

**Electromagnetic Emissions Test Report  
and  
Application for Grant of Equipment Authorization  
pursuant to  
Industry Canada RSS-Gen Issue 1 / RSS 210 Issue 6  
FCC Part 15, Subpart E; FCC Part 15, Subpart C Section 15.247(DTS)  
on the  
Xirrus, Inc.  
Transmitter  
Model: XS-3900 & XS-3700**

UPN: 5428A-XS390016 and 5428A-XS37008  
FCC ID: SK6XS3900A & SK6XS3700A

GRANTEE: Xirrus, Inc.  
370 North Westlake Blvd., Suite 200  
Westlake Village, CA 91362

TEST SITE: Elliott Laboratories, Inc.  
684 W. Maude Ave  
Sunnyvale, CA 94086

REPORT DATE: January 10, 2006

FINAL TEST DATE: November 11, November 29, December 7,  
December 13 and December 23, 2005

AUTHORIZED SIGNATORY:

  
\_\_\_\_\_  
Mark Briggs  
Principal Engineer



2016-01

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Equipment Name and Model:

Transceiver: XS-3900 & XS-3700

Manufacturer:

Xirrus, Inc.  
370 North Westlake Blvd., Suite 200  
Westlake Village, CA 91362

Tested to applicable standard:

Industry Canada RSS-Gen Issue 1  
RSS 210 Issue 6 "Low-power Licence-exempt Radiocommunication Devices (All Frequency Bands): Category I Equipment"  
RSS 310 Issue 1 "Low-power Licence-exempt Radiocommunication Devices (All Frequency Bands): Category II Equipment"

Test Report Prepared For:

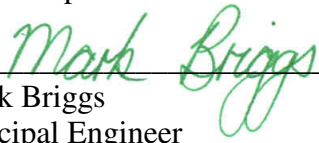
Steve Smith  
Xirrus, Inc.  
370 North Westlake Blvd., Suite 200  
Westlake Village, CA 91362

Measurement Facility Description Filed With Department of Industry:

Departmental Acknowledgement Number: IC2845 SV1 Dated August 16, 2007  
Departmental Acknowledgement Number: IC2845 SV2 Dated August 16, 2007  
Departmental Acknowledgement Number: IC2845 SV3 Dated August 16, 2007

**Declaration of Compliance**

I declare that the testing was performed or supervised by me; that the test measurements were made in accordance with the above mentioned departmental standards (through the use of ANSI C63.4: 2003 as referenced by FCC Part 15 and by section 1.0 of RSS-212, Issue 1, "Test Facilities and Test Methods for Radio Equipment" / RSS-Gen Issue 1); and that the equipment performed in accordance with the data submitted in this report.

Signature   
Name Mark Briggs  
Title Principal Engineer  
Elliott Laboratories Inc.  
Address 684 W. Maude Ave  
Sunnyvale, CA 94086  
USA

Date: January 10, 2006

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**SCOPE**

An electromagnetic emissions test has been performed on the Xirrus, Inc. model XS-3900 & XS-3700 pursuant to the following rules:

Industry Canada RSS-Gen Issue 1  
RSS 210 Issue 6 "Low-power Licence-exempt Radiocommunication Devices (All Frequency Bands): Category I Equipment"  
FCC Part 15, Subpart E requirements for UNII Devices  
FCC Part 15, Subpart C requirements for DTS devices

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

ANSI C63.4:2003  
RSS-212 Issue 1 Test Facilities and Test Methods for Radio Equipment

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.

The test results recorded herein are based on a single type test of the Xirrus, Inc. model XS-3900 and therefore apply only to the tested sample. The sample was selected and prepared by Steve Smith of Xirrus, Inc.

## **OBJECTIVE**

The primary objective of the manufacturer is compliance with the regulations outlined in the previous section. Certification of these devices is required as a prerequisite to marketing in the US and Canada.

The primary objective of the manufacturer is compliance with the regulations outlined in the previous section. Certification of these devices is required as a prerequisite to marketing in the US. Devices categorized as Class II equipment do not require certification by Industry Canada.

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.

## **STATEMENT OF COMPLIANCE**

The tested sample of Xirrus, Inc. model XS-3900 & XS-3700 complied with the requirements of the following regulations:

- Industry Canada RSS-Gen Issue 1
- RSS 210 Issue 6 "Low-power Licence-exempt Radiocommunication Devices (All Frequency Bands): Category I Equipment"
- FCC Part 15, Subpart E requirements for UNII Devices
- FCC Part 15, Subpart C requirements for DTS devices

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.).

**TEST RESULTS SUMMARY****DIGITAL TRANSMISSION SYSTEMS (2400 – 2483.5MHz)**

The 2.4 GHz rf section remains unchanged from the devices originally certified. The results are taken from the original tests performed in February 2005.

FCC Part 15 Reference	RSS Reference	Description	Measured Value / Comments	Limit / Requirement	Result
15.247(a)	N/A	Digital Modulation	Systems uses OFDM and DSSS techniques	-	Complies
15.247 (a) (2)	N/A	6dB Bandwidth	802.11b: 13.1 MHz 802.11g: 16.7 MHz	>500kHz	Complies
15.247 (b) (3)	N/A	Output Power (per transceiver)	802.11b: 18.0 dBm (0.063W) 802.11g: 21.3 dBm (0.135 W)	1Watt, EIRP limited to 4 Watts.	Complies
	N/A	Output Power (aggregate max peak)	3 transmitters 0.405 W Peak		Complies
15.247(d)	N/A	Power Spectral Density	802.11b: -8.68dBm / 3kHz 802.11g: 3.12 dBm / 3kHz	8dBm/3kHz	Complies
15.247(c)	N/A	Antenna Port Spurious Emissions 30MHz – 25 GHz	All spurious emissions < -20dBc	< -20dBc	Complies
15.247(c) / 15.209	N/A	Radiated Spurious Emissions 30MHz – 25 GHz	51.5dB $\mu$ V/m (375.8 $\mu$ V/m) @ 2483.5MHz (-2.5dB)	15.207 in restricted bands, all others < -20dBc	Complies

Note 1: EIRP based on using a maximum antenna gain of 5.2 dBi to determine the highest EIRP.

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

FCC Part 15 Reference	RSS Reference	Description	Measured Value / Comments	Limit / Requirement	Result
15.247(a)	RSS 210 A8.2	Digital Modulation	Systems uses OFDM	System must utilize a digital transmission technology	Complies
15.247 (a) (2)	RSS 210 A8.2 (1)	Minimum 6dB Bandwidth	16.5 MHz	>500kHz	Complies
	RSP100	99% Bandwidth	17.9 MHz	Information only	Complies
15.247 (b) (3) 15.247	RSS 210 A8.2 (2)	Output Power (single transceiver)	20.5 dBm (0.112 Watts) EIRP = 0.45 W <sup>Note 1</sup>	1Watt, EIRP limited to 4 Watts.	Complies
		Output Power (aggregate across the band)	27.5 dBm (0.561 Watts) EIRP = 3.49 W <sup>Note 1</sup>		
15.247(d)	RSS 210 A8.2 (2)	Power Spectral Density	-9.58 dBm / 3kHz	Maximum permitted is 8dBm/3kHz	Complies
15.247(c)	RSS 210 A8.5	Antenna Port Spurious Emissions – 30MHz – 40 GHz	All spurious emissions < -20dBc	< -20dBc	Complies
15.247(c) / 15.209	RSS 210 A8.5 Table 2, 3	Radiated Spurious Emissions 30MHz – 40 GHz	48.2dB $\mu$ V/m (258.2 $\mu$ V/m) @ 11529.1MHz (-5.8dB)	15.207 in restricted bands, all others < -20dBc	Complies

Note 1: EIRP calculated using antenna gain of 6 dBi.

**UNII / LELAN DEVICES****Operation in the 5.15 – 5.25 GHz Band**

FCC Part 15 Section	RSS 210 Section	Description	Measured Value / Comments	Limit / Requirement	Result
15.407(e)	A9	Indoor operation only	Refer to user's manual	N/A	Complies
15.407(a)(1)		26dB Bandwidth	> 20 MHz	N/A – limits output power if < 20MHz	N/A
15.407(a)(1)	A9.2(1)	Output Power (maximum per transceiver)	16 dBm ( 0.04 W)	<= 17dBm (50 mW)	Complies
		Output Power (Max aggregate power in the band with multiple channels being used)	16.6dBm (0.046W)		
15.407(a)(1)	A9.2(1)	Power Spectral Density	3.93 dBm/MHz	4 dBm/MHz	Complies
	A9.5b	Peak Spectral Density		Refer to test data	Complies

**Operation in the 5.25 – 5.35 GHz Band** Note: The device is restricted to indoor use only, therefore the spectral density of spurious emissions in the 5.15 – 5.25 GHz band were limited to the power spectral limits for intentional signals detailed in FCC 15.407(a)(1) and RSS 210 6.2.2 q1 (i)

FCC Part 15 Section	RSS 210 Section	Description	Measured Value / Comments	Limit / Requirement	Result
15.407(a)(2)		26dB Bandwidth	> 20 MHz	N/A – limits output power if < 20MHz	N/A
15.407(a)(2)	A9.2(2)	Output Power (maximum per transceiver)	15.7 dBm ( 0.04W)	24dBm	Complies
		Output Power (aggregate with all 4 channels in the band being used)	20.9 dBm ( 0.12W)		
15.407(a)(2)	A9.2(2)	Power Spectral Density	3.75 dBm/MHz	11 dBm/MHz	Complies
	A9.5b	Peak Spectral Density		Refer to test data	Complies
15.407(a)(2)	A9.4	Dynamic frequency selection / Transmit power control	Not evaluated – this is not a requirement for new equipment until after May 2008 (RSS) and TBD for FCC		N/A



**General requirements for LELAN/UNII Devices**

FCC Part 15 Section	RSS 210 Section	Description	Measured Value / Comments	Limit / Requirement	Result
	A9.5a	Modulation	OFDM is used (Page 13 of operational description)	Digital modulation is required	Complies
	RSP 100	99% bandwidth	17 MHz		
15.407(b) (5) / 15.209	A9.3	Spurious Emissions below 1GHz	Covered by Class A digital device tests. No emissions below 1GHz could be attributed to the 5GHz transceivers		
15.407(b) (2)	A9.3	Spurious Emissions above 1GHz	53.8dB $\mu$ V/m (489.8 $\mu$ V/m) @ 5149.9MHz	15.209 in restricted bands, -27dBm eirp for all others	Complies (- 0.2 dB)
15.407(a)(6)		Peak Excursion Ratio	9.64dB	< 13dB	Complies
	A9.5c	Channel Selection	The device was tested the highest, lowest and center channels across the 5150 – 5350 MHz band with additional measurements at 5240 MHz and 5220 MHz.	Device shall be tested on the top, bottom and center channels in each band	N/A
15.407 (c)	A9.5d	Operation in the absence of information to transmit	Operation is discontinued in the absence of information (Page 13 of operational description)	Device shall automatically discontinue operation in the absence of information to transmit	Complies
15.407 (g)	A9.5e	Frequency Stability	Frequency stability is better than 10ppm (Page 13 of operational description)	10ppm	Complies
	A9.9g and RSS Gen	User Manual information	Refer to page 2 and 3 of the User's Manual		Complies

**GENERAL REQUIREMENTS APPLICABLE TO ALL BANDS**

FCC Part 15 Section	RSS 210 Section	Description	Measured Value / Comments	Limit / Requirement	Result (margin)
15.203	-	RF Connector			Complies
15.109	RSS GEN 7.2.3 Table 1	Receiver spurious emissions	51.4dB $\mu$ V/m (372.8 $\mu$ V/m) @ 7000.0MHz (-2.6dB)	RSS GEN Table 1	Complies (- 2.6 dB)
15.207	RSS GEN Table 2	AC Conducted Emissions	Note 1: 47.1dB $\mu$ V @ 8.970MHz (-2.9dB)	FCC 15.207 and RSS GEN Table 2	Complies (- 2.9dB)
15.247 (b) (5) 15.407 (f)	RSS 102	RF Exposure Requirements	Refer to MPE calculations in Exhibit 11, RSS 102 declaration and User Manual statements (page 3)	Refer to OET 65, FCC Part 1 and RSS 102	Complies

Note 1: The AC power supply and power supply circuitry remains unchanged from the devices originally certified. The results are taken from the original tests performed in February 2005.

**MEASUREMENT UNCERTAINTIES**

ISO Guide 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	Frequency Range (MHz)	Calculated Uncertainty (dB)
Conducted Emissions	0.15 to 30	$\pm 2.4$
Radiated Emissions	0.015 to 30	$\pm ???$
Radiated Emissions	30 to 1000	$\pm 3.6$
Radiated Emissions	1000 to 40000	$\pm \pm ???$

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

The Xirrus, Inc. model XS-3900 & XS-3700 is a multi-radio 802.11abg Access Point radio which is designed to act as a hub for a wireless local area network (WLAN). There are two versions of the system, one (model XS-3900-16) contains 16 separate transceivers, the other (model XS-3700-8) contains 8 transceivers. The radio interfaces are provided via four identical circuit boards. Each of the boards has four 802.11abg radios installed onto it (in the 8-port version two of these radios are removed from each board).

Normally, the EUT would be ceiling mounted during operation. The EUT was tested as both tabletop equipment and also tested with the EUT raised to a height of 1.5m above the ground plane. The electrical rating of the device is 100 - 240Vac, 50/60Hz, 0.5 - 3 A.

A sample of the XS-3900-16 was received on November 7, 2005 and tested on November 11, November 29, December 7, December 13 and December 23, 2005. The EUT consisted of the following component(s):

Manufacturer	Model	Description	Serial Number
Xirrus	XS-3900-16	802.11 a/b/g access point	X339440500197

As the XS-3900-8 is mechanically identical to the XS-3900-16 and the only electrical differences are in the rf board having fewer radios, the test data for the XS-3900-16 is being submitted as representative of the rf and EMC performance related to the requirements for equipment certification for both the XS-3700-8 and XS-3900-16.

Previous versions of both the XS-3700 and XS-3900 have been approved under FCC ID SK6XS37008 and SK6XS390016 respectively. The same versions of the XS-3700 and XS-3900 were certified under Industry Canada numbers 5428A- XS3700 and 5428A- XS3900.

The samples covered by the scope of this application have been modified from the originally certified systems. The changes made are:

- Modified the motherboard (a digital device containing no rf functions)
- Modified the balun used on the rf circuits for each of the 5GHz rf paths
- Modified the control software to allow for power control in the 5150 – 5250 MHz band. This power control ensures that the aggregate power in the 5150 – 5250 MHz band does not exceed the FCC/IC allocated power by reducing the power when more than one radio operates in that band. The previous version set the maximum output power per radio was always the allocated power divided by four.
- Removed the optional 6dB patch antenna for the 2.4 GHz band.

The change in output power in the 5150 – 5250 MHz band necessitates a new FCC ID. The proposed changes are considered to be within the scope of a Class 2 Permissive change for Industry Canada.

Test data to support this application for an FCC approval includes the original data for operation in the 2.4 GHz band under FCC 15.247. The samples tested were received on January 24, 2005 and tested on January 24, January 27, January 28, January 29, February 1, 2005, March 24 and March 28, 2005. The EUT consisted of the following component(s):

Manufacturer	Model	Description	Serial Number	FCC ID
Xirrus	XS-3900-16	802.11 a/b/g access point	-	SK6XS390016
Xirrus	XS-3700-8	802.11 a/b/g access point	-	SK6XS37008

#### **ANTENNA SYSTEM**

The antennas are either integral to the device or connect to the EUT via a non-standard, reverse gender TNC connector, thereby meeting the requirements of FCC 15.203. The XS-3900-16 has provision for three of the 16 transceivers to connect to external antennas. The XS-3700-8 has provision for three of the 8 transceivers to connect to external antennas.

#### **ENCLOSURE**

The EUT enclosure is primarily constructed of plastic. It is circular with a diameter of 48 cm and a height of 10cm.

#### **MODIFICATIONS**

The EUT did not require modifications during testing in order to comply with emissions specifications.

#### **SUPPORT EQUIPMENT**

No local support equipment was used during testing.

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

Manufacturer	Model	Description	Serial Number	FCC ID
Toshiba	Satellite A60 PSA60U-0CS01D	Laptop	X4051688Q	DoC
Netgear	GS605	10/100/1000 Switch	GS19147DB012057	DoC

**EUT INTERFACE PORTS**

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

Port	Connected To	Cable(s)		
		Description	Shielded or Unshielded	Length(m)
EUT 10/100 Ethernet	Netgear switch #1	Cat 5	Shielded	10.0
EUT Console	N/C - note 1			
EUT Gig E #1	Netgear switch #2	Cat 5	Shielded	10.0
EUT Gig E #2	Netgear switch #3	Cat 5	Shielded	10.0
EUT AC power	AC Mains	3-wire	Unshielded	1.5
Netgear Switch #4	Laptop ethernet	Cat 5	Shielded	5.0

Note 1: The console port was not connected during testing. This port is used for configuration and troubleshooting purposes only and is not intended to be connected during normal operation.

**EUT OPERATION**

During emissions testing the EUT was configured with the transceivers transmitting continuously on the specified channel at the specified output power settings. A data rate of 6Mb/s was used for all OFDM modulations and a rate of 1Mb/s for CCK modulation (2.4 GHz band only).

For receiver and digital device emissions measurements the transceivers were all in receive mode and operating on the following channels: # 1,6,11 in the 2.4 GHz band; #36, 48, 52, 64, 100, 120, 140, 149, 153, 157, 161 in the 5GHz bands.

**TEST SITE****GENERAL INFORMATION**

Final test measurements were taken on November 11, November 29, December 7, December 13 and December 23, 2005 at the Elliott Laboratories Open Area Test Sites #1, 2 and 3 located at 684 West Maude Avenue, Sunnyvale, California or 41039 Boyce Road, Fremont, California 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.

ANSI C63.4:2003 recommends that ambient noise at the test site be at least 6 dB below the allowable limits. Ambient levels are below this requirement with the exception of predictable local TV, radio, and mobile communications traffic. The test site contains separate areas for radiated and conducted emissions testing. Considerable engineering effort has been expended to ensure that the facilities conform to all pertinent requirements of ANSI C63.4:2003 and RSS 212.

**CONDUCTED EMISSIONS CONSIDERATIONS**

Conducted emissions testing is performed in conformance with ANSI C63.4:2003 and RSS 212. Measurements are made with the EUT connected to the public power network through a nominal, standardized RF impedance, which is provided by a line impedance stabilization network, known as a LISN. A LISN is inserted in series with each current-carrying conductor in the EUT power cord.

**RADIATED EMISSIONS CONSIDERATIONS**

The FCC has determined that radiation measurements made in a shielded enclosure are not suitable for determining levels of radiated emissions. Radiated measurements are performed in an open field environment or in a semi-anechoic chamber. The test sites are maintained free of conductive objects within the CISPR defined elliptical area incorporated in ANSI C63.4:2003 guidelines and meet the Normalized Site Attenuation (NSA) requirements of ANSI C63.4:2003 / RSS 212.

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**MEASUREMENT INSTRUMENTATION****RECEIVER SYSTEM**

An EMI receiver as specified in CISPR 16-1 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.

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### **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 biconical antenna is used to cover the range from 30 MHz to 300 MHz and a log periodic antenna is utilized from 300 MHz to 1000 MHz. Narrowband tuned dipole antennas are used over the entire 30 to 1000 MHz range for precision measurements of field strength. Above 1000 MHz, a horn antenna is used. The antenna calibration factors are included in site factors 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.

ANSI C63.4:2003 and RSS 212 specify that the test height above ground for table mounted devices shall be 80 centimeters. Floor mounted equipment shall be placed on the ground plane if the device is normally used on a conductive floor or separated from the ground plane by insulating material from 3 to 12 mm if the device is normally used on a non-conductive floor. During radiated measurements, the EUT is positioned on a motorized turntable in conformance with this requirement.

### **INSTRUMENT CALIBRATION**

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



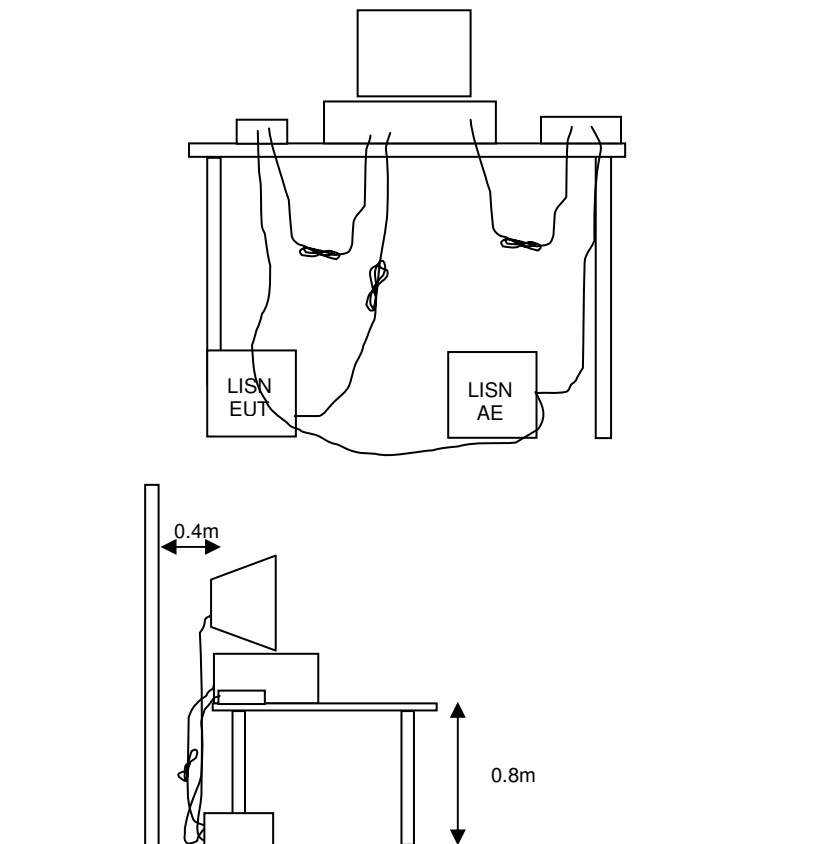
## TEST PROCEDURES

### EUT AND CABLE PLACEMENT

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

### CONDUCTED EMISSIONS

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

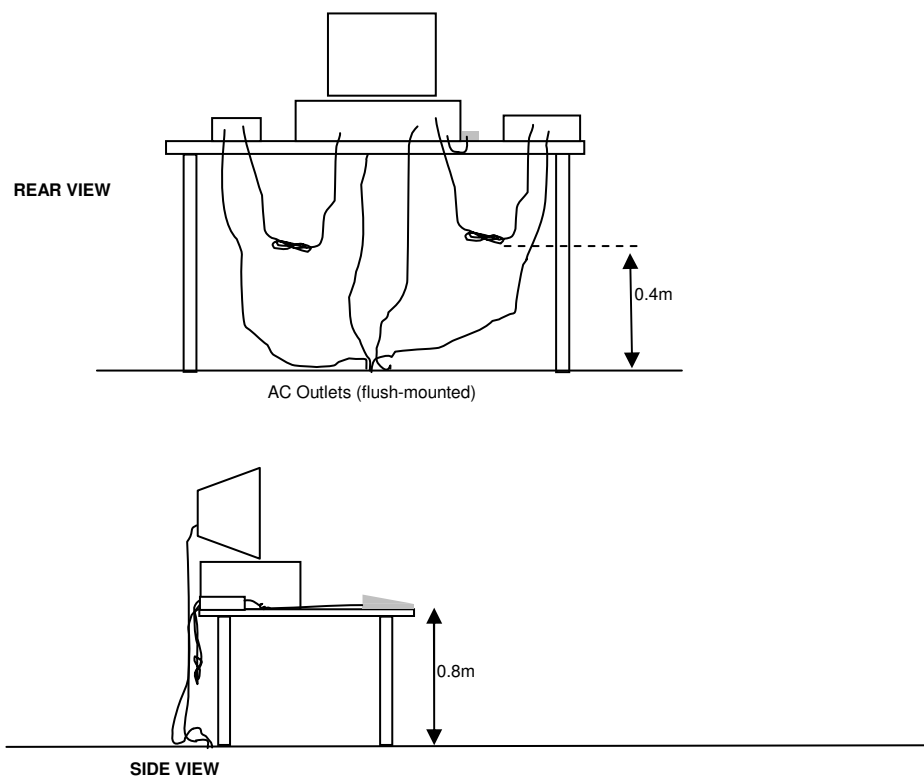


**RADIATED EMISSIONS**

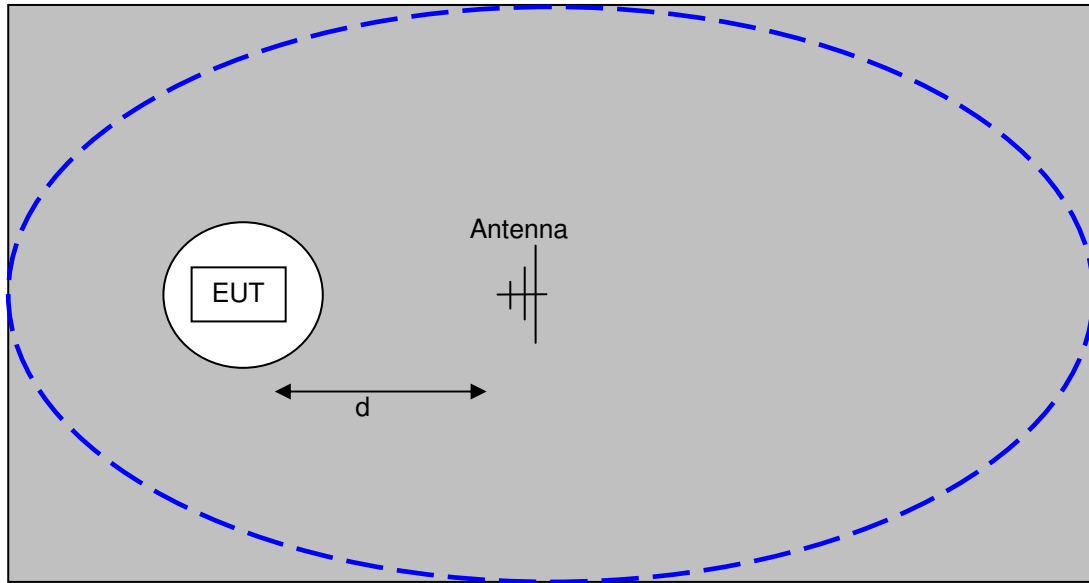
Radiated emissions measurements are performed in two phases as well. A preliminary scan of emissions is conducted in which all significant EUT frequencies are identified with the system in a nominal configuration. At least two scans are performed from 30 MHz up to the frequency required by the regulation specified on page 1. One or more of these is with the antenna polarized vertically while the one or more of these is with the antenna polarized horizontally. During the preliminary scans, the EUT is rotated through 360°, the antenna height is varied 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.

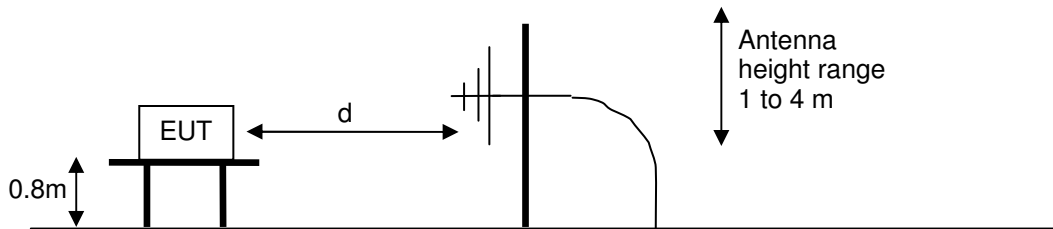
Final maximization is a phase in which the highest amplitude emissions identified in the spectral search are viewed while the EUT azimuth angle is varied from 0 to 360 degrees relative to the receiving antenna. The azimuth, which results in the highest emission is then maintained while varying the antenna height from one to four meters. 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. Emissions, which have values close to the specification limit may also be measured with a tuned dipole antenna to determine compliance.



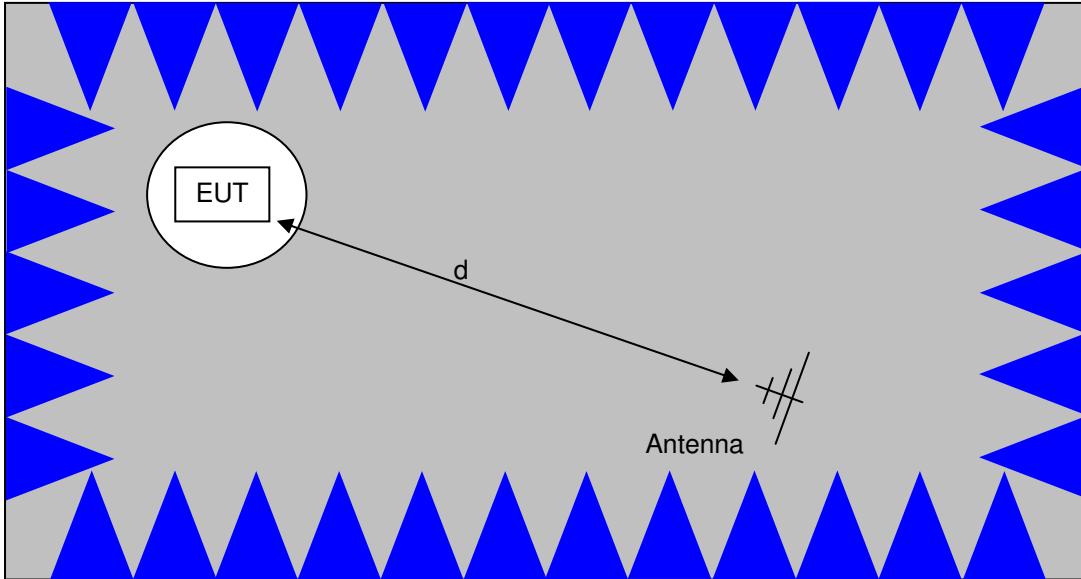
Typical Test Configuration for Radiated Field Strength Measurements



The ground plane extends beyond the ellipse defined in CISPR 16 / CISPR 22 / ANSI C63.4 and is large enough to accommodate test distances ( $d$ ) of 3m and 10m. Refer to the test data tables for the actual measurement distance.

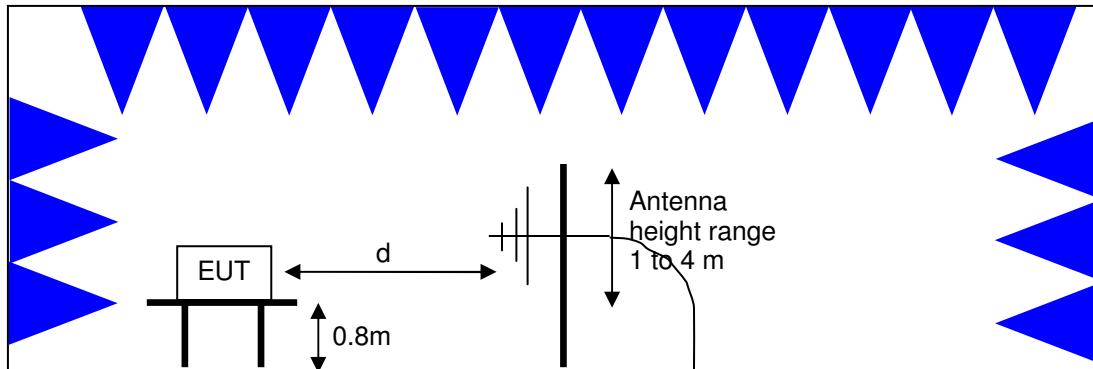


Test Configuration for Radiated Field Strength Measurements  
OATS- Plan and Side Views



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.

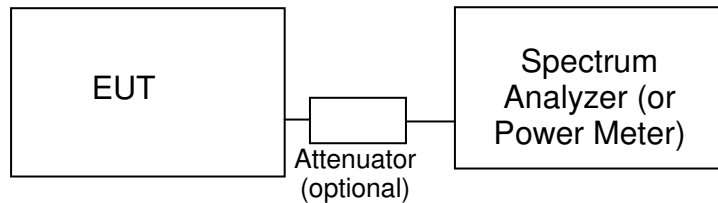
Floor-standing equipment is placed on the floor with insulating supports between the unit and the ground plane.



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

Test Configuration for Antenna Port Measurements

Measurement bandwidths (video and resolution) are set in accordance with the relevant standards and Elliott's test procedures for the type of radio being tested.

