

***Electromagnetic Emissions Test Report
and
Application for Grant of Equipment Authorization
pursuant to
FCC Part 15, Subpart C (15.247) DTS Specifications,
FCC Part 15, Subpart E (UNII Devices) and
Industry Canada RSS 210 Issue 6 (LELEAN Devices)
on the Xirrus, Inc.
Model: XS-3500***

FCC ID: SK6XS35004
UPN: 5428A-XS35004

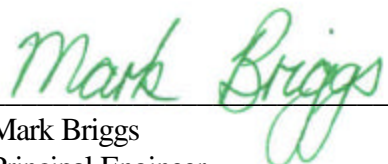
GRANTEE: Xirrus, Inc.
370 North Westlake Blvd., Suite 200
Westlake Village, CA 91362

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

REPORT DATE: August 24, 2005

FINAL TEST DATE: July 22, July 25, July 29, August 1, August 9,
August 10 and August 23, 2005

AUTHORIZED SIGNATORY:



Mark Briggs
Principal Engineer



2016-01

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DECLARATIONS OF COMPLIANCE

Equipment Name and Model:
XS-3500

Manufacturer:
Xirus, Inc.
370 North Westlake Blvd., Suite 200
Westlake Village, CA 91362

Tested to applicable standards:
RSS-210, Issue 6, September 2005, "Low-power Licence-exempt Radiocommunication Devices (All Frequency Bands): Category I Equipment"
RSS-Gen Issue 1, September 2005, "General Requirements and Information for the Certification of Radiocommunication Equipment"
FCC Part 15.247 (DTS)
FCC Part 15 Subpart E (UNII Devices)

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

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 RSS-212, "Test Facilities and Test Methods for Radio Equipment" as referenced by section 4 of 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
Company Elliott Laboratories Inc.
Address 684 W. Maude Ave
Sunnyvale, CA 94086
USA

Date: August 24, 2005

Maintenance of compliance with the above standards 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.).

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SCOPE

An electromagnetic emissions test has been performed on the Xirrus, Inc. model XS-3500 pursuant to Subparts C and E of Part 15 of FCC Rules for Unlicensed National Information Infrastructure (UNII) devices and RSS-210 Issue 6 for licence-exempt local area network (LELAN) devices. Conducted and radiated emissions data has been collected, reduced, and analyzed within this report in accordance with measurement guidelines set forth in ANSI C63.4:2003 and RSS-212 Issue 1 as outlined in Elliott Laboratories test procedures.

The intentional radiator above has been tested in a simulated typical installation to demonstrate compliance with the relevant FCC 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-3500 and therefore apply only to the tested sample. The sample was selected and prepared by Ian Laity of Xirrus, Inc.

OBJECTIVE

The primary objective of the manufacturer is compliance with Subparts C and E of Part 15 of FCC Rules and RSS 210 for the radiated and conducted emissions of intentional radiators. Certification of these devices is required as a prerequisite to marketing as defined in Part 2 the FCC Rules and Industry Canada publications RSP 100 and RSS GEN.

Certification is a procedure where the manufacturer or a contracted laboratory makes measurements and submits the test data and technical information to the FCC. The FCC issues a grant of equipment authorization upon successful completion of their 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.

SUMMARY OF RESULTS**FCC 15.247/RSS 210 (o): 2400 – 2483.5 MHz BAND**

FCC Part 15 Section	RSS 210 Section	Description	Measured Value	Comments	Result
15.247(a)	A8.2	Digital Modulation	Systems uses OFDM and DSSS techniques	System must utilize a digital transmission technology	Complies
15.247 (a) (2)	A8.2 (1)	6dB Bandwidth	> 12 MHz	Minimum allowed is 500kHz	Complies
	RSP 100	99% Bandwidth	802.11b: 14.6MHz 802.11g: 16.9MHz	For information only	Complies
15.247 (b) (3)	A8.4 (4)	Output Power ¹ 2400 - 2483.5 MHz	802.11b: 26.3dBm (0.428 Watts) 802.11g: 27.2dBm (0.528 Watts)	Maximum permitted is 1Watt, with EIRP limited to 4 Watts.	Complies
15.247(d)	A8.2 (2)	Power Spectral Density	7.8dBm / 3kHz	Maximum permitted is 8dBm/3kHz	Complies
15.247(c)	A8.4 (5)	Antenna Port Spurious Emissions -30MHz – 26 GHz	All spurious emissions < -30dBc	All spurious emissions < -30dBc ² .	Complies
15.247(c) / 15.209	A8.4 (5)	Radiated Spurious Emissions -30MHz – 26 GHz	53.8dBμV/m (489.8μV/m) @ 2487.5MHz (-0.2dB)	Emissions in restricted bands must meet the radiated emissions limits detailed in 15.207. All others must be < -30dBc	Complies

FCC 15.247/RSS 210 (o): 5725 –5850 MHz BAND

FCC Part 15 Section	RSS 210 Section	Description	Measured Value	Comments	Result
15.247(a)	A8.2	Digital Modulation	Systems uses OFDM and DSSS techniques	System must utilize a digital transmission technology	Complies
15.247 (a) (2)	A8.2 (1)	6dB Bandwidth	16.8MHz	Minimum allowed is 500kHz	Complies
	RSP 100	99% Bandwidth	17 MHz	For information only	Complies
15.247 (b) (3) 15.247	A8.4 (4)	Output Power 5725 - 5850 MHz	27 dBm ¹ (0.504 Watts)	Maximum permitted is 1Watt, with EIRP limited to 4 Watts.	Complies
15.247(d)	A8.2 (2)	Power Spectral Density	-5.2dBm /3kHz	Maximum permitted is 8dBm/3kHz	Complies
15.247(c)	A8.4 (5)	Antenna Port Spurious Emissions -30MHz – 40 GHz	All spurious emissions < -20dBc	All spurious emissions < -30dBc.	Complies
15.247(c) / 15.209	A8.4 (5)	Radiated Spurious Emissions -30MHz – 40 GHz	53.6dBμV/m (477.5μV/m) @ 11651.7MHz (-0.4dB)	Emissions in restricted bands must meet the radiated emissions limits detailed in 15.207. All others must be < -30dBc	Complies

¹ Output power is the aggregate power across all transmitters, based on the worst case condition with one, two, three or four transceivers operating the band.

² -30dBc limit used as the UNII measurement method was used to measure output power

FCC 15E / RSS 210 q1

FCC Part 15 Section	RSS 210 Section	Description	Comments	Result
Operation in the 5.15 – 5.25 GHz Band				
15.407(e)		Indoor operation only	Refer to user's manual in Exhibit 6	Complies
15.407(a) (1)		26dB Bandwidth	> 20MHz	N/A
15.407(a) (1)	A9.2(1)	Output Power	16.9 dBm (0.049W) ¹	Complies
15.407(a) (1)	A9.2(1)	Power Spectral Density	3.96 dBm/MHz	Complies
	A9.5b	Peak Spectral Density		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)				
15.407(a) (2)		26dB Bandwidth	> 20MHz	N/A
15.407(a) (2)	A9.2(2)	Output Power	23.7 dBm (0.236W) ¹	Complies
15.407(a) (2)	A9.2(2)	Power Spectral Density	5.7dBm/MHz	Complies
	A9.5b	Peak Spectral Density		Complies
	A9.4	Dynamic frequency selection / Transmit power control	Not evaluated – this is not a requirement for new equipment until after January 2006 (FCC) / May 2008 (RSS)	N/A
General requirements for all bands				
	A9.5a	Digital Modulation	Digital Modulation is used, refer to the "Theory of Operations" (Exhibit 9) for a detailed explanation.	Complies
	RSP 100	99% bandwidth	17 MHz	
15.407(b) (5) / 15.209	A9.3	Spurious Emissions below 1GHz	No emissions from transceivers detected below 1GHz (emissions from digital device only)	Complies
15.407(b) (2)	A9.3	Spurious Emissions above 1GHz	53.9dB μ V/m (495.5 μ V/m) @ 5350.0MHz (-0.1dB)	Complies
15.407(a)(6)		Peak Excursion Ratio	10.9dB	Complies
	A9.5c	Channel Selection	The device was tested at 5180, 5260 and 5320 MHz – the highest, lowest and center channels across the 5150 – 5350 MHz band. Additional measurements for power and PSD made at 5200 MHz and 5240 MHz (highest frequency in the 5150 – 5250 MHz sub-band).	N/A
15.407 (c)	A9.5d	Automatic Discontinuation of Operation in the absence of information to transmit	Operation is discontinued in the absence of information to transmit, refer to the "Theory of Operations" in Exhibit 9 for a detailed explanation.	Complies
15.407 (g)	A9.5e	Frequency Stability	Frequency stability is better than 10ppm, refer to the "Theory of Operations" in Exhibit 9 for a detailed analysis.	Complies
	A9.9f; A9.9g	User Manual information	All relevant statements have been included in the user's manuals. Refer to Exhibit 6 for details	Complies
15.407 (f)		RF Exposure Requirements	Refer to MPE calculations in Exhibit 11	Complies

¹ Output power is the aggregate power across all transmitters, based on the worst case condition with one, two, three or four transceivers operating the band.

OTHER REQUIREMENTS

FCC Part 15 Section	RSS 210 Section	Description	Comments	Result
15.203		RF Connector	Integral antenna and external antenna using Reverse polarity TNC	Complies
	RSS GEN 7.2.3/Table 1	Receiver spurious emissions	50.2dB μ V/m (323.6 μ V/m) @ 1452.0MHz (-3.8dB)	Complies
15.207	RSS GEN Table 2	AC Conducted Emissions	39.3dB μ V @ 2.909MHz (-6.7dB)	Complies
15.247 (b) (5) 15.407 (f)	RSS 102	RF Exposure Requirements	Refer to MPE calculations in Exhibit 11, RSS 102 declaration and User Manual statements	Complies

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	± 2.4
Radiated Emissions	30 to 1000	± 3.6

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

The Xirrus, Inc. model XS-3500 is a multi-radio 802.11abg Access Point radio which is designed to act as a hub for a wireless local area network (WLAN). The device contains 4 transceivers, all of which can operate in the 2.4 and 5GHz bands. There is one rf connector to allow the use of an external antenna with one of the transceivers.

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.

The sample was received on July 22, 2005 and tested on July 22, July 25, July 29, August 1, August 9, August 10 and August 23, 2005. The EUT consisted of the following component(s):

Manufacturer	Model	Description	Serial Number	FCC ID
Xirrus	XS-3500	Wireless access point	-	

OTHER EUT DETAILS

The EUT output power in the 5150 – 5250 MHz band is set on each transceiver to ensure that the aggregate output power in the band does not exceed the 17dBm maximum permitted. This technique is not employed for other channels, where the maximum power on any one transceiver is set such that the aggregate power in that band will always be less than maximum permitted.

ENCLOSURE

The EUT enclosure is primarily constructed of molded plastic. It measures approximately 31 cm in diameter by 6 cm high.

MODIFICATIONS

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

SUPPORT EQUIPMENT

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

Manufacturer/Model/Description	Serial Number	FCC ID Number
Winbook Laptop	-	-

No equipment was used as remote support equipment for emissions testing.

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)
Ethernet	Laptop Ethernet	CAT 5	Unshielded	3
Console	Laptop serial	Multiwire	Unshielded	1.5
DC in	AC Adapter	2 wire	Unshielded	1

EUT OPERATION DURING TESTING

During digital emissions testing the EUT was set to receive mode for all four radios. Each radio was tuned to a different frequency - 2412MHz, 2472MHz, 5260MHz and 5780MHz.

During transmitter testing Radio #4 was set to transmit continuously on either CH #1, 2412MHz, CH6, 2437MHz or CH#11, 2462MHz for 8082.11b and g modes. For 802.11a, the radio was set to continuously transmit on 5180 MHz, 5260MHz, 5320MHz, 5745MHz, 5785MHz or 5825MHz.

The following radiated spurious measurements were made:

2400 – 2483.5 MHz, 802.11b Mode

- 2412 MHz (#1) – fundamental, 2390 MHz restricted band and spurious performed at power setting 20 (the actual max power, P=19.8dBm peak) Internal and external antennas.
- 2437 MHz (#6) – spurious performed at power setting 20 (the actual max power, P=20.3dBm peak) Internal and external antennas.
- 2462 MHz (#11) –2483.5 MHz restricted band measured at power setting 15; spurious performed at power setting 20 (the actual max power is setting 15, P=17.7dBm peak) Internal and external antennas.

2400 – 2483.5 MHz, 802.11g Mode

- 2412 MHz (#1) – fundamental, 2390 MHz restricted band and spurious performed at power setting 16 (the actual max power, P=17.1dBm average) for both internal and external antennas.
- 2437 MHz (#6) – spurious performed at power setting 20 (the actual max power, P=21.2dBm average) for both internal and external antennas.
- 2462 MHz (#11) –2483.5 MHz restricted band and other spurious performed at power setting 14 (the actual max power is setting 14, P=13.3dBm average) internal antenna.
- 2462 MHz (#11) –2483.5 MHz restricted band measured at power setting 13; spurious performed at power setting 16 (the actual max power is setting 13, P=12.5dBm average) external antenna.

5150 – 5350 MHz

- 5180 MHz (#36) – fundamental, 5150 MHz restricted band and spurious at power setting 10 with the internal antenna and external antenna. Repeated at power setting 11 with the worst case antenna (internal). Power setting 10 (10.8dBm average) is the highest power setting for 3 or more radios in the band. Power setting 11 (12.7dBm average) is the highest power setting with 1 or 2 radios in the sub-band.
- 5200 MHz (#40) – spurious emissions at power setting 17 (18dBm) with the internal antenna (worst case antenna for #36). Highest power setting for this channel is 14 (16dBm), so testing at the higher setting would represent higher emissions than at the deployed highest power setting. This test was done to verify compliance at the higher power setting in addition to testing channel 36 (bottom channel) because this channel has a higher output power setting.
- 5260 MHz (#52) – spurious emissions at power setting 19 (17.7dBm average) with the internal and external antennas. Highest power setting for this channel is 19 (17.7dBm).
- 5320 MHz (#64) – spurious emissions at power setting 19 (17.5dBm average) with the internal antenna and at power setting 19 with the external antenna. Highest power setting for this channel is 19 (17.5dBm) for the internal antenna and 16 (14.9dBm) for the external antenna. *[External antenna output power limited to meet 5350 MHz band edge]*

5725 – 5850 MHz

- 5745 MHz (#149) – spurious emissions at power setting 17 with internal antenna. Highest power on this channel with internal antenna is 17 (16.8dBm)
- 5745 MHz (#149) – spurious emissions at power setting 13 with external antenna. Highest power on this channel with external antenna is 13 (13.8dBm)
- 5785 MHz (#157) – spurious emissions at power setting 18 with internal antenna. Highest power on this channel with internal antenna is 18 (15.9dBm)
- 5785 MHz (#157) – spurious emissions at power setting 16 with external antenna. Highest power on this channel with external antenna is 16 (14.2dBm)
- 5825 MHz (#165) – spurious emissions at power setting 18 with internal and external antennas. Highest power on this channel with internal or external antenna is 18 (14.2dBm)

ANTENNA REQUIREMENTS

The device uses integral antennas on each of the four transceivers contained within the system. There are two antennas per transceiver, one for the 2.4GHz band and one for the 5GHz band. The gains of these antennas are stated to be 3dBi. One of the transceivers is also capable of connecting to an external antenna. The antenna connector is a reverse TNC that meets the requirements of FCC 15.203. The antennas intended for use with this connector are:

Maxrad model S2403BH, Gain = 3dBd (5.2dBi), Band = 2400 – 2483.5 MHz

Maxrad model S2403BP, Gain = 3dBd (5.2dBi), Band = 2400 – 2483.5 MHz

Maxrad model S5703BH, Gain = 3dBd (5.2dBi), Band = 5725 – 5850 MHz

Radiated emissions tests were performed with the internal antennas, the Maxrad model S2403BP and the Maxrad model S5703BH.

TEST SITE

GENERAL INFORMATION

Final test measurements were taken on July 22, July 25, July 29, August 1, August 9, August 10 and August 23, 2005 at the Elliott Laboratories Open Area Test Site #1, 2 & 3 located at 684 West Maude Avenue, Sunnyvale, California. The test sites contain separate areas for radiated and conducted emissions testing. Pursuant to section 2.948 of the Rules, construction, calibration, and equipment data has been filed with the Federal Communications Commission. In accordance with Industry Canada rules detailed in RSS 210 Issue 6 and RSS-212, construction, calibration, and equipment data for the test sites have been filed with the Federal Communications Commission.

The FCC 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 FCC requirements.

CONDUCTED EMISSIONS CONSIDERATIONS

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

RADIATED EMISSIONS CONSIDERATIONS

The FCC has determined that radiation measurements made in a shielded enclosure are not suitable for determining levels of radiated emissions. Radiated measurements are performed in an open field environment. The test site is maintained free of conductive objects within the CISPR defined elliptical area incorporated in ANSI C63.4:2003 guidelines.

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.

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.

INSTRUMENT CONTROL COMPUTER

The receivers utilize either a Rohde and 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.

POWER METER

A power meter and **peak** power sensor are used for all direct output power measurements from transmitters as they provide a broadband indication of the power output. Where alternative test methods for measuring output power are used the method is described (or the measurement method is referenced) in the test data

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.

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

INSTRUMENT CALIBRATION

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

TEST PROCEDURES

EUT AND CABLE PLACEMENT

The FCC requires 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.

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.

CONDUCTED EMISSIONS FROM ANTENNA PORT

Direct measurements 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.

Measurement bandwidths (video and resolution) are set in accordance with FCC procedures for the type of radio being tested.

SPECIFICATION LIMITS AND SAMPLE CALCULATIONS

The limits for conducted emissions from the AC power port are given in units of microvolts, the limits for radiated electric field emissions are given in units of microvolts per meter at a specified test distance and the output power limits are given in terms of Watts, milliwatts or dBm. 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.

Where the radiated electric field strength is expressed in terms of the equivalent isotropic radiated power (eirp) the following formula is used to determine the field strength limit in terms of microvolts per meter 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)

For reference, converting the voltage and electric field strength specification limits from linear to decibel form is accomplished by taking the base ten logarithm, then multiplying by 20. Conversion of power specification limits from linear units (in milliwatts) to decibel form (in dBm) is accomplished by taking the base ten logarithm, then multiplying by 10.

FCC 15.407 (a) and RSS 210 (o) 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
902 – 928	1 Watts (30 dBm)	8 dBm/3kHz
2400 – 2483.5	1 Watts (30 dBm)	8 dBm/3kHz
5725 – 5850	1 Watts (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.

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.

RS-210 6.2.2(q1) 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	200mW (23 dBm)	10 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.

RSS 210 (o) AND FCC 15.247 TRANSMIT MODE SPURIOUS RADIATED EMISSIONS LIMITS

The limits for unwanted (spurious) emissions from the transmitter falling in the restricted bands detailed in Part 15.205 and for all spurious emissions from the receiver are:

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

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).

RS 210 (q1) and FCC 15E TRANSMIT MODE SPURIOUS RADIATED EMISSIONS LIMITS

The table below shows the limits for unwanted (spurious) emissions falling in the restricted bands detailed in Part 15.205 and Industry Canada RSS-210 Table 2.

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

The table below shows the limits for unwanted (spurious) emissions outside of the restricted bands above 1GHz.

Operating Frequency (MHz)	EIRP Limit (dBm)	Equivalent Field Strength At 3m (dBuV/m)
5150 - 5250	-27 dBm	68.3 dBuV/m
5250 - 5350	-27 dBm (note 1)	68.3 dBuV/m
5725 - 5825	-27 dBm (note 2)	68.3 dBuV/m
	-17 dBm (note 3)	78.3 dBuV/m

Note 1: If operation is restricted to indoor use only then emissions in the band 5.15 – 5.25 GHz must meet the power spectral density limits for the intentional signals detailed in RSS 210 and FCC Subpart E for devices operating in the 5.15 – 5.25 GHz band.

Note 2: Applies to spurious signals separated by more than 10 MHz from the allocated band.

Note 3: Applies to spurious signals within 10 MHz of the allocated band.

RS 210 Table 3 RECEIVE MODE SPURIOUS RADIATED EMISSIONS LIMITS

The table below shows the limits for unwanted (spurious) emissions from the receiver as detailed in table 3 of RSS 210:

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
960 to 1610	500	54.0
Above 1610	1000	60.0

FCC 15.205 AC POWER PORT CONDUCTED EMISSIONS LIMITS

The table below shows the limits for emissions on the AC power line as detailed in FCC Part 15.205.

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

RSS-210 SECTION 6.6 AC POWER PORT CONDUCTED EMISSIONS LIMITS

The table below shows the limits for emissions on the AC power line as detailed in Industry Canada RSS-210 section 6.6.

Frequency Range (MHz)	Limit (uV)	Limit (dBuV)
0.450 to 30.000	250	48

SAMPLE CALCULATIONS - CONDUCTED EMISSIONS

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

$$R_r = C$$

and

$$C - S = M$$

where:

R_r = Receiver Reading in dBuV

C = Corrected 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, is calculated by using the following formula:

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

where:

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

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

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

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

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

$$R_c = R_r + F_d$$

and

$$M = R_c - L_s$$

where:

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

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

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

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

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

EXHIBIT 1: Test Equipment Calibration Data

1 Page

Power, PSD, Antenna port and radiated Emissions - 802.11a/b/g

<u>Manufacturer</u>	<u>Description</u>	<u>Model #</u>	<u>Asset #</u>	<u>Cal Due</u>
Hewlett Packard	Microwave Preamplifier, 1-26.5GHz	8449B	785	26-Apr-06
EMCO	Horn Antenna, D. Ridge 1-18GHz	3115	786	08-Nov-05
Hewlett Packard	EMC Spectrum Analyzer 9kHz - 6.5GHz	8595EM	787	17-Dec-05
Hewlett Packard	EMC Spectrum Analyzer, 9KHz-26.5GHz	8593EM	1141	10-Jun-06
EMCO	Horn antenna, D. Ridge 1-18GHz (SA40 system antenna)30Hz sunnyvale	3115	1142	11-Jun-06
Hewlett Packard	Microwave EMI test system head (includes W1 - W4, Asset 1143 and 1144)	84125C	1145	01-Sep-05
Hewlett Packard	EMC Spectrum Analyzer 30Hz - 40GHz, Sunnyvale (SA40)	8564E (84125C)	1148	01-Sep-05
Hewlett Packard	Microwave EMI test system (SA40, 30Hz - 40GHz), Sunnyvale	84125C	1149	01-Sep-05
EMCO	Horn antenna, 18-26.5 GHz (SA40 30Hz)	3160-09 (84125C)	1150	09-Jun-06
EMCO	Horn antenna, 26.5-40 GHz (SA40 30Hz)	3160-10 (84125C)	1151	09-Jun-06
Hewlett Packard	High Pass filter, 8.2GHz	P/N 84300-80039 (84125C)	1152	16-Aug-06
Hewlett Packard	High Pass filter, 3.5GHz	P/N 84300-80038	1157	28-Apr-06

Digital Device, Radiated emissions, 24-Aug-05

<u>Manufacturer</u>	<u>Description</u>	<u>Model #</u>	<u>Asset #</u>	<u>Cal Due</u>
EMCO	Biconical Antenna, 30-300 MHz	3110B	1320	25-Aug-05
EMCO	Log Periodic Antenna, 0.2-2 GHz	3148	1321	30-Mar-07
Rohde & Schwarz	Test Receiver, 0.009-2750 MHz	ESN	1332	23-May-06

Power, PSD, bandwidth, 31-Aug-05

<u>Manufacturer</u>	<u>Description</u>	<u>Model #</u>	<u>Asset #</u>	<u>Cal Due</u>
Hewlett Packard	Microwave EMI test system (SA40, 30Hz - 40GHz), Sunnyvale	84125C	1149	01-Sep-05
Rohde & Schwarz	Power Sensor 100uW - 10 Watts	NRV-Z53	1236	01-Mar-06
Rohde & Schwarz	Power Meter, Single Channel	NRVS	1290	09-May-06

PPSD, Power Measurements (5725 - 5850 MHz), 07-Sep-05

<u>Manufacturer</u>	<u>Description</u>	<u>Model #</u>	<u>Asset #</u>	<u>Cal Due</u>
Hewlett Packard	EMC Spectrum Analyzer 9kHz - 6.5GHz	8595EM	780	26-May-06
Rohde & Schwarz	Power Meter, Single Channel	NRVS	1422	01-Nov-05
Rohde & Schwarz	Power Sensor, 1uW-100mW, DC-18 GHz, 50ohm	NRV-Z51	1535	22-Sep-05
Rohde & Schwarz	Peak Power Sensor 100uW - 2 Watts	NRV-Z32	1536	09-May-06

Conducted Emissions - AC Power Ports, 09-Sep-05

Engineer: Mehran Birgani

<u>Manufacturer</u>	<u>Description</u>	<u>Model #</u>	<u>Asset #</u>	<u>Cal Due</u>
Elliott Laboratories	FCC / CISPR LISN	LISN-3, OATS	304	08-Jul-06
Solar Electronics	LISN	8028-50-TS-24-BNC support	904	08-Jul-06
Rohde & Schwarz	Test Receiver, 0.009-2750 MHz	ESN	1332	23-May-06
Rohde & Schwarz	Pulse Limiter	ESH3 Z2	1398	11-Feb-06

EXHIBIT 2: Test Data Log Sheets

ELECTROMAGNETIC EMISSIONS

TEST LOG SHEETS

AND

MEASUREMENT DATA

T 61140 89 Pages



EMC Test Data

Client:	Xirrus, Inc.	Job Number:	J60437
Model:	XS-3500 Access Point	T-Log Number:	T61140
		Account Manager:	Susan Pelzl
Contact:	Ian Laity / Steve Smith		
Emissions Spec:	FCC 15.247, 15.401, RSS-210	Class:	Radio
Immunity Spec:	-	Environment:	-

EMC Test Data

For The

Xirrus, Inc.

Model

XS-3500 Access Point

Date of Last Test: 11/4/2005



EMC Test Data

Client:	Xirrus, Inc.	Job Number:	J60437
Model:	XS-3500 Access Point	T-Log Number:	T61140
Contact:	Ian Laity / Steve Smith	Account Manager:	Susan Pelzl
Emissions Spec:	FCC 15.247, 15.401, RSS-210	Class:	Radio
Immunity Spec:	-	Environment:	-

EUT INFORMATION

General Description

The Xirrus, Inc. model XS-3500 is a multi-radio 802.11abg Access Point radio which is designed to act as a hub for a wireless local area network (WLAN). The device contains 4 transceivers, all of which can operate in the 2.4 and 5GHz bands. There is one rf connector to allow the use of an external antenna with one of the transceivers.

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-3500	Wireless acces point	-	

Other EUT Details

2.4 GHz 3dBd Omni antenna (external) and internal antenna, nominal gain 2dBi

5GHz 3dBd Omni antenna (external) and internal antenna, nominal gain 3dBi

EUT Antenna

The antenna is integral to the device for each of the 4 radios.

In addition one radio has a reverse TNC connector to allow the use of external antennas, thereby meeting the requirements of FCC 15.203.

EUT Enclosure

The EUT enclosure is primarily constructed of molded plastic. It measures approximately 31 cm in diameter by 6 cm high.

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, Inc.	Job Number:	J60437
Model:	XS-3500 Access Point	T-Log Number:	T61140
Contact:	Ian Laity / Steve Smith	Account Manager:	Susan Pelzl
Emissions Spec:	FCC 15.247, 15.401, RSS-210	Class:	Radio
Immunity Spec:	-	Environment:	-

Test Configuration #1

Local Support Equipment

Manufacturer	Model	Description	Serial Number	FCC ID
Winbook	Winbook	Laptop	-	-

Remote Support Equipment

Manufacturer	Model	Description	Serial Number	FCC ID
None				

Interface Cabling and Ports

Port	Connected To	Cable(s)		
		Description	Shielded or Unshielded	Length(m)
Etehrnet	Laptop Ethernet	CAT 5	Unshielded	3
Console	Laptop serial	Multiwire	Unshielded	1.5
DC in	AC Adapter	2 wire	Unshielded	1

EUT Operation During Emissions Tests

During digital emissions testing the EUT was set to receive mode for all four radios. Each radio was tuned to a different frequency, 2412MHz, 2472MHz, 5260MHz, 5780MHz

During transmitter testing Radio #4 was set to transmit continuously on either CH #1, 2412MHz, CH6, 2437MHz or CH#11, 2462MHz for 802.11b and g modes. For 802.11a, the radio was set to continuously transmit on either 5180MHz, 5260MHz, 5320MHz, 5745MHz, 5785MHz or 5825MHz. The transmit data rates were selected as those that gave the highest output power and were 6Mb/s for 802.11g and 802.11a modes, 1Mb/s for 802.11b mode. An additional check was made with all radios operating simultaneously, two in the 2.4GHz band and 2 in the lower 5GHz band. No inter-modulation products were observed and the power on each radio remained the same.

The software used during testing to control the radio was test software that allowed the output power and channel to be set by the test operator. Radiated emissions measurements were made at power settings equal to, or greater than, those that will be used for "normal" operation. The end user will not have access to these capabilities to change output power. Further, channel selection will be limited to only those channels that fall in the FCC allocated bands approved for use by this device.

Client: Xirrus, Inc.	Job Number: J60437
Model: XS-3500 Access Point	T-Log Number: T61140
	Account Manager: Susan Peizl
Contact: Ian Laity / Steve Smith	
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: 9/9/2005
 Test Engineer: Mehran Birgani
 Test Location: SVOATS #2

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

General Test Configuration

The EUT was located on a wooden table, 40 cm from a vertical coupling plane and 80cm from the LISN. A second LISN was used for all local support equipment.

Ambient Conditions: Temperature: 11 °C
 Rel. Humidity: 60 %

Summary of Results

Run #	Test Performed	Limit	Result	Margin
1	CE, AC Power, 120V/60Hz	EN55022 Class B	Pass	39.3dB μ V @ 2.909MHz (-6.7dB)
2	CE, AC Power, 120V/60Hz	RSS 210 Issue 5	Pass	39.5dB μ V @ 3.180MHz (-8.5dB)

Modifications Made During Testing:

No modifications were made to the EUT during testing

Deviations From The Standard

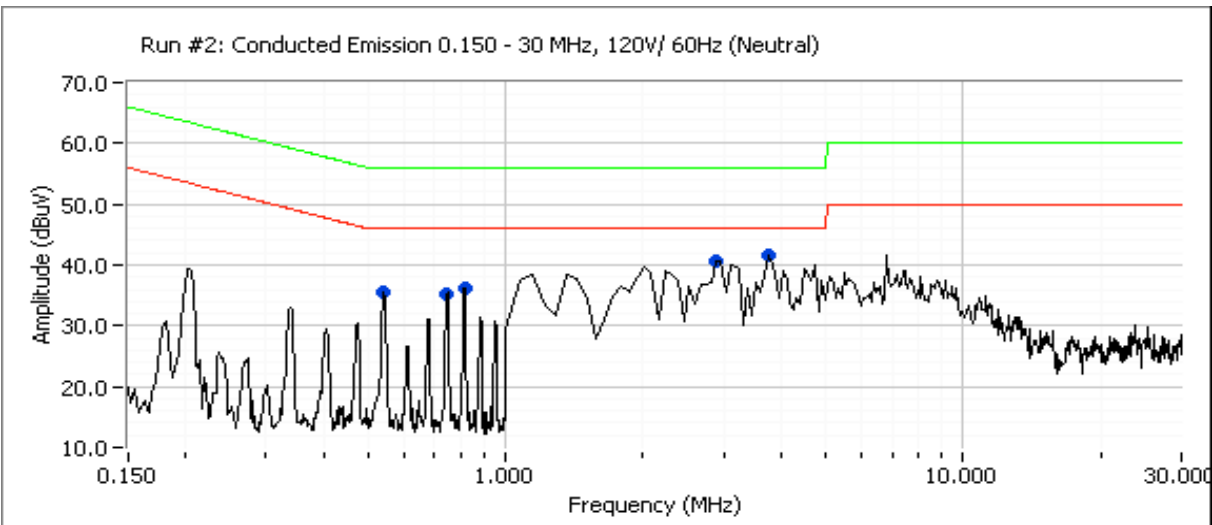
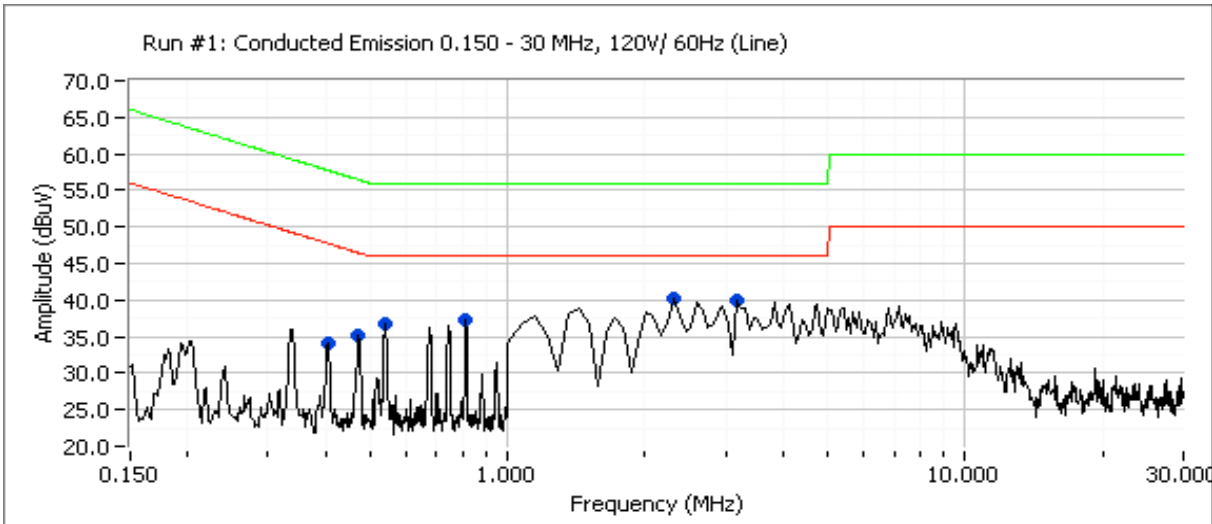
No deviations were made from the requirements of the standard.

