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Electromagnetic Emissions Test Report
Application for Grant of Equipment Authorization
pursuant to
FCC Part 15, Subpart E
on the
Xirrus, Inc.
Transmitter
Model: XN4

UPN:	5428A-XN4
FCC ID:	SK6XN4
GRANTEE:	Xirrus, Inc. 2101 Corporate Center Dr. Newbury Park, CA 91320
TEST SITE(S):	Elliott Laboratories 684 W. Maude Ave Sunnyvale, CA 94086 IC Site Registration #: IC 2845-1; IC 2845-2
REPORT DATE:	January 21, 2009
REISSUE DATE:	December 15, 2009
FINAL TEST DATE:	October 24, through November 11, 2008, January 7 and November 3 through November 13, 2009
AUTHORIZED SIGNATORY:	Mark Briggs Staff Engineer

ACCREDITED

Testing Cert #2016-01

REVISION HISTORY

Rev #	Date	Comments	Modified By
1	Feb 6, 2009	First Release	Briggs
2	March 13, 2009	Added test data for the 5250-5350MHz and 5470-5725 MHz bands (original report only covered 5150-5250MHz operation.	Briggs
3	April 7, 2009	Corrected power detailed in table for 802.11n mode in the 5470-5725 MHz band for 5600MHz Chain C to reflect power detailed in the plot. This also affected the total power for that channel and the maximum power for 802.11n 20MHz mode in that band. Added comments about power plots showing the average signal level to be below -30dBm at the 5725 MHz band edge and, therefore, below -27dBm eirp. Updated the number of pages listed for the rf port test data to account for these new plots. Replaced the plots for output power for dual chain 802.11a modes for the 5250-5350 MHz and 5150-5250 MHz bands with the correct plots for the highest output power.	Briggs
4	December 15, 2009	Reissued after release of the FCC's interim policies for use of the 5470-5725 MHz band which required additional test data to support removal of operating on channels falling inside the 5600-5650 MHz sub-band. All results tables updated. Data for channels falling inside the 5600-5650Mhz ban was removed and replaced with data for a channel in the middle of the 5470-5725 MHz band but outside the 5600-5650 MHz band. Data showing compliance with -20dBc in the 5600 – 5650 MHz sub-band for the channels in each operating mode closest (above and below) to the sub-band. Removed receiver spurious emissions test data and removed RSS 210 from the scope of the test report.	Briggs

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SCOPE

An electromagnetic emissions test has been performed on the Xirrus, Inc. model XN4 pursuant to FCC Part 15, Subpart E requirements for UNII Devices (using FCC DA 02-2138, August 30, 2002), as modified by the FCC's interim policy detailed in the FCC Knowledge Database Publication Number 443999 released on 10/05/2009.

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

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

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

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

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

The test results recorded herein are based on a single type test of the Xirrus, Inc. model XN4 and therefore apply only to the tested sample. The sample was selected and prepared by Steve Smith of Xirrus, Inc.

OBJECTIVE

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

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

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

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

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

STATEMENT OF COMPLIANCE

The tested sample of Xirrus, Inc. model XN4 complied with the requirements of FCC Part 15, Subpart E requirements for UNII Devices.

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

TEST RESULTS SUMMARY

UNII / LELAN DEVICES

Operation in the 5.15 – 5.25 GHz Band

FCC Rule Part	RSS Rule Part	Description	Measured Value / Comments	Limit / Requirement	Result
15.407(e)		Indoor operation only	Refer to user's manual	Device shall be designed for indoor use only	Complies
15.407 (a) (1)	A9.2(1)	Output Power	**Single radio** a: 16.2 dBm a2x: 16.1dBm n20: 16.6dBm n40: 16.3dBm **4x radio** a2x: 16.6dBm **2x radio** n40: 16.7dBm 0.047 Watts	17dBm	Complies
15.407 (a) (1)	-	Power Spectral Density	a: 3.7 dBm/MHz a2x: 3.6dBm/MHz n20: 3.9 dBm/MHz n40: 0.6 dBm/MHz	4 dBm/MHz	Complies
-	A9.5 (2)			5 dBm/MHz	Complies
Output power is detailed for a single radio operating in the 5150-5250 MHz band and also for multiple radios operating in the band. A maximum of four radios using 20MHz channels or two radios using 40MHz channels can operate in the band (the device does not allow two radios to operate on overlapping channels). When multiple radios are operational in the band the maximum output power per radio is reduced by 10log(n) where n is the number of radios in the band. The maximum power is detailed for a single radio for each mode (802.11a, 802.11a 2x2 MIMO, 802.11n 20MHz and 802.11n 40 MHz. The maximum output power across the band for 40MHz and 20MHz channels is also provided.					

Operation in the 5.25 – 5.35 GHz Band

FCC Rule Part	RSS Rule Part	Description	Measured Value / Comments	Limit / Requirement	Result (margin)
15.407(a) (2)	A9.2(2)	Output Power	**Single radio** a: 18.3 dBm a2x: 21.3 Bm n20: 20.9 dBm n40: 22.8 dBm **4x radio** a2x: 23.9 dBm 0.245 Watts	24 dBm / 250mW (eirp < 30dBm)	Complies
15.407(a) (2))		Power Spectral Density	a: 5.7 dBm/MHz a2x: 8.8 dBm/MHz n20: 8.2 dBm/MHz n40: 4.4 dBm/MHz	11 dBm/MHz	Complies
	A9.2(2) / A9.5 (2)			11 dBm / MHz (Shall not exceed the average value by more than 3dB)	Complies
					Complies
Output power is detailed for a single radio operating in the 5250-5350 MHz band and also for multiple radios operating in the band. A maximum of four radios using 20MHz channels or two radios using 40MHz channels can operate in the band (the device does not allow two radios to operate on overlapping channels). When multiple radios are operational in the band the maximum output power per radio is reduced by 10log(n) where n is the number of radios in the band. The maximum power is detailed for a single radio for each mode (802.11a, 802.11a 2x2 MIMO, 802.11n 20MHz and 802.11n 40 MHz. The maximum output power across the band for 40MHz and 20MMz channels is also provided.					

Operation in the 5.47 – 5.725 GHz Band

FCC Rule Part	RSS Rule Part	Description	Measured Value / Comments	Limit / Requirement	Result (margin)
15.407(a) (2)	A9.2(2)	Output Power	**Single radio** a: 19.0 dBm a2x: 20.9 dBm n20: 21.0 dBm n40: 21.1 dBm **4x radio** **A 2x: 24.0 dBm** 0.25 Watts	24 dBm / 250mW (eirp < 30dBm)	Complies
15.407(a) (2))		Power Spectral Density	a: 7.8 dBm/MHz a2x: 8.3dBm/MHz n20: 8.3 dBm/MHz n40: 7.9 dBm/MHz	11 dBm/MHz	Complies
	A9.2(2) / A9.5 (2)			11 dBm / MHz (Shall not exceed the average value by more than 3dB)	Complies
					Complies
KDB 443999		Non-operation in 5600 – 5650 MHz sub band	Device cannot operate in the 5600 – 5650 MHz band.	Refer to manufacturer's attestation.	Complies
			20dB bandwidth of any channels shall not fall inside the 5600-5650 MHz sub-band.	20dB bandwidth below 5591.3 MHz and above 5650.16 MHz	
KDB 443999		Indoor use only	Device is not designed to be installed outdoors. User's manual has been updated to explicitly require indoor installation.		Complies

Output power is detailed for a single radio operating in the 5470-5725 MHz band and also for multiple radios operating in the band. All four radios can operate in the band using either 20MHz or 40MHz channels (the device does not allow two radios to operate on the same/overlapping channels). When multiple radios are operational in the band the maximum output power per radio is reduced by 10log(n) where n is the number of radios in the band.
The maximum power is detailed for a single radio for each mode (802.11a, 802.11a 2x2 MIMO, 802.11n 20MHz and 802.11n 40 MHz. The maximum output power across the band for 40MHz and 20MHz channels is also provided.

General Requirements for all NII bands

FCC Rule Part	RSS Rule Part	Description	Measured Value / Comments	Limit / Requirement	Result
15.401	A9.5a	Modulation	Digital Modulation is used (OFDM)	Digital modulation is required	Complies
15.407(a) (1)	-	26dB Bandwidth (minimum)	a: 21.4 MHz a2x: 21.2 MHz n20: 22.1MHz n40: 40.3MHz	N/A – limits output power if < 20MHz	N/A
15.407(b) (5) / 15.209	A9.3	Spurious Emissions below 1GHz	No emissions related to transmitter/receiver below 1GHz. Digital device tested against FCC / ICES 003 Class B limits		
15.407(b) (2)	A9.3	Spurious Emissions above 1GHz	53.9dBµV/m (495.5µV/m) @ 5350.0MHz	Refer to SPURIOUS LIMITS –UNII and LELAN DEVICES	Complies (-0.1dB)
15.407(a)(6)	-	Peak Excursion Ratio	12.97 dB N40, 5310 MHz	< 13dB	Complies
15.407 (c)	A9.5(4)	Operation in the absence of information to transmit	Operation is discontinued in the absence of information (Operational Description p16)	Device shall automatically discontinue operation in the absence of information to transmit	Complies
15.407 (g)	A9.5 (5)	Frequency Stability	Frequency stability is better than 10ppm Operational Description p 16)		Complies
15.407 (h1)	A9.4	Transmit Power Control	Transmit power control is available and can be set manually and through the 802.11h protocol. Refer to operational description	The U-NII device shall have the capability to operate with a mean EIRP value lower than 24dBm (250mW)	Complies
15.407 (h2)	A9.4	Dynamic frequency Selection (device with radar detection)	Refer to Elliott Test report R74742		

GENERAL REQUIREMENTS APPLICABLE TO ALL BANDS

FCC Rule Part	RSS Rule part	Description	Measured Value / Comments	Limit / Requirement	Result (margin)
15.203	-	RF Connector	Internal antennas are integral to the device. External antenna connects using reverse TNC	Unique connector or integral antenna	Complies
15.207	RSS GEN Table 2	AC Conducted Emissions	41.3dBµV @ 2.972MHz	Refer to standard	Complies (- 4.7 dB)
15.247 (b) (5) 15.407 (f)	RSS 102	RF Exposure Requirements	Refer to MPE calculations in Exhibit 11 and User Manual statements (page 434).	Refer to OET 65, FCC Part 1 and RSS 102	Complies

MEASUREMENT UNCERTAINTIES

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

Measurement Type	Frequency Range (MHz)	Calculated Uncertainty (dB)
Conducted Emissions	0.15 to 30	± 2.4
Radiated Emissions	0.015 to 30	± 3.0
Radiated Emissions	30 to 1000	± 3.6
Radiated Emissions	1000 to 40000	± 6.0

EQUIPMENT UNDER TEST (EUT) DETAILS

GENERAL

The Xirrus, Inc. model XN4 is a multi-radio 802.11abgn Access Point radio which is designed to act as a hub for a wireless local area network (WLAN). The device contains 4 individual 802.11abgn radios supporting legacy mode and 3x3n modes in the 2.4GHz band and legacy and 2x2n modes in the 5 GHz bands. All four radios use internal antennas, with one radio also having the option to use an external antenna (the external antenna only supports legacy mode operation, no MIMO modes). The XN4 is powered via a proprietary PoE connection.

Normally, the EUT's would be ceiling mounted during operation. Preliminary measurements were made with the EUT tested as table-top equipment and also at a height of 1.5m above the ground plane. No significant difference in emissions was observed so formal tests were performed as table-top equipment

The sample was received on October 23, 2008 and tested on October 24, November 3, November 4, November 5, November 6, November 7, November 10 and November 11, 2008. Conducted emissions measurements were made on January 7, 2009. The EUT consisted of the following component(s):

Company	Model	Description	Serial Number	FCC ID
Xirrus	XN4	802.11abgn access point	Prototype	SK6XN4
PhiHong	P73800202A1	PoE Injector	POE60U-560(G)-SS-R	N/A

The sample was returned on October 30, 2009 and tested between November 3, and November 13, 2009. The purpose of these tests was to evaluate the compliance with the FCC's interim policy for devices operating in the 5470-5725 MHz band.

ANTENNA SYSTEM

Each of the radios connects to an internal antenna set configured for 3x3 MIMO operation in 2.4GHz bands and 2x2 MIMO operation in the 5GHz bands. Each internal antenna has a maximum gain of between 0 and 1dBi in the 2.4GHz band and 6dBi in the 5GHz bands.

One radio also has provision for connecting to a single external antenna to operate (typically) as a single-chain, receive-only radio. The external antenna connects to the EUT via a non-standard reverse TNC antenna connector, thereby meeting the requirements of FCC 15.203. The external antenna's maximum gain is 2.5dBi for all bands.

ENCLOSURE

The EUT enclosure is primarily constructed of plastic. It measures approximately 32 cm in diameter by 6 cm high.

MODIFICATIONS

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

SUPPORT EQUIPMENT

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

Company	Model	Description	Serial Number	FCC ID
IBM	Thinkpad R51	Laptop	-	-

No remote support equipment was used during 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)
PoE IN	Switch	Cat 5	Unshielded	10.0
PoE Out	Data& Power IN	Cat 5	Unshielded	1.0
AC Power	PoE	3 wire	Unshielded	1.5

Note: The service port was not connected during testing. The manufacturer stated that this is for setup purposes and therefore would not normally be connected.

EUT OPERATION

During testing the EUT was configured in either a transmit or a receive mode using ART software.

For transmit mode one or more of the four radios was configured to continuously transmit on a specific channel on one or more chains. Each radio could be configured for a single chain operation (legacy 802.11b, g or a modes) or for multi-chain (MIMO) operation (all modes). In receive mode one or more radios was configured in a receive only mode with all chains active.

When evaluating the external antenna only one radio was operating during testing. When evaluating the internal antennas the rf port and radiated band edge measurements were made with a single radio operational. Radiated spurious measurements were made with multiple radios active to allow for evaluating spurious emissions with radios active on top, bottom and center channels. This also allowed for evaluation of any inter-modulation products from the system (none were observed).

TEST SITE

GENERAL INFORMATION

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

Site	Registration Numbers		Location
	FCC	Canada	
SVOATS #1	90592	IC 2845-1	684 West Maude Ave, Sunnyvale CA 94085-3518
SVOATS #2	90593	IC 2845-2	

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

CONDUCTED EMISSIONS CONSIDERATIONS

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

RADIATED EMISSIONS CONSIDERATIONS

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

MEASUREMENT INSTRUMENTATION

RECEIVER SYSTEM

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

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

INSTRUMENT CONTROL COMPUTER

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

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

LINE IMPEDANCE STABILIZATION NETWORK (LISN)

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

FILTERS/ATTENUATORS

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

ANTENNAS

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

ANTENNA MAST AND EQUIPMENT TURNTABLE

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

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

INSTRUMENT CALIBRATION

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

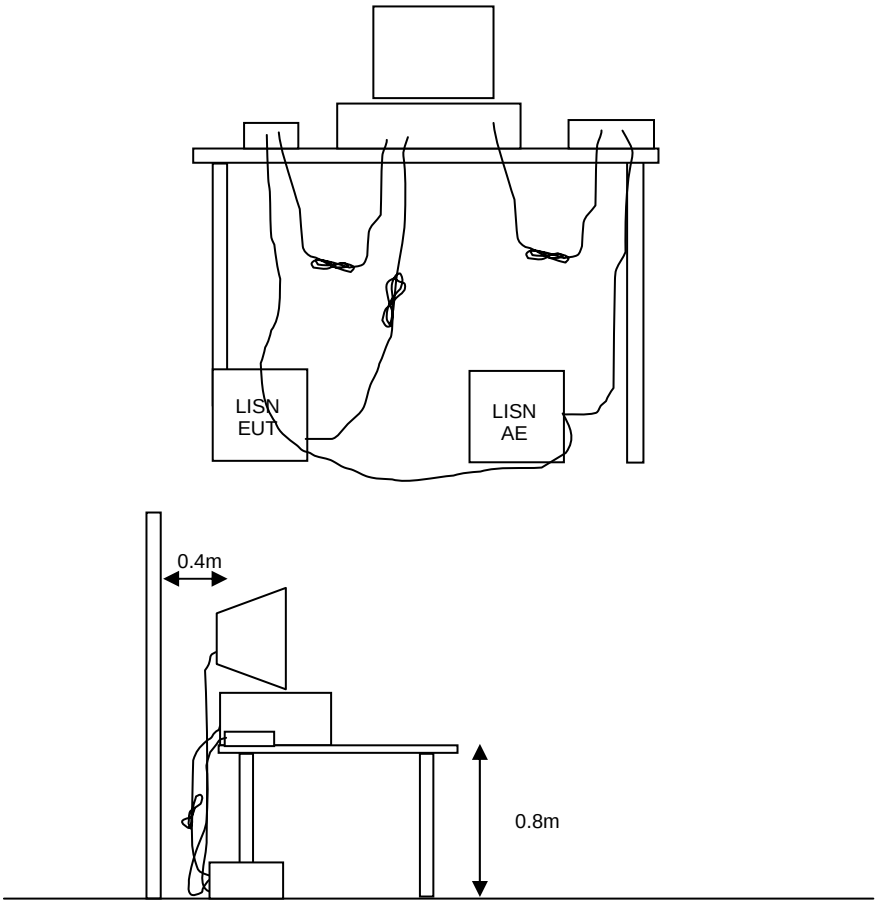
TEST PROCEDURES

EUT AND CABLE PLACEMENT

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

CONDUCTED EMISSIONS

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



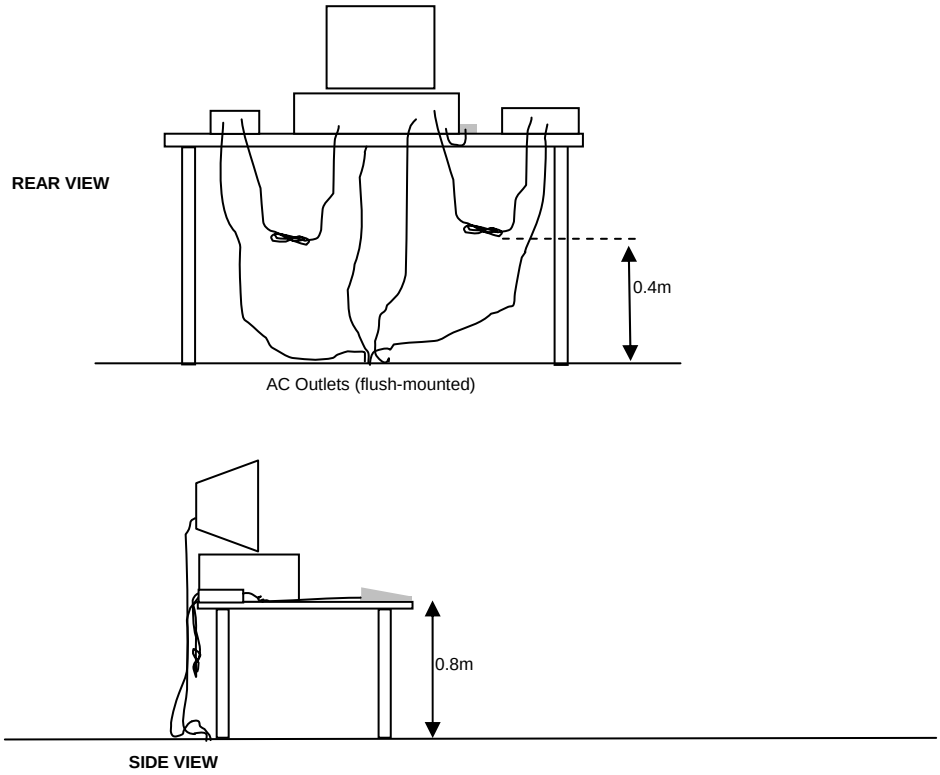
RADIATED EMISSIONS

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

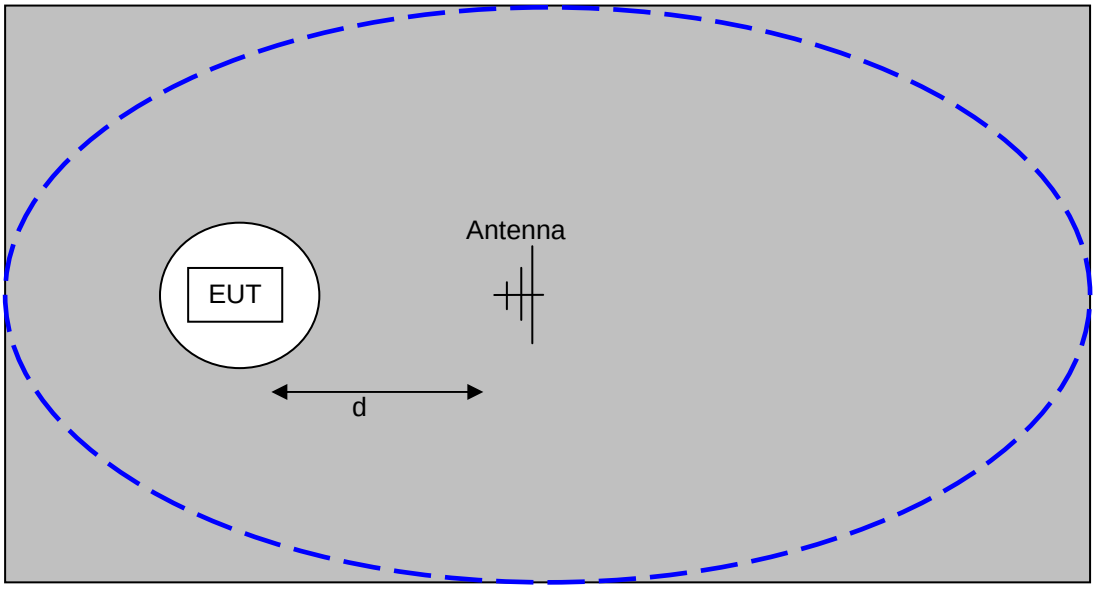
A speaker is provided in the receiver to aid in discriminating between EUT and ambient emissions. Other methods used during the preliminary scan for EUT emissions involve scanning with near field magnetic loops, monitoring I/O cables with RF current clamps, and cycling power to the EUT.

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

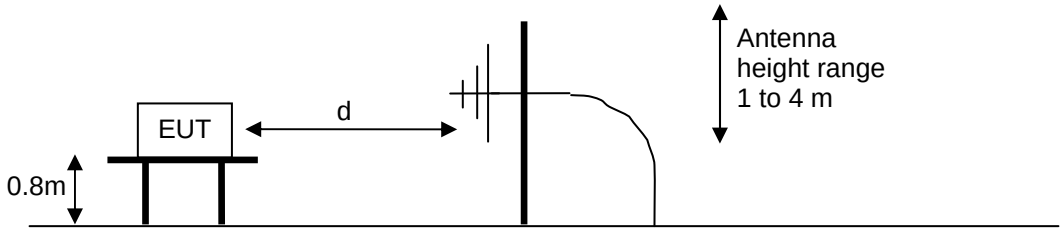
When testing above 18 GHz, the receive antenna is located at 1meter from the EUT and the antenna height is restricted to a maximum of 2.5 meters.



Typical Test Configuration for Radiated Field Strength Measurements



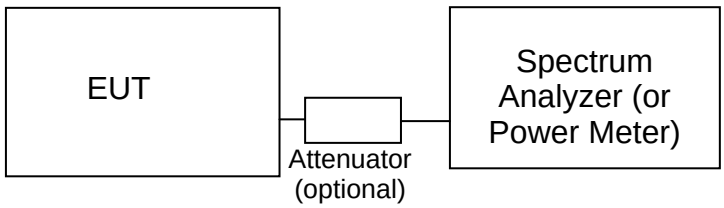
The ground plane extends beyond the ellipse defined in CISPR 16 / CISPR 22 / ANSI C63.4 and is large enough to accommodate test distances (d) of 3m and 10m. Refer to the test data tables for the actual measurement distance.



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

CONDUCTED EMISSIONS FROM ANTENNA PORT

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



Test Configuration for Antenna Port Measurements

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

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

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

BANDWIDTH MEASUREMENTS

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

SPECIFICATION LIMITS AND SAMPLE CALCULATIONS

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

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

GENERAL TRANSMITTER RADIATED EMISSIONS SPECIFICATION LIMITS

The table below shows the limits for the spurious emissions from transmitters that fall in restricted bands[1] (with the exception of transmitters operating under FCC Part 15 Subpart D and RSS 210 Annex 9), the limits for all emissions from a low power device operating under the general rules of RSS 310 (tables 3 and 4), RSS 210 (table 2) and FCC Part 15 Subpart C section 15.209.

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

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

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

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

The peak excursion envelope is limited to 13dB.

OUTPUT POWER LIMITS –LELAN DEVICES

The table below shows the limits for output power and output power density defined by RSS 210. Where the signal bandwidth is less than 20 MHz the maximum output power is reduced to the power spectral density limit plus 10 times the log of the bandwidth (in MHz).

Operating Frequency (MHz)	Output Power	Power Spectral Density
5150 - 5250	200mW (23 dBm) eirp	10 dBm/MHz eirp
5250 - 5350	250 mW (24 dBm)[1] 1W (30dBm) eirp	11 dBm/MHz
5470 - 5725	250 mW (24 dBm)[2] 1W (30dBm) eirp	11 dBm/MHz
5725 – 5825	1 Watts (30 dBm) 4W eirp	17 dBm/MHz

In addition, the power spectral density limit shall be reduced by 1dB for every dB the highest power spectral density exceeds the "average" power spectral density) by more than 3dB. The "average" power spectral density is determined by dividing the output power by 10log(EBW) where EBW is the 99% power bandwidth.

Fixed point-to-point applications using the 5725 – 5825 MHz band may use antennas with gains of up to 23dBi without this limitation. If the gain exceeds 23dBi then the output power limit of 1 Watt is reduced by 1dB for every dB the gain exceeds 23dBi.

SPURIOUS LIMITS –UNII and LELAN DEVICES

The spurious emissions limits for signals below 1GHz are the FCC/RSS-GEN general limits. For emissions above 1GHz, signals in restricted bands are subject to the FCC/RSS GEN general limits. All other signals have a limit of –27dBm/MHz, which is a field strength of 68.3dBuV/m/MHz at a distance of 3m. This is an average limit so the peak value of the emission may not exceed –7dBm/MHz (68.3dBuV/m/MHz at a distance of 3m). For devices operating in the 5725-5850Mhz bands under the LELAN/UNII rules, the limit within 10MHz of the allocated band is increased to –17dBm/MHz.

[1] If EIRP exceeds 500mW the device must employ TPC
[2] If EIRP exceeds 500mW the device must employ TPC

SAMPLE CALCULATIONS - CONDUCTED EMISSIONS

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

$$R_r - S = M$$

where:

R_r = Receiver Reading in dBuV

S = Specification Limit in dBuV

M = Margin to Specification in +/- dB

SAMPLE CALCULATIONS - RADIATED EMISSIONS

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

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

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

where:

F_d = Distance Factor in dB

D_m = Measurement Distance in meters

D_s = Specification Distance in meters

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

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

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

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

$$R_c = R_r + F_d$$

and

$$M = R_c - L_s$$

where:

R_r = Receiver Reading in dBuV/m

F_d = Distance Factor in dB

R_c = Corrected Reading in dBuV/m

L_s = Specification Limit in dBuV/m

M = Margin in dB Relative to Spec

EXHIBIT 1: Test Equipment Calibration Data

2 Pages

Radiated Emissions, 30 - 40,000 MHz, 24-Oct-08
Engineer: Mehran Birgani

Manufacturer	Description	Model #	Asset #	Cal Due
Hewlett Packard	Microwave Preamplifier, 1-26.5GHz	8449B	870	09-Oct-09
EMCO	Antenna, Horn, 1-18 GHz	3115	1561	10-Jun-10
Hewlett Packard	SpecAn 9 kHz - 40 GHz, (SA40)	8564E	CH5273	24-Oct-08

Radiated Emissions, 30 - 18,000 MHz, 30-Oct-08 (Receiver Spurious)
Engineer: Mehran Birgani

Manufacturer	Description	Model #	Asset #	Cal Due
EMCO	Antenna, Horn, 1-18 GHz	3115	487	15-Jul-10
Hewlett Packard	Microwave Preamplifier, 1-26.5GHz	8449B	785	06-Jun-09
Hewlett Packard	SpecAn 30 Hz -40 GHz, SV (SA40) Red	8564E (84125C)	1148	24-Nov-08

Radiated Emissions, 1,000 - 40,000 MHz, 03-Nov-08
Engineer: Mehran Birgani

Manufacturer	Description	Model #	Asset #	Cal Due
EMCO	Antenna, Horn, 1-18 GHz	3115	487	15-Jul-10
Hewlett Packard	Microwave Preamplifier, 1-26.5GHz	8449B	785	06-Jun-09
Hewlett Packard	SpecAn 30 Hz -40 GHz, SV (SA40) Red	8564E (84125C)	1148	24-Nov-08

Radiated Emissions, 1000 - 40,000 MHz, 05-Nov-08
Engineer: Rafael Varelas

Manufacturer	Description	Model #	Asset #	Cal Due
EMCO	Antenna, Horn, 1-18 GHz	3115	487	15-Jul-10
Hewlett Packard	Microwave Preamplifier, 1-26.5GHz	8449B	785	06-Jun-09
Hewlett Packard	SpecAn 30 Hz -40 GHz, SV (SA40) Red	8564E (84125C)	1148	24-Nov-08

Receiver Spurious Emissions, 14-Nov-08
Engineer: Suhaila Khushzad

Manufacturer	Description	Model #	Asset #	Cal Due
EMCO	Antenna, Horn, 1-18 GHz	3115	487	15-Jul-10
Hewlett Packard	Microwave Preamplifier, 1-26.5GHz	8449B	785	06-Jun-09
Hewlett Packard	SpecAn 30 Hz -40 GHz, SV (SA40) Red	8564E (84125C)	1148	24-Nov-08

Conducted Emissions - AC Power and Telecommunications Ports, 07-Jan-09
Engineer: Joseph Cadigal

Manufacturer	Description	Model #	Asset #	Cal Due
Hewlett Packard	SpecAn 9 KHz-26.5 GHz, Non-Program	8563E	284	29-Dec-09
Elliott Laboratories	LISN, FCC / CISPR	LISN-4, OATS	362	31-Jul-09
Fischer Custom Comm.	150-50 ohm adapter, 1/2, 0.15 to 80 MHz	FCC-801-150-50	873	03-Jun-09
Rohde & Schwarz	Test Receiver, 9 kHz-2750 MHz	ESCS 30	1337	02-Oct-09
Rohde& Schwarz	Pulse Limiter	ESH3 Z2	1398	12-Feb-09

Radio Antenna Port (Power and Spurious Emissions), 06-Nov-08 to 11-Nov-08
Engineer: Mehran Birgani

Manufacturer	Description	Model #	Asset #	Cal Due
Hewlett Packard	SpecAn 30 Hz -40 GHz, SV (SA40) Red	8564E (84125C)	1148	24-Nov-08

Radio Antenna Port (Power and Spurious Emissions), 06-Nov-08
Engineer: Mehran Birgani

Manufacturer	Description	Model #	Asset #	Cal Due
Hewlett Packard	SpecAn 30 Hz -40 GHz, SV (SA40) Red	8564E (84125C)	1148	24-Nov-08

Radio Antenna Port (Power and Spurious Emissions), 10-Nov-08
Engineer: Mehran Birgani

Manufacturer	Description	Model #	Asset #	Cal Due
Hewlett Packard	SpecAn 30 Hz -40 GHz, SV (SA40) Red	8564E (84125C)	1148	24-Nov-08

Radio Antenna Port (Power and Spurious Emissions), 11-Nov-08
Engineer: Mehran Birgani

Manufacturer	Description	Model #	Asset #	Cal Due
Hewlett Packard	SpecAn 30 Hz -40 GHz, SV (SA40) Red	8564E (84125C)	1148	24-Nov-08

Radio Antenna Port (Power and Spurious Emissions), 03-Nov-09
Engineer: Suhaila Khushzad

Manufacturer	Description	Model #	Asset #	Cal Due
Agilent	PSA, Spectrum Analyzer, (installed options, 111, 115, 123, 1DS, B7J, HYX,	E4446A	2139	30-Dec-09

Radiated Emissions, 30 - 18,000 MHz, 05-Nov-09
Engineer: Rafael Varelas

Manufacturer	Description	Model #	Asset #	Cal Due
EMCO	Antenna, Horn, 1-18 GHz	3115	487	15-Jul-10
Hewlett Packard	Microwave Preamplifier, 1-26.5GHz	8449B	870	19-Aug-10
Hewlett Packard	SpecAn 30 Hz -40 GHz, SV (SA40) Red	8564E (84125C)	1148	12-Mar-10
Micro-Tronics	Band Reject Filter, 5470-5725 MHz	BRC50704-02	1681	26-May-10

Radio Antenna Port (Power and Spurious Emissions), 10-Nov-09
Engineer: Suhaila Khushzad

Manufacturer	Description	Model #	Asset #	Cal Due
EMCO	Antenna, Horn, 1-18 GHz	3115	487	15-Jul-10
Hewlett Packard	Microwave Preamplifier, 1-26.5GHz	8449B	870	19-Aug-10
Hewlett Packard	SpecAn 30 Hz -40 GHz, SV (SA40) Red	8564E (84125C)	1148	12-Mar-10
Micro-Tronics	Band Reject Filter, 5470-5725 MHz	BRC50704-02	1681	26-May-10

EXHIBIT 2: Test Measurement Data

T73388 (RF Port measurements)	104 pages
T73389 (Transmitter radiated measurements)	38 pages
T77249 Radiated spurious and rf port measurements, center channels for each operating mode in the 5470-5725 MHz band	30 pages
T73385 (AC Conducted emissions measurements)	6 pages

Elliott An NTS company

EMC Test Data

Client:	Xirrus	Job Number:	J71484
Model:	XN4	T-Log Number:	T73388
		Account Manager:	Susan Pelzl
Contact:	Steve Smith		Mark Briggs
Emissions Standard(s):	FCC 15 E, RSS 210	Class:	NII
Immunity Standard(s):	-	Environment:	Wireless

NII RF Port Test Data

For The

Xirrus

Model

XN4

Date of Last Test: 11/11/2008

Client:	Xirrus	Job Number:	J71484
Model:	XN4	T-Log Number:	T73388
		Account Manager:	Susan Pelzl
Contact:	Steve Smith		
Standard:	FCC 15 E, RSS 210	Class:	N/A

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

Test Specific Details

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

Date of Test: 11/6/2008
Test Engineer: Mehran Birgani
Test Location: SV OATS #2

Config. Used: -
Config Change: Direct connection
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: 15-35 °C
Rel. Humidity: 10-60 %

Summary of Results

Run #	Test Performed	Limit	Pass / Fail	Result / Margin
1	Power, 5150 - 5250MHz	15.407(a) (1), (2)	Pass	Single radio: 16.2 dBm 4x radio: 16.3 dBm
1	PSD, 5150 - 5250MHz	15.407(a) (1), (2)	Pass	3.7 dBm/MHz
1	26dB Bandwidth	15.407	-	23.4 MHz
1	99% Bandwidth	RSS 210	-	17.2 MHz
2	Peak Excursion Envelope	15.407(a) (6)	Pass	11.9 dB
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.

Client:	Xirrus	Job Number:	J71484
Model:	XN4	T-Log Number:	T73388
		Account Manager:	Susan Pelzl
Contact:	Steve Smith		
Standard:	FCC 15 E, RSS 210	Class:	N/A

Run #1: Bandwidth, Output Power and Power spectral Density

Antenna gain used is for the internal antenna. The external antenna gain is lower (2.5dBi) and not used for MIMO modes.

Antenna Gain (dBi): 3.0

Power settings for a single radio operating in the band

Frequency (MHz)	Software Setting	Bandwidth		Output Power[1] dBm		Power (Watts)	PSD[2] dBm/MHz			Result
		26dB	99%[4]	Measured	Limit		Measured	FCC Limit	RSS Limit[3]	
5180	18.5	23.4	17.2	16.2	17.0	0.042	3.7	4.0	7.0	Pass
5200	18.0	21.5	17.2	15.9	17.0	0.039	3.5	4.0	7.0	Pass
5240	18.5	21.5	17.2	16.1	17.0	0.041	3.6	4.0	7.0	Pass

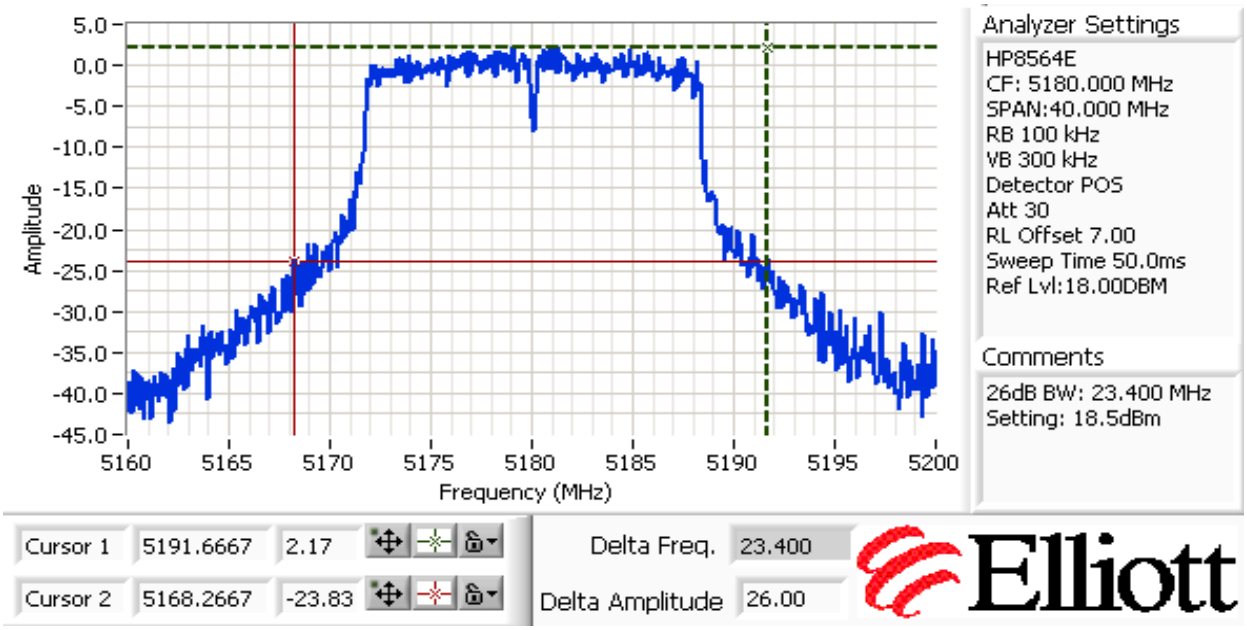
Power settings for all four channels being used in the band

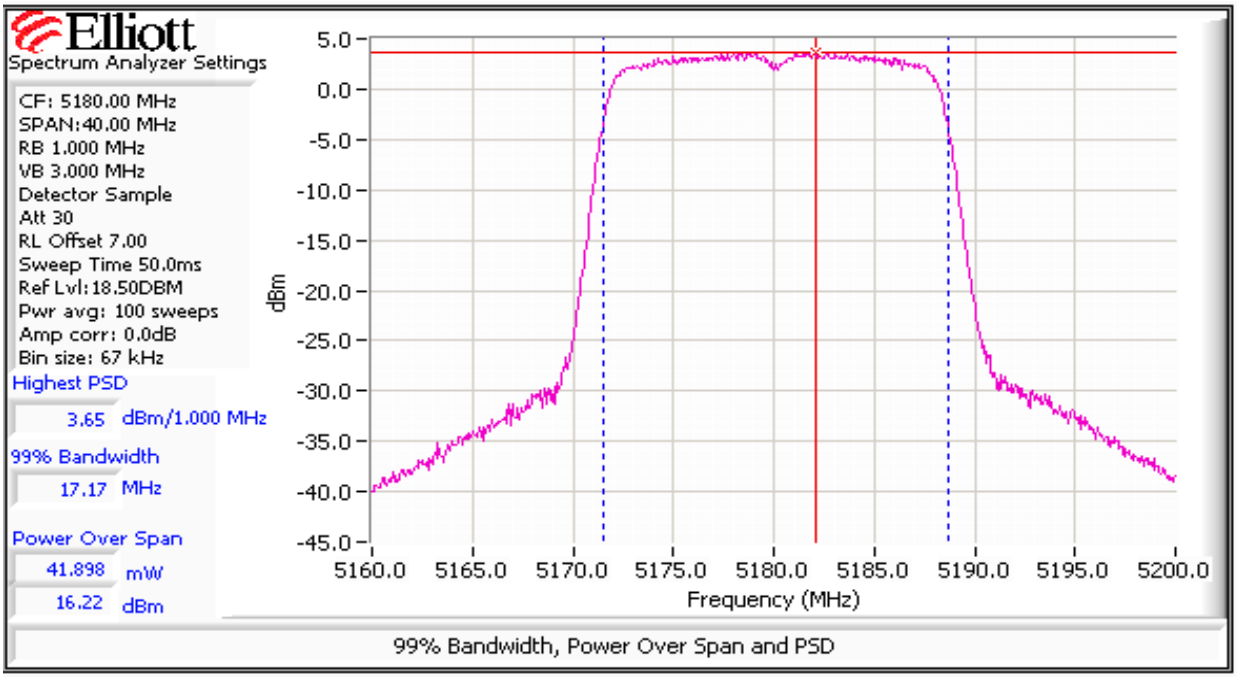
Output power measured on the centre channel to demonstrate power control is available to set the power to a level low enough to comply with limits when all four radios are operational in the band. Only power was measured - aggregation of PSD is not applicable as the device cannot have more than one radio operating on a channel.

Frequency (MHz)	Software Setting	Bandwidth		Measured Power[1]		
		26dB	99%[4]	dBm	mW	
5200	11.0	19.1	17.2	10.3	10.7	Limit
Total Power Across The Band				16.3	42.9	17 dBm

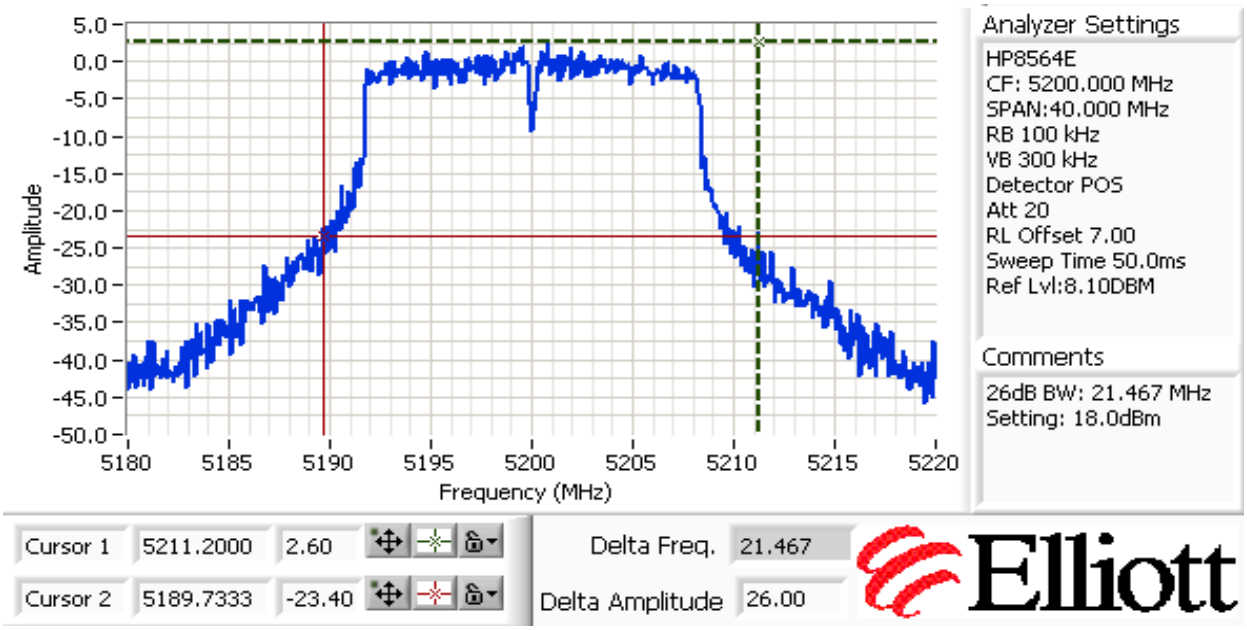
Note 1:	Output power measured using a spectrum analyzer (see plots below): RBW=1MHz, VB=3 MHz, sample detector, power averaging on (transmitted signal was continuous) and power integration over 40 MHz
Note 2:	Measured using the same analyzer settings used for output power.
Note 3:	For RSS-210 the limit for the 5150 - 5250 MHz band accounts for the antenna gain as the maximum eirp allowed is 10dBm/MHz. The limits are also corrected for instances where the highest measured value of the PSD exceeds the average PSD (calculated from the measured power divided by the measured 99% bandwidth) by more than 3dB by the amount that the measured value exceeds the average by more than 3dB.
Note 4:	99% Bandwidth measured in accordance with RSS GEN - RB > 1% of span and VB >=3xRB

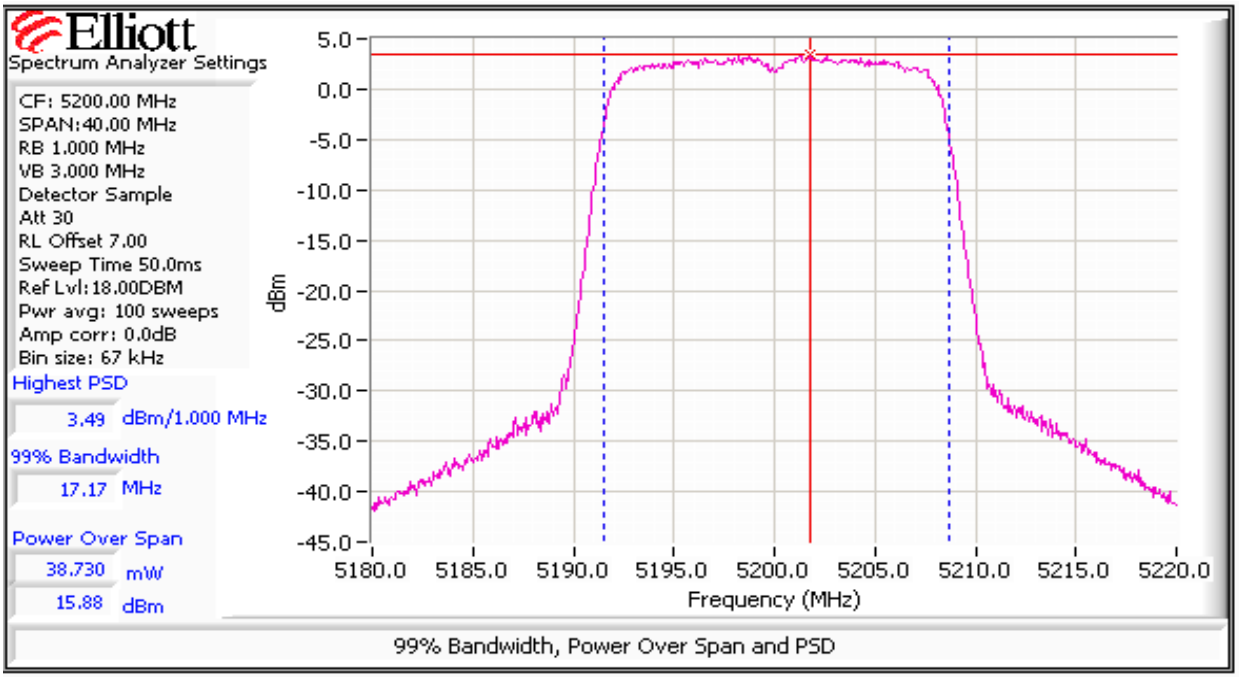
Client:	Xirrus	Job Number:	J71484
Model:	XN4	T-Log Number:	T73388
		Account Manager:	Susan Pelzl
Contact:	Steve Smith		
Standard:	FCC 15 E, RSS 210	Class:	N/A



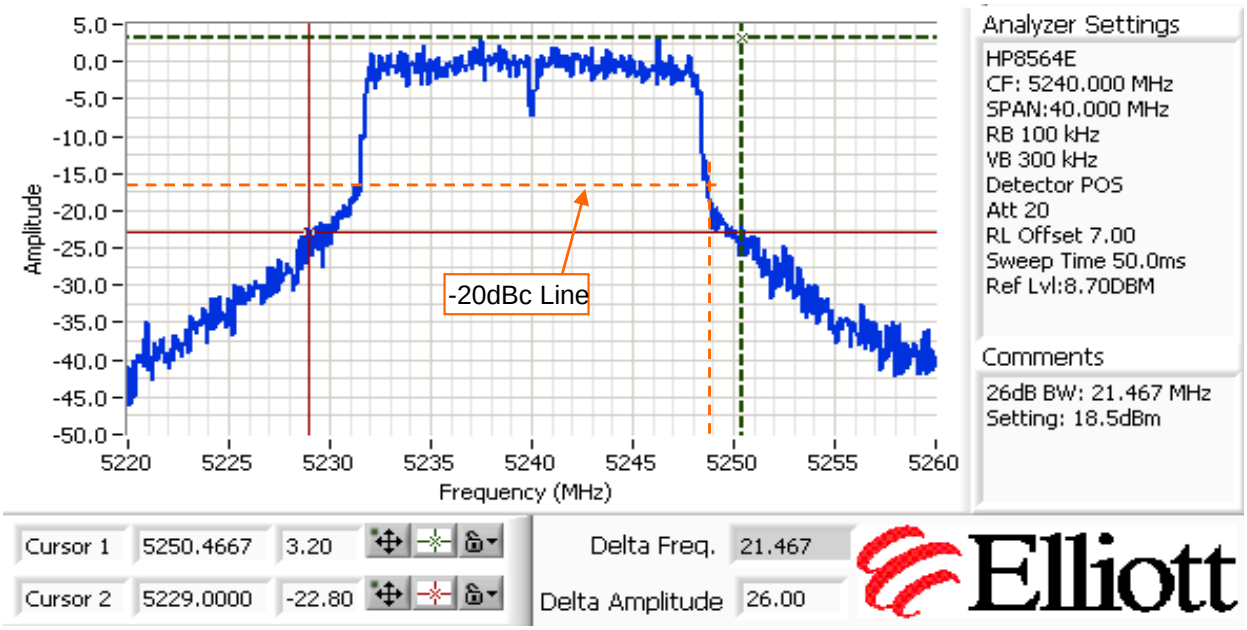


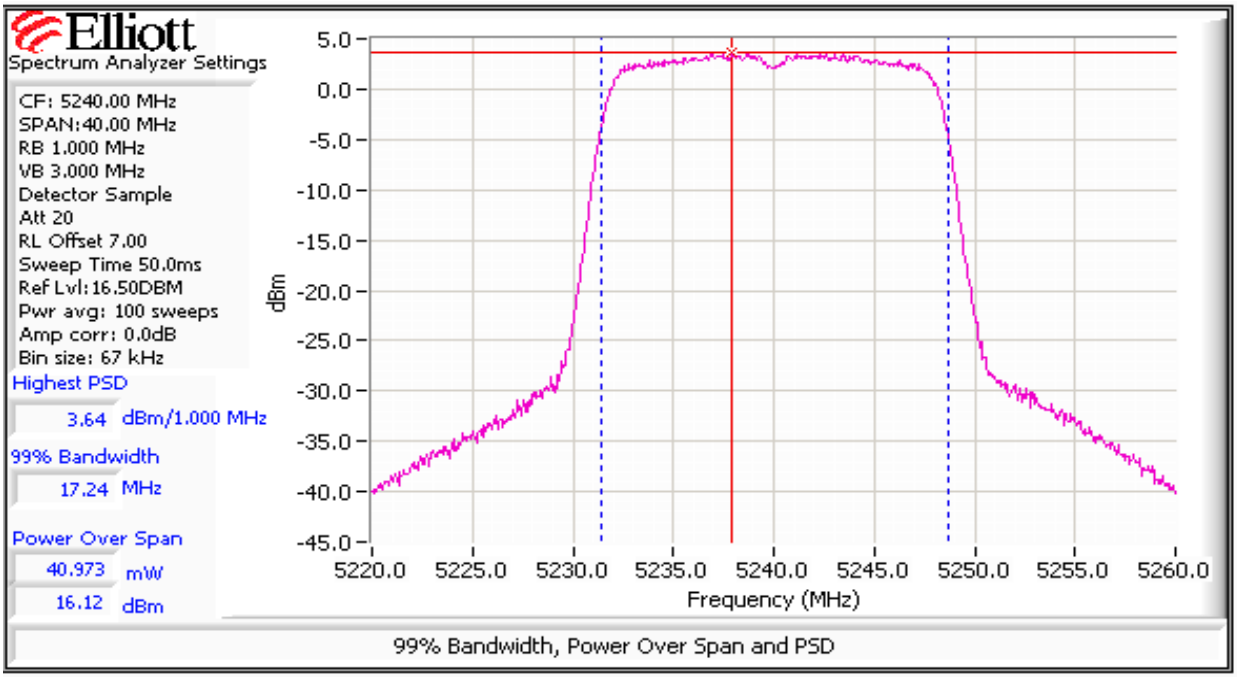
Client:	Xirrus	Job Number:	J71484
Model:	XN4	T-Log Number:	T73388
		Account Manager:	Susan Pelzl
Contact:	Steve Smith		
Standard:	FCC 15 E, RSS 210	Class:	N/A





Client:	Xirrus	Job Number:	J71484
Model:	XN4	T-Log Number:	T73388
		Account Manager:	Susan Pelzl
Contact:	Steve Smith		
Standard:	FCC 15 E, RSS 210	Class:	N/A





Client:	Xirrus	Job Number:	J71484
Model:	XN4	T-Log Number:	T73388
		Account Manager:	Susan Pelzl
Contact:	Steve Smith		
Standard:	FCC 15 E, RSS 210	Class:	N/A

Run #2: Peak Excursion Measurement

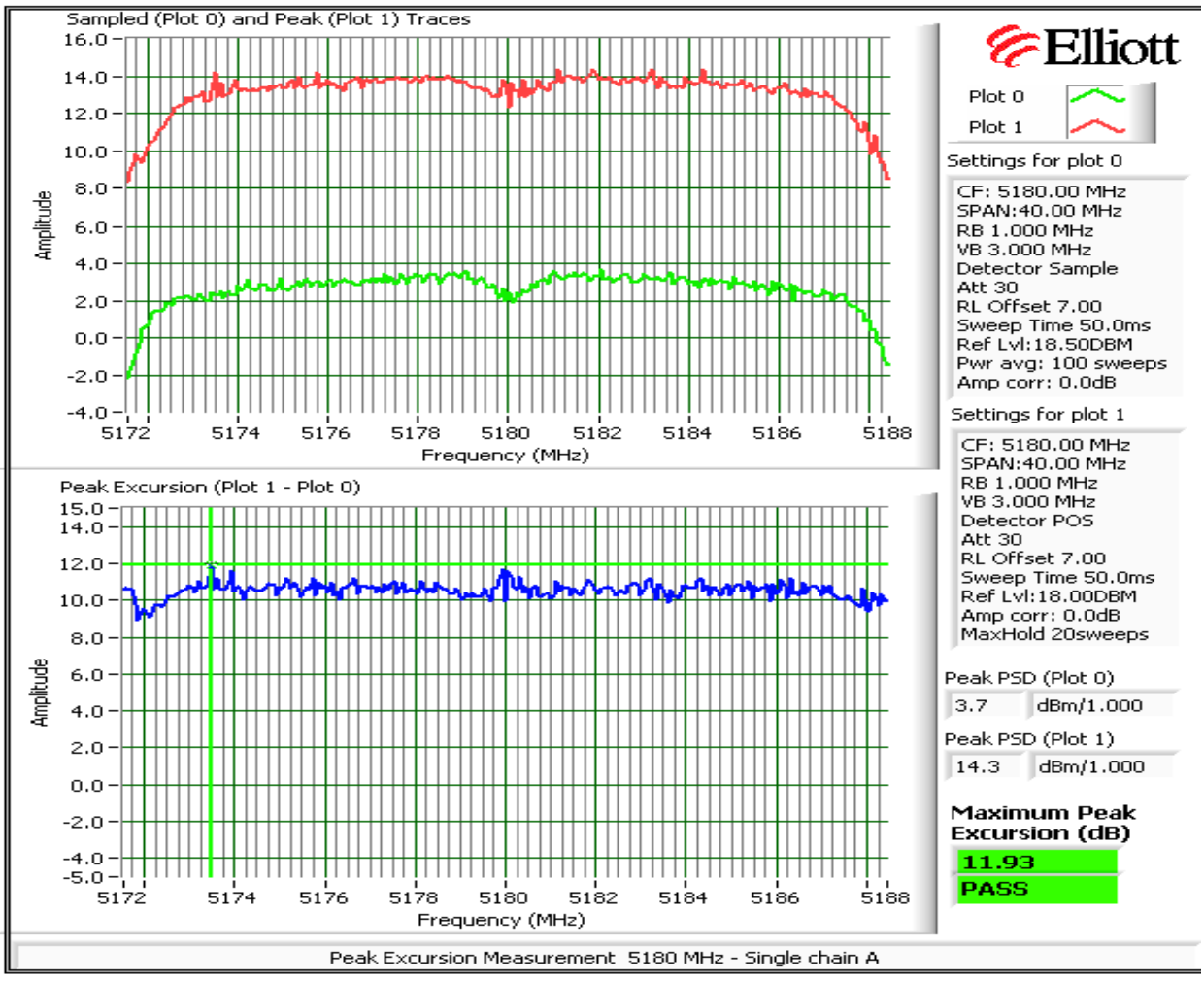
Device meets the requirement for the peak excursion

Freq	Peak Excursion(dB)		Freq	Peak Excursion(dB)		Freq	Peak Excursion(dB)	
(MHz)	Value	Limit	(MHz)	Value	Limit	(MHz)	Value	Limit
5180	11.9	13.0	5260		13.0	5500		13.0
5200	11.9	13.0	5300		13.0	5600		13.0
5240	11.8	13.0	5320		13.0	5700		13.0

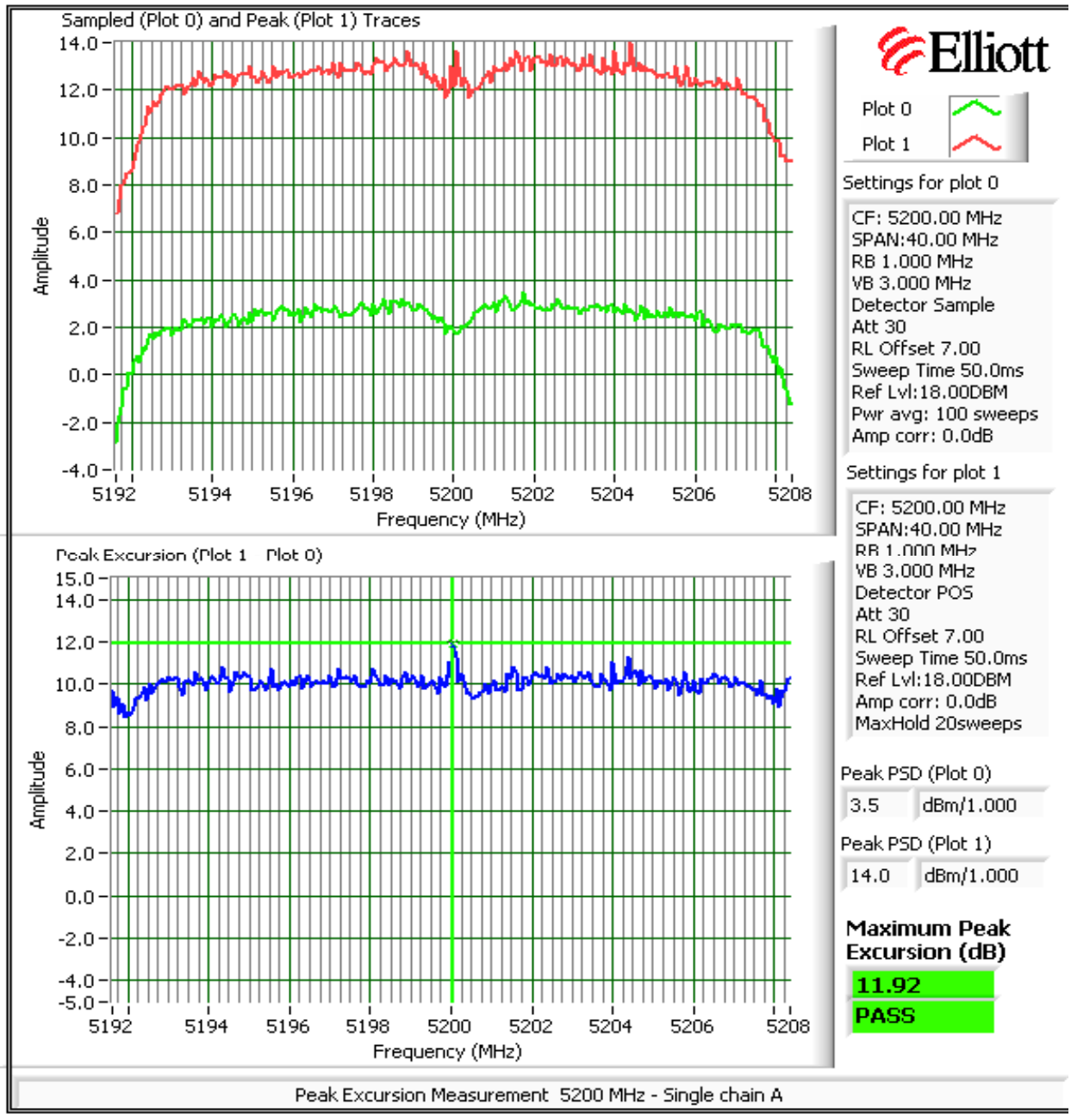
Plots Showing Peak Excursion

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

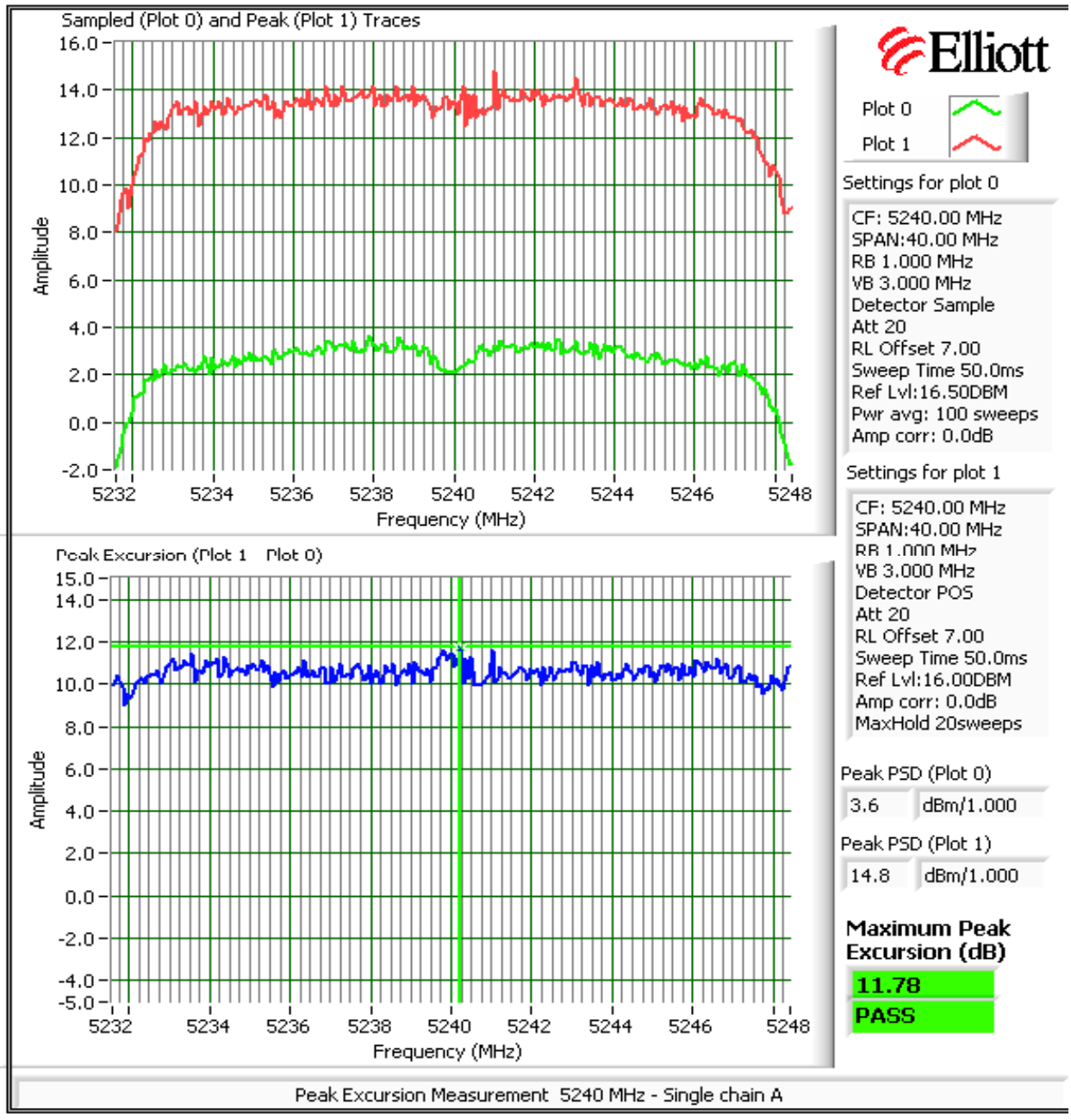
Trace B: RBW = 1 MHz, VBW = 3MHz, Integrated average power



Client:	Xirrus	Job Number:	J71484
Model:	XN4	T-Log Number:	T73388
		Account Manager:	Susan Pelzl
Contact:	Steve Smith		
Standard:	FCC 15 E, RSS 210	Class:	N/A



Client:	Xirrus	Job Number:	J71484
Model:	XN4	T-Log Number:	T73388
		Account Manager:	Susan Pelzl
Contact:	Steve Smith		
Standard:	FCC 15 E, RSS 210	Class:	N/A



Client:	Xirrus	Job Number:	J71484
Model:	XN4	T-Log Number:	T73388
		Account Manager:	Susan Pelzl
Contact:	Steve Smith		
Standard:	FCC 15 E, RSS 210	Class:	N/A

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

MIMO Devices: As the output power setting for the single chain mode is higher than the setting for dual chain, and by adjusting the limit for out of band spurious emissions to account for dual chain operation, the plots below cover both single- and dual chain operation.

Number of transmit chains:	2		
Maximum Antenna Gain:	6.0	dBi	(adjusted to assume two coherent data streams)
Spurious Limit:	-27.0	dBm/MHz eirp	
Adjustment for 2 chains:	-6.0	dB	adjustment for multiple chains and coherency between chains.
Limit Used On Plots [Note 1]:	-39.0	dBm/MHz	Average Limit (RB=1MHz, VB=10Hz)
	-19.0	dBm/MHz	Peak Limit (RB=VB=1MHz)

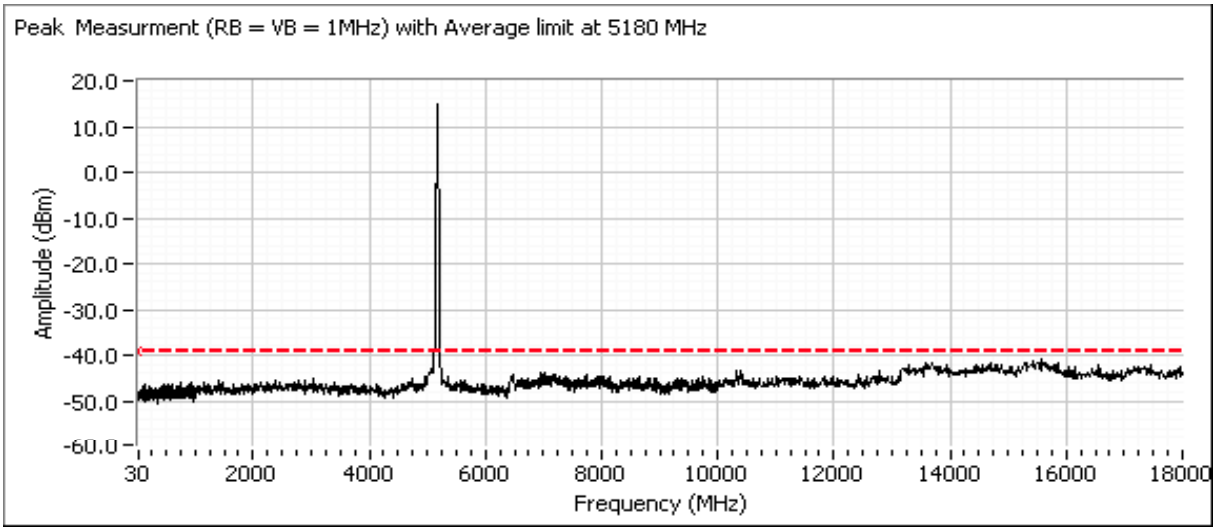
Note 1:	The -27dBm/MHz limit is an eirp limit. The limit for antenna port conducted measurements is adjusted to take into consideration the maximum antenna gain (limit = -27dBm - antenna gain). Radiated field strength measurements for signals more than 50MHz from the bands and that are close to the limit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

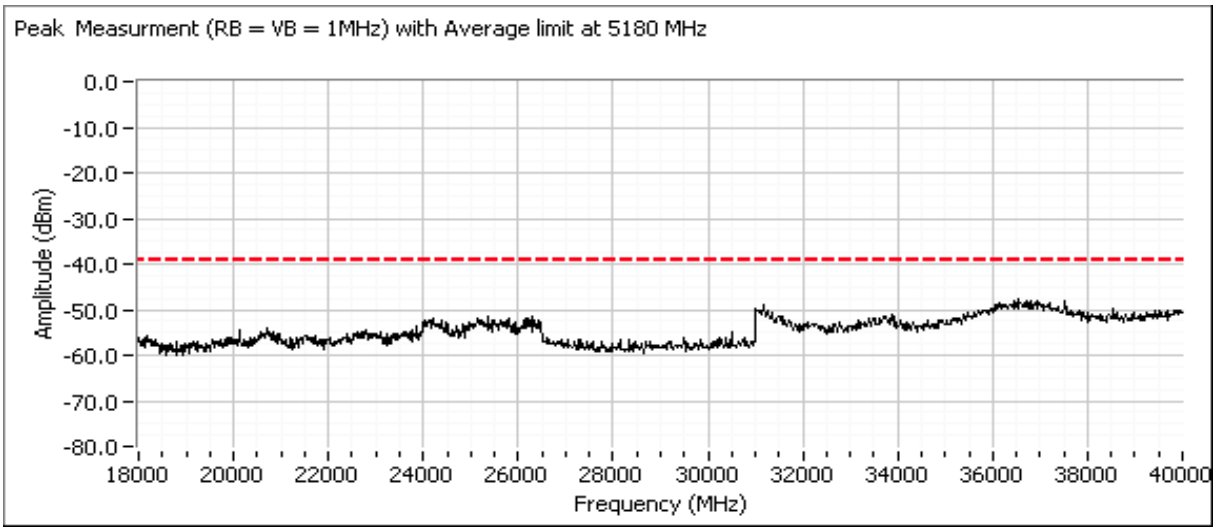
Client:	Xirrus	Job Number:	J71484
Model:	XN4	T-Log Number:	T73388
		Account Manager:	Susan Pelzl
Contact:	Steve Smith		
Standard:	FCC 15 E, RSS 210	Class:	N/A

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

Low channel, 5150 - 5250 MHz Band, Chains A and C with power setting of 20dBm

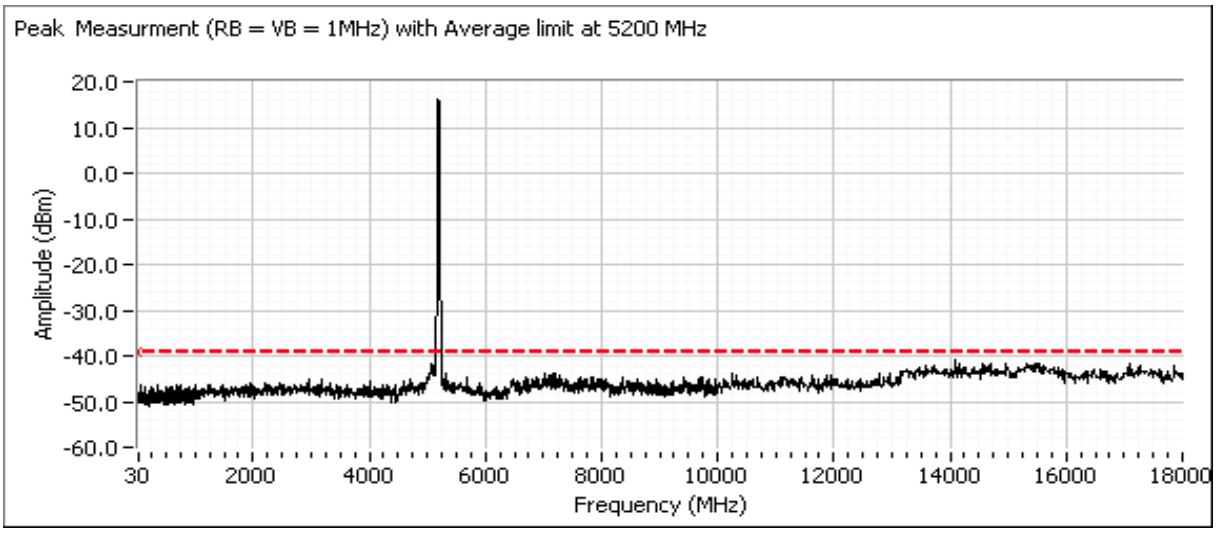
Compliance with the radiated limits for the restricted band immediately below 5150MHz is demonstrated through the radiated emissions tests.

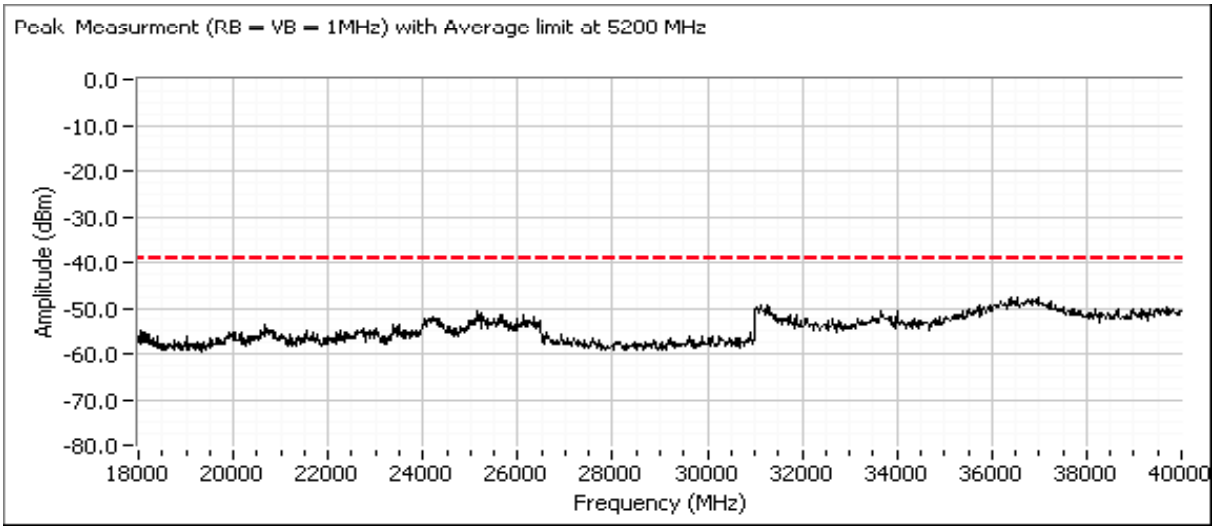




Client:	Xirrus	Job Number:	J71484
Model:	XN4	T-Log Number:	T73388
		Account Manager:	Susan Pelzl
Contact:	Steve Smith		
Standard:	FCC 15 E, RSS 210	Class:	N/A

Center channel, 5150 - 5250 MHz Band, Chains A and C with power setting of 20dBm

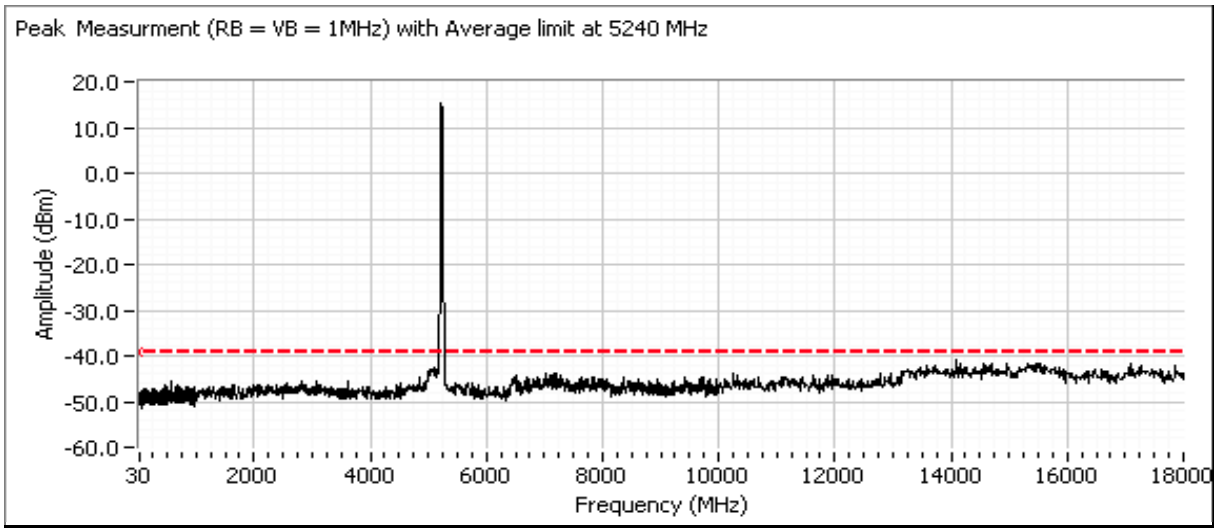


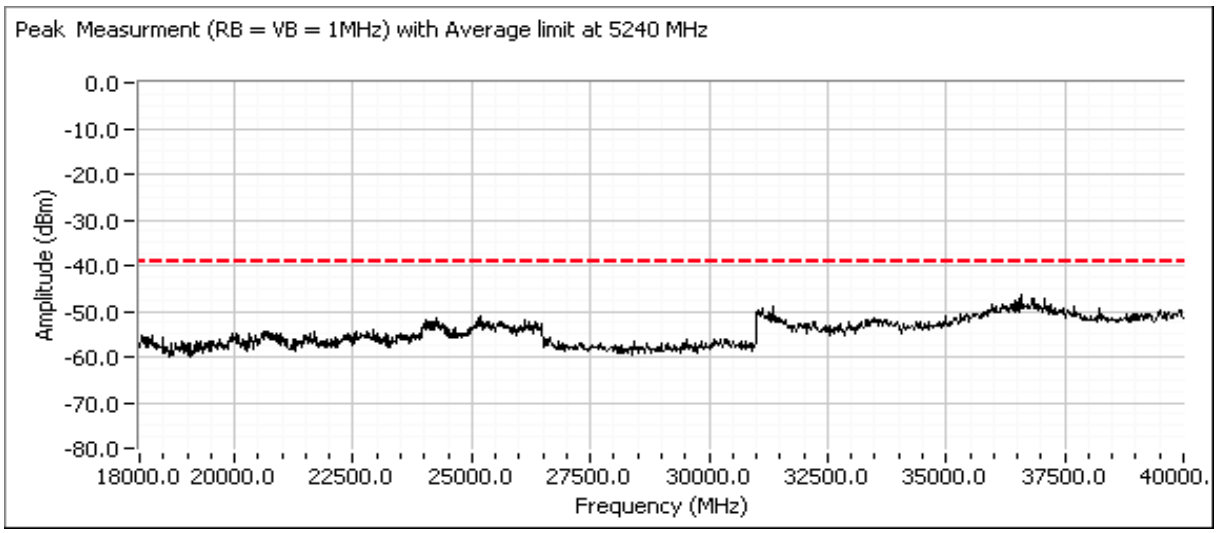


Client:	Xirrus	Job Number:	J71484
Model:	XN4	T-Log Number:	T73388
		Account Manager:	Susan Pelzl
Contact:	Steve Smith		
Standard:	FCC 15 E, RSS 210	Class:	N/A

High channel, 5150 - 5250 MHz Band, Chains A and C

Note; Initial approval for FCC will only allow operation in the 5150 - 5250 MHz NII band so a plot showing -20dBc at 5250 MHz and above is included.





Client:	Xirrus	Job Number:	J71484
Model:	XN4	T-Log Number:	T73388
		Account Manager:	Susan Pelzl
Contact:	Steve Smith		
Standard:	FCC 15 E, RSS 210	Class:	N/A

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

Test Specific Details

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

Date of Test: 11/7/2008
Test Engineer: Rafael Varelas
Test Location: OATS #1

Config. Used: -
Config Change: Direct connection
EUT Voltage: PoE

General Test Configuration

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

Ambient Conditions:

Temperature: 15-36 °C
Rel. Humidity: 10-60 %

Summary of Results

Run #	Test Performed	Limit	Pass / Fail	Result / Margin
1	Power, 5150 - 5250MHz	15.407(a) (1), (2)	Pass	Single radio: 16.1 dBm 4x radio: 16.6 dBm
1	PSD, 5150 - 5250MHz	15.407(a) (1), (2)	Pass	3.6 dBm/MHz
1	26dB Bandwidth	15.407	-	21.9 MHz
1	99% Bandwidth	RSS 210	-	17.2 MHz
2	Peak Excursion Envelope	15.407(a) (6)	Pass	12.6 dB
3	Antenna Conducted Out of Band Spurious	15.407(b)	Covered by single-chain mode measurements	

Modifications Made During Testing

No modifications were made to the EUT during testing

Deviations From The Standard

No deviations were made from the requirements of the standard.

Client:	Xirrus	Job Number:	J71484
Model:	XN4	T-Log Number:	T73388
		Account Manager:	Susan Pelzl
Contact:	Steve Smith		
Standard:	FCC 15 E, RSS 210	Class:	N/A

Run #1: Bandwidth, Output Power and Power spectral Density

Antenna gain used is for the internal antenna. The external antenna gain is lower (2.5dBi) and not used for MIMO modes.

