

## *EMC Test Report*

### *Application for Grant of Equipment Authorization*

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

*Model: XR2000H*

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

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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 C

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

ANSI C63.10-2009

FCC DTS Measurement Guidance KDB558074

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:

Industry Canada RSS-Gen Issue 3

RSS 210 Issue 8 "Low-power Licence-exempt Radiocommunication Devices (All Frequency Bands): Category I Equipment"

FCC Part 15 Subpart C

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

The test results recorded herein are based on a single type test of Xirrus, Inc. model 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****DIGITAL TRANSMISSION SYSTEMS (2400 – 2483.5MHz)**

FCC Rule Part	RSS Rule Part	Description	Measured Value / Comments	Limit / Requirement	Result
15.247(a)	RSS 210 A8.2	Digital Modulation	Systems uses OFDM / DSSS techniques	System must utilize a digital transmission technology	Complies
15.247 (a) (2)	RSS 210 A8.2 (1)	6dB Bandwidth	all > 500 kHz	>500kHz	Complies
15.247 (b) (3)	RSS 210 A8.2 (4)	Output Power (multipoint systems)	b: 10.4 dBm (0.011W) g: 11.1 dBm (0.013W) n20:11.4 dBm(0.014W) n40 20.6dBm (0.114W)  EIRP = 2.072 W <sup>Note 1</sup>	1Watt, EIRP limited to 4 Watts.	Complies
15.247(d)	RSS 210 A8.2 (2)	Power Spectral Density	b: 5.7dBm g: 3.8dBm n20: 4.0dBm n40: -0.7dBm	8dBm/3kHz	Complies
15.247(c)	RSS 210 A8.5	Antenna Port Spurious Emissions 30MHz – 25 GHz	All < 20dBc for < 30dBc as required <sup>Note 2</sup>	< -20dBc < -30dBc <sup>Note 2</sup>	Complies
15.247(c) / 15.209	RSS 210 A8.5	Radiated Spurious Emissions 30MHz – 25 GHz	53.9 dBμV/m @ 2483.5 MHz (-0.1 dB)	15.207 in restricted bands, all others < -20dBc <-30dBc <sup>Note 2</sup>	Complies
Note 1: EIRP calculated using antenna gain of 12.1 dBi for the highest EIRP system.					
Note 2: Limit of -30dBc used for b/g/n20 modes because the power was measured using maximum conducted power averaged over a transmission burst.					

**DIGITAL TRANSMISSION SYSTEMS (5725 –5850 MHz)**

FCC Rule Part	RSS Rule Part	Description	Measured Value / Comments	Limit / Requirement	Result
15.247(a)	RSS 210 A8.2	Digital Modulation	Systems uses OFDM / DSSS techniques	System must utilize a digital transmission technology	Complies
15.247 (a) (2)	RSS 210 A8.2 (1)	6dB Bandwidth	all > 500 kHz	>500kHz	Complies
15.247 (b)	RSS 210 A8.2 (4)	Output Power (multipoint systems)	a 15.5dBm (0.036 W) n20 15.5dBm (0.035W) n40 21.4dBm (0.139W)  EIRP = 3.943 W <sup>Note 1</sup>	1Watt, EIRP limited to 4 Watts.	Complies
15.247(d)	RSS 210 A8.2 (2)	Power Spectral Density	a 5.2dBm n20 5.0dBm n40 2.8dBm	Maximum permitted is 8dBm/3kHz	Complies
15.247(c)	RSS 210 A8.5	Antenna Port Spurious Emissions –30MHz – 40 GHz	All < 20dBc for < 30dBc as required <sup>Note 2</sup>	< -20dBc < -30dBc <sup>Note 2</sup>	Complies
15.247(c) / 15.209	RSS 210 A8.5 Table 2, 3	Radiated Spurious Emissions 30MHz – 40 GHz	53.1 dBµV/m @ 4873.9 MHz (-0.9 dB)	15.207 in restricted bands, all others < -20dBc < -30dBc <sup>Note 2</sup>	Complies
<p>Note 1: EIRP calculated using antenna gain of 11.0 dBi for the highest EIRP system multi-point system.</p> <p>Note 2: Limit of -30dBc used for a/n20 modes because the power was measured using maximum conducted power averaged over a transmission burst.</p>					

**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 dBµV @ 0.286 MHz	Refer to page 18	Complies (-4.5 dB)
15.247 (b) (5) 15.407 (f)	RSS 102	RF Exposure Requirements	Refer to MPE calculations in separate exhibit, RSS 102 declaration and Quick Install Guide.	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	fer to Quick Install Guide	Statement for products with detachable antenna	Complies
-	RSP 100 RSS GEN 4.4.1	99% Bandwidth	b:13.93 MHz a/g 16.97 MHz n20 18.17 MHz n40 36.6 MHz	Information only	N/A

**MEASUREMENT UNCERTAINTIES**

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

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

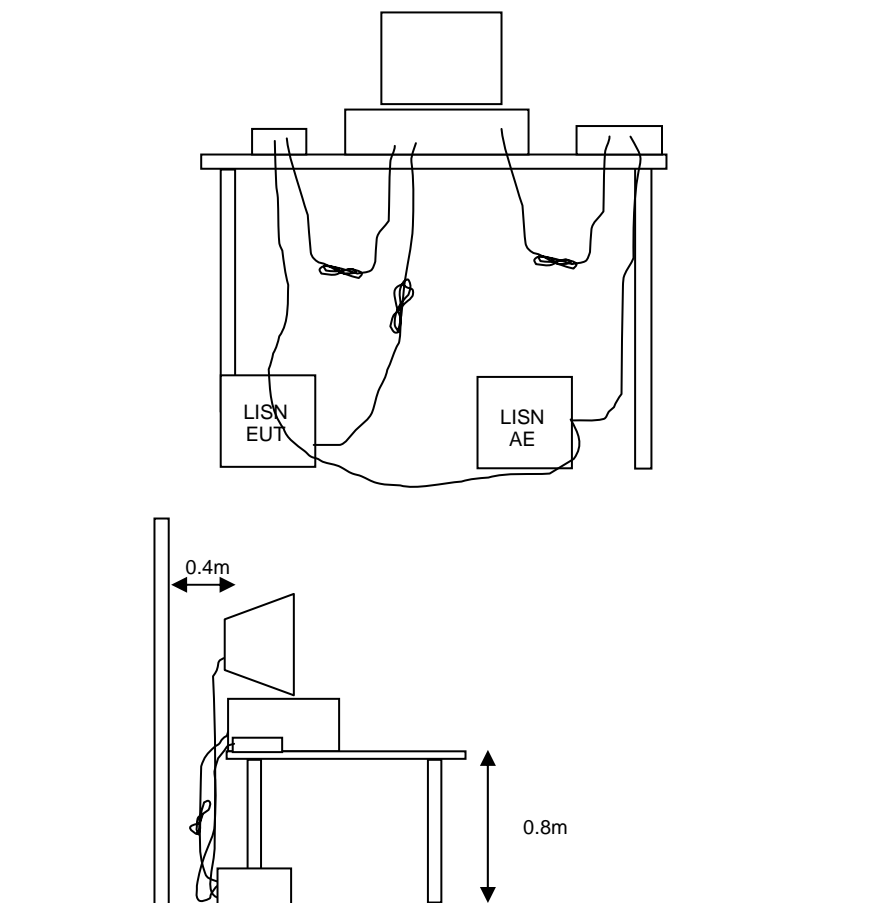
## TEST PROCEDURES

### 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**

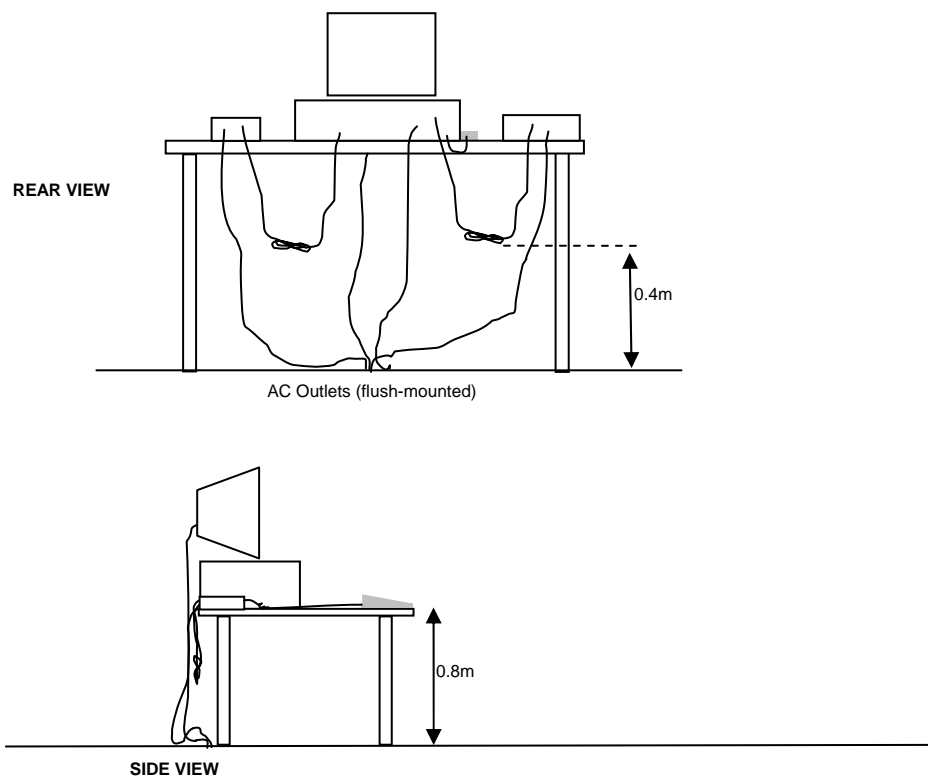
**RADIATED EMISSIONS**

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.

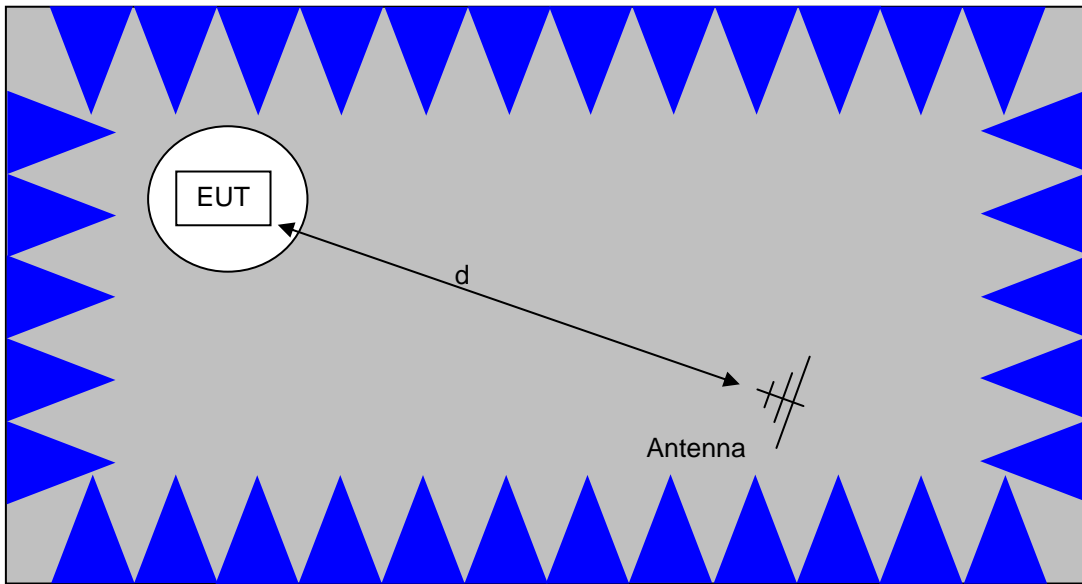
A speaker is provided in the receiver to aid in discriminating between EUT and ambient emissions. Other methods used during the preliminary scan for EUT emissions involve scanning with near field magnetic loops, monitoring I/O cables with RF current clamps, and cycling power to the EUT.

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.

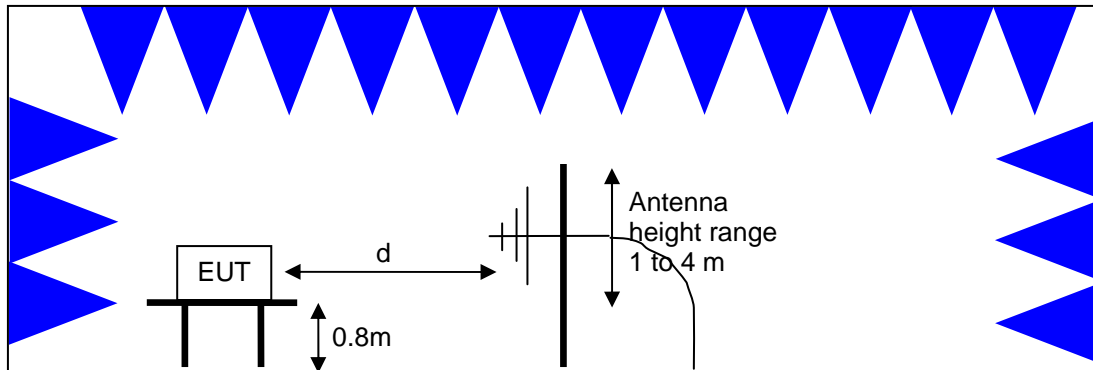


Typical Test Configuration for Radiated Field Strength Measurements



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.

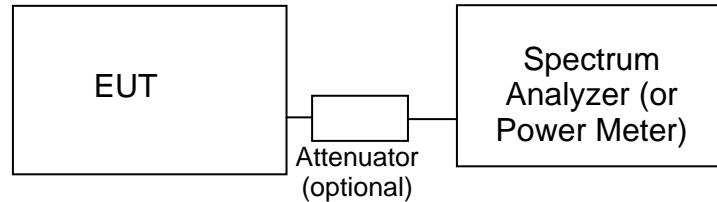


Test Configuration for Radiated Field Strength Measurements  
Semi-Anechoic Chamber, Plan and Side Views



**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 bands<sup>1</sup> (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 <sub>KHz</sub> @ 300m	67.6-20*log <sub>10</sub> (F <sub>KHz</sub> ) @ 300m
0.490-1.705	24000/F <sub>KHz</sub> @ 30m	87.6-20*log <sub>10</sub> (F <sub>KHz</sub> ) @ 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

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

**OUTPUT POWER LIMITS – DIGITAL TRANSMISSION SYSTEMS**

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

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

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

**TRANSMIT MODE SPURIOUS RADIATED EMISSIONS LIMITS – FHSS and DTS SYSTEMS**

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

**SAMPLE CALCULATIONS - CONDUCTED EMISSIONS**

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

$$R_r - S = M$$

where:

$R_r$  = Receiver Reading in dBuV

$S$  = Specification Limit in dBuV

$M$  = Margin to Specification in +/- dB

**SAMPLE CALCULATIONS - RADIATED EMISSIONS**

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

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

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

where:

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

$$D_m = \text{Measurement Distance in meters}$$

$$D_s = \text{Specification Distance in meters}$$

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

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

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

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

$$R_c = R_r + F_d$$

and

$$M = R_c - L_s$$

where:

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

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

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

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

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

#### **SAMPLE CALCULATIONS - FIELD STRENGTH TO EIRP CONVERSION**

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

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

where P is the eirp (Watts)

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

**Appendix A Test Equipment Calibration Data**

<u>Manufacturer</u>	<u>Description</u>	<u>Model</u>	<u>Asset #</u>	<u>Cal Due</u>
<b>Radiated Emissions, 1000 - 6,000 MHz, 16-Sep-13</b>				
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
<b>Radiated Emissions, 1000 - 18,000 MHz, 17-Sep-13</b>				
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
<b>Radiated Emissions, 1000 - 18,000 MHz, 18-Sep-13</b>				
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
<b>Radiated Emissions, 1000 - 18,000 MHz, 19-Sep-13</b>				
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
<b>Radiated Emissions, 1000 - 18,000 MHz, 20-Sep-13</b>				
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
<b>Radiated Emissions, 1000 - 18,000 MHz, 21-Sep-13</b>				
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
<b>Radiated Emissions, 1000 - 6,000 MHz, 24-Sep-13</b>				
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
<b>Radiated Emissions, 1000 - 18,000 MHz, 28-Sep-13</b>				
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
<b>Radiated Emissions, 1000 - 40,000 MHz, 30-Sep-13</b>				
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
<b>Radiated Emissions, 1000 - 40,000 MHz, 01-Oct-13</b>				
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
<b>Radiated Emissions, 1000 - 40,000 MHz, 02-Oct-13</b>				
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
<b>Radiated Emissions, 1 - 40 GHz, 02-Oct-13</b>				
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
<b>Radiated Emissions, 1 - 40 GHz, 03-Oct-13</b>				
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
<b>Radiated Emissions, 1000 - 40,000 MHz, 04-Oct-13</b>				
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
<b>Radiated Emissions, 30 - 1,000 MHz, 06-Oct-13</b>				
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
<b>Conducted Emissions - AC Power Ports, 06-Oct-13</b>				
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

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<u>Manufacturer</u>	<u>Description</u>	<u>Model</u>	<u>Asset #</u>	<u>Cal Due</u>
<b>Radio Antenna Port (Power), 07-Oct-13</b>				
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.

<b>Ambient Conditions:</b>	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

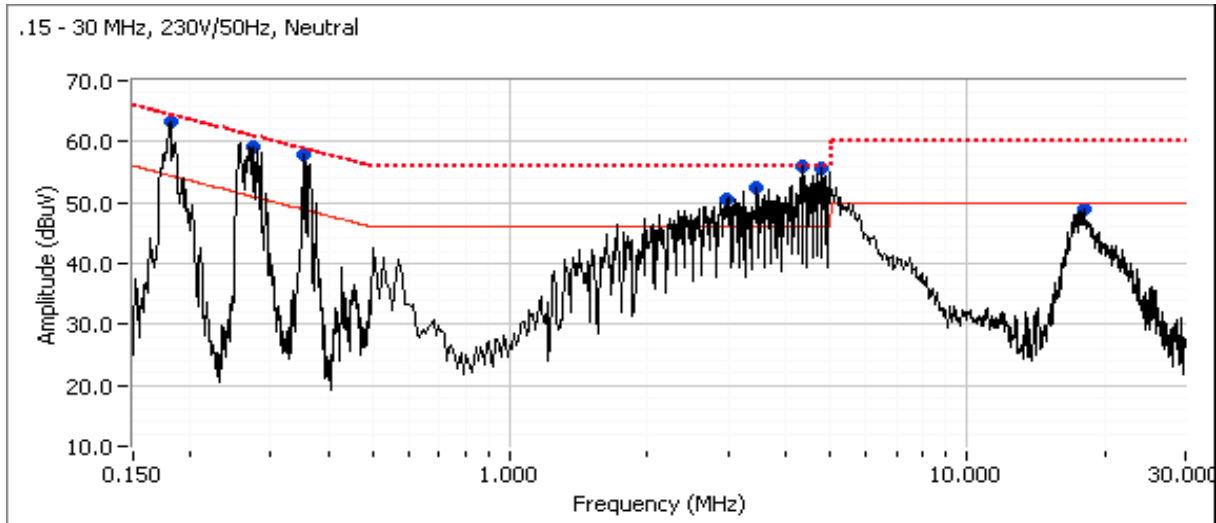
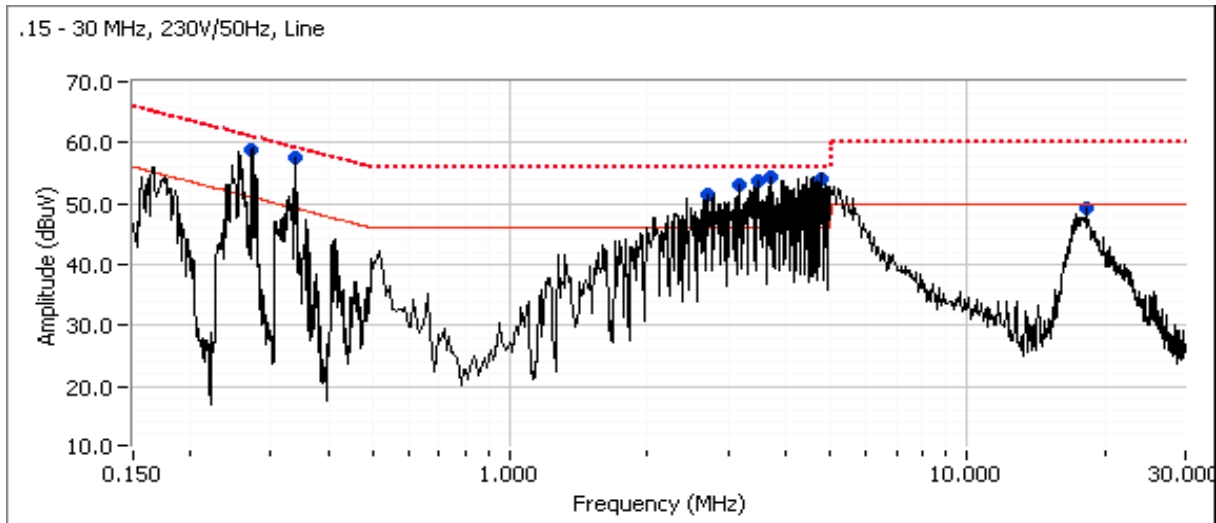
### Deviations From The Standard

No deviations were made from the requirements of the standard.

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 $\mu$ 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 $\mu$ 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)



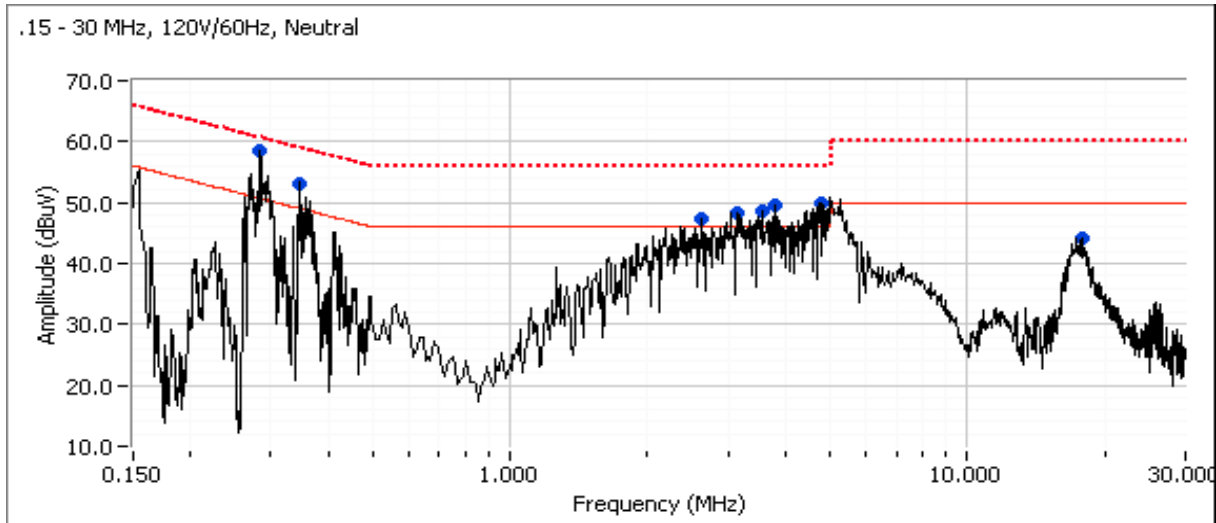
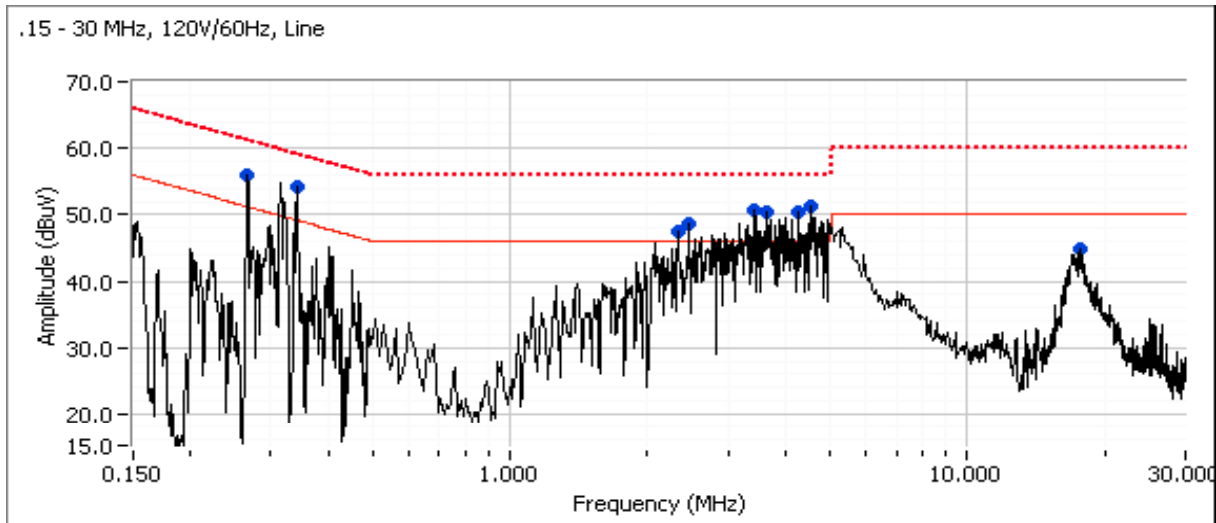


# EMC Test Data

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 $\mu$ 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

