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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: W0001

IC CERTIFICATION #:	8844A-W0001
FCC ID:	X6JW0001
APPLICANT:	Biscotti Inc. 5900 S. Lake Forest Dr., Suite 290 Allen, TX 75013
TEST SITE(S):	NTS Silicon Valley 41039 Boyce Road. Fremont, CA. 94538-2435
IC SITE REGISTRATION #:	2845B-3; 2845B-7
REPORT DATE:	February 6, 2013
FINAL TEST DATES:	November 9, 27, 28, 29 and December 3, 13 and 30, 2012 and January 7, 2013
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Testing Cert #0214.26

REVISION HISTORY

Rev#	Date	Comments	Modified By
-	02-06-2013	First release	

TABLE OF CONTENTS

SCOPE

An electromagnetic emissions test has been performed on the Biscotti Inc. model W0001, 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 (using FCC DA 02-2138, August 30, 2002)

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

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

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

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

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

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 Biscotti Inc. model W0001 complied with the requirements of the following regulations:

Industry Canada RSS-Gen Issue 3
RSS 210 Issue 8 "Low-power Licence-exempt Radiocommunication Devices (All Frequency Bands): Category I Equipment"
FCC Part 15, Subpart 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 Biscotti Inc. model W0001 and therefore apply only to the tested sample. The sample was selected and prepared by Nadeem Ahmed of Biscotti 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	11a: 26.6 MHz n20: 26.3 MHz n40: 38.8 MHz	N/A – limits output power if < 20MHz	N/A
15.407 (a) (1)	A9.2(1)	Output Power	11a: 10.4 dBm n20: 13.0 dBm n40: 13.4 dBm (Max eirp: 0.071 W)	17dBm	Complies
15.407 (a) (1)	-	Power Spectral Density	11a: -1.9 dBm/MHz n20: 1.1 dBm/MHz n40: -1.0 dBm/MHz	4 dBm/MHz	Complies
-	A9.5 (2)			5 dBm/MHz	Complies

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	11a: 20.6 MHz n20: 24.7 MHz n40: 39.3 MHz	N/A – limits output power if < 20MHz	N/A
15.407(a) (2)	A9.2(2)	Output Power	11a: 10 dBm n20: 15.0 dBm n40: 12.3 dBm (Max eirp: 0.113 W)	24dBm (250mW)	Complies
15.407(a) (2)	-	Power Spectral Density	11a: -3.0 dBm/MHz n20: 2.8 dBm/MHz n40: 0.6 dBm/MH	11.0 dBm/MHz	Complies
-	A9.2(2) / A9.5 (2)	Power Spectral Density		11.0 dBm / MHz	Complies

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	11a: 19.6 MHz n20: 24.8 MHz n40: 38.9 MHz	N/A – limits output power if < 20MHz	N/A
15.407(a) (2)	A9.2(2)	Output Power	11a: 7.0 dBm n20: 14.2 dBm n40: 11.9 dBm (Max eirp: 0.094 W)	24 dBm / 250mW (eirp < 30dBm)	Complies
15.407(a) (2))		Power Spectral Density	11a: -5.6 dBm/MHz n20: 2.1 dBm/MHz n40: -2.7 dBm/MHz	11.0 dBm/MHz	Complies
	A9.2(2) / A9.5 (2)	Power Spectral Density		11.0 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

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	68.0 dBµV/m @ 5726.5 MHz (-0.3 dB)	Refer to page 22	Complies
15.407(a)(6)	-	Peak Excursion Ratio	7.4dBm	< 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	Frequency stability is better than 10ppm	Signal shall remain within the allocated band	Complies
15.407 (h1)	A9.4	Transmit Power Control	TPC is not required as the device operates at below 500mW eirp	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 R90045	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	The module uses u.FL connectors	Unique or integral antenna required	Complies
15.207	RSS GEN Table 2	AC Conducted Emissions	51.5dBµV @ 0.183MHz	Refer to page 19	Complies (-12.8dB)
15.109	RSS GEN 7.2.3 Table 1	Receiver spurious emissions	-	-	N/A
15.247 (b) (5) 15.407 (f)	RSS 102	RF Exposure Requirements	Refer to MPE calculations in Exhibit 11, RSS 102 declaration and User Manual statements.	Refer to OET 65, FCC Part 1 and RSS 102	Complies
-	RSP 100 RSS GEN 7.1.5	User Manual	-	Statement required regarding non-interference	Complies
-	RSP 100 RSS GEN 7.1.5	User Manual	-	Statement for products with detachable antenna	Complies
-	RSP 100 RSS GEN 4.4.1	99% Bandwidth	11a: 17.0 MHz n20: 18.2 MHz n40: 36.9 MHz	Information only	N/A

MEASUREMENT UNCERTAINTIES

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

Measurement Type	Measurement Unit	Frequency Range	Expanded Uncertainty
RF power, conducted (power meter)	dBm	25 to 7000 MHz	± 0.52 dB
RF power, conducted (Spectrum analyzer)	dBm	25 to 7000 MHz	± 0.7 dB
Conducted emission of transmitter	dBm	25 to 26500 MHz	± 0.7 dB
Conducted emission of receiver	dBm	25 to 26500 MHz	± 0.7 dB
Radiated emission (substitution method)	dBm	25 to 26500 MHz	± 2.5 dB
Radiated emission (field strength)	dBµV/m	25 to 1000 MHz	± 3.6 dB
		1000 to 40000 MHz	± 6.0 dB
Conducted Emissions (AC Power)	dBµV	0.15 to 30 MHz	± 2.4 dB

EQUIPMENT UNDER TEST (EUT) DETAILS

GENERAL

The Biscotti Inc. model W0001 is an 802.11abgn (2x2) radio module. 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 EUT is powered from a host device.

The sample was received on October 7 2012 and tested on November 9, 27, 28, 29 and December 3, 13 and 30, 2012 and January 7, 2013. The EUT consisted of the following component(s):

Company	Model	Description	Serial Number	FCC ID
Biscotti Inc.	TV Phone (2nd Generation)	802.11abgn 2x3 with BT v4.0 Module	(MAC): B0.EE.45.03.16.B3	W6JW0001

ANTENNA SYSTEM

The EUT was tested with the following antenna:

Taoglas, FXP831.07.0100C0, 3dBi @ 2.4GHz, 5.5dBi @ 5GHz, dipole antenna

ENCLOSURE

The EUT has no enclosure. It is designed to be installed within the enclosure of a host computer.

MODIFICATIONS

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

SUPPORT EQUIPMENT

The following equipment was used as support equipment for testing:

Company	Model	Description	Serial Number	FCC ID
Dell	Inspiron M5040	Laptop	20131950925	-

No remote support equipment was used during testing.

EUT INTERFACE PORTS

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

Port	Connected To	Cable(s)		
		Description	Shielded or Unshielded	Length(m)
EUT	Laptop (USB)	USB	Shielded	1
Laptop	AC Mains	3 Wire	Unshielded	1.5

EUT OPERATION

During testing, the EUT was configured to continuously transmit at the noted power at the lowest data rate, as this resulted in the highest output power; 6Mb/s for 11a, MCS0 for n20 and n40.

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 7	A2LA accreditation	2845B-7	

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

CONDUCTED EMISSIONS CONSIDERATIONS

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

RADIATED EMISSIONS CONSIDERATIONS

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

MEASUREMENT INSTRUMENTATION

RECEIVER SYSTEM

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

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

INSTRUMENT CONTROL COMPUTER

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

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

LINE IMPEDANCE STABILIZATION NETWORK (LISN)

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

FILTERS/ATTENUATORS

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

ANTENNAS

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

ANTENNA MAST AND EQUIPMENT TURNTABLE

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

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

INSTRUMENT CALIBRATION

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

TEST PROCEDURES

EUT AND CABLE PLACEMENT

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

CONDUCTED EMISSIONS

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

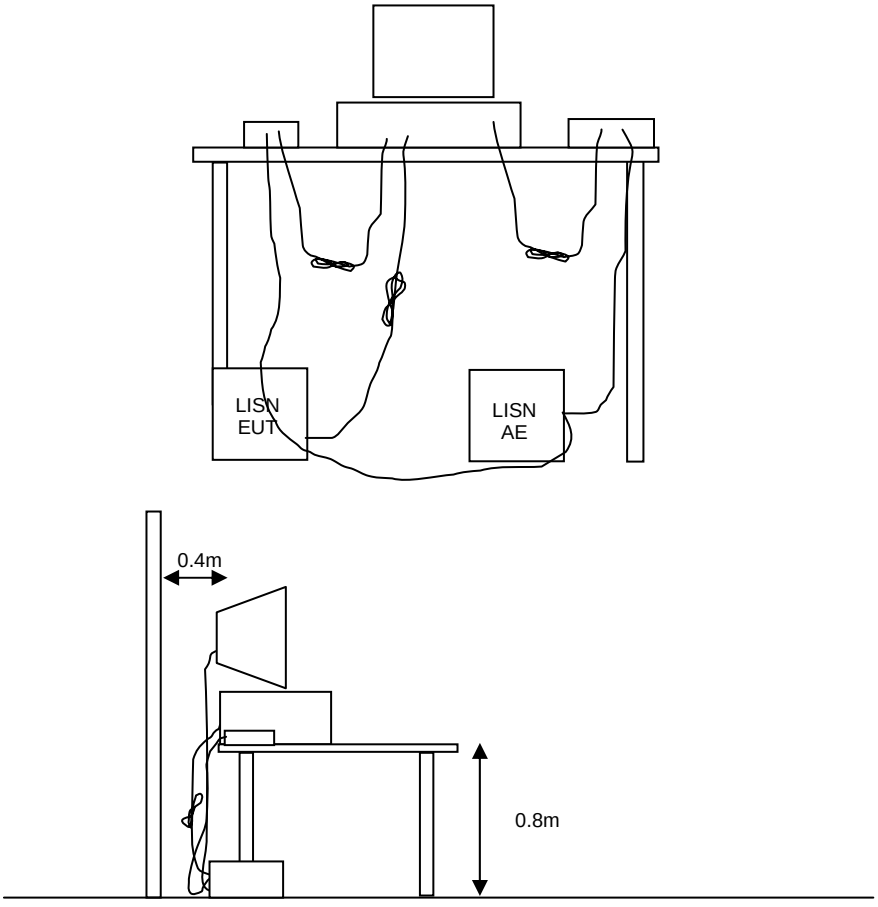


Figure 1 Typical Conducted Emissions Test Configuration

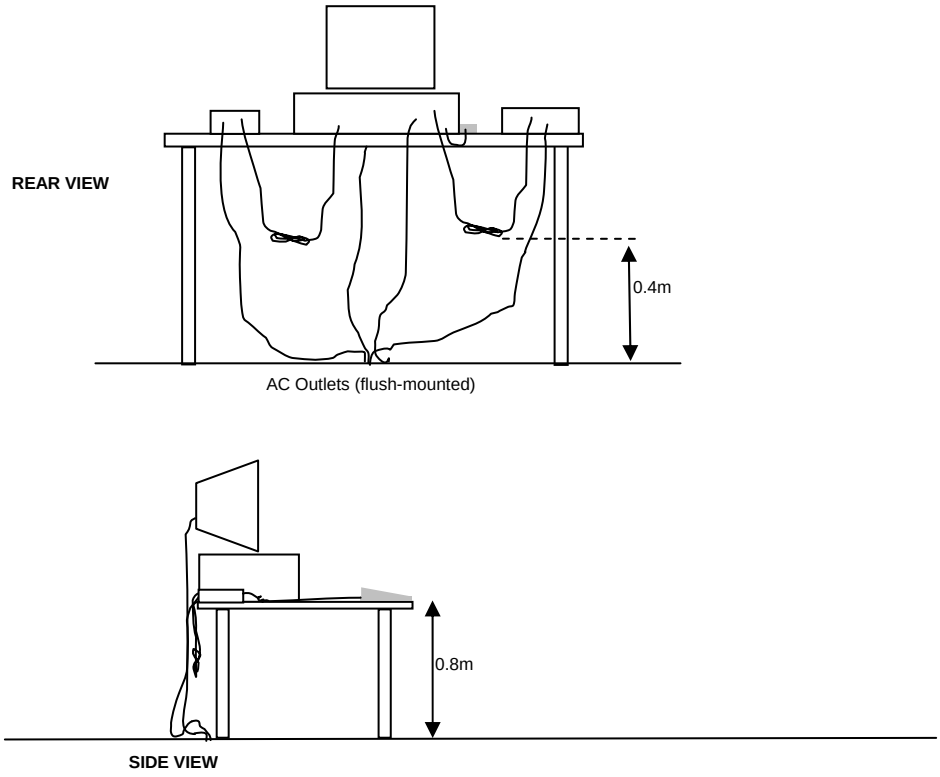
RADIATED EMISSIONS

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

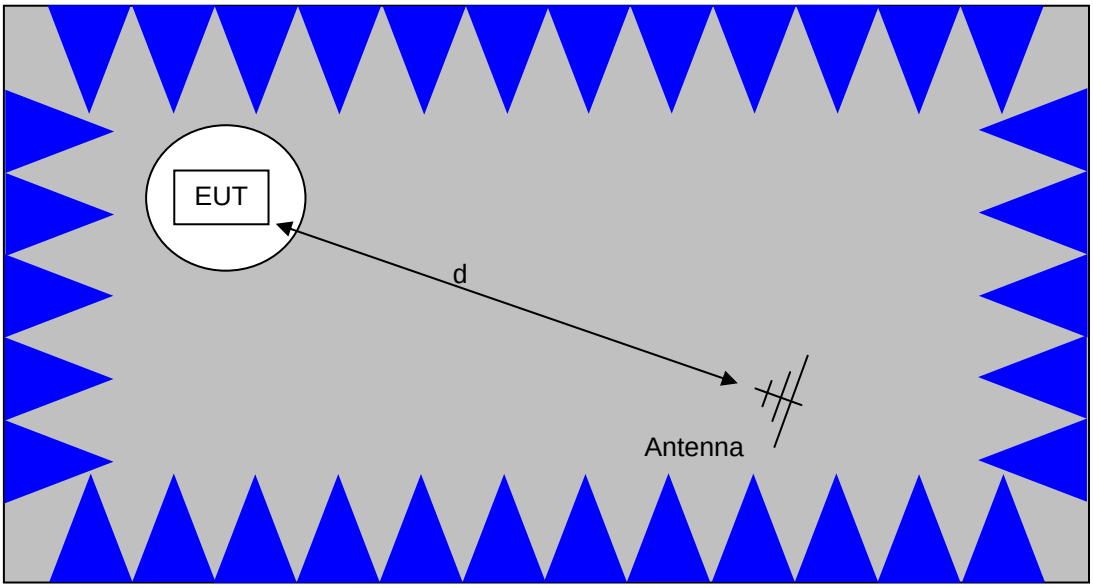
A speaker is provided in the receiver to aid in discriminating between EUT and ambient emissions. Other methods used during the preliminary scan for EUT emissions involve scanning with near field magnetic loops, monitoring I/O cables with RF current clamps, and cycling power to the EUT.

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

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

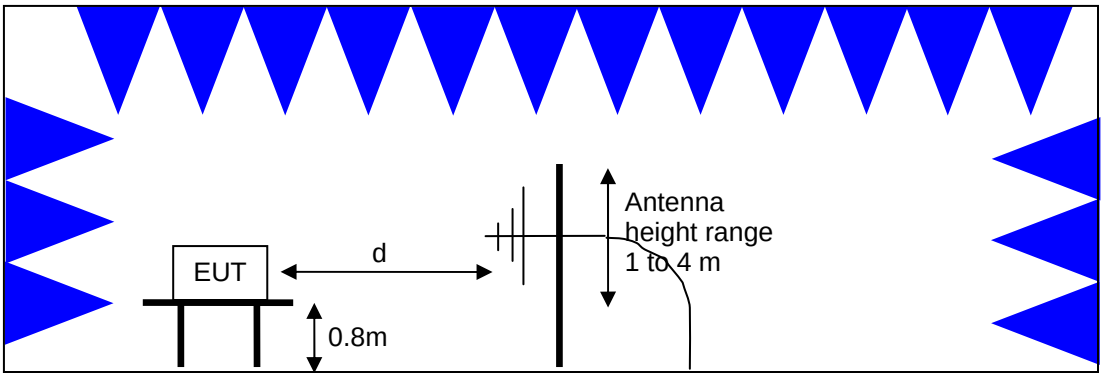


Typical Test Configuration for Radiated Field Strength Measurements



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

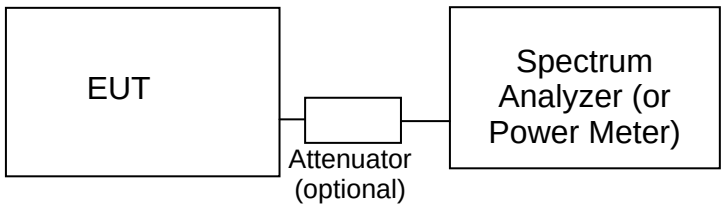
Floor-standing equipment is placed on the floor with insulating supports between the unit and the ground plane.



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

CONDUCTED EMISSIONS FROM ANTENNA PORT

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



Test Configuration for Antenna Port Measurements

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

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

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

BANDWIDTH MEASUREMENTS

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

SPECIFICATION LIMITS AND SAMPLE CALCULATIONS

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

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

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

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

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

GENERAL TRANSMITTER RADIATED EMISSIONS SPECIFICATION LIMITS

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

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

RECEIVER RADIATED SPURIOUS EMISSIONS SPECIFICATION LIMITS

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

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

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

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)[2] 1W (30dBm) eirp	11 dBm/MHz
5470 – 5725	250 mW (24 dBm)[3] 1W (30dBm) eirp	11 dBm/MHz
5725 – 5825	1 Watts (30 dBm) 4W eirp	17 dBm/MHz

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

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

[2] If EIRP exceeds 500mW the device must employ TPC
[3] 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. This is an average limit so the peak value of the emission may not exceed –7dBm/MHz (88.3dBuV/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:

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

where:

F_d = Distance Factor in dB

D_m = Measurement Distance in meters

D_s = Specification Distance in meters

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

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

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

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

$$R_c = R_r + F_d$$

and

$$M = R_c - L_s$$

where:

R_r = Receiver Reading in dBuV/m

F_d = Distance Factor in dB

R_c = Corrected Reading in dBuV/m

L_s = Specification Limit in dBuV/m

M = Margin in dB Relative to Spec

SAMPLE CALCULATIONS - FIELD STRENGTH TO EIRP CONVERSION

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

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

where P is the eirp (Watts)

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

Appendix A Test Equipment Calibration Data

Manufacturer	Description	Model	Asset #	Cal Due
Radiated Emissions, 1,000 - 6,500 MHz, 07-Nov-12				
EMCO	Antenna, Horn, 1-18 GHz	3115	1561	7/12/2014
Rohde & Schwarz	EMI Test Receiver, 20 Hz-7 GHz	ESIB7	1756	5/21/2013
Radiated Emissions, 1,000 - 26,500 MHz, 08-Nov-12				
Hewlett Packard	Head (Inc flex cable, 1143, 2198) Red	84125C	1145	7/5/2013
Hewlett Packard	SpecAn 30 Hz -40 GHz, SV (SA40) Red	8564E (84125C)	1148	9/14/2013
EMCO	Antenna, Horn, 1-18 GHz	3115	1561	7/12/2014
Micro-Tronics	Band Reject Filter, 2400-2500 MHz	BRM50702-02	1683	8/2/2013
Rohde & Schwarz	EMI Test Receiver, 20 Hz-7 GHz	ESIB7	1756	5/21/2013
Hewlett Packard	Microwave Preamplifier, 1-26.5GHz	8449B	1780	11/22/2012
A.H. Systems	Red System Horn, 18-40GHz	SAS-574, p/n: 2581	2161	3/20/2013
Radiated Emissions, 1,000 - 40,000 MHz, 09-Nov-12				
Hewlett Packard	Head (Inc flex cable, 1143, 2198) Red	84125C	1145	7/5/2013
Hewlett Packard	SpecAn 30 Hz -40 GHz, SV (SA40) Red	8564E (84125C)	1148	9/14/2013
Hewlett Packard	High Pass filter, 8.2 GHz (Blu System)	P/N 84300-80039 (84125C)	1392	5/18/2013
EMCO	Antenna, Horn, 1-18 GHz	3115	1561	7/12/2014
Rohde & Schwarz	EMI Test Receiver, 20 Hz-7 GHz	ESIB7	1756	5/21/2013
Hewlett Packard	Microwave Preamplifier, 1-26.5GHz	8449B	1780	11/22/2012
A.H. Systems	Red System Horn, 18-40GHz	SAS-574, p/n: 2581	2161	3/20/2013
Micro-Tronics	Band Reject Filter, 5470-5725 MHz	BRC50704-02	2240	10/4/2013
DFS, 14-Nov-12				
Hewlett Packard	EMC Spectrum Analyzer, 9 kHz - 6.5 GHz	8595EM	780	1/25/2013
EMCO	Antenna, Horn, 1-18 GHz (SA40-Blu)	3115	1386	9/26/2014
EMCO	Antenna, Horn, 1-18 GHz	3117	1662	5/25/2014
Agilent	PSG Vector Signal Generator (250kHz - 20GHz)	E8267C	1877	5/11/2013
Tektronix	500MHz, 2CH, 5GS/s Scope	TDS5052B	2118	10/22/2013
Radiated Emissions, 1 - 18 GHz, 27-Nov-12				
EMCO	Antenna, Horn, 1-18GHz	3115	868	6/19/2014
Hewlett Packard	SpecAn 30 Hz -40 GHz, SV (SA40) Red	8564E (84125C)	1148	9/14/2013
Micro-Tronics	Band Reject Filter, 5725-5875 MHz	BRC50705-02	1682	3/23/2013
Hewlett Packard	Microwave Preamplifier, 1-26.5GHz	8449B	1780	12/5/2012
Micro-Tronics	Band Reject Filter, 5150-5350 MHz	BRC50703-02	2239	10/4/2013
Radiated Emissions, 1000 - 40,000MHz, 29-Nov-12				
EMCO	Antenna, Horn, 1-18 GHz	3115	487	7/19/2014