	Chain 1	Chain 2	Chain 3	Coherent	Effective[5]
Antenna Gain (dBi):	3		3	Yes	6.0

Power settings for a single radio operating in the band

Frequency (MHz)	Software Setting	26dB BW (MHz)	Measured Output Power[1] dBm			Total		Limit (dBm)	Max Power (W)	Pass or Fail
			Chain 1	Chain 2	Chain 3	mW	dBm			
5180	14.5	20.8	12.4		13.7	40.8	16.1	17.0	0.041	PASS
5200	15.0	22.1	12.6		12.9	37.6	15.8	17.0		PASS
5240	15.0	21.9	12.5		13.6	40.5	16.1	17.0		PASS

Frequency (MHz)	99%[4] BW	Total Power	PSD[2] dBm/MHz			Total PSD		Limit		Pass or Fail
			Chain 1	Chain 2	Chain 3	mW/MHz	dBm/MHz	FCC	RSS 210[3]	
5180	17.2	16.1	-0.1		1.2	2.3	3.6	4.0	4.0	PASS
5200	17.2	15.8	0.0		0.5	2.1	3.3	4.0	4.0	PASS
5240	17.2	16.1	-0.1		1.0	2.2	3.5	4.0	4.0	PASS

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

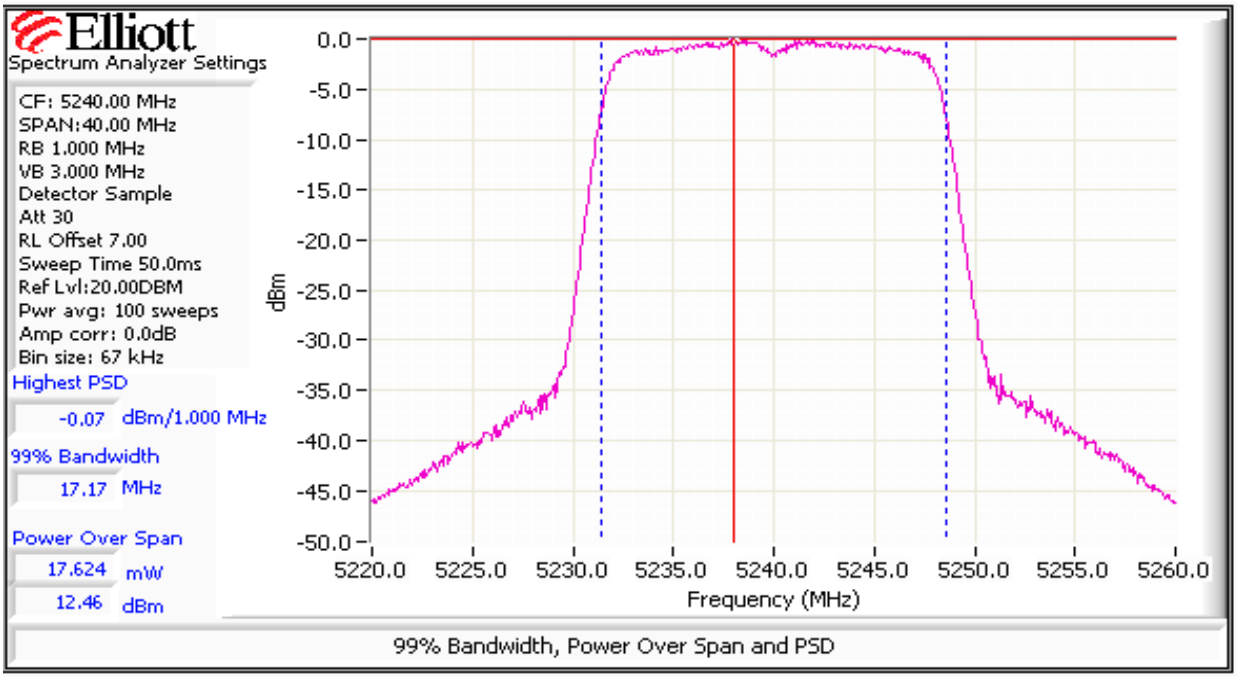
Client:	Xirrus	Job Number:	J71484
Model:	XN4	T-Log Number:	T73388
		Account Manager:	Susan Pelzl
Contact:	Steve Smith		
Standard:	FCC 15 E, RSS 210	Class:	N/A

Power settings for all four 802.11a channels being used in the band:

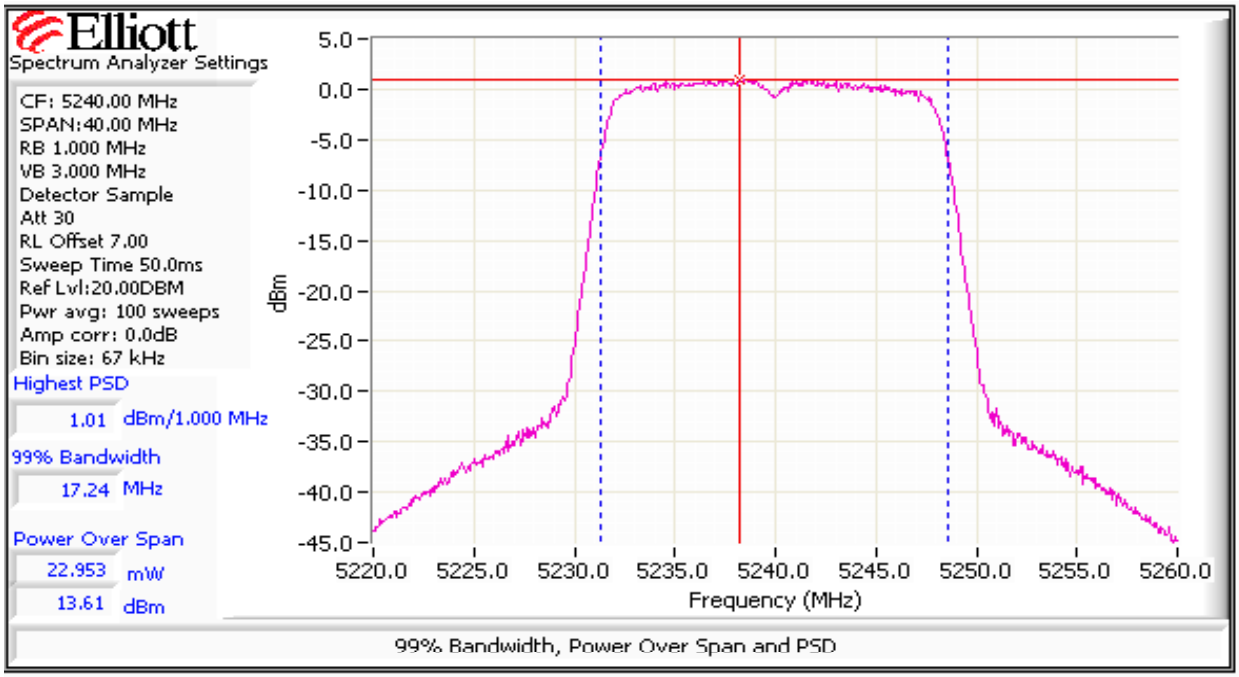
Output power measured on the high channel to demonstrate power control is available to set the power to a level low enough to comply with limits when all four radios are operational in the band. Only power was measured - aggregation of PSD is not applicable as the device cannot have more than one radio operating on a channel.

Frequency (MHz)	Software Setting	26dB BW (MHz)	Measured Output Power[1] dBm			Total				
			Chain 1	Chain 2	Chain 3	mW	dBm			
5240	8.5	21.9	6.9		8.1	11.4	10.6	Limit	P (W)	Result
Total power in the band (four radios operational):						45.4	16.6	17.0	0.045	PASS

Note 1:	Output power measured using a spectrum analyzer (see plots below for the high power measurements): RBW=1MHz, VB=3 MHz, sample detector, power averaging on (transmitted signal was continuous) and power integration over 50MHz.



Client:	Xirrus	Job Number:	J71484
Model:	XN4	T-Log Number:	T73388
		Account Manager:	Susan Pelzl
Contact:	Steve Smith		
Standard:	FCC 15 E, RSS 210	Class:	N/A



Run #2: Peak Excursion Measurement

Device meets the requirement for the peak excursion

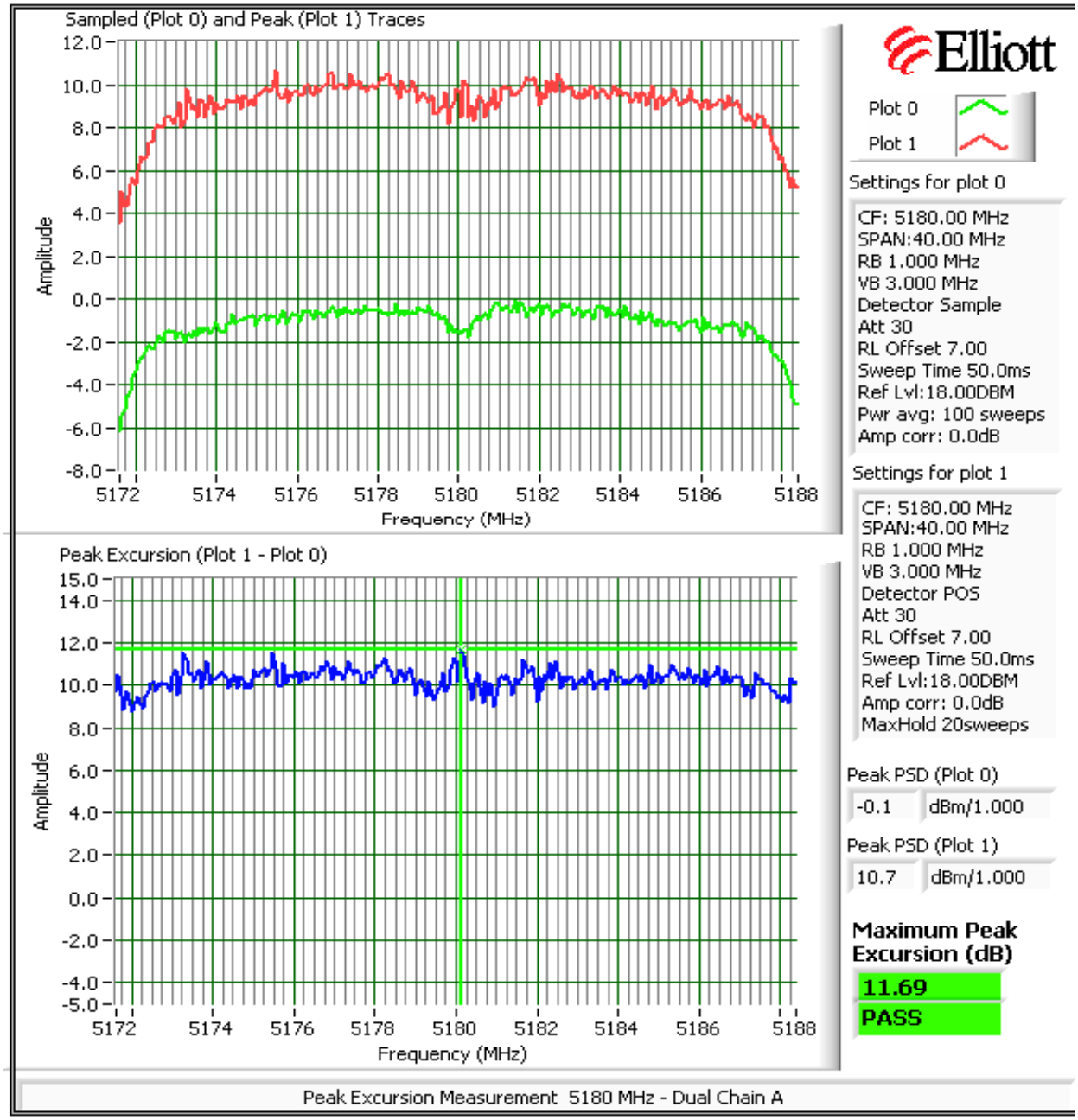
Freq	Peak Excursion(dB)		Freq	Peak Excursion(dB)		Freq	Peak Excursion(dB)	
(MHz)	Value	Limit	(MHz)	Value	Limit	(MHz)	Value	Limit
5180	12.6	13.0	5260		13.0	5500		13.0
5200	11.7	13.0	5300		13.0	5600		13.0
5240	11.3	13.0	5320		13.0	5700		13.0

Plots Showing Peak Excursion

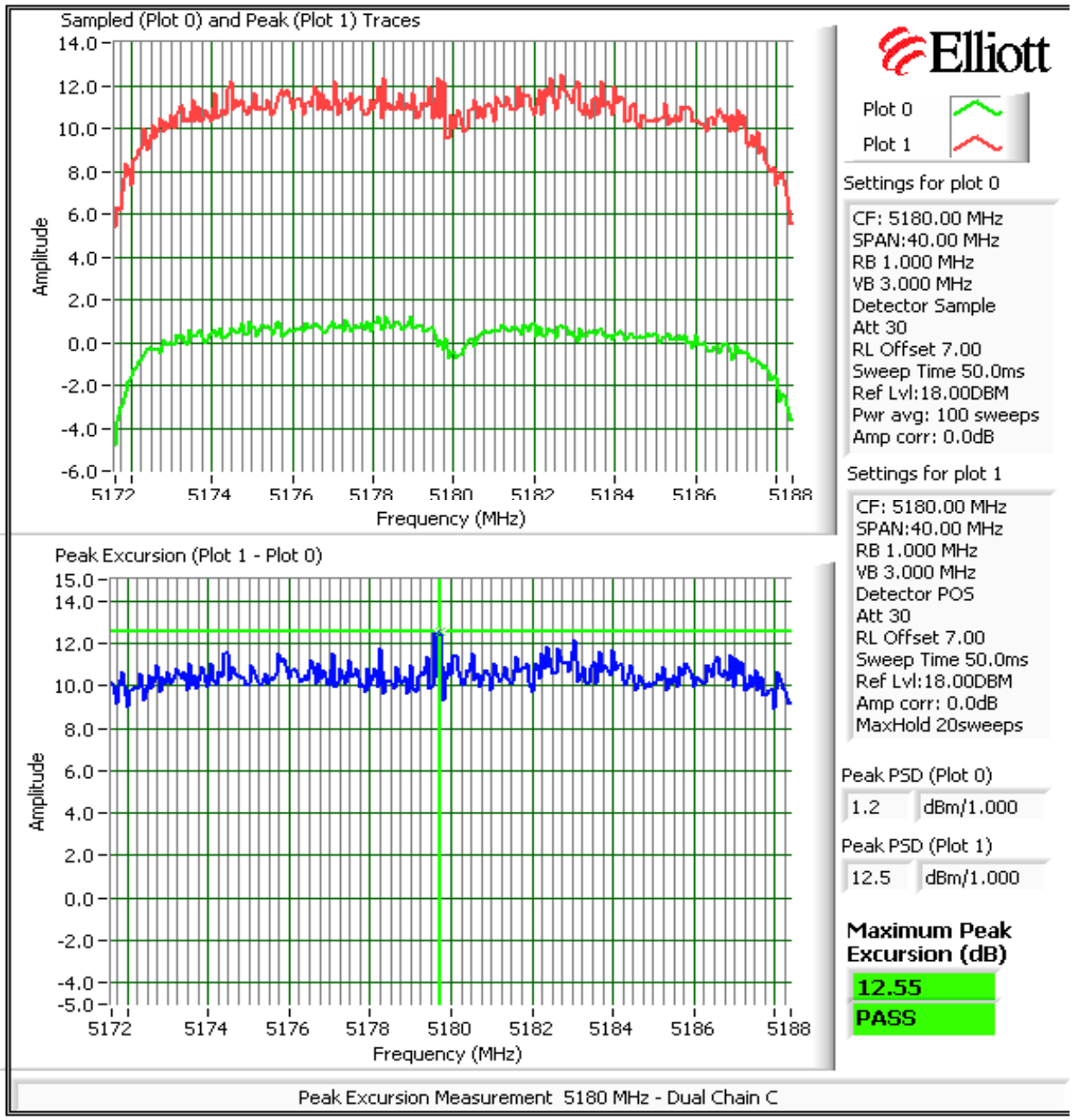
Trace A: RBW = VBW = 3MHz, Peak hold

Trace B: RBW = 1 MHz, VBW = 3MHz, Integrated average power

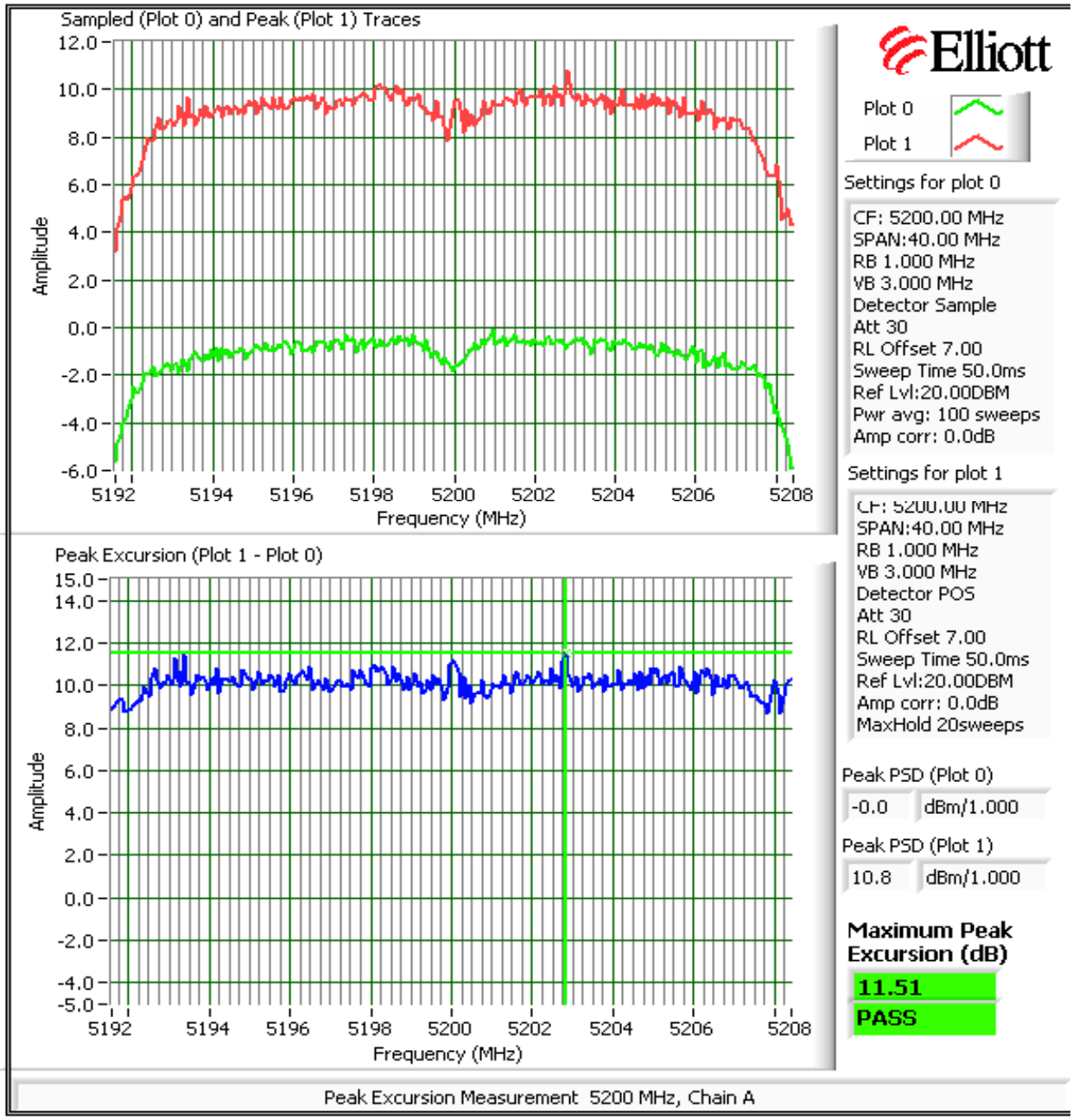
Client:	Xirrus	Job Number:	J71484
Model:	XN4	T-Log Number:	T73388
		Account Manager:	Susan Pelzl
Contact:	Steve Smith		
Standard:	FCC 15 E, RSS 210	Class:	N/A



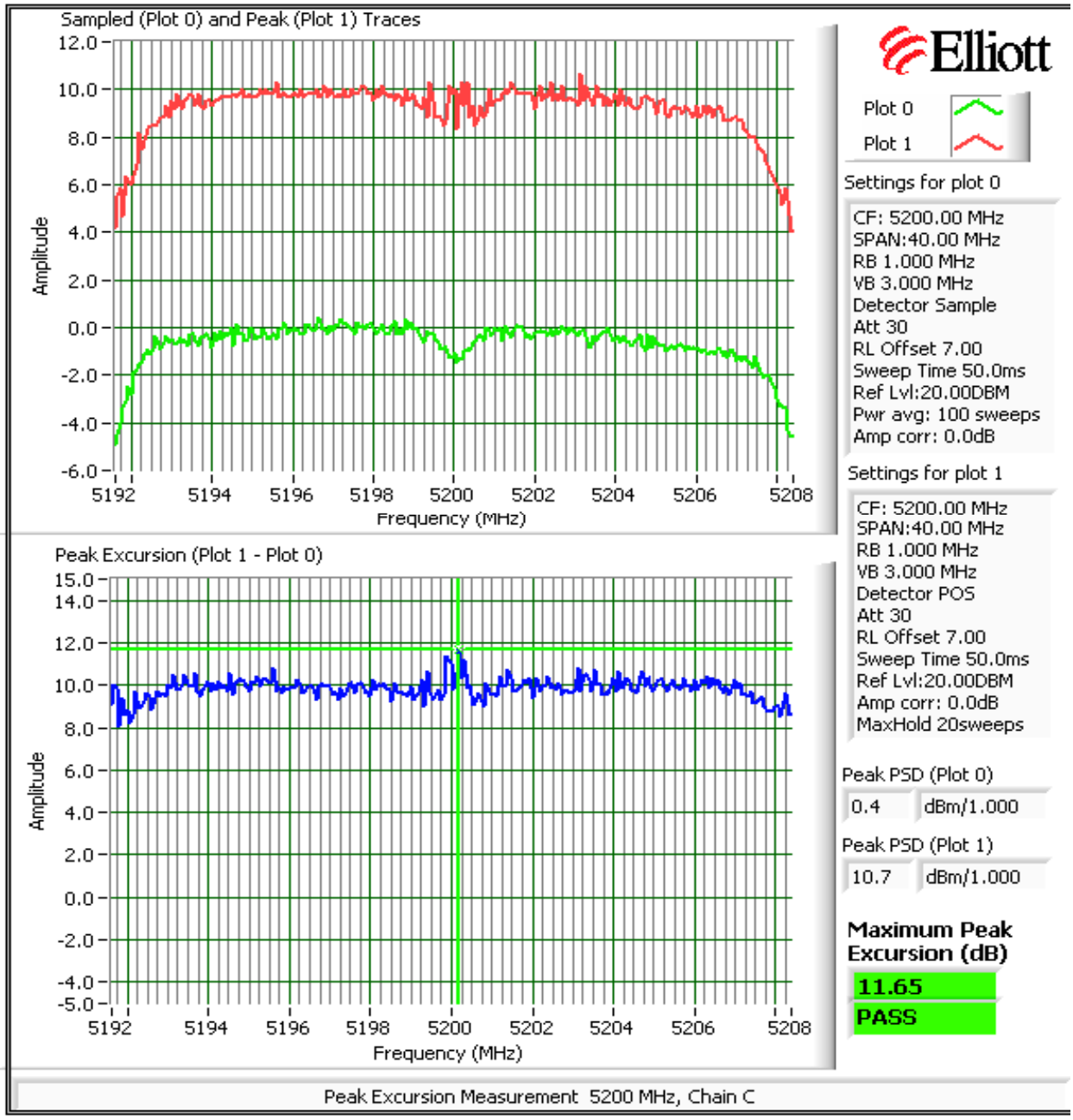
Client:	Xirrus	Job Number:	J71484
Model:	XN4	T-Log Number:	T73388
		Account Manager:	Susan Pelzl
Contact:	Steve Smith		
Standard:	FCC 15 E, RSS 210	Class:	N/A



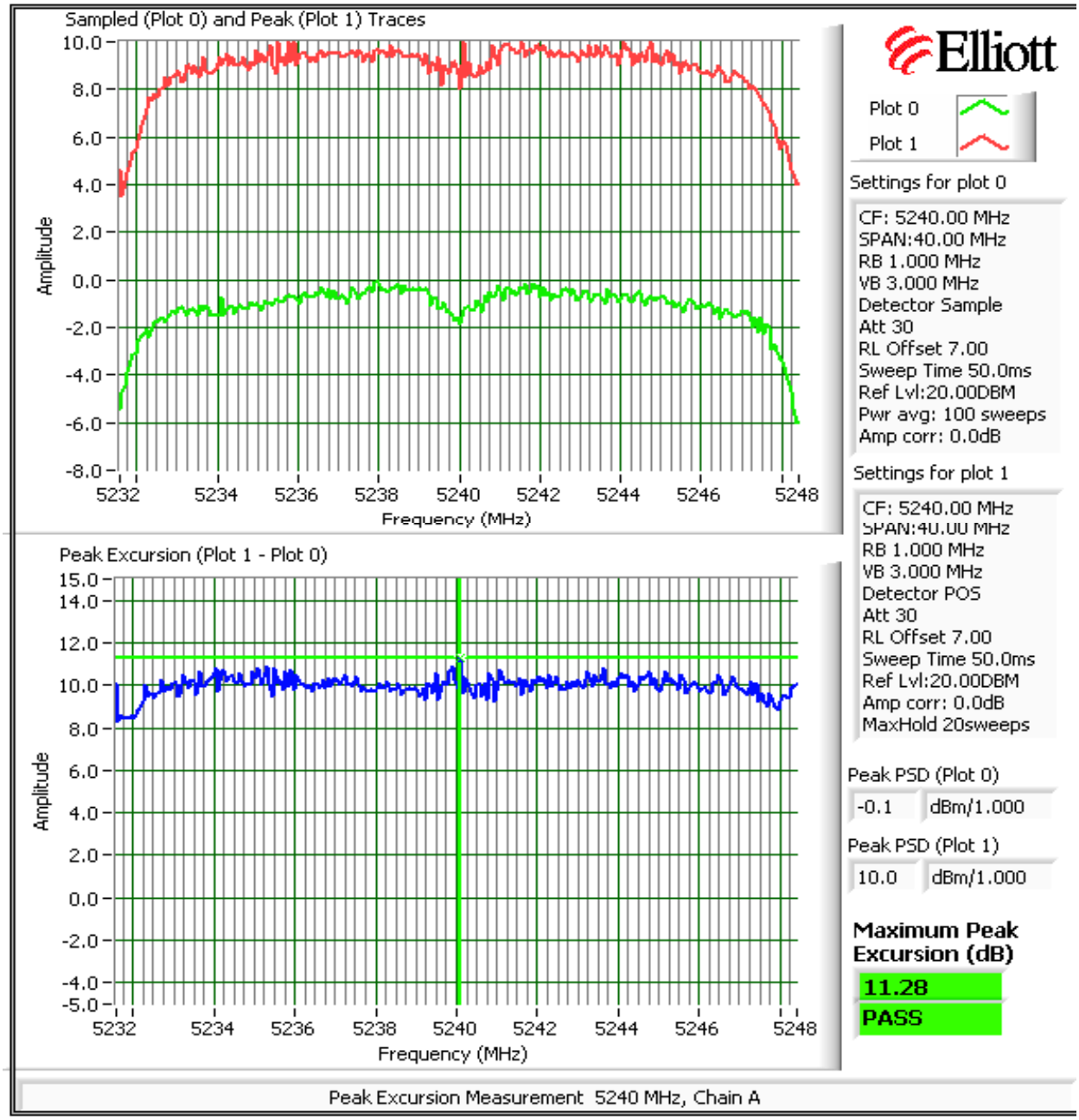
Client:	Xirrus	Job Number:	J71484
Model:	XN4	T-Log Number:	T73388
		Account Manager:	Susan Pelzl
Contact:	Steve Smith		
Standard:	FCC 15 E, RSS 210	Class:	N/A



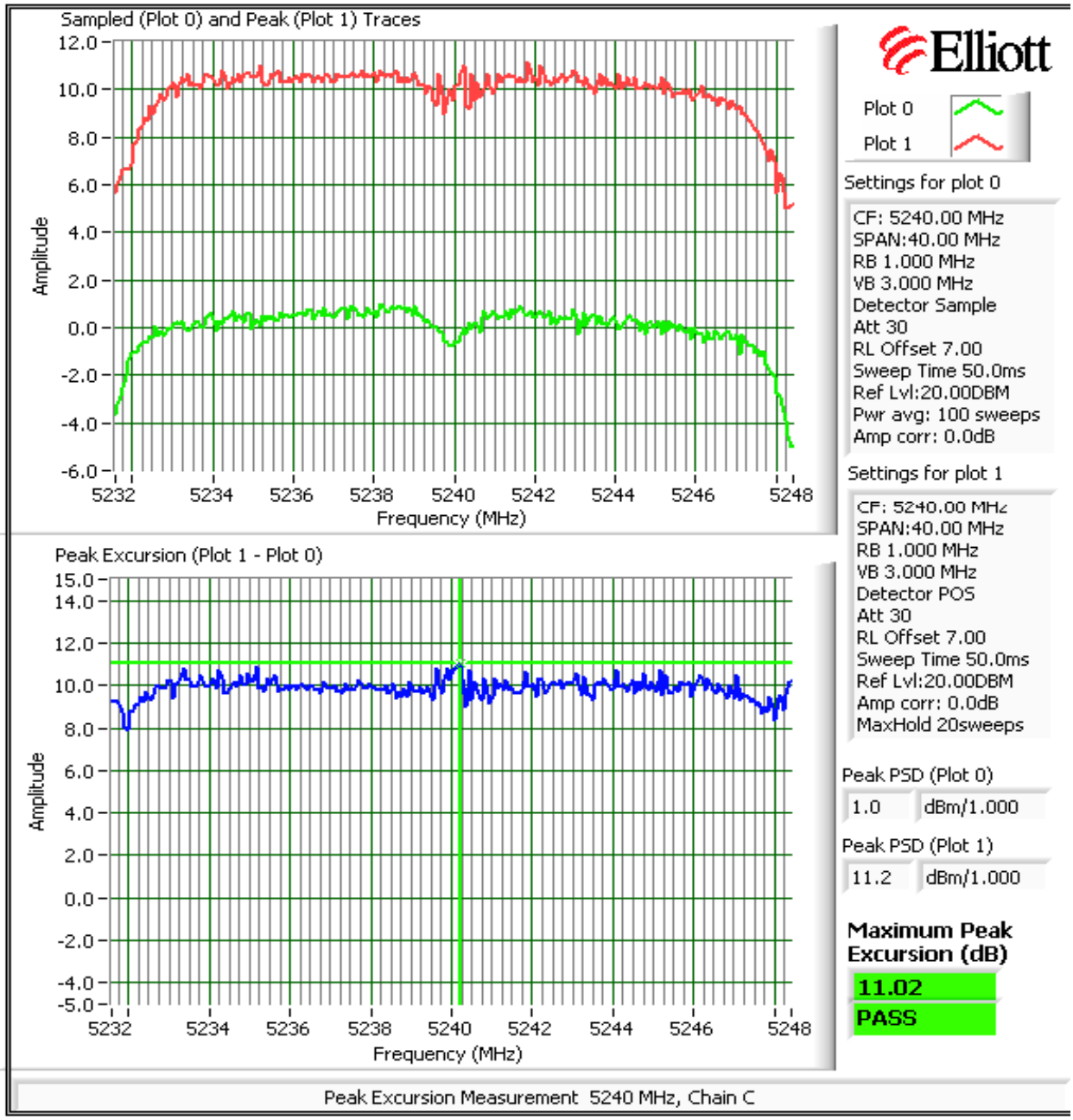
Client:	Xirrus	Job Number:	J71484
Model:	XN4	T-Log Number:	T73388
		Account Manager:	Susan Pelzl
Contact:	Steve Smith		
Standard:	FCC 15 E, RSS 210	Class:	N/A



Client:	Xirrus	Job Number:	J71484
Model:	XN4	T-Log Number:	T73388
		Account Manager:	Susan Pelzl
Contact:	Steve Smith		
Standard:	FCC 15 E, RSS 210	Class:	N/A



Client:	Xirrus	Job Number:	J71484
Model:	XN4	T-Log Number:	T73388
		Account Manager:	Susan Pelzl
Contact:	Steve Smith		
Standard:	FCC 15 E, RSS 210	Class:	N/A



Client:	Xirrus	Job Number:	J71484
Model:	XN4	T-Log Number:	T73388
		Account Manager:	Susan Pelzl
Contact:	Steve Smith		
Standard:	FCC 15 E, RSS 210	Class:	N/A

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

Test Specific Details

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

Date of Test: 11/10 and 11/2008
Test Engineer: Mehran Birgani
Test Location: SV OATS #1

Config. Used: AC powered
Config Change: Direct connection
EUT Voltage: PoE

General Test Configuration

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

Ambient Conditions:

Temperature: 15-36 °C
Rel. Humidity: 10-60 %

Summary of Results

Run #	Mode	Test Performed	Limit	Pass / Fail	Result / Margin
1	n20MHz	Power, 5150 - 5250MHz	15.407(a) (1), (2)	Pass	Single radio: 16.6 dBm 4x radio: 16.5 dBm
1	n20MHz	PSD, 5150 - 5250MHz	15.407(a) (1), (2)	Pass	3.9 dBm/MHz
1	n20MHz	99% Bandwidth	RSS 210	-	18.4 MHz
1	n40MHz	Power, 5150 - 5250MHz	15.407(a) (1), (2)	Pass	Single radio: 16.3 dBm 2x radio: 16.7 dBm
1	n40MHz	PSD, 5150 - 5250MHz	15.407(a) (1), (2)	Pass	0.6 dBm/MHz
1	n40MHz	99% Bandwidth	RSS 210	-	36.7 MHz
2	n20 & n40	Peak Excursion Envelope	15.407(a) (6)	Pass	12.9 dB
3	n20 & n40	Antenna Conducted Spurious	15.407(b)	Pass	< -27dBm/MHz eirp

Modifications Made During Testing

No modifications were made to the EUT during testing

Deviations From The Standard

No deviations were made from the requirements of the standard.

Client:	Xirrus	Job Number:	J71484
Model:	XN4	T-Log Number:	T73388
		Account Manager:	Susan Pelzl
Contact:	Steve Smith		
Standard:	FCC 15 E, RSS 210	Class:	N/A

Run #1: Bandwidth, Output Power and Power spectral Density

Antenna gain used is for the internal antenna. The external antenna gain is lower (2.5dBi) and not used for MIMO modes.

	Chain 1	Chain 2	Chain 3	Coherent	Effective[5]
Antenna Gain (dBi):	3		3	No	3.0

Power settings for a single radio operating in the band

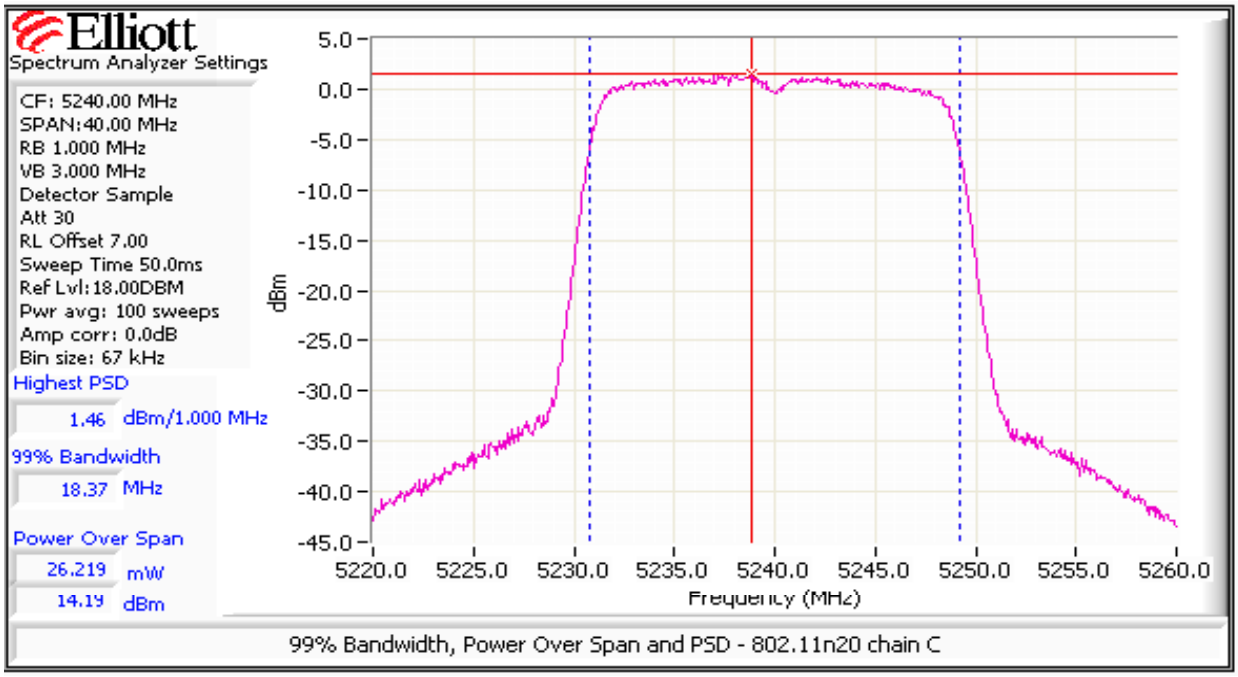
Frequency (MHz)	Software Setting	26dB BW (MHz)	Measured Output Power[1] dBm			Total		Limit (dBm)	Max Power (W)	Pass or Fail
			Chain 1	Chain 2	Chain 3	mW	dBm			
5180	15.0	22.3	12.9		14.0	44.6	16.5	17.0	0.046	PASS
5200	15.0	22.5	12.6		14.1	43.9	16.4	17.0		PASS
5240	15.5	22.9	12.9		14.2	45.8	16.6	17.0		PASS
5190	13.0	40.4	10.9		12.1	28.5	14.6	17.0	0.043	PASS
5230	15.5	41.2	12.6		13.9	42.7	16.3	17.0		PASS

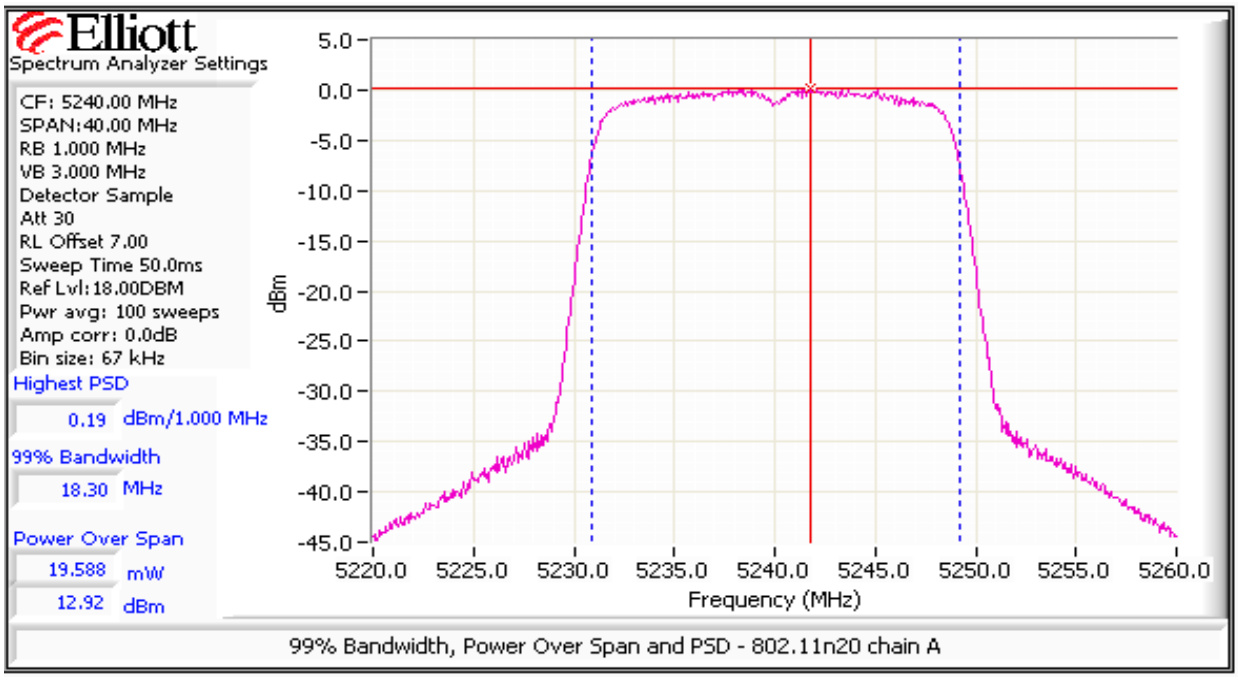
Frequency (MHz)	99%[4] BW	Total Power	PSD[2] dBm/MHz			Total PSD		Limit		Pass or Fail
			Chain 1	Chain 2	Chain 3	mW/MHz	dBm/MHz	FCC	RSS 210[3]	
5180	18.4	16.5	0.3		1.2	2.4	3.8	4.0	7.0	PASS
5200	18.3	16.4	-0.2		1.3	2.3	3.6	4.0	7.0	PASS
5240	18.4	16.6	0.2		1.5	2.5	3.9	4.0	7.0	PASS
5190	36.7	14.6	-5.2		-3.9	0.7	-1.5	4.0	7.0	PASS
5230	36.6	16.3	-3.3		-1.7	1.1	0.6	4.0	7.0	PASS

Note 1:	Output power measured using a spectrum analyzer (see plots below for the high power measurements): RBW=1MHz, VB=3 MHz, sample detector, power averaging on (transmitted signal was continuous) and power integration over 40MHz (20MHz mode) and 80MHz (40MHz mode)
Note 2:	Measured using the same analyzer settings used for output power.
Note 3:	For RSS-210 the limit for the 5150 - 5250 MHz band accounts for the antenna gain as the maximum eirp allowed is 10dBm/MHz. The limits are also corrected for instances where the highest measured value of the PSD exceeds the average PSD (calculated from the measured power divided by the measured 99% bandwidth) by more than 3dB by the amount that the measured value exceeds the average by more than 3dB.
Note 4:	99% Bandwidth measured in accordance with RSS GEN - RB > 1% of span and VB >=3xRB
Note 5:	For MIMO systems the total output power and total PSD are calculated form the sum of the powers of the individual chains (in linear terms). The antenna gain used to determine the EIRP and limits for PSD/Output power depends on the operating mode of the MIMO device. If the signals on the non-coherent between the transmit chains then the gain used to determine the limits is the highest gain of the individual chains and the EIRP is the sum of the products of gain and power on each chain. If the signals are coherent then the effective antenna gain is the sum (in linear terms) of the gains for each chain and the EIRP is the product of the effective gain and total power.

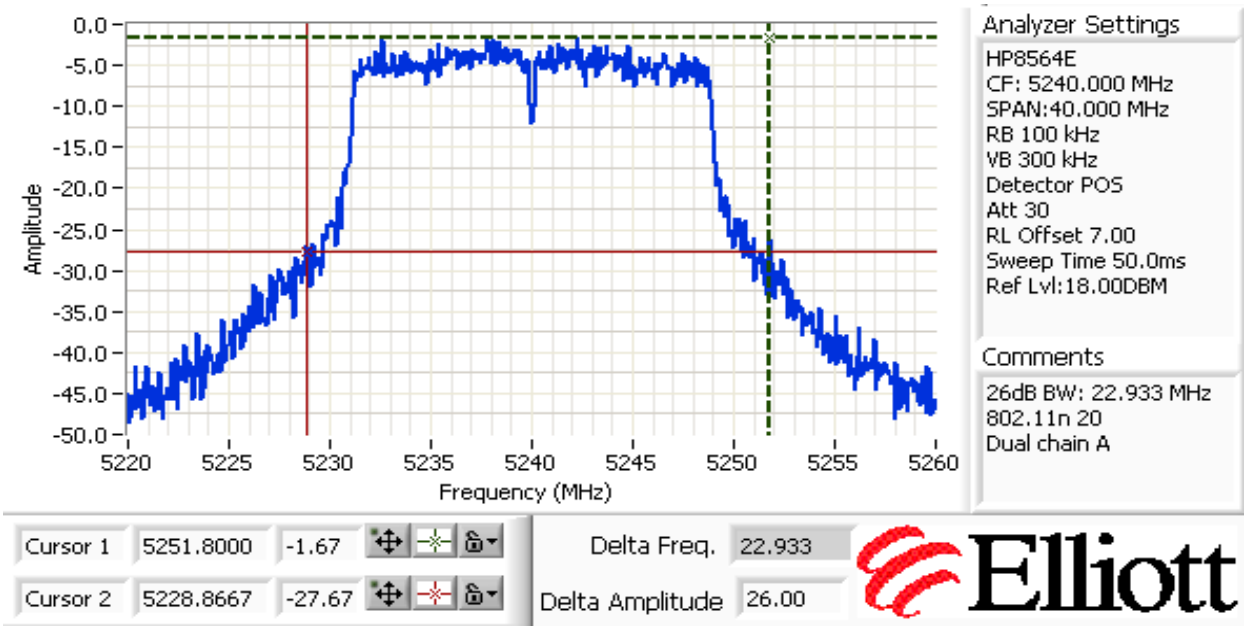
Client:	Xirrus	Job Number:	J71484
Model:	XN4	T-Log Number:	T73388
		Account Manager:	Susan Pelzl
Contact:	Steve Smith		
Standard:	FCC 15 E, RSS 210	Class:	N/A

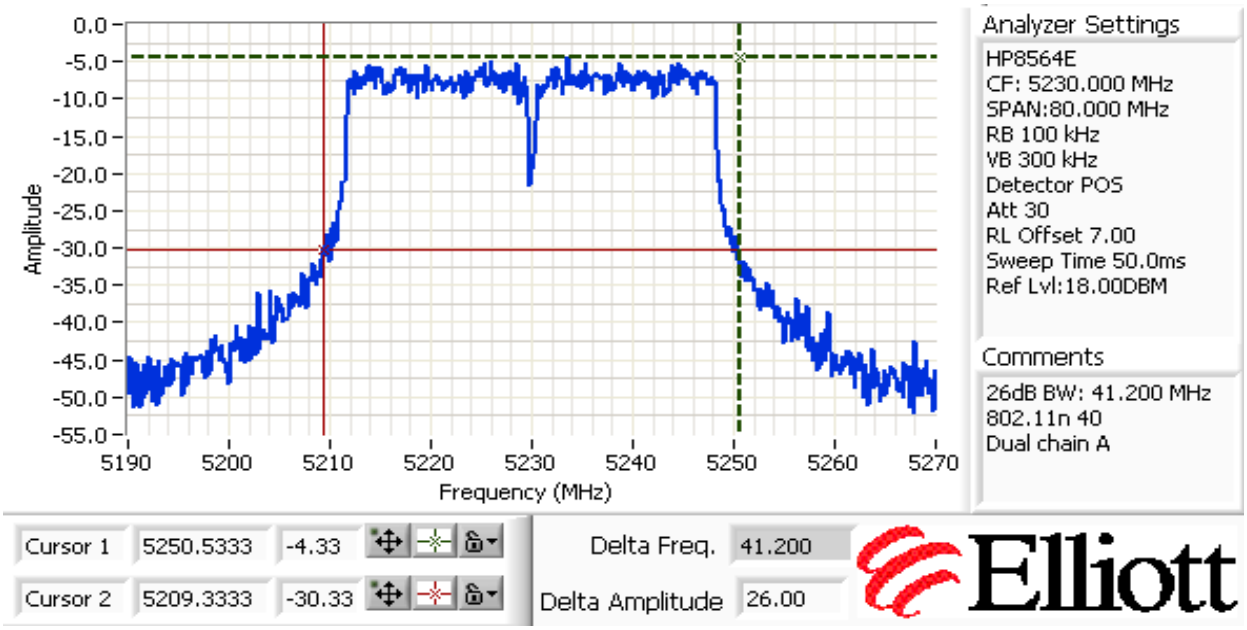
Plots showing power/PSD measurements and 26dB bandwidth measurements at the high power setting



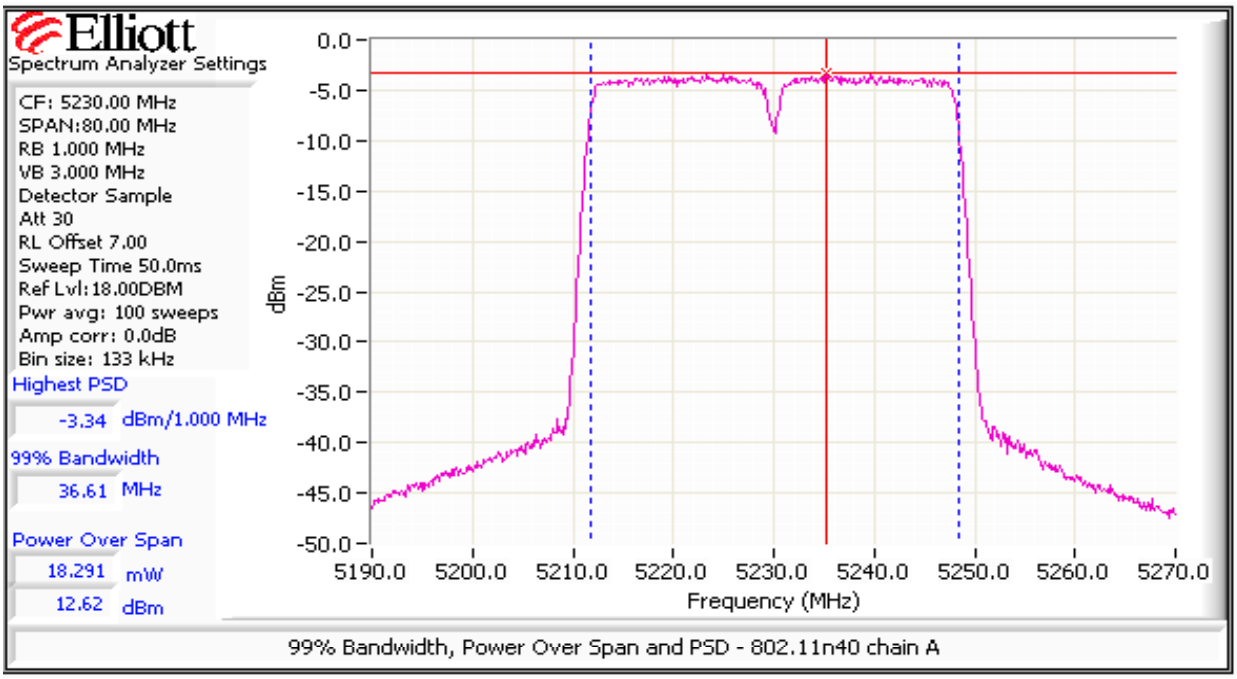


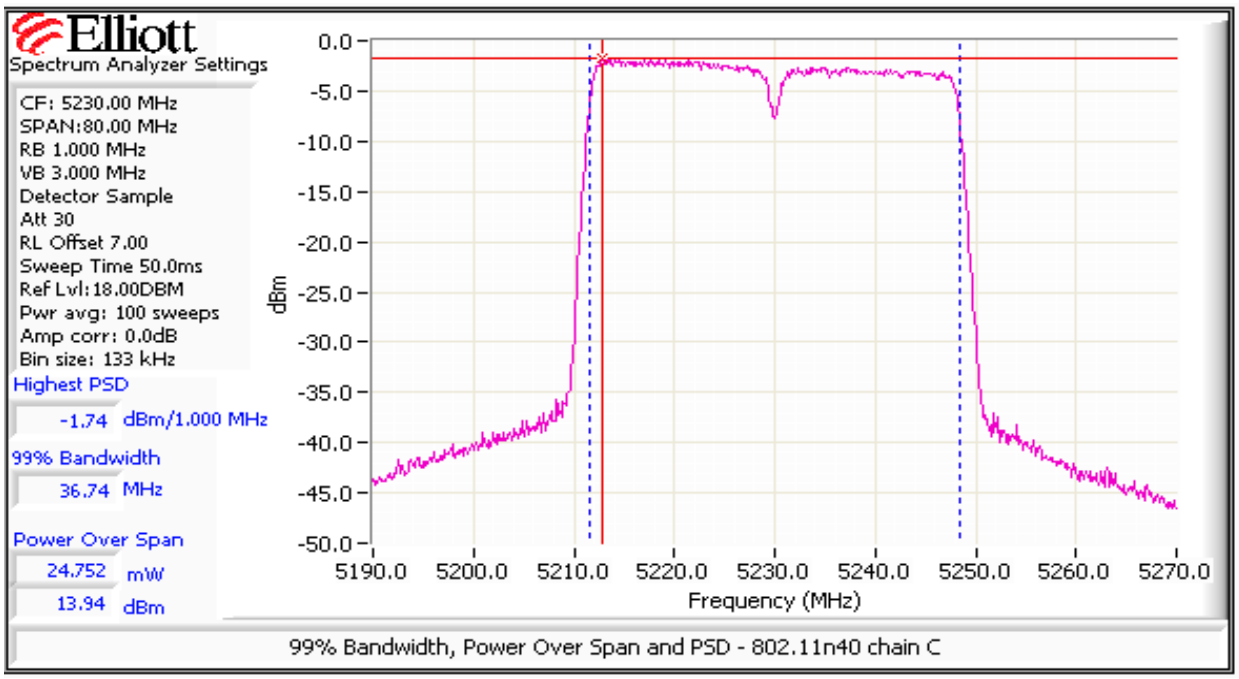
Client:	Xirrus	Job Number:	J71484
Model:	XN4	T-Log Number:	T73388
		Account Manager:	Susan Pelzl
Contact:	Steve Smith		
Standard:	FCC 15 E, RSS 210	Class:	N/A





Client:	Xirrus	Job Number:	J71484
Model:	XN4	T-Log Number:	T73388
		Account Manager:	Susan Pelzl
Contact:	Steve Smith		
Standard:	FCC 15 E, RSS 210	Class:	N/A





Client:	Xirrus	Job Number:	J71484
Model:	XN4	T-Log Number:	T73388
		Account Manager:	Susan Pelzl
Contact:	Steve Smith		
Standard:	FCC 15 E, RSS 210	Class:	N/A

Power settings for all four n20 channels and both n40 channels being used in the band:

The lowest power level required per radio is 14dBm for two radios operating in n40MHz (two 40 MHz or one 40MHz channel and one 20MHz channel available, with both radios at 14dBm the total power in the band is 17dBm).

Output power measured on the center channel to demonstrate power control is available to set the power to a level low enough to comply with limits when all four radios are operational in the band. Only power was measured - aggregation of PSD is not applicable as the device cannot have more than one radio operating on a channel.

Frequency (MHz)	Software Setting	26dB BW (MHz)	Measured Output Power[1] dBm			Total				
			Chain 1	Chain 2	Chain 3	mW	dBm			
5200	8.5	22.5	6.7		8.2	11.3	10.5	Limit	P (W)	Result
Total power in the band (four radios operational in n20MHz mode):						45.1	16.5	17.0	0.045	PASS

Frequency (MHz)	Software Setting	26dB BW (MHz)	Measured Output Power[1] dBm			Total				
			Chain 1	Chain 2	Chain 3	mW	dBm			
5190	12.0	40.4	9.8		11.4	23.4	13.7			
5230	12.0	41.2	9.7		11.4	23.1	13.6	Limit	P (W)	Result
Total power in the band (two radios operational in n40MHz mode):						46.5	16.7	17.0	0.046	PASS

Note 1:	Output power measured using a spectrum analyzer (see plots below for the high power measurements): RBW=1MHz, VB=3 MHz, sample detector, power averaging on (transmitted signal was continuous) and power integration over 40MHz (20MHz mode) and 80MHz (40MHz mode)
Note 2:	Measured using the same analyzer settings used for output power.
Note 3:	For RSS-210 the limit for the 5150 - 5250 MHz band accounts for the antenna gain as the maximum eirp allowed is 10dBm/MHz. The limits are also corrected for instances where the highest measured value of the PSD exceeds the average PSD (calculated from the measured power divided by the measured 99% bandwidth) by more than 3dB by the amount that the measured value exceeds the average by more than 3dB.
Note 4:	99% Bandwidth measured in accordance with RSS GEN - RB > 1% of span and VB >=3xRB
Note 5:	For MIMO systems the total output power and total PSD are calculated form the sum of the powers of the individual chains (in linear terms). The antenna gain used to determine the EIRP and limits for PSD/Output power depends on the operating mode of the MIMO device. If the signals on the non-coherent between the transmit chains then the gain used to determine the limits is the highest gain of the individual chains and the EIRP is the sum of the products of gain and power on each chain. If the signals are coherent then the effective antenna gain is the sum (in linear terms) of the gains for each chain and the EIRP is the product of the effective gain and total power.

Client:	Xirrus	Job Number:	J71484
Model:	XN4	T-Log Number:	T73388
		Account Manager:	Susan Pelzl
Contact:	Steve Smith		
Standard:	FCC 15 E, RSS 210	Class:	N/A

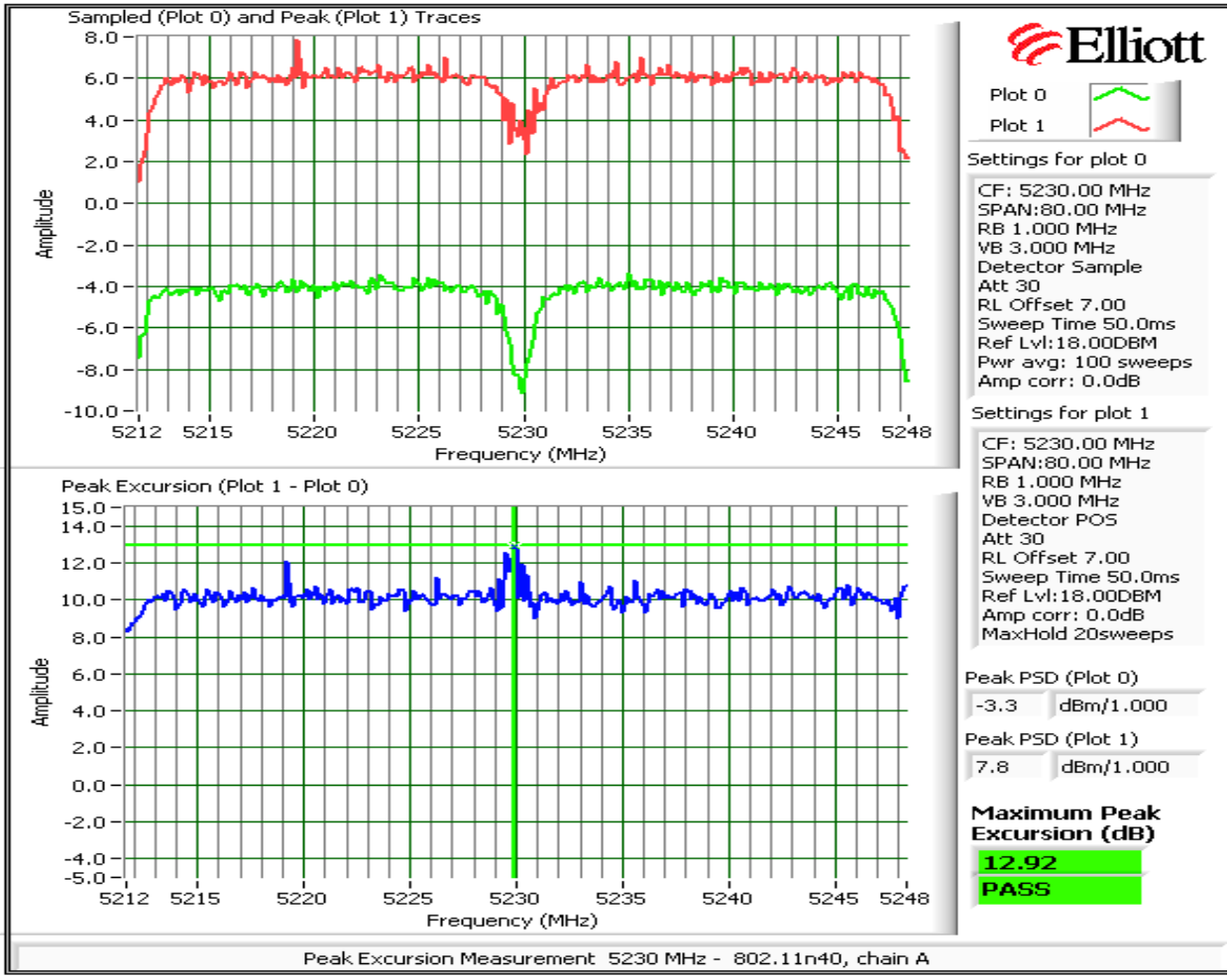
Run #2: Peak Excursion Measurement

Device meets the requirement for the peak excursion

Freq	Mode/ Chain	Peak Excursion(dB)		Mode/ Chain	Peak Excursion(dB)	
(MHz)		Value	Limit		Value	Limit
5180	n20 A	11.7	13.0	n20 C	11.1	13.0
5200	n20 A	11.4	13.0	n20 C	12.1	13.0
5240	n20 A	11.9	13.0	n20 C	11.6	13.0
5190	n40 A	12.9	13.0	n40 A	12.7	13.0
5230	n40 A	12.3	13.0	n40 C	12.6	13.0

Plots Showing Peak Excursion

Trace A: RBW = VBW = 3MHz, Peak hold; Trace B: RBW = 1 MHz, VBW = 3MHz, Integrated average power



Client:	Xirrus	Job Number:	J71484
Model:	XN4	T-Log Number:	T73388
		Account Manager:	Susan Pelzl
Contact:	Steve Smith		
Standard:	FCC 15 E, RSS 210	Class:	N/A

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

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

Number of transmit chains:	2		
Maximum Antenna Gain:	3.0	dBi	
Spurious Limit:	-27.0	dBm/MHz eirp	
Adjustment for 2 chains:	-3.0	dB adjustment for multiple chains.	
Limit Used On Plots Note 1:	-33.0	dBm/MHz	Average Limit (RB=1MHz, VB=10Hz)
	-13.0	dBm/MHz	Peak Limit (RB=VB=1MHz)

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

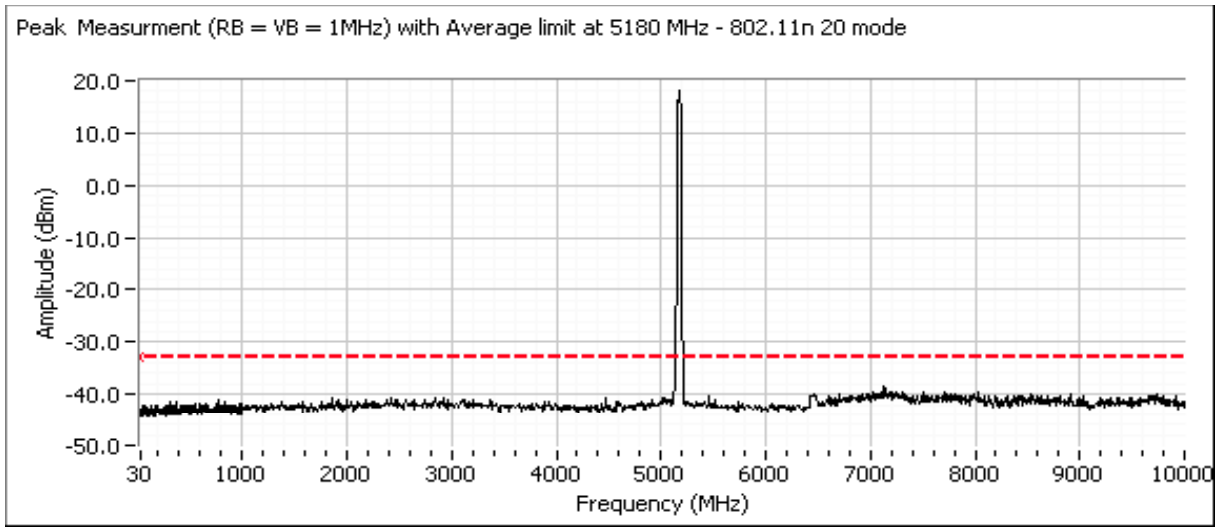
Client:	Xirrus	Job Number:	J71484
Model:	XN4	T-Log Number:	T73388
		Account Manager:	Susan Pelzl
Contact:	Steve Smith		
Standard:	FCC 15 E, RSS 210	Class:	N/A

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

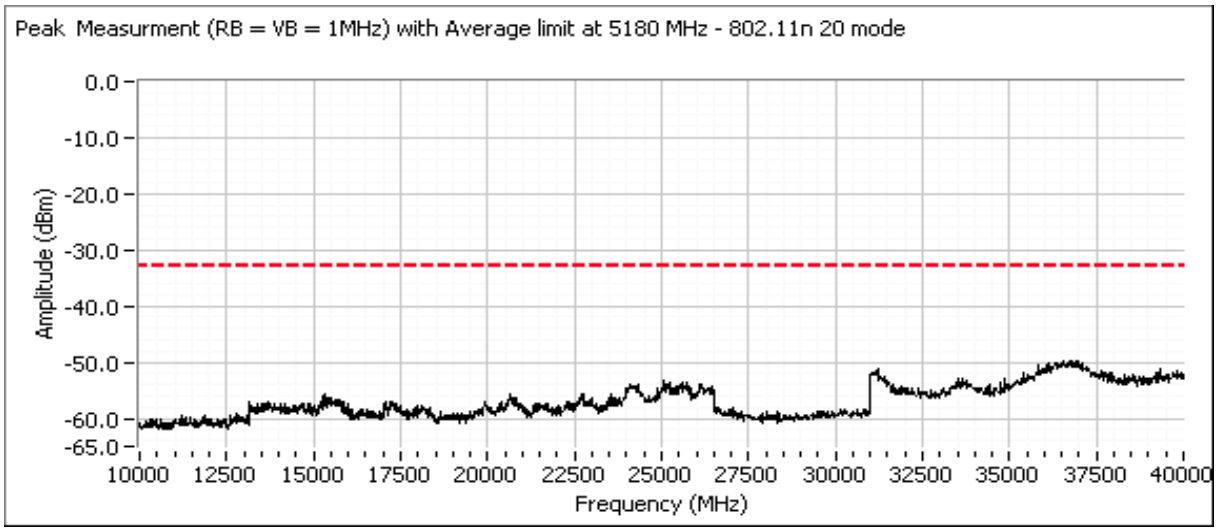
802.11n - 20MHz, Low channel, 5150 - 5250 MHz Band (5180 MHz) with power setting of 17.0 dBm.

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

20dB attenuation pad at front of analyzer and 20dB attenuation at software level.



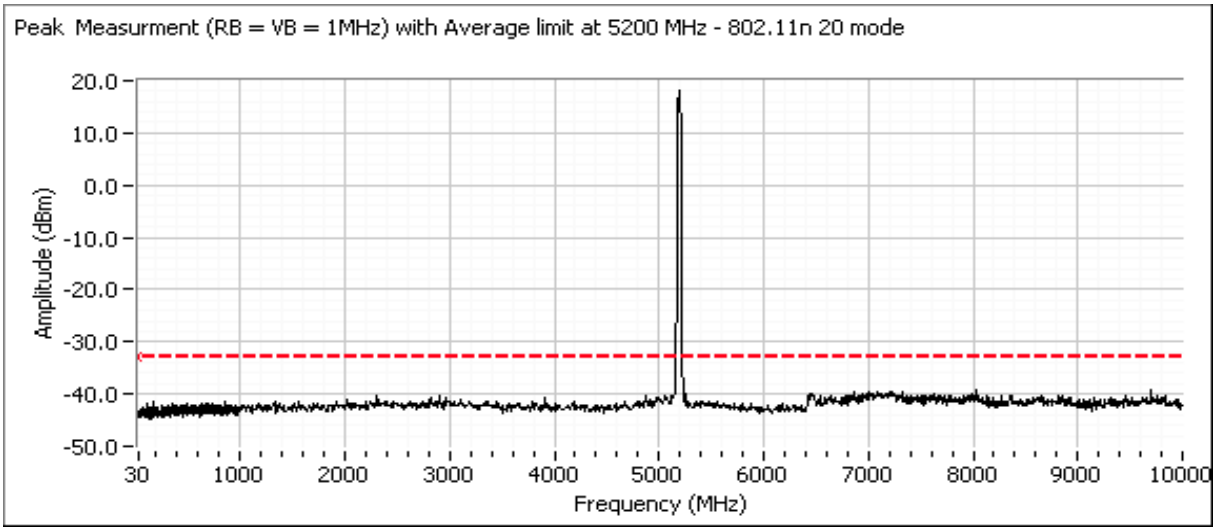
20dB attenuation pad at front of analyzer and 0dB attenuation at software level to reduce the noise floor.



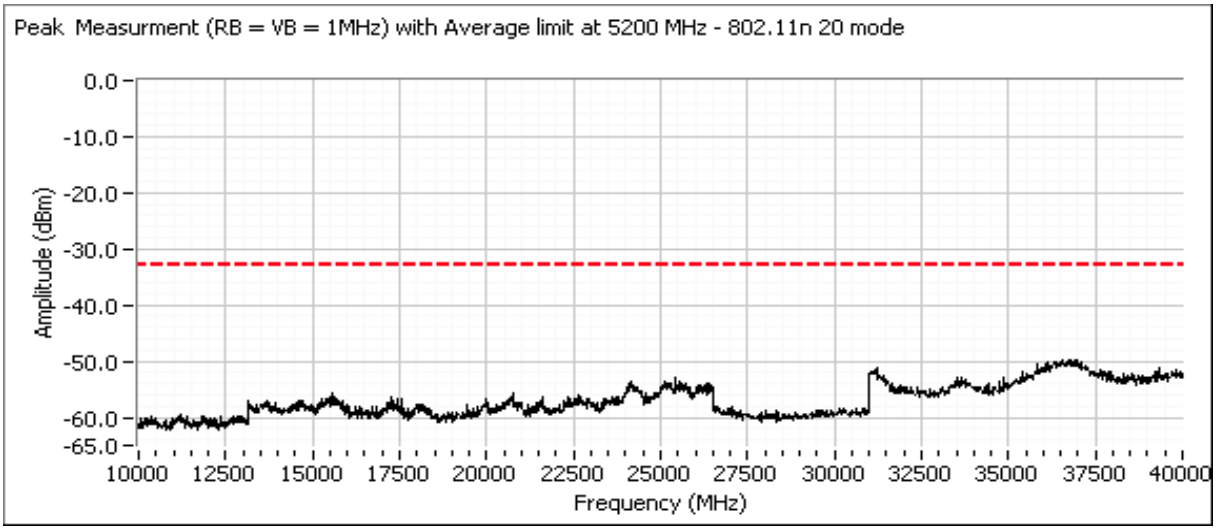
Client:	Xirrus	Job Number:	J71484
Model:	XN4	T-Log Number:	T73388
		Account Manager:	Susan Pelzl
Contact:	Steve Smith		
Standard:	FCC 15 E, RSS 210	Class:	N/A

802.11n - 20MHz, Center channel, 5150 - 5250 MHz Band (5200 MHz) with power setting of 17.0 dBm.

20dB attenuation pad at front of analyzer and 20dB attenuation at software level.



20dB attenuation pad at front of analyzer and 0dB attenuation at software level to reduce the noise floor.

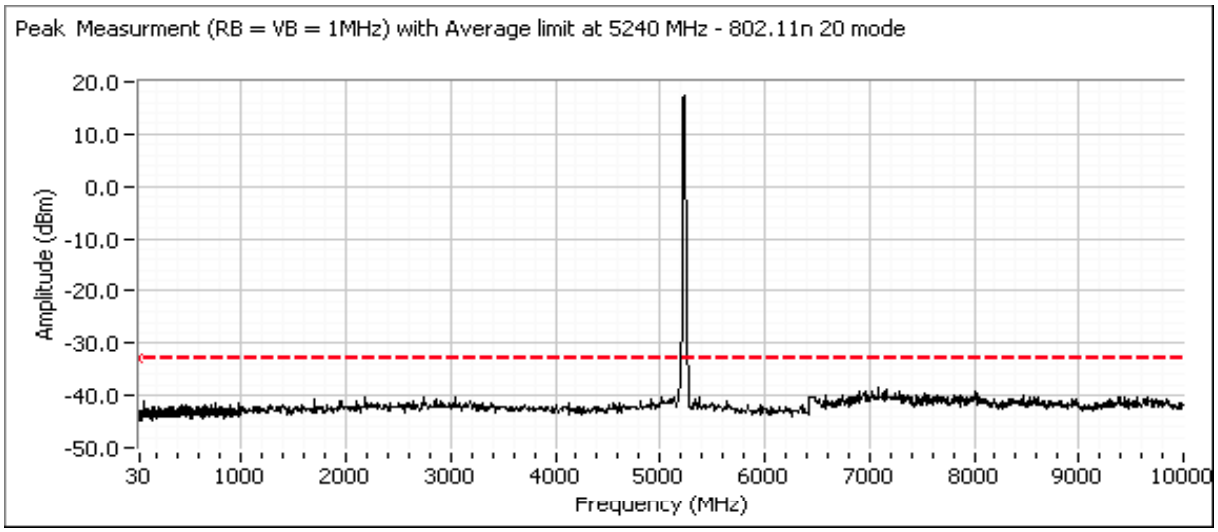


Client:	Xirrus	Job Number:	J71484
Model:	XN4	T-Log Number:	T73388
		Account Manager:	Susan Pelzl
Contact:	Steve Smith		
Standard:	FCC 15 E, RSS 210	Class:	N/A

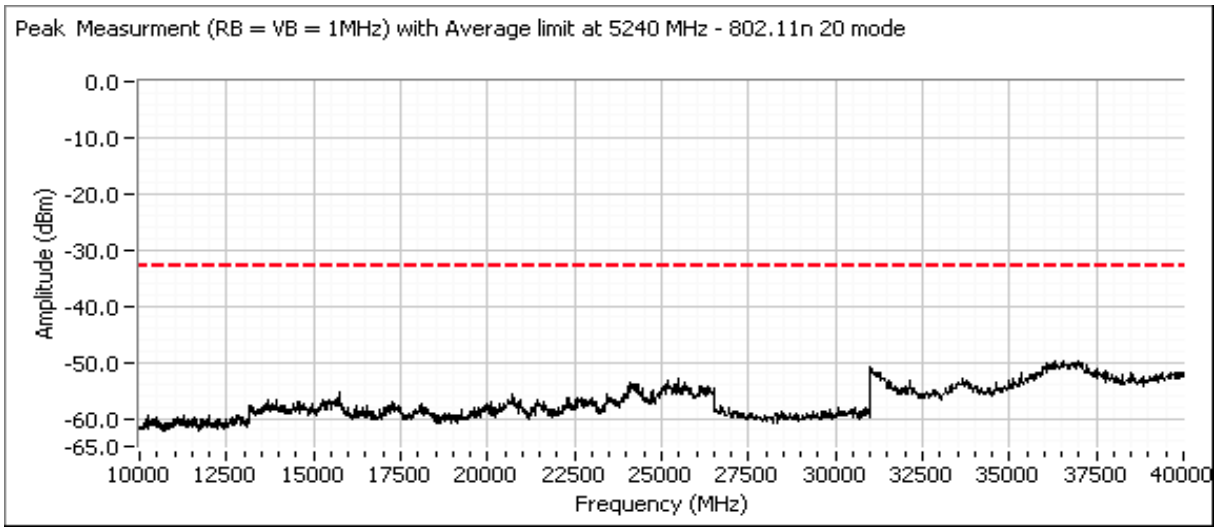
802.11n - 20MHz, High channel, 5150 - 5250 MHz Band (5240 MHz) with power setting of 17.0 dBm.

Note; Initial approval for FCC will only allow operation in the 5150 - 5250 MHz NII band so a plot showing -20dBc at 5250 MHz and above is included.

20dB attenuation pad at front of analyzer and 20dB attenuation at software level.

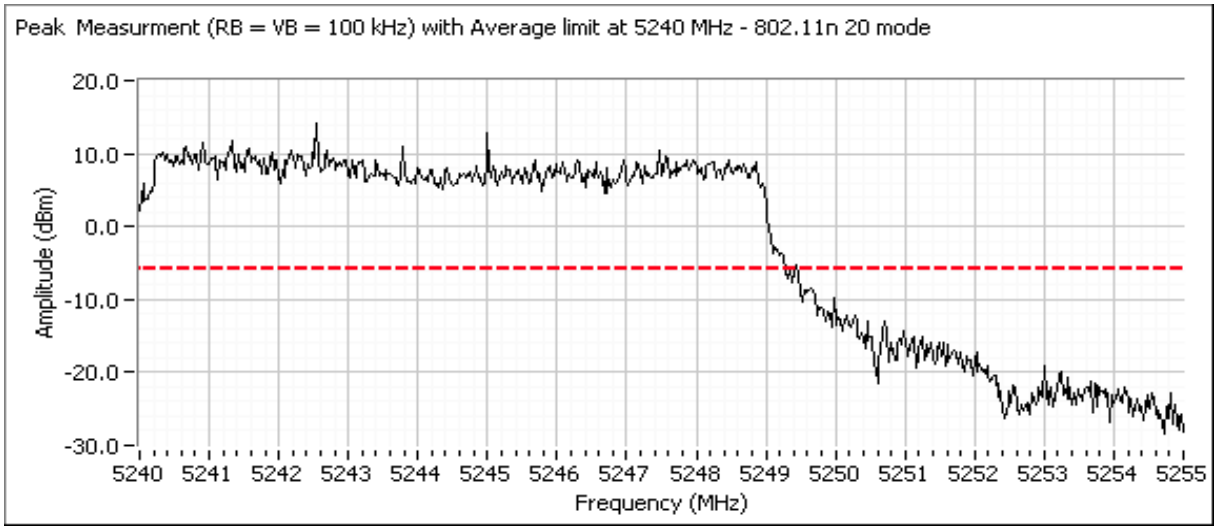


20dB attenuation pad at front of analyzer and 0dB attenuation at software level to reduce the noise floor.



Client:	Xirrus	Job Number:	J71484
Model:	XN4	T-Log Number:	T73388
		Account Manager:	Susan Pelzl
Contact:	Steve Smith		
Standard:	FCC 15 E, RSS 210	Class:	N/A

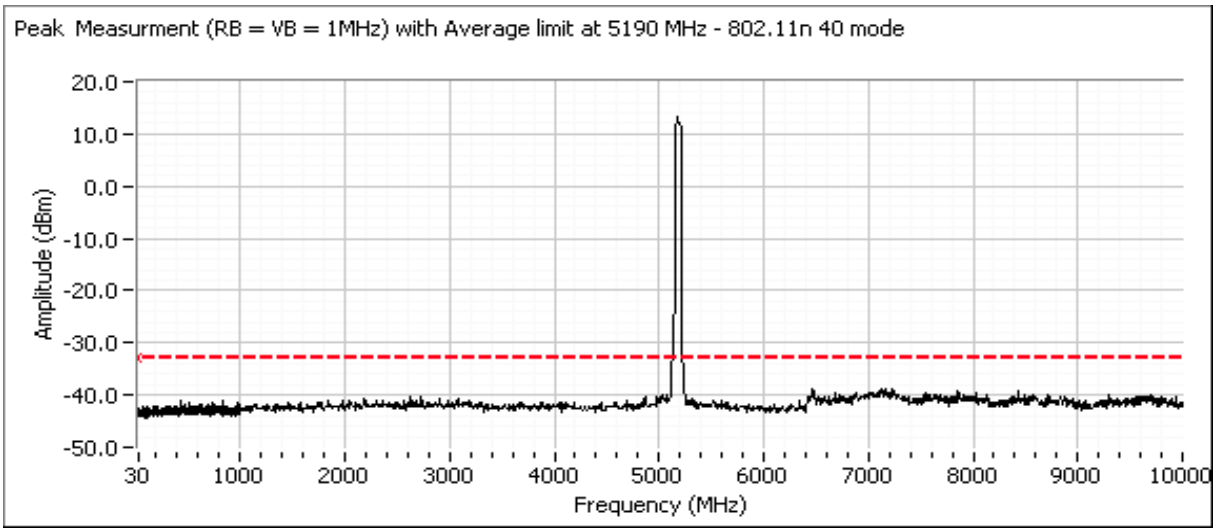
-20dBc of 5240 MHz signal for compliance with FCC at 5250 MHz with power setting of 15.5dBm.



802.11n - 40MHz, Low channel, 5150 - 5250 MHz Band (5190 MHz) with power setting of 17.0dBm.

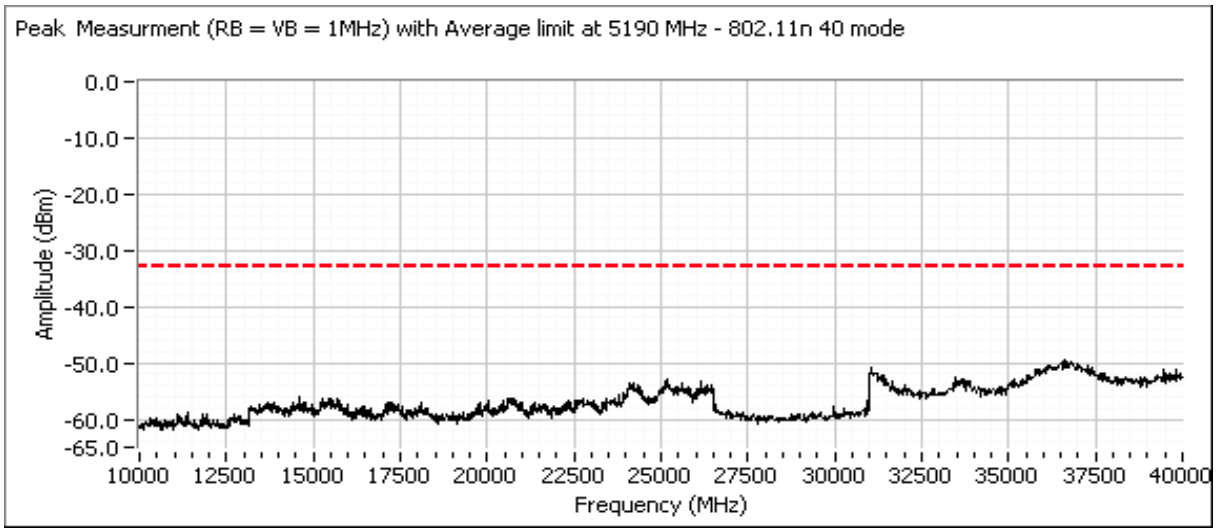
Compliance with the radiated limits for the restricted band immediately below 5150MHz is demonstrated through the radiated emissions tests.