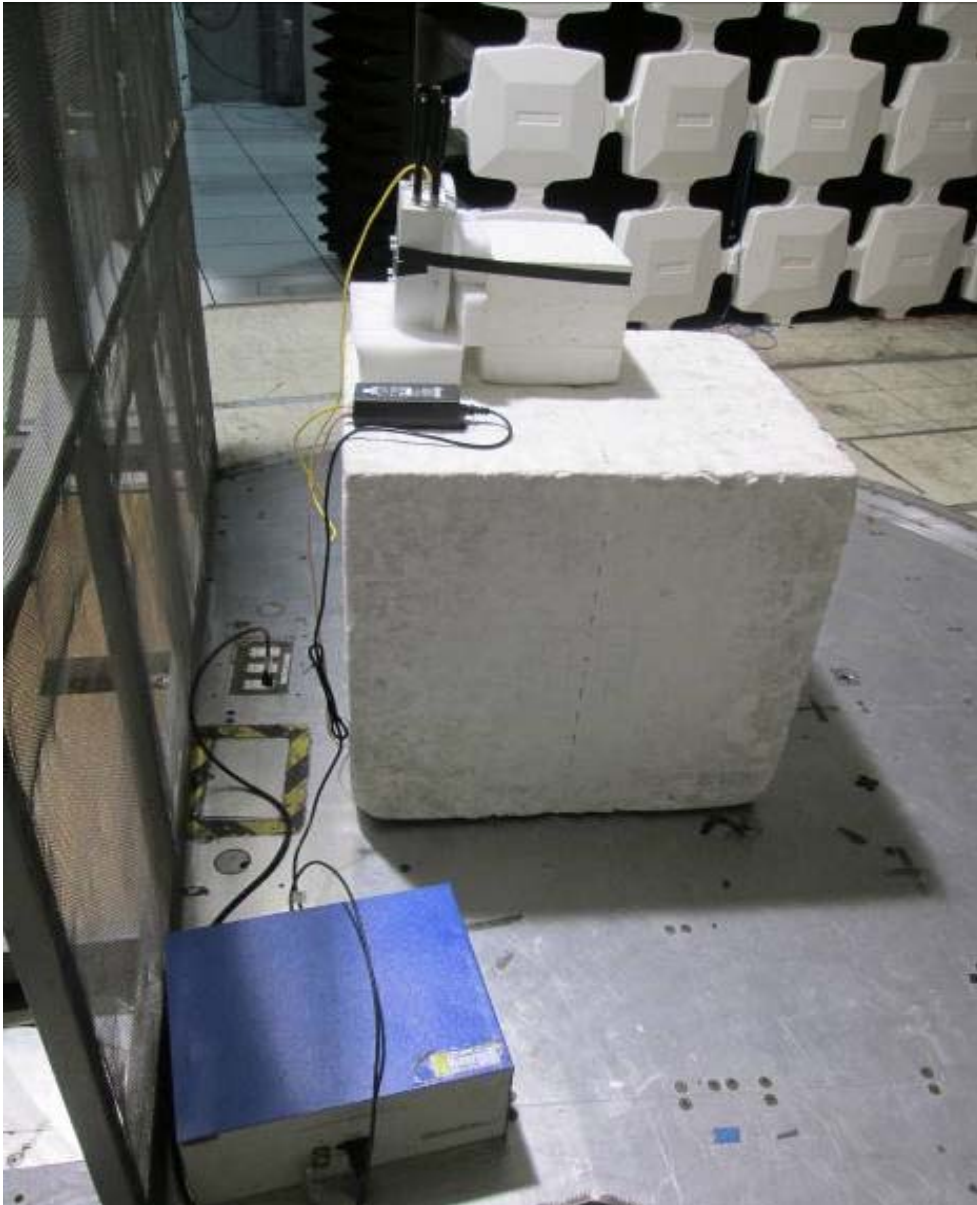
Client: Xirrus	Job Number: J93457
Model: XR2000H	T-Log Number: T93459
	Project Manager: Christine Krebill
Contact: Peter Krebill	Project Coordinator: -
Standard: FCC 15.247, 15.407, EN 55022, FCC B	Class: A

## Final quasi-peak and average readings

Frequency MHz	Level dB $\mu$ 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
	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 15.247 (DTS) Antenna Port Measurements MIMO and Smart Antenna Systems Power, PSD, Bandwidth and Spurious Emissions

### Test Specific Details

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

Date of Test: 10/8/2013  
 Test Engineer: Rafael Varelas  
 Test Location: FT Lab 4B

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

### General Test Configuration

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

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

### Ambient Conditions:

Temperature: 20.8 °C  
 Rel. Humidity: 37 %

### Summary of Results

Run #	Pwr setting	Test Performed	Limit	Pass / Fail	Result / Margin
1	See below	Output Power	15.247(b)	Pass	b: 10.4 dBm (0.011W) g: 11.1 dBm (0.013W) n20:11.4 dBm(0.014W) n40 20.6dBm (0.114W)
2	-	Power spectral Density (PSD)	15.247(d)	Pass	See results for Dipole antenna
3	-	Minimum 6dB Bandwidth	15.247(a)	Pass	
3	-	99% Bandwidth	RSS GEN	Pass	
4		Spurious emissions	15.247(b)	Pass	

### Modifications Made During Testing

No modifications were made to the EUT during testing



# 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

### Deviations From The Standard

No deviations were made from the requirements of the standard.

### Procedure Comments:

Measurements performed in accordance with FCC KDB 558074

Mode	Data Rate	Duty Cycle (x)	Constant DC?	T (ms)	Pwr Cor Factor*	Lin Volt Cor Factor**	Min VBW for FS (Hz)
11b	1	0.99	Yes	4.02	0.0	0.0	249
11g	6	0.95	Yes	1.35	0.2	0.4	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

### Antenna Gain Information

Freq	Antenna Gain (dBi) / Chain				BF	MultiChain Legacy	CDD	Sectorized / Xpol	Dir G (PWR)	Dir G (PSD)
	1	2	3	4						
2437	12.1	12.1			No	Yes	Yes	Yes	12.1	12.1

### 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; Dir G (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.



# 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: Output Power**

Operating Mode: 802.11b  
 Directional Gain (dBi): 12.1

Max EIRP (mW): 514.7

Frequency (MHz)	Chain	Software Setting	Power <sup>1</sup>		Total		Max Power (W)	Limit dBm	Result	Power (dBm) <sup>3</sup>
			dBm	mW	mW	dBm				
2412	1	24	4.0	2.5	11.1	10.4	0.011	23.9	Pass	
	2		9.3	8.6						
2437	1	25	5.4	3.4	9.9	10.0				
	2		8.1	6.5						
2462	1	28	7.0	5.0	10.7	10.3				
	2		7.6	5.8						
Total Power in Band (3 20 MHz channels)							0.032	23.9	Pass	

15.0 dBm

Operating Mode: 802.11g  
 Directional Gain (dBi): 12.1

Max EIRP (mW): 477.5

Frequency (MHz)	Chain	Software Setting	Power <sup>1</sup>		Total		Max Power (W)	Limit dBm	Result	Power (dBm) <sup>3</sup>
			dBm	mW	mW	dBm				
2412	1	22	4.0	2.5	10.7	10.3	0.013	23.9	Pass	
	2		8.8	7.6						
2437	1	26	6.1	4.0	13.0	11.1				
	2		9.2	8.3						
2462	1	22	3.8	2.4	5.8	7.6				
	2		4.9	3.1						
Total Power in Band (3 20 MHz channels)							0.029	23.9	Pass	

14.7 dBm

Operating Mode: 802.11n20  
 Directional Gain (dBi): 12.1

Max EIRP (mW): 521.6

Frequency (MHz)	Chain	Software Setting	Power <sup>1</sup>		Total		Max Power (W)	Limit dBm	Result	Power (dBm) <sup>3</sup>
			dBm	mW	mW	dBm				
2412	1	20	8.4	6.9	13.8	11.4	0.014	23.9	Pass	
	2		8.1	6.4						
2437	1	26	5.9	3.9	12.6	11.0				
	2		9.2	8.4						
2462	1	22	3.6	2.3	5.7	7.6				
	2		5.1	3.3						
Total Power in Band (3 20 MHz channels)							0.032	23.9	Pass	

15.1 dBm





# 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

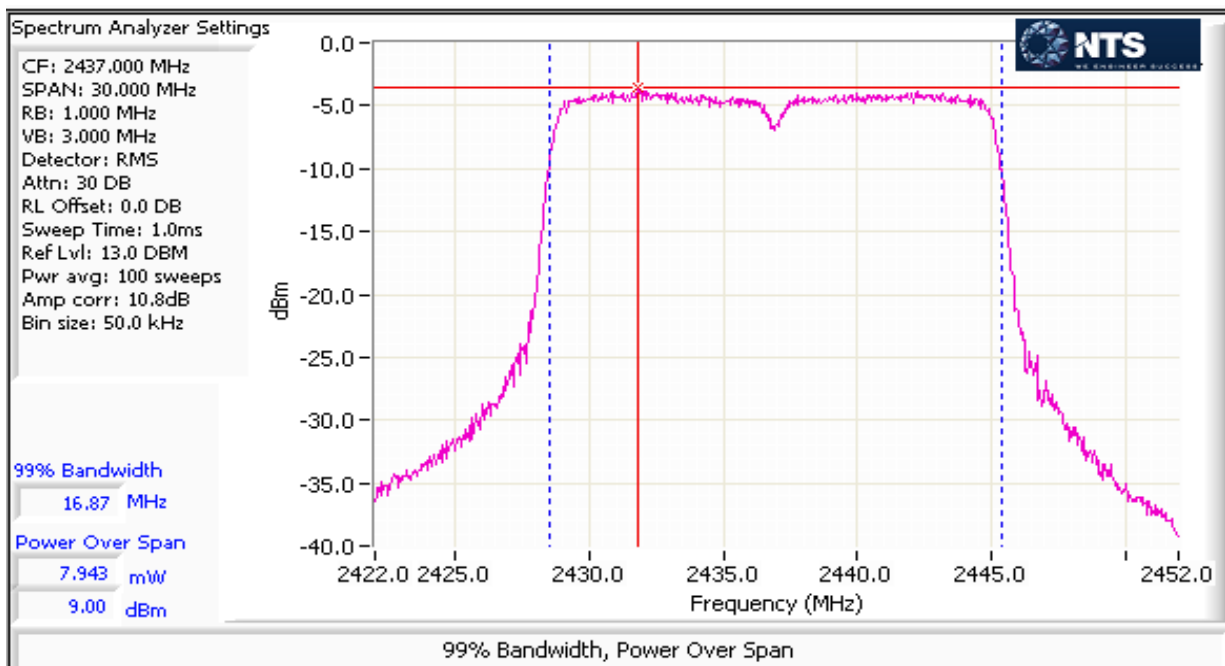
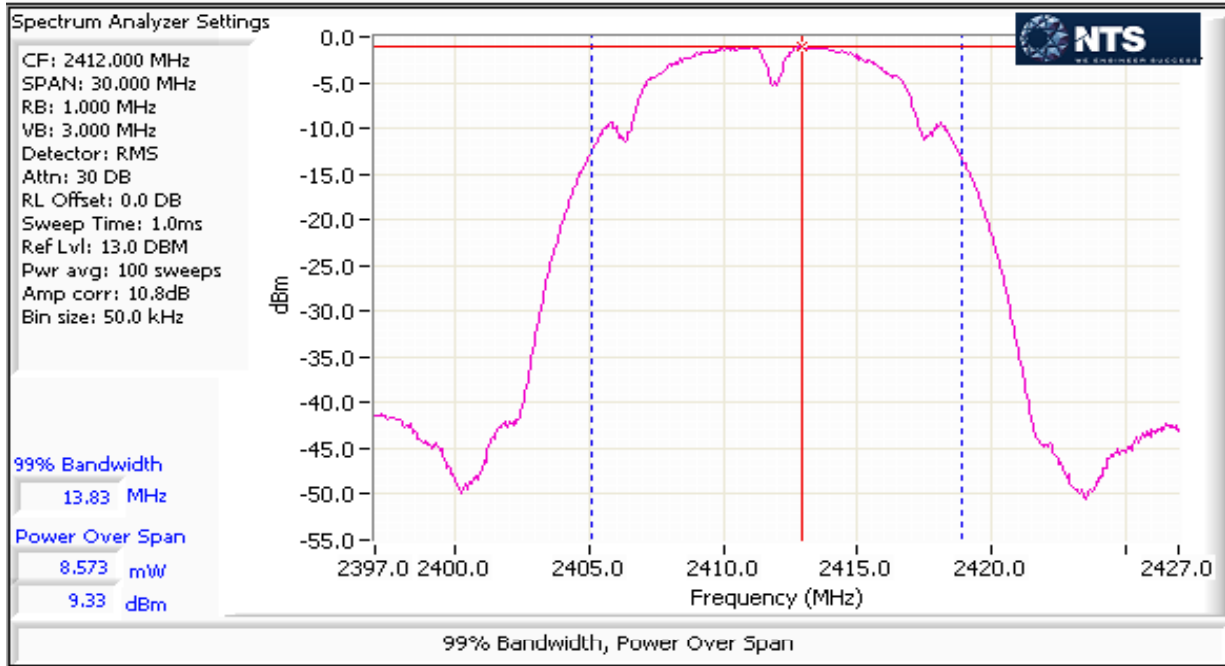
Operating Mode: 802.11n40                      Use peak power meter  
 Directional Gain (dBi): 12.1

Max EIRP (mW): 2072

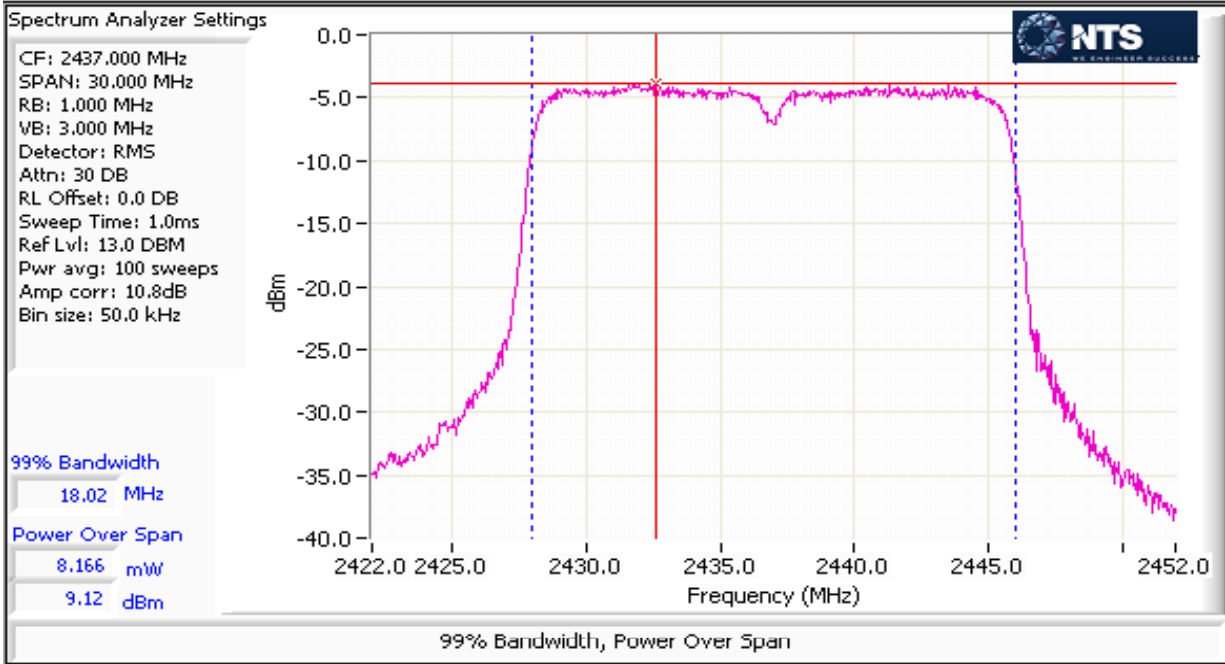
Frequency (MHz)	Chain	Software Setting	Power <sup>1</sup>		Total		Max Power (W)	Limit dBm	Result	Power (dBm) <sup>3</sup>
			dBm	mW	mW	dBm				
2422	1	12	11.7	14.8	33.4	15.2	0.114	23.9	Pass	3.6
	2		12.7	18.6						5.4
2437	1	20	17.3	53.7	114.0	20.6		23.9	Pass	6.9
	2		17.8	60.3						9.8
2452	1	8	7.7	5.9	14.6	11.6		23.9	Pass	-0.8
	2		9.4	8.7						2.9
Total Power in Band (highest 40 MHz and 20 MHz channel)							0.128	23.9	Pass	
							21.1 dBm			

- Note 1: Output power measured using a peak power meter for n40 mode, spurious limit is -20dBc.
- Note 1: For 802.11b mode, duty cycle ≥ 98%. Output power measured using a spectrum analyzer (see plots below) with RBW= 1-5% of OBW, VB≥3\* RBW, RMS detector, power averaging on, and power integration over the OBW, trace average 100 traces (option AVGSA-1, in KDB 558074). Spurious limit becomes -30dBc.
- Note 1: For 802.11g and n20 modes, duty cycle < 98%, constant duty cycle. Output power measured using a spectrum analyzer (see plots below) with RBW= 1-5% of OBW, VB≥3\* RBW, RMS detector, power averaging on, and power integration over the OBW, trace average 100 traces (option AVGSA-2, in KDB 558074). Measurement corrected by Pwr Cor Factor. Spurious limit becomes -30dBc.
- Note 2: Power setting - if a single number the same power setting was used for each chain. If multiple numbers the power setting for each chain is separated by a comma (e.g. x,y would indicate power setting x for chain 1, power setting y for chain 2).
- Note 3: Power measured using average power meter (non-gated) and is included for reference only.

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



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





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

### Test Specific Details

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

Date of Test: 10/8/2013  
 Test Engineer: David Bare  
 Test Location: Fremont Lab #4B

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

### General Test Configuration

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

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

### Ambient Conditions:

Temperature: 22 °C  
 Rel. Humidity: 30 %

### Summary of Results

Run #	Pwr setting	Test Performed	Limit	Pass / Fail	Result / Margin
1	See below	Output Power	15.247(b)	Pass	a 15.5dBm (0.036 W) n20 15.5dBm (0.035W) n40 21.4dBm (0.139W)
2	See below	Power spectral Density (PSD)	15.247(d)	Pass	See results for Dipole antenna
3	See below	Minimum 6dB Bandwidth	15.247(a)	Pass	
3	See below	99% Bandwidth	RSS GEN	Pass	
4		Spurious emissions	15.247(b)	Pass	



# 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 558074

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

### Antenna Gain Information

Freq	Antenna Gain (dBi) / Chain				BF	MultiChain Legacy	CDD	Sectorized / Xpol	Dir G (PWR)	Dir G (PSD)
	1	2	3	4						
5785	11	11			No	Yes	Yes	Yes	11.0	11.0

### 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; Dir G (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.



# 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 #1: Output Power**

Operating Mode: 802.11a  
 Directional Gain (dBi): 11.0

Max EIRP (mW): 1610

Frequency (MHz)	Chain	Software Setting	Power <sup>1</sup>		Total		Max Power (W)	Limit dBm	Result	Power (dBm) <sup>3</sup>
			dBm	mW	mW	dBm				
5745	1	34	12.4	17.3	35.7	15.5	0.036	25.0	Pass	
	2		12.4	17.2						
5785	1	34	11.5	14.0	31.4	15.0		25.0	Pass	
	2		12.1	16.3						
5825	1	34	11.0	12.6	25.0	14.0		25.0	Pass	
	2		10.6	11.6						
Total Power in Band (4 20 MHz channels)							0.128	25.0	Pass	

21.1 dBm

Operating Mode: 802.11n20  
 Directional Gain (dBi): 11.0

Max EIRP (mW): 1582

Frequency (MHz)	Chain	Software Setting	Power <sup>1</sup>		Total		Max Power (W)	Limit dBm	Result	Power (dBm) <sup>3</sup>
			dBm	mW	mW	dBm				
5745	1	34	12.3	16.9	35.4	15.5	0.035	25.0	Pass	
	2		12.4	17.5						
5785	1	34	11.4	13.7	30.4	14.8		25.0	Pass	
	2		12.0	15.8						
5825	1	34	10.8	12.1	24.4	13.9		25.0	Pass	
	2		10.6	11.6						
Total Power in Band (4 20 MHz channels)							0.126	25.0	Pass	

21.0 dBm

Operating Mode: 802.11n40  
 Directional Gain (dBi): 11.0

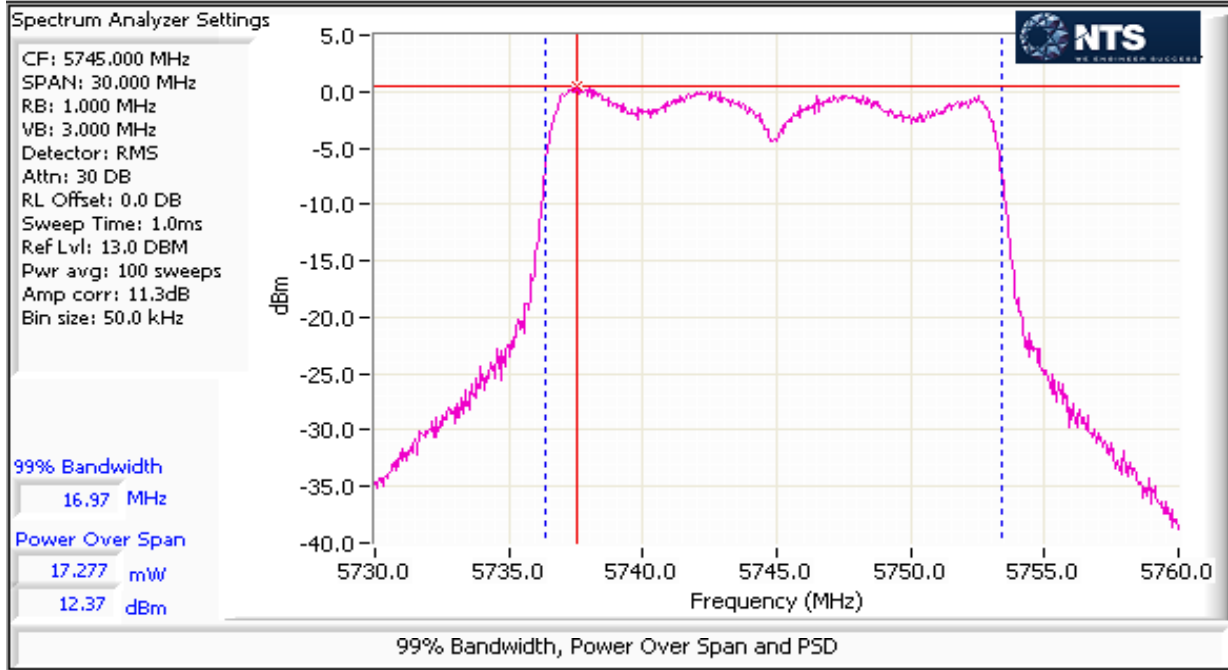
Use peak power meter

Max EIRP (mW): 3943

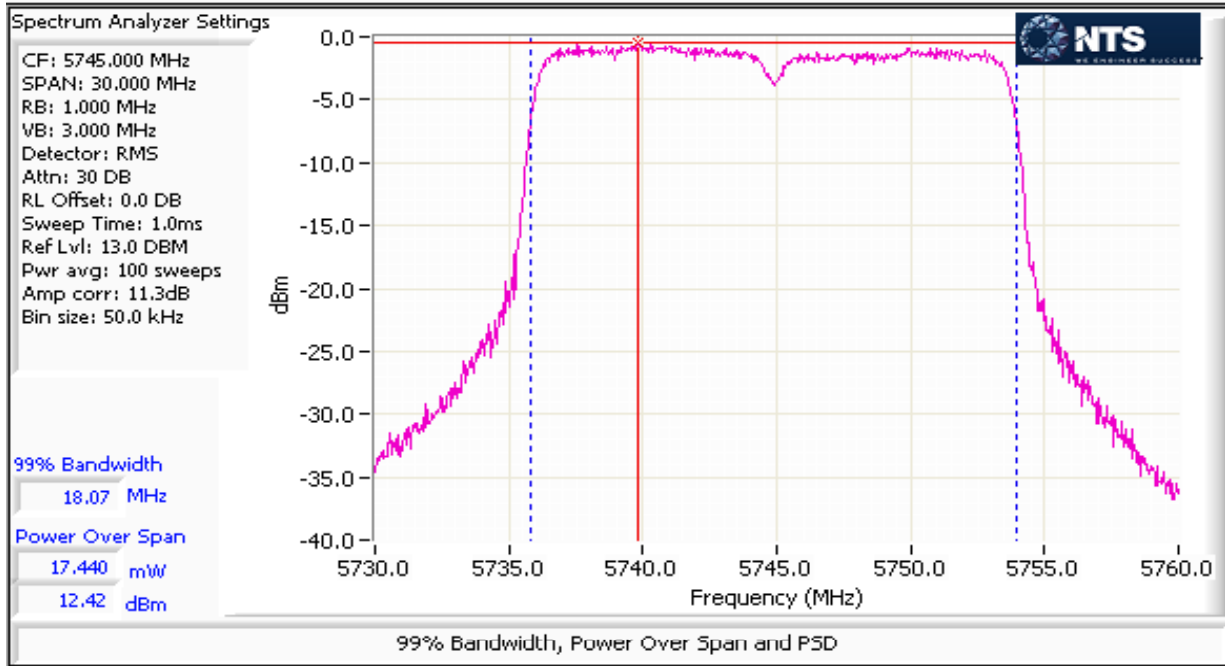
Frequency (MHz)	Chain	Software Setting	Power <sup>1</sup>		Total		Max Power (W)	Limit dBm	Result	Power (dBm) <sup>3</sup>	
			dBm	mW	mW	dBm					
5755	1	31	18.6	72.4	138.5	21.4	0.139	25.0	Pass	12.5	
	2		18.2	66.1						12.4	
5795	1	31	18.8	75.9	139.0	21.4		25.0	Pass	11.5	
	2		18.0	63.1						11.6	
Total Power in Band (2 40 MHz channels + 1 20 MHz channel)								0.313	25.0	Pass	

25.0 dBm

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



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



Note 1:	Output power measured using a peak power meter for n40 mode, spurious limit is -20dBc.
Note 1:	For a and n20 modes, Duty Cycle < 98%, constant duty cycle. Output power measured using a spectrum analyzer (see plots below) with RBW= 1-5% of OBW, VB≥3* RBW, RMS detector, power averaging on, and power integration over the OBW, trace average 100 traces (option AVGSA-1, in KDB 558074). Measurement corrected by Pwr Cor Factor. Spurious limit becomes -30dBc.
Note 2:	Power setting - if a single number the same power setting was used for each chain. If multiple numbers the power setting for each chain is separated by a comma (e.g. x,y would indicate power setting x for chain 1, power setting y for chain 2.
Note 3:	Power measured using average power meter (non-gated) and is included for reference only.