Manufacturer	Description	Model	Asset #	Cal Due
Hewlett Packard	Microwave Preamplifier, 1-26.5GHz	8449B	785	5/18/2013
Hewlett Packard	SpecAn 30 Hz -40 GHz, SV (SA40) Red	8564E (84125C)	1148	9/14/2013
Micro-Tronics	Band Reject Filter, 5150-5350 MHz	BRC50703-02	2239	10/4/2013
Radiated Emissions, 1000 - 40000MHz, 04-Dec-12				
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	SpecAn 30 Hz -40 GHz, SV (SA40) Red	8564E (84125C)	1148	9/14/2013
Radiated Emissions, 1000 - 40,000 MHz, 14-Dec-12				
EMCO	Antenna, Horn, 1-18 GHz (SA40-Red)	3115	1142	8/23/2014
Micro-Tronics	Band Reject Filter, 5150-5350 MHz	BRC50703-02	1680	8/2/2013
Micro-Tronics	Band Reject Filter, 5470-5725 MHz	BRC50704-02	1730	8/2/2013
Hewlett Packard	SpecAn 9 kHz - 40 GHz, (SA40) Purple	8564E (84125C)	1771	5/1/2013
A.H. Systems	Purple System Horn, 18-40GHz	SAS-574, p/n: 2581	2160	4/17/2013
Hewlett Packard	SpecAn 9 kHz - 40 GHz, (SA40) Purple	8564E (84125C)	2415	8/10/2013
Radiated Emissions, 1,000 - 18,000 MHz, 18-Dec-12				
Hewlett Packard	Microwave Preamplifier, 1-26.5GHz	8449B	263	3/29/2013
Hewlett Packard	SpecAn 9 kHz - 40 GHz, FT (SA40) Blue	8564E (84125C)	1393	5/1/2013
EMCO	Antenna, Horn, 1-18 GHz	3115	1561	7/12/2014
Micro-Tronics	Band Reject Filter, 5725-5875 MHz	BRC50705-02	2241	10/4/2013
Radiated Emissions, 1,000 - 40,000 MHz, 18-Dec-12				
Hewlett Packard	Microwave Preamplifier, 1-26.5GHz	8449B	263	3/29/2013
EMCO	Antenna, Horn, 1-18 GHz (SA40-Blu)	3115	1386	9/26/2014
EMCO	Antenna, Horn, 1-18 GHz	3115	1561	7/12/2014
Micro-Tronics	Band Reject Filter, 5725-5875 MHz	BRC50705-02	2241	10/4/2013
Conducted Emissions - AC Power Ports, 19-Dec-12				
EMCO	LISN, 10 kHz-100 MHz, 25A	3825/2	1292	2/16/2013
Rohde & Schwarz	Pulse Limiter	ESH3 Z2	1594	5/22/2013
Rohde & Schwarz	EMI Test Receiver, 20 Hz-7 GHz	ESIB7	1630	5/31/2013
Radio Antenna Port (Power and Spurious Emissions), 28-Dec-12				
Agilent	50GHz PSA Spectrum Analyzer	E4448A-M27	199979	11/15/2013
Radio Antenna Port (Power and Spurious Emissions), 07-Jan-13				
Agilent	50GHz PSA Spectrum Analyzer	E4448A-M27	199979	11/15/2013

Appendix B Test Data

T89809 Pages 27 - 110

Client:	Biscotti, Inc.	Job Number:	J89805
Product	W0001 - Module	T-Log Number:	T89809
	802.11abgn 2x2	Account Manager:	Deepa Shetty
Contact:	Nadeem Ahmed		
Emissions Standard(s):	FCC 15.247, 15.E	Class:	-
Immunity Standard(s):	-	Environment:	-

EMC Test Data

For The

Biscotti, Inc.

Product

W0001 - Module
802.11abgn 2x2

Date of Last Test: 1/7/2013

Client:	Biscotti, Inc.	Job Number:	J89805
Model:	W0001 - Module 802.11abgn 2x2	T-Log Number:	T89809
		Account Manager:	Deepa Shetty
Contact:	Nadeem Ahmed		
Standard:	FCC 15.247, 15.E	Class:	-

Conducted Emissions

(Elliott Laboratories Fremont Facility, Semi-Anechoic Chamber)

Test Specific Details

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

Date of Test: 12/19/2012
Test Engineer: M. Birgani
Test Location: Fremont Chamber #3

Config. Used: 1
Config Change: HP laptop was used.
EUT Voltage: 120V/60Hz

General Test Configuration

The EUT and host system were located on a wooden table inside the semi-anechoic chamber, 40 cm from a vertical coupling plane and 80cm from the LISN.

Ambient Conditions:

Temperature: 13-18 °C
Rel. Humidity: 35-45 %

Summary of Results

Run #	Test Performed	Limit	Result	Margin
1	CE, AC Power,120V/60Hz	Class B	PASS	51.5dBµV @ 0.183MHz (-12.8dB)

Modifications Made During Testing

No modifications were made to the EUT during testing

Deviations From The Standard

No deviations were made from the requirements of the standard.

Client:	Biscotti, Inc.	Job Number:	J89805
Model:	W0001 - Module 802.11abgn 2x2	T-Log Number:	T89809
		Account Manager:	Deepa Shetty
Contact:	Nadeem Ahmed		
Standard:	FCC 15.247, 15.E	Class:	-

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

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

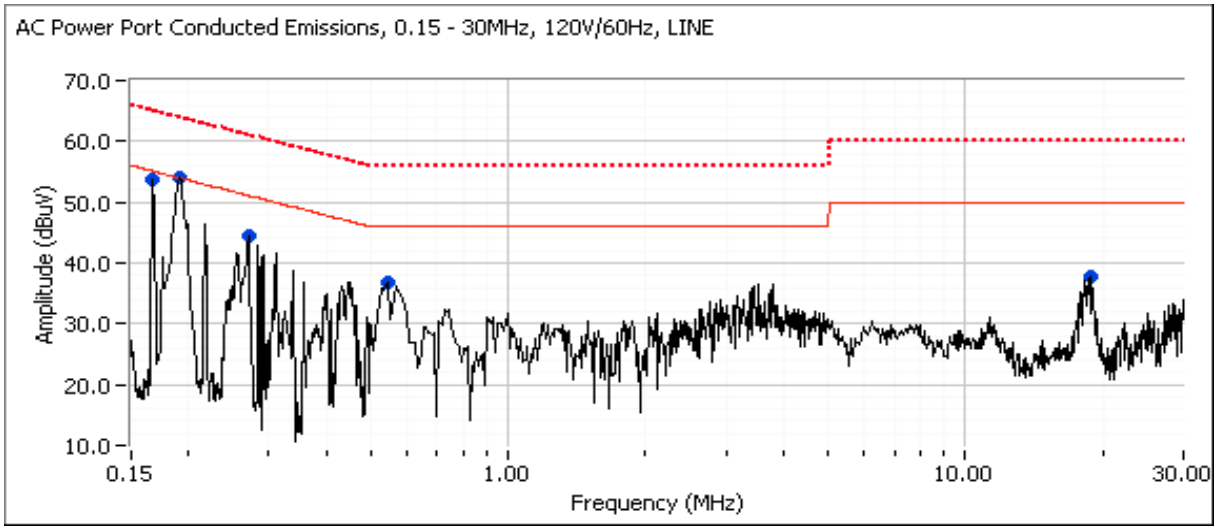
Frequency	Level	AC	Class B		Detector	Comments
MHz	dBµV	Line	Limit	Margin	QP/Ave	
0.194	54.0	Line	54.0	0.0	Peak	
0.164	53.8	Line	55.1	-1.3	Peak	
0.183	50.8	Neutral	54.2	-3.4	Peak	
0.219	47.5	Neutral	52.9	-5.4	Peak	
0.269	44.4	Line	51.1	-6.7	Peak	
0.258	44.6	Neutral	51.4	-6.8	Peak	
0.552	36.7	Line	46.0	-9.3	Peak	
18.656	40.2	Neutral	50.0	-9.8	Peak	
0.556	35.7	Neutral	46.0	-10.3	Peak	

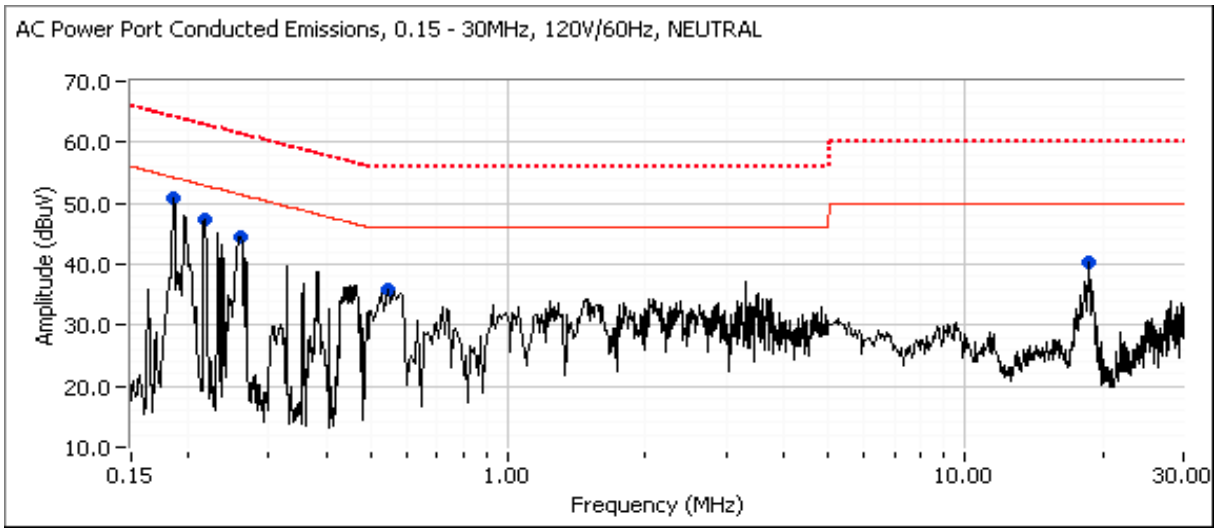
Final quasi-peak and average readings

Frequency	Level	AC	Class B		Detector	Comments
MHz	dBµV	Line	Limit	Margin	QP/Ave	
0.183	51.5	Neutral	64.3	-12.8	QP	QP (1.00s)
0.194	50.1	Line	63.9	-13.8	QP	QP (1.00s)
0.164	47.5	Line	65.3	-17.8	QP	QP (1.00s)
0.183	36.0	Neutral	54.3	-18.3	AVG	AVG (0.10s)
0.194	35.3	Line	53.9	-18.6	AVG	AVG (0.10s)
0.258	41.6	Neutral	61.5	-19.9	QP	QP (1.00s)
0.556	34.6	Neutral	56.0	-21.4	QP	QP (1.00s)
0.219	41.4	Neutral	62.9	-21.5	QP	QP (1.00s)
0.552	34.4	Line	56.0	-21.6	QP	QP (1.00s)
18.656	27.9	Neutral	50.0	-22.1	AVG	AVG (0.10s)
0.269	37.8	Line	61.1	-23.3	QP	QP (1.00s)
0.556	22.3	Neutral	46.0	-23.7	AVG	AVG (0.10s)
0.552	22.2	Line	46.0	-23.8	AVG	AVG (0.10s)
0.258	26.6	Neutral	51.5	-24.9	AVG	AVG (0.10s)
18.656	34.3	Neutral	60.0	-25.7	QP	QP (1.00s)
0.269	19.1	Line	51.1	-32.0	AVG	AVG (0.10s)
0.164	20.4	Line	55.3	-34.9	AVG	AVG (0.10s)
0.219	16.6	Neutral	52.9	-36.3	AVG	AVG (0.10s)

Client:	Biscotti, Inc.	Job Number:	J89805
Model:	W0001 - Module 802.11abgn 2x2	T-Log Number:	T89809
		Account Manager:	Deepa Shetty
Contact:	Nadeem Ahmed		
Standard:	FCC 15.247, 15.E	Class:	-

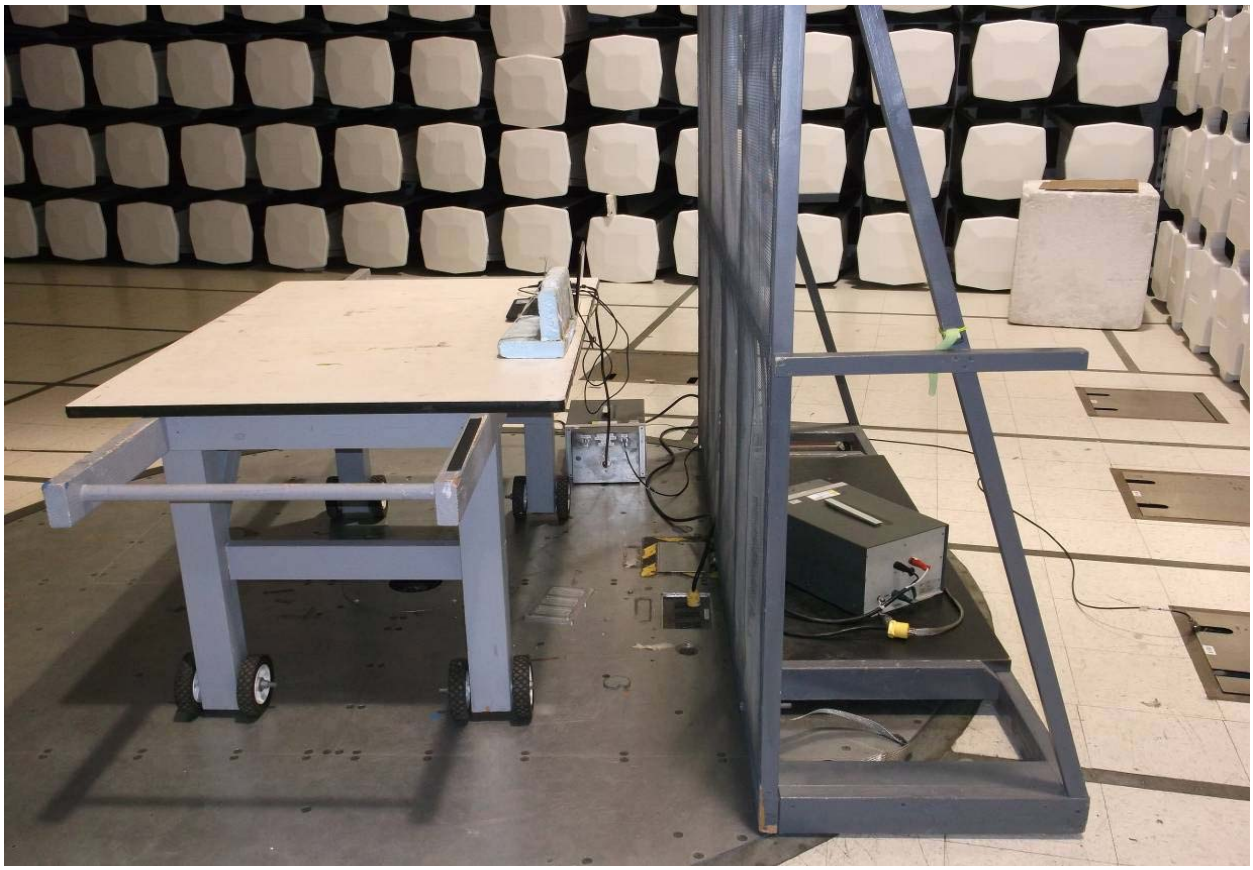
Run #1: AC Power Port Conducted Emissions, 0.15 - 30MHz, 120V/60Hz





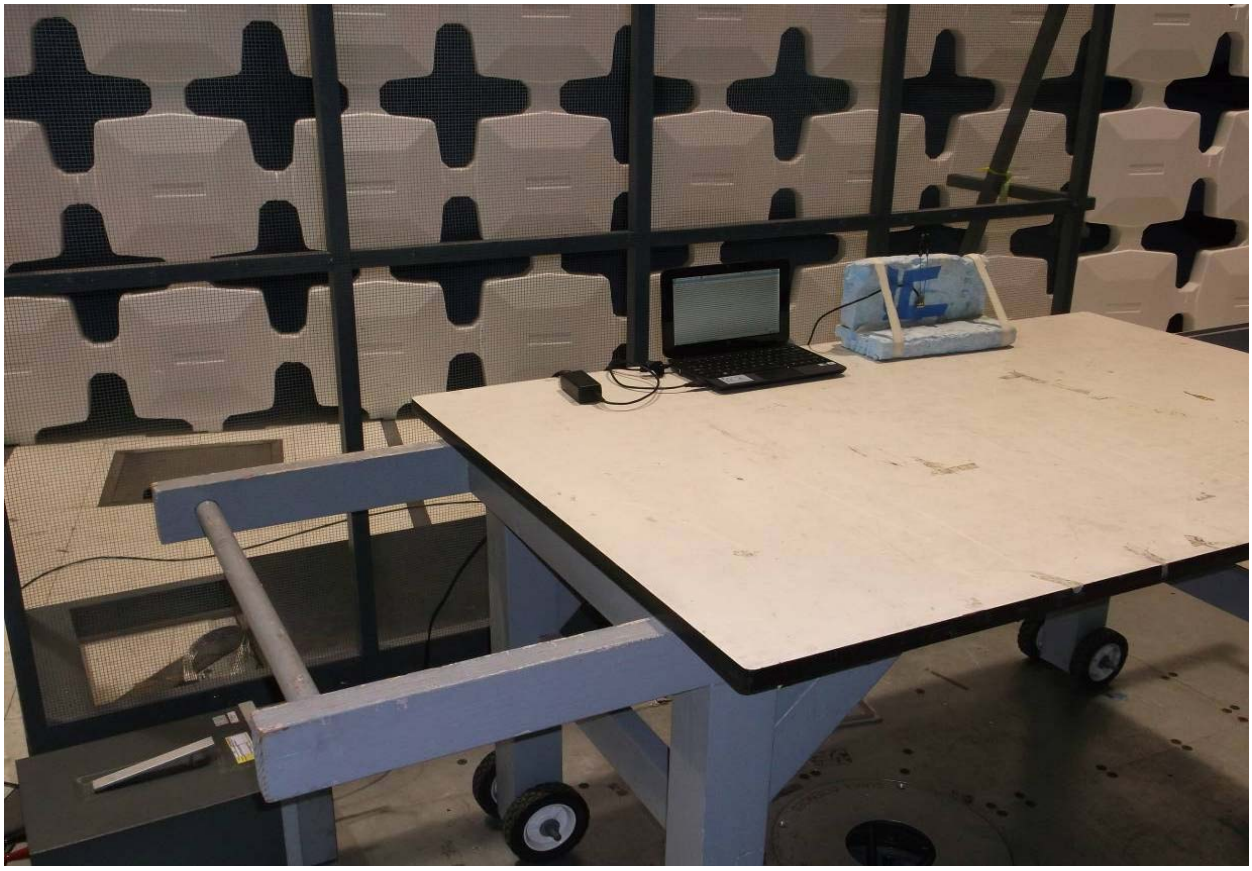
Client:	Biscotti, Inc.	Job Number:	J89805
Model:	W0001 - Module 802.11abgn 2x2	T-Log Number:	T89809
		Account Manager:	Deepa Shetty
Contact:	Nadeem Ahmed		
Standard:	FCC 15.247, 15.E	Class:	-

