Elliott Laboratories Inc.
www.elliottlabs.com
684 West Maude Avenue
Sunnyvale, CA 94085-3518
408-245-7800 Phone
408-245-3499 Fax

Electromagnetic Emissions Test Report and Application for Grant of Equipment Authorization pursuant to

Industry Canada RSS-Gen Issue 2 / RSS 210 Issue 7 FCC Part 15 Subpart C

on the Ruckus Wireless Transmitter Model: MP2N33A

UPN:	5912A-MP2N33A
FCC ID:	S9GMP2N33A
GRANTEE:	Ruckus Wireless 880 West Maude Ave. Suite 101 Sunnyvale, CA 94085
TEST SITE:	Elliott Laboratories, Inc. 684 W. Maude Ave Sunnyvale, CA 94086
REPORT DATE:	December 13, 2007
FINAL TEST DATE:	October 12, October 18, October 19, October 26, November 1 and December 6, 2007
AUTHORIZED SIGNATORY:	David W. Bare Chief Technical Officer

2016-01

REVISION HISTORY

Revision #	Date	Comments	Modified By
1	December 21, 2007	Initial Release	David Guidotti

TABLE OF CONTENTS

TABLE OF CONTENTS (Continued)

SCOPE

An electromagnetic emissions test has been performed on the Ruckus Wireless model MP2N33A pursuant to the following rules:

Industry Canada RSS-Gen Issue 2
RSS 210 Issue 7 "Low-power Licence-exempt Radiocommunication Devices (All Frequency Bands): Category I Equipment"
FCC Part 15 Subpart C

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

ANSI C63.4:2003

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 Ruckus Wireless model MP2N33A and therefore apply only to the tested sample. The sample was selected and prepared by Craig Owens of Ruckus Wireless.

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 Ruckus Wireless model MP2N33A complied with the requirements of the following regulations:

Industry Canada RSS-Gen Issue 2
RSS 210 Issue 7 "Low-power Licence-exempt Radiocommunication Devices (All Frequency Bands): Category I Equipment"
FCC Part 15 Subpart C

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

TEST RESULTS SUMMARY

DIGITAL TRANSMISSION SYSTEMS (2400 – 2483.5MHz)

FCC Rule Part	RSS Rule Part	Description	Measured Value / Comments	Limit / Requirement	Result
15.247(a)	RSS 210 A8.2	Digital Modulation	Systems uses OFDM / DSSS techniques	-	Complies
15.247 (a) (2)	RSS 210 A8.2 (1)	6dB Bandwidth	Minimum 12.2 MHz	>500kHz	Complies
	RSP100	99% Bandwidth	Maximum 38.9MHz	Information only	Complies
15.247 (b) (3)	RSS 210 A8.2 (4)	Output Power (multipoint systems)	23.9 dBm (0.0138 Watts) EIRP = 3.9 W Note 1	1Watt, EIRP limited to 4 Watts.	Complies
15.247(d)	RSS 210 A8.2 (2)	Power Spectral Density	3.9 dBm / 3kHz	8dBm/3kHz	Complies
15.247(c)	RSS 210 A8.5	Antenna Port Spurious Emissions 30MHz – 25 GHz	-33.5dBc	< -30dBc Note 2	Complies
15.247(c) / 15.209	RSS 210 A8.5	Radiated Spurious Emissions 30MHz – 25 GHz	53.7dBuV/m @ 2388.72MHz (-0.3dB)	15.207 in restricted bands, all others <-30dBc Note 2	Complies

Note 1: EIRP calculated using a calculated antenna gain of 12 dBi (15.8), 9dBi antennas for each chain times 2, for the highest EIRP multi-point system.

Note 2: Limit of -30dBc used as the power was measured using the UNII test procedure (maximum power averaged over a transmission burst) / RMS averaging over a time interval, as permitted under RSS 210 section A8.4(4).

GENERAL REQUIREMENTS APPLICABLE TO ALL BANDS

FCC Rule Part	RSS Rule part	Description	Measured Value / Comments	Limit / Requirement	Result (margin)
15.203	-	RF Connector	U.FL board connector	Non standard connector type	Complies
15.109	RSS GEN 7.2.3 Table 1	Receiver spurious emissions	42.7dBµV/m @ 400.012MHz (-3.3dB)	Refer to Standard	Complies
15.207	RSS GEN Table 2	AC Conducted Emissions	40.4dBµV @ 0.983MHz (-5.6dB)	Refer to standard	Complies
15.247 (b) (5) 15.407 (f)	RSS 102	RF Exposure Requirements	Refer to MPE calculations in Exhibit 11, RSS 102 declaration and User Manual statements.	Refer to OET 65, FCC Part 1 and RSS 102	Complies
	RSP 100 RSS GEN 7.1.5	User Manual		Statement required regarding non-interference	
	RSP 100 RSS GEN 7.1.5	User Manual		Statement required regarding detachable antenna	

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 Ruckus Wireless model MP2N33A are 802.11n module that are designed to for installation in access points to provide Internet access to 802.11 clients. Normally, the EUT would be placed on a tabletop during operation. The EUT was, therefore, placed in this position during emissions testing to simulate the end user environment. The electrical rating of the EUT is 120/240 V, 50/60 Hz, 0.3 Amps.

The sample was received on October 12, 2007 and tested on October 12, October 18, October 19, October 26, November 1 and December 6, 2007. The EUT consisted of the following component(s):

Manufacturer	Model	Description	Serial Number	FCC ID
Ruckus	MP2N33A	Access Point module	None	S9GMP2N33A

OTHER EUT DETAILS

The EUT is capable of 2x2 MIMO operation as well as legacy modes.

ANTENNA SYSTEM

The EUT has three antenna options.
Custom antenna (9dbi), Omni antenna (9dBi) and patch antenna (9dBi) connected via the U.FL on-board connectors.

ENCLOSURE

The EUT enclosure is primarily constructed of plastic. It measures approximately 19 cm wide by 15 cm deep by 10 cm high.

MODIFICATIONS

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

SUPPORT EQUIPMENT

No local support equipment was used during emissions testing.

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

Manufacturer	Model	Description	Serial Number	FCC ID
IBM	Thinkpad X20	Laptop	FX-29479	-
HP	Pavilion DV4000	Laptop	CNES18010D	-

The EUT was installed on a Ruckus MP2N33A access point main board for 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)
10/100/POE	Laptop	CAT-5	Unshielded	15.0
10/100	unterminated	RJ-45	Unshielded	2.0
DC Power	AC to DC Adapter	2 wire	Unshielded	2.0

EUT OPERATION

During emissions testing the EUT was set to transmit or receive at the selected frequency and power as appropriate.

TEST SITE

GENERAL INFORMATION

Final test measurements were taken on October 12, October 18, October 19, October 26, November 1 and December 6, 2007 at the Elliott Laboratories Open Area Test Site #1 or #2 located at 684 West Maude Avenue, Sunnyvale, California. Pursuant to section 2.948 of the FCC's Rules and section 3.3 of RSP-100, construction, calibration, and equipment data has been filed with the Commission.

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

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.

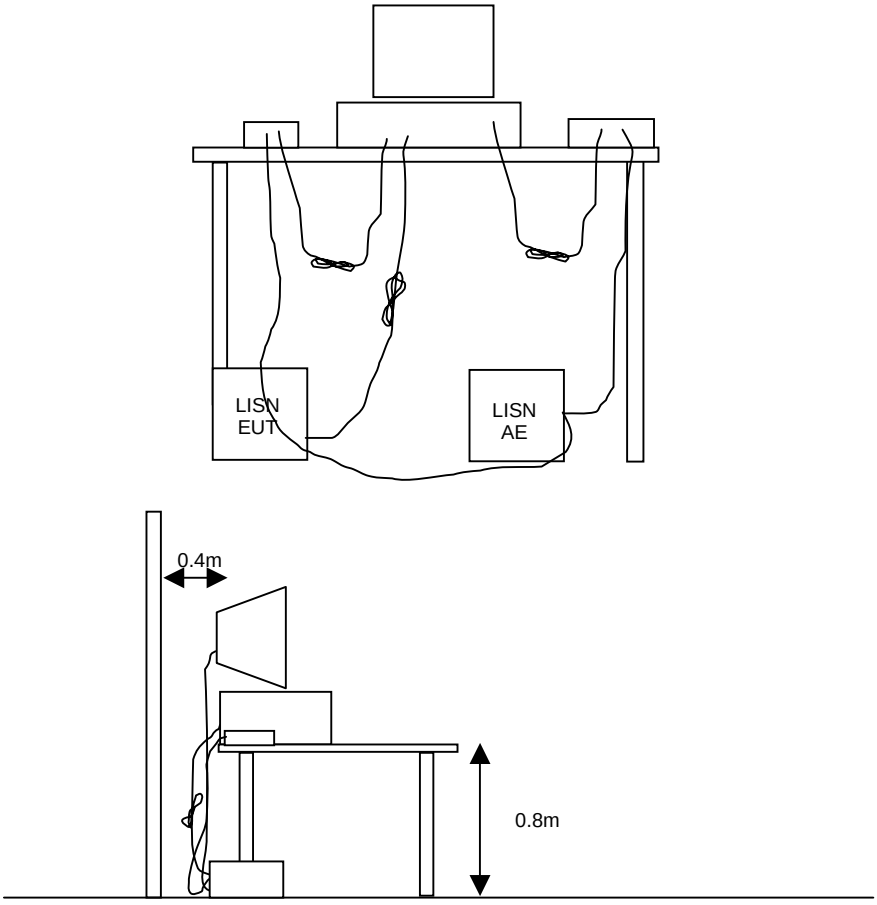
TEST PROCEDURES

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.

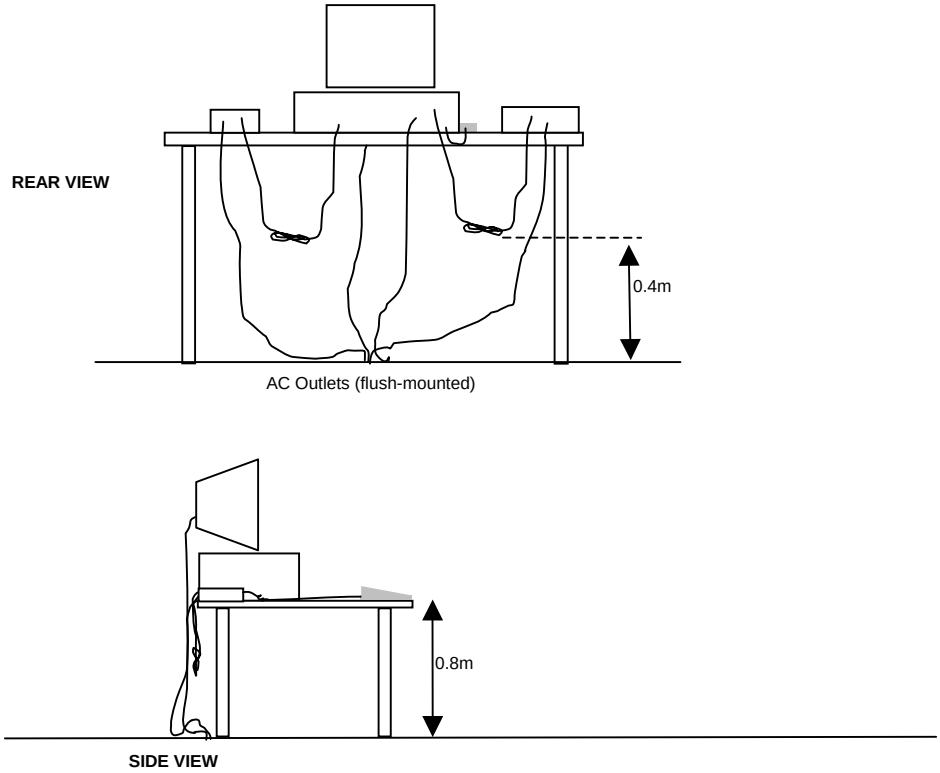


A preliminary scan of the radiated emissions is performed in which all significant EUT frequencies are identified with the system in a nominal configuration. At least two scans are performed, one scan for each antenna polarization (horizontal and vertical; loop parallel and perpendicular to the EUT). 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.

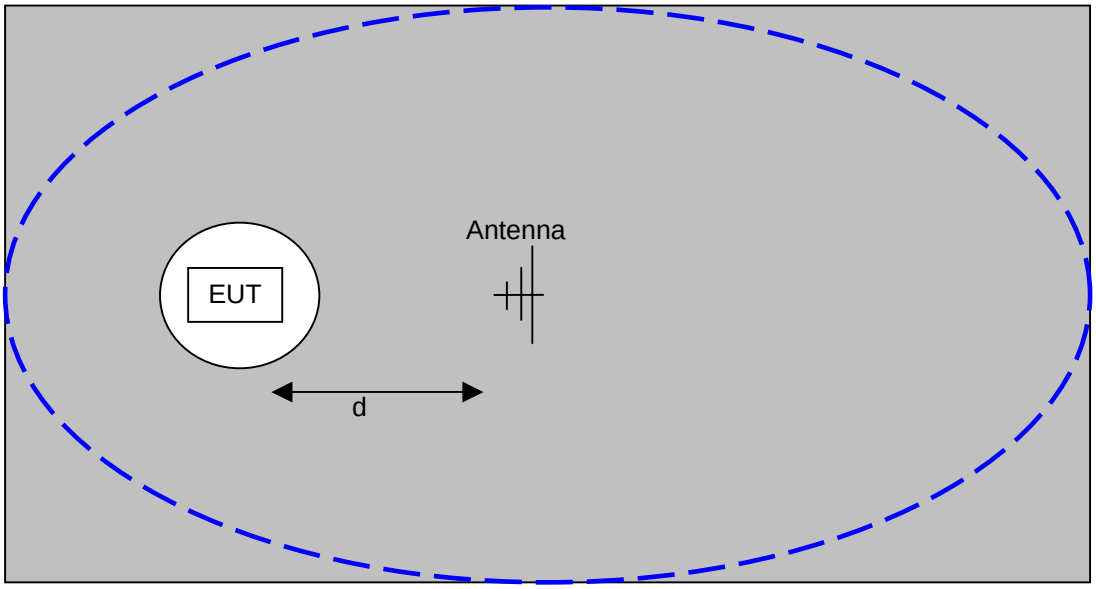
A speaker is provided in the receiver to aid in discriminating between EUT and ambient emissions. Other methods used during the preliminary scan for EUT emissions involve scanning with near field magnetic loops, monitoring I/O cables with RF current clamps, and cycling power to the EUT.

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.

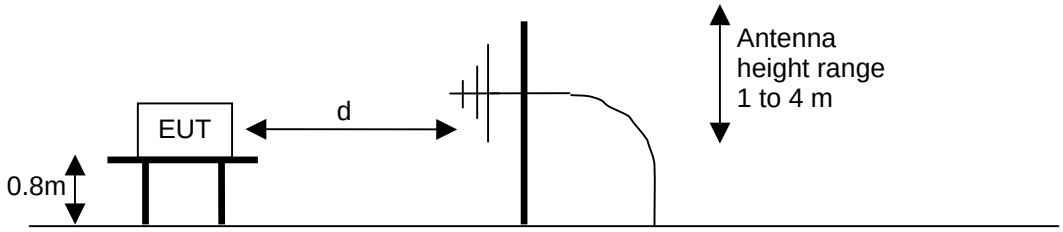
When testing above 18 GHz, the receive antenna is located at 1meter from the EUT and the antenna height is restricted to a maximum of 2.5 meters.



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

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

RECEIVER RADIATED SPURIOUS EMISSIONS SPECIFICATION LIMITS

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

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

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

OUTPUT POWER LIMITS – DIGITAL TRANSMISSION SYSTEMS

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

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

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

TRANSMIT MODE SPURIOUS RADIATED EMISSIONS LIMITS – FHSS and DTS SYSTEMS

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

SAMPLE CALCULATIONS - CONDUCTED EMISSIONS

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

$$R_r - S = M$$

where:

R_r = Receiver Reading in dBuV

S = Specification Limit in dBuV

M = Margin to Specification in +/- dB

SAMPLE CALCULATIONS - RADIATED EMISSIONS

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

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

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

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

SAMPLE CALCULATIONS - FIELD STRENGTH TO EIRP CONVERSION

Where the radiated electric field strength is expressed in terms of the equivalent isotropic radiated power (eirp), or where a field strength measurement of output power is made in lieu of a direct measurement, the following formula is used to convert between eirp and field strength at a distance of 3m from the equipment under test:

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

where P is the eirp (Watts)

EXHIBIT 1: Test Equipment Calibration Data

1 Page

Radiated Emissions, 30 - 18000 MHz, 15-Aug-07
Engineer: Rafael Varelas

Manufacturer	Description	Model #	Asset #	Cal Due
EMCO	Antenna, Horn, 1-18 GHz (SA40-Red)	3115	1142	07-Jun-08
Hewlett Packard	SpecAn 9 kHz - 40 GHz, FMT (SA40) Blue	8564E (84125C)	1393	17-Jan-08
Hewlett Packard	High Pass filter, 3.5 GHz (Purple System)	P/N 84300-80038 (84125C)	1768	08-Nov-07
Hewlett Packard	Microwave Preamplifier, 1-26.5GHz	8449B	1780	15-Nov-07

Radiated Emissions, 30 - 12,750 MHz, 27-Oct-07
Engineer: Rafael Varelas

Manufacturer	Description	Model #	Asset #	Cal Due
EMCO	Log Periodic Antenna, 0.3-1 GHz	3146A	364	01-Dec-07
Elliott Laboratories	Biconical Antenna, 30-300 MHz	DM-105-T1	382	01-Dec-07
Hewlett Packard	Microwave Preamplifier, 1-26.5GHz	8449B	870	15-Nov-07
Hewlett Packard	SpecAn 30 Hz -40 GHz, SV (SA40) Red	8564E (84125C)	1148	08-Oct-08
EMCO	Antenna, Horn, 1-18 GHz	3117	1662	21-Mar-08
Hewlett Packard	Preamplifier	8447D OPT 010	1826	25-May-08

Conducted Emissions - AC Power Ports, 06-Dec-07
Engineer: Wayne Fisher

Manufacturer	Description	Model #	Asset #	Cal Due
Elliott Laboratories	LISN, FCC / CISPR	LISN-3, OATS	304	18-Jul-08
Hewlett Packard	EMC Spectrum Analyzer, 9 KHz-26.5 GHz	8593EM	1141	30-Dec-07
Rohde & Schwarz	Test Receiver, 0.009-2750 MHz	ESN	1332	21-Dec-07
Rohde& Schwarz	Pulse Limiter	ESH3 Z2	1398	05-Feb-08

EXHIBIT 2: Test Measurement Data

128 Pages

Client:	Ruckus Wireless	Job Number:	J68610
Model:	Retriever module	T-Log Number:	T68973
		Account Manager:	Dean Eriksen
Contact:	Craig Owens		
Emissions Standard(s):	FCC Part 15.247/RSS-210	Class:	B
Immunity Standard(s):	EN 301 489-17 v1.2.1	Environment:	-

EMC Test Data

For The

Ruckus Wireless

Model

Retriever module

Date of Last Test: 11/19/2007

Client:	Ruckus Wireless	Job Number:	J68610
Model:	Retriever module	T-Log Number:	T68973
		Account Manger:	Dean Eriksen
Contact:	Craig Owens		
Emissions Standard(s):	FCC Part 15.247/RSS-210	Class:	B
Immunity Standard(s):	EN 301 489-17 v1.2.1	Environment:	-

EUT INFORMATION

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

General Description

The EUT is a 802.11b/g/n Access Point which is designed to provide internet access to 802.11 clients. Normally, the EUT would be placed on a tabletop during operation. The EUT was, therefore, placed in this position during emissions testing to simulate the end user environment. The electrical rating of the EUT is 120/240 V, 50/60 Hz, 0.3 Amps.

Equipment Under Test

Manufacturer	Model	Description	Serial Number	FCC ID
Ruckus	7942	Access Point	None	S9GMP2N33A

Other EUT Details

The following EUT details should be noted: The EUT is capable of 2x2 MIMO operation as well as legacy modes. Testing performed on the 7942 was considered representative of the 7231, 7232, 7241, 7242, 7251, 7252, 7932 and 7952 as the only differences are in memory footprint and software.

EUT Antenna (Intentional Radiators Only)

The EUT has three antenna options.
Custom antenna (9dbi), Omni antenna (9dBi), patch antenna (9dBi)
The antenna connects to the EUT via a non-standard U.FL antenna connector, thereby meeting the requirements of FCC 15.203.

EUT Enclosure

The EUT enclosure is primarily constructed of Plastic. It measures approximately 19 cm wide by 15 cm deep by 10 cm high.

Client:	Ruckus Wireless	Job Number:	J68610
Model:	Retriever module	T-Log Number:	T68973
		Account Manger:	Dean Eriksen
Contact:	Craig Owens		
Emissions Standard(s):	FCC Part 15.247/RSS-210	Class:	B
Immunity Standard(s):	EN 301 489-17 v1.2.1	Environment:	-

Test Configuration # 1

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

Local Support Equipment

Manufacturer	Model	Description	Serial Number	FCC ID
None	-	-	-	-

Remote Support Equipment

Manufacturer	Model	Description	Serial Number	FCC ID
IBM	Thinkpad X20	Laptop	FX-29479	-
HP	Pavilion DV4000	Laptop	CNES18010D	-

Cabling and Ports

Port	Connected To	Cable(s)		
		Description	Shielded or Unshielded	Length(m)
10/100/POE	Laptop	RJ-45	Unshielded	15.0
10/100	unterminated	RJ-45	Unshielded	2.0
DC Power	AC to DC Adapter	2 wire	Unshielded	2.0

Client:	Ruckus Wireless	Job Number:	J68610
Model:	Retriever module	T-Log Number:	T68973
		Account Manger:	Dean Eriksen
Contact:	Craig Owens		
Emissions Standard(s):	FCC Part 15.247/RSS-210	Class:	B
Immunity Standard(s):	EN 301 489-17 v1.2.1	Environment:	-

EUT Operation During Emissions Tests

During emissions testing the EUT was set to transmit or receive at the selected frequency and power as appropriate.

EUT Operation During Immunity Tests

During immunity test the EUT will be monitored in transmit and receive modes .
In transmit mode normal operations is indicated by the continuous ping between the two units and shall be monitored by the laptops connected to each unit.
In Stand-by mode normal operations is when there is no transmission and shall be monitored by the spectrum analyzer between 2.4GHz and 2.5GHz.

Performance Criteria for Immunity Tests

Criterion A:
During and after testing the EUT shall continue to _____TBD_____ .

Criterion B:
During application of the transient test, degradation of performance including _____TBD_____ is allowed provided that the EUT self-recovers to normal operation after testing without any operator intervention.

Criterion C:
Loss of function is allowed provided that normal operation can be restored by ____TBD_____ .

Client:	Ruckus Wireless	Job Number:	J68610
Model:	Retriever module	T-Log Number:	T68973
		Account Manager:	Dean Eriksen
Contact:	Craig Owens		
Standard:	FCC Part 15.247/RSS-210	Class:	N/A

RSS 210 and FCC 15.247 (DTS) Antenna Port Measurements - Output Power

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

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

Summary of Results

Run #	Test Performed	Limit	Pass / Fail	Result / Margin
1	Output Power - b mode	15.247(b)	Pass	23.4dBm (-3.6dB)
2	Output Power - g mode	15.247(b)	N/A	Covered by 20 MHz n mode
3	Output Power - n mode (20 MHz)	15.247(b)	Pass	23.9dBm (-0.1dBm)
4	Output Power - n mode (40 MHz)	15.247(b)	Pass	23.3dBm (-0.7dB)

Modifications Made During Testing

No modifications were made to the EUT during testing

Deviations From The Standard

No deviations were made from the requirements of the standard.

Client:	Ruckus Wireless	Job Number:	J68610
Model:	Retriever module	T-Log Number:	T68973
		Account Manager:	Dean Eriksen
Contact:	Craig Owens		
Standard:	FCC Part 15.247/RSS-210	Class:	N/A

Run #1: Output Power - b mode

Date of Test: 10/26/2007
Test Engineer: Rafael Varelas
Test Location: SVOATS #2

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

Ambient Conditions:

Temperature: 12 °C
Rel. Humidity: 80 %

Power Setting[2]	Frequency (MHz)	Mode/Chain		Output Power		Antenna Gain (dBi)	Result		
		mode	chain	(dBm) [1]	mW				
23	2412	b	1	22.9	195.0	9.0	Pass		
23	2437	b	1	23.3	213.8	9.0	Pass		
23	2462	b	1	23.4	218.8	9.0	Pass		
23	2412	b	2	21.6	144.5	9.0	Pass		
23	2437	b	2	22.1	162.2	9.0	Pass		
23	2462	b	2	21.9	154.9	9.0	Pass		
23	2412	b	3	22.4	173.8	9.0	Pass		
23	2437	b	3	21.9	154.9	9.0	Pass		
23	2462	b	3	22.4	173.8	9.0	Pass		

Note 1:	Output power measured using a peak power meter
Note 2:	Power setting - the software power setting used during testing, included for reference.

Client:	Ruckus Wireless	Job Number:	J68610
Model:	Retriever module	T-Log Number:	T68973
		Account Manager:	Dean Eriksen
Contact:	Craig Owens		
Standard:	FCC Part 15.247/RSS-210	Class:	N/A

Run #2: Output Power - n mode (20 MHz) MCS0

Date of Test: 10/26/2007
Test Engineer: Rafael Varelas
Test Location: SVOATS #2

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

Ambient Conditions:

Temperature: 12 °C
Rel. Humidity: 80 %

Power Setting[2]	Frequency (MHz)	Mode/Chain		Output Power		Antenna Gain (dBi)	Result		
		mode	chain	(dBm) [1]	mW				
22	2412	n - 20	1	20.8	120.2	9.0	Pass		
22	2437	n - 20	1	20.9	123.0	9.0	Pass		
22	2462	n - 20	1	20.8	120.2	9.0	Pass		
22	2412	n - 20	2	20.5	112.2	9.0	Pass		
22	2437	n - 20	2	20.2	104.7	9.0	Pass		
22	2462	n - 20	2	19.9	97.7	9.0	Pass		

Final Power - Max worst case power across all TX chains

Power Setting[2]	Frequency (MHz)	Mode/Chain		Output Power		Antenna Gain (dBi)	Result		
		mode	chain	(dBm) [4]	mW				
N/A	2412	n - 20	all	23.8	240.5	12.0	Pass		
N/A	2437	n - 20	all	23.9	246.1	12.0	Pass		
N/A	2462	n - 20	all	23.8	240.5	12.0	Pass		

Note 1:	Output power measured using the UNII method
Note 2:	Power setting - the software power setting used during testing, included for reference.
Note 3:	Not Used
Note 4:	Total output power calculated from maximum power of a single chain times 2 chains.

Client:	Ruckus Wireless	Job Number:	J68610
Model:	Retriever module	T-Log Number:	T68973
		Account Manager:	Dean Eriksen
Contact:	Craig Owens		
Standard:	FCC Part 15.247/RSS-210	Class:	N/A

Run #3: Output Power - n mode (40 MHz)

Date of Test: 10/26/2007 Config. Used: 1
Test Engineer: Rafael Varelas Config Change: None
Test Location: SVOATS #2 EUT Voltage: 120V/60Hz

Ambient Conditions: Temperature: 12 °C
Rel. Humidity: 80 %

Power Setting[2]	Frequency (MHz)	Mode/Chain		Output Power		Antenna Gain (dBi)	Result		
		mode	chain	(dBm) [1]	mW				
21	2422	n - 40	1	20.0	100.0	9.0	Pass		
21	2437	n - 40	1	20.0	100.0	9.0	Pass		
21	2452	n - 40	1	20.0	100.0	9.0	Pass		
21	2422	n - 40	2	20.3	105.9	9.0	Pass		
21	2437	n - 40	2	20.3	107.2	9.0	Pass		
21	2452	n - 40	2	20.1	102.3	9.0	Pass		

Final Power - Max worst case power across all TX chains

Power Setting[2]	Frequency (MHz)	Mode/Chain		Output Power		Antenna Gain (dBi)	Result		
		mode	chain	(dBm) [4]	mW				
N/A	2422	n - 40	all	23.3	211.9	12.0	Pass		
N/A	2437	n - 40	all	23.3	214.3	12.0	Pass		
N/A	2452	n - 40	all	23.1	204.7	12.0	Pass		

Note 1:	Output power measured using the UNII method
Note 2:	Power setting - the software power setting used during testing, included for reference.
Note 3:	Not Used
Note 4:	Total output power calculated from maximum power of a single chain times 2 chains.

Client:	Ruckus Wireless	Job Number:	J68610
Model:	Retriever module	T-Log Number:	T68973
		Account Manager:	Dean Eriksen
Contact:	Craig Owens		
Standard:	FCC Part 15.247/RSS-210	Class:	N/A

RSS 210 and FCC 15.247 (DTS) Antenna Port Measurements - Bandwidth

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

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

Summary of Results

Run #	Test Performed	Limit	Mode	Pass / Fail	Result / Margin
1a	6dB Bandwidth	15.247(a)	b	Pass	12.17 MHz
1a	99% Bandwidth	RSS GEN	b	-	15.97 MHz
1b	6dB Bandwidth	15.247(a)	g	Pass	Covered by n 20 MHz
1b	99% Bandwidth	RSS GEN	g	-	Covered by n 20 MHz
1c	6dB Bandwidth	15.247(a)	20MHz n	Pass	17.83 MHz
1c	99% Bandwidth	RSS GEN	20MHz n	-	18.97 MHz
1d	6dB Bandwidth	15.247(a)	40MHz n	Pass	38.67 MHz
1d	99% Bandwidth	RSS GEN	40MHz n	-	38.94 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:	Ruckus Wireless	Job Number:	J68610
Model:	Retriever module	T-Log Number:	T68973
		Account Manager:	Dean Eriksen
Contact:	Craig Owens		
Standard:	FCC Part 15.247/RSS-210	Class:	N/A

Run #1a: Signal Bandwidth (802.11b)

Date of Test: 10/19/2007
Test Engineer: Rafael Varelas
Test Location: SVOATS #2

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

Ambient Conditions:

Temperature: 13 °C
Rel. Humidity: 77 %

Power Setting	Frequency (MHz)	Mode	Tx Chain	6 dB Bandwidth (MHz)		99% Bandwidth (MHz)	
				BW	RSBW	99%	RSBW
23	2412	b	1	12.33	1	15.97	1
23	2437	b	1	11.33	1	15.97	1
23	2462	b	1	12.17	1	15.97	1
23	2412	b	2	12.17	1	15.97	1
23	2437	b	2	12.17	1	15.64	1
23	2462	b	2	12.17	1	15.97	1

Note 1: 99% bandwidth measured in accordance with RSS GEN, with RB > 1% of the span and VB > 3xRB

Client:	Ruckus Wireless	Job Number:	J68610
Model:	Retriever module	T-Log Number:	T68973
		Account Manager:	Dean Eriksen
Contact:	Craig Owens		
Standard:	FCC Part 15.247/RSS-210	Class:	N/A

Run #1c: Signal Bandwidth (802.11n 20 MHz)

Date of Test: 10/19/2007
Test Engineer: Rafael Varelas
Test Location: SVOATS #2

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

Ambient Conditions:

Temperature: 13 °C
Rel. Humidity: 77 %

Power Setting	Frequency (MHz)	Mode	Tx Chain	6 dB Bandwidth (MHz)		99% Bandwidth (MHz)	
				BW	RSBW	99%	RSBW
22	2412	20MHz n	1	17.83	1	18.97	1
22	2437	20MHz n	1	17.5	1	18.47	1
22	2462	20MHz n	1	17.67	1	18.47	1
22	2412	20MHz n	2	17.83	1	18.8	1
22	2437	20MHz n	2	17.83	1	18.47	1
22	2462	20MHz n	2	17.67	1	18.47	1

Note 1: 99% bandwidth measured in accordance with RSS GEN, with RB > 1% of the span and VB > 3xRB

Client:	Ruckus Wireless	Job Number:	J68610
Model:	Retriever module	T-Log Number:	T68973
		Account Manager:	Dean Eriksen
Contact:	Craig Owens		
Standard:	FCC Part 15.247/RSS-210	Class:	N/A

Run #1d: Signal Bandwidth (802.11n 40 MHz)

Date of Test: 10/19/2007
Test Engineer: Rafael Varelas
Test Location: SVOATS #2

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

Ambient Conditions:

Temperature: 13 °C
Rel. Humidity: 77 %

Power Setting	Frequency (MHz)	Mode	Tx Chain	6 dB Bandwidth (MHz)		99% Bandwidth (MHz)	
				BW	RSBW	99%	RSBW
21	2422	40MHz n	1	37	1	38.27	1
21	2437	40MHz n	1	38.67	1	38.94	1
21	2452	40MHz n	1	36.67	1	38.6	1
21	2412	40MHz n	2	37	1	38.27	1
21	2437	40MHz n	2	36.67	1	38.27	1
21	2462	40MHz n	2	36.67	1	38.27	1

Note 1: 99% bandwidth measured in accordance with RSS GEN, with RB > 1% of the span and VB > 3xRB

Client:	Ruckus Wireless	Job Number:	J68610
Model:	Retriever module	T-Log Number:	T68973
		Account Manager:	Dean Eriksen
Contact:	Craig Owens		
Standard:	FCC Part 15.247/RSS-210	Class:	N/A

RSS 210 and FCC 15.247 (DTS) Antenna Port Measurements - Power Spectral Density

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 was connected to the spectrum analyzer or power meter via a suitable attenuator. For 802.11b and g, measurements were made on a single chain. For 802.11n mode testing, a combiner was used to connect all the chains to the spectrum analyzer.

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

Summary of Results

Run #	Test Performed	Limit	Mode	Pass / Fail	Result / Margin
1a	Power spectral Density (PSD)	15.247(d)	b	Pass	
1b	Power spectral Density (PSD)	15.247(d)	g	Pass	Covered by 20 MHz n
1c	Power spectral Density (PSD)	15.247(d)	20MHz n	Pass	
1d	Power spectral Density (PSD)	15.247(d)	40MHz n	Pass	

Modifications Made During Testing

No modifications were made to the EUT during testing

Deviations From The Standard

No deviations were made from the requirements of the standard.

EMC Test Data

Client:	Ruckus Wireless	Job Number:	J68610
Model:	Retriever module	T-Log Number:	T68973
		Account Manager:	Dean Eriksen
Contact:	Craig Owens		
Standard:	FCC Part 15.247/RSS-210	Class:	N/A

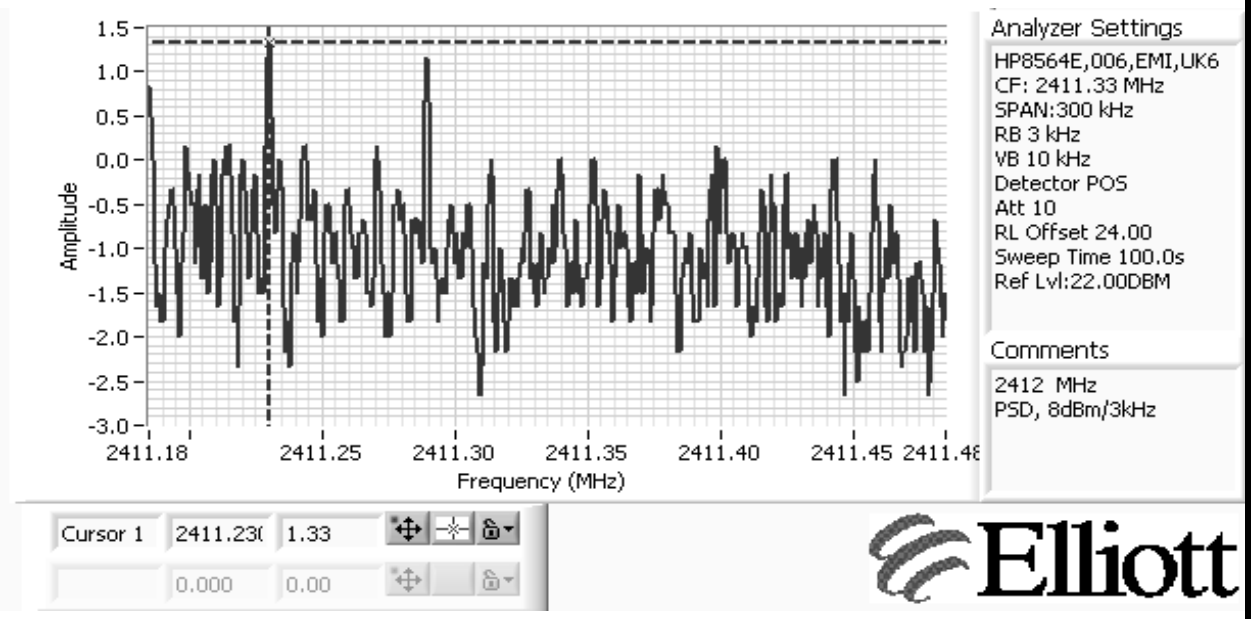
Run #1a: Power spectral Density

Date of Test: 10/26/2007 Config. Used: 1
Test Engineer: Rafael Varelas Config Change: None
Test Location: SVOATS #2 EUT Voltage: 120V/60Hz

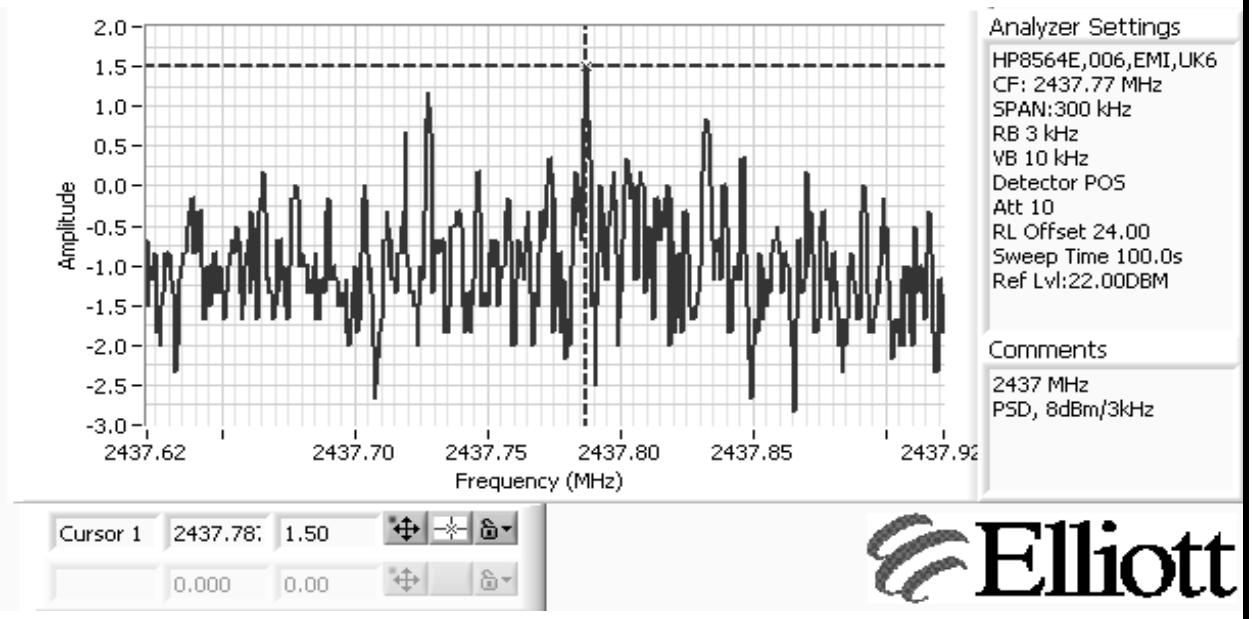
Ambient Conditions: Temperature: 12 °C
Rel. Humidity: 80 %

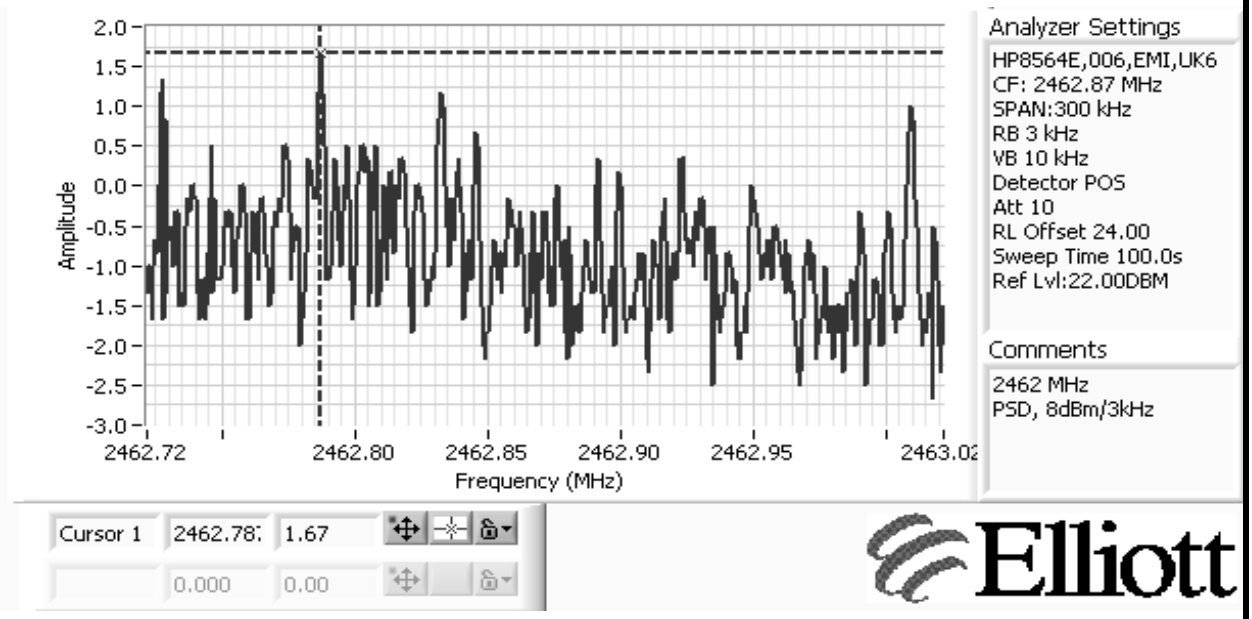
Power Setting	Frequency (MHz)	Mode (Note 2)	PSD (dBm/3kHz) Note 1	Limit dBm/3kHz	Result
23	2412	b	1.3	8.0	Pass
23	2437	b	1.5	8.0	Pass
23	2462	b	1.7	8.0	Pass

Note 1:	Power spectral density measured using RB=3 kHz, VB=10kHz, analyzer with peak detector and with a sweep time set to ensure a dwell time of at least 1 second per 3kHz. The measurement is made at the frequency of PPSD determined from preliminary scans using
Note 2:	For 802.11n mode devices, all tx chains were connected to the spectrum analyzer using a combiner. The loss of the combiner was accounted for.



Client:	Ruckus Wireless	Job Number:	J68610
Model:	Retriever module	T-Log Number:	T68973
		Account Manager:	Dean Eriksen
Contact:	Craig Owens		
Standard:	FCC Part 15.247/RSS-210	Class:	N/A





EMC Test Data

Client:	Ruckus Wireless	Job Number:	J68610
Model:	Retriever module	T-Log Number:	T68973
		Account Manager:	Dean Eriksen
Contact:	Craig Owens		
Standard:	FCC Part 15.247/RSS-210	Class:	N/A

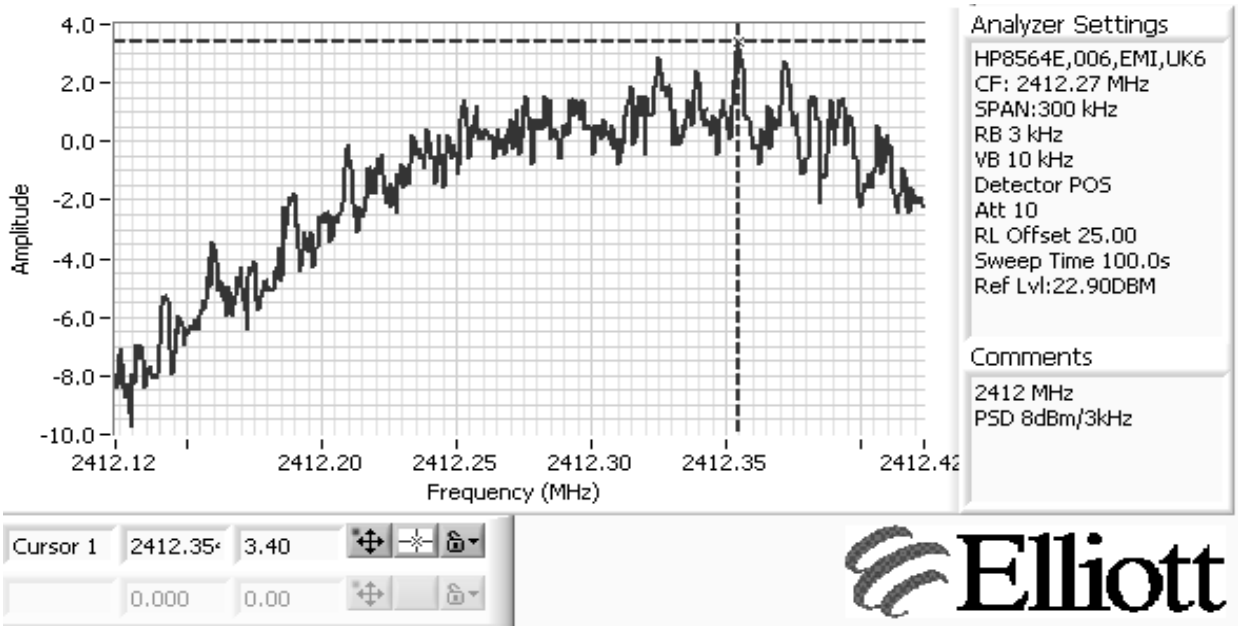
Run #1b: Power spectral Density

Date of Test: 10/26/2007 Config. Used: 1
Test Engineer: Rafael Varelas Config Change: None
Test Location: SVOATS #2 EUT Voltage: 120V/60Hz

Ambient Conditions: Temperature: 12 °C
Rel. Humidity: 80 %

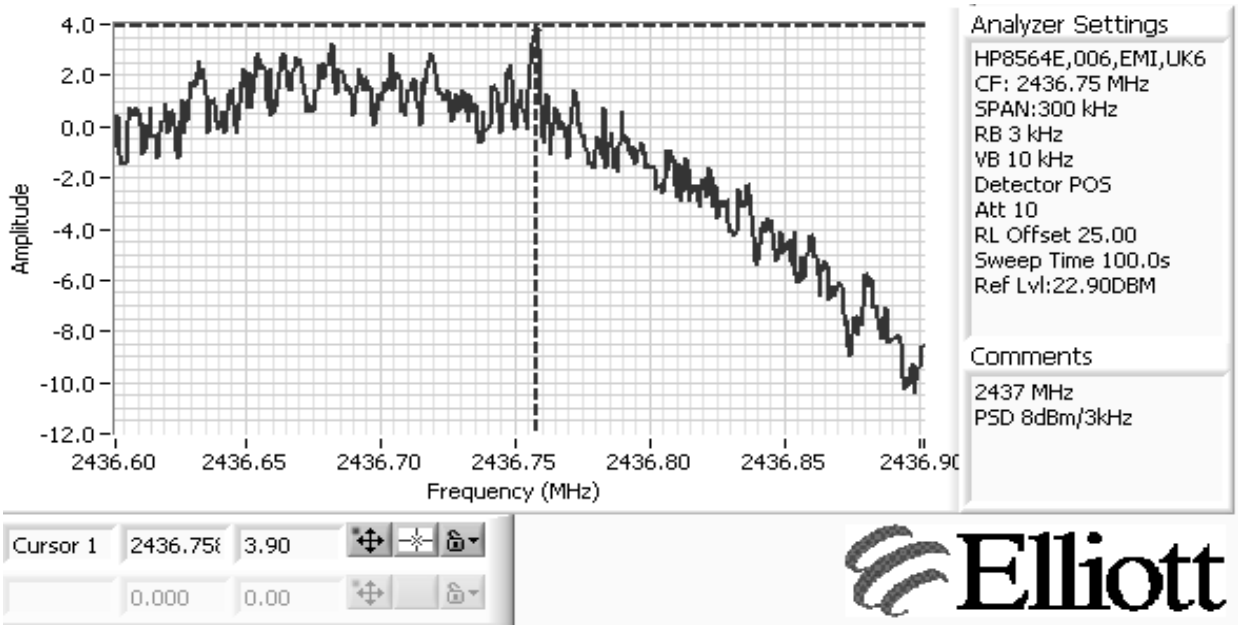
Power Setting	Frequency (MHz)	Mode (Note 2)	PSD (dBm/3kHz) Note 1	Limit dBm/3kHz	Result
22	2412	20MHz n	3.4	8.0	Pass
22	2437	20MHz n	3.9	8.0	Pass
22	2462	20MHz n	3.1	8.0	Pass

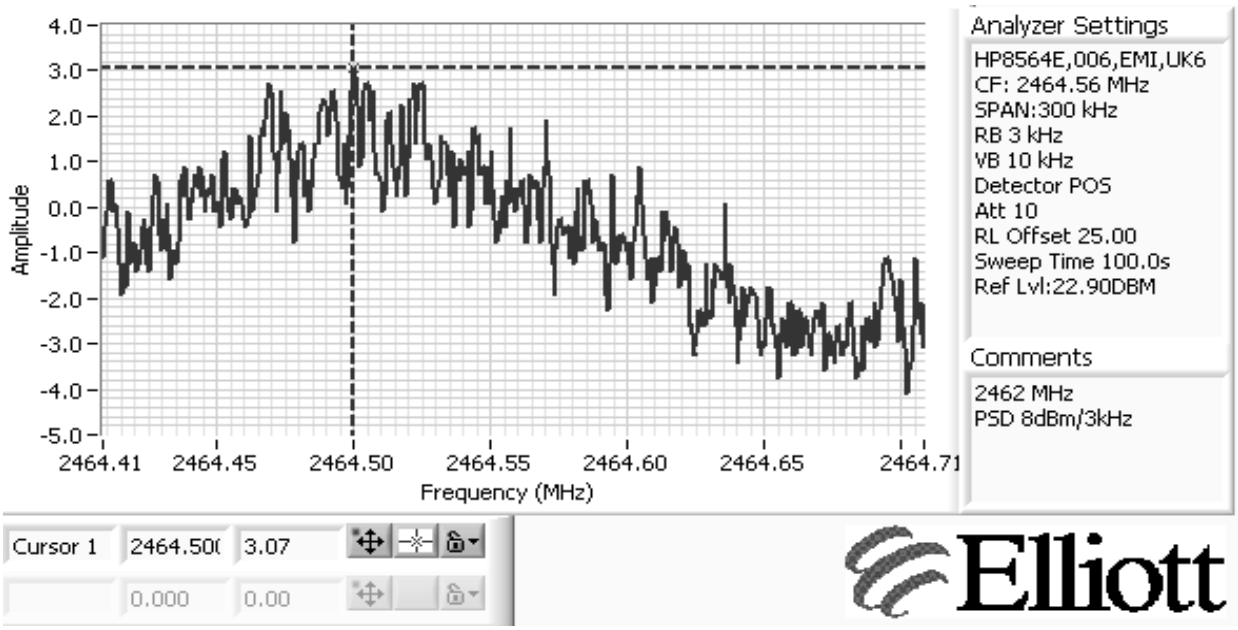
Note 1:	Power spectral density measured using RB=3 kHz, VB=10kHz, analyzer with peak detector and with a sweep time set to ensure a dwell time of at least 1 second per 3kHz. The measurement is made at the frequency of PPSD determined from preliminary scans using
Note 2:	For 802.11n mode devices, all tx chains were connected to the spectrum analyzer using a combiner. The loss of the combiner was accounted for.



EMC Test Data

Client:	Ruckus Wireless	Job Number:	J68610
Model:	Retriever module	T-Log Number:	T68973
		Account Manager:	Dean Eriksen
Contact:	Craig Owens		
Standard:	FCC Part 15.247/RSS-210	Class:	N/A





EMC Test Data

Client:	Ruckus Wireless	Job Number:	J68610
Model:	Retriever module	T-Log Number:	T68973
		Account Manager:	Dean Eriksen
Contact:	Craig Owens		
Standard:	FCC Part 15.247/RSS-210	Class:	N/A

Run #1d: Power spectral Density

Date of Test: 10/26/2007
Test Engineer: Rafael Varelas
Test Location: SVOATS #2

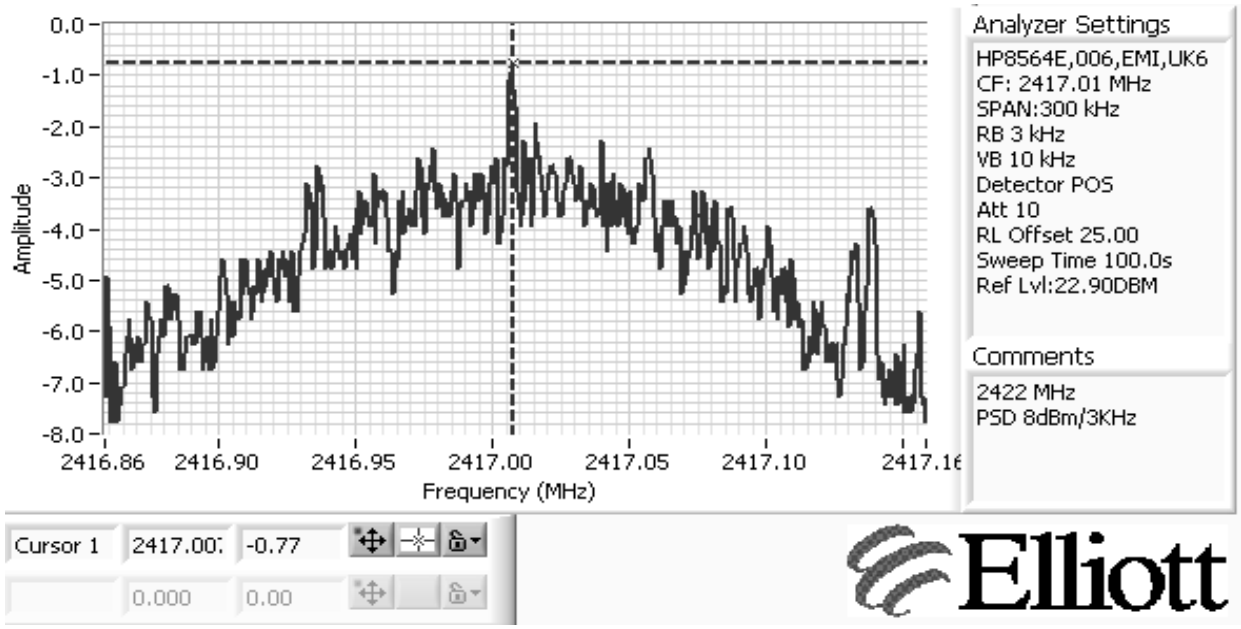
Config. Used: 1
Config Change: None
EUT Voltage: 120V/60Hz

Ambient Conditions:

Temperature: 12 °C
Rel. Humidity: 80 %

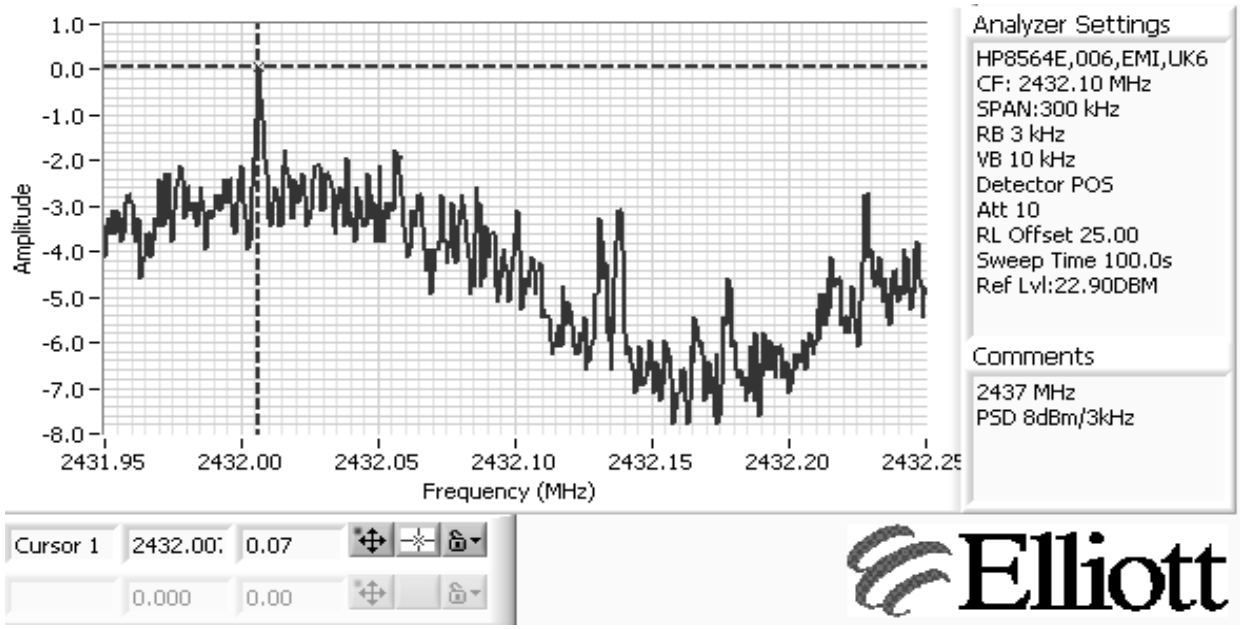
Power Setting	Frequency (MHz)	Mode (Note 2)	PSD (dBm/3kHz) Note 1	Limit dBm/3kHz	Result
21	2422	40MHz n	-0.8	8.0	Pass
21	2437	40MHz n	0.1	8.0	Pass
21	2452	40MHz n	-0.8	8.0	Pass

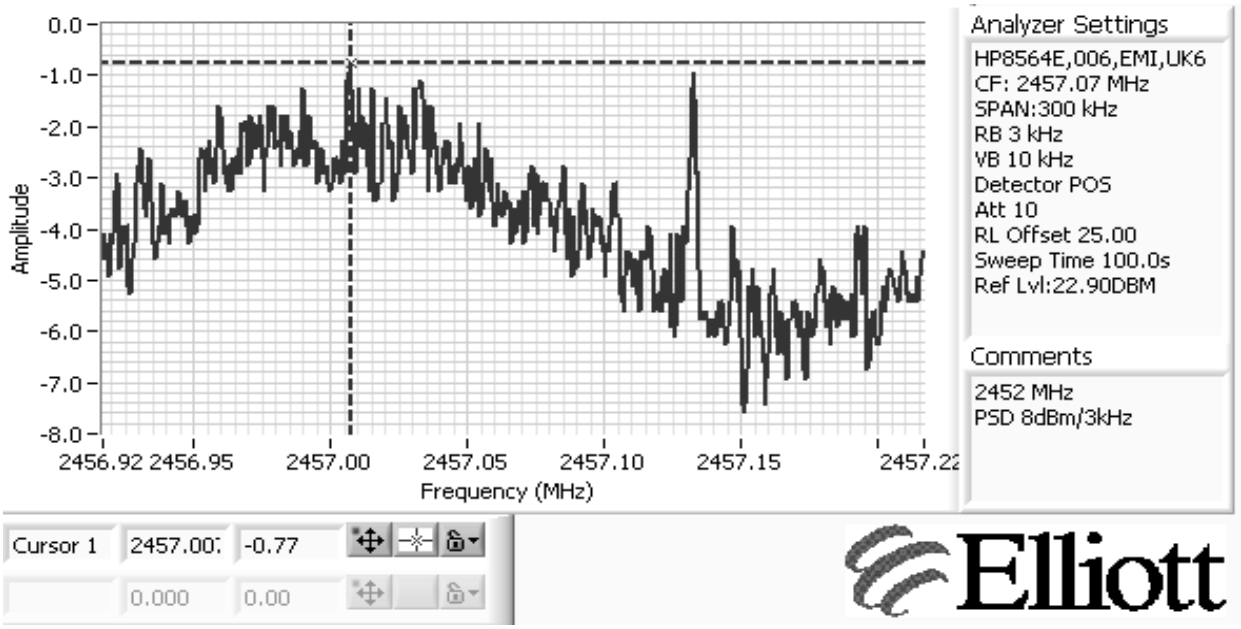
Note 1:	Power spectral density measured using RB=3 kHz, VB=10kHz, analyzer with peak detector and with a sweep time set to ensure a dwell time of at least 1 second per 3kHz. The measurement is made at the frequency of PPSD determined from preliminary scans using
Note 2:	For 802.11n mode devices, all tx chains were connected to the spectrum analyzer using a combiner. The loss of the combiner was accounted for.



EMC Test Data

Client:	Ruckus Wireless	Job Number:	J68610
Model:	Retriever module	T-Log Number:	T68973
		Account Manager:	Dean Eriksen
Contact:	Craig Owens		
Standard:	FCC Part 15.247/RSS-210	Class:	N/A





Client:	Ruckus Wireless	Job Number:	J68610
Model:	Retriever module	T-Log Number:	T68973
		Account Manager:	Dean Eriksen
Contact:	Craig Owens		
Standard:	FCC Part 15.247/RSS-210	Class:	N/A

RSS 210 and FCC 15.247 (DTS) Antenna Port Measurements - Spurious Emissions

Test Specific Details

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

General Test Configuration

The EUT was connected to the spectrum analyzer or power meter via a suitable attenuator. For 802.11b and g, measurements were made on a single chain. For 802.11n mode testing, a combiner was used to connect all the chains to the spectrum analyzer.