# 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

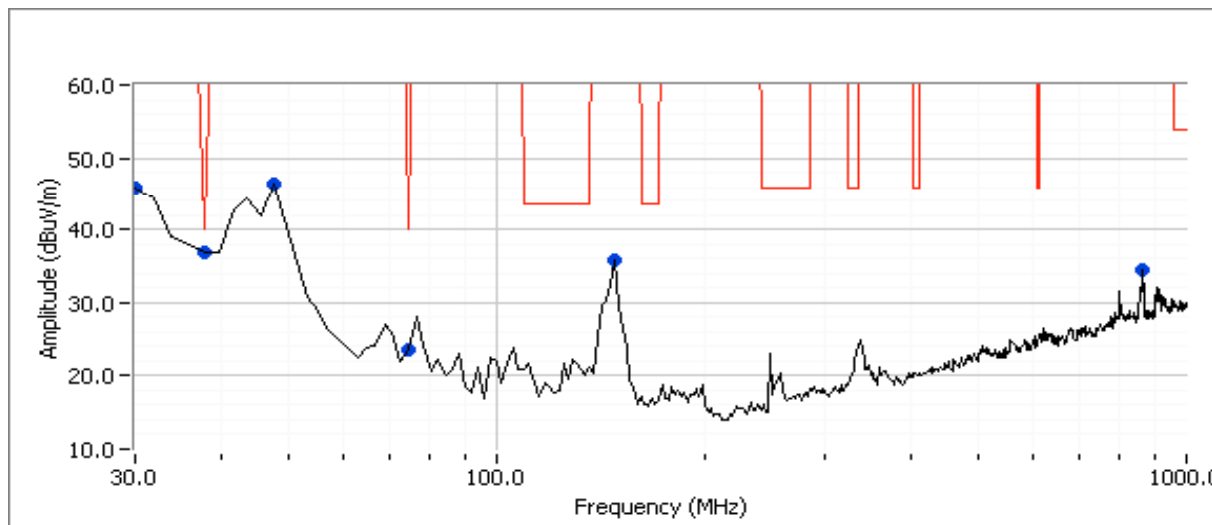
Run #1: Preliminary Radiated Emissions, 30 - 1000 MHz

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 $\mu$ 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 $\mu$ 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)

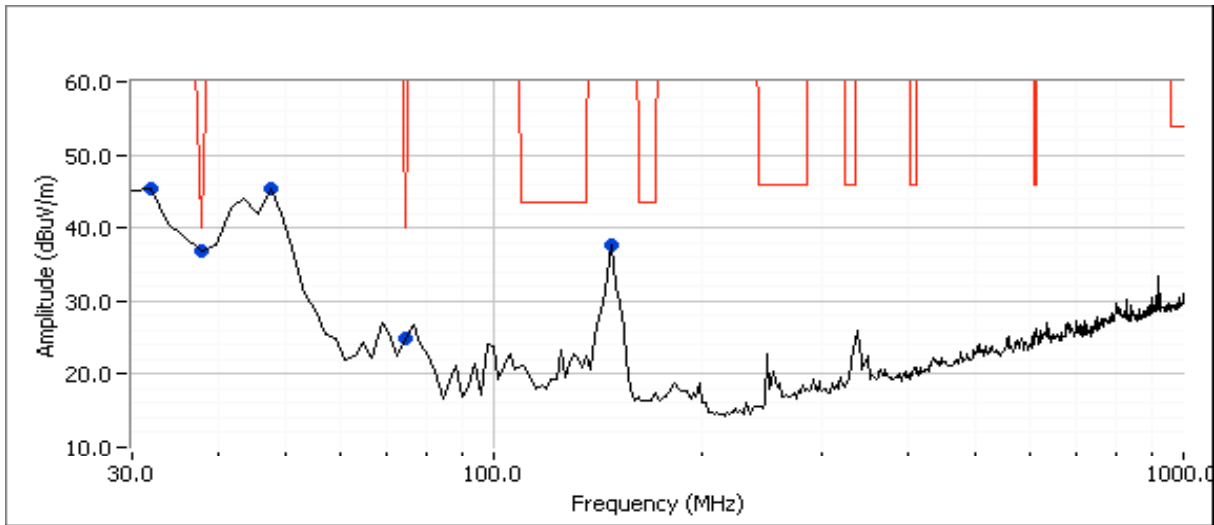


# EMC Test Data

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)

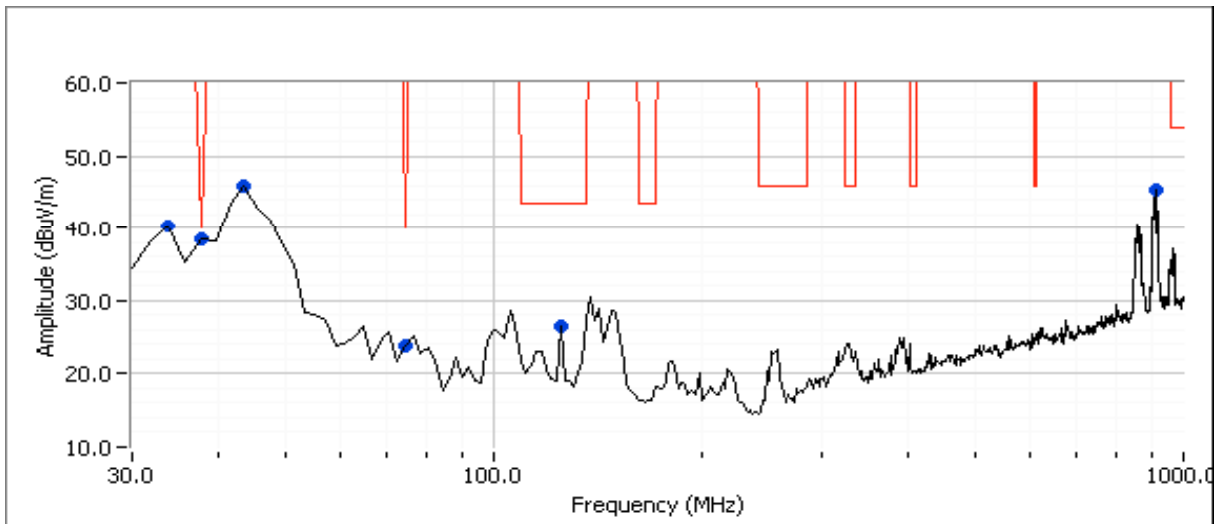
Client: Xirrus	Job Number: J93457
Model: XR2000H	T-Log Number: T93459
	Project Manager: Christine Krebill
Contact: Peter Krebill	Project Coordinator: -
Standard: FCC 15.247, 15.407, EN 55022, FCC B	Class: A

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
	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 $\mu$ 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 $\mu$ 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)

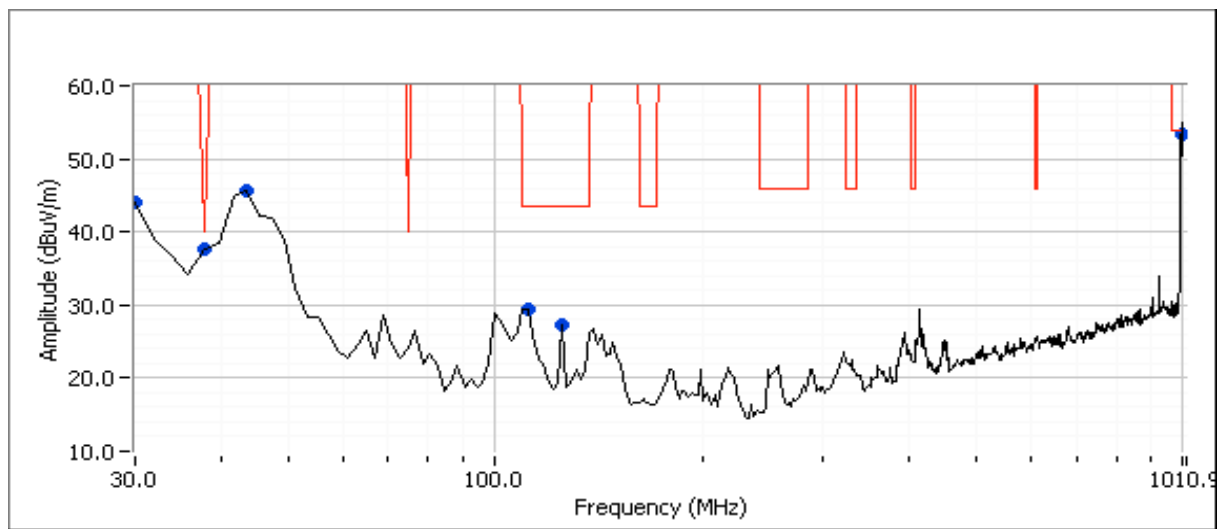


# EMC Test Data

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	dB $\mu$ V/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	dB $\mu$ V/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)



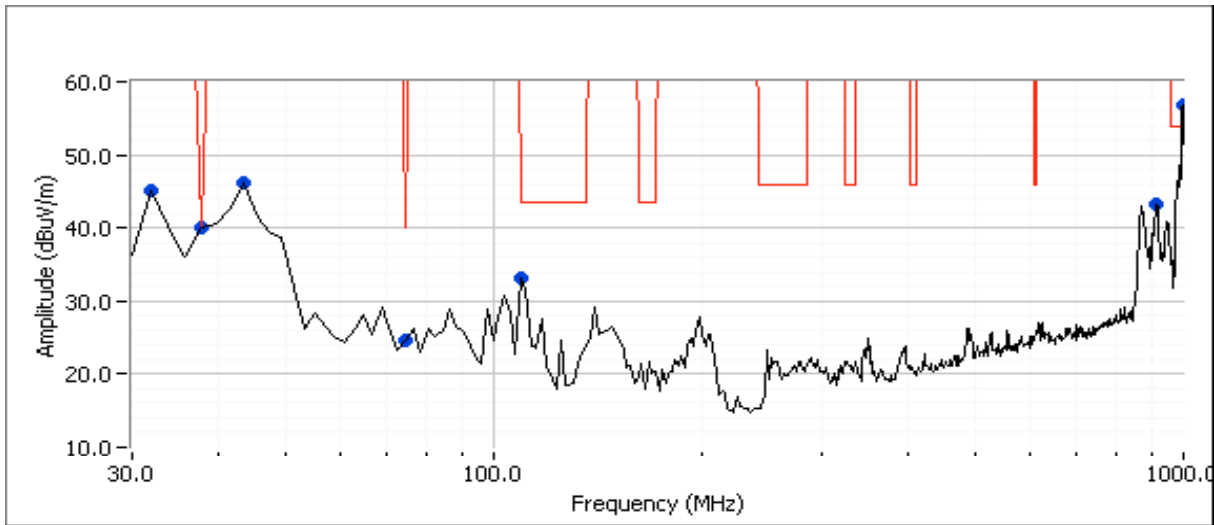


# EMC Test Data

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 $\mu$ 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 $\mu$ 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)

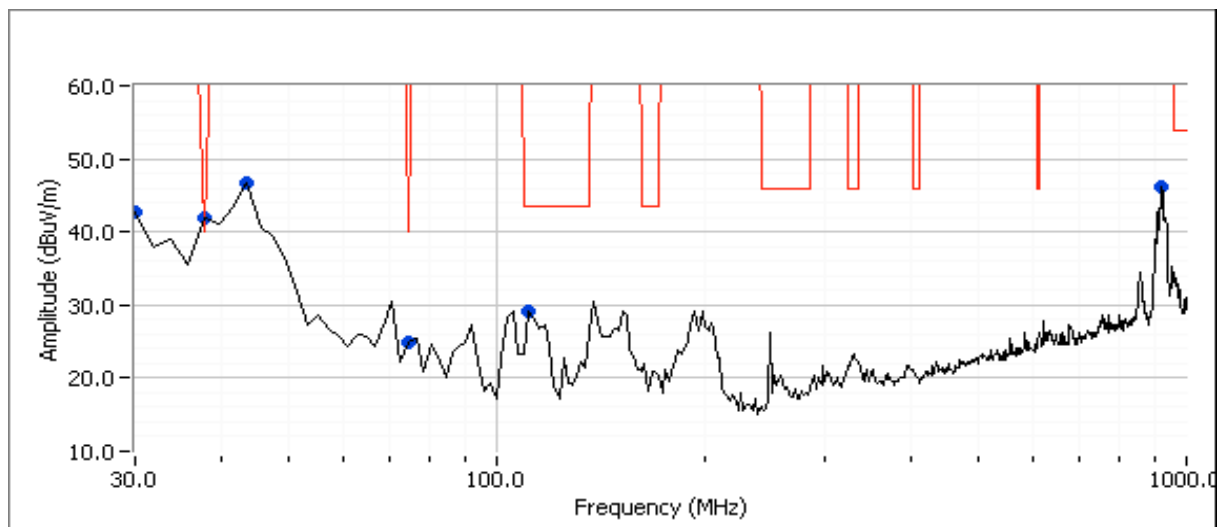


# EMC Test Data

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	dB $\mu$ V/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	dB $\mu$ V/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)

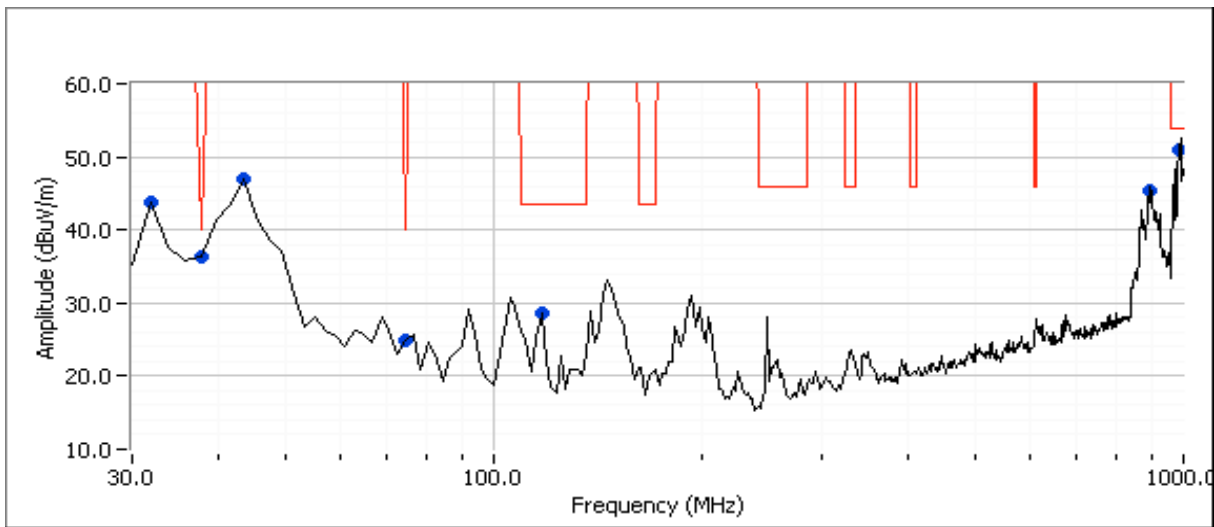


# EMC Test Data

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
Contact: Peter Krebill	Project Manager: Christine Krebill
Standard: FCC 15.247, 15.407, EN 55022, FCC B	Project Coordinator: -
	Class: N/A

## RSS 210 and FCC 15.247 (DTS) Radiated Spurious Emissions

### Test Specific Details

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

### General Test Configuration

The EUT and all local support equipment were located on the turntable for radiated spurious emissions testing. For radiated emissions testing the measurement antenna was located 3 meters from the EUT, unless otherwise noted.

### Ambient Conditions:

Temperature: 20.5 °C  
Rel. Humidity: 38 %

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

Run #	Mode	Channel	Target Power	Power Setting	Test Performed	Limit	Result / Margin
1	b	1 - 2412MHz	See Below		Restricted Band Edge (2390 MHz)	FCC Part 15.209 / 15.247( c)	53.7 dBµV/m @ 2389.1 MHz (-0.3 dB)
	b	11 - 2462MHz	See Below		Restricted Band Edge (2483.5 MHz)	FCC Part 15.209 / 15.247( c)	53.2 dBµV/m @ 2488.1 MHz (-0.8 dB)
2	g	1 - 2412MHz	See Below		Restricted Band Edge (2390 MHz)	FCC Part 15.209 / 15.247( c)	53.7 dBµV/m @ 2388.1 MHz (-0.3 dB)
	g	11 - 2462MHz	See Below		Restricted Band Edge (2483.5 MHz)	FCC Part 15.209 / 15.247( c)	53.5 dBµV/m @ 2484.4 MHz (-0.5 dB)
3	n20	1 - 2412MHz	See Below		Restricted Band Edge (2390 MHz)	FCC Part 15.209 / 15.247( c)	53.7 dBµV/m @ 2390.0 MHz (-0.3 dB)
	n20	11 - 2462MHz	See Below		Restricted Band Edge (2483.5 MHz)	FCC Part 15.209 / 15.247( c)	51.9 dBµV/m @ 2483.7 MHz (-2.1 dB)
4	n40	3 - 2422MHz	See Below		Restricted Band Edge (2390 MHz)	FCC Part 15.209 / 15.247( c)	53.2 dBµV/m @ 2390.0 MHz (-0.8 dB)
	n40	9 - 2452MHz -	See Below		Restricted Band Edge (2483.5 MHz)	FCC Part 15.209 / 15.247( c)	52.5 dBµV/m @ 2483.5 MHz (-1.5 dB)
5	n40	4 - 2427MHz	See Below		Restricted Band Edge (2390 MHz)	FCC Part 15.209 / 15.247( c)	53.5 dBµV/m @ 2387.1 MHz (-0.5 dB)
	n40	8 - 2447MHz	See Below		Restricted Band Edge (2483.5 MHz)	FCC Part 15.209 / 15.247( c)	53.2 dBµV/m @ 2483.5 MHz (-0.8 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.

### Sample Notes

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

Antenna: Dipole (x8)

### Procedure Comments:

Measurements performed in accordance with FCC KDB 558074

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

Unless otherwise stated/noted, emission has duty cycle  $\geq 98\%$  and was measured using RBW=1MHz, VBW=10Hz, peak detector, linear average mode, auto sweep time, max hold.

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
11g	6Mb/s	0.95	Yes	1.35	0.2	0.4	741
n20	MCS0	0.95	Yes	1.26	0.2	0.5	794
n40	MCS0	0.90	Yes	0.6	0.5	1.0	1667

### Measurement Specific Notes:

Note 1:	Emission has 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
Note 2:	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
		Project Manager:	Christine Krebill
Contact:	Peter Krebill	Project Coordinator:	-
Standard:	FCC 15.247, 15.407, EN 55022, FCC B	Class:	N/A

Run: 1

6	2412	1	802.11b	32
10	2437	6	802.11b	34
14	2462	11	802.11b	32
2	5785	157	802.11a	34

Run: 2

6	2412	1	802.11g	33
10	2437	6	802.11g	34
14	2462	11	802.11g	31
2	5785	157	802.11a	34

Run: 3

6	2412	1	802.11n20	27
10	2437	6	802.11n20	34
14	2462	11	802.11n20	30
2	5785	157	802.11n20	34

Run: 4

6	2422	3	802.11n40	10
10	2437	6	802.11n40	28
14	2452	9	802.11n40	10
2	5795	159	802.11n40	34

Run: 5

6	2427	4	802.11n40	22
10	5755	151	802.11n40	34
14	2447	8	802.11n40	28
2	5795	159	802.11n40	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: N/A

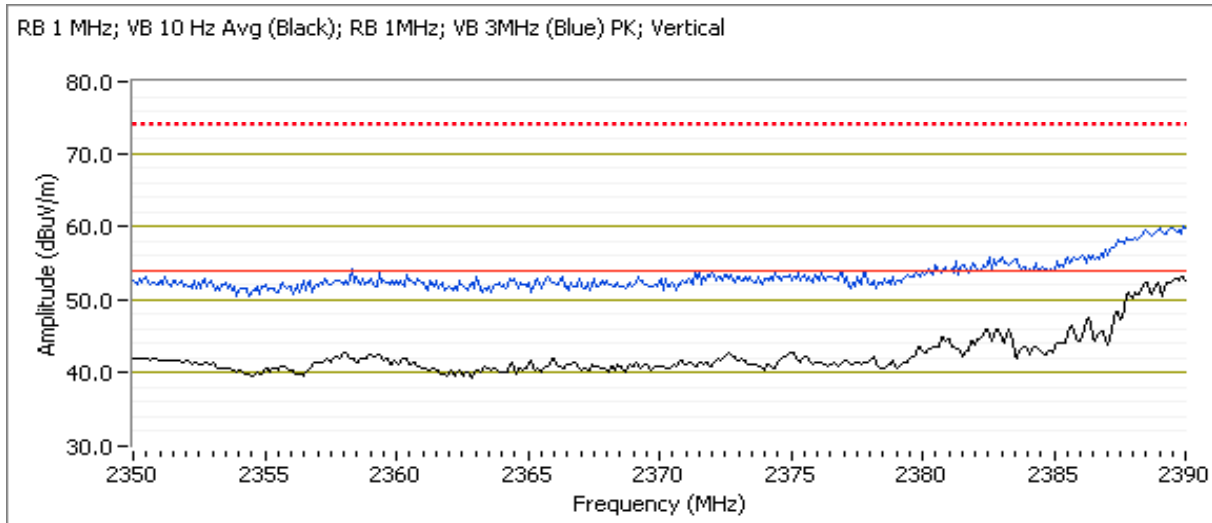
### Run #1: Radiated Bandedge Measurements

Date of Test: 10/4/2013 0:00      Config. Used: 1  
 Test Engineer: Rafael Varelas      Config Change: None  
 Test Location: FT Chamber #5      EUT Voltage: POE

Channel: 1      Mode: b  
 Tx Chain: All - Radio 6      Data Rate: 1Mb/s

### Band Edge Signal Field Strength - Direct measurement of field strength

Frequency	Level	Pol	15.209 / 15.247		Detector	Azimuth	Height	Comments
MHz	dB $\mu$ V/m	v/h	Limit	Margin	Pk/QP/Avg	degrees	meters	
2389.120	53.7	V	54.0	-0.3	AVG	354	1.0	POS; RB 1 MHz; VB: 10 Hz
2389.010	59.5	V	74.0	-14.5	PK	354	1.0	POS; RB 1 MHz; VB: 3 MHz
2389.840	43.3	H	54.0	-10.7	AVG	214	1.0	POS; RB 1 MHz; VB: 10 Hz
2385.990	49.7	H	74.0	-24.3	PK	214	1.0	POS; RB 1 MHz; VB: 3 MHz







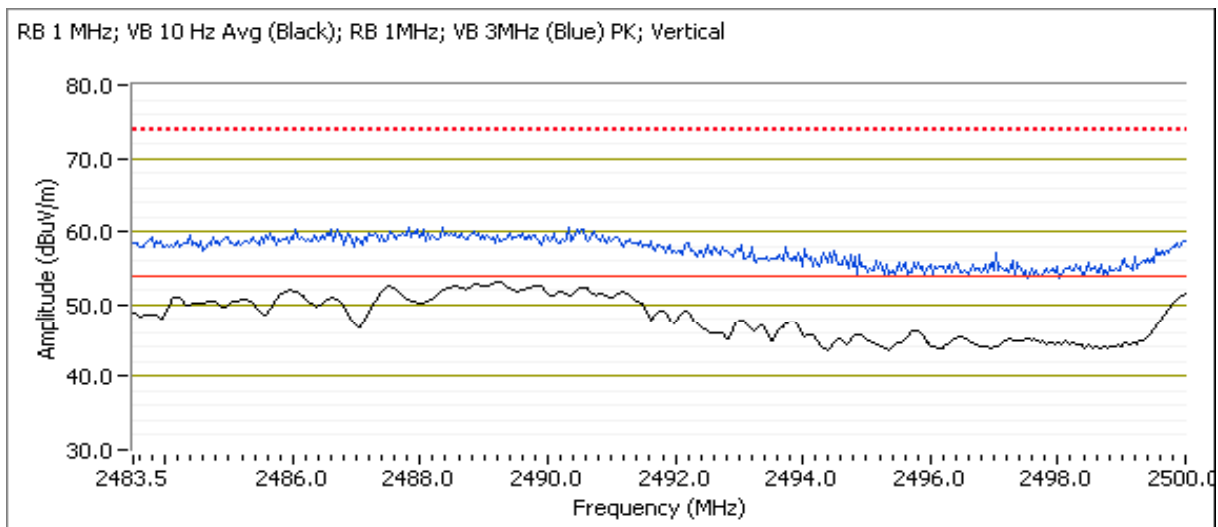
# EMC Test Data

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

Channel: 11                      Mode: b  
 Tx Chain: All - Radio 14      Data Rate: 1Mb/s

### Band Edge Signal Field Strength - Direct measurement of field strength

Frequency	Level	Pol	15.209 / 15.247		Detector	Azimuth	Height	Comments
MHz	dB $\mu$ V/m	v/h	Limit	Margin	Pk/QP/Avg	degrees	meters	
2488.130	53.2	V	54.0	-0.8	AVG	125	1.5	POS; RB 1 MHz; VB: 10 Hz
2488.530	59.7	V	74.0	-14.3	PK	125	1.5	POS; RB 1 MHz; VB: 3 MHz
2500.000	50.7	H	54.0	-3.3	AVG	187	1.0	POS; RB 1 MHz; VB: 10 Hz
2500.000	54.0	H	74.0	-20.0	PK	187	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

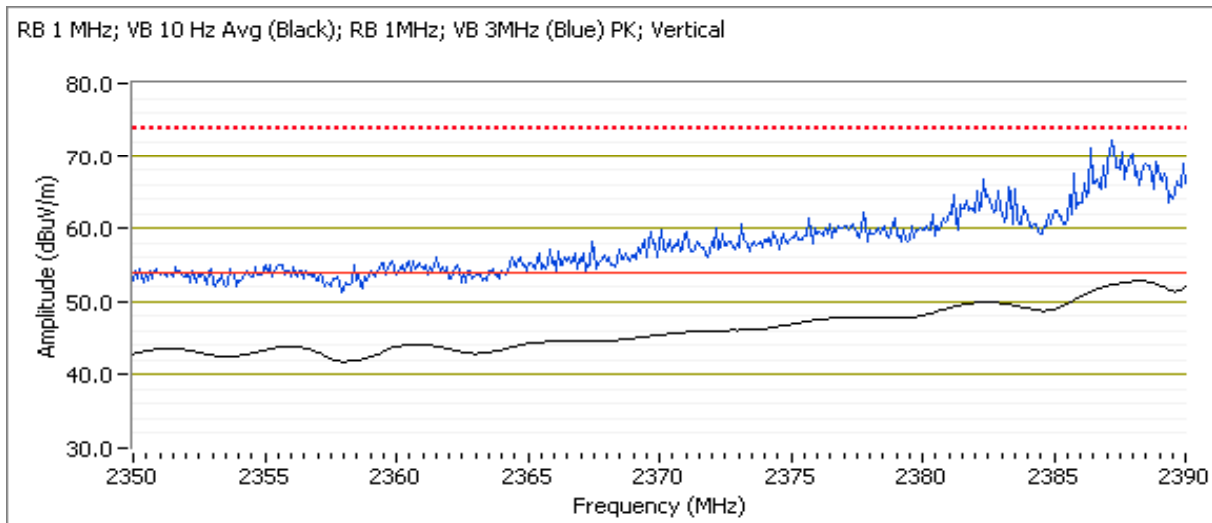
## Run #2: Radiated Bandedge Measurements

