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EMC Test Report

Application for Grant of Equipment Authorization

FCC Part 15 Subpart C

Model: HR44

FCC ID:	PGRHR44
APPLICANT:	Pace Americas 310 Providence Mine Road, Suite 200 Nevada City, CA 95959
TEST SITE(S):	NTS Silicon Valley 41039 Boyce Road. Fremont, CA. 94538-2435
IC SITE REGISTRATION #:	2845B-3; 2845B-4, 2845B-5, 2845B-7
REPORT DATE:	October 30, 2012
FINAL TEST DATES:	September 11, 12, 14, 18, 19, 20, 24 and 26, 2012
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A2LA ACCREDITED
Testing Cert #0214.26

REVISION HISTORY

Rev#	Date	Comments	Modified By
-	10-30-2012	First release	

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SCOPE

An electromagnetic emissions test has been performed on the Pace Americas model HR44, pursuant to the following rules:

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 Pace Americas model HR44 complied with the requirements of the following regulations:

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 Pace Americas model HR44 and therefore apply only to the tested sample. The sample was selected and prepared by Mark Rieger of Pace Americas.

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) (802.11bgn operation)

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	11b: 8.1MHz 11g: 16.7MHz n20: 17.8MHz n40: 36.1MHz	>500kHz	Complies
15.247 (b) (3)	RSS 210 A8.2 (4)	Output Power (multipoint systems)	11b: 19.7dBm (92mW) 11g: 19.2dBm (82mW) n20:21.7dBm (147mW) n40:19.8dBm (96mW) EIRP = 28.0dBm (0.627 W) Note 1	1Watt, EIRP limited to 4 Watts.	Complies
15.247(d)	RSS 210 A8.2 (2)	Power Spectral Density WiFi – Single Chain	11b: -0.8dBm/3kHz 11g: -6.2dBm/3kHz n20: -4.4dBm/3kHz n40: -8.5dBm/3kHz	8dBm/3kHz	Complies
15.247(c)	RSS 210 A8.5	Antenna Port Spurious Emissions 30MHz – 25 GHz	All emissions > -30dBc	< -30dBc Note 2	Complies
15.247(c) / 15.209	RSS 210 A8.5	Radiated Spurious Emissions 30MHz – 25 GHz	54.0 dBµV/m @ 2390.0 MHz (0.0 dB)	15.207 in restricted bands, all others <-30dBc Note 2	Complies

Note 1: EIRP calculated using antenna gain of 3.3 dBi for single chain and effective gain of 6.3dBi for multichain operation.
Note 2: Limit of -30dBc used because the power was measured using the UNII test procedure (maximum power averaged over a transmission burst).

DIGITAL TRANSMISSION SYSTEMS (5725 –5850 MHz) (802.11an operation)

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 techniques	System must utilize a digital transmission technology	Complies
15.247 (a) (2)	RSS 210 A8.2 (1)	6dB Bandwidth	11a: 16.4MHz n20: 17.6MHz n40: 35.3MHz	>500kHz	Complies
15.247 (b)	RSS 210 A8.2 (4)	Output Power (multipoint systems) Single Chain	11a: 19.2dBm (79mW) n20:22.0dBm (159mW) n40:22.1dBm (163mW) EIRP = 29.2 dBm (0.840 W) Note 1	1Watt, EIRP limited to 4 Watts.	Complies
15.247(d)	RSS 210 A8.2 (2)	Power Spectral Density Single Chain	11a: -4.9dBm/3kHz n20: -2.0dBm/3kHz n40: -4.6dBm/3kHz	Maximum permitted is 8dBm/3kHz	Complies
15.247(c)	RSS 210 A8.5	Antenna Port Spurious Emissions – 30MHz – 40 GHz	All spurious emissions < -20dBc	< -30dBc Note 2	Complies
15.247(c) / 15.209	RSS 210 A8.5 Table 2, 3	Radiated Spurious Emissions 30MHz – 40 GHz	48.5 dBµV/m @ 9002.5 MHz (-5.5 dB)	15.207 in restricted bands, all others <-30dBc Note 2	Complies

Note 1: EIRP calculated using antenna gain of 4.1 dBi for single chain and effective gain of 7.1dBi for multichain operation.
Note 2: Limit of -30dBc used because the power was measured using the UNII test procedure (maximum power averaged over a transmission burst).

DIGITAL TRANSMISSION SYSTEMS (2400 – 2483.5MHz) (IEEE 802.15.4 Operation)

FCC Rule Part	RSS Rule Part	Description	Measured Value / Comments	Limit / Requirement	Result
15.247(a)	RSS 210 A8.2	Digital Modulation	Systems uses DSSS techniques	System must utilize a digital transmission technology	Complies
15.247 (a) (2)	RSS 210 A8.2 (1)	6dB Bandwidth	1.53 MHz	>500kHz	Complies
15.247 (b) (3)	RSS 210 A8.2 (4)	Output Power (multipoint systems)	2.8 dBm (1.9mW) EIRP = 7.7 dBm (0.006 W) Note 1	1Watt, EIRP limited to 4 Watts.	Complies
15.247(d)	RSS 210 A8.2 (2)	Power Spectral Density	-11.1 dBm/3kHz	8dBm/3kHz	Complies
15.247(c)	RSS 210 A8.5	Antenna Port Spurious Emissions 30MHz – 25 GHz	All emissions > -20dBc	< -20dBc	Complies
15.247(c) / 15.209	RSS 210 A8.5	Radiated Spurious Emissions 30MHz – 25 GHz	48.9 dBµV/m @ 2220.1 MHz (-5.1 dB)	15.207 in restricted bands, all others < -20dBc	Complies
Note 1: EIRP calculated using antenna gain of 4.9 dBi for the highest EIRP system.					

GENERAL REQUIREMENTS APPLICABLE TO ALL BANDS

FCC Rule Part	RSS Rule part	Description	Measured Value / Comments	Limit / Requirement	Result (margin)
15.203	-	RF Connector	Antennas are internal to the device	Unique or integral antenna required	Complies
15.207	RSS GEN Table 2	AC Conducted Emissions	43.4 dBµV @ 0.397 MHz (-4.5 dB)	Refer to page 20	Complies
15.109	RSS GEN 7.2.3 Table 1	Receiver spurious emissions	N/A – Device tunes above 960MHz	Refer to page 21	N/A
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	Antennas are internal to the device	Statement for products with detachable antenna	N/A
-	RSP 100 RSS GEN 4.4.1	99% Bandwidth	2.4GHz: 11b: 10.6MHz 11g: 17.1MHz n20: 18.1MHz n40: 36.4MHz 5.8GHz: 11a: 16.9MHz n20: 18.1MHz n40: 36.3MHz IEEE 802.15.4: 2.32 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
Conducted Emissions (AC Power)	dBµV	0.15 to 30 MHz	± 2.4 dB

EQUIPMENT UNDER TEST (EUT) DETAILS

GENERAL

The Pace Americas model HR44 is a set-top-box that incorporates 802.11abgn 2x2 and 2.4GHz 802.15.4 radios. 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 electrical rating of the EUT is 120 Volts, 60Hz, 1.3 Amps.

The sample was received on August 27, 2012 and tested on September 11, 12, 14, 18, 19, 20, 24 and 26, 2012. The EUT consisted of the following component(s):

Company	Model	Description	Serial Number	FCC ID
Direct TV	HR44	Set-top-box	Prototype	PGRHR44
Chicony	EPS44R0-15	External power supply	-	N/A

ANTENNA SYSTEM

The wifi and 802.15.4 radios use separate antennas.
The peak gain for the WiFi antennas: 3.3 dBi (2.4GHz), 4.1 dBi (5GHz)
The peak gain for the 802.15.4 antennas: 4.9 dBi (2.4GHz)

ENCLOSURE

The EUT enclosure is primarily constructed of plastic. It measures approximately 34 cm wide by 25 cm deep by 4.5 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 emissions testing:

Company	Model	Description	Serial Number	FCC ID
Dell	Latitude D630	Laptop	-	-

EUT INTERFACE PORTS

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

Port	Connected To	Cable(s)		
		Description	Shielded or Unshielded	Length(m)
Serial	Laptop	Multiwire	Shielded	5
DC power	External power supply	2 wire	Unshielded	2
AC power (ext supply)	AC Mains	3 wire	Unshielded	2

EUT OPERATION

During emissions testing the EUT was transmitting in the mode, on the channel, & at the power called out in the individual tests. For 802.11b mode tests, 1Mb/s was used; 6Mb/s for 802.11g; MCS0 for n20 and n40. These represented the worse case modes.

Note – preliminary testing was performed with both the wifi and zigbee radios operating at the same time. There was no measureable difference with only one radio operating. All final testing was performed with only one radio operating, unless otherwise noted.

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 3	769238	2845B-3	41039 Boyce Road Fremont, CA 94538-2435
Chamber 4	211948	2845B-4	
Chamber 5	211948	2845B-5	
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.

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 16-1-1 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.

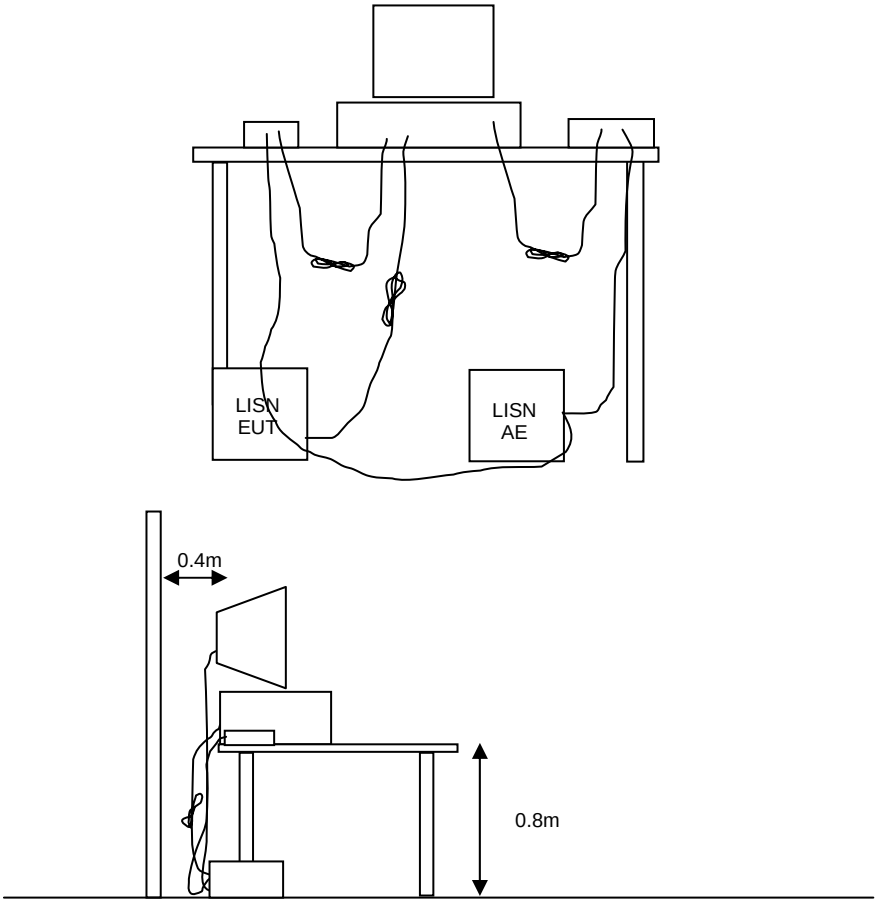


Figure 1 Typical Conducted Emissions Test Configuration

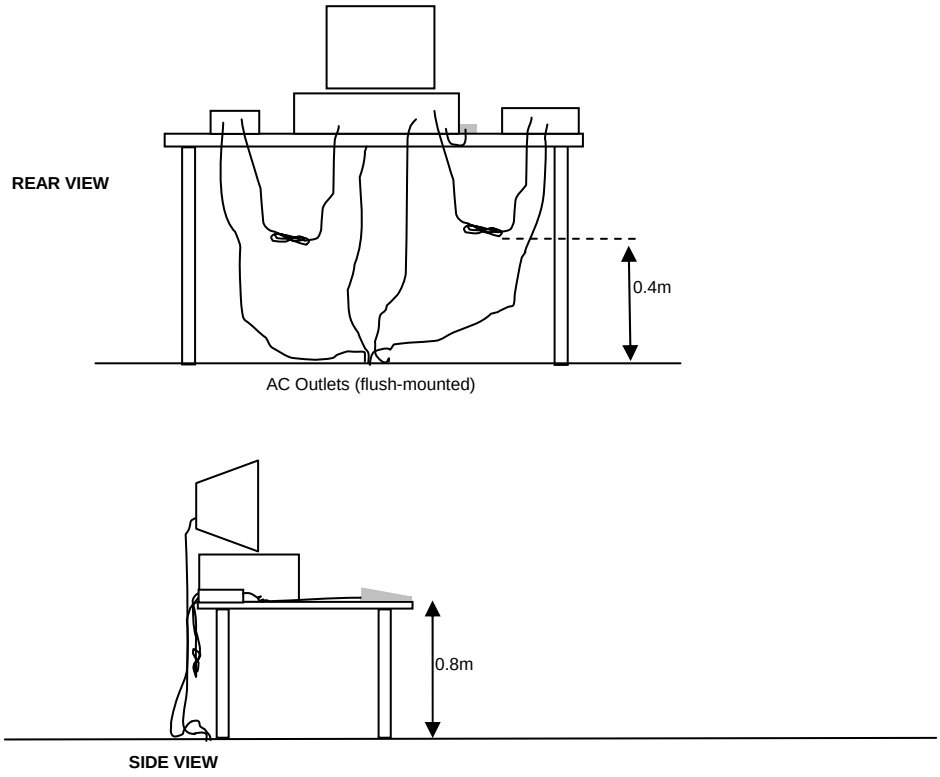
RADIATED EMISSIONS

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.

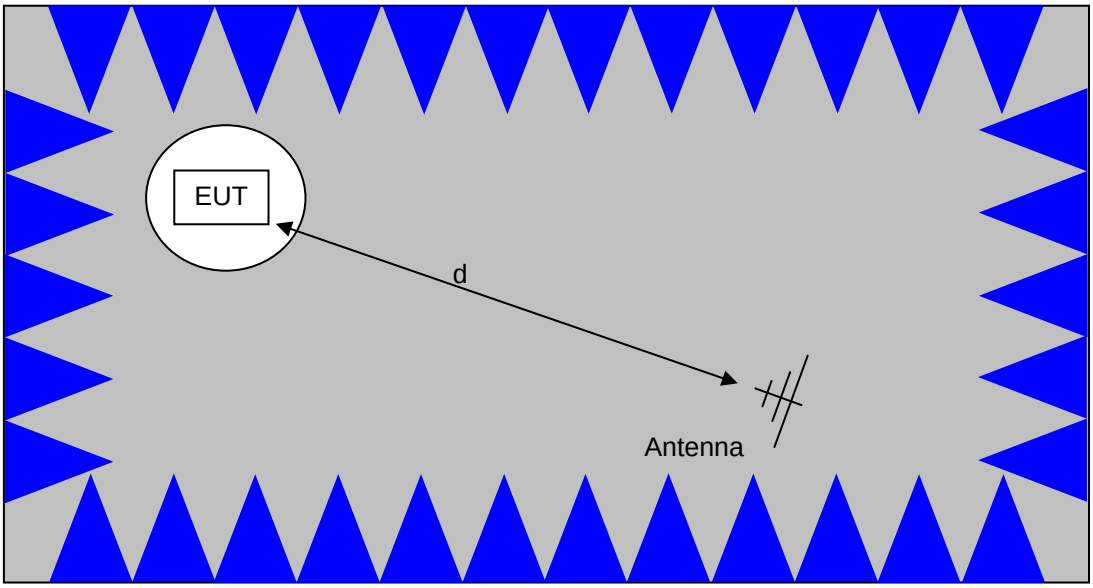
A speaker is provided in the receiver to aid in discriminating between EUT and ambient emissions. Other methods used during the preliminary scan for EUT emissions involve scanning with near field magnetic loops, monitoring I/O cables with RF current clamps, and cycling power to the EUT.

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.

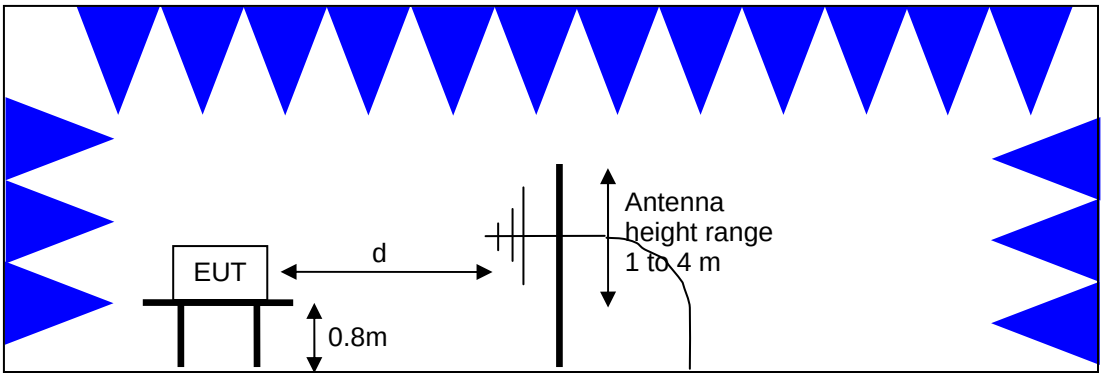


Typical Test Configuration for Radiated Field Strength Measurements



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.

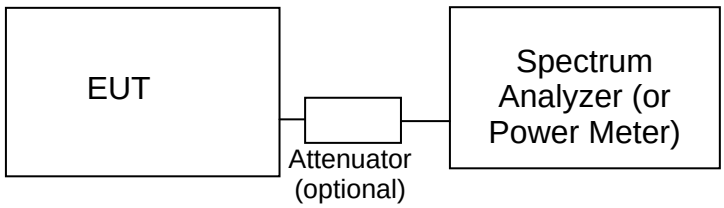
Floor-standing equipment is placed on the floor with insulating supports between the unit and the ground plane.



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:

CONDUCTED EMISSIONS SPECIFICATION LIMITS: FCC 15.207; FCC 15.107(a), RSS GEN

The table below shows the limits for the emissions on the AC power line from an intentional radiator and a receiver.

Frequency (MHz)	Average Limit (dBuV)	Quasi Peak Limit (dBuV)
0.150 to 0.500	Linear decrease on logarithmic frequency axis between 56.0 and 46.0	Linear decrease on logarithmic frequency axis between 66.0 and 56.0
0.500 to 5.000	46.0	56.0
5.000 to 30.000	50.0	60.0

GENERAL 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, 1,000 - 6,500 MHz, 27-Aug-12				
EMCO	Antenna, Horn, 1-18 GHz	3115	487	7/19/2014
Rohde & Schwarz	EMI Test Receiver, 20 Hz-7 GHz	ESIB7	1538	12/6/2012
Radiated Emissions, 1000 - 6,500 MHz, 28-Aug-12				
Fluke Mfg. Inc.	Digital Multimeter	73	77	5/14/2013
EMCO	Antenna, Horn, 1-18 GHz	3115	1561	7/12/2014
Rohde & Schwarz	EMI Test Receiver, 20 Hz-40 GHz	ESIB40 (1088.7490.40)	2493	12/9/2012
Radiated Emissions, 1000 - 25,000 MHz, 29-Aug-12				
Hewlett Packard	SpecAn 30 Hz -40 GHz, SV (SA40) Red	8564E (84125C)	1148	9/15/2012
EMCO	Antenna, Horn, 1-18 GHz	3115	1561	7/12/2014
Hewlett Packard	Microwave Preamplifier, 1-26.5GHz	8449B	1780	11/22/2012
Micro-Tronics	Band Reject Filter, 2400-2500 MHz	BRM50702-02	2249	10/11/2012
Radiated Emissions, 1,000 - 26,500 MHz, 29-Aug-12				
Hewlett Packard	SpecAn 30 Hz -40 GHz, SV (SA40) Red	8564E (84125C)	1148	9/15/2012
EMCO	Antenna, Horn, 1-18 GHz	3115	1561	7/12/2014
Hewlett Packard	Microwave Preamplifier, 1-26.5GHz	8449B	1780	11/22/2012
Micro-Tronics	Band Reject Filter, 2400-2500 MHz	BRM50702-02	2249	10/11/2012
Radiated Emissions, 18 - 40 GHz, 30-Aug-12				
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	9/15/2012
A.H. Systems	Red System Horn, 18-40GHz	SAS-574, p/n: 2581	2161	3/20/2013
Radiated Emissions, 1000 - 18,000 MHz, 31-Aug-12				
EMCO	Antenna, Horn, 1-18 GHz (SA40-Blu)	3115	1386	9/21/2012
Hewlett Packard	Microwave Preamplifier, 1-26.5GHz	8449B	2199	2/23/2013
Micro-Tronics	Band Reject Filter, 5470-5725 MHz	BRC50704-02	2240	10/4/2012
Hewlett Packard	SpecAn 9 kHz - 40 GHz, (SA40) Purple	8564E (84125C)	2415	8/10/2013
Radiated Emissions, 1000 - 18,000 MHz, 04-Sep-12				
Narda West	High Pass Filter, 8 GHz	HPF 180	821	3/22/2013
Hewlett Packard	SpecAn 30 Hz -40 GHz, SV (SA40) Red	8564E (84125C)	1148	9/15/2012
EMCO	Antenna, Horn, 1-18 GHz	3115	1561	7/12/2014
Hewlett Packard	Microwave Preamplifier, 1-26.5GHz	8449B	1780	11/22/2012
Micro-Tronics	Band Reject Filter, 5150-5350 MHz	BRC50703-02	2239	10/4/2012

Manufacturer	Description	Model	Asset #	Cal Due
Micro-Tronics	Band Reject Filter, 5470-5725 MHz	BRC50704-02	2240	10/4/2012
Radiated Emissions, 1000 - 18,000 MHz, 06-Sep-12				
EMCO	Antenna, Horn, 1-18 GHz	3115	487	7/19/2014
Narda West	High Pass Filter, 8 GHz	HPF 180	821	3/22/2013
Hewlett Packard	SpecAn 30 Hz -40 GHz, SV (SA40) Red	8564E (84125C)	1148	9/15/2012
Hewlett Packard	Microwave Preamplifier, 1-26.5GHz	8449B	1780	11/22/2012
Micro-Tronics	Band Reject Filter, 5150-5350 MHz	BRC50703-02	2239	10/4/2012
Radiated Emissions, 1000 - 18,000 MHz, 07-Sep-12				
EMCO	Antenna, Horn, 1-18 GHz (SA40-Blu)	3115	1386	9/21/2012
Micro-Tronics	Band Reject Filter, 5470-5725 MHz	BRC50704-02	1730	8/2/2013
Hewlett Packard	Microwave Preamplifier, 1-26.5GHz	8449B	2199	2/23/2013
Micro-Tronics	Band Reject Filter, 5150-5350 MHz	BRC50703-02	2251	10/11/2012
Hewlett Packard	SpecAn 9 kHz - 40 GHz, (SA40) Purple	8564E (84125C)	2415	8/10/2013
Radiated Emissions, 1000 - 18,000 MHz, 07-Sep-12				
Hewlett Packard	Microwave Preamplifier, 1-26.5GHz	8449B	263	3/29/2013
Narda West	High Pass Filter, 8 GHz	HPF 180	821	3/22/2013
Hewlett Packard	SpecAn 9 kHz - 40 GHz, FT (SA40) Blue	8564E (84125C)	1393	5/1/2013
EMCO	Antenna, Horn, 1-18 GHz	3115	1561	7/12/2014
Micro-Tronics	Band Reject Filter, 5470-5725 MHz	BRC50704-02	1730	8/2/2013
Micro-Tronics	Band Reject Filter, 5150-5350 MHz	BRC50703-02	2251	10/11/2012
Radiated Emissions, 1 - 12 GHz, 11-Sep-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
Micro-Tronics	Band Reject Filter, 5725-5875 MHz	BRC50705-02	1682	3/23/2013
Radiated Emissions, 30 - 12,000 MHz, 12-Sep-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
Micro-Tronics	Band Reject Filter, 5725-5875 MHz	BRC50705-02	2241	10/4/2012
Radio Antenna Port (Power and Spurious Emissions), 14-Sep-12				
Rohde & Schwarz	EMI Test Receiver, 20 Hz-7 GHz	ESIB7	1756	5/21/2013

Manufacturer	Description	Model	Asset #	Cal Due
Radio Antenna Port (Power and Spurious Emissions), 17-Sep-12				
Hewlett Packard	SpecAn 9 kHz - 40 GHz, FT (SA40) Blue	8564E (84125C)	1393	5/1/2013
Radio Antenna Port (Power and Spurious Emissions), 19-Sep-12				
Anritsu	Anritsu 68347C Signal Generator, 10MHz-20GHz	68347C	1785	6/29/2013
Agilent	PSA, Spectrum Analyzer, (installed options, 111, 115, 123, 1DS, B7J, HYX,	E4446A	2139	2/23/2013
Radiated Emissions, 1000 - 26,000 MHz, 20-Sep-12				
EMCO	Antenna, Horn, 1-18 GHz	3115	487	7/19/2014
Rohde & Schwarz	EMI Test Receiver, 20 Hz-7 GHz	ESIB7	1630	5/31/2013
Micro-Tronics	Band Reject Filter, 5470-5725 MHz	BRC50704-02	1681	8/31/2013
Hewlett Packard	Head (Inc W1-W4, 1946 , 1947) Purple	84125C	1772	5/1/2013
A.H. Systems	Purple System Horn, 18-40GHz	SAS-574, p/n: 2581	2160	4/17/2013
Hewlett Packard	Microwave Preamplifier, 1-26.5GHz	8449B	2199	2/23/2013
Micro-Tronics	Band Reject Filter, 2400-2500 MHz	BRM50702-02	2238	10/4/2012
Hewlett Packard	SpecAn 9 kHz - 40 GHz, (SA40) Purple	8564E (84125C)	2415	8/10/2013
Radio Antenna Port (Power and Spurious Emissions), 20-Sep-12				
Anritsu	Anritsu 68347C Signal Generator, 10MHz-20GHz	68347C	1785	6/29/2013
Agilent	PSA, Spectrum Analyzer, (installed options, 111, 115, 123, 1DS, B7J, HYX,	E4446A	2139	2/23/2013
Radiated Emissions, 30 - 2,000 MHz, 21-Sep-12				
Hewlett Packard	SpecAn 30 Hz -40 GHz, SV (SA40) Red	8564E (84125C)	1148	9/14/2013
EMCO	Antenna, Horn, 1-18 GHz (SA40-Red)	3115	1142	8/23/2014
Hewlett Packard	Microwave Preamplifier, 1-26.5GHz	8449B	1780	11/22/2012
Hewlett Packard	Preamplifier, 100 kHz - 1.3 GHz	8447D OPT 010	1826	5/18/2013
Sunol Sciences	Biconilog, 30-3000 MHz	JB3	2197	2/7/2014
Rohde & Schwarz	EMI Test Receiver, 20 Hz-40 GHz	ESIB40 (1088.7490.40)	2493	12/9/2012
Radio Antenna Port (Power and Spurious Emissions), 24-Sep-12				
Agilent	PSA, Spectrum Analyzer, (installed options, 111, 115, 123, 1DS, B7J, HYX,	E4446A	2139	2/23/2013
Antenna conducted measurements, 25-Sep-12				
Rohde & Schwarz	Power Meter, Single Channel	NRVS	1422	12/13/2012
Rohde & Schwarz	Power Sensor 100 uW - 2 Watts (w/ 20 dB pad, SN BJ5155)	NRV-Z32	1536	12/8/2012
Agilent	PSA, Spectrum Analyzer, (installed options, 111, 115, 123, 1DS, B7J, HYX,	E4446A	2139	2/23/2013

Manufacturer	Description	Model	Asset #	Cal Due
Conducted Emissions - AC Power Ports, 26-Sep-12				
Rohde & Schwarz	Pulse Limiter	ESH3 Z2	1594	5/22/2013
Rohde & Schwarz	EMI Test Receiver, 20 Hz-40 GHz	ESIB40 (1088.7490.40)	2493	12/9/2012
Com-Power	9KHz-30MHz, 50uH, 15Aac, 10Adc, max	LI-215A	2672	5/25/2013
Conducted Emissions - AC Power Ports, 26-Sep-12				
Rohde & Schwarz	Pulse Limiter	ESH3 Z2	1401	5/15/2013
Rohde & Schwarz	EMI Test Receiver, 20 Hz-40 GHz	ESIB40 (1088.7490.40)	2493	12/9/2012
Com-Power	9KHz-30MHz, 50uH, 15Aac, 10Adc, max	LI-215A	2671	5/25/2013

Appendix B Test Data

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Client:	Pace Americas	Job Number:	J87430
Product	HR44	T-Log Number:	T89059
		Account Manager:	Michelle Kim
Contact:	Mark Rieger		-
Emissions Standard(s):	FCC 15.247, 15E, RSS-210, 15B	Class:	-
Immunity Standard(s):	-	Environment:	-

EMC Test Data

For The

Pace Americas

Product

HR44

Date of Last Test: 9/26/2012

Client:	Pace Americas	Job Number:	J87430
Model:	HR44	T-Log Number:	T89059
		Account Manager:	Michelle Kim
Contact:	Mark Rieger		
Standard:	FCC 15.247, 15E, RSS-210, 15B	Class:	-

Conducted Emissions

(Elliott Laboratories Fremont Facility, Semi-Anechoic Chamber)

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: 9/26/2012
Test Engineer: John Caizzi
Test Location: Fremont Chamber #5
Config. Used: 1
Config Change: none
EUT Voltage: 120V/60Hz

General Test Configuration

For tabletop equipment, the EUT was located on a wooden table inside the semi-anechoic chamber, 40 cm from a vertical coupling plane and 80cm from the LISN. Remote support equipment was located outside of the semi-anechoic chamber. Any cables running to remote support equipment where routed through metal conduit and when possible passed through a ferrite clamp upon exiting the chamber.

Ambient Conditions:

Temperature: 23 °C
Rel. Humidity: 43 %

Summary of Results

Run #	Test Performed	Limit	Result	Margin
2	CE, AC Power,120V/60Hz	Class B	Pass	43.4 dBµV @ 0.397 MHz (-4.5 dB)

Modifications Made During Testing

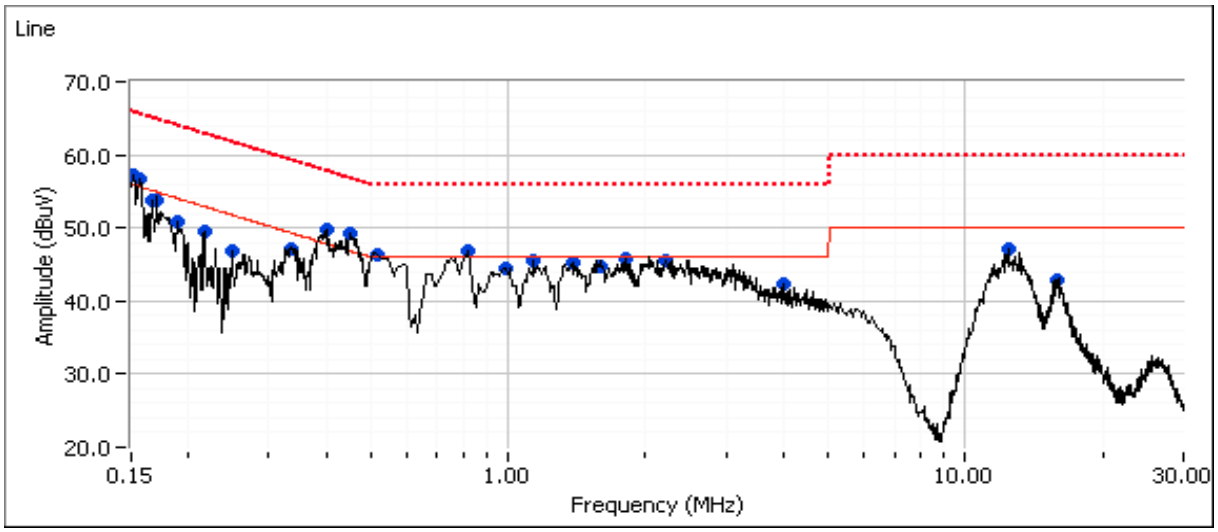
No modifications were made to the EUT during testing

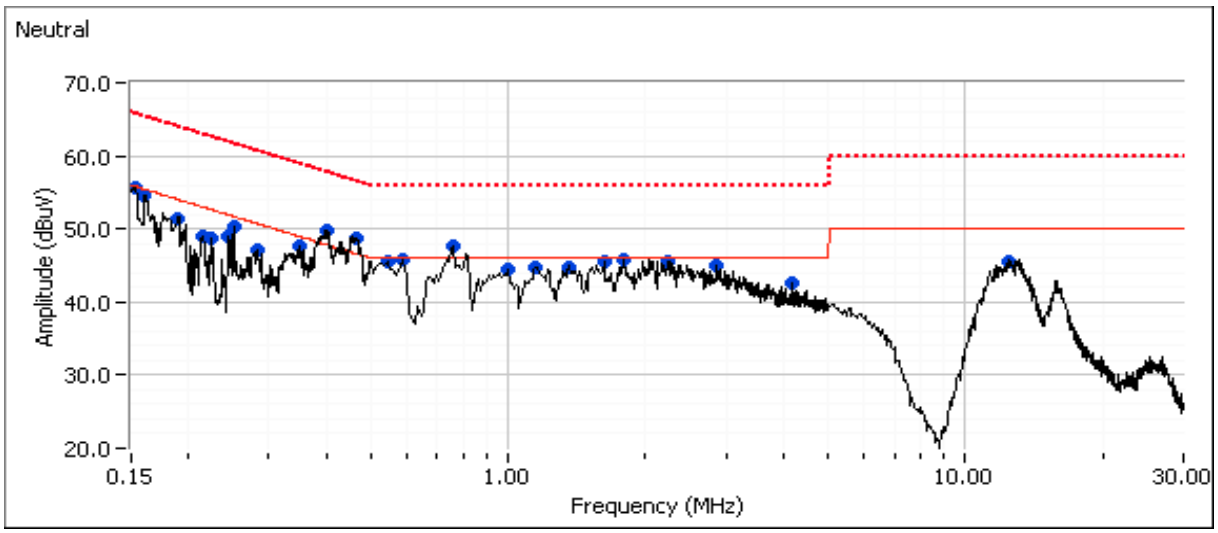
Deviations From The Standard

No deviations were made from the requirements of the standard.

Client:	Pace Americas	Job Number:	J87430
Model:	HR44	T-Log Number:	T89059
		Account Manager:	Michelle Kim
Contact:	Mark Rieger		
Standard:	FCC 15.247, 15E, RSS-210, 15B	Class:	-

Run #2: AC Power Port Conducted Emissions, 0.15 - 30MHz, 120V / 60Hz. Wi-Fi on channel 6, Zigbee on channel 25, max power.





Client:	Pace Americas	Job Number:	J87430
Model:	HR44	T-Log Number:	T89059
		Account Manager:	Michelle Kim
Contact:	Mark Rieger		
Standard:	FCC 15.247, 15E, RSS-210, 15B	Class:	-

Preliminary peak readings captured during pre-scan (peak readings vs. average limit)

Frequency	Level	AC	Class B		Detector	Comments
MHz	dBµV	Line	Limit	Margin	QP/Ave	
0.152	57.2	Line	55.9	1.3	Peak	
0.158	56.6	Line	55.6	1.0	Peak	
0.166	53.9	Line	55.1	-1.2	Peak	
0.172	53.9	Line	54.9	-1.0	Peak	
0.190	50.9	Line	54.1	-3.2	Peak	
0.217	49.6	Line	52.9	-3.3	Peak	
0.336	47.0	Line	49.3	-2.3	Peak	
0.397	49.7	Line	47.8	1.9	Peak	
0.452	49.2	Line	46.9	2.3	Peak	
0.249	46.9	Line	51.8	-4.9	Peak	
0.508	46.4	Line	46.0	0.4	Peak	
0.800	46.9	Line	46.0	0.9	Peak	
1.145	45.4	Line	46.0	-0.6	Peak	
0.977	44.4	Line	46.0	-1.6	Peak	
1.364	45.2	Line	46.0	-0.8	Peak	
1.600	44.8	Line	46.0	-1.2	Peak	
1.773	45.7	Line	46.0	-0.3	Peak	
2.196	45.6	Line	46.0	-0.4	Peak	
4.036	42.4	Line	46.0	-3.6	Peak	
12.563	47.0	Line	50.0	-3.0	Peak	
15.763	43.0	Line	50.0	-7.0	Peak	
0.153	55.6	Neutral	55.8	-0.2	Peak	
0.160	54.6	Neutral	55.4	-0.8	Peak	
0.190	51.5	Neutral	54.0	-2.5	Peak	
0.216	49.1	Neutral	53.0	-3.9	Peak	
0.249	50.4	Neutral	51.7	-1.3	Peak	
0.244	48.9	Neutral	51.9	-3.0	Peak	
0.223	48.7	Neutral	52.7	-4.0	Peak	
0.285	47.1	Neutral	50.7	-3.6	Peak	
0.348	47.7	Neutral	49.0	-1.3	Peak	
0.400	49.8	Neutral	47.8	2.0	Peak	
0.465	48.7	Neutral	46.6	2.1	Peak	
0.550	45.5	Neutral	46.0	-0.5	Peak	
0.589	45.7	Neutral	46.0	-0.3	Peak	
0.760	47.7	Neutral	46.0	1.7	Peak	
0.970	44.5	Neutral	46.0	-1.5	Peak	

Client:	Pace Americas	Job Number:	J87430
Model:	HR44	T-Log Number:	T89059
		Account Manager:	Michelle Kim
Contact:	Mark Rieger		
Standard:	FCC 15.247, 15E, RSS-210, 15B	Class:	-

Preliminary peak readings captured during pre-scan (peak readings vs. average limit) (continued)

Frequency	Level	AC	Class B		Detector	Comments
1.784	45.7	Neutral	46.0	-0.3	Peak	
1.361	44.8	Neutral	46.0	-1.2	Peak	
1.161	44.8	Neutral	46.0	-1.2	Peak	
1.622	45.6	Neutral	46.0	-0.4	Peak	
2.240	45.4	Neutral	46.0	-0.6	Peak	
2.891	45.1	Neutral	46.0	-0.9	Peak	
4.173	42.6	Neutral	46.0	-3.4	Peak	
12.516	45.4	Neutral	50.0	-4.6	Peak	

Client:	Pace Americas	Job Number:	J87430
Model:	HR44	T-Log Number:	T89059
		Account Manager:	Michelle Kim
Contact:	Mark Rieger		
Standard:	FCC 15.247, 15E, RSS-210, 15B	Class:	-

Final quasi-peak and average readings

Frequency	Level	AC	Class B		Detector	Comments
MHz	dBµV	Line	Limit	Margin	QP/Ave	
0.152	42.5	Line	55.9	-13.4	AVG	
0.152	53.0	Line	65.9	-12.9	QP	
0.158	38.5	Line	55.6	-17.1	AVG	
0.158	50.4	Line	65.6	-15.2	QP	
0.166	32.5	Line	55.2	-22.7	AVG	
0.166	50.1	Line	65.2	-15.1	QP	
0.172	39.8	Line	54.9	-15.1	AVG	
0.172	49.5	Line	64.9	-15.4	QP	
0.190	33.8	Line	54.0	-20.2	AVG	
0.190	46.0	Line	64.0	-18.0	QP	
0.217	28.1	Line	52.9	-24.8	AVG	
0.217	40.6	Line	62.9	-22.3	QP	
0.336	36.3	Line	49.3	-13.0	AVG	
0.336	45.5	Line	59.3	-13.8	QP	
0.397	43.4	Line	47.9	-4.5	AVG	
0.397	47.4	Line	57.9	-10.5	QP	
0.452	38.6	Line	46.8	-8.2	AVG	
0.452	47.2	Line	56.8	-9.6	QP	
0.249	34.4	Line	51.8	-17.4	AVG	
0.249	42.3	Line	61.8	-19.5	QP	
0.508	35.3	Line	46.0	-10.7	AVG	
0.508	43.5	Line	56.0	-12.5	QP	
0.800	35.1	Line	46.0	-10.9	AVG	
0.800	43.2	Line	56.0	-12.8	QP	
1.145	36.8	Line	46.0	-9.2	AVG	
1.145	42.4	Line	56.0	-13.6	QP	
0.977	36.3	Line	46.0	-9.7	AVG	
0.977	41.3	Line	56.0	-14.7	QP	
1.364	36.9	Line	46.0	-9.1	AVG	
1.364	42.4	Line	56.0	-13.6	QP	
1.600	36.4	Line	46.0	-9.6	AVG	
1.600	42.0	Line	56.0	-14.0	QP	
1.773	35.8	Line	46.0	-10.2	AVG	
1.773	42.7	Line	56.0	-13.3	QP	

Client:	Pace Americas	Job Number:	J87430
Model:	HR44	T-Log Number:	T89059
		Account Manager:	Michelle Kim
Contact:	Mark Rieger		
Standard:	FCC 15.247, 15E, RSS-210, 15B	Class:	-

Final quasi-peak and average readings (continued)

Frequency	Level	AC	Class B		Detector	Comments
MHz	dBµV	Line	Limit	Margin	QP/Ave	
2.196	35.5	Line	46.0	-10.5	AVG	
2.196	42.1	Line	56.0	-13.9	QP	
4.036	31.6	Line	46.0	-14.4	AVG	
4.036	37.7	Line	56.0	-18.3	QP	
12.563	36.4	Line	50.0	-13.6	AVG	
12.563	42.1	Line	60.0	-17.9	QP	
15.763	31.9	Line	50.0	-18.1	AVG	
15.763	38.5	Line	60.0	-21.5	QP	
0.153	42.2	Neutral	55.8	-13.6	AVG	
0.153	53.0	Neutral	65.8	-12.8	QP	
0.160	36.1	Neutral	55.5	-19.4	AVG	
0.160	49.4	Neutral	65.5	-16.1	QP	
0.190	34.0	Neutral	54.0	-20.0	AVG	
0.190	45.9	Neutral	64.0	-18.1	QP	
0.216	29.2	Neutral	53.0	-23.8	AVG	
0.216	40.8	Neutral	63.0	-22.2	QP	
0.249	33.9	Neutral	51.8	-17.9	AVG	
0.249	42.1	Neutral	61.8	-19.7	QP	
0.244	31.8	Neutral	52.0	-20.2	AVG	
0.244	41.1	Neutral	62.0	-20.9	QP	
0.223	26.5	Neutral	52.7	-26.2	AVG	
0.223	39.2	Neutral	62.7	-23.5	QP	
0.285	35.6	Neutral	50.7	-15.1	AVG	
0.285	42.1	Neutral	60.7	-18.6	QP	
0.348	34.8	Neutral	49.0	-14.2	AVG	
0.348	44.5	Neutral	59.0	-14.5	QP	
0.400	38.1	Neutral	47.9	-9.8	AVG	
0.400	48.4	Neutral	57.9	-9.5	QP	
0.465	38.3	Neutral	46.6	-8.3	AVG	
0.465	46.3	Neutral	56.6	-10.3	QP	
0.550	33.2	Neutral	46.0	-12.8	AVG	
0.550	43.1	Neutral	56.0	-12.9	QP	
0.589	32.5	Neutral	46.0	-13.5	AVG	
0.589	42.4	Neutral	56.0	-13.6	QP	
0.760	35.2	Neutral	46.0	-10.8	AVG	
0.760	43.6	Neutral	56.0	-12.4	QP	
0.970	36.8	Neutral	46.0	-9.2	AVG	

Client:	Pace Americas	Job Number:	J87430
Model:	HR44	T-Log Number:	T89059
		Account Manager:	Michelle Kim
Contact:	Mark Rieger		
Standard:	FCC 15.247, 15E, RSS-210, 15B	Class:	-

Final quasi-peak and average readings (continued)

Frequency	Level	AC	Class B		Detector	Comments
MHz	dBµV	Line	Limit	Margin	QP/Ave	
0.970	41.9	Neutral	56.0	-14.1	QP	
1.361	36.5	Neutral	46.0	-9.5	AVG	
1.361	42.6	Neutral	56.0	-13.4	QP	
1.161	36.4	Neutral	46.0	-9.6	AVG	
1.161	41.9	Neutral	56.0	-14.1	QP	
1.622	34.1	Neutral	46.0	-11.9	AVG	
1.622	41.2	Neutral	56.0	-14.8	QP	
1.784	35.8	Neutral	46.0	-10.2	AVG	
1.784	42.0	Neutral	56.0	-14.0	QP	
2.240	34.1	Neutral	46.0	-11.9	AVG	
2.240	41.4	Neutral	56.0	-14.6	QP	
2.891	34.0	Neutral	46.0	-12.0	AVG	
2.891	39.7	Neutral	56.0	-16.3	QP	
4.173	30.3	Neutral	46.0	-15.7	AVG	
4.173	36.7	Neutral	56.0	-19.3	QP	
12.516	36.5	Neutral	50.0	-13.5	AVG	
12.516	41.9	Neutral	60.0	-18.1	QP	

Client:	Pace Americas	Job Number:	J87430
Model:	HR44	T-Log Number:	T89059
		Account Manager:	Michelle Kim
Contact:	Mark Rieger		
Standard:	FCC 15.247, 15E, RSS-210, 15B	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.

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

Ambient Conditions:

Temperature: 18-20 °C
Rel. Humidity: 30-35 %

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

All testing performed with both chains transmitting at the noted power setting
No radio related emissions below 1GHz observed

Client:	Pace Americas	Job Number:	J87430
Model:	HR44	T-Log Number:	T89059
		Account Manager:	Michelle Kim
Contact:	Mark Rieger		
Standard:	FCC 15.247, 15E, RSS-210, 15B	Class:	N/A

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

Run #	Mode	Channel	Power Setting	Measured Power	Test Performed	Limit	Result / Margin
1	b mode	1	20		Radiated Emissions 1 - 26 GHz	FCC Part 15.209 / 15.247(c)	45.5 dBµV/m @ 4824.0 MHz (-8.5 dB)
		6	20		Radiated Emissions 1 - 26 GHz		48.2 dBµV/m @ 7311.9 MHz (-5.8 dB)
		11	20		Radiated Emissions 1 - 26 GHz		48.4 dBµV/m @ 4924.1 MHz (-5.6 dB)
2	g mode	1	20		Radiated Emissions 1 - 26 GHz		46.6 dBµV/m @ 8996.7 MHz (-7.4 dB)
		6	20		Radiated Emissions 1 - 26 GHz		45.0 dBµV/m @ 7309.7 MHz (-9.0 dB)
		11	20		Radiated Emissions 1 - 26 GHz		43.3 dBµV/m @ 7386.0 MHz (-10.7 dB)
3	n20 mode	1	20		Radiated Emissions 1 - 26 GHz		39.2 dBµV/m @ 4165.2 MHz (-14.8 dB)
		6	20		Radiated Emissions 1 - 26 GHz		42.9 dBµV/m @ 7313.3 MHz (-11.1 dB)
		11	20		Radiated Emissions 1 - 26 GHz		42.8 dBµV/m @ 7383.3 MHz (-11.2 dB)
4	n40 mode	3	20		Radiated Emissions 1 - 26 GHz		39.3 dBµV/m @ 4165.2 MHz (-14.7 dB)
		6	20		Radiated Emissions 1 - 26 GHz		44.9 dBµV/m @ 8215.0 MHz (-9.1 dB)
		9	20		Radiated Emissions 1 - 26 GHz		39.9 dBµV/m @ 4162.5 MHz (-14.1 dB)

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 :	Near field scan between 18-26.5GHz did not show any significant frequency above noise floor.
Note :	For every type of modulation one plots shows 10-18GHz scan, others were omited due to there was no difference.

Antenna: internal antennas
Duty Cycle: 6Mbps 91.7%

Client:	Pace Americas	Job Number:	J87430
Model:	HR44	T-Log Number:	T89059
		Account Manager:	Michelle Kim
Contact:	Mark Rieger		
Standard:	FCC 15.247, 15E, RSS-210, 15B	Class:	N/A

Run #1: Radiated Spurious Emissions, 30 - 26500 MHz. Operating Mode: 802.11b, both chains on at 20 dBm.

Date of Test: 8/29/2012 - 8/30/2012 Test Location: FT Chamber #5

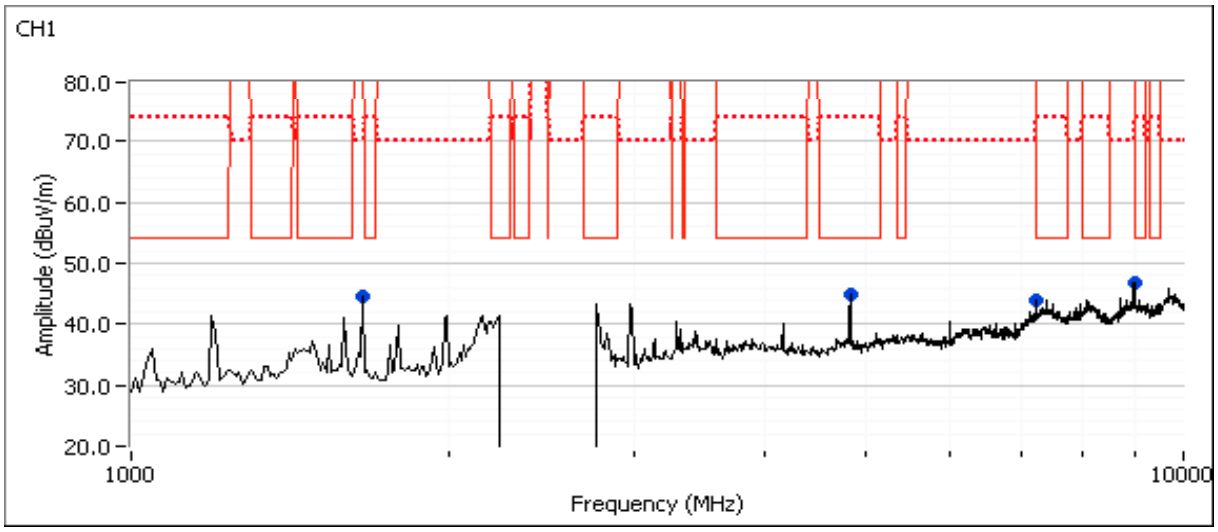
Test Engineer: John Caizzi, Deniz Demirci

Run #1a: Channel 1 @ 2412 MHz (1Mbps Power: 20dBm)

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	
4823.980	45.5	V	54.0	-8.5	AVG	216	1.62	RB 1 MHz;VB 10 Hz;Peak
4823.900	50.0	V	74.0	-24.0	PK	216	1.62	RB 1 MHz;VB 3 MHz;Peak
8996.670	*46.9*	*V*	*70.0*	*-23.1*	*Peak*	*329*	*1.5*	*Note 3*
1660.000	*44.7*	*V*	*70.0*	*-25.3*	*Peak*	*224*	*1.0*	*Note 3*
7235.000	*43.9*	*V*	*54.0*	*-26.1*	*Peak*	*163*	*2.0*	*Note 2*

Note 2:	Signal is not in a restricted band but the more stringent restricted band limit was used.
Note 3:	Signal does not change with channel. Measured previously on channels 6 & 11.