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.

**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 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 the limits for all emissions for a low power device operating under the general rules of RSS 210, FCC Part 15 Subpart C.

Frequency Range (MHz)	Limit (uV/m)	Limit (dBuV/m @ 3m)
0.009-0.490	$2400/F_{\text{KHz}} @ 300\text{m}$	$67.6-20*\log_{10}(F_{\text{KHz}}) @ 300\text{m}$
0.490-1.705	$24000/F_{\text{KHz}} @ 30\text{m}$	$87.6-20*\log_{10}(F_{\text{KHz}}) @ 30\text{m}$
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 SPURIOUS EMISSIONS SPECIFICATION LIMITS**

The table below shows the limits for emissions from the receiver as detailed in FCC Part 15.109, RSS 210 table 2, RSS GEN table 1.

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).

**FCC 15.407 (a) OUTPUT POWER LIMITS**

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

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

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



**SAMPLE CALCULATIONS - CONDUCTED EMISSIONS**

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

$$R_r - S = M$$

where:

$R_r$  = Receiver Reading in dBuV

$S$  = Specification Limit in dBuV

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

**SAMPLE CALCULATIONS - RADIATED EMISSIONS**

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

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

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

where:

$F_d$  = Distance Factor in dB

$D_m$  = Measurement Distance in meters

$D_s$  = Specification Distance in meters

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

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

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

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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 3m from the equipment under test:

$$E = \frac{1000000 \sqrt{30 P}}{3} \quad \text{microvolts per meter}$$

where P is the eirp (Watts)

**EXHIBIT 1: Test Equipment Calibration Data**

4 Pages

<u>Manufacturer</u>	<u>Description</u>	<u>Model #</u>	<u>Asset #</u>	<u>Cal Due</u>
EMCO	Biconical Antenna, 30-300 MHz	3110B	801	09-Jul-05
Hewlett Packard	EMC Spectrum Analyzer 30Hz - 26.5GHz	8563EC	WC,1033	01-Jun-05
Hewlett Packard	EMC Spectrum Analyzer, 9KHz - 22GHz	8593EM	1319	30-Nov-05
Elliott Laboratories	FCC / CISPR LISN	LISN-4, OATS	362	01-Jul-05
EMCO	Horn Antenna, D. Ridge 1-18GHz	3115	487	13-May-06
EMCO	Horn Antenna, D. Ridge 1-18GHz	3115	786	08-Nov-05
EMCO	Horn antenna, D. Ridge 1-18GHz (SA40 system antenna)30Hz sunnyvale	3115	1142	11-Jun-06
EMCO (ETS-Lindgren)	Log Periodic Antenna, 0.2-2 GHz	3148	1595	01-Jun-05
Hewlett Packard	Microwave Preamplifier, 1-26.5GHz	8449B	870	13-Jan-06
Rohde & Schwarz	Power Meter, Single Channel	NRVS	1534	18-Mar-05
Rohde & Schwarz	Power Sensor, 1uW-100mW, DC-18 GHz, 50ohm	NRV-Z51	1535	22-Sep-05
Rohde & Schwarz	Power Sensor, 100uW - 2W, Peak	NRV-Z32	1417	18-Mar-05
Rohde & Schwarz	Pulse Limiter	ESH3 Z2	372	01-Sep-05
Rohde & Schwarz	Test Receiver, 9kHz-2750MHz	ESCS 30	1337	12-Jan-06
Rohde & Schwarz	Test Receiver, 9kHz-2750MHz	ESCS 30	1337	12-Jan-06

**EXHIBIT 2: Test Measurement Data**

T59090      30 Pages  
(Test data for original system covering operation in the  
2.4 GHz bands and for AC conducted emissions).

T61799      56 Pages  
(Test data for modified system covering operation in the  
5 GHz bands, Digital device emissions and Receiver emissions)



## EMC Test Data

Client:	Xirrus, Inc.	Job Number:	J57788
Model:	XS-3900-16 and XS-3700-8 Access Points	T-Log Number:	T59090
		Account Manager:	Joe Rohlfes
Contact:	Ian Laity		
Emissions Spec:	FCC 15.247, 15.401, RSS-210	Class:	Radio
Immunity Spec:	-	Environment:	-

## EMC Test Data

For The

**Xirrus, Inc.**

Model

**XS-3900-16 and XS-3700-8 Access  
Points**

Date of Last Test: 2/24/2005



## EMC Test Data

Client:	Xirrus, Inc.	Job Number:	J57788
Model:	XS-3900-16 and XS-3700-8 Access Points	T-Log Number:	T59090
Contact:	Ian Laity	Account Manager:	Joe Rohlfes
Emissions Spec:	FCC 15.247, 15.401, RSS-210	Class:	Radio
Immunity Spec:	-	Environment:	-

### EUT INFORMATION

#### General Description

The Xirrus, Inc. model XS-3900 is a multi-radio 802.11abg Access Point radio which is designed to act as a hub for a wireless local area network (WLAN). There are two versions of the system, one (model XS-3900-16) contains 16 separate transceivers, the other (model XS-3700-8) contains 8 transceivers. The radio interfaces are provided via four identical circuit boards. Each of the boards has four 802.11abg radios installed onto it (in the 8-port version two of these radios are removed from each board).

Normally, the EUT would be ceiling mounted during operation. The EUT was tested as both table-top equipment and also tested with the EUT raised to a height of 1.5m above the ground plane. The electrical rating of the device is 100 - 240Vac, 50/60Hz, 0.5 - 3 A.

#### Equipment Under Test

Manufacturer	Model	Description	Serial Number	FCC ID
Xirrus	XS-3900-16	802.11 a/b/g access point		

#### EUT Antenna

The antennas are either integral to the device or connect to the EUT via a non-standard, reverse gender TNC connector, thereby meeting the requirements of FCC 15.203.

#### EUT Enclosure

The EUT enclosure is primarily constructed of plastic. It is circular with a diameter of 48 cm and a height of 10cm.

#### Modification History

Mod. #	Test	Date	Modification
1	-	-	-
2			
3			

Modifications applied are assumed to be used on subsequent tests unless otherwise stated as a further modification.





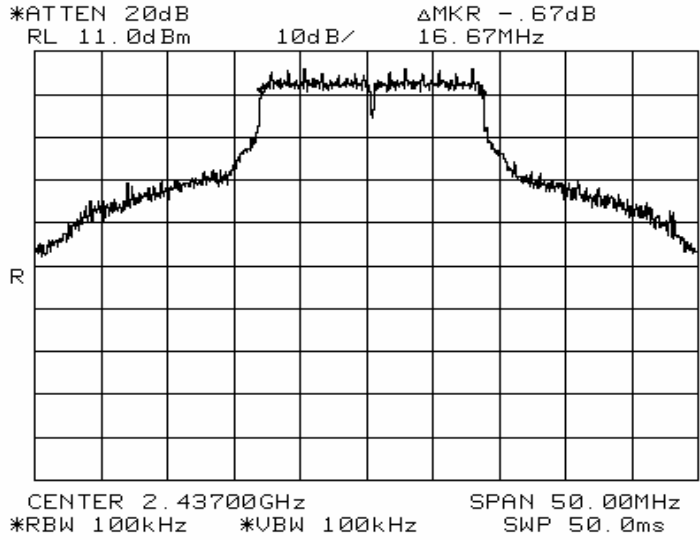




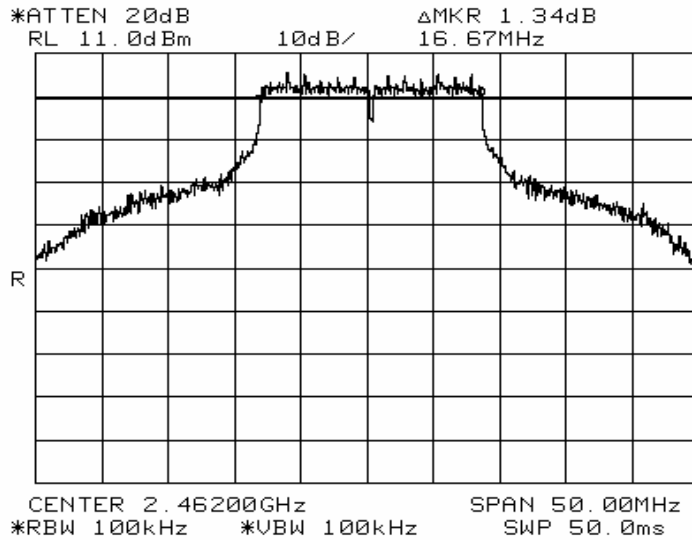


Client: Xirrus, Inc.	Job Number: J57788
Model: XS-3900-16 and XS-3700-8 Access Points	T-Log Number: T59090
	Account Manager: Joe Rohlfes
Contact: Ian Laity	
Spec: FCC 15.247, 15.401, RSS-210	Class: N/A

### Middle Channel



### High Channel





# EMC Test Data

Client:	Xirrus, Inc.	Job Number:	J57788
Model:	XS-3900-16 and XS-3700-8 Access Points	T-Log Number:	T59090
Contact:	Ian Laity	Account Manager:	Joe Rohlfes
Spec:	FCC 15.247, 15.401, RSS-210	Class:	N/A

### Run #3: Output Power

#### Run #3a: Output Power, internal and external antennas

Maximum antenna gain: 5.2 dBi External omni antenna

Channel	Frequency (MHz)	Peak Output Power (dBm)	Average Output Power (dBm)	Peak Output Power (W)	EIRP (W, Peak)
Low	2412	21.3	16.7	0.1349	#REF!
Mid	2437	21.1	16.7	0.1288	#REF!
High	2462	20.4	14.45	0.1096	#REF!

Note 1: Output power measured using a peak power meter for peak power and average sensor for average power.

#### Aggregate power from the system:

There are only three non-overlapping channels in the 2400-2483.5 MHz band. With the device using all three the total output power is 21.3 dBm x 3

Total peak power across the band is:	26.1 dBm	0.405 W
Total peak eirp across the band is:	32.1 dBm	1.611 W
Total average power across the band is:	21.5 dBm	0.140 W
Total average eirp across the band is:	27.5 dBm	0.559 W



# EMC Test Data

Client: Xirrus, Inc.	Job Number: J57788
Model: XS-3900-16 and XS-3700-8 Access Points	T-Log Number: T59090
Contact: Ian Laity	Account Manager: Joe Rohlfes
Spec: FCC 15.247, 15.401, RSS-210	Class: N/A

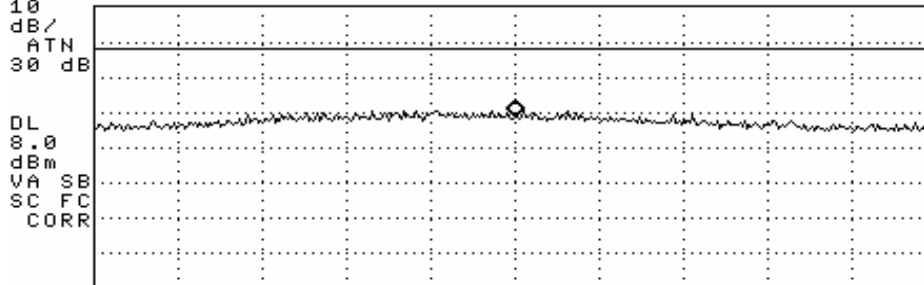
## Run #4: Power Spectral Density

Channel	Frequency (MHz)	Res BW	P.S.D. (averaged over 1 second in a 3kHz bandwidth) dBm
Low	2412	3 kHz	-11.39
Mid	2437	3 kHz	-8.68
High	2462	3 kHz	-8.68

22:45:26 FEB 18, 2005

ACTV DET: PEAK  
 MEAS DET: PEAK QP AVG  
 MKR 2.4107475 GHz  
 -11.33 dBm

LOG REF 20.0 dBm

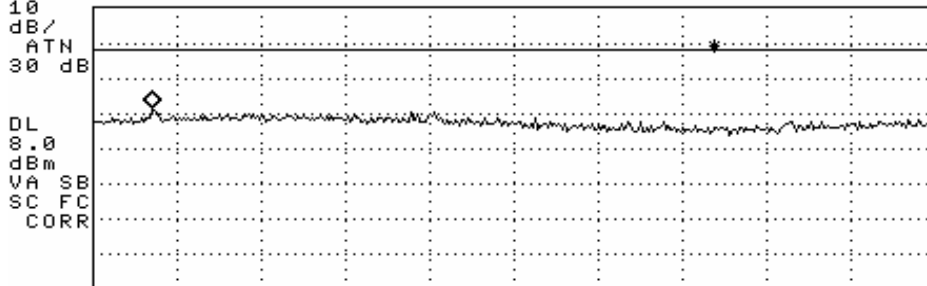


CENTER 2.4107475 GHz SPAN 300.0 kHz  
 RT #IF BW 3.0 kHz #AVG BW 3 kHz #SWP 100 sec

22:49:39 FEB 18, 2005

ACTV DET: PEAK  
 MEAS DET: PEAK QP AVG  
 MKR 2.4353685 GHz  
 -8.68 dBm

LOG REF 20.0 dBm



CENTER 2.4354975 GHz SPAN 300.0 kHz  
 L #IF BW 3.0 kHz #AVG BW 3 kHz #SWP 100 sec



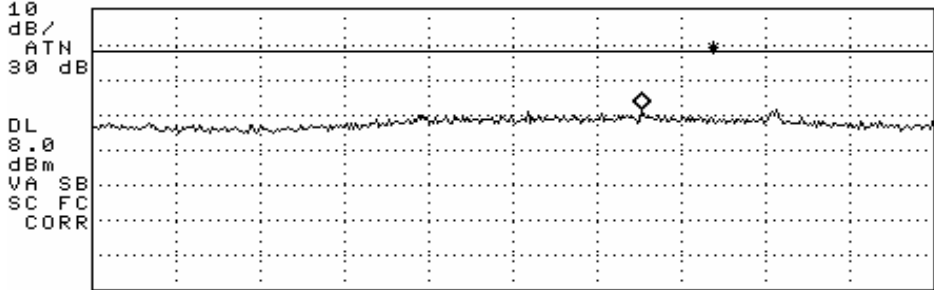
# EMC Test Data

Client: Xirrus, Inc.	Job Number: J57788
Model: XS-3900-16 and XS-3700-8 Access Points	T-Log Number: T59090
	Account Manager: Joe Rohlfes
Contact: Ian Laity	
Spec: FCC 15.247, 15.401, RSS-210	Class: N/A

22:58:31 FEB 18, 2005

ACTV DET: PEAK  
MEAS DET: PEAK QP AVG  
MKR 2.4666708 GHz  
-8.68 dBm

LOG REF 20.0 dBm



CENTER 2.4666250 GHz SPAN 300.0 kHz  
L #IF BW 3.0 kHz #AVG BW 3 kHz #SWP 100 sec



# EMC Test Data

Client:	Xirrus, Inc.	Job Number:	J57788
Model:	XS-3900-16 and XS-3700-8 Access Points	T-Log Number:	T59090
		Account Manager:	Joe Rohlfes
Contact:	Ian Laity		
Spec:	FCC 15.247, 15.401, RSS-210	Class:	N/A

## FCC 15.247 DTS - Radiated Spurious Emissions (802.11g)

### Test Specifics

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: 2/24/2005	Config. Used: 1
Test Engineer: Juan Martinez	Config Change: None
Test Location: SVOATS #3	EUT Voltage: 120V/60Hz

### General Test Configuration

The EUT and all local support equipment were located on the turntable for radiated spurious emissions testing. All remote support equipment was located approximately 30 meters from the EUT with all I/O connections routed overhead.

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

**Ambient Conditions:**

Temperature:	13 °C
Rel. Humidity:	72 %

### Summary of Results

Run #	Test Performed	Limit	Pass / Fail	Result / Margin
1 - Internal antenna	RE, 30 - 26,000 MHz - Spurious Emissions	FCC Part 15.209 / 15.247( c) / RSS 210	Pass	53.6dBµV/m @ 2483.5MHz (-0.4dB)
1 - Externla antenna	RE, 30 - 26,000 MHz - Spurious Emissions	FCC Part 15.209 / 15.247( c) / RSS 210	Pass	53.8dBµV/m @ 2390MHz (-0.2dB)

### Modifications Made During Testing:

Power setting for the highest channel reduced to power level of 14.5dBm average when using the external antenna port to meet the spurious emission limit at the 2483.5MHz band edge.

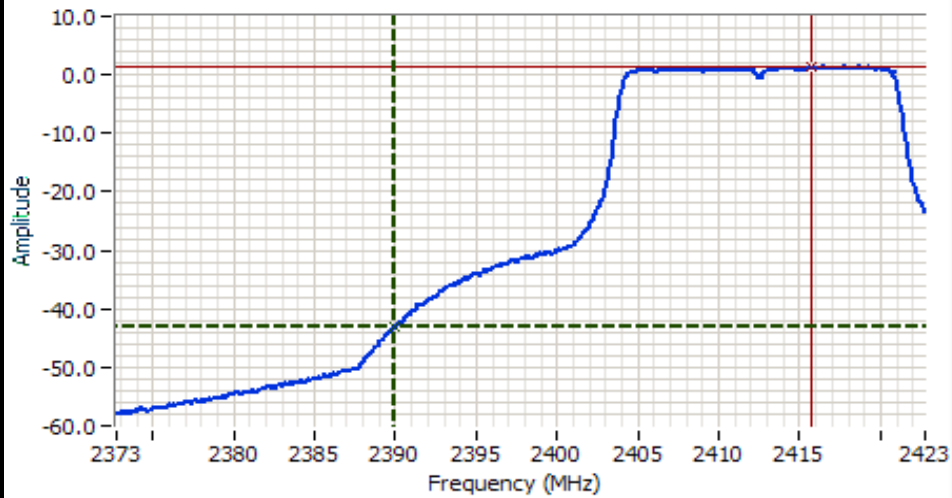
### Deviations From The Standard

No deviations were made from the requirements of the standard.



Client: Xirrus, Inc.	Job Number: J57788
Model: XS-3900-16 and XS-3700-8 Access Points	T-Log Number: T59090
Contact: Ian Laity	Account Manager: Joe Rohlfes
Spec: FCC 15.247, 15.401, RSS-210	Class: N/A

**Run #1a: Radiated Spurious Emissions, 30 - 26,000 MHz. Low Channel @ 2412 MHz**

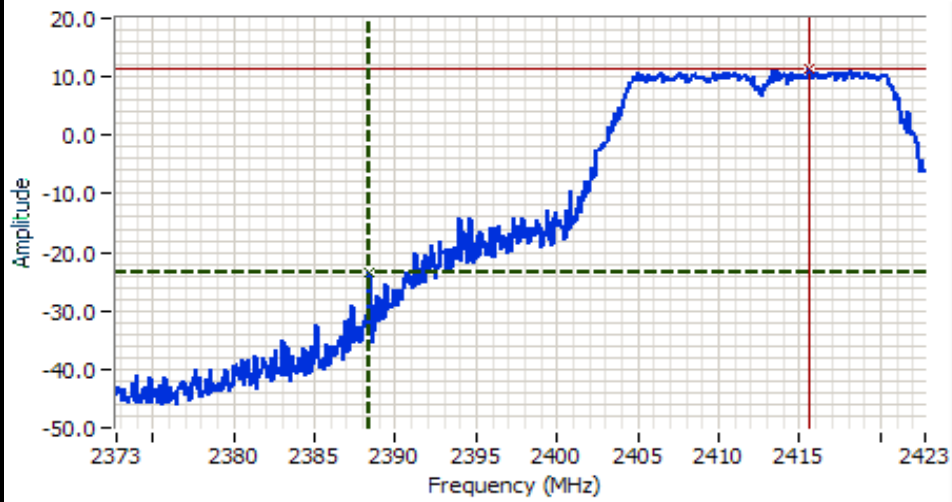


**Analyzer Settings**  
 HP8564E,006,EMI,UK6  
 CF: 2397.75 MHz  
 SPAN: 50.00 MHz  
 RB 1.000 MHz  
 VB 300 Hz  
 Detector Sample  
 Att 20  
 RL Offset 0.00  
 Sweep Time 0.6s  
 Ref Lvl: 1.60DBM

Comments

Cursor 1 2390.00: -43.23  
 Cursor 2 2415.75: 1.43

Delta Freq. 25.75  
 Delta Amplitude 44.67



**Analyzer Settings**  
 HP8564E,006,EMI,UK6  
 CF: 2397.75 MHz  
 SPAN: 50.00 MHz  
 RB 1.000 MHz  
 VB 1.000 MHz  
 Detector POS  
 Att 20  
 RL Offset 0.00  
 Sweep Time 50.0ms  
 Ref Lvl: 10.00DBM

Comments

Cursor 1 2388.41: -23.33  
 Cursor 2 2415.58: 11.50

Delta Freq. 27.17  
 Delta Amplitude 34.83





# EMC Test Data

Client:	Xirrus, Inc.	Job Number:	J57788
Model:	XS-3900-16 and XS-3700-8 Access Points	T-Log Number:	T59090
Contact:	Ian Laity	Account Manager:	Joe Rohlfes
Spec:	FCC 15.247, 15.401, RSS-210	Class:	N/A

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	
<b>Internal</b>								
2405.800	91.3	V	-	-	AVG	110	1.1	RBW =1 MHz
2405.800	99.9	V	-	-	PK	110	1.1	RBW =1 MHz
<b>2439.000</b>	<b>46.6</b>	<b>V</b>	<b>54.0</b>	<b>-7.4</b>	<b>AVG</b>	-	-	<b>Bandedge, mkr delta = 44.7dB</b>
<b>2439.000</b>	<b>65.1</b>	<b>V</b>	<b>74.0</b>	<b>-8.9</b>	<b>PK</b>	-	-	<b>Bandedge, mkr delta = 34.8dB</b>
<b>OMNI antenna</b>								
<b>Power 16</b>								
2412.800	97.8	V	-	-	AVG	270	1.0	RBW =1 MHz
2412.800	106.5	V	-	-	PK	270	1.0	RBW =1 MHz
2411.035	91.6	V	-	-	AVG	270	1.0	#1 Fundamental
2411.035	98.1	V	-	-	PK	270	1.0	#1 Fundamental
<b>2439.000</b>	<b>53.1</b>	<b>V</b>	<b>54.0</b>	<b>-0.9</b>	<b>AVG</b>	-	-	<b>Bandedge, mkr delta = 44.7dB</b>
<b>2439.000</b>	<b>71.7</b>	<b>V</b>	<b>74.0</b>	<b>-2.3</b>	<b>PK</b>	-	-	<b>Bandedge, mkr delta = 34.8dB</b>

Note 1: For emissions in restricted bands, the limit of 15.209 was used. For all other emissions, the limit was set 20 dB below the level of the fundamental.

Note 2: No second harmonic detected. No other emissions above second harmonic detected 20-dB of the limit.

**Run #1b: Radiated Spurious Emissions, 30 - 26,000 MHz. Center Channel @ 2437 MHz**

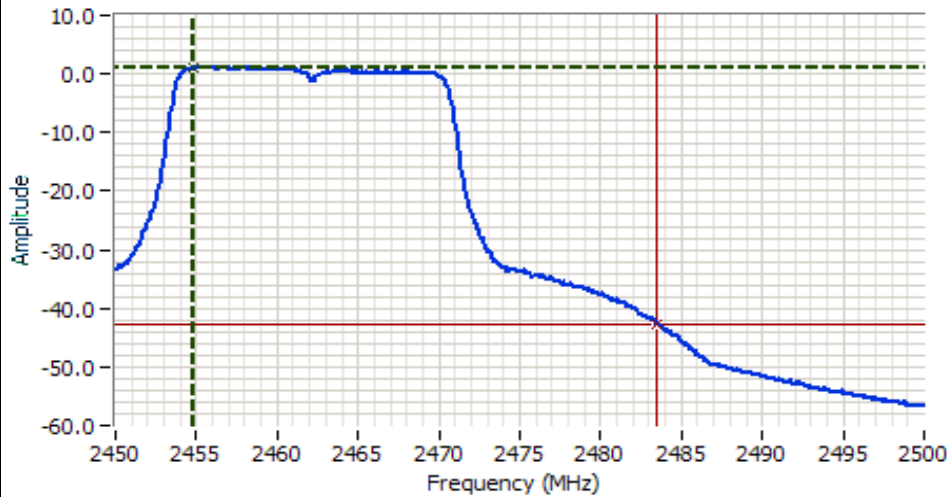
Frequency	Level	Pol	15.209 / 15.247		Detector	Azimuth	Height	Comments
MHz	dB $\mu$ V/m	v/h	Limit	Margin	Pk/QP/Avg	degrees	meters	
4873.935	36.4	V	54.0	-17.7	AVG	0	1.0	2nd harmonic
4873.935	47.1	V	74.0	-26.9	PK	0	1.0	2nd harmonic
7311.155	35.5	V	54.0	-18.5	AVG	0	1.0	3rd harmonic
7311.155	46.8	V	74.0	-27.2	PK	0	1.0	3rd harmonic

Note 1: For emissions in restricted bands, the limit of 15.209 was used. For all other emissions, the limit was set 20dB below the level of the fundamental.

Note 2: No second harmonic detected. No other emissions above second harmonic detected 20-dB of the limit

Client: Xirrus, Inc.	Job Number: J57788
Model: XS-3900-16 and XS-3700-8 Access Points	T-Log Number: T59090
Contact: Ian Laity	Account Manager: Joe Rohlfes
Spec: FCC 15.247, 15.401, RSS-210	Class: N/A

**Run #1c: Radiated Spurious Emissions, 30 - 26,000 MHz. High Channel @ 2462 MHz**



**Analyzer Settings**  
 HP8564E,006,EMI,UK6  
 CF: 2475.00 MHz  
 SPAN: 50.00 MHz  
 RB 1.000 MHz  
 VB 300 Hz  
 Detector POS  
 Att 20  
 RL Offset 0.00  
 Sweep Time 0.6s  
 Ref Lvl: 10.00DBM

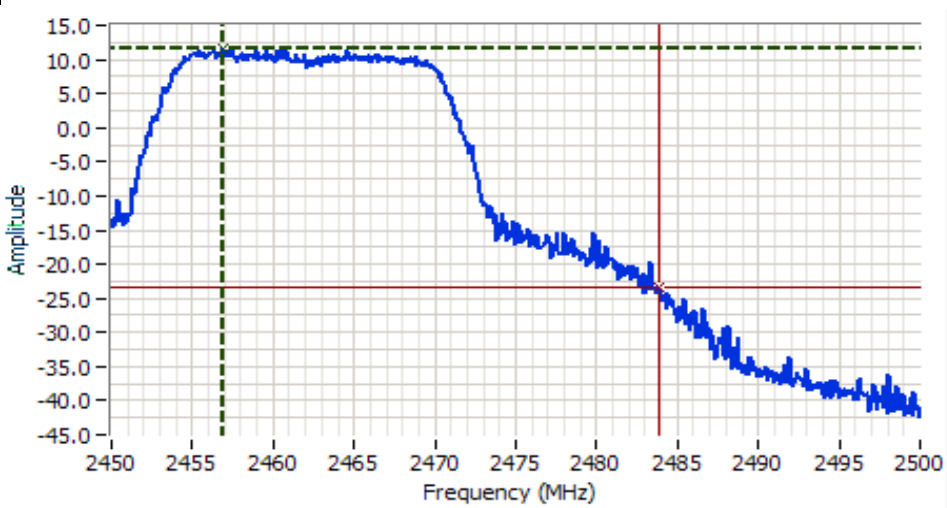
**Comments**

Cursor 1 2454.83: 1.17

Cursor 2 2483.50: -42.67

Delta Freq. 28.67

Delta Amplitude 43.83



**Analyzer Settings**  
 HP8564E,006,EMI,UK6  
 CF: 2475.00 MHz  
 SPAN: 50.00 MHz  
 RB 1.000 MHz  
 VB 1.000 MHz  
 Detector POS  
 Att 20  
 RL Offset 0.00  
 Sweep Time 50.0ms  
 Ref Lvl: 10.00DBM

**Comments**

Cursor 1 2456.91: 11.67

Cursor 2 2483.83: -23.33

Delta Freq. 26.92

Delta Amplitude 35.00





## EMC Test Data

Client:	Xirrus, Inc.	Job Number:	J57788
Model:	XS-3900-16 and XS-3700-8 Access Points	T-Log Number:	T59090
Contact:	Ian Laity	Account Manager:	Joe Rohlfes
Spec:	FCC 15.247, 15.401, RSS-210	Class:	N/A

### Power = 16.5dBm average

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				
<b>OMNI antenna</b>								
2462.728	97.4	V	-	-	AVG	167	1.0	RBW =1 MHz
2462.728	105.6	V	-	-	PK	167	1.0	RBW =1 MHz
<b>2483.500</b>	<b>53.6</b>	<b>V</b>	<b>54.0</b>	<b>-0.4</b>	<b>AVG</b>	-	-	<b>Bandedge, mkr delta = 43.8dB</b>
<b>2483.500</b>	<b>70.6</b>	<b>V</b>	<b>74.0</b>	<b>-3.4</b>	<b>PK</b>	-	-	<b>Bandedge, mkr delta = 35dB</b>
<b>Internal</b>								
2463.283	92.9	V	-	-	AVG	104	1.3	RBW =1 MHz
2463.283	101.7	V	-	-	PK	104	1.3	RBW =1 MHz
<b>2483.500</b>	<b>49.1</b>	<b>V</b>	<b>54.0</b>	<b>-4.9</b>	<b>AVG</b>	-	-	<b>Bandedge, mkr delta = 43.8dB</b>
<b>2483.500</b>	<b>66.7</b>	<b>V</b>	<b>74.0</b>	<b>-7.3</b>	<b>PK</b>	-	-	<b>Bandedge, mkr delta = 35dB</b>

Note 1:	For emissions in restricted bands, the limit of 15.209 was used. For all other emissions, the limit was set 20dB below the level of the fundamental.
Note 2:	No second harmonic detected. No other emissions above second harmonic detected 20-dB of the limit



# EMC Test Data

Client:	Xirrus, Inc.	Job Number:	J57788
Model:	XS-3900-16 and XS-3700-8 Access Points	T-Log Number:	T59090
		Account Manager:	Joe Rohlfes
Contact:	Ian Laity		
Spec:	FCC 15.247, 15.401, RSS-210	Class:	N/A

## FCC 15.247 DTS 802.11b Mode Power, Bandwidth and Conducted Spurious Emissions

### Test Specifics

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: 2/18/2005	Config. Used: #1
Test Engineer: Juan Martinez	Config Change: -
Test Location: Chamber #2	EUT Voltage: 120V/60Hz

### General Test Configuration

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

**Ambient Conditions:**            Temperature:        20 °C  
    Rel. Humidity:      44 %

### Summary of Results

Run #	Test Performed	Limit	Pass / Fail	Result / Margin
1	RE, 30 - 26,500 MHz - Antenna Spurious Emissions	FCC Part 15.247( c)	Pass	> -20dBc
2	Bandwidth	15.247(a)	Pass	6dB: 13.1 MHz 99%: 14.9 MHz
3	Output Power	15.247(b)	Pass	Pk: 18.0dBm (0.06W) Avg: 16.7dBm EIRP: 24dBm 0.25W
4	Power Spectral Density (PSD)	15.247(d)	Pass	3.12 dBm / 3kHz

### Modifications Made During Testing:

No modifications were made to the EUT during testing

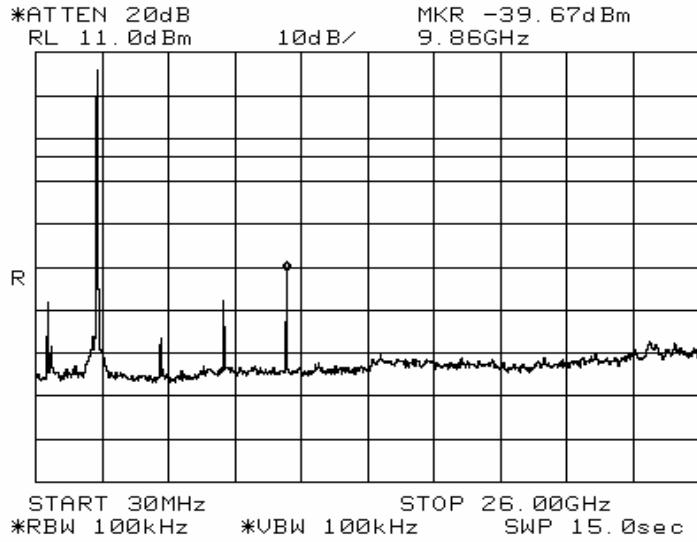
### Deviations From The Standard

No deviations were made from the requirements of the standard.



