NTS Silicon Valley
www.nts.com
41089 Boyce Road
Fremont, CA 94538
510-578-3500 Phone
510-440-9525 Fax

EMC Test Report

Application for Grant of Equipment Authorization

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

Model: B3000 Communication Badge

IC CERTIFICATION #:	4362A-B3000
FCC ID:	QGZAB3000
APPLICANT:	Vocera Communications 525 Race Street San Jose, CA 95126
TEST SITE(S):	NTS Silicon Valley 41039 Boyce Road. Fremont, CA. 94538-2435
IC SITE REGISTRATION #:	2845B-4, 2845B-7
REPORT DATE:	October 23, 2012
FINAL TEST DATES:	August 9, 15, 17 and 31 and September 6, 2012
TOTAL NUMBER OF PAGES:	50

PROGRAM MGR /
TECHNICAL REVIEWER:

Mark E Hill
Staff Engineer

QUALITY ASSURANCE DELEGATE /
FINAL REPORT PREPARER:

David Guidotti
Senior Technical Writer

A2LA ACCREDITED
Testing Cert #0214.26

REVISION HISTORY

Rev#	Date	Comments	Modified By
-	10-23-2012	First release	

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SCOPE

An electromagnetic emissions test has been performed on the Vocera Communications model B3000 Communication Badge, pursuant to the following rules:

Industry Canada RSS-Gen Issue 3
RSS 210 Issue 8 "Low-power Licence-exempt Radiocommunication Devices (All Frequency Bands): Category I Equipment"
FCC Part 15 Subpart C

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

ANSI C63.4:2003
FCC DTS Measurement Procedure KDB558074, March 2005

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

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

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

OBJECTIVE

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

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

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

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

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

STATEMENT OF COMPLIANCE

The tested sample of Vocera Communications model B3000 Communication Badge complied with the requirements of the following regulations:

Industry Canada RSS-Gen Issue 3
RSS 210 Issue 8 "Low-power Licence-exempt Radiocommunication Devices (All Frequency Bands): Category I Equipment"
FCC Part 15 Subpart C

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

The test results recorded herein are based on a single type test of Vocera Communications model B3000 Communication Badge and therefore apply only to the tested sample. The sample was selected and prepared by Rob Holt of Vocera Communications.

DEVIATIONS FROM THE STANDARDS

No deviations were made from the published requirements listed in the scope of this report.

TEST RESULTS SUMMARY

DIGITAL TRANSMISSION SYSTEMS (2400 – 2483.5MHz)

FCC Rule Part	RSS Rule Part	Description	Measured Value / Comments	Limit / Requirement	Result
15.247(a)	RSS 210 A8.2	Digital Modulation	Systems uses OFDM / DSSS techniques	System must utilize a digital transmission technology	Complies
15.247 (a) (2)	RSS 210 A8.2 (1)	6dB Bandwidth	b: 10.0 MHz g: 16.7 MHz	>500kHz	Complies
15.247 (b) (3)	RSS 210 A8.2 (4)	Output Power (multipoint systems)	b: 19.6 dBm g: 16.5 dBm (0.091 Watts) EIRP = 0.18 W Note 1	1Watt, EIRP limited to 4 Watts.	Complies
15.247(d)	RSS 210 A8.2 (2)	Power Spectral Density	b: -5.0 dBm/3kHz g: -4.2 dBm/3kHz	8dBm/3kHz	Complies
15.247(c)	RSS 210 A8.5	Antenna Port Spurious Emissions 30MHz – 25 GHz	All emissions below the -30dBc limit	< -30dBc Note 2	Complies
15.247(c) / 15.209	RSS 210 A8.5	Radiated Spurious Emissions 30MHz – 25 GHz	53.8 dBµV/m @ 2386.3 MHz (-0.2 dB)	15.207 in restricted bands, all others <-30dBc Note 2	Complies

Note 1: EIRP calculated using antenna gain of 3 dBi for the highest EIRP system.
Note 2: Limit of -30dBc used because the power was measured using the UNII test procedure (maximum power averaged over a transmission burst).

GENERAL REQUIREMENTS APPLICABLE TO ALL BANDS

FCC Rule Part	RSS Rule part	Description	Measured Value / Comments	Limit / Requirement	Result (margin)
15.203	-	RF Connector	Antenna is internal to the EUT	Unique or integral antenna required	Complies
15.207	RSS GEN Table 2	AC Conducted Emissions	N/A - The EUT is battery powered		
15.109	RSS GEN 7.2.3 Table 1	Receiver spurious emissions	N/A – device tunes above 960MHz	Refer to page 18	N/A
15.247 (b) (5) 15.407 (f)	RSS 102	RF Exposure Requirements	Refer to SAR report and RSS 102 declaration	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	Complies
-	RSP 100 RSS GEN 7.1.5	User Manual	-	Statement for products with detachable antenna	N/A
-	RSP 100 RSS GEN 4.4.1	99% Bandwidth	802.11b: 14.2 MHz 802.11g: 17.6 MHz	Information only	N/A

MEASUREMENT UNCERTAINTIES

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

Measurement Type	Measurement Unit	Frequency Range	Expanded Uncertainty
RF power, conducted (power meter)	dBm	25 to 7000 MHz	± 0.52 dB
RF power, conducted (Spectrum analyzer)	dBm	25 to 7000 MHz	± 0.7 dB
Conducted emission of transmitter	dBm	25 to 26500 MHz	± 0.7 dB
Conducted emission of receiver	dBm	25 to 26500 MHz	± 0.7 dB
Radiated emission (substitution method)	dBm	25 to 26500 MHz	± 2.5 dB
Radiated emission (field strength)	dBμV/m	25 to 1000 MHz	± 3.6 dB
		1000 to 40000 MHz	± 6.0 dB

EQUIPMENT UNDER TEST (EUT) DETAILS

GENERAL

The Vocera Communications model B3000 Communication Badge is a 802.11bg + BT 2.1 pendant that is designed to provide communication to mobile users. Since the EUT would be placed on a table top during operation, the EUT was treated as table-top equipment during testing to simulate the end-user environment. The EUT is battery powered and is unable to transmit while charging.

The sample was received on August 9, 2012 and tested on August 9, 15, 17 and 31 and September 6, 2012. The EUT consisted of the following component(s):

Company	Model	Description	Serial Number	FCC ID
Vocera	B3000AR	Communication Badge	E4FF12122327	QGZAB3000
Vocera	B3000AR	Communication Badge	E4FF12122329	QGZAB3000
Vocera	B3000AR	Communication Badge	E4FF12122369	QGZAB3000

OTHER EUT DETAILS

The following EUT details should be noted: the BT has a fixed antenna, all BT measurements were performed radiated. A modified sample with an RF connector was provided for WiFi antenna port measurements.

ANTENNA SYSTEM

The EUT uses a 3dBi internal antenna. The Bluetooth and Wifi share the antenna.

ENCLOSURE

The EUT enclosure is primarily constructed of plastic. It measures approximately 9.8 cm wide by 3.6 cm deep by 1.8 cm high.

MODIFICATIONS

No modifications were made to the EUT during the time the product was at NTS Silicon Valley.

SUPPORT EQUIPMENT

No local support equipment was used during testing.

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

Company	Model	Description	Serial Number	FCC ID
Lenovo	T410	Laptop	R9-1EM79 10/01	-
RoHde&SCHWARZ	CBT32	Bluetooth tester	1153.9000K32-100801	-

No remote support equipment was used during WiFi testing.

EUT INTERFACE PORTS

The EUT has no interface ports.

EUT OPERATION

During testing, the EUT was configured for continuous transmission on the noted channel. For 802.11b, 1Mb/s was used. For 802.11g, 6Mb/s was used. These were the worse case data rates. For Bluetooth testing, the Bluetooth Tester system was used to configure the EUT to transmit as noted in the test data.

TEST SITE

GENERAL INFORMATION

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

Site	Registration Numbers		Location
	FCC	Canada	
Chamber 4	211948	2845B-4	41039 Boyce Road Fremont, CA 94538-2435
Chamber 7	A2LA accreditation	2845B-7	

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. The test site(s) contain separate areas for radiated and conducted emissions testing. Considerable engineering effort has been expended to ensure that the facilities conform to all pertinent requirements of ANSI C63.4:2003.

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 16-1-1 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.

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.

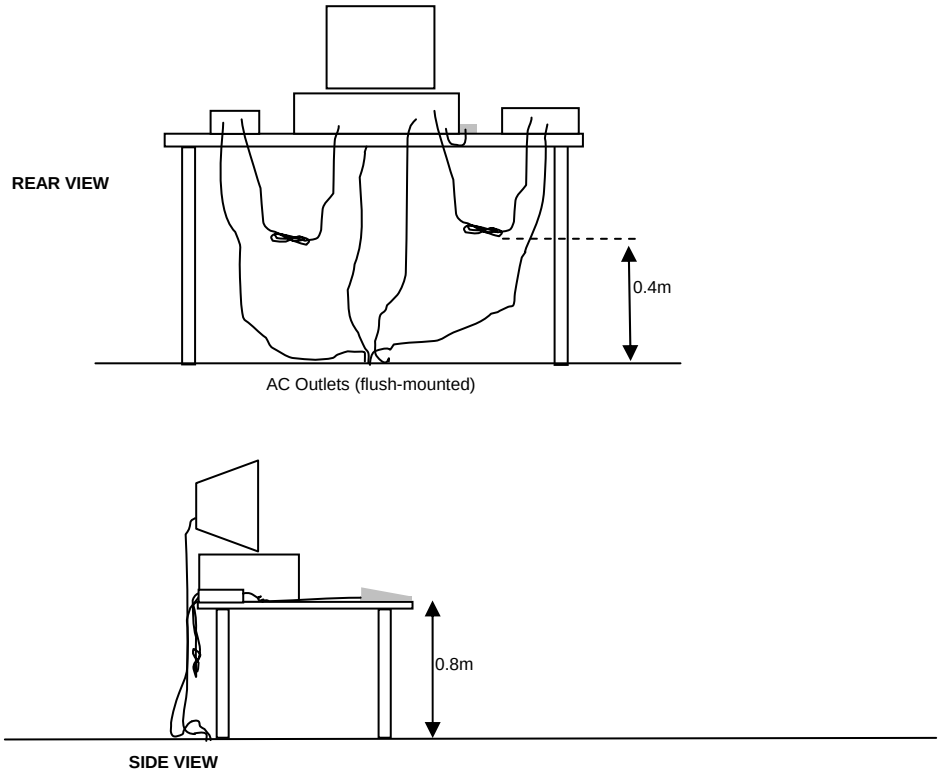
RADIATED EMISSIONS

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

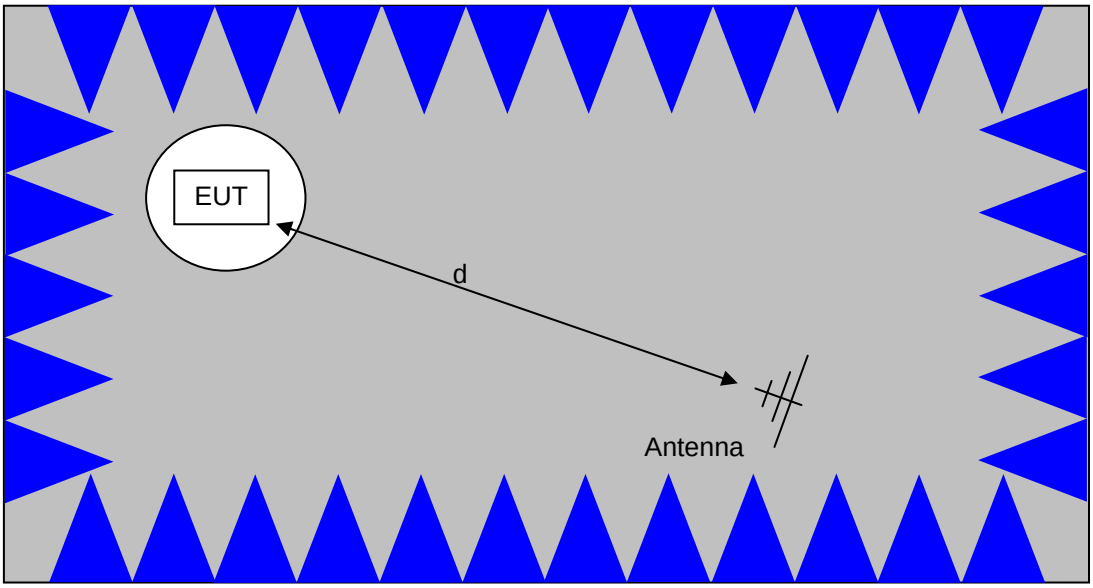
A speaker is provided in the receiver to aid in discriminating between EUT and ambient emissions. Other methods used during the preliminary scan for EUT emissions involve scanning with near field magnetic loops, monitoring I/O cables with RF current clamps, and cycling power to the EUT.

