

EMC Test Report

Application for Grant of Equipment Authorization

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

Model: XR2000H

IC CERTIFICATION #: 5428A-XR2425H
FCC ID: SK6-XR2425H

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

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REVISION HISTORY

Rev#	Date	Comments	Modified By
-	January 21, 2014	First release	
1	February 18, 2014	Revised to have a single maximum power for all antenna types.	David Bare

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SCOPE

An electromagnetic emissions test has been performed on the Xirrus, Inc. model XR2000H, 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

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 National Technical Systems - Silicon Valley test procedures:

ANSI C63.10-2009

FCC General UNII Test Procedures KDB789033

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 XR2000H 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 XR2000H and therefore apply only to the tested sample. The sample was selected and prepared by Peter Krebill of Xirrus, Inc.

DEVIATIONS FROM THE STANDARDS

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

TEST RESULTS SUMMARY**UNII / LELAN DEVICES****Operation in the 5.25 – 5.35 GHz Band**

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

FCC Rule Part	RSS Rule Part	Description	Measured Value / Comments	Limit / Requirement	Result (margin)
15.407(a) (2)		26dB Bandwidth	> 20MHz for all modes	N/A – limits output power if < 20MHz	N/A
15.407(a) (2)	A9.2(2)	Output Power	802.11a: 20.4 mW n20: 19.9 mW n40: 4.3 mW (Max eirp: 28.2 dBm (656.3 mW))	24 dBm / 250mW (eirp < 30dBm)	Complies
15.407(a) (2)	-	Maximum Power Spectral Density	a: 3.0 dBm/MHz n20: 2.5 dBm/MHz n40: -2.0 dBm/MHz	5.8 dBm/MHz	Complies
-	A9.2(2) / A9.5 (2)			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	Result (margin)
15.407(a) (2)		26dB Bandwidth	> 20MHz for all modes	N/A – limits output power if < 20MHz	N/A
15.407(a) (2)	A9.2(2)	Output Power	802.11a: 20.3 mW n20: 20.5 mW n40: 20.1 mW (Max eirp: 24.2 dBm (264 mW))	24 dBm / 250mW (eirp < 30dBm)	Complies
15.407(a) (2)		Power Spectral Density (Dipole)	a: 1.6 dBm/MHz n20: 1.3 dBm/MHz n40: -1.5 dBm/MHz	5.8 dBm/MHz	Complies
	A9.2(2) / A9.5 (2)			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

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	OFDM Digital Modulation is used	Digital modulation is required	Complies
15.407(b) (5) / 15.209	A9.3	Spurious Emissions below 1GHz	51.8 dB μ V/m @ 997.71 MHz (-2.2 dB)	Refer to page 22	Complies
15.407(b) (5) / 15.209	A9.3	Spurious Emissions above 1GHz	53.9 dB μ V/m @ 2483.6 MHz (-0.1 dB)		Complies
15.407(a)(6)	-	Peak Excursion Ratio	9.5dB	< 13dB	Complies
	A9.5 (3)	Channel Selection	Spurious emissions tested at outermost channels in each band	Device was tested on the top, bottom and center channels in each band	N/A
15			Measurements on three channels in each band if available		
15.407 (c)	A9.5(4)	Operation in the absence of information to transmit	Operation is discontinued in the absence of information (see Operational Description page 6)	Device shall automatically discontinue operation in the absence of information to transmit	Complies
15.407 (g)	A9.5 (5)	Frequency Stability	Frequency stability is better than 5ppm (Operational Description page 5)	Signal shall remain within the allocated band	Complies
15.407 (h1)	A9.4	Transmit Power Control	TCP mechanism is discussed in the Operational Description page 6	The U-NII device shall have the capability to operate with a mean EIRP value lower than 24dBm (250mW)	Complies
15.407 (h2)	A9.4	Dynamic frequency Selection (device with radar detection)	Refer to separate test report, reference R93627	Threshold -62dBm (-64dBm if eirp > 200mW) Channel Availability Check > 60s Channel closing transmission time < 260ms Channel move time < 10s Non occupancy period > 30minutes	Complies
	A9.9g	User Manual information	Refer to Quick Install Guide	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	Reverse TNC connector	Unique or integral antenna required	Complies
15.207	RSS GEN Table 2	AC Conducted Emissions	56.1 dB μ V @ 0.286 MHz (-4.5 dB)	Refer to page 19	Complies
15.247 (b) (5) 15.407 (f)	RSS 102	RF Exposure Requirements	Refer to MPE calculations in Exhibit 11, RSS 102 declaration and User Manual statements.	Refer to OET 65, FCC Part 1 and RSS 102	Complies
-	RSP 100 RSS GEN 7.1.5	User Manual	Refer to Quick Install Guide	Statement required regarding non-interference	Complies
-	RSP 100 RSS GEN 7.1.5	User Manual	Refer to Quick Install Guide	Statement for products with detachable antenna	Complies
-	RSP 100 RSS GEN 4.4.1	99% Bandwidth	a: 17.04 MHz n20: 18.3 MHz n40: 36.7 MHz	Information only	N/A

MEASUREMENT UNCERTAINTIES

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

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

EQUIPMENT UNDER TEST (EUT) DETAILS**GENERAL**

The Xirrus, Inc. model XR2000H is an 802.11agbn access point that is designed for outdoor usage. It uses four 2x2 radio modules that can operate in either 2.4GHz or 5GHz bands. The 2x2 modules are identical to those previously certified as modules without the integral antenna. The EUT is powered via POE.

The sample was received on September 16, 2013 and tested on September 16, 17, 18, 19, 20, 21, 24, 28 and 30 and October 1, 2, 3, 4, 6, 7 and 8, 2013. The EUT consisted of the following component(s):

Company	Model	Description	Serial Number	FCC ID
Xirrus	XR2000H	Outdoor Access Point	00:0F:7D:20:0C:7D	SK6-XR2425H
Xirrus	XR2000H	Outdoor Access Point	00:0F:7D:20:0C:A1	SK6-XR2425H

ANTENNA SYSTEM

There are four antenna options:

Air802 Model ANRD245X05-RTP Dipole (2.4 GHz and 5 GHz), 5 dBi.

Laird Technologies Model RD2458-5-RTNC, 3dBi (2.4 GHz), 5dBi (5 GHz)

Eahison Communication Co., Ltd, model EHS1GA202A, four element (two vertical (2.4 GHz and 5 GHz) / two horizontal (2.4 GHz and 5 GHz), 14dBi.

Eahison Communication Co., Ltd, model EHS1GA047A, four element (two vertical (2.4 GHz and 5 GHz) / two horizontal (2.4 GHz and 5 GHz), 8dBi.

Note - the Eahison antennas will be used with RF cabling. Minimum cable loss is 1.9dB for 2.4 GHz, and 2.8 dB for 5.3 GHz, 2.9 dB for 5.6 GHz and 3 dB for 5.8 GHz.

The antenna connects to the EUT via a non-standard reverse polarity TNC antenna connector, thereby meeting the requirements of FCC 15.203.

ENCLOSURE

The EUT enclosure is primarily constructed of metal. It measures approximately 29 cm wide by 8.5 cm deep by 30 cm high.

MODIFICATIONS

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

SUPPORT EQUIPMENT

No local support equipment was used during testing.

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

Company	Model	Description	Serial Number	FCC ID
Xirrus	XP1-75-MSI	POE Adapter	P24100476C1	-
HP	Compaq 8510p	Laptop	CNU8372SGZ	-

EUT INTERFACE PORTS

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

Port	Connected To	Cable(s)		
		Description	Shielded or Unshielded	Length(m)
GigE POE	POE Adapter	Cat 5	Unshielded	15
Antenna	Panel Antenna	LMR-195 Coaxial	Shielded	3
POE Ethernet	Laptop	Cat 5	Unshielded	1

EUT OPERATION

During emissions testing the EUT was command to transmit continuously on all four radios at the selected powers and frequencies.

TEST SITE**GENERAL INFORMATION**

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

Site	Registration Numbers		Location
	FCC	Canada	
Chamber 3	769238	2845B-3	41039 Boyce Road Fremont, CA 94538-2435
Chamber 4	211948	2845B-4	
Chamber 5	211948	2845B-5	
Chamber 7	A2LA accreditation	2845B-7	

ANSI C63.4 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.

CONDUCTED EMISSIONS CONSIDERATIONS

Conducted emissions testing is performed in conformance with ANSI C63.10. 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 guidelines and meet the Normalized Site Attenuation (NSA) requirements of ANSI C63.4.

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 C63.10 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 as specified in ANSI C63.4. 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 C63.10, and the worst-case orientation is used for final measurements.

CONDUCTED EMISSIONS

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

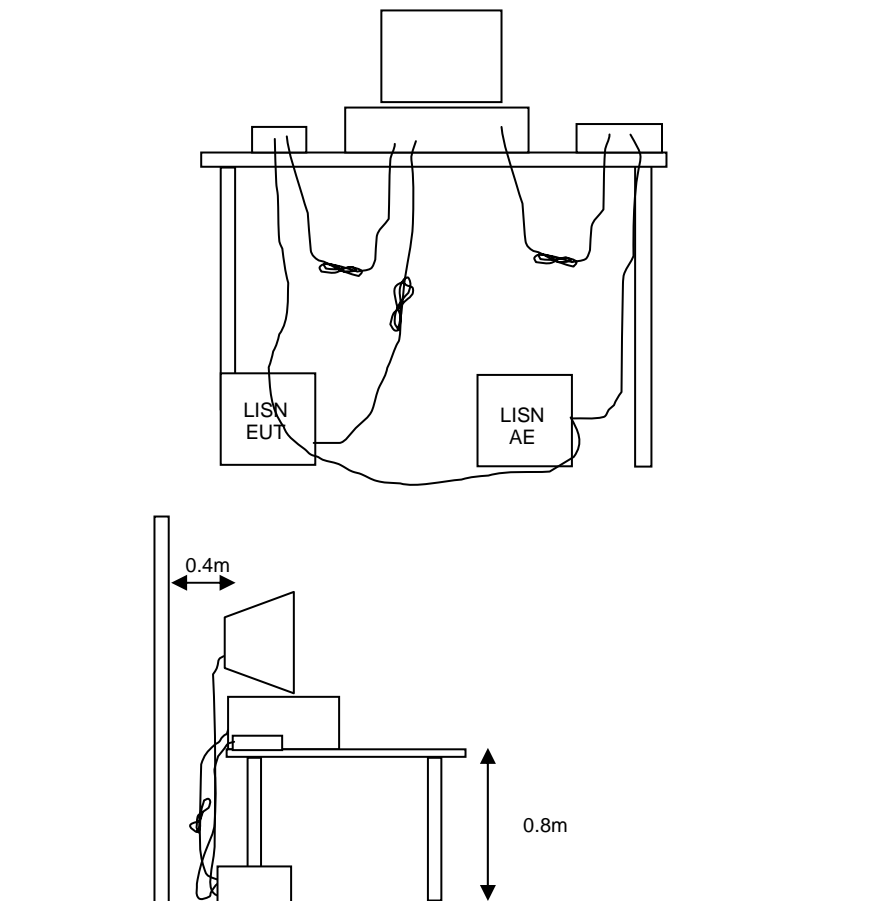


Figure 1 Typical Conducted Emissions Test Configuration

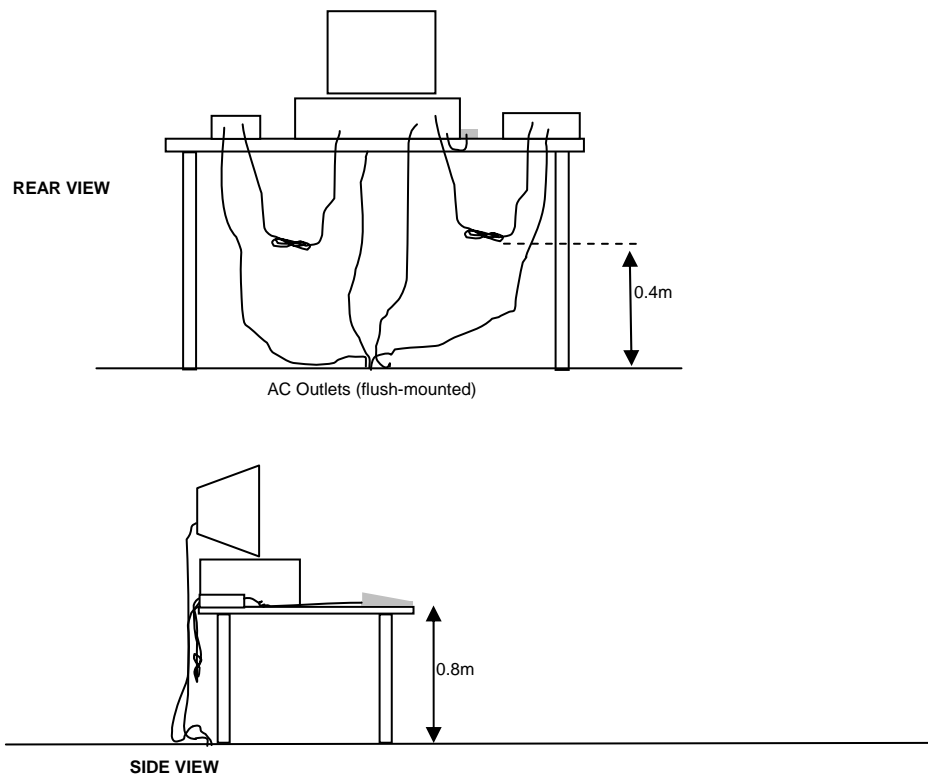
RADIATED EMISSIONS

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

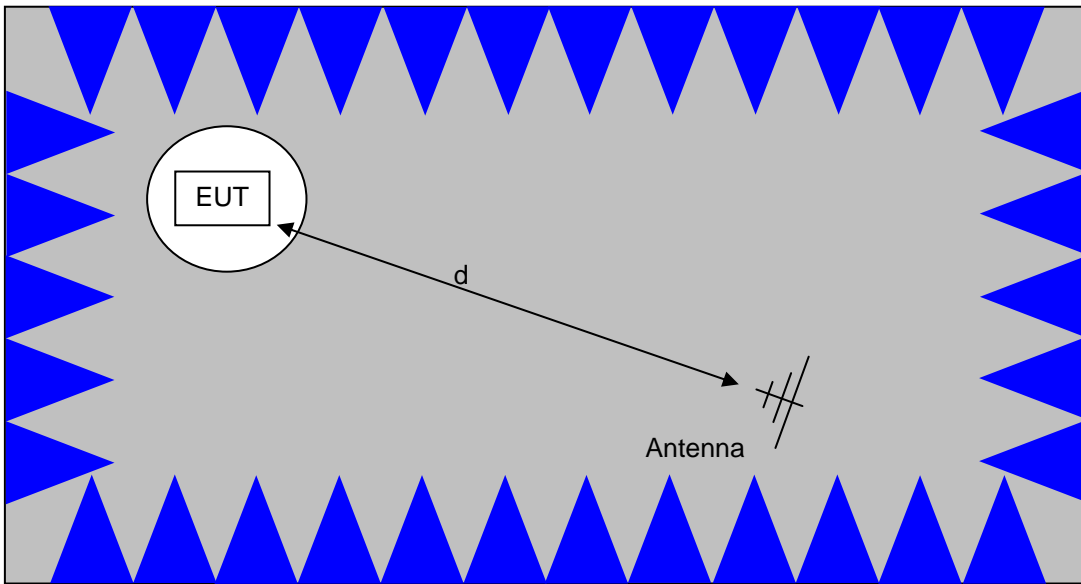
A speaker is provided in the receiver to aid in discriminating between EUT and ambient emissions. Other methods used during the preliminary scan for EUT emissions involve scanning with near field magnetic loops, monitoring I/O cables with RF current clamps, and cycling power to the EUT.

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

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

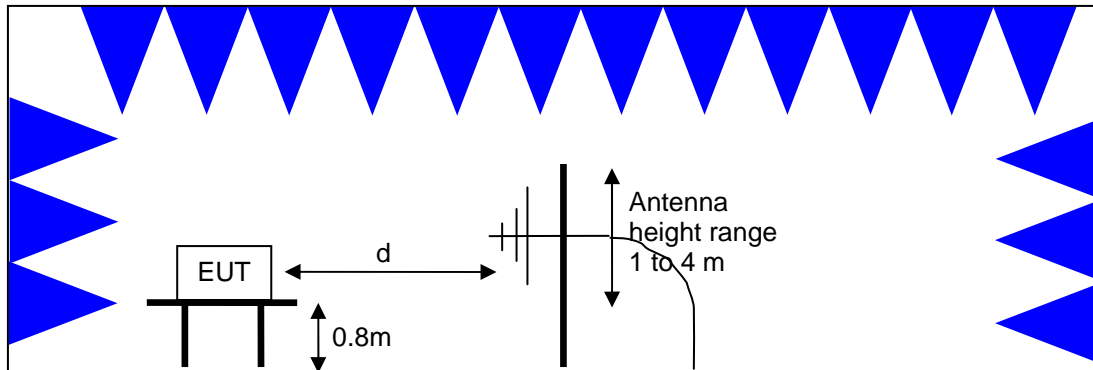


Typical Test Configuration for Radiated Field Strength Measurements



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

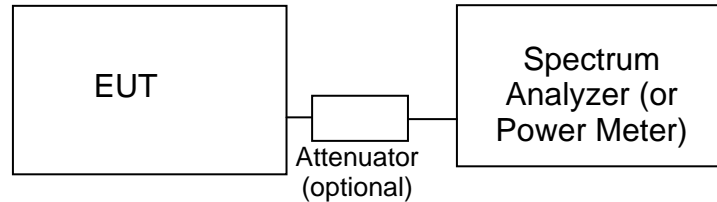
Floor-standing equipment is placed on the floor with insulating supports between the unit and the ground plane.



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

CONDUCTED EMISSIONS FROM ANTENNA PORT

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

**Test Configuration for Antenna Port Measurements**

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

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

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

BANDWIDTH MEASUREMENTS

The 6dB, 20dB, 26dB and/or 99% signal bandwidth are measured using the bandwidths recommended by ANSI C63.10 and 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 bands¹ (with the exception of transmitters operating under FCC Part 15 Subpart D and RSS 210 Annex 9), the limits for all emissions from a low power device operating under the general rules of RSS 310 (tables 3 and 4), RSS 210 (table 2) and FCC Part 15 Subpart C section 15.209.

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

RECEIVER RADIATED SPURIOUS EMISSIONS SPECIFICATION LIMITS

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

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

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

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) ² 1W (30dBm) eirp	11 dBm/MHz
5470 – 5725	250 mW (24 dBm) ³ 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 $10\log(\text{EBW})$ 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.

² If EIRP exceeds 500mW the device must employ TPC

³ 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. 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:

$$R_T - S = M$$

where:

R_T = Receiver Reading in dBuV

S = Specification Limit in dBuV

M = Margin to Specification in +/- dB

SAMPLE CALCULATIONS - RADIATED EMISSIONS

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

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

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

where:

F_d = Distance Factor in dB

D_m = Measurement Distance in meters

D_s = Specification Distance in meters

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

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

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

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

$$R_c = R_r + F_d$$

and

$$M = R_c - L_s$$

where:

R_r = 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

<u>Manufacturer</u>	<u>Description</u>	<u>Model</u>	<u>Asset #</u>	<u>Cal Due</u>
Radiated Emissions, 1000 - 6,000 MHz, 16-Sep-13				
EMCO	Antenna, Horn, 1-18 GHz	3115	1561	7/12/2014
Rohde & Schwarz	EMI Test Receiver, 20 Hz-40 GHz	ESIB40 (1088.7490.40)	2493	1/18/2014
Radiated Emissions, 1000 - 18,000 MHz, 17-Sep-13				
EMCO	Antenna, Horn, 1-18 GHz	3115	1561	7/12/2014
Micro-Tronics	Band Reject Filter, 5725-5875 MHz	BRC50705-02	1682	3/13/2014
Hewlett Packard	Microwave Preamplifier, 1-26.5GHz	8449B	2199	2/19/2014
Micro-Tronics	Band Reject Filter, 2400-2500 MHz	BRM50702-02	2249	10/11/2013
Hewlett Packard	SpecAn 9 kHz - 40 GHz, (SA40) Purple	8564E (84125C)	2415	8/24/2014
Radiated Emissions, 1000 - 18,000 MHz, 18-Sep-13				
EMCO	Antenna, Horn, 1-18 GHz	3115	1561	7/12/2014
Micro-Tronics	Band Reject Filter, 5725-5875 MHz	BRC50705-02	1682	3/13/2014
Hewlett Packard	High Pass filter, 8.2 GHz (Purple System)	P/N 84300-80039	1767	12/5/2013
Hewlett Packard	Microwave Preamplifier, 1-26.5GHz	8449B	2199	2/19/2014
Micro-Tronics	Band Reject Filter, 5150-5350 MHz	BRC50703-02	2239	10/4/2013
Micro-Tronics	Band Reject Filter, 2400-2500 MHz	BRM50702-02	2249	10/11/2013
Hewlett Packard	SpecAn 9 kHz - 40 GHz, (SA40) Purple	8564E (84125C)	2415	8/24/2014
Rohde & Schwarz	EMI Test Receiver, 20 Hz-40 GHz	ESIB40 (1088.7490.40)	2493	1/18/2014
Radiated Emissions, 1000 - 18,000 MHz, 19-Sep-13				
EMCO	Antenna, Horn, 1-18 GHz	3115	1561	7/12/2014
Micro-Tronics	Band Reject Filter, 5470-5725 MHz	BRC50704-02	1681	8/20/2014
Micro-Tronics	Band Reject Filter, 5725-5875 MHz	BRC50705-02	1682	3/13/2014
Hewlett Packard	High Pass filter, 8.2 GHz (Purple System)	P/N 84300-80039	1767	12/5/2013
Hewlett Packard	Microwave Preamplifier, 1-26.5GHz	8449B	2199	2/19/2014
Micro-Tronics	Band Reject Filter, 5150-5350 MHz	BRC50703-02	2239	10/4/2013
Hewlett Packard	SpecAn 9 kHz - 40 GHz, (SA40) Purple	8564E (84125C)	2415	8/24/2014
Rohde & Schwarz	EMI Test Receiver, 20 Hz-40 GHz	ESIB40 (1088.7490.40)	2493	1/18/2014
Radiated Emissions, 1000 - 18,000 MHz, 20-Sep-13				
EMCO	Antenna, Horn, 1-18 GHz	3115	1561	7/12/2014
Micro-Tronics	Band Reject Filter, 5470-5725 MHz	BRC50704-02	1681	8/20/2014

<u>Manufacturer</u>	<u>Description</u>	<u>Model</u>	<u>Asset #</u>	<u>Cal Due</u>
Micro-Tronics	Band Reject Filter, 5725-5875 MHz	BRC50705-02	1682	3/13/2014
Hewlett Packard	High Pass filter, 8.2 GHz (Purple System)	P/N 84300-80039	1767	12/5/2013
Hewlett Packard	Microwave Preamplifier, 1-26.5GHz	8449B	2199	2/19/2014
Micro-Tronics	Band Reject Filter, 5150-5350 MHz	BRC50703-02	2239	10/4/2013
Hewlett Packard	SpecAn 9 kHz - 40 GHz, (SA40) Purple	8564E (84125C)	2415	8/24/2014
Rohde & Schwarz	EMI Test Receiver, 20 Hz-40 GHz	ESIB40 (1088.7490.40)	2493	1/18/2014
Radiated Emissions, 1000 - 18,000 MHz, 21-Sep-13				
EMCO	Antenna, Horn, 1-18 GHz	3115	1561	7/12/2014
Micro-Tronics	Band Reject Filter, 5470-5725 MHz	BRC50704-02	1681	8/20/2014
Micro-Tronics	Band Reject Filter, 5725-5875 MHz	BRC50705-02	1682	3/13/2014
Hewlett Packard	High Pass filter, 8.2 GHz (Purple System)	P/N 84300-80039	1767	12/5/2013
Hewlett Packard	Microwave Preamplifier, 1-26.5GHz	8449B	2199	2/19/2014
Micro-Tronics	Band Reject Filter, 5150-5350 MHz	BRC50703-02	2239	10/4/2013
Hewlett Packard	SpecAn 9 kHz - 40 GHz, (SA40) Purple	8564E (84125C)	2415	8/24/2014
Rohde & Schwarz	EMI Test Receiver, 20 Hz-40 GHz	ESIB40 (1088.7490.40)	2493	1/18/2014
Micro-Tronics	Band Reject Filter, 2400-2500 MHz	BRM50702-02	2238	10/4/2013
Radiated Emissions, 1000 - 6,000 MHz, 24-Sep-13				
EMCO	Antenna, Horn, 1-18 GHz	3115	1561	7/12/2014
Rohde & Schwarz	EMI Test Receiver, 20 Hz-40 GHz	ESIB40 (1088.7490.40)	2493	1/18/2014
Radiated Emissions, 1000 - 18,000 MHz, 28-Sep-13				
EMCO	Antenna, Horn, 1-18 GHz	3115	487	7/19/2014
Hewlett Packard	SpecAn 9 kHz - 40 GHz, FT (SA40) Blue	8564E (84125C)	1393	5/9/2014
Micro-Tronics	Band Reject Filter, 5150-5350 MHz	BRC50703-02	1729	8/2/2014
Hewlett Packard	Microwave Preamplifier, 1-26.5GHz	8449B	1780	12/5/2013
Micro-Tronics	Band Reject Filter, 2400-2500 MHz	BRM50702-02	2238	10/4/2013
Micro-Tronics	Band Reject Filter, 5470-5725 MHz	BRC50704-02	2240	10/4/2013
Micro-Tronics	Band Reject Filter, 5725-5875 MHz	BRC50705-02	2241	10/4/2013
Radiated Emissions, 1000 - 40,000 MHz, 30-Sep-13				
EMCO	Antenna, Horn, 1-18 GHz	3115	487	7/19/2014
Hewlett Packard	SpecAn 9 kHz - 40 GHz, FT (SA40) Blue	8564E (84125C)	1393	5/9/2014
Micro-Tronics	Band Reject Filter, 5150-5350 MHz	BRC50703-02	1729	8/2/2014

<u>Manufacturer</u>	<u>Description</u>	<u>Model</u>	<u>Asset #</u>	<u>Cal Due</u>
Hewlett Packard	Microwave Preamplifier, 1-26.5GHz	8449B	1780	12/5/2013
Micro-Tronics	Band Reject Filter, 2400-2500 MHz	BRM50702-02	2238	10/4/2013
Micro-Tronics	Band Reject Filter, 5470-5725 MHz	BRC50704-02	2240	10/4/2013
Micro-Tronics	Band Reject Filter, 5725-5875 MHz	BRC50705-02	2241	10/4/2013
Hewlett Packard	Head (Inc flex cable, (1742,1743) Blue)	84125C	1620	5/15/2014
A. H. Systems	Purple System Horn, 18-40GHz	SAS-574, p/n: 2581	2160	6/28/2014
Micro-Tronics	Band Reject Filter, 2400-2500 MHz	BRM50702-02	2249	10/11/2013
Rohde & Schwarz	EMI Test Receiver, 20 Hz-40 GHz	ESIB40 (1088.7490.40)	2493	1/18/2014
Radiated Emissions, 1000 - 40,000 MHz, 01-Oct-13				
EMCO	Antenna, Horn, 1-18 GHz	3115	487	7/19/2014
Hewlett Packard	SpecAn 9 kHz - 40 GHz, FT (SA40) Blue	8564E (84125C)	1393	5/9/2014
Micro-Tronics	Band Reject Filter, 5150-5350 MHz	BRC50703-02	1729	8/2/2014
Hewlett Packard	Microwave Preamplifier, 1-26.5GHz	8449B	1780	12/5/2013
Micro-Tronics	Band Reject Filter, 2400-2500 MHz	BRM50702-02	2238	10/4/2013
Micro-Tronics	Band Reject Filter, 5470-5725 MHz	BRC50704-02	2240	10/4/2013
Micro-Tronics	Band Reject Filter, 5725-5875 MHz	BRC50705-02	2241	10/4/2013
Hewlett Packard	Head (Inc flex cable, (1742,1743) Blue)	84125C	1620	5/15/2014
A. H. Systems	Purple System Horn, 18-40GHz	SAS-574, p/n: 2581	2160	6/28/2014
Micro-Tronics	Band Reject Filter, 2400-2500 MHz	BRM50702-02	2249	10/11/2013
Rohde & Schwarz	EMI Test Receiver, 20 Hz-40 GHz	ESIB40 (1088.7490.40)	2493	1/18/2014
Radiated Emissions, 1000 - 40,000 MHz, 02-Oct-13				
EMCO	Antenna, Horn, 1-18 GHz	3115	487	7/19/2014
Rohde & Schwarz	EMI Test Receiver, 20 Hz-40 GHz	ESIB40 (1088.7490.40)	2493	1/18/2014
Radiated Emissions, 1 - 40 GHz, 02-Oct-13				
EMCO	Antenna, Horn, 1-18 GHz	3115	487	7/19/2014
Hewlett Packard	High Pass filter, 8.2 GHz (Blu System)	P/N 84300-80039 (84125C)	1392	5/14/2014
Hewlett Packard	SpecAn 9 kHz - 40 GHz, FT (SA40) Blue	8564E (84125C)	1393	5/9/2014
Micro-Tronics	Band Reject Filter, 2400-2500 MHz	BRM50702-02	1683	8/2/2014
Hewlett Packard	Microwave Preamplifier, 1-26.5GHz	8449B	1780	12/5/2013
Micro-Tronics	Band Reject Filter, 5725-5875 MHz	BRC50705-02	2241	9/18/2014
Rohde & Schwarz	EMI Test Receiver, 20 Hz-40 GHz	ESIB40 (1088.7490.40)	2493	1/18/2014

<u>Manufacturer</u>	<u>Description</u>	<u>Model</u>	<u>Asset #</u>	<u>Cal Due</u>
Hewlett Packard	Head (Inc flex cable, (1742,1743) Blue)	84125C	1620	5/15/2014
A. H. Systems	Purple System Horn, 18-40GHz	SAS-574, p/n: 2581	2160	6/28/2014
Micro-Tronics	Band Reject Filter, 2400-2500 MHz	BRM50702-02	2249	10/11/2013
Radiated Emissions, 1 - 40 GHz, 03-Oct-13				
EMCO	Antenna, Horn, 1-18 GHz	3115	487	7/19/2014
Hewlett Packard	High Pass filter, 8.2 GHz (Blu System)	P/N 84300-80039 (84125C)	1392	5/14/2014
Hewlett Packard	SpecAn 9 kHz - 40 GHz, FT (SA40) Blue	8564E (84125C)	1393	5/9/2014
Micro-Tronics	Band Reject Filter, 2400-2500 MHz	BRM50702-02	1683	8/2/2014
Hewlett Packard	Microwave Preamplifier, 1-26.5GHz	8449B	1780	12/5/2013
Micro-Tronics	Band Reject Filter, 5725-5875 MHz	BRC50705-02	2241	9/18/2014
Rohde & Schwarz	EMI Test Receiver, 20 Hz-40 GHz	ESIB40 (1088.7490.40)	2493	1/18/2014
Hewlett Packard	Head (Inc flex cable, (1742,1743) Blue)	84125C	1620	5/15/2014
A. H. Systems	Purple System Horn, 18-40GHz	SAS-574, p/n: 2581	2160	6/28/2014
Micro-Tronics	Band Reject Filter, 2400-2500 MHz	BRM50702-02	2249	10/11/2013
Radiated Emissions, 1000 - 40,000 MHz, 04-Oct-13				
Hewlett Packard	High Pass filter, 8.2 GHz (Blu System)	P/N 84300-80039 (84125C)	1392	5/14/2014
Hewlett Packard	SpecAn 9 kHz - 40 GHz, FT (SA40) Blue	8564E (84125C)	1393	5/9/2014
EMCO	Antenna, Horn, 1-18 GHz	3115	1561	7/12/2014
Hewlett Packard	Head (Inc flex cable, (1742,1743) Blue)	84125C	1620	5/15/2014
Micro-Tronics	Band Reject Filter, 2400-2500 MHz	BRM50702-02	1683	8/2/2014
Micro-Tronics	Band Reject Filter, 5150-5350 MHz	BRC50703-02	1729	8/2/2014
Hewlett Packard	Microwave Preamplifier, 1-26.5GHz	8449B	1780	12/5/2013
A. H. Systems	Purple System Horn, 18-40GHz	SAS-574, p/n: 2581	2160	6/28/2014
Micro-Tronics	Band Reject Filter, 5725-5875 MHz	BRC50705-02	2241	9/18/2014
Radiated Emissions, 30 - 1,000 MHz, 06-Oct-13				
Micro-Tronics	Band Reject Filter, 2400-2500 MHz	BRM50702-02	1683	8/2/2014
Sunol Sciences	Biconilog, 30-3000 MHz	JB3	2197	2/7/2014
Rohde & Schwarz	EMI Test Receiver, 20 Hz-40 GHz	ESIB40 (1088.7490.40)	2493	1/18/2014
Conducted Emissions - AC Power Ports, 06-Oct-13				
Rohde & Schwarz	Pulse Limiter	ESH3 Z2	1594	5/15/2014
Rohde & Schwarz	EMI Test Receiver, 20 Hz-40 GHz	ESIB40 (1088.7490.40)	2493	1/18/2014
Com-Power	9KHz-30MHz, 50uH, 15Aac, 10Adc, max	LI-215A	2671	5/24/2014

<u>Manufacturer</u>	<u>Description</u>	<u>Model</u>	<u>Asset #</u>	<u>Cal Due</u>
Radio Antenna Port (Power), 07-Oct-13				
Narda West	Attenuator, 10 dB, DC-10 GHz, 50W	774-10	641	8/22/2014
Rohde & Schwarz	EMI Test Receiver, 20 Hz-40 GHz	ESIB40 (1088.7490.40)	2493	1/18/2014

Appendix B Test Data

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EMC Test Data

Client:	Xirrus	Job Number:	J93457
Product:	XR2000H	T-Log Number:	T93459
		Project Manager:	Christine Krebill
Contact:	Peter Krebill	Project Coordinator:	-
Emissions Standard(s):	FCC 15.247, 15.407, EN 55022, FCC B	Class:	A
Immunity Standard(s):	-	Environment:	Radio

EMC Test Data

For The

Xirrus

Product

XR2000H

Date of Last Test: 10/11/2013



EMC Test Data

Client: Xirrus	Job Number: J93457
Model: XR2000H	T-Log Number: T93459
	Project Manager: Christine Krebill
Contact: Peter Krebill	Project Coordinator: -
Standard: FCC 15.247, 15.407, EN 55022, FCC B	Class: A

Conducted Emissions

(Elliott Laboratories Fremont Facility, Semi-Anechoic Chamber)

Test Specific Details

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

Date of Test: 10/5/2013	Config. Used: 1
Test Engineer: Rafael Varelas	Config Change: None
Test Location: Fremont Chamber #5	EUT Voltage: 230V/50Hz & 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. Remote support equipment was located outside of the semi-anechoic chamber. Any cables running to remote support equipment were routed through metal conduit and when possible passed through a ferrite clamp upon exiting the chamber.

Ambient Conditions:	Temperature: 20.8 °C
	Rel. Humidity: 37 %

Summary of Results

Run #	Test Performed	Limit	Result	Margin
1	CE, AC Power, 230V/50Hz	Class B	Pass	56.5 dBµV @ 0.272 MHz (-4.6 dB)
2	CE, AC Power, 120V/60Hz	Class B	Pass	56.1 dBµV @ 0.286 MHz (-4.5 dB)

Modifications Made During Testing

No modifications were made to the EUT during testing

Deviations From The Standard

No deviations were made from the requirements of the standard.

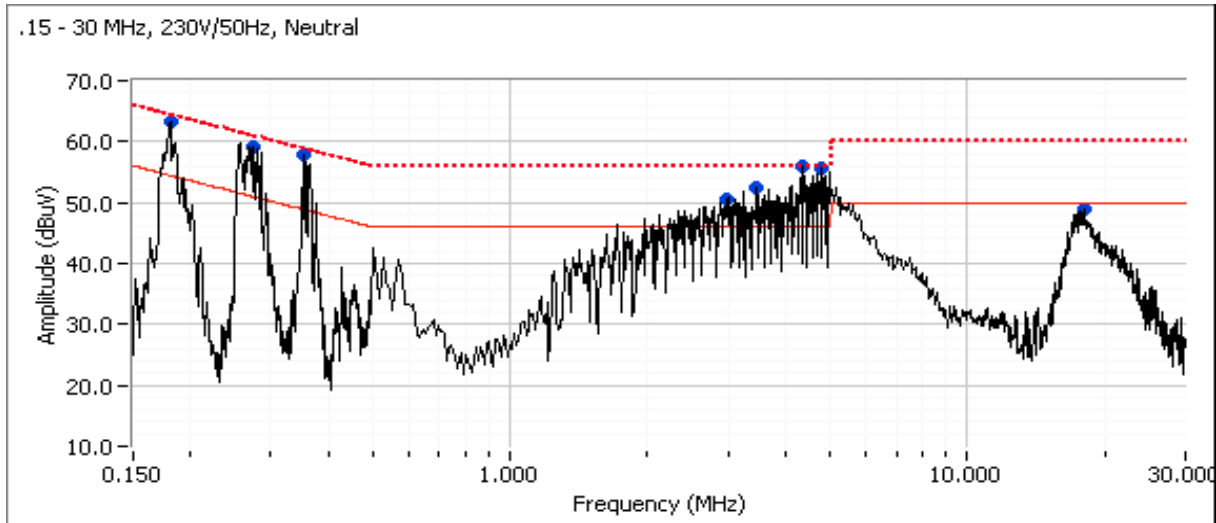
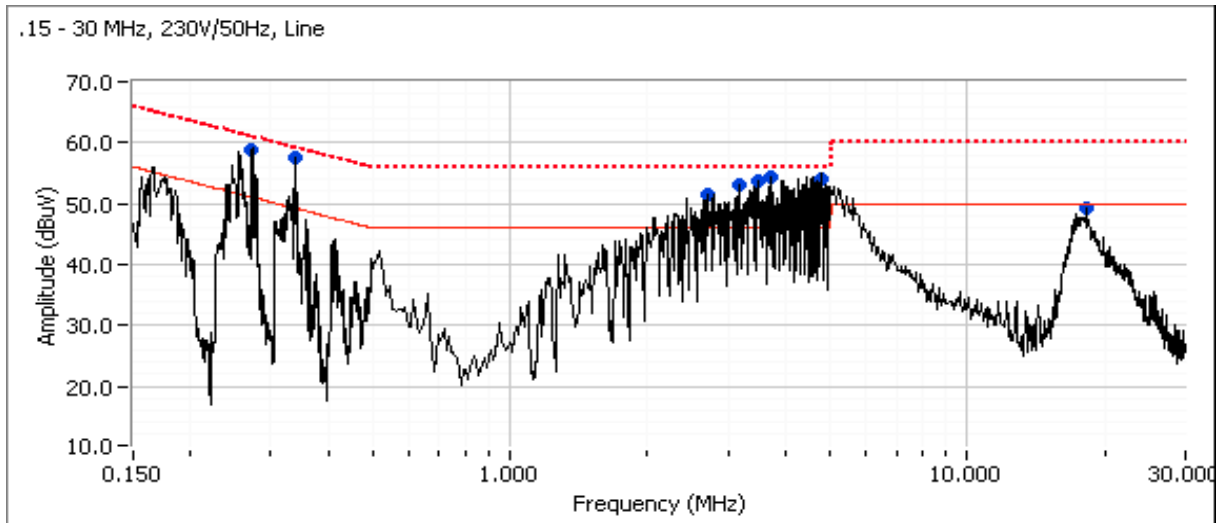


EMC Test Data

Client: Xirrus	Job Number: J93457
Model: XR2000H	T-Log Number: T93459
Contact: Peter Krebill	Project Manager: Christine Krebill
Standard: FCC 15.247, 15.407, EN 55022, FCC B	Project Coordinator: -
	Class: A

Run #1: AC Power Port Conducted Emissions, 0.15 - 30MHz, 230V/50Hz

Radio #	Frequency	CH	Mode	Pwr
6	5280	56	802.11a	34
10	5300	60	802.11a	34
14	5320	64	802.11a	34
2	2437	6	802.11b	34





EMC Test Data

Client: Xirrus	Job Number: J93457
Model: XR2000H	T-Log Number: T93459
	Project Manager: Christine Krebill
Contact: Peter Krebill	Project Coordinator: -
Standard: FCC 15.247, 15.407, EN 55022, FCC B	Class: A

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

Frequency MHz	Level dB μ V	AC Line	Class B		Detector QP/Ave	Comments
			Limit	Margin		
0.272	58.9	Line 1	51.0	7.9	Peak	
0.340	57.4	Line 1	49.2	8.2	Peak	
2.699	51.5	Line 1	46.0	5.5	Peak	
3.186	53.0	Line 1	46.0	7.0	Peak	
3.463	53.8	Line 1	46.0	7.8	Peak	
3.751	54.4	Line 1	46.0	8.4	Peak	
4.784	54.0	Line 1	46.0	8.0	Peak	
18.244	49.1	Line 1	50.0	-0.9	Peak	
0.181	63.4	Neutral	54.4	9.0	Peak	
0.273	59.3	Neutral	51.0	8.3	Peak	
0.356	58.0	Neutral	48.8	9.2	Peak	
2.980	50.6	Neutral	46.0	4.6	Peak	
3.449	52.4	Neutral	46.0	6.4	Peak	
4.351	55.9	Neutral	46.0	9.9	Peak	
4.784	55.5	Neutral	46.0	9.5	Peak	
18.026	48.9	Neutral	50.0	-1.1	Peak	



EMC Test Data

Client: Xirrus	Job Number: J93457
Model: XR2000H	T-Log Number: T93459
	Project Manager: Christine Krebill
Contact: Peter Krebill	Project Coordinator: -
Standard: FCC 15.247, 15.407, EN 55022, FCC B	Class: A

Final quasi-peak and average readings

Frequency MHz	Level dB μ V	AC Line	Class B		Detector QP/Ave	Comments
			Limit	Margin		
0.272	56.5	Line 1	61.1	-4.6	QP	QP (1.00s)
0.275	55.9	Neutral	61.0	-5.1	QP	QP (1.00s)
0.354	53.5	Neutral	58.9	-5.4	QP	QP (1.00s)
0.340	53.4	Line 1	59.2	-5.8	QP	QP (1.00s)
0.182	58.4	Neutral	64.4	-6.0	QP	QP (1.00s)
4.784	49.5	Line 1	56.0	-6.5	QP	QP (1.00s)
4.777	49.3	Neutral	56.0	-6.7	QP	QP (1.00s)
4.358	48.3	Neutral	56.0	-7.7	QP	QP (1.00s)
3.751	47.9	Line 1	56.0	-8.1	QP	QP (1.00s)
3.463	47.3	Line 1	56.0	-8.7	QP	QP (1.00s)
3.186	47.2	Line 1	56.0	-8.8	QP	QP (1.00s)
3.473	46.5	Neutral	56.0	-9.5	QP	QP (1.00s)
0.275	41.1	Neutral	51.0	-9.9	AVG	AVG (0.10s)
0.272	41.0	Line 1	51.1	-10.1	AVG	AVG (0.10s)
0.340	38.9	Line 1	49.2	-10.3	AVG	AVG (0.10s)
2.699	45.7	Line 1	56.0	-10.3	QP	QP (1.00s)
2.974	45.7	Neutral	56.0	-10.3	QP	QP (1.00s)
18.244	39.4	Line 1	50.0	-10.6	AVG	AVG (0.10s)
0.182	43.6	Neutral	54.4	-10.8	AVG	AVG (0.10s)
17.941	39.1	Neutral	50.0	-10.9	AVG	AVG (0.10s)
4.784	35.0	Line 1	46.0	-11.0	AVG	AVG (0.10s)
4.777	35.0	Neutral	46.0	-11.0	AVG	AVG (0.10s)
4.358	34.8	Neutral	46.0	-11.2	AVG	AVG (0.10s)
0.354	37.4	Neutral	48.9	-11.5	AVG	AVG (0.10s)
3.463	34.4	Line 1	46.0	-11.6	AVG	AVG (0.10s)
3.751	34.4	Line 1	46.0	-11.6	AVG	AVG (0.10s)
3.186	33.9	Line 1	46.0	-12.1	AVG	AVG (0.10s)
3.473	32.9	Neutral	46.0	-13.1	AVG	AVG (0.10s)
18.244	45.4	Line 1	60.0	-14.6	QP	QP (1.00s)
2.699	31.1	Line 1	46.0	-14.9	AVG	AVG (0.10s)
17.941	45.0	Neutral	60.0	-15.0	QP	QP (1.00s)
2.974	30.8	Neutral	46.0	-15.2	AVG	AVG (0.10s)

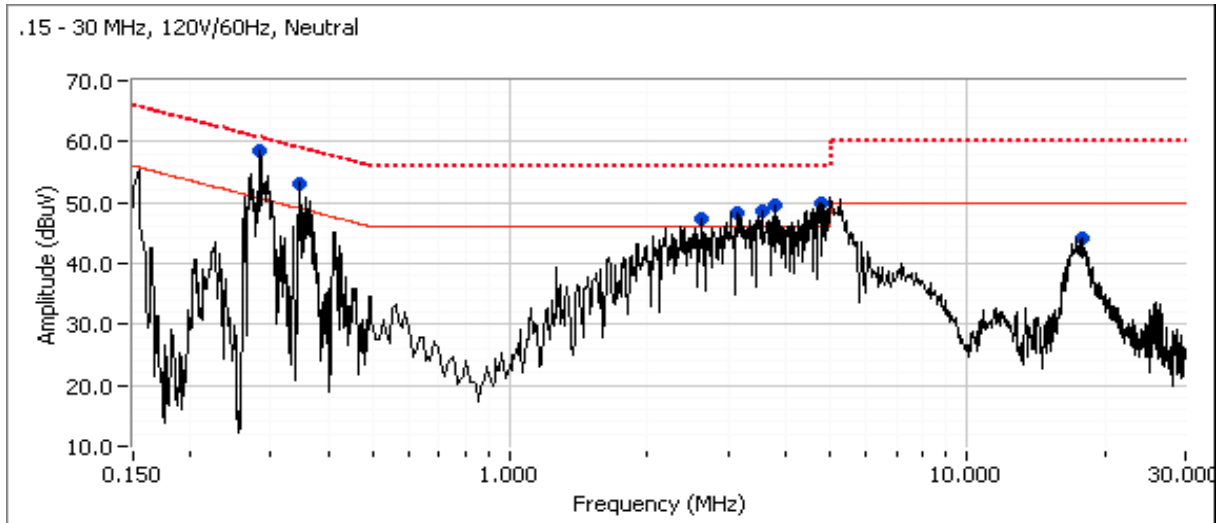
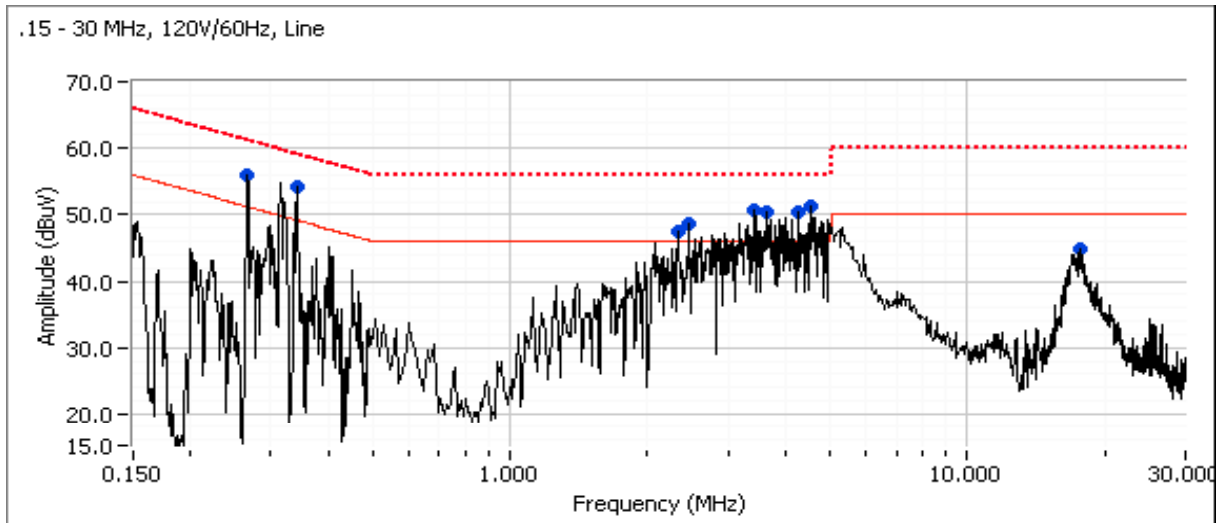