Client: Xirrus, Inc.	Job Number: J57788
Model: XS-3900-16 and XS-3700-8 Access Points	T-Log Number: T59090
	Account Manager: Joe Rohlfes
Contact: Ian Laity	
Spec: FCC 15.247, 15.401, RSS-210	Class: N/A

### High Channel



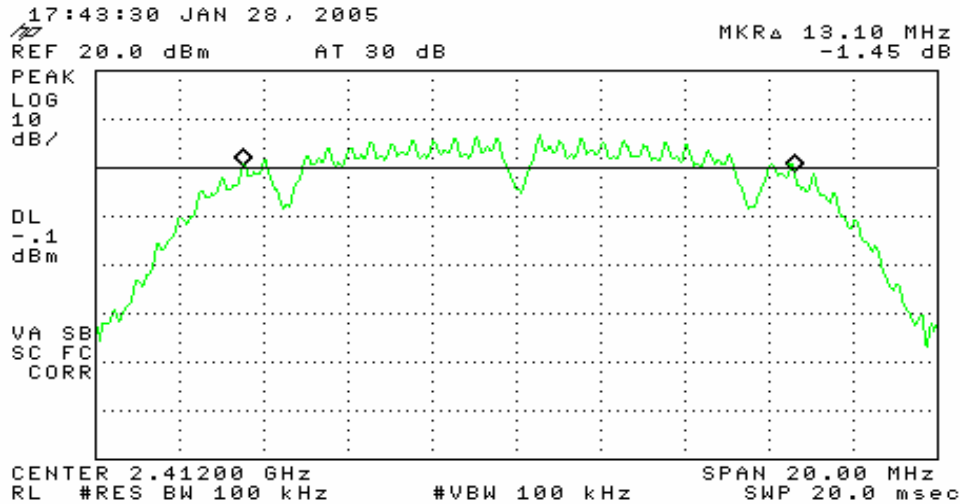
Client: Xirrus, Inc.	Job Number: J57788
Model: XS-3900-16 and XS-3700-8 Access Points	T-Log Number: T59090
Contact: Ian Laity	Account Manager: Joe Rohlfes
Spec: FCC 15.247, 15.401, RSS-210	Class: N/A

### Run #2: Signal Bandwidth

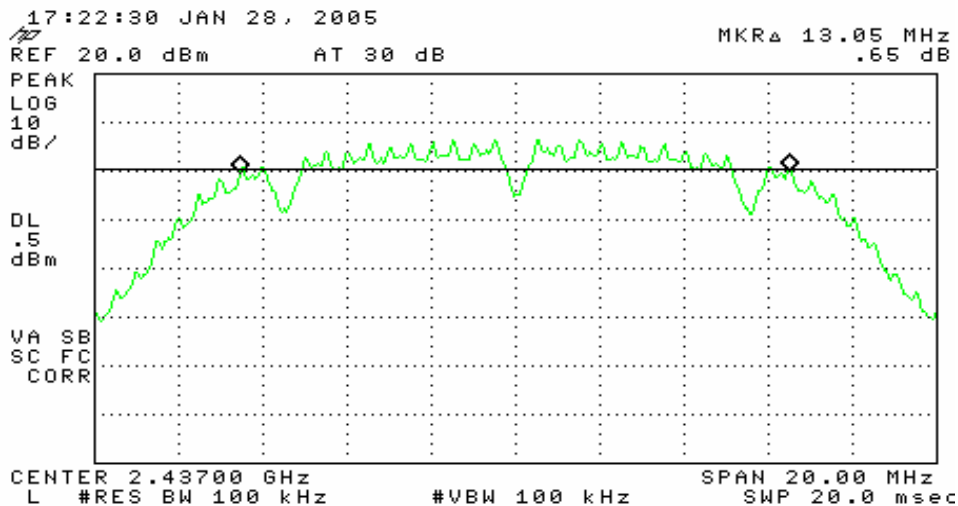
Data rate 1Mbps

Channel	Frequency (MHz)	Resolution Bandwidth	6dB Signal Bandwidth (MHz)	99% Signal Bandwidth (MHz)
Low	2412	100kHz	13.1	14.8
Mid	2437	100kHz	13.1	14.9
High	2462	100kHz	13.1	14.8

#### Low Channel



#### Middle Channel

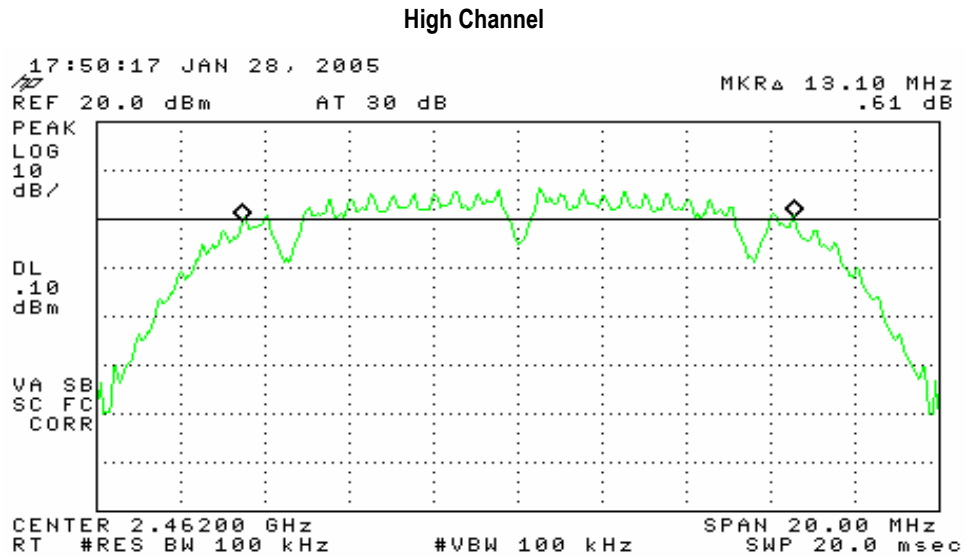






# EMC Test Data

Client: Xirrus, Inc.	Job Number: J57788
Model: XS-3900-16 and XS-3700-8 Access Points	T-Log Number: T59090
	Account Manager: Joe Rohlfes
Contact: Ian Laity	
Spec: FCC 15.247, 15.401, RSS-210	Class: N/A



### Run #3: Output Power

Maximum antenna gain: 5.2 dBi

Channel	Frequency (MHz)	Peak Output Power (dBm)	Average Output Power (dBm)	Output Power (W)	EIRP (W)
Low	2412	18.0	16.7	0.0631	0.2089
Mid	2437	18.0	16.6	0.0631	0.2089
High	2462	17.8	16.5	0.0603	0.1995

Note 1: Output power measured using a peak power meter for peak power and average sensor for average power.

### Aggregate power from the system:

There are only three non-overlapping channels in the 2400-2483.5 MHz band. With the device using all three the total output power is 18.0 dBm x 3

Total peak power across the band is:	22.8 dBm	0.189 W
Total peak eirp across the band is:	28.8 dBm	0.754 W
Total average power across the band is:	21.5 dBm	0.140 W
Total average eirp across the band is:	27.5 dBm	0.559 W



# EMC Test Data

Client: Xirrus, Inc.	Job Number: J57788
Model: XS-3900-16 and XS-3700-8 Access Points	T-Log Number: T59090
Contact: Ian Laity	Account Manager: Joe Rohlfes
Spec: FCC 15.247, 15.401, RSS-210	Class: N/A

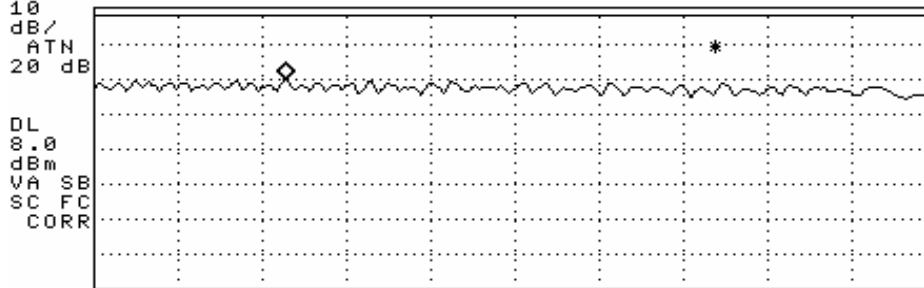
## Run #4: Power Spectral Density

Channel	Frequency (MHz)	Res BW	P.S.D. (averaged over 1 second in a 3kHz bandwidth) dBm
Low	2412	3 kHz	-10.59
Mid	2437	3 kHz	-11.01
High	2462	3 kHz	3.12

22:16:09 FEB 18, 2005

ACTV DET: PEAK  
 MEAS DET: PEAK QP AVG  
 MKR 2.4128976 GHz  
 -10.59 dBm

LOG REF 10.0 dBm

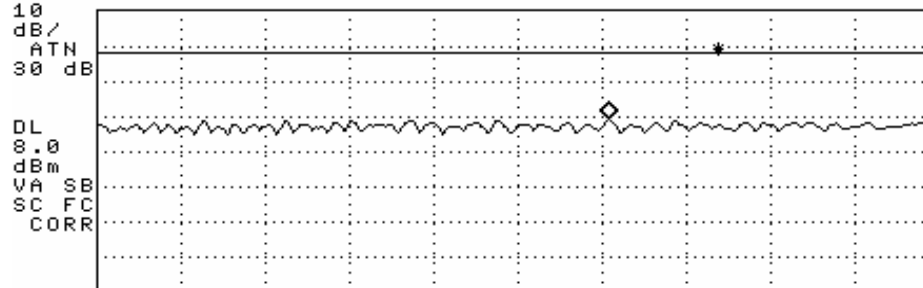


CENTER 2.4129794 GHz SPAN 300.0 kHz  
 RT #IF BW 3.0 kHz #AVG BW 3 kHz #SWP 100 sec

22:20:18 FEB 18, 2005

ACTV DET: PEAK  
 MEAS DET: PEAK QP AVG  
 MKR 2.4350523 GHz  
 -11.01 dBm

LOG REF 20.0 dBm



CENTER 2.4350200 GHz SPAN 300.0 kHz  
 RT #IF BW 3.0 kHz AVG BW 3 kHz #SWP 100 sec



# EMC Test Data

Client: Xirrus, Inc.	Job Number: J57788
Model: XS-3900-16 and XS-3700-8 Access Points	T-Log Number: T59090
	Account Manager: Joe Rohlfes
Contact: Ian Laity	
Spec: FCC 15.247, 15.401, RSS-210	Class: N/A

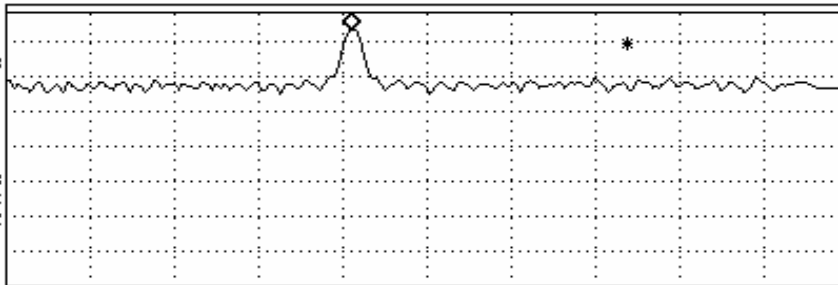
22:31:22 FEB 18, 2005

ACTV DET: PEAK  
MEAS DET: PEAK QP AVG  
MKR 2.4634680 GHz  
3.12 dBm

LOG REF 10.0 dBm

10  
dB/  
ATN  
20 dB

DL  
8.0  
dBm  
VA SB  
SC FC  
CORR



CENTER 2.4634950 GHz SPAN 300.0 kHz  
RT #IF BW 3.0 kHz #AVG BW 3 kHz #SWP 100 sec



# EMC Test Data

Client:	Xirrus, Inc.	Job Number:	J57788
Model:	XS-3900-16 and XS-3700-8 Access Points	T-Log Number:	T59090
		Account Manager:	Joe Rohlfes
Contact:	Ian Laity		
Spec:	FCC 15.247, 15.401, RSS-210	Class:	N/A

## FCC 15.247 DTS - Spurious Emissions (802.11b)

### Test Specifics

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: 2/24/2005	Config. Used: 1
Test Engineer: Juan Martinez	Config Change: None
Test Location: SVOATS #3	EUT Voltage: 120V/60Hz

### General Test Configuration

The EUT and all local support equipment were located on the turntable for radiated spurious emissions testing. All remote support equipment was located approximately 30 meters from the EUT with all I/O connections routed overhead.

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

**Ambient Conditions:**

Temperature:	13 °C
Rel. Humidity:	72 %

### Summary of Results

Run #	Test Performed	Limit	Pass / Fail	Result / Margin
1a - 1c	RE, 30 - 26,000 MHz - Spurious Emissions	FCC Part 15.209 / 15.247( c)	Pass	49.9dBuV/m @ 2439 MHz (-4.1dB)

### Modifications Made During Testing:

No modifications were made to the EUT during testing

### Deviations From The Standard

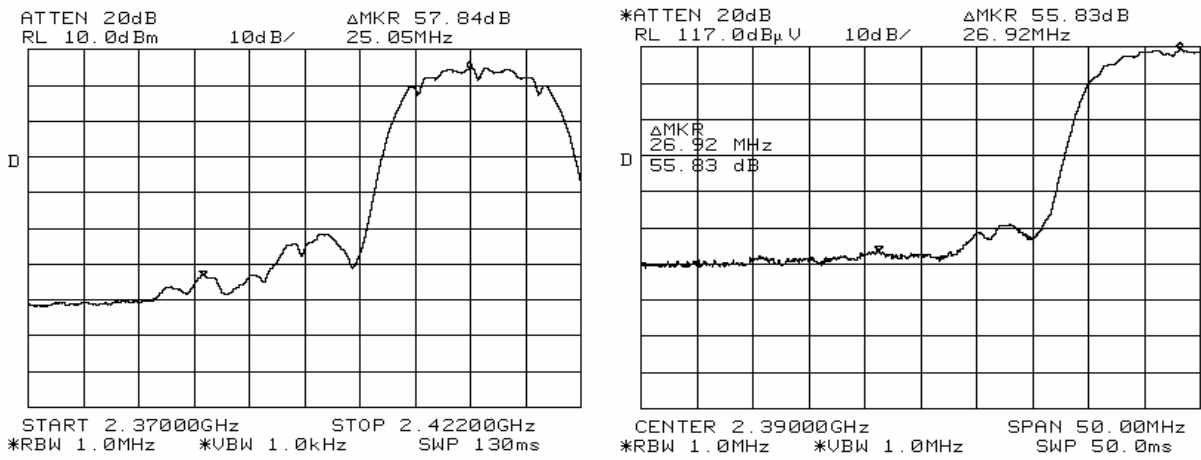
No deviations were made from the requirements of the standard.



# EMC Test Data

Client: Xirrus, Inc.	Job Number: J57788
Model: XS-3900-16 and XS-3700-8 Access Points	T-Log Number: T59090
Contact: Ian Laity	Account Manager: Joe Rohlfes
Spec: FCC 15.247, 15.401, RSS-210	Class: N/A

## Run #1a: Radiated Spurious Emissions, 30 - 26,000 MHz. Low Channel @ 2412 MHz



### Internal (Power Setting of 17)

Frequency	Level	Pol	15.209 / 15.247		Detector	Azimuth	Height	Comments
MHz	dBμV/m	v/h	Limit	Margin	Pk/QP/Avg	degrees	meters	
2386.600	40.9	V	54.0	-13.1	AVG	-	-	Bandedge
2386.600	45.7	V	74.0	-28.3	PK	-	-	Bandedge
4824.115	41.1	V	54.0	-12.9	AVG	0	1.0	2nd harmonic
4824.115	48.1	V	74.0	-25.9	PK	0	1.0	2nd harmonic
2411.035	98.7	V	-	-	AVG	0	1.0	#1 Fundamental
2411.035	101.5	V	-	-	PK	0	1.0	#1 Fundamental
2413.060	96.5	H	-	-	AVG	0	1.0	#1 Fundamental
2413.060	99.6	H	-	-	PK	0	1.0	#1 Fundamental

### OMNI antenna (Power Setting of 16)

Frequency	Level	Pol	15.209 / 15.247		Detector	Azimuth	Height	Comments
MHz	dBμV/m	v/h	Limit	Margin	Pk/QP/Avg	degrees	meters	
2386.600	42.7	V	54.0	-11.3	AVG	-	-	Bandedge
2386.600	48.2	V	74.0	-25.8	PK	-	-	Bandedge
4874.425	34.2	V	54.0	-19.8	AVG	0	1.0	2nd harmonic
4874.425	45.7	V	74.0	-28.4	PK	0	1.0	2nd harmonic
2412.923	100.5	V	-	-	AVG	269	1.0	RBW = 1MHz
2412.923	104.0	V	-	-	PK	269	1.0	RBW = 1MHz
2411.035	91.8	V	-	-	AVG	0	1.0	#1 Fundamental, RBW= 100kHz
2411.035	101.0	V	-	-	PK	0	1.0	#1 Fundamental, RBW= 100kHz

Note 1: For emissions in restricted bands, the limit of 15.209 was used. For all other emissions, the limit was set 20 dB below the level of the fundamental.

Note 2: No other emissions above second harmonic detected close to 20-dB of the limit.



## EMC Test Data

Client:	Xirrus, Inc.	Job Number:	J57788
Model:	XS-3900-16 and XS-3700-8 Access Points	T-Log Number:	T59090
Contact:	Ian Laity	Account Manager:	Joe Rohlfes
Spec:	FCC 15.247, 15.401, RSS-210	Class:	N/A

### Run #1b: Radiated Spurious Emissions, 30 - 26,000 MHz. Center Channel @ 2437 MHz

#### OMNI antenna

#### Power 16

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	
4874.105	49.9	V	54.0	-4.1	AVG	0	1.0	#6 2nd harmonic
4874.105	53.2	V	74.0	-20.8	PK	0	1.0	#6 2nd harmonic
7309.670	35.6	V	54.0	-18.4	AVG	0	1.0	#6 3rd harmonic
7309.670	47.3	V	74.0	-26.7	PK	0	1.0	#6 3rd harmonic

#### Internal

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	
7310.495	41.3	H	54.0	-12.7	AVG	0	1.0	#6 3rd harmonic
7310.495	49.8	H	74.0	-24.2	PK	0	1.0	#6 3rd harmonic
4873.985	34.8	H	54.0	-19.2	AVG	0	1.0	#6 2nd harmonic
4873.985	46.4	H	74.0	-27.6	PK	0	1.0	#6 2nd harmonic
4874.095	39.7	V	54.0	-14.3	AVG	0	1.0	#6 2nd harmonic
4874.095	49.0	V	74.0	-25.0	PK	0	1.0	#6 2nd harmonic
7310.070	40.8	V	54.0	-13.2	AVG	0	1.0	#6 3rd harmonic
7310.070	49.2	V	74.0	-24.8	PK	0	1.0	#6 3rd harmonic

Note 1: For emissions in restricted bands, the limit of 15.209 was used. For all other emissions, the limit was set 20dB below the level of the fundamental.

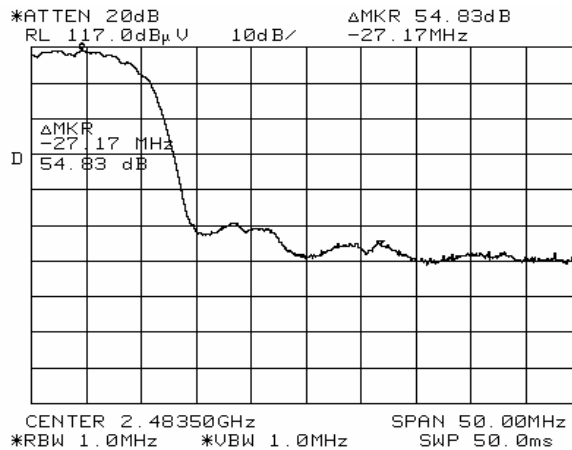
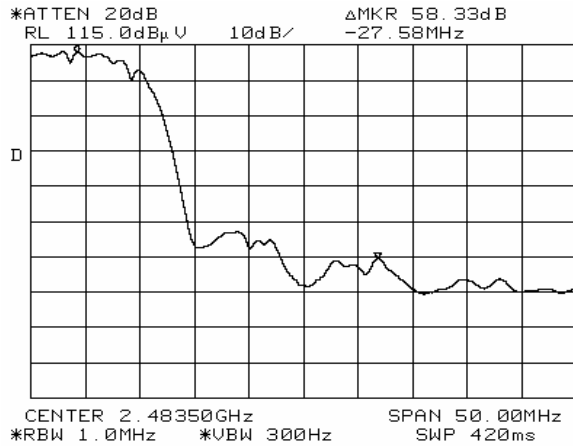
Note 2: No other emissions above second harmonic detected close to 20-dB of the limit.



# EMC Test Data

Client: Xirrus, Inc.	Job Number: J57788
Model: XS-3900-16 and XS-3700-8 Access Points	T-Log Number: T59090
Contact: Ian Laity	Account Manager: Joe Rohlfes
Spec: FCC 15.247, 15.401, RSS-210	Class: N/A

## Run #1c: Radiated Spurious Emissions, 30 - 26,000 MHz. High Channel @ 2462 MHz



Band edge marker deltas: Average -58.3dB, Peak -54.8dB

### OMNI antenna Power 16

Frequency	Level	Pol	15.209 / 15.247		Detector	Azimuth	Height	Comments
MHz	dBµV/m	v/h	Limit	Margin	Pk/QP/Avg	degrees	meters	
2461.033	100.8	V	-	-	AVG	267	1.0	RBW = 1MHz
2461.033	104.3	V	-	-	PK	267	1.0	RBW = 1MHz
2461.475	92.6	V	-	-	AVG	-	-	#11 Fundamental, RBW = 100kHz
2461.475	101.4	V	-	-	PK	-	-	#11 Fundamental, RBW = 100kHz
2461.475	80.3	H	-	-	AVG	-	-	#11 Fundamental, RBW = 100kHz
2461.475	90.4	H	-	-	PK	-	-	#11 Fundamental, RBW = 100kHz
<b>2490.000</b>	<b>42.5</b>	<b>V</b>	<b>54.0</b>	<b>-11.5</b>	<b>AVG</b>	-	-	<b>Bandedge</b>
<b>2490.000</b>	<b>49.5</b>	<b>V</b>	<b>74.0</b>	<b>-24.5</b>	<b>PK</b>	-	-	<b>Bandedge</b>
4924.050	51.5	V	54.0	-2.5	AVG	0	1.0	#11 2nd harmonic
4924.050	54.6	V	74.0	-19.4	PK	0	1.0	#11 2nd harmonic
7386.405	36.0	V	54.0	-18.0	AVG	0	1.0	#11 3rd harmonic
7386.405	47.1	V	74.0	-26.9	PK	0	1.0	#11 3rd harmonic

Note 1: For emissions in restricted bands, the limit of 15.209 was used. For all other emissions, the limit was set 20dB below the level of the fundamental.

Note 2: No other emissions above second harmonic detected close to 20-dB of the limit.



# EMC Test Data

Client:	Xirrus, Inc.	Job Number:	J57788
Model:	XS-3900-16 and XS-3700-8 Access Points	T-Log Number:	T59090
Contact:	Ian Laity	Account Manager:	Joe Rohlfes
Spec:	FCC 15.247, 15.401, RSS-210	Class:	N/A

## Internal Antenna

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				
2461.475	98.6	V	-	-	AVG	0	1.0	#11 Fundamental
2461.475	101.5	V	-	-	PK	0	1.0	#11 Fundamental
2463.025	93.1	H	-	-	AVG	0	1.0	#11 Fundamental
2463.025	96.3	H	-	-	PK	0	1.0	#11 Fundamental
<b>2490.000</b>	<b>43.2</b>	<b>V</b>	<b>54.0</b>	<b>-10.8</b>	<b>AVG</b>	-	-	<b>Bandedge</b>
<b>2490.000</b>	<b>46.7</b>	<b>V</b>	<b>74.0</b>	<b>-27.3</b>	<b>PK</b>	-	-	<b>Bandedge</b>
4924.065	41.7	V	54.0	-12.3	AVG	0	1.0	#11 2nd harmonic
4924.065	48.9	V	74.0	-25.1	PK	0	1.0	#11 2nd harmonic
7385.730	36.2	V	54.0	-17.9	AVG	0	1.0	#11 3rd harmonic
7385.730	48.8	V	74.0	-25.2	PK	0	1.0	#11 3rd harmonic
7385.560	36.5	H	54.0	-17.5	AVG	0	1.0	#11 3rd harmonic
7385.560	47.8	H	74.0	-26.2	PK	0	1.0	#11 3rd harmonic
4924.090	36.6	H	54.0	-17.4	AVG	0	1.0	#11 2nd harmonic
4924.090	46.0	H	74.0	-28.0	PK	0	1.0	#11 2nd harmonic

Note 1: For emissions in restricted bands, the limit of 15.209 was used. For all other emissions, the limit was set 20dB below the level of the fundamental.

Note 2: No other emissions above second harmonic detected close to 20-dB of the limit.





# EMC Test Data

Client:	Xirrus, Inc.	Job Number:	J57788
Model:	XS-3900-16 and XS-3700-8 Access Points	T-Log Number:	T59090
		Account Manager:	Joe Rohlfes
Contact:	Ian Laity		
Spec:	FCC 15.247, 15.401, RSS-210	Class:	Radio

## Conducted Emissions - Power Ports

### Test Specifics

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: 1/27/2005	Config. Used: 1
Test Engineer: Rafael Varelas	Config Change: None
Test Location: SVOATS #1	EUT Voltage: 230V/50Hz

### General Test Configuration

The EUT was located on a wooden table, 40 cm from a vertical coupling plane and 80cm from the LISN. Remote support equipment was located approximately 30 meters from the test area. All I/O connections were routed overhead.

**Ambient Conditions:**            Temperature:        12 °C  
    Rel. Humidity:       54 %

### Summary of Results

Run #	Test Performed	Limit	Result	Margin
1	CE, AC Power, 120V/60Hz	FCC 15.209 / RSS 210 Issue 6	Pass	47.1dBµV @ 8.970MHz (-2.9dB)

### Modifications Made During Testing:

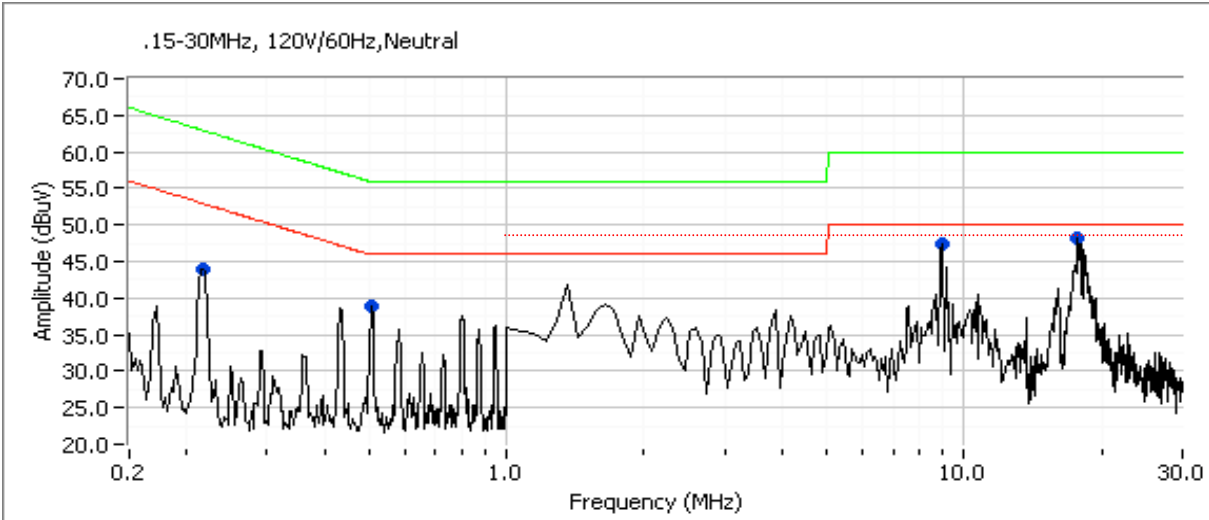
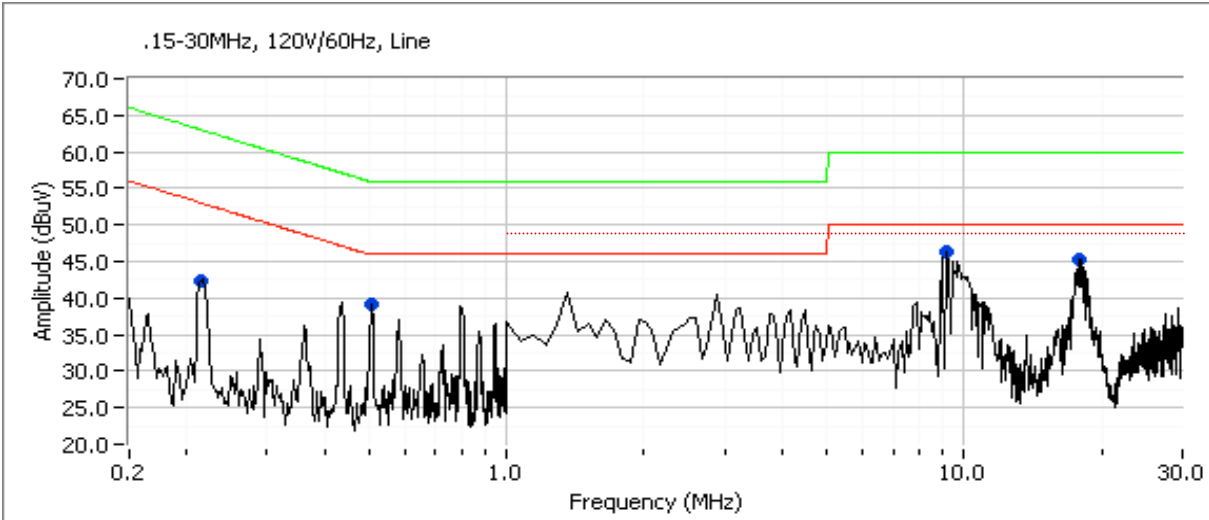
No modifications were made to the EUT during testing

### Deviations From The Standard

No deviations were made from the requirements of the standard.

Client: Xirrus, Inc.	Job Number: J57788
Model: XS-3900-16 and XS-3700-8 Access Points	T-Log Number: T59090
Contact: Ian Laity	Account Manager: Joe Rohlfes
Spec: FCC 15.247, 15.401, RSS-210	Class: Radio

**Run #1: AC Power Port Conducted Emissions, 0.15 - 30MHz, 120V/60Hz**  
**All transmitters active and connected to internal antennas except three external antennas also connected**  
**2.4 GHz Patch and Omni and 5GHz Omni used externally. See Note 1**



Note - frequency range of scan was 0.15 - 30 MHz - graph axes marked to 1 decimal place.