Date of Test: 10/4/2013 0:00  
 Test Engineer: Rafael Varelas  
 Test Location: FT Chamber #5  
 Config. Used: 1  
 Config Change: None  
 EUT Voltage: POE

Channel: 1  
 Tx Chain: All - Radio 6  
 Mode: g  
 Data Rate: 6Mb/s

## Band Edge Signal Field Strength - Direct measurement of field strength

Frequency	Level	Pol	15.209 / 15.247		Detector	Azimuth	Height	Comments
MHz	dB $\mu$ V/m	v/h	Limit	Margin	Pk/QP/Avg	degrees	meters	
2388.120	53.7	V	54.0	-0.3	AVG	315	1.0	POS; RB 1 MHz; VB: 10 Hz, Note 1
2387.560	71.6	V	74.0	-2.4	PK	315	1.0	POS; RB 1 MHz; VB: 3 MHz
2390.000	48.0	H	54.0	-6.0	AVG	203	1.0	POS; RB 1 MHz; VB: 10 Hz, Note 1
2389.120	62.6	H	74.0	-11.4	PK	203	1.0	POS; RB 1 MHz; VB: 3 MHz





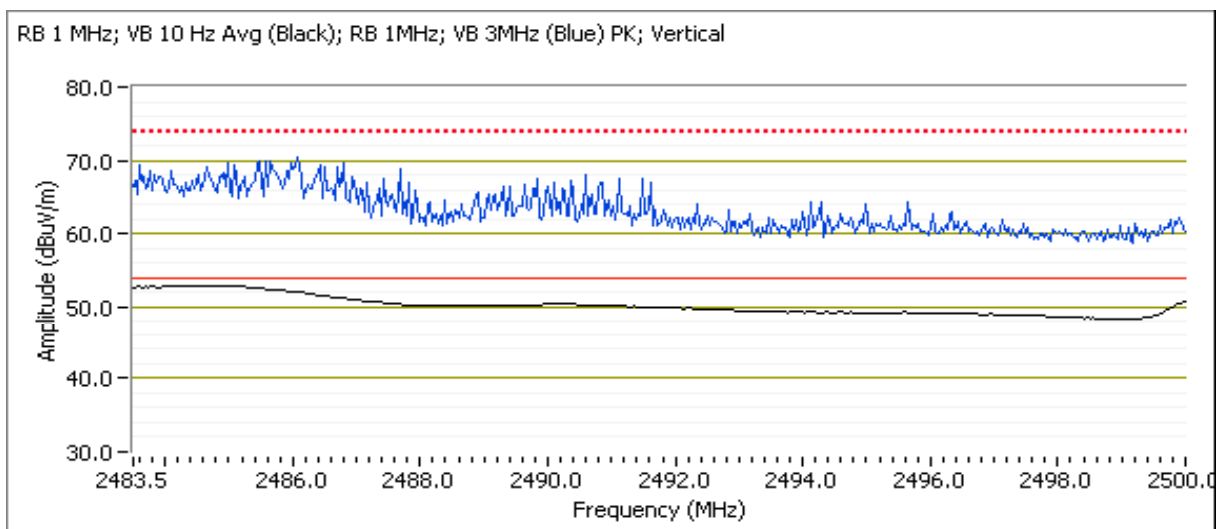
# EMC Test Data

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

Channel: 11                      Mode: g  
 Tx Chain: All - Radio 14      Data Rate: 6Mb/s

### Band Edge Signal Field Strength - Direct measurement of field strength

Frequency	Level	Pol	15.209 / 15.247		Detector	Azimuth	Height	Comments
MHz	dB $\mu$ V/m	v/h	Limit	Margin	PK/QP/Avg	degrees	meters	
2484.390	53.5	V	54.0	-0.5	AVG	122	1.5	POS; RB 1 MHz; VB: 10 Hz, Note 1
2486.200	69.1	V	74.0	-4.9	PK	122	1.5	POS; RB 1 MHz; VB: 3 MHz
2500.000	51.9	H	54.0	-2.5	AVG	190	1.2	POS; RB 1 MHz; VB: 10 Hz, Note 1
2499.930	54.6	H	74.0	-19.4	PK	190	1.2	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

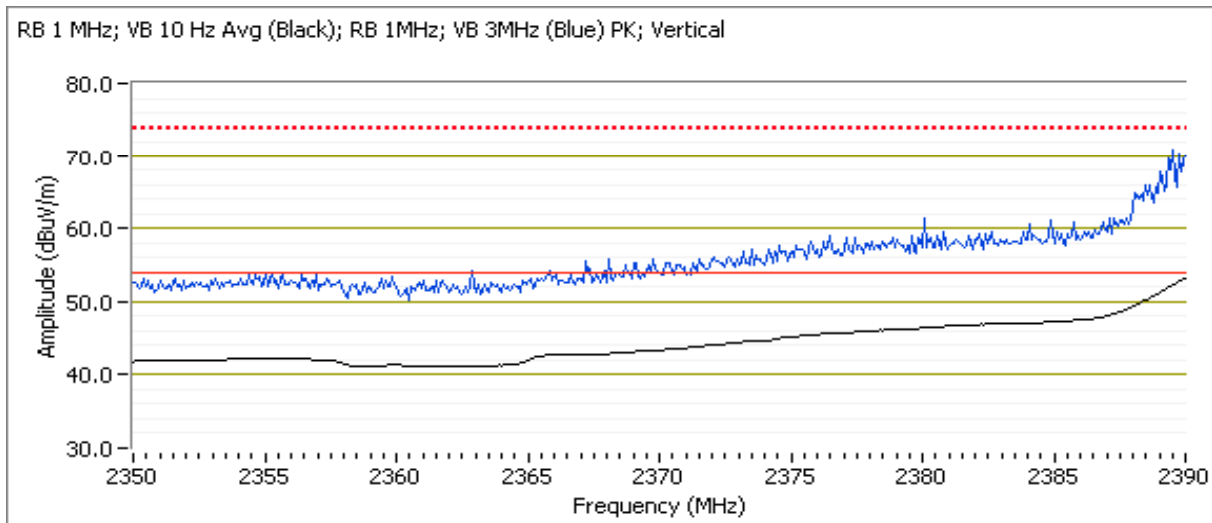
### Run #3: Radiated Bandedge Measurements

Date of Test: 10/4/2013 0:00      Config. Used: 1  
 Test Engineer: Rafael Varelas      Config Change: None  
 Test Location: FT Chamber #5      EUT Voltage: POE

Channel: 1      Mode: n20  
 Tx Chain: All - Radio 6      Data Rate: MCS0

### Band Edge Signal Field Strength - Direct measurement of field strength

Frequency	Level	Pol	15.209 / 15.247		Detector	Azimuth	Height	Comments
MHz	dB $\mu$ V/m	v/h	Limit	Margin	Pk/QP/Avg	degrees	meters	
2390.000	53.7	V	54.0	-0.3	AVG	306	1.0	POS; RB 1 MHz; VB: 10 Hz, Note 1
2389.660	70.1	V	74.0	-3.9	PK	306	1.0	POS; RB 1 MHz; VB: 3 MHz
2390.000	43.3	H	54.0	-10.7	AVG	218	1.3	POS; RB 1 MHz; VB: 10 Hz, Note 1
2389.280	54.8	H	74.0	-19.2	PK	218	1.3	POS; RB 1 MHz; VB: 3 MHz





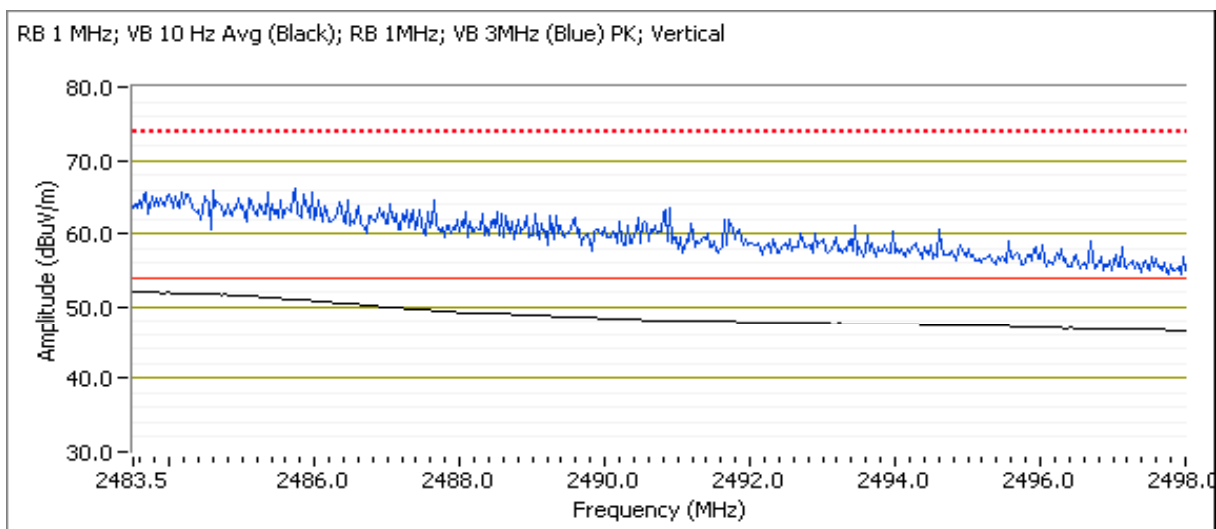
# EMC Test Data

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

Channel: 11                      Mode: n20  
 Tx Chain: All - Radio 14      Data Rate: MCS0

### Band Edge Signal Field Strength - Direct measurement of field strength

Frequency	Level	Pol	15.209 / 15.247		Detector	Azimuth	Height	Comments
MHz	dB $\mu$ V/m	v/h	Limit	Margin	PK/QP/Avg	degrees	meters	
2483.720	51.9	V	54.0	-2.1	AVG	176	1.8	POS; RB 1 MHz; VB: 10 Hz, Note 1
2485.570	64.7	V	74.0	-9.3	PK	176	1.8	POS; RB 1 MHz; VB: 3 MHz
2483.510	41.5	H	54.0	-12.5	AVG	113	1.2	POS; RB 1 MHz; VB: 10 Hz, Note 1
2484.270	55.4	H	74.0	-18.6	PK	113	1.2	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

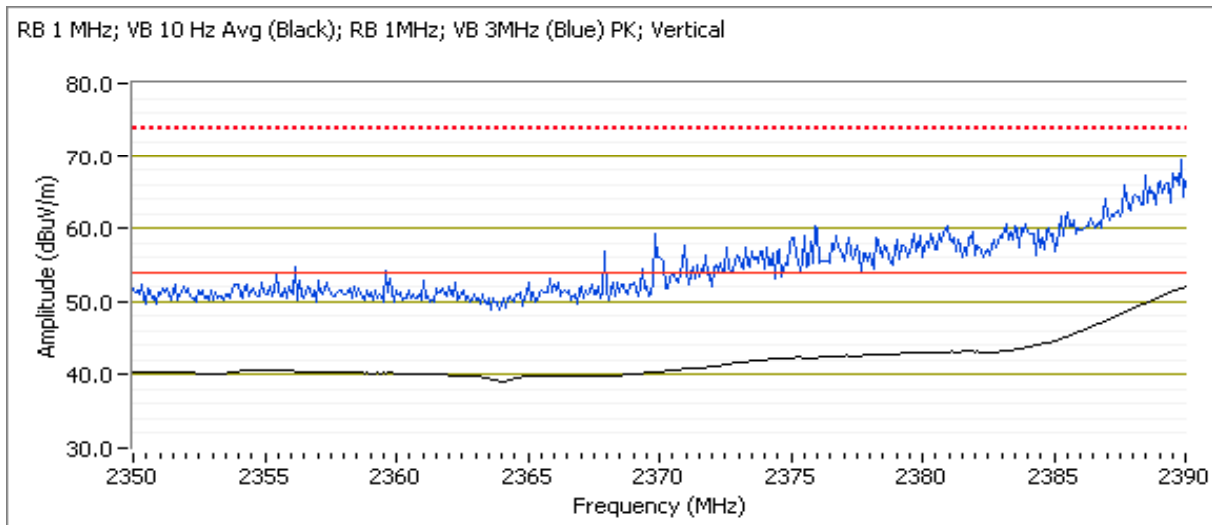
### Run #4: Radiated Bandedge Measurements

Date of Test: 10/4/2013 0:00      Config. Used: 1  
 Test Engineer: Rafael Varelas      Config Change: None  
 Test Location: FT Chamber #5      EUT Voltage: POE

Channel: 3      Mode: n40  
 Tx Chain: All - Radio 6      Data Rate: MCS0

### Band Edge Signal Field Strength - Direct measurement of field strength

Frequency	Level	Pol	15.209 / 15.247		Detector	Azimuth	Height	Comments
MHz	dB $\mu$ V/m	v/h	Limit	Margin	Pk/QP/Avg	degrees	meters	
2390.000	53.2	V	54.0	-0.8	AVG	305	1.0	POS; RB 1 MHz; VB: 10 Hz, Note 1
2388.400	69.6	V	74.0	-4.4	PK	305	1.0	POS; RB 1 MHz; VB: 3 MHz
2390.000	44.1	H	54.0	-9.9	AVG	215	1.0	POS; RB 1 MHz; VB: 10 Hz, Note 1
2386.870	54.8	H	74.0	-19.2	PK	215	1.0	POS; RB 1 MHz; VB: 3 MHz





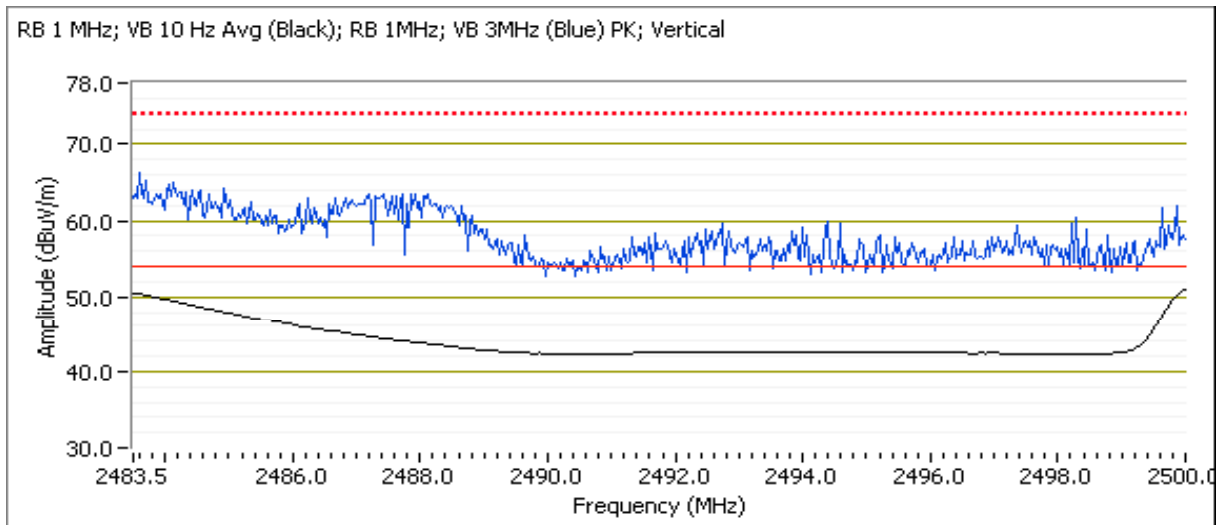
# EMC Test Data

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

Channel: 9                      Mode: n40  
 Tx Chain: All - Radio 14      Data Rate: MCS0

### Band Edge Signal Field Strength - Direct measurement of field strength

Frequency MHz	Level dB $\mu$ V/m	Pol v/h	15.209 / 15.247		Detector Pk/QP/Avg	Azimuth degrees	Height meters	Comments
			Limit	Margin				
2483.500	52.5	V	54.0	-1.5	AVG	126	1.2	POS; RB 1 MHz; VB: 10 Hz, Note 1
2483.860	68.2	V	74.0	-5.8	PK	126	1.2	POS; RB 1 MHz; VB: 3 MHz
2483.560	41.3	H	54.0	-12.7	AVG	200	1.0	POS; RB 1 MHz; VB: 10 Hz, Note 1
2484.550	53.9	H	74.0	-20.1	PK	200	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

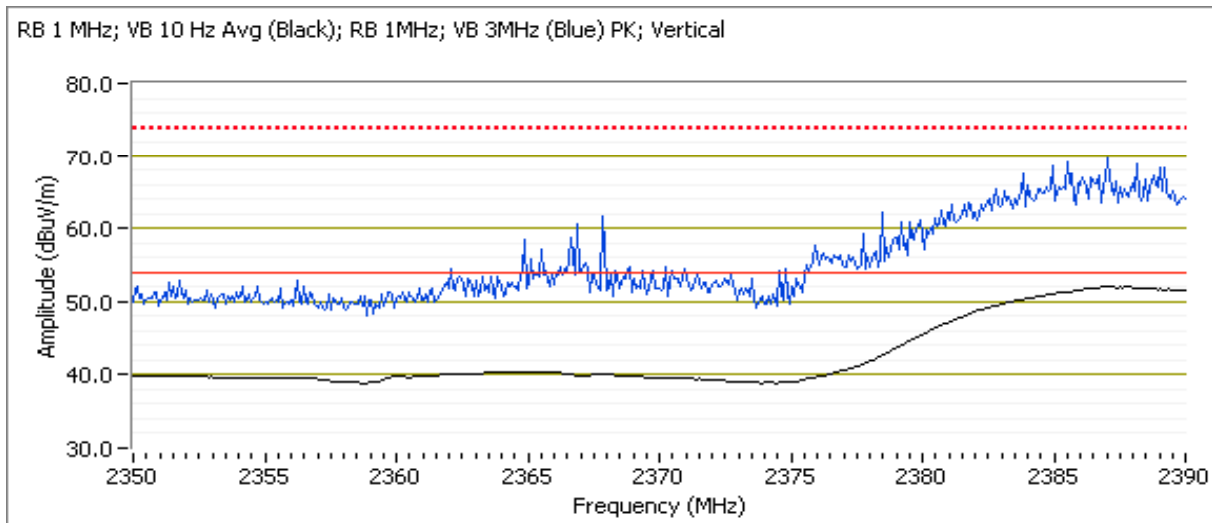
### Run #5: Radiated Bandedge Measurements

Date of Test: 10/4/2013 0:00      Config. Used: 1  
 Test Engineer: Rafael Varelas      Config Change: None  
 Test Location: FT Chamber #5      EUT Voltage: POE

Channel: 4      Mode: n40  
 Tx Chain: All - Radio 6      Data Rate: MCS0

### Band Edge Signal Field Strength - Direct measurement of field strength

Frequency	Level	Pol	15.209 / 15.247		Detector	Azimuth	Height	Comments
MHz	dB $\mu$ V/m	v/h	Limit	Margin	Pk/QP/Avg	degrees	meters	
2387.110	53.5	V	54.0	-0.5	AVG	0	1.0	POS; RB 1 MHz; VB: 10 Hz, Note 1
2386.150	69.1	V	74.0	-4.9	PK	0	1.0	POS; RB 1 MHz; VB: 3 MHz
2390.000	44.3	H	54.0	-9.7	AVG	206	1.3	POS; RB 1 MHz; VB: 10 Hz, Note 1
2389.520	56.2	H	74.0	-17.8	PK	206	1.3	POS; RB 1 MHz; VB: 3 MHz







# EMC Test Data

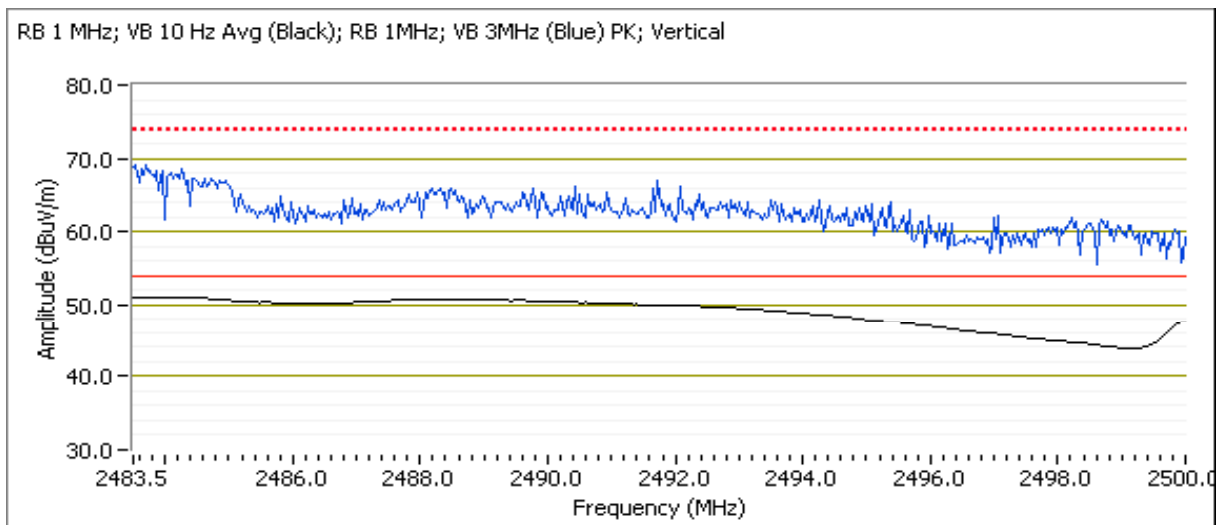
Client: Xirrus	Job Number: J93457
Model: XR2000H	T-Log Number: T93459
Contact: Peter Krebill	Project Manager: Christine Krebill
Standard: FCC 15.247, 15.407, EN 55022, FCC B	Project Coordinator: -
	Class: N/A

Channel: 8                      Mode: n40  
 Tx Chain: All - Radio 14      Data Rate: MCS0

### Band Edge Signal Field Strength - Direct measurement of field strength

Frequency	Level	Pol	15.209 / 15.247		Detector	Azimuth	Height	Comments
MHz	dB $\mu$ V/m	v/h	Limit	Margin	PK/QP/Avg	degrees	meters	
2483.530	53.2	V	54.0	-0.8	AVG	132	1.7	POS; RB 1 MHz; VB: 10 Hz, Note 1
2483.630	69.2	V	74.0	-4.8	PK	132	1.7	POS; RB 1 MHz; VB: 3 MHz
2483.500	41.8	H	54.0	-13.2	AVG	108	1.8	POS; RB 1 MHz; VB: 10 Hz, Note 1
2483.530	53.1	H	74.0	-20.9	PK	108	1.8	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

## RSS 210 and FCC 15.247 (DTS) Radiated Spurious Emissions

### Test Specific Details

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

### General Test Configuration

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

For radiated emissions testing the measurement antenna was located 3 meters from the EUT, unless otherwise noted.

### Ambient Conditions:

Temperature: 21.4 °C  
Rel. Humidity: 38 %

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

Run #	Mode	Channel	Power Setting	Test Performed	Limit	Result / Margin
1	802.11b 802.11a	See Below	See Below	Radiated Emissions, 1 - 25 GHz	FCC Part 15.209 / 15.247( c)	43.1 dBµV/m @ 5000.0 MHz (-10.9 dB)
	802.11b 802.11a	See Below	See Below	Radiated Emissions, 4500 - 5150 MHz	FCC Part 15.209 / 15.247( c)	48.1 dBµV/m @ 4824.0 MHz (-5.9 dB)
2	802.11g 802.11a	See Below	See Below	Radiated Emissions, 1 - 25 GHz	FCC Part 15.209 / 15.247( c)	44.9 dBµV/m @ 5400.0 MHz (-9.1 dB)
3	802.11n20 802.11a	See Below	See Below	Radiated Emissions, 1 - 25 GHz	FCC Part 15.209 / 15.247( c)	48.5 dBµV/m @ 5440.0 MHz (-5.5 dB)
4	802.11n40 802.11a	See Below	See Below	Radiated Emissions, 1 - 25 GHz	FCC Part 15.209 / 15.247( c)	50.1 dBµV/m @ 11568.9 MHz (-3.9 dB)

### Modifications Made During Testing

No modifications were made to the EUT during testing

### Deviations From The Standard

No deviations were made from the requirements of the standard.



# EMC Test Data

Client: Xirrus	Job Number: 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 2400-2483.5 MHz

Radio #	Frequency	CH	Mode	Pwr
<b>Run: 1</b>				
2	2412	1	802.11b	34
6	2437	6	802.11b	34
10	2462	11	802.11b	34
14	5785	157	802.11a	34
<b>Run: 2</b>				
2	2412	1	802.11g	34
6	2437	6	802.11g	34
10	2462	11	802.11g	34
14	5785	157	802.11a	34
<b>Run: 3</b>				
2	2412	1	802.11n20	34
6	2437	6	802.11n20	34
10	2462	11	802.11n20	34
14	5785	157	802.11a	34
<b>Run: 4</b>				
2	2422	3	802.11n40	34
6	2437	6	802.11n40	34
10	2452	9	802.11n40	34
14	5785	157	802.11a	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

## Sample Notes

Sample S/N: Mac address 20:0C:A1

Antenna: (x8)Dipole

## Procedure Comments:

Measurements performed in accordance with FCC KDB 558074

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

Unless otherwise stated/noted, emission has duty cycle  $\geq 98\%$  and was measured using RBW=1MHz, VBW=10Hz, peak detector, linear average mode, auto sweep time, max hold.