EUT Configuration:

Radio	Channel	Frequency
2	64	5320
6	11	2462
10	140	5700
14	1	2412

Client: Xirrus, Inc.	Job Number: J60437
Model: XS-3500 Access Point	T-Log Number: T61140
Contact: Ian Laity / Steve Smith	Account Manager: Susan Pezli
Spec: FCC 15.247, 15.401, RSS-210	Class: Radio

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





EMC Test Data

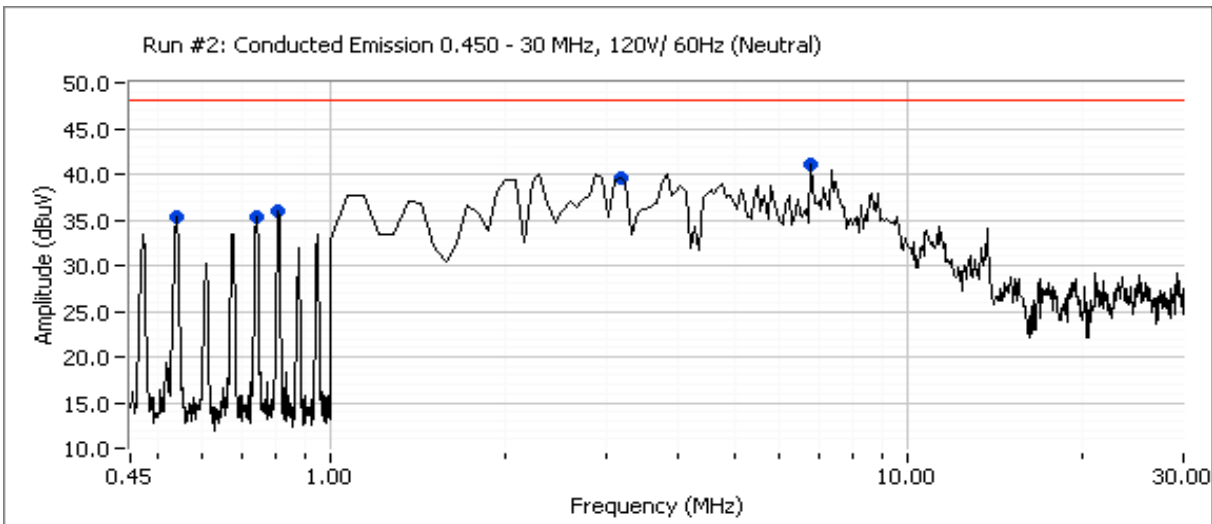
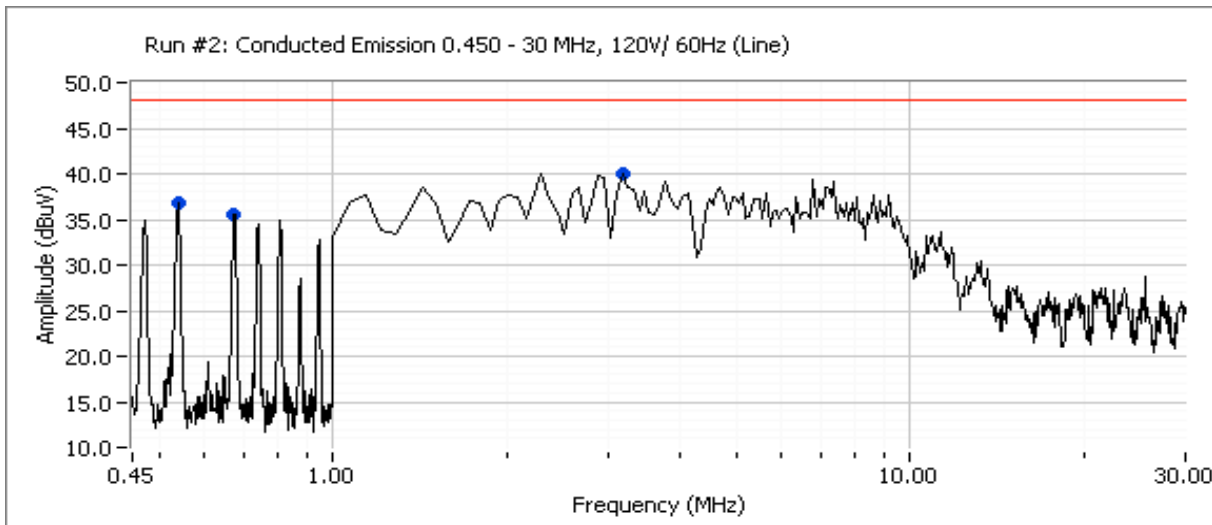
Client:	Xirrus, Inc.	Job Number:	J60437
Model:	XS-3500 Access Point	T-Log Number:	T61140
		Account Manager:	Susan Peizi
Contact:	Ian Laity / Steve Smith		
Spec:	FCC 15.247, 15.401, RSS-210	Class:	Radio

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

Frequency MHz	Level dB μ V	AC Line	RSS GEN/FCC15.207		Detector QP/Ave	Comments
			Limit	Margin		
2.909	39.3	Neutral	46.0	-6.7	Average	
3.180	38.2	Neutral	46.0	-7.8	Average	
3.173	37.7	Line	46.0	-8.3	Average	
2.297	37.1	Line	46.0	-8.9	Average	
0.812	35.9	Neutral	46.0	-10.1	Average	
0.540	35.8	Line	46.0	-10.2	Average	
2.909	40.3	Neutral	56.0	-15.7	QP	
3.180	39.5	Neutral	56.0	-16.5	QP	
2.297	39.4	Line	56.0	-16.6	QP	
3.173	39.3	Line	56.0	-16.7	QP	
0.812	36.4	Neutral	56.0	-19.6	QP	
0.540	36.3	Line	56.0	-19.7	QP	

Client: Xirrus, Inc.	Job Number: J60437
Model: XS-3500 Access Point	T-Log Number: T61140
Contact: Ian Laity / Steve Smith	Account Manager: Susan Pezli
Spec: FCC 15.247, 15.401, RSS-210	Class: Radio

Run #2: AC Power Port Conducted Emissions, 0.45 - 30MHz, 120V/60Hz





EMC Test Data

Client:	Xirrus, Inc.	Job Number:	J60437
Model:	XS-3500 Access Point	T-Log Number:	T61140
Contact:	Ian Laity / Steve Smith	Account Manager:	Susan Peizi
Spec:	FCC 15.247, 15.401, RSS-210	Class:	Radio

Run #2: AC Power Port Conducted Emissions, 0.45 - 30MHz, 120V/60Hz

Frequency MHz	Level dB μ V	AC Line	RSS 210		Detector QP/Ave	Comments
			Limit	Margin		
3.180	39.5	Neutral	48.0	-8.5	QP	
2.297	39.4	Line	48.0	-8.6	QP	
3.173	39.3	Line	48.0	-8.7	QP	
0.540	36.3	Line	48.0	-11.7	QP	
0.746	35.2	Neutral	48.0	-12.8	QP	
0.812	36.4	Neutral	56.0	-19.6	QP	



EMC Test Data

Client:	Xirrus, Inc.	Job Number:	J60437
Model:	XS-3500 Access Point	T-Log Number:	T61140
Contact:	Ian Laity / Steve Smith	Account Manager:	Susan Peizi
Spec:	FCC 15.247, 15.401, RSS-210	Class:	Radio

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

Changed CPU speed from 825MHz to 525MHz, DDR at 266MHz

Test distance = 10m

Frequency	Level	Pol	EN55022 Class A		Detector	Azimuth	Height	Comments
MHz	dBμV/m	V/H	Limit	Margin	Pk/QP/Avg	degrees	meters	
791.998	42.7	H	47.0	-4.3	QP	29	1.8	
593.994	42.1	H	47.0	-4.9	QP	20	1.0	Signal Sub.
527.996	37.7	H	47.0	-9.3	QP	0	1.0	
791.998	37.0	V	47.0	-10.0	QP	250	1.0	
132.006	29.0	V	40.0	-11.0	QP	0	1.1	Broadband
125.007	28.2	V	40.0	-11.8	QP	0	1.0	Broadband
999.999	35.0	V	47.0	-12.0	QP	35	1.0	
750.015	33.3	H	47.0	-13.7	QP	250	1.0	
48.040	23.9	V	40.0	-16.1	QP	350	1.8	Broadband
500.009	30.0	H	47.0	-17.0	QP	0	1.0	
375.012	30.0	H	47.0	-17.0	QP	40	1.0	
395.997	29.2	V	47.0	-17.8	QP	167	2.3	
625.021	29.1	V	47.0	-17.9	QP	214	1.0	
500.009	27.0	V	47.0	-20.0	QP	85	1.2	
264.003	26.4	V	47.0	-20.6	QP	10	1.0	
375.012	25.8	V	47.0	-21.2	QP	185	2.0	
198.001	17.2	V	40.0	-22.8	QP	0	1.0	
250.010	22.0	V	47.0	-25.0	QP	60	2.1	

Run #2: Maximized Readings From Run #1

Test distance = 10m

Frequency	Level	Pol	EN55022 Class A		Detector	Azimuth	Height	Comments
MHz	dBμV/m	V/H	Limit	Margin	Pk/QP/Avg	degrees	meters	
791.998	42.7	H	47.0	-4.3	QP	29	1.8	
593.994	42.1	H	47.0	-4.9	QP	20	1.0	Signal Sub.
527.996	37.7	H	47.0	-9.3	QP	0	1.0	
791.998	37.0	V	47.0	-10.0	QP	250	1.0	
132.006	29.0	V	40.0	-11.0	QP	0	1.1	Broadband
125.007	28.2	V	40.0	-11.8	QP	0	1.0	Broadband



EMC Test Data

Client:	Xirrus, Inc.	Job Number:	J60437
Model:	XS-3500 Access Point	T-Log Number:	T61140
Contact:	Ian Laity / Steve Smith	Account Manager:	Susan Peizl
Spec:	FCC 15.247, 15.401, RSS-210	Class:	Radio

Run #3: Maximized readings, 1000 - 5000 MHz

Test distance = 3m, data extrapolated to 10m

Frequency MHz	Level dB μ V/m	Pol v/h	FCC Class A		Detector Pk/QP/Avg	Azimuth degrees	Height meters	Comments
			Limit	Margin				
1451.958	39.7	V	49.5	-9.8	Pk	275	1.0	
1715.945	39.5	V	49.5	-10.0	Pk	215	1.1	
1320.040	37.7	V	49.5	-11.9	Pk	318	1.1	
1583.968	37.1	V	49.5	-12.4	Pk	170	1.2	
1583.970	36.7	V	49.5	-12.9	Pk	337	1.0	
1451.958	36.4	V	49.5	-13.1	Avg	275	1.0	
1847.922	36.2	V	49.5	-13.3	Pk	22	1.1	
1715.945	35.3	V	49.5	-14.2	Avg	215	1.1	
1320.040	34.5	V	49.5	-15.0	Avg	318	1.1	
1055.973	33.6	V	49.5	-15.9	Pk	209	1.0	
1583.968	32.6	V	49.5	-16.9	Avg	170	1.2	
1583.970	30.6	V	49.5	-19.0	Avg	337	1.0	
1847.922	28.0	V	49.5	-21.5	Avg	22	1.1	
1055.973	27.9	V	49.5	-21.7	Avg	209	1.0	

No emissions observed above 5 GHz (evaluated 5 - 10 GHz).

Table above using RSS 210 Table 3 limits for receivers:

Test distance = 3m

Frequency MHz	Level dB μ V/m	Pol v/h	RSS 210 Table 3		Detector Pk/QP/Avg	Azimuth degrees	Height meters	Comments
			Limit	Margin				
1451.958	50.2	V	54.0	-3.8	Pk	275	1.0	
1715.945	50.0	V	54.0	-4.0	Pk	215	1.1	
1320.040	48.2	V	54.0	-5.8	Pk	318	1.1	
1583.968	47.6	V	54.0	-6.3	Pk	170	1.2	
1583.970	47.2	V	54.0	-6.8	Pk	337	1.0	

For the above measurements there was one receiver operating in each band (2400 - 2484.5 MHz, 5150 - 5350 MHz and 5725 - 5850 MHz). All are peak readings copared to the average limit unless stated otherwise.



EMC Test Data

Client:	Xirrus, Inc.	Job Number:	J60437
Model:	XS-3500 Access Point	T-Log Number:	T61140
		Account Manager:	Susan Pezl
Contact:	Ian Laity / Steve Smith		
Spec:	FCC 15.247, 15.401, RSS-210	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: 8/23/2005
 Test Engineer: Mark Briggs
 Test Location: SVOATS #2

Config. Used: #1
 Config Change: N/A
 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: 45 %

Summary of Results

Run #	Test Performed	Limit	Pass / Fail	Result / Margin
1	Antenna Port Spurious Emissions	FCC Part 15.209 / 15.247(c)		More than 30dB below in-band level
2	6dB Bandwidth	15.247(a)	Pass	> 12 MHz
3	Output Power 802.11b - Peak Power (individual / aggregate)	15.247(b)	Pass	20.3dBm (0.107 W); 26.3dBm (0.428W)
3	Output Power 802.11g - UNII power method (individual / aggregate)	15.247(b)	Pass	21.18dBm (0.131W); 27.18dBm (0.528W)
4	Power Spectral Density (PSD)	15.247(d)	Pass	b mode 7.8dBm/3kHz g mode -3.1dBm/3kHz

Modifications Made During Testing:

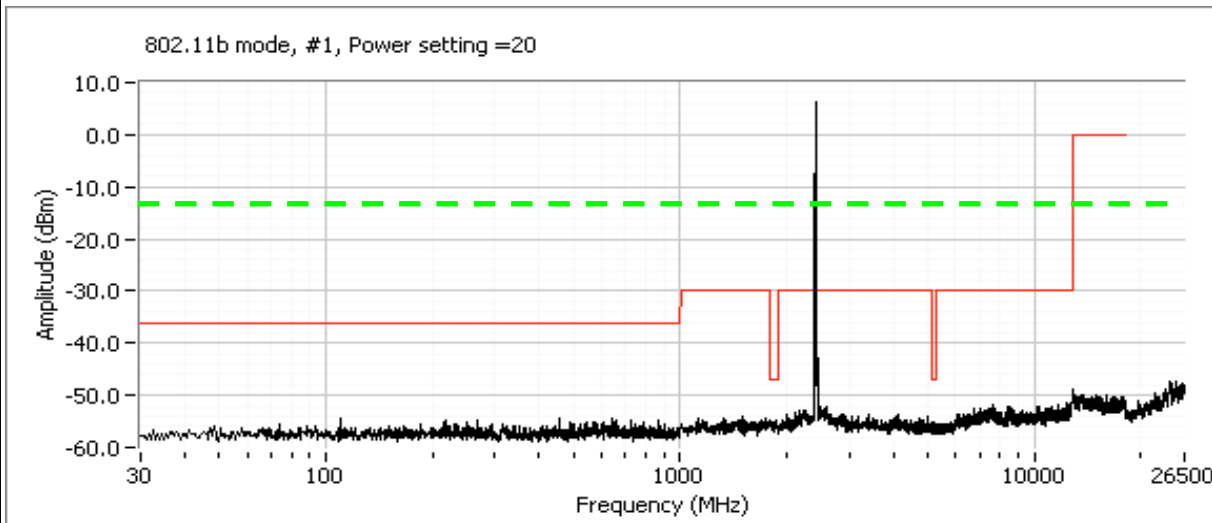
No modifications were made to the EUT during testing

Deviations From The Standard

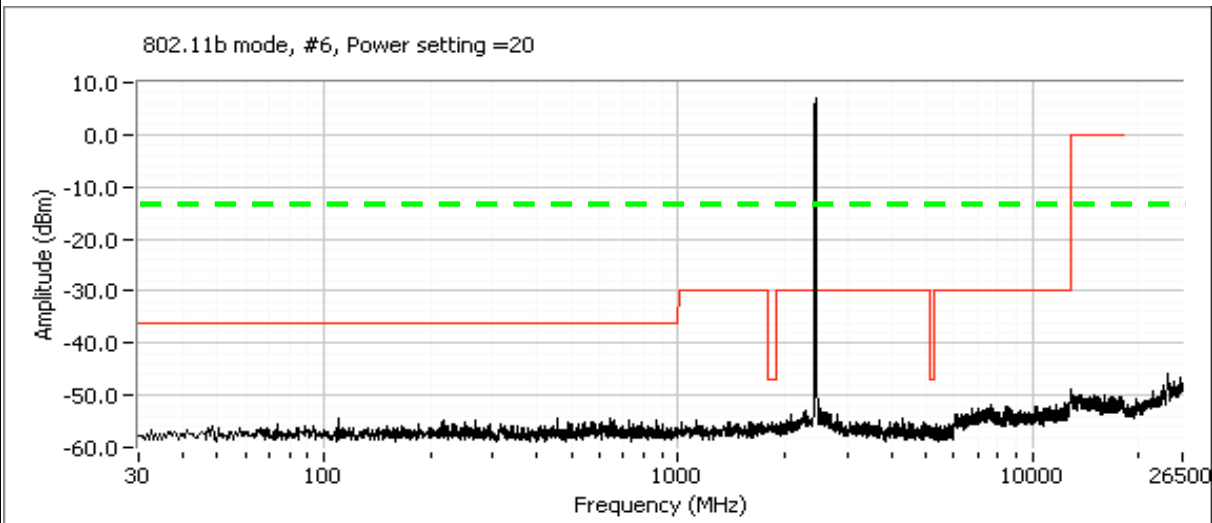
No deviations were made from the requirements of the standard.

Client: Xirrus, Inc.	Job Number: J60437
Model: XS-3500 Access Point	T-Log Number: T61140
Contact: Ian Laity / Steve Smith	Account Manager: Susan Peizl
Spec: FCC 15.247, 15.401, RSS-210	Class: N/A

Run #1: Antenna Port Spurious Emissions
Green limit is -20dBc for 802.11b mode and -30dBc for 802.11a mode
802.11b, #1

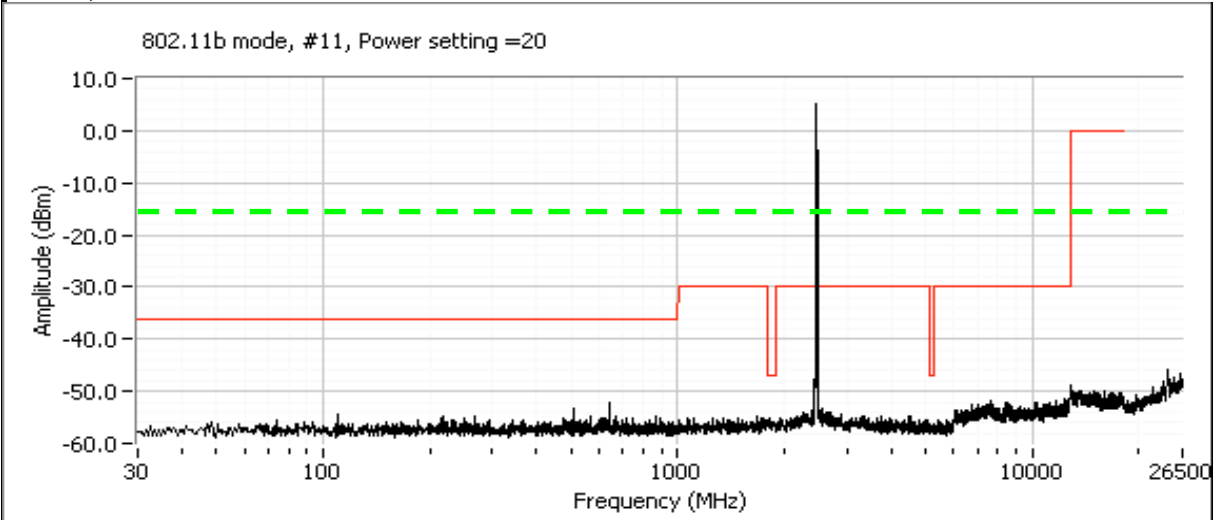


802.11b, #6



Client: Xirrus, Inc.	Job Number: J60437
Model: XS-3500 Access Point	T-Log Number: T61140
Contact: Ian Laity / Steve Smith	Account Manager: Susan Peizi
Spec: FCC 15.247, 15.401, RSS-210	Class: N/A

802.11b, #11

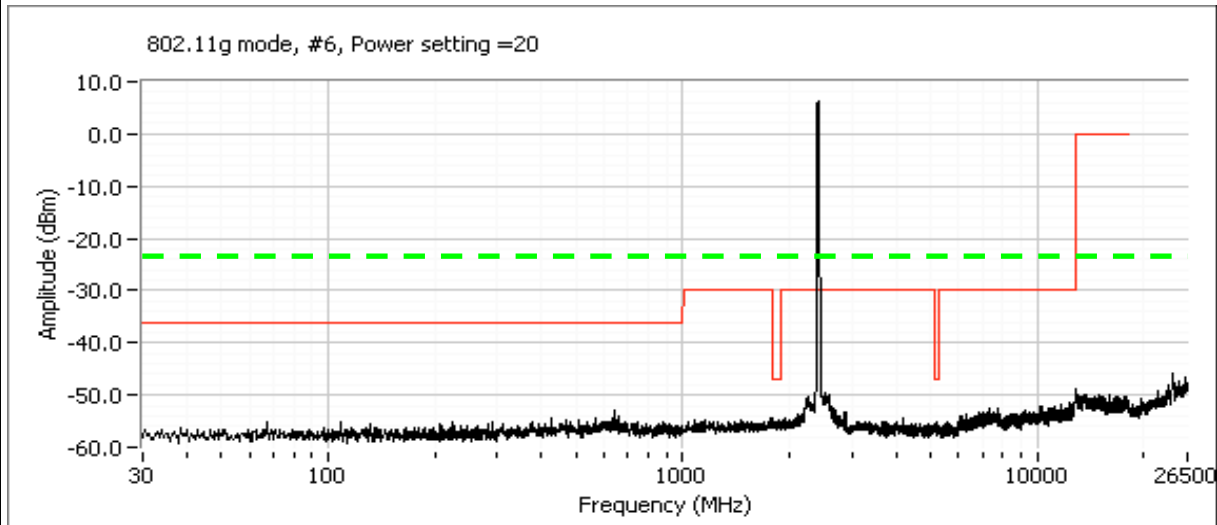


802.11g, #1

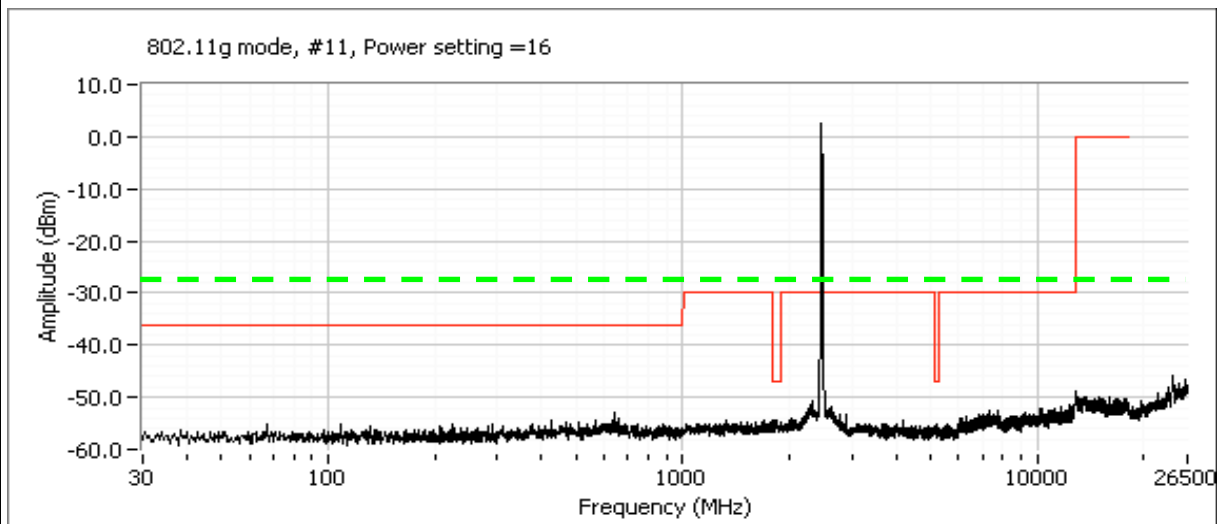


Client: Xirrus, Inc.	Job Number: J60437
Model: XS-3500 Access Point	T-Log Number: T61140
Contact: Ian Laity / Steve Smith	Account Manager: Susan Peizl
Spec: FCC 15.247, 15.401, RSS-210	Class: N/A

802.11g, #6



802.11g, #11





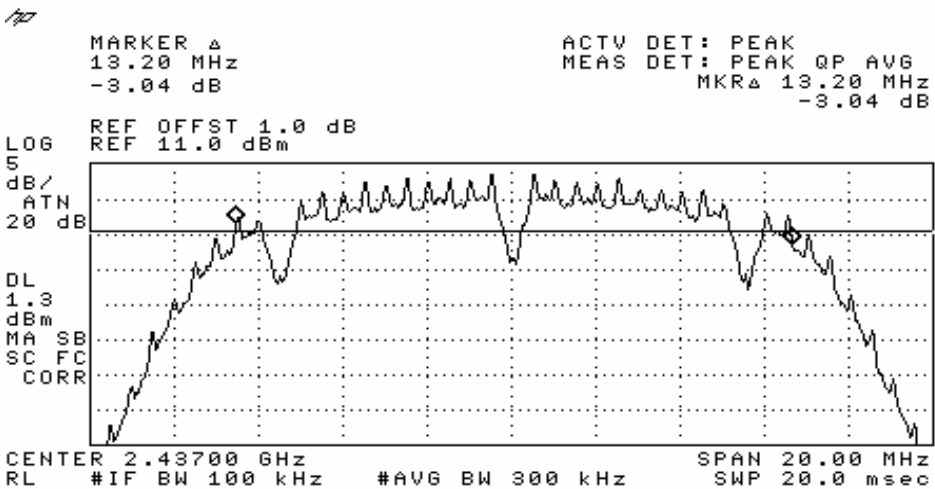
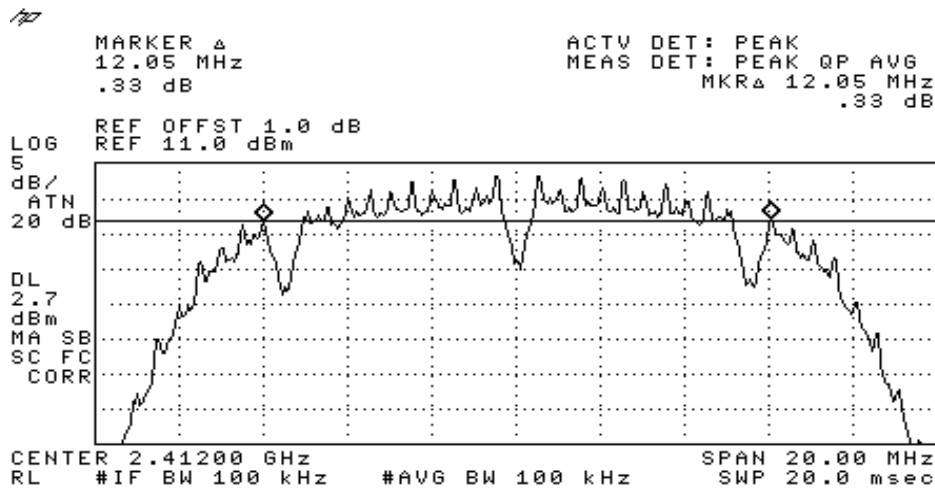
EMC Test Data

Client: Xirrus, Inc.	Job Number: J60437
Model: XS-3500 Access Point	T-Log Number: T61140
Contact: Ian Laity / Steve Smith	Account Manager: Susan Peizi
Spec: FCC 15.247, 15.401, RSS-210	Class: N/A

Run #2: Signal Bandwidth

Mode	Pwr	Frequency (MHz)	Resolution Bandwidth	6dB Signal Bandwidth	99% Signal Bandwidth
b (CCK)	20	2412	100kHz	12.05 MHz	14.60 MHz
b (CCK)	20	2437	100kHz	13.20 MHz	14.55 MHz
b (CCK)	15	2462	100kHz	12.55 MHz	14.60 MHz
g (OFDM)	16	2412	100kHz	16.80 MHz	16.85 MHz
g (OFDM)	20	2437	100kHz	16.73 MHz	16.85 MHz
g (OFDM)	16	2462	100kHz	16.73 MHz	16.80 MHz

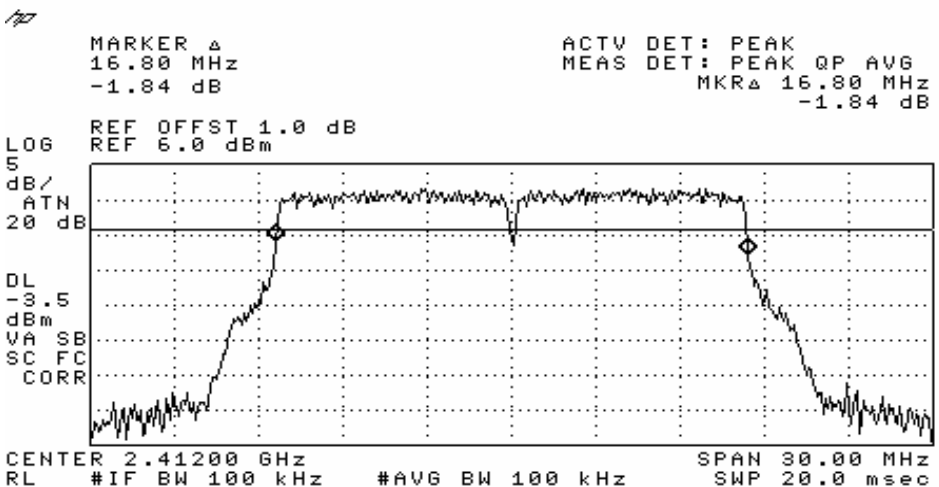
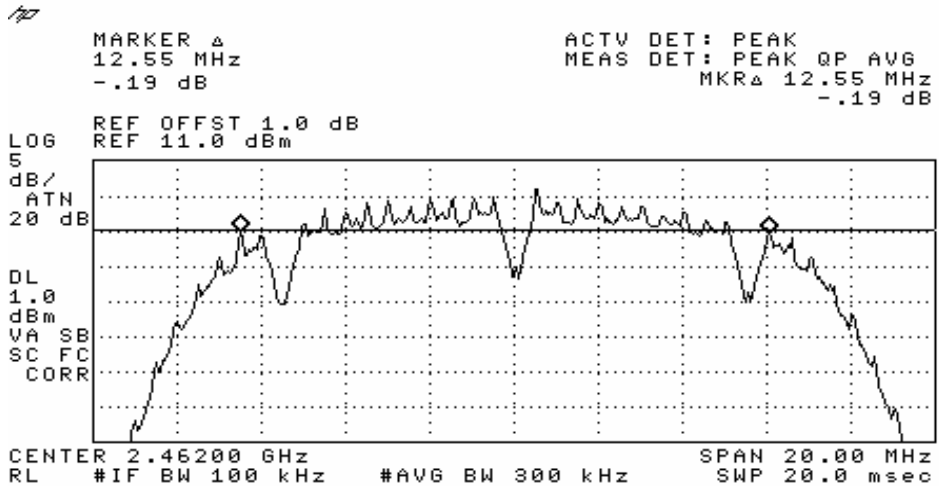
Note 1: 99% bandwidth measured using feature of analyzer





EMC Test Data

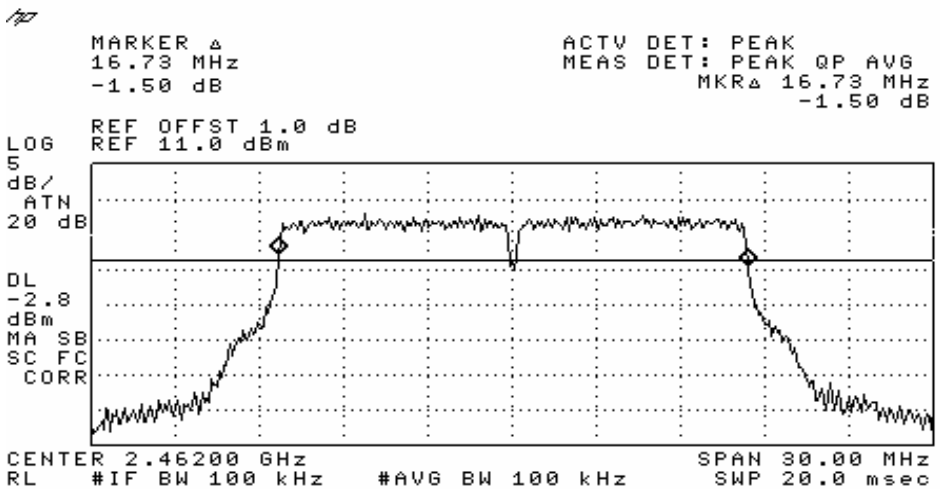
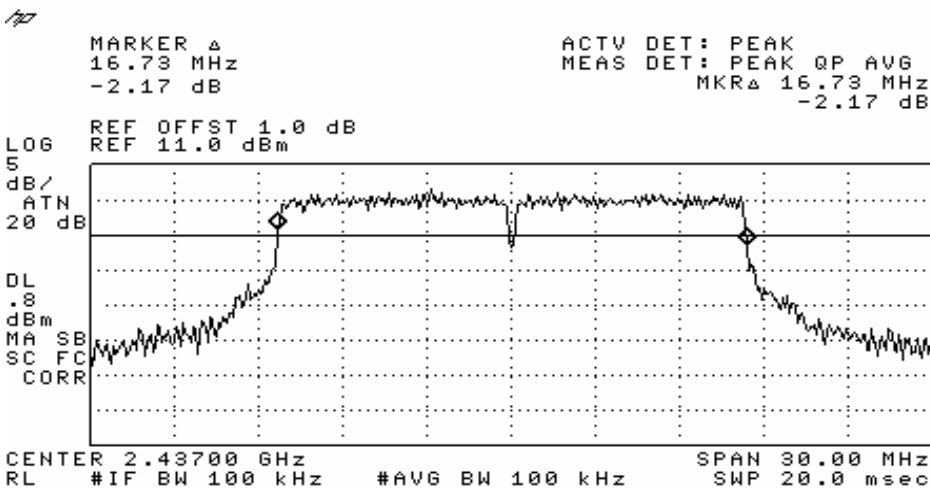
Client: Xirrus, Inc.	Job Number: J60437
Model: XS-3500 Access Point	T-Log Number: T61140
Contact: Ian Laity / Steve Smith	Account Manager: Susan Peizi
Spec: FCC 15.247, 15.401, RSS-210	Class: N/A





EMC Test Data

Client: Xirrus, Inc.	Job Number: J60437
Model: XS-3500 Access Point	T-Log Number: T61140
Contact: Ian Laity / Steve Smith	Account Manager: Susan Peizi
Spec: FCC 15.247, 15.401, RSS-210	Class: N/A





EMC Test Data

Client:	Xirrus, Inc.	Job Number:	J60437
Model:	XS-3500 Access Point	T-Log Number:	T61140
Contact:	Ian Laity / Steve Smith	Account Manager:	Susan Pezli
Spec:	FCC 15.247, 15.401, RSS-210	Class:	N/A

Run #3a: Output Power

Maximum antenna gain: 5.2 dBi

Mode	Pwr	Frequency (MHz)	Res BW	Output Power (dBm)	Output Power (W)	EIRP (W)
b (CCK)	20	2412	-	19.8	0.095	0.316
b (CCK)	20	2437	-	20.3	0.107	0.355
b (CCK)	15	2462	-	17.7	0.059	0.195

Aggregate Power - assumes three radios on non-overlapping channels: 25.071 dBm
 (Note - there are only three non-overlapping channels in the 2.4 GHz band) 0.321 Watts

Note 1: Output power measured using a peak power meter

Run #3b: Output Power - 802.11g mode measured using UNII test method

Maximum antenna gain: 5.2 dBi

Measured using peak power meter - for reference only

Mode	Pwr	Frequency (MHz)	Res BW	Output Power (dBm)	Output Power (W)	EIRP (W)
g (OFDM)	16	2412	-	22.4	0.174	0.575
g (OFDM)	20	2437	-	24.1	0.257	0.851
g (OFDM)	16	2462	-	22.2	0.166	0.550
g (OFDM)	14	2462	-	21.4	0.138	0.275
g (OFDM)	13	2462	-	20.2	0.105	0.347

internal
external

Power measured using UNII test method - values for FCC grant

Mode	Pwr	Frequency (MHz)	Res BW	Output Power (dBm)	Output Power (W)	EIRP (W)
g (OFDM)	16	2412	1MHz	17.13	0.052	0.171
g (OFDM)	20	2437	1MHz	21.18	0.131	0.435
g (OFDM)	14	2462	1MHz	13.25	0.021	0.042
g (OFDM)	13	2462	1MHz	12.46	0.018	0.058