## EMC Test Data

Client: Xirrus, Inc.	Job Number: J57788
Model: XS-3900-16 and XS-3700-8 Access Points	T-Log Number: T59090
	Account Manager: Joe Rohlfes
Contact: Ian Laity	
Spec: FCC 15.247, 15.401, RSS-210	Class: Radio

### Run #2: Continued

Frequency MHz	Level dB $\mu$ V	AC Line	FCC 15.209/15.109		Detector QP/Ave	Comments
			Limit	Margin		
8.970	47.1	N	50.0	-2.9	Average	
9.160	45.4	L	50.0	-4.6	Average	
0.506	37.4	L	46.0	-8.6	Average	
0.507	36.8	N	46.0	-9.2	Average	
8.970	47.6	N	60.0	-12.4	QP	
9.160	46.0	L	60.0	-14.0	QP	
0.216	38.6	N	53.0	-14.4	Average	
0.215	38.4	L	53.0	-14.6	Average	
17.850	42.9	N	60.0	-17.1	QP	
17.840	42.9	L	60.0	-17.1	QP	
0.506	38.3	L	56.0	-17.7	QP	
17.840	32.1	L	50.0	-17.9	Average	
0.507	37.8	N	56.0	-18.2	QP	
17.850	30.5	N	50.0	-19.5	Average	
0.216	42.9	N	63.0	-20.1	QP	
0.215	42.8	L	63.0	-20.2	QP	

Note 1: All 16 radios transmitting continuously on channels 2412, 2437, 2467, 2472, 5180, 5260, 5280, 5300, 5200, 5220, 5240, 5745, 5765, 5785 and 5805  
 Maximum output power for the specified band on each channel.  
 6Mb/s on 5GHz transmitters using 802.11a; 1Mb/s on 2.4 GHz channels using 802.11b



## EMC Test Data

Client:	Xirus	Job Number:	J61731
Model:	XS 3900	Test-Log Number:	T61799
		Project Manager:	-
Contact:	Steve Smith		
Emissions Spec:	EN301489/FCC 15B/EN300328	Class:	B
Immunity Spec:	EN 301 489-17	Environment:	-

## EMC Test Data

For The

**Xirus**

Model

**XS 3900**

Date of Last Test: 2/1/2006



## EMC Test Data

Client:	Xirrus	Job Number:	J61731
Model:	XS 3900	Test-Log Number:	T61799
		Project Manager:	-
Contact:	Steve Smith		
Emissions Spec:	EN301489/FCC 15B/EN300328	Class:	B
Immunity Spec:	EN 301 489-17	Environment:	-

### EUT INFORMATION

*The following information was collected during the test sessions(s).*

#### General Description

The Xirrus, Inc. model XS-3900 is a multi-radio 802.11abg Access Point radio which is designed to act as a hub for a wireless local area network (WLAN). There are two versions of the system, one (model XS-3900-16) contains 16 separate transceivers, the other (model XS-3700-8) contains 8 transceivers. The radio interfaces are provided via four identical circuit boards. Each of the boards has four 802.11abg radios installed onto it (in the 8-port version two of these radios are removed from each board).

Normally, the EUT would be ceiling mounted during operation. The EUT was tested as both table-top equipment and also tested with the EUT raised to a height of 1.5m above the ground plane. The electrical rating of the device is 100 - 240Vac, 50/60Hz, 0.5 - 3 A.

#### Equipment Under Test

Manufacturer	Model	Description	Serial Number	FCC ID
Xirrus	XS-3900-16	802.11 a/b/g access point	X339440500197	

#### EUT Antenna

The antennas are either integral to the device or connect to the EUT via a non-standard, reverse gender TNC connector, thereby meeting the requirements of FCC 15.203.

#### Proposed Changes

The purpose of testing was to evaluate the following modifications which are to be covered under a Class 2 Permissive Change to the FCC / Industry Canada:

- Modified balun on the transceiver
- Modifications to the CPU board (these changes only affect the digital device emissions).

#### EUT Enclosure

The EUT enclosure is primarily constructed of plastic. It is circular with a diameter of 48 cm and a height of 10cm.

#### Modification History

Mod. #	Test	Date	Modification
1			
2			
3			

Modifications applied are assumed to be used on subsequent tests unless otherwise stated as a further modification.



## EMC Test Data

Client:	Xirrus	Job Number:	J61731
Model:	XS 3900	T-Log Number:	T61799
Contact:	Steve Smith	Project Manager:	-
Emissions Spec:	EN301489/FCC 15B/EN300328	Class:	B
Immunity Spec:	EN 301 489-17	Environment:	-

### Test Configuration #1

#### Local Support Equipment

Manufacturer	Model	Description	Serial Number	FCC ID
None				

#### Remote Support Equipment

Manufacturer	Model	Description	Serial Number	FCC ID
Toshiba	Satellite A60 PSA60U-0CS01D	Laptop	X4051688Q	DoC
Netgear	GS605	10/100/1000 Switch	GS19147DB012057	DoC

#### Interface Cabling and Ports

Port	Connected To	Cable(s)		
		Description	Shielded or Unshielded	Length(m)
EUT 10/100 Ethernet	Netgear switch #1	Cat 5	Shielded	10.0
EUT Console	N/C - note 1			
EUT Gig E #1	Netgear switch #2	Cat 5	Shielded	10.0
EUT Gig E #2	Netgear switch #3	Cat 5	Shielded	10.0
EUT AC power	AC Mains	3-wire	Unshielded	1.5
Netgear Switch #4	Laptop ethernet	Cat 5	Shielded	5.0

Note 1: The console port was not connected during testing. This port is used for configuration and troubleshooting purposes only and is not intended to be connected during normal operation.

#### EUT Operation During Emissions Tests - Digital Device / Receiver

During emissions testing the EUT was configured with the processor speed at 825 MHz and with the device pinging the laptop via the gigabit ethernet port. The other ethernet ports were running idles. Note that preliminary testing showed that the processor speed (666 MHz vs 825 Mhz) had no significant effect on the radiated emissions.

The transceivers were all in receive mode - # 1,6,11 in the 2.4 GHz band and #36, 48, 52, 64, 100, 120, 140, 149, 153, 157, 161.

#### EUT Operation During Emissions Tests - Transmitter-related emissions

During emissions testing the EUT was configured with the transceivers transmitting continuously on the specified channel at the specified output power settings. A data rate of 6Mb/s was used for all OFDM modulations and a rate of 1Mb/s for CCK modulation.

The transceivers were all in receive mode - # 1,6,11 in the 2.4 GHz band and #36, 48, 52, 64, 100, 120, 140, 149, 153, 157, 161.



# EMC Test Data

Client:	Xirrus	Job Number:	J61731
Model:	XS 3900	T-Log Number:	T61799
Contact:	Steve Smith	Account Manager:	-
Spec:	EN301489/FCC 15B/EN300328	Class:	N/A

## FCC Part 15 Subpart E Tests - RF Port Measurements

### Test Specifics

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: 12/23/2005  
 Test Engineer: Chris Byleckie  
 Test Location: SVOATS #1

Config. Used: 1  
 Config Change: None  
 EUT Voltage: 120V/60Hz

### General Test Configuration

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

**Ambient Conditions:** Temperature: 16 °C  
 Rel. Humidity: 90 %

### Summary of Results

Run #	Test Performed	Limit	Pass / Fail	Result / Margin
1	Power, 5150 - 5250MHz	15.407(a) (1), (2)	Pass	Pmax =16.0dBm Aggregate P=16.6dBm
1	Power, 5250 - 5350MHz	15.407(a) (1), (2)	Pass	Pmax =15.7dBm Aggregate P=21.7dBm
1	PSD, 5150 - 5250MHz	15.407(a) (1), (2)	Pass	1.12dBm @ 5200MHz
1	PSD, 5250 - 5350MHz	15.407(a) (1), (2)	Pass	0.68dBm @ 5260MHz
1	26dB Bandwidth	15.407	Pass	> 20 MHz
1	99% Bandwidth	RSS 210	Pass	17.0MHz
2	Peak Excursion Envelope	15.407(a) (6)	Pass	9.64dB @ 5240MHz
3	Antenna Conducted - Out of Band Spurious	15.407(b)	Pass	All emissions below the -27dBm/MHz limit

### 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:	J61731
Model:	XS 3900	T-Log Number:	T61799
Contact:	Steve Smith	Account Manager:	-
Spec:	EN301489/FCC 15B/EN300328	Class:	N/A

## Run #1a: Bandwidth, Output Power and Power Spectral Density (5150 - 5250 MHz Band)

Antenna Gain: 6 dBi Highest gain of external and internal antennas

### Output power at the highest power setting on each channel (only one channel in the band being used)

Frequency (MHz)	Software Setting	Bandwidth		Output Power <sup>1</sup> dBm		Power (Watts)	PSD <sup>2</sup> dBm/MHz			Result
		26dB	99%	Measured	Limit <sup>4</sup>		Measured	FCC Limit	RSS Limit <sup>3</sup>	
5180	9.0	21.2	17.0	9.3	17.0	0.009	-2.83	4.0	0.0	Pass
5200	16.0	29.9	17.0	15.4	17.0	0.035	3.30	4.0	6.1	Pass
5240	16.0	28.2	17.0	16.0	17.0	0.040	3.93	4.0	6.7	Pass

- Note 1 Output power measured using a spectrum analyzer with:  
RBW=1MHz, VB=3 MHz, sample detector, power averaging on and power integration over 30MHz
- Note 2 Measured using the same analyzer settings used for output power.
- Note 3 For RSS210 the measured value of the PSD (see note 3) must not exceed the average value (calculated from the measured power divided by the measured 99% bandwidth) by more than 3dB.
- Note 4 The maximum output power for any transceiver in the 5150 - 5250 MHz band detailed above is with only one radio operational in the band. The power is reduced when more than one transceiver is operational in the band to ensure that the aggregate power does not exceed the 17dBm limit. Refer to the table below.

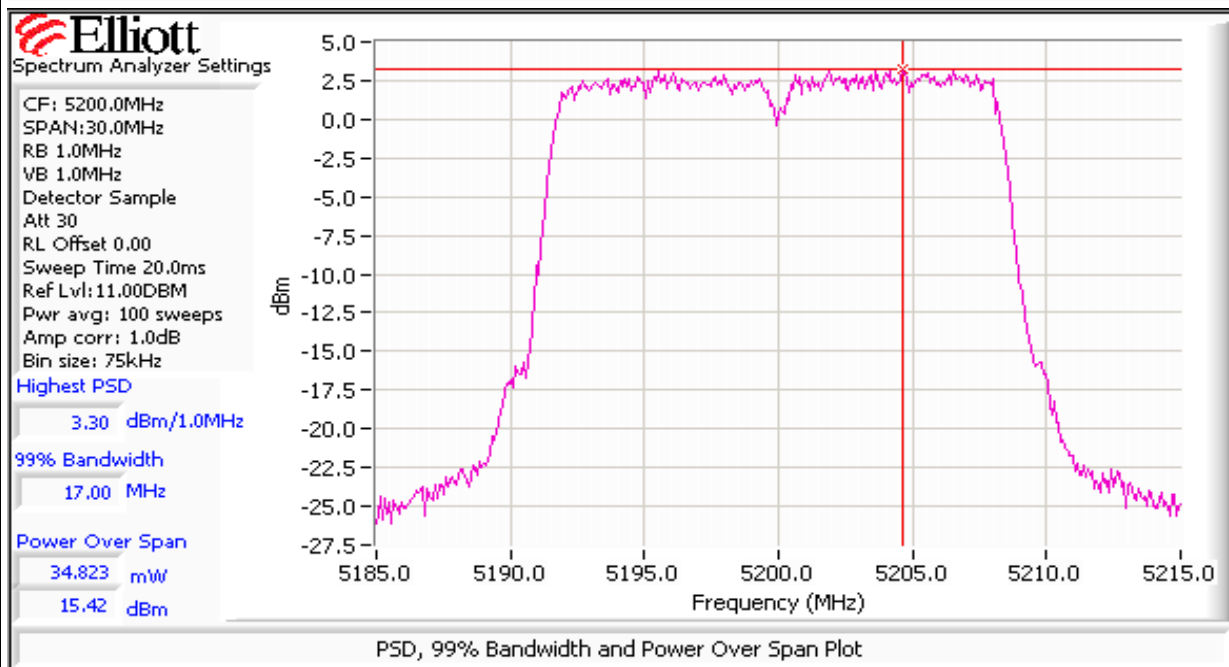
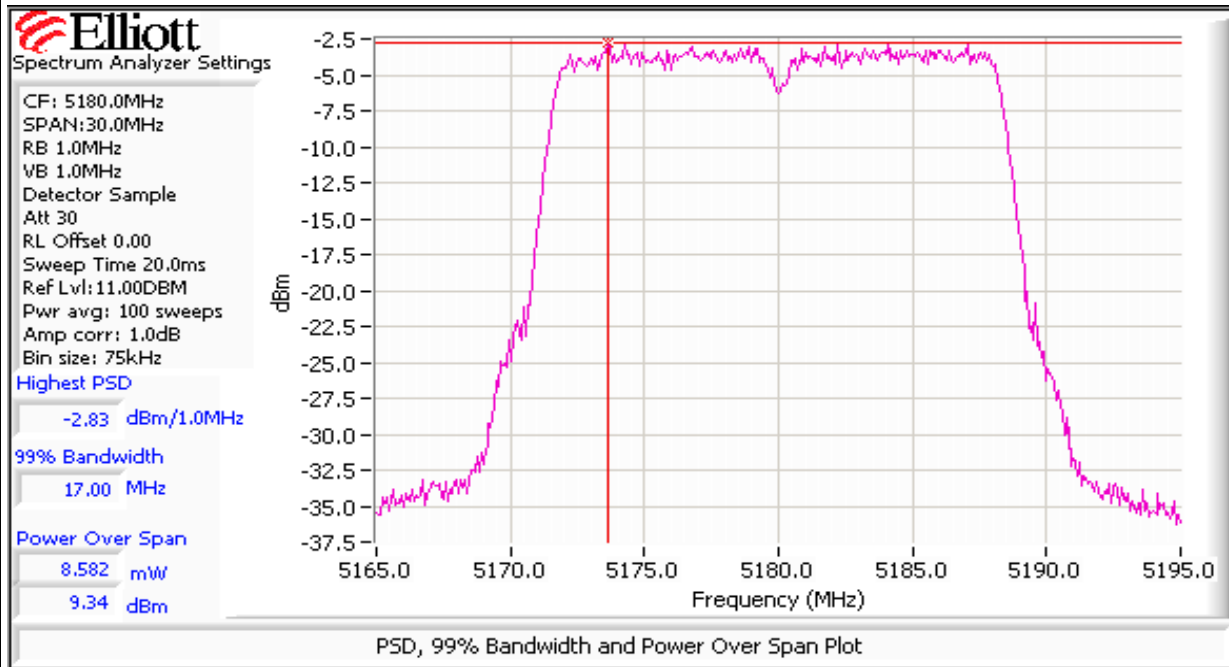
		Out put Power on each channel (dBm)			
		36	40	44	48
Number of TRx active in the band	1 TRx	9.3	15.4	16.0	16.0
	2 TRx	9.3	13.1	13.6	13.6
	3 Trx	9.3	12.0	11.6	12.0
	4 Trx	9.3	10.0	10.6	10.6

		Output Power on each channel (W)				Aggregate Power	
		36	40	44	48	mW	dBm
Number of TRx active in the band	1 TRx	0.009	0.035	0.040	0.040	0.040	16.0
	2 TRx	0.009	0.020	0.023	0.023	0.046	16.6
	3 Trx	0.009	0.016	0.014	0.016	0.046	16.6
	4 Trx	0.009	0.010	0.011	0.011	0.041	16.2

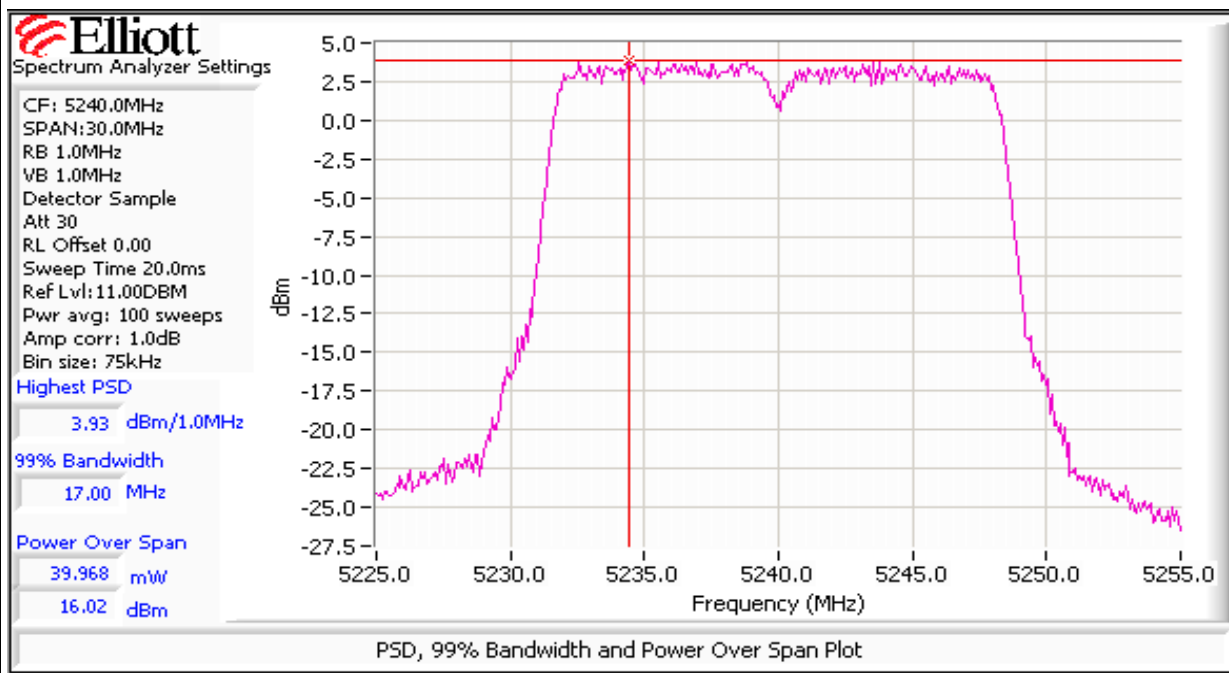
The powers in the tables above were measured using the power averaging method on channels 36, 40 and 48. Levels on channels 44 are taken from the highest value measured on channels 40 and 48 for the same nominal power setting.



Client: Xirrus	Job Number: J61731
Model: XS 3900	T-Log Number: T61799
Contact: Steve Smith	Account Manager: -
Spec: EN301489/FCC 15B/EN300328	Class: N/A



Client: Xirrus	Job Number: J61731
Model: XS 3900	T-Log Number: T61799
Contact: Steve Smith	Account Manager: -
Spec: EN301489/FCC 15B/EN300328	Class: N/A



Client: Xirrus	Job Number: J61731
Model: XS 3900	T-Log Number: T61799
Contact: Steve Smith	Account Manager: -
Spec: EN301489/FCC 15B/EN300328	Class: N/A

### Run #1b: Bandwidth, Output Power and Power Spectral Density (5250 - 5350 MHz Band)

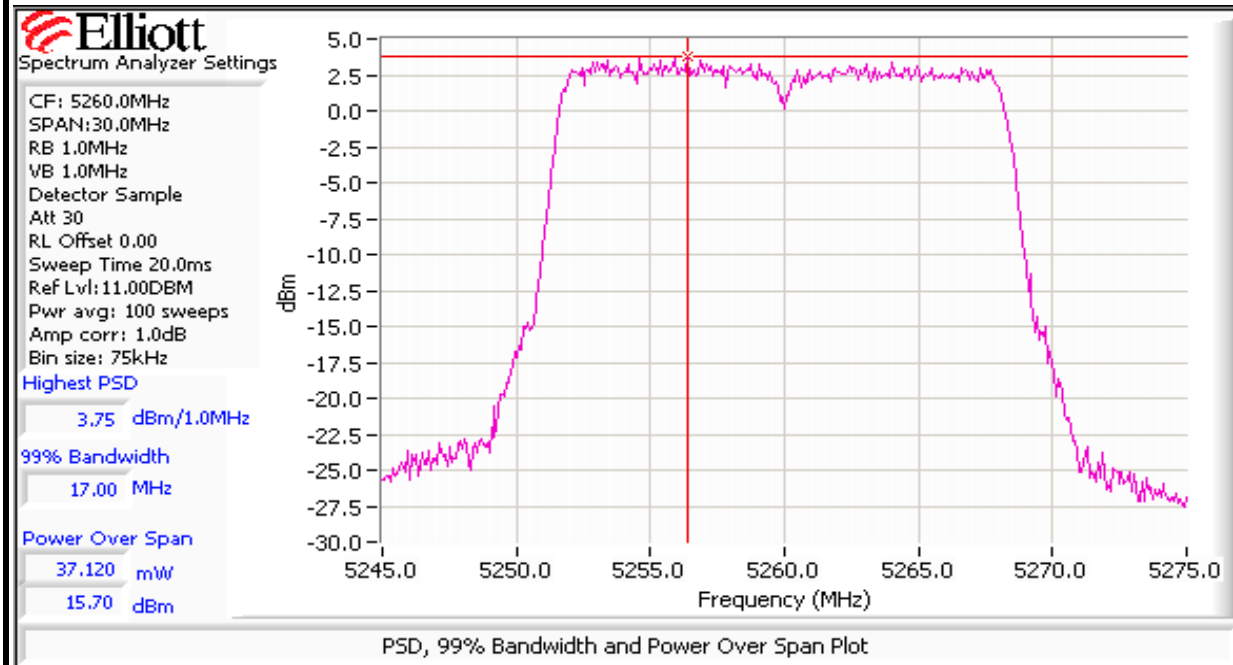
Antenna Gain: 6 dBi      Highest gain of external and internal antennas

Frequency (MHz)	Software Setting	Bandwidth		Output Power <sup>1</sup> dBm		Power (Watts)	PSD <sup>2</sup> dBm/MHz			Result
		26dB	99%	Measured	Limit <sup>4</sup>		Measured	FCC Limit	RSS Limit <sup>3</sup>	
5260	16.0	26.6	17.0	15.7	24.0	0.037	3.75	11.0	6.4	Pass
5320	12.0	21.5	17.0	10.7	24.0	0.012	-1.43	11.0	1.4	Pass

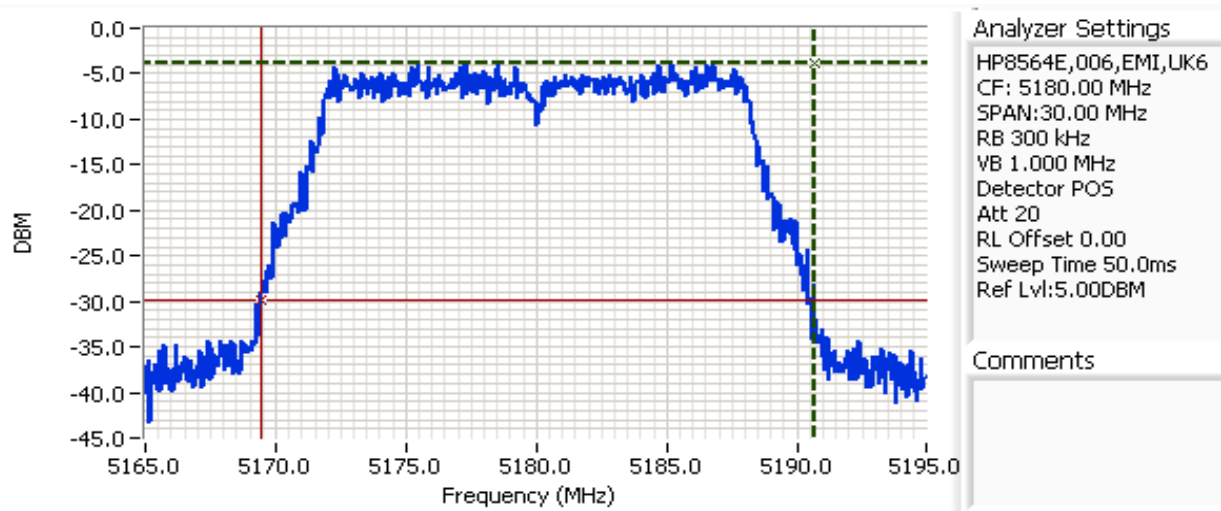
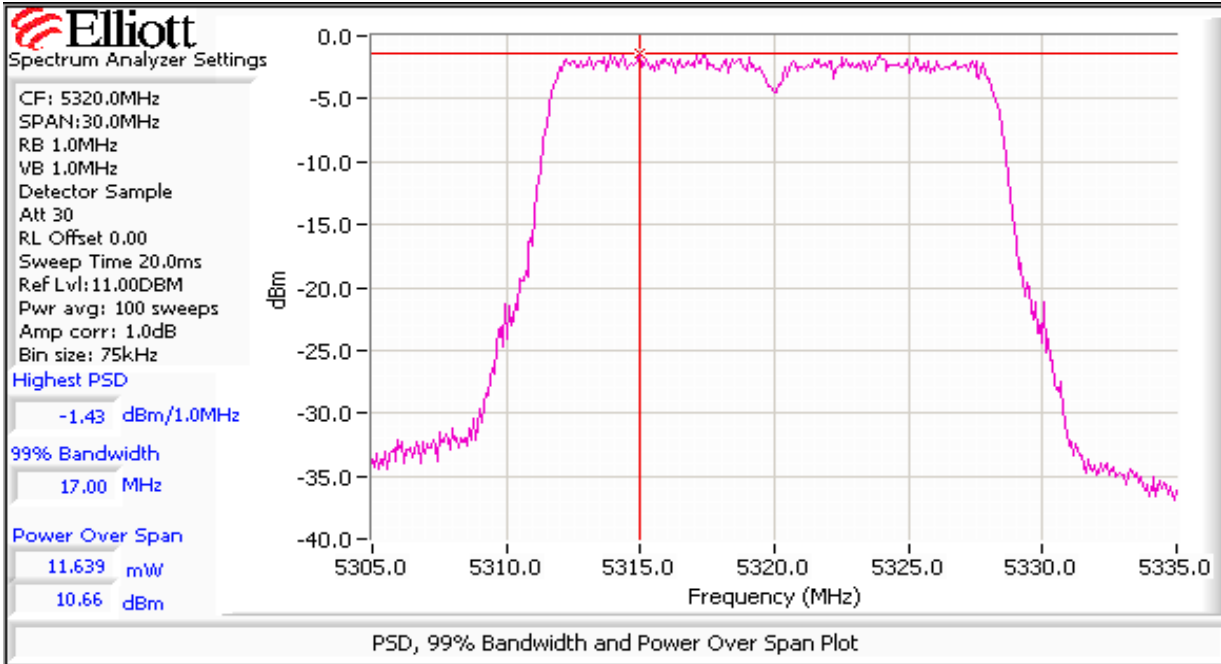
- Note 1 Output power measured using a spectrum analyzer with RBW=1MHz, VB=3 MHz, sample detector, power averaging on and power integration over 30MHz.
- Note 2 Measured using the same analyzer settings used for output power.
- Note 3 For RSS210 the measured value of the PSD (see note 3) must not exceed the average value (calculated from the measured power divided by the measured 99% bandwidth) by more than 3dB.

### Aggregate power in the 5250 - 5350 MHz Band:

With up to four transceivers operating in the 5250-5350 MHz band:  
 Total average power across the band is:      **20.9** dBm      0.123 W  
 Maximum power permitted in the band is:      **24.0** dBm  
 (total power is 15.7dBm for channels 52, 56 and 60 and 10.7dBm for channel 64).



Client: Xirrus	Job Number: J61731
Model: XS 3900	T-Log Number: T61799
Contact: Steve Smith	Account Manager: -
Spec: EN301489/FCC 15B/EN300328	Class: N/A



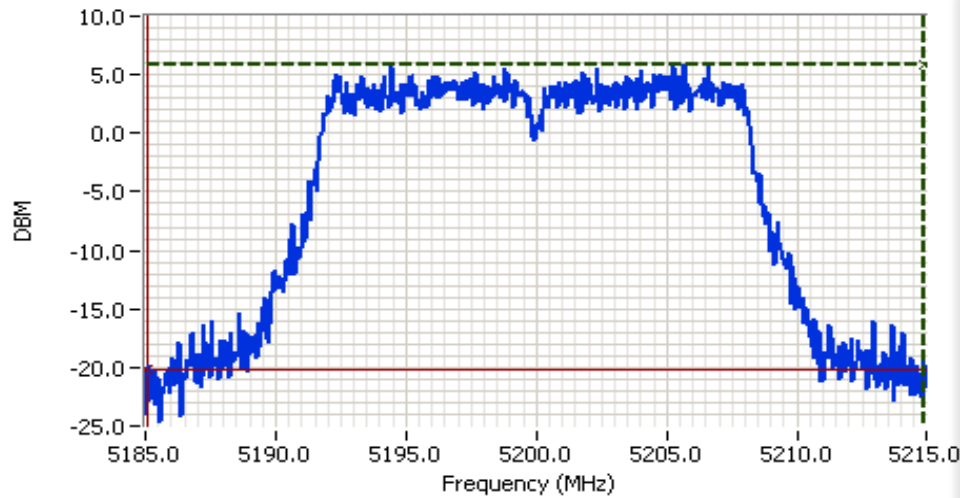
Cursor 1 5190.65; -3.83

Cursor 2 5169.44; -29.83

Delta Freq. 21.21

Delta Amplitude 26.00

Client: Xirrus	Job Number: J61731
Model: XS 3900	T-Log Number: T61799
Contact: Steve Smith	Account Manager: -
Spec: EN301489/FCC 15B/EN300328	Class: N/A



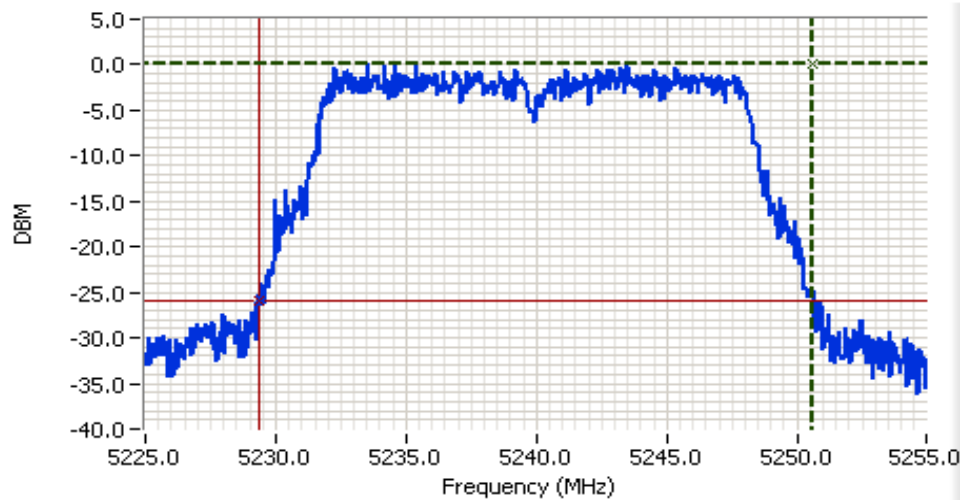
### Analyzer Settings

HP8564E,006,EMI,UK6  
 CF: 5200.00 MHz  
 SPAN:30.00 MHz  
 RB 300 kHz  
 VB 1.000 MHz  
 Detector POS  
 Att 20  
 RL Offset 0.00  
 Sweep Time 50.0ms  
 Ref Lvl:5.00DBM

### Comments

Cursor 1 5214.90 5.83  
 Cursor 2 5185.10 -20.17

Delta Freq. 29.80  
 Delta Amplitude 26.00



### Analyzer Settings

HP8564E,006,EMI,UK6  
 CF: 5240.00 MHz  
 SPAN:30.00 MHz  
 RB 300 kHz  
 VB 1.000 MHz  
 Detector POS  
 Att 20  
 RL Offset 0.00  
 Sweep Time 50.0ms  
 Ref Lvl:10.00DBM

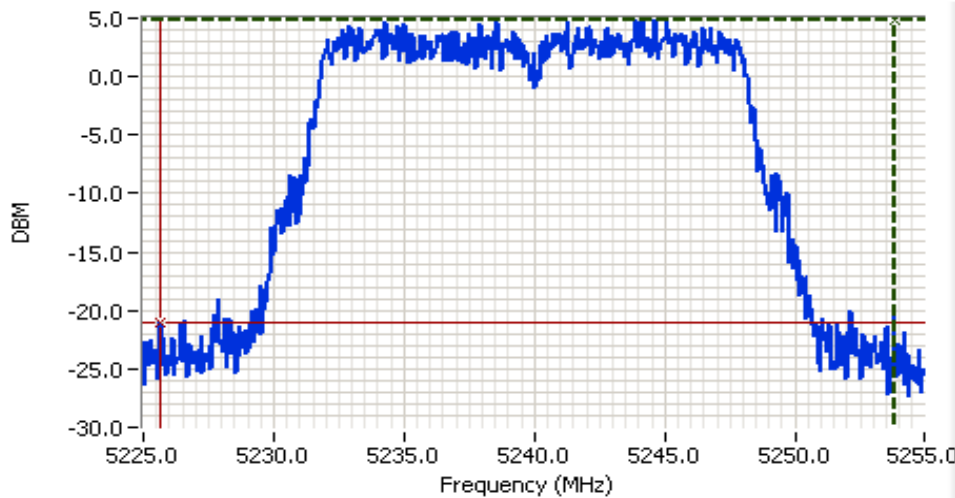
### Comments

Cursor 1 5250.60 0.17  
 Cursor 2 5229.39 -25.83

Delta Freq. 21.21  
 Delta Amplitude 26.00



Client: Xirrus	Job Number: J61731
Model: XS 3900	T-Log Number: T61799
Contact: Steve Smith	Account Manager: -
Spec: EN301489/FCC 15B/EN300328	Class: N/A