20dB attenuation pad at front of analyzer and 20dB attenuation at software level.



Client:	Xirrus	Job Number:	J71484
Model:	XN4	T-Log Number:	T73388
		Account Manager:	Susan Pelzl
Contact:	Steve Smith		
Standard:	FCC 15 E, RSS 210	Class:	N/A

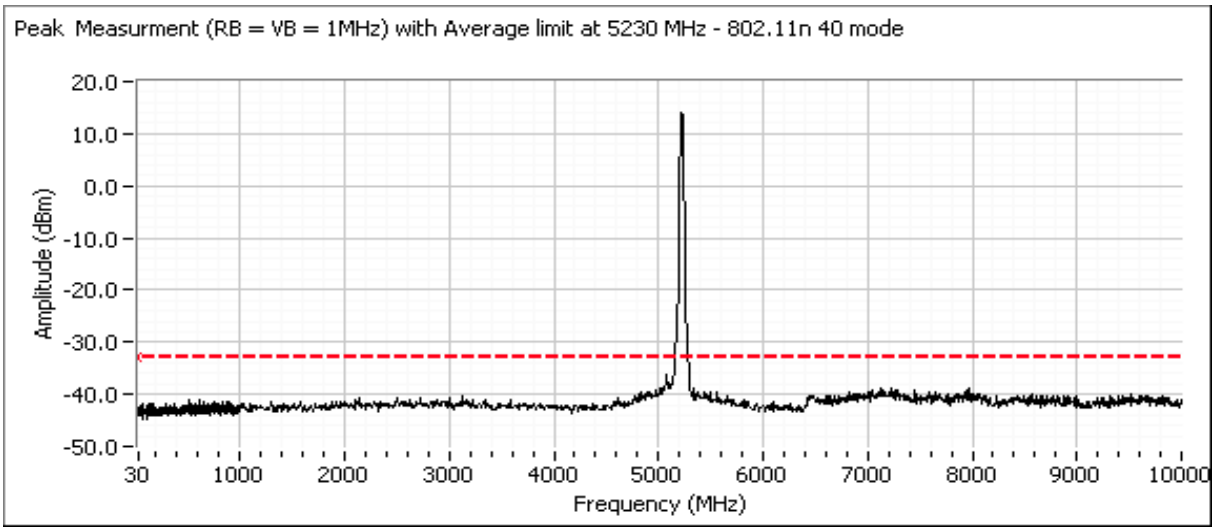
20dB attenuation pad at front of analyzer and 0dB attenuation at software level to reduce the noise floor.



802.11n - 40MHz, High channel, 5150 - 5250 MHz Band (5230 MHz)

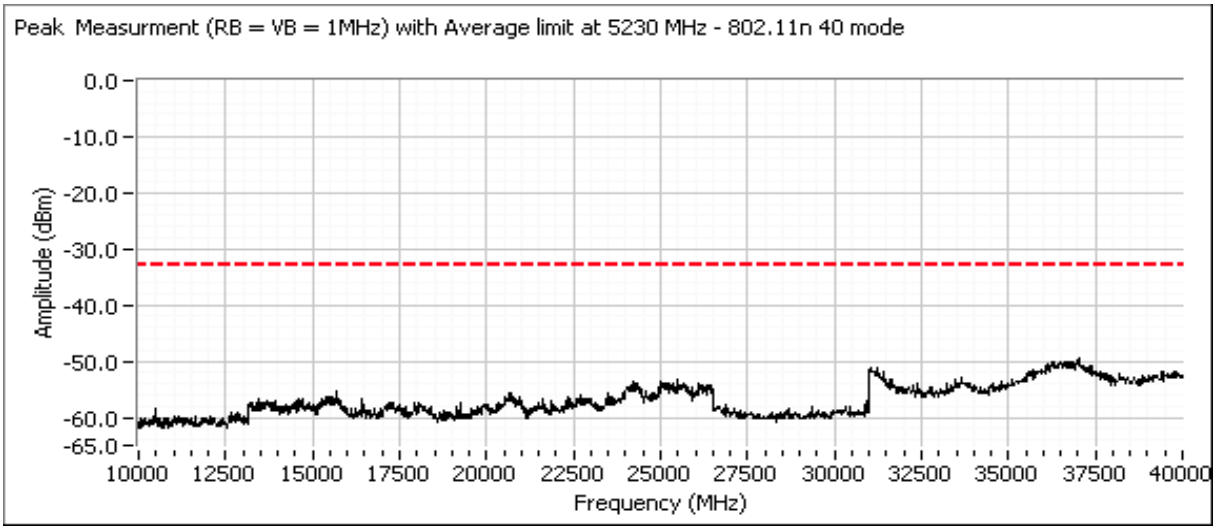
Note; Initial approval for FCC will only allow operation in the 5150 - 5250 MHz NII band so a plot showing -20dBc at 5250 MHz and above is included.

20dB attenuation pad at front of analyzer and 20dB attenuation at software level.

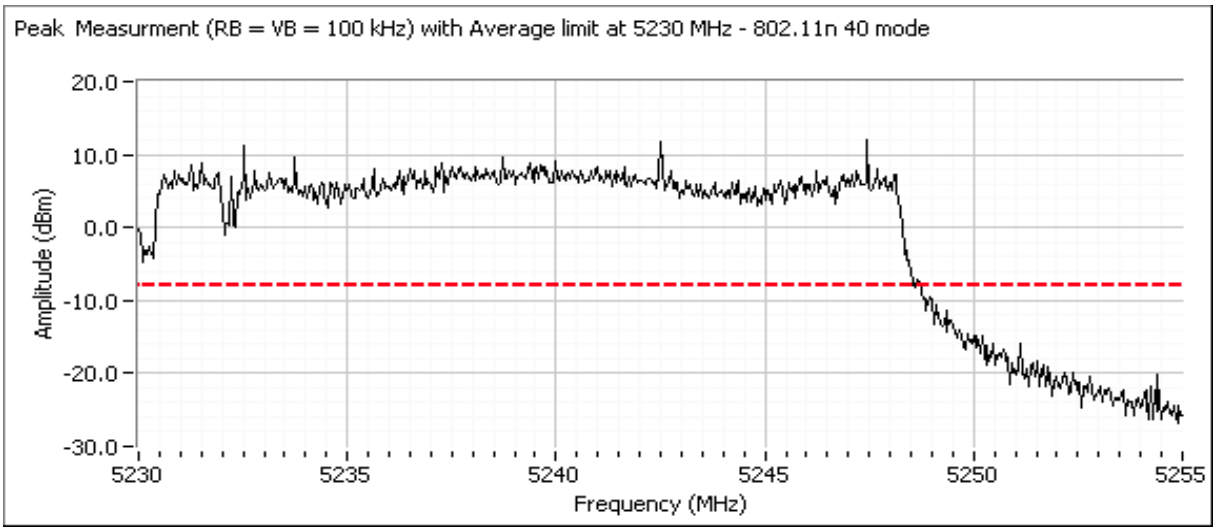


Client:	Xirrus	Job Number:	J71484
Model:	XN4	T-Log Number:	T73388
		Account Manager:	Susan Pelzl
Contact:	Steve Smith		
Standard:	FCC 15 E, RSS 210	Class:	N/A

20dB attenuation pad at front of analyzer and 0dB attenuation at software level to reduce the noise floor.



-20dBc of 5240 MHz signal for compliance with FCC at 5250 MHz with power setting of 15.5dBm.



Client:	Xirrus	Job Number:	J71484
Model:	XN4	T-Log Number:	T73388
		Account Manager:	Susan Pelzl
Contact:	Steve Smith		
Standard:	FCC 15 E, RSS 210	Class:	N/A

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

Test Specific Details

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

Date of Test: 11/6/2008
Test Engineer: Mehran Birgani
Test Location: SV OATS #2

Config. Used: -
Config Change: Direct connection
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: 15-35 °C
Rel. Humidity: 10-60 %

Summary of Results

Run #	Test Performed	Limit	Pass / Fail	Result / Margin
1	Power, 5250 - 5350MHz	15.407(a) (1), (2)	Pass	Single radio: 18.3 dBm 3x radio: 23.1dBm 4x radio: 23.3 dBm
1	PSD, 5250 - 5350MHz	15.407(a) (1), (2)	Pass	5.7 dBm/MHz
1	26dB Bandwidth	15.407	Pass	24.0 MHz
1	99% Bandwidth	RSS 210	-	17.2 MHz
2	Peak Excursion Envelope	15.407(a) (6)	Pass	11.8 dB
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.

Client:	Xirrus	Job Number:	J71484
Model:	XN4	T-Log Number:	T73388
		Account Manager:	Susan Pelzl
Contact:	Steve Smith		
Standard:	FCC 15 E, RSS 210	Class:	N/A

Run #1: Bandwidth, Output Power and Power spectral Density

Antenna gain used is for the internal antenna. The external antenna gain is lower (2.5dBi) and not used for MIMO modes.

Antenna Gain (dBi): 3.0

Power settings for a single radio operating in the band

Frequency (MHz)	Software Setting	Bandwidth 26dB	Bandwidth 99%[4]	Output Power[1] dBm Measured	Output Power[1] dBm Limit	Power (Watts)	PSD[2] dBm/MHz Measured	PSD[2] dBm/MHz FCC Limit	PSD[2] dBm/MHz RSS Limit[3]	Result
5260	20.0	23.3	17.2	18.3	24.0	0.068	5.7	11.0	11.0	Pass
5280	20.0	22.7	17.2	18.1	24.0	0.065	5.6	11.0	11.0	Pass
5320	19.5	24.0	17.2	18.0	24.0	0.063	5.4	11.0	11.0	Pass

Power settings for mutliple channels being used in the band

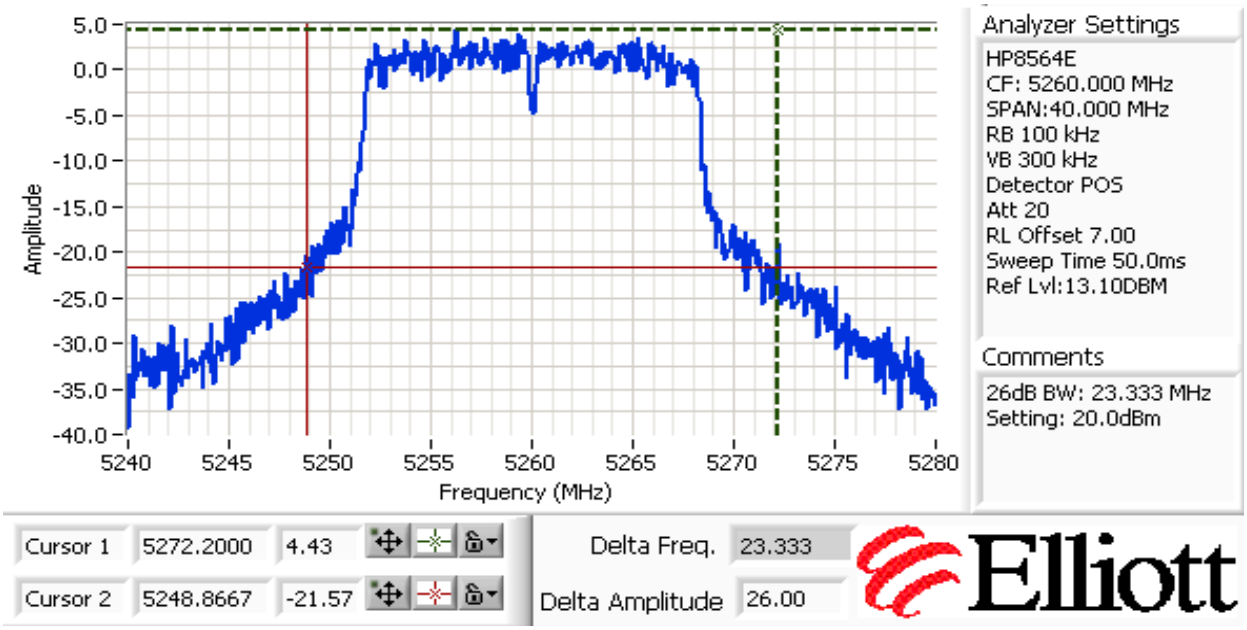
Output power measured on the centre channel to demonstrate power control is available to set the power to a level low enough to comply with limits when all four radios are operational in the band. Only power was measured - aggregation of PSD is not applicable as the device cannot have more than one radio operating on a channel.

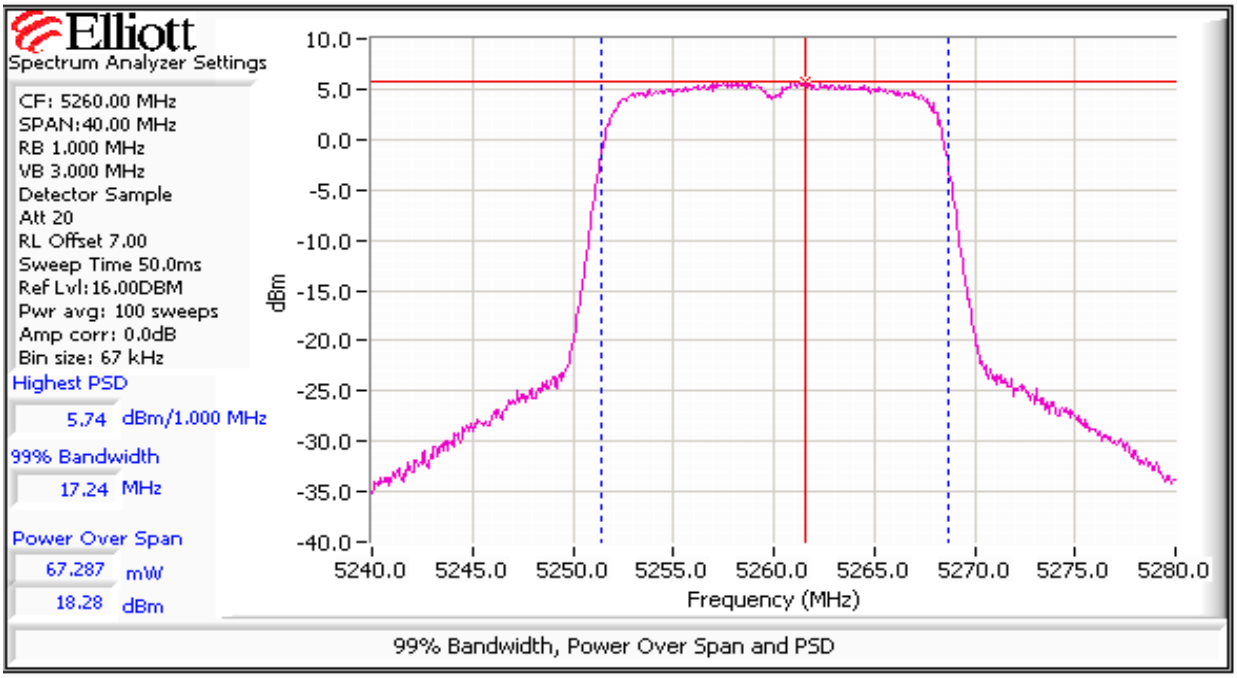
Frequency (MHz)	Software Setting	Bandwidth 26dB	Bandwidth 99%[4]	Measured Power[1] dBm	Measured Power[1] mW	
5260	20.0	23.3	17.2	18.3	67.6	Limit
Total Power Across The Band - 3 radios				23.1	202.8	24 dBm

Frequency (MHz)	Software Setting	Bandwidth 26dB	Bandwidth 99%[4]	Measured Power[1] dBm	Measured Power[1] mW	
5280	19.0	21.9	17.2	17.3	53.7	Limit
Total Power Across The Band - 4 radios				23.3	214.8	24 dBm

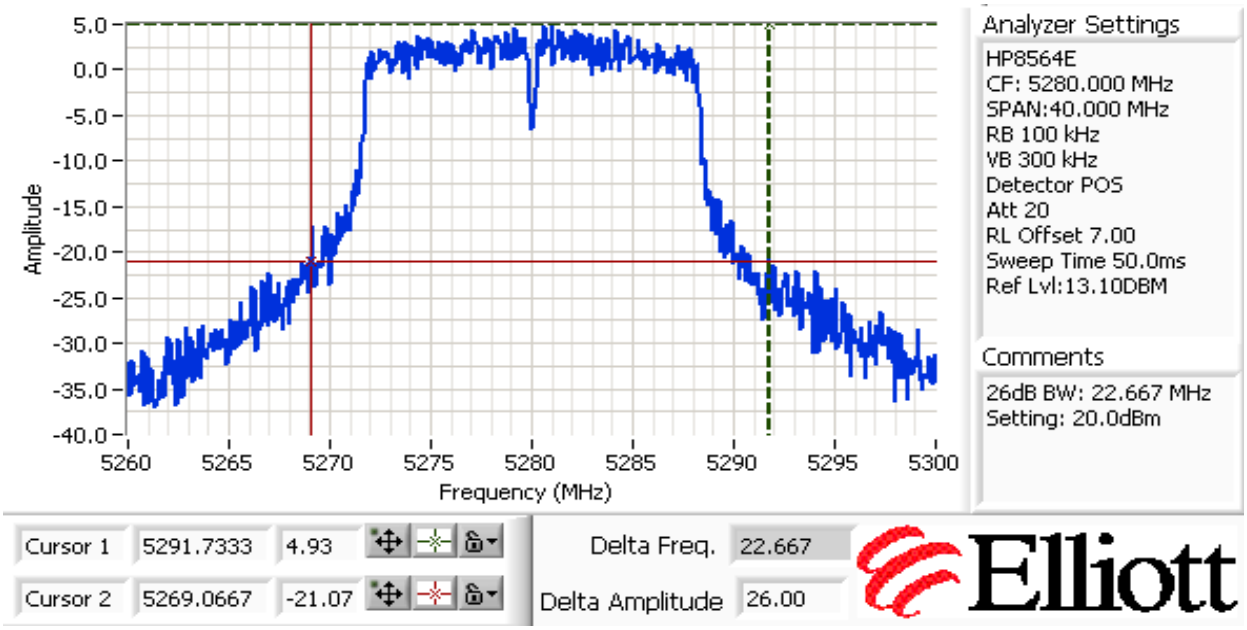
Note 1:	Output power measured using a spectrum analyzer (see plots below): RBW=1MHz, VB=3 MHz, sample detector, power averaging on (transmitted signal was continuous) and power integration over 40 MHz
Note 2:	Measured using the same analyzer settings used for output power.
Note 3:	For RSS-210 the limit for the 5150 - 5250 MHz band accounts for the antenna gain as the maximum eirp allowed is 10dBm/MHz. The limits are also corrected for instances where the highest measured value of the PSD exceeds the average PSD (calculated from the measured power divided by the measured 99% bandwidth) by more than 3dB by the amount that the measured value exceeds the average by more than 3dB.
Note 4:	99% Bandwidth measured in accordance with RSS GEN - RB > 1% of span and VB >=3xRB

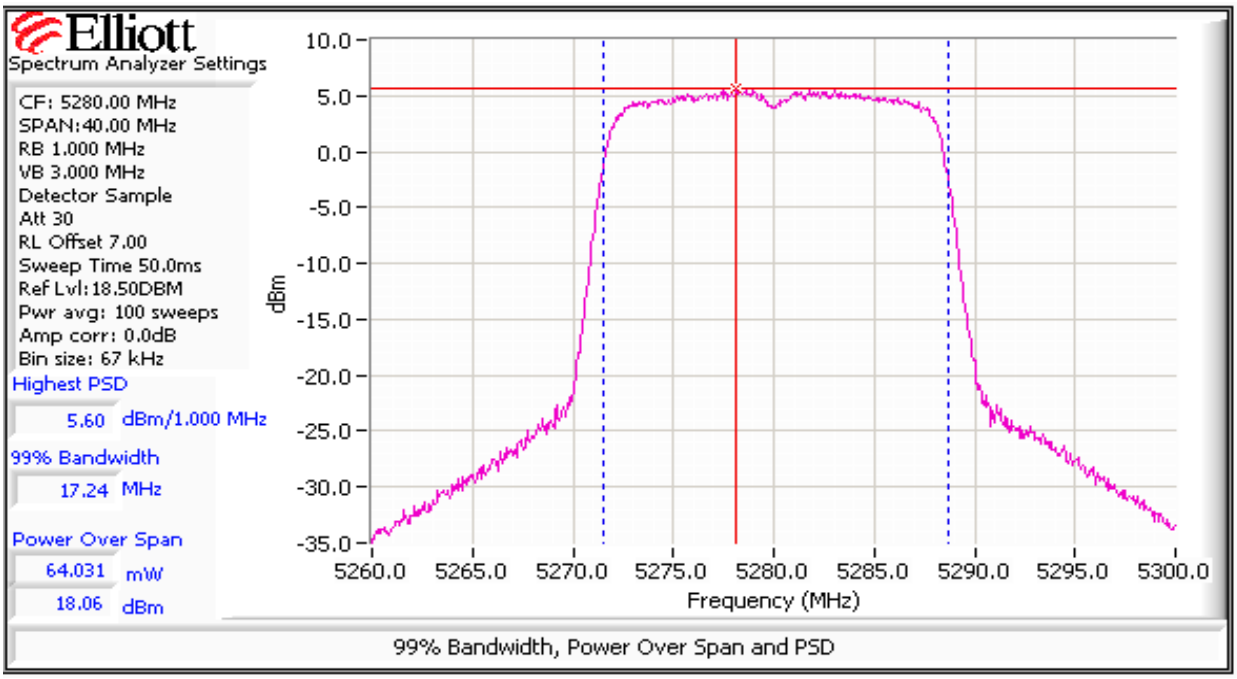
Client:	Xirrus	Job Number:	J71484
Model:	XN4	T-Log Number:	T73388
		Account Manager:	Susan Pelzl
Contact:	Steve Smith		
Standard:	FCC 15 E, RSS 210	Class:	N/A



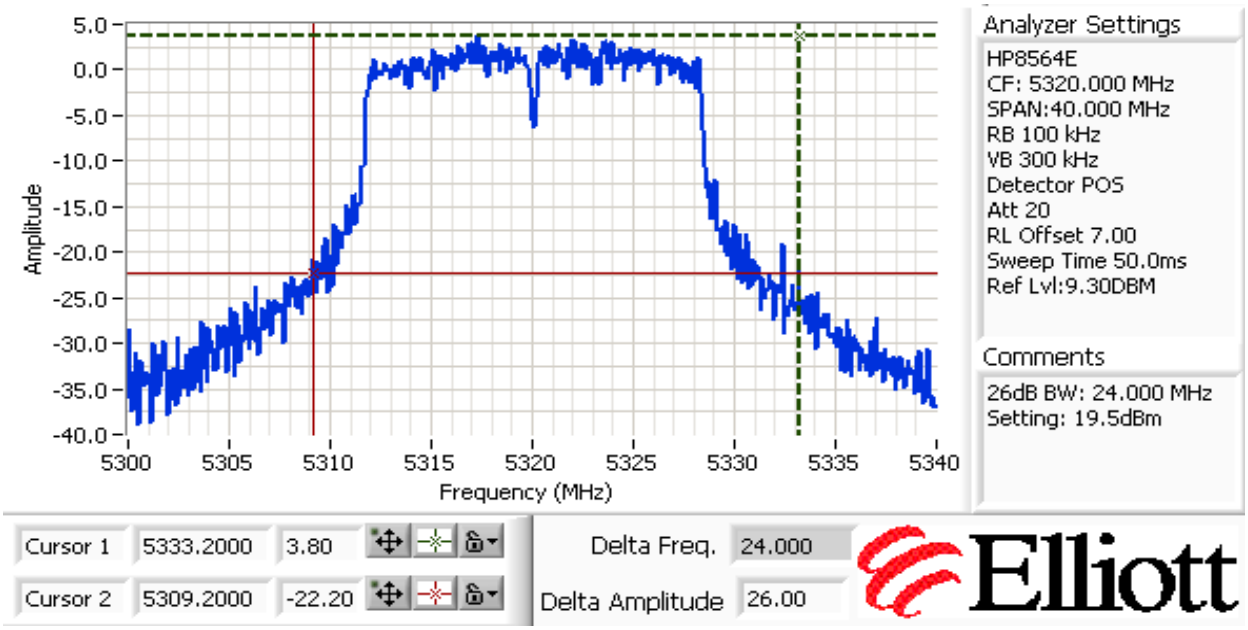


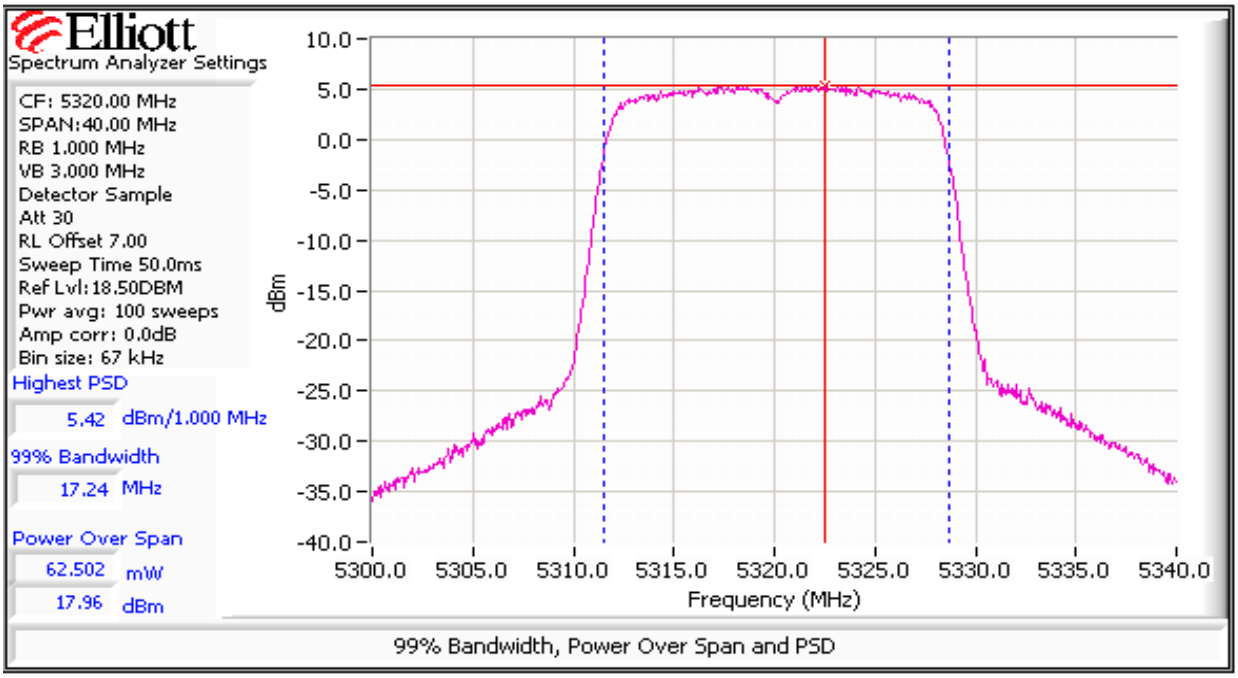
Client:	Xirrus	Job Number:	J71484
Model:	XN4	T-Log Number:	T73388
		Account Manager:	Susan Pelzl
Contact:	Steve Smith		
Standard:	FCC 15 E, RSS 210	Class:	N/A





Client:	Xirrus	Job Number:	J71484
Model:	XN4	T-Log Number:	T73388
		Account Manager:	Susan Pelzl
Contact:	Steve Smith		
Standard:	FCC 15 E, RSS 210	Class:	N/A





Client:	Xirrus	Job Number:	J71484
Model:	XN4	T-Log Number:	T73388
		Account Manager:	Susan Pelzl
Contact:	Steve Smith		
Standard:	FCC 15 E, RSS 210	Class:	N/A

Run #2: Peak Excursion Measurement

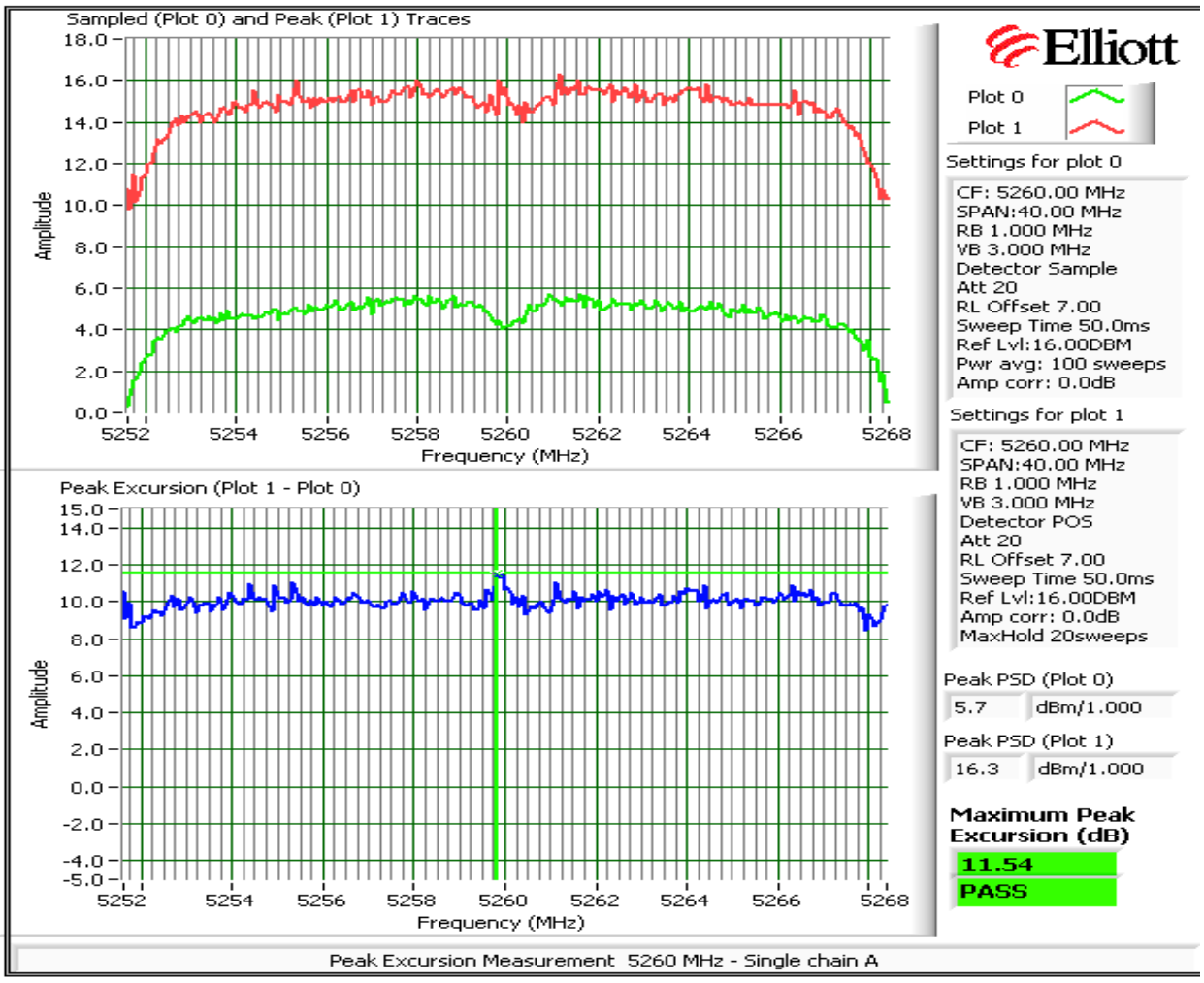
Device meets the requirement for the peak excursion

Freq	Peak Excursion(dB)		Freq	Peak Excursion(dB)		Freq	Peak Excursion(dB)	
(MHz)	Value	Limit	(MHz)	Value	Limit	(MHz)	Value	Limit
5180		13.0	5260	11.5	13.0	5500		13.0
5200		13.0	5300	11.5	13.0	5600		13.0
5240		13.0	5320	11.8	13.0	5700		13.0

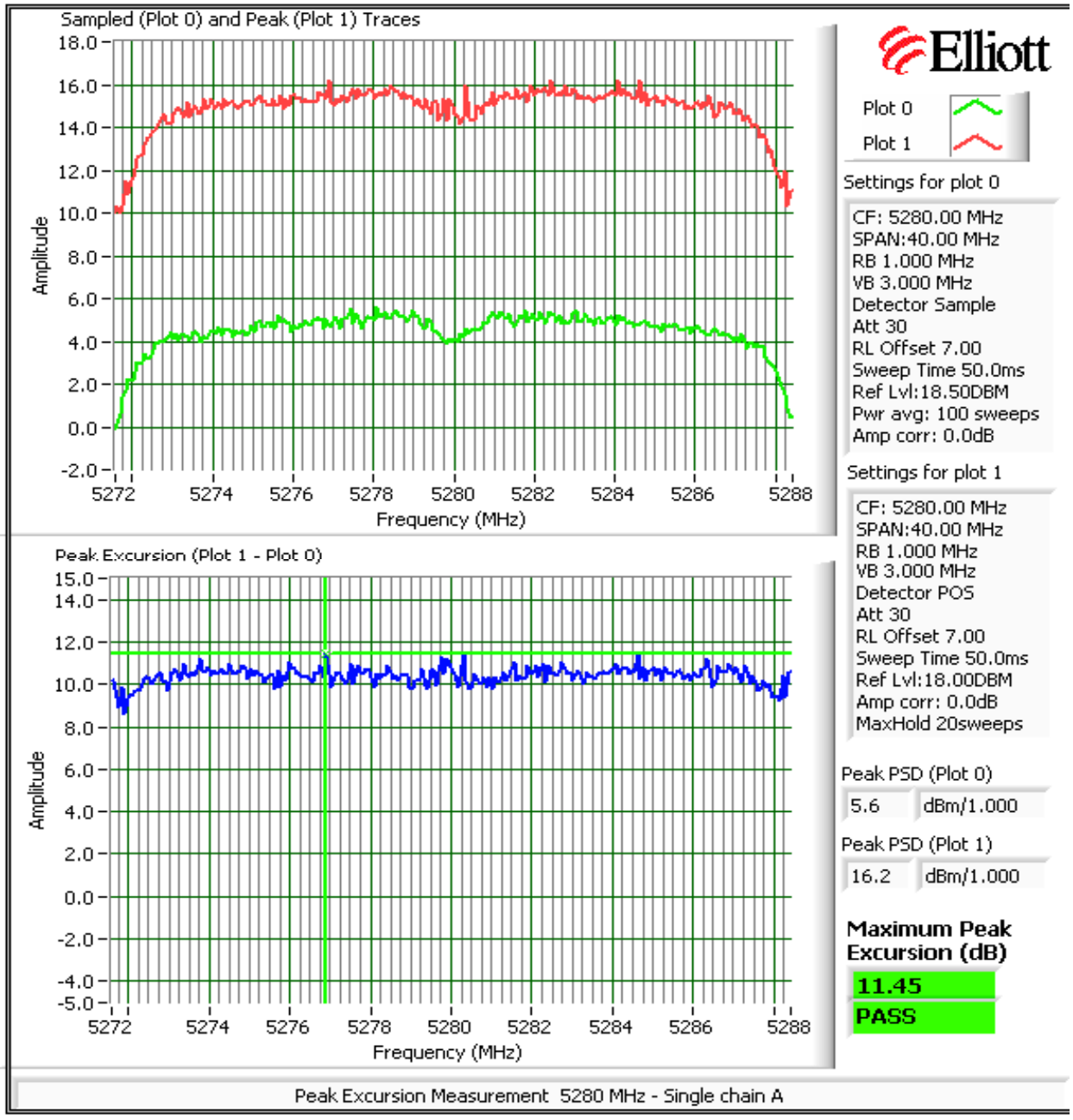
Plots Showing Peak Excursion

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

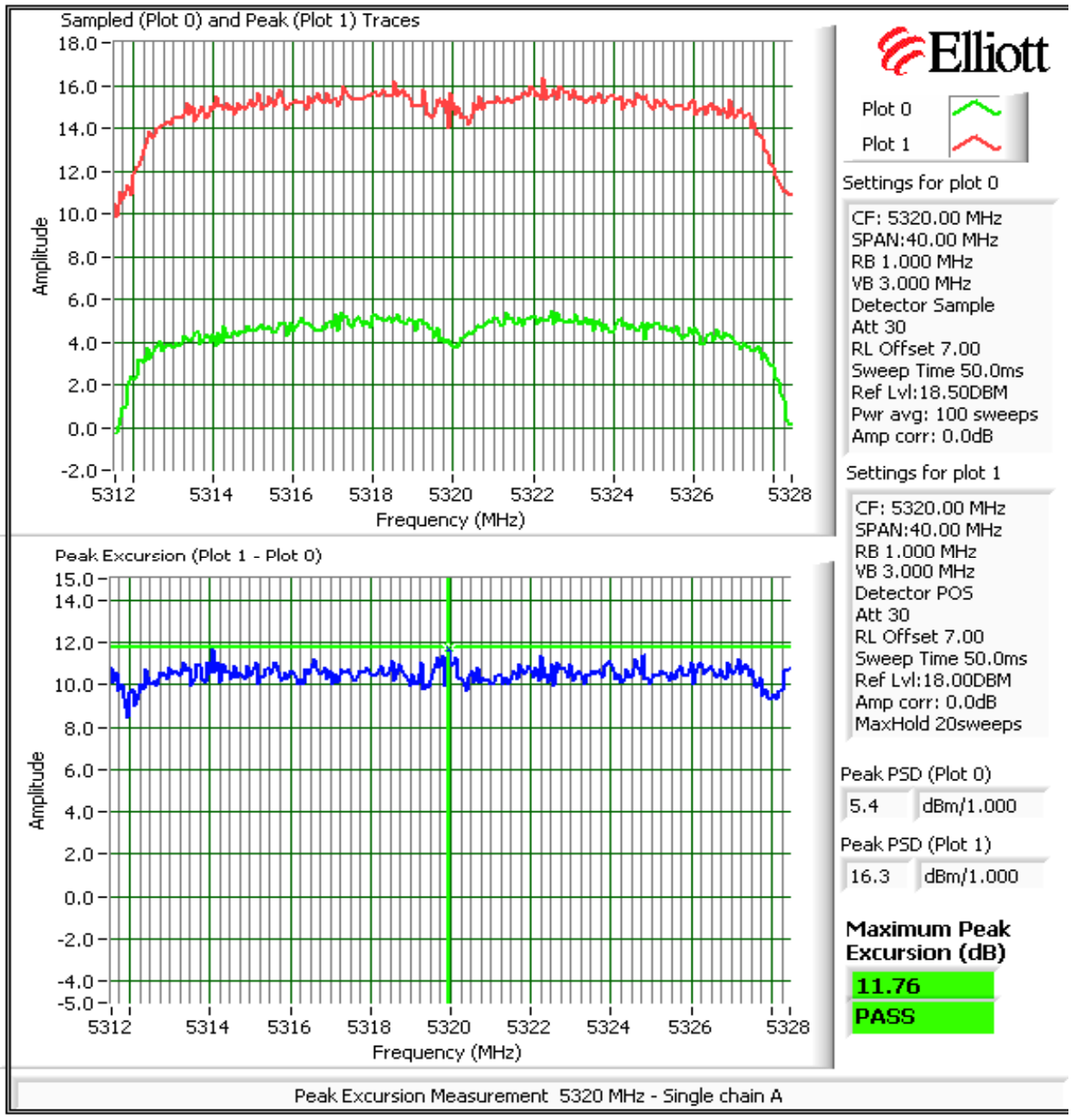
Trace B: RBW = 1 MHz, VBW = 3MHz, Integrated average power



Client:	Xirrus	Job Number:	J71484
Model:	XN4	T-Log Number:	T73388
		Account Manager:	Susan Pelzl
Contact:	Steve Smith		
Standard:	FCC 15 E, RSS 210	Class:	N/A



Client:	Xirrus	Job Number:	J71484
Model:	XN4	T-Log Number:	T73388
		Account Manager:	Susan Pelzl
Contact:	Steve Smith		
Standard:	FCC 15 E, RSS 210	Class:	N/A



Client:	Xirrus	Job Number:	J71484
Model:	XN4	T-Log Number:	T73388
		Account Manager:	Susan Pelzl
Contact:	Steve Smith		
Standard:	FCC 15 E, RSS 210	Class:	N/A

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

MIMO Devices: As the output power setting for the single chain mode is higher than the setting for dual chain, and by adjusting the limit for out of band spurious emissions to account for dual chain operation, the plots below cover both single- and dual chain operation.

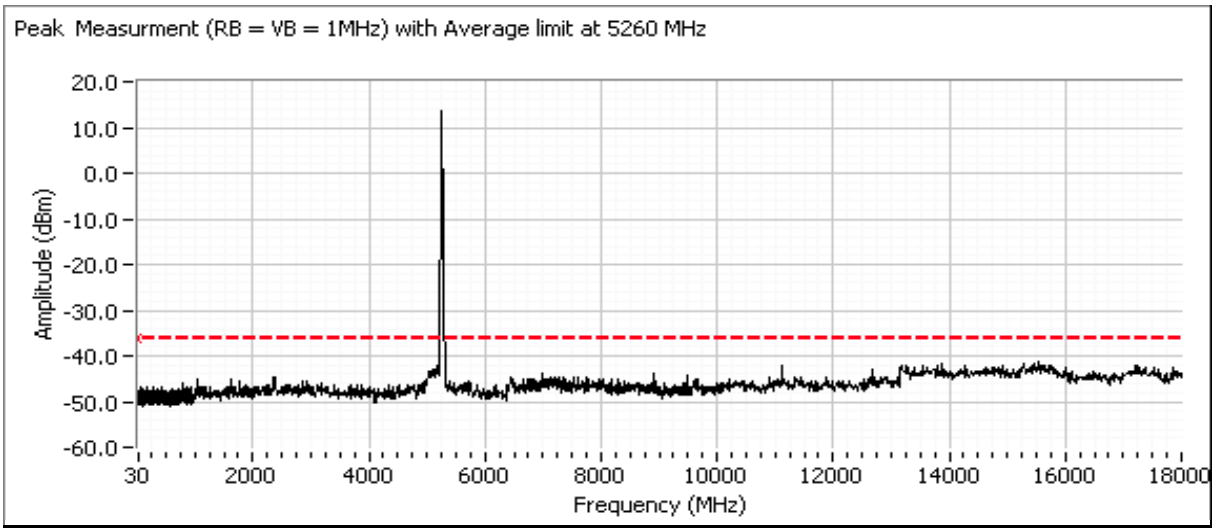
Number of transmit chains:	2		
Maximum Antenna Gain:	3.0	dBi	
Spurious Limit:	-27.0	dBm/MHz eirp	
Adjustment for 2 chains:	-6.0	dB	adjustment for multiple chains and coherency between chains.
Limit Used On Plots [Note 1]:	-36.0	dBm/MHz	Average Limit (RB=1MHz, VB=10Hz)
	-16.0	dBm/MHz	Peak Limit (RB=VB=1MHz)

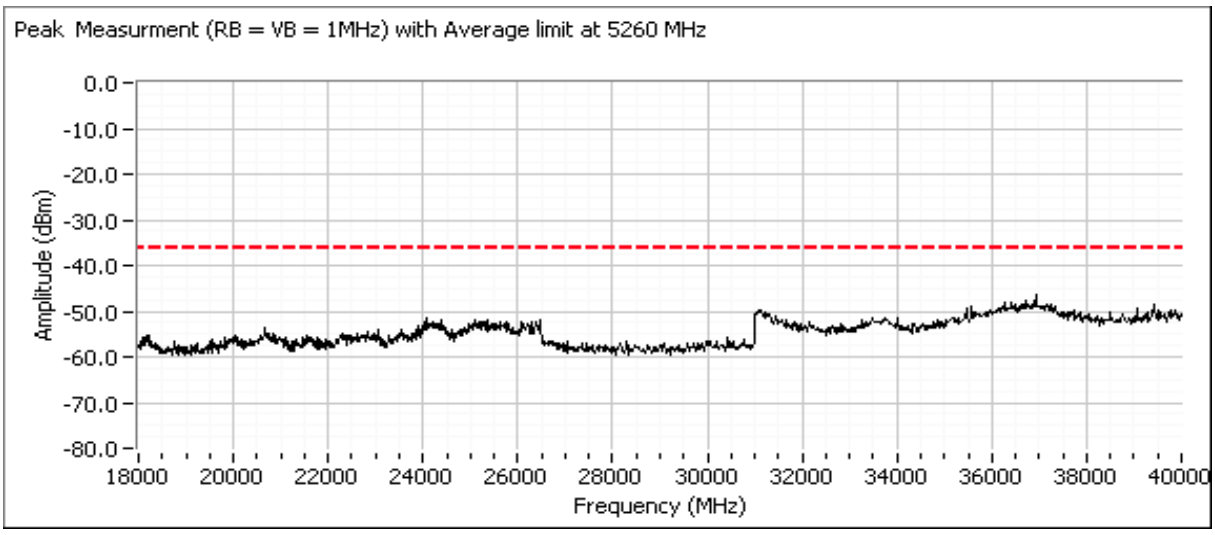
Note 1:	The -27dBm/MHz limit is an eirp limit. The limit for antenna port conducted measurements is adjusted to take into consideration the maximum antenna gain (limit = -27dBm - antenna gain). Radiated field strength measurements for signals more than 50MHz from the bands and that are close to the limit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

Client:	Xirrus	Job Number:	J71484
Model:	XN4	T-Log Number:	T73388
		Account Manager:	Susan Pelzl
Contact:	Steve Smith		
Standard:	FCC 15 E, RSS 210	Class:	N/A

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

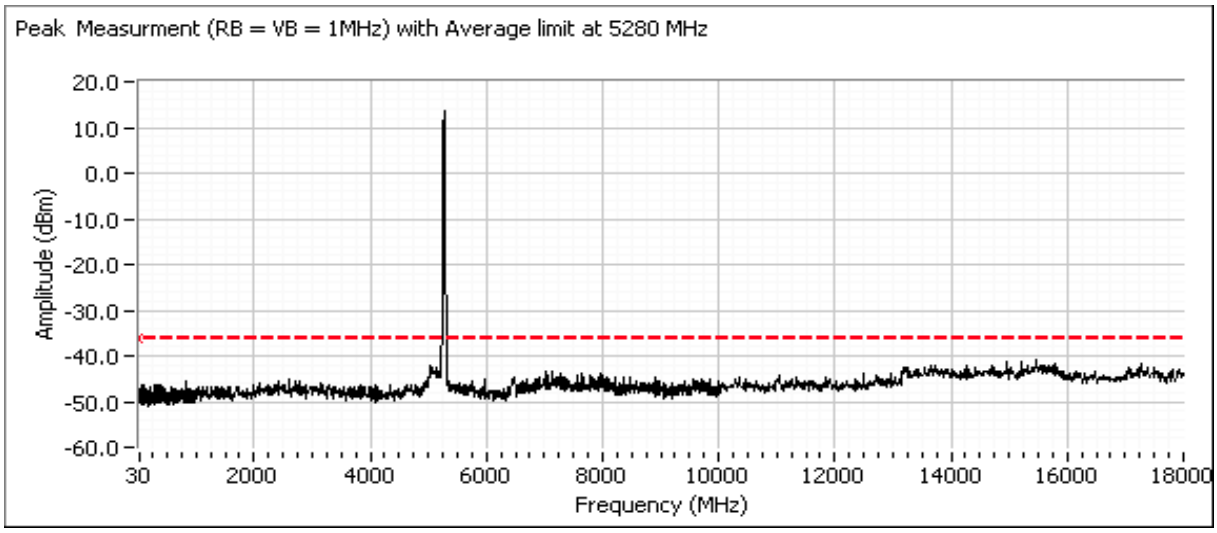
Low channel, 5250 - 5350 MHz Band with Power Setting of 20, Chain A and Chain C

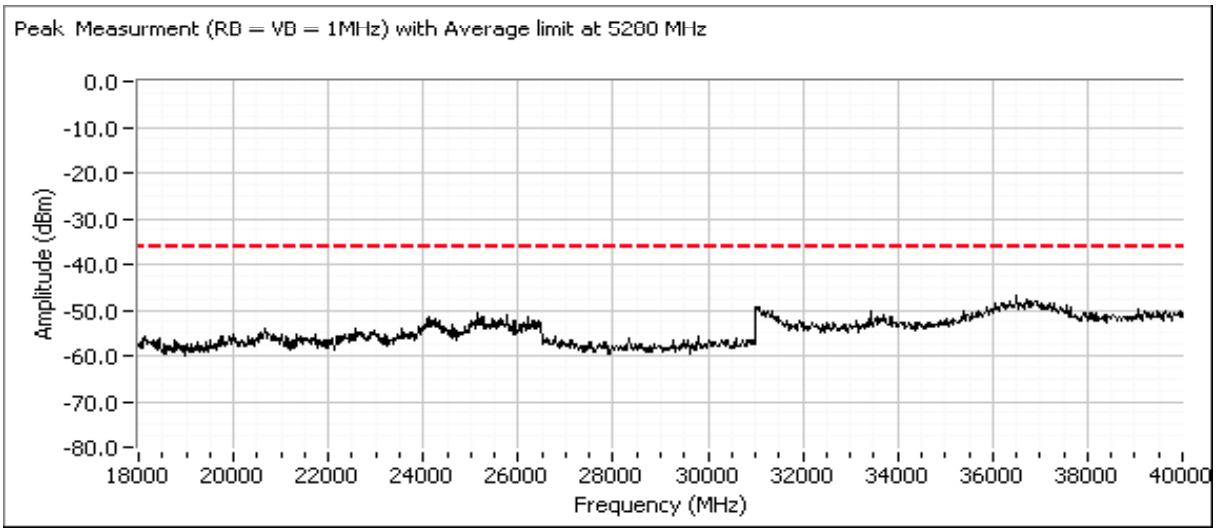




Client:	Xirrus	Job Number:	J71484
Model:	XN4	T-Log Number:	T73388
		Account Manager:	Susan Pelzl
Contact:	Steve Smith		
Standard:	FCC 15 E, RSS 210	Class:	N/A

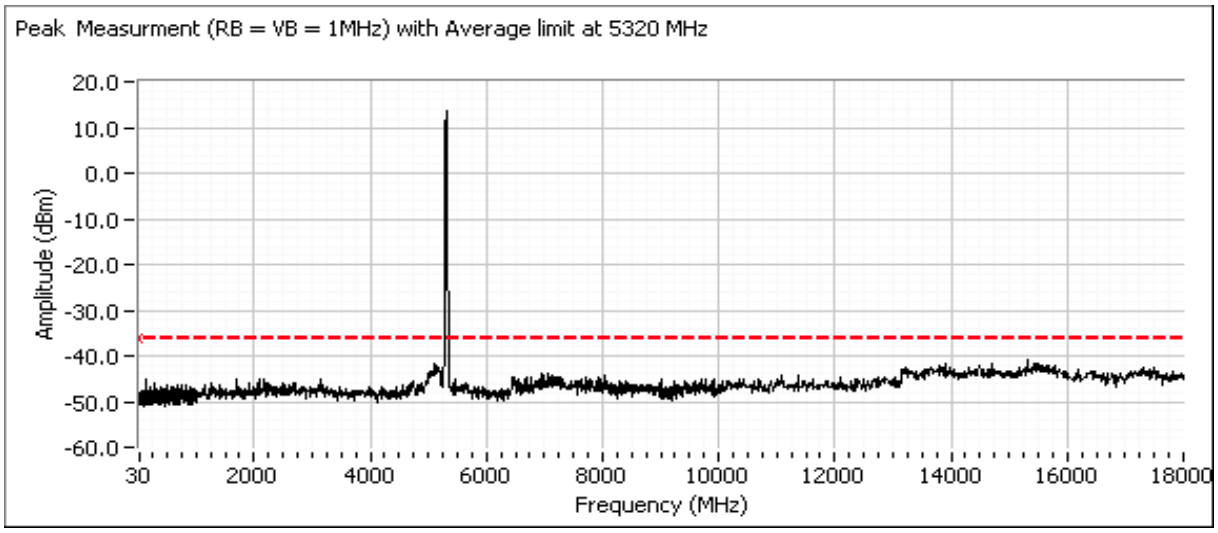
Center channel, 5250 - 5350 MHz Band with Power Setting of 20, Chain A and Chain C

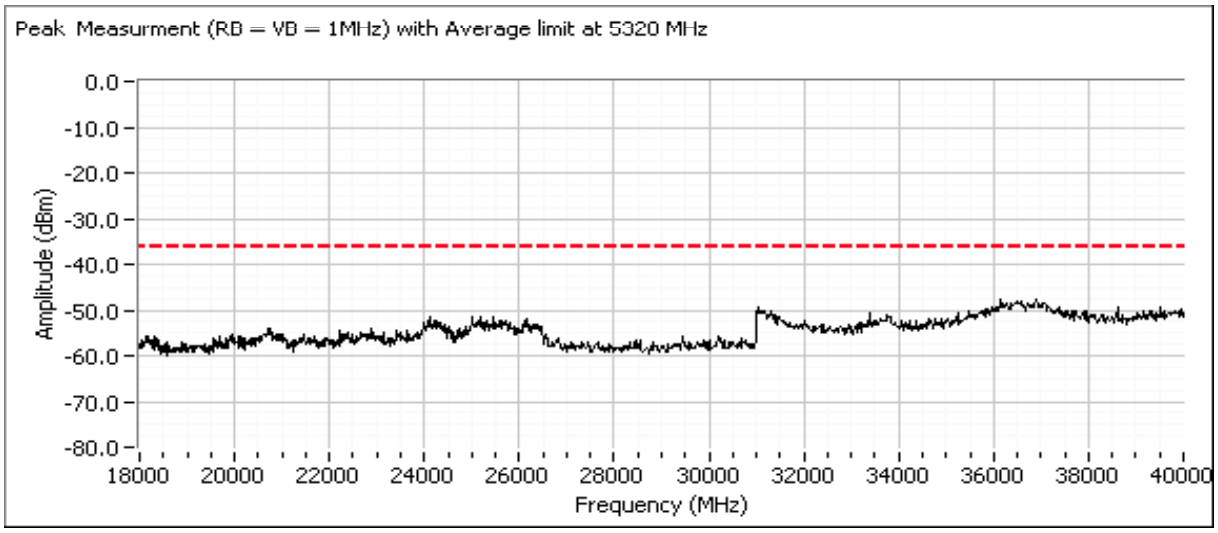




Client:	Xirrus	Job Number:	J71484
Model:	XN4	T-Log Number:	T73388
		Account Manager:	Susan Pelzl
Contact:	Steve Smith		
Standard:	FCC 15 E, RSS 210	Class:	N/A

High channel, 5250 - 5350 MHz Band with Power Setting of 20dBm, Chain A and Chain C





Client:	Xirrus	Job Number:	J71484
Model:	XN4	T-Log Number:	T73388
		Account Manager:	Susan Pelzl
Contact:	Steve Smith		
Standard:	FCC 15 E, RSS 210	Class:	N/A

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

Test Specific Details

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

Date of Test: 11/7/2008
Test Engineer: Rafael Varelas
Test Location: OATS #1

Config. Used: AC powered
Config Change: Direct connection
EUT Voltage: PoE

General Test Configuration

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

Ambient Conditions:

Temperature: 15-36 °C
Rel. Humidity: 10-60 %

Summary of Results

Run #	Test Performed	Limit	Pass / Fail	Result
1	Power, 5250 - 5350MHz	15.407(a) (1), (2)	Pass	Single radio: 21.3 dBm 4x radio: 23.9 dBm
1	PSD, 5250 - 5350MHz	15.407(a) (1), (2)	Pass	8.8 dBm/MHz
1	26dB Bandwidth	15.407	-	25.8 MHz
1	99% Bandwidth	RSS 210	-	17.3 MHz
2	Peak Excursion Envelope	15.407(a) (6)	Pass	12.6 dB
3	Antenna Conducted Out of Band Spurious	15.407(b)	Covered by single-chain mode measurements	

Modifications Made During Testing

No modifications were made to the EUT during testing

Deviations From The Standard

No deviations were made from the requirements of the standard.

Client:	Xirrus	Job Number:	J71484
Model:	XN4	T-Log Number:	T73388
		Account Manager:	Susan Pelzl
Contact:	Steve Smith		
Standard:	FCC 15 E, RSS 210	Class:	N/A

Run #1: Bandwidth, Output Power and Power spectral Density

Antenna gain used is for the internal antenna. The external antenna gain is lower (2.5dBi) and not used for MIMO modes.

	Chain 1	Chain 2	Chain 3	Coherent	Effective[5]
Antenna Gain (dBi):	3		3	Yes	6.0

Power settings for a single radio operating in the band

Frequency (MHz)	Software Setting	26dB BW (MHz)	Measured Output Power[1] dBm			Total		Limit (dBm)	Max Power (W)	Pass or Fail
			Chain 1	Chain 2	Chain 3	mW	dBm			
5260	20.0	24.9	17.9		18.3	128.7	21.1	24.0	0.134	PASS
5300	20.0	25.8	18.7		17.8	134.3	21.3	24.0		PASS
5320	19.0	25.3	17.6		16.5	102.2	20.1	24.0		PASS

Frequency (MHz)	99%[4] BW	Total Power	PSD[2] dBm/MHz			Total PSD		Limit		Pass or Fail
			Chain 1	Chain 2	Chain 3	mW/MHz	dBm/MHz	FCC	RSS 210[3]	
5260	17.2	21.1	5.3		5.7	7.1	8.5	11.0	11.0	PASS
5300	17.3	21.3	6.1		5.3	7.5	8.7	11.0	11.0	PASS
5320	17.2	20.1	5.2		4.0	5.8	7.7	11.0	11.0	PASS

Client:	Xirrus	Job Number:	J71484
Model:	XN4	T-Log Number:	T73388
		Account Manager:	Susan Pelzl
Contact:	Steve Smith		
Standard:	FCC 15 E, RSS 210	Class:	N/A

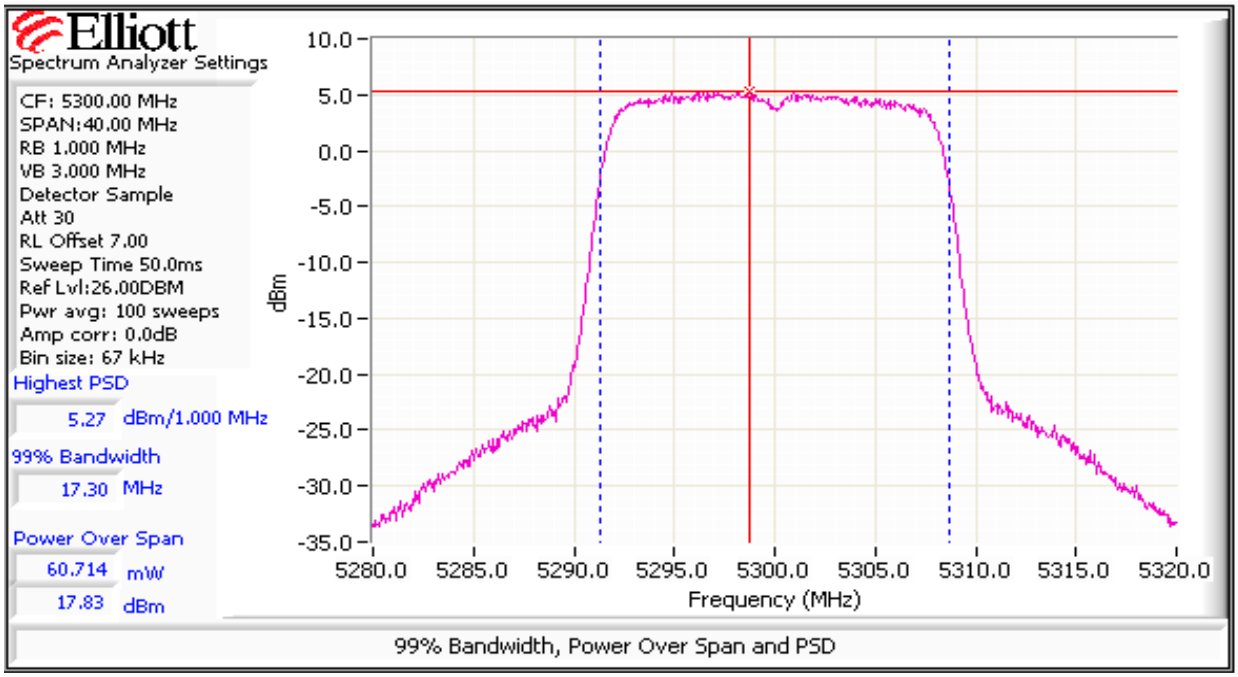
Power settings for all four 802.11a channels being used in the band:

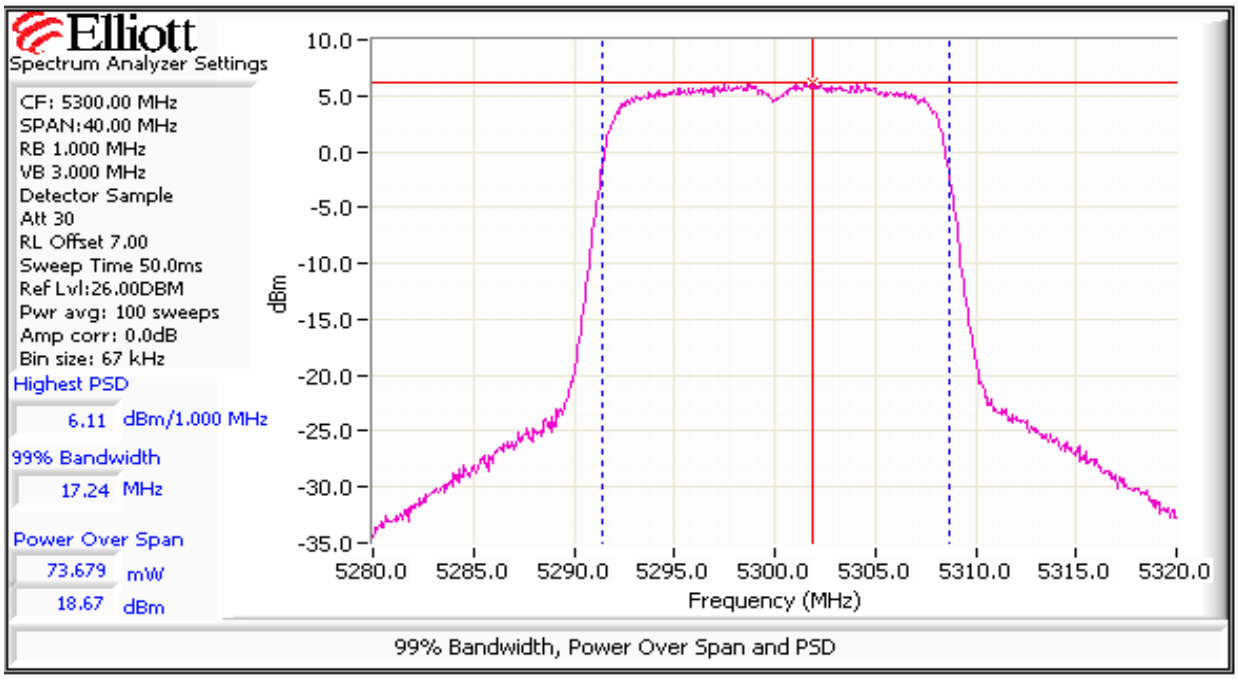
Output power measured on the center channel to demonstrate power control is available to set the power to a level low enough to comply with limits when all four radios are operational in the band. Only power was measured - aggregation of PSD is not applicable as the device cannot have more than one radio operating on a channel.

Frequency (MHz)	Software Setting	26dB BW (MHz)	Measured Output Power[1] dBm			Total				
			Chain 1	Chain 2	Chain 3	mW	dBm			
5300	16.5	25.8	14.9		14.9	61.8	17.9	Limit	P (W)	Result
Total power in the band (four radios operational):						247.2	23.9	24.0	0.247	PASS

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

Client:	Xirrus	Job Number:	J71484
Model:	XN4	T-Log Number:	T73388
		Account Manager:	Susan Pelzl
Contact:	Steve Smith		
Standard:	FCC 15 E, RSS 210	Class:	N/A





Client:	Xirrus	Job Number:	J71484
Model:	XN4	T-Log Number:	T73388
		Account Manager:	Susan Pelzl
Contact:	Steve Smith		
Standard:	FCC 15 E, RSS 210	Class:	N/A

Run #2: Peak Excursion Measurement

Device meets the requirement for the peak excursion

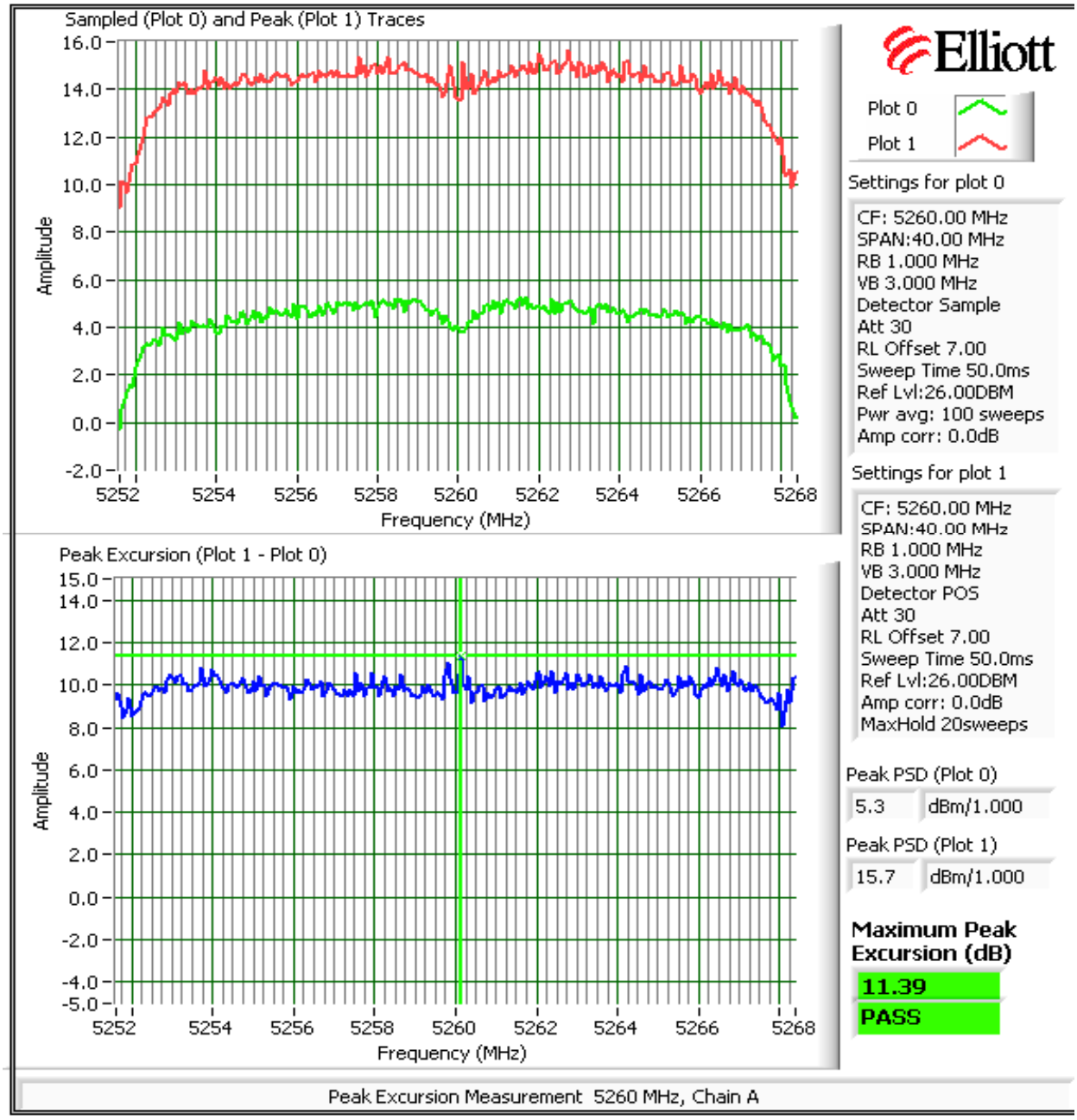
Freq	Peak Excursion(dB)		Freq	Peak Excursion(dB)		Freq	Peak Excursion(dB)	
(MHz)	Value	Limit	(MHz)	Value	Limit	(MHz)	Value	Limit
5180		13.0	5260	11.4	13.0	5500		13.0
5200		13.0	5300	11.7	13.0	5600		13.0
5240		13.0	5320	12.6	13.0	5700		13.0

Plots Showing Peak Excursion

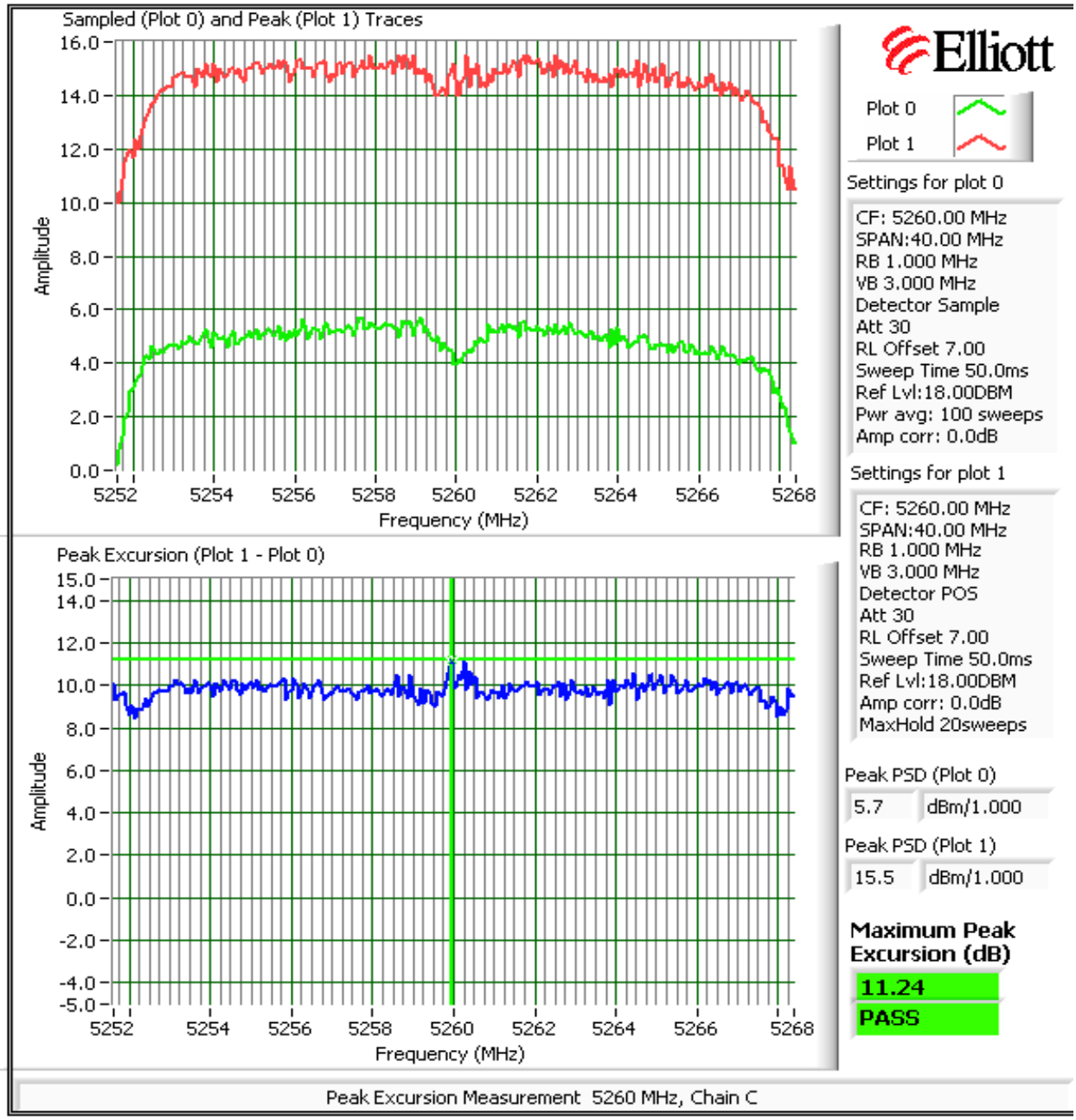
Trace A: RBW = VBW = 3MHz, Peak hold

Trace B: RBW = 1 MHz, VBW = 3MHz, Integrated average power

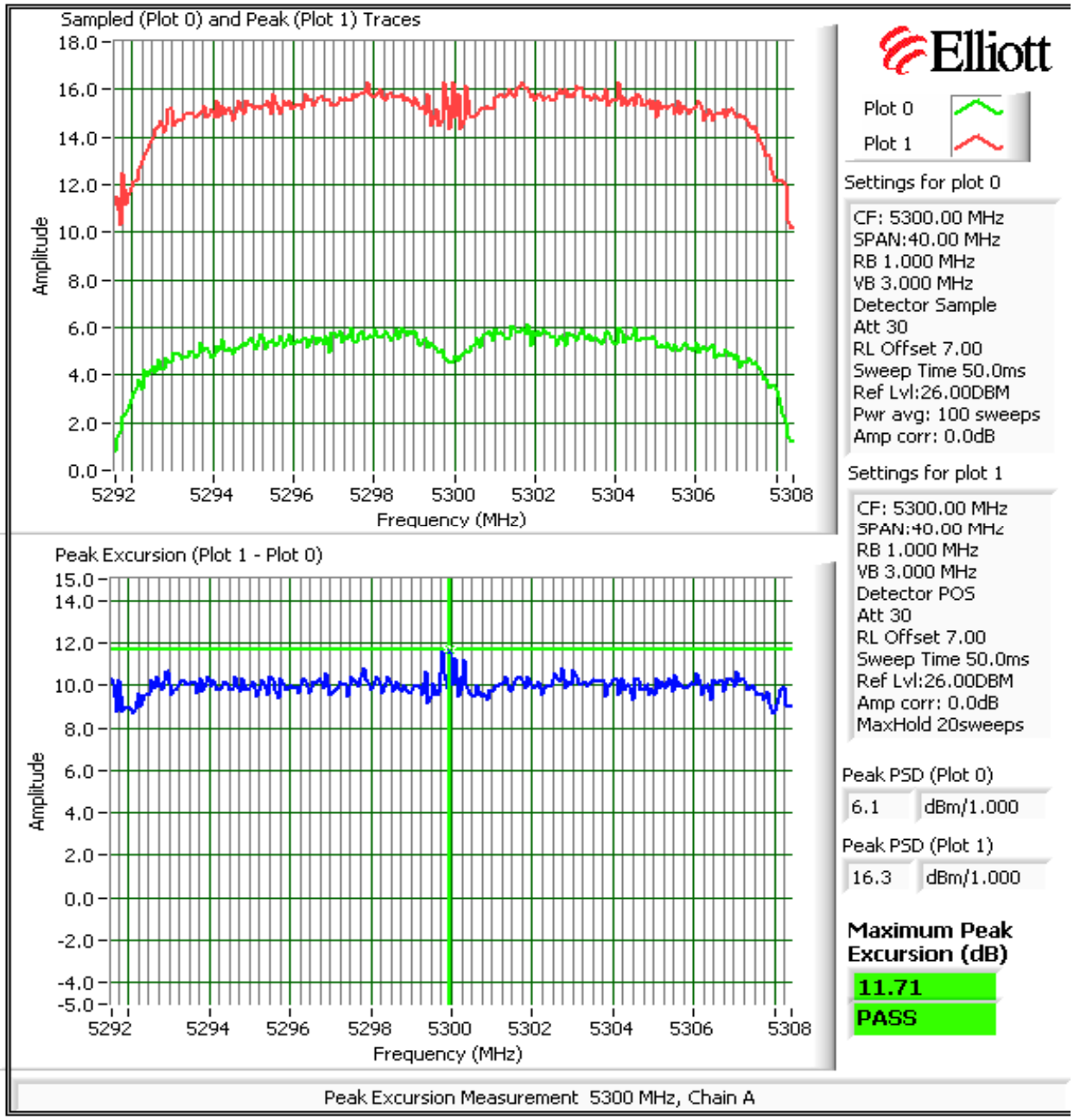
Client:	Xirrus	Job Number:	J71484
Model:	XN4	T-Log Number:	T73388
		Account Manager:	Susan Pelzl
Contact:	Steve Smith		
Standard:	FCC 15 E, RSS 210	Class:	N/A



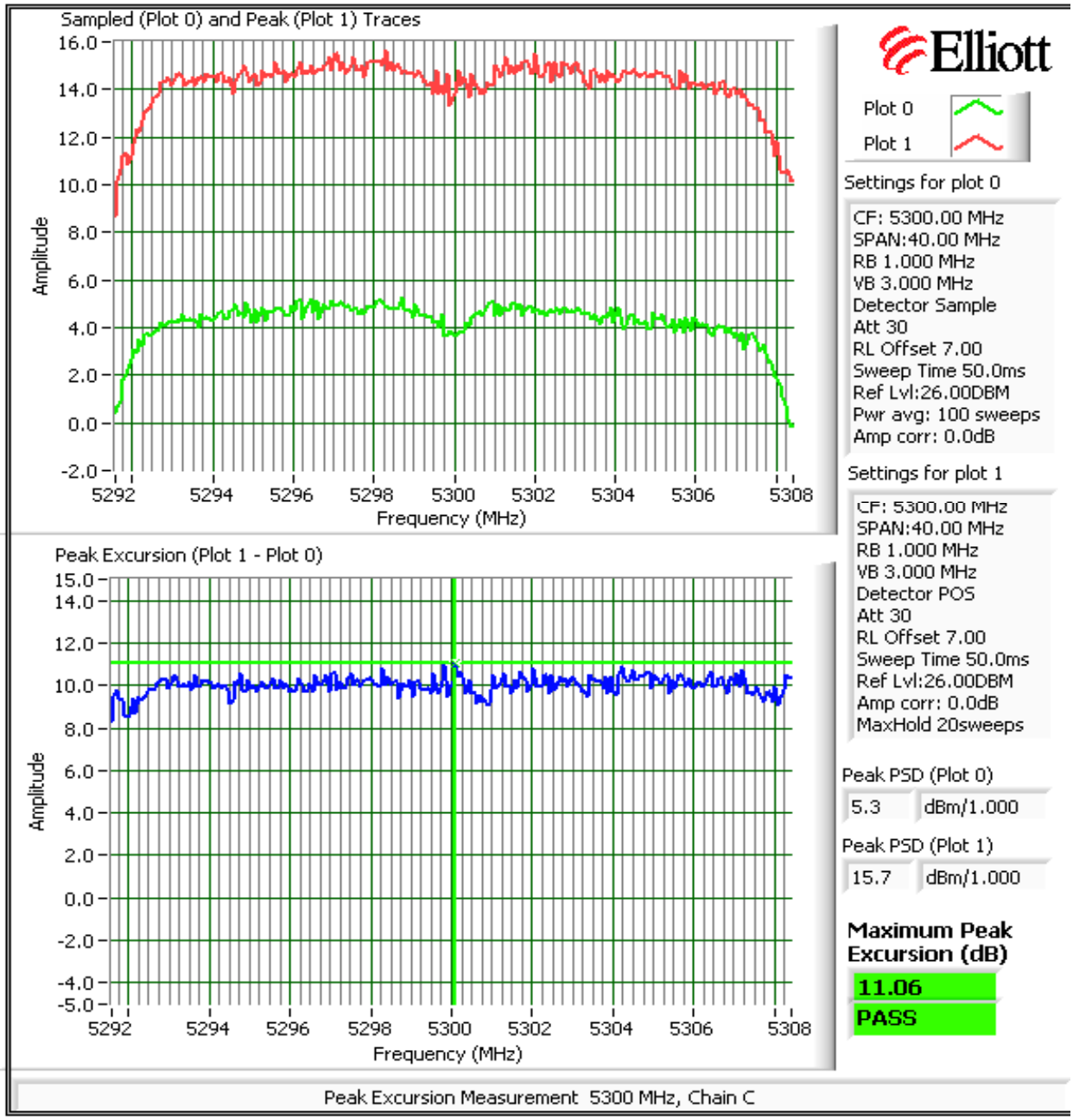
Client:	Xirrus	Job Number:	J71484
Model:	XN4	T-Log Number:	T73388
		Account Manager:	Susan Pelzl
Contact:	Steve Smith		
Standard:	FCC 15 E, RSS 210	Class:	N/A



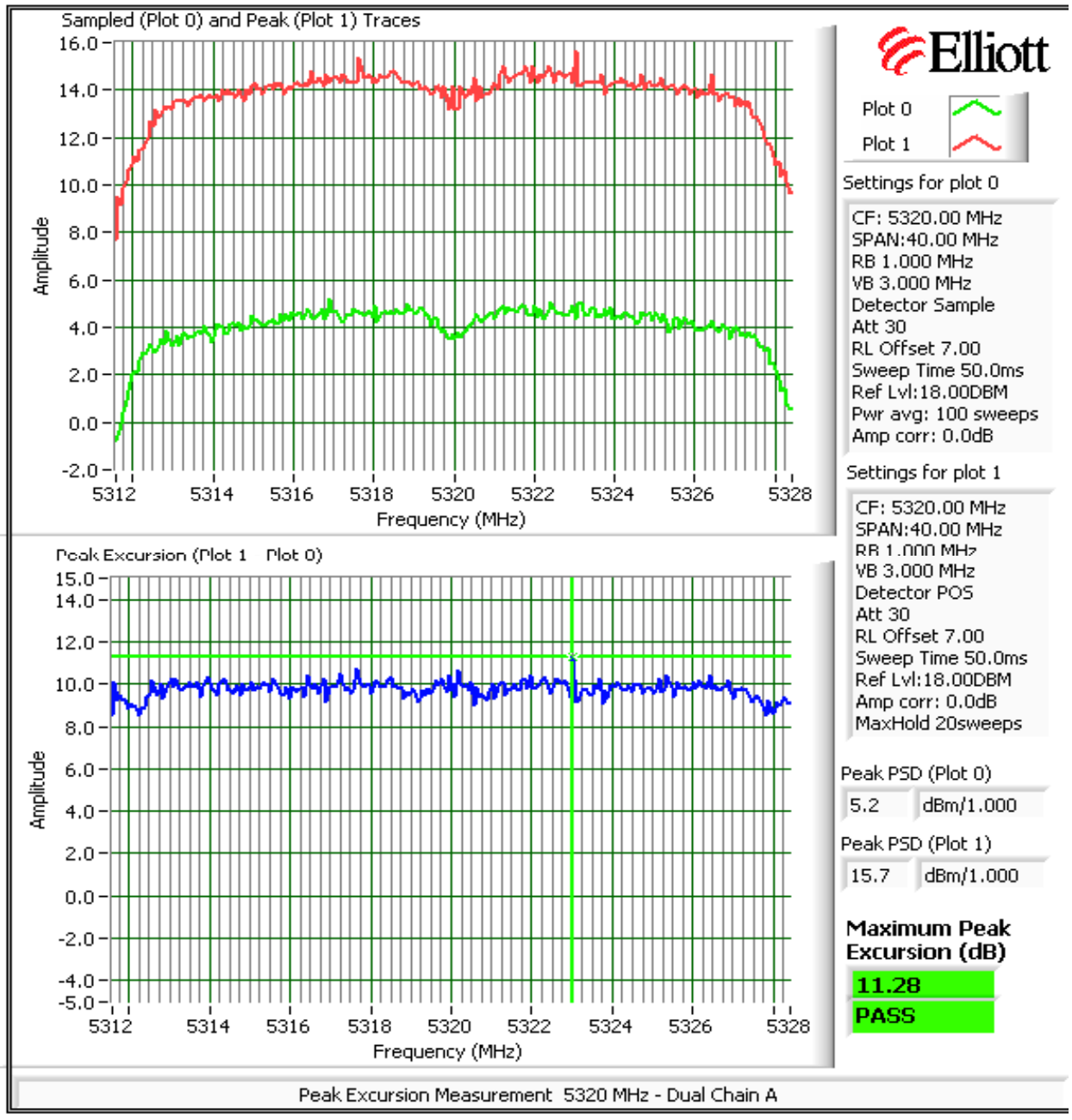
Client:	Xirrus	Job Number:	J71484
Model:	XN4	T-Log Number:	T73388
		Account Manager:	Susan Pelzl
Contact:	Steve Smith		
Standard:	FCC 15 E, RSS 210	Class:	N/A



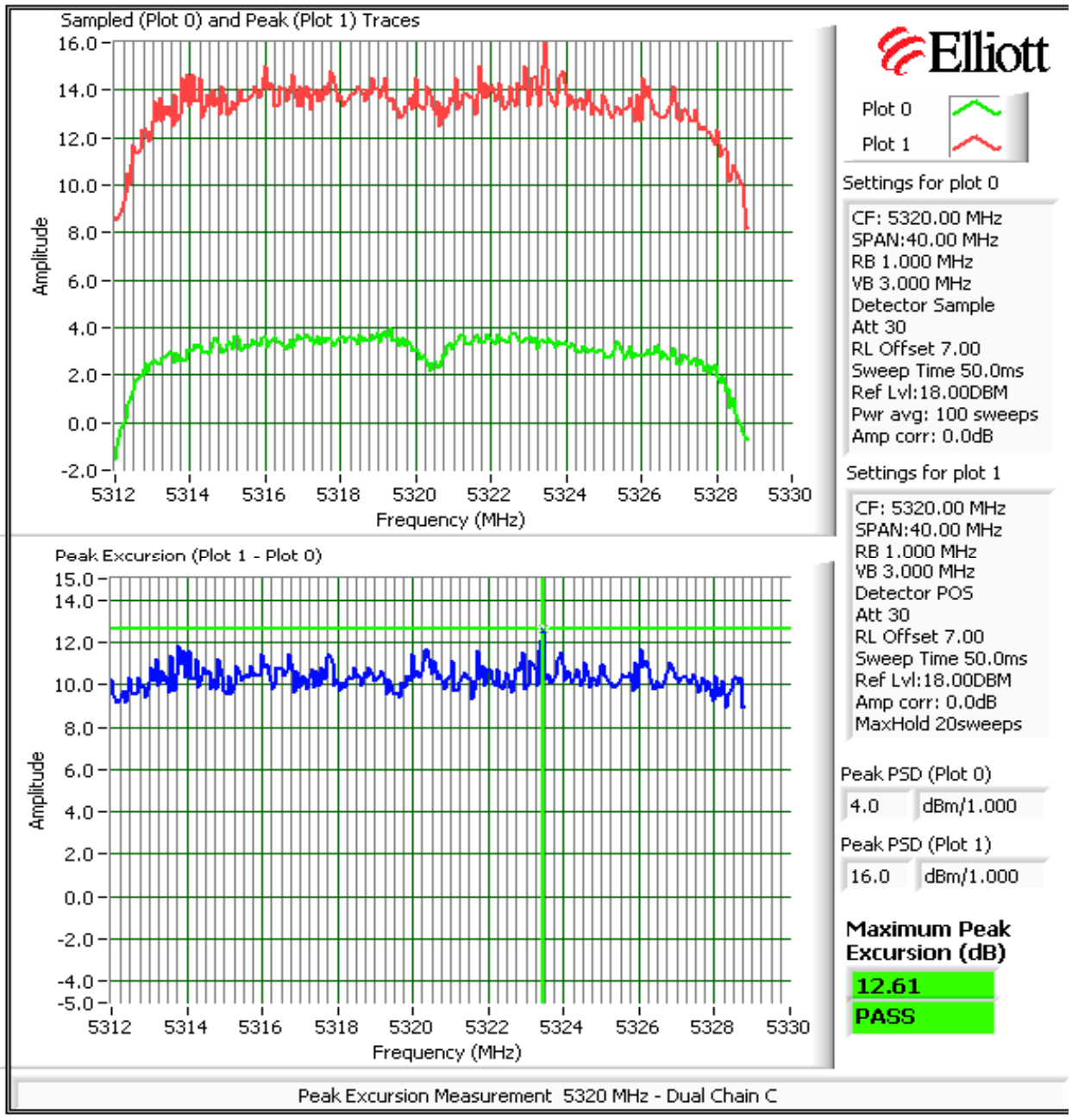
Client:	Xirrus	Job Number:	J71484
Model:	XN4	T-Log Number:	T73388
		Account Manager:	Susan Pelzl
Contact:	Steve Smith		
Standard:	FCC 15 E, RSS 210	Class:	N/A



Client:	Xirrus	Job Number:	J71484
Model:	XN4	T-Log Number:	T73388
		Account Manager:	Susan Pelzl
Contact:	Steve Smith		
Standard:	FCC 15 E, RSS 210	Class:	N/A



Client:	Xirrus	Job Number:	J71484
Model:	XN4	T-Log Number:	T73388
		Account Manager:	Susan Pelzl
Contact:	Steve Smith		
Standard:	FCC 15 E, RSS 210	Class:	N/A



Client:	Xirrus	Job Number:	J71484
Model:	XN4	T-Log Number:	T73388
		Account Manager:	Susan Pelzl
Contact:	Steve Smith		
Standard:	FCC 15 E, RSS 210	Class:	N/A

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

Test Specific Details

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

Date of Test: 11/10 and 11/2008
Test Engineer: Mehran Birgani
Test Location: SV OATS #1

Config. Used: AC powered
Config Change: Direct connection
EUT Voltage: PoE

General Test Configuration

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

Ambient Conditions:

Temperature: 15-36 °C
Rel. Humidity: 10-60 %

Summary of Results

Run #	Mode	Test Performed	Limit	Pass / Fail	Result / Margin
1	n20MHz	Power, 5250-5350MHz	15.407(a) (1), (2)	Pass	Single radio: 20.9 dBm 4x radio: 23.5 dBm
1	n20MHz	PSD, 5250-5350MHz	15.407(a) (1), (2)	Pass	8.2 dBm/MHz
1	n20MHz	99% Bandwidth	RSS 210	-	18.4 MHz
1	n40MHz	Power, 5250-5350MHz	15.407(a) (1), (2)	Pass	Single radio: 20.4 dBm 2x radio: 21.9 dBm
1	n40MHz	PSD, 5250-5350MHz	15.407(a) (1), (2)	Pass	4.4 dBm/MHz
1	n40MHz	99% Bandwidth	RSS 210	-	36.9 MHz
2	n20 & n40	Peak Excursion Envelope	15.407(a) (6)	Pass	12.97 dB
3	n20 & n40	Antenna Conducted Spurious	15.407(b)	Pass	< -27dBm/MHz eirp

Modifications Made During Testing

No modifications were made to the EUT during testing

Deviations From The Standard

No deviations were made from the requirements of the standard.