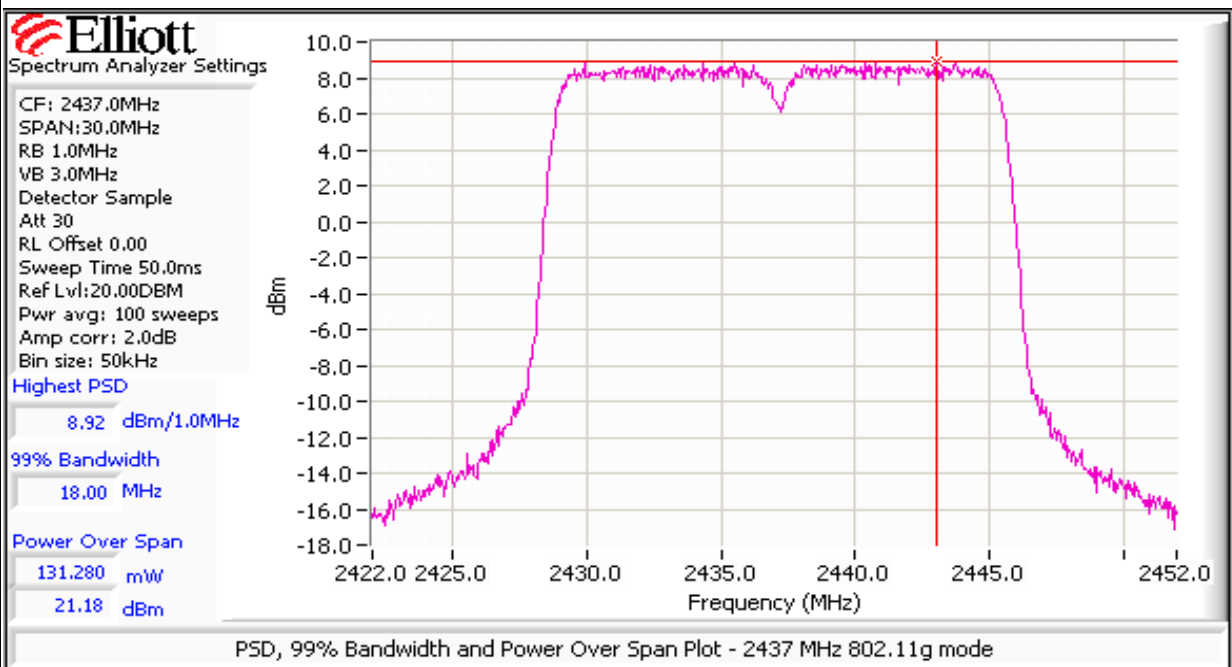
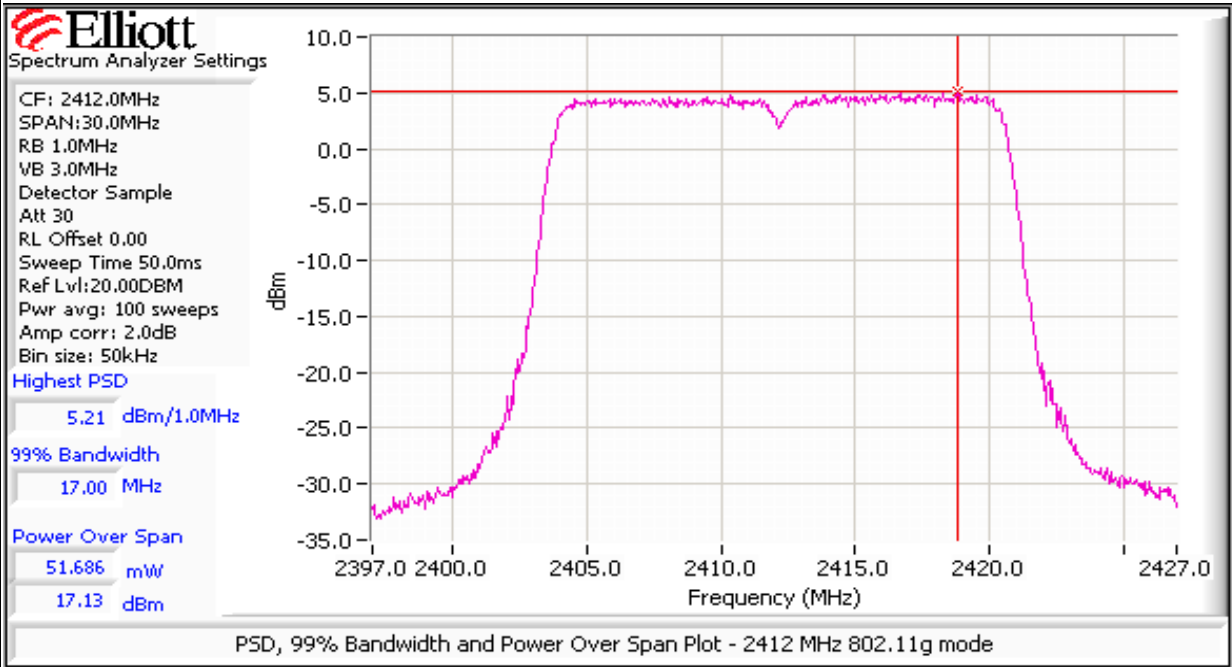
internal
external

Aggregate Power - assumes three radios on non-overlapping channels: 25.951 dBm
 (Note - there are only three non-overlapping channels in the 2.4 GHz band) 0.394 Watts

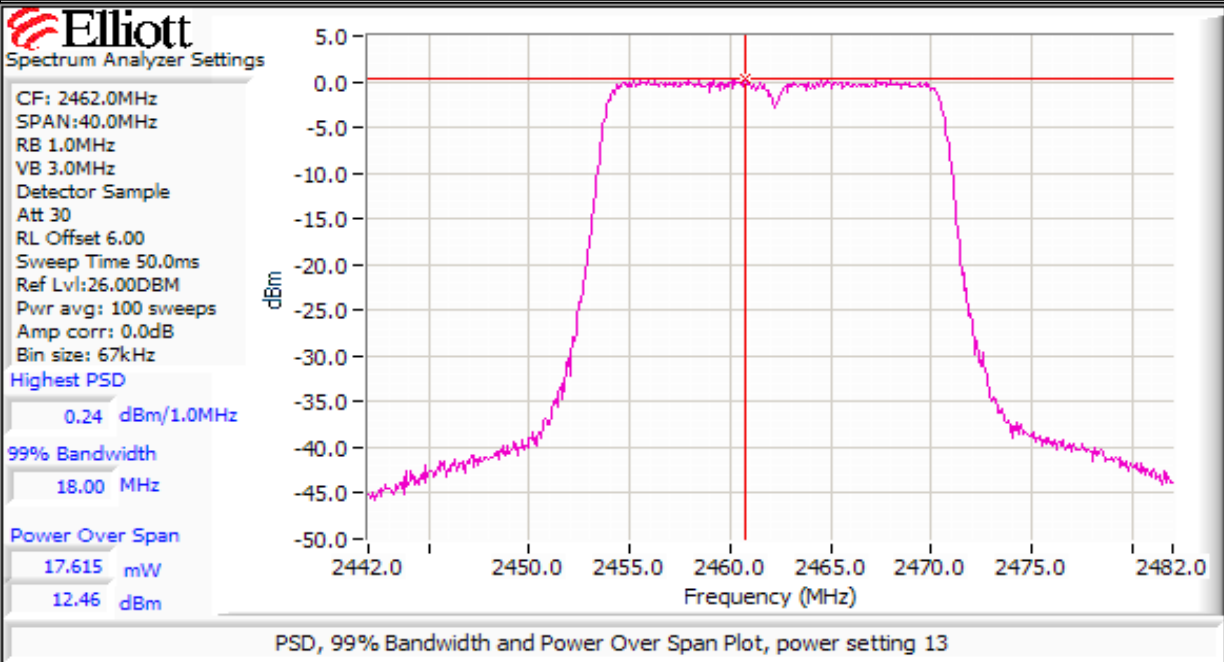
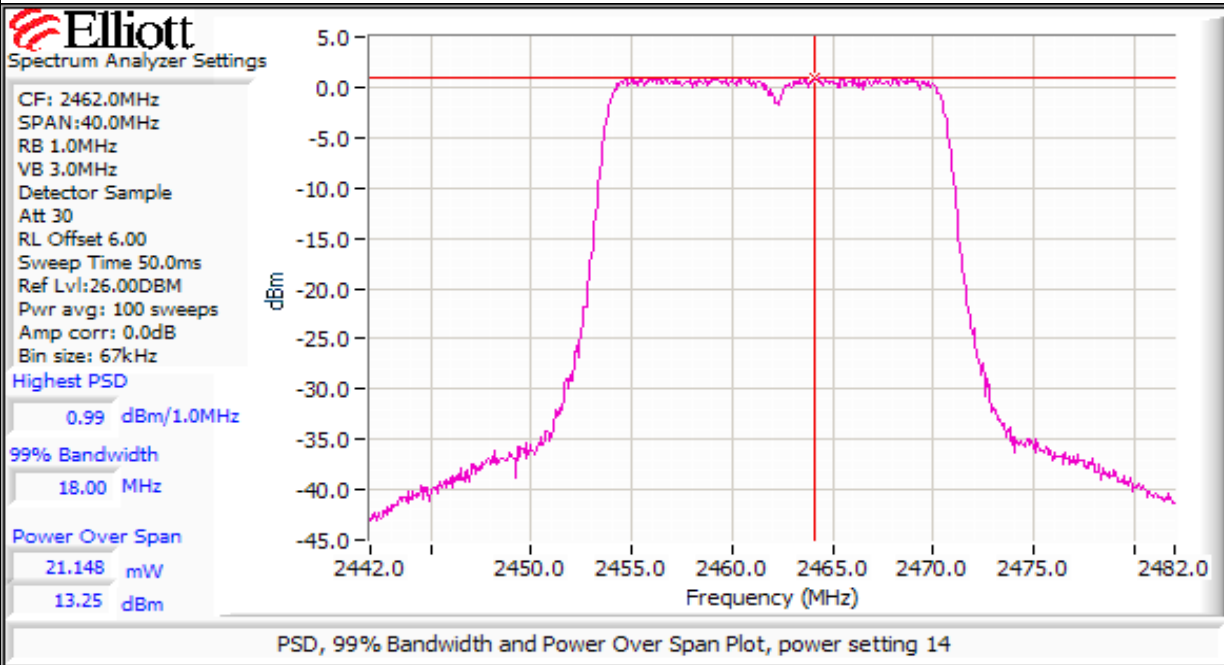
Note 1: Output power measured using power over channel, RB=1MHz, VB=3MHz, sample detector and power averaging (100 sweeps). Refer to plots below.

Note 1: EIRP measurements use the external antenna gain of 3dBd, except for channel 11 which uses the internal antenna gain at power setting 14 (g=3dBi) and the external antenna at power setting 13 (G = 3dBd).

Client: Xirrus, Inc.	Job Number: J60437
Model: XS-3500 Access Point	T-Log Number: T61140
Contact: Ian Laity / Steve Smith	Account Manager: Susan Peizl
Spec: FCC 15.247, 15.401, RSS-210	Class: N/A



Client: Xirrus, Inc.	Job Number: J60437
Model: XS-3500 Access Point	T-Log Number: T61140
Contact: Ian Laity / Steve Smith	Account Manager: Susan Peizi
Spec: FCC 15.247, 15.401, RSS-210	Class: N/A





EMC Test Data

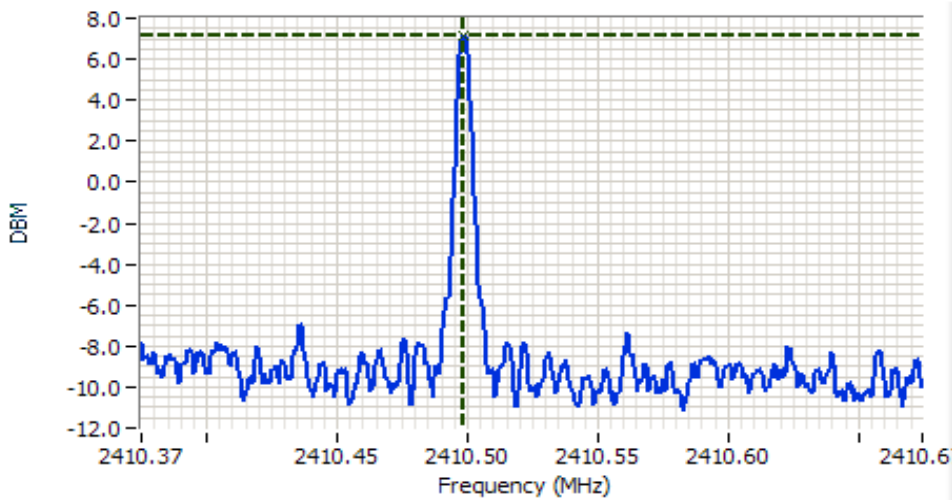
Client: Xirrus, Inc.	Job Number: J60437
Model: XS-3500 Access Point	T-Log Number: T61140
Contact: Ian Laity / Steve Smith	Account Manager: Susan Pezli
Spec: FCC 15.247, 15.401, RSS-210	Class: N/A

Run #4: Power Spectral Density

Mode	Pwr	Channel	Freq (MHz)	Res BW	P.S.D. (averaged over 1 second in a 3kHz bandwidth)	Limit	Status
b (CCK)	20	2412	2410.498	3kHz	7.17	8.0	Pass
b (CCK)	20	2437	2436.498	3kHz	7.83	8.0	Pass
b (CCK)	15	2462	2463.498	3kHz	2.83	8.0	Pass
g (OFDM)	16	2412	2407.017	3kHz	-7.38	8.0	Pass
g (OFDM)	20	2437	2441.655	3kHz	-3.05	8.0	Pass
g (OFDM)	16	2462	2454.749	3kHz	-7.19	8.0	Pass

Note - power spectral density for g mode not re-measured for channels 1 and 11 at the lower power setting required to meet band-edge limits... worst case remains center channel.

Note - PSD measurements for 802.11b mode were taken on 11/1/2005



Analyzer Settings

HP8564E,EMI
 CF: 2410.5 MHz
 SPAN: 300 kHz
 RB 3 kHz
 VB 10 kHz
 Detector POS
 Att 30
 RL Offset 0.00
 Sweep Time 100.0s
 Ref Lvl: 15.00DBM

Comments

Peak PSD, low channel, 802.11b mode, power setting = 20 (19.8dBm)

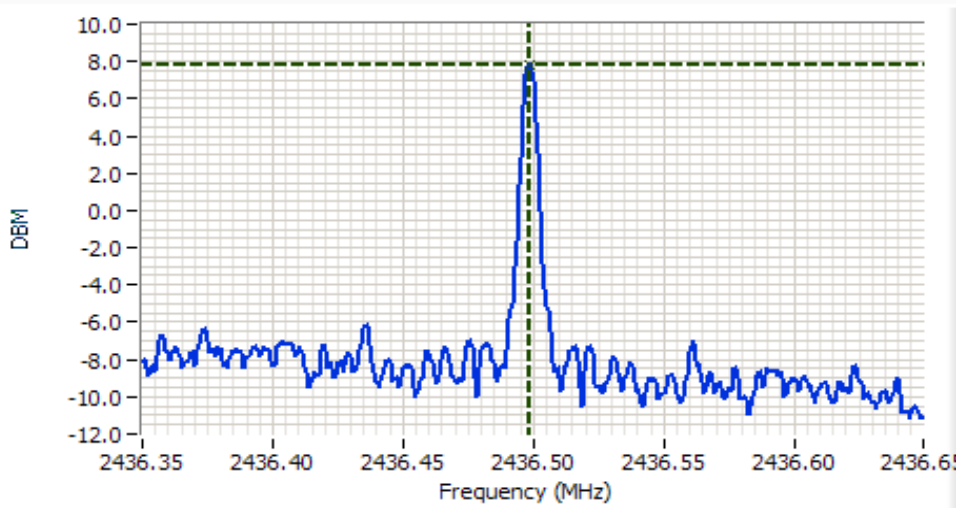
Cursor 1	2410.498	7.17	
	0.000	0.00	





EMC Test Data

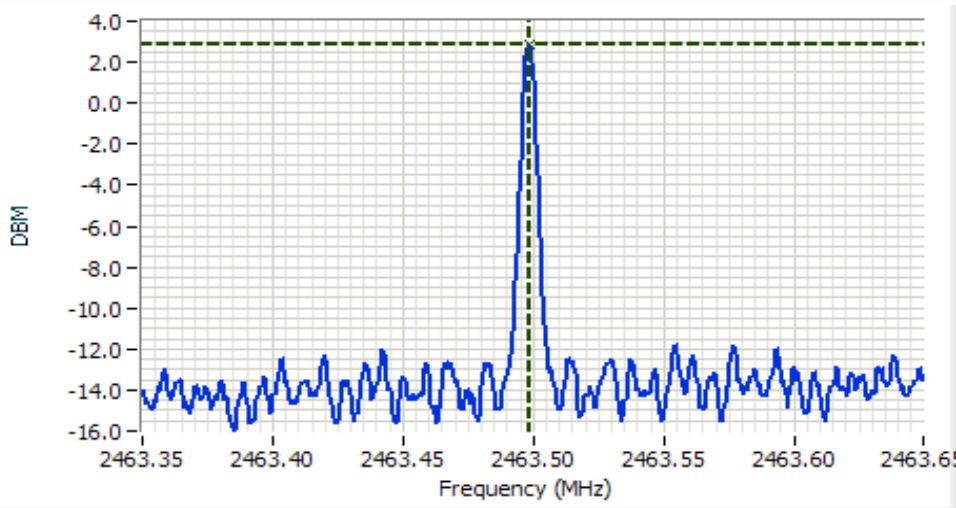
Client: Xirrus, Inc.	Job Number: J60437
Model: XS-3500 Access Point	T-Log Number: T61140
Contact: Ian Laity / Steve Smith	Account Manager: Susan Peizl
Spec: FCC 15.247, 15.401, RSS-210	Class: N/A



Analyzer Settings
HP8564E,EMI
CF: 2436.5 MHz
SPAN: 300 kHz
RB 3 kHz
VB 10 kHz
Detector POS
Att 30
RL Offset 0.00
Sweep Time 100.0s
Ref Lvl: 15.00DBM

Comments
Peak PSD, center channel, 802.11b mode, power setting = 20 (20.3dBm)

Cursor 1 2436.49 7.83
0.000 0.00



Analyzer Settings
HP8564E,EMI
CF: 2463.5 MHz
SPAN: 300 kHz
RB 3 kHz
VB 10 kHz
Detector POS
Att 30
RL Offset 0.00
Sweep Time 100.0s
Ref Lvl: 15.00DBM

Comments
Peak PSD, high channel, 802.11b mode, power setting = 15 (17.7dBm)

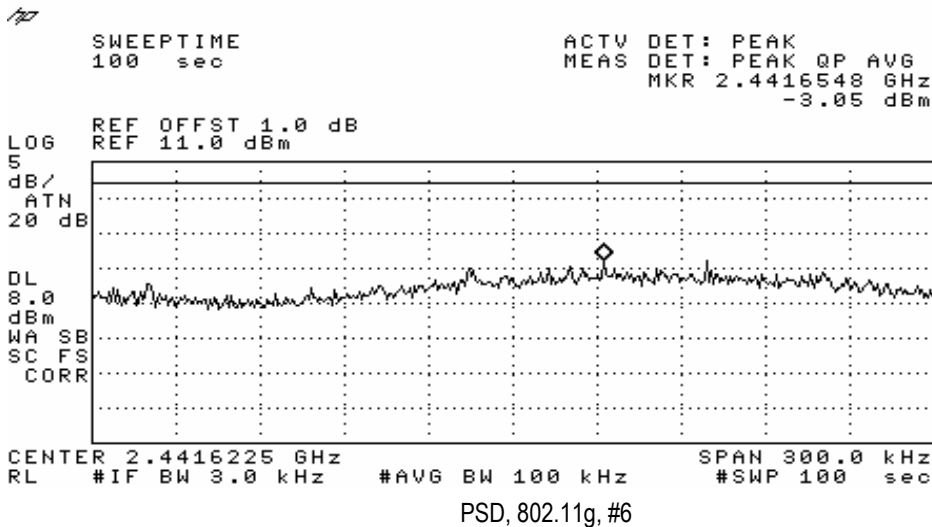
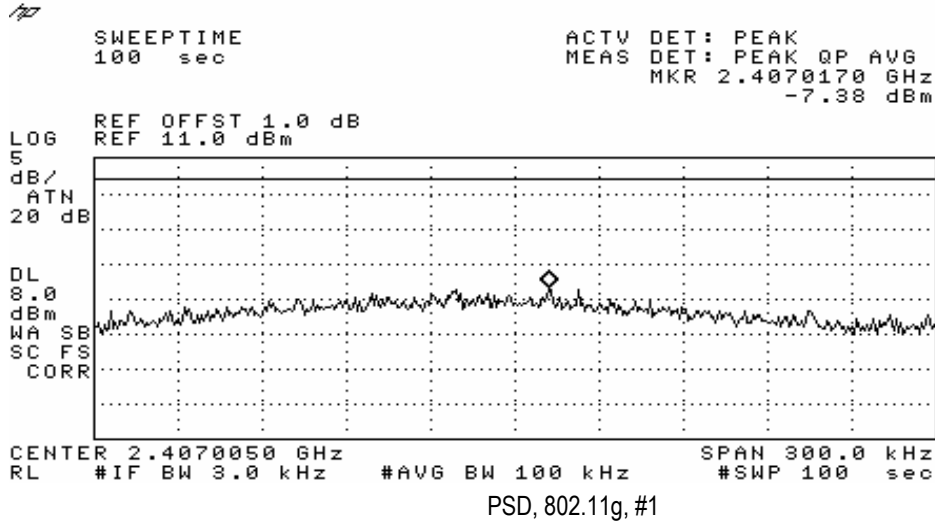
Cursor 1 2463.49 2.83
0.000 0.00





EMC Test Data

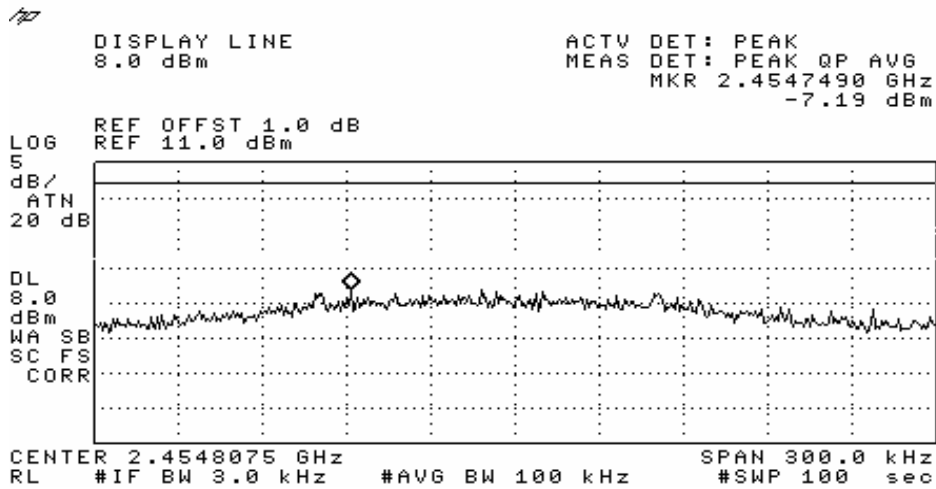
Client: Xirrus, Inc.	Job Number: J60437
Model: XS-3500 Access Point	T-Log Number: T61140
Contact: Ian Laity / Steve Smith	Account Manager: Susan Peizi
Spec: FCC 15.247, 15.401, RSS-210	Class: N/A





EMC Test Data

Client: Xirrus, Inc.	Job Number: J60437
Model: XS-3500 Access Point	T-Log Number: T61140
Contact: Ian Laity / Steve Smith	Account Manager: Susan Peizi
Spec: FCC 15.247, 15.401, RSS-210	Class: N/A



PSD, 802.11g, #11

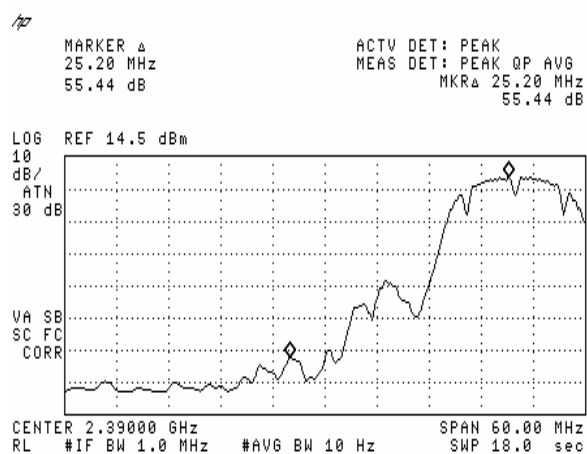
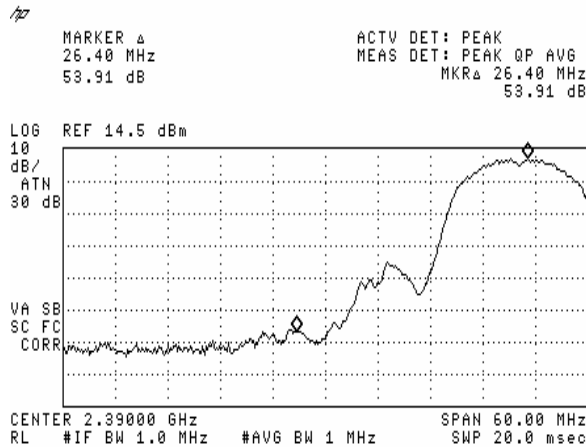


EMC Test Data

Client: Xirrus, Inc.	Job Number: J60437
Model: XS-3500 Access Point	T-Log Number: T61140
Contact: Ian Laity / Steve Smith	Account Manager: Susan Pelzi
Spec: FCC 15.247, 15.401, RSS-210	Class: N/A

**Run #1a: Radiated Spurious Emissions, 1000 - 25000 MHz. Low Channel @ 2412 MHz
Radio #2, Power setting 20**

	H	V	
Fundamental emission level @ 3m in 1MHz RBW:	109.27	111.57	Peak Measurement (RB=VB=1MHz)
Fundamental emission level @ 3m in 1MHz RBW:	106.32	108.29	Average Measurement (RB=1MHz, VB=10Hz)
Delta Marker - Peak	53.91 dB		
Delta Marker - Average	55.44 dB		



Band Edge

Frequency	Level	Pol	15.209 / 15.247	Detector	Azimuth	Height	Comments	
MHz	dBμV/m	v/h	Limit	Margin	Pk/QP/Avg	degrees	meters	
2386.000	52.9	V	54.0	-1.1	AVG	265	1.1	Note 2
2389.300	57.7	V	74.0	-16.3	PK	265	1.1	Note 2

- 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: Band edge measurement calculated from fundamental minus delta markers.



EMC Test Data

Client:	Xirrus, Inc.	Job Number:	J60437
Model:	XS-3500 Access Point	T-Log Number:	T61140
Contact:	Ian Laity / Steve Smith	Account Manager:	Susan Pelzi
Spec:	FCC 15.247, 15.401, RSS-210	Class:	N/A

Other Spurious emissions

Frequency MHz	Level dBµV/m	Pol v/h	15.209 / 15.247		Detector Pk/QP/Avg	Azimuth degrees	Height meters	Comments
			Limit	Margin				
9648.134	43.4	V	54.0	-10.6	AVG	115	1.0	
9648.030	43.1	H	54.0	-10.9	AVG	236	1.2	
7237.183	42.8	V	54.0	-11.2	AVG	216	1.0	
4825.067	40.2	V	54.0	-13.8	AVG	92	1.0	
7239.767	37.5	H	54.0	-16.5	AVG	214	1.0	
4821.850	35.2	H	54.0	-18.8	AVG	190	1.0	
7237.183	54.9	V	74.0	-19.1	PK	216	1.0	
12058.530	34.8	V	54.0	-19.2	AVG	0	1.0	Noise floor
12058.950	34.6	H	54.0	-19.4	AVG	344	1.0	Noise floor
4825.067	52.8	V	74.0	-21.2	PK	92	1.0	
9648.134	51.3	V	74.0	-22.8	PK	115	1.0	
9648.030	49.7	H	74.0	-24.3	PK	236	1.2	
7239.767	49.1	H	74.0	-24.9	PK	214	1.0	
4821.850	47.6	H	74.0	-26.4	PK	190	1.0	
12058.950	46.5	H	74.0	-27.5	PK	344	1.0	Noise floor
12058.530	45.7	V	74.0	-28.3	PK	115	1.0	Noise floor

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 #1b: Radiated Spurious Emissions, 1000 - 25,000 MHz. Center Channel @ 2437 MHz

Radio #2, Power setting 20

Frequency MHz	Level dBµV/m	Pol v/h	15.209 / 15.247		Detector Pk/QP/Avg	Azimuth degrees	Height meters	Comments
			Limit	Margin				
4873.400	44.6	V	54.0	-9.4	AVG	94	1.0	
9747.950	43.3	V	54.0	-10.7	AVG	114	1.0	
9747.995	40.8	H	54.0	-13.2	AVG	225	1.0	
7309.835	40.7	V	54.0	-13.3	AVG	217	1.0	
4872.750	39.0	H	54.0	-15.0	AVG	191	1.0	
4873.400	57.3	V	74.0	-16.7	PK	94	1.0	
7310.105	34.8	H	54.0	-19.2	AVG	214	1.0	
7309.835	52.9	V	74.0	-21.2	PK	217	1.0	
9747.950	52.6	V	74.0	-21.4	PK	114	1.0	
4872.750	51.2	H	74.0	-22.8	PK	191	1.0	
9747.995	48.2	H	74.0	-25.8	PK	225	1.0	
7310.105	45.7	H	74.0	-28.3	PK	214	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.

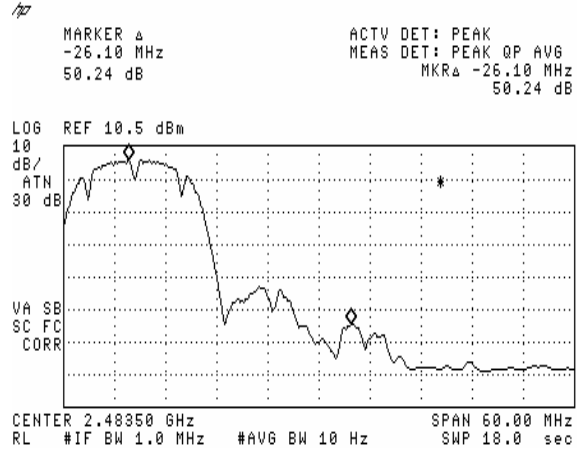
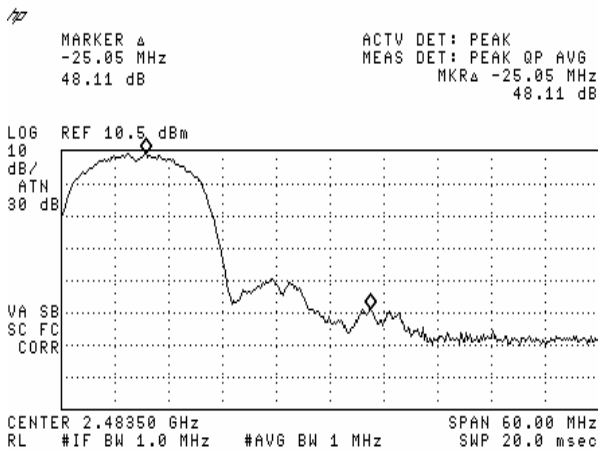


EMC Test Data

Client: Xirrus, Inc.	Job Number: J60437
Model: XS-3500 Access Point	T-Log Number: T61140
Contact: Ian Laity / Steve Smith	Account Manager: Susan Pelzi
Spec: FCC 15.247, 15.401, RSS-210	Class: N/A

Run #1c: Radiated Spurious Emissions, 1000 - 25000 MHz. High Channel @ 2462 MHz Power setting 15

	H	V	
Fundamental emission level @ 3m in 1MHz RBW:	103.0	107.9	Peak Measurement (RB=VB=1MHz)
Fundamental emission level @ 3m in 1MHz RBW:	97.2	104.0	Average Measurement (RB=1MHz, VB=10Hz)
Delta Marker - Peak	48.11 dB		Delta in-band to band edge
Delta Marker - Average	50.2 dB		



Band Edge

Frequency	Level	Pol	15.209 / 15.247	Detector	Azimuth	Height	Comments
MHz	dBμV/m	v/h	Limit	Margin	Pk/QP/Avg	degrees	meters
2487.500	53.8	V	54.0	-0.2	AVG	265	1.0
2483.500	59.8	V	74.0	-14.2	PK	265	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.

Note 2: Band edge measurement calculated from fundamental minus delta markers.



EMC Test Data

Client:	Xirrus, Inc.	Job Number:	J60437
Model:	XS-3500 Access Point	T-Log Number:	T61140
Contact:	Ian Laity / Steve Smith	Account Manager:	Susan Pelzi
Spec:	FCC 15.247, 15.401, RSS-210	Class:	N/A

Other Spurious emissions (measured at a power setting of 20)

Frequency MHz	Level dB μ V/m	Pol v/h	15.209 / 15.247		Detector Pk/QP/Avg	Azimuth degrees	Height meters	Comments
			Limit	Margin				
4925.115	42.0	V	54.0	-12.0	AVG	270	1.2	
4925.115	53.8	V	74.0	-20.2	PK	270	1.2	
7384.707	34.9	V	54.0	-19.1	AVG	322	1.0	
7384.707	46.7	V	74.0	-27.3	PK	322	1.0	
9847.970	39.4	V	54.0	-14.6	AVG	141	1.1	
9847.970	51.6	V	74.0	-22.4	PK	141	1.1	
4925.570	36.7	H	54.0	-17.3	AVG	360	1.0	
4925.570	48.9	H	74.0	-25.1	PK	360	1.0	
7385.350	31.3	H	54.0	-22.7	AVG	10	1.4	
7385.350	42.4	H	74.0	-31.6	PK	10	1.4	
9848.015	35.4	H	54.0	-18.6	AVG	26	1.0	
9848.015	45.5	H	74.0	-28.5	PK	26	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.

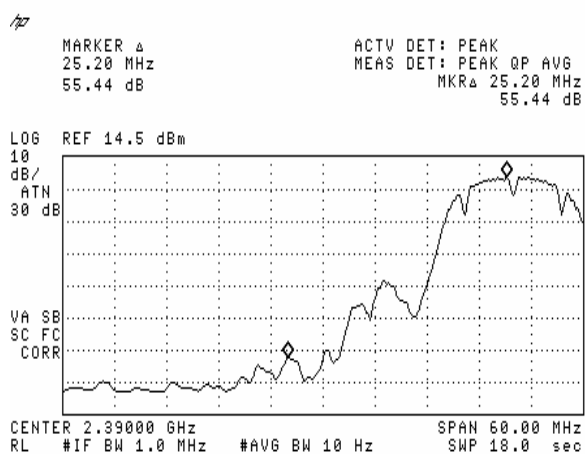
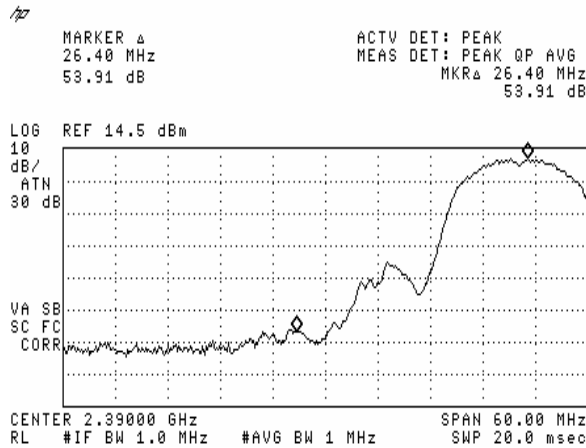


EMC Test Data

Client: Xirrus, Inc.	Job Number: J60437
Model: XS-3500 Access Point	T-Log Number: T61140
Contact: Ian Laity / Steve Smith	Account Manager: Susan Pelzi
Spec: FCC 15.247, 15.401, RSS-210	Class: N/A

Run #1a: Radiated Spurious Emissions, 1000 - 25000 MHz. Low Channel @ 2412 MHz Radio #2, Power setting 20

	H	V	
Fundamental emission level @ 3m in 1MHz RBW:		111.1	Peak Measurement (RB=VB=1MHz)
Fundamental emission level @ 3m in 1MHz RBW:		107.8	Average Measurement (RB=1MHz, VB=10Hz)
Delta Marker - Peak	53.91	dB	
Delta Marker - Average	55.44	dB	



Band Edge

Frequency	Level	Pol	15.209 / 15.247	Detector	Azimuth	Height	Comments	
MHz	dBμV/m	v/h	Limit	Margin	Pk/QP/Avg	degrees	meters	
2386.000	52.3	V	54.0	-1.7	AVG	43	1.5	Note 2
2389.300	57.2	V	74.0	-16.8	PK	43	1.5	Note 2

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: Band edge measurement calculated from fundamental minus delta markers.