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

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

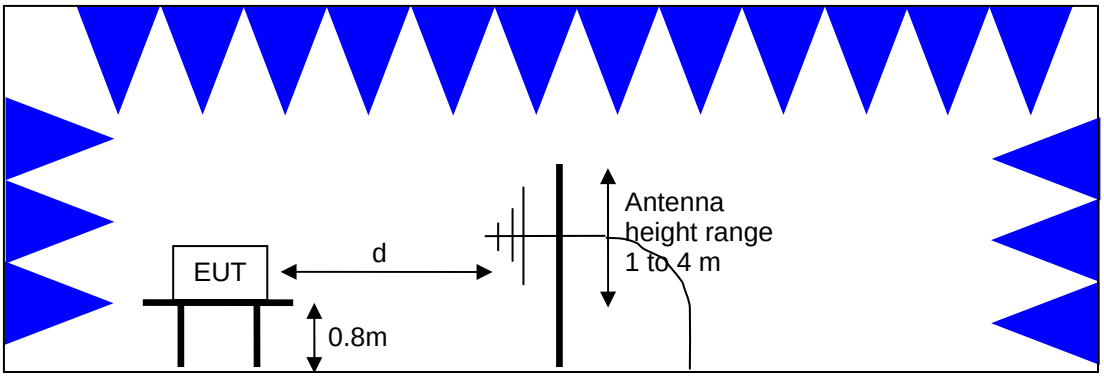


Typical Test Configuration for Radiated Field Strength Measurements



The anechoic materials on the walls and ceiling ensure compliance with the normalized site attenuation requirements of CISPR 16 / CISPR 22 / ANSI C63.4 for an alternate test site at the measurement distances used.

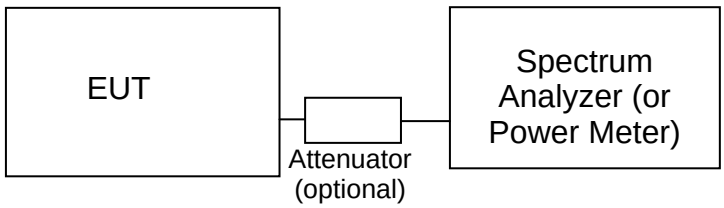
Floor-standing equipment is placed on the floor with insulating supports between the unit and the ground plane.



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

CONDUCTED EMISSIONS FROM ANTENNA PORT

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



Test Configuration for Antenna Port Measurements

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

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

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

BANDWIDTH MEASUREMENTS

The 6dB, 20dB 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 d (meters) from the equipment under test:

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

where P is the eirp (Watts)

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

Appendix A Test Equipment Calibration Data

Manufacturer	Description	Model	Asset #	Cal Due
Radiated Emissions, 1000 - 26,000 MHz, 09-Aug-12				
EMCO	Antenna, Horn, 1-18 GHz	3115	487	7/19/2014
Hewlett Packard	Head (Inc flex cable, 1143, 2198) Red	84125C	1145	7/5/2013
Hewlett Packard	SpecAn 30 Hz -40 GHz, SV (SA40) Red	8564E (84125C)	1148	8/15/2012
Rohde & Schwarz	EMI Test Receiver, 20 Hz-7 GHz	ESIB7	1538	12/6/2012
A.H. Systems	Red System Horn, 18-40GHz	SAS-574, p/n: 2581	2161	3/20/2013
Radiated Emissions, 1000 - 25,000 MHz, 15-Aug-12				
Hewlett Packard	Microwave Preamplifier, 1-26.5GHz	8449B	263	3/29/2013
EMCO	Antenna, Horn, 1-18GHz	3115	868	6/19/2014
Hewlett Packard	SpecAn 9 kHz - 40 GHz, FT (SA40) Blue	8564E (84125C)	1393	5/1/2013
Hewlett Packard	Head (Inc flex cable, (1742,1743) Blue	84125C	1620	5/17/2013
A.H. Systems	Spare System Horn, 18-40GHz	SAS-574, p/n: 2581	2162	5/8/2013
Micro-Tronics	Band Reject Filter, 2400-2500 MHz	BRM50702-02	2249	10/11/2012
Radiated Emissions, 30 - 26,500 MHz, 15-Aug-12				
Hewlett Packard	Microwave Preamplifier, 1-26.5GHz	8449B	263	3/29/2013
EMCO	Antenna, Horn, 1-18GHz	3115	868	6/19/2014
Hewlett Packard	SpecAn 9 kHz - 40 GHz, FT (SA40) Blue	8564E (84125C)	1393	5/1/2013
Sunol Sciences	Biconilog, 30-3000 MHz	JB3	1657	6/4/2014
Hewlett Packard	HF Amplifier, 45 MHz -50 GHz (with 1620)	83051A (84125C)	1742	5/17/2013
Hewlett Packard	HF Amplifier, 45 MHz -50 GHz (with 1620)	83051A (84125C)	1743	5/17/2013
Rohde & Schwarz	EMI Test Receiver, 20 Hz-7 GHz	ESIB7	1756	5/21/2013
Hewlett Packard	Preamplifier, 100 kHz - 1.3 GHz	8447D OPT 010	1826	5/18/2013
A.H. Systems	Spare System Horn, 18-40GHz	SAS-574, p/n: 2581	2162	5/8/2013
Micro-Tronics	Band Reject Filter, 2400-2500 MHz	BRM50702-02	2249	10/11/2012
Radiated Emissions, 1,000 - 6,500 MHz, 17-Aug-12				
EMCO	Antenna, Horn, 1-18 GHz	3115	487	7/19/2014
Rohde & Schwarz	EMI Test Receiver, 20 Hz-7 GHz	ESIB7	1756	5/21/2013
Radiated Emissions, 1,000 - 26,500 MHz, 31-Aug-12				
Hewlett Packard	Microwave Preamplifier, 1-26.5GHz	8449B	263	3/29/2013
EMCO	Antenna, Horn, 1-18 GHz	3115	487	7/19/2014
Hewlett Packard	SpecAn 9 kHz - 40 GHz, FT (SA40) Blue	8564E (84125C)	1393	5/1/2013
Rohde & Schwarz	EMI Test Receiver, 20 Hz-7 GHz	ESIB7	1756	5/21/2013
Micro-Tronics	Band Reject Filter, 2400-2500 MHz	BRM50702-02	2238	10/4/2012
Radio Antenna Port (Power and Spurious Emissions), 06-Sep-12				
Agilent	PSA, Spectrum Analyzer, (installed options, 111, 115, 123, 1DS, B7J, HYX,	E4446A	2139	2/23/2013

Appendix B Test Data

T88664 Pages 24 - 49

Client:	Vocera Communication	Job Number:	J88167
Product	B3000AR	T-Log Number:	T88664
		Account Manager:	Christine Krebill
Contact:	Rob Holt		-
Emissions Standard(s):	FCC 15.247	Class:	-
Immunity Standard(s):	-	Environment:	-

EMC Test Data

For The

Vocera Communication

Product

B3000AR

Date of Last Test: 10/2/2012

Client:	Vocera Communication	Job Number:	J88167
Model:	B3000AR	T-Log Number:	T88664
		Account Manager:	Christine Krebill
Contact:	Rob Holt		
Standard:	FCC 15.247	Class:	N/A

RSS 210 and FCC 15.247 (DTS) Radiated Spurious Emissions

Test Specific Details

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

General Test Configuration

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

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

Ambient Conditions:

Temperature: 24 °C
Rel. Humidity: 38 %

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

Run #	Mode	Channel	Power Setting	Measured Power	Test Performed	Limit	Result / Margin
1a	11b	Ch 1 - 2412 MHz	19		Restricted Band Edge (2390 MHz)	FCC Part 15.209 / 15.247(c)	53.8 dBµV/m @ 2386.3 MHz (-0.2 dB)
			19		Radiated Emissions, 1 - 26 GHz	FCC Part 15.209 / 15.247(c)	46.9 dBµV/m @ 4824.1 MHz (-7.1 dB)
1b	11b	Ch 6 - 2437 MHz	19		Radiated Emissions, 1 - 26 GHz	FCC Part 15.209 / 15.247(c)	49.3 dBµV/m @ 4874.0 MHz (-4.7 dB)
1c	11b	Ch 11 - 2462 MHz	19		Restricted Band Edge (2483.5 MHz)	FCC Part 15.209 / 15.247(c)	53.5 dBµV/m @ 2487.8 MHz (-0.5 dB)
			19		Radiated Emissions, 1 - 26 GHz	FCC Part 15.209 / 15.247(c)	51.0 dBµV/m @ 4924.0 MHz (-3.0 dB)
2a	11g	Ch 1 - 2412 MHz	14		Restricted Band Edge (2390 MHz)	FCC Part 15.209 / 15.247(c)	53.2 dBµV/m @ 2390.0 MHz (-0.8 dB)
			15		Radiated Emissions, 1 - 26 GHz	FCC Part 15.209 / 15.247(c)	44.6 dBµV/m @ 2235.1 MHz (-9.4 dB)
2b	11g	Ch 6 - 2437 MHz	16		Radiated Emissions, 1 - 26 GHz	FCC Part 15.209 / 15.247(c)	45.6 dBµV/m @ 2238.6 MHz (-8.4 dB)
2c	11g	Ch 11 - 2462 MHz	15		Restricted Band Edge (2483.5 MHz)	FCC Part 15.209 / 15.247(c)	53.8 dBµV/m @ 2483.5 MHz (-0.2 dB)
			16		Radiated Emissions, 1 - 26 GHz	FCC Part 15.209 / 15.247(c)	45.4 dBµV/m @ 2241.6 MHz (-8.6 dB)

Client:	Vocera Communication	Job Number:	J88167
Model:	B3000AR	T-Log Number:	T88664
		Account Manager:	Christine Krebill
Contact:	Rob Holt		
Standard:	FCC 15.247	Class:	N/A

Modifications Made During Testing

No modifications were made to the EUT during testing

Deviations From The Standard

No deviations were made from the requirements of the standard.

Notes:

EUT is handheld, measurements performed in three orientations

Sample:

S/N: E4FF12122369 (NTS 2012-2852) for 8/8/12 test
S/N: E4FF12122327 (NTS 2012-2234) for 8/31/12 test

Client:	Vocera Communication	Job Number:	J88167
Model:	B3000AR	T-Log Number:	T88664
		Account Manager:	Christine Krebill
Contact:	Rob Holt		
Standard:	FCC 15.247	Class:	N/A

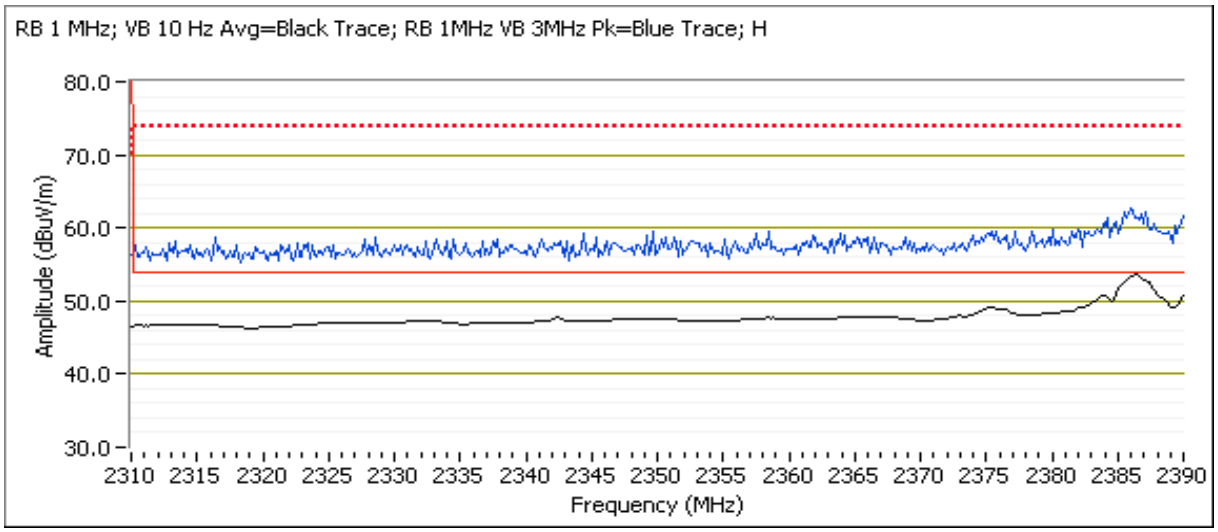
Run #1: Radiated Spurious Emissions, 30 - 25000 MHz. Operating Mode: 802.11b