EMC Test Data

Client: Xirrus	Job Number: J93457
Model: XR2000H	T-Log Number: T93459
Contact: Peter Krebill	Project Manager: Christine Krebill
Standard: FCC 15.247, 15.407, EN 55022, FCC B	Project Coordinator: -
	Class: A

Run #2: AC Power Port Conducted Emissions, 0.15 - 30MHz, 120V/60Hz

Radio #	Frequency	CH	Mode	Pwr
6	5280	56	802.11a	34
10	5300	60	802.11a	34
14	5320	64	802.11a	34
2	2437	6	802.11b	34





EMC Test Data

Client: Xirrus	Job Number: J93457
Model: XR2000H	T-Log Number: T93459
	Project Manager: Christine Krebill
Contact: Peter Krebill	Project Coordinator: -
Standard: FCC 15.247, 15.407, EN 55022, FCC B	Class: A

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

Frequency MHz	Level dB μ V	AC Line	Class B		Detector QP/Ave	Comments
			Limit	Margin		
0.267	56.0	Line 1	51.2	4.8	Peak	
0.344	54.1	Line 1	49.1	5.0	Peak	
2.324	47.5	Line 1	46.0	1.5	Peak	
2.467	48.5	Line 1	46.0	2.5	Peak	
3.448	50.6	Line 1	46.0	4.6	Peak	
3.659	50.3	Line 1	46.0	4.3	Peak	
4.283	50.4	Line 1	46.0	4.4	Peak	
4.528	51.2	Line 1	46.0	5.2	Peak	
17.695	44.8	Line 1	50.0	-5.2	Peak	
0.286	58.4	Neutral	50.7	7.7	Peak	
0.348	53.2	Neutral	49.1	4.1	Peak	
2.616	47.4	Neutral	46.0	1.4	Peak	
3.127	48.4	Neutral	46.0	2.4	Peak	
3.570	48.6	Neutral	46.0	2.6	Peak	
3.792	49.6	Neutral	46.0	3.6	Peak	
4.839	49.9	Neutral	46.0	3.9	Peak	
17.694	44.2	Neutral	50.0	-5.8	Peak	



EMC Test Data

Client: Xirrus	Job Number: J93457
Model: XR2000H	T-Log Number: T93459
	Project Manager: Christine Krebill
Contact: Peter Krebill	Project Coordinator: -
Standard: FCC 15.247, 15.407, EN 55022, FCC B	Class: A

Final quasi-peak and average readings

Frequency MHz	Level dB μ V	AC Line	Class B		Detector QP/Ave	Comments
			Limit	Margin		
0.286	56.1	Neutral	60.6	-4.5	QP	QP (1.00s)
0.267	51.9	Line 1	61.2	-9.3	QP	QP (1.00s)
4.839	45.8	Neutral	56.0	-10.2	QP	QP (1.00s)
0.286	39.5	Neutral	50.6	-11.1	AVG	AVG (0.10s)
0.344	47.7	Line 1	59.1	-11.4	QP	QP (1.00s)
4.528	44.1	Line 1	56.0	-11.9	QP	QP (1.00s)
0.348	46.8	Neutral	59.0	-12.2	QP	QP (1.00s)
17.694	37.6	Neutral	50.0	-12.4	AVG	AVG (0.10s)
17.695	37.5	Line 1	50.0	-12.5	AVG	AVG (0.10s)
4.283	43.4	Line 1	56.0	-12.6	QP	QP (1.00s)
3.659	43.3	Line 1	56.0	-12.7	QP	QP (1.00s)
3.448	43.2	Line 1	56.0	-12.8	QP	QP (1.00s)
3.127	42.9	Neutral	56.0	-13.1	QP	QP (1.00s)
3.659	32.7	Line 1	46.0	-13.3	AVG	AVG (0.10s)
3.570	42.6	Neutral	56.0	-13.4	QP	QP (1.00s)
3.792	42.6	Neutral	56.0	-13.4	QP	QP (1.00s)
4.839	32.3	Neutral	46.0	-13.7	AVG	AVG (0.10s)
3.448	32.1	Line 1	46.0	-13.9	AVG	AVG (0.10s)
2.616	41.7	Neutral	56.0	-14.3	QP	QP (1.00s)
4.283	31.6	Line 1	46.0	-14.4	AVG	AVG (0.10s)
4.528	31.6	Line 1	46.0	-14.4	AVG	AVG (0.10s)
3.792	31.6	Neutral	46.0	-14.4	AVG	AVG (0.10s)
3.570	31.1	Neutral	46.0	-14.9	AVG	AVG (0.10s)
2.467	41.1	Line 1	56.0	-14.9	QP	QP (1.00s)
2.324	40.7	Line 1	56.0	-15.3	QP	QP (1.00s)
17.695	43.5	Line 1	60.0	-16.5	QP	QP (1.00s)
3.127	29.3	Neutral	46.0	-16.7	AVG	AVG (0.10s)
17.694	43.3	Neutral	60.0	-16.7	QP	QP (1.00s)
0.267	33.1	Line 1	51.2	-18.1	AVG	AVG (0.10s)
2.616	26.8	Neutral	46.0	-19.2	AVG	AVG (0.10s)
2.467	26.6	Line 1	46.0	-19.4	AVG	AVG (0.10s)
2.324	25.7	Line 1	46.0	-20.3	AVG	AVG (0.10s)
0.348	27.8	Neutral	49.0	-21.2	AVG	AVG (0.10s)
0.344	27.2	Line 1	49.1	-21.9	AVG	AVG (0.10s)

Client: Xirrus	Job Number: J93457
Model: XR2000H	T-Log Number: T93459
	Project Manager: Christine Krebill
Contact: Peter Krebill	Project Coordinator: -
Standard: FCC 15.247, 15.407, EN 55022, FCC B	Class: A

Test Configuration Photograph #1
(Conducted Emissions - Power Port)



Client: Xirrus	Job Number: J93457
Model: XR2000H	T-Log Number: T93459
	Project Manager: Christine Krebill
Contact: Peter Krebill	Project Coordinator: -
Standard: FCC 15.247, 15.407, EN 55022, FCC B	Class: A

Test Configuration Photograph #2
(Conducted Emissions - Power Port)





EMC Test Data

Client:	Xirrus	Job Number:	J93457
Model:	XR2000H	T-Log Number:	T93459
Contact:	Peter Krebill	Project Manager:	Christine Krebill
Standard:	FCC 15.247, 15.407, EN 55022, FCC B	Project Coordinator:	-
		Class:	N/A

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

Test Specific Details

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

Summary of Results

Run #	Test Performed	Limit	Pass / Fail	Result / Margin
1	Power, 5250 - 5350MHz	15.407(a) (1), (2)	Pass	a: 20.4 mW n20: 19.9 mW n40: 4.3 mW
1	PSD, 5250 - 5350MHz	15.407(a) (1), (2)	Pass	a: 1.1 dBm/MHz n20: 1.2 dBm/MHz n40: -9.0 dBm/MHz
1	Max EIRP 5250 - 5350MHz	TPC required if EIRP ≥ 500mW (27dBm). EIRP ≥ 200mW (23dBm) DFS threshold = -64dBm.	Pass	EIRP = 28.2 dBm (656.3 mW)
1	Power, 5470 - 5725MHz	15.407(a) (1), (2)	Pass	a: 20.3 mW n20: 20.5 mW n40: 20.1 mW
1	PSD, 5470 - 5725MHz	15.407(a) (1), (2)	Pass	a: 0.6 dBm/MHz n20: 0.3 dBm/MHz n40: -2.6 dBm/MHz
1	Max EIRP 5470 - 5725MHz	TPC required if EIRP ≥ 500mW (27dBm). EIRP ≥ 200mW (23dBm) DFS threshold		EIRP = 24.2 dBm (264 mW)
1	26dB Bandwidth	15.407 (Information only)	-	> 20MHz for all modes
1	99% Bandwidth	RSS 210 (Information only)	N/A	a: 17.0 MHz n20: 18.2 MHz n40: 36.7 MHz



EMC Test Data

Client: Xirrus	Job Number: J93457
Model: XR2000H	T-Log Number: T93459
Contact: Peter Krebill	Project Manager: Christine Krebill
Standard: FCC 15.247, 15.407, EN 55022, FCC B	Project Coordinator: -
	Class: N/A

Run #	Test Performed	Limit	Pass / Fail	Result / Margin
2	Peak Excursion Envelope	15.407(a) (6) 13dB	Pass	9.5 dB
3	Antenna Conducted - Band Edge Spurious	15.215 (c)	Pass	Refer to results with Dipole antenna

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: 20.6 °C
Rel. Humidity: 38 %

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.

Procedure Comments:

Measurements performed in accordance with FCC KDB 789033 D01 v01r03, dated April 8, 2013

Mode	Data Rate	Duty Cycle (x)	Constant DC?	T (ms)	Pwr Cor Factor*	Lin Volt Cor Factor**	Min VBW for FS (Hz)
11a	6	0.96	Yes	1.35	0.2	0.3	741
n20	6.5	0.97	Yes	1.27	0.1	0.3	787
n40	13.5	0.90	Yes	0.6	0.5	1.0	1667

Sample Notes

Sample S/N: 20:0C:7D



EMC Test Data

Client: Xirrus	Job Number: J93457
Model: XR2000H	T-Log Number: T93459
	Project Manager: Christine Krebill
Contact: Peter Krebill	Project Coordinator: -
Standard: FCC 15.247, 15.407, EN 55022, FCC B	Class: N/A

Antenna Gain Information

Freq	Antenna Gain (dBi) / Chain				BF	MultiChain Legacy	CDD	Sectorized / Xpol	Dir G (PWR)	Dir G (PSD)
	1	2	3	4						
5250-5350	11.2	11.2			No	Yes	Yes	Yes	11.2	11.2
5470-5725	11.1	11.1			No	Yes	Yes	Yes	11.1	11.1

For devices that support CDD modes

Min # of spatial streams: 1
 Max # of spatial streams: 2

Notes: BF = beamforming mode supported, Multichain Legacy = 802.11 legacy data rates supported for multichain transmissions, CDD = Cyclic Delay Diversity (or Cyclic Shift Diversity) modes supported, Sectorized / Xpol = antennas are sectorized or cross polarized.

Notes: Dir G (PWR) = total gain (Gant + Array Gain) for power calculations; GA (PSD) = total gain for PSD calculations based on FCC KDB 662911. Depending on the modes supported, the Array Gain value for power could be different from the PSD value.

Notes: Array gain for power/psd calculated per KDB 662911 D01, v01r02. Spatial Multiplexing with Nant=2, Nss=1, for worse case condition. Array gain = 10*log(4/2) = 0dB as antenna is cross polarized.

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

Date of Test: 10/7/2013 0:00	Config. Used: 1
Test Engineer: David Bare / R. Varelas	Config Change: None
Test Location: Fremont Chamber #5	EUT Voltage: POE

Note 1: Output power measured using a spectrum analyzer (see plots below). RBW=1MHz, VB=3 MHz, # of points in sweep ≥ 2*span/RBW, RMS detector, trace average 100 traces, power averaging on (transmitted signal was not continuous) and power integration over 30/60 MHz. As the duty cycle is <98%, the measurements were adjusted by adding YY. This is based on 10log(1/x), where x is the duty cycle. (method SA-2 of KDB 789033)

Note 2: Measured using the same analyzer settings used for output power.

Note 3: 99% Bandwidth measured in accordance with RSS GEN - RB > 1% of span and VB ≥ 3xRB

Note 4: For MIMO systems the total output power and total PSD are calculated from the sum of the powers of the individual chains (in linear terms). The antenna gain used to determine the EIRP and limits for PSD/Output power depends on the operating mode of the MIMO device. If the signals are non-coherent between the transmit chains then the gain used to determine the limits is the highest gain of the individual chains and the EIRP is the sum of the products of gain and power on each chain. If the signals are coherent then the effective antenna gain is the sum (in linear terms) of the gains for each chain and the EIRP is the product of the effective gain and total power.



EMC Test Data

Client: Xirrus	Job Number: J93457
Model: XR2000H	T-Log Number: T93459
Contact: Peter Krebill	Project Manager: Christine Krebill
Standard: FCC 15.247, 15.407, EN 55022, FCC B	Project Coordinator: -
	Class: N/A

MIMO Device - 5250-5350 MHz Band - FCC

Mode: 11a

Max EIRP (mW): 656.3

Frequency (MHz)	Chain	Software Setting	26dB BW (MHz)	Duty Cycle %	Power dBm	Total Power ¹		FCC Limit dBm	Max Power (W)	Result
						mW	dBm			
5280	1	26	24.05	96	6.8	10.0	10.0	18.8	0.020	
	2				6.8					
5300	1	31	24.95	96	10.2	19.4	12.9	18.8		
	2				9.1					
5320	1	31	24.65	96	10.0	20.4	13.1	18.8		
	2				9.8					
Total Power in Band (3 20 MHz channels)								18.8	0.050	Pass

17.0 dBm

MIMO Device - 5250-5350 MHz Band - Industry Canada

Mode: 11a

Max EIRP (mW): 656.3

Frequency (MHz)	Chain	Software Setting	99% BW (MHz)	Duty Cycle %	Power ¹ dBm	Total Power		IC limit dBm	Max Power (W)	Result
						mW	dBm			
5280	1	26	16.98	96	6.8	10.0	10.0	18.1	0.020	
	2				6.8					
5300	1	31	16.98	96	10.2	19.4	12.9	18.1		
	2				9.1					
5320	1	31	16.98	96	10.0	20.4	13.1	18.1		
	2				9.8					
Total Power in Band (3 20 MHz channels)								18.1	0.050	Pass

17.0 dBm

5250-5350 PSD - FCC/IC

No overlapping channels in the same band

Mode: 11a

Frequency (MHz)	Chain	Software Setting	99% BW (MHz)	Duty Cycle %	PSD dBm/MHz	Total PSD ¹		FCC Limit dBm/MHz	IC Limit dBm/MHz	Result
						mW/MHz	dBm/MHz			
5280	1	26	16.98	96	-5.0	0.6	-2.2	5.8	11.0	Pass
	2				-5.7					
5300	1	31	16.98	96	-1.4	1.3	1.0	5.8	11.0	Pass
	2				-3.2					
5320	1	31	16.98	96	-1.6	1.3	1.1	5.8	11.0	Pass
	2				-2.7					



EMC Test Data

Client: Xirrus	Job Number: J93457
Model: XR2000H	T-Log Number: T93459
Contact: Peter Krebill	Project Manager: Christine Krebill
Standard: FCC 15.247, 15.407, EN 55022, FCC B	Project Coordinator: -
	Class: N/A

MIMO Device - 5250-5350 MHz Band - FCC

Mode: n20

Max EIRP (mW): 652.0

Frequency (MHz)	Chain	Software Setting	26dB BW (MHz)	Duty Cycle %	Power dBm	Total Power ¹		FCC Limit dBm	Max Power (W)	Result
						mW	dBm			
5280	1	26	24.65	97	7.0	10.2	10.1	18.8	0.020	Pass
	2				6.9					
5300	1	31	23.75	97	10.4	19.9	13.0	18.8		
	2				9.2					
5320	1	31	24.349	97	9.6	19.4	12.9	18.8		
	2				9.9					
Total Power in Band (3 20 MHz channels)								18.8	0.049	Pass
										16.9 dBm

MIMO Device - 5250-5350 MHz Band - Industry Canada

Mode: n20

Max EIRP (mW): 652.0

Frequency (MHz)	Chain	Software Setting	99% BW (MHz)	Duty Cycle %	Power ¹ dBm	Total Power		IC limit dBm	Max Power (W)	Result
						mW	dBm			
5280	1	26	18.24	97	7.0	10.2	10.1	18.4	0.020	Pass
	2				6.9					
5300	1	31	18.18	97	10.4	19.9	13.0	18.4		
	2				9.2					
5320	1	31	18.06	97	9.6	19.4	12.9	18.4		
	2				9.9					
Total Power in Band (3 20 MHz channels)								18.4	0.049	Pass
										16.9 dBm

5250-5350 PSD - FCC/IC

Mode: n20

Frequency (MHz)	Chain	Software Setting	99% BW (MHz)	Duty Cycle %	PSD dBm/MHz	Total PSD ¹		FCC Limit dBm/MHz	IC Limit dBm/MHz	Result
						mW/MHz	dBm/MHz			
5280	1	26	18.24	97	-4.9	0.6	-2.1	5.8	11.0	Pass
	2				-5.7					
5300	1	31	18.18	97	-1.9	1.2	0.6	5.8	11.0	Pass
	2				-3.3					
5320	1	31	18.06	97	-2.2	1.2	0.6	5.8	11.0	Pass
	2				-2.9					



EMC Test Data

Client: Xirrus	Job Number: J93457
Model: XR2000H	T-Log Number: T93459
Contact: Peter Krebill	Project Manager: Christine Krebill
Standard: FCC 15.247, 15.407, EN 55022, FCC B	Project Coordinator: -
	Class: N/A

MIMO Device - 5250-5350 MHz Band - FCC

Mode: n40 Max EIRP (mW): 56.5

Frequency (MHz)	Chain	Software Setting	26dB BW (MHz)	Duty Cycle %	Power dBm	Total Power ¹ mW	Total Power ¹ dBm	FCC Limit dBm	Max Power (W)	Result
5310	1	30	47.976	90	3.7	4.3	6.3	18.8	0.004	Pass
	2				1.8					

MIMO Device - 5250-5350 MHz Band - Industry Canada

Mode: n40 Max EIRP (mW): 56.5

Frequency (MHz)	Chain	Software Setting	99% BW (MHz)	Duty Cycle %	Power ¹ dBm	Total Power mW	Total Power dBm	IC limit dBm	Max Power (W)	Result
5310	1	30	36.72	90	3.7	4.3	6.3	18.8	0.004	Pass
	2				1.8					

MIMO Device 5250-5350 PSD - FCC/IC

Mode: n40

Frequency (MHz)	Chain	Software Setting	99% BW (MHz)	Duty Cycle %	PSD dBm/MHz	Total PSD ¹ mW/MHz	Total PSD ¹ dBm/MHz	FCC Limit dBm/MHz	IC Limit dBm/MHz	Result
5310	1	30	36.72	90	-11.6	0.1	-9.0	5.8	11.0	Pass
	2				-13.4					



EMC Test Data

Client: Xirrus	Job Number: J93457
Model: XR2000H	T-Log Number: T93459
Contact: Peter Krebill	Project Manager: Christine Krebill
Standard: FCC 15.247, 15.407, EN 55022, FCC B	Project Coordinator: -
	Class: N/A

MIMO Device - 5470-5725 MHz Band - FCC

Mode: 11a

Max EIRP (mW): 261.7

Frequency (MHz)	Chain	Software Setting	26dB BW (MHz)	Duty Cycle %	Power dBm	Total Power ¹ mW	Total Power ¹ dBm	FCC Limit dBm	Max Power (W)	Result
5500	1	25	23.57	96	6.0	6.3	8.0	18.9	0.020	Pass
	2				3.2					
5580	1	31	23.93	96	7.8	10.5	10.2	18.9		
	2				6.0					
5700	1	33	23.27	96	11.1	20.3	13.1	18.9		
	2				8.2					
Total Power in Band (4 20 MHz channels)								18.9	0.057	Pass
										17.6 dBm

MIMO Device - 5470-5725 MHz Band - Industry Canada

Mode: 11a

Max EIRP (mW): 261.7

Frequency (MHz)	Chain	Software Setting	99% BW (MHz)	Duty Cycle %	Power ¹ dBm	Total Power mW	Total Power dBm	IC limit dBm	Max Power (W)	Result
5500	1	25	16.98	96	6.0	6.3	8.0	18.2	0.020	Pass
	2				3.2					
5580	1	31	16.98	96	7.8	10.4	10.2	18.2		
	2				6.0					
5700	1	33	16.98	96	11.1	20.3	13.1	18.2		
	2				8.2					
Total Power in Band (4 20 MHz channels)								18.2	0.057	Pass
										17.6 dBm

5470-5700 PSD - FCC/IC

Mode: 11a

Frequency (MHz)	Chain	Software Setting	99% BW (MHz)	Duty Cycle %	PSD dBm/MHz	Total PSD ¹ mW/MHz	Total PSD ¹ dBm/MHz	FCC Limit dBm/MHz	IC Limit dBm/MHz	Result
5500	1	25	16.98	96	-6.5	0.4	-4.5	5.9	11.0	Pass
	2				-9.4					
5580	1	31	16.98	96	-4.7	0.6	-2.2	5.9	11.0	Pass
	2				-6.4					
5700	1	33	16.98	96	-1.5	1.2	0.6	5.9	11.0	Pass
	2				-4.1					



EMC Test Data

Client: Xirrus	Job Number: J93457
Model: XR2000H	T-Log Number: T93459
Contact: Peter Krebill	Project Manager: Christine Krebill
Standard: FCC 15.247, 15.407, EN 55022, FCC B	Project Coordinator: -
	Class: N/A

MIMO Device - 5470-5725 MHz Band - FCC

Mode: n20

Max EIRP (mW): 264.0

Frequency (MHz)	Chain	Software Setting	26dB BW (MHz)	Duty Cycle %	Power dBm	Total Power ¹ mW	dBm	FCC Limit dBm	Max Power (W)	Result
5500	1	25	25.13	97	6.1	6.3	8.0	18.9	0.020	Pass
	2				3.1					
5580	1	31	24.35	97	8.5	11.1	10.4	18.9		
	2				5.6					
5700	1	32	23.75	97	10.6	20.5	13.1	18.9		
	2				9.3					
Total Power in Band (4 20 MHz channels)								18.9	0.058	Pass
										17.7 dBm

MIMO Device - 5470-5725 MHz Band - Industry Canada

Mode: n20

Max EIRP (mW): 264.0

Frequency (MHz)	Chain	Software Setting	99% BW (MHz)	Duty Cycle %	Power ¹ dBm	Total Power mW	dBm	IC limit dBm	Max Power (W)	Result
5500	1	25	18.06	97	6.1	6.3	8.0	18.5	0.020	Pass
	2				3.1					
5580	1	31	18.06	97	8.5	11.1	10.4	18.5		
	2				5.6					
5700	1	32	18.06	97	10.6	20.5	13.1	18.5		
	2				9.3					
Total Power in Band (4 20 MHz channels)								18.5	0.058	Pass
										17.7 dBm

5470-5725 PSD - FCC/IC

Mode: n20

Frequency (MHz)	Chain	Software Setting	99% BW (MHz)	Duty Cycle %	PSD dBm/MHz	Total PSD ¹ mW/MHz	dBm/MHz	FCC Limit dBm/MHz	IC Limit dBm/MHz	Result
5500	1	25	18.06	97	-6.8	0.3	-4.9	5.9	11.0	Pass
	2				-10.0					
5580	1	31	18.06	97	-4.4	0.6	-2.5	5.9	11.0	Pass
	2				-7.3					
5700	1	32	18.06	97	-2.3	1.1	0.3	5.9	11.0	Pass
	2				-3.4					



EMC Test Data

Client: Xirrus	Job Number: J93457
Model: XR2000H	T-Log Number: T93459
Contact: Peter Krebill	Project Manager: Christine Krebill
Standard: FCC 15.247, 15.407, EN 55022, FCC B	Project Coordinator: -
	Class: N/A

MIMO Device - 5470-5725 MHz Band - FCC

Mode: n40

Max EIRP (mW): 258.8

Frequency (MHz)	Chain	Software Setting	26dB BW (MHz)	Duty Cycle %	Power dBm	Total Power ¹ mW	Total Power ¹ dBm	FCC Limit dBm	Max Power (W)	Result
5510	1	15	49.06	90	1.6	2.3	3.6	18.9	0.020	Pass
	2				-1.9					
5550	1	33	52.31	90	9.7	14.9	11.7	18.9		
	2				6.1					
5670	1	33	49.06	90	10.9	20.1	13.0	18.9		
	2				7.7					
Total Power in Band (3 40 MHz channels and 1 20MHz channel)								18.9	0.058	Pass
										17.6 dBm

MIMO Device - 5470-5725 MHz Band - Industry Canada

Mode: n40

Max EIRP (mW): 258.8

Frequency (MHz)	Chain	Software Setting	99% BW (MHz)	Duty Cycle %	Power ¹ dBm	Total Power mW	Total Power dBm	IC limit dBm	Max Power (W)	Result
5510	1	15	36.60	90	1.6	2.3	3.6	18.9	0.020	Pass
	2				-1.9					
5550	1	33	36.60	90	9.7	14.9	11.7	18.9		
	2				6.1					
5670	1	33	36.72	90	10.9	20.1	13.0	18.9		
	2				7.7					
Total Power in Band (3 40 MHz channels and 1 20MHz channel)								18.9	0.058	Pass
										17.6 dBm

5470-5725 PSD - FCC/IC

Mode: n40

Frequency (MHz)	Chain	Software Setting	99% BW (MHz)	Duty Cycle %	PSD dBm/MHz	Total PSD ¹ mW/MHz	Total PSD ¹ dBm/MHz	FCC Limit dBm/MHz	IC Limit dBm/MHz	Result
5510	1	15	36.60	90	-14.2	0.1	-12.1	5.9	11.0	Pass
	2				-17.7					
5550	1	33	36.60	90	-6.0	0.4	-3.9	5.9	11.0	Pass
	2				-9.4					
5670	1	33	36.72	90	-4.9	0.5	-2.6	5.9	11.0	Pass
	2				-7.7					



EMC Test Data

Client: Xirrus	Job Number: J93457
Model: XR2000H	T-Log Number: T93459
	Project Manager: Christine Krebill
Contact: Peter Krebill	Project Coordinator: -
Standard: FCC 15.247, 15.407, EN 55022, FCC B	Class: N/A

Run #2: Peak Excursion Measurement

Date of Test: 10/7/2013 0:00

Test Engineer: David Bare

Test Location: Fremont Chamber #5

Config. Used: 1

Config Change: None

EUT Voltage: POE

20MHz: Device meets the requirement for the peak excursion

Peak Excursion(dB)			Peak Excursion(dB)			Peak Excursion(dB)		
Freq (MHz)	Value	Limit	Freq (MHz)	Value	Limit	Freq (MHz)	Value	Limit
			5300	8.5	13.0	5580	9.2	13.0

40MHz: Device meets the requirement for the peak excursion

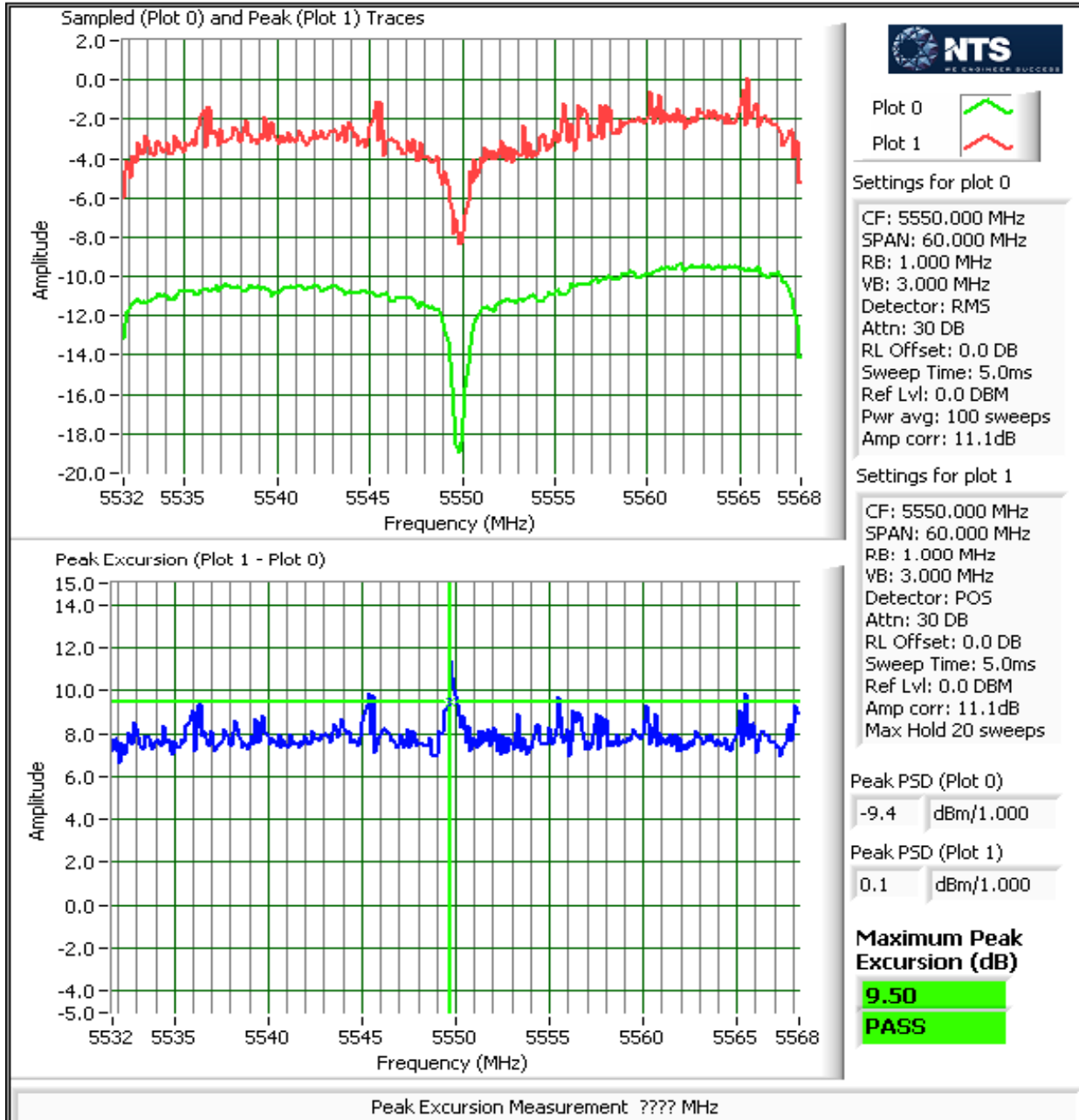
Peak Excursion(dB)			Peak Excursion(dB)			Peak Excursion(dB)		
Freq (MHz)	Value	Limit	Freq (MHz)	Value	Limit	Freq (MHz)	Value	Limit
			5310	8.9	13.0	5550	9.5	13.0

Plots Showing Peak Excursion

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

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

Client: Xirrus	Job Number: J93457
Model: XR2000H	T-Log Number: T93459
Contact: Peter Krebill	Project Manager: Christine Krebill
Standard: FCC 15.247, 15.407, EN 55022, FCC B	Project Coordinator: -
	Class: N/A



Antenna conducted spurious not needed as all testing was done radiated and met the -27 dBm/MHz EIRP radiated limit



EMC Test Data

Client: Xirrus	Job Number: J93457
Model: XR2000H	T-Log Number: T93459
	Project Manager: Christine Krebill
Contact: Peter Krebill	Project Coordinator: -
Standard: FCC 15.247, 15.407, EN 55022, FCC B	Class: A

Radiated Emissions

(Elliott Laboratories Fremont Facility, Semi-Anechoic Chamber)

Test Specific Details

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

Date of Test: 10/6/2013	Config. Used: 1
Test Engineer: Rafael Varelas	Config Change: None
Test Location: Fremont Chamber #5	EUT Voltage: 120V/60Hz

General Test Configuration

The EUT and any local support equipment were located on the turntable for radiated emissions testing. Any remote support equipment was located outside the semi-anechoic chamber. Any cables running to remote support equipment were routed through metal conduit and when possible passed through a ferrite clamp upon exiting the chamber.

The test distance and extrapolation factor (if applicable) are detailed under each run description.

Note, preliminary testing indicates that the emissions were maximized by orientation of the EUT and elevation of the measurement antenna. Maximized testing indicated that the emissions were maximized by orientation of the EUT, elevation of the measurement antenna, and manipulation of the EUT's interface cables.

Ambient Conditions:

Temperature:	20.6 °C
Rel. Humidity:	38 %

Summary of Results (ANSI C63.4:2009)

Run #	Test Performed	Limit	Result	Margin
1 (Dipole Antenna)	Radiated Emissions 30 - 1000 MHz, Maximized	FCC Part 15.209 / 15.247(c)	Pass	35.1 dBµV/m @ 37.54 MHz (-4.9 dB)
2 (Panel Antenna)	Radiated Emissions 30 - 1000 MHz, Maximized	FCC Part 15.209 / 15.247(c)	Pass	51.8 dBµV/m @ 997.71 MHz (-2.2 dB)



EMC Test Data

Client:	Xirrus	Job Number:	J93457
Model:	XR2000H	T-Log Number:	T93459
Contact:	Peter Krebill	Project Manager:	Christine Krebill
Standard:	FCC 15.247, 15.407, EN 55022, FCC B	Project Coordinator:	-
		Class:	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.

Sample Notes

Sample S/N: 20:0C:7D

Antenna: Dipole (x8)

Sample Notes

Sample S/N: 20:0C:7D

Antenna: Panel (x4)

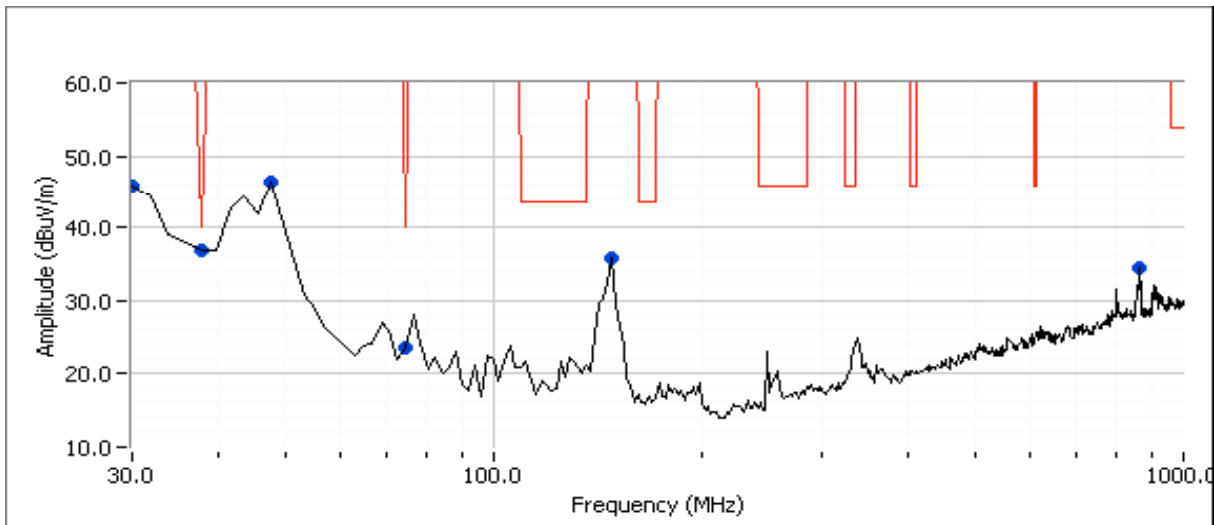
Client: Xirrus	Job Number: J93457
Model: XR2000H	T-Log Number: T93459
Contact: Peter Krebill	Project Manager: Christine Krebill
Standard: FCC 15.247, 15.407, EN 55022, FCC B	Project Coordinator: -
	Class: A

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

Test Parameters for Preliminary Scan(s)			
Frequency Range (MHz)	Prescan Distance (meters)	Limit Distance (meters)	Extrapolation Factor (dB, applied to data)
30 - 1000	3	3	0.0

Run: 1a

Radio #	Frequency	CH	Mode	Pwr
6	2412	1	802.11b	34
10	2437	6	802.11b	34
14	2462	11	802.11b	34
2	5785	157	802.11a	34





EMC Test Data

Client: Xirrus	Job Number: J93457
Model: XR2000H	T-Log Number: T93459
	Project Manager: Christine Krebill
Contact: Peter Krebill	Project Coordinator: -
Standard: FCC 15.247, 15.407, EN 55022, FCC B	Class: A

Preliminary peak readings captured during pre-scan

Frequency MHz	Level dB μ V/m	Pol v/h	15.209 / 15.247		Detector Pk/QP/Avg	Azimuth degrees	Height meters	Comments
			Limit	Margin				
31.441	45.9	V	73.5	-27.6	Peak	157	1.0	Limit is 30dBc from Fundamental
37.546	36.8	V	40.0	-3.2	Peak	92	1.0	
47.803	46.5	V	73.5	-27.0	Peak	360	1.0	Limit is 30dBc from Fundamental
74.569	23.6	V	40.0	-16.4	Peak	170	1.5	
148.139	35.9	V	73.5	-37.6	Peak	98	1.5	Limit is 30dBc from Fundamental
864.811	34.5	V	73.5	-39.0	Peak	161	1.0	Limit is 30dBc from Fundamental

Maximized quasi-peak readings

Frequency MHz	Level dB μ V/m	Pol v/h	15.209 / 15.247		Detector Pk/QP/Avg	Azimuth degrees	Height meters	Comments
			Limit	Margin				
37.546	34.8	V	40.0	-5.2	QP	93	1.0	QP (1.00s)
74.569	23.4	V	40.0	-16.6	QP	169	1.0	QP (1.00s)

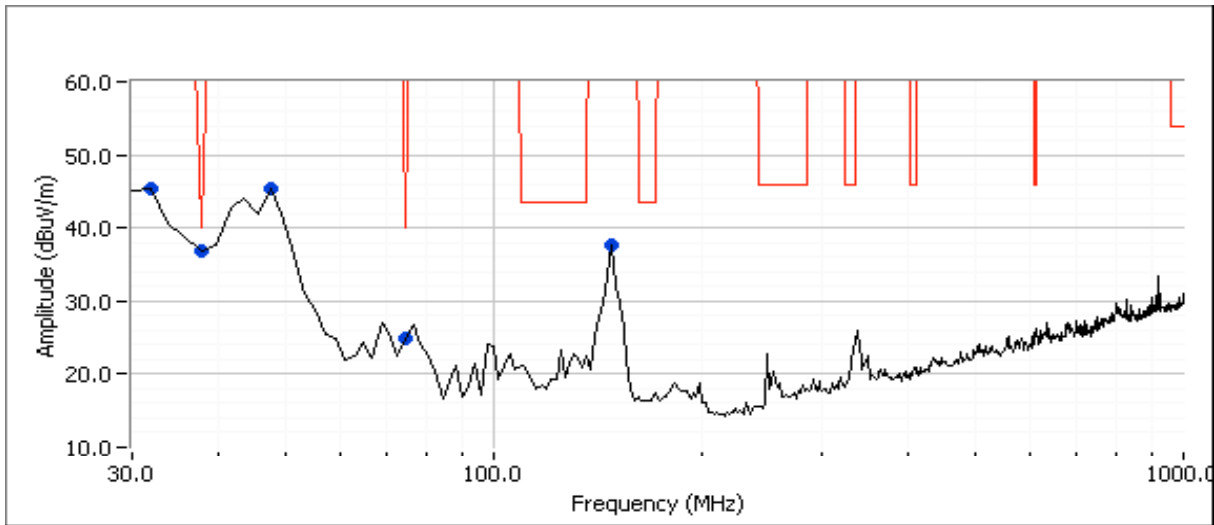


EMC Test Data

Client: Xirrus	Job Number: J93457
Model: XR2000H	T-Log Number: T93459
Contact: Peter Krebill	Project Manager: Christine Krebill
Standard: FCC 15.247, 15.407, EN 55022, FCC B	Project Coordinator: -
	Class: A

Run: 1b

Radio #	Frequency	CH	Mode	Pwr
6	5280	56	802.11a	34
10	5300	60	802.11a	34
14	5320	64	802.11a	34
2	2437	6	802.11b	34



Preliminary peak readings captured during pre-scan

Frequency	Level	Pol	15.209 / 15.247		Detector	Azimuth	Height	Comments
MHz	dBµV/m	v/h	Limit	Margin	Pk/QP/Avg	degrees	meters	
32.603	45.3	V	68.3	-23.0	Peak	32	1.0	Limit is -27 dBm/MHz Peak
37.539	36.9	V	40.0	-3.1	Peak	48	1.0	
47.810	45.5	V	68.3	-22.8	Peak	357	1.0	Limit is -27 dBm/MHz Peak
74.582	24.8	V	40.0	-15.2	Peak	185	1.0	
148.139	37.6	V	68.3	-30.7	Peak	120	1.0	Limit is -27 dBm/MHz Peak

Maximized quasi-peak readings

Frequency	Level	Pol	15.209 / 15.247		Detector	Azimuth	Height	Comments
MHz	dBµV/m	v/h	Limit	Margin	Pk/QP/Avg	degrees	meters	
37.539	35.1	V	40.0	-4.9	QP	42	1.0	QP (1.00s)
74.582	24.0	V	40.0	-16.0	QP	187	1.0	QP (1.00s)

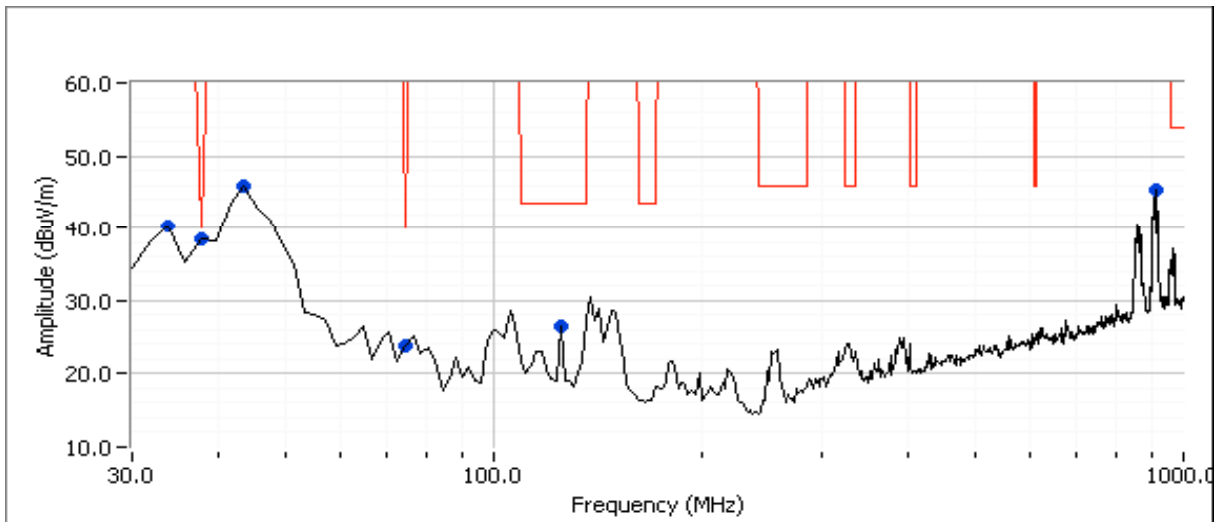
Client: Xirrus	Job Number: J93457
Model: XR2000H	T-Log Number: T93459
	Project Manager: Christine Krebill
Contact: Peter Krebill	Project Coordinator: -
Standard: FCC 15.247, 15.407, EN 55022, FCC B	Class: A

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

Test Parameters for Preliminary Scan(s)			
Frequency Range (MHz)	Prescan Distance (meters)	Limit Distance (meters)	Extrapolation Factor (dB, applied to data)
30 - 1000	5	10	-6.0

Run:2a

Radio #	Frequency	CH	Mode	Pwr
6	2412	1	802.11b	32
10	2437	6	802.11b	34
14	2462	11	802.11b	32
2	5785	157	802.11a	34





EMC Test Data

Client:	Xirrus	Job Number:	J93457
Model:	XR2000H	T-Log Number:	T93459
Contact:	Peter Krebill	Project Manager:	Christine Krebill
Standard:	FCC 15.247, 15.407, EN 55022, FCC B	Project Coordinator:	-
		Class:	A

Preliminary peak readings captured during pre-scan

Frequency MHz	Level dB μ V/m	Pol v/h	15.209 / 15.247		Detector Pk/QP/Avg	Azimuth degrees	Height meters	Comments
			Limit	Margin				
33.456	40.3	V	73.5	-33.2	Peak	247	1.0	Limit is 30dBc from Fundamental
37.539	38.4	V	40.0	-1.6	Peak	268	1.0	
43.773	45.9	V	73.5	-27.6	Peak	359	1.0	Limit is 30dBc from Fundamental
74.576	23.9	V	40.0	-16.1	Peak	218	1.0	
125.008	26.4	V	43.5	-17.1	Peak	347	1.5	
914.465	45.3	H	73.5	-28.2	Peak	334	2.0	Limit is 30dBc from Fundamental

Maximized quasi-peak readings

Frequency MHz	Level dB μ V/m	Pol v/h	15.209 / 15.247		Detector Pk/QP/Avg	Azimuth degrees	Height meters	Comments
			Limit	Margin				
37.539	33.1	V	40.0	-6.9	QP	267	1.0	QP (1.00s)
125.008	27.5	V	43.5	-16.0	QP	343	1.0	QP (1.00s)
74.576	24.0	V	40.0	-16.0	QP	214	1.0	QP (1.00s)

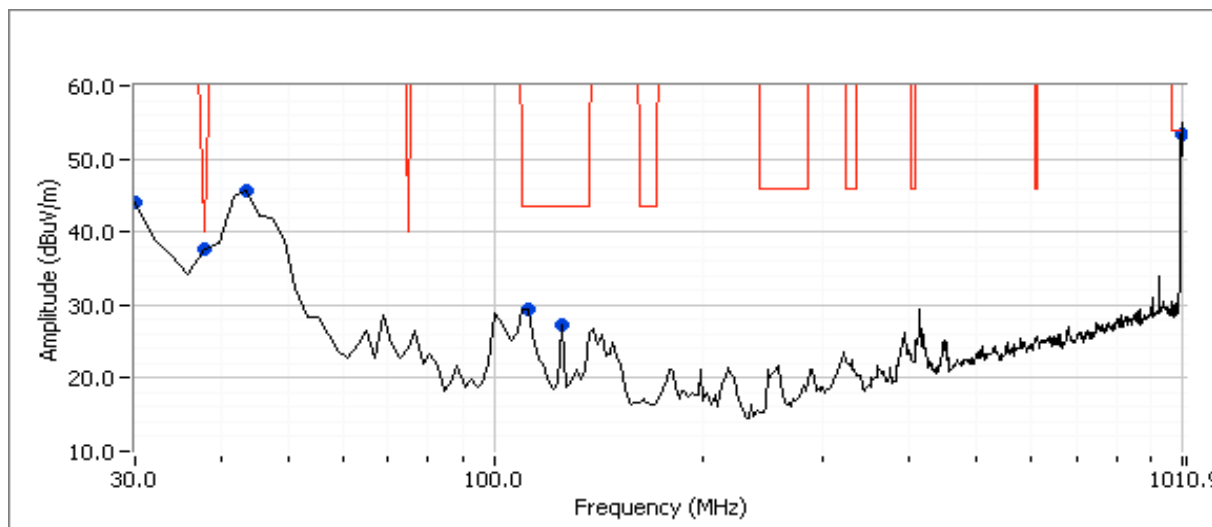


EMC Test Data

Client: Xirrus	Job Number: J93457
Model: XR2000H	T-Log Number: T93459
Contact: Peter Krebill	Project Manager: Christine Krebill
Standard: FCC 15.247, 15.407, EN 55022, FCC B	Project Coordinator: -
	Class: A

Run:2b

Radio #	Frequency	CH	Mode	Pwr
6	5280	56	802.11a	34
10	5300	60	802.11a	34
14	5320	64	802.11a	34
2	2437	6	802.11b	34



Preliminary peak readings captured during pre-scan

Frequency	Level	Pol	15.209 / 15.247		Detector	Azimuth	Height	Comments
MHz	dBµV/m	v/h	Limit	Margin	Pk/QP/Avg	degrees	meters	
996.157	53.4	V	54.0	-0.6	Peak	0	1.0	
31.441	44.0	V	68.3	-24.3	Peak	42	1.0	Limit is -27 dBm/MHz Peak
37.546	37.7	V	40.0	-2.3	Peak	359	1.5	
43.532	45.6	V	68.3	-22.7	Peak	49	1.0	Limit is -27 dBm/MHz Peak
111.588	29.3	V	43.5	-14.2	Peak	318	2.0	
125.008	27.4	V	43.5	-16.1	Peak	359	1.5	

