

## *EMC Test Report*

### *Application for Grant of Equipment Authorization*

### *Industry Canada RSS-Gen Issue 3 / RSS 210 Issue 8 FCC Part 15, Subpart E*

### *Model: IPW8000 Wireless STB*

IC CERTIFICATION #: 3439B-IPW8X4N  
FCC ID: PGRIPW8X4N

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**REVISION HISTORY**

Rev#	Date	Comments	Modified By
-	09-23-2013	First release	
1.0	10-03-2013	Updated UNII BE results. Removed erroneous plot.	Mark Hill

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## SCOPE

An electromagnetic emissions test has been performed on the Pace Americas, Inc. model IPW8000 Wireless STB, pursuant to the following rules:

Industry Canada RSS-Gen Issue 3

RSS 210 Issue 8 “Low-power Licence-exempt Radiocommunication Devices (All Frequency Bands): Category I Equipment”

FCC Part 15, Subpart E requirements for UNII Devices

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 National Technical Systems - Silicon Valley test procedures:

ANSI C63.10-2009

FCC General UNII Test Procedures KDB789033

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, Inc. model IPW8000 Wireless STB complied with the requirements of the following regulations:

RSS 210 Issue 8 “Low-power Licence-exempt Radiocommunication Devices (All Frequency Bands): Category I Equipment”  
FCC Part 15, Subpart E requirements for UNII Devices

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, Inc. model IPW8000 Wireless STB and therefore apply only to the tested sample. The sample was selected and prepared by Mark Rieger of Pace Americas, Inc..

#### ***DEVIATIONS FROM THE STANDARDS***

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

**TEST RESULTS SUMMARY****UNII / LELAN DEVICES****Operation in the 5.15 – 5.25 GHz Band**

FCC Rule Part	RSS Rule Part	Description	Measured Value / Comments	Limit / Requirement	Result
15.407(e)		Indoor operation only	Refer to user's manual	N/A	Complies
15.407(a)(2)		26dB Bandwidth	> 20MHz for all modes	N/A – limits output power if < 20MHz	N/A
15.407 (a)(1)	A9.2(1)	Output Power	11a: 27.2 mW (14.3dBm) n20: 28.1 mW (14.5dBm) n40: 30.6 mW (14.9dBm) (Max eirp: 0.189 W)	17dBm	Complies
15.407 (a)(1)	-	Power Spectral Density	11a: 1.1 dBm/MHz n20: 1.0 dBm/MHz n40: -1.6 dBm/MHz	4 dBm/MHz	Complies
-	A9.5 (2)			4 dBm/MHz	Complies
-	RSP 100 RSS GEN 4.4.1	99% Bandwidth	11a: 17.0 MHz n20: 18.3 MHz n40: 36.8 MHz	Information only	N/A

**Operation in the 5.25 – 5.35 GHz Band**

Note: The device is restricted to indoor use only, therefore the spectral density of spurious emissions in the 5.15 – 5.25 GHz band were limited to the power spectral limits for intentional signals detailed in FCC 15.407(a)(1) and RSS 210 6.2.2 q1 (i)

FCC Rule Part	RSS Rule Part	Description	Measured Value / Comments	Limit / Requirement	Result (margin)
15.407(a)(2)		26dB Bandwidth	> 20MHz for all modes	N/A – limits output power if < 20MHz	N/A
15.407(a)(2)	A9.2(2)	Output Power	11a: 128.9 mW (21.1dBm) n20: 133.3 mW (21.2dBm) n40: 148.6 mW (21.7dBm) (Max eirp: 0.916 W)	17dBm (50mW)	Complies
15.407(a)(2)	-	Power Spectral Density	11a: 8.0 dBm/MHz n20: 8.2 dBm/MHz n40: 5.2 dBm/MHz	11 dBm/MHz	Complies
-	A9.2(2) / A9.5 (2)	Power Spectral Density		11 dBm / MHz	Complies
-	RSP 100 RSS GEN 4.4.1	99% Bandwidth	11a: 17.3 MHz n20: 18.3 MHz n40: 36.8 MHz	Information only	N/A

**Operation in the 5.47 – 5.725 GHz Band**

FCC Rule Part	RSS Rule Part	Description	Measured Value / Comments	Limit / Requirement	Result (margin)
15.407(a) (2)		26dB Bandwidth	> 20MHz for all modes	N/A – limits output power if < 20MHz	N/A
15.407(a) (2)	A9.2(2)	Output Power	11a: 129.8 mW (21.1dBm)  n20: 132.8 mW (21.2dBm)  n40: 155.8 mW (21.9dBm)  (Max eirp: 0.961 W)	24 dBm / 250mW (eirp < 30dBm)	Complies
15.407(a) (2)		Power Spectral Density	11a: 7.9 dBm/MHz n20: 7.8 dBm/MHz n40: 5.4 dBm/MHz	11 dBm/MHz	Complies
	A9.2(2) / A9.5 (2)	Power Spectral Density		11 dBm / MHz	Complies
KDB 443999	A9	Non-operation in 5600 – 5650 MHz sub band	Device cannot operate in the 5600 – 5650 MHz band –refer to Operational Description		Complies
-	RSP 100 RSS GEN 4.4.1	99% Bandwidth	11a: 17.3 MHz n20: 18.4 MHz n40: 36.8 MHz	Information only	N/A

**Requirements for all U-NII/LELAN bands**

FCC Rule Part	RSS Rule Part	Description	Measured Value / Comments	Limit / Requirement	Result
15.407	A9.5a	Modulation	Digital Modulation is used	Digital modulation is required	Complies
15.407(b)(5) / 15.209	A9.3	Spurious Emissions	53.8 dB $\mu$ V/m @ 5140.1 MHz (-0.2 dB)	Refer to page 23	Complies
15.407(a)(6)	-	Peak Excursion Ratio	9.4 dB	< 13dB	Complies
	A9.5 (3)	Channel Selection	Spurious emissions tested at outermost channels in each band	Device was tested on the top, bottom and center channels in each band	N/A
15			Measurements on three channels in each band		Complies
15.407 (c)	A9.5(4)	Operation in the absence of information to transmit	Operation is discontinued in the absence of information	Device shall automatically discontinue operation in the absence of information to transmit	Complies
15.407 (g)	A9.5 (5)	Frequency Stability	Refer to operational description	Signal shall remain within the allocated band	Complies
15.407 (h1)	A9.4	Transmit Power Control	TCP mechanism is discussed in the Operational Description	The U-NII device shall have the capability to operate with a mean EIRP value lower than 24dBm (250mW)	Complies
15.407 (h2)	A9.4	Dynamic frequency Selection (device without radar detection)	Refer to separate test report, reference R93257	Channel move time < 10s Channel closing transmission time < 260ms	Complies
	A9.9g	User Manual information	Refer to Exhibit 6 for details	Warning regarding interference from Satellite Systems	Complies



**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 EUT enclosure.	Unique or integral antenna required	Complies
15.207	RSS GEN Table 2	AC Conducted Emissions	48.9 dB $\mu$ V @ 16.228 MHz(-1.1 dB)	Refer to page 20	Complies
15.109	RSS GEN 7.2.3 Table 1	Receiver spurious emissions	N/A – RX tunes above 960MHz		
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	Refer to manual	Statement required regarding non-interference	Complies
-	RSP 100 RSS GEN 7.1.5	User Manual	Refer to manual	Statement for products with detachable antenna	Complies

**MEASUREMENT UNCERTAINTIES**

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

Measurement Type	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)	dB $\mu$ V/m	25 to 1000 MHz	± 3.6 dB
		1000 to 40000 MHz	± 6.0 dB
Conducted Emissions (AC Power)	dB $\mu$ V	0.15 to 30 MHz	± 2.4 dB

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

### ***GENERAL***

The Pace Americas, Inc. model IPW8000 Wireless STB is a wireless set top box that is designed to wirelessly play video. Since the EUT would be placed on a tabletop during operation, the EUT was treated as tabletop equipment during testing to simulate the end-user environment. The electrical rating of the EUT is 120 Volts, 60 Hz.

The sample was received on August 1, 2013 and tested on August 1, 5, 6, 7, 8, 14 and 15, 2013. The EUT consisted of the following component(s):

Company	Model	Description	Serial Number	FCC ID
Pace Americas	IPW8000	Wireless Set top box	prototype	PGRIPW8X4N
PI	T018WA1225	AC to DC adapter	81061123900000100 0	-

### ***OTHER EUT DETAILS***

The EUT supports 802.11a, n20, and n40 data rates. For all modes, all four Tx chains transmit. It supports operation in the 5GHz bands only.

### ***ANTENNA SYSTEM***

The EUT uses internal antennas, soldered directly to the PCB.

### ***ENCLOSURE***

The EUT enclosure measures approximately 15cm wide by 14cm deep by 4.5cm high. It is primarily constructed of uncoated coated plastic.

### ***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 131L	Laptop	-	-

**EUT INTERFACE PORTS**

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

Port	Connected To	Description	Cable(s)	
			Shielded or Unshielded	Length(m)
Ethernet	Remote Laptop	RJ-45	Unshielded	5
Power	AC/DC Adapter	2Wire	Unshielded	1.5
AC/DC Adapter	AC Mains	2Wire	Unshielded	-
RCA (x6)	Unterminated	RCA	Shielded	1.5
HDMI	Unterminated	HDMI	Shielded	1.5

**EUT OPERATION**

During testing, the EUT was configured to transmit continuously on the noted channel. The lowest data rate was used for each transmit mode.

**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 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.

**CONDUCTED EMISSIONS CONSIDERATIONS**

Conducted emissions testing is performed in conformance with ANSI C63.10. 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 guidelines and meet the Normalized Site Attenuation (NSA) requirements of ANSI C63.4.

## **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 C63.10 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 as specified in ANSI C63.4. 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.

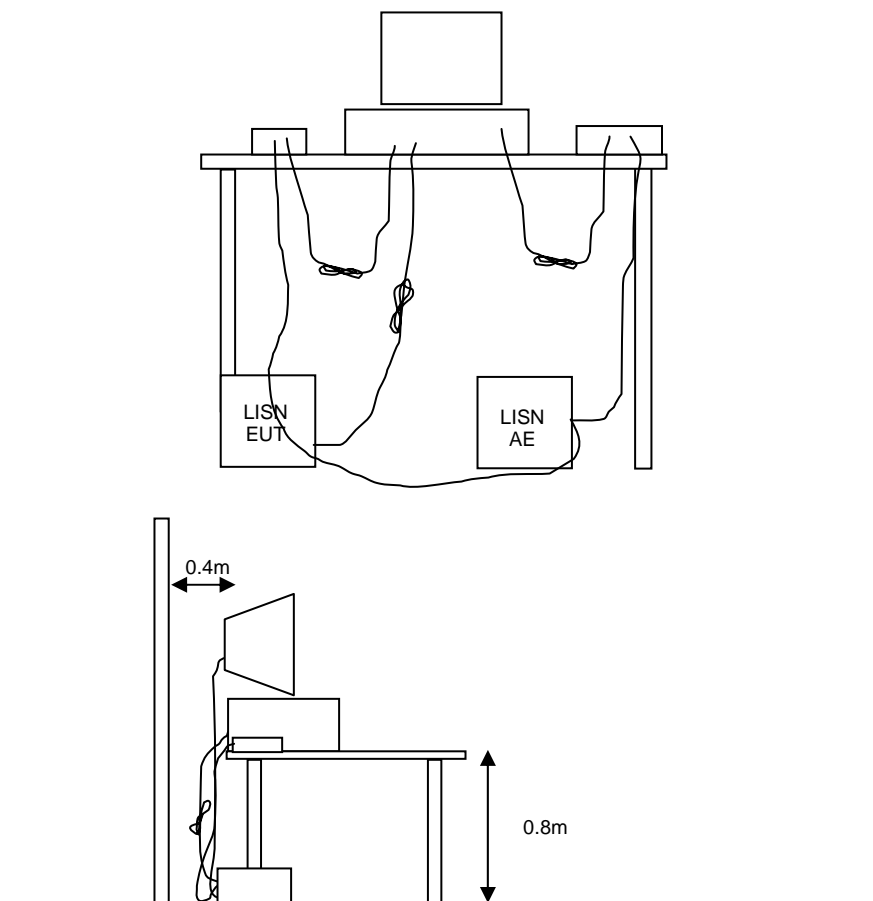
## TEST PROCEDURES

### 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 C63.10, 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**



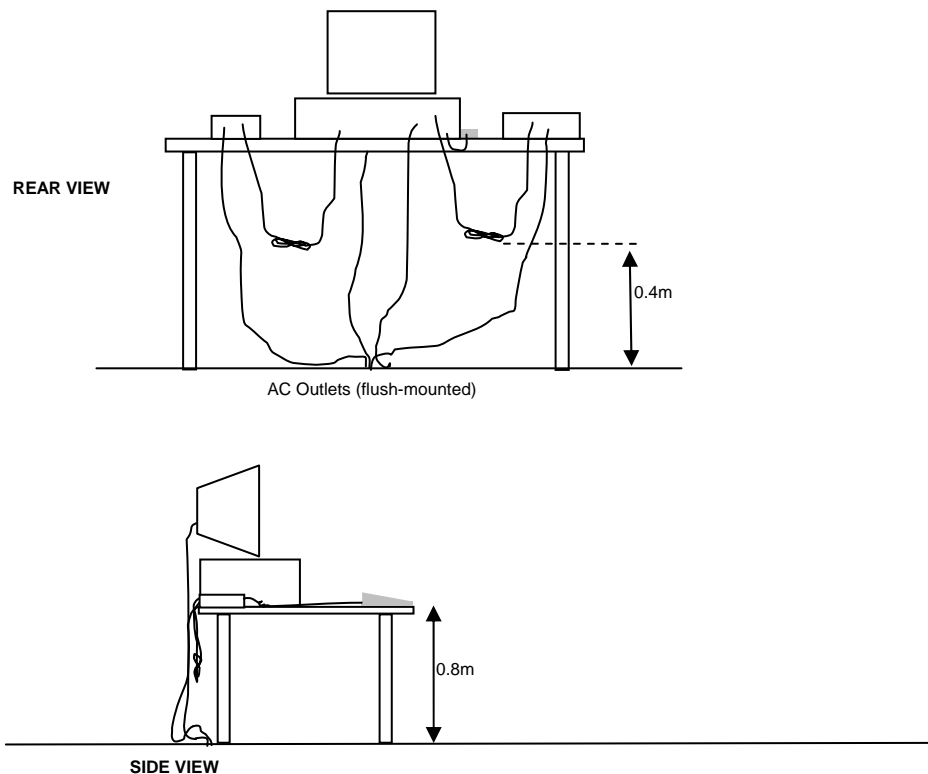
**RADIATED EMISSIONS**

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.

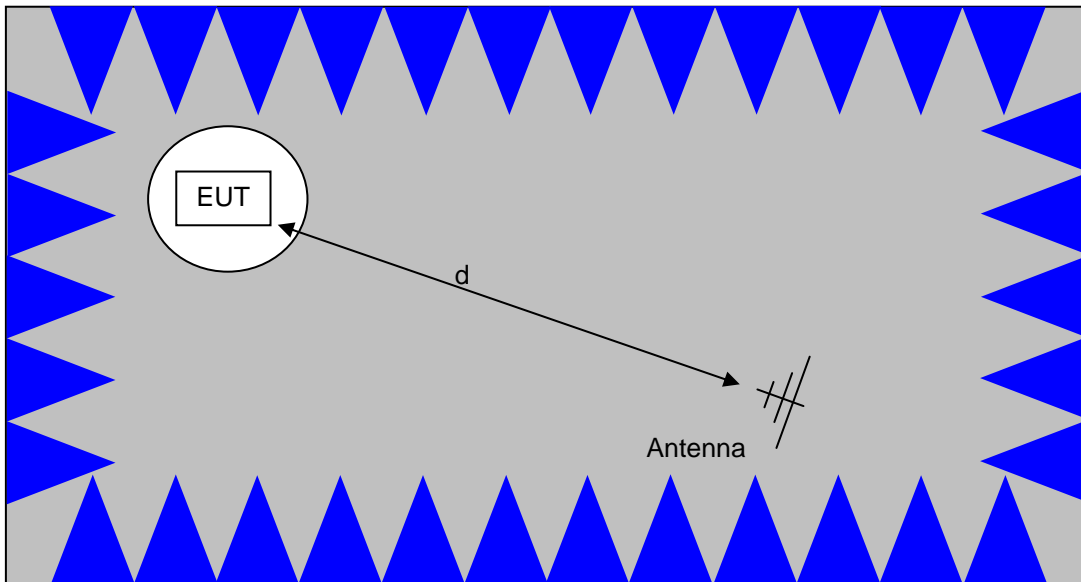
A speaker is provided in the receiver to aid in discriminating between EUT and ambient emissions. Other methods used during the preliminary scan for EUT emissions involve scanning with near field magnetic loops, monitoring I/O cables with RF current clamps, and cycling power to the EUT.

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 1 meter from the EUT and the antenna height is restricted to a maximum of 2.5 meters.

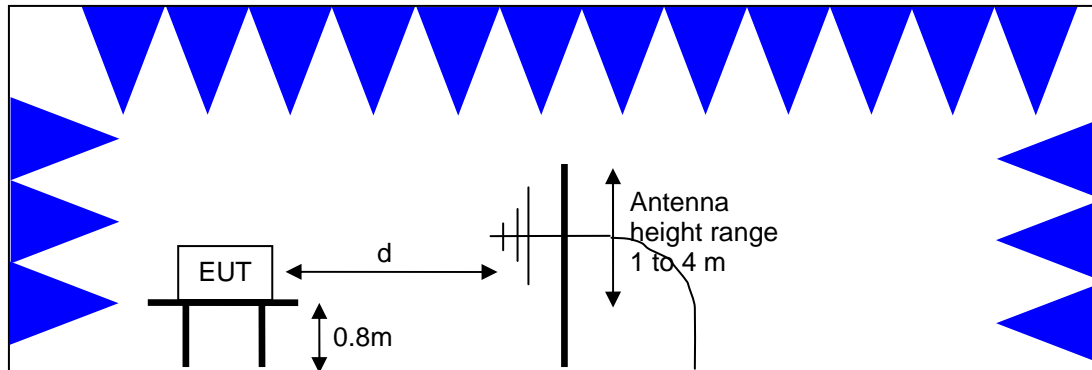


Typical Test Configuration for Radiated Field Strength Measurements



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.

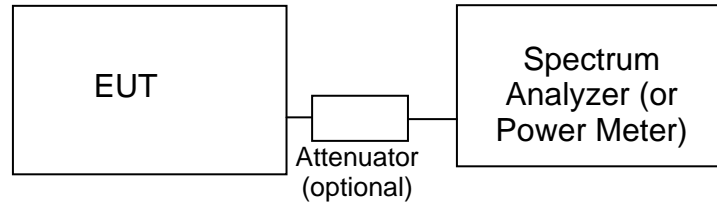
Floor-standing equipment is placed on the floor with insulating supports between the unit and the ground plane.



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, 26dB and/or 99% signal bandwidth are measured using the bandwidths recommended by ANSI C63.10 and 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<sup>1</sup> (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 <sub>KHz</sub> @ 300m	67.6-20*log <sub>10</sub> (F <sub>KHz</sub> ) @ 300m
0.490-1.705	24000/F <sub>KHz</sub> @ 30m	87.6-20*log <sub>10</sub> (F <sub>KHz</sub> ) @ 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

<sup>1</sup> The restricted bands are detailed in FCC 15.203, RSS 210 Table 1 and RSS 310 Table 2

*FCC 15.407 (a) OUTPUT POWER LIMITS*

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

Operating Frequency (MHz)	Output Power	Power Spectral Density
5150 – 5250	50mW (17 dBm)	4 dBm/MHz
5250 – 5350	250 mW (24 dBm)	11 dBm/MHz
5725 – 5825	1 Watts (30 dBm)	17 dBm/MHz

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

The peak excursion envelope is limited to 13dB.

*OUTPUT POWER LIMITS –LELAN DEVICES*

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

Operating Frequency (MHz)	Output Power	Power Spectral Density
5150 – 5250	200mW (23 dBm) eirp	10 dBm/MHz eirp
5250 – 5350	250 mW (24 dBm) <sup>2</sup> 1W (30dBm) eirp	11 dBm/MHz
5470 – 5725	250 mW (24 dBm) <sup>3</sup> 1W (30dBm) eirp	11 dBm/MHz
5725 – 5825	1 Watts (30 dBm) 4W eirp	17 dBm/MHz

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

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

<sup>2</sup> If EIRP exceeds 500mW the device must employ TPC

<sup>3</sup> If EIRP exceeds 500mW the device must employ TPC

**SPURIOUS EMISSIONS LIMITS –UNII and LELAN DEVICES**

The spurious emissions limits for signals below 1GHz are the FCC/RSS-GEN general limits. For emissions above 1GHz, signals in restricted bands are subject to the FCC/RSS GEN general limits. All other signals have a limit of –27dBm/MHz, which is a field strength of 68.3dBuV/m/MHz at a distance of 3m. For devices operating in the 5725-5850Mhz bands under the LELAN/UNII rules, the limit within 10MHz of the allocated band is increased to –17dBm/MHz.

**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:

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

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:

$$F_d = 40 * \text{LOG}_{10} (D_m/D_s)$$

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**

<b><u>Manufacturer</u></b>	<b><u>Description</u></b>	<b><u>Model</u></b>	<b><u>Asset #</u></b>	<b><u>Cal Due</u></b>
<b>Radiated Emissions, 1000 - 6,500 MHz, 01-Aug-13</b>				
EMCO	Antenna, Horn, 1-18 GHz	3115	1561	7/12/2014
Rohde & Schwarz	EMI Test Receiver, 20 Hz-7 GHz	ESIB7	1756	6/8/2014
<b>Radiated Emissions, 1000 - 40,000 MHz, 05-Aug-13</b>				
EMCO	Antenna, Horn, 1-18 GHz	3115	487	7/19/2014
Hewlett Packard	Microwave Preamplifier, 1-26.5GHz	8449B	785	11/9/2013
Hewlett Packard	Head (Inc flex cable, 1143, 2198) Red	84125C	1145	6/26/2014
Hewlett Packard	SpecAn 30 Hz -40 GHz, SV (SA40) Red	8564E (84125C)	1148	9/14/2013
A. H. Systems	Spare System Horn, 18-40GHz	SAS-574, p/n: 2581	2162	7/24/2014
Micro-Tronics	Band Reject Filter, 5725-5875 MHz	BRC50705-02	2241	10/4/2013
Hewlett Packard	High Pass filter, 8.2 GHz (Purple System)	P/N 84300-80039	1767	12/5/2013
<b>Radiated Emissions, 1000 - 40,000 MHz, 06-Aug-13</b>				
EMCO	Antenna, Horn, 1-18 GHz	3115	487	7/19/2014
Hewlett Packard	Microwave Preamplifier, 1-26.5GHz	8449B	785	11/9/2013
Hewlett Packard	Head (Inc flex cable, 1143, 2198) Red	84125C	1145	6/26/2014
Hewlett Packard	SpecAn 30 Hz -40 GHz, SV (SA40) Red	8564E (84125C)	1148	9/14/2013
A. H. Systems	Spare System Horn, 18-40GHz	SAS-574, p/n: 2581	2162	7/24/2014
Micro-Tronics	Band Reject Filter, 5150-5350 MHz	BRC50703-02	2239	10/4/2013
Hewlett Packard	High Pass filter, 8.2 GHz (Purple System)	P/N 84300-80039	1767	12/5/2013
Micro-Tronics	Band Reject Filter, 5470-5725 MHz	BRC50704-02	2240	10/4/2013
<b>Radiated Emissions, 1000 - 40,000 MHz, 07-Aug-13</b>				
EMCO	Antenna, Horn, 1-18 GHz	3115	487	7/19/2014
Hewlett Packard	Microwave Preamplifier, 1-26.5GHz	8449B	785	11/9/2013
Hewlett Packard	Head (Inc flex cable, 1143, 2198) Red	84125C	1145	6/26/2014
Hewlett Packard	SpecAn 30 Hz -40 GHz, SV (SA40) Red	8564E (84125C)	1148	9/14/2013
A. H. Systems	Spare System Horn, 18-40GHz	SAS-574, p/n: 2581	2162	7/24/2014
Micro-Tronics	Band Reject Filter, 5150-5350 MHz	BRC50703-02	2239	10/4/2013
Hewlett Packard	High Pass filter, 8.2 GHz (Purple System)	P/N 84300-80039	1767	12/5/2013
Micro-Tronics	Band Reject Filter, 5470-5725 MHz	BRC50704-02	2240	10/4/2013
<b>Radiated Emissions, 1000 - 6,000 MHz, 08-Aug-13</b>				
EMCO	Antenna, Horn, 1-18 GHz	3115	487	7/19/2014
Rohde & Schwarz	EMI Test Receiver, 20 Hz-7 GHz	ESIB7	1756	6/8/2014

<u>Manufacturer</u>	<u>Description</u>	<u>Model</u>	<u>Asset #</u>	<u>Cal Due</u>
<b>Radio Antenna Port (Power and Spurious Emissions), 14-Aug-13</b>				
Agilent Technologies	3Hz -44GHz PSA Spectrum Analyzer	E4446A	2796	1/28/2014
<b>Conducted Emissions - AC Power Ports, 15-Aug-13</b>				
EMCO	LISN, 10 kHz-100 MHz, 25A	3825/2	1292	2/14/2014
Rohde & Schwarz	Pulse Limiter	ESH3 Z2	1401	5/15/2014
Rohde & Schwarz	EMI Test Receiver, 20 Hz-40 GHz	ESIB40 (1088.7490.40)	2493	1/18/2014
<b>Radiated Emissions, 1000 - 6,000 MHz, 15-Aug-13</b>				
EMCO	Antenna, Horn, 1-18 GHz	3115	487	7/19/2014
Rohde & Schwarz	EMI Test Receiver, 20 Hz-7 GHz	ESIB7	1756	6/8/2014
<b>DFS, 20-Aug-13</b>				
Hewlett Packard	EMC Spectrum Analyzer, 9 kHz - 6.5 GHz	8595EM	780	3/7/2014
EMCO	Antenna, Horn, 1-18 GHz	3117	1662	5/25/2014
Agilent Technologies	PSG Vector Signal Generator (250kHz - 20GHz)	E8267C	1877	6/5/2014
Tektronix	500MHz, 2CH, 5GS/s Scope	TDS5052B	2118	10/22/2013

## ***Appendix B Test Data***

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## *EMC Test Data*

Client:	Pace Americas	Job Number:	J93000
Product:	IPW8000 Wireless STB	T-Log Number:	T93085
		Project Manager:	Susan Hill
Contact:	Mark Rieger	Project Coordinator:	Irene Rademacher
Emissions Standard(s):	FCC, IC	Class:	B
Immunity Standard(s):	-	Environment:	Radio

# **EMC Test Data**

For The

## **Pace Americas**

Product

IPW8000 Wireless STB

Date of Last Test: 8/20/2013



# EMC Test Data

Client: Pace Americas	Job Number: J93000
Model: IPW8000 Wireless STB	T-Log Number: T93085
	Project Manager: Susan Hill
Contact: Mark Rieger	Project Coordinator: Irene Rademacher
Standard: FCC, IC	Class: B

## 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: 8/15/2013	Config. Used: 2
Test Engineer: Rafael Varelas	Config Change: Added RCA and HDMI cables
Test Location: Fremont Chamber #5	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 were routed through metal conduit and when possible passed through a ferrite clamp upon exiting the chamber.

Ambient Conditions:	Temperature:	21.5 °C
	Rel. Humidity:	38 %

### Summary of Results

Run #	Test Performed	Limit	Result	Margin
1	CE, AC Power, 120V/60Hz	Class B	Pass	48.9 dBµV @ 16.228 MHz(-1.1 dB)

### Modifications Made During Testing

No modifications were made to the EUT during testing

### Deviations From The Standard

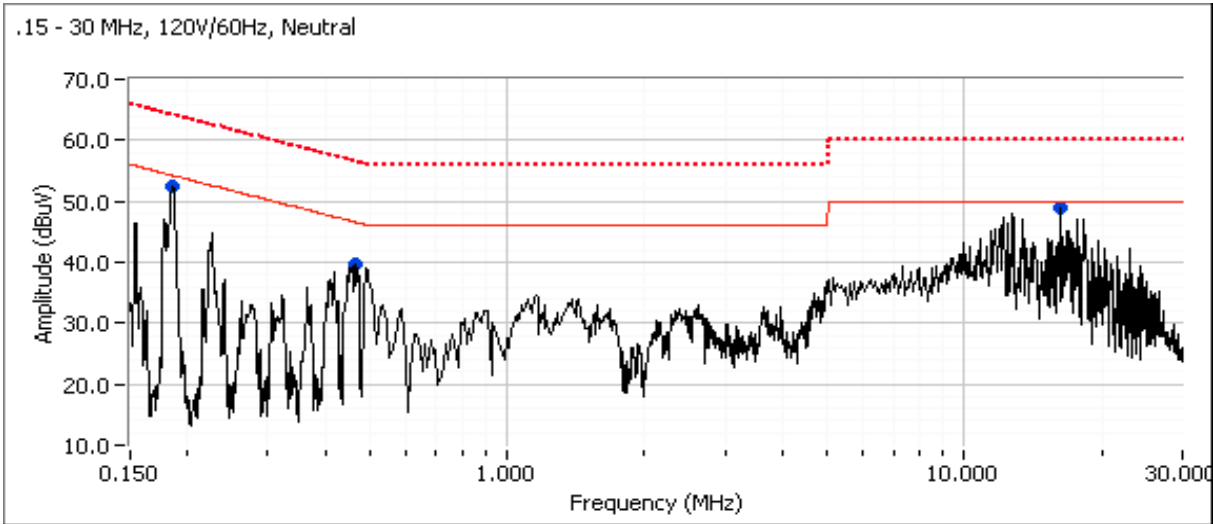
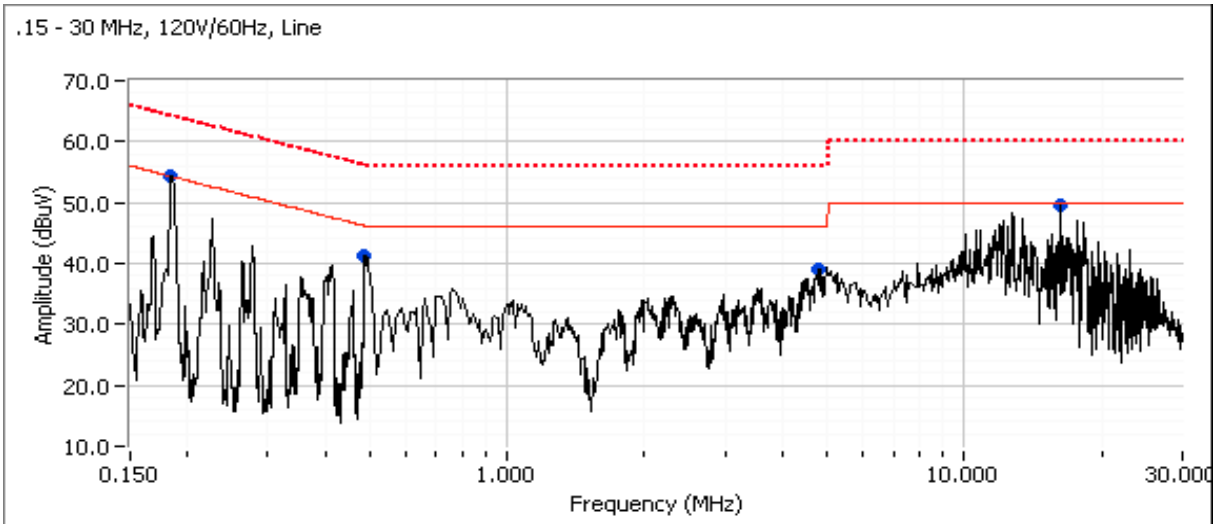
No deviations were made from the requirements of the standard.



# EMC Test Data

Client: Pace Americas	Job Number: J93000
Model: IPW8000 Wireless STB	T-Log Number: T93085
Contact: Mark Rieger	Project Manager: Susan Hill
Standard: FCC, IC	Project Coordinator: Irene Rademacher
	Class: B

Run #1: AC Power Port Conducted Emissions, 0.15 - 30MHz, 120V/60Hz  
 EUT transmitting at 5300 MHz, power setting 18





# EMC Test Data

Client: Pace Americas	Job Number: J93000
Model: IPW8000 Wireless STB	T-Log Number: T93085
	Project Manager: Susan Hill
Contact: Mark Rieger	Project Coordinator: Irene Rademacher
Standard: FCC, IC	Class: B

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

Frequency MHz	Level dB $\mu$ V	AC Line	Class B		Detector QP/Ave	Comments
			Limit	Margin		
0.185	54.4	Line 1	54.3	0.1	Peak	
0.488	41.2	Line 1	46.2	-5.0	Peak	
4.791	38.9	Line 1	46.0	-7.1	Peak	
16.228	49.6	Line 1	50.0	-0.4	Peak	
0.185	52.3	Neutral	54.2	-1.9	Peak	
0.467	39.7	Neutral	46.6	-6.9	Peak	
16.228	48.8	Neutral	50.0	-1.2	Peak	

### Final quasi-peak and average readings

Frequency MHz	Level dB $\mu$ V	AC Line	Class B		Detector QP/Ave	Comments
			Limit	Margin		
16.228	48.9	Line 1	50.0	-1.1	AVG	AVG (0.10s)
16.228	48.5	Neutral	50.0	-1.5	AVG	AVG (0.10s)
16.228	49.6	Line 1	60.0	-10.4	QP	QP (1.00s)
16.228	49.2	Neutral	60.0	-10.8	QP	QP (1.00s)
0.185	52.3	Neutral	64.3	-12.0	QP	QP (1.00s)
0.488	33.3	Line 1	46.2	-12.9	AVG	AVG (0.10s)
0.185	51.2	Line 1	64.3	-13.1	QP	QP (1.00s)
0.488	42.0	Line 1	56.2	-14.2	QP	QP (1.00s)
4.791	28.3	Line 1	46.0	-17.7	AVG	AVG (0.10s)
0.185	36.5	Neutral	54.3	-17.8	AVG	AVG (0.10s)
0.467	28.8	Neutral	46.6	-17.8	AVG	AVG (0.10s)
0.467	38.5	Neutral	56.6	-18.1	QP	QP (1.00s)
4.791	37.0	Line 1	56.0	-19.0	QP	QP (1.00s)
0.185	34.5	Line 1	54.3	-19.8	AVG	AVG (0.10s)



## EMC Test Data

Client:	Pace Americas	Job Number:	J93000
Model:	IPW8000 Wireless STB	T-Log Number:	T93085
Contact:	Mark Rieger	Project Manager:	Susan Hill
Standard:	FCC, IC	Project Coordinator:	Irene Rademacher
		Class:	N/A

### RSS 210 and FCC 15.407 (UNII) Radiated Spurious Emissions

#### Test Specific Details

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

#### General Test Configuration

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

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

#### Ambient Conditions:

Temperature: 25 °C  
Rel. Humidity: 32 %





# EMC Test Data

Client: Pace Americas	Job Number: J93000
Model: IPW8000 Wireless STB	T-Log Number: T93085
	Project Manager: Susan Hill
Contact: Mark Rieger	Project Coordinator: Irene Rademacher
Standard: FCC, IC	Class: N/A

## Summary of Results - 11a

Run #	Mode	Channel	Power Setting	Measured Power	Test Performed	Limit	Result / Margin
20MHz Bandwith Modes							
1	11a	36 - 5180MHz	8		Restricted Band Edge at 5150 MHz	15.209	53.8 dBµV/m @ 5140.1 MHz (-0.2 dB)
2	11a	60 - 5300MHz	18		Restricted Band Edge at 5350 MHz	15.209	48.6 dBµV/m @ 5387.7 MHz (-5.4 dB)
2	11a	64 - 5320MHz	5		Restricted Band Edge at 5350 MHz	15.209	52.8 dBµV/m @ 5360.0 MHz (-1.2 dB)
3	11a	100 - 5500MHz	4		Restricted Band Edge at 5460 MHz	15.209	53.7 dBµV/m @ 5460.0 MHz (-0.3 dB)
	11a	100 - 5500MHz	4		Band Edge 5460 - 5470 MHz	15E	59.3 dBµV/m @ 5460.2 MHz (-9.0 dB)
	11a	104 - 5520MHz	18		Restricted Band Edge at 5460 MHz	15.209	47.3 dBµV/m @ 5459.4 MHz (-6.7 dB)
	11a	104 - 5520MHz	18		Band Edge 5460 - 5470 MHz	15E	60.1 dBµV/m @ 5466.6 MHz (-8.2 dB)
	11a	136 - 5680MHz	18		Band Edge 5725MHz	15E	63.4 dBµV/m @ 5725.0 MHz (-4.9 dB)
	11a	140 - 5700MHz	14		Band Edge 5725MHz	15E	67.7 dBµV/m @ 5740.0 MHz (-0.6 dB)



# EMC Test Data

Client: Pace Americas	Job Number: J93000
Model: IPW8000 Wireless STB	T-Log Number: T93085
	Project Manager: Susan Hill
Contact: Mark Rieger	Project Coordinator: Irene Rademacher
Standard: FCC, IC	Class: N/A

## Summary of Results - n20

Run #	Mode	Channel	Power Setting	Measured Power	Test Performed	Limit	Result / Margin
4	n20	36 - 5180MHz	12		Restricted Band Edge at 5150 MHz	15.209	52.9 dBµV/m @ 5140.1 MHz (-1.1 dB)
5	n20	60 - 5300MHz	18		Restricted Band Edge at 5350 MHz	15.209	48.2 dBµV/m @ 5386.1 MHz (-5.8 dB)
5	n20	64 - 5320MHz	11		Restricted Band Edge at 5350 MHz	15.209	53.5 dBµV/m @ 5360.1 MHz (-0.5 dB)
6	n20	100 - 5500MHz	7		Restricted Band Edge at 5460 MHz	15.209	53.8 dBµV/m @ 5460.0 MHz (-0.2 dB)
	n20	100 - 5500MHz	7		Band Edge 5460 - 5470 MHz	15E	55.2 dBµV/m @ 5460.1 MHz (-13.1 dB)
	n20	104 - 5520MHz	18		Restricted Band Edge at 5460 MHz	15.209	48.9 dBµV/m @ 5441.2 MHz (-5.1 dB)
	n20	104 - 5520MHz	18		Band Edge 5460 - 5470 MHz	15E	60.3 dBµV/m @ 5465.8 MHz (-8.0 dB)
	n20	140 - 5700MHz	18		Band Edge 5725MHz	15E	68.1 dBµV/m @ 5733.0 MHz (-0.2 dB)



# EMC Test Data

Client: Pace Americas	Job Number: J93000
Model: IPW8000 Wireless STB	T-Log Number: T93085
	Project Manager: Susan Hill
Contact: Mark Rieger	Project Coordinator: Irene Rademacher
Standard: FCC, IC	Class: N/A

## Summary of Results - n40

Run #	Mode	Channel	Power Setting	Measured Power	Test Performed	Limit	Result / Margin
7	n40	38 - 5190MHz	12		Restricted Band Edge at 5150 MHz	15.209	53.2 dBµV/m @ 5150.0 MHz (-0.8 dB)
8	n40	54 - 5270MHz	18		Restricted Band Edge at 5350 MHz	15.209	48.1 dBµV/m @ 5430.0 MHz (-5.9 dB)
8	n40	62 - 5310MHz	13		Restricted Band Edge at 5350 MHz	15.209	53.3 dBµV/m @ 5350.0 MHz (-0.7 dB)
9	n40	102 - 5510MHz	18		Restricted Band Edge at 5460 MHz	15.209	51.9 dBµV/m @ 5460.0 MHz (-2.1 dB)
	n40	102 - 5510MHz	17		Band Edge 5460 - 5470 MHz	15E	67.8 dBµV/m @ 5467.6 MHz (-0.5 dB)
	n40	134 - 5670MHz	18		Band Edge 5725MHz	15E	61.2 dBµV/m @ 5726.8 MHz (-7.1 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.

## Procedure Comments:

Measurements performed in accordance with FCC KDB 789033 v01r03, dated April 8, 2013

Peak measurements performed with: RBW=1MHz, VBW=3MHz, peak detector, max hold, auto sweep time

Unless otherwise stated/noted, emission has duty cycle  $\geq 98\%$  and was measured using RBW=1MHz, VBW=10Hz, peak detector, linear average mode, auto sweep time, max hold.

Mode	Data Rate	Duty Cycle (x)	Constant DC?	T (ms)	Pwr Cor Factor*	Lin Volt Cor Factor**	Min VBW for FS (Hz)
11a	6	0.98	Yes	5.35	0.09	0.18	186.9
n20	MCS0	0.99	Yes	4.96	0.04	0.09	201.6
n40	MCS0	0.98	Yes	4.76	0.08	0.16	210.1



# EMC Test Data

Client: Pace Americas	Job Number: J93000
Model: IPW8000 Wireless STB	T-Log Number: T93085
	Project Manager: Susan Hill
Contact: Mark Rieger	Project Coordinator: Irene Rademacher
Standard: FCC, IC	Class: N/A

## Sample Notes

Module S/N: TDVAAGC325620001  
 Driver: ??  
 Antenna: Internal

## Notes

Device operates in 4x4 mode only.

## Measurement Specific Notes:

Note 1:	For emissions outside of the restricted bands the limit is -27dBm/MHz eirp (68.3dBuV/m). The measurement method required is a peak measurement (RB=1MHz, VB≥3MHz, peak detector). Per KDB 789033 2) c) (i), compliance can be demonstrated by meeting the average and peak limits of 15.209, as an alternative.
Note 2:	Emission has duty cycle ≥ 98%, average measurement performed: RBW=1MHz, VBW=3MHz, RMS, Power averaging, auto sweep, trace average 100 traces
Note 3:	Emission has duty cycle < 98%, but constant, average measurement performed: RBW=1MHz, VBW=10Hz, peak detector, linear averaging, auto sweep, trace average 100 * 1/DC traces, measurement corrected by Linear Voltage correction factor
Note 4:	Emission has duty cycle < 98% and is NOT constant, average measurement performed: RBW=1MHz, VBW> 1/T, peak detector, linear average mode, sweep time auto, max hold. Max hold for 50*(1/DC) traces
Note 5:	Emission has duty cycle < 98%, but constant, average measurement performed: RBW=1MHz, VBW=3MHz, RMS, Power averaging, auto sweep, trace average 100 * 1/DC traces, measurement corrected by Pwr correction factor
Note 6:	Plots of the average and peak bandedge do not account for any duty cycle correction. Refer to the tabluar results for final measurements.



# EMC Test Data

Client: Pace Americas	Job Number: J93000
Model: IPW8000 Wireless STB	T-Log Number: T93085
	Project Manager: Susan Hill
Contact: Mark Rieger	Project Coordinator: Irene Rademacher
Standard: FCC, IC	Class: N/A

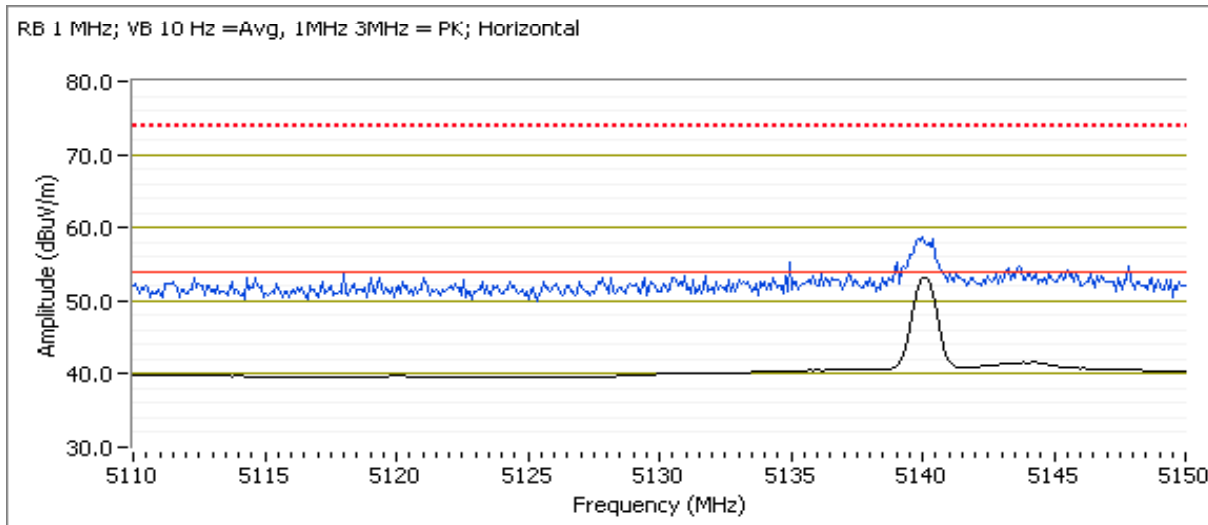
## Run #1: Radiated Bandedge Measurements, 5150-5250MHz

Date of Test: 8/8/2013  
 Test Engineer: Rafael Varelas  
 Test Location: FT Chamber #4

Channel: 36 - 5180 MHz  
 Tx Chain: 4x4 mode  
 Mode: 11a  
 Data Rate: 6

### 5150 MHz Band Edge Signal Radiated Field Strength

Frequency MHz	Level dB $\mu$ V/m	Pol v/h	FCC 15.209		Detector Pk/QP/Avg	Azimuth degrees	Height meters	Comments
			Limit	Margin				
5140.060	53.8	H	54.0	-0.2	AVG	130	1.0	power setting 8
5139.980	58.2	H	74.0	-15.8	PK	130	1.0	power setting 8
5140.060	52.1	V	54.0	-1.9	AVG	119	1.0	power setting 8
5139.980	56.1	V	74.0	-17.9	PK	119	1.0	power setting 8





# EMC Test Data

Client: Pace Americas	Job Number: J93000
Model: IPW8000 Wireless STB	T-Log Number: T93085
	Project Manager: Susan Hill
Contact: Mark Rieger	Project Coordinator: Irene Rademacher
Standard: FCC, IC	Class: N/A

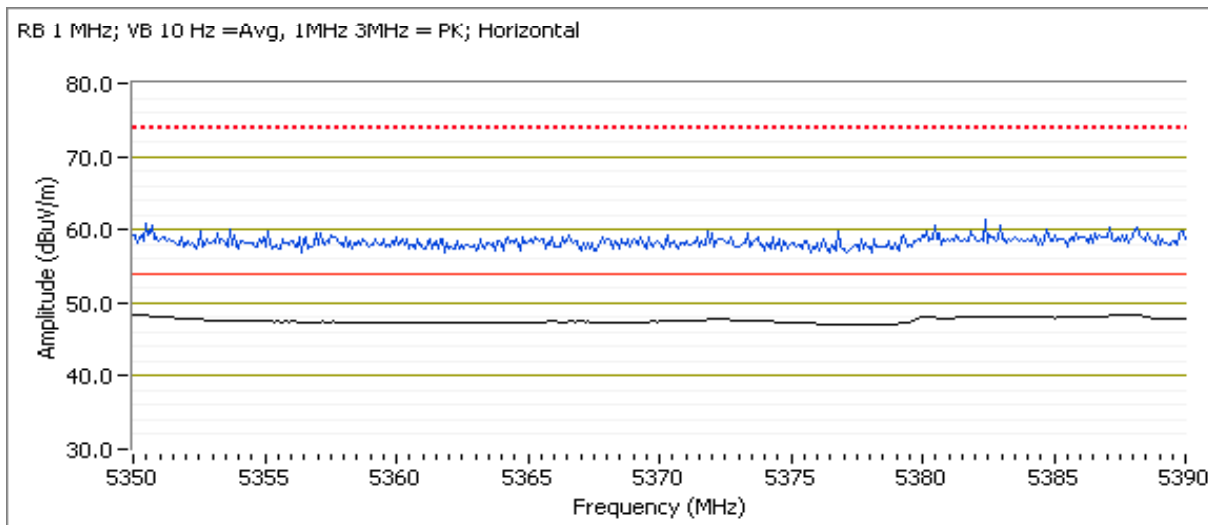
## Run #2: Radiated Bandedge Measurements, 5250-5350MHz

Date of Test: 8/15/2013  
 Test Engineer: Rafael Varelas  
 Test Location: FT Chamber #5

Channel: 60 - 5300 MHz  
 Tx Chain: 4x4 mode  
 Mode: 11a  
 Data Rate: 6

### 5350 MHz Band Edge Signal Radiated Field Strength

Frequency MHz	Level dB $\mu$ V/m	Pol v/h	FCC 15.209		Detector Pk/QP/Avg	Azimuth degrees	Height meters	Comments
			Limit	Margin				
5387.680	48.6	H	54.0	-5.4	AVG	142	1.0	POS; RB 1 MHz; VB: 10 Hz
5381.260	60.0	H	74.0	-14.0	PK	142	1.0	POS; RB 1 MHz; VB: 3 MHz
5350.320	45.7	V	54.0	-8.3	AVG	86	1.1	POS; RB 1 MHz; VB: 10 Hz
5357.700	56.5	V	74.0	-17.5	PK	86	1.1	POS; RB 1 MHz; VB: 3 MHz





# EMC Test Data

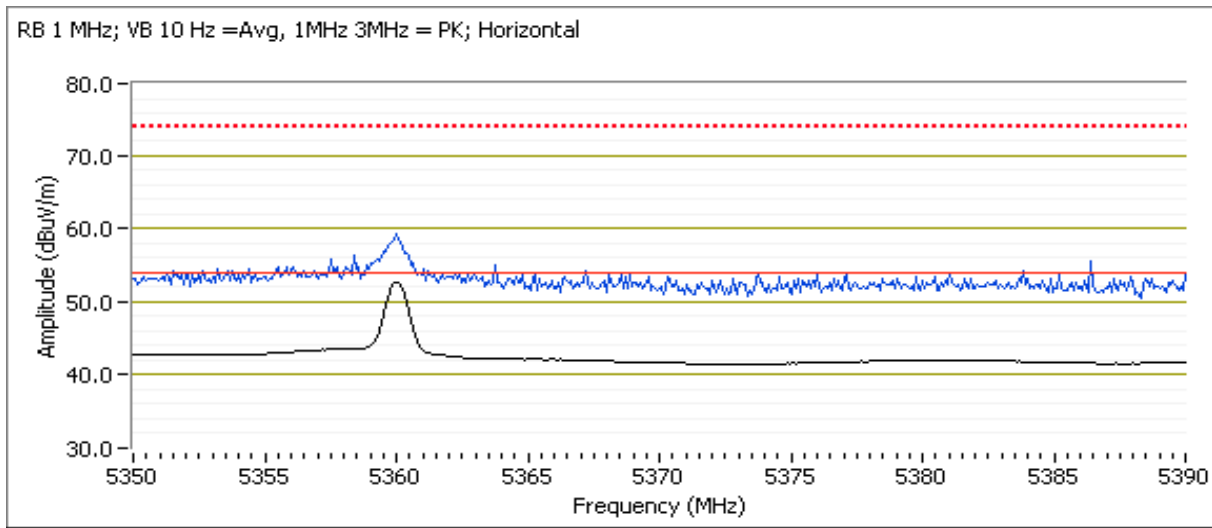
Client: Pace Americas	Job Number: J93000
Model: IPW8000 Wireless STB	T-Log Number: T93085
	Project Manager: Susan Hill
Contact: Mark Rieger	Project Coordinator: Irene Rademacher
Standard: FCC, IC	Class: N/A

Date of Test: 8/8/2013  
 Test Engineer: Rafael Varelas  
 Test Location: FT Chamber #4

Channel: 64 - 5320 MHz  
 Tx Chain: 4x4 mode  
 Mode: 11a  
 Data Rate: 6

### 5350 MHz Band Edge Signal Radiated Field Strength

Frequency	Level	Pol	FCC 15.209		Detector	Azimuth	Height	Comments
MHz	dB $\mu$ V/m	v/h	Limit	Margin	Pk/QP/Avg	degrees	meters	
5360.020	52.8	H	54.0	-1.2	AVG	131	1.0	power setting 5
5360.020	57.3	H	74.0	-16.7	PK	131	1.0	power setting 5
5360.020	50.2	V	54.0	-3.8	AVG	66	1.2	power setting 5
5359.860	55.7	V	74.0	-18.3	PK	66	1.2	power setting 5





# EMC Test Data

Client: Pace Americas	Job Number: J93000
Model: IPW8000 Wireless STB	T-Log Number: T93085
	Project Manager: Susan Hill
Contact: Mark Rieger	Project Coordinator: Irene Rademacher
Standard: FCC, IC	Class: N/A

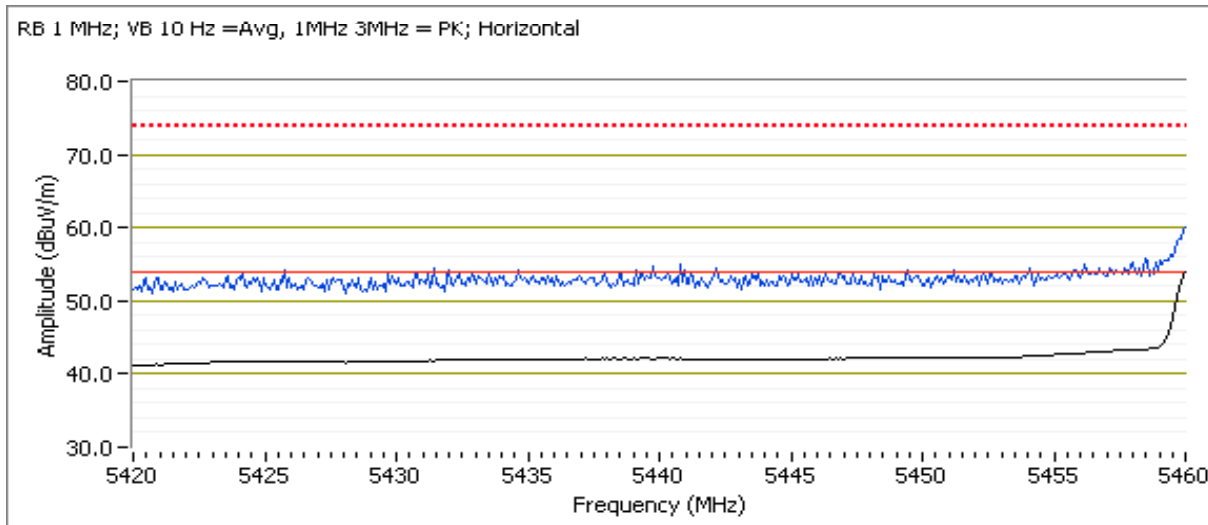
## Run #3: Radiated Bandedge Measurements, 5470-5725MHz

Date of Test: 8/8/2013  
 Test Engineer: Rafael Varelas  
 Test Location: FT Chamber #4

Channel: 100 - 5500 MHz  
 Tx Chain: 4x4 mode  
 Mode: 11a  
 Data Rate: 6

### 5460 MHz Band Edge Signal Radiated Field Strength

Frequency MHz	Level dB $\mu$ V/m	Pol v/h	FCC 15.209		Detector Pk/QP/Avg	Azimuth degrees	Height meters	Comments
			Limit	Margin				
5460.000	53.7	H	54.0	-0.3	AVG	130	1.0	power setting 4
5459.840	58.8	H	74.0	-15.2	PK	130	1.0	power setting 4
5460.000	49.9	V	54.0	-4.1	AVG	160	1.2	power setting 4
5459.920	55.6	V	74.0	-18.4	PK	160	1.2	power setting 4