Date of Test: 8/31/2012
Test Engineer: Jack Liu
Test Location: FT7

Run #1a: Ch 1 - 2412 MHz

Band Edge Signal Field Strength - Direct measurement of 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	
2386.300	53.8	H	54.0	-0.2	AVG	30	1.0	Side
2385.850	62.2	H	74.0	-11.8	PK	30	1.0	Side
2386.310	45.5	V	54.0	-8.5	AVG	360	1.0	Side
2386.310	55.3	V	74.0	-18.7	PK	360	1.0	Side
2386.310	47.4	V	54.0	-6.6	AVG	157	1.3	Flat
2383.590	57.4	V	74.0	-16.6	PK	157	1.3	Flat
2386.470	52.9	H	54.0	-1.1	AVG	215	1.0	Flat
2386.310	60.4	H	74.0	-13.6	PK	215	1.0	Flat
2386.310	48.4	V	54.0	-5.6	AVG	73	1.6	Upright
2364.350	57.1	V	74.0	-16.9	PK	73	1.6	Upright
2386.150	43.9	H	54.0	-10.1	AVG	82	1.0	Upright
2382.460	54.2	H	74.0	-19.8	PK	82	1.0	Upright



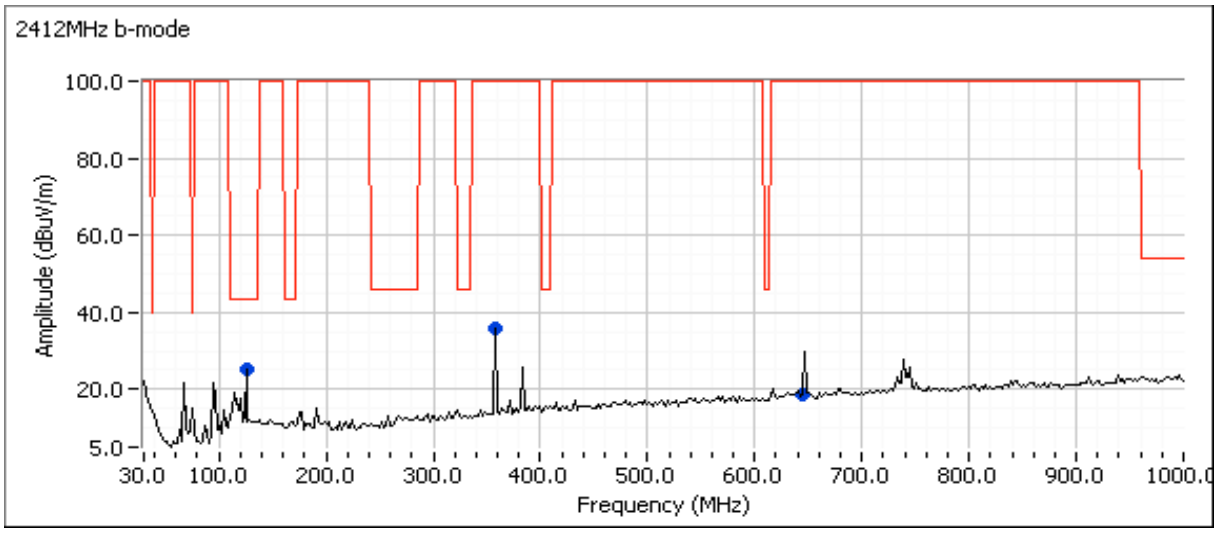
Client:	Vocera Communication	Job Number:	J88167
Model:	B3000AR	T-Log Number:	T88664
		Account Manager:	Christine Krebill
Contact:	Rob Holt		
Standard:	FCC 15.247	Class:	N/A

Other Spurious Emissions

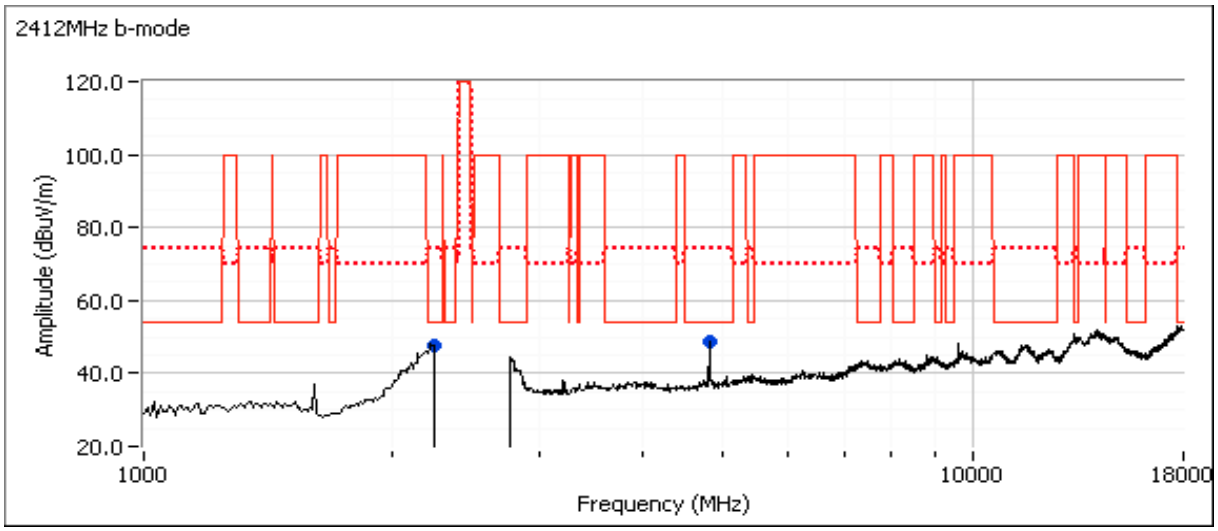
Date of Test: 8/8/2012
Test Engineer: Joseph Cadigal
Test Location: FT Chamber#4

Frequency	Level	Pol	15.209 / 15.247		Detector	Azimuth	Height	Comments
MHz	dBµV/m	v/h	Limit	Margin	Pk/QP/Avg	degrees	meters	
4824.050	46.9	V	54.0	-7.1	AVG	187	1.9	Flat, setting 19
4824.040	50.8	V	74.0	-23.2	PK	187	1.9	Flat, setting 19
2241.410	45.6	H	54.0	-8.4	AVG	46	1.6	Flat, setting 19
2242.100	57.3	H	74.0	-16.7	PK	46	1.6	Flat, setting 19

Note 1:	For emissions in restricted bands, the limit of 15.209 was used. For all other emissions, the limit was set 20dB below the level of the fundamental and measured in 100kHz.
Note 2:	Signal is not in a restricted band but the more stringent restricted band limit was used.
Note 3:	No signals found between 18-26GHz



Client:	Vocera Communication	Job Number:	J88167
Model:	B3000AR	T-Log Number:	T88664
		Account Manager:	Christine Krebill
Contact:	Rob Holt		
Standard:	FCC 15.247	Class:	N/A

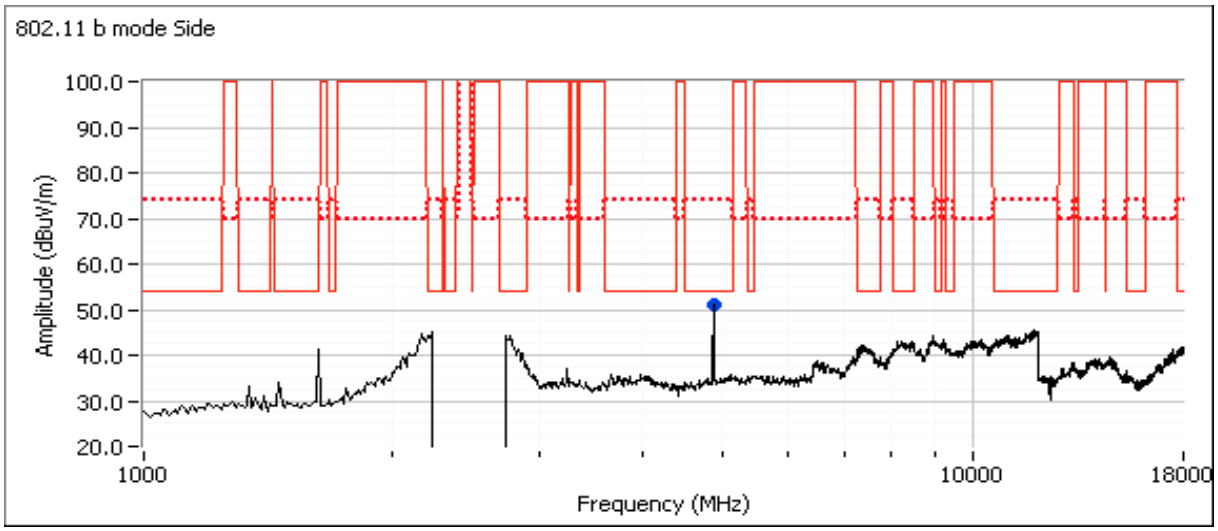


Run #1b: Ch 6 - 2437 MHz
Date of Test: 8/31/2012
Test Engineer: Jack Liu
Test Location: FT7

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	49.3	H	54.0	-4.7	AVG	191	1.0	Side
4874.100	51.0	H	74.0	-23.0	PK	191	1.0	Side
4874.000	45.3	H	54.0	-8.7	AVG	4	1.2	Flat
4873.970	48.1	H	74.0	-25.9	PK	4	1.2	Flat
4873.980	42.7	V	54.0	-11.3	AVG	0	1.2	Flat
4874.000	46.1	V	74.0	-27.9	PK	0	1.2	Flat
4874.020	48.8	H	54.0	-5.2	AVG	187	1.1	Upright
4873.980	50.6	H	74.0	-23.4	PK	187	1.1	Upright
4873.920	48.7	V	54.0	-5.3	AVG	336	1.2	Upright
4874.070	51.5	V	74.0	-22.5	PK	336	1.2	Upright

Note 1:	For emissions in restricted bands, the limit of 15.209 was used. For all other emissions, the limit was set 20dB below the level of the fundamental and measured in 100kHz.
Note 2:	Signal is not in a restricted band but the more stringent restricted band limit was used.
Note 3:	No signals found between 18-26GHz

Client:	Vocera Communication	Job Number:	J88167
Model:	B3000AR	T-Log Number:	T88664
		Account Manager:	Christine Krebill
Contact:	Rob Holt		
Standard:	FCC 15.247	Class:	N/A



Client:	Vocera Communication	Job Number:	J88167
Model:	B3000AR	T-Log Number:	T88664
		Account Manager:	Christine Krebill
Contact:	Rob Holt		
Standard:	FCC 15.247	Class:	N/A