Maximized quasi-peak readings

Frequency	Level	Pol	15.209 / 15.247		Detector	Azimuth	Height	Comments
MHz	dBµV/m	v/h	Limit	Margin	Pk/QP/Avg	degrees	meters	
37.546	34.0	V	40.0	-6.0	QP	360	1.0	QP (1.00s)
996.157	34.0	V	54.0	-20.0	QP	0	1.0	QP (1.00s)
111.588	28.9	V	43.5	-14.6	QP	321	1.0	QP (1.00s)
125.008	28.0	V	43.5	-15.5	QP	355	2.0	QP (1.00s)

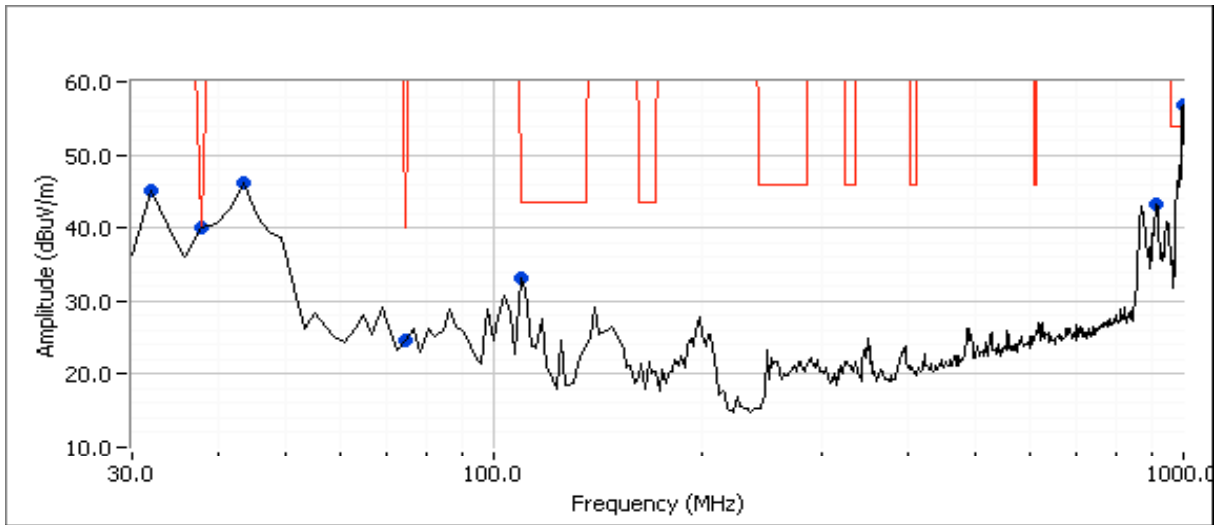


EMC Test Data

Client: Xirrus	Job Number: J93457
Model: XR2000H	T-Log Number: T93459
	Project Manager: Christine Krebill
Contact: Peter Krebill	Project Coordinator: -
Standard: FCC 15.247, 15.407, EN 55022, FCC B	Class: A

Run:2c

Radio #	Frequency	CH	Mode	Pwr
6	5745	149	802.11n20	34
10	5785	157	802.11n20	34
14	5825	165	802.11n20	34
2	2437	6	802.11n20	34





EMC Test Data

Client:	Xirrus	Job Number:	J93457
Model:	XR2000H	T-Log Number:	T93459
Contact:	Peter Krebill	Project Manager:	Christine Krebill
Standard:	FCC 15.247, 15.407, EN 55022, FCC B	Project Coordinator:	-
		Class:	A

Preliminary peak readings captured during pre-scan

Frequency MHz	Level dB μ V/m	Pol v/h	15.209 / 15.247		Detector Pk/QP/Avg	Azimuth degrees	Height meters	Comments
			Limit	Margin				
5790.230	108.3	H	-	-	PK	12	1.6	POS; RB 100 kHz; VB: 300 kHz
5792.440	106.3	V	-	-	PK	351	1.2	POS; RB 100 kHz; VB: 300 kHz
33.454	45.0	V	76.3	-31.3	Peak	280	1.0	Limit is 30dBc from above
37.552	40.1	V	40.0	0.1	Peak	237	1.0	
43.532	46.3	V	76.3	-30.0	Peak	310	1.0	Limit is 30dBc from above
74.582	24.6	V	40.0	-15.4	Peak	170	1.0	
110.864	33.2	H	43.5	-10.3	Peak	227	3.0	
914.854	43.3	H	78.3	-35.0	Peak	51	1.5	Limit is 30dBc from above
997.713	56.8	H	54.0	2.8	Peak	56	2.0	

Maximized quasi-peak readings

Frequency MHz	Level dB μ V/m	Pol v/h	15.209 / 15.247		Detector Pk/QP/Avg	Azimuth degrees	Height meters	Comments
			Limit	Margin				
997.713	51.8	H	54.0	-2.2	QP	58	1.2	QP (1.00s)
37.552	33.8	V	40.0	-6.2	QP	233	1.0	QP (1.00s)
110.864	30.4	H	43.5	-13.1	QP	224	1.5	QP (1.00s)
74.582	24.8	V	40.0	-15.2	QP	164	1.0	QP (1.00s)

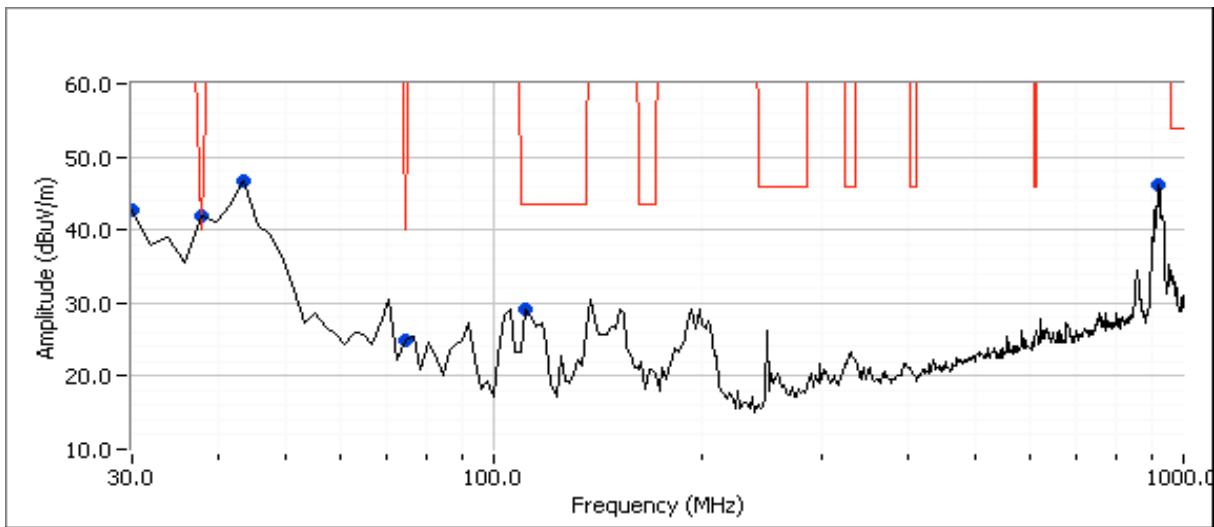


EMC Test Data

Client: Xirrus	Job Number: J93457
Model: XR2000H	T-Log Number: T93459
	Project Manager: Christine Krebill
Contact: Peter Krebill	Project Coordinator: -
Standard: FCC 15.247, 15.407, EN 55022, FCC B	Class: A

Run:2d

Radio #	Frequency	CH	Mode	Pwr
6	2412	1	802.11n20	34
10	2462	11	802.11n20	34
14	5580	116	802.11n20	34
2	5785	157	802.11n20	34



Preliminary peak readings captured during pre-scan

Frequency	Level	Pol	15.209 / 15.247		Detector	Azimuth	Height	Comments
MHz	dBuV/m	v/h	Limit	Margin	Pk/QP/Avg	degrees	meters	
922.303	46.1	H	78.3	-32.2	Peak	273	1.5	Limit is 30dBc from above
31.438	42.6	V	76.3	-33.7	Peak	163	1.0	Limit is 30dBc from above
37.552	42.0	V	40.0	2.0	Peak	305	1.0	
43.532	46.6	V	76.3	-29.7	Peak	316	1.0	Limit is 30dBc from above
74.576	24.8	V	40.0	-15.2	Peak	145	1.0	
112.815	29.2	V	43.5	-14.3	Peak	107	1.0	

Maximized quasi-peak readings

Frequency	Level	Pol	15.209 / 15.247		Detector	Azimuth	Height	Comments
MHz	dBuV/m	v/h	Limit	Margin	Pk/QP/Avg	degrees	meters	
112.815	28.3	V	43.5	-15.2	QP	108	1.0	QP (1.00s)
74.576	24.5	V	40.0	-15.5	QP	145	1.0	QP (1.00s)
37.552	31.4	V	40.0	-8.6	QP	307	1.0	QP (1.00s)

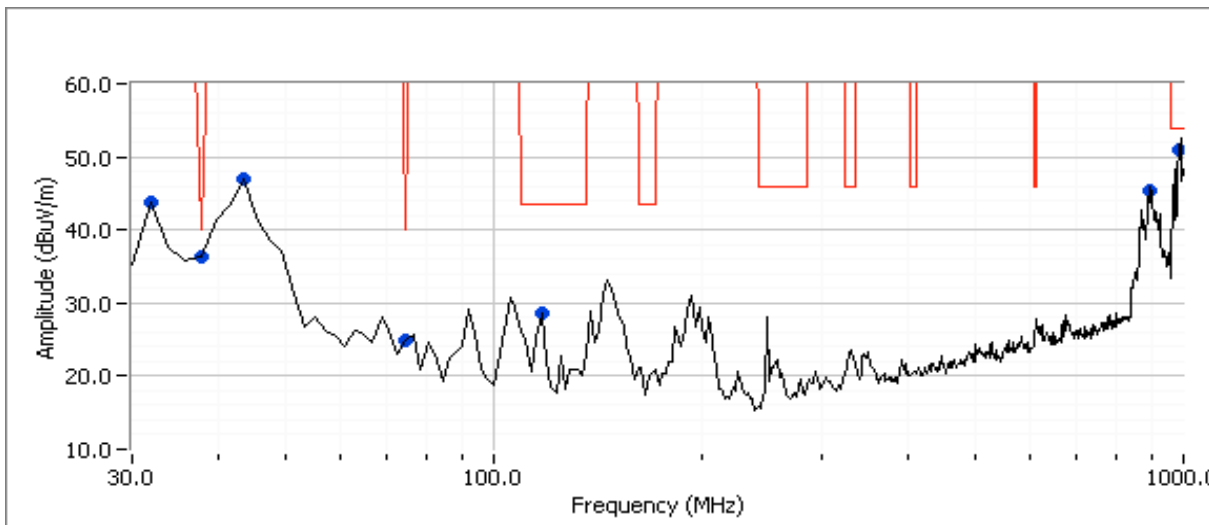


EMC Test Data

Client: Xirrus	Job Number: J93457
Model: XR2000H	T-Log Number: T93459
Contact: Peter Krebill	Project Manager: Christine Krebill
Standard: FCC 15.247, 15.407, EN 55022, FCC B	Project Coordinator: -
	Class: A

Run: 2e

Radio #	Frequency	CH	Mode	Pwr
6	5755	151	802.11n40	34
10	5795	159	802.11n40	34
14	5550	110	802.11n40	34
2	2437	6	802.11n40	34



Preliminary peak readings captured during pre-scan

Frequency	Level	Pol	15.209 / 15.247		Detector	Azimuth	Height	Comments
MHz	dBuV/m	v/h	Limit	Margin	Pk/QP/Avg	degrees	meters	
32.051	43.9	V	76.3	-32.4	Peak	203	1.0	Limit is 30dBc from above
37.546	36.3	V	40.0	-3.7	Peak	18	1.0	
43.526	46.9	V	76.3	-29.4	Peak	285	1.0	Limit is 30dBc from above
74.576	24.9	V	40.0	-15.1	Peak	257	1.0	
117.082	28.7	H	43.5	-14.8	Peak	127	1.5	
895.283	45.3	H	78.3	-33.0	Peak	309	1.5	Limit is 30dBc from above
990.798	51.0	H	54.0	-3.0	Peak	58	2.5	

Maximized quasi-peak readings

Frequency	Level	Pol	15.209 / 15.247		Detector	Azimuth	Height	Comments
MHz	dBuV/m	v/h	Limit	Margin	Pk/QP/Avg	degrees	meters	
37.546	35.9	V	40.0	-4.1	QP	16	1.0	QP (1.00s)
74.576	25.0	V	40.0	-15.0	QP	254	1.0	QP (1.00s)
117.082	28.9	H	43.5	-14.6	QP	123	1.5	QP (1.00s)
990.798	46.3	H	54.0	-7.7	QP	64	1.2	QP (1.00s)



EMC Test Data

Client: Xirrus	Job Number: J93457
Model: XR2000H	T-Log Number: T93459
	Project Manager: Christine Krebill
Contact: Peter Krebill	Project Coordinator: -
Standard: FCC 15.247, 15.407, EN 55022, FCC B	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. For radiated emissions testing the measurement antenna was located 3 meters from the EUT, unless otherwise noted.

Ambient Conditions:

Temperature: 21.2 °C
Rel. Humidity: 36 %

Summary of Results

Run #	Mode	Channel	Power Setting	Test Performed	Limit	Result / Margin
20MHz Bandwidth Modes						
1	a	56 - 5280MHz	-tp 34	Band Edge 5250MHz	15E	73.9 dBµV/m @ 5248.9 MHz (-0.1 dB)
	a	64 - 5320MHz	-tp 34	Restricted Band Edge at 5350 MHz	15.209	46.8 dBµV/m @ 5350.2 MHz (-7.2 dB)
2	a	100 - 5500MHz	-tp 34	Restricted Band Edge at 5460 MHz	15.209	46.6 dBµV/m @ 5440.0 MHz (-7.4 dB)
	a	100 - 5500MHz	-tp 34	Band Edge 5460 - 5470 MHz	15E	60.4 dBµV/m @ 5468.0 MHz (-7.9 dB)
	a	140 - 5700MHz	-tp 34	Band Edge 5725MHz	15E	59.7 dBµV/m @ 5762.4 MHz (-8.6 dB)



EMC Test Data

Client: Xirrus	Job Number: J93457
Model: XR2000H	T-Log Number: T93459
Contact: Peter Krebill	Project Manager: Christine Krebill
Standard: FCC 15.247, 15.407, EN 55022, FCC B	Project Coordinator: -
	Class: N/A

20MHz Bandwith Modes

3	n20	56 - 5280MHz	-tp 34		Band Edge 5250MHz	15E	53.7 dB μ V/m @ 5249.9 MHz (-0.3 dB)
	n20	64 - 5320MHz	-tp 34		Restricted Band Edge at 5350 MHz	15.209	48.4 dB μ V/m @ 5350.0 MHz (-5.6 dB)
4	n20	100 - 5500MHz	-tp 34		Restricted Band Edge at 5460 MHz	15.209	46.1 dB μ V/m @ 5440.0 MHz (-7.9 dB)
	n20	100 - 5500MHz	-tp 34		Band Edge 5460 - 5470 MHz	15E	61.8 dB μ V/m @ 5464.0 MHz (-6.5 dB)
	n20	140 - 5700MHz	-tp 34		Band Edge 5725MHz	15E	66.8 dB μ V/m @ 5726.0 MHz (-1.5 dB)

40MHz Bandwith Modes

5	n40	62 - 5310MHz	-tp 30		Restricted Band Edge at 5250 MHz	15.209	63.0 dB μ V/m @ 5247.6 MHz (-5.3 dB)
	n40	62 - 5310MHz	-tp 30		Restricted Band Edge at 5350 MHz	15.209	52.1 dB μ V/m @ 5350.0 MHz (-1.9 dB)
6	n40	102 - 5510MHz	-tp 27		Restricted Band Edge at 5460 MHz	15.209	53.3 dB μ V/m @ 5460.0 MHz (-0.7 dB)
	n40	102 - 5510MHz	-tp 27		Band Edge 5460 - 5470 MHz	15E	53.0 dB μ V/m @ 5469.9 MHz (-1.0 dB)
	n40	134 - 5670MHz	-tp 34		Band Edge 5725MHz	15E	59.8 dB μ V/m @ 5755.5 MHz (-8.5 dB)



EMC Test Data

Client: Xirrus	Job Number: J93457
Model: XR2000H	T-Log Number: T93459
	Project Manager: Christine Krebill
Contact: Peter Krebill	Project Coordinator: -
Standard: FCC 15.247, 15.407, EN 55022, FCC B	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.

Procedure Comments:

Measurements performed in accordance with FCC KDB 789033

Peak measurements performed with: RBW=1MHz, VBW=3MHz, peak detector, max hold, auto sweep time

Mode	Data Rate	Duty Cycle (x)	Constant DC?	T (ms)	Pwr Cor Factor*	Lin Volt Cor Factor**	Min VBW for FS (Hz)
802.11a	6	0.96	Yes	1.35	0.16	0.32	740.74074
802.11n20	MCS0	0.97	Yes	1.27	0.13	0.27	787.40157
802.11n40	MCS0	0.90	Yes	0.6	0.48	0.96	1666.6667

Sample Notes

Sample S/N: 20:0C:7D
 Driver:
 Antenna: Dipole (x8)

Measurement Specific Notes:

Note 1:	For emissions outside of the restricted bands the limit is -27dBm/MHz eirp (68.3dBuV/m). The measurement method required is a peak measurement (RB=1MHz, VB≥3MHz, peak detector). Per KDB 789033 2) c) (i), compliance can be demonstrated by meeting the average and peak limits of 15.209, as an alternative.
Note 2:	Emission has duty cycle < 98%, but constant, average measurement performed: RBW=1MHz, VBW=10Hz, peak detector, linear averaging, auto sweep, trace average 100 * 1/DC traces, measurement corrected by Linear Voltage correction factor
Note 3:	Plots of the average bandedge do not account for any duty cycle correction. Refer to the tabular results for final measurements.



EMC Test Data

Client: Xirrus	Job Number: J93457
Model: XR2000H	T-Log Number: T93459
Contact: Peter Krebill	Project Manager: Christine Krebill
Standard: FCC 15.247, 15.407, EN 55022, FCC B	Project Coordinator: -
	Class: N/A

Run #1: Radiated Bandedge Measurements, 5250-5350MHz

Date of Test: 9/30/2013 17:00
 Test Engineer: David Bare
 Test Location: Fremont Chamber #5

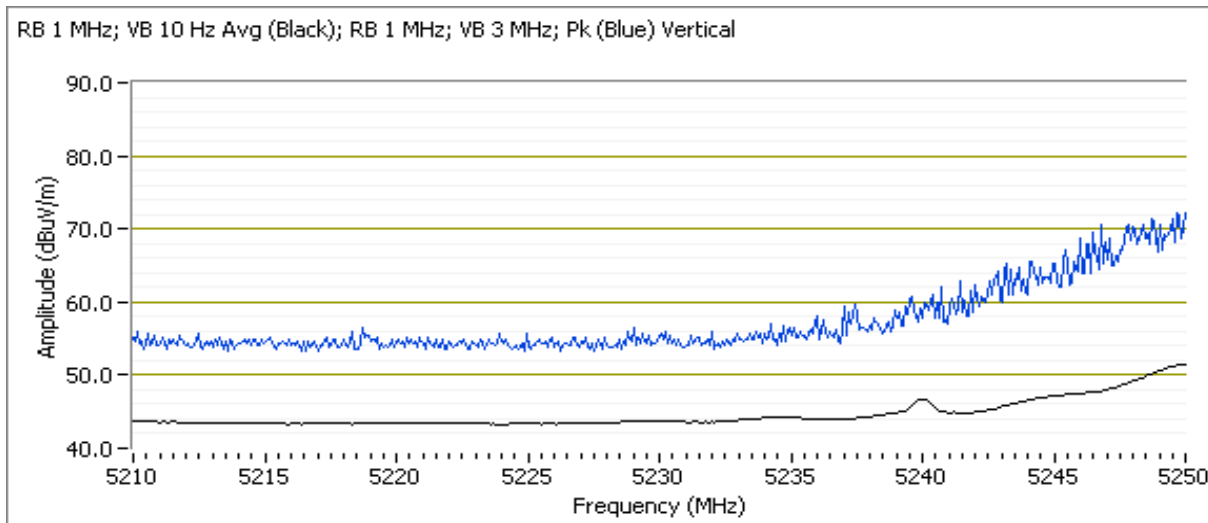
Config. Used: 1
 Config Change: None
 EUT Voltage: POE

Channel: 56 - 5280MHz
 Tx Chain: All - Radio 6
 Mode: a
 Data Rate: 6
 Power setting: Tx Power 34 (Command Line)

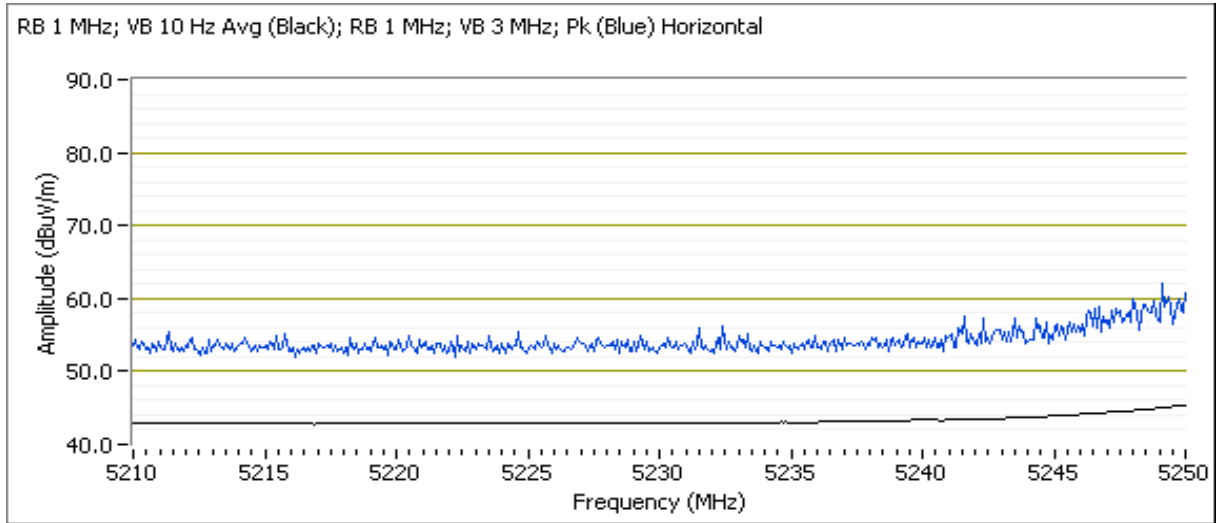
5250 MHz Band Edge Signal Radiated Field Strength

Based on KDB 789033 D01 v01r03 (H) 2.c.i

Frequency	Level	Pol	FCC 15.209		Detector	Azimuth	Height	Comments
MHz	dB μ V/m	v/h	Limit	Margin	Pk/QP/Avg	degrees	meters	
5248.860	73.9	V	74.0	-0.1	PK	0	1.5	POS; RB 1 MHz; VB: 3 MHz
5249.990	52.0	V	54.0	-2.0	AVG	0	1.5	POS; RB 1 MHz; VB: 10 Hz, Note 3
5249.920	45.4	H	54.0	-8.6	AVG	110	1.3	POS; RB 1 MHz; VB: 10 Hz, Note 3
5249.460	64.0	H	74.0	-10.0	PK	110	1.3	POS; RB 1 MHz; VB: 3 MHz



Client: Xirrus	Job Number: J93457
Model: XR2000H	T-Log Number: T93459
	Project Manager: Christine Krebill
Contact: Peter Krebill	Project Coordinator: -
Standard: FCC 15.247, 15.407, EN 55022, FCC B	Class: N/A





EMC Test Data

Client: Xirrus	Job Number: J93457
Model: XR2000H	T-Log Number: T93459
	Project Manager: Christine Krebill
Contact: Peter Krebill	Project Coordinator: -
Standard: FCC 15.247, 15.407, EN 55022, FCC B	Class: N/A

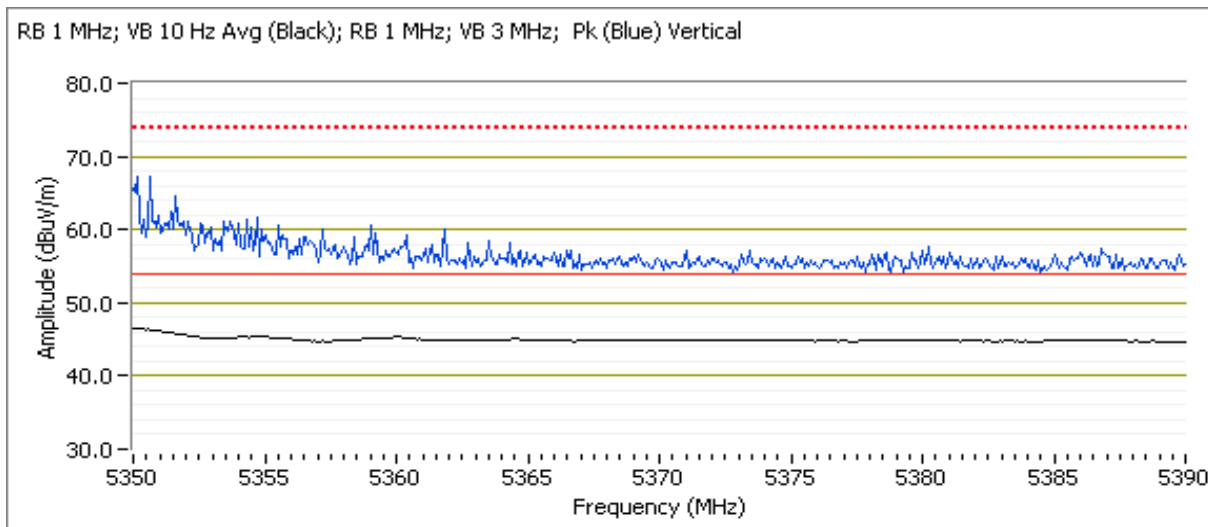
Date of Test: 9/30/2013 17:00
 Test Engineer: Rafael Varelas
 Test Location: Fremont Chamber #5

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

Channel: 64 - 5320MHz
 Tx Chain: All - Radio 6
 Mode: a
 Data Rate: 6
 Power setting: Tx Power 34 (Command Line)

5350 MHz Band Edge Signal Radiated Field Strength

Frequency MHz	Level dB μ V/m	Pol v/h	FCC 15.209		Detector Pk/QP/Avg	Azimuth degrees	Height meters	Comments
			Limit	Margin				
5350.240	46.8	V	54.0	-7.2	AVG	229	1.4	POS; RB 1 MHz; VB: 10 Hz, Note 3
5351.600	66.5	V	74.0	-7.5	PK	229	1.4	POS; RB 1 MHz; VB: 3 MHz
5380.220	44.2	H	54.0	-9.8	AVG	314	1.0	POS; RB 1 MHz; VB: 10 Hz, Note 3
5379.740	56.2	H	74.0	-17.8	PK	314	1.0	POS; RB 1 MHz; VB: 3 MHz





EMC Test Data

Client: Xirrus	Job Number: J93457
Model: XR2000H	T-Log Number: T93459
Contact: Peter Krebill	Project Manager: Christine Krebill
Standard: FCC 15.247, 15.407, EN 55022, FCC B	Project Coordinator: -
	Class: N/A

Run #2: Radiated Bandedge Measurements, 5470-5725MHz

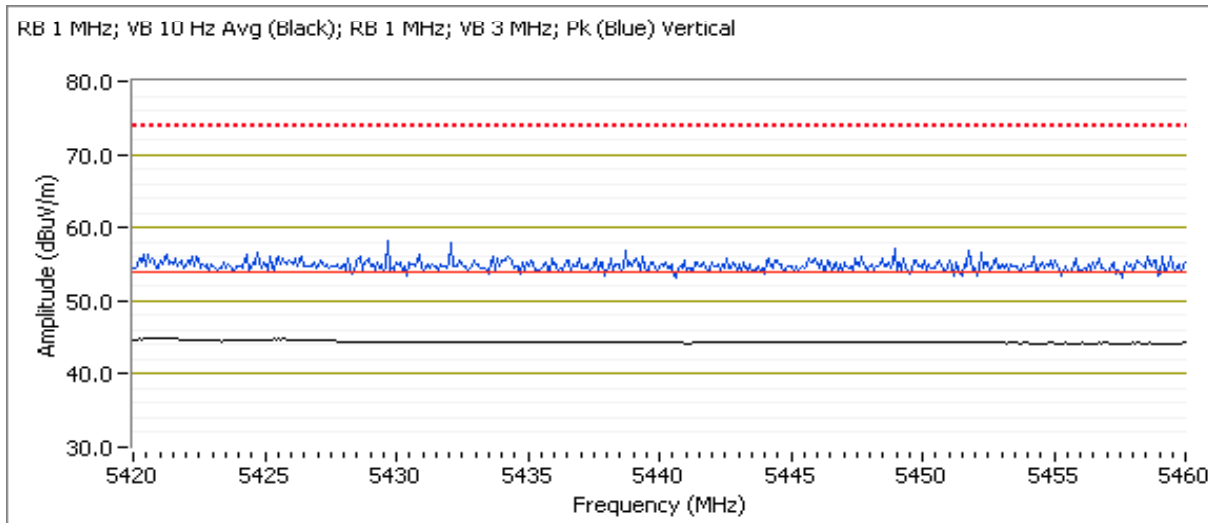
Date of Test: 9/30/2013 17:00
 Test Engineer: Rafael Varelas
 Test Location: Fremont Chamber #5

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

Channel: 100 - 5500MHz
 Tx Chain: All - Radio 6
 Mode: a
 Data Rate: 6
 Power setting: Tx Power 34 (Command Line)

5460 MHz Band Edge Signal Radiated Field Strength

Frequency	Level	Pol	FCC 15.209		Detector	Azimuth	Height	Comments
MHz	dB μ V/m	v/h	Limit	Margin	Pk/QP/Avg	degrees	meters	
5440.040	46.6	V	54.0	-7.4	AVG	289	1.4	POS; RB 1 MHz; VB: 10 Hz, Note 3
5435.150	57.2	V	74.0	-16.8	PK	289	1.4	POS; RB 1 MHz; VB: 3 MHz
5420.720	44.7	H	54.0	-9.3	AVG	315	1.6	POS; RB 1 MHz; VB: 10 Hz, Note 3
5428.740	55.8	H	74.0	-18.2	PK	315	1.6	POS; RB 1 MHz; VB: 3 MHz



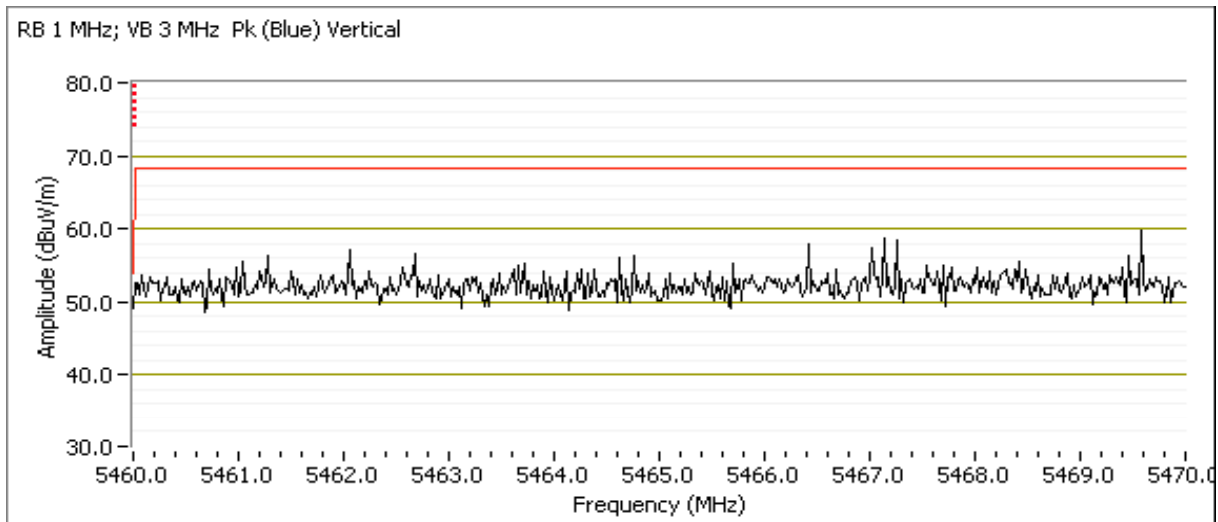


EMC Test Data

Client: Xirrus	Job Number: J93457
Model: XR2000H	T-Log Number: T93459
Contact: Peter Krebill	Project Manager: Christine Krebill
Standard: FCC 15.247, 15.407, EN 55022, FCC B	Project Coordinator: -
	Class: N/A

5470 MHz Band Edge Signal Radiated Field Strength

Frequency MHz	Level dB μ V/m	Pol v/h	15.E		Detector Pk/QP/Avg	Azimuth degrees	Height meters	Comments
			Limit	Margin				
5468.020	60.4	V	68.3	-7.9	PK	241	1.3	POS; RB 1 MHz; VB: 3 MHz
5467.330	57.3	H	68.3	-11.0	PK	315	1.6	POS; RB 1 MHz; VB: 3 MHz





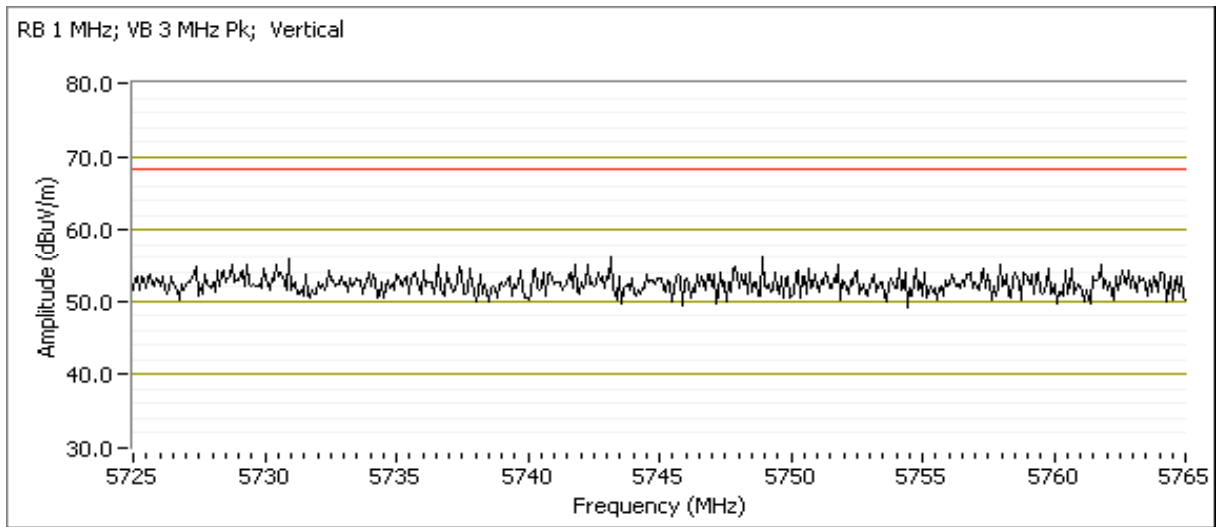
EMC Test Data

Client: Xirrus	Job Number: J93457
Model: XR2000H	T-Log Number: T93459
	Project Manager: Christine Krebill
Contact: Peter Krebill	Project Coordinator: -
Standard: FCC 15.247, 15.407, EN 55022, FCC B	Class: N/A

Channel: 140 - 5700MHz
 Tx Chain: All - Radio 10
 Mode: a
 Data Rate: 6
 Power setting: Tx Power 34 (Command Line)

5725 MHz Band Edge Signal Radiated Field Strength

Frequency	Level	Pol	15.E		Detector	Azimuth	Height	Comments
MHz	dB μ V/m	v/h	Limit	Margin	Pk/QP/Avg	degrees	meters	
5762.440	59.7	V	68.3	-8.6	PK	354	1.8	POS; RB 1 MHz; VB: 3 MHz
5759.310	56.5	H	68.3	-11.8	PK	7	1.0	POS; RB 1 MHz; VB: 3 MHz





EMC Test Data

Client: Xirrus	Job Number: J93457
Model: XR2000H	T-Log Number: T93459
Contact: Peter Krebill	Project Manager: Christine Krebill
Standard: FCC 15.247, 15.407, EN 55022, FCC B	Project Coordinator: -
	Class: N/A

Run #3: Radiated Bandedge Measurements, 5250-5350MHz

Previous testing shows Vertical antenna polarizarization is worst case

Date of Test: 9/30/2013 17:00

Config. Used: 1

Test Engineer: David Bare

Config Change: None

Test Location: Fremont Chamber #5

EUT Voltage: POE

Channel: 56 - 5280MHz

Tx Chain: All - Radio 2

Mode: n20

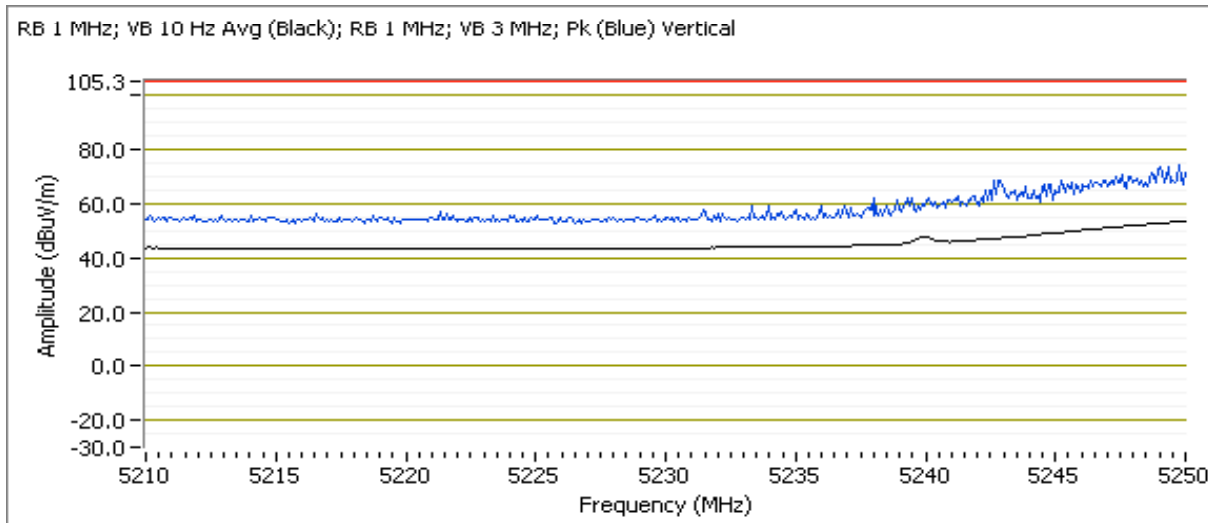
Data Rate: MCS0

Power setting: Tx Power 34 (Command Line)

5250 MHz Band Edge Signal Radiated Field Strength

Based on KDB 789033 D01 v01r03 (H) 2.c.i

Frequency	Level	Pol	FCC 15.209		Detector	Azimuth	Height	Comments
MHz	dB μ V/m	v/h	Limit	Margin	Pk/QP/Avg	degrees	meters	
5249.920	53.7	V	54.0	-0.3	AVG	0	1.5	POS; RB 1 MHz; VB: 10 Hz, Note 3
5248.930	73.6	V	74.0	-0.4	PK	0	1.5	POS; RB 1 MHz; VB: 3 MHz





EMC Test Data

Client: Xirrus	Job Number: J93457
Model: XR2000H	T-Log Number: T93459
	Project Manager: Christine Krebill
Contact: Peter Krebill	Project Coordinator: -
Standard: FCC 15.247, 15.407, EN 55022, FCC B	Class: N/A

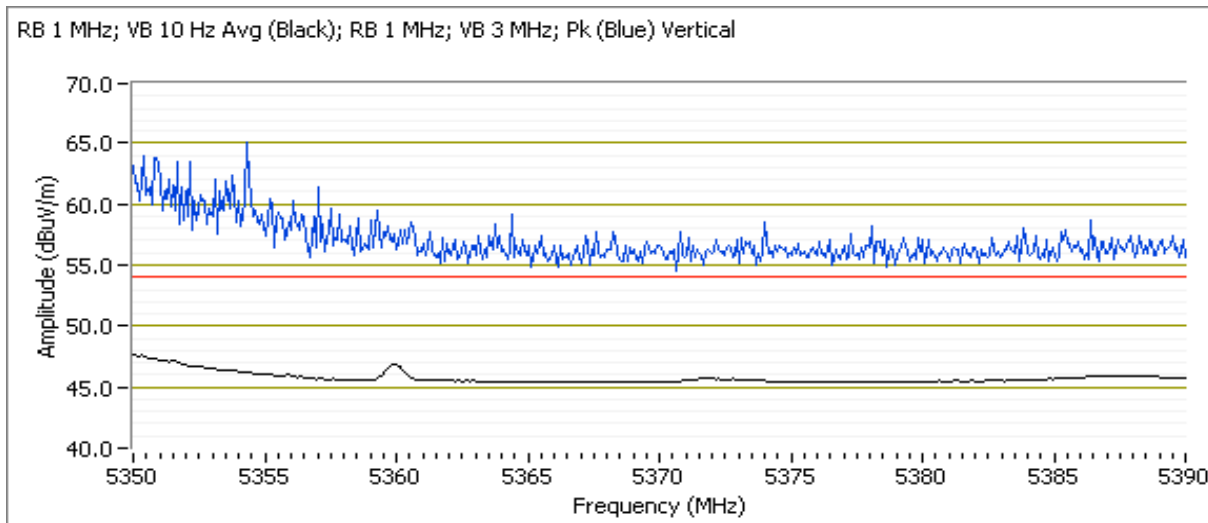
Date of Test: 10/1/2013 8:00
 Test Engineer: David Bare
 Test Location: Fremont Chamber #5

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

Channel: 64 - 5320MHz
 Tx Chain: All - Radio 6
 Mode: n20
 Data Rate: MCS0
 Power setting: Tx Power 34 (Command Line)

5350 MHz Band Edge Signal Radiated Field Strength

Frequency MHz	Level dB μ V/m	Pol v/h	FCC 15.209		Detector Pk/QP/Avg	Azimuth degrees	Height meters	Comments
			Limit	Margin				
5350.000	48.4	V	54.0	-5.6	AVG	289	1.6	POS; RB 1 MHz; VB: 10 Hz, Note 3
5350.050	67.2	V	74.0	-6.8	PK	289	1.6	POS; RB 1 MHz; VB: 3 MHz





EMC Test Data

Client: Xirrus	Job Number: J93457
Model: XR2000H	T-Log Number: T93459
	Project Manager: Christine Krebill
Contact: Peter Krebill	Project Coordinator: -
Standard: FCC 15.247, 15.407, EN 55022, FCC B	Class: N/A

Run #4: Radiated Bandedge Measurements, 5470-5725MHz

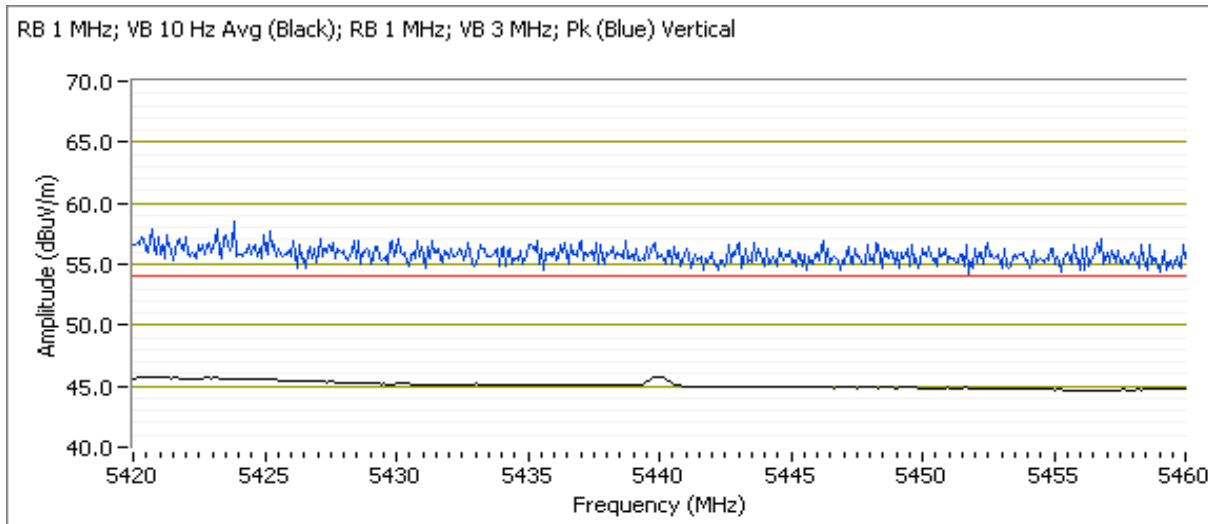
Date of Test: 10/1/2013 8:20
 Test Engineer: David Bare
 Test Location: Fremont Chamber #5

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

Channel: 100 - 5500MHz
 Tx Chain: All - Radio 2
 Mode: n20
 Data Rate: MCS0
 Power setting: Tx Power 34 (Command Line)

5460 MHz Band Edge Signal Radiated Field Strength

Frequency MHz	Level dB μ V/m	Pol v/h	FCC 15.209		Detector Pk/QP/Avg	Azimuth degrees	Height meters	Comments
			Limit	Margin				
5439.960	46.1	V	54.0	-7.9	AVG	289	1.1	POS; RB 1 MHz; VB: 10 Hz, Note 3
5422.320	57.8	V	74.0	-16.2	PK	289	1.1	POS; RB 1 MHz; VB: 3 MHz





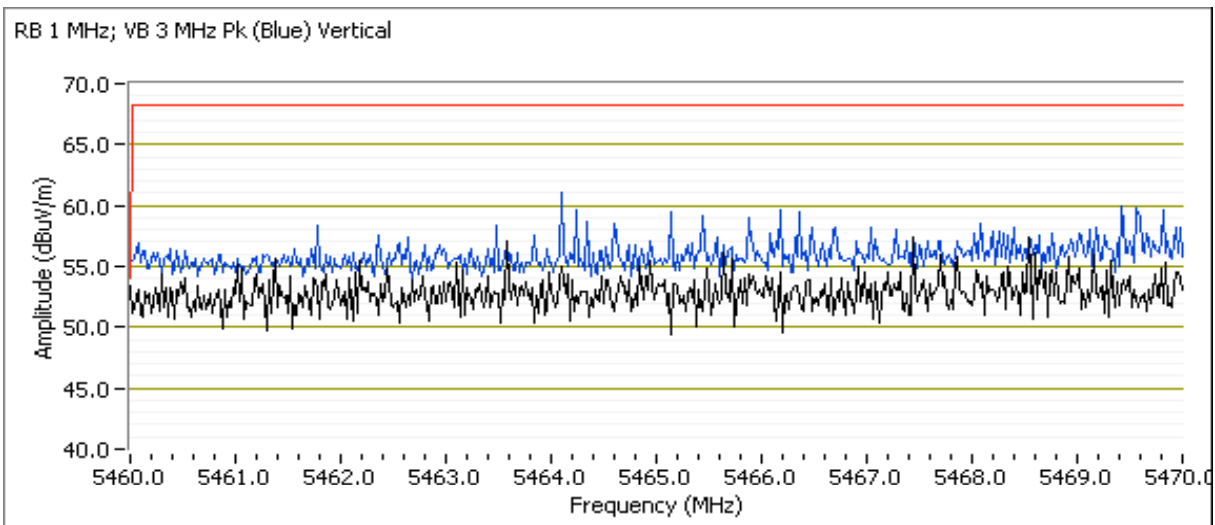
EMC Test Data

Client: Xirrus	Job Number: J93457
Model: XR2000H	T-Log Number: T93459
Contact: Peter Krebill	Project Manager: Christine Krebill
Standard: FCC 15.247, 15.407, EN 55022, FCC B	Project Coordinator: -
	Class: N/A