Test Configuration Photograph #1
(Conducted Emissions - Power Port)



Client:	Biscotti, Inc.	Job Number:	J89805
Model:	W0001 - Module 802.11abgn 2x2	T-Log Number:	T89809
		Account Manager:	Deepa Shetty
Contact:	Nadeem Ahmed		
Standard:	FCC 15.247, 15.E	Class:	-

Test Configuration Photograph #2
(Conducted Emissions - Power Port)



Client:	Biscotti, Inc.	Job Number:	J89805
Model:	W0001 - Module 802.11abgn 2x2	T-Log Number:	T89809
		Account Manager:	Deepa Shetty
Contact:	Nadeem Ahmed		
Standard:	FCC 15.247, 15.E	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: 20-24 °C
Rel. Humidity: 38-40 %

Summary of Results

Run #	Mode	Channel	Power Setting	Measured Power	Test Performed	Limit	Result / Margin
Run #1	802.11a Chain A	#36 5180MHz	20.0	-	Restricted Band Edge at 5150 MHz	15.209	43.4 dBµV/m @ 5150.0 MHz (-10.6 dB)
	802.11a Chain A	#64 5320MHz	20.0	-	Restricted Band Edge at 5350 MHz	15.209	40.3 dBµV/m @ 5350.1 MHz (-13.7 dB)
	802.11a Chain A	#100 5500MHz	20.0	-	Restricted Band Edge at 5460 MHz	15.209	42.7 dBµV/m @ 5460.0 MHz (-11.3 dB)
					Band Edge at 5470 MHz	15 E	64.2 dBµV/m @ 5469.3 MHz (-4.1 dB)
	802.11a Chain A	#140 5700MHz	20.0	-	Band Edge at 5725 MHz	15 E	68.0 dBµV/m @ 5726.5 MHz (-0.3 dB)
Run # 2	802.11n20 Chain A+B	#36 5180MHz	18 18	-	Restricted Band Edge at 5150 MHz	15.209	48.4 dBµV/m @ 5147.9 MHz (-5.6 dB)
	802.11n20 Chain A+B	#64 5320MHz	18 18	-	Restricted Band Edge at 5350 MHz	15.209	47.6 dBµV/m @ 5350.0 MHz (-6.4 dB)
	802.11n20 Chain A+B	#100 5500MHz	15 15	-	Restricted Band Edge at 5460 MHz	15.209	43.8 dBµV/m @ 5460.0 MHz (-10.2 dB)
					Band Edge at 5470 MHz	15 E	65.2 dBµV/m @ 5469.5 MHz (-3.1 dB)
	802.11n20 Chain A+B	#140 5700MHz	13 13	-	Band Edge at 5725 MHz	15 E	67.0 dBµV/m @ 5725.0 MHz (-1.3 dB)

Client:	Biscotti, Inc.	Job Number:	J89805
Model:	W0001 - Module 802.11abgn 2x2	T-Log Number:	T89809
		Account Manager:	Deepa Shetty
Contact:	Nadeem Ahmed		
Standard:	FCC 15.247, 15.E	Class:	N/A

Run #	Mode	Channel	Power Setting	Measured Power	Test Performed	Limit	Result / Margin
Run # 3	802.11n40 Chain A+B	#38 5190MHz	9 9	-	Restricted Band Edge at 5150 MHz	15.209	51.9 dBµV/m @ 5148.5 MHz (-2.1 dB)
Run # 3	802.11n40 Chain A+B	#62 5310MHz	13 13	-	Restricted Band Edge at 5350 MHz	15.209	53.3 dBµV/m @ 5350.3 MHz (-0.7 dB)
Run # 3	802.11n40 Chain A+B	#102 5510MHz	13 13	-	Restricted Band Edge at 5460 MHz	15.209	48.1 dBµV/m @ 5458.8 MHz (-5.9 dB)
					Band Edge at 5470 MHz	15 E	66.4 dBµV/m @ 5468.3 MHz (-1.9 dB)
Run # 3	802.11n40 Chain A+B	#134 5670MHz	15 15	-	Band Edge at 5725 MHz	15 E	66.1 dBµV/m @ 5726.4 MHz (-2.2 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.

Test Procedure Comments:

Unless otherwise noted, average measurements above 1GHz were performed as documented in FCC KDB 789033 G) 6) d) Method VB

Sample Notes:

SAMPLE S/N: (NTS 2012-2239)
EUT Firmware: 14.1.11.132

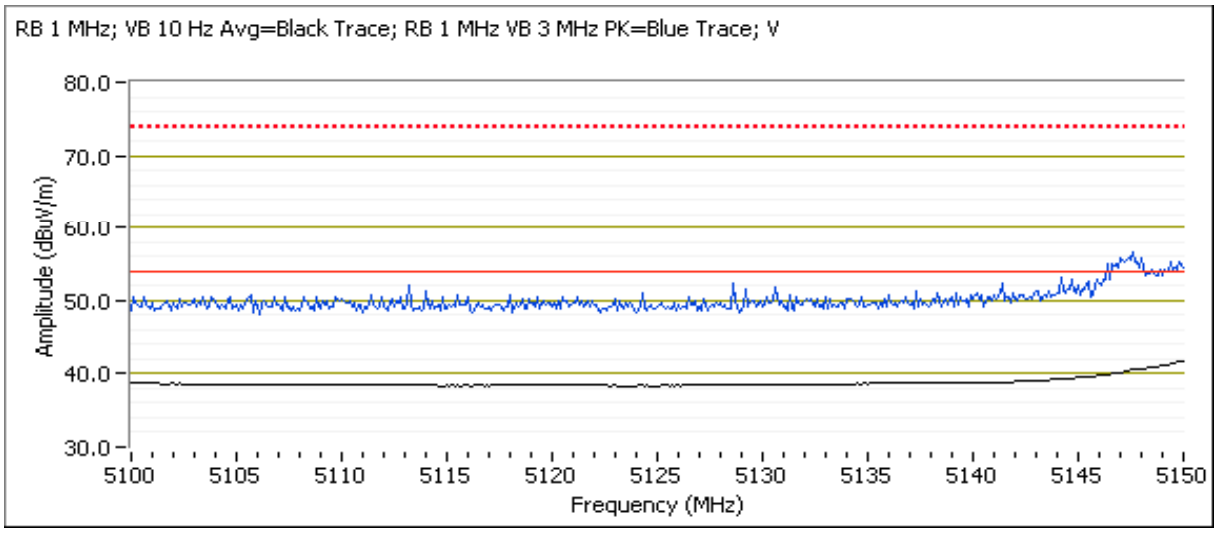
Client:	Biscotti, Inc.	Job Number:	J89805
Model:	W0001 - Module 802.11abgn 2x2	T-Log Number:	T89809
		Account Manager:	Deepa Shetty
Contact:	Nadeem Ahmed		
Standard:	FCC 15.247, 15.E	Class:	N/A

Run #1, Band Edge Field Strength - 802.11a, Chain A
Run #1a, EUT on Channel #36 5180MHz - 802.11a, Chain A

Date of Test: 11/9/2012 Test Location: Chamber 7
Test Engineer: Vishal Narayan Config Change: none

5150 MHz Band Edge Signal Radiated Field Strength

Frequency	Level	Pol	FCC 15.209		Detector	Azimuth	Height	Comments
MHz	dBµV/m	v/h	Limit	Margin	Pk/QP/Avg	degrees	meters	
5150.000	43.4	V	54.0	-10.6	AVG	134	1.0	POS; RB 1 MHz; VB: 10 Hz
5146.950	56.1	V	74.0	-17.9	PK	134	1.0	POS; RB 1 MHz; VB: 3 MHz
5149.920	38.9	H	54.0	-15.1	AVG	305	1.0	POS; RB 1 MHz; VB: 10 Hz
5145.510	50.1	H	74.0	-23.9	PK	305	1.0	POS; RB 1 MHz; VB: 3 MHz



Client:	Biscotti, Inc.	Job Number:	J89805
Model:	W0001 - Module 802.11abgn 2x2	T-Log Number:	T89809
		Account Manager:	Deepa Shetty
Contact:	Nadeem Ahmed		
Standard:	FCC 15.247, 15.E	Class:	N/A

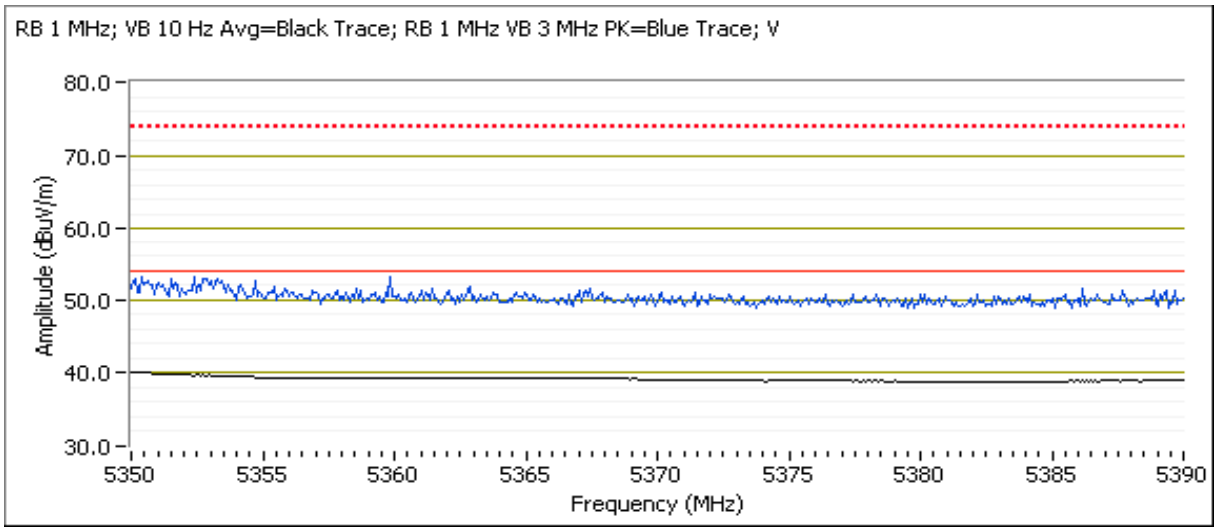
Run #1b, EUT on Channel #64 5320MHz - 802.11a, Chain A

Date of Test: 11/9/2012 Test Location: Chamber 7

Test Engineer: Vishal Narayan Config Change: none

5350 MHz Band Edge Signal Radiated Field Strength

Frequency	Level	Pol	FCC 15.209		Detector	Azimuth	Height	Comments
MHz	dBµV/m	v/h	Limit	Margin	Pk/QP/Avg	degrees	meters	
5350.080	40.3	V	54.0	-13.7	AVG	203	1.0	POS; RB 1 MHz; VB: 10 Hz
5350.080	51.3	V	74.0	-22.7	PK	203	1.0	POS; RB 1 MHz; VB: 3 MHz
5388.480	38.7	H	54.0	-15.3	AVG	260	1.0	POS; RB 1 MHz; VB: 10 Hz
5353.210	50.1	H	74.0	-23.9	PK	260	1.0	POS; RB 1 MHz; VB: 3 MHz

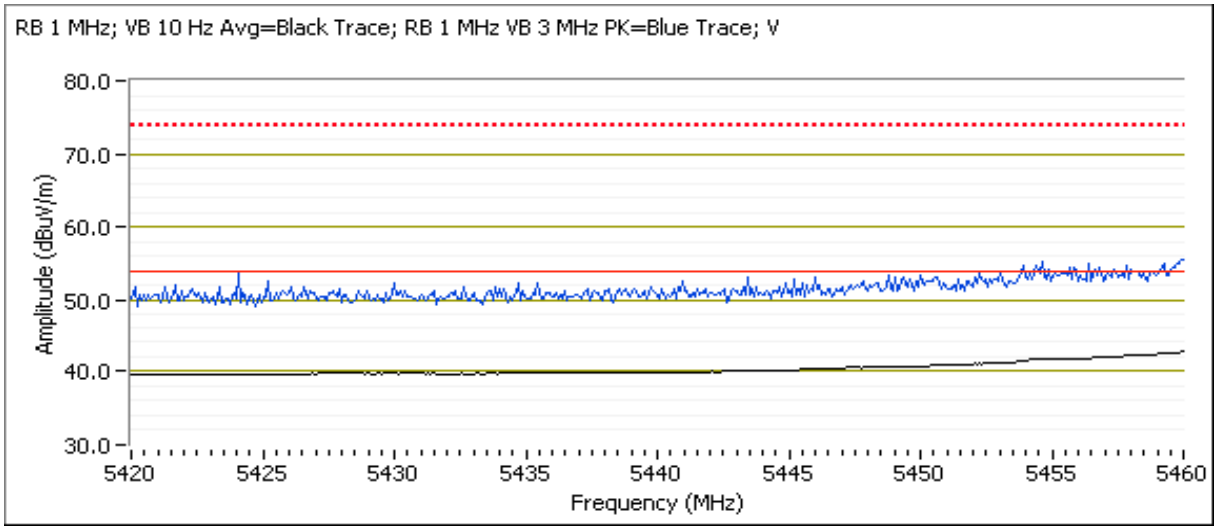


Client:	Biscotti, Inc.	Job Number:	J89805
Model:	W0001 - Module 802.11abgn 2x2	T-Log Number:	T89809
		Account Manager:	Deepa Shetty
Contact:	Nadeem Ahmed		
Standard:	FCC 15.247, 15.E	Class:	N/A

Run #1c, EUT on Channel #100 5500MHz - 802.11a, Chain A

5460 MHz Restricted Band Edge Signal Radiated Field Strength

Frequency	Level	Pol	FCC 15.209		Detector	Azimuth	Height	Comments
MHz	dBµV/m	v/h	Limit	Margin	Pk/QP/Avg	degrees	meters	
5460.000	42.7	V	54.0	-11.3	AVG	205	1.0	POS; RB 1 MHz; VB: 10 Hz
5460.000	55.3	V	74.0	-18.7	PK	205	1.0	POS; RB 1 MHz; VB: 3 MHz
5460.000	40.1	H	54.0	-13.9	AVG	69	1.0	POS; RB 1 MHz; VB: 10 Hz
5459.840	51.2	H	74.0	-22.8	PK	69	1.0	POS; RB 1 MHz; VB: 3 MHz

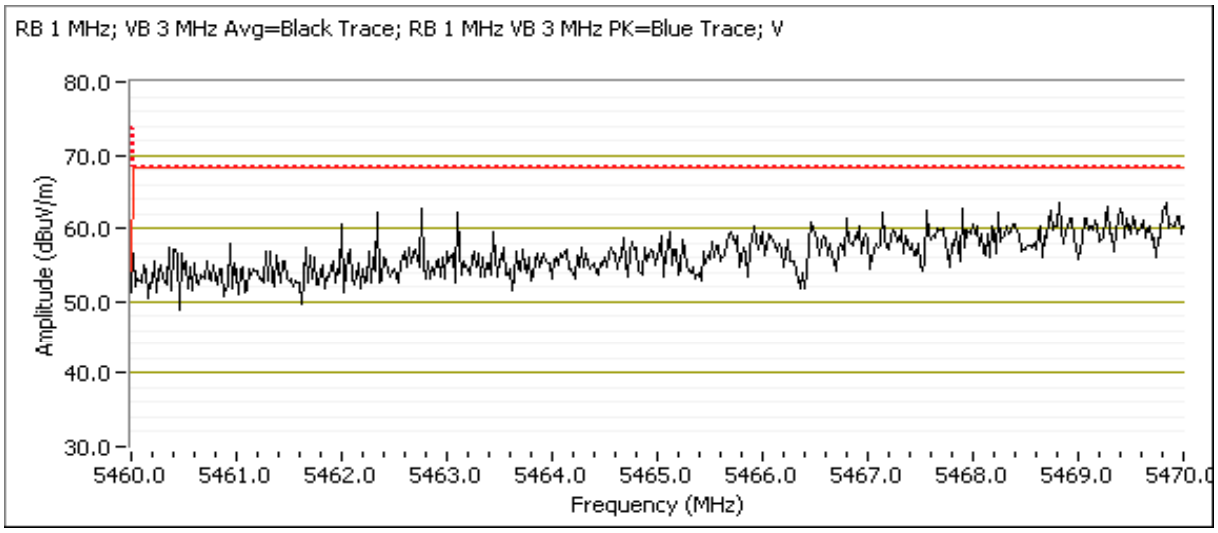


Client:	Biscotti, Inc.	Job Number:	J89805
Model:	W0001 - Module 802.11abgn 2x2	T-Log Number:	T89809
		Account Manager:	Deepa Shetty
Contact:	Nadeem Ahmed		
Standard:	FCC 15.247, 15.E	Class:	N/A

5460 - 5470 MHz Band Edge Radiated Field Strength

Frequency	Level	Pol	15 E		Detector	Azimuth	Height	Comments
MHz	dBµV/m	v/h	Limit	Margin	Pk/QP/Avg	degrees	meters	
5469.320	64.2	V	68.3	-4.1	PK	202	1.6	POS; RB 1 MHz; VB: 3 MHz
5469.780	54.9	H	68.3	-13.4	PK	281	1.6	POS; RB 1 MHz; VB: 3 MHz

For emissions in the 5460-5470MHz frequency range the limit is -27dBm/MHz eirp (68.3dBuV/m). The measurement method required is a peak measurement (RB=1MHz, VB≥3MHz, peak detector).



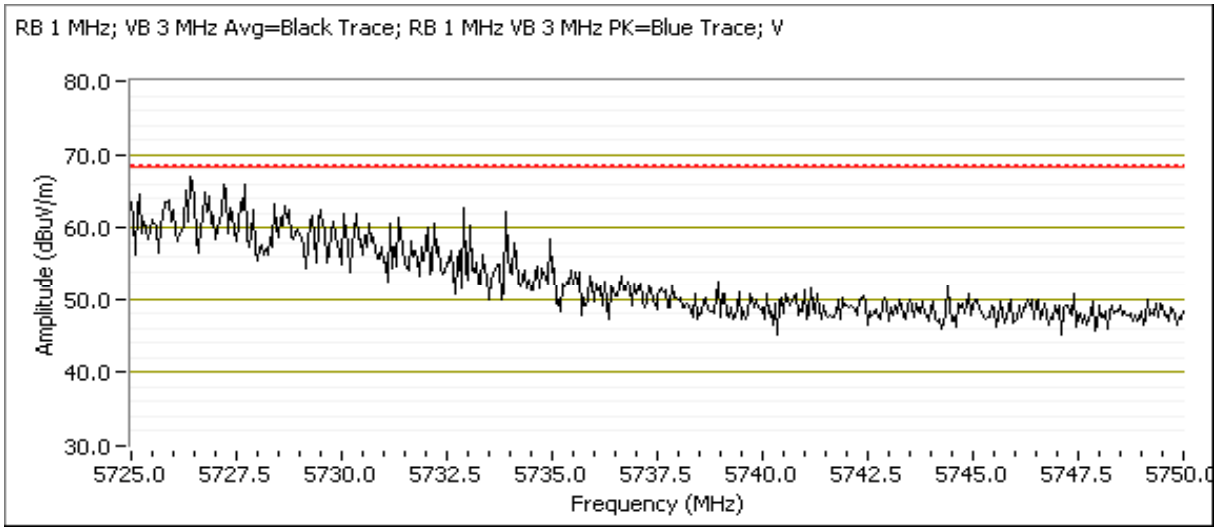
Client:	Biscotti, Inc.	Job Number:	J89805
Model:	W0001 - Module 802.11abgn 2x2	T-Log Number:	T89809
		Account Manager:	Deepa Shetty
Contact:	Nadeem Ahmed		
Standard:	FCC 15.247, 15.E	Class:	N/A

Run #1d, EUT on Channel #140 5700MHz - 802.11a, Chain A

5725 MHz Band Edge Radiated Field Strength

Frequency	Level	Pol	15 E		Detector	Azimuth	Height	Comments
MHz	dBµV/m	v/h	Limit	Margin	Pk/QP/Avg	degrees	meters	
5726.490	68.0	V	68.3	-0.3	Pk	9	1.2	POS; RB 1 MHz; VB: 3 MHz
5726.350	64.1	H	68.3	-4.2	PK	0	1.2	POS; RB 1 MHz; VB: 3 MHz

For emissions iimmediately above 5725 MHz the limit is -27dBm/MHz eirp (68.3dBuV/m). The measurement method required is a peak measurement (RB=1MHz, VB≥3MHz, peak detector).