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

Summary of Results

Run #	Test Performed	Limit	Mode	Pass / Fail	Result / Margin
1a	Spurious emissions	15.247(b)	b	Pass	
1b	Spurious emissions	15.247(b)	g	Pass	Covered by 20MHz n
1c	Spurious emissions	15.247(b)	n 20MHz	Pass	
1d	Spurious emissions	15.247(b)	n 40MHz	Pass	

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:	Ruckus Wireless	Job Number:	J68610
Model:	Retriever module	T-Log Number:	T68973
		Account Manager:	Dean Eriksen
Contact:	Craig Owens		
Standard:	FCC Part 15.247/RSS-210	Class:	N/A

Run #1a: Out of Band Spurious Emissions - 802.11b

Date of Test: 10/26/2007
Test Engineer: Rafael Varelas
Test Location: SVOATS #2

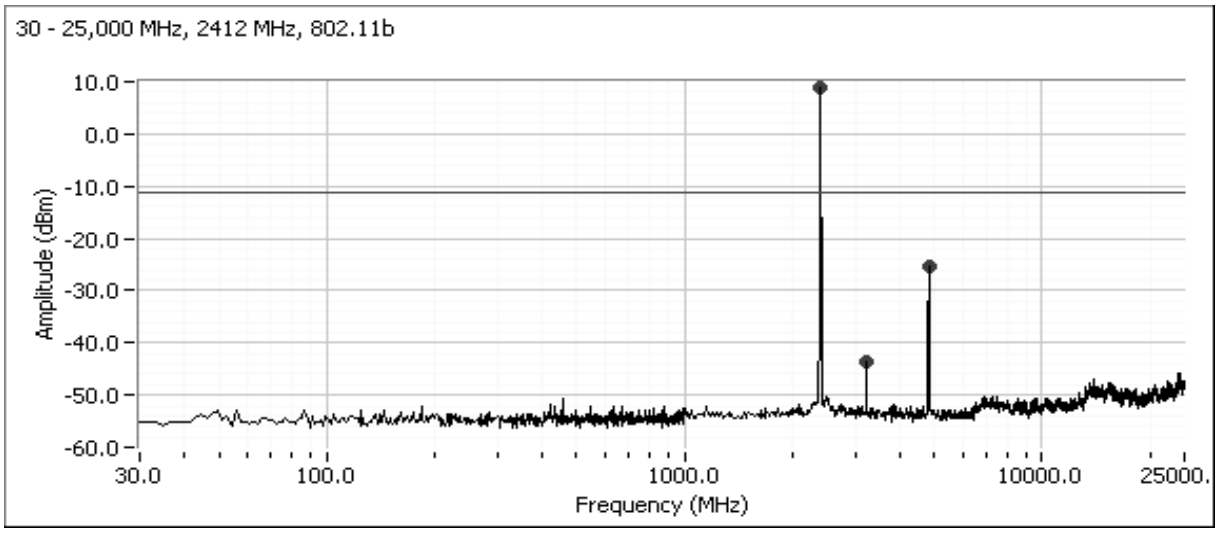
Config. Used: 1
Config Change: None
EUT Voltage: 120V/60Hz

Ambient Conditions:

Temperature: 12 °C
Rel. Humidity: 80 %

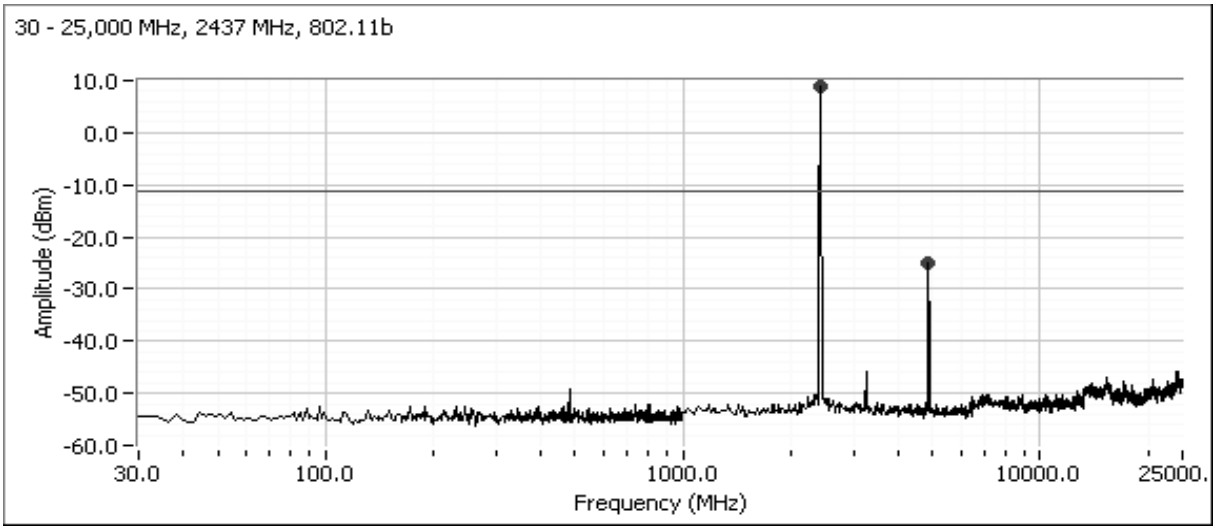
Frequency (MHz)	Limit	Result
2412	-20dBc	-33.9
2437	-20dBc	-34
2462	-20dBc	-33.5

Plots for low channel, power setting(s) = 23

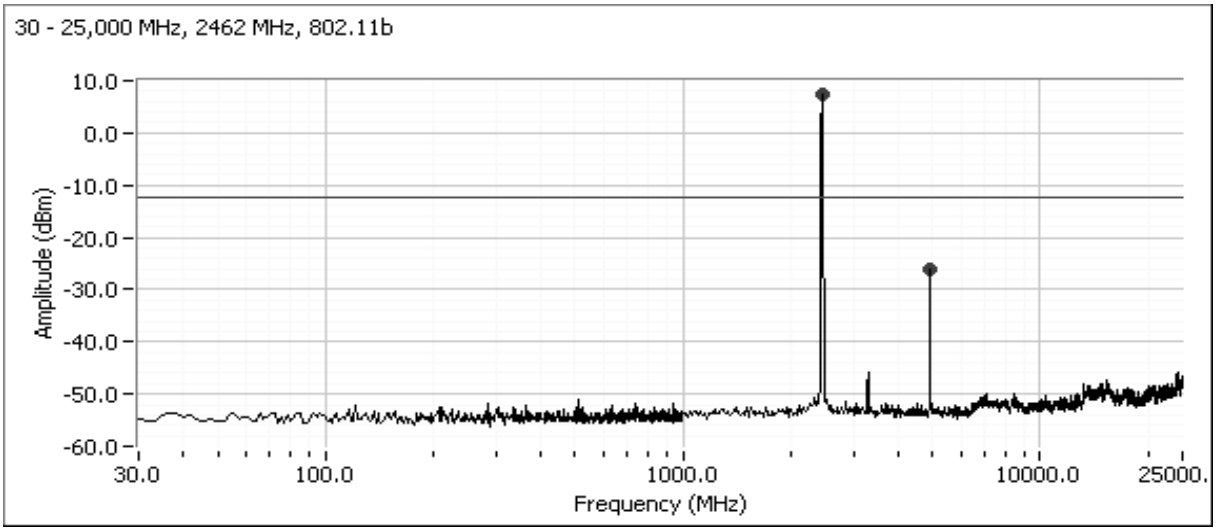


Client:	Ruckus Wireless	Job Number:	J68610
Model:	Retriever module	T-Log Number:	T68973
		Account Manager:	Dean Eriksen
Contact:	Craig Owens		
Standard:	FCC Part 15.247/RSS-210	Class:	N/A

Plots for center channel, power setting(s) = 23



Plots for high channel, power setting(s) = 23



Client:	Ruckus Wireless	Job Number:	J68610
Model:	Retriever module	T-Log Number:	T68973
		Account Manager:	Dean Eriksen
Contact:	Craig Owens		
Standard:	FCC Part 15.247/RSS-210	Class:	N/A

Run #1c: Out of Band Spurious Emissions - 802.11n 20MHz

Date of Test: 10/26/2007
Test Engineer: Rafael Varelas
Test Location: SVOATS #2

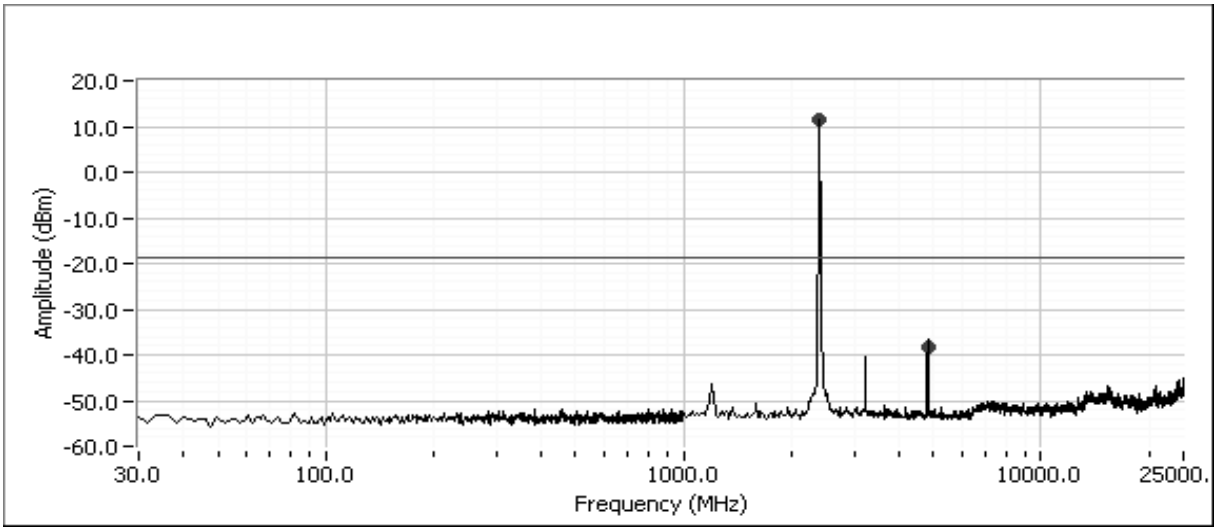
Config. Used: 1
Config Change: None
EUT Voltage: 120V/60Hz

Ambient Conditions:

Temperature: 12 °C
Rel. Humidity: 80 %

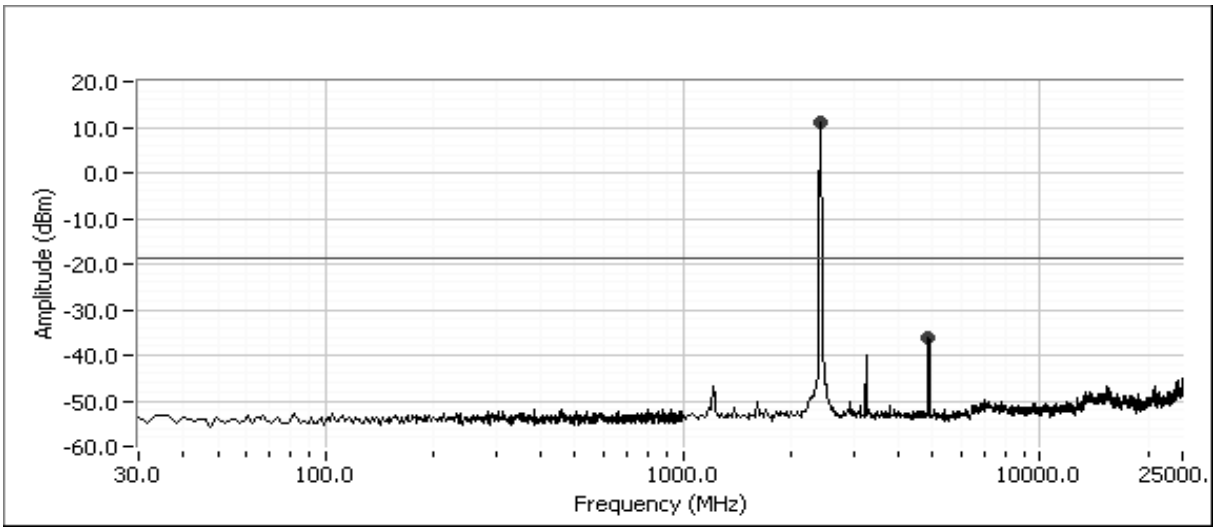
Frequency (MHz)	Limit	Result
2412	-30dBc	-50
2437	-30dBc	-47.4
2462	-30dBc	-46.8

Plots for low channel, power setting(s) = 22

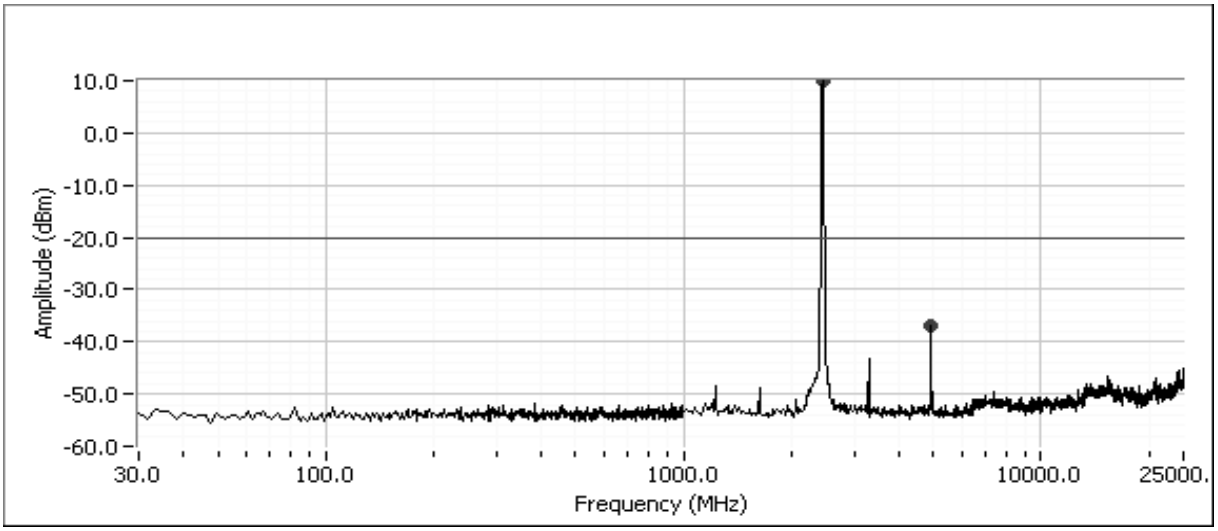


Client:	Ruckus Wireless	Job Number:	J68610
Model:	Retriever module	T-Log Number:	T68973
		Account Manager:	Dean Eriksen
Contact:	Craig Owens		
Standard:	FCC Part 15.247/RSS-210	Class:	N/A

Plots for center channel, power setting(s) = 22



Plots for high channel, power setting(s) = 22



Client:	Ruckus Wireless	Job Number:	J68610
Model:	Retriever module	T-Log Number:	T68973
		Account Manager:	Dean Eriksen
Contact:	Craig Owens		
Standard:	FCC Part 15.247/RSS-210	Class:	N/A

Run #1d: Out of Band Spurious Emissions - 802.11n 40MHz

Date of Test: 10/26/2007
Test Engineer: Rafael Varelas
Test Location: SVOATS #2

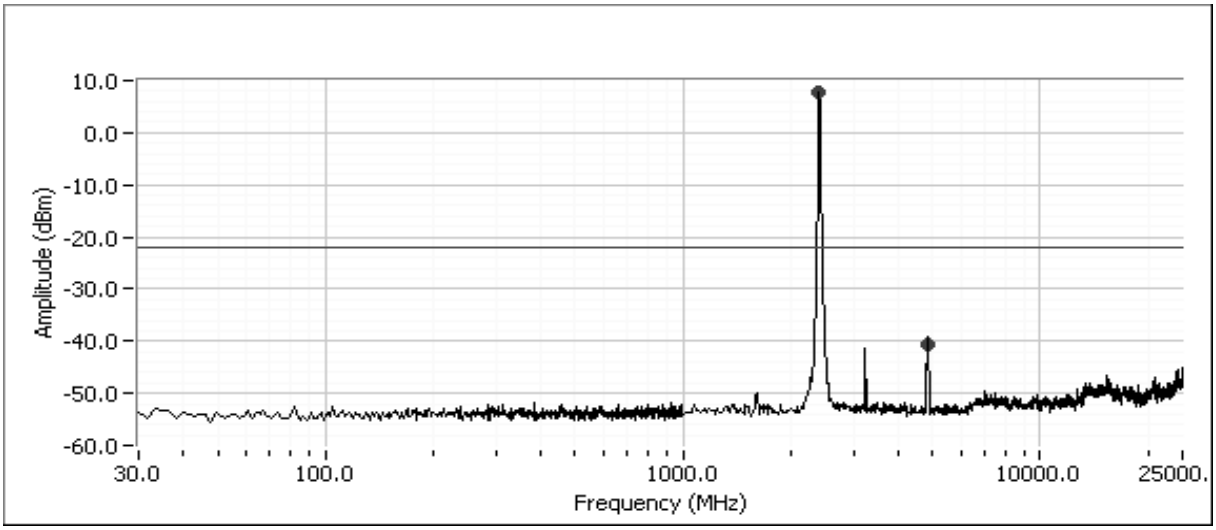
Config. Used: 1
Config Change: None
EUT Voltage: 120V/60Hz

Ambient Conditions:

Temperature: 12 °C
Rel. Humidity: 80 %

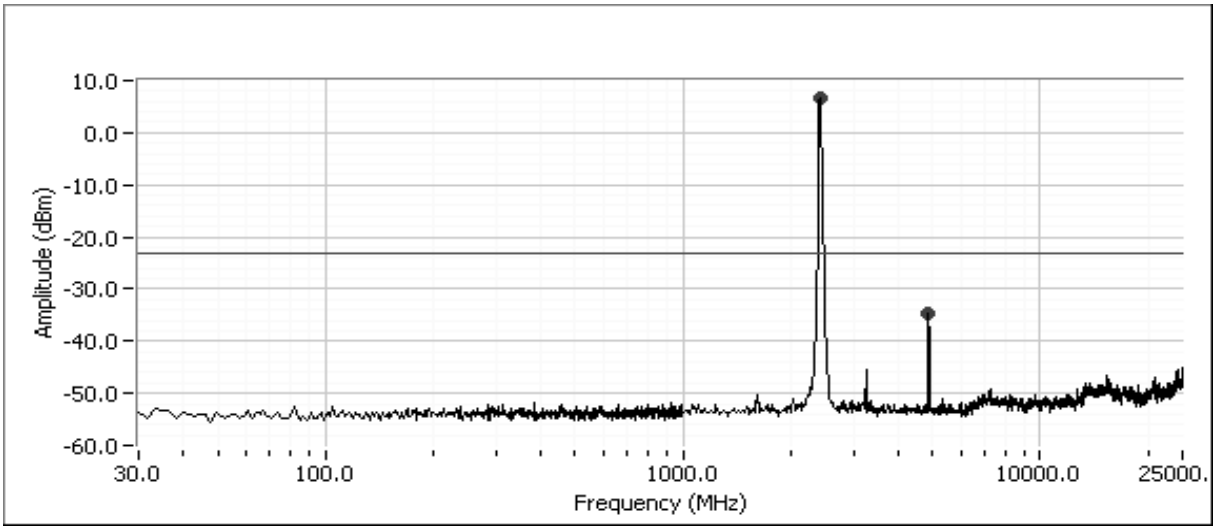
Frequency (MHz)	Limit	Result
2422	-30dBc	-48.6
2437	-30dBc	-41.4
2452	-30dBc	-45.4

Plots for low channel, power setting(s) = 21

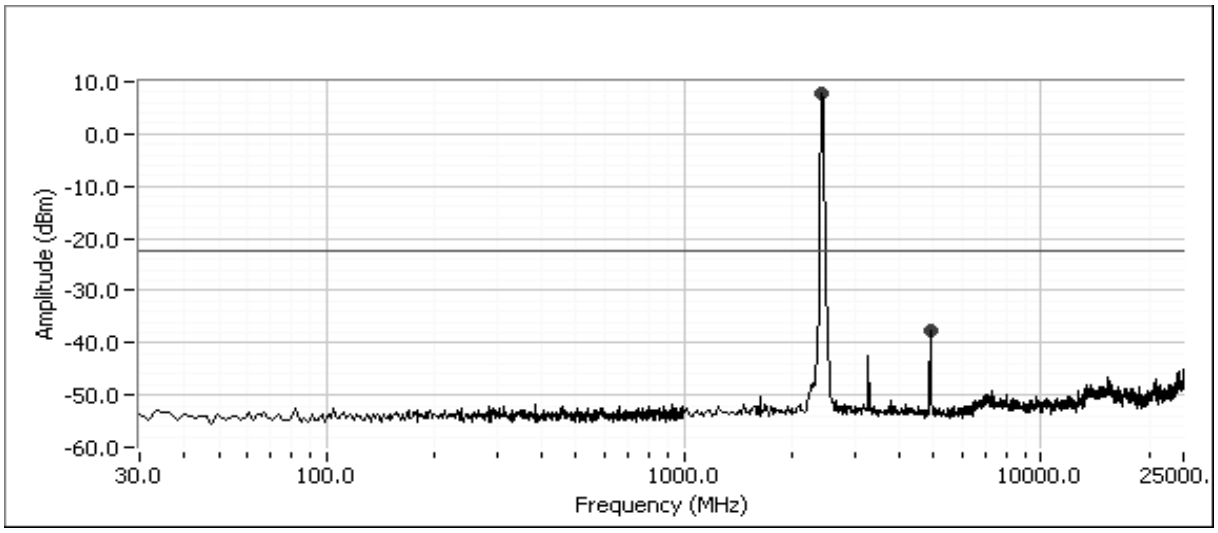


Client:	Ruckus Wireless	Job Number:	J68610
Model:	Retriever module	T-Log Number:	T68973
		Account Manager:	Dean Eriksen
Contact:	Craig Owens		
Standard:	FCC Part 15.247/RSS-210	Class:	N/A

Plots for center channel, power setting(s) = 21



Plots for high channel, power setting(s) = 21



Client:	Ruckus Wireless	Job Number:	J68610
Model:	Retriever module	T-Log Number:	T68973
		Account Manager:	Dean Eriksen
Contact:	Craig Owens		
Standard:	FCC Part 15.247/RSS-210	Class:	N/A

RSS 210 and FCC 15.247 Radiated Spurious Emissions Patch Antennas

Test Specific Details

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

General Test Configuration

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

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

Summary of Results

Run #	Test Performed	Limit	Pass / Fail	Result / Margin
1 (802.11b Mode)	RE, 30 - 18000 MHz - Spurious Emissions	FCC Part 15.209 / 15.247(c)	Pass	50.2dBµV/m @ 2483.5MHz (-3.8dB)
2 (802.11g Mode)	RE, 30 - 18000 MHz - Spurious Emissions	FCC Part 15.209 / 15.247(c)	Pass	53.6dBµV/m @ 2483.5MHz (-0.4dB)
3 (802.11n 20MHz Mode)	RE, 30 - 18000 MHz - Spurious Emissions	FCC Part 15.209 / 15.247(c)	Pass	50.1dBµV/m @ 2483.6MHz (-3.9dB)
4 (802.11n 40MHz Mode)	RE, 30 - 18000 MHz - Spurious Emissions	FCC Part 15.209 / 15.247(c)	Pass	53.2dBµV/m @ 2390.0MHz (-0.8dB)

Modifications Made During Testing

No modifications were made to the EUT during testing

Deviations From The Standard

No deviations were made from the requirements of the standard.

Client:	Ruckus Wireless	Job Number:	J68610
Model:	Retriever module	T-Log Number:	T68973
		Account Manager:	Dean Eriksen
Contact:	Craig Owens		
Standard:	FCC Part 15.247/RSS-210	Class:	N/A

Run #1: Radiated Spurious Emissions, 30 - 18000 MHz. Operating Mode: 802.11b

Date of Test: 10/18/2007 Config. Used: 1
Test Engineer: Rafael Varelas Config Change: None
Test Location: SVOATS #2 EUT Voltage: 120V/60Hz

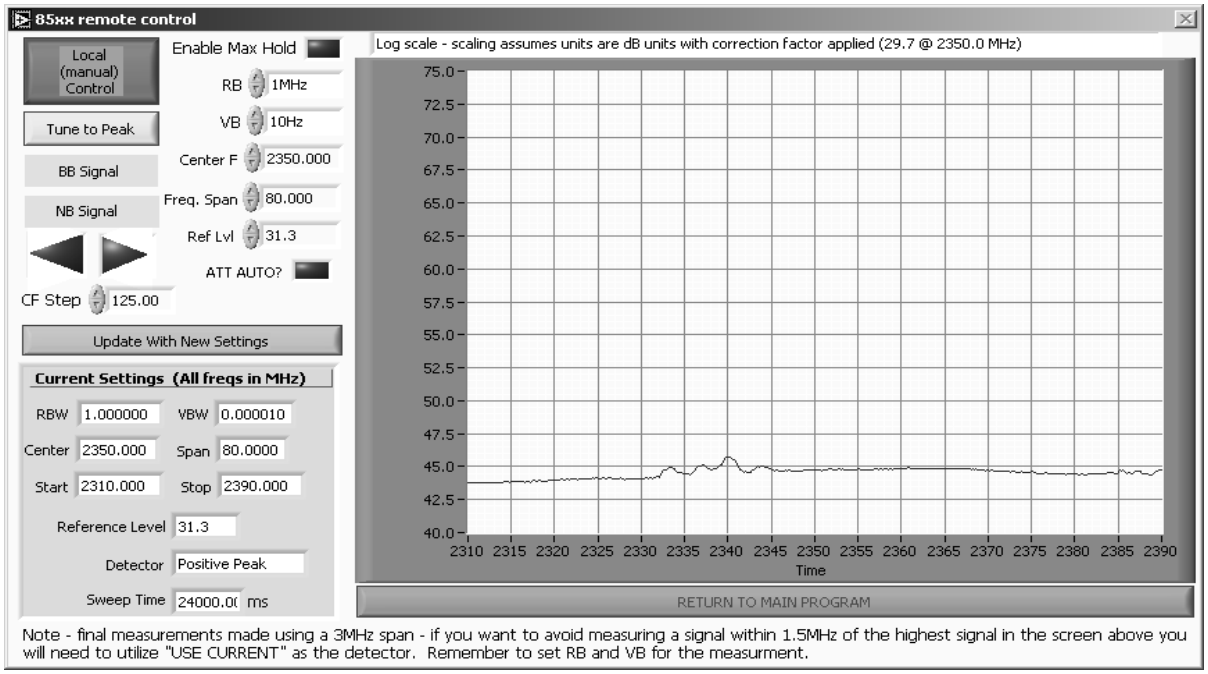
Ambient Conditions: Temperature: 16 °C
Rel. Humidity: 78 %

Run #1a: Low Channel @ 2412 MHz

Fundamental Signal Field Strength: Peak and average values measured in 1 MHz, and peak value measured in 100kHz

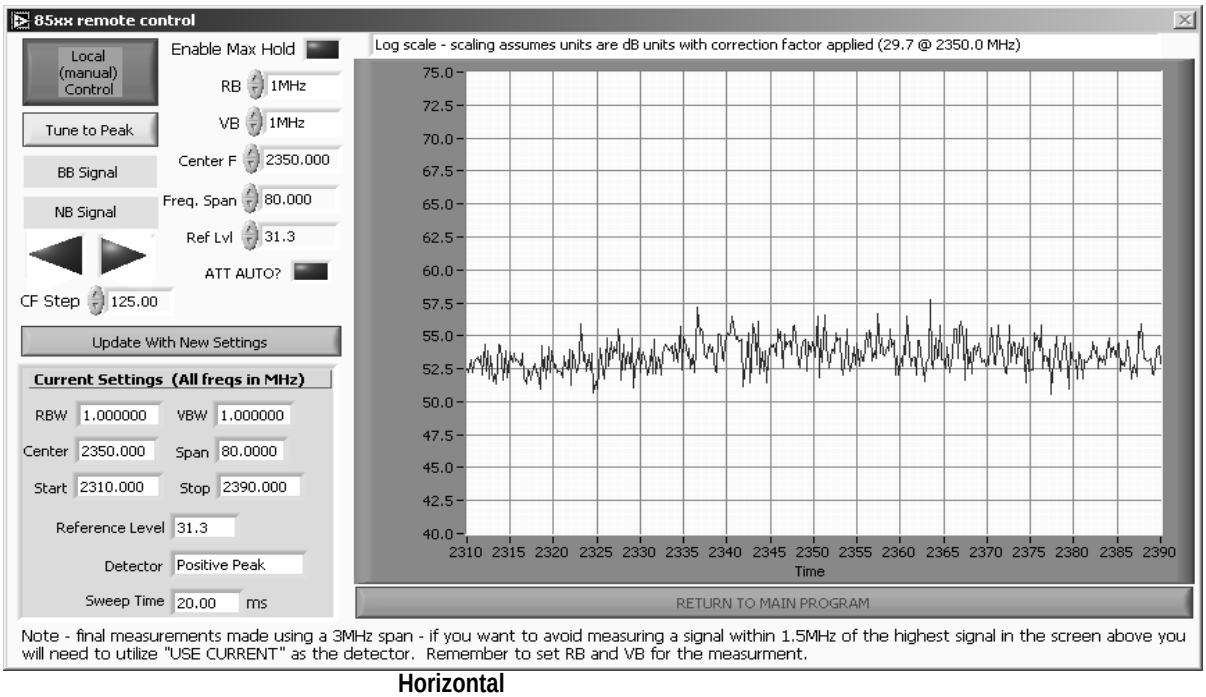
Frequency	Level	Pol	15.209 / 15.247		Detector	Azimuth	Height	Comments
MHz	dBµV/m	v/h	Limit	Margin	Pk/QP/Avg	degrees	meters	
2408.200	101.5	V	-	-	AVG	0	1.5	
2408.200	104.2	V	-	-	PK	0	1.5	
2412.580	91.8	H	-	-	AVG	32	1.1	
2412.580	95.2	H	-	-	PK	32	1.1	

Vertical

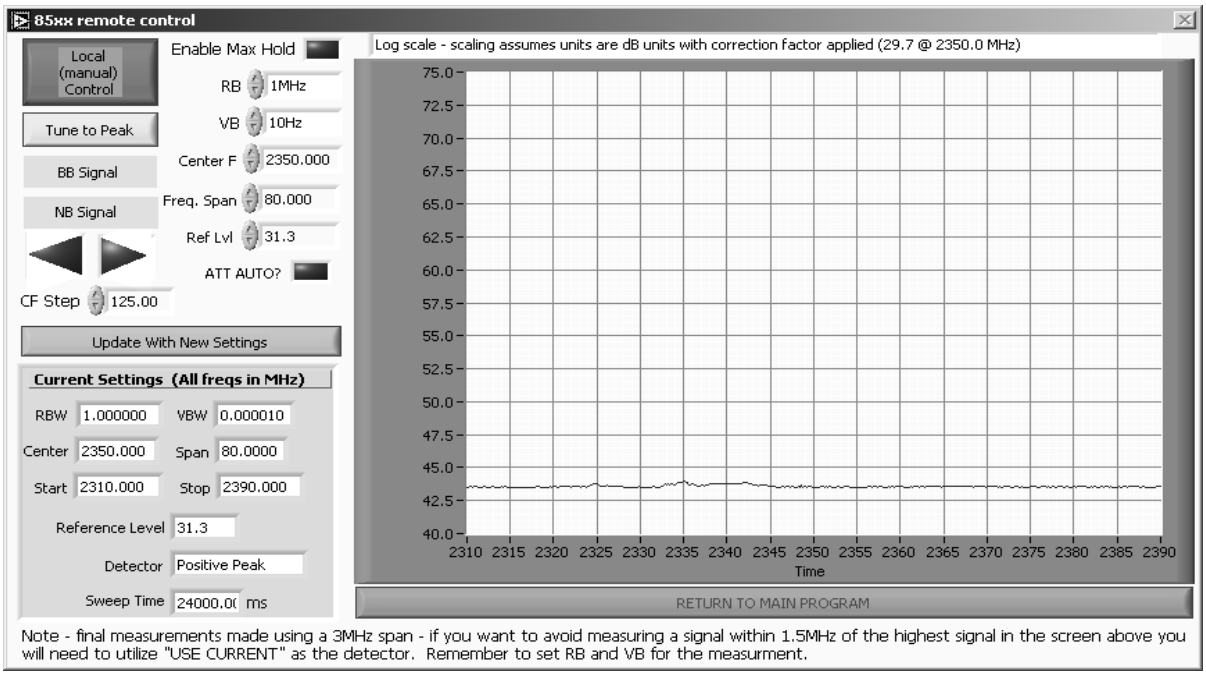


Client:	Ruckus Wireless	Job Number:	J68610
Model:	Retriever module	T-Log Number:	T68973
		Account Manager:	Dean Eriksen
Contact:	Craig Owens		
Standard:	FCC Part 15.247/RSS-210	Class:	N/A

Run #1a: Continued

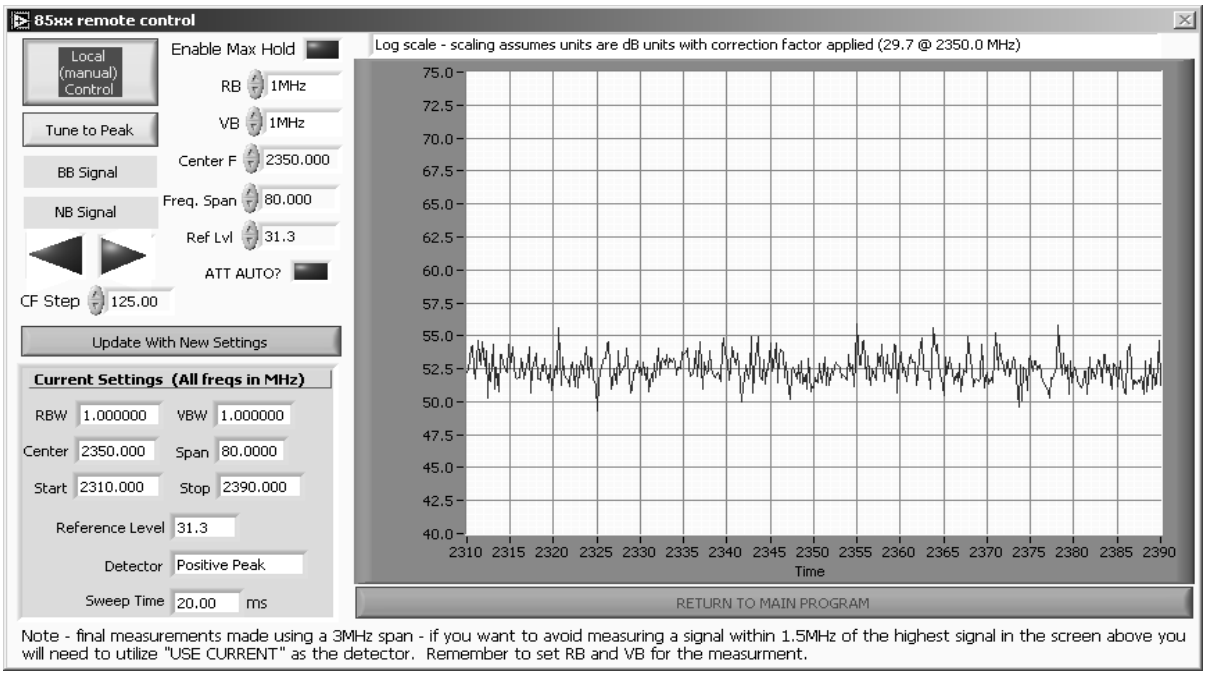


Horizontal



Client:	Ruckus Wireless	Job Number:	J68610
Model:	Retriever module	T-Log Number:	T68973
		Account Manager:	Dean Eriksen
Contact:	Craig Owens		
Standard:	FCC Part 15.247/RSS-210	Class:	N/A

Run #1a: Continued



Band Edge Signal Field Strength

Frequency	Level	Pol	15.209 / 15.247		Detector	Azimuth	Height	Comments
MHz	dBµV/m	v/h	Limit	Margin	Pk/QP/Avg	degrees	meters	
2389.520	46.5	V	54.0	-7.5	AVG	0	1.5	
2389.520	56.8	V	74.0	-17.2	PK	0	1.5	
2387.460	45.1	V	54.0	-8.9	AVG	32	1.1	
2387.460	55.8	V	74.0	-18.2	PK	32	1.1	

Client:	Ruckus Wireless	Job Number:	J68610
Model:	Retriever module	T-Log Number:	T68973
		Account Manager:	Dean Eriksen
Contact:	Craig Owens		
Standard:	FCC Part 15.247/RSS-210	Class:	N/A

Run #1a: Continued

Other Spurious Emissions

Frequency	Level	Pol	15.209 / 15.247		Detector	Azimuth	Height	Comments
MHz	dBµV/m	v/h	Limit	Margin	Pk/QP/Avg	degrees	meters	
4823.950	37.6	V	54.0	-16.4	AVG	72	1.8	
4823.950	44.1	V	74.0	-29.9	PK	72	1.8	
7234.800	34.6	V	54.0	-19.4	AVG	360	1.9	
7234.800	45.4	V	74.0	-28.6	PK	360	1.9	
9649.400	36.2	V	54.0	-17.8	AVG	0	1.0	
9649.400	47.9	V	74.0	-26.1	PK	0	1.0	
12060.980	39.2	V	54.0	-14.8	AVG	328	1.0	
12060.980	50.8	V	74.0	-23.2	PK	328	1.0	
4823.890	40.1	H	54.0	-13.9	AVG	79	1.9	
4823.890	45.6	H	74.0	-28.4	PK	79	1.9	
7234.810	34.6	H	54.0	-19.4	AVG	218	1.0	
7234.810	45.5	H	74.0	-28.5	PK	218	1.0	
9647.990	36.2	H	54.0	-17.8	AVG	221	1.0	
9647.990	47.5	H	74.0	-26.5	PK	221	1.0	

Note 1:	For emissions in restricted bands, the limit of 15.209 was used. For all other emissions, the limit was set 30dB below the level of the fundamental and measured in 100kHz.
Note 2:	Signal is not in a restricted band but the more stringent restricted band limit was used.

Run #1b: Center Channel @ 2437 MHz

Frequency	Level	Pol	15.209 / 15.247		Detector	Azimuth	Height	Comments
MHz	dBµV/m	v/h	Limit	Margin	Pk/QP/Avg	degrees	meters	
4873.960	38.9	H	54.0	-15.1	AVG	82	1.6	
4873.960	45.5	H	74.0	-28.5	PK	82	1.6	
7310.280	35.0	H	54.0	-19.0	AVG	263	1.0	
7310.280	45.8	H	74.0	-28.2	PK	263	1.0	
4874.000	38.0	V	54.0	-16.0	AVG	74	1.8	
4874.000	45.0	V	74.0	-29.0	PK	74	1.8	

Note 1:	For emissions in restricted bands, the limit of 15.209 was used. For all other emissions, the limit was set 30dB below the level of the fundamental and measured in 100kHz.
Note 2:	Signal is not in a restricted band but the more stringent restricted band limit was used.

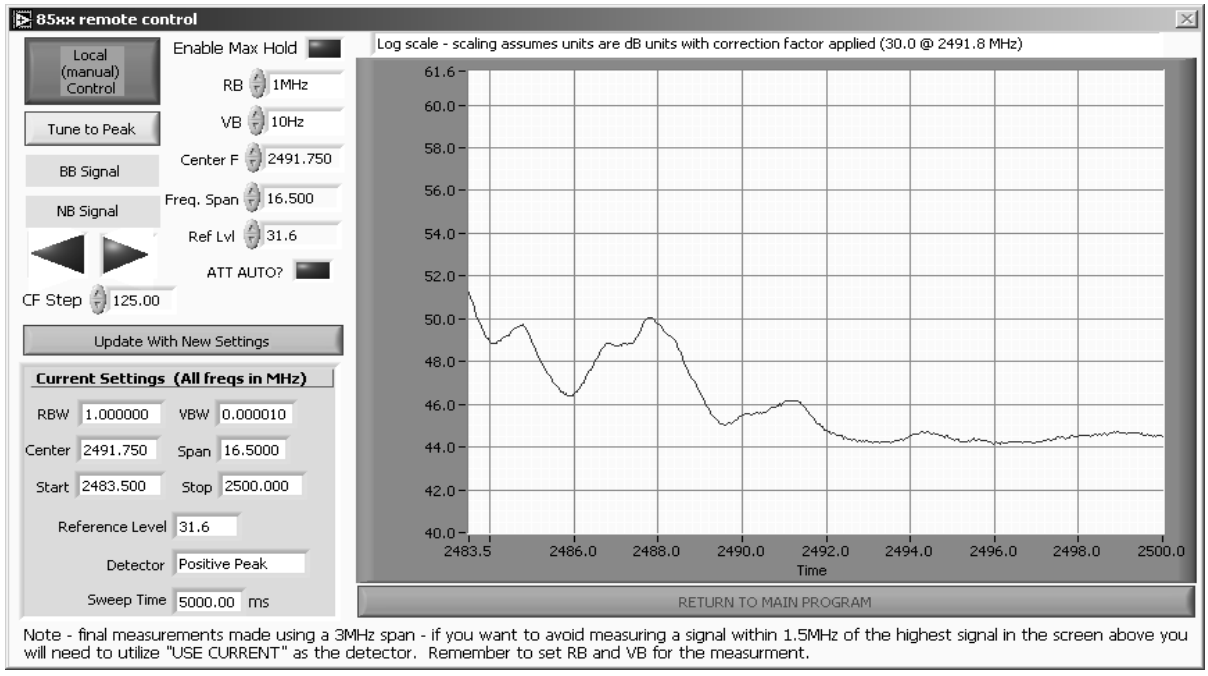
Client:	Ruckus Wireless	Job Number:	J68610
Model:	Retriever module	T-Log Number:	T68973
		Account Manager:	Dean Eriksen
Contact:	Craig Owens		
Standard:	FCC Part 15.247/RSS-210	Class:	N/A

Run #1c: High Channel @ 2462 MHz

Fundamental Signal Field Strength: Peak and average values measured in 1 MHz, and peak value measured in 100kHz

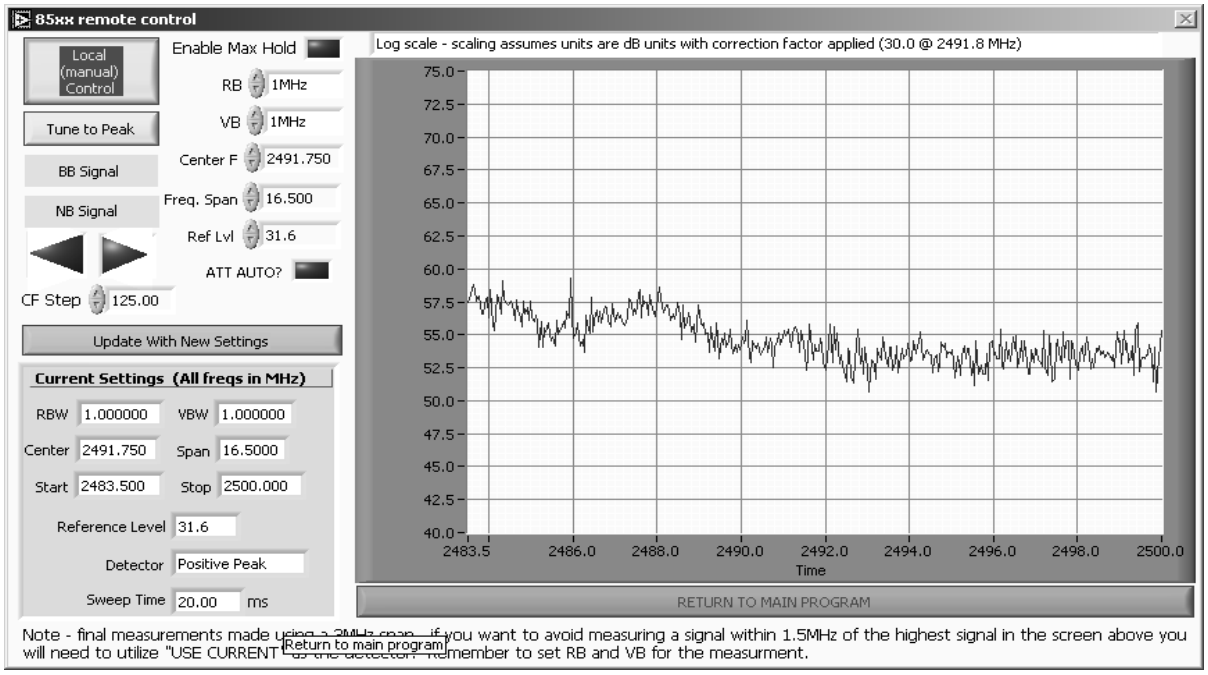
Frequency	Level	Pol	15.209 / 15.247		Detector	Azimuth	Height	Comments
MHz	dBµV/m	v/h	Limit	Margin	Pk/QP/Avg	degrees	meters	
2460.950	104.9	V	-	-	AVG	0	1.5	
2460.950	107.9	V	-	-	PK	0	1.5	
2461.410	92.7	H	-	-	AVG	287	1.4	
2461.410	96.0	H	-	-	PK	287	1.4	

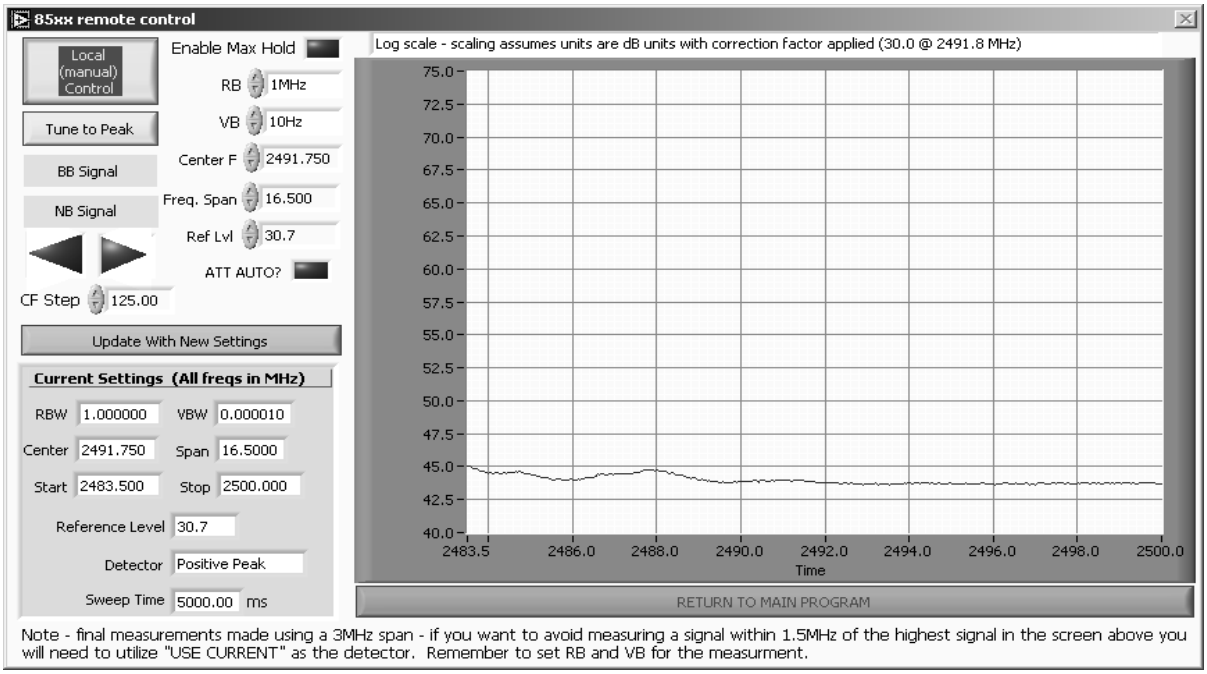
Vertical



Client:	Ruckus Wireless	Job Number:	J68610
Model:	Retriever module	T-Log Number:	T68973
		Account Manager:	Dean Eriksen
Contact:	Craig Owens		
Standard:	FCC Part 15.247/RSS-210	Class:	N/A

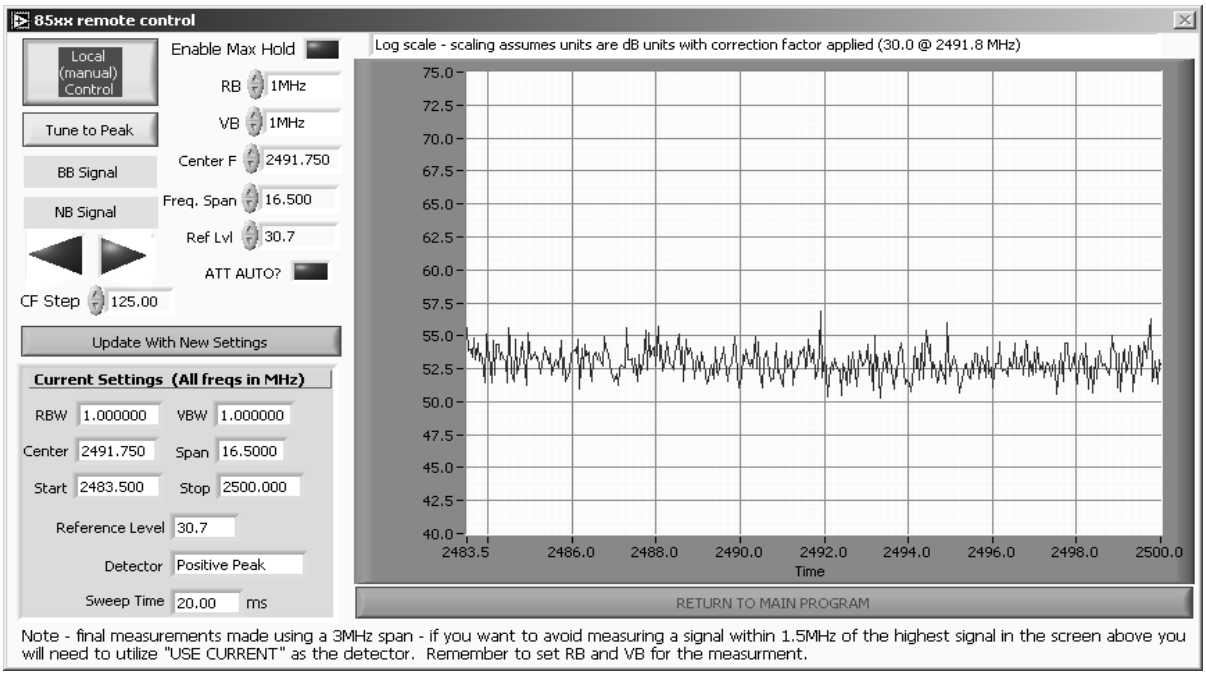
Run #1c: Continued





Client:	Ruckus Wireless	Job Number:	J68610
Model:	Retriever module	T-Log Number:	T68973
		Account Manager:	Dean Eriksen
Contact:	Craig Owens		
Standard:	FCC Part 15.247/RSS-210	Class:	N/A

Run #1c: Continued



Band Edge Signal Field Strength

Frequency	Level	Pol	15.209 / 15.247		Detector	Azimuth	Height	Comments
MHz	dBµV/m	v/h	Limit	Margin	Pk/QP/Avg	degrees	meters	
2483.500	50.2	V	54.0	-3.8	Avg	0	1.5	
2483.750	59.3	V	74.0	-14.7	PK	0	1.5	
2484.290	46.9	H	54.0	-7.1	AVG	287	1.4	
2484.290	57.2	H	74.0	-16.8	PK	287	1.4	

Other Spurious Emissions

Frequency	Level	Pol	15.209 / 15.247		Detector	Azimuth	Height	Comments
MHz	dBµV/m	v/h	Limit	Margin	Pk/QP/Avg	degrees	meters	
4924.030	38.8	V	54.0	-15.2	AVG	82	1.9	
4924.030	44.9	V	74.0	-29.1	PK	82	1.9	
4924.020	33.5	H	54.0	-20.5	AVG	330	1.0	
4924.020	42.8	H	74.0	-31.2	PK	330	1.0	
7384.750	35.7	V	54.0	-18.3	AVG	136	1.7	
7384.750	47.1	V	74.0	-26.9	PK	136	1.7	

Note 1:	For emissions in restricted bands, the limit of 15.209 was used. For all other emissions, the limit was set 30dB below the level of the fundamental and measured in 100kHz.
Note 2:	Signal is not in a restricted band but the more stringent restricted band limit was used.

Client:	Ruckus Wireless	Job Number:	J68610
Model:	Retriever module	T-Log Number:	T68973
		Account Manager:	Dean Eriksen
Contact:	Craig Owens		
Standard:	FCC Part 15.247/RSS-210	Class:	N/A

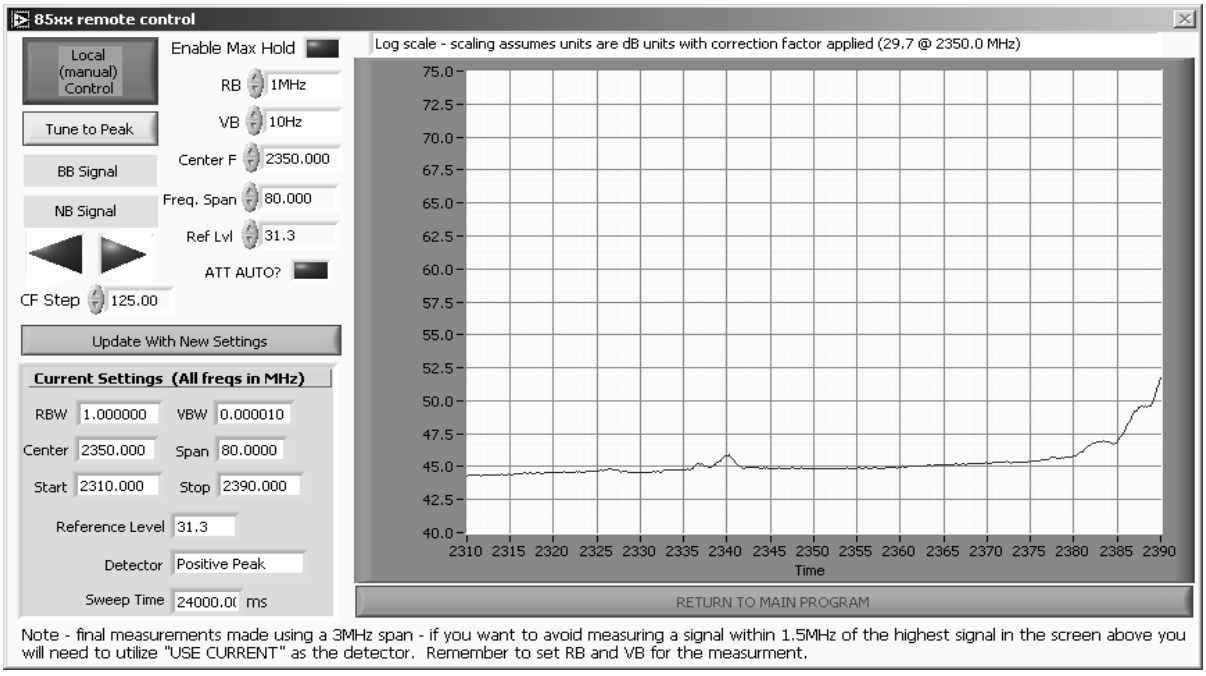
Run #2: Radiated Spurious Emissions, 30 - 18000 MHz. Operating Mode: 802.11g

Run #2a: Low Channel @ 2412 MHz

Fundamental Signal Field Strength: Peak and average values measured in 1 MHz, and peak value measured in 100kHz

Frequency	Level	Pol	15.209 / 15.247		Detector	Azimuth	Height	Comments
MHz	dBµV/m	v/h	Limit	Margin	Pk/QP/Avg	degrees	meters	
2414.850	102.0	V	-	-	AVG	0	1.5	
2414.850	110.9	V	-	-	PK	0	1.5	
2410.800	89.1	H	-	-	AVG	286	1.4	
2410.800	97.5	H	-	-	PK	286	1.4	

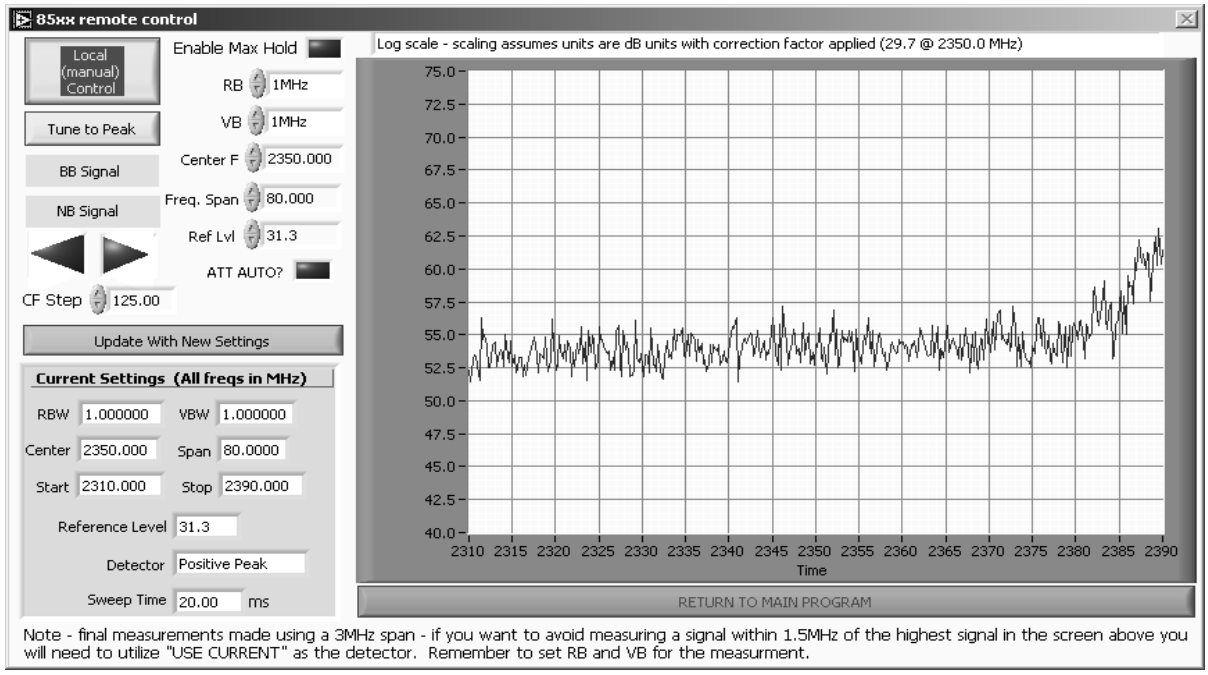
Vertical



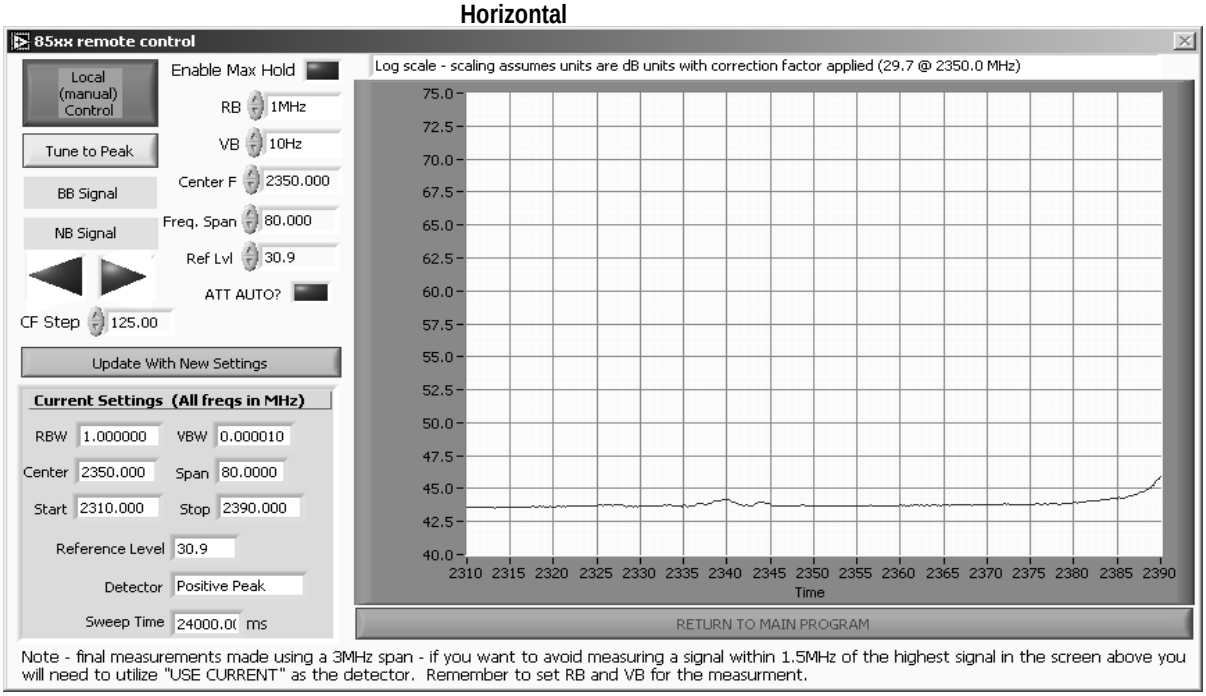
Note - final measurements made using a 3MHz span - if you want to avoid measuring a signal within 1.5MHz of the highest signal in the screen above you will need to utilize "USE CURRENT" as the detector. Remember to set RB and VB for the measurment.

Client:	Ruckus Wireless	Job Number:	J68610
Model:	Retriever module	T-Log Number:	T68973
		Account Manager:	Dean Eriksen
Contact:	Craig Owens		
Standard:	FCC Part 15.247/RSS-210	Class:	N/A

Run #2a: Continued

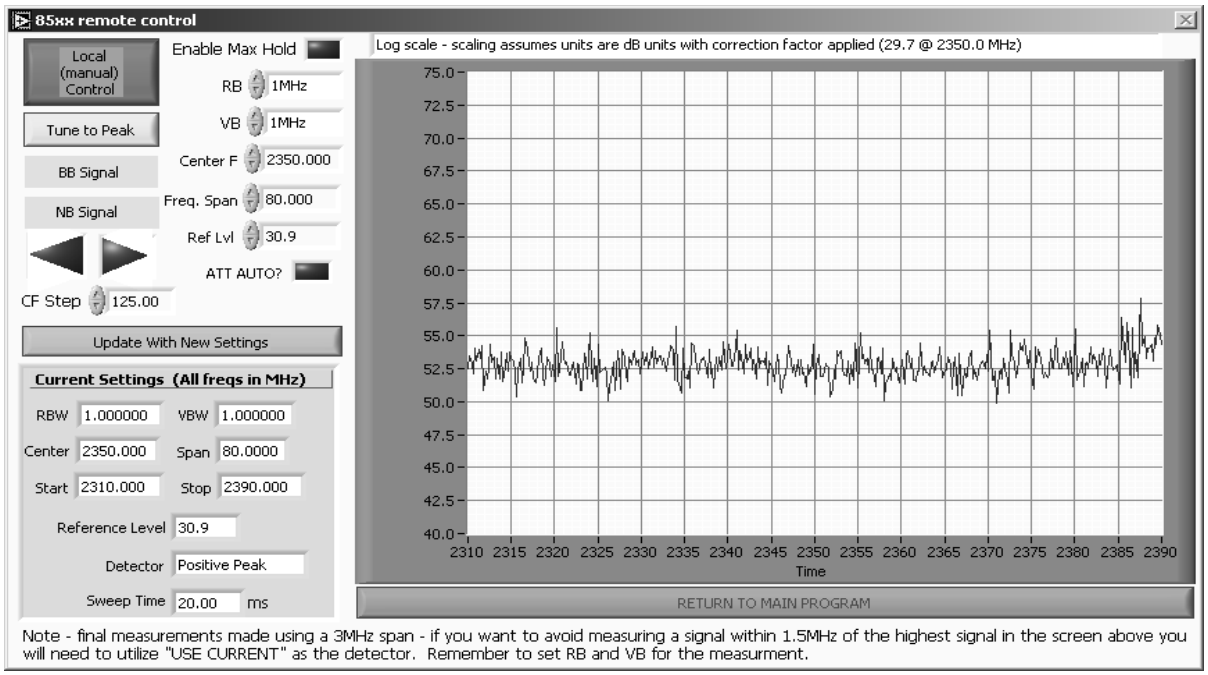


Horizontal



Client:	Ruckus Wireless	Job Number:	J68610
Model:	Retriever module	T-Log Number:	T68973
		Account Manager:	Dean Eriksen
Contact:	Craig Owens		
Standard:	FCC Part 15.247/RSS-210	Class:	N/A

Run #2a: Continued



Band Edge Signal Field Strength

Frequency	Level	Pol	15.209 / 15.247		Detector	Azimuth	Height	Comments
MHz	dBµV/m	v/h	Limit	Margin	Pk/QP/Avg	degrees	meters	
2390.000	52.5	V	54.0	-1.5	Avg	0	1.5	
2389.900	70.4	V	74.0	-3.6	Pk	0	1.5	
2390.000	46.3	H	54.0	-7.7	Avg	286	1.4	
2389.580	61.2	H	74.0	-12.8	PK	286	1.4	

Other Spurious Emissions

Frequency	Level	Pol	15.209 / 15.247		Detector	Azimuth	Height	Comments
MHz	dBµV/m	v/h	Limit	Margin	Pk/QP/Avg	degrees	meters	
4824.760	29.9	H	54.0	-24.1	AVG	115	1.3	
4824.760	41.1	H	74.0	-32.9	PK	115	1.3	
4824.160	29.9	V	54.0	-24.1	AVG	16	1.0	
4824.160	40.5	V	74.0	-33.5	PK	16	1.0	
Note 1:	For emissions in restricted bands, the limit of 15.209 was used. For all other emissions, the limit was set 30dB below the level of the fundamental and measured in 100kHz.							
Note 2:	Signal is not in a restricted band but the more stringent restricted band limit was used.							