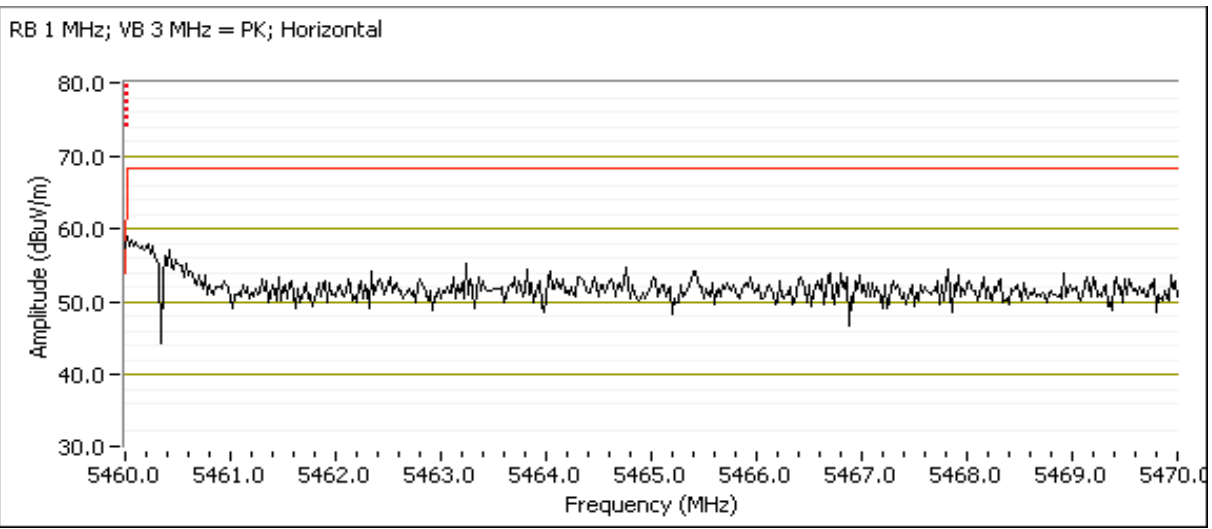


# EMC Test Data

Client: Pace Americas	Job Number: J93000
Model: IPW8000 Wireless STB	T-Log Number: T93085
	Project Manager: Susan Hill
Contact: Mark Rieger	Project Coordinator: Irene Rademacher
Standard: FCC, IC	Class: N/A

### 5470 MHz Band Edge Signal Radiated Field Strength

Frequency MHz	Level dB $\mu$ V/m	Pol v/h	15.E		Detector Pk/QP/Avg	Azimuth degrees	Height meters	Comments
			Limit	Margin				
5460.220	59.3	H	68.3	-9.0	PK	130	1.0	power setting 4
5460.020	55.4	V	68.3	-12.9	PK	160	1.2	power setting 4





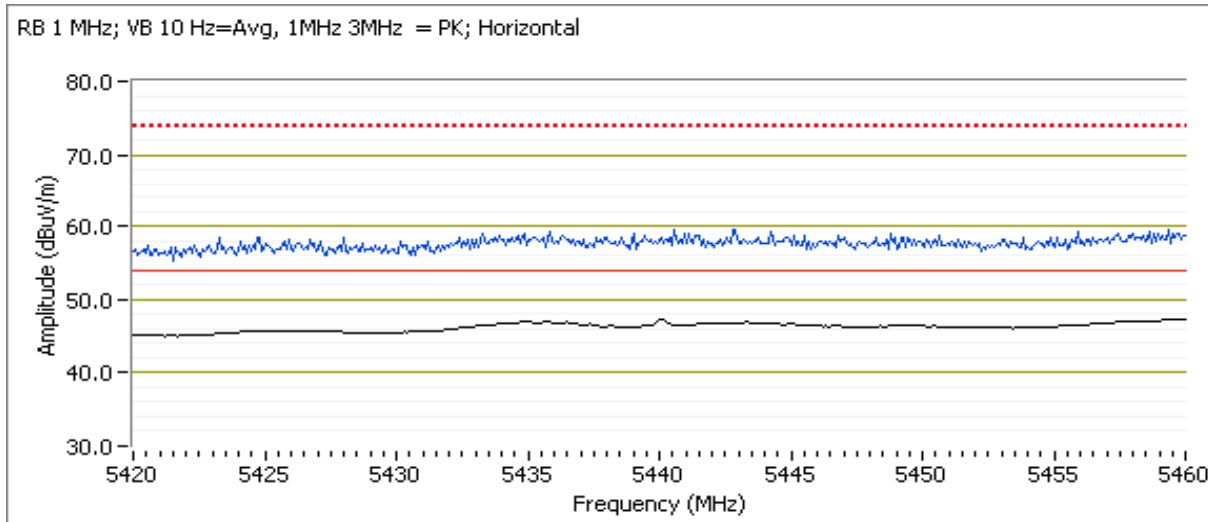
# EMC Test Data

Client: Pace Americas	Job Number: J93000
Model: IPW8000 Wireless STB	T-Log Number: T93085
	Project Manager: Susan Hill
Contact: Mark Rieger	Project Coordinator: Irene Rademacher
Standard: FCC, IC	Class: N/A

Channel: 104 - 5520 MHz  
 Tx Chain: 4x4 mode  
 Mode: 11a  
 Data Rate: 6

### 5460 MHz Band Edge Signal Radiated Field Strength

Frequency MHz	Level dB $\mu$ V/m	Pol v/h	FCC 15.209		Detector Pk/QP/Avg	Azimuth degrees	Height meters	Comments
			Limit	Margin				
5459.440	47.3	H	54.0	-6.7	AVG	130	1.0	POS; RB 1 MHz; VB: 10 Hz
5439.720	58.0	H	74.0	-16.0	PK	130	1.0	POS; RB 1 MHz; VB: 3 MHz
5440.040	43.7	V	54.0	-10.3	AVG	289	1.0	POS; RB 1 MHz; VB: 10 Hz
5457.110	54.8	V	74.0	-19.2	PK	289	1.0	POS; RB 1 MHz; VB: 3 MHz



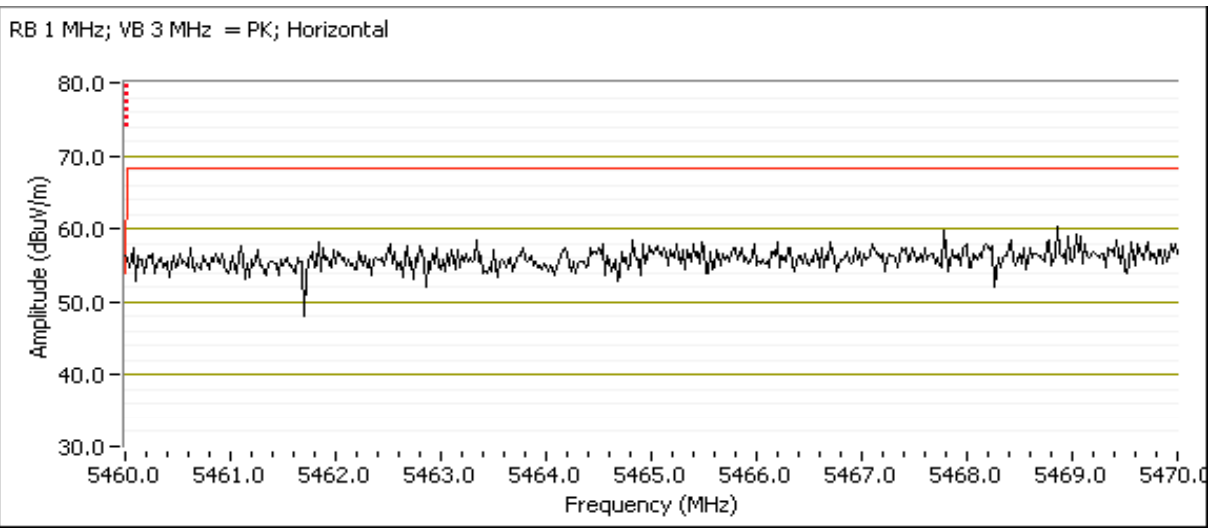


# EMC Test Data

Client: Pace Americas	Job Number: J93000
Model: IPW8000 Wireless STB	T-Log Number: T93085
	Project Manager: Susan Hill
Contact: Mark Rieger	Project Coordinator: Irene Rademacher
Standard: FCC, IC	Class: N/A

## 5470 MHz Band Edge Signal Radiated Field Strength

Frequency MHz	Level dB $\mu$ V/m	Pol v/h	15.E		Detector Pk/QP/Avg	Azimuth degrees	Height meters	Comments
			Limit	Margin				
5466.610	60.1	H	68.3	-8.2	PK	130	1.0	POS; RB 1 MHz; VB: 3 MHz
5469.100	56.1	V	68.3	-12.2	PK	289	1.0	POS; RB 1 MHz; VB: 3 MHz





# EMC Test Data

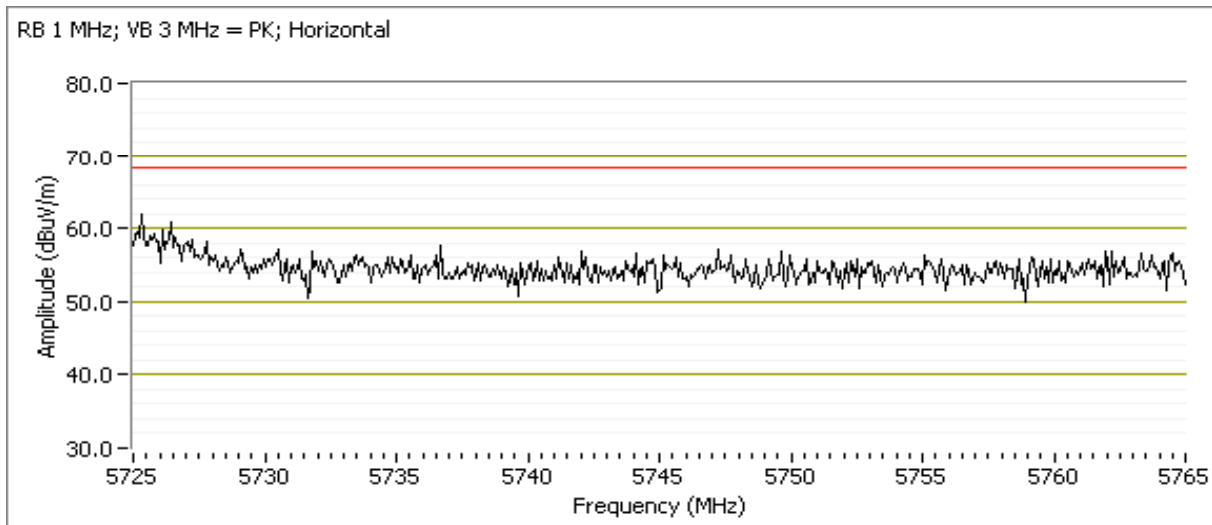
Client: Pace Americas	Job Number: J93000
Model: IPW8000 Wireless STB	T-Log Number: T93085
	Project Manager: Susan Hill
Contact: Mark Rieger	Project Coordinator: Irene Rademacher
Standard: FCC, IC	Class: N/A

Date of Test: 8/15/2013  
 Test Engineer: Rafael Varelas  
 Test Location: FT Chamber #5

Channel: 136 - 5680 MHz  
 Tx Chain: 4x4 mode  
 Mode: 11a  
 Data Rate: 6

### 5725 MHz Band Edge Signal Radiated Field Strength

Frequency	Level	Pol	FCC 15.209		Detector	Azimuth	Height	Comments
MHz	dB $\mu$ V/m	v/h	Limit	Margin	Pk/QP/Avg	degrees	meters	
5725.000	63.4	H	68.3	-4.9	PK	151	1.0	POS; RB 1 MHz; VB: 3 MHz
5725.000	62.2	V	68.3	-6.1	PK	151	1.0	POS; RB 1 MHz; VB: 3 MHz





# EMC Test Data

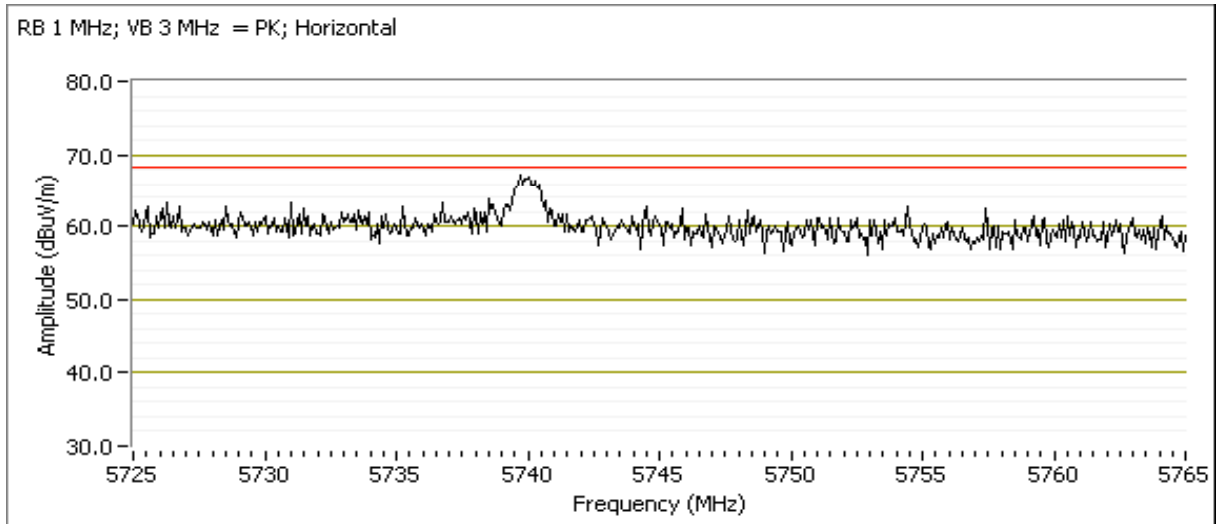
Client: Pace Americas	Job Number: J93000
Model: IPW8000 Wireless STB	T-Log Number: T93085
	Project Manager: Susan Hill
Contact: Mark Rieger	Project Coordinator: Irene Rademacher
Standard: FCC, IC	Class: N/A

Date of Test: 8/8/2013  
 Test Engineer: Rafael Varelas  
 Test Location: FT Chamber #4

Channel: 140 - 5700 MHz  
 Tx Chain: 4x4 mode  
 Mode: 11a  
 Data Rate: 6

### 5725 MHz Band Edge Signal Radiated Field Strength

Frequency	Level	Pol	FCC 15.209		Detector	Azimuth	Height	Comments
MHz	dB $\mu$ V/m	v/h	Limit	Margin	Pk/QP/Avg	degrees	meters	
5739.990	67.7	H	68.3	-0.6	PK	130	1.0	power setting 14
5740.230	62.2	V	88.3	-26.1	PK	150	0.9	power setting 14





# EMC Test Data

Client: Pace Americas	Job Number: J93000
Model: IPW8000 Wireless STB	T-Log Number: T93085
	Project Manager: Susan Hill
Contact: Mark Rieger	Project Coordinator: Irene Rademacher
Standard: FCC, IC	Class: N/A

**Run #4: Radiated Bandedge Measurements, 5150-5250MHz**

Date of Test: 7/31/2013  
 Test Engineer: Joseph Cadigal  
 Test Location: FT Chamber#4

Channel: 36 - 5180 MHz  
 Tx Chain: 4x4 mode  
 Mode: n20  
 Data Rate: MCS0

**5150 MHz Band Edge Signal Radiated Field Strength**

Frequency	Level	Pol	FCC 15.209		Detector	Azimuth	Height	Comments
MHz	dB $\mu$ V/m	v/h	Limit	Margin	Pk/QP/Avg	degrees	meters	
5140.140	52.9	H	54.0	-1.1	AVG	166	0.9	power setting 12
5140.220	59.4	H	74.0	-14.6	PK	166	0.9	power setting 12



# EMC Test Data

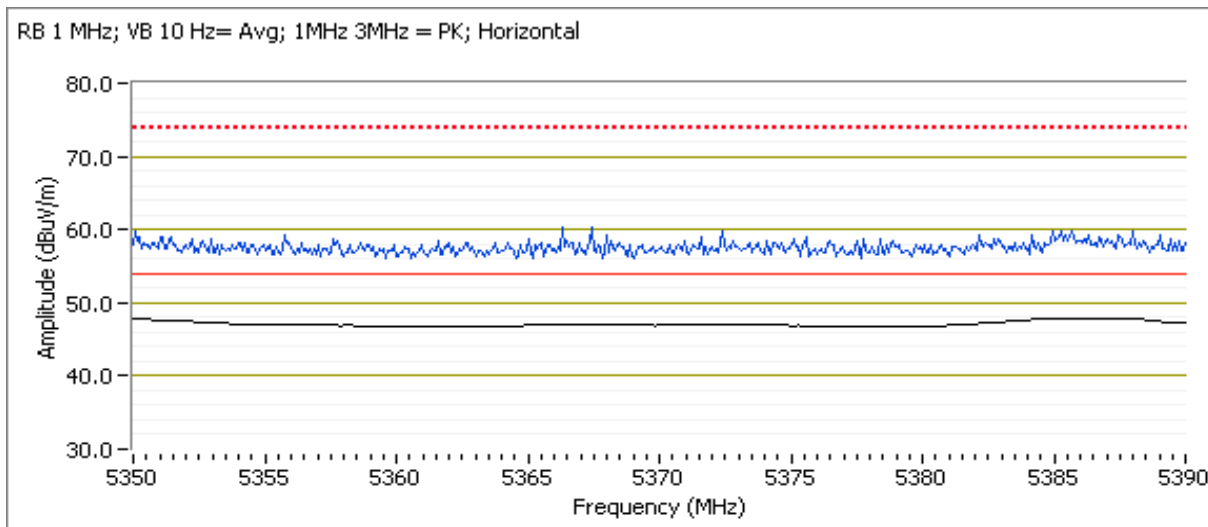
Client: Pace Americas	Job Number: J93000
Model: IPW8000 Wireless STB	T-Log Number: T93085
	Project Manager: Susan Hill
Contact: Mark Rieger	Project Coordinator: Irene Rademacher
Standard: FCC, IC	Class: N/A

Run #5: Radiated Bandedge Measurements, 5250-5350MHz  
 Date of Test: 8/15/2013  
 Test Engineer: Rafael Varelas  
 Test Location: FT Chamber#5

Channel: 60 - 5300MHz  
 Tx Chain: 4x4 mode  
 Mode: n20  
 Data Rate: MCS0

### 5350 MHz Band Edge Signal Radiated Field Strength

Frequency MHz	Level dB $\mu$ V/m	Pol v/h	FCC 15.209		Detector Pk/QP/Avg	Azimuth degrees	Height meters	Comments
			Limit	Margin				
5386.070	48.2	H	54.0	-5.8	AVG	136	1.0	POS; RB 1 MHz; VB: 10 Hz
5389.920	59.3	H	74.0	-14.7	PK	136	1.0	POS; RB 1 MHz; VB: 3 MHz
5350.080	45.7	V	54.0	-8.3	AVG	88	1.0	POS; RB 1 MHz; VB: 10 Hz
5368.680	56.3	V	74.0	-17.7	PK	88	1.0	POS; RB 1 MHz; VB: 3 MHz





# EMC Test Data

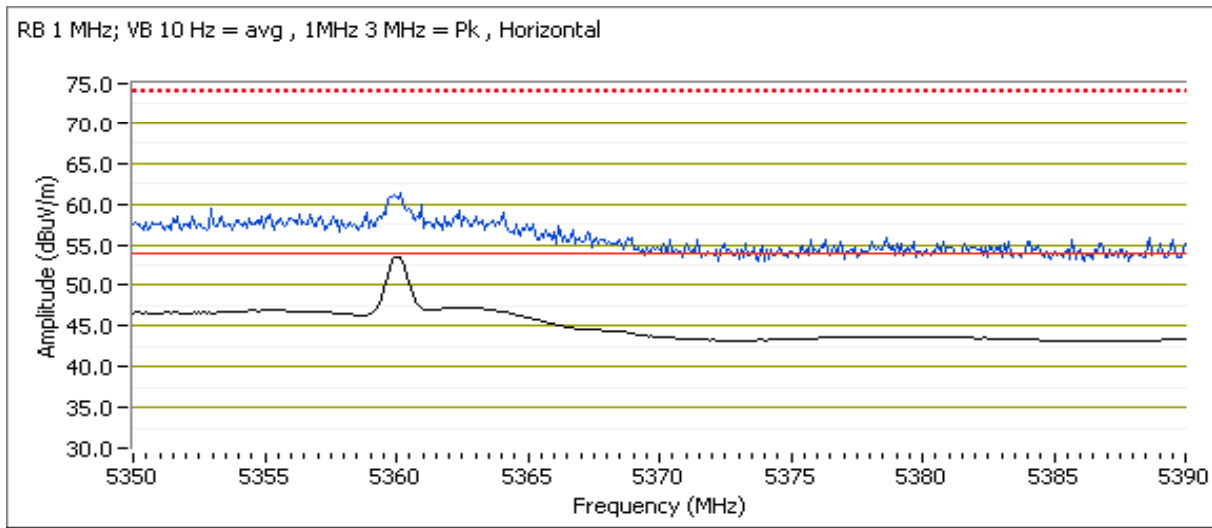
Client: Pace Americas	Job Number: J93000
Model: IPW8000 Wireless STB	T-Log Number: T93085
	Project Manager: Susan Hill
Contact: Mark Rieger	Project Coordinator: Irene Rademacher
Standard: FCC, IC	Class: N/A

Date of Test: 7/31/2013  
 Test Engineer: Joseph Cadigal  
 Test Location: FT Chamber#4

Channel: 64 - 5320MHz  
 Tx Chain: 4x4 mode  
 Mode: n20  
 Data Rate: MCS0

### 5350 MHz Band Edge Signal Radiated Field Strength

Frequency MHz	Level dB $\mu$ V/m	Pol v/h	FCC 15.209		Detector Pk/QP/Avg	Azimuth degrees	Height meters	Comments
			Limit	Margin				
5360.100	53.5	H	54.0	-0.5	AVG	162	1.0	power setting 11
5359.860	59.6	H	74.0	-14.4	PK	162	1.0	power setting 11
5360.020	46.8	V	54.0	-7.2	AVG	110	0.9	power setting 11
5359.860	55.5	V	74.0	-18.5	PK	110	0.9	power setting 11







# EMC Test Data

Client: Pace Americas	Job Number: J93000
Model: IPW8000 Wireless STB	T-Log Number: T93085
	Project Manager: Susan Hill
Contact: Mark Rieger	Project Coordinator: Irene Rademacher
Standard: FCC, IC	Class: N/A

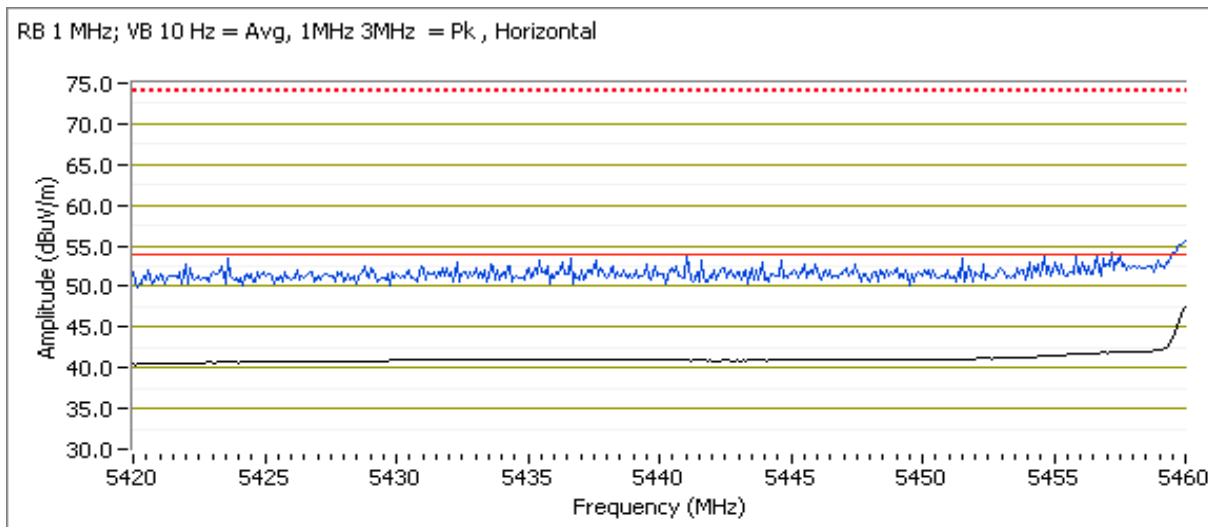
## Run #6: Radiated Bandedge Measurements, 5470-5725MHz

Date of Test: 7/31/2013  
 Test Engineer: Joseph Cadigal  
 Test Location: FT Chamber#4

Channel: 100 - 5500MHz  
 Tx Chain: 4x4 mode  
 Mode: n20  
 Data Rate: MCS0

### 5460 MHz Band Edge Signal Radiated Field Strength

Frequency MHz	Level dB $\mu$ V/m	Pol v/h	FCC 15.209		Detector Pk/QP/Avg	Azimuth degrees	Height meters	Comments
			Limit	Margin				
5460.000	53.8	H	54.0	-0.2	AVG	160	1.0	power setting 7
5460.000	59.9	H	74.0	-14.1	PK	160	1.0	power setting 7
5460.000	50.7	V	54.0	-3.3	AVG	63	1.1	power setting 7
5460.000	56.0	V	74.0	-18.0	PK	63	1.1	power setting 7





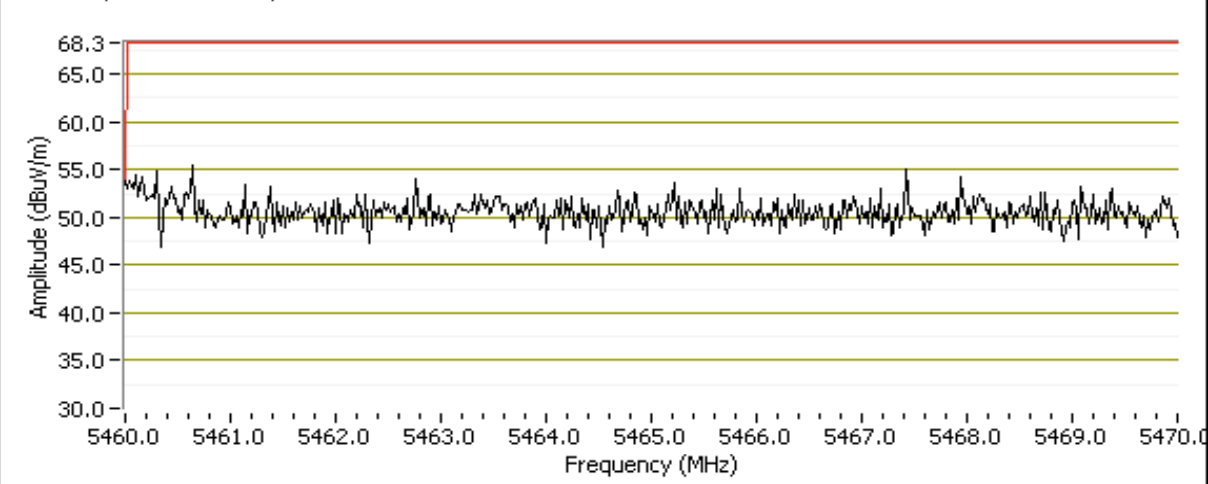
# EMC Test Data

Client: Pace Americas	Job Number: J93000
Model: IPW8000 Wireless STB	T-Log Number: T93085
	Project Manager: Susan Hill
Contact: Mark Rieger	Project Coordinator: Irene Rademacher
Standard: FCC, IC	Class: N/A

## 5470 MHz Band Edge Signal Radiated Field Strength

Frequency	Level	Pol	15.E		Detector	Azimuth	Height	Comments
MHz	dB $\mu$ V/m	v/h	Limit	Margin	Pk/QP/Avg	degrees	meters	
5460.060	55.2	H	68.3	-13.1	Pk	161	1.0	power setting 7

RB 1 MHz; VB 3 MHz = Pk, Horizontal





# EMC Test Data

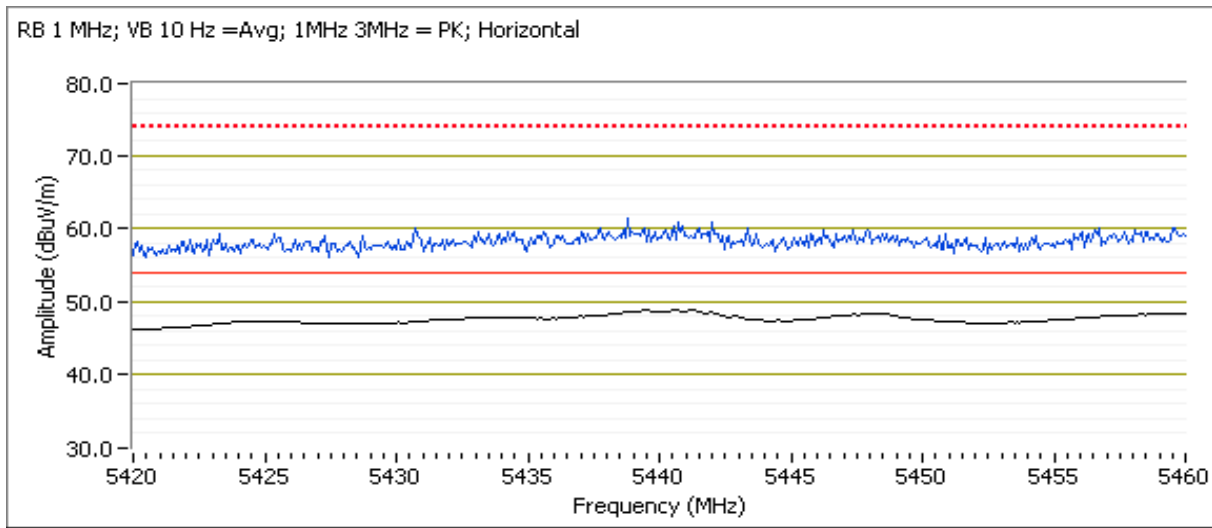
Client: Pace Americas	Job Number: J93000
Model: IPW8000 Wireless STB	T-Log Number: T93085
	Project Manager: Susan Hill
Contact: Mark Rieger	Project Coordinator: Irene Rademacher
Standard: FCC, IC	Class: N/A

Date of Test: 8/8/2013  
 Test Engineer: Rafael varelas  
 Test Location: FT Chamber#4

Channel: 104 - 5520MHz  
 Tx Chain: 4x4 mode  
 Mode: n20  
 Data Rate: MCS0

### 5460 MHz Band Edge Signal Radiated Field Strength

Frequency MHz	Level dB $\mu$ V/m	Pol v/h	FCC 15.209		Detector Pk/QP/Avg	Azimuth degrees	Height meters	Comments
			Limit	Margin				
5441.240	48.9	H	54.0	-5.1	AVG	152	1.0	POS; RB 1 MHz; VB: 10 Hz
5438.920	60.3	H	74.0	-13.7	PK	152	1.0	POS; RB 1 MHz; VB: 3 MHz
5460.000	43.1	V	54.0	-10.9	AVG	277	2.0	POS; RB 1 MHz; VB: 10 Hz
5436.350	55.2	V	74.0	-18.8	PK	277	2.0	POS; RB 1 MHz; VB: 3 MHz



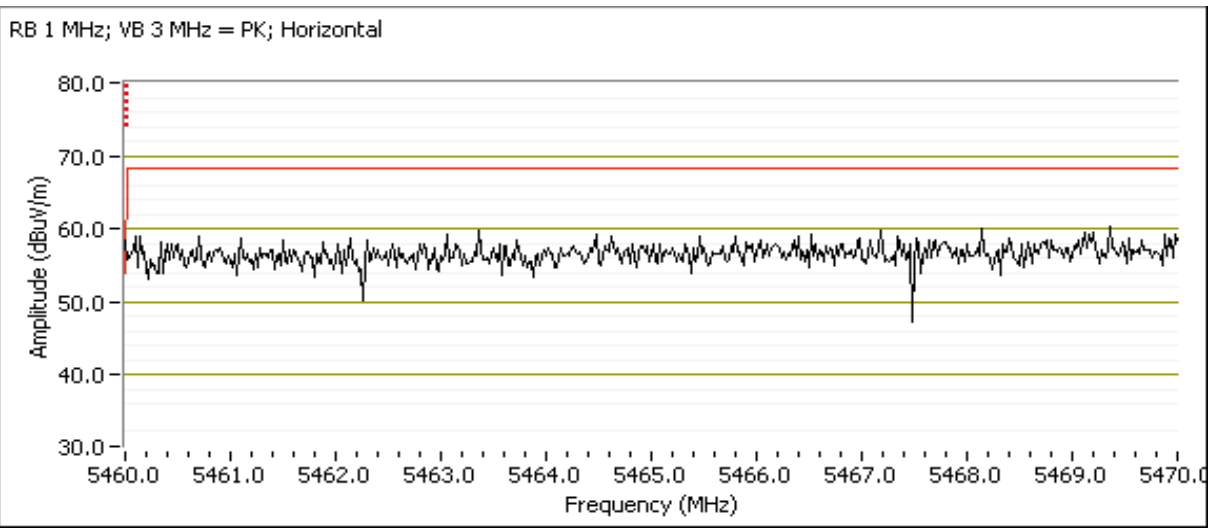


# EMC Test Data

Client: Pace Americas	Job Number: J93000
Model: IPW8000 Wireless STB	T-Log Number: T93085
	Project Manager: Susan Hill
Contact: Mark Rieger	Project Coordinator: Irene Rademacher
Standard: FCC, IC	Class: N/A

## 5470 MHz Band Edge Signal Radiated Field Strength

Frequency MHz	Level dB $\mu$ V/m	Pol v/h	15.E		Detector Pk/QP/Avg	Azimuth degrees	Height meters	Comments
			Limit	Margin				
5465.830	60.3	H	68.3	-8.0	PK	152	1.0	POS; RB 1 MHz; VB: 3 MHz
5466.450	55.0	V	68.3	-13.3	PK	277	2.0	POS; RB 1 MHz; VB: 3 MHz





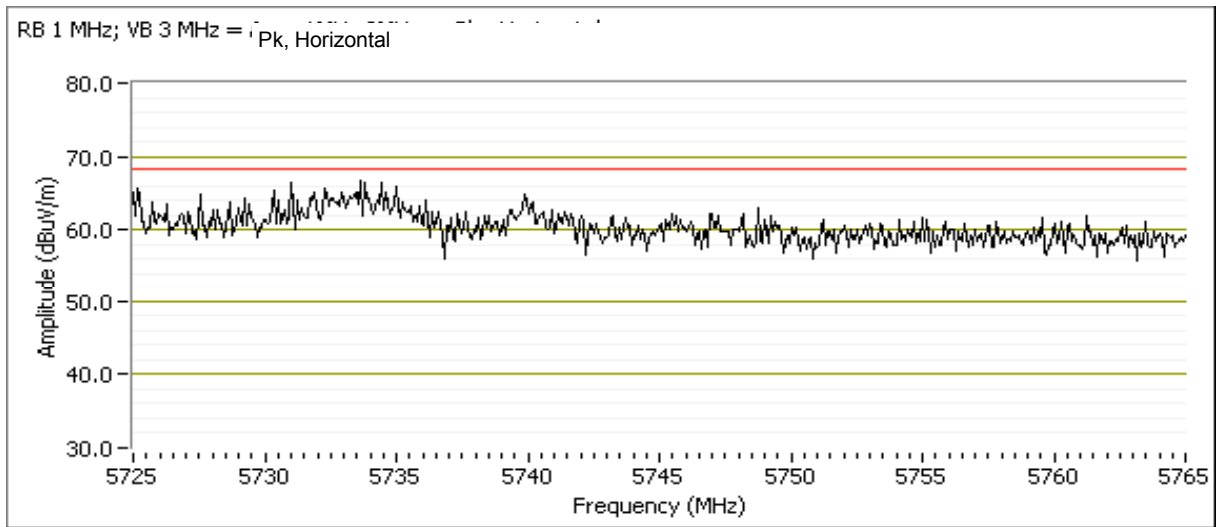
# EMC Test Data

Client: Pace Americas	Job Number: J93000
Model: IPW8000 Wireless STB	T-Log Number: T93085
	Project Manager: Susan Hill
Contact: Mark Rieger	Project Coordinator: Irene Rademacher
Standard: FCC, IC	Class: N/A

Channel: 140 - 5700MHz  
 Tx Chain: 4x4 mode  
 Mode: n20  
 Data Rate: MCS0

### 5725 MHz Band Edge Signal Radiated Field Strength

Frequency	Level	Pol	15.E		Detector	Azimuth	Height	Comments
MHz	dB $\mu$ V/m	v/h	Limit	Margin	Pk/QP/Avg	degrees	meters	
5733.020	68.1	H	68.3	-0.2	Pk	101	1.1	POS; RB 1 MHz; VB: 3 MHz





# EMC Test Data

Client: Pace Americas	Job Number: J93000
Model: IPW8000 Wireless STB	T-Log Number: T93085
	Project Manager: Susan Hill
Contact: Mark Rieger	Project Coordinator: Irene Rademacher
Standard: FCC, IC	Class: N/A

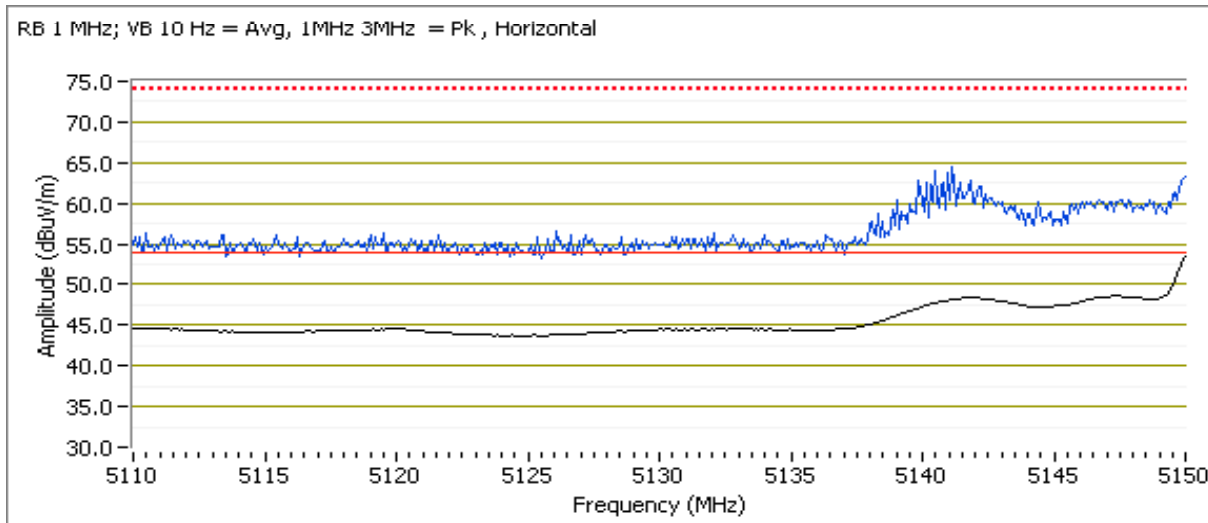
## Run #7: Radiated Bandedge Measurements, 5150-5250MHz

Date of Test: 7/31/2013  
 Test Engineer: Joseph Cadigal  
 Test Location: FT Chamber#4

Channel: 38 - 5190 MHz  
 Tx Chain: 4x4 mode  
 Mode: n40  
 Data Rate: MCS0

### 5150 MHz Band Edge Signal Radiated Field Strength

Frequency MHz	Level dB $\mu$ V/m	Pol v/h	FCC 15.209		Detector Pk/QP/Avg	Azimuth degrees	Height meters	Comments
			Limit	Margin				
5150.000	53.2	H	54.0	-0.8	AVG	171	0.9	power setting 12
5141.180	62.8	H	74.0	-11.2	PK	171	0.9	power setting 12
5150.000	50.8	V	54.0	-3.2	AVG	173	1.2	power setting 12
5142.300	58.5	V	74.0	-15.5	PK	173	1.2	power setting 12





# EMC Test Data

Client: Pace Americas	Job Number: J93000
Model: IPW8000 Wireless STB	T-Log Number: T93085
	Project Manager: Susan Hill
Contact: Mark Rieger	Project Coordinator: Irene Rademacher
Standard: FCC, IC	Class: N/A

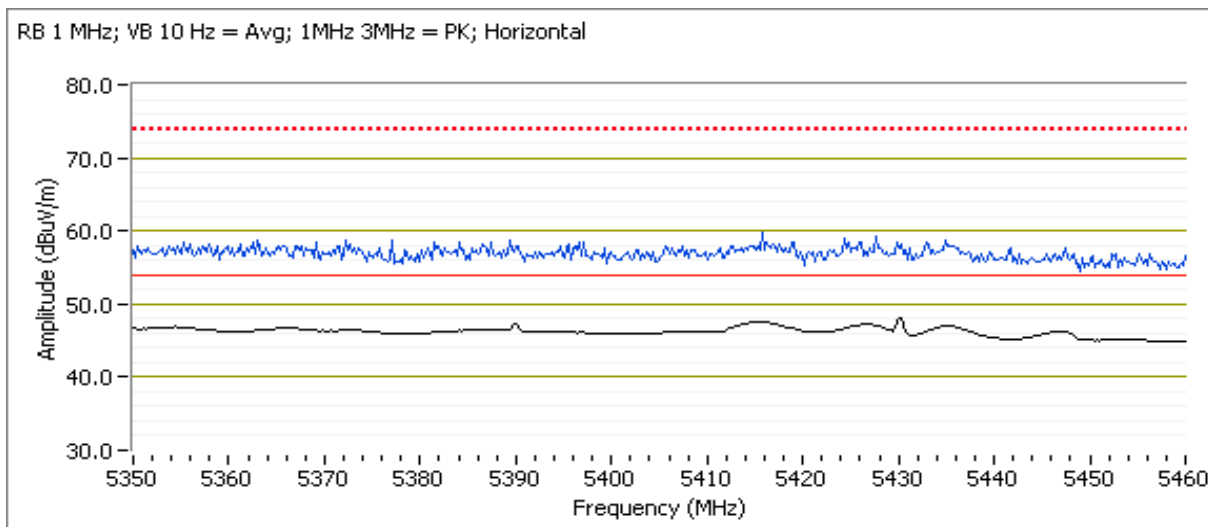
## Run #8: Radiated Bandedge Measurements, 5250-5350MHz

Date of Test: 8/15/2013  
 Test Engineer: Rafael Varelas  
 Test Location: FT Chamber#5

Channel: 54 - 5270MHz  
 Tx Chain: 4x4 mode  
 Mode: n40  
 Data Rate: MCS0

### 5350 MHz Band Edge Signal Radiated Field Strength

Frequency	Level	Pol	FCC 15.209		Detector	Azimuth	Height	Comments
MHz	dB $\mu$ V/m	v/h	Limit	Margin	PK/QP/Avg	degrees	meters	
5430.020	48.1	H	54.0	-5.9	AVG	123	1.2	POS; RB 1 MHz; VB: 10 Hz
5389.680	58.3	H	74.0	-15.7	PK	123	1.2	POS; RB 1 MHz; VB: 3 MHz
5430.000	46.2	V	54.0	-7.8	AVG	75	1.0	POS; RB 1 MHz; VB: 10 Hz
5401.620	56.7	V	74.0	-17.3	PK	75	1.0	POS; RB 1 MHz; VB: 3 MHz





# EMC Test Data

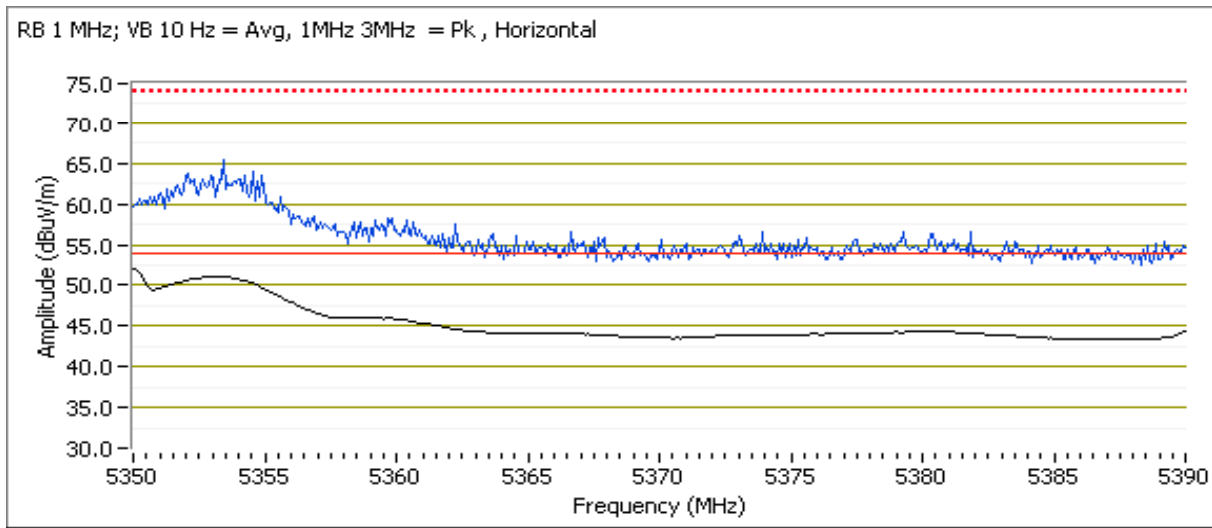
Client: Pace Americas	Job Number: J93000
Model: IPW8000 Wireless STB	T-Log Number: T93085
	Project Manager: Susan Hill
Contact: Mark Rieger	Project Coordinator: Irene Rademacher
Standard: FCC, IC	Class: N/A

Date of Test: 7/31/2013  
 Test Engineer: Joseph Cadigal  
 Test Location: FT Chamber#4

Channel: 62 - 5310MHz  
 Tx Chain: 4x4 mode  
 Mode: n40  
 Data Rate: MCS0

### 5350 MHz Band Edge Signal Radiated Field Strength

Frequency MHz	Level dB $\mu$ V/m	Pol v/h	FCC 15.209		Detector Pk/QP/Avg	Azimuth degrees	Height meters	Comments
			Limit	Margin				
5350.000	53.3	H	54.0	-0.7	AVG	168	1.0	power setting 13
5353.530	64.5	H	74.0	-9.5	PK	168	1.0	power setting 13
5350.000	53.2	V	54.0	-0.8	AVG	84	1.4	power setting 13
5350.000	58.9	V	74.0	-15.1	PK	84	1.4	power setting 13







# EMC Test Data

Client: Pace Americas	Job Number: J93000
Model: IPW8000 Wireless STB	T-Log Number: T93085
	Project Manager: Susan Hill
Contact: Mark Rieger	Project Coordinator: Irene Rademacher
Standard: FCC, IC	Class: N/A

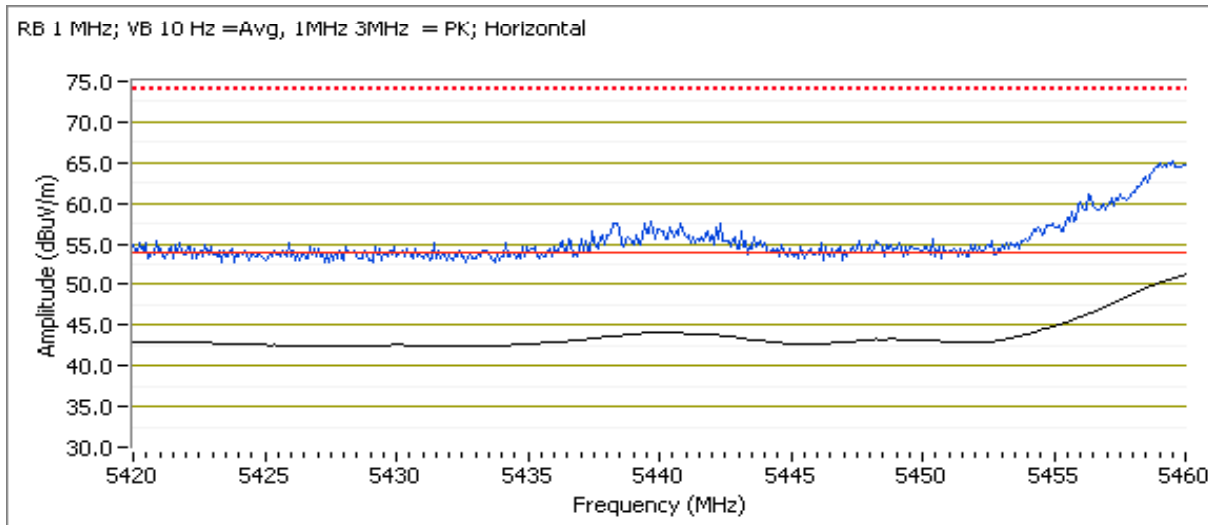
## Run #9: Radiated Bandedge Measurements, 5470-5725MHz

Date of Test: 8/5/2013  
 Test Engineer: Rafael Varelas  
 Test Location: FT Chamber #7

Channel: 102 - 5510MHz  
 Tx Chain: 4x4 mode  
 Mode: n40  
 Data Rate: MCS0

### 5460 MHz Band Edge Signal Radiated Field Strength

Frequency MHz	Level dB $\mu$ V/m	Pol v/h	FCC 15.209		Detector Pk/QP/Avg	Azimuth degrees	Height meters	Comments
			Limit	Margin				
5460.000	51.9	H	54.0	-2.1	AVG	90	1.1	power setting 18
5459.600	62.4	H	74.0	-11.6	PK	90	1.1	power setting 18
5460.000	49.6	V	54.0	-4.4	AVG	92	1.0	power setting 18
5458.400	60.3	V	74.0	-13.7	PK	92	1.0	power setting 18



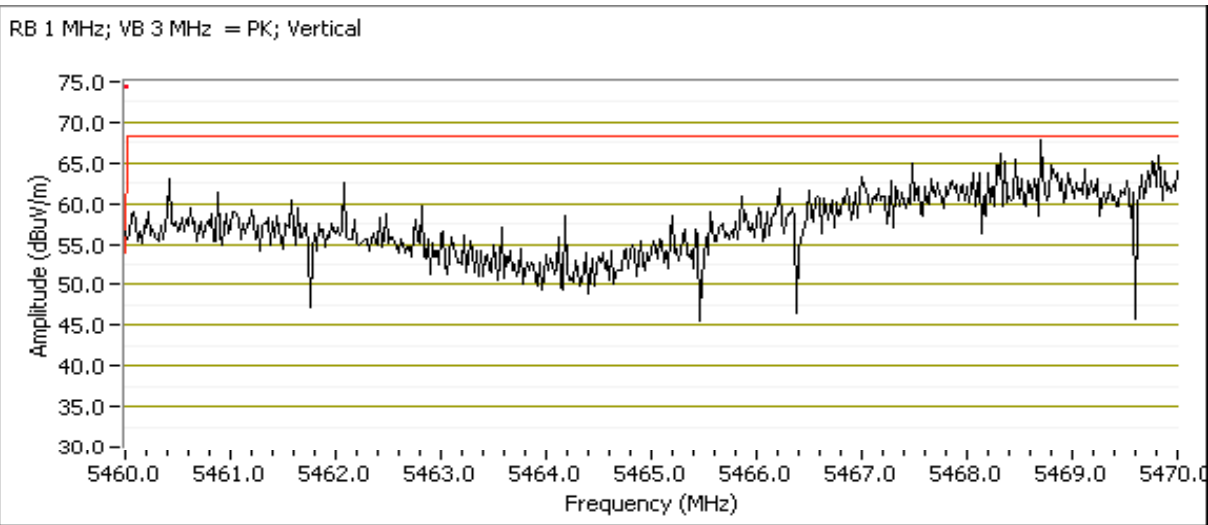


# EMC Test Data

Client: Pace Americas	Job Number: J93000
Model: IPW8000 Wireless STB	T-Log Number: T93085
Contact: Mark Rieger	Project Manager: Susan Hill
Standard: FCC, IC	Project Coordinator: Irene Rademacher
	Class: N/A

## 5470 MHz Band Edge Signal Radiated Field Strength

Frequency	Level	Pol	15.E		Detector	Azimuth	Height	Comments
MHz	dB $\mu$ V/m	v/h	Limit	Margin	Pk/QP/Avg	degrees	meters	
5467.620	67.8	V	68.3	-0.5	PK	92	1.0	power setting 17





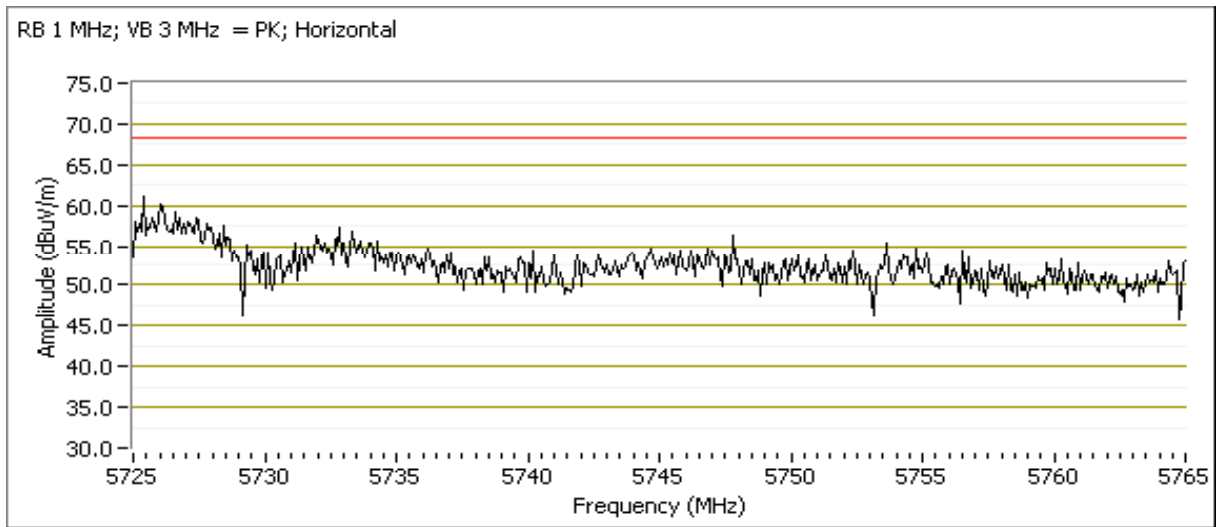
# EMC Test Data

Client: Pace Americas	Job Number: J93000
Model: IPW8000 Wireless STB	T-Log Number: T93085
	Project Manager: Susan Hill
Contact: Mark Rieger	Project Coordinator: Irene Rademacher
Standard: FCC, IC	Class: N/A

Channel: 134 - 5670MHz  
 Tx Chain: 4x4 mode  
 Mode: n40  
 Data Rate: MCS0

### 5725 MHz Band Edge Signal Radiated Field Strength

Frequency	Level	Pol	15.E		Detector	Azimuth	Height	Comments
MHz	dB $\mu$ V/m	v/h	Limit	Margin	Pk/QP/Avg	degrees	meters	
5726.840	61.2	H	68.3	-7.1	PK	137	1.0	POS; RB 1 MHz; VB: 3 MHz
5728.050	56.1	V	68.3	-12.2	PK	50	1.0	POS; RB 1 MHz; VB: 3 MHz





# EMC Test Data

Client:	Pace Americas	Job Number:	J93000
Model:	IPW8000 Wireless STB	T-Log Number:	T93085
		Project Manager:	Susan Hill
Contact:	Mark Rieger	Project Coordinator:	Irene Rademacher
Standard:	FCC, IC	Class:	N/A

## RSS 210 and FCC 15.407 (UNII) Radiated Spurious Emissions

### Test Specific Details

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

Date of Test: 8/6/2013 0:00  
Test Engineer: Rafael Varelas  
Test Location: FT Chamber #4

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

### General Test Configuration

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

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

### Ambient Conditions:

Temperature: 20.8 °C  
Rel. Humidity: 36 %



# EMC Test Data

Client: Pace Americas	Job Number: J93000
Model: IPW8000 Wireless STB	T-Log Number: T93085
	Project Manager: Susan Hill
Contact: Mark Rieger	Project Coordinator: Irene Rademacher
Standard: FCC, IC	Class: N/A

## Summary of Results

Run #	Mode	Channel	Power Setting	Measured Power	Test Performed	Limit	Result / Margin
1	n20 4x4 mode	5150-5250 Low	18		Radiated Emissions, 1 - 40 GHz	FCC 15.209 / 15 E	48.2 dBµV/m @ 5438.1 MHz (-5.8 dB)
	n20 4x4 mode	5150-5250 Center	18		Radiated Emissions, 1 - 40 GHz	FCC 15.209 / 15 E	51.0 dBµV/m @ 5435.9 MHz (-3.0 dB)
	n20 4x4 mode	5150-5250 High	18		Radiated Emissions, 1 - 40 GHz	FCC 15.209 / 15 E	49.6 dBµV/m @ 5004.0 MHz (-4.4 dB)
2	n20 4x4 mode	5250-5350 Low	18		Radiated Emissions, 1 - 40 GHz	FCC 15.209 / 15 E	48.5 dBµV/m @ 5435.3 MHz (-5.5 dB)
	n20 4x4 mode	5250-5350 Center	18		Radiated Emissions, 1 - 40 GHz	FCC 15.209 / 15 E	48.5 dBµV/m @ 4985.8 MHz (-5.5 dB)
	n20 4x4 mode	5250-5350 High	18		Radiated Emissions, 1 - 40 GHz	FCC 15.209 / 15 E	50.2 dBµV/m @ 5435.9 MHz (-3.8 dB)
3	n20 4x4 mode	5470-5725 Low	18		Radiated Emissions, 1 - 40 GHz	FCC 15.209 / 15 E	49.5 dBµV/m @ 5372.8 MHz (-4.5 dB)
	n20 4x4 mode	5470-5725 Center	18		Radiated Emissions, 1 - 40 GHz	FCC 15.209 / 15 E	49.8 dBµV/m @ 7440.0 MHz (-4.2 dB)
	n20 4x4 mode	5470-5725 High	18		Radiated Emissions, 1 - 40 GHz	FCC 15.209 / 15 E	49.3 dBµV/m @ 5376.9 MHz (-4.7 dB)
4	n40 4x4 mode	5150-5250 Low	18		Radiated Emissions, 1 - 40 GHz	FCC 15.209 / 15 E	50.3 dBµV/m @ 5043.1 MHz (-3.7 dB)
	n40 4x4 mode	5150-5250 High	18		Radiated Emissions, 1 - 40 GHz	FCC 15.209 / 15 E	50.7 dBµV/m @ 5050.1 MHz (-3.3 dB)
5	n40 4x4 mode	5250-5350 Low	18		Radiated Emissions, 1 - 40 GHz	FCC 15.209 / 15 E	51.9 dBµV/m @ 5434.4 MHz (-2.1 dB)
	n40 4x4 mode	5250-5350 High	18		Radiated Emissions, 1 - 40 GHz	FCC 15.209 / 15 E	50.4 dBµV/m @ 5436.3 MHz (-3.6 dB)
6	n40 4x4 mode	5470-5725 Low	18		Radiated Emissions, 1 - 40 GHz	FCC 15.209 / 15 E	49.2 dBµV/m @ 5372.7 MHz (-4.8 dB)
	n40 4x4 mode	5470-5725 Center	18		Radiated Emissions, 1 - 40 GHz	FCC 15.209 / 15 E	47.6 dBµV/m @ 5373.2 MHz (-6.4 dB)
	n40 4x4 mode	5470-5725 High	18		Radiated Emissions, 1 - 40 GHz	FCC 15.209 / 15 E	49.0 dBµV/m @ 7560.1 MHz (-5.0 dB)



# EMC Test Data

Client: Pace Americas	Job Number: J93000
Model: IPW8000 Wireless STB	T-Log Number: T93085
	Project Manager: Susan Hill
Contact: Mark Rieger	Project Coordinator: Irene Rademacher
Standard: FCC, IC	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.