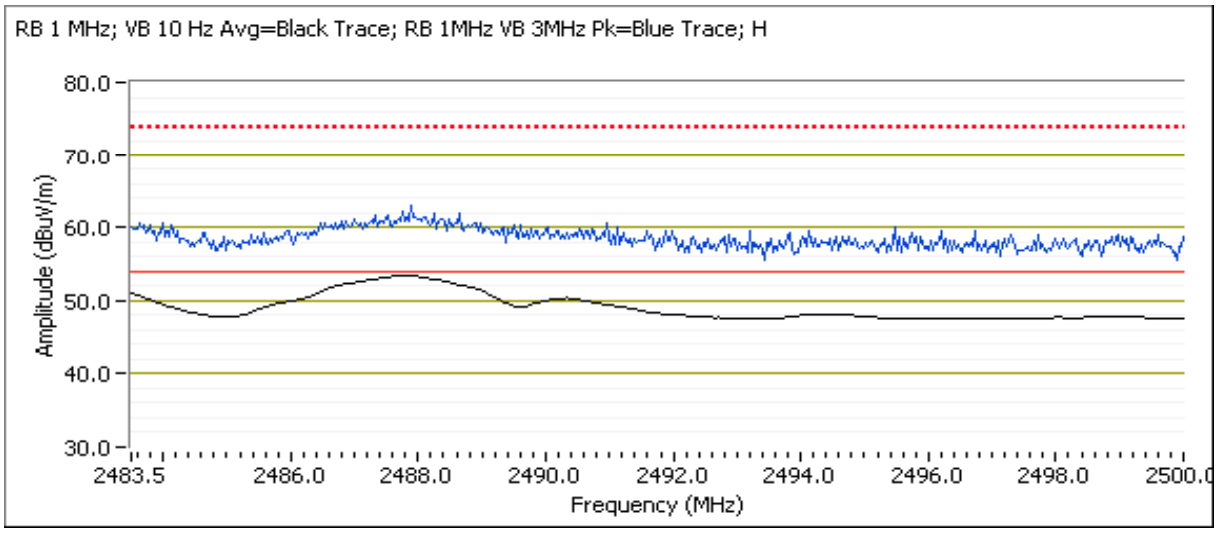
Run #1c: Ch 11 - 2462 MHz

Date of Test: 8/31/2012
Test Engineer: Jack Liu
Test Location: FT7

Run #1c: Ch 11 - 2462 MHz

Band Edge Signal Field Strength - Direct measurement of 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	
2487.800	53.5	H	54.0	-0.5	AVG	35	1.2	Side
2487.470	61.6	H	74.0	-12.4	PK	35	1.2	Side
2487.730	44.3	V	54.0	-9.7	AVG	169	1.3	Side
2487.860	54.8	V	74.0	-19.2	PK	169	1.3	Side



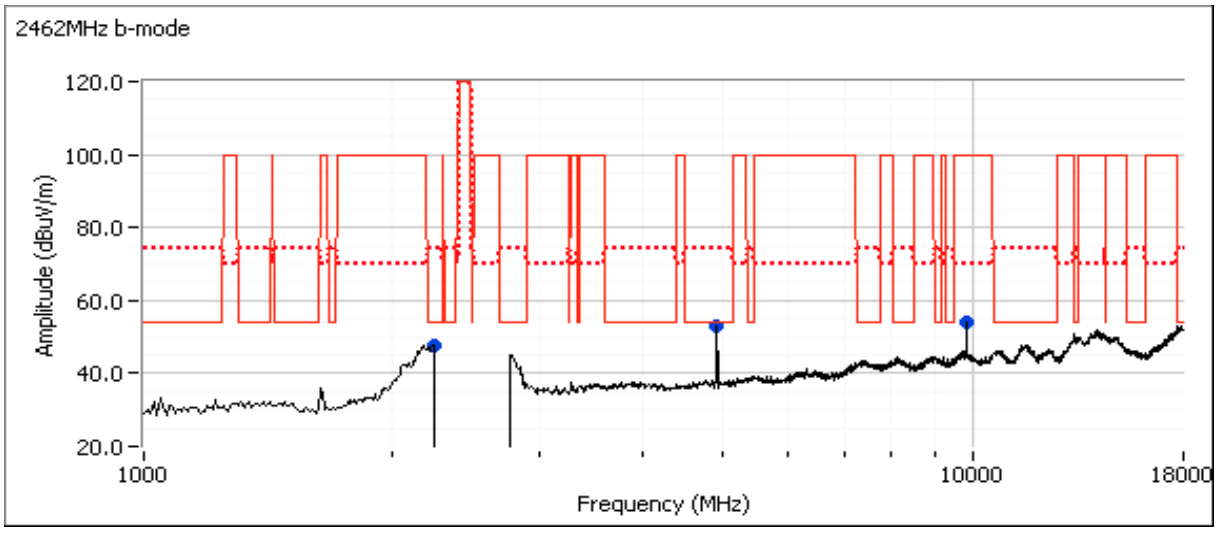
Client:	Vocera Communication	Job Number:	J88167
Model:	B3000AR	T-Log Number:	T88664
		Account Manager:	Christine Krebill
Contact:	Rob Holt		
Standard:	FCC 15.247	Class:	N/A

Other Spurious Emissions

Date of Test: 8/8/2012
Test Engineer: Joseph Cadigal
Test Location: FT Chamber#4

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	51.0	V	54.0	-3.0	AVG	202	1.0	Flat, setting 19
4923.990	53.6	V	74.0	-20.4	PK	202	1.0	Flat, setting 19
2237.430	45.6	H	54.0	-8.4	AVG	53	1.6	Flat, setting 19
2239.950	57.0	H	74.0	-17.0	PK	53	1.6	Flat, setting 19
9847.890	45.0	V	100.0	-55.0	AVG	164	1.0	Flat, setting 19
9848.220	53.5	V	70.0	-16.5	PK	164	1.0	Flat, setting 19

Note 1:	For emissions in restricted bands, the limit of 15.209 was used. For all other emissions, the limit was set 20dB below the level of the fundamental and measured in 100kHz.
Note 2:	Signal is not in a restricted band but the more stringent restricted band limit was used.
Note 3:	No signals found between 18-26GHz



Client:	Vocera Communication	Job Number:	J88167
Model:	B3000AR	T-Log Number:	T88664
		Account Manager:	Christine Krebill
Contact:	Rob Holt		
Standard:	FCC 15.247	Class:	N/A

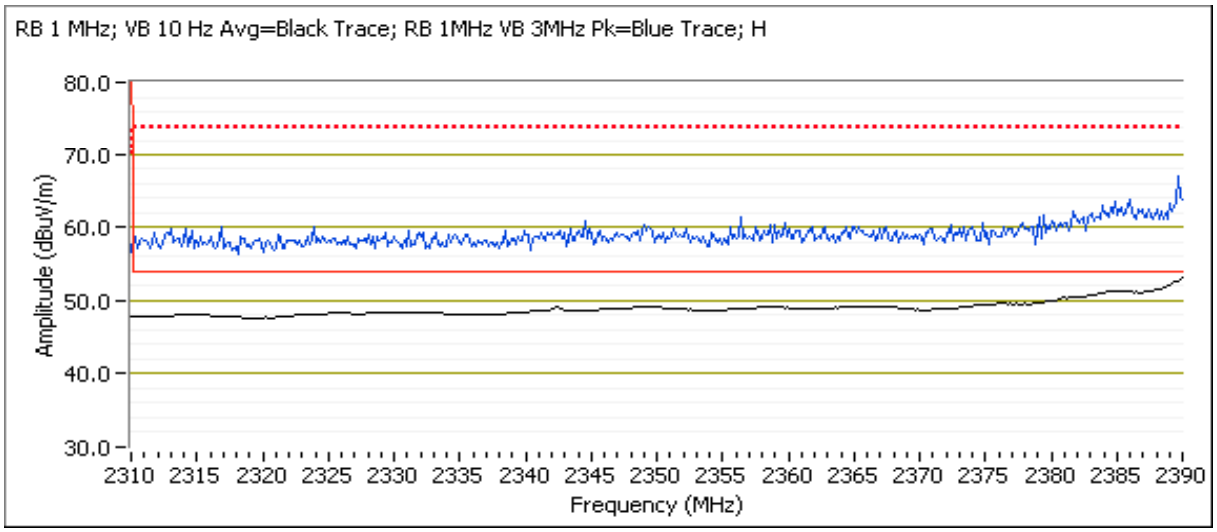
Run #2: Radiated Spurious Emissions, 30 - 25000 MHz. Operating Mode: 802.11g

Date of Test: 8/31/2012
Test Engineer: Jack Liu
Test Location: FT7

Run #2a: Ch 1 - 2412 MHz

Band Edge Signal Field Strength - Direct measurement of 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	53.2	H	54.0	-0.8	AVG	31	1.0	Side Power setting 14
2388.800	63.0	H	74.0	-11.0	PK	31	1.0	Side Power setting 14
2390.000	45.3	V	54.0	-8.7	AVG	356	1.3	Side Power setting 14
2388.520	56.2	V	74.0	-17.8	PK	356	1.3	Side Power setting 14



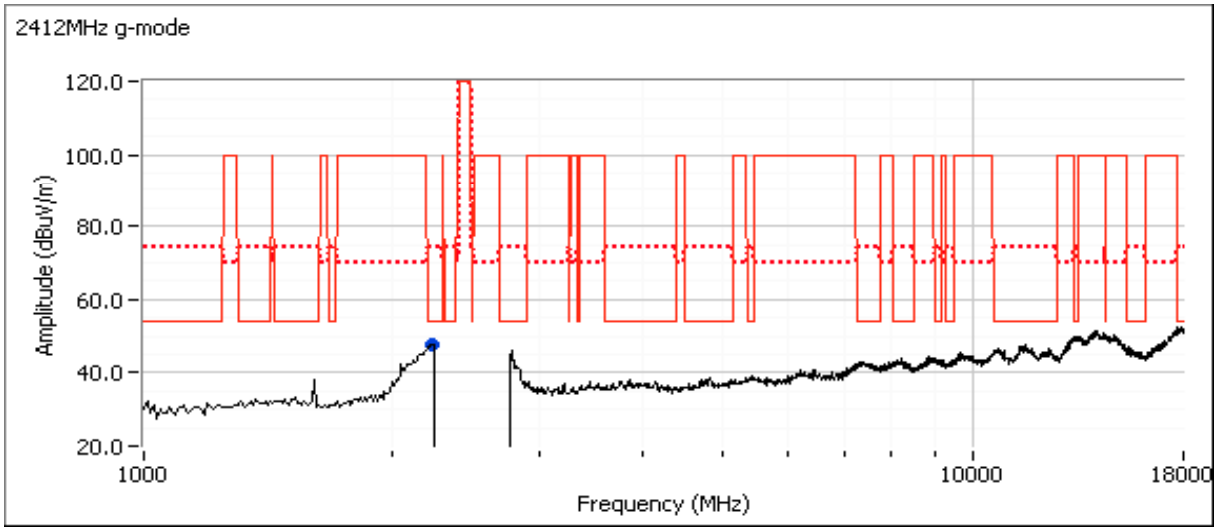
Client:	Vocera Communication	Job Number:	J88167
Model:	B3000AR	T-Log Number:	T88664
		Account Manager:	Christine Krebill
Contact:	Rob Holt		
Standard:	FCC 15.247	Class:	N/A

Other Spurious Emissions

Date of Test: 8/8/2012
Test Engineer: Joseph Cadigal
Test Location: FT Chamber#4

Frequency	Level	Pol	15.209 / 15.247		Detector	Azimuth	Height	Comments
MHz	dBµV/m	v/h	Limit	Margin	Pk/QP/Avg	degrees	meters	
2235.140	44.6	H	54.0	-9.4	AVG	55	1.6	Flat, setting 15
2237.530	56.0	H	74.0	-18.0	PK	55	1.6	Flat, setting 15

Note 1:	For emissions in restricted bands, the limit of 15.209 was used. For all other emissions, the limit was set 20dB below the level of the fundamental and measured in 100kHz.
Note 2:	Signal is not in a restricted band but the more stringent restricted band limit was used.