Client:	Xirrus	Job Number:	J71484
Model:	XN4	T-Log Number:	T73388
		Account Manager:	Susan Pelzl
Contact:	Steve Smith		
Standard:	FCC 15 E, RSS 210	Class:	N/A

Run #1: Bandwidth, Output Power and Power spectral Density

Antenna gain used is for the internal antenna. The external antenna gain is lower (2.5dBi) and not used for MIMO modes.

	Chain 1	Chain 2	Chain 3	Coherent	Effective[5]
Antenna Gain (dBi):	3		3	No	3.0

Power settings for a single radio operating in the band

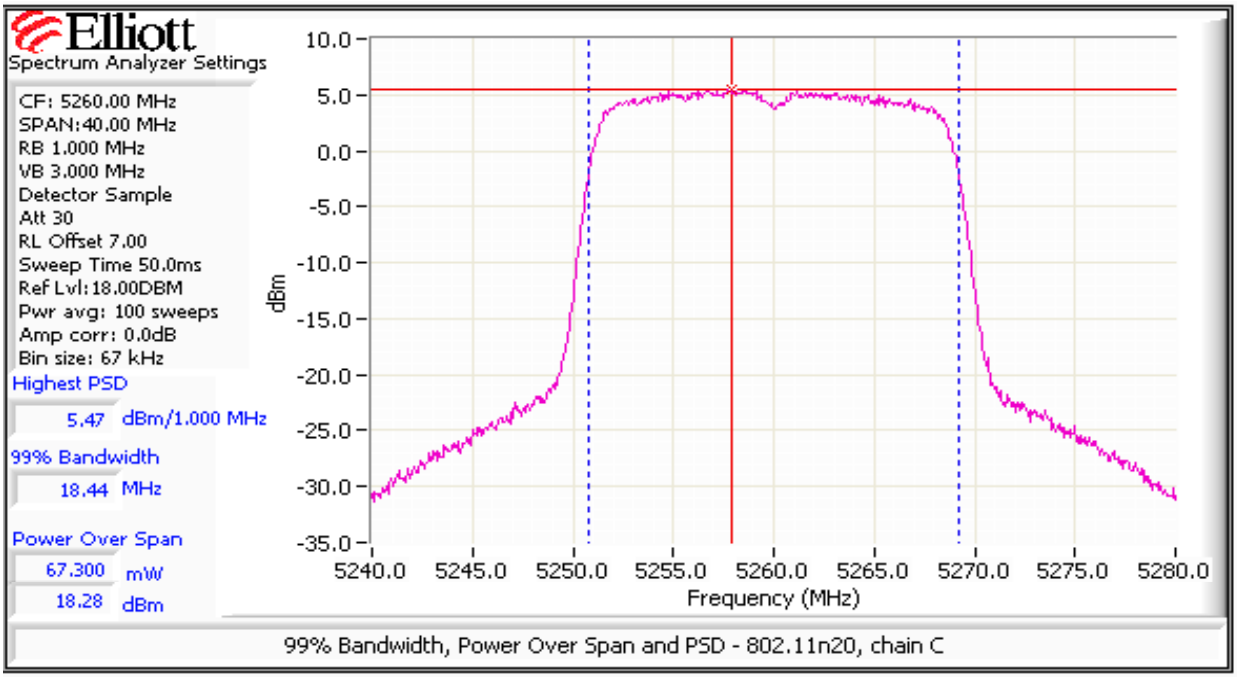
Frequency (MHz)	Software Setting	26dB BW (MHz)	Measured Output Power[1] dBm			Total		Limit (dBm)	Max Power (W)	Pass or Fail
			Chain 1	Chain 2	Chain 3	mW	dBm			
5260	20.0	23.0	17.5		18.3	123.8	20.9	24.0	0.124	PASS
5300	20.0	24.3	18.0		17.4	118.0	20.7	24.0		PASS
5320	18.5	22.1	16.4		15.7	80.8	19.1	24.0		PASS
5270	20.0	44.0	17.1		17.6	108.8	20.4	24.0	0.109	PASS
5310	16.5	41.6	13.8		13.5	46.4	16.7	24.0		PASS

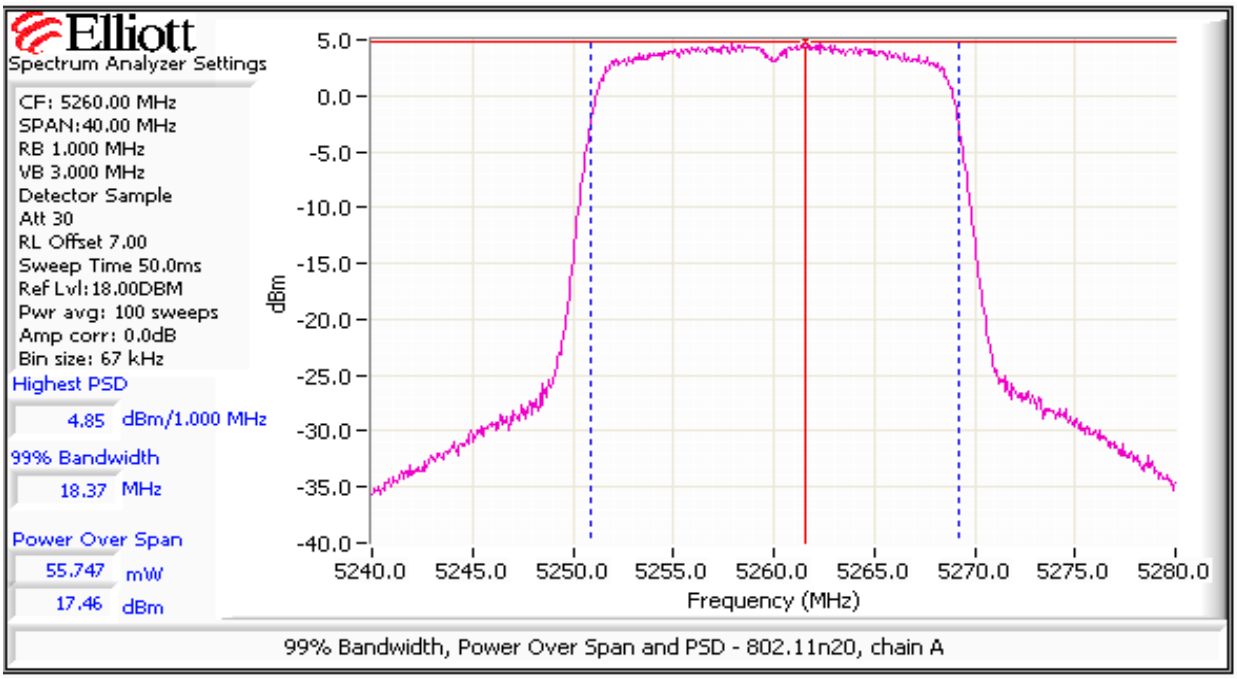
Frequency (MHz)	99%[4] BW	Total Power	PSD[2] dBm/MHz			Total PSD		Limit		Pass or Fail
			Chain 1	Chain 2	Chain 3	mW/MHz	dBm/MHz	FCC	RSS 210[3]	
5260	18.4	20.9	4.9		5.5	6.6	8.2	11.0	11.0	PASS
5280	18.4	20.7	5.4		4.7	6.4	8.1	11.0	11.0	PASS
5320	18.4	19.1	3.8		3.0	4.4	6.4	11.0	11.0	PASS
5270	36.9	20.4	1.1		1.7	2.8	4.4	11.0	11.0	PASS
5310	36.9	16.7	-2.2		-2.4	1.2	0.7	11.0	11.0	PASS

Note 1:	Output power measured using a spectrum analyzer (see plots below for the high power measurements): RBW=1MHz, VB=3 MHz, sample detector, power averaging on (transmitted signal was continuous) and power integration over 40MHz (20MHz mode) and 80MHz (40MHz mode)
Note 2:	Measured using the same analyzer settings used for output power.
Note 3:	For RSS-210 the limit for the 5250 - 5350 MHz band accounts for the antenna gain as the maximum eirp allowed is 11dBm/MHz. The limits are also corrected for instances where the highest measured value of the PSD exceeds the average PSD (calculated from the measured power divided by the measured 99% bandwidth) by more than 3dB by the amount that the measured value exceeds the average by more than 3dB.
Note 4:	99% Bandwidth measured in accordance with RSS GEN - RB > 1% of span and VB >=3xRB
Note 5:	For MIMO systems the total output power and total PSD are calculated form the sum of the powers of the individual chains (in linear terms). The antenna gain used to determine the EIRP and limits for PSD/Output power depends on the operating mode of the MIMO device. If the signals on the non-coherent between the transmit chains then the gain used to determine the limits is the highest gain of the individual chains and the EIRP is the sum of the products of gain and power on each chain. If the signals are coherent then the effective antenna gain is the sum (in linear terms) of the gains for each chain and the EIRP is the product of the effective gain and total power.

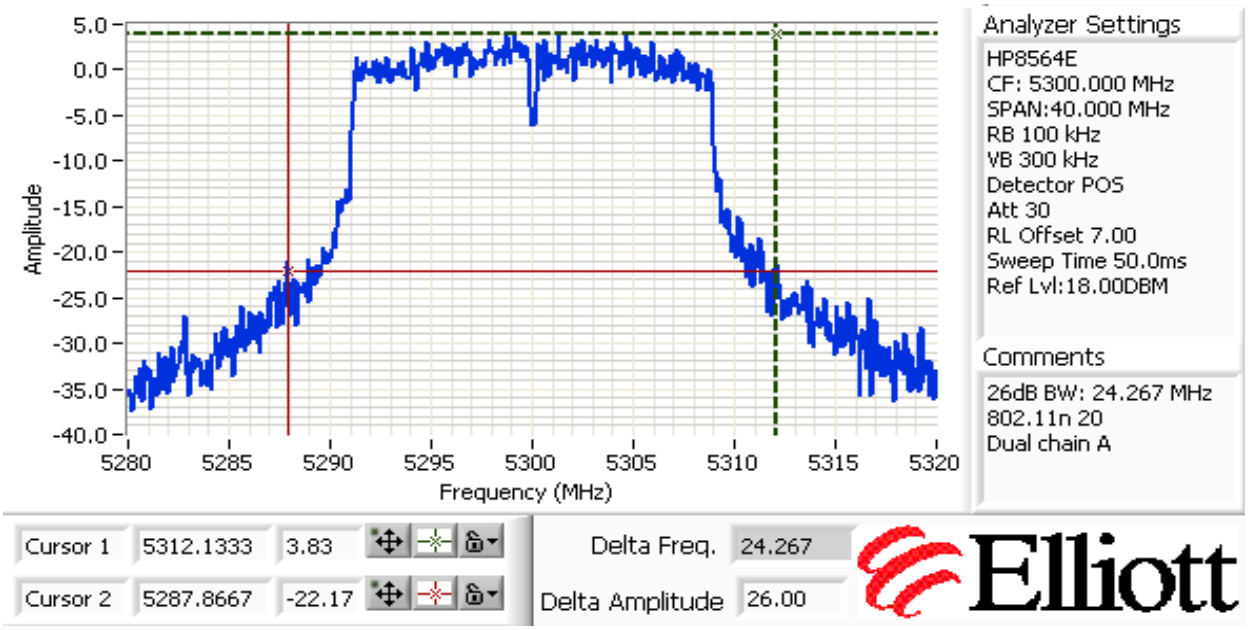
Client:	Xirrus	Job Number:	J71484
Model:	XN4	T-Log Number:	T73388
		Account Manager:	Susan Pelzl
Contact:	Steve Smith		
Standard:	FCC 15 E, RSS 210	Class:	N/A

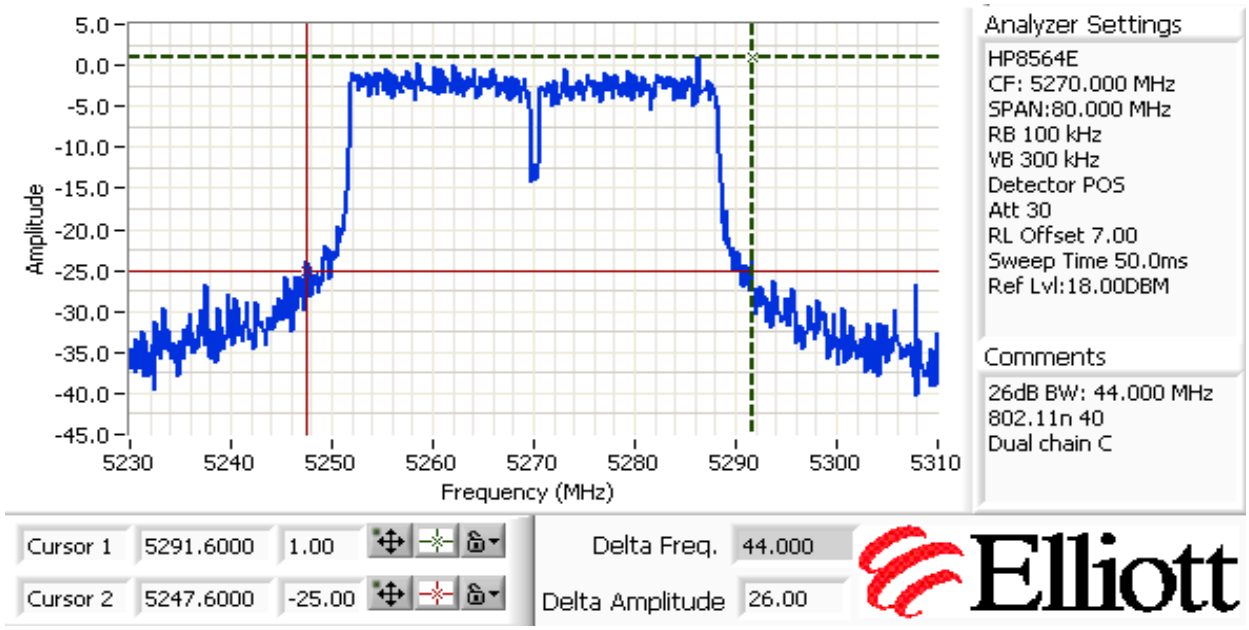
Plots showing power/PSD measurements and 26dB bandwidth measurements at the high power setting



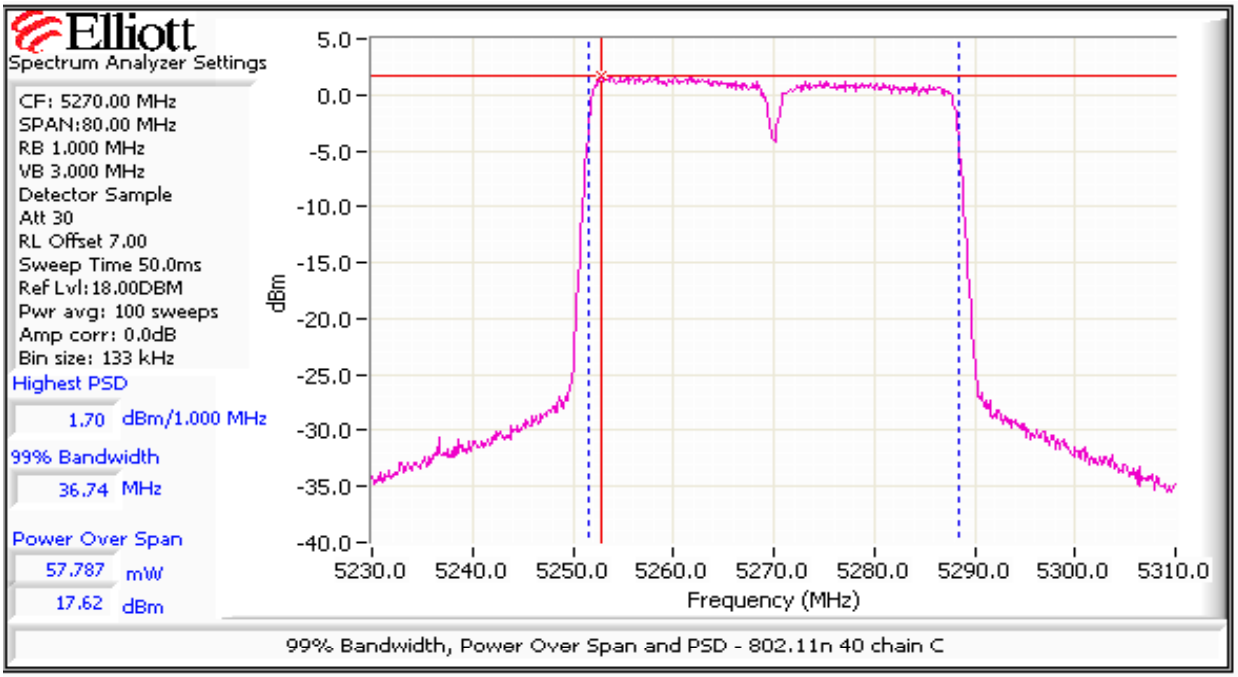


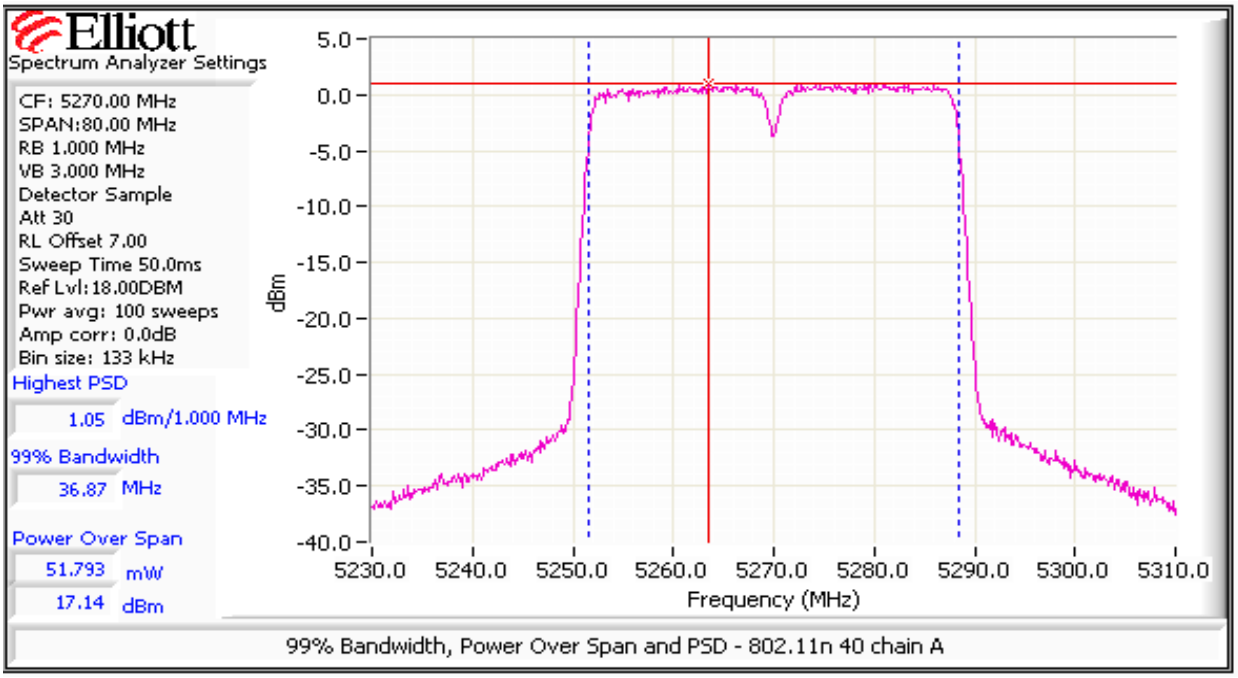
Client:	Xirrus	Job Number:	J71484
Model:	XN4	T-Log Number:	T73388
		Account Manager:	Susan Pelzl
Contact:	Steve Smith		
Standard:	FCC 15 E, RSS 210	Class:	N/A





Client:	Xirrus	Job Number:	J71484
Model:	XN4	T-Log Number:	T73388
		Account Manager:	Susan Pelzl
Contact:	Steve Smith		
Standard:	FCC 15 E, RSS 210	Class:	N/A





Client:	Xirrus	Job Number:	J71484
Model:	XN4	T-Log Number:	T73388
		Account Manager:	Susan Pelzl
Contact:	Steve Smith		
Standard:	FCC 15 E, RSS 210	Class:	N/A

Power settings for all four n20 channels and both n40 channels being used in the band:

The device adjusts output power downwards if mutliple radios operate in the same band to maintain compliance with the total power limit for the band. Measuremetns were made at the lowest required power setting (i.e. all non-overlaping channels in the band occupied) to verify the device has the dynamic range to do this.

Frequency (MHz)	Software Setting	26dB BW (MHz)	Measured Output Power[1] dBm			Total				
			Chain 1	Chain 2	Chain 3	mW	dBm			
5300	17.0	24.3	14.6		14.4	56.4	17.5	Limit	P (W)	Result
Total power in the band (four radios operational in n20MHz mode):						225.5	23.5	24.0	0.226	PASS

Frequency (MHz)	Software Setting	26dB BW (MHz)	Measured Output Power[1] dBm			Total				
			Chain 1	Chain 2	Chain 3	mW	dBm			
5270	20.0	44.0	17.1		17.6	108.8	20.4			
5310	16.5	41.6	13.8		13.5	46.4	16.7	Limit	P (W)	Result
Total power in the band (two radios operational in n40MHz mode):						155.2	21.9	24.0	0.155	PASS

Note 1:	Output power measured using a spectrum analyzer (see plots below for the high power measurements): RBW=1MHz, VB=3 MHz, sample detector, power averaging on (transmitted signal was continuous) and power integration over 40MHz (20MHz mode) and 80MHz (40MHz mode)
Note 2:	Measured using the same analyzer settings used for output power.
Note 3:	For RSS-210 the limit for the 5250 - 5350 MHz band accounts for the antenna gain as the maximum eirp allowed is 11dBm/MHz. The limits are also corrected for instances where the highest measured value of the PSD exceeds the average PSD (calculated from the measured power divided by the measured 99% bandwidth) by more than 3dB by the amount that the measured value exceeds the average by more than 3dB.
Note 4:	99% Bandwidth measured in accordance with RSS GEN - RB > 1% of span and VB >=3xRB
Note 5:	For MIMO systems the total output power and total PSD are calculated form the sum of the powers of the individual chains (in linear terms). The antenna gain used to determine the EIRP and limits for PSD/Output power depends on the operating mode of the MIMO device. If the signals on the non-coherent between the transmit chains then the gain used to determine the limits is the highest gain of the individual chains and the EIRP is the sum of the products of gain and power on each chain. If the signals are coherent then the effective antenna gain is the sum (in linear terms) of the gains for each chain and the EIRP is the product of the effective gain and total power.

Client:	Xirrus	Job Number:	J71484
Model:	XN4	T-Log Number:	T73388
		Account Manager:	Susan Pelzl
Contact:	Steve Smith		
Standard:	FCC 15 E, RSS 210	Class:	N/A

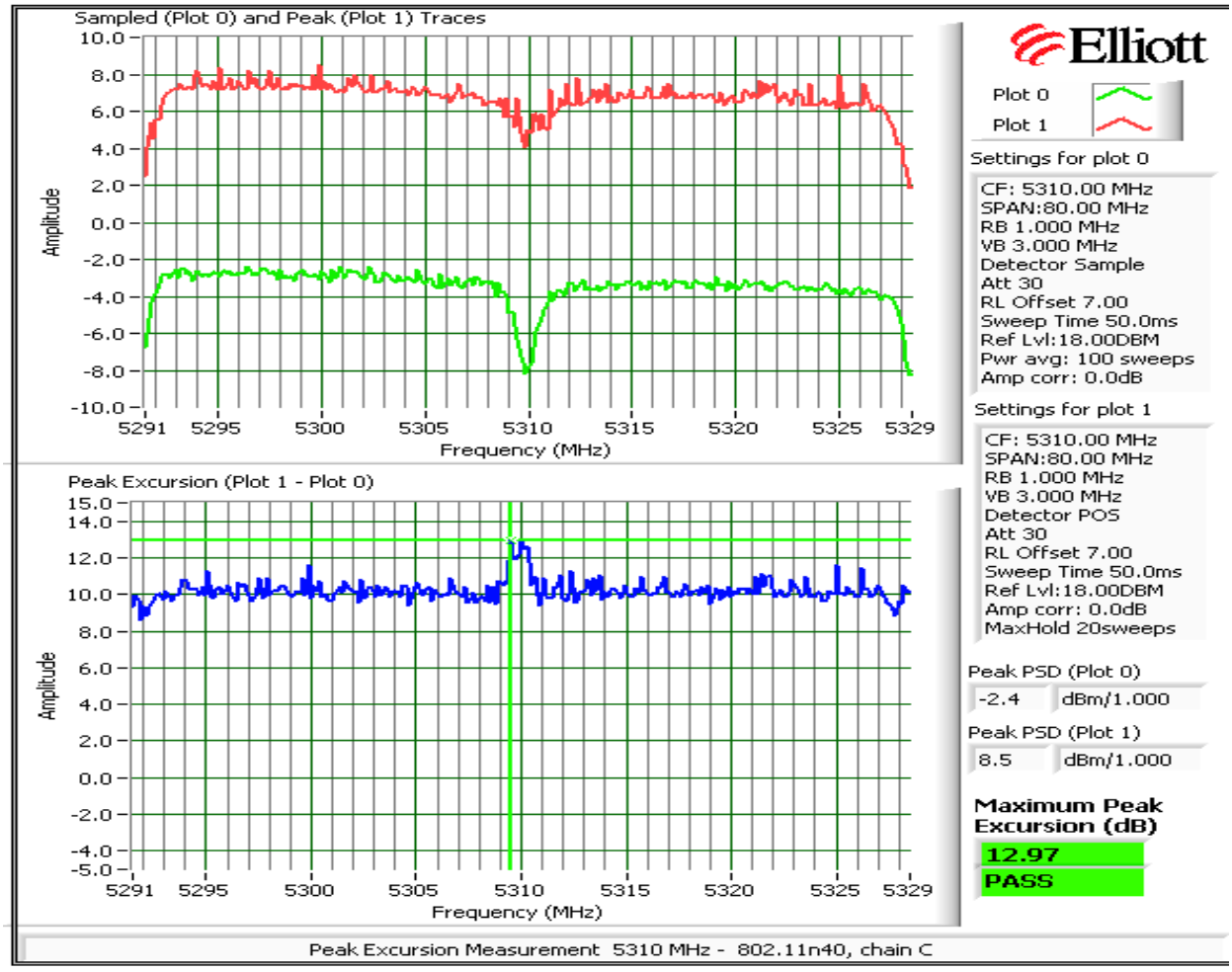
Run #2: Peak Excursion Measurement

Device meets the requirement for the peak excursion

Freq	Mode/ Chain	Peak Excursion(dB)		Mode/ Chain	Peak Excursion(dB)	
(MHz)		Value	Limit		Value	Limit
5260	n20 A	11.2	13.0	n20 C	11.2	13.0
5280	n20 A	11.3	13.0	n20 C	11.4	13.0
5320	n20 A	11.9	13.0	n20 C	11.3	13.0
5270	n40 A	12.6	13.0	n40 A	12.9	13.0
5310	n40 A	12.8	13.0	n40 C	12.97	13.0

Plots Showing Peak Excursion

Trace A: RBW = VBW = 3MHz, Peak hold; Trace B: RBW = 1 MHz, VBW = 3MHz, Integrated average power



Client:	Xirrus	Job Number:	J71484
Model:	XN4	T-Log Number:	T73388
		Account Manager:	Susan Pelzl
Contact:	Steve Smith		
Standard:	FCC 15 E, RSS 210	Class:	N/A

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

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

Number of transmit chains:	2		
Maximum Antenna Gain:	3.0	dBi	
Spurious Limit:	-27.0	dBm/MHz eirp	
Adjustment for 2 chains:	-3.0	dB adjustment for multiple chains.	
Limit Used On Plots [Note 1]:	-33.0	dBm/MHz	Average Limit (RB=1MHz, VB=10Hz)
	-13.0	dBm/MHz	Peak Limit (RB=VB=1MHz)

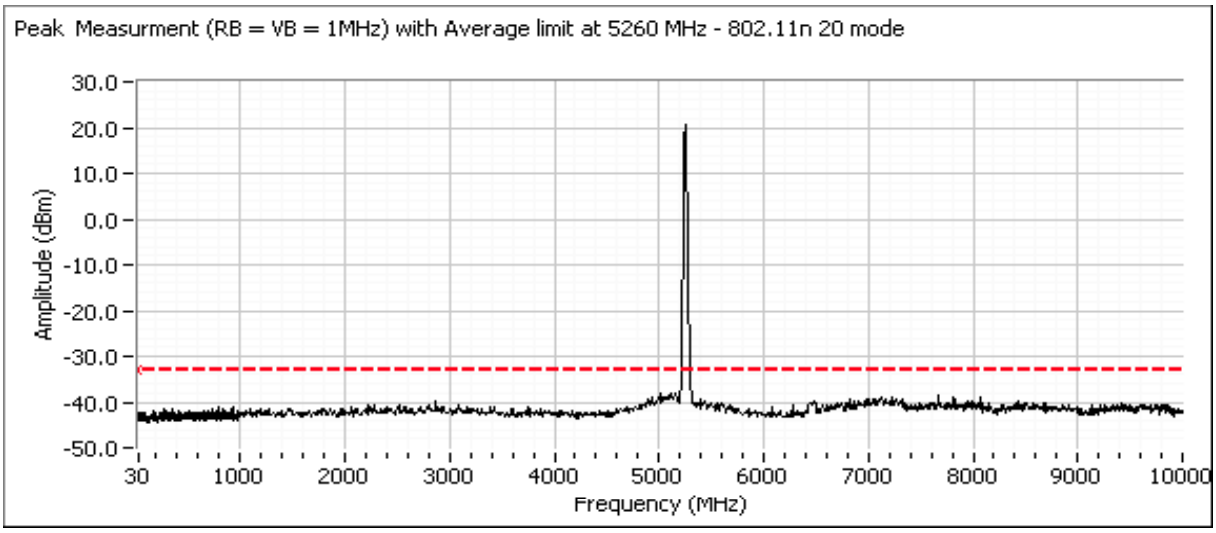
Note 1:	The -27dBm/MHz limit is an eirp limit. The limit for antenna port conducted measurements is adjusted to take into consideration the maximum antenna gain (limit = -27dBm - antenna gain). Radiated field strength measurements for signals more than 50MHz from the bands and that are close to the limit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

Client:	Xirrus	Job Number:	J71484
Model:	XN4	T-Log Number:	T73388
		Account Manager:	Susan Pelzl
Contact:	Steve Smith		
Standard:	FCC 15 E, RSS 210	Class:	N/A

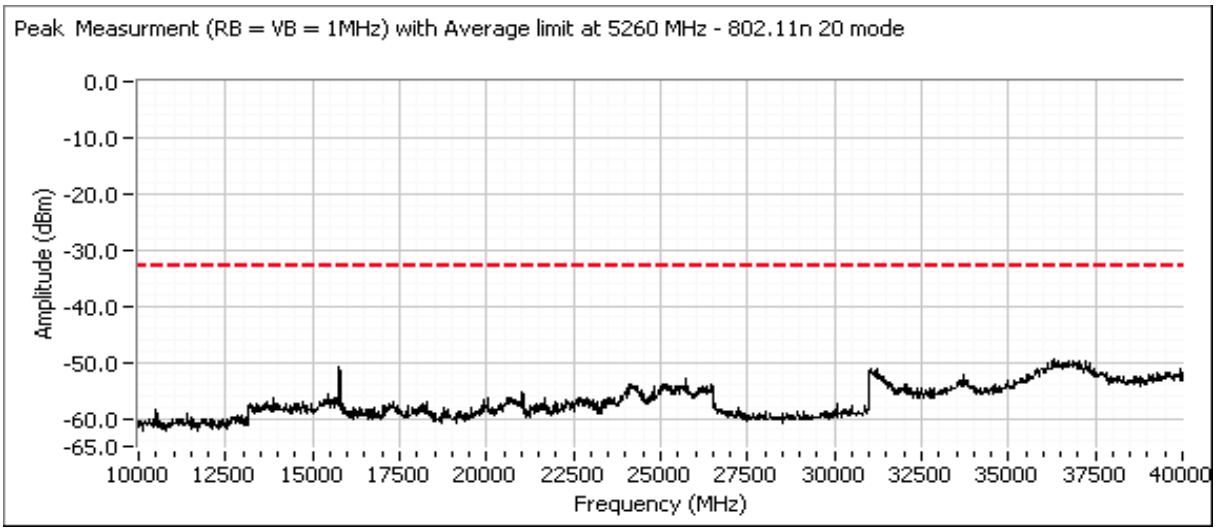
Plots Showing Out-Of-Band Emissions (RBW=VBW=1MHz) on Each Chain

802.11n 20MHz, 5260 MHz, Low channel, 5250 - 5350 MHz Band with power setting of 20dBm.

20dB attenuation pad at front of analyzer and 20dB attenuation at software level.



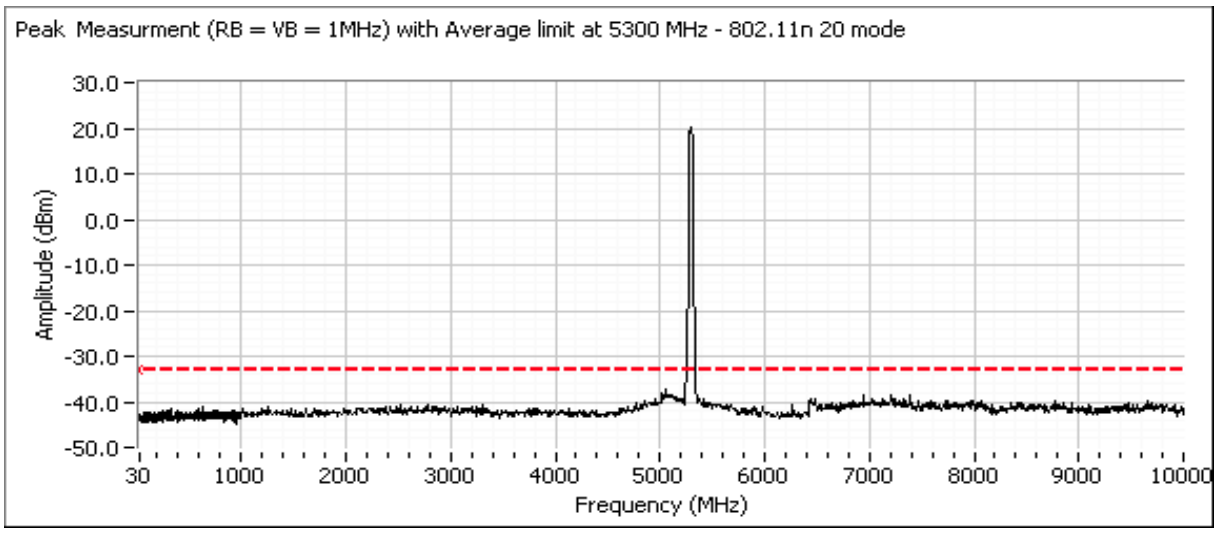
20dB attenuation pad at front of analyzer and 0dB attenuation at software level to reduce the noise floor.



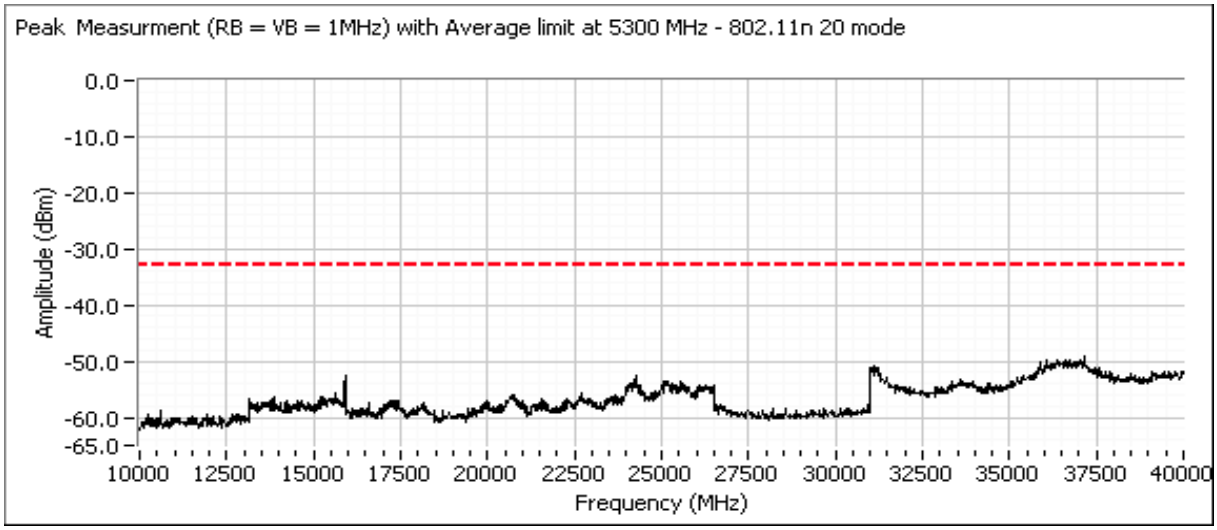
Client:	Xirrus	Job Number:	J71484
Model:	XN4	T-Log Number:	T73388
		Account Manager:	Susan Pelzl
Contact:	Steve Smith		
Standard:	FCC 15 E, RSS 210	Class:	N/A

802.11n 20MHz, 5300 MHz, Center channel, 5250 - 5350 MHz Band with power setting of 20dBm.

20dB attenuation pad at front of analyzer and 20dB attenuation at software level.



20dB attenuation pad at front of analyzer and 0dB attenuation at software level to reduce the noise floor.

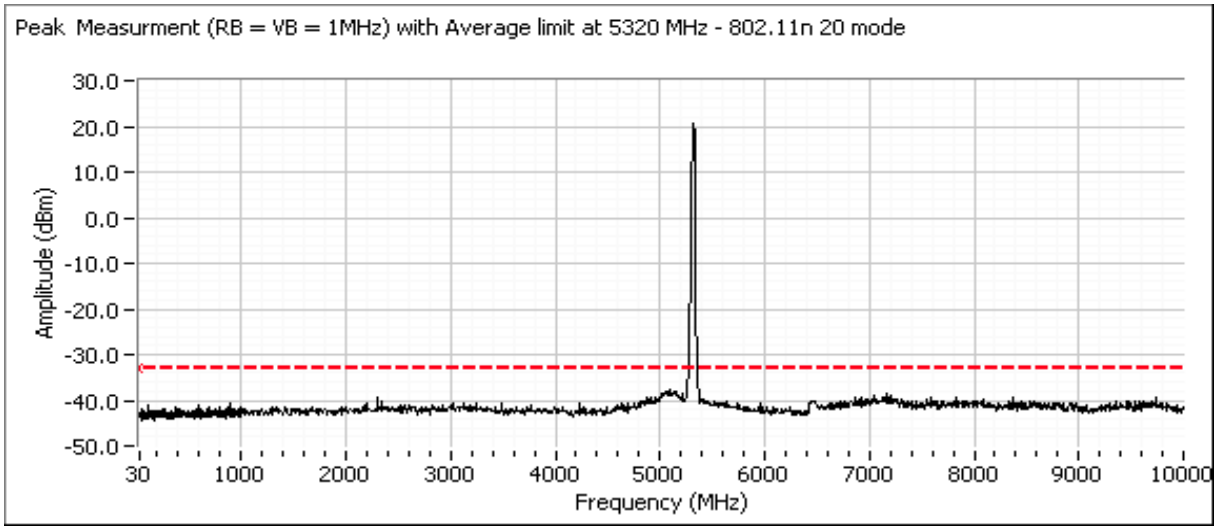


Client:	Xirrus	Job Number:	J71484
Model:	XN4	T-Log Number:	T73388
		Account Manager:	Susan Pelzl
Contact:	Steve Smith		
Standard:	FCC 15 E, RSS 210	Class:	N/A

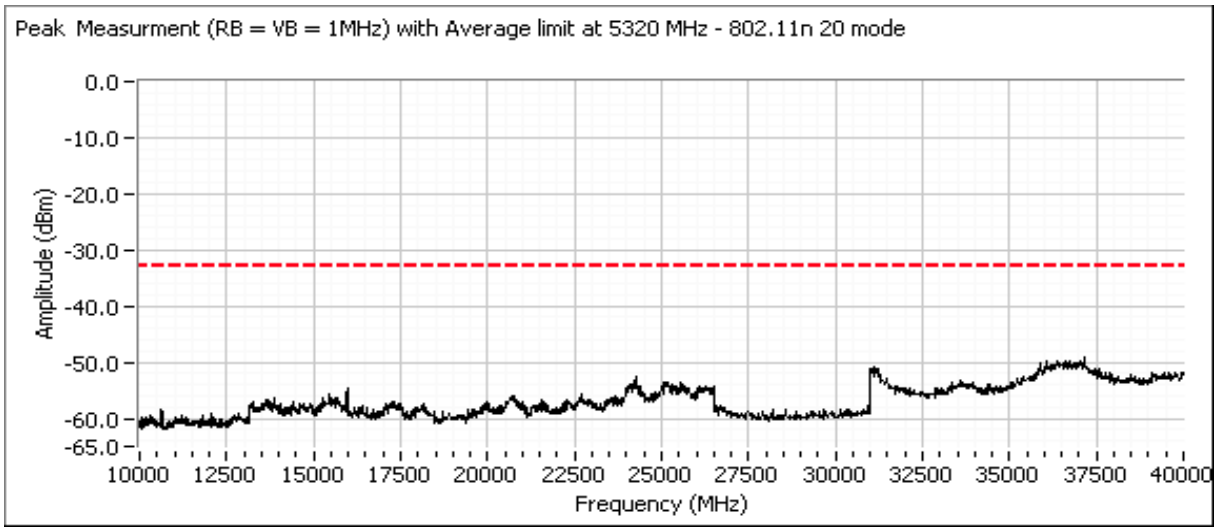
802.11n 20MHz, 5320 MHz, High channel, 5250 - 5350 MHz Band with power setting of 20dBm.

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

20dB attenuation pad at front of analyzer and 20dB attenuation at software level.



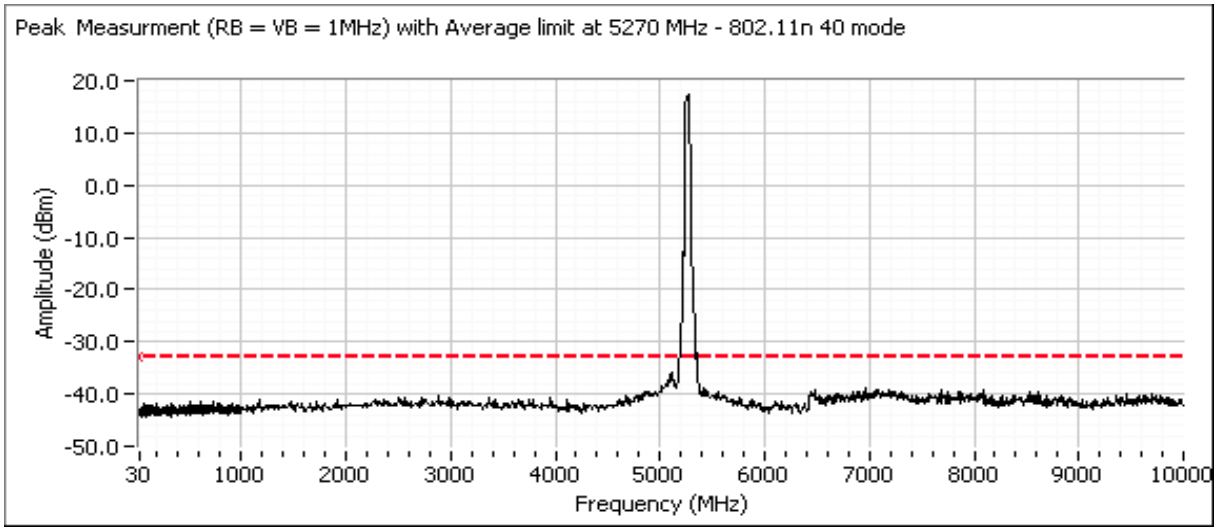
20dB attenuation pad at front of analyzer and 0dB attenuation at software level to reduce the noise floor.



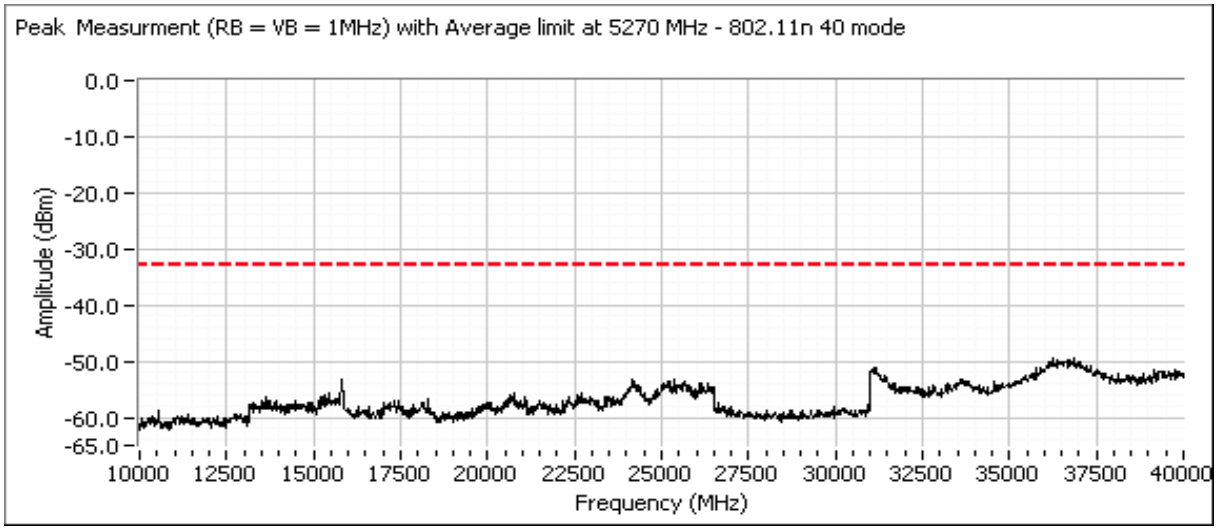
Client:	Xirrus	Job Number:	J71484
Model:	XN4	T-Log Number:	T73388
		Account Manager:	Susan Pelzl
Contact:	Steve Smith		
Standard:	FCC 15 E, RSS 210	Class:	N/A

802.11n 40MHz, 5270 MHz, Low channel, 5250 - 5350 MHz Band with power setting of 20dBm.

20dB attenuation pad at front of analyzer and 20dB attenuation at software level.



20dB attenuation pad at front of analyzer and 0dB attenuation at software level to reduce the noise floor.

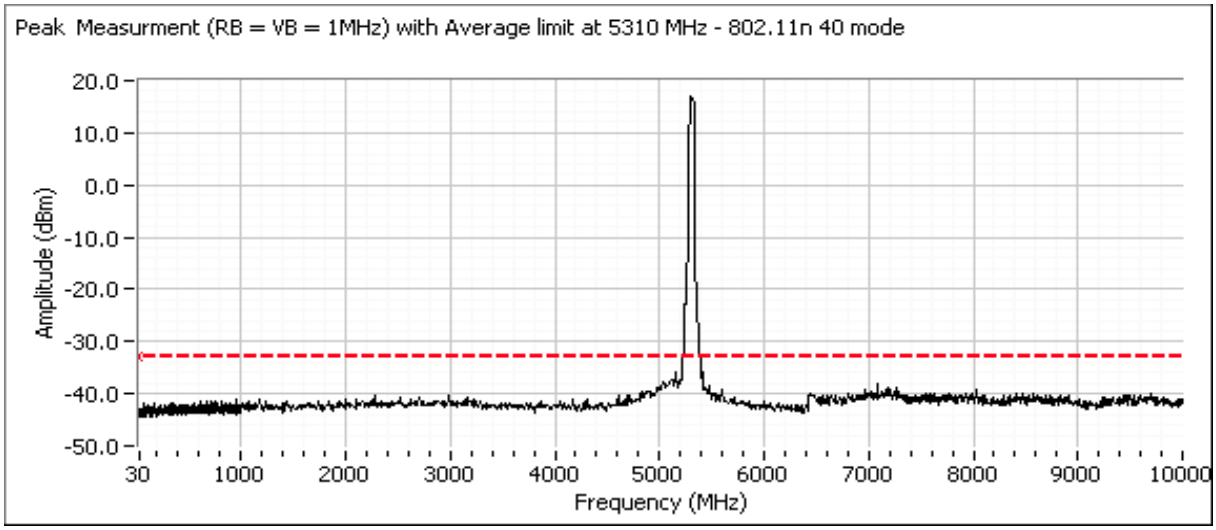


Client:	Xirrus	Job Number:	J71484
Model:	XN4	T-Log Number:	T73388
		Account Manager:	Susan Pelzl
Contact:	Steve Smith		
Standard:	FCC 15 E, RSS 210	Class:	N/A

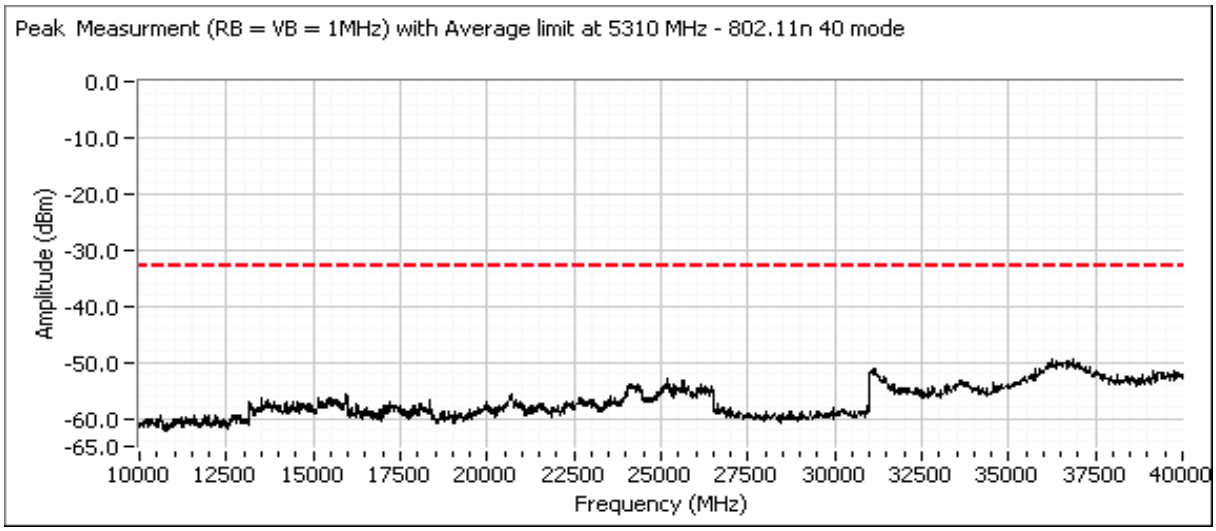
802.11n 40MHz, 5310 MHz, High channel, 5250 - 5350 MHz Band with power setting of 20dBm.

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

20dB attenuation pad at front of analyzer and 20dB attenuation at software level.



20dB attenuation pad at front of analyzer and 0dB attenuation at software level to reduce the noise floor.



Client:	Xirrus	Job Number:	J71484
Model:	XN4	T-Log Number:	T73388
		Account Manager:	Susan Pelzl
Contact:	Steve Smith		
Standard:	FCC 15 E, RSS 210	Class:	N/A

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

Test Specific Details

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

Date of Test: 11/6/2008
Test Engineer: Mehran Birgani
Test Location: SV OATS #2

Config. Used: -
Config Change: Direct connection
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: 15-35 °C
Rel. Humidity: 10-60 %

Summary of Results

Run #	Test Performed	Limit	Pass / Fail	Result / Margin
1	Power, 5470 - 5725MHz	15.407(a) (1), (2)	Pass	Single radio: 19.0 dBm
1	PSD, 5470 - 5725MHz	15.407(a) (1), (2)	Pass	7.8 dBm/MHz
1	26dB Bandwidth	15.407	Pass	23.1 MHz
1	99% Bandwidth	RSS 210	-	17.4 MHz
2	Peak Excursion Envelope	15.407(a) (6)	Pass	11.9 dB
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.

Client:	Xirrus	Job Number:	J71484
Model:	XN4	T-Log Number:	T73388
		Account Manager:	Susan Pelzl
Contact:	Steve Smith		
Standard:	FCC 15 E, RSS 210	Class:	N/A

Run #1: Bandwidth, Output Power and Power spectral Density

Antenna gain used is for the internal antenna. The external antenna gain is lower (2.5dBi) and not used for MIMO modes.

Antenna Gain (dBi): 3.0

Power settings for a single radio operating in the band

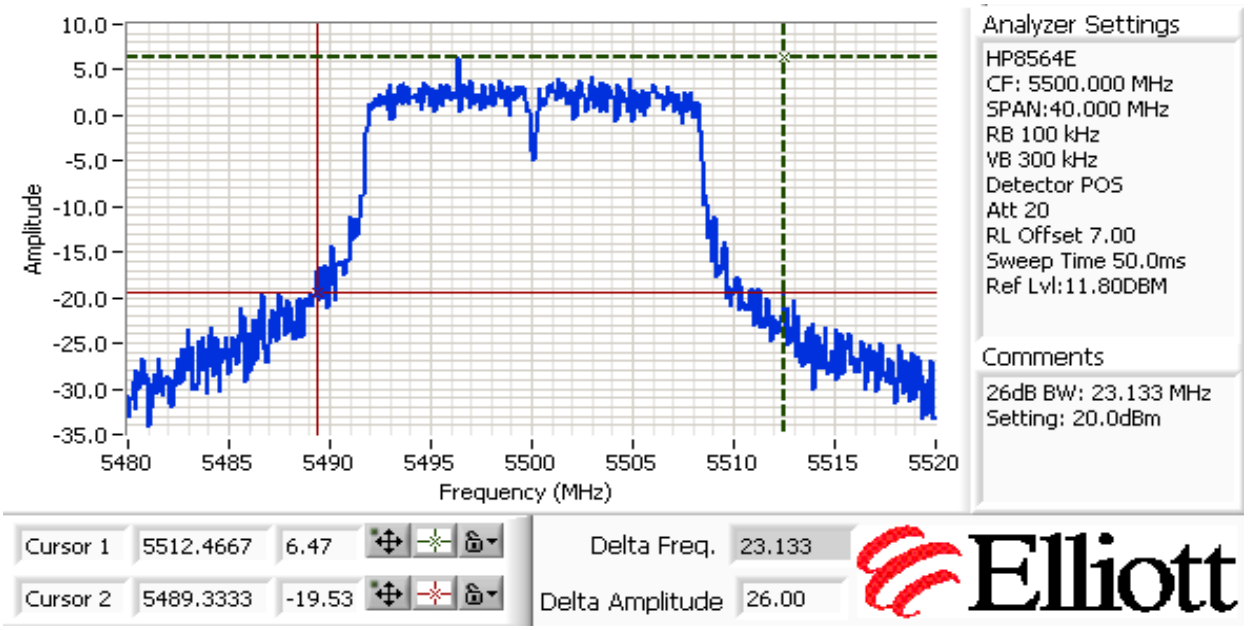
Frequency (MHz)	Software Setting	Bandwidth		Output Power[1] dBm		Power (Watts)	PSD[2] dBm/MHz			Result
		26dB	99%[4]	Measured	Limit		Measured	FCC Limit	RSS Limit[3]	
5500	20.0	23.1	17.3	19.0	24.0	0.079	6.5	11.0	11.0	Pass
5700	20.0	22.5	17.4	17.7	24.0	0.059	5.2	11.0	11.0	Pass

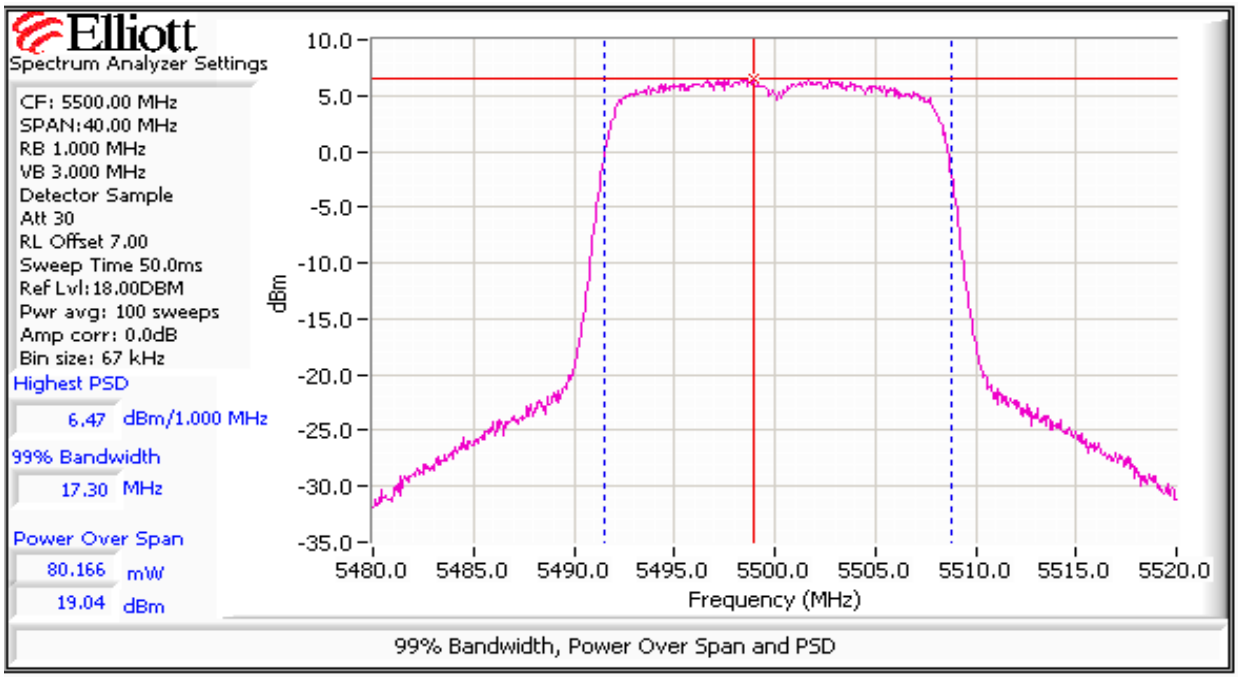
Power settings for all four radios operating in the band:

Evaluation of total output power with all fiour radios operating in the band is covered by test data log T77249.

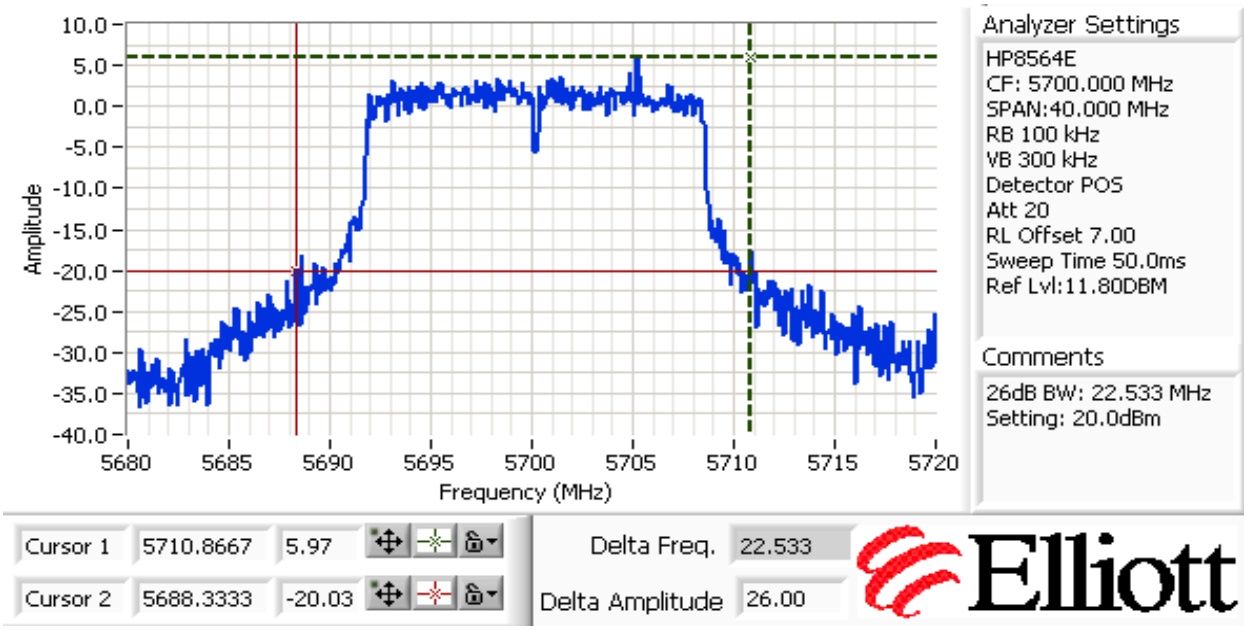
Note 1:	Output power measured using a spectrum analyzer (see plots below): RBW=1MHz, VB=3 MHz, sample detector, power averaging on (transmitted signal was continuous) and power integration over 40 MHz
Note 2:	Measured using the same analyzer settings used for output power.
Note 3:	For RSS-210 the limit for the 5150 - 5250 MHz band accounts for the antenna gain as the maximum eirp allowed is 10dBm/MHz. The limits are also corrected for instances where the highest measured value of the PSD exceeds the average PSD (calculated from the measured power divided by the measured 99% bandwidth) by more than 3dB by the amount that the measured value exceeds the average by more than 3dB.
Note 4:	99% Bandwidth measured in accordance with RSS GEN - RB > 1% of span and VB >=3xRB

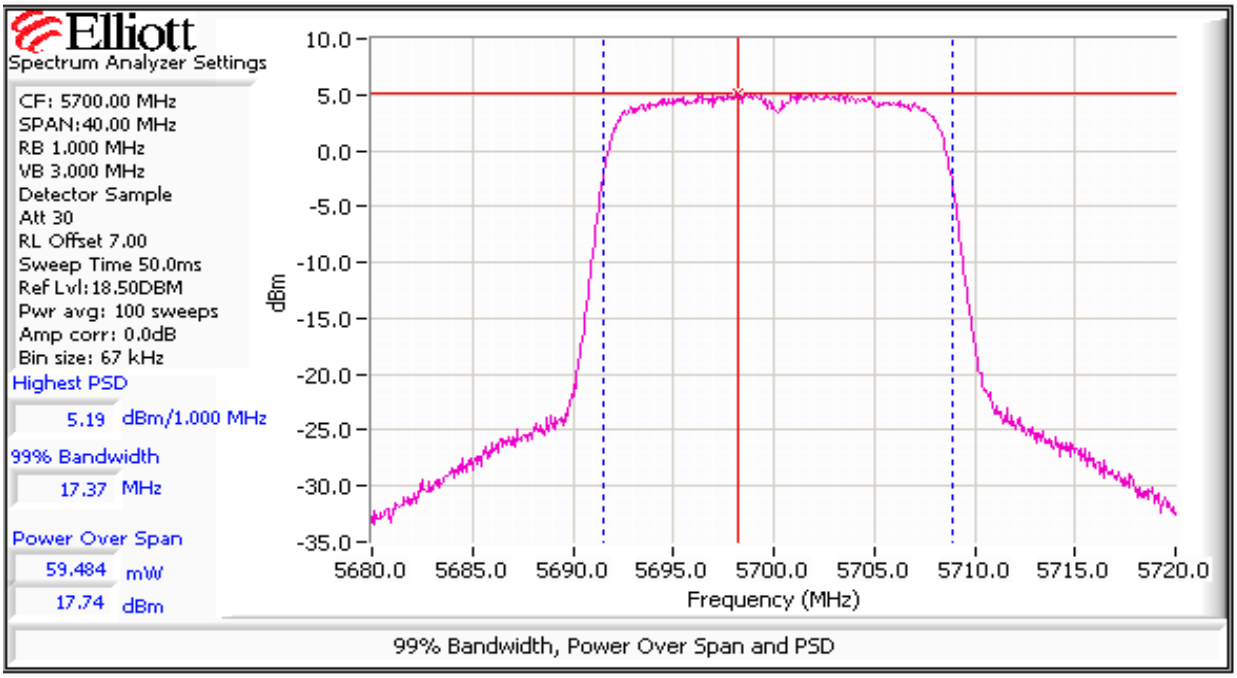
Client:	Xirrus	Job Number:	J71484
Model:	XN4	T-Log Number:	T73388
		Account Manager:	Susan Pelzl
Contact:	Steve Smith		
Standard:	FCC 15 E, RSS 210	Class:	N/A





Client:	Xirrus	Job Number:	J71484
Model:	XN4	T-Log Number:	T73388
		Account Manager:	Susan Pelzl
Contact:	Steve Smith		
Standard:	FCC 15 E, RSS 210	Class:	N/A





Client:	Xirrus	Job Number:	J71484
Model:	XN4	T-Log Number:	T73388
		Account Manager:	Susan Pelzl
Contact:	Steve Smith		
Standard:	FCC 15 E, RSS 210	Class:	N/A

Run #2: Peak Excursion Measurement

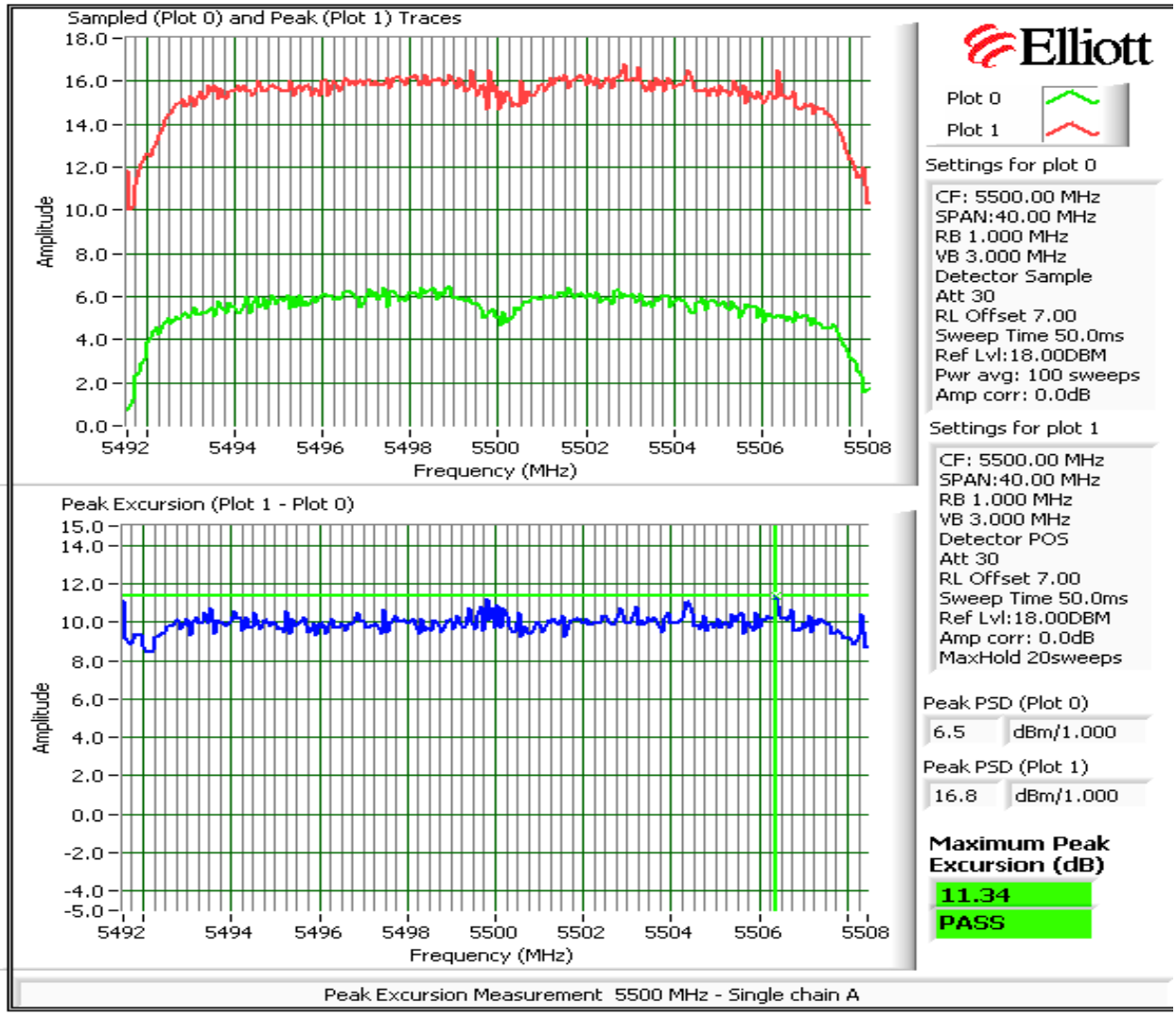
Device meets the requirement for the peak excursion

Freq	Peak Excursion(dB)	
(MHz)	Value	Limit
5500	11.3	13.0
5700	11.9	13.0

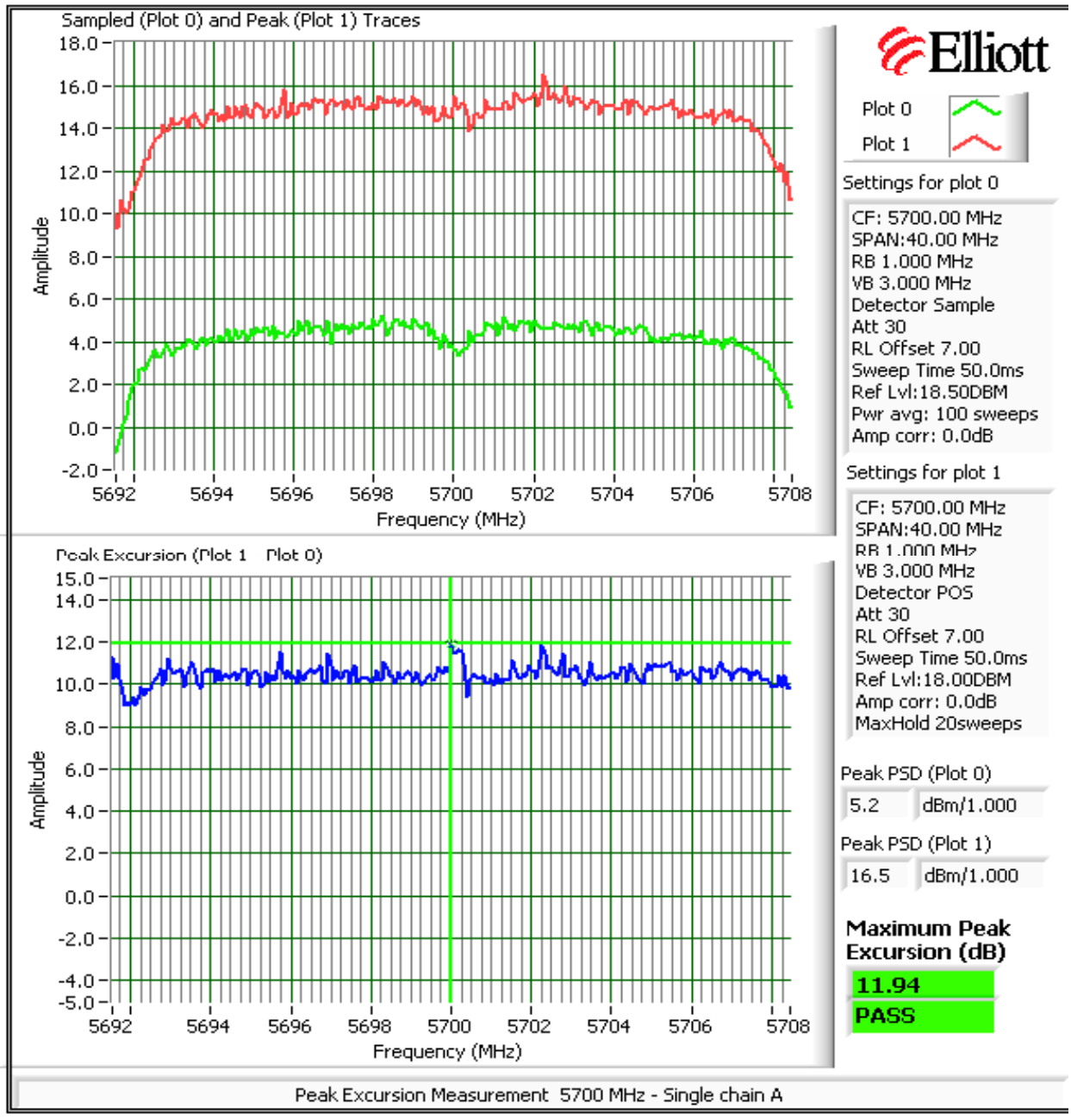
Plots Showing Peak Excursion

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

Trace B: RBW = 1 MHz, VBW = 3MHz, Integrated average power



Client:	Xirrus	Job Number:	J71484
Model:	XN4	T-Log Number:	T73388
		Account Manager:	Susan Pelzl
Contact:	Steve Smith		
Standard:	FCC 15 E, RSS 210	Class:	N/A



Client:	Xirrus	Job Number:	J71484
Model:	XN4	T-Log Number:	T73388
		Account Manager:	Susan Pelzl
Contact:	Steve Smith		
Standard:	FCC 15 E, RSS 210	Class:	N/A

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

MIMO Devices: As the output power setting for the single chain mode is higher than the setting for dual chain, and by adjusting the limit for out of band spurious emissions to account for dual chain operation, the plots below cover both single- and dual chain operation.