## Procedure Comments:

Measurements performed in accordance with FCC KDB 789033 v01r03, dated April 8, 2013

Peak measurements performed with: RBW=1MHz, VBW=3MHz, peak detector, max hold, auto sweep time

Unless otherwise stated/noted, emission has duty cycle  $\geq 98\%$  and was measured using RBW=1MHz, VBW=10Hz, peak detector, linear average mode, auto sweep time, max hold.

Mode	Data Rate	Duty Cycle (x)	Constant DC?	T (ms)	Pwr Cor Factor*	Lin Volt Cor Factor**	Min VBW for FS (Hz)
n20	MCS0	0.99	Yes	4.96	0.04	0.09	201.6
n40	MCS0	0.98	Yes	4.76	0.08	0.16	210.1

## Sample Notes

Module S/N: TDVAAGC325620001

Driver: ??

Antenna: Internal

## Notes

Device operates in 4x4 mode only.

Testing performed at the highest power setting

n20 tested as representative of 11a

No spurious emissions below 1GHz were observed in preliminary testing



## EMC Test Data

Client:	Pace Americas	Job Number:	J93000
Model:	IPW8000 Wireless STB	T-Log Number:	T93085
		Project Manager:	Susan Hill
Contact:	Mark Rieger	Project Coordinator:	Irene Rademacher
Standard:	FCC, IC	Class:	N/A

### Measurement Specific Notes:

Note 1:	For emissions outside of the restricted bands the limit is -27dBm/MHz eirp (68.3dBuV/m). The measurement method required is a peak measurement (RB=1MHz, VB≥3MHz, peak detector). Per KDB 789033 2) c) (i), compliance can be demonstrated by meeting the average and peak limits of 15.209, as an alternative.
Note 2:	Emission has duty cycle ≥ 98%, average measurement performed: RBW=1MHz, VBW=3MHz, RMS, Power averaging, auto sweep, trace average 100 traces
Note 3:	Emission has duty cycle < 98%, but constant, average measurement performed: RBW=1MHz, VBW=10Hz, peak detector, linear averaging, auto sweep, trace average 100 * 1/DC traces, measurement corrected by Linear Voltage correction factor
Note 4:	Emission has duty cycle < 98% and is NOT constant, average measurement performed: RBW=1MHz, VBW> 1/T, peak detector, linear average mode, sweep time auto, max hold. Max hold for 50*(1/DC) traces
Note 5:	Emission has duty cycle < 98%, but constant, average measurement performed: RBW=1MHz, VBW=3MHz, RMS, Power averaging, auto sweep, trace average 100 * 1/DC traces, measurement corrected by Pwr correction factor
Note 6:	Plots of the average and peak bandedge do not account for any duty cycle correction. Refer to the tabular results for final measurements.



# EMC Test Data

Client: Pace Americas	Job Number: J93000
Model: IPW8000 Wireless STB	T-Log Number: T93085
	Project Manager: Susan Hill
Contact: Mark Rieger	Project Coordinator: Irene Rademacher
Standard: FCC, IC	Class: N/A

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

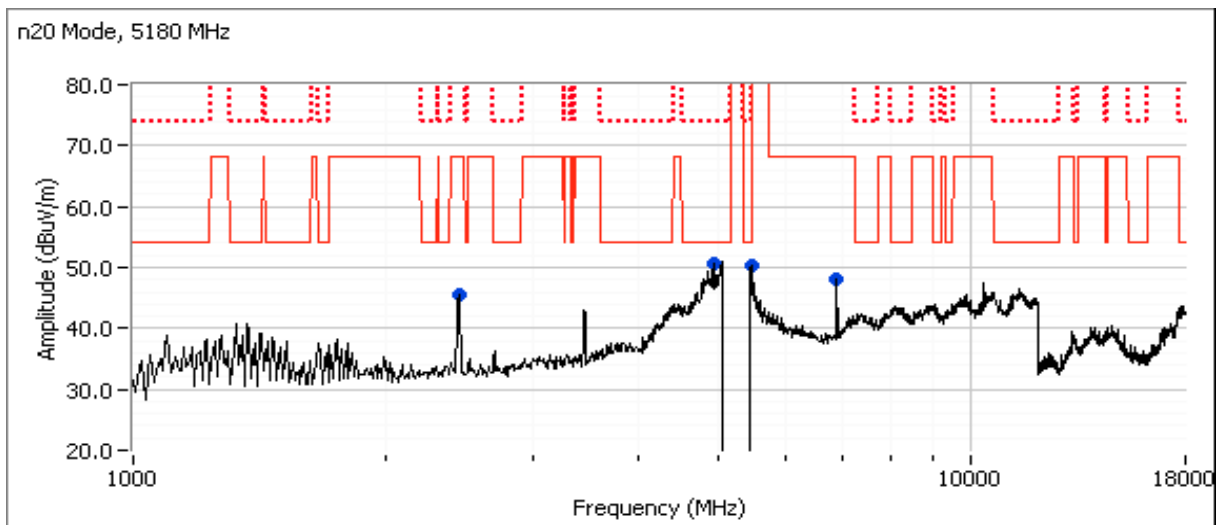
Run #1a: Low Channel

Date of Test: 8/6/2013  
 Test Engineer: Rafael Varelas  
 Test Location: FT Chamber #4

Channel: 36 - 5180 MHz  
 Tx Chain: 4x4 mode  
 Mode: n20  
 Data Rate: MCS0

**Spurious Radiated Emissions:**

Frequency MHz	Level dB $\mu$ V/m	Pol v/h	15.209 / 15.247		Detector Pk/QP/Avg	Azimuth degrees	Height meters	Comments
			Limit	Margin				
5438.100	48.2	H	54.0	-5.8	AVG	161	1.0	RB 1 MHz;VB 10 Hz;Peak
5436.910	59.5	H	74.0	-14.5	PK	161	1.0	RB 1 MHz;VB 3 MHz;Peak
6906.990	52.6	V	68.3	-15.7	PK	80	1.3	RB 1 MHz;VB 3 MHz;Peak
4940.100	46.9	H	54.0	-7.1	AVG	104	1.0	RB 1 MHz;VB 10 Hz;Peak
4940.330	57.3	H	74.0	-16.7	PK	104	1.0	RB 1 MHz;VB 3 MHz;Peak
2450.180	51.9	V	68.3	-16.4	PK	161	1.0	RB 1 MHz;VB 3 MHz;Peak







# EMC Test Data

Client: Pace Americas	Job Number: J93000
Model: IPW8000 Wireless STB	T-Log Number: T93085
	Project Manager: Susan Hill
Contact: Mark Rieger	Project Coordinator: Irene Rademacher
Standard: FCC, IC	Class: N/A

## Run #1b: Center Channel

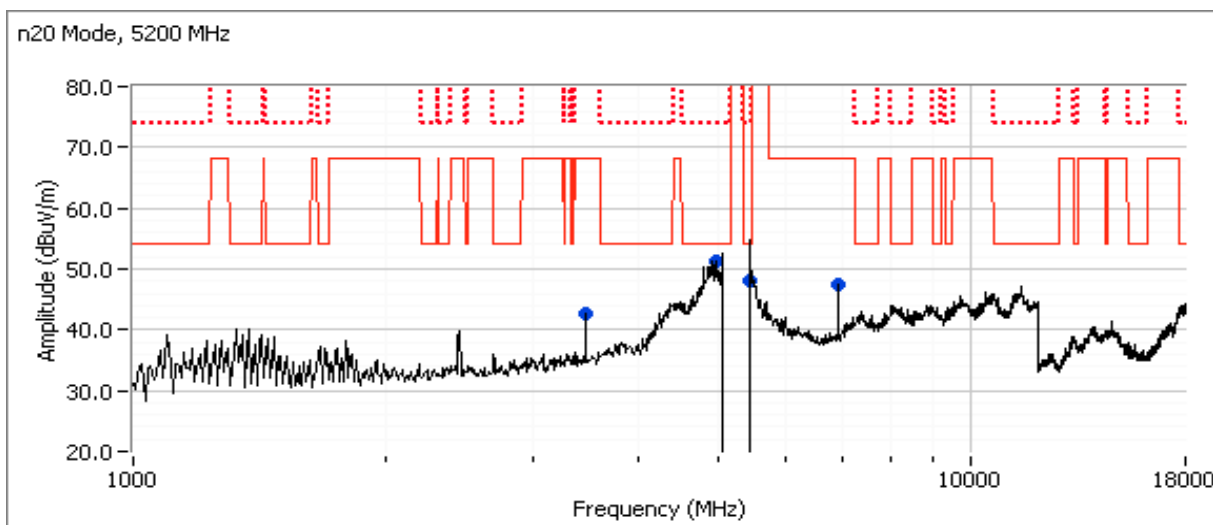
Date of Test: 8/6/2013  
 Test Engineer: Rafael Varelas  
 Test Location: FT Chamber #4

Channel: 40 - 5200 MHz  
 Tx Chain: 4x4 mode  
 Mode: n20  
 Data Rate: MCS0

### Spurious Radiated Emissions:

Frequency MHz	Level dB $\mu$ V/m	Pol v/h	15.209 / 15E		Detector Pk/QP/Avg	Azimuth degrees	Height meters	Comments
			Limit	Margin				
5435.940	51.0	H	54.0	-3.0	AVG	135	1.0	RB 1 MHz;VB 10 Hz;Peak
5435.550	62.4	H	74.0	-11.6	PK	135	1.0	RB 1 MHz;VB 3 MHz;Peak
6933.510	52.4	V	68.3	-15.9	PK	100	1.1	RB 1 MHz;VB 3 MHz;Peak
3466.850	48.6	H	68.3	-19.7	PK	157	1.1	RB 1 MHz;VB 3 MHz;Peak
4968.000	49.2	H	54.0	-4.8	AVG	175	1.1	RB 1 MHz;VB 10 Hz;Peak
4968.300	60.8	H	74.0	-13.2	PK	175	1.1	RB 1 MHz;VB 3 MHz;Peak

Note: Scans made between 18 - 40 GHz with the measurement antenna moved around the EUT and its antennas 20-50cm from the device indicated there were no significant emissions in this frequency range





# EMC Test Data

Client: Pace Americas	Job Number: J93000
Model: IPW8000 Wireless STB	T-Log Number: T93085
	Project Manager: Susan Hill
Contact: Mark Rieger	Project Coordinator: Irene Rademacher
Standard: FCC, IC	Class: N/A

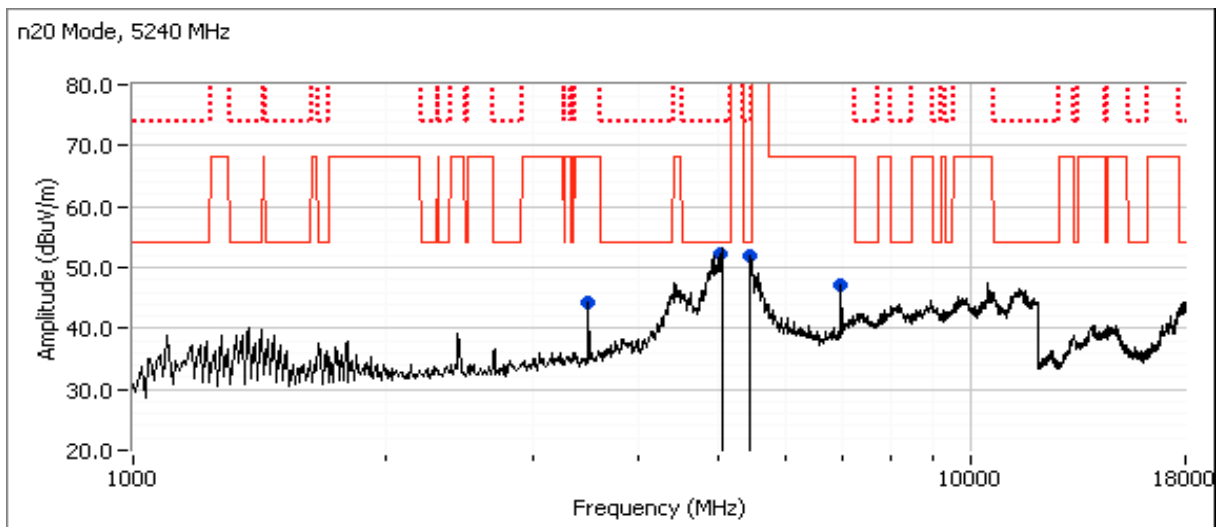
## Run #1c: High Channel

Date of Test: 8/6/2013  
 Test Engineer: Rafael Varelas  
 Test Location: FT Chamber #4

Channel: 48 - 5240 MHz  
 Tx Chain: 4x4 mode  
 Mode: n20  
 Data Rate: MCS0

### Spurious Radiated Emissions:

Frequency MHz	Level dB $\mu$ V/m	Pol v/h	15.209 / 15E		Detector Pk/QP/Avg	Azimuth degrees	Height meters	Comments
			Limit	Margin				
5004.030	49.6	H	54.0	-4.4	AVG	176	1.1	RB 1 MHz;VB 10 Hz;Peak
5005.860	60.3	H	74.0	-13.7	PK	176	1.1	RB 1 MHz;VB 3 MHz;Peak
6988.330	47.9	V	68.3	-20.4	PK	187	1.0	RB 1 MHz;VB 3 MHz;Peak
3493.320	48.9	H	68.3	-19.4	PK	161	1.0	RB 1 MHz;VB 3 MHz;Peak
5436.060	47.7	H	54.0	-6.3	AVG	134	1.0	RB 1 MHz;VB 10 Hz;Peak
5435.750	59.0	H	74.0	-15.0	PK	134	1.0	RB 1 MHz;VB 3 MHz;Peak





# EMC Test Data

Client: Pace Americas	Job Number: J93000
Model: IPW8000 Wireless STB	T-Log Number: T93085
	Project Manager: Susan Hill
Contact: Mark Rieger	Project Coordinator: Irene Rademacher
Standard: FCC, IC	Class: N/A

Run #2, Radiated Spurious Emissions, 30 - 40,000 MHz. Operation in the 5250-5350 MHz Band

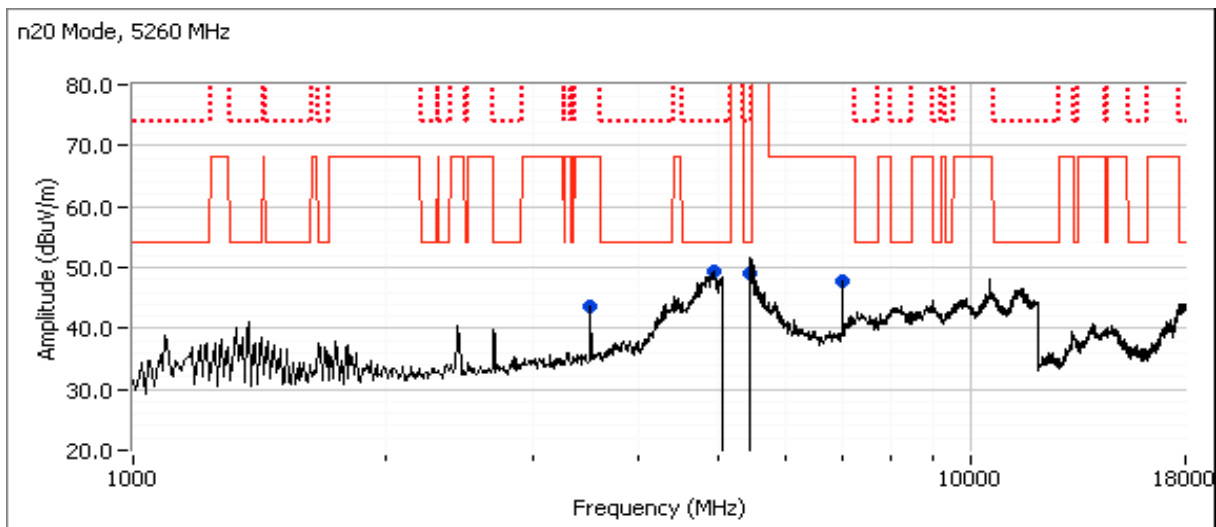
Run #2a: Low Channel

Date of Test: 8/6/2013  
 Test Engineer: Rafael Varelas  
 Test Location: FT Chamber #4

Channel: 52 - 5260 MHz  
 Tx Chain: 4x4 mode  
 Mode: n20  
 Data Rate: MCS0

**Spurious Radiated Emissions:**

Frequency MHz	Level dB $\mu$ V/m	Pol v/h	15.209 / 15E		Detector Pk/QP/Avg	Azimuth degrees	Height meters	Comments
			Limit	Margin				
5435.280	48.5	H	54.0	-5.5	AVG	132	1.0	RB 1 MHz;VB 10 Hz;Peak
5435.150	59.8	H	74.0	-14.2	PK	132	1.0	RB 1 MHz;VB 3 MHz;Peak
7013.370	51.1	V	68.3	-17.2	PK	110	1.0	RB 1 MHz;VB 3 MHz;Peak
3506.580	47.4	V	68.3	-20.9	PK	106	1.2	RB 1 MHz;VB 3 MHz;Peak
4933.630	48.3	H	54.0	-5.7	AVG	175	1.0	RB 1 MHz;VB 10 Hz;Peak
4935.100	59.0	H	74.0	-15.0	PK	175	1.0	RB 1 MHz;VB 3 MHz;Peak





# EMC Test Data

Client: Pace Americas	Job Number: J93000
Model: IPW8000 Wireless STB	T-Log Number: T93085
	Project Manager: Susan Hill
Contact: Mark Rieger	Project Coordinator: Irene Rademacher
Standard: FCC, IC	Class: N/A

## Run #2b: Center Channel

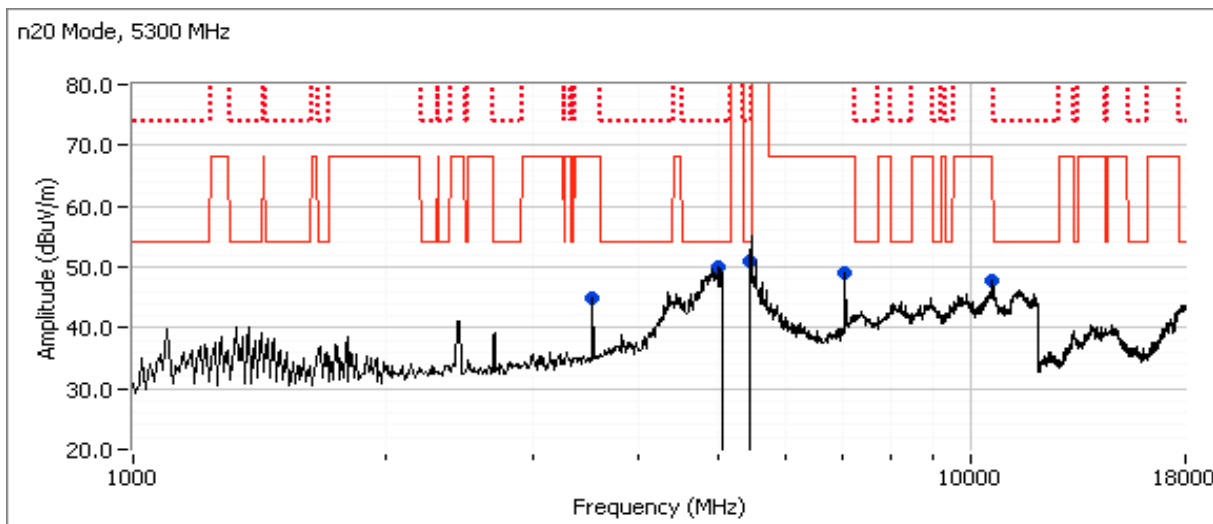
Date of Test: 8/6/2013  
 Test Engineer: Rafael Varelas  
 Test Location: FT Chamber #4

Channel: 60 - 5300 MHz  
 Tx Chain: 4x4 mode  
 Mode: n20  
 Data Rate: MCS0

### Spurious Radiated Emissions:

Frequency MHz	Level dB $\mu$ V/m	Pol v/h	15.209 / 15E		Detector Pk/QP/Avg	Azimuth degrees	Height meters	Comments
			Limit	Margin				
4985.810	48.5	H	54.0	-5.5	AVG	168	1.2	RB 1 MHz;VB 10 Hz;Peak
4986.050	60.0	H	74.0	-14.0	PK	168	1.2	RB 1 MHz;VB 3 MHz;Peak
10600.080	47.8	V	54.0	-6.2	AVG	42	1.0	RB 1 MHz;VB 10 Hz;Peak
10600.020	55.4	V	74.0	-18.6	PK	42	1.0	RB 1 MHz;VB 3 MHz;Peak
7066.720	51.6	V	68.3	-16.7	PK	114	1.4	RB 1 MHz;VB 3 MHz;Peak
5435.350	48.4	H	54.0	-5.6	AVG	121	1.0	RB 1 MHz;VB 10 Hz;Peak
5434.770	59.3	H	74.0	-14.7	PK	121	1.0	RB 1 MHz;VB 3 MHz;Peak
3533.320	48.0	V	68.3	-20.3	PK	179	1.0	RB 1 MHz;VB 3 MHz;Peak

Note: Scans made between 18 - 40 GHz with the measurement antenna moved around the EUT and its antennas 20-50cm from the device indicated there were no significant emissions in this frequency range





# EMC Test Data

Client: Pace Americas	Job Number: J93000
Model: IPW8000 Wireless STB	T-Log Number: T93085
	Project Manager: Susan Hill
Contact: Mark Rieger	Project Coordinator: Irene Rademacher
Standard: FCC, IC	Class: N/A

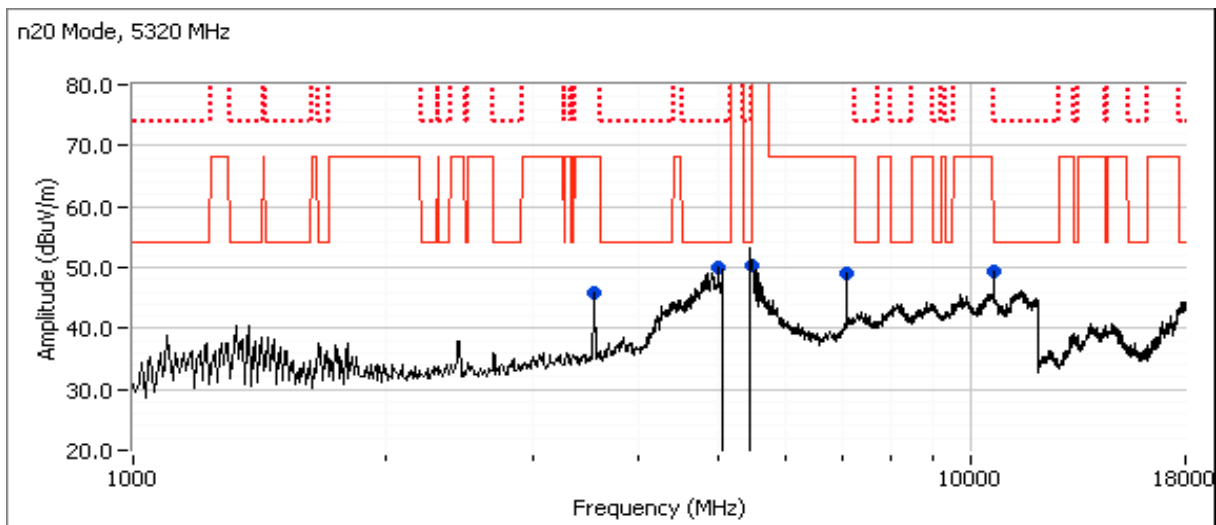
## Run #2c: High Channel

Date of Test: 8/6/2013  
 Test Engineer: Rafael Varelas  
 Test Location: FT Chamber #4

Channel: 64 - 5320 MHz  
 Tx Chain: 4x4 mode  
 Mode: n20  
 Data Rate: MCS0

### Spurious Radiated Emissions:

Frequency MHz	Level dB $\mu$ V/m	Pol v/h	15.209 / 15E		Detector Pk/QP/Avg	Azimuth degrees	Height meters	Comments
			Limit	Margin				
5435.860	50.2	H	54.0	-3.8	AVG	166	1.0	RB 1 MHz;VB 10 Hz;Peak
5434.760	61.5	H	74.0	-12.5	PK	166	1.0	RB 1 MHz;VB 3 MHz;Peak
10640.090	47.9	V	54.0	-6.1	AVG	43	1.0	RB 1 MHz;VB 10 Hz;Peak
10639.930	55.6	V	74.0	-18.4	PK	43	1.0	RB 1 MHz;VB 3 MHz;Peak
4994.020	47.1	H	54.0	-6.9	AVG	102	1.0	RB 1 MHz;VB 10 Hz;Peak
4995.230	58.7	H	74.0	-15.3	PK	102	1.0	RB 1 MHz;VB 3 MHz;Peak
7093.540	52.9	V	68.3	-15.4	PK	88	1.3	RB 1 MHz;VB 3 MHz;Peak
3546.720	49.0	H	68.3	-19.3	PK	159	1.0	RB 1 MHz;VB 3 MHz;Peak





# EMC Test Data

Client: Pace Americas	Job Number: J93000
Model: IPW8000 Wireless STB	T-Log Number: T93085
	Project Manager: Susan Hill
Contact: Mark Rieger	Project Coordinator: Irene Rademacher
Standard: FCC, IC	Class: N/A

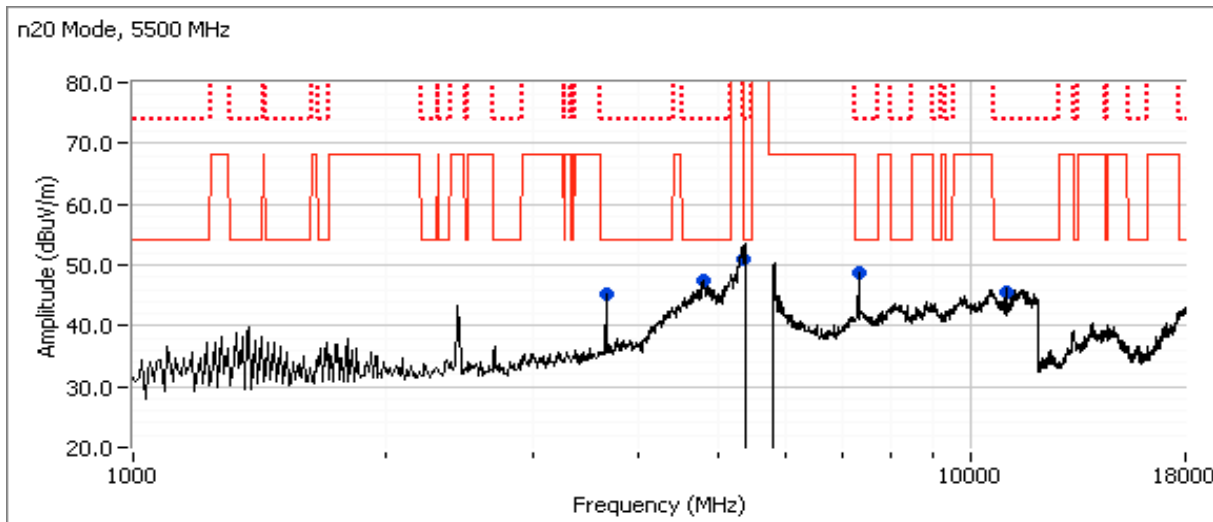
Run #3, Radiated Spurious Emissions, 30 - 40,000 MHz. Operation in the 5470-5725 MHz Band  
 Run #3a: Low Channel

Date of Test: 8/6/2013  
 Test Engineer: Rafael Varelas  
 Test Location: FT Chamber #4

Channel: 100 - 5500 MHz  
 Tx Chain: 4x4 mode  
 Mode: n20  
 Data Rate: MCS0

**Spurious Radiated Emissions:**

Frequency MHz	Level dB $\mu$ V/m	Pol v/h	15.209 / 15E		Detector PK/QP/Avg	Azimuth degrees	Height meters	Comments
			Limit	Margin				
5372.830	49.5	H	54.0	-4.5	AVG	175	1.0	RB 1 MHz;VB 10 Hz;Peak
5373.040	61.0	H	74.0	-13.0	PK	175	1.0	RB 1 MHz;VB 3 MHz;Peak
11000.090	44.4	V	54.0	-9.6	AVG	62	1.0	RB 1 MHz;VB 10 Hz;Peak
11000.180	54.6	V	74.0	-19.4	PK	62	1.0	RB 1 MHz;VB 3 MHz;Peak
7333.450	46.6	V	54.0	-7.4	AVG	51	1.9	RB 1 MHz;VB 10 Hz;Peak
7334.000	53.7	V	74.0	-20.3	PK	51	1.9	RB 1 MHz;VB 3 MHz;Peak
3666.740	44.5	H	54.0	-9.5	AVG	95	1.0	RB 1 MHz;VB 10 Hz;Peak
3666.550	49.7	H	74.0	-24.3	PK	95	1.0	RB 1 MHz;VB 3 MHz;Peak
4800.060	44.3	H	54.0	-9.7	AVG	175	1.0	RB 1 MHz;VB 10 Hz;Peak
4799.660	55.8	H	74.0	-18.2	PK	175	1.0	RB 1 MHz;VB 3 MHz;Peak





# EMC Test Data

Client: Pace Americas	Job Number: J93000
Model: IPW8000 Wireless STB	T-Log Number: T93085
	Project Manager: Susan Hill
Contact: Mark Rieger	Project Coordinator: Irene Rademacher
Standard: FCC, IC	Class: N/A

**Run #3b: Center Channel**

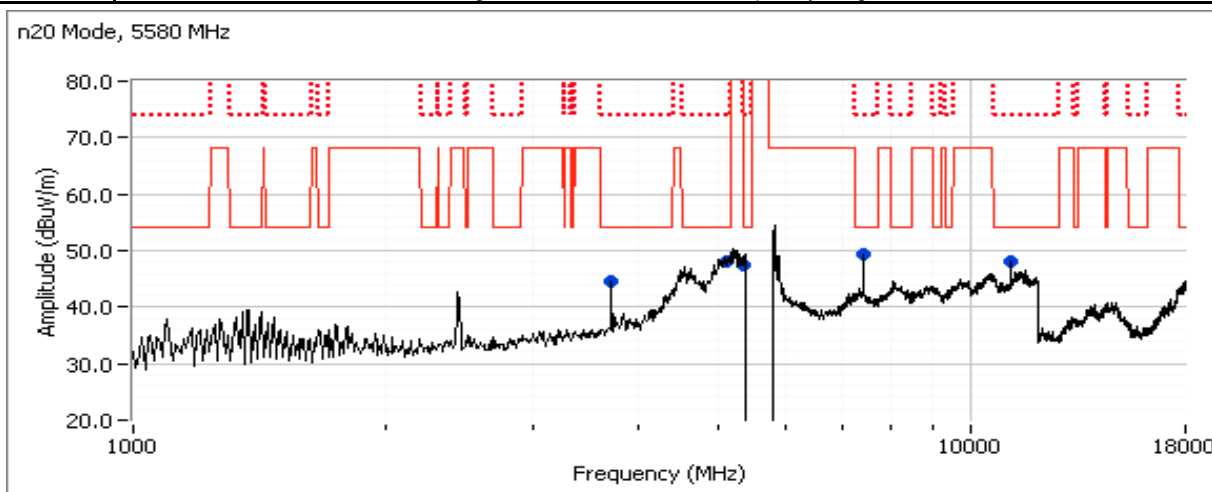
Date of Test: 8/7/2013  
 Test Engineer: Rafael Varelas  
 Test Location: FT Chamber #4

Channel: 116 - 5580 MHz  
 Tx Chain: 4x4 mode  
 Mode: n20  
 Data Rate: MCS0

**Spurious Radiated Emissions:**

Frequency MHz	Level dB $\mu$ V/m	Pol v/h	15.209 / 15E		Detector Pk/QP/Avg	Azimuth degrees	Height meters	Comments
			Limit	Margin				
7440.030	49.8	V	54.0	-4.2	AVG	123	1.0	RB 1 MHz;VB 10 Hz;Peak
7440.250	55.3	V	74.0	-18.7	PK	123	1.0	RB 1 MHz;VB 3 MHz;Peak
11160.220	44.9	V	54.0	-9.1	AVG	316	1.8	RB 1 MHz;VB 10 Hz;Peak
11159.200	57.1	V	74.0	-16.9	PK	316	1.8	RB 1 MHz;VB 3 MHz;Peak
5375.140	48.7	H	54.0	-5.3	AVG	148	0.9	RB 1 MHz;VB 10 Hz;Peak
5373.150	60.2	H	74.0	-13.8	PK	148	0.9	RB 1 MHz;VB 3 MHz;Peak
5107.070	45.2	H	54.0	-8.8	AVG	167	1.0	RB 1 MHz;VB 10 Hz;Peak
5106.210	57.1	H	74.0	-16.9	PK	167	1.0	RB 1 MHz;VB 3 MHz;Peak
3720.140	43.3	V	54.0	-10.7	AVG	86	1.0	RB 1 MHz;VB 10 Hz;Peak
3720.300	49.1	V	74.0	-24.9	PK	86	1.0	RB 1 MHz;VB 3 MHz;Peak

Note: Scans made between 18 - 40 GHz with the measurement antenna moved around the EUT and its antennas 20-50cm from the device indicated there were no significant emissions in this frequency range





# EMC Test Data

Client: Pace Americas	Job Number: J93000
Model: IPW8000 Wireless STB	T-Log Number: T93085
	Project Manager: Susan Hill
Contact: Mark Rieger	Project Coordinator: Irene Rademacher
Standard: FCC, IC	Class: N/A

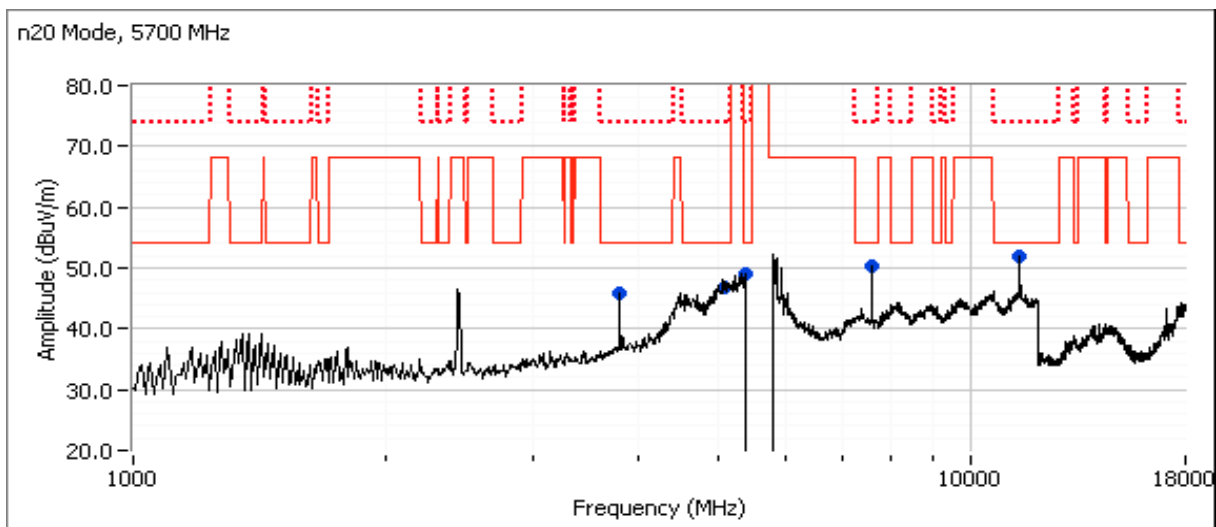
## Run #3c: High Channel

Date of Test: 8/7/2013  
 Test Engineer: Rafael Varelas  
 Test Location: FT Chamber #4

Channel: 140 - 5700 MHz  
 Tx Chain: 4x4 mode  
 Mode: n20  
 Data Rate: MCS0

### Spurious Radiated Emissions:

Frequency MHz	Level dB $\mu$ V/m	Pol v/h	15.209 / 15E		Detector PK/QP/Avg	Azimuth degrees	Height meters	Comments
			Limit	Margin				
5376.870	49.3	H	54.0	-4.7	AVG	152	1.1	RB 1 MHz;VB 10 Hz;Peak
5377.020	60.7	H	74.0	-13.3	PK	152	1.1	RB 1 MHz;VB 3 MHz;Peak
11400.310	47.1	V	54.0	-6.9	AVG	25	1.1	RB 1 MHz;VB 10 Hz;Peak
11399.940	57.9	V	74.0	-16.1	PK	25	1.1	RB 1 MHz;VB 3 MHz;Peak
7600.130	48.8	V	54.0	-5.2	AVG	59	1.1	RB 1 MHz;VB 10 Hz;Peak
7600.050	54.5	V	74.0	-19.5	PK	59	1.1	RB 1 MHz;VB 3 MHz;Peak
3800.110	46.3	V	54.0	-7.7	AVG	92	1.0	RB 1 MHz;VB 10 Hz;Peak
3800.010	51.0	V	74.0	-23.0	PK	92	1.0	RB 1 MHz;VB 3 MHz;Peak
5075.010	43.5	H	54.0	-10.5	AVG	112	1.0	RB 1 MHz;VB 10 Hz;Peak
5076.150	55.0	H	74.0	-19.0	PK	112	1.0	RB 1 MHz;VB 3 MHz;Peak







# EMC Test Data

Client: Pace Americas	Job Number: J93000
Model: IPW8000 Wireless STB	T-Log Number: T93085
	Project Manager: Susan Hill
Contact: Mark Rieger	Project Coordinator: Irene Rademacher
Standard: FCC, IC	Class: N/A

Run #4, Radiated Spurious Emissions, 30 - 40,000 MHz. Operation in the 5150-5250 MHz Band

Run #4a: Low Channel

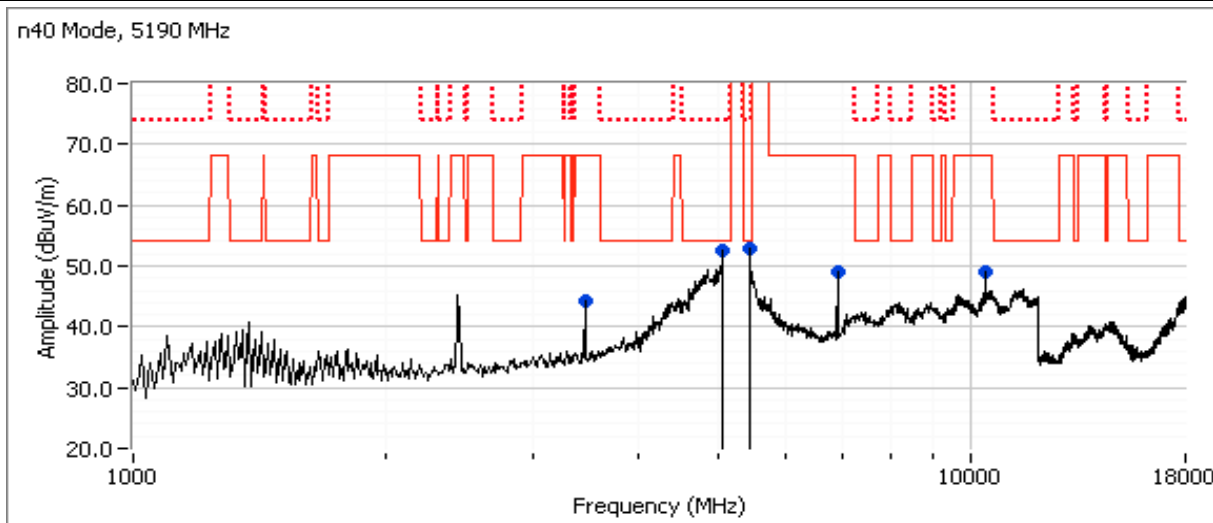
Date of Test: 8/7/2013  
 Test Engineer: Rafael Varelas  
 Test Location: FT Chamber #4

Channel: 38 - 5190 MHz  
 Tx Chain: 4x4 mode  
 Mode: n40  
 Data Rate: MCS0

### Fundamental Signal Field Strength

Frequency MHz	Level dB $\mu$ V/m	Pol v/h	15.209 / 15.247		Detector PK/QP/Avg	Azimuth degrees	Height meters	Comments
			Limit	Margin				
5043.110	50.3	H	54.0	-3.7	AVG	79	1.0	RB 1 MHz;VB 10 Hz;Peak
5043.750	60.8	H	74.0	-13.2	PK	79	1.0	RB 1 MHz;VB 3 MHz;Peak
10380.230	53.6	V	68.3	-14.7	PK	46	1.2	RB 1 MHz;VB 3 MHz;Peak
6920.030	51.8	V	68.3	-16.5	PK	97	1.1	RB 1 MHz;VB 3 MHz;Peak
3460.080	48.7	H	68.3	-19.6	PK	153	1.0	RB 1 MHz;VB 3 MHz;Peak
5436.790	48.3	H	54.0	-5.7	AVG	173	1.1	RB 1 MHz;VB 10 Hz;Peak
5438.330	59.5	H	74.0	-14.5	PK	173	1.1	RB 1 MHz;VB 3 MHz;Peak

Note: Scans made between 18 - 40 GHz with the measurement antenna moved around the EUT and its antennas 20-50cm from the device indicated there were no significant emissions in this frequency range





# EMC Test Data

Client: Pace Americas	Job Number: J93000
Model: IPW8000 Wireless STB	T-Log Number: T93085
	Project Manager: Susan Hill
Contact: Mark Rieger	Project Coordinator: Irene Rademacher
Standard: FCC, IC	Class: N/A

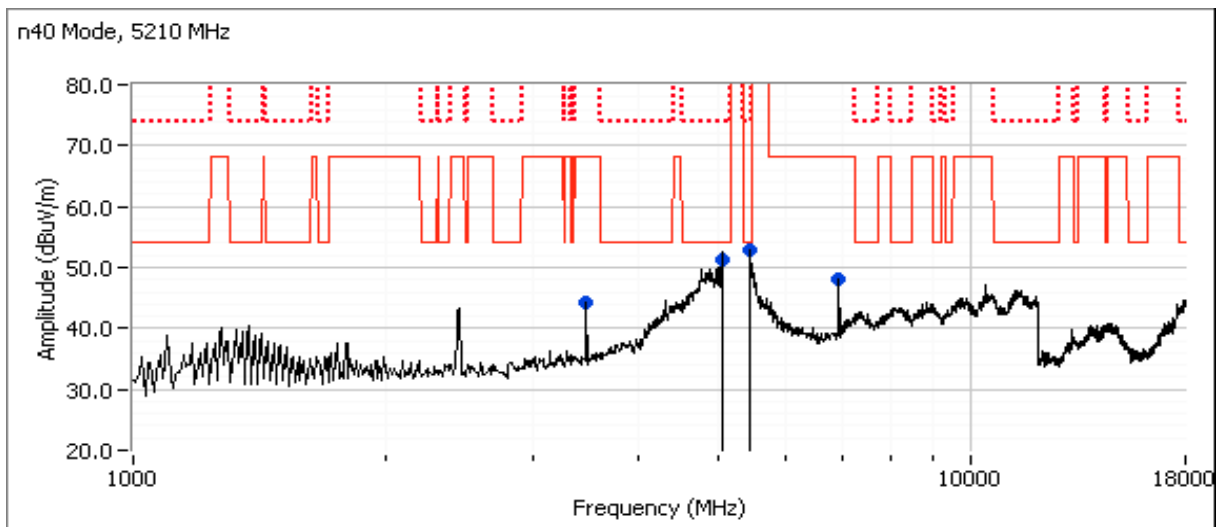
## Run #4c: High Channel

Date of Test: 8/7/2013  
 Test Engineer: Rafael Varelas  
 Test Location: FT Chamber #4

Channel: 42 - 5210 MHz  
 Tx Chain: 4x4 mode  
 Mode: n40  
 Data Rate: MCS0

### Spurious Radiated Emissions:

Frequency MHz	Level dB $\mu$ V/m	Pol v/h	15.209 / 15E		Detector Pk/QP/Avg	Azimuth degrees	Height meters	Comments
			Limit	Margin				
5050.090	50.7	V	54.0	-3.3	AVG	160	0.9	RB 1 MHz;VB 10 Hz;Peak
5050.310	61.1	V	74.0	-12.9	PK	160	0.9	RB 1 MHz;VB 3 MHz;Peak
5436.000	49.4	H	54.0	-4.6	AVG	171	1.2	RB 1 MHz;VB 10 Hz;Peak
5436.270	60.1	H	74.0	-13.9	PK	171	1.2	RB 1 MHz;VB 3 MHz;Peak
3473.250	47.0	H	68.3	-21.3	PK	156	1.3	RB 1 MHz;VB 3 MHz;Peak
6946.810	54.0	V	68.3	-14.3	PK	71	1.3	RB 1 MHz;VB 3 MHz;Peak





# EMC Test Data

Client: Pace Americas	Job Number: J93000
Model: IPW8000 Wireless STB	T-Log Number: T93085
	Project Manager: Susan Hill
Contact: Mark Rieger	Project Coordinator: Irene Rademacher
Standard: FCC, IC	Class: N/A

Run #5, Radiated Spurious Emissions, 30 - 40,000 MHz. Operation in the 5250-5350 MHz Band

Run #5a: Low Channel

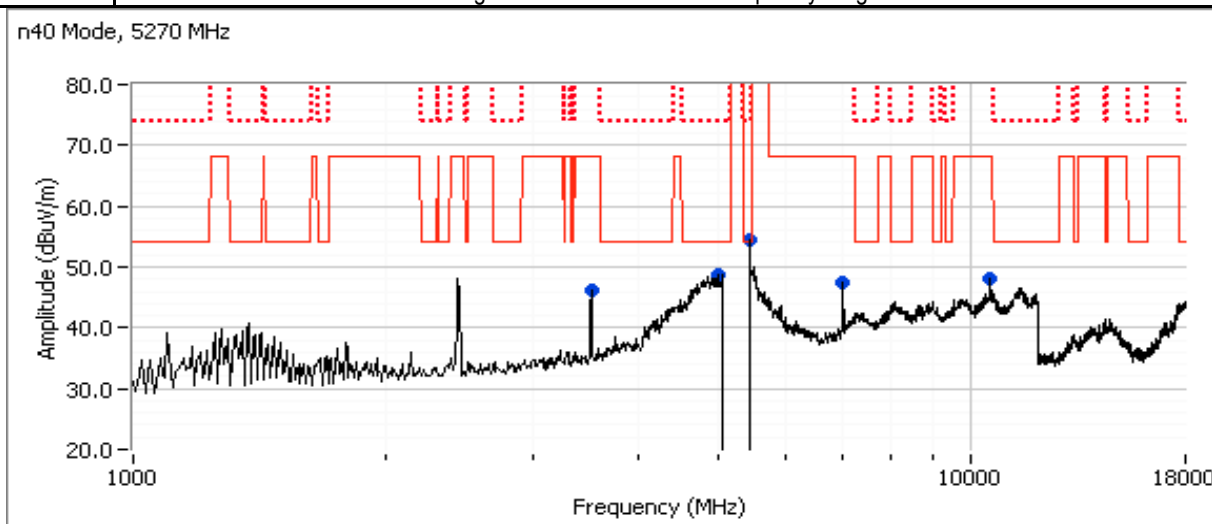
Date of Test: 8/7/2013  
 Test Engineer: Rafael Varelas  
 Test Location: FT Chamber #4

Channel: 54 - 5270 MHz  
 Tx Chain: 4x4 mode  
 Mode: n40  
 Data Rate: MCS0

**Spurious Radiated Emissions:**

Frequency MHz	Level dB $\mu$ V/m	Pol v/h	15.209 / 15E		Detector Pk/QP/Avg	Azimuth degrees	Height meters	Comments
			Limit	Margin				
5434.350	51.9	H	54.0	-2.1	AVG	157	0.9	RB 1 MHz;VB 10 Hz;Peak
5433.010	62.7	H	74.0	-11.3	PK	157	0.9	RB 1 MHz;VB 3 MHz;Peak
7026.800	52.5	V	68.3	-15.8	PK	198	1.0	RB 1 MHz;VB 3 MHz;Peak
4992.040	44.8	V	54.0	-9.2	AVG	152	0.9	RB 1 MHz;VB 10 Hz;Peak
4994.190	56.3	V	74.0	-17.7	PK	152	0.9	RB 1 MHz;VB 3 MHz;Peak
3513.490	48.9	H	68.3	-19.4	PK	152	1.2	RB 1 MHz;VB 3 MHz;Peak
10540.990	52.4	V	68.3	-15.9	PK	43	1.0	RB 1 MHz;VB 3 MHz;Peak

Note: Scans made between 18 - 40 GHz with the measurement antenna moved around the EUT and its antennas 20-50cm from the device indicated there were no significant emissions in this frequency range





# EMC Test Data

Client: Pace Americas	Job Number: J93000
Model: IPW8000 Wireless STB	T-Log Number: T93085
	Project Manager: Susan Hill
Contact: Mark Rieger	Project Coordinator: Irene Rademacher
Standard: FCC, IC	Class: N/A

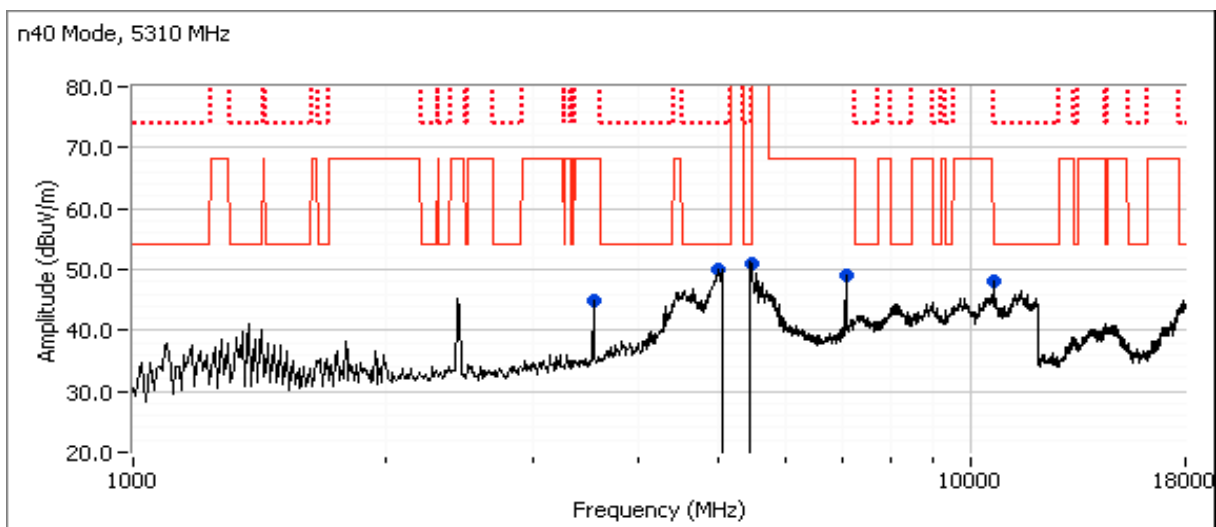
## Run #5c: High Channel

Date of Test: 8/7/2013  
 Test Engineer: Rafael Varelas  
 Test Location: FT Chamber #4

Channel: 62 - 5310 MHz  
 Tx Chain: 4x4 mode  
 Mode: n40  
 Data Rate: MCS0

### Spurious Radiated Emissions:

Frequency MHz	Level dB $\mu$ V/m	Pol v/h	15.209 / 15E		Detector Pk/QP/Avg	Azimuth degrees	Height meters	Comments
			Limit	Margin				
5436.340	50.4	H	54.0	-3.6	AVG	156	1.0	RB 1 MHz;VB 10 Hz;Peak
5434.510	61.3	H	74.0	-12.7	PK	156	1.0	RB 1 MHz;VB 3 MHz;Peak
10620.110	48.7	V	54.0	-5.3	AVG	28	1.0	RB 1 MHz;VB 10 Hz;Peak
10619.900	56.0	V	74.0	-18.0	PK	28	1.0	RB 1 MHz;VB 3 MHz;Peak
7080.170	54.3	V	68.3	-14.0	PK	80	1.3	RB 1 MHz;VB 3 MHz;Peak
3539.890	48.9	H	68.3	-19.4	PK	148	1.1	RB 1 MHz;VB 3 MHz;Peak
4971.540	47.6	H	54.0	-6.4	AVG	163	1.2	RB 1 MHz;VB 10 Hz;Peak
4970.870	59.6	H	74.0	-14.4	PK	163	1.2	RB 1 MHz;VB 3 MHz;Peak





# EMC Test Data

Client: Pace Americas	Job Number: J93000
Model: IPW8000 Wireless STB	T-Log Number: T93085
	Project Manager: Susan Hill
Contact: Mark Rieger	Project Coordinator: Irene Rademacher
Standard: FCC, IC	Class: N/A