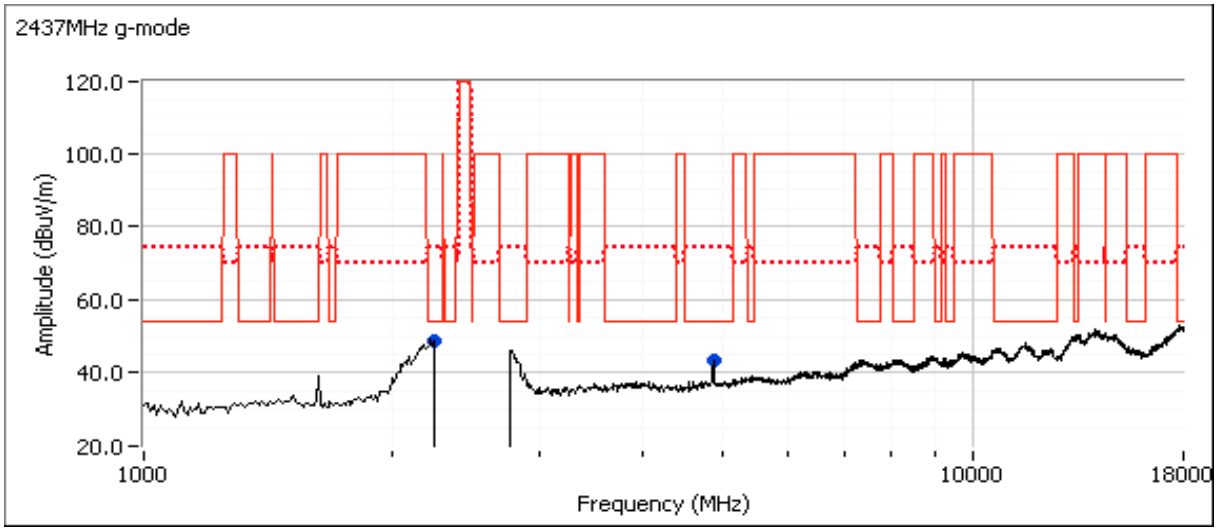


Client:	Vocera Communication	Job Number:	J88167
Model:	B3000AR	T-Log Number:	T88664
		Account Manager:	Christine Krebill
Contact:	Rob Holt		
Standard:	FCC 15.247	Class:	N/A

Run #2b: Ch 6 - 2437 MHz
Date of Test: 8/8/2012
Test Engineer: Joseph Cadigal
Test Location: FT Chamber#4

Frequency	Level	Pol	15.209 / 15.247		Detector	Azimuth	Height	Comments
MHz	dBµV/m	v/h	Limit	Margin	Pk/QP/Avg	degrees	meters	
2238.580	45.6	H	54.0	-8.4	AVG	45	1.6	Flat, setting 16
2239.650	56.9	H	74.0	-17.1	PK	45	1.6	Flat, setting 16
4875.700	41.1	V	54.0	-12.9	AVG	205	1.3	Flat, setting 16
4876.330	55.0	V	74.0	-19.0	PK	205	1.3	Flat, setting 16

Note 1:	For emissions in restricted bands, the limit of 15.209 was used. For all other emissions, the limit was set 20dB below the level of the fundamental and measured in 100kHz.
Note 2:	Signal is not in a restricted band but the more stringent restricted band limit was used.



Client:	Vocera Communication	Job Number:	J88167
Model:	B3000AR	T-Log Number:	T88664
		Account Manager:	Christine Krebill
Contact:	Rob Holt		
Standard:	FCC 15.247	Class:	N/A

Run #2c: Ch 11 - 2462 MHz

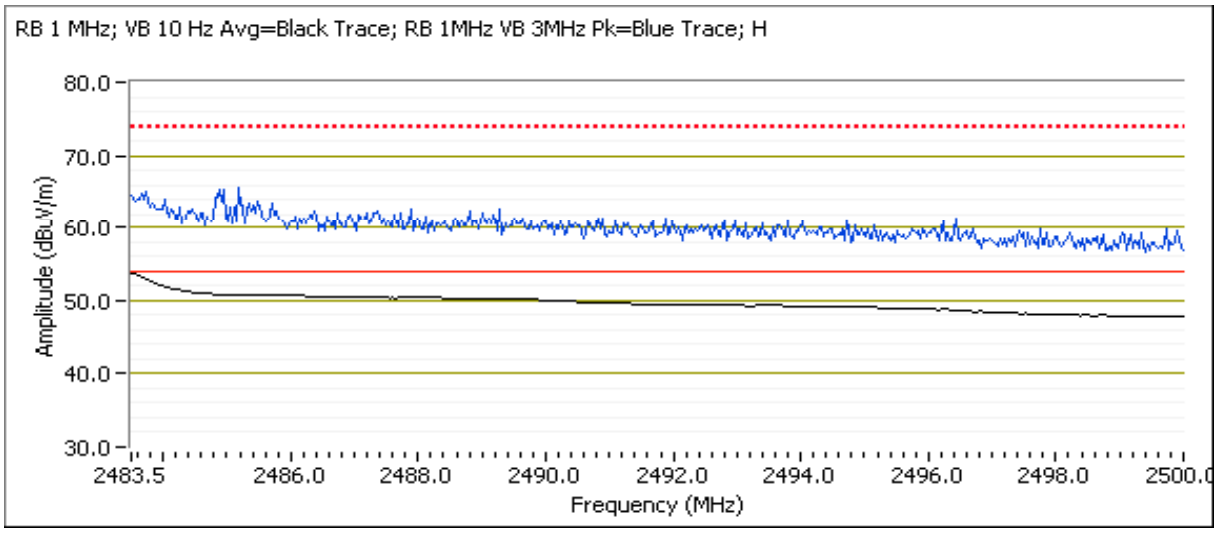
Date of Test: 8/31/2012

Test Engineer: Jack Liu

Test Location: FT7

Band Edge Signal Field Strength - Direct measurement of 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	53.8	H	54.0	-0.2	AVG	33	1.2	Side Power setting 15
2483.670	64.7	H	74.0	-9.3	PK	33	1.2	Side Power setting 15
2483.500	44.6	V	54.0	-9.4	AVG	170	1.3	Side Power setting 15
2484.530	55.6	V	74.0	-18.4	PK	170	1.3	Side Power setting 15



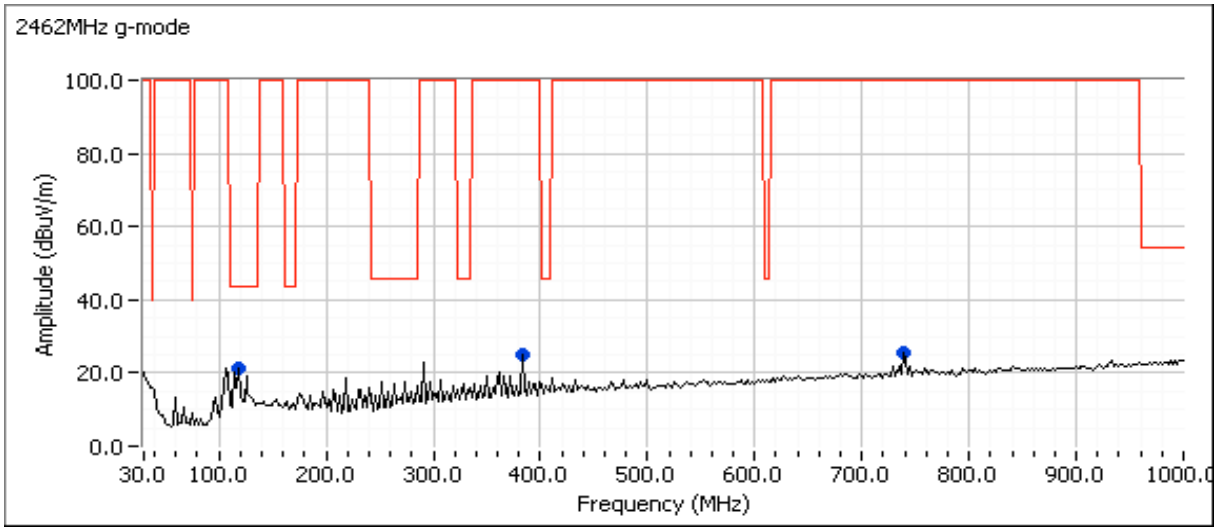
Client:	Vocera Communication	Job Number:	J88167
Model:	B3000AR	T-Log Number:	T88664
		Account Manager:	Christine Krebill
Contact:	Rob Holt		
Standard:	FCC 15.247	Class:	N/A

Other Spurious Emissions

Date of Test: 8/8/2012
Test Engineer: Joseph Cadigal
Test Location: FT Chamber#4

Frequency	Level	Pol	15.209 / 15.247		Detector	Azimuth	Height	Comments
MHz	dBµV/m	v/h	Limit	Margin	Pk/QP/Avg	degrees	meters	
2241.580	45.4	H	54.0	-8.6	AVG	51	1.6	Flat, setting 16
117.475	21.2	V	43.5	-22.3	Peak	333	1.5	Flat, setting 16
383.788	24.8	V	46.0	-21.2	Peak	91	1.5	Flat, setting 16
739.519	25.3	H	46.0	-20.7	Peak	104	2.0	Flat, setting 16
2244.540	57.5	H	74.0	-16.5	PK	51	1.6	Flat, setting 16
4925.840	35.1	V	54.0	-18.9	AVG	191	1.0	Flat, setting 16
4926.170	48.6	V	74.0	-25.4	PK	191	1.0	Flat, setting 16

Note 1:	For emissions in restricted bands, the limit of 15.209 was used. For all other emissions, the limit was set 20dB below the level of the fundamental and measured in 100kHz.
Note 2:	Signal is not in a restricted band but the more stringent restricted band limit was used.



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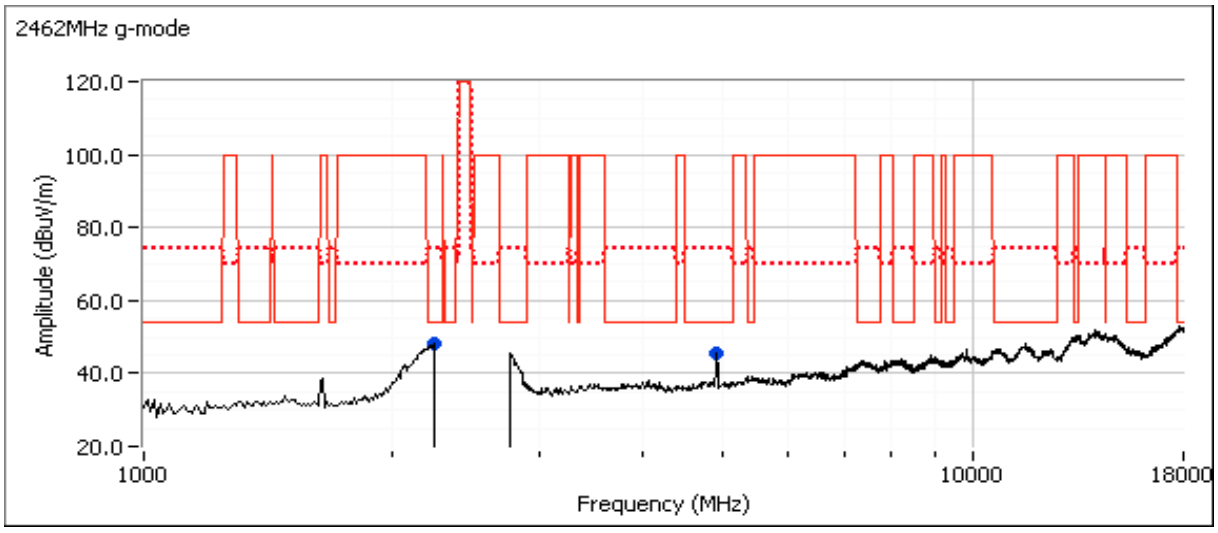
Model:	B3000AR	T-Log Number:	T88664
		Account Manager:	Christine Krebill
Contact:	Rob Holt		
Standard:	FCC 15.247	Class:	N/A



Client:	Vocera Communication	Job Number:	J88167
Model:	B3000AR	T-Log Number:	T88664
		Account Manager:	Christine Krebill
Contact:	Rob Holt		
Standard:	FCC 15.247	Class:	N/A

RSS 210 and FCC 15.247 (DTS) Antenna Port Measurements

Power, PSD, Bandwidth and Spurious Emissions

Test Specific Details

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

Date of Test: 8/9/2012 and 9/6/12
Test Engineer: Rafael Varelas and Jack Liu
Test Location: FT Chamber #7

Config. Used: 1
Config Change: None
EUT Voltage: Battery Powered

General Test Configuration

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

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

Ambient Conditions:

Temperature: 20.9 °C
Rel. Humidity: 36 %

Summary of Results

Run #	Test Performed	Limit	Pass / Fail	Result / Margin
1	Output Power	15.247(b)	Pass	b: 19.6 dBm g: 16.5 dBm
2	Power spectral Density (PSD)	15.247(d)	Pass	b: -5.0 dBm/3kHz g: -4.2 dBm/3kHz
3	Minimum 6dB Bandwidth	15.247(a)	Pass	b: 10.0 MHz g: 16.7 MHz
3	99% Bandwidth	RSS GEN	-	b: 14.2 MHz g: 17.6 MHz
4	Spurious emissions	15.247(b)	Pass	All emissions below the -30dBc limit

Modifications Made During Testing

No modifications were made to the EUT during testing

Deviations From The Standard

No deviations were made from the requirements of the standard.