Other Spurious emissions

Frequency	Level	Pol	15.209 / 15.247	Detector	Azimuth	Height	Comments
MHz	dBμV/m	v/h	Limit	Margin	Pk/QP/Avg	degrees	meters
4823.995	48.8	V	54.0	-5.2	AVG	10	1.3
4823.998	48.3	H	54.0	-5.7	AVG	129	1.0
4823.998	55.0	H	74.0	-19.0	PK	129	1.0
4823.995	54.4	V	74.0	-19.7	PK	10	1.3

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, Inc.	Job Number: J60437
Model: XS-3500 Access Point	T-Log Number: T61140
Contact: Ian Laity / Steve Smith	Account Manager: Susan Pelzi
Spec: FCC 15.247, 15.401, RSS-210	Class: N/A

Run #1b: Radiated Spurious Emissions, 1000 - 25,000 MHz. Center Channel @ 2437 MHz

Radio #2, Power setting 20

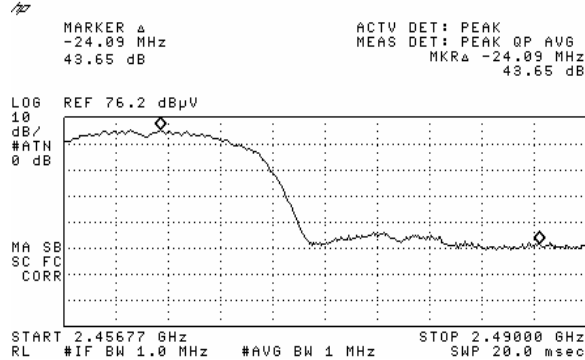
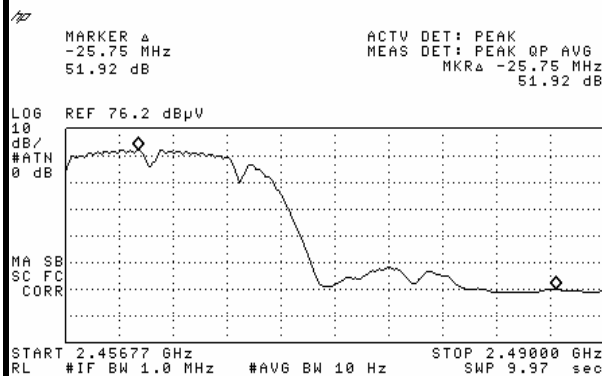
Frequency	Level	Pol	15.209 / 15.247		Detector	Azimuth	Height	Comments
MHz	dBμV/m	v/h	Limit	Margin	Pk/QP/Avg	degrees	meters	
4873.996	49.4	H	54.0	-4.6	AVG	305	1.0	
4873.996	55.8	H	74.0	-18.2	PK	305	1.0	
4873.996	52.9	V	54.0	-1.1	AVG	361	1.0	
4873.996	57.8	V	74.0	-16.2	PK	361	1.0	

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.

Run #1c: Radiated Spurious Emissions, 1000 - 25000 MHz. High Channel @ 2462 MHz

Power setting 15

	H	V	
Fundamental emission level @ 3m in 1MHz RBW:		108.7	Peak Measurement (RB=VB=1MHz)
Fundamental emission level @ 3m in 1MHz RBW:		105.7	Average Measurement (RB=1MHz, VB=10Hz)
Delta Marker - Peak	43.65 dB		Delta in-band to band edge
Delta Marker - Average	51.92 dB		



Band Edge

Frequency	Level	Pol	15.209 / 15.247		Detector	Azimuth	Height	Comments
MHz	dBμV/m	v/h	Limit	Margin	Pk/QP/Avg	degrees	meters	
2487.500	53.8	V	54.0	-0.2	AVG	265	1.0	
2483.500	65.1	V	74.0	-8.9	PK	265	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.

Note 2: Band edge measurement calculated from fundamental minus delta markers.



EMC Test Data

Client:	Xirrus, Inc.	Job Number:	J60437
Model:	XS-3500 Access Point	T-Log Number:	T61140
Contact:	Ian Laity / Steve Smith	Account Manager:	Susan Pelzi
Spec:	FCC 15.247, 15.401, RSS-210	Class:	N/A

Other Spurious emissions

Frequency MHz	Level dB μ V/m	Pol v/h	15.209 / 15.247		Detector Pk/QP/Avg	Azimuth degrees	Height meters	Comments
			Limit	Margin				
4923.996	45.1	H	54.0	-8.9	AVG	-45	1.2	
4923.998	44.1	V	54.0	-9.9	AVG	185	1.5	
4923.996	54.2	H	74.0	-19.9	PK	-45	1.2	
4923.998	53.7	V	74.0	-20.3	PK	185	1.5	

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: All other emissions were below the 15.209 limit when measured at a distance of 0.5m



EMC Test Data

Client:	Xirrus, Inc.	Job Number:	J60437
Model:	XS-3500 Access Point	T-Log Number:	T61140
		Account Manager:	Susan Pezl
Contact:	Ian Laity / Steve Smith		
Spec:	FCC 15.247, 15.401, RSS-210	Class:	N/A

FCC 15.247 Spurious Emissions - 802.11g 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: 7/29/2005	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:	23 °C
Rel. Humidity:	59 %

Summary of Results

Run #	Test Performed	Limit	Pass / Fail	Result / Margin
1	RE, 1000 - 25000 MHz - Spurious Emissions	FCC Part 15.209 / 15.247(c)	Pass	53.3dBµV/m (462.4µV/m) @ 2483.5MHz (-0.7dB)

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.

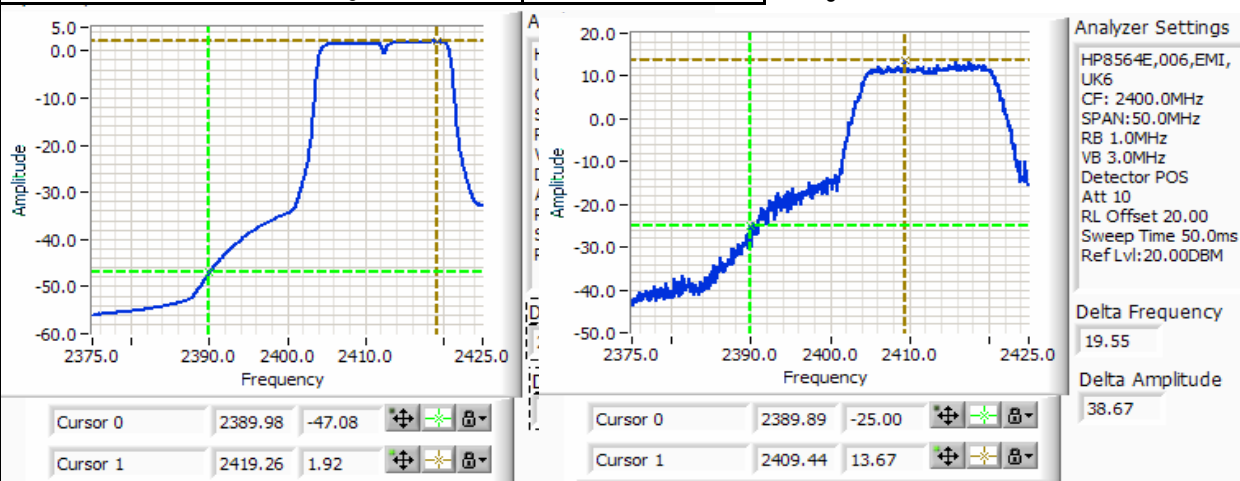


EMC Test Data

Client: Xirrus, Inc.	Job Number: J60437
Model: XS-3500 Access Point	T-Log Number: T61140
Contact: Ian Laity / Steve Smith	Account Manager: Susan Peizi
Spec: FCC 15.247, 15.401, RSS-210	Class: N/A

Radio #14 Internal Antenna
Fundamental field strength higher with EUT 80cm above the groundplane
Run #1a: Radiated Spurious Emissions, 1000 - 25000 MHz. Low Channel @ 2412 MHz
Pwr setting 16

	H	V	
Fundamental emission level @ 3m in 1MHz RBW:	101.33	110	Peak Measurement (RB=VB=1MHz)
Fundamental emission level @ 3m in 1MHz RBW:	92.7	101.6	Average Measurement (RB=1MHz, VB=10Hz)
Delta Marker - Peak	38.7 dB		
Delta Marker - Average	49 dB		
Calculated Band-Edge Measurement:	71.3 dBuV/m		Peak
Calculated Band-Edge Measurement:	52.6 dBuV/m		Average



Band Edge

Frequency	Level	Pol	15.209 / 15.247	Detector	Azimuth	Height	Comments	
MHz	dBuV/m	v/h	Limit	Margin	Pk/QP/Avg	degrees	meters	
2390.000	52.6	v	54.0	-1.4	Avg	-	-	Note 2, delta = 49.0dB
2390.000	71.3	v	74.0	-2.7	PK	-	-	Note 2, delta = 38.7dB

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: Band edge measurement calculated from fundamental minus delta markers. Marker deltas are the difference between the highest signal level in the restricted band and the highest in-band signal level for average (RB=1MHz, VB=10Hz) and peak (RB=VB=1MHz) measurements.



EMC Test Data

Client:	Xirrus, Inc.	Job Number:	J60437
Model:	XS-3500 Access Point	T-Log Number:	T61140
Contact:	Ian Laity / Steve Smith	Account Manager:	Susan Peizl
Spec:	FCC 15.247, 15.401, RSS-210	Class:	N/A

Spurious Emissions

Frequency MHz	Level dB μ V/m	Pol v/h	15.209 / 15.247		Detector Pk/QP/Avg	Azimuth degrees	Height meters	Comments
			Limit	Margin				
9647.96	47.9	V	54.0	-6.1	AVG	156	1.6	
4822.67	45.9	V	54.0	-8.1	AVG	70	1.4	
12060.33	39.8	H	54.0	-14.2	AVG	0	1.0	
4823.84	39.7	H	54.0	-14.3	AVG	61	1.0	
12058.50	39.6	V	54.0	-14.4	AVG	0	1.0	
4822.67	58.2	V	74.0	-15.8	PK	70	1.4	
9646.52	38.1	H	54.0	-15.9	AVG	195	1.0	
9647.96	53.1	V	74.0	-20.9	PK	156	1.6	
4823.84	52.0	H	74.0	-22.0	PK	61	1.0	
12058.50	51.3	V	74.0	-22.7	PK	0	1.0	
12060.33	50.7	H	74.0	-23.3	PK	0	1.0	
9646.52	49.1	H	74.0	-24.9	PK	195	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.

Run #1b: Radiated Spurious Emissions, 1000 - 25000 MHz. Center Channel @ 2437 MHz

Power setting 20

Frequency MHz	Level dB μ V/m	Pol v/h	15.209 / 15.247		Detector Pk/QP/Avg	Azimuth degrees	Height meters	Comments
			Limit	Margin				
4873.52	50.1	V	54.0	-3.9	AVG	92	1.2	
9747.99	43.7	V	54.0	-10.3	AVG	157	1.4	
4873.52	62.7	V	74.0	-11.3	PK	92	1.2	
4873.50	42.5	H	54.0	-11.5	AVG	31	1.0	
12185.60	39.0	V	54.0	-15.0	AVG	81	1.0	
12184.14	39.0	H	54.0	-15.0	AVG	0	1.0	
9748.02	38.6	H	54.0	-15.4	AVG	142	1.0	
7310.46	37.9	V	54.0	-16.1	AVG	115	1.0	
7310.79	36.7	H	54.0	-17.3	AVG	42	1.0	
4873.50	55.0	H	74.0	-19.0	PK	31	1.0	
9747.99	51.4	V	74.0	-22.6	PK	157	1.4	
12184.14	50.3	H	74.0	-23.7	PK	0	1.0	
7310.46	50.1	V	74.0	-23.9	PK	115	1.0	
12185.60	49.8	V	74.0	-24.2	PK	81	1.0	
9748.02	48.3	H	74.0	-25.8	PK	142	1.0	
7310.79	48.0	H	74.0	-26.0	PK	42	1.0	

Note 1: For emissions in restricted bands, the limit of 15.209 was used. For all other emissions, the limit was set 30dB below the level of the fundamental or the 15.209 limit.

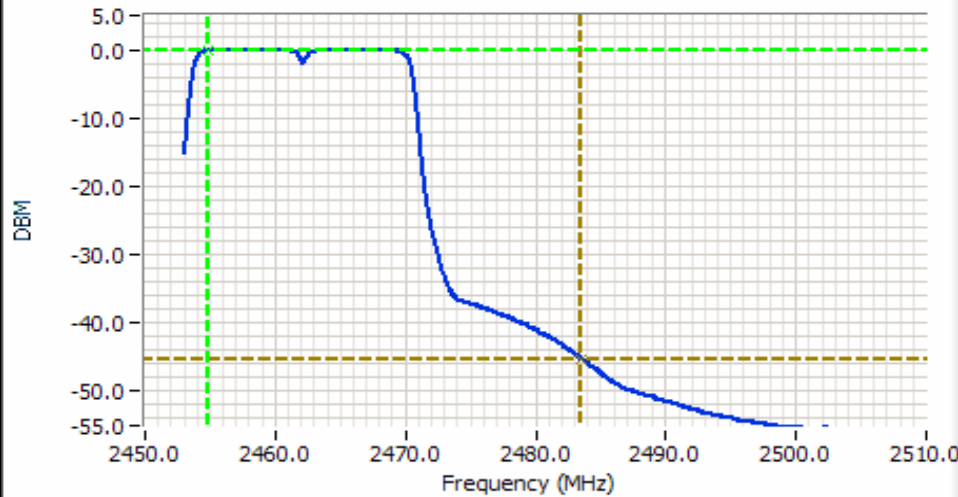


EMC Test Data

Client: Xirrus, Inc.	Job Number: J60437
Model: XS-3500 Access Point	T-Log Number: T61140
Contact: Ian Laity / Steve Smith	Account Manager: Susan Peizl
Spec: FCC 15.247, 15.401, RSS-210	Class: N/A

Run #1c: Radiated Spurious Emissions, 1000 - 26000 MHz. High Channel @ 2462 MHz Power setting 14

	H	V	
Fundamental emission level @ 3m in 1MHz RBW:		106.4	Peak Measurement (RB=VB=1MHz)
Fundamental emission level @ 3m in 1MHz RBW:		97.65	Average Measurement (RB=1MHz, VB=10Hz)



Analyzer Settings

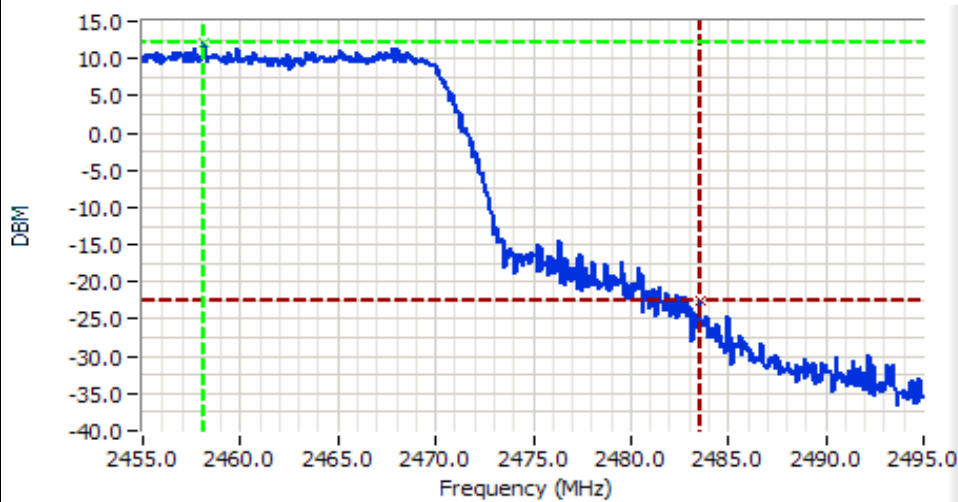
HP8564E,006,EMI,UK6
 CF: 2478.0MHz
 SPAN:50.0MHz
 RB 1.0MHz
 VB 10Hz
 Detector Sample
 Att 30
 RL Offset 0.00
 Sweep Time 19.0s
 Ref Lvl:20.00DBM

Comments

EUT on #11 (2462MHz)
 802.11g mode
 power setting = 14

Cursor 0	2454.91	0.00	
Cursor 1	2483.53	-45.33	

Delta Frequency 28.62
 Delta Amplitude 45.33



Analyzer Settings

HP8564E,006,EMI,UK6
 CF: 2475.0MHz
 SPAN:40.0MHz
 RB 1.0MHz
 VB 3.0MHz
 Detector POS
 Att 30
 RL Offset 6.00
 Sweep Time 50.0ms
 Ref Lvl:26.10DBM

Comments

EUT on #1 (2412MHz)
 802.11g mode
 power setting = 16

Cursor 0	2458.13	12.10	
Cursor 0	2483.55	-22.57	

Delta Frequency 25.42
 Delta Amplitude 34.67

Band edge
 2483.50



EMC Test Data

Client:	Xirrus, Inc.	Job Number:	J60437
Model:	XS-3500 Access Point	T-Log Number:	T61140
Contact:	Ian Laity / Steve Smith	Account Manager:	Susan Peizi
Spec:	FCC 15.247, 15.401, RSS-210	Class:	N/A

Band Edge - channel 11 at power setting = 14

Frequency	Level	Pol	15.209 / 15.247		Detector	Azimuth	Height	Comments
MHz	dB μ V/m	v/h	Limit	Margin	Pk/QP/Avg	degrees	meters	
2483.500	52.3	v	54.0	-1.7	Avg	-	-	Note 2, delta = 45.3dB
2483.500	71.7	v	74.0	-2.3	Pk	-	-	Note 2, delta = 34.7dB

Note 1: For emissions in restricted bands, the limit of 15.209 was used. For all other emissions, the limit was set 30dB below the level of the fundamental or the 15.209 limit.

Note 2: Band edge measurement calculated from fundamental minus delta markers. Marker deltas are the difference between the highest signal level in the restricted band and the highest in-band signal level for average (RB=1MHz, VB=10Hz) and peak (RB=VB=1MHz) measurements.

Spurious Emissions

Frequency	Level	Pol	15.209 / 15.247		Detector	Azimuth	Height	Comments
MHz	dB μ V/m	v/h	Limit	Margin	Pk/QP/Avg	degrees	meters	
9847.95	47.1	V	54.0	-6.9	AVG	154	1.0	
4923.90	45.3	V	54.0	-8.7	AVG	71	1.0	
9848.03	40.5	H	54.0	-13.5	AVG	137	1.0	
12309.46	38.3	H	54.0	-15.7	AVG	0	1.0	
12308.80	37.8	V	54.0	-16.2	AVG	361	1.0	
4924.07	37.5	H	54.0	-16.5	AVG	347	1.0	
7386.94	36.6	V	54.0	-17.5	AVG	318	1.0	
7385.51	36.1	H	54.0	-17.9	AVG	42	1.0	
4923.90	55.3	V	74.0	-18.7	PK	71	1.0	
9847.95	53.4	V	74.0	-20.6	PK	154	1.0	
9848.03	51.0	H	74.0	-23.0	PK	137	1.0	
12309.46	49.3	H	74.0	-24.7	PK	0	1.0	
12308.80	49.2	V	74.0	-24.8	PK	361	1.0	
4924.07	48.0	H	74.0	-26.0	PK	347	1.0	
7386.94	48.0	V	74.0	-26.0	PK	318	1.0	
7385.51	47.6	H	74.0	-26.4	PK	42	1.0	

Note 1: For emissions in restricted bands, the limit of 15.209 was used. For all other emissions, the limit was set 30dB below the level of the fundamental or the 15.209 limit.



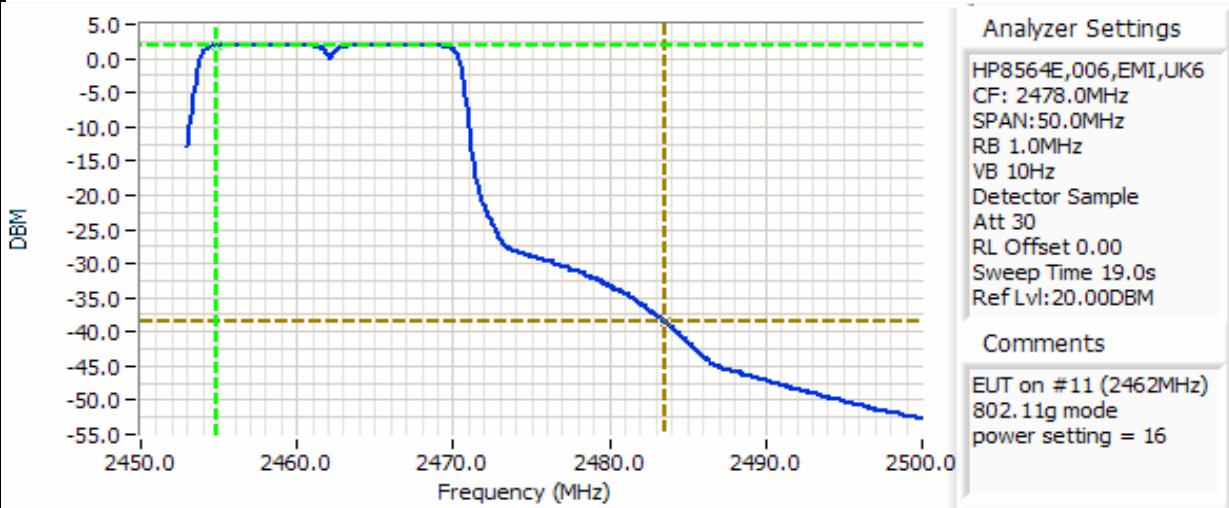
EMC Test Data

Client: Xirrus, Inc.	Job Number: J60437
Model: XS-3500 Access Point	T-Log Number: T61140
Contact: Ian Laity / Steve Smith	Account Manager: Susan Peizi
Spec: FCC 15.247, 15.401, RSS-210	Class: N/A

Following for client information only

Power setting 16

	H	V	
Fundamental emission level @ 3m in 1MHz RBW:	101.27	108.1	Peak Measurement (RB=VB=1MHz)
Fundamental emission level @ 3m in 1MHz RBW:	92.48	99.49	Average Measurement (RB=1MHz, VB=10Hz)
Delta Marker - Peak	31.2 dB		
Delta Marker - Average	40.5 dB		
Calculated Band-Edge Measurement:	76.9 dBuV/m		Peak 12.7
Calculated Band-Edge Measurement:	58.99 dBuV/m		Average 2.17



Cursor 0	2454.91	2.00	+	-	+	-
Cursor 1	2483.53	-38.50	+	-	+	-
Delta Frequency		28.62				
Delta Amplitude		40.50				

Frequency	Level	Pol	15.209 / 15.247	Detector	Azimuth	Height	Comments
MHz	dBuV/m	v/h	Limit	Margin	Pk/QP/Avg	degrees	meters
2483.500	59.0	v	54.0	5.0	Avg	-	-
2483.500	76.9	v	74.0	2.9	Pk	-	-

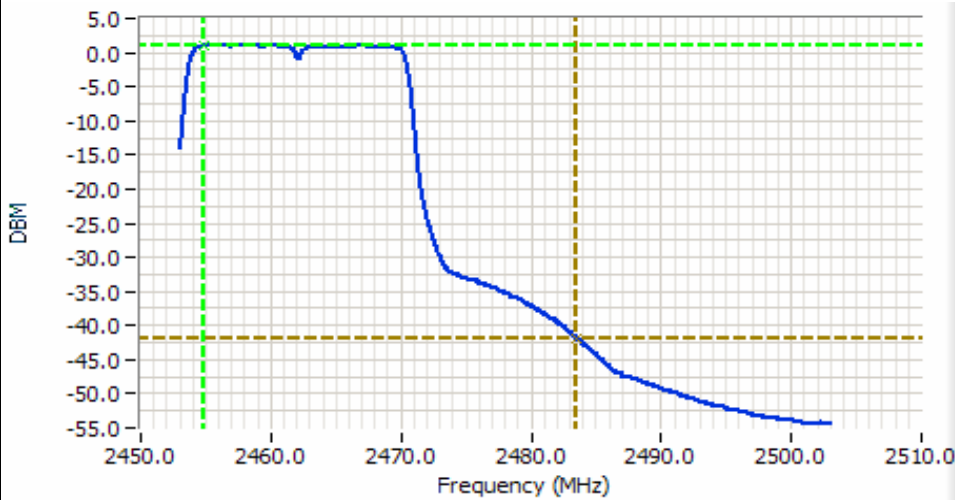


EMC Test Data

Client: Xirrus, Inc.	Job Number: J60437
Model: XS-3500 Access Point	T-Log Number: T61140
Contact: Ian Laity / Steve Smith	Account Manager: Susan Peizi
Spec: FCC 15.247, 15.401, RSS-210	Class: N/A

Power setting 15

	H	V	
Fundamental emission level @ 3m in 1MHz RBW:	101.27	107.1	Peak Measurement (RB=VB=1MHz)
Fundamental emission level @ 3m in 1MHz RBW:	92.48	98.42	Average Measurement (RB=1MHz, VB=10Hz)
Delta Marker - Peak	- dB		
Delta Marker - Average	42.8 dB		
Calculated Band-Edge Measurement:	- dBuV/m		Peak
Calculated Band-Edge Measurement:	55.62 dBuV/m		Average



Analyzer Settings

HP8564E,006,EMI,UK6
 CF: 2478.0MHz
 SPAN: 50.0MHz
 RB 1.0MHz
 VB 10Hz
 Detector Sample
 Att 30
 RL Offset 0.00
 Sweep Time 19.0s
 Ref Lvl: 20.00DBM

Comments

EUT on #11 (2462MHz)
 802.11g mode
 power setting = 15

Cursor 0	2454.91	1.00		Delta Frequency	28.62
Cursor 1	2483.53	-41.83		Delta Amplitude	42.83

Frequency	Level	Pol	15.209 / 15.247	Detector	Azimuth	Height	Comments
MHz	dBuV/m	v/h	Limit	Margin	Pk/QP/Avg	degrees	meters
2483.500	55.7	v	54.0	1.7	Avg	-	-



EMC Test Data

Client:	Xirrus, Inc.	Job Number:	J60437
Model:	XS-3500 Access Point	T-Log Number:	T61140
		Account Manager:	Susan Peizl
Contact:	Ian Laity / Steve Smith		
Spec:	FCC 15.247, 15.401, RSS-210	Class:	N/A

FCC 15.247 Spurious Emissions - 802.11g 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: 8/24/2005	Config. Used: 1
Test Engineer: Mark Briggs	Config Change: None (3dBd Omni antenna connected)
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:	23 °C
Rel. Humidity:	59 %

Summary of Results

Run #	Test Performed	Limit	Pass / Fail	Result / Margin
1	RE, 1000 - 25000 MHz - Spurious Emissions	FCC Part 15.209 / 15.247(c)	Pass	53.8dBµV/m (487.5µV/m) @ 2390.0MHz (-0.2dB)

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: J60437
Model: XS-3500 Access Point	T-Log Number: T61140
Contact: Ian Laity / Steve Smith	Account Manager: Susan Pezli
Spec: FCC 15.247, 15.401, RSS-210	Class: N/A

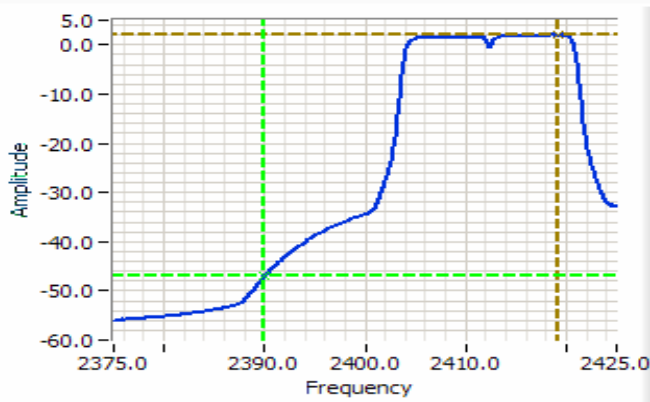
Radio #14 Internal Antenna

Fundamental field strength higher with EUT 80cm above the groundplane

Run #1a: Radiated Spurious Emissions, 1000 - 25000 MHz. Low Channel @ 2412 MHz

Pwr setting 16

	H	V	
Fundamental emission level @ 3m in 1MHz RBW:		111.39	Peak Measurement (RB=VB=1MHz)
Fundamental emission level @ 3m in 1MHz RBW:		102.92	Average Measurement (RB=1MHz, VB=10Hz)

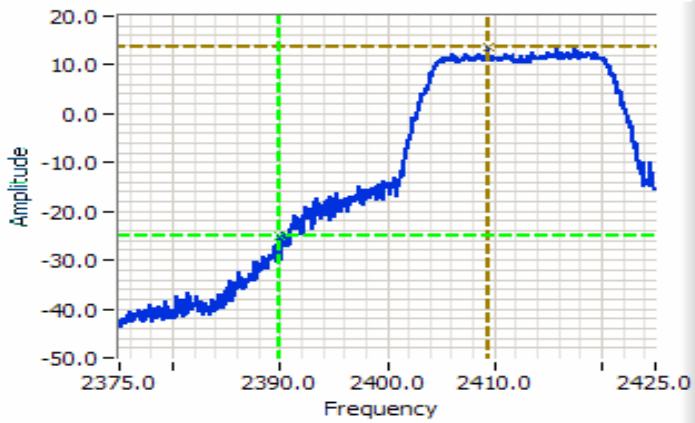


Analyzer Settings

HP8564E,006,EMI, UK6
 CF: 2400.0MHz
 SPAN:50.0MHz
 RB 1.0MHz
 VB 10Hz
 Detector Sample
 Att 10
 RL Offset 20.00
 Sweep Time 19.0s
 Ref Lvl: 10.75DBM

Delta Frequency: 29.28
 Delta Amplitude: 49.00

Cursor 0	2389.98	-47.08	+	-	+	-
Cursor 1	2419.26	1.92	+	-	+	-



Analyzer Settings

HP8564E,006,EMI, UK6
 CF: 2400.0MHz
 SPAN:50.0MHz
 RB 1.0MHz
 VB 3.0MHz
 Detector POS
 Att 10
 RL Offset 20.00
 Sweep Time 50.0ms
 Ref Lvl:20.00DBM

Delta Frequency: 19.55
 Delta Amplitude: 38.67

Cursor 0	2389.89	-25.00	+	-	+	-
Cursor 1	2409.44	13.67	+	-	+	-



EMC Test Data

Client:	Xirrus, Inc.	Job Number:	J60437
Model:	XS-3500 Access Point	T-Log Number:	T61140
Contact:	Ian Laity / Steve Smith	Account Manager:	Susan Peizi
Spec:	FCC 15.247, 15.401, RSS-210	Class:	N/A

Band Edge - channel 1 at power setting = 16

Frequency	Level	Pol	15.209 / 15.247		Detector	Azimuth	Height	Comments
MHz	dB μ V/m	v/h	Limit	Margin	Pk/QP/Avg	degrees	meters	
2390.000	53.8	v	54.0	-0.2	Avg	50	1.5	Note 2, delta = 49
2390.000	62.2	v	74.0	-11.8	Pk	50	1.5	Note 2, delta = 38.7

Spurious Emissions

Frequency	Level	Pol	15.209 / 15.247		Detector	Azimuth	Height	Comments
MHz	dB μ V/m	v/h	Limit	Margin	Pk/QP/Avg	degrees	meters	
4824.013	42.3	V	54.0	-11.7	AVG	32	1.0	
4824.013	53.2	V	74.0	-20.9	PK	32	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.

Note 2: Band edge measurement calculated from fundamental minus delta markers. Marker deltas are the difference between the highest signal level in the restricted band and the highest in-band signal level for average (RB=1MHz, VB=10Hz) and peak (RB=VB=1MHz) measurements.

Run #1b: Radiated Spurious Emissions, 1000 - 25000 MHz. Center Channel @ 2437 MHz

Power setting 20

Frequency	Level	Pol	15.209 / 15.247		Detector	Azimuth	Height	Comments
MHz	dB μ V/m	v/h	Limit	Margin	Pk/QP/Avg	degrees	meters	
4866.540	42.8	H	54.0	-11.2	AVG	96	1.0	
4866.540	54.2	H	74.0	-19.8	PK	96	1.0	
4873.700	47.3	V	54.0	-6.7	AVG	361	1.0	
4873.700	59.6	V	74.0	-14.4	PK	361	1.0	

Note 1: For emissions in restricted bands, the limit of 15.209 was used. For all other emissions, the limit was set 30dB below the level of the fundamental or the 15.209 limit.