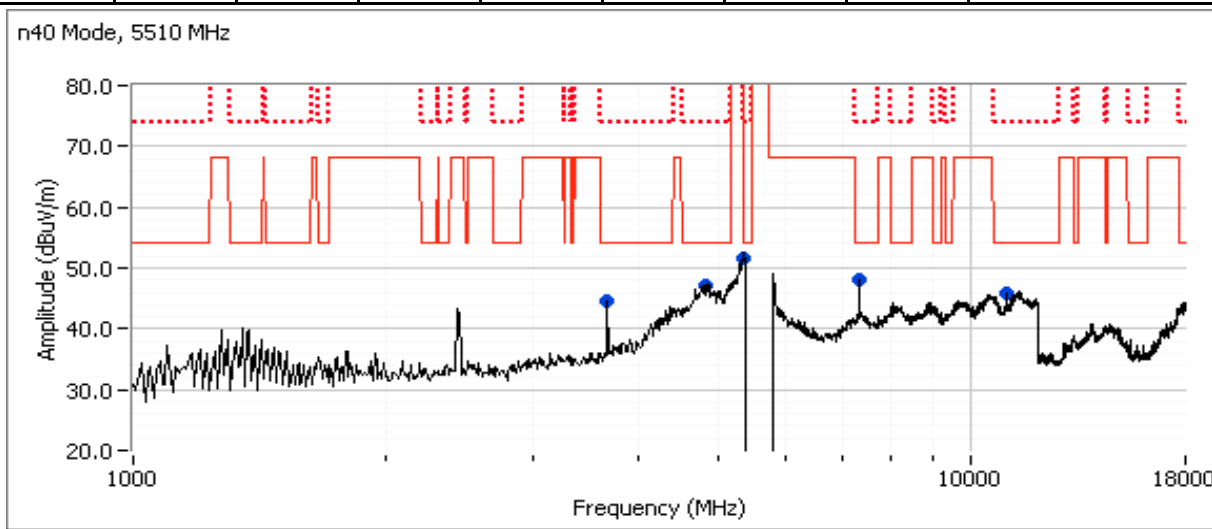
Run #6, Radiated Spurious Emissions, 30 - 40,000 MHz. Operation in the 5470-5725 MHz Band  
 Run #6a: Low Channel

Date of Test: 8/7/2013  
 Test Engineer: Rafael Varelas  
 Test Location: FT Chamber #4

Channel: 102 - 5510 MHz  
 Tx Chain: 4x4 mode  
 Mode: n40  
 Data Rate: MCS0

**Spurious Radiated Emissions:**

Frequency MHz	Level dB $\mu$ V/m	Pol v/h	15.209 / 15E		Detector Pk/QP/Avg	Azimuth degrees	Height meters	Comments
			Limit	Margin				
5372.650	49.2	H	54.0	-4.8	AVG	164	0.9	RB 1 MHz;VB 10 Hz;Peak
5374.960	60.5	H	74.0	-13.5	PK	164	0.9	RB 1 MHz;VB 3 MHz;Peak
7346.700	41.3	V	54.0	-12.7	AVG	220	1.2	RB 1 MHz;VB 10 Hz;Peak
7346.610	53.4	V	74.0	-20.6	PK	220	1.2	RB 1 MHz;VB 3 MHz;Peak
4824.610	43.2	H	54.0	-10.8	AVG	168	1.2	RB 1 MHz;VB 10 Hz;Peak
4823.040	54.2	H	74.0	-19.8	PK	168	1.2	RB 1 MHz;VB 3 MHz;Peak
11020.170	44.5	V	54.0	-9.5	AVG	69	1.1	RB 1 MHz;VB 10 Hz;Peak
11020.010	52.9	V	74.0	-21.1	PK	69	1.1	RB 1 MHz;VB 3 MHz;Peak
3673.340	44.4	H	54.0	-9.6	AVG	79	1.1	RB 1 MHz;VB 10 Hz;Peak
3673.540	49.1	H	74.0	-24.9	PK	79	1.1	RB 1 MHz;VB 3 MHz;Peak





# EMC Test Data

Client: Pace Americas	Job Number: J93000
Model: IPW8000 Wireless STB	T-Log Number: T93085
	Project Manager: Susan Hill
Contact: Mark Rieger	Project Coordinator: Irene Rademacher
Standard: FCC, IC	Class: N/A

## Run #6b: Center Channel

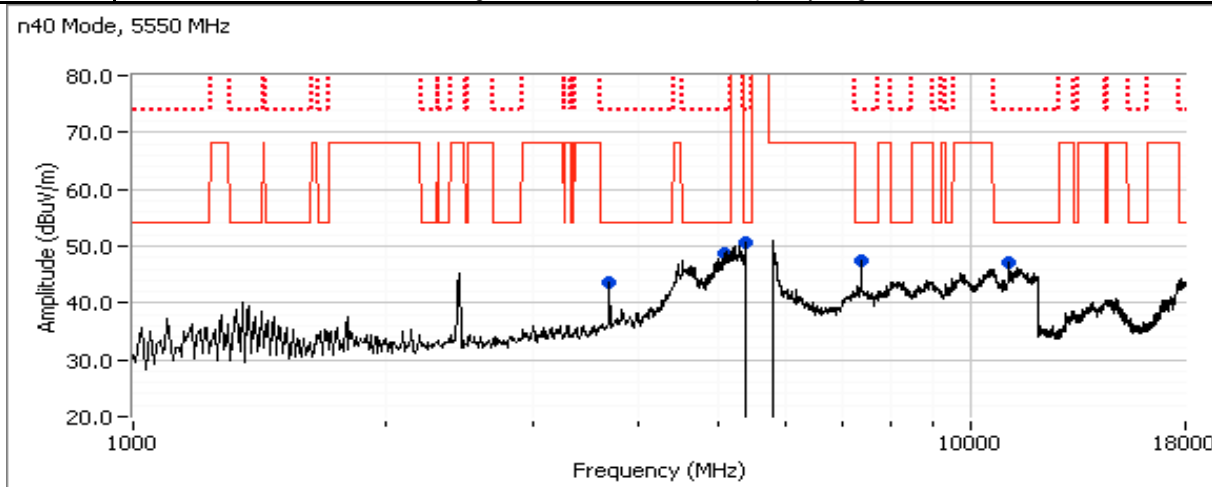
Date of Test: 8/7/2013  
 Test Engineer: Rafael Varelas  
 Test Location: FT Chamber #4

Channel: 110 - 5550 MHz  
 Tx Chain: 4x4 mode  
 Mode: n40  
 Data Rate: MCS0

### Spurious Radiated Emissions:

Frequency MHz	Level dB $\mu$ V/m	Pol v/h	15.209 / 15E		Detector Pk/QP/Avg	Azimuth degrees	Height meters	Comments
			Limit	Margin				
5373.190	47.6	V	54.0	-6.4	AVG	158	1.2	RB 1 MHz;VB 10 Hz;Peak
5374.550	58.7	V	74.0	-15.3	PK	158	1.2	RB 1 MHz;VB 3 MHz;Peak
11100.110	44.1	V	54.0	-9.9	AVG	48	1.0	RB 1 MHz;VB 10 Hz;Peak
11099.860	53.6	V	74.0	-20.4	PK	48	1.0	RB 1 MHz;VB 3 MHz;Peak
3700.070	43.5	V	54.0	-10.5	AVG	105	1.0	RB 1 MHz;VB 10 Hz;Peak
3700.370	48.8	V	74.0	-25.2	PK	105	1.0	RB 1 MHz;VB 3 MHz;Peak
5080.480	43.3	H	54.0	-10.7	AVG	113	1.0	RB 1 MHz;VB 10 Hz;Peak
5080.720	54.6	H	74.0	-19.4	PK	113	1.0	RB 1 MHz;VB 3 MHz;Peak
7400.050	46.5	V	54.0	-7.5	AVG	306	1.0	RB 1 MHz;VB 10 Hz;Peak
7400.140	53.8	V	74.0	-20.2	PK	306	1.0	RB 1 MHz;VB 3 MHz;Peak

Note: Scans made between 18 - 40 GHz with the measurement antenna moved around the EUT and its antennas 20-50cm from the device indicated there were no significant emissions in this frequency range





# EMC Test Data

Client: Pace Americas	Job Number: J93000
Model: IPW8000 Wireless STB	T-Log Number: T93085
	Project Manager: Susan Hill
Contact: Mark Rieger	Project Coordinator: Irene Rademacher
Standard: FCC, IC	Class: N/A

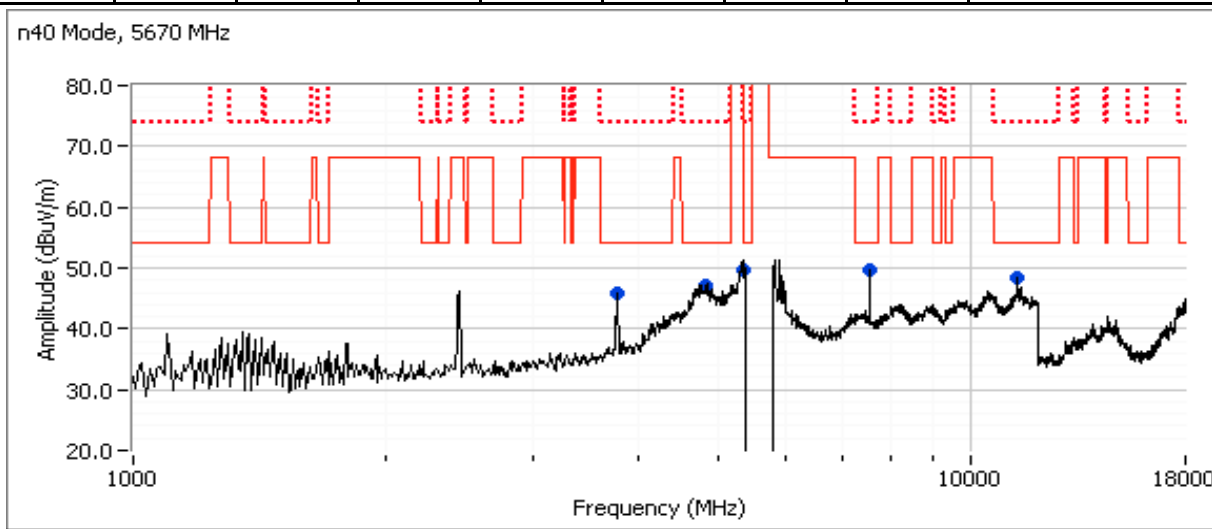
## Run #6c: High Channel

Date of Test: 8/7/2013  
 Test Engineer: Rafael Varelas  
 Test Location: FT Chamber #4

Channel: 134 - 5670 MHz  
 Tx Chain: 4x4 mode  
 Mode: n40  
 Data Rate: MCS0

### Spurious Radiated Emissions:

Frequency MHz	Level dB $\mu$ V/m	Pol v/h	15.209 / 15E		Detector Pk/QP/Avg	Azimuth degrees	Height meters	Comments
			Limit	Margin				
7560.100	49.0	V	54.0	-5.0	AVG	138	1.2	RB 1 MHz;VB 10 Hz;Peak
7560.250	54.4	V	74.0	-19.6	PK	138	1.2	RB 1 MHz;VB 3 MHz;Peak
3780.080	46.0	H	54.0	-8.0	AVG	105	1.3	RB 1 MHz;VB 10 Hz;Peak
3780.250	50.4	H	74.0	-23.6	PK	105	1.3	RB 1 MHz;VB 3 MHz;Peak
5372.990	48.6	H	54.0	-5.4	AVG	146	1.0	RB 1 MHz;VB 10 Hz;Peak
5374.020	59.7	H	74.0	-14.3	PK	146	1.0	RB 1 MHz;VB 3 MHz;Peak
4826.250	43.4	H	54.0	-10.6	AVG	168	1.3	RB 1 MHz;VB 10 Hz;Peak
4824.600	54.9	H	74.0	-19.1	PK	168	1.3	RB 1 MHz;VB 3 MHz;Peak
11345.500	45.1	V	54.0	-8.9	AVG	326	1.5	RB 1 MHz;VB 10 Hz;Peak
11346.350	56.7	V	74.0	-17.3	PK	326	1.5	RB 1 MHz;VB 3 MHz;Peak



Client: Pace Americas	Job Number: J93000
Model: IPW8000 Wireless STB	T-Log Number: T93085
	Project Manager: Susan Hill
Contact: Mark Rieger	Project Coordinator: Irene Rademacher
Standard: FCC, IC	Class: N/A

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

### Test Specific Details

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

### Summary of Results

Run #	Test Performed	Limit	Pass / Fail	Result / Margin
1	Power, 5150 - 5250MHz	15.407(a) (1), (2)	Pass	11a: 27.2 mW (14.3dBm) n20: 28.1 mW (14.5dBm) n40: 30.6 mW (14.9dBm)
1	PSD, 5150 - 5250MHz	15.407(a) (1), (2)	Pass	11a: 1.1 dBm/MHz n20: 1.0 dBm/MHz n40: -1.6 dBm/MHz
1	Power, 5250 - 5350MHz	15.407(a) (1), (2)	Pass	11a: 128.9 mW (21.1dBm) n20: 133.3 mW (21.2dBm) n40: 148.6 mW (21.7dBm)
1	PSD, 5250 - 5350MHz	15.407(a) (1), (2)	Pass	11a: 8.0 dBm/MHz n20: 8.2 dBm/MHz n40: 5.2 dBm/MHz
1	Max EIRP 5250 - 5350MHz	TPC required if EIRP ≥ 500mW (27dBm). EIRP ≥ 200mW (23dBm) DFS threshold = -64dBm	Pass	EIRP = 29.6 dBm (916.1 mW)
1	Power, 5470 - 5725MHz	15.407(a) (1), (2)	Pass	11a: 129.8 mW (21.1dBm) n20: 132.8 mW (21.2dBm) n40: 155.8 mW (21.9dBm)
1	PSD, 5470 - 5725MHz	15.407(a) (1), (2)	Pass	11a: 7.9 dBm/MHz n20: 7.8 dBm/MHz n40: 5.4 dBm/MHz
1	Max EIRP 5470 - 5725MHz	TPC required if EIRP ≥ 500mW (27dBm). EIRP ≥ 200mW (23dBm) DFS threshold = -64dBm.	Pass	EIRP = 29.8 dBm (960.6 mW)



Client: Pace Americas	Job Number: J93000
Model: IPW8000 Wireless STB	T-Log Number: T93085
	Project Manager: Susan Hill
Contact: Mark Rieger	Project Coordinator: Irene Rademacher
Standard: FCC, IC	Class: N/A

Run #	Test Performed	Limit	Pass / Fail	Result / Margin
1	26dB Bandwidth	15.407 (Information only)	-	> 20MHz for all modes
1	99% Bandwidth	RSS 210 (Information only)	N/A	n20: 18.4 MHz n40: 36.8 MHz
2	Peak Excursion Envelope	15.407(a) (6) 13dB	Pass	9.4 dB (-3.6 dB)
3	Antenna Conducted - Out of Band Spurious	15.407(b) -27dBm/MHz	Pass	All emissions below the -27dBm/MHz limit

### General Test Configuration

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

### Ambient Conditions:

Temperature: 20.7 °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.

### Procedure Comments:

Measurements performed in accordance with FCC KDB 789033 D01 v01r03, dated April 8, 2013

Mode	Data Rate	Duty Cycle (x)	Constant DC?	T (ms)	Pwr Cor Factor*	Lin Volt Cor Factor**	Min VBW for FS (Hz)
11a	6	0.98	Yes	5.35	0.09	0.18	186.9
n20	MCS0	0.99	Yes	4.96	0.04	0.09	201.6
n40	MCS0	0.98	Yes	4.76	0.08	0.16	210.1

### Sample Notes

Sample S/N:  
Driver:



# EMC Test Data

Client: Pace Americas	Job Number: J93000
Model: IPW8000 Wireless STB	T-Log Number: T93085
	Project Manager: Susan Hill
Contact: Mark Rieger	Project Coordinator: Irene Rademacher
Standard: FCC, IC	Class: N/A

**Run #1: Bandwidth, Output Power and Power Spectral Density - MIMO Systems**

Date of Test: 8/12/2013

Test Engineer: Rafael Varelas

Test Location: FT Lab 4A

Note 1:	Output power measured using a spectrum analyzer (see plots below). RBW=1MHz, VB=3 MHz, # of points in sweep $\geq 2 \times \text{span}/\text{RBW}$ , sample RMS detector, power averaging on (transmitted signal was continuous) and power integration over 50 MHz (method SA-1 of KDB 789033).
Note 2:	Measured using the same analyzer settings used for output power.
Note 3:	For RSS-210 the limit for the 5150 - 5250 MHz band accounts for the antenna gain as the maximum eirp allowed is 10dBm/MHz. The limits are also corrected for instances where the highest measured value of the PSD exceeds the average PSD (calculated from the measured power divided by the measured 99% bandwidth) by more than 3dB by the amount that the measured value exceeds the average by more than 3dB.
Note 4:	99% Bandwidth measured in accordance with RSS GEN - RB > 1% of span and VB $\geq 3 \times \text{RB}$
Note 5:	For MIMO systems the total output power and total PSD are calculated from the sum of the powers of the individual chains (in linear terms). The antenna gain used to determine the EIRP and limits for PSD/Output power depends on the operating mode of the MIMO device. If the signals are non-coherent between the transmit chains then the gain used to determine the limits is the highest gain of the individual chains and the EIRP is the sum of the products of gain and power on each chain. If the signals are coherent then the effective antenna gain is the sum (in linear terms) of the gains for each chain and the EIRP is the product of the effective gain and total power.

**MIMO Device - 5150-5250 MHz Band**

**Antenna Gain Information**

Freq	Antenna Gain (dBi) / Chain				BF	MultiChain Legacy	CDD	Sectorized / Xpol	Dir G (PWR)	Dir G (PSD)
	1	2	3	4						
5150-5250	1.84	1.91	1.89	1.88	Yes	Yes	Yes	No	7.90	7.90
5250-5350	1.84	1.91	1.89	1.88	Yes	Yes	Yes	No	7.90	7.90
5470-5725	1.84	1.91	1.89	1.88	Yes	Yes	Yes	No	7.90	7.90
5725-5825	1.84	1.91	1.89	1.88	Yes	Yes	Yes	No	7.90	7.90



# EMC Test Data

Client:	Pace Americas	Job Number:	J93000
Model:	IPW8000 Wireless STB	T-Log Number:	T93085
		Project Manager:	Susan Hill
Contact:	Mark Rieger	Project Coordinator:	Irene Rademacher
Standard:	FCC, IC	Class:	N/A

**For devices that support CDD modes**

Min # of spatial streams: 1  
 Max # of spatial streams: 4

Notes:	BF = beamforming mode supported, Multichain Legacy = 802.11 legacy data rates supported for multichain transmissions, CDD = Cyclic Delay Diversity (or Cyclic Shift Diversity) modes supported, Sectorized / Xpol = antennas are sectorized or cross polarized
Notes:	Dir G (PWR) = total gain (Gant + Array Gain) for power calculations; GA (PSD) = total gain for PSD calculations based on FCC KDB 662911. Depending on the modes supported, the Array Gain value for power could be different from the PSD value.
Notes:	Array gain for power/psd calculated per KDB 662911 D01



# EMC Test Data

Client: Pace Americas	Job Number: J93000
Model: IPW8000 Wireless STB	T-Log Number: T93085
	Project Manager: Susan Hill
Contact: Mark Rieger	Project Coordinator: Irene Rademacher
Standard: FCC, IC	Class: N/A

## MIMO Device - 5150-5250 MHz Band - FCC

Mode: 11a

Max EIRP (mW): 167.9

Frequency (MHz)	Chain	Software Setting	26dB BW (MHz)	Duty Cycle %	Power <sup>1</sup> dBm	Total Power mW	Total Power dBm	FCC Limit dBm	Max Power (W)	Result
5180	1	8	26.3	98.0	7.7	20.1	13.0	15.1	0.027	Pass
	2				5.7					
	3				7.2					
	4				7.3					
5200	1	9	26.5	98.0	8.5	23.8	13.8	15.1		Pass
	2				5.8					
	3				8.0					
	4				8.2					
5240	1	9	26.2	98.0	9.0	27.2	14.3	15.1		Pass
	2				5.9					
	3				8.8					
	4				9.0					

## MIMO Device - 5150-5250 MHz Band - Industry Canada

Mode: 11a

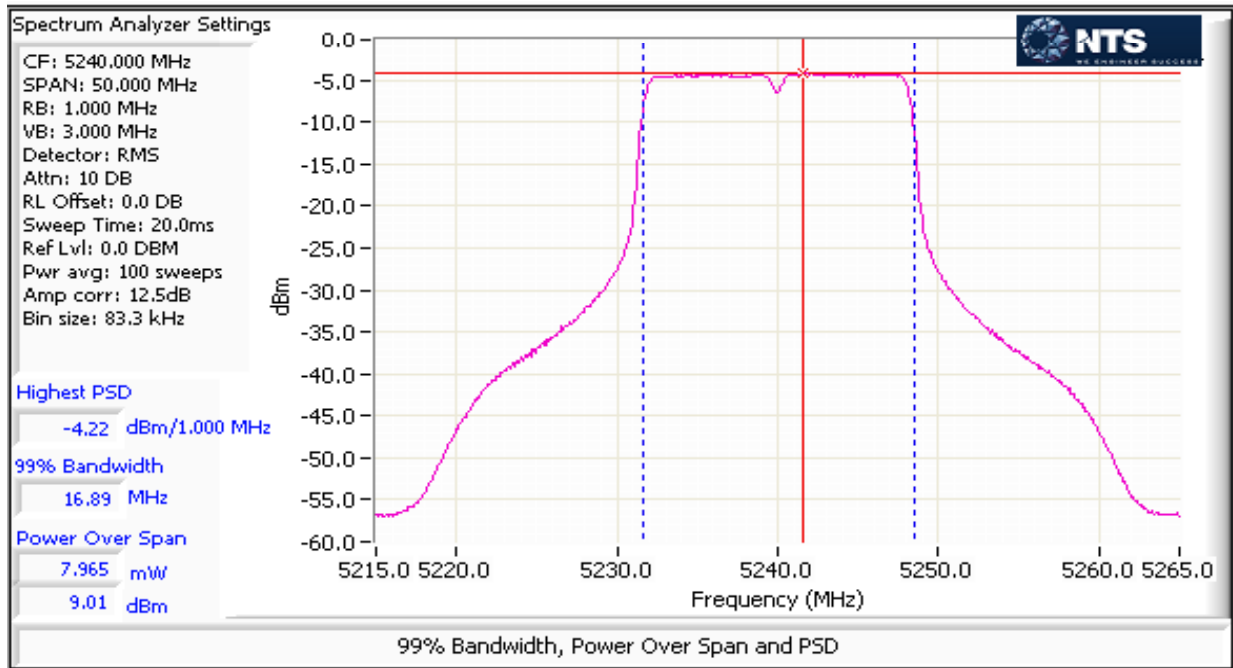
Frequency (MHz)	Chain	Software Setting	99% BW (MHz)	Duty Cycle %	Power <sup>1</sup> dBm	Total Power dBm	Total Power dBm (eirp)	IC limit dBm (eirp)	Max Power (W)	Result
5180	1	8	16.9	98.0	7.7	13.0	20.9	22.3	0.027	Pass
	2				5.7					
	3				7.2					
	4				7.3					
5200	1	9	17.0	98.0	8.5	13.8	21.7	22.3		Pass
	2				5.8					
	3				8.0					
	4				8.2					
5240	1	9	17.0	98.0	9.0	14.3	22.2	22.3		Pass
	2				5.9					
	3				8.8					
	4				9.0					

Client: Pace Americas	Job Number: J93000
Model: IPW8000 Wireless STB	T-Log Number: T93085
	Project Manager: Susan Hill
Contact: Mark Rieger	Project Coordinator: Irene Rademacher
Standard: FCC, IC	Class: N/A

### 5150-5250 PSD - FCC/IC

Mode: 11a

Frequency (MHz)	Chain	Software Setting	99% BW (MHz)	Duty Cycle %	PSD	Total PSD <sup>1</sup>		FCC Limit dBm/MHz	IC Limit dBm/MHz	Result
					dBm/MHz	mW/MHz	dBm/MHz			
5180	1	8	16.9	98.0	-5.1	1.0	0.1	2.1	2.1	Pass
	2				-7.3					
	3				-5.8					
	4				-5.6					
5200	1	9	17.0	98.0	-4.7	1.1	0.5	2.1	2.1	Pass
	2				-7.4					
	3				-5.4					
	4				-5.0					
5240	1	9	17.0	98.0	-4.3	1.3	1.1	2.1	2.1	Pass
	2				-7.4					
	3				-4.6					
	4				-4.2					



Chain 4



# EMC Test Data

Client: Pace Americas	Job Number: J93000
Model: IPW8000 Wireless STB	T-Log Number: T93085
	Project Manager: Susan Hill
Contact: Mark Rieger	Project Coordinator: Irene Rademacher
Standard: FCC, IC	Class: N/A

## MIMO Device - 5150-5250 MHz Band - FCC

Mode: n20

Max EIRP (mW): 173.2

Frequency (MHz)	Chain	Software Setting	26dB BW (MHz)	Duty Cycle %	Power <sup>1</sup> dBm	Total Power mW	Total Power dBm	FCC Limit dBm	Max Power (W)	Result
5180	1	9	25.8	99.0	8.8	26.9	14.3	15.1	0.028	Pass
	2				5.7					
	3				8.5					
	4				9.3					
5200	1	9	26.9	99.0	9.0	27.9	14.5	15.1		Pass
	2				6.1					
	3				8.8					
	4				9.2					
5240	1	9	26.9	99.0	9.2	28.1	14.5	15.1		Pass
	2				5.7					
	3				8.7					
	4				9.4					

## MIMO Device - 5150-5250 MHz Band - Industry Canada

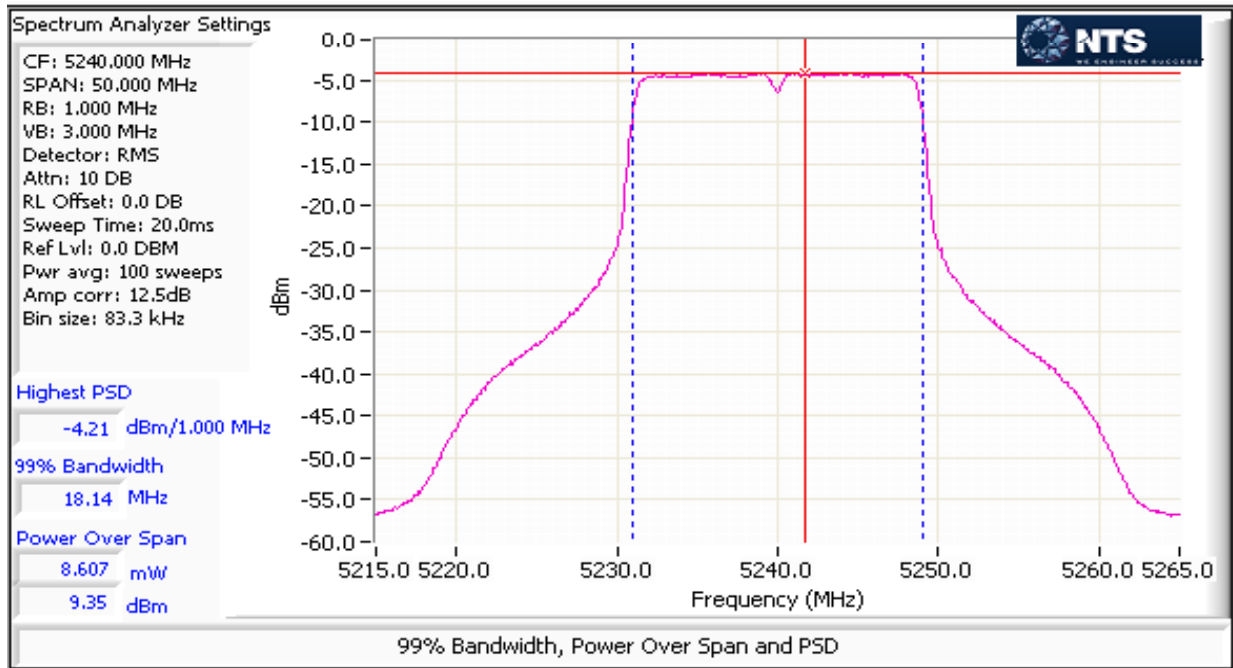
Mode: n20

Frequency (MHz)	Chain	Software Setting	99% BW (MHz)	Duty Cycle %	Power <sup>1</sup> dBm	Total Power dBm	Total Power dBm (eirp)	IC limit dBm (eirp)	Max Power (W)	Result
5180	1	9	18.3	99.0	8.8	14.3	22.2	22.6	0.028	Pass
	2				5.7					
	3				8.5					
	4				9.3					
5200	1	9	18.0	99.0	9.0	14.5	22.4	22.5		Pass
	2				6.1					
	3				8.8					
	4				9.2					
5240	1	9	18.0	99.0	9.2	14.5	22.4	22.5		Pass
	2				5.7					
	3				8.7					
	4				9.4					

Client: Pace Americas	Job Number: J93000
Model: IPW8000 Wireless STB	T-Log Number: T93085
	Project Manager: Susan Hill
Contact: Mark Rieger	Project Coordinator: Irene Rademacher
Standard: FCC, IC	Class: N/A

5150-5250 PSD - FCC/IC  
 Mode: n20

Frequency (MHz)	Chain	Software Setting	99% BW (MHz)	Duty Cycle %	PSD dBm/MHz	Total PSD <sup>1</sup> mW/MHz	Total PSD <sup>1</sup> dBm/MHz	FCC Limit dBm/MHz	IC Limit dBm/MHz	Result
5180	1	9	18.3	99.0	-4.8	1.2	0.7	2.1	2.1	Pass
	2				-7.8					
	3				-5.1					
	4				-4.3					
5200	1	9	18.0	99.0	-4.6	1.2	0.9	2.1	2.1	Pass
	2				-7.4					
	3				-4.7					
	4				-4.3					
5240	1	9	18.0	99.0	-4.3	1.2	1.0	2.1	2.1	Pass
	2				-7.8					
	3				-4.8					
	4				-4.2					



Chain 4



# EMC Test Data

Client: Pace Americas	Job Number: J93000
Model: IPW8000 Wireless STB	T-Log Number: T93085
	Project Manager: Susan Hill
Contact: Mark Rieger	Project Coordinator: Irene Rademacher
Standard: FCC, IC	Class: N/A

## MIMO Device - 5150-5250 MHz Band - FCC

Mode: n40

Max EIRP (mW): 188.5

Frequency (MHz)	Chain	Software Setting	26dB BW (MHz)	Duty Cycle %	Power dBm	Total Power <sup>1</sup> mW	dBm	FCC Limit dBm	Max Power (W)	Result
5190	1	10	43.6	98.0	9.4	30.5	14.8	15.1	0.031	Pass
	2				7.2					
	3				9.2					
	4				9.2					
5230	1	10	43.5	98.0	9.4	30.6	14.9	15.1		
	2				7.2					
	3				9.1					
	4				9.3					

## MIMO Device - 5150-5250 MHz Band - Industry Canada

Mode: n40

Frequency (MHz)	Chain	Software Setting	99% BW (MHz)	Duty Cycle %	Power <sup>1</sup> dBm	Total Power dBm	dBm (eirp)	IC limit dBm (eirp)	Max Power (W)	Result
5190	1	10	36.6	98.0	9.4	14.8	22.7	23.0	0.031	Pass
	2				7.2					
	3				9.2					
	4				9.2					
5230	1	10	36.8	98.0	9.4	14.9	22.8	23.0		
	2				7.2					
	3				9.1					
	4				9.3					

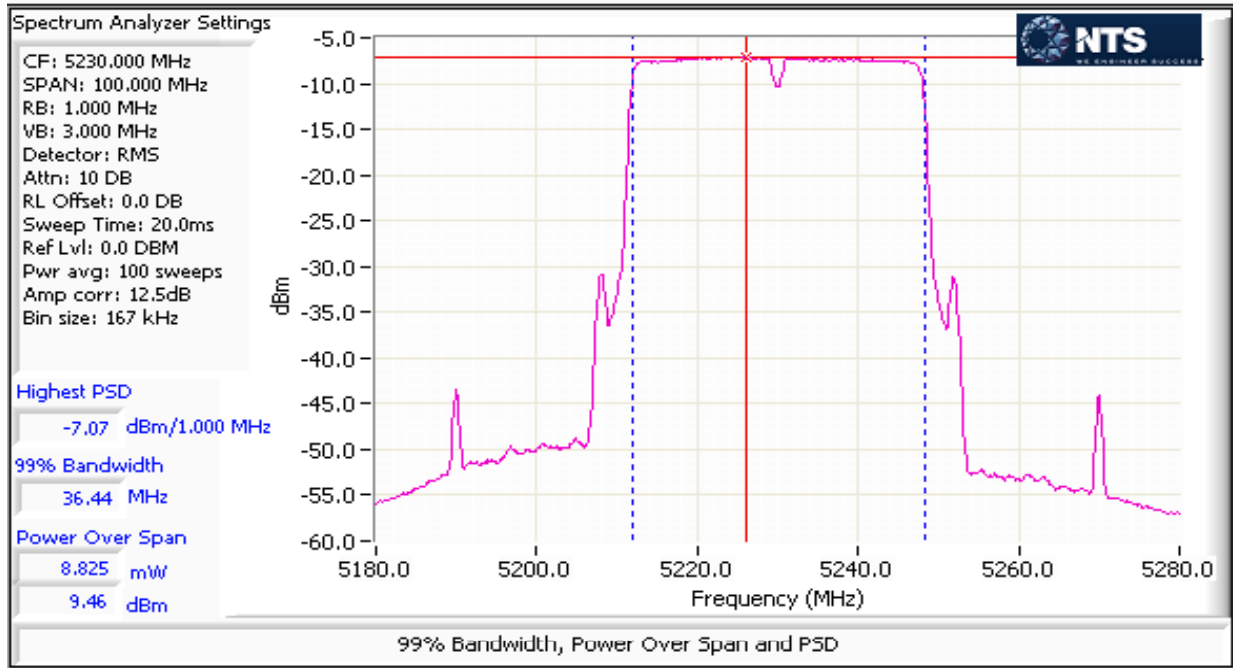
## 5150-5250 PSD - FCC/IC

Mode: n40

Frequency (MHz)	Chain	Software Setting	99% BW (MHz)	Duty Cycle %	PSD dBm/MHz	Total PSD <sup>1</sup> mW/MHz	dBm/MHz	FCC Limit dBm/MHz	IC Limit dBm/MHz	Result
5190	1	10	36.6	98.0	-7.2	0.7	-1.7	2.1	2.1	Pass
	2				-9.3					
	3				-7.3					
	4				-7.4					
5230	1	10	36.8	98.0	-7.1	0.7	-1.6	2.1	2.1	
	2				-8.9					
	3				-7.5					
	4				-7.3					



Client: Pace Americas	Job Number: J93000
Model: IPW8000 Wireless STB	T-Log Number: T93085
	Project Manager: Susan Hill
Contact: Mark Rieger	Project Coordinator: Irene Rademacher
Standard: FCC, IC	Class: N/A



Chain 1



# EMC Test Data

Client: Pace Americas	Job Number: J93000
Model: IPW8000 Wireless STB	T-Log Number: T93085
	Project Manager: Susan Hill
Contact: Mark Rieger	Project Coordinator: Irene Rademacher
Standard: FCC, IC	Class: N/A

## MIMO Device - 5250-5350 MHz Band - FCC

Mode: 11a Max EIRP (mW): 794.9

Frequency (MHz)	Chain	Software Setting	26dB BW (MHz)	Duty Cycle %	Power dBm	Total Power <sup>1</sup> mW	FCC Limit dBm	Max Power (W)	Result
5260	1	16	25.6	98.0	15.4	128.9	21.1	22.1	Pass
	2				14.1				
	3				15.2				
	4				15.5				
5300	1	16	26.4	98.0	15.1	122.1	20.9	22.1	Pass
	2				14.1				
	3				14.8				
	4				15.3				
5320	1	5	25.6	98.0	5.7	17.0	12.3	22.1	Pass
	2				4.6				
	3				8.0				
	4				6.2				

## MIMO Device - 5250-5350 MHz Band - Industry Canada

Mode: 11a

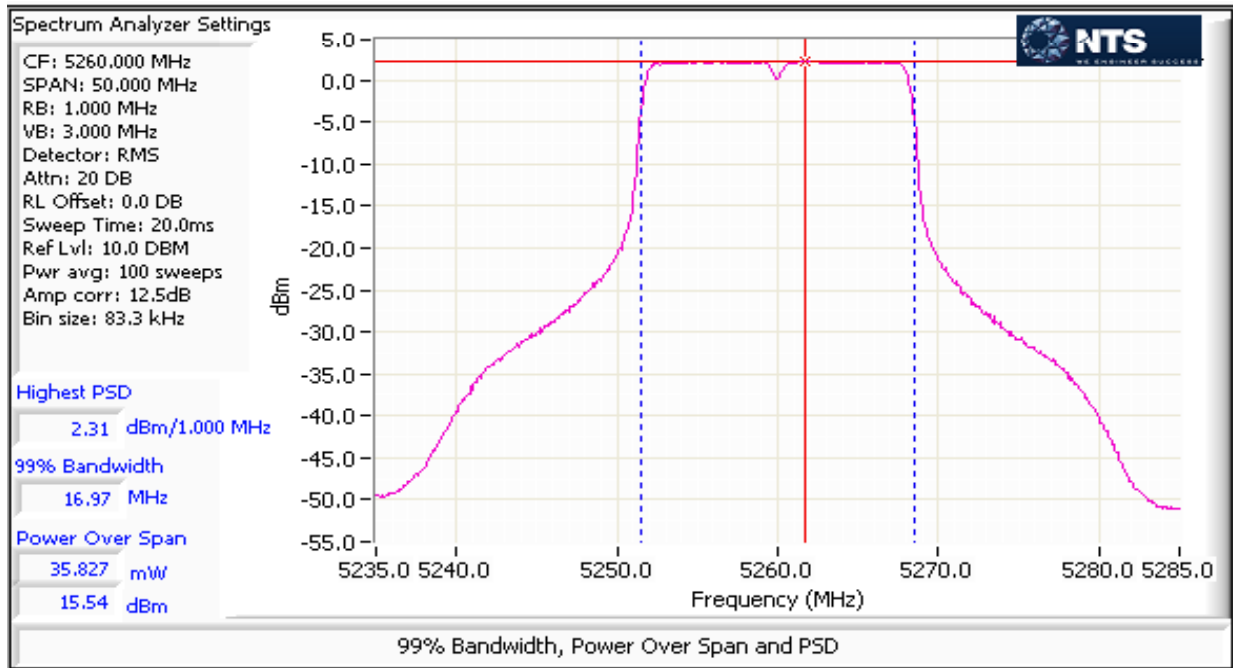
Frequency (MHz)	Chain	Software Setting	99% BW (MHz)	Duty Cycle %	Power <sup>1</sup> dBm	Total Power dBm	dBm (eirp)	IC limit dBm	Max Power (W)	Result
5260	1	16	17.3	98.0	15.4	21.1	29.0	21.5	0.129	Pass
	2				14.1					
	3				15.2					
	4				15.5					
5300	1	16	17.1	98.0	15.1	20.9	28.8	21.4	0.129	Pass
	2				14.1					
	3				14.8					
	4				15.3					
5320	1	5	17.2	98.0	5.7	12.3	20.2	21.5	0.129	Pass
	2				4.6					
	3				8.0					
	4				6.2					

Client: Pace Americas	Job Number: J93000
Model: IPW8000 Wireless STB	T-Log Number: T93085
	Project Manager: Susan Hill
Contact: Mark Rieger	Project Coordinator: Irene Rademacher
Standard: FCC, IC	Class: N/A

### 5250-5350 PSD - FCC/IC

Mode: 11a

Frequency (MHz)	Chain	Software Setting	99% BW (MHz)	Duty Cycle %	PSD	Total PSD <sup>1</sup>		FCC Limit dBm/MHz	IC Limit dBm/MHz	Result
					dBm/MHz	mW/MHz	dBm/MHz			
5260	1	16	17.3	98.0	2.3	6.2	7.9	9.1	11.0	Pass
	2				0.9					
	3				1.9					
	4				2.3					
5300	1	16	17.1	98.0	2.2	6.3	8.0	9.1	11.0	Pass
	2				1.3					
	3				1.9					
	4				2.5					
5320	1	5	17.2	98.0	-7.1	0.9	-0.7	9.1	11.0	Pass
	2				-8.3					
	3				-5.1					
	4				-6.8					



Chain 4



# EMC Test Data

Client: Pace Americas	Job Number: J93000
Model: IPW8000 Wireless STB	T-Log Number: T93085
	Project Manager: Susan Hill
Contact: Mark Rieger	Project Coordinator: Irene Rademacher
Standard: FCC, IC	Class: N/A

## MIMO Device - 5250-5350 MHz Band - FCC

Mode: n20

Max EIRP (mW): 821.8

Frequency (MHz)	Chain	Software Setting	26dB BW (MHz)	Duty Cycle %	Power dBm	Total Power <sup>1</sup> mW	dBm	FCC Limit dBm	Max Power (W)	Result
5260	1	16	25.0	99.0	15.3	133.3	21.2	22.1	0.133	Pass
	2				14.4					
	3				15.4					
	4				15.7					
5300	1	16	26.9	99.0	15.2	122.8	20.9	22.1		Pass
	2				13.8					
	3				14.8					
	4				15.5					
5320	1	11	27.3	99.0	10.4	39.1	15.9	22.1		Pass
	2				8.4					
	3				10.1					
	4				10.4					

## MIMO Device - 5250-5350 MHz Band - Industry Canada

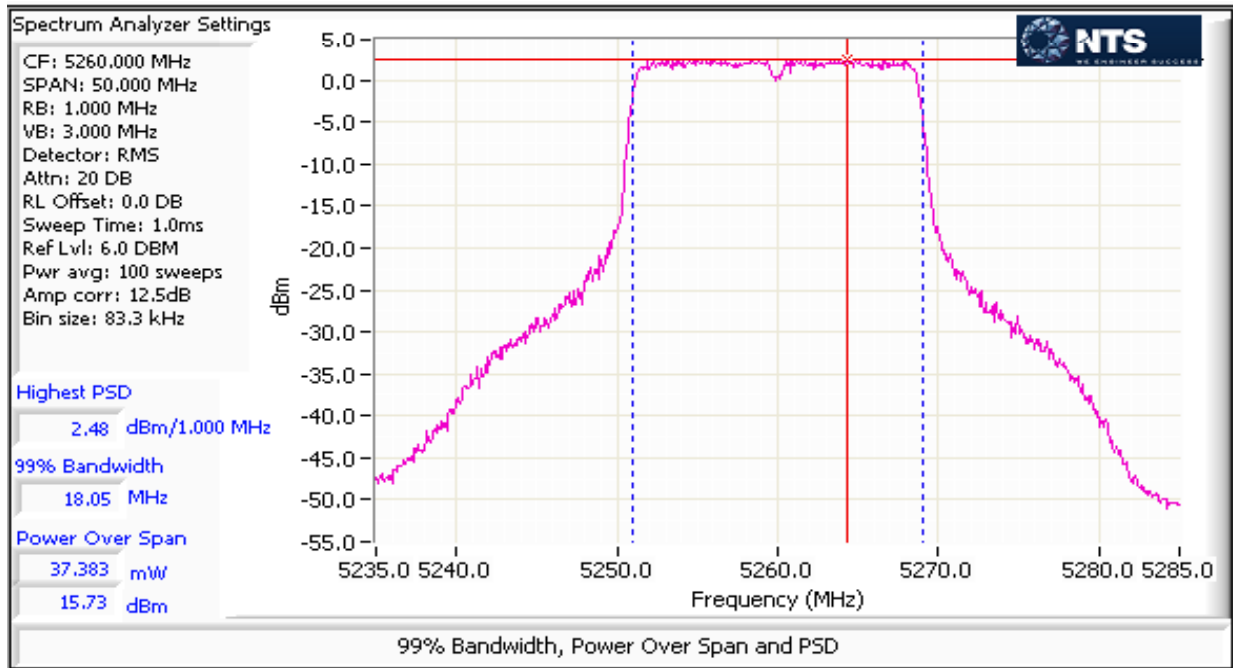
Mode: n20

Frequency (MHz)	Chain	Software Setting	99% BW (MHz)	Duty Cycle %	Power <sup>1</sup> dBm	Total Power dBm	dBm (eirp)	IC limit dBm	Max Power (W)	Result
5260	1	16	18.3	99.0	15.3	21.2	29.1	21.7	0.133	Pass
	2				14.4					
	3				15.4					
	4				15.7					
5300	1	16	18.2	99.0	15.2	20.9	28.8	21.7		Pass
	2				13.8					
	3				14.8					
	4				15.5					
5320	1	11	18.2	99.0	10.4	15.9	23.8	21.7		Pass
	2				8.4					
	3				10.1					
	4				10.4					

Client: Pace Americas	Job Number: J93000
Model: IPW8000 Wireless STB	T-Log Number: T93085
	Project Manager: Susan Hill
Contact: Mark Rieger	Project Coordinator: Irene Rademacher
Standard: FCC, IC	Class: N/A

5250-5350 PSD - FCC/IC  
Mode: n20

Frequency (MHz)	Chain	Software Setting	99% BW (MHz)	Duty Cycle %	PSD dBm/MHz	Total PSD <sup>1</sup> mW/MHz	Total PSD <sup>1</sup> dBm/MHz	FCC Limit dBm/MHz	IC Limit dBm/MHz	Result
5260	1	16	18.3	99.0	2.4	6.6	8.2	9.1	11.0	Pass
	2				1.3					
	3				2.3					
	4				2.5					
5300	1	16	18.2	99.0	2.1	6.1	7.8	9.1	11.0	Pass
	2				0.7					
	3				1.7					
	4				2.5					
5320	1	11	18.2	99.0	-2.7	1.9	2.7	9.1	11.0	Pass
	2				-4.8					
	3				-3.1					
	4				-2.8					



Chain 4



# EMC Test Data

Client: Pace Americas	Job Number: J93000
Model: IPW8000 Wireless STB	T-Log Number: T93085
	Project Manager: Susan Hill
Contact: Mark Rieger	Project Coordinator: Irene Rademacher
Standard: FCC, IC	Class: N/A

### MIMO Device - 5250-5350 MHz Band - FCC

Mode: n40 Max EIRP (mW): 916.1

Frequency (MHz)	Chain	Software Setting	26dB BW (MHz)	Duty Cycle %	Power dBm	Total Power <sup>1</sup> mW	FCC Limit dBm	Max Power (W)	Result
5270	1	17	43.8	98.0	16.0	148.6	21.7	0.149	Pass
	2				14.8				
	3				15.6				
	4				16.3				
5310	1	13	44.2	98.0	11.9	53.7	17.3	0.149	Pass
	2				10.5				
	3				10.5				
	4				12.0				

### MIMO Device - 5250-5350 MHz Band - Industry Canada

Mode: n40

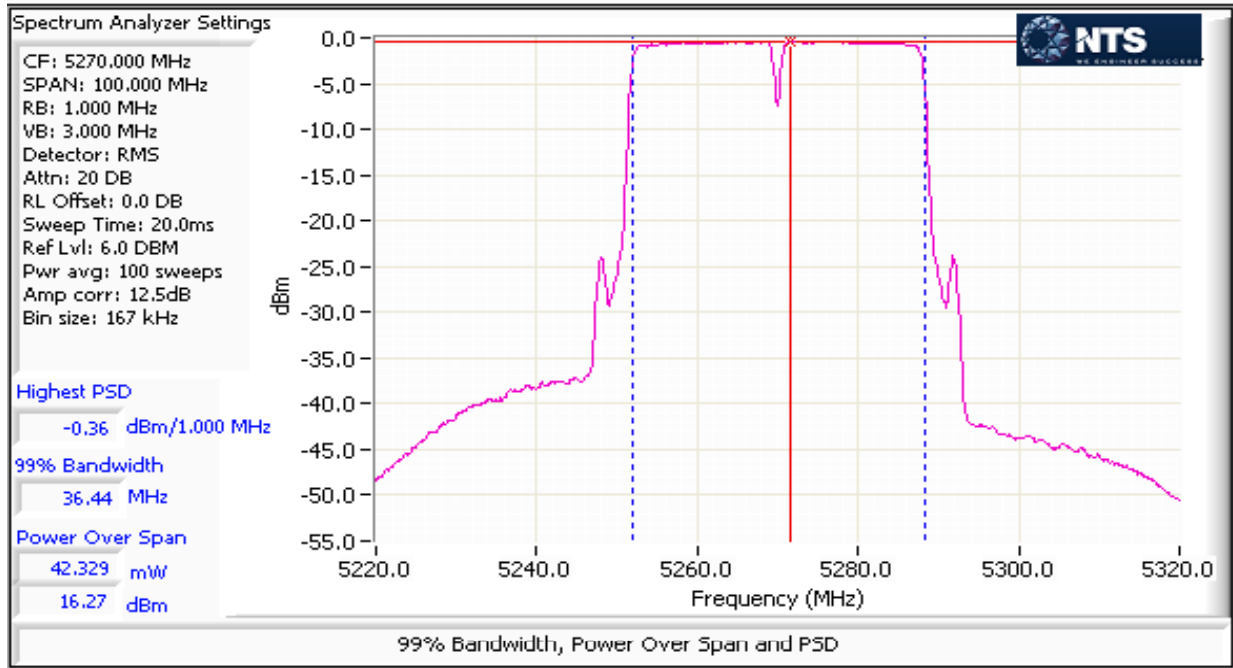
Frequency (MHz)	Chain	Software Setting	99% BW (MHz)	Duty Cycle %	Power <sup>1</sup> dBm	Total Power dBm	dBm (eirp)	IC limit dBm	Max Power (W)	Result
5270	1	17	36.6	98.0	16.0	21.7	29.6	22.1	0.149	Pass
	2				14.8					
	3				15.6					
	4				16.3					
5310	1	13	36.8	98.0	11.9	17.3	25.2	22.1	0.149	Pass
	2				10.5					
	3				10.5					
	4				12.0					

### MIMO Device 5250-5350 PSD - FCC/IC

Mode: n40

Frequency (MHz)	Chain	Software Setting	99% BW (MHz)	Duty Cycle %	PSD dBm/MHz	Total PSD <sup>1</sup> mW/MHz	dBm/MHz	FCC Limit dBm/MHz	IC Limit dBm/MHz	Result
5270	1	17	36.6	98.0	-0.5	3.3	5.2	9.1	11.0	Pass
	2				-1.8					
	3				-1.0					
	4				-0.4					
5310	1	13	36.8	98.0	-4.3	1.3	1.1	9.1	11.0	Pass
	2				-5.8					
	3				-5.7					
	4				-4.3					

Client: Pace Americas	Job Number: J93000
Model: IPW8000 Wireless STB	T-Log Number: T93085
	Project Manager: Susan Hill
Contact: Mark Rieger	Project Coordinator: Irene Rademacher
Standard: FCC, IC	Class: N/A



Chain 4



# EMC Test Data

Client: Pace Americas	Job Number: J93000
Model: IPW8000 Wireless STB	T-Log Number: T93085
	Project Manager: Susan Hill
Contact: Mark Rieger	Project Coordinator: Irene Rademacher
Standard: FCC, IC	Class: N/A

## MIMO Device - 5470-5725 MHz Band - FCC

Mode: 11a Max EIRP (mW): 800.6

Frequency (MHz)	Chain	Software Setting	26dB BW (MHz)	Duty Cycle %	Power dBm	Total Power <sup>1</sup> mW	FCC Limit dBm	Max Power (W)	Result
5500	1	4	26.3	98.0	4.9	15.8	12.0	22.1	Pass
	2				5.0				
	3				6.4				
	4				7.2				
5580	1	16	26.1	98.0	15.6	129.8	21.1	22.1	Pass
	2				14.3				
	3				15.2				
	4				15.2				
5700	1	14	26.9	98.0	14.0	102.0	20.1	22.1	Pass
	2				13.3				
	3				14.5				
	4				14.4				

## MIMO Device - 5470-5725 MHz Band - Industry Canada

Mode: 11a

Frequency (MHz)	Chain	Software Setting	99% BW (MHz)	Duty Cycle %	Power <sup>1</sup> dBm	Total Power dBm	dBm (eirp)	IC limit dBm	Max Power (W)	Result
5500	1	4	17.3	98.0	4.9	12.0	19.9	21.5	0.130	Pass
	2				5.0					
	3				6.4					
	4				7.2					
5580	1	16	17.3	98.0	15.6	21.1	29.0	21.5	0.130	Pass
	2				14.3					
	3				15.2					
	4				15.2					
5700	1	14	17.3	98.0	14.0	20.1	28.0	21.5	0.130	Pass
	2				13.3					
	3				14.5					
	4				14.4					

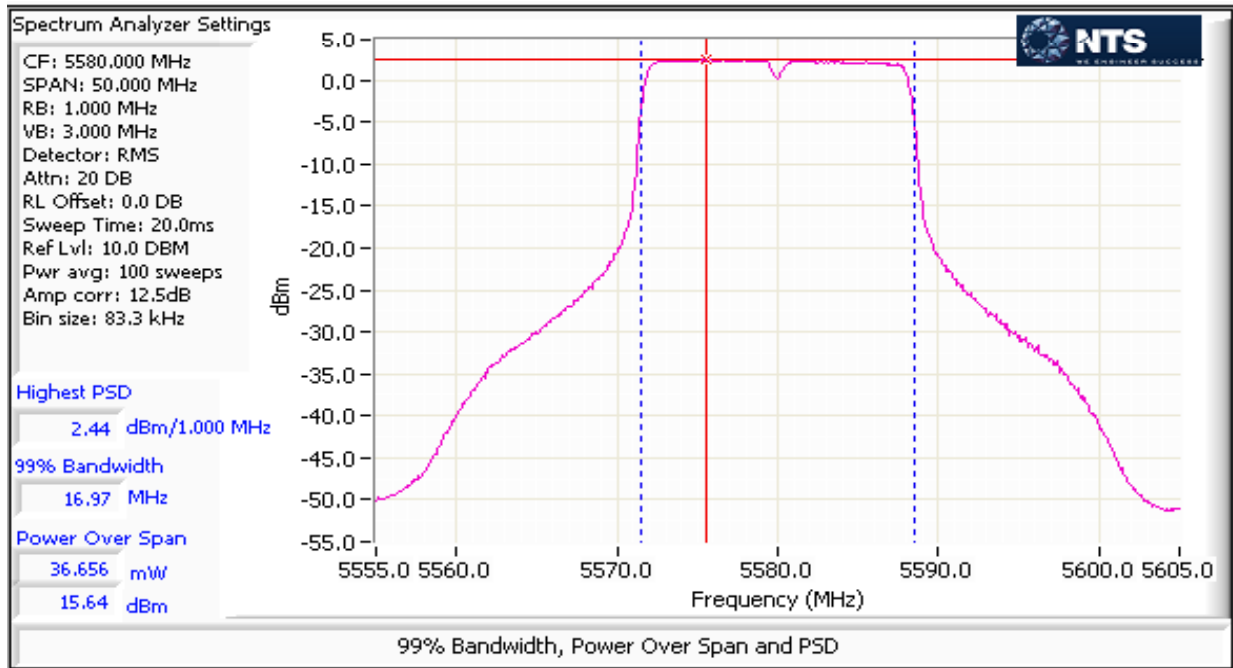


Client: Pace Americas	Job Number: J93000
Model: IPW8000 Wireless STB	T-Log Number: T93085
	Project Manager: Susan Hill
Contact: Mark Rieger	Project Coordinator: Irene Rademacher
Standard: FCC, IC	Class: N/A

### 5470-5700 PSD - FCC/IC

Mode: 11a

Frequency (MHz)	Chain	Software Setting	99% BW (MHz)	Duty Cycle %	PSD	Total PSD <sup>1</sup>		FCC Limit	IC Limit	Result
					dBm/MHz	mW/MHz	dBm/MHz	dBm/MHz		
5500	1	4	17.3	98.0	-8.4	0.7	-1.3	9.1	11.0	Pass
	2				-8.3					
	3				-6.9					
	4				-6.1					
5580	1	16	17.3	98.0	2.4	6.2	7.9	9.1	11.0	Pass
	2				1.1					
	3				2.0					
	4				2.0					
5700	1	14	17.3	98.0	0.7	4.8	6.8	9.1	11.0	Pass
	2				0.0					
	3				1.3					
	4				1.2					