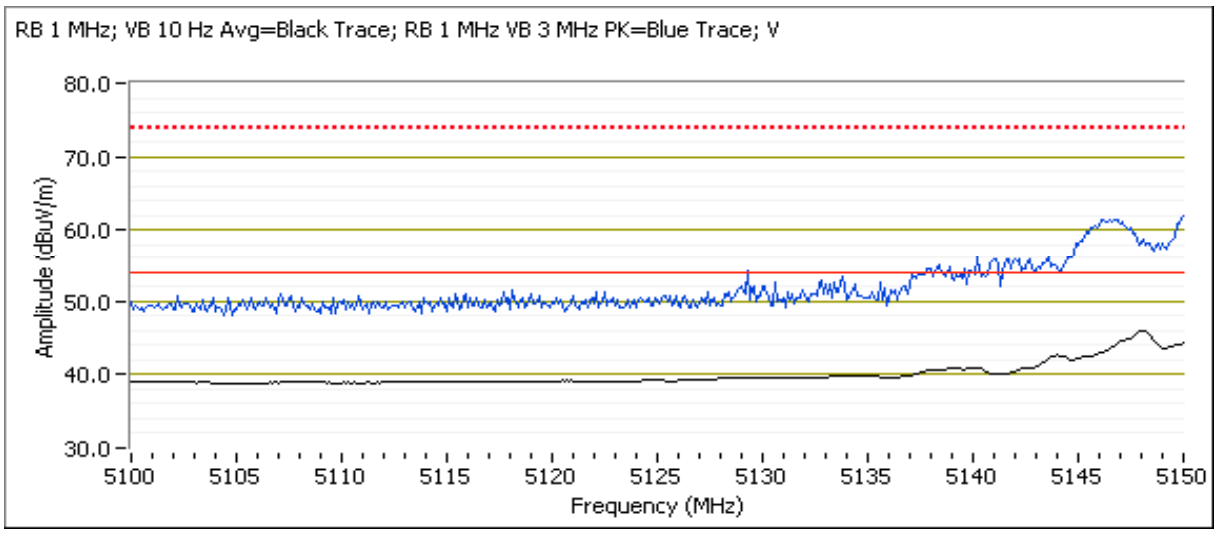
Client:	Biscotti, Inc.	Job Number:	J89805
Model:	W0001 - Module 802.11abgn 2x2	T-Log Number:	T89809
		Account Manager:	Deepa Shetty
Contact:	Nadeem Ahmed		
Standard:	FCC 15.247, 15.E	Class:	N/A

Run # 2, Band Edge Field Strength - 802.11n20, Chain A+B
Run # 2a, EUT on Channel #36 5180MHz - 802.11n20, Chain A+B

Date of Test: 11/8/2012 Test Location: FT7
Test Engineer: Rafael Varelas Config Change: none

5150 MHz Band Edge Signal Radiated Field Strength

Frequency	Level	Pol	FCC 15.209		Detector	Azimuth	Height	Comments
MHz	dBµV/m	v/h	Limit	Margin	Pk/QP/Avg	degrees	meters	
5147.920	48.4	V	54.0	-5.6	AVG	138	1.0	POS; RB 1 MHz; VB: 10 Hz
5146.710	62.2	V	74.0	-11.8	PK	138	1.0	POS; RB 1 MHz; VB: 3 MHz
5148.320	44.4	H	54.0	-9.6	AVG	304	1.0	POS; RB 1 MHz; VB: 10 Hz
5147.840	59.1	H	74.0	-14.9	PK	304	1.0	POS; RB 1 MHz; VB: 3 MHz



Client:	Biscotti, Inc.	Job Number:	J89805
Model:	W0001 - Module 802.11abgn 2x2	T-Log Number:	T89809
		Account Manager:	Deepa Shetty
Contact:	Nadeem Ahmed		
Standard:	FCC 15.247, 15.E	Class:	N/A

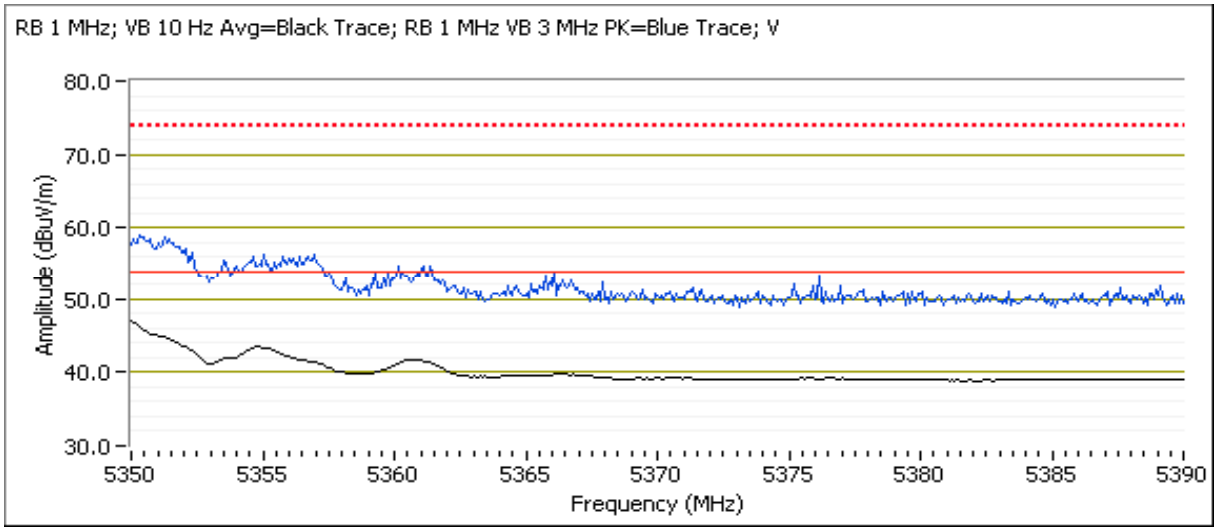
Run # 2b, EUT on Channel #64 5320MHz - 802.11n20, Chain A+B

Date of Test: 11/9/2012 Test Location: Chamber 7

Test Engineer: Vishal Narayan Config Change: none

5350 MHz Band Edge Signal Radiated Field Strength

Frequency	Level	Pol	FCC 15.209		Detector	Azimuth	Height	Comments
MHz	dBµV/m	v/h	Limit	Margin	Pk/QP/Avg	degrees	meters	
5350.000	47.6	V	54.0	-6.4	AVG	103	1.0	POS; RB 1 MHz; VB: 10 Hz
5351.520	57.6	V	74.0	-16.4	PK	103	1.0	POS; RB 1 MHz; VB: 3 MHz
5350.000	47.4	H	54.0	-6.6	AVG	201	1.1	POS; RB 1 MHz; VB: 10 Hz
5350.240	58.1	H	74.0	-15.9	PK	201	1.1	POS; RB 1 MHz; VB: 3 MHz



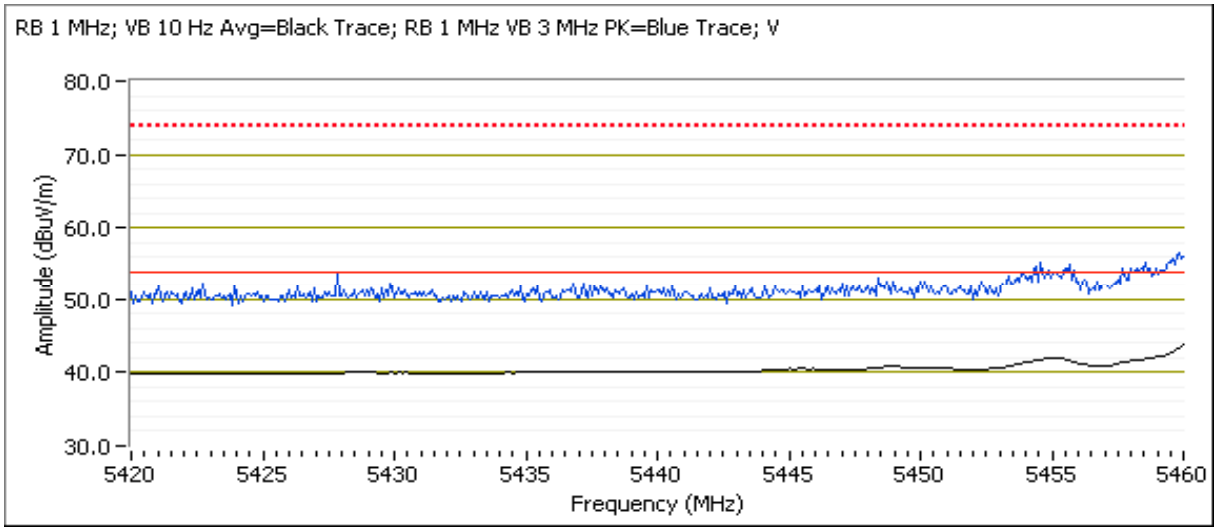
Client:	Biscotti, Inc.	Job Number:	J89805
Model:	W0001 - Module 802.11abgn 2x2	T-Log Number:	T89809
		Account Manager:	Deepa Shetty
Contact:	Nadeem Ahmed		
Standard:	FCC 15.247, 15.E	Class:	N/A

Run # 2c, EUT on Channel #100 5500MHz - 802.11n20, Chain A+B

5460 MHz Band Edge Radiated Field Strength

Frequency	Level	Pol	15.209		Detector	Azimuth	Height	Comments
MHz	dBµV/m	v/h	Limit	Margin	Pk/QP/Avg	degrees	meters	
5460.000	43.8	V	54.0	-10.2	AVG	16	1.0	POS; RB 1 MHz; VB: 10 Hz
5459.840	54.7	V	74.0	-19.3	PK	16	1.0	POS; RB 1 MHz; VB: 3 MHz
5460.000	41.3	H	54.0	-12.7	AVG	150	1.5	POS; RB 1 MHz; VB: 10 Hz
5459.440	51.7	H	74.0	-22.3	PK	150	1.5	POS; RB 1 MHz; VB: 3 MHz

For emissions in the restricted band immediately below 5460MHz the 15.209/RSS GEN limits apply.

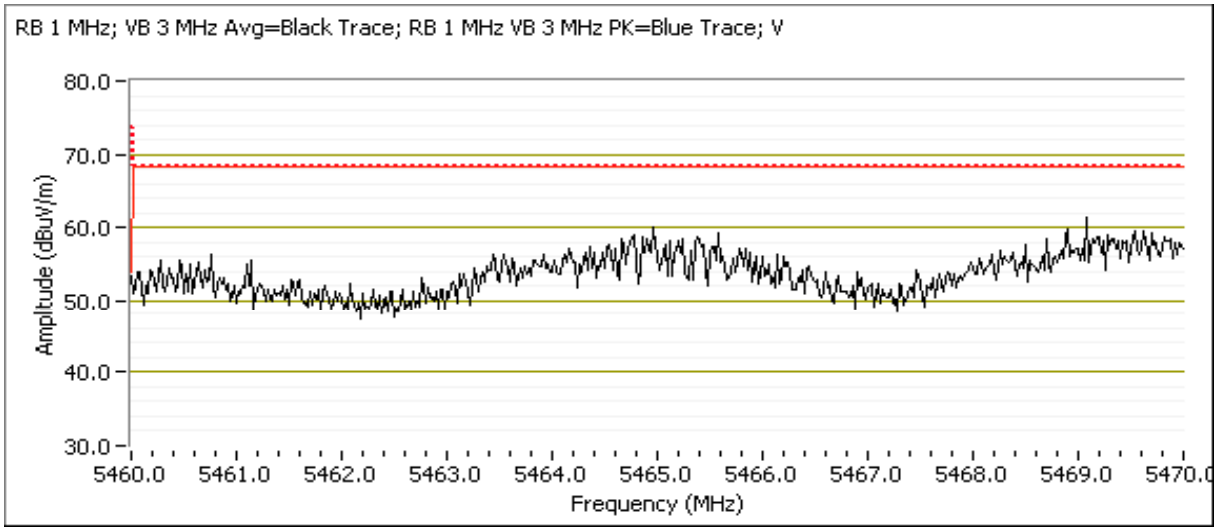


Client:	Biscotti, Inc.	Job Number:	J89805
Model:	W0001 - Module 802.11abgn 2x2	T-Log Number:	T89809
		Account Manager:	Deepa Shetty
Contact:	Nadeem Ahmed		
Standard:	FCC 15.247, 15.E	Class:	N/A

5460 - 5470 MHz Band Edge Radiated Field Strength

Frequency	Level	Pol	15 E		Detector	Azimuth	Height	Comments
MHz	dBµV/m	v/h	Limit	Margin	Pk/QP/Avg	degrees	meters	
5469.500	65.2	V	68.3	-3.1	PK	25	1.0	POS; RB 1 MHz; VB: 3 MHz
5468.800	59.4	H	68.3	-8.9	PK	38	1.0	POS; RB 1 MHz; VB: 3 MHz

For emissions in the 5460-5470MHz frequency range the limit is -27dBm/MHz eirp (68.3dBuV/m). The measurement method required is a peak measurement (RB=1MHz, VB≥3MHz, peak detector).



Client:	Biscotti, Inc.	Job Number:	J89805
Model:	W0001 - Module 802.11abgn 2x2	T-Log Number:	T89809
		Account Manager:	Deepa Shetty
Contact:	Nadeem Ahmed		
Standard:	FCC 15.247, 15.E	Class:	N/A

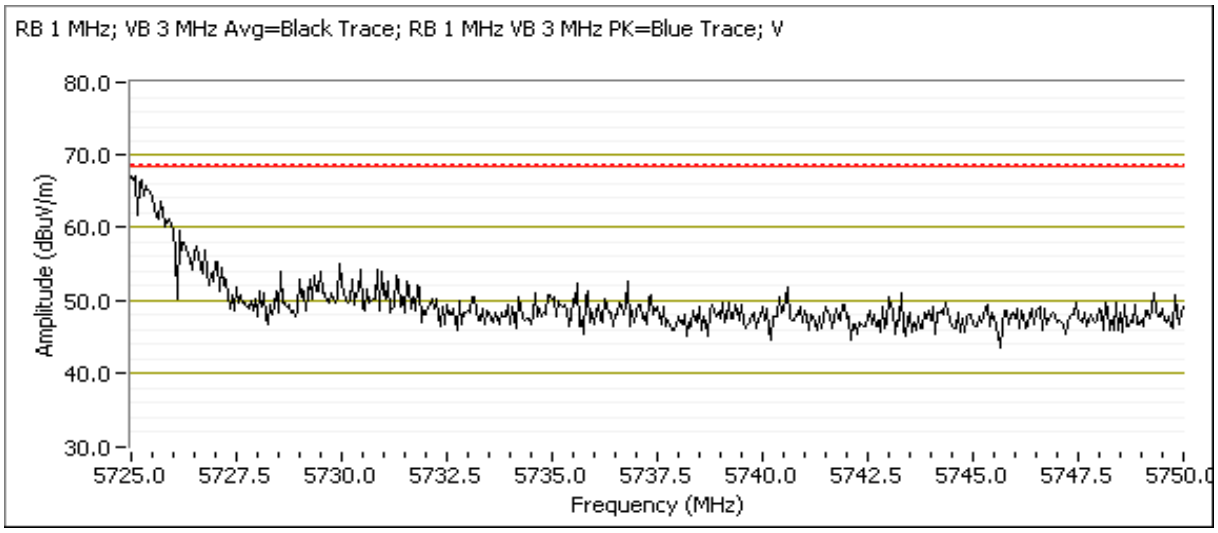
Run # 2d, EUT on Channel #140 5700MHz - 802.11n20, Chain A+B

	Power Settings		
	Target (dBm)	Measured (dBm)	Software Setting
Chain A			13.0

5725 MHz Band Edge Radiated Field Strength

Frequency	Level	Pol	15 E		Detector	Azimuth	Height	Comments
MHz	dBµV/m	v/h	Limit	Margin	Pk/QP/Avg	degrees	meters	
5725.000	67.0	V	68.3	-1.3	PK	312	1.0	POS; RB 1 MHz; VB: 3 MHz
5726.350	61.2	H	68.3	-7.1	PK	204	1.0	POS; RB 1 MHz; VB: 3 MHz

For emissions iimmediately above 5725 MHz the limit is -27dBm/MHz eirp (68.3dBuV/m). The measurement method required is a peak measurement (RB=1MHz, VB≥3MHz, peak detector).



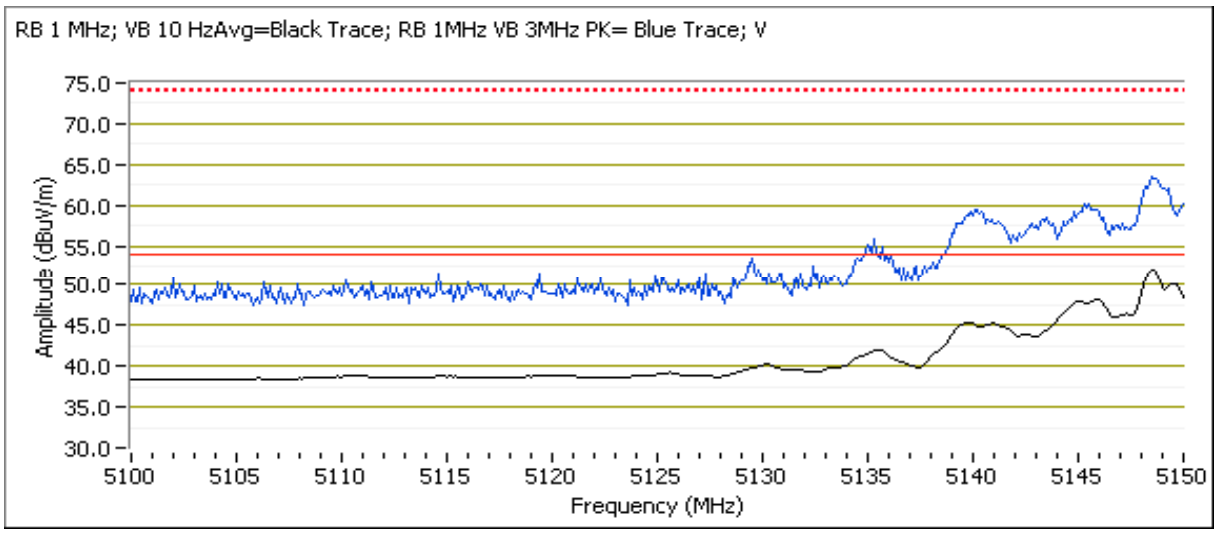
Client:	Biscotti, Inc.	Job Number:	J89805
Model:	W0001 - Module 802.11abgn 2x2	T-Log Number:	T89809
		Account Manager:	Deepa Shetty
Contact:	Nadeem Ahmed		
Standard:	FCC 15.247, 15.E	Class:	N/A

Run # 3, Band Edge Field Strength - 802.11n40, Chain A+B
Run # 3a, EUT on Channel #38 5190MHz - 802.11n40, Chain A+B

Date of Test: 11/9/2012 Test Location: FT7
Test Engineer: Jack Liu Config Change: none

5150 MHz Band Edge Signal Radiated Field Strength

Frequency	Level	Pol	FCC 15.209		Detector	Azimuth	Height	Comments
MHz	dBµV/m	v/h	Limit	Margin	Pk/QP/Avg	degrees	meters	
5148.500	51.9	V	54.0	-2.1	AVG	38	1.0	Pwr setting =9
5148.600	63.2	V	74.0	-10.8	PK	38	1.0	Pwr setting =9
5148.400	49.7	H	54.0	-4.3	AVG	17	1.0	Pwr setting =9
5148.240	61.2	H	74.0	-12.8	PK	17	1.0	Pwr setting =9



Client:	Biscotti, Inc.	Job Number:	J89805
Model:	W0001 - Module 802.11abgn 2x2	T-Log Number:	T89809
		Account Manager:	Deepa Shetty
Contact:	Nadeem Ahmed		
Standard:	FCC 15.247, 15.E	Class:	N/A