2.4GHz band reject filter used

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
11g	6Mb/s	0.95	Yes	1.35	0.2	0.4	741
11a	6Mb/s	0.96	Yes	1.35	0.2	0.3	741
n20	MCS0	0.95	Yes	1.26	0.2	0.5	794
n40	MCS0	0.90	Yes	0.6	0.5	1.0	1667

## Measurement Specific Notes:

Note 1:	Emission has 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
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# 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 - 25000 MHz. Operating Mode: 802.11b/a

Date of Test: 9/17/2013 0:00

Config. Used: 1

Test Engineer: Rafael Varelas

Config Change: None

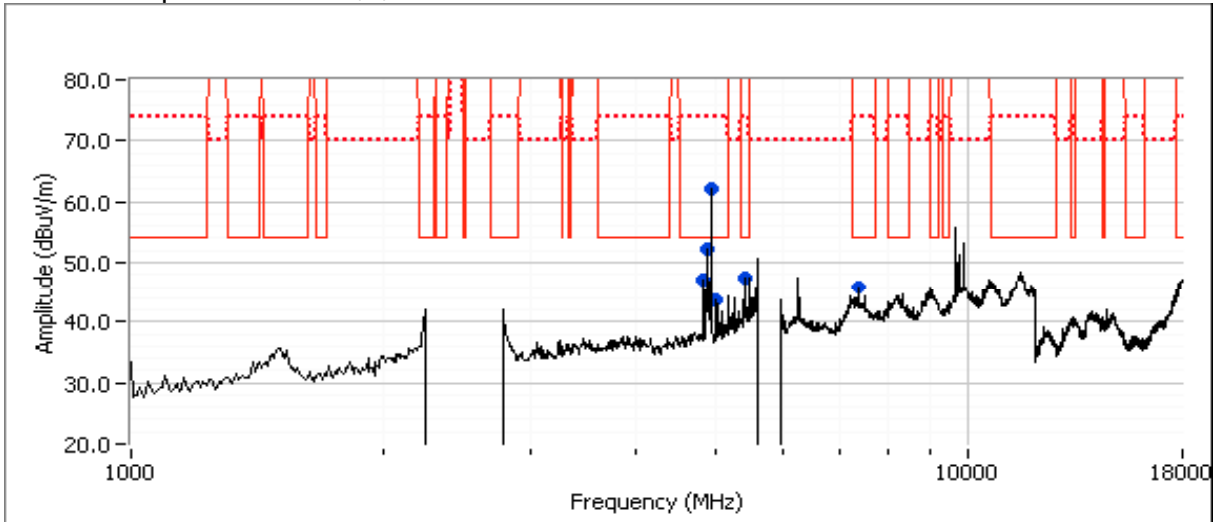
Test Location: FT Chamber #5

EUT Voltage: POE

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

Tx Chain: 2x2

Run #1a: Radiated Spurious Emissions, 1,000 - 25000 MHz.

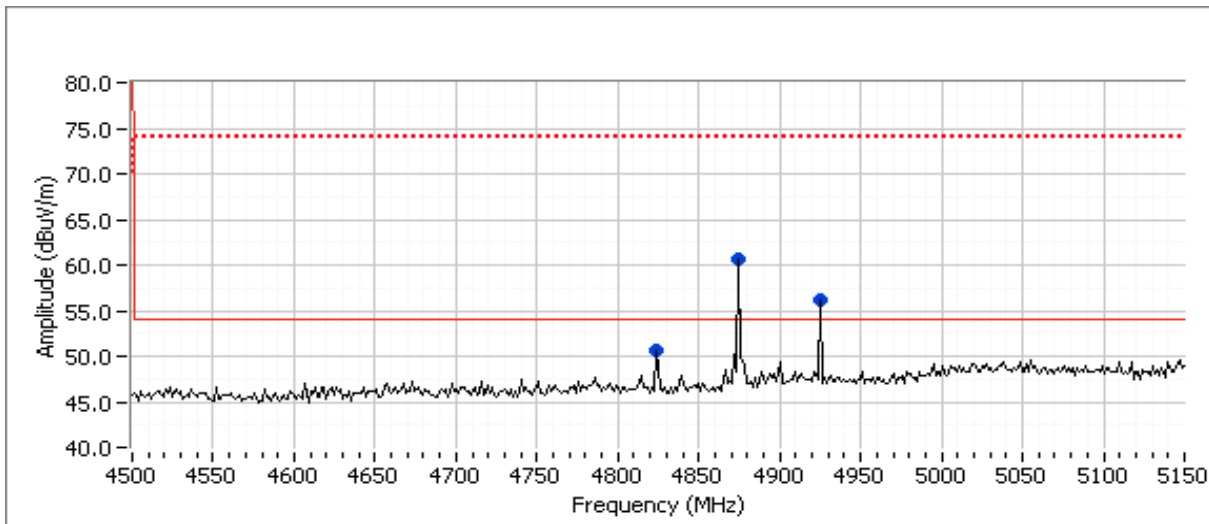


Frequency	Level	Pol	15.209 / 15.247		Detector	Azimuth	Height	Comments
MHz	dB $\mu$ V/m	v/h	Limit	Margin	Pk/QP/Avg	degrees	meters	
4999.980	43.1	V	60.0	-16.9	AVG	133	1.4	Digital Bus Emission, Class A limits
4999.980	49.6	V	80.0	-30.4	PK	133	1.4	Digital Bus Emission, Class A limits
4823.930								refer to #1b
5401.940	37.2	V	54.0	-16.8	AVG	126	1.0	RB 1 MHz;VB 10 Hz;Peak
5405.570	47.9	V	74.0	-26.1	PK	126	1.0	RB 1 MHz;VB 3 MHz;Peak
4874.000								refer to #1b
4923.960								refer to #1b
7384.780	42.2	V	54.0	-11.8	AVG	200	1.3	RB 1 MHz;VB 10 Hz;Peak
7387.610	56.7	V	74.0	-17.3	PK	200	1.3	RB 1 MHz;VB 3 MHz;Peak

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

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.



Frequency MHz	Level dB $\mu$ V/m	Pol v/h	15.209 / 15.247		Detector PK/QP/Avg	Azimuth degrees	Height meters	Comments
			Limit	Margin				
4823.950	48.1	V	54.0	-5.9	AVG	234	1.0	POS; RB 1 MHz; VB: 10 Hz
4823.960	55.1	V	74.0	-18.9	PK	234	1.0	POS; RB 1 MHz; VB: 3 MHz
4924.000	42.6	V	54.0	-11.4	AVG	44	1.3	POS; RB 1 MHz; VB: 10 Hz
4924.610	56.6	V	74.0	-17.4	PK	44	1.3	POS; RB 1 MHz; VB: 3 MHz
4873.980	45.2	V	54.0	-8.8	AVG	75	1.3	POS; RB 1 MHz; VB: 10 Hz
4874.110	61.8	V	74.0	-12.2	PK	75	1.3	POS; RB 1 MHz; VB: 3 MHz



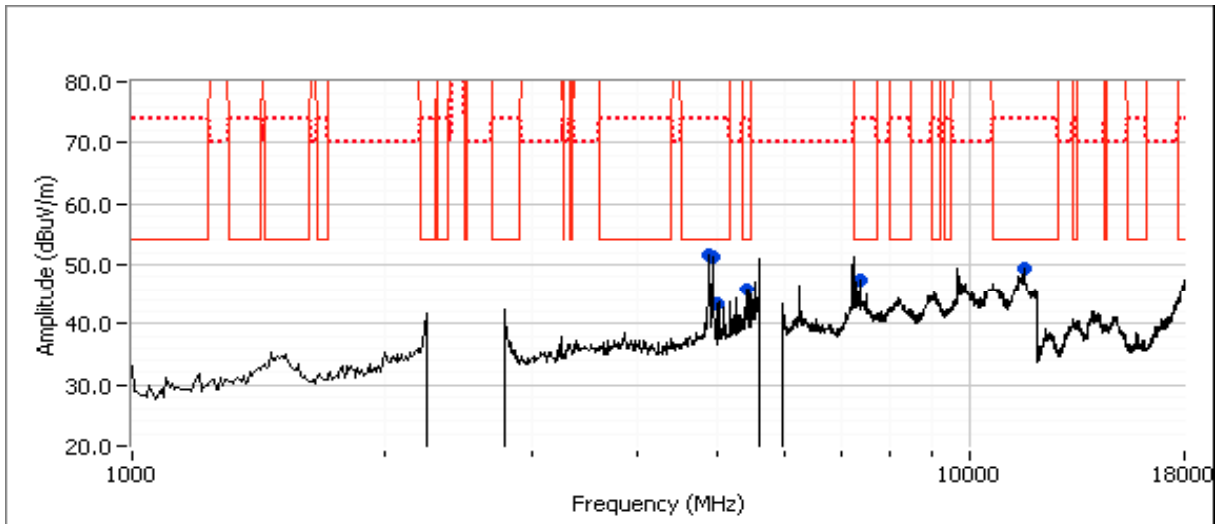
# EMC Test Data

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

Run #2: Radiated Spurious Emissions, 1,000 - 25000 MHz. Operating Mode: 802.11g/a  
 Date of Test: 9/17/2013 0:00 Config. Used: 1  
 Test Engineer: Rafael Varelas Config Change: None  
 Test Location: FT Chamber #5 EUT Voltage: POE

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

Tx Chain: 2x2



Frequency	Level	Pol	15.209 / 15.247	Detector	Azimuth	Height	Comments	
MHz	dBuV/m	v/h	Limit	Margin	Pk/QP/Avg	degrees	meters	
4875.460	38.1	V	54.0	-15.9	AVG	313	1.0	RB 1 MHz;VB 10 Hz;Peak, Note 1
4874.760	58.2	V	74.0	-15.8	PK	313	1.0	RB 1 MHz;VB 3 MHz;Peak
7380.930	40.9	V	54.0	-13.1	AVG	197	1.0	RB 1 MHz;VB 10 Hz;Peak, Note 1
7392.800	52.1	V	74.0	-21.9	PK	197	1.0	RB 1 MHz;VB 3 MHz;Peak
5399.950	45.3	V	54.0	-8.7	AVG	225	1.0	RB 1 MHz;VB 10 Hz;Peak, Note 1
5399.890	51.4	V	74.0	-22.6	PK	225	1.0	RB 1 MHz;VB 3 MHz;Peak
11571.640	44.8	V	54.0	-9.2	AVG	243	1.3	RB 1 MHz;VB 10 Hz;Peak, Note 1
11566.370	55.2	V	74.0	-18.8	PK	243	1.3	RB 1 MHz;VB 3 MHz;Peak
5000.020	42.6	V	60.0	-17.4	AVG	294	1.2	Digital Bus Emission, Class A limits
5000.070	49.9	V	80.0	-30.1	PK	294	1.2	Digital Bus Emission, Class A limits
4920.060	39.0	V	54.0	-15.0	AVG	318	1.0	RB 1 MHz;VB 10 Hz;Peak, Note 1
4925.150	56.2	V	74.0	-17.8	PK	318	1.0	RB 1 MHz;VB 3 MHz;Peak



# EMC Test Data

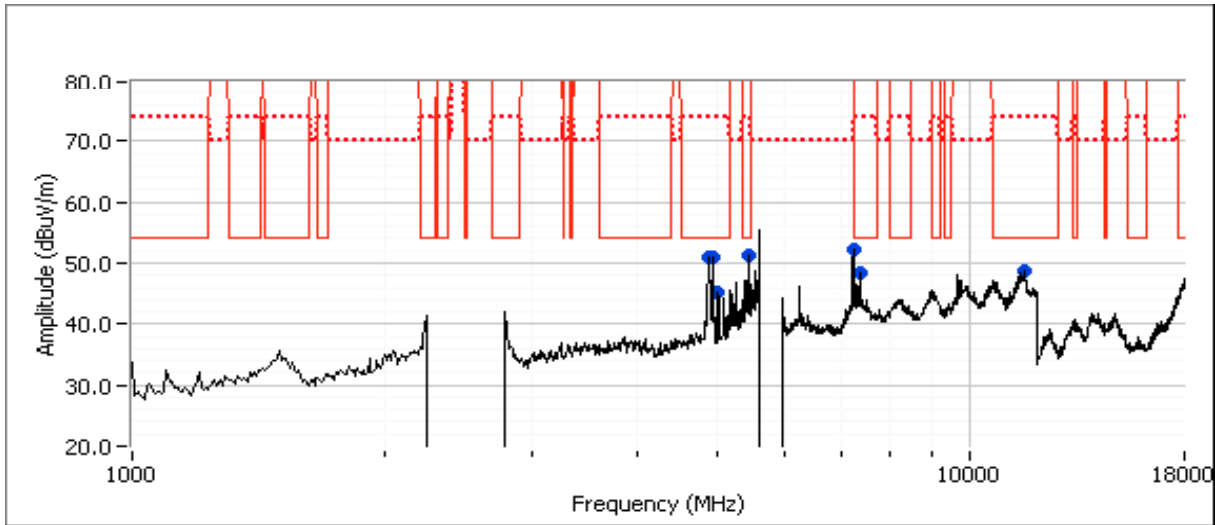
Client: Xirrus	Job Number: J93457
Model: XR2000H	T-Log Number: T93459
	Project Manager: Christine Krebill
Contact: Peter Krebill	Project Coordinator: -
Standard: FCC 15.247, 15.407, EN 55022, FCC B	Class: N/A

Note: Scans made between 18 - 25 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

Run #3: Radiated Spurious Emissions, 1,000 - 25000 MHz. Operating Mode: 802.11n20/a  
 Date of Test: 9/17/2013 0:00 Config. Used: 1  
 Test Engineer: Rafael Varelas Config Change: None  
 Test Location: FT Chamber #5 EUT Voltage: POE

Radio #	Frequency	CH	Mode	Pwr
Run: 3				
2	2412	1	802.11n20	34
6	2437	6	802.11n20	34
10	2462	11	802.11n20	34
14	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 $\mu$ V/m	Pol v/h	15.209 / 15.247		Detector PK/QP/Avg	Azimuth degrees	Height meters	Comments
			Limit	Margin				
7248.270	59.2	V	68.3	-9.1	PK	20	2.0	RB 1 MHz;VB 3 MHz;Peak
4875.120	38.1	V	54.0	-15.9	AVG	341	1.0	RB 1 MHz;VB 10 Hz;Peak, Note 1
4874.310	58.5	V	74.0	-15.5	PK	341	1.0	RB 1 MHz;VB 3 MHz;Peak
4999.970	43.8	V	60.0	-16.2	AVG	304	1.4	Digital Bus Emission, Class A limits
4999.950	50.5	V	80.0	-29.5	PK	304	1.4	Digital Bus Emission, Class A limits
11575.230	44.9	H	54.0	-9.1	AVG	240	1.5	RB 1 MHz;VB 10 Hz;Peak, Note 1
11575.630	56.5	H	74.0	-17.5	PK	240	1.5	RB 1 MHz;VB 3 MHz;Peak
5439.950	48.5	V	54.0	-5.5	AVG	230	1.9	RB 1 MHz;VB 10 Hz;Peak, Note 1
5440.230	52.6	V	74.0	-21.4	PK	230	1.9	RB 1 MHz;VB 3 MHz;Peak
7377.740	42.1	V	54.0	-11.9	AVG	172	1.7	RB 1 MHz;VB 10 Hz;Peak, Note 1
7388.580	58.9	V	74.0	-15.1	PK	172	1.7	RB 1 MHz;VB 3 MHz;Peak
4924.050	36.8	V	54.0	-17.2	AVG	19	1.4	RB 1 MHz;VB 10 Hz;Peak, Note 1
4925.470	58.3	V	74.0	-15.7	PK	19	1.4	RB 1 MHz;VB 3 MHz;Peak

Note: Scans made between 18 - 25 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



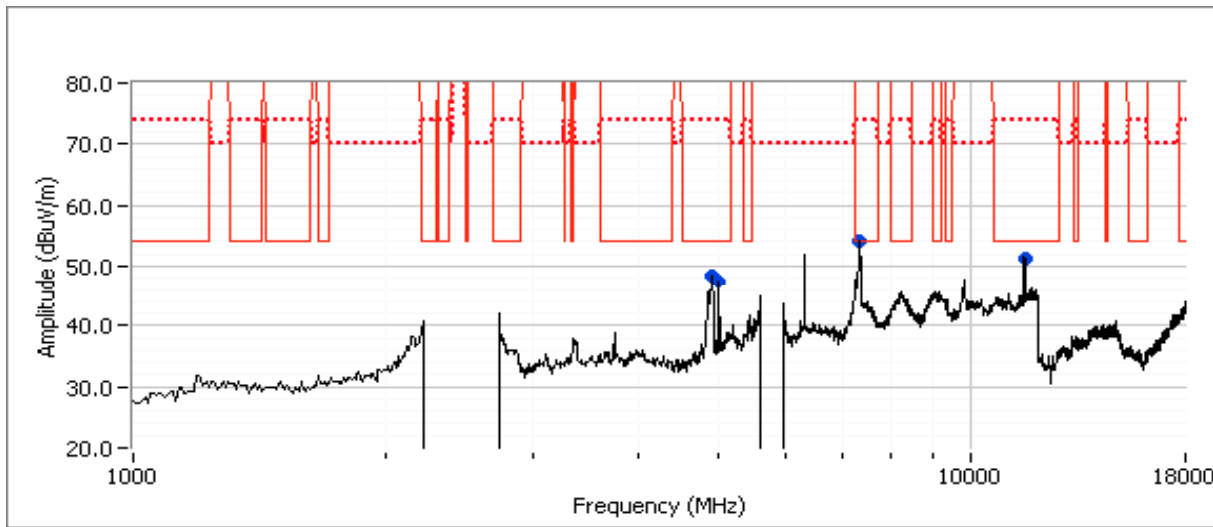
# EMC Test Data

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 #4: Radiated Spurious Emissions, 1,000 - 25000 MHz. Operating Mode: 802.11n40/a  
 Date of Test: 9/30/2013 0:00 Config. Used: 1  
 Test Engineer: Rafael Varelas Config Change: None  
 Test Location: FT Chamber #5 EUT Voltage: POE

Radio #	Frequency	CH	Mode	Pwr
Run: 4				
2	2422	3	802.11n40	34
6	2437	6	802.11n40	34
10	2452	9	802.11n40	34
14	5785	157	802.11a	34

Tx Chain: 2x2



Frequency	Level	Pol	15.209 / 15.247		Detector	Azimuth	Height	Comments
MHz	dB $\mu$ V/m	v/h	Limit	Margin	PK/QP/Avg	degrees	meters	
11568.900	50.1	V	54.0	-3.9	AVG	207	1.5	RB 1 MHz;VB 10 Hz;Peak, Note 1
11568.630	61.0	V	74.0	-13.0	PK	207	1.5	RB 1 MHz;VB 3 MHz;Peak
4892.680	36.4	V	54.0	-17.6	AVG	98	1.2	RB 1 MHz;VB 10 Hz;Peak, Note 1
4890.940	52.0	V	74.0	-22.0	PK	98	1.2	RB 1 MHz;VB 3 MHz;Peak
7364.860	44.5	V	54.0	-9.5	AVG	216	1.4	RB 1 MHz;VB 10 Hz;Peak, Note 1
7365.760	59.6	V	74.0	-14.4	PK	216	1.4	RB 1 MHz;VB 3 MHz;Peak
5000.000	40.8	V	60.0	-19.2	AVG	263	1.2	Digital Bus Emission, Class A limits
5000.160	46.8	V	80.0	-33.2	PK	263	1.2	Digital Bus Emission, Class A limits

Note: Scans made between 18 - 25 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

## RSS 210 and FCC 15.247 (DTS) Radiated Spurious Emissions

### Test Specific Details

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

### General Test Configuration

The EUT and all local support equipment were located on the turntable for radiated spurious emissions testing. For radiated emissions testing the measurement antenna was located 3 meters from the EUT, unless otherwise noted.

### Ambient Conditions:

Temperature: 17-25 °C  
Rel. Humidity: 34-43 %

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

Run #	Mode	Channel	Power Setting	Test Performed	Limit	Result / Margin
1	b	1 - 2412MHz	See Below	Restricted Band Edge (2390 MHz)	FCC Part 15.209 / 15.247( c)	53.1 dBµV/m @ 2350.6 MHz (-0.9 dB)
	b	11 - 2462MHz	See Below	Restricted Band Edge (2483.5 MHz)	FCC Part 15.209 / 15.247( c)	52.8 dBµV/m @ 2497.6 MHz (-1.2 dB)
2	g	1 - 2412MHz	See Below	Restricted Band Edge (2390 MHz)	FCC Part 15.209 / 15.247( c)	53.2 dBµV/m @ 2389.4 MHz (-0.8 dB)
	g	11 - 2462MHz	See Below	Restricted Band Edge (2483.5 MHz)	FCC Part 15.209 / 15.247( c)	53.8 dBµV/m @ 2493.1 MHz (-0.2 dB)
3	n20	1 - 2412MHz	See Below	Restricted Band Edge (2390 MHz)	FCC Part 15.209 / 15.247( c)	53.0 dBµV/m @ 2390.0 MHz (-1.0 dB)
	n20	11 - 2462MHz	See Below	Restricted Band Edge (2483.5 MHz)	FCC Part 15.209 / 15.247( c)	53.9 dBµV/m @ 2483.6 MHz (-0.1 dB)
4	n40	3 - 2422MHz	See Below	Restricted Band Edge (2390 MHz)	FCC Part 15.209 / 15.247( c)	52.6 dBµV/m @ 2390.0 MHz (-1.4 dB)
	n40	9 - 2452MHz	See Below	Restricted Band Edge (2483.5 MHz)	FCC Part 15.209 / 15.247( c)	53.9 dBµV/m @ 2483.5 MHz (-0.1 dB)
5	n40	4 - 2427MHz	See Below	Restricted Band Edge (2390 MHz)	FCC Part 15.209 / 15.247( c)	53.7 dBµV/m @ 2390.0 MHz (-0.3 dB)
	n40	8 - 2447MHz	See Below	Restricted Band Edge (2483.5 MHz)	FCC Part 15.209 / 15.247( c)	53.9 dBµV/m @ 2483.6 MHz (-0.1 dB)
6	n40	5 - 2432MHz	See Below	Restricted Band Edge (2390 MHz)	FCC Part 15.209 / 15.247( c)	53.2 dBµV/m @ 2390.0 MHz (-0.8 dB)
	n40	7 - 2442MHz	See Below	Restricted Band Edge (2483.5 MHz)	FCC Part 15.209 / 15.247( c)	51.3 dBµV/m @ 2483.7 MHz (-2.7 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.

### Sample Notes

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

Antenna: Panel (x4)

### Procedure Comments:

Measurements performed in accordance with FCC KDB 558074

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

Unless otherwise stated/noted, emission has duty cycle  $\geq 98\%$  and was measured using RBW=1MHz, VBW=10Hz, peak detector, linear average mode, auto sweep time, max hold.