### Analyzer Settings

HP8564E,006,EMI,UK6  
CF: 5240.00 MHz  
SPAN:30.00 MHz  
RB 300 kHz  
VB 1.000 MHz  
Detector POS  
Att 20  
RL Offset 0.00  
Sweep Time 50.0ms  
Ref Lvl:10.00DBM

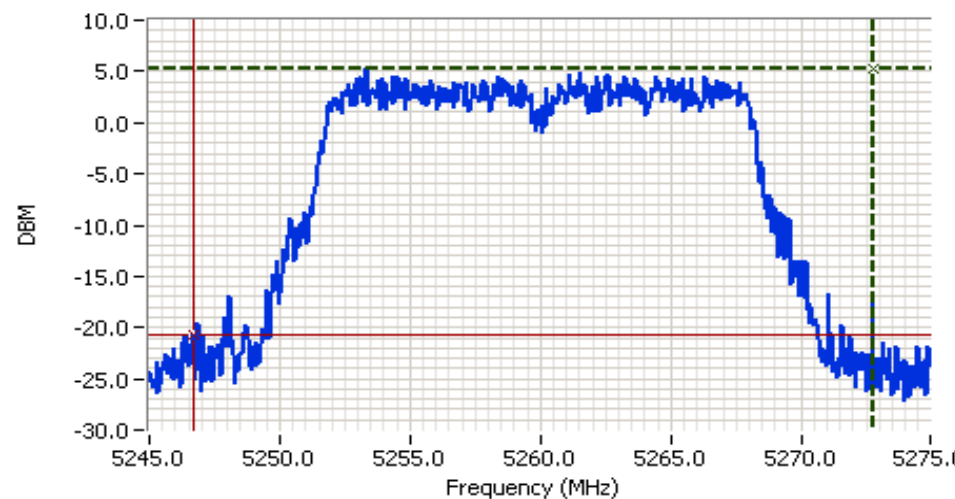
### Comments

Cursor 1 5253.80 4.92

Cursor 2 5225.64 -21.08

Delta Freq. 28.15

Delta Amplitude 26.00



### Analyzer Settings

HP8564E,006,EMI,UK6  
CF: 5260.00 MHz  
SPAN:30.00 MHz  
RB 300 kHz  
VB 1.000 MHz  
Detector POS  
Att 20  
RL Offset 0.00  
Sweep Time 50.0ms  
Ref Lvl:10.00DBM

### Comments

Cursor 1 5272.75 5.25

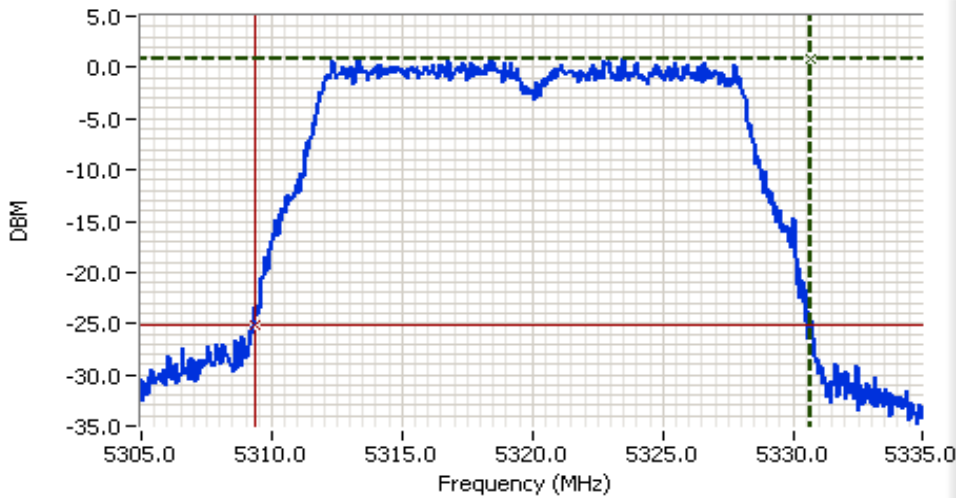
Cursor 2 5246.69 -20.75

Delta Freq. 26.06

Delta Amplitude 26.00



Client: Xirrus	Job Number: J61731
Model: XS 3900	T-Log Number: T61799
Contact: Steve Smith	Account Manager: -
Spec: EN301489/FCC 15B/EN300328	Class: N/A



**Analyzer Settings**

- HP8564E,006,EMI,UK6
- CF: 5320.00 MHz
- SPAN:30.00 MHz
- RB 300 kHz
- VB 1.000 MHz
- Detector POS
- Att 20
- RL Offset 0.00
- Sweep Time 50.0ms
- Ref Lvl:10.00DBM

**Comments**

Cursor 1	5330.70	0.83	
Cursor 2	5309.34	-25.17	

Delta Freq. 21.36  
Delta Amplitude 26.00



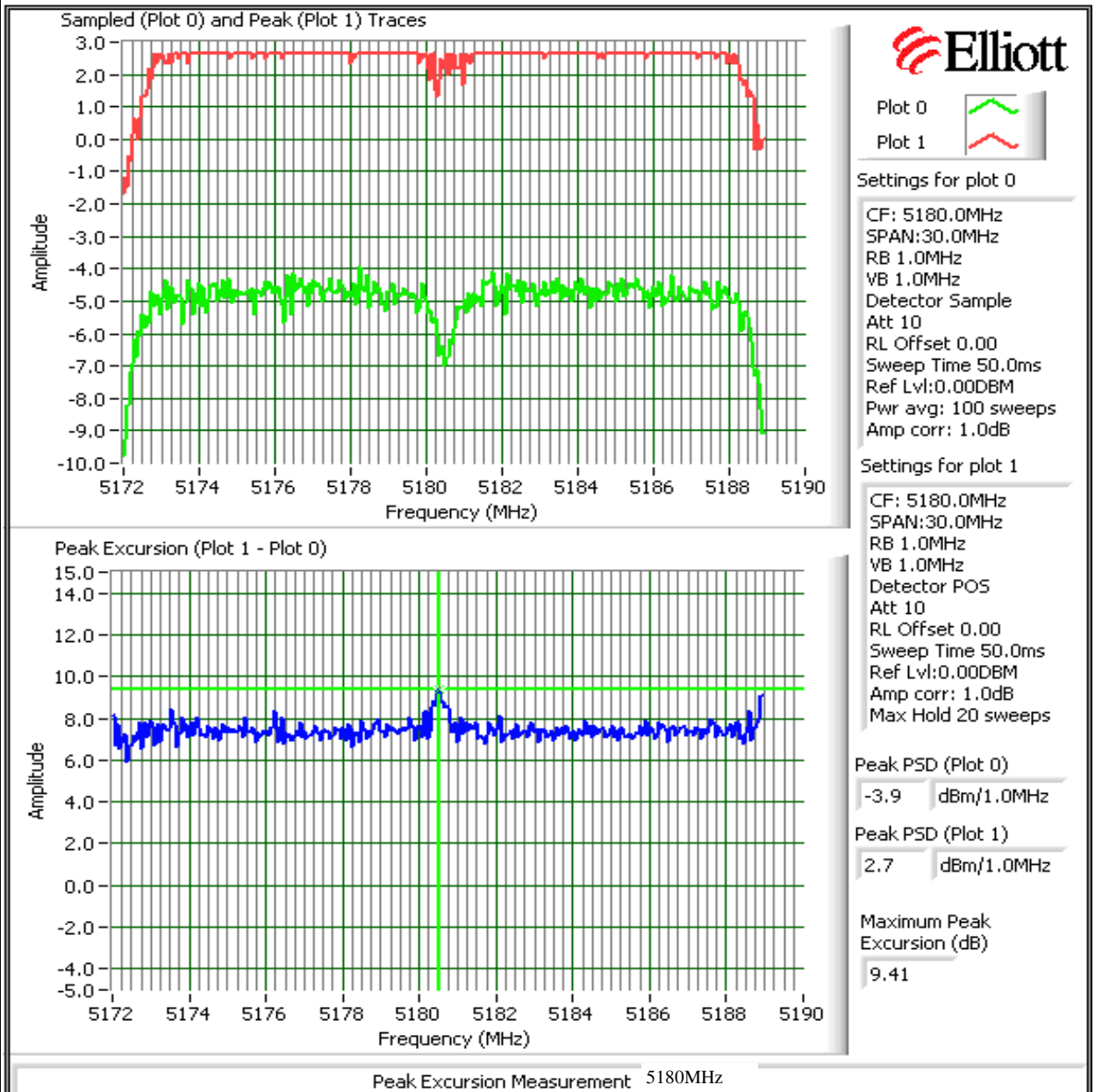
Client: Xirrus	Job Number: J61731
Model: XS 3900	T-Log Number: T61799
Contact: Steve Smith	Account Manager: -
Spec: EN301489/FCC 15B/EN300328	Class: N/A

### Run #2: Peak Excursion Measurement

#### Plots Showing Peak Excursion

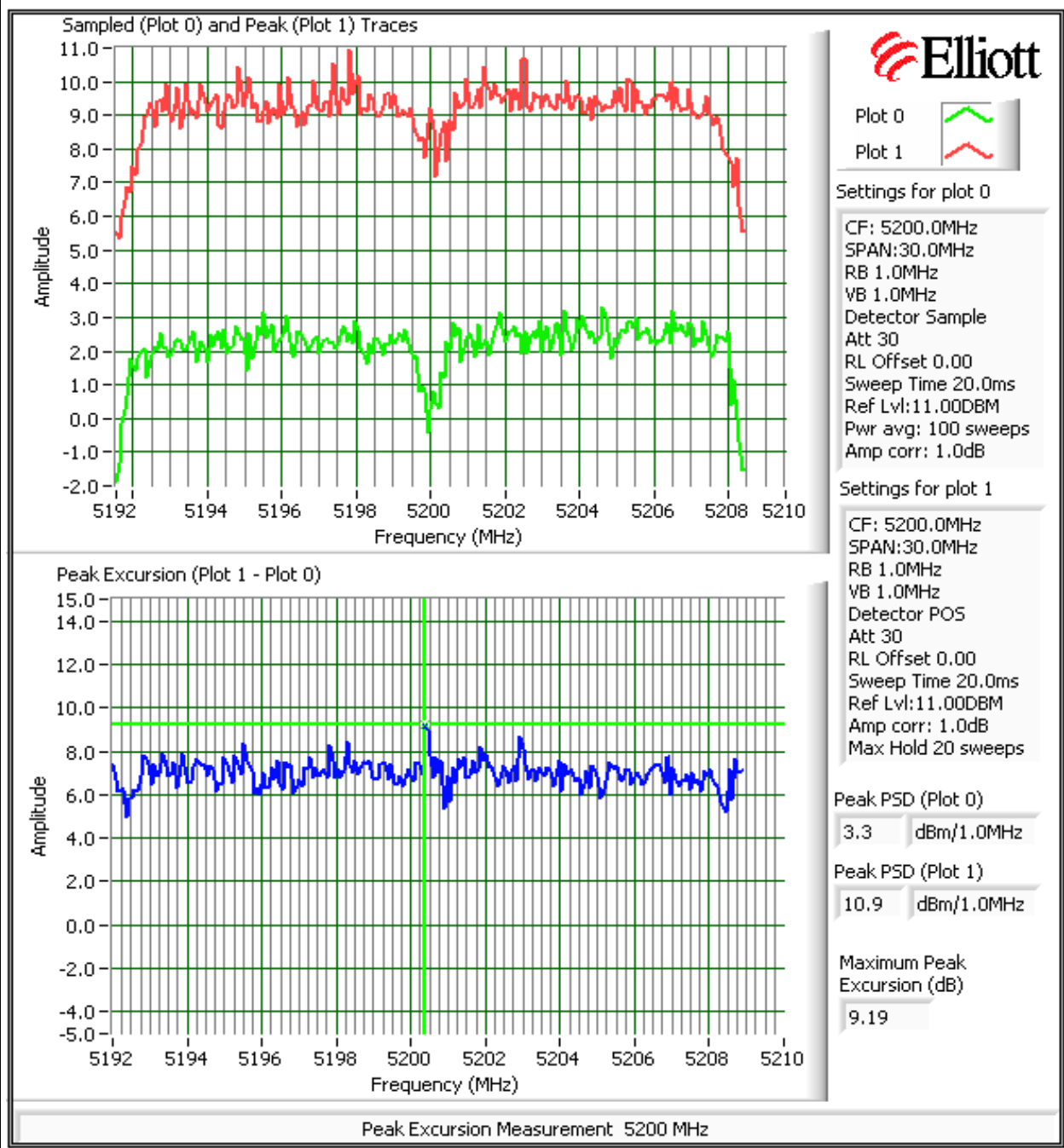
Trace A: RBW = VBW = 1MHz

Trace B: RBW = 1 MHz, VBW = 30kHz

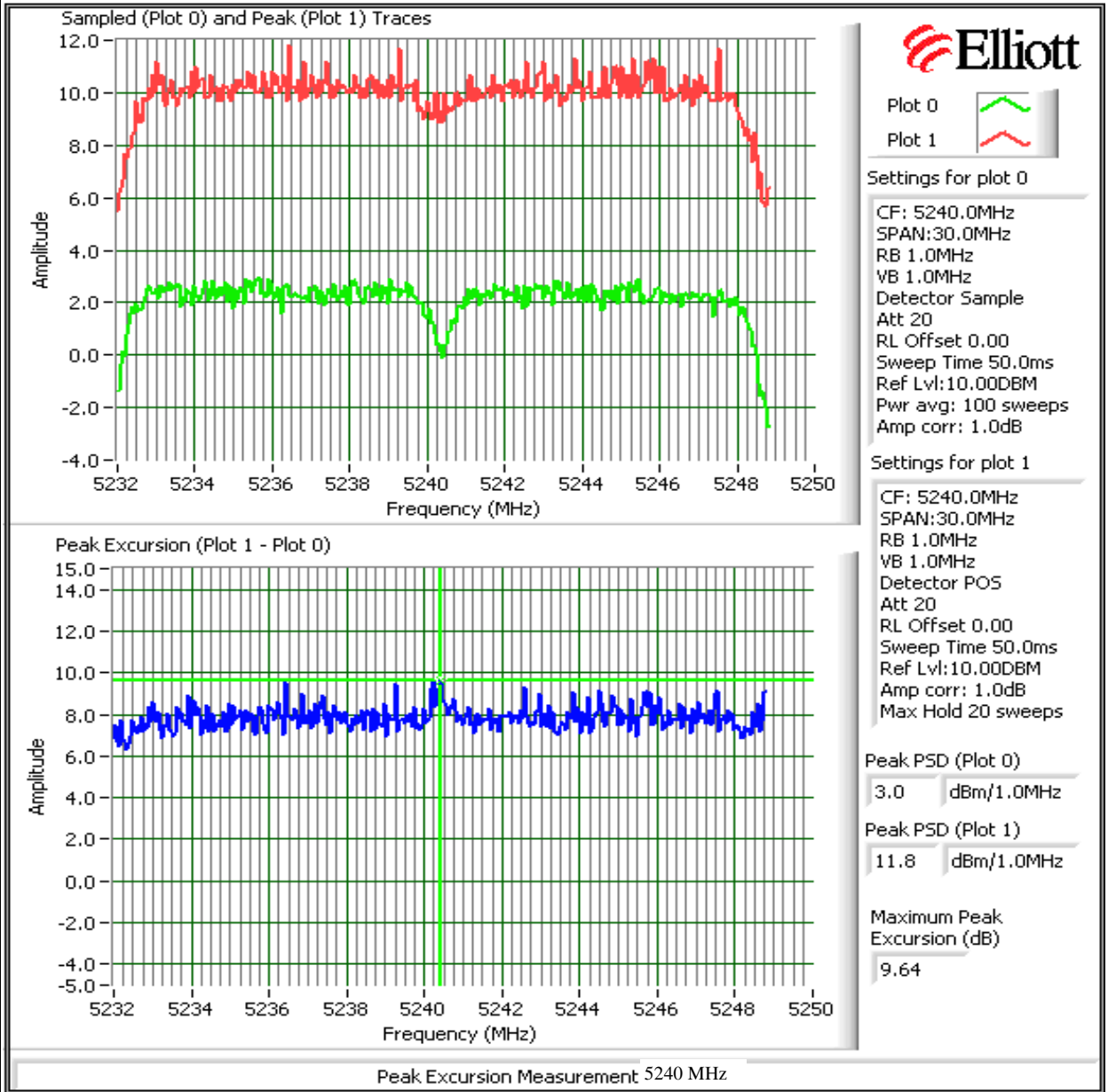




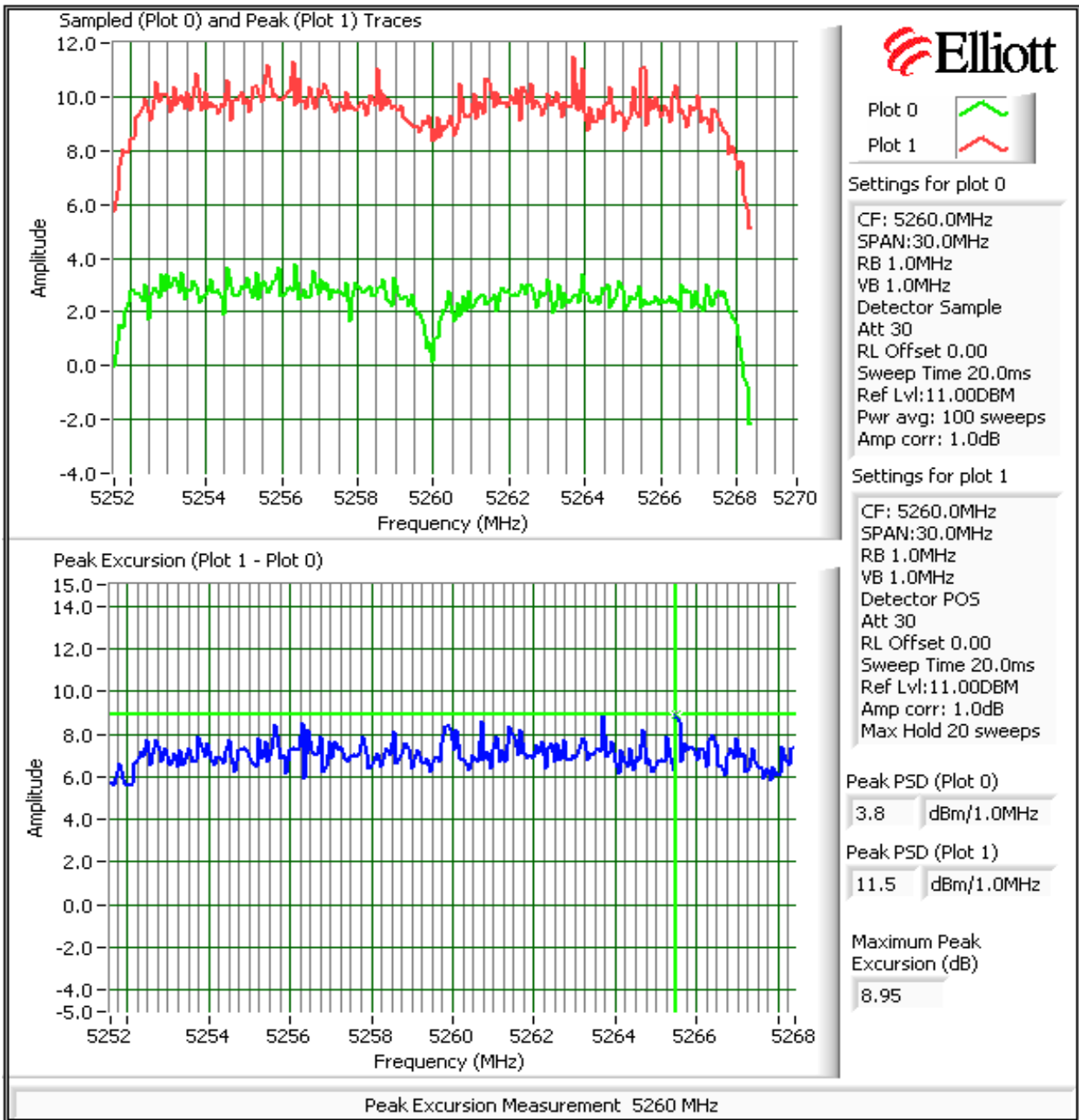
Client: Xirrus	Job Number: J61731
Model: XS 3900	T-Log Number: T61799
Contact: Steve Smith	Account Manager: -
Spec: EN301489/FCC 15B/EN300328	Class: N/A



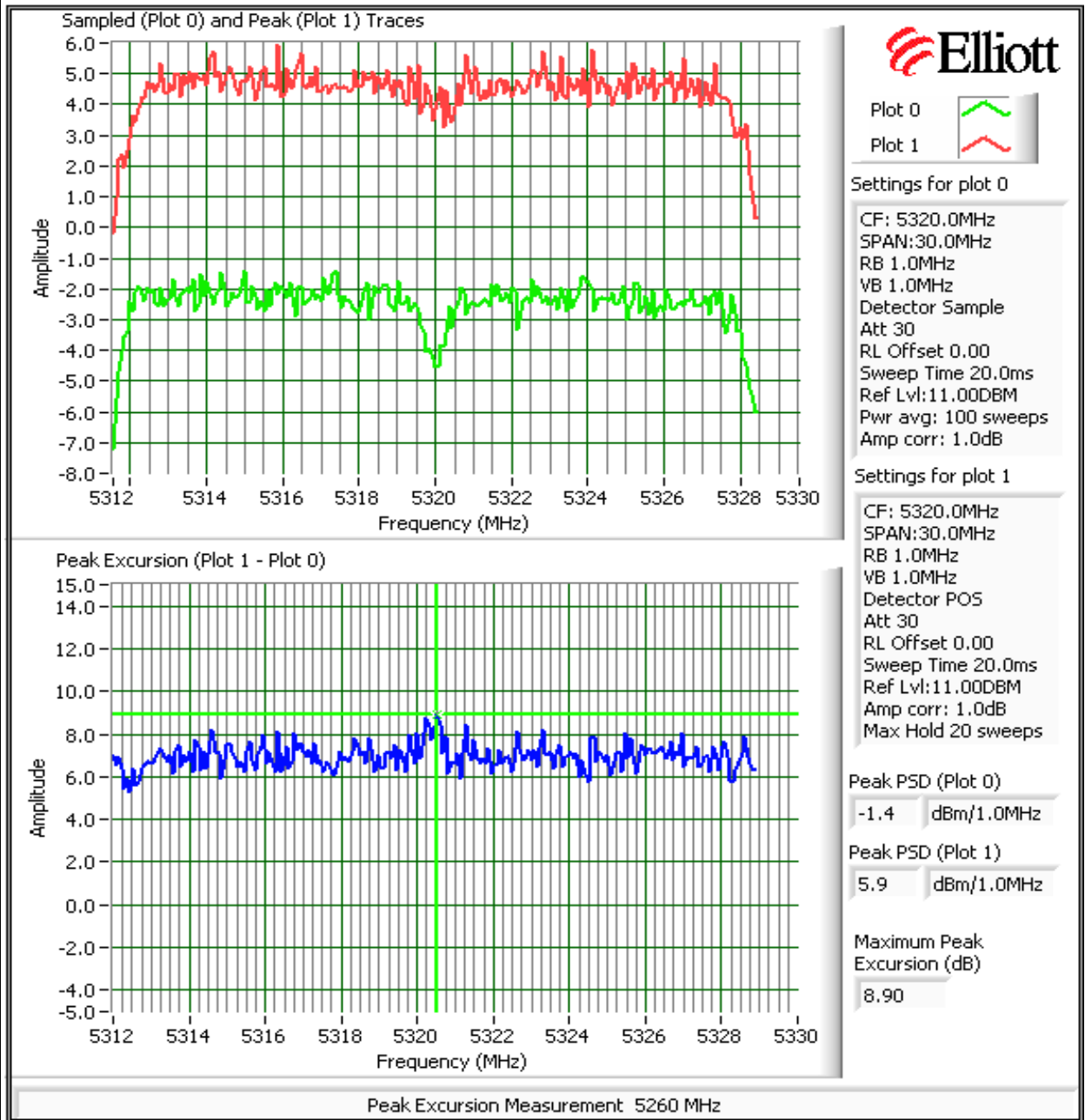
Client: Xirus	Job Number: J61731
Model: XS 3900	T-Log Number: T61799
Contact: Steve Smith	Account Manager: -
Spec: EN301489/FCC 15B/EN300328	Class: N/A



Client: Xirrus	Job Number: J61731
Model: XS 3900	T-Log Number: T61799
Contact: Steve Smith	Account Manager: -
Spec: EN301489/FCC 15B/EN300328	Class: N/A



Client: Xirus	Job Number: J61731
Model: XS 3900	T-Log Number: T61799
Contact: Steve Smith	Account Manager: -
Spec: EN301489/FCC 15B/EN300328	Class: N/A



Client: Xirrus	Job Number: J61731
Model: XS 3900	T-Log Number: T61799
Contact: Steve Smith	Account Manager: -
Spec: EN301489/FCC 15B/EN300328	Class: N/A

**Run #3: Out Of Band Spurious Emissions - Antenna Conducted**

Maximum Antenna Gain: 6 dBi Highest gain of external and internal antennas  
 Spurious Limit: -27 dBm/MHz eirp  
 Limit Used On Plots <sup>Note 1</sup>: -33 dBm/MHz

Frequency MHz	Level dBμV/m	Pol v/h	FCC Class B		Detector	
			Limit	Margin		
10340.00	-49.5	Line 1	-33.0	-16.5	Peak	Channel 36 - measured radiated
10380.00	-43.5	Line 1	-33.0	-10.5	Peak	Channel 40 - measured radiated
10420.00	-42.8	Line 1	-33.0	-9.8	Peak	Channel 44 - measured radiated
10500.00	-44.8	Line 1	-33.0	-11.8	Peak	Channel 52 - measured radiated
10620.00	-54.3	Line 1	-33.0	-21.3	Peak	Channel 64 - measured radiated

Note 1: The -27dBm/MHz limit is an eirp limit. The limit for antenna port conducted measurements is adjusted to take into consideration the maximum antenna gain (limit = -27dBm - antenna gain). Radiated field strength measurements for signals more than 50MHz from the bands and that are close to the limit are made to determine compliance as the antenna gain is not known at these frequencies.

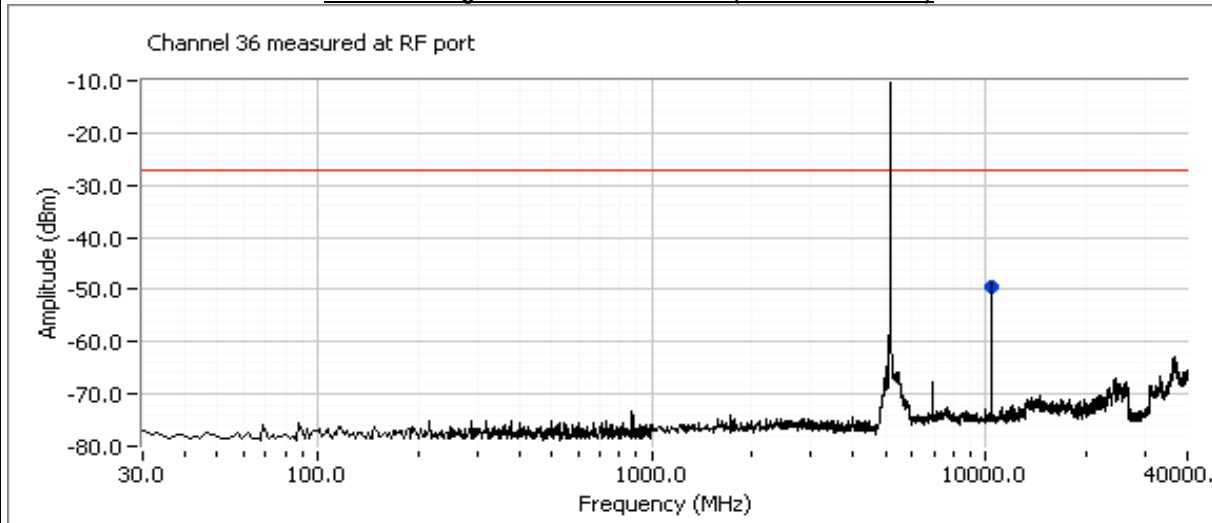
Note 2: All spurious signals below 1GHz are measured during digital device radiated emissions test.

Note 3: Signals within 10MHz of the 5.725 or 5.825 Band edge are subject to a limit of -17dBm EIRP

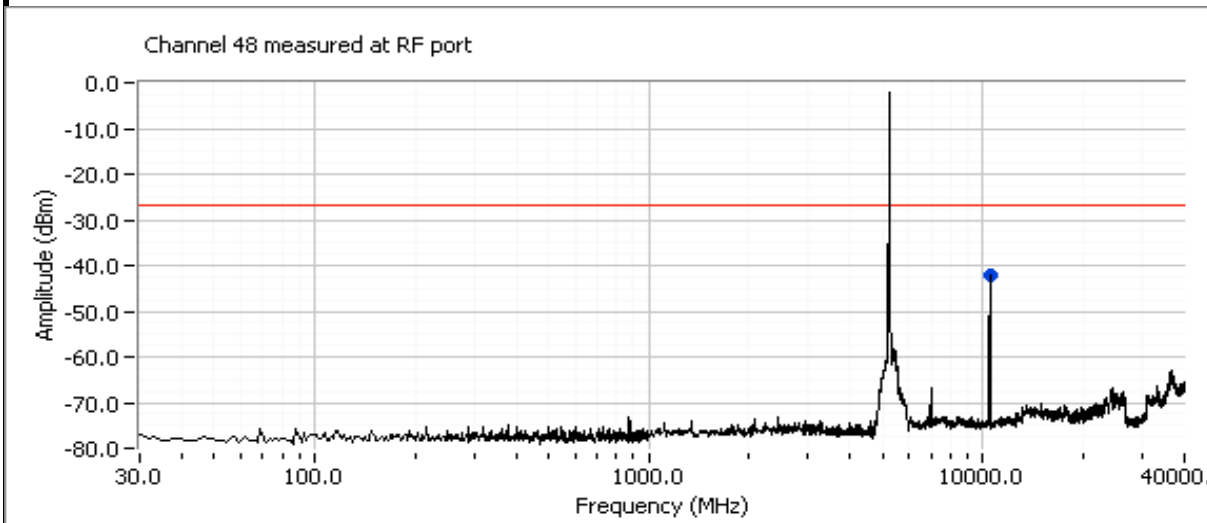
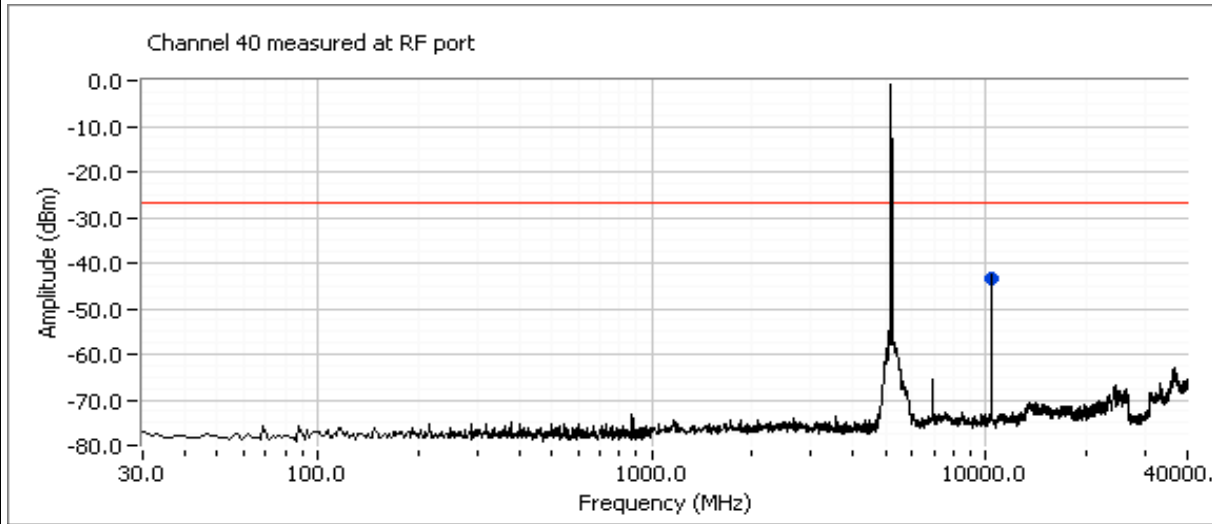
Note 4: If the device is for outdoor use then the -27dBm eirp limit also applies in the 5150 - 5250 MHz band.