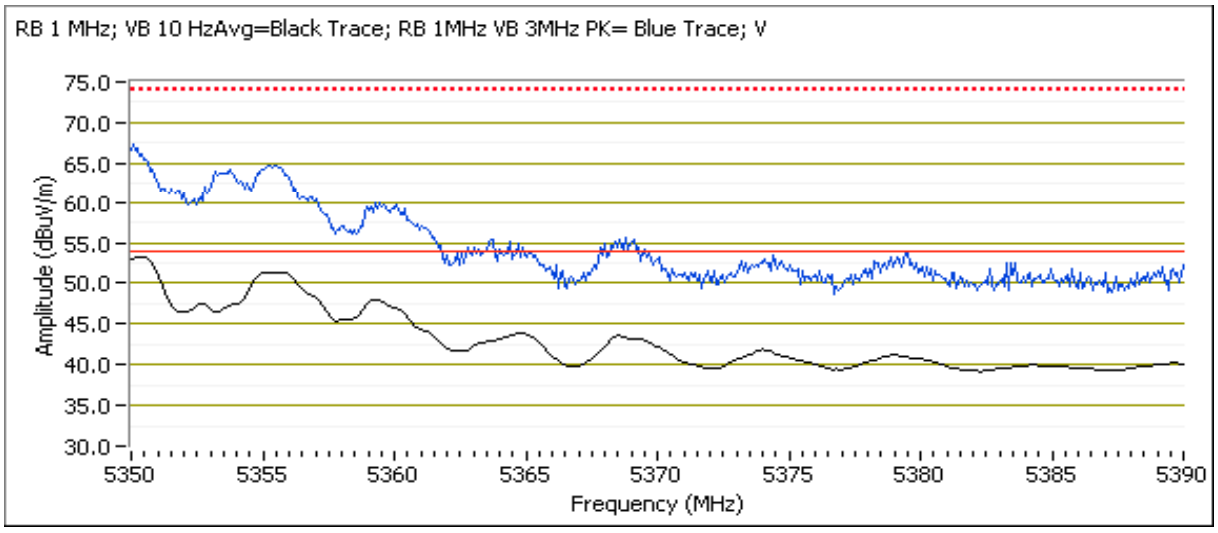
Run # 3b, EUT on Channel #62 5310MHz - 802.11n40, Chain A+B

Date of Test: 11/9/2012 Test Location: FT7

Test Engineer: Jack Liu Config Change: none

5350 MHz Band Edge Signal Radiated Field Strength

Frequency	Level	Pol	FCC 15.209		Detector	Azimuth	Height	Comments
MHz	dBµV/m	v/h	Limit	Margin	Pk/QP/Avg	degrees	meters	
5350.320	53.3	V	54.0	-0.7	AVG	141	1.0	POS; RB 1 MHz; VB: 10 Hz
5350.720	67.3	V	74.0	-6.7	PK	141	1.0	POS; RB 1 MHz; VB: 3 MHz
5358.020	50.0	H	54.0	-4.0	AVG	290	1.1	POS; RB 1 MHz; VB: 10 Hz
5351.920	62.0	H	74.0	-12.0	PK	290	1.1	POS; RB 1 MHz; VB: 3 MHz



Client:	Biscotti, Inc.	Job Number:	J89805
Model:	W0001 - Module 802.11abgn 2x2	T-Log Number:	T89809
		Account Manager:	Deepa Shetty
Contact:	Nadeem Ahmed		
Standard:	FCC 15.247, 15.E	Class:	N/A

Run # 3c, EUT on Channel #102 5510MHz - 802.11n40, Chain A+B

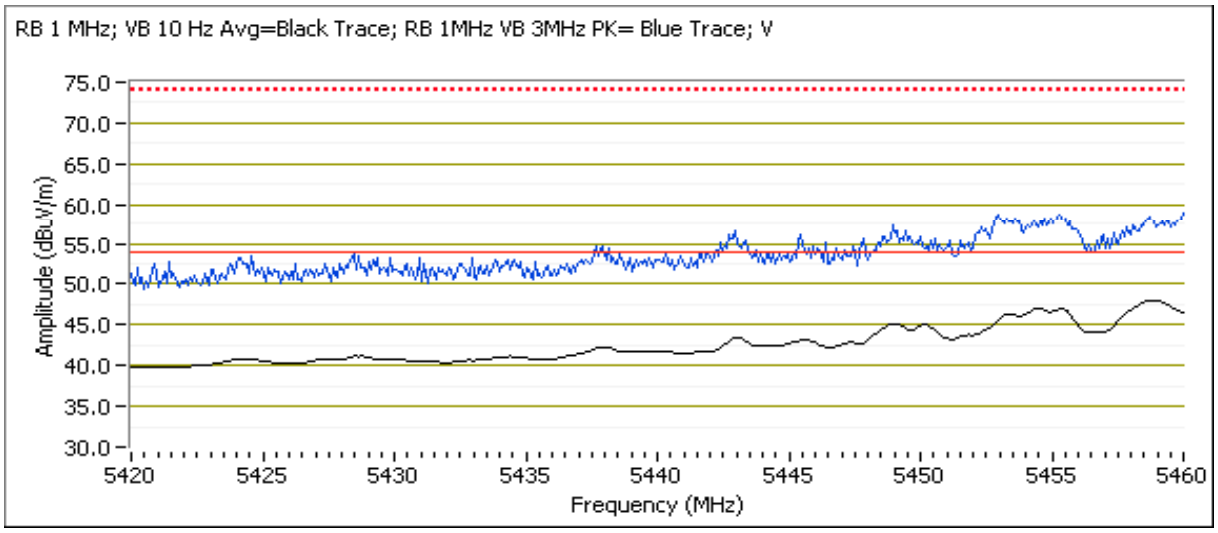
Date of Test: 11/9/2012 Test Location: FT7

Test Engineer: Jack Liu Config Change: none

5460 MHz Band Edge Radiated Field Strength

Frequency	Level	Pol	15.209		Detector	Azimuth	Height	Comments
MHz	dBµV/m	v/h	Limit	Margin	Pk/QP/Avg	degrees	meters	
5458.800	48.1	V	54.0	-5.9	AVG	262	1.6	POS; RB 1 MHz; VB: 10 Hz
5455.110	57.8	V	74.0	-16.2	PK	262	1.6	POS; RB 1 MHz; VB: 3 MHz
5458.880	46.5	H	54.0	-7.5	AVG	272	1.0	POS; RB 1 MHz; VB: 10 Hz
5455.430	57.5	H	74.0	-16.5	PK	272	1.0	POS; RB 1 MHz; VB: 3 MHz

For emissions in the restricted band immediately below 5460MHz the 15.209/RSS GEN limits apply.

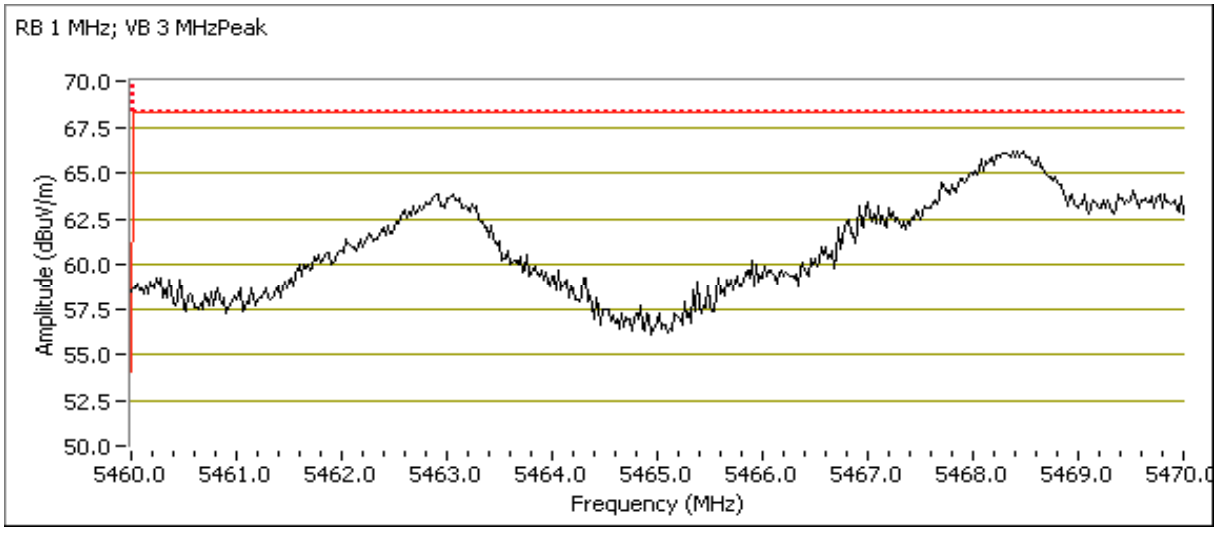


Client:	Biscotti, Inc.	Job Number:	J89805
Model:	W0001 - Module 802.11abgn 2x2	T-Log Number:	T89809
		Account Manager:	Deepa Shetty
Contact:	Nadeem Ahmed		
Standard:	FCC 15.247, 15.E	Class:	N/A

5460 - 5470 MHz Band Edge Radiated Field Strength

Frequency	Level	Pol	15 E		Detector	Azimuth	Height	Comments
MHz	dBµV/m	v/h	Limit	Margin	Pk/QP/Avg	degrees	meters	
5468.260	66.4	V	68.3	-1.9	PK	262	1.6	POS; RB 1 MHz; VB: 3 MHz
5468.360	63.8	H	68.3	-4.5	PK	272	1.0	POS; RB 1 MHz; VB: 3 MHz

For emissions in the 5460-5470MHz frequency range the limit is -27dBm/MHz eirp (68.3dBuV/m). The measurement method required is a peak measurement (RB=1MHz, VB≥3MHz, peak detector).



Client:	Biscotti, Inc.	Job Number:	J89805
Model:	W0001 - Module 802.11abgn 2x2	T-Log Number:	T89809
		Account Manager:	Deepa Shetty
Contact:	Nadeem Ahmed		
Standard:	FCC 15.247, 15.E	Class:	N/A

Run # 3d, EUT on Channel #134 5670MHz - 802.11n40, Chain A+B

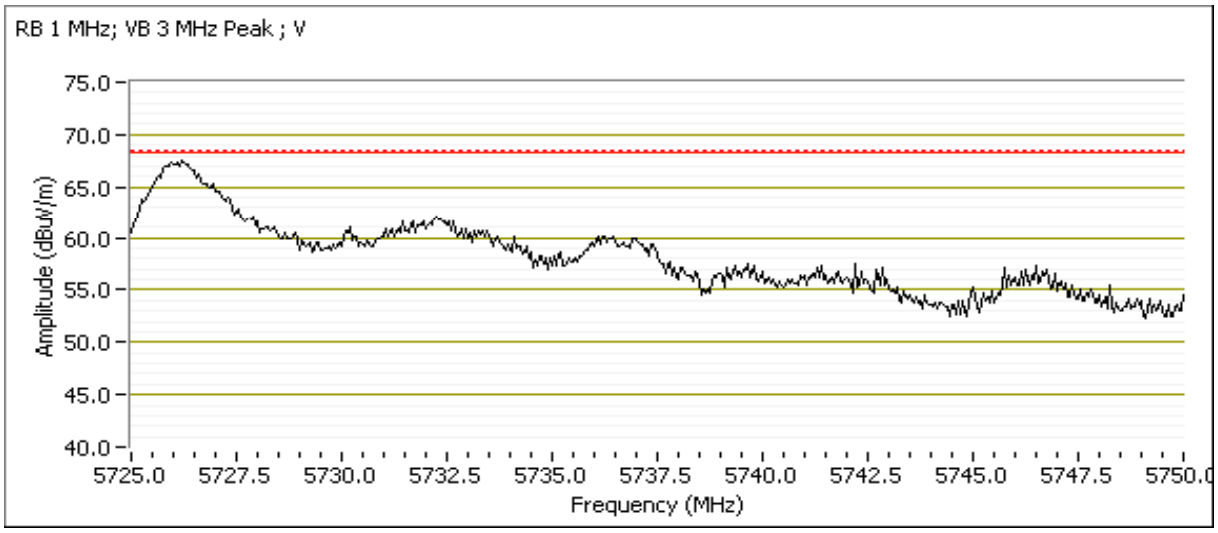
Date of Test: 11/9/2012 Test Location: FT7

Test Engineer: Jack Liu Config Change: none

5725 MHz Band Edge Radiated Field Strength

Frequency	Level	Pol	15 E		Detector	Azimuth	Height	Comments
MHz	dBµV/m	v/h	Limit	Margin	Pk/QP/Avg	degrees	meters	
5726.350	66.1	V	68.3	-2.2	PK	26	1.0	POS; RB 1 MHz; VB: 3 MHz
5726.500	60.3	H	68.3	-8.0	PK	132	1.0	POS; RB 1 MHz; VB: 3 MHz

For emissions iimmediately above 5725 MHz the limit is -27dBm/MHz eirp (68.3dBuV/m). The measurement method required is a peak measurement (RB=1MHz, VB≥3MHz, peak detector).



Client:	Biscotti, Inc.	Job Number:	J89805
Model:	W0001 - Module 802.11abgn 2x2	T-Log Number:	T89809
		Account Manager:	Deepa Shetty
Contact:	Nadeem Ahmed		
Standard:	FCC 15.247, 15.E	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.

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

Ambient Conditions:

Temperature: 15-20 °C

Rel. Humidity: 35-45 %

Modifications Made During Testing

No modifications were made to the EUT during testing

Deviations From The Standard

No deviations were made from the requirements of the standard.

Test Procedure Comments:

Unless otherwise noted, average measurements above 1GHz were performed as documented in FCC KDB 789033 G) 6) d) Method VB

Sample Notes:

SAMPLE S/N: (NTS 2012-2239)

EUT Firmware: 14.1.11.132

Notes:

No radio related emissions observed below 1GHz or above 18GHz in preliminary measurements.

Client:	Biscotti, Inc.	Job Number:	J89805
Model:	W0001 - Module 802.11abgn 2x2	T-Log Number:	T89809
		Account Manager:	Deepa Shetty
Contact:	Nadeem Ahmed		
Standard:	FCC 15.247, 15.E	Class:	N/A

Summary of Results

Run #	Mode	Channel	Power Setting	Measured Power	Test Performed	Limit	Result / Margin
Run # 1	802.11a Chain A	#36	15.0		Radiated Emissions 1 - 40 GHz	FCC 15.209 / 15 E	43.8dBµV/m (-10.2dB)
		#40	15.0				43.8dBµV/m (-10.2dB)
		#48	15.0				43.8dBµV/m (-10.2dB)
Run # 1	802.11a Chain A	#52	15.0		Radiated Emissions 1 - 40 GHz	FCC 15.209 / 15 E	37.2 dBµV/m(-16.8 dB)
		#60	15.0				38.6 dBµV/m(-15.4 dB)
		#64	15.0				43.8dBµV/m (-10.2dB)
Run # 1	802.11a Chain A	#100	15.0		Radiated Emissions 1 - 40 GHz	FCC 15.209 / 15 E	37.3 dBµV/m(-16.7 dB)
		#116	15.0				35.9 dBµV/m(-18.1 dB)
		#140	15.0				34.6 dBµV/m(-19.4 dB)
Run # 2	802.11n20 Chain A+B	#36	15.0		Radiated Emissions 1 - 40 GHz	FCC 15.209 / 15 E	35.5 dBµV/m(-18.5 dB)
		#40	15.0				36.2 dBµV/m(-17.8 dB)
		#48	15.0				More than 10dB margin
Run # 2	802.11n20 Chain A+B	#52	15.0		Radiated Emissions 1 - 40 GHz	FCC 15.209 / 15 E	More than 10dB margin
		#60	15.0				More than 10dB margin
		#64	15.0				More than 10dB margin
Run # 2	802.11n20 Chain A+B	#100	15.0		Radiated Emissions 1 - 40 GHz	FCC 15.209 / 15 E	34.9 dBµV/m(-19.1 dB)
		#116	15.0				32.8 dBµV/m(-21.2 dB)
		#140	15.0				34.0 dBµV/m(-20.0 dB)
Run # 3	802.11n40 Chain A+B	#38	15.0		Radiated Emissions 1 - 40 GHz	FCC 15.209 / 15 E	41.2 dBµV/m(-12.8 dB)
		#46	15.0				41.9 dBµV/m(-12.1 dB)
Run # 3	802.11n40 Chain A+B	#54	15.0		Radiated Emissions 1 - 40 GHz	FCC 15.209 / 15 E	34.6 dBµV/m(-19.4 dB)
		#62	15.0				38.1 dBµV/m(-15.9 dB)
Run # 3	802.11n40 Chain A+B	#102	15.0		Radiated Emissions 1 - 40 GHz	FCC 15.209 / 15 E	41.9 dBµV/m(-12.1 dB)
		#110	15.0				40.8 dBµV/m(-13.2 dB)
		#134	15.0				41.0 dBµV/m(-13.0 dB)

Client:	Biscotti, Inc.	Job Number:	J89805
Model:	W0001 - Module 802.11abgn 2x2	T-Log Number:	T89809
		Account Manager:	Deepa Shetty
Contact:	Nadeem Ahmed		
Standard:	FCC 15.247, 15.E	Class:	N/A

Run # 1, Radiated Spurious Emissions, 1-40GHz, 802.11a, Chain A

Date of Test: 11/27/2012 Test Location: FT Chamber #3

Test Engineer: M. Birgani Config Change: -

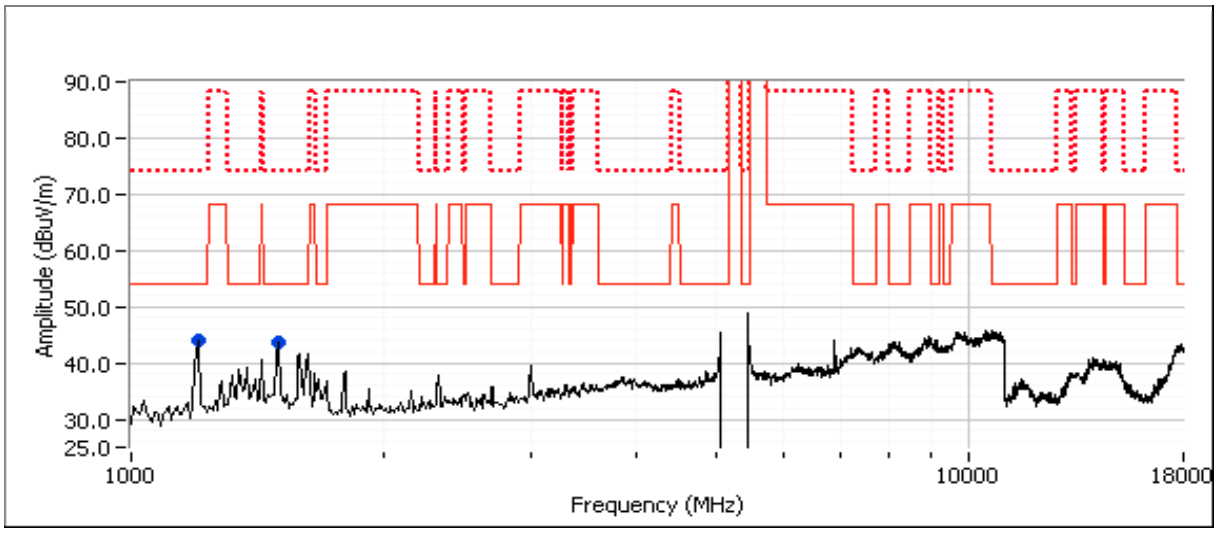
For emissions in restricted bands, the limit of 15.209 was used. For all other emissions, the limit is -27dBm eirp (68.3dBuV/m @3m) using a peak detector.

Run # 1a: EUT on Channel #36 5180MHz - 802.11a, Chain A

Spurious Radiated Emissions:

Frequency	Level	Pol	15.209 / 15E		Detector	Azimuth	Height	Comments
MHz	dBµV/m	v/h	Limit	Margin	Pk/QP/Avg	degrees	meters	
1500.050	43.8	V	54.0	-10.2	AVG	266	1.0	RB 1 MHz;VB 10 Hz;Peak
1200.050	41.8	V	54.0	-12.2	AVG	266	1.2	RB 1 MHz;VB 10 Hz;Peak
1500.140	52.3	V	74.0	-21.7	PK	266	1.0	RB 1 MHz;VB 3 MHz;Peak
1199.870	50.0	V	74.0	-24.0	PK	266	1.2	RB 1 MHz;VB 3 MHz;Peak

Note 1:	For emissions in restricted bands, the limit of 15.209 was used which requires average and peak measurements.
Note 2:	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).