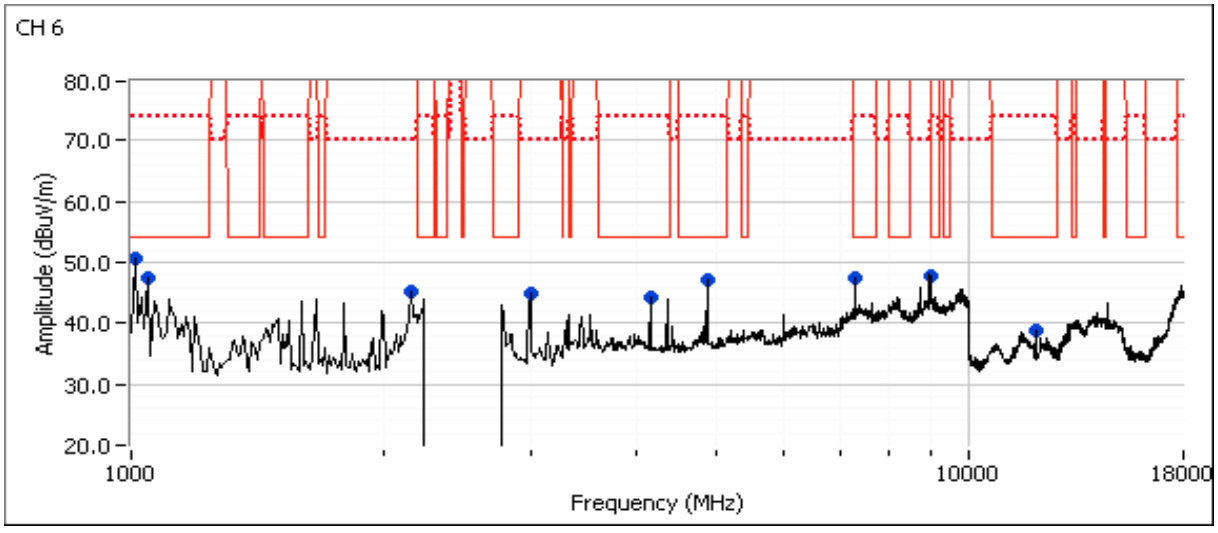
Client:	Pace Americas	Job Number:	J87430
Model:	HR44	T-Log Number:	T89059
		Account Manager:	Michelle Kim
Contact:	Mark Rieger		
Standard:	FCC 15.247, 15E, RSS-210, 15B	Class:	N/A

Run #1b: Channel 6 @ 2437 MHz (1Mbps Power: 20dBm)

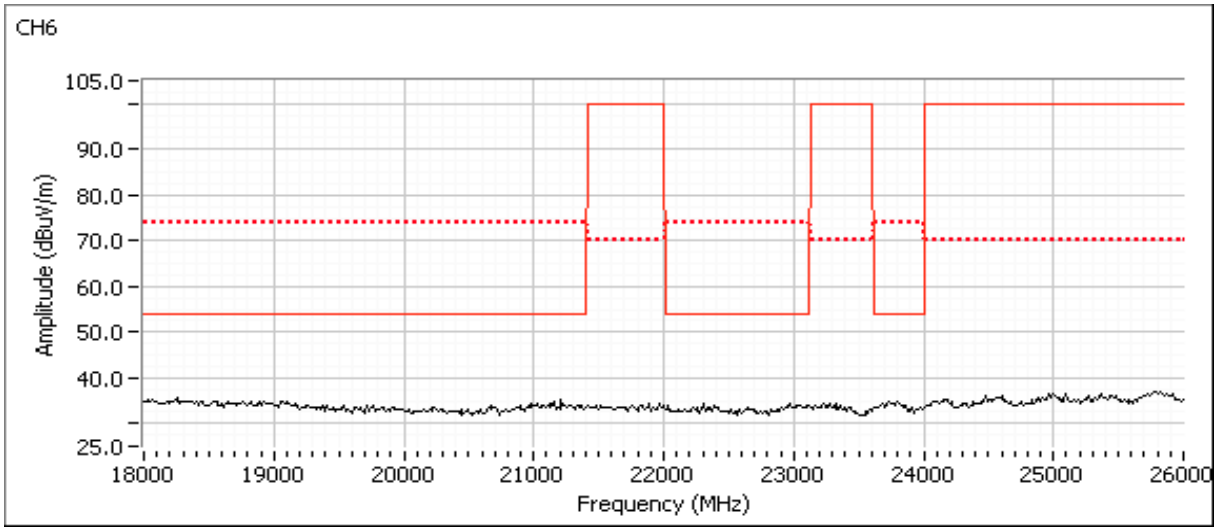
Other Spurious Emissions (from scan)

Frequency	Level	Pol	15.209 / 15.247		Detector	Azimuth	Height	Comments
MHz	dBµV/m	v/h	Limit	Margin	Pk/QP/Avg	degrees	meters	
7311.870	48.2	V	54.0	-5.8	AVG	328	1.72	
1009.170	*50.5*	*V*	*54.0*	*-3.5*	*Peak*	*344*	*2.5*	*Ambient*
1045.830	*47.5*	*V*	*54.0*	*-6.5*	*Peak*	*234*	*2.5*	*Ambient*
4874.050	45.9	V	54.0	-8.1	AVG	110	1.04	
4165.150	45.3	V	54.0	-8.7	AVG	192	1.06	
9000.000	40.4	V	54.0	-13.6	AVG	304	1.17	
7309.870	54.6	V	74.0	-19.4	PK	328	1.72	
9005.170	51.3	V	74.0	-22.7	PK	304	1.17	
4874.250	50.9	V	74.0	-23.1	PK	110	1.04	
4165.470	50.0	V	74.0	-24.0	PK	192	1.06	

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



Client:	Pace Americas	Job Number:	J87430
Model:	HR44	T-Log Number:	T89059
		Account Manager:	Michelle Kim
Contact:	Mark Rieger		
Standard:	FCC 15.247, 15E, RSS-210, 15B	Class:	N/A



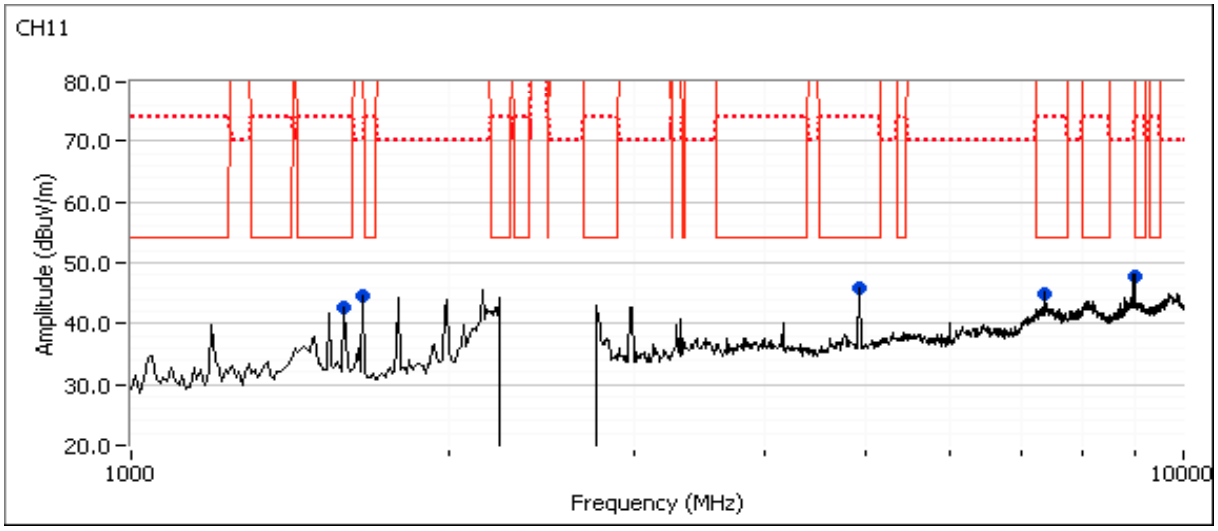
Client:	Pace Americas	Job Number:	J87430
Model:	HR44	T-Log Number:	T89059
		Account Manager:	Michelle Kim
Contact:	Mark Rieger		
Standard:	FCC 15.247, 15E, RSS-210, 15B	Class:	N/A

Run #1c: Channel 11 @ 2462 MHz (1Mbps Power: 20dBm)

Other Spurious Emissions (from scan)

Frequency	Level	Pol	15.209 / 15.247		Detector	Azimuth	Height	Comments
MHz	dBµV/m	v/h	Limit	Margin	Pk/QP/Avg	degrees	meters	
4924.140	48.4	V	54.0	-5.6	AVG	198	1.75	
7385.230	45.0	V	54.0	-9.0	AVG	309	1.27	
7385.770	52.6	V	74.0	-21.4	PK	309	1.27	
9000.000	40.4	V	54.0	-13.6	AVG	286	1.32	
9000.080	51.8	V	74.0	-22.2	PK	286	1.32	
1600.100	42.7	V	54.0	-11.3	AVG	238	2.03	
1600.130	45.5	V	74.0	-28.5	PK	238	2.03	
1666.070	44.9	V	54.0	-9.1	AVG	219	1.00	
1666.420	48.1	V	74.0	-25.9	PK	219	1.00	
4923.990	51.6	V	74.0	-22.4	PK	198	1.75	

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



Client:	Pace Americas	Job Number:	J87430
Model:	HR44	T-Log Number:	T89059
		Account Manager:	Michelle Kim
Contact:	Mark Rieger		
Standard:	FCC 15.247, 15E, RSS-210, 15B	Class:	N/A

Run #2: Radiated Spurious Emissions, 30 - 26500 MHz. Operating Mode: 802.11g, both chains on at 20 dBm.

Date of Test: 08/29/12 Test Location: FT Chamber #5

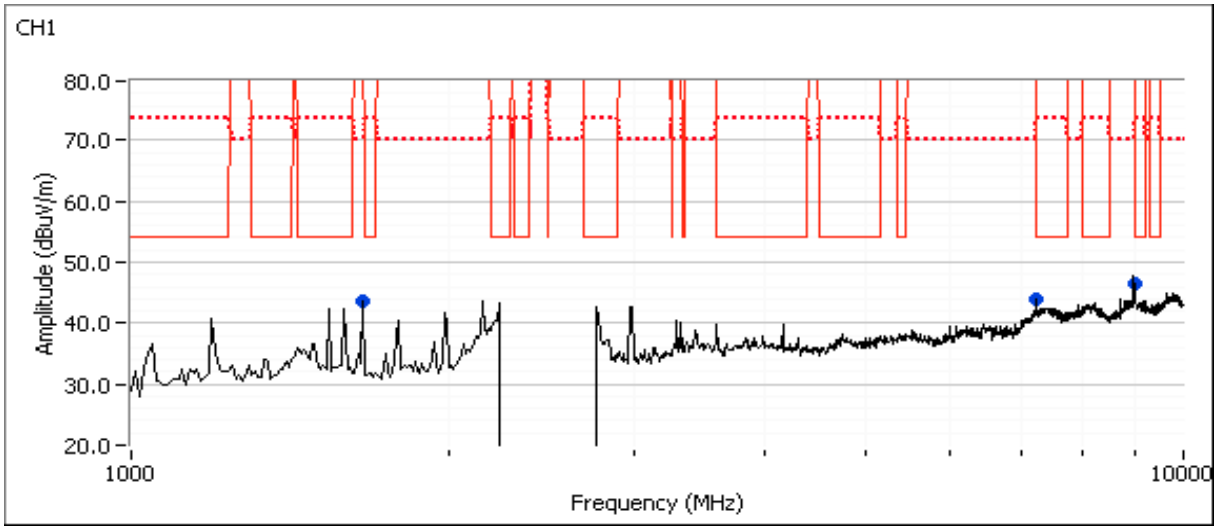
Test Engineer: John Caizzi

Run #2a: Channel 1 @ 2412 MHz (6Mbps Power: 20dBm)

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		
8996.670	*46.6*	*V*	*54.0*	*-7.4*	*Peak*	*20*	*1.0*	*Note 3*	Pk reading w/ avg limit
7235.000	*43.8*	*V*	*54.0*	*-10.2*	*Peak*	*332*	*2.0*	*Note 2*	Pk reading w/ avg limit
1660.000	*43.7*	*V*	*54.0*	*-10.3*	*Peak*	*218*	*1.0*	*Note 3*	Pk reading w/ avg limit

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.
Note 3:	Signal does not change with mode or channel. Measured previously in b mode.



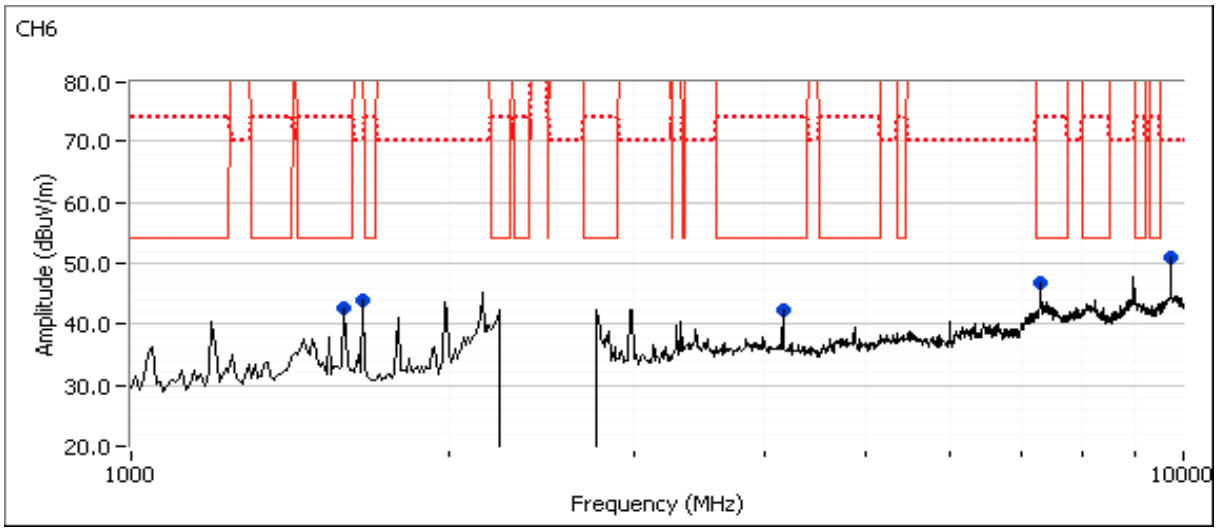
Client:	Pace Americas	Job Number:	J87430
Model:	HR44	T-Log Number:	T89059
		Account Manager:	Michelle Kim
Contact:	Mark Rieger		
Standard:	FCC 15.247, 15E, RSS-210, 15B	Class:	N/A

Run #2b: Channel 6 @ 2437 MHz (6Mbps Power: 20dBm)

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	
7309.730	45.0	V	54.0	-9.0	AVG	328	1.81	
1595.830	*42.7*	*V*	*54.0*	*-11.3*	*Peak*	*253*	*2.0*	*Note 3*
4165.120	40.8	V	54.0	-13.2	AVG	307	1.99	
7309.600	59.0	V	74.0	-15.0	PK	328	1.81	
9714.170	*50.9*	*H*	*70.0*	*-19.1*	*Peak*	*332*	*2.0*	
1660.000	*44.0*	*V*	*70.0*	*-26.0*	*Peak*	*224*	*1.0*	*Note 3*
4165.330	47.6	V	74.0	-26.4	PK	307	1.99	

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.
Note 3:	Signal does not change with mode or channel. Measured previously in b mode.



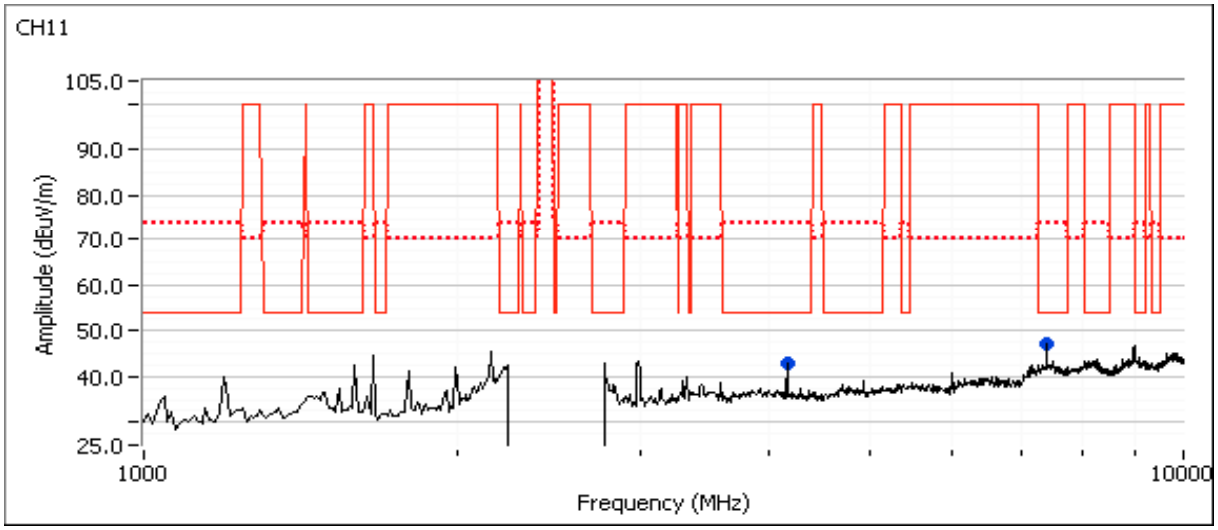
Client:	Pace Americas	Job Number:	J87430
Model:	HR44	T-Log Number:	T89059
		Account Manager:	Michelle Kim
Contact:	Mark Rieger		
Standard:	FCC 15.247, 15E, RSS-210, 15B	Class:	N/A

Run #2c: Channel 11 @ 2462 MHz (6Mbps Power: 20dBm)

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	
7386.030	43.3	V	54.0	-10.7	AVG	110	1.4	RB 1 MHz;VB 10 Hz;Peak
4165.190	39.1	V	54.0	-14.9	AVG	184	1.0	RB 1 MHz;VB 10 Hz;Peak
7378.300	57.6	V	74.0	-16.4	PK	110	1.4	RB 1 MHz;VB 3 MHz;Peak
4165.290	45.9	V	74.0	-28.1	PK	184	1.0	RB 1 MHz;VB 3 MHz;Peak

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:	Pace Americas	Job Number:	J87430
Model:	HR44	T-Log Number:	T89059
		Account Manager:	Michelle Kim
Contact:	Mark Rieger		
Standard:	FCC 15.247, 15E, RSS-210, 15B	Class:	N/A

Run #3: Radiated Spurious Emissions, 30 - 26500 MHz. Operating Mode: 802.11n 20MHz

Date of Test: 8/29/2012 - 8/30/2012 Test Location: FT Chamber #5

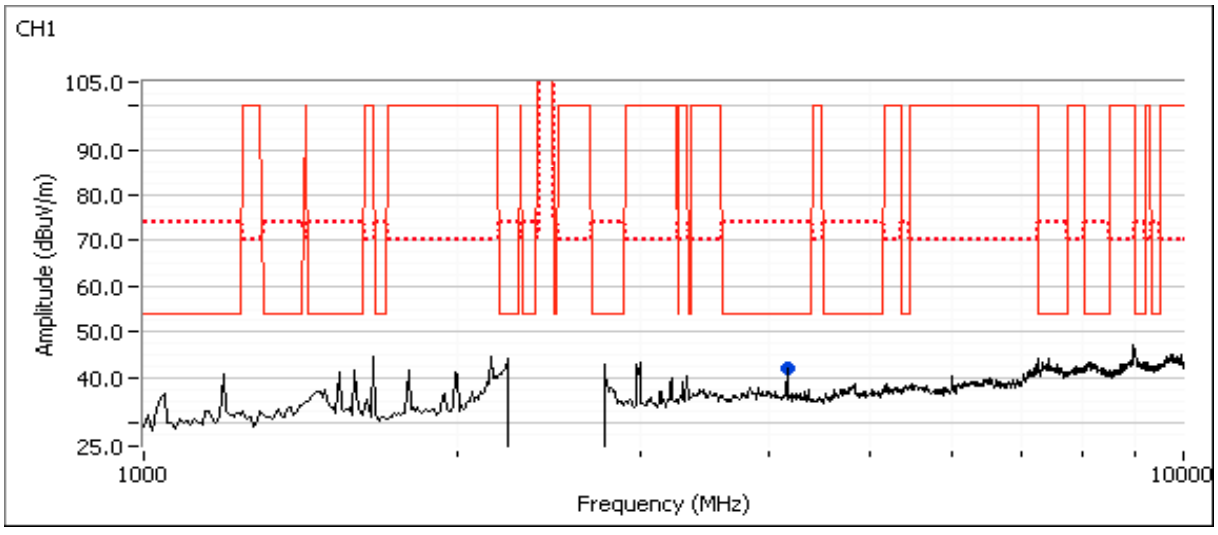
Test Engineer: M. Birgani, D. Demirci

Run #3a: Channel 1 @ 2412 MHz (MCS0, Power: 20dBm)

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	
4165.190	39.2	V	54.0	-14.8	AVG	171	2.0	RB 1 MHz;VB 10 Hz;Peak
4165.290	45.9	V	74.0	-28.1	PK	171	2.0	RB 1 MHz;VB 3 MHz;Peak

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.



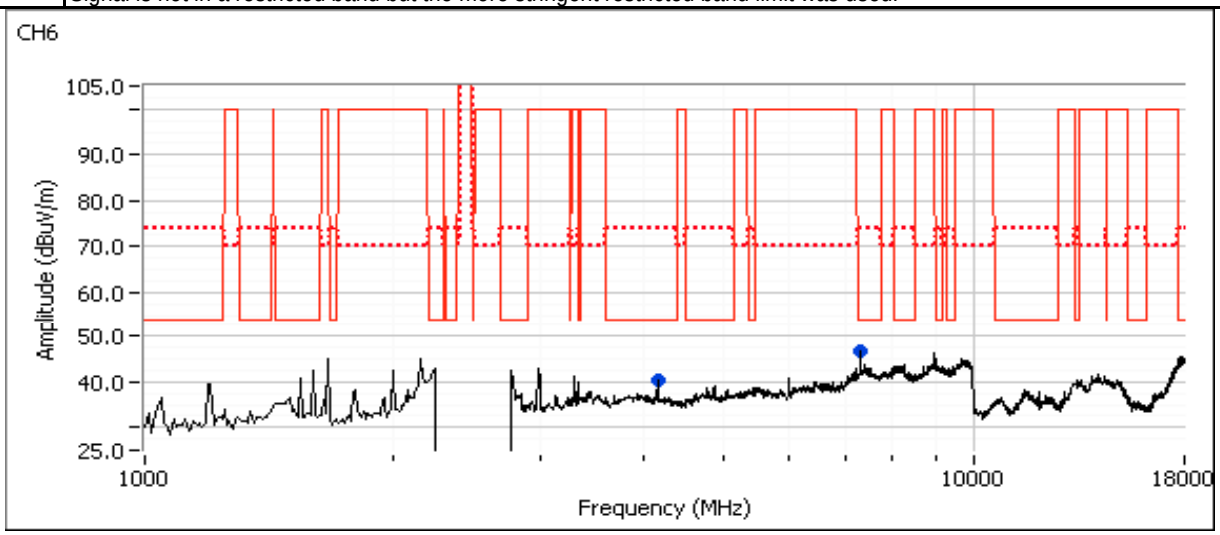
Client:	Pace Americas	Job Number:	J87430
Model:	HR44	T-Log Number:	T89059
		Account Manager:	Michelle Kim
Contact:	Mark Rieger		
Standard:	FCC 15.247, 15E, RSS-210, 15B	Class:	N/A

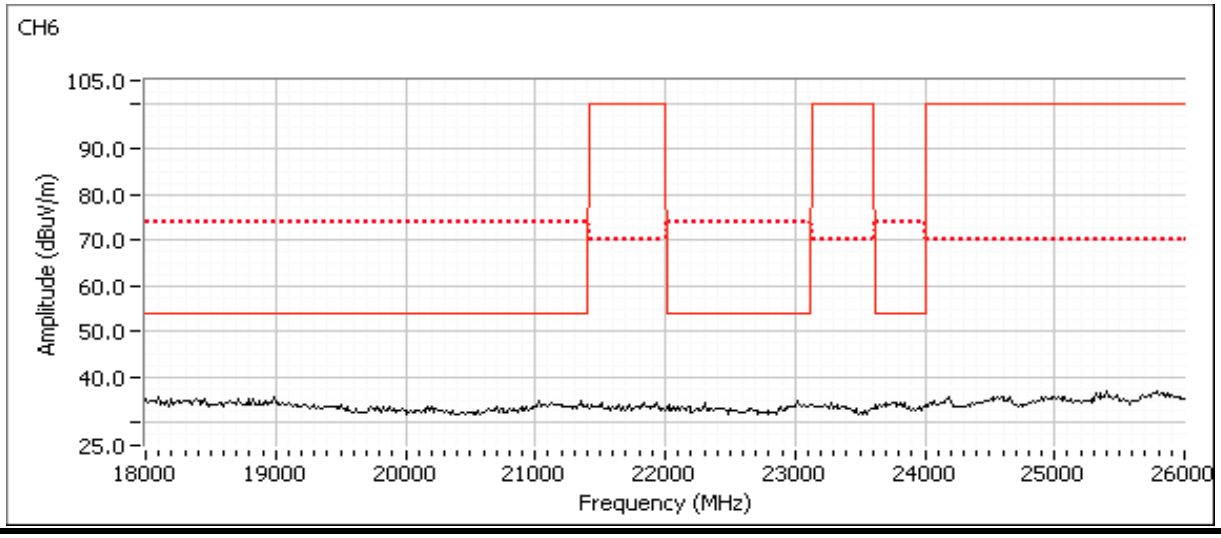
Run #3b: Channel 6 @ 2437 MHz (MCS0, Power: 20dBm)
Other Spurious Emissions

Frequency	Level	Pol	15.209 / 15.247		Detector	Azimuth	Height	Comments
MHz	dBµV/m	v/h	Limit	Margin	Pk/QP/Avg	degrees	meters	
7313.340	42.9	V	54.0	-11.1	AVG	125	1.5	RB 1 MHz;VB 10 Hz;Peak
4165.200	39.3	V	54.0	-14.7	AVG	278	2.2	RB 1 MHz;VB 10 Hz;Peak
7310.000	55.5	V	74.0	-18.5	PK	125	1.5	RB 1 MHz;VB 3 MHz;Peak
4165.050	46.3	V	74.0	-27.7	PK	278	2.2	RB 1 MHz;VB 3 MHz;Peak

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.





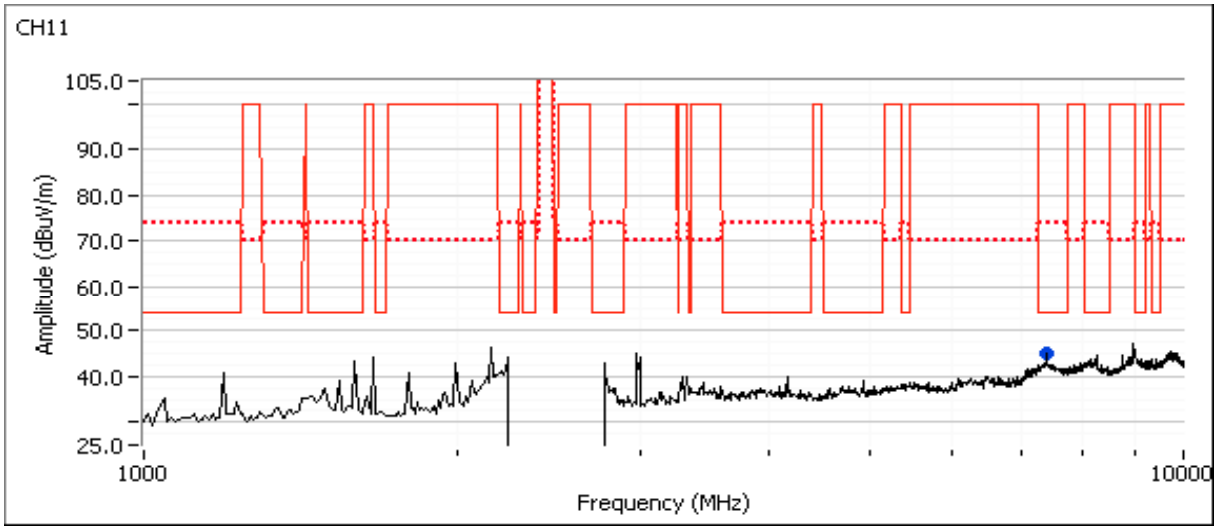
Client:	Pace Americas	Job Number:	J87430
Model:	HR44	T-Log Number:	T89059
		Account Manager:	Michelle Kim
Contact:	Mark Rieger		
Standard:	FCC 15.247, 15E, RSS-210, 15B	Class:	N/A

Run #3c: Channel 11 @ 2462 MHz (MCS0, Power: 20dBm)

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	
7383.300	42.8	V	54.0	-11.2	AVG	126	1.6	RB 1 MHz;VB 10 Hz;Peak
7377.570	56.4	V	74.0	-17.6	PK	126	1.6	RB 1 MHz;VB 3 MHz;Peak

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:	Pace Americas	Job Number:	J87430
Model:	HR44	T-Log Number:	T89059
		Account Manager:	Michelle Kim
Contact:	Mark Rieger		
Standard:	FCC 15.247, 15E, RSS-210, 15B	Class:	N/A

Run #4: Radiated Spurious Emissions, 30 - 26500 MHz. Operating Mode: 802.11n 40MHz

Date of Test: 08/29/12 Test Location: FT Chamber #5

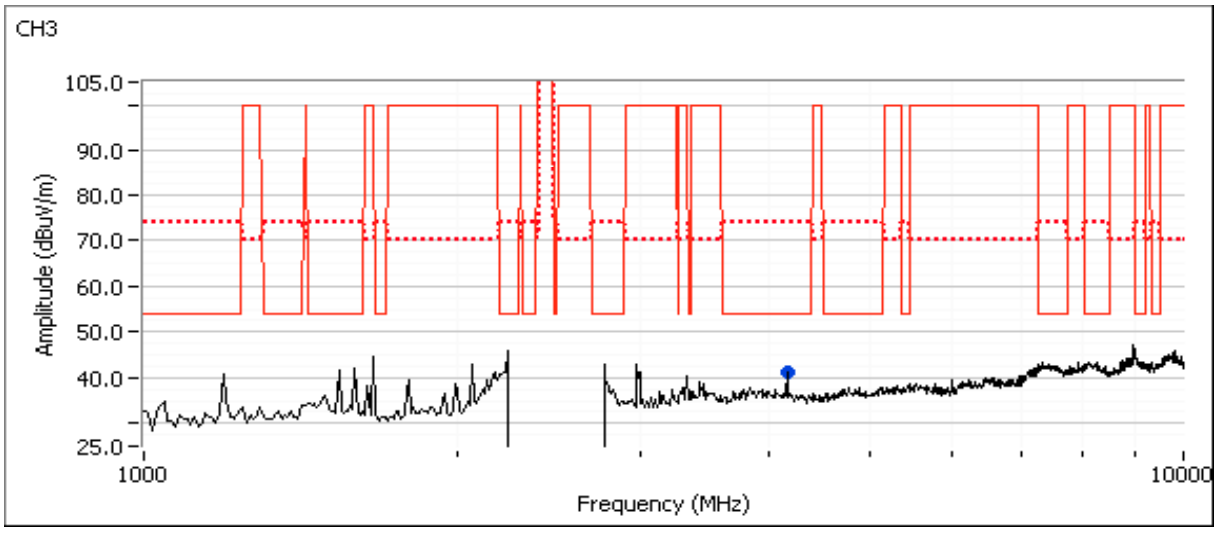
Test Engineer: M. Birgani

Run #4a: Channel 3 @ 2422 MHz (MCS8, Power: 20dBm)

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	
4165.200	39.3	V	54.0	-14.7	AVG	278	2.2	RB 1 MHz;VB 10 Hz;Peak
4165.050	46.3	V	74.0	-27.7	PK	278	2.2	RB 1 MHz;VB 3 MHz;Peak

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.

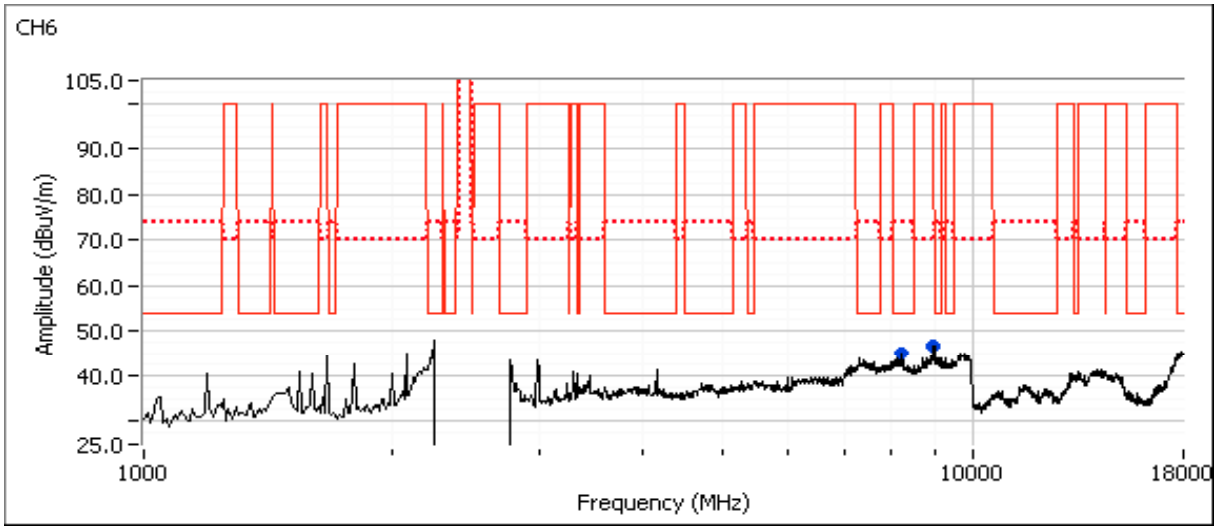


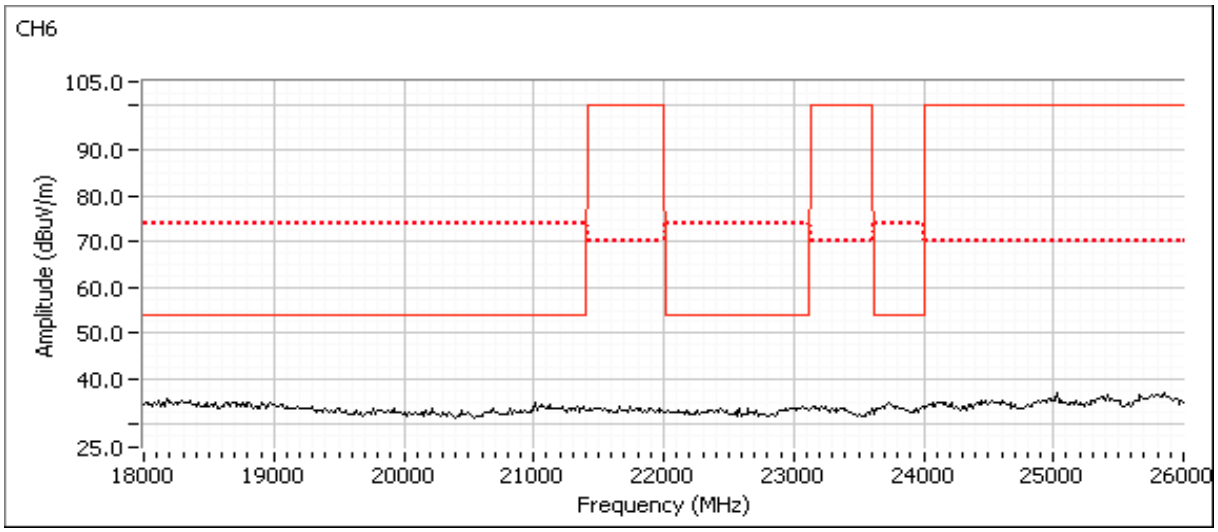
Client:	Pace Americas	Job Number:	J87430
Model:	HR44	T-Log Number:	T89059
		Account Manager:	Michelle Kim
Contact:	Mark Rieger		
Standard:	FCC 15.247, 15E, RSS-210, 15B	Class:	N/A

Run #4b: Channel 6 @ 2437 MHz
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	
8215.000	44.9	V	54.0	-9.1	Peak	2	1.0	Peak reading with average limit
8955.830	46.7	V	70.0	-23.3	Peak	331	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.



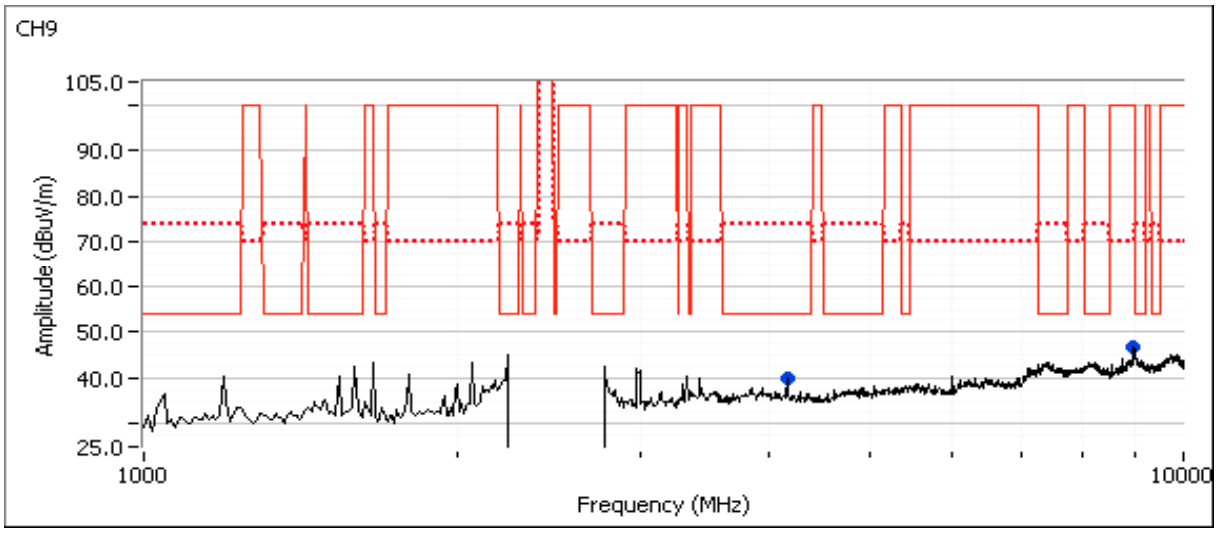


Client:	Pace Americas	Job Number:	J87430
Model:	HR44	T-Log Number:	T89059
		Account Manager:	Michelle Kim
Contact:	Mark Rieger		
Standard:	FCC 15.247, 15E, RSS-210, 15B	Class:	N/A

Run #4c: Channel 9 @ 2452 MHz
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	
4162.500	39.9	V	54.0	-14.1	Peak	305	2.0	
8955.830	46.9	V	70.0	-23.1	Peak	331	1.5	
4162.500	48.2	V	74.0	-25.8	Peak	305	2.0	

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:	Pace Americas	Job Number:	J87430
Model:	HR44	T-Log Number:	T89059
		Account Manager:	Michelle Kim
Contact:	Mark Rieger		
Standard:	FCC 15.247, 15E, RSS-210, 15B	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.

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

Ambient Conditions:

Temperature: 18-20 °C

Rel. Humidity: 30-35 %

Modifications Made During Testing

No modifications were made to the EUT during testing

Deviations From The Standard

No deviations were made from the requirements of the standard.

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

Run #	Mode	Channel	Power Setting	Measured Power	Test Performed	Limit	Result / Margin
1	b mode	1	20.0		Restricted Band Edge (2390 MHz)	FCC Part 15.209 / 15.247(c)	48.9 dBµV/m @ 2390.0 MHz (-5.1 dB)
		11	20.0		Restricted Band Edge (2483.5 MHz)	FCC Part 15.209 / 15.247(c)	47.9 dBµV/m @ 2483.5 MHz (-6.1 dB)
2	g mode	1	17.5		Restricted Band Edge (2390 MHz)	FCC Part 15.209 / 15.247(c)	53.4 dBµV/m @ 2390.0 MHz (-0.6 dB)
		2	19.5		Restricted Band Edge (2390 MHz)	FCC Part 15.209 / 15.247(c)	53.2 dBµV/m @ 2390.0 MHz (-0.8 dB)
		3	20.0		Restricted Band Edge (2390 MHz)	FCC Part 15.209 / 15.247(c)	54.0 dBµV/m @ 2390.0 MHz (0.0 dB)
		9	20.0		Restricted Band Edge (2483.5 MHz)	FCC Part 15.209 / 15.247(c)	73.3 dBµV/m @ 2488.0 MHz (-0.7 dB)
		10	19.0		Restricted Band Edge (2483.5 MHz)	FCC Part 15.209 / 15.247(c)	74.0 dBµV/m @ 2483.7 MHz (0.0 dB)
		11	17.5		Restricted Band Edge (2483.5 MHz)	FCC Part 15.209 / 15.247(c)	74.0 dBµV/m @ 2483.8 MHz (0.0 dB)

Client:	Pace Americas	Job Number:	J87430
Model:	HR44	T-Log Number:	T89059
		Account Manager:	Michelle Kim
Contact:	Mark Rieger		
Standard:	FCC 15.247, 15E, RSS-210, 15B	Class:	N/A

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

Run #	Mode	Channel	Power Setting	Measured Power	Test Performed	Limit	Result / Margin
3	n20 mode	1	17.5		Restricted Band Edge (2390 MHz)	FCC Part 15.209 / 15.247(c)	53.2 dBµV/m @ 2390.0 MHz (-0.8 dB)
		2	19.0		Restricted Band Edge (2390 MHz)	FCC Part 15.209 / 15.247(c)	53.6 dBµV/m @ 2390.0 MHz (-0.4 dB)
		3	20.0		Restricted Band Edge (2390 MHz)	FCC Part 15.209 / 15.247(c)	53.2 dBµV/m @ 2390.0 MHz (-0.8 dB)
		9	20.0		Restricted Band Edge (2483.5 MHz)	FCC Part 15.209 / 15.247(c)	72.0 dBµV/m @ 2485.9 MHz (-2.0 dB)
		10	18.5		Restricted Band Edge (2483.5 MHz)	FCC Part 15.209 / 15.247(c)	72.7 dBµV/m @ 2484.2 MHz (-1.3 dB)
		11	17.0		Restricted Band Edge (2483.5 MHz)	FCC Part 15.209 / 15.247(c)	73.3 dBµV/m @ 2485.2 MHz (-0.7 dB)
4	n40 mode	3	14.5		Restricted Band Edge (2390 MHz)	FCC Part 15.209 / 15.247(c)	52.9 dBµV/m @ 2389.6 MHz (-1.1 dB)
		4	16.0		Restricted Band Edge (2390 MHz)	FCC Part 15.209 / 15.247(c)	53.6 dBµV/m @ 2389.7 MHz (-0.4 dB)
		5	17.0		Restricted Band Edge (2390 MHz)	FCC Part 15.209 / 15.247(c)	51.2 dBµV/m @ 2389.5 MHz (-2.8 dB)
		6	18.0		Restricted Band Edge (2390 MHz)	FCC Part 15.209 / 15.247(c)	52.2 dBµV/m @ 2389.6 MHz (-1.8 dB)
		6	18.0		Restricted Band Edge (2483.5 MHz)	FCC Part 15.209 / 15.247(c)	49.2 dBµV/m @ 2483.7 MHz (-4.8 dB)
		7	17.5		Restricted Band Edge (2483.5 MHz)	FCC Part 15.209 / 15.247(c)	73.9 dBµV/m @ 2483.9 MHz (-0.1 dB)
		8	17.0		Restricted Band Edge (2483.5 MHz)	FCC Part 15.209 / 15.247(c)	72.6 dBµV/m @ 2486.8 MHz (-1.4 dB)
		9	16.0		Restricted Band Edge (2483.5 MHz)	FCC Part 15.209 / 15.247(c)	71.3 dBµV/m @ 2485.1 MHz (-2.7 dB)

Notes

All testing performed with both chains transmitting at the noted power setting

Antenna: internal antennas
Duty Cycle: 6Mbps 91.7%

Client:	Pace Americas	Job Number:	J87430
Model:	HR44	T-Log Number:	T89059
		Account Manager:	Michelle Kim
Contact:	Mark Rieger		
Standard:	FCC 15.247, 15E, RSS-210, 15B	Class:	N/A

Run #1: Radiated Spurious Emissions, 30 - 26500 MHz. Operating Mode: 802.11b (1Mbps)

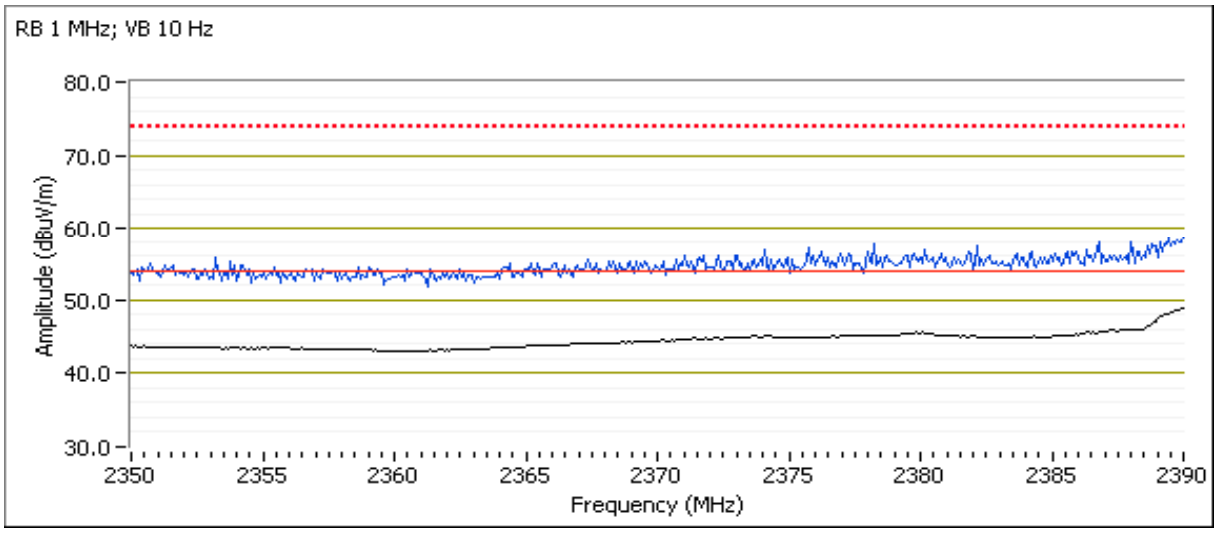
Date of Test: 08/27/12 Test Location: FT Chamber #4

Test Engineer: D. Demirci, M. Birgani

Run #1a: Channel 1 @ 2412 MHz (Power: 20dBm)

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	48.9	H	54.0	-5.1	AVG	46	1.0	POS; RB 1 MHz; VB: 10 Hz
2390.000	43.2	V	54.0	-10.8	AVG	256	1.5	POS; RB 1 MHz; VB: 10 Hz
2385.750	58.3	H	74.0	-15.7	PK	46	1.0	POS; RB 1 MHz; VB: 3 MHz
2374.450	52.7	V	74.0	-21.3	PK	256	1.5	POS; RB 1 MHz; VB: 3 MHz

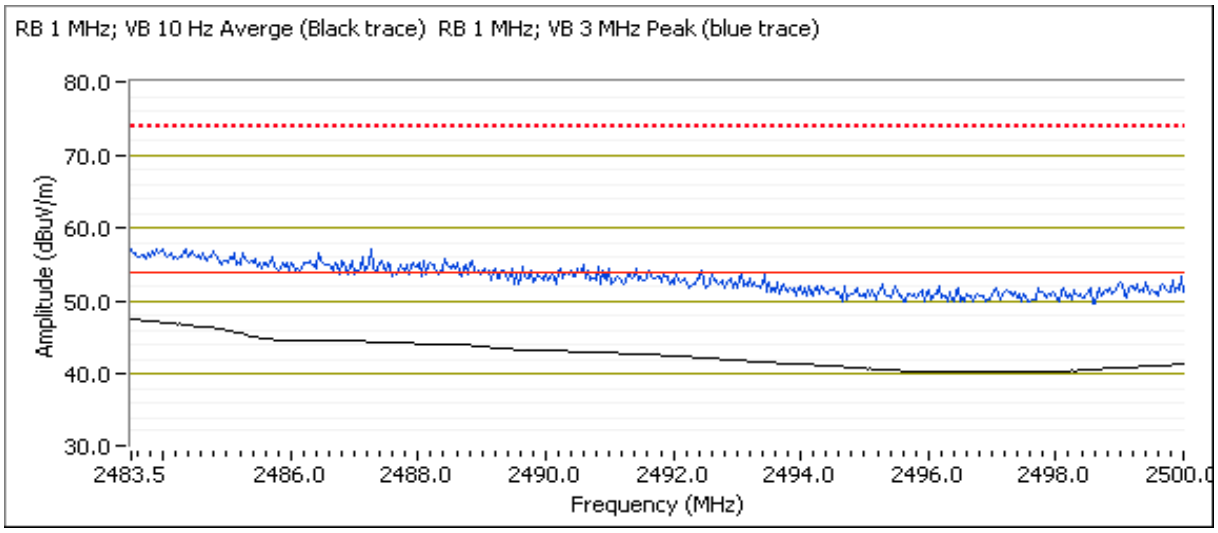


Client:	Pace Americas	Job Number:	J87430
Model:	HR44	T-Log Number:	T89059
		Account Manager:	Michelle Kim
Contact:	Mark Rieger		
Standard:	FCC 15.247, 15E, RSS-210, 15B	Class:	N/A

Run #1b: Channel 11 @ 2462 MHz (Power: 20dBm)

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	47.9	H	54.0	-6.1	AVG	51	1.0	POS; RB 1 MHz; VB: 10 Hz
2484.000	57.5	H	74.0	-16.5	PK	51	1.0	POS; RB 1 MHz; VB: 3 MHz



Client:	Pace Americas	Job Number:	J87430
Model:	HR44	T-Log Number:	T89059
		Account Manager:	Michelle Kim
Contact:	Mark Rieger		
Standard:	FCC 15.247, 15E, RSS-210, 15B	Class:	N/A

Run #2: Radiated Spurious Emissions, 30 - 26500 MHz. Operating Mode: 802.11g (6Mbps)

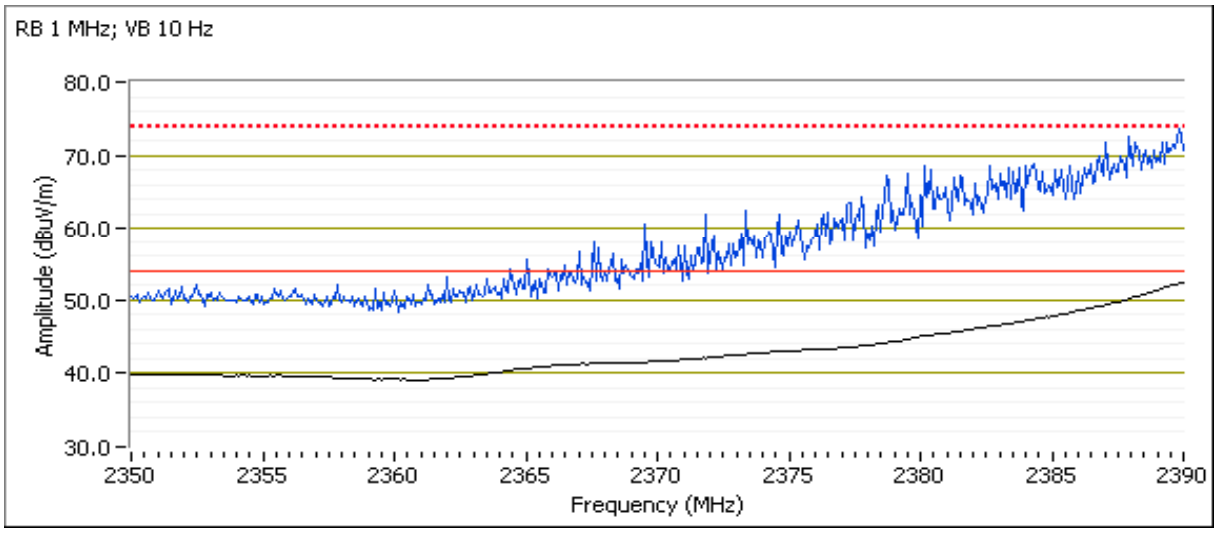
Date of Test: 08/27/12 Test Location: FT Chamber #4