Note 5: Signals that fall in the restricted bands of 15.205 are subject to the limit of 15.209.

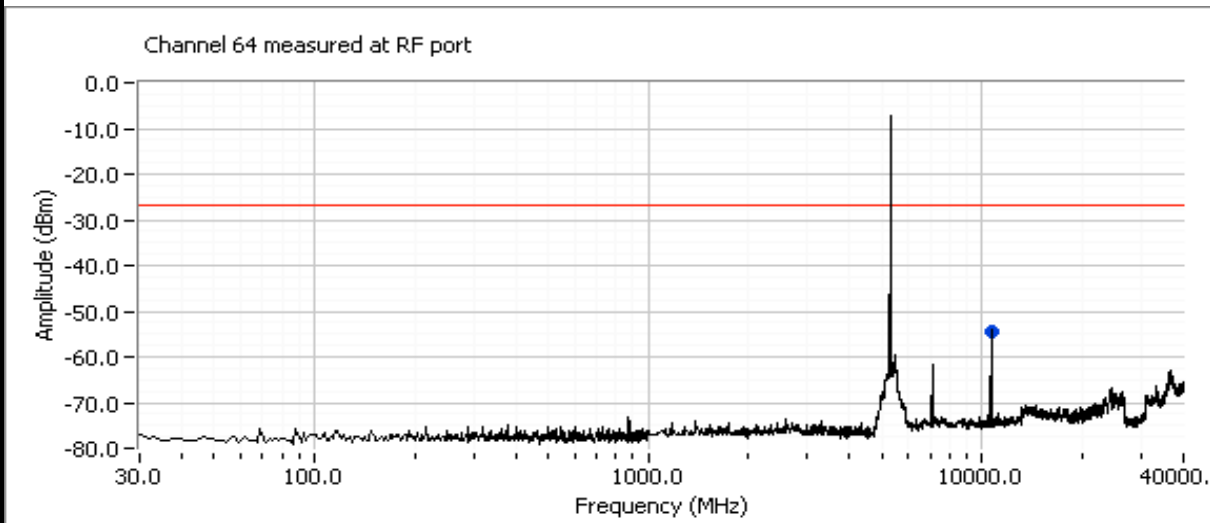
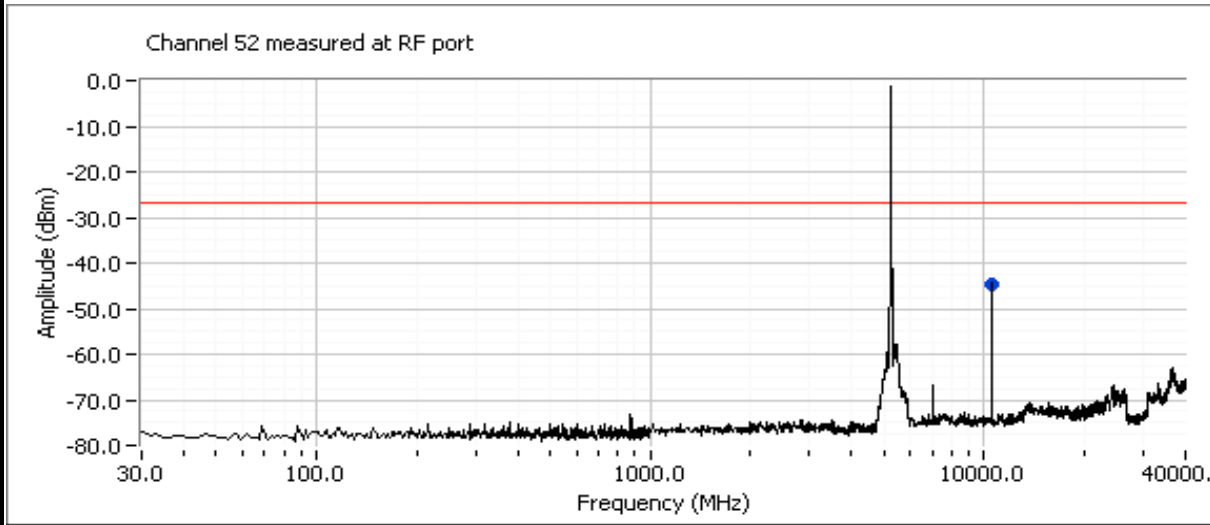
**Plots Showing Out-Of-Band Emissions (RBW=VBW=1MHz)**



Client: Xirrus	Job Number: J61731
Model: XS 3900	T-Log Number: T61799
Contact: Steve Smith	Account Manager: -
Spec: EN301489/FCC 15B/EN300328	Class: N/A



Client: Xirrus	Job Number: J61731
Model: XS 3900	T-Log Number: T61799
Contact: Steve Smith	Account Manager: -
Spec: EN301489/FCC 15B/EN300328	Class: N/A





# EMC Test Data

Client: Xirrus	Job Number: J61731
Model: XS 3900	T-Log Number: T61799
	Account Manager: -
Contact: Steve Smith	
Spec: EN301489/FCC 15B/EN300328	Class: N/A

## U-NII Radiated Emissions - External Antenna

### Test Specifics

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: 12/13/2005

Config. Used: 1

Test Engineer: Chris Byleckie

Config Change: None

Test Location: SVOATS #2

EUT Voltage: 120V/60Hz

### General Test Configuration

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

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

### Ambient Conditions:

Temperature: 11 °C

Rel. Humidity: 89 %

### Summary of Results

Run #	Test Performed	Limit	Pass / Fail	Result / Margin
1a - c	RE, 1000 - 40000 MHz - Spurious Emissions	FCC Part 15.209 / 15.247 ( c )	Pass	53.2dBµV/m (458.1µV/m) @ 10643.7MHz (-0.8dB)

### Modifications Made During Testing:

Modifications are detailed under each run description.

### Deviations From The Standard

No deviations were made from the requirements of the standard.





# EMC Test Data

Client:	Xirrus	Job Number:	J61731
Model:	XS 3900	T-Log Number:	T61799
Contact:	Steve Smith	Account Manager:	-
Spec:	EN301489/FCC 15B/EN300328	Class:	N/A

**Cushcraft 3dBd Omni antenna**

**Run #1a: Radiated Spurious Emissions, 1000 - 40000 MHz. Low Channel @ 5180 MHz**

**Radio #2 Power Setting = 9 and Power = 11.6 dBm (Average)**

	H	V	
Fundamental emission level @ 3m in 1MHz RBW:	87.5	101.6	Peak Measurement (RB=VB=1MHz)
Fundamental emission level @ 3m in 1MHz RBW:	79.2	92.5	Average Measurement (RB=1MHz, VB=10Hz)
Delta Marker - Peak	42.5 dB		
Delta Marker - Average	48.2 dB		
Calculated Band-Edge Measurement:	59.1 dBuV/m		Peak
Calculated Band-Edge Measurement:	44.3 dBuV/m		Average

**Band Edge Signal Radiated Field Strength**

Frequency	Level	Pol	15.209 / 15E		Detector	Azimuth	Height	Comments
MHz	dBμV/m	V/H	Limit	Margin	Pk/QP/Avg	degrees	meters	
5148.910	59.1	-	74.0	-14.9	Pk	41	1.2	Note 2
5149.909	44.3	-	54.0	-9.7	Avg	41	1.2	Note 2

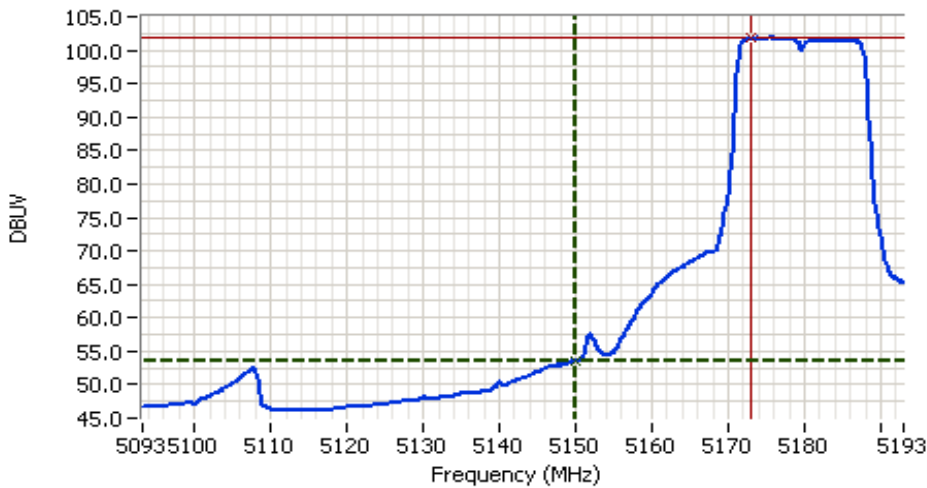
**Other Spurious Radiated Emissions:**

Frequency	Level	Pol	15.209 / 15E		Detector	Azimuth	Height	Comments
MHz	dBμV/m	V/H	Limit	Margin	Pk/QP/Avg	degrees	meters	
15531.63	36.9	H	54.0	-17.1	AVG	0	1.0	
15539.80	36.9	V	54.0	-17.1	AVG	0	1.0	
10369.83	50.1	V	68.0	-17.9	AVG	203	1.5	Non-restricted
10363.07	44.8	H	68.0	-23.2	AVG	171	1.0	Non-restricted
15531.63	48.9	H	74.0	-25.1	PK	0	1.0	
10369.83	62.9	V	88.0	-25.1	PK	203	1.5	Non-restricted
15539.80	48.0	V	74.0	-26.0	PK	0	1.0	
10363.07	57.0	H	88.0	-31.0	PK	171	1.0	Non-restricted

Note 1: For emissions in restricted bands, the limit of 15.209 was used. For all other emissions, the limit was set to -27dBm/MHz (~68dBuV/m).

Note 2: Band-edge measurement calculated from the fundamental field strength (peak or average) minus the band edge delta marker measurement.

Client: Xirus	Job Number: J61731
Model: XS 3900	T-Log Number: T61799
Contact: Steve Smith	Account Manager: -
Spec: EN301489/FCC 15B/EN300328	Class: N/A

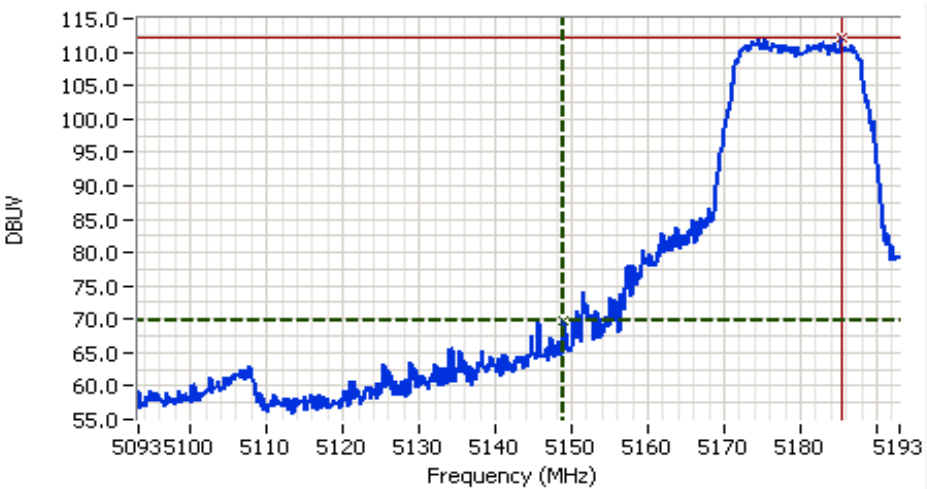


**Analyzer Settings**  
 HP8564E,EMI  
 CF: 5143.17 MHz  
 SPAN:100.00 MHz  
 RB 1.000 MHz  
 VB 10 Hz  
 Detector Sample  
 Att 20  
 RL Offset 0.00  
 Sweep Time 37.0s  
 Ref Lvl:112.60DBUW

**Comments**  
 Power Setting: 9  
 Avg

Cursor 1	5149.90	53.60	
Cursor 2	5172.87	101.77	

Delta Freq. 22.96  
 Delta Amplitude 48.17



**Analyzer Settings**  
 HP8564E,EMI  
 CF: 5143.17 MHz  
 SPAN:100.00 MHz  
 RB 1.000 MHz  
 VB 1.000 MHz  
 Detector POS  
 Att 20  
 RL Offset 0.00  
 Sweep Time 50.0ms  
 Ref Lvl:112.60DBUW

**Comments**  
 Power Setting: 9  
 Peak

Cursor 1	5148.91	69.77	
Cursor 2	5185.35	112.27	

Delta Freq. 36.44  
 Delta Amplitude 42.50





# EMC Test Data

Client: Xirrus	Job Number: J61731
Model: XS 3900	T-Log Number: T61799
Contact: Steve Smith	Account Manager: -
Spec: EN301489/FCC 15B/EN300328	Class: N/A

## Run #1b: Radiated Spurious Emissions, 30 - 40000 MHz. High Channel @ 5240 MHz

Radio #2 Power Setting = 10 and Power = 11.8 dBm (Average)

	H	V	
Fundamental emission level @ 3m in 1MHz RBW:	96.8	108.54	Peak Measurement (RB=VB=1MHz)
Fundamental emission level @ 3m in 1MHz RBW:	87.3	100.07	Average Measurement (RB=1MHz, VB=10Hz)

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	
15721.53	37.0	H	54.0	-17.0	AVG	0	1.0	
15725.30	36.9	V	54.0	-17.1	AVG	0	1.0	
10480.40	47.4	V	68.0	-20.6	AVG	222	1.0	Un-restricted (Note 1)
10480.40	43.5	H	68.0	-24.5	AVG	258	1.0	Un-restricted (Note 1)
15725.30	48.0	V	74.0	-26.0	PK	0	1.0	
15721.53	48.0	H	74.0	-26.0	PK	0	1.0	
10480.40	59.0	V	88.0	-29.0	PK	222	1.0	Un-restricted (Note 1)
10480.40	55.0	H	88.0	-33.0	PK	258	1.0	Un-restricted (Note 1)

- Note 1: For emissions in restricted bands, the limit of 15.209 was used. For all other emissions, the limit was set to -27dBm/MHz (~68dBuV/m).
- Note 2: Band-edge measurement calculated from the fundamental field strength (peak or average) minus the band edge delta marker measurement.

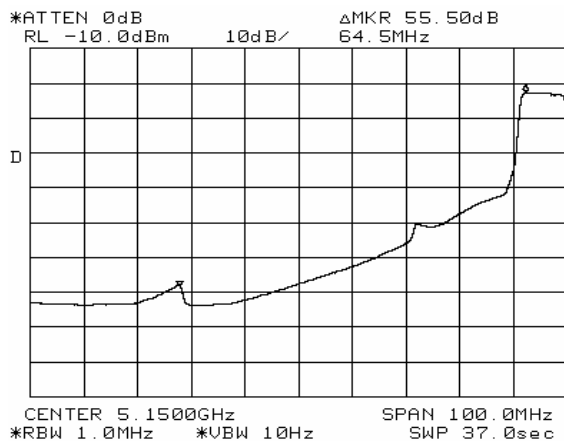
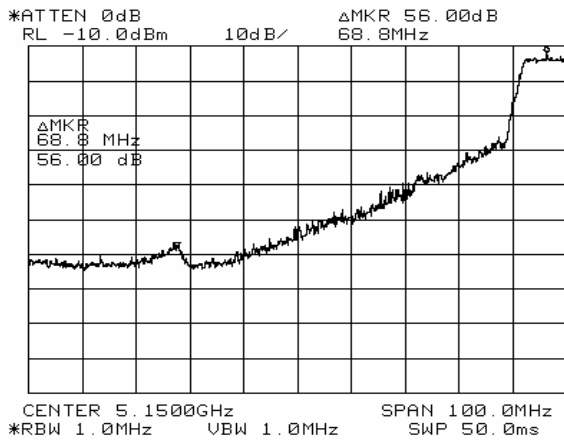


# EMC Test Data

Client: Xirrus	Job Number: J61731
Model: XS 3900	T-Log Number: T61799
Contact: Steve Smith	Account Manager: -
Spec: EN301489/FCC 15B/EN300328	Class: N/A

**Run #1c: Radiated Spurious Emissions, 30 - 40000 MHz. Center Channel @ 5200 MHz**  
**Radio #2 Power Setting = 18 and Power = 18 dBm (Average)**

	H	V	
Fundamental emission level @ 3m in 1MHz RBW:	99.7	111.9	Peak Measurement (RB=VB=1MHz)
Fundamental emission level @ 3m in 1MHz RBW:	90.0	103.1	Average Measurement (RB=1MHz, VB=10Hz)
Delta Marker - Peak	56.0		
Delta Marker - Average	55.5 dB		
Calculated Band-Edge Measurement:	55.9 dBuV/m		Peak
Calculated Band-Edge Measurement:	47.6 dBuV/m		Average



**Band Edge Signal Radiated Field Strength**

Frequency	Level	Pol	15.209 / 15E		Detector	Azimuth	Height	Comments
MHz	dBμV/m	V/H	Limit	Margin	Pk/QP/Avg	degrees	meters	
5148.910	55.9	-	74.0	-18.1	Pk	41	1.2	
5149.909	47.6	-	54.0	-6.4	Avg	41	1.2	



# EMC Test Data

Client:	Xirrus	Job Number:	J61731
Model:	XS 3900	T-Log Number:	T61799
Contact:	Steve Smith	Account Manager:	-
Spec:	EN301489/FCC 15B/EN300328	Class:	N/A

## Run #1c: Continue

Other Spurious Radiated Emissions:

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	
10398.87	53.6	V	68.0	-14.4	AVG	0	1.0	Un-restricted (Note 1)
15598.07	37.2	V	54.0	-16.8	AVG	0	1.0	
15597.05	37.1	H	54.0	-16.9	AVG	0	1.0	
10398.87	65.5	V	88.0	-22.5	PK	0	1.0	Un-restricted (Note 1)
15598.07	49.5	V	74.0	-24.5	PK	0	1.0	
15597.05	48.6	H	74.0	-25.4	PK	0	1.0	
10398.67	40.8	H	68.0	-27.2	AVG	172	2.5	Un-restricted (Note 1)
10398.67	48.6	H	88.0	-39.4	PK	172	2.5	Un-restricted (Note 1)

Note 1: For emissions in restricted bands, the limit of 15.209 was used. For all other emissions, the limit was set to -27dBm/MHz (~68dBuV/m).

## Run #1d: Radiated Spurious Emissions, 30 - 40000 MHz. High Channel @ 5260 MHz

Radio #2 Power Setting = 16 and Power = 17.5 dBm (Average)

	H	V	
Fundamental emission level @ 3m in 1MHz RBW:	102	113.82	Peak Measurement (RB=VB=1MHz)
Fundamental emission level @ 3m in 1MHz RBW:	92.9	105.36	Average Measurement (RB=1MHz, VB=10Hz)

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	
10518.75	74.5	H	88.0	-13.5	PK	217	1.0	Non-restricted
10518.89	51.1	V	68.0	-16.9	AVG	222	1.1	Non-restricted
15778.88	37.0	H	54.0	-17.0	AVG	200	1.0	
15779.21	37.0	V	54.0	-17.0	AVG	287	2.0	
10518.75	47.4	H	68.0	-20.6	AVG	217	1.0	Non-restricted
10518.89	64.1	V	88.0	-23.9	PK	222	1.1	Non-restricted
15778.88	49.4	H	74.0	-24.6	PK	200	1.0	
15779.21	49.1	V	74.0	-24.9	PK	287	2.0	

Note 1: For emissions in restricted bands, the limit of 15.209 was used. For all other emissions, the limit was set to -

Note 2: Band-edge measurement calculated from the fundamental field strength (peak or average) minus the band edge



# EMC Test Data

Client:	Xirrus	Job Number:	J61731
Model:	XS 3900	T-Log Number:	T61799
Contact:	Steve Smith	Account Manager:	-
Spec:	EN301489/FCC 15B/EN300328	Class:	N/A

**Run #1e: Radiated Spurious Emissions, 30 - 40000 MHz. High Channel @ 5320 MHz**  
**Radio #0 Power Setting = 12**

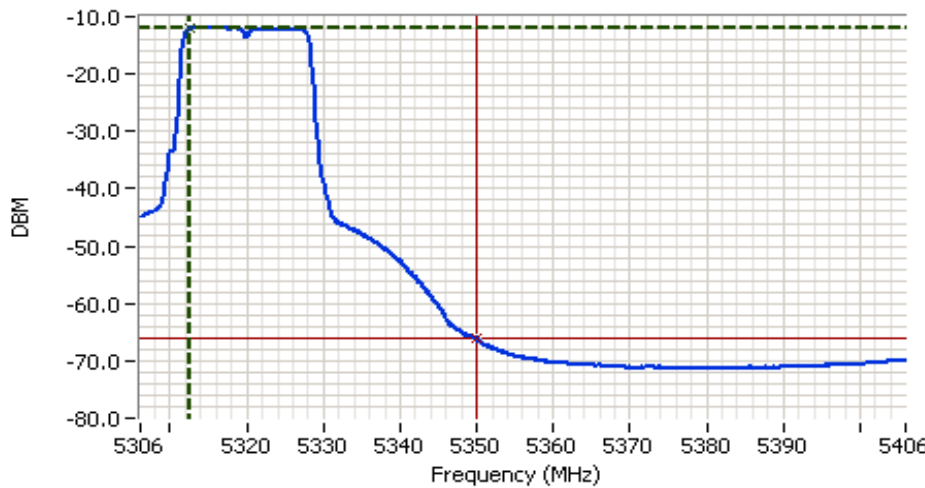
	H	V	
Fundamental emission level @ 3m in 1MHz RBW:	96.3	107.2	Peak Measurement (RB=VB=1MHz)
Fundamental emission level @ 3m in 1MHz RBW:	87.6	98.6	Average Measurement (RB=1MHz, VB=10Hz)
Delta Marker - Peak	48.0 dB		
Delta Marker - Average	54.0 dB		
Calculated Band-Edge Measurement:	59.2 dBuV/m		Peak
Calculated Band-Edge Measurement:	44.6 dBuV/m		Average

Other Spurious Radiated Emissions:

Frequency	Level	Pol	15.209 / 15.247		Detector	Azimuth	Height	Comments
MHz	dBuV/m	V/H	Limit	Margin	Pk/QP/Avg	degrees	meters	
10643.65	53.2	V	54.0	-0.8	AVG	224	1.0	
10639.19	65.6	V	74.0	-8.4	PK	224	1.0	
10640.51	44.7	H	54.0	-9.3	AVG	215	1.0	
15958.61	39.4	H	54.0	-14.6	AVG	250	1.0	
15960.48	38.3	V	54.0	-15.8	AVG	78	1.0	
10640.51	57.0	H	74.0	-17.0	PK	215	1.0	
15960.48	49.8	V	74.0	-24.2	PK	78	1.0	
15958.61	49.4	H	74.0	-24.7	PK	250	1.0	

- Note 1: For emissions in restricted bands, the limit of 15.209 was used. For all other emissions, the limit was set to -  
 Note 2: Band-edge measurement calculated from the fundamental field strength (peak or average) minus the band edge

Client: Xirrus	Job Number: J61731
Model: XS 3900	T-Log Number: T61799
Contact: Steve Smith	Account Manager: -
Spec: EN301489/FCC 15B/EN300328	Class: N/A

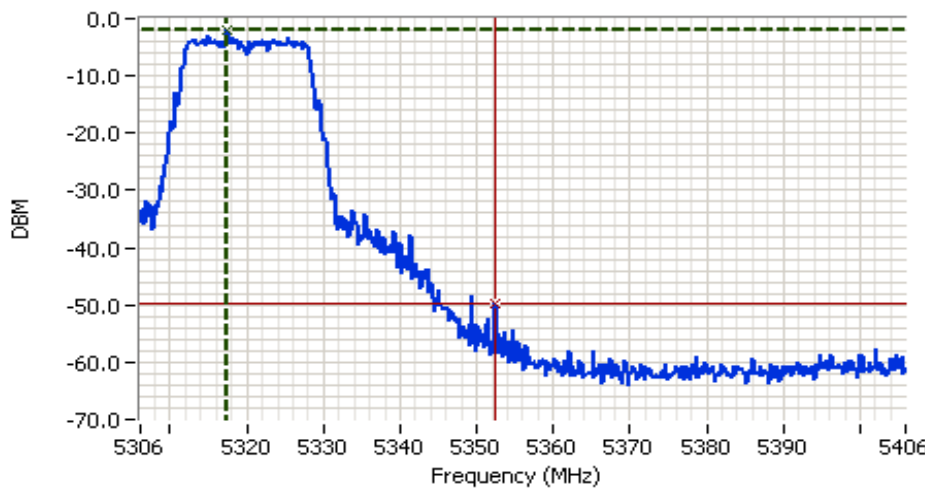


**Analyzer Settings**  
 HP8564E,EMI  
 CF: 5356.10 MHz  
 SPAN:100.00 MHz  
 RB 1.000 MHz  
 VB 10 Hz  
 Detector Sample  
 Att 10  
 RL Offset 0.00  
 Sweep Time 37.0s  
 Ref Lvl:-8.90DBM

**Comments**  
 802.11a,  
 Channel 64, 5320 MHz  
 Power Setting = 12  
 Peak

Cursor 1	5312.58	-12.07	
Cursor 2	5350.02	-66.07	

Delta Freq. 37.44  
 Delta Amplitude 54.00



**Analyzer Settings**  
 HP8564E,EMI  
 CF: 5356.10 MHz  
 SPAN:100.00 MHz  
 RB 1.000 MHz  
 VB 1.000 MHz  
 Detector POS  
 Att 10  
 RL Offset 0.00  
 Sweep Time 50.0ms  
 Ref Lvl:0.00DBM

**Comments**  
 802.11a,  
 Channel 64, 5320 MHz  
 Power Setting = 12  
 Peak

Cursor 1	5317.41	-1.83	
Cursor 2	5352.35	-49.83	

Delta Freq. 34.94  
 Delta Amplitude 48.00





# EMC Test Data

Client: Xirrus	Job Number: J61731
Model: XS 3900	T-Log Number: T61799
	Account Manager: -
Contact: Steve Smith	
Spec: EN301489/FCC 15B/EN300328	Class: N/A

## Radiated Emissions U-NII Internal Antenna

### Test Specifics

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: 11/29/2005

Config. Used: 1

Test Engineer: Chris Byleckie

Config Change: None

Test Location: SVOATS #2

EUT Voltage: 120V/60Hz

### General Test Configuration

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

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

### Ambient Conditions:

Temperature: 11 °C

Rel. Humidity: 89 %

### Summary of Results

Run #	Test Performed	Limit	Pass / Fail	Result / Margin
1a - c	RE, 1000 - 40000 MHz - Spurious Emissions	FCC Part 15.209 / 15.247( c)	Pass	53.8dBµV/m (489.8µV/m) @ 5149.9MHz (-0.2dB)

### Modifications Made During Testing:

Modifications are detailed under each run description.

### Deviations From The Standard

No deviations were made from the requirements of the standard.





# EMC Test Data

Client: Xirrus	Job Number: J61731
Model: XS 3900	T-Log Number: T61799
Contact: Steve Smith	Account Manager: -
Spec: EN301489/FCC 15B/EN300328	Class: N/A

## Run #1a: Radiated Spurious Emissions, 1000 - 40000 MHz. Low Channel @ 5180 MHz

### Radio #2 Power Setting = 9 and Power = 11.6 dBm (Average)

	H	V	
Fundamental emission level @ 3m in 1MHz RBW:	87.2	111.0	Peak Measurement (RB=VB=1MHz)
Fundamental emission level @ 3m in 1MHz RBW:	78.8	102.0	Average Measurement (RB=1MHz, VB=10Hz)
Delta Marker - Peak	42.5 dB		
Delta Marker - Average	48.2 dB		
Calculated Band-Edge Measurement:	68.5 dBuV/m		Peak
Calculated Band-Edge Measurement:	53.8 dBuV/m		Average

### Band Edge Signal Radiated Field Strength

Frequency	Level	Pol	15.209 / 15E		Detector	Azimuth	Height	Comments
MHz	dBμV/m	V/H	Limit	Margin	Pk/QP/Avg	degrees	meters	
5149.909	53.8	-	54.0	-0.2	Avg	41	1.2	Note 2
5148.910	68.5	-	74.0	-5.5	Pk	41	1.2	Note 2

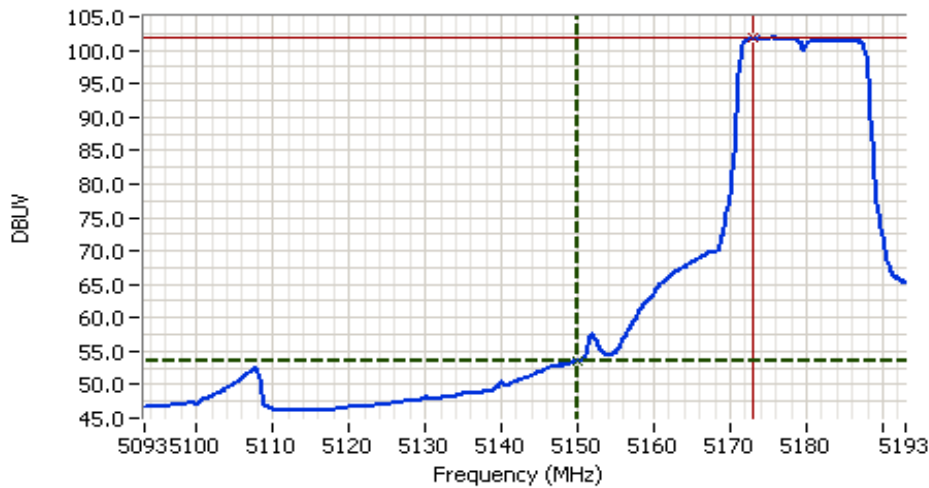
### Other Spurious Radiated Emissions:

Frequency	Level	Pol	15.209 / 15E		Detector	Azimuth	Height	Comments
MHz	dBμV/m	V/H	Limit	Margin	Pk/QP/Avg	degrees	meters	
10363.07	34.6	V	68.0	-33.4	AVG	8	1.5	Un-restricted (Note 1)
10363.07	48.5	V	88.0	-39.5	PK	8	1.5	Un-restricted (Note 1)
15531.63	32.6	V	54.0	-21.4	AVG	1	1.0	
15531.63	43.9	V	74.0	-30.1	PK	1	1.0	
10369.83	30.8	H	68.0	-37.2	AVG	40	2.2	
10369.83	41.7	H	88.0	-46.3	PK	40	2.2	
15539.80	32.7	H	54.0	-21.3	AVG	10	1.6	
15539.80	44.3	H	74.0	-29.7	PK	10	1.6	

Note 1: For emissions in restricted bands, the limit of 15.209 was used. For all other emissions, the limit was set to -27dBm/MHz (~68dBuV/m).

Note 2: Band-edge measurement calculated from the fundamental field strength (peak or average) minus the band edge delta marker measurement.