5470 MHz Band Edge Signal Radiated Field Strength

Frequency	Level	Pol	15.E		Detector	Azimuth	Height	Comments
MHz	dB μ V/m	v/h	Limit	Margin	Pk/QP/Avg	degrees	meters	
5464.030	61.8	V	68.3	-6.5	PK	289	1.1	POS; RB 1 MHz; VB: 3 MHz

RB 1 MHz; VB 3 MHz Pk (Blue) Vertical





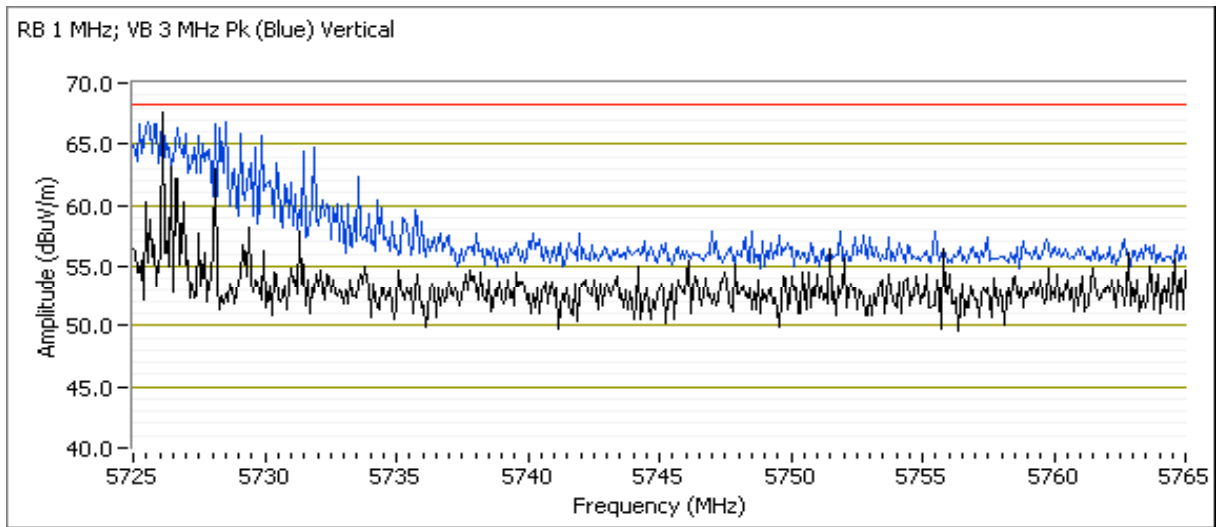
EMC Test Data

Client: Xirrus	Job Number: J93457
Model: XR2000H	T-Log Number: T93459
Contact: Peter Krebill	Project Manager: Christine Krebill
Standard: FCC 15.247, 15.407, EN 55022, FCC B	Project Coordinator: -
	Class: N/A

Channel: 140 - 5700MHz
 Tx Chain: All - Radio 10
 Mode: n20
 Data Rate: MCS0
 Power setting: Tx Power 34 (Command Line)

5725 MHz Band Edge Signal Radiated Field Strength

Frequency	Level	Pol	15.E		Detector	Azimuth	Height	Comments
MHz	dB μ V/m	v/h	Limit	Margin	Pk/QP/Avg	degrees	meters	
5725.960	66.8	V	68.3	-1.5	PK	33	1.5	POS; RB 1 MHz; VB: 3 MHz





EMC Test Data

Client: Xirrus	Job Number: J93457
Model: XR2000H	T-Log Number: T93459
Contact: Peter Krebill	Project Manager: Christine Krebill
Standard: FCC 15.247, 15.407, EN 55022, FCC B	Project Coordinator: -
	Class: N/A

Run #5: Radiated Bandedge Measurements, 5250-5350MHz

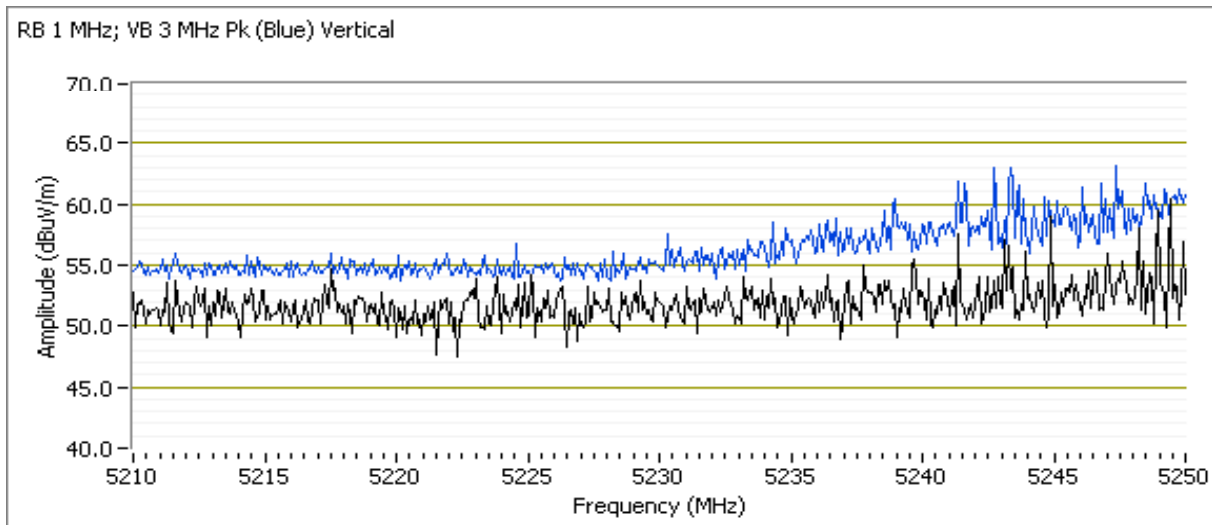
Date of Test: 9/30/2013 0:00
 Test Engineer: Rafael Varelas
 Test Location: FT Chamber #5

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

Channel: 62 - 5310MHz
 Tx Chain: All - Radio 6
 Mode: n40
 Data Rate: MCS0
 Power setting: Tx Power 30 (Command Line)

5250 MHz Band Edge Signal Radiated Field Strength

Frequency	Level	Pol	FCC 15.209		Detector	Azimuth	Height	Comments
MHz	dB μ V/m	v/h	Limit	Margin	Pk/QP/Avg	degrees	meters	
5247.600	63.0	V	68.3	-5.3	PK	101	1.0	POS; RB 1 MHz; VB: 3 MHz



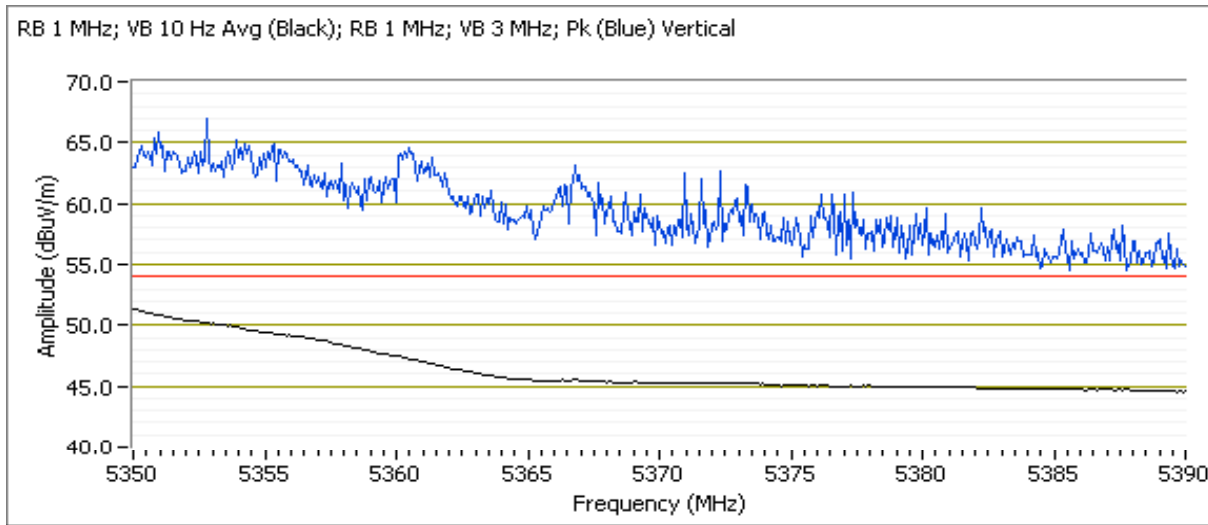


EMC Test Data

Client: Xirrus	Job Number: J93457
Model: XR2000H	T-Log Number: T93459
Contact: Peter Krebill	Project Manager: Christine Krebill
Standard: FCC 15.247, 15.407, EN 55022, FCC B	Project Coordinator: -
	Class: N/A

5350 MHz Band Edge Signal Radiated Field Strength

Frequency MHz	Level dB μ V/m	Pol v/h	FCC 15.209		Detector Pk/QP/Avg	Azimuth degrees	Height meters	Comments
			Limit	Margin				
5350.000	52.1	V	54.0	-1.9	AVG	101	1.0	POS; RB 1 MHz; VB: 10 Hz, Note 3
5350.400	65.2	V	74.0	-8.8	PK	101	1.0	POS; RB 1 MHz; VB: 3 MHz





EMC Test Data

Client: Xirrus	Job Number: J93457
Model: XR2000H	T-Log Number: T93459
Contact: Peter Krebill	Project Manager: Christine Krebill
Standard: FCC 15.247, 15.407, EN 55022, FCC B	Project Coordinator: -
	Class: N/A

Run #6: Radiated Bandedge Measurements, 5470-5725MHz

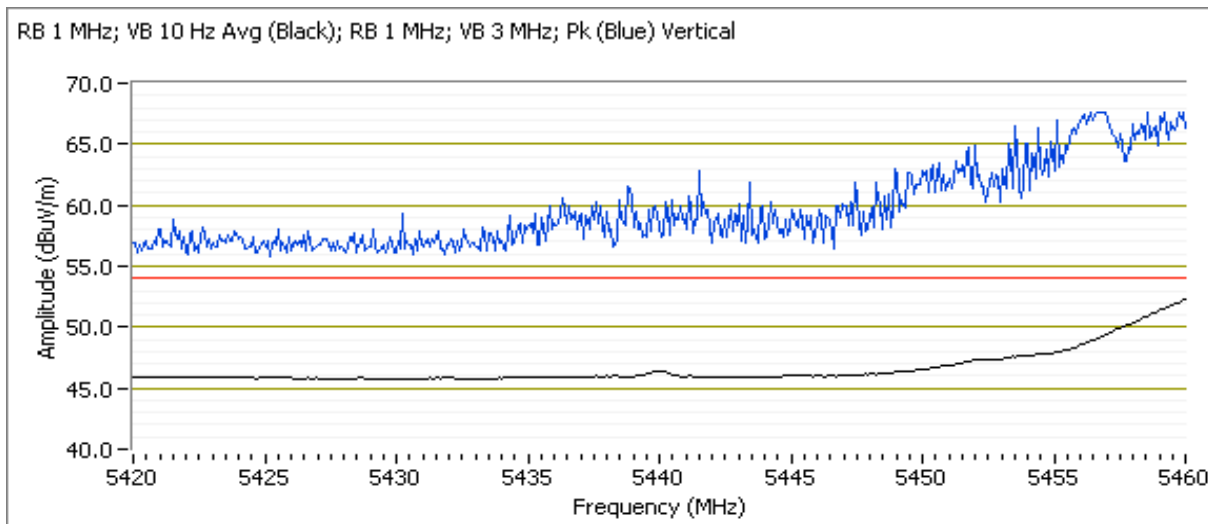
Date of Test: 10/1/2013 9:20
 Test Engineer: David Bare
 Test Location: Fremont Chamber #5

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

Channel: 102 - 5510MHz
 Tx Chain: All - Radio 2
 Mode: n40
 Data Rate: MCS0
 Power setting: Tx Power 27 (Command Line)

5460 MHz Band Edge Signal Radiated Field Strength

Frequency	Level	Pol	FCC 15.209		Detector	Azimuth	Height	Comments
MHz	dB μ V/m	v/h	Limit	Margin	PK/QP/Avg	degrees	meters	
5460.000	53.3	V	54.0	-0.7	AVG	0	1.5	POS; RB 1 MHz; VB: 10 Hz, Note 3
5459.520	67.7	V	74.0	-6.3	PK	0	1.5	POS; RB 1 MHz; VB: 3 MHz



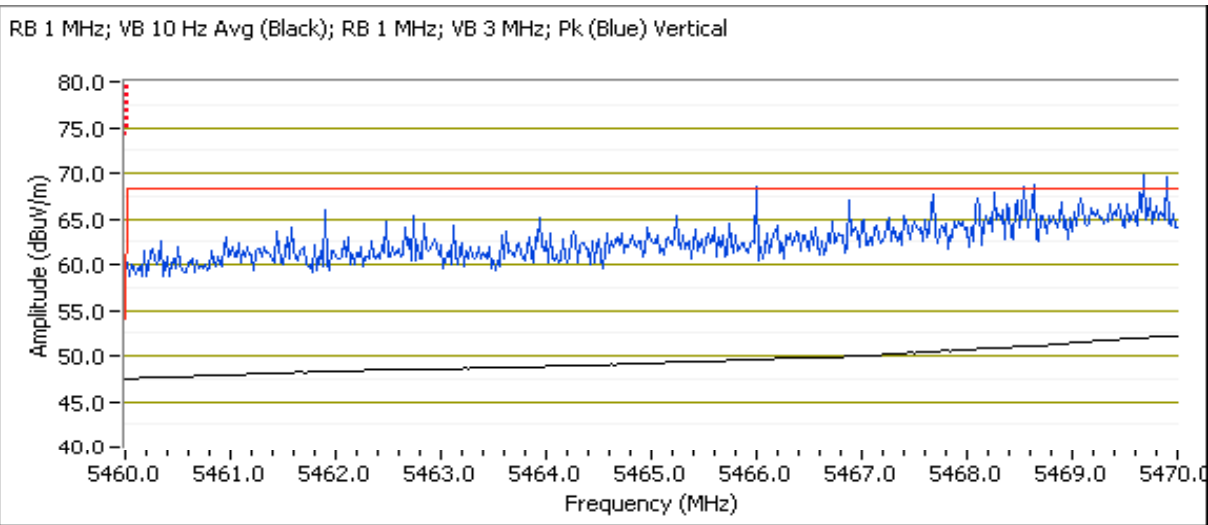


EMC Test Data

Client: Xirrus	Job Number: J93457
Model: XR2000H	T-Log Number: T93459
Contact: Peter Krebill	Project Manager: Christine Krebill
Standard: FCC 15.247, 15.407, EN 55022, FCC B	Project Coordinator: -
	Class: N/A

5470 MHz Band Edge Signal Radiated Field Strength

Frequency MHz	Level dB μ V/m	Pol v/h	15.E		Detector Pk/QP/Avg	Azimuth degrees	Height meters	Comments
			Limit	Margin				
5469.920	53.0	V	54.0	-1.0	AVG	0	1.5	POS; RB 1 MHz; VB: 10 Hz, Note 3
5467.520	71.2	V	74.0	-2.8	PK	0	1.5	POS; RB 1 MHz; VB: 3 MHz





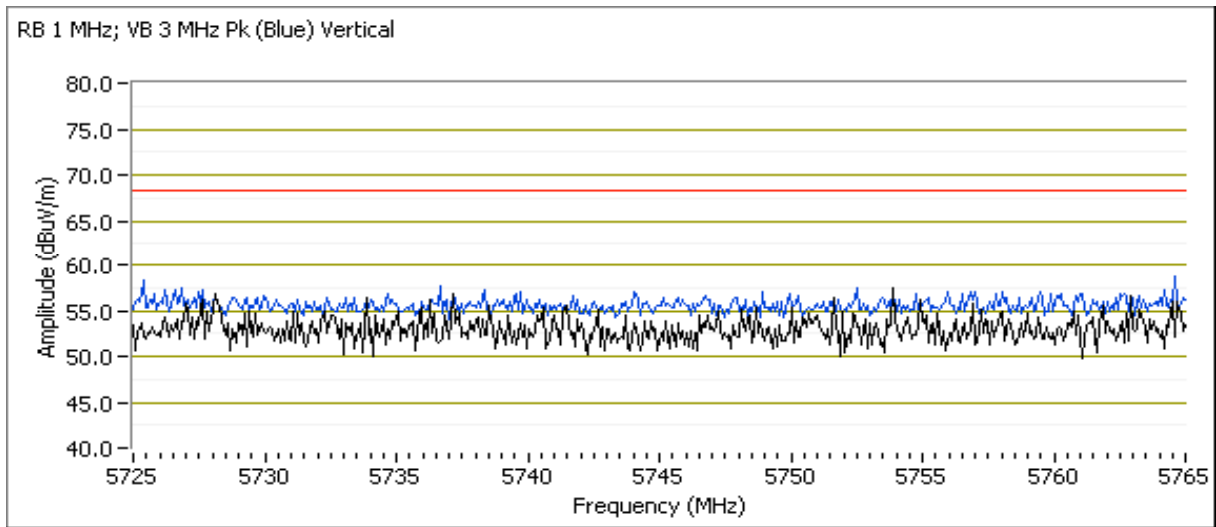
EMC Test Data

Client: Xirrus	Job Number: J93457
Model: XR2000H	T-Log Number: T93459
	Project Manager: Christine Krebill
Contact: Peter Krebill	Project Coordinator: -
Standard: FCC 15.247, 15.407, EN 55022, FCC B	Class: N/A

Channel: 134 - 5670MHz
 Tx Chain: All - Radio 10
 Mode: n40
 Data Rate: MCS0
 Power setting: Tx Power 34 (Command Line)

5725 MHz Band Edge Signal Radiated Field Strength

Frequency	Level	Pol	15.E		Detector	Azimuth	Height	Comments
MHz	dB μ V/m	v/h	Limit	Margin	Pk/QP/Avg	degrees	meters	
5755.540	59.8	V	68.3	-8.5	PK	88	1.3	POS; RB 1 MHz; VB: 3 MHz





EMC Test Data

Client: Xirrus	Job Number: J93457
Model: XR2000H	T-Log Number: T93459
	Project Manager: Christine Krebill
Contact: Peter Krebill	Project Coordinator: -
Standard: FCC 15.247, 15.407, EN 55022, FCC B	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. For radiated emissions testing the measurement antenna was located 3 meters from the EUT, unless otherwise noted.

Ambient Conditions:

Temperature: 20.8 °C
Rel. Humidity: 39 %

Summary of Results

Run #	Mode	Channel	Power Setting	Test Performed	Limit	Result / Margin
Operating within 5250-5350 MHz						
1	802.11a 802.11b	See Below	See Below	Radiated Emissions, 1 - 40 GHz	FCC 15.209 / 15 E	67.1 dBµV/m @ 10521.3 MHz (-1.2 dB)
	802.11a 802.11b	See Below	See Below	Radiated Emissions, 4500 - 5150 MHz	FCC 15.209 / 15 E	See above
2	802.11n20 802.11b	See Below	See Below	Radiated Emissions, 1 - 40 GHz	FCC 15.209 / 15 E	53.6 dBµV/m @ 10600.0 MHz (-0.4 dB)
	802.11n20 802.11b	See Below	See Below	Radiated Emissions, 4500 - 5150 MHz	FCC 15.209 / 15 E	See above
3	802.11a 802.11a	See Below	See Below	Radiated Emissions, 1 - 40 GHz	FCC 15.209 / 15 E	53.5 dBµV/m @ 10600.9 MHz (-0.5 dB)
4	802.11n20 802.11n20	See Below	See Below	Radiated Emissions, 1 - 40 GHz	FCC 15.209 / 15 E	66.7 dBµV/m @ 6318.5 MHz (-1.6 dB)
5	802.11n40 802.11n20	See Below	See Below	Radiated Emissions, 1 - 40 GHz	FCC 15.209 / 15 E	67.4 dBµV/m @ 10533.0 MHz (-0.9 dB)
	802.11n40 802.11n20	See Below	See Below	Radiated Emissions, 4500 - 5150 MHz	FCC 15.209 / 15 E	See above
6	802.11n40 802.11n20	See Below	See Below	Radiated Emissions, 1 - 40 GHz	FCC 15.209 / 15 E	66.2 dBµV/m @ 10537.0 MHz (-2.1 dB)



EMC Test Data

Client:	Xirrus	Job Number:	J93457
Model:	XR2000H	T-Log Number:	T93459
Contact:	Peter Krebill	Project Manager:	Christine Krebill
Standard:	FCC 15.247, 15.407, EN 55022, FCC B	Project Coordinator:	-
		Class:	N/A

System Configuration: Operating within 5250-5350 MHz

Radio #	Frequency	CH	Mode	Pwr
Run: 1				
2	5260	52	802.11a	34
6	5300	60	802.11a	34
10	5320	64	802.11a	34
14	2437	6	802.11b	34
Run: 2				
2	5260	52	802.11n20	34
6	5300	60	802.11n20	34
10	5320	64	802.11n20	34
14	2437	6	802.11b	34
Run: 3				
2	5260	52	802.11a	32
6	5300	60	802.11a	32
10	5320	64	802.11a	34
14	5785	157	802.11a	34
Run: 4				
2	5260	52	802.11n20	34
6	5300	60	802.11n20	34
10	5320	64	802.11n20	34
14	5785	157	802.11n20	34
Run: 5				
2	5270	54	802.11n40	34
6	5310	62	802.11n40	34
10	5755	151	802.11n40	34
14	5785	157	802.11n20	34
Run: 6				
2	5270	54	802.11n40	34
6	5310	62	802.11n40	34
10	2422	3	802.11n40	34
14	2437	6	802.11n20	34

Notes - Multiple radios operating at the same time as shown above. In all cases, power set to the maximum worse case single channel power, transmitting on all chains.



EMC Test Data

Client: Xirrus	Job Number: J93457
Model: XR2000H	T-Log Number: T93459
Contact: Peter Krebill	Project Manager: Christine Krebill
Standard: FCC 15.247, 15.407, EN 55022, FCC B	Project Coordinator: -
	Class: N/A

Run #	Mode	Channel	Power Setting		Test Performed	Limit	Result / Margin
Operating within 5470-5725 MHz							
7	802.11a 802.11b	See Below	See Below		Radiated Emissions, 1 - 40 GHz	FCC 15.209 / 15 E	51.6 dB μ V/m @ 11003.7 MHz (-2.4 dB)
	802.11a 802.11b	See Below	See Below		Radiated Emissions, 4500 - 5150 MHz	FCC 15.209 / 15 E	See above
8	802.11n20 802.11b	See Below	See Below		Radiated Emissions, 1 - 40 GHz	FCC 15.209 / 15 E	52.1 dB μ V/m @ 10998.5 MHz (-1.9 dB)
	802.11n20 802.11b	See Below	See Below		Radiated Emissions, 4500 - 5150 MHz	FCC 15.209 / 15 E	See above
9	802.11a 802.11a	See Below	See Below		Radiated Emissions, 1 - 40 GHz	FCC 15.209 / 15 E	53.2 dB μ V/m @ 10998.6 MHz -0.8 dB)
10	802.11n20 802.11n20	See Below	See Below		Radiated Emissions, 1 - 40 GHz	FCC 15.209 / 15 E	53.1 dB μ V/m @ 10998.5 MHz (-0.9 dB)
11	802.11n40 802.11n20	See Below	See Below		Radiated Emissions, 1 - 40 GHz	FCC 15.209 / 15 E	50.2 dB μ V/m @ 11015.9 MHz (-3.8 dB)
	802.11n40 802.11n20	See Below	See Below		Radiated Emissions, 4500 - 5150 MHz	FCC 15.209 / 15 E	See above
12	802.11n40 802.11n20	See Below	See Below		Radiated Emissions, 1 - 40 GHz	FCC 15.209 / 15 E	53.5 dB μ V/m @ 11014.1 MHz (-0.5 dB)



EMC Test Data

Client:	Xirrus	Job Number:	J93457
Model:	XR2000H	T-Log Number:	T93459
		Project Manager:	Christine Krebill
Contact:	Peter Krebill	Project Coordinator:	-
Standard:	FCC 15.247, 15.407, EN 55022, FCC B	Class:	N/A

System Configuration: Operating within 5470-5725 MHz

Radio #	Frequency	CH	Mode	Pwr
Run: 7				
2	5500	100	802.11a	32
10	5580	116	802.11a	34
14	5700	140	802.11a	34
6	2437	6	802.11b	34
Run: 8				
2	5500	100	802.11n20	31
10	5580	116	802.11n20	34
14	5700	140	802.11n20	34
6	2437	6	802.11b	34
Run: 9				
2	5500	100	802.11a	32
10	5580	116	802.11a	34
14	5700	140	802.11a	34
6	5785	157	802.11a	34
Run: 10				
2	5500	100	802.11n20	31
10	5580	116	802.11n20	34
14	5700	140	802.11n20	34
6	5785	157	802.11n20	34
Run: 11				
2	5510	102	802.11n40	34
6	5550	110	802.11n40	34
10	5670	134	802.11n40	34
14	5785	157	802.11n20	34
Run: 12				
2	5510	102	802.11n40	34
6	5550	110	802.11n40	34
10	5670	134	802.11n40	34
14	2437	6	802.11n20	34

Notes - Multiple radios operating at the same time as shown above. In all cases, power set to the maximum worse case single channel power, transmitting on all chains.



EMC Test Data

Client: Xirrus	Job Number: J93457
Model: XR2000H	T-Log Number: T93459
	Project Manager: Christine Krebill
Contact: Peter Krebill	Project Coordinator: -
Standard: FCC 15.247, 15.407, EN 55022, FCC B	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.

Procedure Comments:

Measurements performed in accordance with FCC KDB 789033

Peak measurements performed with: RBW=1MHz, VBW=3MHz, peak detector, max hold, auto sweep time

Unless otherwise stated/noted, emissions had duty cycle < 98%, but constant, average measurement performed: RBW=1MHz, VBW=10Hz, peak detector, linear averaging, auto sweep, trace average 100 traces, measurement corrected by Linear Voltage correction factor.

Mode	Data Rate	Duty Cycle (x)	Constant DC?	T (ms)	Pwr Cor Factor*	Lin Volt Cor Factor**	Min VBW for FS (Hz)
11b	1Mb/s	0.99	Yes	4.02	0.0	0.0	249
11a	MB/s	0.96	Yes	1.35	0.2	0.3	741
11n20	MCS	0.97	Yes	1.27	0.1	0.3	787
11n40	MCS	0.90	Yes	0.6	0.5	1.0	1667

Sample Notes

Sample S/N: 20:0C:7D

Driver:

Antenna: (x8) Dipole

Measurement Specific Notes:

Note 1:	For emissions outside of the restricted bands the limit is -27dBm/MHz eirp (68.3dBuV/m). The measurement method required is a peak measurement (RB=1MHz, VB≥3MHz, peak detector). Per KDB 789033 2) c) (i), compliance can be demonstrated by meeting the average and peak limits of 15.209, as an alternative.
Note 2:	Emission has duty cycle < 98%, but constant, average measurement performed: RBW=1MHz, VBW=10Hz, peak detector, linear averaging, auto sweep, trace average 100 * 1/DC traces, measurement corrected by Linear Voltage correction factor



EMC Test Data

Client: Xirrus	Job Number: J93457
Model: XR2000H	T-Log Number: T93459
Contact: Peter Krebill	Project Manager: Christine Krebill
Standard: FCC 15.247, 15.407, EN 55022, FCC B	Project Coordinator: -
	Class: N/A

Run #1, Radiated Spurious Emissions, 1,000 - 40,000 MHz. Operation in the 5250-5350 MHz Band, 802.11a/b

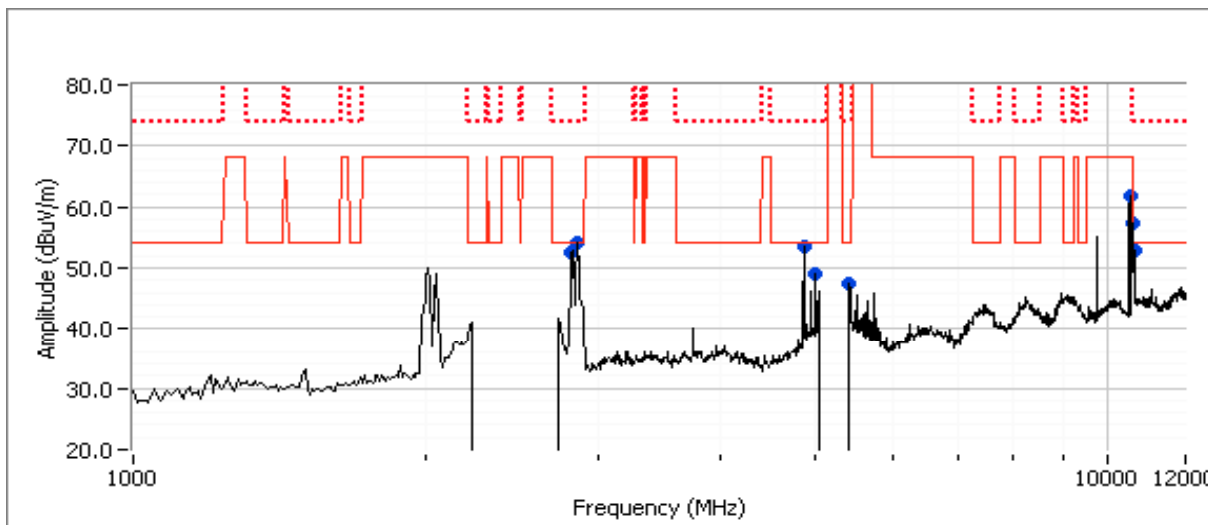
Date of Test: 9/27/2013 0:00
 Test Engineer: Rafael Varelas
 Test Location: Fremont Chamber#5

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

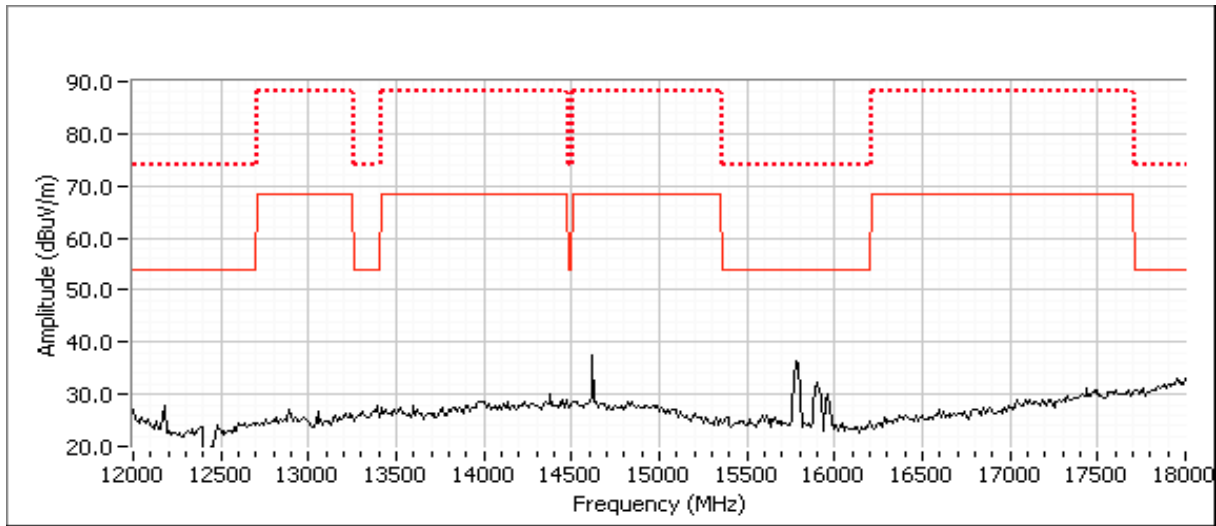
Radio #	Frequency	CH	Mode	Pwr	Radio #	Frequency	CH	Mode	Pwr
2	5260	52	802.11a	34	10	5320	64	802.11a	34
6	5300	60	802.11a	34	14	2437	6	802.11b	34

Tx Chain: 2x2

Run #1a: Radiated Spurious Emissions, 1,000 - 40000 MHz.



Client: Xirrus	Job Number: J93457
Model: XR2000H	T-Log Number: T93459
Contact: Peter Krebill	Project Manager: Christine Krebill
Standard: FCC 15.247, 15.407, EN 55022, FCC B	Project Coordinator: -
	Class: N/A

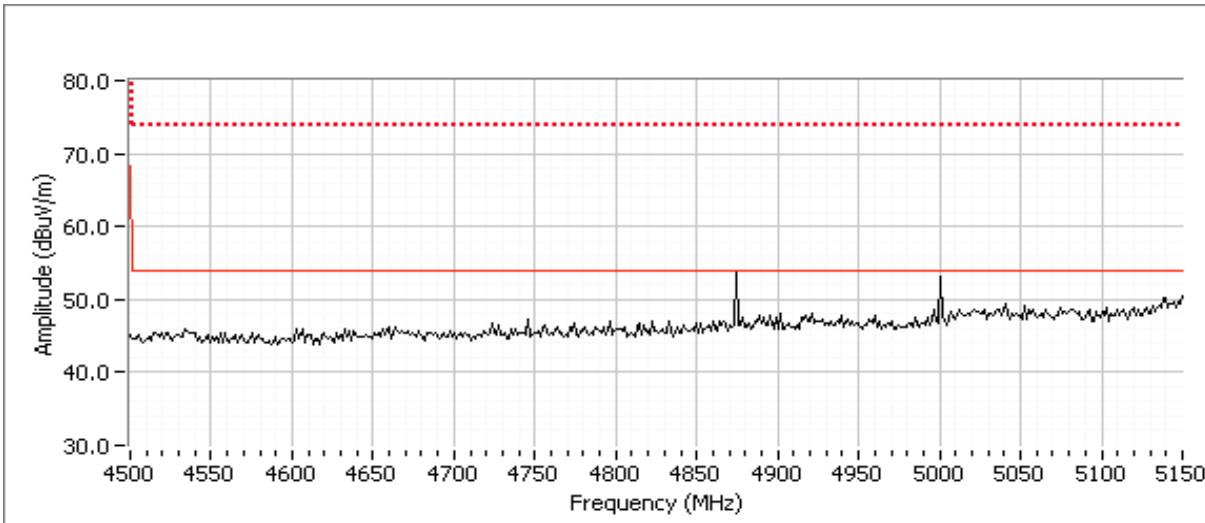


Frequency MHz	Level dB μ V/m	Pol v/h	15.209 / 15E		Detector PK/QP/Avg	Azimuth degrees	Height meters	Comments
			Limit	Margin				
10521.300	67.1	V	68.3	-1.2	PK	198	1.4	RB 1 MHz;VB 3 MHz;Peak
10600.090	48.9	H	54.0	-5.1	AVG	150	1.0	RB 1 MHz;VB 10 Hz;Peak
10601.880	60.4	H	74.0	-13.6	PK	150	1.0	RB 1 MHz;VB 3 MHz;Peak
4873.950	49.6	V	54.0	-4.4	AVG	186	1.4	RB 1 MHz;VB 10 Hz;Peak, Note 2
4873.970	53.2	V	74.0	-20.8	PK	186	1.4	RB 1 MHz;VB 3 MHz;Peak
2828.420	49.0	V	54.0	-5.0	AVG	215	1.1	RB 1 MHz;VB 10 Hz;Peak
2825.960	59.7	V	74.0	-14.3	PK	215	1.1	RB 1 MHz;VB 3 MHz;Peak
2883.040	43.4	V	54.0	-10.6	AVG	191	1.0	RB 1 MHz;VB 10 Hz;Peak
2886.870	54.2	V	74.0	-19.8	PK	191	1.0	RB 1 MHz;VB 3 MHz;Peak
10639.680	51.4	H	54.0	-2.6	AVG	225	1.1	RB 1 MHz;VB 10 Hz;Peak
10635.230	62.7	H	74.0	-11.3	PK	225	1.1	RB 1 MHz;VB 3 MHz;Peak
5000.040	44.6	V	60.0	-15.4	AVG	296	1.3	Digital Bus Emission, Class A limits
5000.000	49.5	V	80.0	-30.5	PK	296	1.3	Digital Bus Emission, Class A limits
5421.410	41.9	V	54.0	-12.1	AVG	347	1.6	RB 1 MHz;VB 10 Hz;Peak
5419.660	51.8	V	74.0	-22.2	PK	347	1.6	RB 1 MHz;VB 3 MHz;Peak

Note:	Scans made between 18 - 40 GHz with the measurement antenna moved around the EUT and its antennas 30cm from the device indicated there were no significant emissions in this frequency range
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 a peak measurement (RB=1MHz, VB \geq 3MHz, peak detector).

Client: Xirrus	Job Number: J93457
Model: XR2000H	T-Log Number: T93459
	Project Manager: Christine Krebill
Contact: Peter Krebill	Project Coordinator: -
Standard: FCC 15.247, 15.407, EN 55022, FCC B	Class: N/A

Run #1b: Radiated Spurious Emissions, 4,500 - 5,150 MHz zoom scan





EMC Test Data

Client: Xirrus	Job Number: J93457
Model: XR2000H	T-Log Number: T93459
	Project Manager: Christine Krebill
Contact: Peter Krebill	Project Coordinator: -
Standard: FCC 15.247, 15.407, EN 55022, FCC B	Class: N/A

Run #2, Radiated Spurious Emissions, 1,000 - 40,000 MHz. Operation in the 5250-5350 MHz Band, 802.11n20/b

Date of Test: 9/27/2013 0:00

Config. Used: 1

Test Engineer: Rafael Varelas

Config Change: None

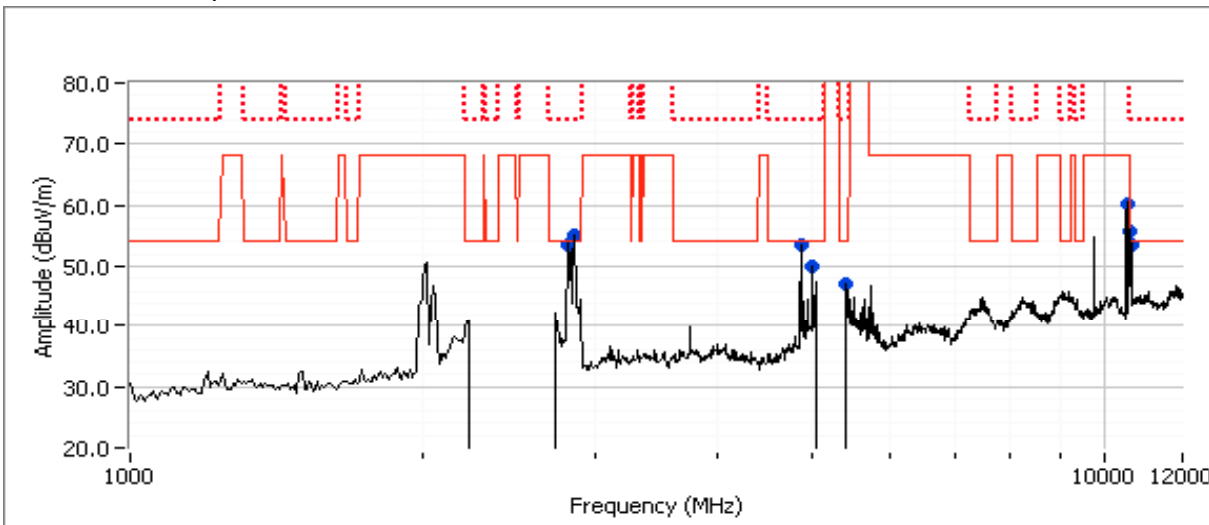
Test Location: Fremont Chamber#5

EUT Voltage: POE

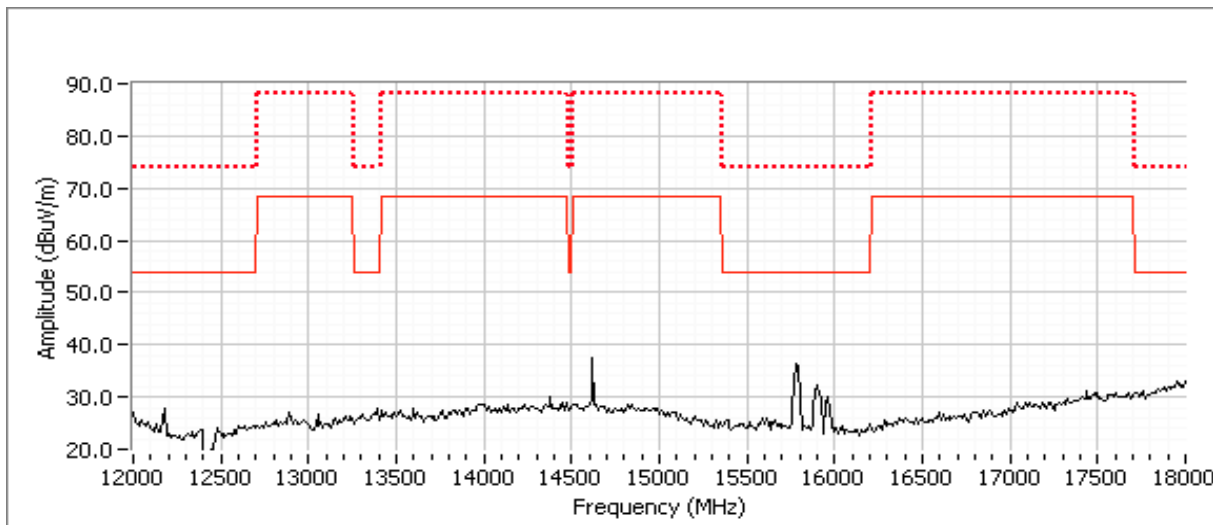
Radio #	Frequency	CH	Mode	Pwr	Radio #	Frequency	CH	Mode	Pwr
2	5260	52	802.11n20	34	10	5320	64	802.11n20	34
6	5300	60	802.11n20	34	14	2437	6	802.11b	34

Tx Chain: 2x2

Run #2a: Radiated Spurious Emissions, 1,000 - 40000 MHz.



Client: Xirrus	Job Number: J93457
Model: XR2000H	T-Log Number: T93459
Contact: Peter Krebill	Project Manager: Christine Krebill
Standard: FCC 15.247, 15.407, EN 55022, FCC B	Project Coordinator: -
	Class: N/A

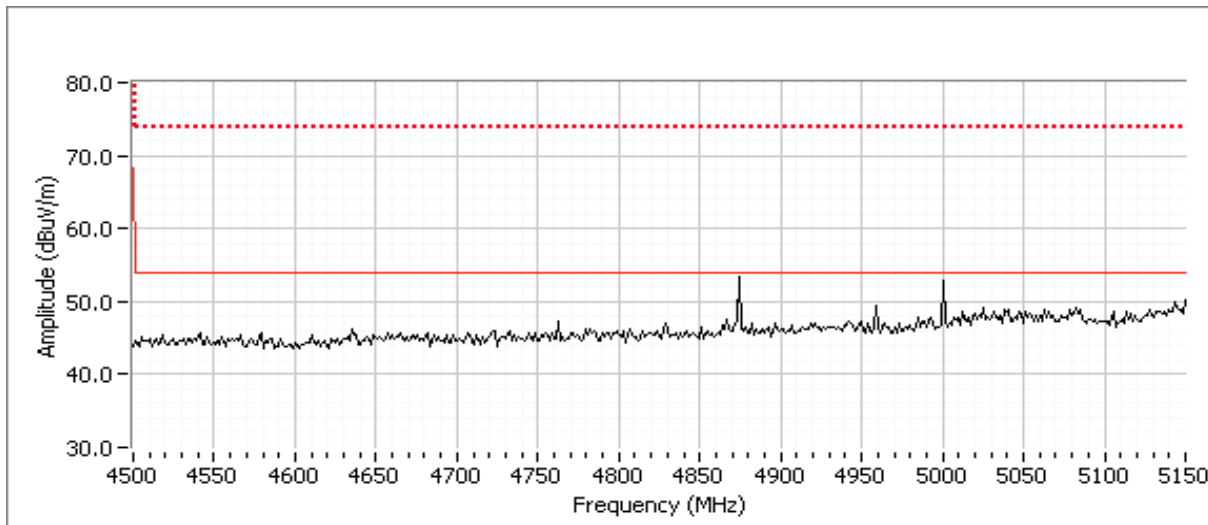


Frequency MHz	Level dB μ V/m	Pol v/h	15.209 / 15E		Detector PK/QP/Avg	Azimuth degrees	Height meters	Comments
			Limit	Margin				
10600.020	53.6	H	54.0	-0.4	AVG	74	1.7	RB 1 MHz;VB 10 Hz;Peak
10600.870	66.1	H	74.0	-7.9	PK	74	1.7	RB 1 MHz;VB 3 MHz;Peak
4999.960	44.8	V	60.0	-15.2	AVG	307	1.4	Digital Bus Emission, Class A limits
5000.040	51.0	V	80.0	-29.0	PK	307	1.4	Digital Bus Emission, Class A limits
2858.110	51.7	V	54.0	-2.3	AVG	247	1.3	RB 1 MHz;VB 10 Hz;Peak
2858.580	61.8	V	74.0	-12.2	PK	247	1.3	RB 1 MHz;VB 3 MHz;Peak
10639.460	51.7	V	54.0	-2.3	AVG	205	1.3	RB 1 MHz;VB 10 Hz;Peak
10641.210	63.2	V	74.0	-10.8	PK	205	1.3	RB 1 MHz;VB 3 MHz;Peak
2819.440	50.4	V	54.0	-3.6	AVG	227	1.2	RB 1 MHz;VB 10 Hz;Peak
2818.630	61.9	V	74.0	-12.1	PK	227	1.2	RB 1 MHz;VB 3 MHz;Peak
5414.340	42.7	V	54.0	-11.3	AVG	183	1.6	RB 1 MHz;VB 10 Hz;Peak
5413.470	53.6	V	74.0	-20.4	PK	183	1.6	RB 1 MHz;VB 3 MHz;Peak
4873.950	50.8	V	54.0	-3.2	AVG	162	1.3	RB 1 MHz;VB 10 Hz;Peak, Note 2
4873.990	53.9	V	74.0	-20.1	PK	162	1.3	RB 1 MHz;VB 3 MHz;Peak
10522.210	67.3	V	68.3	-1.0	PK	155	1.0	RB 1 MHz;VB 3 MHz;Peak

Note:	Scans made between 18 - 40 GHz with the measurement antenna moved around the EUT and its antennas 30cm from the device indicated there were no significant emissions in this frequency range
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 a peak measurement (RB=1MHz, VB \geq 3MHz, peak detector).