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
11g	6Mb/s	0.95	Yes	1.35	0.2	0.4	741
n20	MCS0	0.95	Yes	1.26	0.2	0.5	794
n40	MCS0	0.90	Yes	0.6	0.5	1.0	1667

### Measurement Specific Notes:

Note 1:	For 802.11g, n20 and n40, emission has 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
Note 2:	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
		Project Manager:	Christine Krebill
Contact:	Peter Krebill	Project Coordinator:	-
Standard:	FCC 15.247, 15.407, EN 55022, FCC B	Class:	N/A

Run: 1

6	2412	1	802.11b	24
10	2437	6	802.11b	26
14	2462	11	802.11b	28
2	5785	157	802.11a	34

Run: 2

6	2412	1	802.11g	22
10	2437	6	802.11g	26
14	2462	11	802.11g	22
2	5785	157	802.11a	34

Run: 3

6	2412	1	802.11n20	20
10	2437	6	802.11n20	26
14	2462	11	802.11n20	22
2	5785	157	802.11n20	34

Run: 4

6	2422	3	802.11n40	12
10	2437	6	802.11n40	20
14	2452	9	802.11n40	8
2	5795	159	802.11n40	34

Run: 5

6	2427	4	802.11n40	12
10	5755	151	802.11n40	20
14	2447	8	802.11n40	14
2	5795	159	802.11n40	34

Run: 6

6	2432	5	802.11n40	18
10	5755	151	802.11n40	20
14	2442	7	802.11n40	20
2	5795	159	802.11n40	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: N/A

### Run #1: Radiated Bandedge Measurements

Date of Test: 10/2/2013 8:20

Test Engineer: David Bare

Test Location: Fremont Chamber #5

Config. Used: 1

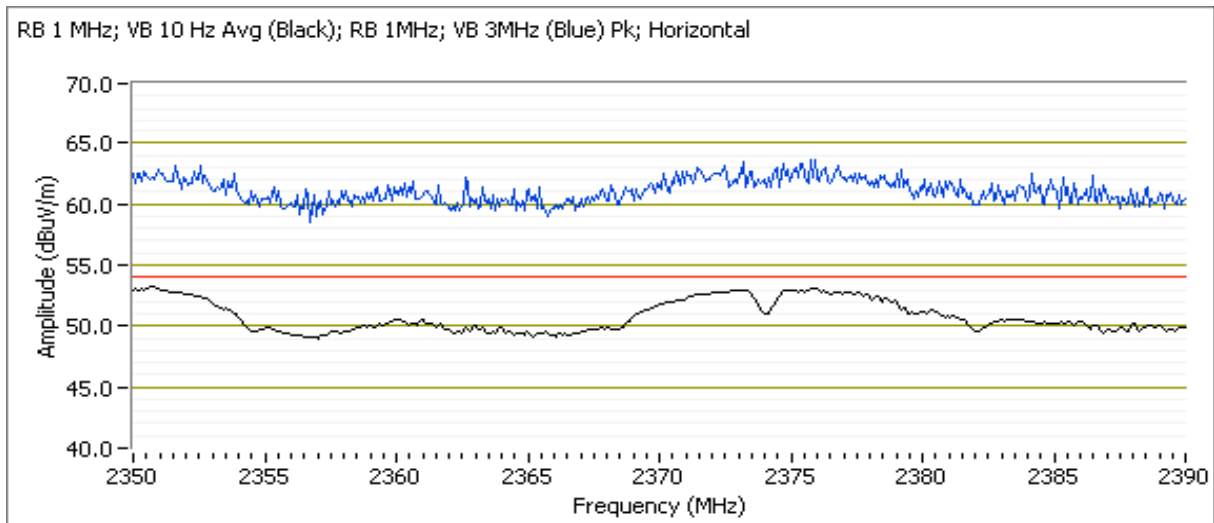
Config Change: None

EUT Voltage: POE

Channel: 1                      Mode: b  
 Tx Chain: All - Radio 6        Data Rate: 1Mb/s

### Band Edge Signal Field Strength - Direct measurement of field strength

Frequency	Level	Pol	15.209 / 15.247		Detector	Azimuth	Height	Comments
MHz	dB $\mu$ V/m	v/h	Limit	Margin	Pk/QP/Avg	degrees	meters	
2350.640	53.1	H	54.0	-0.9	AVG	355	1.0	POS; RB 1 MHz; VB: 10 Hz
2375.010	63.5	H	74.0	-10.5	PK	355	1.0	POS; RB 1 MHz; VB: 3 MHz
2383.510	52.2	V	54.0	-1.8	AVG	0	1.0	POS; RB 1 MHz; VB: 10 Hz
2377.740	63.1	V	74.0	-10.9	PK	0	1.0	POS; RB 1 MHz; VB: 3 MHz





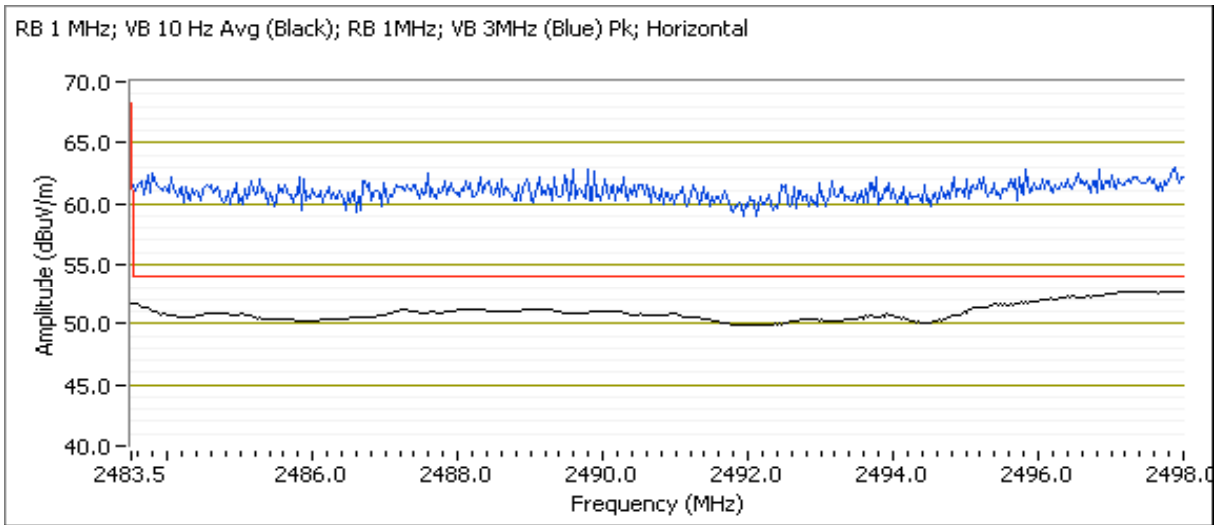
# EMC Test Data

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

Channel: 11                      Mode: b  
 Tx Chain: All - Radio 14      Data Rate: 1Mb/s

### Band Edge Signal Field Strength - Direct measurement of field strength

Frequency MHz	Level dB $\mu$ V/m	Pol v/h	15.209 / 15.247		Detector PK/QP/Avg	Azimuth degrees	Height meters	Comments
			Limit	Margin				
2497.560	52.8	H	54.0	-1.2	AVG	360	1.2	POS; RB 1 MHz; VB: 10 Hz
2495.820	63.5	H	74.0	-10.5	PK	360	1.2	POS; RB 1 MHz; VB: 3 MHz
2493.760	52.6	V	54.0	-1.4	AVG	360	1.2	POS; RB 1 MHz; VB: 10 Hz
2497.360	63.1	V	74.0	-10.9	PK	360	1.2	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

Date of Test: 10/2/2013 9:40

Config. Used: 1

Test Engineer: David Bare

Config Change: None

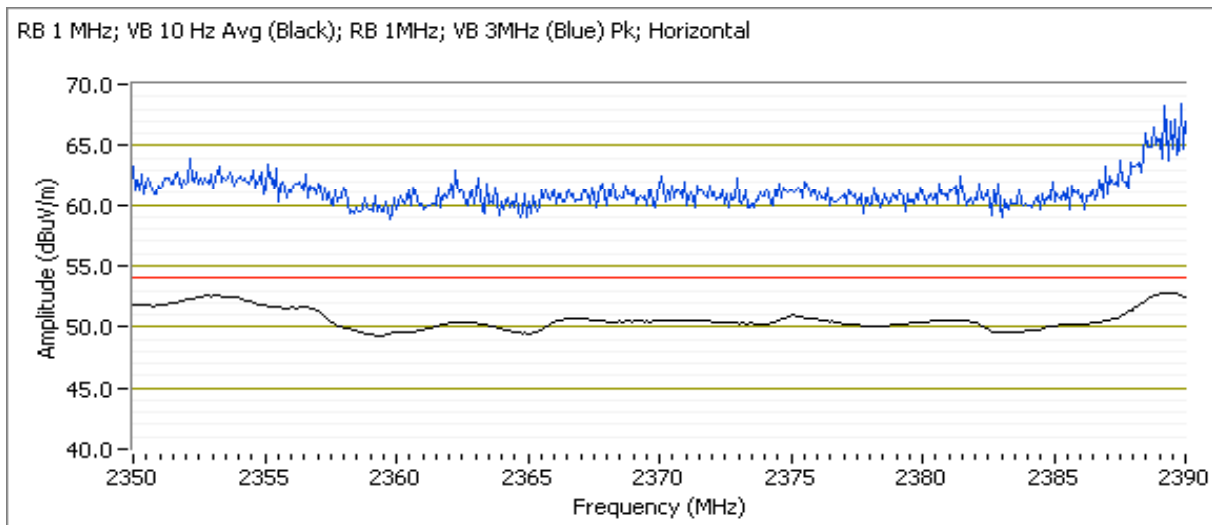
Test Location: Fremont Chamber #5

EUT Voltage: POE

Channel: 1 Mode: g  
 Tx Chain: All - Radio 6 Data Rate: 6Mb/s

### Band Edge Signal Field Strength - Direct measurement of field strength

Frequency	Level	Pol	15.209 / 15.247		Detector	Azimuth	Height	Comments
MHz	dB $\mu$ V/m	v/h	Limit	Margin	Pk/QP/Avg	degrees	meters	
2389.360	53.2	H	54.0	-0.8	AVG	360	1.0	POS; RB 1 MHz; VB: 10 Hz, Note 1
2388.640	67.9	H	74.0	-6.1	PK	360	1.0	POS; RB 1 MHz; VB: 3 MHz







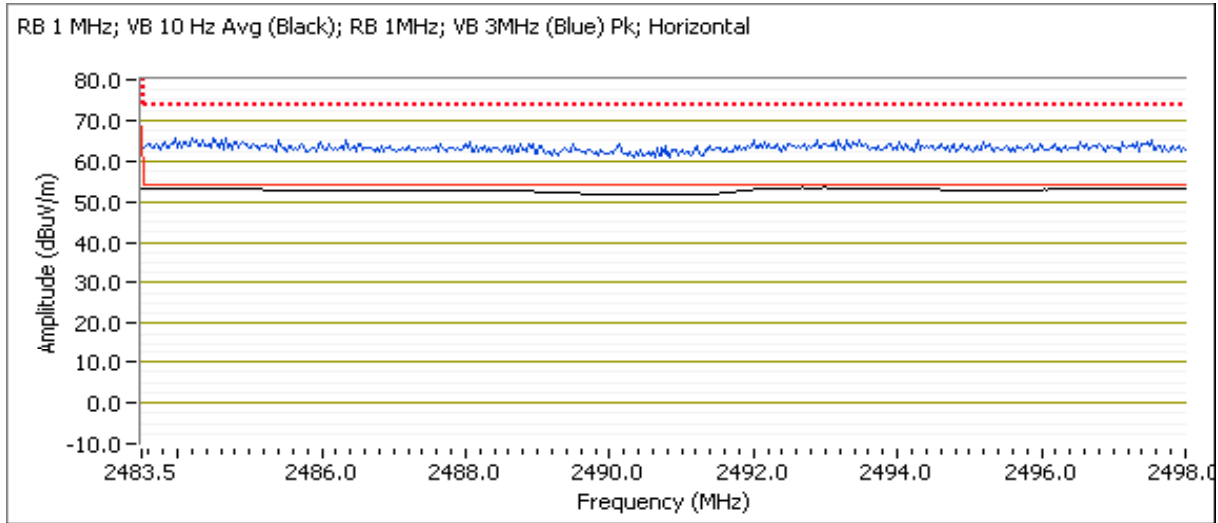
# EMC Test Data

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

Channel: 11                      Mode: g  
 Tx Chain: All - Radio 14      Data Rate: 6Mb/s

### Band Edge Signal Field Strength - Direct measurement of field strength

Frequency MHz	Level dB $\mu$ V/m	Pol v/h	15.209 / 15.247		Detector PK/QP/Avg	Azimuth degrees	Height meters	Comments
			Limit	Margin				
2493.120	53.8	H	54.0	-0.2	AVG	360	1.2	POS; RB 1 MHz; VB: 10 Hz, Note 1
2484.580	66.6	H	74.0	-7.4	PK	360	1.2	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 #3: Radiated Bandedge Measurements

Date of Test: 10/2/2013 10:10

Config. Used: 1

Test Engineer: David Bare

Config Change: None

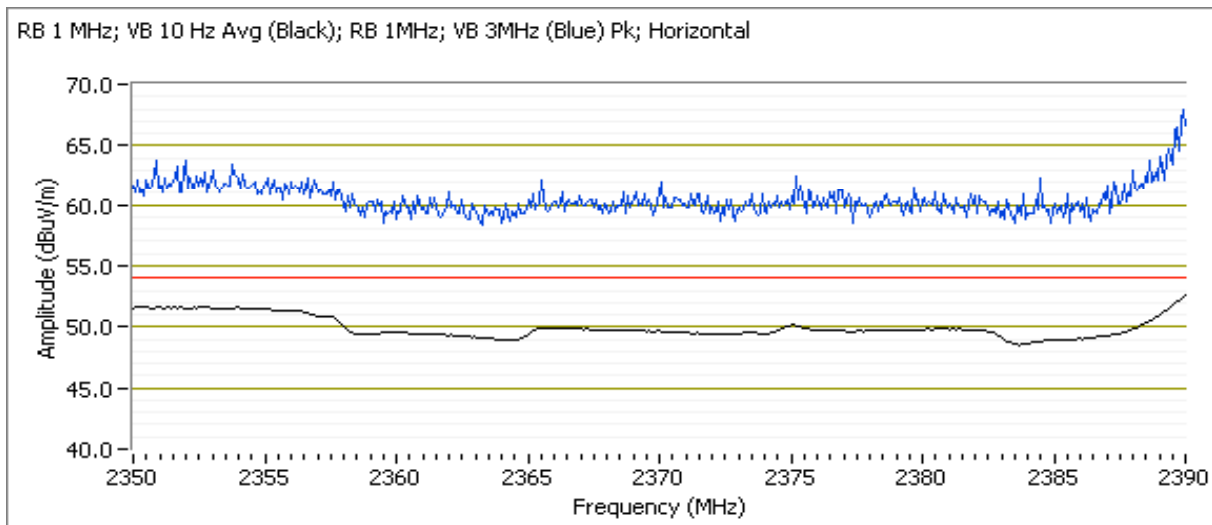
Test Location: Fremont Chamber #5

EUT Voltage: POE

Channel: 1                      Mode: n20  
 Tx Chain: All - Radio 6        Data Rate: MCS0

### Band Edge Signal Field Strength - Direct measurement of field strength

Frequency	Level	Pol	15.209 / 15.247		Detector	Azimuth	Height	Comments
MHz	dB $\mu$ V/m	v/h	Limit	Margin	Pk/QP/Avg	degrees	meters	
2390.000	53.0	H	54.0	-1.0	AVG	360	1.0	POS; RB 1 MHz; VB: 10 Hz, Note 1
2389.520	68.3	H	74.0	-5.7	PK	360	1.0	POS; RB 1 MHz; VB: 3 MHz





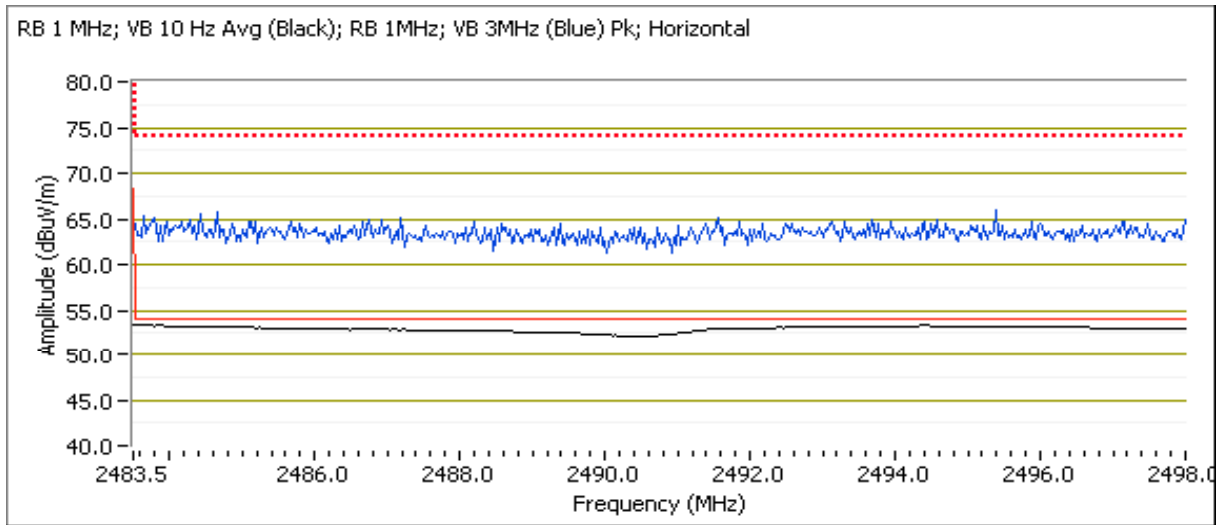
# EMC Test Data

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: 11                      Mode: n20  
 Tx Chain: All - Radio 14      Data Rate: MCS0

### Band Edge Signal Field Strength - Direct measurement of field strength

Frequency MHz	Level dB $\mu$ V/m	Pol v/h	15.209 / 15.247		Detector PK/QP/Avg	Azimuth degrees	Height meters	Comments
			Limit	Margin				
2483.560	53.9	H	54.0	-0.1	AVG	360	1.2	POS; RB 1 MHz; VB: 10 Hz, Note 1
2493.000	65.5	H	74.0	-8.5	PK	360	1.2	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

Date of Test: 10/2/2013 10:30

Config. Used: 1

Test Engineer: David Bare

Config Change: None

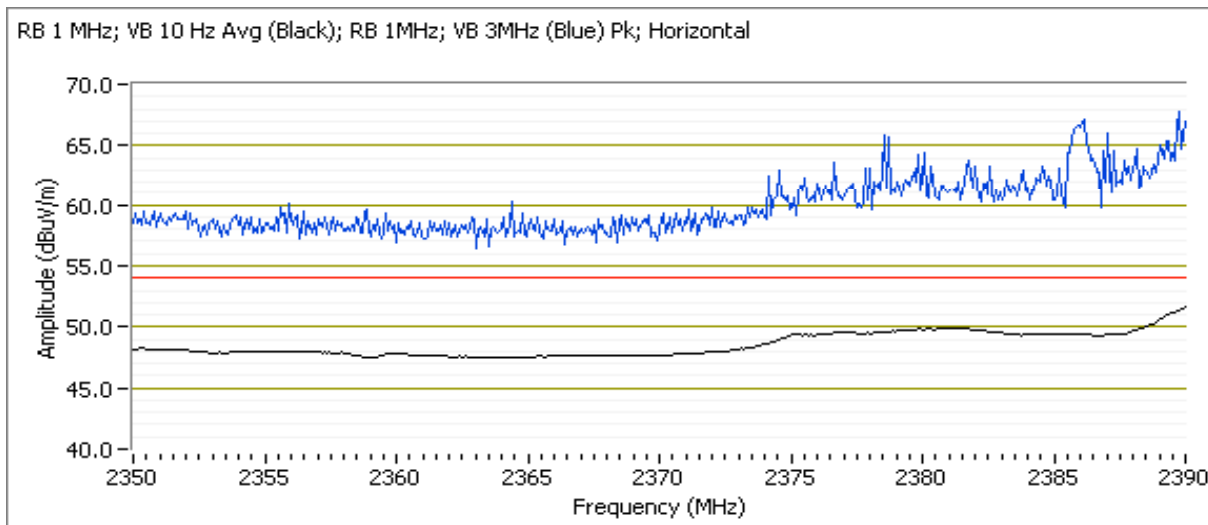
Test Location: Fremont Chamber #5

EUT Voltage: POE

Channel: 3                      Mode: n40  
 Tx Chain: All - Radio 6        Data Rate: MCS0

### Band Edge Signal Field Strength - Direct measurement of field strength

Frequency	Level	Pol	15.209 / 15.247		Detector	Azimuth	Height	Comments
MHz	dB $\mu$ V/m	v/h	Limit	Margin	Pk/QP/Avg	degrees	meters	
2390.000	52.6	H	54.0	-1.4	AVG	360	1.0	POS; RB 1 MHz; VB: 10 Hz, Note 1
2389.900	69.4	H	74.0	-4.6	PK	360	1.0	POS; RB 1 MHz; VB: 3 MHz





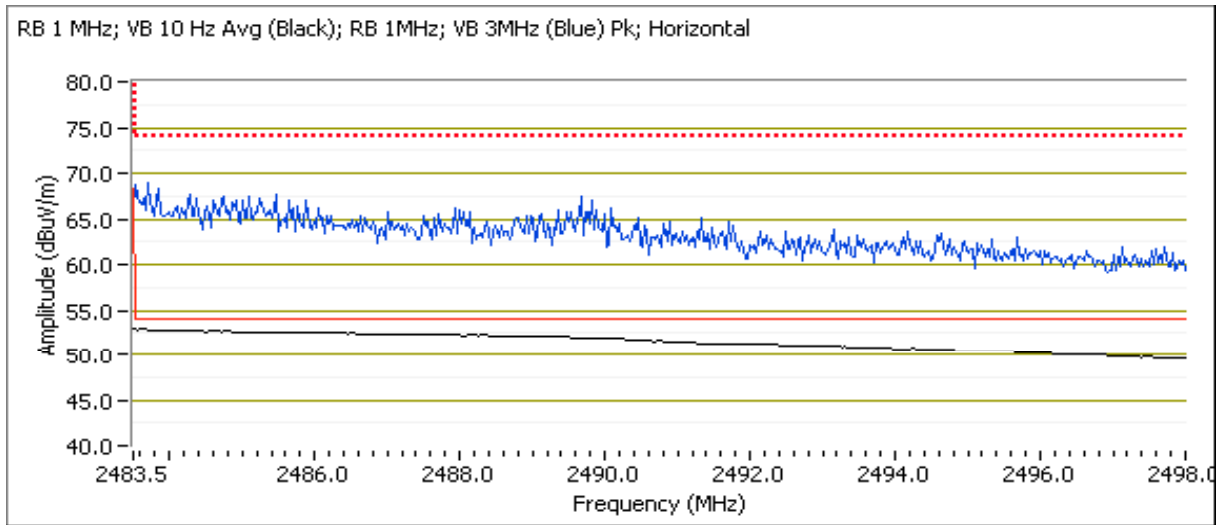
# EMC Test Data

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: 9                      Mode: n40  
 Tx Chain: All - Radio 14      Data Rate: MCS0

### Band Edge Signal Field Strength - Direct measurement of field strength

Frequency MHz	Level dB $\mu$ V/m	Pol v/h	15.209 / 15.247		Detector PK/QP/Avg	Azimuth degrees	Height meters	Comments
			Limit	Margin				
2483.500	53.9	H	54.0	-0.1	AVG	360	1.2	POS; RB 1 MHz; VB: 10 Hz, Note 1
2485.130	69.0	H	74.0	-5.0	PK	360	1.2	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  
 Date of Test: 10/2/2013 11:30  
 Test Engineer: David Bare  
 Test Location: Fremont Chamber #5  
 Config. Used: 1  
 Config Change: None  
 EUT Voltage: POE

Channel: 4 Mode: n40  
 Tx Chain: All - Radio 6 Data Rate: MCS0

### Band Edge Signal Field Strength - Direct measurement of field strength

Frequency	Level	Pol	15.209 / 15.247		Detector	Azimuth	Height	Comments
MHz	dB $\mu$ V/m	v/h	Limit	Margin	Pk/QP/Avg	degrees	meters	
2390.000	53.7	H	54.0	-0.3	AVG	360	1.0	POS; RB 1 MHz; VB: 10 Hz, Note 1
2388.240	67.1	H	74.0	-6.9	PK	360	1.0	POS; RB 1 MHz; VB: 3 MHz

Channel: 8 Mode: n40  
 Tx Chain: All - Radio 14 Data Rate: MCS0

### Band Edge Signal Field Strength - Direct measurement of field strength

Frequency	Level	Pol	15.209 / 15.247		Detector	Azimuth	Height	Comments
MHz	dB $\mu$ V/m	v/h	Limit	Margin	Pk/QP/Avg	degrees	meters	
2483.580	53.9	H	54.0	-0.1	AVG	360	1.2	POS; RB 1 MHz; VB: 10 Hz, Note 1
2484.300	68.4	H	74.0	-5.6	PK	360	1.2	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 #6: Radiated Bandedge Measurements  
 Date of Test: 10/2/2013 11:50  
 Test Engineer: David Bare  
 Test Location: Fremont Chamber #5  
 Config. Used: 1  
 Config Change: None  
 EUT Voltage: POE

Channel: 5 Mode: n40  
 Tx Chain: All - Radio 6 Data Rate: MCS0

### Band Edge Signal Field Strength - Direct measurement of field strength

Frequency	Level	Pol	15.209 / 15.247		Detector	Azimuth	Height	Comments
MHz	dB $\mu$ V/m	v/h	Limit	Margin	Pk/QP/Avg	degrees	meters	
2390.000	53.2	H	54.0	-0.8	AVG	360	1.0	POS; RB 1 MHz; VB: 10 Hz, Note 1
2389.840	66.4	H	74.0	-7.6	PK	360	1.0	POS; RB 1 MHz; VB: 3 MHz

Channel: 7 Mode: n40  
 Tx Chain: All - Radio 14 Data Rate: MCS0

### Band Edge Signal Field Strength - Direct measurement of field strength

Frequency	Level	Pol	15.209 / 15.247		Detector	Azimuth	Height	Comments
MHz	dB $\mu$ V/m	v/h	Limit	Margin	Pk/QP/Avg	degrees	meters	
2483.670	51.3	H	54.0	-2.7	AVG	360	1.2	POS; RB 1 MHz; VB: 10 Hz, Note 1
2484.590	66.9	H	74.0	-7.1	PK	360	1.2	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 15.247 (DTS) Radiated Spurious Emissions

### Test Specific Details

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

### General Test Configuration

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

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 - Device Operating in the 2400-2483.5 MHz Band

Run #	Mode	Channel	Power Setting	Test Performed	Limit	Result / Margin
1	802.11b 802.11a	See Below	See Below	Radiated Emissions, 1 - 25 GHz	FCC Part 15.209 / 15.247( c)	52.4 dBµV/m @ 4874.0 MHz (-1.6 dB)
2	802.11g 802.11a	See Below	See Below	Radiated Emissions, 1 - 25 GHz	FCC Part 15.209 / 15.247( c)	49.1 dBµV/m @ 11571.8 MHz (-4.9 dB)
3	802.11n20 802.11a	See Below	See Below	Radiated Emissions, 1 - 25 GHz	FCC Part 15.209 / 15.247( c)	48.8 dBµV/m @ 11567.7 MHz (-5.2 dB)
4	802.11n40 802.11a	See Below	See Below	Radiated Emissions, 1 - 25 GHz	FCC Part 15.209 / 15.247( c)	49.6 dBµV/m @ 11571.5 MHz (-4.4 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 2400-2483.5 MHz

Radio #	Frequency	CH	Mode	Pwr
<b>Run: 1</b>				
6	2412	1	802.11b	34
10	2437	6	802.11b	34
14	2462	11	802.11b	34
2	5785	157	802.11a	34
<b>Run: 2</b>				
6	2412	1	802.11g	34
10	2437	6	802.11g	34
14	2462	11	802.11g	34
2	5785	157	802.11a	34
<b>Run: 3</b>				
6	2412	1	802.11n20	34
10	2437	6	802.11n20	34
14	2462	11	802.11n20	34
2	5785	157	802.11a	34
<b>Run: 4</b>				
6	2422	3	802.11n40	34
10	2437	6	802.11n40	34
14	2452	9	802.11n40	34
2	5785	157	802.11a	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.

### 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: Panel (x4)



# 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 558074

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

Unless otherwise stated/noted, emission has duty cycle  $\geq 98\%$  and was measured using RBW=1MHz, VBW=10Hz, peak detector, linear average mode, auto sweep time, max hold.