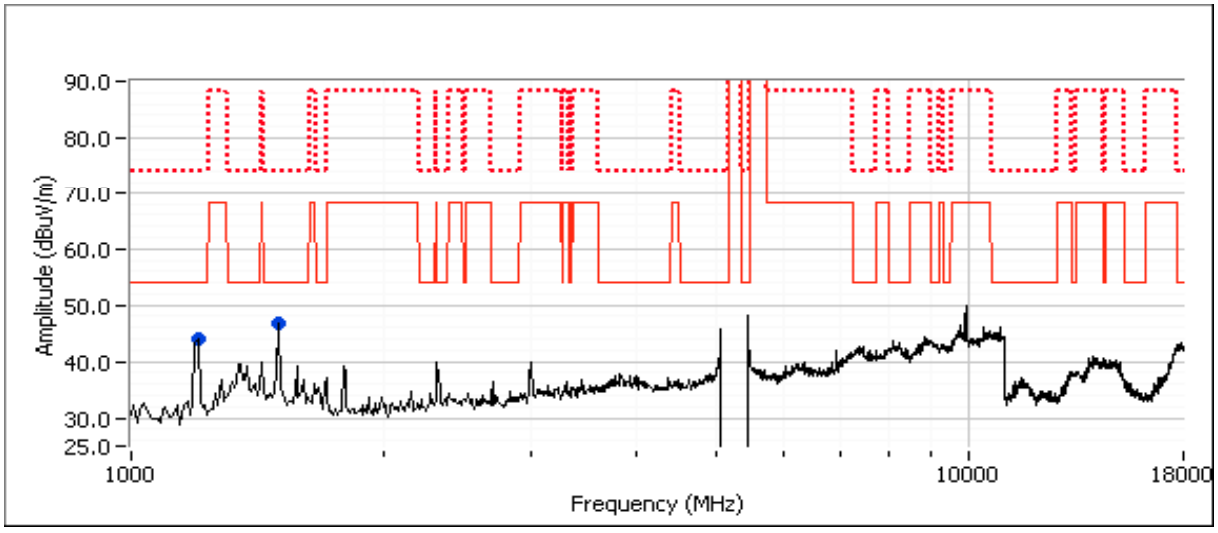
Client:	Biscotti, Inc.	Job Number:	J89805
Model:	W0001 - Module 802.11abgn 2x2	T-Log Number:	T89809
		Account Manager:	Deepa Shetty
Contact:	Nadeem Ahmed		
Standard:	FCC 15.247, 15.E	Class:	N/A

Run # 1b: EUT on Channel #40 5200MHz - 802.11a, Chain A

Spurious Radiated Emissions:

Frequency	Level	Pol	15.209 / 15E		Detector	Azimuth	Height	Comments
MHz	dBµV/m	v/h	Limit	Margin	Pk/QP/Avg	degrees	meters	
Note 4								

Note 1:	For emissions in restricted bands, the limit of 15.209 was used which requires average and peak measurements.
Note 2:	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).
Note 3:	Scans made between 18 - 40GHz with the measurement antenna moved around the card and its antennas 20-50cm from the device indicated there were no signifcant emissions in this frequency range
Note 4:	Frequencies marked on the plot were the same level and same frequency as run 1a. These frequencies did not change with transmission frequencies and were related to the local support equipment (laptop).



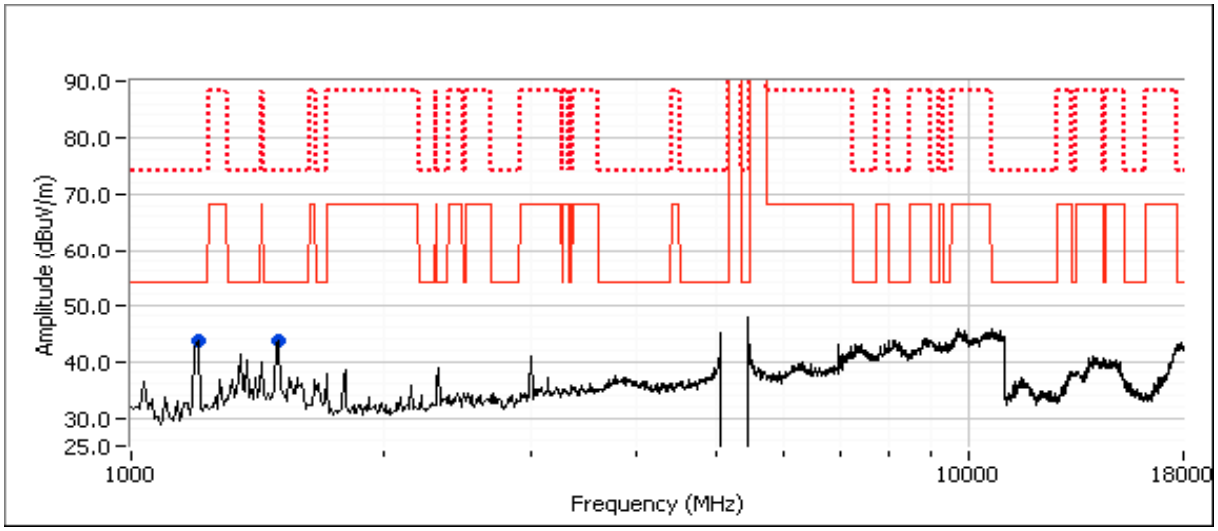
Client:	Biscotti, Inc.	Job Number:	J89805
Model:	W0001 - Module 802.11abgn 2x2	T-Log Number:	T89809
		Account Manager:	Deepa Shetty
Contact:	Nadeem Ahmed		
Standard:	FCC 15.247, 15.E	Class:	N/A

Run # 1c: EUT on Channel #48 5240MHz - 802.11a, Chain A

Spurious Radiated Emissions:

Frequency	Level	Pol	15.209 / 15E		Detector	Azimuth	Height	Comments
MHz	dBµV/m	v/h	Limit	Margin	Pk/QP/Avg	degrees	meters	
Note 4								

Note 1:	For emissions in restricted bands, the limit of 15.209 was used which requires average and peak measurements.
Note 2:	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).
Note 4:	Frequencies marked on the plot were the same level and same frequency as run 1a. These frequencies did not change with transmission frequencies and were related to the local support equipment (laptop).



Client:	Biscotti, Inc.	Job Number:	J89805
Model:	W0001 - Module 802.11abgn 2x2	T-Log Number:	T89809
		Account Manager:	Deepa Shetty
Contact:	Nadeem Ahmed		
Standard:	FCC 15.247, 15.E	Class:	N/A

Run # 1d: EUT on Channel #52 5260MHz - 802.11a, Chain A

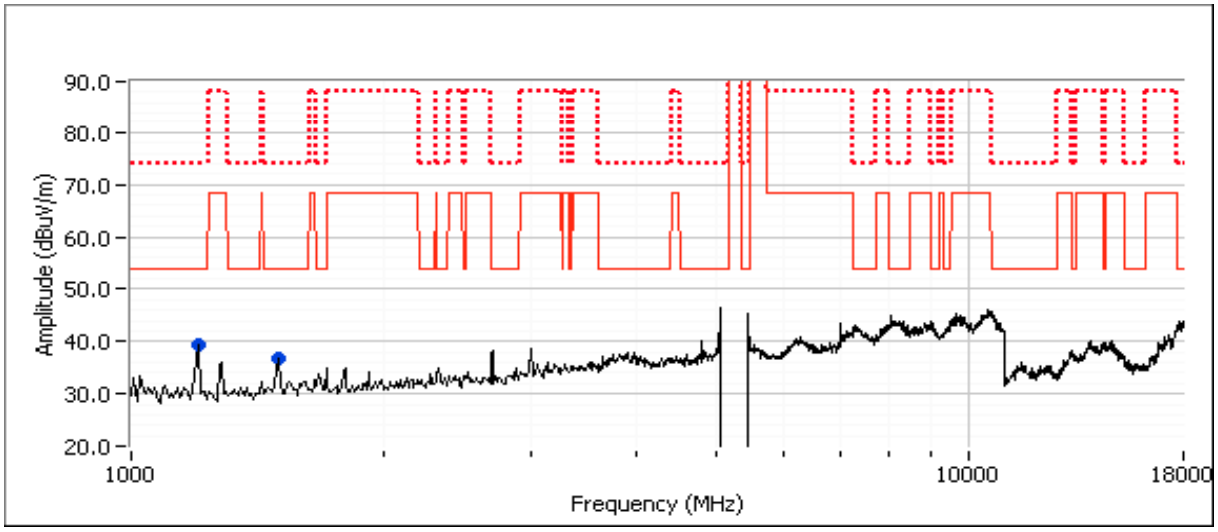
Date of Test: 11/28/2012 Test Location: FT Chamber #3

Test Engineer: Joseph Cadigal Config Change: -

Spurious Radiated Emissions:

Frequency	Level	Pol	15.209 / 15E		Detector	Azimuth	Height	Comments
MHz	dBµV/m	v/h	Limit	Margin	Pk/QP/Avg	degrees	meters	
1500.090	37.2	H	54.0	-16.8	AVG	321	1.0	RB 1 MHz;VB 10 Hz;Peak
1200.060	35.1	V	54.0	-18.9	AVG	250	1.0	RB 1 MHz;VB 10 Hz;Peak
1200.100	43.5	V	74.0	-30.5	PK	250	1.0	RB 1 MHz;VB 3 MHz;Peak
1499.760	43.2	H	74.0	-30.8	PK	321	1.0	RB 1 MHz;VB 3 MHz;Peak

Note 1:	For emissions in restricted bands, the limit of 15.209 was used which requires average and peak measurements.
Note 2:	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).



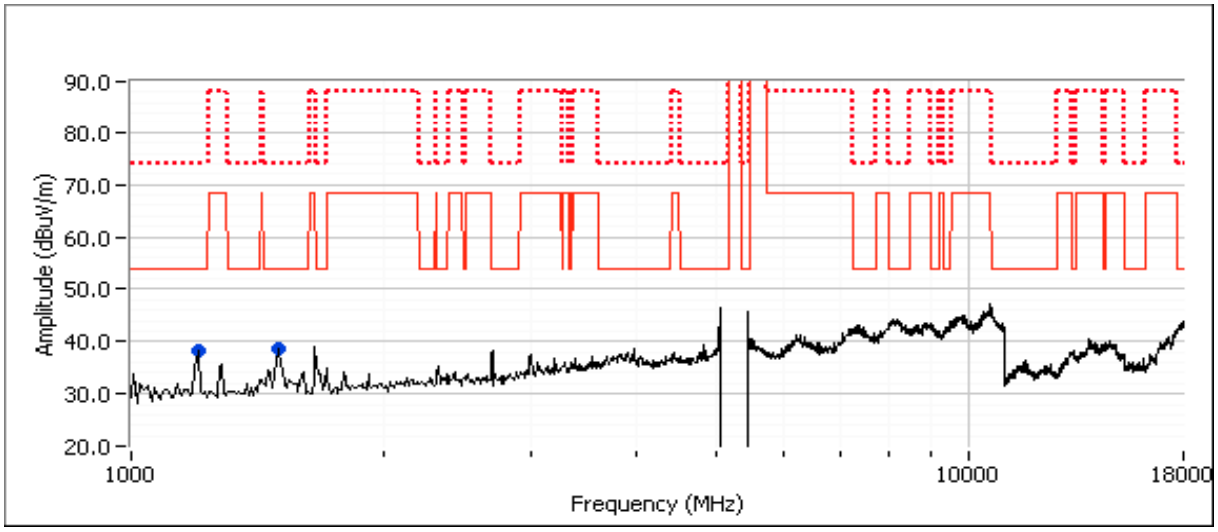
Client:	Biscotti, Inc.	Job Number:	J89805
Model:	W0001 - Module 802.11abgn 2x2	T-Log Number:	T89809
		Account Manager:	Deepa Shetty
Contact:	Nadeem Ahmed		
Standard:	FCC 15.247, 15.E	Class:	N/A

Run # 1e: EUT on Channel #60 5300MHz - 802.11a, Chain A

Spurious Radiated Emissions:

Frequency	Level	Pol	15.209 / 15E		Detector	Azimuth	Height	Comments
MHz	dBµV/m	v/h	Limit	Margin	Pk/QP/Avg	degrees	meters	
1500.010	38.6	H	54.0	-15.4	AVG	312	1.3	RB 1 MHz;VB 10 Hz;Peak
1200.200	34.8	V	54.0	-19.2	AVG	249	1.0	RB 1 MHz;VB 10 Hz;Peak
1500.600	45.9	H	74.0	-28.1	PK	312	1.3	RB 1 MHz;VB 3 MHz;Peak
1199.840	43.6	V	74.0	-30.4	PK	249	1.0	RB 1 MHz;VB 3 MHz;Peak

Note 1:	For emissions in restricted bands, the limit of 15.209 was used which requires average and peak measurements.
Note 2:	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).
Note 3:	Scans made between 18 - 40GHz with the measurement antenna moved around the card and its antennas 20-50cm from the device indicated there were no signifcant emissions in this frequency range



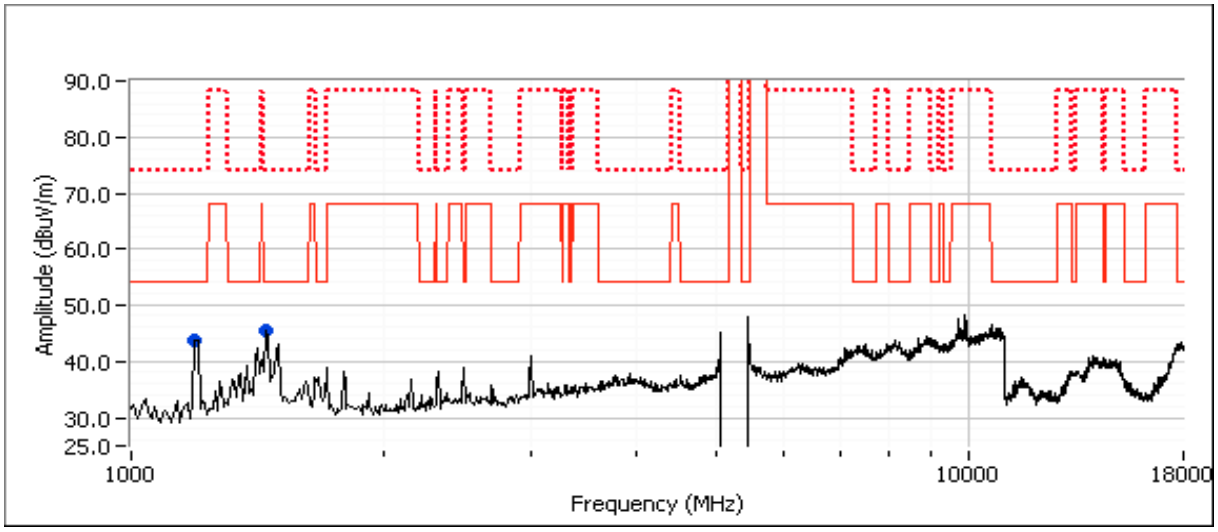
Client:	Biscotti, Inc.	Job Number:	J89805
Model:	W0001 - Module 802.11abgn 2x2	T-Log Number:	T89809
		Account Manager:	Deepa Shetty
Contact:	Nadeem Ahmed		
Standard:	FCC 15.247, 15.E	Class:	N/A

Run # 1f: EUT on Channel #64 5320MHz - 802.11a, Chain A

Spurious Radiated Emissions:

Frequency	Level	Pol	15.209 / 15E		Detector	Azimuth	Height	Comments
MHz	dBµV/m	v/h	Limit	Margin	Pk/QP/Avg	degrees	meters	
Note 4								

Note 1:	For emissions in restricted bands, the limit of 15.209 was used which requires average and peak measurements.
Note 2:	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).
Note 4:	Frequencies marked on the plot were the same level and same frequency as run 1a. These frequencies did not change with transmission frequencies and were related to the local support equipment (laptop).



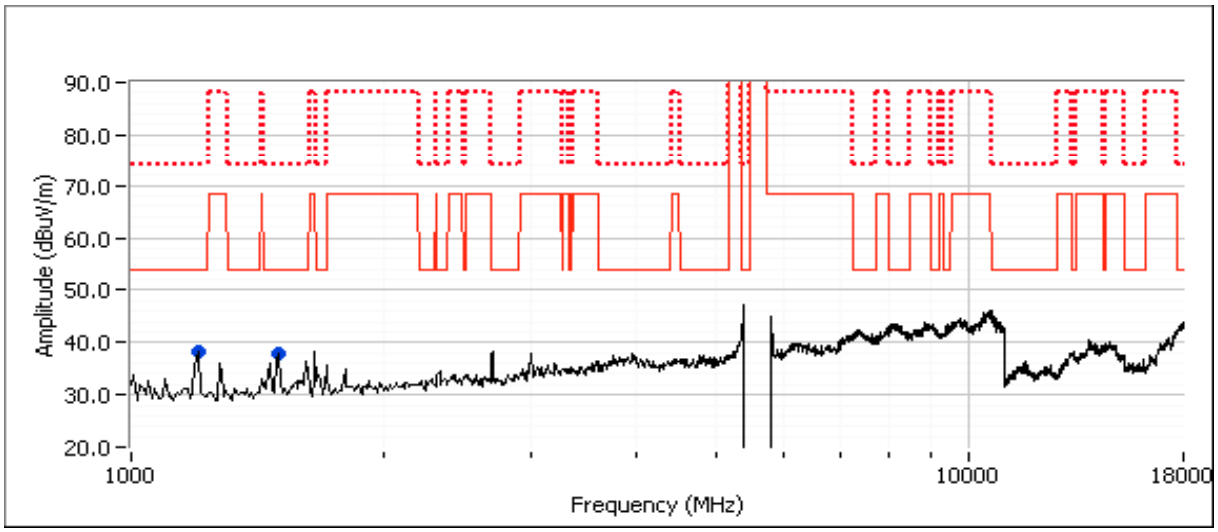
Client:	Biscotti, Inc.	Job Number:	J89805
Model:	W0001 - Module 802.11abgn 2x2	T-Log Number:	T89809
		Account Manager:	Deepa Shetty
Contact:	Nadeem Ahmed		
Standard:	FCC 15.247, 15.E	Class:	N/A

Run # 1g: EUT on Channel #100 5500MHz - 802.11a, Chain A

Spurious Radiated Emissions:

Frequency	Level	Pol	15.209 / 15E		Detector	Azimuth	Height	Comments
MHz	dBµV/m	v/h	Limit	Margin	Pk/QP/Avg	degrees	meters	
1500.110	37.3	H	54.0	-16.7	AVG	309	1.0	RB 1 MHz;VB 10 Hz;Peak
1200.060	33.9	V	54.0	-20.1	AVG	171	1.6	RB 1 MHz;VB 10 Hz;Peak
1500.490	45.1	H	74.0	-28.9	PK	309	1.0	RB 1 MHz;VB 3 MHz;Peak
1199.950	44.9	V	74.0	-29.1	PK	171	1.6	RB 1 MHz;VB 3 MHz;Peak

Note 1:	For emissions in restricted bands, the limit of 15.209 was used which requires average and peak measurements.
Note 2:	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).