Number of transmit chains:	2		
Maximum Antenna Gain:	3.0	dBi	
Spurious Limit:	-27.0	dBm/MHz eirp	
Adjustment for 2 chains:	-6.0	dB	adjustment for multiple chains and coherency between chains.
Limit Used On Plots [Note 1]:	-36.0	dBm/MHz	Average Limit (RB=1MHz, VB=10Hz)
	-16.0	dBm/MHz	Peak Limit (RB=VB=1MHz)

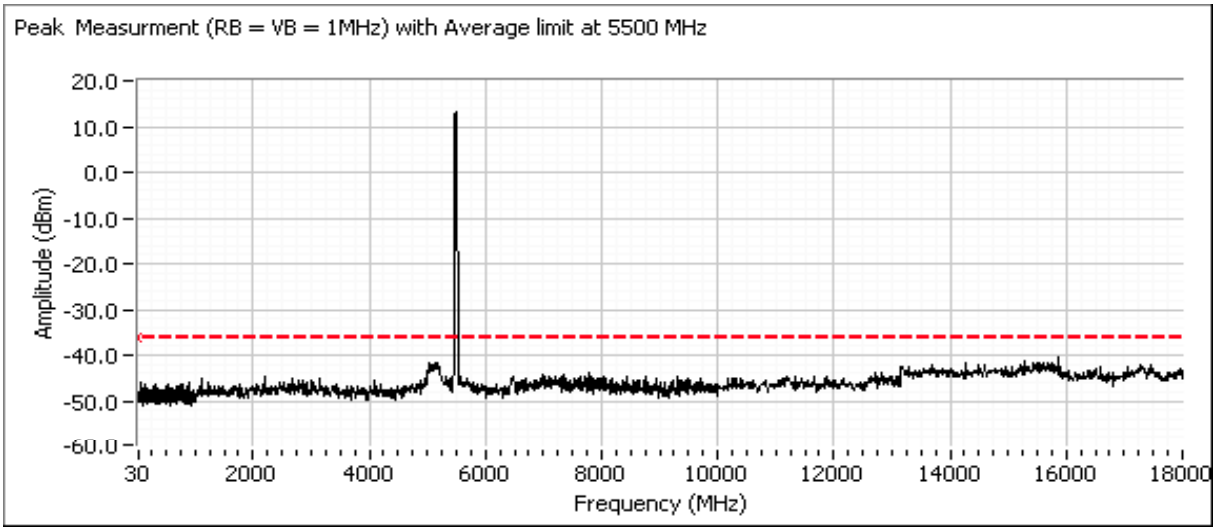
Note 1:	The -27dBm/MHz limit is an eirp limit. The limit for antenna port conducted measurements is adjusted to take into consideration the maximum antenna gain (limit = -27dBm - antenna gain). Radiated field strength measurements for signals more than 50MHz from the bands and that are close to the limit are made to determine compliance as the antenna gain is not known at these frequencies.
Note 2:	All spurious signals below 1GHz are measured during digital device radiated emissions test.
Note 3:	Signals that fall in the restricted bands of 15.205 are subject to the limit of 15.209.

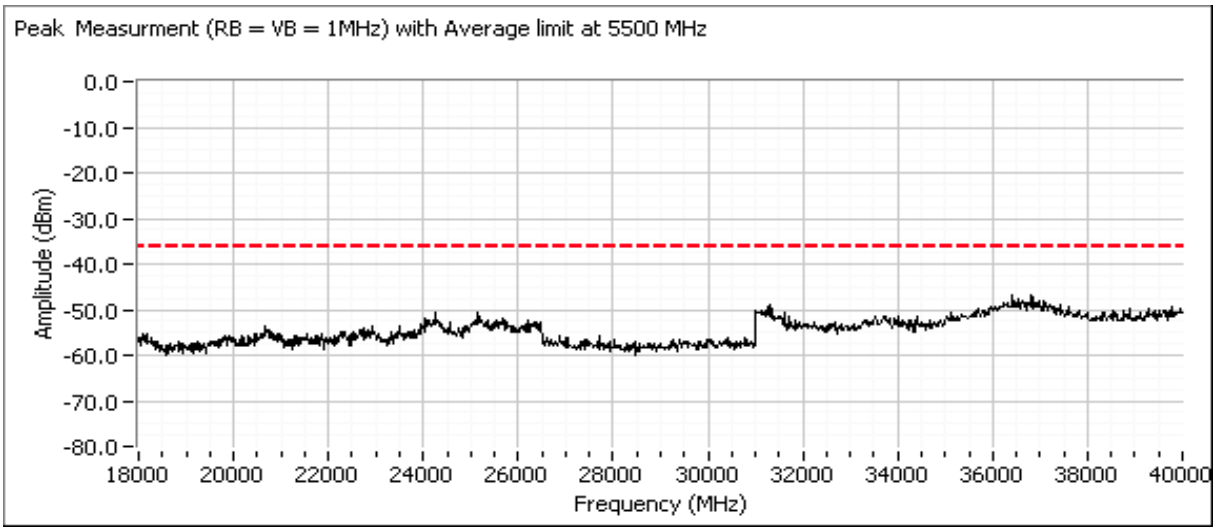
Client:	Xirrus	Job Number:	J71484
Model:	XN4	T-Log Number:	T73388
		Account Manager:	Susan Pelzl
Contact:	Steve Smith		
Standard:	FCC 15 E, RSS 210	Class:	N/A

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

Low channel, 5470 - 5725 MHz Band with Power Setting of 20, Chain A and Chain C

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

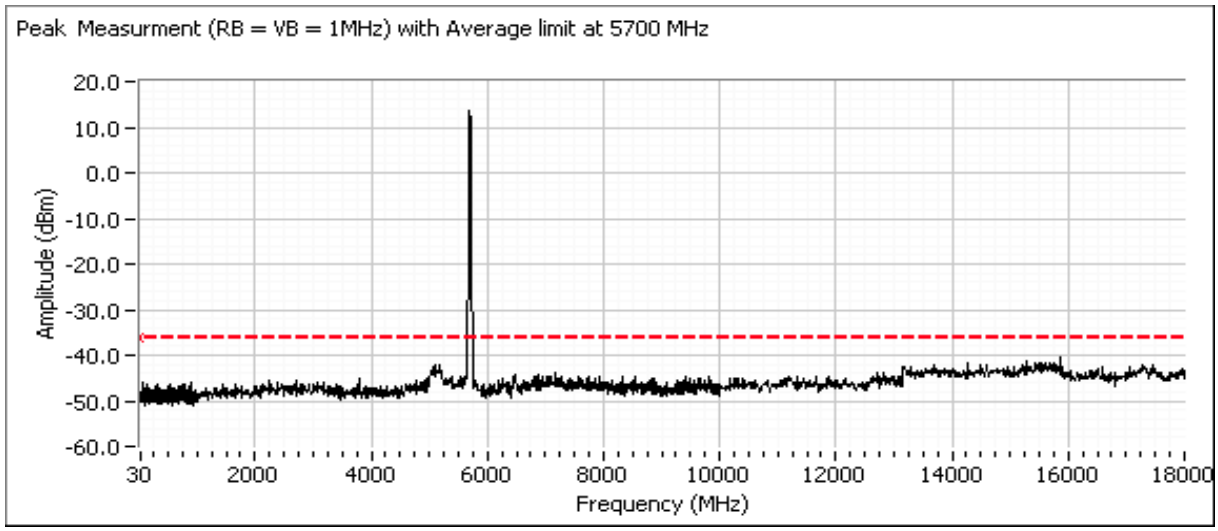


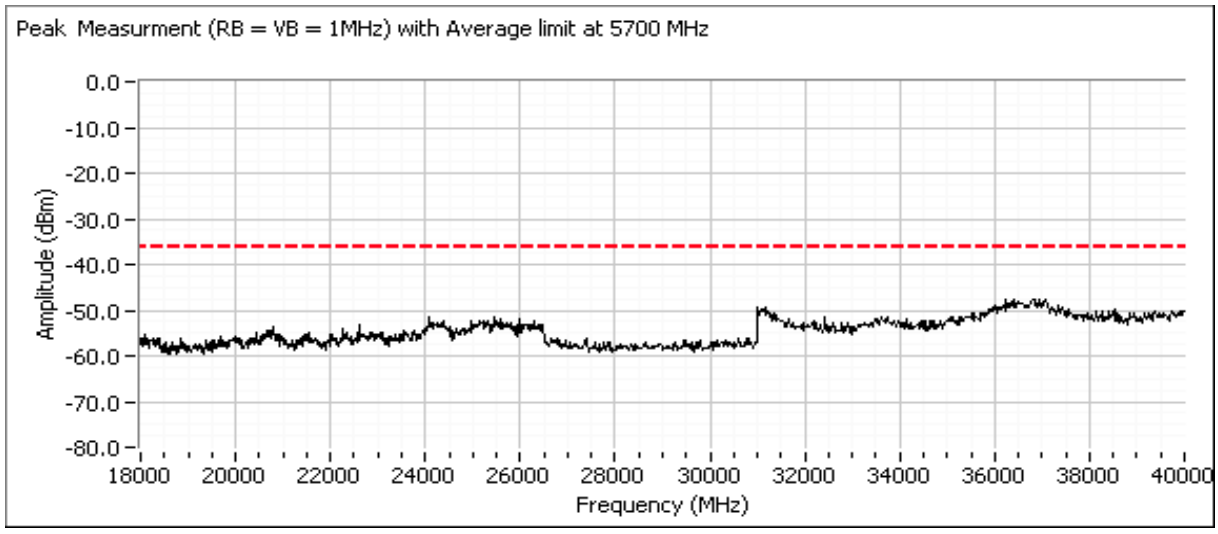


Client:	Xirrus	Job Number:	J71484
Model:	XN4	T-Log Number:	T73388
		Account Manager:	Susan Pelzl
Contact:	Steve Smith		
Standard:	FCC 15 E, RSS 210	Class:	N/A

High channel, 5470 - 5725 MHz Band with Power Setting of 20, Chain A and Chain C

The 26dB bandiwtdh data shows that the 26dB signal bandiwdth (and, therefore, the 20dB signal bandwidth) remains within the allocated band. The power plot shows the signal level at 5725 MHz as falling below the -27dBm eirp limit (level is below -30dBm/MHz)





Client:	Xirrus	Job Number:	J71484
Model:	XN4	T-Log Number:	T73388
		Account Manager:	Susan Pelzl
Contact:	Steve Smith		
Standard:	FCC 15 E, RSS 210	Class:	N/A

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

Test Specific Details

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

Date of Test: 11/10/2008
Test Engineer: Mehran Birgani
Test Location: SV OATS #1

Config. Used: AC powered
Config Change: Direct connection
EUT Voltage: PoE

General Test Configuration

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

Ambient Conditions:

Temperature: 15-36 °C
Rel. Humidity: 10-60 %

Summary of Results

Run #	Mode	Test Performed	Limit	Pass / Fail	Result / Margin
1	a	Power, 5470 - 5725MHz	15.407(a) (1), (2)	Pass	Single radio: 20.8 dBm
1	a	PSD, 5470 - 5725MHz	15.407(a) (1), (2)	Pass	8.3 dBm/MHz
1	a	99% Bandwidth	RSS 210	-	17.4 MHz
2	a	Peak Excursion Envelope	15.407(a) (6)	Pass	11.9 dB
3		Antenna Conducted - Out of Band Spurious	15.407(b)	Covered by single-chain mode measurements	

Modifications Made During Testing

No modifications were made to the EUT during testing

Deviations From The Standard

No deviations were made from the requirements of the standard.

Client:	Xirrus	Job Number:	J71484
Model:	XN4	T-Log Number:	T73388
		Account Manager:	Susan Pelzl
Contact:	Steve Smith		
Standard:	FCC 15 E, RSS 210	Class:	N/A

Run #1: Bandwidth, Output Power and Power spectral Density

Antenna gain used is for the internal antenna. The external antenna gain is lower (2.5dBi) and not used for MIMO modes.

	Chain 1	Chain 2	Chain 3	Coherent	Effective[5]
Antenna Gain (dBi):	3		3	Yes	6.0

Power settings for a single radio operating in the band

Frequency (MHz)	Software Setting	26dB BW (MHz)	Measured Output Power[1] dBm			Total		Limit (dBm)	Max Power (W)	Pass or Fail
			Chain 1	Chain 2	Chain 3	mW	dBm			
5500	20.0	21.2	18.2		17.2	118.6	20.7	24.0	0.121	PASS
5700	20.0	26.7	17.8		17.8	120.5	20.8	24.0		PASS

Frequency (MHz)	99%[4] BW	Total Power	PSD[2] dBm/MHz			Total PSD		Limit		Pass or Fail
			Chain 1	Chain 2	Chain 3	mW/MHz	dBm/MHz	FCC	RSS 210[3]	
5500	17.3	20.7	5.8		4.6	6.7	8.3	11.0	11.0	PASS
5700	17.4	20.8	5.3		5.2	6.7	8.3	11.0	11.0	PASS

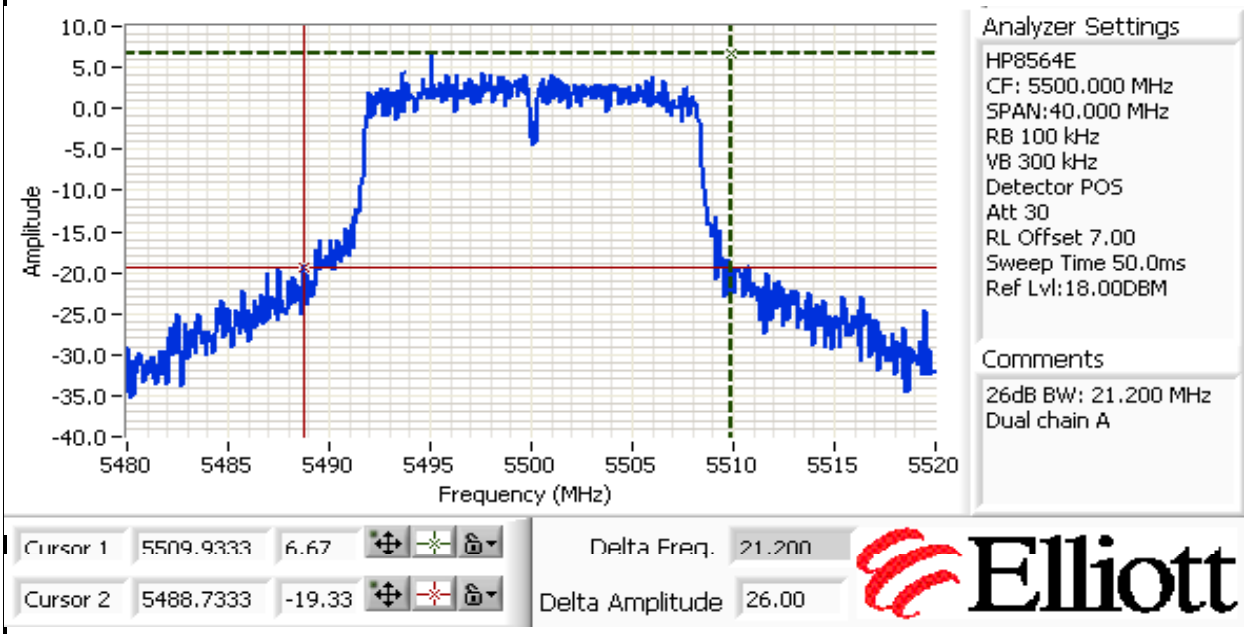
Power settings for all four radios operating in the band:

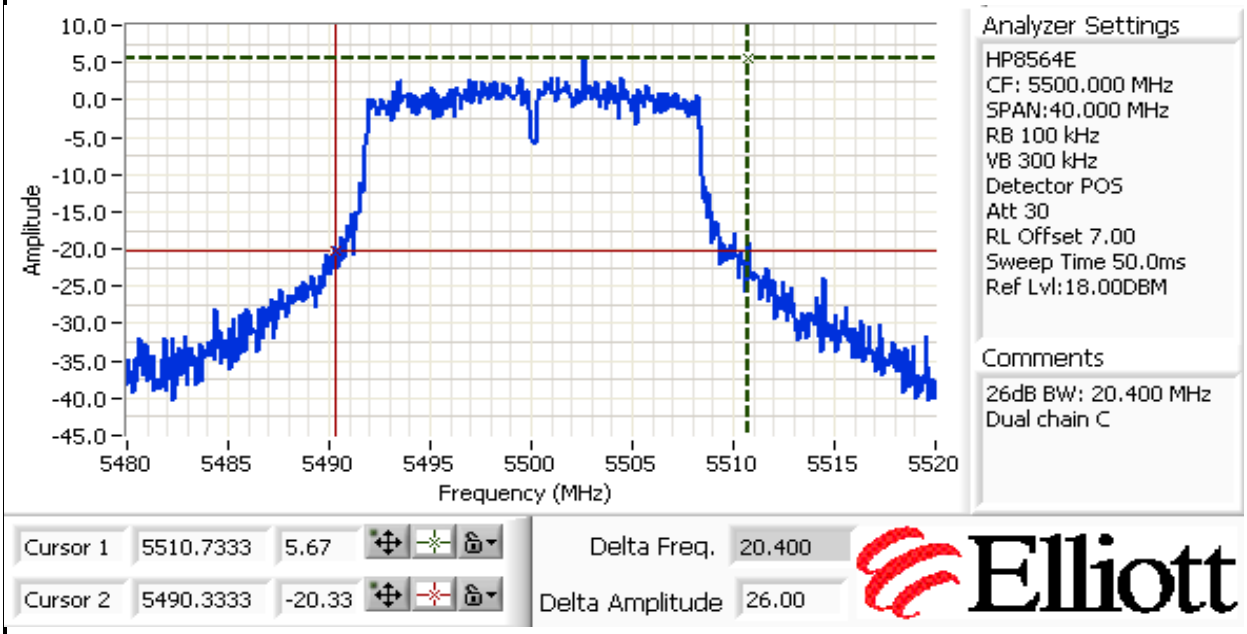
Evaluation of total output power with all fiour radios operating in the band is covered by test data log T77249.

Note 1:	Output power measured using a spectrum analyzer (see plots below for the high power measurements): RBW=1MHz, VB=3 MHz, sample detector, power averaging on (transmitted signal was continuous) and power integration over 40MHz (20MHz mode) and 100MHz (40MHz mode)
Note 2:	Measured using the same analyzer settings used for output power.
Note 3:	For RSS-210 the limit for the 5150 - 5250 MHz band accounts for the antenna gain as the maximum eirp allowed is 10dBm/MHz. The limits are also corrected for instances where the highest measured value of the PSD exceeds the average PSD (calculated from the measured power divided by the measured 99% bandwidth) by more than 3dB by the amount that the measured value exceeds the average by more than 3dB.
Note 4:	99% Bandwidth measured in accordance with RSS GEN - RB > 1% of span and VB >=3xRB
Note 5:	For MIMO systems the total output power and total PSD are calculated form the sum of the powers of the individual chains (in linear terms). The antenna gain used to determine the EIRP and limits for PSD/Output power depends on the operating mode of the MIMO device. If the signals on the non-coherent between the transmit chains then the gain used to determine the limits is the highest gain of the individual chains and the EIRP is the sum of the products of gain and power on each chain. If the signals are coherent then the effective antenna gain is the sum (in linear terms) of the gains for each chain and the EIRP is the product of the effective gain and total power.

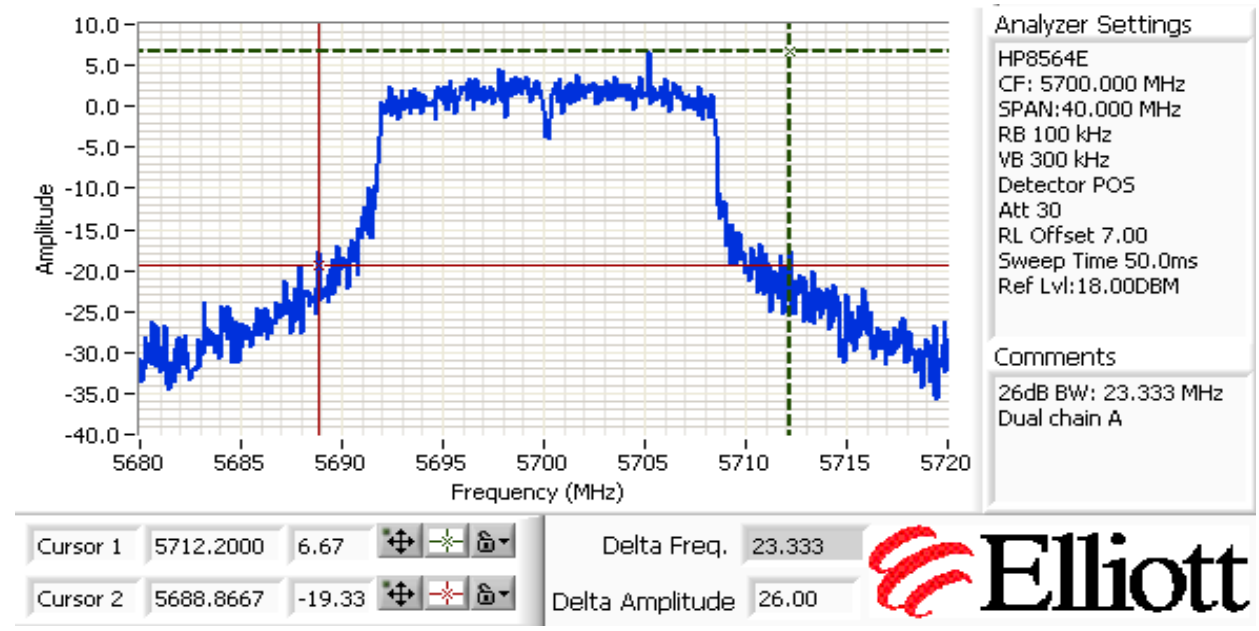
Client:	Xirrus	Job Number:	J71484
Model:	XN4	T-Log Number:	T73388
		Account Manager:	Susan Pelzl
Contact:	Steve Smith		
Standard:	FCC 15 E, RSS 210	Class:	N/A

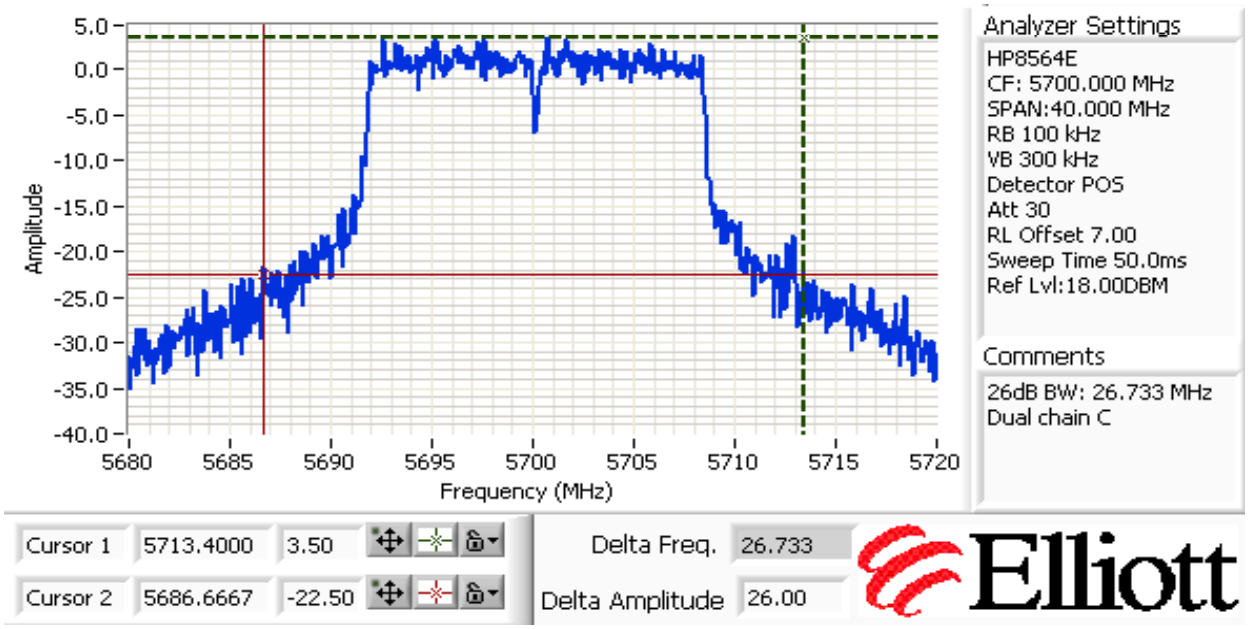
Plots showing power/PSD measurements and 26dB bandwidth measurements at the high power setting



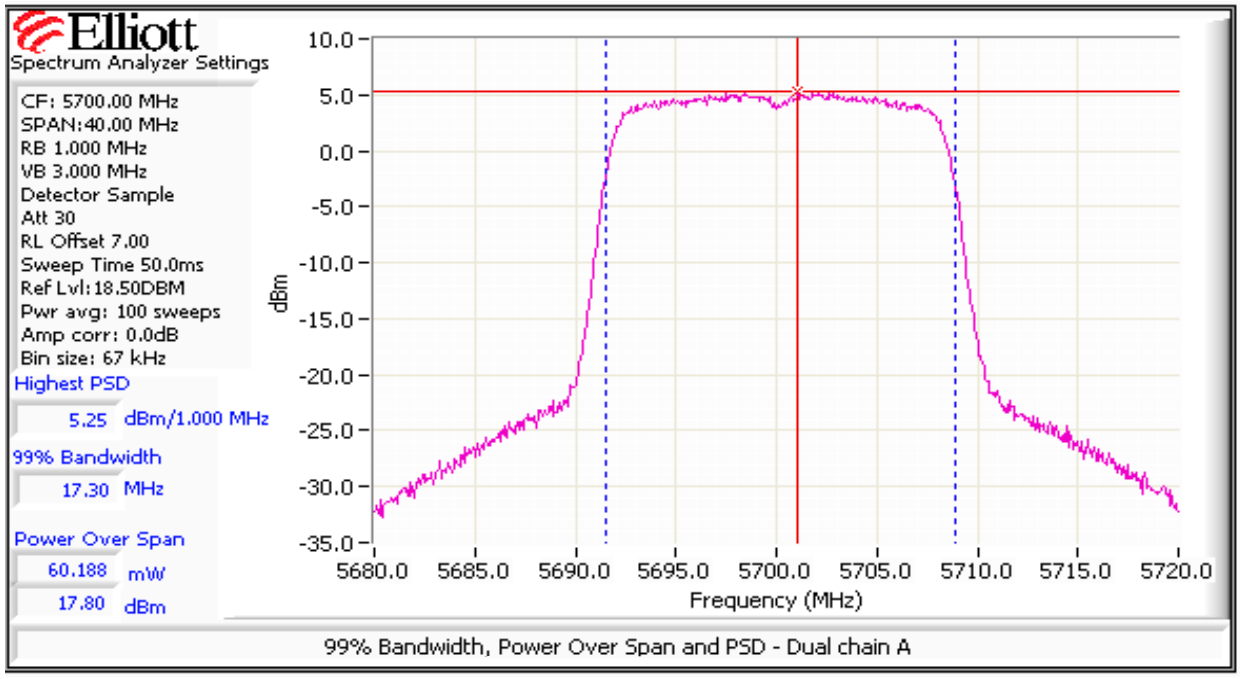


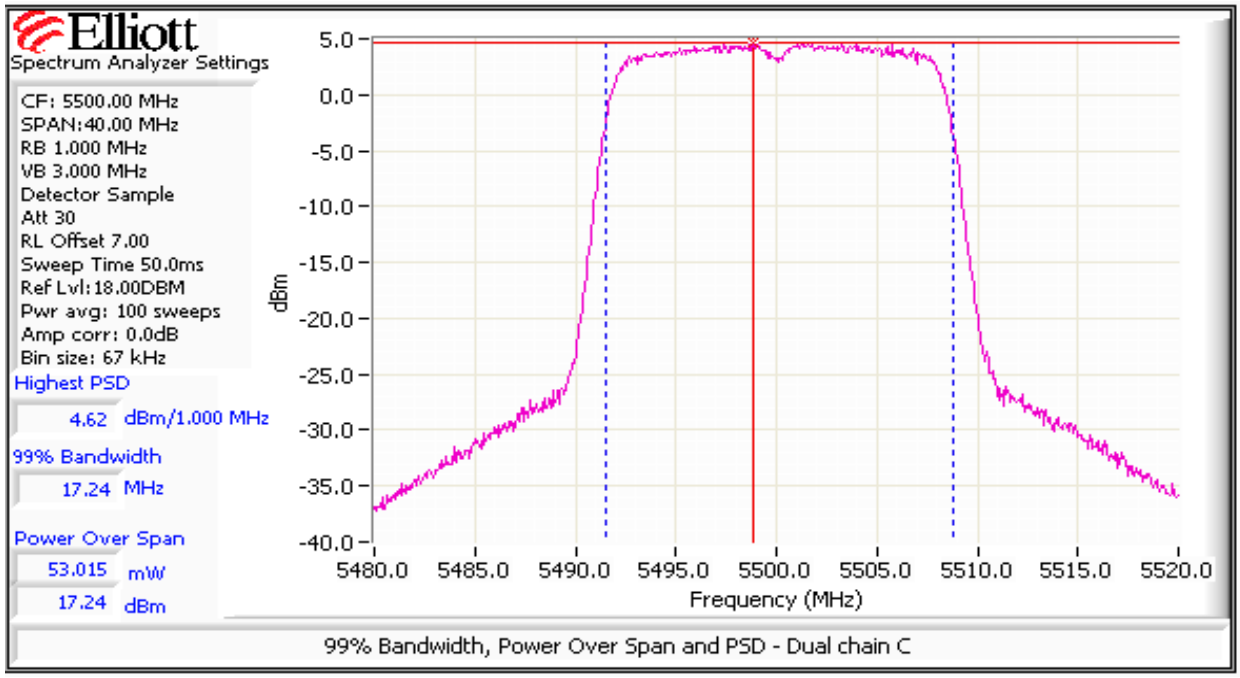
Client:	Xirrus	Job Number:	J71484
Model:	XN4	T-Log Number:	T73388
		Account Manager:	Susan Pelzl
Contact:	Steve Smith		
Standard:	FCC 15 E, RSS 210	Class:	N/A



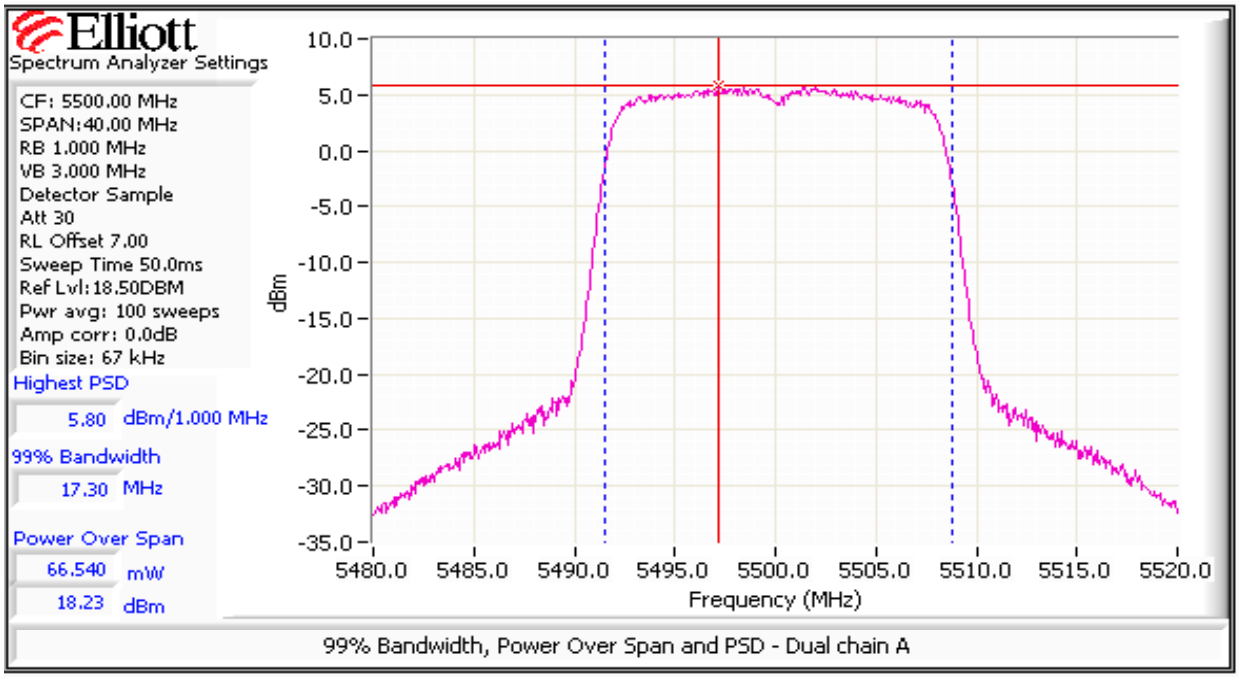


Client:	Xirrus	Job Number:	J71484
Model:	XN4	T-Log Number:	T73388
		Account Manager:	Susan Pelzl
Contact:	Steve Smith		
Standard:	FCC 15 E, RSS 210	Class:	N/A

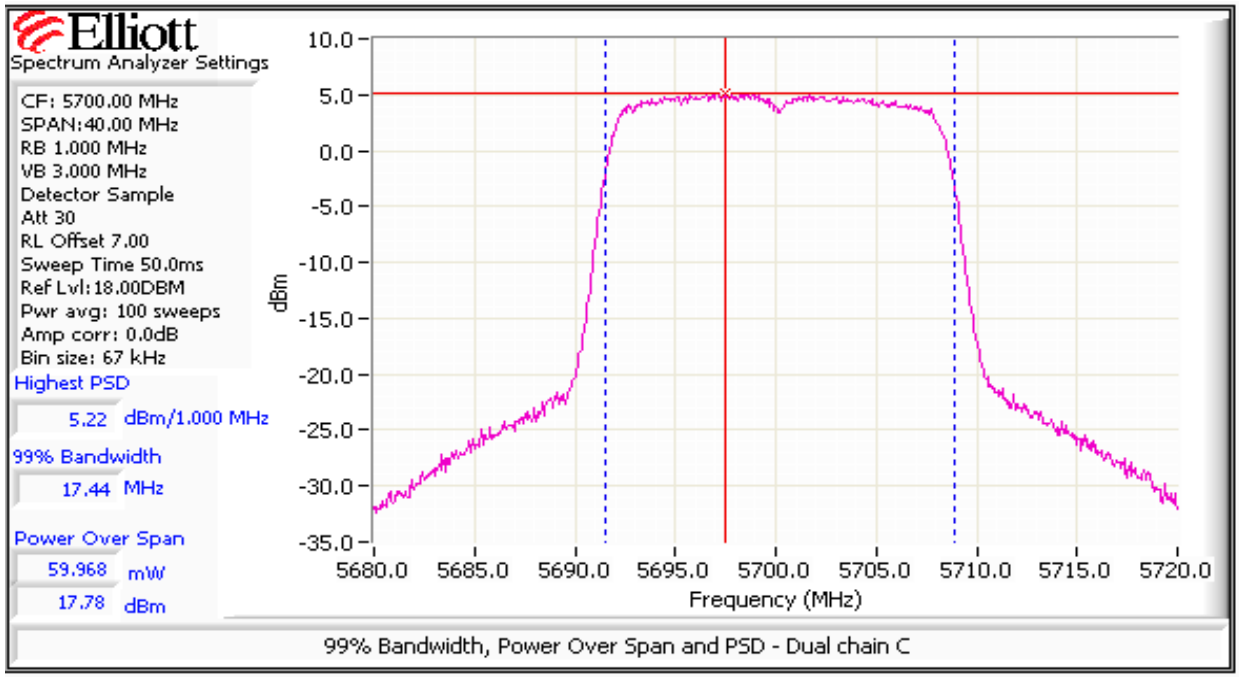




Client:	Xirrus	Job Number:	J71484
Model:	XN4	T-Log Number:	T73388
		Account Manager:	Susan Pelzl
Contact:	Steve Smith		
Standard:	FCC 15 E, RSS 210	Class:	N/A



99% Bandwidth, Power Over Span and PSD - Dual chain A



99% Bandwidth, Power Over Span and PSD - Dual chain C

Client:	Xirrus	Job Number:	J71484
Model:	XN4	T-Log Number:	T73388
		Account Manager:	Susan Pelzl
Contact:	Steve Smith		
Standard:	FCC 15 E, RSS 210	Class:	N/A

Run #2: Peak Excursion Measurement

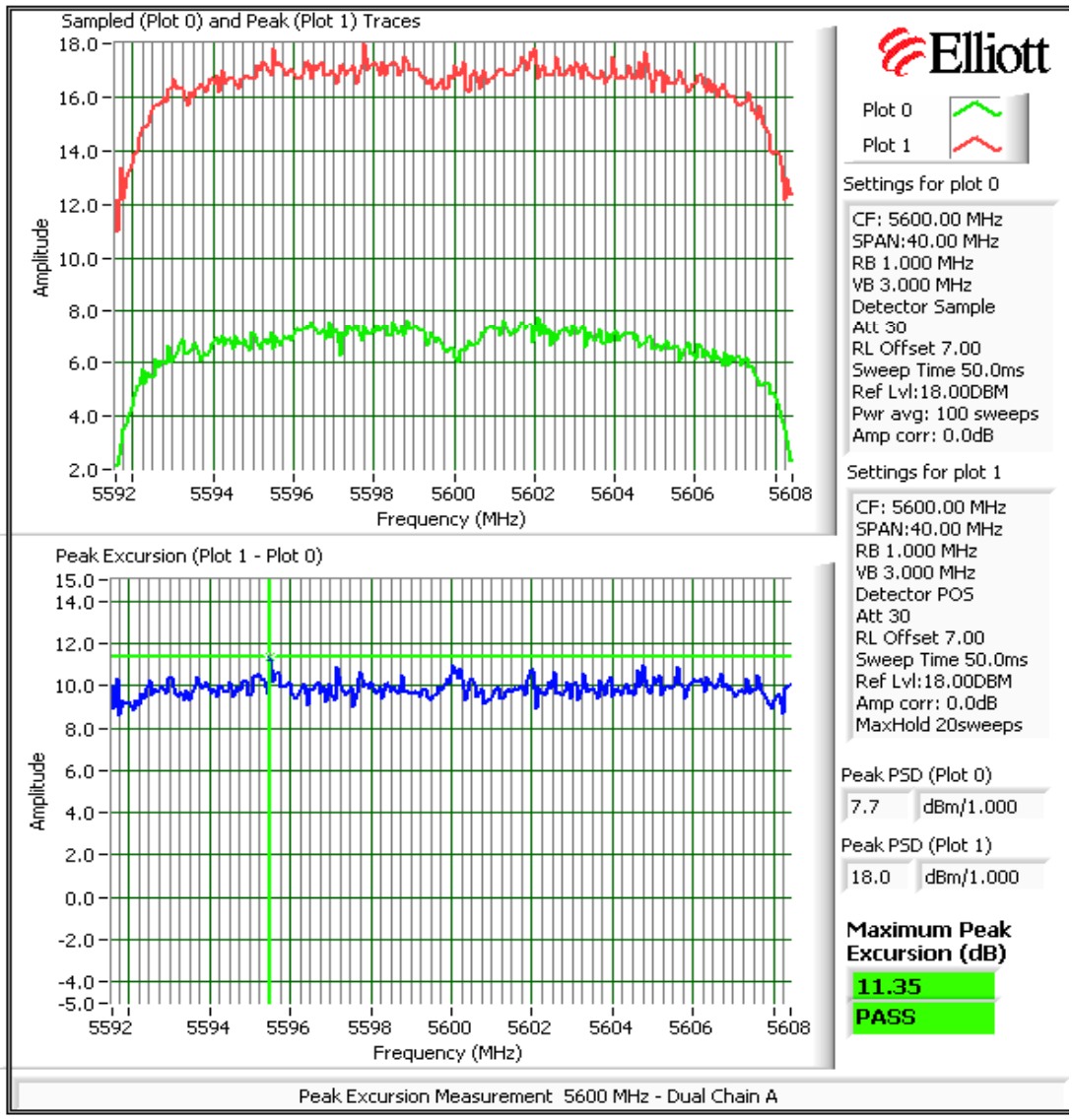
Device meets the requirement for the peak excursion

Freq	Mode, Chain	Peak Excursion(dB)		Mode, Chain	Peak Excursion(dB)	
(MHz)		Value	Limit		Value	Limit
5500	a, A	11.9	13.0	a, C	11.8	13.0
5700	a, A	11.7	13.0	a, C	11.9	13.0

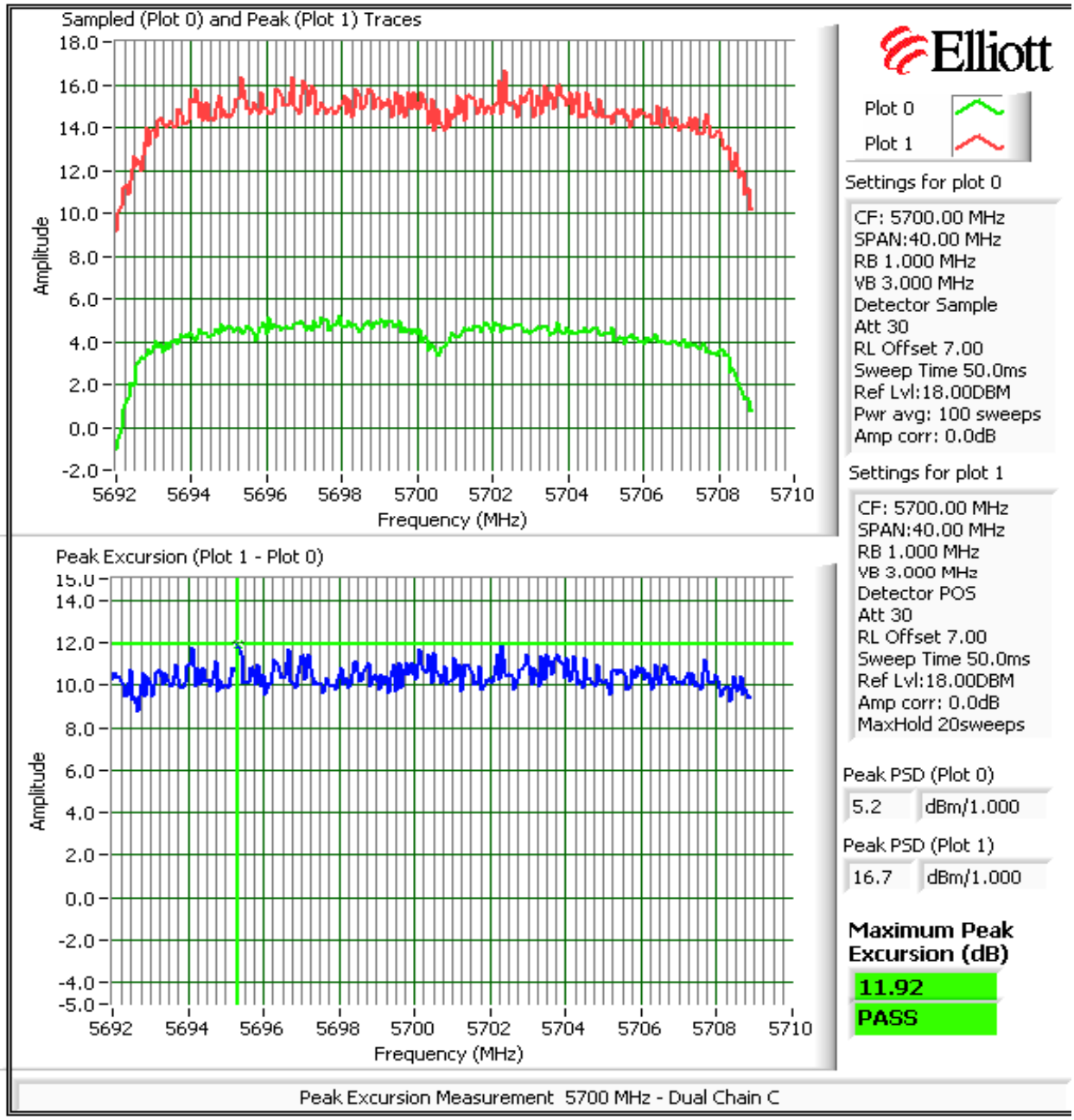
Plots Showing Peak Excursion

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

Trace B: RBW = 1 MHz, VBW = 3MHz, Integrated average power



Client:	Xirrus	Job Number:	J71484
Model:	XN4	T-Log Number:	T73388
		Account Manager:	Susan Pelzl
Contact:	Steve Smith		
Standard:	FCC 15 E, RSS 210	Class:	N/A



Client:	Xirrus	Job Number:	J71484
Model:	XN4	T-Log Number:	T73388
		Account Manager:	Susan Pelzl
Contact:	Steve Smith		
Standard:	FCC 15 E, RSS 210	Class:	N/A

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

Test Specific Details

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

Date of Test: 11/10 and 11/2008
Test Engineer: Mehran Birgani
Test Location: SV OATS #1

Config. Used: AC powered
Config Change: Direct connection
EUT Voltage: PoE

General Test Configuration

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

Ambient Conditions:

Temperature: 15-36 °C
Rel. Humidity: 10-60 %

Summary of Results

Run #	Mode	Test Performed	Limit	Pass / Fail	Result / Margin
1	n20MHz	Power, 5470-5725MHz	15.407(a) (1), (2)	Pass	Single radio: 21.0 dBm
1	n20MHz	PSD, 5470-5725MHz	15.407(a) (1), (2)	Pass	8.3 dBm/MHz
1	n20MHz	99% Bandwidth	RSS 210	-	18.6 MHz
1	n40MHz	Power, 5470-5725MHz	15.407(a) (1), (2)	Pass	Single radio: 21.1 dBm
1	n40MHz	PSD, 5470-5725MHz	15.407(a) (1), (2)	Pass	5.1 dBm/MHz
1	n40MHz	99% Bandwidth	RSS 210	-	37.1 MHz
2	n20 & n40	Peak Excursion Envelope	15.407(a) (6)	Pass	12.9 dB
3	n20 & n40	Antenna Conducted Spurious	15.407(b)	Pass	< -27dBm/MHz eirp

Modifications Made During Testing

No modifications were made to the EUT during testing

Deviations From The Standard

No deviations were made from the requirements of the standard.

Client:	Xirrus	Job Number:	J71484
Model:	XN4	T-Log Number:	T73388
		Account Manager:	Susan Pelzl
Contact:	Steve Smith		
Standard:	FCC 15 E, RSS 210	Class:	N/A

Run #1: Bandwidth, Output Power and Power spectral Density

Antenna gain used is for the internal antenna. The external antenna gain is lower (2.5dBi) and not used for MIMO modes.

	Chain 1	Chain 2	Chain 3	Coherent	Effective[5]
Antenna Gain (dBi):	3		3	No	3.0

Power settings for a single radio operating in the band

Frequency (MHz)	Software Setting	26dB BW (MHz)	Measured Output Power[1] dBm			Total		Limit (dBm)	Max Power (W)	Pass or Fail
			Chain 1	Chain 2	Chain 3	mW	dBm			
5500	20.0	23.9	18.6		17.1	123.7	20.9	24.0	0.126	PASS
5700	20.0	27.1	18.3		17.7	126.5	21.0	24.0		PASS
5510	17.5	40.7	15.4		14.5	62.9	18.0	24.0	0.128	PASS
5670	20.0	71.6	18.8		17.2	128.3	21.1	24.0		PASS

Frequency (MHz)	99%[4] BW	Total Power	PSD[2] dBm/MHz			Total PSD		Limit		Pass or Fail
			Chain 1	Chain 2	Chain 3	mW/MHz	dBm/MHz	FCC	RSS 210[3]	
5500	18.4	20.9	6.0		4.3	6.7	8.2	11.0	11.0	PASS
5700	18.6	21.0	5.6		4.9	6.7	8.3	11.0	11.0	PASS
5510	36.9	18.0	-0.6		-1.4	1.6	2.0	11.0	11.0	PASS
5670	37.1	21.1	2.7		1.3	3.2	5.1	11.0	11.0	PASS

Note 1:	Output power measured using a spectrum analyzer (see plots below for the high power measurements): RBW=1MHz, VB=3 MHz, sample detector, power averaging on (transmitted signal was continuous) and power integration over 40MHz (20MHz mode) and 80MHz (40MHz mode)
Note 2:	Measured using the same analyzer settings used for output power.
Note 3:	For RSS-210 the limit for the 5470 - 5725 MHz band accounts for the antenna gain as the maximum eirp allowed is 11dBm/MHz. The limits are also corrected for instances where the highest measured value of the PSD exceeds the average PSD (calculated from the measured power divided by the measured 99% bandwidth) by more than 3dB by the amount that the measured value exceeds the average by more than 3dB.
Note 4:	99% Bandwidth measured in accordance with RSS GEN - RB > 1% of span and VB >=3xRB
Note 5:	For MIMO systems the total output power and total PSD are calculated form the sum of the powers of the individual chains (in linear terms). The antenna gain used to determine the EIRP and limits for PSD/Output power depends on the operating mode of the MIMO device. If the signals on the non-coherent between the transmit chains then the gain used to determine the limits is the highest gain of the individual chains and the EIRP is the sum of the products of gain and power on each chain. If the signals are coherent then the effective antenna gain is the sum (in linear terms) of the gains for each chain and the EIRP is the product of the effective gain and total power.

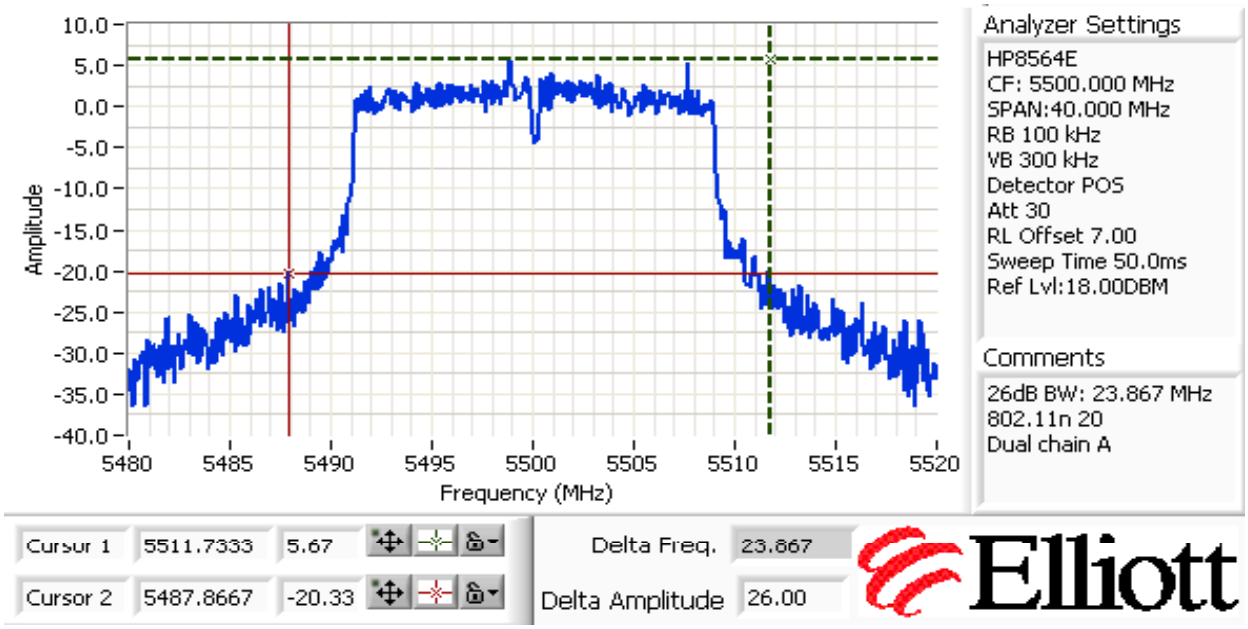
Power settings for all four radios operating in the band:

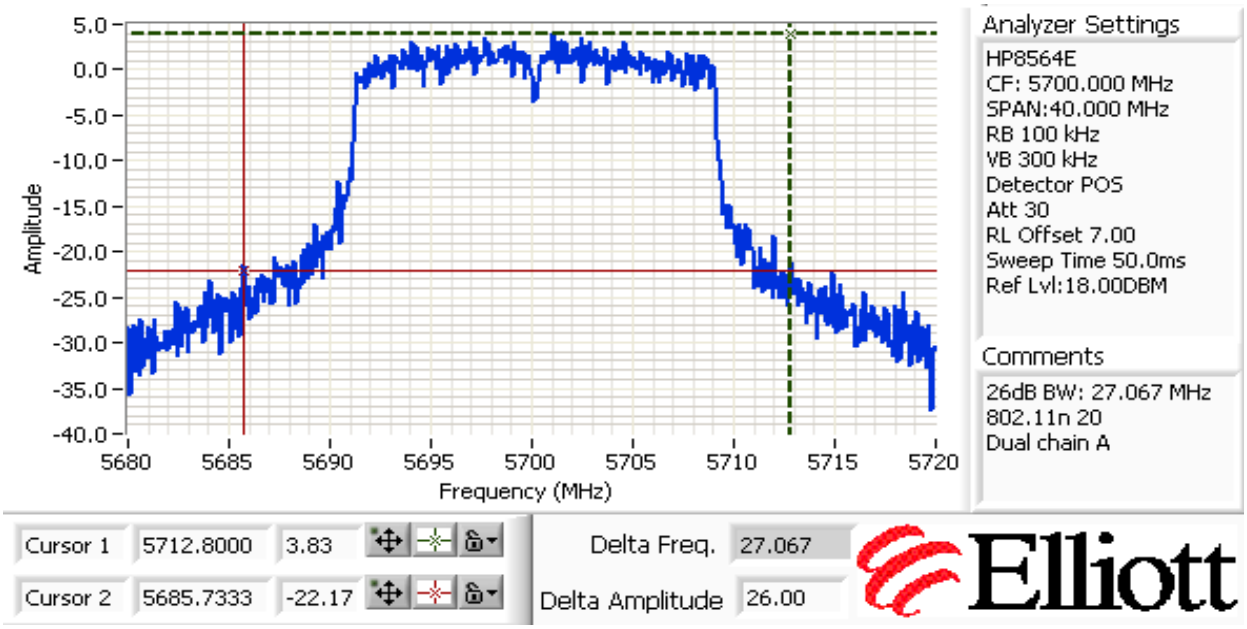
Evaluation of total output power with all fiour radios operating in the band is covered by test data log T77249.

Client:	Xirrus	Job Number:	J71484
Model:	XN4	T-Log Number:	T73388
		Account Manager:	Susan Pelzl
Contact:	Steve Smith		
Standard:	FCC 15 E, RSS 210	Class:	N/A

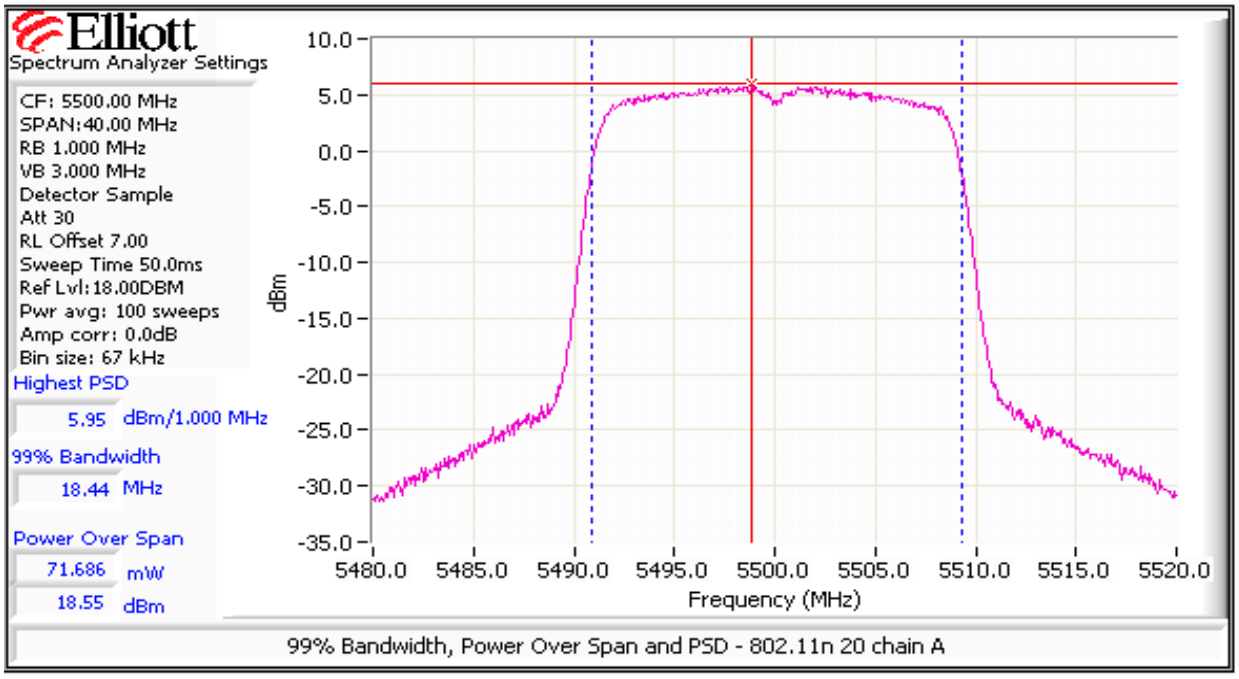
Plots showing power/PSD measurements and 26dB bandwidth measurements at the high power setting

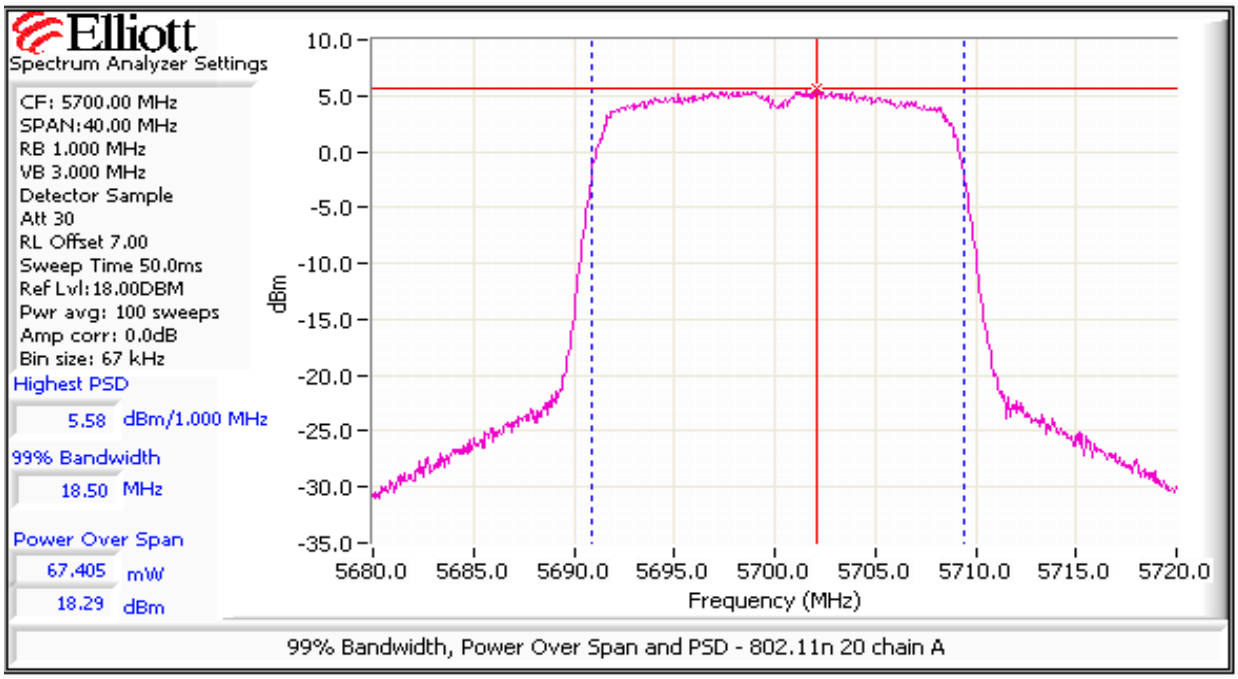
Plot for each channel for the chain with the highest power provided.





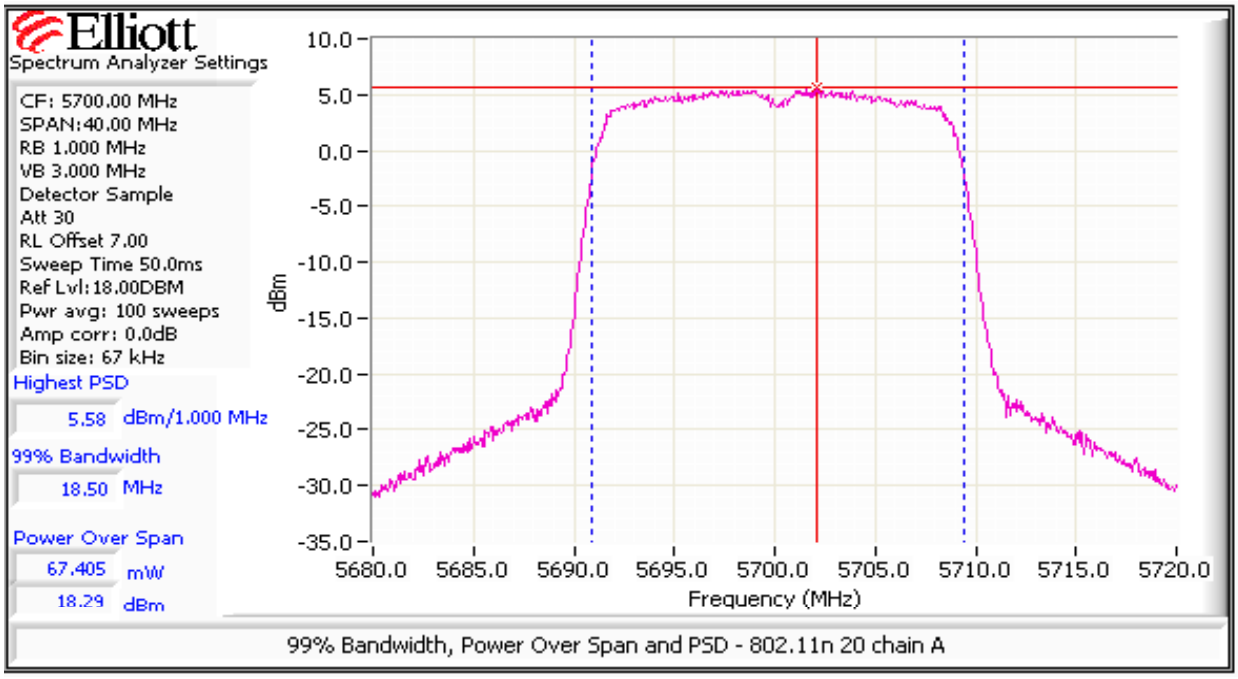
Client:	Xirrus	Job Number:	J71484
Model:	XN4	T-Log Number:	T73388
		Account Manager:	Susan Pelzl
Contact:	Steve Smith		
Standard:	FCC 15 E, RSS 210	Class:	N/A

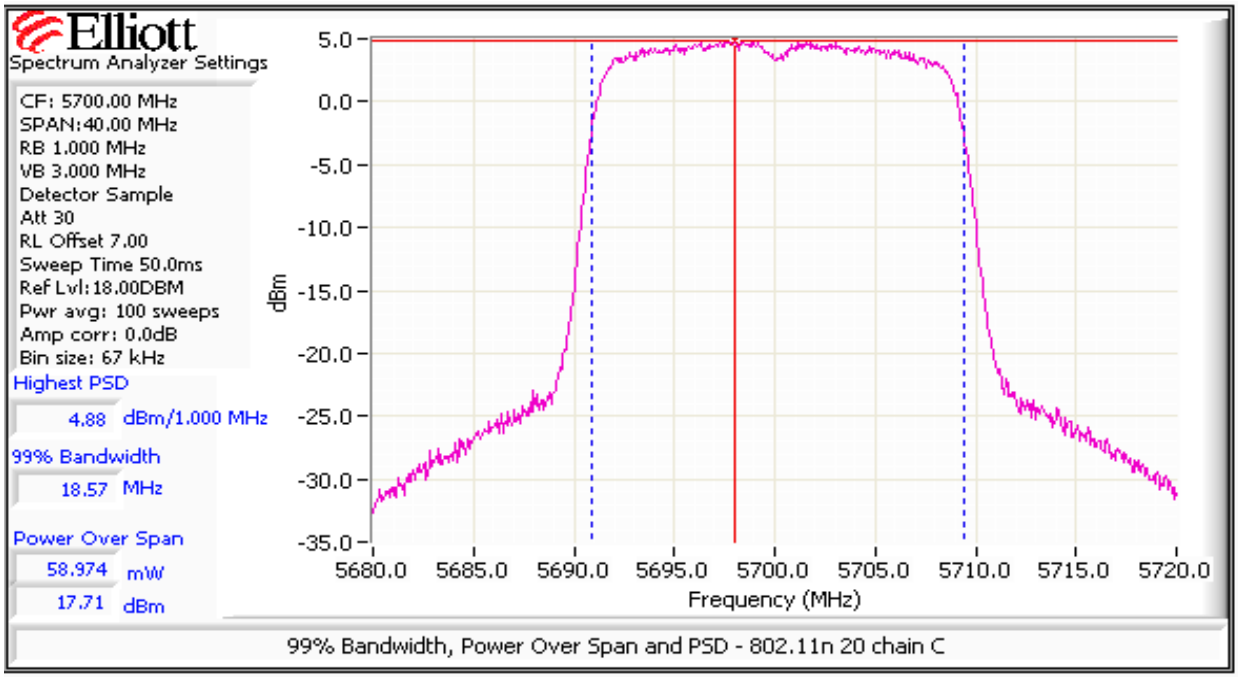




Client:	Xirrus	Job Number:	J71484
Model:	XN4	T-Log Number:	T73388
		Account Manager:	Susan Pelzl
Contact:	Steve Smith		
Standard:	FCC 15 E, RSS 210	Class:	N/A

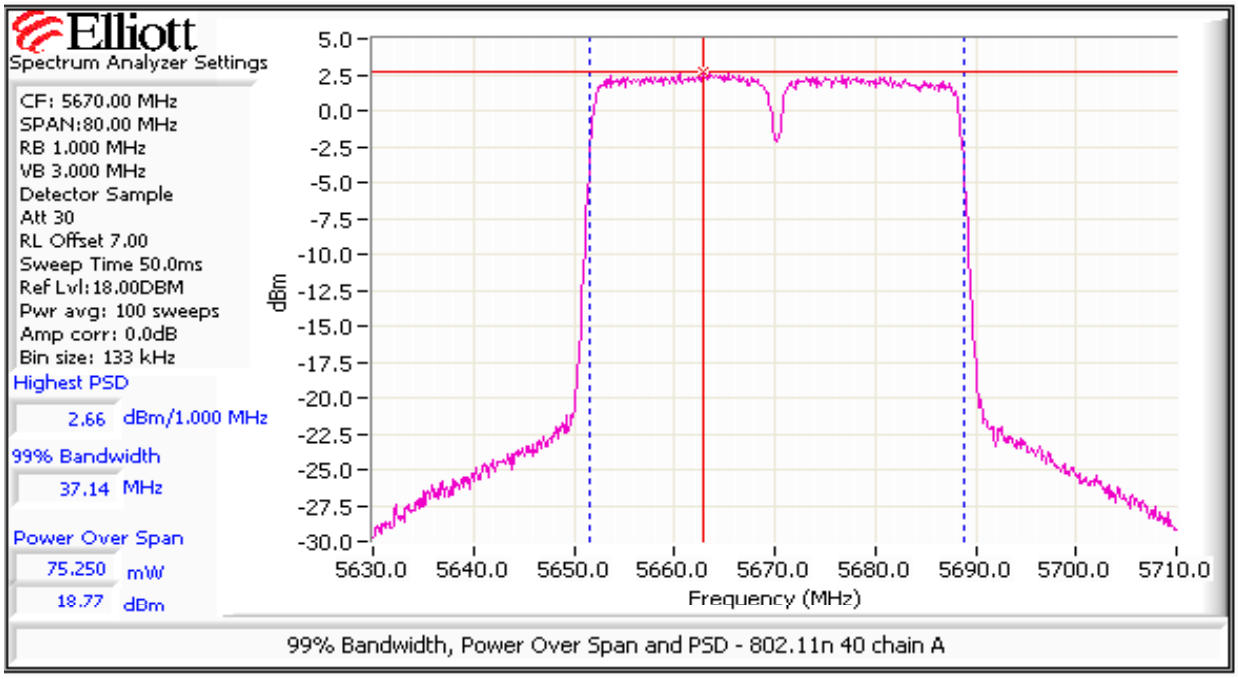
Plots showing signal level for the high channel below -30dBm/MHz at 5720MHz with signal level continuing to fall to demonstrate compliance with the -27dBm eirp requirement at 5725MHz

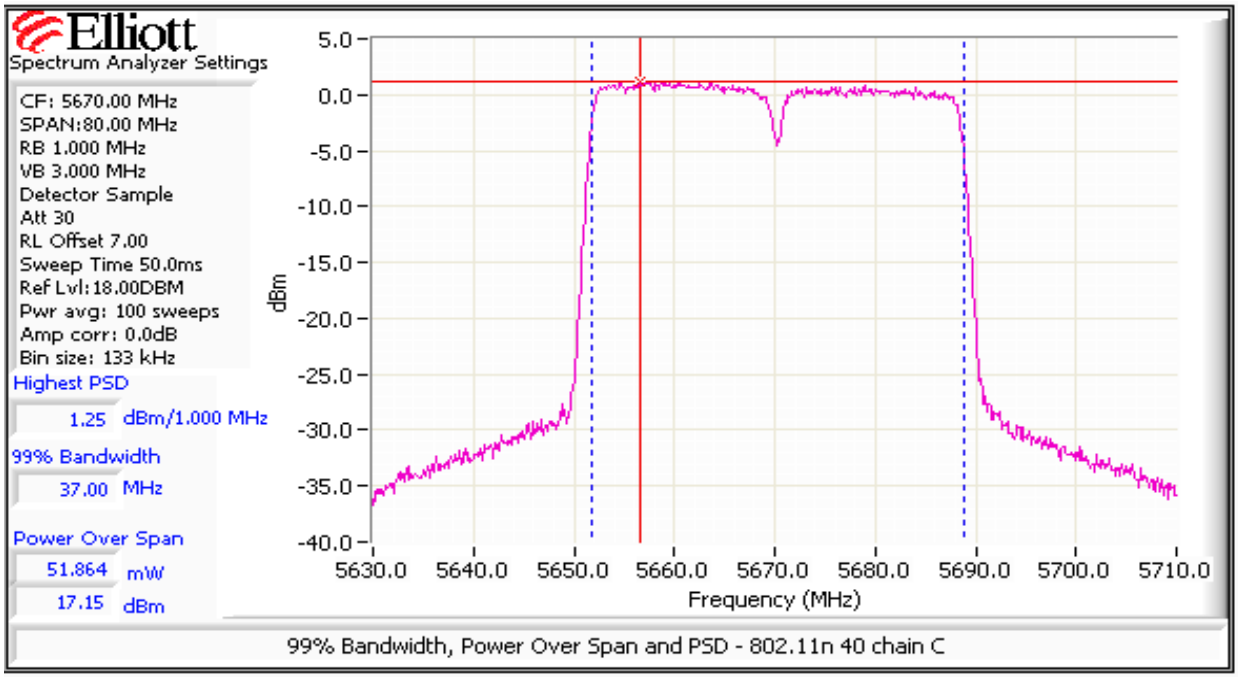




Client:	Xirrus	Job Number:	J71484
Model:	XN4	T-Log Number:	T73388
		Account Manager:	Susan Pelzl
Contact:	Steve Smith		
Standard:	FCC 15 E, RSS 210	Class:	N/A

Plots showing signal level for the high channel below -30dBm/MHz at 5720MHz with signal level continuing to fall to demonstrate compliance with the -27dBm eirp requirement at 5725MHz





Client:	Xirrus	Job Number:	J71484
Model:	XN4	T-Log Number:	T73388
		Account Manager:	Susan Pelzl
Contact:	Steve Smith		
Standard:	FCC 15 E, RSS 210	Class:	N/A

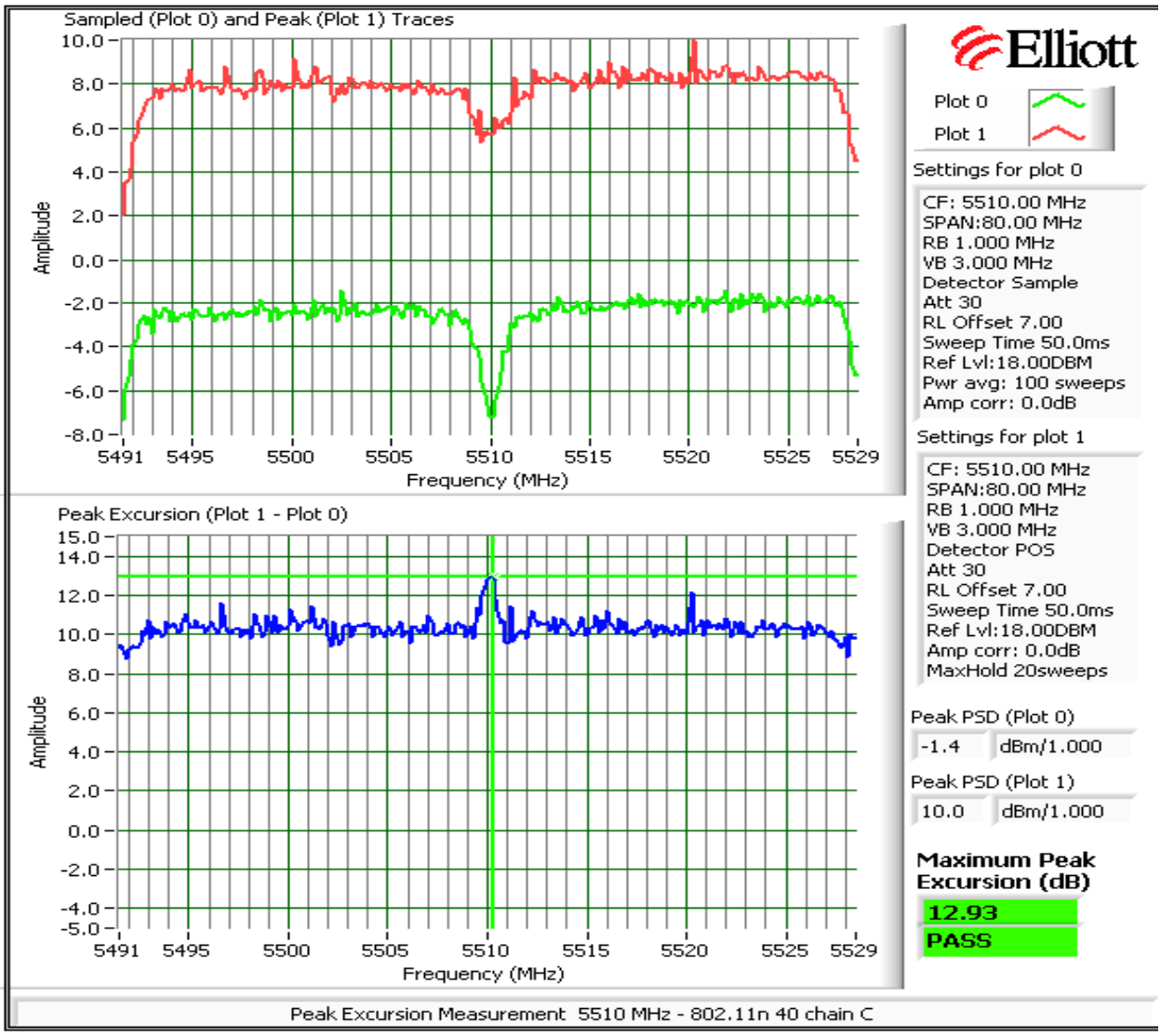
Run #2: Peak Excursion Measurement

Device meets the requirement for the peak excursion

Freq	Mode, Chain	Peak Excursion(dB)		Mode, Chain	Peak Excursion(dB)	
(MHz)		Value	Limit		Value	Limit
5500	n20 A	11.3	13.0	n20 C	11.6	13.0
5700	n20 A	11.5	13.0	n20 C	11.2	13.0
5510	n40 A	11.8	13.0	n40 C	12.9	13.0
5670	n40 A	12.8	13.0	n40 C	12.6	13.0

Plots Showing Peak Excursion

Trace A: RBW = VBW = 3MHz, Peak hold; Trace B: RBW = 1 MHz, VBW = 3MHz, Integrated average power



Client:	Xirrus	Job Number:	J71484
Model:	XN4	T-Log Number:	T73388
		Account Manager:	Susan Pelzl
Contact:	Steve Smith		
Standard:	FCC 15 E, RSS 210	Class:	N/A

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

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

Number of transmit chains:	2		
Maximum Antenna Gain:	3.0	dBi	
Spurious Limit:	-27.0	dBm/MHz eirp	
Adjustment for 2 chains:	-3.0	dB adjustment for multiple chains.	
Limit Used On Plots [Note 1]:	-33.0	dBm/MHz	Average Limit (RB=1MHz, VB=10Hz)
	-13.0	dBm/MHz	Peak Limit (RB=VB=1MHz)

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

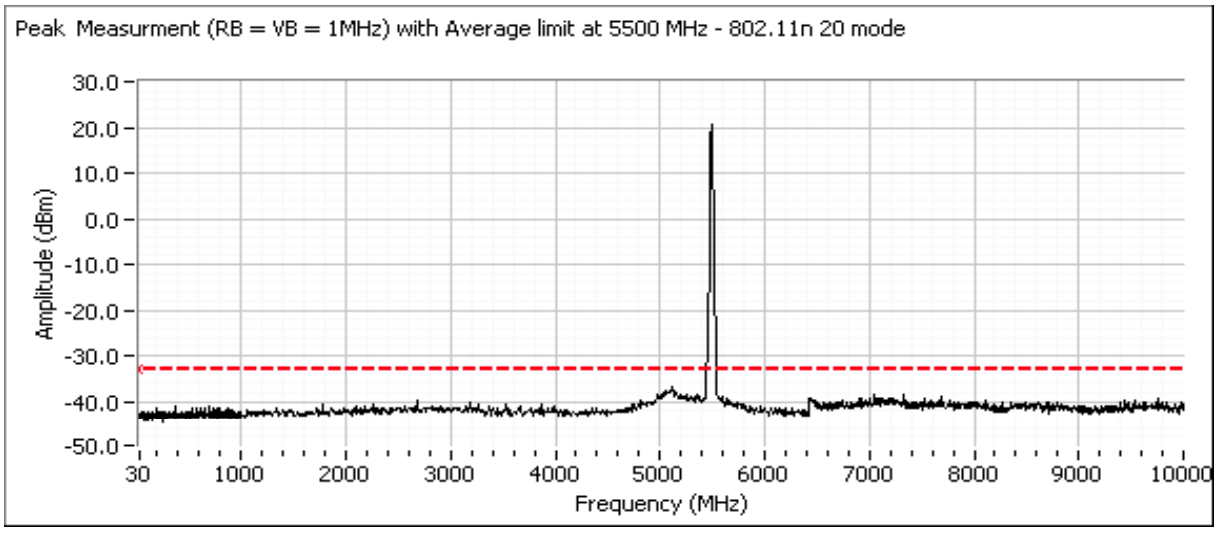
Client:	Xirrus	Job Number:	J71484
Model:	XN4	T-Log Number:	T73388
		Account Manager:	Susan Pelzl
Contact:	Steve Smith		
Standard:	FCC 15 E, RSS 210	Class:	N/A

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

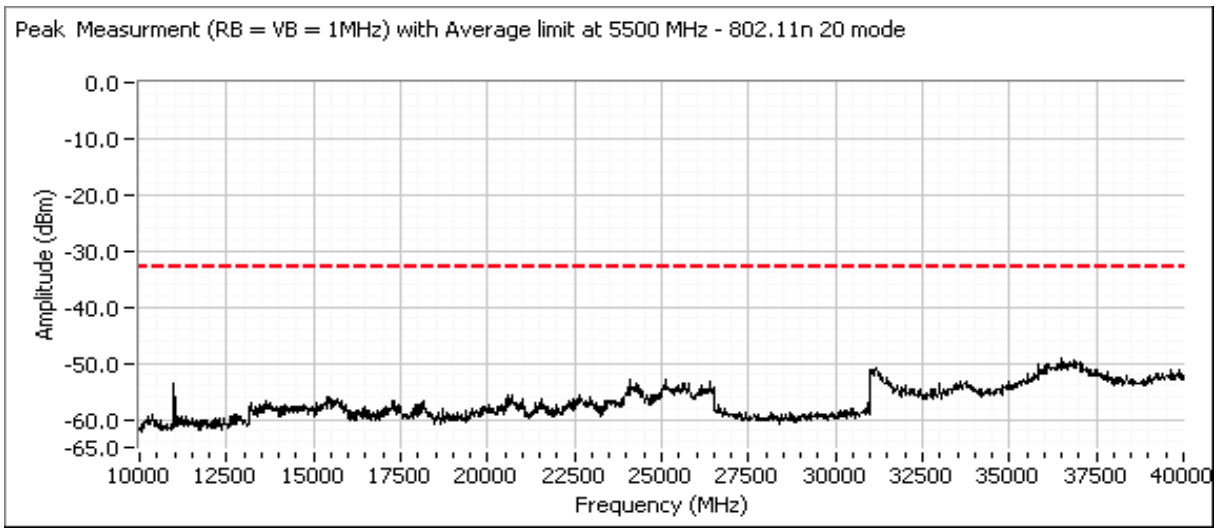
802.11n 20MHz, Low channel (5500 MHz), 5470 - 5725 MHz Band with power setting of 20dBm.

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

20dB attenuation pad at front of analyzer and 20dB attenuation at software level.

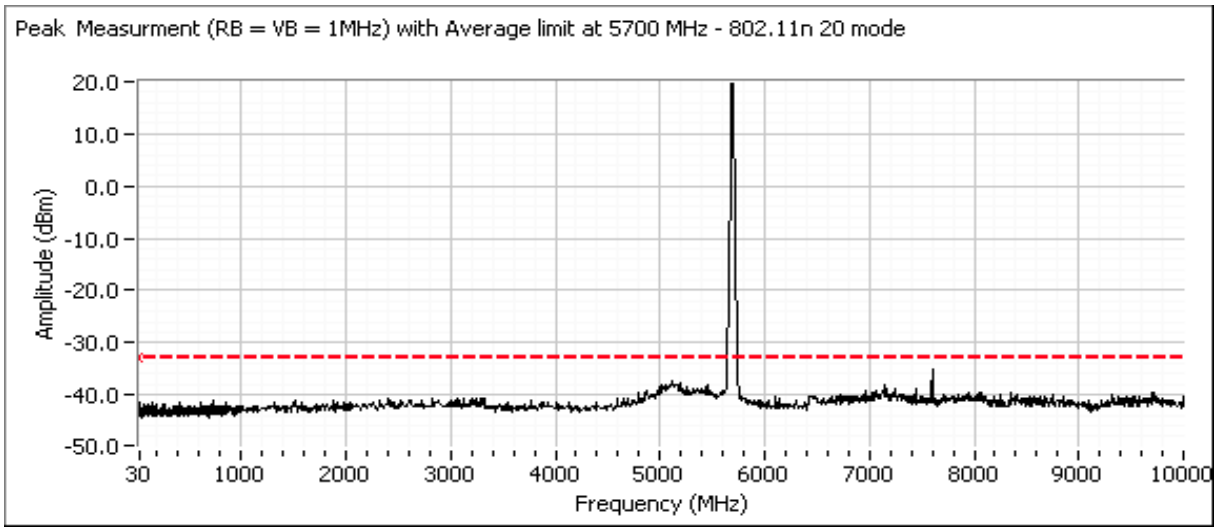


20dB attenuation pad at front of analyzer and 0dB attenuation at software level to reduce the noise floor.