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
11g	6Mb/s	0.95	Yes	1.35	0.2	0.4	741
11a	6Mb/s	0.96	Yes	1.35	0.2	0.3	741
n20	MCS0	0.95	Yes	1.26	0.2	0.5	794
n40	MCS0	0.90	Yes	0.6	0.5	1.0	1667

## Measurement Specific Notes:

Note 1:	Emission has 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
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# EMC Test Data

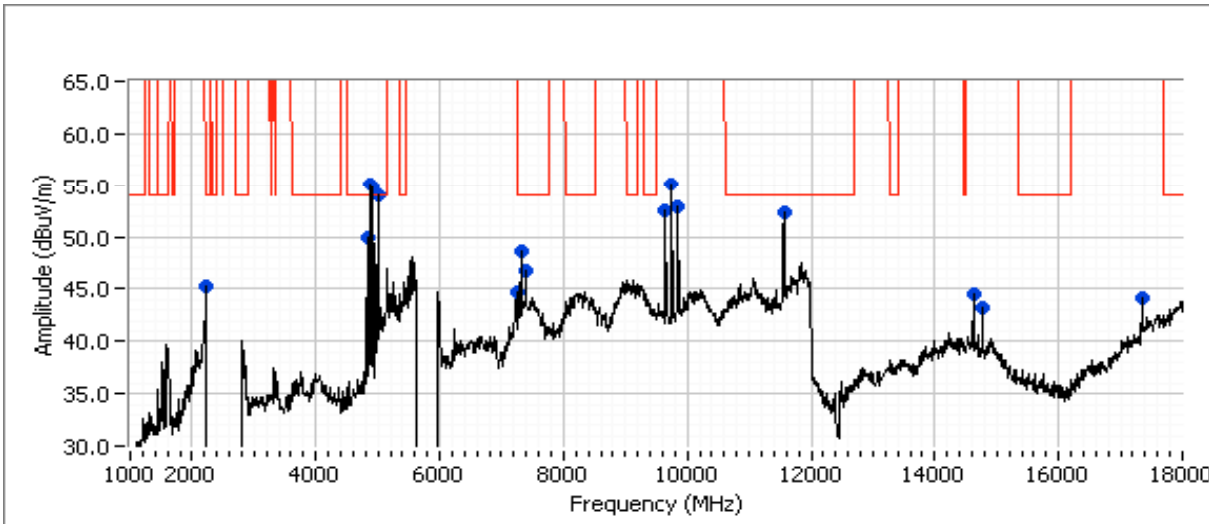
Client: Xirrus	Job Number: J93457
Model: XR2000H	T-Log Number: T93459
	Project Manager: Christine Krebill
Contact: Peter Krebill	Project Coordinator: -
Standard: FCC 15.247, 15.407, EN 55022, FCC B	Class: N/A

Run #1: Radiated Spurious Emissions, 1,000 - 25000 MHz. Operating Mode: 802.11b/a  
 Date of Test: 10/2/2013 Config. Used: 1  
 Test Engineer: Deniz Demirci Config Change: None  
 Test Location: FT Ch# 5 EUT Voltage: POE

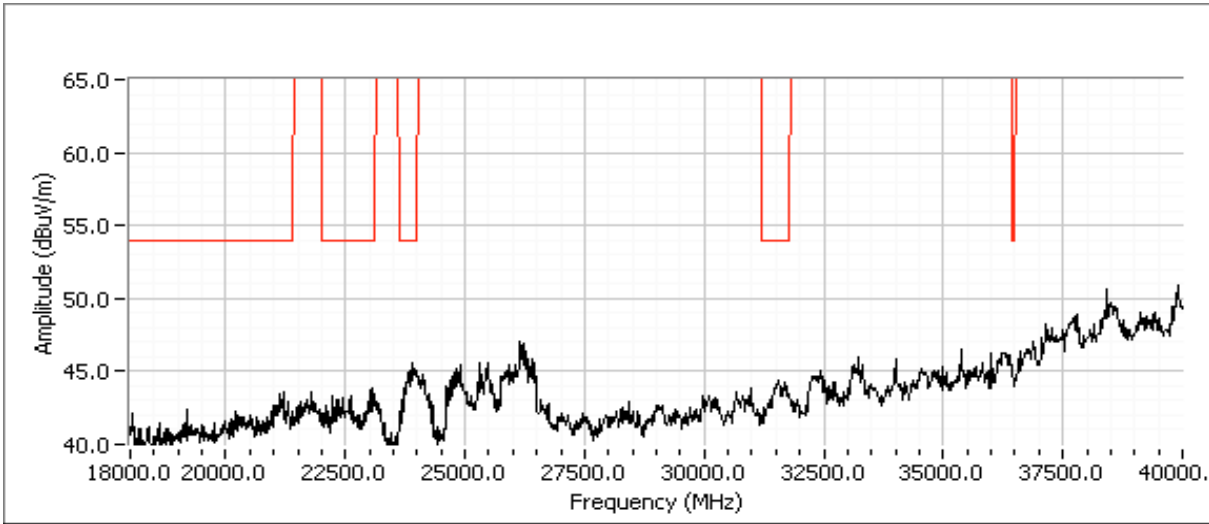
Radio #	Frequency	CH	Mode	Pwr
Run: 1				
6	2412	1	802.11b	34
10	2437	6	802.11b	34
14	2462	11	802.11b	34
2	5785	157	802.11a	34

Tx Chain: 2x2

Run #1a: Radiated Spurious Emissions, 1,000 - 25000 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
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 $\mu$ V/m	Pol v/h	15.209 / 15.247		Detector PK/QP/Avg	Azimuth degrees	Height meters	Comments
			Limit	Margin				
2231.910	42.4	H	54.0	-11.6	AVG	349	1.5	RB 1 MHz;VB 10 Hz;Peak
2231.400	54.8	H	74.0	-19.2	PK	349	1.5	RB 1 MHz;VB 3 MHz;Peak
4823.950	45.7	V	54.0	-8.3	AVG	330	1.7	RB 1 MHz;VB 10 Hz;Peak
4823.950	49.9	V	74.0	-24.1	PK	330	1.7	RB 1 MHz;VB 3 MHz;Peak
4873.960	52.4	V	54.0	-1.6	AVG	347	1.7	RB 1 MHz;VB 10 Hz;Peak
4873.920	55.0	V	74.0	-19.0	PK	347	1.7	RB 1 MHz;VB 3 MHz;Peak
4923.960	51.7	V	54.0	-2.3	AVG	353	1.3	RB 1 MHz;VB 10 Hz;Peak
4923.970	55.5	V	74.0	-18.5	PK	353	1.3	RB 1 MHz;VB 3 MHz;Peak
4999.990	50.2	H	60.0	-9.8	AVG	351	1.3	Digital Bus Emission, Class A limits
4999.950	54.4	H	80.0	-25.6	PK	351	1.3	Digital Bus Emission, Class A limits
7310.200	48.0	V	54.0	-6.0	AVG	311	1.2	RB 1 MHz;VB 10 Hz;Peak
7310.380	56.6	V	74.0	-17.4	PK	311	1.2	RB 1 MHz;VB 3 MHz;Peak
7388.650	44.4	V	54.0	-9.6	AVG	331	1.4	RB 1 MHz;VB 10 Hz;Peak
7388.300	54.4	V	74.0	-19.6	PK	331	1.4	RB 1 MHz;VB 3 MHz;Peak
7236.750	44.3	H	68.3	-24.0	AVG	356	1.3	RB 1 MHz;VB 10 Hz;Peak
7241.770	53.6	H	88.3	-34.7	PK	356	1.3	RB 1 MHz;VB 3 MHz;Peak
9647.870	52.8	H	68.3	-15.5	AVG	174	1.0	RB 1 MHz;VB 10 Hz;Peak
9647.720	57.1	H	88.3	-31.2	PK	174	1.0	RB 1 MHz;VB 3 MHz;Peak
9747.870	56.6	H	68.3	-11.7	AVG	208	1.1	RB 1 MHz;VB 10 Hz;Peak
9747.980	59.8	H	88.3	-28.5	PK	208	1.1	RB 1 MHz;VB 3 MHz;Peak
9847.920	49.9	V	68.3	-18.4	AVG	157	1.7	RB 1 MHz;VB 10 Hz;Peak
9847.950	55.6	V	88.3	-32.7	PK	157	1.7	RB 1 MHz;VB 3 MHz;Peak
11567.480	51.5	V	54.0	-2.5	AVG	202	1.5	RB 1 MHz;VB 10 Hz;Peak, Note 1
11568.010	64.2	V	74.0	-9.8	PK	202	1.5	RB 1 MHz;VB 3 MHz;Peak
14621.770	40.9	V	68.3	-27.4	AVG	166	1.2	RB 1 MHz;VB 10 Hz;Peak
14621.740	51.5	V	88.3	-36.8	PK	166	1.2	RB 1 MHz;VB 3 MHz;Peak
14771.810	41.7	V	68.3	-26.6	AVG	232	1.1	RB 1 MHz;VB 10 Hz;Peak
14771.800	51.4	V	88.3	-36.9	PK	232	1.1	RB 1 MHz;VB 3 MHz;Peak
17354.930	42.0	V	68.3	-26.3	AVG	220	1.2	RB 1 MHz;VB 10 Hz;Peak
17354.630	54.7	V	88.3	-33.6	PK	220	1.2	RB 1 MHz;VB 3 MHz;Peak

Note: Scans made between 18 - 25 GHz with the measurement antenna moved around the card and its antennas 100 cm from the device indicated there were no significant emissions in this frequency range



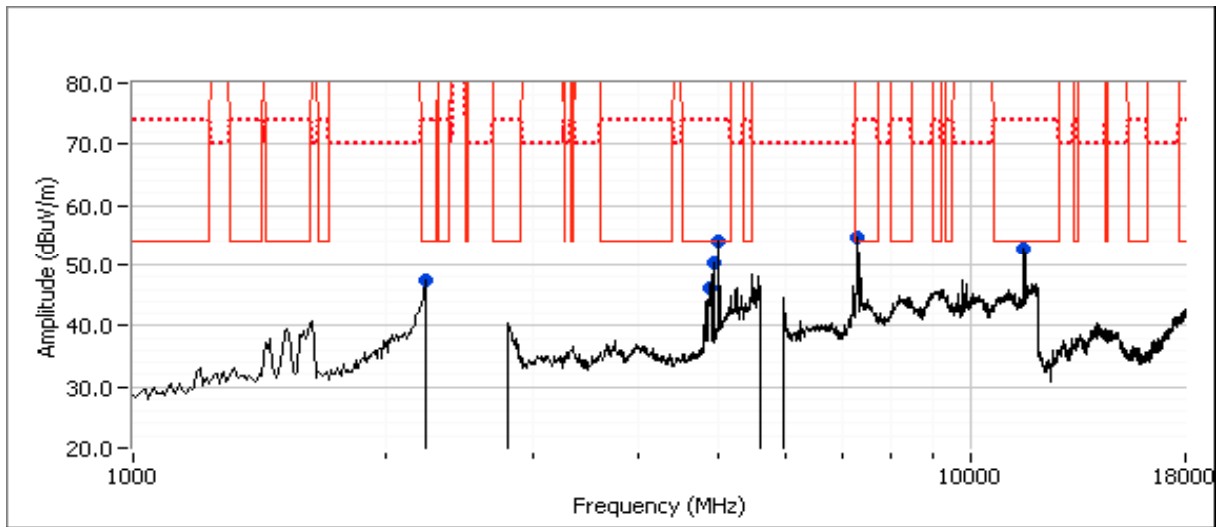
# EMC Test Data

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 #2: Radiated Spurious Emissions, 1,000 - 25000 MHz. Operating Mode: 802.11g/a  
 Date of Test: 10/2/2013 0:00 Config. Used: 1  
 Test Engineer: Rafael Varelas Config Change: None  
 Test Location: FT Chamber #5 EUT Voltage: POE

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

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 $\mu$ V/m	Pol v/h	15.209 / 15.247		Detector Pk/QP/Avg	Azimuth degrees	Height meters	Comments
			Limit	Margin				
11571.780	49.1	V	54.0	-4.9	AVG	149	1.3	RB 1 MHz;VB 10 Hz;Peak, Note 1
11566.580	61.5	V	74.0	-12.5	PK	149	1.3	RB 1 MHz;VB 3 MHz;Peak
7316.630	47.7	H	54.0	-6.3	AVG	354	1.2	RB 1 MHz;VB 10 Hz;Peak, Note 1
7316.560	64.2	H	74.0	-9.8	PK	354	1.2	RB 1 MHz;VB 3 MHz;Peak
4999.990	51.2	H	60.0	-8.8	AVG	346	1.4	Digital Bus Emission, Class A limits
4999.920	54.1	H	80.0	-25.9	PK	346	1.4	Digital Bus Emission, Class A limits
4878.320	39.6	V	54.0	-14.4	AVG	345	1.7	RB 1 MHz;VB 10 Hz;Peak, Note 1
4873.120	52.0	V	74.0	-22.0	PK	345	1.7	RB 1 MHz;VB 3 MHz;Peak
2233.070	43.5	V	54.0	-10.5	AVG	343	1.3	RB 1 MHz;VB 10 Hz;Peak
2234.850	55.9	V	74.0	-18.1	PK	343	1.3	RB 1 MHz;VB 3 MHz;Peak
4922.470	41.9	V	54.0	-12.1	AVG	353	1.8	RB 1 MHz;VB 10 Hz;Peak, Note 1
4922.130	53.4	V	74.0	-20.6	PK	353	1.8	RB 1 MHz;VB 3 MHz;Peak

Note: Scans made between 18 - 25 GHz with the measurement antenna moved around the card and its antennas 20-50cm from



# EMC Test Data

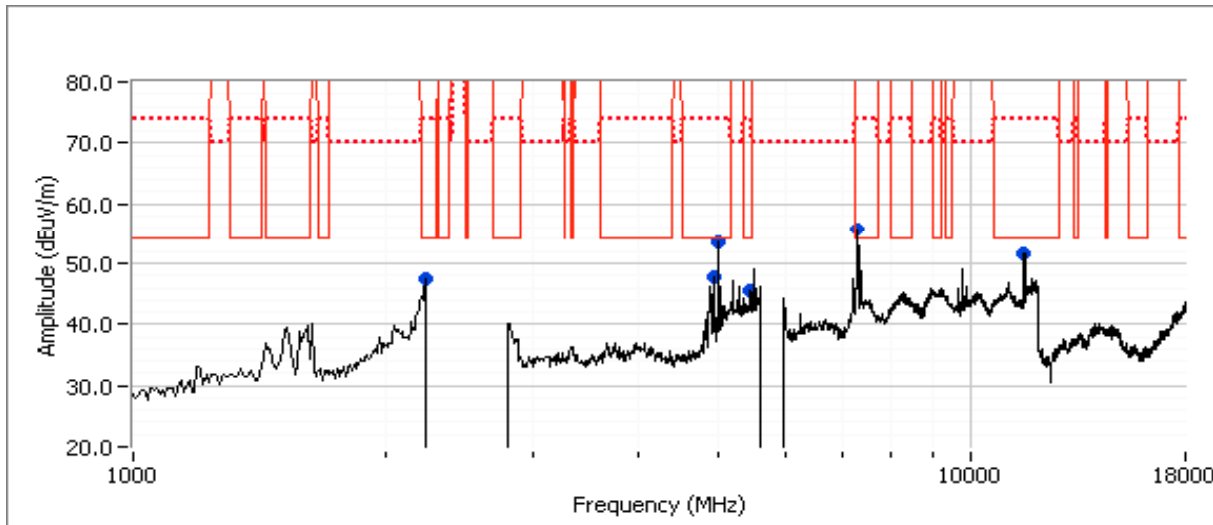
Client: Xirrus	Job Number: J93457
Model: XR2000H	T-Log Number: T93459
	Project Manager: Christine Krebill
Contact: Peter Krebill	Project Coordinator: -
Standard: FCC 15.247, 15.407, EN 55022, FCC B	Class: N/A

Run #3: Radiated Spurious Emissions, 1,000 - 25000 MHz. Operating Mode: 802.11n20/a

Date of Test: 10/2/2013 0:00      Config. Used: 1  
 Test Engineer: Rafael Varelas      Config Change: None  
 Test Location: FT Chamber #5      EUT Voltage: POE

Radio #	Frequency	CH	Mode	Pwr
Run: 3				
6	2412	1	802.11n20	34
10	2437	6	802.11n20	34
14	2462	11	802.11n20	34
2	5785	157	802.11a	34

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 $\mu$ V/m	Pol v/h	15.209 / 15.247		Detector Pk/QP/Avg	Azimuth degrees	Height meters	Comments
			Limit	Margin				
11567.690	48.8	V	54.0	-5.2	AVG	233	1.9	RB 1 MHz;VB 10 Hz;Peak, Note 1
11566.950	60.3	V	74.0	-13.7	PK	233	1.9	RB 1 MHz;VB 3 MHz;Peak
7313.560	48.3	V	54.0	-5.7	AVG	299	1.0	RB 1 MHz;VB 10 Hz;Peak, Note 1
7316.160	65.6	V	74.0	-8.4	PK	299	1.0	RB 1 MHz;VB 3 MHz;Peak
5439.920	41.4	V	54.0	-12.6	AVG	341	1.5	RB 1 MHz;VB 10 Hz;Peak, Note 1
5440.000	48.9	V	74.0	-25.1	PK	341	1.5	RB 1 MHz;VB 3 MHz;Peak
4999.900	49.8	H	60.0	-10.2	AVG	339	1.1	Digital Bus Emission, Class A limits
4999.990	54.1	H	80.0	-25.9	PK	339	1.1	Digital Bus Emission, Class A limits
2233.220	44.1	H	54.0	-9.9	AVG	341	1.6	RB 1 MHz;VB 10 Hz;Peak
2234.500	56.0	H	74.0	-18.0	PK	341	1.6	RB 1 MHz;VB 3 MHz;Peak
4919.930	42.9	V	54.0	-11.1	AVG	349	1.8	RB 1 MHz;VB 10 Hz;Peak, Note 1
4922.170	53.8	V	74.0	-20.2	PK	349	1.8	RB 1 MHz;VB 3 MHz;Peak

Note: Scans made between 18 - 25 GHz with the measurement antenna moved around the card and its antennas 20-50cm from



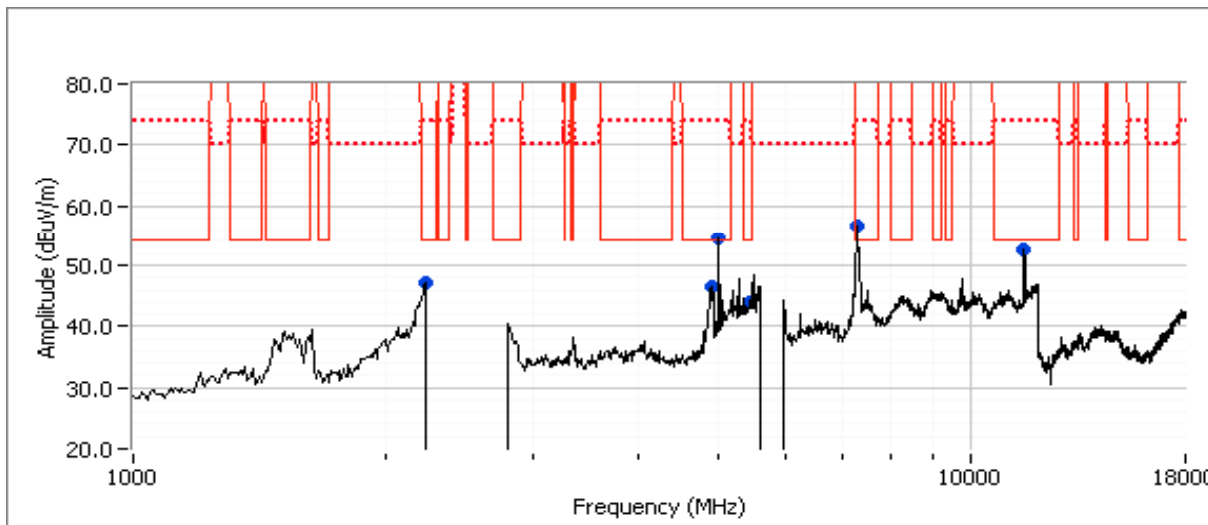
# EMC Test Data

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 - 25000 MHz. Operating Mode: 802.11n40/a  
 Date of Test: 10/2/2013 0:00 Config. Used: 1  
 Test Engineer: Rafael Varelas Config Change: None  
 Test Location: FT Chamber #5 EUT Voltage: POE

Radio #	Frequency	CH	Mode	Pwr
Run: 4				
6	2422	3	802.11n40	34
10	2437	6	802.11n40	34
14	2452	9	802.11n40	34
2	5785	157	802.11a	34

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 $\mu$ V/m	Pol v/h	15.209 / 15.247		Detector Pk/QP/Avg	Azimuth degrees	Height meters	Comments
			Limit	Margin				
11571.510	49.6	V	54.0	-4.4	AVG	158	1.6	RB 1 MHz;VB 10 Hz;Peak, Note 1
11571.510	61.1	V	74.0	-12.9	PK	158	1.6	RB 1 MHz;VB 3 MHz;Peak
4898.990	39.8	V	54.0	-14.2	AVG	347	1.5	RB 1 MHz;VB 10 Hz;Peak
4900.440	52.3	V	74.0	-21.7	PK	347	1.5	RB 1 MHz;VB 10 Hz;Peak, Note 1
2232.960	42.9	H	54.0	-11.1	AVG	359	1.6	RB 1 MHz;VB 10 Hz;Peak
2234.980	54.4	H	74.0	-19.6	PK	359	1.6	RB 1 MHz;VB 3 MHz;Peak
7309.050	47.8	V	54.0	-6.2	AVG	332	1.6	RB 1 MHz;VB 10 Hz;Peak, Note 1
7290.450	63.5	V	74.0	-10.5	PK	332	1.6	RB 1 MHz;VB 3 MHz;Peak
4999.990	50.2	H	60.0	-9.8	AVG	344	1.2	Digital Bus Emission, Class A limits
5000.020	54.4	H	80.0	-25.6	PK	344	1.2	Digital Bus Emission, Class A limits
5439.900	41.9	V	54.0	-12.1	AVG	344	1.5	RB 1 MHz;VB 10 Hz;Peak, Note 1
5439.720	49.1	V	74.0	-24.9	PK	344	1.5	RB 1 MHz;VB 3 MHz;Peak

Note: Scans made between 18 - 25 GHz with the measurement antenna moved around the card and its antennas 20-50cm from



# 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 15.247 (DTS) Radiated Spurious Emissions

### Test Specific Details

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

### General Test Configuration

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

For radiated emissions testing the measurement antenna was located 3 meters from the EUT, unless otherwise noted.

### Ambient Conditions:

Temperature: 20.9 °C  
 Rel. Humidity: 37 %

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

Run #	Mode	Channel	Power Setting	Test Performed	Limit	Result / Margin
1	802.11a 802.11b	See Below	See Below	Radiated Emissions, 1 - 40 GHz	FCC Part 15.209 / 15.247( c)	52.8 dBµV/m @ 11489.1 MHz (-1.2 dB)
2	802.11n20 802.11b	See Below	See Below	Radiated Emissions, 1 - 40 GHz	FCC Part 15.209 / 15.247( c)	52.3 dBµV/m @ 11486.8 MHz (-1.7 dB)
3	802.11n40 802.11b	See Below	See Below	Radiated Emissions, 1 - 40 GHz	FCC Part 15.209 / 15.247( c)	50.8 dBµV/m @ 7268.3 MHz (-3.2 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.

### Sample Notes

Sample S/N: Mac address 20:0C:A1 for 802.11a and n20 tests and 20:0C:7D for 802.11n40 tests  
 Antenna: Dipole (x8)



# 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 5725-5850 MHz

Radio #	Frequency	CH	Mode	Pwr
<b>Run: 1</b>				
2	5745	149	802.11a	34
6	5785	157	802.11a	34
10	5825	165	802.11a	34
14	2437	6	802.11b	34
<b>Run: 2</b>				
2	5745	149	802.11n20	34
6	5785	157	802.11n20	34
10	5825	165	802.11n20	34
14	2437	6	802.11b	34
<b>Run: 3</b>				
2	5755	151	802.11n40	34
6	5795	159	802.11n40	34
10	2422	3	802.11n40	34
14	2437	6	802.11b	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.