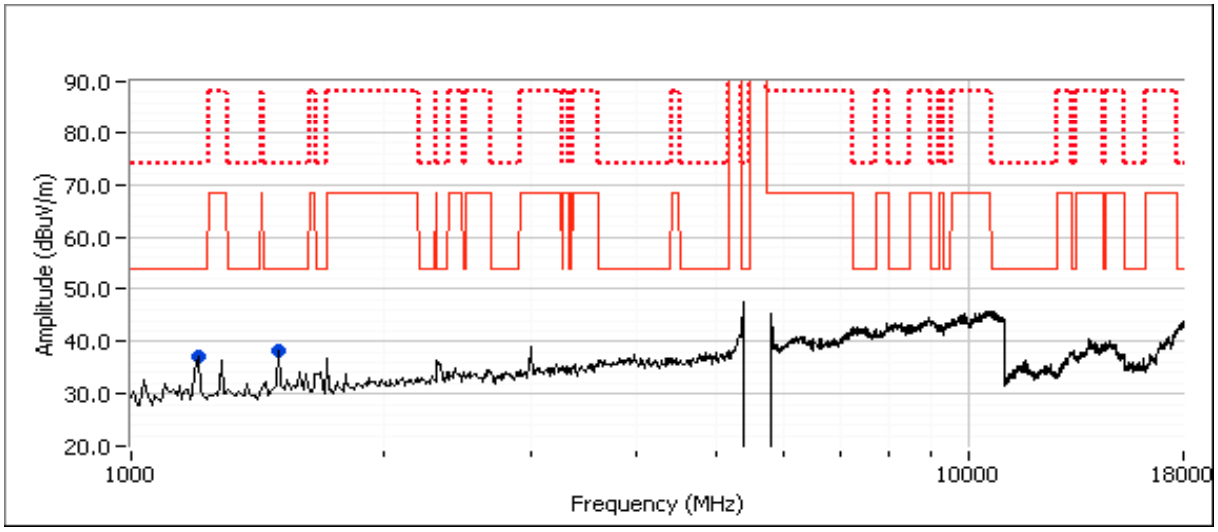
Client:	Biscotti, Inc.	Job Number:	J89805
Model:	W0001 - Module 802.11abgn 2x2	T-Log Number:	T89809
		Account Manager:	Deepa Shetty
Contact:	Nadeem Ahmed		
Standard:	FCC 15.247, 15.E	Class:	N/A

Run # 1h: EUT on Channel #116 5580MHz - 802.11a, Chain A

Spurious Radiated Emissions:

Frequency	Level	Pol	15.209 / 15E		Detector	Azimuth	Height	Comments
MHz	dBµV/m	v/h	Limit	Margin	Pk/QP/Avg	degrees	meters	
1500.040	35.9	H	54.0	-18.1	AVG	171	1.0	RB 1 MHz;VB 10 Hz;Peak
1200.000	35.2	V	54.0	-18.8	AVG	246	1.0	RB 1 MHz;VB 10 Hz;Peak
1200.220	43.3	V	74.0	-30.7	PK	246	1.0	RB 1 MHz;VB 3 MHz;Peak
1500.090	43.0	H	74.0	-31.0	PK	171	1.0	RB 1 MHz;VB 3 MHz;Peak

Note 1:	For emissions in restricted bands, the limit of 15.209 was used which requires average and peak measurements.
Note 2:	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).
Note 3:	Scans made between 18 - 40GHz with the measurement antenna moved around the card and its antennas 20-50cm from the device indicated there were no signifcant emissions in this frequency range



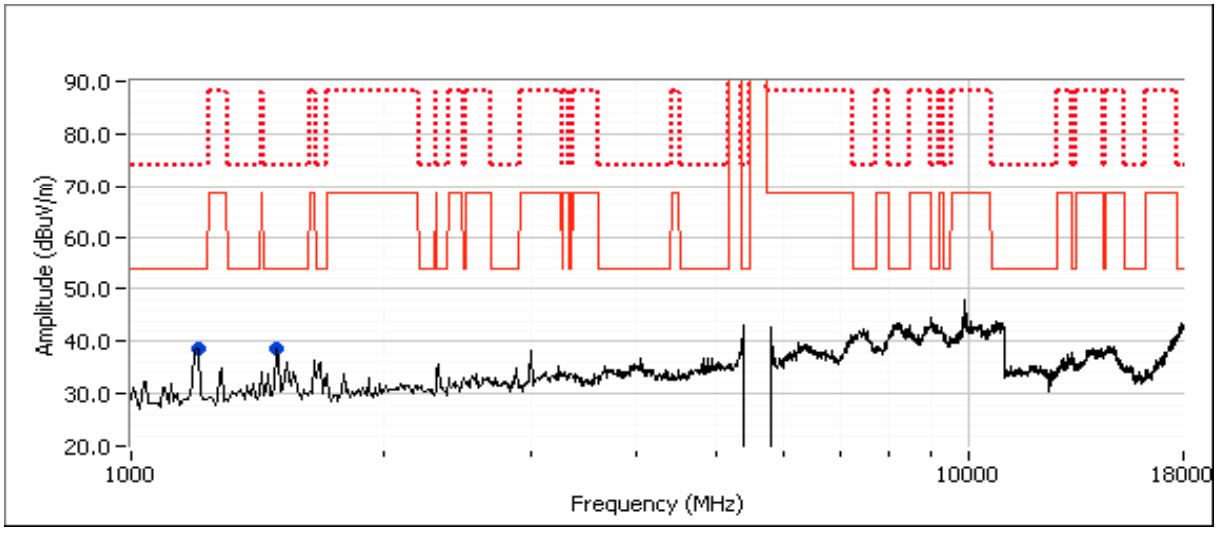
Client:	Biscotti, Inc.	Job Number:	J89805
Model:	W0001 - Module 802.11abgn 2x2	T-Log Number:	T89809
		Account Manager:	Deepa Shetty
Contact:	Nadeem Ahmed		
Standard:	FCC 15.247, 15.E	Class:	N/A

Run # 1i: EUT on Channel #140 5700MHz - 802.11a, Chain A

Spurious Radiated Emissions:

Frequency	Level	Pol	15.209 / 15E		Detector	Azimuth	Height	Comments
MHz	dBµV/m	v/h	Limit	Margin	Pk/QP/Avg	degrees	meters	
1200.020	34.6	V	54.0	-19.4	AVG	120	1.3	RB 1 MHz;VB 10 Hz;Peak
1492.280	33.6	H	54.0	-20.4	AVG	197	1.0	RB 1 MHz;VB 10 Hz;Peak
1199.920	43.8	V	74.0	-30.2	PK	120	1.3	RB 1 MHz;VB 3 MHz;Peak
1492.390	41.3	H	74.0	-32.7	PK	197	1.0	RB 1 MHz;VB 3 MHz;Peak

Note 1:	For emissions in restricted bands, the limit of 15.209 was used which requires average and peak measurements.
Note 2:	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).



Client:	Biscotti, Inc.	Job Number:	J89805
Model:	W0001 - Module 802.11abgn 2x2	T-Log Number:	T89809
		Account Manager:	Deepa Shetty
Contact:	Nadeem Ahmed		
Standard:	FCC 15.247, 15.E	Class:	N/A

Run # 2, Radiated Spurious Emissions, 1-40GHz, 802.11n20, Chain A+B

Date of Test: 11/29/2012 Test Location: FT Chamber #3

Test Engineer: Joseph Cadigal Config Change: -

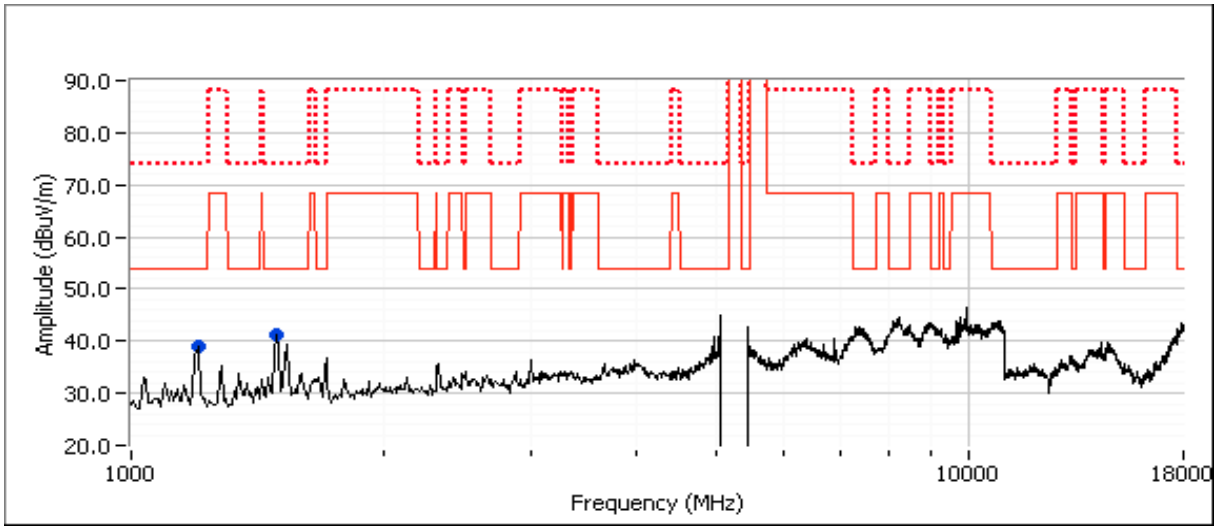
For emissions in restricted bands, the limit of 15.209 was used. For all other emissions, the limit is -27dBm eirp (68.3dBuV/m @3m) using a peak detector.

Run # 2a: EUT on Channel #36 5180MHz - 802.11n20, Chain A+B

Spurious Radiated Emissions:

Frequency	Level	Pol	15.209 / 15E		Detector	Azimuth	Height	Comments
MHz	dBµV/m	v/h	Limit	Margin	Pk/QP/Avg	degrees	meters	
1200.050	35.5	V	54.0	-18.5	AVG	258	1.0	RB 1 MHz;VB 10 Hz;Peak
1489.100	30.7	V	54.0	-23.3	AVG	55	1.3	RB 1 MHz;VB 10 Hz;Peak
1200.010	44.1	V	74.0	-29.9	PK	258	1.0	RB 1 MHz;VB 3 MHz;Peak
1489.590	37.2	V	74.0	-36.8	PK	55	1.3	RB 1 MHz;VB 3 MHz;Peak

Note 1:	For emissions in restricted bands, the limit of 15.209 was used which requires average and peak measurements.
Note 2:	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).



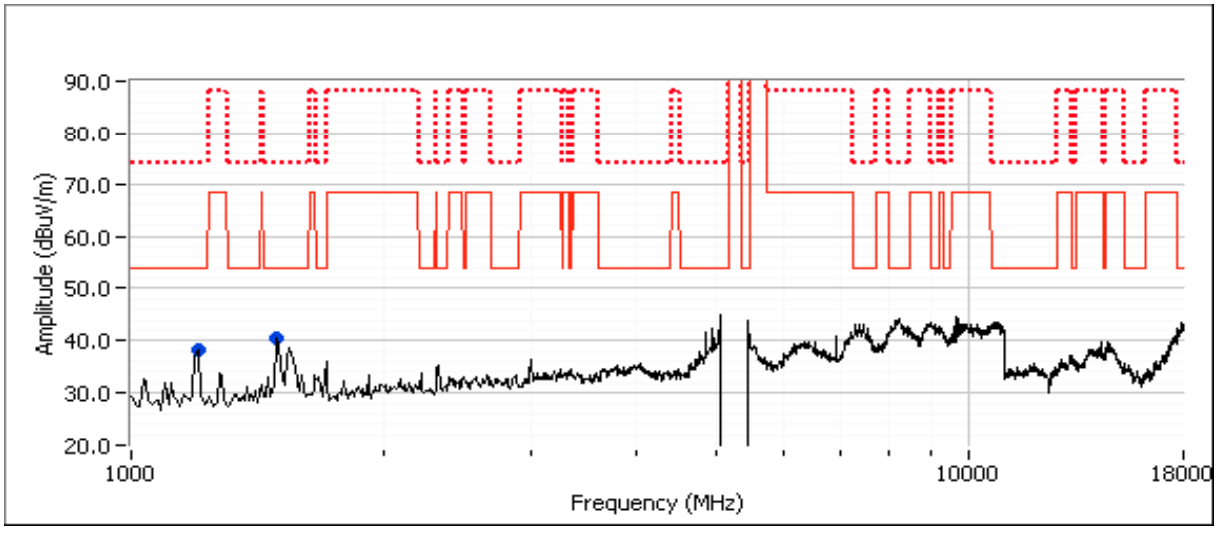
Client:	Biscotti, Inc.	Job Number:	J89805
Model:	W0001 - Module 802.11abgn 2x2	T-Log Number:	T89809
		Account Manager:	Deepa Shetty
Contact:	Nadeem Ahmed		
Standard:	FCC 15.247, 15.E	Class:	N/A

Run # 2b: EUT on Channel #40 5200MHz - 802.11n20, Chain A+B

Spurious Radiated Emissions:

Frequency	Level	Pol	15.209 / 15E		Detector	Azimuth	Height	Comments
MHz	dBµV/m	v/h	Limit	Margin	Pk/QP/Avg	degrees	meters	
1200.050	36.2	V	54.0	-17.8	AVG	273	1.3	RB 1 MHz;VB 10 Hz;Peak
1493.810	26.9	V	54.0	-27.1	AVG	293	1.0	RB 1 MHz;VB 10 Hz;Peak
1199.990	43.4	V	74.0	-30.6	PK	273	1.3	RB 1 MHz;VB 3 MHz;Peak
1493.150	38.0	V	74.0	-36.0	PK	293	1.0	RB 1 MHz;VB 3 MHz;Peak

Note 1:	For emissions in restricted bands, the limit of 15.209 was used which requires average and peak measurements.
Note 2:	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).
Note 3:	Scans made between 18 - 40GHz with the measurement antenna moved around the card and its antennas 20-50cm from the device indicated there were no signifcant emissions in this frequency range



Client:	Biscotti, Inc.	Job Number:	J89805
Model:	W0001 - Module 802.11abgn 2x2	T-Log Number:	T89809
		Account Manager:	Deepa Shetty
Contact:	Nadeem Ahmed		
Standard:	FCC 15.247, 15.E	Class:	N/A

Run # 2c: EUT on Channel #48 5240MHz - 802.11n20, Chain A+B

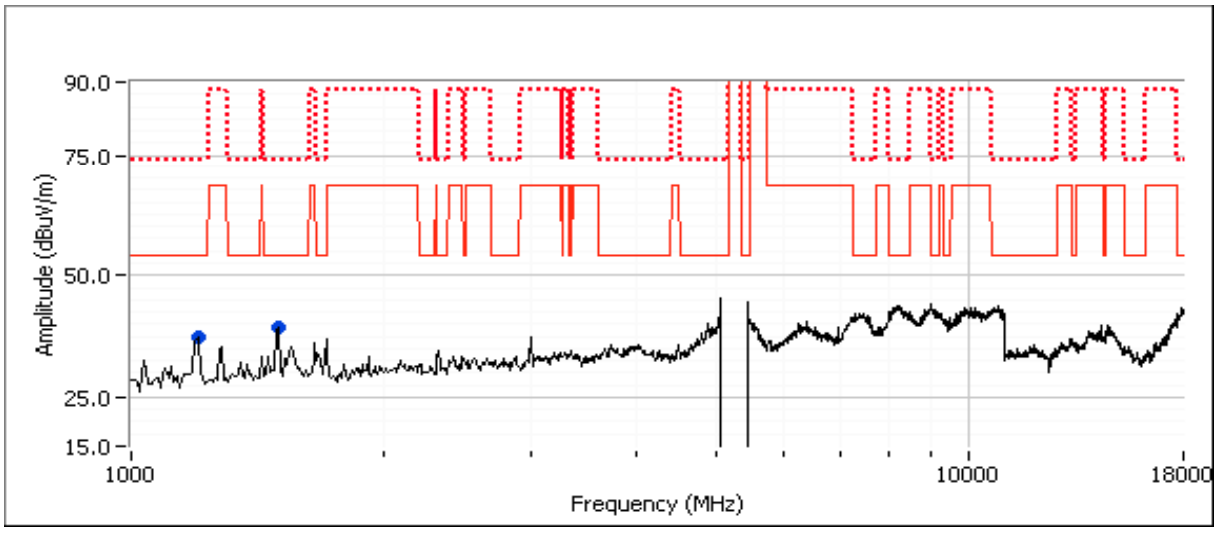
Date of Test: 11/29/2012 Test Location: FT Chamber #3

Test Engineer: M. Birgani Config Change: -

Spurious Radiated Emissions:

Frequency	Level	Pol	15.209 / 15E		Detector	Azimuth	Height	Comments
MHz	dBµV/m	v/h	Limit	Margin	Pk/QP/Avg	degrees	meters	
Note 4				0.0				

Note 1:	For emissions in restricted bands, the limit of 15.209 was used which requires average and peak measurements.
Note 2:	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).
Note 4:	Frequencies marked on the plot were the same level and same frequency as run 1a. These frequencies did not change with transmission frequencies and were related to the local support equipment (laptop).



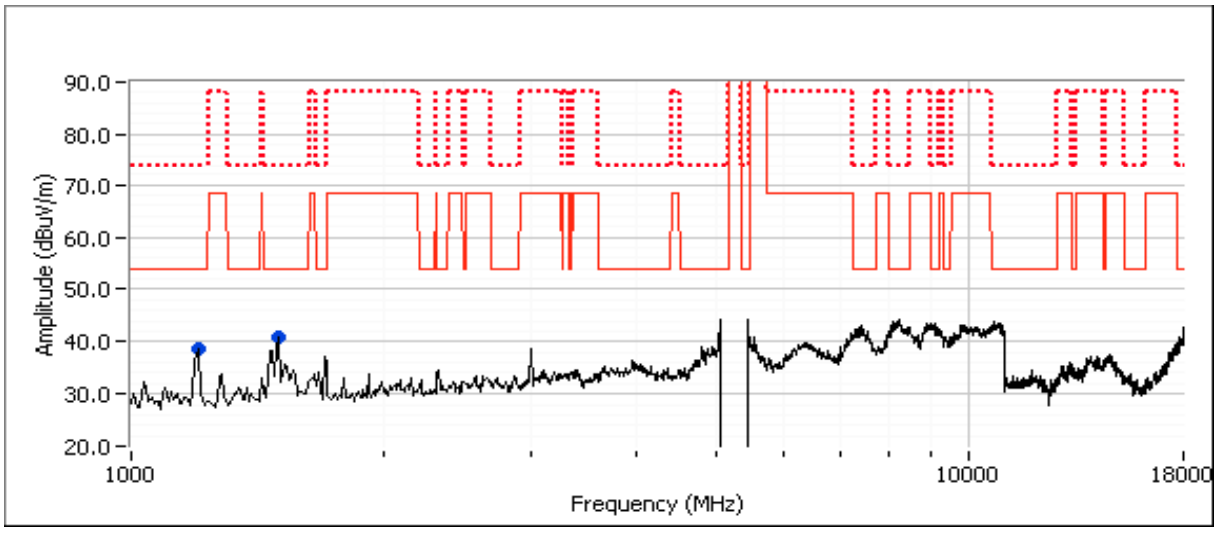
Client:	Biscotti, Inc.	Job Number:	J89805
Model:	W0001 - Module 802.11abgn 2x2	T-Log Number:	T89809
		Account Manager:	Deepa Shetty
Contact:	Nadeem Ahmed		
Standard:	FCC 15.247, 15.E	Class:	N/A

Run # 2d: EUT on Channel #52 5260MHz - 802.11n20, Chain A+B

Spurious Radiated Emissions:

Frequency	Level	Pol	15.209 / 15E		Detector	Azimuth	Height	Comments
MHz	dBµV/m	v/h	Limit	Margin	Pk/QP/Avg	degrees	meters	
Note 4								

Note 1:	For emissions in restricted bands, the limit of 15.209 was used which requires average and peak measurements.
Note 2:	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).
Note 3:	Scans made between 18 - 40GHz with the measurement antenna moved around the card and its antennas 20-50cm from the device indicated there were no signifcant emissions in this frequency range
Note 4:	Frequencies marked on the plot were the same level and same frequency as run 1a. These frequencies did not change with transmission frequencies and were related to the local support equipment (laptop).



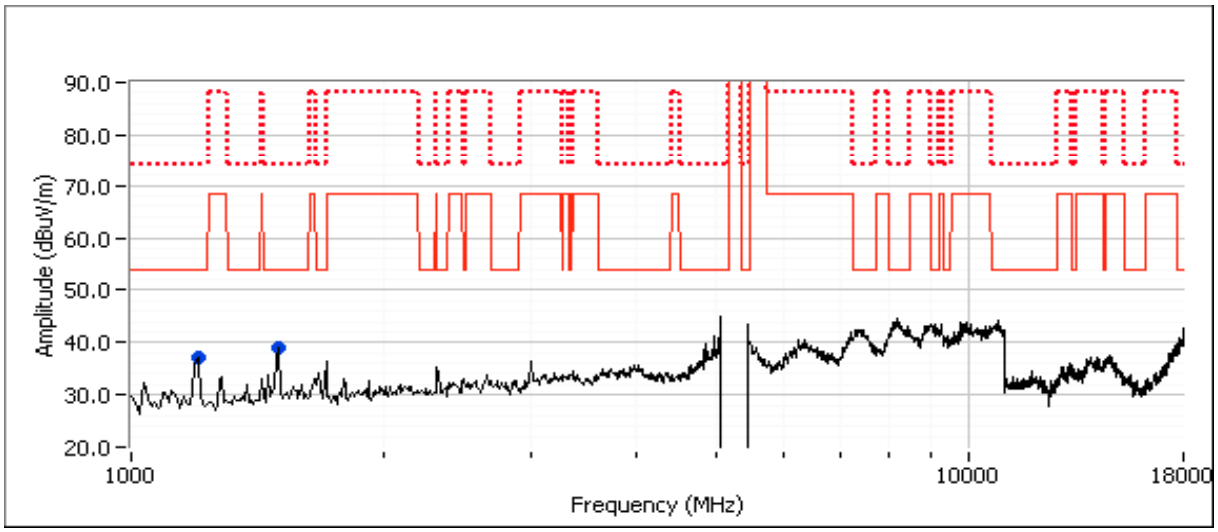
Client:	Biscotti, Inc.	Job Number:	J89805
Model:	W0001 - Module 802.11abgn 2x2	T-Log Number:	T89809
		Account Manager:	Deepa Shetty
Contact:	Nadeem Ahmed		
Standard:	FCC 15.247, 15.E	Class:	N/A

Run # 2e: EUT on Channel #60 5300MHz - 802.11n20, Chain A+B

Spurious Radiated Emissions:

Frequency	Level	Pol	15.209 / 15E		Detector	Azimuth	Height	Comments
MHz	dBµV/m	v/h	Limit	Margin	Pk/QP/Avg	degrees	meters	
Note 4								

Note 1:	For emissions in restricted bands, the limit of 15.209 was used which requires average and peak measurements.
Note 2:	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).
Note 3:	Scans made between 18 - 40GHz with the measurement antenna moved around the card and its antennas 20-50cm from the device indicated there were no signifcant emissions in this frequency range
Note 4:	Frequencies marked on the plot were the same level and same frequency as run 1a. These frequencies did not change with transmission frequencies and were related to the local support equipment (laptop).