Chain 1



# EMC Test Data

Client: Pace Americas	Job Number: J93000
Model: IPW8000 Wireless STB	T-Log Number: T93085
	Project Manager: Susan Hill
Contact: Mark Rieger	Project Coordinator: Irene Rademacher
Standard: FCC, IC	Class: N/A

## MIMO Device - 5470-5725 MHz Band - FCC

Mode: n20

Max EIRP (mW): 819.3

Frequency (MHz)	Chain	Software Setting	26dB BW (MHz)	Duty Cycle %	Power dBm	Total Power <sup>1</sup> mW	FCC Limit dBm	Max Power (W)	Result	
5500	1	7	27.2	99.0	7.2	18.2	12.6	0.133	Pass	
	2				5.2					
	3				6.4					
	4				7.2					
5580	1	16	25.7	99.0	15.6	132.8	21.2		22.1	Pass
	2				14.4					
	3				15.2					
	4				15.5					
5700	1	15	25.9	99.0	15.0	127.8	21.1		22.1	Pass
	2				14.4					
	3				15.7					
	4				15.1					

## MIMO Device - 5470-5725 MHz Band - Industry Canada

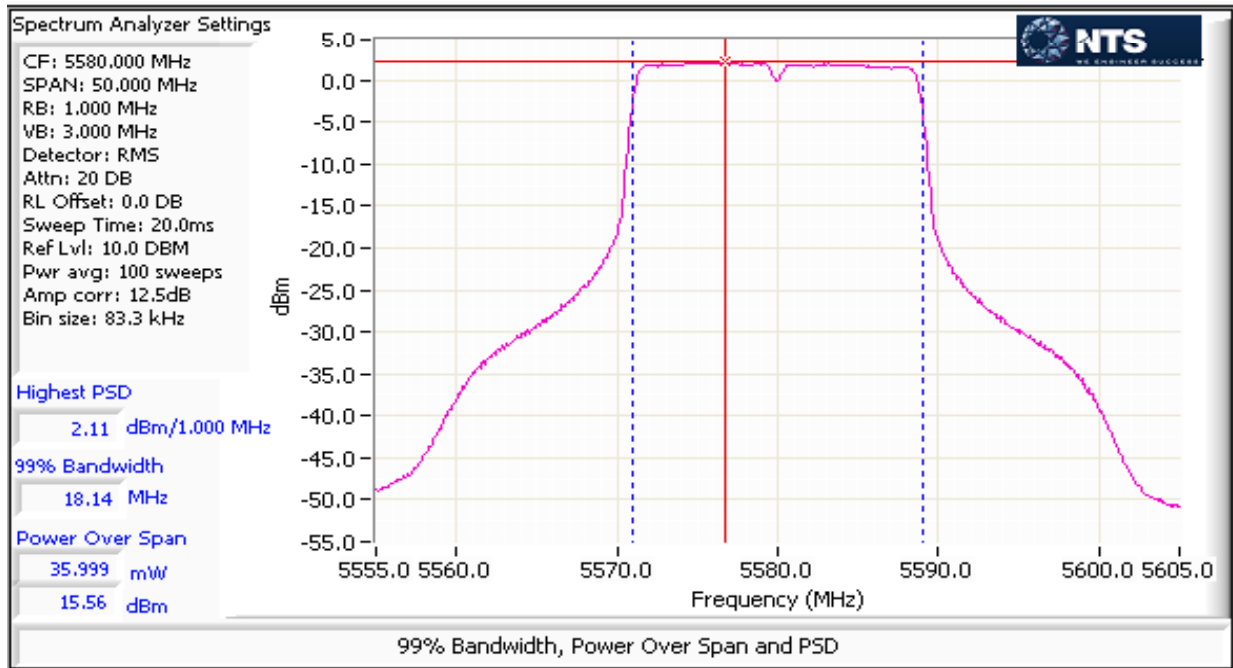
Mode: n20

Frequency (MHz)	Chain	Software Setting	99% BW (MHz)	Duty Cycle %	Power <sup>1</sup> dBm	Total Power dBm	dBm (eirp)	IC limit dBm	Max Power (W)	Result	
5500	1	7	18.4	99.0	7.2	12.6	20.5	21.7	0.133	Pass	
	2				5.2						
	3				6.4						
	4				7.2						
5580	1	16	18.2	99.0	15.6	21.2	29.1	21.7		21.7	Pass
	2				14.4						
	3				15.2						
	4				15.5						
5700	1	15	18.3	99.0	15.0	21.1	29.0	21.7		21.7	Pass
	2				14.4						
	3				15.7						
	4				15.1						

Client: Pace Americas	Job Number: J93000
Model: IPW8000 Wireless STB	T-Log Number: T93085
	Project Manager: Susan Hill
Contact: Mark Rieger	Project Coordinator: Irene Rademacher
Standard: FCC, IC	Class: N/A

5470-5725 PSD - FCC/IC  
Mode: n20

Frequency (MHz)	Chain	Software Setting	99% BW (MHz)	Duty Cycle %	PSD	Total PSD <sup>1</sup>		FCC Limit dBm/MHz	IC Limit dBm/MHz	Result
					dBm/MHz	mW/MHz	dBm/MHz			
5500	1	7	18.4	99.0	-6.4	0.8	-1.0	9.1	11.0	Pass
	2				-8.4					
	3				-7.1					
	4				-6.3					
5580	1	16	18.2	99.0	2.1	6.0	7.8	9.1	11.0	Pass
	2				1.0					
	3				1.8					
	4				2.0					
5700	1	15	18.3	99.0	1.4	5.7	7.6	9.1	11.0	Pass
	2				0.9					
	3				2.2					
	4				1.6					



Chain 1



# EMC Test Data

Client: Pace Americas	Job Number: J93000
Model: IPW8000 Wireless STB	T-Log Number: T93085
	Project Manager: Susan Hill
Contact: Mark Rieger	Project Coordinator: Irene Rademacher
Standard: FCC, IC	Class: N/A

## MIMO Device - 5470-5725 MHz Band - FCC

Mode: n40

Max EIRP (mW): 960.6

Frequency (MHz)	Chain	Software Setting	26dB BW (MHz)	Duty Cycle %	Power dBm	Total Power <sup>1</sup> mW	dBm	FCC Limit dBm	Max Power (W)	Result
5510	1	17	43.5	98.0	16.2	154.4	21.9	22.1	0.156	Pass
	2				15.4					
	3				16.0					
	4				15.9					
5550	1	17	43.7	98.0	16.2	155.8	21.9	22.1		Pass
	2				15.4					
	3				15.8					
	4				16.2					
5670	1	17	44.1	98.0	16.0	150.3	21.8	22.1		Pass
	2				15.1					
	3				15.8					
	4				16.1					

## MIMO Device - 5470-5725 MHz Band - Industry Canada

Mode: n40

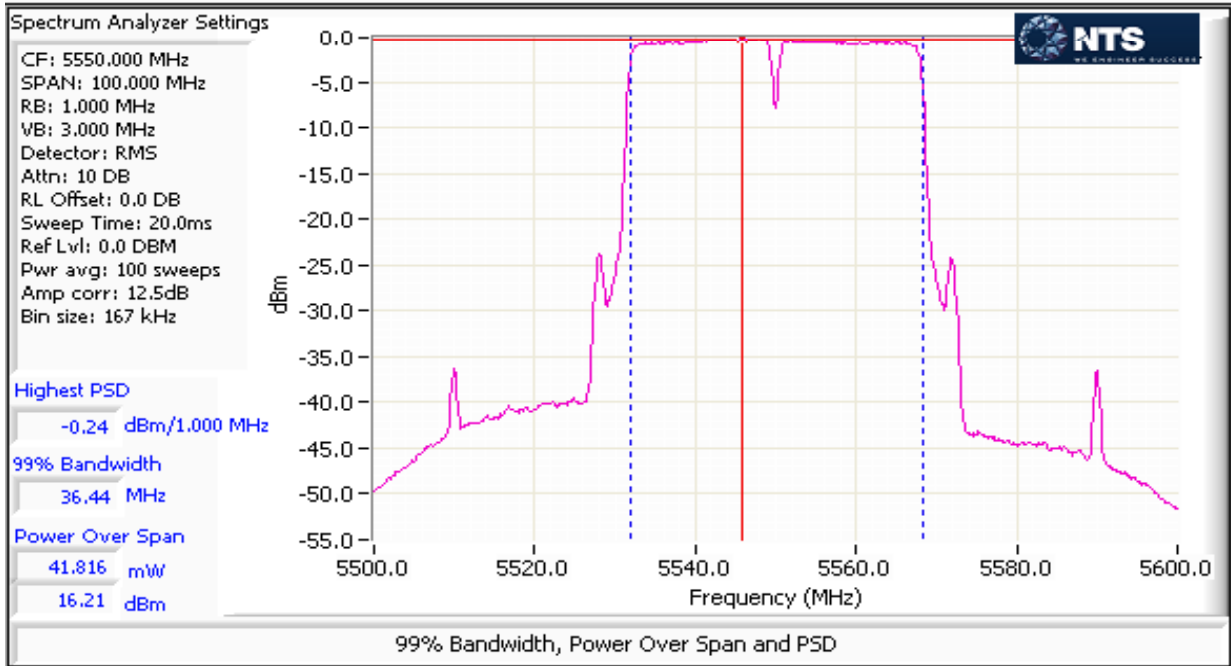
Frequency (MHz)	Chain	Software Setting	99% BW (MHz)	Duty Cycle %	Power <sup>1</sup> dBm	Total Power dBm	dBm (eirp)	IC limit dBm	Max Power (W)	Result
5510	1	17	36.8	98.0	16.2	21.89	29.8	22.1	0.156	Pass
	2				15.4					
	3				16.0					
	4				15.9					
5550	1	17	36.6	98.0	16.2	21.9	29.8	22.1		Pass
	2				15.4					
	3				15.8					
	4				16.2					
5670	1	17	36.8	98.0	16.0	21.8	29.7	22.1		Pass
	2				15.1					
	3				15.8					
	4				16.1					

Client: Pace Americas	Job Number: J93000
Model: IPW8000 Wireless STB	T-Log Number: T93085
	Project Manager: Susan Hill
Contact: Mark Rieger	Project Coordinator: Irene Rademacher
Standard: FCC, IC	Class: N/A

**MIMO Device 5470-5725 PSD - FCC/IC**

Mode: n40

Frequency (MHz)	Chain	Software Setting	99% BW (MHz)	Duty Cycle %	PSD dBm/MHz	Total PSD <sup>1</sup> mW/MHz	Total PSD <sup>1</sup> dBm/MHz	FCC Limit dBm/MHz	IC Limit dBm/MHz	Result
5510	1	17	36.8	98.0	-0.3	3.4	5.4	9.1	11.0	Pass
	2				-1.2					
	3				-0.5					
	4				-0.7					
5550	1	17	36.6	98.0	-0.2	3.5	5.4	9.1	11.0	Pass
	2				-1.1					
	3				-0.7					
	4				-0.4					
5670	1	17	36.8	98.0	-0.5	3.4	5.3	9.1	11.0	Pass
	2				-1.4					
	3				-0.7					
	4				-0.4					



Chain 1

Client: Pace Americas	Job Number: J93000
Model: IPW8000 Wireless STB	T-Log Number: T93085
	Project Manager: Susan Hill
Contact: Mark Rieger	Project Coordinator: Irene Rademacher
Standard: FCC, IC	Class: N/A

Run #2: Peak Excursion Measurement  
 Date of Test: 8/12/2013  
 Test Engineer: Rafael Varelas  
 Test Location: FT Lab 4A

802.11a: Device meets the requirement for the peak excursion

Peak Excursion(dB)			Peak Excursion(dB)			Peak Excursion(dB)		
Freq	Value	Limit	Freq	Value	Limit	Freq	Value	Limit
(MHz)			(MHz)			(MHz)		
5180	8.1	13.0	5260	8.1	13.0	5500	8.4	13.0
5200	8.7	13.0	5300	8.3	13.0	5580	8.7	13.0
5240	8.3	13.0	5320	8.1	13.0	5700	8.4	13.0

20MHz: Device meets the requirement for the peak excursion

Peak Excursion(dB)			Peak Excursion(dB)			Peak Excursion(dB)		
Freq	Value	Limit	Freq	Value	Limit	Freq	Value	Limit
(MHz)			(MHz)			(MHz)		
5180	8.7	13.0	5260	8.1	13.0	5500	9.0	13.0
5200	8.8	13.0	5300	8.7	13.0	5580	9.0	13.0
5240	9.2	13.0	5320	8.5	13.0	5700	8.8	13.0

40MHz: Device meets the requirement for the peak excursion

Peak Excursion(dB)			Peak Excursion(dB)			Peak Excursion(dB)		
Freq	Value	Limit	Freq	Value	Limit	Freq	Value	Limit
(MHz)			(MHz)			(MHz)		
5190	8.7	13.0	5270	8.4	13.0	5510	8.9	13.0
5230	9.4	13.0	5310	9.4	13.0	5550	8.7	13.0
						5670	8.8	13.0

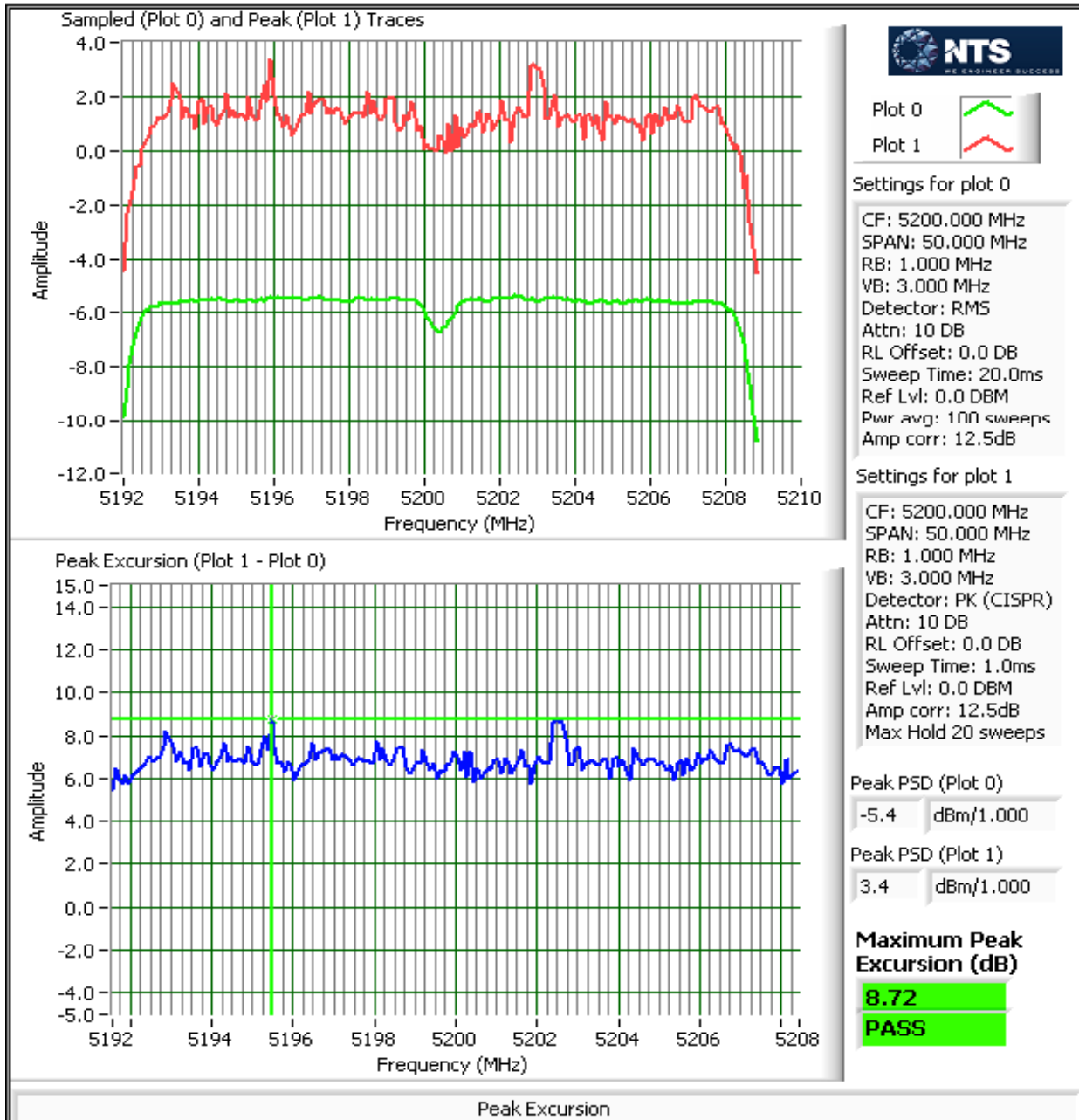
Client: Pace Americas	Job Number: J93000
Model: IPW8000 Wireless STB	T-Log Number: T93085
Contact: Mark Rieger	Project Manager: Susan Hill
Standard: FCC, IC	Project Coordinator: Irene Rademacher
	Class: N/A

### Plots Showing Peak Excursion

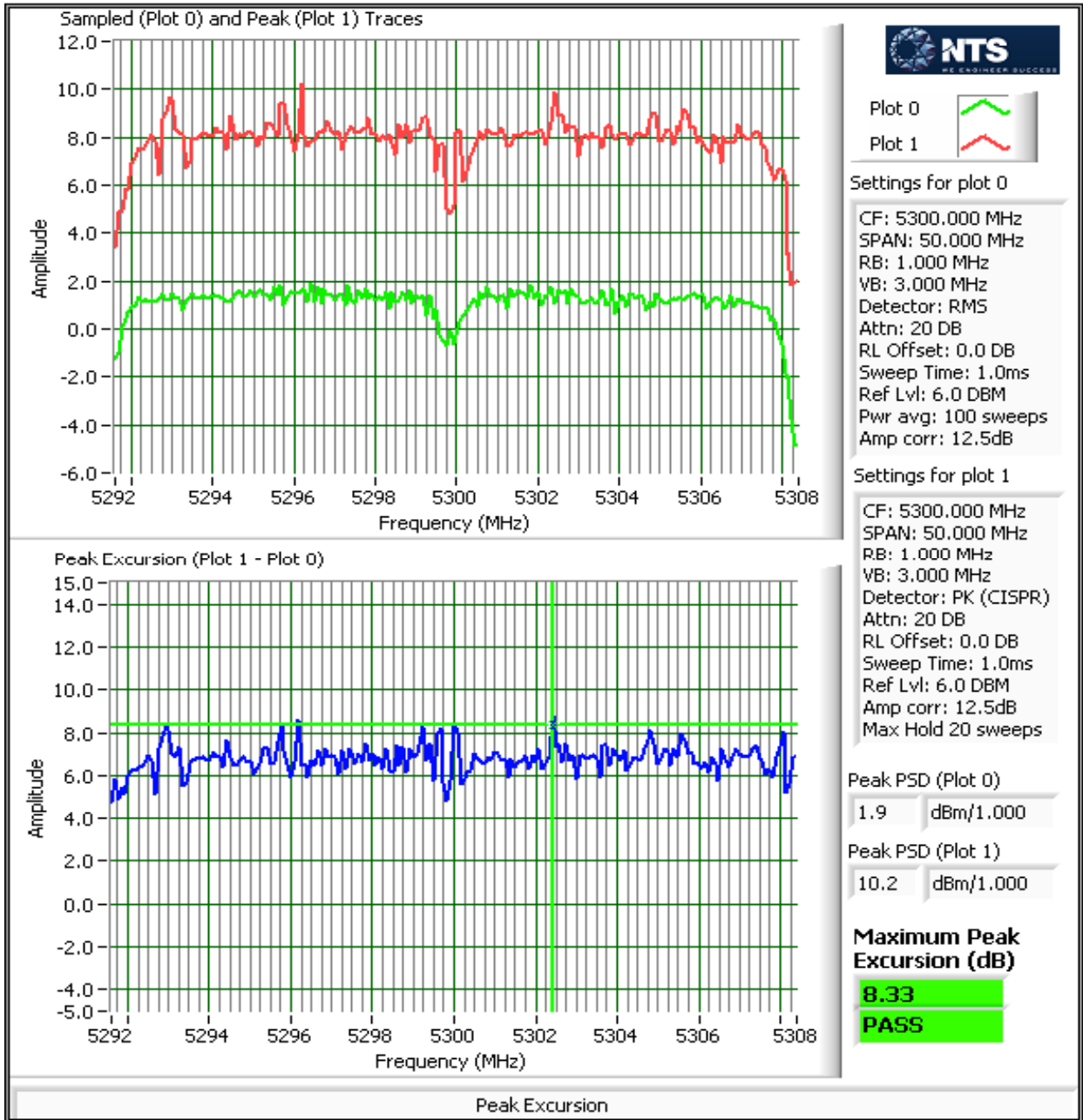
Trace A: RBW = 1MHz, VBW = 3MHz, Peak hold

Trace B: Same settings as used for power/PSD measurements (RBW = 1 MHz, VBW = 3MHz, Integrated average power)

11a

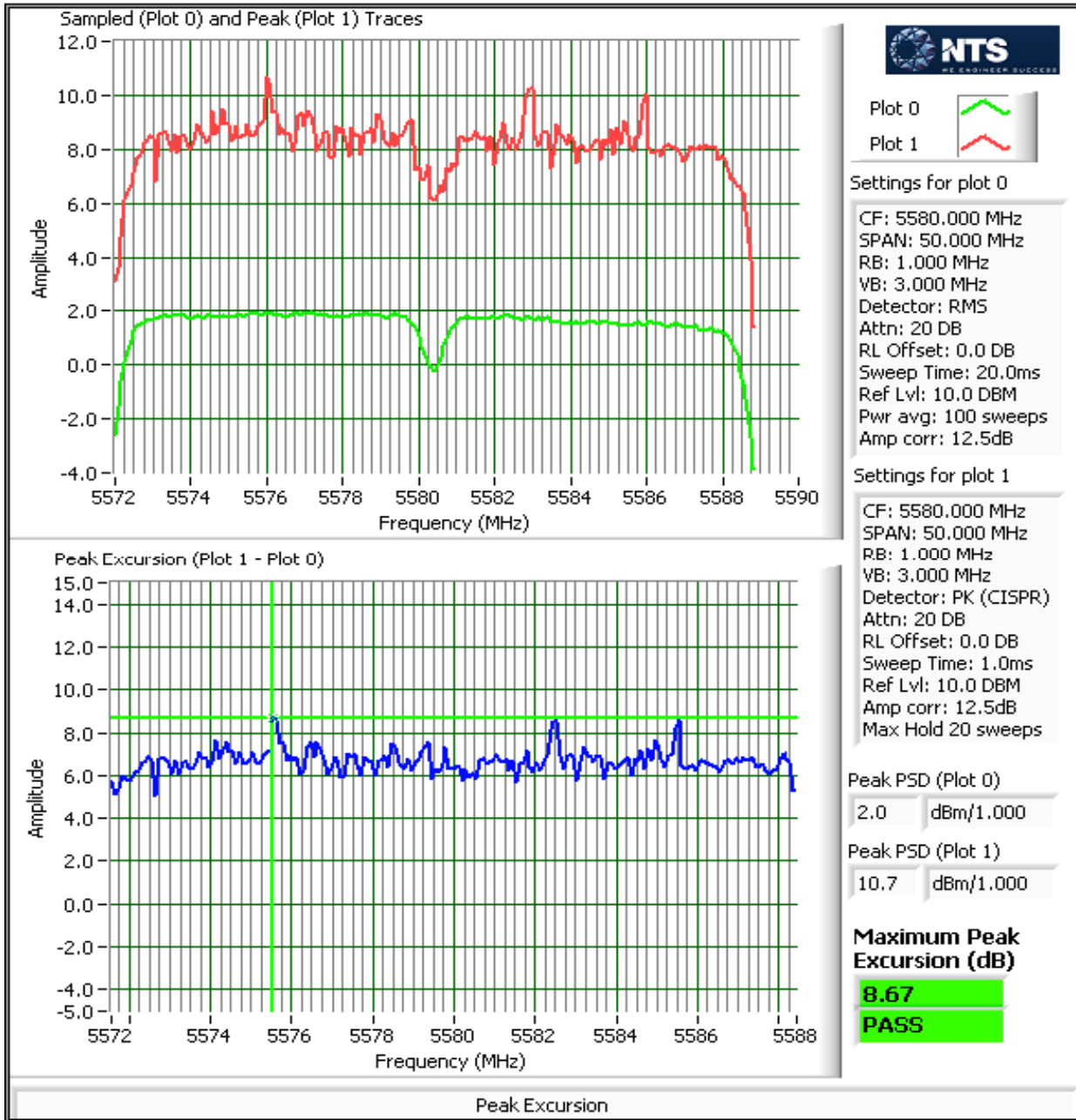


Client: Pace Americas	Job Number: J93000
Model: IPW8000 Wireless STB	T-Log Number: T93085
Contact: Mark Rieger	Project Manager: Susan Hill
Standard: FCC, IC	Project Coordinator: Irene Rademacher
	Class: N/A



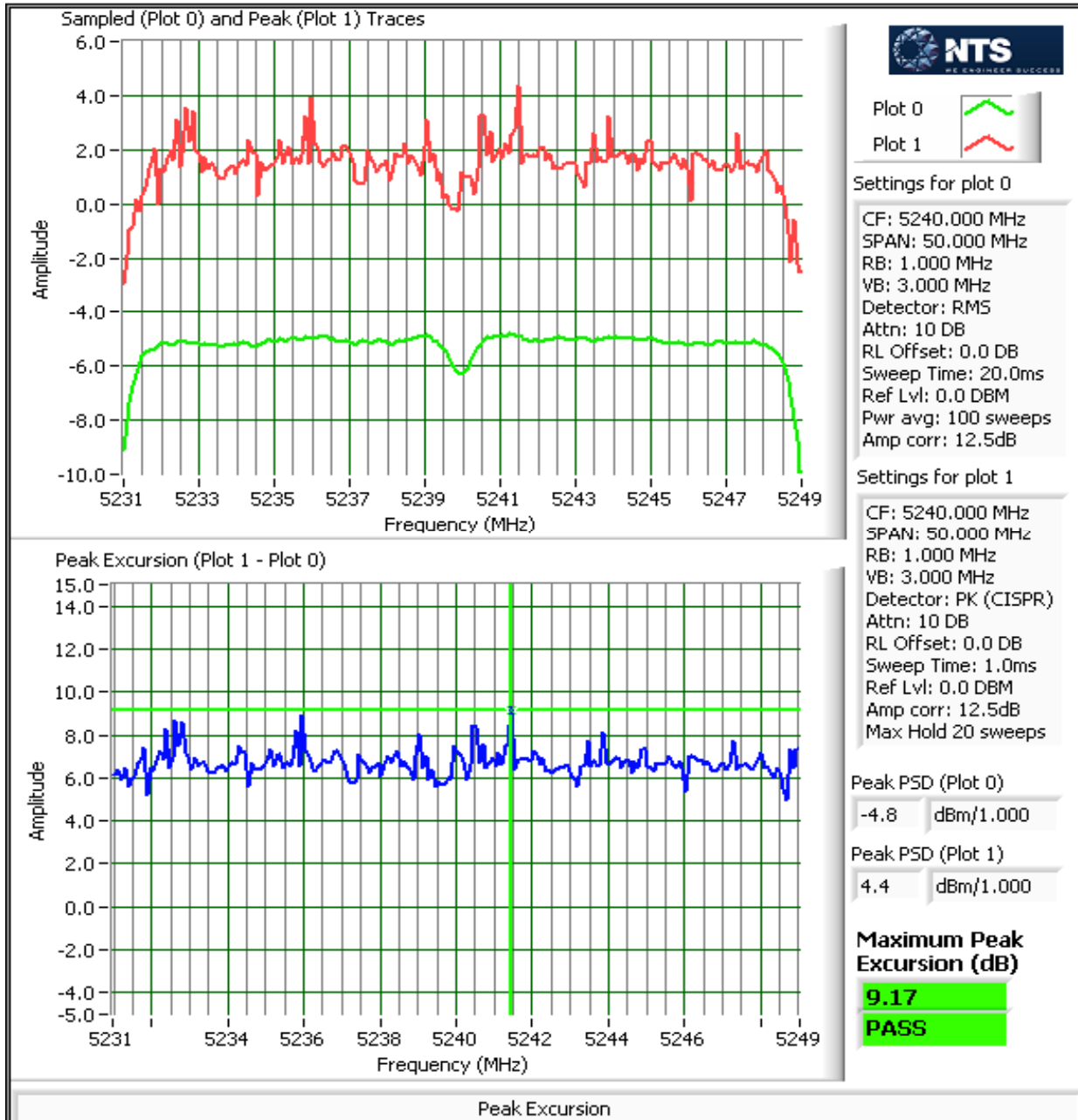


Client: Pace Americas	Job Number: J93000
Model: IPW8000 Wireless STB	T-Log Number: T93085
Contact: Mark Rieger	Project Manager: Susan Hill
Standard: FCC, IC	Project Coordinator: Irene Rademacher
	Class: N/A

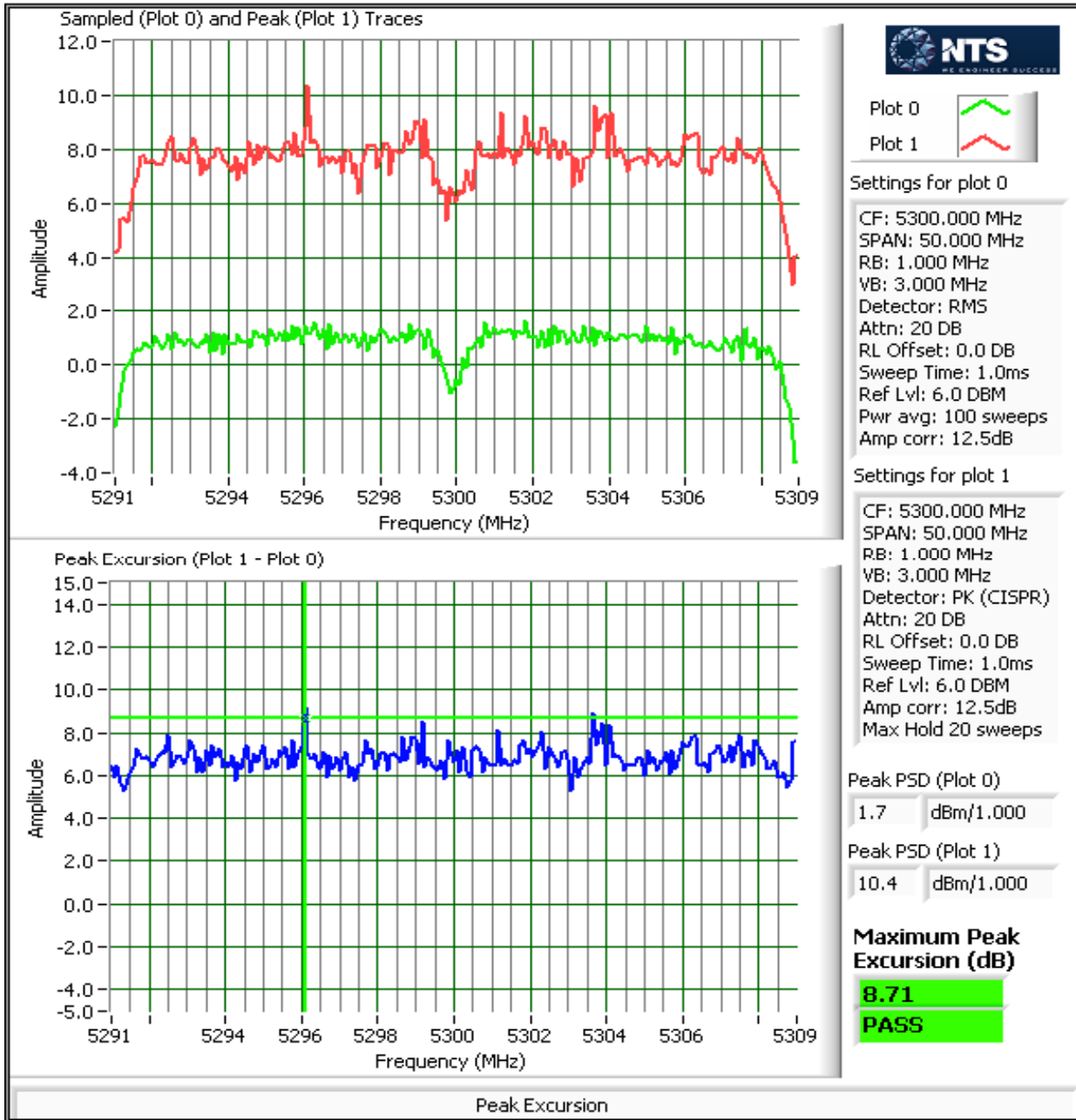


Client: Pace Americas	Job Number: J93000
Model: IPW8000 Wireless STB	T-Log Number: T93085
Contact: Mark Rieger	Project Manager: Susan Hill
Standard: FCC, IC	Project Coordinator: Irene Rademacher
	Class: N/A

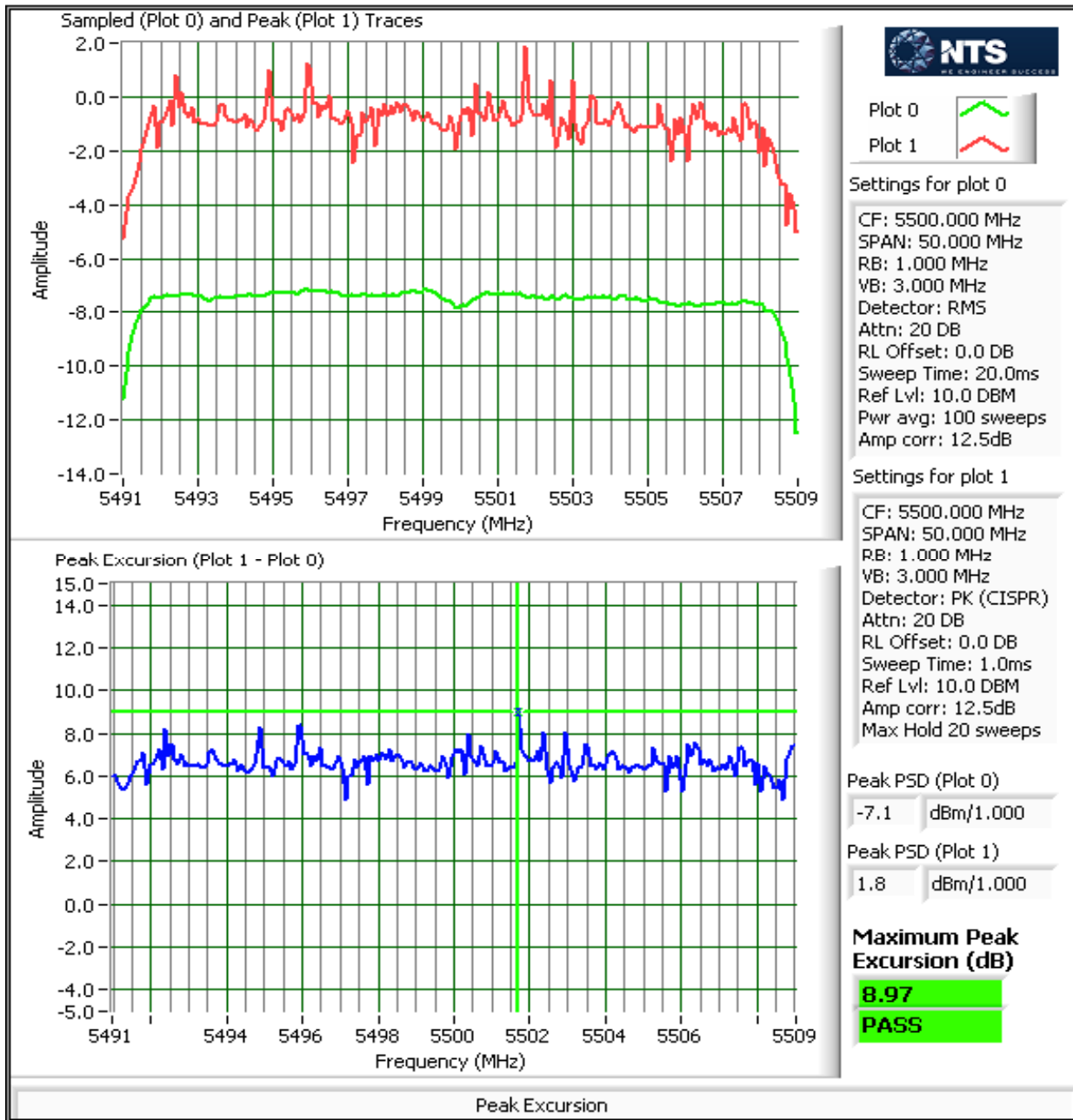
n20



Client: Pace Americas	Job Number: J93000
Model: IPW8000 Wireless STB	T-Log Number: T93085
Contact: Mark Rieger	Project Manager: Susan Hill
Standard: FCC, IC	Project Coordinator: Irene Rademacher
	Class: N/A

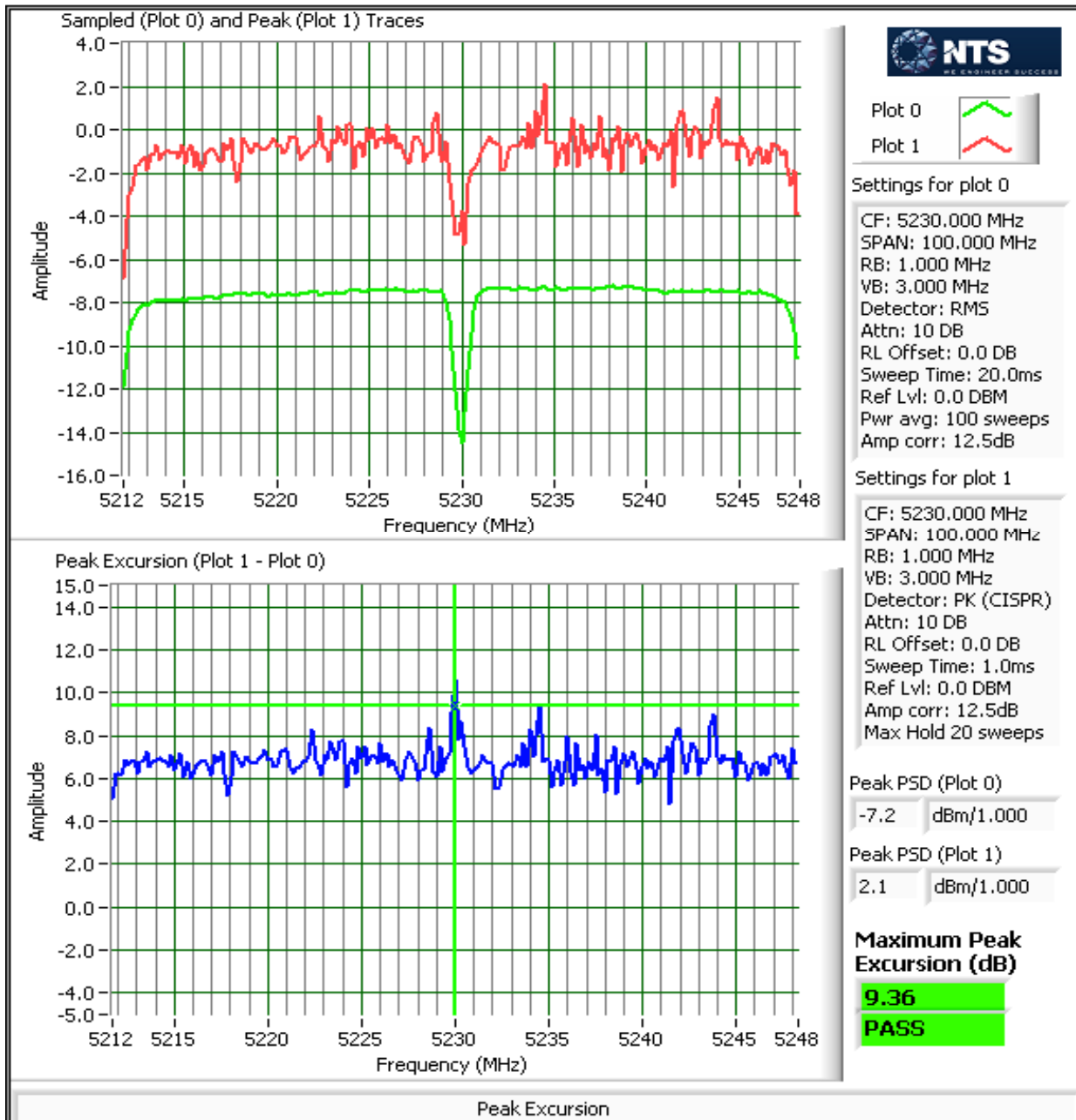


Client: Pace Americas	Job Number: J93000
Model: IPW8000 Wireless STB	T-Log Number: T93085
Contact: Mark Rieger	Project Manager: Susan Hill
Standard: FCC, IC	Project Coordinator: Irene Rademacher
	Class: N/A

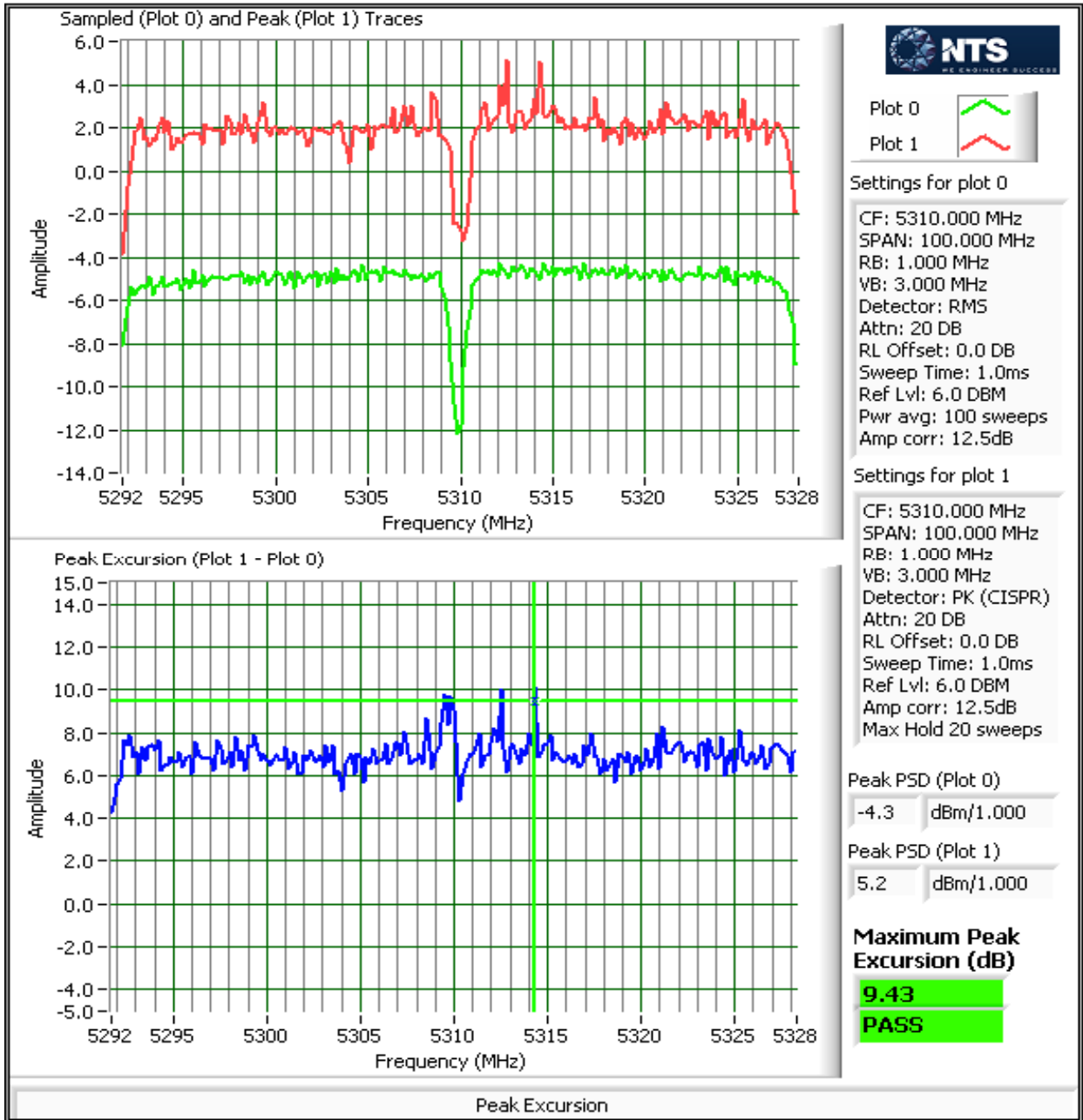


Client: Pace Americas	Job Number: J93000
Model: IPW8000 Wireless STB	T-Log Number: T93085
Contact: Mark Rieger	Project Manager: Susan Hill
Standard: FCC, IC	Project Coordinator: Irene Rademacher
	Class: N/A

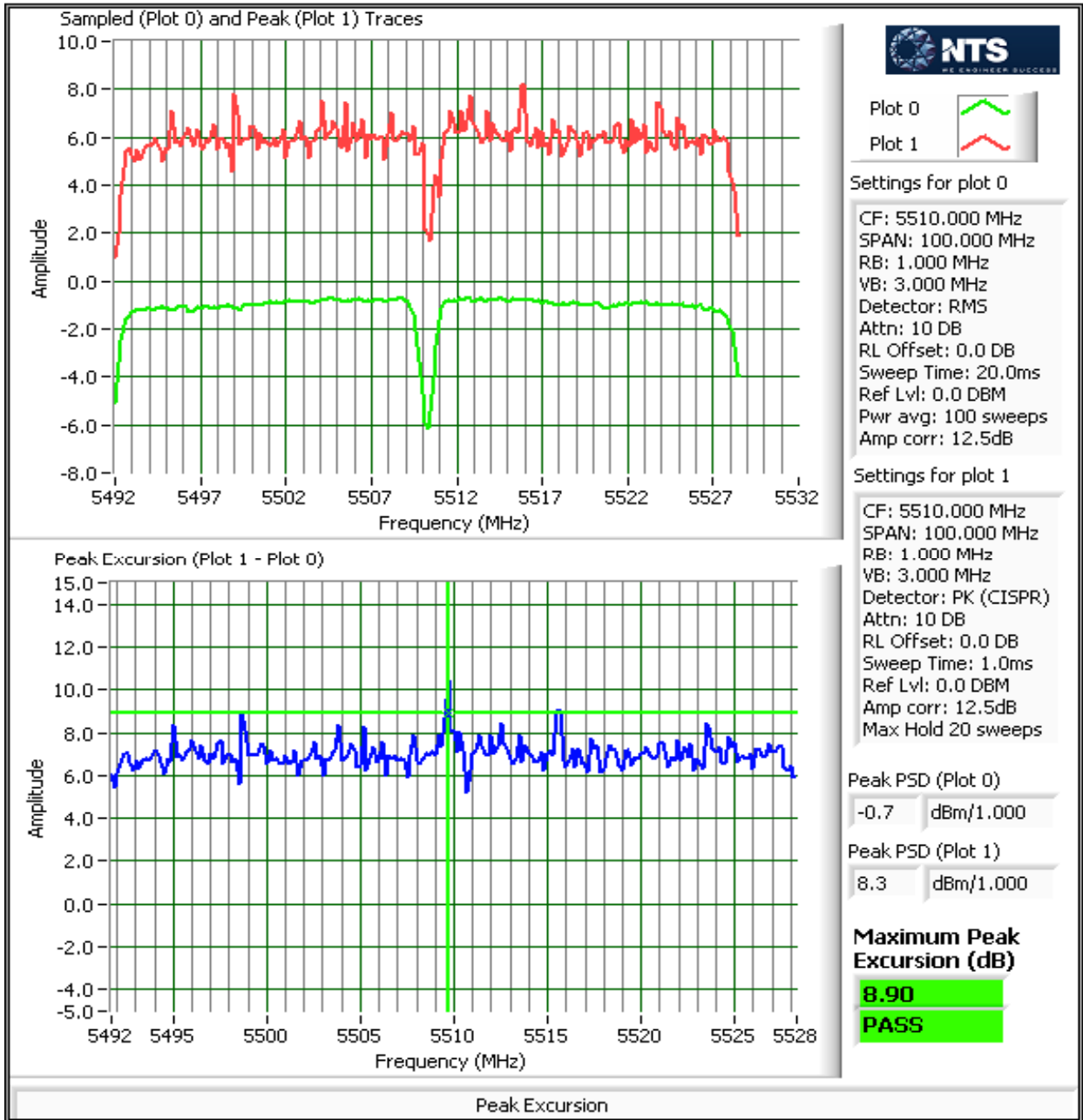
n40



Client: Pace Americas	Job Number: J93000
Model: IPW8000 Wireless STB	T-Log Number: T93085
Contact: Mark Rieger	Project Manager: Susan Hill
Standard: FCC, IC	Project Coordinator: Irene Rademacher
	Class: N/A



Client: Pace Americas	Job Number: J93000
Model: IPW8000 Wireless STB	T-Log Number: T93085
Contact: Mark Rieger	Project Manager: Susan Hill
Standard: FCC, IC	Project Coordinator: Irene Rademacher
	Class: N/A



Client: Pace Americas	Job Number: J93000
Model: IPW8000 Wireless STB	T-Log Number: T93085
	Project Manager: Susan Hill
Contact: Mark Rieger	Project Coordinator: Irene Rademacher
Standard: FCC, IC	Class: N/A

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

Date of Test: 8/12/2013  
 Test Engineer: John Caizzi / R. Varelas  
 Test Location: Lab 4A

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

Number of transmit chains: 4  
 Maximum Antenna Gain: 2.0 dBi  
 Spurious Limit: -27.0 dBm/MHz eirp  
 Adjustment for 4 chains: -6.0 dB adjustment for multiple chains.  
 Limit Used On Plots<sup>Note 1</sup>: -35.0 dBm/MHz Peak Limit (RB=VB=1MHz)

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

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

802.11a. Not done, since this mode is equivalent to n20 mode, for the purpose of spurious emissions.