Client:	Vocera Communication	Job Number:	J88167
Model:	B3000AR	T-Log Number:	T88664
		Account Manager:	Christine Krebill
Contact:	Rob Holt		
Standard:	FCC 15.247	Class:	N/A

Sample:

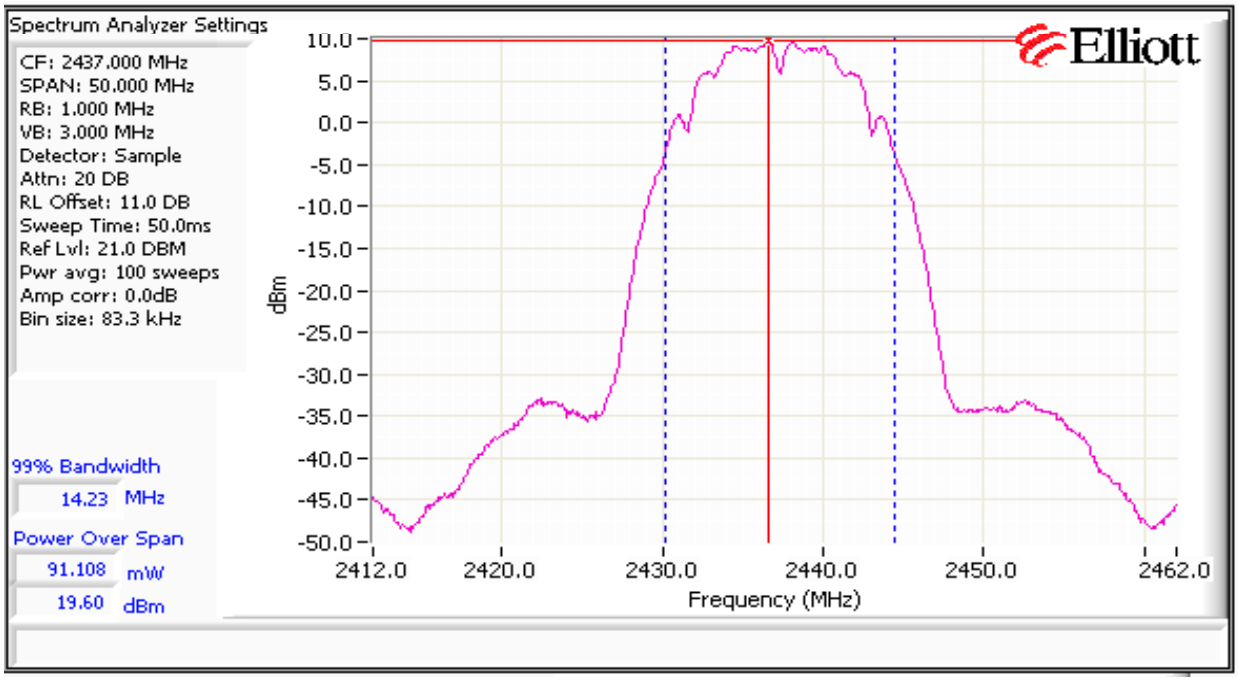
S/N: E4FF12122329 (NTS 2012-2853)

Client:	Vocera Communication	Job Number:	J88167
Model:	B3000AR	T-Log Number:	T88664
		Account Manager:	Christine Krebill
Contact:	Rob Holt		
Standard:	FCC 15.247	Class:	N/A

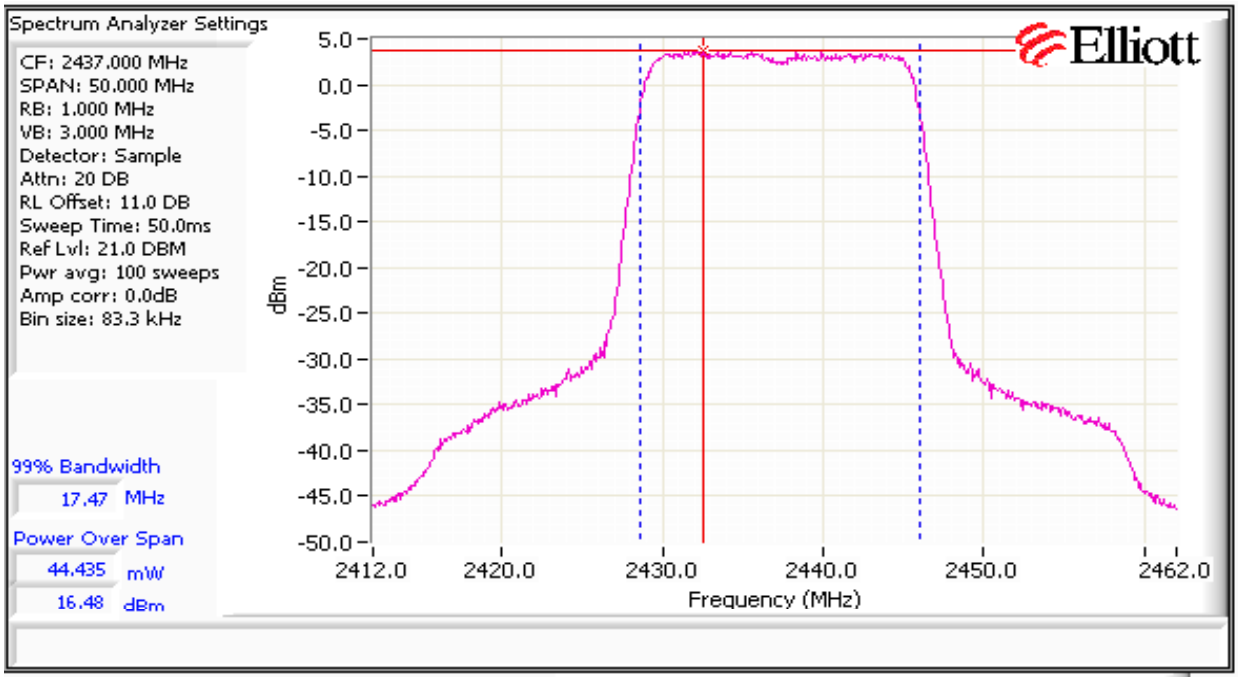
Run #1: Output Power

Power Setting[2]	Frequency (MHz)	Output Power (dBm) [1]	Output Power mW	Antenna Gain (dBi)	Result	EIRP [Note 2] dBm	EIRP W	Output Power (dBm) [3]	Output Power mW
802.11b									
18	2412	18.6	72.4	3.0	Pass	21.6	0.145	18.2	66.1
19	2437	19.6	91.2	3.0	Pass	22.6	0.182	18.6	72.4
19	2462	19.6	91.2	3.0	Pass	22.6	0.182	18.5	70.8
802.11g					Pass	0.0	0.001		
14	2412	13.9	24.7	3.0	Pass	16.9	0.049	15.0	31.6
16	2437	16.5	44.7	3.0	Pass	19.5	0.089	15.9	38.9
15	2462	15.4	34.7	3.0	Pass	18.4	0.069	15.8	38.0

Note 1:	Output power measured using a spectrum analyzer (see plots below) with RBW=1MHz, VB=3 MHz, sample detector, power averaging on (transmitted signal was continuous) and power integration over 50 MHz (option #2, method 1 in KDB 558074, equivalent to method 1 of DA-02-2138A1 for U-NII devices). Spurious limit becomes -30dBc.
Note 2:	Power setting - the software power setting used during testing, included for reference only.
Note 3:	Power measured using average power meter and is included for reference only.



Client:	Vocera Communication	Job Number:	J88167
Model:	B3000AR	T-Log Number:	T88664
		Account Manager:	Christine Krebill
Contact:	Rob Holt		
Standard:	FCC 15.247	Class:	N/A



Run #2: Power spectral Density

Power Setting	Frequency (MHz)	PSD (dBm/3kHz) Note 1	Limit dBm/3kHz	Result
802.11b				
19	2411.995	-5.3	8.0	Pass
19	2436.995	-5.0	8.0	Pass
19	2461.9955	-5.0	8.0	Pass
802.11g				
15	2411.9945	-4.3	8.0	Pass
16	2436.994	-4.2	8.0	Pass
16	2461.9945	-5.7	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 RB=3kHz using multiple sweeps at a faster rate over the 6dB bandwidth of the signal.

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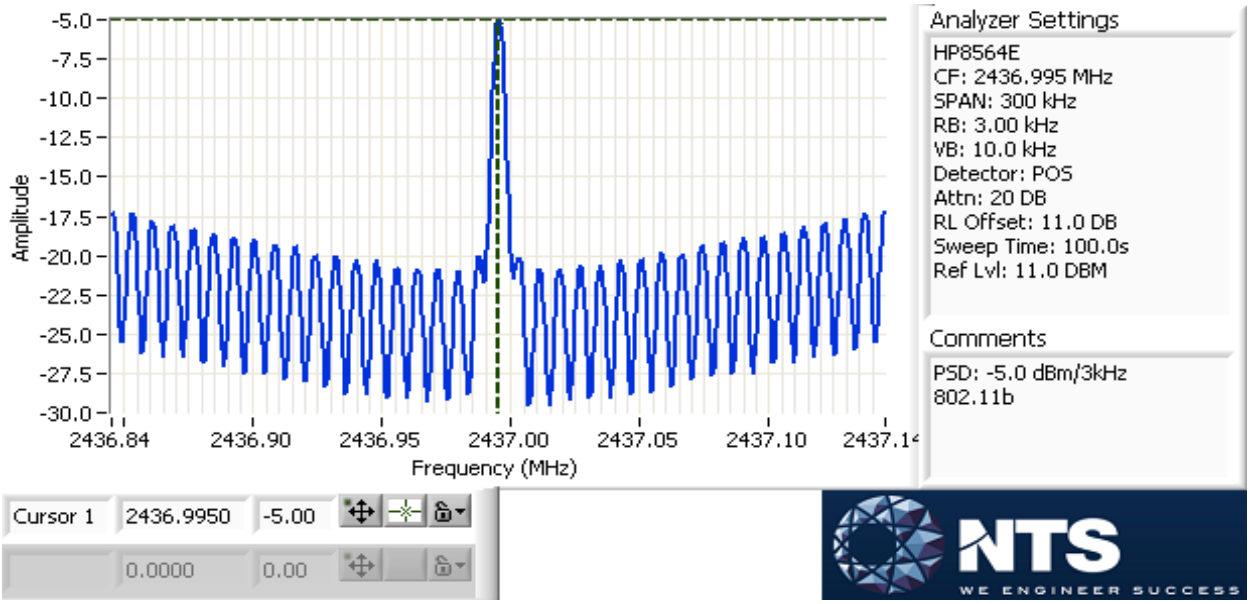
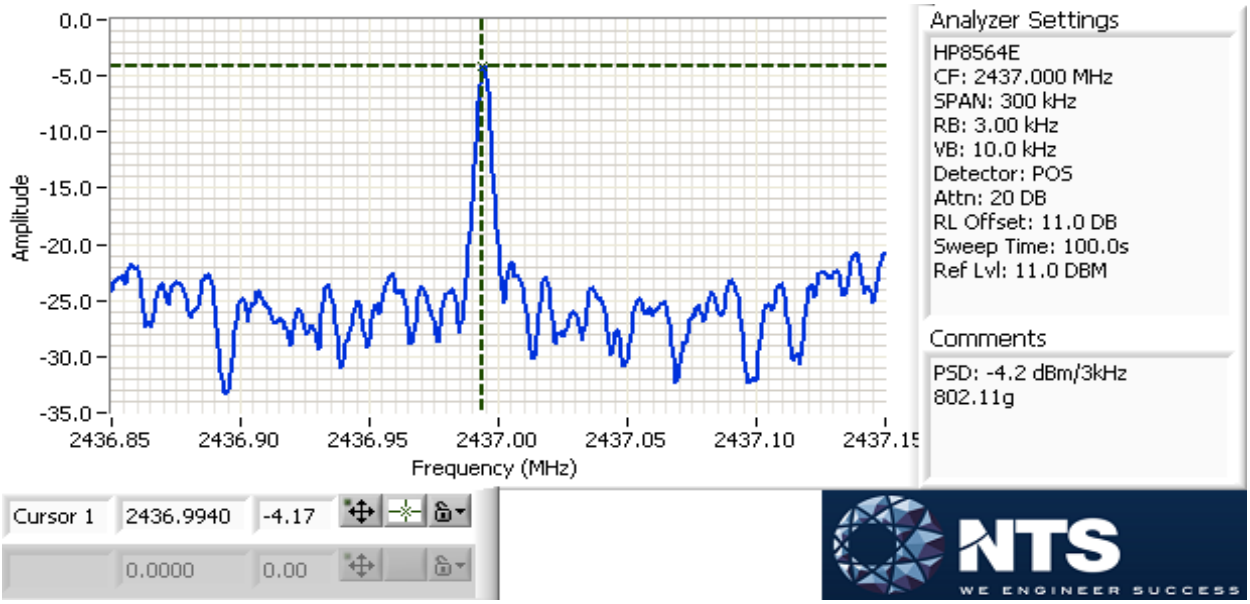
Contact:	Rob Holt		
Standard:	FCC 15.247	Class:	N/A