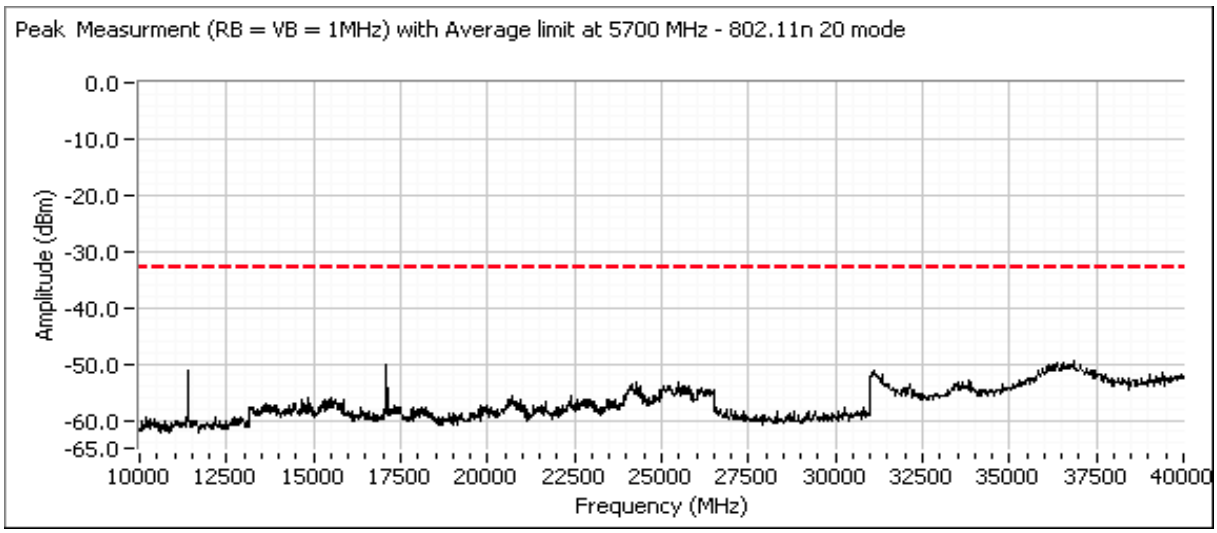


Client:	Xirrus	Job Number:	J71484
Model:	XN4	T-Log Number:	T73388
		Account Manager:	Susan Pelzl
Contact:	Steve Smith		
Standard:	FCC 15 E, RSS 210	Class:	N/A

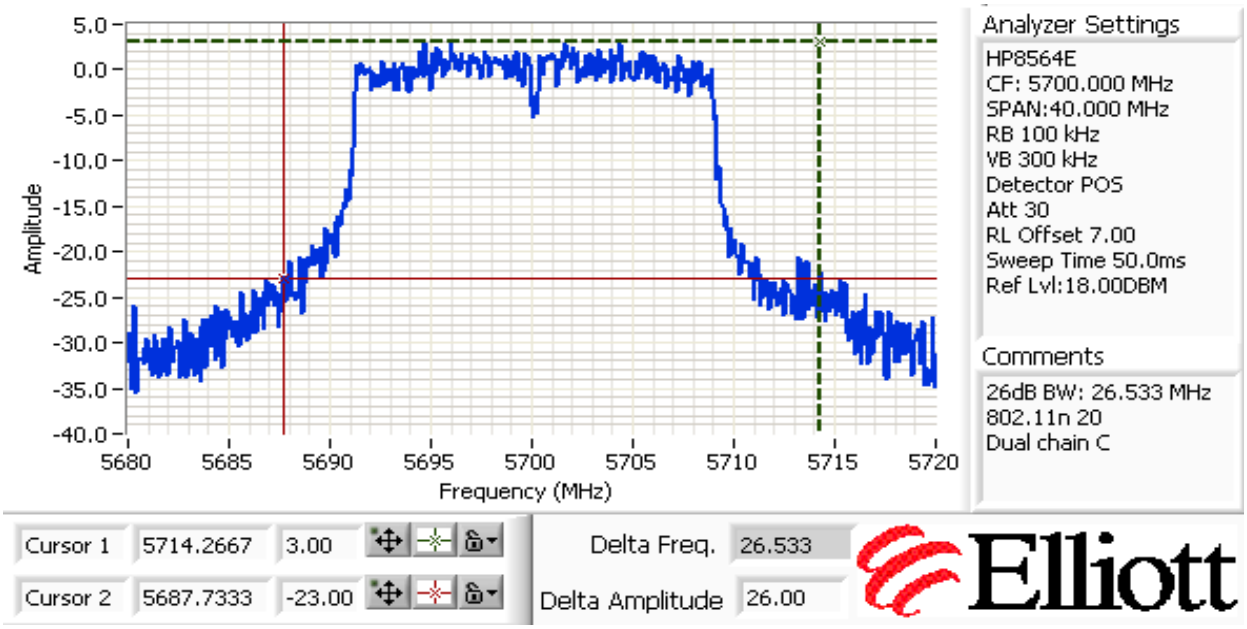
802.11n 20MHz, High channel (5700 MHz), 5470 - 5725 MHz Band with power setting of 20dBm.
The 26dB bandwidth data shows that the 26dB signal bandwidth (and, therefore, the 20dB signal bandwidth) remains within the allocated band - see plots on the following page.
The 26dB bandiwtdh data shows that the 26dB signal bandiwdth (and, therefore, the 20dB signal bandwidth) remains within the allocated band. The power plot shows the signal level at 5725 MHz as falling below the -27dBm eirp limit (level is below -30dBm/MHz)
20dB attenuation pad at front of analyzer and 20dB attenuation at software level.

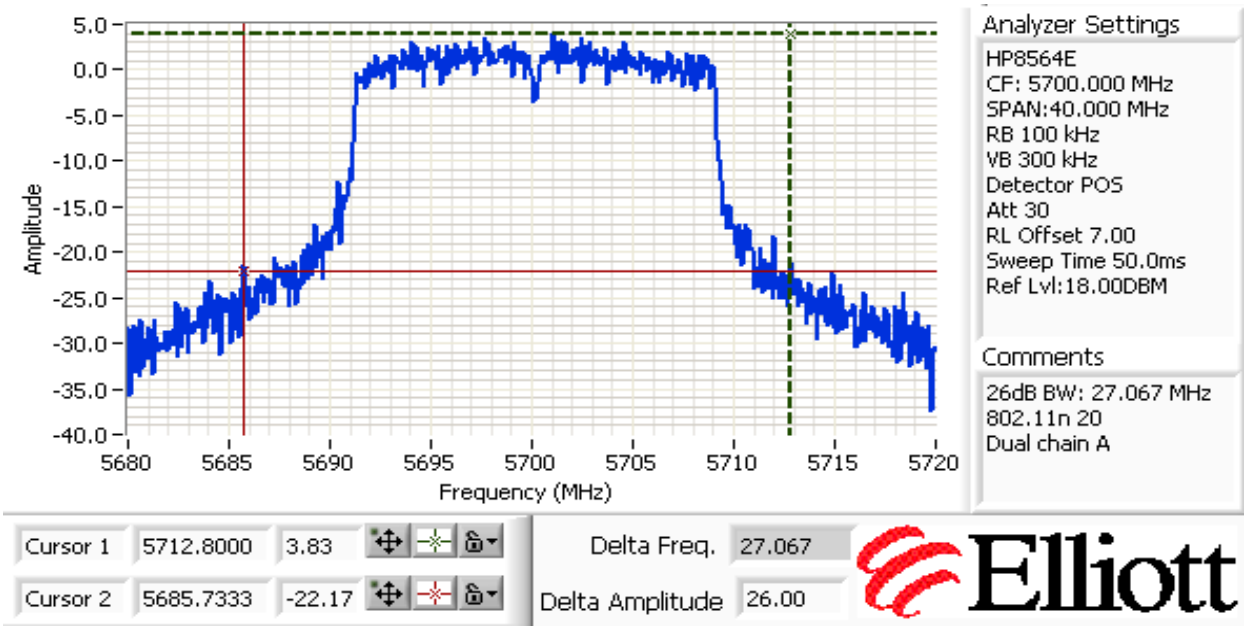


20dB attenuation pad at front of analyzer and 0dB attenuation at software level to reduce the noise floor.



Client:	Xirrus	Job Number:	J71484
Model:	XN4	T-Log Number:	T73388
		Account Manager:	Susan Pelzl
Contact:	Steve Smith		
Standard:	FCC 15 E, RSS 210	Class:	N/A



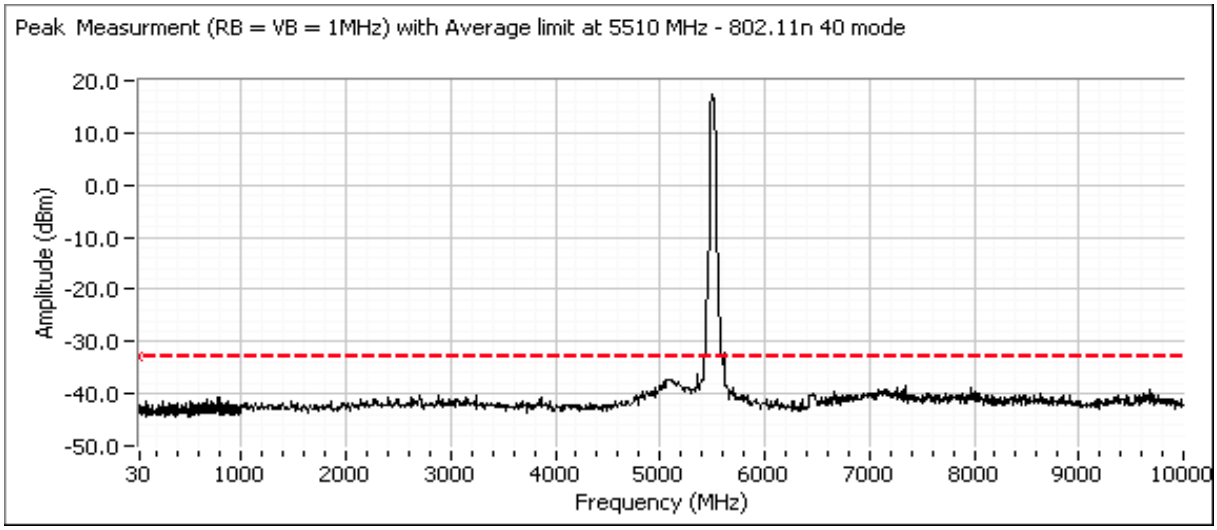


Client:	Xirrus	Job Number:	J71484
Model:	XN4	T-Log Number:	T73388
		Account Manager:	Susan Pelzl
Contact:	Steve Smith		
Standard:	FCC 15 E, RSS 210	Class:	N/A

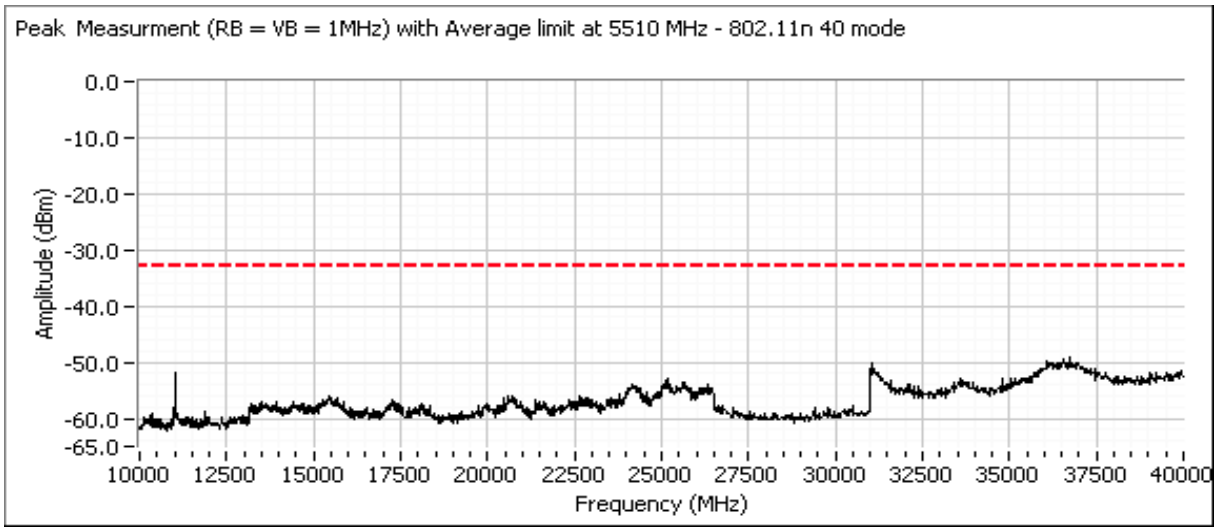
802.11n 40MHz, Low channel (5510 MHz), 5470 - 5725 MHz Band with power setting of 20dBm.

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

20dB attenuation pad at front of analyzer and 20dB attenuation at software level.

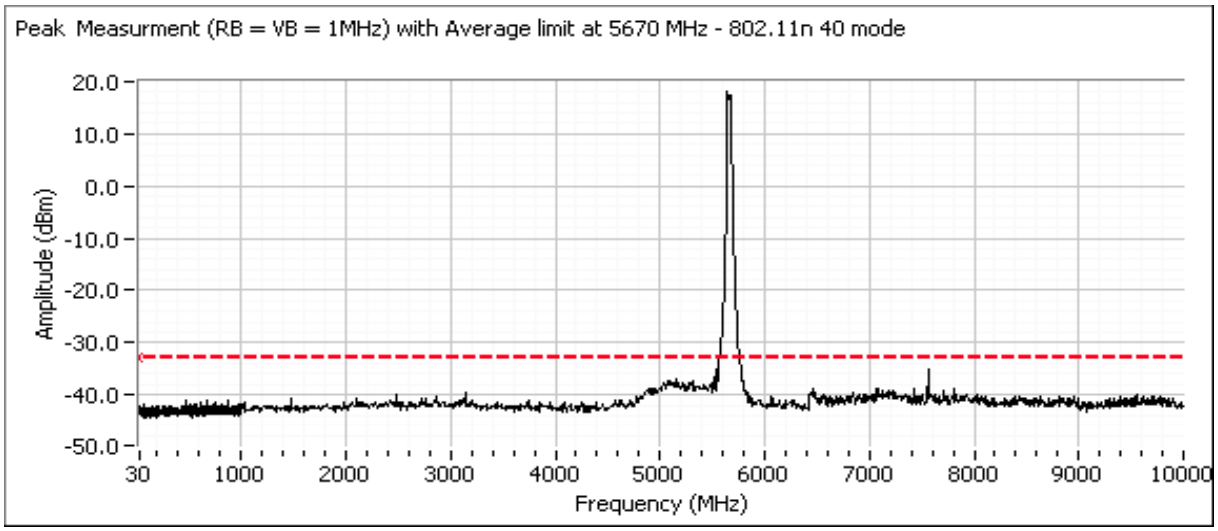


20dB attenuation pad at front of analyzer and 0dB attenuation at software level to reduce the noise floor.

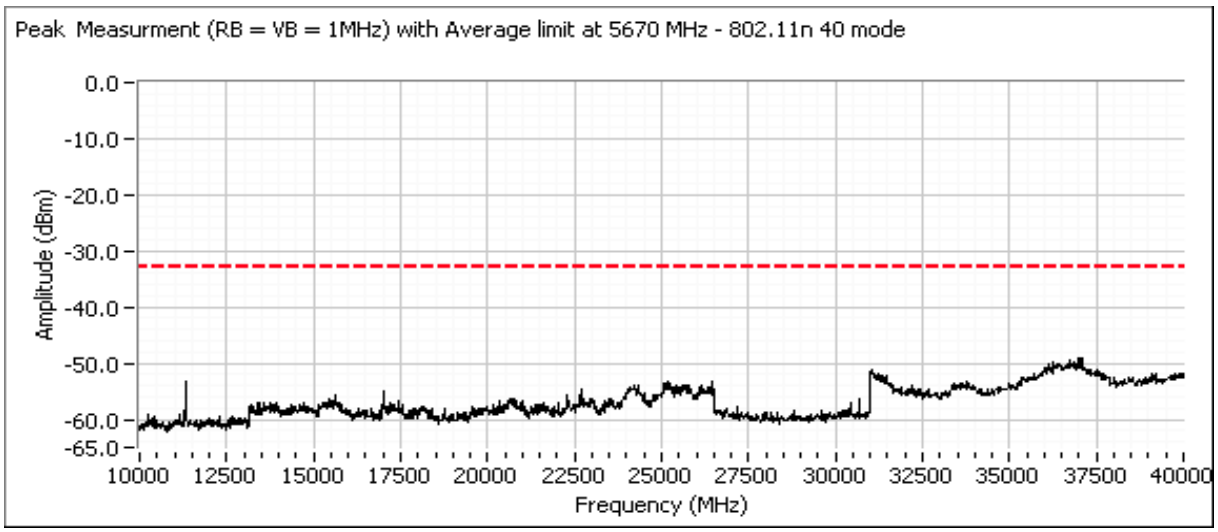


Client:	Xirrus	Job Number:	J71484
Model:	XN4	T-Log Number:	T73388
		Account Manager:	Susan Pelzl
Contact:	Steve Smith		
Standard:	FCC 15 E, RSS 210	Class:	N/A

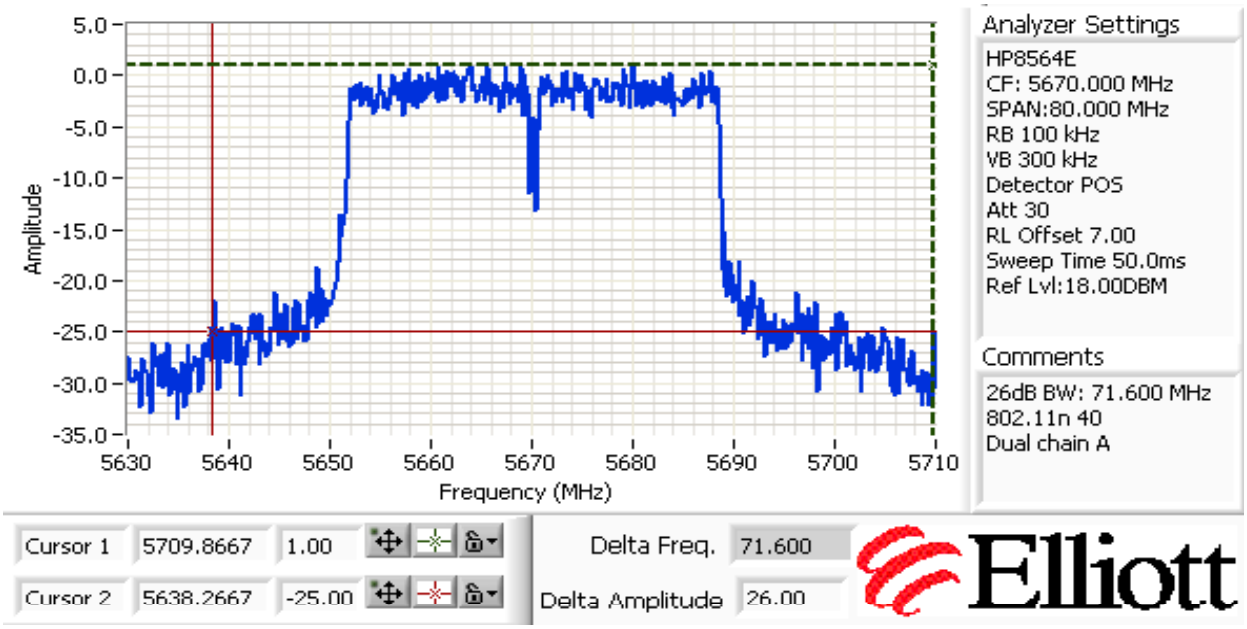
802.11n 40MHz, High channel (5670 MHz), 5470 - 5725 MHz Band with power setting of 20dBm.
The 26dB bandwidth data shows that the 26dB signal bandwidth (and, therefore, the 20dB signal bandwidth) remains within the allocated band - see plots on the following page.
The 26dB bandiwtdh data shows that the 26dB signal bandiwdth (and, therefore, the 20dB signal bandwidth) remains within the allocated band. The power plot shows the signal level at 5725 MHz as falling below the -27dBm eirp limit (level is below -30dBm/MHz)
20dB attenuation pad at front of analyzer and 0dB attenuation at analyzer input level to reduce the noise floor.

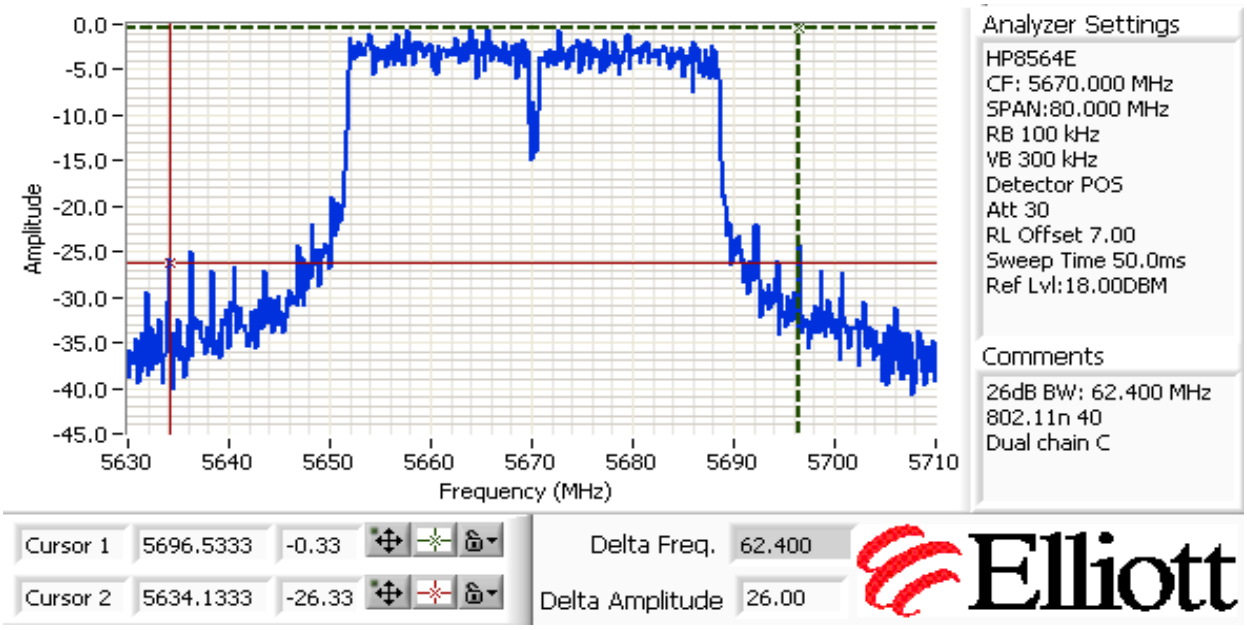


20dB attenuation pad at front of analyzer and 0dB attenuation at analyzer input level to reduce the noise floor.



Client:	Xirrus	Job Number:	J71484
Model:	XN4	T-Log Number:	T73388
		Account Manager:	Susan Pelzl
Contact:	Steve Smith		
Standard:	FCC 15 E, RSS 210	Class:	N/A





Client:	Xirrus	Job Number:	J71484
Model:	XN4	T-Log Number:	T73389
		Account Manager:	Susan Pelzl
Contact:	Steve Smith		Mark Briggs
Emissions Standard(s):	FCC 15.247 / RSS 210	Class:	UNII
Immunity Standard(s):	-	Environment:	Wireless

EMC Test Data

For The

Xirrus

Model

XN4

Date of Last Test: 11/6/2008

Client:	Xirrus	Job Number:	J71484
Model:	XN4	T-Log Number:	T73389
		Account Manager:	Susan Pelzl
Contact:	Steve Smith		
Standard:	FCC 15.247 / RSS 210	Class:	N/A

RSS 210 and FCC 15.407 (UNII - 5150 - 5250 MHz)
Radiated Spurious Emissions, Band Edges - Internal Antenna

Test Specific Details

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

General Test Configuration

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

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

Ambient Conditions:

Temperature: 15-35 °C
Rel. Humidity: 10-60 %

Summary of Results

Run #	Mode	Channel	Power Setting	Test Performed	Limit	Result / Margin
1a	802.11a Chain A	5180 MHz	20.0dBm	Restricted Band Edge at 5150 MHz	15.209	51.8dBµV/m (389.0µV/m) @ 5149.9MHz (-2.2dB)
1b	802.11a Chain A+C	5180 MHz	18.5dBm	Restricted Band Edge at 5150 MHz	15.209	53.2dBµV/m (457.1µV/m) @ 5149.9MHz (-0.8dB)
1c	802.11n20 Chain A+C	5180 MHz	17.0dBm	Restricted Band Edge at 5150 MHz	15.209	53.7dBµV/m (484.2µV/m) @ 5149.9MHz (-0.3dB)
1d	802.11n40 Chain A+C	5190 MHz	13.0dBm	Restricted Band Edge at 5150 MHz	15.209	52.4dBµV/m (416.9µV/m) @ 5148.3MHz (-1.6dB)

Modifications Made During Testing

No modifications were made to the EUT during testing

Deviations From The Standard

No deviations were made from the requirements of the standard.

Client:	Xirrus	Job Number:	J71484
Model:	XN4	T-Log Number:	T73389
		Account Manager:	Susan Pelzl
Contact:	Steve Smith		
Standard:	FCC 15.247 / RSS 210	Class:	N/A

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

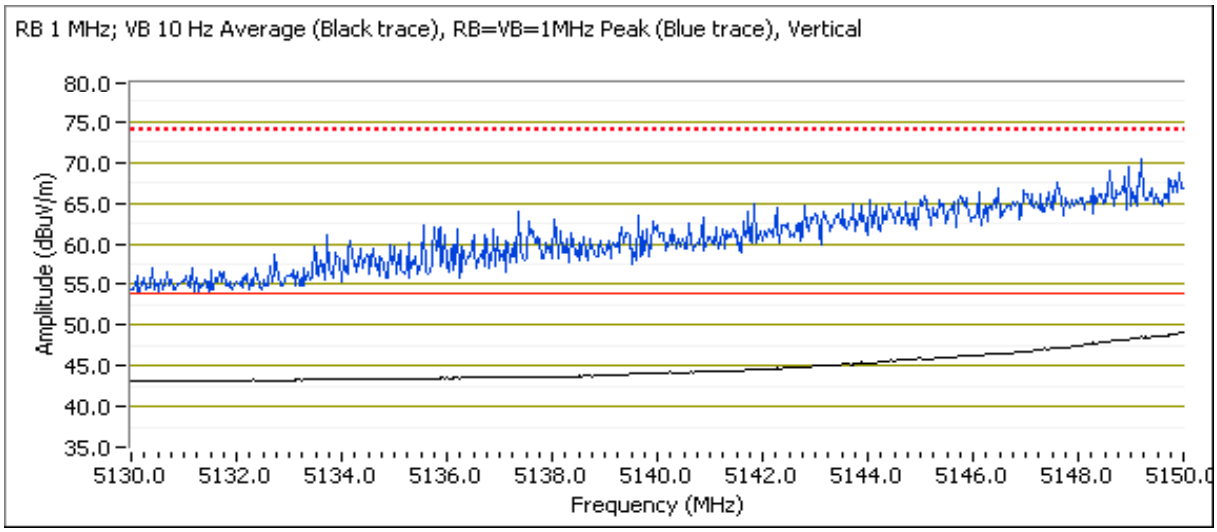
Date of Test: 10/24/2008
Test Engineer: Mehran Birgani
Test Location: SV OATS #1

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

Run #1a: 5180 MHz, 802.11a, Chain A with power setting of 20.0 dBm
5150 MHz Band Edge Signal Radiated Field Strength

Frequency	Level	Pol	FCC 15.209		Detector	Azimuth	Height	Comments
MHz	dBµV/m	V/H	Limit	Margin	Pk/QP/Avg	degrees	meters	
5149.930	51.8	V	54.0	-2.2	AVG	276	1.9	RB 1 MHz; VB: 10 Hz
5150.000	46.6	H	54.0	-7.4	AVG	15	1.0	RB 1 MHz; VB: 10 Hz
5148.630	61.8	H	74.0	-12.2	PK	15	1.0	RB 1 MHz; VB: 1 MHz
5149.500	69.2	V	74.0	-4.8	PK	276	1.9	RB 1 MHz; VB: 1 MHz

Note 1:	For emissions in restricted band immediately below 5150MHz, the limit of 15.209 was used.

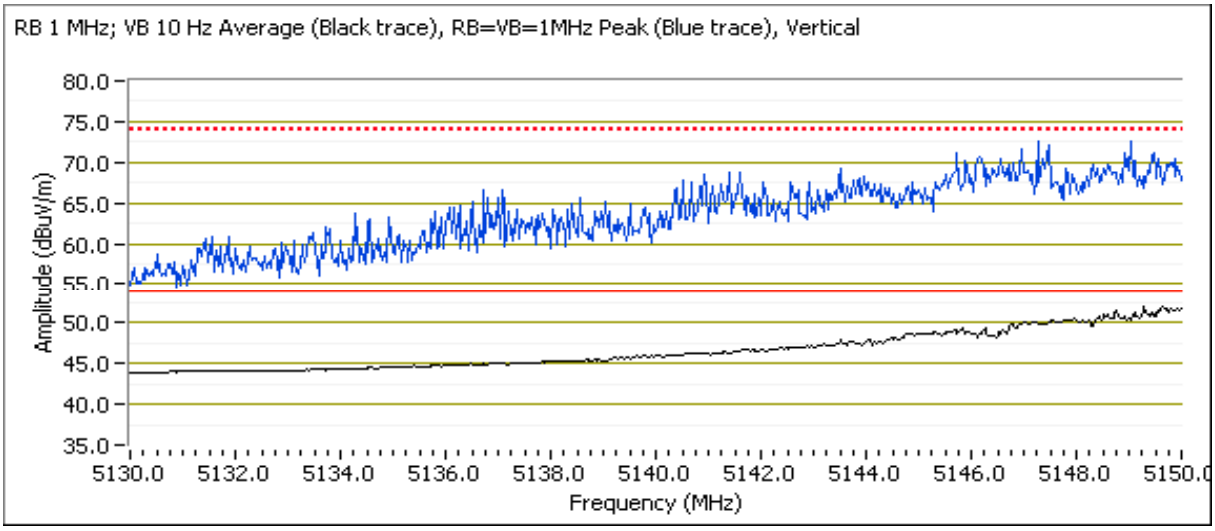


Client:	Xirrus	Job Number:	J71484
Model:	XN4	T-Log Number:	T73389
		Account Manager:	Susan Pelzl
Contact:	Steve Smith		
Standard:	FCC 15.247 / RSS 210	Class:	N/A

Run #1b: 5180 MHz, 802.11a, Chain A+C with power setting of 18.5 dBm
5150 MHz Band Edge Signal Radiated Field Strength

Frequency	Level	Pol	FCC 15.209		Detector	Azimuth	Height	Comments
MHz	dBµV/m	V/H	Limit	Margin	Pk/QP/Avg	degrees	meters	
5149.830	48.9	H	54.0	-5.1	AVG	236	2.4	RB 1 MHz; VB: 10 Hz
5149.930	53.2	V	54.0	-0.8	AVG	271	2.0	RB 1 MHz; VB: 10 Hz
5149.730	69.6	V	74.0	-4.4	PK	271	2.0	RB 1 MHz; VB: 1 MHz
5149.970	63.7	H	74.0	-10.3	PK	236	2.4	RB 1 MHz; VB: 1 MHz

Note 1:	For emissions in restricted band immediately below 5150MHz, the limit of 15.209 was used.

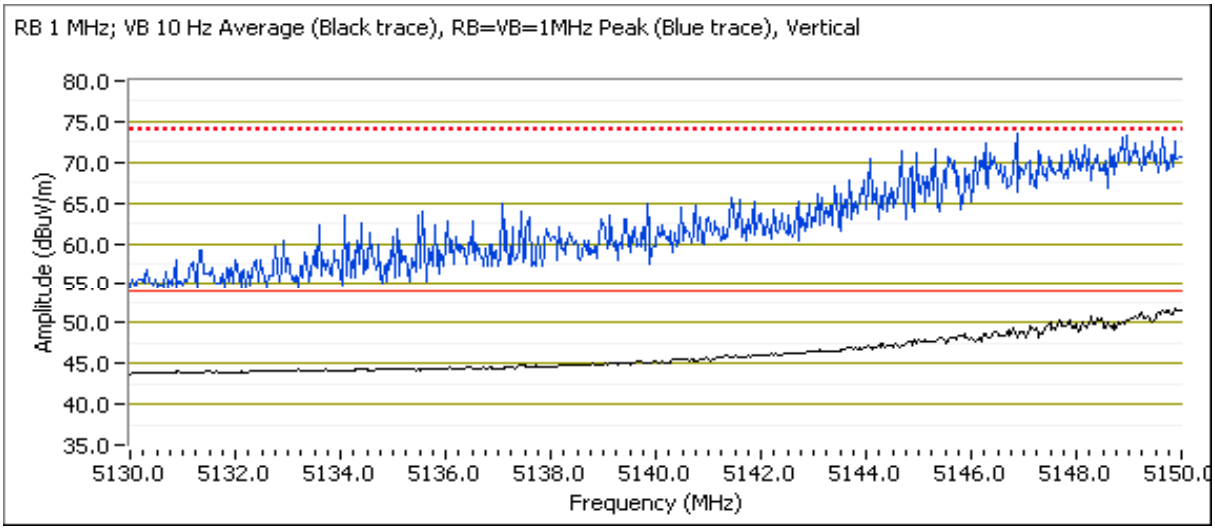


Client:	Xirrus	Job Number:	J71484
Model:	XN4	T-Log Number:	T73389
		Account Manager:	Susan Pelzl
Contact:	Steve Smith		
Standard:	FCC 15.247 / RSS 210	Class:	N/A

Run #1c: 5180 MHz, 802.11n 20MHz Chain A+C with power setting of 17.0 dBm
5150 MHz Band Edge Signal Radiated Field Strength

Frequency	Level	Pol	FCC 15.209		Detector	Azimuth	Height	Comments
MHz	dBµV/m	V/H	Limit	Margin	Pk/QP/Avg	degrees	meters	
5149.930	53.7	V	54.0	-0.3	AVG	256	1.6	RB 1 MHz; VB: 10 Hz
5146.600	72.6	V	74.0	-1.4	PK	256	1.6	RB 1 MHz; VB: 1 MHz
5147.500	61.7	H	74.0	-12.3	PK	231	2.5	RB 1 MHz; VB: 1 MHz
5149.830	72.8	V	74.0	-1.2	PK	256	1.6	RB 1 MHz; VB: 1 MHz

Note 1:	For emissions in restricted band immediately below 5150MHz, the limit of 15.209 was used.

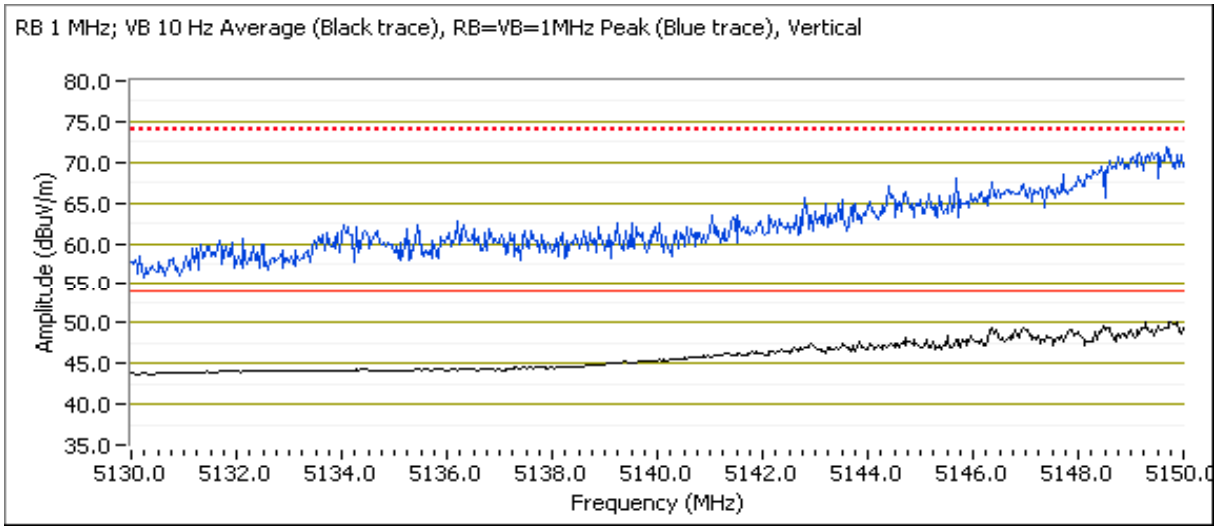


Client:	Xirrus	Job Number:	J71484
Model:	XN4	T-Log Number:	T73389
		Account Manager:	Susan Pelzl
Contact:	Steve Smith		
Standard:	FCC 15.247 / RSS 210	Class:	N/A

Run #1d: 5190 MHz, 802.11n 40MHz Chain A+C with power setting of 13.0 dBm
5150 MHz Band Edge Signal Radiated Field Strength

Frequency	Level	Pol	FCC 15.209		Detector	Azimuth	Height	Comments
MHz	dBµV/m	V/H	Limit	Margin	Pk/QP/Avg	degrees	meters	
5148.300	52.4	V	54.0	-1.6	AVG	253	1.6	RB 1 MHz; VB: 10 Hz
5149.500	46.3	H	54.0	-7.7	AVG	235	1.0	RB 1 MHz; VB: 10 Hz
5149.530	69.7	V	74.0	-4.3	PK	253	1.6	RB 1 MHz; VB: 1 MHz
5149.830	63.8	H	74.0	-10.2	PK	235	1.0	RB 1 MHz; VB: 1 MHz

Note 1:	For emissions in restricted band immediately below 5150MHz, the limit of 15.209 was used.



Client:	Xirrus	Job Number:	J71484
Model:	XN4	T-Log Number:	T73389
		Account Manager:	Susan Pelzl
Contact:	Steve Smith		
Standard:	FCC 15.247 / RSS 210	Class:	N/A

RSS 210 and FCC 15.407 (UNII - 5150 - 5250 MHz)
Radiated Spurious Emissions, Internal Antenna

Test Specific Details

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

Date of Test: 11/3/2008
Test Engineer: Mehran Birgani
Test Location: SV OATS #1

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

General Test Configuration

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

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

Ambient Conditions:

Temperature: 15-35 °C
Rel. Humidity: 10-60 %

Summary of Results

Run #	Mode	Channel	Power Setting	Test Performed	Limit	Result / Margin
1	802.11a, n20, n40	5180 MHz 5190 MHz	20 per chain	Radiated Emissions, 1 - 40 GHz	FCC 15.209 / 15 E	39.9dBµV/m (98.9µV/m) @ 10357.7MHz (-14.1dB)
	802.11a, n20	5200 MHz				40.4dBµV/m (104.7µV/m) @ 10398.8MHz (-13.6dB)
	802.11a, n20, n40	5240 MHz 5230 MHz				38.9dBµV/m (88.1µV/m) @ 10476.4MHz (-15.1dB)

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.

Frequency Range	Test Distance	Limit Distance	Extrapolation Factor
1000 - 18000 MHz	3	3	0.0

Client:	Xirrus	Job Number:	J71484
Model:	XN4	T-Log Number:	T73389
		Account Manager:	Susan Pelzl
Contact:	Steve Smith		
Standard:	FCC 15.247 / RSS 210	Class:	N/A

Run #1, Radiated Spurious Emissions, 30 - 40,000 MH. Operation in the 5150-5250 MHz Band, 802.11a Mode

Run #1a: 5180 MHz, 802.11a, 802.11n20 and 802.11n40 Low Channel

Radio	Channel (MHz)	Mode	Power Setting		Comments
			Chain A	Chain C	
1	5180	a	20	20	
2	5180	n20	20	20	
3	5190	n40	20	20	
4	-	-			

Scan made in anechoic chamber, measurements in tables below taken on OATS.

Spurious Radiated Emissions:

Frequency	Level	Pol	15.209 / 15E		Detector	Azimuth	Height	Comments
MHz	dBµV/m	v/h	Limit	Margin	Pk/QP/Avg	degrees	meters	
6902.620	33.9	H	54.0	-20.1	AVG	58	1.0	Note 2, RB 1 MHz; VB: 10 Hz
6906.880	33.9	V	54.0	-20.1	AVG	21	1.0	Note 2, RB 1 MHz; VB: 10 Hz
6919.930	34.4	V	54.0	-19.6	AVG	349	1.0	Note 2, RB 1 MHz; VB: 10 Hz
6922.720	34.2	H	54.0	-19.8	AVG	253	1.0	Note 2, RB 1 MHz; VB: 10 Hz
10355.230	39.3	H	54.0	-14.7	AVG	27	1.0	Note 2, RB 1 MHz; VB: 10 Hz
10357.720	39.9	V	54.0	-14.1	AVG	233	1.0	Note 2, RB 1 MHz; VB: 10 Hz
10381.820	39.5	V	54.0	-14.5	AVG	258	1.4	Note 2, RB 1 MHz; VB: 10 Hz
10381.820	39.4	H	54.0	-14.6	AVG	177	1.0	Note 2, RB 1 MHz; VB: 10 Hz
6904.370	45.3	V	74.0	-28.7	PK	21	1.0	Note 2, RB 1 MHz; VB: 1 MHz
6908.000	44.7	H	74.0	-29.3	PK	58	1.0	Note 2, RB 1 MHz; VB: 1 MHz
6914.730	45.3	V	74.0	-28.7	PK	349	1.0	Note 2, RB 1 MHz; VB: 1 MHz
6917.270	45.6	H	74.0	-28.4	PK	253	1.0	Note 2, RB 1 MHz; VB: 1 MHz
10359.200	51.1	V	74.0	-22.9	PK	233	1.0	Note 2, RB 1 MHz; VB: 1 MHz
10359.580	50.4	H	74.0	-23.6	PK	27	1.0	Note 2, RB 1 MHz; VB: 1 MHz
10376.800	50.3	H	74.0	-23.7	PK	177	1.0	Note 2, RB 1 MHz; VB: 1 MHz
10380.750	50.6	V	74.0	-23.4	PK	258	1.4	Note 2, RB 1 MHz; VB: 1 MHz

Note 1:	For emissions in restricted bands, the limit of 15.209 was used. For all other emissions outside the 5150 - 5250MHz band the average limit was set to -27dBm/MHz (~68.3 dBuV/m) and peak limit set to 20dB higher than the average limit (88.3 dBuV/m).
Note 2:	Not in a restricted band

Client:	Xirrus	Job Number:	J71484
Model:	XN4	T-Log Number:	T73389
		Account Manager:	Susan Pelzl
Contact:	Steve Smith		
Standard:	FCC 15.247 / RSS 210	Class:	N/A

Run #1b: 5200 MHz, 802.11a, 802.11n20 Center Channel

Radio	Channel (MHz)	Mode	Power Setting		Comments
			Chain A	Chain C	
1	5200	a	20	20	
2	5200	n20	20	20	

Spurious Radiated Emissions:

Frequency	Level	Pol	15.209 / 15E		Detector	Azimuth	Height	Comments
MHz	dBµV/m	v/h	Limit	Margin	Pk/QP/Avg	degrees	meters	
6933.170	34.5	H	54.0	-19.5	AVG	253	1.0	Note 2, RB 1 MHz; VB: 10 Hz
6933.300	35.6	V	54.0	-18.4	AVG	310	1.0	Note 2, RB 1 MHz; VB: 10 Hz
10398.500	40.3	H	54.0	-13.7	AVG	315	1.0	Note 2, RB 1 MHz; VB: 10 Hz
10398.820	40.4	V	54.0	-13.6	AVG	18	1.6	Note 2, RB 1 MHz; VB: 10 Hz
6931.500	46.1	V	74.0	-27.9	PK	310	1.0	Note 2, RB 1 MHz; VB: 1 MHz
6935.450	45.8	H	74.0	-28.2	PK	253	1.0	Note 2, RB 1 MHz; VB: 1 MHz
10398.620	51.6	H	74.0	-22.4	PK	315	1.0	Note 2, RB 1 MHz; VB: 1 MHz
10402.000	51.7	V	74.0	-22.3	PK	18	1.6	Note 2, RB 1 MHz; VB: 1 MHz

Note 1:	For emissions in restricted bands, the limit of 15.209 was used. For all other emissions outside the 5150 - 5250MHz band the average limit was set to -27dBm/MHz (~68.3 dBuV/m) and peak limit set to 20dB higher than the average limit (88.3 dBuV/m).
Note 2:	Not in a restricted band

Client:	Xirrus	Job Number:	J71484
Model:	XN4	T-Log Number:	T73389
		Account Manager:	Susan Pelzl
Contact:	Steve Smith		
Standard:	FCC 15.247 / RSS 210	Class:	N/A

Run #1c: 802.11a, 802.11n20 and 802.11n40, High Channel

Radio	Channel (MHz)	Mode	Power Setting		Comments
			Chain A	Chain C	
1	5240	a	20	20	
2	5240	n20	20	20	
3	5230	n40	20	20	

Spurious Radiated Emissions:

Frequency	Level	Pol	15.209 / 15E		Detector	Azimuth	Height	Comments
MHz	dBµV/m	v/h	Limit	Margin	Pk/QP/Avg	degrees	meters	
6966.600	34.0	H	54.0	-20.0	AVG	76	1.0	Note 2, RB 1 MHz; VB: 10 Hz
6986.350	34.0	H	54.0	-20.0	AVG	10	1.0	Note 2, RB 1 MHz; VB: 10 Hz
10460.280	38.9	V	54.0	-15.1	AVG	53	1.0	Note 2, RB 1 MHz; VB: 10 Hz
10463.780	38.7	H	54.0	-15.3	AVG	355	1.0	Note 2, RB 1 MHz; VB: 10 Hz
10475.170	38.8	H	54.0	-15.2	AVG	0	1.0	Note 2, RB 1 MHz; VB: 10 Hz
10476.380	38.9	V	54.0	-15.1	AVG	246	1.0	Note 2, RB 1 MHz; VB: 10 Hz
6976.020	45.1	H	74.0	-28.9	PK	76	1.0	Note 2, RB 1 MHz; VB: 1 MHz
6982.680	45.1	H	74.0	-28.9	PK	10	1.0	Note 2, RB 1 MHz; VB: 1 MHz
10457.720	50.5	V	74.0	-23.5	PK	53	1.0	Note 2, RB 1 MHz; VB: 1 MHz
10461.730	49.7	H	74.0	-24.3	PK	355	1.0	Note 2, RB 1 MHz; VB: 1 MHz
10476.120	51.0	V	74.0	-23.0	PK	246	1.0	Note 2, RB 1 MHz; VB: 1 MHz
10476.230	49.9	H	74.0	-24.1	PK	0	1.0	Note 2, RB 1 MHz; VB: 1 MHz

Note 1:	For emissions in restricted bands, the limit of 15.209 was used. For all other emissions outside the 5150 - 5250MHz band the average limit was set to -27dBm/MHz (~68.3 dBuV/m) and peak limit set to 20dB higher than the average limit (88.3 dBuV/m).
Note 2:	Not in a restricted band

Client:	Xirrus	Job Number:	J71484
Model:	XN4	T-Log Number:	T73389
		Account Manager:	Susan Pelzl
Contact:	Steve Smith		
Standard:	FCC 15.247 / RSS 210	Class:	N/A

RSS 210 and FCC 15.407 (UNII - 5150 - 5250 MHz)
Radiated Spurious Emissions, Band Edges - External Antenna

Test Specific Details

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

Date of Test: 11/5/2008
Test Engineer: Rafael Varelas
Test Location: OATS #1

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

General Test Configuration

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

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

Ambient Conditions:

Temperature: 15-35 °C
Rel. Humidity: 10-60 %

Summary of Results

Run #	Mode	Channel	Power Setting	Test Performed	Limit	Result / Margin
1	802.11a Chain B	5180 MHz	20.0	Restricted Band Edge at 5150 MHz	15.209	51.5dBµV/m @ 5149.9MHz (-2.5dB)

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.

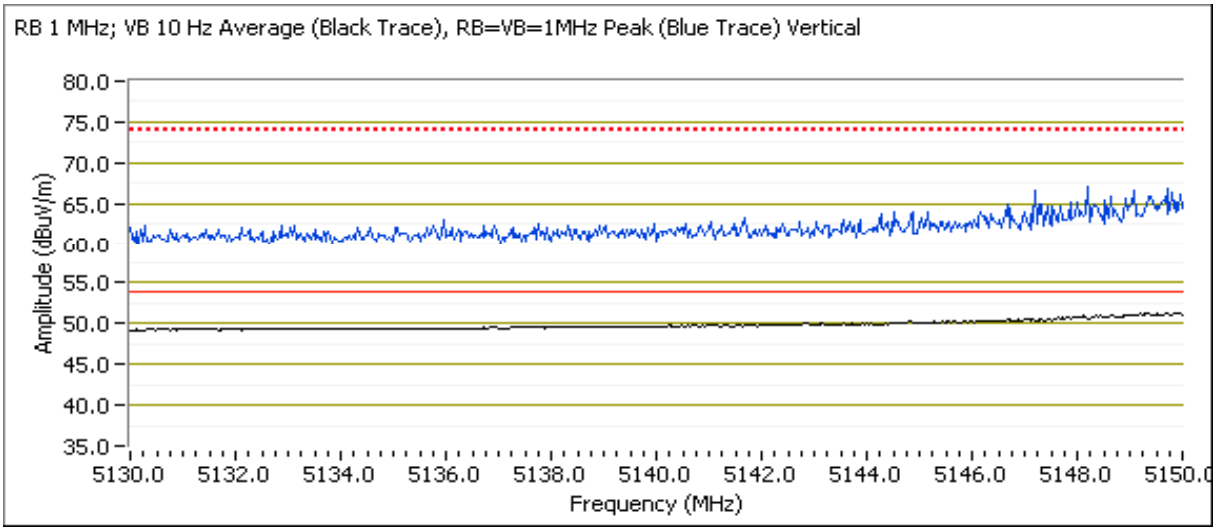
Client:	Xirrus	Job Number:	J71484
Model:	XN4	T-Log Number:	T73389
		Account Manager:	Susan Pelzl
Contact:	Steve Smith		
Standard:	FCC 15.247 / RSS 210	Class:	N/A

Run #1, Radiated Spurious Emissions, 30 - 40,000 MH. Operation in the 5150-5250 MHz Band
5180 MHz, 802.11a, Chain B with power setting of 20dBm

5150 MHz Band Edge Signal Radiated Field Strength

Frequency	Level	Pol	FCC 15.209		Detector	Azimuth	Height	Comments
MHz	dBµV/m	V/H	Limit	Margin	Pk/QP/Avg	degrees	meters	
5149.940	51.5	V	54.0	-2.5	Avg	303	1.9	RB 1 MHz; VB: 10 Hz
5147.440	66.6	V	74.0	-7.4	PK	303	1.9	RB 1 MHz; VB: 1 MHz
5149.810	49.5	H	54.0	-4.5	Avg	347	1.0	RB 1 MHz; VB: 10 Hz
5149.210	62.0	H	74.0	-12.0	PK	347	1.0	RB 1 MHz; VB: 1 MHz

Note 1:	For emissions in restricted band immediately below 5150MHz, the limit of 15.209 was used.



Client:	Xirrus	Job Number:	J71484
Model:	XN4	T-Log Number:	T73389
		Account Manager:	Susan Pelzl
Contact:	Steve Smith		
Standard:	FCC 15.247 / RSS 210	Class:	N/A

RSS 210 and FCC 15.407 (UNII - 5150 - 5250 MHz)
Radiated Spurious Emissions, External Antenna

Test Specific Details

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

Date of Test: 11/5/2008
Test Engineer: Rafael Varelas
Test Location: OATS #1

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

General Test Configuration

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

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

Ambient Conditions:

Temperature: 15-35 °C
Rel. Humidity: 10-60 %

Summary of Results

Run #	Mode	Channel	Power Setting	Radio	Test Performed	Limit	Result / Margin
1	802.11a	5180 MHz	20	4	Radiated Emissions, 1 - 40 GHz	FCC 15.209 / 15 E	40.5dBµV/m @ 10359.7MHz (-13.5dB)
	802.11a	5200 MHz		4			41.6dBµV/m @ 10398MHz (-12.4dB)
	802.11a	5240 MHz		4			40.9dBµV/m @ 10479.0MHz (-13.1dB)

Modifications Made During Testing

No modifications were made to the EUT during testing

Deviations From The Standard

No deviations were made from the requirements of the standard.

Client:	Xirrus	Job Number:	J71484
Model:	XN4	T-Log Number:	T73389
		Account Manager:	Susan Pelzl
Contact:	Steve Smith		
Standard:	FCC 15.247 / RSS 210	Class:	N/A

Run #1, Radiated Spurious Emissions, 30 - 40,000 MH. Operation in the 5150-5250 MHz Band, 802.11a Mode, External Ant.
Run #1a: 5180 MHz, 802.11a, Low Channel, With External Antenna

Frequency Range	Test Distance	Limit Distance	Extrapolation Factor
1000 - 18000 MHz	3	3	0.0

Spurious Radiated Emissions:

Frequency	Level	Pol	15.209 / 15E		Detector	Azimuth	Height	Comments
MHz	dBµV/m	v/h	Limit	Margin	Pk/QP/Avg	degrees	meters	
10359.660	40.5	V	54.0	-13.5	AVG	360	1.0	RB 1 MHz; VB: 10 Hz
10359.760	51.9	V	74.0	-22.1	PK	360	1.0	RB 1 MHz; VB: 1 MHz
6906.680	39.0	V	54.0	-15.0	AVG	0	1.0	RB 1 MHz; VB: 10 Hz
6906.230	48.6	V	74.0	-25.4	PK	0	1.0	RB 1 MHz; VB: 1 MHz
6906.520	34.4	H	54.0	-19.6	AVG	233	1.0	RB 1 MHz; VB: 10 Hz
6905.270	45.8	H	74.0	-28.2	PK	233	1.0	RB 1 MHz; VB: 1 MHz
10359.680	39.8	H	54.0	-14.2	AVG	298	1.0	RB 1 MHz; VB: 10 Hz
10360.380	51.1	H	74.0	-22.9	PK	298	1.0	RB 1 MHz; VB: 1 MHz

Run #1b: 5200 MHz, 802.11a, Center Channel, With External Antenna
Spurious Radiated Emissions:

Frequency	Level	Pol	15.209 / 15E		Detector	Azimuth	Height	Comments
MHz	dBµV/m	v/h	Limit	Margin	Pk/QP/Avg	degrees	meters	
10398.520	41.6	H	54.0	-12.4	AVG	0	2.1	RB 1 MHz; VB: 10 Hz
10400.070	52.6	H	74.0	-21.4	PK	0	2.1	RB 1 MHz; VB: 1 MHz
6933.080	35.9	H	54.0	-18.1	AVG	360	2.3	RB 1 MHz; VB: 10 Hz
6931.920	46.6	H	74.0	-27.4	PK	360	2.3	RB 1 MHz; VB: 1 MHz
10398.670	41.1	V	54.0	-12.9	AVG	5	1.1	RB 1 MHz; VB: 10 Hz
10400.080	52.2	V	74.0	-21.8	PK	5	1.1	RB 1 MHz; VB: 1 MHz
6933.390	37.9	V	54.0	-16.1	AVG	253	1.0	RB 1 MHz; VB: 10 Hz
6933.330	47.9	V	74.0	-26.1	PK	253	1.0	RB 1 MHz; VB: 1 MHz

Run #1c: 5240 MHz, 802.11a, High Channel, With External Antenna

Frequency	Level	Pol	15.209 / 15E		Detector	Azimuth	Height	Comments
MHz	dBµV/m	v/h	Limit	Margin	Pk/QP/Avg	degrees	meters	
10478.990	40.9	V	54.0	-13.1	AVG	351	1.0	MHz; VB: 10 Hz
10479.360	51.8	V	74.0	-22.2	PK	351	1.0	MHz; VB: 1 MHz
6972.750	34.5	V	54.0	-19.5	AVG	244	1.0	MHz; VB: 10 Hz
6970.150	45.5	V	74.0	-28.5	PK	244	1.0	MHz; VB: 1 MHz
10478.530	40.1	H	54.0	-13.9	AVG	360	1.0	MHz; VB: 10 Hz
10481.310	54.9	H	74.0	-19.1	PK	360	1.0	MHz; VB: 1 MHz
6970.120	34.5	H	54.0	-19.5	AVG	50	1.0	MHz; VB: 10 Hz
6971.690	46.0	H	74.0	-28.0	PK	50	1.0	MHz; VB: 1 MHz

Client:	Xirrus	Job Number:	J71484
Model:	XN4	T-Log Number:	T73389
		Account Manager:	Susan Pelzl
Contact:	Steve Smith		
Standard:	FCC 15.247 / RSS 210	Class:	N/A

RSS 210 and FCC 15.407 (UNII - 5250 - 5350 MHz and 5470-5725MHz) Radiated Spurious Emissions, Band Edges, Internal Antenna

Test Specific Details

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

General Test Configuration

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

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

Ambient Conditions:

Temperature:	15-35 °C
Rel. Humidity:	10-60 %

Modifications Made During Testing

No modifications were made to the EUT during testing

Deviations From The Standard

No deviations were made from the requirements of the standard.

Client:	Xirrus	Job Number:	J71484
Model:	XN4	T-Log Number:	T73389
		Account Manager:	Susan Pelzl
Contact:	Steve Smith		
Standard:	FCC 15.247 / RSS 210	Class:	N/A

Summary of Results

Run #	Mode	Channel	Power Setting	Test Performed	Limit	Result / Margin
1a	802.11a Chain A	5320 MHz	19.5dBm	Restricted Band Edge at 5350 MHz	FCC 15.209 / 15 E	53.9dBµV/m (495.5µV/m) @ 5350.0MHz (-0.1dB)
1b	802.11a Chain A	5500 MHz	20.0dBm	Restricted Band Edge at 5460 MHz	FCC 15.209 / 15 E	48.3dBµV/m (260.0µV/m) @ 5459.2MHz (-5.7dB)
			20.0dBm	Band Edge 5460 - 5470 MHz	15E (68.3 dBuV/m avg, 88.3dBuV/m peak)	54.3dBµV/m (518.8µV/m) @ 5469.9MHz (-14.0dB)
2a	802.11a Chain A+C	5320 MHz	19.0dBm	Restricted Band Edge at 5350 MHz	FCC 15.209 / 15 E	53.9dBµV/m (495.5µV/m) @ 5350.0MHz (-0.1dB)
2b	802.11a Chain A+C	5500 MHz	20.0dBm	Restricted Band Edge at 5460 MHz	FCC 15.209 / 15 E	45.5dBµV/m (188.4µV/m) @ 5459.5MHz (-8.5dB)
			20.0dBm	Band Edge 5460 - 5470 MHz	15E (68.3 dBuV/m avg, 88.3dBuV/m peak)	50.1dBµV/m (319.9µV/m) @ 5469.8MHz (-18.2dB)
3a	802.11n20 Chain A+C	5320 MHz	18.5dBm	Restricted Band Edge at 5350 MHz	FCC 15.209 / 15 E	50.9dBµV/m (350.8µV/m) @ 5350.0MHz (-3.1dB)
3b	802.11n20 Chain A+C	5500 MHz	20.0dBm	Restricted Band Edge at 5460 MHz	FCC 15.209 / 15 E	46.7dBµV/m (216.3µV/m) @ 5460.0MHz (-7.3dB)
			20.0dBm	Band Edge 5460 - 5470 MHz	15E (68.3 dBuV/m avg, 88.3dBuV/m peak)	52.6dBµV/m (426.6µV/m) @ 5469.8MHz (-15.7dB)
4a	802.11n40 Chain A+C	5310 MHz	17.0dBm	Restricted Band Edge at 5350 MHz	FCC 15.209 / 15 E	52.2dBµV/m (407.4µV/m) @ 5350.0MHz (-1.8dB)
4b	802.11n40 Chain A+C	5510 MHz	17.5dBm	Restricted Band Edge at 5460 MHz	FCC 15.209 / 15 E	53.6dBµV/m (478.6µV/m) @ 5459.8MHz (-0.4dB)
			17.5dBm	Band Edge 5460 - 5470 MHz	15E (68.3 dBuV/m avg, 88.3dBuV/m peak)	57.7dBµV/m (767.4µV/m) @ 5469.7MHz (-10.6dB)

Client:	Xirrus	Job Number:	J71484
Model:	XN4	T-Log Number:	T73389
		Account Manager:	Susan Pelzl
Contact:	Steve Smith		
Standard:	FCC 15.247 / RSS 210	Class:	N/A

Run #1: Radiated Emissions at Band Edges, Operation in the 5250-5350MHz and 5460 - 5725MHz Bands, 802.11a mode

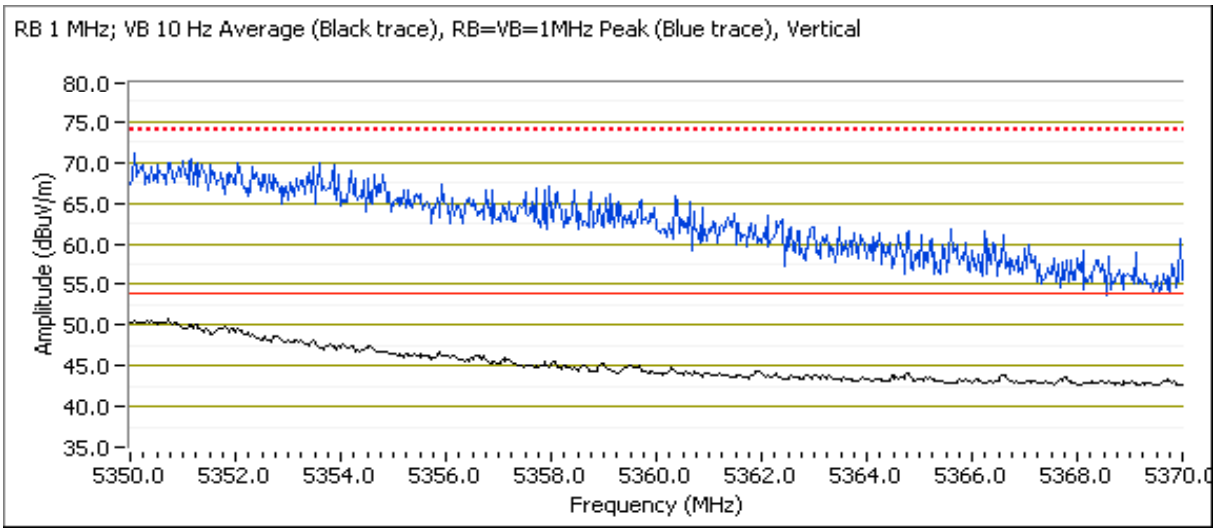
Date of Test: 10/24/2008
Test Engineer: Mehran Birgani
Test Location: SV OATS #1

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

Run #1a: 5320 MHz, 802.11a (Chain A) with power setting of 19.5 dBm
5350 MHz Band Edge Signal Radiated Field Strength

Frequency	Level	Pol	FCC 15.209		Detector	Azimuth	Height	Comments
MHz	dBµV/m	V/H	Limit	Margin	Pk/QP/Avg	degrees	meters	
5350.000	47.0	H	54.0	-7.0	AVG	8	1.1	RB 1 MHz; VB: 10 Hz
5350.030	53.9	V	54.0	-0.1	AVG	279	1.9	RB 1 MHz; VB: 10 Hz
5352.500	63.7	H	74.0	-10.3	PK	8	1.1	RB 1 MHz; VB: 1 MHz
5353.500	70.0	V	74.0	-4.0	PK	279	1.9	RB 1 MHz; VB: 1 MHz

Note 1:	For emissions in restricted band immediately above 5350MHz, the limit of 15.209 was used.



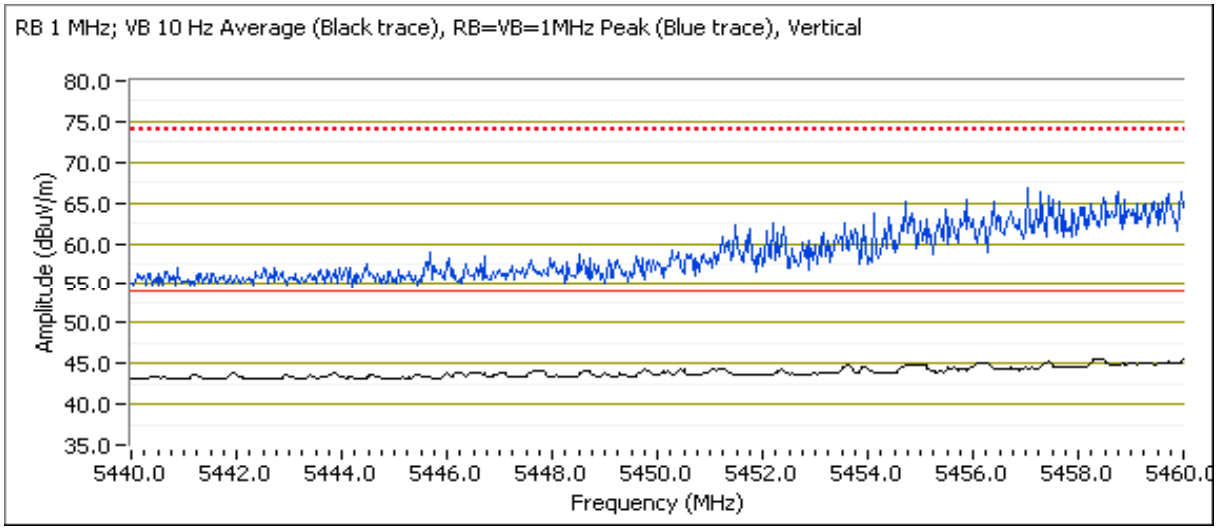
Client:	Xirrus	Job Number:	J71484
Model:	XN4	T-Log Number:	T73389
		Account Manager:	Susan Pelzl
Contact:	Steve Smith		
Standard:	FCC 15.247 / RSS 210	Class:	N/A

Run #1b: 5500 MHz, 802.11a (Chain A) with power setting of 20.0 dBm

5350-5460 MHz Restricted Band Edge Signal Radiated Field Strength

Frequency	Level	Pol	FCC 15.209		Detector	Azimuth	Height	Comments
MHz	dBµV/m	V/H	Limit	Margin	Pk/QP/Avg	degrees	meters	
5459.200	48.3	V	54.0	-5.7	AVG	314	1.0	RB 1 MHz; VB: 10 Hz
5459.230	45.1	H	54.0	-8.9	AVG	0	1.1	RB 1 MHz; VB: 10 Hz
5457.430	66.2	V	74.0	-7.8	PK	314	1.0	RB 1 MHz; VB: 1 MHz
5457.700	61.5	H	74.0	-12.5	PK	0	1.1	RB 1 MHz; VB: 1 MHz

Note 1:	For emissions in restricted band immediately below 5150MHz, the limit of 15.209 was used.



5460 - 5470 MHz Band Edge Radiated Field Strength

Frequency	Level	Pol	15 E		Detector	Azimuth	Height	Comments
MHz	dBµV/m	V/H	Limit	Margin	Pk/QP/Avg	degrees	meters	
5469.880	54.3	V	68.3	-14.0	AVG	314	1.0	RB 1 MHz; VB: 10 Hz
5470.000	49.3	H	68.3	-19.0	AVG	0	1.1	RB 1 MHz; VB: 10 Hz
5469.500	70.3	V	88.3	-18.0	PK	314	1.0	RB 1 MHz; VB: 1 MHz
5469.830	66.1	H	88.3	-22.2	PK	0	1.1	RB 1 MHz; VB: 1 MHz

Note 1:	For emissions in the 5460-5470 MHz the **average** limit was set to -27dBm/MHz (68.3dBuV/m) and the peak limit to -7dBm/MHz (88.3dBuV/m)

Client:	Xirrus	Job Number:	J71484
Model:	XN4	T-Log Number:	T73389
		Account Manager:	Susan Pelzl
Contact:	Steve Smith		
Standard:	FCC 15.247 / RSS 210	Class:	N/A

Run #2: Radiated Emissions at Band Edges, Operation in the 5250-5350MHz and 5460 - 5725MHz Bands, 802.11a mode

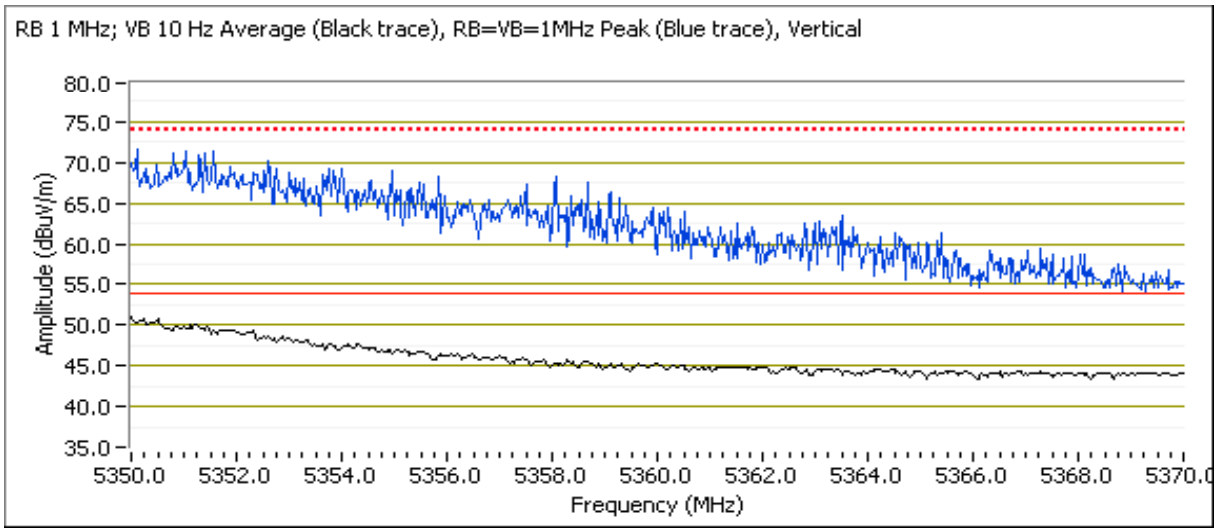
Date of Test: 10/24/2008
Test Engineer: Mehran Birgani
Test Location: SV OATS #1

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

Run #2a: 5320 MHz, 802.11a (Chain A+C) with power setting of 19.0 dBm
5350 MHz Band Edge Signal Radiated Field Strength

Frequency	Level	Pol	FCC 15.209		Detector	Azimuth	Height	Comments
MHz	dBµV/m	V/H	Limit	Margin	Pk/QP/Avg	degrees	meters	
5350.000	53.9	V	54.0	-0.1	AVG	293	1.8	RB 1 MHz; VB: 10 Hz
5350.000	46.6	H	54.0	-7.4	AVG	19	1.0	RB 1 MHz; VB: 10 Hz
5350.400	62.7	H	74.0	-11.3	PK	19	1.0	RB 1 MHz; VB: 1 MHz
5351.670	70.7	V	74.0	-3.3	PK	293	1.8	RB 1 MHz; VB: 1 MHz

Note 1:	For emissions in restricted band immediately above 5350MHz, the limit of 15.209 was used.



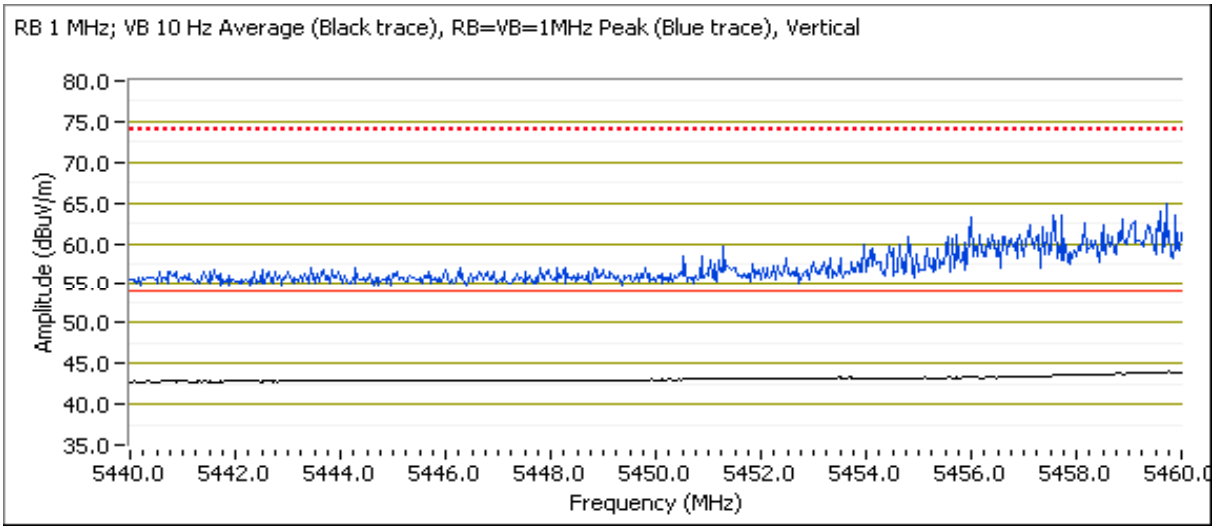
Client:	Xirrus	Job Number:	J71484
Model:	XN4	T-Log Number:	T73389
		Account Manager:	Susan Pelzl
Contact:	Steve Smith		
Standard:	FCC 15.247 / RSS 210	Class:	N/A

Run #2b: 5500 MHz, 802.11a (Chain A+C) with power setting of 20.0 dBm

5350-5460 MHz Restricted Band Edge Signal Radiated Field Strength

Frequency	Level	Pol	FCC 15.209		Detector	Azimuth	Height	Comments
MHz	dBµV/m	V/H	Limit	Margin	Pk/QP/Avg	degrees	meters	
5459.530	45.5	V	54.0	-8.5	AVG	241	1.0	RB 1 MHz; VB: 10 Hz
5460.000	44.8	H	54.0	-9.2	AVG	1	1.0	RB 1 MHz; VB: 10 Hz
5459.070	60.1	V	74.0	-13.9	PK	241	1.0	RB 1 MHz; VB: 1 MHz
5459.570	58.5	H	74.0	-15.5	PK	1	1.0	RB 1 MHz; VB: 1 MHz

Note 1:	For emissions in restricted band immediately below 5150MHz, the limit of 15.209 was used.



5460 - 5470 MHz Band Edge Radiated Field Strength

Frequency	Level	Pol	15 E		Detector	Azimuth	Height	Comments
MHz	dBµV/m	V/H	Limit	Margin	Pk/QP/Avg	degrees	meters	
5469.830	50.1	V	68.3	-18.2	AVG	241	1.0	RB 1 MHz; VB: 10 Hz
5469.920	49.9	H	68.3	-18.4	AVG	1	1.0	RB 1 MHz; VB: 10 Hz
5469.150	64.0	H	88.3	-24.3	PK	1	1.0	RB 1 MHz; VB: 1 MHz
5469.850	69.5	V	88.3	-18.8	PK	241	1.0	RB 1 MHz; VB: 1 MHz

Note 1:	For emissions in the 5460-5470 MHz the **average** limit was set to -27dBm/MHz (68.3dBuV/m) and the peak limit to -7dBm/MHz (88.3dBuV/m)

Client:	Xirrus	Job Number:	J71484
Model:	XN4	T-Log Number:	T73389
		Account Manager:	Susan Pelzl
Contact:	Steve Smith		
Standard:	FCC 15.247 / RSS 210	Class:	N/A

Run #3: Radiated Emissions, Band Edges, Operation in the 5250-5350MHz and 5460 - 5725MHz Bands, 802.11n 20MHz

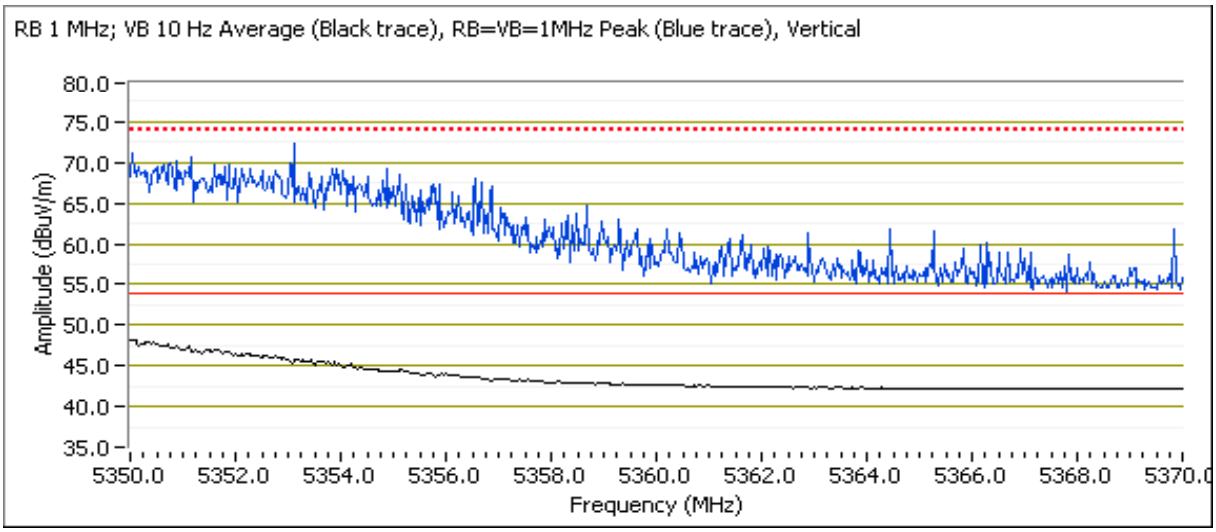
Date of Test: 10/24/2008
Test Engineer: Mehran Birgani
Test Location: SV OATS #1

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

Run #3a: 5320 MHz, 802.11n 20MHz (Chain A+C) with power setting of 18.5 dBm
5350 MHz Band Edge Signal Radiated Field Strength

Frequency	Level	Pol	FCC 15.209		Detector	Azimuth	Height	Comments
MHz	dBµV/m	V/H	Limit	Margin	Pk/QP/Avg	degrees	meters	
5350.000	50.9	V	54.0	-3.1	AVG	271	2.0	RB 1 MHz; VB: 10 Hz
5350.000	49.3	H	54.0	-4.7	AVG	30	1.0	RB 1 MHz; VB: 10 Hz
5353.500	63.3	H	74.0	-10.7	PK	30	1.0	RB 1 MHz; VB: 1 MHz
5354.770	69.1	V	74.0	-4.9	PK	271	2.0	RB 1 MHz; VB: 1 MHz

Note 1:	For emissions in restricted band immediately above 5350MHz, the limit of 15.209 was used.



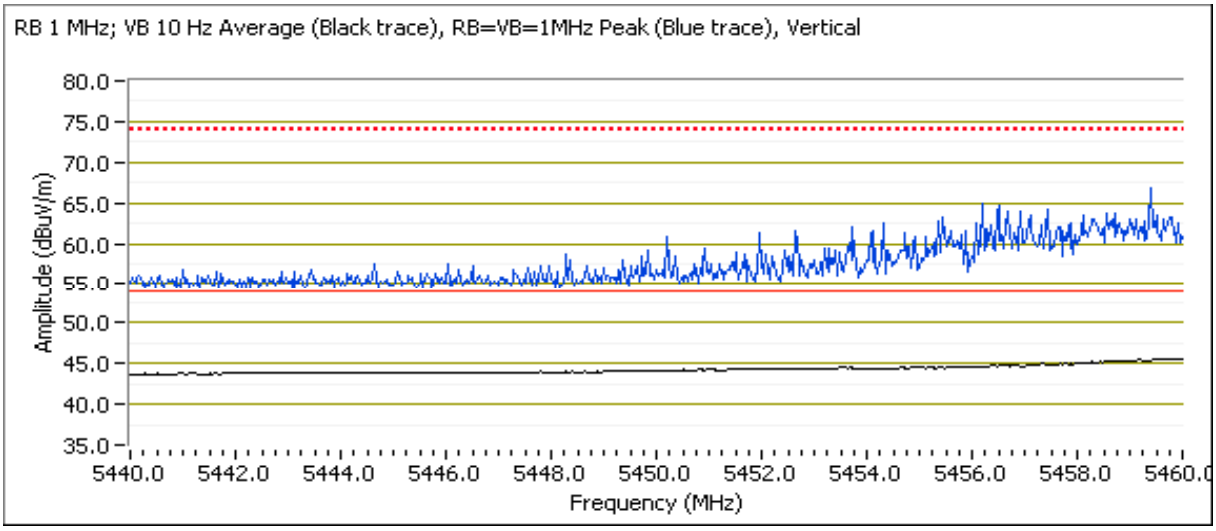
Client:	Xirrus	Job Number:	J71484
Model:	XN4	T-Log Number:	T73389
		Account Manager:	Susan Pelzl
Contact:	Steve Smith		
Standard:	FCC 15.247 / RSS 210	Class:	N/A

Run #3b: 5500 MHz, 802.11n 20MHz (Chain A+C) with power setting of 20.0 dBm

5350-5460 MHz Restricted Band Edge Signal Radiated Field Strength

Frequency	Level	Pol	FCC 15.209		Detector	Azimuth	Height	Comments
MHz	dBµV/m	V/H	Limit	Margin	Pk/QP/Avg	degrees	meters	
5459.970	46.7	V	54.0	-7.3	AVG	242	1.0	RB 1 MHz; VB: 10 Hz
5459.970	46.1	H	54.0	-7.9	AVG	1	1.2	RB 1 MHz; VB: 10 Hz
5458.530	59.8	H	74.0	-14.2	PK	1	1.2	RB 1 MHz; VB: 1 MHz
5459.770	63.1	V	74.0	-10.9	PK	242	1.0	RB 1 MHz; VB: 1 MHz

Note 1:	For emissions in restricted band immediately below 5150MHz, the limit of 15.209 was used.