Client: Xirrus	Job Number: J93457
Model: XR2000H	T-Log Number: T93459
	Project Manager: Christine Krebill
Contact: Peter Krebill	Project Coordinator: -
Standard: FCC 15.247, 15.407, EN 55022, FCC B	Class: N/A

Run #2b: Radiated Spurious Emissions, 4,500 - 5,150 MHz zoom scan





EMC Test Data

Client: Xirrus	Job Number: J93457
Model: XR2000H	T-Log Number: T93459
Contact: Peter Krebill	Project Manager: Christine Krebill
Standard: FCC 15.247, 15.407, EN 55022, FCC B	Project Coordinator: -
	Class: N/A

Run #3, Radiated Spurious Emissions, 1,000 - 40,000 MHz. Operation in the 5250-5350 MHz Band, 802.11a

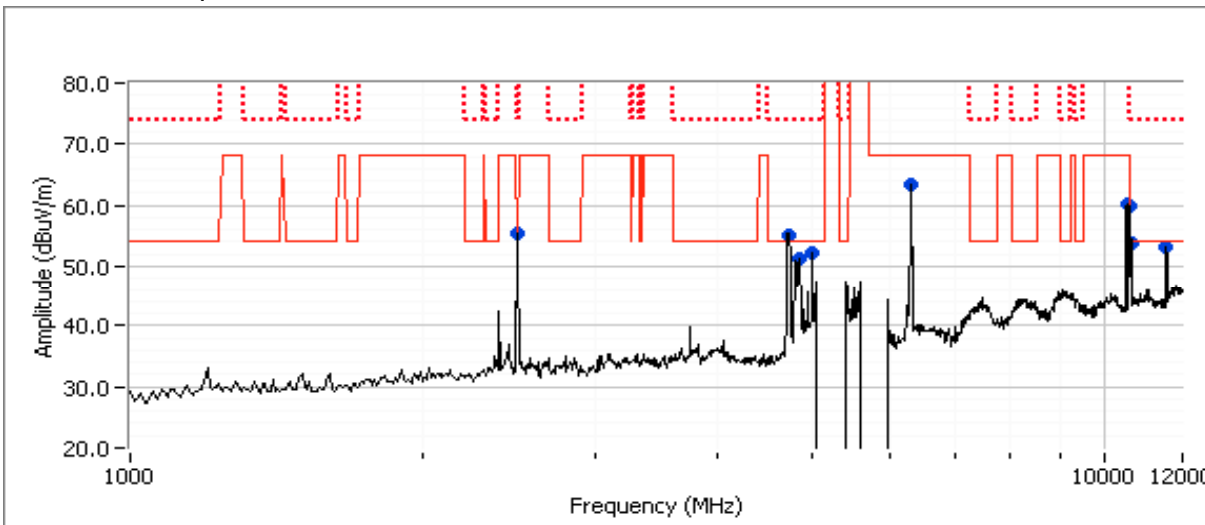
Date of Test: 9/27/2013 0:00
 Test Engineer: Rafael Varelas
 Test Location: Fremont Chamber#5

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

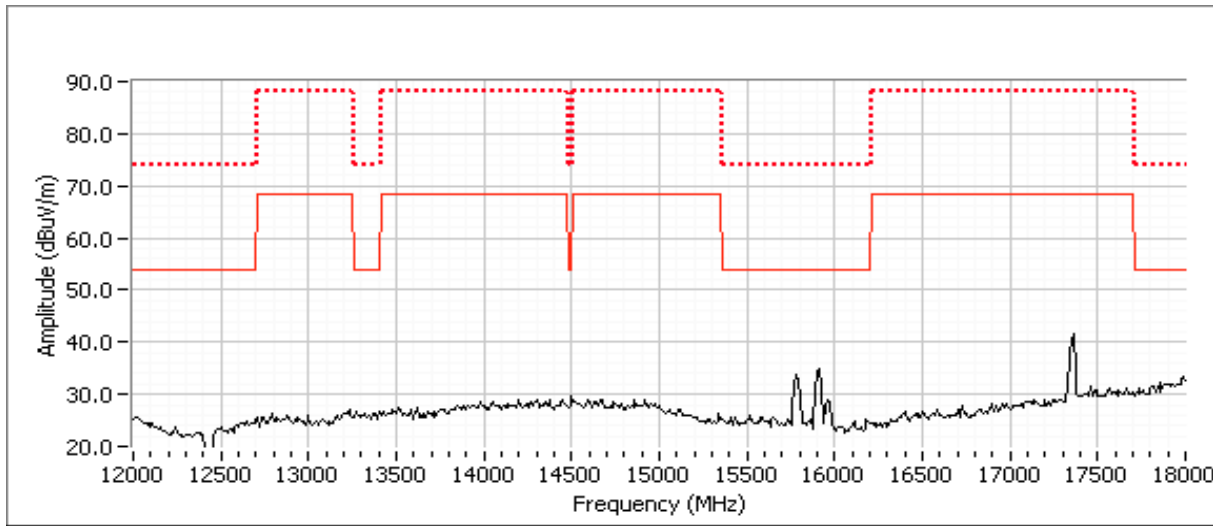
Radio #	Frequency	CH	Mode	Pwr	Radio #	Frequency	CH	Mode	Pwr
Run: 3									
2	5260	52	802.11a	32	10	5320	64	802.11a	34
6	5300	60	802.11a	32	14	5785	157	802.11a	34

Tx Chain: 2x2

Run #3: Radiated Spurious Emissions, 1,000 - 40000 MHz.



Client: Xirrus	Job Number: J93457
Model: XR2000H	T-Log Number: T93459
	Project Manager: Christine Krebill
Contact: Peter Krebill	Project Coordinator: -
Standard: FCC 15.247, 15.407, EN 55022, FCC B	Class: N/A



Frequency MHz	Level dBµV/m	Pol v/h	15.209 / 15E		Detector PK/QP/Avg	Azimuth degrees	Height meters	Comments
			Limit	Margin				
10600.870	53.5	V	54.0	-0.5	AVG	125	1.3	RB 1 MHz;VB 10 Hz;Peak
10600.870	66.2	V	74.0	-7.8	PK	125	1.3	RB 1 MHz;VB 3 MHz;Peak
4735.530	50.1	V	54.0	-4.2	AVG	54	1.2	RB 1 MHz;VB 10 Hz;Peak
4740.670	62.8	V	74.0	-11.2	PK	54	1.2	RB 1 MHz;VB 3 MHz;Peak
4999.980	46.7	V	60.0	-7.3	AVG	125	1.0	Digital Bus Emission, Class A limits
5000.010	51.5	V	80.0	-22.5	PK	125	1.0	Digital Bus Emission, Class A limits
4855.680	45.9	V	54.0	-8.4	AVG	151	1.0	RB 1 MHz;VB 10 Hz;Peak
4860.260	56.7	V	74.0	-17.3	PK	151	1.0	RB 1 MHz;VB 3 MHz;Peak
10518.670	65.2	H	68.3	-3.1	PK	197	1.2	RB 1 MHz;VB 3 MHz;Peak



EMC Test Data

Client: Xirrus	Job Number: J93457
Model: XR2000H	T-Log Number: T93459
	Project Manager: Christine Krebill
Contact: Peter Krebill	Project Coordinator: -
Standard: FCC 15.247, 15.407, EN 55022, FCC B	Class: N/A

Frequency MHz	Level dB μ V/m	Pol v/h	15.209 / 15E		Detector Pk/QP/Avg	Azimuth degrees	Height meters	Comments
			Limit	Margin				
11564.280	48.1	V	54.0	-5.9	AVG	220	1.5	RB 1 MHz;VB 10 Hz;Peak
11564.880	59.3	V	74.0	-14.7	PK	220	1.5	RB 1 MHz;VB 3 MHz;Peak
10640.060	51.3	H	54.0	-2.7	AVG	230	1.1	RB 1 MHz;VB 10 Hz;Peak
10639.910	63.4	H	74.0	-10.6	PK	230	1.1	RB 1 MHz;VB 3 MHz;Peak
6318.380	67.0	V	68.3	-1.3	PK	265	1.3	RB 1 MHz;VB 3 MHz;Peak

Note:	Scans made between 18 - 40 GHz with the measurement antenna moved around the EUT and its antennas 30cm from the device indicated there were no significant emissions in this frequency range
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 a peak measurement (RB=1MHz, VB \geq 3MHz, peak detector).
Note 3:	2500MHz is a digital signal from PCI bus. Refer to test data for Part 15B.
Note 4:	Power reduced to setting 32 on radios 2 and 6



EMC Test Data

Client: Xirrus	Job Number: J93457
Model: XR2000H	T-Log Number: T93459
	Project Manager: Christine Krebill
Contact: Peter Krebill	Project Coordinator: -
Standard: FCC 15.247, 15.407, EN 55022, FCC B	Class: N/A

Run #4, Radiated Spurious Emissions, 1,000 - 40,000 MHz. Operation in the 5250-5350 MHz Band, 802.11n20

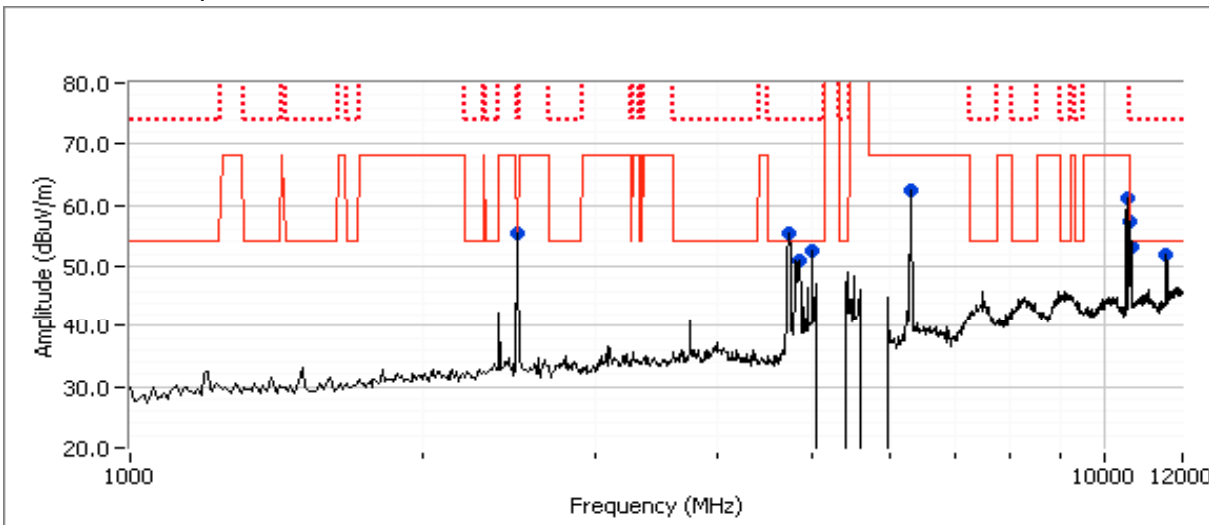
Date of Test: 9/27/2013 0:00
 Test Engineer: Rafael Varelas
 Test Location: Fremont Chamber#5

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

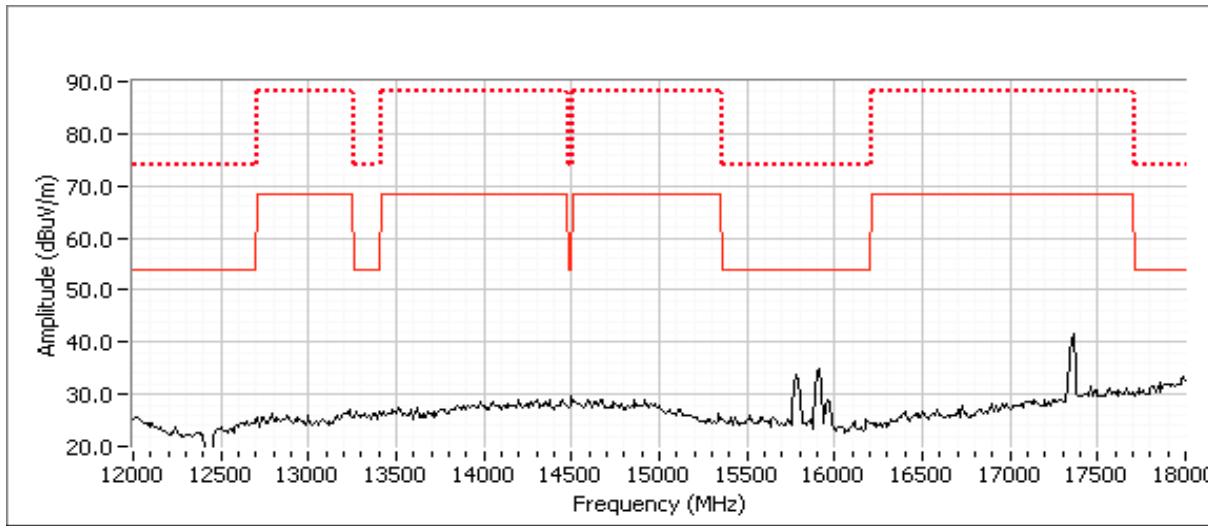
Radio #	Frequency	CH	Mode	Pwr	Radio #	Frequency	CH	Mode	Pwr
2	5260	52	802.11n20	34	10	5320	64	802.11n20	34
6	5300	60	802.11n20	34	14	5785	157	802.11n20	34

Tx Chain: 2x2

Run #4: Radiated Spurious Emissions, 1,000 - 40000 MHz.



Client: Xirrus	Job Number: J93457
Model: XR2000H	T-Log Number: T93459
Contact: Peter Krebill	Project Manager: Christine Krebill
Standard: FCC 15.247, 15.407, EN 55022, FCC B	Project Coordinator: -
	Class: N/A



Frequency MHz	Level dB μ V/m	Pol v/h	15.209 / 15E		Detector PK/QP/Avg	Azimuth degrees	Height meters	Comments
			Limit	Margin				
6318.470	66.7	V	68.3	-1.6	PK	257	1.2	RB 1 MHz;VB 3 MHz;Peak
4999.970	46.5	V	60.0	-13.5	AVG	308	1.0	Digital Bus Emission, Class A limits
4999.670	51.6	V	80.0	-28.4	PK	308	1.0	Digital Bus Emission, Class A limits
4739.930	49.2	V	54.0	-4.8	AVG	300	1.3	RB 1 MHz;VB 10 Hz;Peak
4738.740	61.0	V	74.0	-13.0	PK	300	1.3	RB 1 MHz;VB 3 MHz;Peak
10639.800	51.6	H	54.0	-2.4	AVG	230	1.0	RB 1 MHz;VB 10 Hz;Peak
10641.030	63.2	H	74.0	-10.8	PK	230	1.0	RB 1 MHz;VB 3 MHz;Peak
11575.030	47.2	V	54.0	-6.8	AVG	210	1.0	RB 1 MHz;VB 10 Hz;Peak
11575.660	59.5	V	74.0	-14.5	PK	210	1.0	RB 1 MHz;VB 3 MHz;Peak
10527.050	66.6	H	68.3	-1.7	PK	217	1.0	RB 1 MHz;VB 3 MHz;Peak
10600.020	51.5	V	54.0	-2.5	AVG	172	1.3	RB 1 MHz;VB 10 Hz;Peak
10601.240	62.6	V	74.0	-11.4	PK	172	1.3	RB 1 MHz;VB 3 MHz;Peak
4859.650	46.6	V	54.0	-7.4	AVG	151	1.3	RB 1 MHz;VB 10 Hz;Peak
4856.970	57.7	V	74.0	-16.3	PK	151	1.3	RB 1 MHz;VB 3 MHz;Peak

Note:	Scans made between 18 - 40 GHz with the measurement antenna moved around the EUT and its antennas 30cm from the device indicated there were no significant emissions in this frequency range
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 a peak measurement (RB=1MHz, VB \geq 3MHz, peak detector).
Note 3:	2500MHz is a digital signal from PCI bus. Refer to test data for Part 15B.



EMC Test Data

Client: Xirrus	Job Number: J93457
Model: XR2000H	T-Log Number: T93459
	Project Manager: Christine Krebill
Contact: Peter Krebill	Project Coordinator: -
Standard: FCC 15.247, 15.407, EN 55022, FCC B	Class: N/A

Run #5, Radiated Spurious Emissions, 1,000 - 40,000 MHz. Operation in the 5250-5350 MHz Band, 802.11n40/n20

Date of Test: 9/27/2013 0:00

Config. Used: 1

Test Engineer: Rafael Varelas

Config Change: None

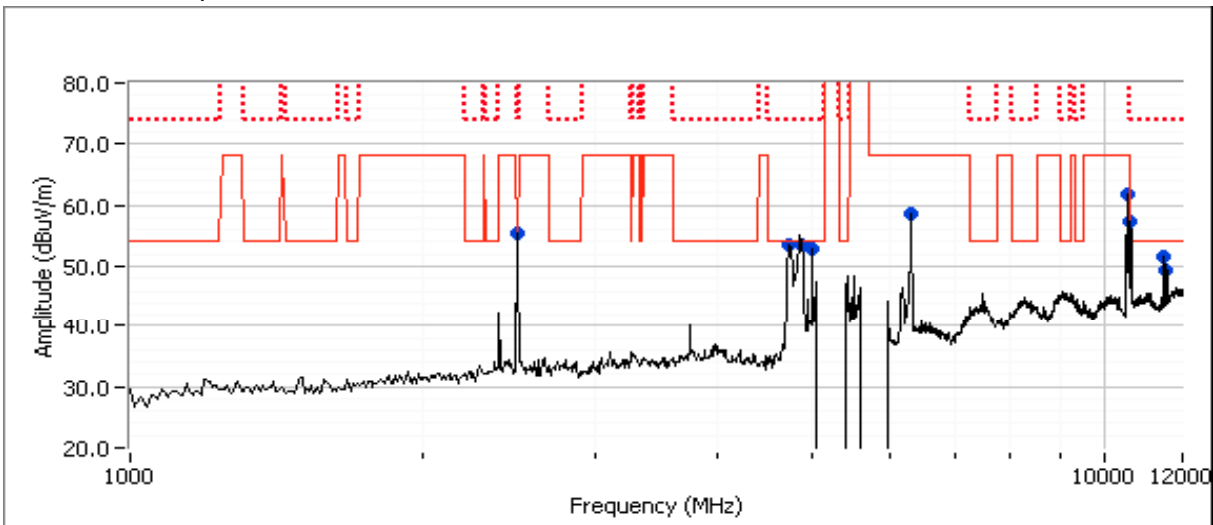
Test Location: Fremont Chamber#5

EUT Voltage: POE

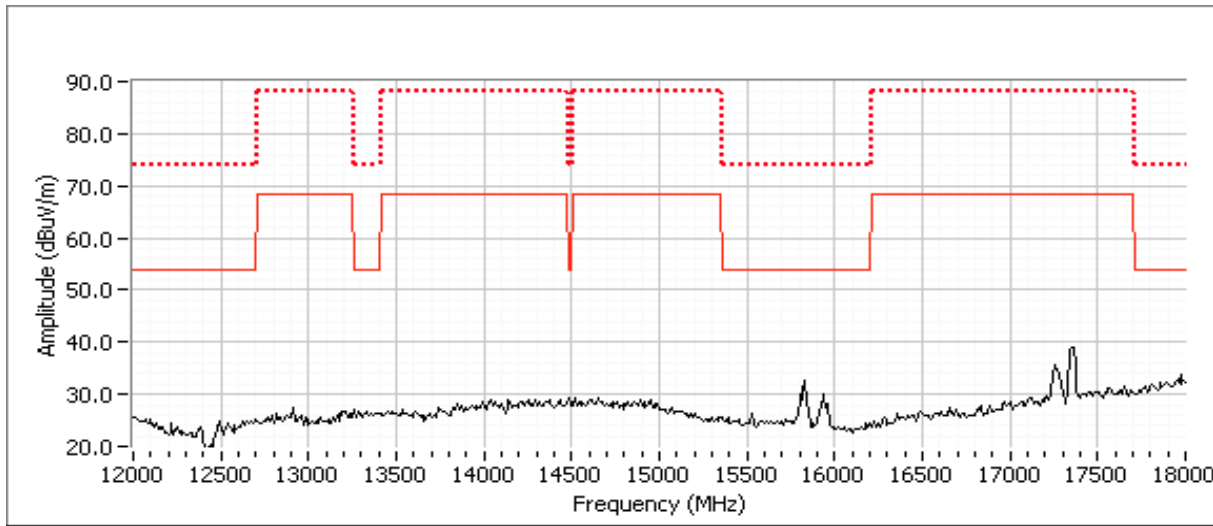
Radio #	Frequency	CH	Mode	Pwr	Radio #	Frequency	CH	Mode	Pwr
2	5270	54	802.11n40	34	10	5755	151	802.11n40	34
6	5310	62	802.11n40	34	14	5785	157	802.11n20	34

Tx Chain: 2x2

Run #5: Radiated Spurious Emissions, 1,000 - 40000 MHz.



Client: Xirrus	Job Number: J93457
Model: XR2000H	T-Log Number: T93459
Contact: Peter Krebill	Project Manager: Christine Krebill
Standard: FCC 15.247, 15.407, EN 55022, FCC B	Project Coordinator: -
	Class: N/A

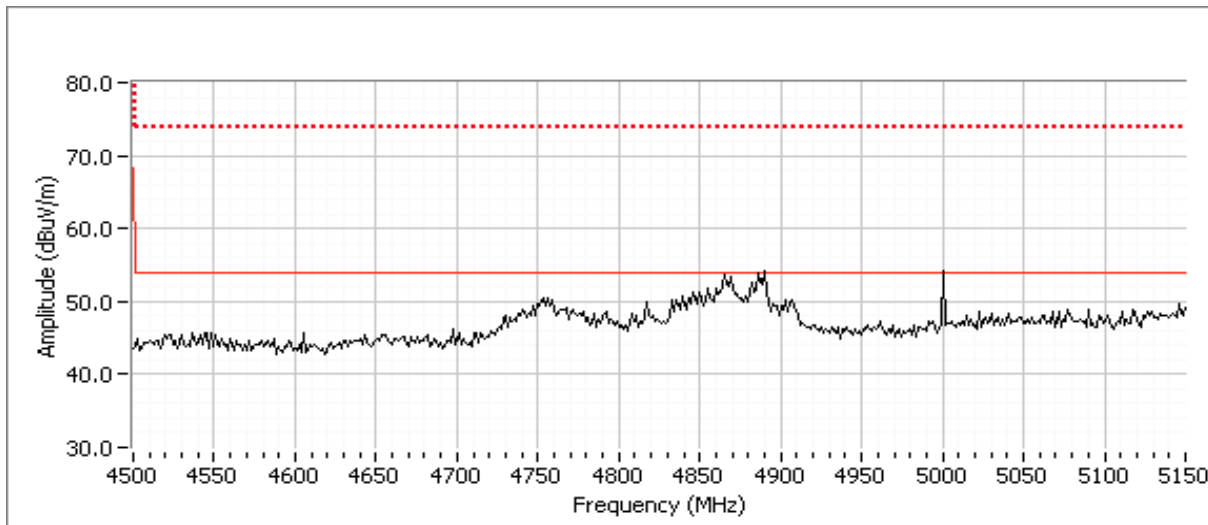


Frequency MHz	Level dB μ V/m	Pol v/h	15.209 / 15E		Detector PK/QP/Avg	Azimuth degrees	Height meters	Comments
			Limit	Margin				
10532.960	67.4	V	68.3	-0.9	PK	148	1.3	RB 1 MHz;VB 3 MHz;Peak
4746.400	49.6	V	54.0	-4.4	AVG	48	1.1	RB 1 MHz;VB 10 Hz;Peak
4744.720	60.8	V	74.0	-13.2	PK	48	1.1	RB 1 MHz;VB 3 MHz;Peak
11509.430	45.7	H	54.0	-8.3	AVG	130	1.6	RB 1 MHz;VB 10 Hz;Peak
11508.460	56.9	H	74.0	-17.1	PK	130	1.6	RB 1 MHz;VB 3 MHz;Peak
10615.920	51.1	H	54.0	-2.9	AVG	259	1.4	RB 1 MHz;VB 10 Hz;Peak
10615.400	62.9	H	74.0	-11.1	PK	259	1.4	RB 1 MHz;VB 3 MHz;Peak
11562.750	48.7	V	54.0	-5.3	AVG	225	1.5	RB 1 MHz;VB 10 Hz;Peak
11562.620	59.4	V	74.0	-14.6	PK	225	1.5	RB 1 MHz;VB 3 MHz;Peak
6316.520	64.1	V	68.3	-4.2	PK	261	1.1	RB 1 MHz;VB 3 MHz;Peak
4887.290	49.6	V	54.0	-4.4	AVG	302	1.2	RB 1 MHz;VB 10 Hz;Peak
4882.890	60.7	V	74.0	-13.3	PK	302	1.2	RB 1 MHz;VB 3 MHz;Peak
5000.040	47.8	V	54.0	-6.2	AVG	306	1.2	Digital Bus Emission, Class A limits
4999.960	52.4	V	74.0	-21.6	PK	306	1.2	Digital Bus Emission, Class A limits

Note:	Scans made between 18 - 40 GHz with the measurement antenna moved around the EUT and its antennas 30cm from the device indicated there were no significant emissions in this frequency range
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 a peak measurement (RB=1MHz, VB \geq 3MHz, peak detector).
Note 3:	2500MHz is a digital signal from PCI bus. Refer to test data for Part 15B.

Client: Xirrus	Job Number: J93457
Model: XR2000H	T-Log Number: T93459
	Project Manager: Christine Krebill
Contact: Peter Krebill	Project Coordinator: -
Standard: FCC 15.247, 15.407, EN 55022, FCC B	Class: N/A

Run #5b: Radiated Spurious Emissions, 4,500 - 5,150 MHz zoom scan





EMC Test Data

Client: Xirrus	Job Number: J93457
Model: XR2000H	T-Log Number: T93459
	Project Manager: Christine Krebill
Contact: Peter Krebill	Project Coordinator: -
Standard: FCC 15.247, 15.407, EN 55022, FCC B	Class: N/A

Run #6, Radiated Spurious Emissions, 1,000 - 40,000 MHz. Operation in the 5250-5350 MHz Band, 802.11n40/n20

Date of Test: 9/30/2013 13:10

Config. Used: 1

Test Engineer: David Bare

Config Change: None

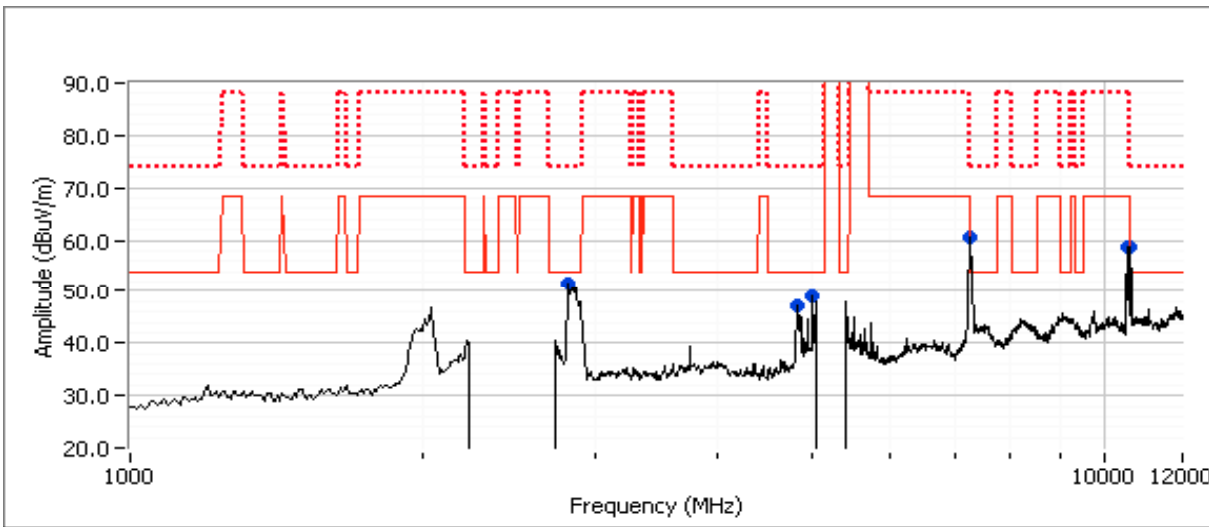
Test Location: Fremont Chamber #5

EUT Voltage: POE

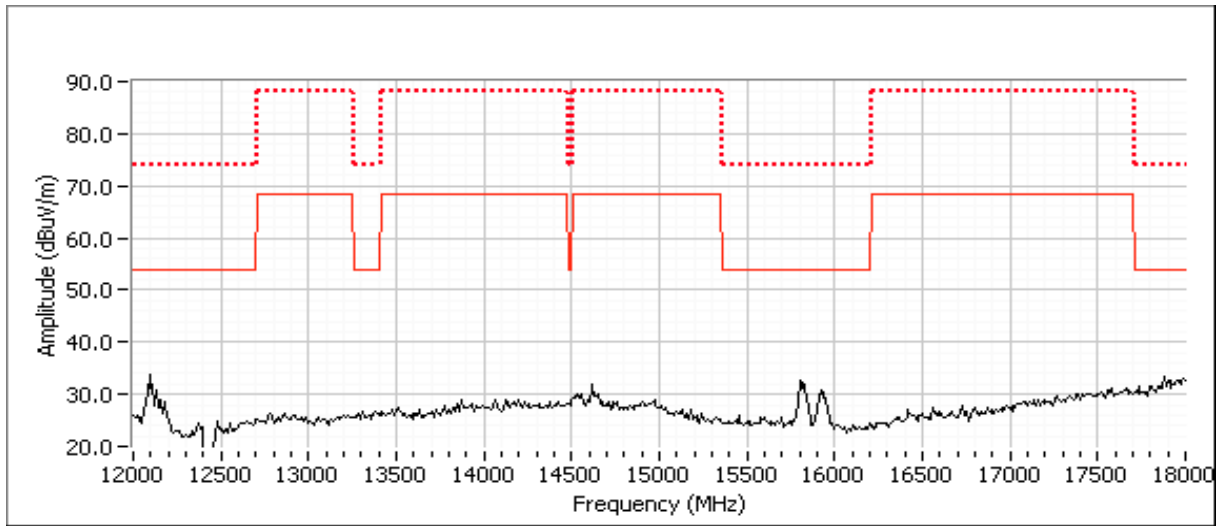
Radio #	Frequency	CH	Mode	Pwr	Radio #	Frequency	CH	Mode	Pwr
2	5270	54	802.11n40	34	10	2422	3	802.11n40	34
6	5310	62	802.11n40	34	14	2437	6	802.11n20	34

Tx Chain: 2x2

Run #6: Radiated Spurious Emissions, 1,000 - 40000 MHz.



Client: Xirrus	Job Number: J93457
Model: XR2000H	T-Log Number: T93459
Contact: Peter Krebill	Project Manager: Christine Krebill
Standard: FCC 15.247, 15.407, EN 55022, FCC B	Project Coordinator: -
	Class: N/A



Frequency MHz	Level dB μ V/m	Pol v/h	15.209 / 15E		Detector Pk/QP/Avg	Azimuth degrees	Height meters	Comments
			Limit	Margin				
10537.030	66.2	V	68.3	-2.1	PK	131	1.0	RB 1 MHz;VB 3 MHz;Peak
10617.800	51.3	V	54.0	-2.7	AVG	136	1.9	RB 1 MHz;VB 10 Hz;Peak
10615.300	64.0	V	74.0	-10.0	PK	136	1.9	RB 1 MHz;VB 3 MHz;Peak
7272.750	50.8	V	54.0	-3.2	AVG	316	1.1	RB 1 MHz;VB 10 Hz;Peak
7278.280	69.3	V	74.0	-4.7	PK	316	1.1	RB 1 MHz;VB 3 MHz;Peak
2823.850	46.0	V	54.0	-8.0	AVG	198	1.3	RB 1 MHz;VB 10 Hz;Peak
2829.250	58.8	V	74.0	-15.2	PK	198	1.3	RB 1 MHz;VB 3 MHz;Peak

Note:	Scans made between 18 - 40 GHz with the measurement antenna moved around the EUT and its antennas 30cm from the device indicated there were no significant emissions in this frequency range
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 a peak measurement (RB=1MHz, VB \geq 3MHz, peak detector).



EMC Test Data

Client: Xirrus	Job Number: J93457
Model: XR2000H	T-Log Number: T93459
	Project Manager: Christine Krebill
Contact: Peter Krebill	Project Coordinator: -
Standard: FCC 15.247, 15.407, EN 55022, FCC B	Class: N/A

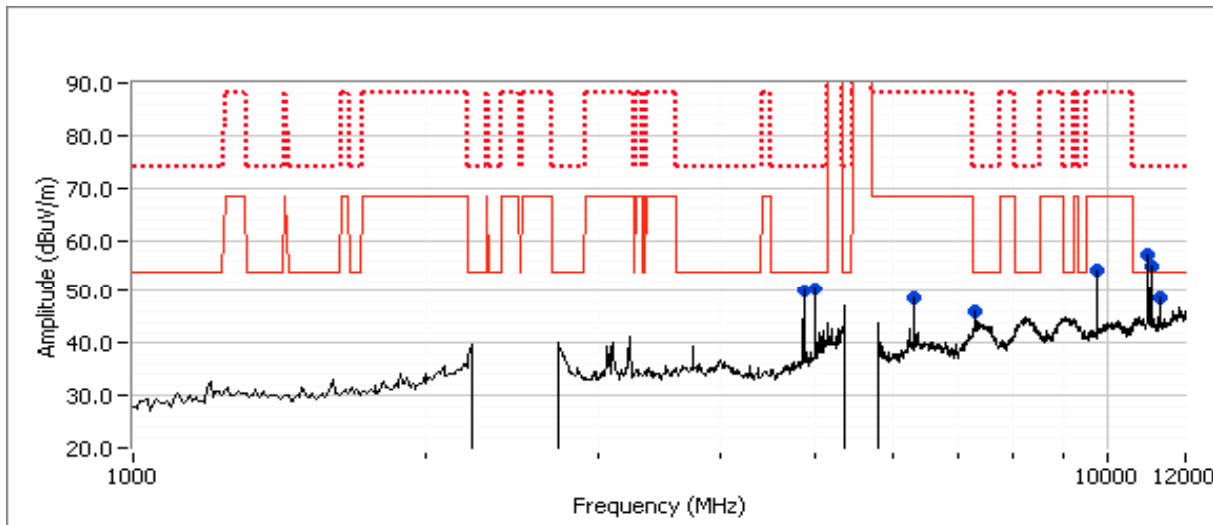
Run #7, Radiated Spurious Emissions, 1,000 - 40,000 MHz. Operation in the 5470-5725 MHz Band

Date of Test: 9/30/2013 11:28 Config. Used: 1
 Test Engineer: David Bare Config Change: None
 Test Location: Fremont Chamber #5 EUT Voltage: POE

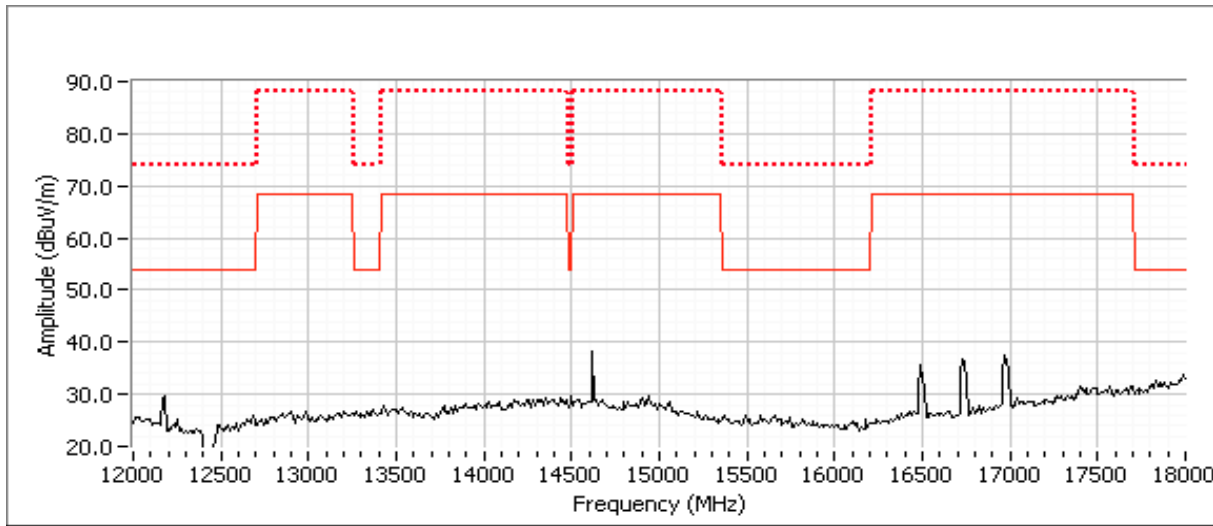
Radio #	Frequency	CH	Mode	Pwr	Radio #	Frequency	CH	Mode	Pwr
2	5500	100	802.11a	32	14	5700	140	802.11a	34
10	5580	116	802.11a	34	6	2437	6	802.11b	34

Tx Chain: 2x2

Run #7: Radiated Spurious Emissions, 1,000 - 40000 MHz.



Client: Xirrus	Job Number: J93457
Model: XR2000H	T-Log Number: T93459
Contact: Peter Krebill	Project Manager: Christine Krebill
Standard: FCC 15.247, 15.407, EN 55022, FCC B	Project Coordinator: -
	Class: N/A



Frequency MHz	Level dB μ V/m	Pol v/h	15.209 / 15E		Detector PK/QP/Avg	Azimuth degrees	Height meters	Comments
			Limit	Margin				
11003.730	51.6	V	54.0	-2.4	AVG	141	1.5	RB 1 MHz;VB 10 Hz;Peak
11002.780	65.6	V	74.0	-8.4	PK	141	1.5	RB 1 MHz;VB 3 MHz;Peak
11158.030	48.5	V	54.0	-5.5	AVG	183	1.6	RB 1 MHz;VB 10 Hz;Peak
11158.200	59.7	V	74.0	-14.3	PK	183	1.6	RB 1 MHz;VB 3 MHz;Peak
4873.940	47.9	V	54.0	-6.1	AVG	340	1.4	RB 1 MHz;VB 10 Hz;Peak, Note 2
4873.960	52.5	V	74.0	-21.5	PK	340	1.4	RB 1 MHz;VB 3 MHz;Peak
5000.000	47.2	V	60.0	-12.8	AVG	321	1.3	Digital Bus Emission, Class A limits
5000.040	51.9	V	80.0	-28.1	PK	321	1.3	Digital Bus Emission, Class A limits

Note:	Scans made between 18 - 40 GHz with the measurement antenna moved around the EUT and its antennas 30cm from the device indicated there were no significant emissions in this frequency range
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 a peak measurement (RB=1MHz, VB \geq 3MHz, peak detector).



EMC Test Data

Client: Xirrus	Job Number: J93457
Model: XR2000H	T-Log Number: T93459
	Project Manager: Christine Krebill
Contact: Peter Krebill	Project Coordinator: -
Standard: FCC 15.247, 15.407, EN 55022, FCC B	Class: N/A

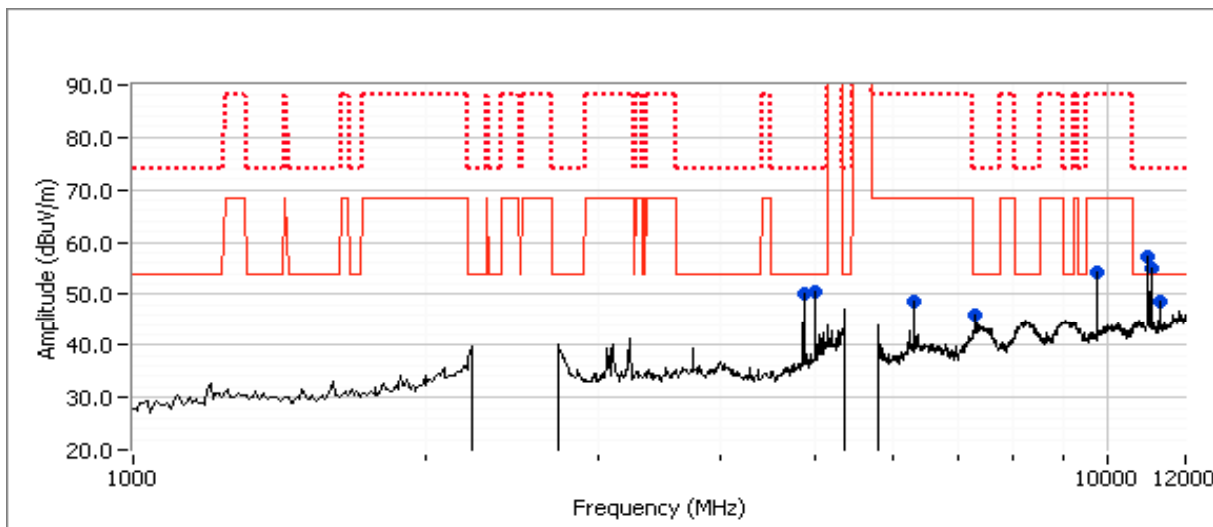
Run #8, Radiated Spurious Emissions, 1,000 - 40,000 MHz. Operation in the 5470-5725 MHz Band

Date of Test: 9/30/2013 10:48 Config. Used: 1
 Test Engineer: David Bare Config Change: None
 Test Location: Fremont Chamber #5 EUT Voltage: POE

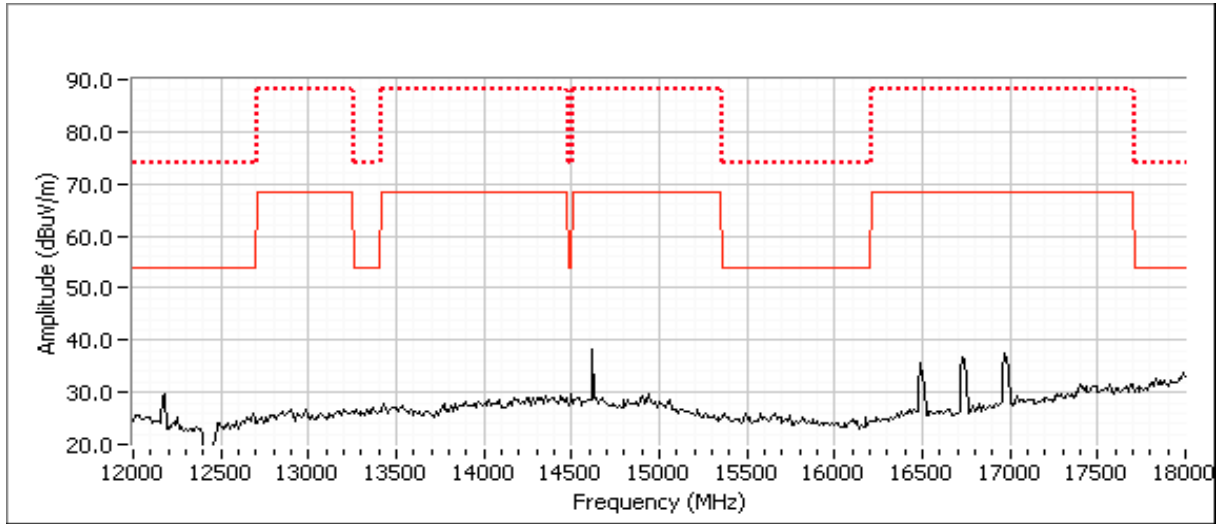
Radio #	Frequency	CH	Mode	Pwr	Radio #	Frequency	CH	Mode	Pwr
2	5500	100	802.11n20	31	14	5700	140	802.11n20	34
10	5580	116	802.11n20	34	6	2437	6	802.11b	34

Tx Chain: 2x2

Run #8: Radiated Spurious Emissions, 1,000 - 40000 MHz.



Client: Xirrus	Job Number: J93457
Model: XR2000H	T-Log Number: T93459
	Project Manager: Christine Krebill
Contact: Peter Krebill	Project Coordinator: -
Standard: FCC 15.247, 15.407, EN 55022, FCC B	Class: N/A



Frequency MHz	Level dB μ V/m	Pol v/h	15.209 / 15E		Detector Pk/QP/Avg	Azimuth degrees	Height meters	Comments
			Limit	Margin				
10998.520	52.1	V	54.0	-1.9	AVG	190	1.6	RB 1 MHz;VB 10 Hz;Peak
10999.910	66.0	V	74.0	-8.0	PK	190	1.6	RB 1 MHz;VB 3 MHz;Peak
11160.470	49.1	V	54.0	-4.9	AVG	176	1.6	RB 1 MHz;VB 10 Hz;Peak
11159.040	61.8	V	74.0	-12.2	PK	176	1.6	RB 1 MHz;VB 3 MHz;Peak
4873.940	48.1	V	54.0	-5.9	AVG	339	1.4	RB 1 MHz;VB 10 Hz;Peak, Note 2
4873.960	52.5	V	74.0	-21.5	PK	339	1.4	RB 1 MHz;VB 3 MHz;Peak
5000.000	47.1	V	60.0	-12.9	AVG	323	1.3	Digital Bus Emission, Class A limits
5000.040	51.9	V	80.0	-28.1	PK	323	1.3	Digital Bus Emission, Class A limits

Note:	Scans made between 18 - 40 GHz with the measurement antenna moved around the EUT and its antennas 30cm from the device indicated there were no significant emissions in this frequency range
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 a peak measurement (RB=1MHz, VB \geq 3MHz, peak detector).



EMC Test Data

Client: Xirrus	Job Number: J93457
Model: XR2000H	T-Log Number: T93459
	Project Manager: Christine Krebill
Contact: Peter Krebill	Project Coordinator: -
Standard: FCC 15.247, 15.407, EN 55022, FCC B	Class: N/A

Run #9, Radiated Spurious Emissions, 1,000 - 40,000 MHz. Operation in the 5470-5725 MHz Band

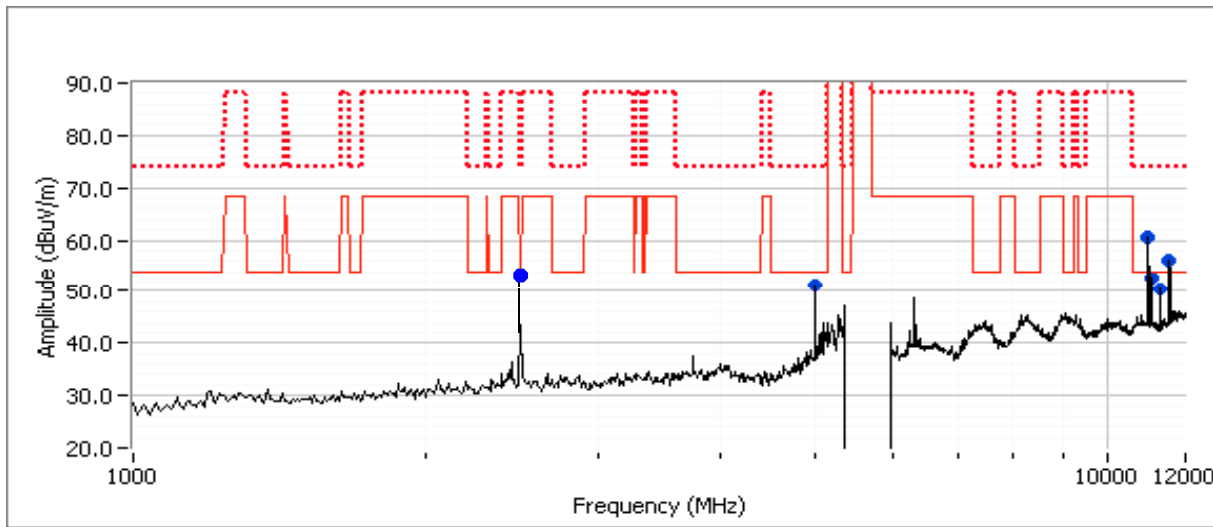
Date of Test: 9/30/2013 8:30
 Test Engineer: David Bare
 Test Location: Fremont Chamber#5

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

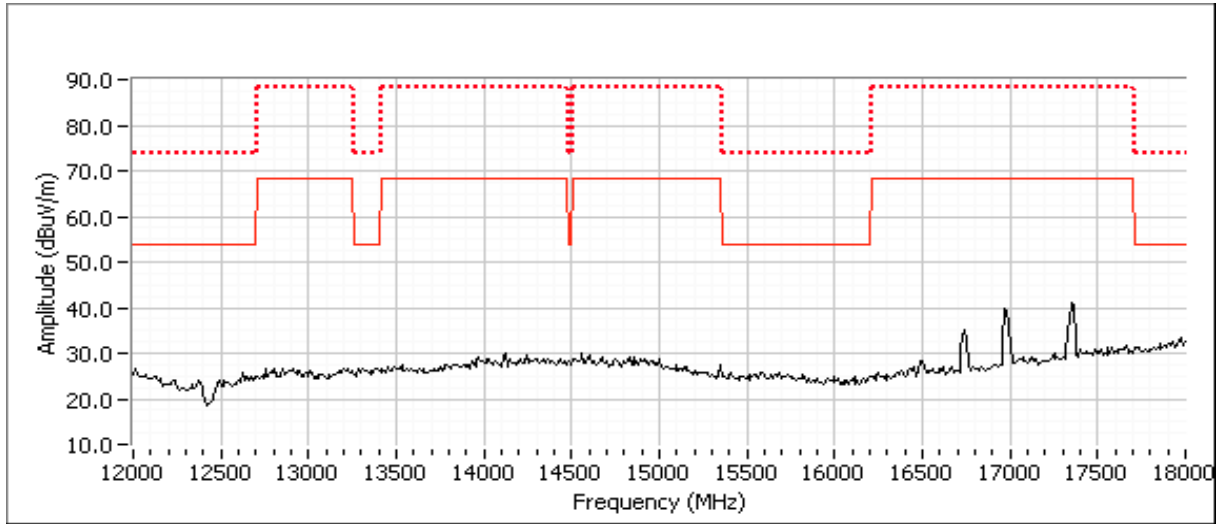
Radio #	Frequency	CH	Mode	Pwr	Radio #	Frequency	CH	Mode	Pwr
2	5500	100	802.11a	32	14	5700	140	802.11a	34
10	5580	116	802.11a	34	6	5785	157	802.11a	34

Tx Chain: 2x2

Run #9: Radiated Spurious Emissions, 1,000 - 40000 MHz.