Test Engineer: D. Demirci, M. Birgani

Run #2a: Channel 1 @ 2412 MHz (Power: 17.5dBm)

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	53.4	H	54.0	-0.6	AVG	41	1.1	POS; RB 1 MHz; VB: 10 Hz
2386.710	72.1	H	74.0	-1.9	PK	41	1.1	POS; RB 1 MHz; VB: 10 Hz
2390.000	49.7	V	54.0	-4.3	AVG	255	1.5	POS; RB 1 MHz; VB: 10 Hz
2389.520	68.1	V	74.0	-5.9	PK	255	1.5	POS; RB 1 MHz; VB: 10 Hz

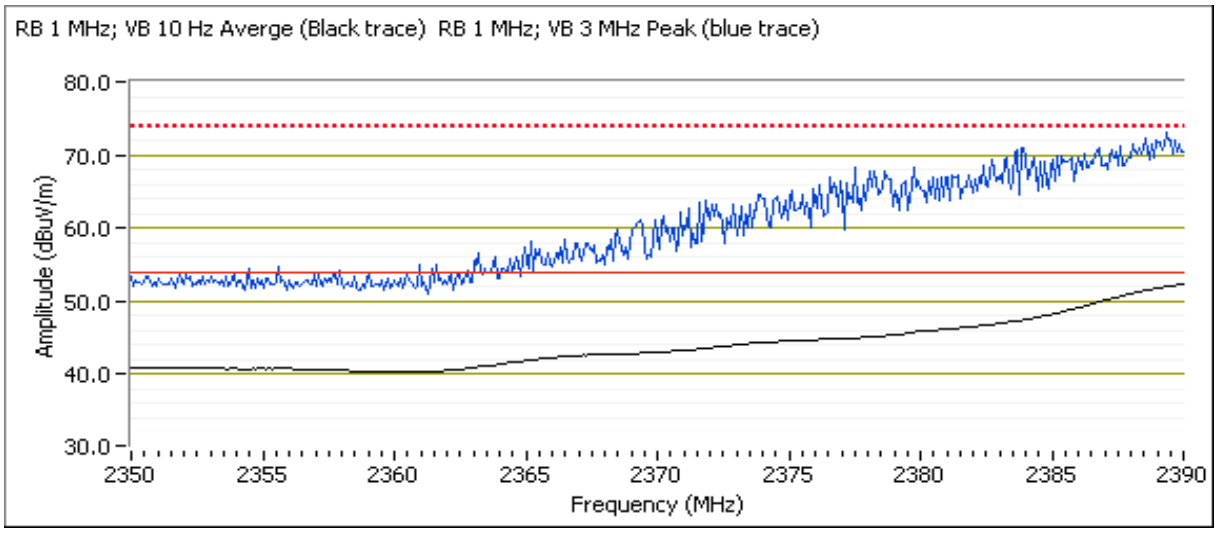


Client:	Pace Americas	Job Number:	J87430
Model:	HR44	T-Log Number:	T89059
		Account Manager:	Michelle Kim
Contact:	Mark Rieger		
Standard:	FCC 15.247, 15E, RSS-210, 15B	Class:	N/A

Run #2b: Channel 2 @ 2417 MHz (Power: 19.5dBm)

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	41	1.1	POS; RB 1 MHz; VB: 10 Hz
2388.240	72.3	H	74.0	-1.7	PK	41	1.1	POS; RB 1 MHz; VB: 10 Hz

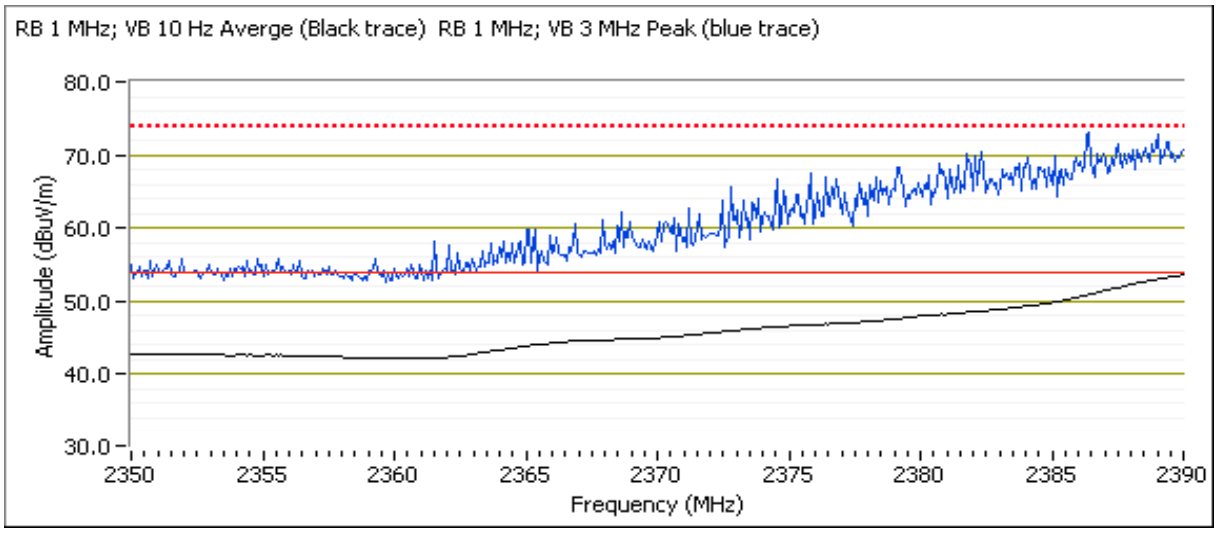


Client:	Pace Americas	Job Number:	J87430
Model:	HR44	T-Log Number:	T89059
		Account Manager:	Michelle Kim
Contact:	Mark Rieger		
Standard:	FCC 15.247, 15E, RSS-210, 15B	Class:	N/A

Run #2c: Channel 3 @ 2422 MHz (Power: 20dBm)

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	54.0	H	54.0	0.0	AVG	41	1.1	g ch 3, power 20.0dBm
2388.800	71.9	H	74.0	-2.1	PK	41	1.1	g ch 3, power 20.0dBm

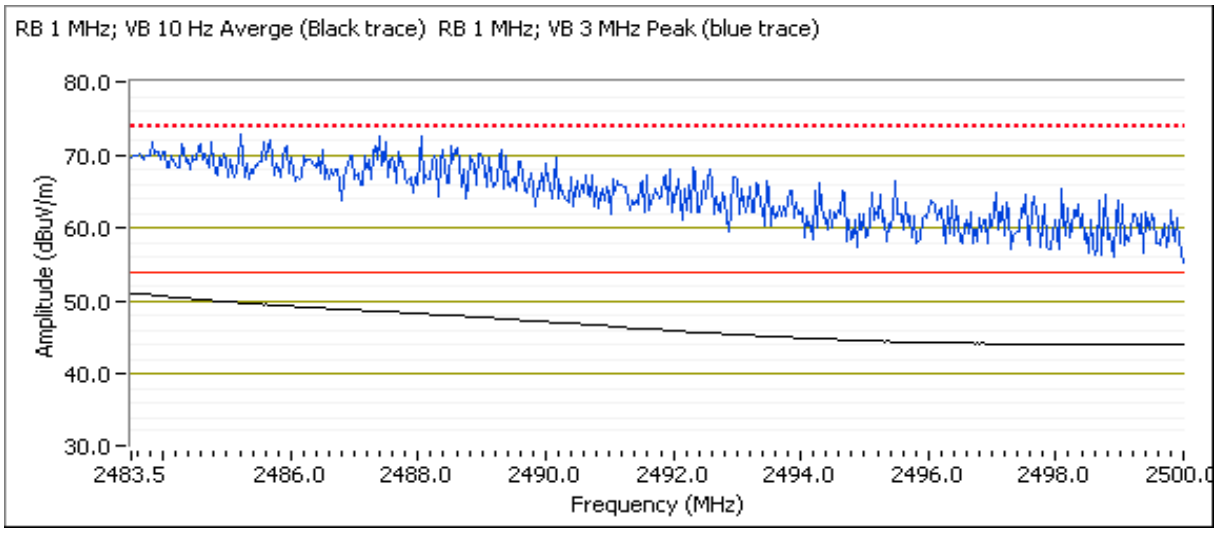


Client:	Pace Americas	Job Number:	J87430
Model:	HR44	T-Log Number:	T89059
		Account Manager:	Michelle Kim
Contact:	Mark Rieger		
Standard:	FCC 15.247, 15E, RSS-210, 15B	Class:	N/A

Run #2d: Channel 9 @ 2452 MHz (Power: 20dBm)

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	
2487.960	73.3	H	74.0	-0.7	PK	51	1.0	POS; RB 1 MHz; VB: 3 MHz
2483.530	51.1	H	54.0	-2.9	AVG	51	1.0	POS; RB 1 MHz; VB: 10 Hz

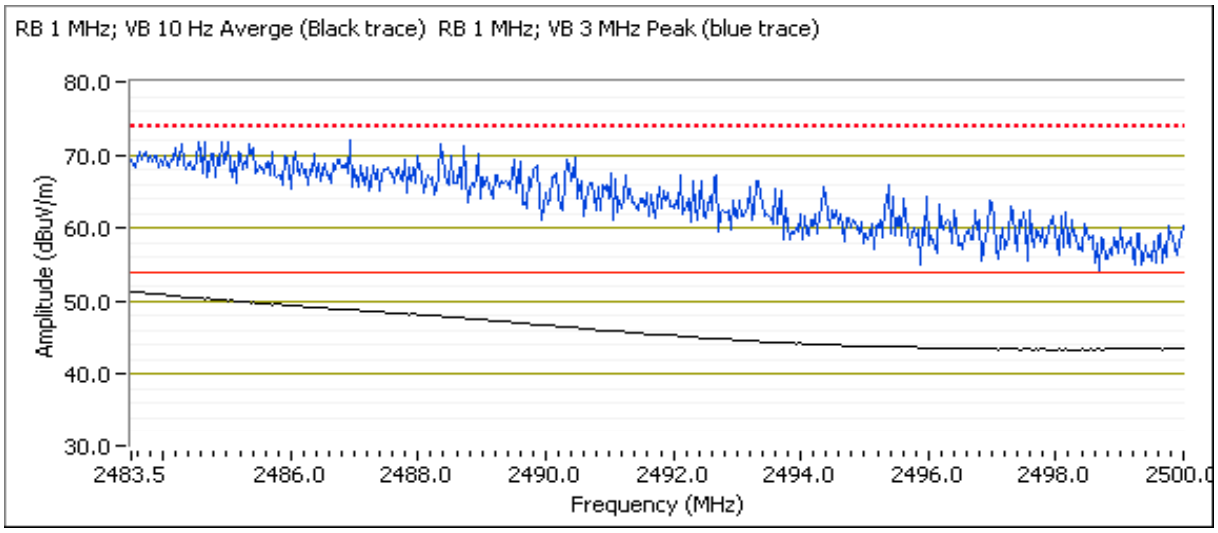


Client:	Pace Americas	Job Number:	J87430
Model:	HR44	T-Log Number:	T89059
		Account Manager:	Michelle Kim
Contact:	Mark Rieger		
Standard:	FCC 15.247, 15E, RSS-210, 15B	Class:	N/A

Run #2e: Channel 10 @ 2457 MHz (Power: 19.0dBm)

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	
2483.700	74.0	H	74.0	0.0	PK	51	1.0	POS; RB 1 MHz; VB: 3 MHz
2483.500	51.3	H	54.0	-2.7	AVG	51	1.0	POS; RB 1 MHz; VB: 10 Hz

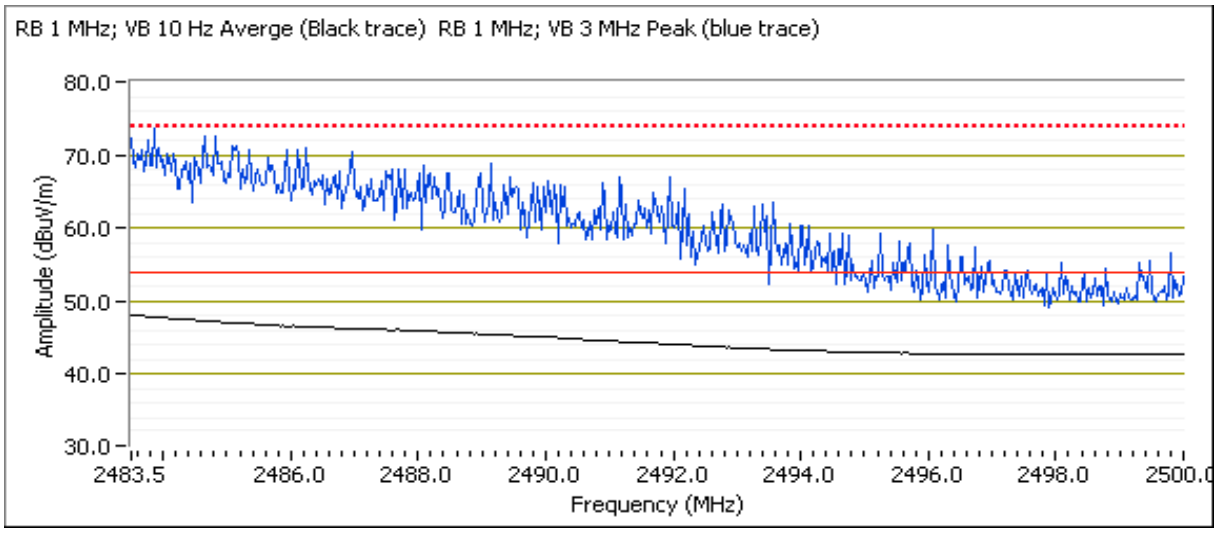


Client:	Pace Americas	Job Number:	J87430
Model:	HR44	T-Log Number:	T89059
		Account Manager:	Michelle Kim
Contact:	Mark Rieger		
Standard:	FCC 15.247, 15E, RSS-210, 15B	Class:	N/A

Run #2f: Channel 11 @ 2462 MHz (Power: 17.5dBm)

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	
2483.760	74.0	H	74.0	0.0	PK	51	1.0	POS; RB 1 MHz; VB: 3 MHz
2483.500	48.1	H	54.0	-5.9	AVG	51	1.0	POS; RB 1 MHz; VB: 10 Hz



Client:	Pace Americas	Job Number:	J87430
Model:	HR44	T-Log Number:	T89059
		Account Manager:	Michelle Kim
Contact:	Mark Rieger		
Standard:	FCC 15.247, 15E, RSS-210, 15B	Class:	N/A

Run #3: Radiated Spurious Emissions, 30 - 26500 MHz. Operating Mode: 802.11n 20 MHz

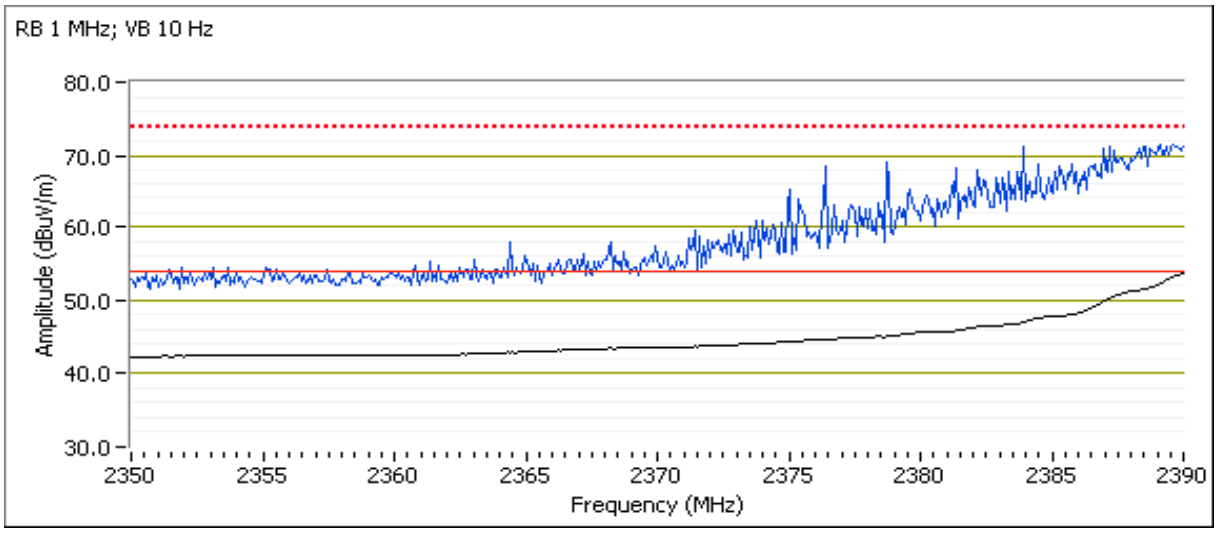
Date of Test: 08/27/12 Test Location: FT Chamber #4

Test Engineer: D. Demirci, M. Birgani

Run #3a: Channel 1 @ 2412 MHz (Power: 17.5dBm)

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	52	1.1	MCS0, 17.5 dBm
2390.000	52.0	H	54.0	-2.0	AVG	41	1.1	MCS8, 17.5 dBm
2388.720	71.2	H	74.0	-2.8	PK	41	1.1	MCS8, 17.5 dBm
2389.520	70.8	H	74.0	-3.2	PK	52	1.1	MCS0, 17.5 dBm
2389.280	70.7	V	74.0	-3.3	PK	256	1.5	MCS0, 17.5 dBm
2390.000	49.7	V	54.0	-4.3	AVG	256	1.5	MCS0, 17.5 dBm

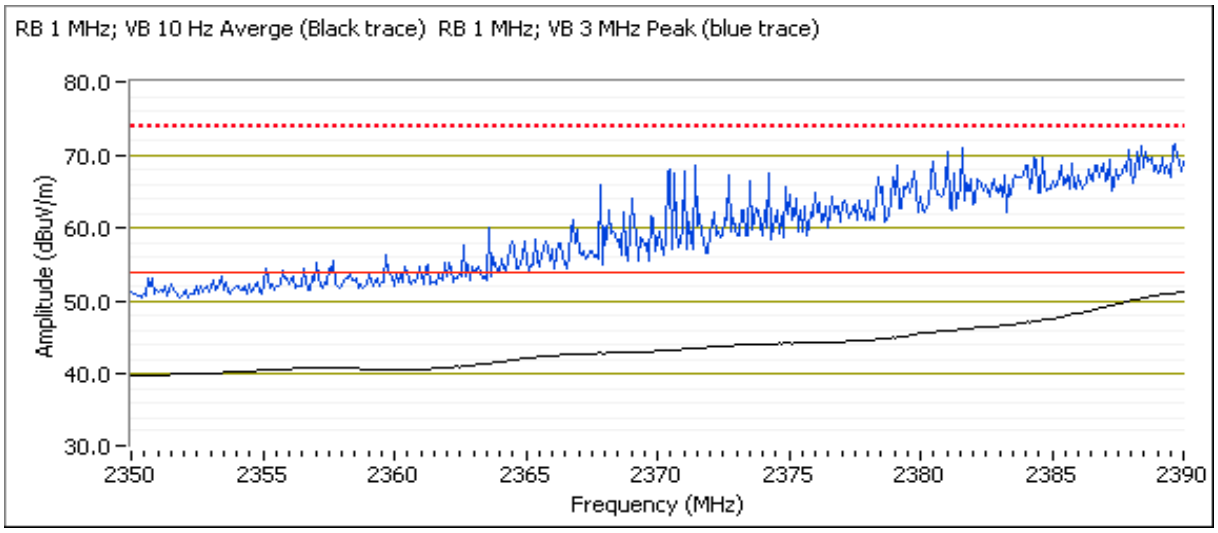


Client:	Pace Americas	Job Number:	J87430
Model:	HR44	T-Log Number:	T89059
		Account Manager:	Michelle Kim
Contact:	Mark Rieger		
Standard:	FCC 15.247, 15E, RSS-210, 15B	Class:	N/A

Run #3b: Channel 2 @ 2417 MHz (MCS0, Power: 19.0dBm)

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	53.6	H	54.0	-0.4	AVG	79	1.1	POS; RB 1 MHz; VB: 10 Hz
2387.110	70.2	H	74.0	-3.8	PK	79	1.1	POS; RB 1 MHz; VB: 3 MHz

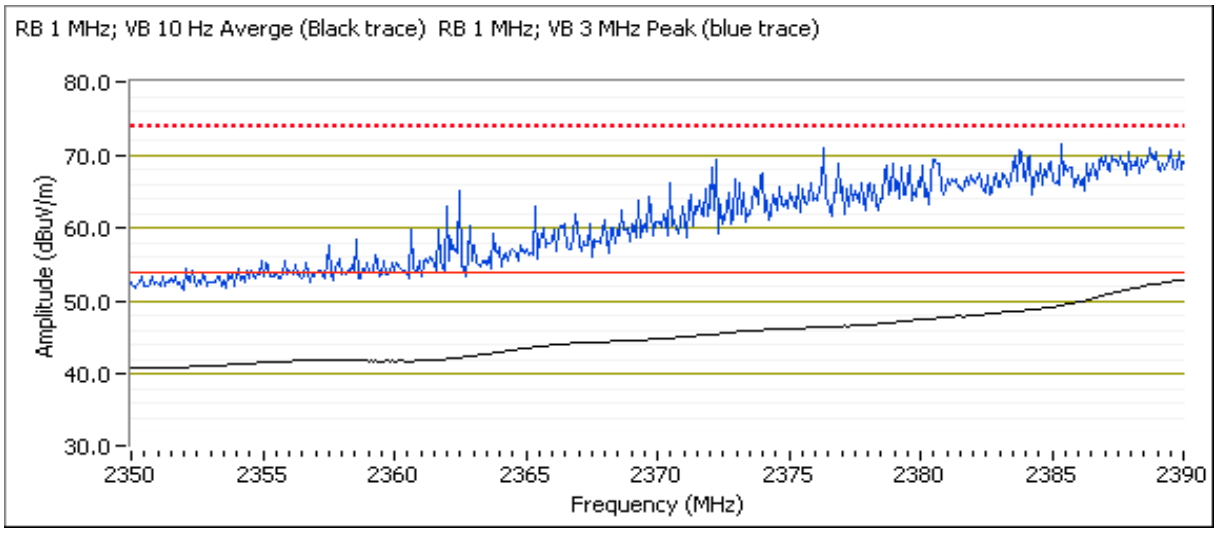


Client:	Pace Americas	Job Number:	J87430
Model:	HR44	T-Log Number:	T89059
		Account Manager:	Michelle Kim
Contact:	Mark Rieger		
Standard:	FCC 15.247, 15E, RSS-210, 15B	Class:	N/A

Run #3c: Channel 3 @ 2422 MHz (MCS0, Power: 20.0dBm)

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	79	1.1	POS; RB 1 MHz; VB: 10 Hz
2387.520	69.2	H	74.0	-4.8	PK	79	1.1	POS; RB 1 MHz; VB: 3 MHz

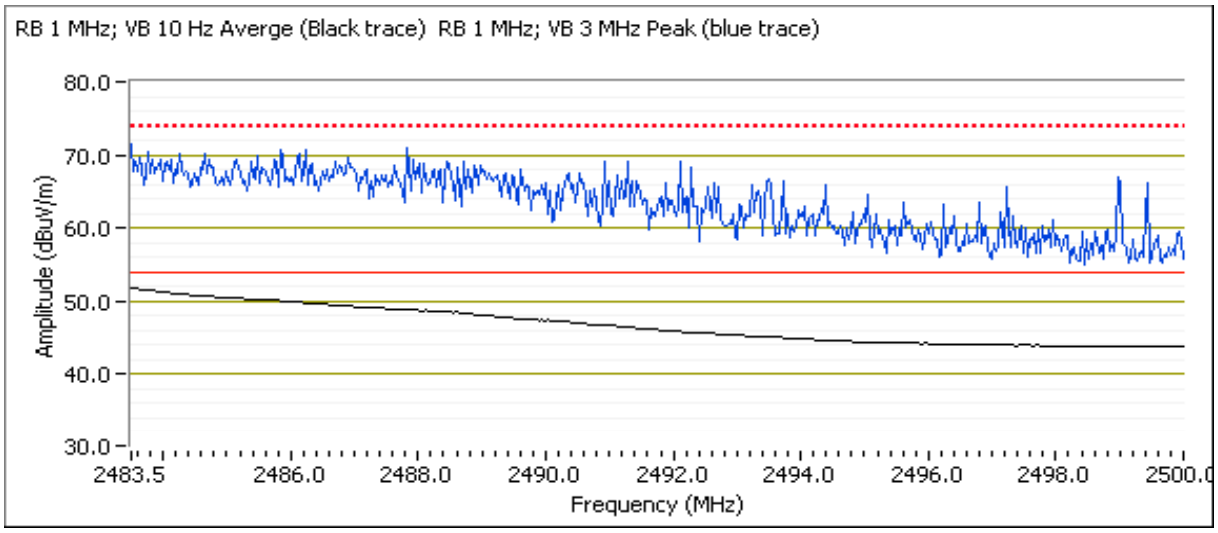


Client:	Pace Americas	Job Number:	J87430
Model:	HR44	T-Log Number:	T89059
		Account Manager:	Michelle Kim
Contact:	Mark Rieger		
Standard:	FCC 15.247, 15E, RSS-210, 15B	Class:	N/A

Run #3d: Channel 9 @ 2452 MHz (MCS0, Power: 20.0dBm)

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	
2485.850	72.0	H	74.0	-2.0	PK	51	1.0	POS; RB 1 MHz; VB: 3 MHz
2483.500	51.9	H	54.0	-2.1	AVG	51	1.0	POS; RB 1 MHz; VB: 10 Hz

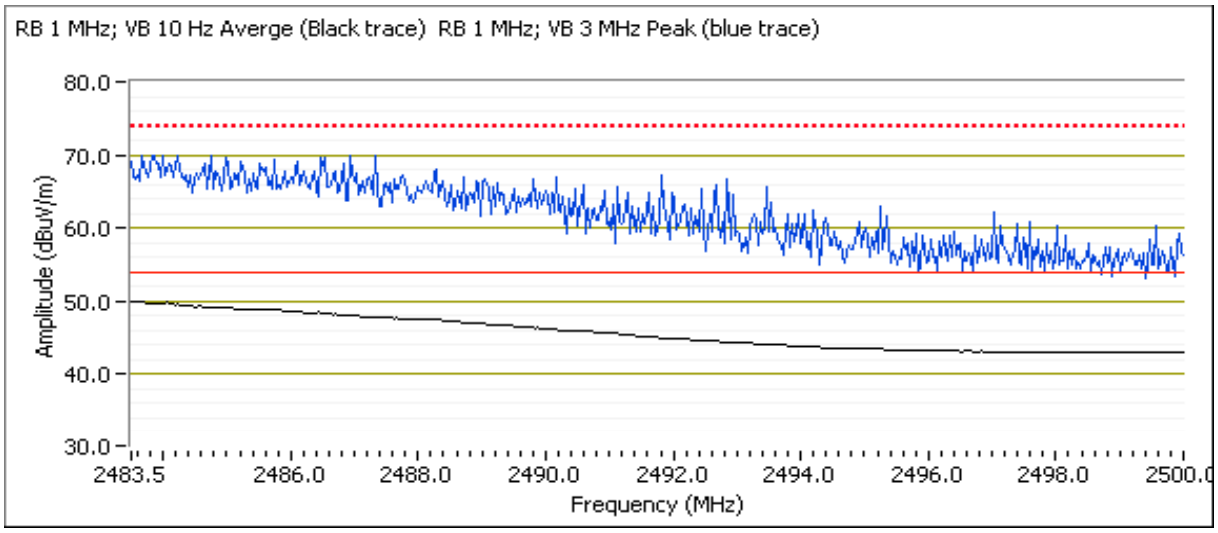


Client:	Pace Americas	Job Number:	J87430
Model:	HR44	T-Log Number:	T89059
		Account Manager:	Michelle Kim
Contact:	Mark Rieger		
Standard:	FCC 15.247, 15E, RSS-210, 15B	Class:	N/A

Run #3e: Channel 10 @ 2457 MHz (MCS0, Power: 18.5dBm)

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	
2484.190	72.7	H	74.0	-1.3	PK	51	1.0	POS; RB 1 MHz; VB: 3 MHz
2483.530	50.2	H	54.0	-3.8	AVG	51	1.0	POS; RB 1 MHz; VB: 10 Hz

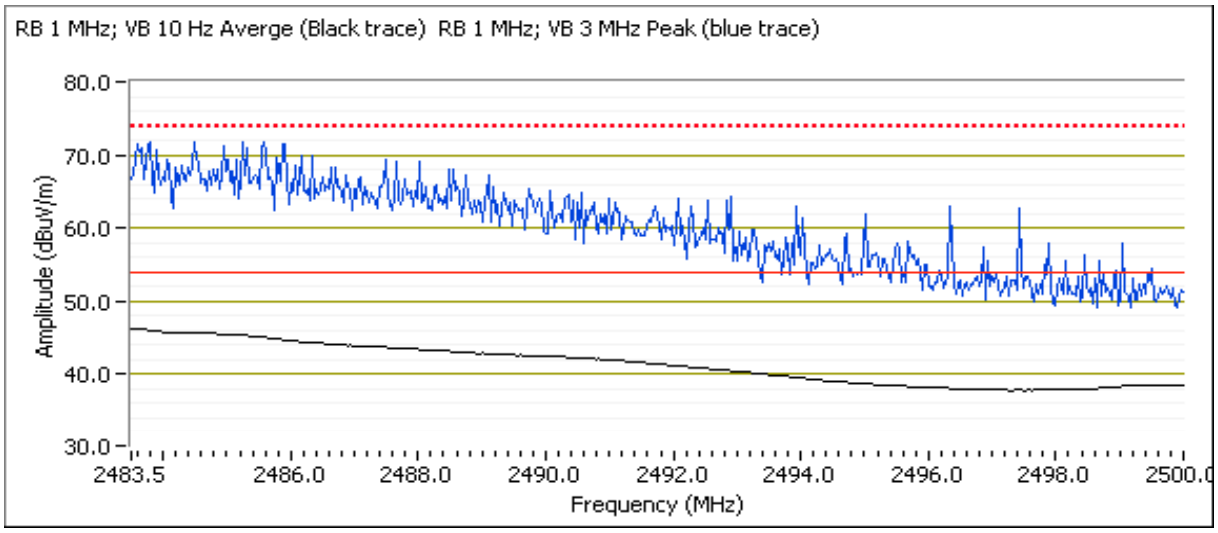


Client:	Pace Americas	Job Number:	J87430
Model:	HR44	T-Log Number:	T89059
		Account Manager:	Michelle Kim
Contact:	Mark Rieger		
Standard:	FCC 15.247, 15E, RSS-210, 15B	Class:	N/A

Run #3f: Channel 11 @ 2462 MHz (MCS0, Power: 17.0dBm)

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	
2485.220	73.3	H	74.0	-0.7	PK	51	1.0	POS; RB 1 MHz; VB: 3 MHz
2483.500	46.5	H	54.0	-7.5	AVG	51	1.0	POS; RB 1 MHz; VB: 10 Hz



Client:	Pace Americas	Job Number:	J87430
Model:	HR44	T-Log Number:	T89059
		Account Manager:	Michelle Kim
Contact:	Mark Rieger		
Standard:	FCC 15.247, 15E, RSS-210, 15B	Class:	N/A

Run #4: Radiated Spurious Emissions, 30 - 26500 MHz. Operating Mode: 802.11n 40 MHz

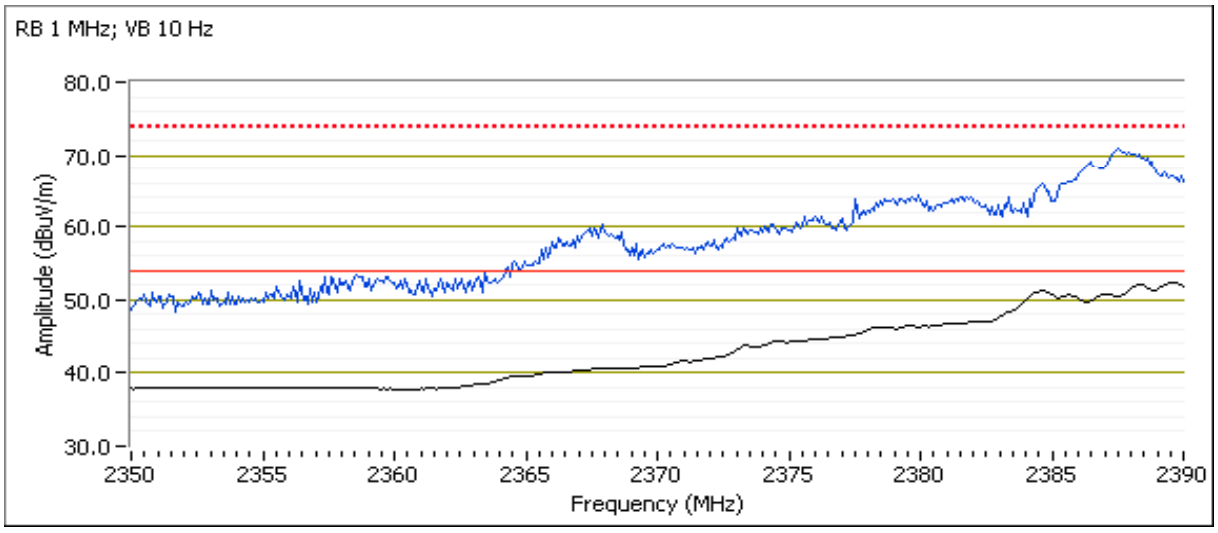
Date of Test: 08/27/12 Test Location: FT Chamber #4

Test Engineer: D. Demirci, M. Birgani

Run #1a: Channel 3 @ 2422 MHz (Power: 14.5dBm)

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	
2389.600	52.9	H	54.0	-1.1	AVG	39	1.1	MCS8, Power: 14.5 dBm
2387.350	71.2	H	74.0	-2.8	PK	39	1.1	MCS8, Power: 14.5 dBm
2389.680	48.5	V	54.0	-5.5	AVG	256	1.5	MCS8, Power: 14.5 dBm
2386.310	65.8	V	74.0	-8.2	PK	256	1.5	MCS8, Power: 14.5 dBm
2388.800	70.8	H	74.0	-3.2	PK	46	1.1	MCS0, Power: 14.5 dBm
2389.680	52.7	H	54.0	-1.3	AVG	46	1.1	MCS0, Power: 14.5 dBm

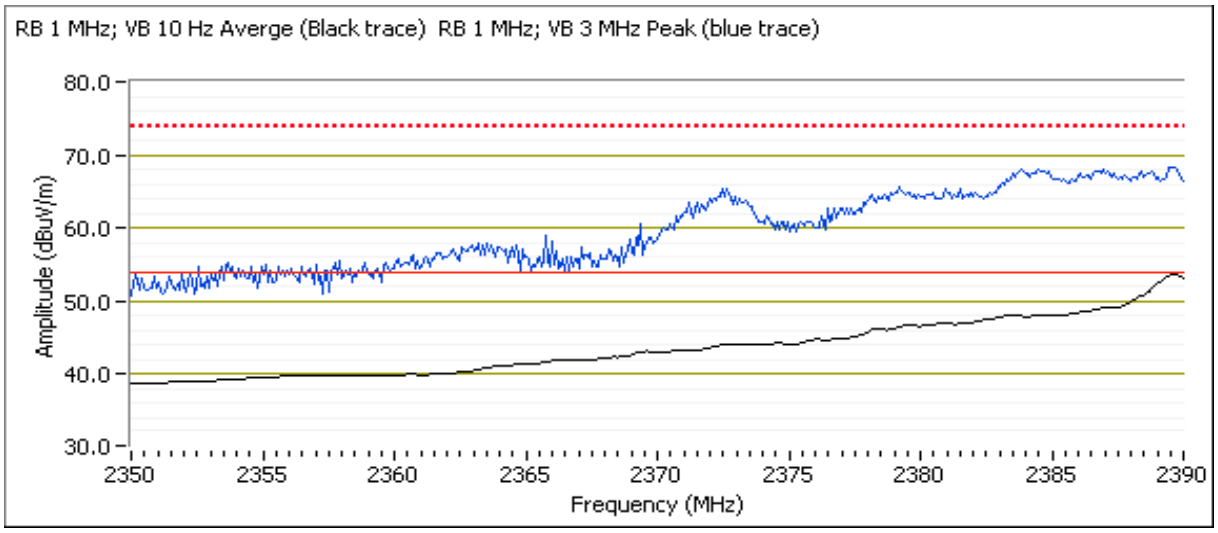


Client:	Pace Americas	Job Number:	J87430
Model:	HR44	T-Log Number:	T89059
		Account Manager:	Michelle Kim
Contact:	Mark Rieger		
Standard:	FCC 15.247, 15E, RSS-210, 15B	Class:	N/A

Run #4b: Channel 4 @ 2427 MHz (MCS0, Power: 16.0dBm)

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	
2389.680	53.6	H	54.0	-0.4	AVG	79	1.1	POS; RB 1 MHz; VB: 10 Hz
2384.310	68.5	H	74.0	-5.5	PK	79	1.1	POS; RB 1 MHz; VB: 3 MHz

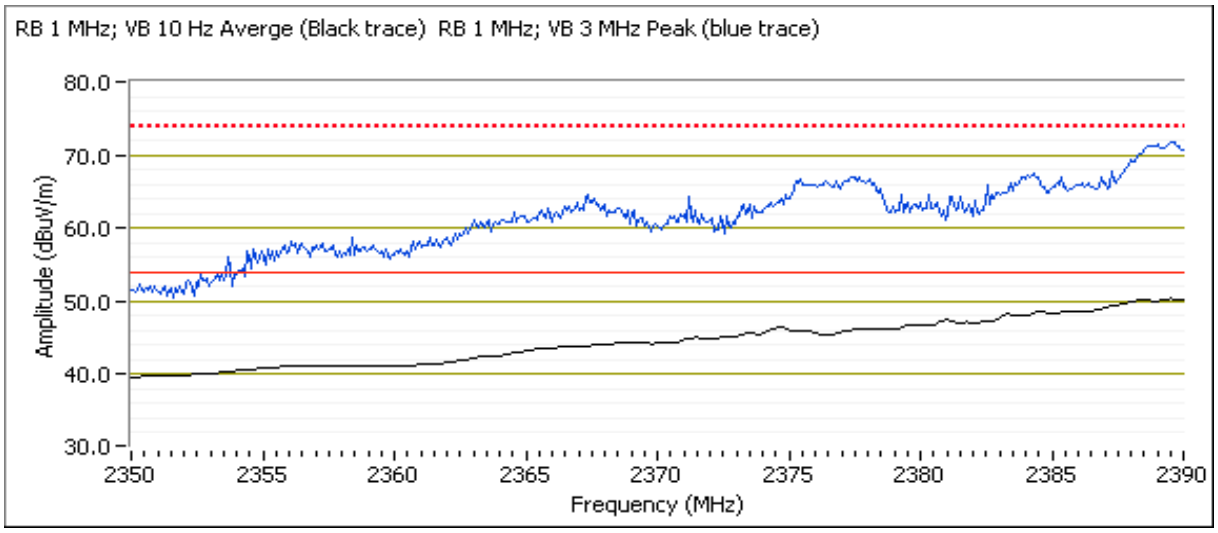


Client:	Pace Americas	Job Number:	J87430
Model:	HR44	T-Log Number:	T89059
		Account Manager:	Michelle Kim
Contact:	Mark Rieger		
Standard:	FCC 15.247, 15E, RSS-210, 15B	Class:	N/A

Run #4c: Channel 5 @ 2432 MHz (Power: 17.0dBm)

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	
2389.520	51.2	H	54.0	-2.8	AVG	79	1.1	POS; RB 1 MHz; VB: 10 Hz
2389.440	71.2	H	74.0	-2.8	PK	79	1.1	POS; RB 1 MHz; VB: 3 MHz

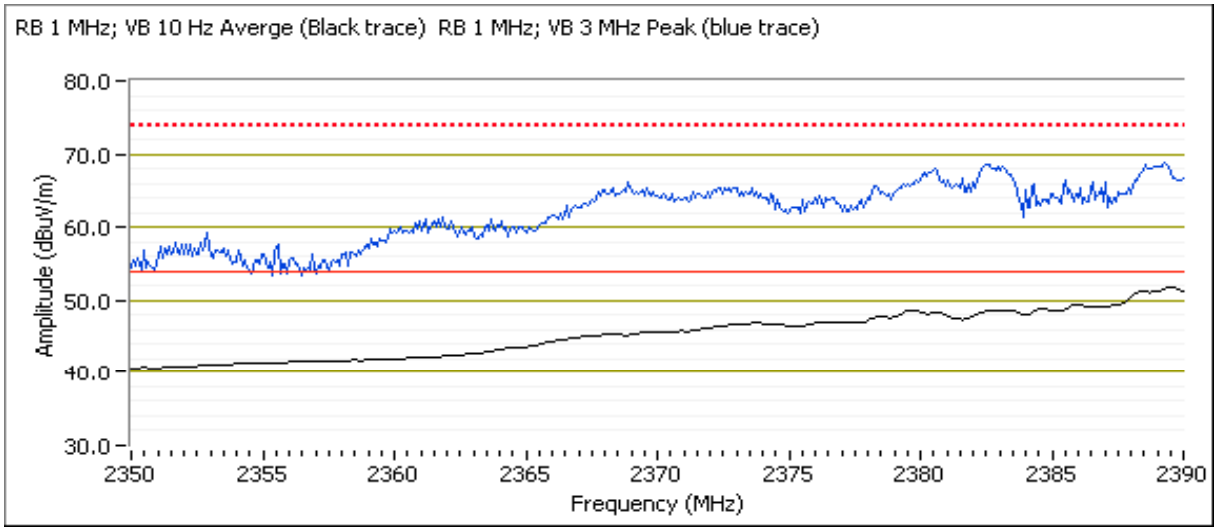


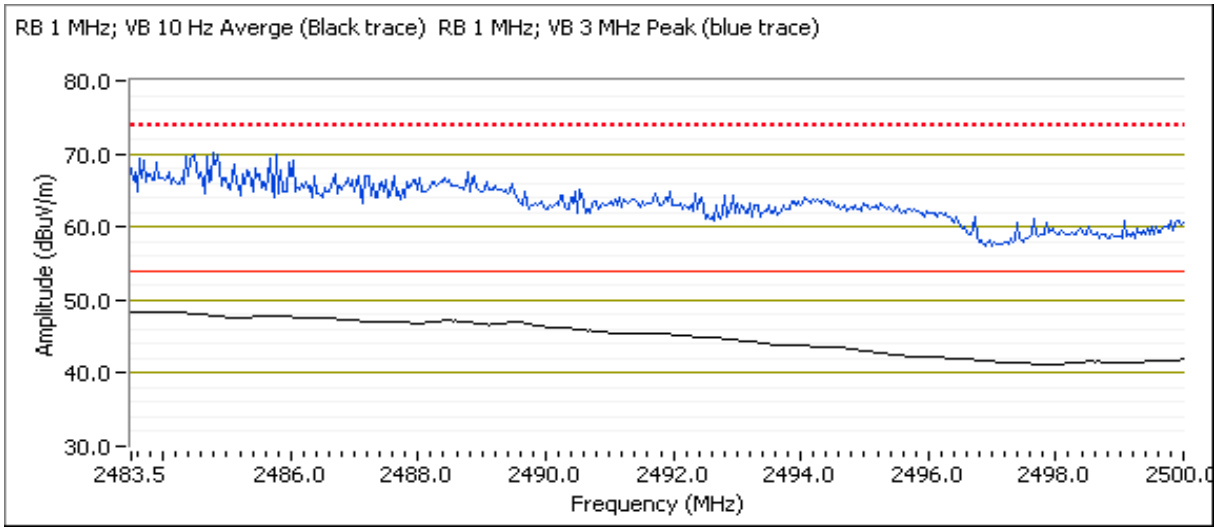
Client:	Pace Americas	Job Number:	J87430
Model:	HR44	T-Log Number:	T89059
		Account Manager:	Michelle Kim
Contact:	Mark Rieger		
Standard:	FCC 15.247, 15E, RSS-210, 15B	Class:	N/A

Run #4d: Channel 6 @ 2437 MHz (Power: 18.0dBm)

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	
2389.600	52.2	H	54.0	-1.8	AVG	79	1.1	POS; RB 1 MHz; VB: 10 Hz
2389.040	68.5	H	74.0	-5.5	PK	79	1.1	POS; RB 1 MHz; VB: 3 MHz
2483.700	49.2	H	54.0	-4.8	AVG	50	1.0	POS; RB 1 MHz; VB: 10 Hz
2488.590	68.3	H	74.0	-5.7	PK	50	1.0	POS; RB 1 MHz; VB: 3 MHz



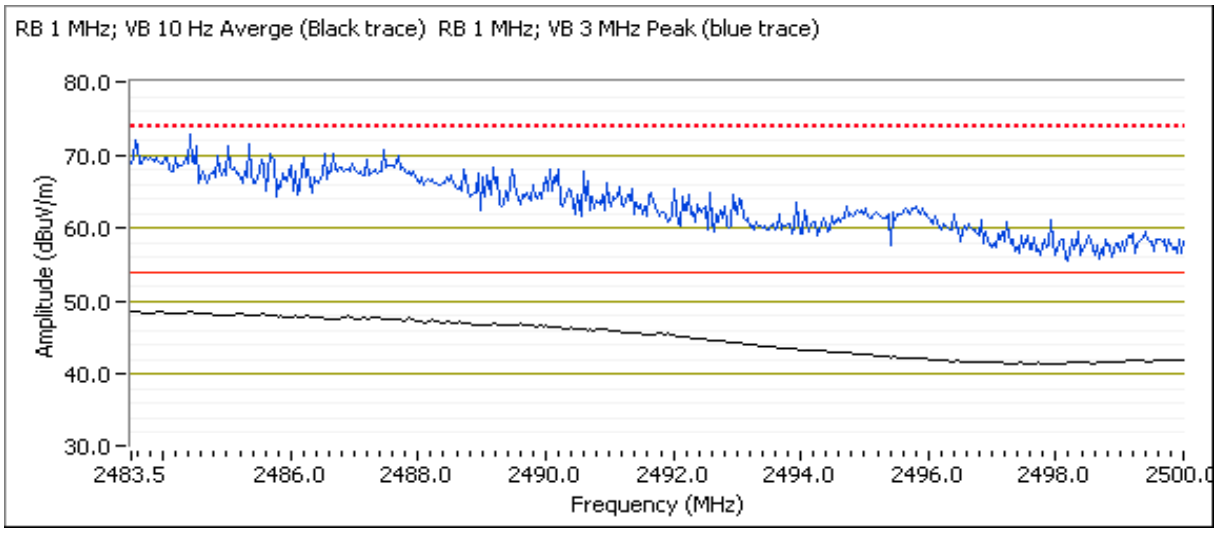


Client:	Pace Americas	Job Number:	J87430
Model:	HR44	T-Log Number:	T89059
		Account Manager:	Michelle Kim
Contact:	Mark Rieger		
Standard:	FCC 15.247, 15E, RSS-210, 15B	Class:	N/A

Run #4e: Channel 7 @ 2442 MHz (Power: 17.5dBm)

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	
2483.930	73.9	H	74.0	-0.1	PK	51	1.0	POS; RB 1 MHz; VB: 3 MHz
2483.960	49.0	H	54.0	-5.0	AVG	51	1.0	POS; RB 1 MHz; VB: 10 Hz

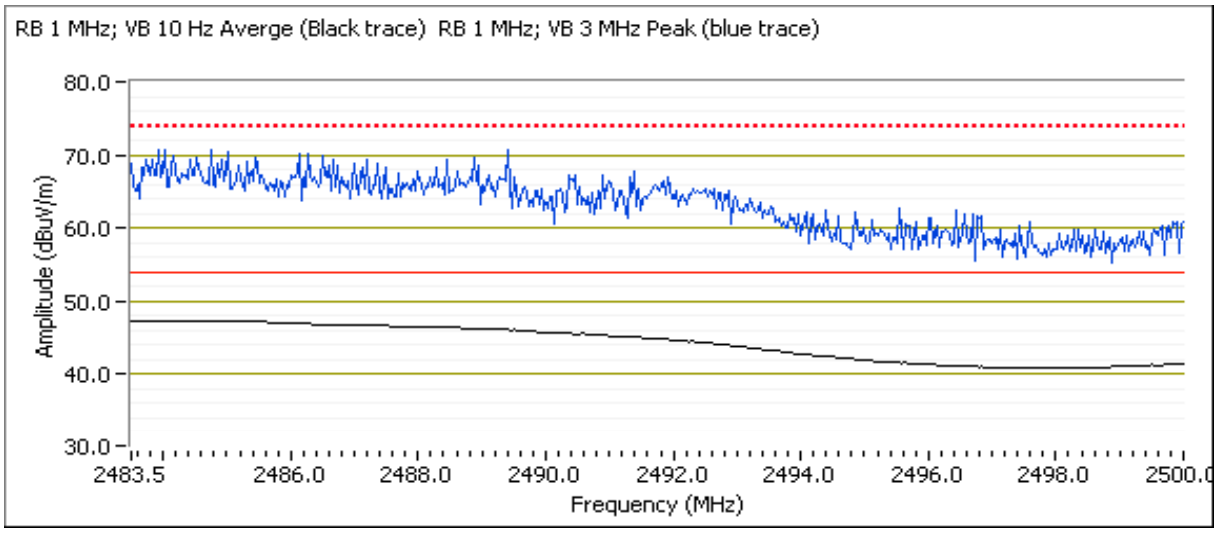


Client:	Pace Americas	Job Number:	J87430
Model:	HR44	T-Log Number:	T89059
		Account Manager:	Michelle Kim
Contact:	Mark Rieger		
Standard:	FCC 15.247, 15E, RSS-210, 15B	Class:	N/A

Run #4e: Channel 8 @ 2447 MHz (Power: 17.0dBm)

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	
2486.770	72.6	H	74.0	-1.4	PK	51	1.0	POS; RB 1 MHz; VB: 3 MHz
2484.330	47.5	H	54.0	-6.5	AVG	51	1.0	POS; RB 1 MHz; VB: 10 Hz

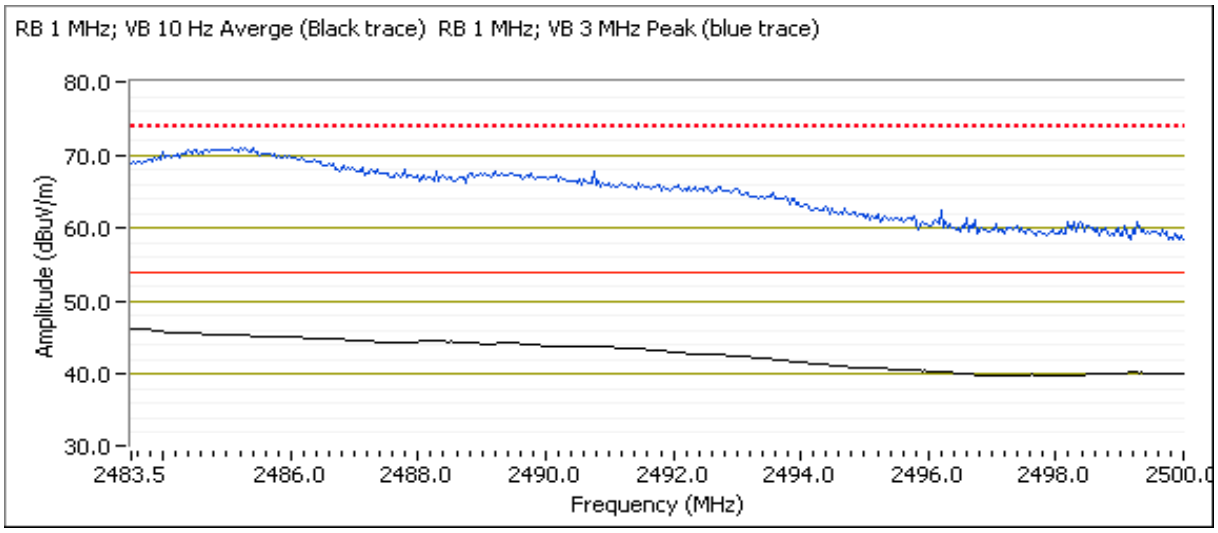


Client:	Pace Americas	Job Number:	J87430
Model:	HR44	T-Log Number:	T89059
		Account Manager:	Michelle Kim
Contact:	Mark Rieger		
Standard:	FCC 15.247, 15E, RSS-210, 15B	Class:	N/A

Run #4b: Channel 9 @ 2452 MHz (Power: 16.0dBm)

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	
2485.050	71.3	H	74.0	-2.7	PK	51	1.0	POS; RB 1 MHz; VB: 3 MHz
2483.500	47.8	H	54.0	-6.2	AVG	51	1.0	POS; RB 1 MHz; VB: 10 Hz



Client:	Pace Americas	Job Number:	J87430
Model:	HR44	T-Log Number:	T89059
		Account Manager:	Michelle Kim
Contact:	Mark Rieger		
Standard:	FCC 15.247, 15E, RSS-210, 15B	Class:	N/A

RSS 210 and FCC 15.247 (DTS) Antenna Port Measurements
MIMO and Smart Antenna Systems
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: 9/14/2012
Test Engineer: John Caizzi
Test Location: Chamber 7

Config. Used: Direct connection to antenna ports.
Config Change: NA
EUT Voltage: 120V / 60Hz

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: 24 °C
Rel. Humidity: 44 %

Client:	Pace Americas	Job Number:	J87430
Model:	HR44	T-Log Number:	T89059
		Account Manager:	Michelle Kim
Contact:	Mark Rieger		
Standard:	FCC 15.247, 15E, RSS-210, 15B	Class:	N/A

Summary of Results

Run #	Pwr setting	Avg Pwr	Test Performed	Limit	Pass / Fail	Result / Margin
Single Chain Operation						
1	-	-	Output Power	15.247(b)	Pass	11b: 19.7dBm (92mW) 11g: 19.2dBm (82mW)
2	-	-	Power spectral Density (PSD)	15.247(d)	Pass	11b: -0.8dBm/3kHz 11g: -6.2dBm/3kHz
MIMO Operation						
1	-	-	Output Power	15.247(b)	Pass	n20:21.7dBm (147mW) n40:19.8dBm (96mW)
2	-	-	Power spectral Density (PSD)	15.247(d)	Pass	n20: -4.4dBm/3kHz n40: -8.5dBm/3kHz
Applicable to both modes of operation						
3	-	-	Minimum 6dB Bandwidth	15.247(a)	Pass	11b: 8.1MHz 11g: 16.7MHz n20: 17.8MHz n40: 36.1MHz
3	-	-	99% Bandwidth	RSS GEN	Pass	11b: 10.6MHz 11g: 17.1MHz n20: 18.1MHz n40: 36.4MHz
4	-	-	Spurious emissions	15.247(b)	Pass	All emissions > -30dBc

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

Legacy modes, 802.11b and 802.11g are single chain only.