5460 - 5470 MHz Band Edge Radiated Field Strength

Frequency	Level	Pol	15 E		Detector	Azimuth	Height	Comments
MHz	dBµV/m	V/H	Limit	Margin	Pk/QP/Avg	degrees	meters	
5469.780	52.6	V	68.3	-15.7	AVG	242	1.0	RB 1 MHz; VB: 10 Hz
5469.870	50.1	H	68.3	-18.2	AVG	1	1.2	RB 1 MHz; VB: 10 Hz
5467.230	71.5	V	88.3	-16.8	PK	242	1.0	RB 1 MHz; VB: 1 MHz
5469.700	65.2	H	88.3	-23.1	PK	1	1.2	RB 1 MHz; VB: 1 MHz

Note 1:	For emissions in the 5460-5470 MHz the **average** limit was set to -27dBm/MHz (68.3dBuV/m) and the peak limit to -7dBm/MHz (88.3dBuV/m)

Client:	Xirrus	Job Number:	J71484
Model:	XN4	T-Log Number:	T73389
		Account Manager:	Susan Pelzl
Contact:	Steve Smith		
Standard:	FCC 15.247 / RSS 210	Class:	N/A

Run #4: Radiated Emissions, Band Edges, Operation in the 5250-5350MHz and 5460 - 5725MHz Bands, 802.11n 40MHz

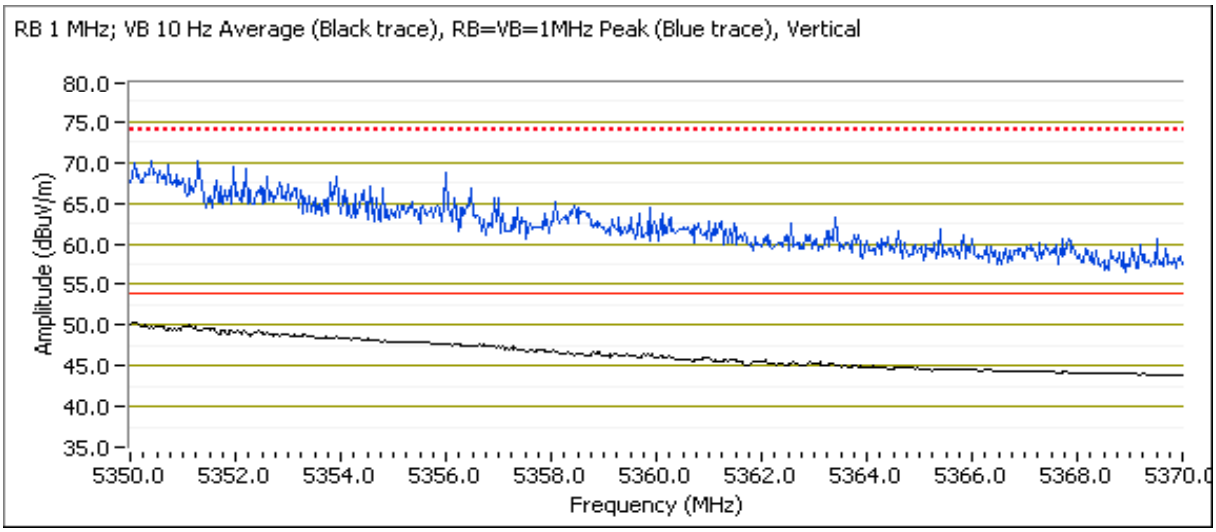
Date of Test: 10/24/2008
Test Engineer: Mehran Birgani
Test Location: SV OATS #1

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

Run #4a: 5310 MHz, 802.11n 40MHz (Chain A+C) with power setting of 17.0 dBm
5350 MHz Band Edge Signal Radiated Field Strength

Frequency	Level	Pol	FCC 15.209		Detector	Azimuth	Height	Comments
MHz	dBµV/m	V/H	Limit	Margin	Pk/QP/Avg	degrees	meters	
5350.030	52.2	V	54.0	-1.8	AVG	313	1.9	RB 1 MHz; VB: 10 Hz
5350.030	49.3	H	54.0	-4.7	AVG	0	1.2	RB 1 MHz; VB: 10 Hz
5350.200	66.4	H	74.0	-7.6	PK	0	1.2	RB 1 MHz; VB: 1 MHz
5350.230	71.2	V	74.0	-2.8	PK	313	1.9	RB 1 MHz; VB: 1 MHz

Note 1:	For emissions in the restricted band starting at 5350 MHz the limit of 15.209 was used.



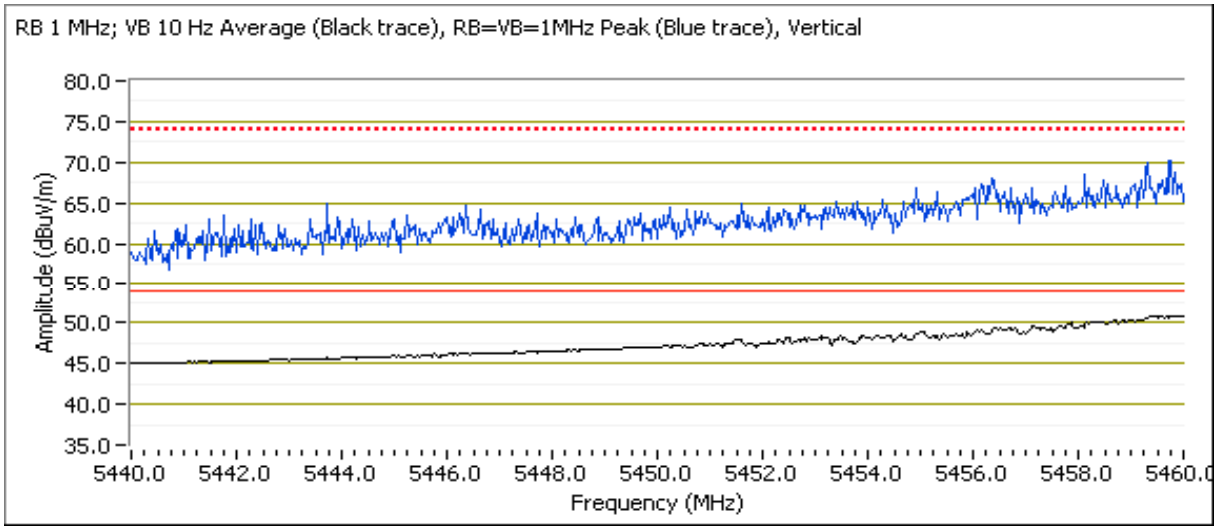
Client:	Xirrus	Job Number:	J71484
Model:	XN4	T-Log Number:	T73389
		Account Manager:	Susan Pelzl
Contact:	Steve Smith		
Standard:	FCC 15.247 / RSS 210	Class:	N/A

Run #4b: 5510 MHz, 802.11n 40MHz (Chain A+C) with power setting of 17.5 dBm

5350-5460 MHz Restricted Band Edge Signal Radiated Field Strength

Frequency	Level	Pol	FCC 15.209		Detector	Azimuth	Height	Comments
MHz	dBµV/m	V/H	Limit	Margin	Pk/QP/Avg	degrees	meters	
5459.800	53.6	V	54.0	-0.4	AVG	261	1.9	RB 1 MHz; VB: 10 Hz
5459.870	45.8	H	54.0	-8.2	AVG	217	1.0	RB 1 MHz; VB: 10 Hz
5458.700	60.9	H	74.0	-13.1	PK	217	1.0	RB 1 MHz; VB: 1 MHz
5459.300	68.3	V	74.0	-5.7	PK	261	1.9	RB 1 MHz; VB: 1 MHz

Note 1:	For emissions in the restricted band ending at 5460 MHz the limit of 15.209 was used.



5460 - 5470 MHz Band Edge Radiated Field Strength

Frequency	Level	Pol	15 E		Detector	Azimuth	Height	Comments
MHz	dBµV/m	V/H	Limit	Margin	Pk/QP/Avg	degrees	meters	
5469.680	57.7	V	68.3	-10.6	AVG	261	1.9	RB 1 MHz; VB: 10 Hz
5469.980	50.5	H	68.3	-17.8	AVG	217	1.0	RB 1 MHz; VB: 10 Hz
5466.650	76.0	V	88.3	-12.3	PK	261	1.9	RB 1 MHz; VB: 1 MHz
5468.500	69.2	H	88.3	-19.1	PK	217	1.0	RB 1 MHz; VB: 1 MHz

Note 1:	For emissions in the 5460-5470 MHz the **average** limit was set to -27dBm/MHz (68.3dBuV/m) and the peak limit to -7dBm/MHz (88.3dBuV/m)

Client:	Xirrus	Job Number:	J71484
Model:	XN4	T-Log Number:	T73389
		Account Manager:	Susan Pelzl
Contact:	Steve Smith		
Standard:	FCC 15.247 / RSS 210	Class:	N/A

RSS 210 and FCC 15.407 (UNII - 5250 - 5350 MHz and 5470-5725MHz) Radiated Spurious Emissions, 1 - 40 GHz, Internal Antenna

Test Specific Details

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

Date of Test: 11/3 & 11/4/2008
Test Engineer: Mehran Birgani/Rafael Varelas
Test Location: SV OATS #1

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

General Test Configuration

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

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

Ambient Conditions:

Temperature: 15-35 °C
Rel. Humidity: 10-60 %

Summary of Results

Run #	Mode	Channel	Power Setting	Test Performed	Limit	Result / Margin
1a	802.11a, n20,n40	5260 MHz 5270 MHz	20 on each chain (highest power setting)	Radiated Emissions, 1 - 40 GHz	FCC 15.209 / 15 E	41.7dBµV/m (121.6µV/m) @ 7026.7MHz (-12.3dB)
1b	802.11a, n20	5300 MHz				38.1dBµV/m (80.4µV/m) @ 10597.1MHz (-15.9dB)
1c	802.11a, n20,n40	5320 MHz 5310 MHz				39.9dBµV/m @ 10638.8MHz (-14.1dB)
1d	802.11a, n20,n40	5500 MHz 5510 MHz				46.0dBµV/m @ 7333.4MHz (-8.0dB)
1e	802.11a, n20,n40	-				Refer to test data log T77249 for radiated emissions, center channel
1f	802.11a, n20,n40	5700 MHz 5670 MHz				50.3dBµV/m @ 7600.1MHz (-3.7dB)

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.

Client:	Xirrus	Job Number:	J71484
Model:	XN4	T-Log Number:	T73389
		Account Manager:	Susan Pelzl
Contact:	Steve Smith		
Standard:	FCC 15.247 / RSS 210	Class:	N/A

Frequency Range	Test Distance	Limit Distance	Extrapolation Factor
1000 - 18000 MHz	3	3	0.0

Run #1, Radiated Spurious Emissions, 1,000 - 40,000 MHz. Operation in the 5250-5350 MHz and 5470 - 5725 MHz Bands

Scan made in anechoic chamber, measurements in tables below taken on OATS.

Run #1a: Low Channel (5250-5350 MHz) 802.11a, 802.11n20 and 802.11n40

Radio	Channel (MHz)	Mode	Power Setting		Comments
			Chain A	Chain C	
1	5260	a	20	20	
2	5260	n20	20	20	
3	5270	n40	20	20	
4	-	-	-	-	

Spurious Radiated Emissions:

Frequency	Level	Pol	15.209 / 15E		Detector	Azimuth	Height	Comments	Mode
MHz	dBµV/m	v/h	Limit	Margin	Pk/QP/Avg	degrees	meters		
7013.410	36.8	V	54.0	-17.2	AVG	8	1.0	RB 1 MHz; VB: 10 Hz	all
7026.660	41.7	V	54.0	-12.3	AVG	88	2.2	RB 1 MHz; VB: 10 Hz	all
10518.260	38.4	H	54.0	-15.6	AVG	65	1.7	RB 1 MHz; VB: 10 Hz	all
10520.870	37.8	V	54.0	-16.2	AVG	96	1.0	RB 1 MHz; VB: 10 Hz	all
10536.770	37.8	H	54.0	-16.2	AVG	0	1.0	RB 1 MHz; VB: 10 Hz	all
10544.050	38.1	V	54.0	-15.9	AVG	54	1.0	RB 1 MHz; VB: 10 Hz	all
7013.440	46.9	V	74.0	-27.1	PK	8	1.0	RB 1 MHz; VB: 1 MHz	all
7026.680	49.1	V	74.0	-24.9	PK	88	2.2	RB 1 MHz; VB: 1 MHz	all
10518.600	59.7	H	74.0	-14.3	PK	65	1.7	RB 1 MHz; VB: 1 MHz	all
10524.980	54.3	V	74.0	-19.7	PK	96	1.0	RB 1 MHz; VB: 1 MHz	all
10536.450	49.6	H	74.0	-24.4	PK	0	1.0	RB 1 MHz; VB: 1 MHz	all
10541.100	48.9	V	74.0	-25.1	PK	54	1.0	RB 1 MHz; VB: 1 MHz	all

Note 1:	For emissions in restricted bands, the limit of 15.209 was used. For all other emissions the average limit was set to -27dBm/MHz (~68.3 dBuV/m) and peak limit set to 20dB higher than the average limit (88.3 dBuV/m).

Client:	Xirrus	Job Number:	J71484
Model:	XN4	T-Log Number:	T73389
		Account Manager:	Susan Pelzl
Contact:	Steve Smith		
Standard:	FCC 15.247 / RSS 210	Class:	N/A

Run #1b: Center Channel (5250-5350 MHz) 802.11a, 802.11n20

Radio	Channel (MHz)	Mode	Power Setting		Comments
			Chain A	Chain C	
1	5300	a	20	20	
2	5300	n20	20	20	
3	-	-	-	-	
4	-	-	-	-	

Spurious Radiated Emissions:

Frequency	Level	Pol	15.209 / 15E		Detector	Azimuth	Height	Comments	Mode
MHz	dBµV/m	v/h	Limit	Margin	Pk/QP/Avg	degrees	meters		
7066.600	35.4	H	54.0	-18.6	AVG	101	1.8	RB 1 MHz; VB: 10 Hz	a, n20
7066.630	38.1	V	54.0	-15.9	AVG	360	1.0	RB 1 MHz; VB: 10 Hz	a, n20
10595.080	37.5	H	54.0	-16.5	AVG	81	2.3	RB 1 MHz; VB: 10 Hz	a, n20
10597.130	38.1	V	54.0	-15.9	AVG	0	2.2	RB 1 MHz; VB: 10 Hz	a, n20
7066.620	47.2	V	74.0	-26.8	PK	360	1.0	RB 1 MHz; VB: 1 MHz	a, n20
7066.720	45.6	H	74.0	-28.4	PK	101	1.8	RB 1 MHz; VB: 1 MHz	a, n20
10597.580	49.3	V	74.0	-24.7	PK	0	2.2	RB 1 MHz; VB: 1 MHz	a, n20
10600.150	49.1	H	74.0	-24.9	PK	81	2.3	RB 1 MHz; VB: 1 MHz	a, n20

Note 1:	For emissions in restricted bands, the limit of 15.209 was used. For all other emissions the average limit was set to -27dBm/MHz (~68.3 dBuV/m) and peak limit set to 20dB higher than the average limit (88.3 dBuV/m).

Run #1c: High Channel (5250-5350 MHz) 802.11a, 802.11n20 and 802.11n40

Radio	Channel (MHz)	Mode	Power Setting		Comments
			Chain A	Chain C	
1	5320	a	20	20	
2	5320	n20	20	20	
3	5310	n40	20	20	
4	-	-	-	-	

Client:	Xirrus	Job Number:	J71484
Model:	XN4	T-Log Number:	T73389
		Account Manager:	Susan Pelzl
Contact:	Steve Smith		
Standard:	FCC 15.247 / RSS 210	Class:	N/A

Spurious Radiated Emissions:

Frequency	Level	Pol	15.209 / 15E		Detector	Azimuth	Height	Comments	Mode
MHz	dBµV/m	v/h	Limit	Margin	Pk/QP/Avg	degrees	meters		
10638.780	39.9	V	54.0	-14.1	AVG	360	1.8	RB 1 MHz; VB: 10 Hz	all
10638.530	39.5	H	54.0	-14.5	AVG	0	1.5	RB 1 MHz; VB: 10 Hz	all
10618.540	39.2	H	54.0	-14.8	AVG	305	1.0	RB 1 MHz; VB: 10 Hz	all
10618.500	39.0	V	54.0	-15.0	AVG	34	1.0	RB 1 MHz; VB: 10 Hz	all
7093.390	38.6	V	54.0	-15.4	AVG	19	1.6	RB 1 MHz; VB: 10 Hz	all
7093.260	36.7	H	54.0	-17.3	AVG	280	1.3	RB 1 MHz; VB: 10 Hz	all
7080.240	36.4	H	54.0	-17.6	AVG	28	1.3	RB 1 MHz; VB: 10 Hz	all
7080.390	36.2	V	54.0	-17.8	AVG	240	1.0	RB 1 MHz; VB: 10 Hz	all
10638.740	51.3	V	74.0	-22.7	PK	360	1.8	RB 1 MHz; VB: 1 MHz	all
10621.420	50.4	H	74.0	-23.6	PK	305	1.0	RB 1 MHz; VB: 1 MHz	all
10638.580	50.3	H	74.0	-23.7	PK	0	1.5	RB 1 MHz; VB: 1 MHz	all
10620.230	50.1	V	74.0	-23.9	PK	34	1.0	RB 1 MHz; VB: 1 MHz	all
7093.370	49.2	V	74.0	-24.8	PK	19	1.6	RB 1 MHz; VB: 1 MHz	all
7093.940	48.7	H	74.0	-25.3	PK	280	1.3	RB 1 MHz; VB: 1 MHz	all
7081.310	47.9	H	74.0	-26.1	PK	28	1.3	RB 1 MHz; VB: 1 MHz	all
7078.970	47.6	V	74.0	-26.4	PK	240	1.0	RB 1 MHz; VB: 1 MHz	all

Note 1:	For emissions in restricted bands, the limit of 15.209 was used. For all other emissions the average limit was set to -27dBm/MHz (~68.3 dBuV/m) and peak limit set to 20dB higher than the average limit (88.3 dBuV/m).

Run #1d: Low Channel (5470-5725 MHz) 802.11a, 802.11n20 and 802.11n40

Radio	Channel (MHz)	Mode	Power Setting		Comments
			Chain A	Chain C	
1	5500	a	20	20	
2	5500	n20	20	20	
3	5510	n40	20	20	
4	-	-	-	-	

Client:	Xirrus	Job Number:	J71484
Model:	XN4	T-Log Number:	T73389
		Account Manager:	Susan Pelzl
Contact:	Steve Smith		
Standard:	FCC 15.247 / RSS 210	Class:	N/A

Spurious Radiated Emissions:

Frequency	Level	Pol	15.209 / 15E		Detector	Azimuth	Height	Comments	Mode
MHz	dBµV/m	v/h	Limit	Margin	Pk/QP/Avg	degrees	meters		
7333.420	46.0	V	54.0	-8.0	AVG	330	1.0	RB 1 MHz; VB: 10 Hz	all
7346.710	43.7	V	54.0	-10.3	AVG	27	1.0	RB 1 MHz; VB: 10 Hz	all
11000.910	41.8	V	54.0	-12.2	AVG	334	1.0	RB 1 MHz; VB: 10 Hz	all
11018.530	41.2	V	54.0	-12.8	AVG	153	1.0	RB 1 MHz; VB: 10 Hz	all
10999.650	40.5	H	54.0	-13.5	AVG	265	1.0	RB 1 MHz; VB: 10 Hz	all
11020.270	40.4	H	54.0	-13.6	AVG	93	1.0	RB 1 MHz; VB: 10 Hz	all
7333.630	39.3	H	54.0	-14.7	AVG	21	1.0	RB 1 MHz; VB: 10 Hz	all
7346.730	38.2	H	54.0	-15.8	AVG	123	1.1	RB 1 MHz; VB: 10 Hz	all
11000.450	52.9	V	74.0	-21.1	PK	334	1.0	RB 1 MHz; VB: 1 MHz	all
11019.290	52.8	V	74.0	-21.2	PK	153	1.0	RB 1 MHz; VB: 1 MHz	all
11001.040	52.4	H	74.0	-21.6	PK	265	1.0	RB 1 MHz; VB: 1 MHz	all
7333.070	52.3	V	74.0	-21.7	PK	330	1.0	RB 1 MHz; VB: 1 MHz	all
11020.080	51.7	H	74.0	-22.3	PK	93	1.0	RB 1 MHz; VB: 1 MHz	all
7346.650	50.4	V	74.0	-23.6	PK	27	1.0	RB 1 MHz; VB: 1 MHz	all
7332.810	48.6	H	74.0	-25.4	PK	21	1.0	RB 1 MHz; VB: 1 MHz	all
7346.390	48.2	H	74.0	-25.8	PK	123	1.1	RB 1 MHz; VB: 1 MHz	all

Note 1:	For emissions in restricted bands, the limit of 15.209 was used. For all other emissions the average limit was set to -27dBm/MHz (~68.3 dBuV/m) and peak limit set to 20dB higher than the average limit (88.3 dBuV/m).

Client:	Xirrus	Job Number:	J71484
Model:	XN4	T-Log Number:	T73389
		Account Manager:	Susan Pelzl
Contact:	Steve Smith		
Standard:	FCC 15.247 / RSS 210	Class:	N/A

Run #1f: high Channel (5470-5725 MHz) 802.11a, 802.11n20 and 802.11n40

Radio	Channel (MHz)	Mode	Power Setting		Comments
			Chain A	Chain C	
1	5700	a	20	20	
2	5700	n20	20	20	
3	5670	n40	20	20	
4	-	-	-	-	

Spurious Radiated Emissions:

Frequency	Level	Pol	15.209 / 15E		Detector	Azimuth	Height	Comments	Mode
MHz	dBµV/m	v/h	Limit	Margin	Pk/QP/Avg	degrees	meters		
7600.080	50.3	V	54.0	-3.7	AVG	319	2.0	RB 1 MHz; VB: 10 Hz	all
11399.460	47.2	V	54.0	-6.8	AVG	327	1.0	RB 1 MHz; VB: 10 Hz	all
7560.040	45.7	V	54.0	-8.3	AVG	72	2.0	RB 1 MHz; VB: 10 Hz	all
11399.920	44.3	H	54.0	-9.7	AVG	239	1.0	RB 1 MHz; VB: 10 Hz	all
7600.060	43.7	H	54.0	-10.3	AVG	318	2.0	RB 1 MHz; VB: 10 Hz	all
11339.530	42.4	V	54.0	-11.6	AVG	237	1.0	RB 1 MHz; VB: 10 Hz	all
11339.910	41.2	H	54.0	-12.8	AVG	74	1.0	RB 1 MHz; VB: 10 Hz	all
11400.420	59.5	V	74.0	-14.5	PK	327	1.0	RB 1 MHz; VB: 1 MHz	all
7560.060	38.8	H	54.0	-15.2	AVG	123	1.0	RB 1 MHz; VB: 10 Hz	all
11399.120	56.5	H	74.0	-17.5	PK	239	1.0	RB 1 MHz; VB: 1 MHz	all
7600.150	55.0	V	74.0	-19.0	PK	319	2.0	RB 1 MHz; VB: 1 MHz	all
11339.760	53.9	H	74.0	-20.1	PK	74	1.0	RB 1 MHz; VB: 1 MHz	all
11340.130	53.8	V	74.0	-20.2	PK	237	1.0	RB 1 MHz; VB: 1 MHz	all
7559.840	51.6	V	74.0	-22.4	PK	72	2.0	RB 1 MHz; VB: 1 MHz	all
7600.260	51.5	H	74.0	-22.5	PK	318	2.0	RB 1 MHz; VB: 1 MHz	all
7560.270	48.9	H	74.0	-25.1	PK	123	1.0	RB 1 MHz; VB: 1 MHz	all

Note 1:	For emissions in restricted bands, the limit of 15.209 was used. For all other emissions the average limit was set to -27dBm/MHz (~68.3 dBuV/m) and peak limit set to 20dB higher than the average limit (88.3 dBuV/m).

Client:	Xirrus	Job Number:	J71484
Model:	XN4	T-Log Number:	T73389
		Account Manager:	Susan Pelzl
Contact:	Steve Smith		
Standard:	FCC 15.247 / RSS 210	Class:	N/A

RSS 210 and FCC 15.407 (UNII - 5250 - 5350 MHz and 5470-5725MHz) Radiated Spurious Emissions, Band Edges - External Antenna

Test Specific Details

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

Date of Test: 11/5/2008
Test Engineer: Rafael Varelas
Test Location: OATS #1

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

General Test Configuration

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

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

Ambient Conditions:

Temperature: 15-35 °C
Rel. Humidity: 10-60 %

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.

Summary of Results

Run #	Mode	Channel	Power Setting	Test Performed	Limit	Result / Margin
1a	802.11a Chain B	5320 MHz	19.5	Restricted Band Edge at 5350 MHz	FCC 15.209 / 15 E	49.6dBµV/m @ 5350.0MHz (-4.4dB)
1b	802.11a Chain B	5500 MHz	20.0	Restricted Band Edge at 5460 MHz	FCC 15.209 / 15 E	49.5dBµV/m @ 5457.0MHz (-4.5dB)
			20.0	Band Edge 5460 - 5470 MHz	15E (68.3 dBuV/m avg, 88.3dBuV/m peak)	49.8dBµV/m @ 5469.7MHz (-18.5dB)

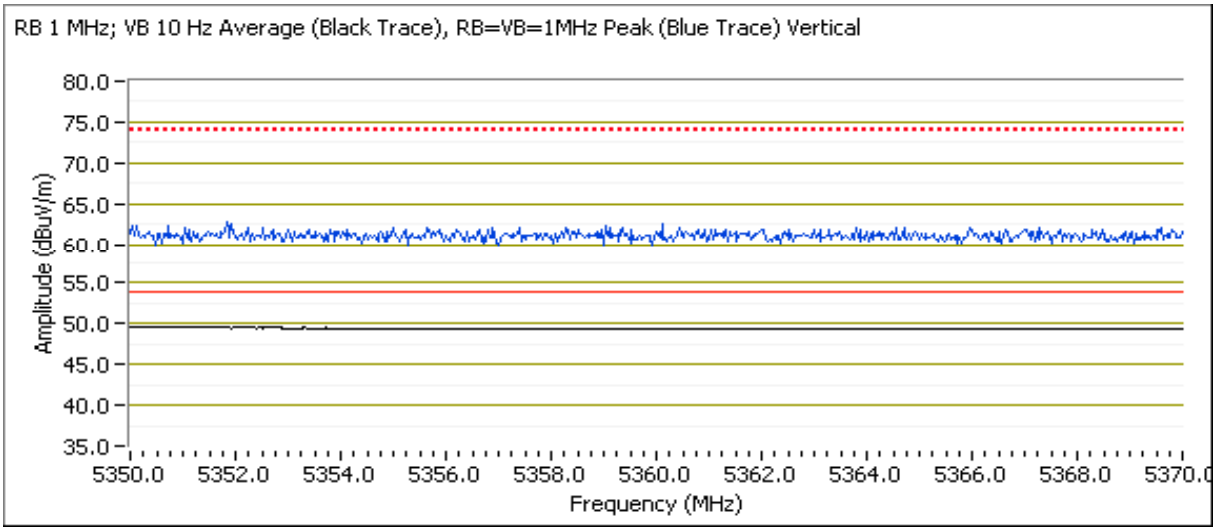
Client:	Xirrus	Job Number:	J71484
Model:	XN4	T-Log Number:	T73389
		Account Manager:	Susan Pelzl
Contact:	Steve Smith		
Standard:	FCC 15.247 / RSS 210	Class:	N/A

Run #1: Radiated Emissions at Band Edges, Operation in the 5250-5350MHz and 5460 - 5725MHz Bands, 802.11a mode
Run #1a: 5320 MHz, 802.11a (Chain B) with power setting of 19.5

5350 MHz Band Edge Signal Radiated Field Strength

Frequency	Level	Pol	FCC 15.209		Detector	Azimuth	Height	Comments
MHz	dBµV/m	v/h	Limit	Margin	Pk/QP/Avg	degrees	meters	
5350.000	49.6	V	54.0	-4.4	Avg	101	1.9	RB 1 MHz; VB: 10 Hz
5352.420	61.9	V	74.0	-12.1	PK	101	1.9	RB 1 MHz; VB: 1 MHz
5350.030	49.4	H	54.0	-4.6	Avg	183	2.3	RB 1 MHz; VB: 10 Hz
5350.880	62.1	H	74.0	-11.9	PK	183	2.3	RB 1 MHz; VB: 1 MHz

Note 1:	For emissions in restricted band immediately above 5350MHz, the limit of 15.209 was used.

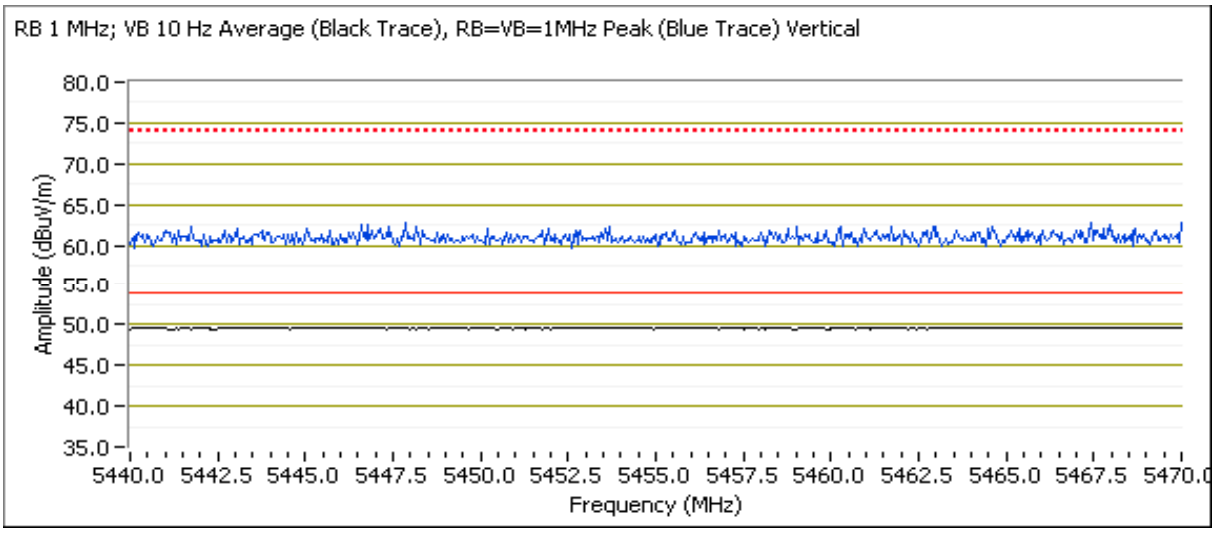


Client:	Xirrus	Job Number:	J71484
Model:	XN4	T-Log Number:	T73389
		Account Manager:	Susan Pelzl
Contact:	Steve Smith		
Standard:	FCC 15.247 / RSS 210	Class:	N/A

Run #1b: 5500 MHz, 802.11a (Chain B) with power setting of 20

5460 MHz Restricted Band Edge Signal Radiated Field Strength

Frequency	Level	Pol	FCC 15.209		Detector	Azimuth	Height	Comments
MHz	dBµV/m	V/H	Limit	Margin	Pk/QP/Avg	degrees	meters	
5457.020	49.5	V	54.0	-4.5	Avg	313	1.8	RB 1 MHz; VB: 10 Hz
5458.060	62.0	V	74.0	-12.0	PK	313	1.8	RB 1 MHz; VB: 1 MHz
5457.110	49.4	H	54.0	-4.6	Avg	5	1.1	RB 1 MHz; VB: 10 Hz
5458.370	61.7	H	74.0	-12.3	PK	5	1.1	RB 1 MHz; VB: 1 MHz



5470 MHz Band Edge Radiated Field Strength

Frequency	Level	Pol	15 E		Detector	Azimuth	Height	Comments
MHz	dBµV/m	V/H	Limit	Margin	Pk/QP/Avg	degrees	meters	
5469.670	49.8	V	68.3	-18.5	Avg	313	1.8	RB 1 MHz; VB: 10 Hz
5469.490	62.3	V	88.3	-26.0	PK	313	1.8	RB 1 MHz; VB: 1 MHz
5468.130	49.5	H	68.3	-18.8	Avg	5	1.1	RB 1 MHz; VB: 10 Hz
5467.160	61.5	H	88.3	-26.8	PK	5	1.1	RB 1 MHz; VB: 1 MHz

Note 1:	For emissions in restricted band immediately below 5460MHz, the limit of 15.209 was used.
Note 2:	For emissions in the 5460-5470 MHz the **average** limit was set to -27dBm/MHz (68.3dBuV/m) and the peak limit to -7dBm/MHz (88.3dBuV/m)

Client:	Xirrus	Job Number:	J71484
Model:	XN4	T-Log Number:	T73389
		Account Manager:	Susan Pelzl
Contact:	Steve Smith		
Standard:	FCC 15.247 / RSS 210	Class:	N/A

RSS 210 and FCC 15.407 (UNII - 5250 - 5350 MHz and 5470-5725MHz) Radiated Spurious Emissions, 1 - 40 GHz, External Antenna

Test Specific Details

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

Date of Test: 11/4/2008
Test Engineer: Rafael Varelas
Test Location: SVOATS #1

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

General Test Configuration

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

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

Ambient Conditions:

Temperature: 15-35 °C
Rel. Humidity: 10-60 %

Summary of Results

Run #	Mode	Channel	Power Setting	Measured Power	Test Performed	Limit	Result / Margin
1	802.11a	5260 MHz MHz	20		Radiated Emissions, 1 - 40 GHz	FCC 15.209 / 15 E	63.7dBµV/m @ 10520.8MHz (-10.3dB)
	802.11a	5300 MHz					41.3dBµV/m @ 7066.8MHz (-12.7dB)
	802.11a	5320 MHz					40.3dBµV/m @ 7093.4MHz (-13.7dB)
2	802.11a	5500 MHz	20				42.9dBµV/m @ 7333.5MHz (-11.1dB)
	802.11a	-					Refer to T77249 for radiated emissions, center channel
	802.11a	5700 MHz					52.3dBµV/m @ 7600.1MHz (-1.7dB)

Modifications Made During Testing

No modifications were made to the EUT during testing

Client:	Xirrus	Job Number:	J71484
Model:	XN4	T-Log Number:	T73389
		Account Manager:	Susan Pelzl
Contact:	Steve Smith		
Standard:	FCC 15.247 / RSS 210	Class:	N/A

Deviations From The Standard

No deviations were made from the requirements of the standard.

Run #1, Radiated Spurious Emissions, 1,000 - 40,000 MHz. Operation in the 5250-5350 MHz and 5470 - 5725 MHz Bands

Frequency Range	Test Distance	Limit Distance	Extrapolation Factor
1000 - 18000 MHz	3	3	0.0

Run #1a: 802.11a, Low Channel @ 5260

Radio	Channel (MHz)	Mode	Power Setting Chain A	Comments
4	5260	a	20	

Spurious Radiated Emissions:

Frequency	Level	Pol	15.209 / 15E		Detector	Azimuth	Height	Comments
MHz	dBµV/m	v/h	Limit	Margin	Pk/QP/Avg	degrees	meters	
10520.790	63.7	H	74.0	-10.3	PK	349	1.0	RB 1 MHz; VB: 1 MHz
10518.830	40.4	H	54.0	-13.6	AVG	349	1.0	RB 1 MHz; VB: 10 Hz
10519.860	39.8	V	54.0	-14.2	AVG	163	1.0	RB 1 MHz; VB: 10 Hz
7013.340	39.0	V	54.0	-15.0	AVG	345	1.1	RB 1 MHz; VB: 10 Hz
7013.400	37.9	H	54.0	-16.1	AVG	238	1.7	RB 1 MHz; VB: 10 Hz
10521.280	52.0	V	74.0	-22.0	PK	163	1.0	RB 1 MHz; VB: 1 MHz
7013.380	48.2	V	74.0	-25.8	PK	345	1.1	RB 1 MHz; VB: 1 MHz
7013.680	48.1	H	74.0	-25.9	PK	238	1.7	RB 1 MHz; VB: 1 MHz
		Chain B on 11/5/08						
10518.660	39.5	V	54.0	-14.5	AVG	360	1.8	RB 1 MHz; VB: 10 Hz
10518.990	50.5	V	74.0	-23.5	PK	360	1.8	RB 1 MHz; VB: 1 MHz
7013.410	40.2	V	54.0	-13.8	AVG	287	1.0	RB 1 MHz; VB: 10 Hz
7013.480	48.8	V	74.0	-25.2	PK	287	1.0	RB 1 MHz; VB: 1 MHz
10518.760	40.4	H	54.0	-13.6	AVG	253	1.8	RB 1 MHz; VB: 10 Hz
10519.120	61.7	H	74.0	-12.3	PK	253	1.8	RB 1 MHz; VB: 1 MHz

Client:	Xirrus	Job Number:	J71484
Model:	XN4	T-Log Number:	T73389
		Account Manager:	Susan Pelzl
Contact:	Steve Smith		
Standard:	FCC 15.247 / RSS 210	Class:	N/A

Run #1b: 802.11a, Center Channel @ 5300

Radio	Channel (MHz)	Mode	Power Setting Chain A	Comments
4	5300	a	20	

Spurious Radiated Emissions:

Frequency	Level	Pol	15.209 / 15E		Detector	Azimuth	Height	Comments
MHz	dBµV/m	v/h	Limit	Margin	Pk/QP/Avg	degrees	meters	
7066.750	41.3	V	54.0	-12.7	AVG	349	2.0	RB 1 MHz; VB: 10 Hz
10598.500	39.6	H	54.0	-14.4	AVG	0	1.0	RB 1 MHz; VB: 10 Hz
10598.500	39.6	V	54.0	-14.4	AVG	268	1.0	RB 1 MHz; VB: 10 Hz
7066.310	36.1	H	54.0	-17.9	AVG	314	1.4	RB 1 MHz; VB: 10 Hz
10598.840	51.4	H	74.0	-22.6	PK	0	1.0	RB 1 MHz; VB: 1 MHz
10599.570	51.1	V	74.0	-22.9	PK	268	1.0	RB 1 MHz; VB: 1 MHz
7066.750	49.7	V	74.0	-24.3	PK	349	2.0	RB 1 MHz; VB: 1 MHz
7066.130	47.1	H	74.0	-26.9	PK	314	1.4	RB 1 MHz; VB: 1 MHz
		Chain B on 11/5/08						
10598.540	39.0	H	54.0	-15.0	AVG	17	1.0	RB 1 MHz; VB: 10 Hz
10599.470	50.4	H	74.0	-23.6	PK	17	1.0	RB 1 MHz; VB: 1 MHz
7066.690	38.2	V	54.0	-15.8	AVG	23	1.0	RB 1 MHz; VB: 10 Hz
7067.100	47.6	V	74.0	-26.4	PK	23	1.0	RB 1 MHz; VB: 1 MHz

Note 1:	For emissions in restricted bands, the limit of 15.209 was used. For all other emissions the average limit was set to -27dBm/MHz (~68.3 dBuV/m) and peak limit set to 20dB higher than the average limit (88.3 dBuV/m).

Client:	Xirrus	Job Number:	J71484
Model:	XN4	T-Log Number:	T73389
		Account Manager:	Susan Pelzl
Contact:	Steve Smith		
Standard:	FCC 15.247 / RSS 210	Class:	N/A

Run #1, Radiated Spurious Emissions, 1,000 - 40,000 MHz. Operation in the 5250-5350 MHz and 5470 - 5725 MHz Bands
Run #1c: 802.11a, High Channel @ 5320

Radio	Channel (MHz)	Mode	Power Setting Chain A	Comments
4	5320	a	20	

Frequency	Level	Pol	15.209 / 15E		Detector	Azimuth	Height	Comments
MHz	dBµV/m	v/h	Limit	Margin	Pk/QP/Avg	degrees	meters	
7093.370	40.3	V	54.0	-13.7	AVG	360	1.0	RB 1 MHz; VB: 10 Hz
10638.830	39.4	V	54.0	-14.6	AVG	252	1.0	RB 1 MHz; VB: 10 Hz
10638.530	39.4	H	54.0	-14.6	AVG	5	1.0	RB 1 MHz; VB: 10 Hz
7093.290	37.6	H	54.0	-16.4	AVG	180	1.1	RB 1 MHz; VB: 10 Hz
10640.940	51.1	V	74.0	-22.9	PK	252	1.0	RB 1 MHz; VB: 1 MHz
10638.570	50.6	H	74.0	-23.4	PK	5	1.0	RB 1 MHz; VB: 1 MHz
7093.140	49.2	V	74.0	-24.8	PK	360	1.0	RB 1 MHz; VB: 1 MHz
7093.500	48.1	H	74.0	-25.9	PK	180	1.1	RB 1 MHz; VB: 1 MHz
		Chain B on 11/5/08						
7093.530	41.1	V	54.0	-12.9	AVG	181	1.0	RB 1 MHz; VB: 10 Hz
7093.270	49.5	V	74.0	-24.5	PK	181	1.0	RB 1 MHz; VB: 1 MHz
10638.510	39.0	V	54.0	-15.0	AVG	360	1.0	RB 1 MHz; VB: 10 Hz
10639.460	51.0	V	74.0	-23.0	PK	360	1.0	RB 1 MHz; VB: 1 MHz

Note 1:	For emissions in restricted bands, the limit of 15.209 was used. For all other emissions the average limit was set to -27dBm/MHz (~68.3 dBuV/m) and peak limit set to 20dB higher than the average limit (88.3 dBuV/m).

Run #2, Radiated Spurious Emissions, 1,000 - 40,000 MHz. Operation in the 5250-5350 MHz and 5470 - 5725 MHz Bands
Run #2a: 802.11a, Low Channel @ 5500

Radio	Channel (MHz)	Mode	Power Setting Chain A	Comments
4	5500	a	20	

Spurious Radiated Emissions:

Frequency	Level	Pol	15.209 / 15E		Detector	Azimuth	Height	Comments	Mode
MHz	dBµV/m	v/h	Limit	Margin	Pk/QP/Avg	degrees	meters		
7333.450	42.9	V	54.0	-11.1	AVG	227	1.0	RB 1 MHz; VB: 10 Hz	a
11000.830	40.1	V	54.0	-13.9	AVG	14	1.0	RB 1 MHz; VB: 10 Hz	a
11000.750	40.0	H	54.0	-14.0	AVG	360	1.0	RB 1 MHz; VB: 10 Hz	a
7333.400	39.1	H	54.0	-14.9	AVG	250	1.0	RB 1 MHz; VB: 10 Hz	a
10999.820	51.1	V	74.0	-22.9	PK	14	1.0	RB 1 MHz; VB: 1 MHz	a
11001.360	51.1	H	74.0	-22.9	PK	360	1.0	RB 1 MHz; VB: 1 MHz	a
7333.370	50.0	V	74.0	-24.0	PK	227	1.0	RB 1 MHz; VB: 1 MHz	a
7333.290	48.6	H	74.0	-25.4	PK	250	1.0	RB 1 MHz; VB: 1 MHz	a
		Chain B on 11/5/08							
7333.370	39.4	V	54.0	-14.6	AVG	280	1.0	RB 1 MHz; VB: 10 Hz	
7333.280	49.1	V	74.0	-24.9	PK	280	1.0	RB 1 MHz; VB: 1 MHz	

Client:	Xirrus	Job Number:	J71484
Model:	XN4	T-Log Number:	T73389
		Account Manager:	Susan Pelzl
Contact:	Steve Smith		
Standard:	FCC 15.247 / RSS 210	Class:	N/A

Run #2c: 802.11a, High Channel @ 5700

Radio	Channel (MHz)	Mode	Power Setting Chain A	Comments
4	5700	a	20	

Spurious Radiated Emissions:

Frequency	Level	Pol	15.209 / 15E		Detector	Azimuth	Height	Comments	Mode
MHz	dBµV/m	v/h	Limit	Margin	Pk/QP/Avg	degrees	meters		
7600.050	52.3	V	54.0	-1.7	AVG	230	2.0	RB 1 MHz; VB: 10 Hz	a
11398.500	42.8	V	54.0	-11.2	AVG	217	1.9	RB 1 MHz; VB: 10 Hz	a
7600.040	42.8	H	54.0	-11.2	AVG	234	1.0	RB 1 MHz; VB: 10 Hz	a
11399.060	41.9	H	54.0	-12.1	AVG	263	1.0	RB 1 MHz; VB: 10 Hz	a
7600.140	55.7	V	74.0	-18.3	PK	230	2.0	RB 1 MHz; VB: 1 MHz	a
11399.220	54.5	V	74.0	-19.5	PK	217	1.9	RB 1 MHz; VB: 1 MHz	a
11400.570	53.3	H	74.0	-20.7	PK	263	1.0	RB 1 MHz; VB: 1 MHz	a
7600.020	50.2	H	74.0	-23.8	PK	234	1.0	RB 1 MHz; VB: 1 MHz	a
		Chain B on 11/5/08							
7600.020	44.1	V	54.0	-9.9	AVG	352	1.1	RB 1 MHz; VB: 10 Hz	a
7600.250	50.5	V	74.0	-23.5	PK	352	1.1	RB 1 MHz; VB: 1 MHz	a

Client:	Xirrus	Job Number:	J77228
Model:	XN4	T-Log Number:	T77249
		Account Manager:	Susan Pelzl
Contact:	Steve Smith		Mark Briggs
Emissions Standard(s):	FCC 15 E, RSS 210	Class:	NII
Immunity Standard(s):	-	Environment:	Wireless

NII RF Port Test Data

For The

Xirrus

Model

XN4

Date of Last Test: 11/23/2009

Client:	Xirrus	Job Number:	J77228
Model:	XN4	T-Log Number:	T77249
		Account Manager:	Susan Pelzl
Contact:	Steve Smith		
Standard:	FCC 15 E, RSS 210	Class:	N/A

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

Test Specific Details

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

Date of Test: 11/23/2009
Test Engineer: Rafael Varelas
Test Location: OATS #2

Config. Used: -
Config Change: Direct connection
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: 15-35 °C
Rel. Humidity: 10-60 %

Summary of Results

Run #	Test Performed	Limit	Pass / Fail	Result / Margin
1	Power, 5470 - 5725MHz	15.407(a) (1), (2)	Pass	Single radio: 18.5 dBm 4x radio: 23.5 dBm
1	PSD, 5470 - 5725MHz	15.407(a) (1), (2)	Pass	6.0 dBm/MHz
1	26dB Bandwidth	15.407	Pass	37.9 MHz
1	99% Bandwidth	RSS 210	-	17.4 MHz
2	Peak Excursion Envelope	15.407(a) (6)	Pass	11.98 dB
3	Antenna Conducted Out of Band Spurious	15.407(b)	Pass	All emissions below the -27dBm/MHz limit
4	20dB bandwidth	15.407(b)	Pass	20dB bandwidth below 5589.3 MHz and above 5650.2 MHz

Modifications Made During Testing

No modifications were made to the EUT during testing

Deviations From The Standard

No deviations were made from the requirements of the standard.

Client:	Xirrus	Job Number:	J77228
Model:	XN4	T-Log Number:	T77249
		Account Manager:	Susan Pelzl
Contact:	Steve Smith		
Standard:	FCC 15 E, RSS 210	Class:	N/A

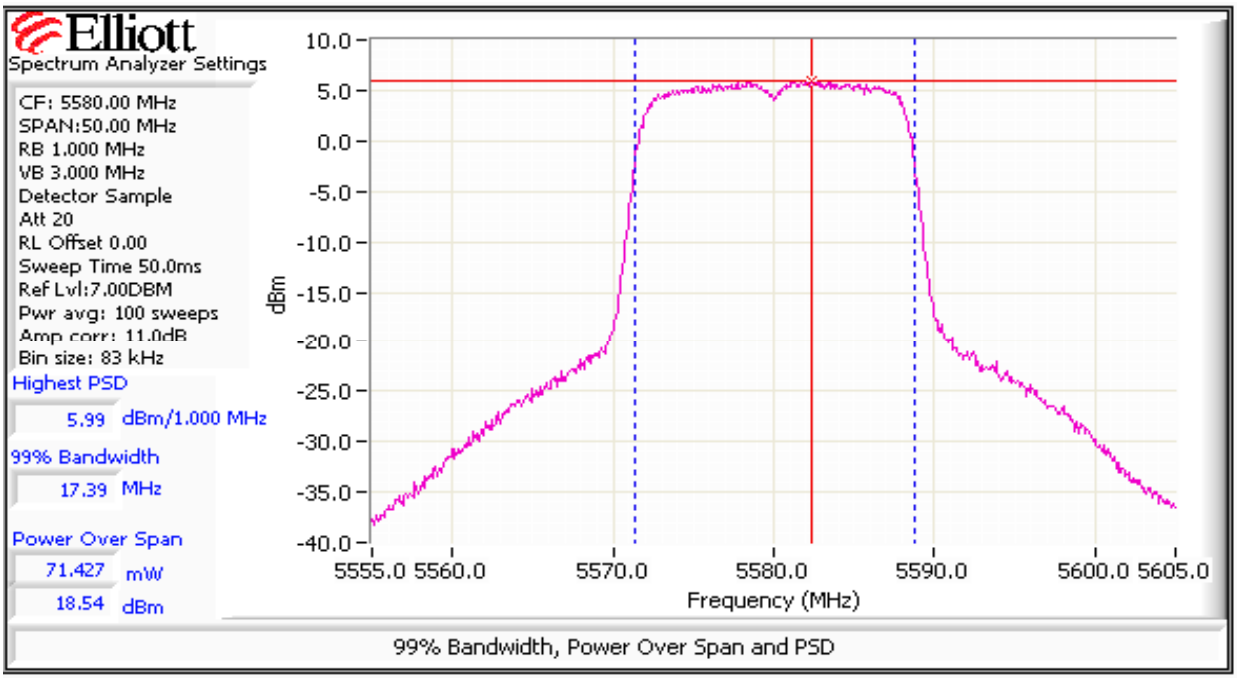
Run #1: Bandwidth, Output Power and Power spectral Density

Antenna gain used is for the internal antenna. The external antenna gain is lower (2.5dBi) and not used for MIMO modes.

Antenna Gain (dBi): 3.0

Power settings for a single radio operating in the band

Frequency (MHz)	Software Setting	Bandwidth 26dB	Bandwidth 99%[4]	Output Power[1] dBm Measured	Output Power[1] dBm Limit	Power (Watts)	PSD[2] dBm/MHz Measured	PSD[2] dBm/MHz FCC Limit	PSD[2] dBm/MHz RSS Limit[3]	Result
5580	20.0	37.9	17.4	18.5	24.0	0.071	6.0	11.0	11.0	Pass



Note 1:	Output power measured using a spectrum analyzer (see plots below): RBW=1MHz, VB=3 MHz, sample detector, power averaging on (transmitted signal was continuous) and power integration over 40 MHz
Note 2:	Measured using the same analyzer settings used for output power.
Note 3:	For RSS-210 the limit for the 5150 - 5250 MHz band accounts for the antenna gain as the maximum eirp allowed is 10dBm/MHz. The limits are also corrected for instances where the highest measured value of the PSD exceeds the average PSD (calculated from the measured power divided by the measured 99% bandwidth) by more than 3dB by the amount that the measured value exceeds the average by more than 3dB.
Note 4:	99% Bandwidth measured in accordance with RSS GEN - RB > 1% of span and VB >=3xRB

Client:	Xirrus	Job Number:	J77228
Model:	XN4	T-Log Number:	T77249
		Account Manager:	Susan Pelzl
Contact:	Steve Smith		
Standard:	FCC 15 E, RSS 210	Class:	N/A

Power settings for all four radios operating in the 5470 - 5725 MHz band

Output power measured on the centre channel to demonstrate power control is available to set the power to a level low enough to comply with limits when all four radios are operational in the band. Only power was measured - aggregation of PSD is not applicable as the device cannot have more than one radio operating on a channel.

Frequency	Software	Bandwidth		Measured Power[1]		
(MHz)	Setting	26dB	99%[4]	dBm	mW	
5580	19.5	37.9	-	17.5	56.5	Limit
Total Power Across The Band				23.5	226.0	24 dBm

Run #2: Peak Excursion Measurement

Device meets the requirement for the peak excursion

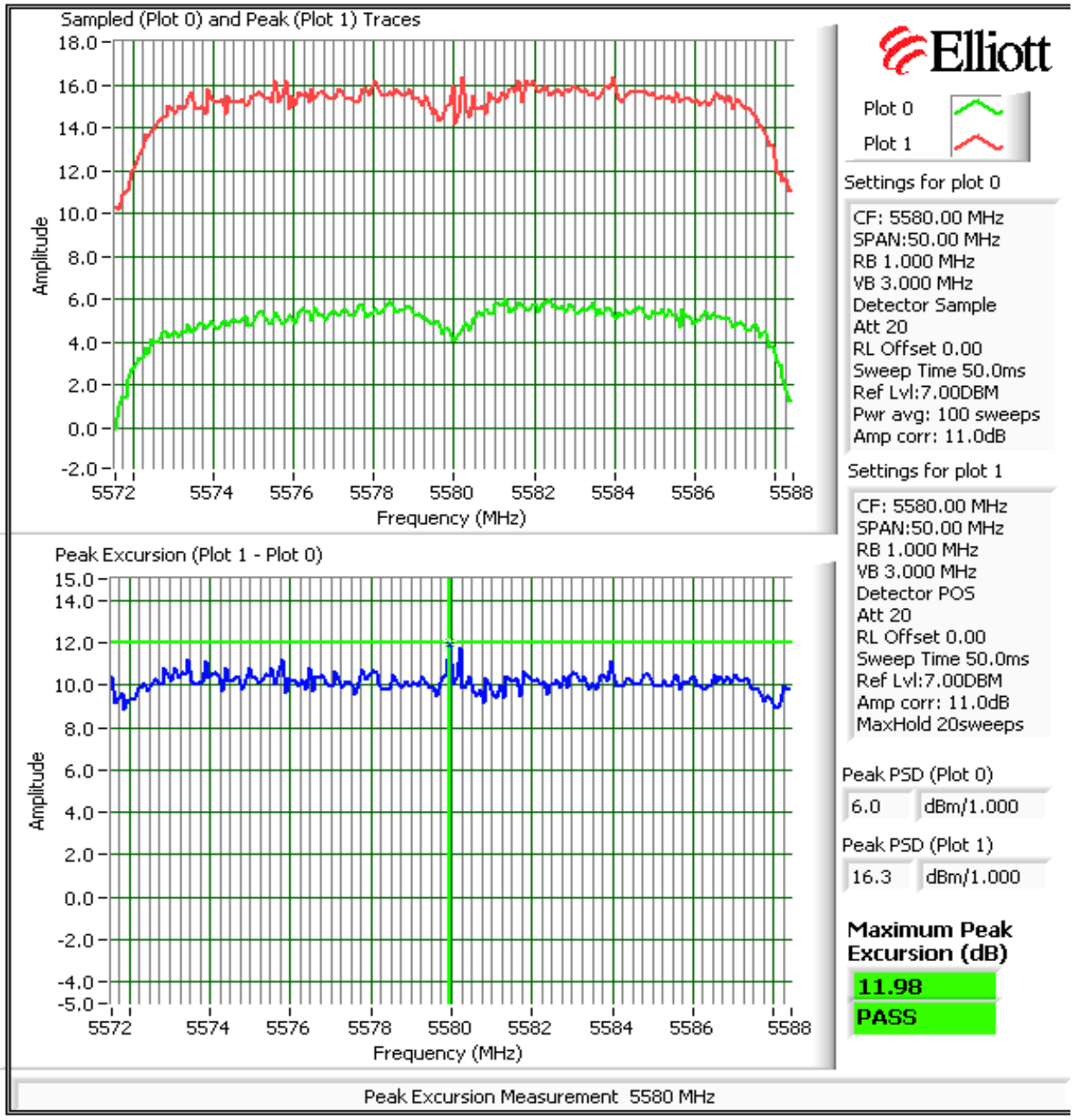
Freq	Peak Excursion(dB)		Freq	Peak Excursion(dB)		Freq	Peak Excursion(dB)	
(MHz)	Value	Limit	(MHz)	Value	Limit	(MHz)	Value	Limit
5180		13.0	5260		13.0	5500	11.1	13.0
5200		13.0	5300		13.0	5580	12.0	13.0
5240		13.0	5320		13.0	5700	11.0	13.0

Client:	Xirrus	Job Number:	J77228
Model:	XN4	T-Log Number:	T77249
		Account Manager:	Susan Pelzl
Contact:	Steve Smith		
Standard:	FCC 15 E, RSS 210	Class:	N/A

Plots Showing Peak Excursion

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

Trace B: RBW = 1 MHz, VBW = 3MHz, Integrated average power



Client:	Xirrus	Job Number:	J77228
Model:	XN4	T-Log Number:	T77249
		Account Manager:	Susan Pelzl
Contact:	Steve Smith		
Standard:	FCC 15 E, RSS 210	Class:	N/A

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

Date of Test: 11/3/2009
Test Engineer: Suhaila Khushzad
Test Location: Chamber #2

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

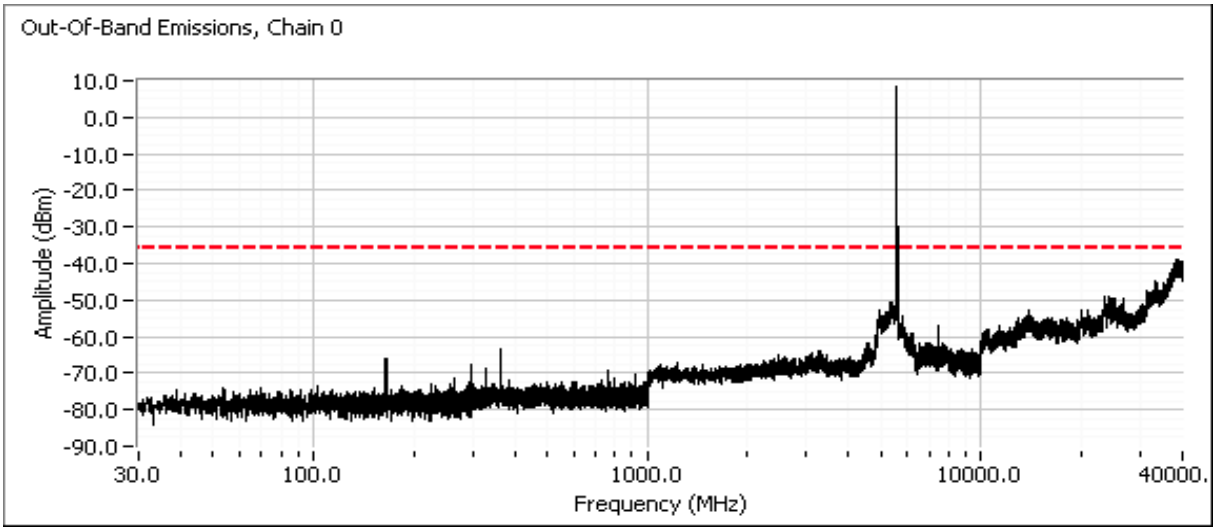
MIMO Devices: As the output power setting for the single chain mode is higher than the setting for dual chain, and by adjusting the limit for out of band spurious emissions to account for dual chain operation, the plots below cover both single- and dual chain operation.

Number of transmit chains:	2		
Maximum Antenna Gain:	3.0	dBi	
Spurious Limit:	-27.0	dBm/MHz eirp	
Adjustment for 2 chains:	-6.0	dB	adjustment for multiple chains and coherency between chains.
Limit Used On Plots [Note 1]:	-36.0	dBm/MHz	Average Limit (RB=1MHz, VB=10Hz)
	-16.0	dBm/MHz	Peak Limit (RB=VB=1MHz)

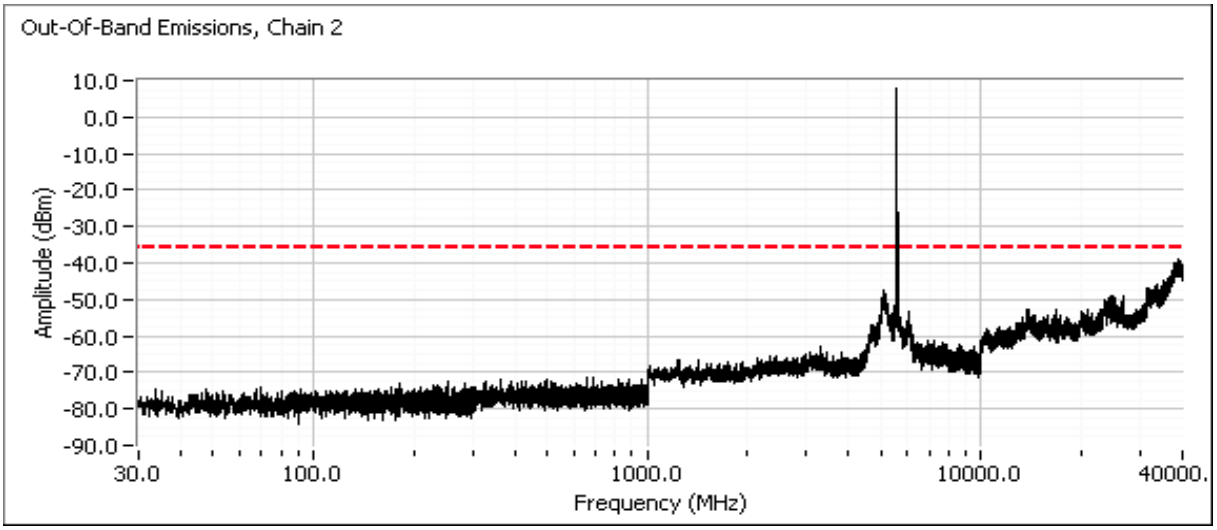
Note 1:	The -27dBm/MHz limit is an eirp limit. The limit for antenna port conducted measurements is adjusted to take into consideration the maximum antenna gain (limit = -27dBm - antenna gain). Radiated field strength measurements for signals more than 50MHz from the bands and that are close to the limit are made to determine compliance as the antenna gain is not known at these frequencies.
Note 2:	All spurious signals below 1GHz are measured during digital device radiated emissions test.
Note 3:	Signals that fall in the restricted bands of 15.205 are subject to the limit of 15.209.

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

Middle channel, 5580 MHz with Power Setting of 22.0, Chain A and Chain C



Client:	Xirrus	Job Number:	J77228
Model:	XN4	T-Log Number:	T77249
		Account Manager:	Susan Pelzl
Contact:	Steve Smith		
Standard:	FCC 15 E, RSS 210	Class:	N/A

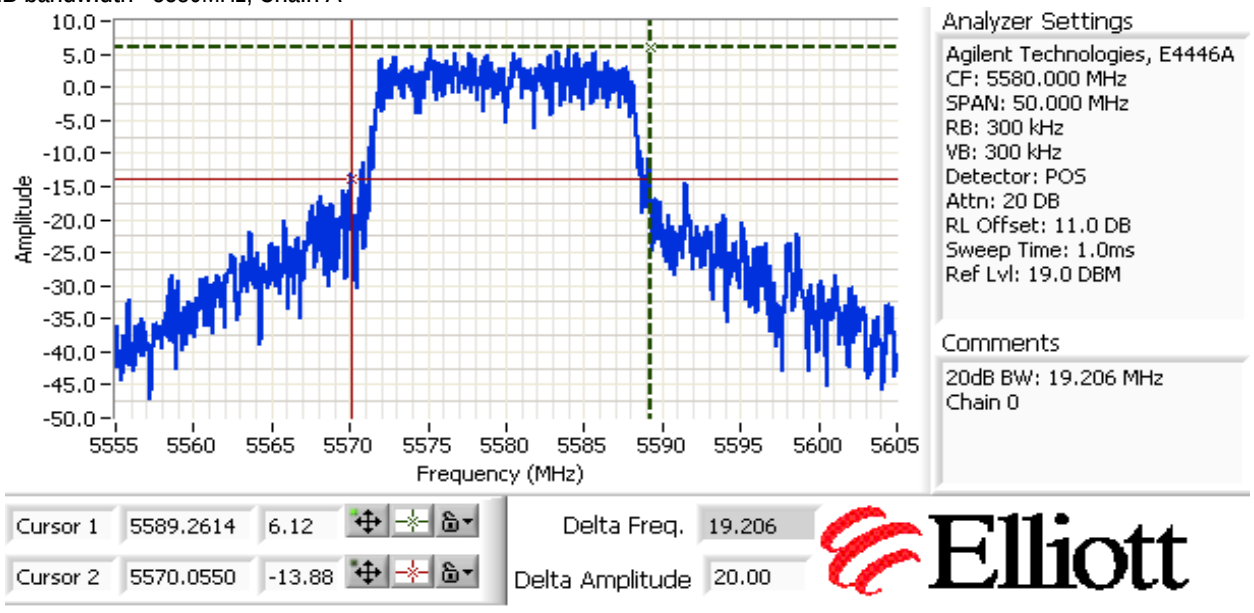


Run #4: 20dB Bandwidth - Channels Adjacent to 5600-5650MHz band

Date of Test: 11/3/2009
Test Engineer: Suhaila Khushzad
Test Location: Chamber #2
Config. Used: -
Config Change: Direct connection
EUT Voltage: 120V/60Hz

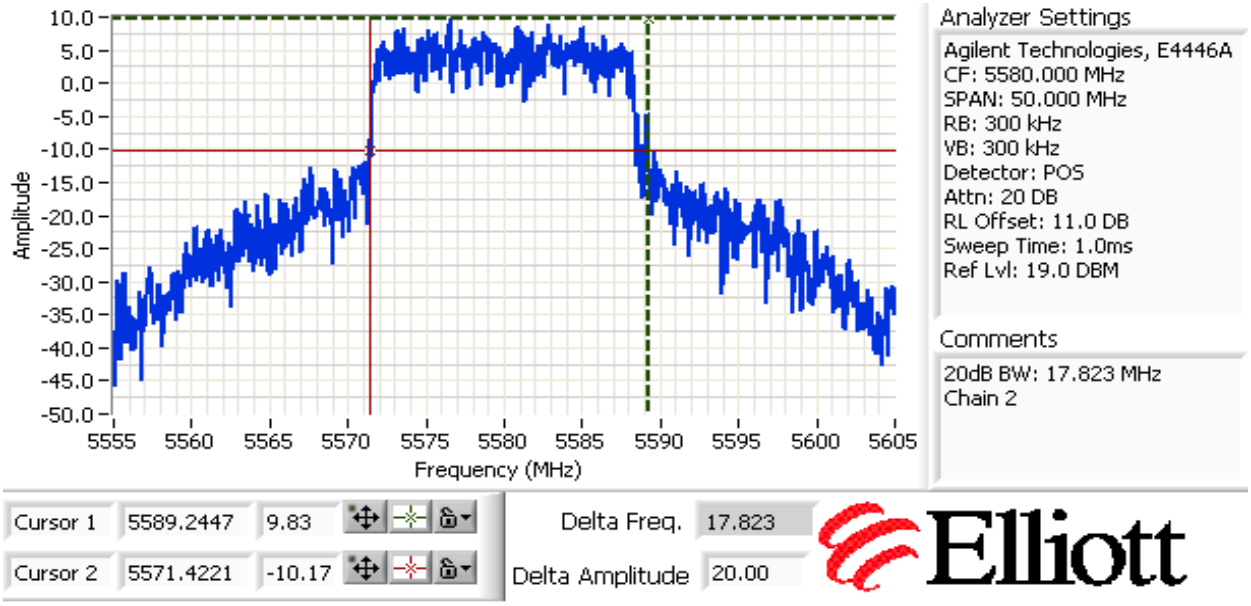
These measurements are used to demonstrate that the 20dB bandwidth of the channels either side of the 5600-5650 MHz band do not fall into the 5600-5650 MHz band. Measurements made with RB=VB=300kHz, peak detector.

20dB bandwidth - 5580MHz, Chain A

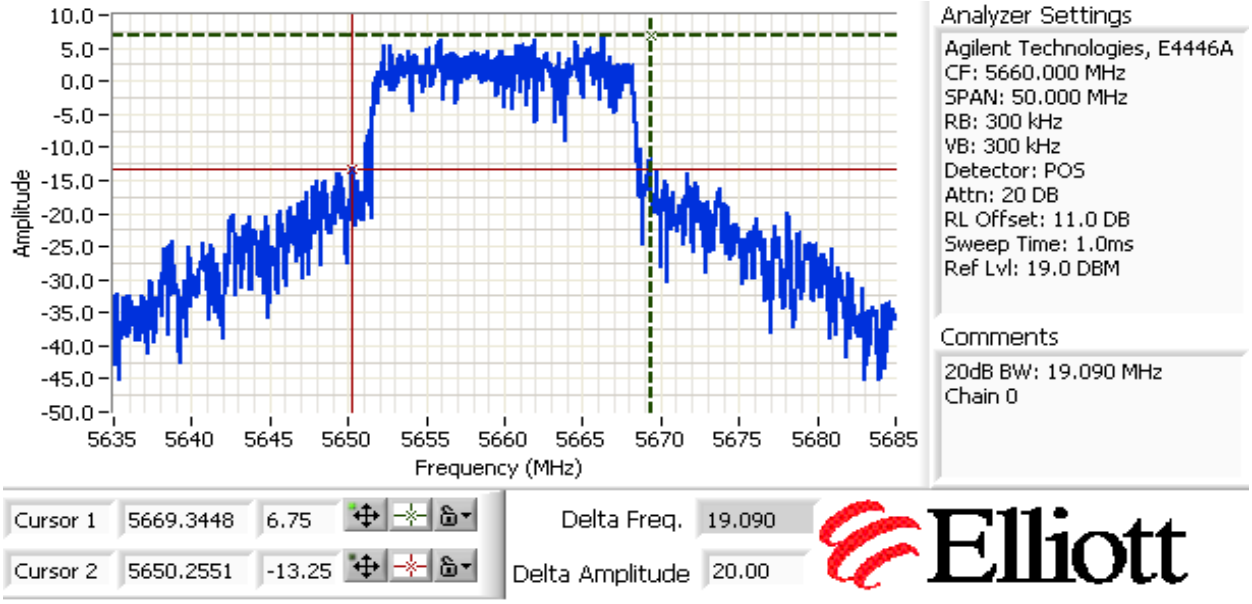


Client:	Xirrus	Job Number:	J77228
Model:	XN4	T-Log Number:	T77249
		Account Manager:	Susan Pelzl
Contact:	Steve Smith		
Standard:	FCC 15 E, RSS 210	Class:	N/A

20dB bandwidth - 5580MHz, Chain C

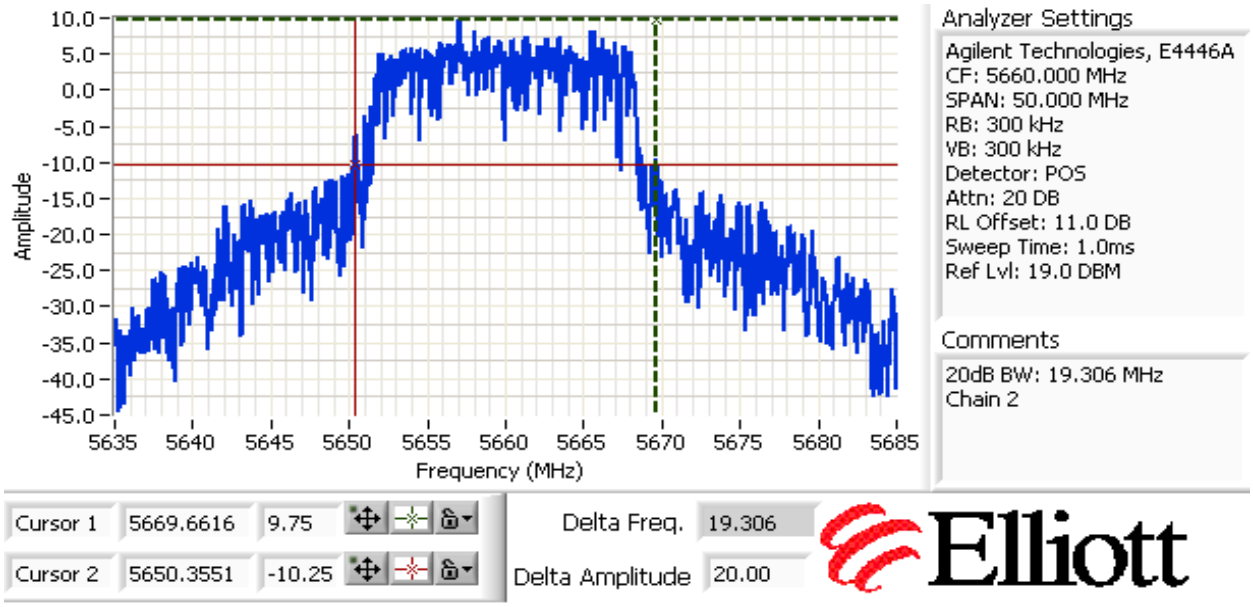


20dB bandwidth - 5660MHz, Chain A



Client:	Xirrus	Job Number:	J77228
Model:	XN4	T-Log Number:	T77249
		Account Manager:	Susan Pelzl
Contact:	Steve Smith		
Standard:	FCC 15 E, RSS 210	Class:	N/A

20dB bandwidth - 5660MHz, Chain C



Client:	Xirrus	Job Number:	J77228
Model:	XN4	T-Log Number:	T77249
		Account Manager:	Susan Pelzl
Contact:	Steve Smith		
Standard:	FCC 15 E, RSS 210	Class:	N/A

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

Test Specific Details

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

Date of Test: 11/3/2009 & 11/23/09
Test Engineer: Suhaila Khushzad/Rafael Varelas
Test Location: OATS #2

Config. Used: AC powered
Config Change: Direct connection
EUT Voltage: PoE

General Test Configuration

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

Ambient Conditions:

Temperature: 15-36 °C
Rel. Humidity: 10-60 %

Summary of Results

Run #	Mode	Test Performed	Limit	Pass / Fail	Result / Margin
1	a	Power, 5470 - 5725MHz	15.407(a) (1), (2)	Pass	Single radio: 20.9 dBm 4x radio: 24.0 dBm
1	a	PSD, 5470 - 5725MHz	15.407(a) (1), (2)	Pass	8.4 dBm/MHz
1	a	99% Bandwidth	RSS 210	-	17.4 MHz
2	a	Peak Excursion Envelope	15.407(a) (6)	Pass	12.4 dB
3		Antenna Conducted - Out of Band Spurious	15.407(b)	Covered by single-chain mode measurements	
4		20dB bandwidth	15.407(b)	Pass	20dB bandwidth below 5591.0 MHz and above 5650.3 MHz

Modifications Made During Testing

No modifications were made to the EUT during testing

Deviations From The Standard

No deviations were made from the requirements of the standard.

Client:	Xirrus	Job Number:	J77228
Model:	XN4	T-Log Number:	T77249
		Account Manager:	Susan Pelzl
Contact:	Steve Smith		
Standard:	FCC 15 E, RSS 210	Class:	N/A

Run #1: Bandwidth, Output Power and Power spectral Density

Antenna gain used is for the internal antenna. The external antenna gain is lower (2.5dBi) and not used for MIMO modes.

	Chain 1	Chain 2	Chain 3	Coherent	Effective[5]
Antenna Gain (dBi):	3		3	Yes	6.0

Power settings for a single radio operating in the band

Frequency (MHz)	Software Setting	26dB BW (MHz)	Measured Output Power[1] dBm			Total		Limit (dBm)	Max Power (W)	Pass or Fail
			Chain 1	Chain 2	Chain 3	mW	dBm			
5580	20.0	38.2	17.3		18.4	122.9	20.9	24.0	0.123	PASS

Frequency (MHz)	99%[4] BW	Total Power	PSD[2] dBm/MHz			Total PSD		Limit		Pass or Fail
			Chain 1	Chain 2	Chain 3	mW/MHz	dBm/MHz	FCC	RSS 210[3]	
5580	17.4	20.9	4.7		6.0	6.9	8.4	11.0	11.0	PASS

Power settings for all four 802.11a channels being used in the band:

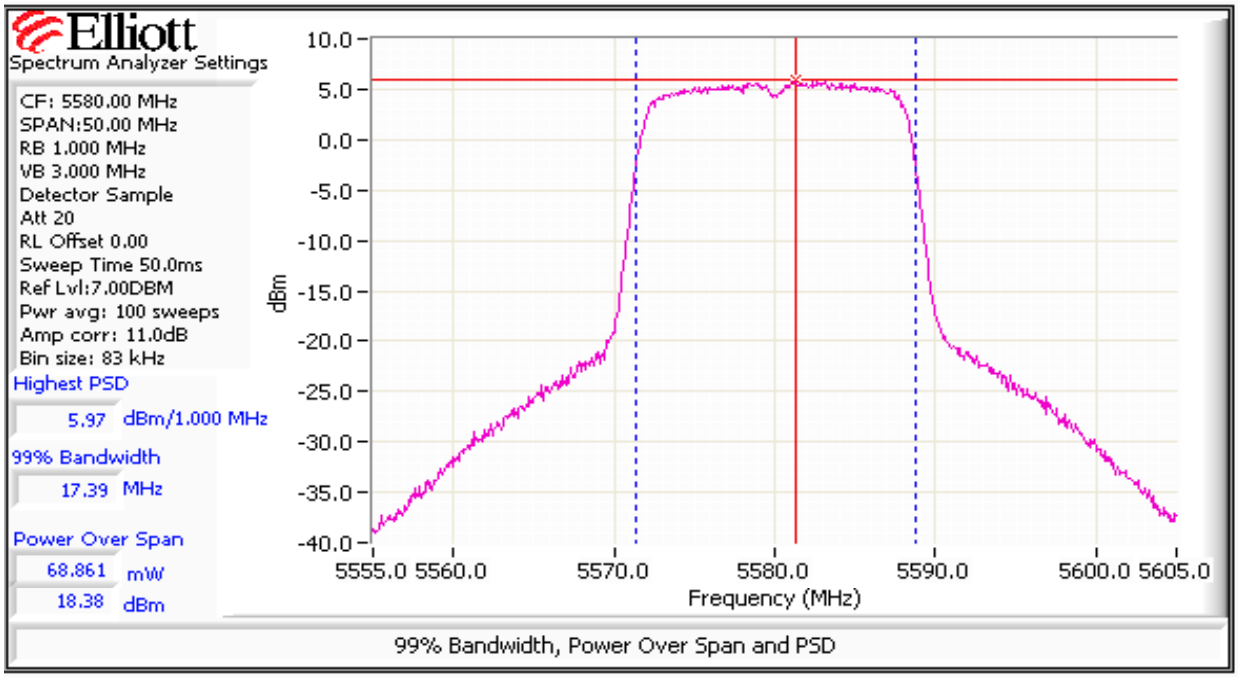
Output power measured on the center channel to demonstrate power control is available to set the power to a level low enough to comply with limits when all four radios are operational in the band. Only power was measured - aggregation of PSD is not applicable as the device cannot have more than one radio operating on a channel.

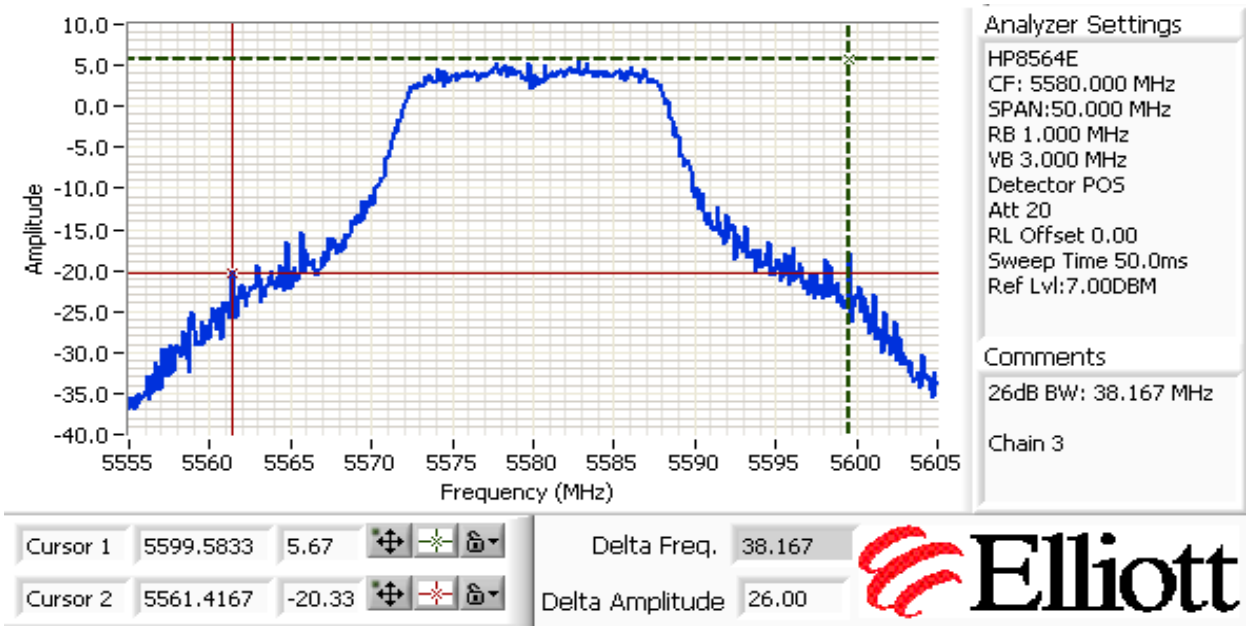
Frequency (MHz)	Software Setting	26dB BW (MHz)	Measured Output Power[1] dBm			Total				
			Chain 1	Chain 2	Chain 3	mW	dBm			
5580	16.5	38.2	14.5		15.3	62.3	17.9	Limit	P (W)	Result
Total power in the band (four radios operational):						249.3	24.0	24.0	0.249	PASS

Note 1:	Output power measured using a spectrum analyzer (see plots below for the high power measurements): RBW=1MHz, VB=3 MHz, sample detector, power averaging on (transmitted signal was continuous) and power integration over 40MHz (20MHz mode) and 100MHz (40MHz mode)
Note 2:	Measured using the same analyzer settings used for output power.
Note 3:	For RSS-210 the limit for the 5150 - 5250 MHz band accounts for the antenna gain as the maximum eirp allowed is 10dBm/MHz. The limits are also corrected for instances where the highest measured value of the PSD exceeds the average PSD (calculated from the measured power divided by the measured 99% bandwidth) by more than 3dB by the amount that the measured value exceeds the average by more than 3dB.
Note 4:	99% Bandwidth measured in accordance with RSS GEN - RB > 1% of span and VB >=3xRB
Note 5:	For MIMO systems the total output power and total PSD are calculated form the sum of the powers of the individual chains (in linear terms). The antenna gain used to determine the EIRP and limits for PSD/Output power depends on the operating mode of the MIMO device. If the signals on the non-coherent between the transmit chains then the gain used to determine the limits is the highest gain of the individual chains and the EIRP is the sum of the products of gain and power on each chain. If the signals are coherent then the effective antenna gain is the sum (in linear terms) of the gains for each chain and the EIRP is the product of the effective gain and total power.