Client:	Ruckus Wireless	Job Number:	J68610
Model:	Retriever module	T-Log Number:	T68973
		Account Manager:	Dean Eriksen
Contact:	Craig Owens		
Standard:	FCC Part 15.247/RSS-210	Class:	N/A

Run #2b: Center Channel @ 2437 MHz

Frequency	Level	Pol	15.209 / 15.247		Detector	Azimuth	Height	Comments
MHz	dBµV/m	v/h	Limit	Margin	Pk/QP/Avg	degrees	meters	
4875.120	30.5	V	54.0	-23.5	AVG	104	1.4	
4875.120	40.9	V	74.0	-33.1	PK	104	1.4	
4873.990	30.5	H	54.0	-23.5	AVG	0	1.1	
4873.990	41.4	H	74.0	-32.6	PK	0	1.1	

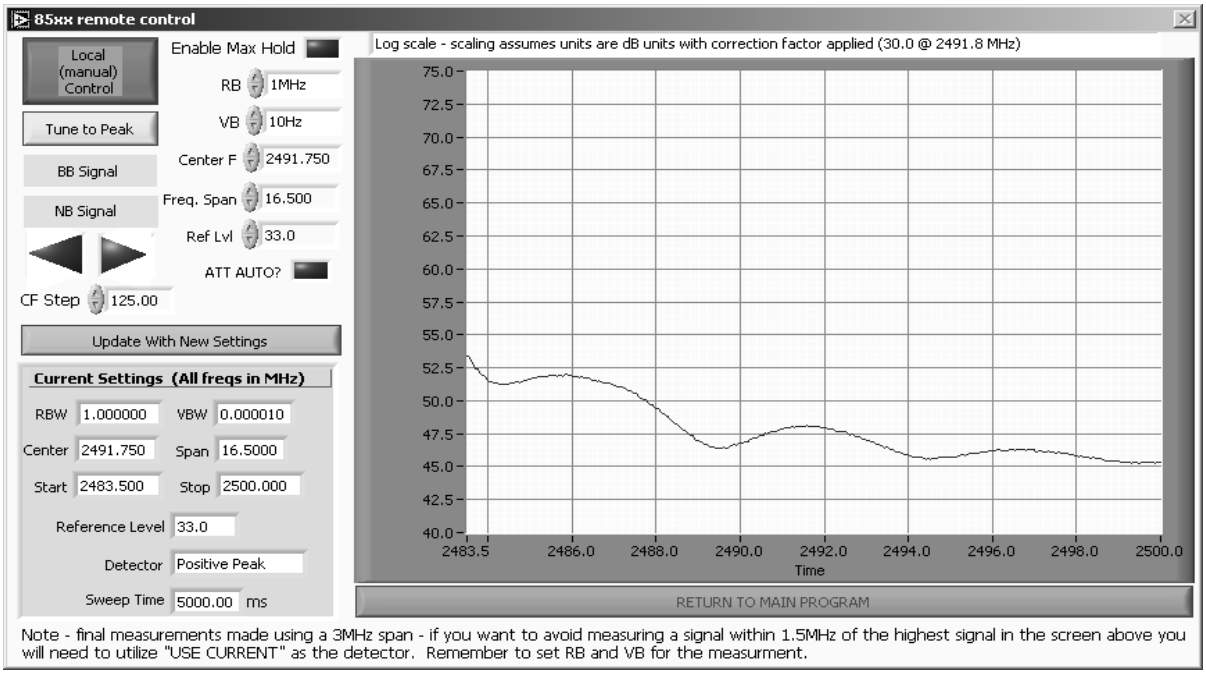
Note 1:	For emissions in restricted bands, the limit of 15.209 was used. For all other emissions, the limit was set 30dB below the level of the fundamental and measured in 100kHz.
Note 2:	Signal is not in a restricted band but the more stringent restricted band limit was used.

Run #2c: High Channel @ 2462 MHz

Fundamental Signal Field Strength: Peak and average values measured in 1 MHz, and peak value measured in 100kHz

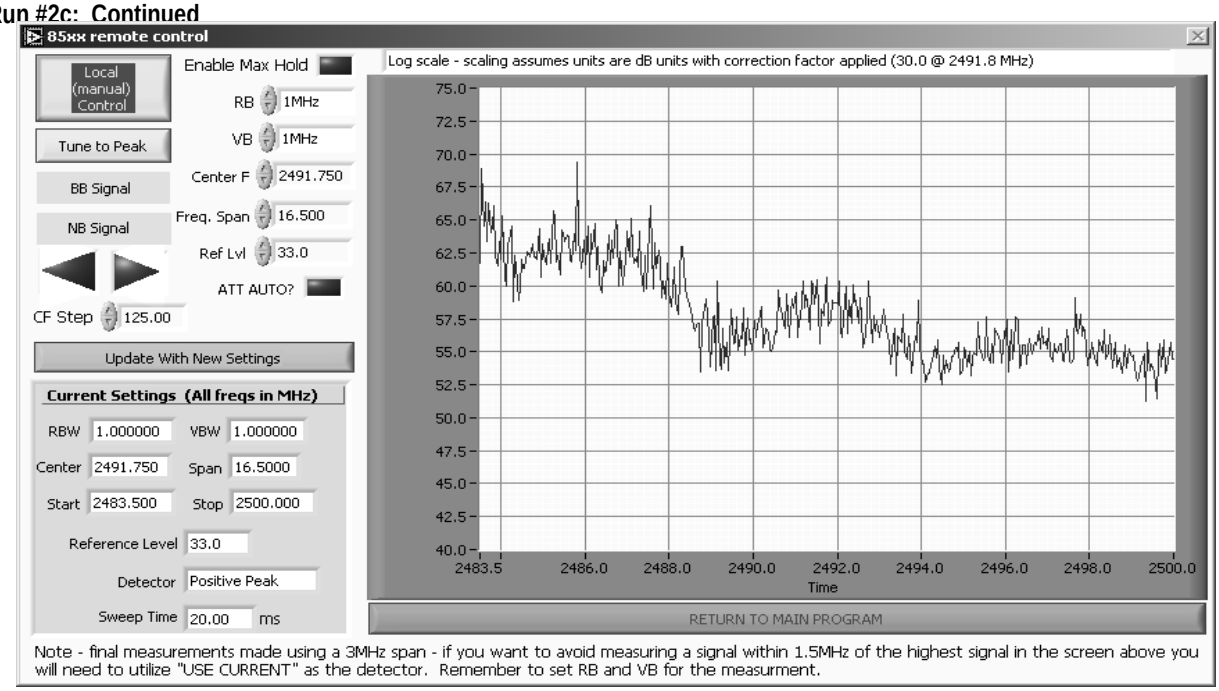
Frequency	Level	Pol	15.209 / 15.247		Detector	Azimuth	Height	Comments
MHz	dBµV/m	v/h	Limit	Margin	Pk/QP/Avg	degrees	meters	
2459.050	103.5	V	-	-	AVG	360	1.5	
2459.050	112.6	V	-	-	PK	360	1.5	
2461.160	90.3	H	-	-	AVG	58	1.6	
2461.160	98.1	H	-	-	PK	58	1.6	

Vertical

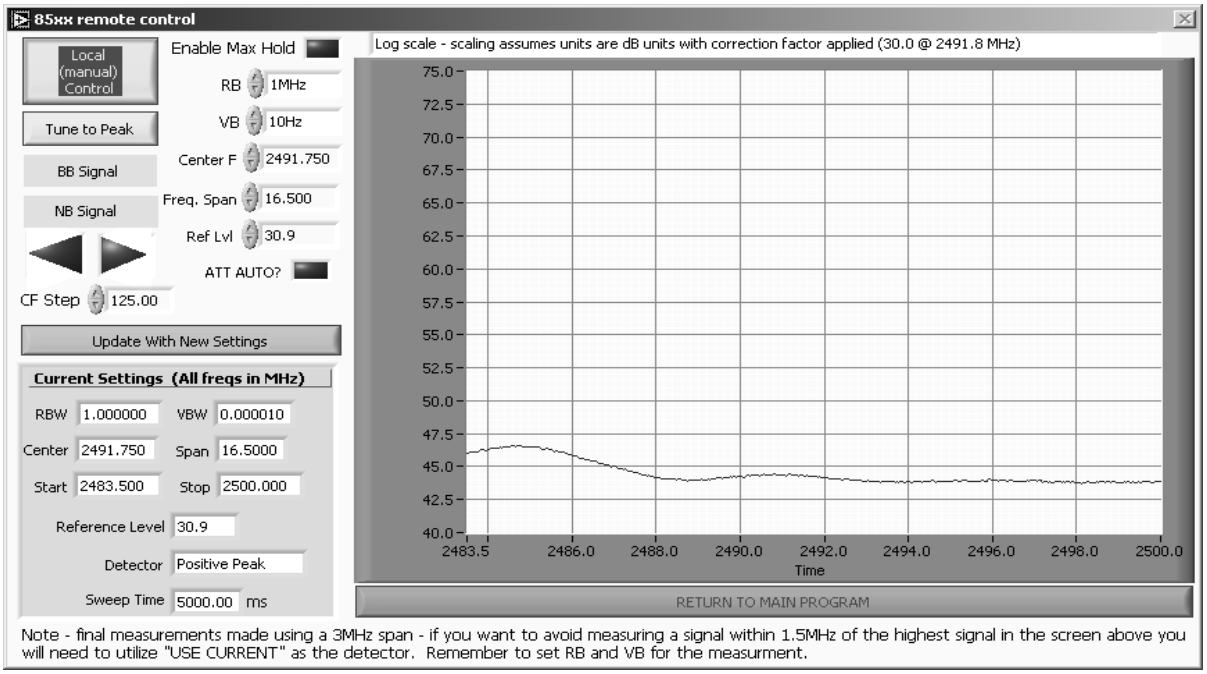


Client:	Ruckus Wireless	Job Number:	J68610
Model:	Retriever module	T-Log Number:	T68973
		Account Manager:	Dean Eriksen
Contact:	Craig Owens		
Standard:	FCC Part 15.247/RSS-210	Class:	N/A

Run #2c: Continued

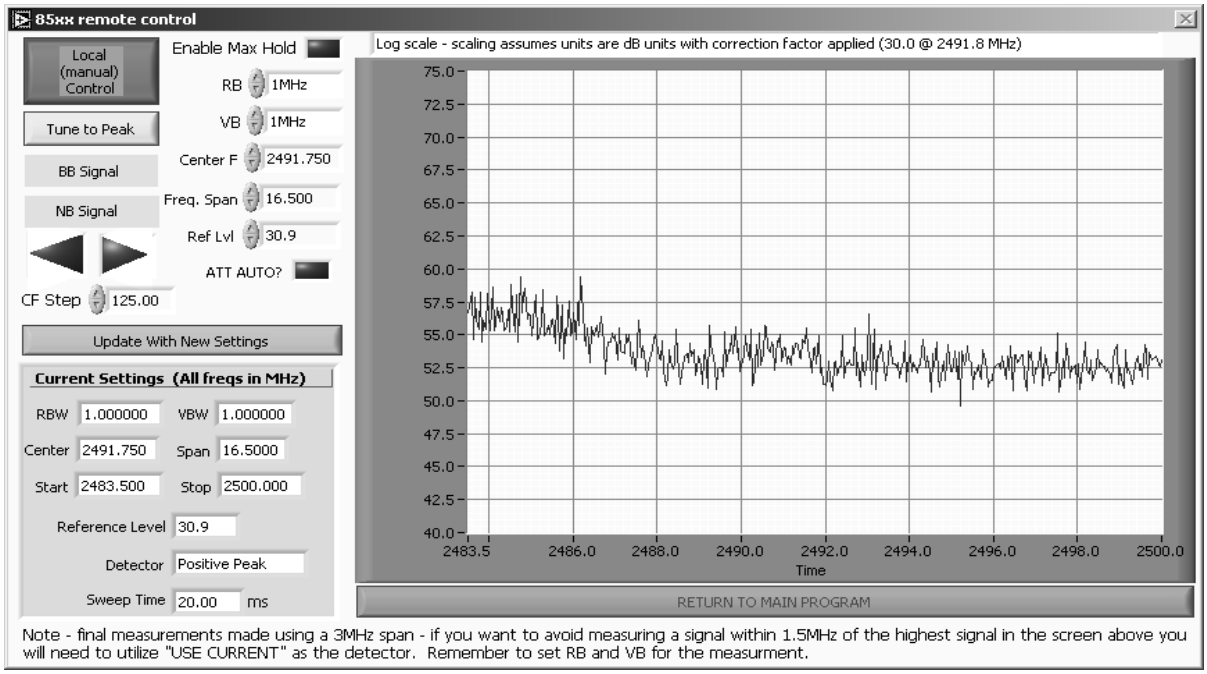


Horizontal



Client:	Ruckus Wireless	Job Number:	J68610
Model:	Retriever module	T-Log Number:	T68973
		Account Manager:	Dean Eriksen
Contact:	Craig Owens		
Standard:	FCC Part 15.247/RSS-210	Class:	N/A

Run #2c: Continued



Band Edge Signal Field Strength

Frequency	Level	Pol	15.209 / 15.247		Detector	Azimuth	Height	Comments
MHz	dBµV/m	v/h	Limit	Margin	Pk/QP/Avg	degrees	meters	
2483.510	53.6	V	54.0	-0.4	Avg	360	1.5	
2484.660	70.7	V	74.0	-3.3	PK	360	1.5	
2484.780	47.0	H	54.0	-7.0	Avg	58	1.6	
2484.110	62.1	H	74.0	-11.9	PK	58	1.6	

Other Spurious Emissions

Frequency	Level	Pol	15.209 / 15.247		Detector	Azimuth	Height	Comments
MHz	dBµV/m	v/h	Limit	Margin	Pk/QP/Avg	degrees	meters	
4923.360	30.5	H	54.0	-23.5	AVG	78	1.3	
4923.360	41.9	H	74.0	-32.1	PK	78	1.3	
4922.920	30.4	V	54.0	-23.6	AVG	336	1.7	
4922.920	41.2	V	74.0	-32.8	PK	336	1.7	

Note 1:	For emissions in restricted bands, the limit of 15.209 was used. For all other emissions, the limit was set 30dB below the level of the fundamental and measured in 100kHz.
Note 2:	Signal is not in a restricted band but the more stringent restricted band limit was used.

Client:	Ruckus Wireless	Job Number:	J68610
Model:	Retriever module	T-Log Number:	T68973
		Account Manager:	Dean Eriksen
Contact:	Craig Owens		
Standard:	FCC Part 15.247/RSS-210	Class:	N/A

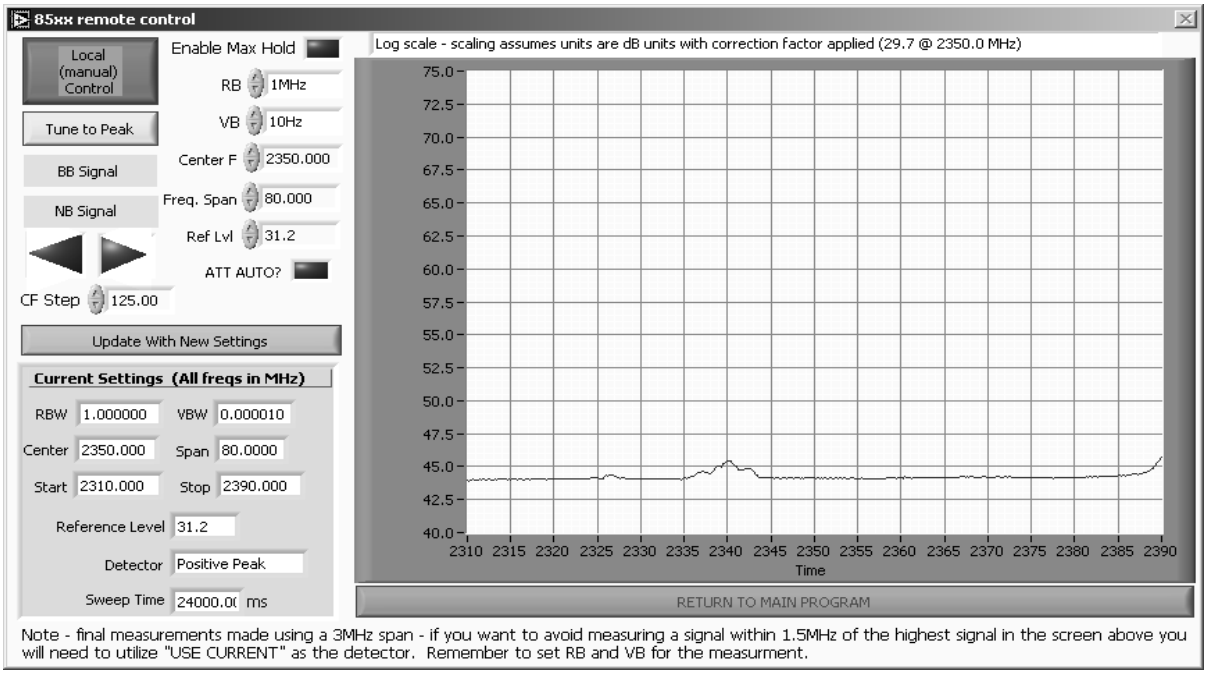
Run #3: Radiated Spurious Emissions, 30 - 18000 MHz. Operating Mode: 802.11n 20 MHz HT20 MCS0

Run #3a: Low Channel @ 2412 MHz

Fundamental Signal Field Strength: Peak and average values measured in 1 MHz, and peak value measured in 100kHz

Frequency	Level	Pol	15.209 / 15.247		Detector	Azimuth	Height	Comments
MHz	dBµV/m	v/h	Limit	Margin	Pk/QP/Avg	degrees	meters	
2412.980	101.6	V	-	-	AVG	12	1.6	
2412.980	110.2	V	-	-	PK	12	1.6	
2413.040	85.9	H	-	-	AVG	286	1.4	
2413.040	94.7	H	-	-	PK	286	1.4	

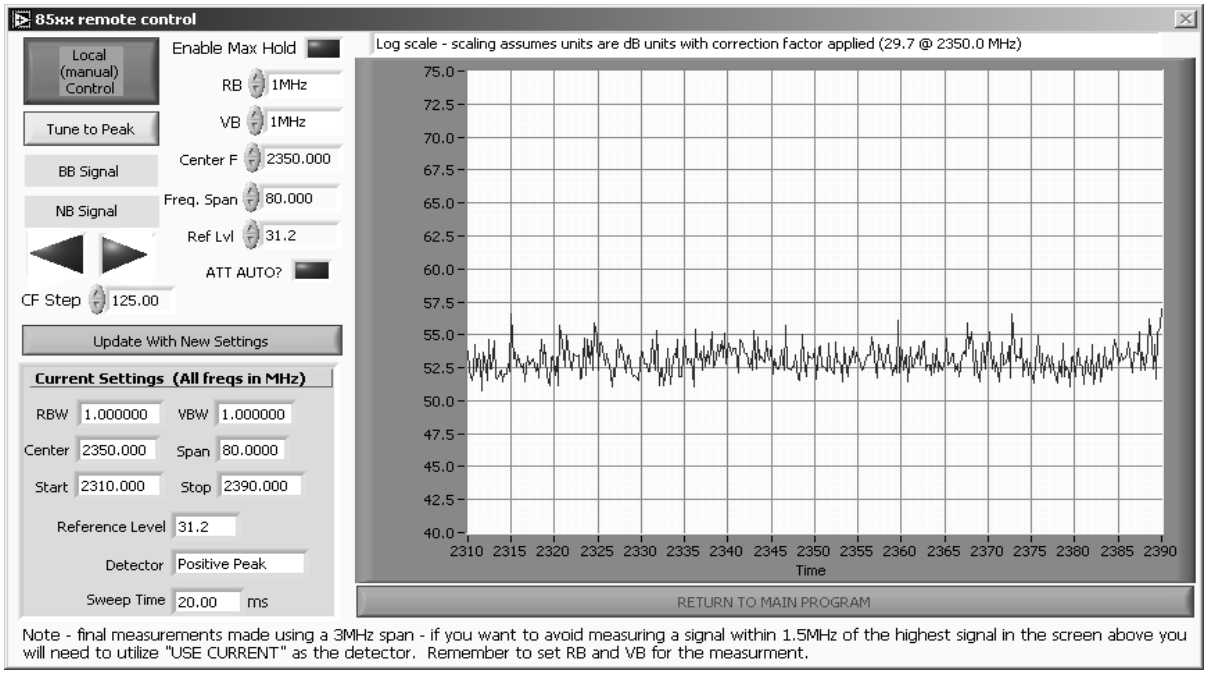
Vertical



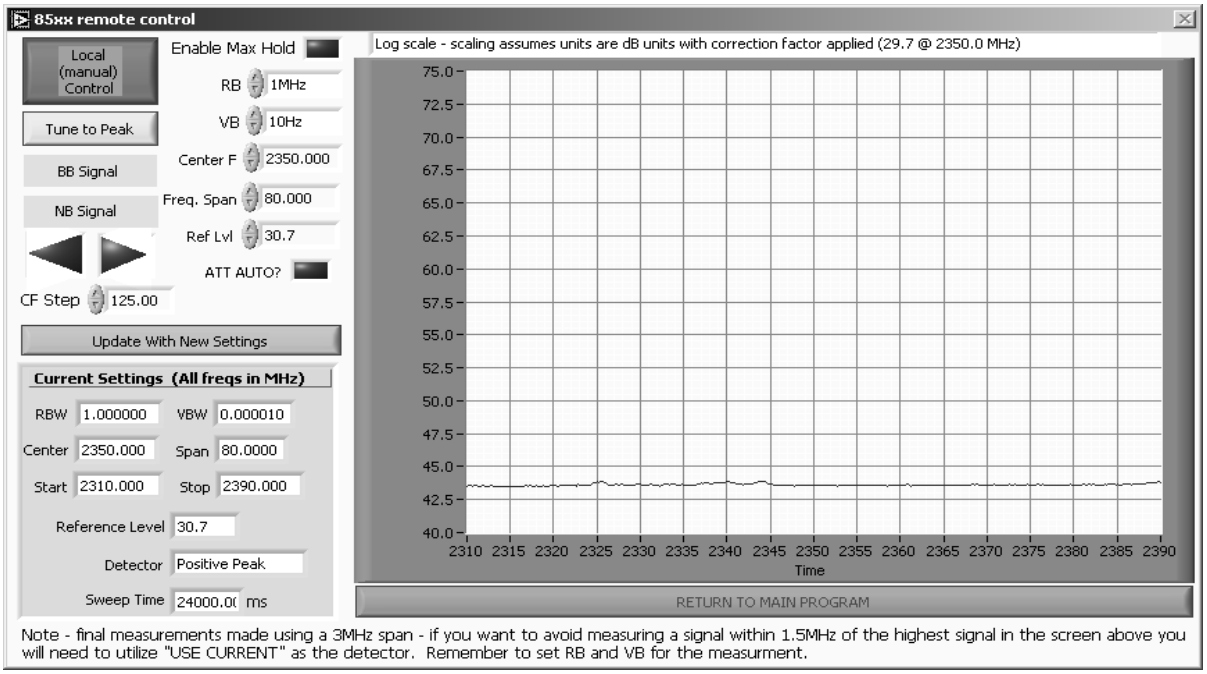
Note - final measurements made using a 3MHz span - if you want to avoid measuring a signal within 1.5MHz of the highest signal in the screen above you will need to utilize "USE CURRENT" as the detector. Remember to set RB and VB for the measurment.

Client:	Ruckus Wireless	Job Number:	J68610
Model:	Retriever module	T-Log Number:	T68973
		Account Manager:	Dean Eriksen
Contact:	Craig Owens		
Standard:	FCC Part 15.247/RSS-210	Class:	N/A

Run #3a: Continued

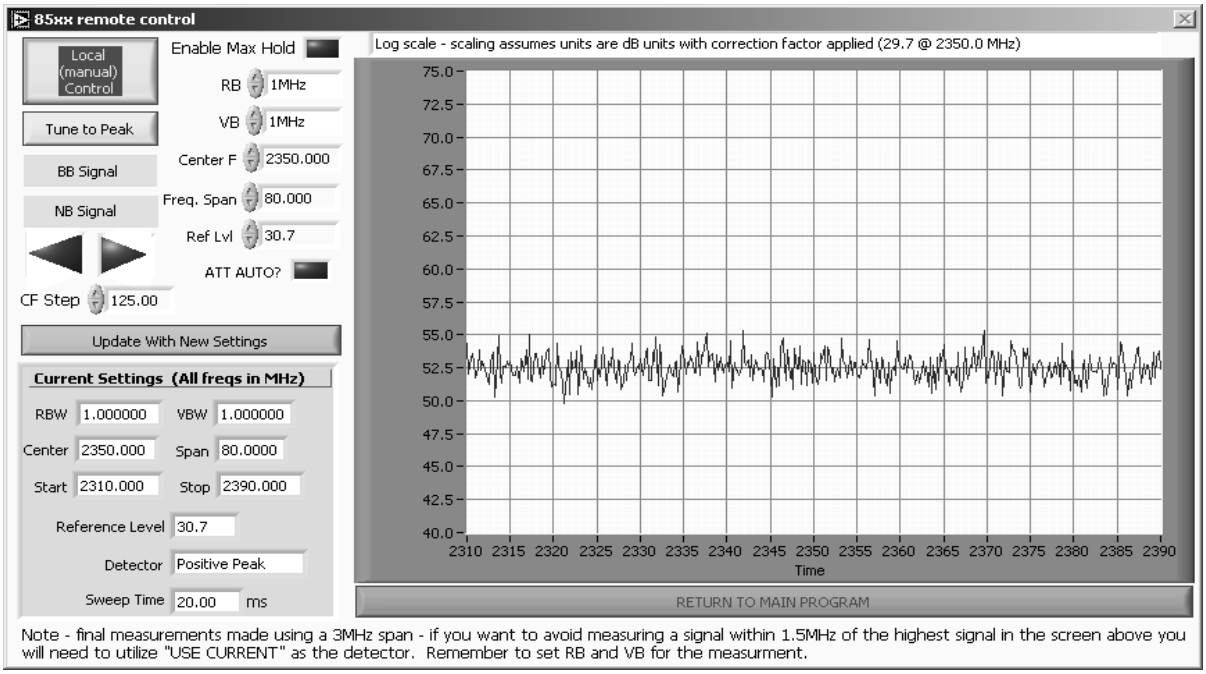


Horizontal



Client:	Ruckus Wireless	Job Number:	J68610
Model:	Retriever module	T-Log Number:	T68973
		Account Manager:	Dean Eriksen
Contact:	Craig Owens		
Standard:	FCC Part 15.247/RSS-210	Class:	N/A

Run #3a: Continued



Band Edge Signal Field Strength

Frequency	Level	Pol	15.209 / 15.247		Detector	Azimuth	Height	Comments
MHz	dBµV/m	v/h	Limit	Margin	Pk/QP/Avg	degrees	meters	
2389.980	45.6	V	54.0	-8.4	Avg	12	1.1	
2389.940	60.0	V	74.0	-14.0	PK	12	1.6	
2389.770	44.0	H	54.0	-10.0	Avg	286	1.4	
2389.870	56.7	H	74.0	-17.3	PK	286	1.4	

Other Spurious Emissions

Frequency	Level	Pol	15.209 / 15.247		Detector	Azimuth	Height	Comments
MHz	dBµV/m	v/h	Limit	Margin	Pk/QP/Avg	degrees	meters	
4825.050	29.9	V	54.0	-24.1	AVG	0	1.0	
4825.050	40.7	V	74.0	-33.3	PK	0	1.0	
4824.560	29.9	H	54.0	-24.1	AVG	16	1.0	
4824.560	40.5	H	74.0	-33.5	PK	16	1.0	
Note 1:	For emissions in restricted bands, the limit of 15.209 was used. For all other emissions, the limit was set 30dB below the level of the fundamental and measured in 100kHz.							
Note 2:	Signal is not in a restricted band but the more stringent restricted band limit was used.							

Client:	Ruckus Wireless	Job Number:	J68610
Model:	Retriever module	T-Log Number:	T68973
		Account Manager:	Dean Eriksen
Contact:	Craig Owens		
Standard:	FCC Part 15.247/RSS-210	Class:	N/A

Run #3b: Center Channel @ 2437 MHz

Frequency	Level	Pol	15.209 / 15.247		Detector	Azimuth	Height	Comments
MHz	dBµV/m	v/h	Limit	Margin	Pk/QP/Avg	degrees	meters	
4873.540	30.4	H	54.0	-23.6	AVG	8	1.0	
4873.540	40.8	H	74.0	-33.2	PK	8	1.0	
4875.350	30.4	V	54.0	-23.6	AVG	16	1.0	
4875.350	42.0	V	74.0	-32.0	PK	16	1.0	

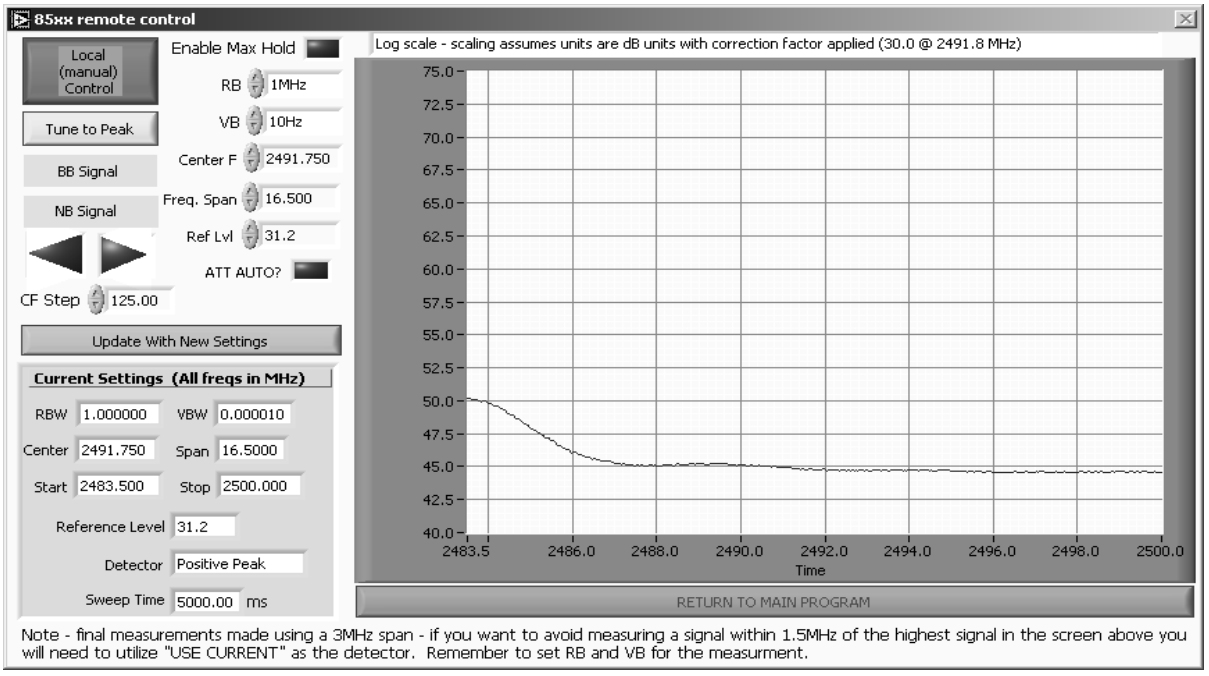
Note 1:	For emissions in restricted bands, the limit of 15.209 was used. For all other emissions, the limit was set 30dB below the level of the fundamental and measured in 100kHz.
Note 2:	Signal is not in a restricted band but the more stringent restricted band limit was used.

Run #3c: High Channel @ 2462 MHz

Fundamental Signal Field Strength: Peak and average values measured in 1 MHz, and peak value measured in 100kHz

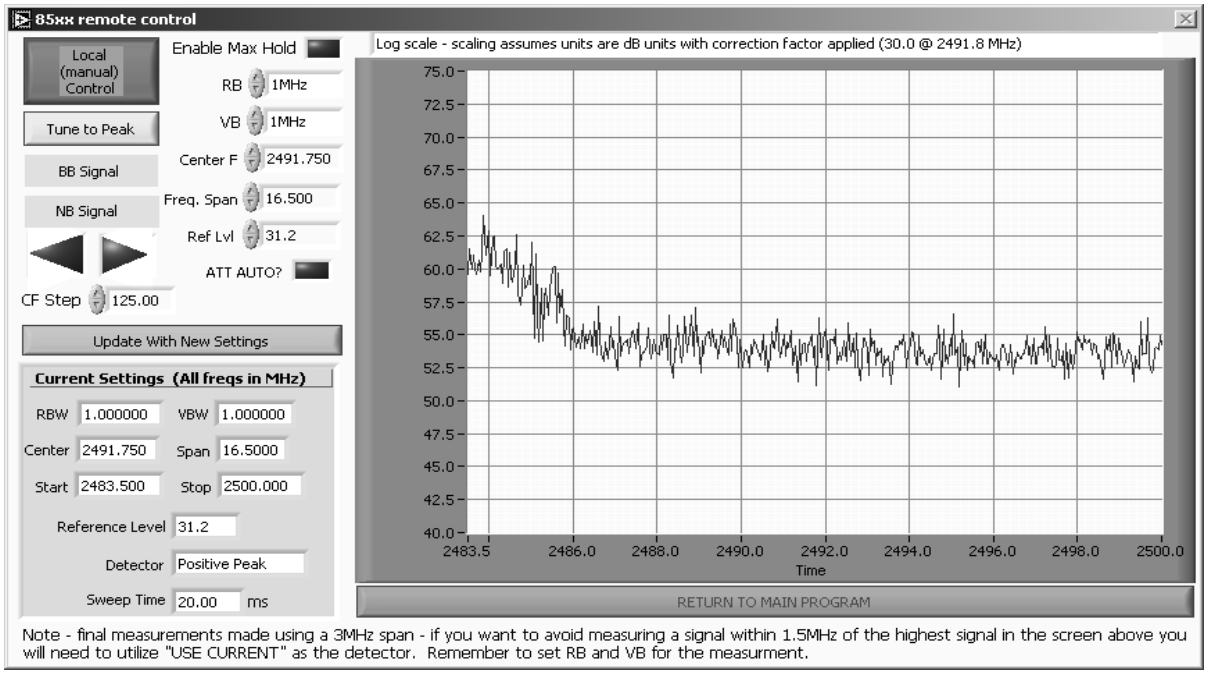
Frequency	Level	Pol	15.209 / 15.247		Detector	Azimuth	Height	Comments
MHz	dBµV/m	v/h	Limit	Margin	Pk/QP/Avg	degrees	meters	
2463.080	103.4	V	-	-	AVG	3	1.5	
2463.080	113.0	V	-	-	PK	3	1.5	
2462.960	86.4	H	-	-	AVG	59	1.3	
2462.960	94.3	H	-	-	PK	59	1.3	

Vertical

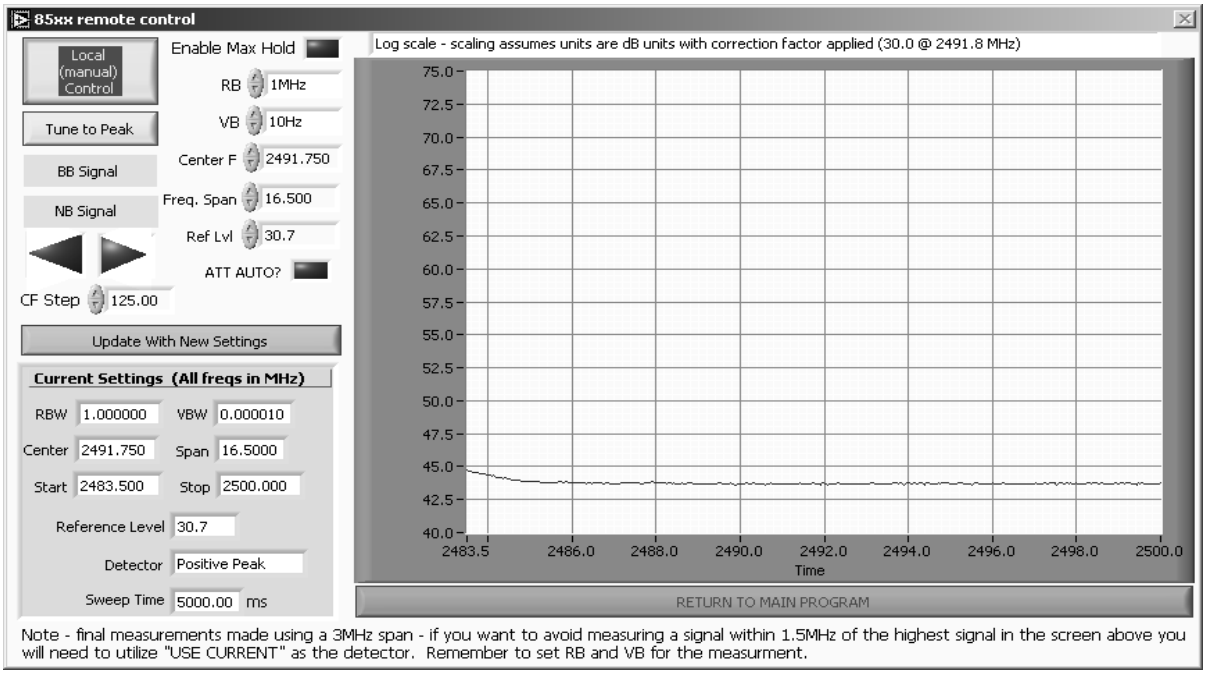


Client:	Ruckus Wireless	Job Number:	J68610
Model:	Retriever module	T-Log Number:	T68973
		Account Manager:	Dean Eriksen
Contact:	Craig Owens		
Standard:	FCC Part 15.247/RSS-210	Class:	N/A

Run #3c: Continued

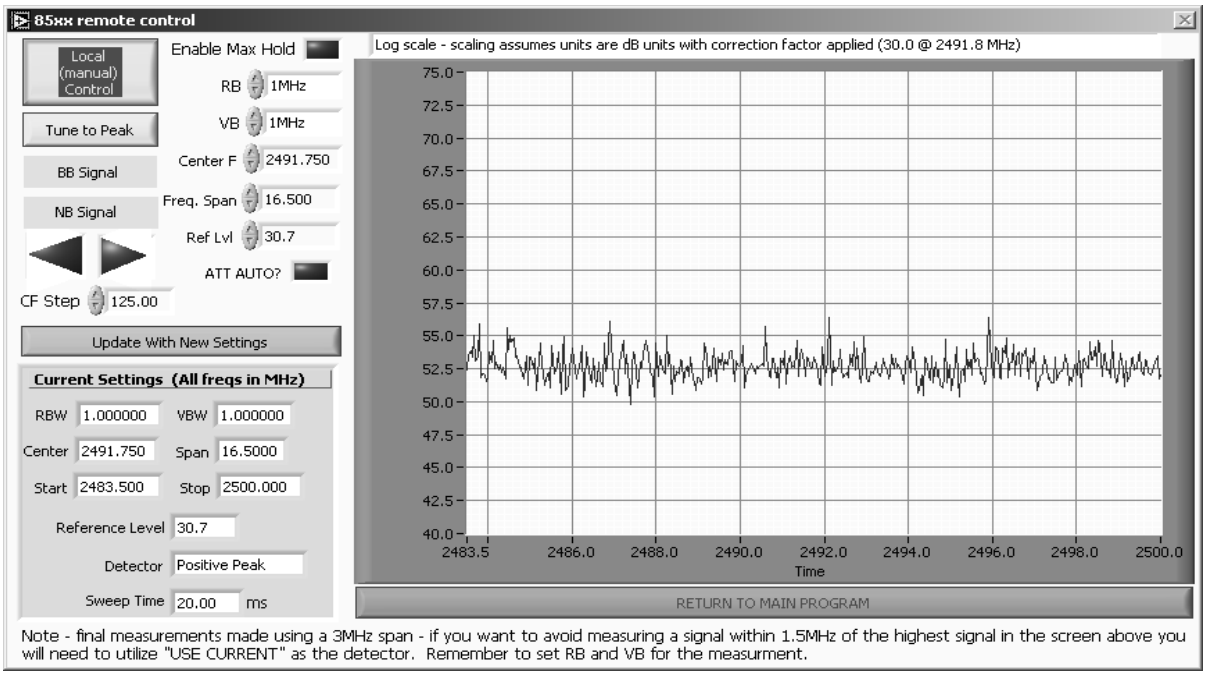


Horizontal



Client:	Ruckus Wireless	Job Number:	J68610
Model:	Retriever module	T-Log Number:	T68973
		Account Manager:	Dean Eriksen
Contact:	Craig Owens		
Standard:	FCC Part 15.247/RSS-210	Class:	N/A

Run #3c: Continued



Band Edge Signal Field Strength

Frequency	Level	Pol	15.209 / 15.247		Detector	Azimuth	Height	Comments
MHz	dBµV/m	v/h	Limit	Margin	Pk/QP/Avg	degrees	meters	
2483.570	50.1	V	54.0	-3.9	Avg	3	1.5	
2483.970	66.5	V	74.0	-7.5	PK	3	1.5	
2483.500	44.8	H	54.0	-9.2	Avg	59	1.3	
2483.530	56.5	H	74.0	-17.5	PK	59	1.3	

Other Spurious Emissions

Frequency	Level	Pol	15.209 / 15.247		Detector	Azimuth	Height	Comments
MHz	dBµV/m	v/h	Limit	Margin	Pk/QP/Avg	degrees	meters	
4924.260	30.5	V	54.0	-23.5	AVG	11	1.0	
4924.260	40.9	V	74.0	-33.1	PK	11	1.0	
4924.670	30.6	H	54.0	-23.4	AVG	30	1.0	
4924.670	41.2	H	74.0	-32.8	PK	30	1.0	
Note 1:	For emissions in restricted bands, the limit of 15.209 was used. For all other emissions, the limit was set 30dB below the level of the fundamental and measured in 100kHz.							
Note 2:	Signal is not in a restricted band but the more stringent restricted band limit was used.							

Client:	Ruckus Wireless	Job Number:	J68610
Model:	Retriever module	T-Log Number:	T68973
		Account Manager:	Dean Eriksen
Contact:	Craig Owens		
Standard:	FCC Part 15.247/RSS-210	Class:	N/A

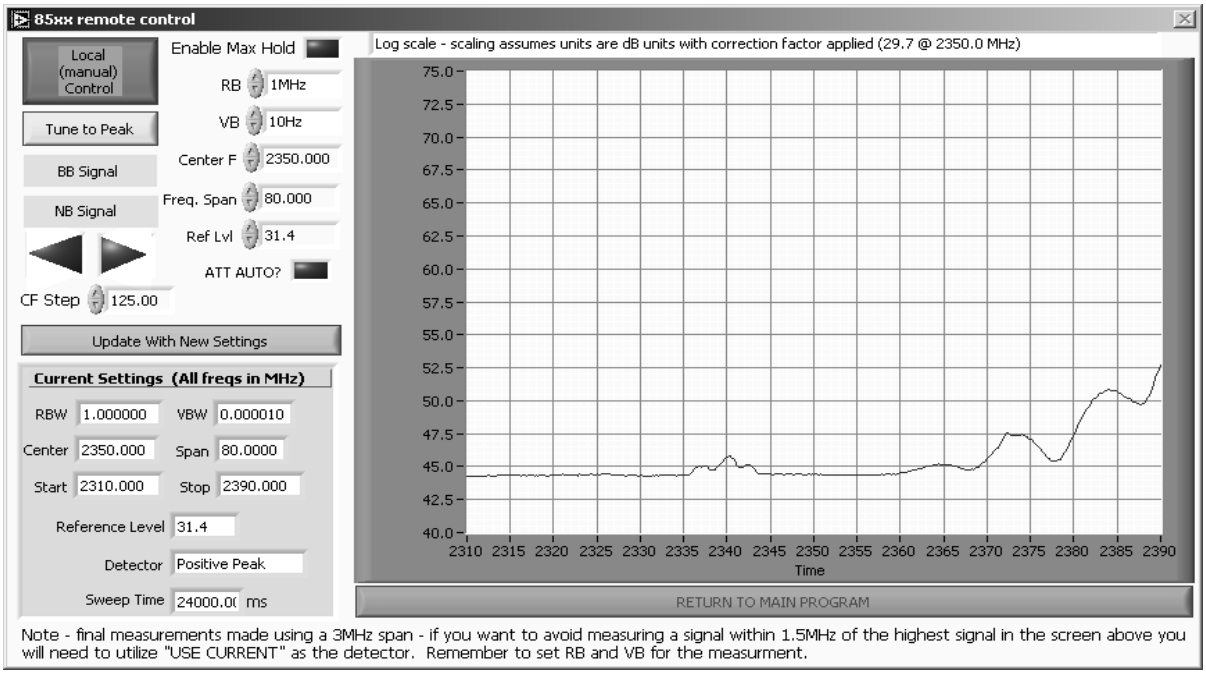
Run #4: Radiated Spurious Emissions, 30 - 18000 MHz. Operating Mode: 802.11n 40 MHz HT40 MCS0

Run #4a: Low Channel @ 2422 MHz

Fundamental Signal Field Strength: Peak and average values measured in 1 MHz, and peak value measured in 100kHz

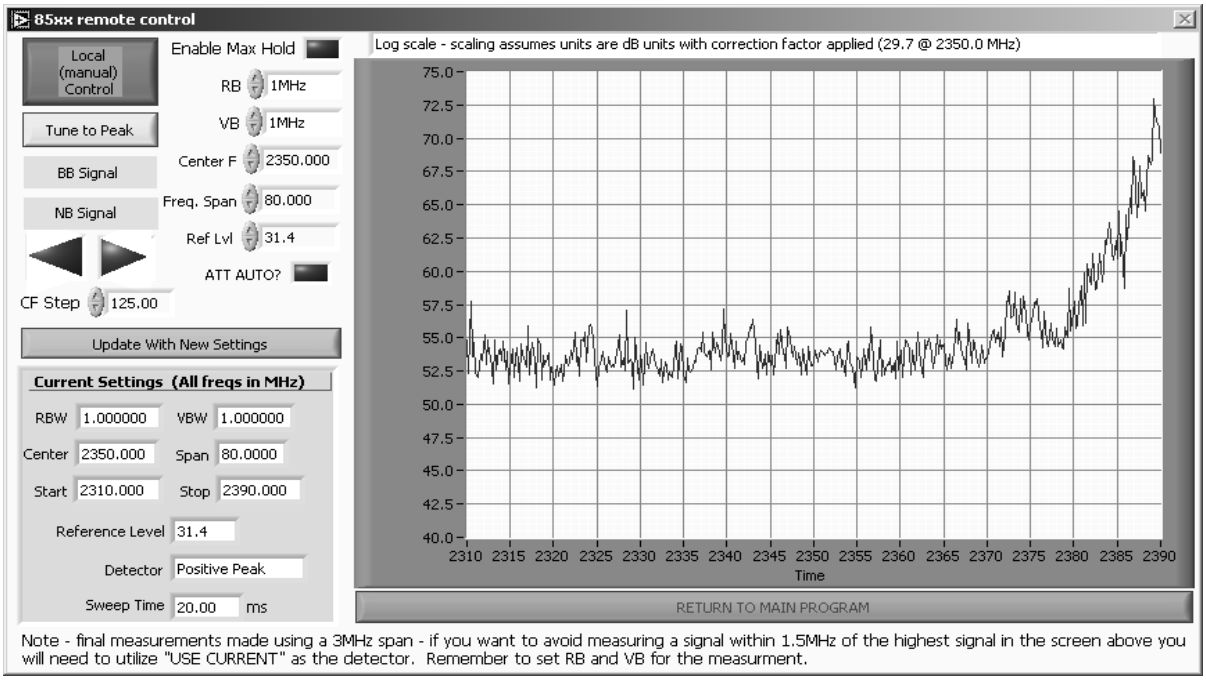
Frequency	Level	Pol	15.209 / 15.247		Detector	Azimuth	Height	Comments
MHz	dBµV/m	v/h	Limit	Margin	Pk/QP/Avg	degrees	meters	
2420.600	98.8	V	-	-	AVG	11	1.6	
2420.600	107.7	V	-	-	PK	11	1.6	
2420.640	81.2	H	-	-	AVG	60	1.6	
2420.640	89.2	H	-	-	PK	60	1.6	

Vertical

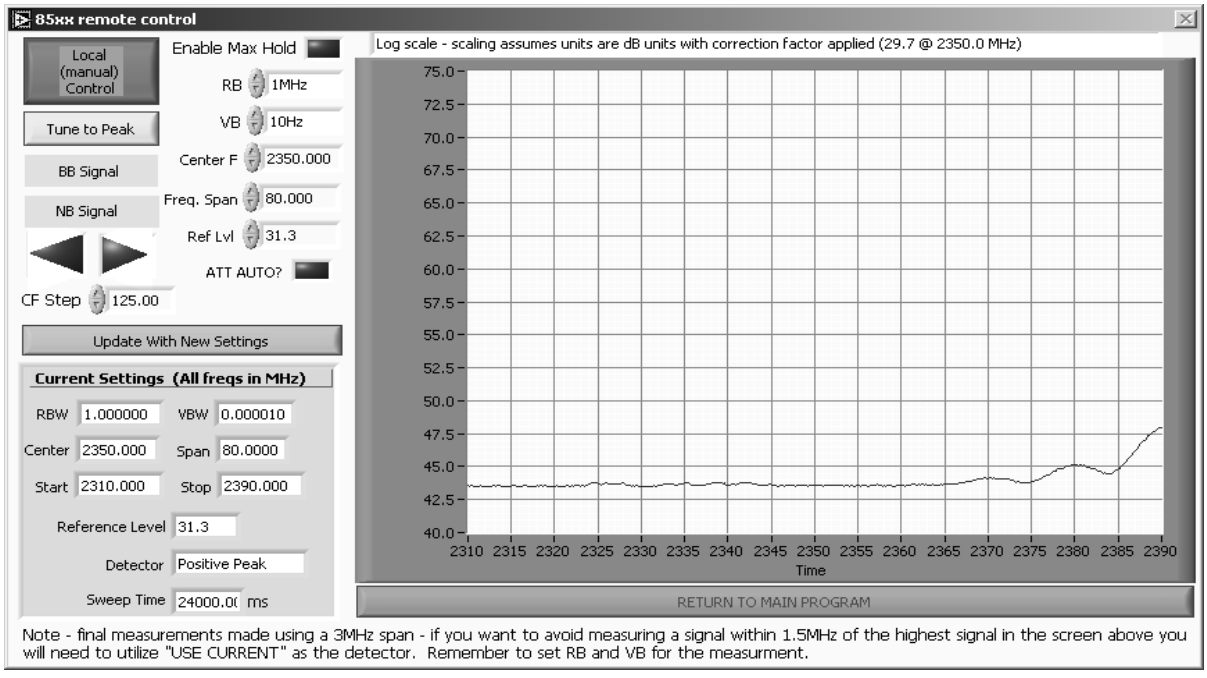


Client:	Ruckus Wireless	Job Number:	J68610
Model:	Retriever module	T-Log Number:	T68973
		Account Manager:	Dean Eriksen
Contact:	Craig Owens		
Standard:	FCC Part 15.247/RSS-210	Class:	N/A

Run #4a: Continued

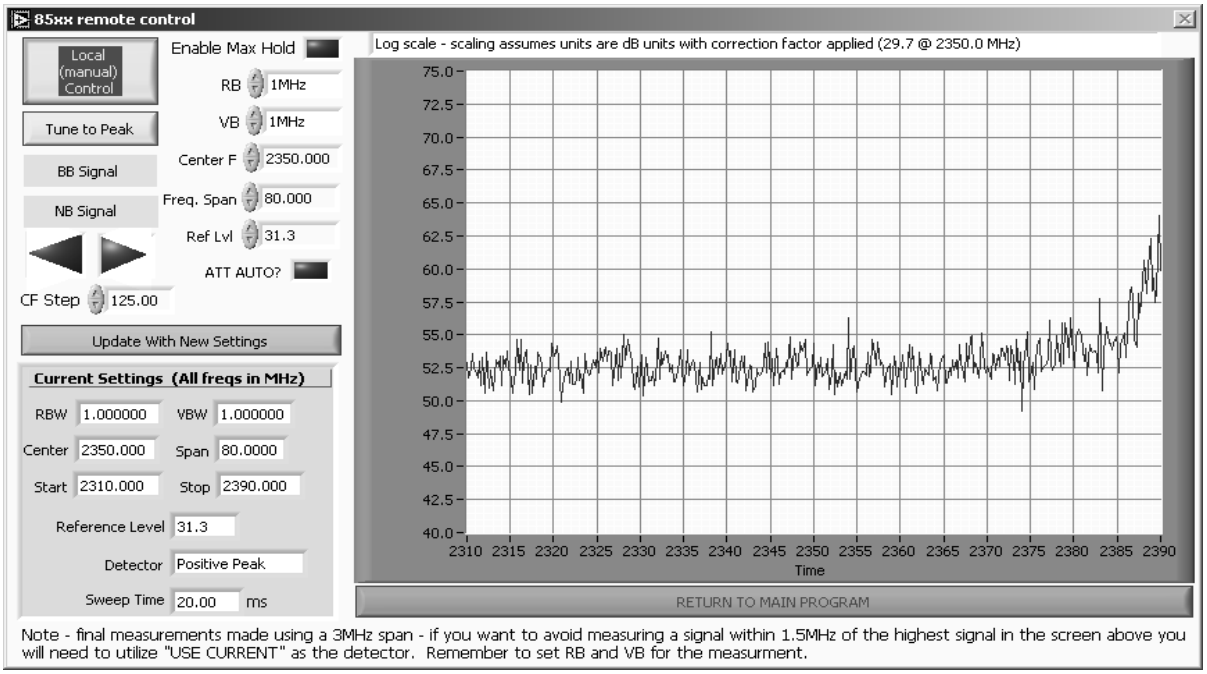


Horizontal



Client:	Ruckus Wireless	Job Number:	J68610
Model:	Retriever module	T-Log Number:	T68973
		Account Manager:	Dean Eriksen
Contact:	Craig Owens		
Standard:	FCC Part 15.247/RSS-210	Class:	N/A

Run #4a: Continued



Band Edge Signal Field Strength

Frequency	Level	Pol	15.209 / 15.247		Detector	Azimuth	Height	Comments
MHz	dBµV/m	v/h	Limit	Margin	Pk/QP/Avg	degrees	meters	
2389.990	53.2	V	54.0	-0.8	Avg	11	1.5	
2389.750	72.3	V	74.0	-1.7	PK	11	1.5	
2389.980	48.2	H	54.0	-5.8	Avg	60	1.6	
2389.980	66.1	H	74.0	-7.9	PK	60	1.6	

Other Spurious Emissions

Frequency	Level	Pol	15.209 / 15.247		Detector	Azimuth	Height	Comments
MHz	dBµV/m	v/h	Limit	Margin	Pk/QP/Avg	degrees	meters	
4845.120	29.7	H	54.0	-24.3	AVG	19	1.0	
4845.120	41.7	H	74.0	-32.3	PK	19	1.0	
4843.280	29.7	V	54.0	-24.3	AVG	23	1.0	
4843.280	40.8	V	74.0	-33.2	PK	23	1.0	
Note 1:	For emissions in restricted bands, the limit of 15.209 was used. For all other emissions, the limit was set 30dB below the level of the fundamental and measured in 100kHz.							
Note 2:	Signal is not in a restricted band but the more stringent restricted band limit was used.							

Client:	Ruckus Wireless	Job Number:	J68610
Model:	Retriever module	T-Log Number:	T68973
		Account Manager:	Dean Eriksen
Contact:	Craig Owens		
Standard:	FCC Part 15.247/RSS-210	Class:	N/A

Run #4b: Center Channel @ 2437 MHz

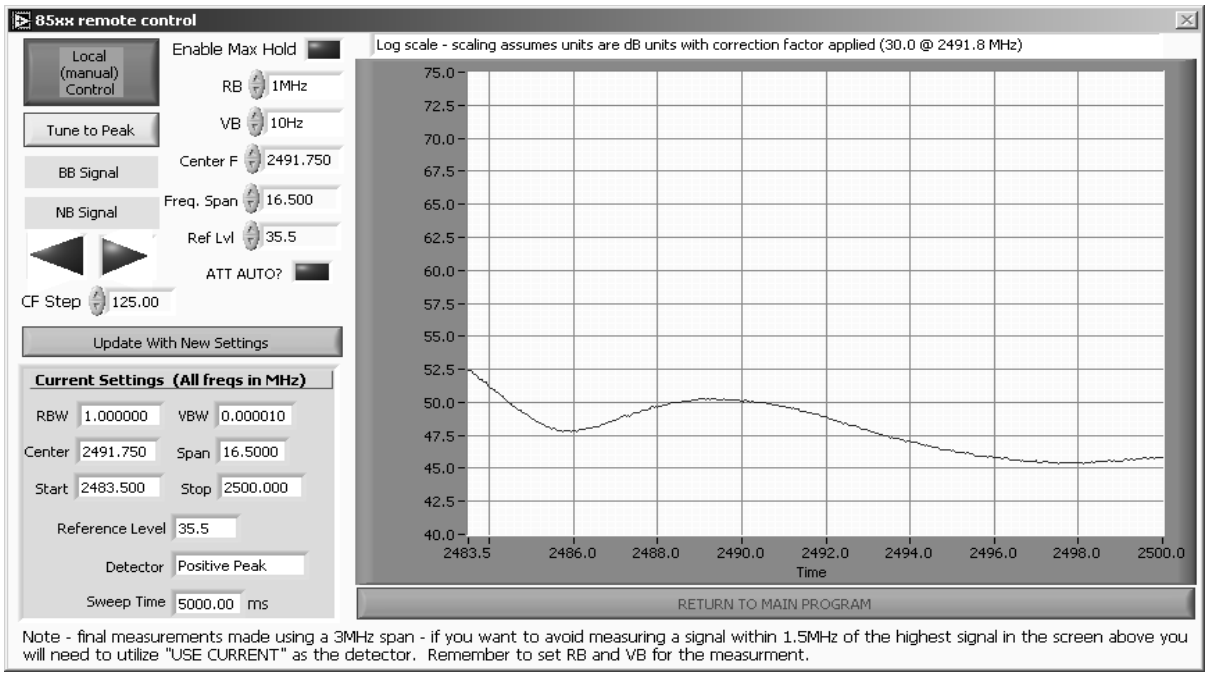
Frequency	Level	Pol	15.209 / 15.247		Detector	Azimuth	Height	Comments
MHz	dBµV/m	v/h	Limit	Margin	Pk/QP/Avg	degrees	meters	
4874.830	30.4	V	54.0	-23.6	AVG	13	1.0	
4874.830	41.1	V	74.0	-32.9	PK	13	1.0	
4874.250	30.4	H	54.0	-23.6	AVG	19	1.0	
4874.250	41.5	H	74.0	-32.5	PK	19	1.0	
Note 1:	For emissions in restricted bands, the limit of 15.209 was used. For all other emissions, the limit was set 30dB below the level of the fundamental and measured in 100kHz.							
Note 2:	Signal is not in a restricted band but the more stringent restricted band limit was used.							

Run #4c: High Channel @ 2452 MHz

Fundamental Signal Field Strength: Peak and average values measured in 1 MHz, and peak value measured in 100kHz

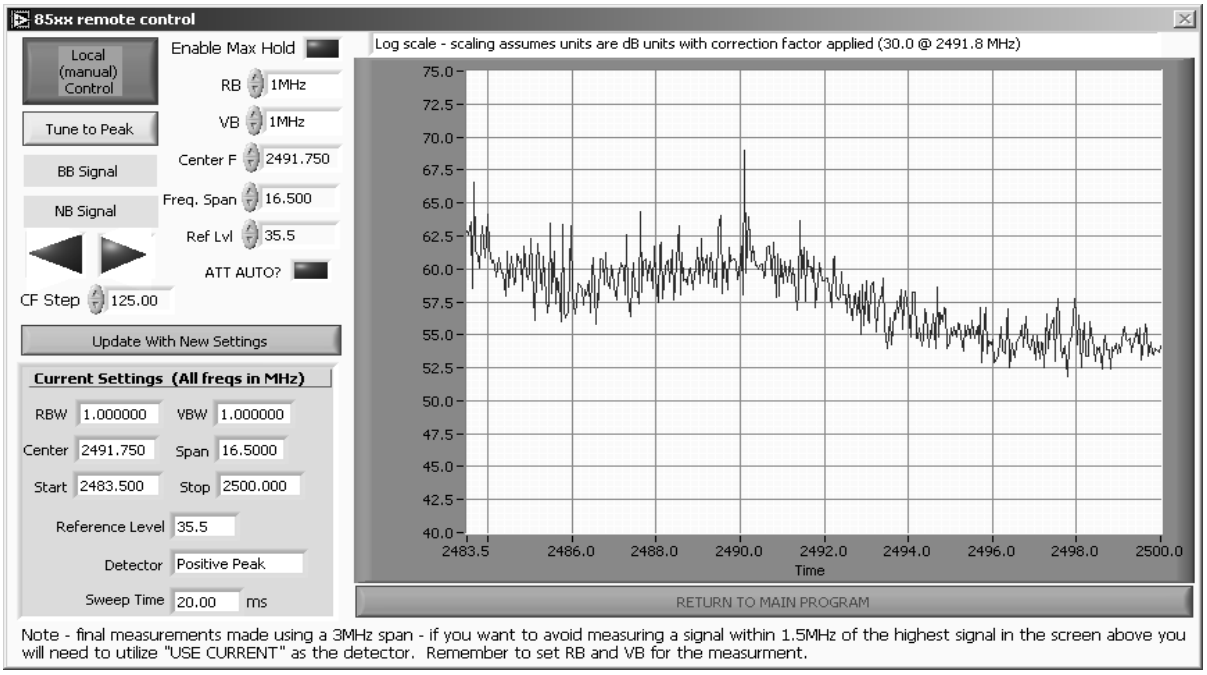
Frequency	Level	Pol	15.209 / 15.247		Detector	Azimuth	Height	Comments
MHz	dBµV/m	v/h	Limit	Margin	Pk/QP/Avg	degrees	meters	
2450.580	99.6	V	-	-	AVG	360	1.5	
2450.580	108.7	V	-	-	PK	360	1.5	
2450.770	84.0	H	-	-	AVG	57	1.6	
2450.770	92.1	H	-	-	PK	57	1.6	

Vertical

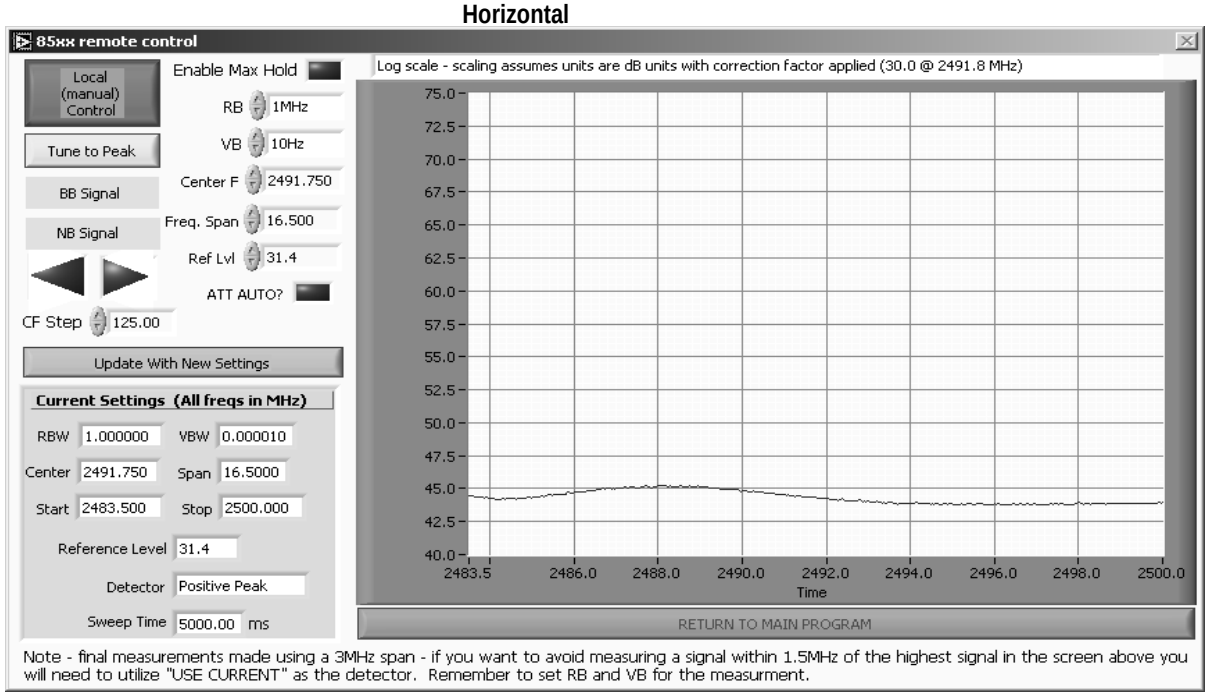


Client:	Ruckus Wireless	Job Number:	J68610
Model:	Retriever module	T-Log Number:	T68973
		Account Manager:	Dean Eriksen
Contact:	Craig Owens		
Standard:	FCC Part 15.247/RSS-210	Class:	N/A

Run #4c: Continued

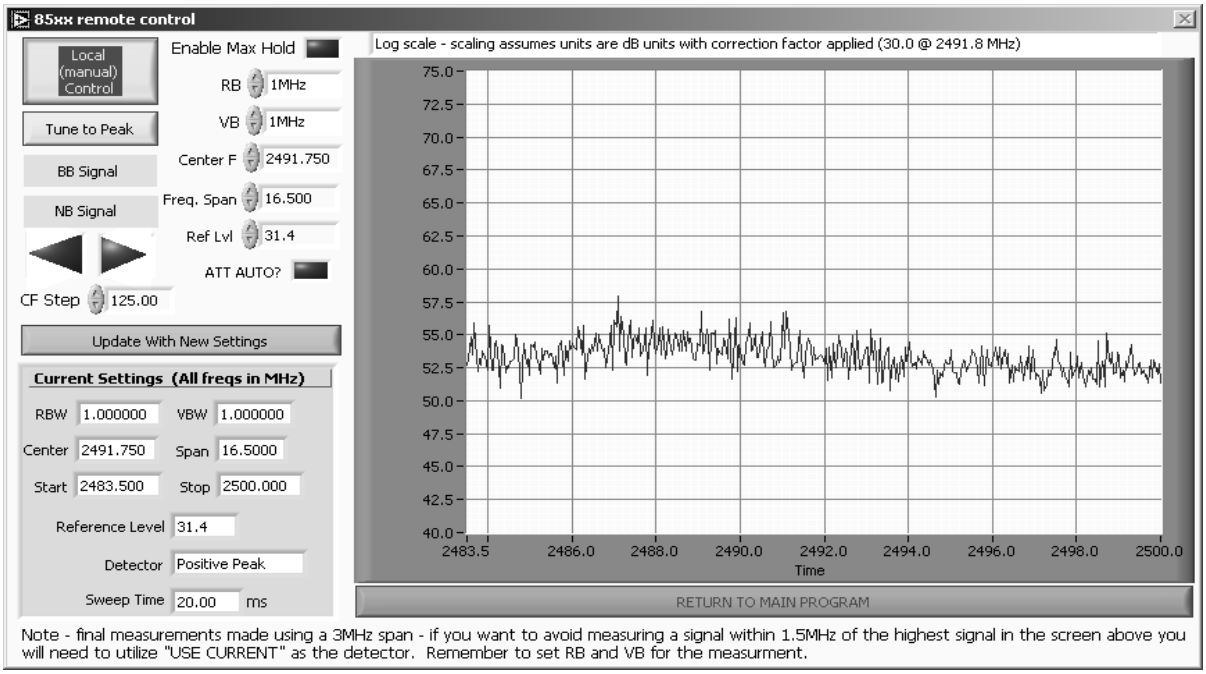


Horizontal



Client:	Ruckus Wireless	Job Number:	J68610
Model:	Retriever module	T-Log Number:	T68973
		Account Manager:	Dean Eriksen
Contact:	Craig Owens		
Standard:	FCC Part 15.247/RSS-210	Class:	N/A

Run #4c: Continued



Band Edge Signal Field Strength

Frequency	Level	Pol	15.209 / 15.247		Detector	Azimuth	Height	Comments
MHz	dBµV/m	v/h	Limit	Margin	Pk/QP/Avg	degrees	meters	
2483.510	52.9	H	54.0	-1.1	Avg	360	1.5	
2483.500	67.6	H	74.0	-6.4	PK	360	1.5	
2486.120	46.7	H	54.0	-7.3	AVG	57	1.6	
2486.120	59.3	H	74.0	-14.7	PK	57	1.6	

Other Spurious Emissions

Frequency	Level	Pol	15.209 / 15.247		Detector	Azimuth	Height	Comments
MHz	dBµV/m	v/h	Limit	Margin	Pk/QP/Avg	degrees	meters	
4905.180	30.4	H	54.0	-23.6	AVG	16	1.0	
4905.180	41.0	H	74.0	-33.0	PK	16	1.0	
4904.090	30.4	V	54.0	-23.6	AVG	2	1.0	
4904.090	41.5	V	74.0	-32.5	PK	2	1.0	

Note 1:	For emissions in restricted bands, the limit of 15.209 was used. For all other emissions, the limit was set 30dB below the level of the fundamental and measured in 100kHz.
Note 2:	Signal is not in a restricted band but the more stringent restricted band limit was used.