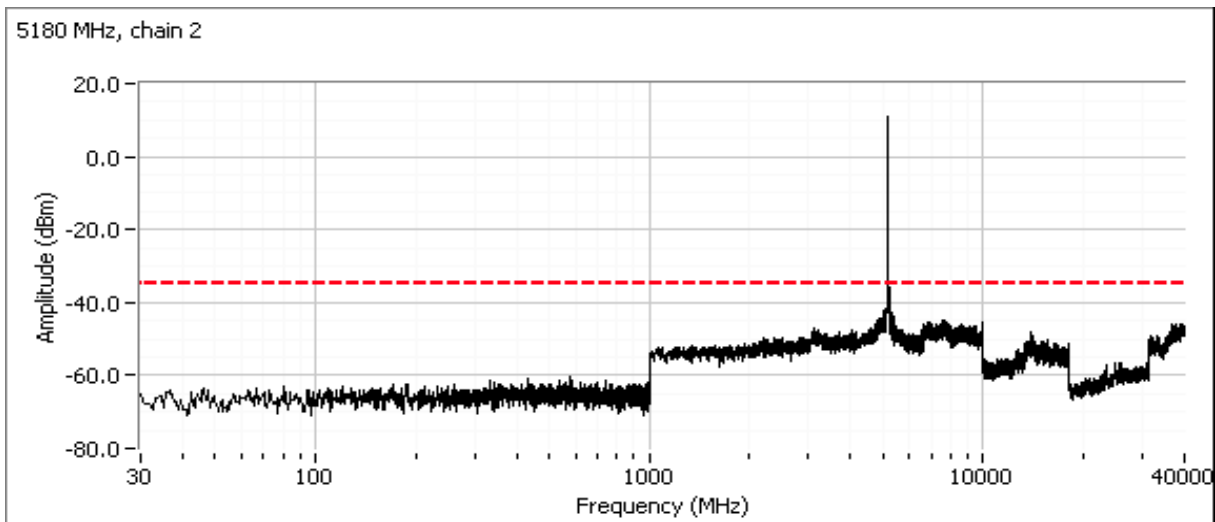
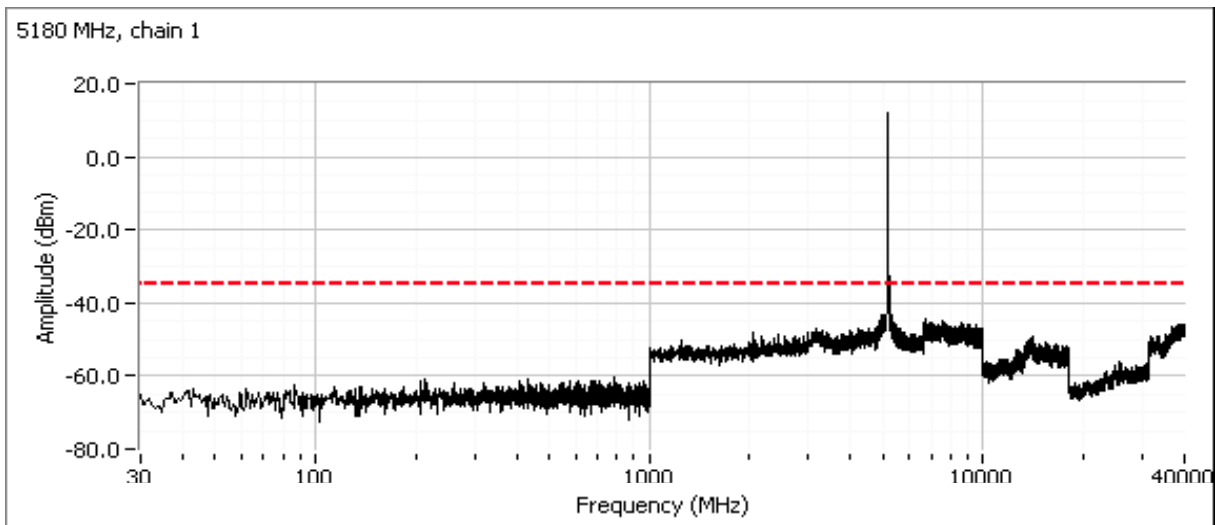


Client: Pace Americas	Job Number: J93000
Model: IPW8000 Wireless STB	T-Log Number: T93085
	Project Manager: Susan Hill
Contact: Mark Rieger	Project Coordinator: Irene Rademacher
Standard: FCC, IC	Class: N/A

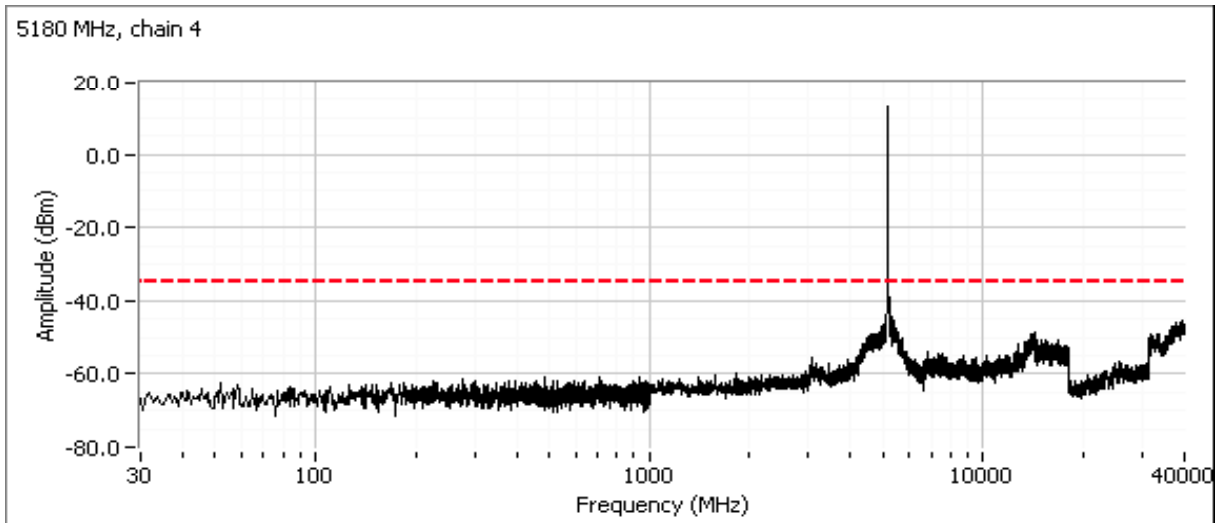
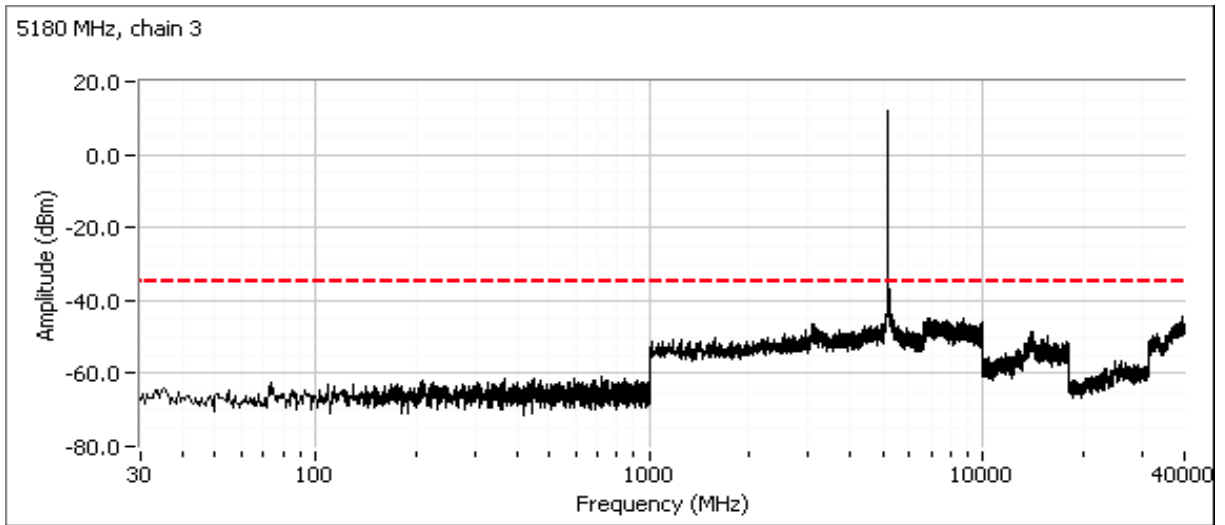
802.11n20, setting = 18

Low channel, 5150 - 5250 MHz Band

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

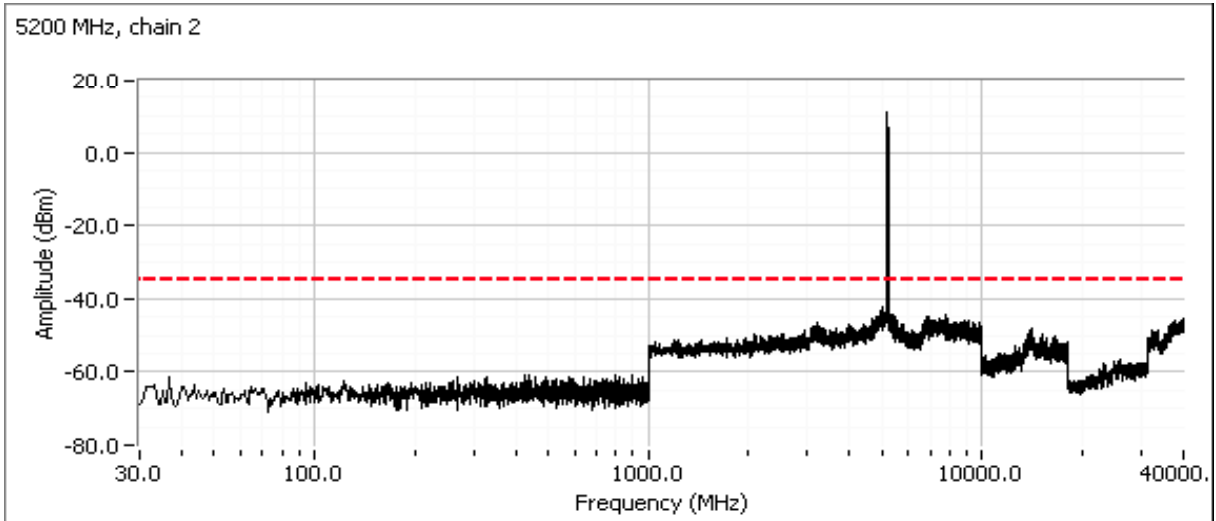
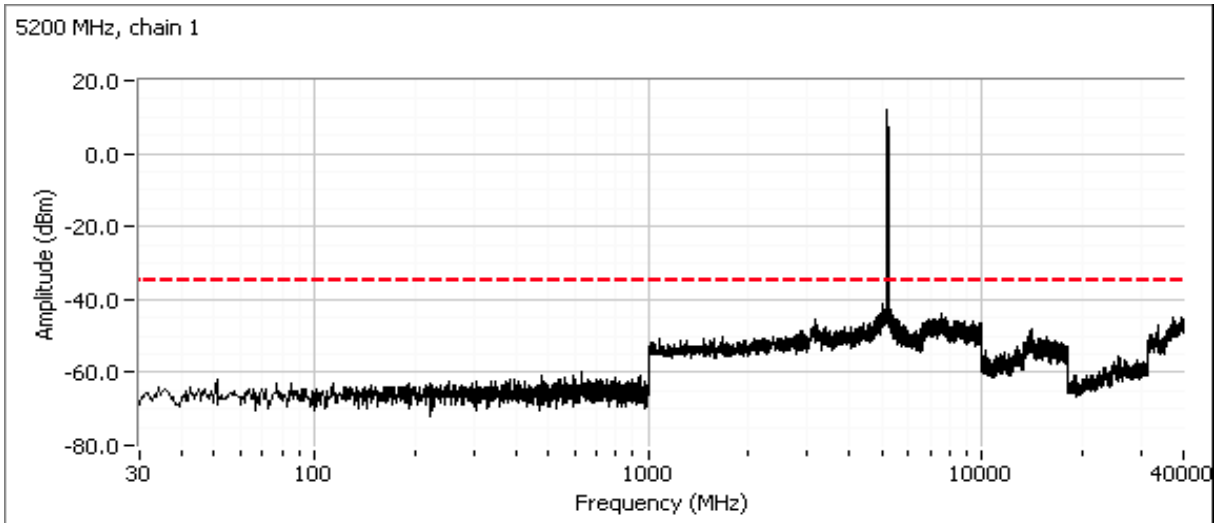


Client: Pace Americas	Job Number: J93000
Model: IPW8000 Wireless STB	T-Log Number: T93085
	Project Manager: Susan Hill
Contact: Mark Rieger	Project Coordinator: Irene Rademacher
Standard: FCC, IC	Class: N/A

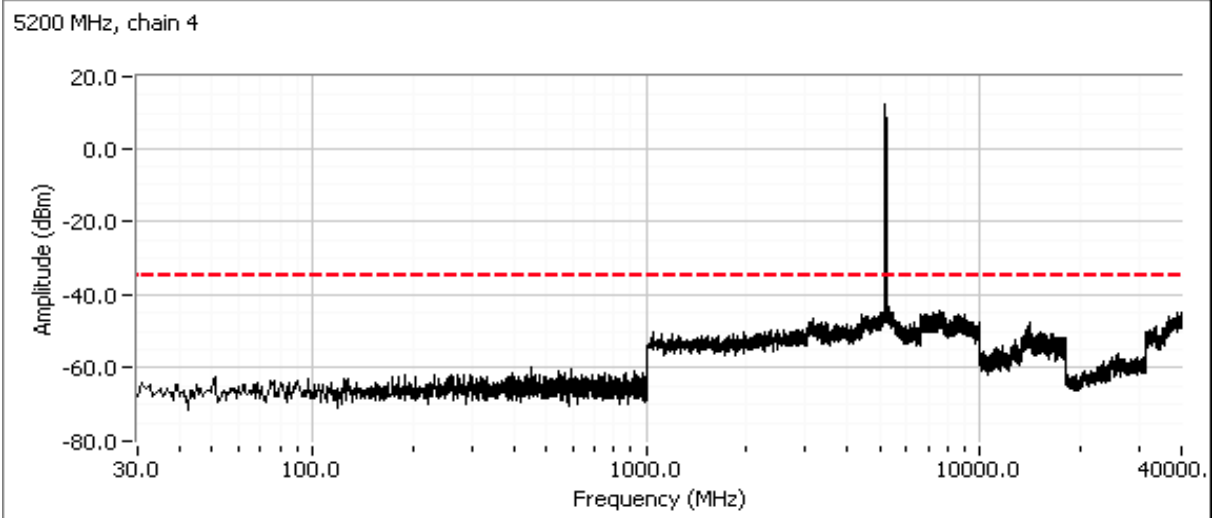
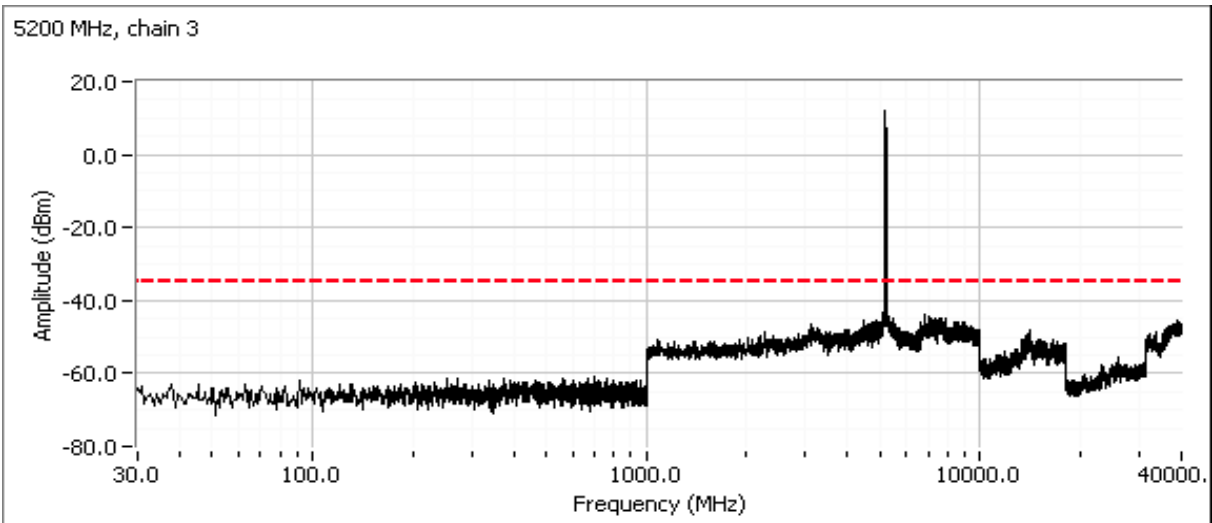


Client: Pace Americas	Job Number: J93000
Model: IPW8000 Wireless STB	T-Log Number: T93085
Contact: Mark Rieger	Project Manager: Susan Hill
Standard: FCC, IC	Project Coordinator: Irene Rademacher
	Class: N/A

Center channel, 5150 - 5250 MHz Band



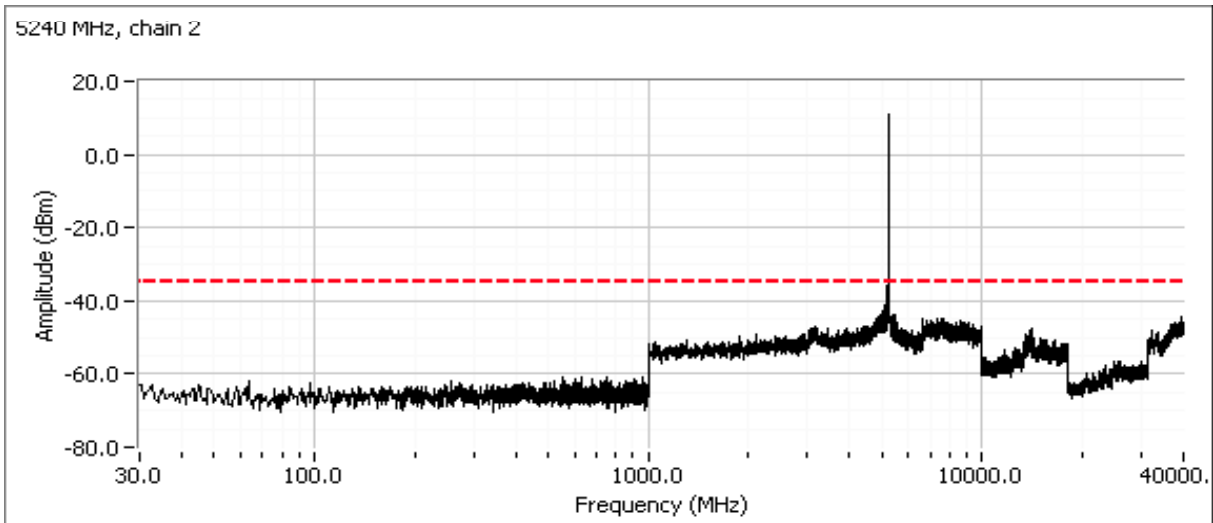
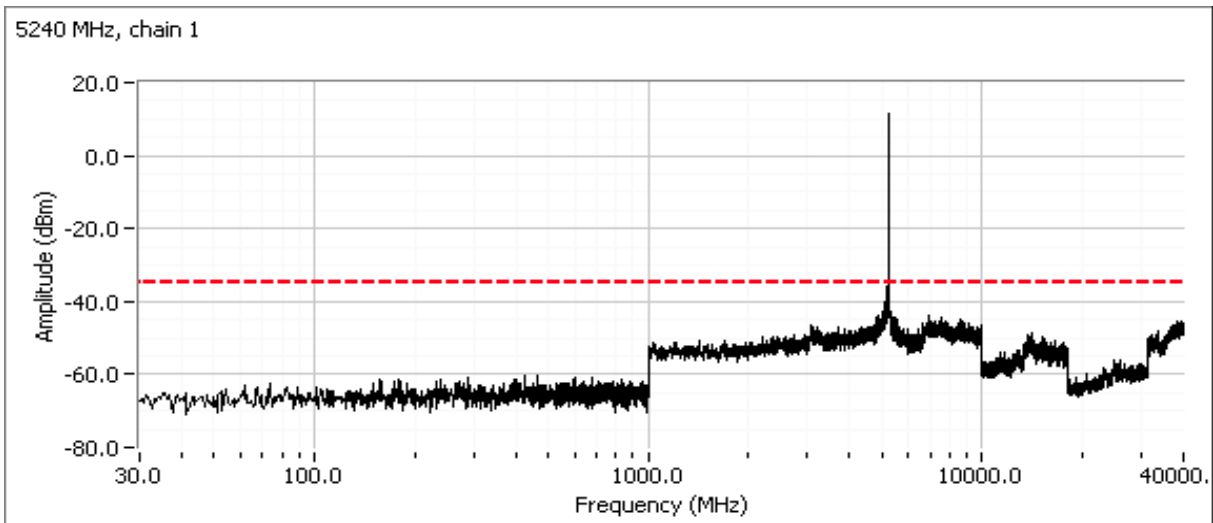
Client: Pace Americas	Job Number: J93000
Model: IPW8000 Wireless STB	T-Log Number: T93085
	Project Manager: Susan Hill
Contact: Mark Rieger	Project Coordinator: Irene Rademacher
Standard: FCC, IC	Class: N/A



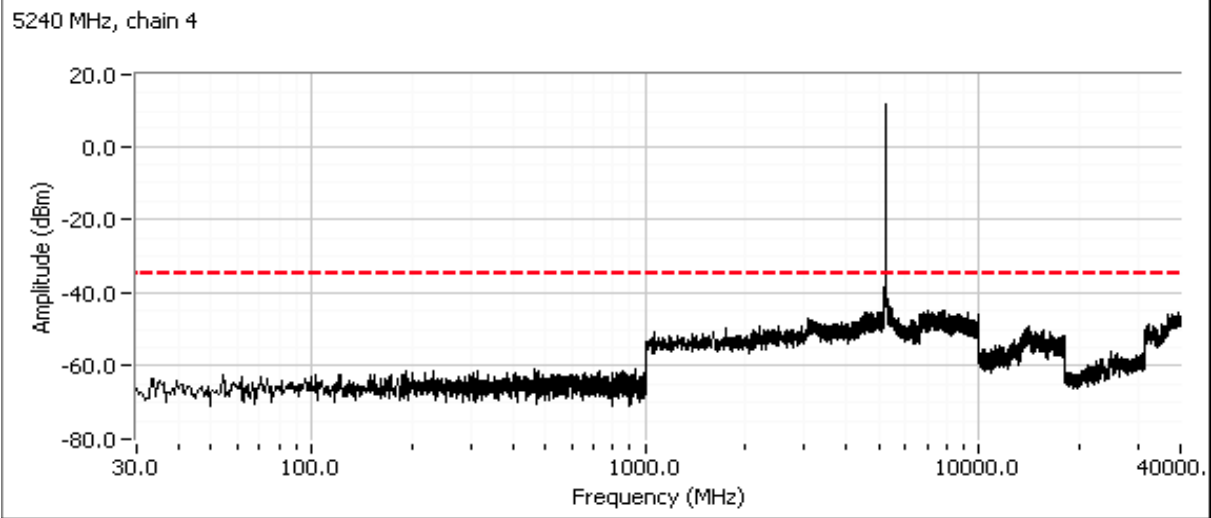
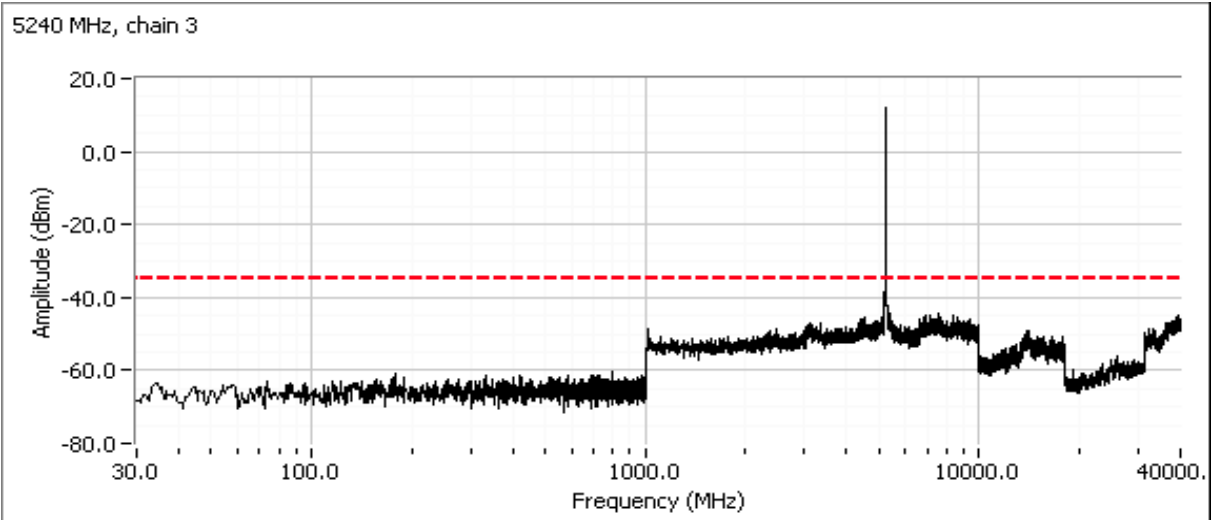
Client: Pace Americas	Job Number: J93000
Model: IPW8000 Wireless STB	T-Log Number: T93085
Contact: Mark Rieger	Project Manager: Susan Hill
Standard: FCC, IC	Project Coordinator: Irene Rademacher
	Class: N/A

### High channel, 5150 - 5250 MHz Band

Note: If device does not operate in the 5250 - 5350 MHz band include a plot showing -20dBc at 5250 MHz

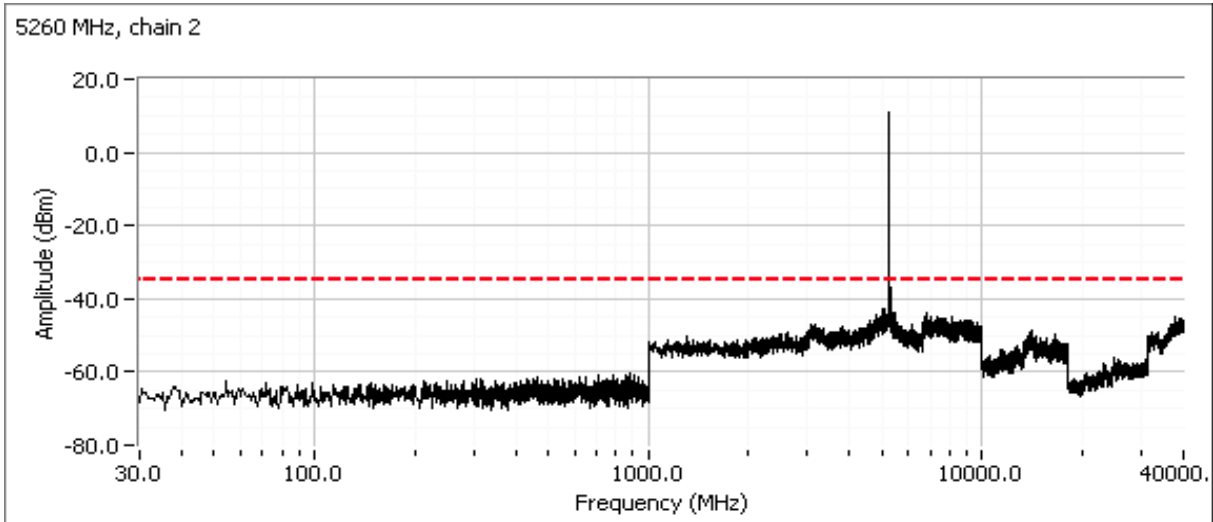
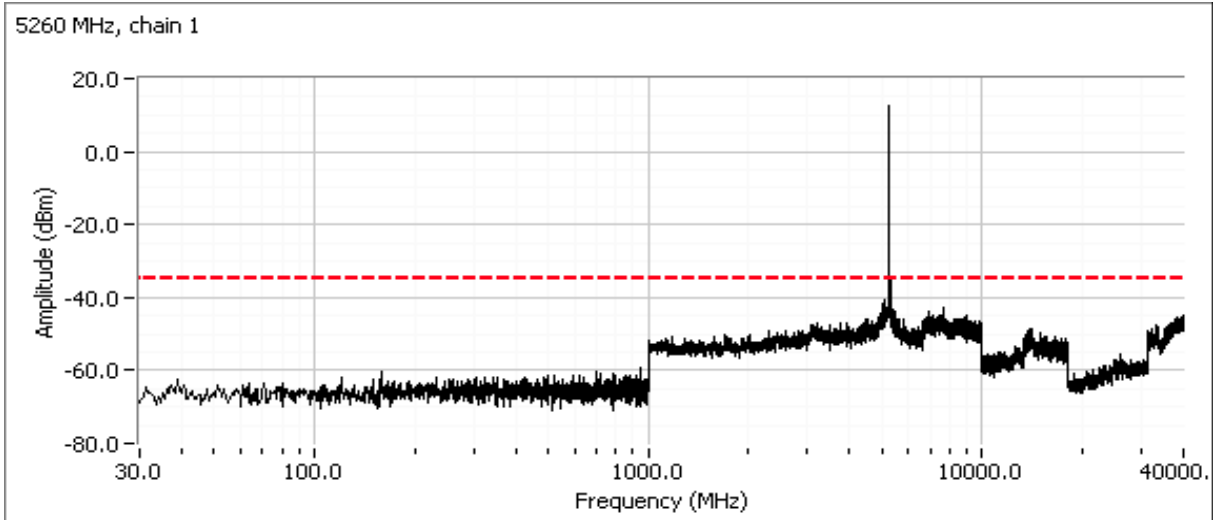


Client: Pace Americas	Job Number: J93000
Model: IPW8000 Wireless STB	T-Log Number: T93085
	Project Manager: Susan Hill
Contact: Mark Rieger	Project Coordinator: Irene Rademacher
Standard: FCC, IC	Class: N/A

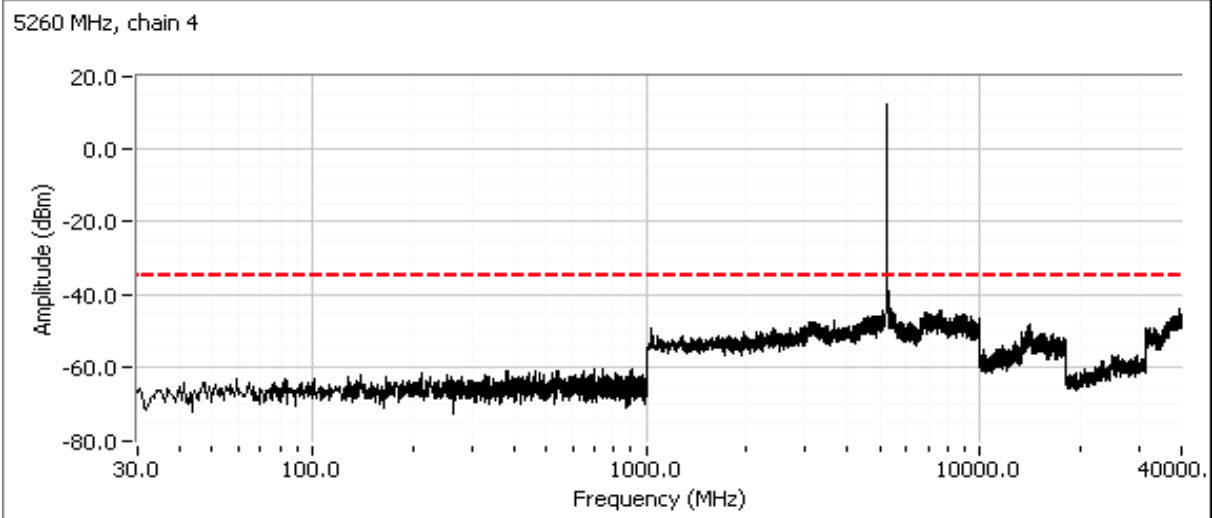
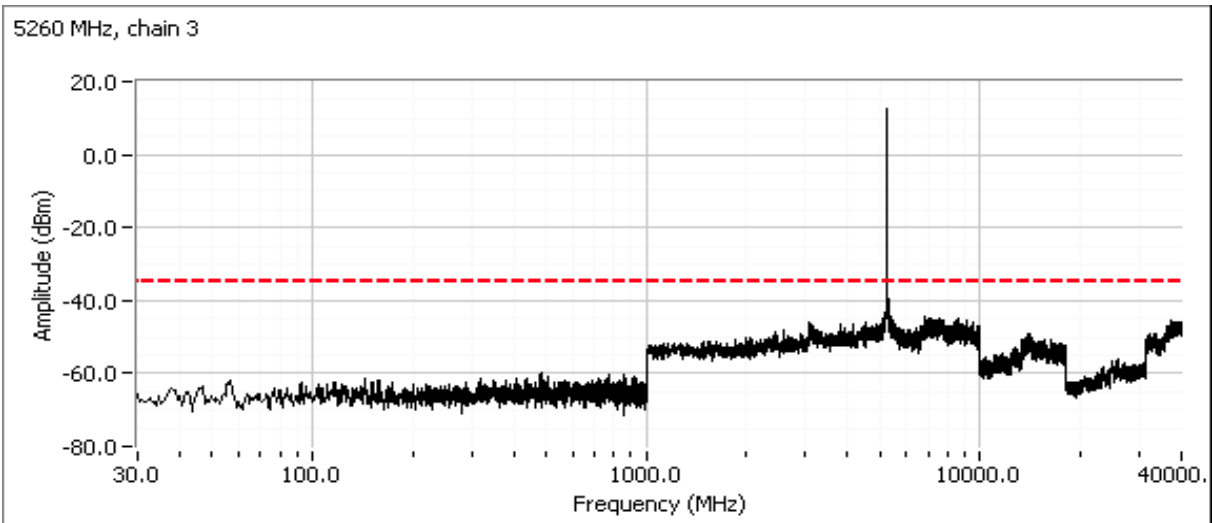


Client: Pace Americas	Job Number: J93000
Model: IPW8000 Wireless STB	T-Log Number: T93085
Contact: Mark Rieger	Project Manager: Susan Hill
Standard: FCC, IC	Project Coordinator: Irene Rademacher
	Class: N/A

Low channel, 5250 - 5350 MHz Band  
 Wide-band plot, RB=VB=1MHz (Peak measurements versus limit).



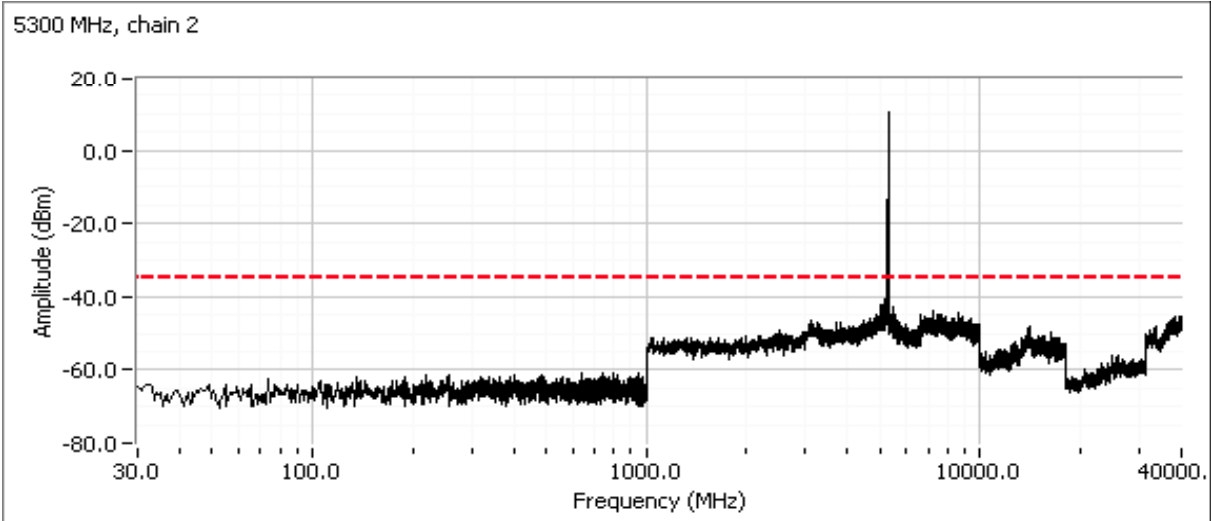
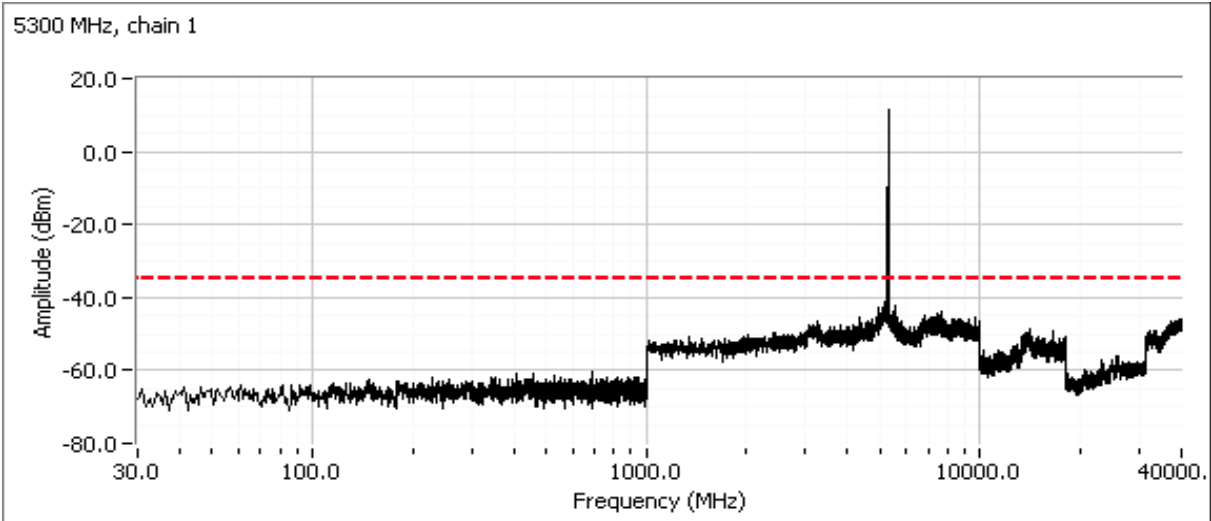
Client: Pace Americas	Job Number: J93000
Model: IPW8000 Wireless STB	T-Log Number: T93085
	Project Manager: Susan Hill
Contact: Mark Rieger	Project Coordinator: Irene Rademacher
Standard: FCC, IC	Class: N/A



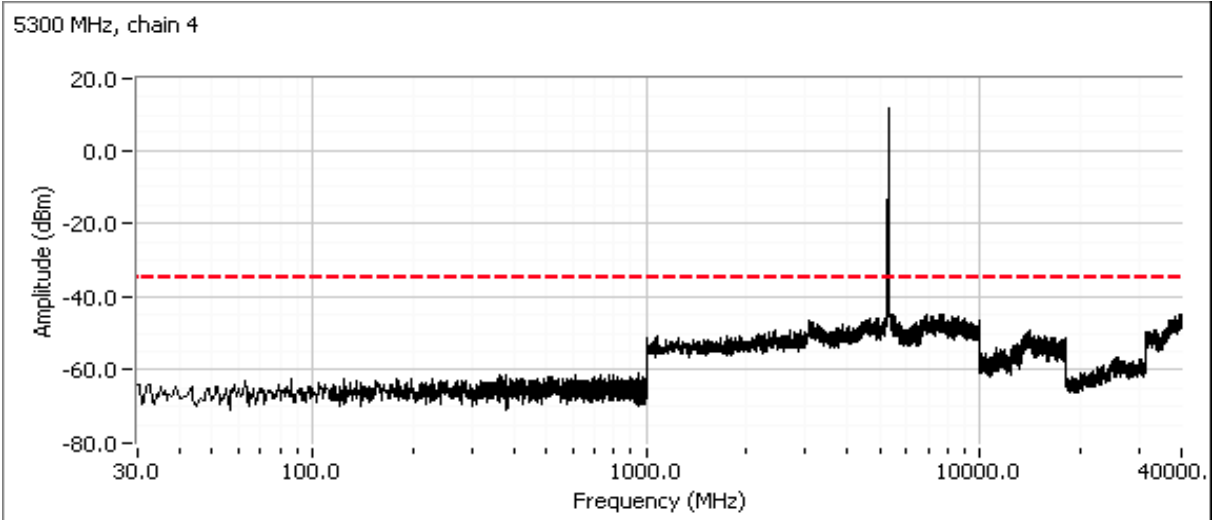
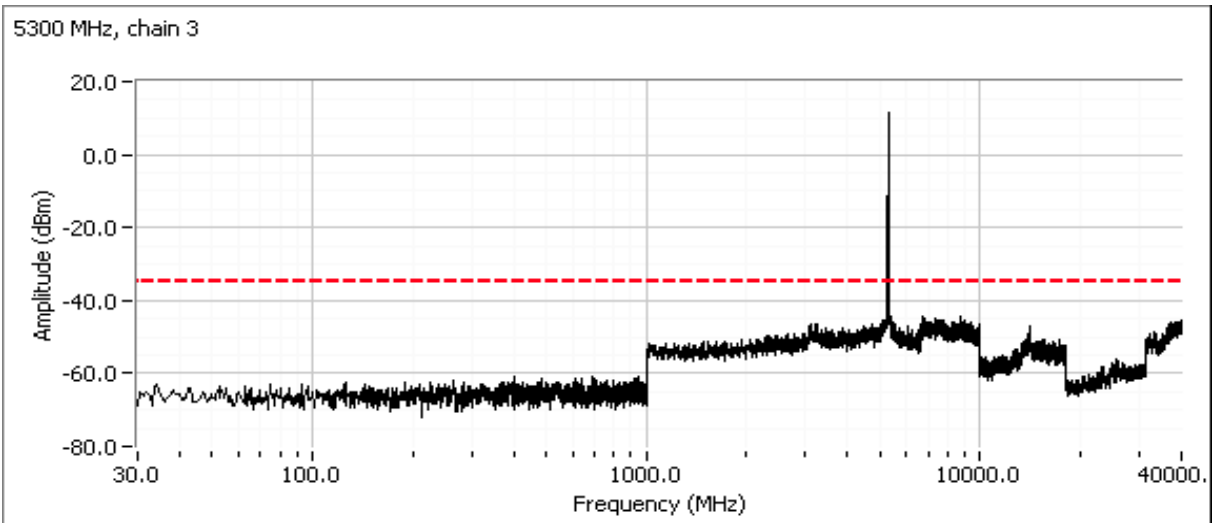


Client: Pace Americas	Job Number: J93000
Model: IPW8000 Wireless STB	T-Log Number: T93085
	Project Manager: Susan Hill
Contact: Mark Rieger	Project Coordinator: Irene Rademacher
Standard: FCC, IC	Class: N/A

Center channel, 5250 - 5350 MHz Band



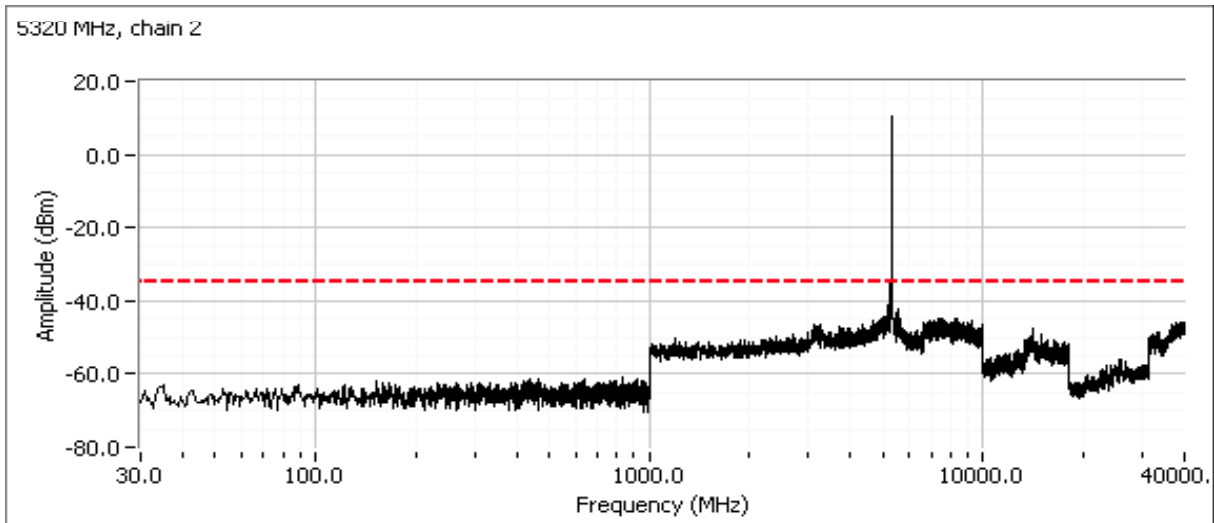
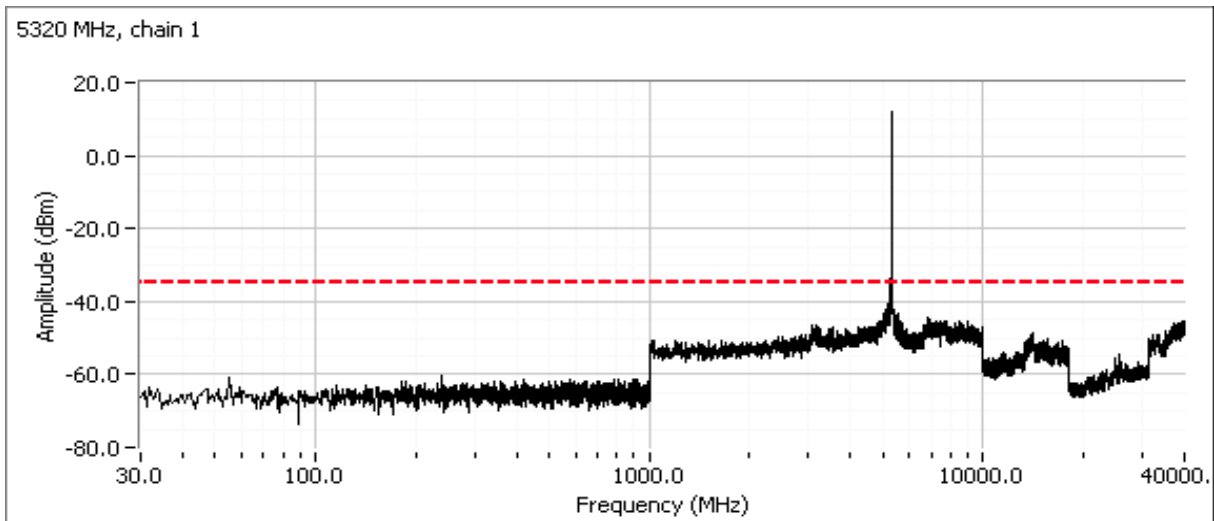
Client: Pace Americas	Job Number: J93000
Model: IPW8000 Wireless STB	T-Log Number: T93085
	Project Manager: Susan Hill
Contact: Mark Rieger	Project Coordinator: Irene Rademacher
Standard: FCC, IC	Class: N/A



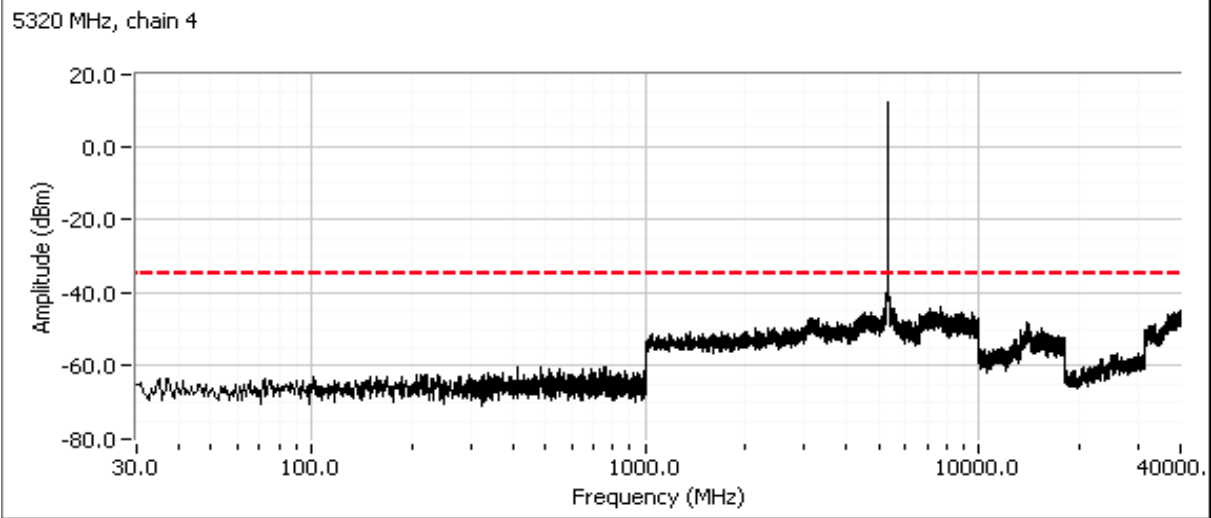
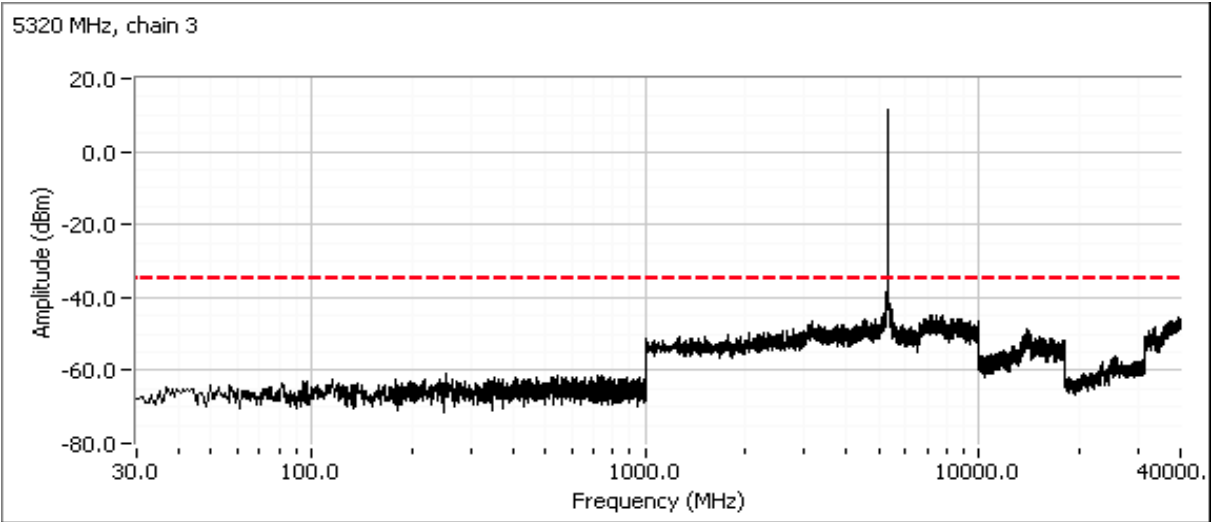
Client: Pace Americas	Job Number: J93000
Model: IPW8000 Wireless STB	T-Log Number: T93085
	Project Manager: Susan Hill
Contact: Mark Rieger	Project Coordinator: Irene Rademacher
Standard: FCC, IC	Class: N/A

### High channel, 5250 - 5350 MHz Band

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

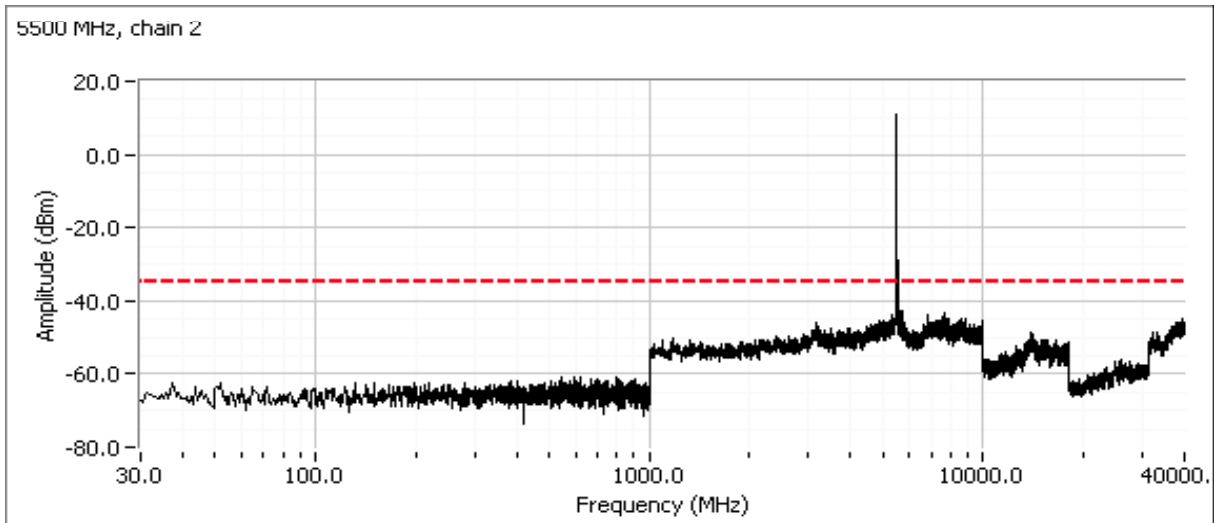
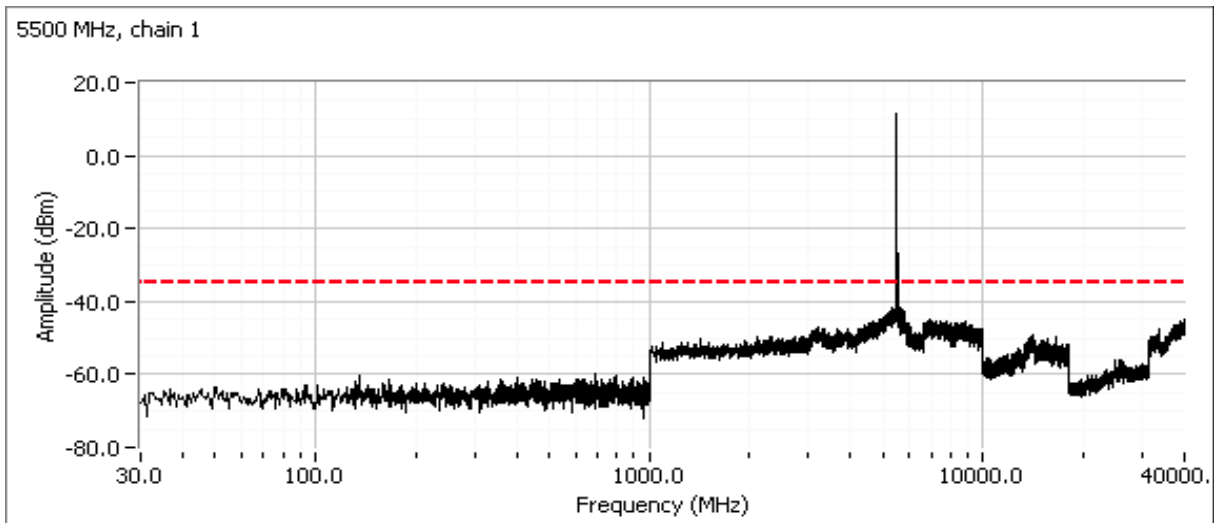


Client: Pace Americas	Job Number: J93000
Model: IPW8000 Wireless STB	T-Log Number: T93085
	Project Manager: Susan Hill
Contact: Mark Rieger	Project Coordinator: Irene Rademacher
Standard: FCC, IC	Class: N/A

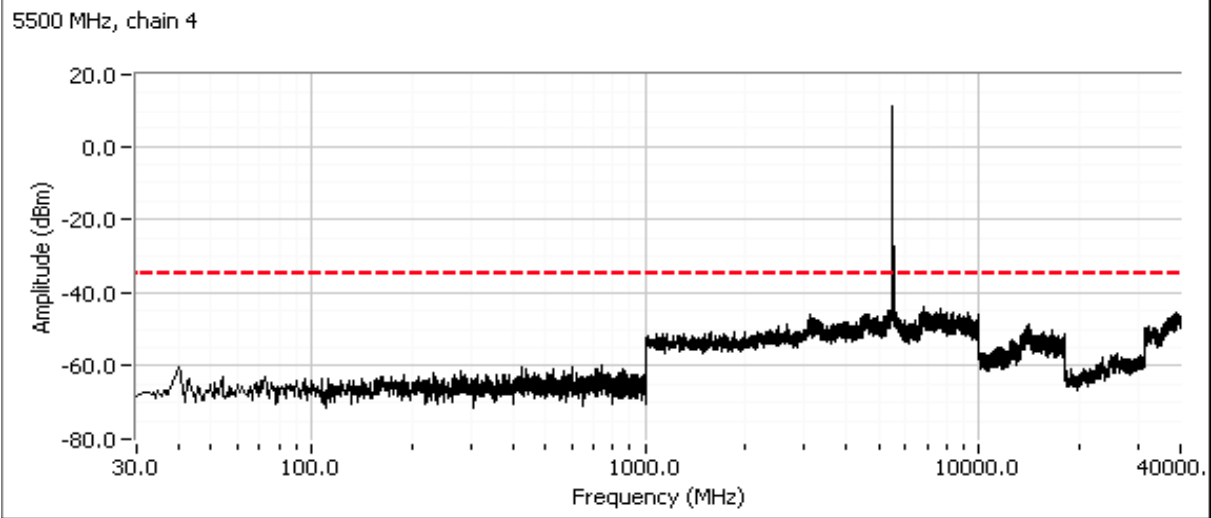
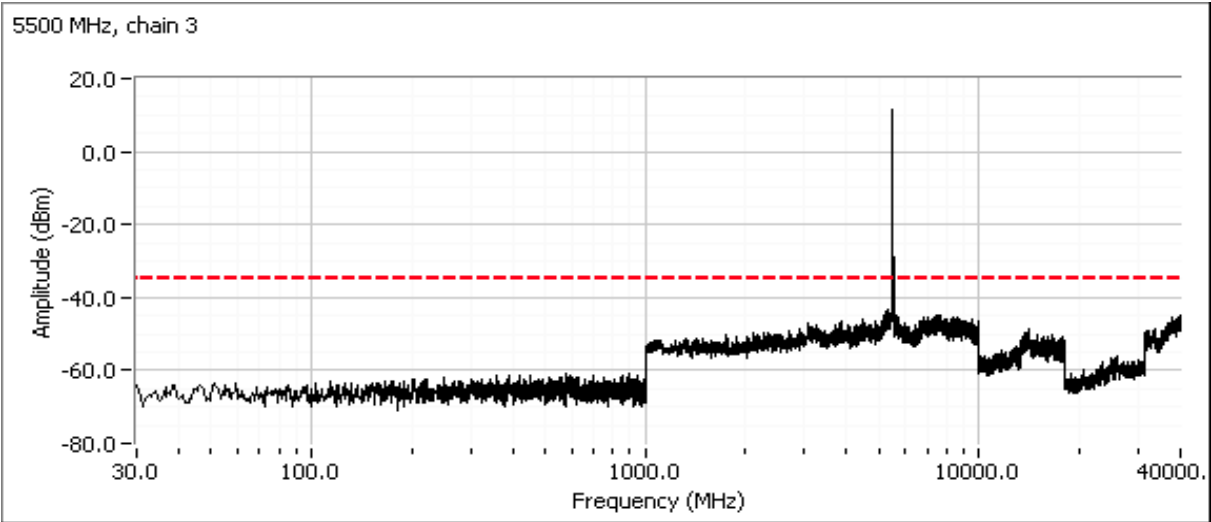


Client: Pace Americas	Job Number: J93000
Model: IPW8000 Wireless STB	T-Log Number: T93085
	Project Manager: Susan Hill
Contact: Mark Rieger	Project Coordinator: Irene Rademacher
Standard: FCC, IC	Class: N/A

Low channel, 5470 - 5725 MHz Band  
 Wide-band plot, RB=VB=1MHz (Peak measurements versus limit).



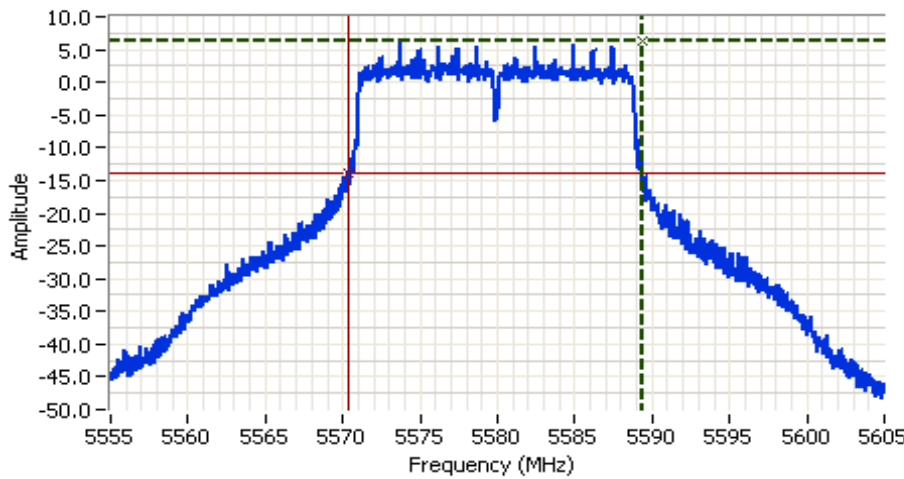
Client: Pace Americas	Job Number: J93000
Model: IPW8000 Wireless STB	T-Log Number: T93085
	Project Manager: Susan Hill
Contact: Mark Rieger	Project Coordinator: Irene Rademacher
Standard: FCC, IC	Class: N/A



Client: Pace Americas	Job Number: J93000
Model: IPW8000 Wireless STB	T-Log Number: T93085
Contact: Mark Rieger	Project Manager: Susan Hill
Standard: FCC, IC	Project Coordinator: Irene Rademacher
	Class: N/A

### Center channel, 5470 - 5725 MHz Band

For master devices - This plot is showing that the 20dB bandwidth of the channel closest to 5600 MHz does not spill into the 5600-5650 MHz band. RB > 1% of span.