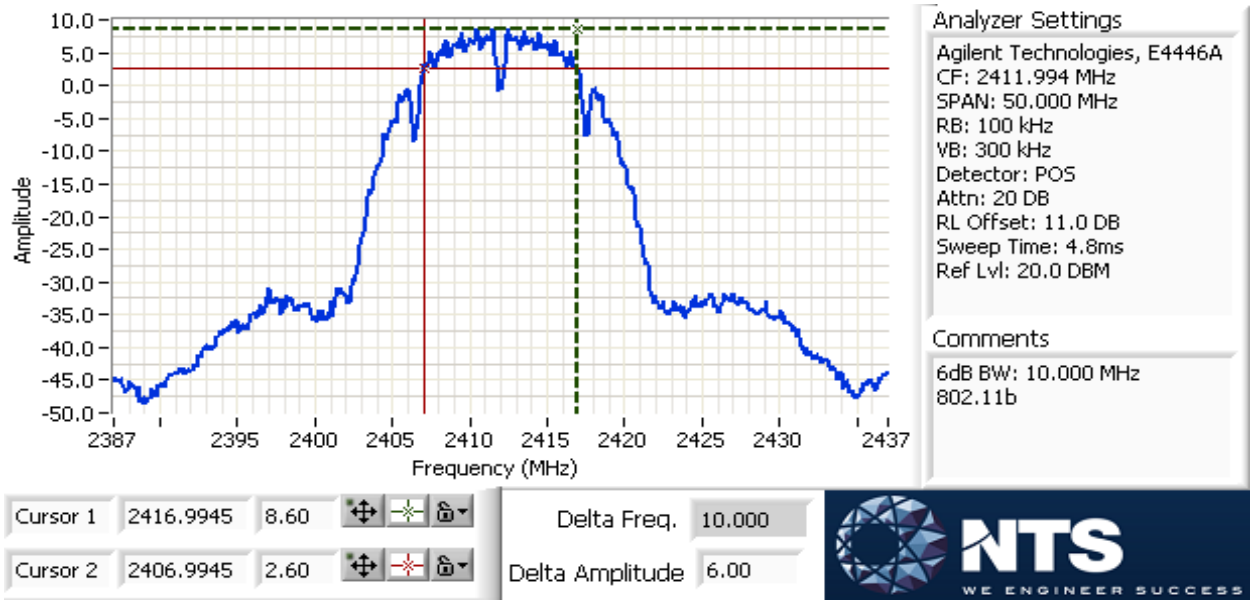


Client:	Vocera Communication	Job Number:	J88167
Model:	B3000AR	T-Log Number:	T88664
		Account Manager:	Christine Krebill
Contact:	Rob Holt		
Standard:	FCC 15.247	Class:	N/A

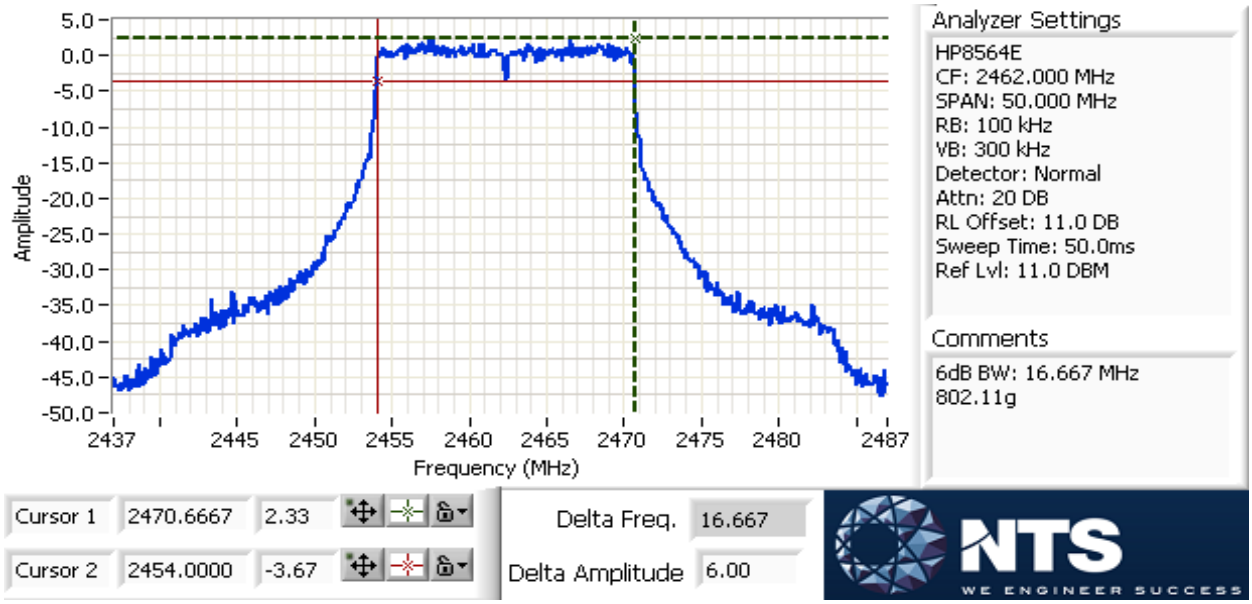
Run #3: Signal Bandwidth

Power Setting	Frequency (MHz)	6dB BW		99% BW	
		RBW	6dB BW	RBW	99% BW
802.11b					
19	2412	100kHz	10.0	1MHz	13.9
19	2437	100kHz	10.3	1MHz	14.2
19	2462	100kHz	10.3	1MHz	14.1
802.11g					
15	2412	100kHz	16.8	1MHz	17.6
16	2437	100kHz	16.8	1MHz	17.5
16	2462	100kHz	16.7	1MHz	17.5

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



Client:	Vocera Communication	Job Number:	J88167
Model:	B3000AR	T-Log Number:	T88664
		Account Manager:	Christine Krebill
Contact:	Rob Holt		
Standard:	FCC 15.247	Class:	N/A



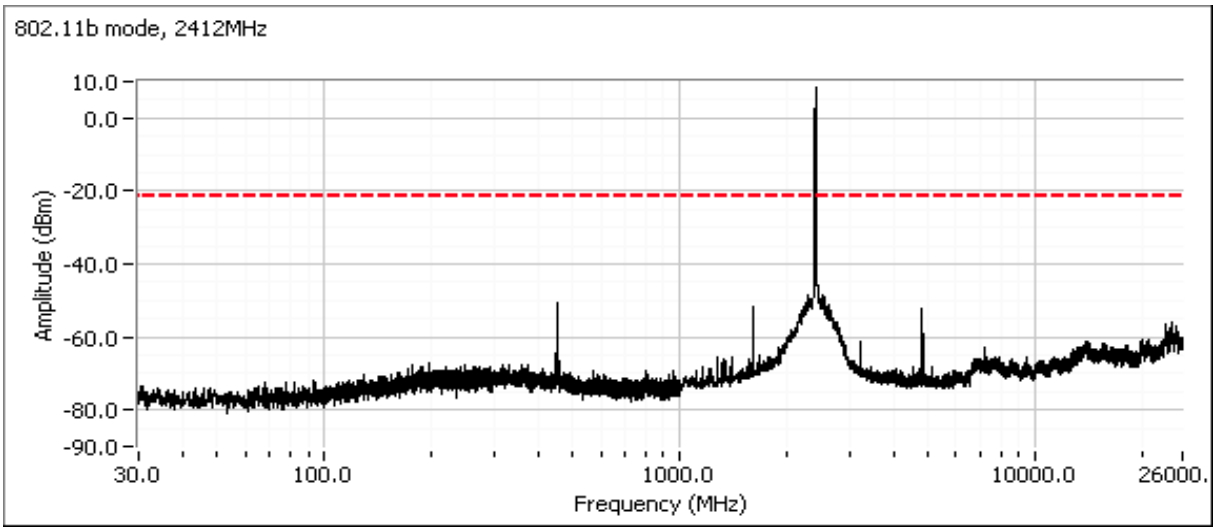
Run #4: Out of Band Spurious Emissions

Frequency (MHz)	Limit	Result
802.11b		
2412	-30dBc	Pass
2437	-30dBc	Pass
2462	-30dBc	Pass
802.11g		
2412	-30dBc	Pass
2437	-30dBc	Pass
2462	-30dBc	Pass

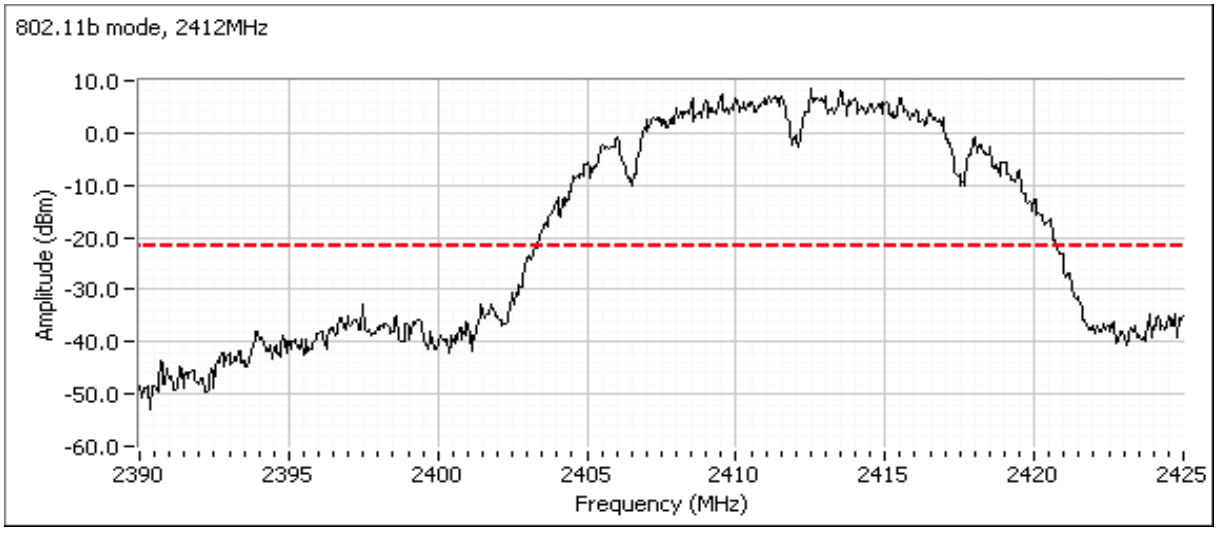
Client:	Vocera Communication	Job Number:	J88167
Model:	B3000AR	T-Log Number:	T88664
		Account Manager:	Christine Krebill
Contact:	Rob Holt		
Standard:	FCC 15.247	Class:	N/A

802.11b Mode

Plots for low channel, power setting(s) = 19

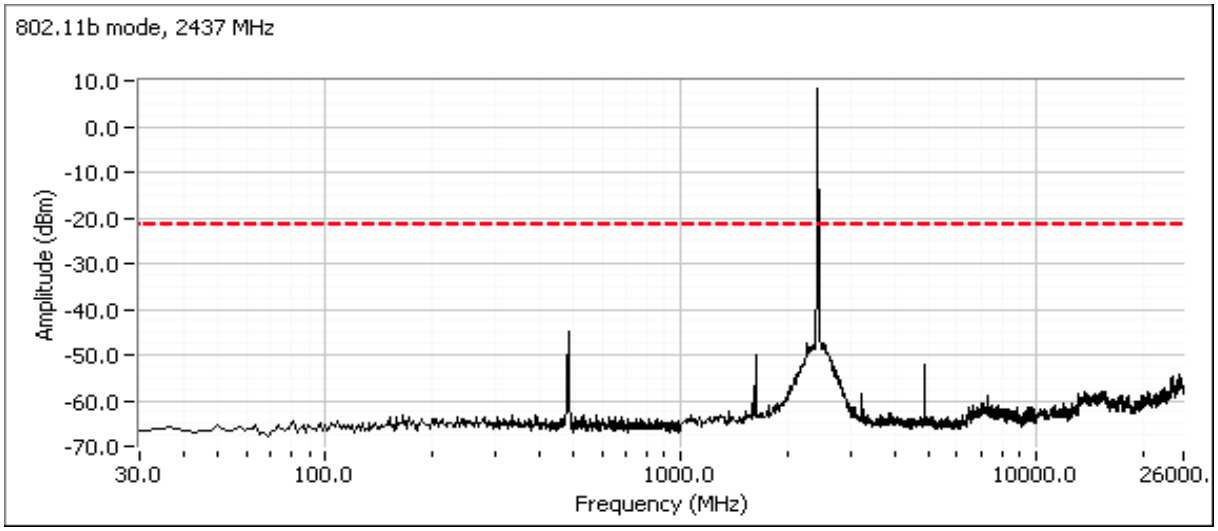


Additional plot showing compliance with -30dBc limit from 2390 MHz to 2400 MHz. Radiated measurements used to show compliance with the limits in the restricted band below 2390 MHz.