Client:	Ruckus Wireless	Job Number:	J68610
Model:	Retriever module	T-Log Number:	T68973
		Account Manager:	Dean Eriksen
Contact:	Craig Owens		
Standard:	FCC Part 15.247/RSS-210	Class:	N/A

RSS 210 and FCC 15.247 Radiated Spurious Emissions

Test Specific Details

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

Date of Test: 10/12/2007
Test Engineer: Rafael Varelas
Test Location: SVOATS #1

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

General Test Configuration

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

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

Ambient Conditions:

Temperature: 13 °C
Rel. Humidity: 89 %

Summary of Results

Run #	Test Performed	Limit	Pass / Fail	Result / Margin
1 (802.11b Mode)	RE, 30 - 18000 MHz - Spurious Emissions	FCC Part 15.209 / 15.247(c)	Pass	53.4dBµV/m @ 4824.0MHz (-0.6dB)
2 (802.11g Mode)	RE, 30 - 18000 MHz - Spurious Emissions	FCC Part 15.209 / 15.247(c)	Pass	52.2dBµV/m @ 2390MHz (-1.8dB)
3 (802.11n 20MHz Mode)	RE, 30 - 18000 MHz - Spurious Emissions	FCC Part 15.209 / 15.247(c)	Pass	51.6dBµV/m @ 2484.22MHz (-2.4dB)
4 (802.11n 40MHz Mode)	RE, 30 - 18000 MHz - Spurious Emissions	FCC Part 15.209 / 15.247(c)	Pass	52.5dBµV/m @ 2483.5MHz (-1.5dB)

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:	Ruckus Wireless	Job Number:	J68610
Model:	Retriever module	T-Log Number:	T68973
		Account Manager:	Dean Eriksen
Contact:	Craig Owens		
Standard:	FCC Part 15.247/RSS-210	Class:	N/A

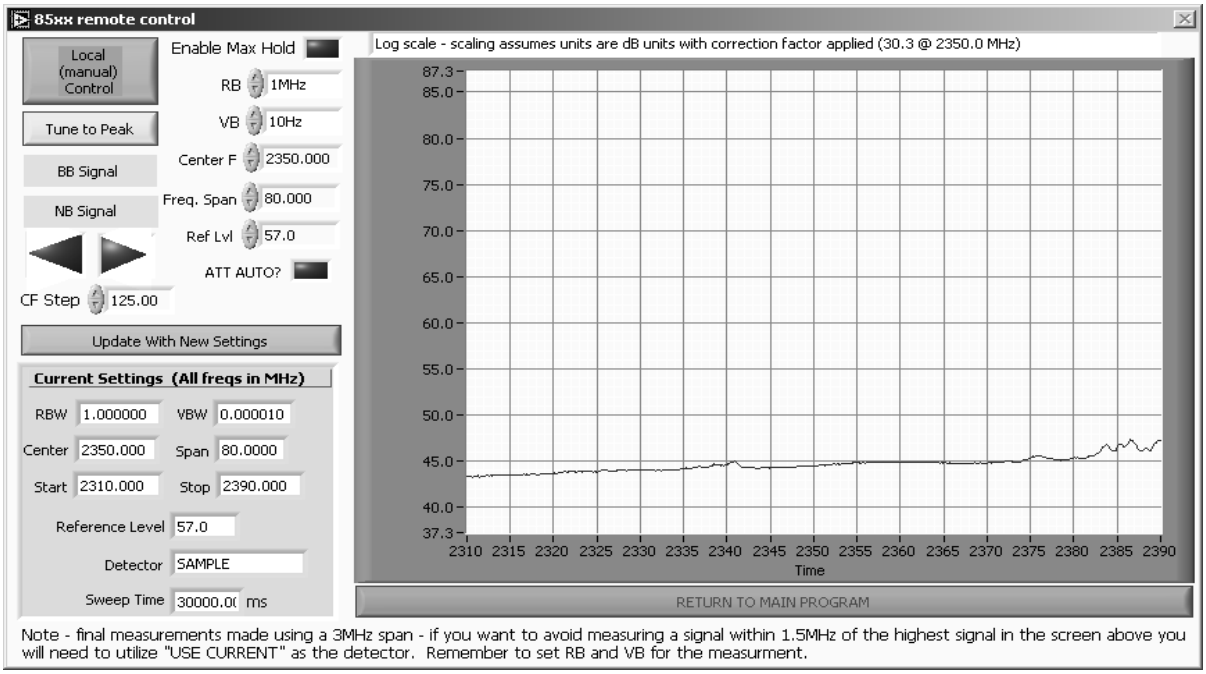
Run #1: Radiated Spurious Emissions, 30 - 18000 MHz. Operating Mode: 802.11b

Run #1a: Low Channel @ 2412 MHz

Fundamental Signal Field Strength: Peak and average values measured in 1 MHz, and peak value measured in 100kHz

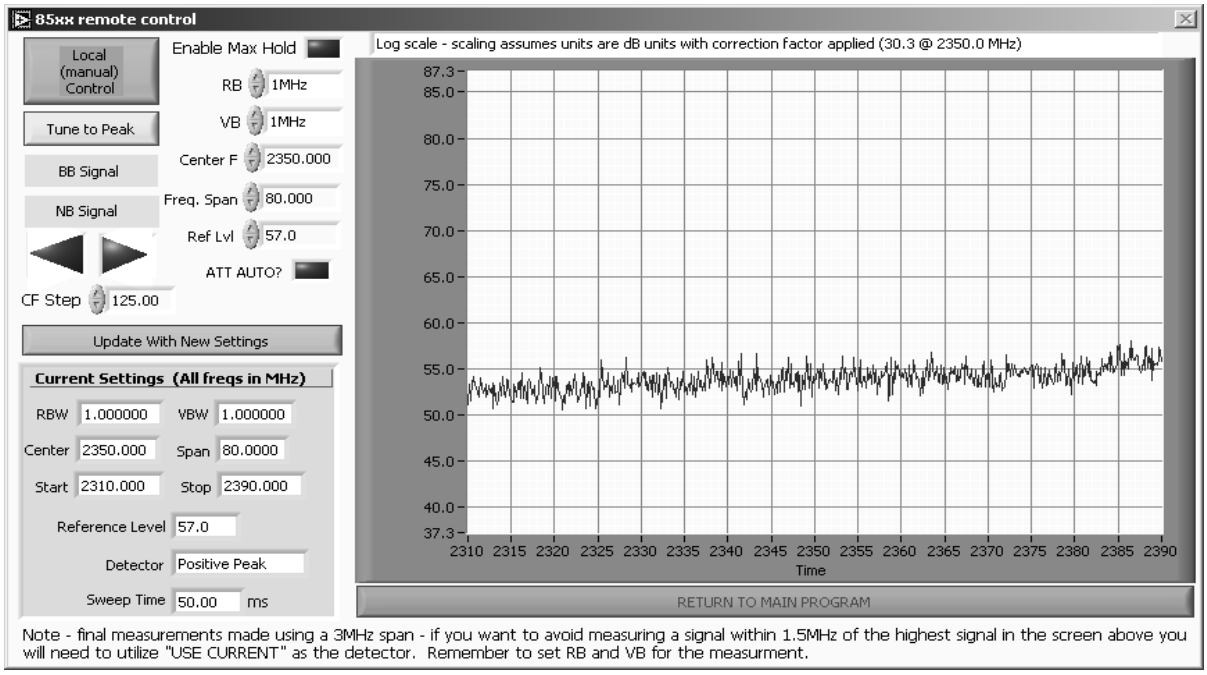
Frequency	Level	Pol	15.209 / 15.247		Detector	Azimuth	Height	Comments
MHz	dBµV/m	v/h	Limit	Margin	Pk/QP/Avg	degrees	meters	
2410.860	96.2	H	-	-	AVG	160	1.0	
2410.860	99.4	H	-	-	PK	160	1.0	
2411.510	110.1	V	-	-	AVG	353	1.4	
2411.510	112.9	V	-	-	PK	353	1.4	

Vertical

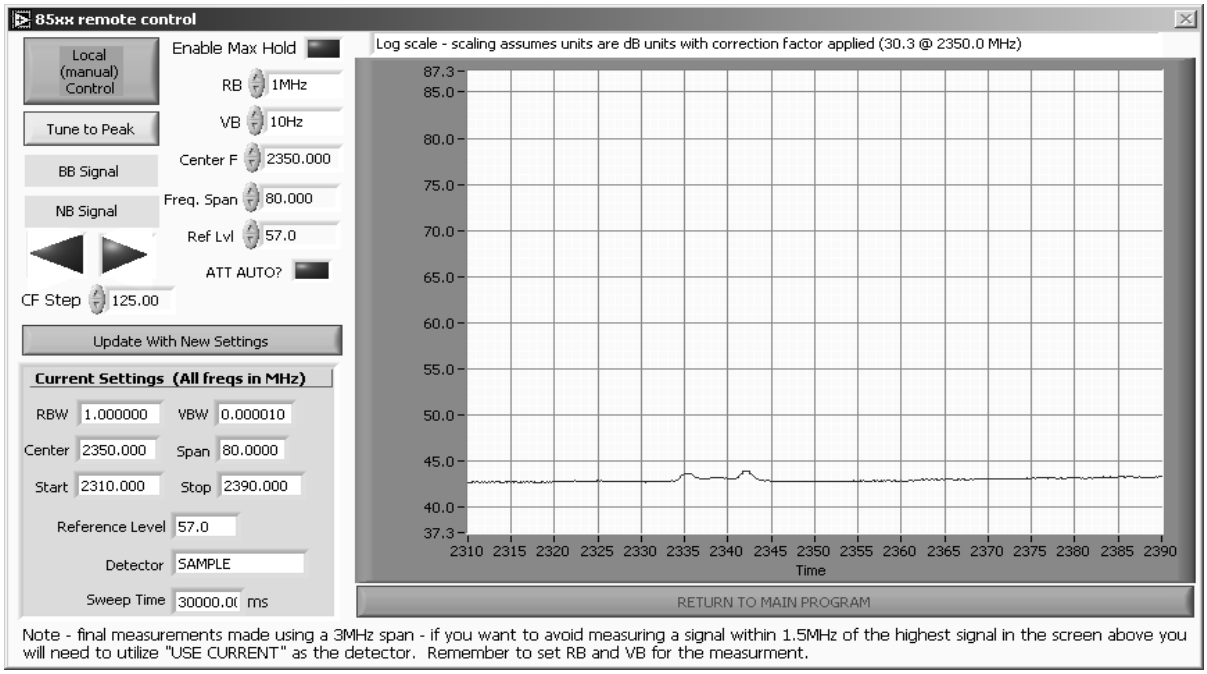


Client:	Ruckus Wireless	Job Number:	J68610
Model:	Retriever module	T-Log Number:	T68973
		Account Manager:	Dean Eriksen
Contact:	Craig Owens		
Standard:	FCC Part 15.247/RSS-210	Class:	N/A

Run #1a: Continued

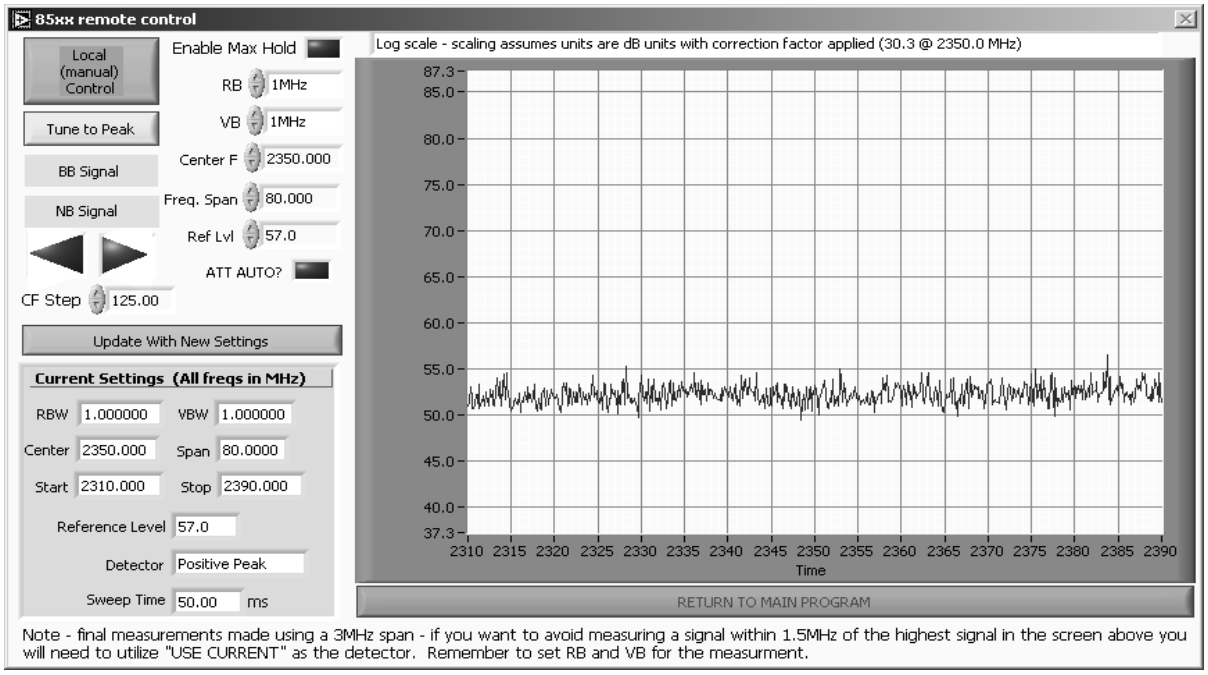


Horizontal



Client:	Ruckus Wireless	Job Number:	J68610
Model:	Retriever module	T-Log Number:	T68973
		Account Manager:	Dean Eriksen
Contact:	Craig Owens		
Standard:	FCC Part 15.247/RSS-210	Class:	N/A

Run #1a: Continued



Band Edge Signal Field Strength

Frequency	Level	Pol	15.209 / 15.247		Detector	Azimuth	Height	Comments
MHz	dBµV/m	v/h	Limit	Margin	Pk/QP/Avg	degrees	meters	
2386.770	48.7	H	54.0	-5.3	AVG	353	1.4	
2386.770	59.7	H	74.0	-14.3	PK	353	1.4	
2389.110	44.7	H	54.0	-9.3	AVG	160	1.0	
2389.110	55.9	H	74.0	-18.1	PK	160	1.0	

Client:	Ruckus Wireless	Job Number:	J68610
Model:	Retriever module	T-Log Number:	T68973
		Account Manager:	Dean Eriksen
Contact:	Craig Owens		
Standard:	FCC Part 15.247/RSS-210	Class:	N/A

Run #1a: Continued
Other Spurious Emissions

Frequency	Level	Pol	15.209 / 15.247		Detector	Azimuth	Height	Comments
MHz	dBµV/m	v/h	Limit	Margin	Pk/QP/Avg	degrees	meters	
4823.990	53.4	V	54.0	-0.6	AVG	137	1.0	
4823.990	54.4	V	74.0	-19.6	PK	137	1.0	
7236.080	47.8	V	54.0	-6.2	AVG	116	1.4	
7236.080	51.8	V	74.0	-22.2	PK	116	1.4	
9648.030	52.9	V	54.0	-1.1	AVG	293	1.2	
9648.030	55.5	V	74.0	-18.5	PK	293	1.2	
12060.040	42.3	V	54.0	-11.7	AVG	11	1.3	
12060.040	51.2	V	74.0	-22.8	PK	11	1.3	
4824.040	48.6	H	54.0	-5.4	AVG	168	1.1	
4824.040	50.7	H	74.0	-23.3	PK	168	1.1	
7235.990	47.4	H	54.0	-6.6	AVG	45	1.4	
7235.990	51.1	H	74.0	-22.9	PK	45	1.4	
9647.980	45.5	H	54.0	-8.5	AVG	309	1.2	
9647.980	50.7	H	74.0	-23.3	PK	309	1.2	

Note 1:	For emissions in restricted bands, the limit of 15.209 was used. For all other emissions, the limit was set 30dB below the level of the fundamental and measured in 100kHz.
Note 2:	Signal is not in a restricted band but the more stringent restricted band limit was used.

Run #1b: Center Channel @ 2437 MHz

Frequency	Level	Pol	15.209 / 15.247		Detector	Azimuth	Height	Comments
MHz	dBµV/m	v/h	Limit	Margin	Pk/QP/Avg	degrees	meters	
4874.030	52.3	V	54.0	-1.7	AVG	354	1.2	
4874.030	53.8	V	74.0	-20.2	PK	354	1.2	
7311.080	43.4	V	54.0	-10.6	AVG	225	1.3	
7311.080	49.3	V	74.0	-24.7	PK	225	1.3	
9748.090	44.3	H	54.0	-9.7	AVG	285	1.4	
9748.090	49.7	H	74.0	-24.3	PK	285	1.4	
4874.040	47.0	H	54.0	-7.0	AVG	22	1.1	
4874.040	50.2	H	74.0	-23.8	PK	22	1.1	
7311.020	40.6	H	54.0	-13.4	AVG	8	1.3	
7311.020	47.9	H	74.0	-26.1	PK	8	1.3	
9748.130	38.7	H	54.0	-15.3	AVG	47	1.2	
9748.130	47.7	H	74.0	-26.3	PK	47	1.2	

Note 1:	For emissions in restricted bands, the limit of 15.209 was used. For all other emissions, the limit was set 30dB below the level of the fundamental and measured in 100kHz.
Note 2:	Signal is not in a restricted band but the more stringent restricted band limit was used.

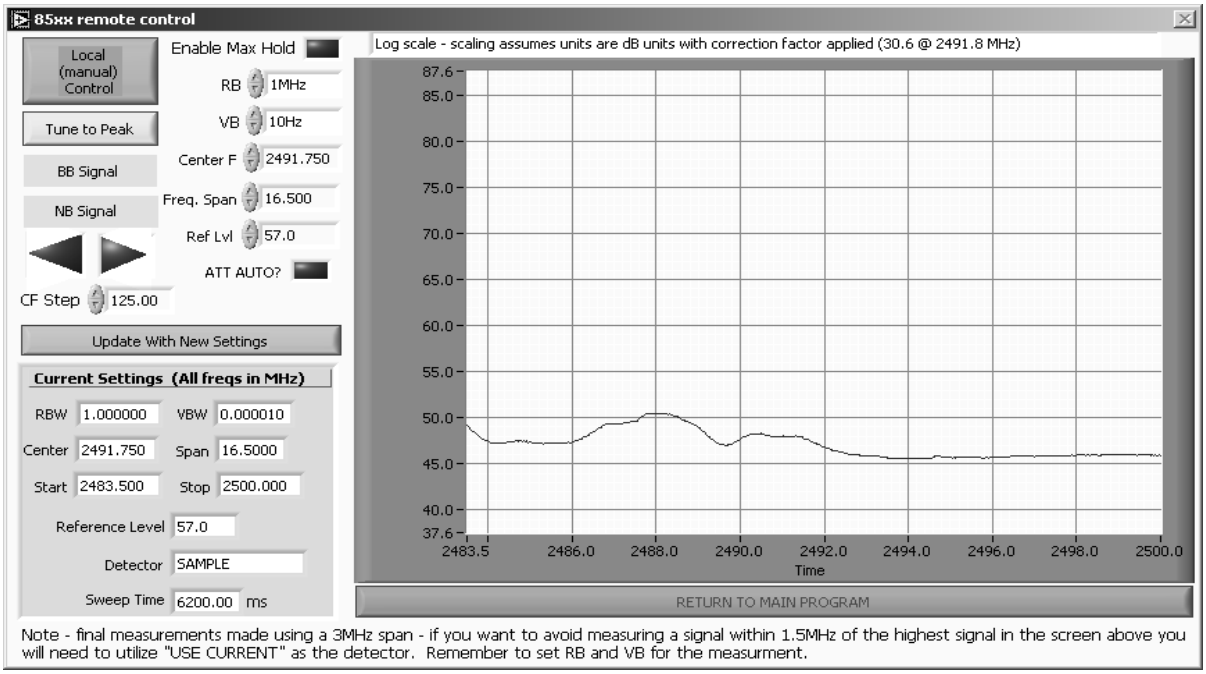
Client:	Ruckus Wireless	Job Number:	J68610
Model:	Retriever module	T-Log Number:	T68973
		Account Manager:	Dean Eriksen
Contact:	Craig Owens		
Standard:	FCC Part 15.247/RSS-210	Class:	N/A

Run #1c: High Channel @ 2462 MHz

Fundamental Signal Field Strength: Peak and average values measured in 1 MHz, and peak value measured in 100kHz

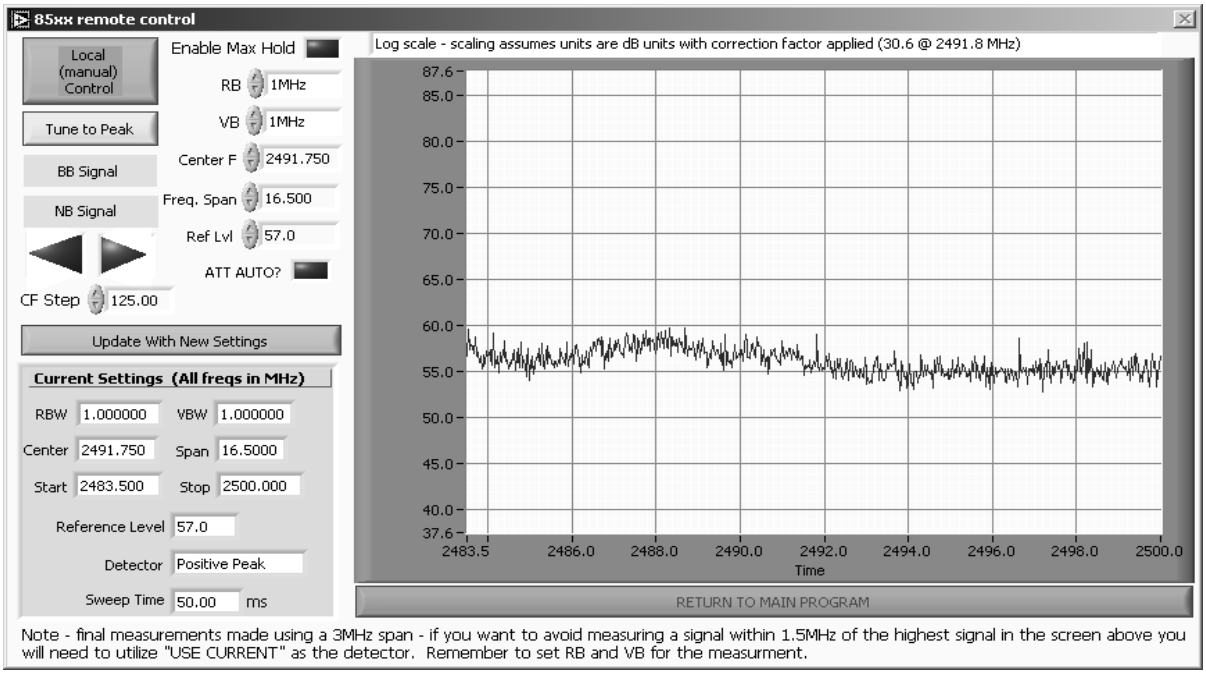
Frequency	Level	Pol	15.209 / 15.247		Detector	Azimuth	Height	Comments
MHz	dBµV/m	v/h	Limit	Margin	Pk/QP/Avg	degrees	meters	
2460.520	109.4	V	-	-	AVG	0	1.4	
2460.520	112.4	V	-	-	PK	0	1.4	
2462.630	95.6	H	-	-	AVG	169	1.1	
2462.630	98.8	H	-	-	PK	169	1.1	

Vertical

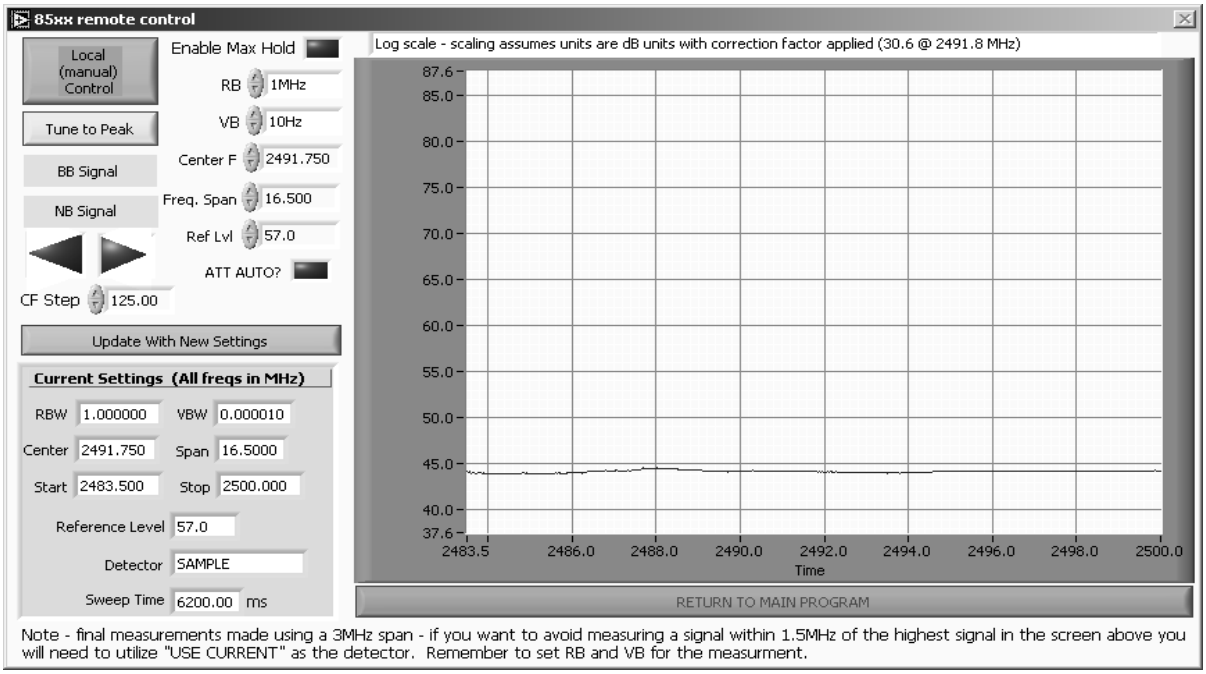


Client:	Ruckus Wireless	Job Number:	J68610
Model:	Retriever module	T-Log Number:	T68973
		Account Manager:	Dean Eriksen
Contact:	Craig Owens		
Standard:	FCC Part 15.247/RSS-210	Class:	N/A

Run #1c: Continued

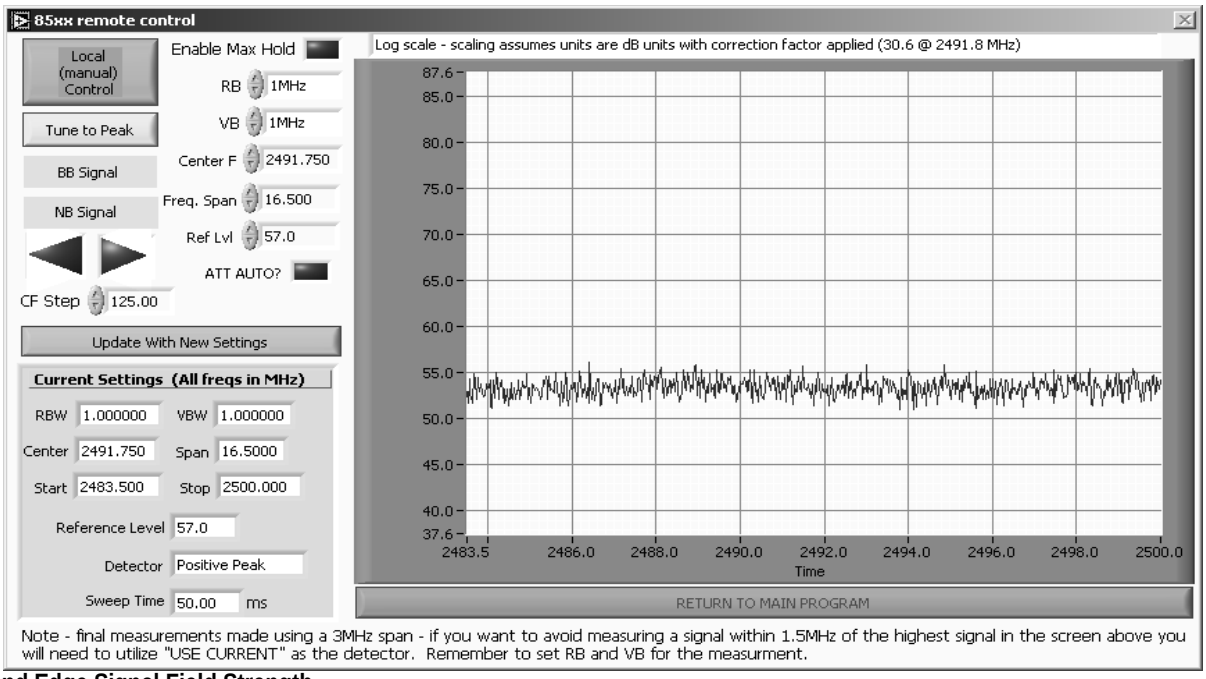


Horizontal



Client:	Ruckus Wireless	Job Number:	J68610
Model:	Retriever module	T-Log Number:	T68973
		Account Manager:	Dean Eriksen
Contact:	Craig Owens		
Standard:	FCC Part 15.247/RSS-210	Class:	N/A

Run #1c: Continued



Band Edge Signal Field Strength

Frequency	Level	Pol	15.209 / 15.247		Detector	Azimuth	Height	Comments
MHz	dBµV/m	v/h	Limit	Margin	Pk/QP/Avg	degrees	meters	
2488.380	51.6	V	54.0	-2.4	AVG	0	1.4	
2488.380	60.7	V	74.0	-13.3	PK	0	1.4	
2487.700	45.7	H	54.0	-8.3	AVG	169	1.1	
2487.700	57.6	H	74.0	-16.4	PK	169	1.1	

Other Spurious Emissions

Frequency	Level	Pol	15.209 / 15.247		Detector	Azimuth	Height	Comments
MHz	dBµV/m	v/h	Limit	Margin	Pk/QP/Avg	degrees	meters	
4924.060	46.9	V	54.0	-7.1	AVG	336	1.2	
4924.060	50.1	V	74.0	-23.9	PK	336	1.2	
7384.790	34.3	V	54.0	-19.7	AVG	0	1.4	
7384.790	45.5	V	74.0	-28.5	PK	0	1.4	
9847.660	35.9	V	54.0	-18.1	AVG	360	1.0	
9847.660	46.7	V	74.0	-27.3	PK	360	1.0	
4923.970	41.2	H	54.0	-12.8	AVG	13	1.0	
4923.970	46.9	H	74.0	-27.1	PK	13	1.0	

Note 1:	For emissions in restricted bands, the limit of 15.209 was used. For all other emissions, the limit was set 30dB below the level of the fundamental and measured in 100kHz.
Note 2:	Signal is not in a restricted band but the more stringent restricted band limit was used.

Client:	Ruckus Wireless	Job Number:	J68610
Model:	Retriever module	T-Log Number:	T68973
		Account Manager:	Dean Eriksen
Contact:	Craig Owens		
Standard:	FCC Part 15.247/RSS-210	Class:	N/A

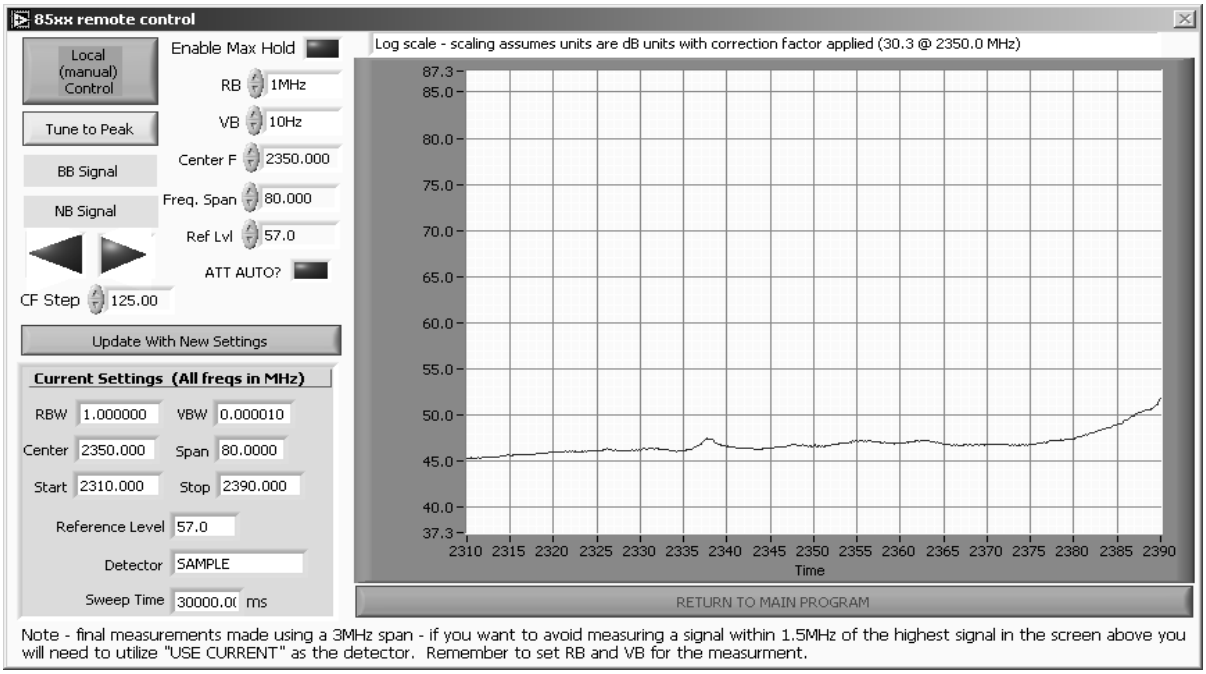
Run #2: Radiated Spurious Emissions, 30 - 18000 MHz. Operating Mode: 802.11g

Run #2a: Low Channel @ 2412 MHz

Fundamental Signal Field Strength: Peak and average values measured in 1 MHz, and peak value measured in 100kHz

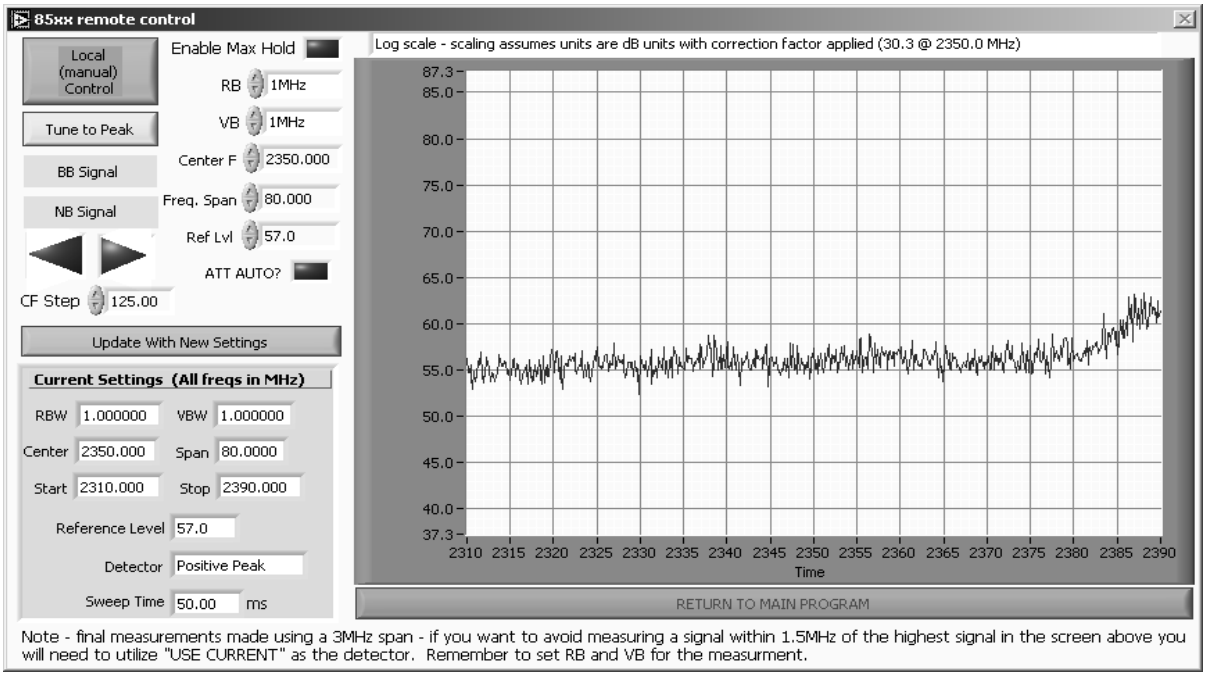
Frequency	Level	Pol	15.209 / 15.247		Detector	Azimuth	Height	Comments
MHz	dBµV/m	v/h	Limit	Margin	Pk/QP/Avg	degrees	meters	
2413.350	108.2	V	-	-	AVG	196	1.2	
2413.350	116.5	V	-	-	PK	196	1.2	
2410.640	90.4	H	-	-	AVG	19	2.0	
2410.640	98.1	H	-	-	PK	19	2.0	

Vertical

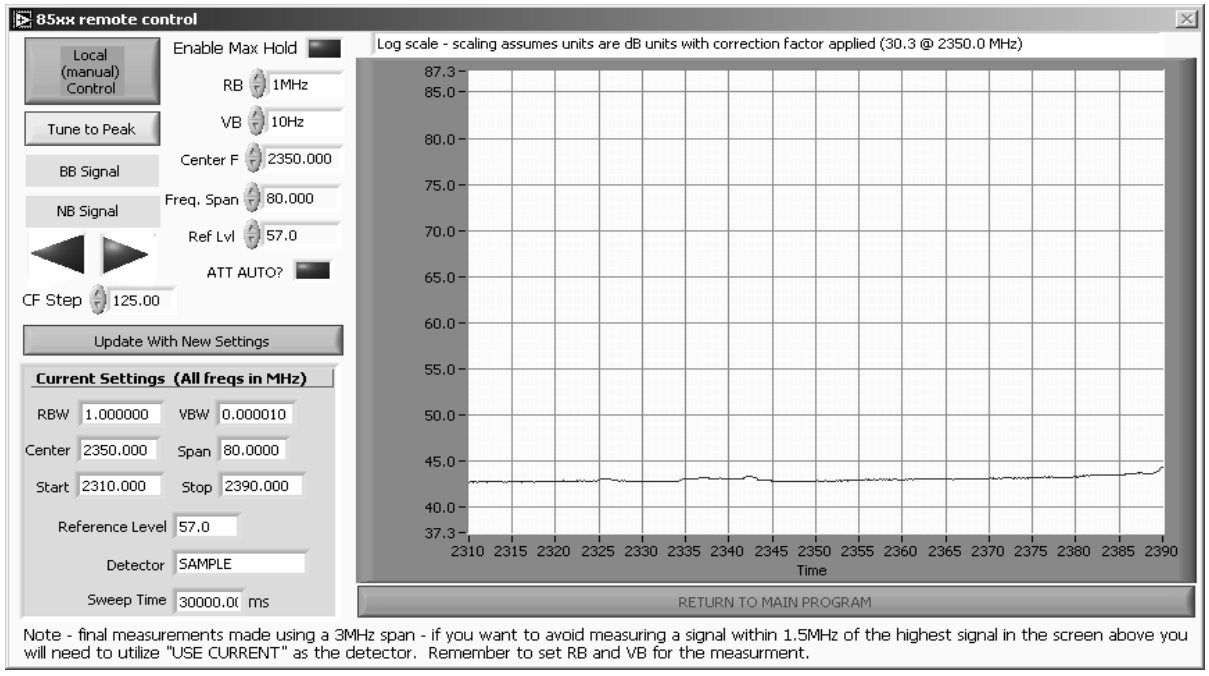


Client:	Ruckus Wireless	Job Number:	J68610
Model:	Retriever module	T-Log Number:	T68973
		Account Manager:	Dean Eriksen
Contact:	Craig Owens		
Standard:	FCC Part 15.247/RSS-210	Class:	N/A

Run #2a: Continued

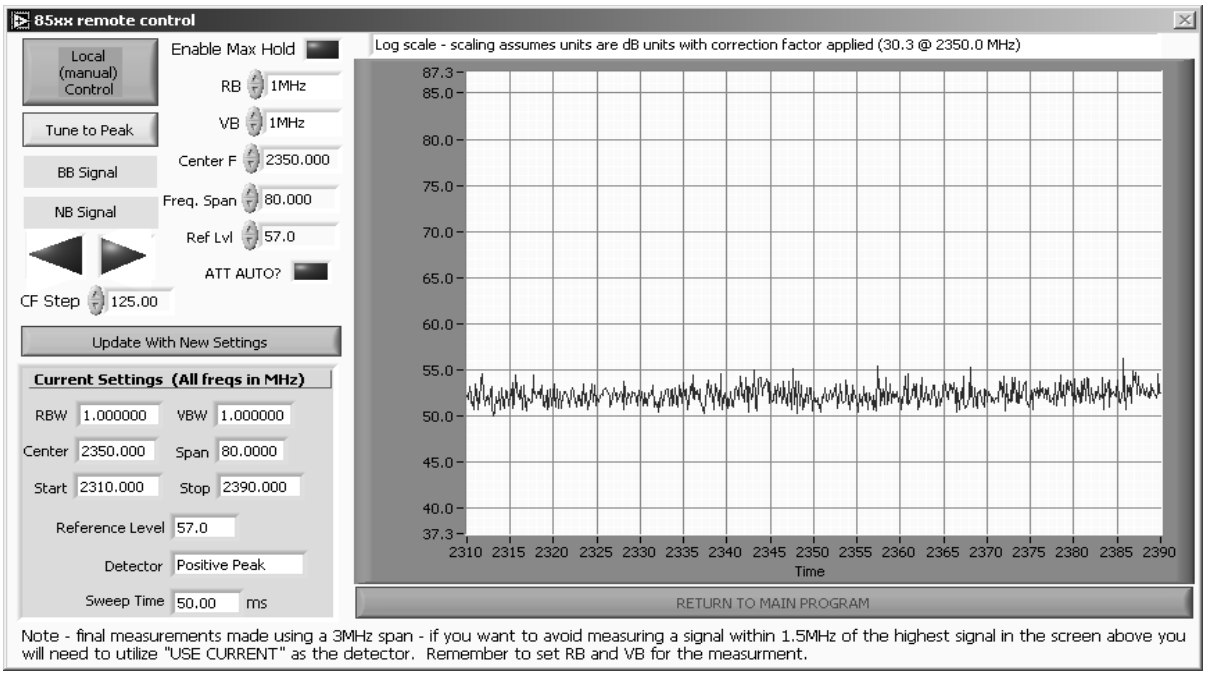


Horizontal



Client:	Ruckus Wireless	Job Number:	J68610
Model:	Retriever module	T-Log Number:	T68973
		Account Manager:	Dean Eriksen
Contact:	Craig Owens		
Standard:	FCC Part 15.247/RSS-210	Class:	N/A

Run #2a: Continued



Band Edge Signal Field Strength

Frequency	Level	Pol	15.209 / 15.247		Detector	Azimuth	Height	Comments
MHz	dBµV/m	v/h	Limit	Margin	Pk/QP/Avg	degrees	meters	
2387.530	45.1	H	54.0	-8.9	AVG	19	2.0	
2387.530	56.8	H	74.0	-17.2	PK	19	2.0	
2389.970	52.2	V	54.0	-1.8	Avg	196	1.2	
2389.500	69.4	V	74.0	-4.6	PK	196	1.2	

Other Spurious Emissions

Frequency	Level	Pol	15.209 / 15.247		Detector	Azimuth	Height	Comments
MHz	dBµV/m	v/h	Limit	Margin	Pk/QP/Avg	degrees	meters	
4823.600	34.7	V	54.0	-19.3	AVG	321	1.1	
4823.600	47.2	V	74.0	-26.8	PK	321	1.1	
7235.150	33.4	V	54.0	-20.6	AVG	205	1.0	
7235.150	45.1	V	74.0	-28.9	PK	205	1.0	
4822.900	30.2	H	54.0	-23.8	AVG	0	1.0	
4822.900	42.5	H	74.0	-31.5	PK	0	1.0	
Note 1:	For emissions in restricted bands, the limit of 15.209 was used. For all other emissions, the limit was set 30dB below the level of the fundamental and measured in 100kHz.							
Note 2:	Signal is not in a restricted band but the more stringent restricted band limit was used.							

Client:	Ruckus Wireless	Job Number:	J68610
Model:	Retriever module	T-Log Number:	T68973
		Account Manager:	Dean Eriksen
Contact:	Craig Owens		
Standard:	FCC Part 15.247/RSS-210	Class:	N/A

Run #2b: Center Channel @ 2437 MHz

Frequency	Level	Pol	15.209 / 15.247		Detector	Azimuth	Height	Comments
MHz	dBµV/m	v/h	Limit	Margin	Pk/QP/Avg	degrees	meters	
4875.040	32.4	H	54.0	-21.6	AVG	202	1.8	
4875.040	43.9	H	74.0	-30.1	PK	202	1.8	
4875.430	34.5	V	54.0	-19.5	AVG	335	1.0	
4875.430	46.9	V	74.0	-27.1	PK	335	1.0	
7311.510	41.3	V	54.0	-12.7	AVG	72	1.0	
7311.510	48.1	V	74.0	-25.9	PK	72	1.0	

Note 1: For emissions in restricted bands, the limit of 15.209 was used. For all other emissions, the limit was set 30dB below the level of the fundamental and measured in 100kHz.

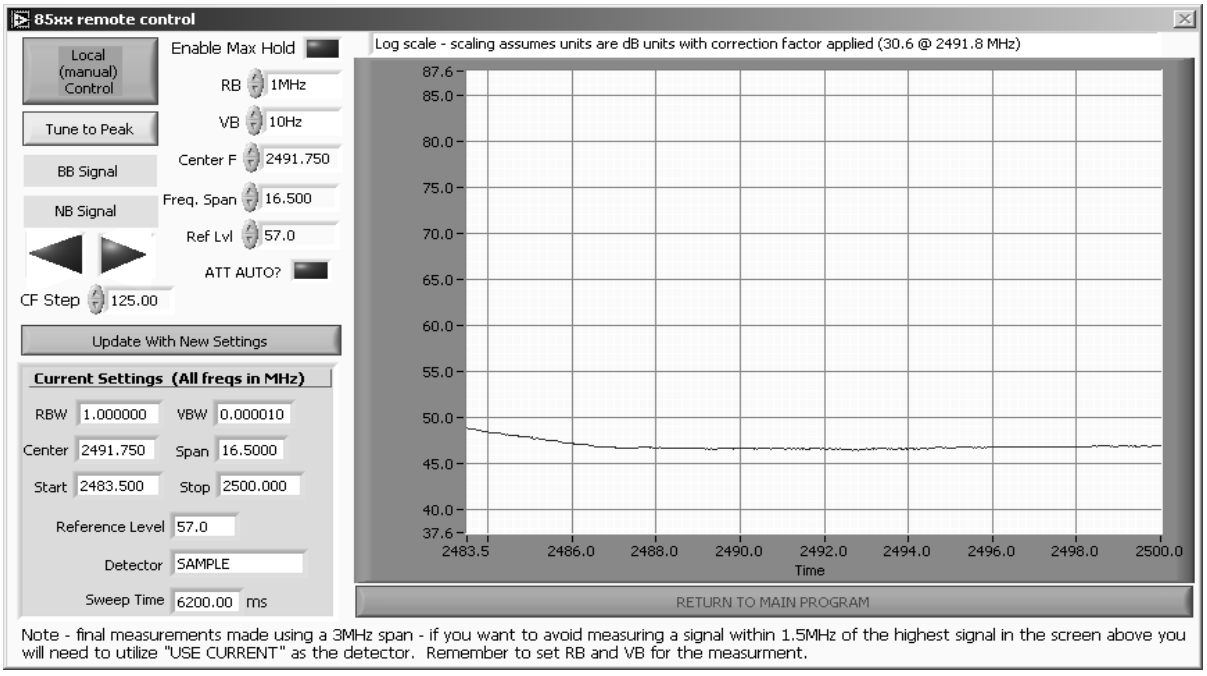
Note 2: Signal is not in a restricted band but the more stringent restricted band limit was used.

Run #2c: High Channel @ 2462 MHz

Fundamental Signal Field Strength: Peak and average values measured in 1 MHz, and peak value measured in 100kHz

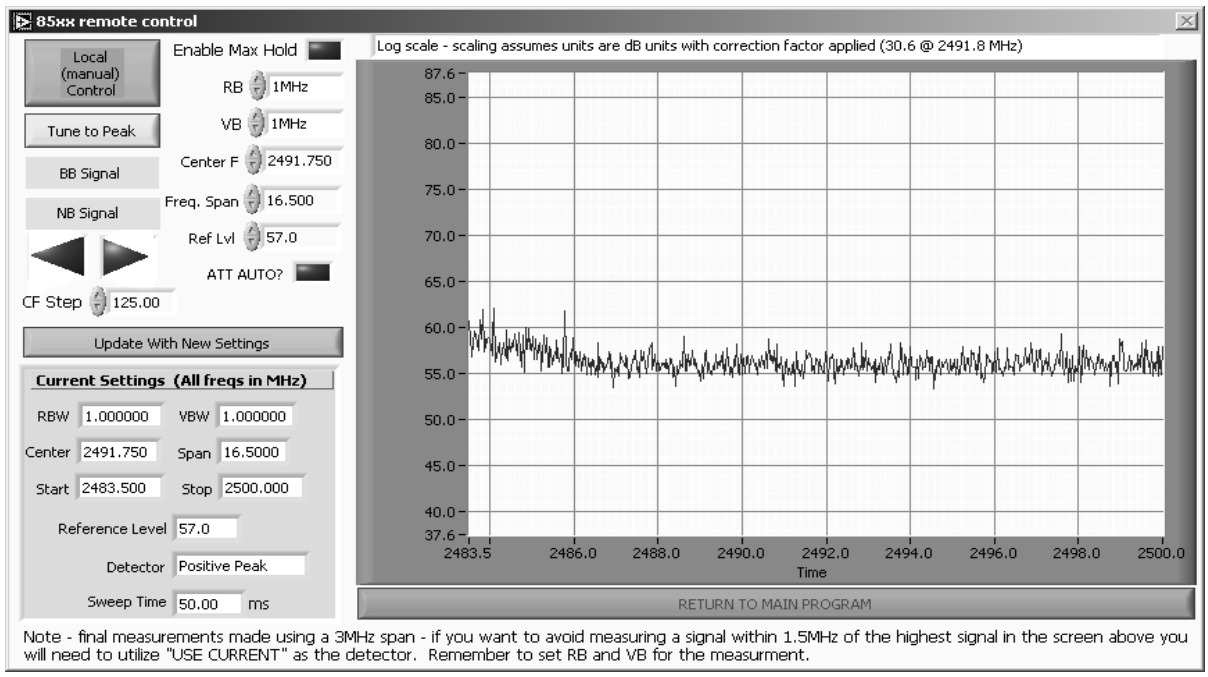
Frequency	Level	Pol	15.209 / 15.247		Detector	Azimuth	Height	Comments
MHz	dBµV/m	v/h	Limit	Margin	Pk/QP/Avg	degrees	meters	
2462.860	89.8	H	54.0	35.8	AVG	24	1.0	
2462.860	98.2	H	74.0	24.2	PK	24	1.0	
2463.270	105.4	V	54.0	51.4	AVG	11	1.4	
2463.270	113.8	V	74.0	39.8	PK	11	1.4	

Vertical

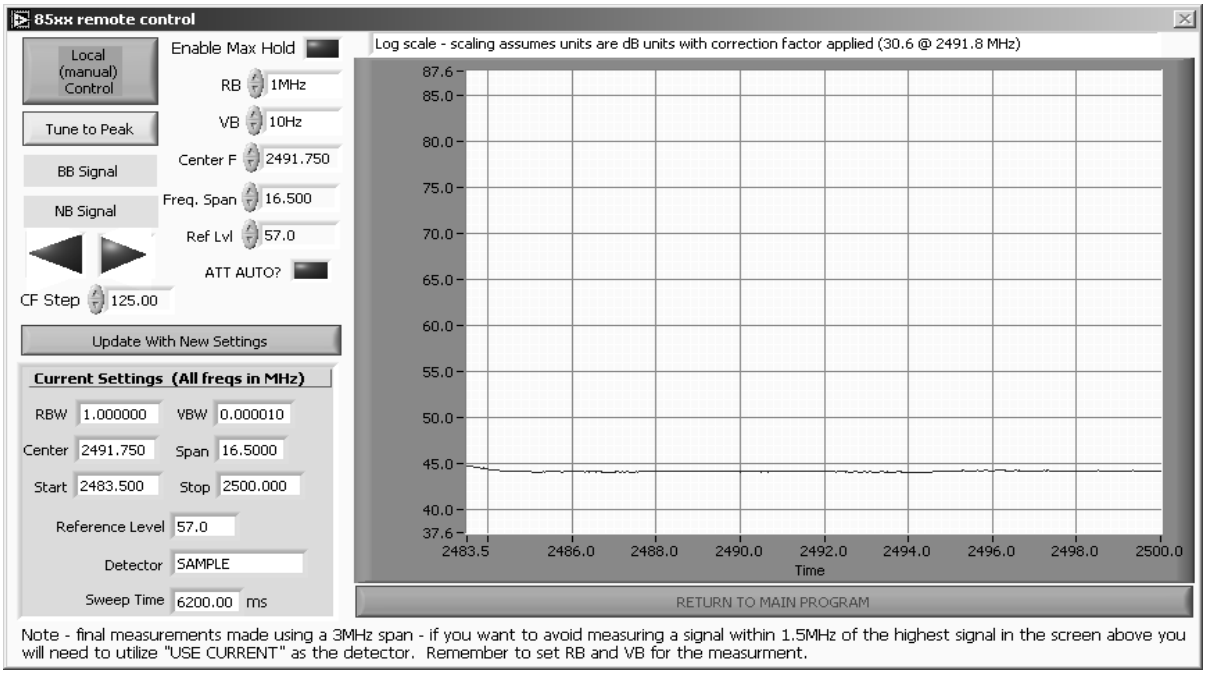


Client:	Ruckus Wireless	Job Number:	J68610
Model:	Retriever module	T-Log Number:	T68973
		Account Manager:	Dean Eriksen
Contact:	Craig Owens		
Standard:	FCC Part 15.247/RSS-210	Class:	N/A

Run #2c: Continued

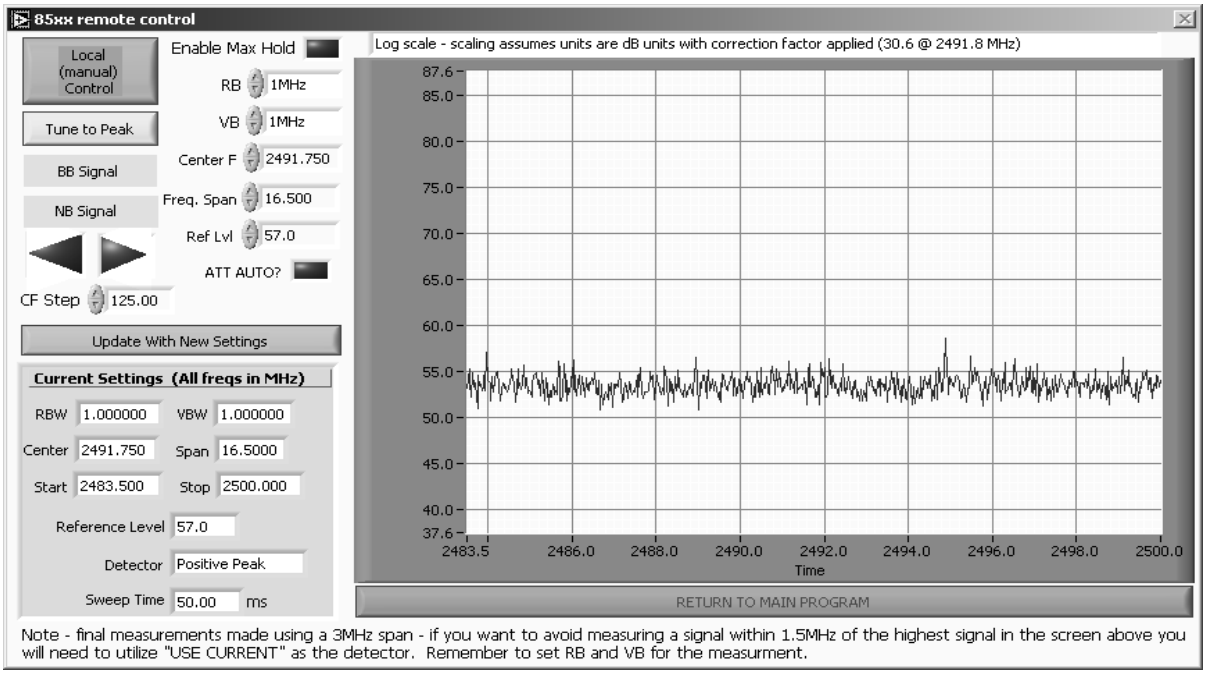


Horizontal



Client:	Ruckus Wireless	Job Number:	J68610
Model:	Retriever module	T-Log Number:	T68973
		Account Manager:	Dean Eriksen
Contact:	Craig Owens		
Standard:	FCC Part 15.247/RSS-210	Class:	N/A

Run #2c: Continued



Band Edge Signal Field Strength

Frequency	Level	Pol	15.209 / 15.247		Detector	Azimuth	Height	Comments
MHz	dBµV/m	v/h	Limit	Margin	Pk/QP/Avg	degrees	meters	
2483.500	51.4	V	54.0	-2.6	Avg	11	1.4	
2483.780	68.3	V	74.0	-5.7	PK	11	1.4	
2483.540	47.4	H	54.0	-6.6	AVG	24	1.0	
2483.540	62.7	H	74.0	-11.3	PK	24	1.0	

Other Spurious Emissions

Frequency	Level	Pol	15.209 / 15.247		Detector	Azimuth	Height	Comments
MHz	dBµV/m	v/h	Limit	Margin	Pk/QP/Avg	degrees	meters	
4922.650	36.2	V	54.0	-17.8	AVG	238	1.0	
4922.650	49.4	V	74.0	-24.6	PK	238	1.0	
7385.010	34.0	V	54.0	-20.0	AVG	0	1.0	
7385.010	45.7	V	74.0	-28.3	PK	0	1.0	
4925.040	32.2	H	54.0	-21.8	AVG	10	1.0	
4925.040	43.6	H	74.0	-30.4	PK	10	1.0	
Note 1:	For emissions in restricted bands, the limit of 15.209 was used. For all other emissions, the limit was set 30dB below the level of the fundamental and measured in 100kHz.							
Note 2:	Signal is not in a restricted band but the more stringent restricted band limit was used.							