Client: Xirrus	Job Number: J93457
Model: XR2000H	T-Log Number: T93459
Contact: Peter Krebill	Project Manager: Christine Krebill
Standard: FCC 15.247, 15.407, EN 55022, FCC B	Project Coordinator: -
	Class: N/A



Frequency MHz	Level dBuV/m	Pol v/h	15.209 / 15E		Detector Pk/QP/Avg	Azimuth degrees	Height meters	Comments
			Limit	Margin				
10998.550	53.2	V	54.0	-0.8	AVG	138	1.5	RB 1 MHz;VB 10 Hz;Peak
10998.170	66.7	V	74.0	-7.3	PK	138	1.5	RB 1 MHz;VB 3 MHz;Peak
11568.500	53.6	V	54.0	-0.4	AVG	138	1.7	RB 1 MHz;VB 10 Hz;Peak
11568.570	66.0	V	74.0	-8.0	PK	138	1.7	RB 1 MHz;VB 3 MHz;Peak
11160.440	48.5	V	54.0	-5.5	AVG	284	1.9	RB 1 MHz;VB 10 Hz;Peak
11160.370	61.5	V	74.0	-12.5	PK	284	1.9	RB 1 MHz;VB 3 MHz;Peak
5000.010	48.2	V	60.0	-11.8	AVG	102	1.1	Digital Bus Emission, Class A limits
5000.010	53.4	V	80.0	-26.6	PK	102	1.1	Digital Bus Emission, Class A limits

Note:	Scans made between 18 - 40 GHz with the measurement antenna moved around the EUT and its antennas 30cm from the device indicated there were no significant emissions in this frequency range
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 a peak measurement (RB=1MHz, VB≥3MHz, peak detector).
Note 3:	2500MHz is a digital signal from PCI bus. Refer to test data for Part 15B.



EMC Test Data

Client: Xirrus	Job Number: J93457
Model: XR2000H	T-Log Number: T93459
	Project Manager: Christine Krebill
Contact: Peter Krebill	Project Coordinator: -
Standard: FCC 15.247, 15.407, EN 55022, FCC B	Class: N/A

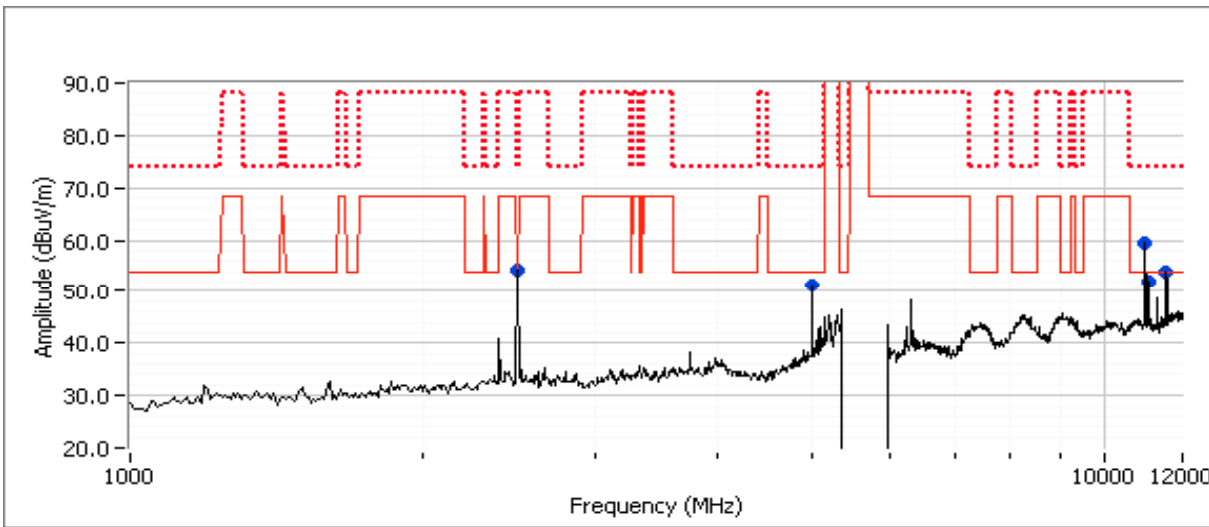
Run #10, Radiated Spurious Emissions, 1,000 - 40,000 MHz. Operation in the 5470-5725 MHz Band

Date of Test: 9/30/2013 9:48 Config. Used: 1
 Test Engineer: David Bare Config Change: None
 Test Location: Fremont Chamber#5 EUT Voltage: POE

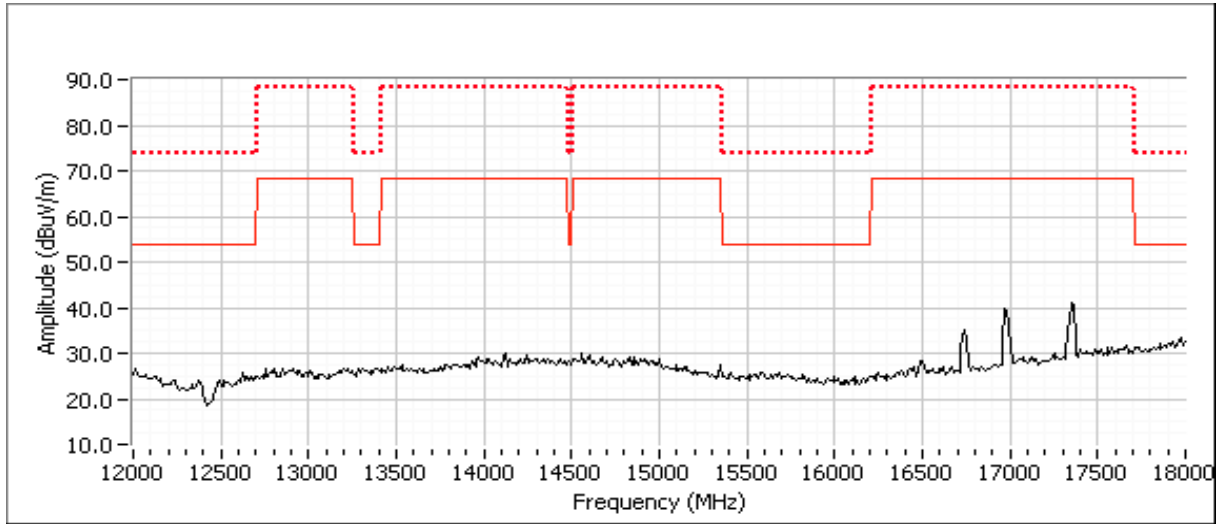
Radio #	Frequency	CH	Mode	Pwr	Radio #	Frequency	CH	Mode	Pwr
2	5500	100	802.11n20	31	14	5700	140	802.11n20	34
10	5580	116	802.11n20	34	6	5785	157	802.11n20	34

Tx Chain: 2x2

Run #10: Radiated Spurious Emissions, 1,000 - 40000 MHz.



Client: Xirrus	Job Number: J93457
Model: XR2000H	T-Log Number: T93459
Contact: Peter Krebill	Project Manager: Christine Krebill
Standard: FCC 15.247, 15.407, EN 55022, FCC B	Project Coordinator: -
	Class: N/A



Frequency MHz	Level dB μ V/m	Pol v/h	15.209 / 15E		Detector Pk/QP/Avg	Azimuth degrees	Height meters	Comments
			Limit	Margin				
10998.520	53.1	V	54.0	-0.9	AVG	202	1.6	RB 1 MHz;VB 10 Hz;Peak
10999.910	66.1	V	74.0	-7.9	PK	202	1.6	RB 1 MHz;VB 3 MHz;Peak
11160.470	49.3	V	54.0	-4.7	AVG	188	1.6	RB 1 MHz;VB 10 Hz;Peak
11159.040	61.8	V	74.0	-12.2	PK	188	1.6	RB 1 MHz;VB 3 MHz;Peak
11564.350	51.0	V	54.0	-3.0	AVG	141	1.4	RB 1 MHz;VB 10 Hz;Peak
11564.030	64.1	V	74.0	-9.9	PK	141	1.4	RB 1 MHz;VB 3 MHz;Peak
5000.020	46.7	V	60.0	-13.3	AVG	140	1.3	Digital Bus Emission, Class A limits
5000.020	51.9	V	80.0	-28.1	PK	140	1.3	Digital Bus Emission, Class A limits

Note:	Scans made between 18 - 40 GHz with the measurement antenna moved around the EUT and its antennas 30cm from the device indicated there were no significant emissions in this frequency range
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 a peak measurement (RB=1MHz, VB \geq 3MHz, peak detector).
Note 3:	2500MHz is a digital signal from PCI bus. Refer to test data for Part 15B.



EMC Test Data

Client: Xirrus	Job Number: J93457
Model: XR2000H	T-Log Number: T93459
Contact: Peter Krebill	Project Manager: Christine Krebill
Standard: FCC 15.247, 15.407, EN 55022, FCC B	Project Coordinator: -
	Class: N/A

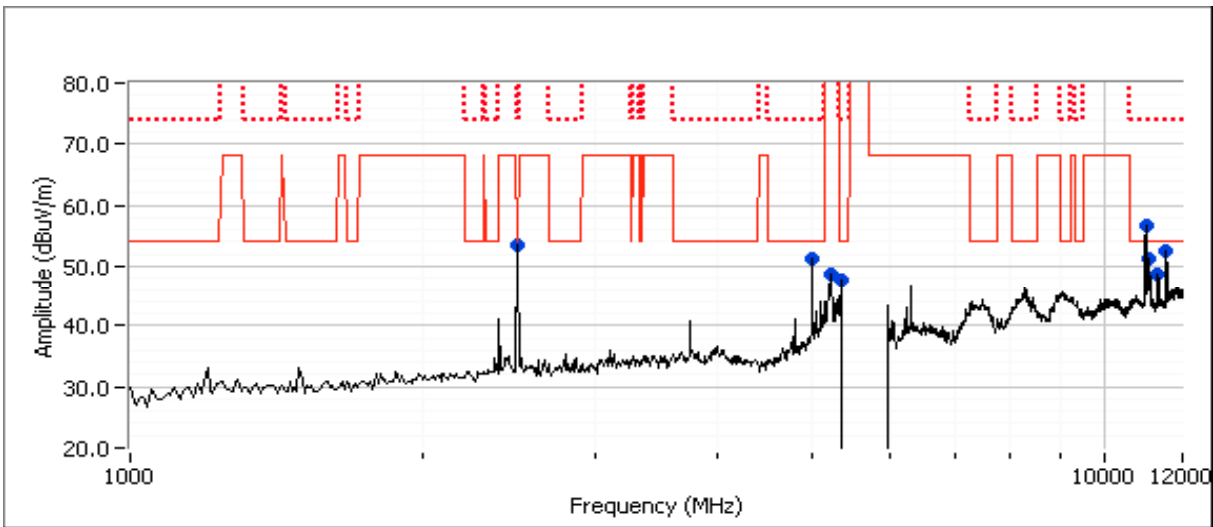
Run #11, Radiated Spurious Emissions, 1,000 - 40,000 MHz. Operation in the 5470-5725 MHz Band

Date of Test: 9/27/2013 0:00 Config. Used: 1
 Test Engineer: Jack Liu / R. Varelas Config Change: none
 Test Location: Fremont Chamber#5 EUT Voltage: POE

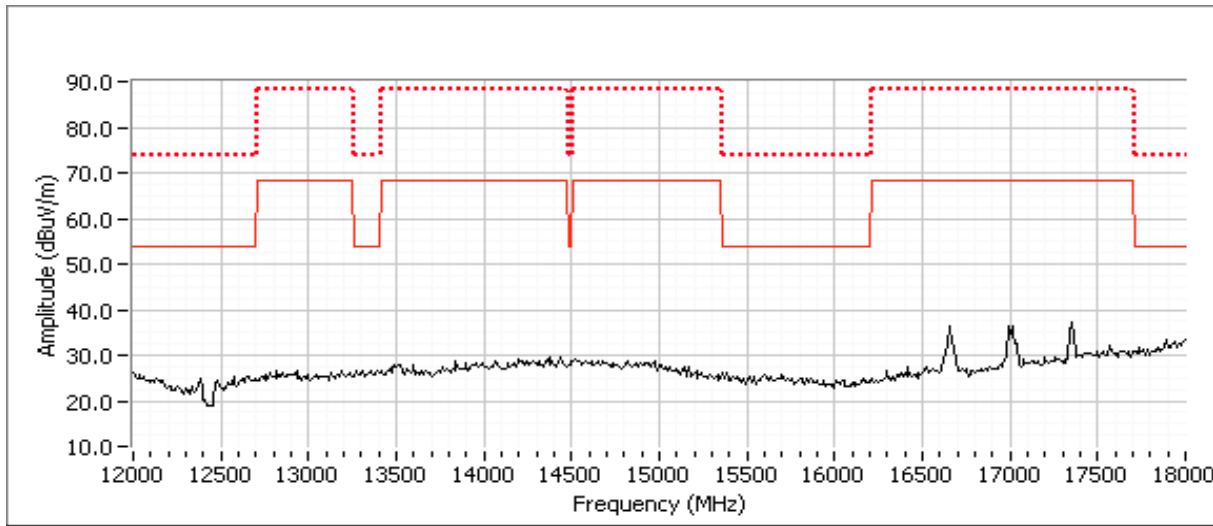
Radio #	Frequency	CH	Mode	Pwr	Radio #	Frequency	CH	Mode	Pwr
2	5510	102	802.11n40	34	10	5670	134	802.11n40	34
6	5550	110	802.11n40	34	14	5785	157	802.11n20	34

Tx Chain: 2x2

Run #11: Radiated Spurious Emissions, 1,000 - 40000 MHz.



Client: Xirrus	Job Number: J93457
Model: XR2000H	T-Log Number: T93459
Contact: Peter Krebill	Project Manager: Christine Krebill
Standard: FCC 15.247, 15.407, EN 55022, FCC B	Project Coordinator: -
	Class: N/A



Frequency MHz	Level dBuV/m	Pol v/h	15.209 / 15E		Detector PK/QP/Avg	Azimuth degrees	Height meters	Comments
			Limit	Margin				
11015.930	50.2	H	54.0	-3.8	AVG	98	1.0	RB 1 MHz;VB 10 Hz;Peak
11018.070	60.7	H	74.0	-13.3	PK	98	1.0	RB 1 MHz;VB 3 MHz;Peak
11087.430	50.0	V	54.0	-4.0	AVG	151	1.6	RB 1 MHz;VB 10 Hz;Peak
11096.130	60.6	V	74.0	-13.4	PK	151	1.6	RB 1 MHz;VB 3 MHz;Peak
5359.960	39.6	V	54.0	-14.4	AVG	44	1.0	RB 1 MHz;VB 10 Hz;Peak
5358.230	48.7	V	74.0	-25.3	PK	44	1.0	RB 1 MHz;VB 3 MHz;Peak
11341.030	46.2	H	54.0	-7.8	AVG	214	1.0	RB 1 MHz;VB 10 Hz;Peak
11338.700	57.1	H	74.0	-16.9	PK	214	1.0	RB 1 MHz;VB 3 MHz;Peak
11566.430	49.3	V	54.0	-4.7	AVG	220	1.4	RB 1 MHz;VB 10 Hz;Peak
11563.030	60.5	V	74.0	-13.5	PK	220	1.4	RB 1 MHz;VB 3 MHz;Peak
5226.310	54.4	V	68.3	-13.9	PK	313	1.3	RB 1 MHz;VB 3 MHz;Peak
5000.020	47.1	V	60.0	-12.9	AVG	312	1.3	Digital Bus Emission, Class A limits
5000.100	50.6	V	80.0	-29.4	PK	312	1.3	Digital Bus Emission, Class A limits

Note:	Scans made between 18 - 40 GHz with the measurement antenna moved around the EUT and its antennas 30cm from the device indicated there were no significant emissions in this frequency range
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 a peak measurement (RB=1MHz, VB≥3MHz, peak detector).
Note 3:	2500MHz is a digital signal from PCI bus. Refer to test data for Part 15B.



EMC Test Data

Client: Xirrus	Job Number: J93457
Model: XR2000H	T-Log Number: T93459
	Project Manager: Christine Krebill
Contact: Peter Krebill	Project Coordinator: -
Standard: FCC 15.247, 15.407, EN 55022, FCC B	Class: N/A

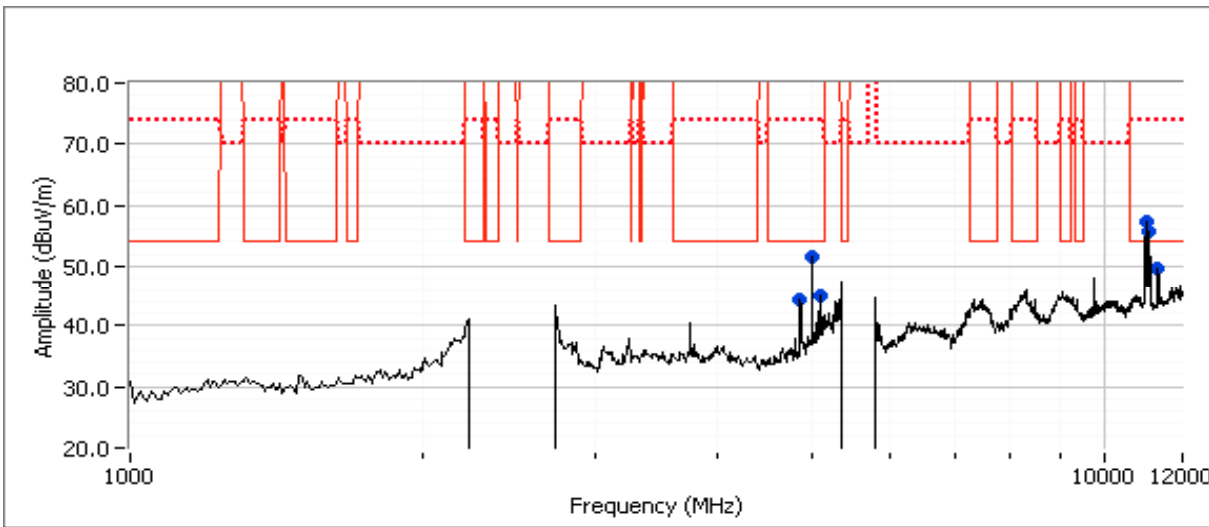
Run #12, Radiated Spurious Emissions, 1,000 - 40,000 MHz. Operation in the 5470-5725 MHz Band

Date of Test: 9/27/2013 0:00 Config. Used: 1
 Test Engineer: Jack Liu / R. Varelas Config Change: none
 Test Location: Fremont Chamber#5 EUT Voltage: POE

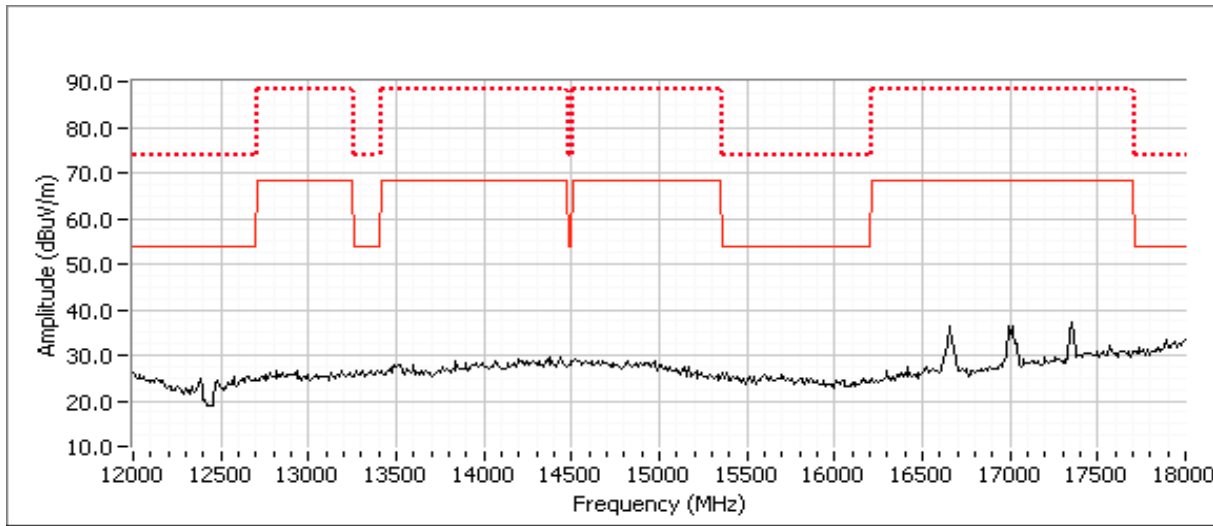
Radio #	Frequency	CH	Mode	Pwr	Radio #	Frequency	CH	Mode	Pwr
2	5510	102	802.11n40	34	10	5670	134	802.11n40	34
6	5550	110	802.11n40	34	14	2437	6	802.11n20	34

Tx Chain: 2x2

Run #12: Radiated Spurious Emissions, 1,000 - 40000 MHz.



Client: Xirrus	Job Number: J93457
Model: XR2000H	T-Log Number: T93459
Contact: Peter Krebill	Project Manager: Christine Krebill
Standard: FCC 15.247, 15.407, EN 55022, FCC B	Project Coordinator: -
	Class: N/A



Frequency MHz	Level dB μ V/m	Pol v/h	15.209 / 15E		Detector PK/QP/Avg	Azimuth degrees	Height meters	Comments
			Limit	Margin				
11014.100	53.5	V	54.0	-0.5	AVG	158	1.6	RB 1 MHz;VB 10 Hz;Peak
11012.800	65.2	V	74.0	-8.8	PK	158	1.6	RB 1 MHz;VB 3 MHz;Peak
11106.670	47.5	H	54.0	-6.5	AVG	134	1.5	RB 1 MHz;VB 10 Hz;Peak
11106.330	58.5	H	74.0	-15.5	PK	134	1.5	RB 1 MHz;VB 3 MHz;Peak
11341.200	46.9	V	54.0	-7.1	AVG	127	1.5	RB 1 MHz;VB 10 Hz;Peak
11343.400	57.6	V	74.0	-16.4	PK	127	1.5	RB 1 MHz;VB 3 MHz;Peak
5119.970	36.6	V	54.0	-17.4	AVG	6	1.5	RB 1 MHz;VB 10 Hz;Peak
5120.100	44.4	V	74.0	-29.6	PK	6	1.5	RB 1 MHz;VB 3 MHz;Peak
4873.730	37.0	V	54.0	-17.0	AVG	240	1.4	RB 1 MHz;VB 10 Hz;Peak
4880.020	49.5	V	74.0	-24.5	PK	240	1.4	RB 1 MHz;VB 3 MHz;Peak
5000.050	45.9	V	60.0	-14.1	AVG	304	1.8	RB 1 MHz;VB 10 Hz;Peak
5000.120	48.4	V	80.0	-31.6	PK	304	1.8	RB 1 MHz;VB 3 MHz;Peak

Note:	Scans made between 18 - 40 GHz with the measurement antenna moved around the EUT and its antennas 30cm from the device indicated there were no significant emissions in this frequency range
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 a peak measurement (RB=1MHz, VB \geq 3MHz, peak detector).



EMC Test Data

Client: Xirrus	Job Number: J93457
Model: XR2000H	T-Log Number: T93459
	Project Manager: Christine Krebill
Contact: Peter Krebill	Project Coordinator: -
Standard: FCC 15.247, 15.407, EN 55022, FCC B	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. For radiated emissions testing the measurement antenna was located 3 meters from the EUT, unless otherwise noted.

Ambient Conditions:

Temperature: 21.2 °C
Rel. Humidity: 36 %

Summary of Results

Run #	Mode	Channel	Power Setting	Measured Power	Test Performed	Limit	Result / Margin
20MHz Bandwith Modes							
1	a	56 - 5260MHz	-tp 26		Band Edge 5250MHz	15E	73.3 dBµV/m @ 5248.2 MHz (-0.7 dB)
	a	64 - 5320MHz	-tp 31		Restricted Band Edge at 5350 MHz	15.209	72.9 dBµV/m @ 5358.6 MHz (-1.1 dB)
2	a	100 - 5500MHz	-tp 25		Restricted Band Edge at 5460 MHz	15.209	53.1 dBµV/m @ 5421.1 MHz (-0.9 dB)
	a	100 - 5500MHz	-tp 25		Band Edge 5460 - 5470 MHz	15E	67.5 dBµV/m @ 5464.7 MHz (-0.8 dB)
	a	140 - 5700MHz	-tp 33		Band Edge 5725MHz	15E	67.5 dBµV/m @ 5728.0 MHz (-0.8 dB)



EMC Test Data

Client: Xirrus	Job Number: J93457
Model: XR2000H	T-Log Number: T93459
Contact: Peter Krebill	Project Manager: Christine Krebill
Standard: FCC 15.247, 15.407, EN 55022, FCC B	Project Coordinator: -
	Class: N/A

Run #	Mode	Channel	Power Setting	Measured Power	Test Performed	Limit	Result / Margin
20MHz Bandwith Modes							
3	n20	56 - 5280MHz	-tp 26		Band Edge 5250MHz	15E/15.209 KDB789033 D01 (H.2.c.i)	73.2 dBµV/m @ 5248.7 MHz (-0.8 dB)
	n20	64 - 5320MHz	-tp 31		Restricted Band Edge at 5350 MHz	15.209	73.2 dBµV/m @ 5350.5 MHz (-0.8 dB)
4	n20	100 - 5500MHz	-tp 25		Restricted Band Edge at 5460 MHz	15.209	53.7 dBµV/m @ 5424.4 MHz (-0.3 dB)
	n20	100 - 5500MHz	-tp 25		Band Edge 5460 - 5470 MHz	15E	67.5 dBµV/m @ 5464.5 MHz (-0.8 dB)
	n20	140 - 5700MHz	-tp 32		Band Edge 5725MHz	15E	67.5 dBµV/m @ 5725.5 MHz (-0.8 dB)

40MHz Bandwith Modes							
5	n40	62 - 5310MHz	-tp 16		Restricted Band Edge at 5250 MHz	15.209	49.4 dBµV/m @ 5240.0 MHz (-4.6 dB)
	n40	62 - 5310MHz	-tp 16		Restricted Band Edge at 5350 MHz	15.209	53.4 dBµV/m @ 5350.2 MHz (-0.6 dB)
6	n40	102 - 5510MHz	-tp 15		Restricted Band Edge at 5460 MHz	15.209	50.8 dBµV/m @ 5440.0 MHz (-3.2 dB)
	n40	102 - 5510MHz	-tp 15		Band Edge 5460 - 5470 MHz	15E	67.7 dBµV/m @ 5464.8 MHz (-0.6 dB)
	n40	134 - 5670MHz	-tp 33		Band Edge 5725MHz	15E	67.9 dBµV/m @ 5727.4 MHz (-0.4 dB)

Modifications Made During Testing

No modifications were made to the EUT during testing

Deviations From The Standard

No deviations were made from the requirements of the standard.



EMC Test Data

Client: Xirrus	Job Number: J93457
Model: XR2000H	T-Log Number: T93459
	Project Manager: Christine Krebill
Contact: Peter Krebill	Project Coordinator: -
Standard: FCC 15.247, 15.407, EN 55022, FCC B	Class: N/A

Procedure Comments:

Measurements performed in accordance with FCC KDB 789033

Peak measurements performed with: RBW=1MHz, VBW=3MHz, peak detector, max hold, auto sweep time

Mode	Data Rate	Duty Cycle (x)	Constant DC?	T (ms)	Pwr Cor Factor*	Lin Volt Cor Factor**	Min VBW for FS (Hz)
802.11a	6	0.96	Yes	1.35	0.2	0.3	741
802.11n20	MCS0	0.97	Yes	1.27	0.1	0.3	787
802.11n40	MCS0	0.90	Yes	0.6	0.5	1.0	1667

Sample Notes

Sample S/N: 20:0C:7D

Driver:

Antenna: Panel (x4)

Measurement Specific Notes:

Note 1:	For emissions outside of the restricted bands the limit is -27dBm/MHz eirp (68.3dBuV/m). The measurement method required is a peak measurement (RB=1MHz, VB≥3MHz, peak detector). Per KDB 789033 2) c) (i), compliance can be demonstrated by meeting the average and peak limits of 15.209, as an alternative.
Note 2:	Emission has duty cycle < 98%, but constant, average measurement performed: RBW=1MHz, VBW=10Hz, peak detector, linear averaging, auto sweep, trace average 100 * 1/DC traces, measurement corrected by Linear Voltage correction factor
Note 3:	Plots of the average bandedge do not account for any duty cycle correction. Refer to the tabular results for final measurements.



EMC Test Data

Client: Xirrus	Job Number: J93457
Model: XR2000H	T-Log Number: T93459
Contact: Peter Krebill	Project Manager: Christine Krebill
Standard: FCC 15.247, 15.407, EN 55022, FCC B	Project Coordinator: -
	Class: N/A

Run #1: Radiated Bandedge Measurements, 5250-5350MHz

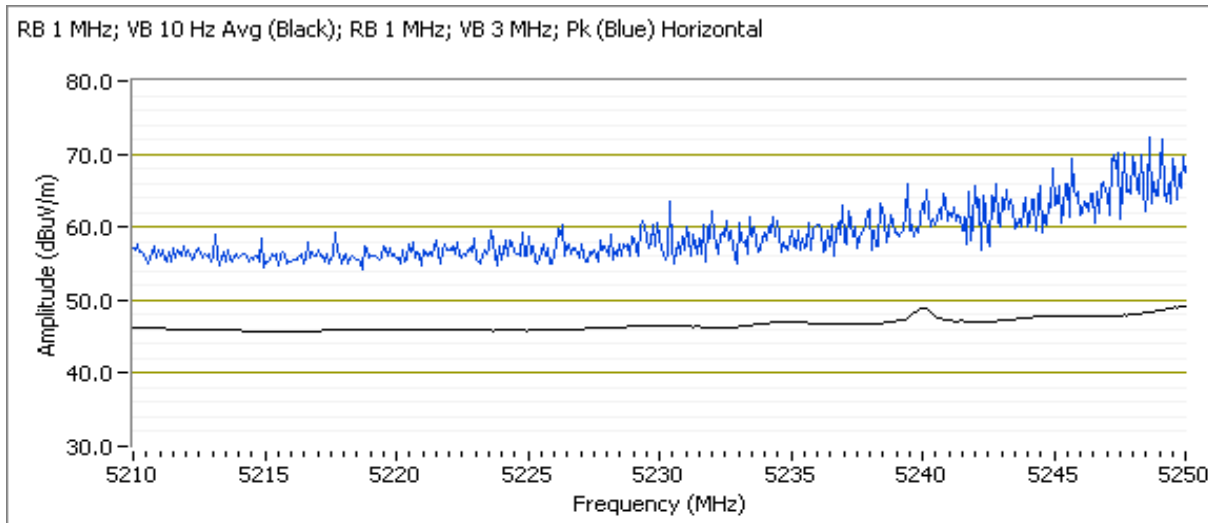
Date of Test: 10/1/2013 0:00
 Test Engineer: Rafael Varelas
 Test Location: FT Chamber #5

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

Channel: 56 - 5280MHz Mode: a
 Tx Chain: All - Radio 2 Data Rate: 6
 Power setting: Tx Power 26 (Command Line)

5250 MHz Band Edge Signal Radiated Field Strength

Frequency	Level	Pol	FCC 15.209		Detector	Azimuth	Height	Comments
MHz	dB μ V/m	v/h	Limit	Margin	Pk/QP/Avg	degrees	meters	
Based on KDB 789033 D01 v01r03 (H) 2.c.i								
5250.000	50.7	V	54.0	-3.3	AVG	337	1.5	POS; RB 1 MHz; VB: 10 Hz, Note 3
5247.030	71.9	V	74.0	-2.1	PK	337	1.5	POS; RB 1 MHz; VB: 3 MHz
5249.920	49.8	H	54.0	-4.2	AVG	350	1.3	POS; RB 1 MHz; VB: 10 Hz, Note 3
5248.160	73.3	H	74.0	-0.7	PK	350	1.3	POS; RB 1 MHz; VB: 3 MHz





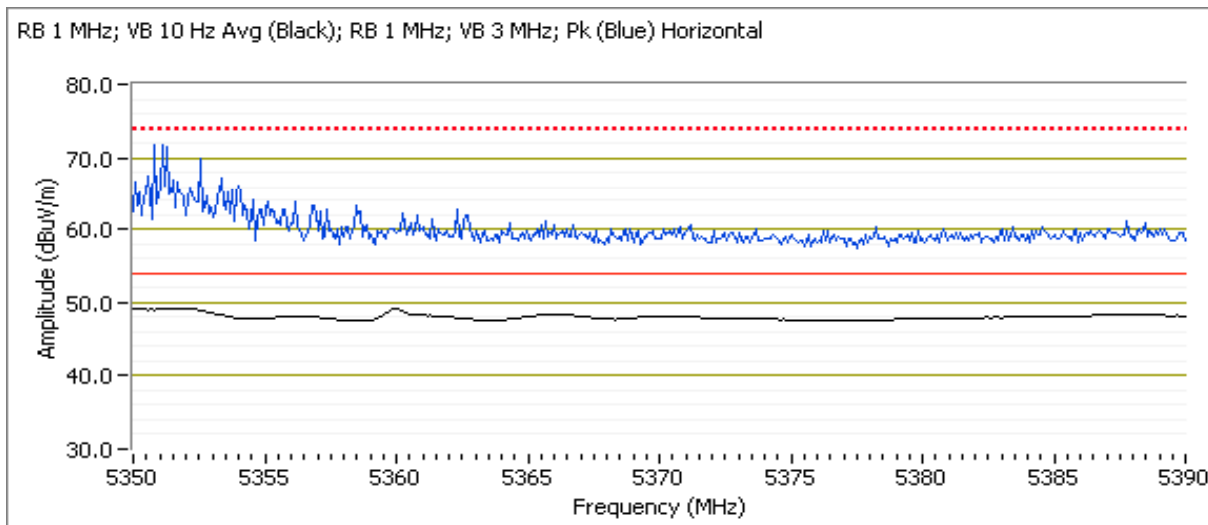
EMC Test Data

Client: Xirrus	Job Number: J93457
Model: XR2000H	T-Log Number: T93459
	Project Manager: Christine Krebill
Contact: Peter Krebill	Project Coordinator: -
Standard: FCC 15.247, 15.407, EN 55022, FCC B	Class: N/A

Channel: 64 - 5320MHz
 Tx Chain: All - Radio 10
 Mode: a
 Data Rate: 6
 Power setting: Tx Power 31 (Command Line)

5350 MHz Band Edge Signal Radiated Field Strength

Frequency MHz	Level dB μ V/m	Pol v/h	FCC 15.209		Detector Pk/QP/Avg	Azimuth degrees	Height meters	Comments
			Limit	Margin				
5250.000	51.8	V	54.0	-2.2	AVG	337	1.5	POS; RB 1 MHz; VB: 10 Hz, Note 3
5247.030	72.9	V	74.0	-1.1	PK	337	1.5	POS; RB 1 MHz; VB: 3 MHz
5351.920	49.6	H	54.0	-4.4	AVG	346	1.5	POS; RB 1 MHz; VB: 10 Hz, Note 3
5358.580	72.7	H	74.0	-1.3	PK	346	1.5	POS; RB 1 MHz; VB: 3 MHz





EMC Test Data

Client: Xirrus	Job Number: J93457
Model: XR2000H	T-Log Number: T93459
	Project Manager: Christine Krebill
Contact: Peter Krebill	Project Coordinator: -
Standard: FCC 15.247, 15.407, EN 55022, FCC B	Class: N/A

Run #2: Radiated Bandedge Measurements, 5470-5725MHz

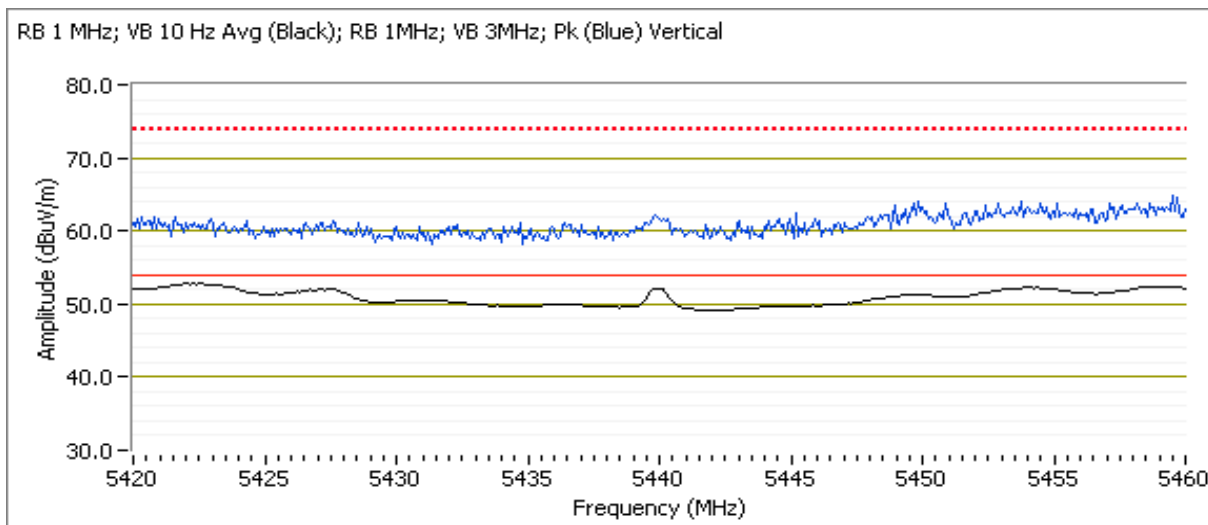
Date of Test: 10/1/2013 0:00
 Test Engineer: Rafael Varelas
 Test Location: FT Chamber #5

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

Channel: 100 - 5500MHz
 Tx Chain: All - Radio 2
 Mode: a
 Data Rate: 6
 Power setting: Tx Power 25 (Command Line)

5460 MHz Band Edge Signal Radiated Field Strength

Frequency MHz	Level dB μ V/m	Pol v/h	FCC 15.209		Detector Pk/QP/Avg	Azimuth degrees	Height meters	Comments
			Limit	Margin				
5421.120	53.1	V	54.0	-0.9	AVG	350	1.5	POS; RB 1 MHz; VB: 10 Hz, Note 3
5425.770	64.8	V	74.0	-9.2	PK	350	1.5	POS; RB 1 MHz; VB: 3 MHz
5459.280	51.4	H	54.0	-2.6	AVG	6	1.6	POS; RB 1 MHz; VB: 10 Hz, Note 3
5451.580	62.9	H	74.0	-11.1	PK	6	1.6	POS; RB 1 MHz; VB: 3 MHz



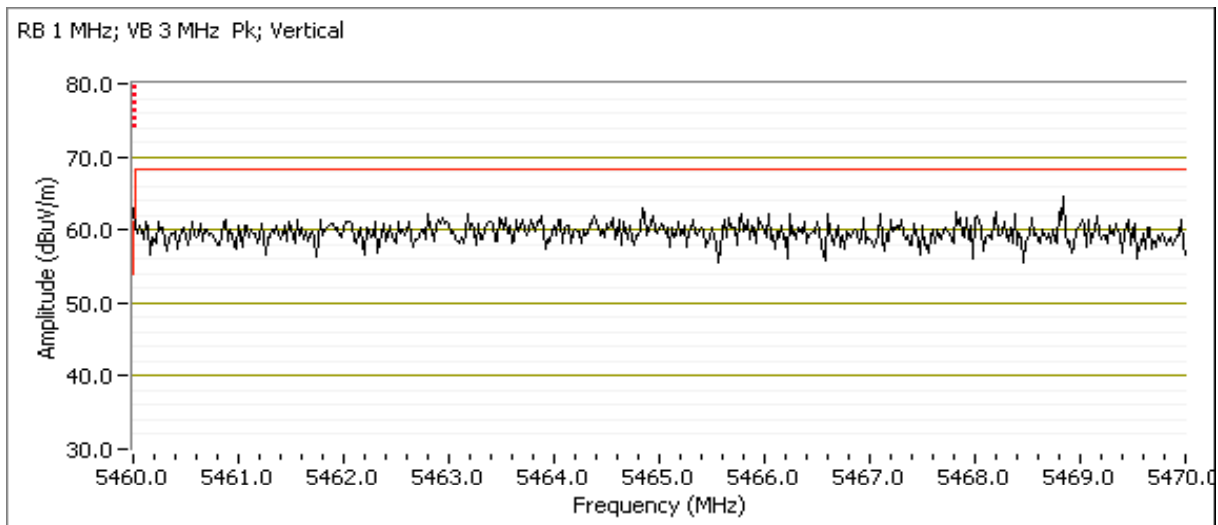


EMC Test Data

Client: Xirrus	Job Number: J93457
Model: XR2000H	T-Log Number: T93459
Contact: Peter Krebill	Project Manager: Christine Krebill
Standard: FCC 15.247, 15.407, EN 55022, FCC B	Project Coordinator: -
	Class: N/A

5470 MHz Band Edge Signal Radiated Field Strength

Frequency	Level	Pol	15.E		Detector	Azimuth	Height	Comments
MHz	dB μ V/m	v/h	Limit	Margin	PK/QP/Avg	degrees	meters	
5464.690	67.5	V	68.3	-0.8	PK	346	1.3	POS; RB 1 MHz; VB: 3 MHz





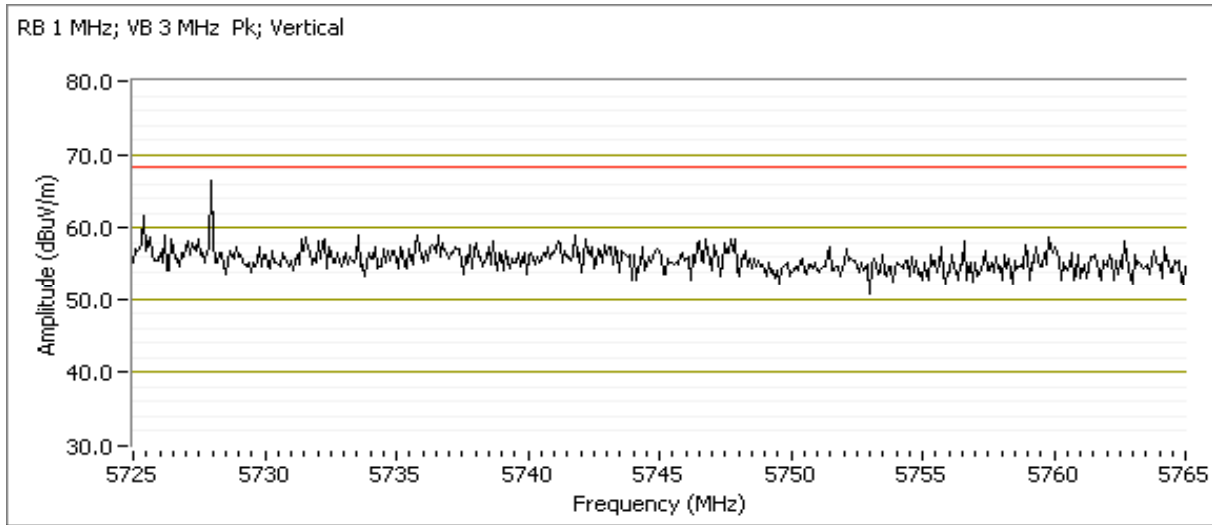
EMC Test Data

Client: Xirrus	Job Number: J93457
Model: XR2000H	T-Log Number: T93459
	Project Manager: Christine Krebill
Contact: Peter Krebill	Project Coordinator: -
Standard: FCC 15.247, 15.407, EN 55022, FCC B	Class: N/A

Channel: 140 - 5700MHz
 Tx Chain: All - Radio 10
 Mode: a
 Data Rate: 6
 Power setting: Tx Power 33 (Command Line)

5725 MHz Band Edge Signal Radiated Field Strength

Frequency	Level	Pol	15.E		Detector	Azimuth	Height	Comments
MHz	dB μ V/m	v/h	Limit	Margin	Pk/QP/Avg	degrees	meters	
5727.970	67.5	V	68.3	-0.8	PK	341	1.5	-tp 33





EMC Test Data

Client: Xirrus	Job Number: J93457
Model: XR2000H	T-Log Number: T93459
Contact: Peter Krebill	Project Manager: Christine Krebill
Standard: FCC 15.247, 15.407, EN 55022, FCC B	Project Coordinator: -
	Class: N/A

Run #3: Radiated Bandedge Measurements, 5250-5350MHz

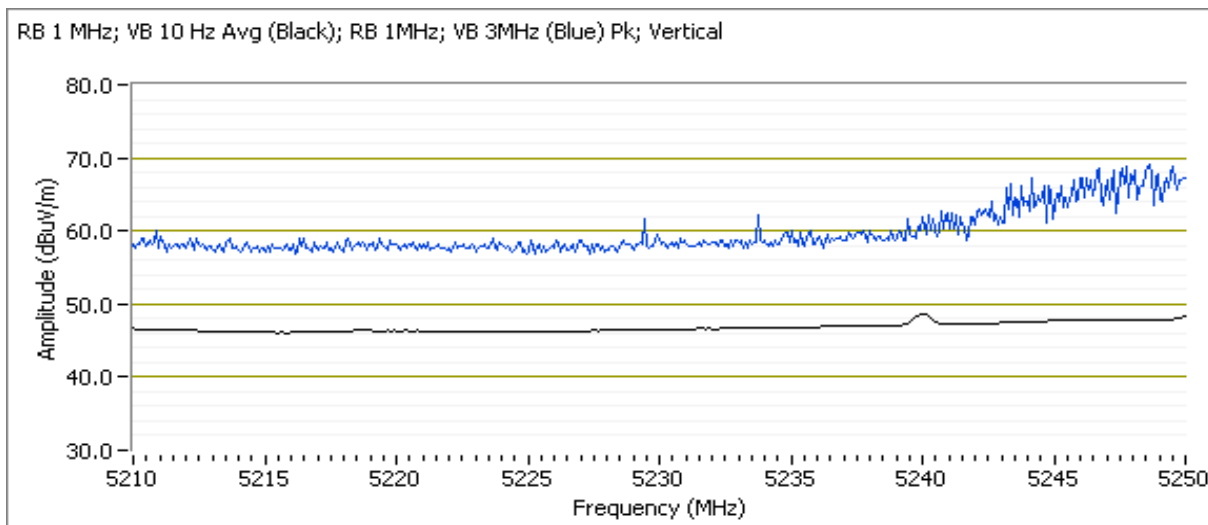
Date of Test: 10/1/2013 0:00
 Test Engineer: Rafael Varelas
 Test Location: FT Chamber #5

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

Channel: 56 - 5280 MHz
 Tx Chain: All - Radio 2
 Mode: n20
 Data Rate: MCS0
 Power setting: Tx Power 26 (Command Line)

5250 MHz Band Edge Signal Radiated Field Strength

Frequency	Level	Pol	FCC 15.209/ 15E		Detector	Azimuth	Height	Comments
MHz	dB μ V/m	v/h	Limit	Margin	Pk/QP/Avg	degrees	meters	
Based on KDB 789033 D01 v01r03 (H) 2.c.i								
5250.000	49.0	V	54.0	-5.0	AVG	345	1.7	POS; RB 1 MHz; VB: 10 Hz, Note 3
5248.720	73.2	V	74.0	-0.8	PK	345	1.7	POS; RB 1 MHz; VB: 3 MHz
5250.000	48.6	H	54.0	-5.4	AVG	353	1.3	POS; RB 1 MHz; VB: 10 Hz, Note 3
5249.120	70.3	H	74.0	-3.7	PK	353	1.3	POS; RB 1 MHz; VB: 3 MHz