Client:	Pace Americas	Job Number:	J87430
Model:	HR44	T-Log Number:	T89059
		Account Manager:	Michelle Kim
Contact:	Mark Rieger		
Standard:	FCC 15.247, 15E, RSS-210, 15B	Class:	N/A

Run #1: Output Power - Chain A + B

Operating Mode: 802.11b

Transmitted signal on chain is coherent ? Yes

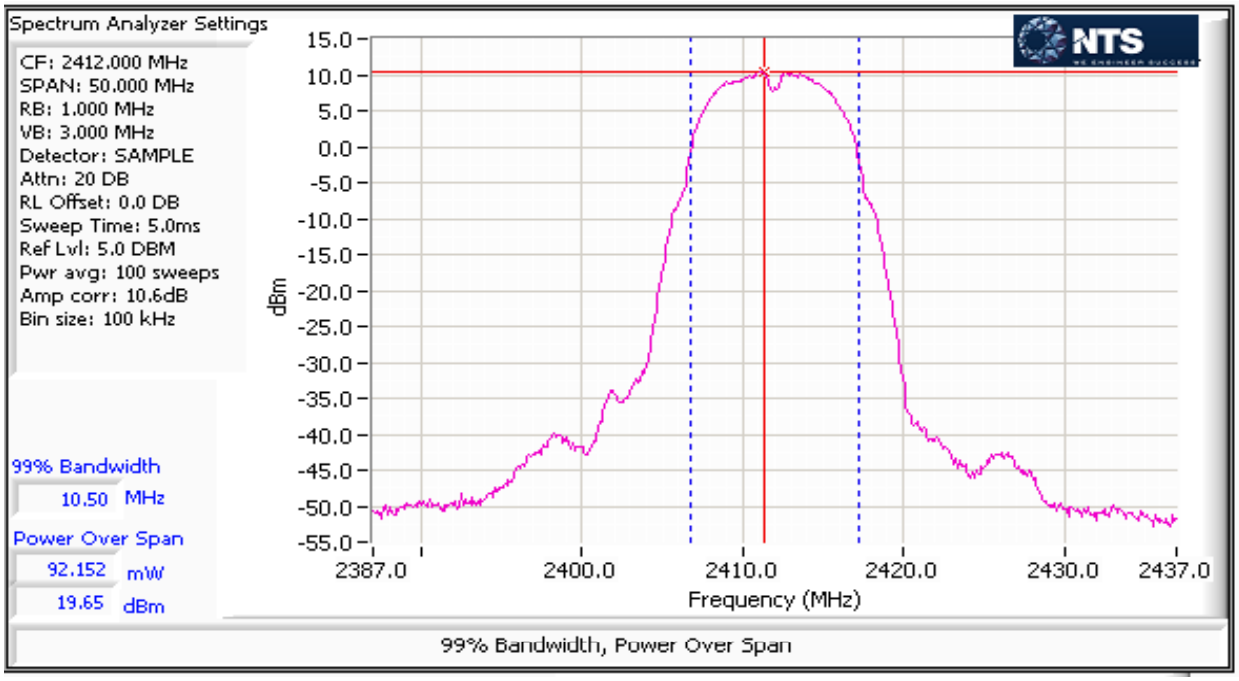
2412 MHz	Chain 1	Chain 2	Chain 3	Chain 4	Total Across All Chains		Limit	
Power Setting Note 3	20.0							
Output Power (dBm) Note 1	19.7				19.7 dBm	0.092 W	30.0 dBm	1.000 W
Antenna Gain (dBi) Note 2	3.3				3.3 dBi	3.3 dBi	Pass	
eirp (dBm) Note 2	22.95				23.0 dBm	0.197 W		

2437 MHz	Chain 1	Chain 2	Chain 3	Chain 4	Total Across All Chains		Limit	
Power Setting Note 3	20.0							
Output Power (dBm) Note 1	19.5				19.5 dBm	0.089 W	30.0 dBm	1.000 W
Antenna Gain (dBi) Note 2	3.3				3.3 dBi	3.3 dBi	Pass	
eirp (dBm) Note 2	22.77				22.8 dBm	0.189 W		

2462 MHz	Chain 1	Chain 2	Chain 3	Chain 4	Total Across All Chains		Limit	
Power Setting Note 3	20.0							
Output Power (dBm) Note 1	19.2				19.2 dBm	0.084 W	30.0 dBm	1.000 W
Antenna Gain (dBi) Note 2	3.3				3.3 dBi	3.3 dBi	Pass	
eirp (dBm) Note 2	22.54				22.5 dBm	0.179 W		

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 not continuous but the ESI analyzer was configured with a gated sweep such that the analyzer was only sweeping when the device was transmitting) 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.

Client:	Pace Americas	Job Number:	J87430
Model:	HR44	T-Log Number:	T89059
		Account Manager:	Michelle Kim
Contact:	Mark Rieger		
Standard:	FCC 15.247, 15E, RSS-210, 15B	Class:	N/A



Client:	Pace Americas	Job Number:	J87430
Model:	HR44	T-Log Number:	T89059
		Account Manager:	Michelle Kim
Contact:	Mark Rieger		
Standard:	FCC 15.247, 15E, RSS-210, 15B	Class:	N/A

Operating Mode: 802.11g

Transmitted signal on chain is coherent ? yes

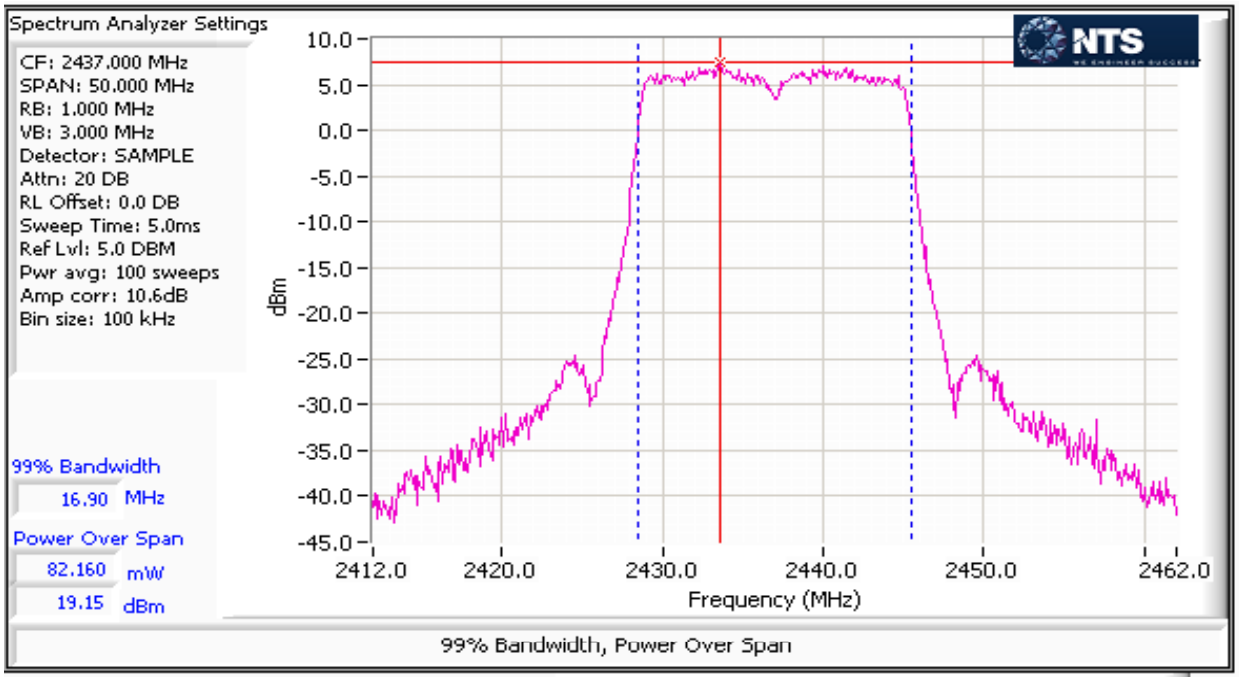
2412 MHz	Chain 1	Chain 2	Chain 3	Chain 4	Total Across All Chains		Limit	
Power Setting Note 3	17.5							
Output Power (dBm) Note 1	17.05				17.1 dBm	0.051 W	30.0 dBm	1.000 W
Antenna Gain (dBi) Note 2	3.3				3.3 dBi	3.3 dBi	Pass	
eirp (dBm) Note 2	20.35				20.4 dBm	0.108 W		

2437 MHz	Chain 1	Chain 2	Chain 3	Chain 4	Total Across All Chains		Limit	
Power Setting Note 3	20.0							
Output Power (dBm) Note 1	19.15				19.2 dBm	0.082 W	30.0 dBm	1.000 W
Antenna Gain (dBi) Note 2	3.3				3.3 dBi	3.3 dBi	Pass	
eirp (dBm) Note 2	22.45				22.5 dBm	0.176 W		

2462 MHz	Chain 1	Chain 2	Chain 3	Chain 4	Total Across All Chains		Limit	
Power Setting Note 3	17.5							
Output Power (dBm) Note 1	16.59				16.6 dBm	0.046 W	30.0 dBm	1.000 W
Antenna Gain (dBi) Note 2	3.3				3.3 dBi	3.3 dBi	Pass	
eirp (dBm) Note 2	19.89				19.9 dBm	0.098 W		

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 not continuous but the ESI analyzer was configured with a gated sweep such that the analyzer was only sweeping when the device was transmitting) 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.

Client:	Pace Americas	Job Number:	J87430
Model:	HR44	T-Log Number:	T89059
		Account Manager:	Michelle Kim
Contact:	Mark Rieger		
Standard:	FCC 15.247, 15E, RSS-210, 15B	Class:	N/A



Client:	Pace Americas	Job Number:	J87430
Model:	HR44	T-Log Number:	T89059
		Account Manager:	Michelle Kim
Contact:	Mark Rieger		
Standard:	FCC 15.247, 15E, RSS-210, 15B	Class:	N/A

Operating Mode: 802.11n20

Transmitted signal on chain is coherent ? yes

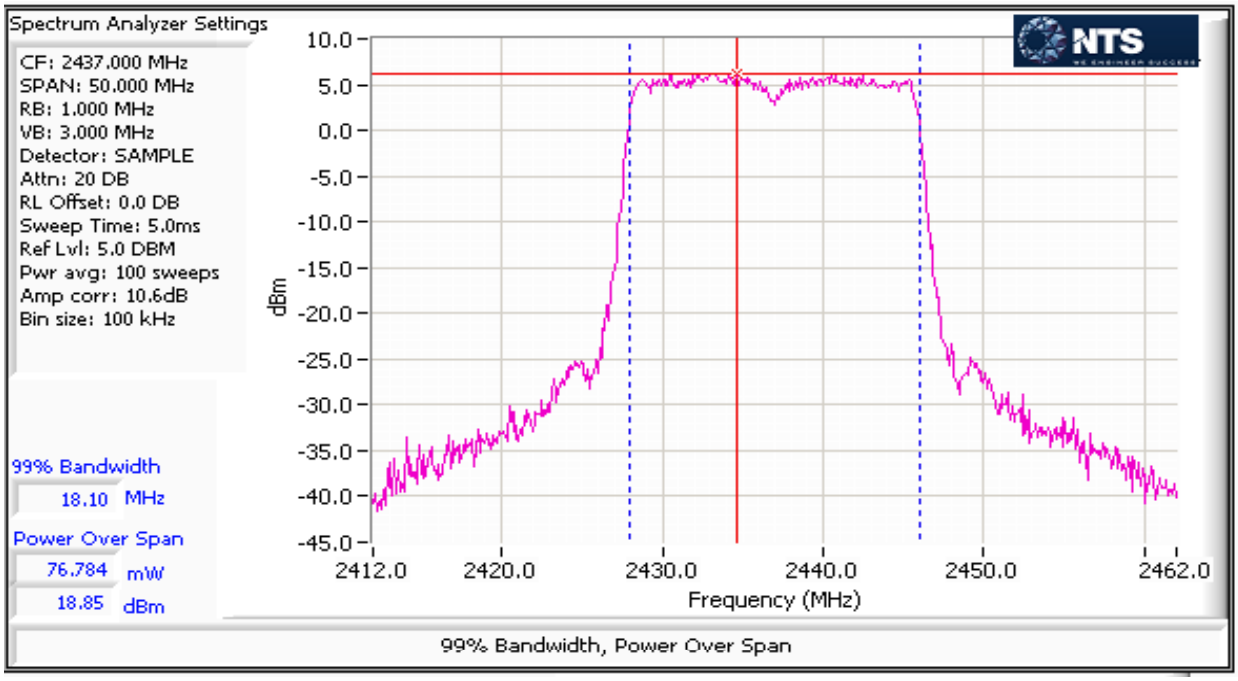
2412 MHz	Chain 1	Chain 2	Chain 3	Chain 4	Total Across All Chains		Limit	
Power Setting Note 3	17.5							
Output Power (dBm) Note 1	16.7	16.24			19.5 dBm	0.088 W	29.7 dBm	0.931 W
Antenna Gain (dBi) Note 2	3.3	3.3			6.3 dBi	6.3 dBi	Pass	
eirp (dBm) Note 2	20.0	19.54			25.8 dBm	0.378 W		

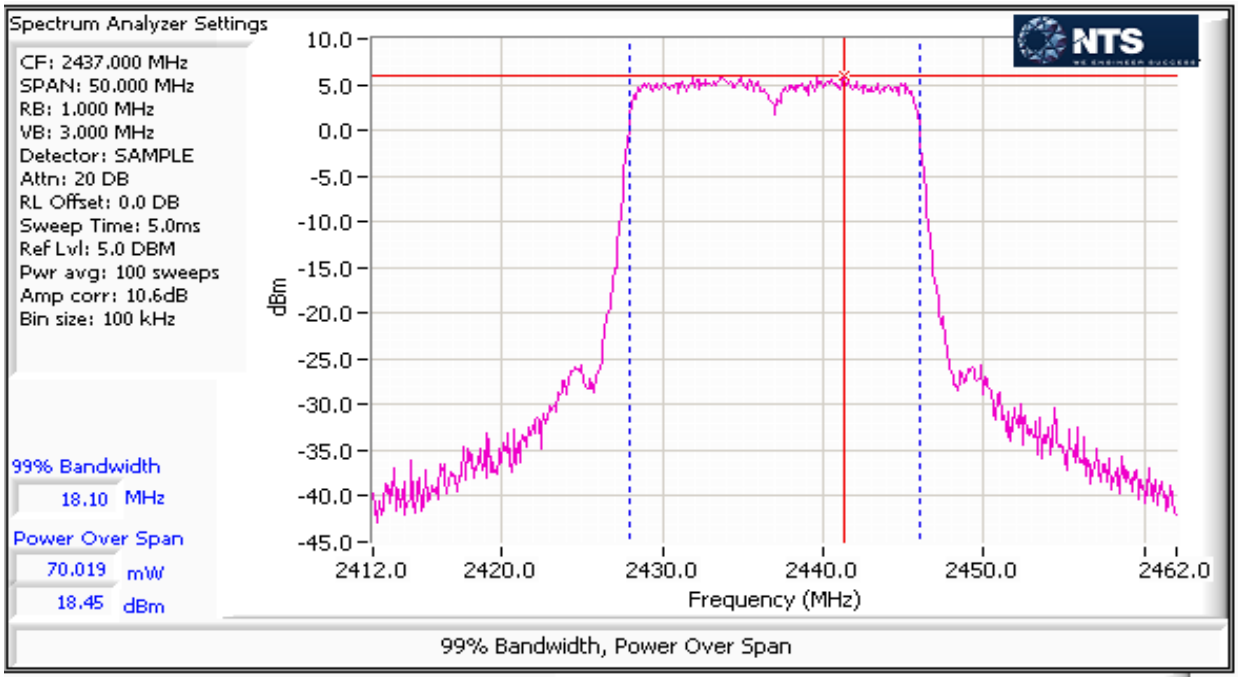
2437 MHz	Chain 1	Chain 2	Chain 3	Chain 4	Total Across All Chains		Limit	
Power Setting Note 3	20.0							
Output Power (dBm) Note 1	18.9	18.45			21.7 dBm	0.147 W	29.7 dBm	0.931 W
Antenna Gain (dBi) Note 2	3.3	3.3			6.3 dBi	6.3 dBi	Pass	
eirp (dBm) Note 2	22.2	21.75			28.0 dBm	0.627 W		

2462 MHz	Chain 1	Chain 2	Chain 3	Chain 4	Total Across All Chains		Limit	
Power Setting Note 3	17.0							
Output Power (dBm) Note 1	15.57	15.74			18.7 dBm	0.074 W	29.7 dBm	0.931 W
Antenna Gain (dBi) Note 2	3.3	3.3			6.3 dBi	6.3 dBi	Pass	
eirp (dBm) Note 2	18.87	19.04			25.0 dBm	0.315 W		

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 not continuous but the ESI analyzer was configured with a gated sweep such that the analyzer was only sweeping when the device was transmitting) 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 3:	Power setting - if a single number the same power setting was used for each chain.

Client:	Pace Americas	Job Number:	J87430
Model:	HR44	T-Log Number:	T89059
		Account Manager:	Michelle Kim
Contact:	Mark Rieger		
Standard:	FCC 15.247, 15E, RSS-210, 15B	Class:	N/A





Client:	Pace Americas	Job Number:	J87430
Model:	HR44	T-Log Number:	T89059
		Account Manager:	Michelle Kim
Contact:	Mark Rieger		
Standard:	FCC 15.247, 15E, RSS-210, 15B	Class:	N/A

Operating Mode: 802.11n40
Transmitted signal on chain is coherent ? yes

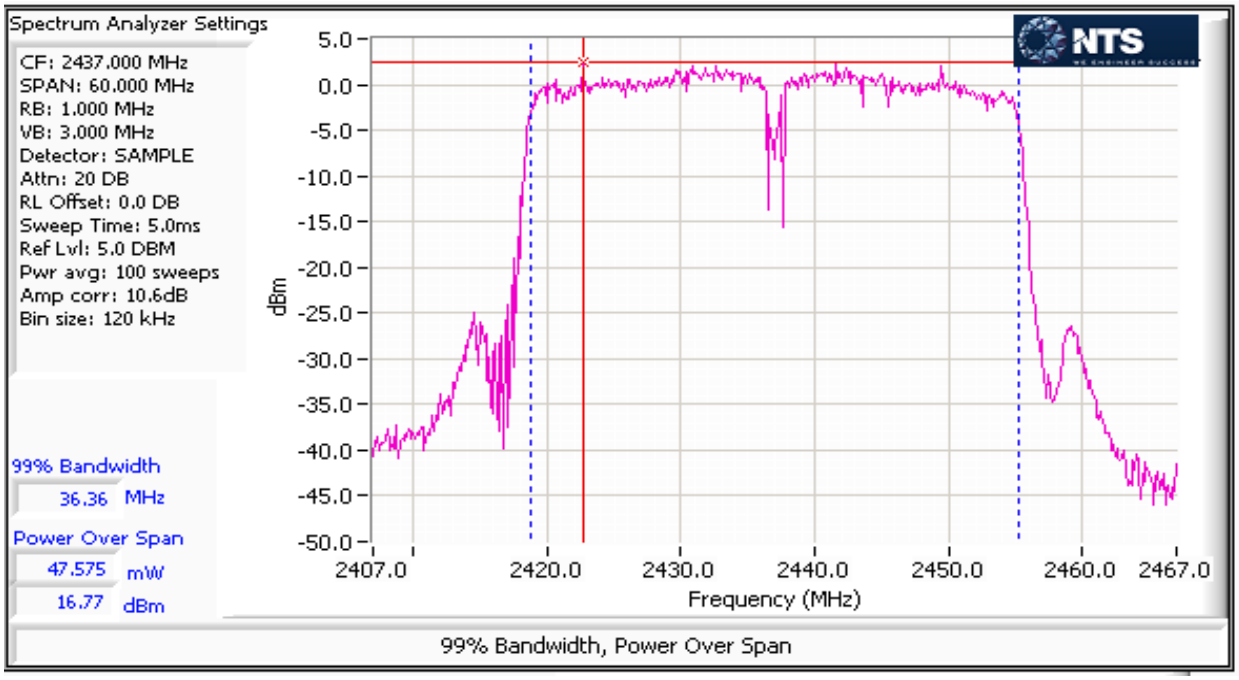
2422	Chain 1	Chain 2	Chain 3	Chain 4	Total Across All Chains		Limit	
Power Setting Note 3	14.5							
Output Power (dBm) Note 1	13.25	13.6			16.4 dBm	0.044 W	29.7 dBm	0.931 W
Antenna Gain (dBi) Note 2	3.3	3.3			6.3 dBi	6.3 dBi	Pass	
eirp (dBm) Note 2	16.55	16.92			22.8 dBm	0.189 W		

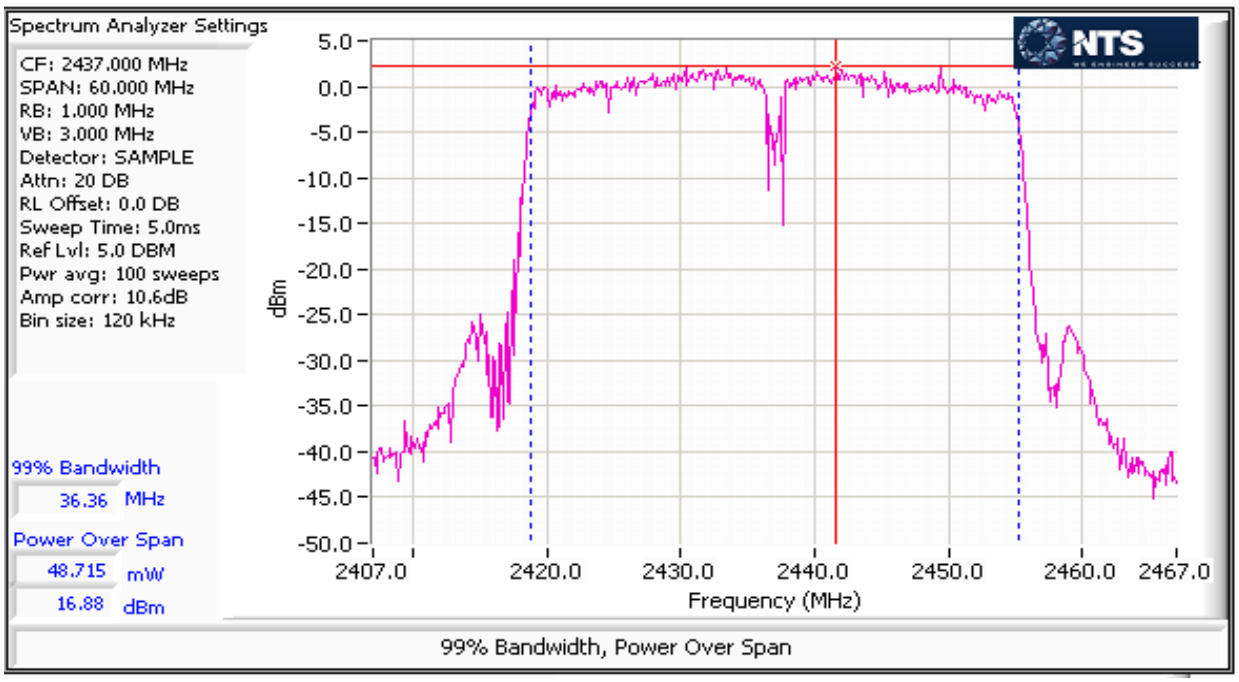
2437 MHz	Chain 1	Chain 2	Chain 3	Chain 4	Total Across All Chains		Limit	
Power Setting Note 3	18.0							
Output Power (dBm) Note 1	16.77	16.9			19.8 dBm	0.096 W	29.7 dBm	0.931 W
Antenna Gain (dBi) Note 2	3.3	3.3			6.3 dBi	6.3 dBi	Pass	
eirp (dBm) Note 2	20.07	20.18			26.1 dBm	0.412 W		

2452	Chain 1	Chain 2	Chain 3	Chain 4	Total Across All Chains		Limit	
Power Setting Note 3	16.0							
Output Power (dBm) Note 1	14.74	14.98			17.9 dBm	0.061 W	29.7 dBm	0.931 W
Antenna Gain (dBi) Note 2	3.3	3.3			6.3 dBi	6.3 dBi	Pass	
eirp (dBm) Note 2	18.04	18.28			24.2 dBm	0.262 W		

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 not continuous but the ESI analyzer was configured with a gated sweep such that the analyzer was only sweeping when the device was transmitting) and power integration over 60 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 3:	Power setting - if a single number the same power setting was used for each chain.

Client:	Pace Americas	Job Number:	J87430
Model:	HR44	T-Log Number:	T89059
		Account Manager:	Michelle Kim
Contact:	Mark Rieger		
Standard:	FCC 15.247, 15E, RSS-210, 15B	Class:	N/A





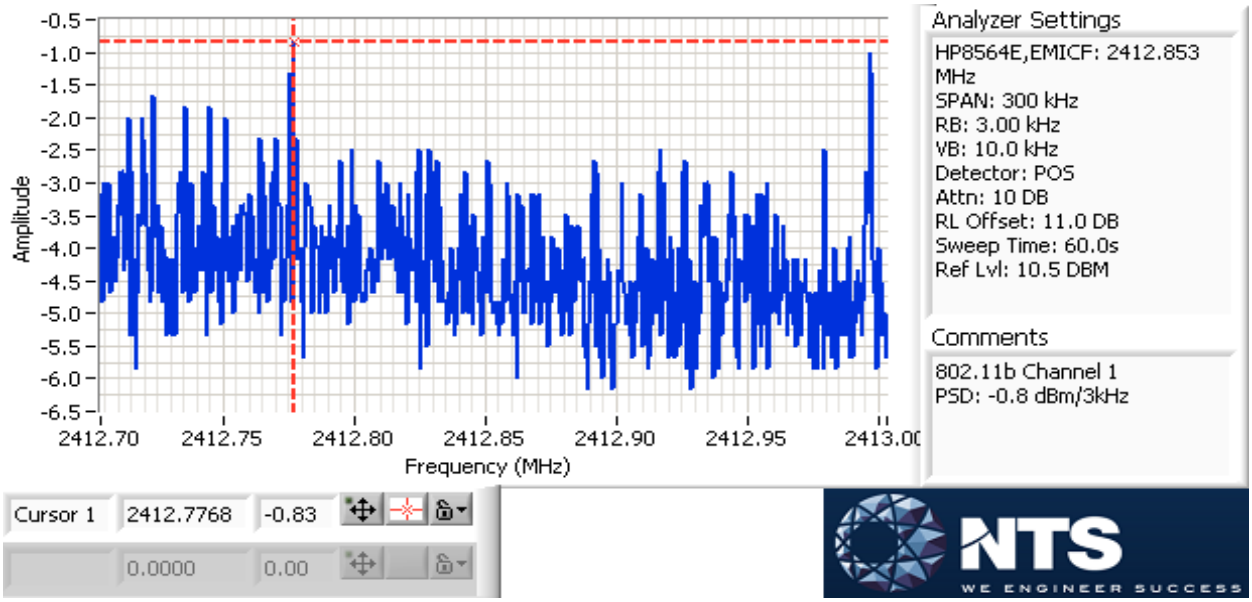
Client:	Pace Americas	Job Number:	J87430
Model:	HR44	T-Log Number:	T89059
		Account Manager:	Michelle Kim
Contact:	Mark Rieger		
Standard:	FCC 15.247, 15E, RSS-210, 15B	Class:	N/A

Run #2: Power spectral Density

Power Setting	Frequency (MHz)	PSD (dBm/3kHz) Note 1 Chain 1	Chain 2	Chain 3	Chain 4	Total	Limit dBm/3kHz	Result
802.11b								
20	2412	-0.8				-0.8	8.0	Pass
20	2437	-2.0				-2.0	8.0	Pass
20	2462	-2.0				-2.0	8.0	Pass
802.11g								
17.5	2412	-8.3				-8.3	8.0	Pass
20.0	2437	-6.2				-6.2	8.0	Pass
17.5	2462	-8.7				-8.7	8.0	Pass
802.11n20								
17.5	2412	-9.6	-6.0			-4.4	8.0	Pass
20.0	2437	-7.7	-7.3			-4.5	8.0	Pass
17.0	2462	-10.3	-8.7			-6.4	8.0	Pass
802.11n40								
14.5	2422	-14.8	-14.2			-11.5	8.0	Pass
18.0	2437	-11.3	-12.7			-8.9	8.0	Pass
16.0	2452	-13.4	-10.2			-8.5	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.

Client:	Pace Americas	Job Number:	J87430
Model:	HR44	T-Log Number:	T89059
		Account Manager:	Michelle Kim
Contact:	Mark Rieger		
Standard:	FCC 15.247, 15E, RSS-210, 15B	Class:	N/A



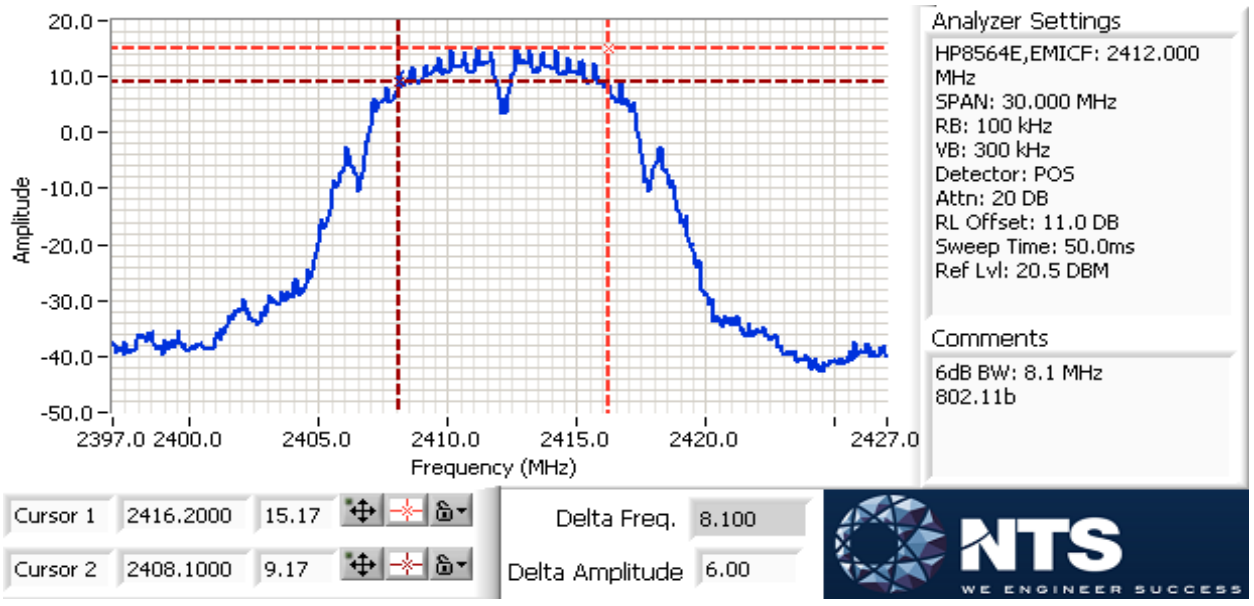
Client:	Pace Americas	Job Number:	J87430
Model:	HR44	T-Log Number:	T89059
		Account Manager:	Michelle Kim
Contact:	Mark Rieger		
Standard:	FCC 15.247, 15E, RSS-210, 15B	Class:	N/A

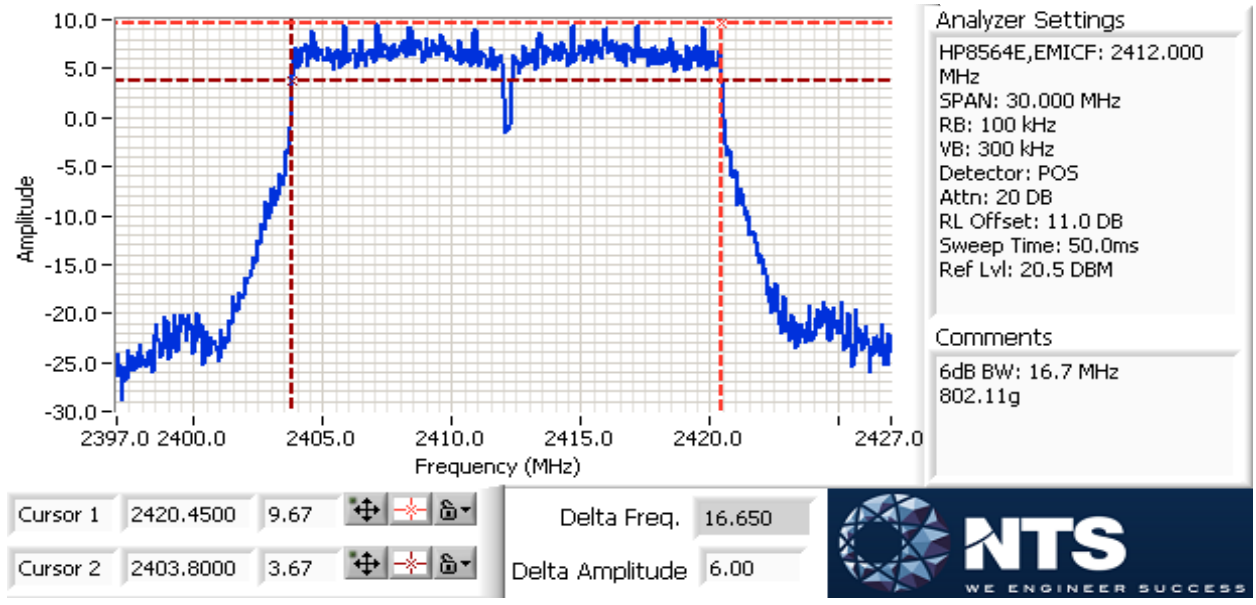
Run #3: Signal Bandwidth

Power Setting	Frequency (MHz)	Resolution Bandwidth	BW (MHz) 6dB	Resolution Bandwidth	BW (MHz) 99%
802.11b					
20.0	2412	100kHz	8.1	1MHz	10.5
20.0	2437	100kHz	8.1	1MHz	10.5
20.0	2462	100kHz	8.1	1MHz	10.6
802.11g					
17.5	2412	100kHz	16.7	1MHz	17.1
20.0	2437	100kHz	16.7	1MHz	16.9
17.5	2462	100kHz	16.7	1MHz	17.0
802.11n20					
17.5	2412	100kHz	17.8	1MHz	18.1
20.0	2437	100kHz	17.8	1MHz	18.1
17.0	2462	100kHz	17.8	1MHz	18.1
802.11n40					
14.5	2422	100kHz	36.1	1MHz	36.4
18.0	2437	100kHz	36.1	1MHz	36.4
16.0	2452	100kHz	36.2	1MHz	36.4

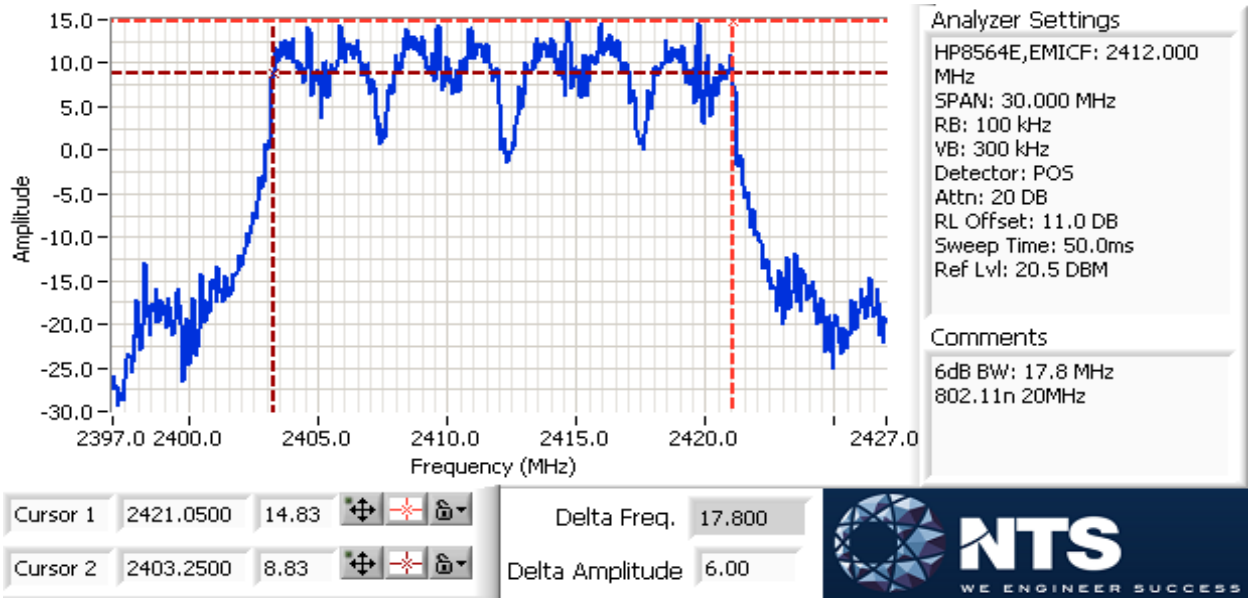
Note 1:	Measured on a single chain
Note 2:	99% bandwidth measured in accordance with RSS GEN, with RB > 1% of the span and VB > 3xRB

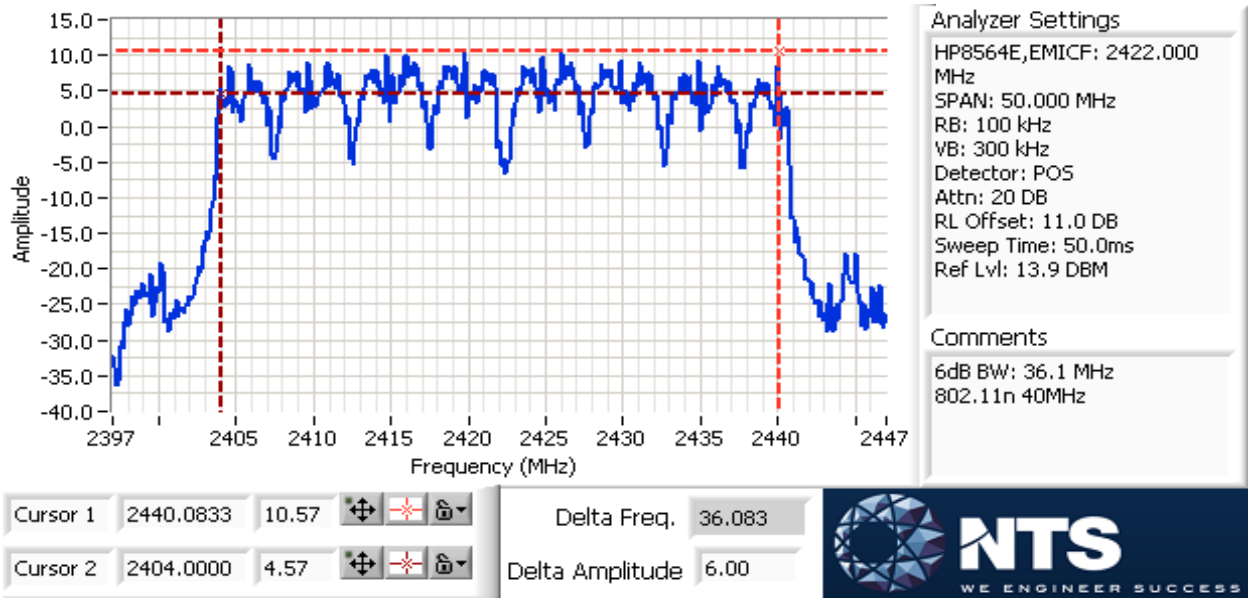
Client:	Pace Americas	Job Number:	J87430
Model:	HR44	T-Log Number:	T89059
		Account Manager:	Michelle Kim
Contact:	Mark Rieger		
Standard:	FCC 15.247, 15E, RSS-210, 15B	Class:	N/A





Client:	Pace Americas	Job Number:	J87430
Model:	HR44	T-Log Number:	T89059
		Account Manager:	Michelle Kim
Contact:	Mark Rieger		
Standard:	FCC 15.247, 15E, RSS-210, 15B	Class:	N/A





Client:	Pace Americas	Job Number:	J87430
Model:	HR44	T-Log Number:	T89059
		Account Manager:	Michelle Kim
Contact:	Mark Rieger		
Standard:	FCC 15.247, 15E, RSS-210, 15B	Class:	N/A

Run #4: Out of Band Spurious Emissions

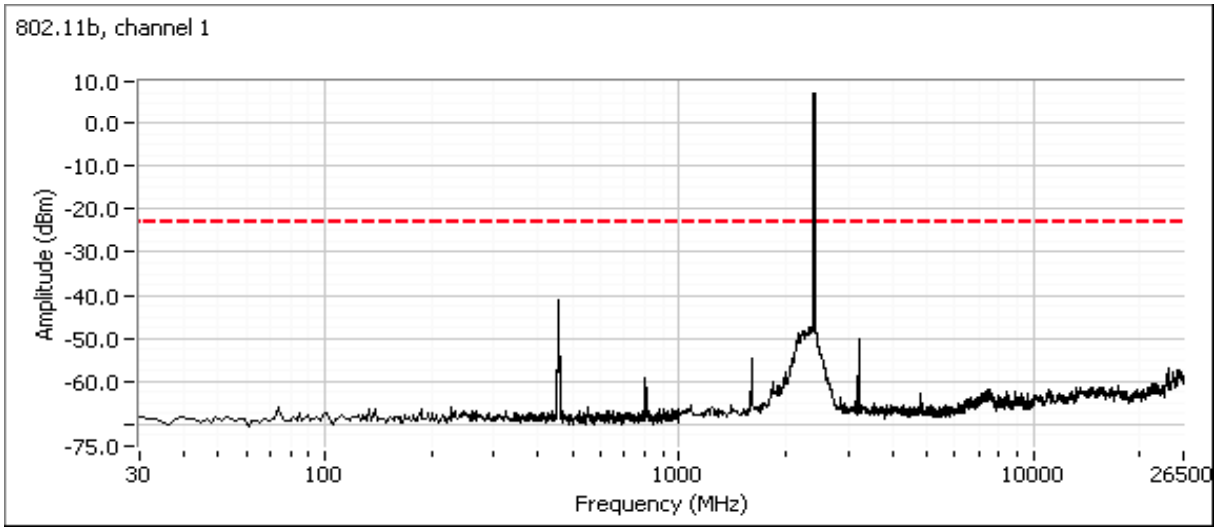
Mode: 802.11b

Power Setting Per Chain #1	#2	#3	#4	Frequency (MHz)	Limit	Result
20				2412	-30dBc	PASS
20				2437	-30dBc	PASS
20				2462	-30dBc	PASS

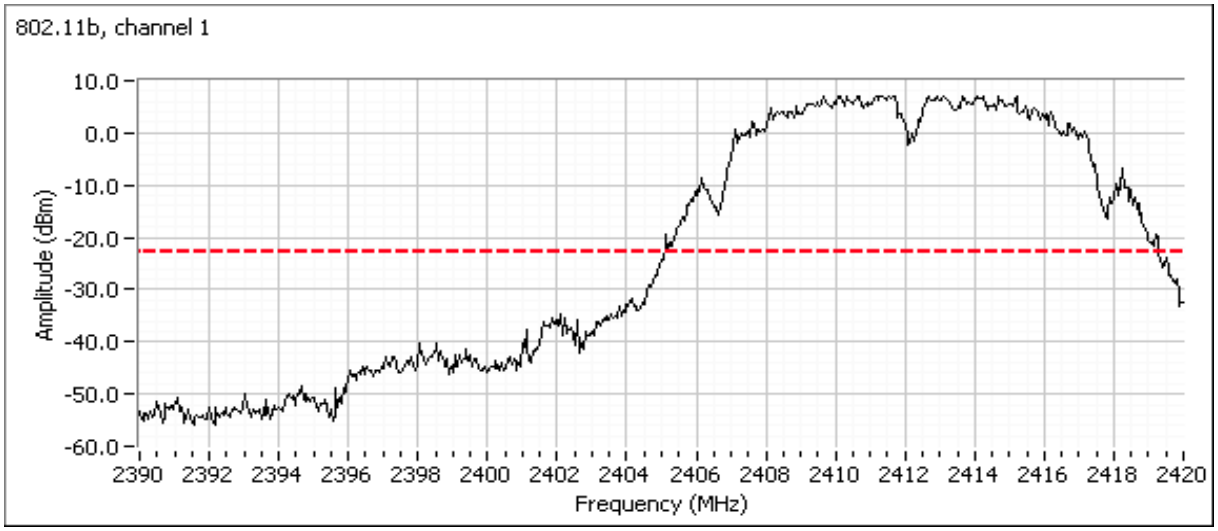
Note 1:	Measured on each chain individually

Plots for low channel, power setting(s) = 20

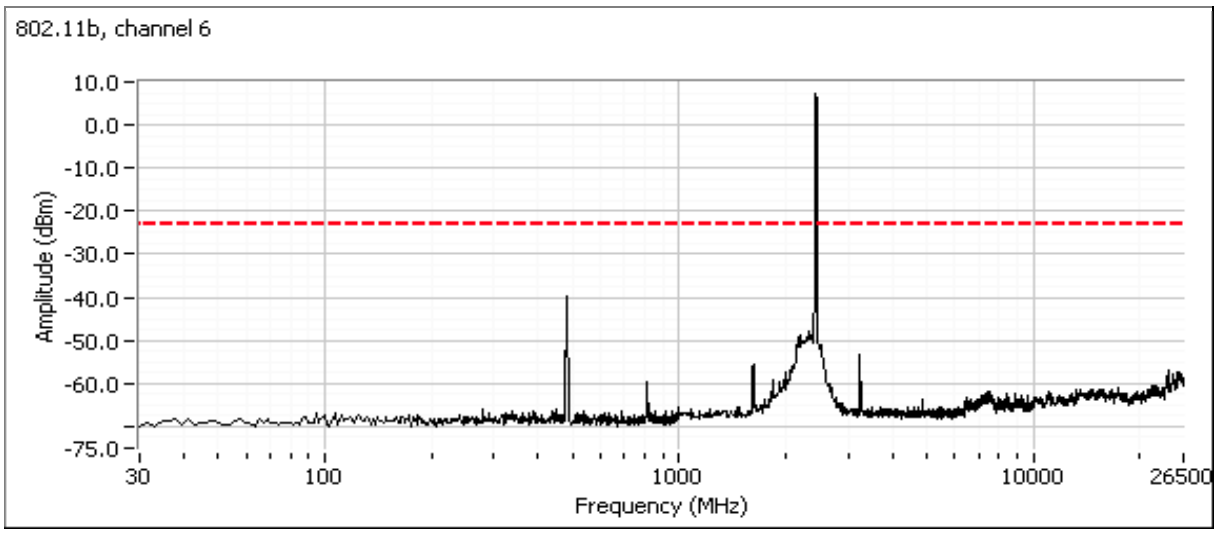
Additional plot showing compliance with -30dBc limit from 2390 MHz to 2400 MHz. Radiated measurements used to show compliance with the limits in the restricted band below 2390 MHz.