Client:	Ruckus Wireless	Job Number:	J68610
Model:	Retriever module	T-Log Number:	T68973
		Account Manager:	Dean Eriksen
Contact:	Craig Owens		
Standard:	FCC Part 15.247/RSS-210	Class:	N/A

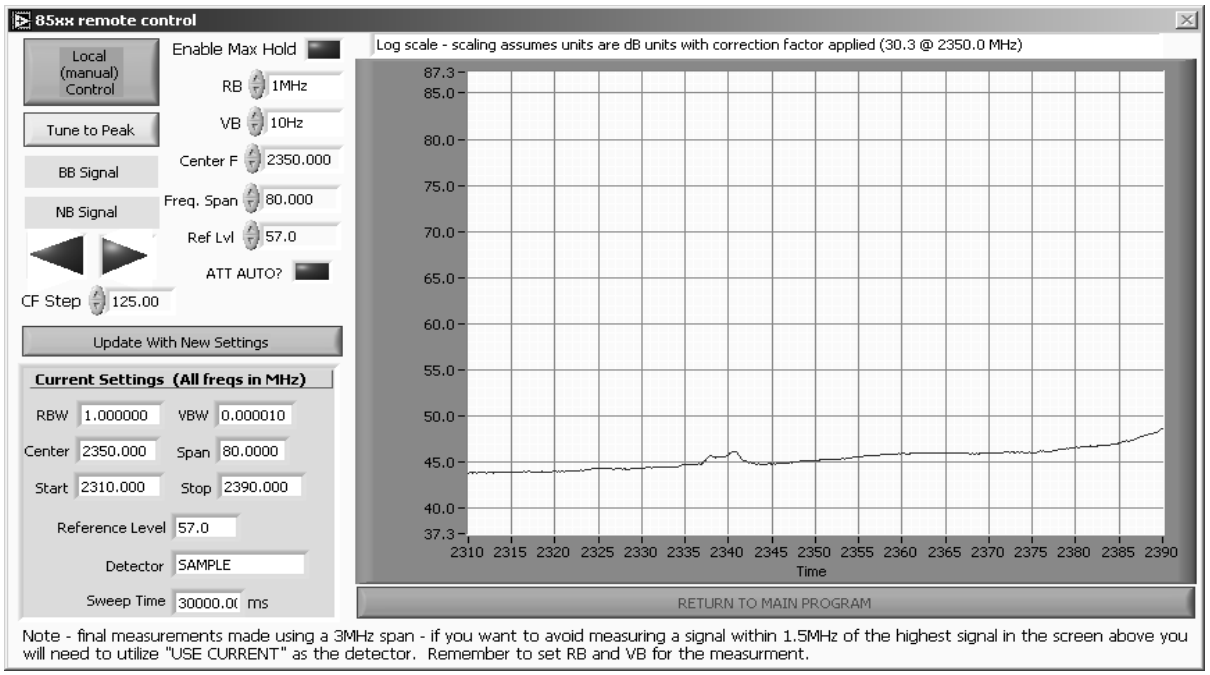
Run #3: Radiated Spurious Emissions, 30 - 18000 MHz. Operating Mode: 802.11n HT20 MCS0

Run #3a: Low Channel @ 2412 MHz

Fundamental Signal Field Strength: Peak and average values measured in 1 MHz, and peak value measured in 100kHz

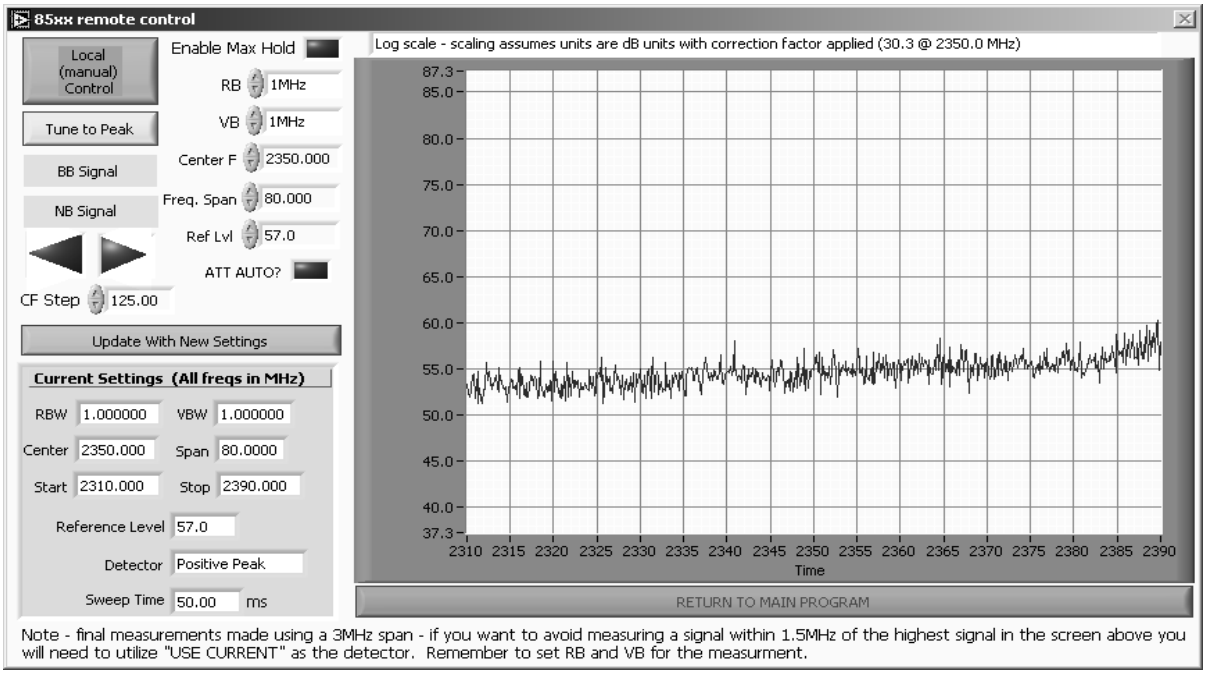
Frequency	Level	Pol	15.209 / 15.247		Detector	Azimuth	Height	Comments
MHz	dBµV/m	v/h	Limit	Margin	Pk/QP/Avg	degrees	meters	
2413.190	85.2	H	-	-	AVG	6	1.0	
2413.190	93.7	H	-	-	PK	6	1.0	
2410.720	102.1	V	-	-	AVG	5	1.4	
2410.720	111.0	V	-	-	PK	5	1.4	

Vertical

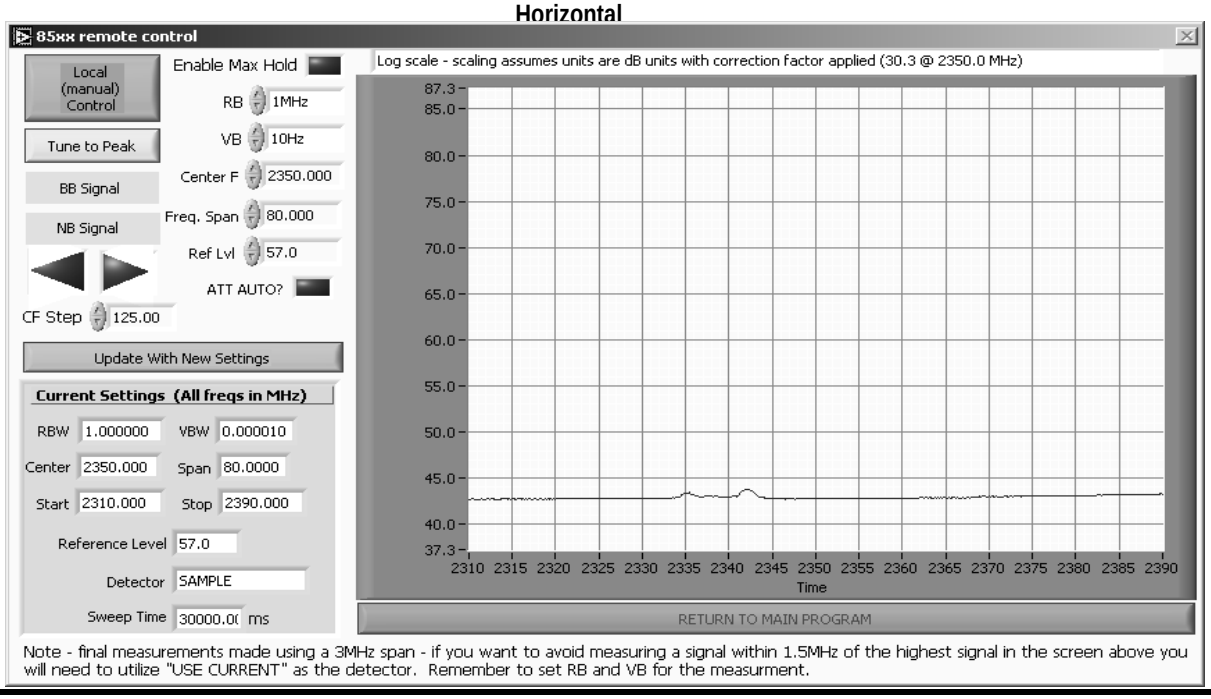


Client:	Ruckus Wireless	Job Number:	J68610
Model:	Retriever module	T-Log Number:	T68973
		Account Manager:	Dean Eriksen
Contact:	Craig Owens		
Standard:	FCC Part 15.247/RSS-210	Class:	N/A

Run #3a: Continued

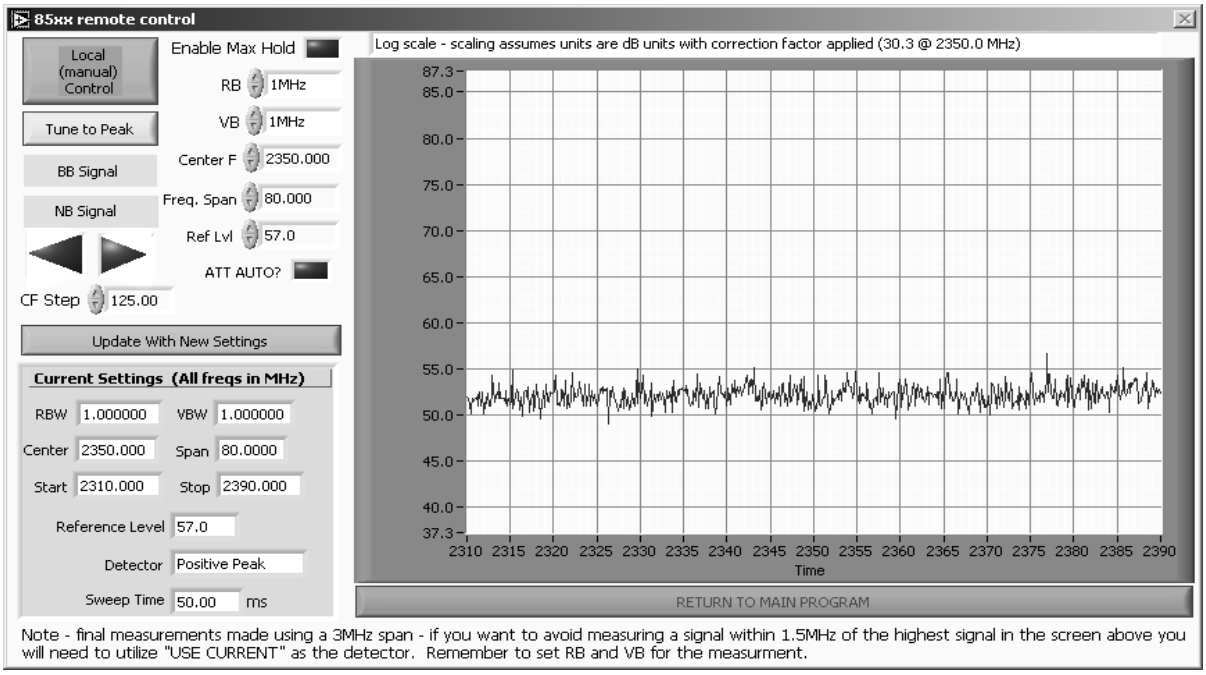


Horizontal



Client:	Ruckus Wireless	Job Number:	J68610
Model:	Retriever module	T-Log Number:	T68973
		Account Manager:	Dean Eriksen
Contact:	Craig Owens		
Standard:	FCC Part 15.247/RSS-210	Class:	N/A

Run #3a: Continued



Note - final measurements made using a 3MHz span - if you want to avoid measuring a signal within 1.5MHz of the highest signal in the screen above you will need to utilize "USE CURRENT" as the detector. Remember to set RB and VB for the measurment.

Band Edge Signal Field Strength

Frequency	Level	Pol	15.209 / 15.247		Detector	Azimuth	Height	Comments
MHz	dBµV/m	v/h	Limit	Margin	Pk/QP/Avg	degrees	meters	
2389.770	50.8	V	54.0	-3.2	AVG	5	1.4	
2389.770	64.4	V	74.0	-9.6	PK	5	1.4	
2389.460	44.6	H	54.0	-9.4	AVG	6	1.0	
2389.460	55.9	H	74.0	-18.1	PK	6	1.0	

Other Spurious Emissions

Frequency	Level	Pol	15.209 / 15.247		Detector	Azimuth	Height	Comments
MHz	dBµV/m	v/h	Limit	Margin	Pk/QP/Avg	degrees	meters	
4825.280	30.2	H	54.0	-23.8	AVG	360	1.0	
4825.280	41.4	H	74.0	-32.6	PK	360	1.0	
4824.600	33.6	V	54.0	-20.4	AVG	319	1.0	
4824.600	45.5	V	74.0	-28.5	PK	319	1.0	
7235.380	33.7	V	54.0	-20.3	AVG	0	1.0	
7235.380	44.5	V	74.0	-29.5	PK	0	1.0	
Note 1:	For emissions in restricted bands, the limit of 15.209 was used. For all other emissions, the limit was set 30dB below the level of the fundamental and measured in 100kHz.							
Note 2:	Signal is not in a restricted band but the more stringent restricted band limit was used.							

Client:	Ruckus Wireless	Job Number:	J68610
Model:	Retriever module	T-Log Number:	T68973
		Account Manager:	Dean Eriksen
Contact:	Craig Owens		
Standard:	FCC Part 15.247/RSS-210	Class:	N/A

Run #3b: Center Channel @ 2437 MHz

Frequency	Level	Pol	15.209 / 15.247		Detector	Azimuth	Height	Comments
MHz	dBµV/m	v/h	Limit	Margin	Pk/QP/Avg	degrees	meters	
4875.480	35.9	V	54.0	-18.1	AVG	316	1.1	
4875.480	47.6	V	74.0	-26.4	PK	316	1.1	
7311.020	41.5	V	54.0	-12.5	AVG	60	1.0	
7311.020	48.0	V	74.0	-26.0	PK	60	1.0	
4875.490	31.2	H	54.0	-22.8	AVG	360	1.0	
4875.490	42.6	H	74.0	-31.4	PK	360	1.0	

Note 1: For emissions in restricted bands, the limit of 15.209 was used. For all other emissions, the limit was set 30dB below the level of the fundamental and measured in 100kHz.

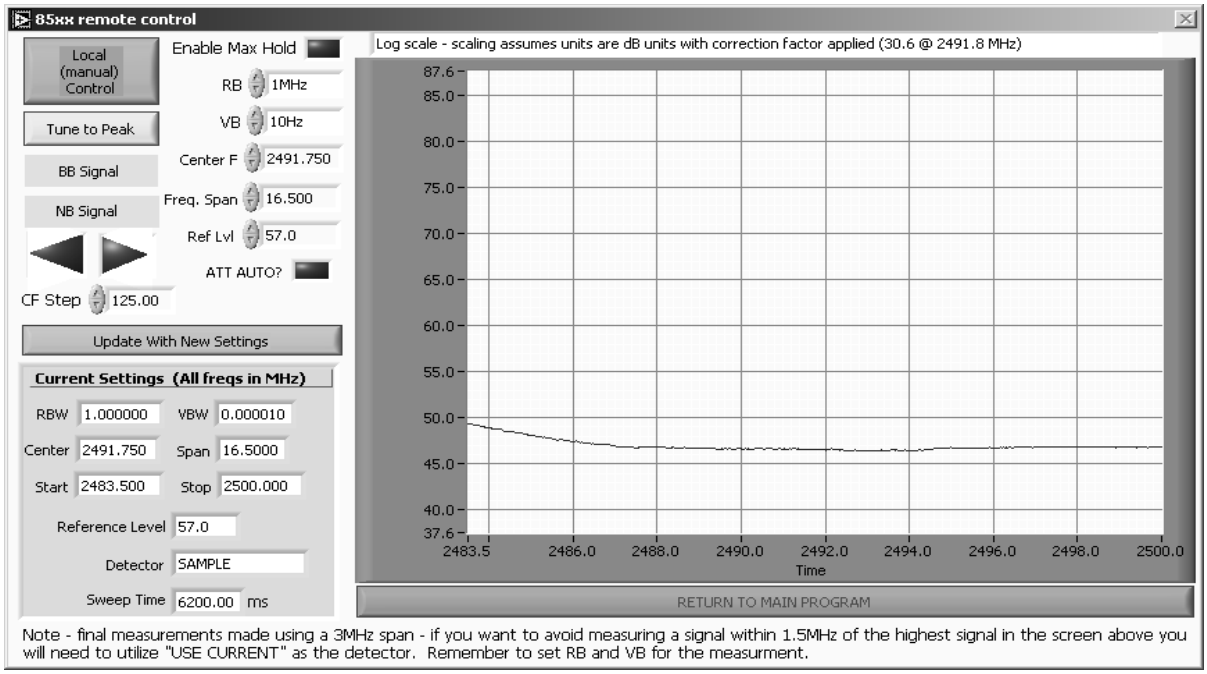
Note 2: Signal is not in a restricted band but the more stringent restricted band limit was used.

Run #3c: High Channel @ 2462 MHz

Fundamental Signal Field Strength: Peak and average values measured in 1 MHz, and peak value measured in 100kHz

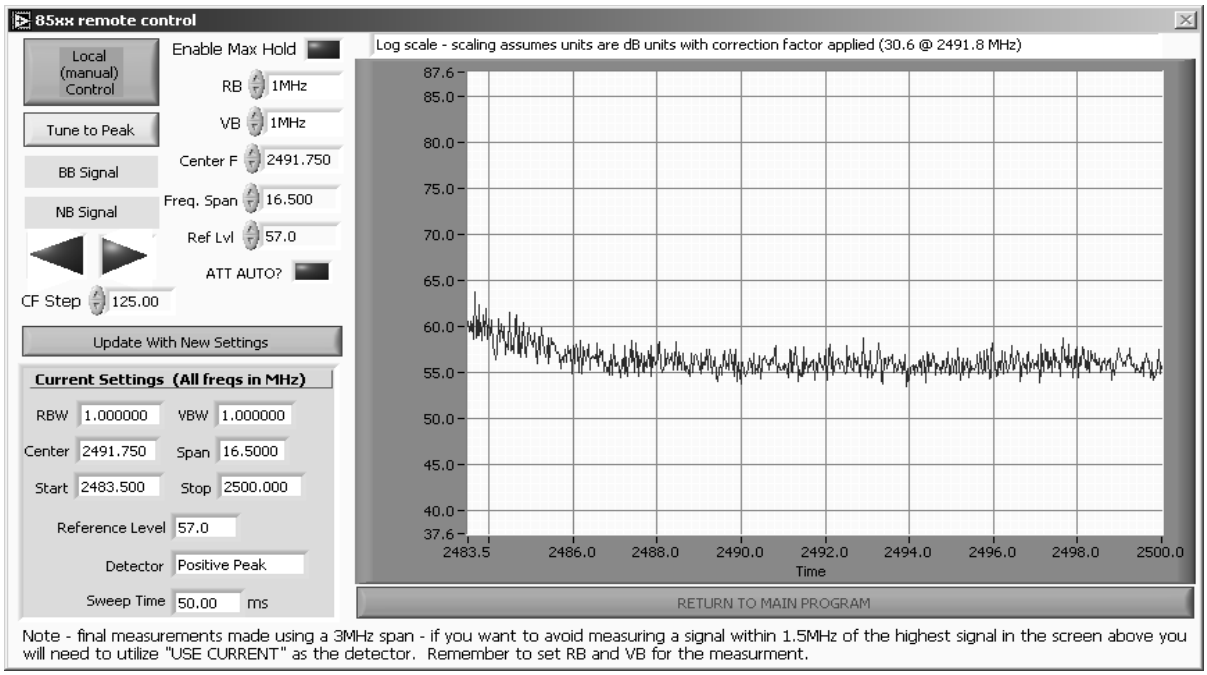
Frequency	Level	Pol	15.209 / 15.247		Detector	Azimuth	Height	Comments
MHz	dBµV/m	v/h	Limit	Margin	Pk/QP/Avg	degrees	meters	
2460.560	101.5	V	-	-	AVG	6	1.4	
2460.560	110.8	V	-	-	PK	6	1.4	
2460.570	86.7	H	-	-	AVG	6	1.1	
2460.570	94.9	H	-	-	PK	6	1.1	

Vertical

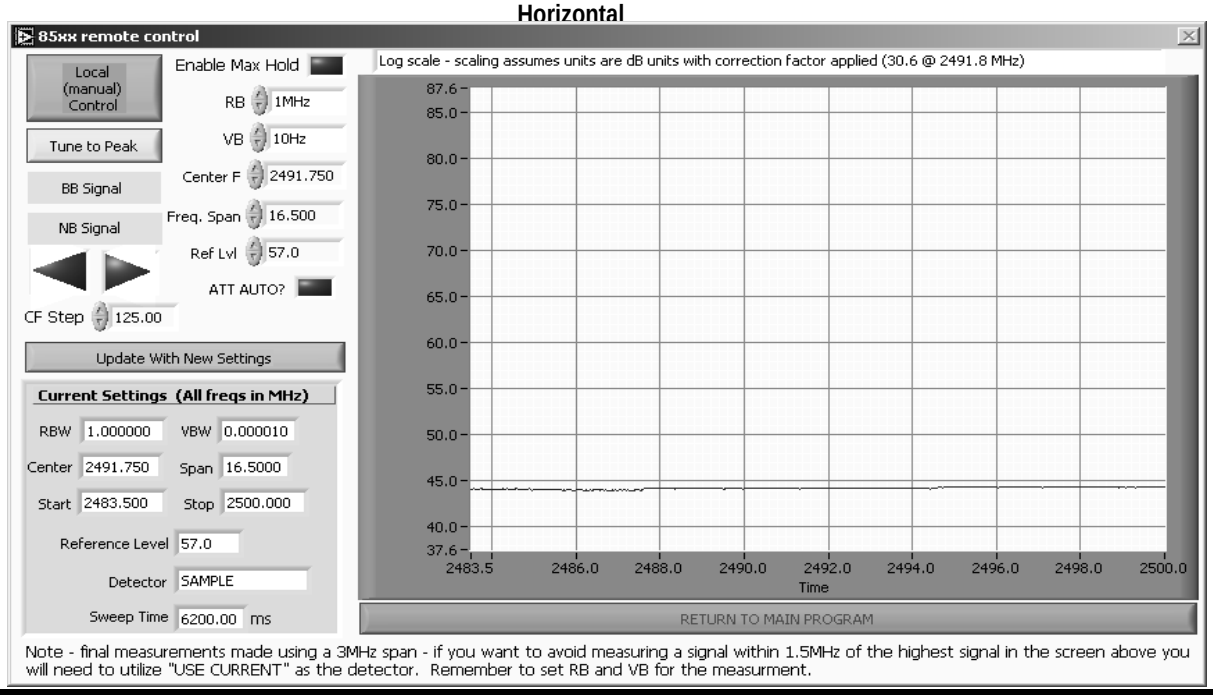


Client:	Ruckus Wireless	Job Number:	J68610
Model:	Retriever module	T-Log Number:	T68973
		Account Manager:	Dean Eriksen
Contact:	Craig Owens		
Standard:	FCC Part 15.247/RSS-210	Class:	N/A

Run #3c: Continued

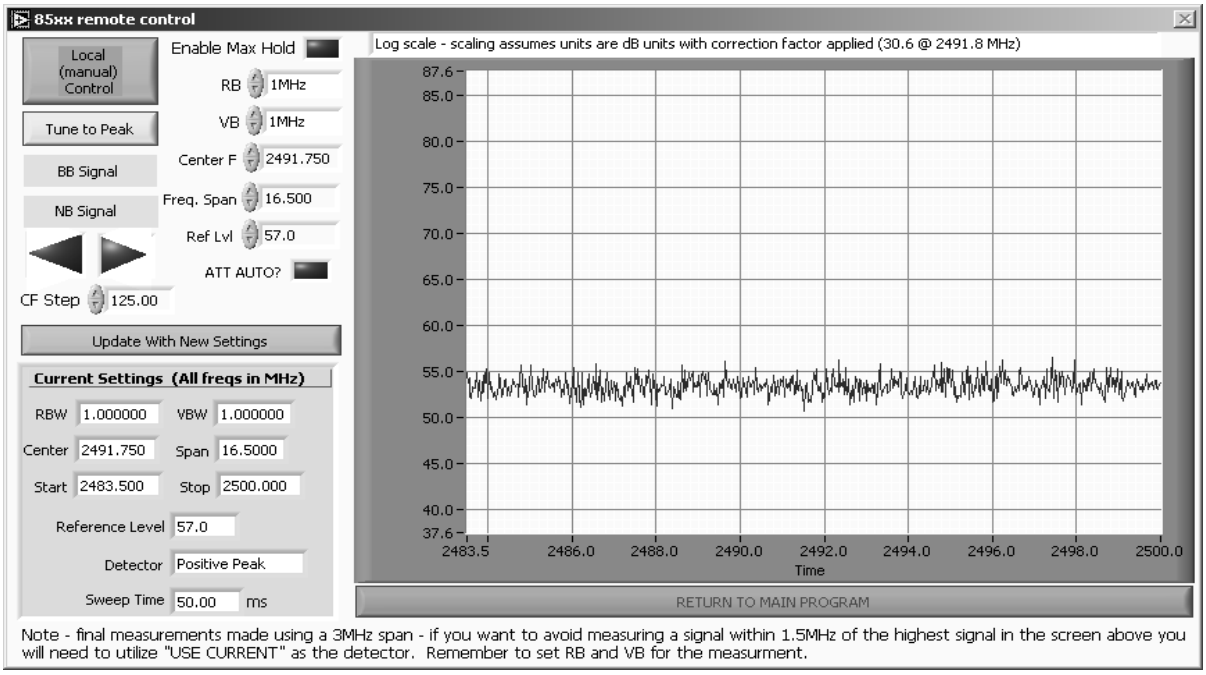


Horizontal



Client:	Ruckus Wireless	Job Number:	J68610
Model:	Retriever module	T-Log Number:	T68973
		Account Manager:	Dean Eriksen
Contact:	Craig Owens		
Standard:	FCC Part 15.247/RSS-210	Class:	N/A

Run #3c: Continued



Band Edge Signal Field Strength

Frequency	Level	Pol	15.209 / 15.247		Detector	Azimuth	Height	Comments
MHz	dBµV/m	v/h	Limit	Margin	Pk/QP/Avg	degrees	meters	
2485.660	45.2	H	54.0	-8.8	AVG	6	1.0	
2485.660	57.3	H	74.0	-16.7	PK	6	1.0	
2484.150	51.6	V	54.0	-2.4	AVG	6	1.4	
2484.150	65.5	V	74.0	-8.5	PK	6	1.4	

Other Spurious Emissions

Frequency	Level	Pol	15.209 / 15.247		Detector	Azimuth	Height	Comments
MHz	dBµV/m	v/h	Limit	Margin	Pk/QP/Avg	degrees	meters	
4923.100	31.7	H	54.0	-22.3	AVG	360	1.0	
4923.100	42.5	H	74.0	-31.5	PK	360	1.0	
4923.310	36.2	V	54.0	-17.8	AVG	303	1.2	
4923.310	49.6	V	74.0	-24.4	PK	303	1.2	
7386.730	34.0	V	54.0	-20.0	AVG	0	1.0	
7386.730	45.3	V	74.0	-28.7	PK	0	1.0	
Note 1:	For emissions in restricted bands, the limit of 15.209 was used. For all other emissions, the limit was set 30dB below the level of the fundamental and measured in 100kHz.							
Note 2:	Signal is not in a restricted band but the more stringent restricted band limit was used.							

Client:	Ruckus Wireless	Job Number:	J68610
Model:	Retriever module	T-Log Number:	T68973
		Account Manager:	Dean Eriksen
Contact:	Craig Owens		
Standard:	FCC Part 15.247/RSS-210	Class:	N/A

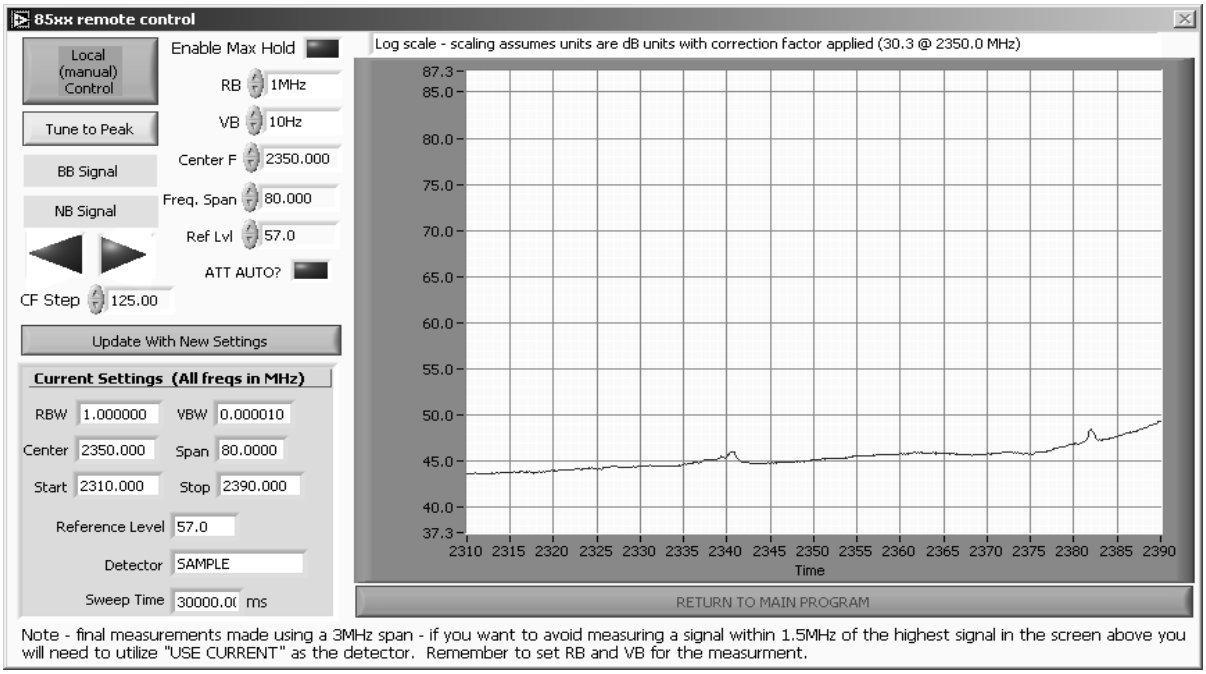
Run #4: Radiated Spurious Emissions, 30 - 18000 MHz. Operating Mode: 802.11n 40 MHz HT40 MCS0

Run #4a: Low Channel @ 2422 MHz

Fundamental Signal Field Strength: Peak and average values measured in 1 MHz, and peak value measured in 100kHz

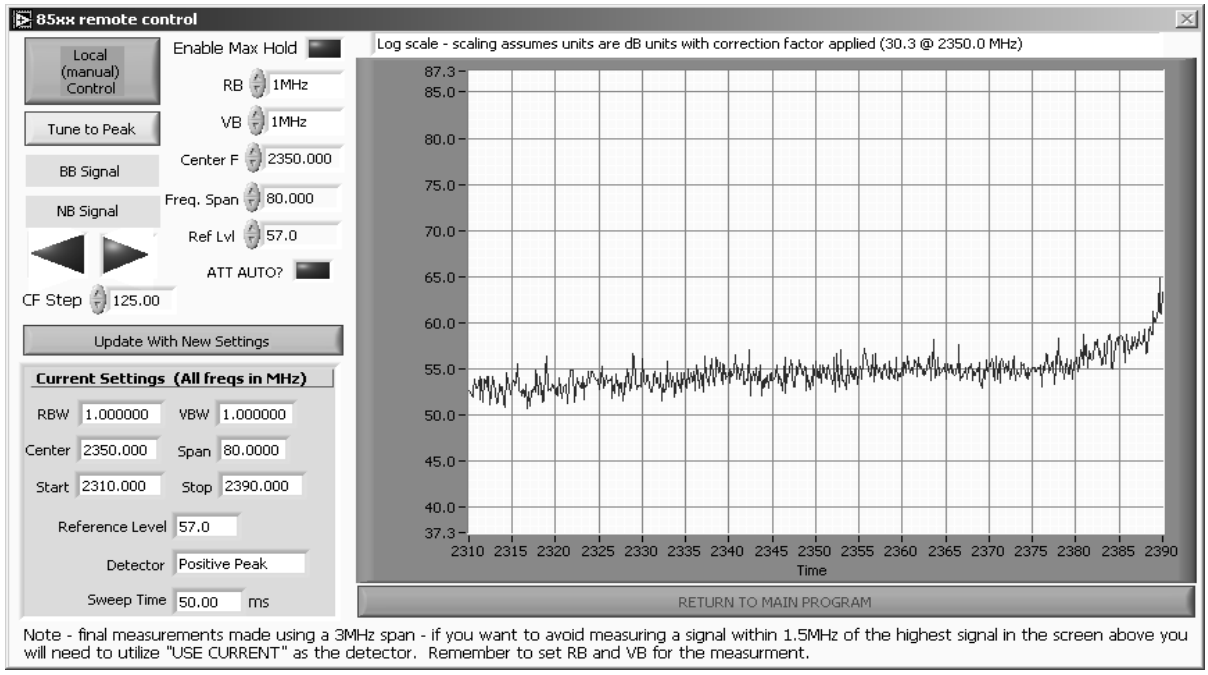
Frequency	Level	Pol	15.209 / 15.247		Detector	Azimuth	Height	Comments
MHz	dBµV/m	v/h	Limit	Margin	Pk/QP/Avg	degrees	meters	
2423.380	94.7	V	-	-	AVG	0	1.4	
2423.380	102.9	V	-	-	PK	0	1.4	
2420.790	80.1	H	-	-	AVG	166	1.6	
2420.790	88.3	H	-	-	PK	166	1.6	

Vertical

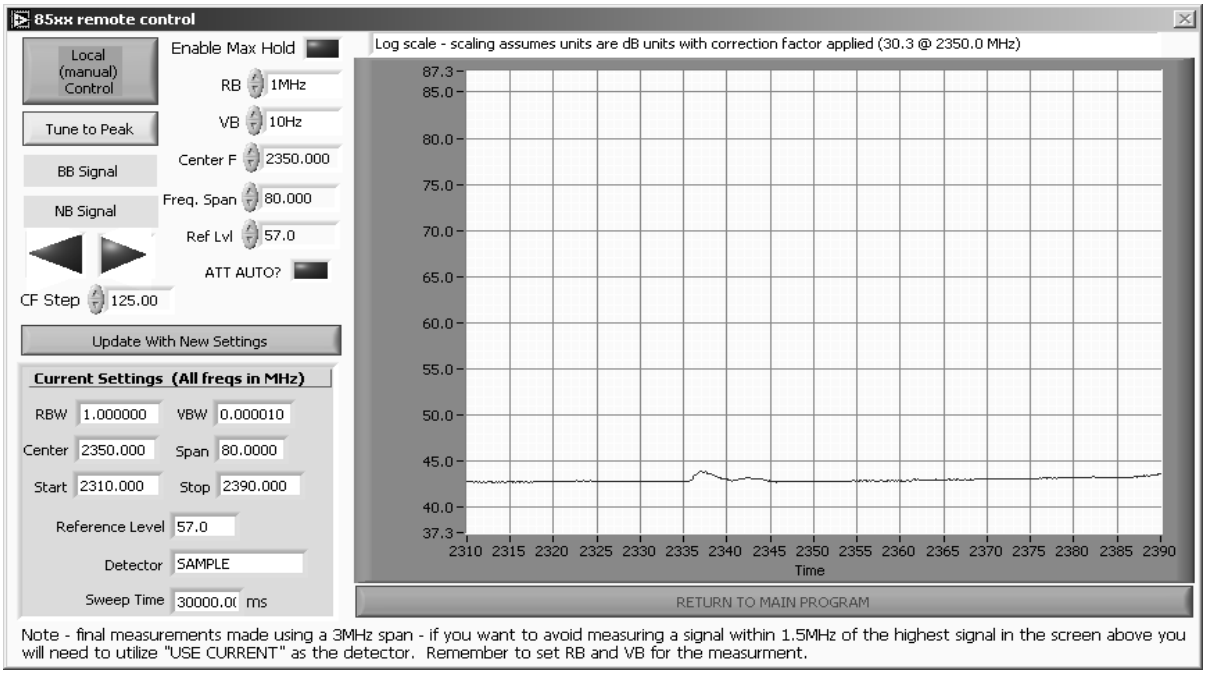


Client:	Ruckus Wireless	Job Number:	J68610
Model:	Retriever module	T-Log Number:	T68973
		Account Manager:	Dean Eriksen
Contact:	Craig Owens		
Standard:	FCC Part 15.247/RSS-210	Class:	N/A

Run #4a: Continued

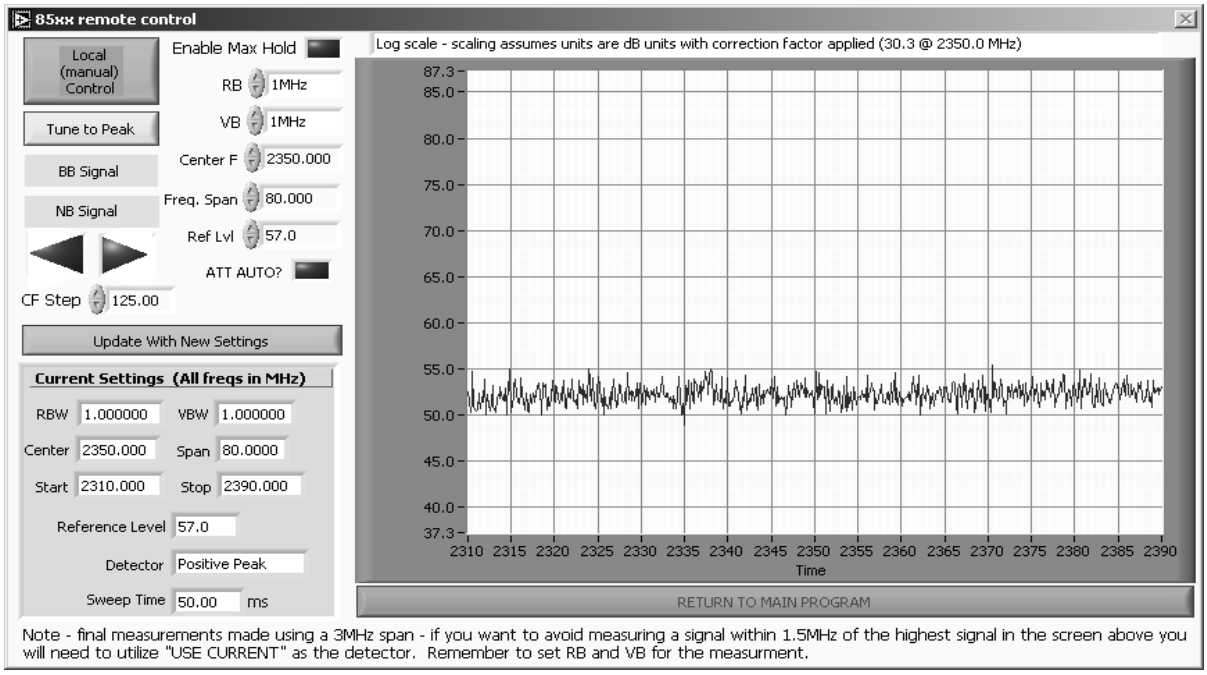


Horizontal



Client:	Ruckus Wireless	Job Number:	J68610
Model:	Retriever module	T-Log Number:	T68973
		Account Manager:	Dean Eriksen
Contact:	Craig Owens		
Standard:	FCC Part 15.247/RSS-210	Class:	N/A

Run #4a: Continued



Band Edge Signal Field Strength

Frequency	Level	Pol	15.209 / 15.247		Detector	Azimuth	Height	Comments
MHz	dBµV/m	v/h	Limit	Margin	Pk/QP/Avg	degrees	meters	
2387.040	44.7	H	54.0	-9.3	AVG	166	1.6	
2387.040	55.8	H	74.0	-18.2	PK	166	1.6	
2389.700	51.4	V	54.0	-2.6	AVG	0	1.4	
2389.700	66.3	V	74.0	-7.7	PK	0	1.4	

Other Spurious Emissions

Frequency	Level	Pol	15.209 / 15.247		Detector	Azimuth	Height	Comments
MHz	dBµV/m	v/h	Limit	Margin	Pk/QP/Avg	degrees	meters	
4844.610	30.9	V	54.0	-23.1	AVG	302	1.2	
4844.610	43.2	V	74.0	-30.8	PK	302	1.2	
7264.890	34.2	V	54.0	-19.8	AVG	0	1.0	
7264.890	45.7	V	74.0	-28.3	PK	0	1.0	
4844.080	30.0	H	54.0	-24.0	AVG	360	1.0	
4844.080	41.2	H	74.0	-32.8	PK	360	1.0	
Note 1:	For emissions in restricted bands, the limit of 15.209 was used. For all other emissions, the limit was set 30dB below the level of the fundamental and measured in 100kHz.							
Note 2:	Signal is not in a restricted band but the more stringent restricted band limit was used.							

Client:	Ruckus Wireless	Job Number:	J68610
Model:	Retriever module	T-Log Number:	T68973
		Account Manager:	Dean Eriksen
Contact:	Craig Owens		
Standard:	FCC Part 15.247/RSS-210	Class:	N/A

Run #4b: Center Channel @ 2437 MHz

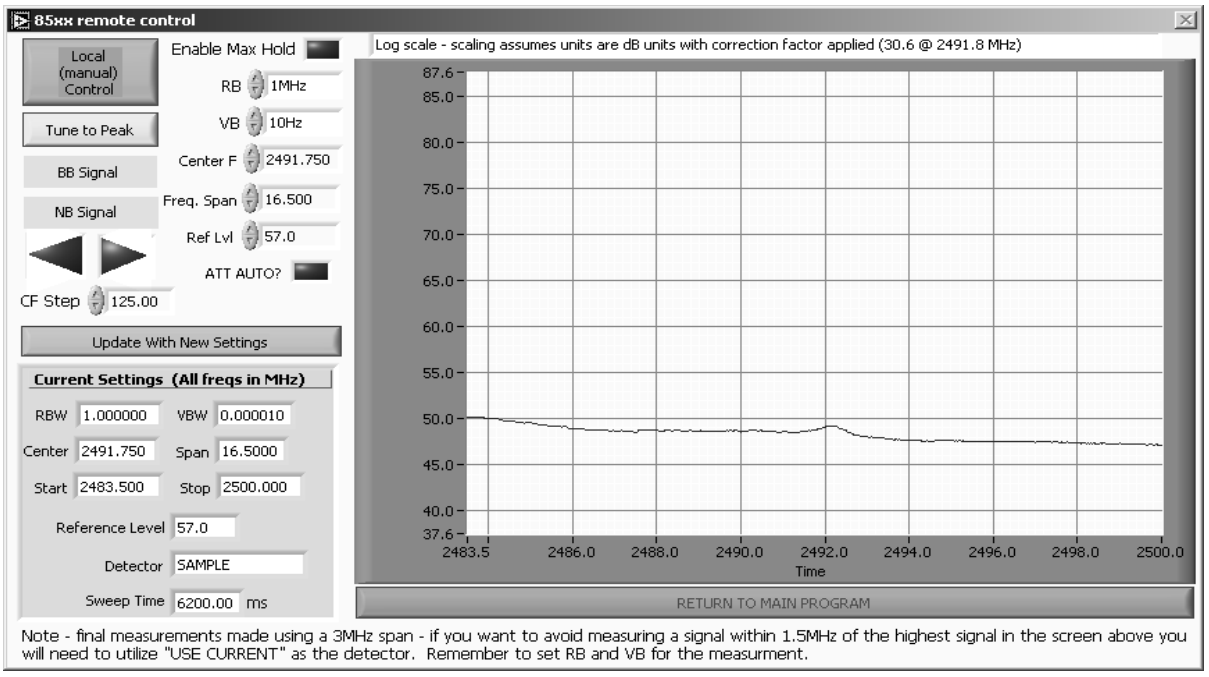
Frequency	Level	Pol	15.209 / 15.247		Detector	Azimuth	Height	Comments
MHz	dBµV/m	v/h	Limit	Margin	Pk/QP/Avg	degrees	meters	
4873.690	30.6	H	54.0	-23.4	AVG	0	1.0	
4873.690	42.2	H	74.0	-31.8	PK	0	1.0	
4875.210	31.7	V	54.0	-22.3	AVG	300	1.0	
4875.210	43.0	V	74.0	-31.0	PK	300	1.0	
7309.630	35.4	V	54.0	-18.6	AVG	0	1.0	
7309.630	45.6	V	74.0	-28.4	PK	0	1.0	
Note 1:	For emissions in restricted bands, the limit of 15.209 was used. For all other emissions, the limit was set 30dB below the level of the fundamental and measured in 100kHz.							
Note 2:	Signal is not in a restricted band but the more stringent restricted band limit was used.							

Run #4c: High Channel @ 2452 MHz

Fundamental Signal Field Strength: Peak and average values measured in 1 MHz, and peak value measured in 100kHz

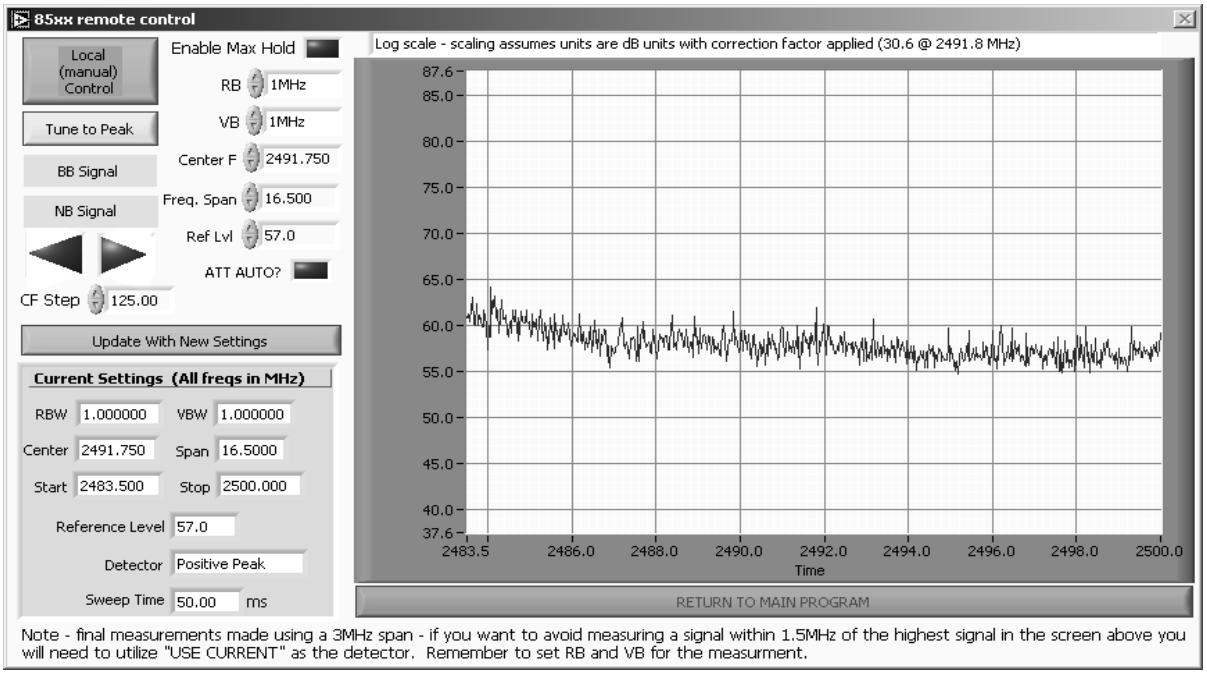
Frequency	Level	Pol	15.209 / 15.247		Detector	Azimuth	Height	Comments
MHz	dBµV/m	v/h	Limit	Margin	Pk/QP/Avg	degrees	meters	
2450.780	81.5	H	-	-	AVG	166	1.3	
2450.780	89.9	H	-	-	PK	166	1.3	
2450.950	95.2	V	-	-	AVG	0	1.4	
2450.950	103.5	V	-	-	PK	0	1.4	

Vertical

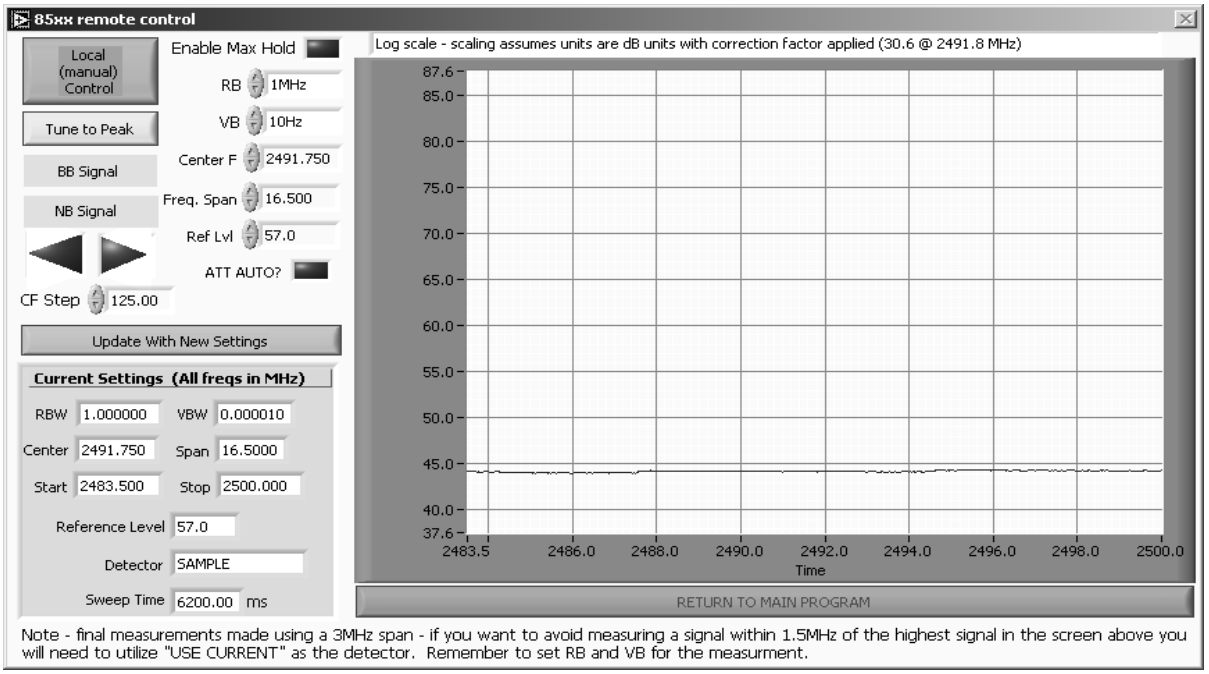


Client:	Ruckus Wireless	Job Number:	J68610
Model:	Retriever module	T-Log Number:	T68973
		Account Manager:	Dean Eriksen
Contact:	Craig Owens		
Standard:	FCC Part 15.247/RSS-210	Class:	N/A

Run #4c: Continued

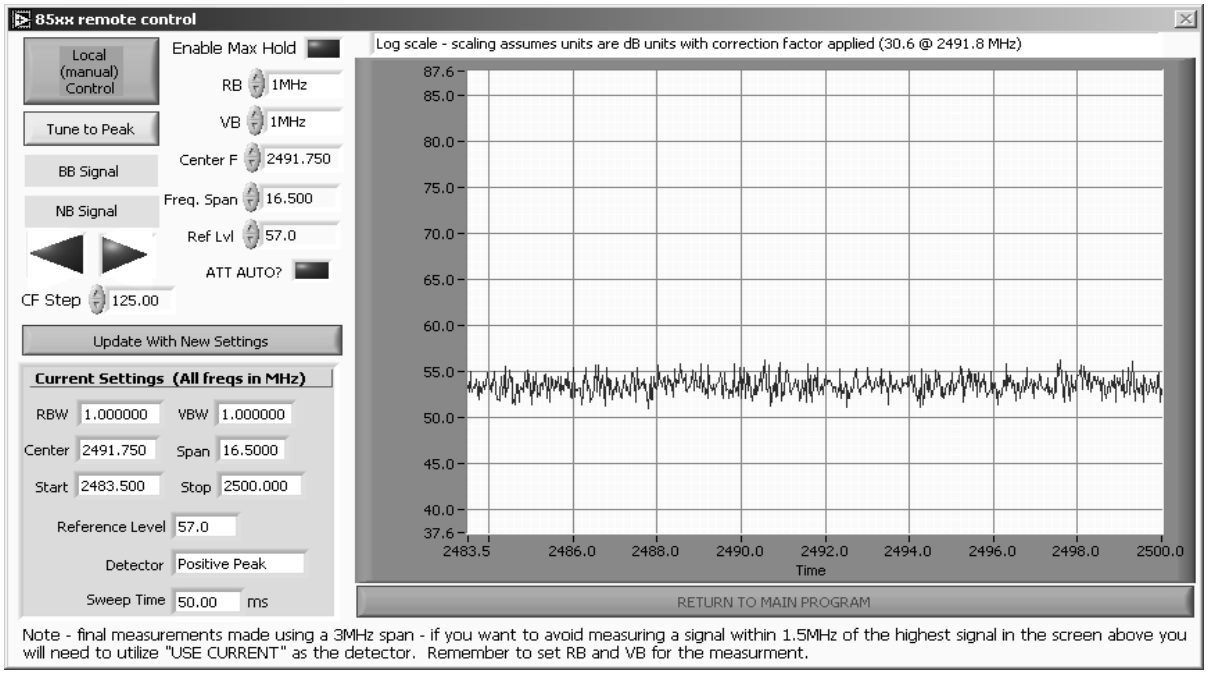


Horizontal



Client:	Ruckus Wireless	Job Number:	J68610
Model:	Retriever module	T-Log Number:	T68973
		Account Manager:	Dean Eriksen
Contact:	Craig Owens		
Standard:	FCC Part 15.247/RSS-210	Class:	N/A

Run #4c: Continued



Note - final measurements made using a 3MHz span - if you want to avoid measuring a signal within 1.5MHz of the highest signal in the screen above you will need to utilize "USE CURRENT" as the detector. Remember to set RB and VB for the measurment.

Band Edge Signal Field Strength

Frequency	Level	Pol	15.209 / 15.247		Detector	Azimuth	Height	Comments
MHz	dBµV/m	v/h	Limit	Margin	Pk/QP/Avg	degrees	meters	
2483.540	52.5	V	54.0	-1.5	AVG	0	1.4	
2483.540	67.9	V	74.0	-6.1	PK	0	1.4	
2483.700	45.5	H	54.0	-8.5	AVG	166	1.3	
2483.700	57.2	H	74.0	-16.8	PK	166	1.3	

Other Spurious Emissions

Frequency	Level	Pol	15.209 / 15.247		Detector	Azimuth	Height	Comments
MHz	dBµV/m	v/h	Limit	Margin	Pk/QP/Avg	degrees	meters	
4903.120	30.8	V	54.0	-23.2	AVG	341	1.0	2452
4903.120	42.3	V	74.0	-31.7	PK	341	1.0	2452
7355.040	34.2	V	54.0	-19.8	AVG	0	1.0	2452
7355.040	45.7	V	74.0	-28.3	PK	0	1.0	2452
4903.620	30.2	H	54.0	-23.8	AVG	360	1.0	2452
4903.620	43.0	H	74.0	-31.0	PK	360	1.0	2452

Note 1:	For emissions in restricted bands, the limit of 15.209 was used. For all other emissions, the limit was set 30dB below the level of the fundamental and measured in 100kHz.
Note 2:	Signal is not in a restricted band but the more stringent restricted band limit was used.

Client:	Ruckus Wireless	Job Number:	J68610
Model:	Retriever module	T-Log Number:	T68973
		Account Manager:	Dean Eriksen
Contact:	Craig Owens		
Standard:	FCC Part 15.247/RSS-210	Class:	N/A

RSS 210 and FCC 15.247 Radiated Spurious Emissions

Test Specific Details

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

Date of Test: 10/12/2007
Test Engineer: Rafael Varelas
Test Location: SVOATS #1

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

General Test Configuration

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

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

Ambient Conditions:

Temperature: 13 °C
Rel. Humidity: 89 %

Summary of Results

Run #	Test Performed	Limit	Pass / Fail	Result / Margin
1 (802.11b Mode)	RE, 30 - 18000 MHz - Spurious Emissions	FCC Part 15.209 / 15.247(c)	Pass	53.661dBµV/m @ 2484.6MHz (-0.4dB)
2 (802.11g Mode)	RE, 30 - 18000 MHz - Spurious Emissions	FCC Part 15.209 / 15.247(c)	Pass	53.7dBuV/m @ 2388.72MHz (-0.3dB)
3 (802.11n 20MHz Mode)	RE, 30 - 18000 MHz - Spurious Emissions	FCC Part 15.209 / 15.247(c)	Pass	53.5dBµV/m @ 2483.5MHz (-0.5dB)
4 (802.11n 40MHz Mode)	RE, 30 - 18000 MHz - Spurious Emissions	FCC Part 15.209 / 15.247(c)	Pass	52.2dBµV/m @ 2483.5MHz (-1.8dB)

Modifications Made During Testing

No modifications were made to the EUT during testing

Deviations From The Standard

No deviations were made from the requirements of the standard.