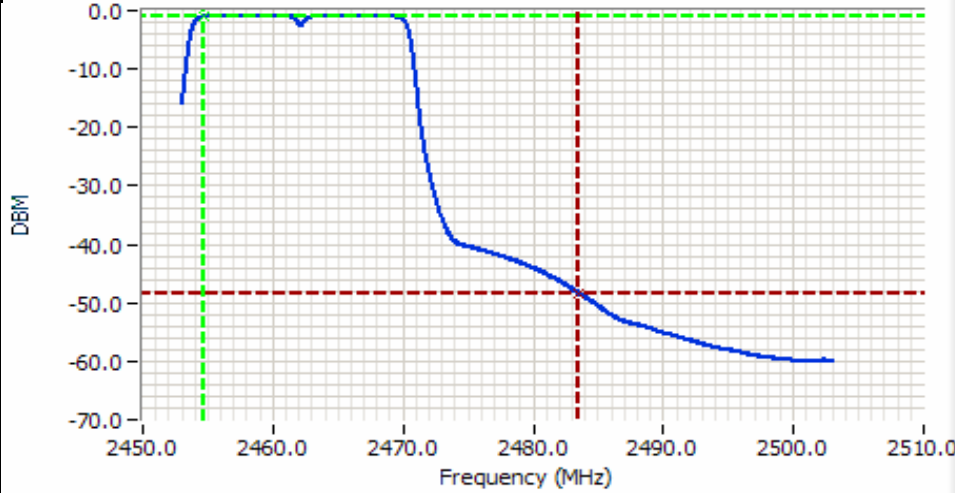


EMC Test Data

Client: Xirrus, Inc.	Job Number: J60437
Model: XS-3500 Access Point	T-Log Number: T61140
Contact: Ian Laity / Steve Smith	Account Manager: Susan Peizl
Spec: FCC 15.247, 15.401, RSS-210	Class: N/A

Run #1c: Radiated Spurious Emissions, 1000 - 26000 MHz. High Channel @ 2462 MHz
Power setting = 13

Frequency	Level	Pol	15.209 / 15.247	Detector	Azimuth	Height	Comments	
MHz	dBμV/m	v/h	Limit	Margin	Pk/QP/Avg	degrees	meters	
2463.425	101.2	V		101.2	AVG	57	1.6	P=13
2463.425	109.7	V		109.7	PK	57	1.6	P=13



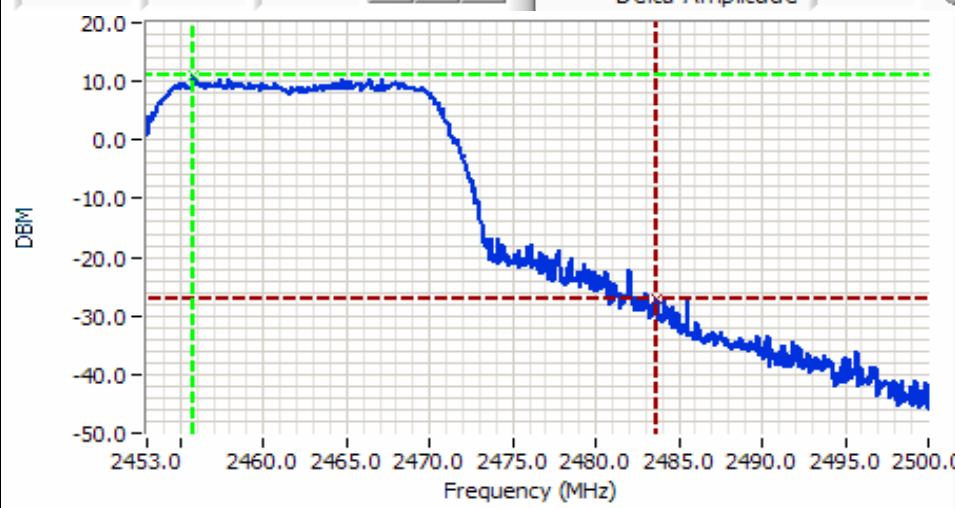
Analyzer Settings

HP8564E,006,EMI,UK6
 CF: 2478.0MHz
 SPAN:50.0MHz
 RB 1.0MHz
 VB 10Hz
 Detector Sample
 Att 20
 RL Offset 0.00
 Sweep Time 19.0s
 Ref Lvl: 10.00DBM

Comments

EUT on #11 (2462MHz)
 802.11g mode
 power setting = 13

Cursor 0	2454.66	-0.83	Delta Frequency	28.87	Band edge	2483.50
Cursor 0	2483.53	-48.33	Delta Amplitude	47.50		



Analyzer Settings

HP8564E,006,EMI,UK6
 CF: 2478.0MHz
 SPAN:50.0MHz
 RB 1.0MHz
 VB 3.0MHz
 Detector POS
 Att 20
 RL Offset 0.00
 Sweep Time 50.0ms
 Ref Lvl: 10.00DBM

Comments

EUT on #11 (2462MHz)
 802.11g mode
 power setting = 13

Cursor 0	2455.83	11.00	Delta Frequency	27.87	Band edge	2483.50
Cursor 0	2483.70	-27.00	Delta Amplitude	38.00		



EMC Test Data

Client:	Xirrus, Inc.	Job Number:	J60437
Model:	XS-3500 Access Point	T-Log Number:	T61140
Contact:	Ian Laity / Steve Smith	Account Manager:	Susan Peizi
Spec:	FCC 15.247, 15.401, RSS-210	Class:	N/A

Band Edge - channel 11 at power setting = 13

Frequency	Level	Pol	15.209 / 15.247		Detector	Azimuth	Height	Comments
MHz	dB μ V/m	v/h	Limit	Margin	Pk/QP/Avg	degrees	meters	
2483.500	53.7	v	54.0	-0.3	Avg	57	1.6	Note 2, delta = 47.5dB
2483.500	71.7	v	74.0	-2.3	Pk	57	1.6	Note 2, delta =38.0dB

Spurious Emissions (measured at power setting 16)

Frequency	Level	Pol	15.209 / 15.247		Detector	Azimuth	Height	Comments
MHz	dB μ V/m	v/h	Limit	Margin	Pk/QP/Avg	degrees	meters	
4924.790	42.5	V	54.0	-11.5	AVG	359	1.0	
4924.790	54.5	V	74.0	-19.5	PK	359	1.0	

Note 1: For emissions in restricted bands, the limit of 15.209 was used. For all other emissions, the limit was set 30dB below the level of the fundamental or the 15.209 limit.

Note 2: Band edge measurement calculated from fundamental minus delta markers. Marker deltas are the difference between the highest signal level in the restricted band and the highest in-band signal level for average (RB=1MHz, VB=10Hz) and peak (RB=VB=1MHz) measurements.

Client: Xirrus, Inc.	Job Number: J60437
Model: XS-3500 Access Point	T-Log Number: T61140
	Account Manager: Susan Pelzl
Contact: Ian Laity / Steve Smith	
Spec: FCC 15.247, 15.401, RSS-210	Class: N/A

FCC Part 15 Subpart E Tests

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: 7/22/2005 - 9/22/2005,
11/7/2004

Config. Used: #1

Test Engineer: Mehran Birgani, M Briggs

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 and cables used.

Ambient Conditions: Temperature: 16 - 22 °C
Rel. Humidity: 35 - 45 %

Summary of Results

Run #	Test Performed	Limit	Pass / Fail	Result / Margin
1	Output Power, PSD (5150 - 5250 MHz)	15.407(a) (1), (2)	Pass	Refer to run
1	Output Power, PSD (5250 - 5350 MHz)	15.407(a) (1), (2)	Pass	Refer to run
1	Output Power, Aggregate (5150 - 5250 MHz)	15.407(a) (1), (2)	Pass	16.9dBm 0.049W
1	Output Power, Aggregate (5250 - 5350 MHz)	15.407(a) (1), (2)	Pass	23.7dBm 0.236W
1	26dB Bandwidth	15.407	Pass	> 20 MHz
1	20 dB Bandwidth	RSS 210	Pass	> 20 MHz
2	Peak Excursion Envelope	15.407(a) (6)	Pass	<= 10.89dB
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, Inc.	Job Number: J60437
Model: XS-3500 Access Point	T-Log Number: T61140
	Account Manager: Susan Pelzl
Contact: Ian Laity / Steve Smith	
Spec: FCC 15.247, 15.401, RSS-210	Class: N/A

Run #1a: Bandwidth, Output Power and Power Spectral Density - 5150 - 5250 MHz
Measured for 1, 2 and 3 or 4 radios operating simultaneously (See Note 4)
 Antenna Gain: 5.2 dBi (internal antenna = 3dBi, external = 3dBd [5.2dBi])

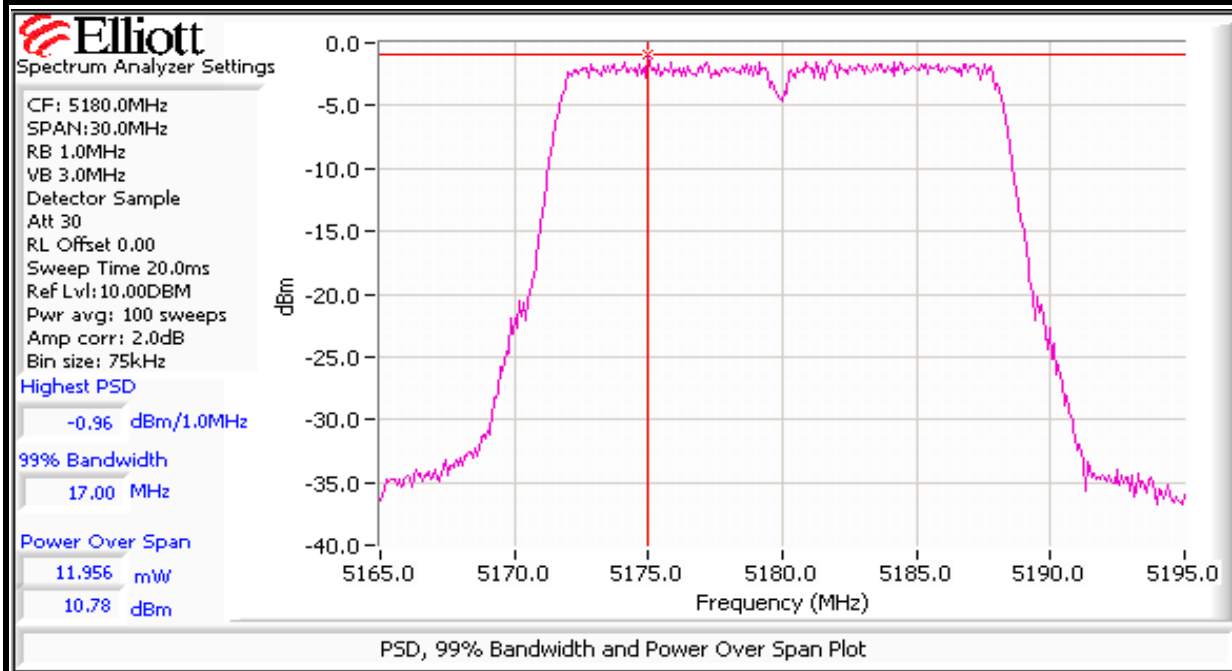
Frequency (MHz)	Software Power setting	Bandwidth 99%	Output Power ¹ dBm		Power (Watts)	PSD ² dBm/MHz			Result
			Measured	Limit ⁴		Measured	FCC Limit	RSS Limit ³	
5180	10.0	17.0	10.8	11.0	0.012	-0.96	4.0	1.5	Pass
5180	11.0	17.0	12.7	14.0	0.019	1.02	4.0	3.4	Pass
5200	14.0	17.0	15.7	17.0	0.037	3.69	4.0	6.4	Pass
5240	10.0	17.0	10.8	11.0	0.012	-1.30	4.0	1.5	Pass
5240	13.0	17.0	13.3	14.0	0.021	1.35	4.0	4.0	Pass
5240	16.0	17.0	15.9	17.0	0.039	3.96	4.0	6.6	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 is set dependent on the number of transceivers operating in that band. With only one transceiver the max power is 12.7dBm on #36, 15.9dBm on the other three channels (limited by the power spectral density limit of 4dBm/MHz). With two transceivers, the max power drops to 13.3dBm on channels 40, 44 and 48. With more than two transceivers the max power on any channel is 10.8dBm.

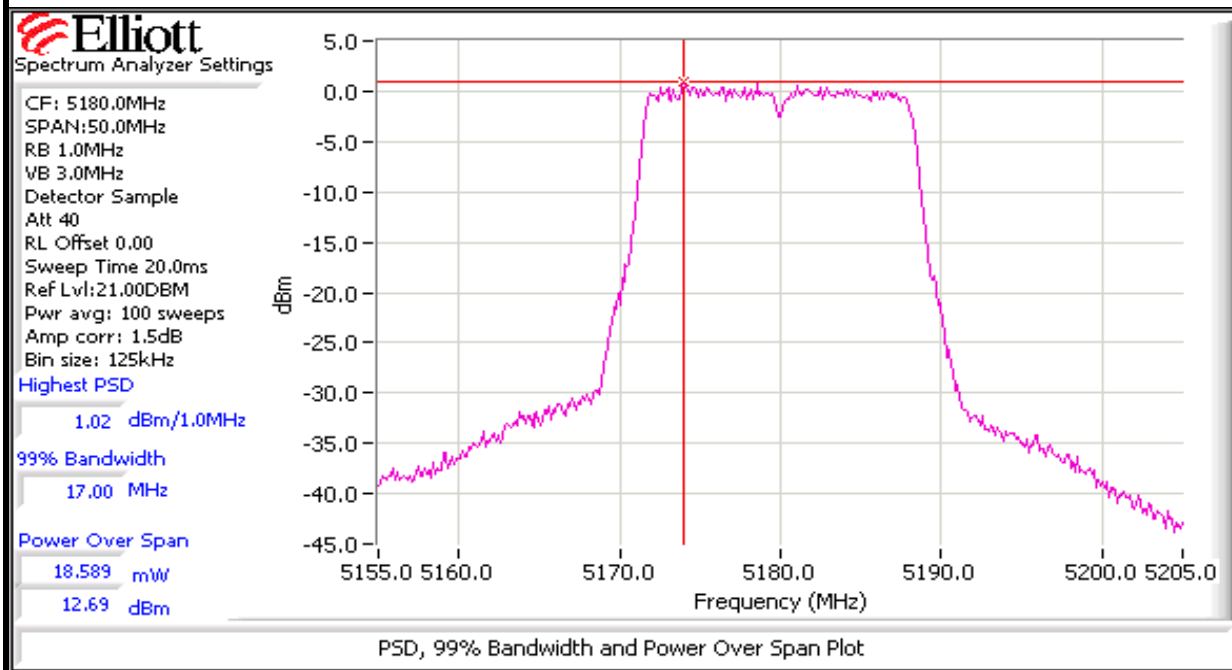
Aggregate power in each band (The software will set the output power in the 5150 - 5250 MHz band based on the number of channels used in this sub-band - see note 5 above)

With one transceiver operating in the 5150-5250 MHz band:		
Maximum per radio:	15.9 dBm	0.039 W
Number of radios:	1	
Total average power across the band is:	15.9 dBm	0.039 W
With two transceivers operating in the 5150-5250 MHz band:		
Maximum per radio:	13.3 dBm	0.021 W
Number of radios:	2	
Total average power across the band is:	16.3 dBm	0.043 W
With three or four transceivers operating in the 5150-5250 MHz band:		
Maximum per radio:	10.8 dBm	0.012 W
Number of radios:	4	
Total average power across the band is:	16.8 dBm	0.048 W

Client: Xirrus, Inc.	Job Number: J60437
Model: XS-3500 Access Point	T-Log Number: T61140
Contact: Ian Laity / Steve Smith	Account Manager: Susan Pelzl
Spec: FCC 15.247, 15.401, RSS-210	Class: N/A

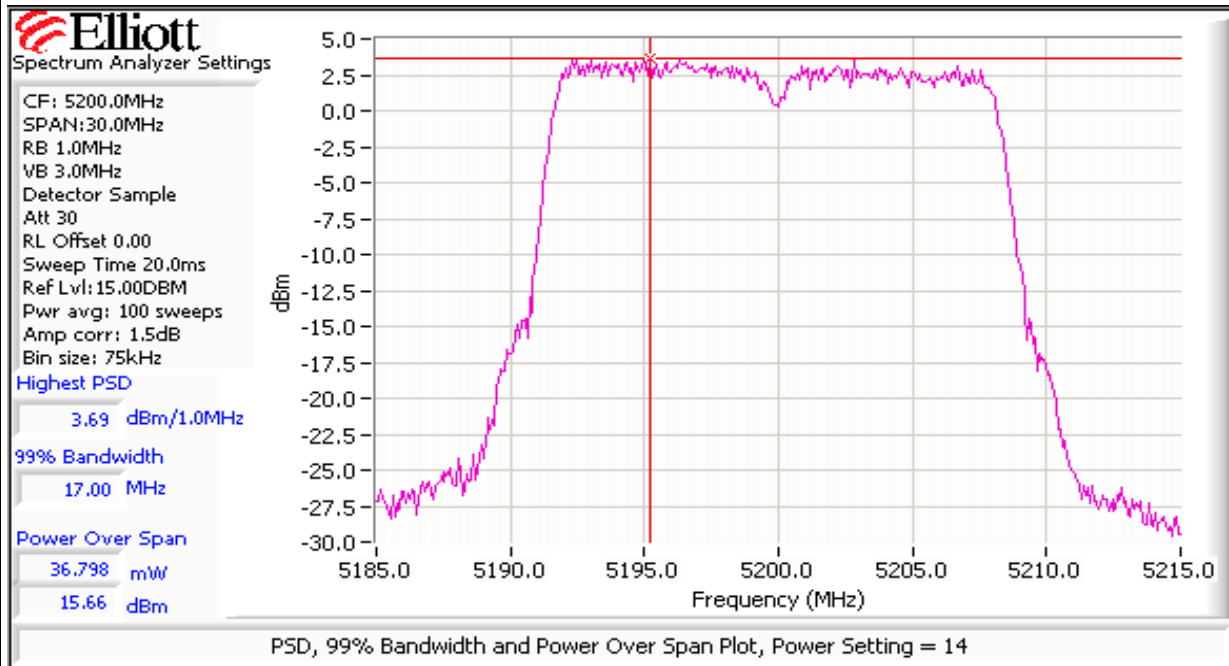


Power and PSD Plot, 5180 MHz, power setting = 10 (Pout = 10.78dBm) - Setting for 3 or 4 radios in low band

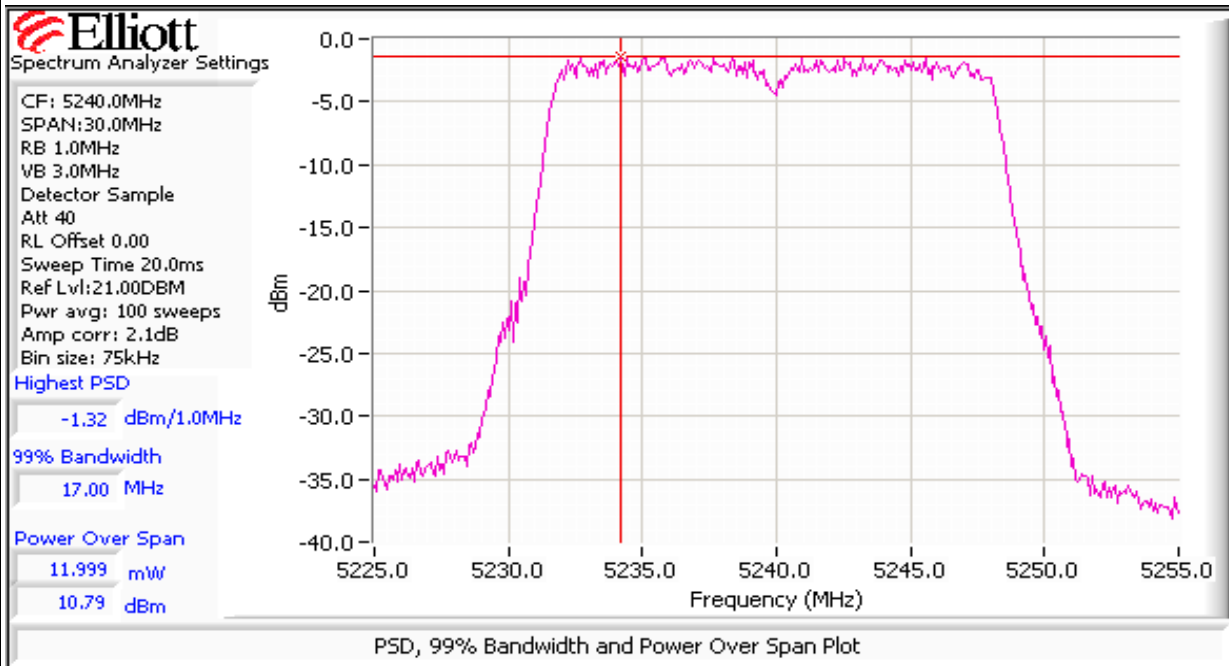


Power and PSD Plot, 5180 MHz, power setting = 11 (Pout = 12.69 dBm) - Setting for 1 or 2 radios in low band

Client: Xirrus, Inc.	Job Number: J60437
Model: XS-3500 Access Point	T-Log Number: T61140
Contact: Ian Laity / Steve Smith	Account Manager: Susan Pelzl
Spec: FCC 15.247, 15.401, RSS-210	Class: N/A

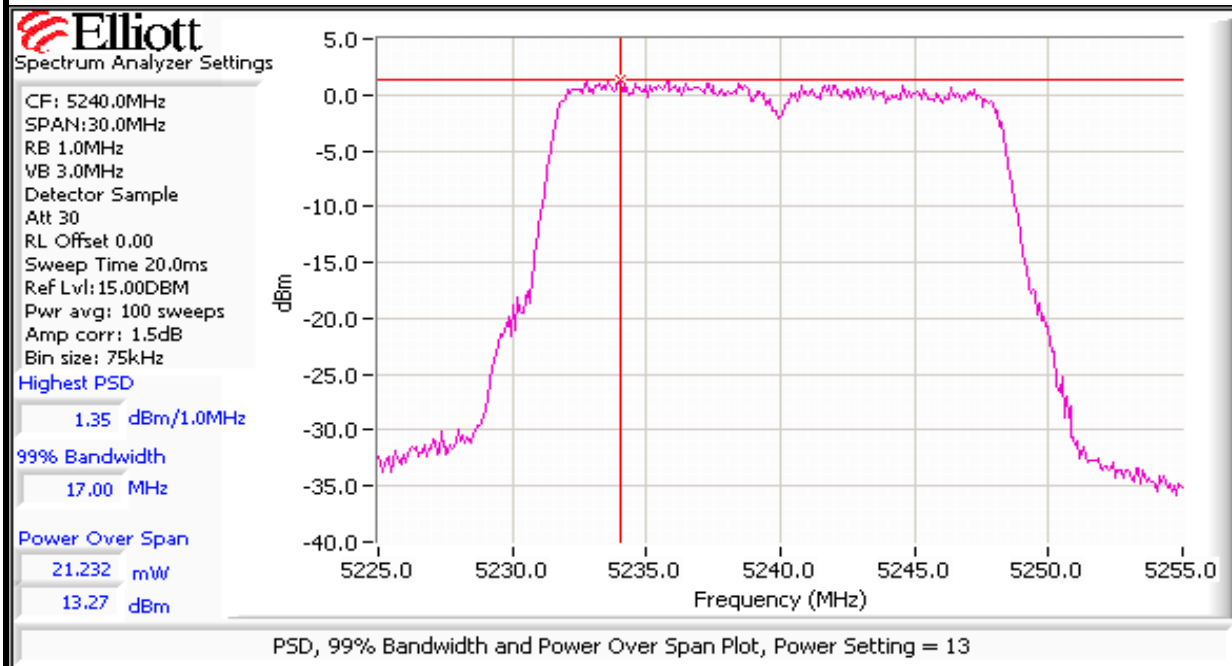


Power and PSD Plot, 5200 MHz, power setting = 14 (Pout = 15.7 dBm) - Setting for 1 radio in low band

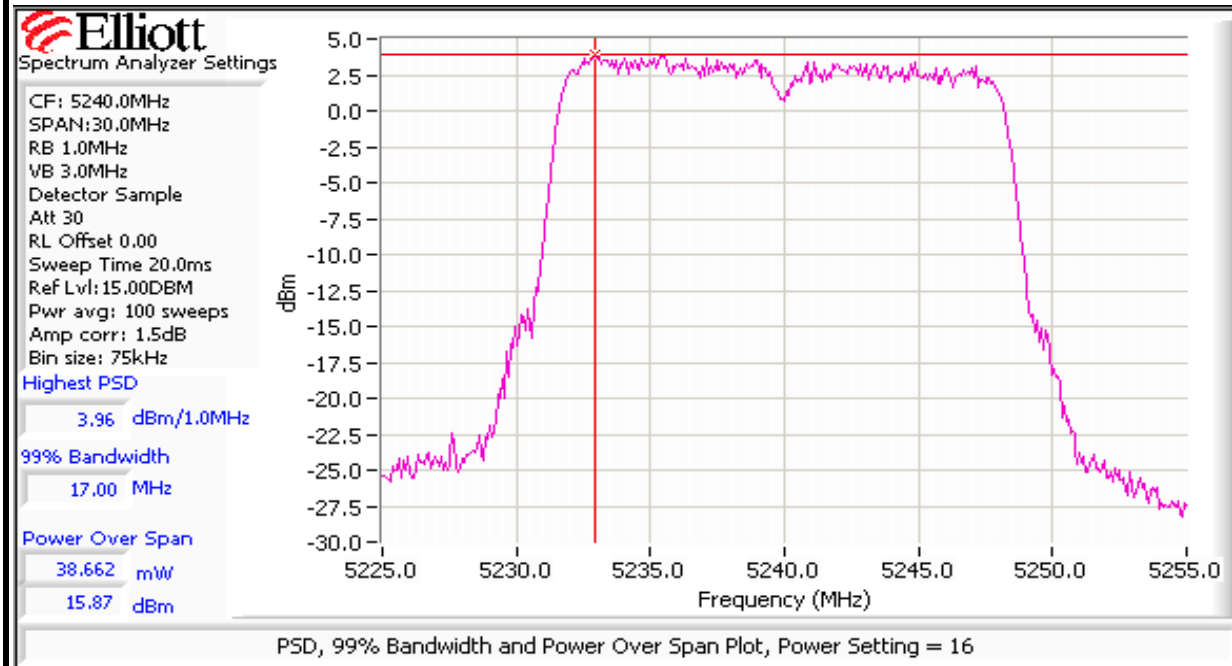


Power and PSD Plot, 5240 MHz, power setting = 10 (Pout = 10.79dBm) - Setting for 3 or 4 radios in low band

Client: Xirrus, Inc.	Job Number: J60437
Model: XS-3500 Access Point	T-Log Number: T61140
Contact: Ian Laity / Steve Smith	Account Manager: Susan Pelzl
Spec: FCC 15.247, 15.401, RSS-210	Class: N/A



Power and PSD Plot, 5240 MHz, power setting = 13 (Pout = 13.3dBm) - Setting for 2 radios in low band



Power and PSD Plot, 5240 MHz, power setting = 16 (Pout = 15.87dBm) - Setting for 1 radio in low band

Client: Xirrus, Inc.	Job Number: J60437
Model: XS-3500 Access Point	T-Log Number: T61140
	Account Manager: Susan Pelzl
Contact: Ian Laity / Steve Smith	
Spec: FCC 15.247, 15.401, RSS-210	Class: N/A

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

Antenna Gain: 5.2 dBi (internal antenna = 3dBi, external = 3dBd [5.2dBi])

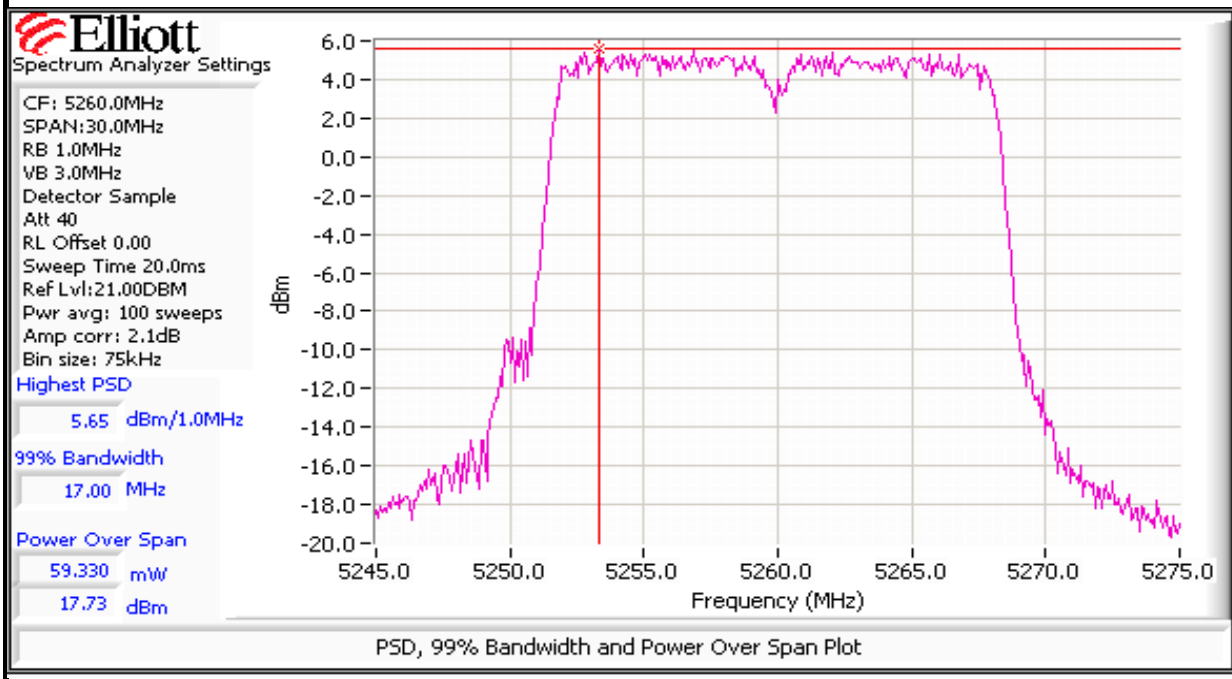
Frequency (MHz)	Software Power setting	Bandwidth 99%	Output Power ¹ dBm		Power (Watts)	PSD ² dBm/MHz			Result
			Measured	Limit ⁴		Measured	FCC Limit	RSS Limit ³	
5260	19.0	17.0	17.7	18.0	0.059	5.65	11.0	8.4	Pass
5320	19.0	17.0	17.5	18.0	0.056	5.47	11.0	8.2	Pass
5320	16.0	17.0	14.9	18.0	0.031	2.7	11.0	5.6	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 total power permitted in the band [250mW] divided by the measured 99% bandwidth) by more than 3dB.
- Note 4 Power setting 16 on channel 64 (5320 MHz) used for the external antenna to comply with the requirements for radiated field strength in the restricted band starting at 5350 MHz.

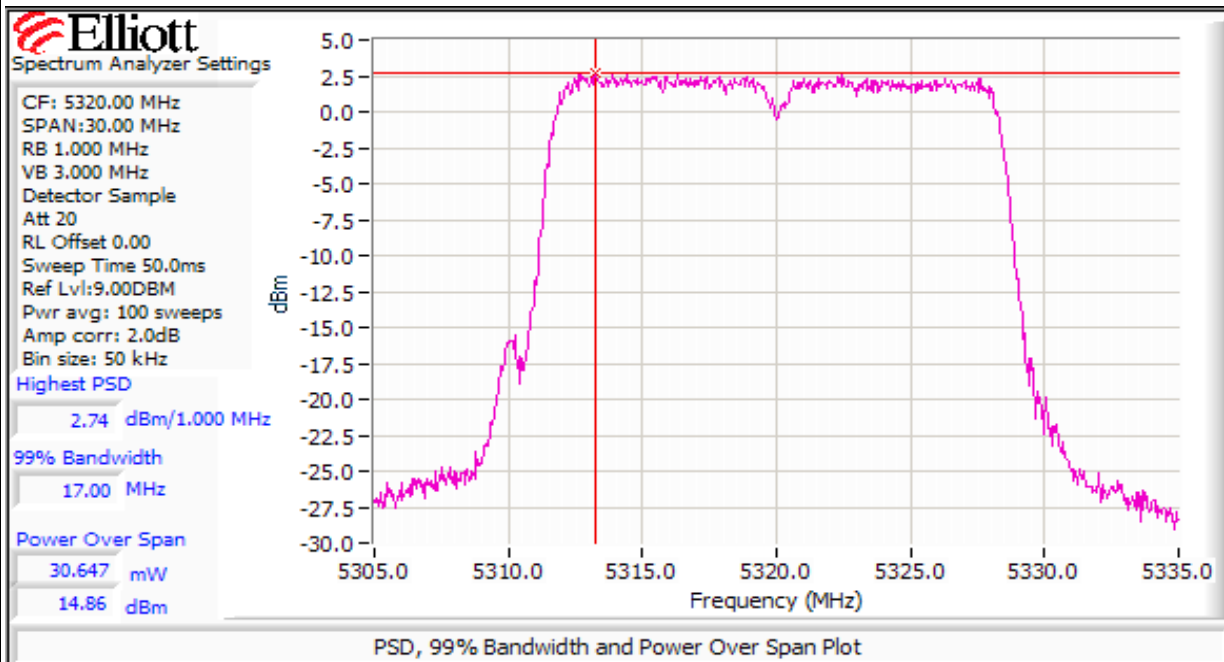
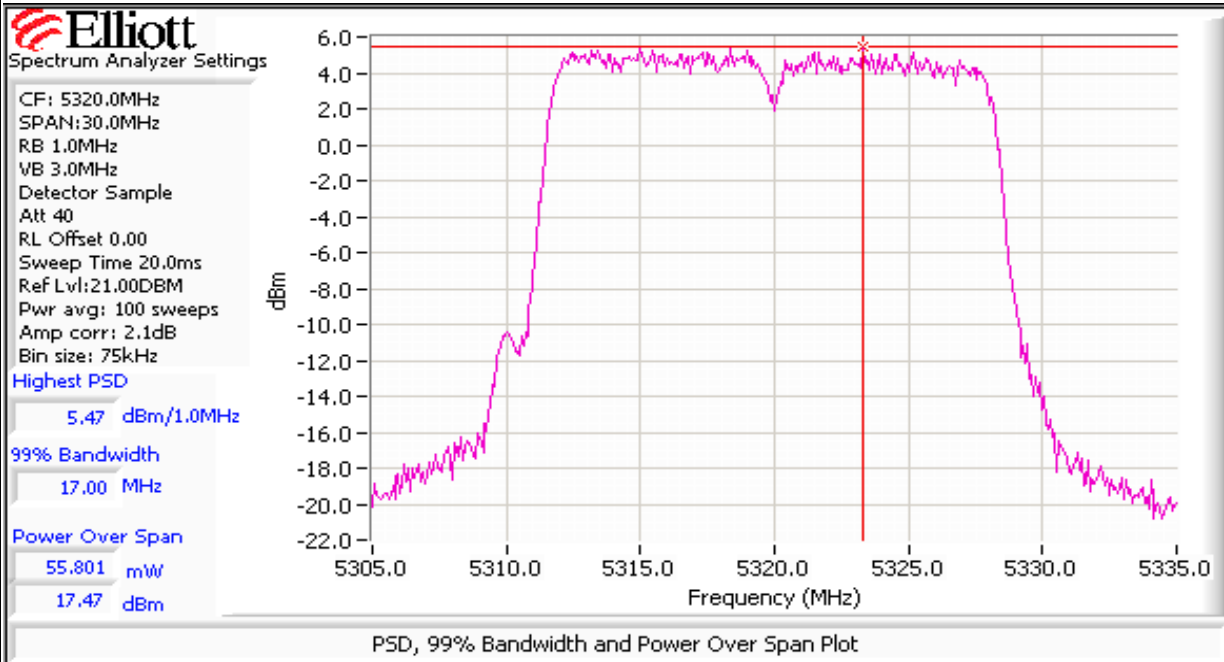
Aggregate power in the 5250 - 5250 MHz Band:

With up to four transceivers operating in the 5250-5350 MHz band:

Maximum power per radio:	17.7 dBm	0.059 W
Number of radios:	4	
Total average power across the band is:	23.7 dBm	0.236 W
Maximum power permitted in the band is:	24.0 dBm	0.251 W