Client:	Pace Americas	Job Number:	J87430
Model:	HR44	T-Log Number:	T89059
		Account Manager:	Michelle Kim
Contact:	Mark Rieger		
Standard:	FCC 15.247, 15E, RSS-210, 15B	Class:	N/A

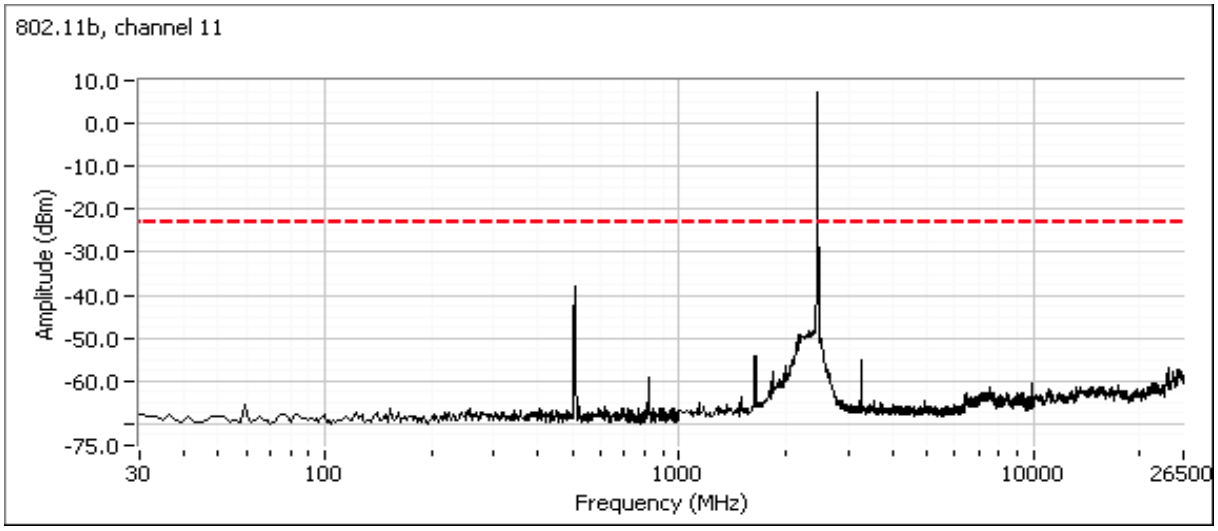


Plots for center channel, power setting(s) = 20



Client:	Pace Americas	Job Number:	J87430
Model:	HR44	T-Log Number:	T89059
		Account Manager:	Michelle Kim
Contact:	Mark Rieger		
Standard:	FCC 15.247, 15E, RSS-210, 15B	Class:	N/A

Plots for high channel, power setting(s) = 20



Mode: 802.11g

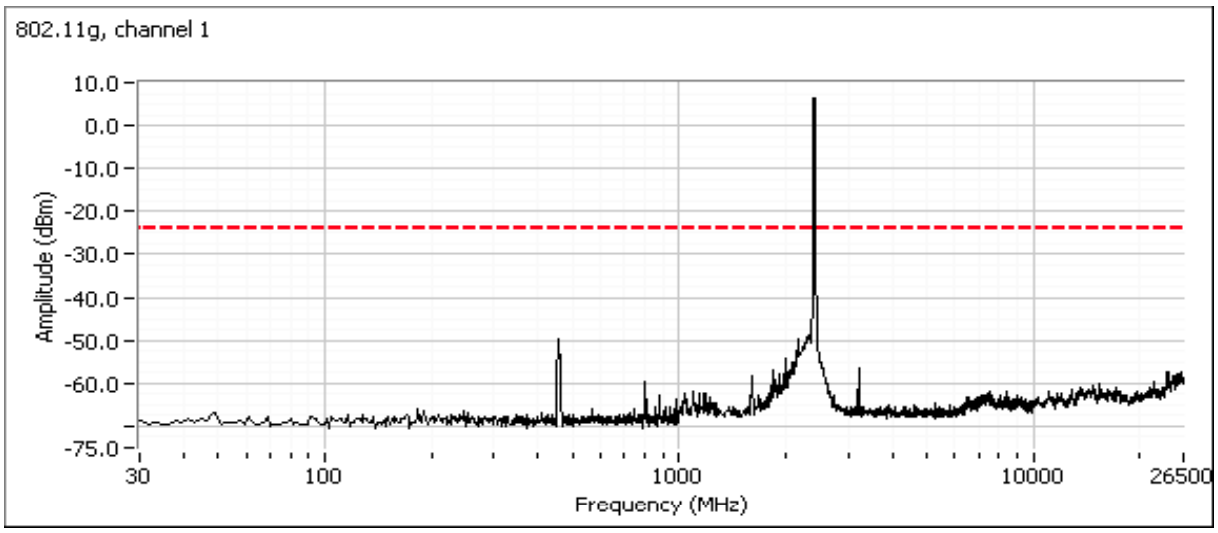
Power Setting Per Chain #1	#2	#3	#4	Frequency (MHz)	Limit	Result
18				2412	-30dBc	PASS
20				2437	-30dBc	PASS
18				2462	-30dBc	PASS

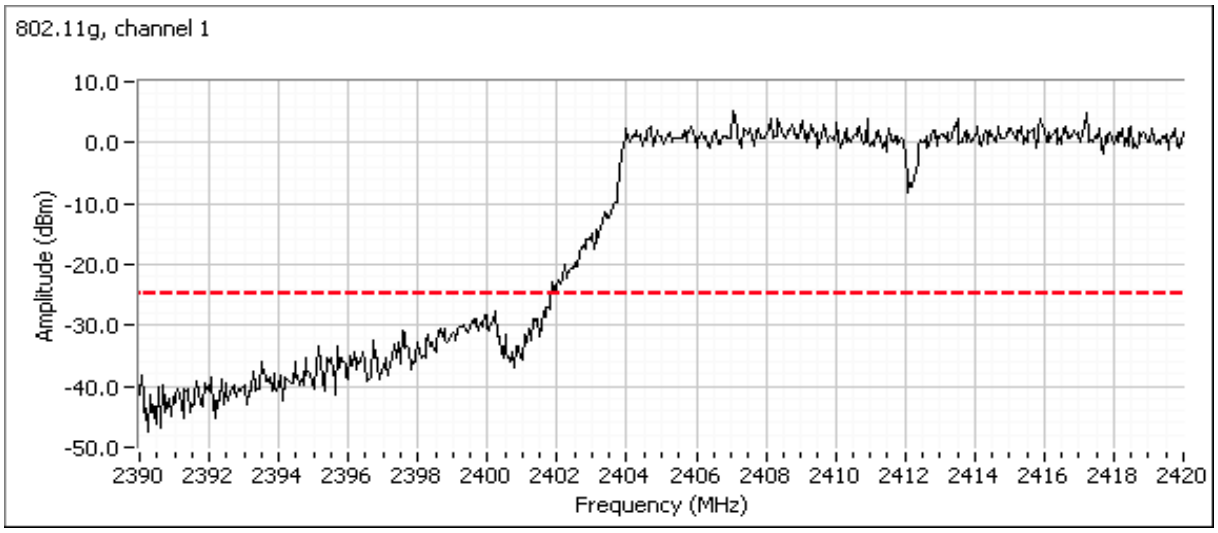
Note 1:	Measured on each chain individually

Client:	Pace Americas	Job Number:	J87430
Model:	HR44	T-Log Number:	T89059
		Account Manager:	Michelle Kim
Contact:	Mark Rieger		
Standard:	FCC 15.247, 15E, RSS-210, 15B	Class:	N/A

Plots for low channel, power setting(s) = 18

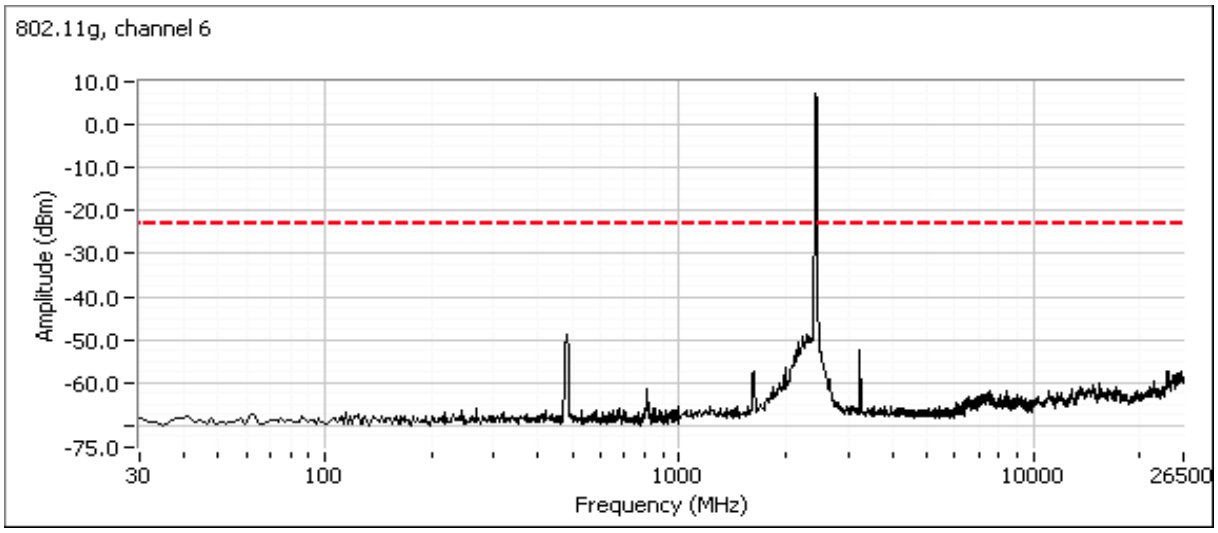
Additional plot showing compliance with -30dBc limit from 2390 MHz to 2400 MHz. Radiated measurements used to show compliance with the limits in the restricted band below 2390 MHz.



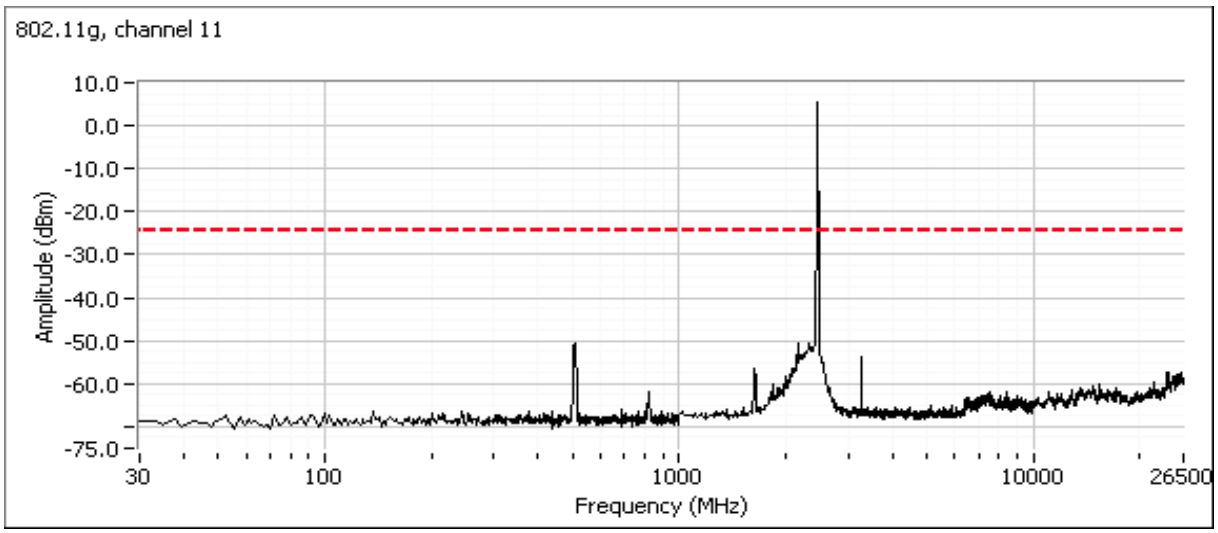


Client:	Pace Americas	Job Number:	J87430
Model:	HR44	T-Log Number:	T89059
		Account Manager:	Michelle Kim
Contact:	Mark Rieger		
Standard:	FCC 15.247, 15E, RSS-210, 15B	Class:	N/A

Plots for center channel, power setting(s) = 20



Plots for high channel, power setting(s) = 18



Client:	Pace Americas	Job Number:	J87430
Model:	HR44	T-Log Number:	T89059
		Account Manager:	Michelle Kim
Contact:	Mark Rieger		
Standard:	FCC 15.247, 15E, RSS-210, 15B	Class:	N/A

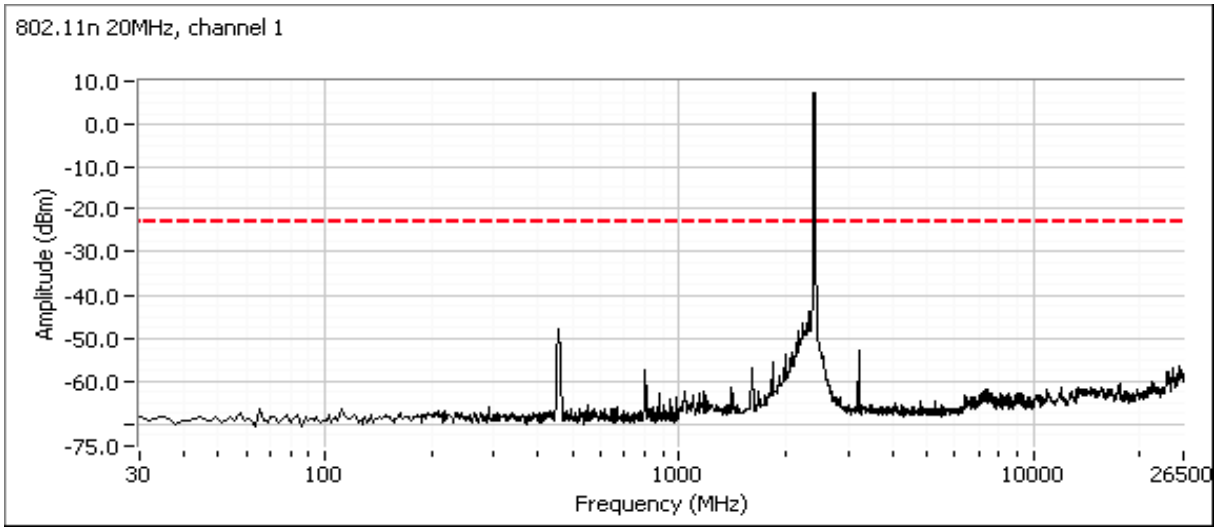
Mode: 802.11n20

Power Setting Per Chain				Frequency (MHz)	Limit	Result
#1	#2	#3	#4			
18	18			2412	-30dBc	PASS
20	20			2437	-30dBc	PASS
18	18			2462	-30dBc	PASS

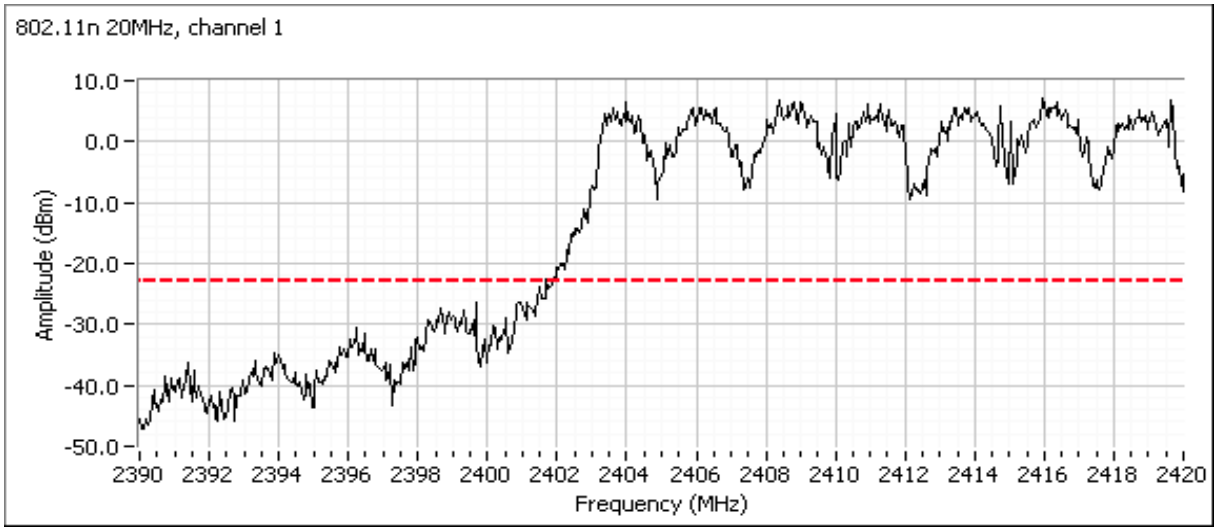
Note 1:	Measured with all chains connected together through a combiner, unused ports on the combiner terminated in 50ohms.

Plots for low channel, power setting(s) = 18

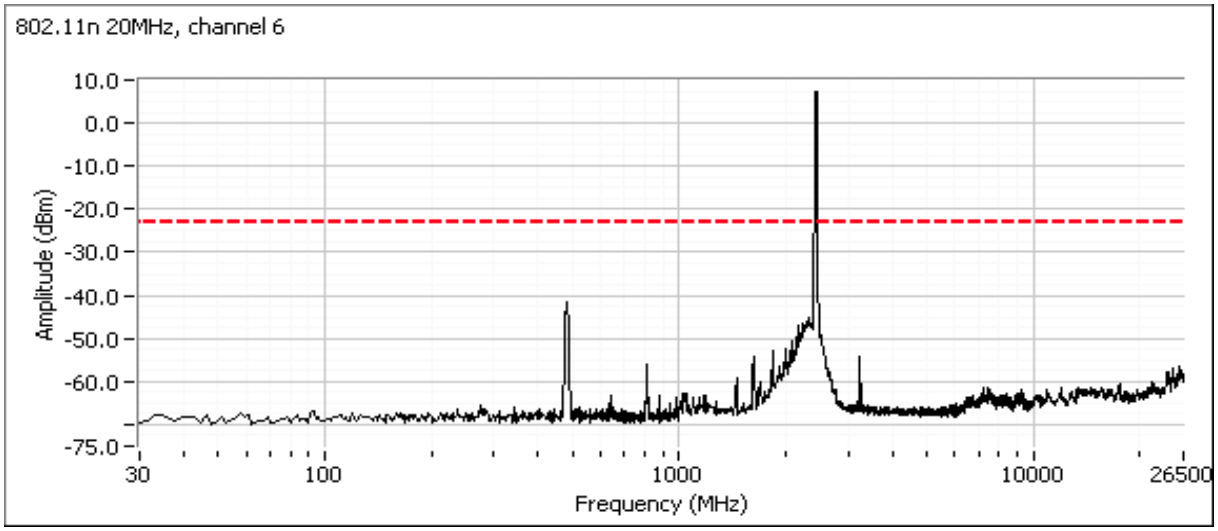
Additional plot showing compliance with -30dBc limit from 2390 MHz to 2400 MHz. Radiated measurements used to show compliance with the limits in the restricted band below 2390 MHz.



Client:	Pace Americas	Job Number:	J87430
Model:	HR44	T-Log Number:	T89059
		Account Manager:	Michelle Kim
Contact:	Mark Rieger		
Standard:	FCC 15.247, 15E, RSS-210, 15B	Class:	N/A

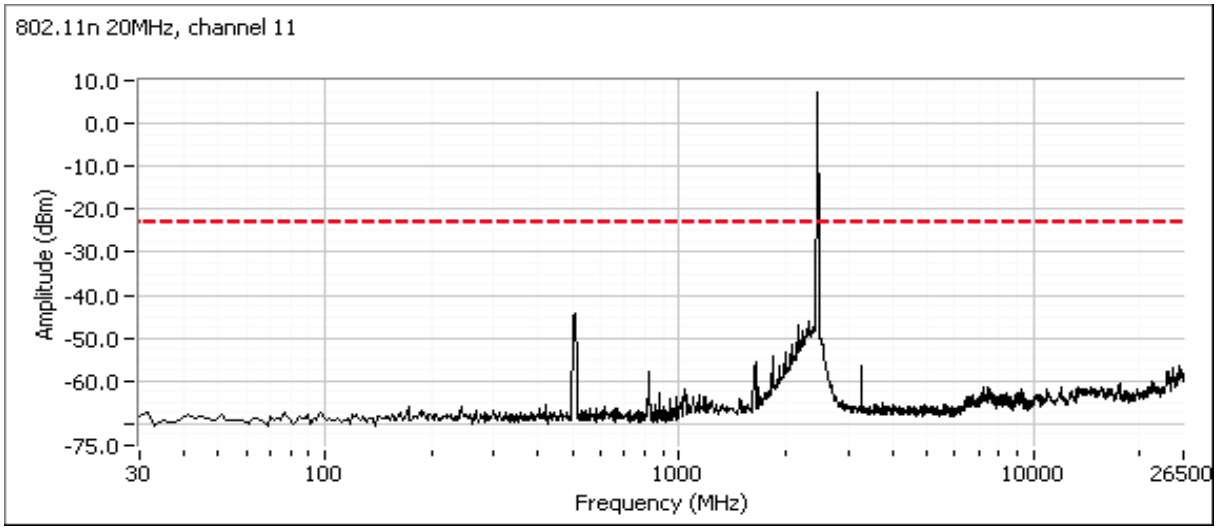


Plots for center channel, power setting(s) = 20



Client:	Pace Americas	Job Number:	J87430
Model:	HR44	T-Log Number:	T89059
		Account Manager:	Michelle Kim
Contact:	Mark Rieger		
Standard:	FCC 15.247, 15E, RSS-210, 15B	Class:	N/A

Plots for high channel, power setting(s) = 18



Mode: 802.11n40

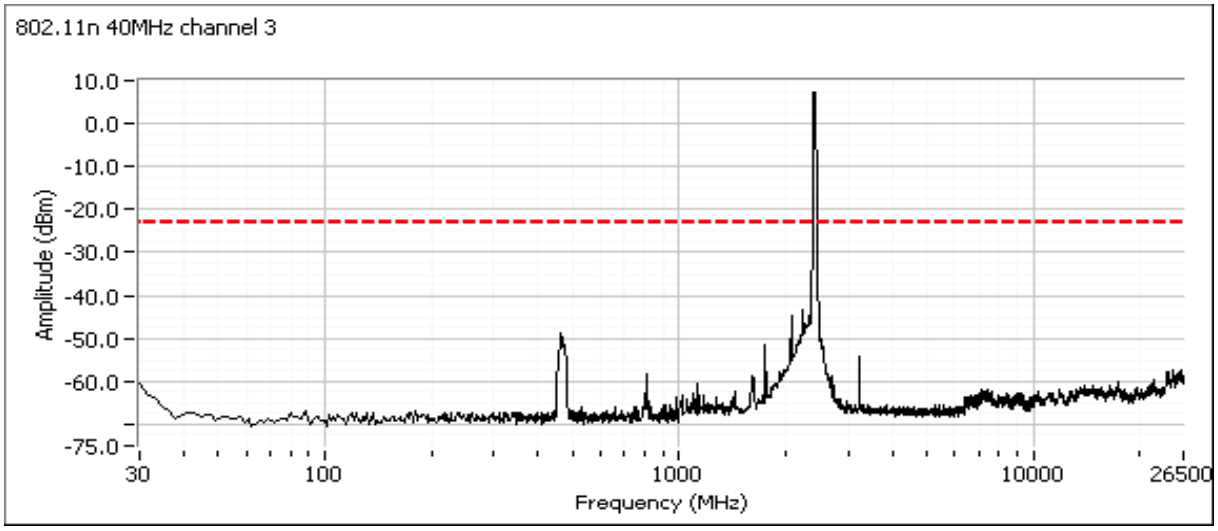
Power Setting Per Chain #1	#2	#3	#4	Frequency (MHz)	Limit	Result
18	18			2422	-30dBc	PASS
18	18			2437	-30dBc	PASS
16	16			2452	-30dBc	PASS

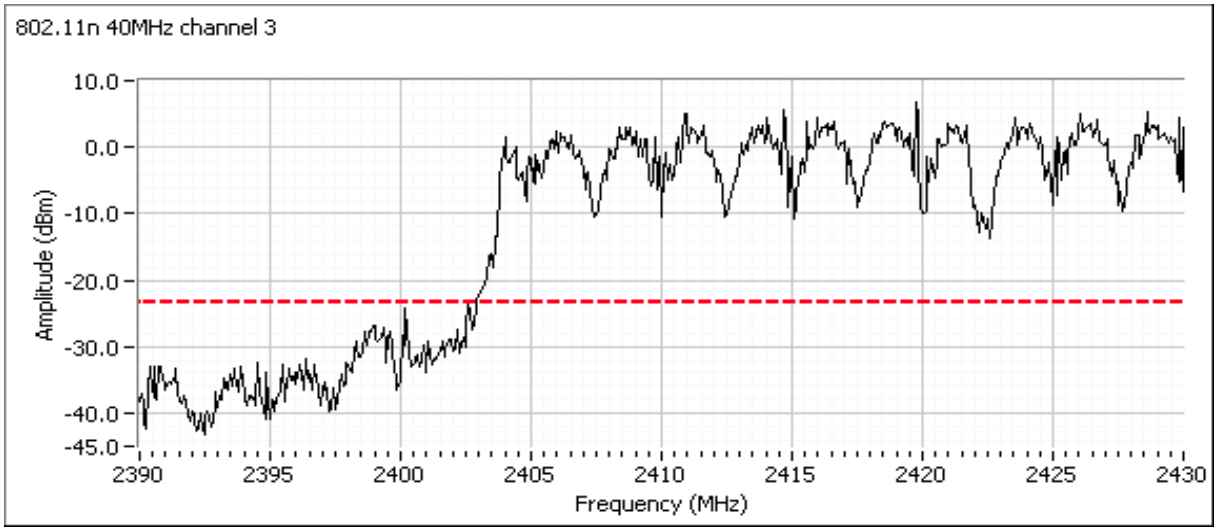
Note 1:	Measured with all chains connected together through a combiner, unused ports on the combiner terminated in 50ohms.

Client:	Pace Americas	Job Number:	J87430
Model:	HR44	T-Log Number:	T89059
		Account Manager:	Michelle Kim
Contact:	Mark Rieger		
Standard:	FCC 15.247, 15E, RSS-210, 15B	Class:	N/A

Plots for low channel, power setting(s) = 18

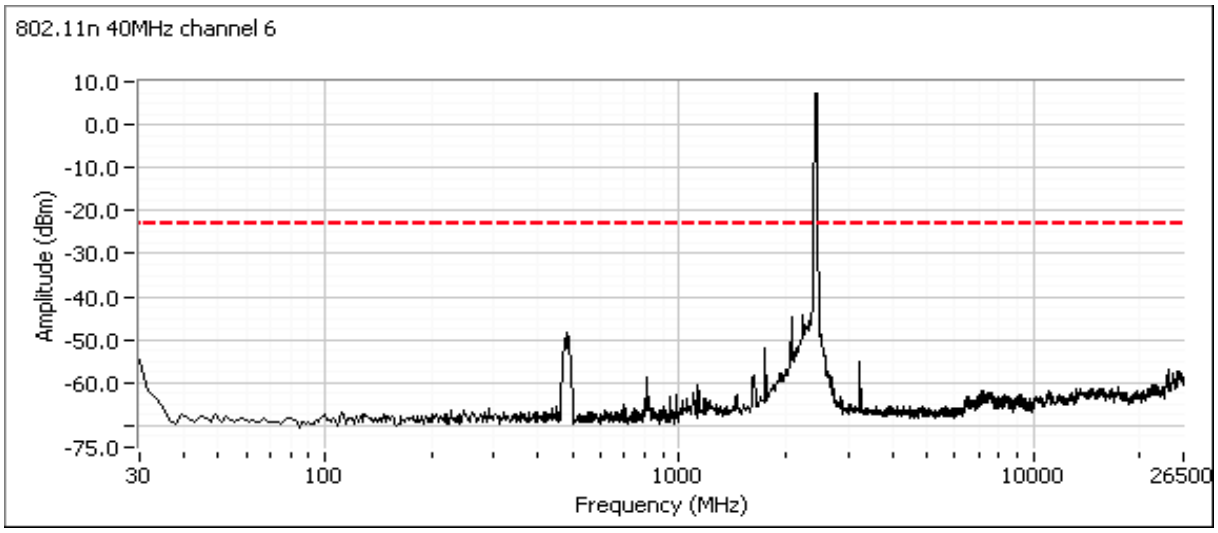
Additional plot showing compliance with -30dBc limit from 2390 MHz to 2400 MHz. Radiated measurements used to show compliance with the limits in the restricted band below 2390 MHz.



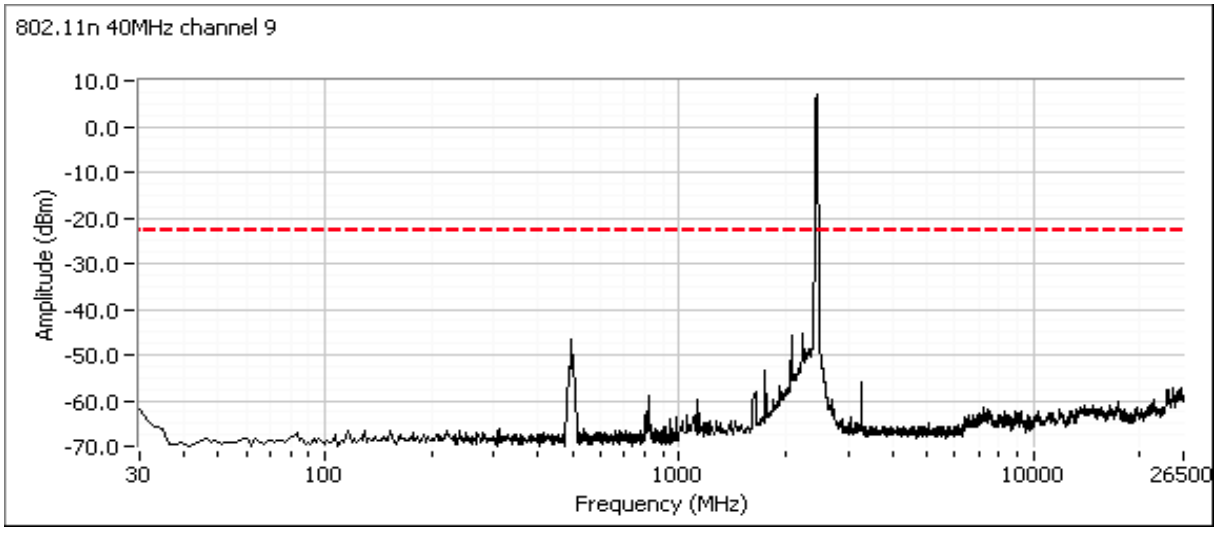


Client:	Pace Americas	Job Number:	J87430
Model:	HR44	T-Log Number:	T89059
		Account Manager:	Michelle Kim
Contact:	Mark Rieger		
Standard:	FCC 15.247, 15E, RSS-210, 15B	Class:	N/A

Plots for center channel, power setting(s) = 18



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



Client:	Pace Americas	Job Number:	J87430
Model:	HR44	T-Log Number:	T89059
		Account Manager:	Michelle Kim
Contact:	Mark Rieger		
Standard:	FCC 15.247, 15E, RSS-210, 15B	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 outside the chamber.

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

Ambient Conditions:

Temperature: 23 °C

Rel. Humidity: 36 %

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

All testing performed with both chains transmitting at the noted power setting

No radio related emissions below 1GHz observed or above 18GHz

Antenna: internal antennas

Duty Cycle: 6Mbps 91.7%

Client:	Pace Americas	Job Number:	J87430
Model:	HR44	T-Log Number:	T89059
		Account Manager:	Michelle Kim
Contact:	Mark Rieger		
Standard:	FCC 15.247, 15E, RSS-210, 15B	Class:	N/A

Summary of Results - Device Operating in the 5725 - 5850 MHz Band

Run #	Mode	Channel	Power Setting	Measured Power	Test Performed	Limit	Result / Margin
1a	a	149	20		Radiated Emissions, 1 - 40GHz	FCC Part 15.209 / 15.247(c)	45.0 dBµV/m @ 5355.2 MHz (-9.0 dB)
1b	a	157			Radiated Emissions, 1 - 40GHz	FCC Part 15.209 / 15.247(c)	46.7 dBµV/m @ 5364.8 MHz (-7.3 dB)
1c	a	165			Radiated Emissions, 1 - 40GHz	FCC Part 15.209 / 15.247(c)	46.7 dBµV/m @ 5388.7 MHz (-7.3 dB)
1a	n20	149			Radiated Emissions, 1 - 40GHz	FCC Part 15.209 / 15.247(c)	43.6 dBµV/m @ 4165.2 MHz (-10.4 dB)
1b	n20	157			Radiated Emissions, 1 - 40GHz	FCC Part 15.209 / 15.247(c)	46.3 dBµV/m @ 5448.6 MHz (-7.7 dB)
1c	n20	165			Radiated Emissions, 1 - 40GHz	FCC Part 15.209 / 15.247(c)	46.9 dBµV/m @ 5449.6 MHz (-7.1 dB)
1a	n40	151			Radiated Emissions, 1 - 40GHz	FCC Part 15.209 / 15.247(c)	46.3 dBµV/m @ 5448.6 MHz (-7.7 dB)
1c	n40	159			Radiated Emissions, 1 - 40GHz	FCC Part 15.209 / 15.247(c)	48.5 dBµV/m @ 9002.5 MHz (-5.5 dB)

Client:	Pace Americas	Job Number:	J87430
Model:	HR44	T-Log Number:	T89059
		Account Manager:	Michelle Kim
Contact:	Mark Rieger		
Standard:	FCC 15.247, 15E, RSS-210, 15B	Class:	N/A

Run #1: Radiated Spurious Emissions, 1 - 40000 MHz. Operating Mode: 802.11a

Date of Test: 9/11/2012 Test Location: FT Ch5

Test Engineer: Deniz Demirci

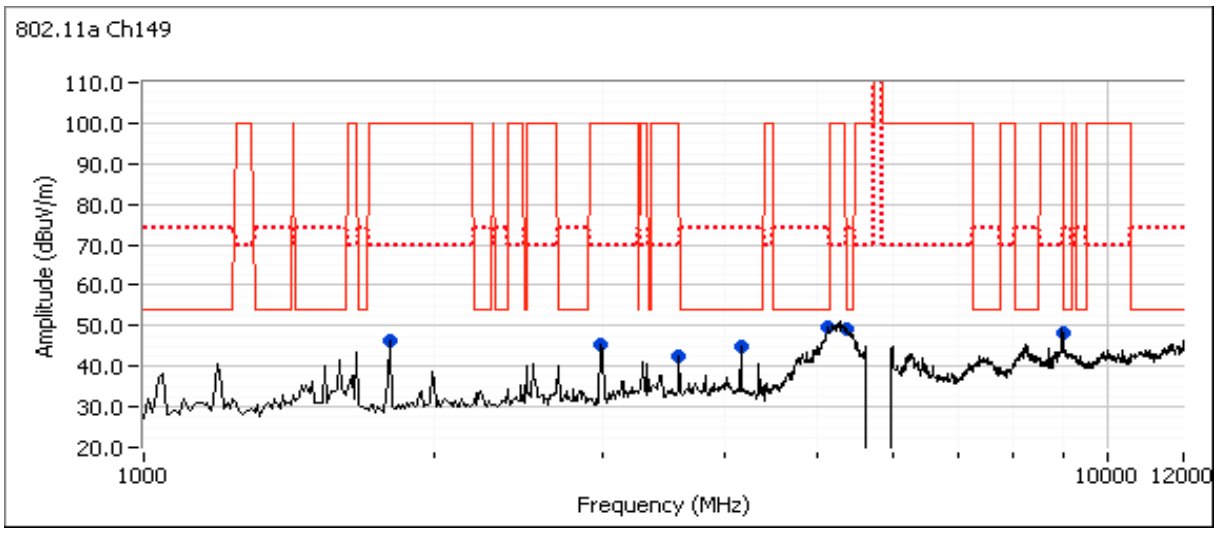
Run #1a: Channel 149 @ 5745 MHz

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	
5355.150	45.0	H	54.0	-9.0	AVG	81	1.2	
5142.250	44.9	H	54.0	-9.1	AVG	90	1.0	
4165.190	43.5	V	54.0	-10.5	AVG	189	1.3	
5350.710	57.4	H	74.0	-16.6	PK	81	1.2	
5144.000	55.9	H	74.0	-18.1	PK	90	1.0	
2989.070	51.3	H	74.0	-22.7	PK	228	1.0	Note 2
9000.040	54.0	V	74.0	-20.0	PK	23	1.0	
4165.160	48.4	V	74.0	-25.6	PK	189	1.3	
3600.040	28.1	H	54.0	-25.9	AVG	20	1.9	
1792.020	41.0	H	74.0	-33.0	PK	36	2.0	Note 2
3600.110	41.6	H	74.0	-32.4	PK	20	1.9	
9000.000	39.6	V	54.0	-14.4	AVG	23	1.0	Note 2
2986.870	30.9	H	54.0	-23.1	AVG	228	1.0	Note 2
1792.070	27.4	H	54.0	-26.6	AVG	36	2.0	Note 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.

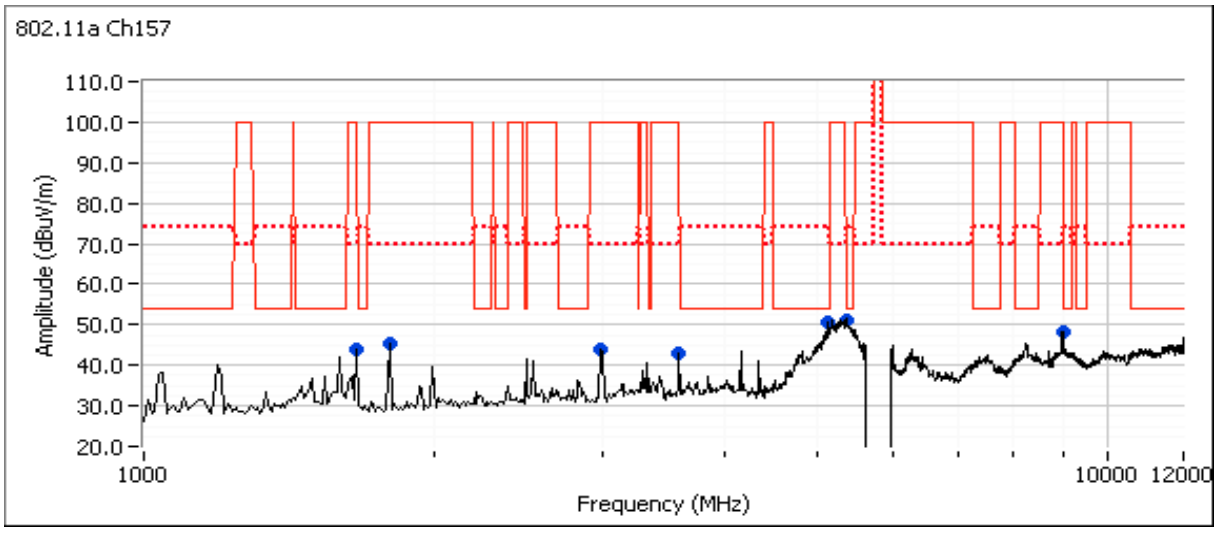


Client:	Pace Americas	Job Number:	J87430
Model:	HR44	T-Log Number:	T89059
		Account Manager:	Michelle Kim
Contact:	Mark Rieger		
Standard:	FCC 15.247, 15E, RSS-210, 15B	Class:	N/A

Run #1b: Channel 157 @ 5785 MHz
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	
5364.780	46.7	H	54.0	-7.3	AVG	76	1.1	
5149.750	45.1	H	54.0	-8.9	AVG	92	1.0	
1665.990	41.6	H	54.0	-12.4	AVG	38	1.1	
9000.000	40.2	V	54.0	-13.8	AVG	16	1.1	
5361.790	58.8	H	74.0	-15.2	PK	76	1.1	
2985.350	53.5	V	74.0	-20.5	PK	272	1.0	Note 2
5149.230	57.0	H	74.0	-17.0	PK	92	1.0	
9000.010	56.6	V	74.0	-17.4	PK	16	1.1	
2986.500	32.7	V	54.0	-21.3	AVG	272	1.0	Note 2
3599.880	27.7	H	54.0	-26.3	AVG	339	1.2	Note 2
1811.250	26.3	H	54.0	-27.7	AVG	345	1.1	Note 2
1665.840	44.5	H	74.0	-29.5	PK	38	1.1	
3599.690	39.8	H	74.0	-34.2	PK	339	1.2	Note 2
1811.540	35.8	H	74.0	-38.2	PK	345	1.1	Note 2

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

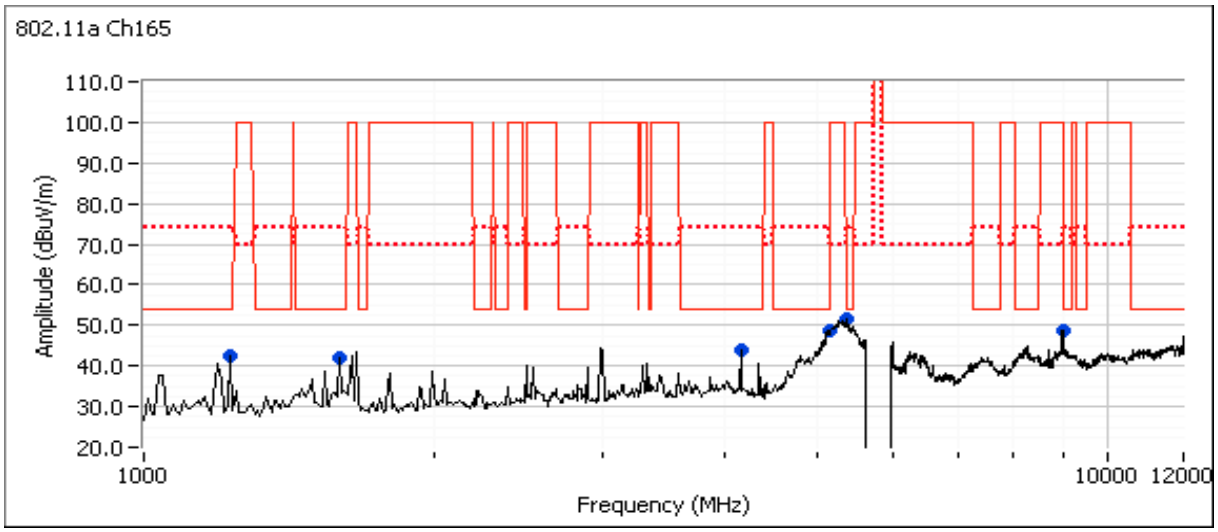


Client:	Pace Americas	Job Number:	J87430
Model:	HR44	T-Log Number:	T89059
		Account Manager:	Michelle Kim
Contact:	Mark Rieger		
Standard:	FCC 15.247, 15E, RSS-210, 15B	Class:	N/A

Run #1c: Channel 165 @ 5825 MHz
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	
5388.650	46.7	H	54.0	-7.3	AVG	65	1.1	
5149.840	43.6	H	54.0	-10.4	AVG	61	1.0	
1600.160	42.2	H	54.0	-11.8	AVG	14	1.3	
4165.150	41.2	V	54.0	-12.8	AVG	193	1.8	
9000.000	39.9	V	54.0	-14.1	AVG	334	1.2	
5384.270	59.2	H	74.0	-14.8	PK	65	1.1	
5147.830	55.3	H	74.0	-18.7	PK	61	1.0	
9000.040	51.0	V	74.0	-23.0	PK	334	1.2	
1220.640	28.1	V	54.0	-25.9	AVG	287	1.4	
4164.510	46.6	V	74.0	-27.4	PK	193	1.8	
1599.970	45.8	H	74.0	-28.2	PK	14	1.3	
1220.100	36.8	V	74.0	-37.2	PK	287	1.4	

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:	Pace Americas	Job Number:	J87430
Model:	HR44	T-Log Number:	T89059
		Account Manager:	Michelle Kim
Contact:	Mark Rieger		
Standard:	FCC 15.247, 15E, RSS-210, 15B	Class:	N/A

Run #2: Radiated Spurious Emissions, 1 - 40000 MHz. Operating Mode: 802.11n20

Date of Test: 9/12/2012 Test Location: FT Chamber #3

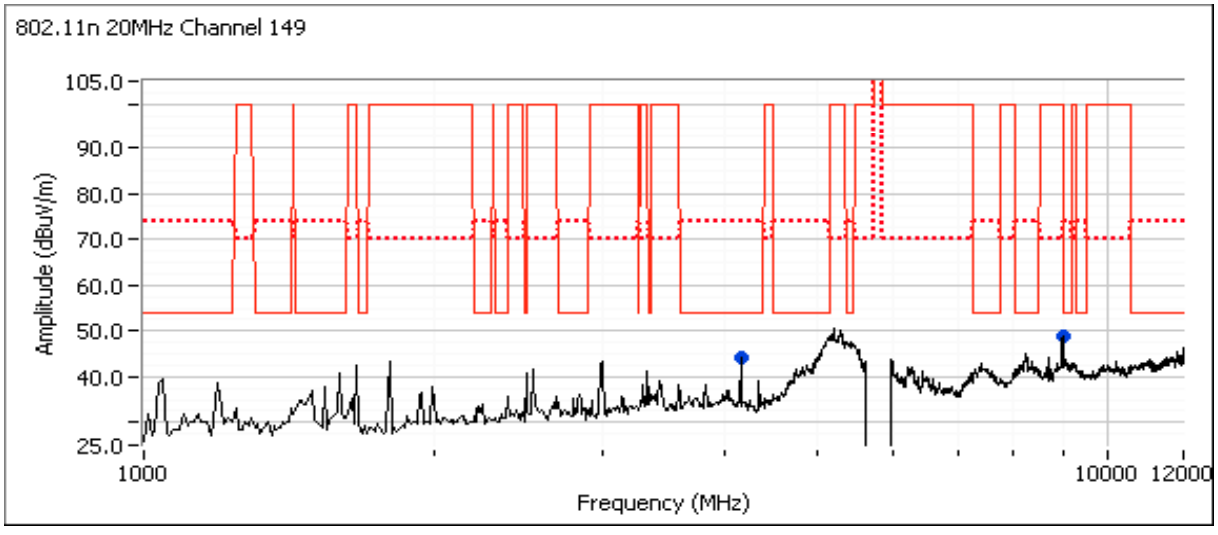
Test Engineer: M. Birgani

Run #2a: Channel 149 @ 5745 MHz

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	
4165.220	43.6	V	54.0	-10.4	AVG	187	1.1	RB 1 MHz;VB 10 Hz;Peak
9000.000	40.6	V	54.0	-13.4	AVG	335	1.2	RB 1 MHz;VB 10 Hz;Peak
9000.010	56.3	V	74.0	-17.7	PK	335	1.2	RB 1 MHz;VB 3 MHz;Peak
4165.120	48.4	V	74.0	-25.6	PK	187	1.1	RB 1 MHz;VB 3 MHz;Peak

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.

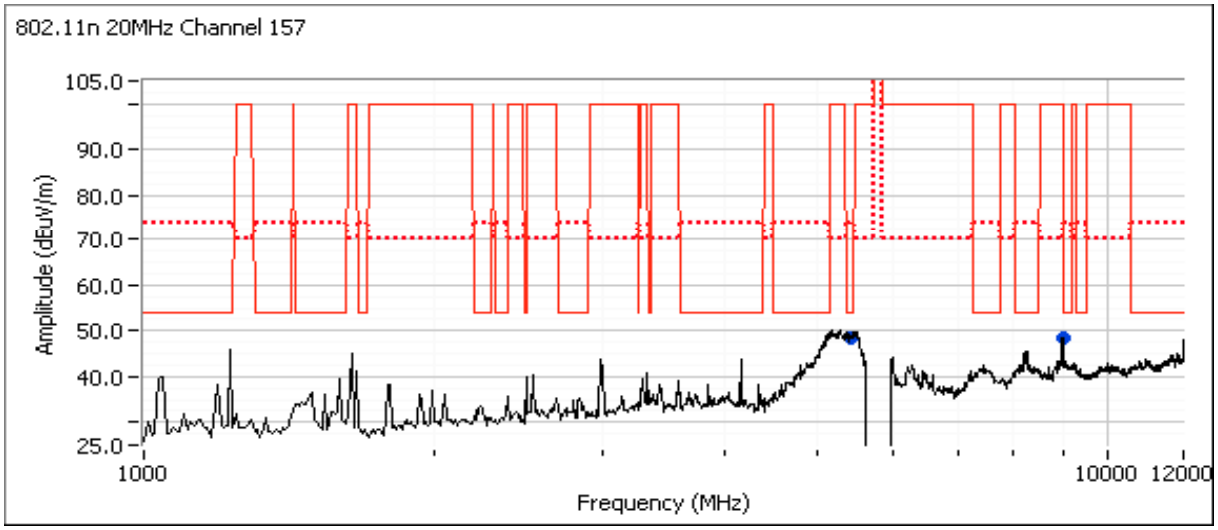


Client:	Pace Americas	Job Number:	J87430
Model:	HR44	T-Log Number:	T89059
		Account Manager:	Michelle Kim
Contact:	Mark Rieger		
Standard:	FCC 15.247, 15E, RSS-210, 15B	Class:	N/A

Run #2b: Channel 157 @ 5785 MHz
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	
5448.600	46.3	H	54.0	-7.7	AVG	55	1.2	RB 1 MHz;VB 10 Hz;Peak
9000.440	38.0	V	54.0	-16.0	AVG	297	1.2	RB 1 MHz;VB 10 Hz;Peak
5428.270	57.5	H	74.0	-16.5	PK	55	1.2	RB 1 MHz;VB 3 MHz;Peak
9006.020	49.3	V	74.0	-24.7	PK	297	1.2	RB 1 MHz;VB 3 MHz;Peak

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.

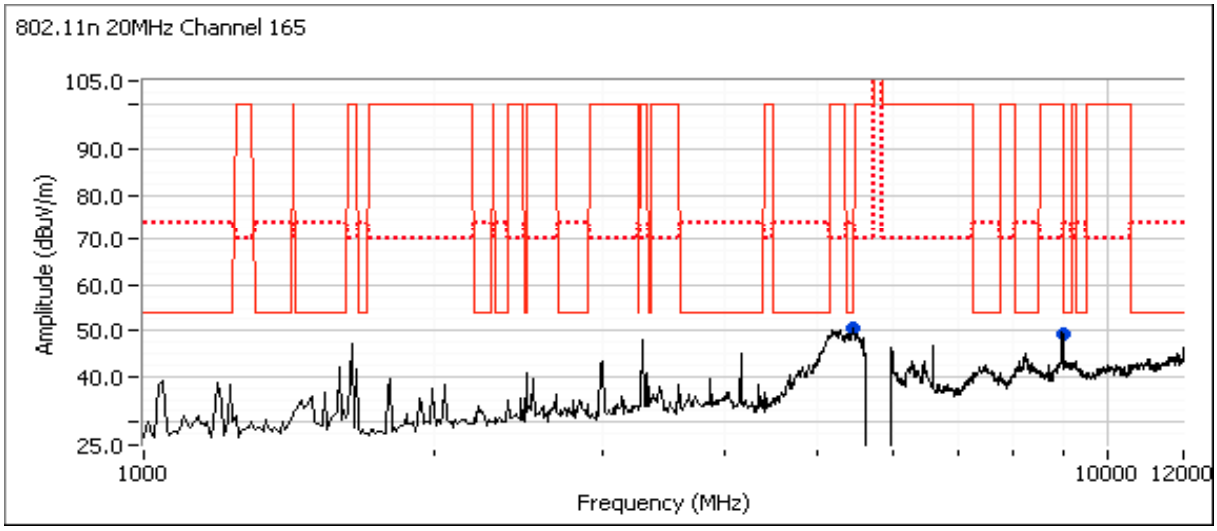


Client:	Pace Americas	Job Number:	J87430
Model:	HR44	T-Log Number:	T89059
		Account Manager:	Michelle Kim
Contact:	Mark Rieger		
Standard:	FCC 15.247, 15E, RSS-210, 15B	Class:	N/A

Run #2c: Channel 165 @ 5825 MHz
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	
5449.600	46.9	H	54.0	-7.1	AVG	60	1.1	RB 1 MHz;VB 10 Hz;Peak
9001.300	38.0	V	54.0	-16.0	AVG	310	1.2	RB 1 MHz;VB 10 Hz;Peak
5428.270	57.8	H	74.0	-16.2	PK	60	1.1	RB 1 MHz;VB 3 MHz;Peak
9004.080	49.3	V	74.0	-24.7	PK	310	1.2	RB 1 MHz;VB 3 MHz;Peak

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:	Pace Americas	Job Number:	J87430
Model:	HR44	T-Log Number:	T89059
		Account Manager:	Michelle Kim
Contact:	Mark Rieger		
Standard:	FCC 15.247, 15E, RSS-210, 15B	Class:	N/A

Run #3: Radiated Spurious Emissions, 1 - 40000 MHz. Operating Mode: 802.11n40

Date of Test: 9/12/2012 Test Location: FT Chamber #3

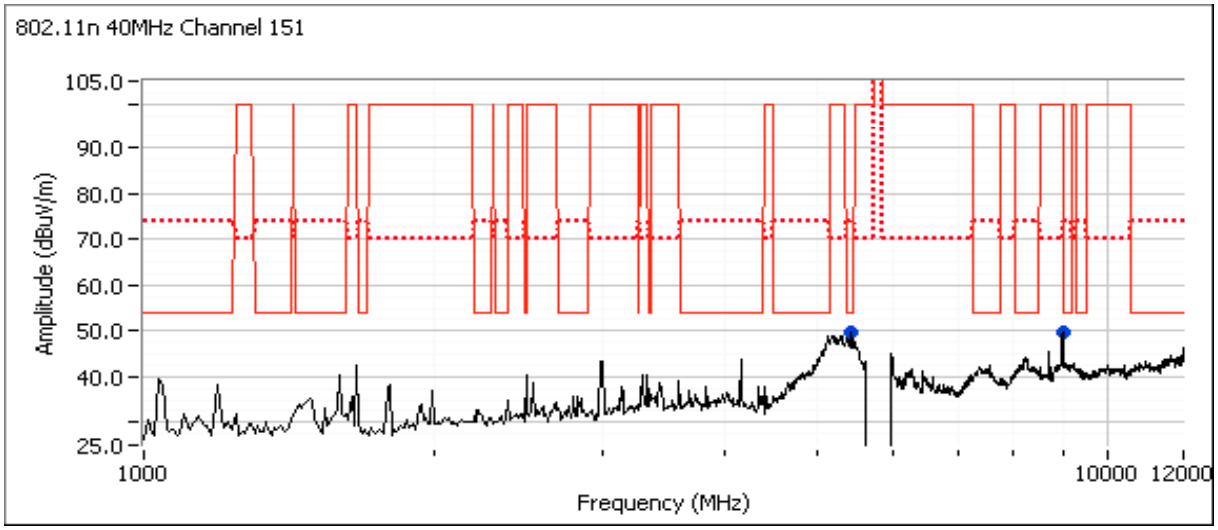
Test Engineer: M. Birgani

Run #3a: Channel 151 @ 5755 MHz

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	
5448.600	46.3	H	54.0	-7.7	AVG	55	1.2	RB 1 MHz;VB 10 Hz;Peak
9000.440	38.0	V	54.0	-16.0	AVG	297	1.2	RB 1 MHz;VB 10 Hz;Peak
5428.270	57.5	H	74.0	-16.5	PK	55	1.2	RB 1 MHz;VB 3 MHz;Peak
9006.020	49.3	V	74.0	-24.7	PK	297	1.2	RB 1 MHz;VB 3 MHz;Peak

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.