### Procedure Comments:

Measurements performed in accordance with FCC KDB 558074

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	6Mb/s	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



# EMC Test Data

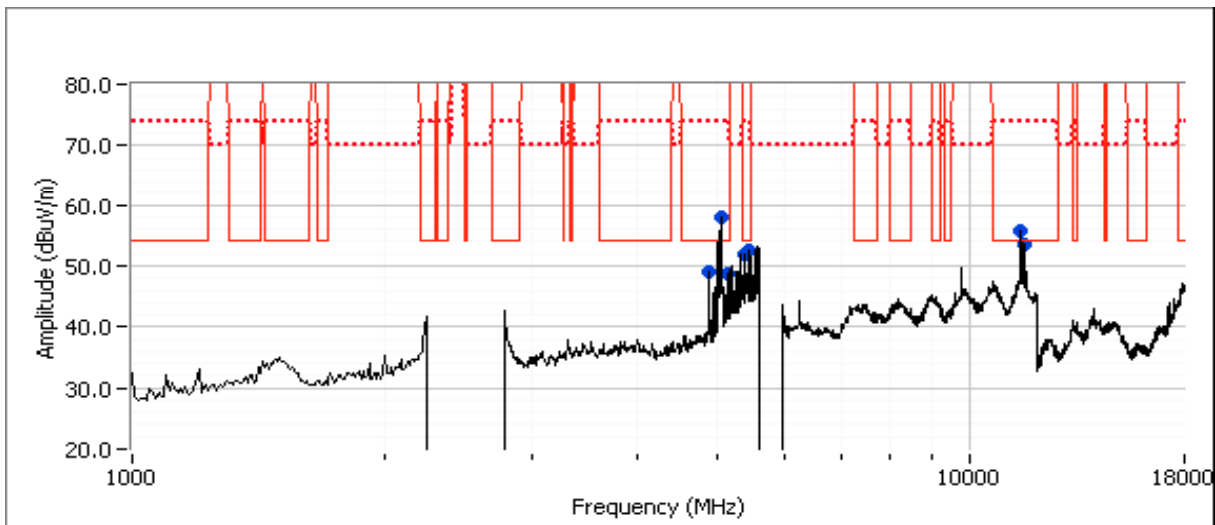
Client: Xirrus	Job Number: J93457
Model: XR2000H	T-Log Number: T93459
	Project Manager: Christine Krebill
Contact: Peter Krebill	Project Coordinator: -
Standard: FCC 15.247, 15.407, EN 55022, FCC B	Class: N/A

Run #1: Radiated Spurious Emissions, 1,000 - 40000 MHz. Operating Mode: 802.11a/b  
 Date of Test: 9/18/2013 0:00 Config. Used: 1  
 Test Engineer: Jack Liu / R. Varelas Config Change: None  
 Test Location: FT Chamber# 5 EUT Voltage: POE

Radio #	Frequency	CH	Mode	Pwr
Run: 1				
2	5745	149	802.11a	34
6	5785	157	802.11a	34
10	5825	165	802.11a	34
14	2437	6	802.11b	34

Tx Chain: 2x2

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

Frequency MHz	Level dB $\mu$ V/m	Pol v/h	15.209 / 15.247		Detector PK/QP/Avg	Azimuth degrees	Height meters	Comments
			Limit	Margin				
11489.070	52.8	V	54.0	-1.2	AVG	168	2.0	RB 1 MHz;VB 10 Hz;Peak
11489.270	66.0	V	74.0	-8.0	PK	168	2.0	RB 1 MHz;VB 3 MHz;Peak
5119.930	44.5	V	54.0	-9.5	AVG	45	1.0	RB 1 MHz;VB 10 Hz;Peak
5120.030	52.5	V	74.0	-21.5	PK	45	1.0	RB 1 MHz;VB 3 MHz;Peak
5439.980	49.1	V	54.0	-4.9	AVG	134	1.7	POS; RB 1 MHz; VB: 10 Hz
5439.790	58.2	V	74.0	-15.8	PK	134	1.7	POS; RB 1 MHz; VB: 3 MHz
5360.020	42.8	V	54.0	-11.2	AVG	97	1.0	RB 1 MHz;VB 10 Hz;Peak
5360.040	52.8	V	74.0	-21.2	PK	97	1.0	RB 1 MHz;VB 3 MHz;Peak
4873.970	50.4	V	54.0	-3.6	AVG	133	1.2	POS; RB 1 MHz; VB: 10 Hz, Note 1
4873.810	56.6	V	74.0	-17.4	PK	133	1.2	POS; RB 1 MHz; VB: 3 MHz
11570.200	51.2	V	54.0	-2.8	AVG	150	1.2	RB 1 MHz;VB 10 Hz;Peak
11570.530	63.2	V	74.0	-10.8	PK	150	1.2	RB 1 MHz;VB 3 MHz;Peak
5000.030	48.8	V	60.0	-11.2	AVG	70	1.4	Digital Bus Emission, Class A limits
4999.960	56.7	V	80.0	-23.3	PK	70	1.4	Digital Bus Emission, Class A limits
5040.030	35.8	V	54.0	-18.2	AVG	331	1.3	RB 1 MHz;VB 10 Hz;Peak
5040.150	46.6	V	74.0	-27.4	PK	331	1.3	RB 1 MHz;VB 3 MHz;Peak

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:	Emission has duty cycle $\geq$ 98%, average measurement performed: RBW=1MHz, VBW=3MHz, RMS, Power averaging, auto sweep, trace average 100 traces



# 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 - 40000 MHz. Operating Mode: 802.11n20/b

Date of Test: 9/18/2013 0:00

Config. Used: 1

Test Engineer: Jack Liu / R. Varelas

Config Change: None

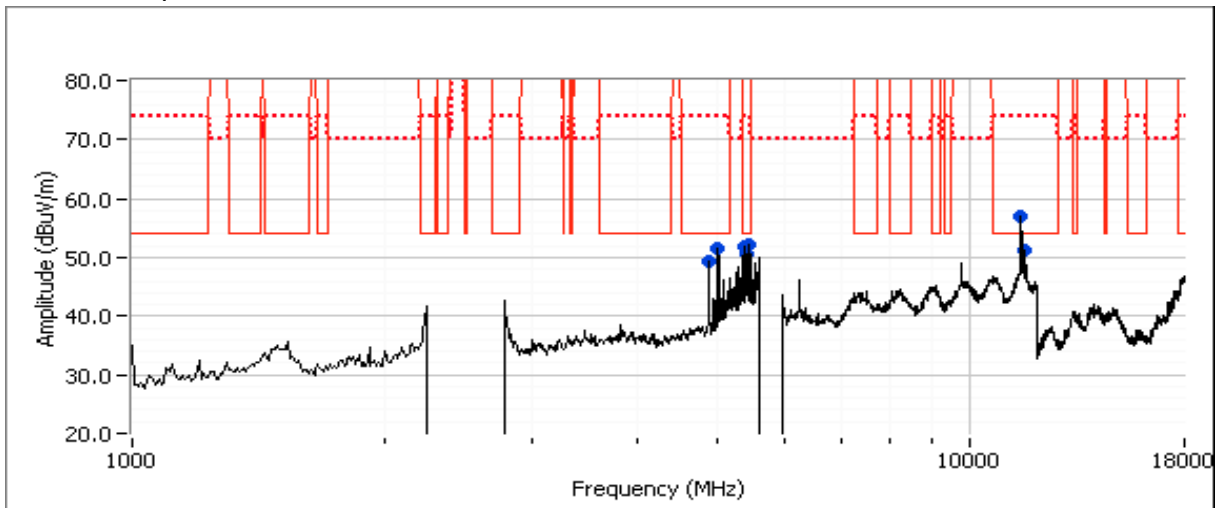
Test Location: FT Chamber# 5

EUT Voltage: POE

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

Tx Chain: 2x2

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

Frequency MHz	Level dB $\mu$ V/m	Pol v/h	15.209 / 15.247		Detector PK/QP/Avg	Azimuth degrees	Height meters	Comments
			Limit	Margin				
11486.820	52.3	V	54.0	-1.7	AVG	212	2.0	RB 1 MHz;VB 10 Hz;Peak
11484.750	64.4	V	74.0	-9.6	PK	212	2.0	RB 1 MHz;VB 3 MHz;Peak
11570.230	50.4	V	54.0	-3.6	AVG	149	1.3	RB 1 MHz;VB 10 Hz;Peak
11571.270	63.0	V	74.0	-11.0	PK	149	1.3	RB 1 MHz;VB 3 MHz;Peak
4873.960	50.9	V	54.0	-3.1	AVG	139	1.3	POS; RB 1 MHz; VB: 10 Hz, Note 1
4873.810	56.8	V	74.0	-17.2	PK	139	1.3	POS; RB 1 MHz; VB: 3 MHz
5000.000	49.4	V	60.0	-10.6	AVG	82	1.5	Digital Bus Emission, Class A limits
5000.040	57.3	V	80.0	-22.7	PK	82	1.5	Digital Bus Emission, Class A limits
5400.020	48.7	V	54.0	-5.3	AVG	61	1.2	POS; RB 1 MHz; VB: 10 Hz
5400.960	57.0	V	74.0	-17.0	PK	61	1.2	POS; RB 1 MHz; VB: 3 MHz

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:	Emission has duty cycle $\geq$ 98%, average measurement performed: RBW=1MHz, VBW=3MHz, RMS, Power averaging, auto sweep, trace average 100 traces



# 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 - 40000 MHz. Operating Mode: 802.11n40/b

Date of Test: 9/30/2013 0:00

Config. Used: 1

Test Engineer: Rafael Varelas

Config Change: None

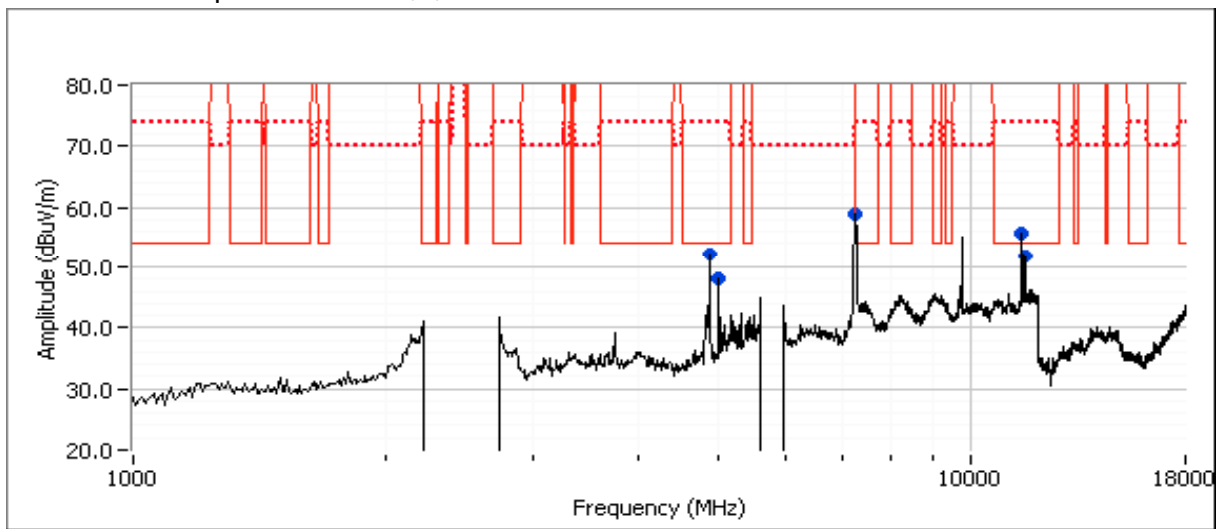
Test Location: FT Chamber #5

EUT Voltage: POE

Radio #	Frequency	CH	Mode	Pwr
Run: 3				
2	5755	151	802.11n40	34
6	5795	159	802.11n40	34
10	2422	3	802.11n40	34
14	2437	6	802.11b	34

Tx Chain: 2x2

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

Frequency MHz	Level dB $\mu$ V/m	Pol v/h	15.209 / 15.247		Detector Pk/QP/Avg	Azimuth degrees	Height meters	Comments
			Limit	Margin				
7268.250	50.8	V	54.0	-3.2	AVG	312	1.1	RB 1 MHz;VB 10 Hz;Peak
7270.080	69.4	V	74.0	-4.6	PK	312	1.1	RB 1 MHz;VB 3 MHz;Peak
4873.970	48.8	V	54.0	-5.2	AVG	303	1.4	RB 1 MHz;VB 10 Hz;Peak, Note 1
4873.990	53.2	V	74.0	-20.8	PK	303	1.4	RB 1 MHz;VB 3 MHz;Peak
5000.000	44.3	V	60.0	-15.7	AVG	223	1.1	Digital Bus Emission, Class A limits
4999.910	49.6	V	80.0	-30.4	PK	223	1.1	Digital Bus Emission, Class A limits
11583.290	49.1	V	54.0	-4.9	AVG	139	1.6	RB 1 MHz;VB 10 Hz;Peak
11583.130	61.1	V	74.0	-12.9	PK	139	1.6	RB 1 MHz;VB 3 MHz;Peak
5036.640	43.8	V	54.0	-10.2	AVG	56	1.3	RB 1 MHz;VB 10 Hz;Peak
5031.190	54.3	V	74.0	-19.7	PK	56	1.3	RB 1 MHz;VB 3 MHz;Peak
11506.070	46.1	V	54.0	-7.9	AVG	149	1.0	RB 1 MHz;VB 10 Hz;Peak
11502.770	57.0	V	74.0	-17.0	PK	149	1.0	RB 1 MHz;VB 3 MHz;Peak

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:	Emission has duty cycle $\geq$ 98%, average measurement performed: RBW=1MHz, VBW=3MHz, RMS, Power averaging, auto sweep, trace average 100 traces



# 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 15.247 (DTS) Radiated Spurious Emissions

### Test Specific Details

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

### General Test Configuration

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

For radiated emissions testing the measurement antenna was located 3 meters from the EUT, unless otherwise noted.

### Ambient Conditions:

Temperature: 21.4 °C  
 Rel. Humidity: 37 %

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

Run #	Mode	Channel	Power Setting	Test Performed	Limit	Result / Margin
1	802.11a 802.11b	See Below	See Below	Radiated Emissions, 1 - 40 GHz	FCC Part 15.209 / 15.247( c)	53.1 dBµV/m @ 4873.9 MHz (-0.9 dB)
2	802.11n20 802.11b	See Below	See Below	Radiated Emissions, 1 - 40 GHz	FCC Part 15.209 / 15.247( c)	53.3 dBµV/m @ 4874.0 MHz (-0.7 dB)
3	802.11n40 802.11b	See Below	See Below	Radiated Emissions, 1 - 40 GHz	FCC Part 15.209 / 15.247( c)	50.3 dBµV/m @ 4873.9 MHz (-3.7 dB)

System Configuration: Operating within 5725-5850 MHz

### 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:	N/A

Radio #	Frequency	CH	Mode	Pwr
<b>Run: 1</b>				
2	5745	149	802.11a	34
6	5785	157	802.11a	34
10	5825	165	802.11a	34
14	2437	6	802.11b	34
<b>Run: 2</b>				
2	5745	149	802.11n20	34
6	5785	157	802.11n20	34
10	5825	165	802.11n20	34
14	2437	6	802.11b	34
<b>Run: 3</b>				
2	5755	151	802.11n40	34
6	5795	159	802.11n40	34
10	2422	3	802.11n40	34
14	2437	6	802.11b	34

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

### Sample Notes

Sample S/N: 20:0C:7D  
 Antenna: Panel (x4)

### Procedure Comments:

Measurements performed in accordance with FCC KDB 558074  
 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	6Mb/s	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



# EMC Test Data

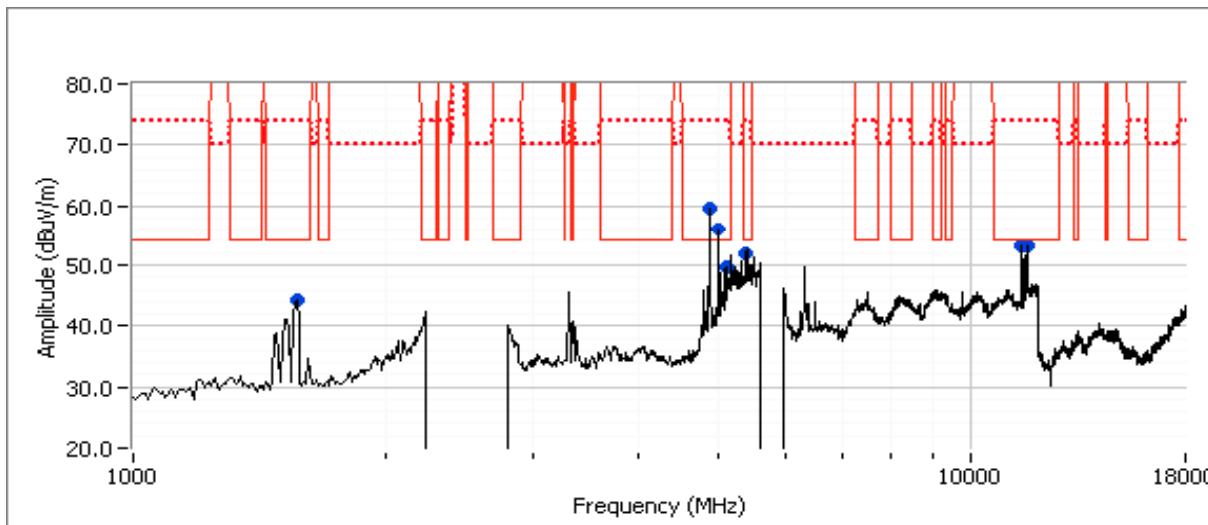
Client: Xirrus	Job Number: J93457
Model: XR2000H	T-Log Number: T93459
	Project Manager: Christine Krebill
Contact: Peter Krebill	Project Coordinator: -
Standard: FCC 15.247, 15.407, EN 55022, FCC B	Class: N/A

Run #1: Radiated Spurious Emissions, 1,000 - 40000 MHz. Operating Mode: 802.11a/b  
 Date of Test: 10/2/2013 0:00 Config. Used: 1  
 Test Engineer: Rafael Varelas Config Change: None  
 Test Location: FT Chamber #5 EUT Voltage: POE

Radio #	Frequency	CH	Mode	Pwr
Run: 1				
6	5745	149	802.11a	34
10	5785	157	802.11a	34
14	5825	165	802.11a	34
2	2437	6	802.11b	25

Tx Chain: 2x2

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

Frequency MHz	Level dB $\mu$ V/m	Pol v/h	15.209 / 15.247		Detector Pk/QP/Avg	Azimuth degrees	Height meters	Comments
			Limit	Margin				
4873.910	53.1	V	54.0	-0.9	AVG	346	1.2	RB 1 MHz;VB 10 Hz;Peak, Note 1
4873.950	56.5	V	74.0	-17.5	PK	346	1.2	RB 1 MHz;VB 3 MHz;Peak
11649.100	51.5	V	54.0	-2.5	AVG	118	1.3	RB 1 MHz;VB 10 Hz;Peak
11650.600	63.7	V	74.0	-10.3	PK	118	1.3	RB 1 MHz;VB 3 MHz;Peak
11491.040	52.0	V	54.0	-2.0	AVG	198	1.0	RB 1 MHz;VB 10 Hz;Peak
11486.340	63.1	V	74.0	-10.9	PK	198	1.0	RB 1 MHz;VB 3 MHz;Peak
1571.730	40.9	H	54.0	-13.1	AVG	319	1.0	RB 1 MHz;VB 10 Hz;Peak
1565.180	52.0	H	74.0	-22.0	PK	319	1.0	RB 1 MHz;VB 3 MHz;Peak
5000.000	48.7	V	60.0	-11.3	AVG	339	1.6	Digital Bus Emission, Class A limits
5000.060	54.6	V	80.0	-25.4	PK	339	1.6	Digital Bus Emission, Class A limits
5399.900	46.8	V	54.0	-7.2	AVG	340	1.3	RB 1 MHz;VB 10 Hz;Peak
5400.050	55.0	V	74.0	-19.0	PK	340	1.3	RB 1 MHz;VB 3 MHz;Peak
5120.010	45.0	V	54.0	-9.0	AVG	339	1.7	RB 1 MHz;VB 10 Hz;Peak
5119.790	54.4	V	74.0	-19.6	PK	339	1.7	RB 1 MHz;VB 3 MHz;Peak

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:	Emission has duty cycle $\geq$ 98%, average measurement performed: RBW=1MHz, VBW=3MHz, RMS, Power averaging, auto sweep, trace average 100 traces



# 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 - 40000 MHz. Operating Mode: 802.11n20/b

Date of Test: 10/2/2013 0:00

Config. Used: 1

Test Engineer: Rafael Varelas

Config Change: None

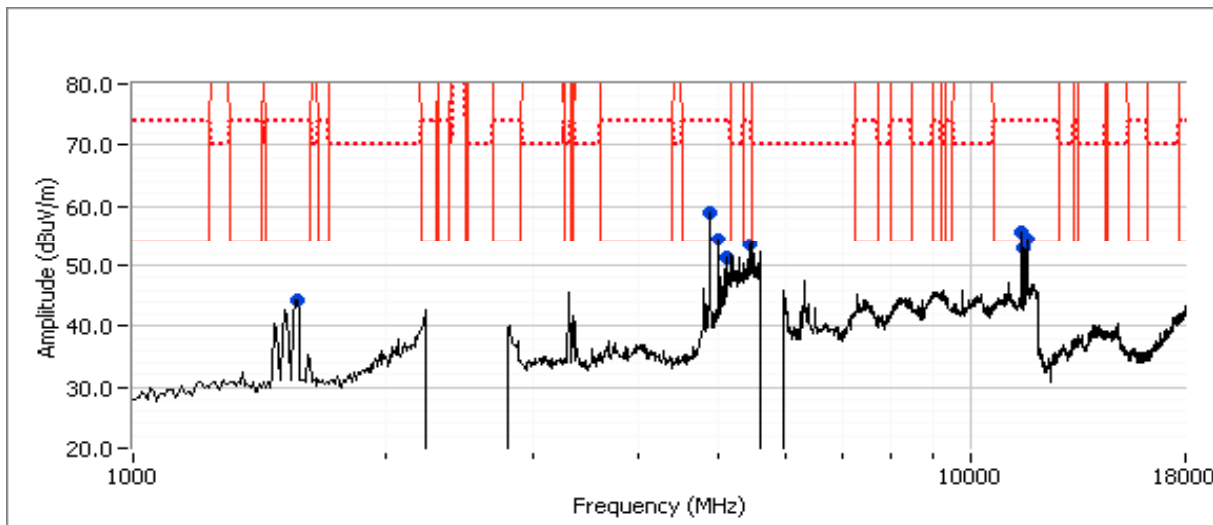
Test Location: FT Chamber #5

EUT Voltage: POE

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

Tx Chain: 2x2

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

Frequency MHz	Level dB $\mu$ V/m	Pol v/h	15.209 / 15.247		Detector PK/QP/Avg	Azimuth degrees	Height meters	Comments
			Limit	Margin				
4874.040	53.3	V	54.0	-0.7	AVG	325	1.2	RB 1 MHz;VB 10 Hz;Peak, Note 1
4873.890	56.2	V	74.0	-17.8	PK	325	1.2	RB 1 MHz;VB 3 MHz;Peak
5119.960	45.2	V	54.0	-8.8	AVG	346	1.4	RB 1 MHz;VB 10 Hz;Peak
5119.650	54.8	V	74.0	-19.2	PK	346	1.4	RB 1 MHz;VB 3 MHz;Peak
5439.940	45.8	V	54.0	-8.2	AVG	327	1.5	RB 1 MHz;VB 10 Hz;Peak
5439.740	54.6	V	74.0	-19.4	PK	327	1.5	RB 1 MHz;VB 3 MHz;Peak
4999.950	48.8	V	60.0	-11.2	AVG	352	1.6	Digital Bus Emission, Class A limits
4999.980	54.5	V	80.0	-25.5	PK	352	1.6	Digital Bus Emission, Class A limits
1563.510	40.1	H	54.0	-13.9	AVG	326	1.3	RB 1 MHz;VB 10 Hz;Peak
1568.600	51.4	H	74.0	-22.6	PK	326	1.3	RB 1 MHz;VB 3 MHz;Peak
11490.900	50.8	V	54.0	-3.2	AVG	190	1.1	RB 1 MHz;VB 10 Hz;Peak
11491.340	62.4	V	74.0	-11.6	PK	190	1.1	RB 1 MHz;VB 3 MHz;Peak
11569.670	48.3	V	54.0	-5.7	AVG	157	1.3	RB 1 MHz;VB 10 Hz;Peak
11570.770	60.8	V	74.0	-13.2	PK	157	1.3	RB 1 MHz;VB 3 MHz;Peak
11648.670	50.6	V	54.0	-3.4	AVG	123	1.3	RB 1 MHz;VB 10 Hz;Peak
11650.170	63.1	V	74.0	-10.9	PK	123	1.3	RB 1 MHz;VB 3 MHz;Peak

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:	Emission has duty cycle $\geq$ 98%, average measurement performed: RBW=1MHz, VBW=3MHz, RMS, Power averaging, auto sweep, trace average 100 traces



# 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 - 40000 MHz. Operating Mode: 802.11n40/b

Date of Test: 10/2/2013 0:00

Config. Used: 1

Test Engineer: Rafael Varelas

Config Change: None

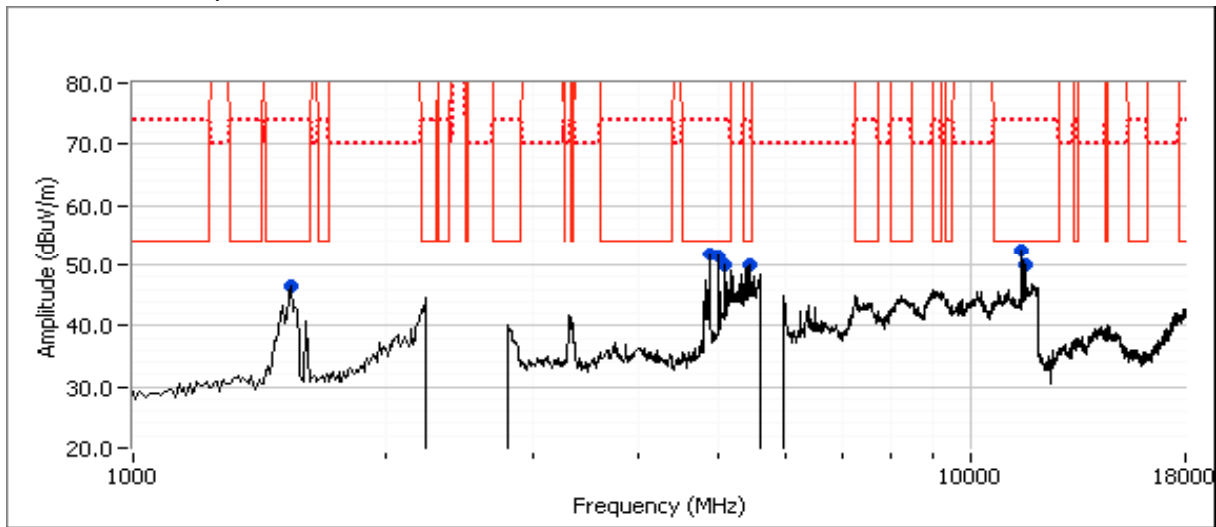
Test Location: FT Chamber #5

EUT Voltage: POE

Radio #	Frequency	CH	Mode	Pwr
Run: 3				
6	5755	151	802.11n40	34
10	5795	159	802.11n40	34
14	2422	3	802.11n40	34
2	2437	6	802.11b	34

Tx Chain: 2x2

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

Frequency MHz	Level dB $\mu$ V/m	Pol v/h	15.209 / 15.247		Detector PK/QP/Avg	Azimuth degrees	Height meters	Comments
			Limit	Margin				
4873.870	50.3	H	54.0	-3.7	AVG	352	1.3	RB 1 MHz;VB 10 Hz;Peak, Note 1
4873.940	52.9	H	74.0	-21.1	PK	352	1.3	RB 1 MHz;VB 3 MHz;Peak
11508.200	47.4	V	54.0	-6.6	AVG	137	1.0	RB 1 MHz;VB 10 Hz;Peak
11508.770	60.3	V	74.0	-13.7	PK	137	1.0	RB 1 MHz;VB 3 MHz;Peak
5439.910	45.4	V	54.0	-8.6	AVG	345	1.4	RB 1 MHz;VB 10 Hz;Peak
5439.800	54.1	V	74.0	-19.9	PK	345	1.4	RB 1 MHz;VB 3 MHz;Peak
11588.750	46.1	V	54.0	-7.9	AVG	199	1.0	RB 1 MHz;VB 10 Hz;Peak
11583.050	57.8	V	74.0	-16.2	PK	199	1.0	RB 1 MHz;VB 3 MHz;Peak
1546.450	45.4	H	54.0	-8.6	AVG	14	1.2	RB 1 MHz;VB 10 Hz;Peak
1547.020	55.0	H	74.0	-19.0	PK	14	1.2	RB 1 MHz;VB 3 MHz;Peak
5000.000	44.3	H	60.0	-15.7	AVG	334	1.8	Digital Bus Emission, Class A limits
4999.840	51.0	H	80.0	-29.0	PK	334	1.8	Digital Bus Emission, Class A limits
5079.920	45.2	V	54.0	-8.8	AVG	340	1.5	RB 1 MHz;VB 10 Hz;Peak
5079.820	51.7	V	74.0	-22.3	PK	340	1.5	RB 1 MHz;VB 3 MHz;Peak

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:	Emission has duty cycle $\geq$ 98%, average measurement performed: RBW=1MHz, VBW=3MHz, RMS, Power averaging, auto sweep, trace average 100 traces

*End of Report*

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