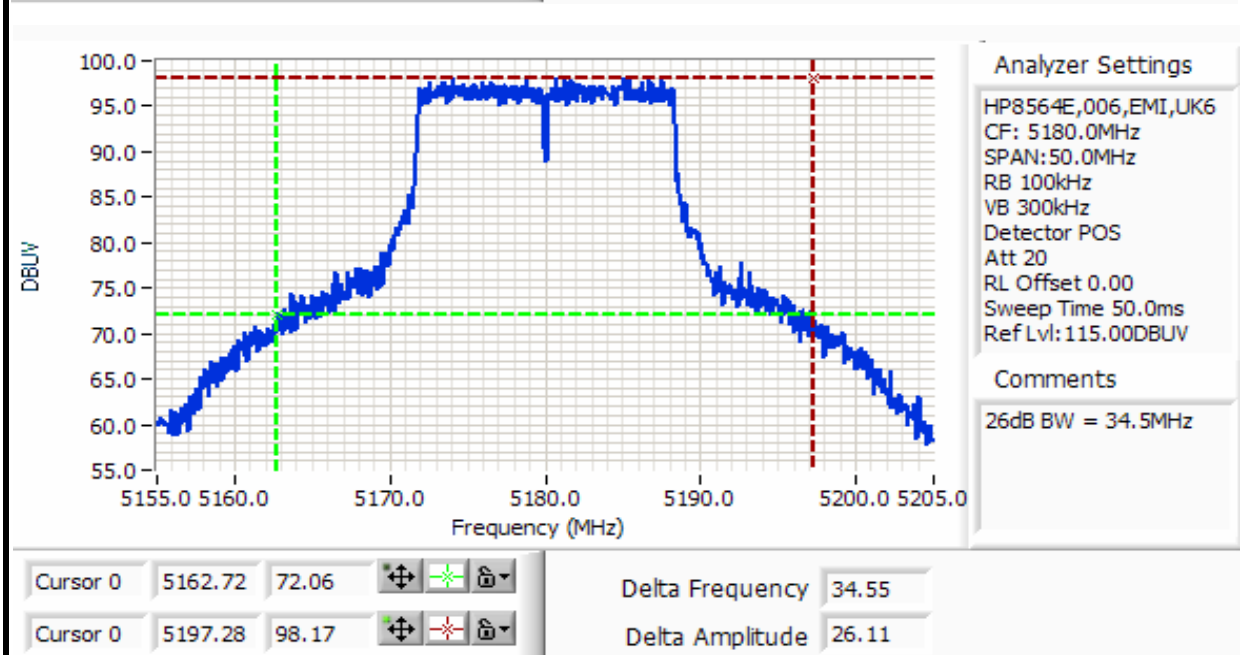
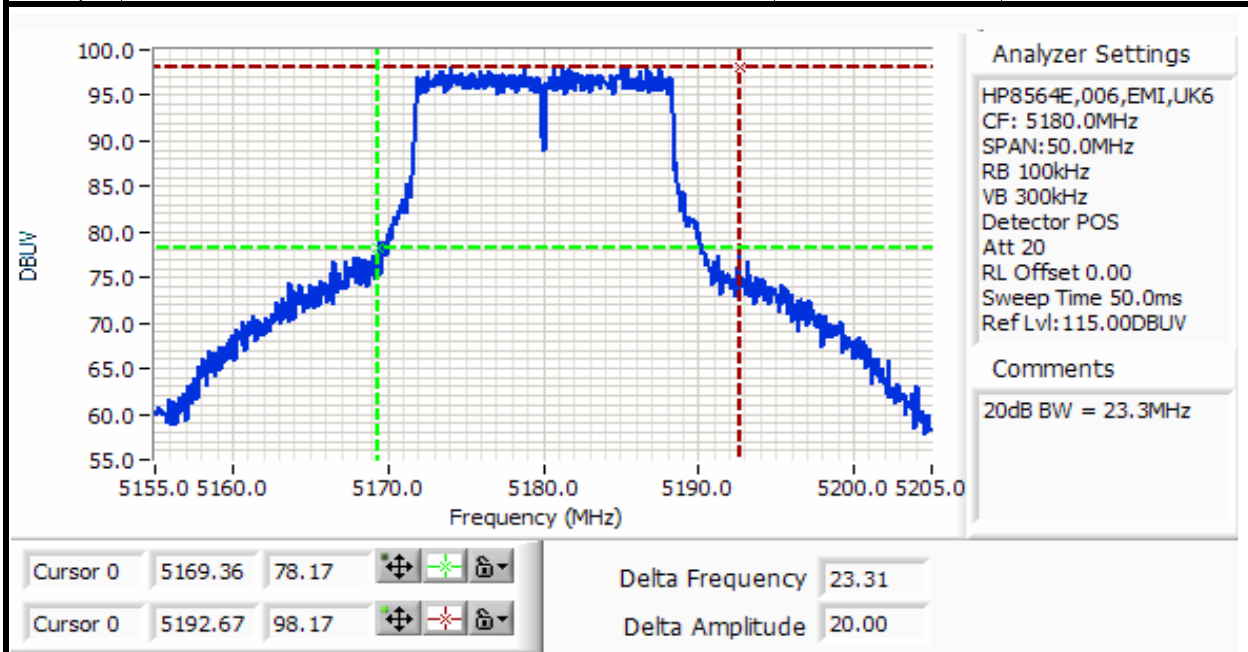


Client: Xirrus, Inc.	Job Number: J60437
Model: XS-3500 Access Point	T-Log Number: T61140
Contact: Ian Laity / Steve Smith	Account Manager: Susan Pelzl
Spec: FCC 15.247, 15.401, RSS-210	Class: N/A

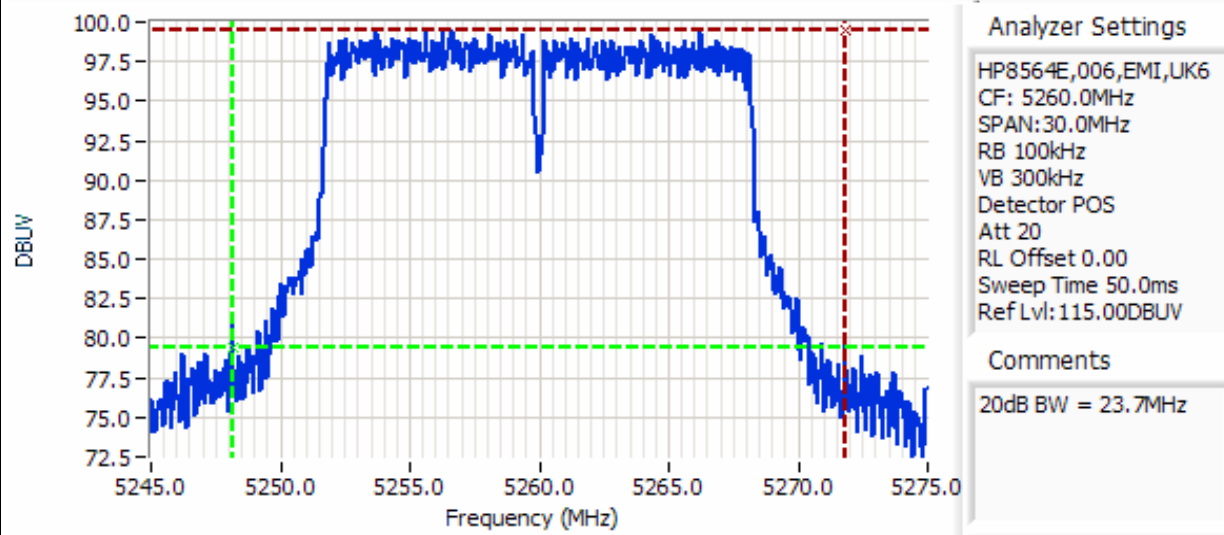


Power setting = 16 on channel 64 for external antenna

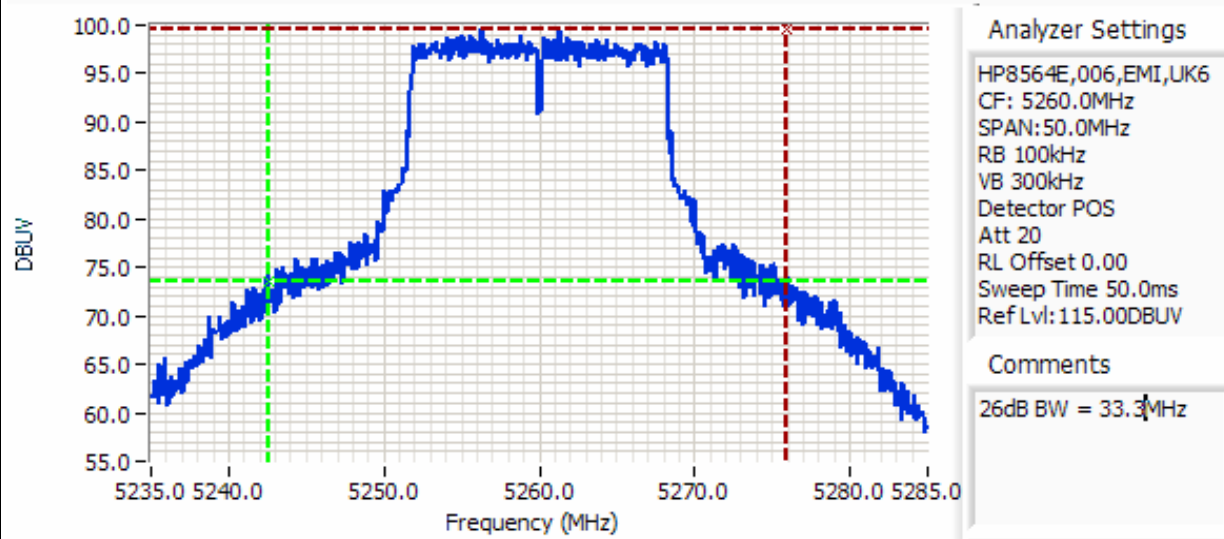
Client: Xirrus, Inc.	Job Number: J60437
Model: XS-3500 Access Point	T-Log Number: T61140
Contact: Ian Laity / Steve Smith	Account Manager: Susan Pelzl
Spec: FCC 15.247, 15.401, RSS-210	Class: N/A



Client: Xirrus, Inc.	Job Number: J60437
Model: XS-3500 Access Point	T-Log Number: T61140
Contact: Ian Laity / Steve Smith	Account Manager: Susan Pelzl
Spec: FCC 15.247, 15.401, RSS-210	Class: N/A

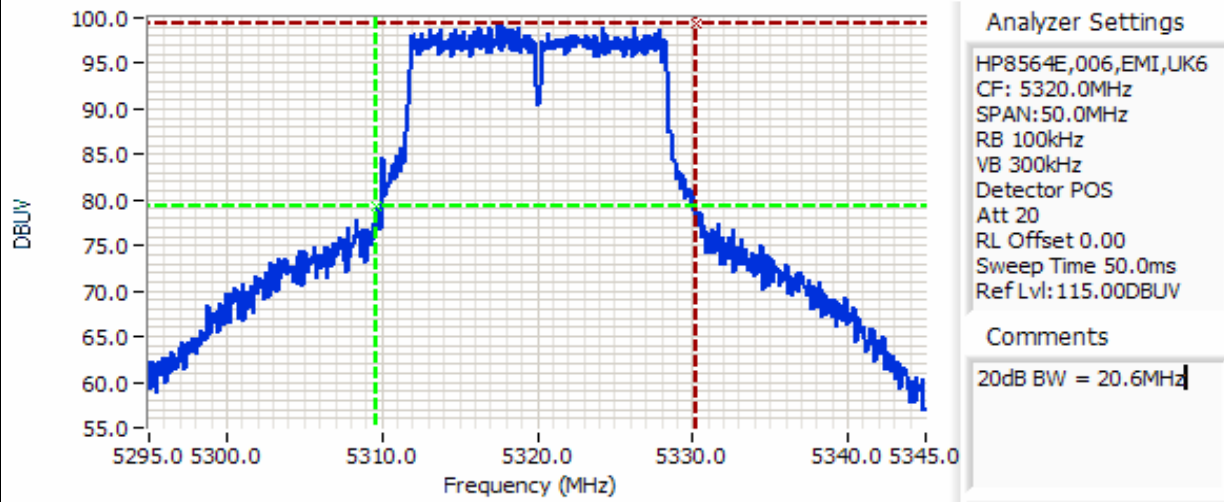


Cursor 0	5248.17	79.41	↔	↕	🔒	Delta Frequency	23.66
Cursor 0	5271.83	99.50	↔	↕	🔒	Delta Amplitude	20.09



Cursor 0	5242.59	73.50	↔	↕	🔒	Delta Frequency	33.33
Cursor 0	5275.92	99.50	↔	↕	🔒	Delta Amplitude	26.00

Client: Xirrus, Inc.	Job Number: J60437
Model: XS-3500 Access Point	T-Log Number: T61140
Contact: Ian Laity / Steve Smith	Account Manager: Susan Pelzl
Spec: FCC 15.247, 15.401, RSS-210	Class: N/A



Analyzer Settings

HP8564E,006,EMI,UK6
 CF: 5320.0MHz
 SPAN: 50.0MHz
 RB 100kHz
 VB 300kHz
 Detector POS
 Att 20
 RL Offset 0.00
 Sweep Time 50.0ms
 Ref Lvl: 115.00DBUV

Comments

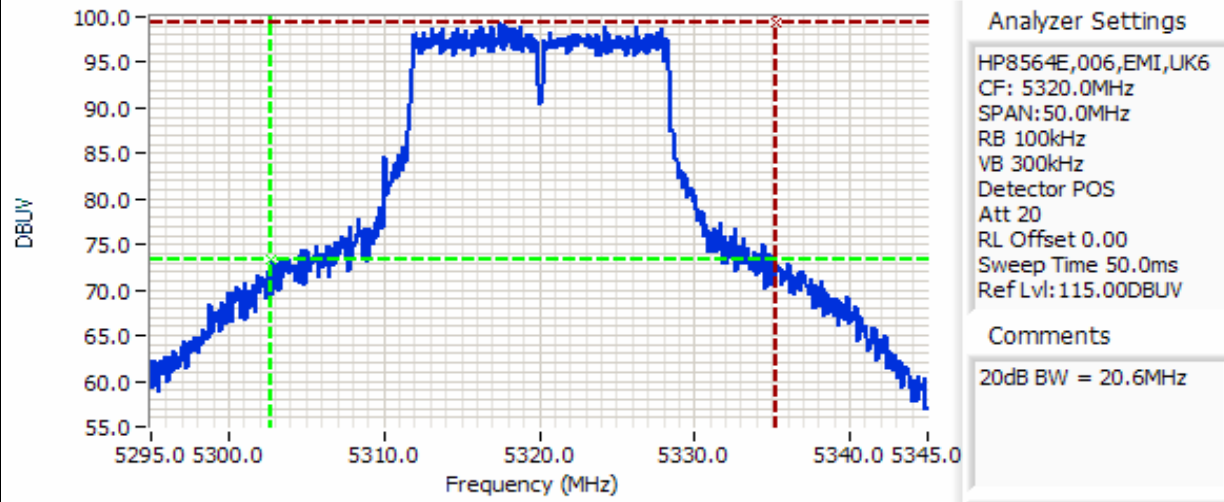
20dB BW = 20.6MHz

Cursor 0 5309.63 79.33

Cursor 0 5330.23 99.33

Delta Frequency 20.60

Delta Amplitude 20.00



Analyzer Settings

HP8564E,006,EMI,UK6
 CF: 5320.0MHz
 SPAN: 50.0MHz
 RB 100kHz
 VB 300kHz
 Detector POS
 Att 20
 RL Offset 0.00
 Sweep Time 50.0ms
 Ref Lvl: 115.00DBUV

Comments

20dB BW = 20.6MHz

Cursor 0 5302.72 73.33

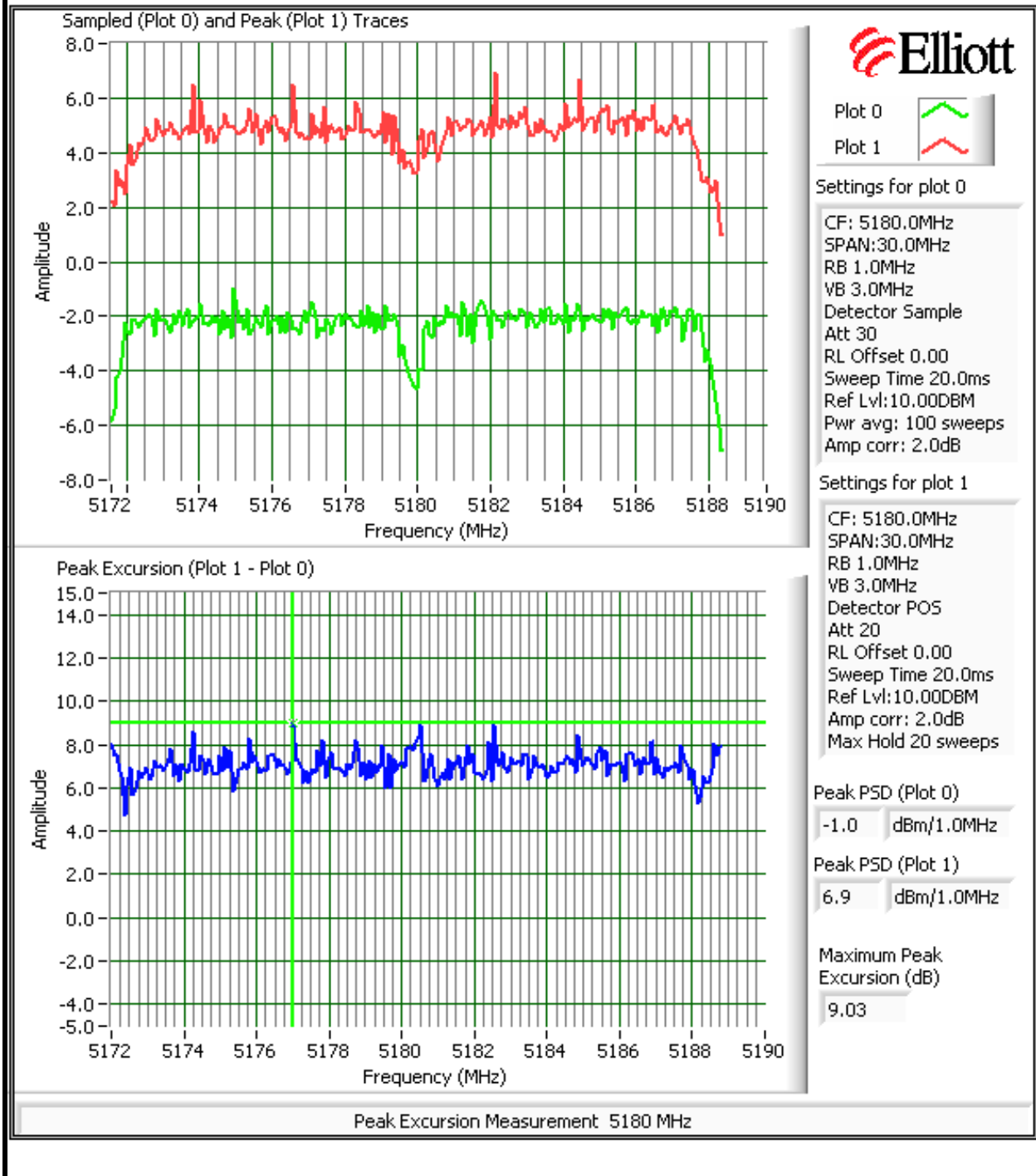
Cursor 0 5335.24 99.33

Delta Frequency 32.52

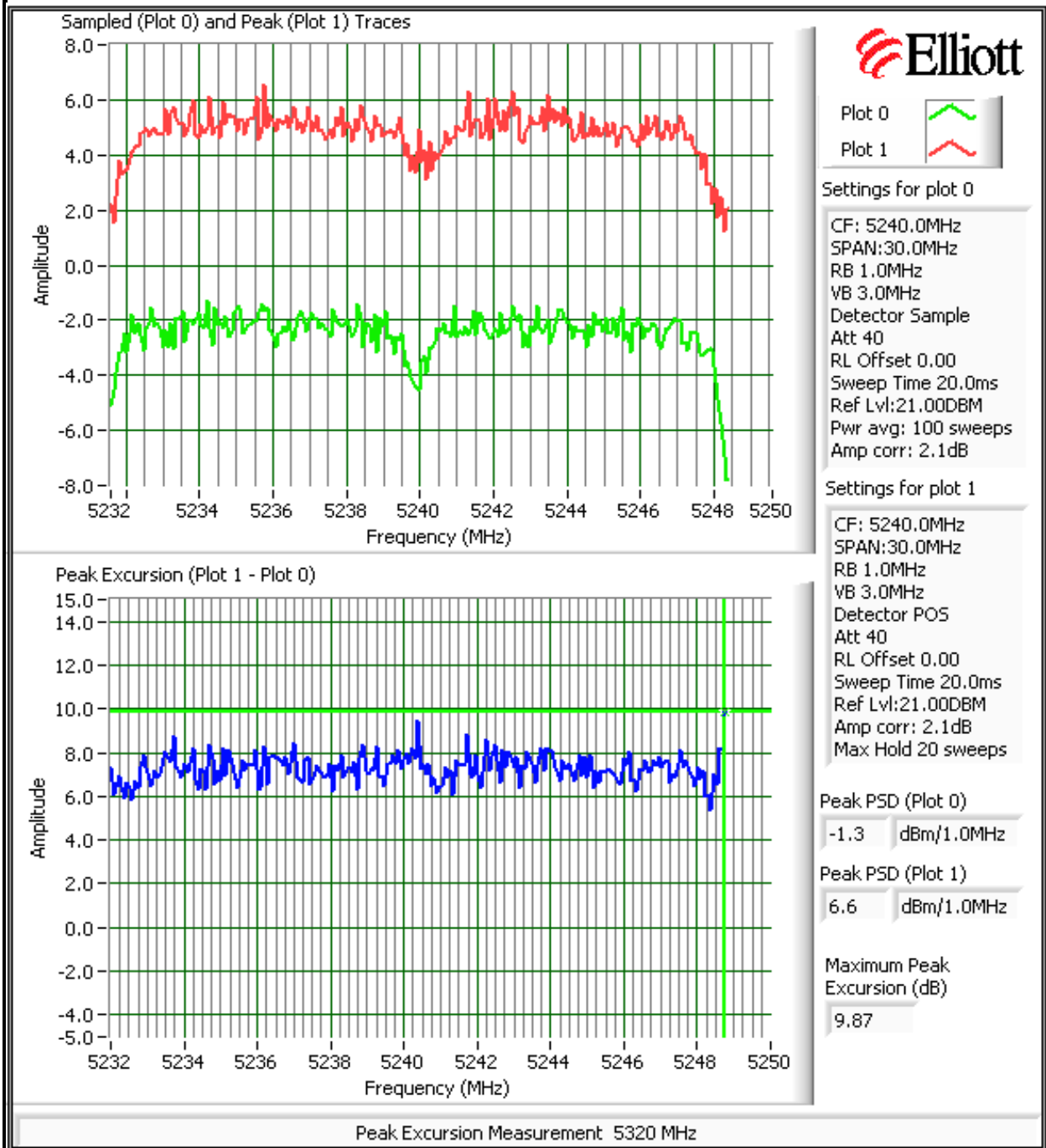
Delta Amplitude 26.00

Client: Xirrus, Inc.	Job Number: J60437
Model: XS-3500 Access Point	T-Log Number: T61140
Contact: Ian Laity / Steve Smith	Account Manager: Susan Pelzi
Spec: FCC 15.247, 15.401, RSS-210	Class: N/A

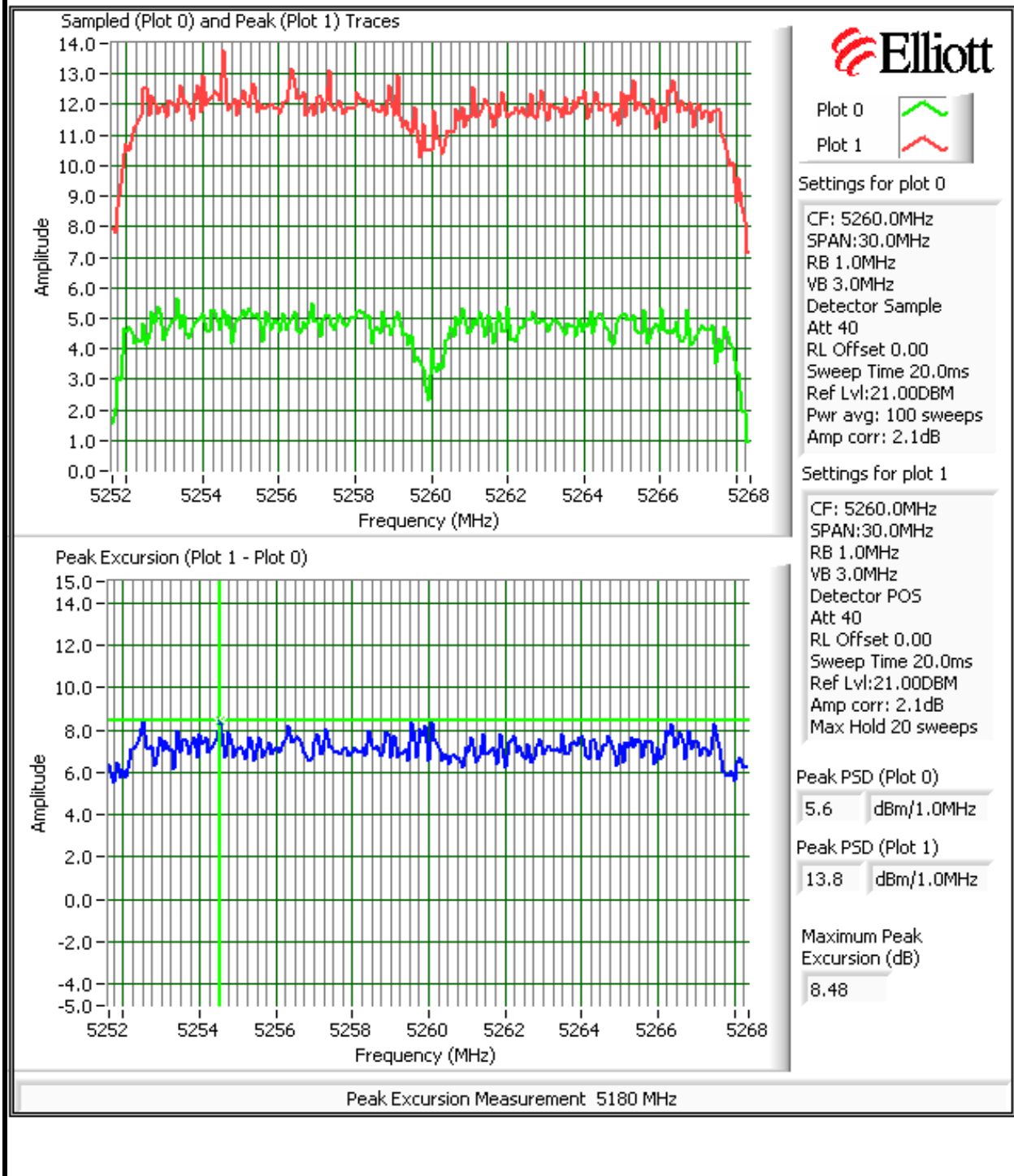
Run #2: Peak Excursion Plots



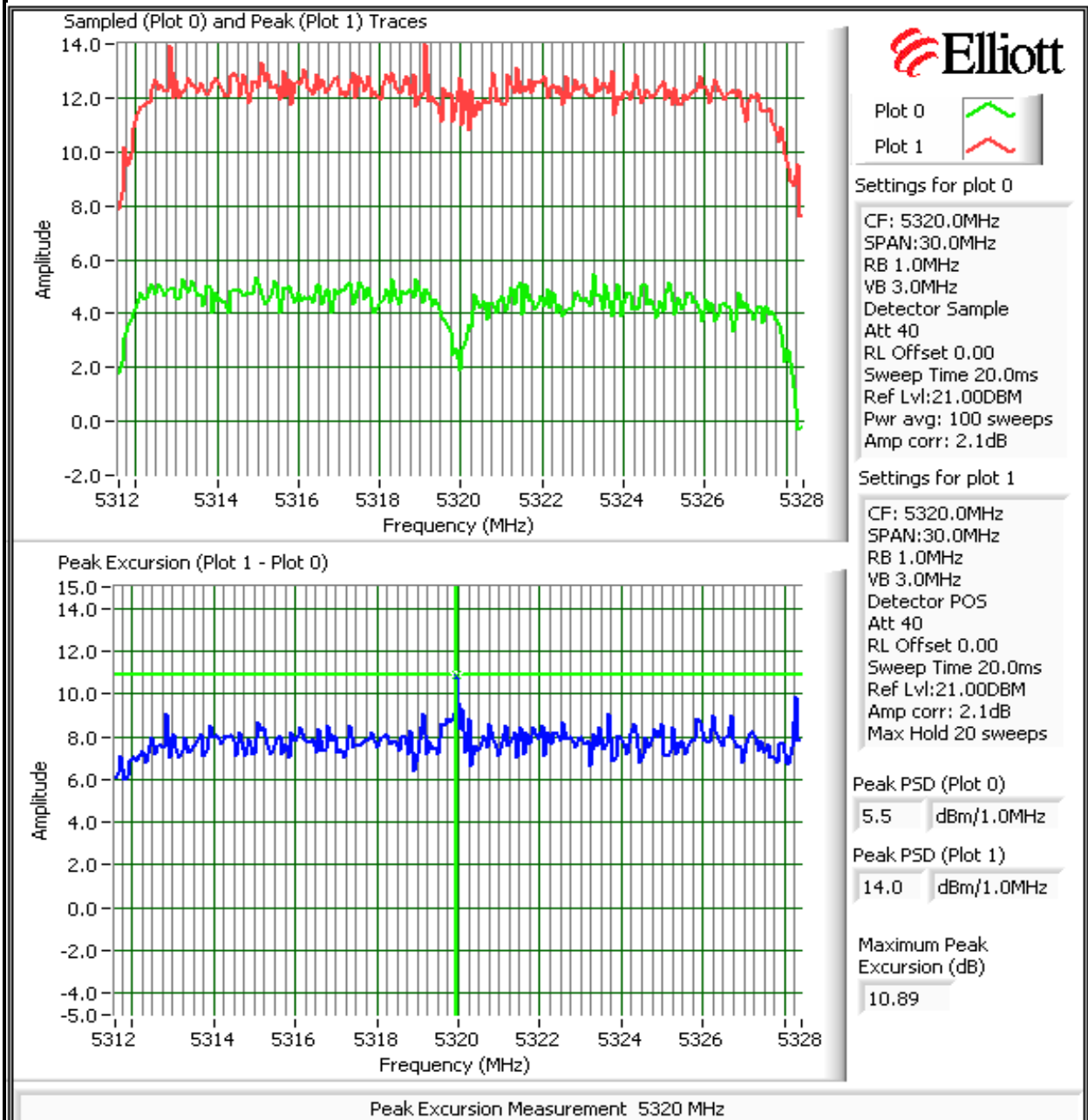
Client: Xirrus, Inc.	Job Number: J60437
Model: XS-3500 Access Point	T-Log Number: T61140
Contact: Ian Laity / Steve Smith	Account Manager: Susan Pelzl
Spec: FCC 15.247, 15.401, RSS-210	Class: N/A



Client: Xirrus, Inc.	Job Number: J60437
Model: XS-3500 Access Point	T-Log Number: T61140
Contact: Ian Laity / Steve Smith	Account Manager: Susan Pelzl
Spec: FCC 15.247, 15.401, RSS-210	Class: N/A



Client: Xirrus, Inc.	Job Number: J60437
Model: XS-3500 Access Point	T-Log Number: T61140
Contact: Ian Laity / Steve Smith	Account Manager: Susan Pelzi
Spec: FCC 15.247, 15.401, RSS-210	Class: N/A

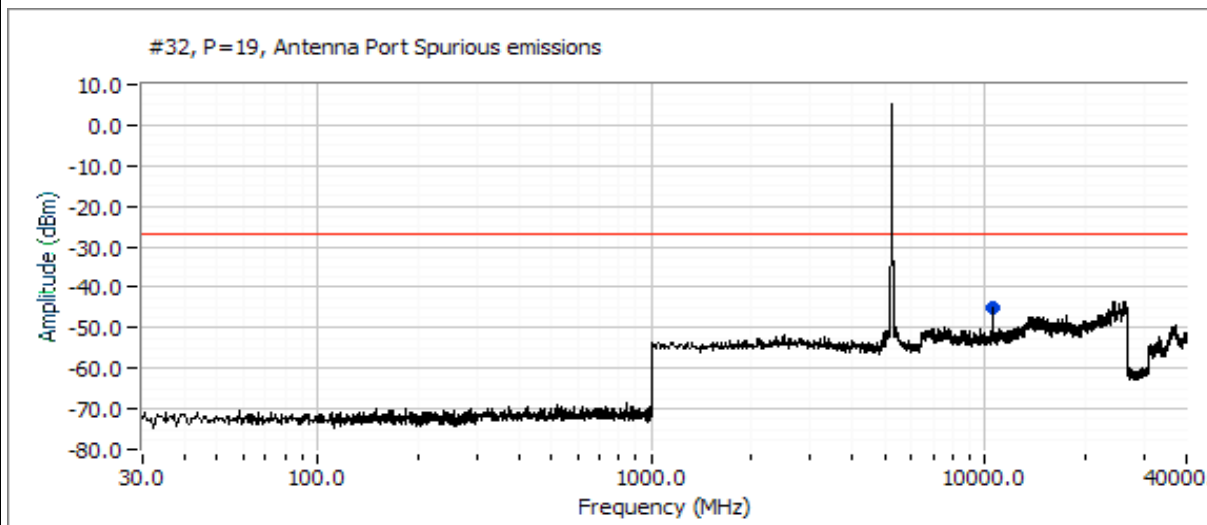
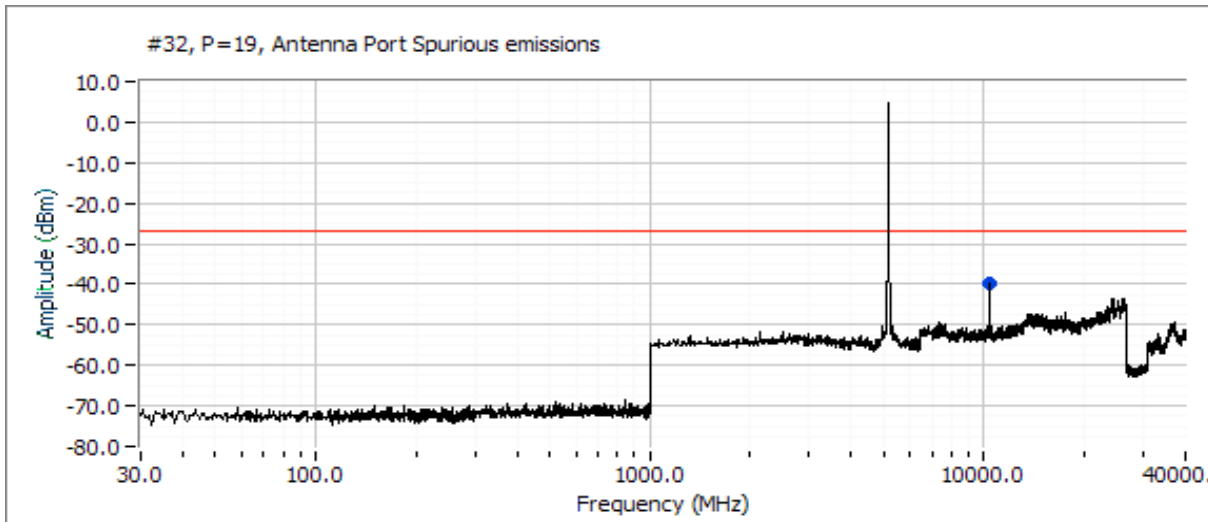


Client: Xirrus, Inc.	Job Number: J60437
Model: XS-3500 Access Point	T-Log Number: T61140
Contact: Ian Laity / Steve Smith	Account Manager: Susan Pelzl
Spec: FCC 15.247, 15.401, RSS-210	Class: N/A

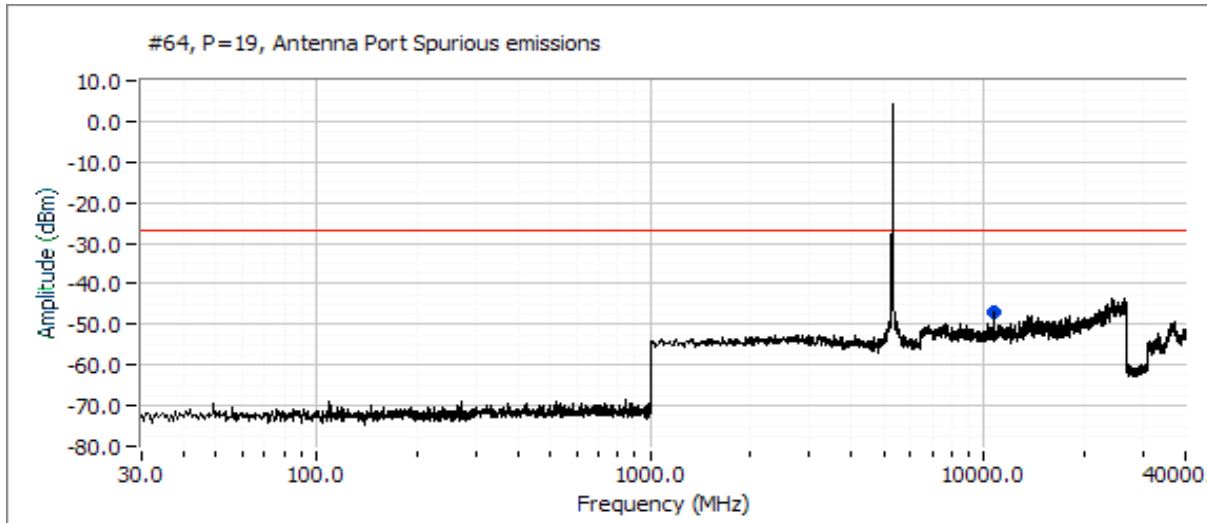
Run #3: Out Of Band Spurious Emissions - Antenna Conducted

The EIRP limit is -27dBm/MHz for all out of band signals that do not fall in restricted bands. No correction has been made to the limit to account for antenna gain as the antenna gain outside of the allocated band is not known.