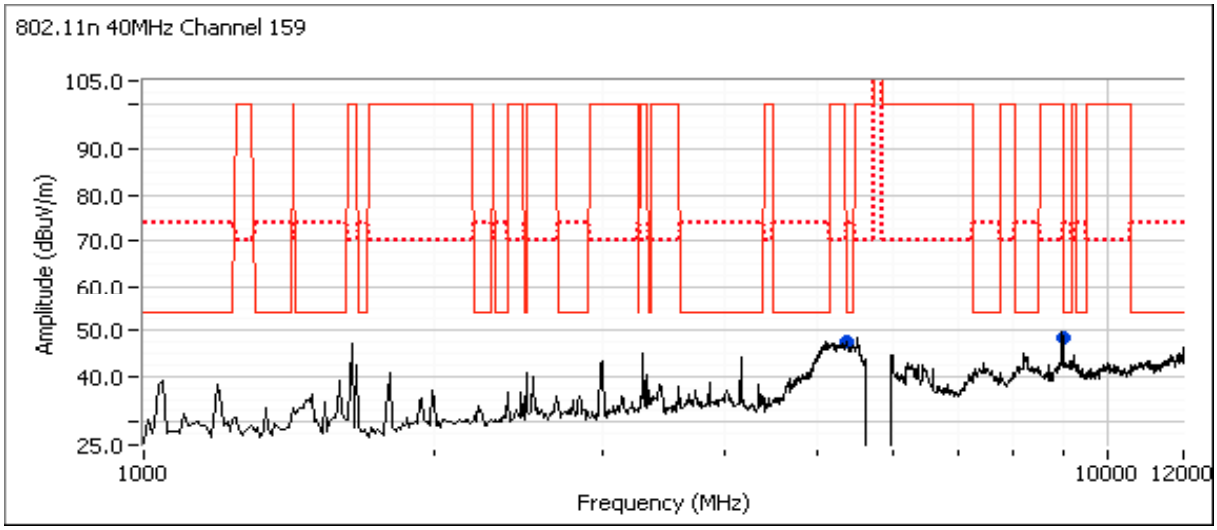


Client:	Pace Americas	Job Number:	J87430
Model:	HR44	T-Log Number:	T89059
		Account Manager:	Michelle Kim
Contact:	Mark Rieger		
Standard:	FCC 15.247, 15E, RSS-210, 15B	Class:	N/A

Run #3b: Channel 159 @ 5795 MHz
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	
9002.500	48.5	V	54.0	-5.5	Peak	321	1.0	Peak reading with average limit
5363.330	47.5	H	54.0	-6.5	Peak	63	1.3	Peak reading with average limit

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:	Pace Americas	Job Number:	J87430
Model:	HR44	T-Log Number:	T89059
		Account Manager:	Michelle Kim
Contact:	Mark Rieger		
Standard:	FCC 15.247, 15E, RSS-210, 15B	Class:	N/A

RSS 210 and FCC 15.247 (DTS) Antenna Port Measurements
MIMO and Smart Antenna Systems
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: 9/18/2012, 9/19/2012
Test Engineer: Deniz Demirci
Test Location: FT Lab#4

Config. Used: Direct connection to antenna ports.
Config Change: NA
EUT Voltage: 120V / 60Hz

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:	23 °C
Rel. Humidity:	38 %

Client:	Pace Americas	Job Number:	J87430
Model:	HR44	T-Log Number:	T89059
		Account Manager:	Michelle Kim
Contact:	Mark Rieger		
Standard:	FCC 15.247, 15E, RSS-210, 15B	Class:	N/A

Summary of Results

Run #	Pwr setting	Avg Pwr	Test Performed	Limit	Pass / Fail	Result / Margin
Single Chain Operation						
1	-	-	Output Power	15.247(b)	Pass	11a: 19.2dBm (79mW)
2	-	-	Power spectral Density (PSD)	15.247(d)	Pass	11a: -4.9dBm/3kHz
MIMO Operation						
1	-	-	Output Power	15.247(b)	Pass	n20:22dBm (159mW) n40:22.1dBm (163mW)
2	-	-	Power spectral Density (PSD)	15.247(d)	Pass	n20: -2.0dBm/3kHz n40: -4.6dBm/3kHz
Applicable to both modes of operation						
3	-	-	Minimum 6dB Bandwidth	15.247(a)	Pass	11a: 16.4MHz n20: 17.6MHz n40: 35.3MHz
3	-	-	99% Bandwidth	RSS GEN	Pass	11a: 16.9MHz n20: 18.1MHz n40: 36.3MHz
4	-	-	Spurious emissions	15.247(b)	Pass	All emissions > -30dBc

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

Legacy mode, 802.11a are single chain only. Chain with highest power reported

Client:	Pace Americas	Job Number:	J87430
Model:	HR44	T-Log Number:	T89059
		Account Manager:	Michelle Kim
Contact:	Mark Rieger		
Standard:	FCC 15.247, 15E, RSS-210, 15B	Class:	N/A

Run #1: Output Power - Chain A + B

Operating Mode: 802.11a

Transmitted signal on chain is coherent ? yes

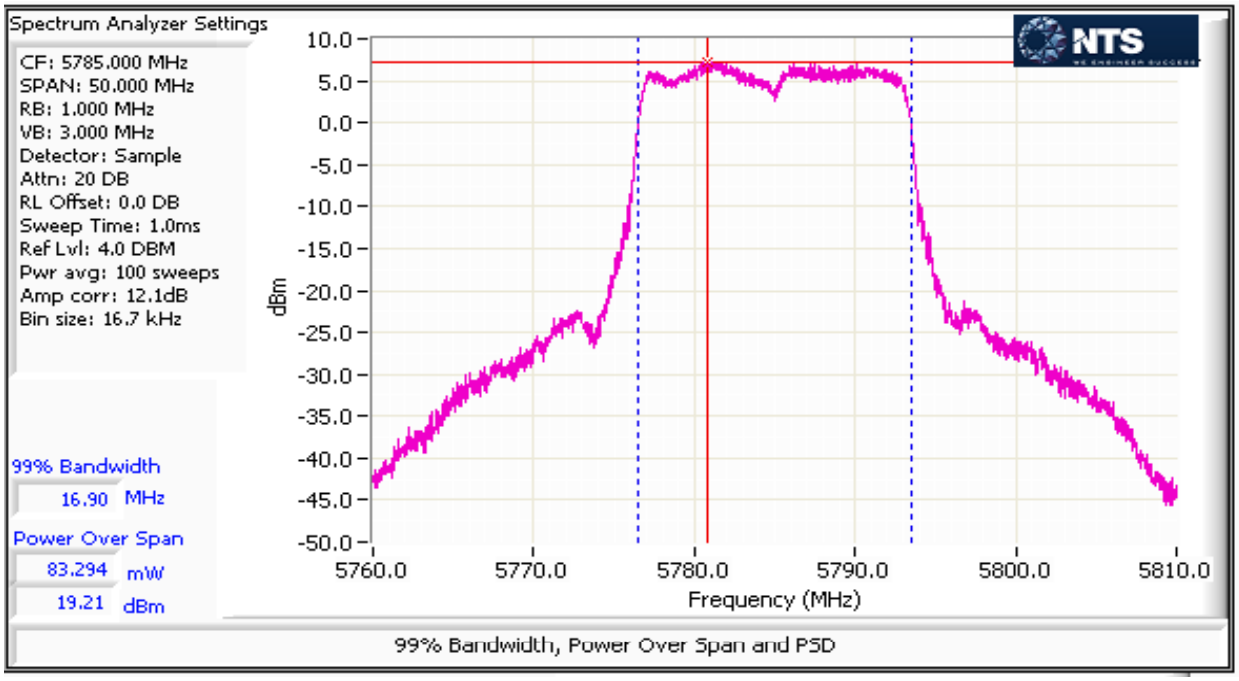
5745 MHz	Chain 1	Chain 2	Chain 3	Chain 4	Total Across All Chains		Limit	
Power Setting Note 3		20.0						
Output Power (dBm) Note 1		18.96			19.0 dBm	0.079 W	30.0 dBm	1.000 W
Antenna Gain (dBi) Note 2		4.1			4.1 dBi		Pass	
eirp (dBm) Note 2		23.06			23.1 dBm	0.202 W		

5785 MHz	Chain 1	Chain 2	Chain 3	Chain 4	Total Across All Chains		Limit	
Power Setting Note 3		20.0						
Output Power (dBm) Note 1		19.21			19.2 dBm	0.083 W	30.0 dBm	1.000 W
Antenna Gain (dBi) Note 2		4.1			4.1 dBi		Pass	
eirp (dBm) Note 2		23.31			23.3 dBm	0.214 W		

5825 MHz	Chain 1	Chain 2	Chain 3	Chain 4	Total Across All Chains		Limit	
Power Setting Note 3		20.0						
Output Power (dBm) Note 1		18.98			19.0 dBm	0.079 W	30.0 dBm	1.000 W
Antenna Gain (dBi) Note 2		4.1			4.1 dBi		Pass	
eirp (dBm) Note 2		23.08			23.1 dBm	0.203 W		

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:	As there is coherency between chains the effective antenna gain is the sum of the individual antenna gains and the eirp is the product of the total power and the effective antenna gain
Note 3:	Power setting - if a single number the same power setting was used for each chain. If multiple numbers the power setting for each chain is separated by a comma (e.g. x,y would indicate power setting x for chain 1, power setting y for chain 2.

Client:	Pace Americas	Job Number:	J87430
Model:	HR44	T-Log Number:	T89059
		Account Manager:	Michelle Kim
Contact:	Mark Rieger		
Standard:	FCC 15.247, 15E, RSS-210, 15B	Class:	N/A



Client:	Pace Americas	Job Number:	J87430
Model:	HR44	T-Log Number:	T89059
		Account Manager:	Michelle Kim
Contact:	Mark Rieger		
Standard:	FCC 15.247, 15E, RSS-210, 15B	Class:	N/A

Operating Mode: 802.11n20

Transmitted signal on chain is coherent ? yes

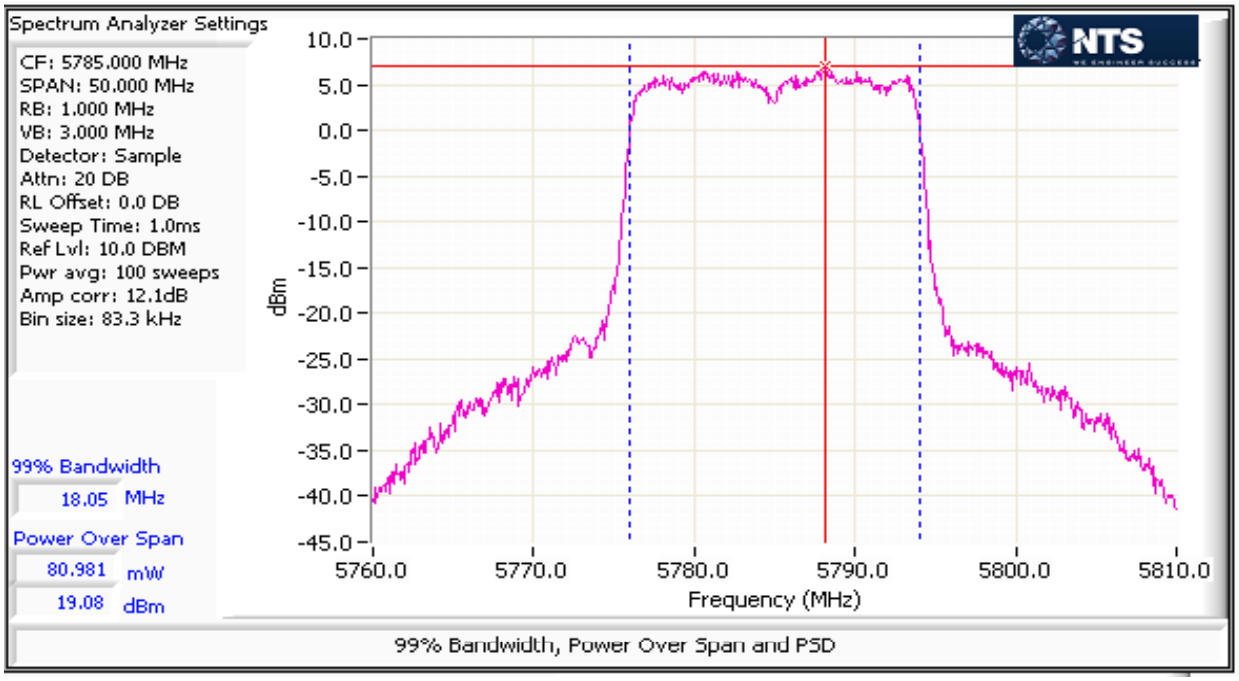
5745 MHz	Chain 1	Chain 2	Chain 3	Chain 4	Total Across All Chains		Limit	
Power Setting Note 3	20.0	20.0						
Output Power (dBm) Note 1	18.84	19.03			21.9 dBm	0.157 W	28.9 dBm	0.774 W
Antenna Gain (dBi) Note 2	4.1	4.1			7.1 dBi		Pass	
eirp (dBm) Note 2	22.94	23.13			29.1 dBm	0.805 W		

5785 MHz	Chain 1	Chain 2	Chain 3	Chain 4	Total Across All Chains		Limit	
Power Setting Note 3	20.0	20.0						
Output Power (dBm) Note 1	18.93	19.08			22.0 dBm	0.159 W	28.9 dBm	0.774 W
Antenna Gain (dBi) Note 2	4.1	4.1			7.1 dBi		Pass	
eirp (dBm) Note 2	23.03	23.18			29.1 dBm	0.818 W		

5825 MHz	Chain 1	Chain 2	Chain 3	Chain 4	Total Across All Chains		Limit	
Power Setting Note 3	20.0	20.0						
Output Power (dBm) Note 1	18.65	18.91			21.8 dBm	0.151 W	28.9 dBm	0.774 W
Antenna Gain (dBi) Note 2	4.1	4.1			7.1 dBi		Pass	
eirp (dBm) Note 2	22.75	23.01			28.9 dBm	0.777 W		

Note 1:	Output power measured using a peak power meter, spurious limit is -20dBc.
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:	As there is coherency between chains the effective antenna gain is the sum of the individual antenna gains and the eirp is the product of the total power and the effective antenna gain
Note 3:	Power setting - if a single number the same power setting was used for each chain. If multiple numbers the power setting for each chain is separated by a comma (e.g. x,y would indicate power setting x for chain 1, power setting y for chain 2.

Client:	Pace Americas	Job Number:	J87430
Model:	HR44	T-Log Number:	T89059
		Account Manager:	Michelle Kim
Contact:	Mark Rieger		
Standard:	FCC 15.247, 15E, RSS-210, 15B	Class:	N/A



Client:	Pace Americas	Job Number:	J87430
Model:	HR44	T-Log Number:	T89059
		Account Manager:	Michelle Kim
Contact:	Mark Rieger		
Standard:	FCC 15.247, 15E, RSS-210, 15B	Class:	N/A

Operating Mode: 802.11n40

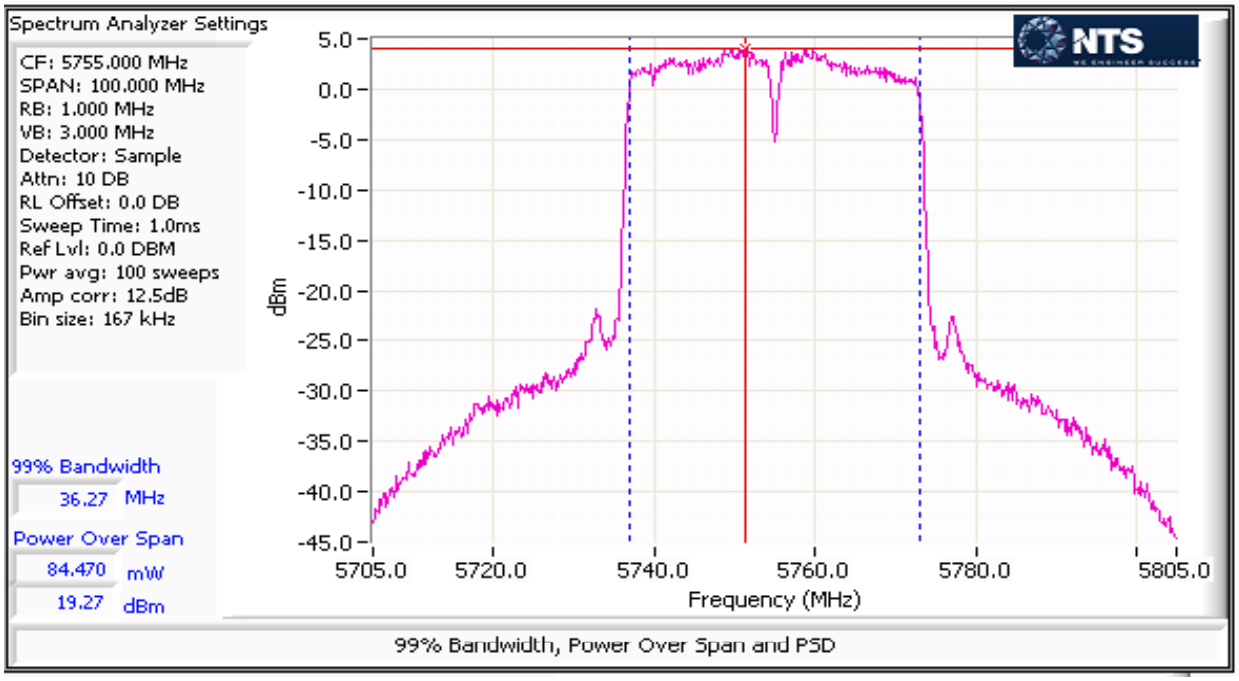
Transmitted signal on chain is coherent ? yes

5755	Chain 1	Chain 2	Chain 3	Chain 4	Total Across All Chains		Limit	
Power Setting Note 3	20.0	20.0						
Output Power (dBm) Note 1	19.27	18.73			22.0 dBm	0.159 W	28.9 dBm	0.774 W
Antenna Gain (dBi) Note 2	4.1	4.1			7.1 dBi		Pass	
eirp (dBm) Note 2	23.37	22.83			29.1 dBm	0.818 W		

5795	Chain 1	Chain 2	Chain 3	Chain 4	Total Across All Chains		Limit	
Power Setting Note 3	20.0	20.0						
Output Power (dBm) Note 1	19.05	19.19			22.1 dBm	0.163 W	28.9 dBm	0.774 W
Antenna Gain (dBi) Note 2	4.1	4.1			7.1 dBi		Pass	
eirp (dBm) Note 2	23.15	23.29			29.2 dBm	0.840 W		

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 100 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:	As there is coherency between chains the effective antenna gain is the sum of the individual antenna gains and the eirp is the product of the total power and the effective antenna gain
Note 3:	Power setting - if a single number the same power setting was used for each chain. If multiple numbers the power setting for each chain is separated by a comma (e.g. x,y would indicate power setting x for chain 1, power setting y for chain 2.

Client:	Pace Americas	Job Number:	J87430
Model:	HR44	T-Log Number:	T89059
		Account Manager:	Michelle Kim
Contact:	Mark Rieger		
Standard:	FCC 15.247, 15E, RSS-210, 15B	Class:	N/A

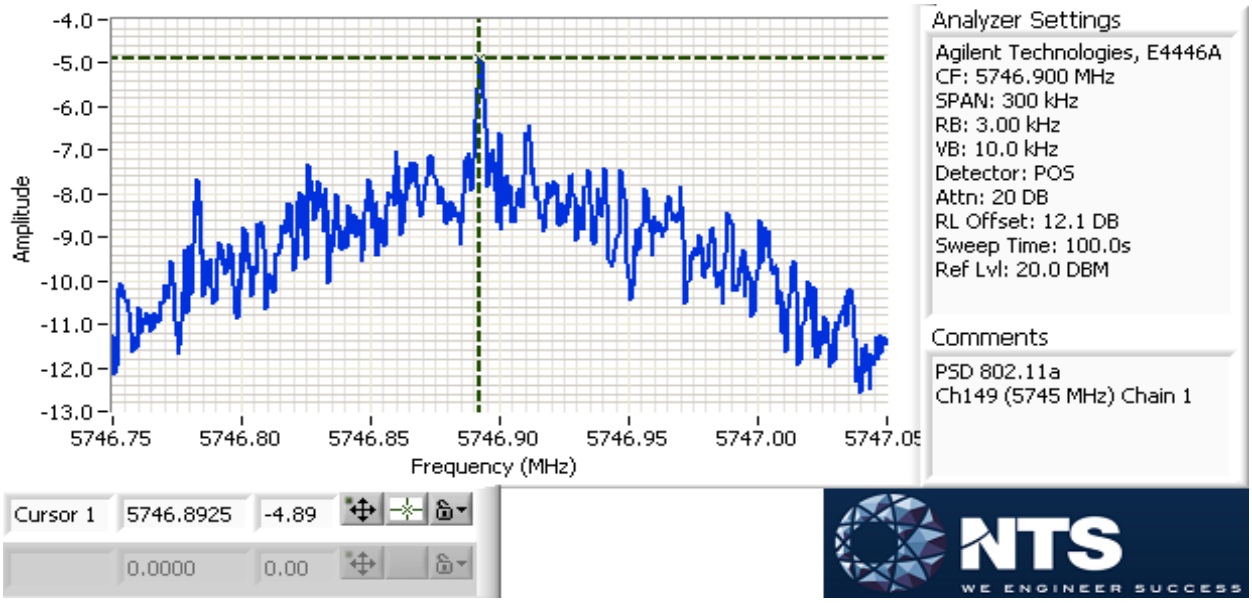


Client:	Pace Americas	Job Number:	J87430
Model:	HR44	T-Log Number:	T89059
		Account Manager:	Michelle Kim
Contact:	Mark Rieger		
Standard:	FCC 15.247, 15E, RSS-210, 15B	Class:	N/A

Run #2: Power spectral Density

Power Setting	Frequency (MHz)	PSD (dBm/3kHz) Note 1 Chain 1	Chain 2	Chain 3	Chain 4	Total	Limit dBm/3kHz	Result
802.11a								
	5745	-4.9				-4.9	8.0	Pass
	5785	-6.3				-6.3	8.0	Pass
	5825	-5.6				-5.6	8.0	Pass
802.11n20								
	5745	-5.8	-5.5			-2.7	8.0	Pass
	5785	-6.2	-4.2			-2.0	8.0	Pass
	5825	-6.1	-5.5			-2.8	8.0	Pass
802.11n40								
	5755	-8.4	-8.9			-5.6	8.0	Pass
	5795	-8.8	-6.6			-4.6	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.

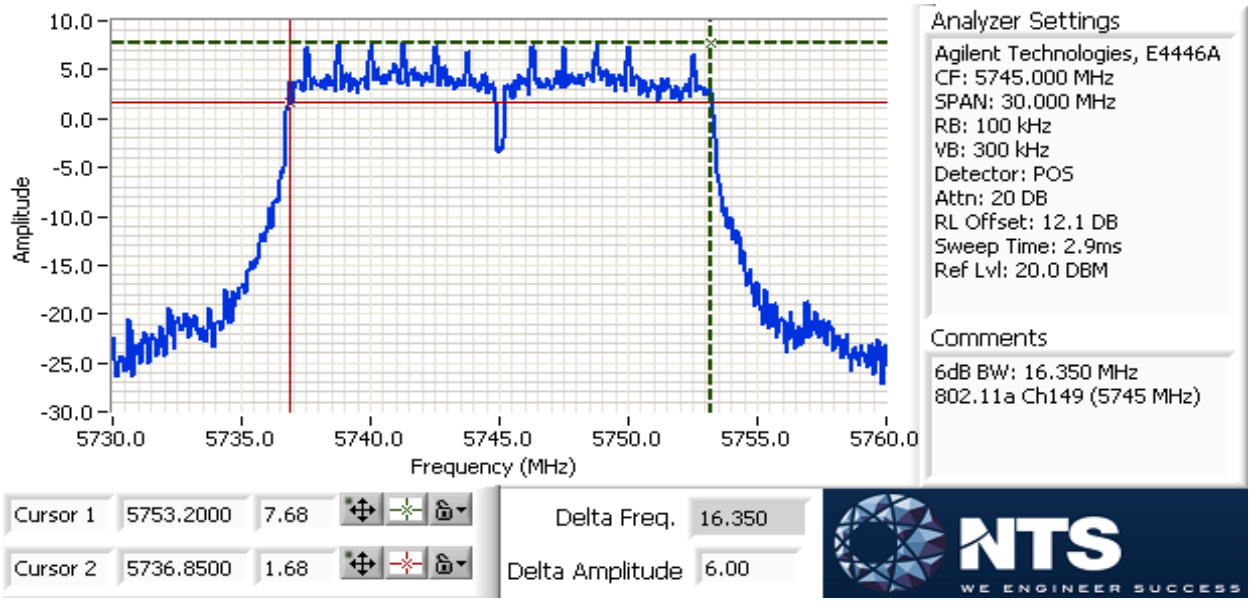


Client:	Pace Americas	Job Number:	J87430
Model:	HR44	T-Log Number:	T89059
		Account Manager:	Michelle Kim
Contact:	Mark Rieger		
Standard:	FCC 15.247, 15E, RSS-210, 15B	Class:	N/A

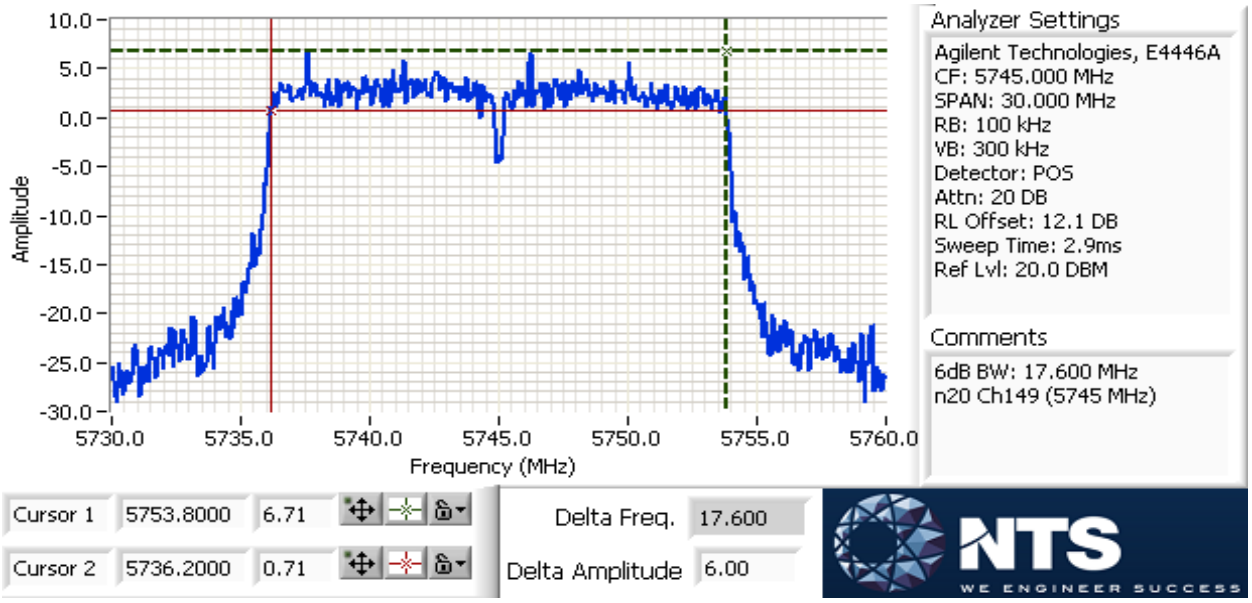
Run #3: Signal Bandwidth

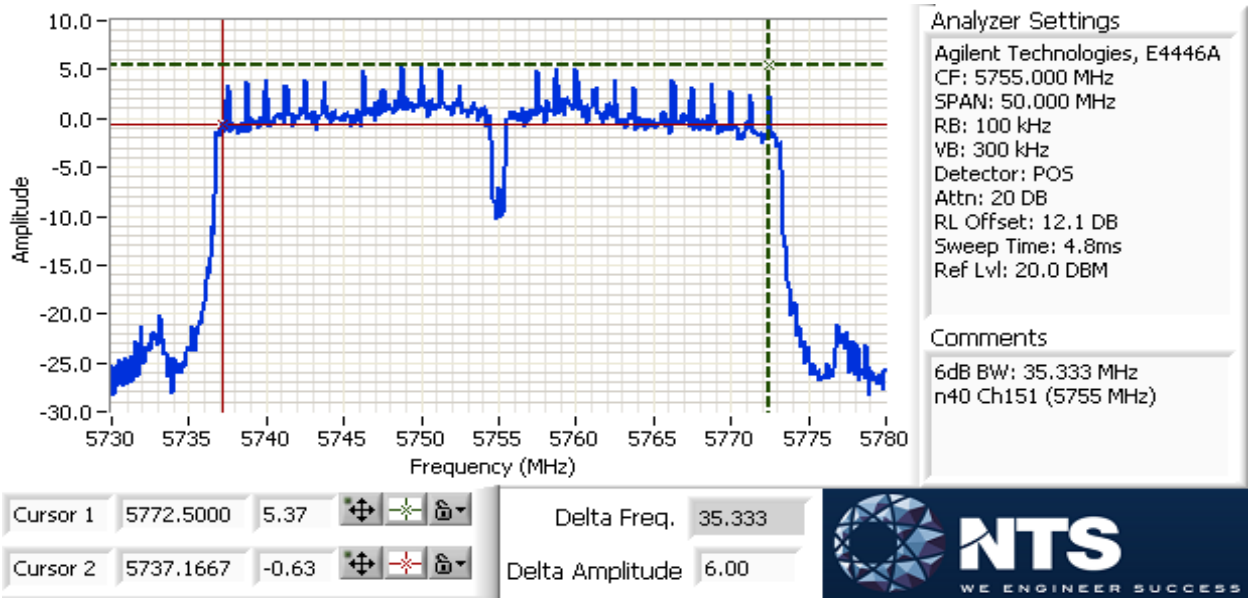
Power Setting	Frequency (MHz)	Resolution Bandwidth	Bandwidth (MHz) 6dB	Resolution Bandwidth	Bandwidth (MHz) 99%
802.11a					
	5745	100 kHz	16.35	1 MHz	16.93
	5785	100 kHz	16.35	1 MHz	16.92
	5825	100 kHz	16.35	1 MHz	16.90
802.11n20					
	5745	100 kHz	17.60	1 MHz	18.02
	5785	100 kHz	17.60	1 MHz	18.05
	5825	100 kHz	17.60	1 MHz	18.05
802.11n40					
	5755	100 kHz	35.33	1 MHz	36.27
	5795	100 kHz	35.33	1 MHz	36.27

Note 1:	Measured on a single chain
Note 2:	99% bandwidth measured in accordance with RSS GEN, with RB > 1% of the span and VB > 3xRB



Client:	Pace Americas	Job Number:	J87430
Model:	HR44	T-Log Number:	T89059
		Account Manager:	Michelle Kim
Contact:	Mark Rieger		
Standard:	FCC 15.247, 15E, RSS-210, 15B	Class:	N/A





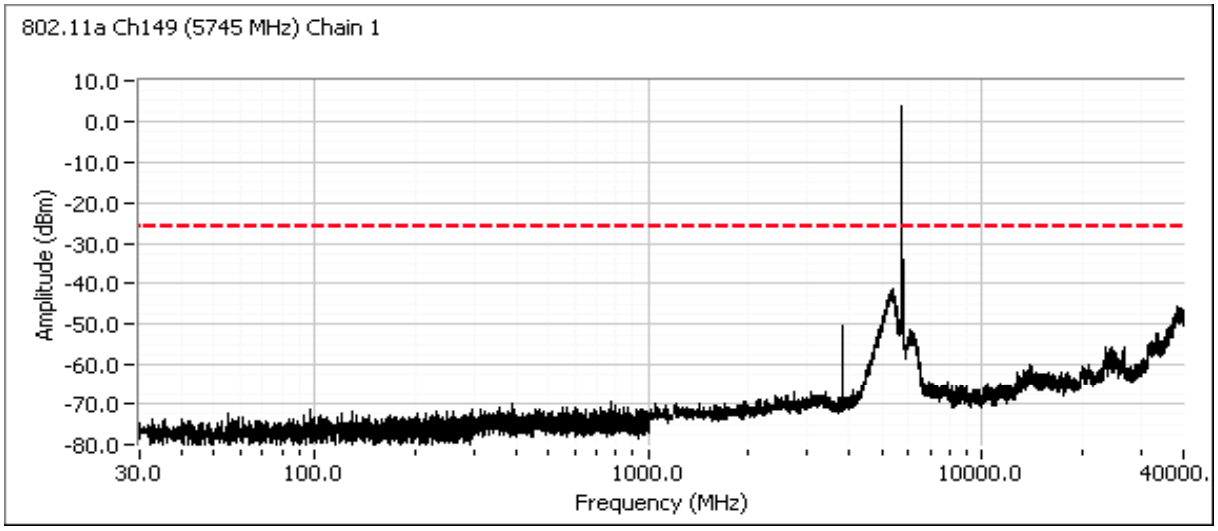
Client:	Pace Americas	Job Number:	J87430
Model:	HR44	T-Log Number:	T89059
		Account Manager:	Michelle Kim
Contact:	Mark Rieger		
Standard:	FCC 15.247, 15E, RSS-210, 15B	Class:	N/A

Run #4: Out of Band Spurious Emissions
Mode: 802.11a

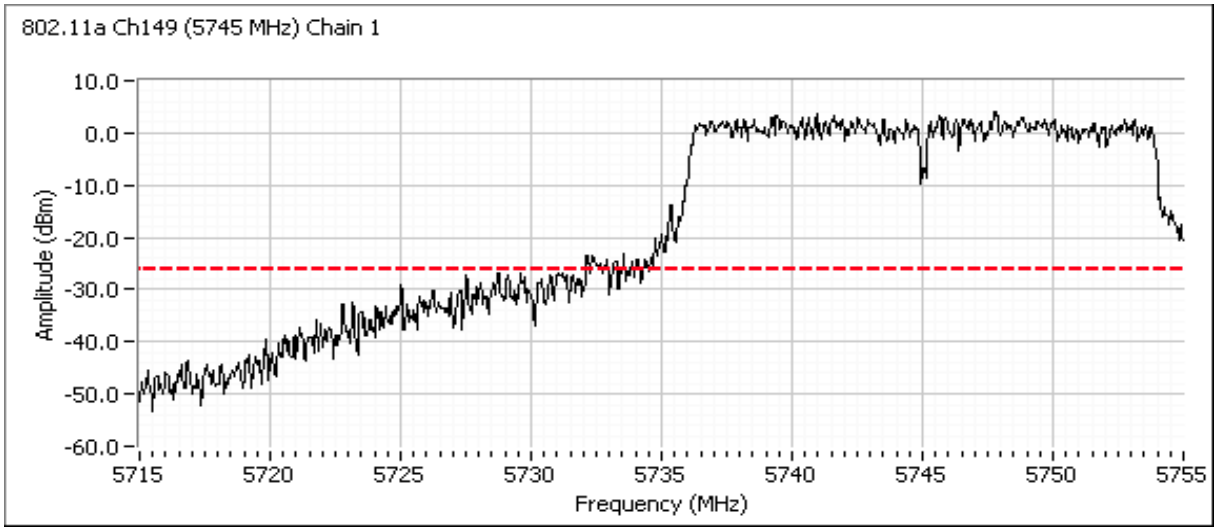
Power Setting Per Chain				Frequency (MHz)	Limit	Result
#1	#2	#3	#4			
20	20			5745	-30 dBc	Pass
20	20			5785	-30 dBc	Pass
20	20			5825	-30 dBc	Pass

Note 1: Measured on each chain individually

Chain 1 plots for low channel, power setting(s) = 20

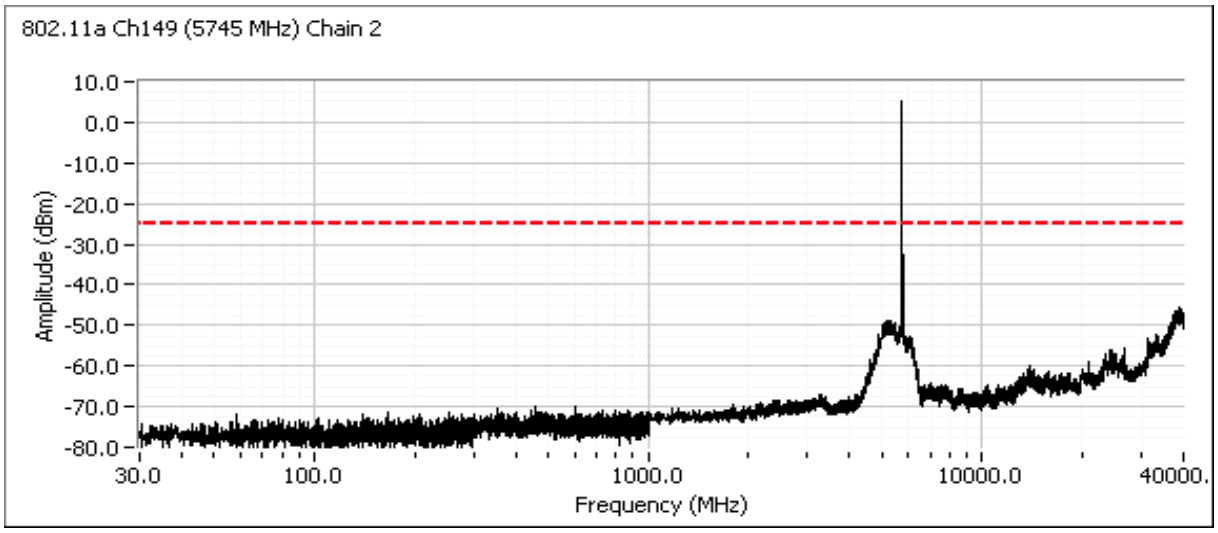


Additional plot from 5715 - 5755 MHz showing compliance with -30dBc at the band edge.

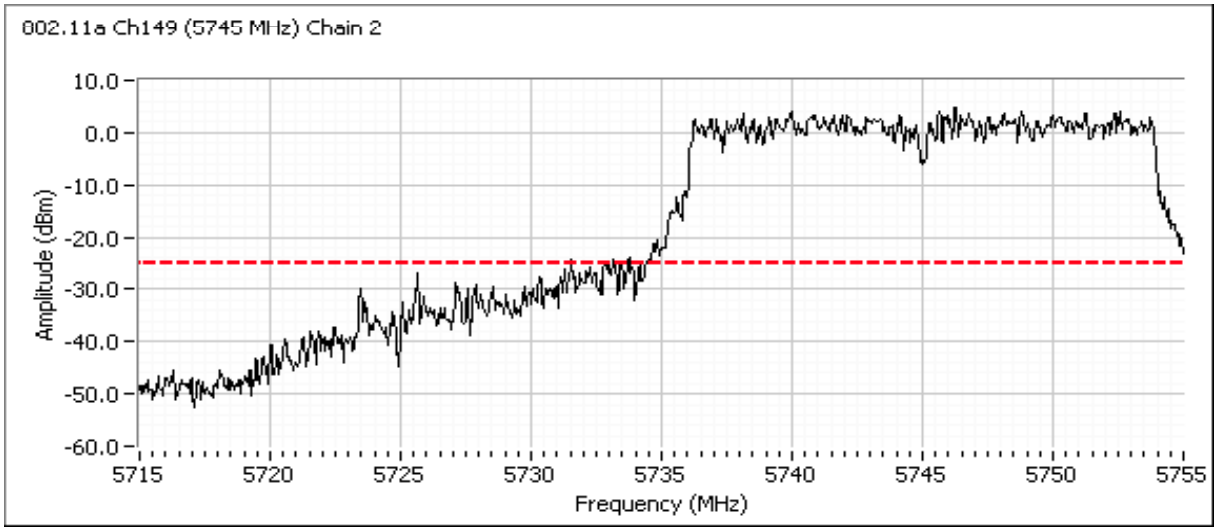


Client:	Pace Americas	Job Number:	J87430
Model:	HR44	T-Log Number:	T89059
		Account Manager:	Michelle Kim
Contact:	Mark Rieger		
Standard:	FCC 15.247, 15E, RSS-210, 15B	Class:	N/A

Chain 2 plots for low channel, power setting(s) = 20

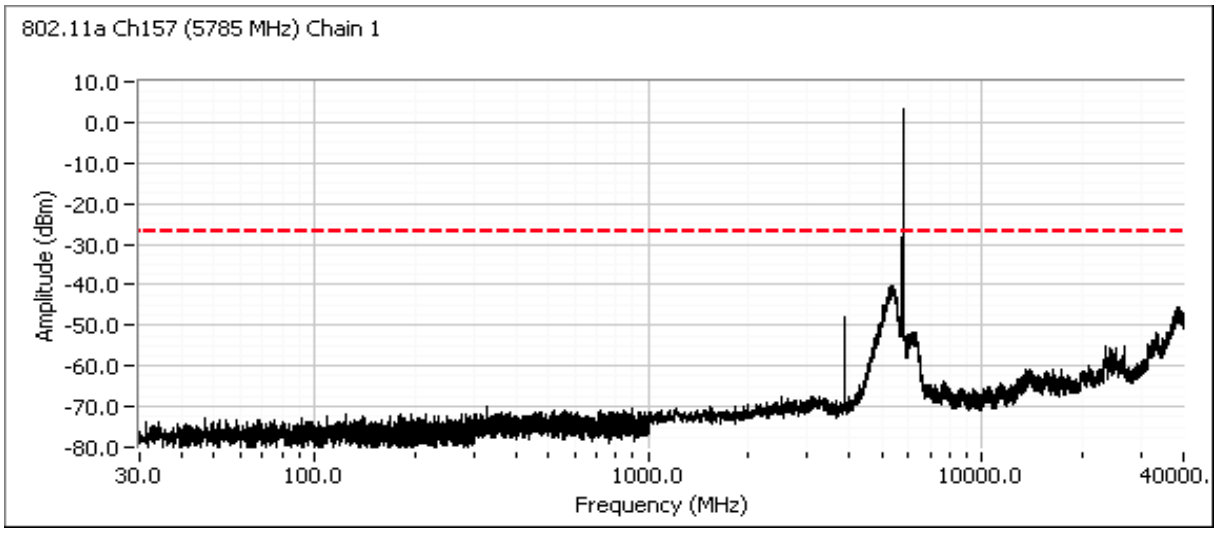


Additional plot from 5715 - 5755 MHz showing compliance with -30dBc at the band edge.

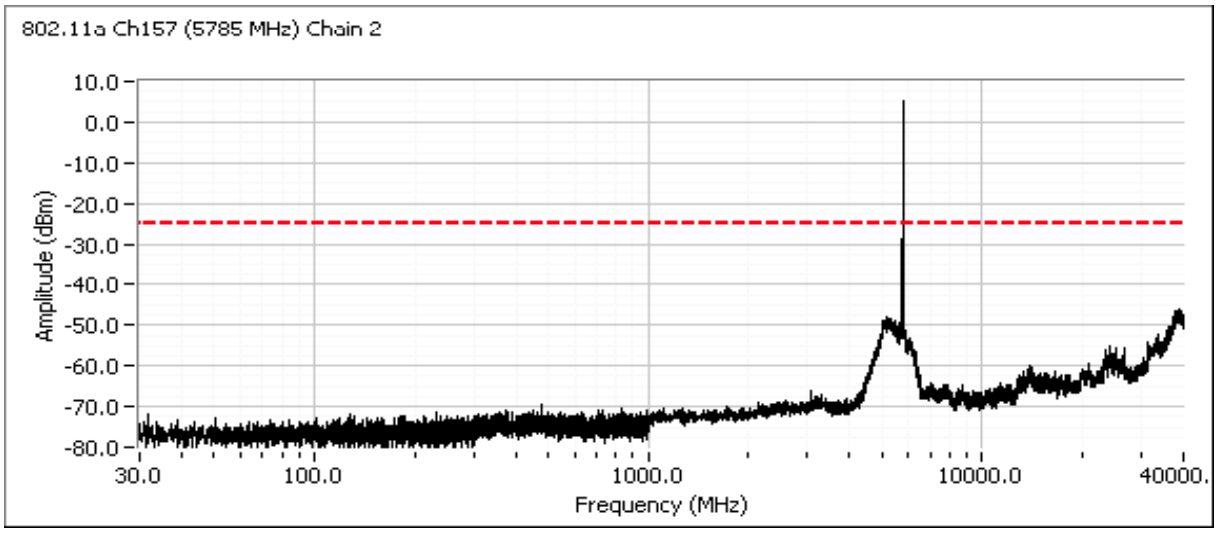


Client:	Pace Americas	Job Number:	J87430
Model:	HR44	T-Log Number:	T89059
		Account Manager:	Michelle Kim
Contact:	Mark Rieger		
Standard:	FCC 15.247, 15E, RSS-210, 15B	Class:	N/A

Chain 1 plots for center channel, power setting(s) = 20

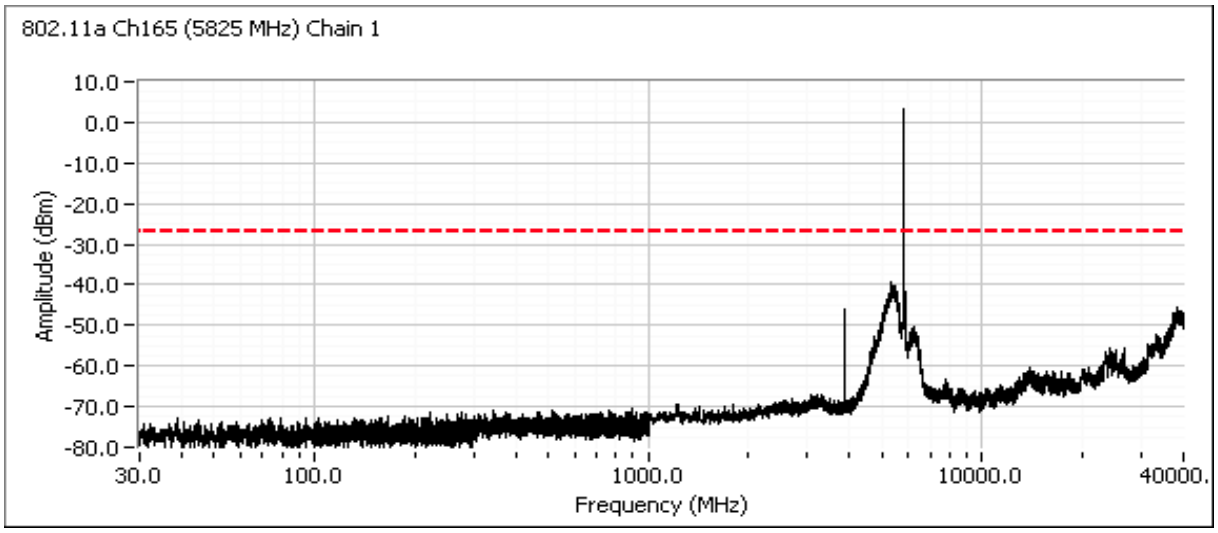


Chain 2 plots for center channel, power setting(s) = 20

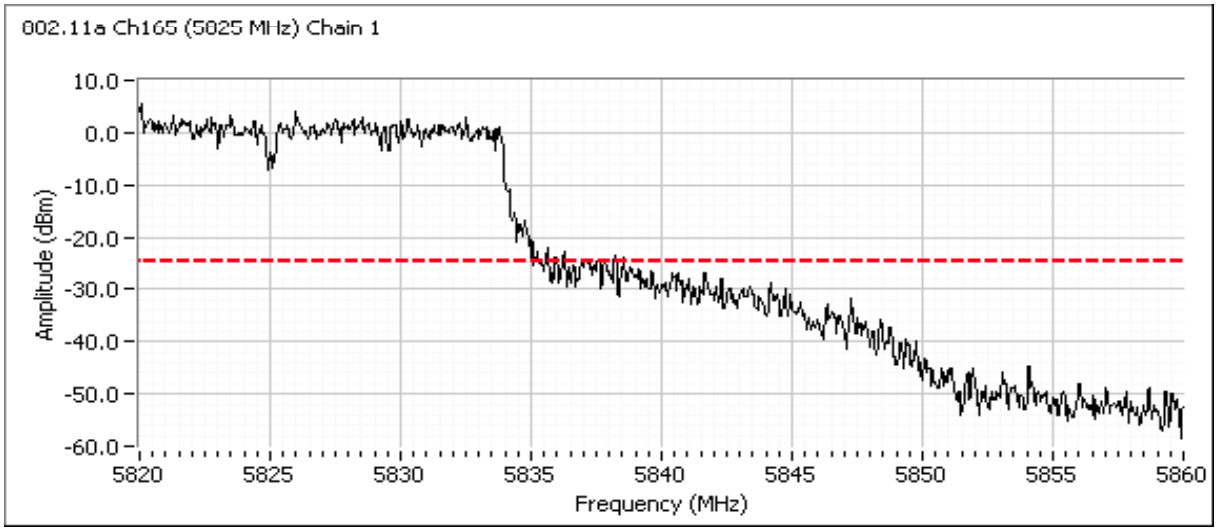


Client:	Pace Americas	Job Number:	J87430
Model:	HR44	T-Log Number:	T89059
		Account Manager:	Michelle Kim
Contact:	Mark Rieger		
Standard:	FCC 15.247, 15E, RSS-210, 15B	Class:	N/A

Chain 1 plots for high channel, power setting(s) = 20

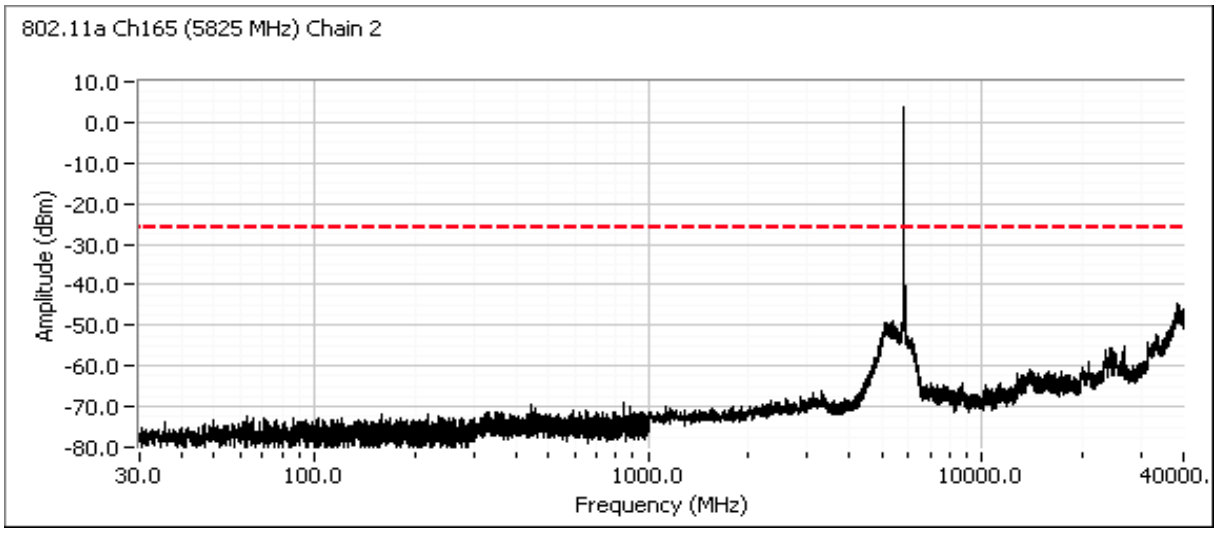


Additional plot from 5820 - 5860 MHz showing compliance with -30dBc at the band edge.