EMC Test Data

Client: Xirrus	Job Number: J93457
Model: XR2000H	T-Log Number: T93459
Contact: Peter Krebill	Project Manager: Christine Krebill
Standard: FCC 15.247, 15.407, EN 55022, FCC B	Project Coordinator: -
	Class: N/A

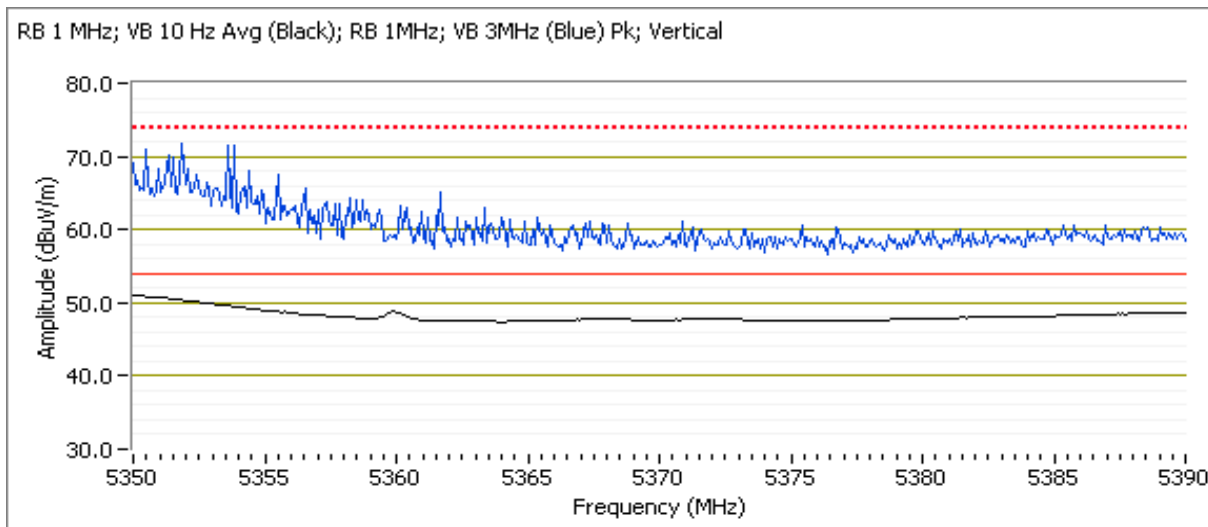
Date of Test: 10/1/2013 0:00
 Test Engineer: Rafael Varelas
 Test Location: FT Chamber #5

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

Channel: 64 - 5320MHz
 Tx Chain: All - Radio 10
 Mode: n20
 Data Rate: MCS0
 Power setting: Tx Power 31 (Command Line)

5350 MHz Band Edge Signal Radiated Field Strength

Frequency	Level	Pol	FCC 15.209		Detector	Azimuth	Height	Comments
MHz	dB μ V/m	v/h	Limit	Margin	Pk/QP/Avg	degrees	meters	
5350.000	50.6	H	54.0	-3.4	AVG	348	1.4	POS; RB 1 MHz; VB: 10 Hz, Note 3
5350.480	71.6	H	74.0	-2.4	PK	348	1.4	POS; RB 1 MHz; VB: 3 MHz
5350.000	51.5	V	54.0	-2.5	AVG	336	1.5	POS; RB 1 MHz; VB: 10 Hz, Note 3
5350.480	73.2	V	74.0	-0.8	PK	336	1.5	POS; RB 1 MHz; VB: 3 MHz





EMC Test Data

Client: Xirrus	Job Number: J93457
Model: XR2000H	T-Log Number: T93459
	Project Manager: Christine Krebill
Contact: Peter Krebill	Project Coordinator: -
Standard: FCC 15.247, 15.407, EN 55022, FCC B	Class: N/A

Run #4: Radiated Bandedge Measurements, 5470-5725MHz

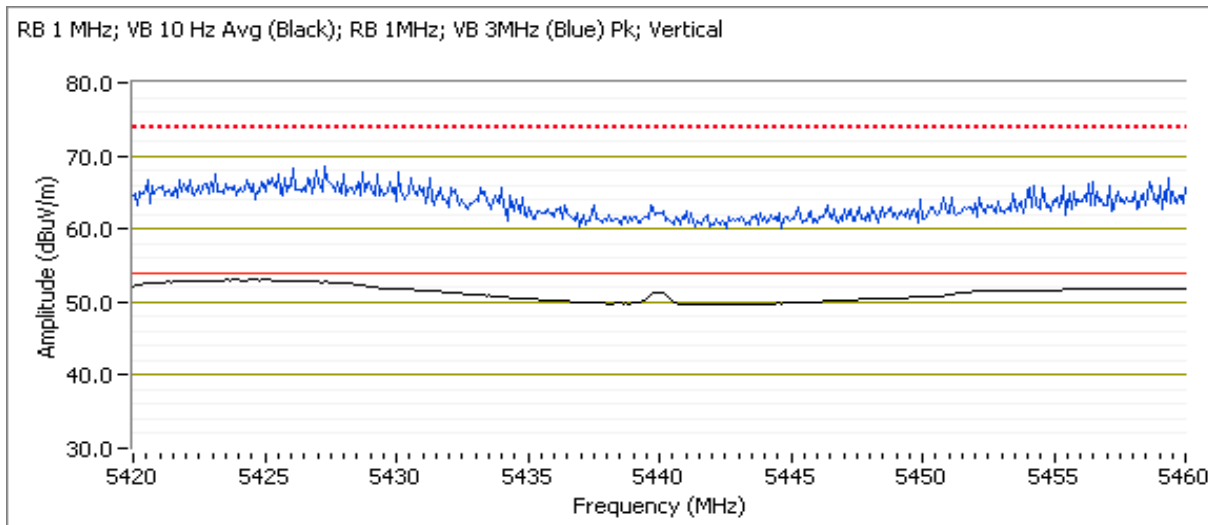
Date of Test: 10/1/2013 0:00
 Test Engineer: Rafael Varelas
 Test Location: FT Chamber #5

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

Channel: 100 - 5500MHz
 Tx Chain: All - Radio 2
 Mode: n20
 Data Rate: MCS0
 Power setting: Tx Power 25 (Command Line)

5460 MHz Band Edge Signal Radiated Field Strength

Frequency	Level	Pol	FCC 15.209		Detector	Azimuth	Height	Comments
MHz	dB μ V/m	v/h	Limit	Margin	Pk/QP/Avg	degrees	meters	
5424.410	53.7	V	54.0	-0.3	AVG	346	1.4	POS; RB 1 MHz; VB: 10 Hz, Note 3
5424.410	71.7	V	74.0	-2.3	PK	346	1.4	POS; RB 1 MHz; VB: 3 MHz
5459.920	50.9	H	54.0	-3.1	AVG	357	1.6	POS; RB 1 MHz; VB: 10 Hz, Note 3
5454.150	65.8	H	74.0	-8.2	PK	357	1.6	POS; RB 1 MHz; VB: 3 MHz





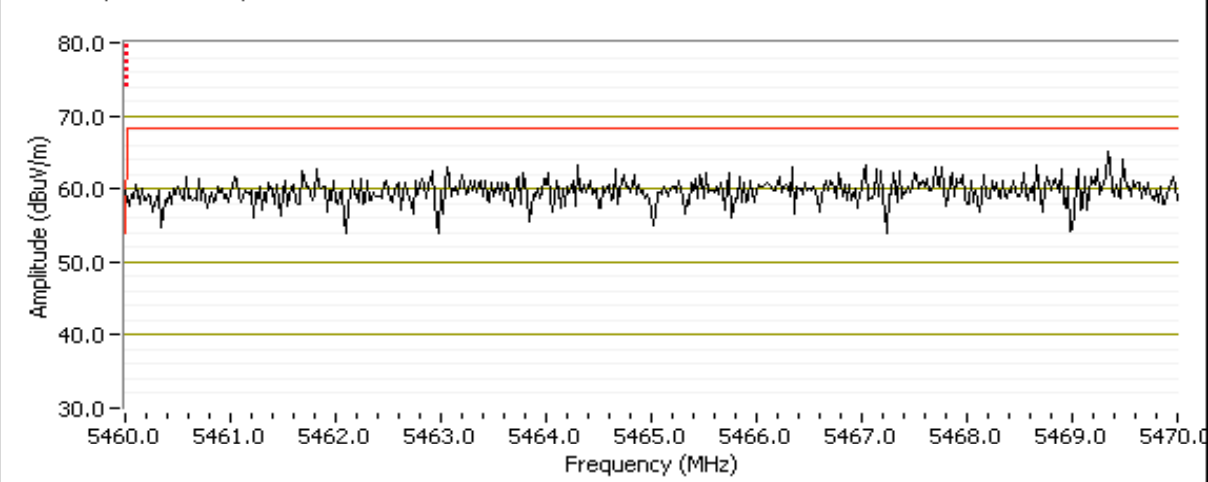
EMC Test Data

Client: Xirrus	Job Number: J93457
Model: XR2000H	T-Log Number: T93459
Contact: Peter Krebill	Project Manager: Christine Krebill
Standard: FCC 15.247, 15.407, EN 55022, FCC B	Project Coordinator: -
	Class: N/A

5470 MHz Band Edge Signal Radiated Field Strength

Frequency	Level	Pol	15.E		Detector	Azimuth	Height	Comments
MHz	dB μ V/m	v/h	Limit	Margin	PK/QP/Avg	degrees	meters	
5464.490	67.5	V	68.3	-0.8	PK	347	1.3	POS; RB 1 MHz; VB: 3 MHz

RB 1 MHz; VB 3 MHz Pk; Vertical





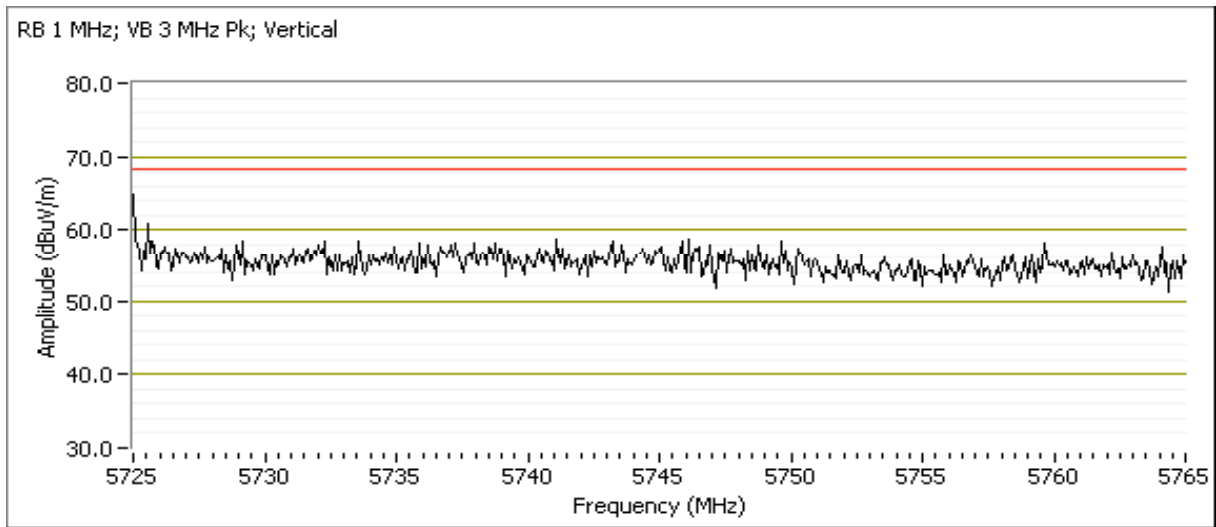
EMC Test Data

Client: Xirrus	Job Number: J93457
Model: XR2000H	T-Log Number: T93459
	Project Manager: Christine Krebill
Contact: Peter Krebill	Project Coordinator: -
Standard: FCC 15.247, 15.407, EN 55022, FCC B	Class: N/A

Channel: 140 - 5700MHz
 Tx Chain: All - Radio 10
 Mode: n20
 Data Rate: MCS0
 Power setting: Tx Power 32 (Command Line)

5725 MHz Band Edge Signal Radiated Field Strength

Frequency MHz	Level dB μ V/m	Pol v/h	15.E		Detector Pk/QP/Avg	Azimuth degrees	Height meters	Comments
			Limit	Margin				
5725.480	67.5	V	68.3	-0.8	PK	348	1.0	POS; RB 1 MHz; VB: 3 MHz
5754.420	63.8	H	68.3	-4.5	PK	360	1.3	POS; RB 1 MHz; VB: 3 MHz





EMC Test Data

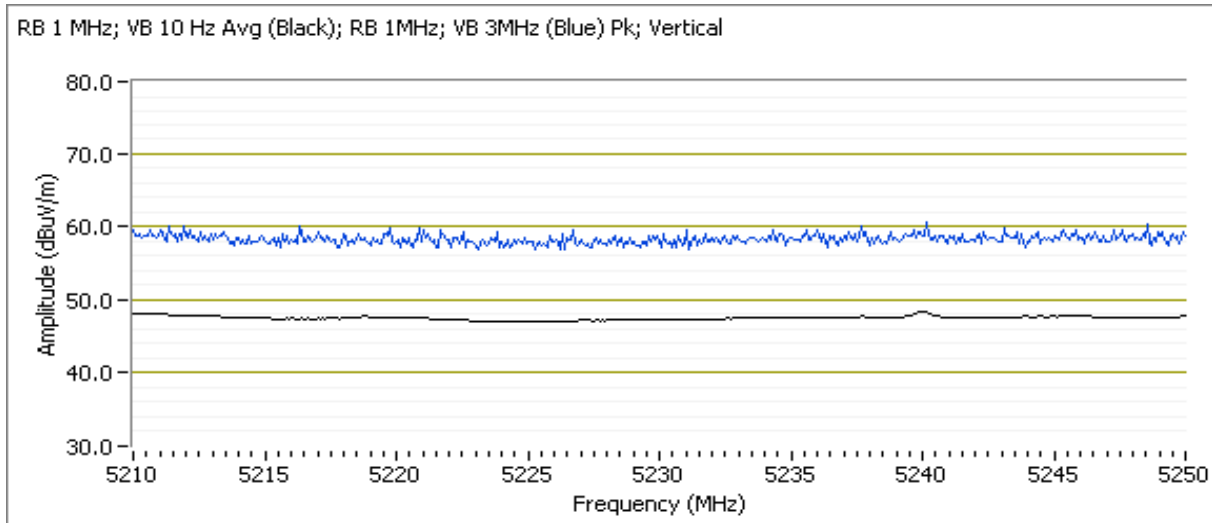
Client: Xirrus	Job Number: J93457
Model: XR2000H	T-Log Number: T93459
	Project Manager: Christine Krebill
Contact: Peter Krebill	Project Coordinator: -
Standard: FCC 15.247, 15.407, EN 55022, FCC B	Class: N/A

Run #5: Radiated Bandedge Measurements, 5250-5350MHz

Channel: 62 - 5310MHz
 Tx Chain: All - Radio 2
 Mode: n40
 Data Rate: MCS0
 Power setting: Tx Power 16 (Command Line)

5250 MHz Band Edge Signal Radiated Field Strength

Frequency	Level	Pol	FCC 15.209		Detector	Azimuth	Height	Comments
MHz	dB μ V/m	v/h	Limit	Margin	Pk/QP/Avg	degrees	meters	
5239.980	49.4	V	54.0	-4.6	AVG	343	1.5	POS; RB 1 MHz; VB: 10 Hz, Note 3
5240.060	60.5	V	74.0	-13.5	PK	343	1.5	POS; RB 1 MHz; VB: 3 MHz
5239.900	47.5	H	54.0	-6.5	AVG	360	1.4	POS; RB 1 MHz; VB: 10 Hz, Note 3
5211.520	58.1	H	74.0	-15.9	PK	360	1.4	POS; RB 1 MHz; VB: 3 MHz





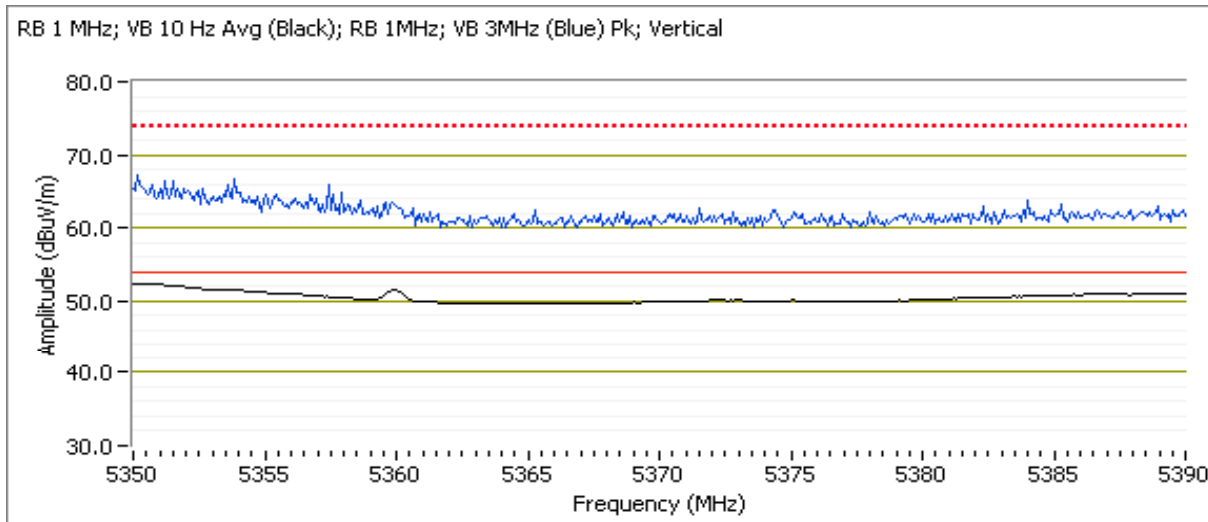
EMC Test Data

Client: Xirrus	Job Number: J93457
Model: XR2000H	T-Log Number: T93459
Contact: Peter Krebill	Project Manager: Christine Krebill
Standard: FCC 15.247, 15.407, EN 55022, FCC B	Project Coordinator: -
	Class: N/A

5350 MHz Band Edge Signal Radiated Field Strength

Frequency MHz	Level dB μ V/m	Pol v/h	FCC 15.209		Detector Pk/QP/Avg	Azimuth degrees	Height meters	Comments
			Limit	Margin				
5350.160	53.4	V	54.0	-0.6	AVG	343	1.5	POS; RB 1 MHz; VB: 10 Hz, Note 3
5350.960	68.1	V	74.0	-5.9	PK	343	1.5	POS; RB 1 MHz; VB: 3 MHz
5386.070	52.0	H	54.0	-2.0	AVG	360	1.4	POS; RB 1 MHz; VB: 10 Hz, Note 3
5385.270	64.6	H	74.0	-9.4	PK	360	1.4	POS; RB 1 MHz; VB: 3 MHz

RB 1 MHz; VB 10 Hz Avg (Black); RB 1MHz; VB 3MHz (Blue) Pk; Vertical





EMC Test Data

Client: Xirrus	Job Number: J93457
Model: XR2000H	T-Log Number: T93459
	Project Manager: Christine Krebill
Contact: Peter Krebill	Project Coordinator: -
Standard: FCC 15.247, 15.407, EN 55022, FCC B	Class: N/A

Run #6: Radiated Bandedge Measurements, 5470-5725MHz

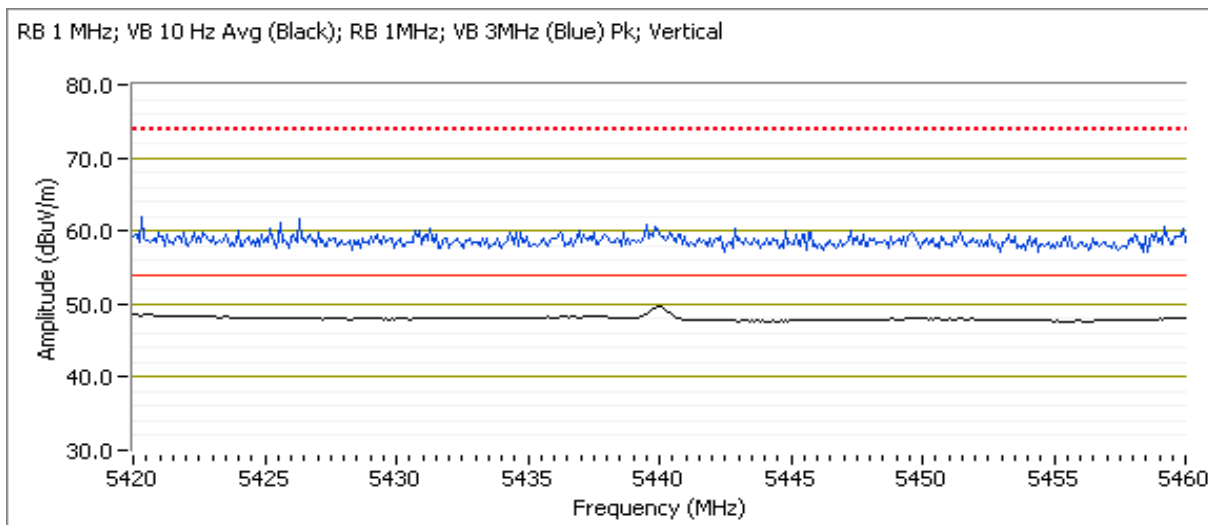
Date of Test: 10/1/2013 0:00
 Test Engineer: Rafael Varelas
 Test Location: FT Chamber #5

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

Channel: 102 - 5510MHz
 Tx Chain: All - Radio 2
 Mode: n40
 Data Rate: MCS0
 Power setting: Tx Power 15 (Command Line)

5460 MHz Band Edge Signal Radiated Field Strength

Frequency MHz	Level dB μ V/m	Pol v/h	FCC 15.209		Detector Pk/QP/Avg	Azimuth degrees	Height meters	Comments
			Limit	Margin				
5439.960	50.8	V	54.0	-3.2	AVG	349	1.4	POS; RB 1 MHz; VB: 10 Hz, Note 3
5428.180	61.2	V	74.0	-12.8	PK	349	1.4	POS; RB 1 MHz; VB: 3 MHz
5439.960	49.0	H	54.0	-5.0	AVG	2	1.4	POS; RB 1 MHz; VB: 10 Hz, Note 3
5423.930	59.0	H	74.0	-15.0	PK	2	1.4	POS; RB 1 MHz; VB: 3 MHz



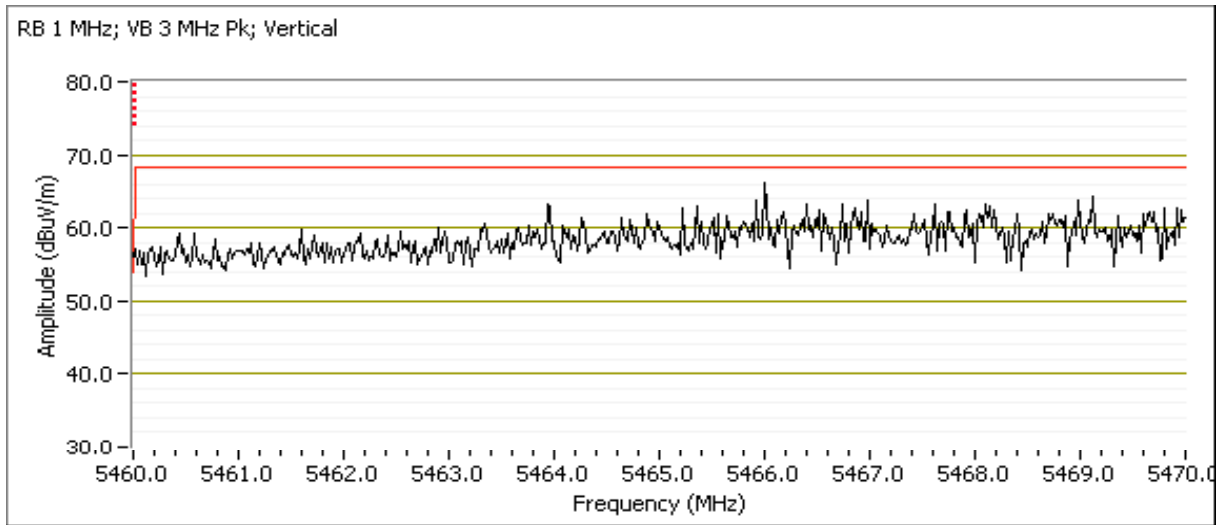


EMC Test Data

Client: Xirrus	Job Number: J93457
Model: XR2000H	T-Log Number: T93459
	Project Manager: Christine Krebill
Contact: Peter Krebill	Project Coordinator: -
Standard: FCC 15.247, 15.407, EN 55022, FCC B	Class: N/A

5470 MHz Band Edge Signal Radiated Field Strength

Frequency MHz	Level dB μ V/m	Pol v/h	15.E		Detector Pk/QP/Avg	Azimuth degrees	Height meters	Comments
			Limit	Margin				
5464.770	67.7	V	68.3	-0.6	PK	349	1.4	POS; RB 1 MHz; VB: 3 MHz
5468.440	65.4	H	68.3	-2.9	PK	2	1.4	POS; RB 1 MHz; VB: 3 MHz





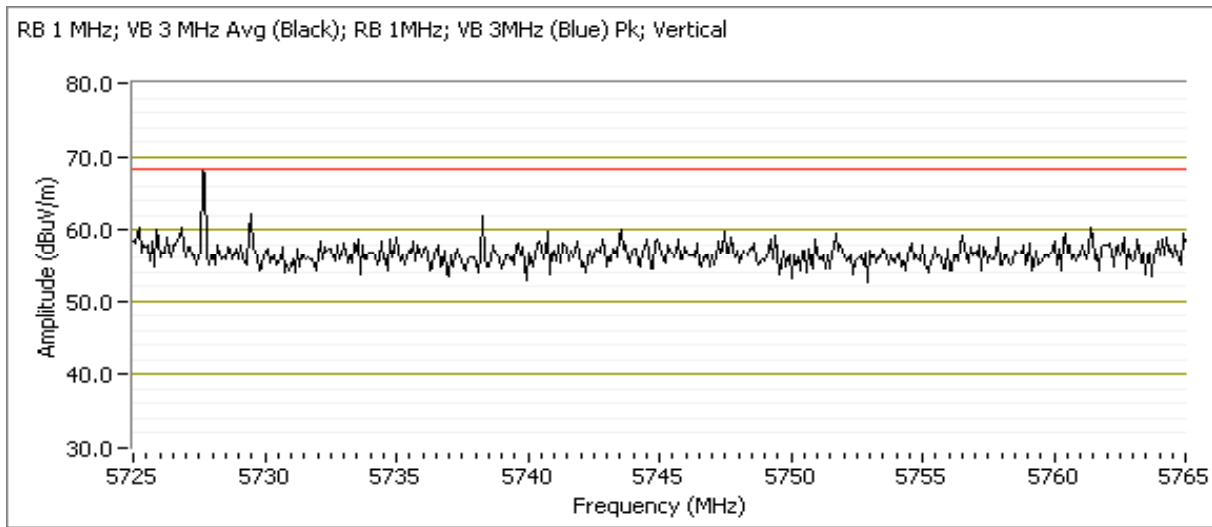
EMC Test Data

Client: Xirrus	Job Number: J93457
Model: XR2000H	T-Log Number: T93459
	Project Manager: Christine Krebill
Contact: Peter Krebill	Project Coordinator: -
Standard: FCC 15.247, 15.407, EN 55022, FCC B	Class: N/A

Channel: 134 - 5670MHz
 Tx Chain: All - Radio 10
 Mode: n40
 Data Rate: MCS0
 Power setting: Tx Power 33 (Command Line)

5725 MHz Band Edge Signal Radiated Field Strength

Frequency MHz	Level dB μ V/m	Pol v/h	15.E		Detector Pk/QP/Avg	Azimuth degrees	Height meters	Comments
			Limit	Margin				
5727.400	67.9	V	68.3	-0.4	PK	343	1.4	POS; RB 1 MHz; VB: 3 MHz
5739.750	65.9	H	68.3	-2.4	PK	360	1.4	POS; RB 1 MHz; VB: 3 MHz





EMC Test Data

Client: Xirrus	Job Number: J93457
Model: XR2000H	T-Log Number: T93459
	Project Manager: Christine Krebill
Contact: Peter Krebill	Project Coordinator: -
Standard: FCC 15.247, 15.407, EN 55022, FCC B	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. For radiated emissions testing the measurement antenna was located 3 meters from the EUT, unless otherwise noted.

Ambient Conditions:

Temperature: 21-25 °C
Rel. Humidity: 35-45 %

Summary of Results

Run #	Mode	Channel	Power Setting	Test Performed	Limit	Result / Margin
Operating within 5250-5350 MHz						
1	802.11a 802.11b	See Below	See Below	Radiated Emissions, 1 - 40 GHz	FCC 15.209 / 15 E	52.9 dBµV/m @ 4873.9 MHz (-1.1 dB)
2	802.11n20 802.11b	See Below	See Below	Radiated Emissions, 1 - 40 GHz	FCC 15.209 / 15 E	52.7 dBµV/m @ 4873.9 MHz (-1.3 dB)
3	802.11a 802.11a	See Below	See Below	Radiated Emissions, 1 - 40 GHz	FCC 15.209 / 15 E	51.4 dBµV/m @ 4816.7 MHz (-2.6 dB)
4	802.11n20 802.11n20	See Below	See Below	Radiated Emissions, 1 - 40 GHz	FCC 15.209 / 15 E	63.2 dBµV/m @ 10558.6 MHz (-5.1 dB)
5	802.11n40 802.11n20	See Below	See Below	Radiated Emissions, 1 - 40 GHz	FCC 15.209 / 15 E	48.9 dBµV/m @ 4848.5 MHz (-5.1 dB)
6	802.11n40 802.11n20	See Below	See Below	Radiated Emissions, 1 - 40 GHz	FCC 15.209 / 15 E	50.4 dBµV/m @ 2833.4 MHz (-3.6 dB)



EMC Test Data

Client: Xirrus	Job Number: J93457
Model: XR2000H	T-Log Number: T93459
	Project Manager: Christine Krebill
Contact: Peter Krebill	Project Coordinator: -
Standard: FCC 15.247, 15.407, EN 55022, FCC B	Class: N/A

System Configuration: Operating within 5250-5350 MHz

Radio #	Frequency	CH	Mode	Pwr
Run: 1				
6	5280	56	802.11a	31
10	5300	60	802.11a	31
14	5320	64	802.11a	31
2	2437	6	802.11b	26
Run: 2				
6	5280	56	802.11n20	31
10	5300	60	802.11n20	31
14	5320	64	802.11n20	31
2	2437	6	802.11b	26
Run: 3				
6	5280	56	802.11a	31
10	5300	60	802.11a	31
14	5320	64	802.11a	31
2	5785	157	802.11a	34
Run: 4				
6	5280	56	802.11n20	31
10	5300	60	802.11n20	31
14	5320	64	802.11n20	31
2	5785	157	802.11n20	34
Run: 5				
6	5270	54	802.11n40	31
10	5310	62	802.11n40	31
14	5755	151	802.11n40	34
2	5785	157	802.11n20	34
Run: 6				
6	5270	54	802.11n40	31
10	5310	62	802.11n40	31
14	2422	3	802.11n40	26
2	2437	6	802.11n20	26

Notes - Multiple radios operating at the same time as shown above. In all cases, power set to the maximum worse case single channel power, transmitting on all chains.



EMC Test Data

Client: Xirrus	Job Number: J93457
Model: XR2000H	T-Log Number: T93459
	Project Manager: Christine Krebill
Contact: Peter Krebill	Project Coordinator: -
Standard: FCC 15.247, 15.407, EN 55022, FCC B	Class: N/A

Run #	Mode	Channel	Power Setting		Test Performed	Limit	Result / Margin
Operating within 5470-5725 MHz							
7	802.11a 802.11b	See Below	See Below		Radiated Emissions, 1 - 40 GHz	FCC 15.209 / 15 E	50.3 dB μ V/m @ 11021.0 MHz (-3.7 dB)
8	802.11n20 802.11b	See Below	See Below		Radiated Emissions, 1 - 40 GHz	FCC 15.209 / 15 E	52.4 dB μ V/m @ 11004.9 MHz (-1.6 dB)
9	802.11a 802.11a	See Below	See Below		Radiated Emissions, 1 - 40 GHz	FCC 15.209 / 15 E	45.6 dB μ V/m @ 11568.8 MHz (-8.4 dB)
10	802.11n20 802.11n20	See Below	See Below		Radiated Emissions, 1 - 40 GHz	FCC 15.209 / 15 E	47.5 dB μ V/m @ 5080.0 MHz (-6.5 dB)
11	802.11n40 802.11n20	See Below	See Below		Radiated Emissions, 1 - 40 GHz	FCC 15.209 / 15 E	48.2 dB μ V/m @ 5080.0 MHz (-5.8 dB)
12	802.11n40 802.11n20	See Below	See Below		Radiated Emissions, 1 - 40 GHz	FCC 15.209 / 15 E	51.6 dB μ V/m @ 5356.1 MHz (-2.4 dB)



EMC Test Data

Client: Xirrus	Job Number: J93457
Model: XR2000H	T-Log Number: T93459
	Project Manager: Christine Krebill
Contact: Peter Krebill	Project Coordinator: -
Standard: FCC 15.247, 15.407, EN 55022, FCC B	Class: N/A

System Configuration: Operating within 5470-5725 MHz

Radio #	Frequency	CH	Mode	Pwr
Run: 7				
6	5500	100	802.11a	33
10	5540	108	802.11a	33
14	5660	132	802.11a	33
2	2437	6	802.11b	26
Run: 8				
6	5500	100	802.11n20	32
10	5580	116	802.11n20	32
14	5700	140	802.11n20	32
2	2437	6	802.11b	26
Run: 9				
6	5500	100	802.11a	33
10	5580	116	802.11a	33
14	5700	140	802.11a	33
2	5785	157	802.11a	34
Run: 10				
6	5500	100	802.11n20	32
10	5580	116	802.11n20	32
14	5700	140	802.11n20	32
2	5785	157	802.11n20	34
Run: 11				
6	5510	102	802.11n40	33
10	5550	110	802.11n40	33
14	5670	134	802.11n40	33
2	5785	157	802.11n20	34
Run: 12				
6	5510	102	802.11n40	15
10	5550	110	802.11n40	33
14	5670	134	802.11n40	33
2	2437	6	802.11n20	26

Notes - Multiple radios operating at the same time as shown above. In all cases, power set to the maximum worse case single channel power, transmitting on all chains.



EMC Test Data

Client: Xirrus	Job Number: J93457
Model: XR2000H	T-Log Number: T93459
	Project Manager: Christine Krebill
Contact: Peter Krebill	Project Coordinator: -
Standard: FCC 15.247, 15.407, EN 55022, FCC B	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.

Procedure Comments:

Measurements performed in accordance with FCC KDB 789033

Peak measurements performed with: RBW=1MHz, VBW=3MHz, peak detector, max hold, auto sweep time

Unless otherwise stated/noted, emissions had duty cycle < 98%, but constant, average measurement performed: RBW=1MHz, VBW=10Hz, peak detector, linear averaging, auto sweep, trace average 100 traces, measurement corrected by Linear Voltage correction factor.

Mode	Data Rate	Duty Cycle (x)	Constant DC?	T (ms)	Pwr Cor Factor*	Lin Volt Cor Factor**	Min VBW for FS (Hz)
11b	1Mb/s	0.99	Yes	4.02	0.0	0.0	249
11a	MB/s	0.96	Yes	1.35	0.2	0.3	741
11n20	MCS	0.97	Yes	1.27	0.1	0.3	787
11n40	MCS	0.90	Yes	0.6	0.5	1.0	1667

Sample Notes

Sample S/N: 20:0C:7D

Driver:

Antenna: Panel (x4)

Measurement Specific Notes:

Note 1:	For emissions outside of the restricted bands the limit is -27dBm/MHz eirp (68.3dBuV/m). The measurement method required is a peak measurement (RB=1MHz, VB≥3MHz, peak detector). Per KDB 789033 2) c) (i), compliance can be demonstrated by meeting the average and peak limits of 15.209, as an alternative.
Note 2:	Emission have duty cycle < 98%, but constant, average measurement performed: RBW=1MHz, VBW=10Hz, peak detector, linear averaging, auto sweep, trace average 100 * 1/DC traces, measurement corrected by Linear Voltage correction factor



EMC Test Data

Client: Xirrus	Job Number: J93457
Model: XR2000H	T-Log Number: T93459
Contact: Peter Krebill	Project Manager: Christine Krebill
Standard: FCC 15.247, 15.407, EN 55022, FCC B	Project Coordinator: -
	Class: N/A

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

Date of Test: 10/3/2013

Config. Used: 1

Test Engineer: Deniz Demirci

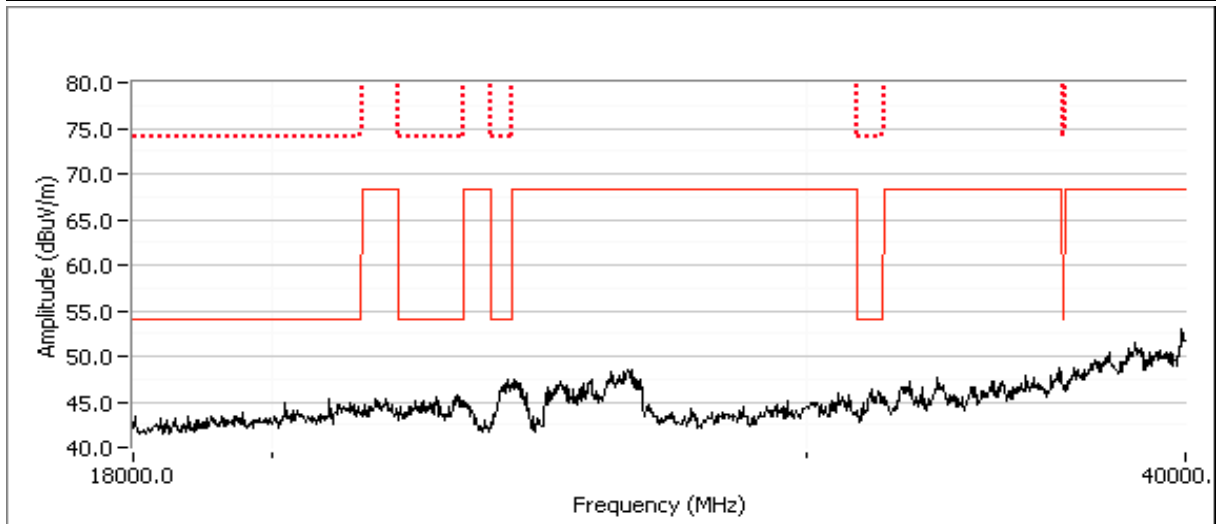
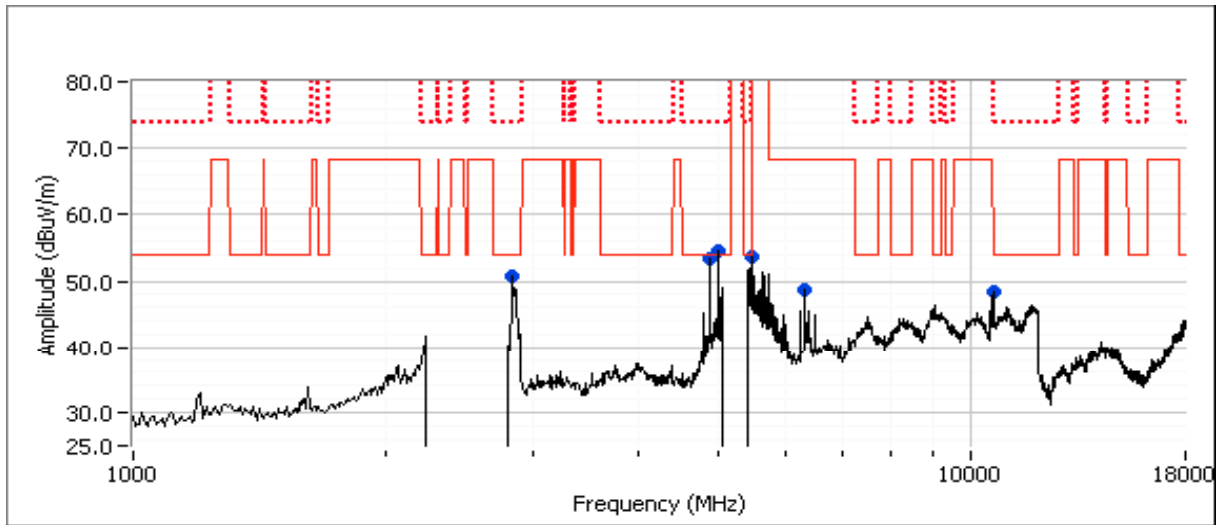
Config Change: None

Test Location: FT Ch# 5

EUT Voltage: POE

Radio #	Frequency	CH	Mode	Pwr
6	5260	56	802.11a	31
10	5300	60	802.11a	31
14	5320	64	802.11a	31
2	2437	6	802.11b	26

Tx Chain: 2x2





EMC Test Data

Client: Xirrus	Job Number: J93457
Model: XR2000H	T-Log Number: T93459
	Project Manager: Christine Krebill
Contact: Peter Krebill	Project Coordinator: -
Standard: FCC 15.247, 15.407, EN 55022, FCC B	Class: N/A

Frequency MHz	Level dB μ V/m	Pol v/h	15.209 / 15E		Detector Pk/QP/Avg	Azimuth degrees	Height meters	Comments
			Limit	Margin				
4873.900	52.9	V	54.0	-1.1	AVG	344	1.4	RB 1 MHz;VB 10 Hz;Peak, Note 2
4873.840	55.8	V	74.0	-18.2	PK	344	1.4	RB 1 MHz;VB 3 MHz;Peak
2834.710	44.2	V	54.0	-9.8	AVG	347	1.1	RB 1 MHz;VB 10 Hz;Peak
2834.110	55.7	V	74.0	-18.3	PK	347	1.1	RB 1 MHz;VB 3 MHz;Peak
4999.980	50.1	V	60.0	-9.9	AVG	351	1.5	Digital Bus Emission, Class A limits
4999.980	56.0	V	80.0	-24.0	PK	351	1.5	Digital Bus Emission, Class A limits
5479.900	53.8	V	68.3	-14.5	PK	337	1.4	RB 1 MHz;VB 3 MHz;Peak
6323.010	54.1	V	68.3	-14.2	PK	334	1.4	RB 1 MHz;VB 3 MHz;Peak
10562.400	56.8	V	68.3	-11.5	PK	198	1.0	RB 1 MHz;VB 3 MHz;Peak

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 a peak measurement (RB=1MHz, VB \geq 3MHz, peak detector).



EMC Test Data

Client: Xirrus	Job Number: J93457
Model: XR2000H	T-Log Number: T93459
Contact: Peter Krebill	Project Manager: Christine Krebill
Standard: FCC 15.247, 15.407, EN 55022, FCC B	Project Coordinator: -
	Class: N/A

Run #2, Radiated Spurious Emissions, 1,000 - 40,000 MHz. Operation in the 5250-5350 MHz Band

Date of Test: 10/3/2013

Config. Used: 1

Test Engineer: Rafael Varelas

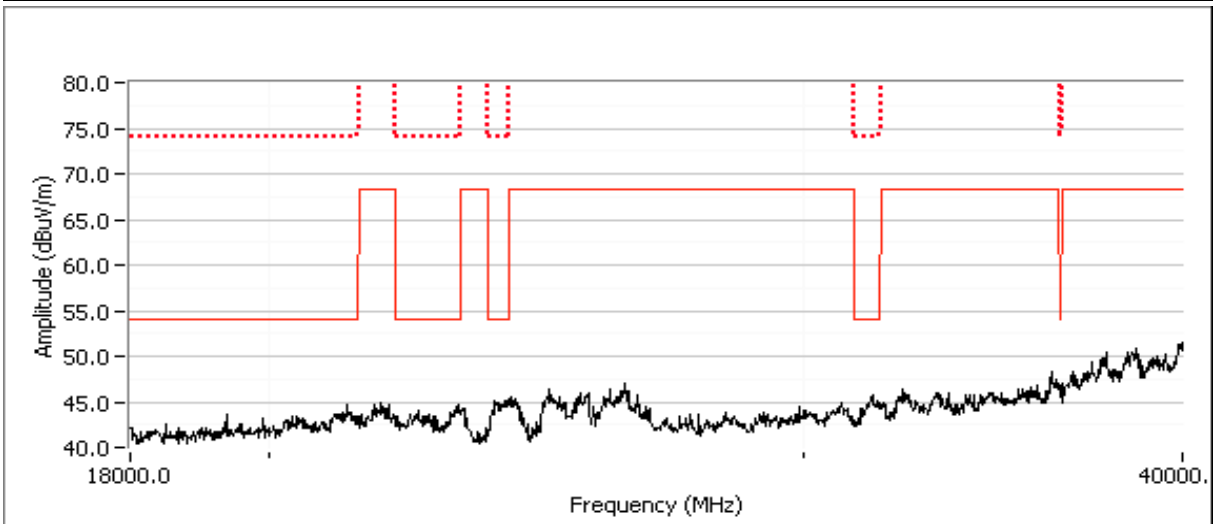
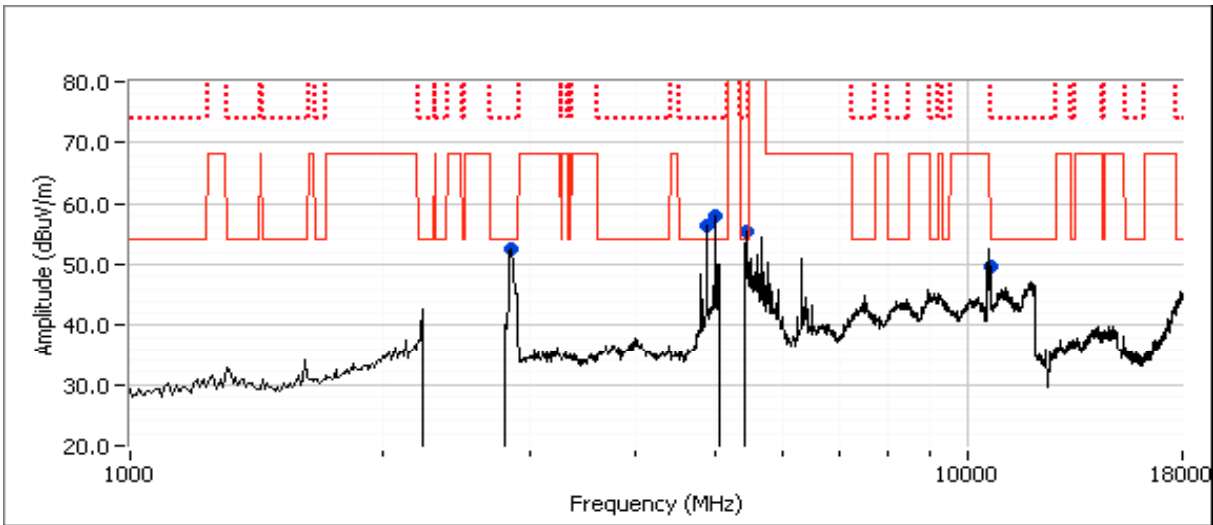
Config Change: None

Test Location: FT Ch# 5

EUT Voltage: POE

Radio #	Frequency	CH	Mode	Pwr
6	5260	56	802.11n20	31
10	5300	60	802.11n20	31
14	5320	64	802.11n20	31
2	2437	6	802.11b	26

Tx Chain: 2x2





EMC Test Data

Client: Xirrus	Job Number: J93457
Model: XR2000H	T-Log Number: T93459
	Project Manager: Christine Krebill
Contact: Peter Krebill	Project Coordinator: -
Standard: FCC 15.247, 15.407, EN 55022, FCC B	Class: N/A

Frequency MHz	Level dB μ V/m	Pol v/h	15.209 / 15E		Detector Pk/QP/Avg	Azimuth degrees	Height meters	Comments
			Limit	Margin				
4873.900	52.7	H	54.0	-1.3	AVG	340	1.6	RB 1 MHz;VB 10 Hz;Peak, Note 2
4873.900	56.6	H	74.0	-17.4	PK	340	1.6	RB 1 MHz;VB 3 MHz;Peak
2845.610	48.4	H	54.0	-5.6	AVG	354	1.0	RB 1 MHz;VB 10 Hz;Peak
2845.110	59.6	H	74.0	-14.4	PK	354	1.0	RB 1 MHz;VB 3 MHz;Peak
5439.960	46.4	V	54.0	-7.6	AVG	347	1.6	RB 1 MHz;VB 10 Hz;Peak
5439.810	55.6	V	74.0	-18.4	PK	347	1.6	RB 1 MHz;VB 3 MHz;Peak
5000.000	51.1	V	60.0	-8.9	AVG	340	1.6	Digital Bus Emission, Class A limits
4999.900	56.7	V	80.0	-23.3	PK	340	1.6	Digital Bus Emission, Class A limits
10645.100	47.2	V	54.0	-6.8	AVG	149	1.3	RB 1 MHz;VB 10 Hz;Peak
10644.430	60.6	V	74.0	-13.4	PK	149	1.3	RB 1 MHz;VB 3 MHz;Peak

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 a peak measurement (RB=1MHz, VB \geq 3MHz, peak detector).