All measurements made at power setting 19



Client: Xirrus, Inc.	Job Number: J60437
Model: XS-3500 Access Point	T-Log Number: T61140
Contact: Ian Laity / Steve Smith	Account Manager: Susan Pelzl
Spec: FCC 15.247, 15.401, RSS-210	Class: N/A



Frequency MHz	Level dBm	Port	15.209 / 15E		Detector Pk/QP/Avg	Comments
			Limit	Margin		
10640.00	-46.8	RF Port	-27.0	-19.8	Peak	#64
10360.00	-38.3	RF Port	-27.0	-11.3	Peak	#32
10520.00	-44.8	RF Port	-27.0	-17.8	Peak	#52



EMC Test Data

Client: Xirrus, Inc.	Job Number: J60437
Model: XS-3500 Access Point	T-Log Number: T61140
	Account Manager: Susan Pezl
Contact: Ian Laity / Steve Smith	
Spec: FCC 15.247, 15.401, RSS-210	Class: N/A

Radiated Emissions, FCC 15E, 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: 7/25/2005	Config. Used: 1
Test Engineer: Chris Byleckie/Rafael	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.

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

Ambient Conditions:	Temperature:	18 °C
	Rel. Humidity:	78 %

Summary of Results

Run #	Test Performed	Limit	Pass / Fail	Result / Margin
1a - c	RE, 1000 - 40000 MHz - Spurious Emissions	FCC Part 15.209 / 15.407	Pass	52.9dBµV/m (441.6µV/m) @ 5350.0MHz (-1.1dB)

Modifications Made During Testing:

No modifications were made to the EUT during testing

Deviations From The Standard

No deviations were made from the requirements of the standard.



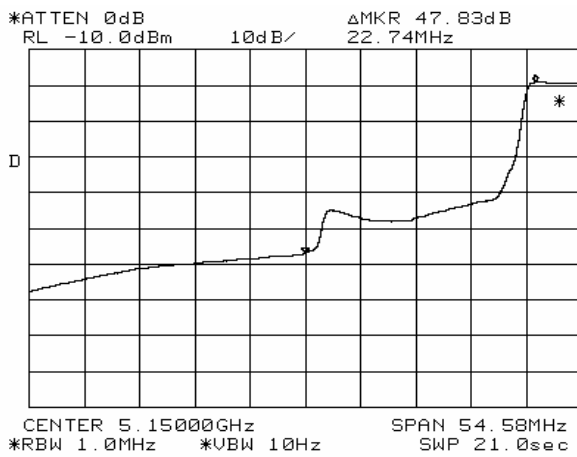
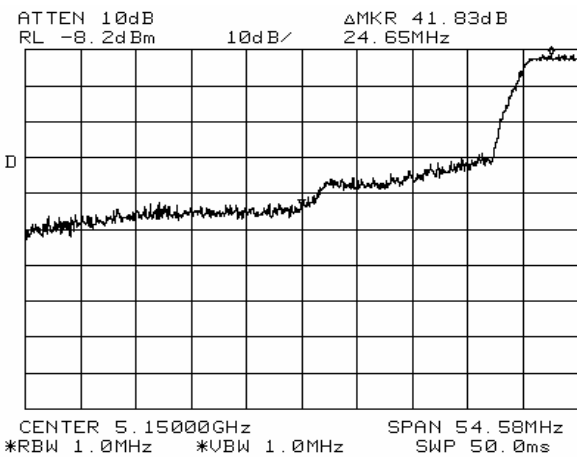
EMC Test Data

Client: Xirrus, Inc.	Job Number: J60437
Model: XS-3500 Access Point	T-Log Number: T61140
Contact: Ian Laity / Steve Smith	Account Manager: Susan Peizi
Spec: FCC 15.247, 15.401, RSS-210	Class: N/A

EUT 1.5m above groundplane (higher emissions than with EUT at 0.8m height)
 Run #1a: Radiated Spurious Emissions, 1000 - 40000 MHz. Low Channel @ 5180 MHz

	H	V	
Fundamental emission level @ 3m in 1MHz RBW:	94.69	108.62	Peak Measurement (RB=VB=1MHz)
Fundamental emission level @ 3m in 1MHz RBW:	85.48	98.17	Average Measurement (RB=1MHz, VB=10Hz)
Delta Marker - Peak	41.83 dB		
Delta Marker - Average	47.83 dB		
Calculated Band-Edge Measurement:	66.79 dBuV/m		Peak
Calculated Band-Edge Measurement:	50.34 dBuV/m		Average

Power setting 10



Band Edge Signal Radiated Field Strength

Frequency	Level	Pol	15.209 / 15E		Detector	Azimuth	Height	Comments
MHz	dBuV/m	v/h	Limit	Margin	Pk/QP/Avg	degrees	meters	
5150.000	50.3	-	54.0	-3.7	Avg	-	-	Note 2
5150.000	66.8	-	74.0	-7.2	Pk	-	-	Note 2



EMC Test Data

Client: Xirrus, Inc.	Job Number: J60437
Model: XS-3500 Access Point	T-Log Number: T61140
	Account Manager: Susan Pezli
Contact: Ian Laity / Steve Smith	
Spec: FCC 15.247, 15.401, RSS-210	Class: N/A

Run #1a: Continued

Other Spurious Radiated Emissions:

Frequency MHz	Level dB μ V/m	Pol v/h	15.209 / 15E		Detector Pk/QP/Avg	Azimuth degrees	Height meters	Comments
			Limit	Margin				
10359.88	66.0	V	68.3	-2.3	PK	89	1.0	Non-restricted, pk reading, avg limit
10357.53	64.7	H	68.3	-3.6	PK	202	1.3	Non-restricted, pk reading, avg limit
15537.22	41.7	H	54.0	-12.3	AVG	235	1.0	Noise Floor
15540.45	41.5	V	54.0	-12.5	AVG	228	1.0	Noise Floor
10359.88	53.8	V	68.3	-14.5	AVG	89	1.0	Non-restricted
10357.53	51.9	H	68.3	-16.4	AVG	202	1.3	Non-restricted
15537.22	52.7	H	74.0	-21.3	PK	235	1.0	Noise Floor
15540.45	52.5	V	74.0	-21.5	PK	228	1.0	Noise Floor

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 (~68dB μ V/m).

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

Run #1b: Radiated Spurious Emissions, 1000 - 40000 MHz. Center Channel @ 5260 MHz

Power setting 19

Frequency MHz	Level dB μ V/m	Pol v/h	15.209 / 15.247		Detector Pk/QP/Avg	Azimuth degrees	Height meters	Comments
			Limit	Margin				
10518.97	64.6	V	68.3	-3.7	PK	205	1.0	Peak reading average limit
10518.28	61.9	H	68.3	-6.4	PK	233	1.3	Peak reading average limit
15773.92	41.7	H	54.0	-12.3	AVG	80	1.0	
15781.45	41.6	V	54.0	-12.4	AVG	205	1.0	
15781.45	52.4	V	74.0	-21.6	PK	205	1.0	
15773.92	52.2	H	74.0	-21.8	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 (~68dB μ V/m).

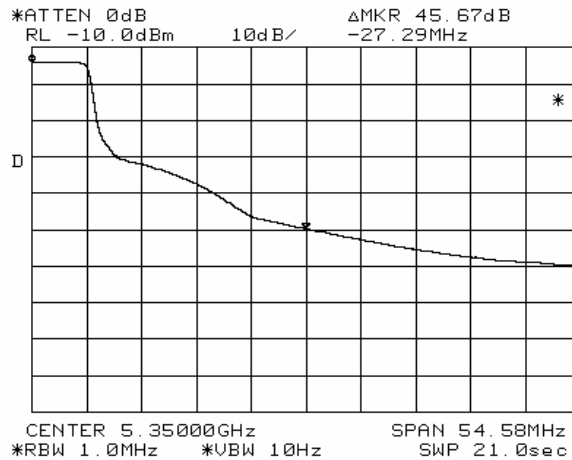
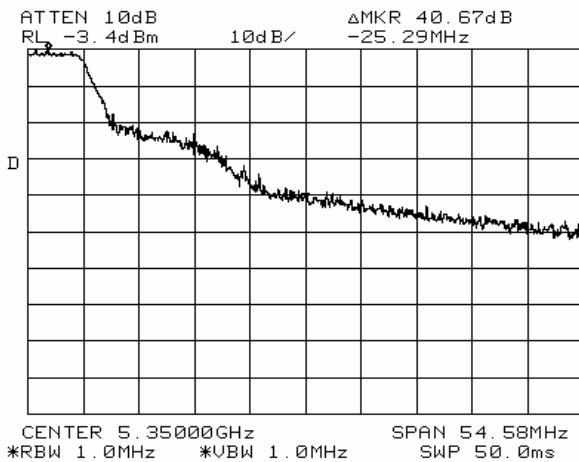


EMC Test Data

Client: Xirrus, Inc.	Job Number: J60437
Model: XS-3500 Access Point	T-Log Number: T61140
Contact: Ian Laity / Steve Smith	Account Manager: Susan Peizi
Spec: FCC 15.247, 15.401, RSS-210	Class: N/A

Run #1c: Radiated Spurious Emissions, 1000 - 40000 MHz. High Channel @ 5320 MHz
Power setting 19

	H	V	
Fundamental emission level @ 3m in 1MHz RBW:	96.69	107.85	Peak Measurement (RB=VB=1MHz)
Fundamental emission level @ 3m in 1MHz RBW:	87.56	98.55	Average Measurement (RB=1MHz, VB=10Hz)
Delta Marker - Peak	40.67 dB		
Delta Marker - Average	45.67 dB		
Calculated Band-Edge Measurement:	67.18 dBuV/m		Peak
Calculated Band-Edge Measurement:	52.88 dBuV/m		Average



Band Edge Signal Radiated Field Strength

Frequency	Level	Pol	15.209 / 15E		Detector	Azimuth	Height	Comments
MHz	dBuV/m	v/h	Limit	Margin	Pk/QP/Avg	degrees	meters	
5350.000	52.9	-	54.0	-1.1	Avg	-	-	Note 2
5350.000	67.2	-	74.0	-6.8	Pk	-	-	Note 2

Performed on August 9, 2005 by Mehran

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	
10639.41	52.4	V	54.0	-1.6	Avg	182	1.8	Power = 19
10642.03	45.7	H	54.0	-8.3	Avg	115	1.0	Power = 19
10639.41	64.1	V	74.0	-9.9	Pk	182	1.8	Power = 19
10642.03	57.3	H	74.0	-16.7	Pk	115	1.0	Power = 19



EMC Test Data

Client:	Xirrus, Inc.	Job Number:	J60437
Model:	XS-3500 Access Point	T-Log Number:	T61140
		Account Manager:	Susan Pezl
Contact:	Ian Laity / Steve Smith		
Spec:	FCC 15.247, 15.401, RSS-210	Class:	N/A

Radiated Emissions, FCC 15E, 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: 7/25/2005	Config. Used: 1
Test Engineer: Chris Byleckie/Rafael	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.

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

Ambient Conditions: Temperature: 17 °C
 Rel. Humidity: 84 %

Summary of Results

Run #	Test Performed	Limit	Pass / Fail	Result / Margin
1a - g	RE, 1000 - 40000 MHz - Spurious Emissions	FCC Part 15.209 / 15.247(c)	Pass	53.9dBµV/m (495.5µV/m) @ 5350.0MHz (-0.1dB)

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.



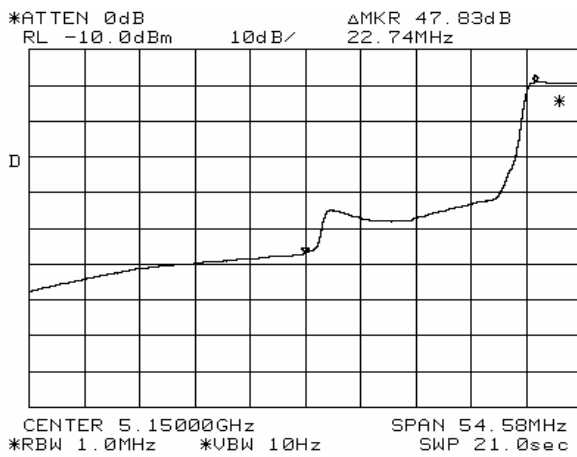
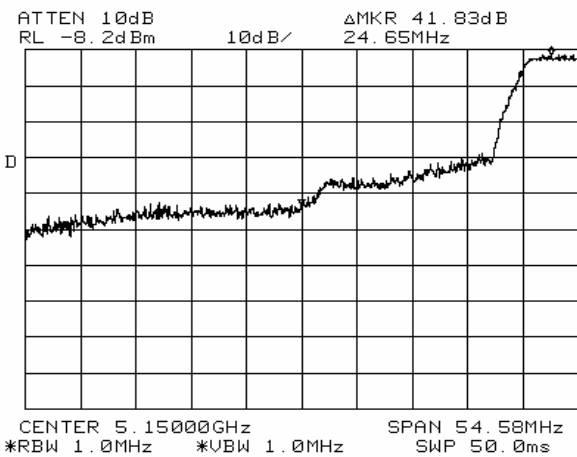
EMC Test Data

Client: Xirrus, Inc.	Job Number: J60437
Model: XS-3500 Access Point	T-Log Number: T61140
Contact: Ian Laity / Steve Smith	Account Manager: Susan Peizi
Spec: FCC 15.247, 15.401, RSS-210	Class: N/A

EUT 1.5m above groundplane (higher emissions than with EUT at 0.8m height)
 Run #1a: Radiated Spurious Emissions, 1000 - 40000 MHz. Low Channel @ 5180 MHz

	H	V	
Fundamental emission level @ 3m in 1MHz RBW:	90.75	105.64	Peak Measurement (RB=VB=1MHz)
Fundamental emission level @ 3m in 1MHz RBW:	82.57	96.33	Average Measurement (RB=1MHz, VB=10Hz)
Delta Marker - Peak	41.83 dB		
Delta Marker - Average	47.83 dB		
Calculated Band-Edge Measurement:	63.81 dBuV/m		Peak
Calculated Band-Edge Measurement:	48.5 dBuV/m		Average

Power setting 10



Band Edge Signal Radiated Field Strength

Frequency	Level	Pol	15.209 / 15E		Detector	Azimuth	Height	Comments
MHz	dBuV/m	v/h	Limit	Margin	Pk/QP/Avg	degrees	meters	
5150.000	48.5	-	54.0	-5.5	Avg	-	-	Note 2
5150.000	63.8	-	74.0	-10.2	Pk	-	-	Note 2



EMC Test Data

Client: Xirrus, Inc.	Job Number: J60437
Model: XS-3500 Access Point	T-Log Number: T61140
	Account Manager: Susan Peizl
Contact: Ian Laity / Steve Smith	
Spec: FCC 15.247, 15.401, RSS-210	Class: N/A

Run #1a: Continued

Other Spurious Radiated Emissions:

Frequency MHz	Level dB μ V/m	Pol v/h	15.209 / 15E		Detector Pk/QP/Avg	Azimuth degrees	Height meters	Comments
			Limit	Margin				
15538.72	44.2	H	54.0	-9.8	AVG	183	1.0	Noise Floor
15534.35	44.2	V	54.0	-9.8	AVG	74	1.0	Noise Floor
10361.00	53.1	V	68.3	-15.2	AVG	9	1.0	Non-restricted
10360.55	52.6	H	68.3	-15.7	AVG	7	1.0	Non-restricted
15538.72	55.4	H	74.0	-18.6	PK	183	1.0	Noise Floor
15534.35	55.1	V	74.0	-18.9	PK	74	1.0	Noise Floor
10361.00	65.7	V	88.3	-22.6	PK	9	1.0	Non-restricted
10360.55	65.5	H	88.3	-22.9	PK	7	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 (~68dB μ V/m).

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

Run #1b: Radiated Spurious Emissions, 1000 - 40000 MHz. Center Channel @ 5260 MHz

Power setting 19

Frequency MHz	Level dB μ V/m	Pol v/h	15.209 / 15.247		Detector Pk/QP/Avg	Azimuth degrees	Height meters	Comments
			Limit	Margin				
10521.29	72.8	H	88.3	-15.5	PK	5	1.0	
15780.42	34.7	H	54.0	-19.3	AVG	32	1.0	
10521.30	69.0	V	88.3	-19.4	PK	240	1.0	
15780.80	34.5	V	54.0	-19.5	AVG	190	1.0	
15780.42	46.3	H	74.0	-27.8	PK	32	1.0	
15780.80	45.9	V	74.0	-28.1	PK	190	1.0	
10521.29	39.4	H	68.3	-28.9	AVG	5	1.0	
10521.30	38.9	V	68.3	-29.4	AVG	240	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 (~68dB μ V/m).



EMC Test Data

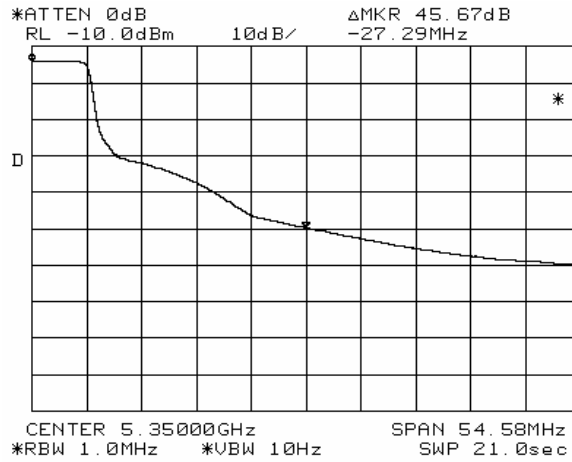
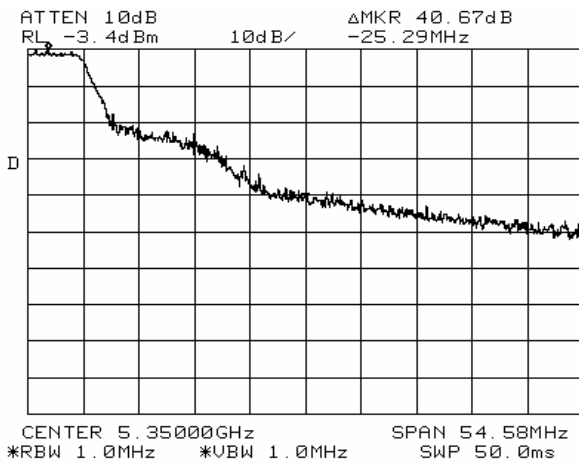
Client: Xirrus, Inc.	Job Number: J60437
Model: XS-3500 Access Point	T-Log Number: T61140
Contact: Ian Laity / Steve Smith	Account Manager: Susan Peizi
Spec: FCC 15.247, 15.401, RSS-210	Class: N/A

Run #1c: Radiated Spurious Emissions, 1000 - 40000 MHz. High Channel @ 5320 MHz

Measurements made November 4, 2005

Power setting 16 (Pout = 14.9dBm)

Note - Band edge plots taken at power setting of 19



	H	V	
Fundamental emission level @ 3m in 1MHz RBW:		110.00	Peak Measurement (RB=VB=1MHz)
Fundamental emission level @ 3m in 1MHz RBW:		99.6	Average Measurement (RB=1MHz, VB=10Hz)
Delta Marker - Peak	40.7 dB		
Delta Marker - Average	45.7 dB		
Calculated Band-Edge Measurement:	69.3 dBuV/m		Peak
Calculated Band-Edge Measurement:	53.9 dBuV/m		Average

Band Edge 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
5350.00	53.9	v	54.0	-0.1	AVG		
5350.00	69.3	v	74.0	-4.7	PK		

Spurious emissions, taken at power setting = 19 (Pout measured at 17dBm)

Frequency	Level	Pol	15.209 / 15.247	Detector	Azimuth	Height	Comments	
MHz	dBuV/m	v/h	Limit	Margin	Pk/QP/Avg	degrees	meters	
10639.20	52.8	V	54.0	-1.2	AVG	313	1.0	2nd Harmonic of 5320
10639.20	65.0	V	74.0	-9.0	PK	313	1.0	2nd Harmonic of 5320
10640.10	44.8	H	54.0	-9.2	AVG	79	1.0	2nd Harmonic of 5320
10640.10	56.6	H	74.0	-17.4	PK	79	1.0	2nd Harmonic of 5320

All other spurious emissions more than 10dB below the limit and below the measurement system noise floor.

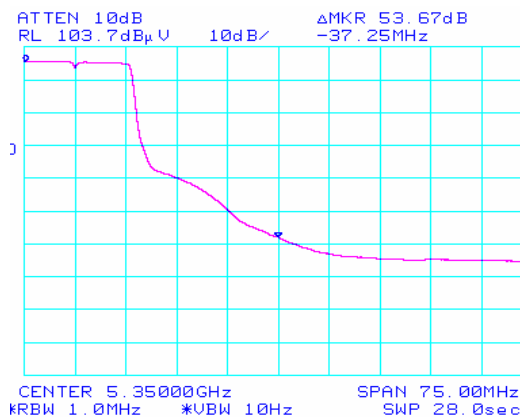
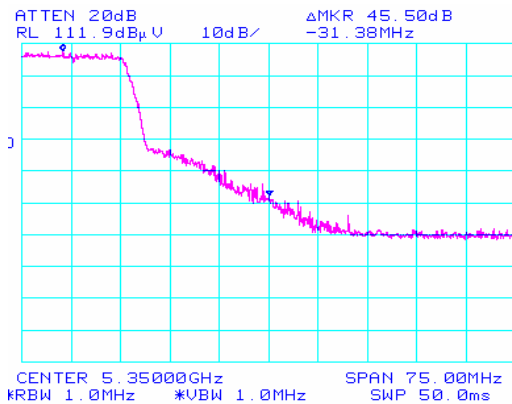


EMC Test Data

Client: Xirrus, Inc.	Job Number: J60437
Model: XS-3500 Access Point	T-Log Number: T61140
Contact: Ian Laity / Steve Smith	Account Manager: Susan Peizl
Spec: FCC 15.247, 15.401, RSS-210	Class: N/A

Run #1c: Radiated Spurious Emissions, 1000 - 40000 MHz. High Channel @ 5320 MHz Power setting 10

	H	V	
Fundamental emission level @ 3m in 1MHz RBW:	87.27	104.02	Peak Measurement (RB=VB=1MHz)
Fundamental emission level @ 3m in 1MHz RBW:	78.72	94.92	Average Measurement (RB=1MHz, VB=10Hz)
Delta Marker - Peak	45.5 dB		
Delta Marker - Average	53.67 dB		
Calculated Band-Edge Measurement:	58.52 dBuV/m		Peak
Calculated Band-Edge Measurement:	41.25 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	
5350.000	41.3	-	54.0	-12.8	Avg	-	-	Note 2
5350.000	58.5	-	74.0	-15.5	Pk	-	-	Note 2

Other Spurious Radiated Emissions:

Frequency	Level	Pol	15.209 / 15.247		Detector	Azimuth	Height	Comments
MHz	dBµV/m	v/h	Limit	Margin	Pk/QP/Avg	degrees	meters	
10639.39	53.4	V	54.0	-0.6	AVG	253	1.1	
10637.88	47.9	H	54.0	-6.1	AVG	38	1.0	
10639.39	66.4	V	74.0	-7.6	PK	253	1.1	
15953.70	43.7	V	54.0	-10.3	AVG	243	1.0	
15959.91	43.7	H	54.0	-10.3	AVG	210	1.0	
10637.88	60.3	H	74.0	-13.7	PK	38	1.0	
15953.70	55.0	V	74.0	-19.0	PK	243	1.0	
15959.91	54.6	H	74.0	-19.4	PK	210	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, Inc.	Job Number:	J60437
Model:	XS-3500 Access Point	T-Log Number:	T61140
		Account Manager:	Susan Peizl
Contact:	Ian Laity / Steve Smith		
Spec:	FCC 15.247, 15.401, RSS-210	Class:	N/A

FCC 15 E UNII - Radiated Spurious Emissions, Low Band, Highest Power Setting

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: 9/16/2005	Config. Used: 1
Test Engineer: Mehran Birgani	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:	17 °C
	Rel. Humidity:	47 %

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	53.3dBµV/m (462.4µV/m) @

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.



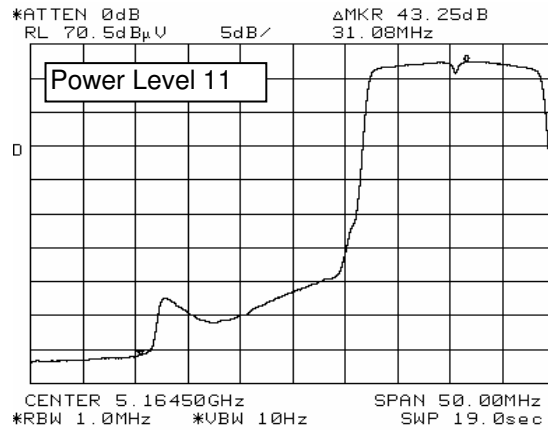
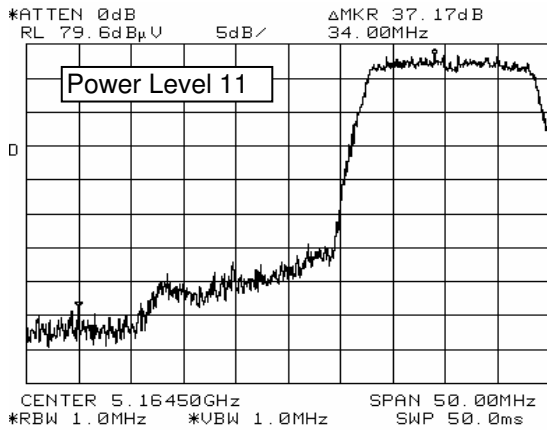
EMC Test Data

Client: Xirrus, Inc.	Job Number: J60437
Model: XS-3500 Access Point	T-Log Number: T61140
Contact: Ian Laity / Steve Smith	Account Manager: Susan Peizi
Spec: FCC 15.247, 15.401, RSS-210	Class: N/A

Run #1a: Radiated Spurious Emissions, 30 - 26500 MHz. Low Channel @ 5180 MHz at P=11

Fundamental Signal Field Strength: Peak and average values measured in 1 MHz, and peak value measured in 100kHz
 Measurements made with internal antenna - this had higher emissions than the external antenna at 5180 MHz

Frequency	Level	Pol	15.209 / 15.247		Detector	Azimuth	Height	Comments
MHz	dB μ V/m	V/H	Limit	Margin	Pk/QP/Avg	degrees	meters	
5182.459	106.9	V	-	-	PK	212	1.4	RB = VB = 1MHz
5182.459	96.6	V	-	-	AVG	212	1.4	RB = 1MHz, VB = 10Hz
5174.500	94.1	H	-	-	PK	102	1.0	RB = VB = 1MHz
5174.500	85.4	H	-	-	AVG	102	1.0	RB = 1MHz, VB = 10Hz



Delta Marker - Peak	37.2 dB	Delta between highest in-band and highest
Delta Marker - Average	43.3 dB	

Band Edge Signal Field Strength

Frequency	Level	Pol	15.209 / 15.247		Detector	Azimuth	Height	Comments
MHz	dB μ V/m	V/H	Limit	Margin	Pk/QP/Avg	degrees	meters	
5149.700	53.3	V	54.0	-0.7	AVG	212	1.4	Power level @ 11
5149.500	69.7	V	74.0	-4.3	PK	212	1.4	Power level @ 11

Note 1: Calculated by subtracting the marker delta values from the fundamental field strength measurements.



EMC Test Data

Client:	Xirrus, Inc.	Job Number:	J60437
Model:	XS-3500 Access Point	T-Log Number:	T61140
Contact:	Ian Laity / Steve Smith	Account Manager:	Susan Peizl
Spec:	FCC 15.247, 15.401, RSS-210	Class:	N/A

Other Spurious Emissions

Frequency	Level	Pol	15.209 / 15.247		Detector	Azimuth	Height	Comments
MHz	dB μ V/m	v/h	Limit	Margin	Pk/QP/Avg	degrees	meters	
10358.16	57.5	V	68.3	-10.8	AVG	201	1.5	Non-restricted band
10358.16	71.2	V	88.3	-17.1	AVG	201	1.5	Non-restricted band
15530.66	35.3	V	54.0	-18.7	AVG	335	1.0	Noise Floor
15530.66	34.2	H	54.0	-19.8	AVG	192	1.1	Noise Floor
10362.66	46.9	H	68.3	-21.5	AVG	170	1.0	Non-restricted band
15530.66	46.9	H	74.0	-27.1	PK	335	1.0	Noise Floor
15530.66	46.1	V	74.0	-27.9	PK	192	1.1	Noise Floor
10362.66	60.0	H	88.3	-28.3	AVG	170	1.0	Non-restricted band

Note 1: For emissions in restricted bands, the limit of 15.209 was used. For all other emissions, the limit was set to -27dBm eirp (68.3 dB μ V/m).

Run #1b: Radiated Spurious Emissions, 30 - 26500 MHz. Channel @ 5200 MHz

Other Spurious Emissions, power setting = 17 (Note that the actual max power on #40 is a setting of 14 (16dBm) - these measurements were made at a setting of 17, ~18dBm).

Measurements made with internal antenna - this had higher emissions than the external antenna at 5180 MHz

	Level	Pol	15.209 / 15.247		Detector	Azimuth	Height	Comments
MHz	dB μ V/m	v/h	Limit	Margin	Pk/QP/Avg	degrees	meters	
10398.83	59.0	V	68.3	-9.3	AVG	190	1.5	Non-restricted band
15599.33	42.0	H	54.0	-12.0	AVG	180	1.1	Noise Floor
15600.53	41.9	V	54.0	-12.1	AVG	202	1.0	Noise Floor
10398.83	71.4	V	88.3	-16.9	AVG	190	1.5	Non-restricted band
10401.80	50.3	H	68.3	-18.0	AVG	169	1.3	Non-restricted band
15600.53	53.4	V	74.0	-20.6	PK	202	1.0	Noise Floor
15599.33	53.0	H	74.0	-21.0	PK	180	1.0	Noise Floor
10401.80	63.2	H	88.3	-25.1	AVG	169	1.3	Non-restricted band

Note 1: For emissions in restricted bands, the limit of 15.209 was used. For all other emissions, the limit was set to -27dBm eirp (68.3 dB μ V/m).



EMC Test Data

Client:	Xirrus, Inc.	Job Number:	J60437
Model:	XS-3500 Access Point	T-Log Number:	T61140
		Account Manager:	Susan Pezl
Contact:	Ian Laity / Steve Smith		
Spec:	FCC 15.247, 15.401, RSS-210	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: 8/23/2005
Test Engineer: Mark Briggs
Test Location: SVOATS #2

Config. Used: 1
Config Change: -
EUT Voltage: 120V/60Hz

General Test Configuration

The EUT was located on a wooden table. The rf output was connected to the power meter or analyzer via an attenuator.

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: 45 %

Summary of Results

Run #	Test Performed	Limit	Pass / Fail	Result / Margin
1	Antenna Port Spurious Emissions	FCC Part 15.209 / 15.247(c)	Pass	All emissions < -20dBc
2	6dB Bandwidth	15.247(a)	Pass	16.8MHz
3	Output Power 802.11a - Peak Power (individual / aggregate): Internal Antenna	15.247(b)	Pass	21dBm / 0.251W 27dBm / 0.504 W
3	Output Power 802.11a - Peak Power (individual / aggregate): External Antenna	15.247(b)	Pass	19.9 dBm / 0.098W 25.9dBm / 0.391 W
4	Power Spectral Density (PSD)	15.247(d)	Pass	5.21dBm/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.

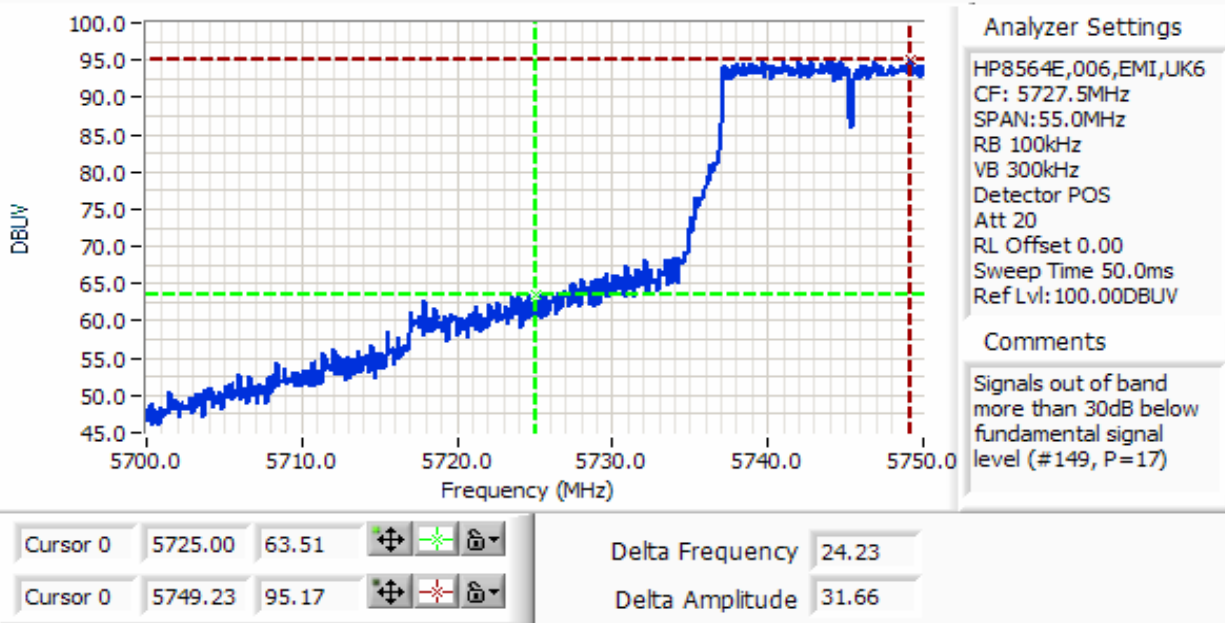


EMC Test Data

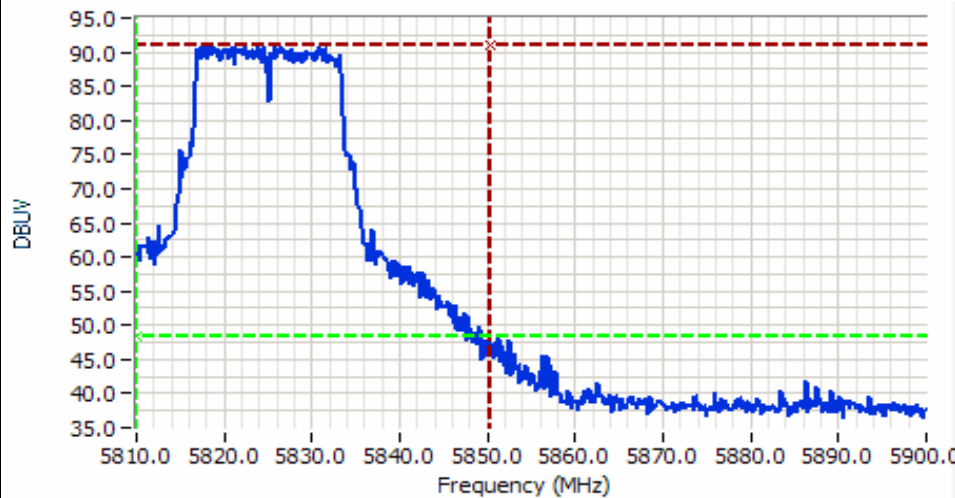
Client: Xirrus, Inc.	Job Number: J60437
Model: XS-3500 Access Point	T-Log Number: T61140
Contact: Ian Laity / Steve Smith	Account Manager: Susan Peizi
Spec: FCC 15.247, 15.401, RSS-210	Class: N/A

Run #1: Antenna Port Spurious Emissions

Plots made using RB=100kHz, VB >=100kHz. First two plots show band edge to verify -20dBc at the band edges.
Lower red line is set to -20dBc.