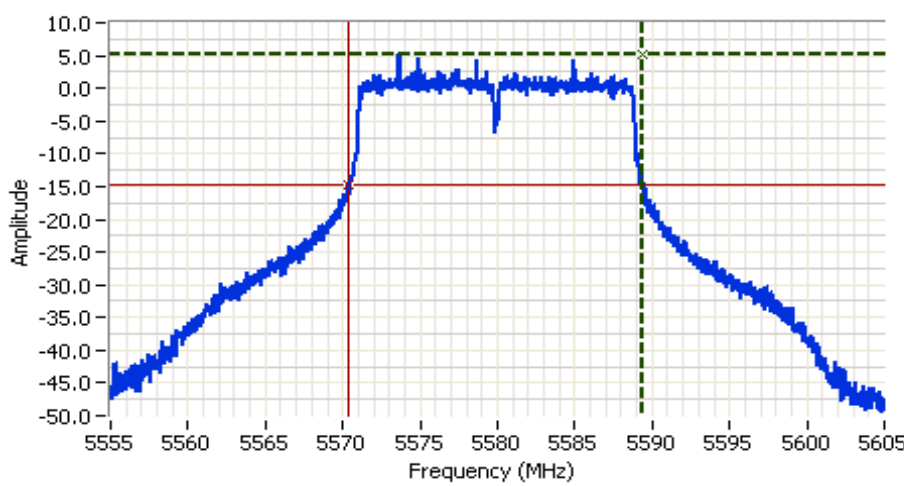
**Analyzer Settings**

- Agilent Technologies, E4446A
- CF: 5580.000 MHz
- SPAN: 50.000 MHz
- RB: 100 kHz
- VB: 200 kHz
- Detector: POS
- Attn: 20 DB
- RL Offset: 12.5 DB
- Sweep Time: 5.0ms
- Ref Lvl: 19.5 DBM

**Comments**

- 20dB BW: 19.040 MHz
- FH: 5589.3781 MHz
- Chain 1

Cursor 1: 5589.3781 6.16  
 Cursor 2: 5570.3384 -13.84  
 Delta Freq: 19.040  
 Delta Amplitude: 20.00



**Analyzer Settings**

- Agilent Technologies, E4446A
- CF: 5580.000 MHz
- SPAN: 50.000 MHz
- RB: 100 kHz
- VB: 200 kHz
- Detector: POS
- Attn: 20 DB
- RL Offset: 12.5 DB
- Sweep Time: 5.0ms
- Ref Lvl: 19.5 DBM

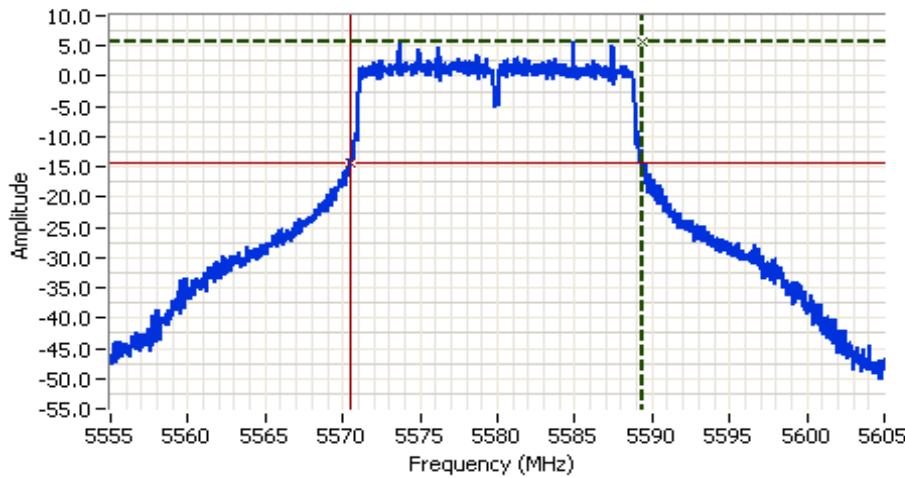
**Comments**

- 20dB BW: 19.056 MHz
- FH: 5589.4281 MHz
- Chain 2

Cursor 1: 5589.4281 5.17  
 Cursor 2: 5570.3718 -14.83  
 Delta Freq: 19.056  
 Delta Amplitude: 20.00



Client: Pace Americas	Job Number: J93000
Model: IPW8000 Wireless STB	T-Log Number: T93085
Contact: Mark Rieger	Project Manager: Susan Hill
Standard: FCC, IC	Project Coordinator: Irene Rademacher
	Class: N/A

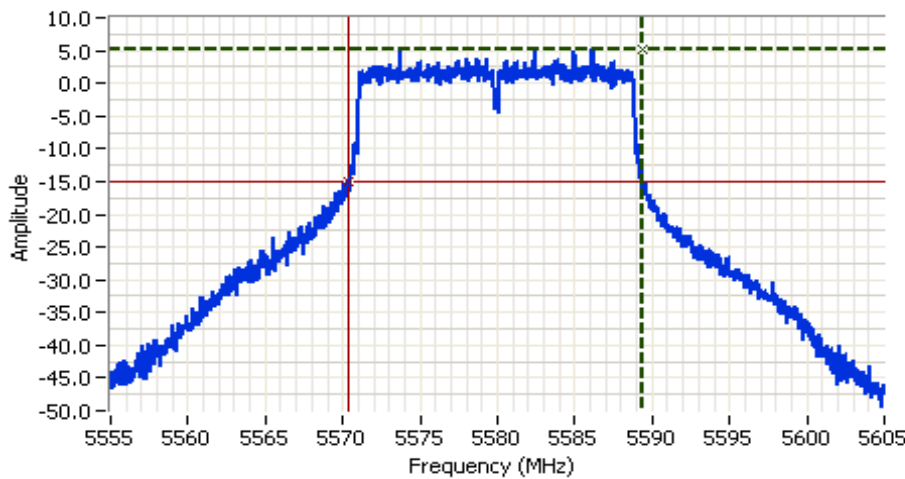


**Analyzer Settings**  
 Agilent Technologies, E4446A  
 CF: 5580.000 MHz  
 SPAN: 50.000 MHz  
 RB: 100 kHz  
 VB: 200 kHz  
 Detector: POS  
 Attn: 20 DB  
 RL Offset: 12.5 DB  
 Sweep Time: 5.0ms  
 Ref Lvl: 19.5 DBM

**Comments**  
 20dB BW: 18.823 MHz  
 FH: 5589.3781 MHz  
 Chain 3

Cursor 1 5589.3781 5.68  
 Cursor 2 5570.5552 -14.32

Delta Freq. 18.823  
 Delta Amplitude 20.00



**Analyzer Settings**  
 Agilent Technologies, E4446A  
 CF: 5580.000 MHz  
 SPAN: 50.000 MHz  
 RB: 100 kHz  
 VB: 200 kHz  
 Detector: POS  
 Attn: 20 DB  
 RL Offset: 12.5 DB  
 Sweep Time: 5.0ms  
 Ref Lvl: 19.5 DBM

**Comments**  
 20dB BW: 19.090 MHz  
 FH: 5589.4115 MHz  
 Chain 4

Cursor 1 5589.4115 5.08  
 Cursor 2 5570.3218 -14.92

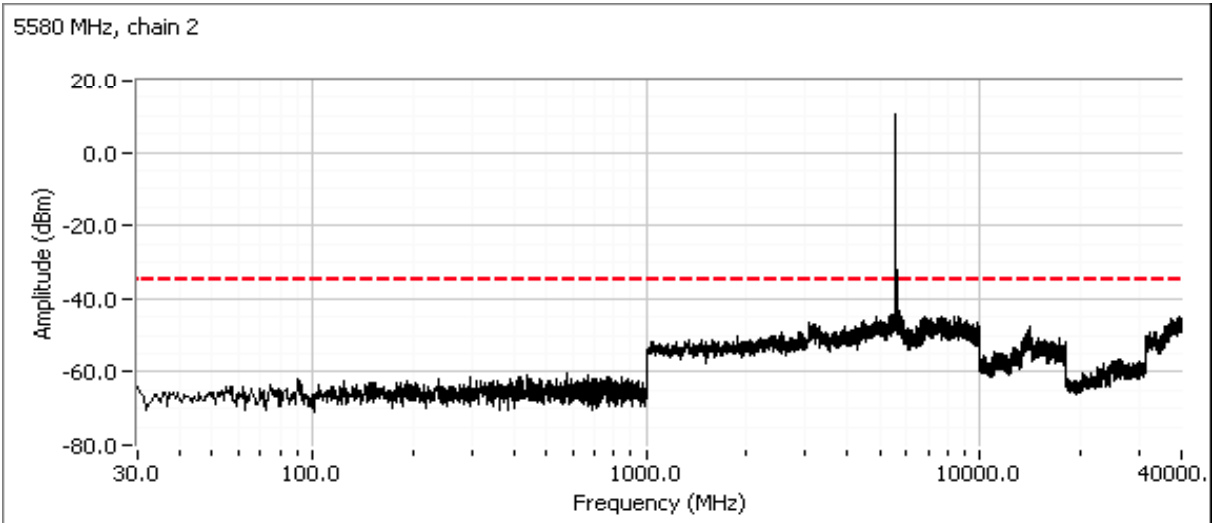
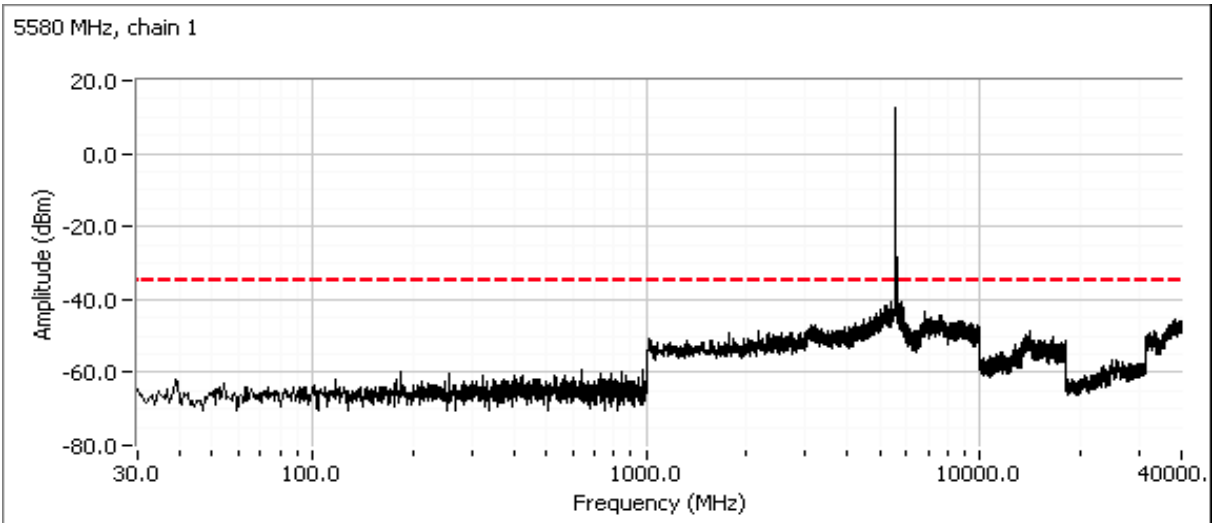
Delta Freq. 19.090  
 Delta Amplitude 20.00



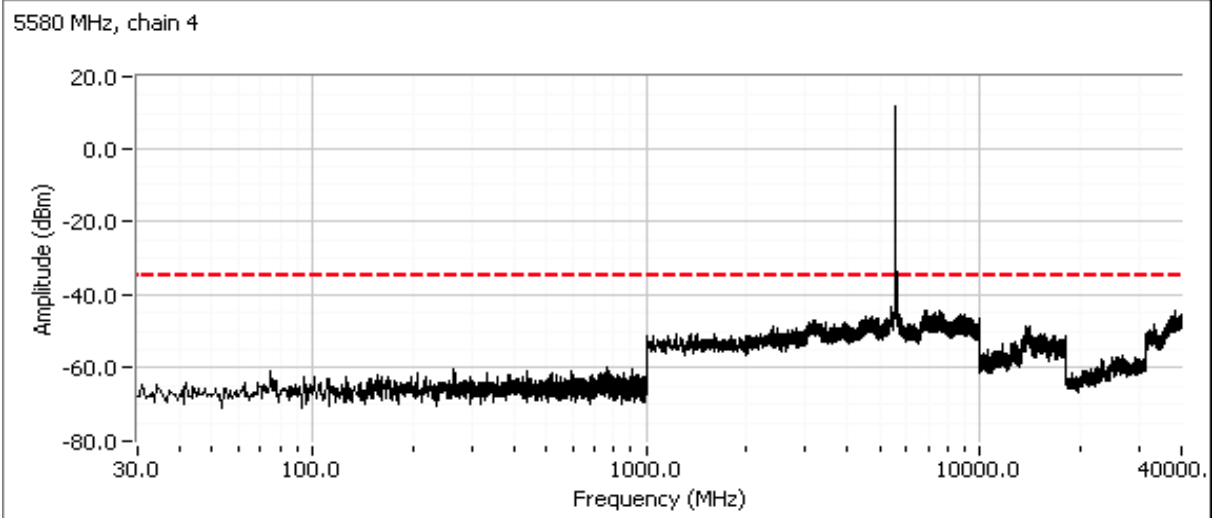
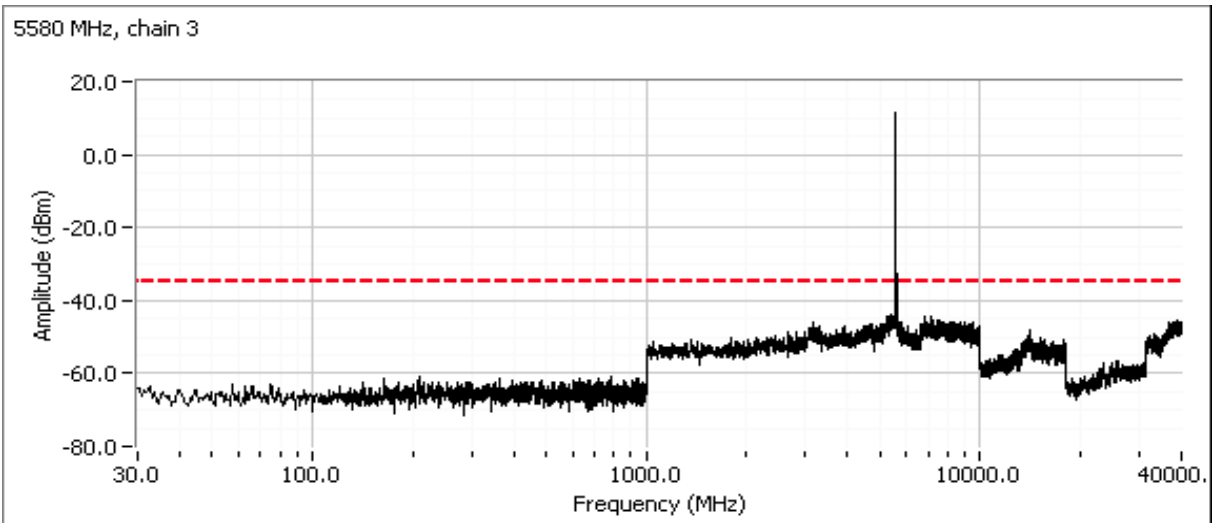


Client: Pace Americas	Job Number: J93000
Model: IPW8000 Wireless STB	T-Log Number: T93085
	Project Manager: Susan Hill
Contact: Mark Rieger	Project Coordinator: Irene Rademacher
Standard: FCC, IC	Class: N/A

Wide-band plot, RB=VB=1MHz (Peak measurements versus limit).



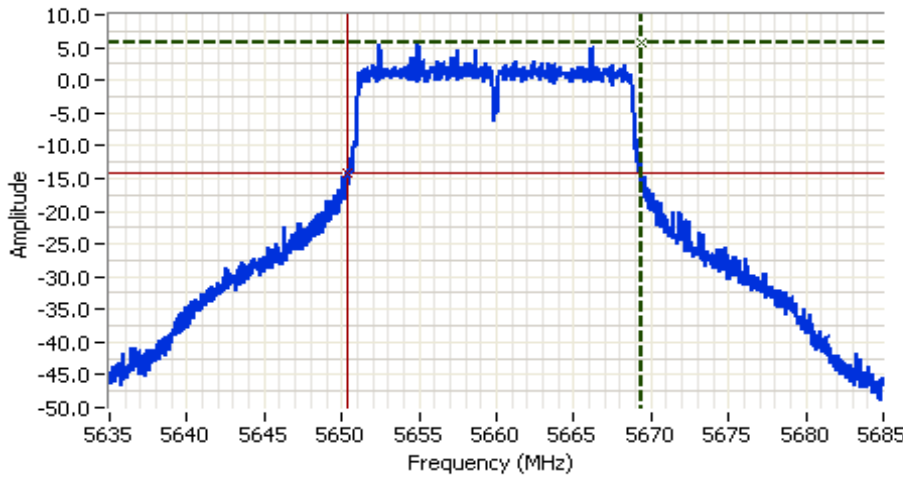
Client: Pace Americas	Job Number: J93000
Model: IPW8000 Wireless STB	T-Log Number: T93085
	Project Manager: Susan Hill
Contact: Mark Rieger	Project Coordinator: Irene Rademacher
Standard: FCC, IC	Class: N/A



Client: Pace Americas	Job Number: J93000
Model: IPW8000 Wireless STB	T-Log Number: T93085
Contact: Mark Rieger	Project Manager: Susan Hill
Standard: FCC, IC	Project Coordinator: Irene Rademacher
	Class: N/A

### Channel adjacent to 5650 MHz (Master Device)

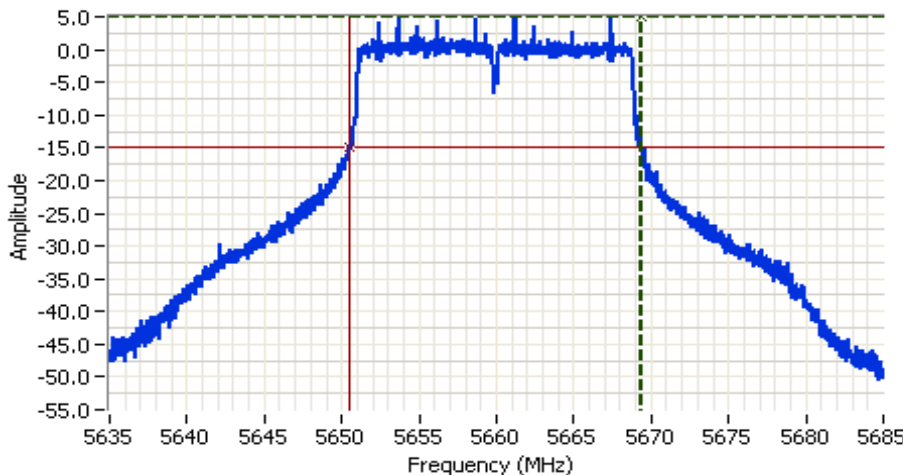
Plots showing that the 20dB bandwidth of the channel closest to 5650 MHz does not spill into the 5600-5650 MHz band. RB > 1% of span.



**Analyzer Settings**  
 Agilent Technologies, E4446A  
 CF: 5660.000 MHz  
 SPAN: 50.000 MHz  
 RB: 100 kHz  
 VB: 200 kHz  
 Detector: POS  
 Attn: 20 DB  
 RL Offset: 12.5 DB  
 Sweep Time: 5.0ms  
 Ref Lvl: 19.5 DBM

**Comments**  
 20dB BW: 19.056 MHz  
 FL: 5650.3218 MHz  
 Chain 1

Cursor 1: 5669.3781, 5.81  
 Cursor 2: 5650.3218, -14.19  
 Delta Freq: 19.056  
 Delta Amplitude: 20.00



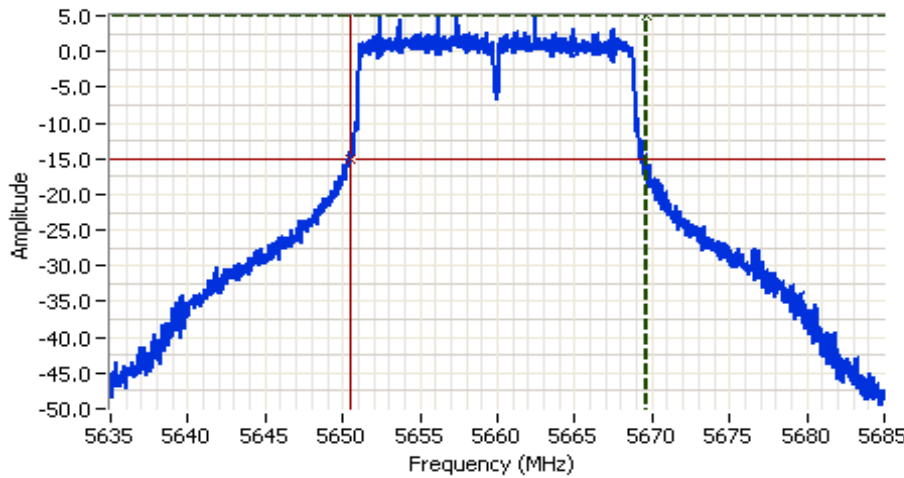
**Analyzer Settings**  
 Agilent Technologies, E4446A  
 CF: 5660.000 MHz  
 SPAN: 50.000 MHz  
 RB: 100 kHz  
 VB: 200 kHz  
 Detector: POS  
 Attn: 20 DB  
 RL Offset: 12.5 DB  
 Sweep Time: 5.0ms  
 Ref Lvl: 19.5 DBM

**Comments**  
 20dB BW: 18.856 MHz  
 FL: 5650.5552 MHz  
 Chain 2

Cursor 1: 5669.4115, 4.97  
 Cursor 2: 5650.5552, -15.03  
 Delta Freq: 18.856  
 Delta Amplitude: 20.00



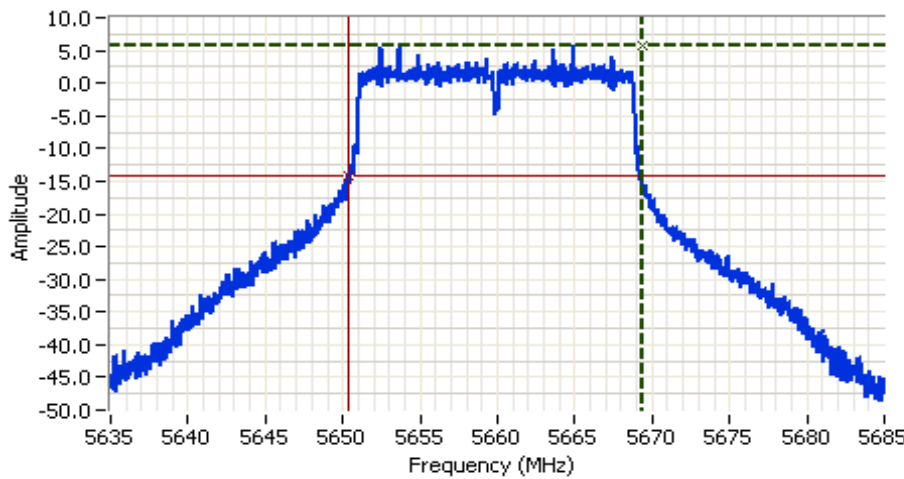
Client: Pace Americas	Job Number: J93000
Model: IPW8000 Wireless STB	T-Log Number: T93085
Contact: Mark Rieger	Project Manager: Susan Hill
Standard: FCC, IC	Project Coordinator: Irene Rademacher
	Class: N/A



**Analyzer Settings**  
 Agilent Technologies, E4446A  
 CF: 5660.000 MHz  
 SPAN: 50.000 MHz  
 RB: 100 kHz  
 VB: 200 kHz  
 Detector: POS  
 Attn: 20 DB  
 RL Offset: 12.5 DB  
 Sweep Time: 5.0ms  
 Ref Lvl: 19.5 DBM

**Comments**  
 20dB BW: 19.090 MHz  
 FL: 5650.5385 MHz  
 Chain 3

Cursor 1 5669.6282 4.99 Delta Freq. 19.090  
 Cursor 2 5650.5385 -15.01 Delta Amplitude 20.00



**Analyzer Settings**  
 Agilent Technologies, E4446A  
 CF: 5660.000 MHz  
 SPAN: 50.000 MHz  
 RB: 100 kHz  
 VB: 200 kHz  
 Detector: POS  
 Attn: 20 DB  
 RL Offset: 12.5 DB  
 Sweep Time: 5.0ms  
 Ref Lvl: 19.5 DBM

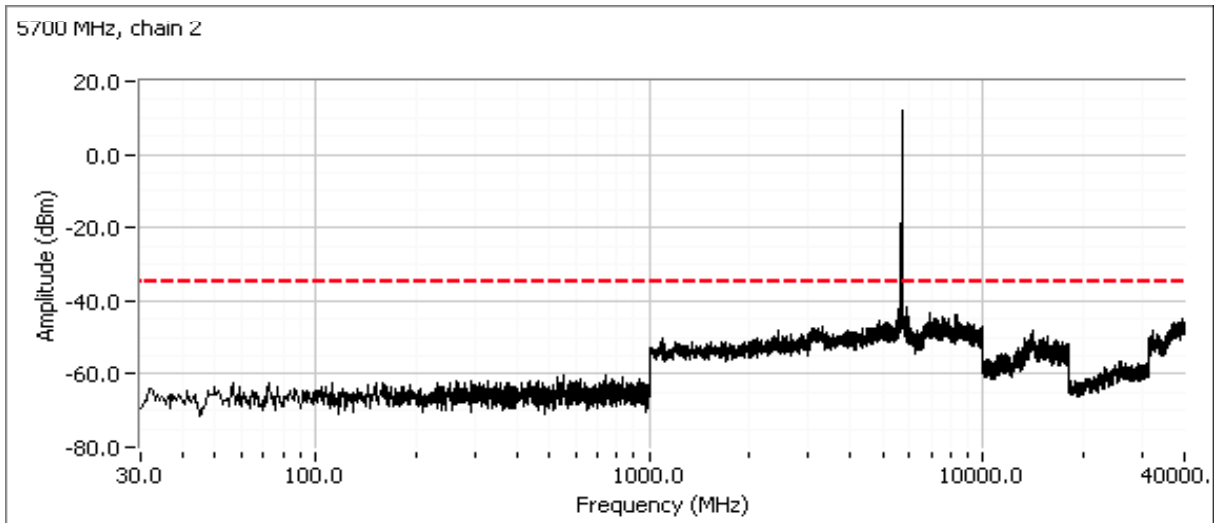
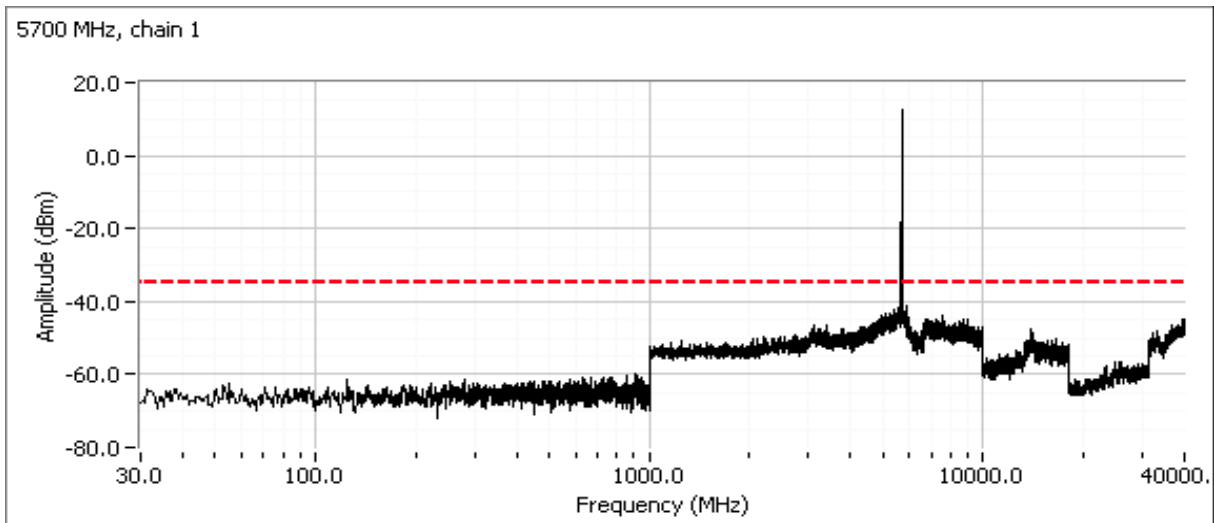
**Comments**  
 20dB BW: 19.040 MHz  
 FL: 5650.3384 MHz  
 Chain 4

Cursor 1 5669.3781 5.85 Delta Freq. 19.040  
 Cursor 2 5650.3384 -14.15 Delta Amplitude 20.00

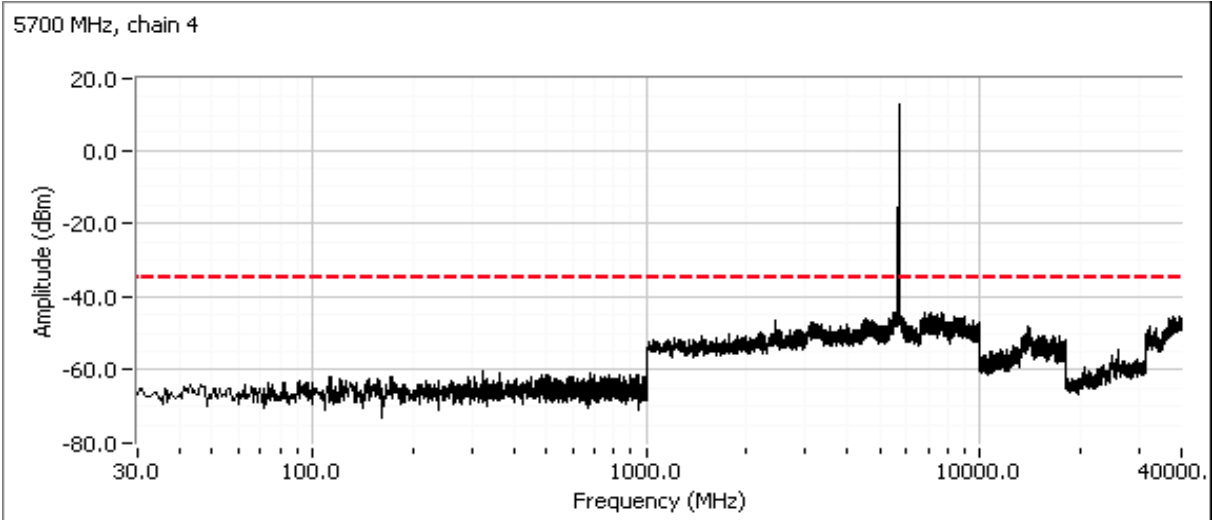
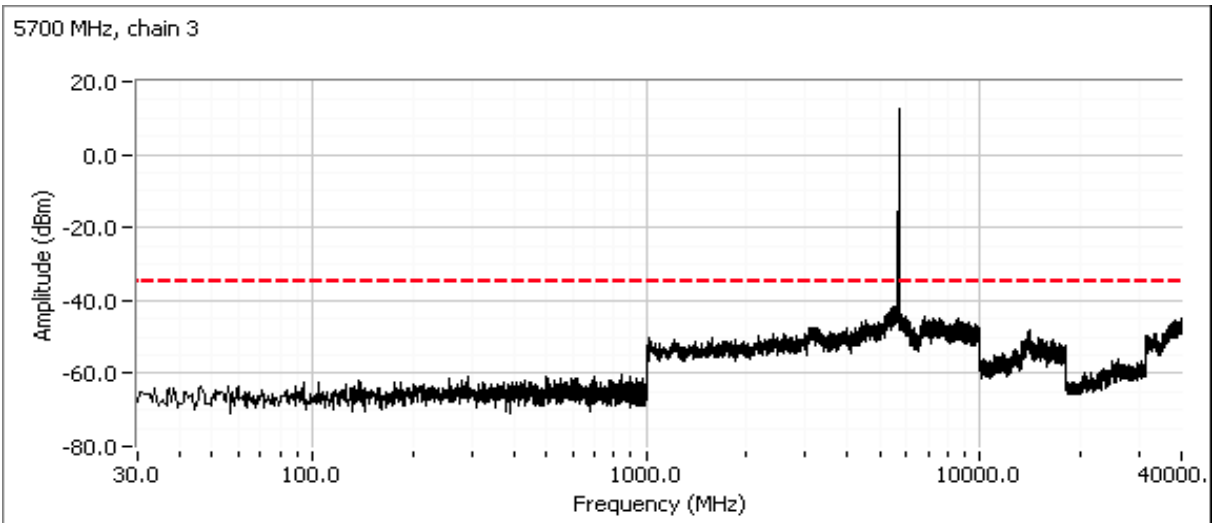


Client: Pace Americas	Job Number: J93000
Model: IPW8000 Wireless STB	T-Log Number: T93085
	Project Manager: Susan Hill
Contact: Mark Rieger	Project Coordinator: Irene Rademacher
Standard: FCC, IC	Class: N/A

High channel, 5470 - 5725 MHz Band  
 Wide-band plot, RB=VB=1MHz (Peak measurements versus limit).



Client: Pace Americas	Job Number: J93000
Model: IPW8000 Wireless STB	T-Log Number: T93085
	Project Manager: Susan Hill
Contact: Mark Rieger	Project Coordinator: Irene Rademacher
Standard: FCC, IC	Class: N/A

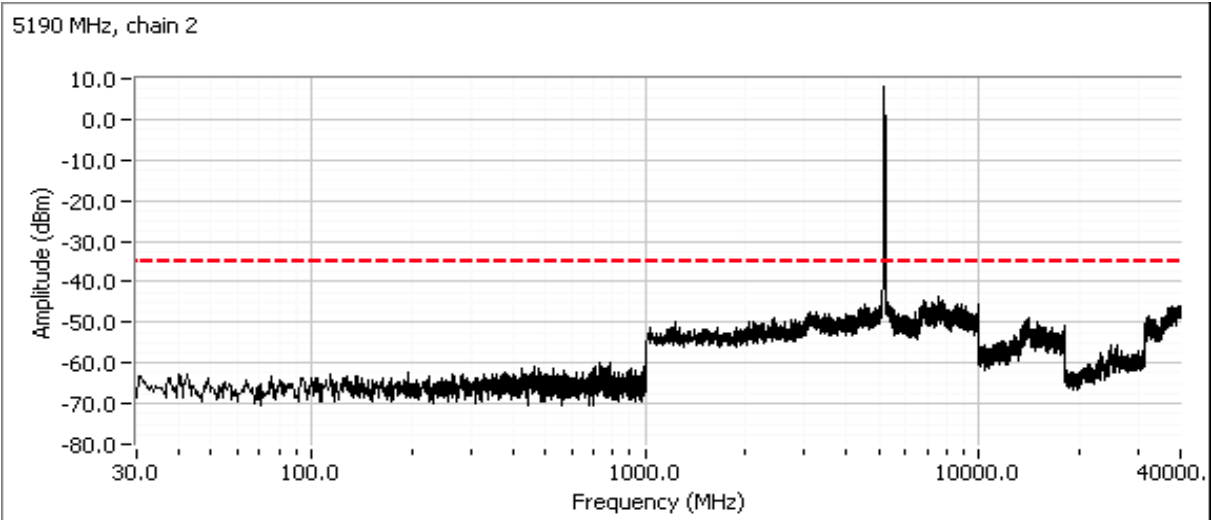
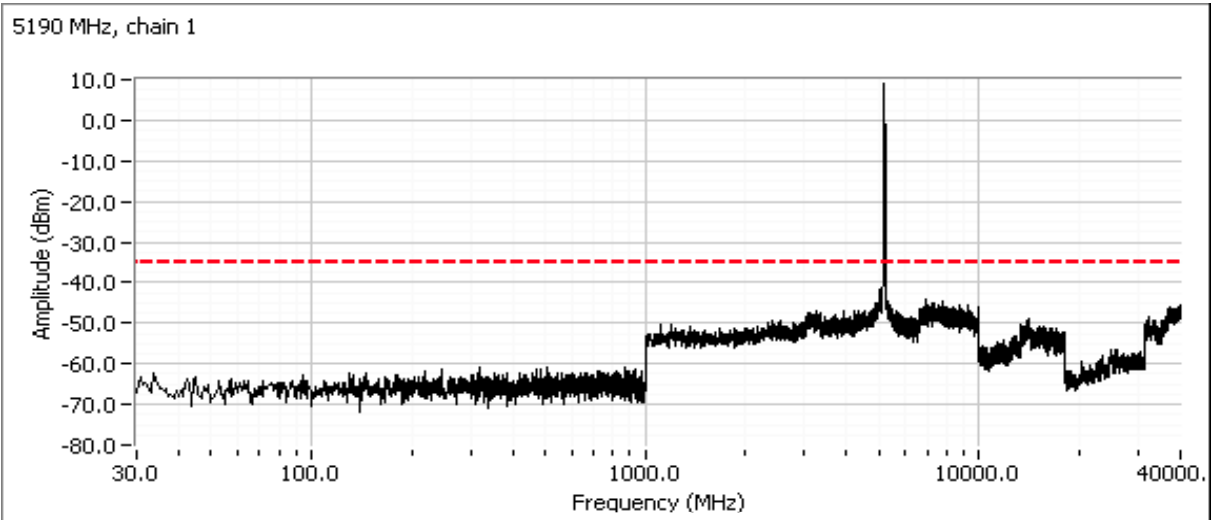


Client: Pace Americas	Job Number: J93000
Model: IPW8000 Wireless STB	T-Log Number: T93085
	Project Manager: Susan Hill
Contact: Mark Rieger	Project Coordinator: Irene Rademacher
Standard: FCC, IC	Class: N/A

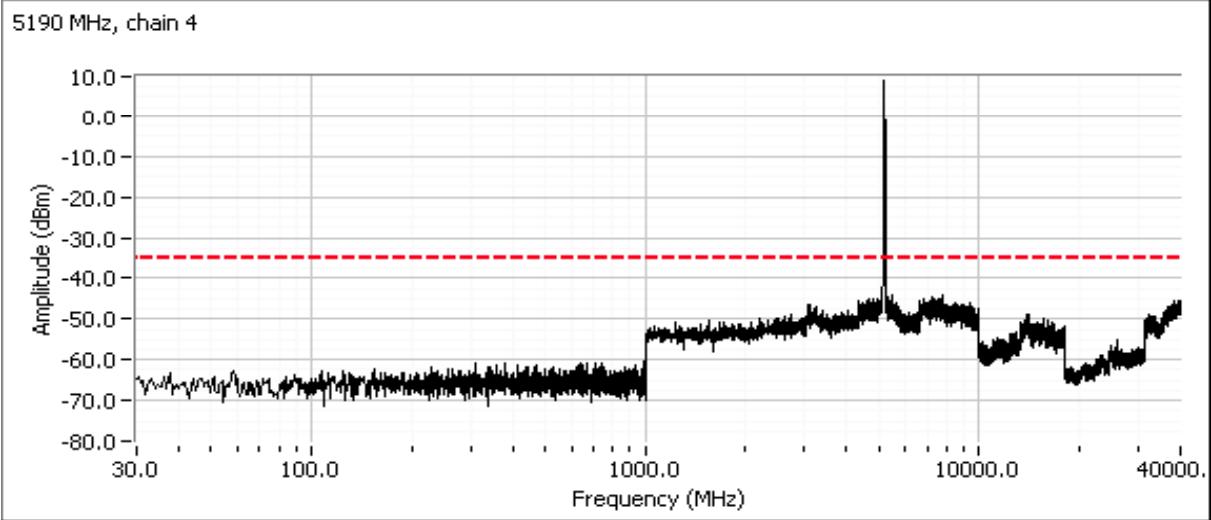
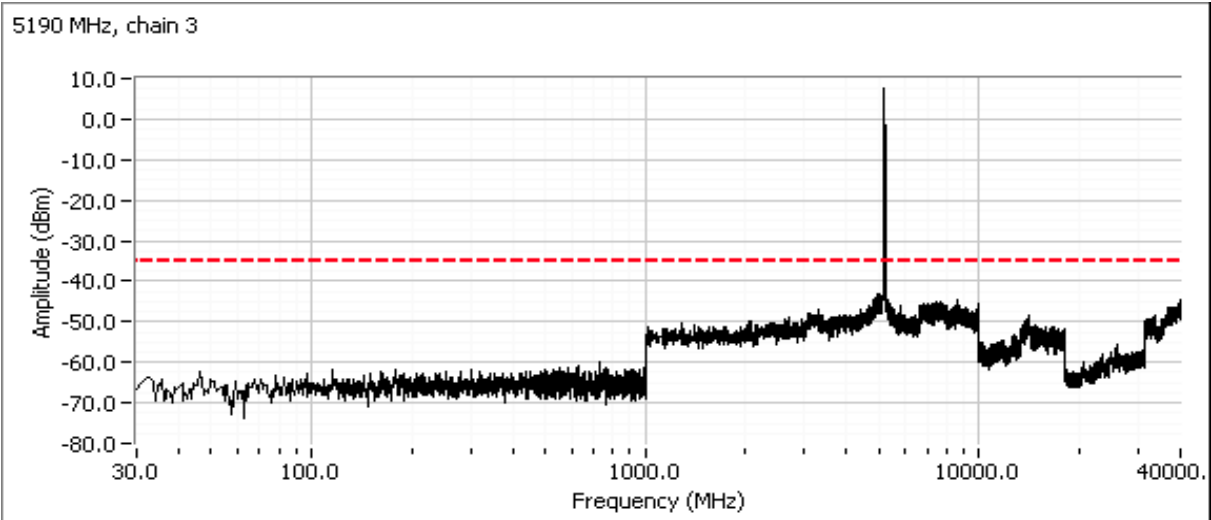
802.11n40, Power setting 18

Low channel, 5150 - 5250 MHz Band

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



Client: Pace Americas	Job Number: J93000
Model: IPW8000 Wireless STB	T-Log Number: T93085
	Project Manager: Susan Hill
Contact: Mark Rieger	Project Coordinator: Irene Rademacher
Standard: FCC, IC	Class: N/A

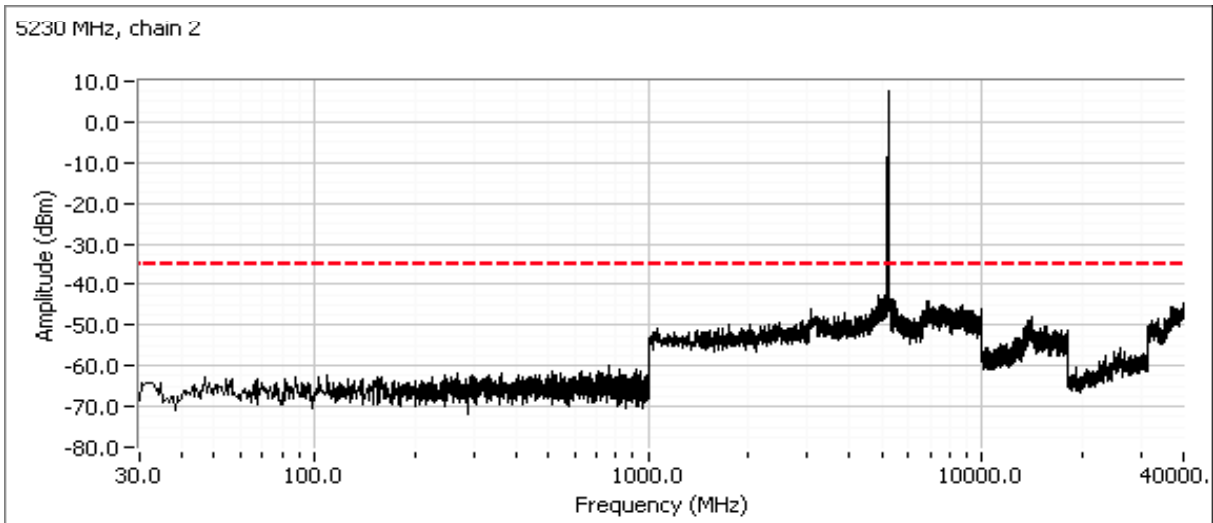
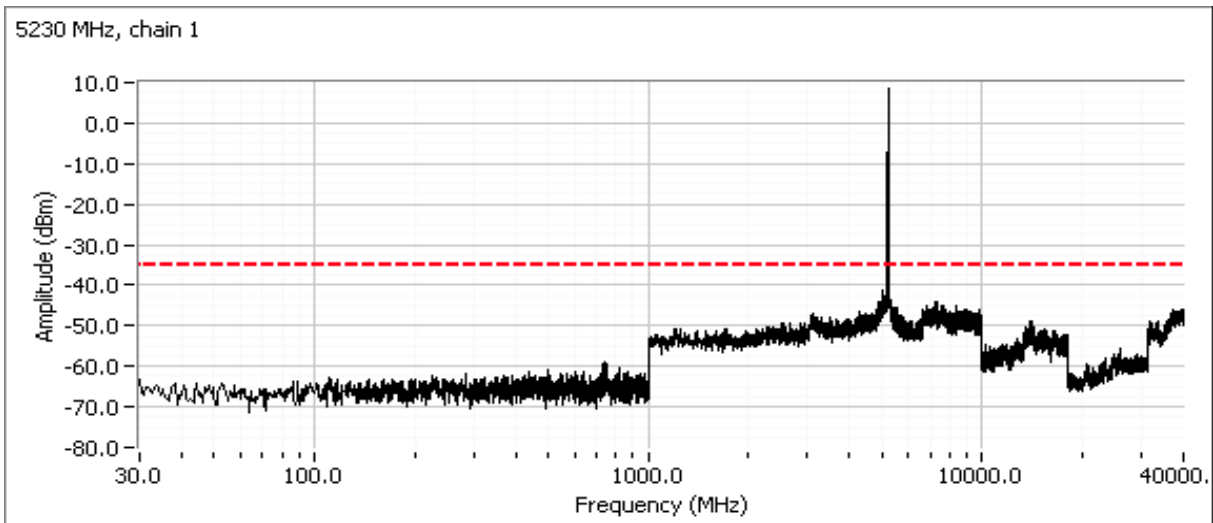




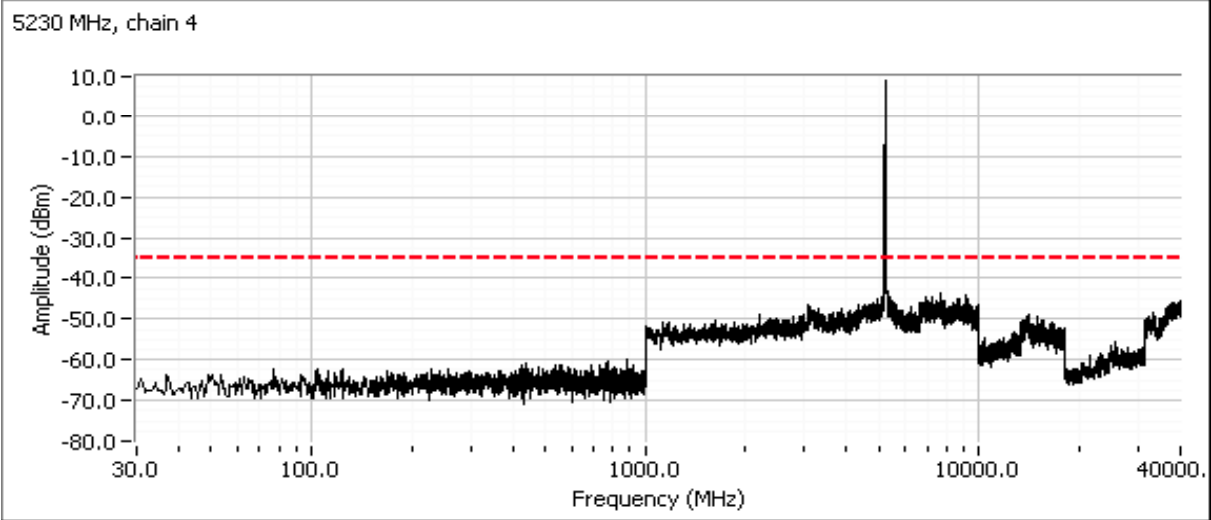
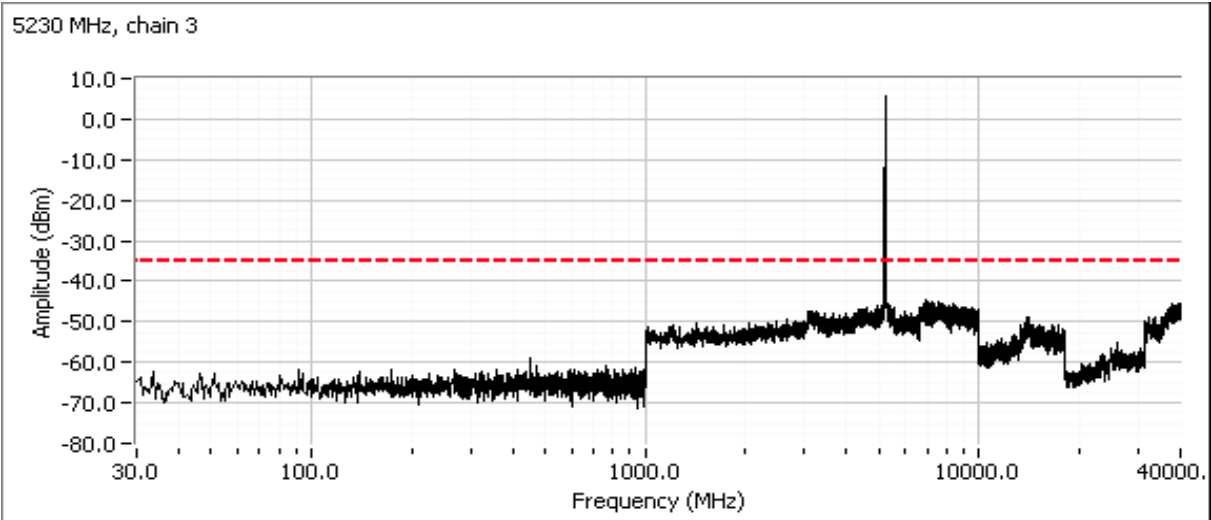
Client: Pace Americas	Job Number: J93000
Model: IPW8000 Wireless STB	T-Log Number: T93085
Contact: Mark Rieger	Project Manager: Susan Hill
Standard: FCC, IC	Project Coordinator: Irene Rademacher
	Class: N/A

### High channel, 5150 - 5250 MHz Band

Note: If device does not operate in the 5250 - 5350 Mhz band include a plot showing -20dBc at 5250 MHz

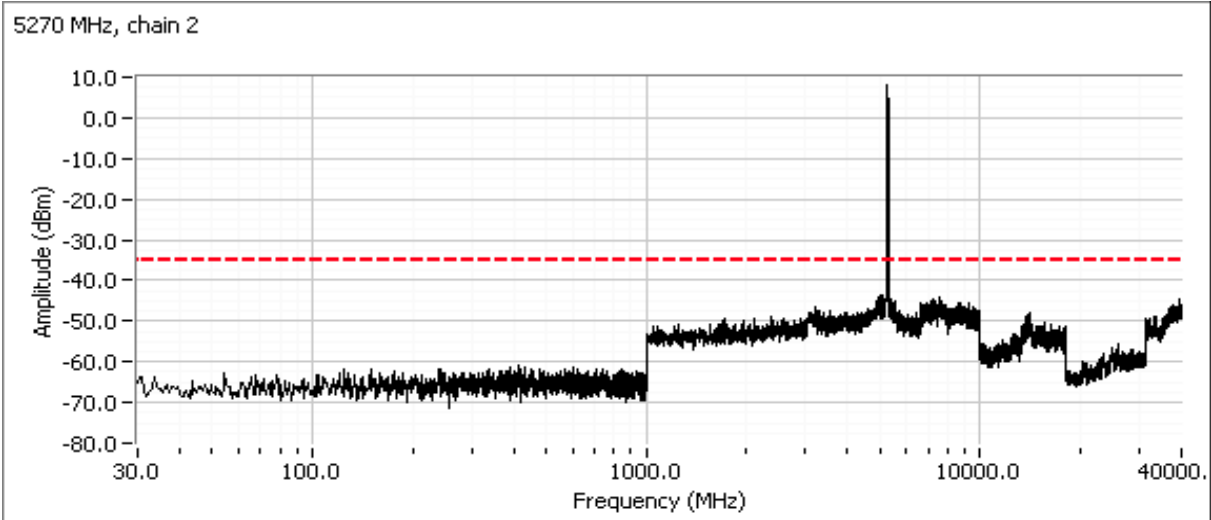
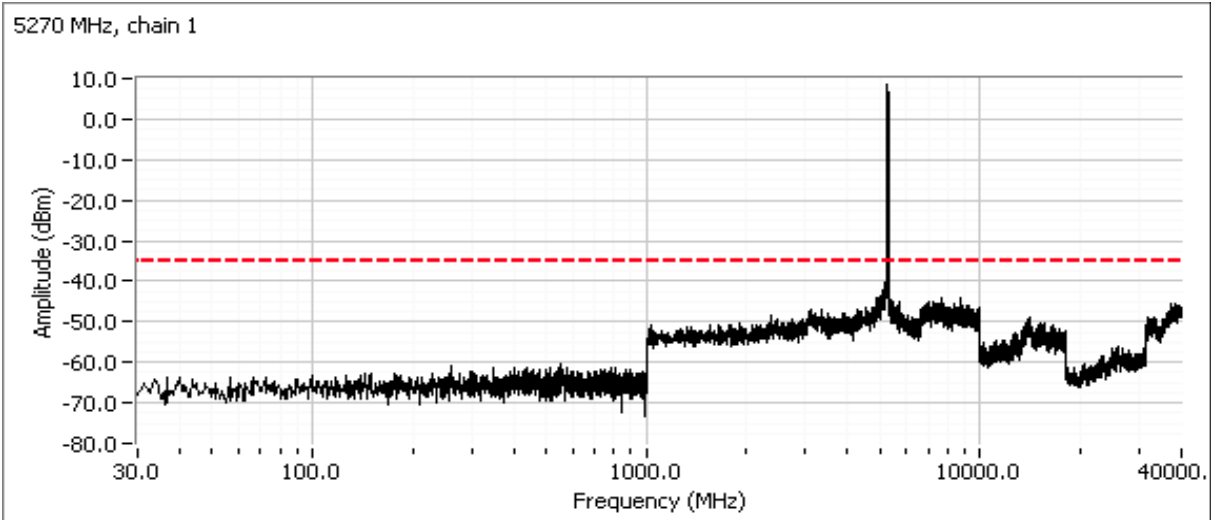


Client: Pace Americas	Job Number: J93000
Model: IPW8000 Wireless STB	T-Log Number: T93085
	Project Manager: Susan Hill
Contact: Mark Rieger	Project Coordinator: Irene Rademacher
Standard: FCC, IC	Class: N/A

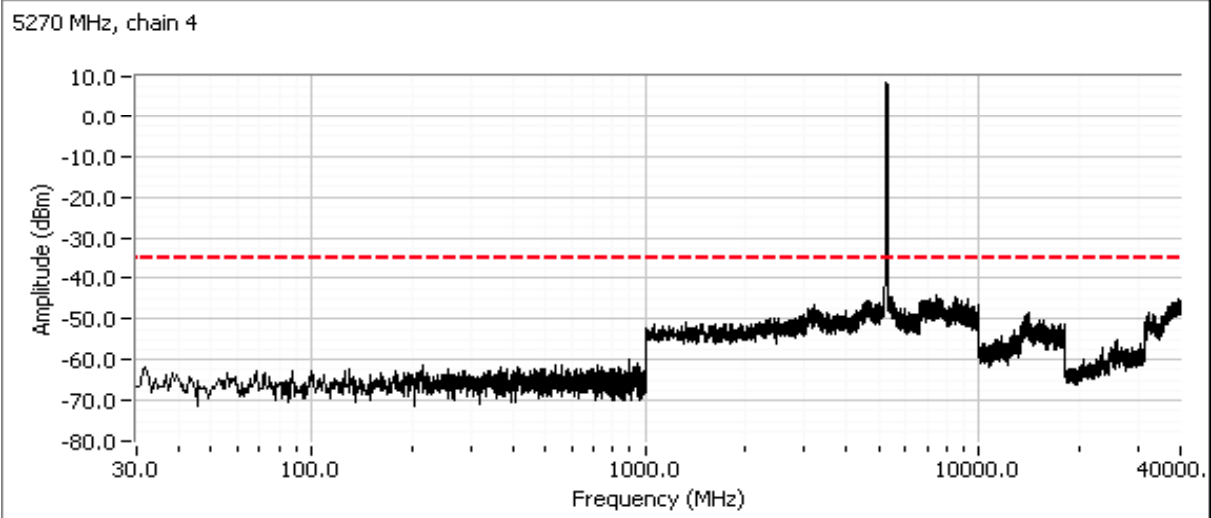
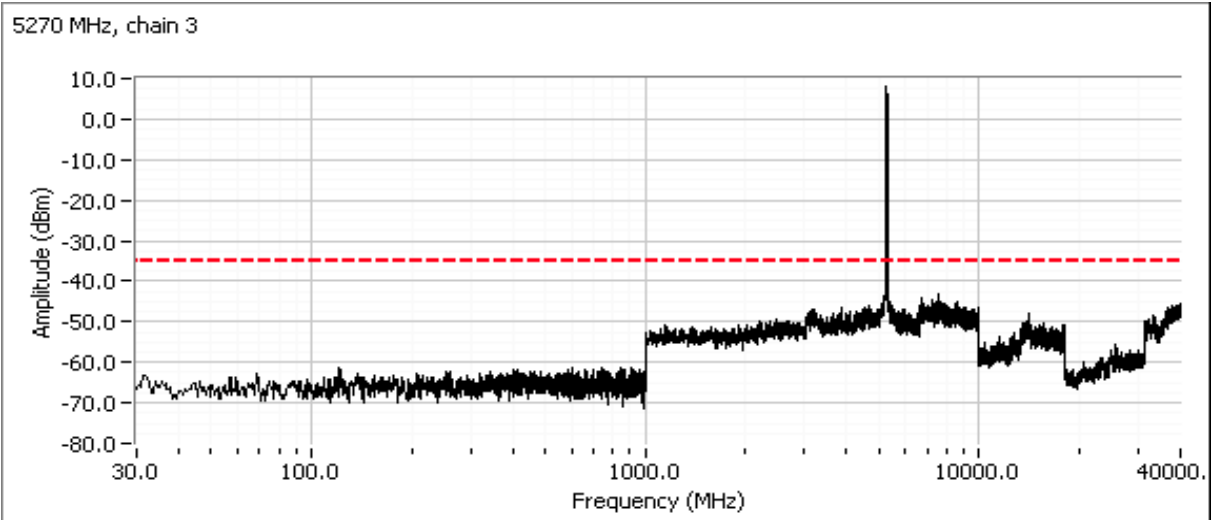


Client: Pace Americas	Job Number: J93000
Model: IPW8000 Wireless STB	T-Log Number: T93085
	Project Manager: Susan Hill
Contact: Mark Rieger	Project Coordinator: Irene Rademacher
Standard: FCC, IC	Class: N/A

Low channel, 5250 - 5350 MHz Band  
 Wide-band plot, RB=VB=1MHz (Peak measurements versus limit).