EMC Test Data

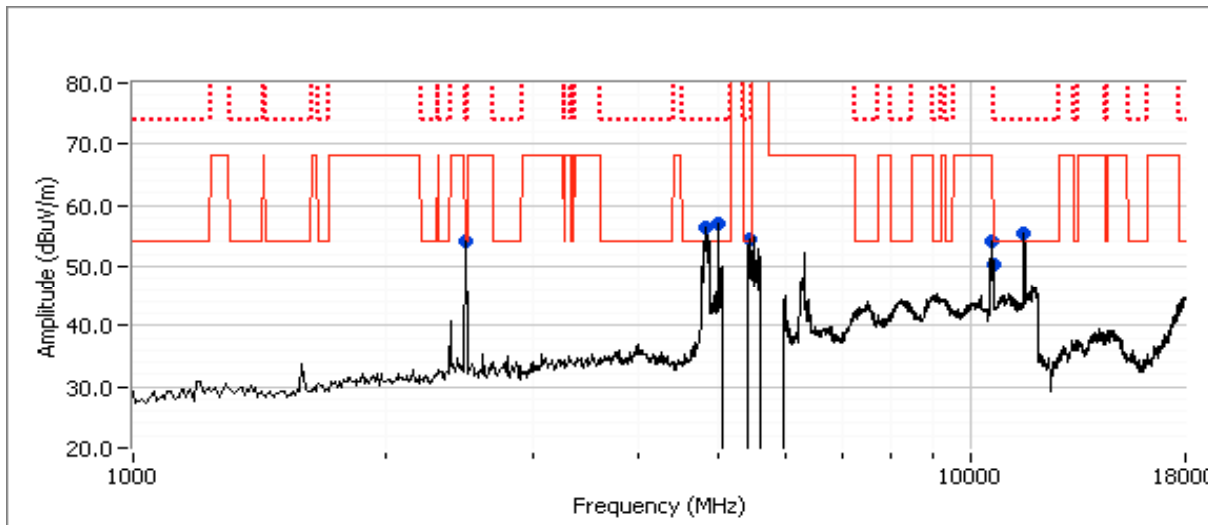
Client: Xirrus	Job Number: J93457
Model: XR2000H	T-Log Number: T93459
	Project Manager: Christine Krebill
Contact: Peter Krebill	Project Coordinator: -
Standard: FCC 15.247, 15.407, EN 55022, FCC B	Class: N/A

Run #3, Radiated Spurious Emissions, 1,000 - 40,000 MHz. Operation in the 5250-5350 MHz Band

Date of Test: 10/3/2013	Config. Used: 1
Test Engineer: Rafael Varelas	Config Change: None
Test Location: FT Ch# 5	EUT Voltage: POE

Radio #	Frequency	CH	Mode	Pwr
6	5260	56	802.11a	31
10	5300	60	802.11a	31
14	5320	64	802.11a	31
2	5785	157	802.11a	34

Tx Chain: 2x2





EMC Test Data

Client: Xirrus	Job Number: J93457
Model: XR2000H	T-Log Number: T93459
Contact: Peter Krebill	Project Manager: Christine Krebill
Standard: FCC 15.247, 15.407, EN 55022, FCC B	Project Coordinator: -
	Class: N/A

Frequency MHz	Level dB μ V/m	Pol v/h	15.209 / 15E		Detector PK/QP/Avg	Azimuth degrees	Height meters	Comments
			Limit	Margin				
4816.700	51.4	V	54.0	-2.6	AVG	343	1.4	RB 1 MHz;VB 10 Hz;Peak
4817.440	64.5	V	74.0	-9.5	PK	343	1.4	RB 1 MHz;VB 3 MHz;Peak
5000.000	52.4	H	60.0	-7.6	AVG	341	1.6	Digital Bus Emission, Class A limits
5000.060	57.3	H	80.0	-22.7	PK	341	1.6	Digital Bus Emission, Class A limits
5439.850	47.1	V	54.0	-6.9	AVG	345	1.6	RB 1 MHz;VB 10 Hz;Peak
5439.960	56.5	V	74.0	-17.5	PK	345	1.6	RB 1 MHz;VB 3 MHz;Peak
10564.980	65.1	V	68.3	-3.2	PK	191	1.4	RB 1 MHz;VB 3 MHz;Peak
11563.530	46.0	V	54.0	-8.0	AVG	164	1.0	RB 1 MHz;VB 10 Hz;Peak
11563.850	59.1	V	74.0	-14.9	PK	164	1.0	RB 1 MHz;VB 3 MHz;Peak
10641.370	49.5	V	54.0	-4.5	AVG	150	1.0	RB 1 MHz;VB 10 Hz;Peak
10641.000	61.0	V	74.0	-13.0	PK	150	1.0	RB 1 MHz;VB 3 MHz;Peak
2499.990	52.0	H	60.0	-8.0	AVG	136	1.3	Digital Bus Emission, Class A limits
2499.950	53.3	H	80.0	-26.7	PK	136	1.3	Digital Bus Emission, Class A limits

Note:	Scans made between 18 - 40 GHz with the measurement antenna moved around the card and its antennas 20-50cm from the device indicated there were no significant emissions in this frequency range
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 a peak measurement (RB=1MHz, VB \geq 3MHz, peak detector).



EMC Test Data

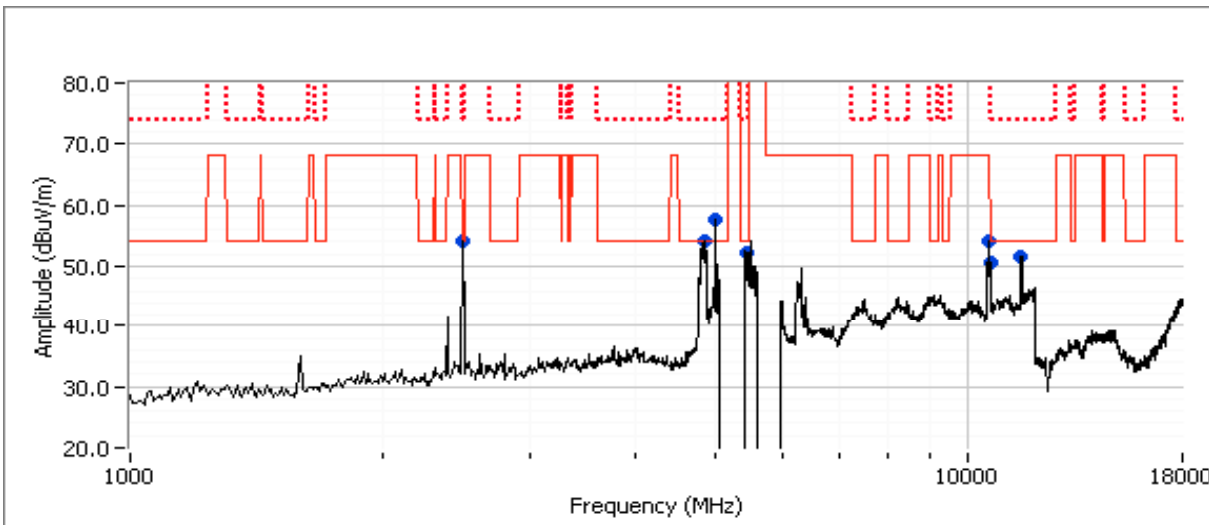
Client: Xirrus	Job Number: J93457
Model: XR2000H	T-Log Number: T93459
	Project Manager: Christine Krebill
Contact: Peter Krebill	Project Coordinator: -
Standard: FCC 15.247, 15.407, EN 55022, FCC B	Class: N/A

Run #4, Radiated Spurious Emissions, 1,000 - 40,000 MHz. Operation in the 5250-5350 MHz Band

Date of Test: 10/3/2013	Config. Used: 1
Test Engineer: Rafael Varelas	Config Change: None
Test Location: FT Ch# 5	EUT Voltage: POE

Radio #	Frequency	CH	Mode	Pwr
6	5280	56	802.11n20	31
10	5300	60	802.11n20	31
14	5320	64	802.11n20	31
2	5785	157	802.11n20	34

Tx Chain: 2x2





EMC Test Data

Client: Xirrus	Job Number: J93457
Model: XR2000H	T-Log Number: T93459
Contact: Peter Krebill	Project Manager: Christine Krebill
Standard: FCC 15.247, 15.407, EN 55022, FCC B	Project Coordinator: -
	Class: N/A

Frequency MHz	Level dB μ V/m	Pol v/h	15.209 / 15E		Detector PK/QP/Avg	Azimuth degrees	Height meters	Comments
			Limit	Margin				
10558.570	63.2	V	68.3	-5.1	PK	108	1.1	RB 1 MHz;VB 3 MHz;Peak
5000.000	51.7	H	60.0	-8.3	AVG	342	1.6	Digital Bus Emission, Class A limits
4999.860	56.9	H	80.0	-23.1	PK	342	1.6	Digital Bus Emission, Class A limits
10643.400	47.7	V	54.0	-6.3	AVG	148	1.0	RB 1 MHz;VB 10 Hz;Peak
10645.770	59.7	V	74.0	-14.3	PK	148	1.0	RB 1 MHz;VB 3 MHz;Peak
11570.580	47.3	V	54.0	-6.7	AVG	207	1.1	RB 1 MHz;VB 10 Hz;Peak
11569.950	58.1	V	74.0	-15.9	PK	207	1.1	RB 1 MHz;VB 3 MHz;Peak
4852.730	48.7	V	54.0	-5.3	AVG	339	1.5	RB 1 MHz;VB 10 Hz;Peak
4852.230	60.7	V	74.0	-13.3	PK	339	1.5	RB 1 MHz;VB 3 MHz;Peak
5439.870	46.6	H	54.0	-7.4	AVG	342	1.6	RB 1 MHz;VB 10 Hz;Peak
5440.070	55.9	H	74.0	-18.1	PK	342	1.6	RB 1 MHz;VB 3 MHz;Peak
2500.000	52.2	H	60.0	-7.8	AVG	137	1.3	Digital Bus Emission, Class A limits
2500.000	53.3	H	80.0	-26.7	PK	137	1.3	Digital Bus Emission, Class A limits

Note:	Scans made between 18 - 40 GHz with the measurement antenna moved around the card and its antennas 20-50cm from the device indicated there were no significant emissions in this frequency range
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 a peak measurement (RB=1MHz, VB \geq 3MHz, peak detector).



EMC Test Data

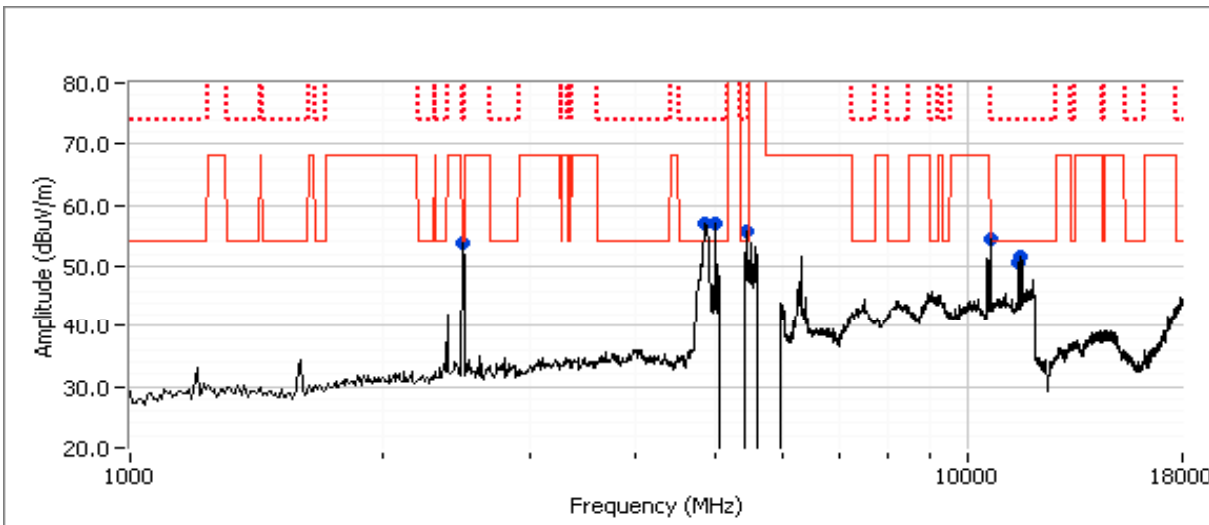
Client: Xirrus	Job Number: J93457
Model: XR2000H	T-Log Number: T93459
	Project Manager: Christine Krebill
Contact: Peter Krebill	Project Coordinator: -
Standard: FCC 15.247, 15.407, EN 55022, FCC B	Class: N/A

Run #5, Radiated Spurious Emissions, 1,000 - 40,000 MHz. Operation in the 5250-5350 MHz Band

Date of Test: 10/3/2013	Config. Used: 1
Test Engineer: Rafael Varelas	Config Change: None
Test Location: FT Ch# 5	EUT Voltage: POE

Radio #	Frequency	CH	Mode	Pwr
6	5270	54	802.11n40	31
10	5310	62	802.11n40	31
14	5755	151	802.11n40	34
2	5785	157	802.11n20	34

Tx Chain: 2x2





EMC Test Data

Client: Xirrus	Job Number: J93457
Model: XR2000H	T-Log Number: T93459
Contact: Peter Krebill	Project Manager: Christine Krebill
Standard: FCC 15.247, 15.407, EN 55022, FCC B	Project Coordinator: -
	Class: N/A

Frequency MHz	Level dB μ V/m	Pol v/h	15.209 / 15E		Detector PK/QP/Avg	Azimuth degrees	Height meters	Comments
			Limit	Margin				
4848.470	48.9	V	54.0	-5.1	AVG	327	1.5	RB 1 MHz;VB 10 Hz;Peak
4849.440	61.4	V	74.0	-12.6	PK	327	1.5	RB 1 MHz;VB 3 MHz;Peak
4999.980	52.8	H	60.0	-7.2	AVG	340	1.6	Digital Bus Emission, Class A limits
5000.000	58.0	H	80.0	-22.0	PK	340	1.6	Digital Bus Emission, Class A limits
5439.980	48.5	V	54.0	-5.5	AVG	338	1.3	RB 1 MHz;VB 10 Hz;Peak
5440.030	57.5	V	74.0	-16.5	PK	338	1.3	RB 1 MHz;VB 3 MHz;Peak
10611.910	45.0	V	54.0	-9.0	AVG	156	1.3	RB 1 MHz;VB 10 Hz;Peak
10600.810	56.5	V	74.0	-17.5	PK	156	1.3	RB 1 MHz;VB 3 MHz;Peak
11561.730	47.7	V	54.0	-6.3	AVG	192	1.6	RB 1 MHz;VB 10 Hz;Peak
11560.100	61.2	V	74.0	-12.8	PK	192	1.6	RB 1 MHz;VB 3 MHz;Peak
11490.000	45.1	V	54.0	-8.9	AVG	141	1.8	RB 1 MHz;VB 10 Hz;Peak
11506.200	57.2	V	74.0	-16.8	PK	141	1.8	RB 1 MHz;VB 3 MHz;Peak
2500.000	52.2	H	60.0	-7.8	AVG	109	1.8	Digital Bus Emission, Class A limits
2499.990	54.3	H	80.0	-25.7	PK	109	1.8	Digital Bus Emission, Class A limits

Note:	Scans made between 18 - 40 GHz with the measurement antenna moved around the card and its antennas 20-50cm from the device indicated there were no significant emissions in this frequency range
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 a peak measurement (RB=1MHz, VB \geq 3MHz, peak detector).



EMC Test Data

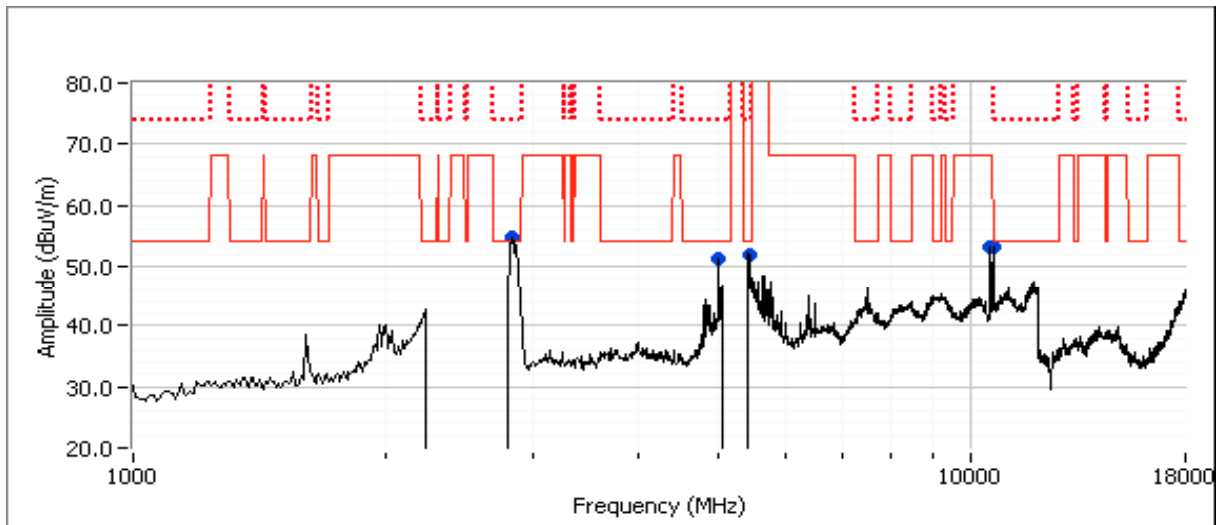
Client: Xirrus	Job Number: J93457
Model: XR2000H	T-Log Number: T93459
	Project Manager: Christine Krebill
Contact: Peter Krebill	Project Coordinator: -
Standard: FCC 15.247, 15.407, EN 55022, FCC B	Class: N/A

Run #6, Radiated Spurious Emissions, 1,000 - 40,000 MHz. Operation in the 5250-5350 MHz Band

Date of Test: 10/3/2013 Config. Used: 1
 Test Engineer: Rafael Varelas Config Change: None
 Test Location: FT Ch# 5 EUT Voltage: POE

Radio #	Frequency	CH	Mode	Pwr
6	5270	54	802.11n40	31
10	5310	62	802.11n40	31
14	2422	3	802.11n40	26
2	2437	6	802.11n20	26

Tx Chain: 2x2





EMC Test Data

Client: Xirrus	Job Number: J93457
Model: XR2000H	T-Log Number: T93459
	Project Manager: Christine Krebill
Contact: Peter Krebill	Project Coordinator: -
Standard: FCC 15.247, 15.407, EN 55022, FCC B	Class: N/A

Frequency MHz	Level dB μ V/m	Pol v/h	15.209 / 15E		Detector Pk/QP/Avg	Azimuth degrees	Height meters	Comments
			Limit	Margin				
2833.400	50.4	V	54.0	-3.6	AVG	342	1.3	RB 1 MHz;VB 10 Hz;Peak
2831.940	61.4	V	74.0	-12.6	PK	342	1.3	RB 1 MHz;VB 3 MHz;Peak
10539.900	59.4	V	68.3	-8.9	PK	172	1.3	RB 1 MHz;VB 3 MHz;Peak
10610.300	44.5	H	54.0	-9.5	AVG	206	1.1	RB 1 MHz;VB 10 Hz;Peak
10609.120	54.8	H	74.0	-19.2	PK	206	1.1	RB 1 MHz;VB 3 MHz;Peak
5439.900	45.8	H	54.0	-8.2	AVG	348	1.9	RB 1 MHz;VB 10 Hz;Peak
5439.860	53.0	H	74.0	-21.0	PK	348	1.9	RB 1 MHz;VB 3 MHz;Peak
4999.980	48.5	H	54.0	-5.5	AVG	354	1.5	Digital Bus Emission, Class A limits
5000.070	53.4	H	74.0	-20.6	PK	354	1.5	Digital Bus Emission, Class A limits

Note:	Scans made between 18 - 40 GHz with the measurement antenna moved around the card and its antennas 20-50cm from the device indicated there were no significant emissions in this frequency range
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 a peak measurement (RB=1MHz, VB \geq 3MHz, peak detector).



EMC Test Data

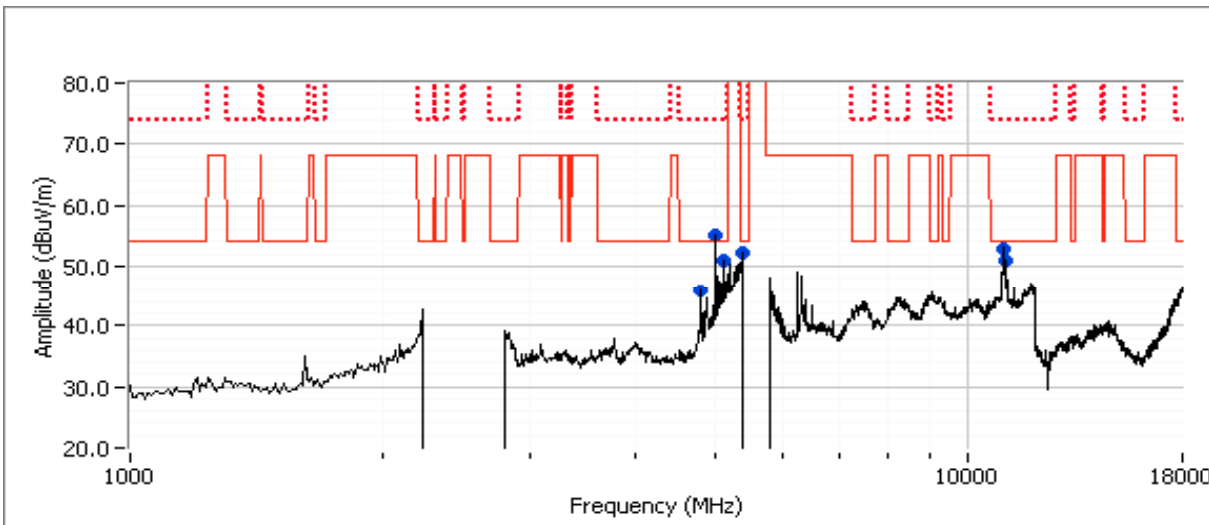
Client: Xirrus	Job Number: J93457
Model: XR2000H	T-Log Number: T93459
	Project Manager: Christine Krebill
Contact: Peter Krebill	Project Coordinator: -
Standard: FCC 15.247, 15.407, EN 55022, FCC B	Class: N/A

Run #7, Radiated Spurious Emissions, 1,000 - 40,000 MHz. Operation in the 5470-5725 MHz Band

Date of Test: 10/4/2013	Config. Used: 1
Test Engineer: Deniz Demirci	Config Change: None
Test Location: FT Ch# 5	EUT Voltage: POE

Radio #	Frequency	CH	Mode	Pwr
6	5500	100	802.11a	33
10	5540	108	802.11a	33
14	5670	134	802.11a	33
2	2437	6	802.11b	26

Tx Chain: 2x2





EMC Test Data

Client: Xirrus	Job Number: J93457
Model: XR2000H	T-Log Number: T93459
Contact: Peter Krebill	Project Manager: Christine Krebill
Standard: FCC 15.247, 15.407, EN 55022, FCC B	Project Coordinator: -
	Class: N/A

Frequency MHz	Level dB μ V/m	Pol v/h	15.209 / 15E		Detector PK/QP/Avg	Azimuth degrees	Height meters	Comments
			Limit	Margin				
11021.010	50.3	H	54.0	-3.7	AVG	100	1.0	RB 1 MHz;VB 10 Hz;Peak
11022.660	62.7	H	74.0	-11.3	PK	100	1.0	RB 1 MHz;VB 3 MHz;Peak
4999.990	51.9	H	60.0	-8.1	AVG	348	1.7	Digital Bus Emission, Class A limits
4999.940	57.3	H	80.0	-22.7	PK	348	1.7	Digital Bus Emission, Class A limits
4799.960	43.2	V	54.0	-10.8	AVG	343	1.4	RB 1 MHz;VB 10 Hz;Peak
4800.000	50.8	V	74.0	-23.2	PK	343	1.4	RB 1 MHz;VB 3 MHz;Peak
5119.990	45.1	H	54.0	-8.9	AVG	331	1.5	RB 1 MHz;VB 10 Hz;Peak
5120.180	54.3	H	74.0	-19.7	PK	331	1.5	RB 1 MHz;VB 3 MHz;Peak
5374.940	47.4	V	54.0	-6.6	AVG	346	1.3	RB 1 MHz;VB 10 Hz;Peak
5374.820	60.1	V	74.0	-13.9	PK	346	1.3	RB 1 MHz;VB 3 MHz;Peak
11101.330	46.3	V	54.0	-7.7	AVG	176	1.1	RB 1 MHz;VB 10 Hz;Peak
11083.670	58.6	V	74.0	-15.4	PK	176	1.1	RB 1 MHz;VB 3 MHz;Peak

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 a peak measurement (RB=1MHz, VB \geq 3MHz, peak detector).
Note 3:	Scans made between 18 - 40 GHz with the measurement antenna moved around the card and its antennas 20-50cm from the device indicated there were no significant emissions in this frequency range



EMC Test Data

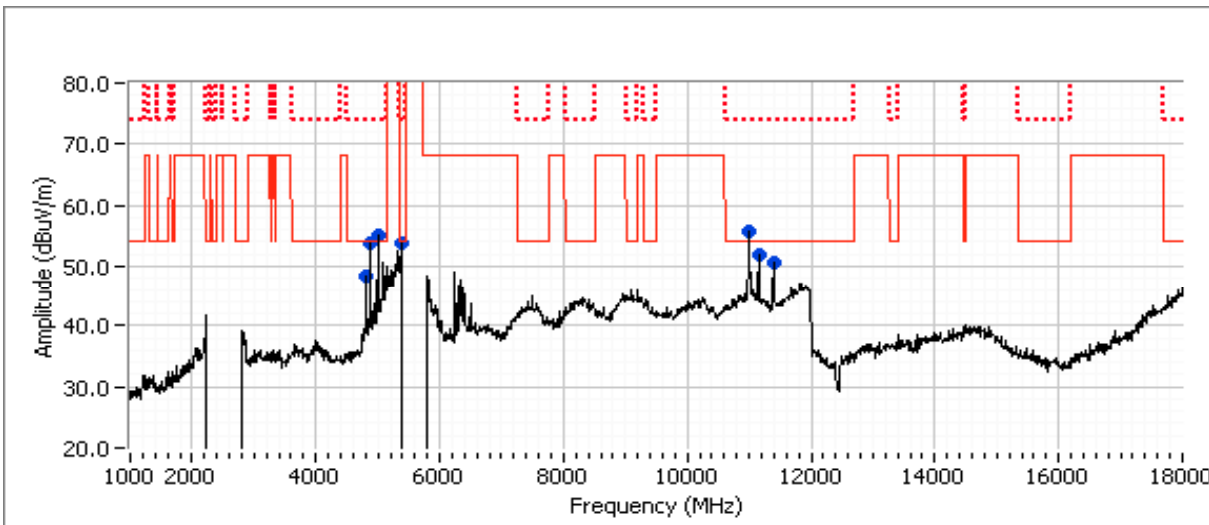
Client: Xirrus	Job Number: J93457
Model: XR2000H	T-Log Number: T93459
	Project Manager: Christine Krebill
Contact: Peter Krebill	Project Coordinator: -
Standard: FCC 15.247, 15.407, EN 55022, FCC B	Class: N/A

Run #8, Radiated Spurious Emissions, 1,000 - 40,000 MHz. Operation in the 5470-5725 MHz Band

Date of Test: 10/4/2013	Config. Used: 1
Test Engineer: Deniz Demirci	Config Change: None
Test Location: FT Ch# 5	EUT Voltage: POE

Radio #	Frequency	CH	Mode	Pwr
6	5500	100	802.11n20	32
10	5580	116	802.11n20	32
14	5700	140	802.11n20	32
2	2437	6	802.11b	26

Tx Chain: 2x2





EMC Test Data

Client: Xirrus	Job Number: J93457
Model: XR2000H	T-Log Number: T93459
Contact: Peter Krebill	Project Manager: Christine Krebill
Standard: FCC 15.247, 15.407, EN 55022, FCC B	Project Coordinator: -
	Class: N/A

Frequency MHz	Level dB μ V/m	Pol v/h	15.209 / 15E		Detector PK/QP/Avg	Azimuth degrees	Height meters	Comments
			Limit	Margin				
11004.880	52.4	V	54.0	-1.6	AVG	189	2.0	RB 1 MHz;VB 10 Hz;Peak
11002.250	65.4	V	74.0	-8.6	PK	189	2.0	RB 1 MHz;VB 3 MHz;Peak
4800.000	44.8	V	54.0	-9.2	AVG	343	1.4	RB 1 MHz;VB 10 Hz;Peak
4800.010	51.3	V	74.0	-22.7	PK	343	1.4	RB 1 MHz;VB 3 MHz;Peak
4873.910	50.7	V	54.0	-3.3	AVG	327	1.4	RB 1 MHz;VB 10 Hz;Peak, Note 2
4873.850	54.2	V	74.0	-19.8	PK	327	1.4	RB 1 MHz;VB 3 MHz;Peak
5000.000	51.3	V	60.0	-8.7	AVG	347	1.5	Digital Bus Emission, Class A limits
4999.890	57.2	V	80.0	-22.8	PK	347	1.5	Digital Bus Emission, Class A limits
5365.100	51.3	V	54.0	-2.7	AVG	341	1.2	RB 1 MHz;VB 10 Hz;Peak
5366.900	56.0	V	74.0	-18.0	PK	341	1.2	RB 1 MHz;VB 3 MHz;Peak
11159.400	48.2	V	54.0	-5.8	AVG	187	1.7	RB 1 MHz;VB 10 Hz;Peak
11159.400	61.8	V	74.0	-12.2	PK	187	1.7	RB 1 MHz;VB 3 MHz;Peak
11399.120	47.3	H	54.0	-6.7	AVG	145	1.4	RB 1 MHz;VB 10 Hz;Peak
11399.750	60.1	H	74.0	-13.9	PK	145	1.4	RB 1 MHz;VB 3 MHz;Peak

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 a peak measurement (RB=1MHz, VB≥3MHz, peak detector).
Note 3:	Scans made between 18 - 40 GHz with the measurement antenna moved around the card and its antennas 20-50cm from the device indicated there were no significant emissions in this frequency range



EMC Test Data

Client: Xirrus	Job Number: J93457
Model: XR2000H	T-Log Number: T93459
Contact: Peter Krebill	Project Manager: Christine Krebill
Standard: FCC 15.247, 15.407, EN 55022, FCC B	Project Coordinator: -
	Class: N/A

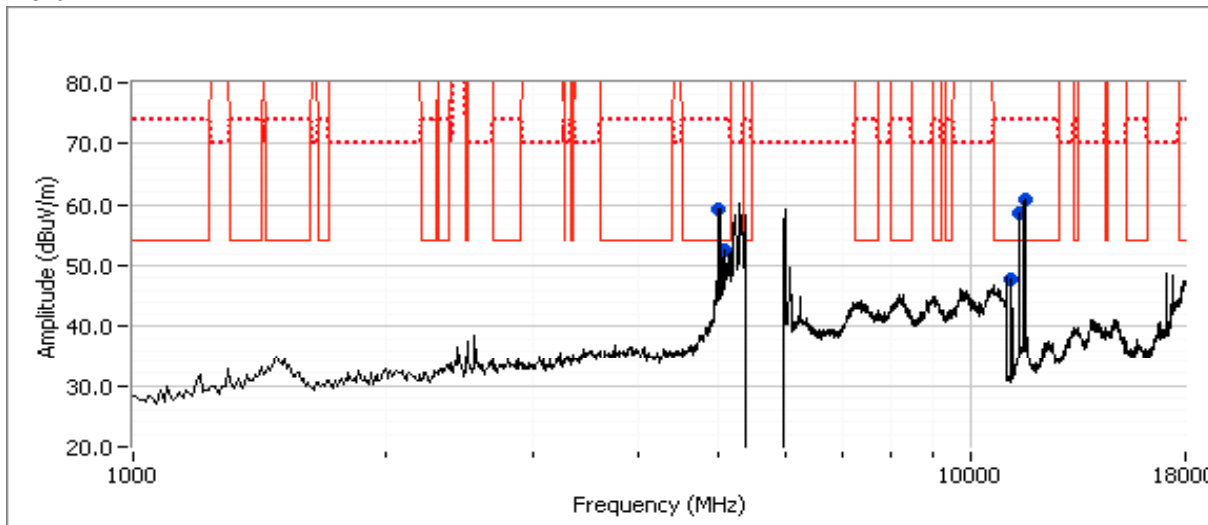
Run #9, Radiated Spurious Emissions, 1,000 - 40,000 MHz. Operation in the 5470-5725 MHz Band

Date of Test: 10/4/2013
 Test Engineer: Deniz Demirci
 Test Location: FT Ch# 5

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

Radio #	Frequency	CH	Mode	Pwr set	Radio #	Frequency	CH	Mode	Pwr set
6	5500	100	802.11a	25	14	5700	140	802.11a	33
10	5580	116	802.11a	31	2	5785	157	802.11a	34

Tx Chain: 2x2



Frequency	Level	Pol	15.209 / 15E		Detector	Azimuth	Height	Comments
MHz	dBuV/m	v/h	Limit	Margin	Pk/QP/Avg	degrees	meters	
11568.750	45.6	V	54.0	-8.4	AVG	219	1.6	RB 1 MHz;VB 10 Hz;Peak
11568.240	57.7	V	74.0	-16.3	PK	219	1.6	RB 1 MHz;VB 3 MHz;Peak
11399.740	43.3	V	54.0	-10.7	AVG	219	1.6	RB 1 MHz;VB 10 Hz;Peak
11411.470	53.8	V	74.0	-20.2	PK	219	1.6	RB 1 MHz;VB 3 MHz;Peak
11005.400	39.9	H	54.0	-14.1	AVG	284	1.6	RB 1 MHz;VB 10 Hz;Peak
10997.670	51.2	H	74.0	-22.8	PK	284	1.6	RB 1 MHz;VB 3 MHz;Peak
11158.540	39.9	V	54.0	-14.1	AVG	230	1.0	RB 1 MHz;VB 10 Hz;Peak
11146.000	51.0	V	74.0	-23.0	PK	230	1.0	RB 1 MHz;VB 3 MHz;Peak

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 a peak measurement (RB=1MHz, VB≥3MHz, peak detector).
Note 3:	Scans made between 18 - 40 GHz with the measurement antenna moved around the card and its antennas 20-50cm from the device indicated there were no significant emissions in this frequency range



EMC Test Data

Client: Xirrus	Job Number: J93457
Model: XR2000H	T-Log Number: T93459
Contact: Peter Krebill	Project Manager: Christine Krebill
Standard: FCC 15.247, 15.407, EN 55022, FCC B	Project Coordinator: -
	Class: N/A

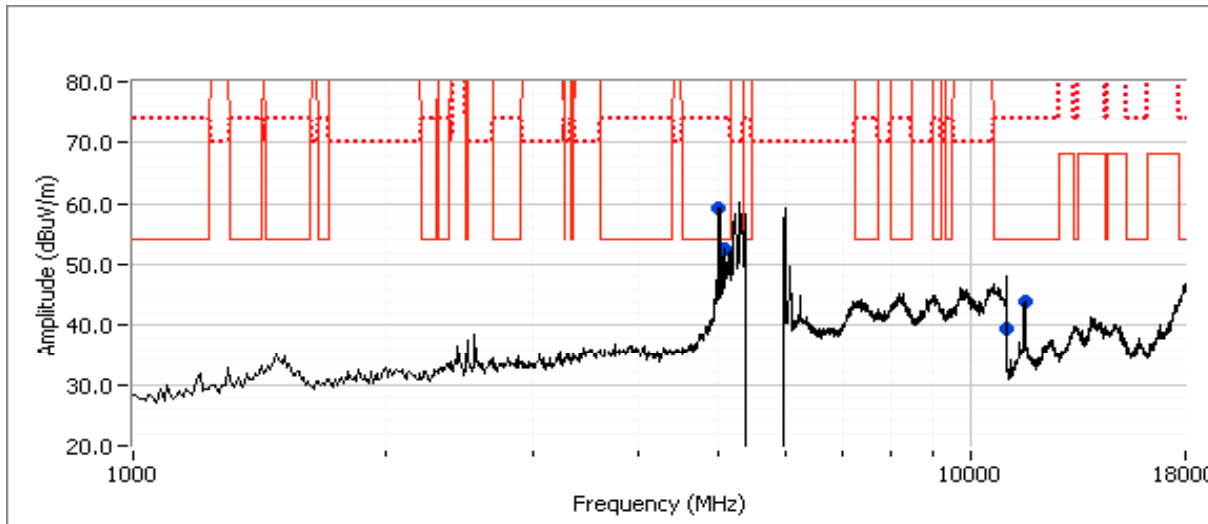
Run #10, Radiated Spurious Emissions, 1,000 - 40,000 MHz. Operation in the 5470-5725 MHz Band

Date of Test: 10/4/2013
 Test Engineer: Deniz Demirci
 Test Location: FT Ch# 5

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

Radio #	Frequency	CH	Mode	Pwr set	Radio #	Frequency	CH	Mode	Pwr set
6	5500	100	802.11n20	25	14	5700	140	802.11n20	33
10	5580	116	802.11n20	31	2	5785	157	802.11n20	34

Tx Chain: 2x2



Frequency MHz	Level dB μ V/m	Pol v/h	15.209 / 15E		Detector Pk/QP/Avg	Azimuth degrees	Height meters	Comments
			Limit	Margin				
5079.960	47.5	V	54.0	-6.5	AVG	64	1.7	RB 1 MHz;VB 10 Hz;Peak
5079.960	55.3	V	74.0	-18.7	PK	64	1.7	RB 1 MHz;VB 3 MHz;Peak
11569.070	46.2	V	54.0	-7.8	AVG	288	1.0	RB 1 MHz;VB 10 Hz;Peak
11569.270	58.8	V	74.0	-15.2	PK	288	1.0	RB 1 MHz;VB 3 MHz;Peak
11001.000	41.0	V	54.0	-13.0	AVG	342	1.0	RB 1 MHz;VB 10 Hz;Peak
11000.900	53.2	V	74.0	-20.8	PK	342	1.0	RB 1 MHz;VB 3 MHz;Peak

- 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 a peak measurement (RB=1MHz, VB \geq 3MHz, peak detector).
- Note 3: Scans made between 18 - 40 GHz with the measurement antenna moved around the card and its antennas 20-50cm from the device indicated there were no significant emissions in this frequency range



EMC Test Data

Client: Xirrus	Job Number: J93457
Model: XR2000H	T-Log Number: T93459
Contact: Peter Krebill	Project Manager: Christine Krebill
Standard: FCC 15.247, 15.407, EN 55022, FCC B	Project Coordinator: -
	Class: N/A

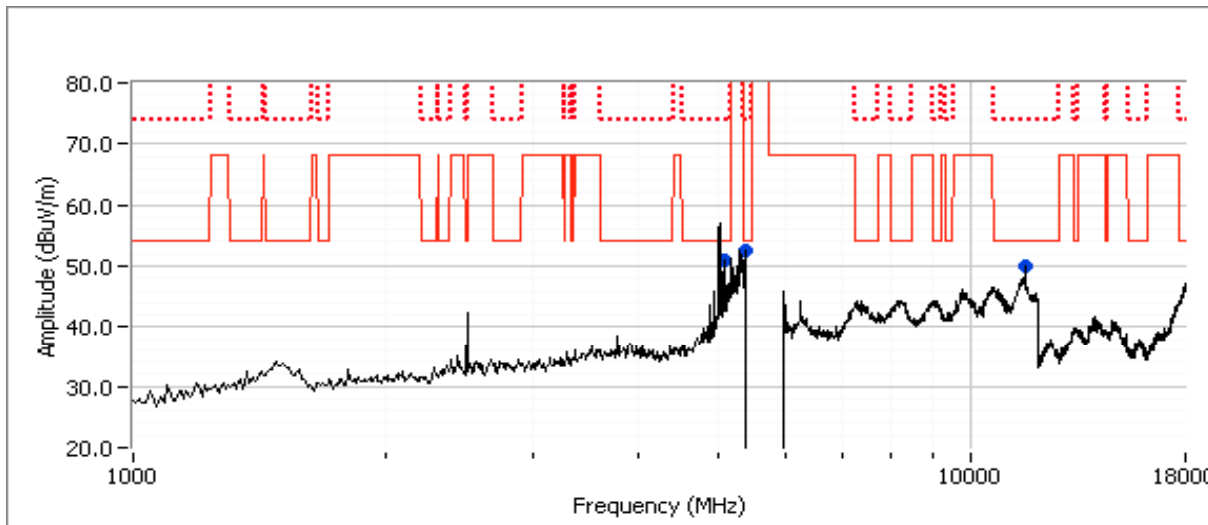
Run #11, Radiated Spurious Emissions, 1,000 - 40,000 MHz. Operation in the 5470-5725 MHz Band

Date of Test: 10/4/2013
 Test Engineer: Deniz Demirci
 Test Location: FT Ch# 5

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

Radio #	Frequency	CH	Mode	Pwr set	Radio #	Frequency	CH	Mode	Pwr set
6	5510	102	802.11n40	33	14	5670	134	802.11n40	33
10	5550	110	802.11n40	33	2	5785	157	802.11n20	34

Tx Chain: 2x2



Frequency MHz	Level dB μ V/m	Pol v/h	15.209 / 15E		Detector Pk/QP/Avg	Azimuth degrees	Height meters	Comments
			Limit	Margin				
5079.960	48.2	V	54.0	-5.8	AVG	69	1.7	RB 1 MHz;VB 10 Hz;Peak
5079.770	56.0	V	74.0	-18.0	PK	69	1.7	RB 1 MHz;VB 3 MHz;Peak
5362.440	47.5	V	54.0	-6.5	AVG	75	1.7	RB 1 MHz;VB 10 Hz;Peak
5363.070	57.8	V	74.0	-16.2	PK	75	1.7	RB 1 MHz;VB 3 MHz;Peak
11569.910	46.6	V	54.0	-7.4	AVG	298	1.1	RB 1 MHz;VB 10 Hz;Peak
11570.640	57.5	V	74.0	-16.5	PK	298	1.1	RB 1 MHz;VB 3 MHz;Peak

- 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 a peak measurement (RB=1MHz, VB \geq 3MHz, peak detector).
- Note 3: Scans made between 18 - 40 GHz with the measurement antenna moved around the card and its antennas 20-50cm from the device indicated there were no significant emissions in this frequency range



EMC Test Data

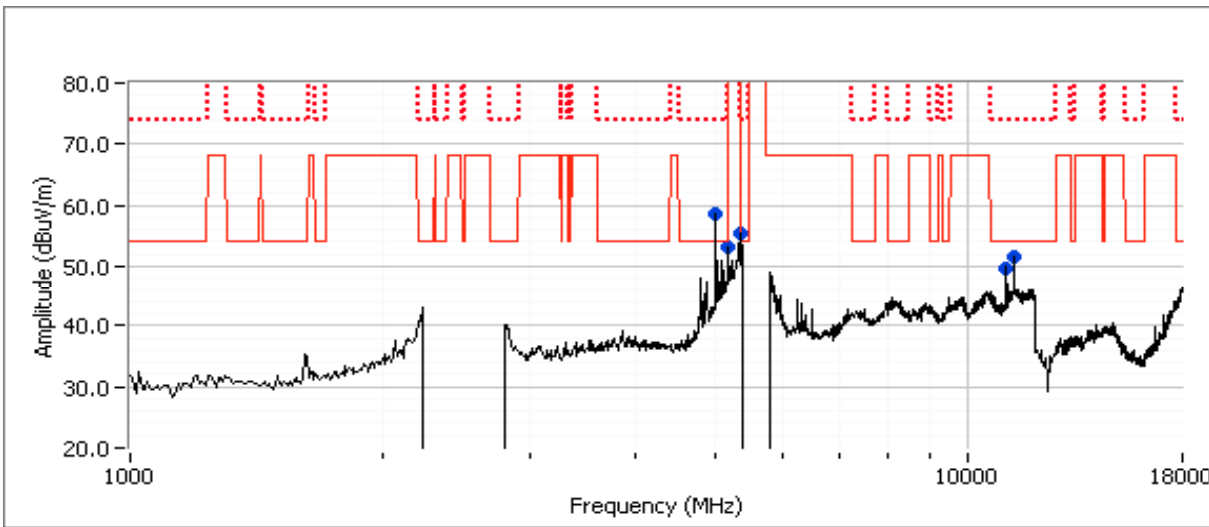
Client: Xirrus	Job Number: J93457
Model: XR2000H	T-Log Number: T93459
Contact: Peter Krebill	Project Manager: Christine Krebill
Standard: FCC 15.247, 15.407, EN 55022, FCC B	Project Coordinator: -
	Class: N/A

Run #12, Radiated Spurious Emissions, 1,000 - 40,000 MHz. Operation in the 5470-5725 MHz Band

Date of Test: 10/4/2013 Config. Used: 1
 Test Engineer: Deniz Demirci Config Change: None
 Test Location: FT Ch# 5 EUT Voltage: POE

Radio #	Frequency	CH	Mode	Pwr set# 1
6	5510	102	802.11n40	15
10	5550	110	802.11n40	33
14	5670	134	802.11n40	33
2	2437	6	802.11n20	26

Tx Chain: 2x2





EMC Test Data

Client: Xirrus	Job Number: J93457
Model: XR2000H	T-Log Number: T93459
	Project Manager: Christine Krebill
Contact: Peter Krebill	Project Coordinator: -
Standard: FCC 15.247, 15.407, EN 55022, FCC B	Class: N/A

Frequency MHz	Level dB μ V/m	Pol v/h	15.209 / 15E		Detector Pk/QP/Avg	Azimuth degrees	Height meters	Comments
			Limit	Margin				
5356.060	51.6	V	54.0	-2.4	AVG	338	1.3	RB 1 MHz;VB 10 Hz;Peak
5352.900	62.6	V	74.0	-11.4	PK	338	1.3	RB 1 MHz;VB 3 MHz;Peak
5000.050	53.9	H	60.0	-6.1	AVG	348	1.4	Digital Bus Emission, Class A limits
4999.880	59.3	H	80.0	-20.7	PK	348	1.4	Digital Bus Emission, Class A limits
5159.900	45.0	H	54.0	-9.0	AVG	339	1.3	RB 1 MHz;VB 10 Hz;Peak
5159.990	58.6	H	74.0	-15.4	PK	339	1.3	RB 1 MHz;VB 3 MHz;Peak
11100.330	45.7	V	54.0	-8.3	AVG	208	1.0	RB 1 MHz;VB 10 Hz;Peak
11101.400	57.0	V	74.0	-17.0	PK	208	1.0	RB 1 MHz;VB 3 MHz;Peak
11338.600	44.7	V	54.0	-9.3	AVG	141	1.6	RB 1 MHz;VB 10 Hz;Peak
11340.730	56.7	V	74.0	-17.3	PK	141	1.6	RB 1 MHz;VB 3 MHz;Peak

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 a peak measurement (RB=1MHz, VB \geq 3MHz, peak detector).
Note 3:	Scans made between 18 - 40 GHz with the measurement antenna moved around the card and its antennas 20-50cm from the device indicated there were no significant emissions in this frequency range

End of Report

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