Client: Xirrus, Inc.	Job Number: J60437
Model: XS-3500 Access Point	T-Log Number: T61140
Contact: Ian Laity / Steve Smith	Account Manager: Susan Pezli
Spec: FCC 15.247, 15.401, RSS-210	Class: N/A



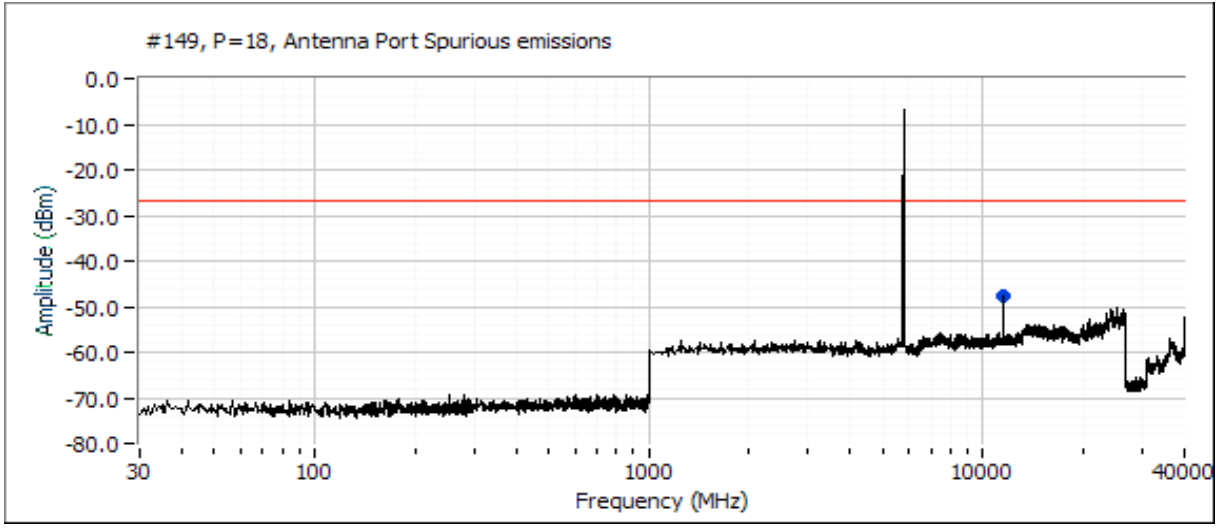
Analyzer Settings

HP8564E,006,EMI,UK6
 CF: 5855.0MHz
 SPAN:90.0MHz
 RB 100kHz
 VB 300kHz
 Detector POS
 Att 20
 RL Offset 0.00
 Sweep Time 50.0ms
 Ref Lvl:100.00DBUV

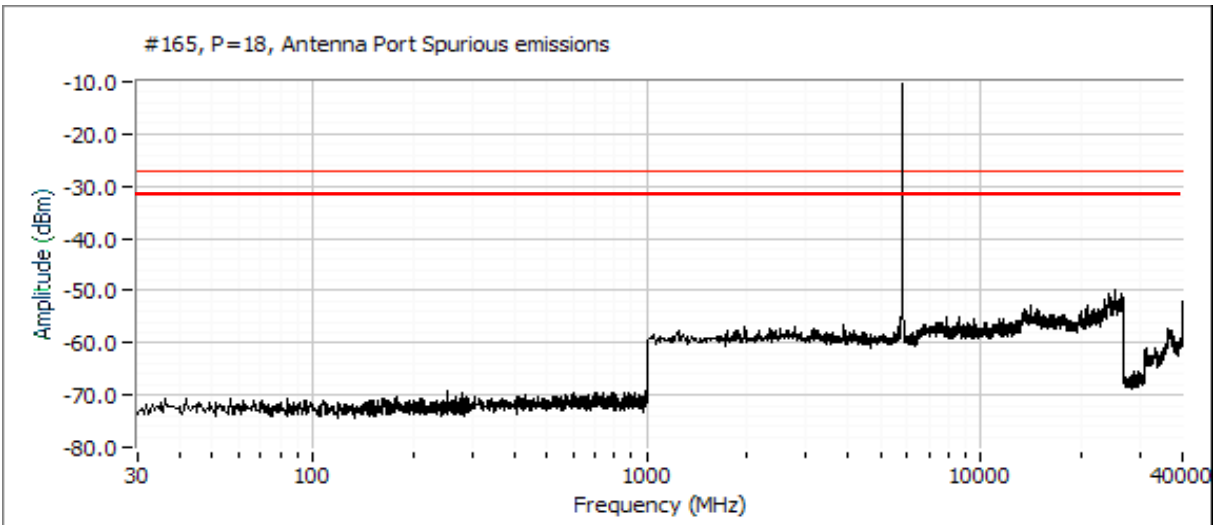
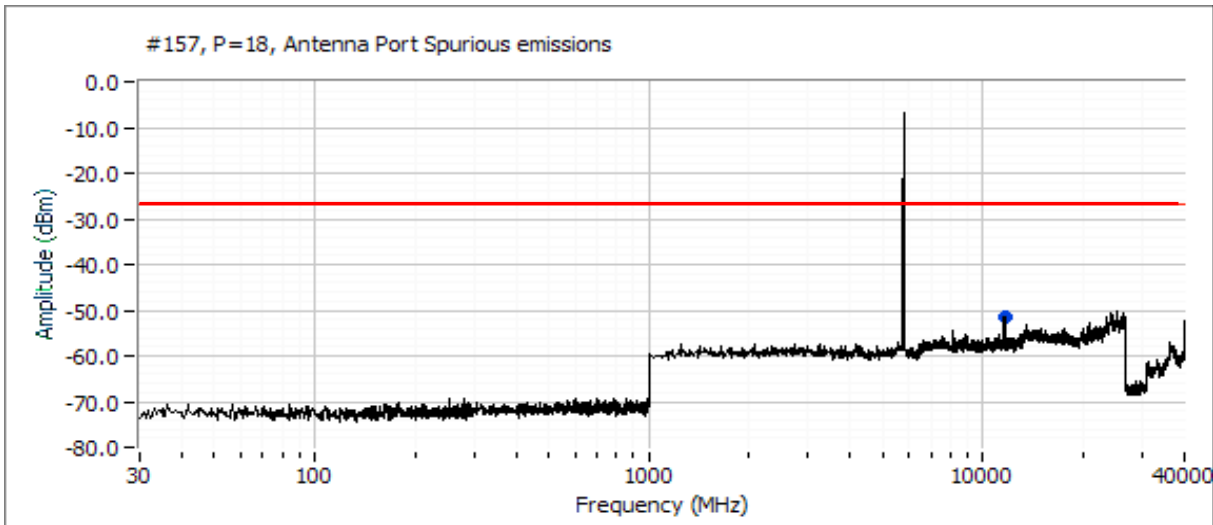
Comments

Signals out of band more than 40dB below fundamental signal level (#165, P=18)

Cursor 0	5810.00	48.36		Delta Frequency	40.32
Cursor 0	5850.32	91.00		Delta Amplitude	42.64



Client: Xirrus, Inc.	Job Number: J60437
Model: XS-3500 Access Point	T-Log Number: T61140
Contact: Ian Laity / Steve Smith	Account Manager: Susan Peizi
Spec: FCC 15.247, 15.401, RSS-210	Class: N/A

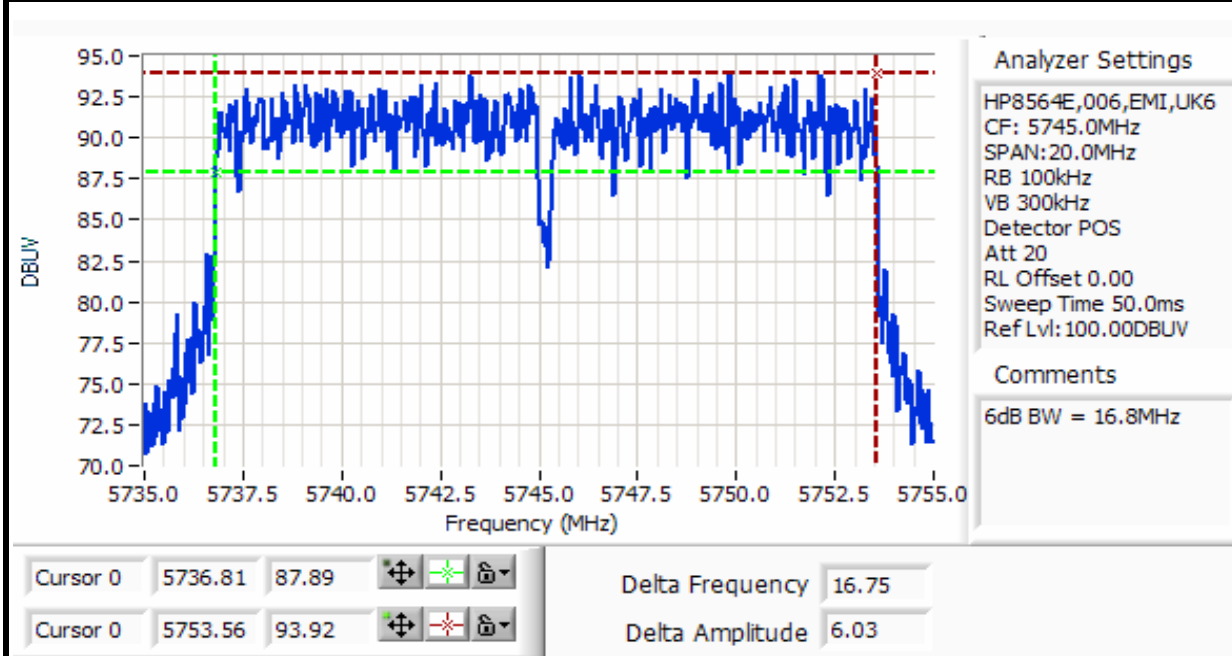


Client: Xirrus, Inc.	Job Number: J60437
Model: XS-3500 Access Point	T-Log Number: T61140
Contact: Ian Laity / Steve Smith	Account Manager: Susan Peizi
Spec: FCC 15.247, 15.401, RSS-210	Class: N/A

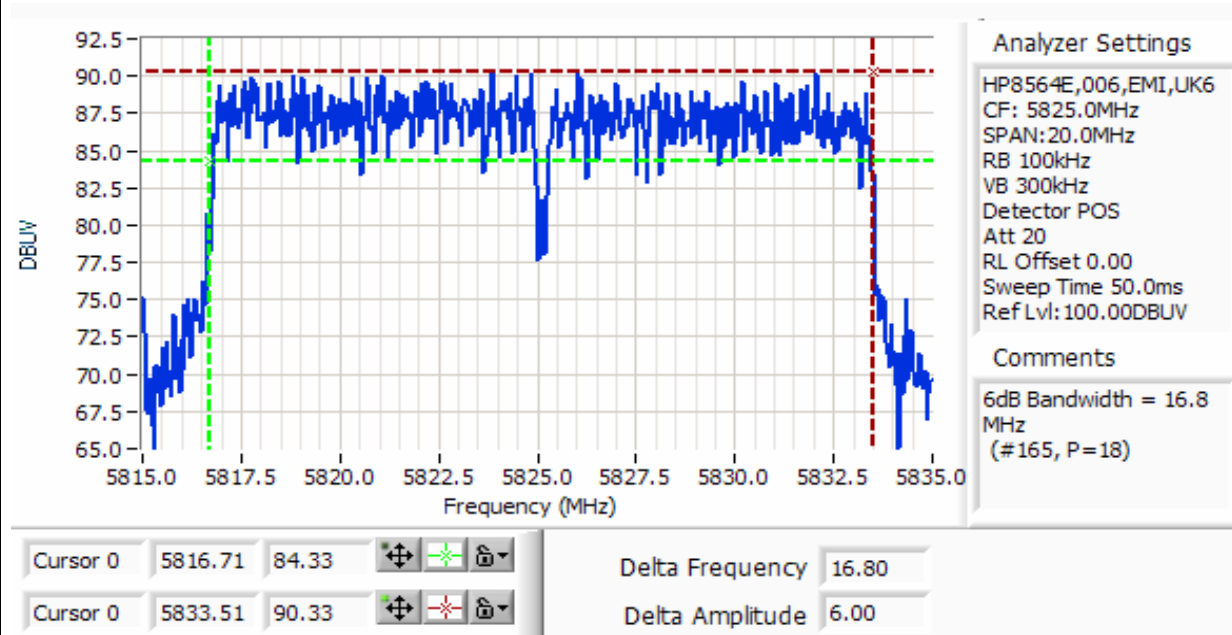
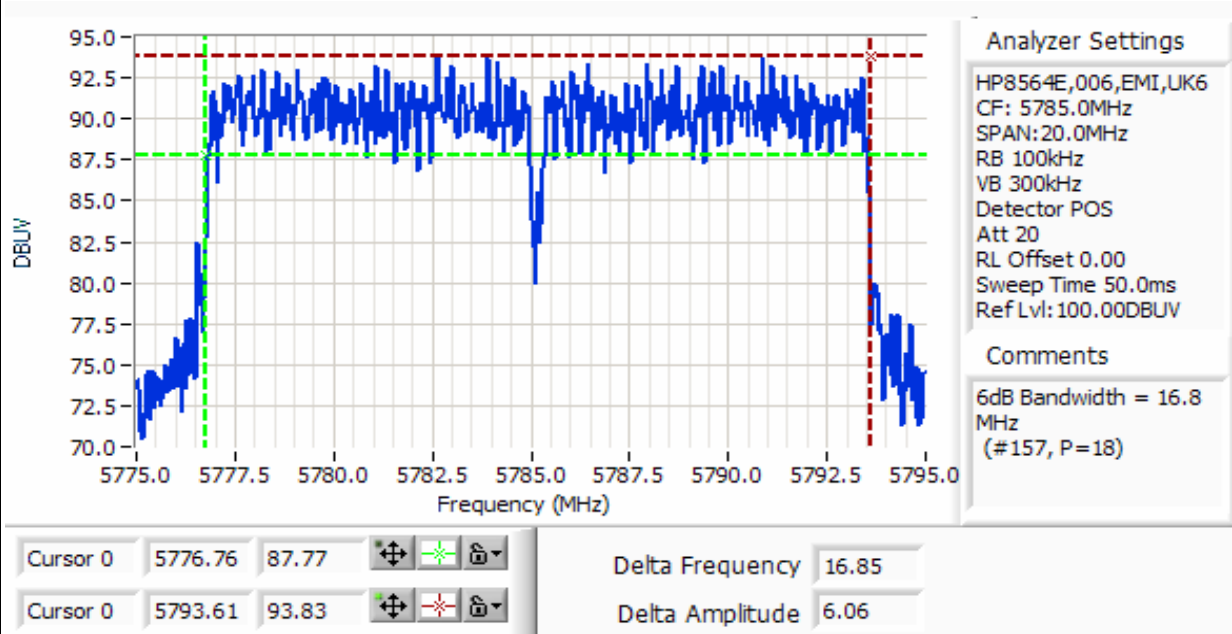
Run #2: Signal Bandwidth

Mode	Pwr	Frequency (MHz)	Resolution Bandwidth	6dB Signal Bandwidth	99% Signal Bandwidth
a (OFDM)	17	5745	100kHz	16.8 MHz	17MHz
a (OFDM)	18	5785	100kHz	16.8 MHz	17MHz
a (OFDM)	18	5825	100kHz	16.8 MHz	17MHz

Note 1: 99% bandwidth measured using feature of analyzer



Client: Xirrus, Inc.	Job Number: J60437
Model: XS-3500 Access Point	T-Log Number: T61140
Contact: Ian Laity / Steve Smith	Account Manager: Susan Peizl
Spec: FCC 15.247, 15.401, RSS-210	Class: N/A





EMC Test Data

Client:	Xirrus, Inc.	Job Number:	J60437
Model:	XS-3500 Access Point	T-Log Number:	T61140
		Account Manager:	Susan Peizl
Contact:	Ian Laity / Steve Smith		
Spec:	FCC 15.247, 15.401, RSS-210	Class:	N/A

Run #3a: Output Power

Internal Antenna

Maximum antenna gain: 3 dBi

Mode	Pwr Setting	Frequency (MHz)	Res BW	Output Power (dBm)		Output Power (W)		EIRP (W)	EIRP (W, avg)
				Pk ¹	Avg ²	Pk ¹	Avg ²		
a (OFDM)	17	5745	-	21.0	16.8	0.126	0.048	0.251	0.095
a (OFDM)	18	5785	-	20.0	15.9	0.100	0.039	0.200	0.078
a (OFDM)	18	5825	-	18.0	14.2	0.063	0.026	0.126	0.052

Aggregate Power - all four radios operating with internal antennas: 27.0 dBm (pk) 0.382 W EIRP Avg
0.50 Watts 1.005 W EIRP Pk

External Antenna

Maximum antenna gain: 5.2 dBi (=3dBd)

Mode	Pwr Setting	Frequency (MHz)	Res BW	Output Power (dBm)		Output Power (W)		EIRP (W)	EIRP (W, avg)
				Pk ¹	Avg ²	Pk ¹	Avg ²		
a (OFDM)	13	5745	-	19.9	13.8	0.098	0.024	0.324	0.079
a (OFDM)	16	5785	-	19.5	14.5	0.089	0.028	0.295	0.093
a (OFDM)	18	5825	-	18.0	14.2	0.063	0.026	0.209	0.087

Aggregate Power, 3 radios on internal antenna, one on external antenna: 26.8 dBm (pk) 0.380 W EIRP Avg
0.48 Watts 1.077 W EIRP Pk

Note 1: Output power measured using a peak power meter

Note 2: Output power measured using an average power sensor.

Note 3: Aggregate power is calculated based on the assumption that all four radios are operating in the 5725 - 5850 MHz band at the highest output power (19.9dBm for external antenna, 21.0dBm for internal antenna). Two cases are considered -
all four radios on the internal antennas
one external, three internal antennas.

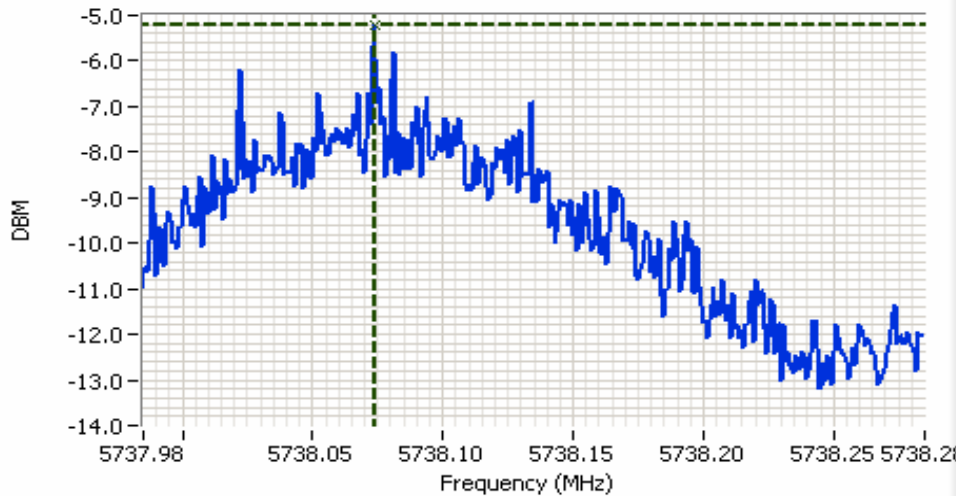
Run #4: Power Spectral Density

Mode	Pwr	Frequency (MHz)	Freq (MHz)	Res BW	P.S.D. (averaged over 1 second in a 3kHz bandwidth)	Limit	Status
a (OFDM)	17	5745	5738.07	3kHz	-5.21	8.0	Pass
a (OFDM)	18	5785	5779.58	3kHz	-8.29	8.0	Pass
a (OFDM)	18	5825	5817.82	3kHz	-8.96	8.0	Pass



EMC Test Data

Client: Xirrus, Inc.	Job Number: J60437
Model: XS-3500 Access Point	T-Log Number: T61140
Contact: Ian Laity / Steve Smith	Account Manager: Susan Peizl
Spec: FCC 15.247, 15.401, RSS-210	Class: N/A

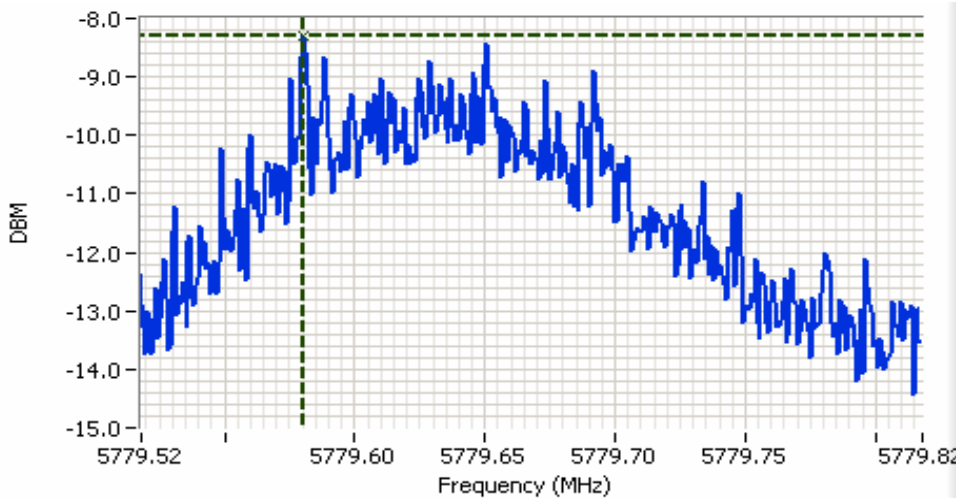


Analyzer Settings
HP8595EM
CF: 5738.1MHz
SPAN:300kHz
RB 3kHz
VB 3kHz
Detector POS
Att 10
RL Offset 1.50
Sweep Time 100.0s
Ref Lvl:2.00DBM

Comments
Power Spectral Density
Channel 149 (5745
MHz), Power setting 17

Cursor 1 5738.07 -5.21
0.00 0.00

Delta Frequency 5738.07
Delta Amplitude 5.21



Analyzer Settings
HP8595EM
CF: 5779.7MHz
SPAN:300kHz
RB 3kHz
VB 3kHz
Detector POS
Att 10
RL Offset 1.50
Sweep Time 100.0s
Ref Lvl:2.00DBM

Comments
Power Spectral Density
Channel 157 (5785
MHz), Power setting 18

Cursor 1 5779.58 -8.29
0.00 0.00

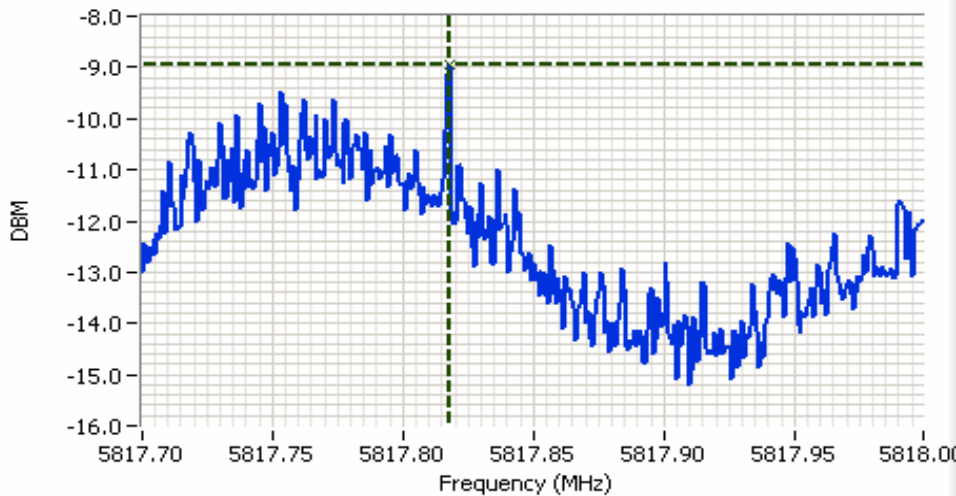
Delta Frequency 5779.58
Delta Amplitude 8.29





EMC Test Data

Client: Xirrus, Inc.	Job Number: J60437
Model: XS-3500 Access Point	T-Log Number: T61140
Contact: Ian Laity / Steve Smith	Account Manager: Susan Peizi
Spec: FCC 15.247, 15.401, RSS-210	Class: N/A



Analyzer Settings
HP8595EM

CF: 5817.9MHz
SPAN: 300kHz
RB 3kHz
VB 3kHz
Detector POS
Att 10
RL Offset 1.50
Sweep Time 100.0s
Ref Lvl: 2.00dBm

Comments
99% power bandwidth:
57.0MHz
Power over span:
3.46dBm

Cursor 1 5817.82 -8.96 [Icons]

 0.00 0.00 [Icons]





EMC Test Data

Client:	Xirrus, Inc.	Job Number:	J60437
Model:	XS-3500 Access Point	T-Log Number:	T61140
		Account Manager:	Susan Pezl
Contact:	Ian Laity / Steve Smith		
Spec:	FCC 15.247, 15.401, RSS-210	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: 8/1/2005	Config. Used: 1
Test Engineer: Chris Byleckie	Config Change: -
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:	27 °C
Rel. Humidity:	50 %

Summary of Results

Run #	Test Performed	Limit	Pass / Fail	Result / Margin
1	RE, 1000 - 40000 MHz - Spurious Emissions In Restricted Bands	FCC Part 15.209 / 15.247(c)	Pass	53.4dBµV/m (467.2µV/m) @ 11649.3MHz (-0.6dB)

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, Inc.	Job Number:	J60437
Model:	XS-3500 Access Point	T-Log Number:	T61140
Contact:	Ian Laity / Steve Smith	Account Manager:	Susan Peizl
Spec:	FCC 15.247, 15.401, RSS-210	Class:	N/A

EUT 1.5cm above groundplane
Run #1a: Radiated Spurious Emissions, 1000 - 4000 MHz. Low Channel @ 5745 MHz
Power setting 17

		H	V		
Fundamental emission level @ 3m in 1MHz RBW:		103.9	111.6	Peak	
Fundamental emission level @ 3m in 1MHz RBW:		94.69	102.9	Avg	

Frequency	Level	Pol	15.209 / 15.247		Detector	Azimuth	Height	Comments
MHz	dBµV/m	v/h	Limit	Margin	Pk/QP/Avg	degrees	meters	
11488.94	53.2	V	54.0	-0.8	AVG	97	1.0	Restricted Band
11489.32	51.2	H	54.0	-2.8	AVG	321	1.0	Restricted Band
11488.94	67.8	V	74.0	-6.2	PK	97	1.0	Restricted Band
11489.32	63.7	H	74.0	-10.4	PK	321	1.0	Restricted Band
17235.02	56.2	H	95.7	-39.5	PK	11	1.0	
17229.67	55.8	V	95.7	-39.9	PK	44	1.0	

EUT 80cm above groundplane

11488.53	51.6	V	54.0	-2.4	AVG	236	1.0	Restricted Band
11488.53	65.3	V	74.0	-8.7	PK	236	1.0	Restricted Band

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.

Run #1b: Radiated Spurious Emissions, 1000 - 40000 MHz. Center Channel @ 5785 MHz
Power setting 18

Frequency	Level	Pol	15.209 / 15.247		Detector	Azimuth	Height	Comments
MHz	dBµV/m	v/h	Limit	Margin	Pk/QP/Avg	degrees	meters	
11563.00	50.3	V	54.0	-3.8	AVG	97	1.0	Restricted Band
11566.33	46.5	H	54.0	-7.6	AVG	328	1.0	Restricted Band
17350.83	45.9	H	54.0	-8.1	AVG	37	1.0	
17353.94	44.4	V	54.0	-9.6	AVG	43	1.0	
11563.00	63.5	V	74.0	-10.5	PK	97	1.0	Restricted Band
11566.33	59.9	H	74.0	-14.1	PK	328	1.0	Restricted Band
17350.83	58.3	H	74.0	-15.7	PK	37	1.0	
17353.94	57.2	V	74.0	-16.8	PK	43	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, Inc.	Job Number:	J60437
Model:	XS-3500 Access Point	T-Log Number:	T61140
Contact:	Ian Laity / Steve Smith	Account Manager:	Susan Peizl
Spec:	FCC 15.247, 15.401, RSS-210	Class:	N/A

Run #1c: Radiated Spurious Emissions, 1000 - 40000 MHz. High Channel @ 5825 MHz
Power setting 18

Frequency	Level	Pol	15.209 / 15.247		Detector	Azimuth	Height	Comments
MHz	dB μ V/m	v/h	Limit	Margin	Pk/QP/Avg	degrees	meters	
11649.33	53.4	V	54.0	-0.6	AVG	84	1.0	Restricted Band
11649.27	46.3	H	54.0	-7.7	AVG	325	1.0	Restricted Band
11649.33	65.0	V	74.0	-9.0	PK	84	1.0	Restricted Band
17474.54	43.8	V	54.0	-10.2	AVG	37	1.3	
17473.64	43.6	H	54.0	-10.4	AVG	34	1.0	
11649.27	57.3	H	74.0	-16.7	PK	325	1.0	Restricted Band
17473.64	56.8	H	74.0	-17.3	PK	34	1.0	
17474.54	55.9	V	74.0	-18.1	PK	37	1.3	

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, Inc.	Job Number:	J60437
Model:	XS-3500 Access Point	T-Log Number:	T61140
		Account Manager:	Susan Pezl
Contact:	Ian Laity / Steve Smith		
Spec:	FCC 15.247, 15.401, RSS-210	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: 8/1/2005	Config. Used: 1
Test Engineer: Chris Byleckie/Rafael	Config Change: -
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.

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:	17 °C
Rel. Humidity:	84 %

Summary of Results

Run #	Test Performed	Limit	Pass / Fail	Result / Margin
1	RE, 1000 - 40000 MHz - Spurious Emissions In Restricted Bands	FCC Part 15.209 / 15.247(c)	Pass	53.6dBµV/m (477.5µV/m) @ 11651.7MHz (-0.4dB)

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: J60437
Model: XS-3500 Access Point	T-Log Number: T61140
Contact: Ian Laity / Steve Smith	Account Manager: Susan Peizl
Spec: FCC 15.247, 15.401, RSS-210	Class: N/A

EUT 1.5m above groundplane

Run #1a: Radiated Spurious Emissions, 1000 - 4000 MHz. Low Channel @ 5745 MHz

Power setting 13

	H	V	
Fundamental emission level @ 3m in 1MHz RBW:	96.41	108.99	Peak
Fundamental emission level @ 3m in 1MHz RBW:	87.1	100.36	Avg

Frequency	Level	Pol	15.209 / 15.247		Detector	Azimuth	Height	Comments
MHz	dBμV/m	v/h	Limit	Margin	Pk/QP/Avg	degrees	meters	
11488.83	51.9	V	54.0	-2.1	AVG	208	1.1	
11489.55	46.3	H	54.0	-7.7	AVG	16	0.0	
11488.83	63.8	V	74.0	-10.2	PK	208	1.1	
11489.55	58.3	H	74.0	-15.7	PK	16	0.0	
17233.71	43.7	H	-	-	AVG	356	1.0	Non-restricted
17233.71	55.1	H	-	-	PK	356	1.0	Non-restricted
17235.35	43.5	V	-	-	AVG	120	1.0	Non-restricted
17235.35	55.1	V	-	-	PK	120	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 20 dB below the level of the fundamental.

Run #1b: Radiated Spurious Emissions, 1000 - 40000 MHz. Center Channel @ 5785 MHz

Power setting 16

Frequency	Level	Pol	15.209 / 15.247		Detector	Azimuth	Height	Comments
MHz	dBμV/m	v/h	Limit	Margin	Pk/QP/Avg	degrees	meters	
11570.42	52.3	V	54.0	-1.7	AVG	180	1.0	
11569.47	48.9	H	54.0	-5.1	AVG	299	1.0	
11570.42	65.6	V	74.0	-8.4	PK	180	1.0	
11569.47	61.9	H	74.0	-12.1	PK	299	1.0	
17353.53	45.0	H	-	-	AVG	83	1.0	Non-restricted
17353.53	56.9	H	-	-	PK	83	1.0	Non-restricted
17354.95	46.1	V	-	-	AVG	300	1.0	Non-restricted
17354.95	57.9	V	-	-	PK	300	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, Inc.	Job Number:	J60437
Model:	XS-3500 Access Point	T-Log Number:	T61140
		Account Manager:	Susan Peizl
Contact:	Ian Laity / Steve Smith		
Spec:	FCC 15.247, 15.401, RSS-210	Class:	N/A

Run #1c: Radiated Spurious Emissions, 1000 - 40000 MHz. High Channel @ 5825 MHz
Power setting 18

Frequency MHz	Level dB μ V/m	Pol v/h	15.209 / 15.247		Detector Pk/QP/Avg	Azimuth degrees	Height meters	Comments
			Limit	Margin				
11651.72	53.6	V	54.0	-0.4	AVG	291	1.1	
11649.45	47.9	H	54.0	-6.1	AVG	13	0.0	
11651.72	67.2	V	74.0	-6.8	PK	291	1.1	
11649.45	60.5	H	74.0	-13.5	PK	13	0.0	
17474.88	46.7	H	-	-	AVG	304	1.0	
17474.88	58.6	H	-	-	PK	304	1.0	
17475.98	49.1	V	-	-	AVG	298	1.0	
17475.98	61.1	V	-	-	PK	298	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.

EXHIBIT 3: Test Configuration Photographs

3 Pages

EXHIBIT 4: Proposed FCC ID Label & Label Location

**EXHIBIT 5: Detailed Photographs
of Xirrus, Inc. Model XS-3500 Construction**

Pages

**EXHIBIT 6: Operator's Manual
for Xirrus, Inc. Model XS-3500**

Pages

**EXHIBIT 7: Block Diagram
of Xirrus, Inc. Model XS-3500**

Pages

**EXHIBIT 8: Schematic Diagrams
for Xirrus, Inc. Model XS-3500**

Pages

**EXHIBIT 9: Theory of Operation
for Xirrus, Inc. Model XS-3500**

Pages

EXHIBIT 10: RF Exposure Information

Pages