Client:	Xirrus	Job Number:	J77228
Model:	XN4	T-Log Number:	T77249
		Account Manager:	Susan Pelzl
Contact:	Steve Smith		
Standard:	FCC 15 E, RSS 210	Class:	N/A

Plots showing power/PSD measurements and 26dB bandwidth measurements at the high power setting





Client:	Xirrus	Job Number:	J77228
Model:	XN4	T-Log Number:	T77249
		Account Manager:	Susan Pelzl
Contact:	Steve Smith		
Standard:	FCC 15 E, RSS 210	Class:	N/A

Run #2: Peak Excursion Measurement

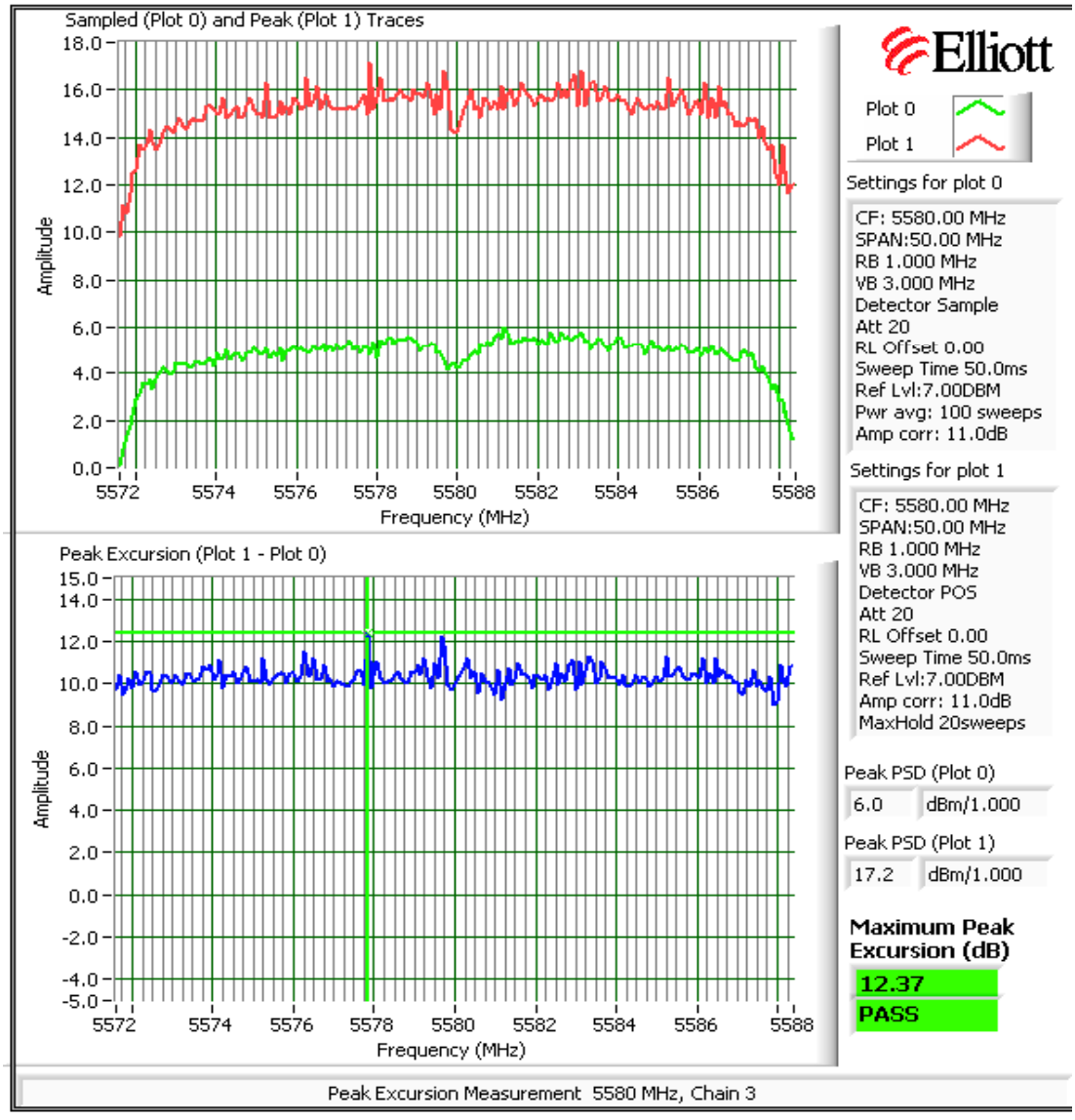
Device meets the requirement for the peak excursion

Freq	Mode, Chain	Peak Excursion(dB)		Mode, Chain	Peak Excursion(dB)	
(MHz)		Value	Limit		Value	Limit
5580	a, A	11.6	13.0	a, C	12.4	13.0

Plots Showing Peak Excursion

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

Trace B: RBW = 1 MHz, VBW = 3MHz, Integrated average power



Client:	Xirrus	Job Number:	J77228
Model:	XN4	T-Log Number:	T77249
		Account Manager:	Susan Pelzl
Contact:	Steve Smith		
Standard:	FCC 15 E, RSS 210	Class:	N/A

Run #4: 20dB Bandwidth - Channels Adjacent to 5600-5650MHz band

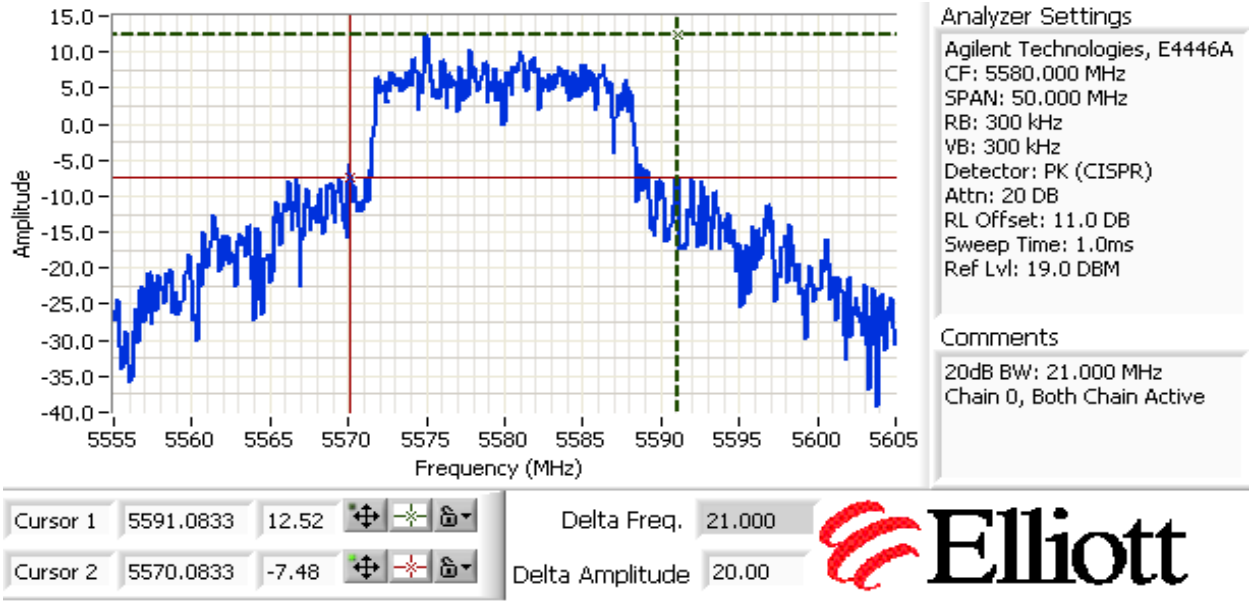
Date of Test: 11/3/2009 Config. Used: AC powered

Test Engineer: Suhaila Khushzad Config Change: Direct connection

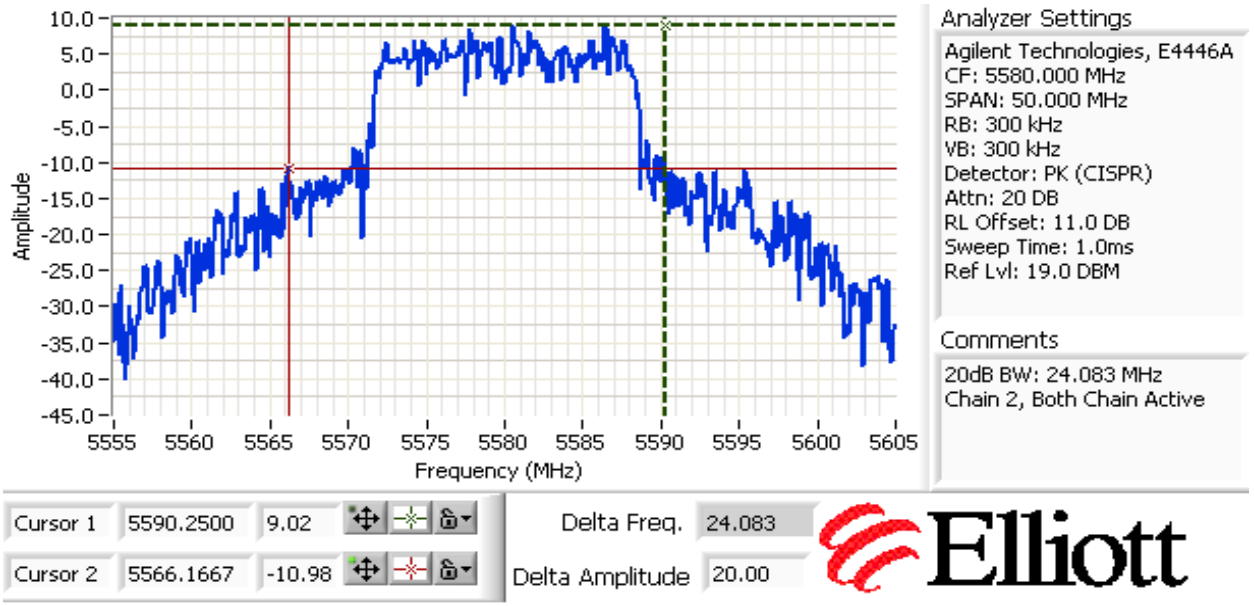
These measurements are used to demonstrate that the 20dB bandwidth of the channels either side of the 5600-5650 MHz band do not fall into the 5600-5650 MHz band.

Measurements made with RB=VB=300kHz, peak detector.

20dB bandwidth - 5580MHz, Chain A

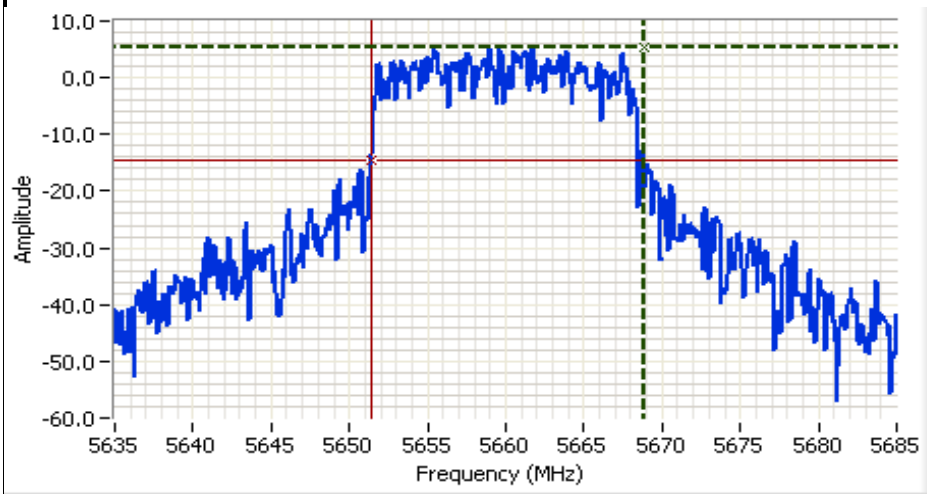


20dB bandwidth - 5580MHz, Chain C



Client:	Xirrus	Job Number:	J77228
Model:	XN4	T-Log Number:	T77249
		Account Manager:	Susan Pelzl
Contact:	Steve Smith		
Standard:	FCC 15 E, RSS 210	Class:	N/A

20dB bandwidth - 5660MHz, Chain A



Analyzer Settings

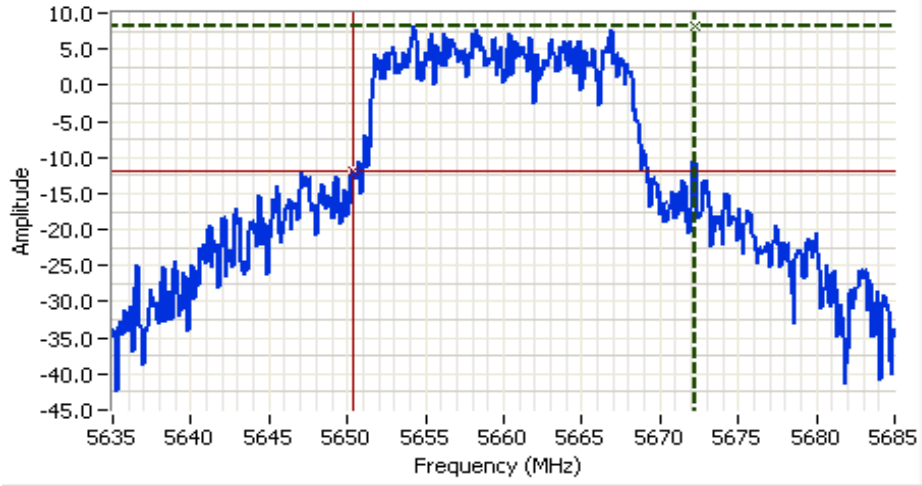
Agilent Technologies, E4446A
CF: 5660.000 MHz
SPAN: 50.000 MHz
RB: 300 kHz
VB: 300 kHz
Detector: PK (CISPR)
Attn: 20 DB
RL Offset: 11.0 DB
Sweep Time: 1.0ms
Ref Lvl: 19.0 DBM

Comments

20dB BW: 17.417 MHz
Chain 0, Both Chain Active

Cursor 1	5668.8333	5.36	Delta Freq.	17.417	Elliott
Cursor 2	5651.4167	-14.64	Delta Amplitude	20.00	

20dB bandwidth - 5660MHz, Chain C



Analyzer Settings

Agilent Technologies, E4446A
CF: 5660.000 MHz
SPAN: 50.000 MHz
RB: 300 kHz
VB: 300 kHz
Detector: PK (CISPR)
Attn: 20 DB
RL Offset: 11.0 DB
Sweep Time: 1.0ms
Ref Lvl: 19.0 DBM

Comments

20dB BW: 21.917 MHz
Chain 2, Both Chain Active

Cursor 1	5672.2500	8.15	Delta Freq.	21.917	Elliott
Cursor 2	5650.3333	-11.85	Delta Amplitude	20.00	

Client:	Xirrus	Job Number:	J77228
Model:	XN4	T-Log Number:	T77249
		Account Manager:	Susan Pelzl
Contact:	Steve Smith		
Standard:	FCC 15 E, RSS 210	Class:	N/A

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

Test Specific Details

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

Date of Test: 11/23/2009
Test Engineer: Rafael Varelas
Test Location: OATS #2

Config. Used: AC powered
Config Change: Direct connection
EUT Voltage: PoE

General Test Configuration

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

Ambient Conditions:

Temperature: 15-36 °C
Rel. Humidity: 10-60 %

Summary of Results

Run #	Mode	Test Performed	Limit	Pass / Fail	Result / Margin
1	n20MHz	Power, 5470-5725MHz	15.407(a) (1), (2)	Pass	Single radio: 20.9 dBm 4x radio: 23.8 dBm
1	n20MHz	PSD, 5470-5725MHz	15.407(a) (1), (2)	Pass	8.1 dBm/MHz
1	n20MHz	99% Bandwidth	RSS 210	-	18.5 MHz
1	n40MHz	Power, 5470-5725MHz	15.407(a) (1), (2)	Pass	Single radio: 20.6 dBm 3x radio: 22.5 dBm
1	n40MHz	PSD, 5470-5725MHz	15.407(a) (1), (2)	Pass	7.9 dBm/MHz
1	n40MHz	99% Bandwidth	RSS 210	-	36.7 MHz
2	n20 & n40	Peak Excursion Envelope	15.407(a) (6)	Pass	12.3 dB
3	n20 & n40	Antenna Conducted Spurious	15.407(b)	Pass	< -27dBm/MHz eirp
4	n20MHz	20dB bandwidth	15.407(b)	Pass	20dB bandwidth below 5591.3 MHz and above 5650.16 MHz
4	n40MHz	20dB bandwidth	15.407(b)	Pass	20dB bandwidth below 5569.7 MHz and above 5650.3 MHz

Modifications Made During Testing

No modifications were made to the EUT during testing

Deviations From The Standard

No deviations were made from the requirements of the standard.

Client:	Xirrus	Job Number:	J77228
Model:	XN4	T-Log Number:	T77249
		Account Manager:	Susan Pelzl
Contact:	Steve Smith		
Standard:	FCC 15 E, RSS 210	Class:	N/A

Run #1: Bandwidth, Output Power and Power spectral Density

Antenna gain used is for the internal antenna. The external antenna gain is lower (2.5dBi) and not used for MIMO modes.

	Chain 1	Chain 2	Chain 3	Coherent	Effective[5]
Antenna Gain (dBi):	3		3	No	3.0

Power settings for a single radio operating in the band

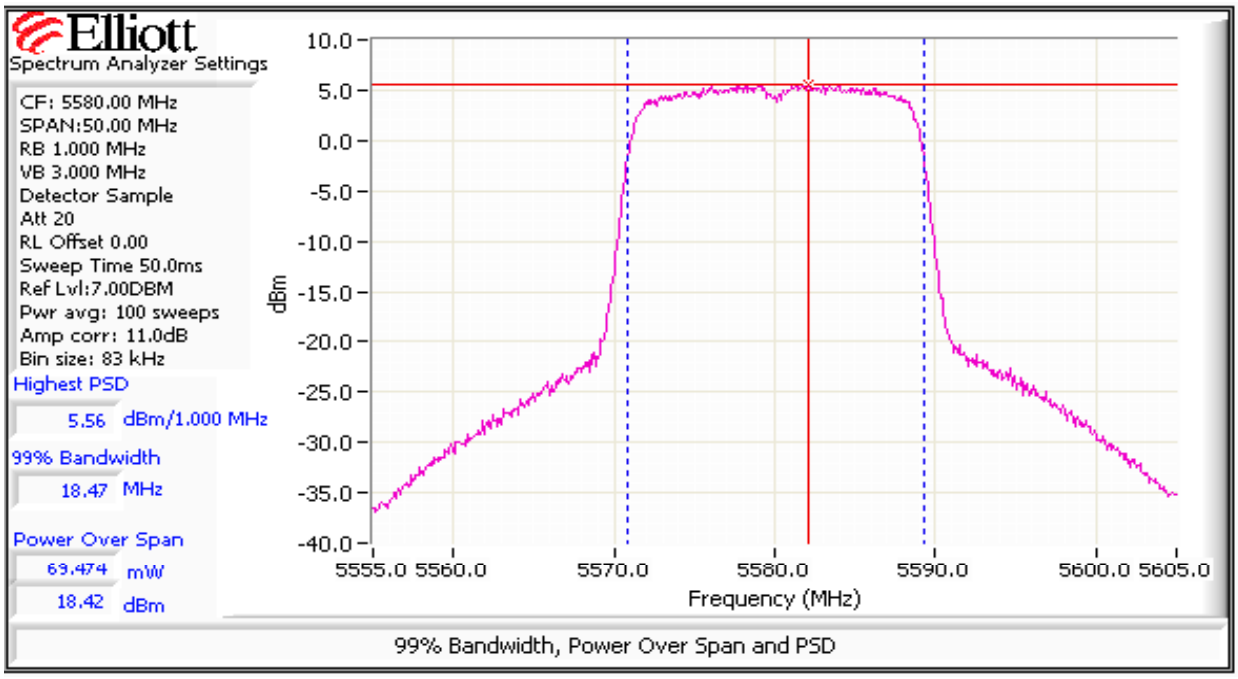
Frequency (MHz)	Software Setting	26dB BW (MHz)	Measured Output Power[1] dBm			Total		Limit (dBm)	Max Power (W)	Pass or Fail
			Chain 1	Chain 2	Chain 3	mW	dBm			
5580	20.0	36.3	17.3		18.4	122.3	20.9	24.0	0.122	PASS
5550	20.0	39.2	16.8		18.2	113.9	20.6	24.0	0.114	PASS

Frequency (MHz)	99%[4] BW	Total Power	PSD[2] dBm/MHz			Total PSD		Limit		Pass or Fail
			Chain 1	Chain 2	Chain 3	mW/MHz	dBm/MHz	FCC	RSS 210[3]	
5580	18.5	20.9	4.4		5.6	6.4	8.1	11.0	11.0	PASS
5550	18.5	20.6	4.2		5.4	6.1	7.9	11.0	11.0	PASS

Note 1:	Output power measured using a spectrum analyzer (see plots below for the high power measurements): RBW=1MHz, VB=3 MHz, sample detector, power averaging on (transmitted signal was continuous) and power integration over 40MHz (20MHz mode) and 80MHz (40MHz mode)
Note 2:	Measured using the same analyzer settings used for output power.
Note 3:	For RSS-210 the limit for the 5470 - 5725 MHz band accounts for the antenna gain as the maximum eirp allowed is 11dBm/MHz. The limits are also corrected for instances where the highest measured value of the PSD exceeds the average PSD (calculated from the measured power divided by the measured 99% bandwidth) by more than 3dB by the amount that the measured value exceeds the average by more than 3dB.
Note 4:	99% Bandwidth measured in accordance with RSS GEN - RB > 1% of span and VB >=3xRB
Note 5:	For MIMO systems the total output power and total PSD are calculated form the sum of the powers of the individual chains (in linear terms). The antenna gain used to determine the EIRP and limits for PSD/Output power depends on the operating mode of the MIMO device. If the signals on the non-coherent between the transmit chains then the gain used to determine the limits is the highest gain of the individual chains and the EIRP is the sum of the products of gain and power on each chain. If the signals are coherent then the effective antenna gain is the sum (in linear terms) of the gains for each chain and the EIRP is the product of the effective gain and total power.

Client:	Xirrus	Job Number:	J77228
Model:	XN4	T-Log Number:	T77249
		Account Manager:	Susan Pelzl
Contact:	Steve Smith		
Standard:	FCC 15 E, RSS 210	Class:	N/A

Plot showing PSD measurement at the high power setting for highest power chain (HT20 mode)



Power settings for all four n20 channels and both n40 channels being used in the band:

The device adjusts output power downwards if multiple radios operate in the same band to maintain compliance with the total power limit for the band. Measurements were made at the lowest required power setting (i.e. all non-overlapping channels in the band occupied) to verify the device has the dynamic range to do this.

Frequency (MHz)	Software Setting	26dB BW (MHz)	Measured Output Power[1] dBm			Total				
			Chain 1	Chain 2	Chain 3	mW	dBm			
5580	16.0	36.3	14.8		14.7	59.6	17.8	Limit	P (W)	Result
Total power in the band (four radios operational in n20MHz mode):						238.3	23.8	24.0	0.238	PASS

Frequency (MHz)	Software Setting	26dB BW (MHz)	Measured Output Power[1] dBm			Total				
			Chain 1	Chain 2	Chain 3	mW	dBm			
5550	17.0	58.3	14.2		15.2	59.4	17.7	Limit	P (W)	Result
Total power in the band (three radios operational in n40MHz mode):						178.2	22.5	24.0	0.178	PASS

Client:	Xirrus	Job Number:	J77228
Model:	XN4	T-Log Number:	T77249
		Account Manager:	Susan Pelzl
Contact:	Steve Smith		
Standard:	FCC 15 E, RSS 210	Class:	N/A

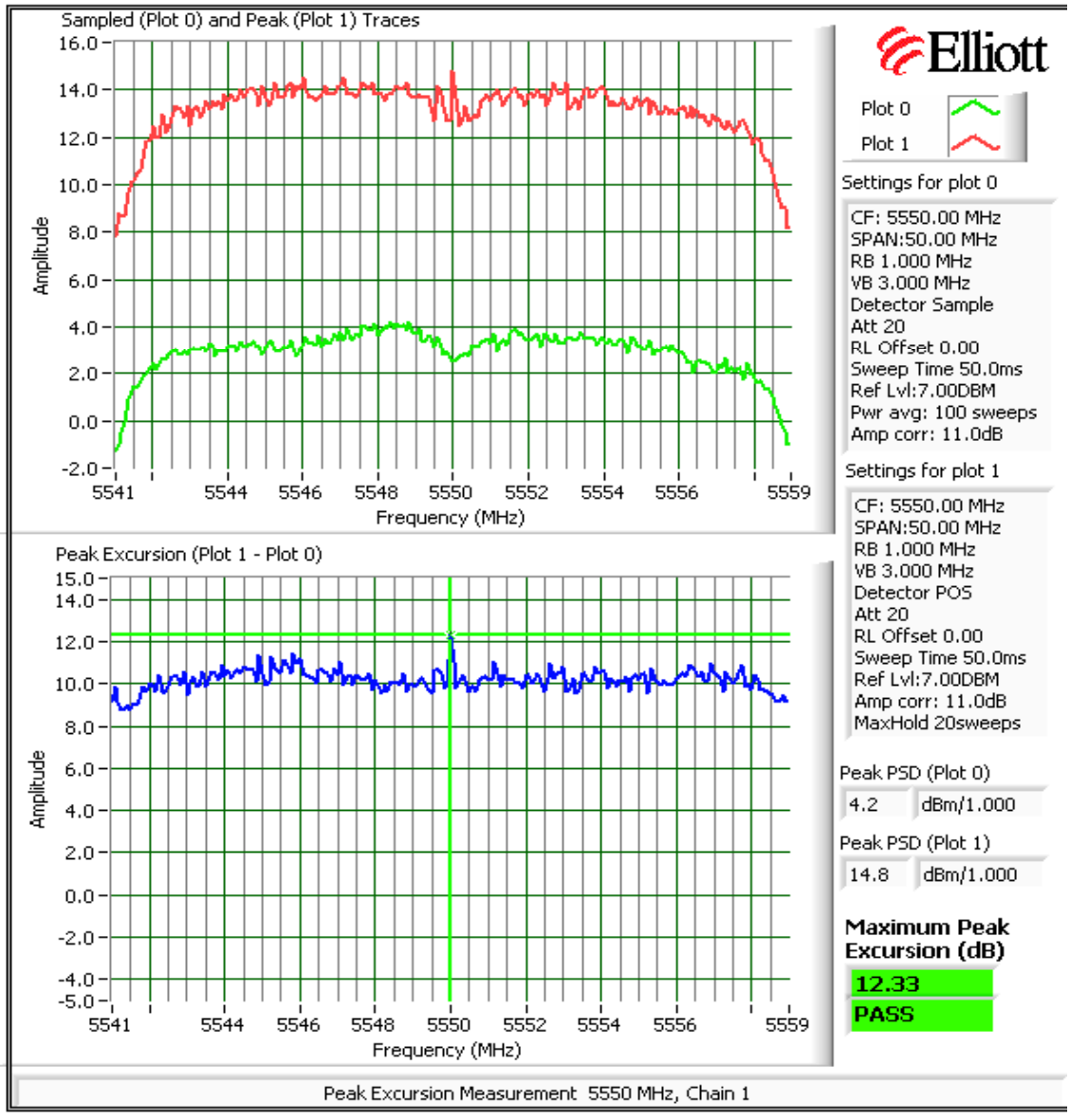
Run #2: Peak Excursion Measurement

Device meets the requirement for the peak excursion

Freq	Mode, Chain	Peak Excursion(dB)		Mode, Chain	Peak Excursion(dB)	
(MHz)		Value	Limit		Value	Limit
5580	n20 A	11.7	13.0	n20 C	11.3	13.0
5550	n20 A	12.3	13.0	n20 C	11.2	13.0

Plots Showing Peak Excursion

Trace A: RBW = VBW = 3MHz, Peak hold; Trace B: RBW = 1 MHz, VBW = 3MHz, Integrated average power



Client:	Xirrus	Job Number:	J77228
Model:	XN4	T-Log Number:	T77249
		Account Manager:	Susan Pelzl
Contact:	Steve Smith		
Standard:	FCC 15 E, RSS 210	Class:	N/A

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

Date of Test: 11/3/2009
Test Engineer: Suhaila Khushzad
Test Location: Chamber #2

Config. Used: AC powered
Config Change: Direct connection
EUT Voltage: PoE

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

Number of transmit chains:	2		
Maximum Antenna Gain:	3.0	dBi	
Spurious Limit:	-27.0	dBm/MHz eirp	
Adjustment for 2 chains:	-3.0	dB adjustment for multiple chains.	
Limit Used On Plots [Note 1]:	-33.0	dBm/MHz	Average Limit (RB=1MHz, VB=10Hz)
	-13.0	dBm/MHz	Peak Limit (RB=VB=1MHz)

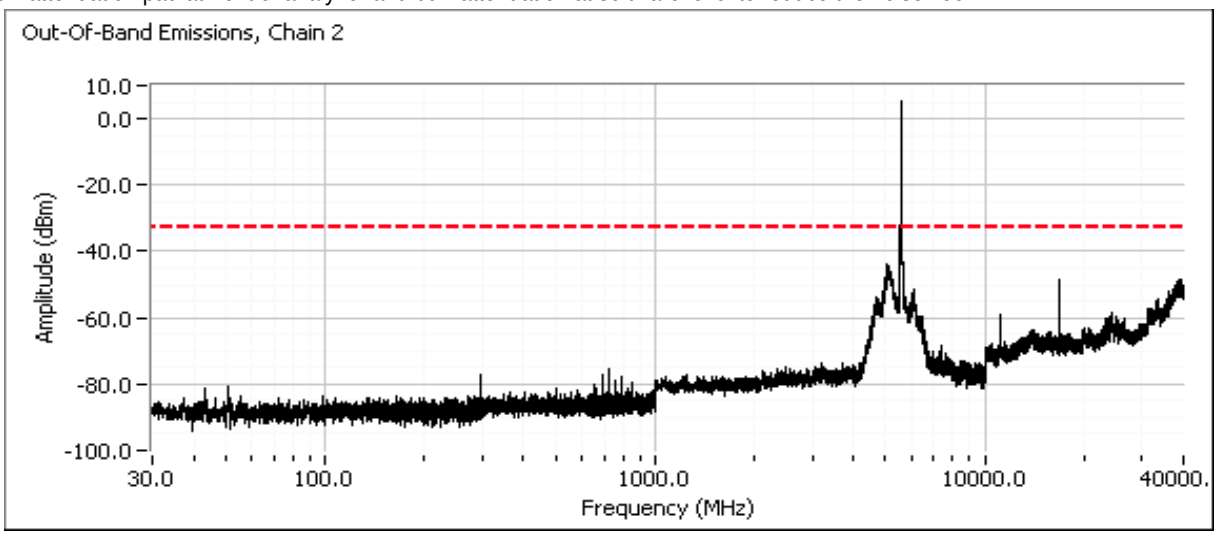
Note 1:	The -27dBm/MHz limit is an eirp limit. The limit for antenna port conducted measurements is adjusted to take into consideration the maximum antenna gain (limit = -27dBm - antenna gain). Radiated field strength measurements for signals more than 50MHz from the bands and that are close to the limit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

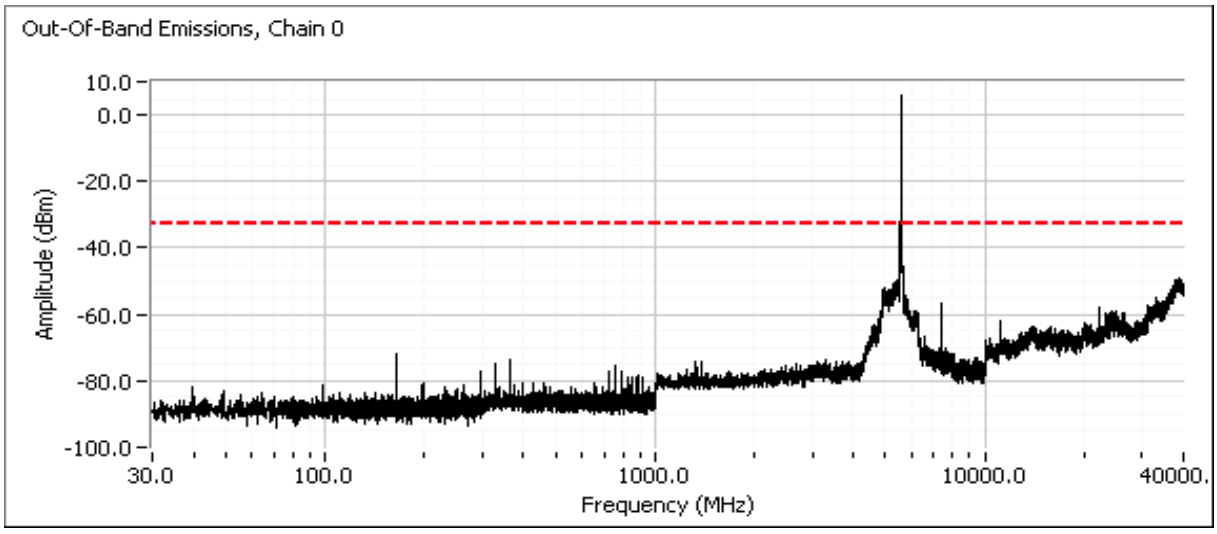
Client:	Xirrus	Job Number:	J77228
Model:	XN4	T-Log Number:	T77249
		Account Manager:	Susan Pelzl
Contact:	Steve Smith		
Standard:	FCC 15 E, RSS 210	Class:	N/A

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

802.11n 20MHz, Center channel (5580 MHz), 5470 - 5725 MHz Band

20dB attenuation pad at front of analyzer and 0dB attenuation at software level to reduce the noise floor.

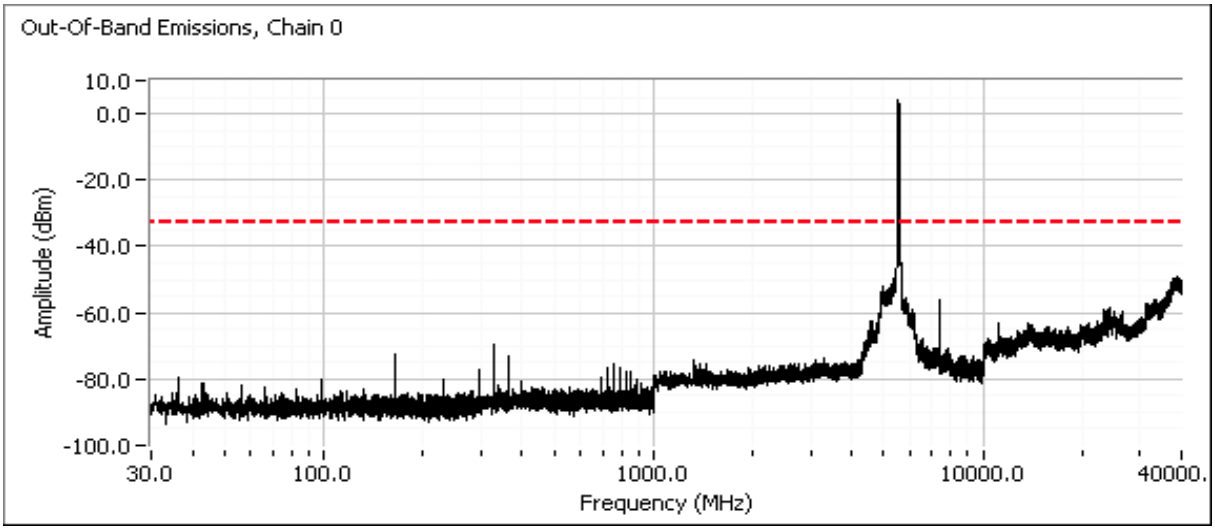


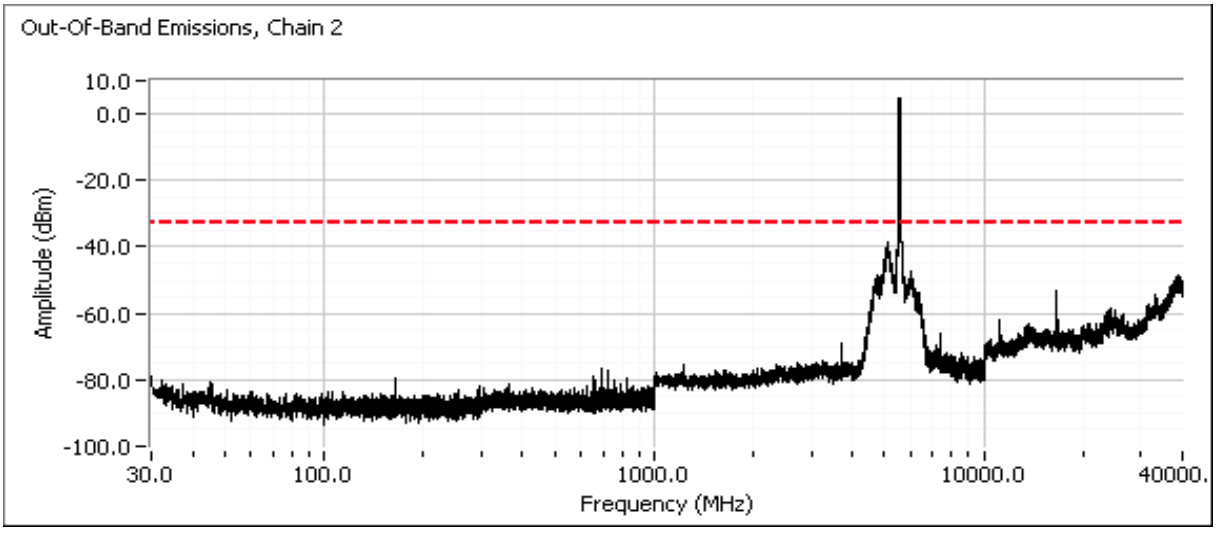


Client:	Xirrus	Job Number:	J77228
Model:	XN4	T-Log Number:	T77249
		Account Manager:	Susan Pelzl
Contact:	Steve Smith		
Standard:	FCC 15 E, RSS 210	Class:	N/A

802.11n 40MHz, Center channel (5550 MHz), 5470 - 5725 MHz Band

20dB attenuation pad at front of analyzer and 20dB attenuation at software level.





Client:	Xirrus	Job Number:	J77228
Model:	XN4	T-Log Number:	T77249
		Account Manager:	Susan Pelzl
Contact:	Steve Smith		
Standard:	FCC 15 E, RSS 210	Class:	N/A

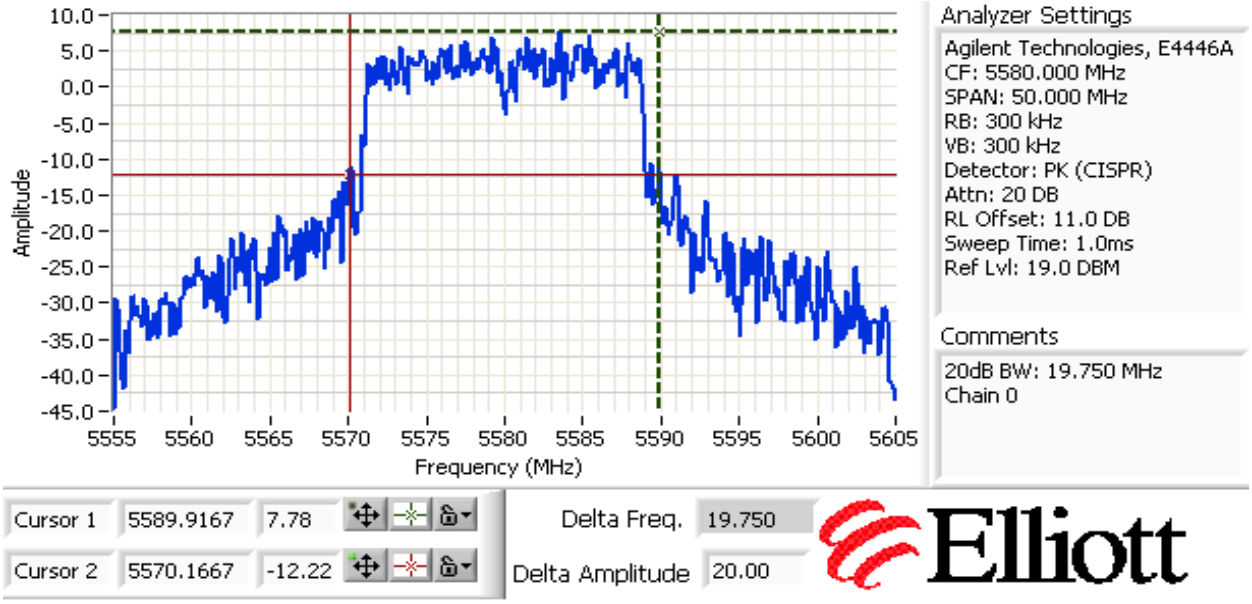
Run #4: 20dB Bandwidth - Channels Adjacent to 5600-5650MHz band

Date of Test: 11/3/2009 Config. Used: AC powered

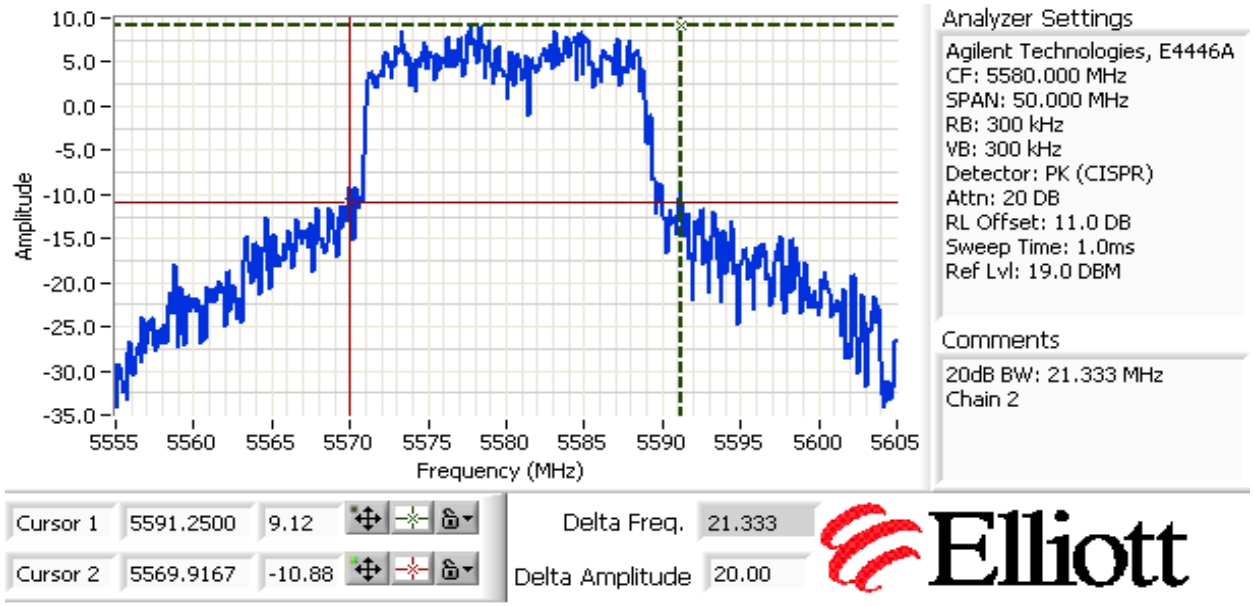
Test Engineer: Suhaila Khushzad Config Change: Direct connection

These measurements are used to demonstrate that the 20dB bandwidth of the channels either side of the 5600-5650 MHz band do not fall into the 5600-5650 MHz band. Measurements made with RB=VB=300kHz, peak detector.

20dB bandwidth - 5580MHz, HT20, Chain A

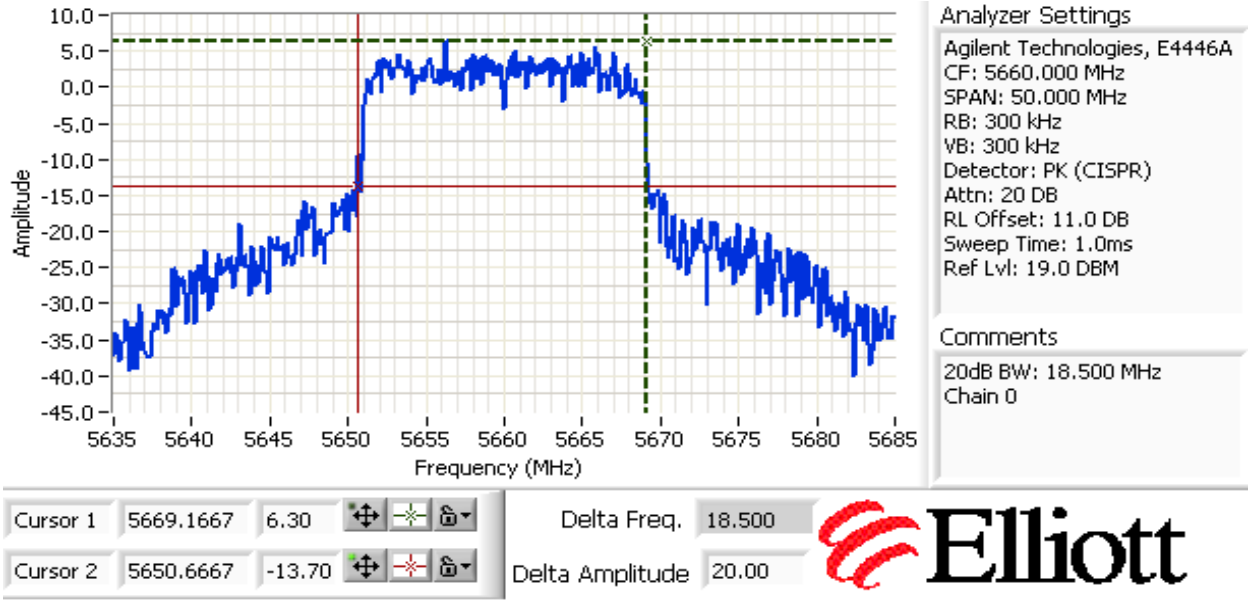


20dB bandwidth - 5580MHz, HT20, Chain C

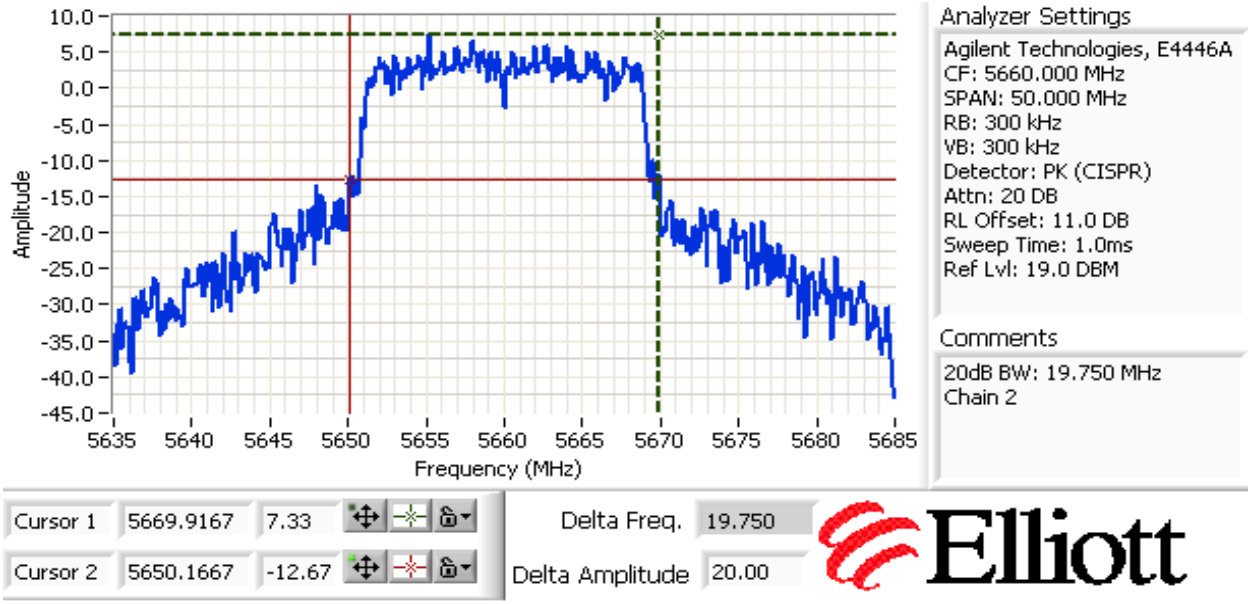


Client:	Xirrus	Job Number:	J77228
Model:	XN4	T-Log Number:	T77249
		Account Manager:	Susan Pelzl
Contact:	Steve Smith		
Standard:	FCC 15 E, RSS 210	Class:	N/A

20dB bandwidth - 5660MHz, HT20, Chain A, Power Setting 20.5

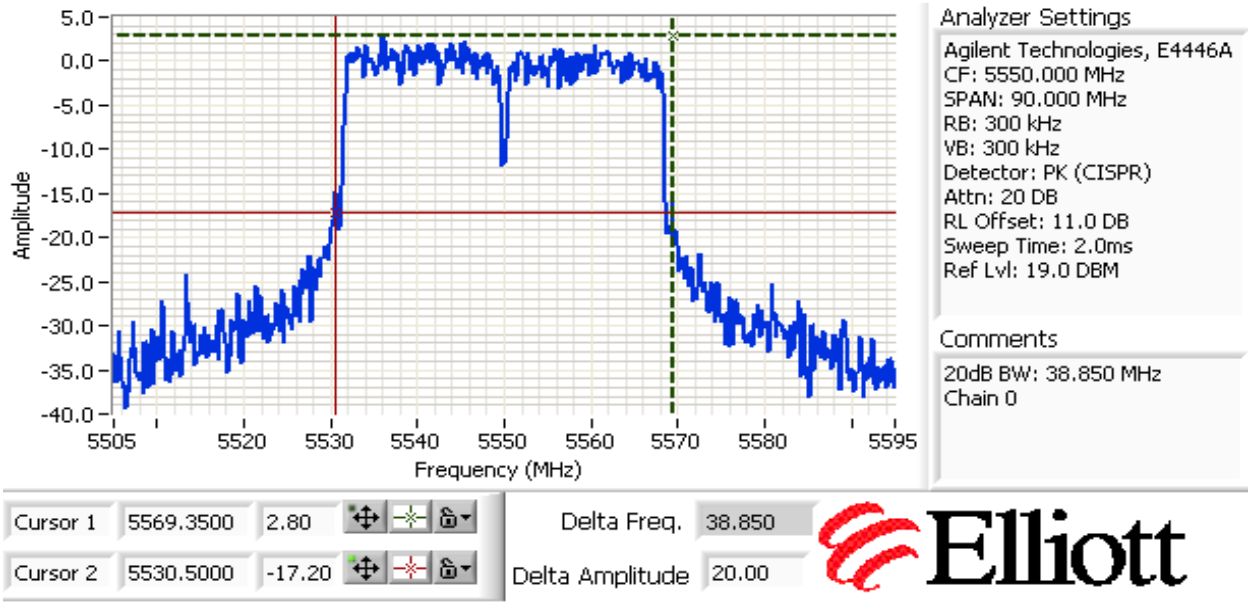


20dB bandwidth - 5660MHz, HT20, Chain C

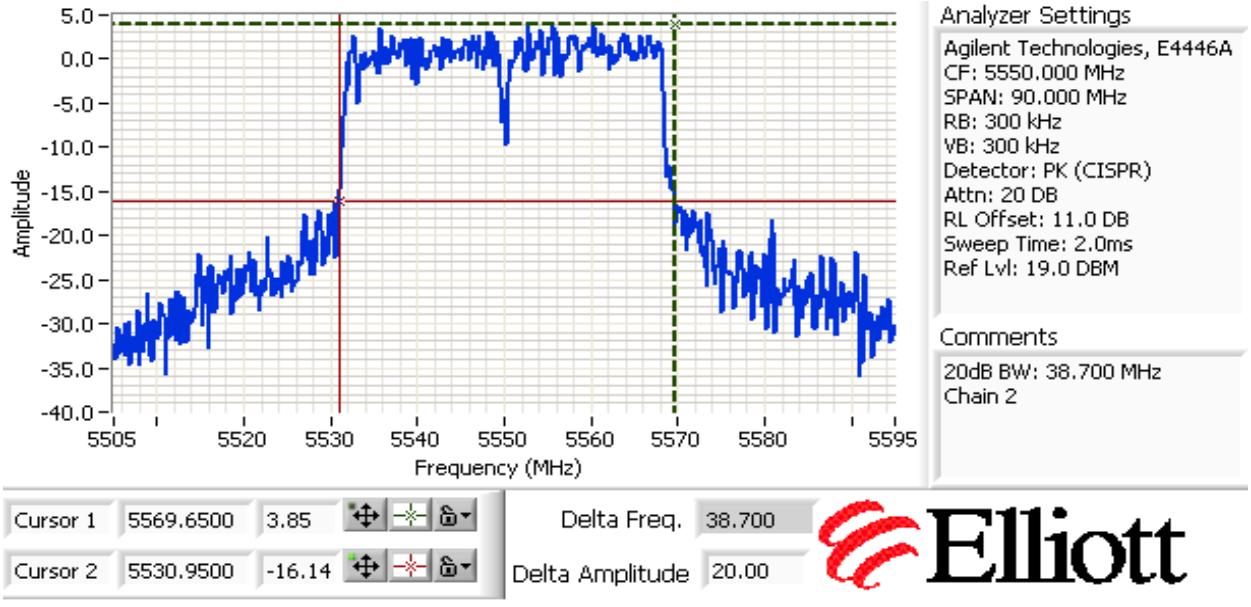


Client:	Xirrus	Job Number:	J77228
Model:	XN4	T-Log Number:	T77249
		Account Manager:	Susan Pelzl
Contact:	Steve Smith		
Standard:	FCC 15 E, RSS 210	Class:	N/A

20dB bandwidth - 5550MHz, HT40, Chain A

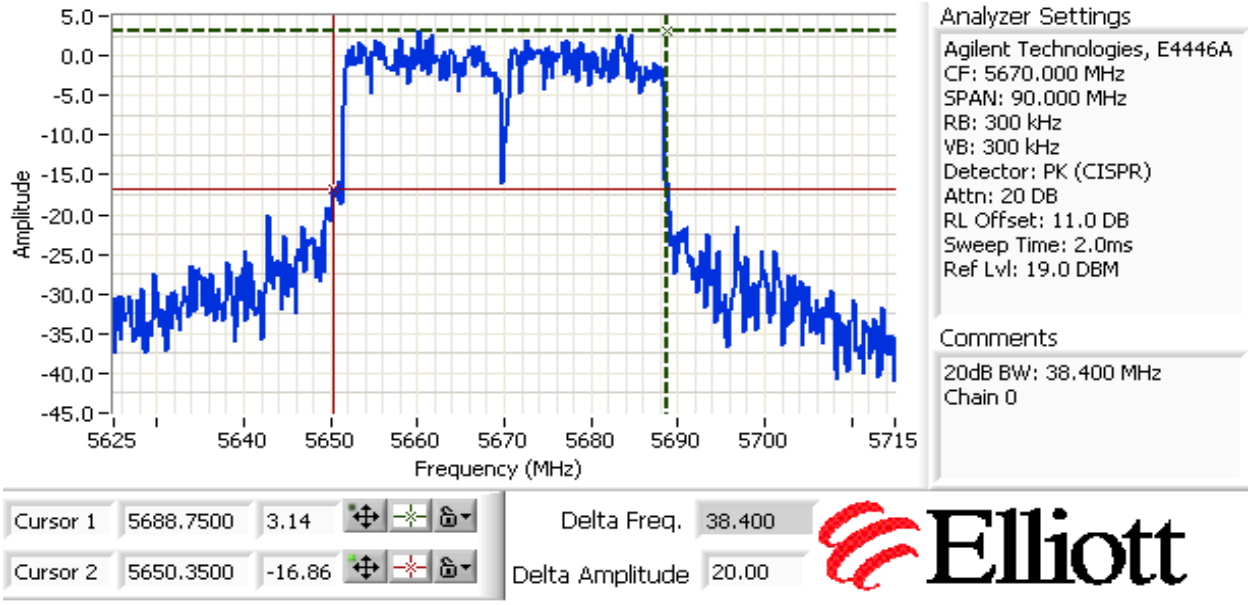


20dB bandwidth - 5550MHz, HT40, Chain C

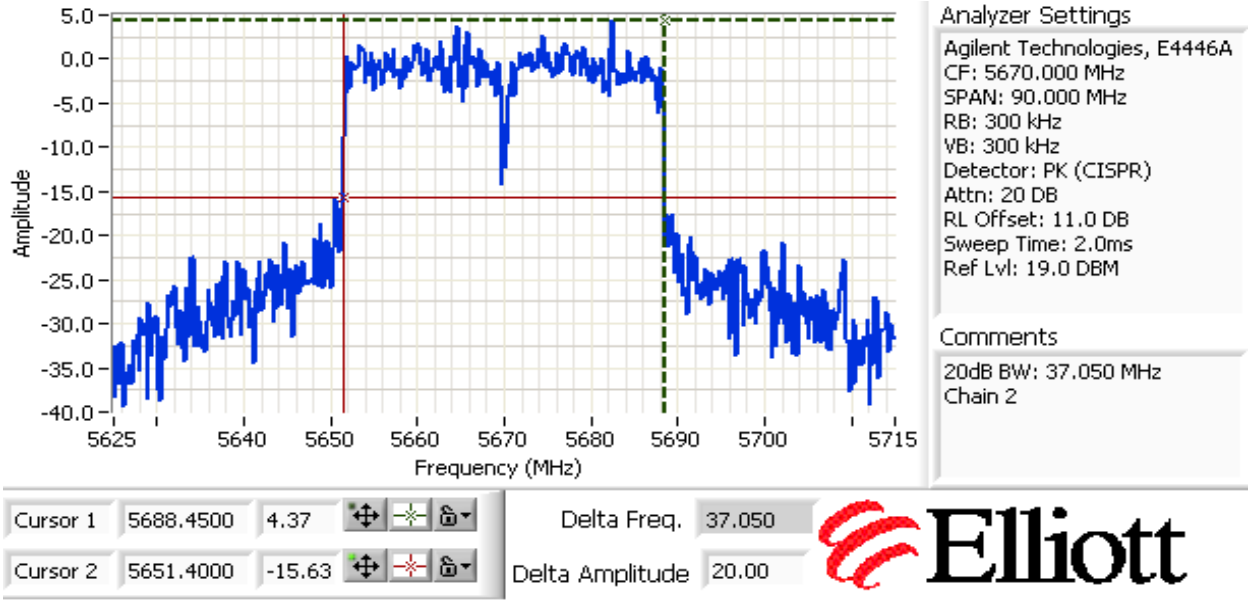


Client:	Xirrus	Job Number:	J77228
Model:	XN4	T-Log Number:	T77249
		Account Manager:	Susan Pelzl
Contact:	Steve Smith		
Standard:	FCC 15 E, RSS 210	Class:	N/A

20dB bandwidth - 5670MHz, HT40, Chain A



20dB bandwidth - 5670MHz, HT40, Chain C



Client:	Xirrus	Job Number:	J77228
Model:	XN4	T-Log Number:	T77249
		Account Manager:	Susan Pelzl
Contact:	Steve Smith		
Standard:	FCC 15 E, RSS 210	Class:	N/A

RSS 210 and FCC 15.407 (UNII - 5250 - 5350 MHz and 5470-5725MHz) Radiated Spurious Emissions, 1 - 40 GHz, Internal Antenna

Test Specific Details

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

General Test Configuration

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

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

Ambient Conditions:

Temperature: 12 °C
Rel. Humidity: 84 %

Summary of Results

Run #	Mode	Channel	Power Setting	Test Performed	Limit	Result / Margin
1	802.11a, n20,n40	5580 MHz 5550 MHz	20 on each chain	Radiated Emissions, 1 - 40 GHz	FCC 15.209 / 15 E	53.9dBµV/m @ 7400.1MHz (-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.

Client:	Xirrus	Job Number:	J77228
Model:	XN4	T-Log Number:	T77249
		Account Manager:	Susan Pelzl
Contact:	Steve Smith		
Standard:	FCC 15 E, RSS 210	Class:	N/A

Frequency Range	Test Distance	Limit Distance	Extrapolation Factor
1000 - 18000 MHz	3	3	0.0

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

Radio	Channel (MHz)	Mode	Power Setting		Comments
			Chain A	Chain C	
1	5580	a	20	20	
2	5580	n20	20	20	
3	5550	n40	20	20	
4	-	-	-	-	

Run 2c:Spurious Radiated Emissions:(Console Port disconnected)

Radio	Channel (MHz)	Mode	Power Setting		Comments
			Chain A	Chain C	
1	5580	a	20	20	
2	5580	n20	20	20	
3	5550	n40	20	20	
4	-	-	-	-	

Frequency MHz	Level dBµV/m	Pol v/h	15.209 / 15E Limit	Margin	Detector Pk/QP/Avg	Azimuth degrees	Height meters	Comments	Mode
7400.070	53.9	V	54.0	-0.1	AVG	65	1.4		all
7440.040	45.4	H	54.0	-8.6	AVG	197	1.4		all
7440.060	48.5	V	54.0	-5.5	AVG	33	1.7		all
7400.020	57.2	V	74.0	-16.8	PK	65	1.4		all
7439.920	52.9	H	74.0	-21.1	PK	197	1.4		all
7440.090	54.1	V	74.0	-19.9	PK	33	1.7		all
Note -the second harmonics were measured with power set to setting 22									
11168.030	52.5	V	54.0	-1.5	AVG	17	1.2	RB 1 MHz; VB: 10 Hz	all
11162.270	46.7	H	54.0	-7.3	AVG	129	1.0	RB 1 MHz; VB: 10 Hz	all
11100.780	46.1	V	54.0	-7.9	AVG	97	1.0	RB 1 MHz; VB: 10 Hz	all
11168.970	64.0	V	74.0	-10.0	PK	17	1.2	RB 1 MHz; VB: 1 MHz	all
11101.190	44.0	H	54.0	-10.0	AVG	139	1.8	RB 1 MHz; VB: 10 Hz	all
11166.030	58.3	H	74.0	-15.7	PK	129	1.0	RB 1 MHz; VB: 1 MHz	all
11100.390	58.1	V	74.0	-15.9	PK	97	1.0	RB 1 MHz; VB: 1 MHz	all
11101.390	55.1	H	74.0	-18.9	PK	139	1.8	RB 1 MHz; VB: 1 MHz	all

Note 1:	For emissions in restricted bands, the limit of 15.209 was used. For all other emissions the average limit was set to -27dBm/MHz (~68.3 dBuV/m) and peak limit set to 20dB higher than the average limit (88.3 dBuV/m).

Client:	Xirrus	Job Number:	J77228
Model:	XN4	T-Log Number:	T77249
		Account Manager:	Susan Pelzl
Contact:	Steve Smith		
Standard:	FCC 15 E, RSS 210	Class:	N/A

RSS 210 and FCC 15.407 (UNII - 5250 - 5350 MHz and 5470-5725MHz) Radiated Spurious Emissions, 1 - 40 GHz, External Antenna

Test Specific Details

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

General Test Configuration

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

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

Ambient Conditions:

Temperature: 12 °C
Rel. Humidity: 84 %

Summary of Results

Run #	Mode	Channel	Power Setting	Measured Power	Test Performed	Limit	Result / Margin
2	802.11a	5580 MHz	22		Radiated Emissions, 1 - 40 GHz	FCC 15.209 / 15 E	46.7dBµV/m @ 7440.1MHz (-7.3dB)

Modifications Made During Testing

No modifications were made to the EUT during testing

Deviations From The Standard

No deviations were made from the requirements of the standard.

Client:	Xirrus	Job Number:	J77228
Model:	XN4	T-Log Number:	T77249
		Account Manager:	Susan Pelzl
Contact:	Steve Smith		
Standard:	FCC 15 E, RSS 210	Class:	N/A

Run #1, Radiated Spurious Emissions, 1,000 - 40,000 MHz. Operation in the 5250-5350 MHz and 5470 - 5725 MHz Bands

Date of Test:	11/10/2009	Config. Used:	1
Test Engineer:	Suhaila Khushzad	Config Change:	None
Test Location:	SVOATS #2	EUT Voltage:	POE

Radio	Channel (MHz)	Mode	Power Setting Chain B	Comments
4	5580	a	21	

Spurious Radiated Emissions:

Frequency	Level	Pol	15.209 / 15E		Detector	Azimuth	Height	Comments	Mode
MHz	dBµV/m	v/h	Limit	Margin	Pk/QP/Avg	degrees	meters		
7440.090	46.7	V	54.0	-7.3	AVG	184	1.2	Power setting 21	a
11160.200	42.9	H	54.0	-11.1	AVG	186	1.1	RB 1 MHz; VB: 10 Hz	a
11160.500	43.5	V	54.0	-10.5	AVG	296	1.0	RB 1 MHz; VB: 10 Hz	a
7439.960	58.2	H	74.0	-15.8	PK	145	1.3	RB 1 MHz; VB: 1 MHz	a
7440.220	52.5	V	74.0	-21.5	PK	184	1.2	Power setting 21	a
7440.250	60.4	V	74.0	-13.6	PK	317	1.3	RB 1 MHz; VB: 1 MHz	a
11150.100	54.0	V	74.0	-20.0	PK	296	1.0	RB 1 MHz; VB: 1 MHz	a
11160.480	53.8	H	74.0	-20.2	PK	186	1.1	RB 1 MHz; VB: 1 MHz	a

Client:	Xirrus	Job Number:	J71484
Model:	XN4	T-Log Number:	T73385 (EMC)
		Account Manager:	Susan Pelzl
Contact:	Steve Smith		Mark Briggs
Emissions Standard(s):	EN 301 489-17, FCC 15B	Class:	FCC Class B
Immunity Standard(s):	EN 301 489-17	Environment:	-

EMC Test Data

For The

Xirrus

Model

XN4

Date of Last Test: 1/21/2009

Client:	Xirrus	Job Number:	J71484
Model:	XN4	T-Log Number:	T73385 (EMC)
		Account Manager:	Susan Pelzl
Contact:	Steve Smith		
Standard:	EN 301 489-17, FCC 15B	Class:	FCC Class B

Conducted Emissions - Power Ports

Test Specific Details

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

Date of Test: 1/7/2009 12:48
Test Engineer: Joseph Cadigal
Test Location: SVOATS #1

Config. Used: 1
Config Change: None
EUT Voltage: 230V/50Hz, 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. Remote support equipment was located approximately 30 meters from the test area. All I/O connections were routed overhead.

Ambient Conditions:

Temperature: 13 °C
Rel. Humidity: 66 %

Summary of Results

Run #	Test Performed	Limit	Result	Margin
1	CE, AC Power, 120V/60Hz	FCC 15.209 FCC Class B	Pass	41.3dBµV @ 2.972MHz (-4.7dB)
2	CE, AC Power,120V/60Hz	EN 55022 Class A	Pass	48.3dBµV @ 3.397MHz (-11.7dB)

Modifications Made During Testing

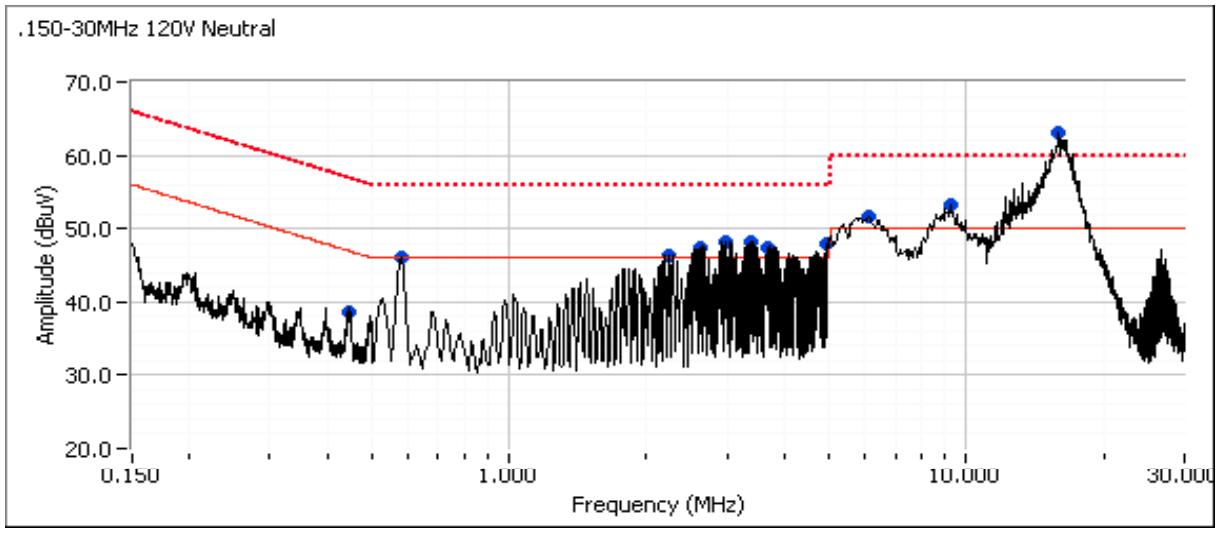
No modifications were made to the EUT during testing

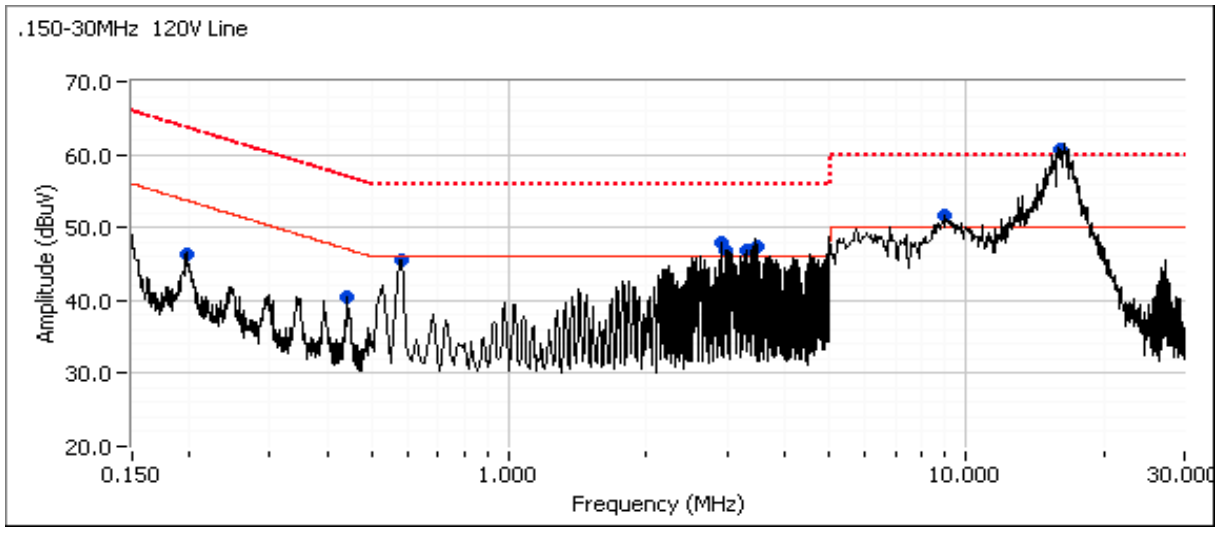
Deviations From The Standard

No deviations were made from the requirements of the standard.

Client:	Xirrus	Job Number:	J71484
Model:	XN4	T-Log Number:	T73385 (EMC)
		Account Manager:	Susan Pelzl
Contact:	Steve Smith		
Standard:	EN 301 489-17, FCC 15B	Class:	FCC Class B

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





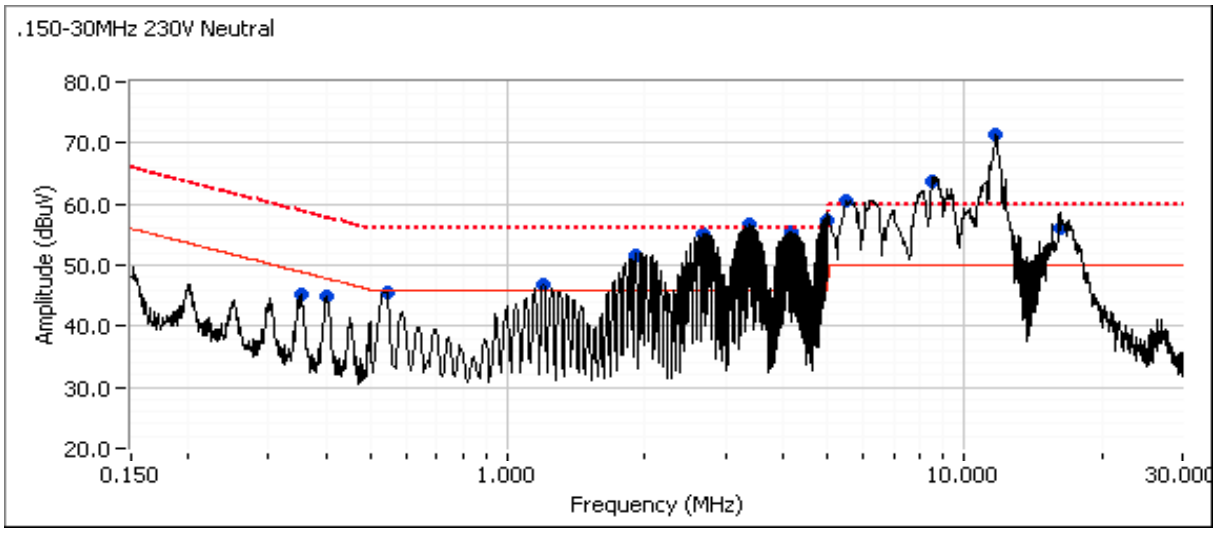
Run #1: AC Power Port Conducted Emissions, 0.15 - 30MHz, 120V/60Hz Continued next page...

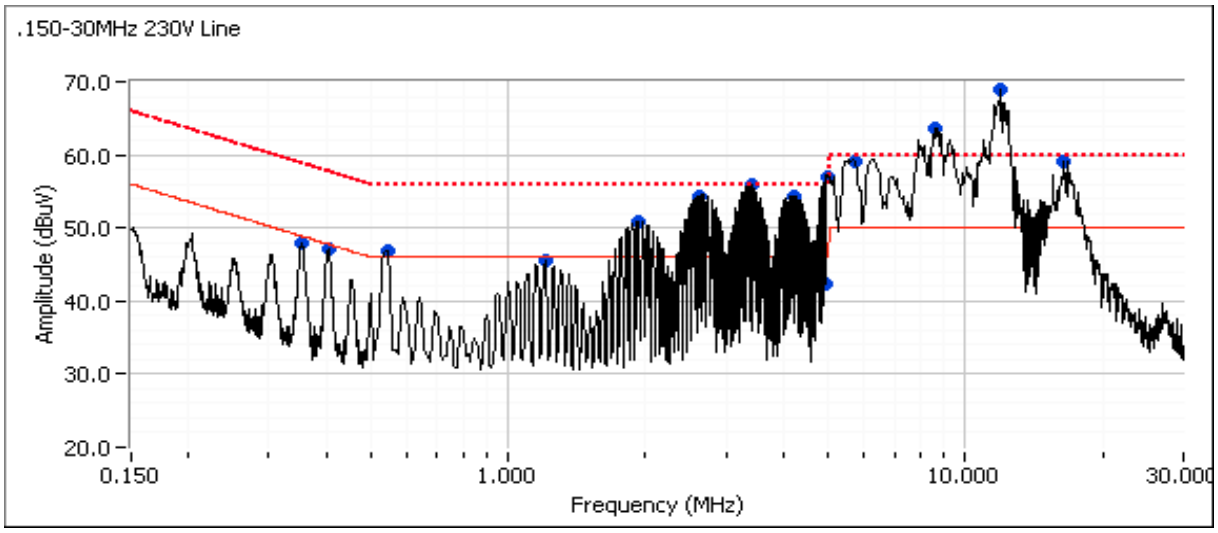
Client:	Xirrus	Job Number:	J71484
Model:	XN4	T-Log Number:	T73385 (EMC)
		Account Manager:	Susan Pelzl
Contact:	Steve Smith		
Standard:	EN 301 489-17, FCC 15B	Class:	FCC Class B

Frequency	Level	AC	Class B		Detector	Comments
MHz	dBµV	Line	Limit	Margin	QP/Ave	
2.972	41.3	Line 1	46.0	-4.7	AVG	AVG (0.100s)
0.594	41.0	Line 1	46.0	-5.0	AVG	AVG (0.100s)
2.634	40.7	Neutral	46.0	-5.3	AVG	AVG (0.100s)
2.981	40.5	Neutral	46.0	-5.5	AVG	AVG (0.100s)
2.921	40.1	Line 1	46.0	-5.9	AVG	AVG (0.100s)
3.318	40.0	Line 1	46.0	-6.0	AVG	AVG (0.100s)
3.378	39.5	Neutral	46.0	-6.5	AVG	AVG (0.100s)
3.466	39.4	Line 1	46.0	-6.6	AVG	AVG (0.100s)
2.236	39.1	Neutral	46.0	-6.9	AVG	AVG (0.100s)
0.594	38.7	Neutral	46.0	-7.3	AVG	AVG (0.100s)
3.677	34.8	Neutral	46.0	-11.2	AVG	AVG (0.100s)
2.634	42.7	Neutral	56.0	-13.3	QP	QP (1.000s)
15.905	46.6	Neutral	60.0	-13.4	QP	QP (1.000s)
3.466	42.5	Line 1	56.0	-13.5	QP	QP (1.000s)
2.972	42.5	Line 1	56.0	-13.5	QP	QP (1.000s)
0.594	42.3	Line 1	56.0	-13.7	QP	QP (1.000s)
2.921	42.0	Line 1	56.0	-14.0	QP	QP (1.000s)
3.318	41.9	Line 1	56.0	-14.1	QP	QP (1.000s)
2.981	41.9	Neutral	56.0	-14.1	QP	QP (1.000s)
16.098	45.7	Line 1	60.0	-14.3	QP	QP (1.000s)
2.236	41.2	Neutral	56.0	-14.8	QP	QP (1.000s)
3.378	40.9	Neutral	56.0	-15.1	QP	QP (1.000s)
15.905	34.8	Neutral	50.0	-15.2	AVG	AVG (0.100s)
4.970	30.2	Neutral	46.0	-15.8	AVG	AVG (0.100s)
16.098	34.1	Line 1	50.0	-15.9	AVG	AVG (0.100s)
0.444	30.9	Line 1	47.0	-16.1	AVG	AVG (0.100s)
0.594	39.9	Neutral	56.0	-16.1	QP	QP (1.000s)
0.447	30.4	Neutral	46.9	-16.5	AVG	AVG (0.100s)
0.198	36.7	Line 1	53.7	-17.0	AVG	AVG (0.100s)
3.677	37.5	Neutral	56.0	-18.5	QP	QP (1.000s)
9.146	30.6	Neutral	50.0	-19.4	AVG	AVG (0.100s)
8.966	29.0	Line 1	50.0	-21.0	AVG	AVG (0.100s)
4.970	33.9	Neutral	56.0	-22.1	QP	QP (1.000s)
9.146	37.1	Neutral	60.0	-22.9	QP	QP (1.000s)
0.444	33.2	Line 1	57.0	-23.8	QP	QP (1.000s)
6.114	26.0	Neutral	50.0	-24.0	AVG	AVG (0.100s)
0.198	39.4	Line 1	63.7	-24.3	QP	QP (1.000s)
8.966	35.5	Line 1	60.0	-24.5	QP	QP (1.000s)
0.447	32.1	Neutral	56.9	-24.8	QP	QP (1.000s)
6.114	32.6	Neutral	60.0	-27.4	QP	QP (1.000s)

Client:	Xirrus	Job Number:	J71484
Model:	XN4	T-Log Number:	T73385 (EMC)
		Account Manager:	Susan Pelzl
Contact:	Steve Smith		
Standard:	EN 301 489-17, FCC 15B	Class:	FCC Class B

Run #2: AC Power Port Conducted Emissions, 0.15 - 30MHz, 230V/50Hz





Run #2: AC Power Port Conducted Emissions, 0.15 - 30MHz, 230V/50Hz Continued next page...

Client:	Xirrus	Job Number:	J71484
Model:	XN4	T-Log Number:	T73385 (EMC)
		Account Manager:	Susan Pelzl
Contact:	Steve Smith		
Standard:	EN 301 489-17, FCC 15B	Class:	FCC Class B

Frequency	Level	AC	EN55022 A		Detector	Comments
MHz	dBµV	Line	Limit	Margin	QP/Ave	
0.555	42.1	Neutral	60.0	-17.9	AVG	AVG (0.100s)
0.556	40.5	Line 1	60.0	-19.5	AVG	AVG (0.100s)
1.916	44.4	Neutral	60.0	-15.6	AVG	AVG (0.100s)
1.927	45.0	Line 1	60.0	-15.0	AVG	AVG (0.100s)
2.637	47.3	Line 1	60.0	-12.7	AVG	AVG (0.100s)
2.671	46.6	Neutral	60.0	-13.4	AVG	AVG (0.100s)
3.377	44.0	Neutral	60.0	-16.0	AVG	AVG (0.100s)
3.397	48.3	Line 1	60.0	-11.7	AVG	AVG (0.100s)
4.209	43.9	Line 1	60.0	-16.1	AVG	AVG (0.100s)
4.981	42.7	Line 1	60.0	-17.3	AVG	AVG (0.100s)

EXHIBIT 3: Photographs of Test Configurations