Client: Xirus	Job Number: J61731
Model: XS 3900	T-Log Number: T61799
Contact: Steve Smith	Account Manager: -
Spec: EN301489/FCC 15B/EN300328	Class: N/A

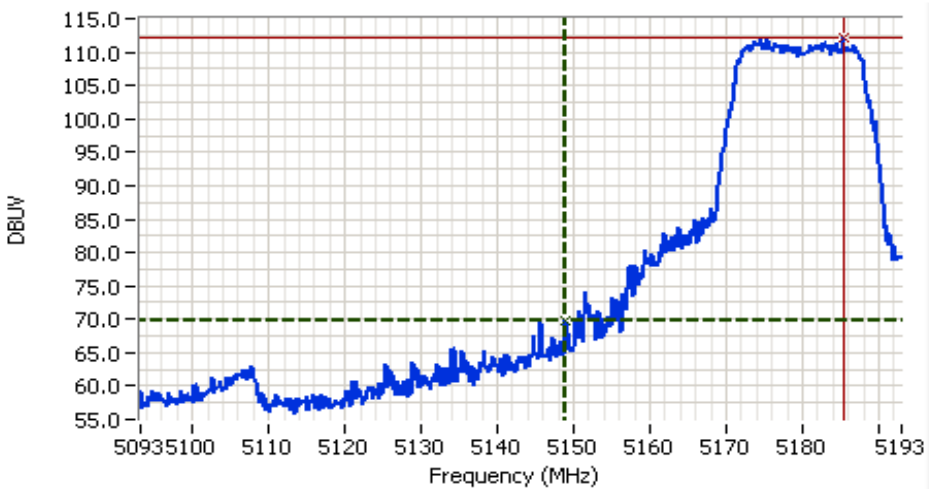


**Analyzer Settings**  
 HP8564E,EMI  
 CF: 5143.17 MHz  
 SPAN:100.00 MHz  
 RB 1.000 MHz  
 VB 10 Hz  
 Detector Sample  
 Att 20  
 RL Offset 0.00  
 Sweep Time 37.0s  
 Ref Lvl:112.60DBUW

**Comments**  
 Power Setting: 9  
 Avg

Cursor 1	5149.90	53.60	
Cursor 2	5172.87	101.77	

Delta Freq. 22.96  
 Delta Amplitude 48.17



**Analyzer Settings**  
 HP8564E,EMI  
 CF: 5143.17 MHz  
 SPAN:100.00 MHz  
 RB 1.000 MHz  
 VB 1.000 MHz  
 Detector POS  
 Att 20  
 RL Offset 0.00  
 Sweep Time 50.0ms  
 Ref Lvl:112.60DBUW

**Comments**  
 Power Setting: 9  
 Peak

Cursor 1	5148.91	69.77	
Cursor 2	5185.35	112.27	

Delta Freq. 36.44  
 Delta Amplitude 42.50





# EMC Test Data

Client: Xirrus	Job Number: J61731
Model: XS 3900	T-Log Number: T61799
	Account Manager: -
Contact: Steve Smith	
Spec: EN301489/FCC 15B/EN300328	Class: N/A

**Run #1b: Radiated Spurious Emissions, 30 - 40000 MHz. High Channel @ 5240 MHz**

**Radio #2 Power Setting = 10 and Power = 11.8 dBm (Average)**

	H	V	
Fundamental emission level @ 3m in 1MHz RBW:	97.5	110.8	Peak Measurement (RB=VB=1MHz)
Fundamental emission level @ 3m in 1MHz RBW:	88.5	101.5	Average Measurement (RB=1MHz, VB=10Hz)

Frequency	Level	Pol	15.209 / 15.247		Detector	Azimuth	Height	Comments
MHz	dBμV/m	V/H	Limit	Margin	Pk/QP/Avg	degrees	meters	
10480.40	48.2	V	68.0	-19.8	AVG	71	1.5	Un-restricted (Note 1)
10480.40	60.3	V	88.0	-27.7	PK	71	1.5	Un-restricted (Note 1)
15725.30	32.2	V	54.0	-21.9	AVG	78	1.0	
15725.30	43.5	V	74.0	-30.5	PK	78	1.0	
15721.53	32.2	H	54.0	-21.8	AVG	104	1.0	
15721.53	43.7	H	74.0	-30.4	PK	104	1.0	

Note 1:	For emissions in restricted bands, the limit of 15.209 was used. For all other emissions, the limit was set to -27dBm/MHz (~68dBuV/m).
Note 2:	Band-edge measurement calculated from the fundamental field strength (peak or average) minus the band edge delta marker measurement.



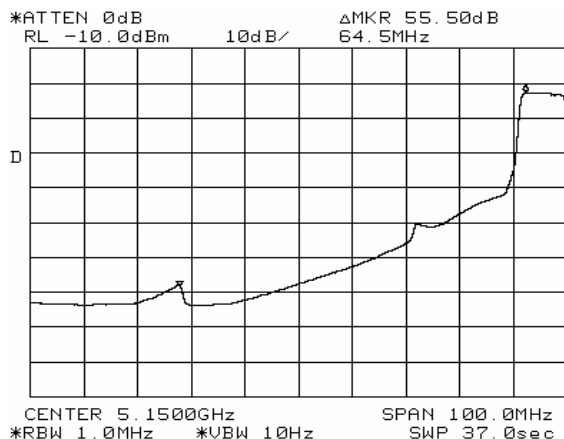
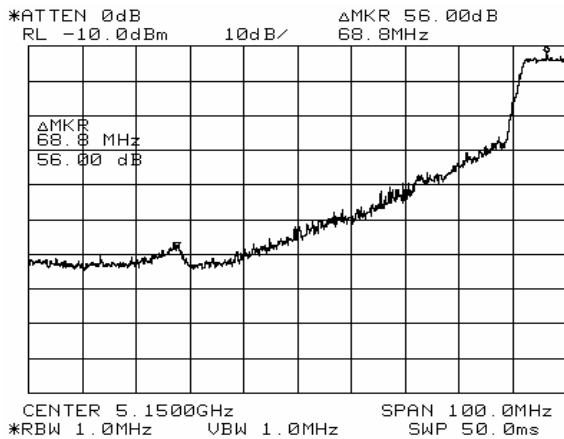
# EMC Test Data

Client: Xirrus	Job Number: J61731
Model: XS 3900	T-Log Number: T61799
Contact: Steve Smith	Account Manager: -
Spec: EN301489/FCC 15B/EN300328	Class: N/A

**Ambient Conditions:** Temperature: 9 °C Rel. Humidity: 69% %  
 Date of Test: 12/7/2005 Config. Used: 1  
 Test Engineer: Chris Byleckie Config Change: None  
 Test Location: SVOATS #1 EUT Voltage: 120V/60Hz

**Run #1c: Radiated Spurious Emissions, 30 - 40000 MHz. Center Channel @ 5200 MHz**  
**Radio #2 Power Setting = 18 and Power = 18 dBm (Average)**

	H	V	
Fundamental emission level @ 3m in 1MHz RBW:	99.2	117.9	Peak Measurement (RB=VB=1MHz)
Fundamental emission level @ 3m in 1MHz RBW:	89.9	108.6	Average Measurement (RB=1MHz, VB=10Hz)
Delta Marker - Peak	56.0		
Delta Marker - Average	55.5 dB		
Calculated Band-Edge Measurement:	61.9 dBuV/m		Peak
Calculated Band-Edge Measurement:	53.1 dBuV/m		Average



**Band Edge Signal Radiated Field Strength**

Frequency	Level	Pol	15.209 / 15E		Detector	Azimuth	Height	Comments
MHz	dBμV/m	V/H	Limit	Margin	Pk/QP/Avg	degrees	meters	
5148.910	61.9	-	74.0	-12.1	Pk	41	1.2	
5149.909	53.1	-	54.0	-0.9	Avg	41	1.2	



## EMC Test Data

Client:	Xirrus	Job Number:	J61731
Model:	XS 3900	T-Log Number:	T61799
Contact:	Steve Smith	Account Manager:	-
Spec:	EN301489/FCC 15B/EN300328	Class:	N/A

### Run #1c: Continue

Other Spurious Radiated Emissions:

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	
10398.87	53.3	V	68.0	-14.7	AVG	190	1.3	Un-restricted (Note 1)
10398.87	66.7	V	88.0	-21.3	PK	190	1.3	Un-restricted (Note 1)
15598.07	41.0	V	54.0	-13.0	AVG	202	1.0	
15598.07	51.6	V	74.0	-22.4	PK	202	1.0	
10398.67	47.9	H	68.0	-20.1	AVG	239	1.0	Un-restricted (Note 1)
10398.67	60.8	H	88.0	-27.2	PK	239	1.0	Un-restricted (Note 1)
15597.05	40.7	H	54.0	-13.3	AVG	80	1.0	
15597.05	51.4	H	74.0	-22.6	PK	80	1.0	

Note 1: For emissions in restricted bands, the limit of 15.209 was used. For all other emissions, the limit was set to -27dBm/MHz (~68dBuV/m).

### Run #1d: Radiated Spurious Emissions, 30 - 40000 MHz. High Channel @ 5260 MHz

Radio #2 Power Setting = 16 and Power = 17.5 dBm (Average)

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	
10518.89	42.0	H	68.0	-26.0	AVG	136	1.0	Un-restricted (Note 1)
10518.89	54.0	H	88.0	-34.0	PK	136	1.0	Un-restricted (Note 1)
15779.21	40.2	H	54.0	-13.9	AVG	137	1.0	
15779.21	51.4	H	74.0	-22.6	PK	137	1.0	
10518.75	45.8	V	68.0	-22.2	AVG	245	2.3	Un-restricted (Note 1)
10518.75	58.7	V	88.0	-29.3	PK	245	2.3	Un-restricted (Note 1)
15778.88	39.9	V	54.0	-14.1	AVG	84	1.0	
15778.88	51.1	V	74.0	-22.9	PK	84	1.0	

Note 1: For emissions in restricted bands, the limit of 15.209 was used. For all other emissions, the limit was set to -

Note 2: Band-edge measurement calculated from the fundamental field strength (peak or average) minus the band edge



# EMC Test Data

Client:	Xirrus	Job Number:	J61731
Model:	XS 3900	T-Log Number:	T61799
Contact:	Steve Smith	Account Manager:	-
Spec:	EN301489/FCC 15B/EN300328	Class:	N/A

Date of Test: 12/7/2005  
 Test Engineer: Mehran Birgani  
 Test Location: SVOATS #1

Config. Used: 1  
 Config Change: None  
 EUT Voltage: 120V/60Hz

**Run #1e: Radiated Spurious Emissions, 30 - 40000 MHz. High Channel @ 5320 MHz**  
**Radio #0 Power Setting = 12 and Power ~ 12.8 dBm (Average)**

	H	V	
Fundamental emission level @ 3m in 1MHz RBW:	107.0	116.7	Peak Measurement (RB=VB=1MHz)
Fundamental emission level @ 3m in 1MHz RBW:	92.8	107.0	Average Measurement (RB=1MHz, VB=10Hz)
Delta Marker - Peak	48.0 dB		
Delta Marker - Average	54.0 dB		
Calculated Band-Edge Measurement:	68.7 dBuV/m		Peak
Calculated Band-Edge Measurement:	53.0 dBuV/m		Average

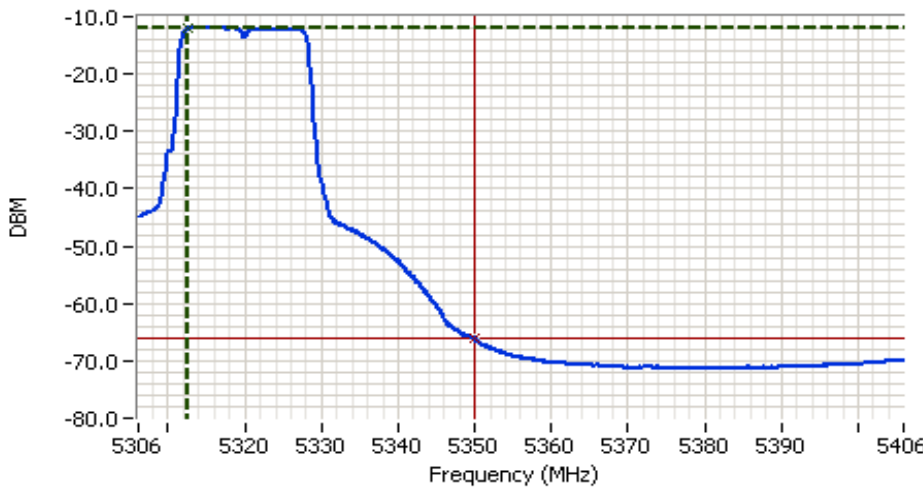
Other Spurious Radiated Emission, tested at power setting 16 to cover spurious emissions for other channels in the band at this s

Frequency	Level	Pol	15.209 / 15.247		Detector	Azimuth	Height	Comments
MHz	dBuV/m	V/H	Limit	Margin	Pk/QP/Avg	degrees	meters	
10643.65	37.7	V	68.0	-30.3	AVG	152	1.0	
10639.19	49.3	V	88.0	-38.7	PK	152	1.0	
15960.48	40.9	V	54.0	-13.1	AVG	210	1.0	
15960.48	51.8	V	74.0	-22.2	PK	210	1.0	
10640.51	38.0	H	54.0	-16.0	AVG	61	1.0	
10640.51	49.3	H	74.0	-24.7	PK	61	1.0	
15958.61	40.5	H	54.0	-13.5	AVG	319	1.0	
15958.61	52.1	H	74.0	-21.9	PK	319	1.0	

Note 1: For emissions in restricted bands, the limit of 15.209 was used. For all other emissions, the limit was set to -

Note 2: Band-edge measurement calculated from the fundamental field strength (peak or average) minus the band edge

Client: Xirrus	Job Number: J61731
Model: XS 3900	T-Log Number: T61799
Contact: Steve Smith	Account Manager: -
Spec: EN301489/FCC 15B/EN300328	Class: N/A

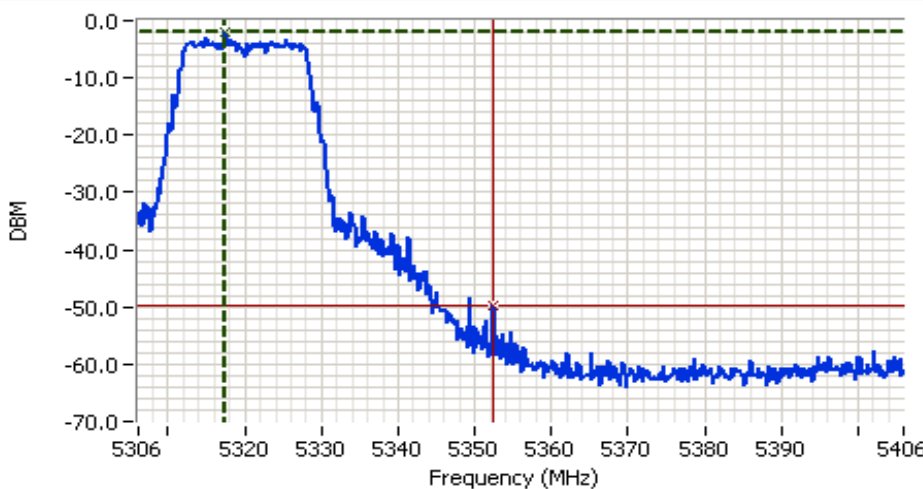


**Analyzer Settings**  
 HP8564E,EMI  
 CF: 5356.10 MHz  
 SPAN:100.00 MHz  
 RB 1.000 MHz  
 VB 10 Hz  
 Detector Sample  
 Att 10  
 RL Offset 0.00  
 Sweep Time 37.0s  
 Ref Lvl:-8.90DBM

**Comments**  
 802.11a,  
 Channel 64, 5320 MHz  
 Power Setting = 12  
 Peak

Cursor 1	5312.58	-12.07	
Cursor 2	5350.02	-66.07	

Delta Freq. 37.44  
 Delta Amplitude 54.00



**Analyzer Settings**  
 HP8564E,EMI  
 CF: 5356.10 MHz  
 SPAN:100.00 MHz  
 RB 1.000 MHz  
 VB 1.000 MHz  
 Detector POS  
 Att 10  
 RL Offset 0.00  
 Sweep Time 50.0ms  
 Ref Lvl:0.00DBM

**Comments**  
 802.11a,  
 Channel 64, 5320 MHz  
 Power Setting = 12  
 Peak

Cursor 1	5317.41	-1.83	
Cursor 2	5352.35	-49.83	

Delta Freq. 34.94  
 Delta Amplitude 48.00





Client:	Xirrus	Job Number:	J61731
Model:	XS 3900	T-Log Number:	T61799
		Account Manager:	-
Contact:	Steve Smith		
Spec:	EN301489/FCC 15B/EN300328	Class:	N/A

**FCC 15.247 DTS - Power, Bandwidth and Spurious Emissions**

**Test Specifics**

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: 12/23/2005	Config. Used: 1
Test Engineer: Chris Byleckie	Config Change: None
Test Location: SVOATS #1	EUT Voltage: 120V/60Hz

**General Test Configuration**

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

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

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

<b>Ambient Conditions:</b>	Temperature:	16 °C
	Rel. Humidity:	90 %

**Summary of Results**

Run #	Test Performed	Limit	Pass / Fail	Result / Margin
1	RE, 30 - 40000 MHz - Spurious Emissions	FCC Part 15.209 / 15.247( c)	Pass	> 20dBc
2	6dB Bandwidth	15.247(a)	Pass	16.5MHz @ 5785MHz
3	Output Power	15.247(b)	Pass	20.5dBm max per transceiver. 27.5 dBm aggregate
4	Power Spectral Density (PSD)	15.247(d)	Pass	-9.58dBm

**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.

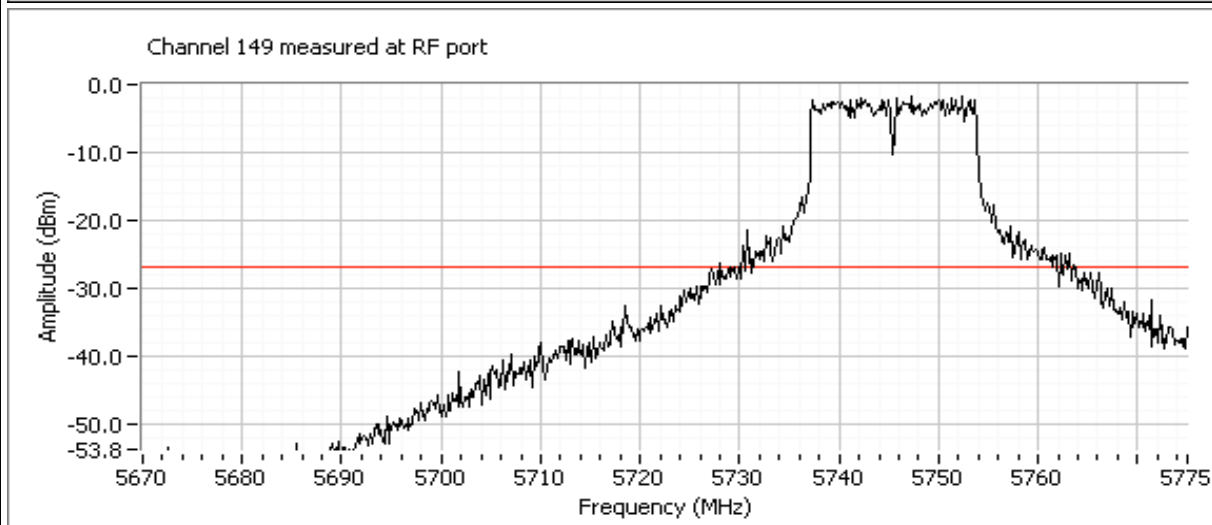
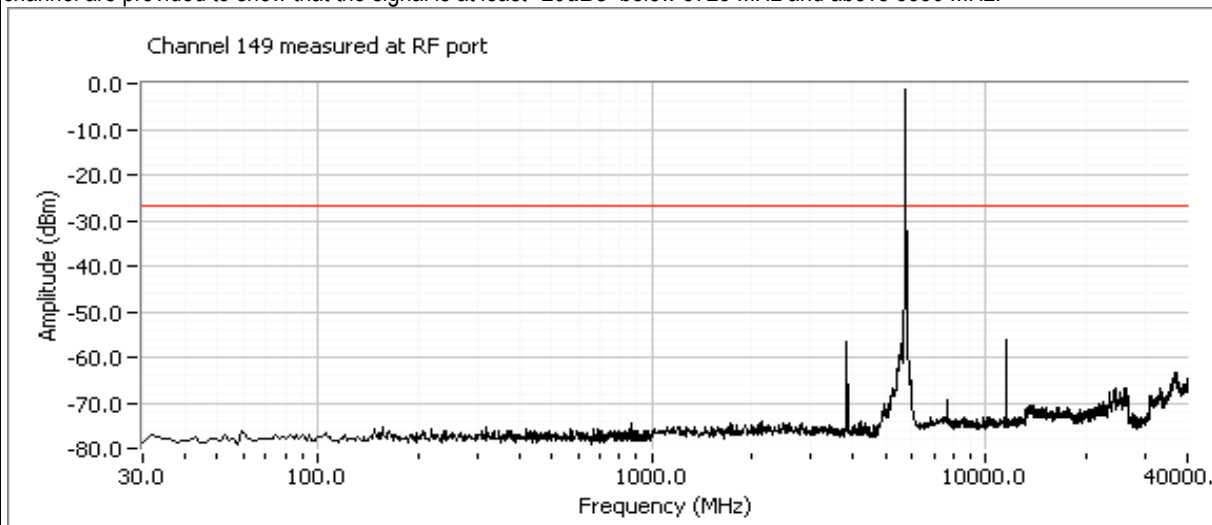


Client: Xirrus	Job Number: J61731
Model: XS 3900	T-Log Number: T61799
Contact: Steve Smith	Account Manager: -
Spec: EN301489/FCC 15B/EN300328	Class: N/A

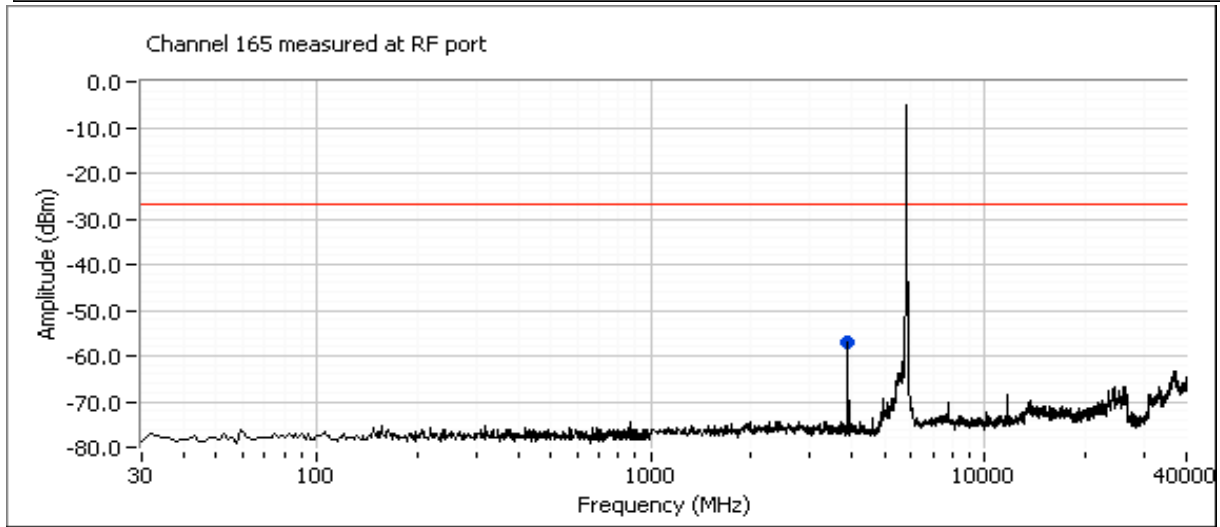
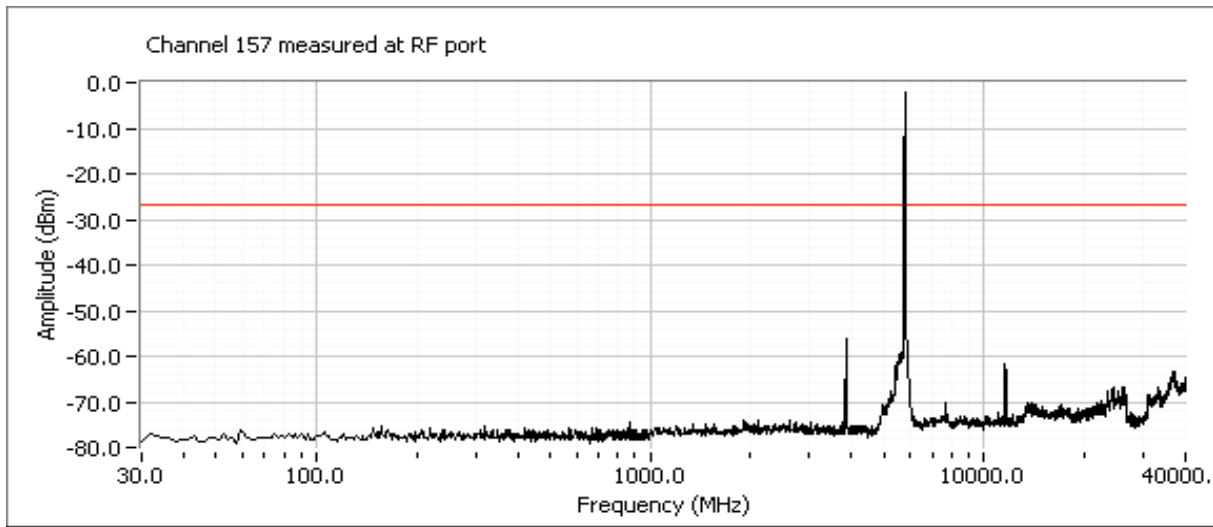
**Run #1: Antenna Conducted Spurious Emissions, 30 - 40000 MHz.**

Refer to plots below. Scans made using RBW=VB=100 KHz with the limit line set at 20dB below the highest in-band signal level.

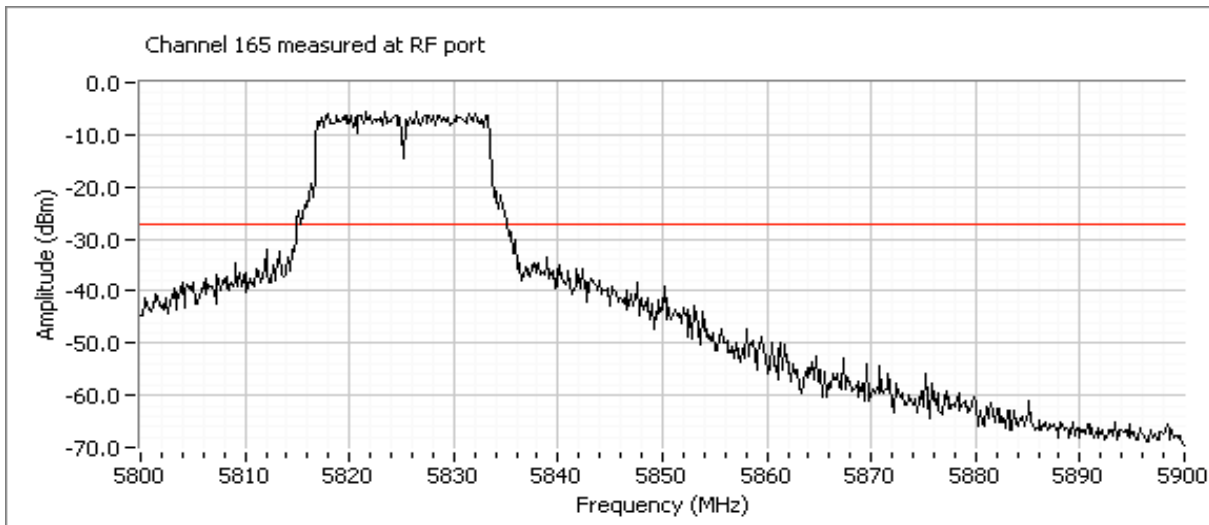
If the device operates in the 5725 - 5850 band plots of 5700 - 5780 MHz for the lowest channel and 5820 - 5900 for the highest channel are provided to show that the signal is at least **-20dBc** below 5725 MHz and above 5850 MHz.



Client: Xirrus	Job Number: J61731
Model: XS 3900	T-Log Number: T61799
Contact: Steve Smith	Account Manager: -
Spec: EN301489/FCC 15B/EN300328	Class: N/A

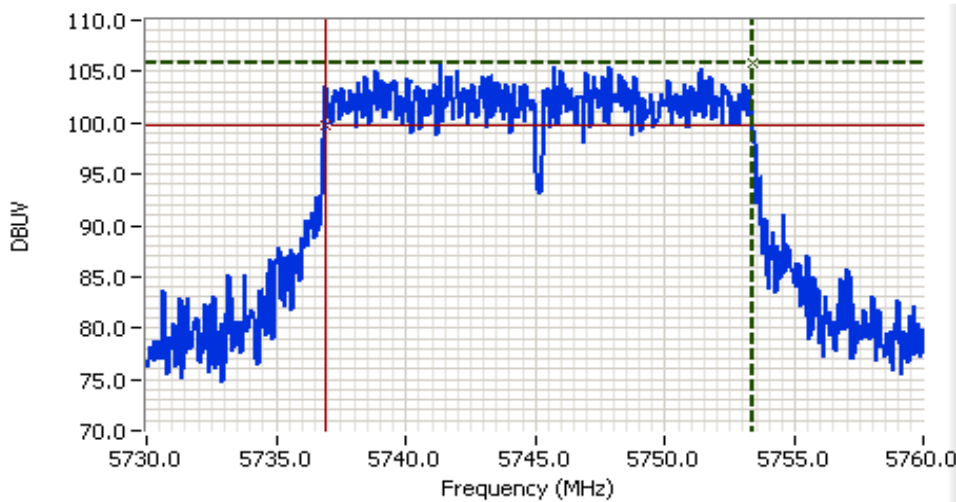


Client: Xirrus	Job Number: J61731
Model: XS 3900	T-Log Number: T61799
Contact: Steve Smith	Account Manager: -
Spec: EN301489/FCC 15B/EN300328	Class: N/A



Run #2: Signal Bandwidth

Power Setting	Frequency (MHz)	Resolution Bandwidth	6dB Signal Bandwidth	99% Signal Bandwidth
18	5745	100kHz	16.5	17.2
18	5785	100kHz	16.6	17.9
18	5825	100kHz	16.5	16.5



**Analyzer Settings**  
 HP8564E,006,EMI,UK6  
 CF: 5745.00 MHz  
 SPAN:30.00 MHz  
 RB 100 kHz  
 VB 100 kHz  
 Detector POS  
 Att 20  
 RL Offset 0.00  
 Sweep Time 50.0ms  
 Ref Lvl:110.00DBU

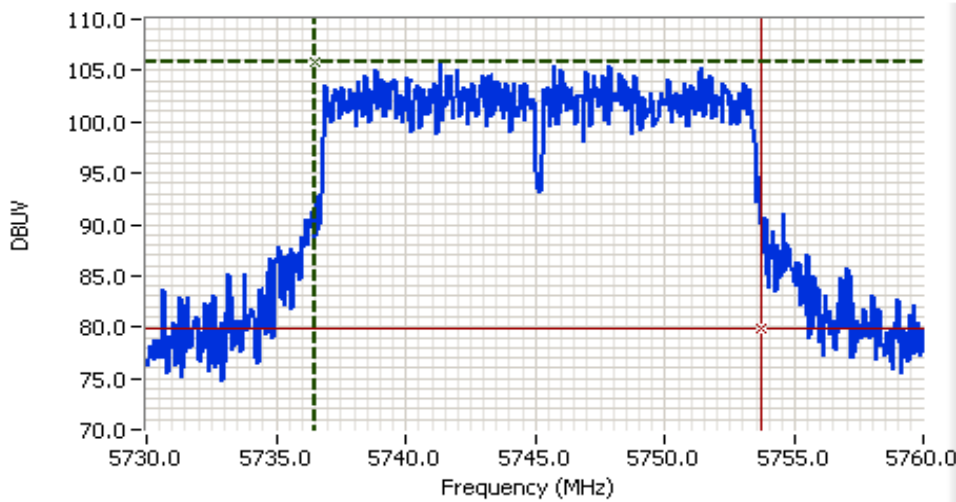
**Comments**

Cursor 1	5753.36	105.83	
Cursor 2	5736.88	99.83	

Delta Freq. 16.47  
 Delta Amplitude 6.00



Client: Xirrus	Job Number: J61731
Model: XS 3900	T-Log Number: T61799
Contact: Steve Smith	Account Manager: -
Spec: EN301489/FCC 15B/EN300328	Class: N/A