Client:	Ruckus Wireless	Job Number:	J68610
Model:	Retriever module	T-Log Number:	T68973
		Account Manager:	Dean Eriksen
Contact:	Craig Owens		
Standard:	FCC Part 15.247/RSS-210	Class:	N/A

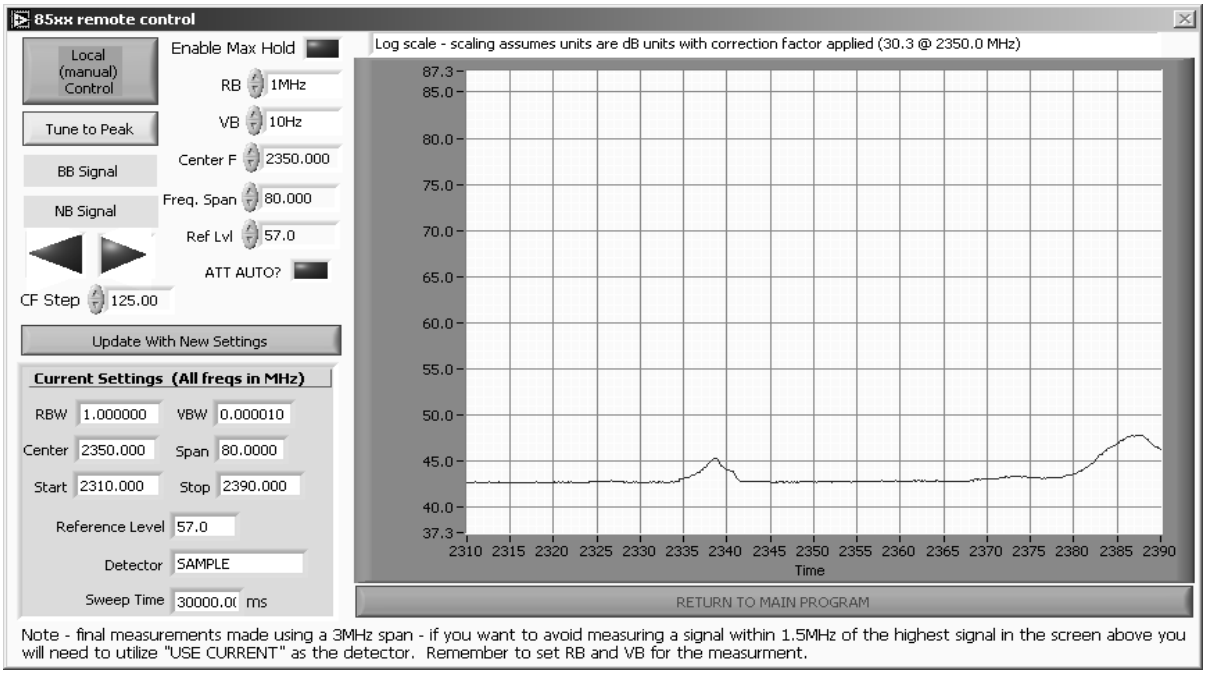
Run #1: Radiated Spurious Emissions, 30 - 18000 MHz. Operating Mode: 802.11b

Run #1a: Low Channel @ 2412 MHz

Fundamental Signal Field Strength: Peak and average values measured in 1 MHz, and peak value measured in 100kHz

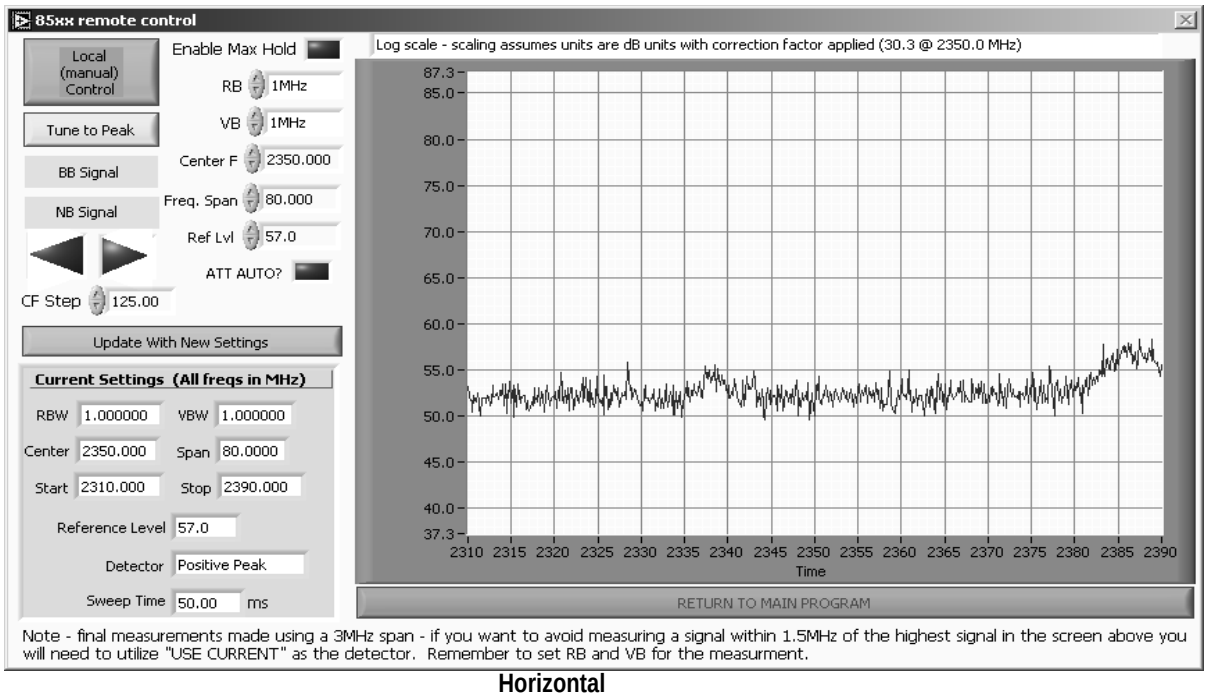
Frequency	Level	Pol	15.209 / 15.247		Detector	Azimuth	Height	Comments
MHz	dBµV/m	v/h	Limit	Margin	Pk/QP/Avg	degrees	meters	
2409.550	90.3	V	-	-	AVG	97	2.0	
2409.550	97.7	V	-	-	PK	97	2.0	
2410.610	109.0	H	-	-	AVG	118	2.0	
2410.610	116.4	H	-	-	PK	118	2.0	

Vertical

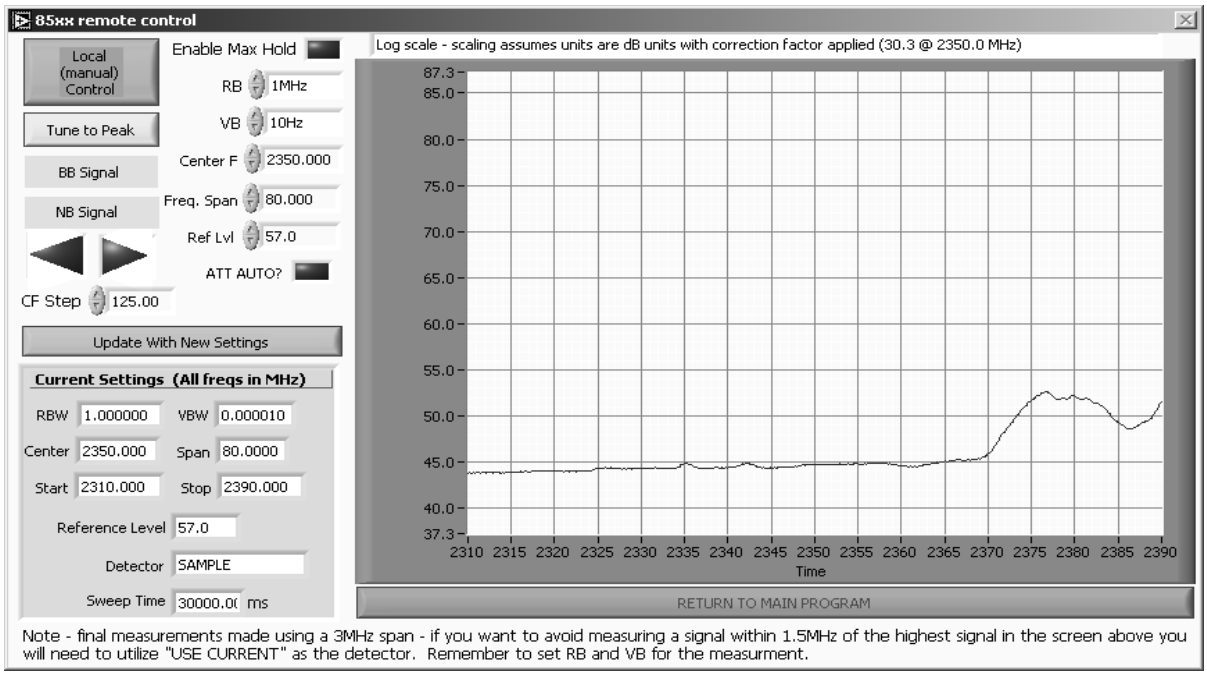


Client:	Ruckus Wireless	Job Number:	J68610
Model:	Retriever module	T-Log Number:	T68973
		Account Manager:	Dean Eriksen
Contact:	Craig Owens		
Standard:	FCC Part 15.247/RSS-210	Class:	N/A

Run #1a: Continued

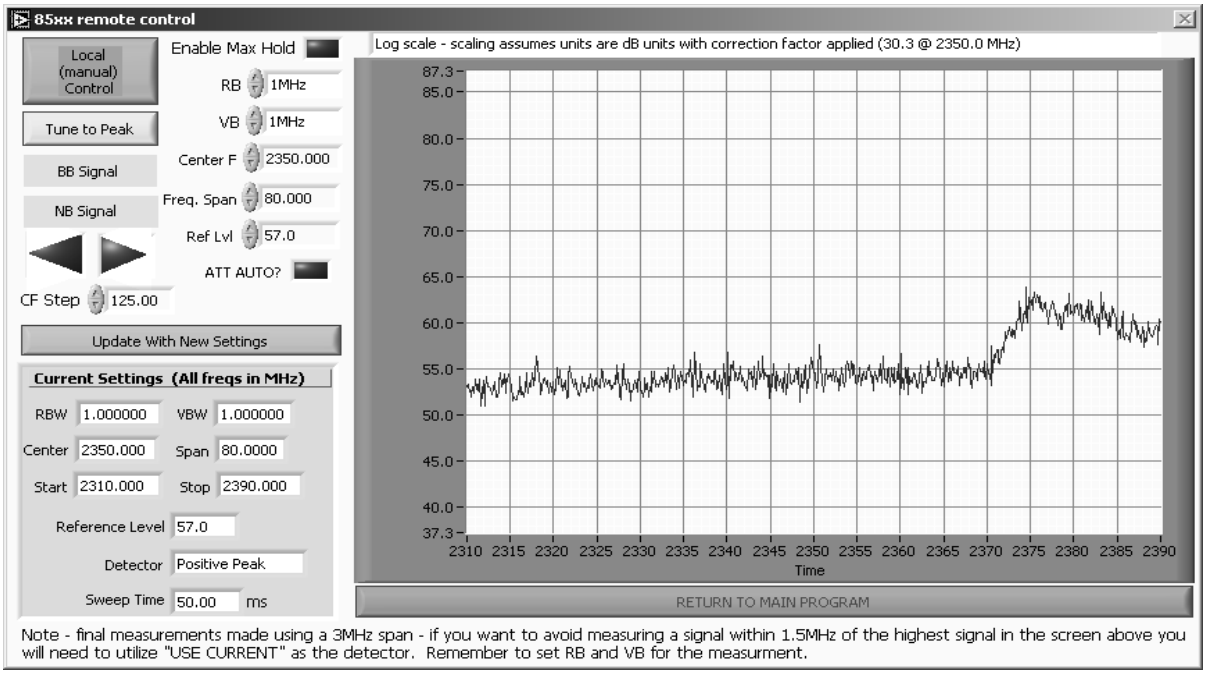


Horizontal



Client:	Ruckus Wireless	Job Number:	J68610
Model:	Retriever module	T-Log Number:	T68973
		Account Manager:	Dean Eriksen
Contact:	Craig Owens		
Standard:	FCC Part 15.247/RSS-210	Class:	N/A

Run #1a: Continued



Band Edge Signal Field Strength

Frequency	Level	Pol	15.209 / 15.247		Detector	Azimuth	Height	Comments
MHz	dBµV/m	v/h	Limit	Margin	Pk/QP/Avg	degrees	meters	
2376.330	52.8	H	54.0	-1.2	Avg	118	2.0	
2376.380	64.4	H	74.0	-9.6	PK	118	2.0	
2387.380	49.2	V	54.0	-4.8	AVG	97	2.0	
2387.380	59.5	V	74.0	-14.5	PK	97	2.0	

Client:	Ruckus Wireless	Job Number:	J68610
Model:	Retriever module	T-Log Number:	T68973
		Account Manager:	Dean Eriksen
Contact:	Craig Owens		
Standard:	FCC Part 15.247/RSS-210	Class:	N/A

Run #1a: Continued
Other Spurious Emissions

Frequency	Level	Pol	15.209 / 15.247		Detector	Azimuth	Height	Comments
MHz	dBµV/m	v/h	Limit	Margin	Pk/QP/Avg	degrees	meters	
4824.040	49.5	H	54.0	-4.5	AVG	323	1.4	
4824.040	51.6	H	74.0	-22.4	PK	323	1.4	
7235.460	33.9	H	54.0	-20.1	AVG	49	1.8	
7235.460	45.6	H	74.0	-28.4	PK	49	1.8	
9647.890	37.8	H	54.0	-16.2	AVG	155	1.4	
9647.890	47.1	H	74.0	-26.9	PK	155	1.4	
12058.750	38.6	H	54.0	-15.4	AVG	81	1.1	
12058.750	49.8	H	74.0	-24.2	PK	81	1.1	
4824.000	53.5	V	54.0	-0.5	AVG	6	1.3	
4824.000	55.6	V	74.0	-18.4	PK	6	1.3	
7234.990	34.4	V	54.0	-19.6	AVG	325	1.0	
7234.990	45.5	V	74.0	-28.5	PK	325	1.0	
9648.120	37.0	V	54.0	-17.0	AVG	0	1.0	
9648.120	47.0	V	74.0	-27.0	PK	0	1.0	
12060.580	38.6	V	54.0	-15.4	AVG	360	1.3	
12060.580	50.3	V	74.0	-23.7	PK	360	1.3	

Note 1:	For emissions in restricted bands, the limit of 15.209 was used. For all other emissions, the limit was set 30dB below the level of the fundamental and measured in 100kHz.
Note 2:	Signal is not in a restricted band but the more stringent restricted band limit was used.

Run #1b: Center Channel @ 2437 MHz

Frequency	Level	Pol	15.209 / 15.247		Detector	Azimuth	Height	Comments
MHz	dBµV/m	v/h	Limit	Margin	Pk/QP/Avg	degrees	meters	
4874.040	49.9	V	54.0	-4.1	AVG	30	1.0	
4874.040	52.0	V	74.0	-22.0	PK	30	1.0	
7311.000	43.4	V	54.0	-10.6	AVG	305	1.5	
7311.000	49.4	V	74.0	-24.6	PK	305	1.5	
4874.020	48.3	H	54.0	-5.7	AVG	52	1.4	
4874.020	51.1	H	74.0	-22.9	PK	52	1.4	
7311.150	43.1	H	54.0	-10.9	AVG	234	1.5	
7311.150	49.1	H	74.0	-24.9	PK	234	1.5	

Note 1:	For emissions in restricted bands, the limit of 15.209 was used. For all other emissions, the limit was set 30dB below the level of the fundamental and measured in 100kHz.
Note 2:	Signal is not in a restricted band but the more stringent restricted band limit was used.

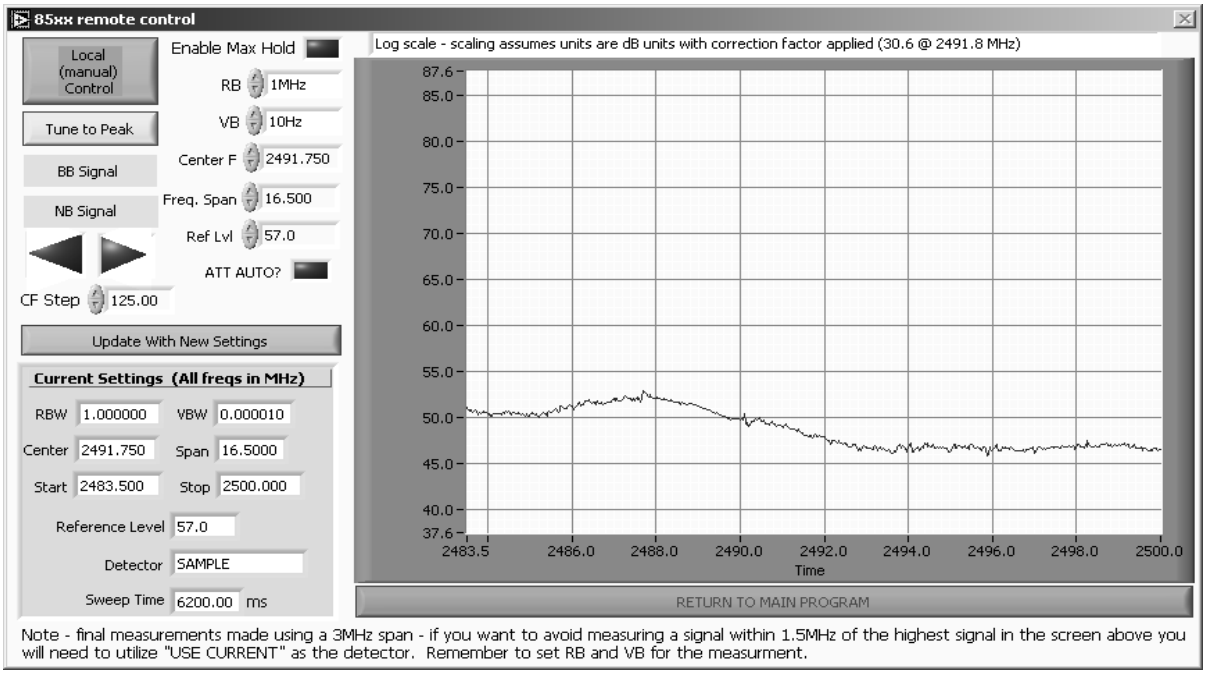
Client:	Ruckus Wireless	Job Number:	J68610
Model:	Retriever module	T-Log Number:	T68973
		Account Manager:	Dean Eriksen
Contact:	Craig Owens		
Standard:	FCC Part 15.247/RSS-210	Class:	N/A

Run #1c: High Channel @ 2462 MHz

Fundamental Signal Field Strength: Peak and average values measured in 1 MHz, and peak value measured in 100kHz

Frequency	Level	Pol	15.209 / 15.247		Detector	Azimuth	Height	Comments
MHz	dBµV/m	v/h	Limit	Margin	Pk/QP/Avg	degrees	meters	
2461.440	105.5	H	54.0	51.5	AVG	145	2.0	
2461.440	104.1	H	74.0	30.1	PK	145	2.0	
2463.210	93.5	V	54.0	39.5	AVG	189	2.0	
2463.210	99.3	V	74.0	25.3	PK	189	2.0	

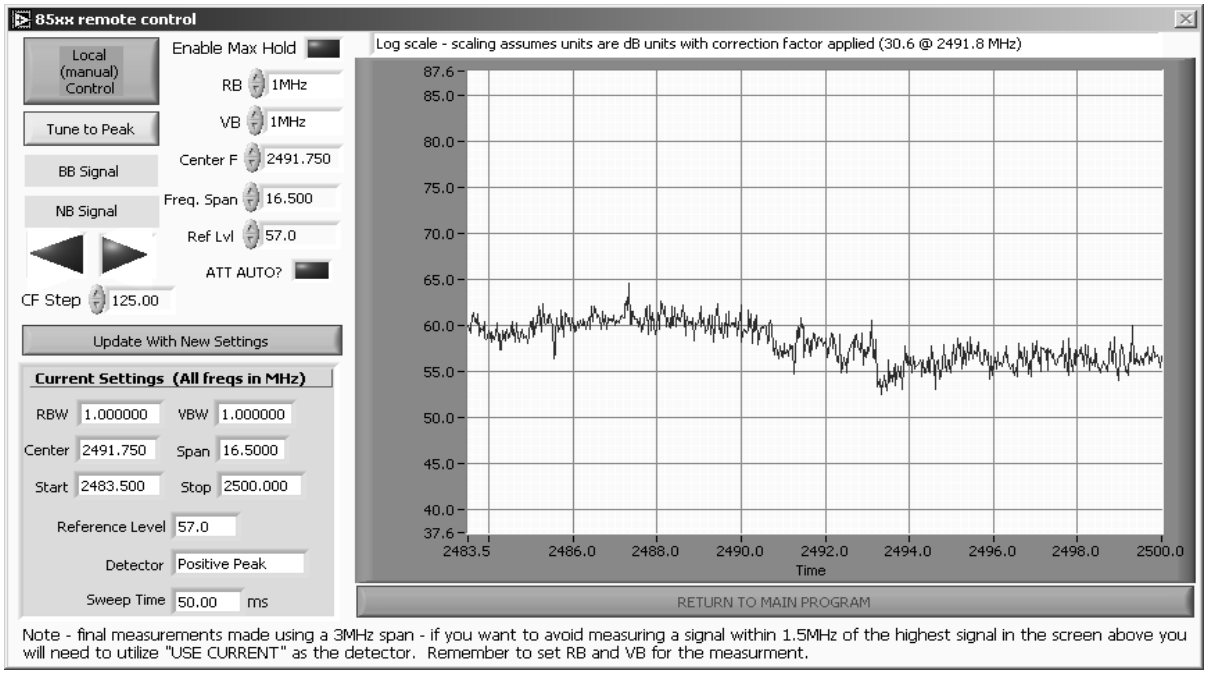
Vertical



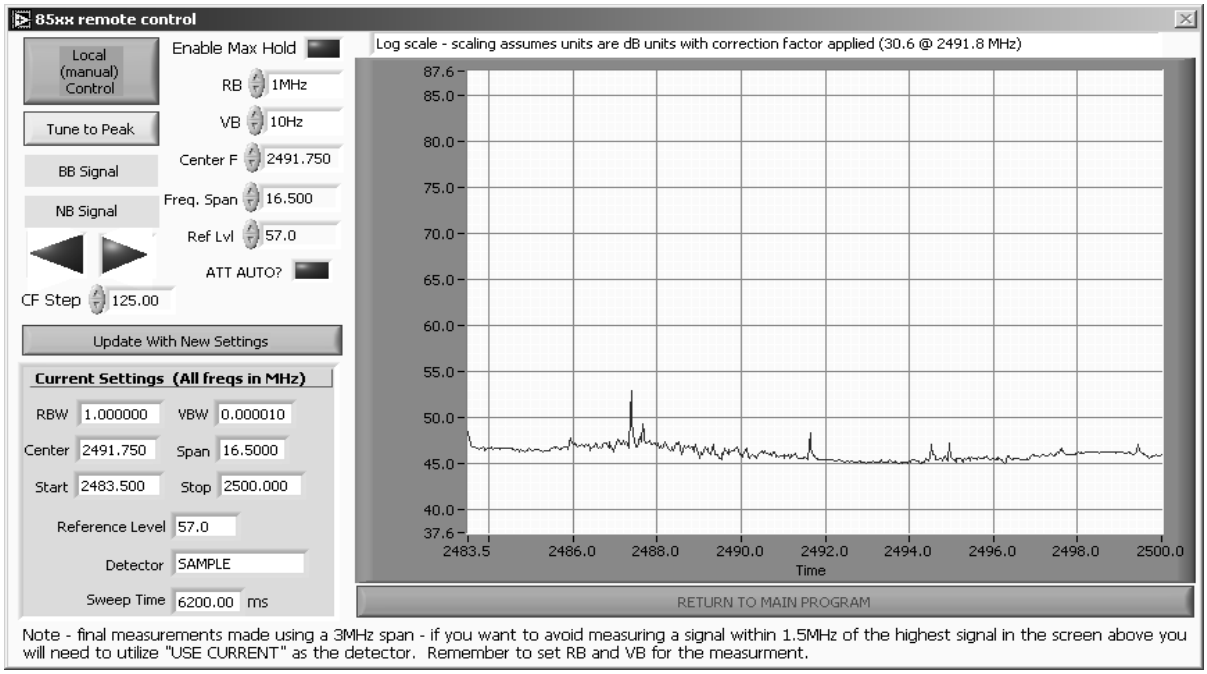
Note - final measurements made using a 3MHz span - if you want to avoid measuring a signal within 1.5MHz of the highest signal in the screen above you will need to utilize "USE CURRENT" as the detector. Remember to set RB and VB for the measurment.

Client:	Ruckus Wireless	Job Number:	J68610
Model:	Retriever module	T-Log Number:	T68973
		Account Manager:	Dean Eriksen
Contact:	Craig Owens		
Standard:	FCC Part 15.247/RSS-210	Class:	N/A

Run #1c: Continued

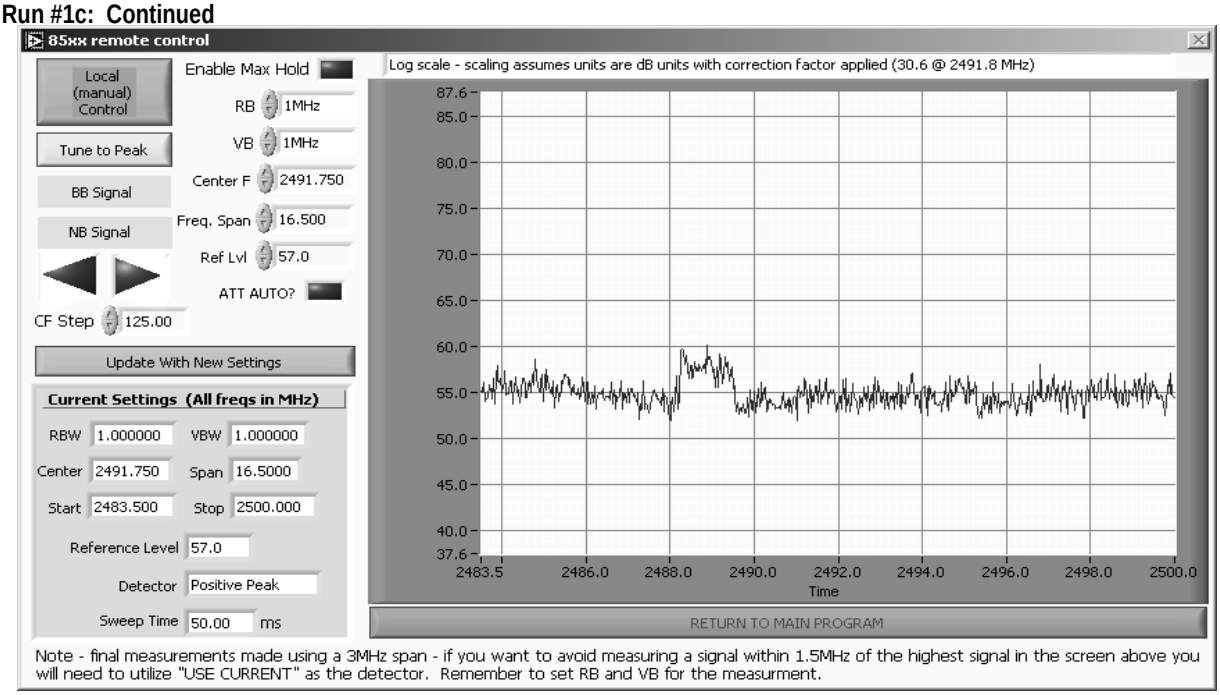


Horizontal



Client:	Ruckus Wireless	Job Number:	J68610
Model:	Retriever module	T-Log Number:	T68973
		Account Manager:	Dean Eriksen
Contact:	Craig Owens		
Standard:	FCC Part 15.247/RSS-210	Class:	N/A

Run #1c: Continued



Band Edge Signal Field Strength

Frequency	Level	Pol	15.209 / 15.247		Detector	Azimuth	Height	Comments
MHz	dBµV/m	v/h	Limit	Margin	Pk/QP/Avg	degrees	meters	
2484.160	61.0	H	74.0	-13.0	PK	145	2.0	
2484.550	53.6	H	54.0	-0.4	Avg	145	2.0	
2487.580	52.3	V	54.0	-1.7	Avg	189	2.0	
2487.820	63.7	V	74.0	-10.3	PK	189	2.0	

Other Spurious Emissions

Frequency	Level	Pol	15.209 / 15.247		Detector	Azimuth	Height	Comments
MHz	dBµV/m	v/h	Limit	Margin	Pk/QP/Avg	degrees	meters	
4924.010	53.0	H	54.0	-1.0	AVG	47	1.4	
4924.010	54.6	H	74.0	-19.4	PK	47	1.4	
7385.960	39.4	H	54.0	-14.6	AVG	26	1.1	
7385.960	48.9	H	74.0	-25.1	PK	26	1.1	
4924.010	51.4	V	54.0	-2.6	AVG	18	1.0	
4924.010	53.5	V	74.0	-20.5	PK	18	1.0	
7385.920	34.7	V	54.0	-19.3	AVG	0	1.0	
7385.920	46.3	V	74.0	-27.7	PK	0	1.0	
Note 1:	For emissions in restricted bands, the limit of 15.209 was used. For all other emissions, the limit was set 30dB below the level of the fundamental and measured in 100kHz.							
Note 2:	Signal is not in a restricted band but the more stringent restricted band limit was used.							

Client:	Ruckus Wireless	Job Number:	J68610
Model:	Retriever module	T-Log Number:	T68973
		Account Manager:	Dean Eriksen
Contact:	Craig Owens		
Standard:	FCC Part 15.247/RSS-210	Class:	N/A

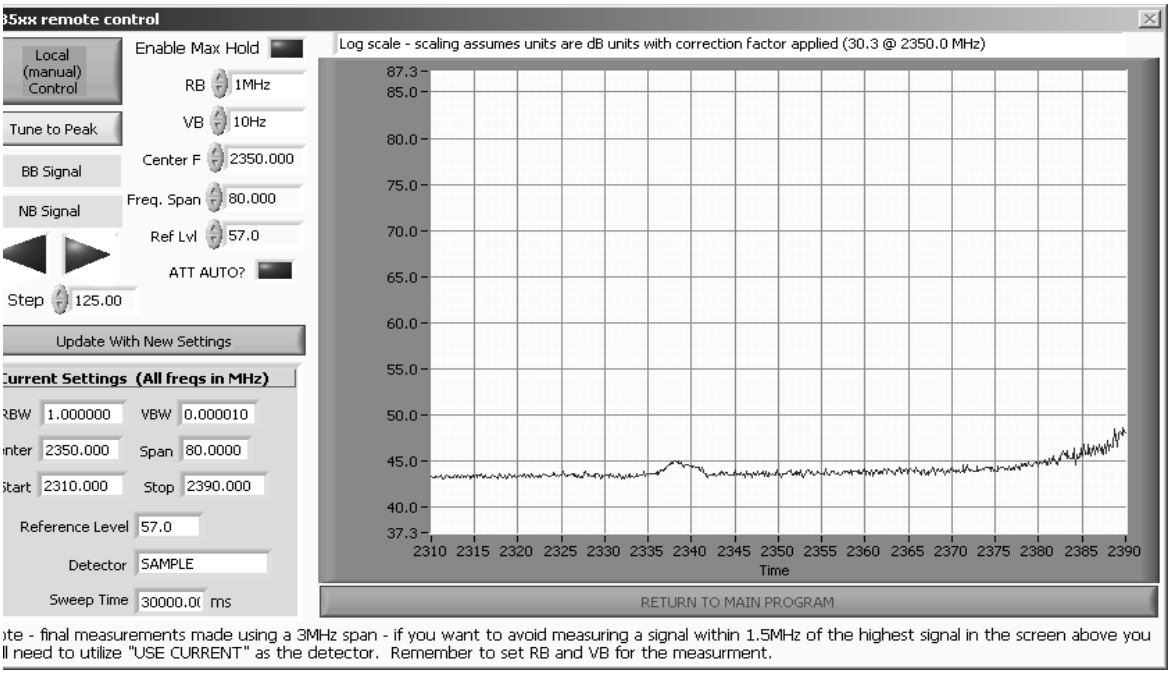
Run #2: Radiated Spurious Emissions, 30 - 18000 MHz. Operating Mode: 802.11g

Run #2a: Low Channel @ 2412 MHz

Fundamental Signal Field Strength: Peak and average values measured in 1 MHz, and peak value measured in 100kHz

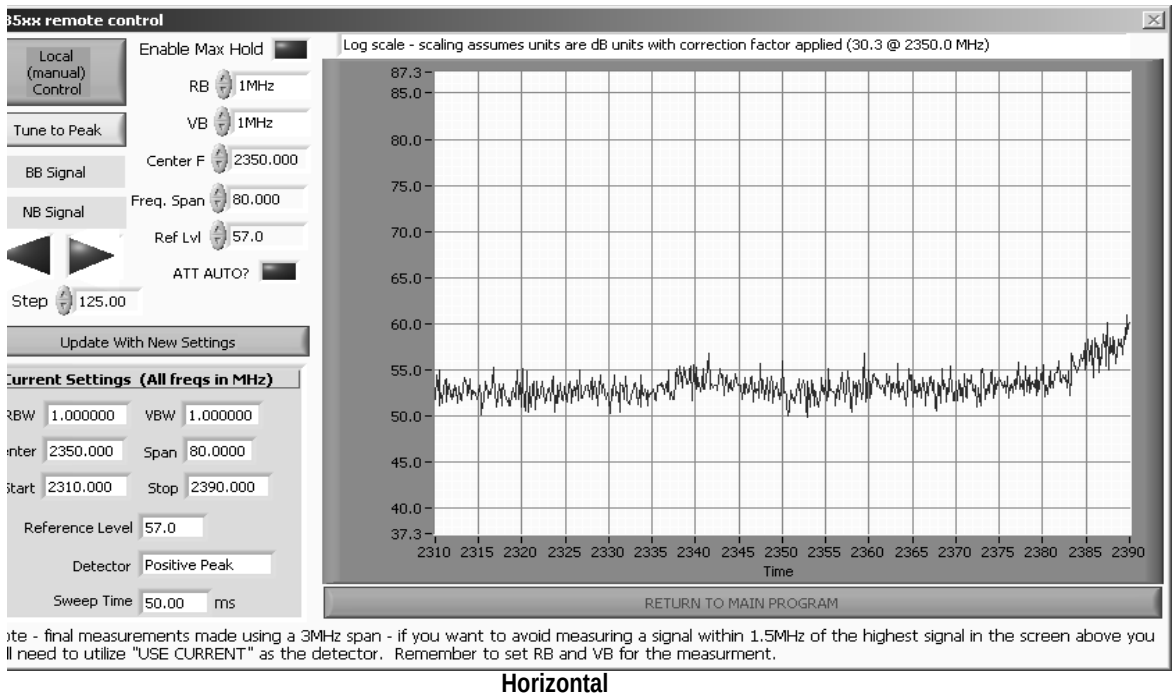
Frequency	Level	Pol	15.209 / 15.247		Detector	Azimuth	Height	Comments
MHz	dBµV/m	v/h	Limit	Margin	Pk/QP/Avg	degrees	meters	
2410.660	97.7	V	-	-	AVG	360	2.0	
2410.660	106.4	V	-	-	PK	360	2.0	
2412.580	102.0	H	-	-	AVG	143	2.0	
2412.580	111.5	H	-	-	PK	143	2.0	

Vertical

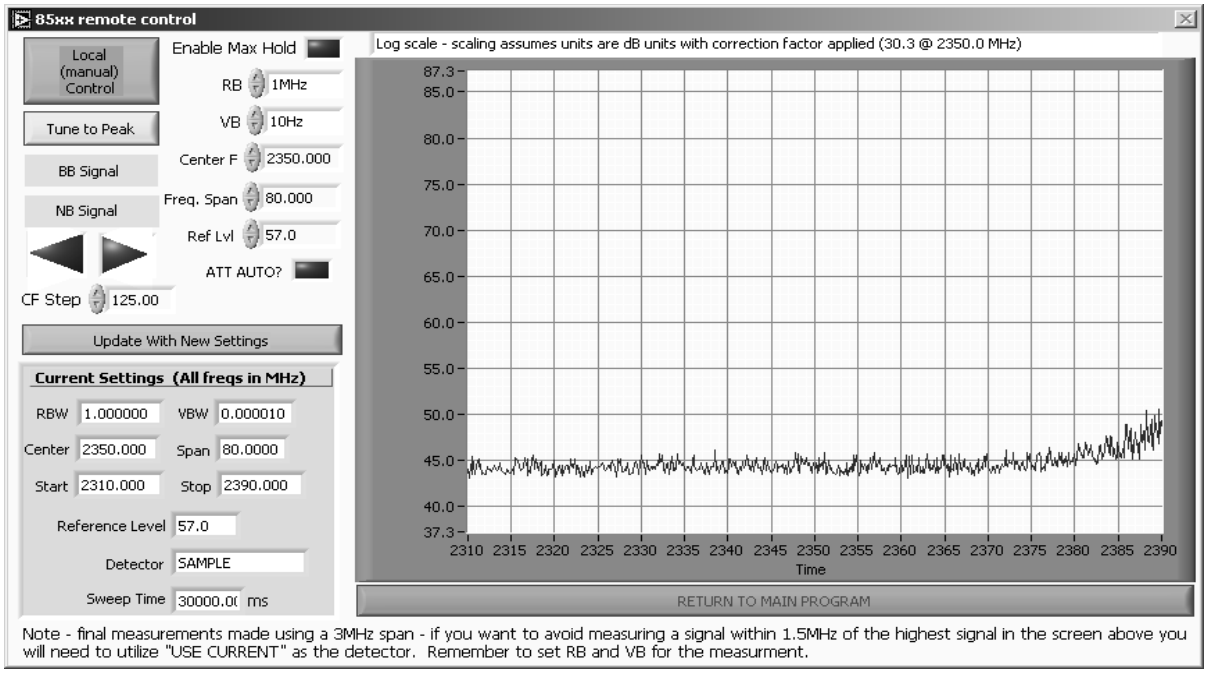


Client:	Ruckus Wireless	Job Number:	J68610
Model:	Retriever module	T-Log Number:	T68973
		Account Manager:	Dean Eriksen
Contact:	Craig Owens		
Standard:	FCC Part 15.247/RSS-210	Class:	N/A

Run #2a: Continued

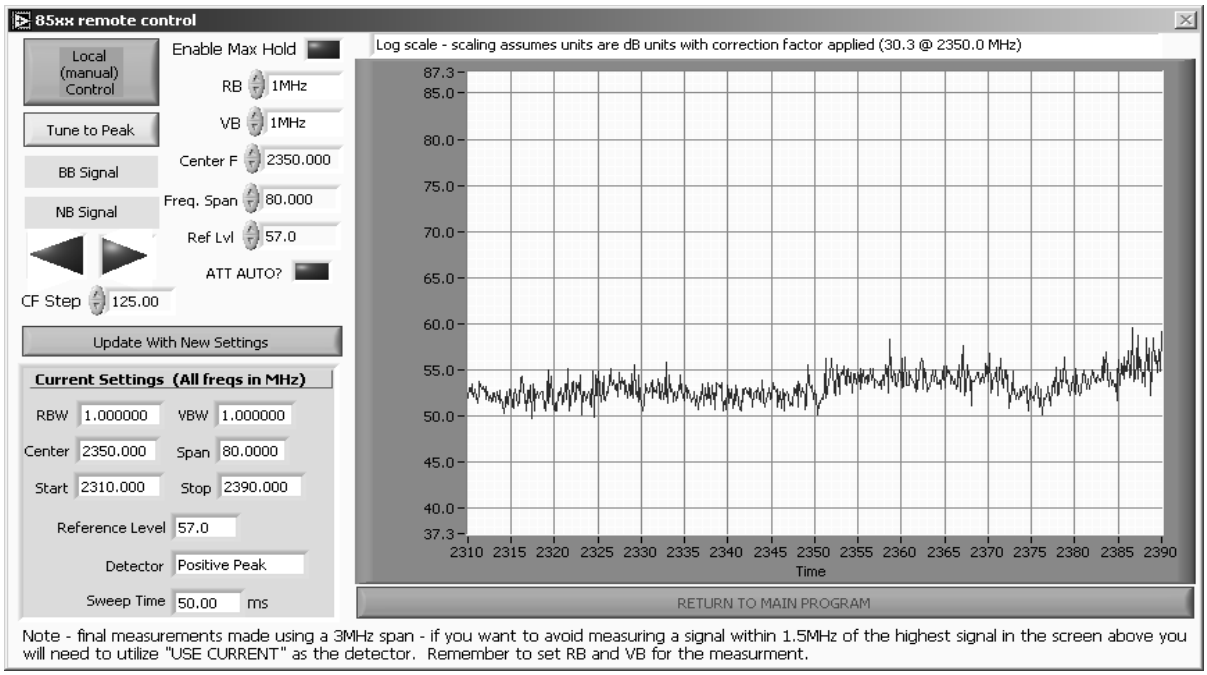


Horizontal



Client:	Ruckus Wireless	Job Number:	J68610
Model:	Retriever module	T-Log Number:	T68973
		Account Manager:	Dean Eriksen
Contact:	Craig Owens		
Standard:	FCC Part 15.247/RSS-210	Class:	N/A

Run #2a: Continued



Band Edge Signal Field Strength

Frequency	Level	Pol	15.209 / 15.247		Detector	Azimuth	Height	Comments
MHz	dBµV/m	v/h	Limit	Margin	Pk/QP/Avg	degrees	meters	
2389.250	53.4	V	54.0	-0.6	AVG	360	2.0	
2389.250	68.6	V	74.0	-5.4	PK	360	2.0	
2388.720	53.7	H	54.0	-0.3	AVG	143	2.0	
2388.720	71.4	H	74.0	-2.6	PK	143	2.0	

Other Spurious Emissions

Frequency	Level	Pol	15.209 / 15.247		Detector	Azimuth	Height	Comments
MHz	dBµV/m	v/h	Limit	Margin	Pk/QP/Avg	degrees	meters	
4824.600	30.4	H	54.0	-23.6	AVG	94	1.1	
4824.600	41.4	H	74.0	-32.6	PK	94	1.1	
4824.170	30.2	V	54.0	-23.8	AVG	0	1.0	
4824.170	41.5	V	74.0	-32.5	PK	0	1.0	
7234.790	33.4	V	54.0	-20.6	AVG	360	1.0	
7234.790	45.2	V	74.0	-28.8	PK	360	1.0	
Note 1:	For emissions in restricted bands, the limit of 15.209 was used. For all other emissions, the limit was set 30dB below the level of the fundamental and measured in 100kHz.							
Note 2:	Signal is not in a restricted band but the more stringent restricted band limit was used.							

Client:	Ruckus Wireless	Job Number:	J68610
Model:	Retriever module	T-Log Number:	T68973
		Account Manager:	Dean Eriksen
Contact:	Craig Owens		
Standard:	FCC Part 15.247/RSS-210	Class:	N/A

Run #2b: Center Channel @ 2437 MHz

Frequency	Level	Pol	15.209 / 15.247		Detector	Azimuth	Height	Comments
MHz	dBµV/m	v/h	Limit	Margin	Pk/QP/Avg	degrees	meters	
4873.670	31.2	V	54.0	-22.8	AVG	0	1.0	
4873.670	42.7	V	74.0	-31.3	PK	0	1.0	
7311.750	42.0	V	54.0	-12.0	AVG	360	1.0	
7311.750	48.5	V	74.0	-25.5	PK	360	1.0	
4873.330	31.9	H	54.0	-22.1	AVG	282	1.0	
4873.330	43.4	H	74.0	-30.6	PK	282	1.0	

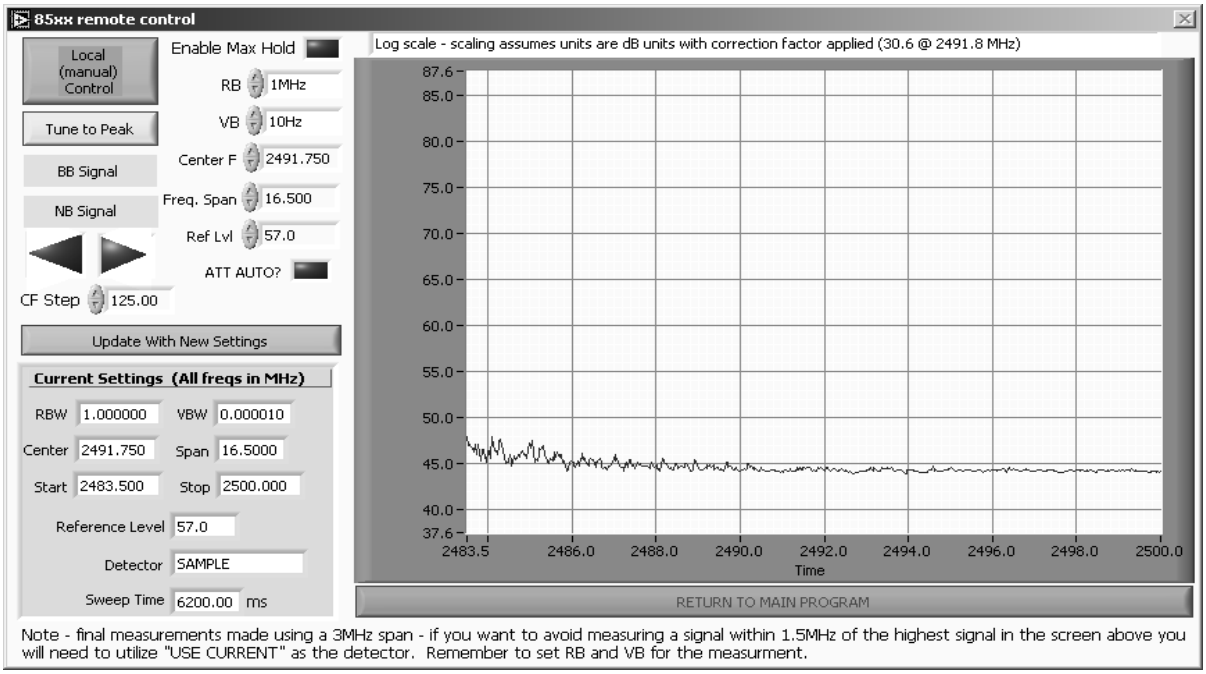
Note 1:	For emissions in restricted bands, the limit of 15.209 was used. For all other emissions, the limit was set 30dB below the level of the fundamental and measured in 100kHz.
Note 2:	Signal is not in a restricted band but the more stringent restricted band limit was used.

Run #2c: High Channel @ 2462 MHz

Fundamental Signal Field Strength: Peak and average values measured in 1 MHz, and peak value measured in 100kHz

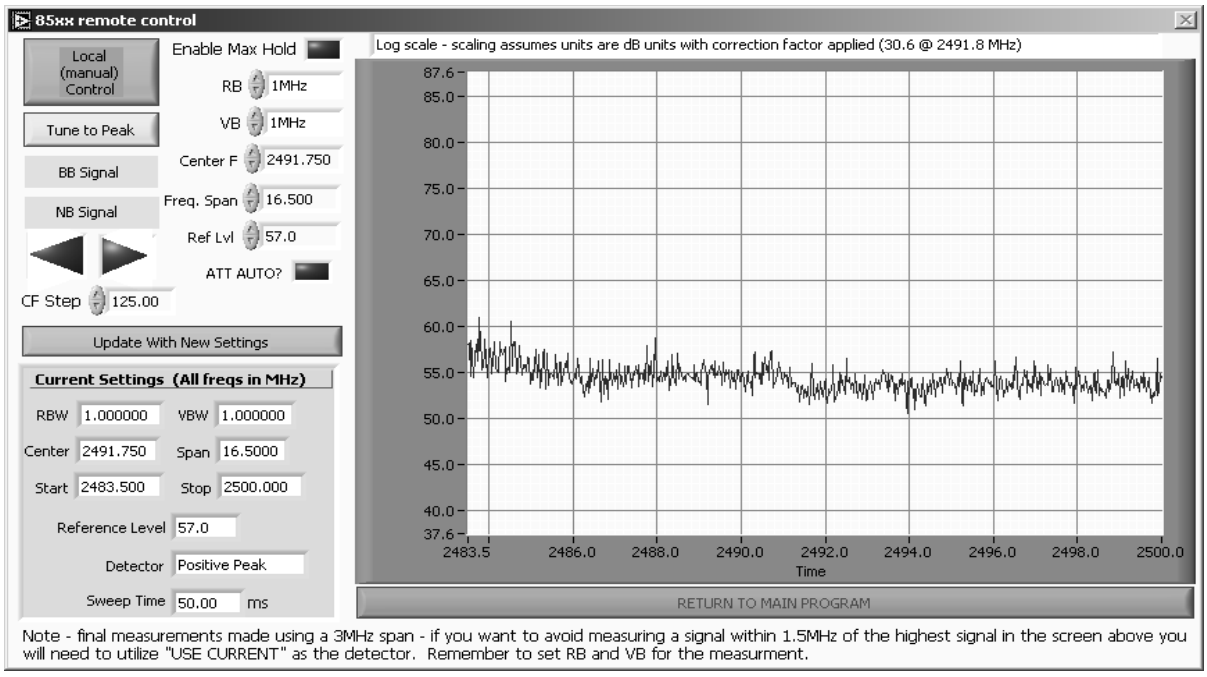
Frequency	Level	Pol	15.209 / 15.247		Detector	Azimuth	Height	Comments
MHz	dBµV/m	v/h	Limit	Margin	Pk/QP/Avg	degrees	meters	
2461.010	92.5	V	-	-	AVG	69	2.0	
2461.010	101.8	V	-	-	PK	69	2.0	
2463.490	97.0	H	-	-	AVG	135	1.0	
2463.490	105.3	H	-	-	PK	135	1.0	

Vertical

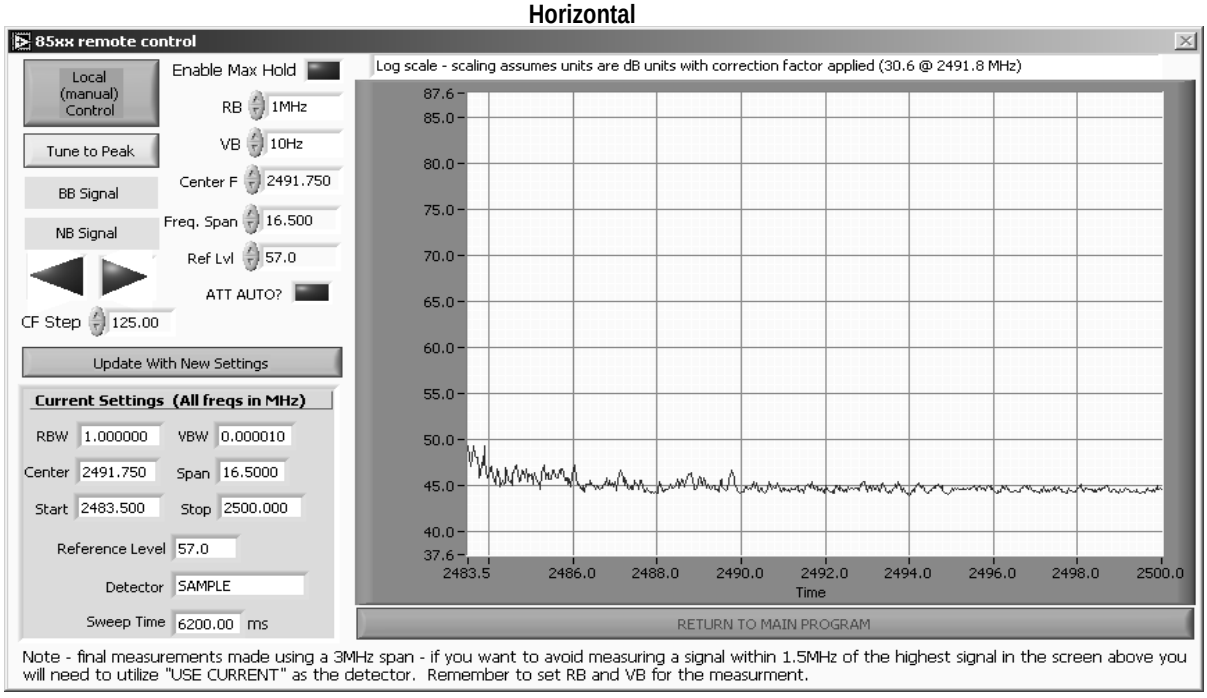


Client:	Ruckus Wireless	Job Number:	J68610
Model:	Retriever module	T-Log Number:	T68973
		Account Manager:	Dean Eriksen
Contact:	Craig Owens		
Standard:	FCC Part 15.247/RSS-210	Class:	N/A

Run #2c: Continued

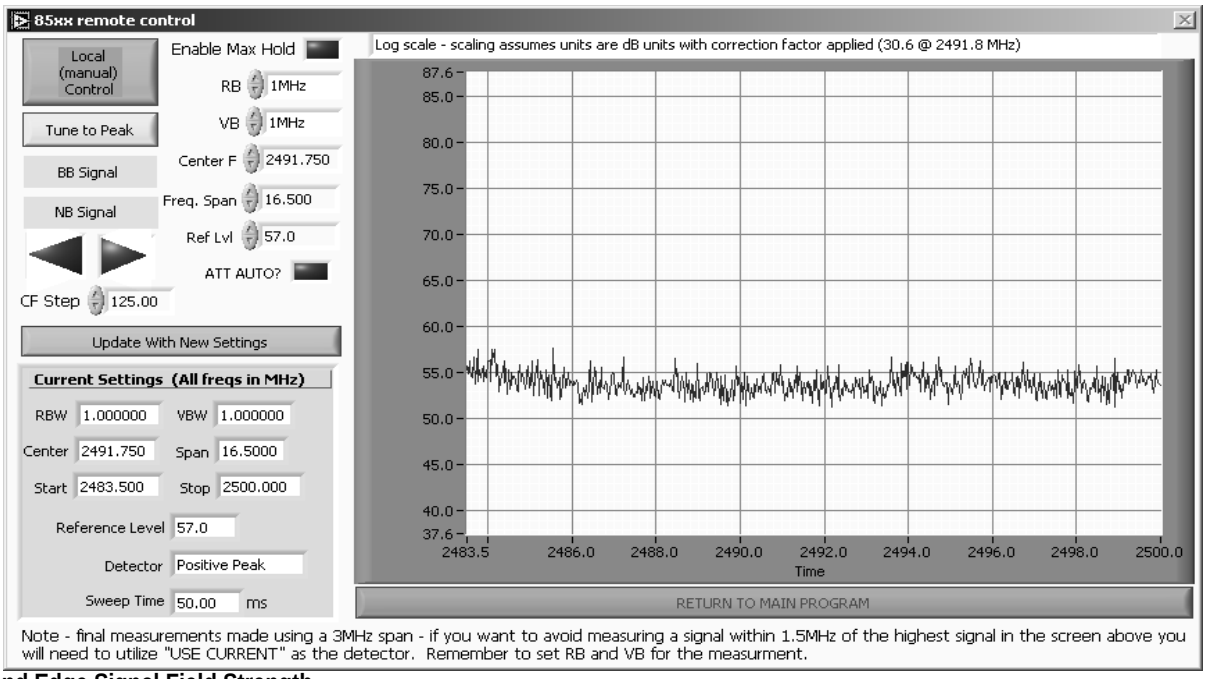


Horizontal



Client:	Ruckus Wireless	Job Number:	J68610
Model:	Retriever module	T-Log Number:	T68973
		Account Manager:	Dean Eriksen
Contact:	Craig Owens		
Standard:	FCC Part 15.247/RSS-210	Class:	N/A

Run #2c: Continued



Band Edge Signal Field Strength

Frequency	Level	Pol	15.209 / 15.247		Detector	Azimuth	Height	Comments
MHz	dBµV/m	v/h	Limit	Margin	Pk/QP/Avg	degrees	meters	
2484.420	52.1	V	54.0	-1.9	AVG	69	2.0	
2484.420	67.1	V	74.0	-6.9	PK	69	2.0	
2485.540	51.6	H	54.0	-2.4	AVG	135	1.0	
2485.540	69.4	H	74.0	-4.6	PK	135	1.0	

Other Spurious Emissions

Frequency	Level	Pol	15.209 / 15.247		Detector	Azimuth	Height	Comments
MHz	dBµV/m	v/h	Limit	Margin	Pk/QP/Avg	degrees	meters	
4922.830	32.4	H	54.0	-21.6	AVG	71	1.0	
4922.830	44.4	H	74.0	-29.6	PK	71	1.0	
4923.540	31.3	V	54.0	-22.7	AVG	302	1.0	
4923.540	43.1	V	74.0	-30.9	PK	302	1.0	
7386.880	34.1	V	54.0	-19.9	AVG	360	1.0	
7386.880	45.2	V	74.0	-28.8	PK	360	1.0	

Note 1:	For emissions in restricted bands, the limit of 15.209 was used. For all other emissions, the limit was set 30dB below the level of the fundamental and measured in 100kHz.
Note 2:	Signal is not in a restricted band but the more stringent restricted band limit was used.

Client:	Ruckus Wireless	Job Number:	J68610
Model:	Retriever module	T-Log Number:	T68973
		Account Manager:	Dean Eriksen
Contact:	Craig Owens		
Standard:	FCC Part 15.247/RSS-210	Class:	N/A

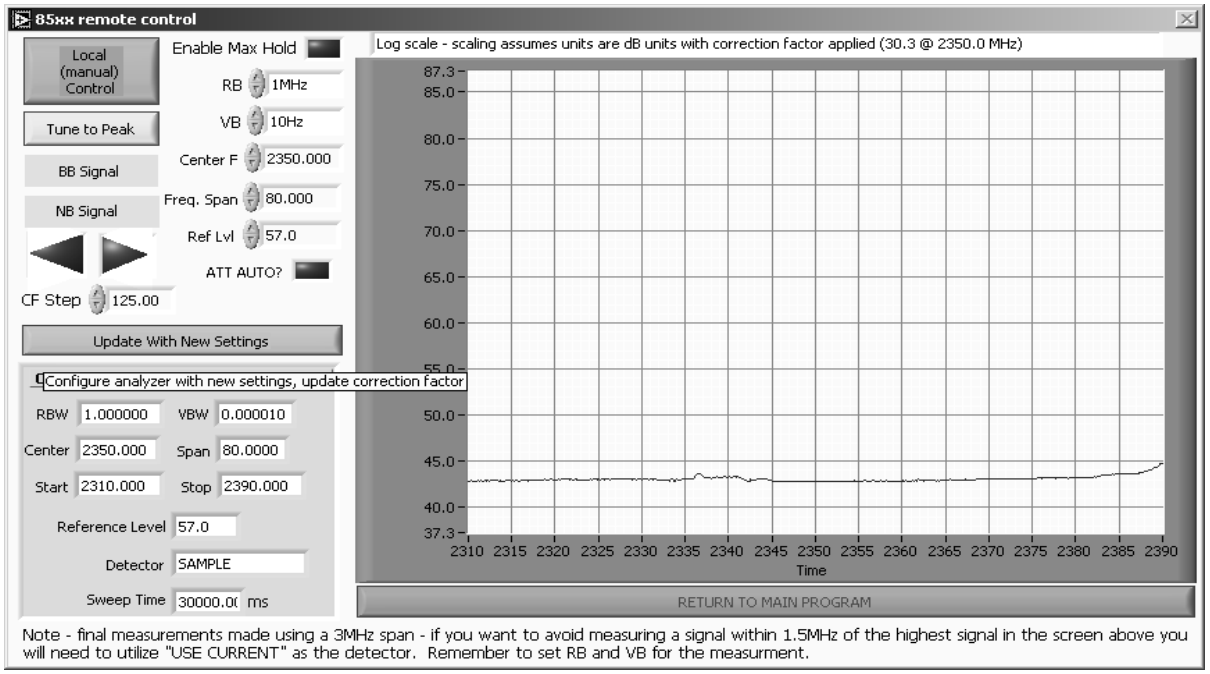
Run #3: Radiated Spurious Emissions, 30 - 18000 MHz. Operating Mode: 802.11n HT20 MCS0

Run #3a: Low Channel @ 2412 MHz

Fundamental Signal Field Strength: Peak and average values measured in 1 MHz, and peak value measured in 100kHz

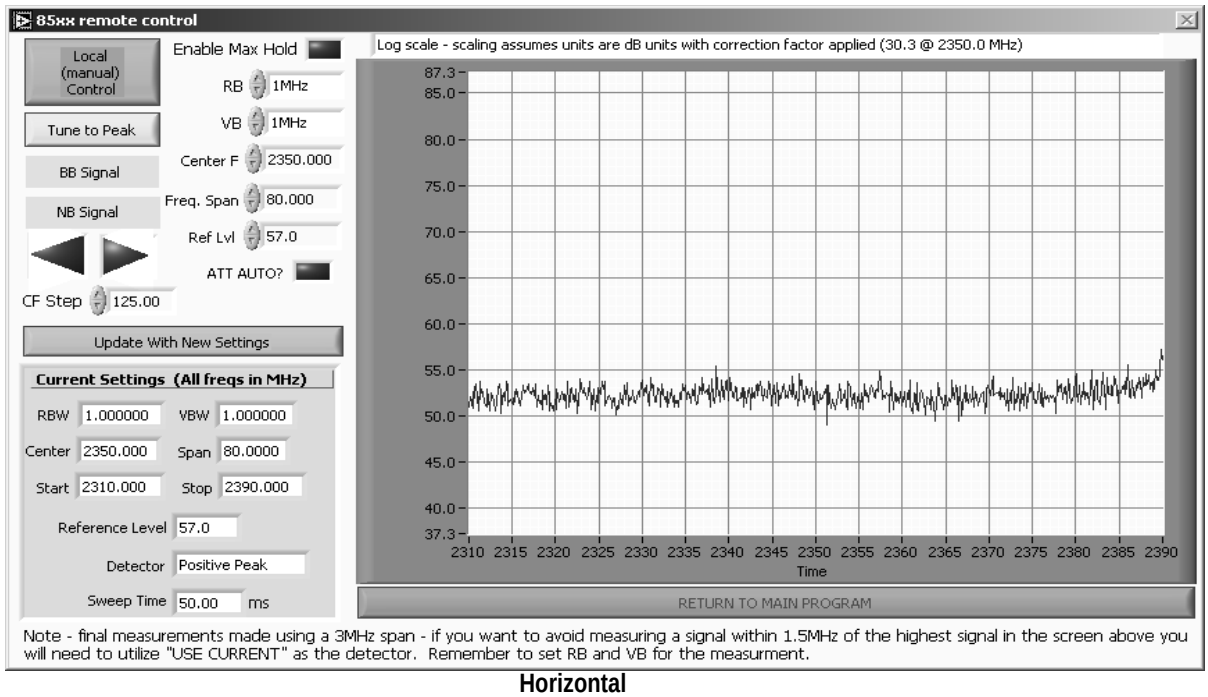
Frequency	Level	Pol	15.209 / 15.247		Detector	Azimuth	Height	Comments
MHz	dBµV/m	v/h	Limit	Margin	Pk/QP/Avg	degrees	meters	
2410.500	104.3	H	-	-	AVG	344	2.0	
2410.500	113.0	H	-	-	PK	344	2.0	
2410.520	90.7	V	-	-	AVG	102	1.0	
2410.520	98.9	V	-	-	PK	102	1.0	

Vertical

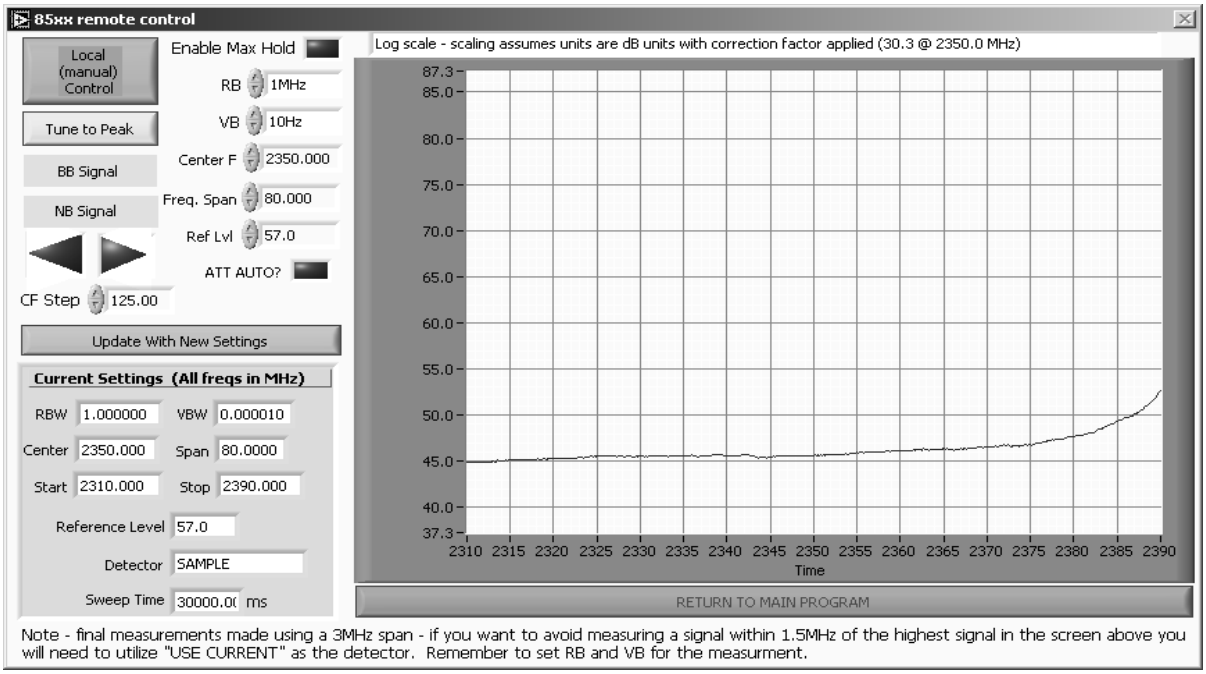


Client:	Ruckus Wireless	Job Number:	J68610
Model:	Retriever module	T-Log Number:	T68973
		Account Manager:	Dean Eriksen
Contact:	Craig Owens		
Standard:	FCC Part 15.247/RSS-210	Class:	N/A

Run #3a: Continued

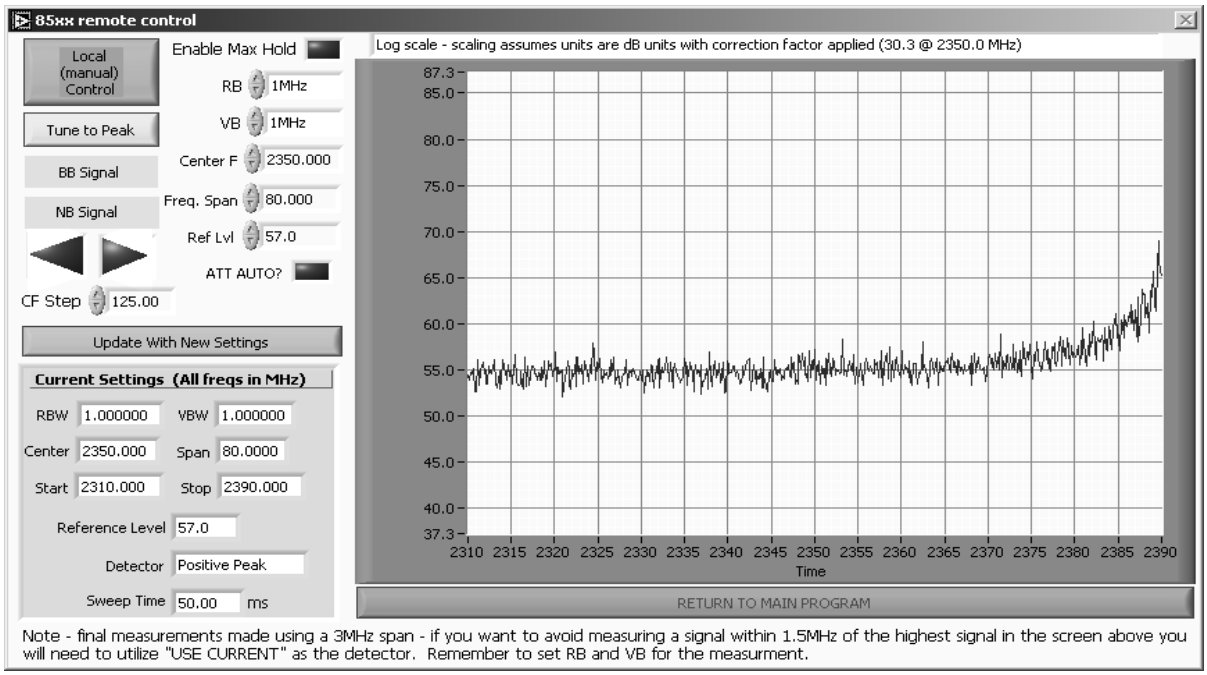


Horizontal



Client:	Ruckus Wireless	Job Number:	J68610
Model:	Retriever module	T-Log Number:	T68973
		Account Manager:	Dean Eriksen
Contact:	Craig Owens		
Standard:	FCC Part 15.247/RSS-210	Class:	N/A

Run #3a: Continued



Band Edge Signal Field Strength

Frequency	Level	Pol	15.209 / 15.247		Detector	Azimuth	Height	Comments
MHz	dBµV/m	v/h	Limit	Margin	Pk/QP/Avg	degrees	meters	
2389.540	46.5	V	54.0	-7.5	AVG	102	1.0	
2389.540	61.9	V	74.0	-12.1	PK	102	1.0	
2389.950	53.0	H	54.0	-1.0	Avg	344	2.0	
2389.950	72.6	H	74.0	-1.4	PK	344	2.0	

Other Spurious Emissions

Frequency	Level	Pol	15.209 / 15.247		Detector	Azimuth	Height	Comments
MHz	dBµV/m	v/h	Limit	Margin	Pk/QP/Avg	degrees	meters	
4823.150	30.3	V	54.0	-23.7	AVG	0	1.0	
4823.150	41.9	V	74.0	-32.1	PK	0	1.0	
7235.230	33.4	V	54.0	-20.6	AVG	15	1.0	
7235.230	44.9	V	74.0	-29.1	PK	15	1.0	
4824.660	30.3	H	54.0	-23.7	AVG	33	1.0	
4824.660	42.7	H	74.0	-31.3	PK	33	1.0	
Note 1:	For emissions in restricted bands, the limit of 15.209 was used. For all other emissions, the limit was set 30dB below the level of the fundamental and measured in 100kHz.							
Note 2:	Signal is not in a restricted band but the more stringent restricted band limit was used.							