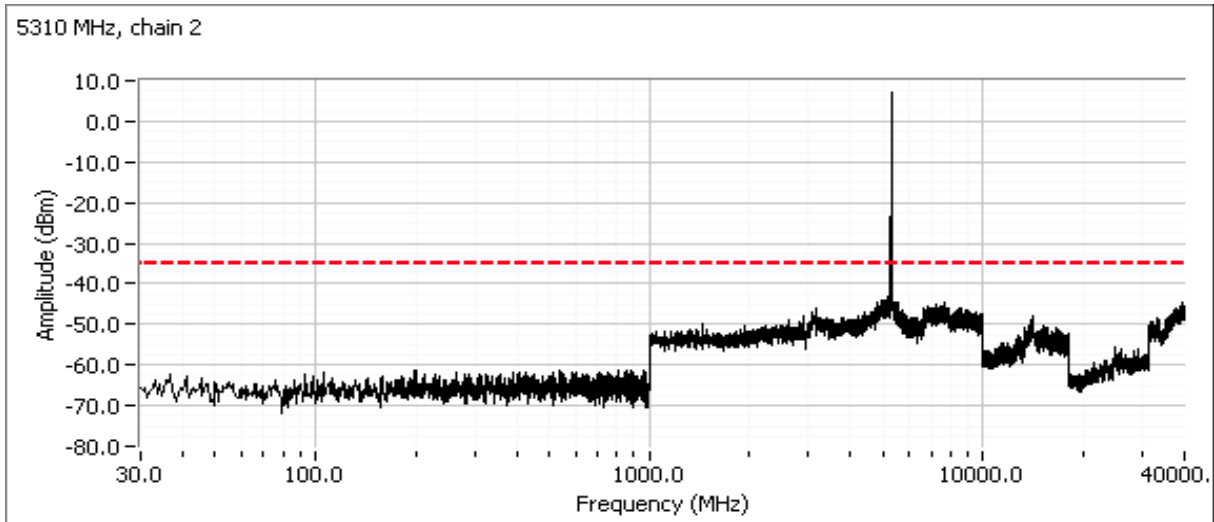
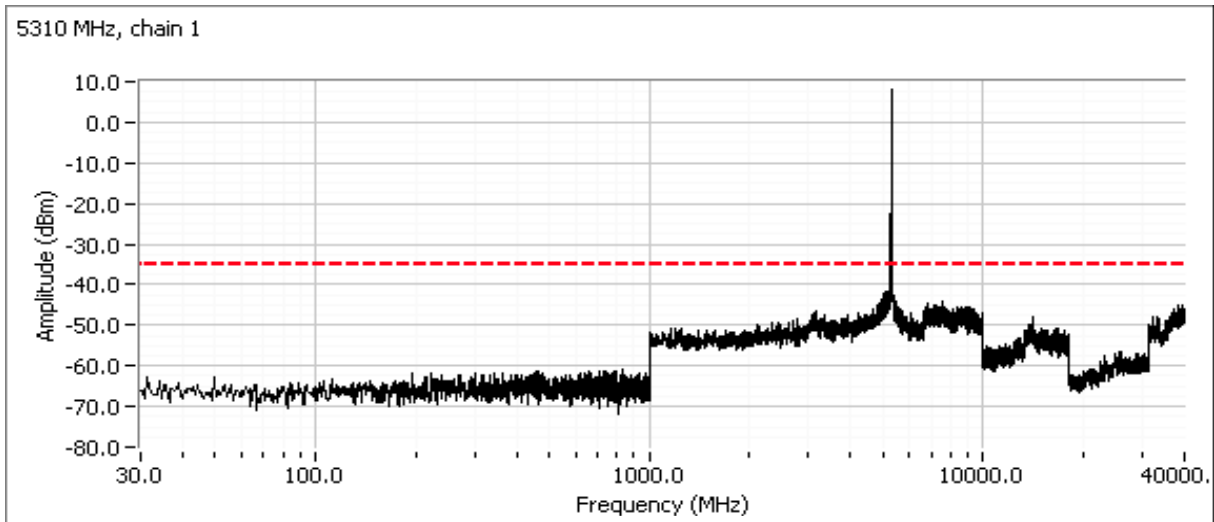
Client: Pace Americas	Job Number: J93000
Model: IPW8000 Wireless STB	T-Log Number: T93085
	Project Manager: Susan Hill
Contact: Mark Rieger	Project Coordinator: Irene Rademacher
Standard: FCC, IC	Class: N/A



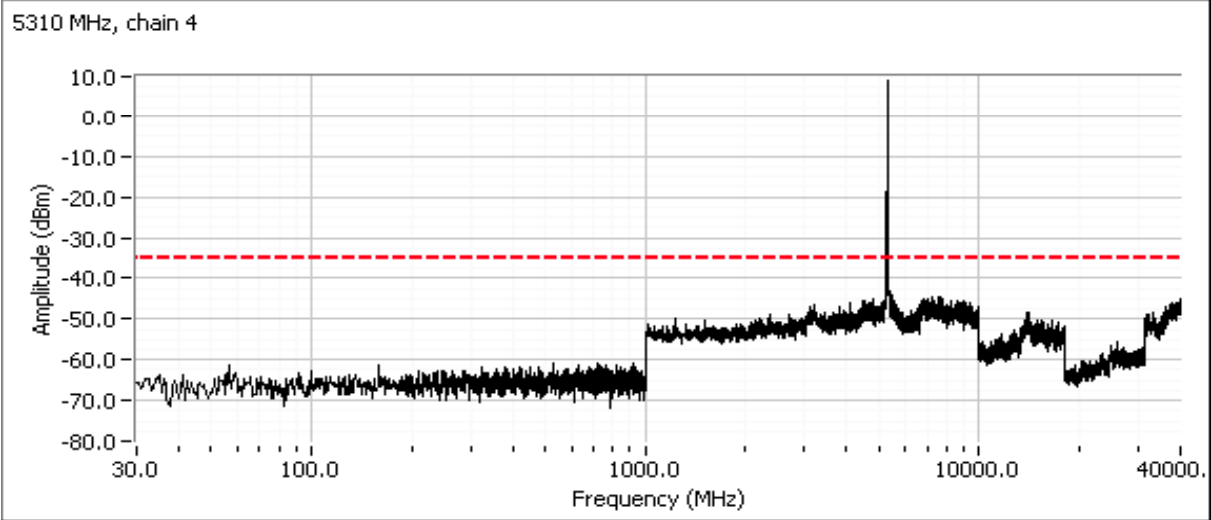
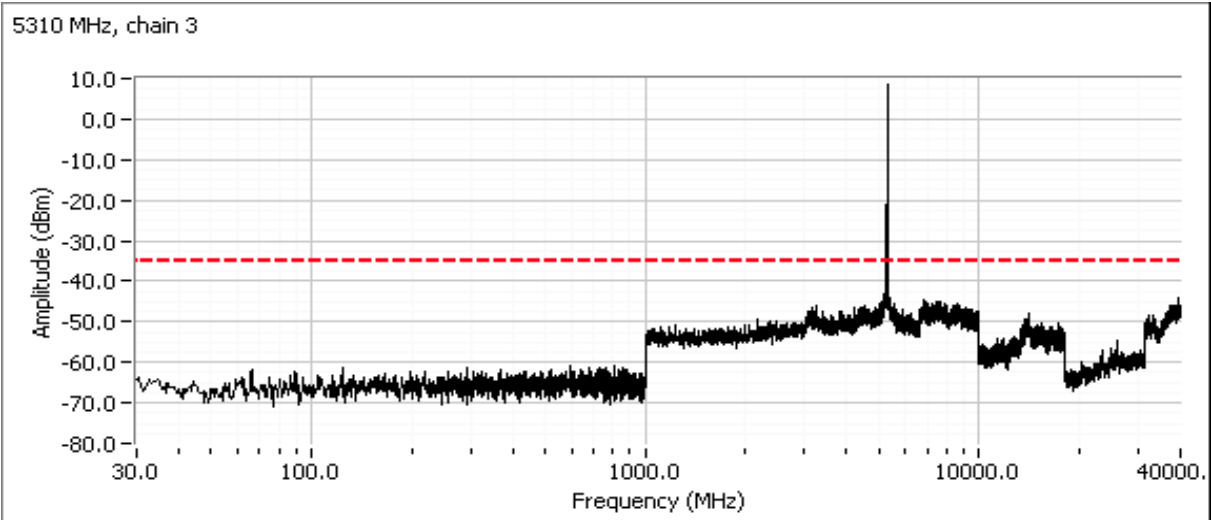
Client: Pace Americas	Job Number: J93000
Model: IPW8000 Wireless STB	T-Log Number: T93085
	Project Manager: Susan Hill
Contact: Mark Rieger	Project Coordinator: Irene Rademacher
Standard: FCC, IC	Class: N/A

### High channel, 5250 - 5350 MHz Band

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

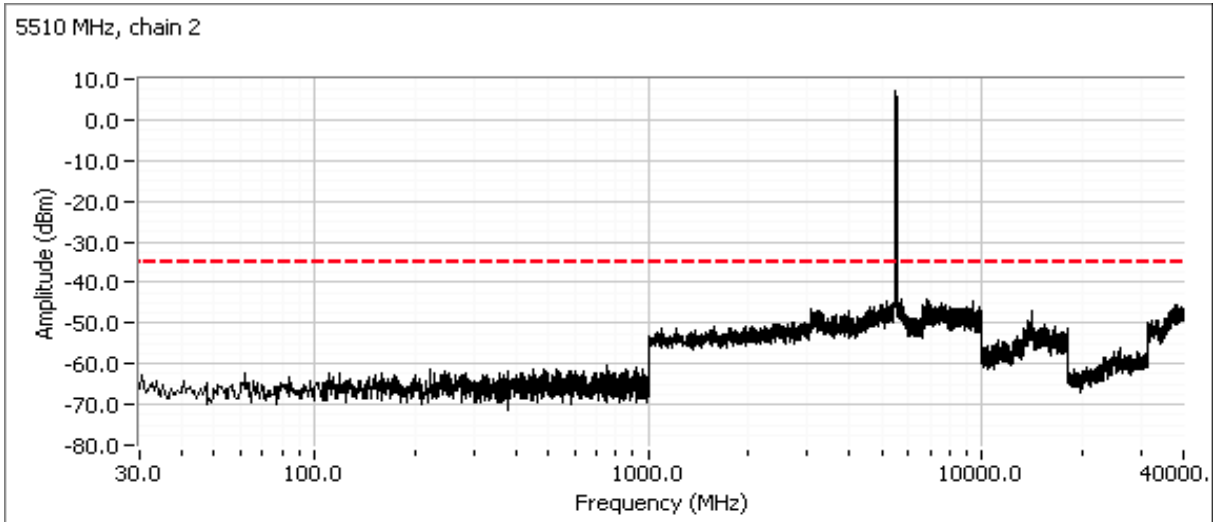
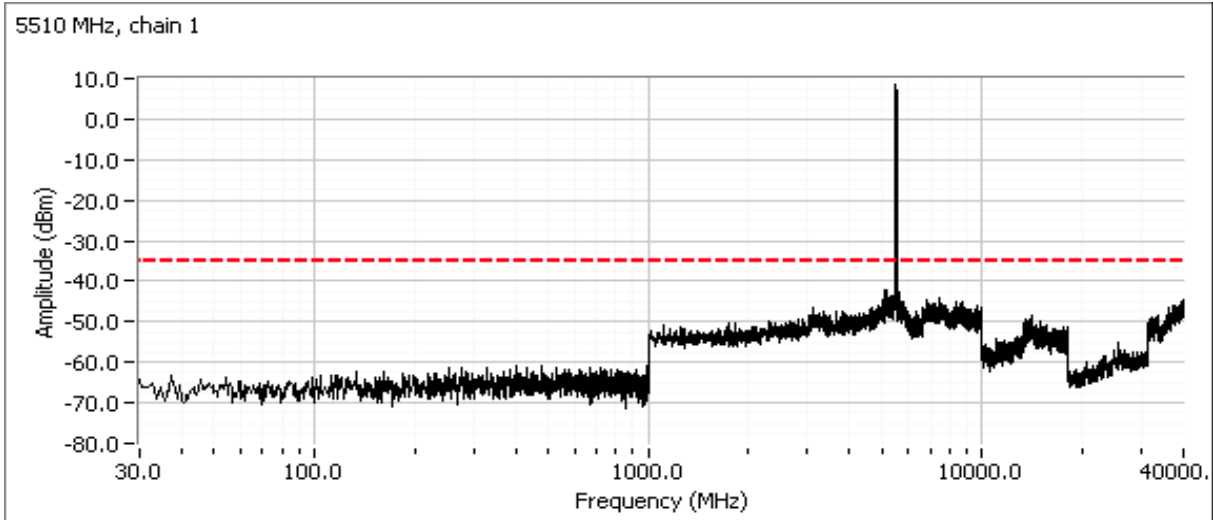


Client: Pace Americas	Job Number: J93000
Model: IPW8000 Wireless STB	T-Log Number: T93085
	Project Manager: Susan Hill
Contact: Mark Rieger	Project Coordinator: Irene Rademacher
Standard: FCC, IC	Class: N/A

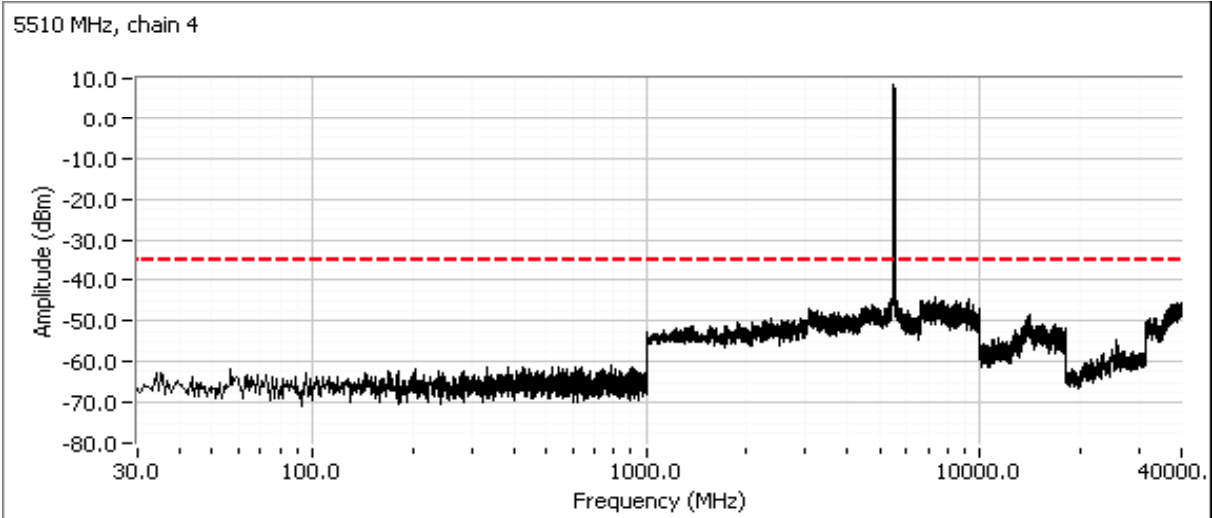
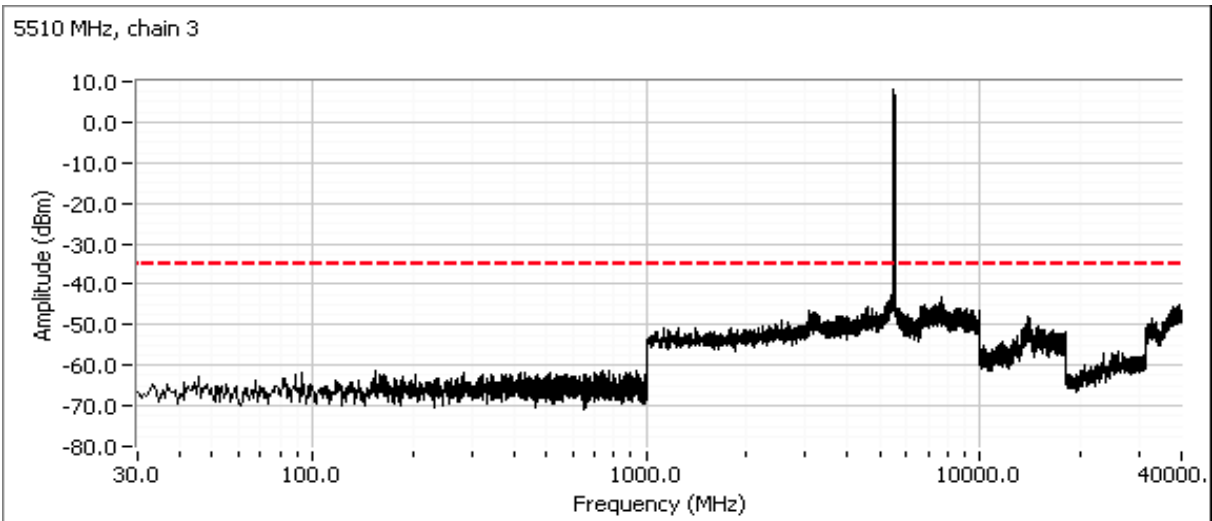


Client: Pace Americas	Job Number: J93000
Model: IPW8000 Wireless STB	T-Log Number: T93085
	Project Manager: Susan Hill
Contact: Mark Rieger	Project Coordinator: Irene Rademacher
Standard: FCC, IC	Class: N/A

Low channel, 5470 - 5725 MHz Band  
 Wide-band plot, RB=VB=1MHz (Peak measurements versus limit).



Client: Pace Americas	Job Number: J93000
Model: IPW8000 Wireless STB	T-Log Number: T93085
	Project Manager: Susan Hill
Contact: Mark Rieger	Project Coordinator: Irene Rademacher
Standard: FCC, IC	Class: N/A

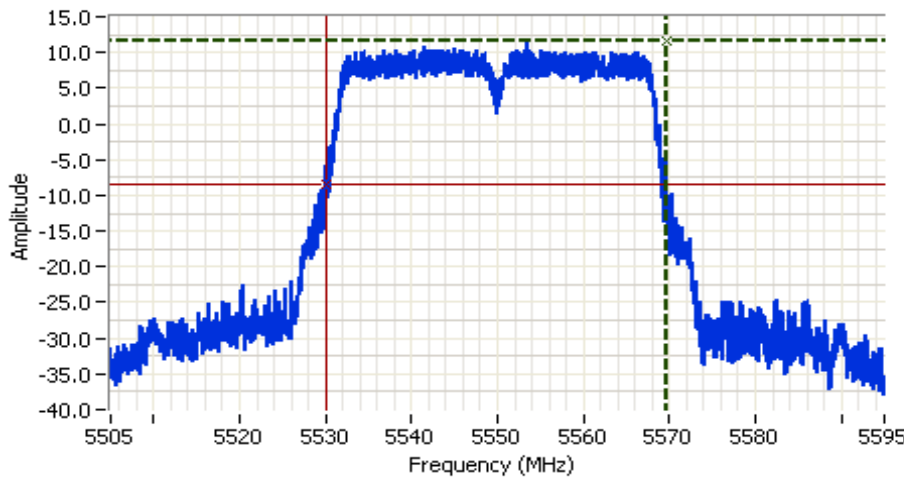




Client: Pace Americas	Job Number: J93000
Model: IPW8000 Wireless STB	T-Log Number: T93085
Contact: Mark Rieger	Project Manager: Susan Hill
Standard: FCC, IC	Project Coordinator: Irene Rademacher
	Class: N/A

### Center channel, 5470 - 5725 MHz Band

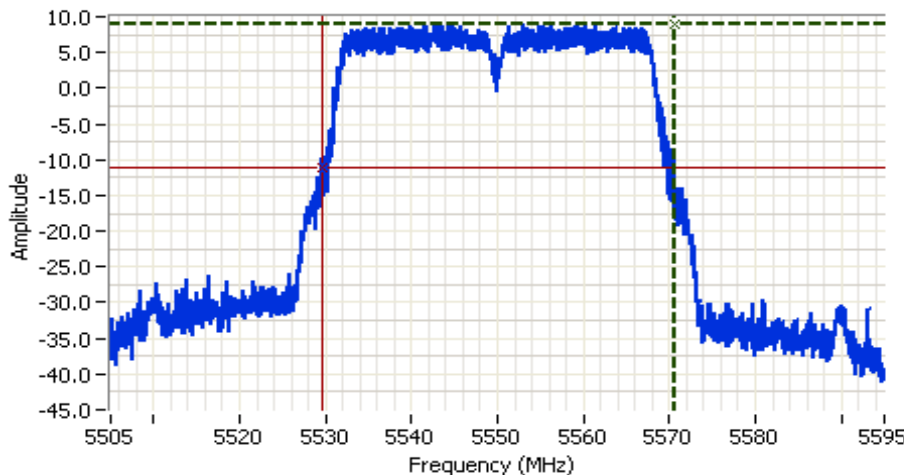
For master devices - This plot is showing that the 20dB bandwidth of the channel closest to 5600 MHz does not spill into the 5600-5650 MHz band. RB > 1% of span.



**Analyzer Settings**  
 Agilent Technologies, E4446A  
 CF: 5550.000 MHz  
 SPAN: 90.000 MHz  
 RB: 1.000 MHz  
 VB: 3.000 MHz  
 Detector: POS  
 Attn: 20 DB  
 RL Offset: 12.5 DB  
 Sweep Time: 1.0ms  
 Ref Lvl: 17.5 DBM

**Comments**  
 20dB BW: 39.583 MHz  
 FH: 5569.7316 MHz  
 Chain 1

Cursor 1: 5569.7316, 11.64  
 Cursor 2: 5530.1484, -8.36  
 Delta Freq: 39.583  
 Delta Amplitude: 20.00



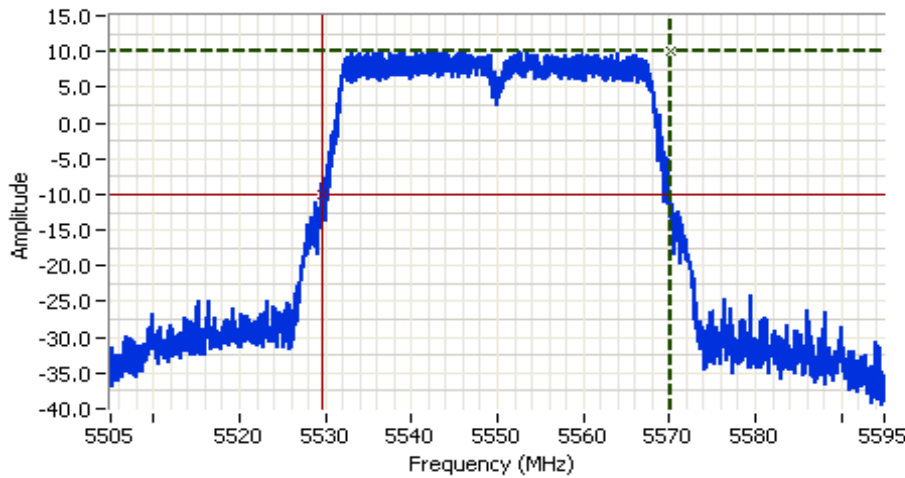
**Analyzer Settings**  
 Agilent Technologies, E4446A  
 CF: 5550.000 MHz  
 SPAN: 90.000 MHz  
 RB: 1.000 MHz  
 VB: 3.000 MHz  
 Detector: POS  
 Attn: 20 DB  
 RL Offset: 12.5 DB  
 Sweep Time: 1.0ms  
 Ref Lvl: 17.5 DBM

**Comments**  
 20dB BW: 40.964 MHz  
 FH: 5570.6019 MHz  
 Chain 2

Cursor 1: 5570.6019, 8.94  
 Cursor 2: 5529.6382, -11.06  
 Delta Freq: 40.964  
 Delta Amplitude: 20.00



Client: Pace Americas	Job Number: J93000
Model: IPW8000 Wireless STB	T-Log Number: T93085
Contact: Mark Rieger	Project Manager: Susan Hill
Standard: FCC, IC	Project Coordinator: Irene Rademacher
	Class: N/A


**Analyzer Settings**

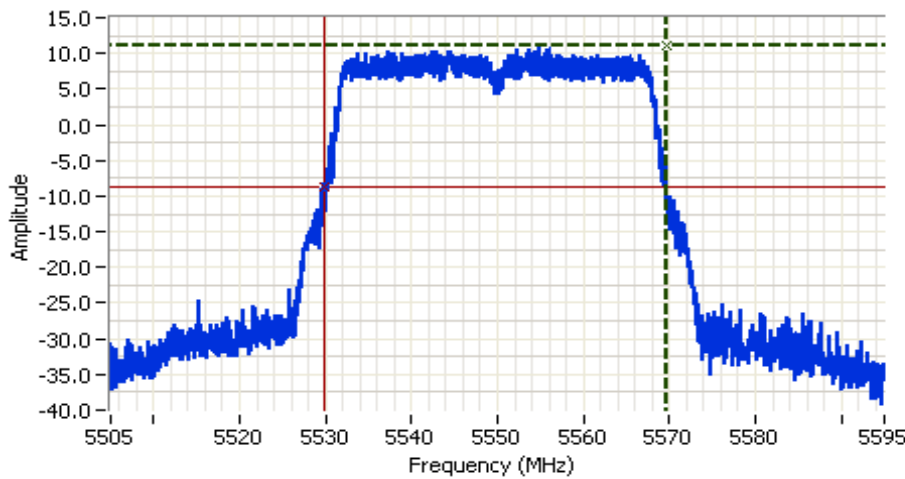
Agilent Technologies, E4446A  
 CF: 5550.000 MHz  
 SPAN: 90.000 MHz  
 RB: 1.000 MHz  
 VB: 3.000 MHz  
 Detector: POS  
 Attn: 20 DB  
 RL Offset: 12.5 DB  
 Sweep Time: 1.0ms  
 Ref Lvl: 17.5 DBM

**Comments**

20dB BW: 40.664 MHz  
 FH: 5570.2417 MHz  
 Chain 3

Cursor 1 5570.2417 10.01  
 Cursor 2 5529.5782 -9.99

Delta Freq. 40.664  
 Delta Amplitude 20.00


**Analyzer Settings**

Agilent Technologies, E4446A  
 CF: 5550.000 MHz  
 SPAN: 90.000 MHz  
 RB: 1.000 MHz  
 VB: 3.000 MHz  
 Detector: POS  
 Attn: 20 DB  
 RL Offset: 12.5 DB  
 Sweep Time: 1.0ms  
 Ref Lvl: 17.5 DBM

**Comments**

20dB BW: 39.883 MHz  
 FH: 5569.7316 MHz  
 Chain 4

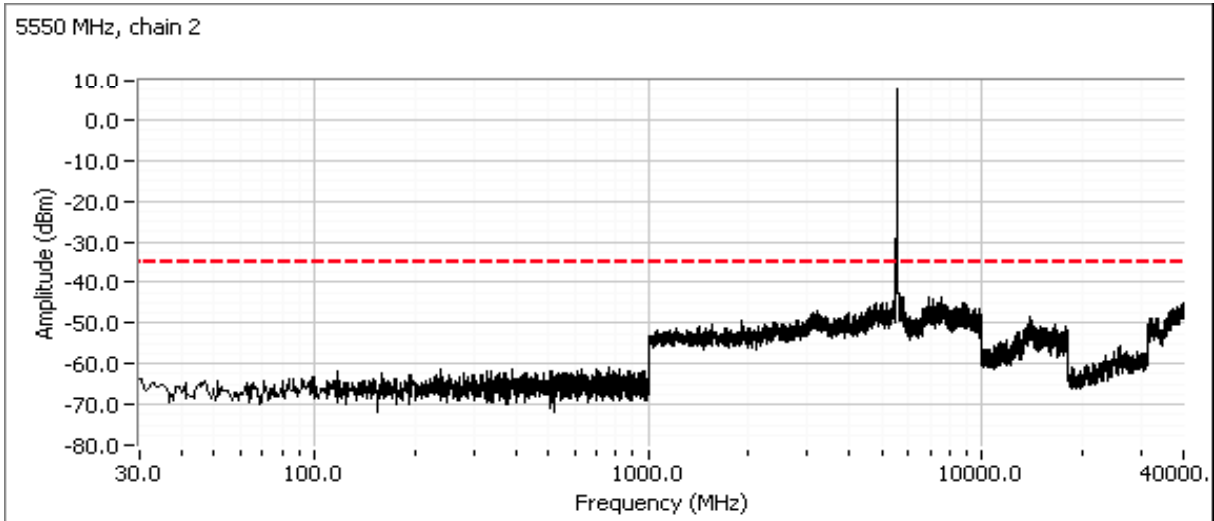
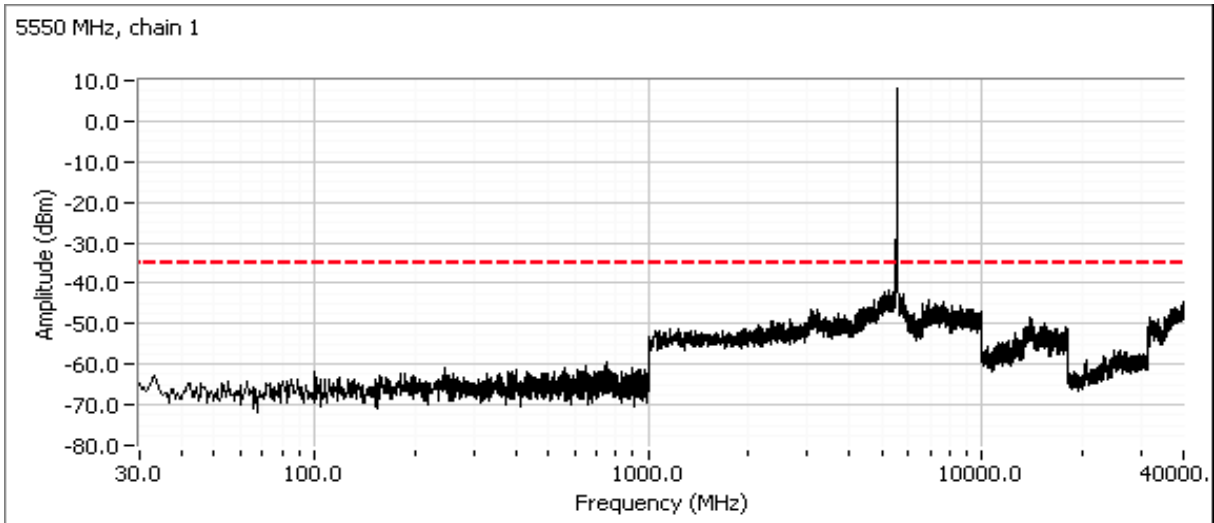
Cursor 1 5569.7316 11.16  
 Cursor 2 5529.8483 -8.84

Delta Freq. 39.883  
 Delta Amplitude 20.00

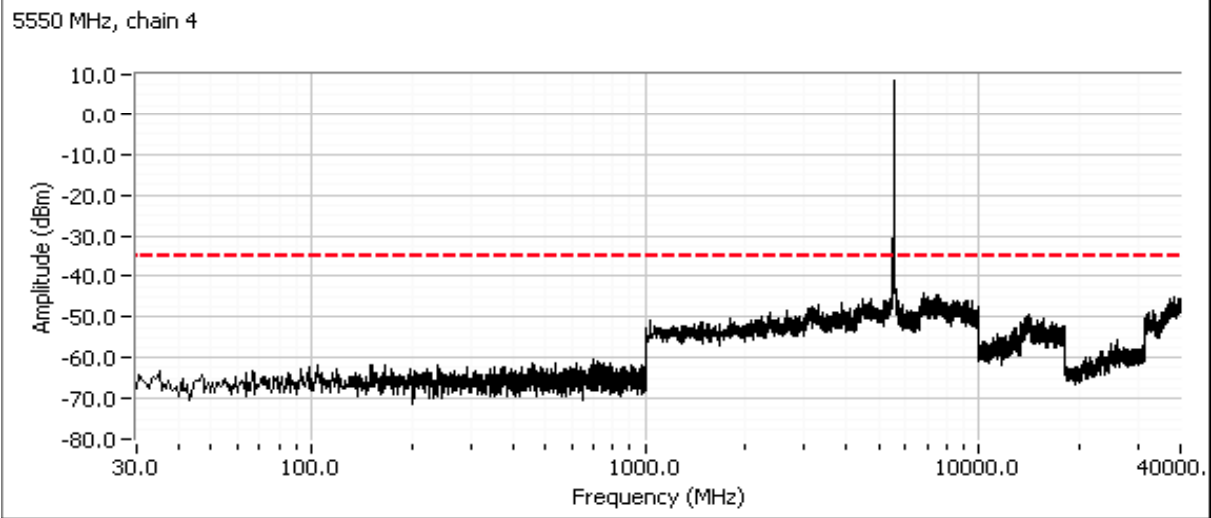
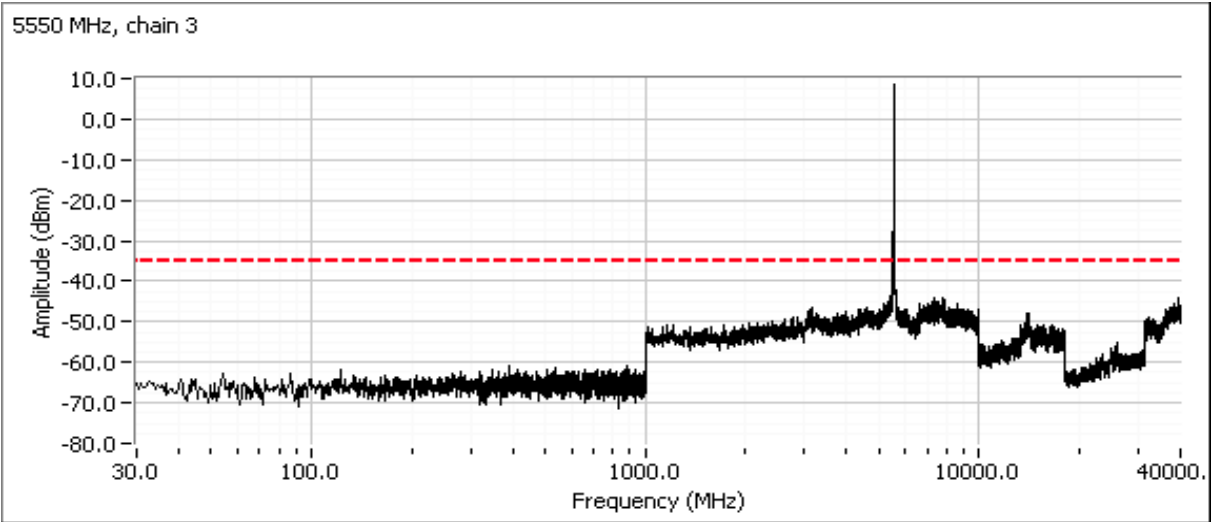


Client: Pace Americas	Job Number: J93000
Model: IPW8000 Wireless STB	T-Log Number: T93085
	Project Manager: Susan Hill
Contact: Mark Rieger	Project Coordinator: Irene Rademacher
Standard: FCC, IC	Class: N/A

Wide-band plot, RB=VB=1MHz (Peak measurements versus limit).



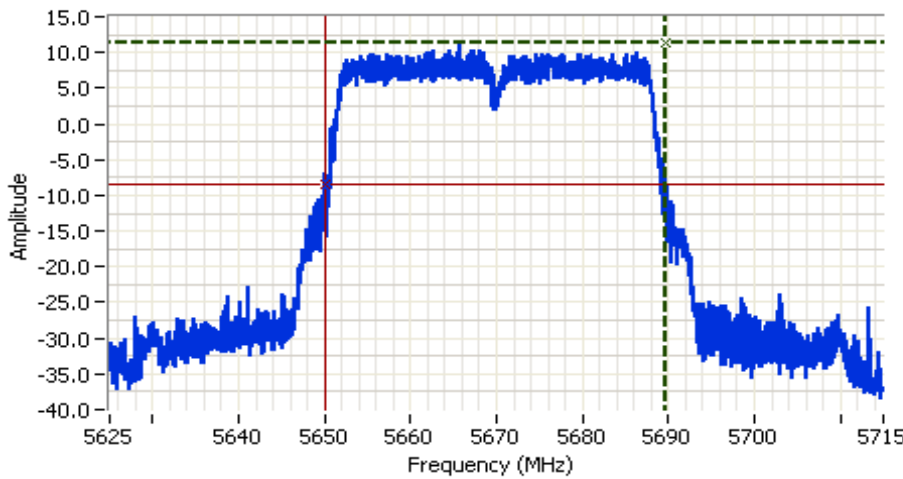
Client: Pace Americas	Job Number: J93000
Model: IPW8000 Wireless STB	T-Log Number: T93085
	Project Manager: Susan Hill
Contact: Mark Rieger	Project Coordinator: Irene Rademacher
Standard: FCC, IC	Class: N/A



Client: Pace Americas	Job Number: J93000
Model: IPW8000 Wireless STB	T-Log Number: T93085
Contact: Mark Rieger	Project Manager: Susan Hill
Standard: FCC, IC	Project Coordinator: Irene Rademacher
	Class: N/A

### Channel adjacent to 5650 MHz (Master Device)

Plots showing that the 20dB bandwidth of the channel closest to 5650 MHz does not spill into the 5600-5650 MHz band. RB > 1% of span.



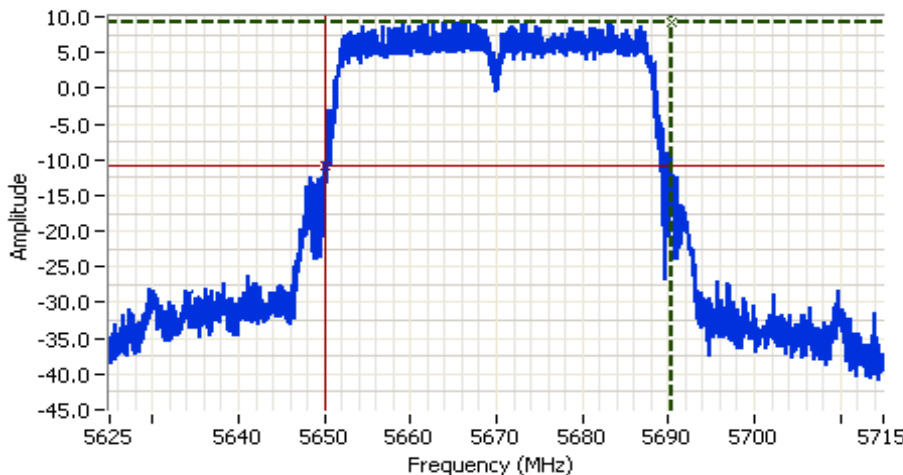
**Analyzer Settings**

Agilent Technologies, E4446A  
 CF: 5670.000 MHz  
 SPAN: 90.000 MHz  
 RB: 1.000 MHz  
 VB: 3.000 MHz  
 Detector: POS  
 Attn: 20 DB  
 RL Offset: 12.5 DB  
 Sweep Time: 1.0ms  
 Ref Lvl: 17.5 DBM

**Comments**

20dB BW: 39.433 MHz  
 FL: 5650.1784 MHz  
 Chain 1

Cursor 1: 5689.6115, 11.48  
 Cursor 2: 5650.1784, -8.52  
 Delta Freq: 39.433  
 Delta Amplitude: 20.00



**Analyzer Settings**

Agilent Technologies, E4446A  
 CF: 5670.000 MHz  
 SPAN: 90.000 MHz  
 RB: 1.000 MHz  
 VB: 3.000 MHz  
 Detector: POS  
 Attn: 20 DB  
 RL Offset: 12.5 DB  
 Sweep Time: 1.0ms  
 Ref Lvl: 17.5 DBM

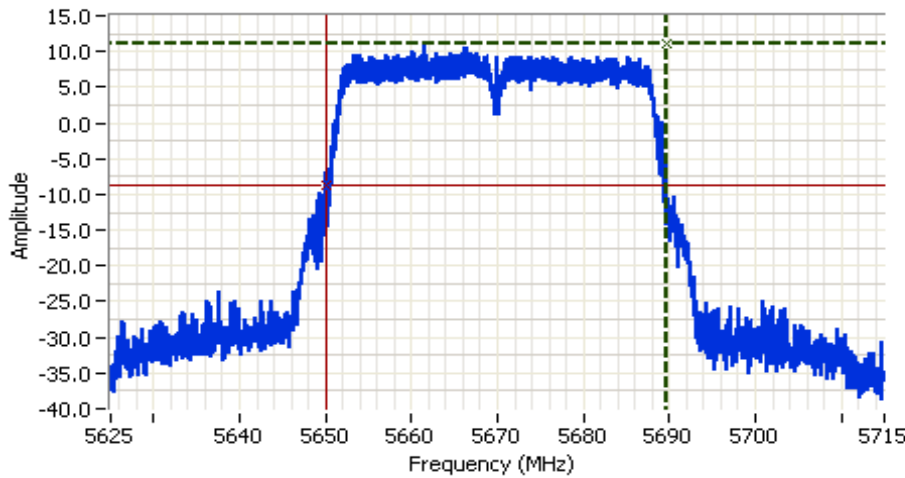
**Comments**

20dB BW: 40.423 MHz  
 FL: 5650.0283 MHz  
 Chain 2

Cursor 1: 5690.4518, 9.27  
 Cursor 2: 5650.0283, -10.73  
 Delta Freq: 40.423  
 Delta Amplitude: 20.00



Client: Pace Americas	Job Number: J93000
Model: IPW8000 Wireless STB	T-Log Number: T93085
Contact: Mark Rieger	Project Manager: Susan Hill
Standard: FCC, IC	Project Coordinator: Irene Rademacher
	Class: N/A

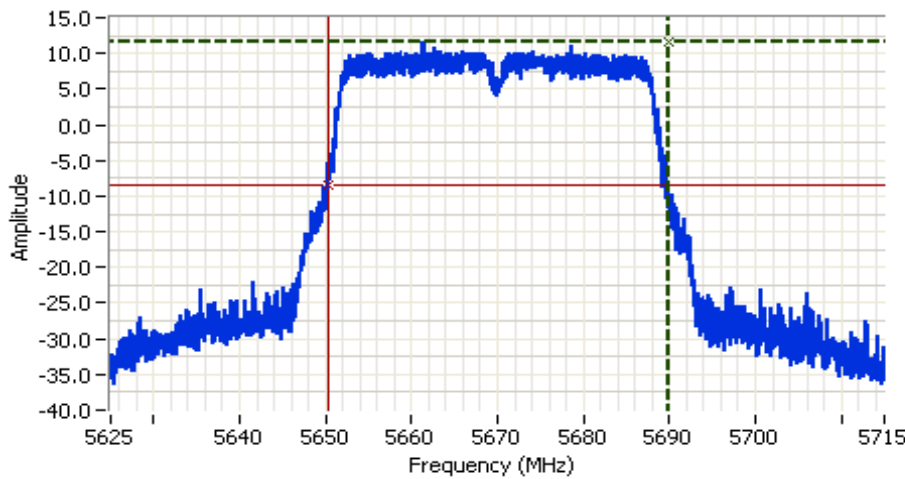


**Analyzer Settings**  
 Agilent Technologies, E4446A  
 CF: 5670.000 MHz  
 SPAN: 90.000 MHz  
 RB: 1.000 MHz  
 VB: 3.000 MHz  
 Detector: POS  
 Attn: 20 DB  
 RL Offset: 12.5 DB  
 Sweep Time: 1.0ms  
 Ref Lvl: 17.5 DBM

**Comments**  
 20dB BW: 39.643 MHz  
 FL: 5650.0283 MHz  
 Chain 3

Cursor 1 5689.6716 11.16  
 Cursor 2 5650.0283 -8.84

Delta Freq. 39.643  
 Delta Amplitude 20.00



**Analyzer Settings**  
 Agilent Technologies, E4446A  
 CF: 5670.000 MHz  
 SPAN: 90.000 MHz  
 RB: 1.000 MHz  
 VB: 3.000 MHz  
 Detector: POS  
 Attn: 20 DB  
 RL Offset: 12.5 DB  
 Sweep Time: 1.0ms  
 Ref Lvl: 17.5 DBM

**Comments**  
 20dB BW: 39.673 MHz  
 FL: 5650.2084 MHz  
 Chain 4

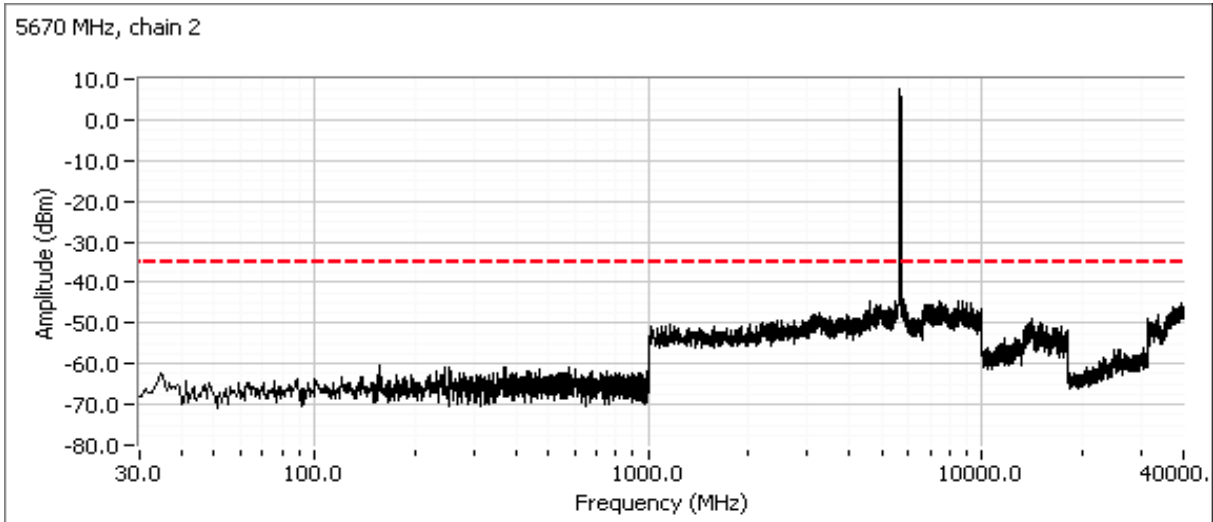
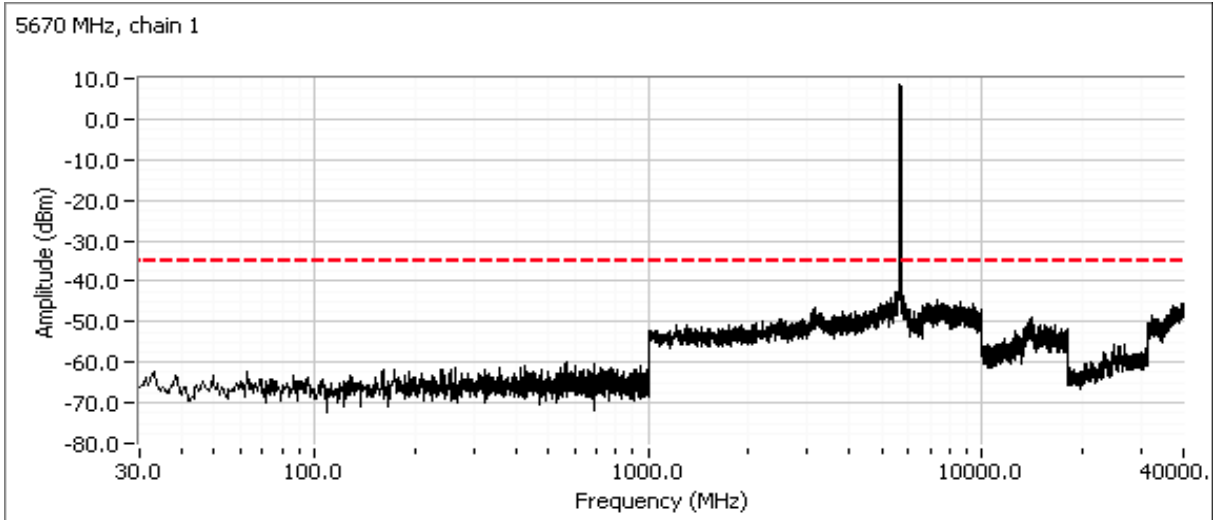
Cursor 1 5689.8816 11.51  
 Cursor 2 5650.2084 -8.49

Delta Freq. 39.673  
 Delta Amplitude 20.00

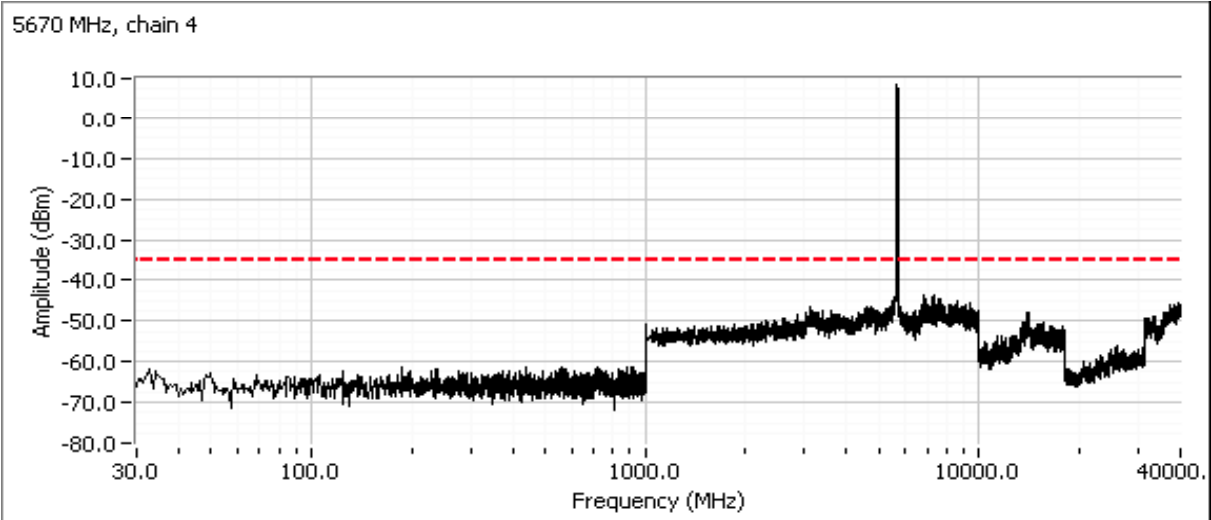
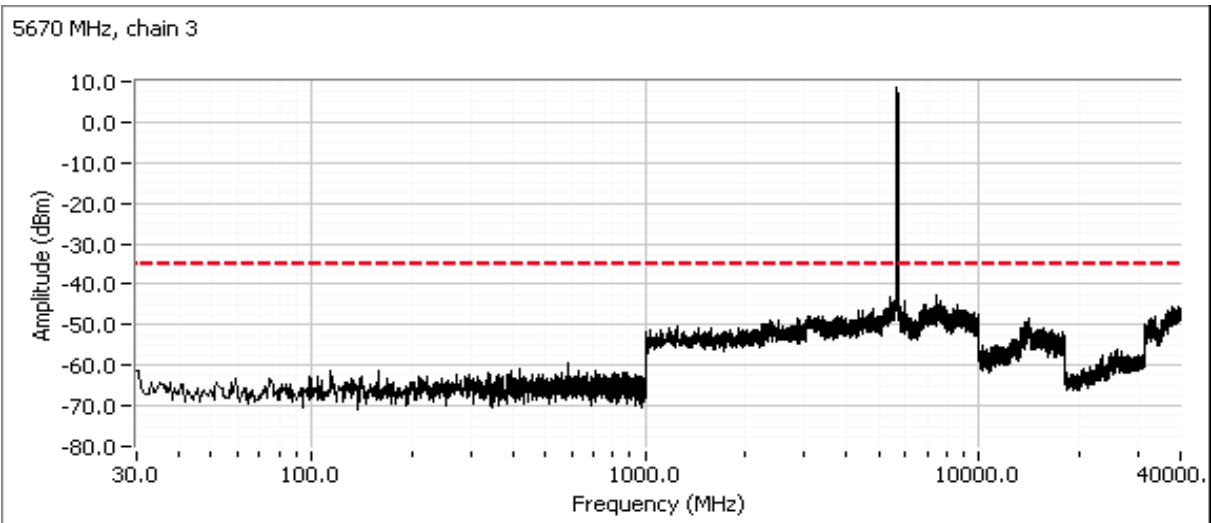


Client: Pace Americas	Job Number: J93000
Model: IPW8000 Wireless STB	T-Log Number: T93085
	Project Manager: Susan Hill
Contact: Mark Rieger	Project Coordinator: Irene Rademacher
Standard: FCC, IC	Class: N/A

High channel, 5470 - 5725 MHz Band  
 Wide-band plot, RB=VB=1MHz (Peak measurements versus limit).



Client: Pace Americas	Job Number: J93000
Model: IPW8000 Wireless STB	T-Log Number: T93085
	Project Manager: Susan Hill
Contact: Mark Rieger	Project Coordinator: Irene Rademacher
Standard: FCC, IC	Class: N/A





*End of Report*

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