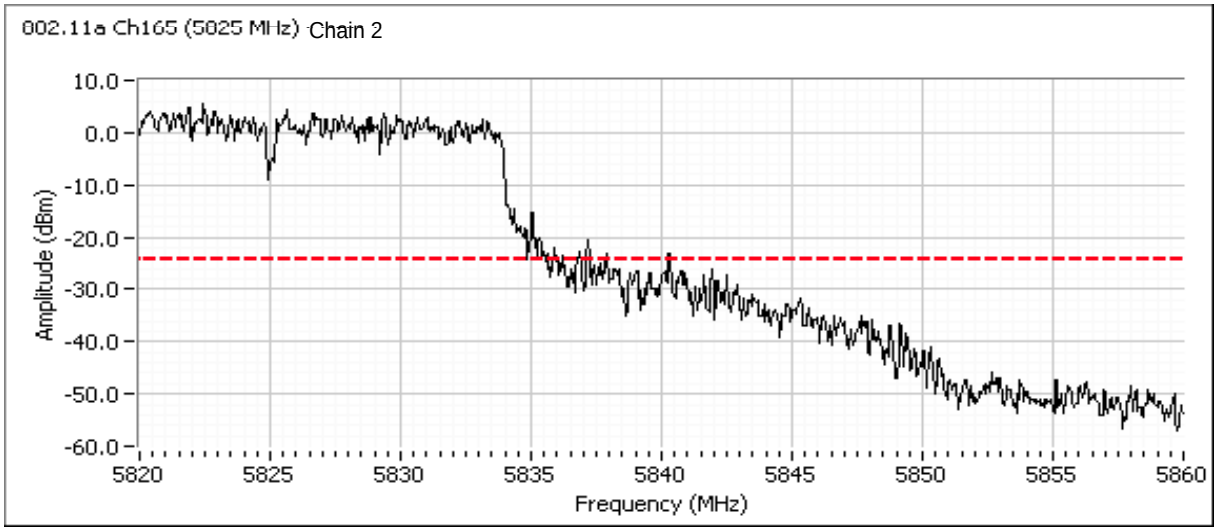


Client:	Pace Americas	Job Number:	J87430
Model:	HR44	T-Log Number:	T89059
		Account Manager:	Michelle Kim
Contact:	Mark Rieger		
Standard:	FCC 15.247, 15E, RSS-210, 15B	Class:	N/A

Chain 2 plots for high channel, power setting(s) = 20



Additional plot from 5820 - 5860 MHz showing compliance with -30dBc at the band edge.



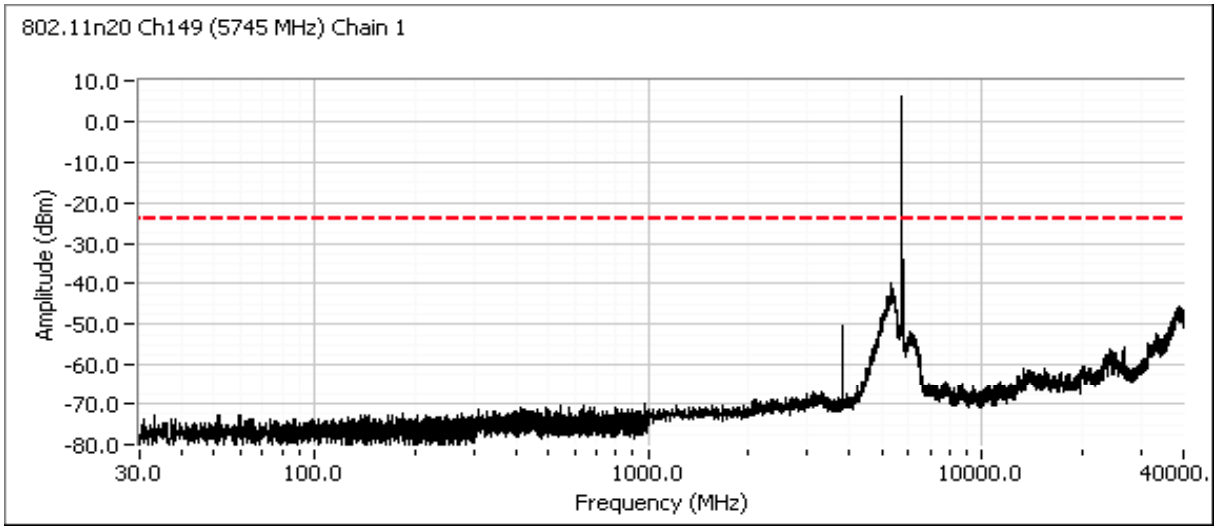
Client:	Pace Americas	Job Number:	J87430
Model:	HR44	T-Log Number:	T89059
		Account Manager:	Michelle Kim
Contact:	Mark Rieger		
Standard:	FCC 15.247, 15E, RSS-210, 15B	Class:	N/A

Mode: 802.11n20

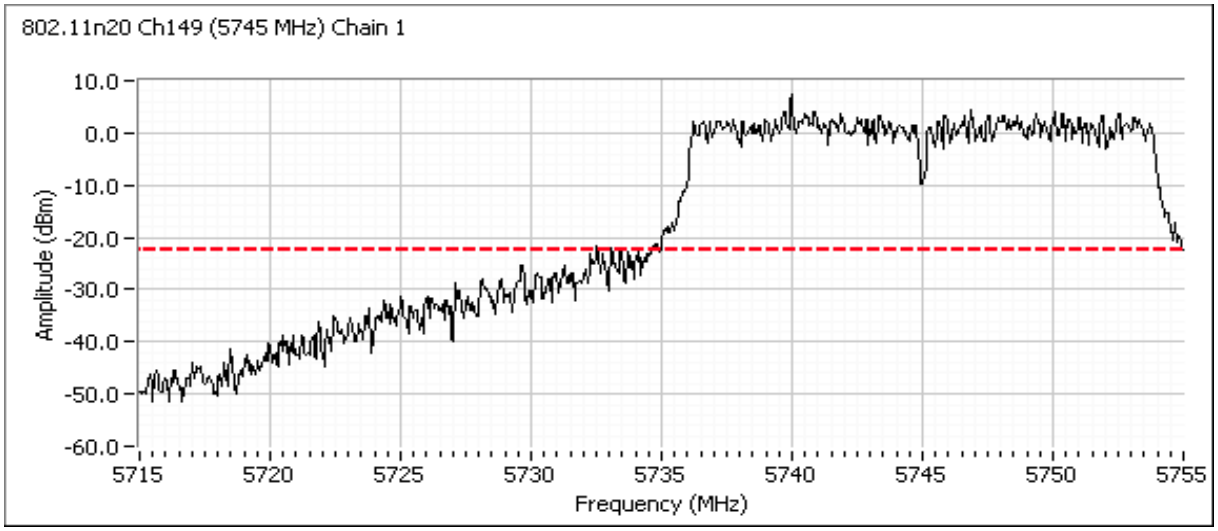
Power Setting Per Chain				Frequency (MHz)	Limit	Result
#1	#2	#3	#4			
20	20			5745	-30 dBc	Pass
20	20			5785	-30 dBc	Pass
20	20			5825	-30 dBc	Pass

Note 1: Measured on each chain individually

Chain 1 plots for low channel, power setting(s) = 20

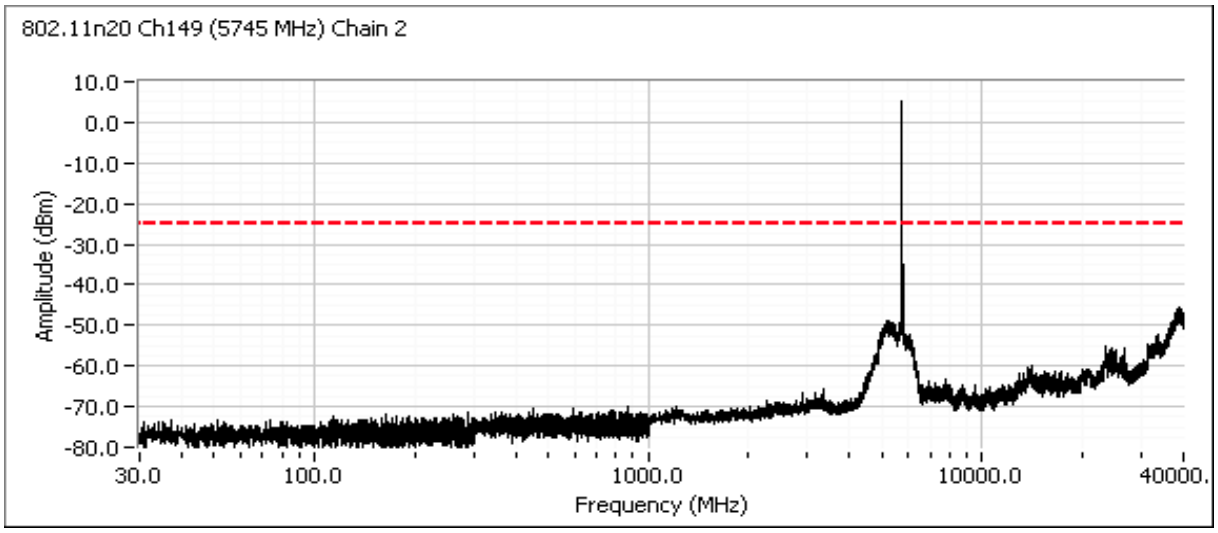


Additional plot from 5715 - 5755 MHz showing compliance with -30dBc at the band edge.

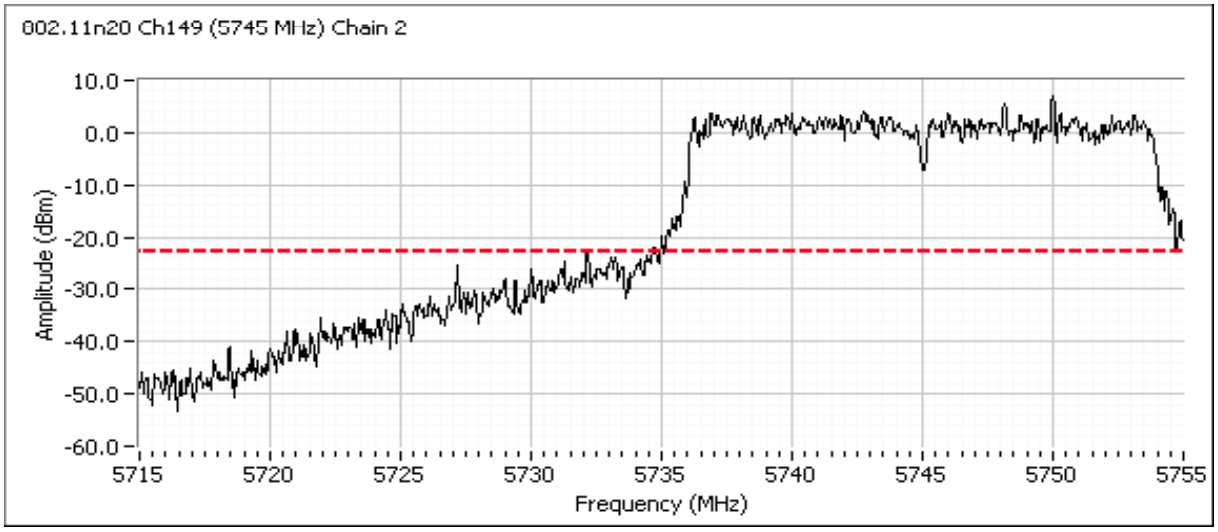


Client:	Pace Americas	Job Number:	J87430
Model:	HR44	T-Log Number:	T89059
		Account Manager:	Michelle Kim
Contact:	Mark Rieger		
Standard:	FCC 15.247, 15E, RSS-210, 15B	Class:	N/A

Chain 2 plots for low channel, power setting(s) = 20

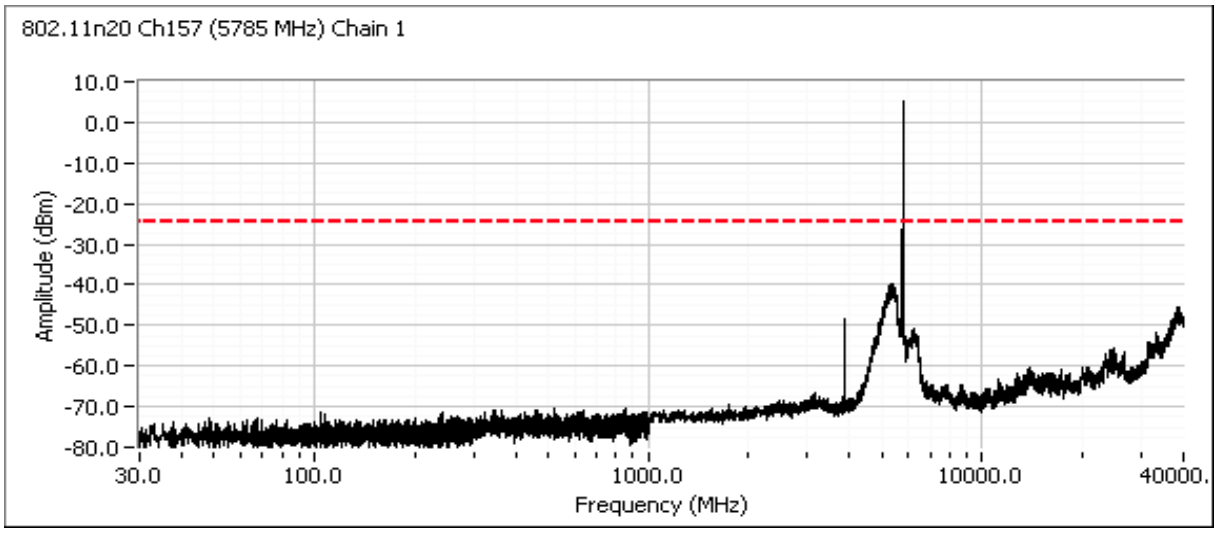


Additional plot from 5715 - 5755 MHz showing compliance with -30dBc at the band edge.

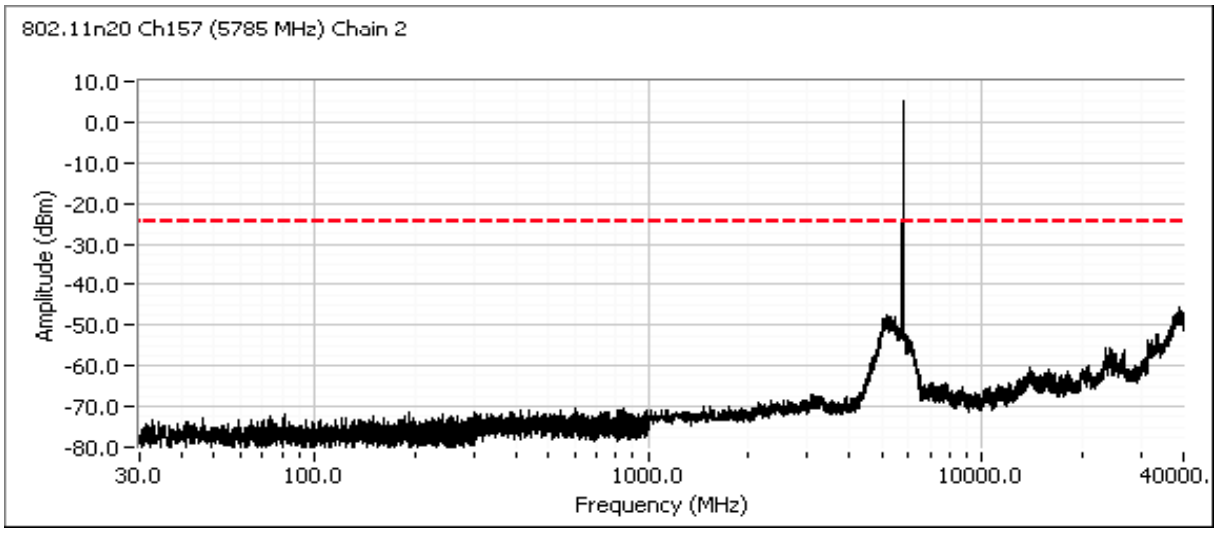


Client:	Pace Americas	Job Number:	J87430
Model:	HR44	T-Log Number:	T89059
		Account Manager:	Michelle Kim
Contact:	Mark Rieger		
Standard:	FCC 15.247, 15E, RSS-210, 15B	Class:	N/A

Chain 1 plots for center channel, power setting(s) = 20

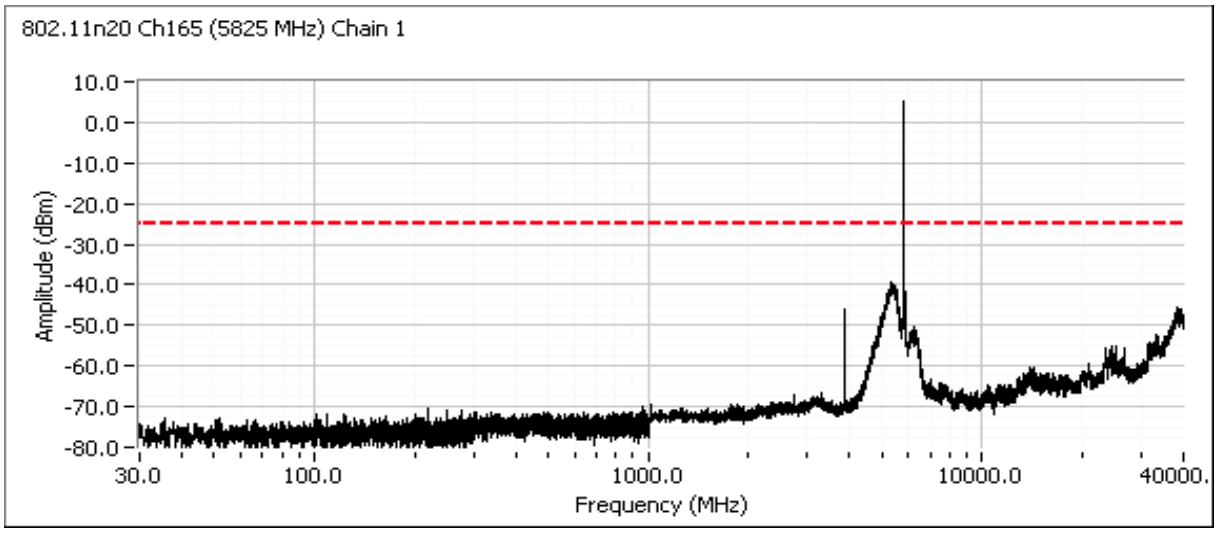


Chain 2 plots for center channel, power setting(s) = 20

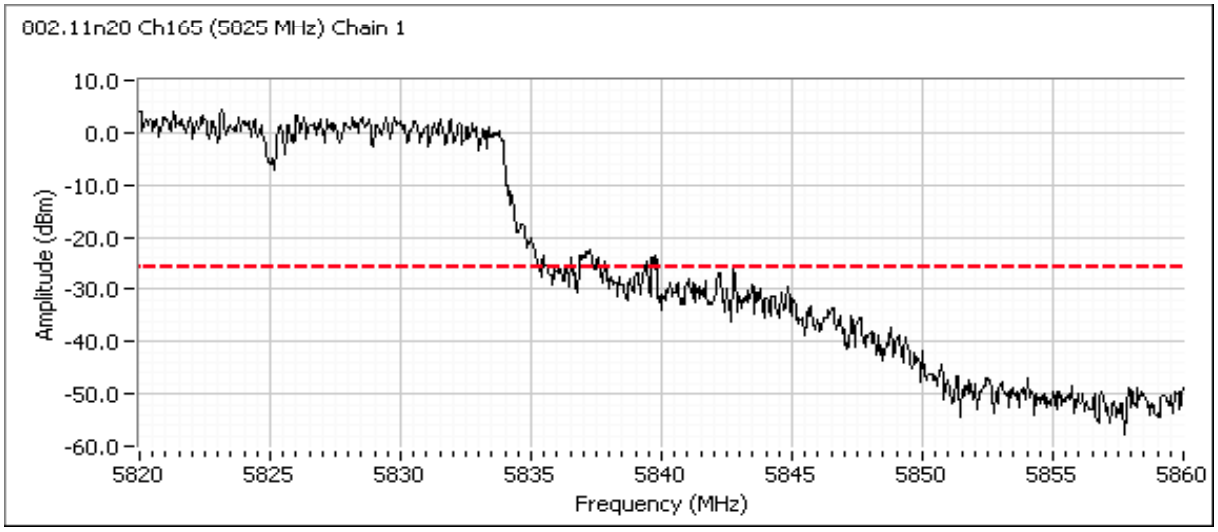


Client:	Pace Americas	Job Number:	J87430
Model:	HR44	T-Log Number:	T89059
		Account Manager:	Michelle Kim
Contact:	Mark Rieger		
Standard:	FCC 15.247, 15E, RSS-210, 15B	Class:	N/A

Chain 1 plots for high channel, power setting(s) = 20

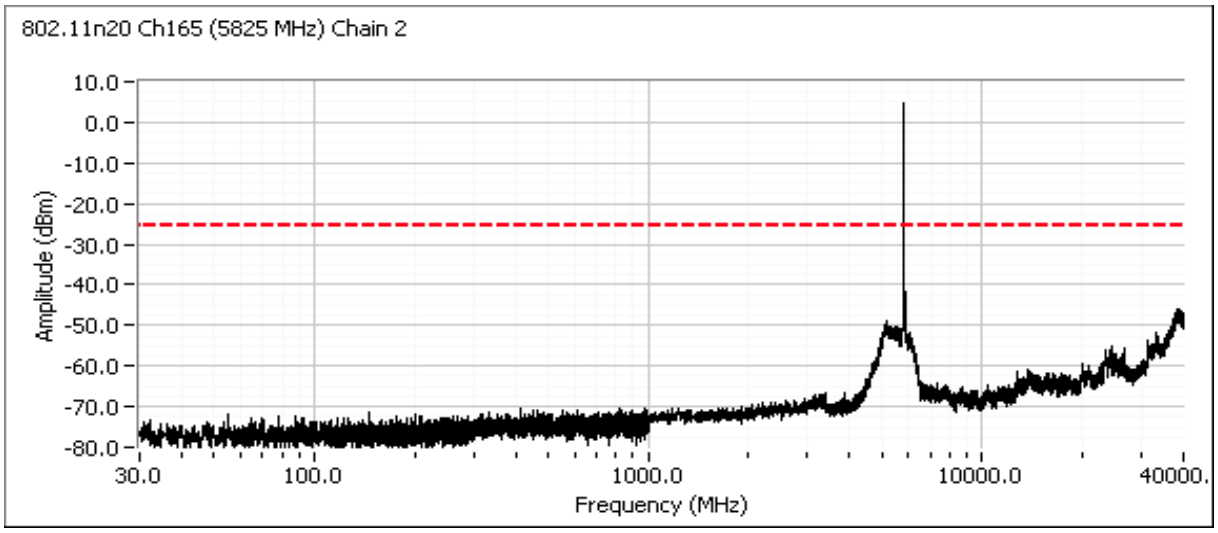


Additional plot from 5820 - 5860 MHz showing compliance with -30dBc at the band edge.

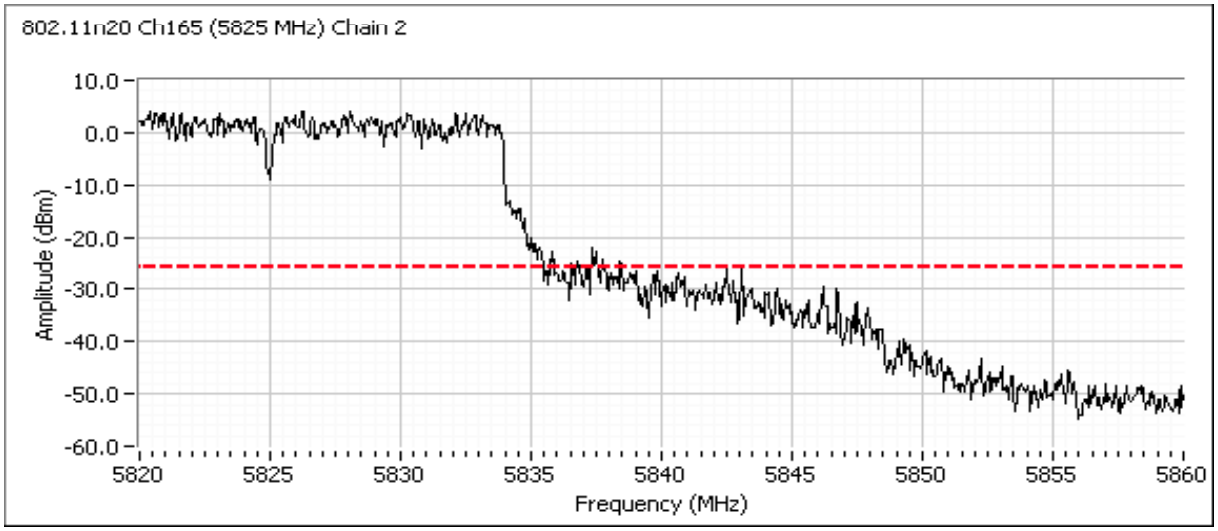


Client:	Pace Americas	Job Number:	J87430
Model:	HR44	T-Log Number:	T89059
		Account Manager:	Michelle Kim
Contact:	Mark Rieger		
Standard:	FCC 15.247, 15E, RSS-210, 15B	Class:	N/A

Chain 2 plots for high channel, power setting(s) = 20



Additional plot from 5820 - 5860 MHz showing compliance with -30dBc at the band edge.



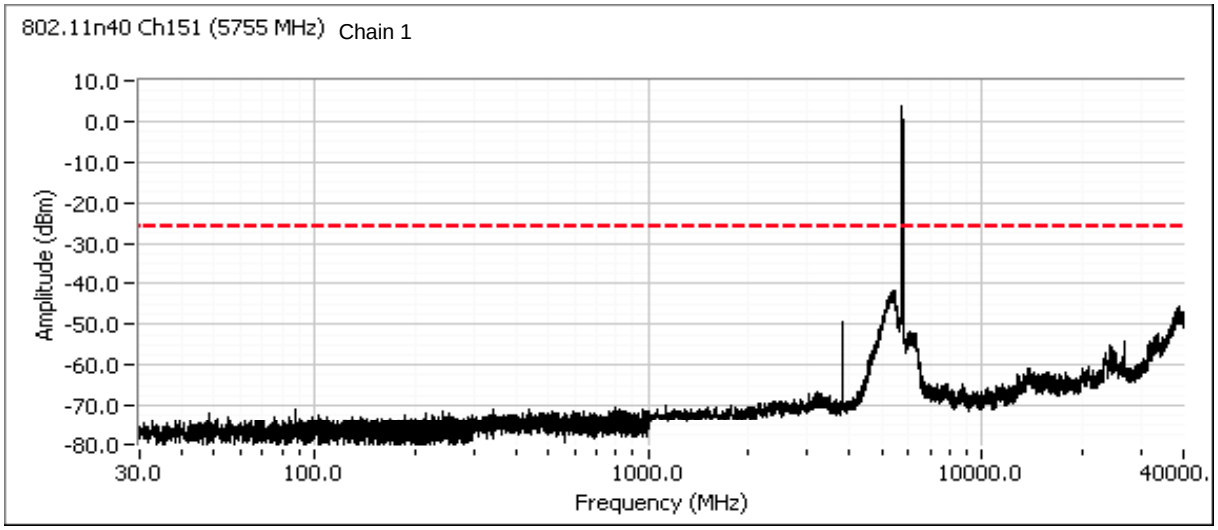
Client:	Pace Americas	Job Number:	J87430
Model:	HR44	T-Log Number:	T89059
		Account Manager:	Michelle Kim
Contact:	Mark Rieger		
Standard:	FCC 15.247, 15E, RSS-210, 15B	Class:	N/A

Mode: 802.11n40

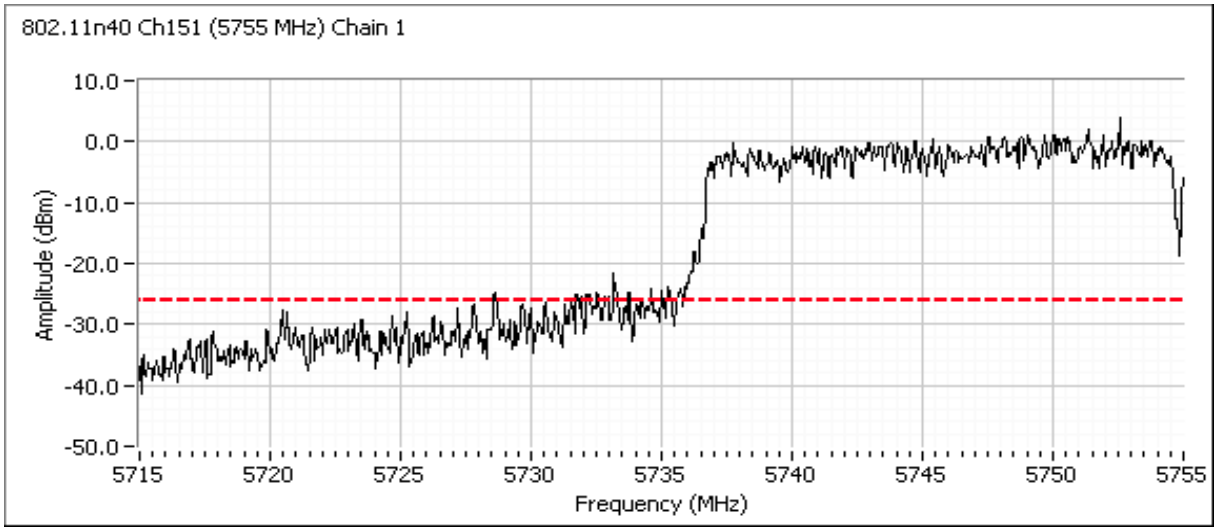
Power Setting Per Chain				Frequency (MHz)	Limit	Result
#1	#2	#3	#4			
20	20			5755	-30 dBc	Pass
20	20			5795	-30 dBc	Pass

Note 1: Measured on each chain individually

Chain 1 plots for low channel, power setting(s) = 20

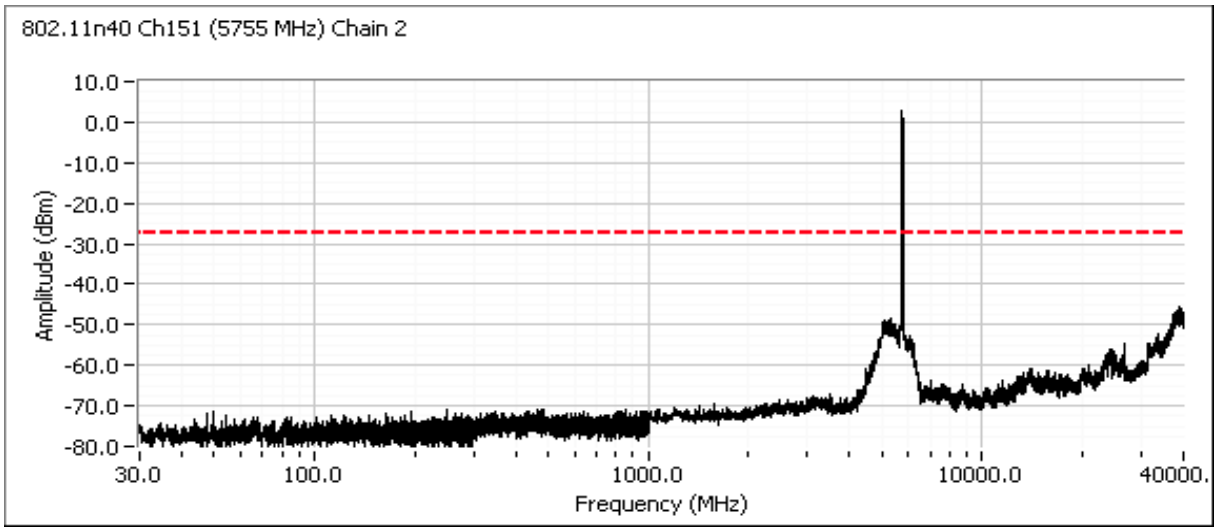


Additional plot from 5715 - 5755 MHz showing compliance with -30dBc at the band edge.

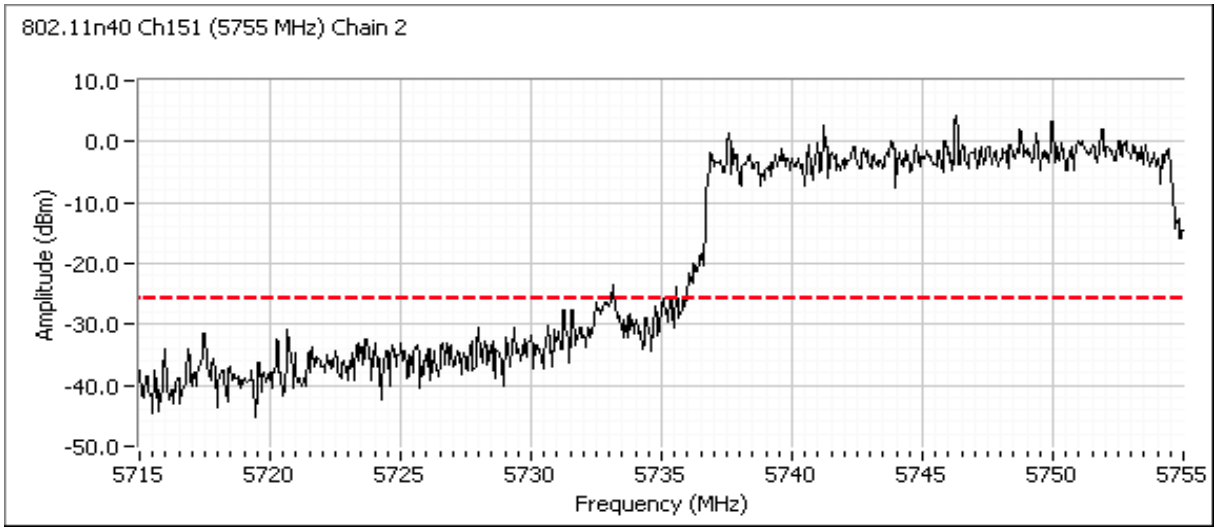


Client:	Pace Americas	Job Number:	J87430
Model:	HR44	T-Log Number:	T89059
		Account Manager:	Michelle Kim
Contact:	Mark Rieger		
Standard:	FCC 15.247, 15E, RSS-210, 15B	Class:	N/A

Chain 2 plots for low channel, power setting(s) = 20

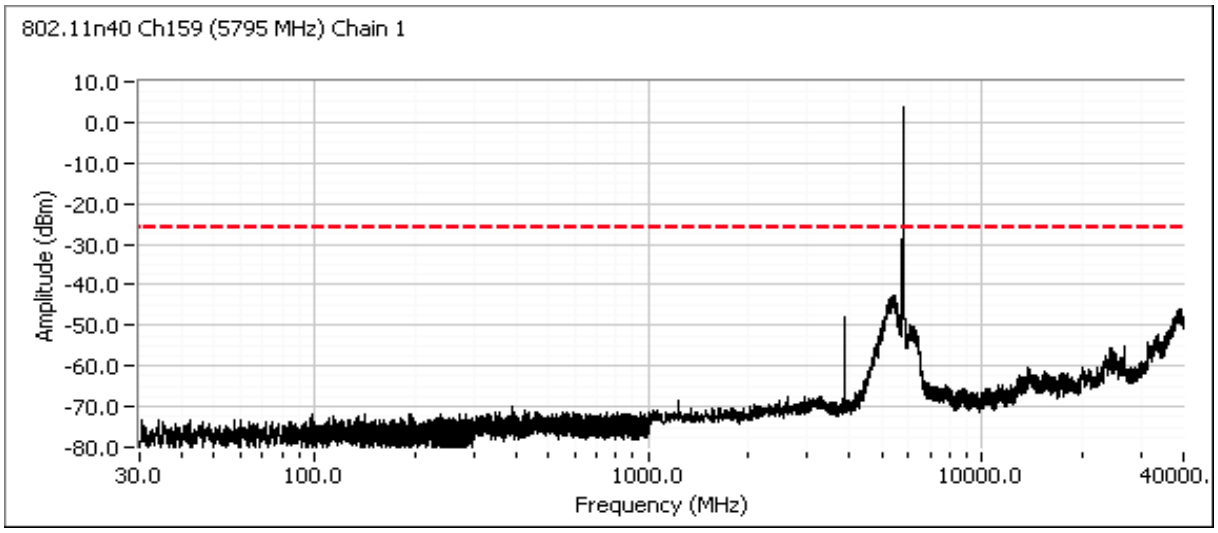


Additional plot from 5715 - 5755 MHz showing compliance with -30dBc at the band edge.

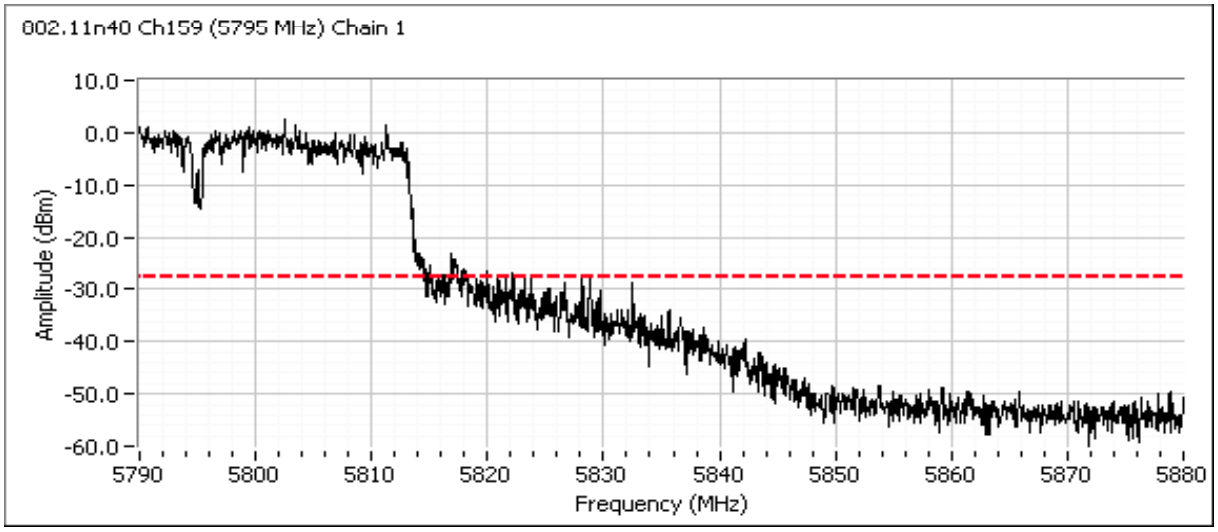


Client:	Pace Americas	Job Number:	J87430
Model:	HR44	T-Log Number:	T89059
		Account Manager:	Michelle Kim
Contact:	Mark Rieger		
Standard:	FCC 15.247, 15E, RSS-210, 15B	Class:	N/A

Chain 1 Plots for high channel, power setting(s) = 20

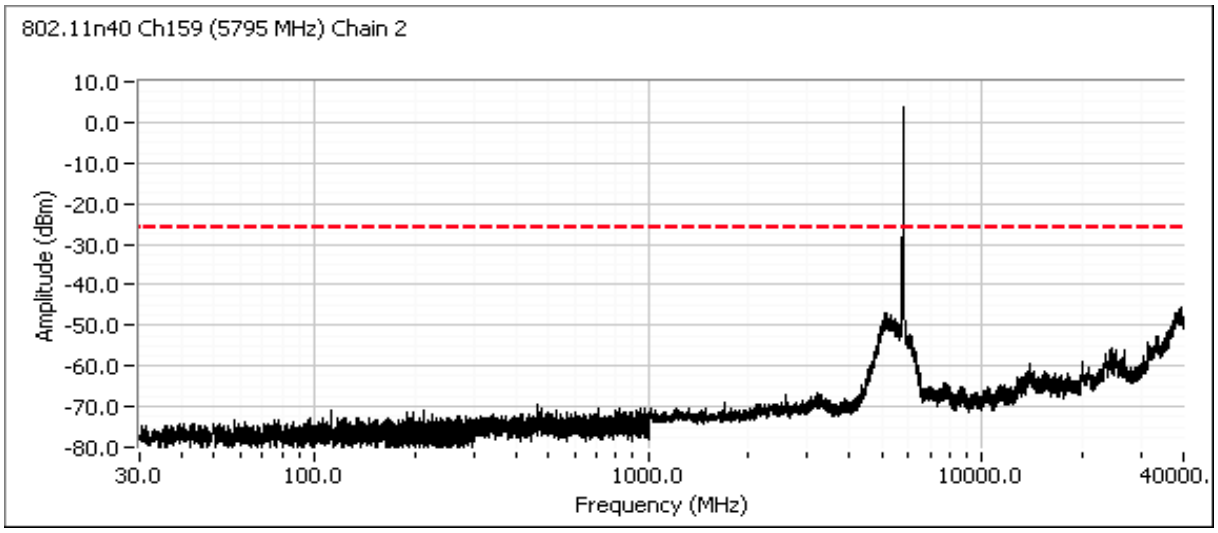


Additional plot from 5790 - 5880 MHz showing compliance with -30dBc at the band edge.

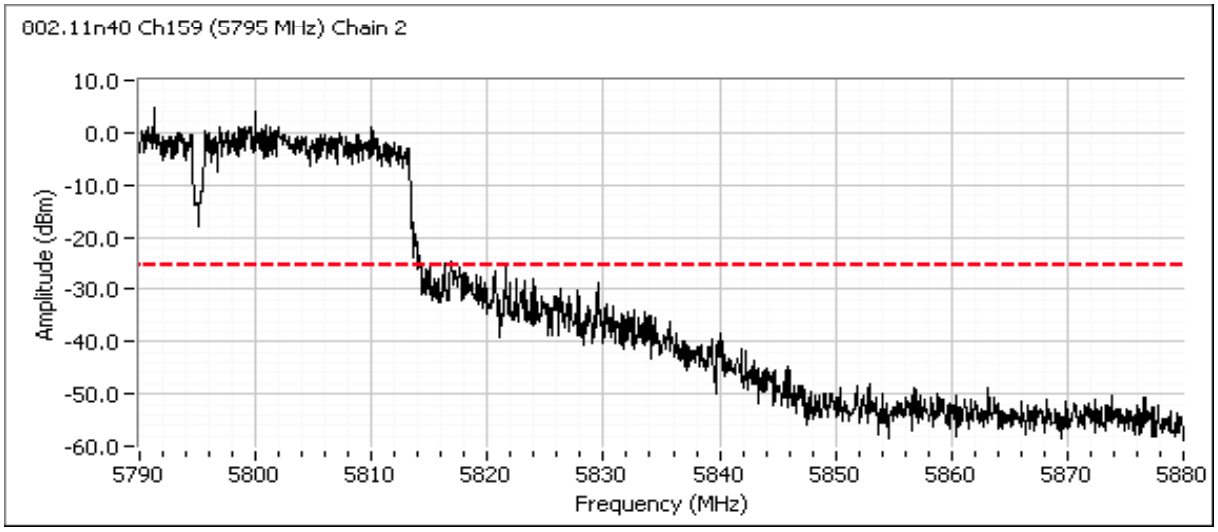


Client:	Pace Americas	Job Number:	J87430
Model:	HR44	T-Log Number:	T89059
		Account Manager:	Michelle Kim
Contact:	Mark Rieger		
Standard:	FCC 15.247, 15E, RSS-210, 15B	Class:	N/A

Chain 2 Plots for high channel, power setting(s) = 20



Additional plot from 5790 - 5880 MHz showing compliance with -30dBc at the band edge.



Client:	Pace Americas	Job Number:	J87430
Model:	HR44	T-Log Number:	T89059
		Account Manager:	Michelle Kim
Contact:	Mark Rieger		
Standard:	FCC 15.247, 15E, RSS-210, 15B	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: 9/25/2012
Test Engineer: D. Demirci
Test Location: FT Lab# 4

Config. Used: Direct connection to antenna ports.
Config Change: None
EUT Voltage: 120 VAC 60 Hz

General Test Configuration

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

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

Ambient Conditions:

Temperature: 23 °C
Rel. Humidity: 37 %

Summary of Results

Run #	Pwr setting	Avg Pwr	Test Performed	Limit	Pass / Fail	Result / Margin
1	w3	-	Output Power	15.247(b)	Pass	2.8 dBm (1.9mW)
2	w3	-	Power spectral Density (PSD)	15.247(d)	Pass	-11.1 dBm/3kHz
3	w3	-	Minimum 6dB Bandwidth	15.247(a)	Pass	1.53 MHz
3	w3	-	99% Bandwidth	RSS GEN	-	2.32 MHz
4	w3	-	Spurious emissions	15.247(b)	Pass	All emissions below the -20 dBc 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:	Pace Americas	Job Number:	J87430
Model:	HR44	T-Log Number:	T89059
		Account Manager:	Michelle Kim
Contact:	Mark Rieger		
Standard:	FCC 15.247, 15E, RSS-210, 15B	Class:	N/A

Run #1: Output Power

Chain 1

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
w3	2405	2.8	1.9	4.9	Pass	7.7	0.006		
w3	2440	2.8	1.9	4.9	Pass	7.7	0.006		
w3	2475	2.5	1.8	4.9	Pass	7.4	0.005		

Chain 2

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
w3	2405	2.2	1.7	4.9	Pass	7.1	0.005		
w3	2440	2.2	1.6	4.9	Pass	7.1	0.005		
w3	2475	2.1	1.6	4.9	Pass	7.0	0.005		

Note 1:	Output power measured using a peak power meter, spurious limit is -20dBc.

Client:	Pace Americas	Job Number:	J87430
Model:	HR44	T-Log Number:	T89059
		Account Manager:	Michelle Kim
Contact:	Mark Rieger		
Standard:	FCC 15.247, 15E, RSS-210, 15B	Class:	N/A

Run #2: Power spectral Density

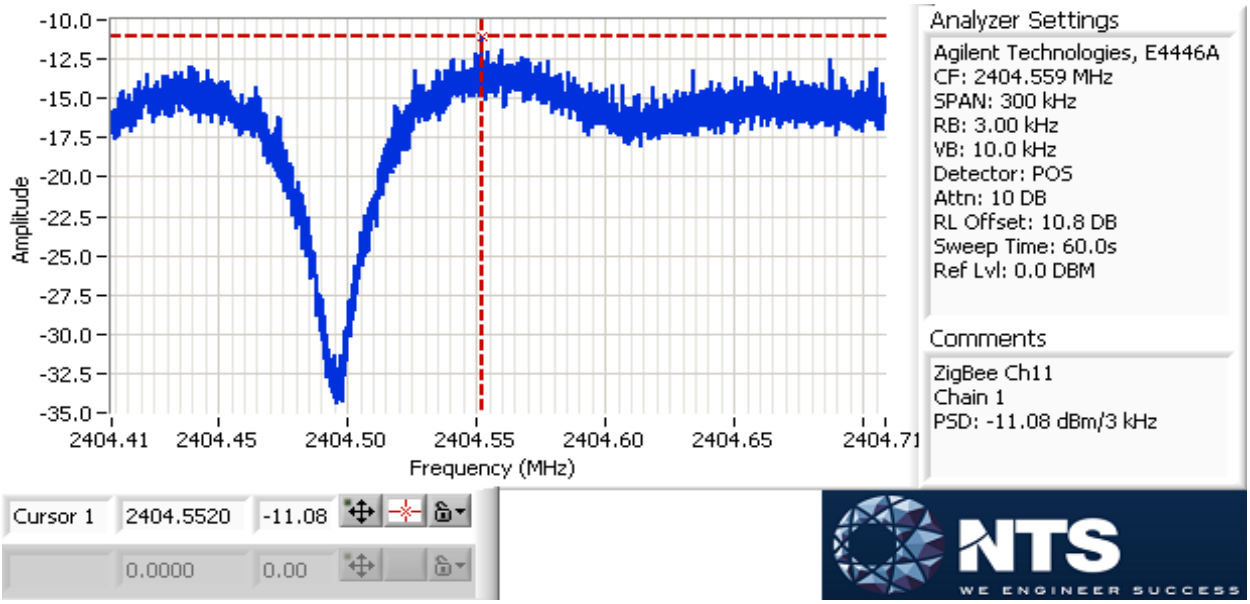
Chain 1

Power Setting	Frequency (MHz)	PSD (dBm/3kHz) Note 1	Limit dBm/3kHz	Result
w3	2405	-11.1	8.0	Pass
w3	2440	-12.4	8.0	Pass
w3	2475	-12.6	8.0	Pass

Chain 2

Power Setting	Frequency (MHz)	PSD (dBm/3kHz) Note 1	Limit dBm/3kHz	Result
w3	2405	-12.3	8.0	Pass
w3	2440	-13.1	8.0	Pass
w3	2475	-13.2	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.