Client:	Ruckus Wireless	Job Number:	J68610
Model:	Retriever module	T-Log Number:	T68973
		Account Manager:	Dean Eriksen
Contact:	Craig Owens		
Standard:	FCC Part 15.247/RSS-210	Class:	N/A

Run #3b: Center Channel @ 2437 MHz

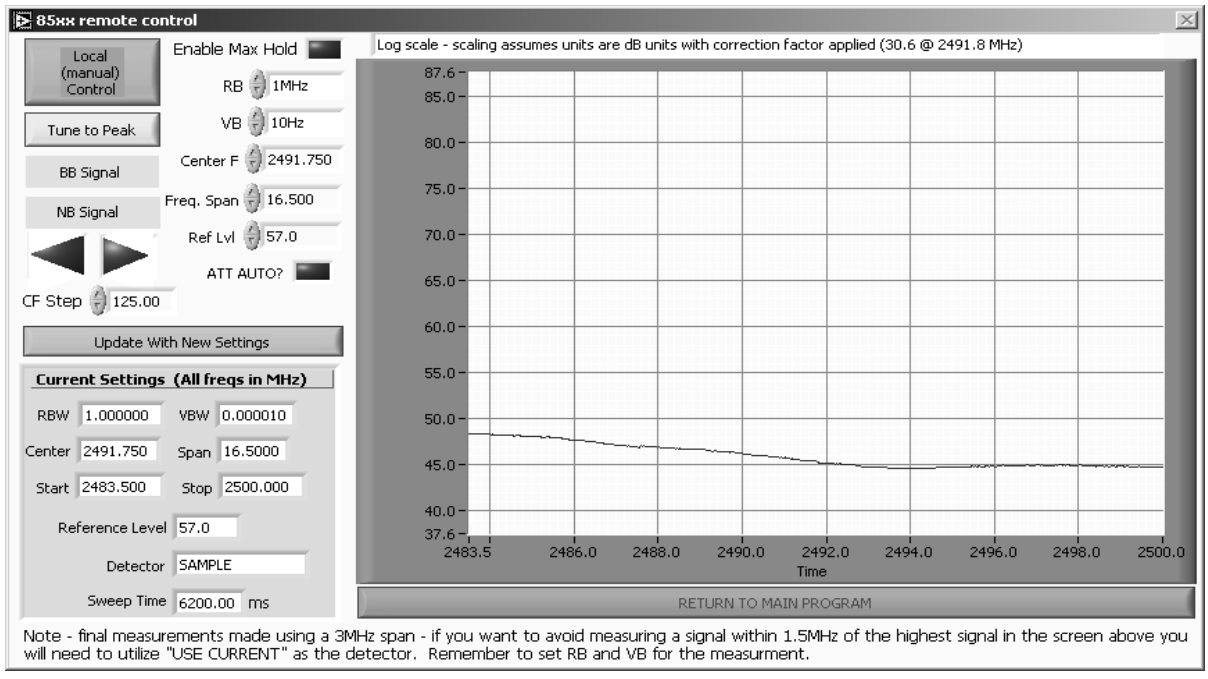
Frequency	Level	Pol	15.209 / 15.247		Detector	Azimuth	Height	Comments
MHz	dBµV/m	v/h	Limit	Margin	Pk/QP/Avg	degrees	meters	
4873.790	31.1	H	54.0	-22.9	AVG	0	1.0	
4873.790	43.0	H	74.0	-31.0	PK	0	1.0	
4874.380	31.4	V	54.0	-22.6	AVG	360	1.0	
4874.380	42.5	V	74.0	-31.5	PK	360	1.0	
7312.130	42.2	V	54.0	-11.8	AVG	330	1.0	
7312.130	48.6	V	74.0	-25.4	PK	330	1.0	
Note 1:	For emissions in restricted bands, the limit of 15.209 was used. For all other emissions, the limit was set 30dB below the level of the fundamental and measured in 100kHz.							
Note 2:	Signal is not in a restricted band but the more stringent restricted band limit was used.							

Run #3c: High Channel @ 2462 MHz

Fundamental Signal Field Strength: Peak and average values measured in 1 MHz, and peak value measured in 100kHz

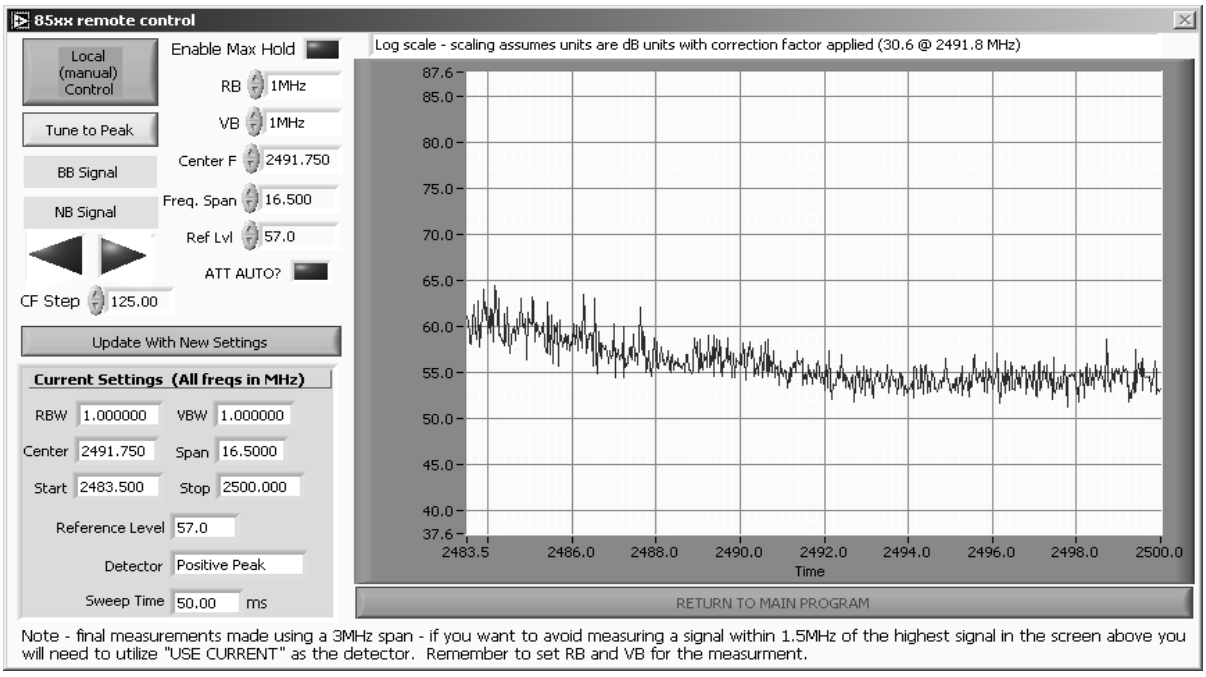
Frequency	Level	Pol	15.209 / 15.247		Detector	Azimuth	Height	Comments
MHz	dBµV/m	v/h	Limit	Margin	Pk/QP/Avg	degrees	meters	
2460.640	95.4	V	-	-	AVG	88	1.2	
2460.640	103.6	V	-	-	PK	88	1.2	
2461.040	99.0	H	-	-	AVG	158	2.0	
2461.040	107.8	H	-	-	PK	158	2.0	

Vertical

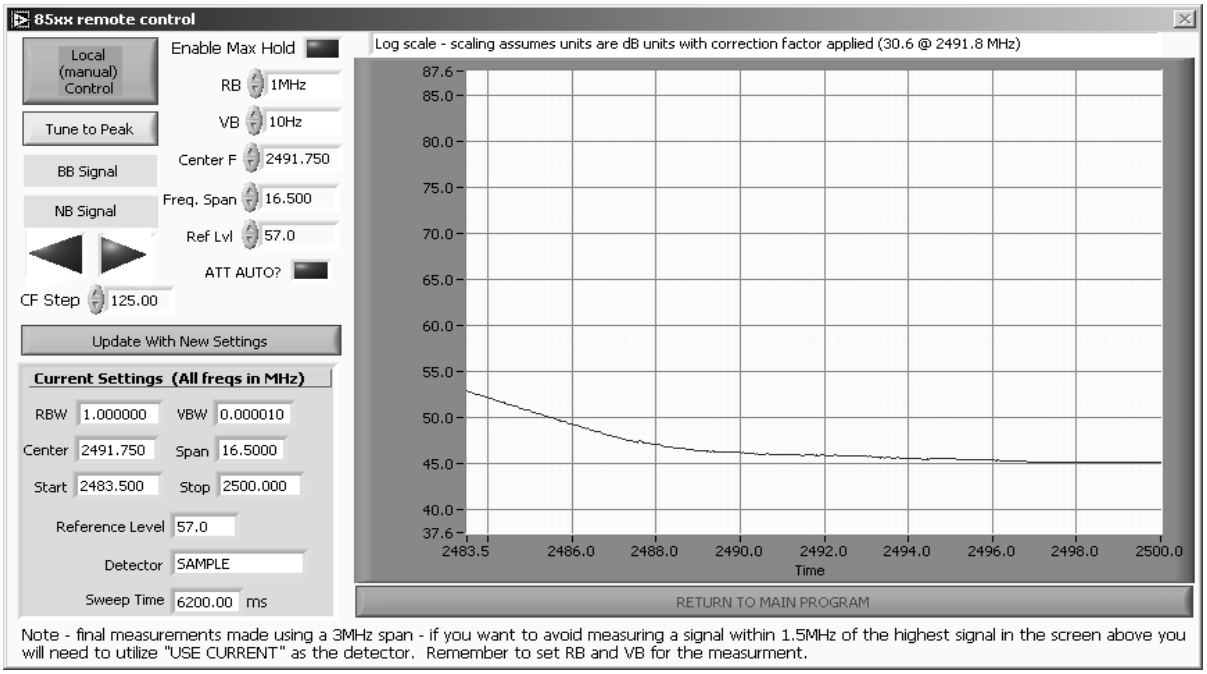


Client:	Ruckus Wireless	Job Number:	J68610
Model:	Retriever module	T-Log Number:	T68973
		Account Manager:	Dean Eriksen
Contact:	Craig Owens		
Standard:	FCC Part 15.247/RSS-210	Class:	N/A

Run #3c: Continued

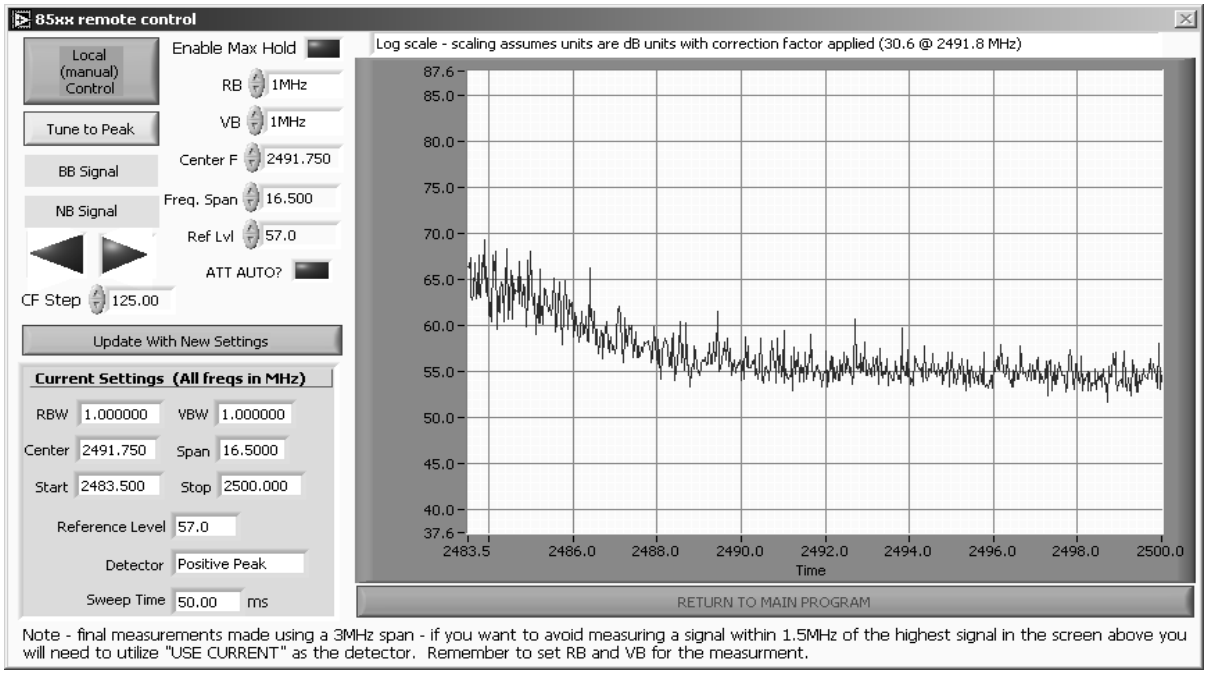


Horizontal



Client:	Ruckus Wireless	Job Number:	J68610
Model:	Retriever module	T-Log Number:	T68973
		Account Manager:	Dean Eriksen
Contact:	Craig Owens		
Standard:	FCC Part 15.247/RSS-210	Class:	N/A

Run #3c: Continued



Band Edge Signal Field Strength

Frequency	Level	Pol	15.209 / 15.247		Detector	Azimuth	Height	Comments
MHz	dBµV/m	v/h	Limit	Margin	Pk/QP/Avg	degrees	meters	
2483.500	53.5	H	54.0	-0.5	Avg	158	2.0	
2485.210	71.5	H	74.0	-2.5	PK	158	2.0	
2483.540	52.6	V	54.0	-1.4	AVG	88	1.2	
2483.540	69.1	V	74.0	-4.9	PK	88	1.2	

Other Spurious Emissions

Frequency	Level	Pol	15.209 / 15.247		Detector	Azimuth	Height	Comments
MHz	dBµV/m	v/h	Limit	Margin	Pk/QP/Avg	degrees	meters	
4924.200	31.3	V	54.0	-22.7	AVG	360	1.3	
4924.200	43.4	V	74.0	-30.6	PK	360	1.3	
7384.610	34.0	V	54.0	-20.0	AVG	0	1.0	
7384.610	45.8	V	74.0	-28.2	PK	0	1.0	
4925.380	31.4	H	54.0	-22.6	AVG	360	1.0	
4925.380	43.4	H	74.0	-30.6	PK	360	1.0	
Note 1:	For emissions in restricted bands, the limit of 15.209 was used. For all other emissions, the limit was set 30dB below the level of the fundamental and measured in 100kHz.							
Note 2:	Signal is not in a restricted band but the more stringent restricted band limit was used.							

Client:	Ruckus Wireless	Job Number:	J68610
Model:	Retriever module	T-Log Number:	T68973
		Account Manager:	Dean Eriksen
Contact:	Craig Owens		
Standard:	FCC Part 15.247/RSS-210	Class:	N/A

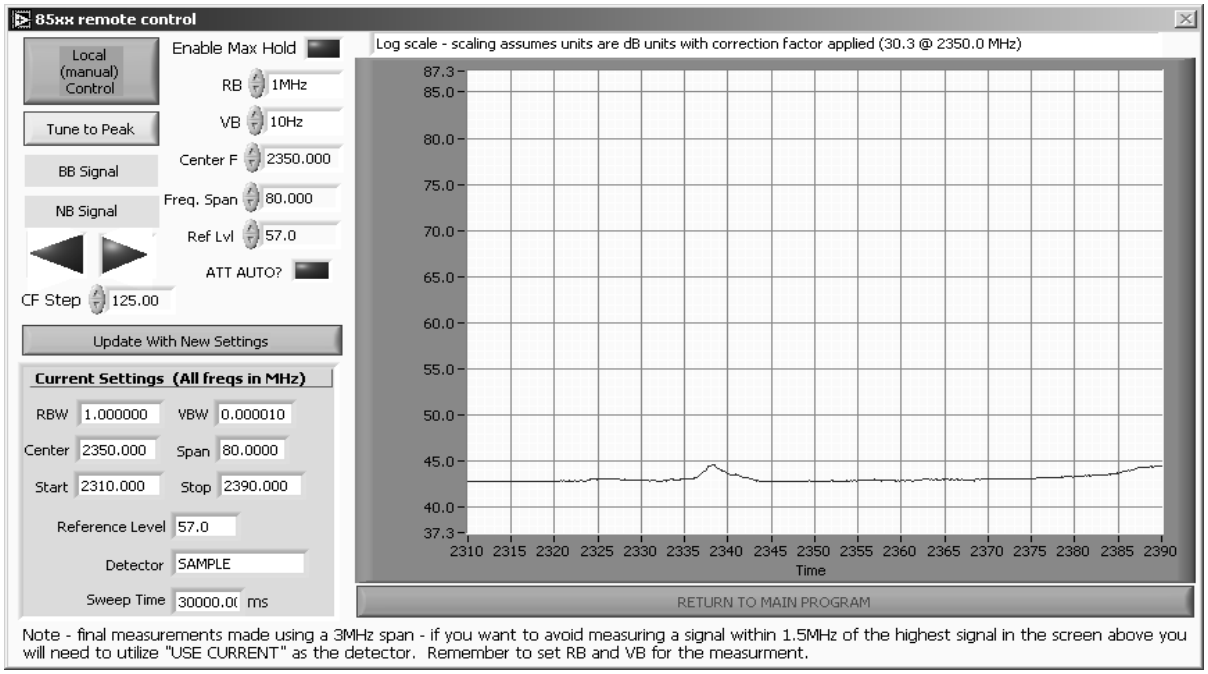
Run #4: Radiated Spurious Emissions, 30 - 18000 MHz. Operating Mode: 802.11n 40 MHz HT40 MCS0

Run #4a: Low Channel @ 2422 MHz

Fundamental Signal Field Strength: Peak and average values measured in 1 MHz, and peak value measured in 100kHz

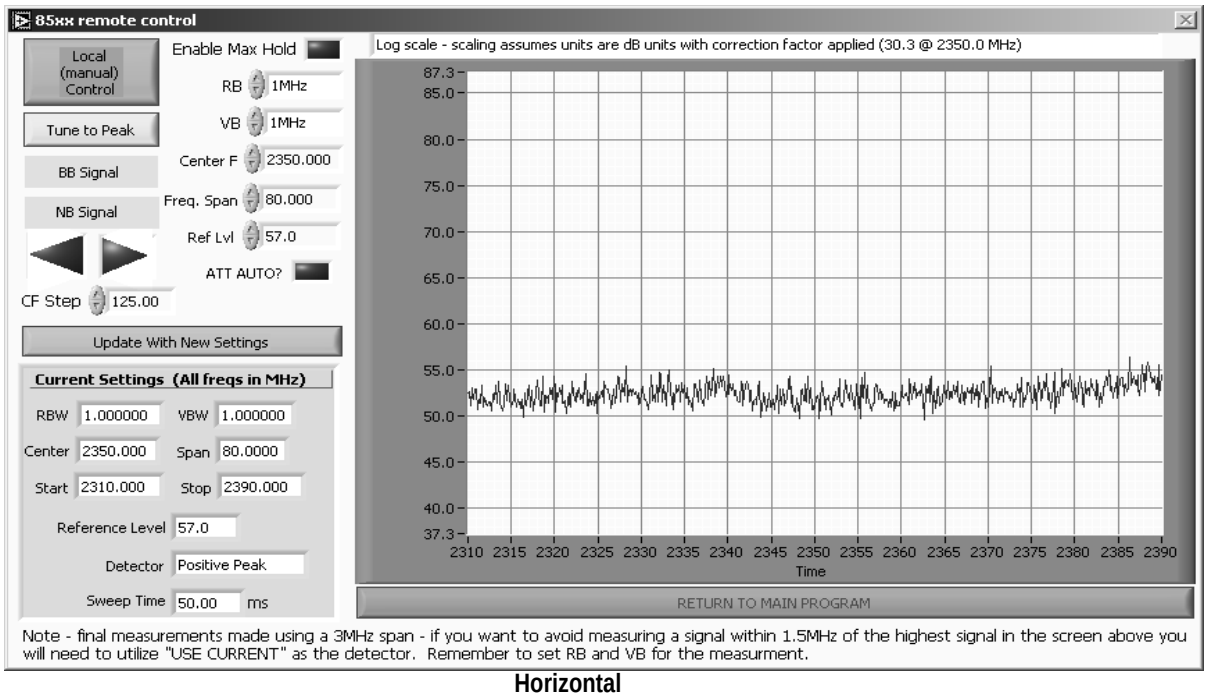
Frequency	Level	Pol	15.209 / 15.247		Detector	Azimuth	Height	Comments
MHz	dBµV/m	v/h	Limit	Margin	Pk/QP/Avg	degrees	meters	
2423.430	86.7	V	-	-	AVG	61	1.2	
2423.430	96.1	V	-	-	PK	61	1.2	
2417.710	93.2	H	-	-	AVG	128	2.0	
2417.710	101.6	H	-	-	PK	128	2.0	

Vertical

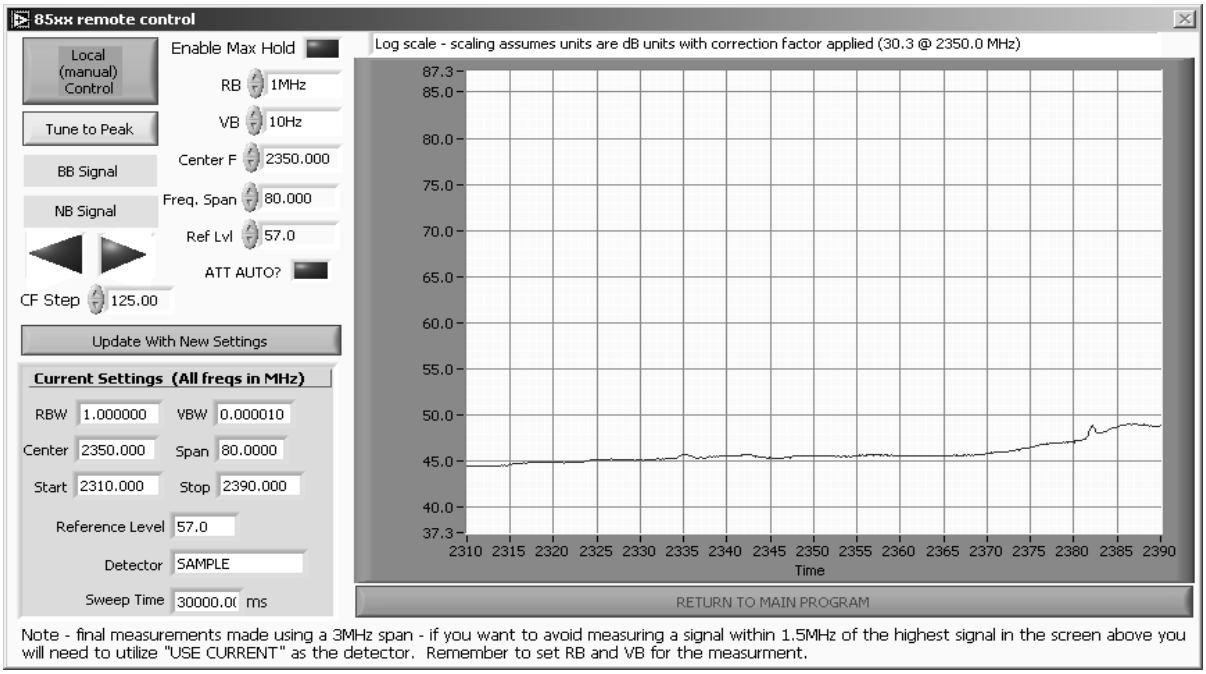


Client:	Ruckus Wireless	Job Number:	J68610
Model:	Retriever module	T-Log Number:	T68973
		Account Manager:	Dean Eriksen
Contact:	Craig Owens		
Standard:	FCC Part 15.247/RSS-210	Class:	N/A

Run #4a: Continued

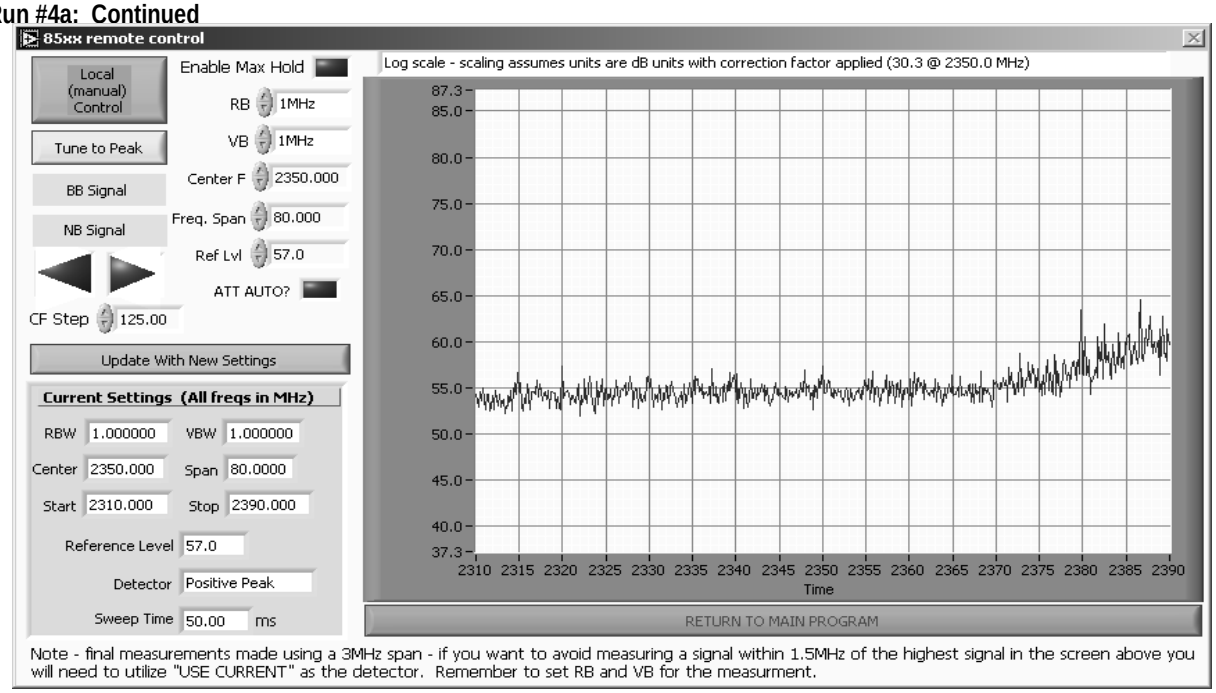


Horizontal



Client:	Ruckus Wireless	Job Number:	J68610
Model:	Retriever module	T-Log Number:	T68973
		Account Manager:	Dean Eriksen
Contact:	Craig Owens		
Standard:	FCC Part 15.247/RSS-210	Class:	N/A

Run #4a: Continued



Band Edge Signal Field Strength

Frequency	Level	Pol	15.209 / 15.247		Detector	Azimuth	Height	Comments
MHz	dBµV/m	v/h	Limit	Margin	Pk/QP/Avg	degrees	meters	
2387.090	50.1	H	54.0	-3.9	AVG	128	2.0	
2387.090	68.8	H	74.0	-5.2	PK	128	2.0	
2388.100	45.8	V	54.0	-8.2	AVG	61	1.2	
2388.100	59.1	V	74.0	-14.9	PK	61	1.2	

Other Spurious Emissions

Frequency	Level	Pol	15.209 / 15.247		Detector	Azimuth	Height	Comments
MHz	dBµV/m	v/h	Limit	Margin	Pk/QP/Avg	degrees	meters	
4844.530	30.1	H	54.0	-23.9	AVG	336	1.0	
4844.530	41.4	H	74.0	-32.6	PK	336	1.0	
7264.580	34.3	V	54.0	-19.7	AVG	19	1.0	
7264.580	45.6	V	74.0	-28.4	PK	19	1.0	
4842.730	30.0	V	54.0	-24.0	AVG	344	1.0	
4842.730	41.3	V	74.0	-32.7	PK	344	1.0	

Note 1:	For emissions in restricted bands, the limit of 15.209 was used. For all other emissions, the limit was set 30dB below the level of the fundamental and measured in 100kHz.
Note 2:	Signal is not in a restricted band but the more stringent restricted band limit was used.

Client:	Ruckus Wireless	Job Number:	J68610
Model:	Retriever module	T-Log Number:	T68973
		Account Manager:	Dean Eriksen
Contact:	Craig Owens		
Standard:	FCC Part 15.247/RSS-210	Class:	N/A

Run #3b: Center Channel @ 2437 MHz

Frequency	Level	Pol	15.209 / 15.247		Detector	Azimuth	Height	Comments
MHz	dBµV/m	v/h	Limit	Margin	Pk/QP/Avg	degrees	meters	
4874.970	30.8	V	54.0	-23.2	AVG	0	1.0	
4874.970	42.7	V	74.0	-31.3	PK	0	1.0	
7309.510	42.7	V	54.0	-11.3	AVG	114	1.0	
7309.510	48.7	V	74.0	-25.3	PK	114	1.0	
4873.710	30.6	H	54.0	-23.4	AVG	119	1.0	
4873.710	42.0	H	74.0	-32.0	PK	119	1.0	

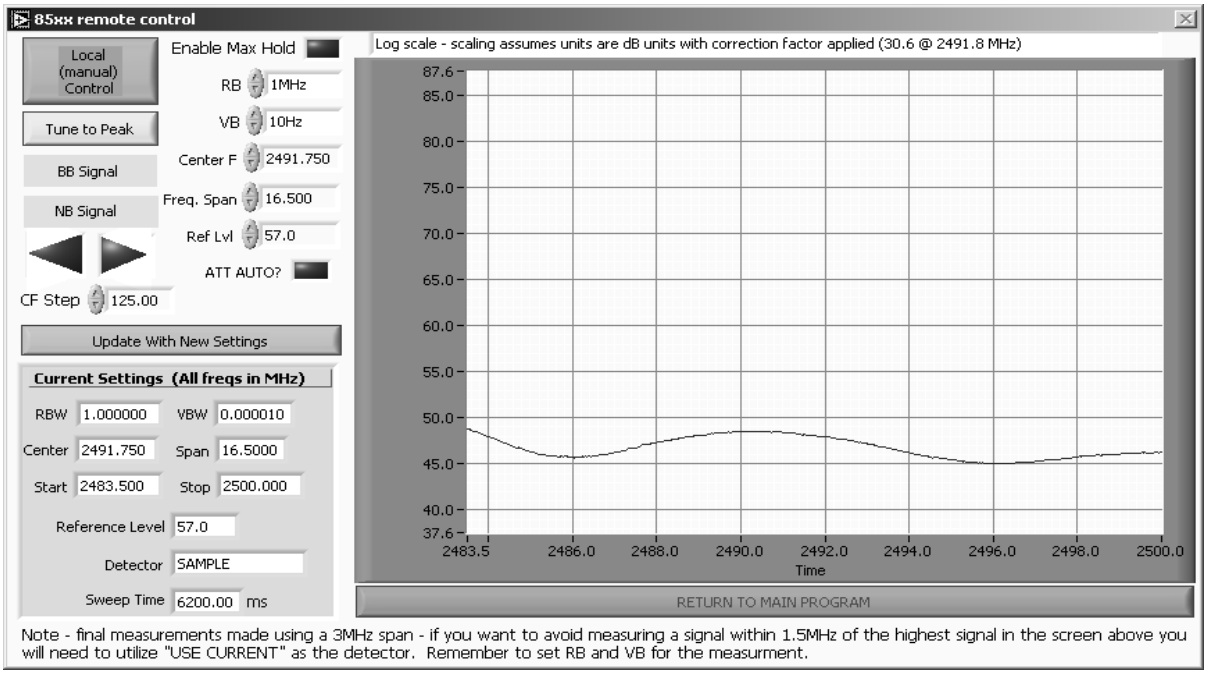
Note 1:	For emissions in restricted bands, the limit of 15.209 was used. For all other emissions, the limit was set 30dB below the level of the fundamental and measured in 100kHz.
Note 2:	Signal is not in a restricted band but the more stringent restricted band limit was used.

Run #4c: High Channel @ 2452 MHz

Fundamental Signal Field Strength: Peak and average values measured in 1 MHz, and peak value measured in 100kHz

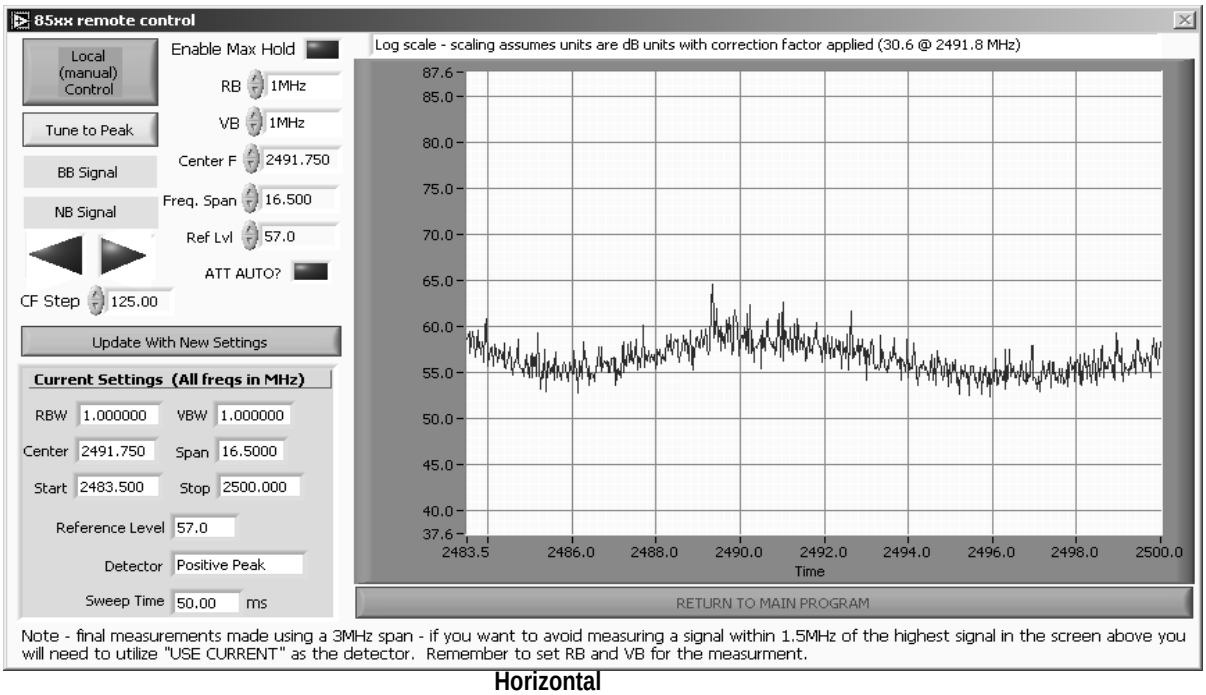
Frequency	Level	Pol	15.209 / 15.247		Detector	Azimuth	Height	Comments
MHz	dBµV/m	v/h	Limit	Margin	Pk/QP/Avg	degrees	meters	
2450.800	92.8	H	-	-	AVG	148	1.9	
2450.800	101.3	H	-	-	PK	148	1.9	
2450.640	87.8	V	-	-	AVG	0	1.3	
2450.640	96.1	V	-	-	PK	0	1.3	

Vertical

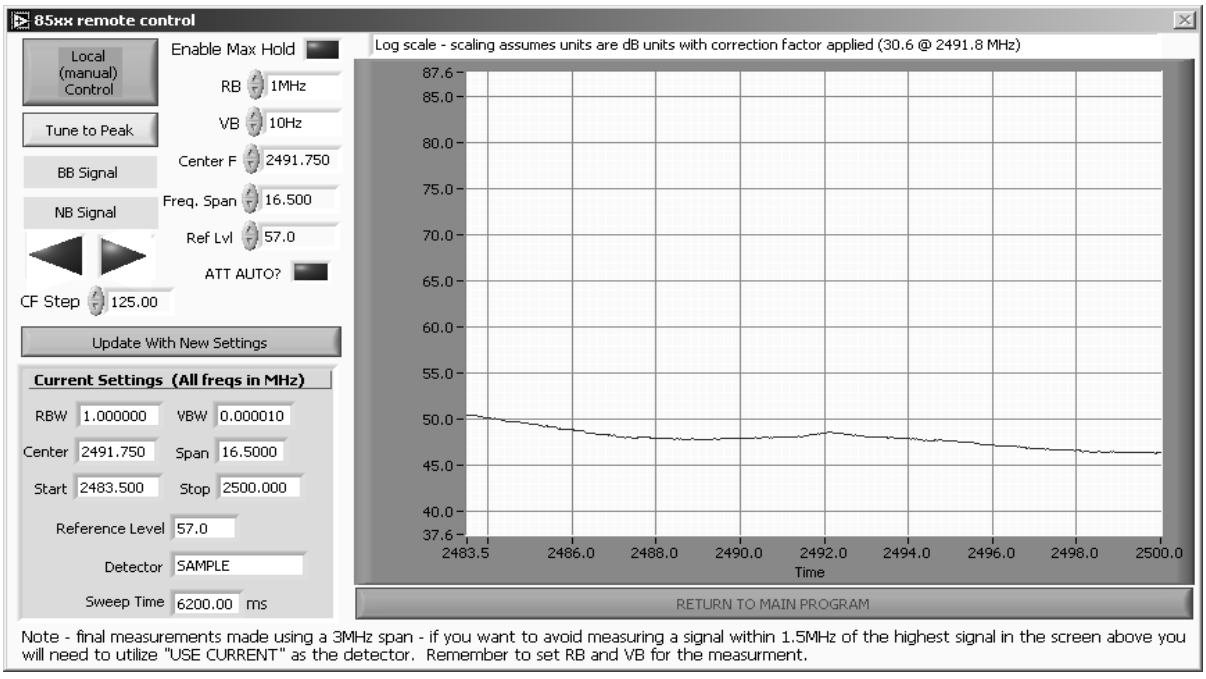


Client:	Ruckus Wireless	Job Number:	J68610
Model:	Retriever module	T-Log Number:	T68973
		Account Manager:	Dean Eriksen
Contact:	Craig Owens		
Standard:	FCC Part 15.247/RSS-210	Class:	N/A

Run #4c: Continued

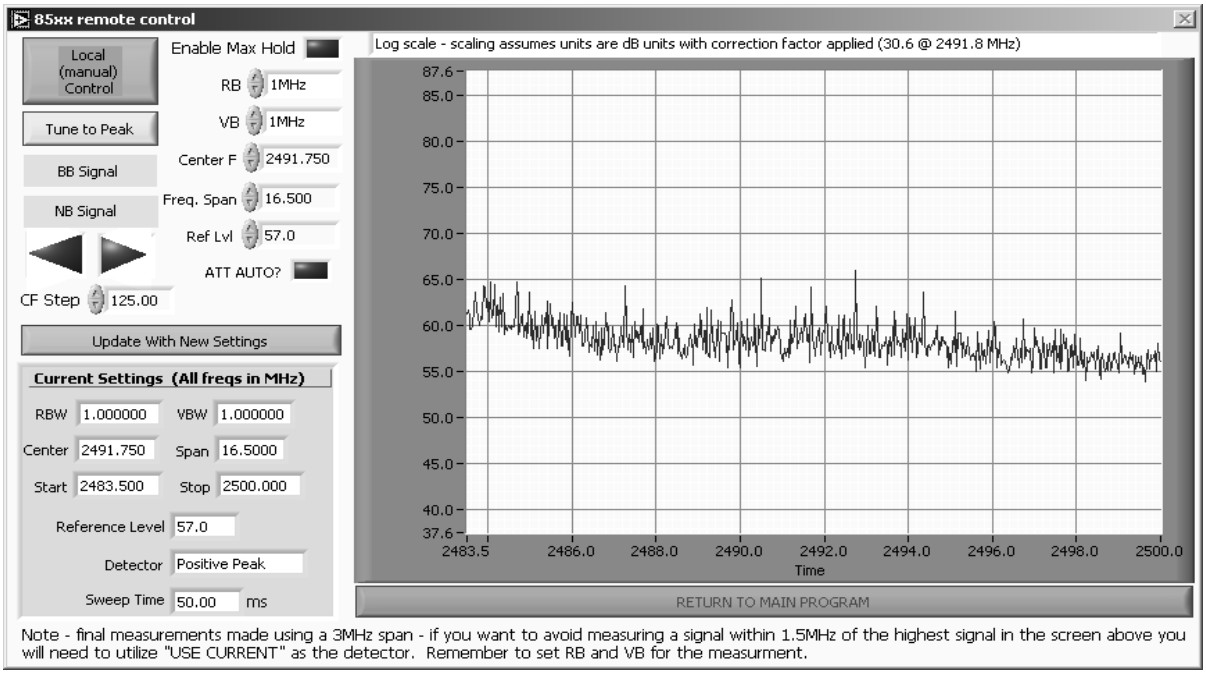


Horizontal



Client:	Ruckus Wireless	Job Number:	J68610
Model:	Retriever module	T-Log Number:	T68973
		Account Manager:	Dean Eriksen
Contact:	Craig Owens		
Standard:	FCC Part 15.247/RSS-210	Class:	N/A

Run #4c: Continued



Band Edge Signal Field Strength

Frequency	Level	Pol	15.209 / 15.247		Detector	Azimuth	Height	Comments
MHz	dBµV/m	v/h	Limit	Margin	Pk/QP/Avg	degrees	meters	
2483.540	52.2	V	54.0	-1.8	AVG	0	1.3	
2483.540	67.3	V	74.0	-6.7	PK	0	1.3	
2483.830	52.1	H	54.0	-1.9	AVG	148	1.9	
2483.830	69.0	H	74.0	-5.0	PK	148	1.9	

Other Spurious Emissions

Frequency	Level	Pol	15.209 / 15.247		Detector	Azimuth	Height	Comments
MHz	dBµV/m	v/h	Limit	Margin	Pk/QP/Avg	degrees	meters	
4903.130	30.2	H	54.0	-23.8	AVG	90	1.0	
4903.130	42.5	H	74.0	-31.5	PK	90	1.0	
4903.540	30.3	V	54.0	-23.7	AVG	41	1.4	
4903.540	41.8	V	74.0	-32.2	PK	41	1.4	
7355.870	34.3	V	54.0	-19.7	AVG	313	1.0	
7355.870	45.6	V	74.0	-28.4	PK	313	1.0	
Note 1:	For emissions in restricted bands, the limit of 15.209 was used. For all other emissions, the limit was set 30dB below the level of the fundamental and measured in 100kHz.							
Note 2:	Signal is not in a restricted band but the more stringent restricted band limit was used.							

Client:	Ruckus Wireless	Job Number:	J68610
Model:	Retriever module	T-Log Number:	T68973
		Account Manager:	Dean Eriksen
Contact:	Craig Owens		
Standard:	FCC Part 15.247/RSS-210	Class:	B

Radiated Emissions - Rx Mode

Test Specific Details

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

Date of Test: 11/1/2007 18:37
Test Engineer: Rafael Varelas
Test Location: Chamber #2/SVOATS #2
Config. Used: 1
Config Change: None
EUT Voltage: 120V/60Hz

General Test Configuration

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

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

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

Ambient Conditions:

Temperature: 12 °C
Rel. Humidity: 83 %

Summary of Results

Run #	Test Performed	Limit	Result	Margin
1d (Internal Antenna)	RE, 30 - 8000MHz, Maximized Emissions	FCC Class B	Pass	36.4dBµV/m @ 875.021MHz (-9.6dB)
2d (Omni Antenna)	RE, 30 - 8000MHz, Maximized Emissions	FCC Class B	Pass	42.7dBµV/m @ 400.012MHz (-3.3dB)
3d (Patch Antenna)	RE, 30 - 8000MHz, Maximized Emissions	FCC Class B	Pass	39.3dBµV/m @ 875.021MHz (-6.7dB)

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.

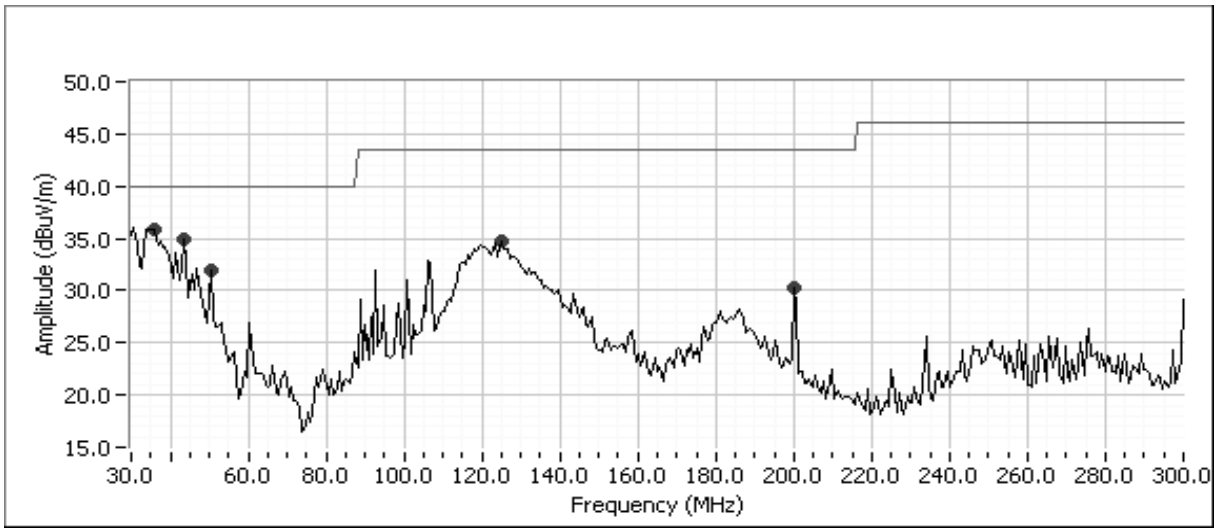
Test Notes

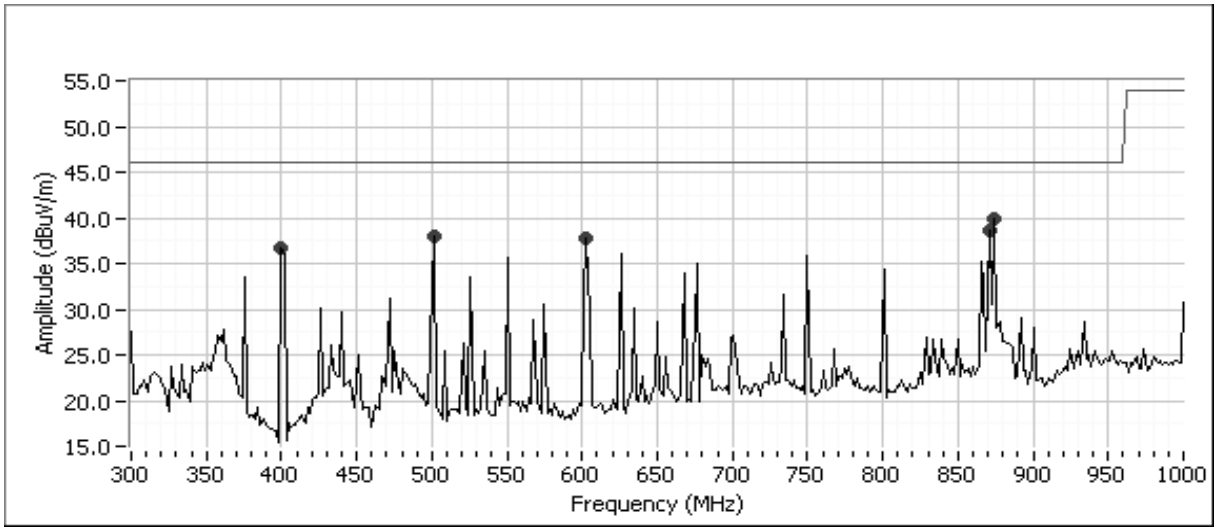
Preliminary tests showed that the emissions are not affected by changes of the receive frequency.

Client:	Ruckus Wireless	Job Number:	J68610
Model:	Retriever module	T-Log Number:	T68973
		Account Manager:	Dean Eriksen
Contact:	Craig Owens		
Standard:	FCC Part 15.247/RSS-210	Class:	B

Run #1a: Preliminary Radiated Emissions, 30-8000 MHz, 802.11b
Internal Antenna
2437 MHz, Rx Mode

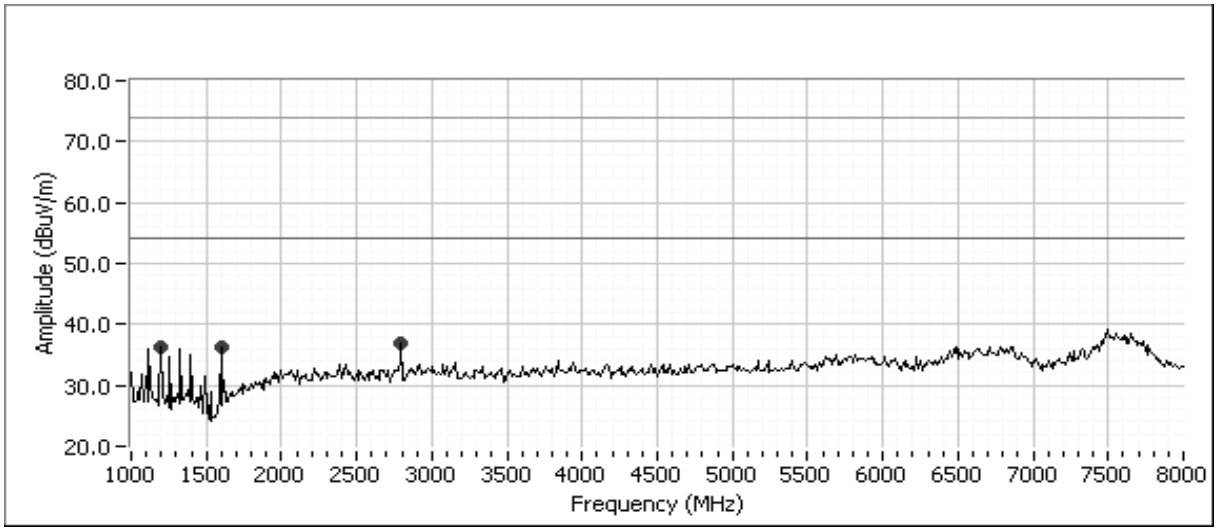
Frequency Range	Test Distance	Limit Distance	Extrapolation Factor
30 - 1000 MHz	3	3	0.0





Client:	Ruckus Wireless	Job Number:	J68610
Model:	Retriever module	T-Log Number:	T68973
		Account Manager:	Dean Eriksen
Contact:	Craig Owens		
Standard:	FCC Part 15.247/RSS-210	Class:	B

Run #1a: Continued

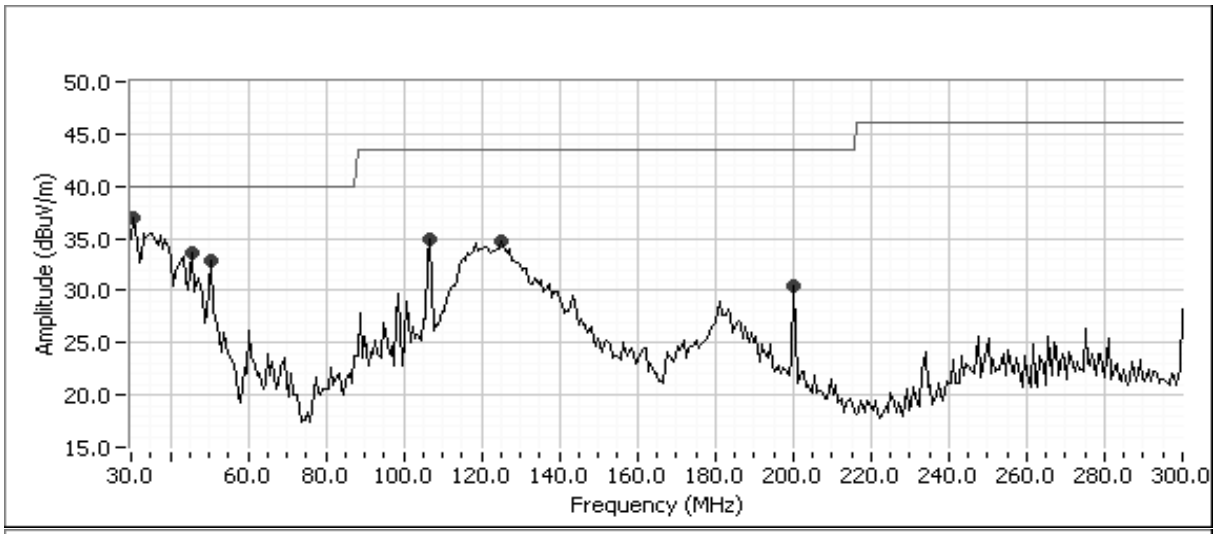


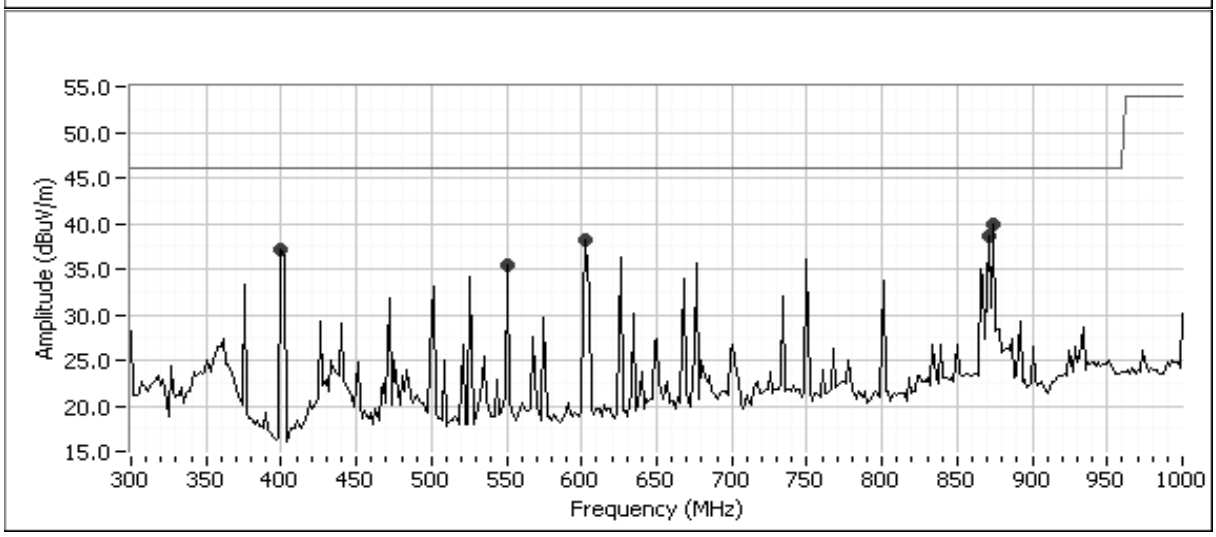
Frequency	Level	Pol	FCC Class B		Detector	Azimuth	Height	Comments
MHz	dBµV/m	v/h	Limit	Margin	Pk/QP/Avg	degrees	meters	
35.772	35.8	V	40.0	-4.2	Peak	149	1.7	
50.250	32.0	V	40.0	-8.0	Peak	209	1.7	
43.813	35.0	V	40.0	-5.0	Peak	179	1.7	
123.680	34.7	H	43.5	-8.8	Peak	91	1.7	
199.999	30.3	V	43.5	-13.2	Peak	29	1.7	
500.019	38.0	H	46.0	-8.0	Peak	166	1.7	
873.616	38.6	V	46.0	-7.4	Peak	279	1.7	
875.021	39.9	V	46.0	-6.1	Peak	118	1.7	
603.274	37.8	V	46.0	-8.2	Peak	138	1.7	
400.012	36.7	H	46.0	-9.3	Peak	108	1.7	
1198.330	36.3	V	54.0	-17.7	Peak	70	1.7	
1595.000	36.2	H	54.0	-17.8	Peak	0	1.7	
2796.670	36.8	V	54.0	-17.2	Peak	359	1.7	

Client:	Ruckus Wireless	Job Number:	J68610
Model:	Retriever module	T-Log Number:	T68973
		Account Manager:	Dean Eriksen
Contact:	Craig Owens		
Standard:	FCC Part 15.247/RSS-210	Class:	B

Run #1b: Preliminary Radiated Emissions, 30-8000 MHz, 802.11n (20MHz)
Internal Antenna
2437 MHz, Rx Mode

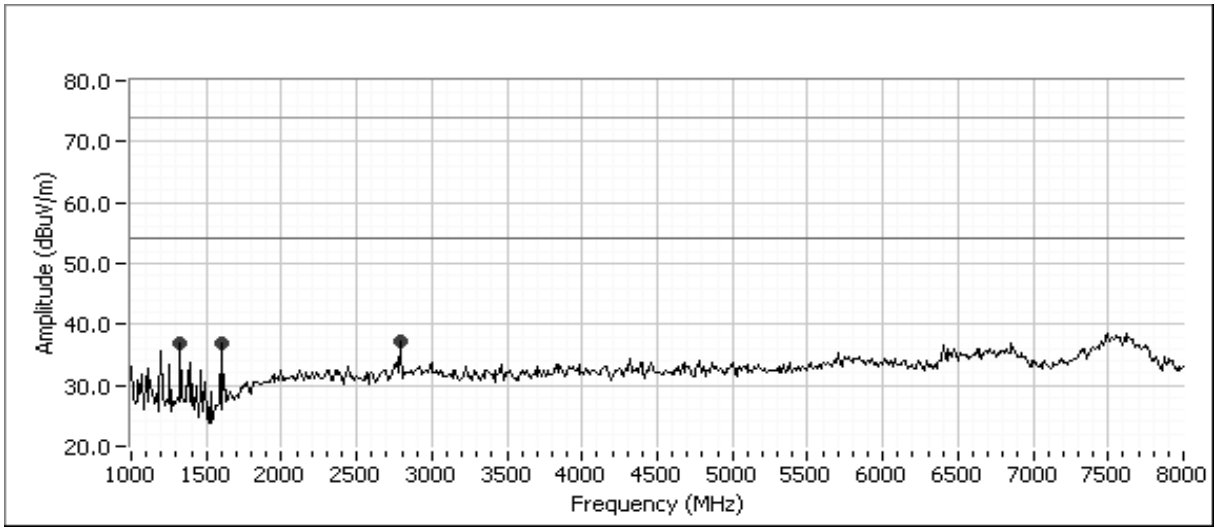
Frequency Range	Test Distance	Limit Distance	Extrapolation Factor
30 - 1000 MHz	3	3	0.0





Client:	Ruckus Wireless	Job Number:	J68610
Model:	Retriever module	T-Log Number:	T68973
		Account Manager:	Dean Eriksen
Contact:	Craig Owens		
Standard:	FCC Part 15.247/RSS-210	Class:	B

Run #1b: Continued

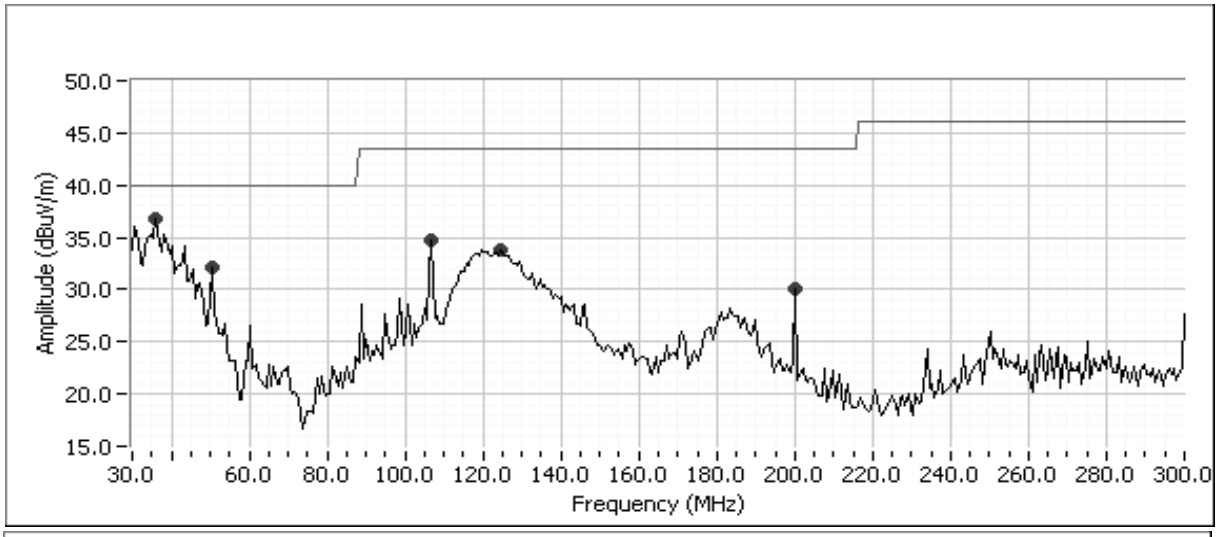


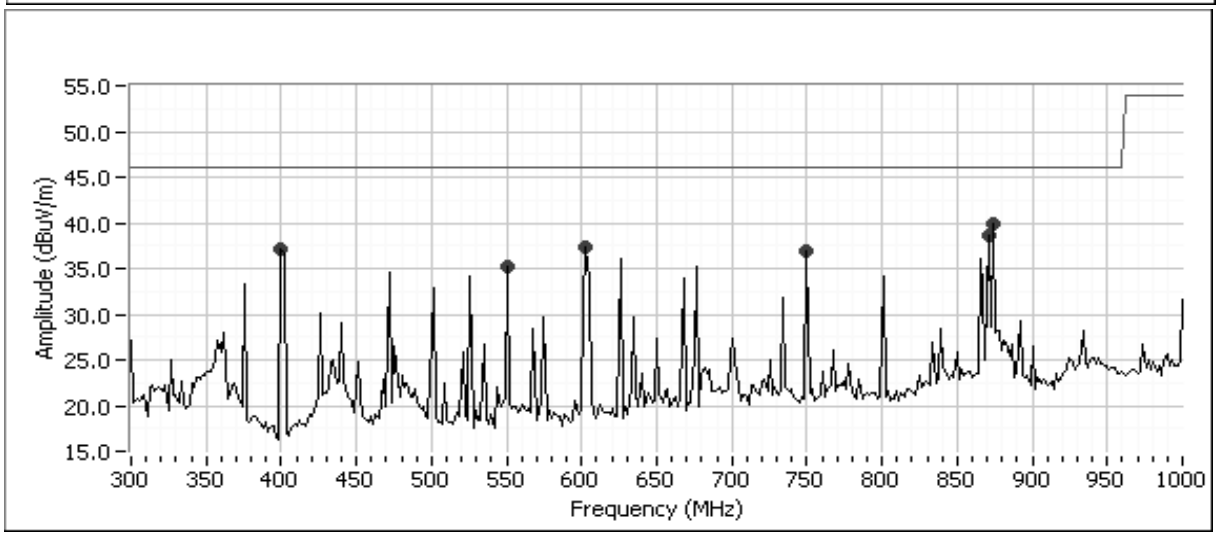
Frequency	Level	Pol	FCC Class B		Detector	Azimuth	Height	Comments
MHz	dBµV/m	v/h	Limit	Margin	Pk/QP/Avg	degrees	meters	
30.876	36.9	H	40.0	-3.1	Peak	121	1.7	
875.021	40.0	V	46.0	-6.0	Peak	29	1.7	
43.828	33.7	V	40.0	-6.3	Peak	208	1.7	
50.361	32.8	V	40.0	-7.2	Peak	208	1.7	
873.616	38.6	V	46.0	-7.4	Peak	359	1.7	
603.274	38.2	V	46.0	-7.8	Peak	24	1.7	
108.909	35.0	H	43.5	-8.5	Peak	61	1.7	
123.680	34.7	V	43.5	-8.8	Peak	88	1.7	
400.012	37.1	H	46.0	-8.9	Peak	124	1.7	
550.041	35.4	H	46.0	-10.6	Peak	106	1.7	
199.989	30.4	V	43.5	-13.1	Peak	28	1.7	
2785.000	37.3	V	54.0	-16.7	Peak	360	1.7	
1595.000	37.0	V	54.0	-17.0	Peak	18	1.7	
1326.670	36.8	V	54.0	-17.2	Peak	308	1.7	

Client:	Ruckus Wireless	Job Number:	J68610
Model:	Retriever module	T-Log Number:	T68973
		Account Manager:	Dean Eriksen
Contact:	Craig Owens		
Standard:	FCC Part 15.247/RSS-210	Class:	B