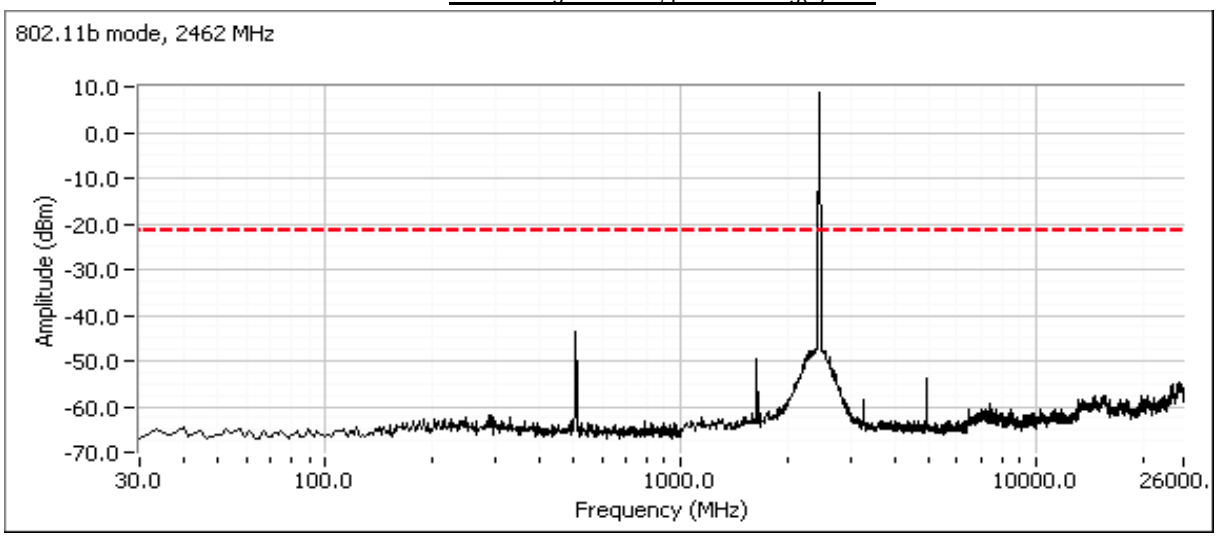


Client:	Vocera Communication	Job Number:	J88167
Model:	B3000AR	T-Log Number:	T88664
		Account Manager:	Christine Krebill
Contact:	Rob Holt		
Standard:	FCC 15.247	Class:	N/A

Plots for center channel, power setting(s) = 19



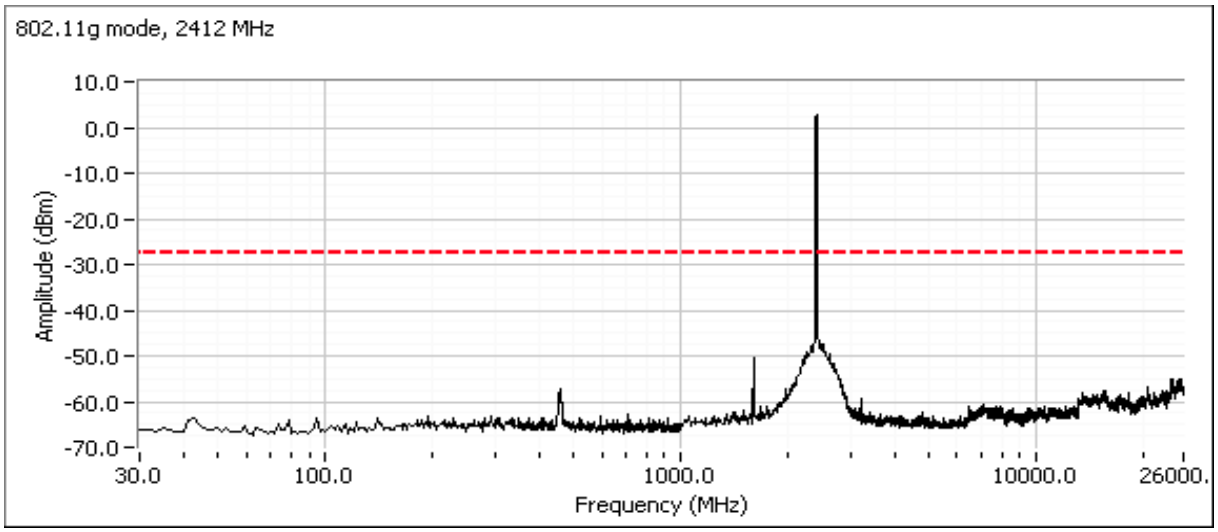
Plots for high channel, power setting(s) = 19



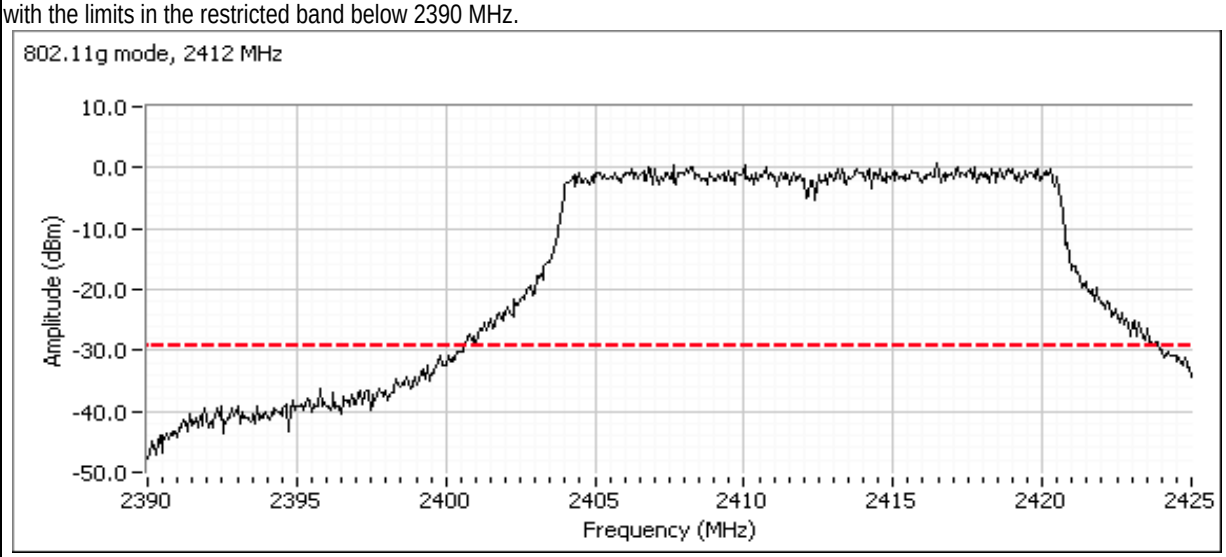
Client:	Vocera Communication	Job Number:	J88167
Model:	B3000AR	T-Log Number:	T88664
		Account Manager:	Christine Krebill
Contact:	Rob Holt		
Standard:	FCC 15.247	Class:	N/A

802.11g Mode

Plots for low channel, power setting(s) = 15

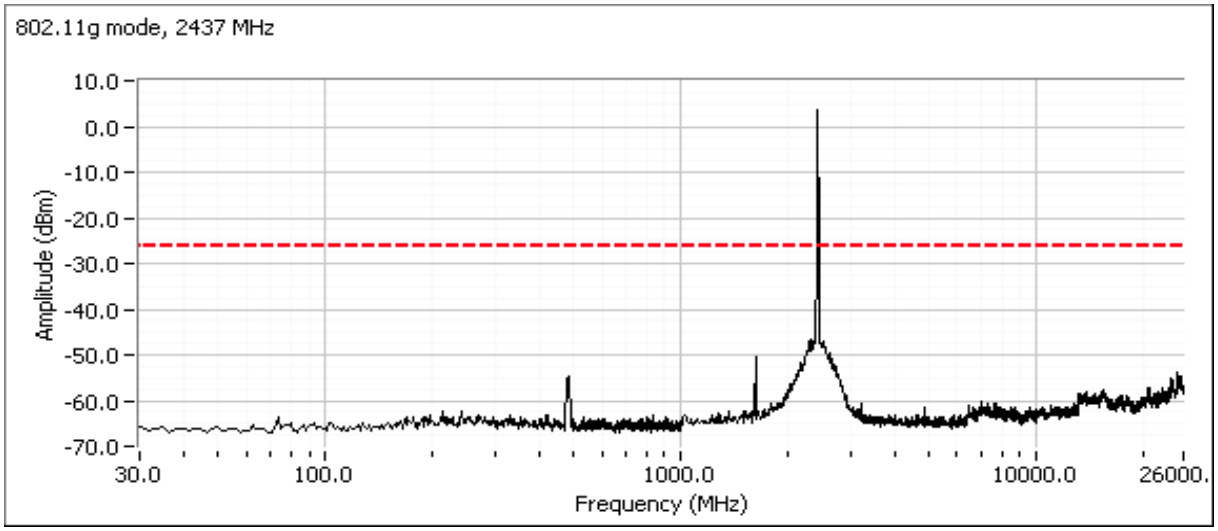


Additional plot showing compliance with -30dBc limit from 2390 MHz to 2400 MHz. Radiated measurements used to show compliance with the limits in the restricted band below 2390 MHz.

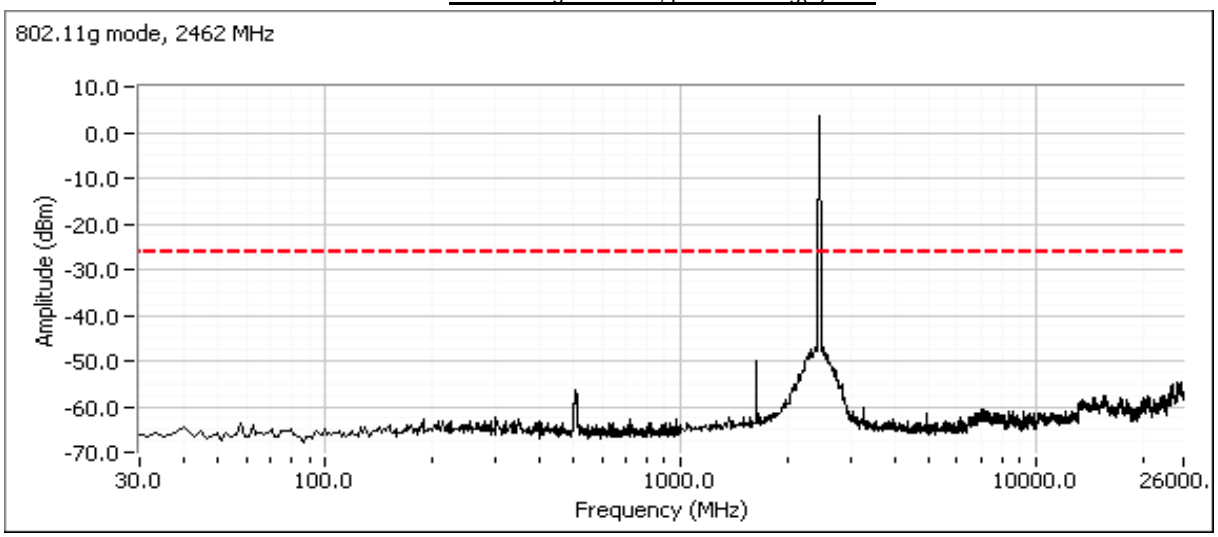


Client:	Vocera Communication	Job Number:	J88167
Model:	B3000AR	T-Log Number:	T88664
		Account Manager:	Christine Krebill
Contact:	Rob Holt		
Standard:	FCC 15.247	Class:	N/A

Plots for center channel, power setting(s) = 16



Plots for high channel, power setting(s) = 16



End of Report

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