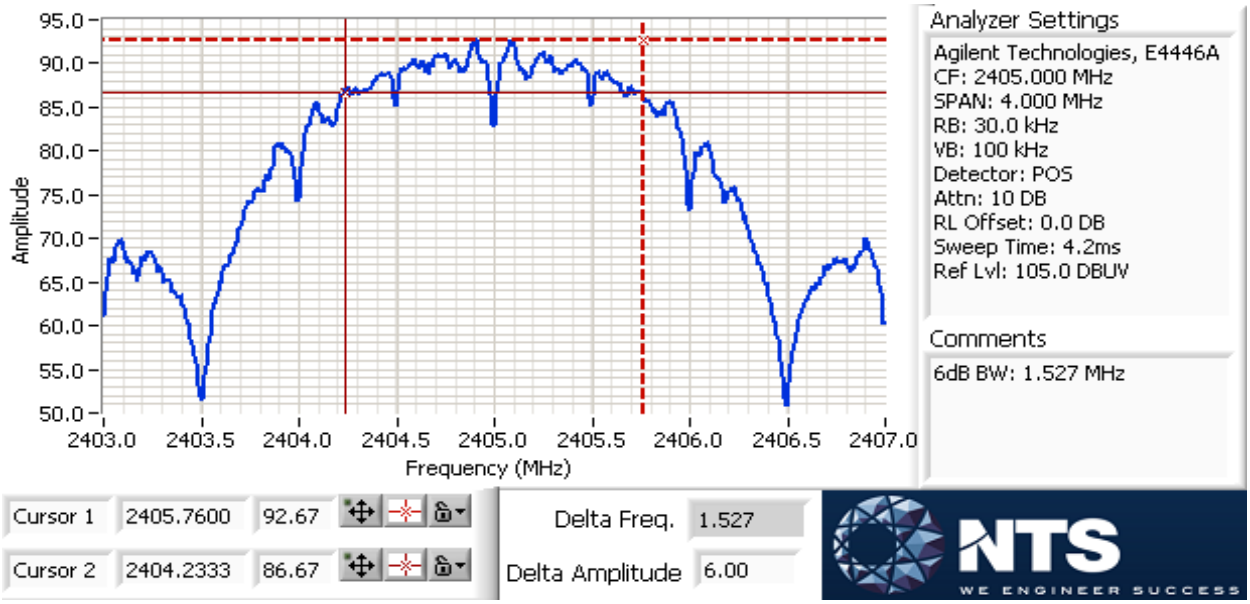
Client:	Pace Americas	Job Number:	J87430
Model:	HR44	T-Log Number:	T89059
		Account Manager:	Michelle Kim
Contact:	Mark Rieger		
Standard:	FCC 15.247, 15E, RSS-210, 15B	Class:	N/A

Run #3: Signal Bandwidth

Power Setting	Frequency (MHz)	Resolution Bandwidth	Bandwidth (MHz) 6dB	99%
w3	2405	30 kHz	1.53	2.32
w3	2440	30 kHz	1.53	2.32
w3	2475	30 kHz	1.52	2.32

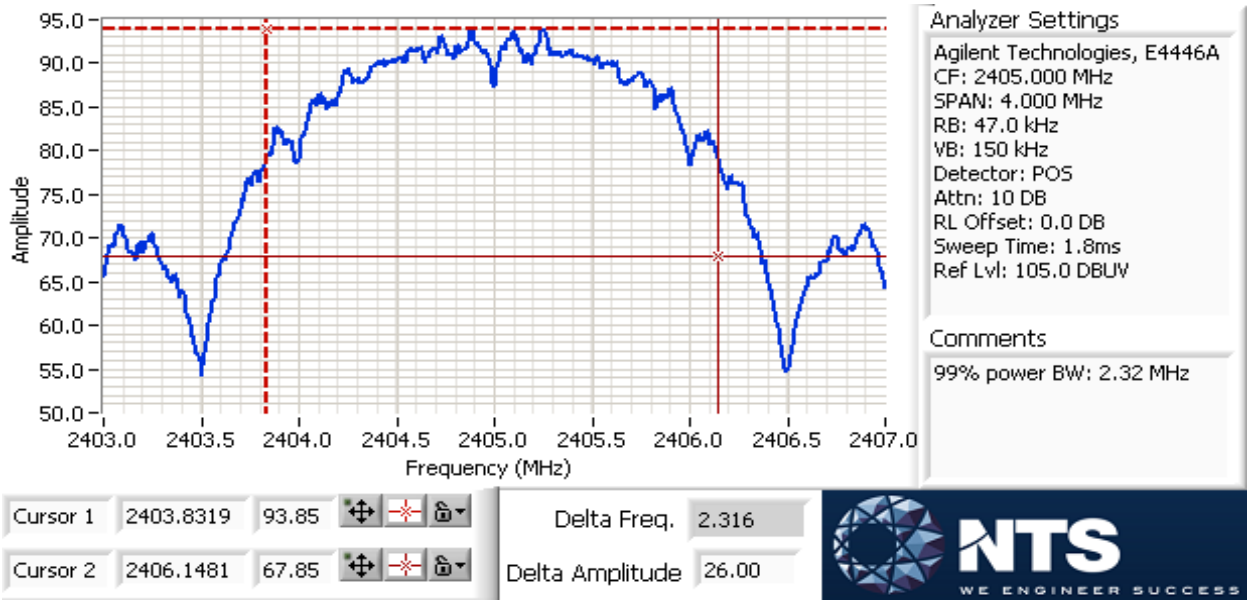
Note 1:	99% bandwidth measured in accordance with RSS GEN, with RB > 1% of the span and VB > 3xRB

6 dB BW



Client:	Pace Americas	Job Number:	J87430
Model:	HR44	T-Log Number:	T89059
		Account Manager:	Michelle Kim
Contact:	Mark Rieger		
Standard:	FCC 15.247, 15E, RSS-210, 15B	Class:	N/A

99% power BW

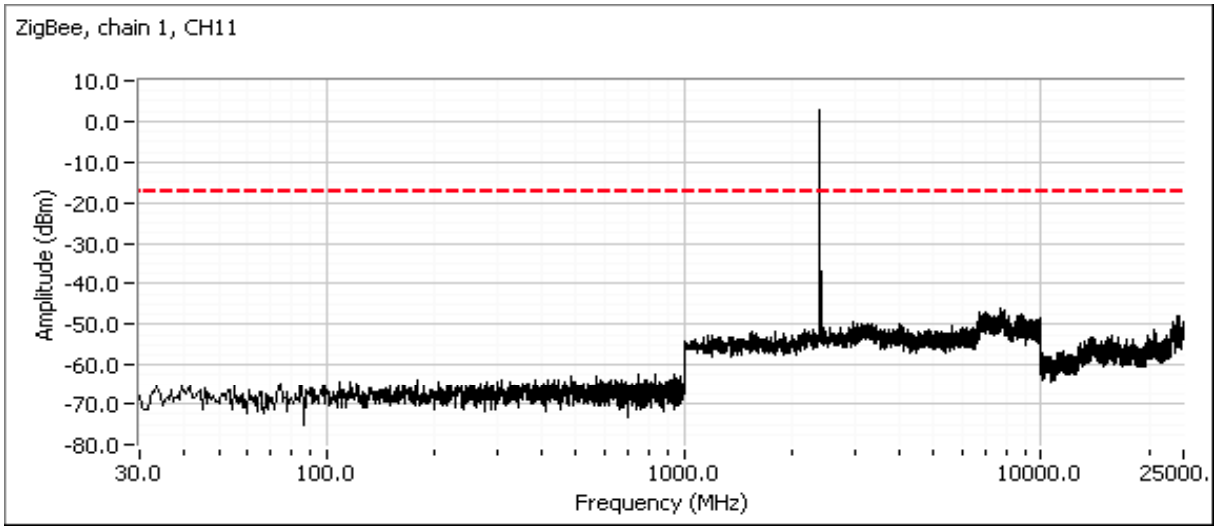


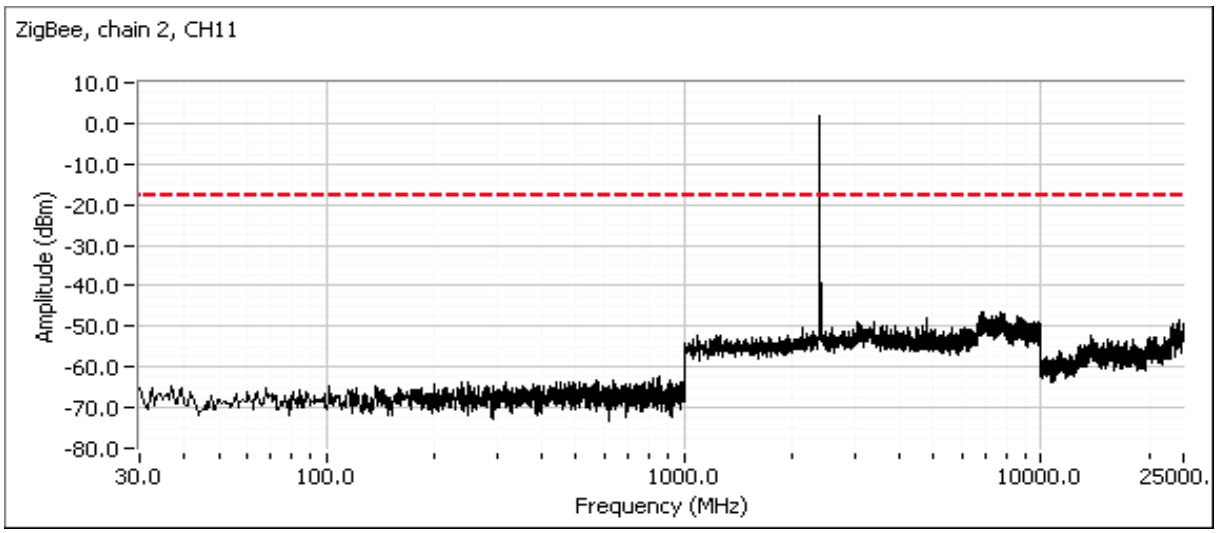
Client:	Pace Americas	Job Number:	J87430
Model:	HR44	T-Log Number:	T89059
		Account Manager:	Michelle Kim
Contact:	Mark Rieger		
Standard:	FCC 15.247, 15E, RSS-210, 15B	Class:	N/A

Run #4: Out of Band Spurious Emissions

Frequency (MHz)	Limit	Result
2405	-20dBc	Pass
2440	-20dBc	Pass
2475	-20dBc	Pass

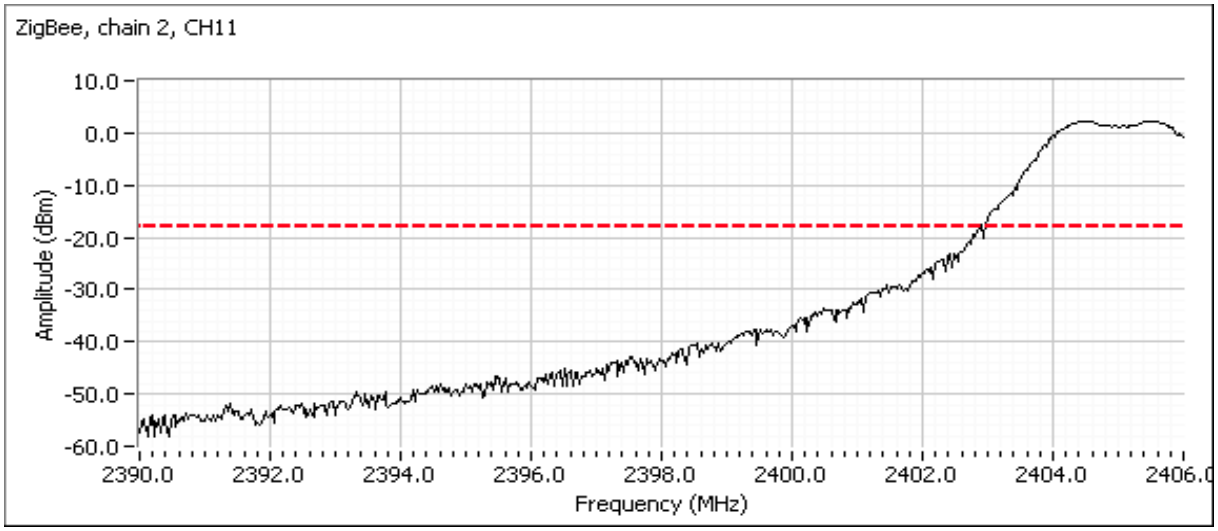
Plots for low channel, power setting(s) = w3

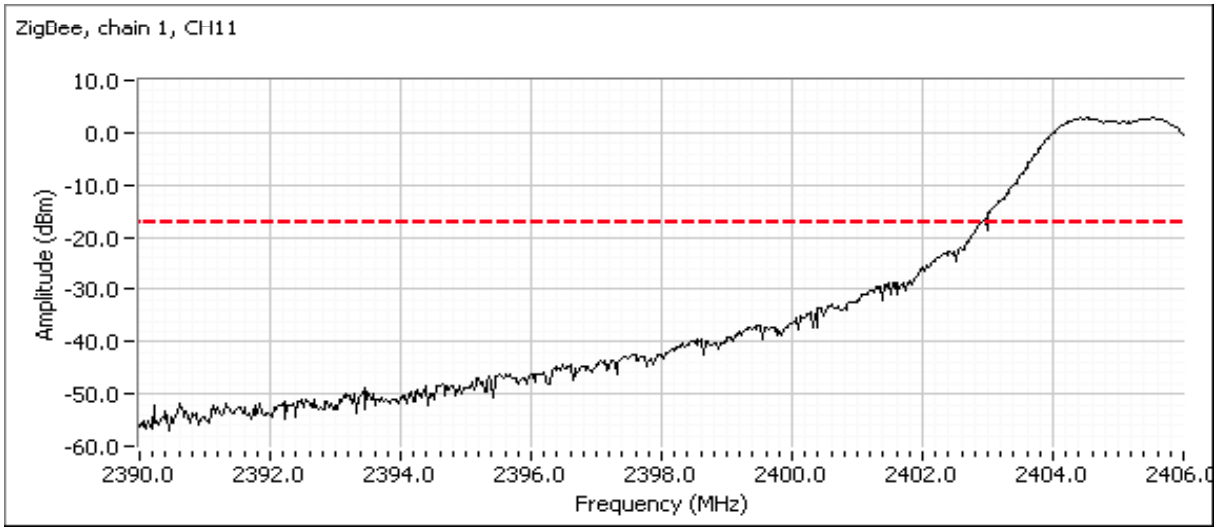




Client:	Pace Americas	Job Number:	J87430
Model:	HR44	T-Log Number:	T89059
		Account Manager:	Michelle Kim
Contact:	Mark Rieger		
Standard:	FCC 15.247, 15E, RSS-210, 15B	Class:	N/A

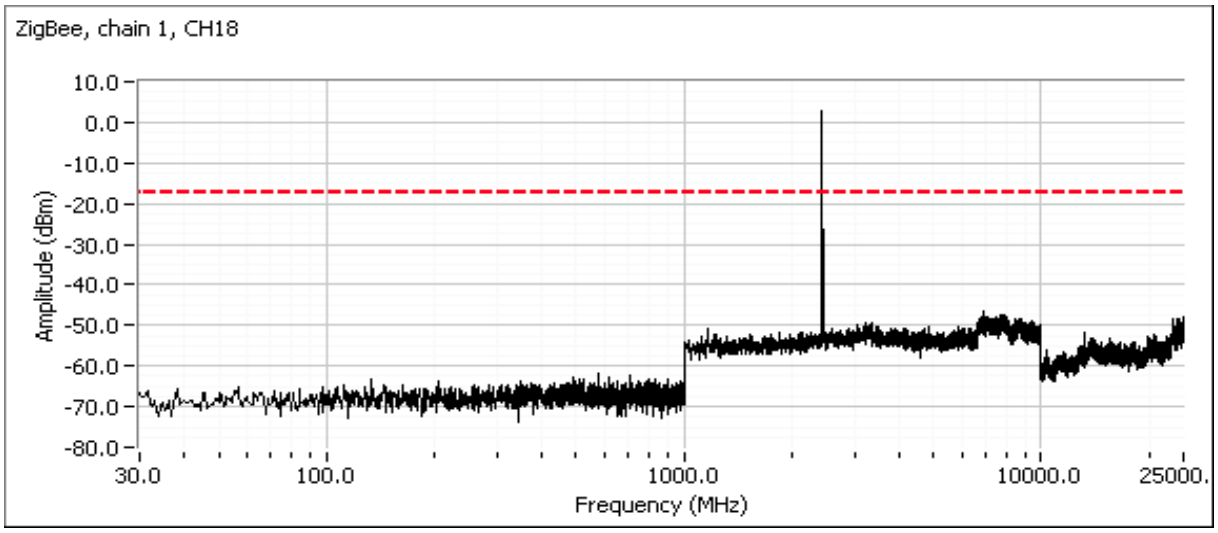
Additional plot showing compliance with -20dBc limit from 2390 MHz to 2400 MHz. Radiated measurements used to show compliance with the limits in the restricted band below 2390 MHz.

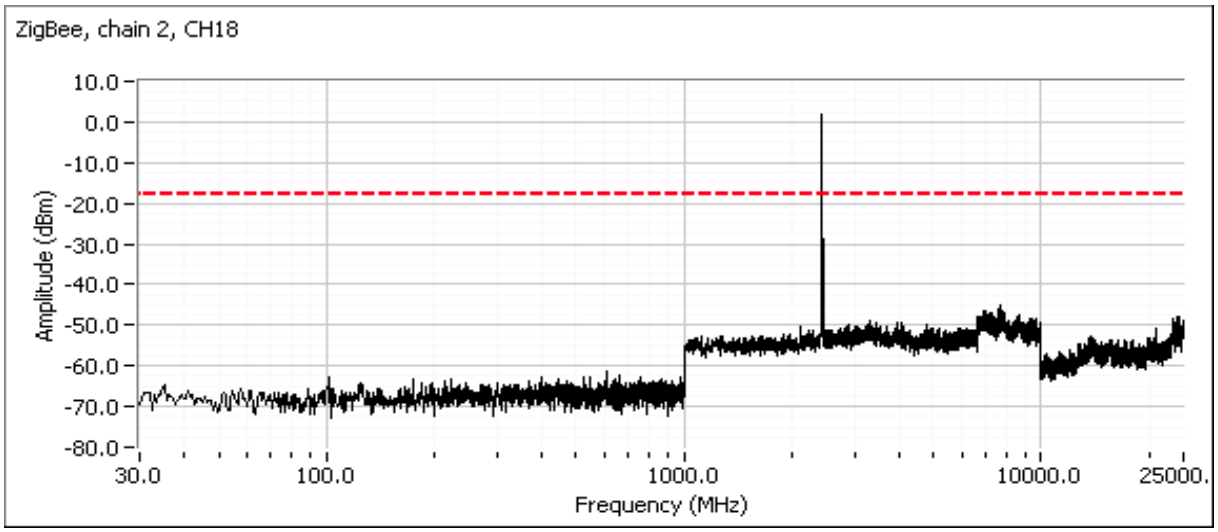




Client:	Pace Americas	Job Number:	J87430
Model:	HR44	T-Log Number:	T89059
		Account Manager:	Michelle Kim
Contact:	Mark Rieger		
Standard:	FCC 15.247, 15E, RSS-210, 15B	Class:	N/A

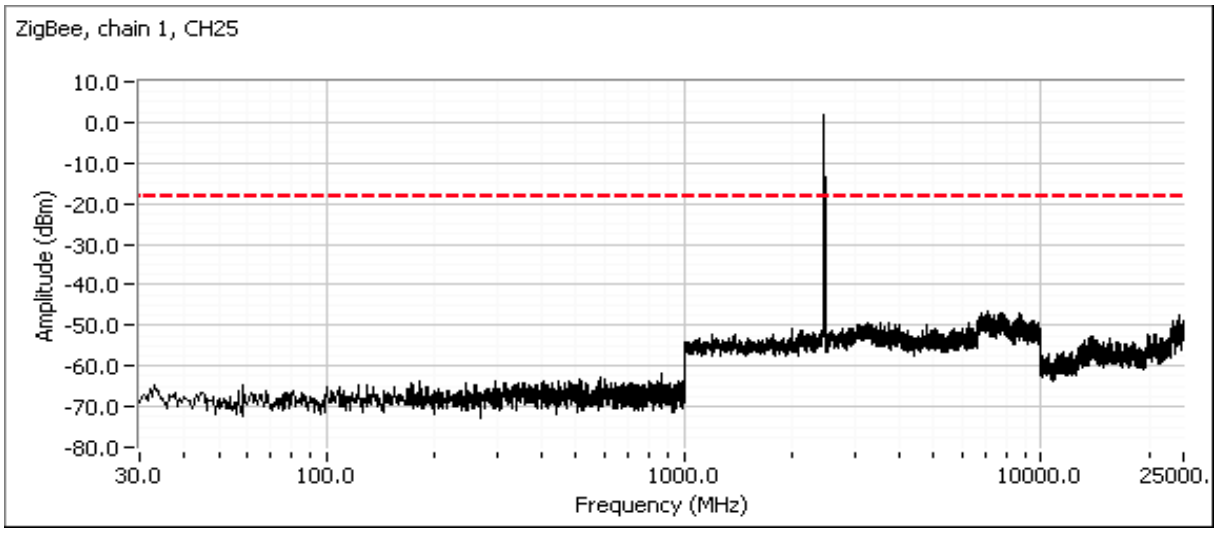
Plots for center channel, power setting(s) = w3

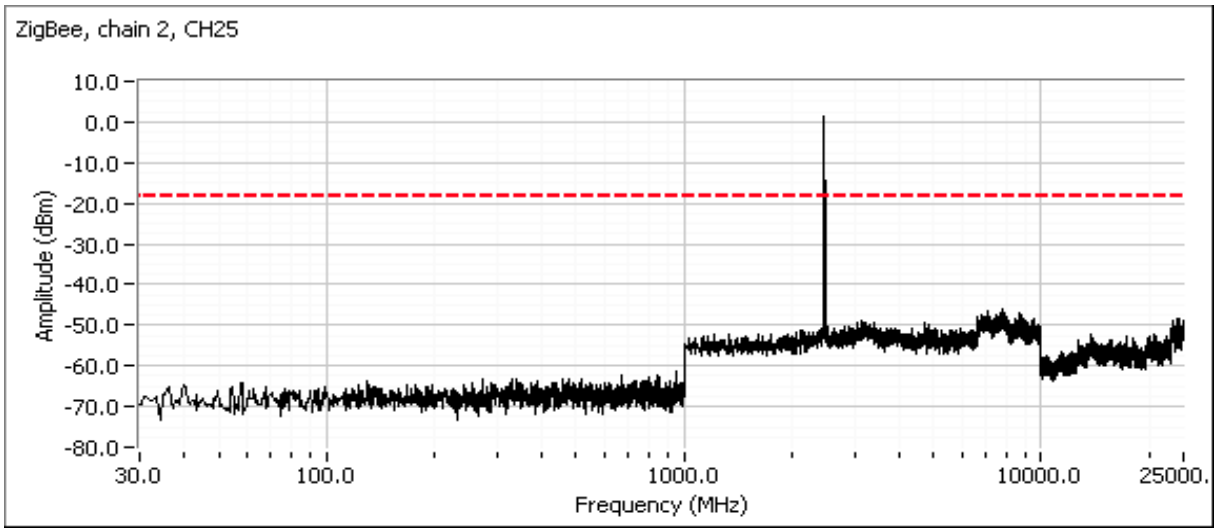




Client:	Pace Americas	Job Number:	J87430
Model:	HR44	T-Log Number:	T89059
		Account Manager:	Michelle Kim
Contact:	Mark Rieger		
Standard:	FCC 15.247, 15E, RSS-210, 15B	Class:	N/A

Plots for high channel, power setting(s) = w3





Client:	Pace Americas	Job Number:	J87430
Model:	HR44	T-Log Number:	T89059
		Account Manager:	Michelle Kim
Contact:	Mark Rieger		
Standard:	FCC 15.247, 15E, RSS-210, 15B	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.

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

Ambient Conditions:

Temperature: 20.8 °C
Rel. Humidity: 35 %

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	-	low ch11	w3	-	Restricted Band Edge (2390 MHz)	FCC Part 15.209 / 15.247(c)	36.2 dBµV/m @ 2390.0 MHz (-17.8 dB)
			w3	-	Radiated Emissions, 1 - 26 GHz	FCC Part 15.209 / 15.247(c)	47.0 dBµV/m @ 9000.0 MHz (-7.0 dB)
1b	-	center ch20	w3	-	Radiated Emissions, 1 - 26 GHz	FCC Part 15.209 / 15.247(c)	47.1 dBµV/m @ 9000.0 MHz (-6.9 dB)
1c	-	high ch25	w3	-	Restricted Band Edge (2483.5 MHz)	FCC Part 15.209 / 15.247(c)	42.5 dBµV/m @ 2499.1 MHz (-11.5 dB)
			w3	-	Radiated Emissions, 1 - 26 GHz	FCC Part 15.209 / 15.247(c)	48.9 dBµV/m @ 2220.1 MHz (-5.1 dB)

Client:	Pace Americas	Job Number:	J87430
Model:	HR44	T-Log Number:	T89059
		Account Manager:	Michelle Kim
Contact:	Mark Rieger		
Standard:	FCC 15.247, 15E, RSS-210, 15B	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.

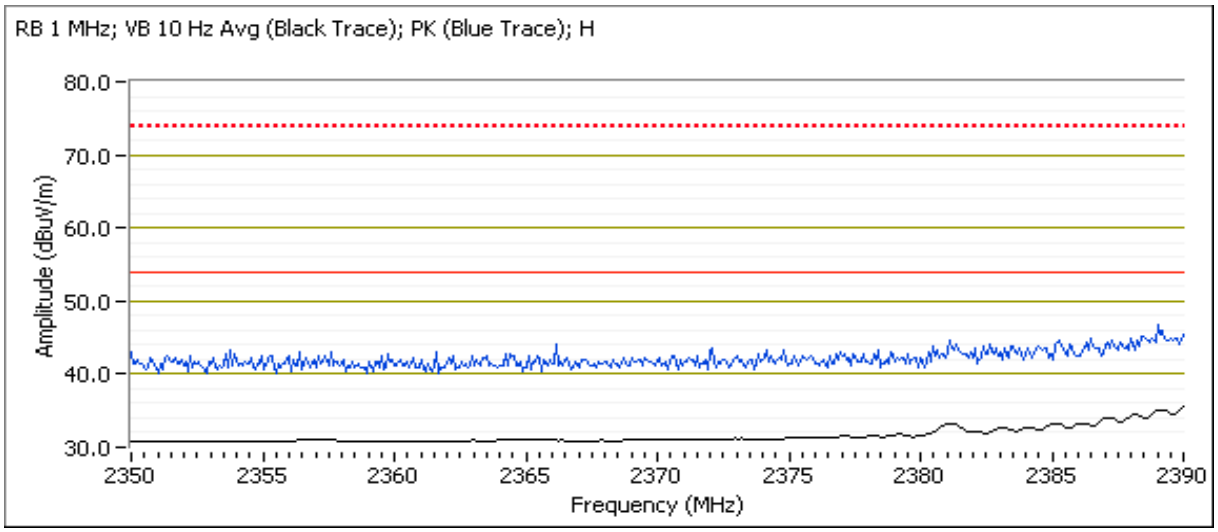
Run #1: Radiated Spurious Emissions, 30 - 25000 MHz. Operating Mode: IEEE 802.15.4

Date of Test: 9/20/2012
Test Engineer: Rafael Varelas
Test Location: FT Chamber #3

Run #1a: Channel 11 @ 2405 MHz

Band Edge Signal Field Strength - Direct measurement of field strength Ant 0

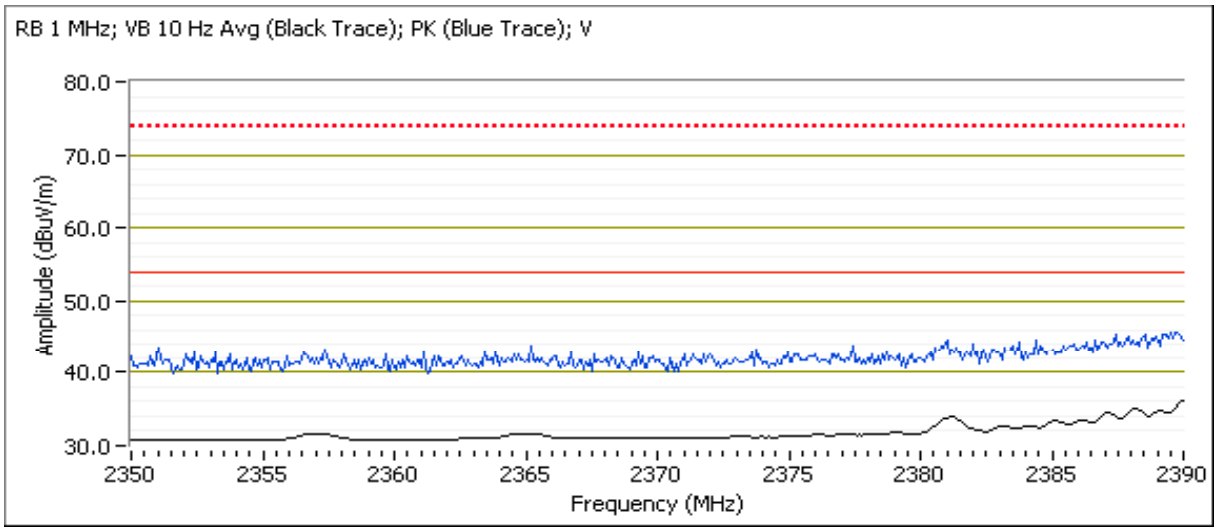
Frequency	Level	Pol	15.209 / 15.247		Detector	Azimuth	Height	Comments
MHz	dBµV/m	v/h	Limit	Margin	Pk/QP/Avg	degrees	meters	
2390.000	35.6	H	54.0	-18.4	AVG	37	1.1	POS; RB 1 MHz; VB: 10 Hz
2387.190	43.7	H	74.0	-30.3	PK	37	1.1	POS; RB 1 MHz; VB: 3 MHz
2390.000	34.0	V	54.0	-20.0	AVG	319	1.7	POS; RB 1 MHz; VB: 10 Hz
2389.120	43.6	V	74.0	-30.4	PK	319	1.7	POS; RB 1 MHz; VB: 3 MHz



Client:	Pace Americas	Job Number:	J87430
Model:	HR44	T-Log Number:	T89059
		Account Manager:	Michelle Kim
Contact:	Mark Rieger		
Standard:	FCC 15.247, 15E, RSS-210, 15B	Class:	N/A

Band Edge Signal Field Strength - Direct measurement of field strength, Ant 1

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	36.2	V	54.0	-17.8	AVG	344	1.0	POS; RB 1 MHz; VB: 10 Hz
2389.440	44.7	V	74.0	-29.3	PK	344	1.0	POS; RB 1 MHz; VB: 3 MHz
2389.960	32.5	H	54.0	-21.5	AVG	17	1.3	POS; RB 1 MHz; VB: 10 Hz
2388.060	44.2	H	74.0	-29.8	PK	17	1.3	POS; RB 1 MHz; VB: 3 MHz

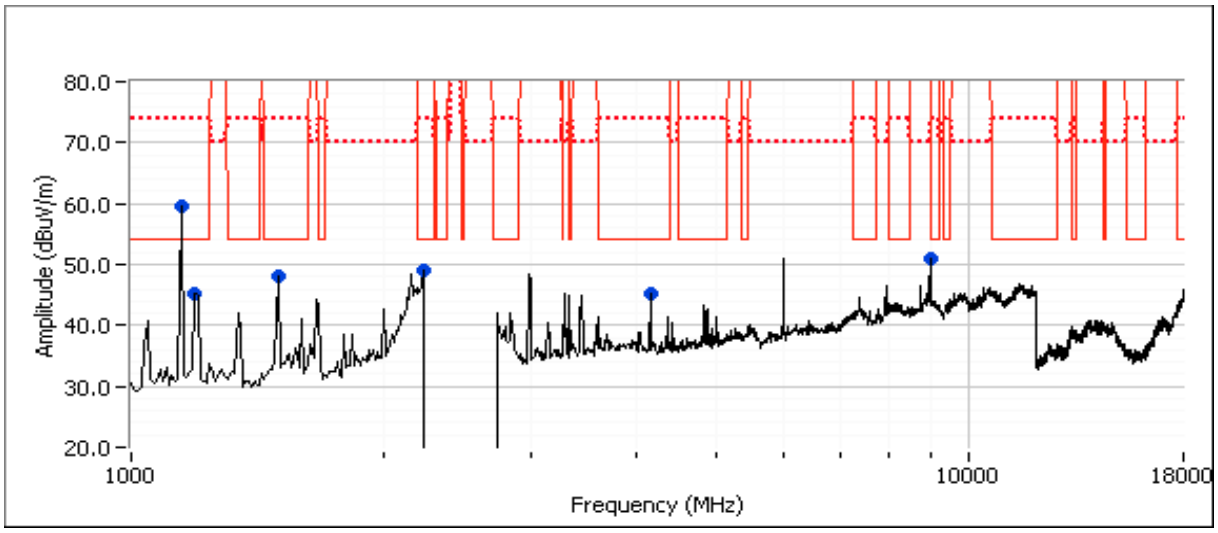


Client:	Pace Americas	Job Number:	J87430
Model:	HR44	T-Log Number:	T89059
		Account Manager:	Michelle Kim
Contact:	Mark Rieger		
Standard:	FCC 15.247, 15E, RSS-210, 15B	Class:	N/A

Other Spurious Emissions, Zigbee @ 2405MHz & WiFi @ 2462MHz, Ant 0

Frequency	Level	Pol	15.209 / 15.247		Detector	Azimuth	Height	Comments
MHz	dBµV/m	v/h	Limit	Margin	Pk/QP/Avg	degrees	meters	
9000.030	47.0	V	54.0	-7.0	AVG	360	1.2	RB 1 MHz;VB 10 Hz;Peak
9000.000	54.1	V	74.0	-19.9	PK	360	1.2	RB 1 MHz;VB 3 MHz;Peak
2220.130	45.0	H	54.0	-9.0	AVG	69	1.2	RB 1 MHz;VB 10 Hz;Peak
2228.970	55.5	H	74.0	-18.5	PK	69	1.2	RB 1 MHz;VB 3 MHz;Peak
1133.340	24.5	H	54.0	-29.5	AVG	86	1.0	Random spike
1133.930	36.1	H	74.0	-37.9	PK	86	1.0	Random spike
1500.050	28.6	V	54.0	-25.4	AVG	175	1.0	RB 1 MHz;VB 10 Hz;Peak
1499.540	38.2	V	74.0	-35.8	PK	175	1.0	RB 1 MHz;VB 3 MHz;Peak
4165.060	45.9	V	54.0	-8.1	AVG	196	1.1	RB 1 MHz;VB 10 Hz;Peak
4165.170	50.0	V	74.0	-24.0	PK	196	1.1	RB 1 MHz;VB 3 MHz;Peak
1199.940	40.8	V	54.0	-13.2	AVG	302	1.0	RB 1 MHz;VB 10 Hz;Peak
1199.800	52.1	V	74.0	-21.9	PK	302	1.0	RB 1 MHz;VB 3 MHz;Peak

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.



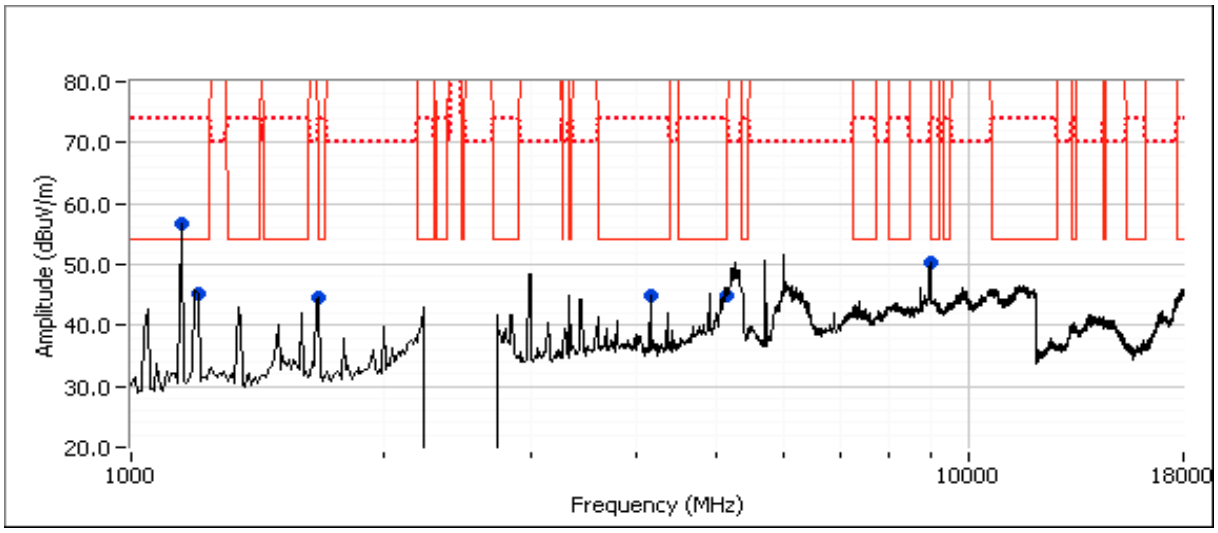
Client:	Pace Americas	Job Number:	J87430
Model:	HR44	T-Log Number:	T89059
		Account Manager:	Michelle Kim
Contact:	Mark Rieger		
Standard:	FCC 15.247, 15E, RSS-210, 15B	Class:	N/A

Run #1b: Channel 20 @ 2450 MHz

Ant 0 (WiFi @ 5700MHz)

Frequency	Level	Pol	15.209 / 15.247		Detector	Azimuth	Height	Comments
MHz	dBµV/m	v/h	Limit	Margin	Pk/QP/Avg	degrees	meters	
9000.000	47.1	V	54.0	-6.9	AVG	360	1.3	RB 1 MHz;VB 10 Hz;Peak
9000.090	53.2	V	74.0	-20.8	PK	360	1.3	RB 1 MHz;VB 3 MHz;Peak
1134.040	26.5	V	54.0	-27.5	AVG	81	1.2	Random spike
1160.570	36.5	V	74.0	-37.5	PK	81	1.2	Random spike
5134.490	42.3	H	54.0	-11.7	AVG	90	1.0	RB 1 MHz;VB 10 Hz;Peak
5133.800	53.0	H	74.0	-21.0	PK	90	1.0	RB 1 MHz;VB 3 MHz;Peak
4165.050	46.1	V	54.0	-7.9	AVG	195	1.3	RB 1 MHz;VB 10 Hz;Peak
4165.350	50.4	V	74.0	-23.6	PK	195	1.3	RB 1 MHz;VB 3 MHz;Peak
1666.040	44.5	V	54.0	-9.5	AVG	221	1.4	RB 1 MHz;VB 10 Hz;Peak
1665.850	47.1	V	74.0	-26.9	PK	221	1.4	RB 1 MHz;VB 3 MHz;Peak
1199.920	40.9	V	54.0	-13.1	AVG	301	1.0	RB 1 MHz;VB 10 Hz;Peak
1199.890	52.4	V	74.0	-21.6	PK	301	1.0	RB 1 MHz;VB 3 MHz;Peak

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.

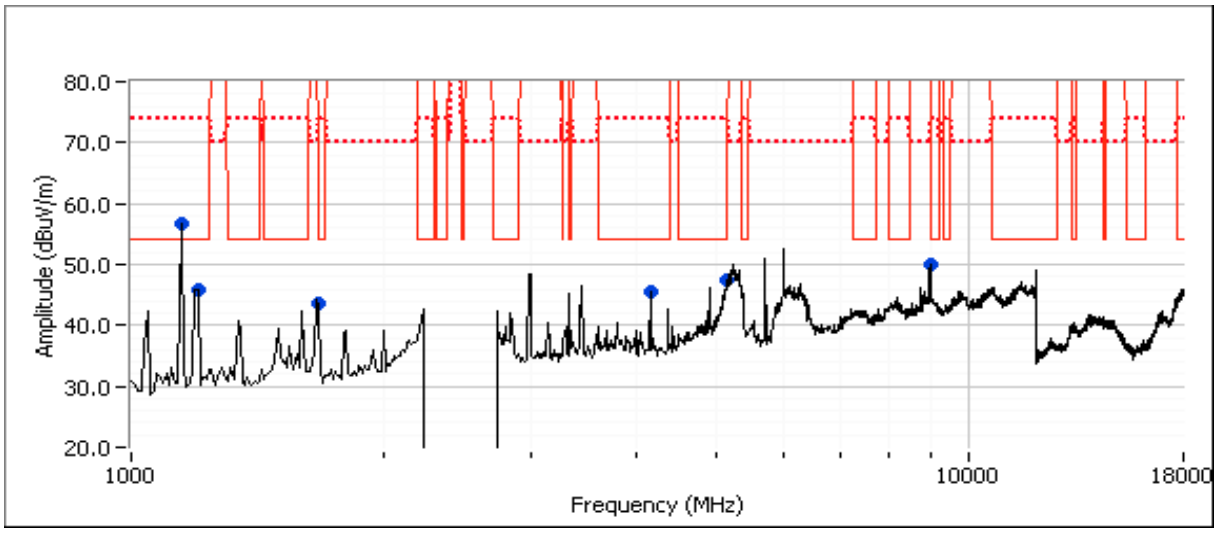


Client:	Pace Americas	Job Number:	J87430
Model:	HR44	T-Log Number:	T89059
		Account Manager:	Michelle Kim
Contact:	Mark Rieger		
Standard:	FCC 15.247, 15E, RSS-210, 15B	Class:	N/A

Ant 1 (WiFi @ 5700MHz)

Frequency	Level	Pol	15.209 / 15.247		Detector	Azimuth	Height	Comments
MHz	dBµV/m	v/h	Limit	Margin	Pk/QP/Avg	degrees	meters	
9000.000	40.1	V	54.0	-13.9	AVG	338	1.1	RB 1 MHz;VB 10 Hz;Peak
9000.050	59.3	V	74.0	-14.7	PK	338	1.1	RB 1 MHz;VB 3 MHz;Peak
1199.910	41.0	V	54.0	-13.0	AVG	296	1.0	RB 1 MHz;VB 10 Hz;Peak
1200.020	52.3	V	74.0	-21.7	PK	296	1.0	RB 1 MHz;VB 3 MHz;Peak
1666.030	45.4	V	54.0	-8.6	AVG	228	1.4	RB 1 MHz;VB 10 Hz;Peak
1666.070	47.8	V	74.0	-26.2	PK	228	1.4	RB 1 MHz;VB 3 MHz;Peak
4165.050	45.9	V	54.0	-8.1	AVG	198	1.3	RB 1 MHz;VB 10 Hz;Peak
4165.020	49.7	V	74.0	-24.3	PK	198	1.3	RB 1 MHz;VB 3 MHz;Peak
1154.680	26.4	V	54.0	-27.6	AVG	97	1.0	Random spike
1155.690	37.8	V	74.0	-36.2	PK	97	1.0	Random spike
5138.290	42.5	H	54.0	-11.5	AVG	68	1.0	RB 1 MHz;VB 10 Hz;Peak
5134.050	53.2	H	74.0	-20.8	PK	68	1.0	RB 1 MHz;VB 3 MHz;Peak

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.

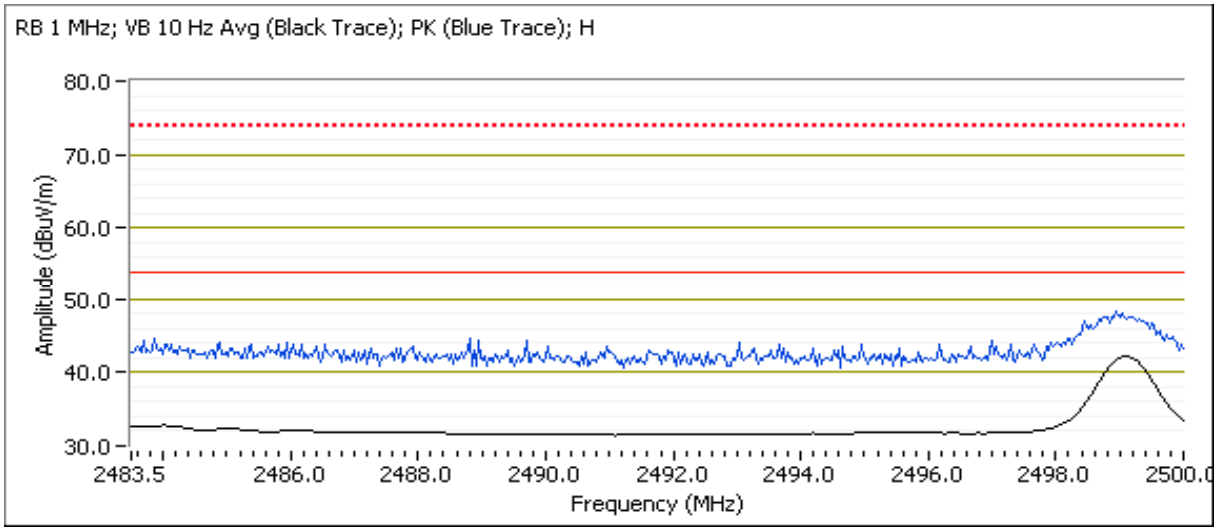


Client:	Pace Americas	Job Number:	J87430
Model:	HR44	T-Log Number:	T89059
		Account Manager:	Michelle Kim
Contact:	Mark Rieger		
Standard:	FCC 15.247, 15E, RSS-210, 15B	Class:	N/A

Run #1c: Channel 25 @ 2475 MHz

Band Edge Signal Field Strength - Direct measurement of field strength, Ant0

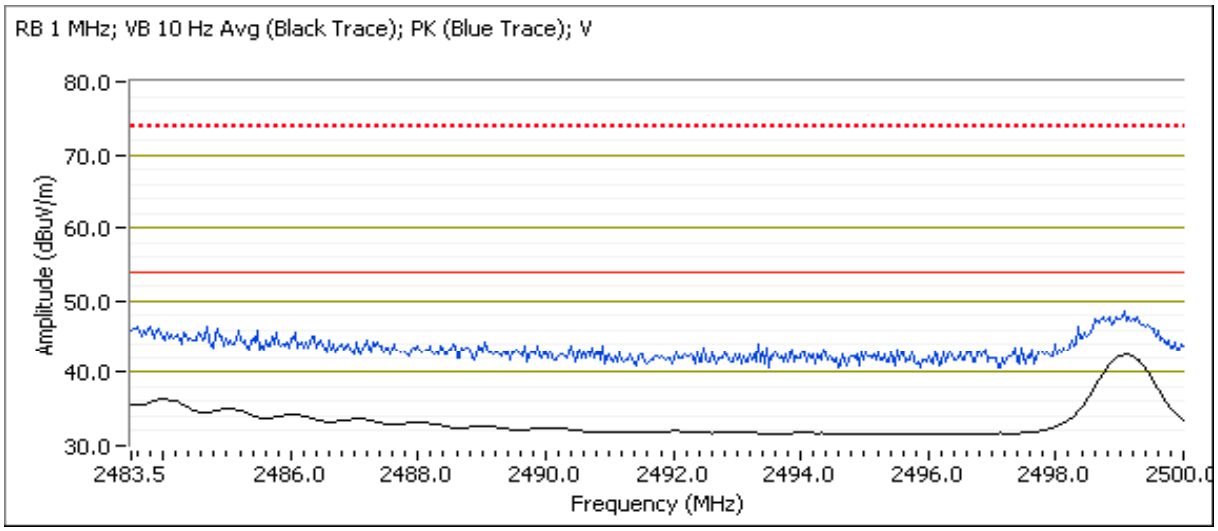
Frequency	Level	Pol	15.209 / 15.247		Detector	Azimuth	Height	Comments
MHz	dBµV/m	v/h	Limit	Margin	Pk/QP/Avg	degrees	meters	
2499.110	42.2	H	54.0	-11.8	AVG	247	1.0	POS; RB 1 MHz; VB: 10 Hz
2498.910	47.5	H	74.0	-26.5	PK	247	1.0	POS; RB 1 MHz; VB: 3 MHz
2499.110	41.4	V	54.0	-12.6	AVG	221	1.0	POS; RB 1 MHz; VB: 10 Hz
2483.530	48.1	V	74.0	-25.9	PK	221	1.0	POS; RB 1 MHz; VB: 3 MHz



Client:	Pace Americas	Job Number:	J87430
Model:	HR44	T-Log Number:	T89059
		Account Manager:	Michelle Kim
Contact:	Mark Rieger		
Standard:	FCC 15.247, 15E, RSS-210, 15B	Class:	N/A

Band Edge Signal Field Strength - Direct measurement of field strength, Ant 1

Frequency	Level	Pol	15.209 / 15.247		Detector	Azimuth	Height	Comments
MHz	dBµV/m	v/h	Limit	Margin	Pk/QP/Avg	degrees	meters	
2499.140	42.5	V	54.0	-11.5	AVG	222	1.2	POS; RB 1 MHz; VB: 10 Hz
2499.010	48.0	V	74.0	-26.0	PK	222	1.2	POS; RB 1 MHz; VB: 3 MHz
2499.110	41.9	H	54.0	-12.1	AVG	247	1.0	POS; RB 1 MHz; VB: 10 Hz
2498.970	47.2	H	74.0	-26.8	PK	247	1.0	POS; RB 1 MHz; VB: 3 MHz

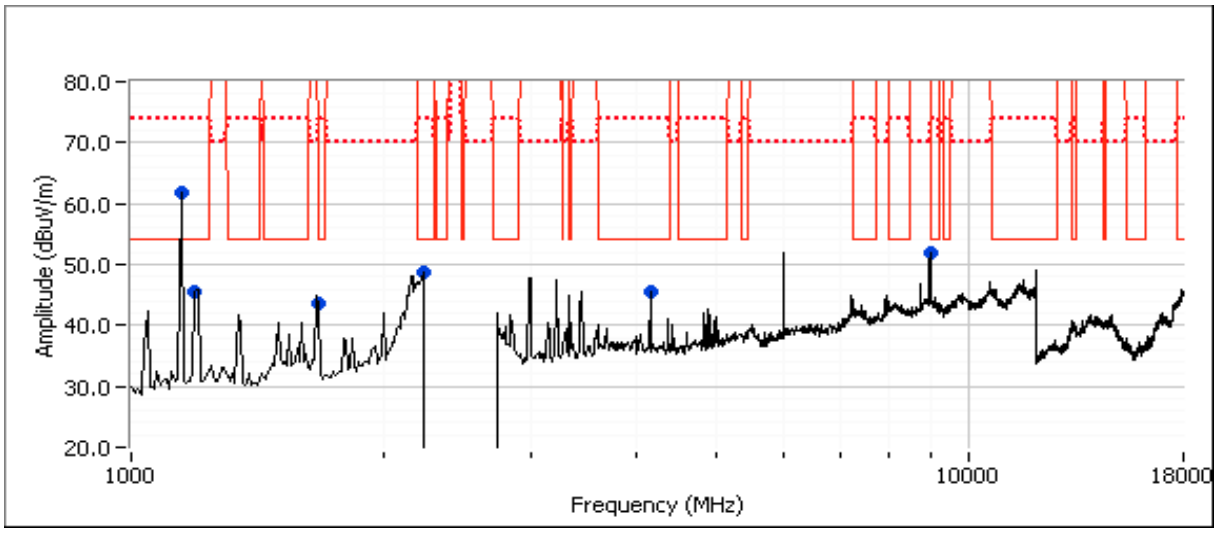


Client:	Pace Americas	Job Number:	J87430
Model:	HR44	T-Log Number:	T89059
		Account Manager:	Michelle Kim
Contact:	Mark Rieger		
Standard:	FCC 15.247, 15E, RSS-210, 15B	Class:	N/A

Other Spurious Emissions, Zigbee @ 2475MHz & WiFi @ 2412MHz, Ant 0

Frequency	Level	Pol	15.209 / 15.247		Detector	Azimuth	Height	Comments
MHz	dBµV/m	v/h	Limit	Margin	Pk/QP/Avg	degrees	meters	
2220.060	48.9	H	54.0	-5.1	AVG	313	1.1	RB 1 MHz;VB 10 Hz;Peak
2227.360	59.4	H	74.0	-14.6	PK	313	1.1	RB 1 MHz;VB 3 MHz;Peak
1159.970	25.8	H	54.0	-28.2	AVG	0	1.0	Random spike
1159.860	36.5	H	74.0	-37.5	PK	0	1.0	Random spike
4165.060	46.1	V	54.0	-7.9	AVG	194	1.3	RB 1 MHz;VB 10 Hz;Peak
4165.050	50.1	V	74.0	-23.9	PK	194	1.3	RB 1 MHz;VB 3 MHz;Peak
1666.030	45.5	V	54.0	-8.5	AVG	225	1.4	RB 1 MHz;VB 10 Hz;Peak
1666.190	47.6	V	74.0	-26.4	PK	225	1.4	RB 1 MHz;VB 3 MHz;Peak
1199.920	40.8	V	54.0	-13.2	AVG	301	1.0	RB 1 MHz;VB 10 Hz;Peak
1200.020	51.5	V	74.0	-22.5	PK	301	1.0	RB 1 MHz;VB 3 MHz;Peak
9000.010	46.6	V	54.0	-7.4	AVG	360	1.2	RB 1 MHz;VB 10 Hz;Peak
9000.010	52.9	V	74.0	-21.1	PK	360	1.2	RB 1 MHz;VB 3 MHz;Peak

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.



End of Report

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