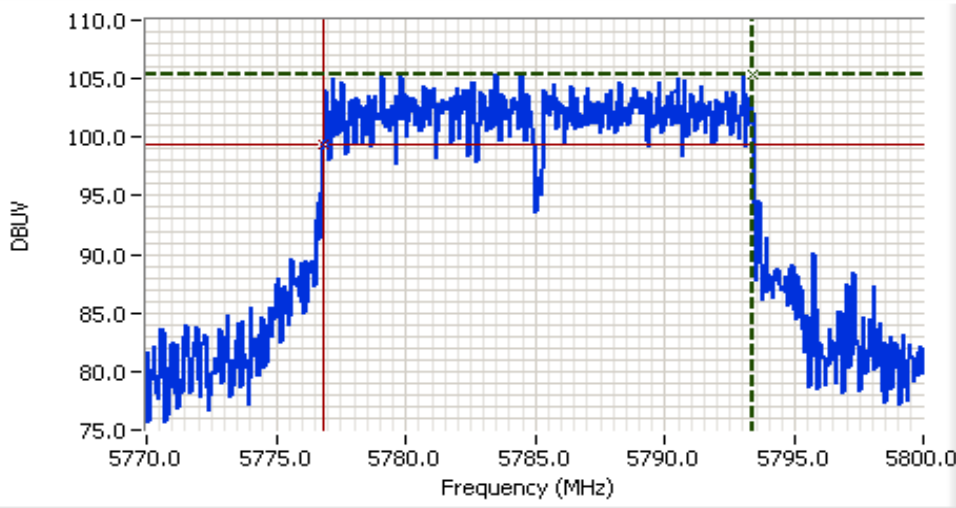


**Analyzer Settings**  
 HP8564E,006,EMI,UK6  
 CF: 5745.00 MHz  
 SPAN:30.00 MHz  
 RB 100 kHz  
 VB 100 kHz  
 Detector POS  
 Att 20  
 RL Offset 0.00  
 Sweep Time 50.0ms  
 Ref Lvl:110.00DBLW

**Comments**

Cursor 1	5736.52	105.83	
Cursor 2	5753.72	79.83	

Delta Freq. 17.20  
 Delta Amplitude 26.00



**Analyzer Settings**  
 HP8564E,006,EMI,UK6  
 CF: 5785.00 MHz  
 SPAN:30.00 MHz  
 RB 100 kHz  
 VB 100 kHz  
 Detector POS  
 Att 20  
 RL Offset 0.00  
 Sweep Time 50.0ms  
 Ref Lvl:110.00DBLW

**Comments**

Cursor 1	5793.41	105.42	
Cursor 2	5776.83	99.42	

Delta Freq. 16.57  
 Delta Amplitude 6.00



Client: Xirrus	Job Number: J61731
Model: XS 3900	T-Log Number: T61799
Contact: Steve Smith	Account Manager: -
Spec: EN301489/FCC 15B/EN300328	Class: N/A

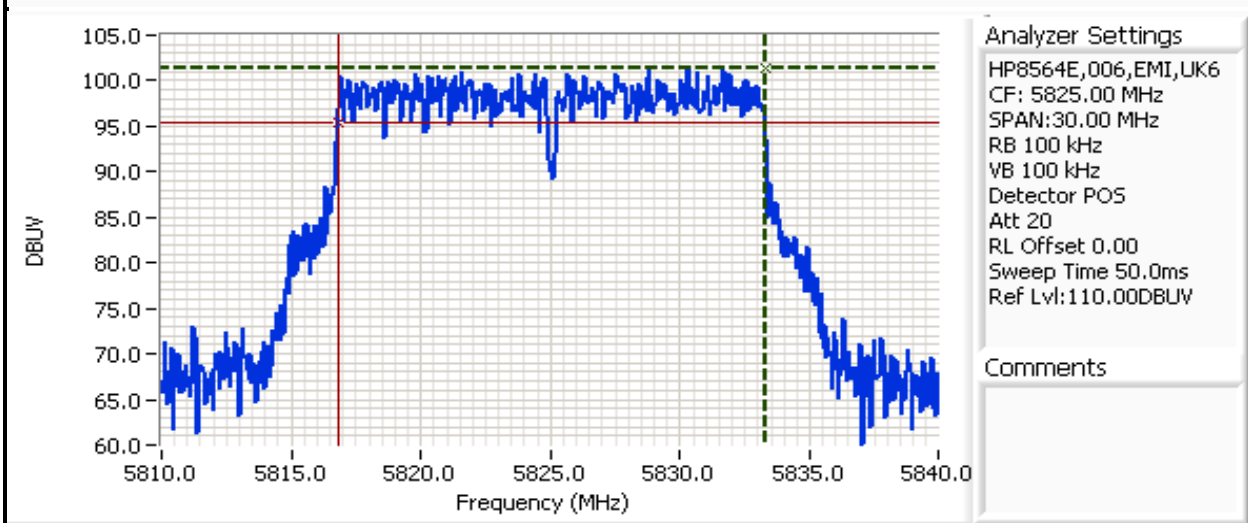


Cursor 1 5776.17 105.42

Cursor 2 5794.07 79.42

Delta Freq. 17.90

Delta Amplitude 26.00



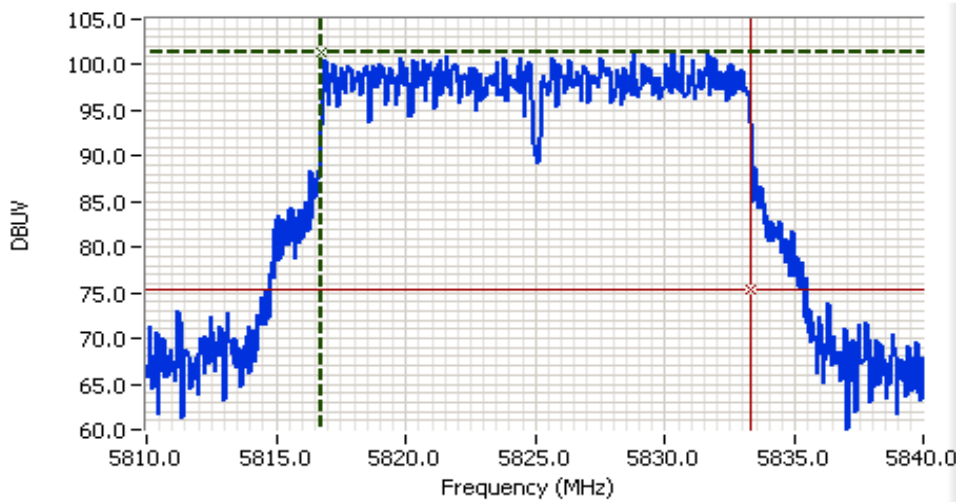
Cursor 1 5833.26 101.42

Cursor 2 5816.78 95.42

Delta Freq. 16.47

Delta Amplitude 6.00

Client: Xirrus	Job Number: J61731
Model: XS 3900	T-Log Number: T61799
Contact: Steve Smith	Account Manager: -
Spec: EN301489/FCC 15B/EN300328	Class: N/A



**Analyzer Settings**

HP8564E,006,EMI,UK6  
 CF: 5825.00 MHz  
 SPAN: 30.00 MHz  
 RB 100 kHz  
 VB 100 kHz  
 Detector POS  
 Att 20  
 RL Offset 0.00  
 Sweep Time 50.0ms  
 Ref Lvl: 110.00DBUW

**Comments**

Cursor 1	5816.77?	101.42	
Cursor 2	5833.27?	75.42	

Delta Freq. 16.50  
 Delta Amplitude 26.00



**Run #3: Output Power**

Maximum antenna gain: 6 dBi Highest gain of external and internal antennas

Power Setting	Frequency (MHz)	Output Power <sup>Note 1</sup>		EIRP W	Average Power <sup>Note 2</sup>	
		dBm	W		dBm	W
18	5745	20.5	0.112	0.447	17.0	0.050
18	5785	20.5	0.112	0.447	17.1	0.051
18	5825	18.7	0.074	0.295	17.0	0.050

Note 1: Output power measured using a peak power meter

Note 2: Output power measured using an average power sensor - this value is for reference purposes and MPE calculations.

**Aggregate power in the 5725 - 5850 MHz Band:**

With up to five transceivers operating in the band (5 non-overlapping channels, 5745, 5765, 5785, 5805, 5825 MHz):

Maximum power per radio:	20.5 dBm	0.112 W	
Number of radios:	5		
Total average power across the band is:	<b>27.5</b> dBm	0.561 W	(EIRP = 3.49 W)
Maximum power permitted in the band is:	<b>30.0</b> dBm	1.000 W	

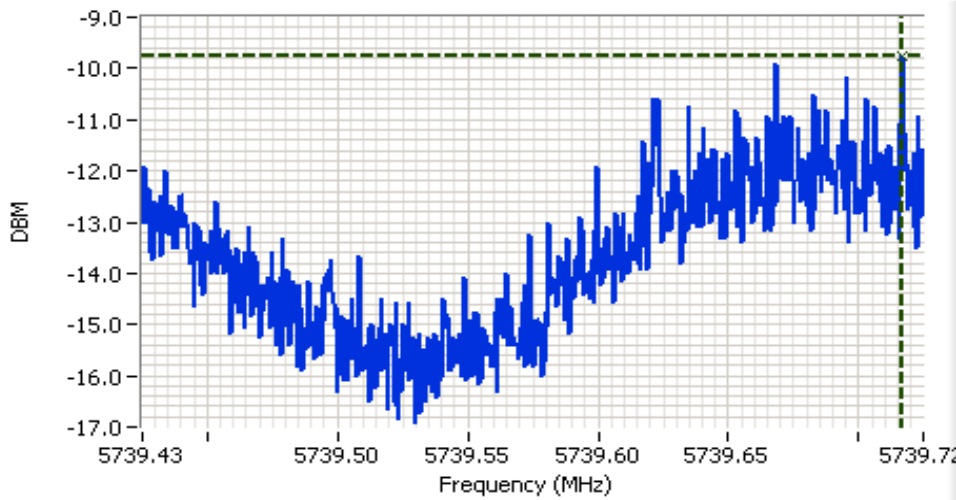
Client: Xirrus	Job Number: J61731
Model: XS 3900	T-Log Number: T61799
Contact: Steve Smith	Account Manager: -
Spec: EN301489/FCC 15B/EN300328	Class: N/A

**Run #4: Power Spectral Density**

Power Setting	Operating Frequency (MHz)	Freq. @ PPSD	Res BW	P.S.D. (dBm/3kHz)
18	5745	5739	3kHz	-9.75
18	5785	5782	3kHz	-9.58
18	5825	5825	3kHz	-13.25

Note 1: Freq. @ PPSD: Frequency of the Peak Power Spectral Density (PPSD)

Note 2: Power spectral density measured using RB=3 kHz, VB=10kHz with a sweep time set to ensure a dwell time of at least 1 second per 3kHz. The measurement is made at the frequency of PPSD determined from preliminary scans using RB=3kHz using multiple sweeps at a faster rate over the 6dB bandwidth of the signal.



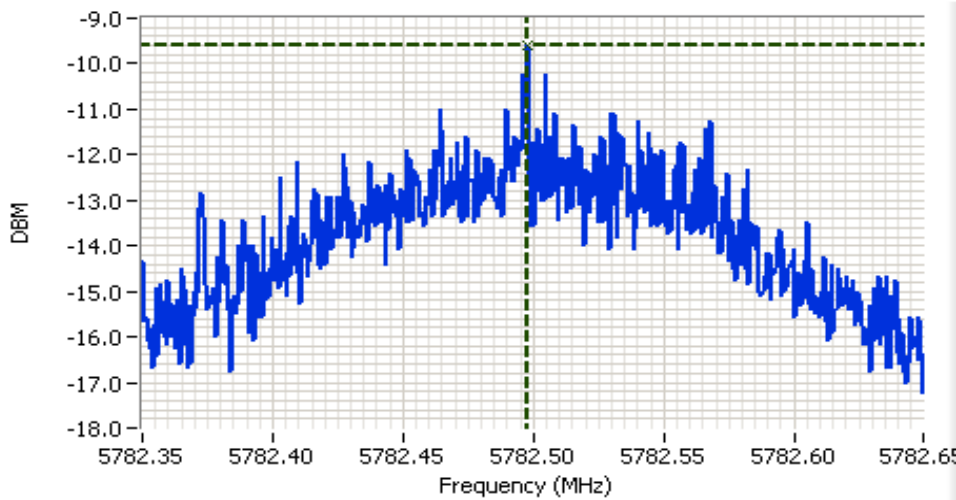
**Analyzer Settings**

HP8564E,006,EMI,UK6  
 CF: 5739.58 MHz  
 SPAN: 300 kHz  
 RB 3 kHz  
 VB 10 kHz  
 Detector POS  
 Att 20  
 RL Offset 0.00  
 Sweep Time 100.0s  
 Ref Lvl: 3.00DBM

**Comments**

Cursor 1	5739.71	-9.75	
	0.000	0.00	

Client: Xirrus	Job Number: J61731
Model: XS 3900	T-Log Number: T61799
Contact: Steve Smith	Account Manager: -
Spec: EN301489/FCC 15B/EN300328	Class: N/A

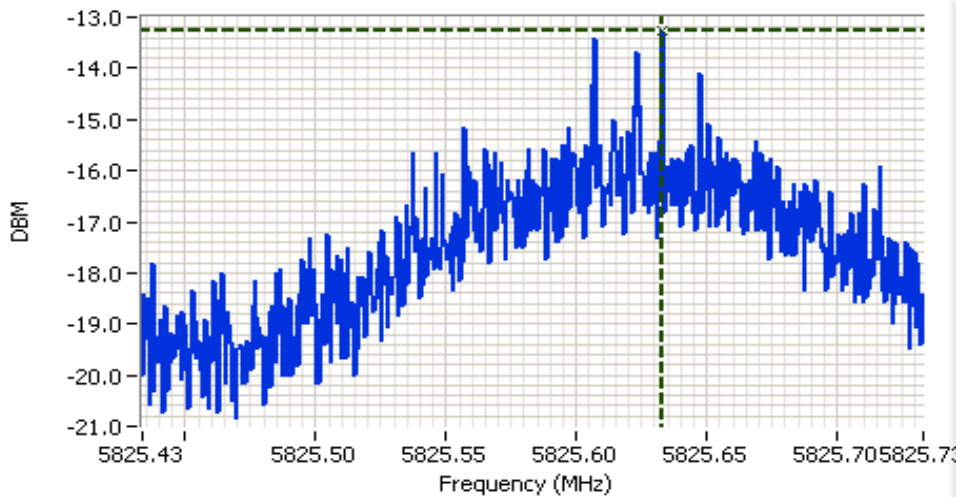


**Analyzer Settings**  
 HP8564E,006,EMI,UK6  
 CF: 5782.50 MHz  
 SPAN:300 kHz  
 RB 3 kHz  
 VB 10 kHz  
 Detector POS  
 Att 20  
 RL Offset 0.00  
 Sweep Time 100.0s  
 Ref Lvl:3.00DBM

**Comments**

Cursor 1 5782.49 -9.58

0.000 0.00



**Analyzer Settings**  
 HP8564E,006,EMI,UK6  
 CF: 5825.58 MHz  
 SPAN:300 kHz  
 RB 3 kHz  
 VB 10 kHz  
 Detector POS  
 Att 20  
 RL Offset 0.00  
 Sweep Time 100.0s  
 Ref Lvl:3.00DBM

**Comments**

Cursor 1 5825.63 -13.25

0.000 0.00







# EMC Test Data

Client: Xirrus	Job Number: J61731
Model: XS 3900	T-Log Number: T61799
	Account Manager: -
Contact: Steve Smith	
Spec: EN301489/FCC 15B/EN300328	Class: N/A

## FCC 15.247 DTS - Spurious Emissions with External Antenna

### Test Specifics

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: 12/13/2005

Config. Used: 1

Test Engineer: Chris Byleckie

Config Change: none

Test Location: SVOATS #3

EUT Voltage: 120V/60Hz

### General Test Configuration

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

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

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

### Ambient Conditions:

Temperature: 9 °C

Rel. Humidity: 69 %

### Summary of Results

Run #	Test Performed	Limit	Pass / Fail	Result / Margin
1	RE, 1000 - 40000 MHz - Spurious Emissions	FCC Part 15.209 / 15.247( c)	Pass	48.2dBµV/m (258.2µV/m) @ 11529.1MHz (-5.8dB)

### 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: J61731
Model: XS 3900	T-Log Number: T61799
Contact: Steve Smith	Account Manager: -
Spec: EN301489/FCC 15B/EN300328	Class: N/A

**Cushcraft 3dBd Omni antenna**  
**Run #1a: Radiated Spurious Emissions, 1000 - 40000 MHz. Low Channel @ 5745 MHz**  
**Power setting - 18**

	H	V
Fundamental emission level @ 3m in 100kHz RBW:	89.5	102.6
Limit for emissions outside of restricted bands:	82.6 dB $\mu$ V/m	

	H	V	
Fundamental emission level @ 3m in 1MHz RBW:	98.1	112.9	Peak Measurement (RB=VB=1MHz)
Fundamental emission level @ 3m in 1MHz RBW:	89.3	104.1	Average Measurement (RB=1MHz, VB=10Hz)

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	
11488.53	48.0	V	54.0	-6.0	AVG	86	1.0	
11488.94	47.7	H	54.0	-6.3	AVG	81	1.4	
11488.53	60.8	V	74.0	-13.3	PK	86	1.0	
11488.94	59.3	H	74.0	-14.7	PK	81	1.4	
17236.29	54.8	H	82.6	-27.9	PK	233	1.0	Non-restricted
17233.88	54.4	V	82.6	-28.2	PK	139	1.0	Non-restricted

Note 1: For emissions in restricted bands, the limit of 15.209 was used. For all other emissions, the limit was set 20dB below the level of the fundamental.



# EMC Test Data

Client: Xirrus	Job Number: J61731
Model: XS 3900	T-Log Number: T61799
Contact: Steve Smith	Account Manager: -
Spec: EN301489/FCC 15B/EN300328	Class: N/A

## Run #1b: Radiated Spurious Emissions, 1000 - 40000 MHz. Center Channel @ 5765 MHz

### Power setting - 18

	H	V
Fundamental emission level @ 3m in 100kHz RBW:	90.08	104
Limit for emissions outside of restricted bands:	84 dBµV/m	

	H	V
Fundamental emission level @ 3m in 1MHz RBW:	99.25	113.83
Fundamental emission level @ 3m in 1MHz RBW:	90.76	105

Peak Measurement (RB=VB=1MHz)  
Average Measurement (RB=1MHz, VB=10Hz)

Frequency	Level	Pol	15.209 / 15.247		Detector	Azimuth	Height	Comments
MHz	dBµV/m	v/h	Limit	Margin	Pk/QP/Avg	degrees	meters	
11529.14	48.2	V	54.0	-5.8	AVG	86	1.0	
11529.55	43.1	H	54.0	-10.9	AVG	108	1.0	
11529.14	60.3	V	74.0	-13.7	PK	86	1.0	
11529.55	56.1	H	74.0	-18.0	PK	108	1.0	
17293.96	55.9	V	84.0	-28.1	PK	34	1.0	Non-restricted
17294.14	55.4	H	84.0	-28.6	PK	149	1.0	Non-restricted

Note 1: For emissions in restricted bands, the limit of 15.209 was used. For all other emissions, the limit was set 20dB below the level of the fundamental.

## Run #1c: Radiated Spurious Emissions, 1000 - 40000 MHz. High Channel @ 5825 MHz

### Power setting - 18

	H	V
Fundamental emission level @ 3m in 100kHz RBW:	85.61	99.3
Limit for emissions outside of restricted bands:	79.3 dBµV/m	

	H	V
Fundamental emission level @ 3m in 1MHz RBW:	95.2	109.8
Fundamental emission level @ 3m in 1MHz RBW:	86.7	100.8

Peak Measurement (RB=VB=1MHz)  
Average Measurement (RB=1MHz, VB=10Hz)

Frequency	Level	Pol	15.209 / 15.247		Detector	Azimuth	Height	Comments
MHz	dBµV/m	v/h	Limit	Margin	Pk/QP/Avg	degrees	meters	
11648.61	39.1	V	54.0	-14.9	AVG	89	1.0	
11650.51	37.3	H	54.0	-16.7	AVG	300	1.0	
11648.61	51.2	V	74.0	-22.8	PK	89	1.0	
17475.25	56.3	V	79.3	-23.0	PK	301	1.0	Non-restricted
17473.50	56.01	H	79.3	-23.3	PK	204	1.0	Non-restricted
11650.51	48.1	H	74.0	-25.9	PK	300	1.0	

Note 1: For emissions in restricted bands, the limit of 15.209 was used. For all other emissions, the limit was set 20dB below the level of the fundamental.



# EMC Test Data

Client: Xirrus	Job Number: J61731
Model: XS 3900	T-Log Number: T61799
	Account Manager: -
Contact: Steve Smith	
Spec: EN301489/FCC 15B/EN300328	Class: N/A

## FCC 15.247 DTS - Spurious Emissions with Internal Antenna

### Test Specifics

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: 12/7/2005

Config. Used: 1

Test Engineer: Chris Byleckie

Config Change: none

Test Location: SVOATS #1

EUT Voltage: 120V/60Hz

### General Test Configuration

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

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

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

### Ambient Conditions:

Temperature: 9 °C

Rel. Humidity: 69 %

### Summary of Results

Run #	Test Performed	Limit	Pass / Fail	Result / Margin
1	RE, 1000 - 40000 MHz - Spurious Emissions	FCC Part 15.209 / 15.247( c)	Pass	45.9dBµV/m (196.6µV/m) @ 11529.1MHz (-8.1dB)

### Modifications Made During Testing:

No modifications were made to the EUT during testing

### Deviations From The Standard

No deviations were made from the requirements of the standard.



## EMC Test Data

Client:	Xirrus	Job Number:	J61731
Model:	XS 3900	T-Log Number:	T61799
Contact:	Steve Smith	Account Manager:	-
Spec:	EN301489/FCC 15B/EN300328	Class:	N/A

**Run #1a: Radiated Spurious Emissions, 1000 - 40000 MHz. Low Channel @ 5745 MHz**

**Power setting - 18**

	H	V
Fundamental emission level @ 3m in 100kHz RBW:	95.31	111.22
Limit for emissions outside of restricted bands:	91.22 dBµV/m	

	H	V	
Fundamental emission level @ 3m in 1MHz RBW:	100.9	118.7	Peak Measurement (RB=VB=1MHz)
Fundamental emission level @ 3m in 1MHz RBW:	91.8	109.8	Average Measurement (RB=1MHz, VB=10Hz)

Frequency MHz	Level dBµV/m	Pol v/h	15.209 / 15.247		Detector Pk/QP/Avg	Azimuth degrees	Height meters	Comments
			Limit	Margin				
11488.53	45.2	V	54.0	-8.8	AVG	249	2.4	
11488.53	57.4	V	74.0	-16.6	PK	249	2.4	
17233.88	55.8	V	91.2	-35.4	PK	257	1.0	Non-restricted
11488.94	42.5	H	54.0	-11.5	AVG	241	1.0	
11488.94	53.5	H	74.0	-20.5	PK	241	1.0	
17236.29	56.1	H	91.2	-35.1	PK	186	1.0	Non-restricted

Note 1: For emissions in restricted bands, the limit of 15.209 was used. For all other emissions, the limit was set 20dB below the level of the fundamental.



# EMC Test Data

Client: Xirrus	Job Number: J61731
Model: XS 3900	T-Log Number: T61799
Contact: Steve Smith	Account Manager: -
Spec: EN301489/FCC 15B/EN300328	Class: N/A

## Run #1b: Radiated Spurious Emissions, 1000 - 40000 MHz. Center Channel @ 5765 MHz

### Power setting - 18

	H	V
Fundamental emission level @ 3m in 100kHz RBW:	96.23	111.98
Limit for emissions outside of restricted bands:	91.98 dB $\mu$ V/m	

	H	V
Fundamental emission level @ 3m in 1MHz RBW:	102.5	121.3
Fundamental emission level @ 3m in 1MHz RBW:	93.5	112.5

Peak Measurement (RB=VB=1MHz)  
Average Measurement (RB=1MHz, VB=10Hz)

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	
11529.14	45.9	V	54.0	-8.1	AVG	198	1.0	
11529.14	58.5	V	74.0	-15.6	PK	198	1.0	
17293.96	56.7	V	92.0	-35.3	PK	182	1.0	Non-restricted
11529.55	41.9	H	54.0	-12.1	AVG	186	1.0	
11529.55	53.5	H	74.0	-20.5	PK	186	1.0	
17294.14	56.8	H	92.0	-35.2	PK	167	1.0	Non-restricted

Note 1: For emissions in restricted bands, the limit of 15.209 was used. For all other emissions, the limit was set 20dB below the level of the fundamental.

## Run #1c: Radiated Spurious Emissions, 1000 - 40000 MHz. High Channel @ 5825 MHz

### Power setting - 18

	H	V
Fundamental emission level @ 3m in 100kHz RBW:	95.2	111.3
Limit for emissions outside of restricted bands:	91.3 dB $\mu$ V/m	

	H	V
Fundamental emission level @ 3m in 1MHz RBW:	102.1	120.9
Fundamental emission level @ 3m in 1MHz RBW:	92.5	112.1

Peak Measurement (RB=VB=1MHz)  
Average Measurement (RB=1MHz, VB=10Hz)

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	
11648.61	44.8	V	54.0	-9.2	AVG	73	1.0	
11648.61	57.6	V	74.0	-16.4	PK	73	1.0	
17475.25	56.2	V	91.3	-35.1	PK	68	1.0	Non-restricted
11650.51	41.5	H	54.0	-12.5	AVG	64	1.0	
11650.51	54.0	H	74.0	-20.0	PK	64	1.0	
17473.50	56.1	H	91.3	-35.2	PK	60	1.0	Non-restricted

Note 1: For emissions in restricted bands, the limit of 15.209 was used. For all other emissions, the limit was set 20dB below the level of the fundamental.



# EMC Test Data

Client: Xirrus	Job Number: J61731
Model: XS 3900	T-Log Number: T61799
	Account Manager: -
Contact: Steve Smith	
Spec: EN301489/FCC 15B/EN300328	Class: B

## Digital Device and Receiver Radiated Emissions

### Test Specifics

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: 11/29/2005

Config. Used: 1

Test Engineer: Chris Byleckie

Config Change: None

Test Location: SVOATS #2

EUT Voltage: 120V/60Hz

### General Test Configuration

The EUT and all local support equipment were located on the turntable for radiated emissions testing. Remote support equipment was located approximately 5 meters from the test area with all I/O connections routed overhead.

The test distance and extrapolation factor (if used) 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.

Note, for testing above 1 GHz, the FCC specifies the limit as an average measurement. In addition, the FCC states that the peak reading of any emission above 1 GHz, can not exceed the average limit by more than 20 dB.

### Ambient Conditions:

Temperature: 14 °C

Rel. Humidity: 67 %

### Summary of Results

Run #	Test Performed	Limit	Result	Margin
1	RE, 1000 - 15000 MHz, Maximized Emissions	FCC B	Pass	51.4dBµV/m (372.8µV/m) @ 7000.0MHz (-2.6dB)

### Modifications Made During Testing:

No modifications were made to the EUT during testing

### Deviations From The Standard

No deviations were made from the requirements of the standard.



## EMC Test Data

Client:	Xirrus	Job Number:	J61731
Model:	XS 3900	T-Log Number:	T61799
Contact:	Steve Smith	Account Manager:	-
Spec:	EN301489/FCC 15B/EN300328	Class:	B

**Radios set to receive mode on FCC channels (1, 6, 11, 36, 40, 44, 48, 52, 56, 60, 64, 100, 108, 120 & 140)**

**Run #1: Maximized readings, 1000 - 15,000 MHz (Receiver)**

FCC Class B limits used since these are from the receiver

Frequency MHz	Level dB $\mu$ V/m	Pol v/h	FCC Class B		Detector Pk/QP/Avg	Azimuth degrees	Height meters	Comments
			Limit	Margin				
7000.028	51.4	V	54.0	-2.6	AVG	198	1.0	
6946.605	51.4	V	54.0	-2.6	AVG	168	1.0	
7080.018	51.1	V	54.0	-2.9	AVG	256	1.6	
7053.426	50.4	V	54.0	-3.6	AVG	255	1.4	
6920.025	50.3	V	54.0	-3.7	AVG	141	1.4	
6973.345	50.2	V	54.0	-3.8	AVG	177	2.1	
6893.302	49.9	V	54.0	-4.1	AVG	18	1.0	
7026.770	49.7	V	54.0	-4.3	AVG	228	1.2	
7673.402	35.8	V	54.0	-18.2	AVG	0	1.0	
7700.638	35.6	V	54.0	-18.4	AVG	303	1.0	
7647.056	35.6	V	54.0	-18.5	AVG	28	1.0	
7727.470	35.0	V	54.0	-19.0	AVG	0	1.0	
6893.302	53.3	V	74.0	-20.7	PK	18	1.0	
6920.025	52.8	V	75.0	-22.2	PK	141	1.4	
6946.605	53.6	V	76.0	-22.4	PK	168	1.0	
6973.345	53.1	V	77.0	-23.9	PK	177	2.1	
7000.028	53.8	V	78.0	-24.2	PK	198	1.0	
7026.770	52.3	V	79.0	-26.7	PK	228	1.2	
7053.426	53.3	V	80.0	-26.7	PK	255	1.4	
7080.018	53.7	V	81.0	-27.3	PK	256	1.6	
7647.056	46.7	V	82.0	-35.3	PK	28	1.0	
7673.402	46.9	V	83.0	-36.1	PK	0	1.0	
7700.638	47.2	V	84.0	-36.8	PK	303	1.0	
7727.470	47.1	V	85.0	-37.9	PK	0	1.0	

Note 1: FCC Class B / RSS 210 Receive mode limit used for all emissions above 1GHz







# EMC Test Data

Client: Xirrus	Job Number: J61731
Model: XS 3900	T-Log Number: T61799
Contact: Steve Smith	Account Manager: -
Spec: EN301489/FCC 15B/EN300328	Class: B

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

Frequency MHz	Level dBmV/m	Pol v/h	Class A		Detector Pk/QP/Avg	Azimuth degrees	Height meters	Comments
			Limit	Margin				
396.000	42.0	H	47.0	-5.0	QP	298	1.9	
500.000	41.3	H	47.0	-5.7	QP	213	1.0	
750.000	41.2	V	47.0	-5.8	QP	131	1.6	
396.000	41.0	V	47.0	-6.0	QP	216	3.3	
500.000	39.0	V	47.0	-8.0	QP	109	1.0	
625.000	38.8	H	47.0	-8.2	QP	54	1.0	Note 1
625.000	37.5	V	47.0	-9.5	QP	360	1.0	Note 1
198.000	30.0	V	40.0	-10.0	QP	360	1.0	
198.000	27.5	H	40.0	-12.5	QP	360	4.0	
750.000	33.8	H	47.0	-13.2	QP	57	1.0	
30.700	21.3	V	40.0	-18.7	QP	98	1.0	BB
30.700	19.0	H	40.0	-21.0	QP	0	1.0	BB

Note 1: Measured at 3m. Applied -10.5 dB correction factor.

## Run #2: Maximized Readings From Run #1

Frequency MHz	Level dBμV/m	Pol v/h	Class A		Detector Pk/QP/Avg	Azimuth degrees	Height meters	Comments
			Limit	Margin				
396.000	42.0	H	47.0	-5.0	QP	298	1.9	
500.000	41.3	H	47.0	-5.7	QP	213	1.0	
750.000	41.2	V	47.0	-5.8	QP	131	1.6	
396.000	41.0	V	47.0	-6.0	QP	216	3.3	
500.000	39.0	V	47.0	-8.0	QP	109	1.0	
625.000	38.8	H	47.0	-8.2	QP	54	1.0	Note 1

Note 1: Measured at 3m. Applied -10.5 dB correction factor.



# EMC Test Data

Client:	Xirrus	Job Number:	J61731
Model:	XS 3900	T-Log Number:	T61799
Contact:	Steve Smith	Account Manager:	-
Spec:	EN301489/FCC 15B/EN300328	Class:	B

**Run #3: Maximized readings, 1000 - 15,000 MHz (Digital Device)**  
Measurements made at 3m test distance and extrapolated to 10m using -10.5 correction factor.

Frequency	Level	Pol	FCC Class A		Detector	Azimuth	Height	Comments
MHz	dB $\mu$ V/m	v/h	Limit	Margin	Pk/QP/Avg	degrees	meters	
2475.098	36.4	V	49.5	-13.1	Avg	91	1.0	
2475.098	36.2	H	49.5	-13.3	Avg	360	1.7	
1650.047	35.0	V	49.5	-14.5	Avg	90	1.9	
2475.098	54.6	H	69.5	-14.9	Pk	360	1.7	
1485.047	33.6	V	49.5	-15.9	Avg	231	1.5	
2475.098	50.6	V	69.5	-18.9	Pk	91	1.0	
1650.047	49.6	V	69.5	-19.9	Pk	92	1.9	
1485.047	49.6	V	69.5	-19.9	Pk	231	1.5	
1485.047	29.2	H	49.5	-20.3	Avg	338	1.0	
1650.047	28.5	H	49.5	-21.0	Avg	360	2.2	
1485.047	43.9	H	69.5	-25.6	Pk	338	1.0	
1650.047	40.4	H	69.5	-29.1	Pk	360	2.2	