Run #1c: Preliminary Radiated Emissions, 30-8000 MHz, 802.11n (40MHz)
Internal Antenna
2437 MHz, Rx Mode

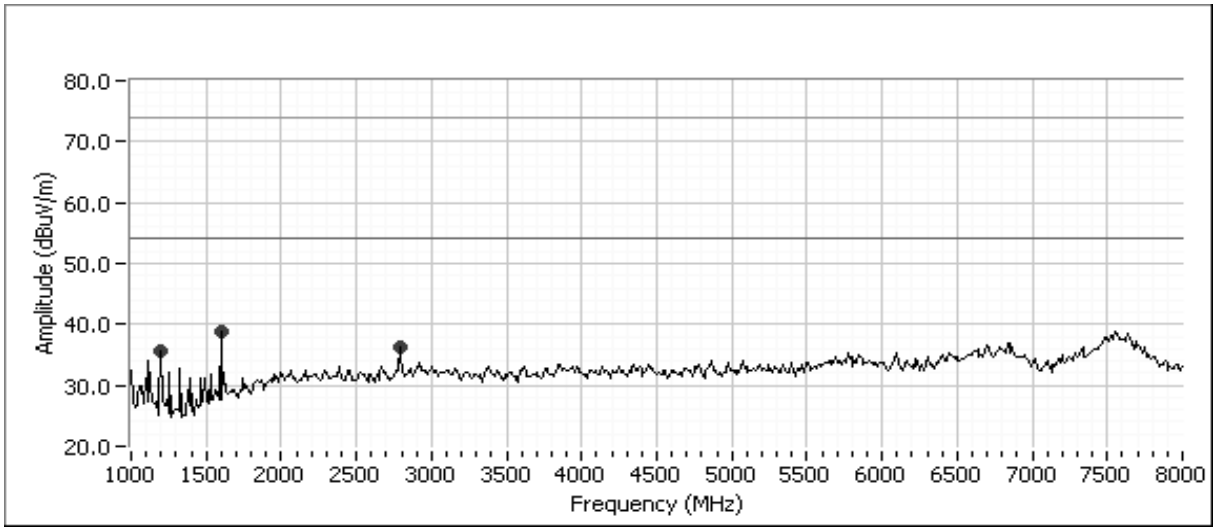
Frequency Range	Test Distance	Limit Distance	Extrapolation Factor
30 - 1000 MHz	3	3	0.0





Client:	Ruckus Wireless	Job Number:	J68610
Model:	Retriever module	T-Log Number:	T68973
		Account Manager:	Dean Eriksen
Contact:	Craig Owens		
Standard:	FCC Part 15.247/RSS-210	Class:	B

Run #1c: Continued



Frequency	Level	Pol	FCC Class B		Detector	Azimuth	Height	Comments
MHz	dBµV/m	v/h	Limit	Margin	Pk/QP/Avg	degrees	meters	
35.085	36.8	H	40.0	-3.2	Peak	360	1.7	
50.361	32.2	V	40.0	-7.8	Peak	151	1.7	
106.516	34.7	H	43.5	-8.8	Peak	148	1.7	
123.086	33.8	V	43.5	-9.7	Peak	121	1.7	
199.999	30.1	V	43.5	-13.4	Peak	360	1.7	
873.564	38.7	V	46.0	-7.3	Peak	174	1.7	
875.021	40.0	V	46.0	-6.0	Peak	347	1.7	
603.247	37.4	V	46.0	-8.6	Peak	309	1.7	
750.038	36.9	V	46.0	-9.1	Peak	77	1.7	
550.014	35.2	H	46.0	-10.8	Peak	98	1.7	
400.038	37.2	H	46.0	-8.8	Peak	108	1.7	
1198.330	35.7	V	54.0	-18.3	Peak	252	1.7	
1595.000	38.8	V	54.0	-15.2	Peak	23	1.7	
2785.000	36.2	V	54.0	-17.8	Peak	359	1.7	

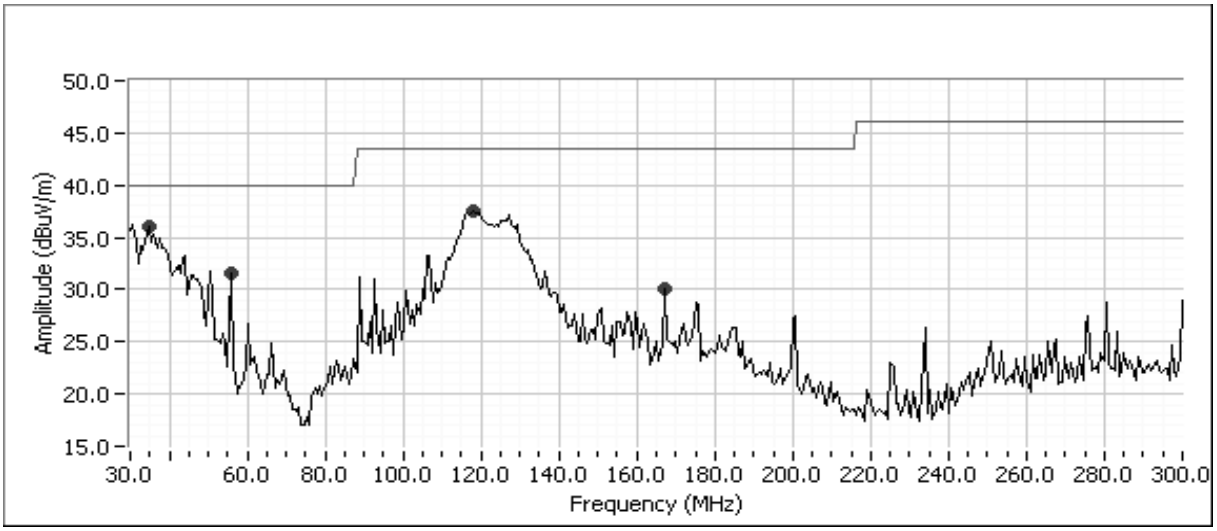
Client:	Ruckus Wireless	Job Number:	J68610
Model:	Retriever module	T-Log Number:	T68973
		Account Manager:	Dean Eriksen
Contact:	Craig Owens		
Standard:	FCC Part 15.247/RSS-210	Class:	B

Run #1d: Maximized Readings From Run #1b

Frequency	Level	Pol	FCC Class B		Detector	Azimuth	Height	Comments
MHz	dBµV/m	v/h	Limit	Margin	Pk/QP/Avg	degrees	meters	
875.021	36.4	V	46.0	-9.6	QP	170	1.0	Signal Sub.
400.012	34.6	H	46.0	-11.4	QP	131	1.4	
603.274	33.9	V	46.0	-12.1	QP	100	1.0	Signal Sub.
873.616	32.6	V	46.0	-13.4	QP	115	1.1	Signal Sub.
50.361	16.2	V	40.0	-23.8	QP	135	1.0	
43.828	15.8	V	40.0	-24.2	QP	275	1.0	
30.876	12.9	V	40.0	-27.1	QP	95	1.0	
108.909	15.7	H	43.5	-27.8	QP	60	1.0	
123.680	14.3	V	43.5	-29.2	QP	200	1.0	

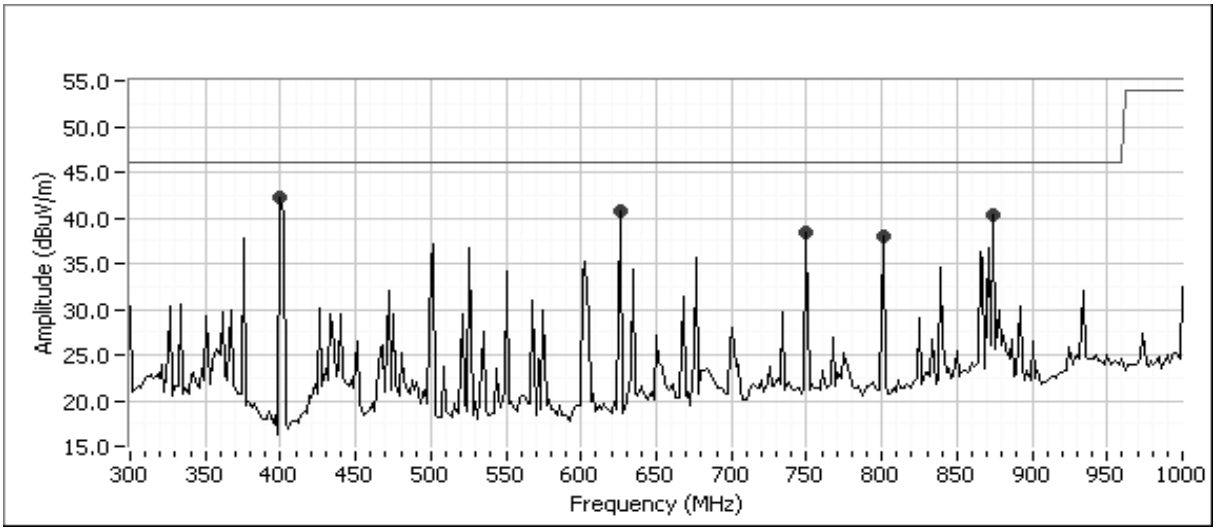
Run #2a: Preliminary Radiated Emissions, 30-8000 MHz, 802.11b
Omni Antenna
2437 MHz, Rx Mode

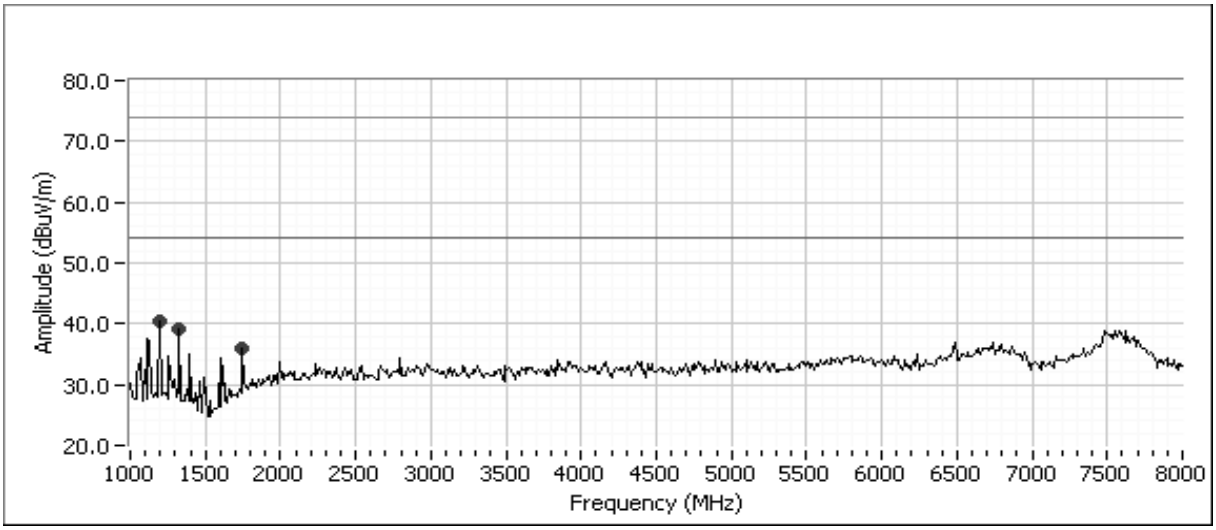
Frequency Range	Test Distance	Limit Distance	Extrapolation Factor
30 - 1000 MHz	3	3	0.0



Client:	Ruckus Wireless	Job Number:	J68610
Model:	Retriever module	T-Log Number:	T68973
		Account Manager:	Dean Eriksen
Contact:	Craig Owens		
Standard:	FCC Part 15.247/RSS-210	Class:	B

Run #2a: Continued





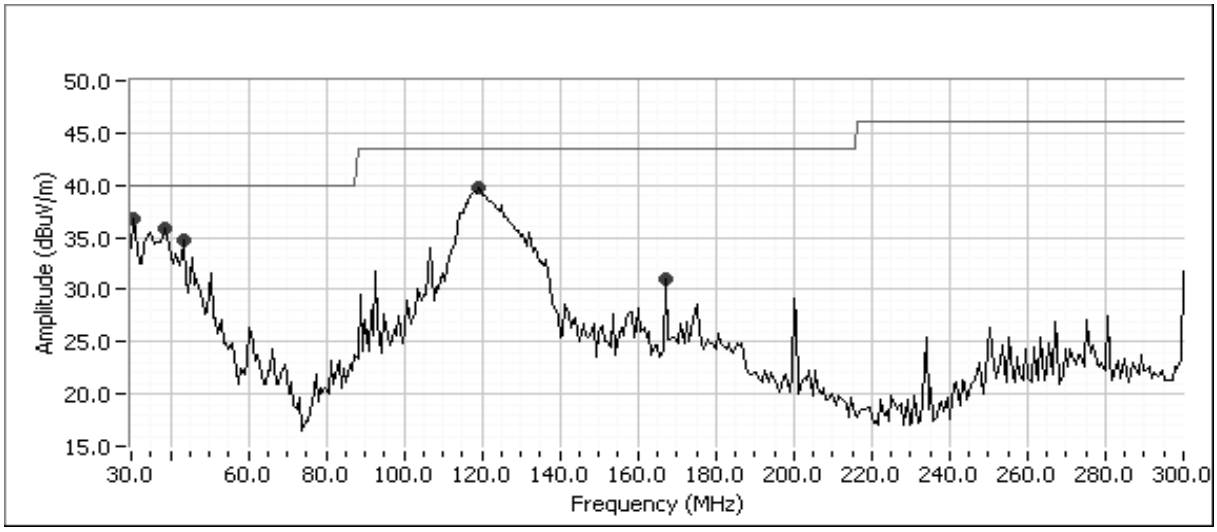
Client:	Ruckus Wireless	Job Number:	J68610
Model:	Retriever module	T-Log Number:	T68973
		Account Manager:	Dean Eriksen
Contact:	Craig Owens		
Standard:	FCC Part 15.247/RSS-210	Class:	B

Run #2a: Continued

Frequency	Level	Pol	FCC Class B		Detector	Azimuth	Height	Comments
MHz	dBµV/m	v/h	Limit	Margin	Pk/QP/Avg	degrees	meters	
35.816	36.0	V	40.0	-4.0	Peak	331	1.7	
53.812	31.5	H	40.0	-8.5	Peak	329	1.7	
118.972	37.5	H	43.5	-6.0	Peak	28	1.7	
166.661	30.1	V	43.5	-13.4	Peak	91	1.7	
400.012	42.3	H	46.0	-3.7	Peak	131	1.7	
625.029	40.8	H	46.0	-5.2	Peak	79	1.7	
750.038	38.3	H	46.0	-7.7	Peak	110	1.7	
875.021	40.4	V	46.0	-5.6	Peak	340	1.7	
800.029	37.9	H	46.0	-8.1	Peak	175	1.7	
1198.330	40.3	V	54.0	-13.7	Peak	171	1.7	
1326.670	39.0	V	54.0	-15.0	Peak	19	1.7	
1746.670	35.9	V	54.0	-18.1	Peak	105	1.7	

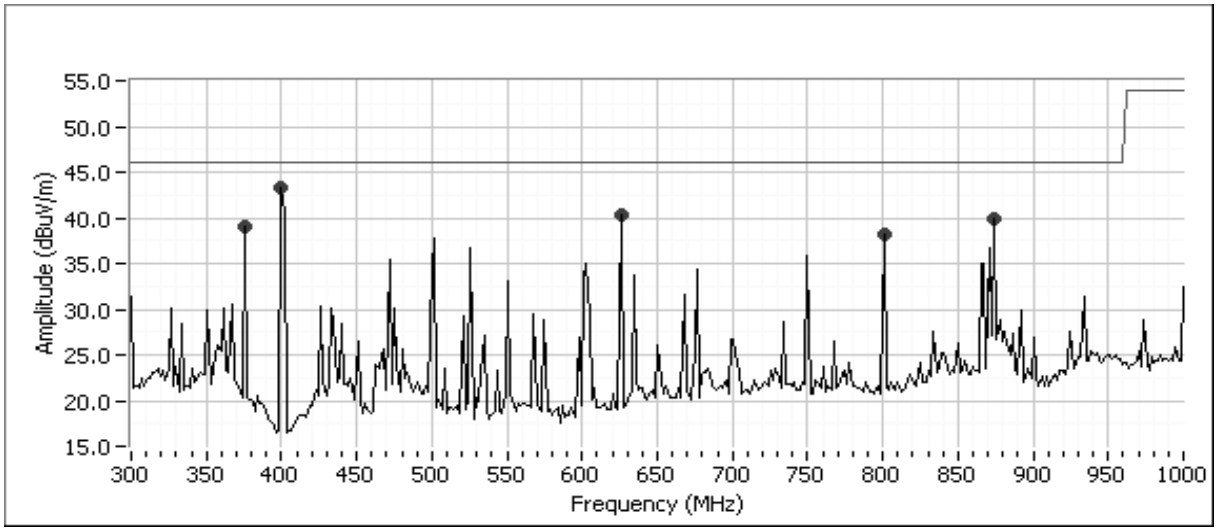
Run #2b: Preliminary Radiated Emissions, 30-8000 MHz, 802.11n (20MHz)
Omni Antenna
2437 MHz, Rx Mode

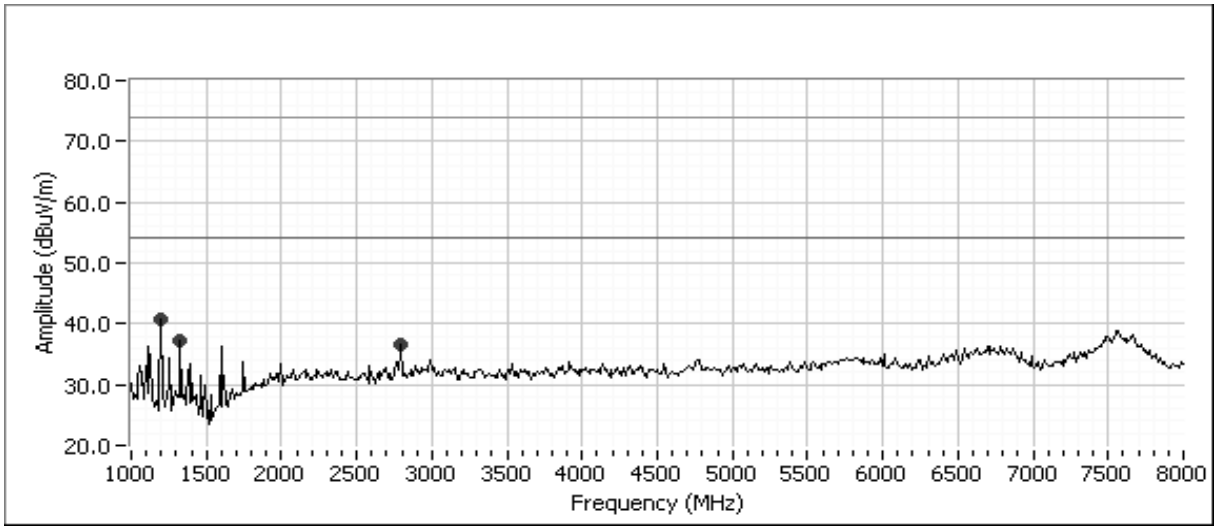
Frequency Range	Test Distance	Limit Distance	Extrapolation Factor
30 - 1000 MHz	3	3	0.0



Client:	Ruckus Wireless	Job Number:	J68610
Model:	Retriever module	T-Log Number:	T68973
		Account Manager:	Dean Eriksen
Contact:	Craig Owens		
Standard:	FCC Part 15.247/RSS-210	Class:	B

Run #2b: Continued





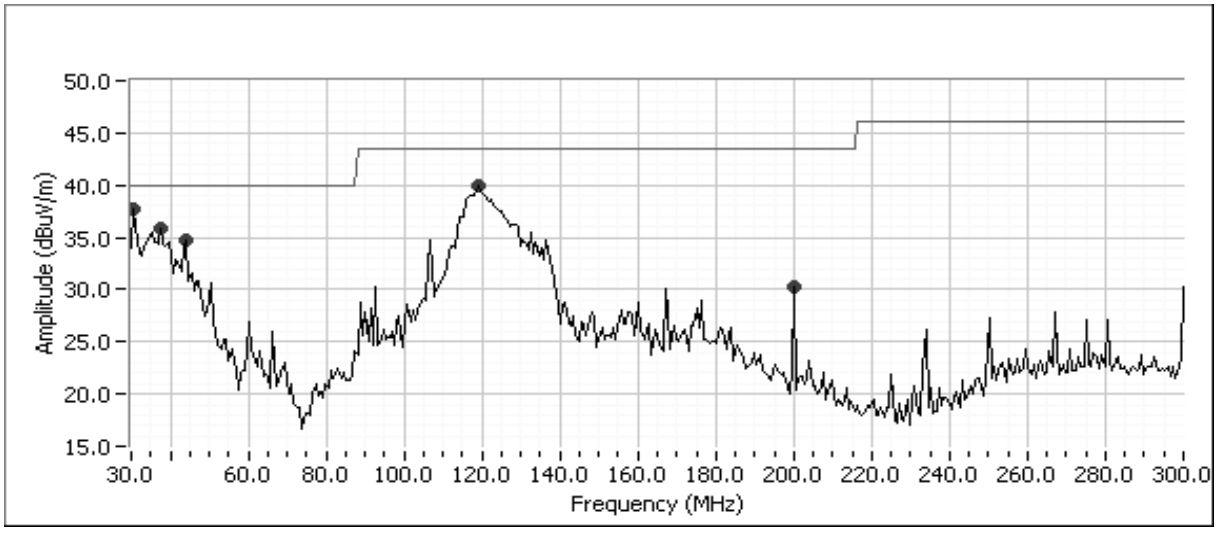
Client:	Ruckus Wireless	Job Number:	J68610
Model:	Retriever module	T-Log Number:	T68973
		Account Manager:	Dean Eriksen
Contact:	Craig Owens		
Standard:	FCC Part 15.247/RSS-210	Class:	B

Run #2b: Continued

Frequency	Level	Pol	FCC Class B		Detector	Azimuth	Height	Comments
MHz	dBµV/m	v/h	Limit	Margin	Pk/QP/Avg	degrees	meters	
400.012	43.4	H	46.0	-2.6	Peak	108	1.7	
30.579	36.8	V	40.0	-3.2	Peak	301	1.7	
118.969	39.7	H	43.5	-3.8	Peak	28	1.7	
37.523	35.9	H	40.0	-4.1	Peak	148	1.7	
42.318	34.8	H	40.0	-5.2	Peak	148	1.7	
625.029	40.4	H	46.0	-5.6	Peak	79	1.7	
873.633	40.0	V	46.0	-6.0	Peak	110	1.7	
375.014	39.0	H	46.0	-7.0	Peak	131	1.7	
800.029	38.1	H	46.0	-7.9	Peak	165	1.7	
166.651	31.0	V	43.5	-12.5	Peak	91	1.7	
1198.330	40.8	V	54.0	-13.2	Peak	185	1.7	
1326.670	37.1	V	54.0	-16.9	Peak	359	1.7	
2796.670	36.7	V	54.0	-17.3	Peak	228	1.7	

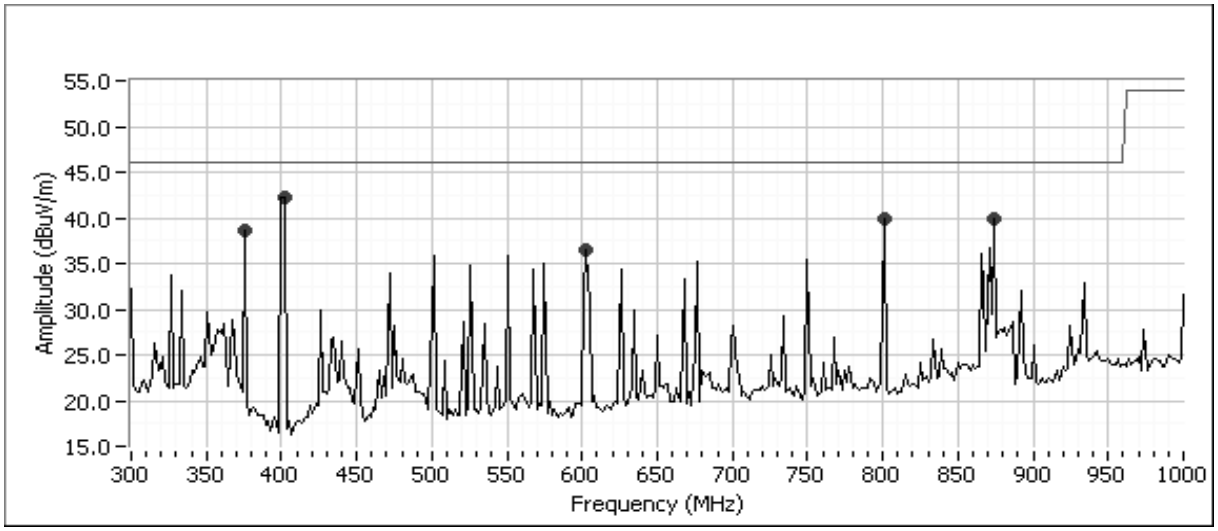
Run #2c: Preliminary Radiated Emissions, 30-8000 MHz, 802.11n (40MHz)
Omni Antenna
2437 MHz, Rx Mode

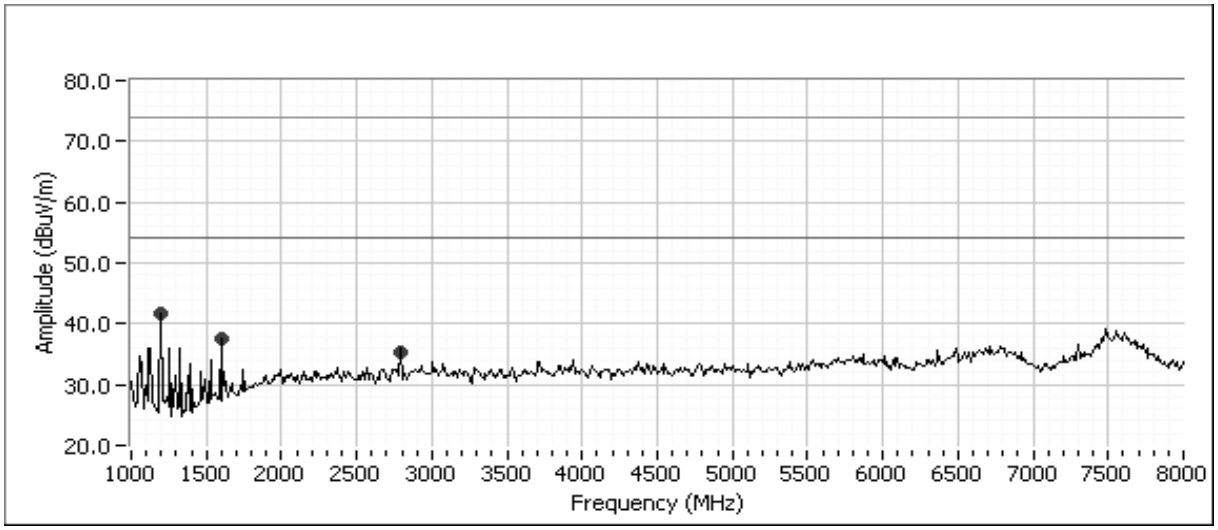
Frequency Range	Test Distance	Limit Distance	Extrapolation Factor
30 - 1000 MHz	3	3	0.0



Client:	Ruckus Wireless	Job Number:	J68610
Model:	Retriever module	T-Log Number:	T68973
		Account Manager:	Dean Eriksen
Contact:	Craig Owens		
Standard:	FCC Part 15.247/RSS-210	Class:	B

Run #2c: Continued





Client:	Ruckus Wireless	Job Number:	J68610
Model:	Retriever module	T-Log Number:	T68973
		Account Manager:	Dean Eriksen
Contact:	Craig Owens		
Standard:	FCC Part 15.247/RSS-210	Class:	B

Run #2c: Continued

Frequency	Level	Pol	FCC Class B		Detector	Azimuth	Height	Comments
MHz	dBµV/m	v/h	Limit	Margin	Pk/QP/Avg	degrees	meters	
30.627	37.8	H	40.0	-2.2	Peak	119	1.7	
36.122	35.9	V	40.0	-4.1	Peak	151	1.7	
43.993	34.8	H	40.0	-5.2	Peak	119	1.7	
117.191	39.9	V	43.5	-3.6	Peak	31	1.7	
199.979	30.3	V	43.5	-13.2	Peak	1	1.7	
374.988	38.6	H	46.0	-7.4	Peak	89	1.7	
399.929	42.3	H	46.0	-3.7	Peak	95	1.7	
799.976	39.9	H	46.0	-6.1	Peak	160	1.7	
873.529	39.9	V	46.0	-6.1	Peak	319	1.7	
603.221	36.4	V	46.0	-9.6	Peak	279	1.7	
1198.330	41.8	V	54.0	-12.2	Peak	106	1.7	
1595.000	37.5	V	54.0	-16.5	Peak	177	1.7	
2785.000	35.3	V	54.0	-18.7	Peak	264	1.7	

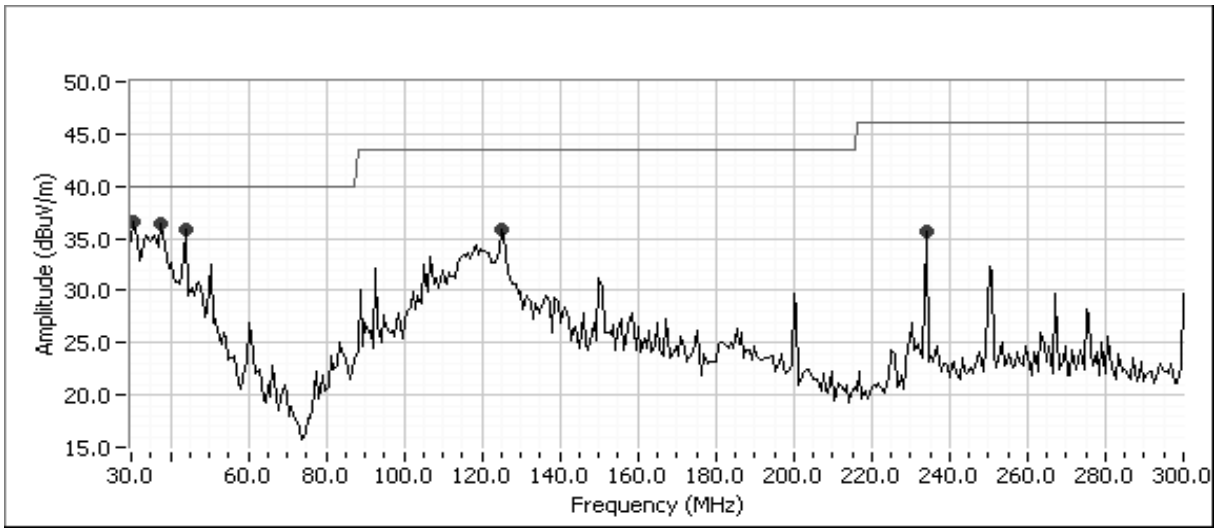
Run #2d: Maximized Readings From Run #2b

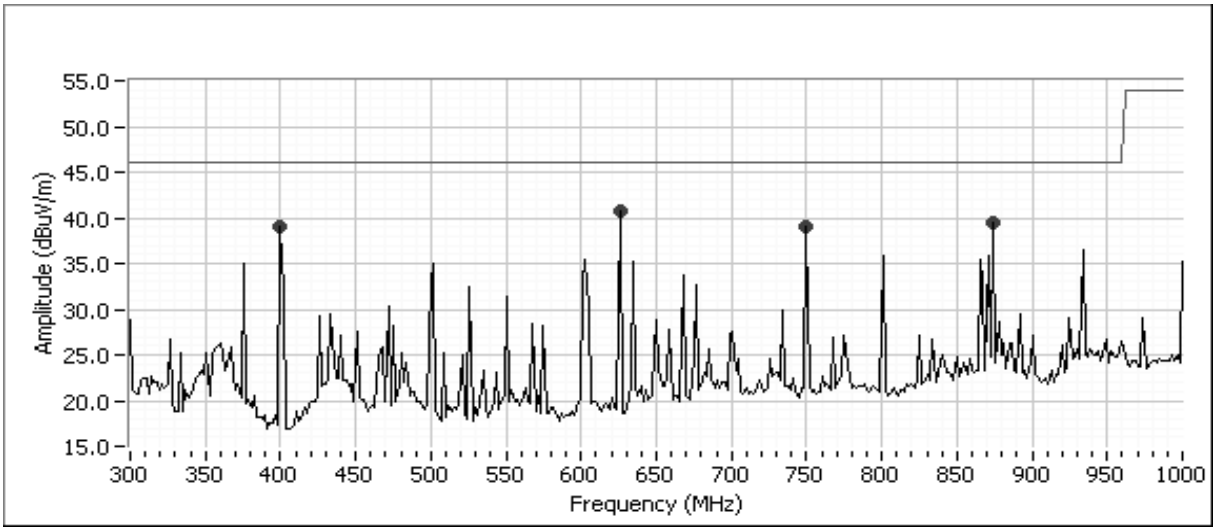
Frequency	Level	Pol	FCC Class B		Detector	Azimuth	Height	Comments
MHz	dBµV/m	v/h	Limit	Margin	Pk/QP/Avg	degrees	meters	
400.012	42.7	H	46.0	-3.3	QP	175	1.5	
375.014	40.7	H	46.0	-5.3	QP	130	1.4	
625.029	39.9	H	46.0	-6.1	QP	150	1.4	Signal Sub.
873.633	39.6	V	46.0	-6.4	QP	145	1.5	Signal Sub.
30.579	15.1	V	40.0	-24.9	QP	65	1.0	
37.523	14.8	H	40.0	-25.2	QP	210	1.0	
42.318	13.6	H	40.0	-26.4	QP	205	1.0	
118.969	14.2	H	43.5	-29.3	QP	260	1.0	
800.029	33.2	H	46.0	-12.8	QP	115	1.1	

Client:	Ruckus Wireless	Job Number:	J68610
Model:	Retriever module	T-Log Number:	T68973
		Account Manager:	Dean Eriksen
Contact:	Craig Owens		
Standard:	FCC Part 15.247/RSS-210	Class:	B

Run #3a: Preliminary Radiated Emissions, 30-8000 MHz, 802.11b
Patch Antenna
2437 MHz, Rx Mode

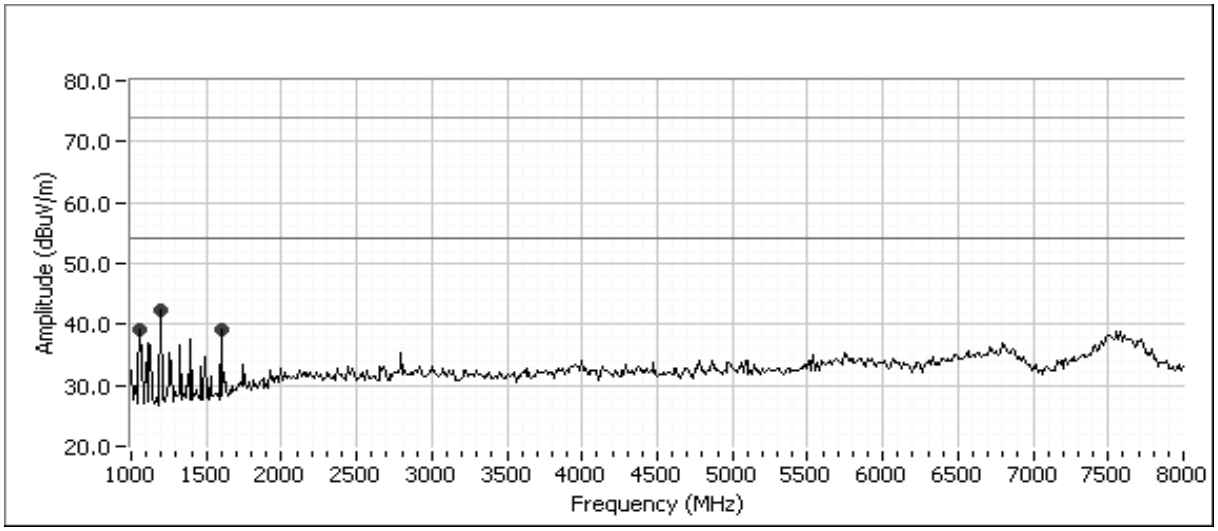
Frequency Range	Test Distance	Limit Distance	Extrapolation Factor
30 - 1000 MHz	3	3	0.0





Client:	Ruckus Wireless	Job Number:	J68610
Model:	Retriever module	T-Log Number:	T68973
		Account Manager:	Dean Eriksen
Contact:	Craig Owens		
Standard:	FCC Part 15.247/RSS-210	Class:	B

Run #3a: Continued

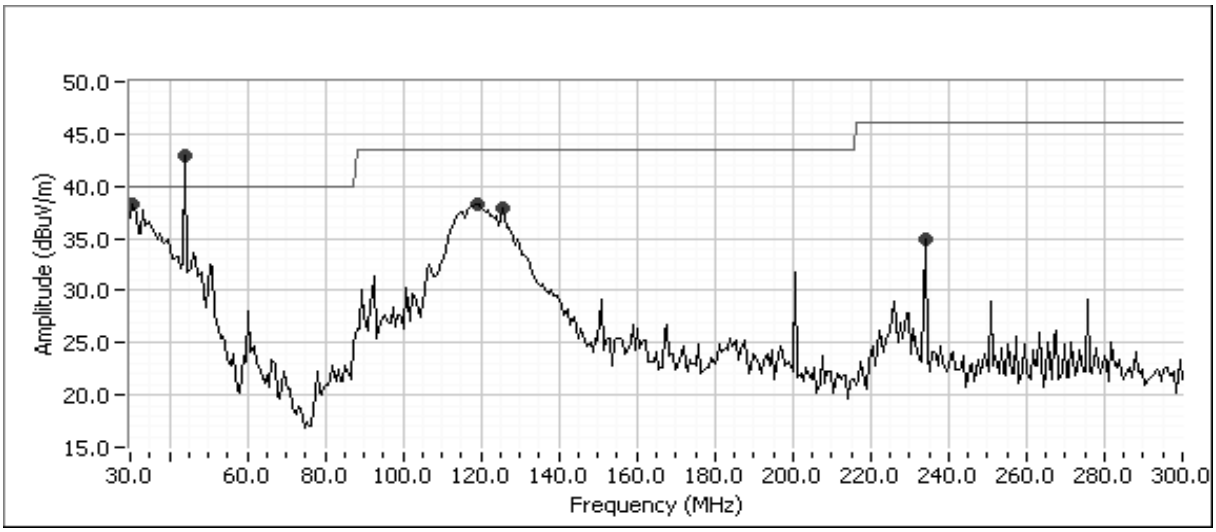


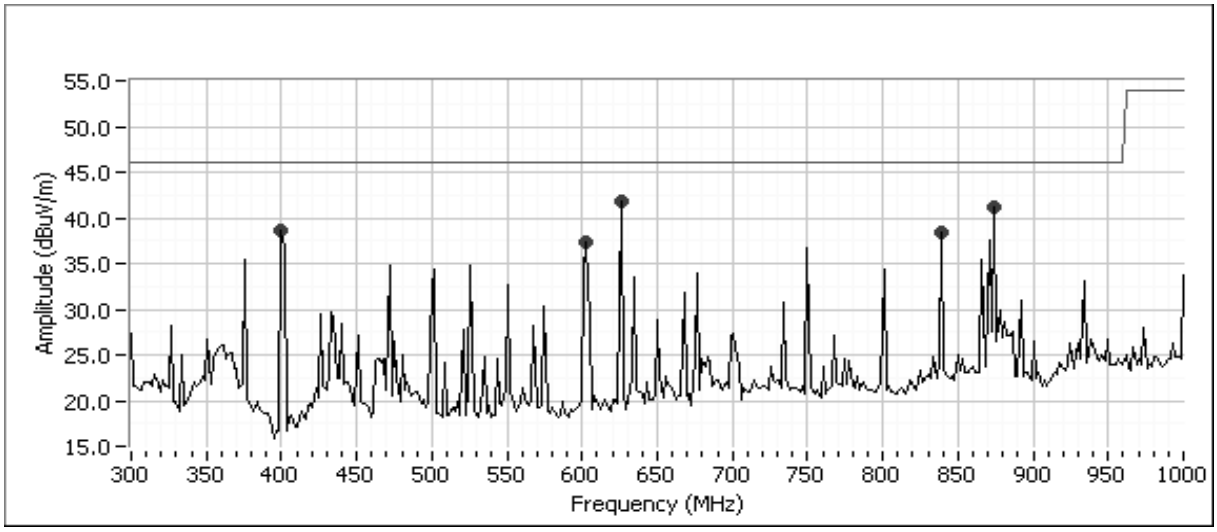
Frequency	Level	Pol	FCC Class B		Detector	Azimuth	Height	Comments
MHz	dBµV/m	v/h	Limit	Margin	Pk/QP/Avg	degrees	meters	
30.627	36.6	H	40.0	-3.4	Peak	118	1.7	
35.516	36.4	V	40.0	-3.6	Peak	151	1.7	
43.993	35.8	H	40.0	-4.2	Peak	59	1.7	
124.993	35.8	V	43.5	-7.7	Peak	360	1.7	
233.325	35.6	H	46.0	-10.4	Peak	118	1.7	
400.012	39.1	H	46.0	-6.9	Peak	52	1.7	
625.029	40.8	H	46.0	-5.2	Peak	55	1.7	
750.038	39.0	H	46.0	-7.0	Peak	71	1.7	
875.021	39.5	V	46.0	-6.5	Peak	341	1.7	
1199.960	42.3	V	54.0	-11.7	Peak	315	1.7	
1066.719	39.0	H	54.0	-15.0	Peak	164	1.7	
1599.890	39.2	V	54.0	-14.8	Peak	197	1.7	

Client:	Ruckus Wireless	Job Number:	J68610
Model:	Retriever module	T-Log Number:	T68973
		Account Manager:	Dean Eriksen
Contact:	Craig Owens		
Standard:	FCC Part 15.247/RSS-210	Class:	B

Run #3b: Preliminary Radiated Emissions, 30-8000 MHz, 802.11n (20MHz)
Patch Antenna
2437 MHz, Rx Mode

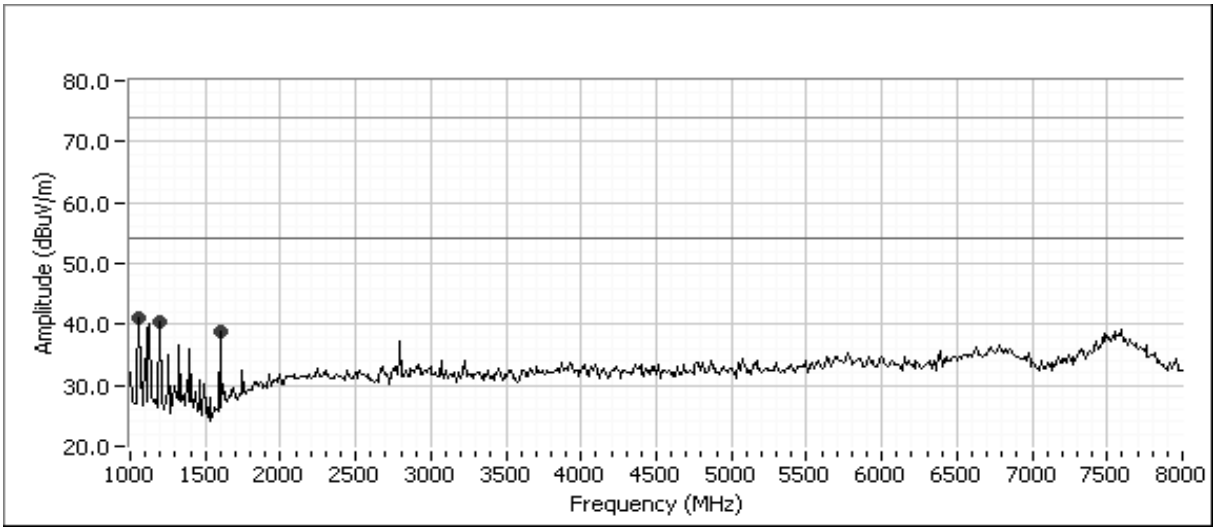
Frequency Range	Test Distance	Limit Distance	Extrapolation Factor
30 - 1000 MHz	3	3	0.0





Client:	Ruckus Wireless	Job Number:	J68610
Model:	Retriever module	T-Log Number:	T68973
		Account Manager:	Dean Eriksen
Contact:	Craig Owens		
Standard:	FCC Part 15.247/RSS-210	Class:	B

Run #3b: Continued

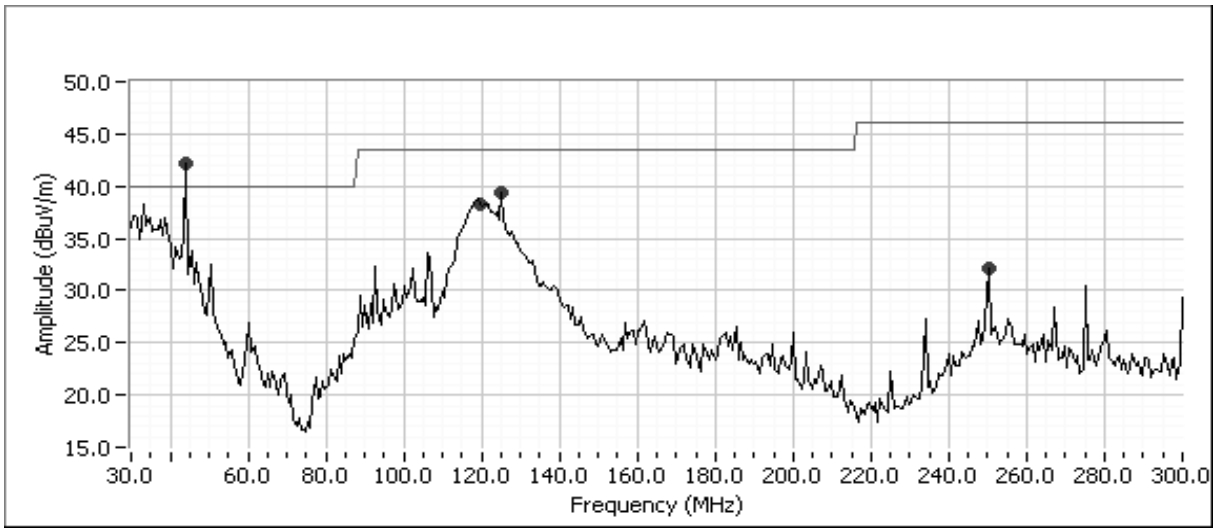


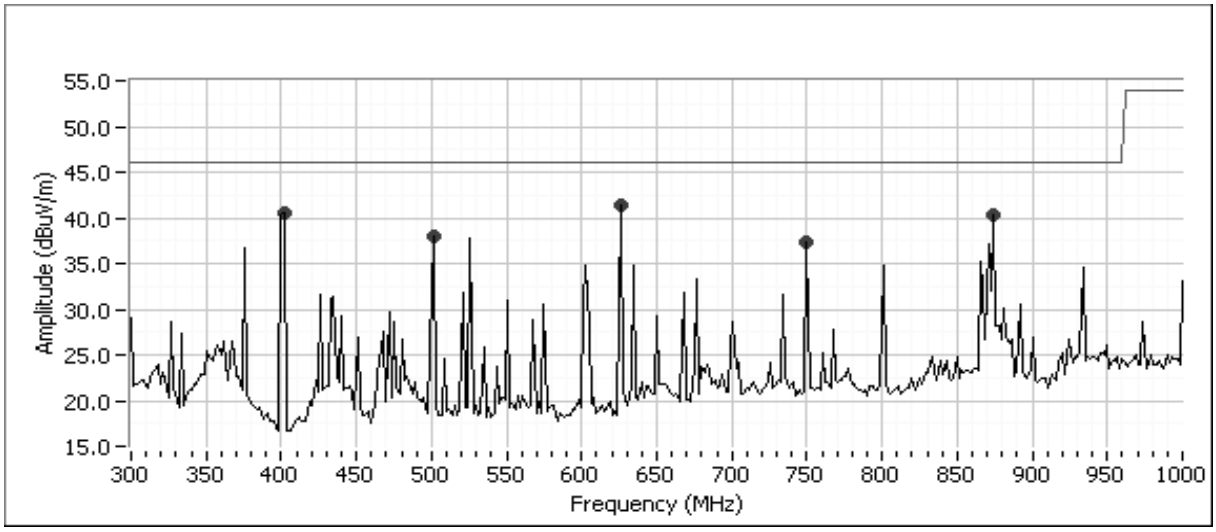
Frequency	Level	Pol	FCC Class B		Detector	Azimuth	Height	Comments
MHz	dBµV/m	v/h	Limit	Margin	Pk/QP/Avg	degrees	meters	
43.993	43.0	V	40.0	**3.0**	Peak	118	1.7	
30.876	38.2	V	40.0	-1.8	Peak	148	1.7	
625.029	41.9	H	46.0	-4.1	Peak	72	1.7	
875.021	41.2	V	46.0	-4.8	Peak	339	1.7	
117.201	38.2	H	43.5	-5.3	Peak	0	1.7	
124.345	37.9	H	43.5	-5.6	Peak	31	1.7	
400.012	38.6	H	46.0	-7.4	Peak	324	1.7	
840.021	38.4	V	46.0	-7.6	Peak	345	1.7	
603.274	37.4	V	46.0	-8.6	Peak	78	1.7	
233.325	34.9	V	46.0	-11.1	Peak	88	1.7	
1058.333	41.1	H	54.0	-12.9	Peak	137	1.7	
1198.330	40.5	V	54.0	-13.5	Peak	309	1.7	
1595.000	38.8	V	54.0	-15.2	Peak	309	1.7	

Client:	Ruckus Wireless	Job Number:	J68610
Model:	Retriever module	T-Log Number:	T68973
		Account Manager:	Dean Eriksen
Contact:	Craig Owens		
Standard:	FCC Part 15.247/RSS-210	Class:	B

Run #3c: Preliminary Radiated Emissions, 30-8000 MHz, 802.11n (40MHz)
Patch Antenna
2437 MHz, Rx Mode

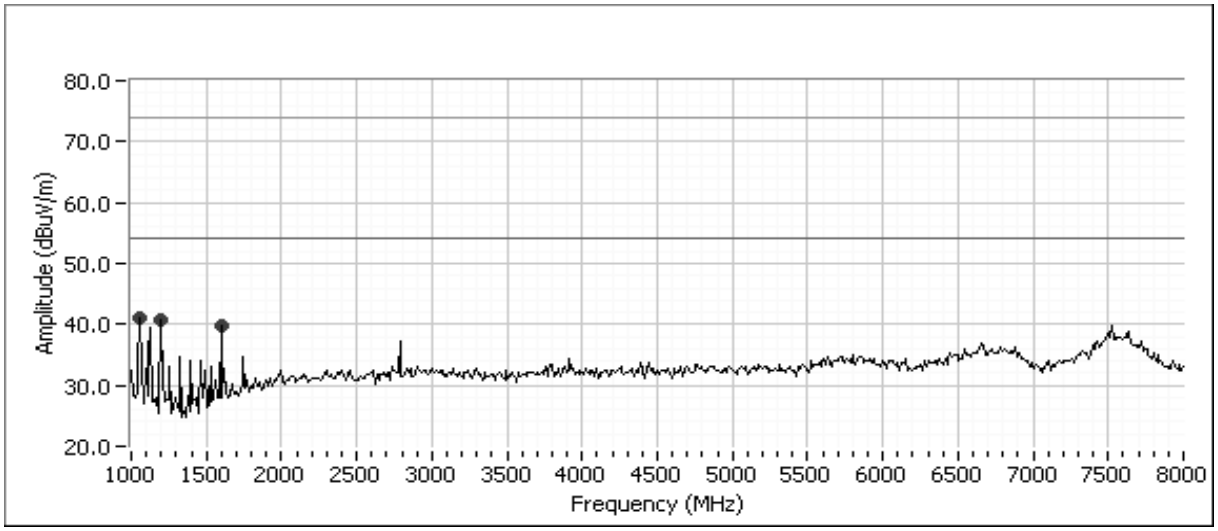
Frequency Range	Test Distance	Limit Distance	Extrapolation Factor
30 - 1000 MHz	3	3	0.0





Client:	Ruckus Wireless	Job Number:	J68610
Model:	Retriever module	T-Log Number:	T68973
		Account Manager:	Dean Eriksen
Contact:	Craig Owens		
Standard:	FCC Part 15.247/RSS-210	Class:	B

Run #3c: Continued



Frequency	Level	Pol	FCC Class B		Detector	Azimuth	Height	Comments
MHz	dBµV/m	v/h	Limit	Margin	Pk/QP/Avg	degrees	meters	
43.993	42.2	V	40.0	2.2	Peak	88	1.7	
118.957	38.3	V	43.5	-5.2	Peak	28	1.7	
123.721	39.3	V	43.5	-4.2	Peak	28	1.7	
249.989	32.1	H	46.0	-13.9	Peak	241	1.7	
400.034	40.6	H	46.0	-5.4	Peak	95	1.7	
500.019	38.0	H	46.0	-8.0	Peak	59	1.7	
625.029	41.4	H	46.0	-4.6	Peak	93	1.7	
875.021	40.3	V	46.0	-5.7	Peak	63	1.7	
750.012	37.4	H	46.0	-8.6	Peak	183	1.7	
1595.000	39.8	V	54.0	-14.2	Peak	268	1.7	
1058.333	41.0	V	54.0	-13.0	Peak	359	1.7	
1198.330	40.7	V	54.0	-13.3	Peak	268	1.7	

Client:	Ruckus Wireless	Job Number:	J68610
Model:	Retriever module	T-Log Number:	T68973
		Account Manager:	Dean Eriksen
Contact:	Craig Owens		
Standard:	FCC Part 15.247/RSS-210	Class:	B

Run #3d: Maximized Readings From Run #3b

Frequency	Level	Pol	FCC Class B		Detector	Azimuth	Height	Comments
MHz	dBµV/m	v/h	Limit	Margin	Pk/QP/Avg	degrees	meters	
875.021	39.3	V	46.0	-6.7	QP	345	1.2	Signal Sub.
400.012	38.8	H	46.0	-7.2	QP	75	1.4	
625.029	38.1	H	46.0	-7.9	QP	300	1.2	Signal Sub.
840.021	36.7	V	46.0	-9.3	QP	95	1.3	Signal Sub.
603.274	35.3	V	46.0	-10.7	QP	100	1.2	Signal Sub.
30.876	14.6	V	40.0	-25.4	QP	35	1.0	
43.993	12.5	V	40.0	-27.5	QP	90	1.0	
124.345	12.4	H	43.5	-31.1	QP	300	1.0	
117.201	11.2	H	43.5	-32.3	QP	290	1.0	

Client:	Ruckus Wireless	Job Number:	J68610
Model:	Retriever module	T-Log Number:	T68973
		Account Manager:	Dean Eriksen
Contact:	Craig Owens		
Standard:	FCC Part 15.247/RSS-210	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: 12/6/2007 7:56
Test Engineer: Wayne Fisher
Test Location: SVOATS #2
Config. Used: 1
Config Change: None
EUT Voltage: 120V/60Hz

General Test Configuration

The EUT was located on a wooden table, 40 cm from a vertical coupling plane and 80cm from the LISN. Remote support equipment was located approximately 10 meters from the test area.

Ambient Conditions:

Temperature: 11.1 °C
Rel. Humidity: 82 %

Summary of Results

Run #	Test Performed	Limit	Result	Margin
1	CE, AC Power,120V/60Hz	FCC Class B	Pass	40.4dBµV @ 0.983MHz (-5.6dB)

Modifications Made During Testing

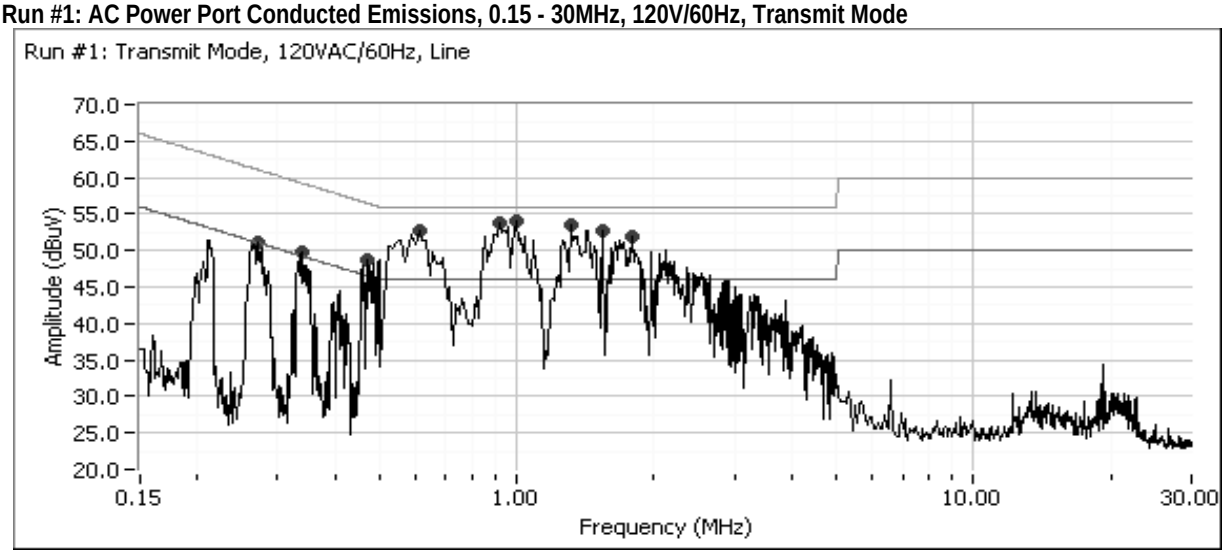
No modifications were made to the EUT during testing

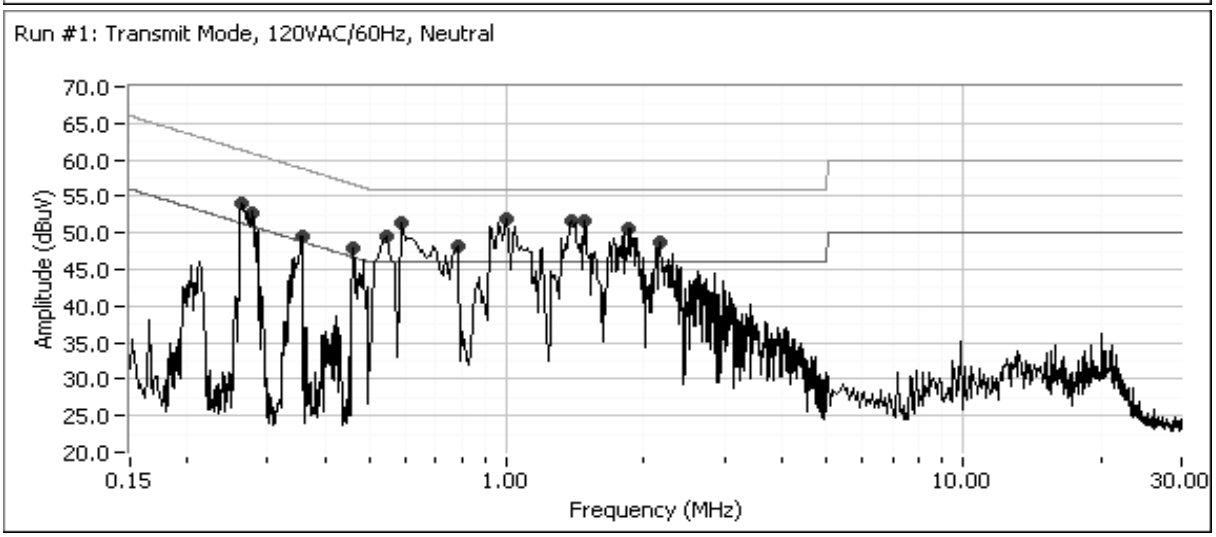
Deviations From The Standard

No deviations were made from the requirements of the standard.

Client:	Ruckus Wireless	Job Number:	J68610
Model:	Retriever module	T-Log Number:	T68973
		Account Manager:	Dean Eriksen
Contact:	Craig Owens		
Standard:	FCC Part 15.247/RSS-210	Class:	B

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





Frequency MHz	Level dBµV	AC Line	FCC B Limit	FCC B Margin	Detector QP/Ave	Comments
0.983	40.4	Neutral	46.0	-5.6	AVG	
0.983	50.4	Neutral	56.0	-5.6	QP	
1.494	50.1	Neutral	56.0	-5.9	QP	
0.605	50.0	Neutral	56.0	-6.0	QP	
0.269	45.0	Neutral	51.2	-6.2	AVG	
0.605	39.7	Neutral	46.0	-6.3	AVG	

Client:	Ruckus Wireless	Job Number:	J68610
Model:	Retriever module	T-Log Number:	T68973
		Account Manager:	Dean Eriksen
Contact:	Craig Owens		
Standard:	FCC Part 15.247/RSS-210	Class:	B

Run #1 Continued from previous page

1.847	39.7	Neutral	46.0	-6.3	AVG	
0.983	49.6	Line 1	56.0	-6.4	QP	
1.376	49.5	Neutral	56.0	-6.5	QP	
0.270	44.4	Line 1	51.1	-6.7	AVG	
1.494	39.2	Neutral	46.0	-6.8	AVG	
0.608	39.1	Line 1	46.0	-6.9	AVG	
0.983	39.1	Line 1	46.0	-6.9	AVG	
0.608	48.9	Line 1	56.0	-7.1	QP	
0.277	43.8	Neutral	50.9	-7.1	AVG	
0.541	38.6	Neutral	46.0	-7.4	AVG	
1.847	48.5	Neutral	56.0	-7.5	QP	
1.376	38.4	Neutral	46.0	-7.6	AVG	
0.541	48.1	Neutral	56.0	-7.9	QP	
0.918	48.0	Line 1	56.0	-8.0	QP	
1.312	47.4	Line 1	56.0	-8.6	QP	
1.771	47.4	Line 1	56.0	-8.6	QP	
1.771	37.0	Line 1	46.0	-9.0	AVG	
0.269	52.0	Neutral	61.2	-9.2	QP	
1.548	46.5	Line 1	56.0	-9.5	QP	
0.918	36.2	Line 1	46.0	-9.8	AVG	
0.270	51.2	Line 1	61.1	-9.9	QP	
0.277	51.0	Neutral	60.9	-9.9	QP	
2.162	46.0	Neutral	56.0	-10.0	QP	
0.471	36.4	Neutral	46.5	-10.1	AVG	
0.471	45.9	Neutral	56.5	-10.6	QP	
2.162	35.2	Neutral	46.0	-10.8	AVG	
1.312	35.0	Line 1	46.0	-11.0	AVG	
1.548	34.6	Line 1	46.0	-11.4	AVG	
0.773	44.6	Neutral	56.0	-11.4	QP	
0.477	34.6	Line 1	46.4	-11.8	AVG	
0.347	37.2	Neutral	49.0	-11.8	AVG	
0.343	37.0	Line 1	49.1	-12.1	AVG	
0.477	43.2	Line 1	56.4	-13.2	QP	
0.347	45.4	Neutral	59.0	-13.6	QP	
0.343	45.1	Line 1	59.1	-14.0	QP	
0.773	31.1	Neutral	46.0	-14.9	AVG	

EXHIBIT 3: Photographs of Test Configurations

Pages

EXHIBIT 4: Proposed FCC ID Label & Label Location

EXHIBIT 5: Detailed Photographs of Ruckus Wireless Model MP2N33AConstruction

Pages

EXHIBIT 6: Operator's Manual for Ruckus Wireless Model MP2N33A

Pages

EXHIBIT 7: Block Diagram of Ruckus Wireless Model MP2N33A

Pages

EXHIBIT 8: Schematic Diagrams for Ruckus Wireless Model MP2N33A

Pages

EXHIBIT 9: Theory of Operation for Ruckus Wireless Model MP2N33A

Pages

EXHIBIT 10: RF Exposure Information

Pages