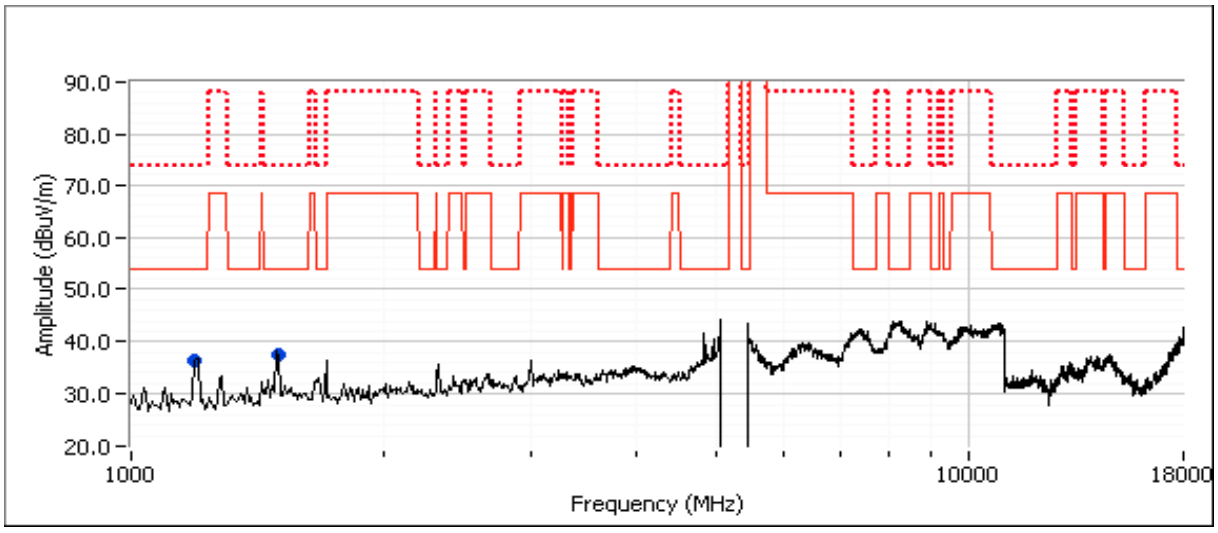
Client:	Biscotti, Inc.	Job Number:	J89805
Model:	W0001 - Module 802.11abgn 2x2	T-Log Number:	T89809
		Account Manager:	Deepa Shetty
Contact:	Nadeem Ahmed		
Standard:	FCC 15.247, 15.E	Class:	N/A

Run # 2f: EUT on Channel #64 5320MHz - 802.11n20, Chain A+B

Spurious Radiated Emissions:

Frequency	Level	Pol	15.209 / 15E		Detector	Azimuth	Height	Comments
MHz	dBµV/m	v/h	Limit	Margin	Pk/QP/Avg	degrees	meters	
Note 4								

Note 1:	For emissions in restricted bands, the limit of 15.209 was used which requires average and peak measurements.
Note 2:	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).
Note 3:	Scans made between 18 - 40GHz with the measurement antenna moved around the card and its antennas 20-50cm from the device indicated there were no signifcant emissions in this frequency range
Note 4:	Frequencies marked on the plot were the same level and same frequency as run 1a. These frequencies did not change with transmission frequencies and were related to the local support equipment (laptop).



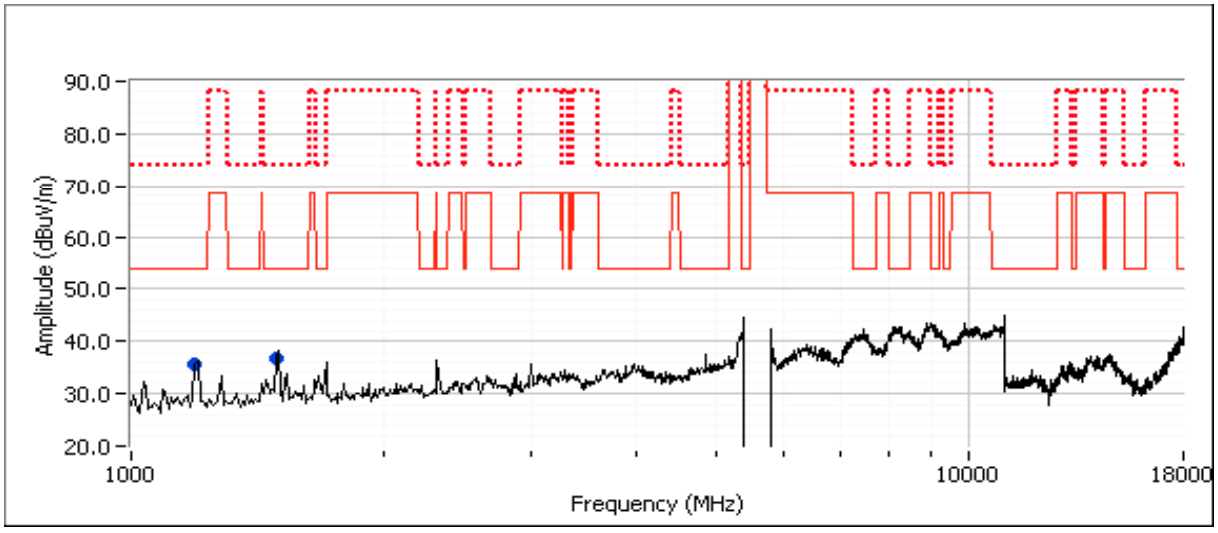
Client:	Biscotti, Inc.	Job Number:	J89805
Model:	W0001 - Module 802.11abgn 2x2	T-Log Number:	T89809
		Account Manager:	Deepa Shetty
Contact:	Nadeem Ahmed		
Standard:	FCC 15.247, 15.E	Class:	N/A

Run # 2g: EUT on Channel #100 5500MHz - 802.11n20, Chain A+B

Spurious Radiated Emissions:

Frequency	Level	Pol	15.209 / 15E		Detector	Azimuth	Height	Comments
MHz	dBµV/m	v/h	Limit	Margin	Pk/QP/Avg	degrees	meters	
1200.040	34.9	V	54.0	-19.1	AVG	138	1.3	RB 1 MHz;VB 10 Hz;Peak
1483.130	31.6	H	54.0	-22.4	AVG	203	1.1	RB 1 MHz;VB 10 Hz;Peak
1200.300	43.5	V	74.0	-30.5	PK	138	1.3	RB 1 MHz;VB 3 MHz;Peak
1484.200	39.0	H	74.0	-35.0	PK	203	1.1	RB 1 MHz;VB 3 MHz;Peak

Note 1:	For emissions in restricted bands, the limit of 15.209 was used which requires average and peak measurements.
Note 2:	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).



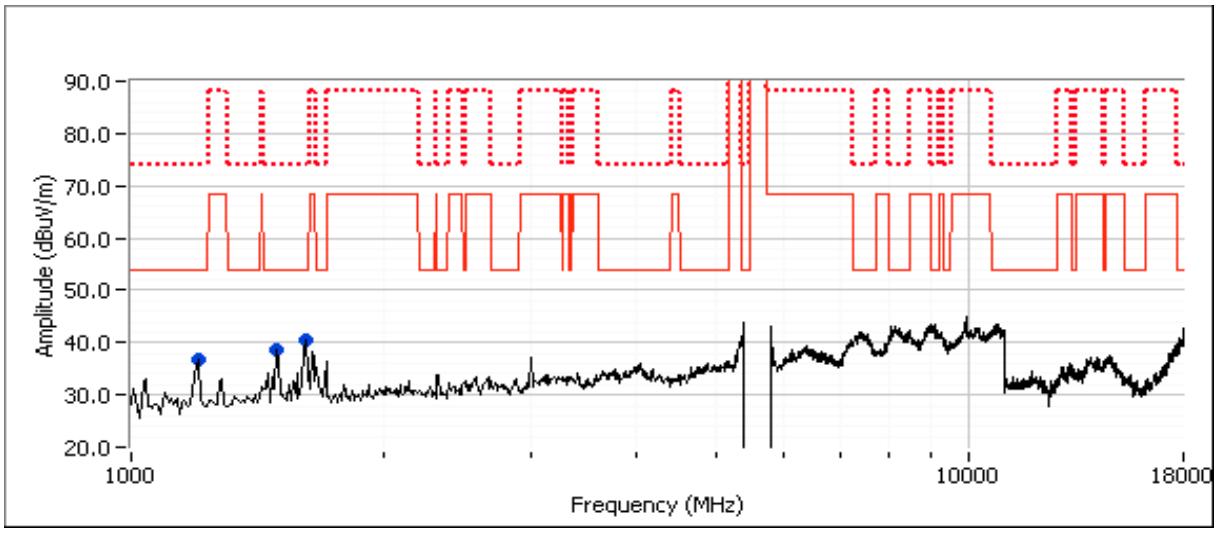
Client:	Biscotti, Inc.	Job Number:	J89805
Model:	W0001 - Module 802.11abgn 2x2	T-Log Number:	T89809
		Account Manager:	Deepa Shetty
Contact:	Nadeem Ahmed		
Standard:	FCC 15.247, 15.E	Class:	N/A

Run # 2h: EUT on Channel #116 5580MHz - 802.11n20, Chain A+B

Spurious Radiated Emissions:

Frequency	Level	Pol	15.209 / 15E		Detector	Azimuth	Height	Comments
MHz	dBµV/m	v/h	Limit	Margin	Pk/QP/Avg	degrees	meters	
1200.070	32.8	V	54.0	-21.2	AVG	159	1.3	RB 1 MHz;VB 10 Hz;Peak
1488.680	32.4	H	54.0	-21.6	AVG	200	1.1	RB 1 MHz;VB 10 Hz;Peak
1624.160	29.6	V	54.0	-24.4	AVG	23	1.3	RB 1 MHz;VB 10 Hz;Peak
1199.940	40.7	V	74.0	-33.3	PK	159	1.3	RB 1 MHz;VB 3 MHz;Peak
1488.090	40.1	H	74.0	-33.9	PK	200	1.1	RB 1 MHz;VB 3 MHz;Peak
1623.920	37.0	V	74.0	-37.0	PK	23	1.3	RB 1 MHz;VB 3 MHz;Peak

Note 1:	For emissions in restricted bands, the limit of 15.209 was used which requires average and peak measurements.
Note 2:	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).
Note 3:	Scans made between 18 - 40GHz with the measurement antenna moved around the card and its antennas 20-50cm from the device indicated there were no signifcant emissions in this frequency range



Client:	Biscotti, Inc.	Job Number:	J89805
Model:	W0001 - Module 802.11abgn 2x2	T-Log Number:	T89809
		Account Manager:	Deepa Shetty
Contact:	Nadeem Ahmed		
Standard:	FCC 15.247, 15.E	Class:	N/A

Run # 2i: EUT on Channel #140 5700MHz - 802.11n20, Chain A+B

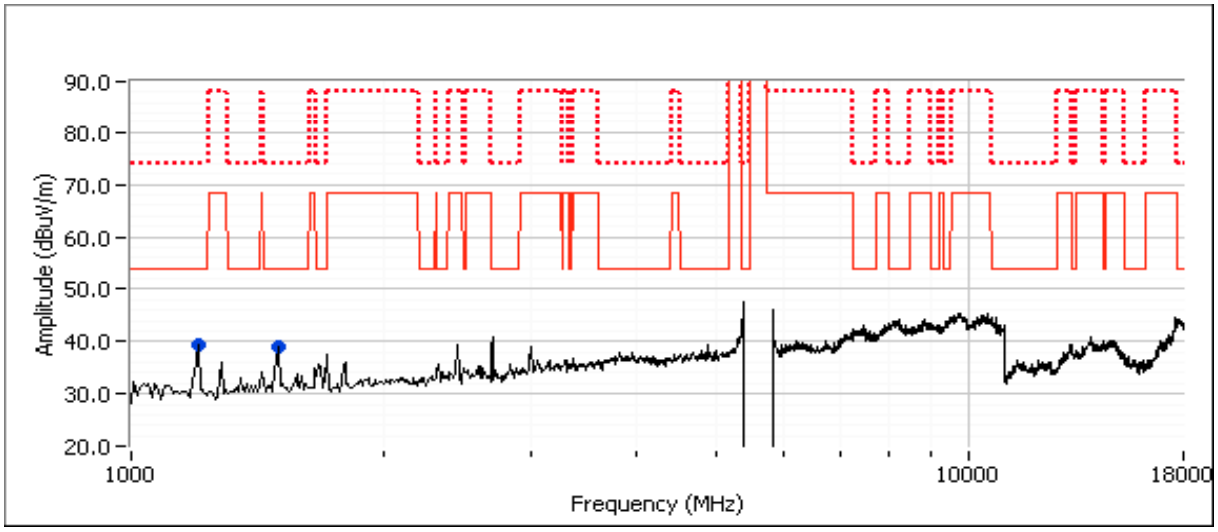
Date of Test: 12/3/2012 Test Location: FT Chamber #3

Test Engineer: Joseph Cadigal Config Change: -

Spurious Radiated Emissions:

Frequency	Level	Pol	15.209 / 15E		Detector	Azimuth	Height	Comments
MHz	dBµV/m	v/h	Limit	Margin	Pk/QP/Avg	degrees	meters	
1200.110	34.0	V	54.0	-20.0	AVG	73	1.3	RB 1 MHz;VB 10 Hz;Peak
1503.960	33.0	H	54.0	-21.0	AVG	221	1.0	RB 1 MHz;VB 10 Hz;Peak
1506.390	45.9	H	74.0	-28.1	PK	221	1.0	RB 1 MHz;VB 3 MHz;Peak
1200.270	44.1	V	74.0	-29.9	PK	73	1.3	RB 1 MHz;VB 3 MHz;Peak

Note 1:	For emissions in restricted bands, the limit of 15.209 was used which requires average and peak measurements.
Note 2:	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).



Client:	Biscotti, Inc.	Job Number:	J89805
Model:	W0001 - Module 802.11abgn 2x2	T-Log Number:	T89809
		Account Manager:	Deepa Shetty
Contact:	Nadeem Ahmed		
Standard:	FCC 15.247, 15.E	Class:	N/A

Run # 3, Radiated Spurious Emissions, 1-40GHz, 802.11n40, Chain A+B

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

Test Engineer: Joseph Cadigal Config Change: -

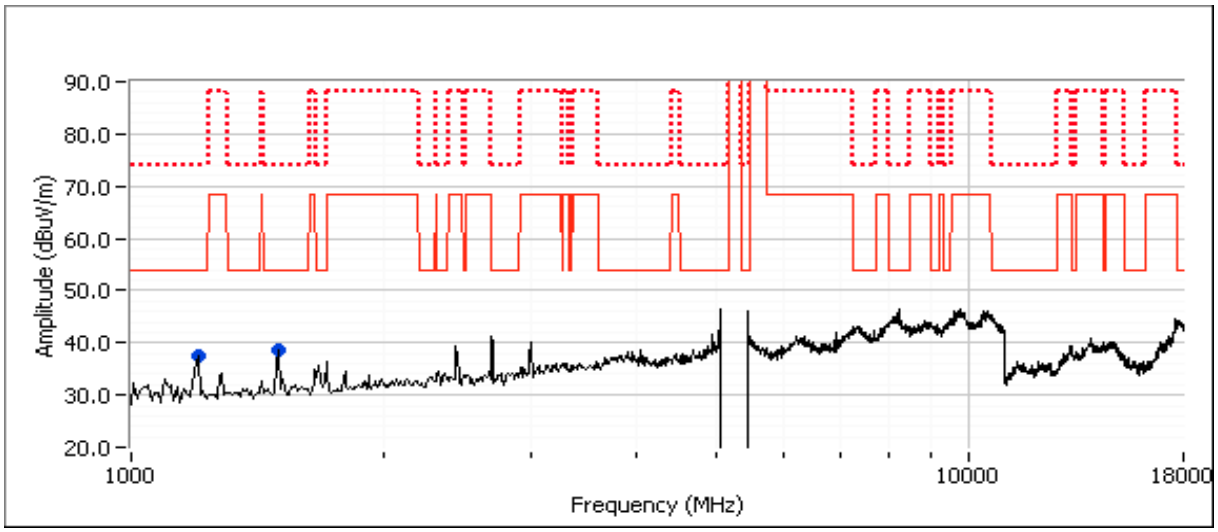
For emissions in restricted bands, the limit of 15.209 was used. For all other emissions, the limit is -27dBm eirp (68.3dBuV/m @3m) using a peak detector.

Run # 3a: EUT on Channel #38 5190MHz - 802.11n40, Chain A+B

Spurious Radiated Emissions:

Frequency	Level	Pol	15.209 / 15E		Detector	Azimuth	Height	Comments
MHz	dBµV/m	v/h	Limit	Margin	Pk/QP/Avg	degrees	meters	
1499.960	41.2	H	54.0	-12.8	AVG	224	1.0	RB 1 MHz;VB 10 Hz;Peak
1200.080	34.6	V	54.0	-19.4	AVG	317	1.3	RB 1 MHz;VB 10 Hz;Peak
1500.190	48.3	H	74.0	-25.7	PK	224	1.0	RB 1 MHz;VB 3 MHz;Peak
1199.830	43.0	V	74.0	-31.0	PK	317	1.3	RB 1 MHz;VB 3 MHz;Peak

Note 1:	For emissions in restricted bands, the limit of 15.209 was used which requires average and peak measurements.
Note 2:	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).



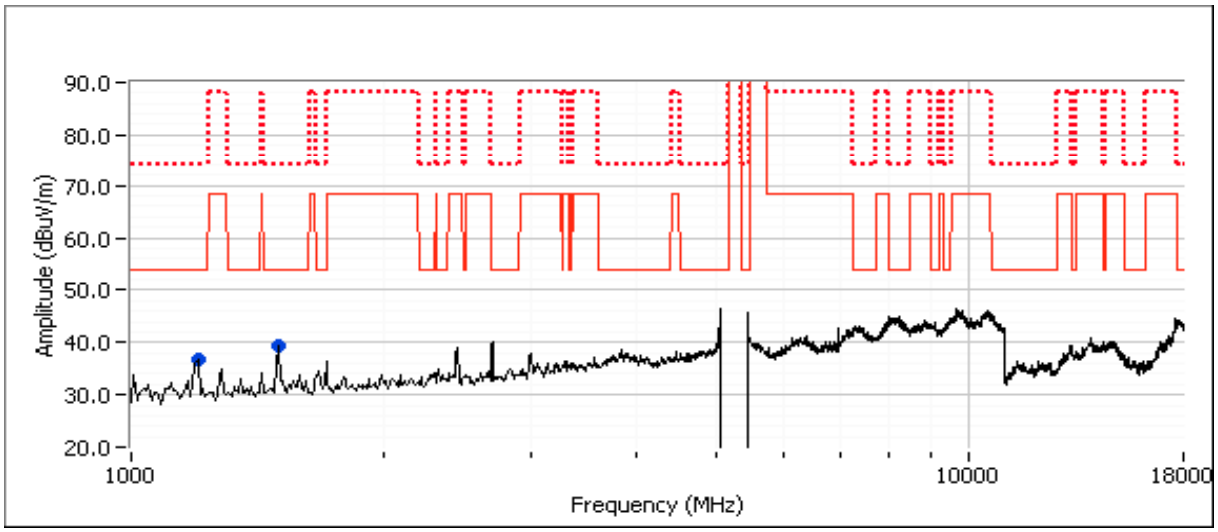
Client:	Biscotti, Inc.	Job Number:	J89805
Model:	W0001 - Module 802.11abgn 2x2	T-Log Number:	T89809
		Account Manager:	Deepa Shetty
Contact:	Nadeem Ahmed		
Standard:	FCC 15.247, 15.E	Class:	N/A

Run # 3c: EUT on Channel #46 5230MHz - 802.11n40, Chain A+B

Spurious Radiated Emissions:

Frequency	Level	Pol	15.209 / 15E		Detector	Azimuth	Height	Comments
MHz	dBµV/m	v/h	Limit	Margin	Pk/QP/Avg	degrees	meters	
1499.920	41.9	H	54.0	-12.1	AVG	219	1.0	RB 1 MHz;VB 10 Hz;Peak
1200.090	33.8	V	54.0	-20.2	AVG	327	1.3	RB 1 MHz;VB 10 Hz;Peak
1500.090	48.6	H	74.0	-25.4	PK	219	1.0	RB 1 MHz;VB 3 MHz;Peak
1199.730	43.5	V	74.0	-30.5	PK	327	1.3	RB 1 MHz;VB 3 MHz;Peak

Note 1:	For emissions in restricted bands, the limit of 15.209 was used which requires average and peak measurements.
Note 2:	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).



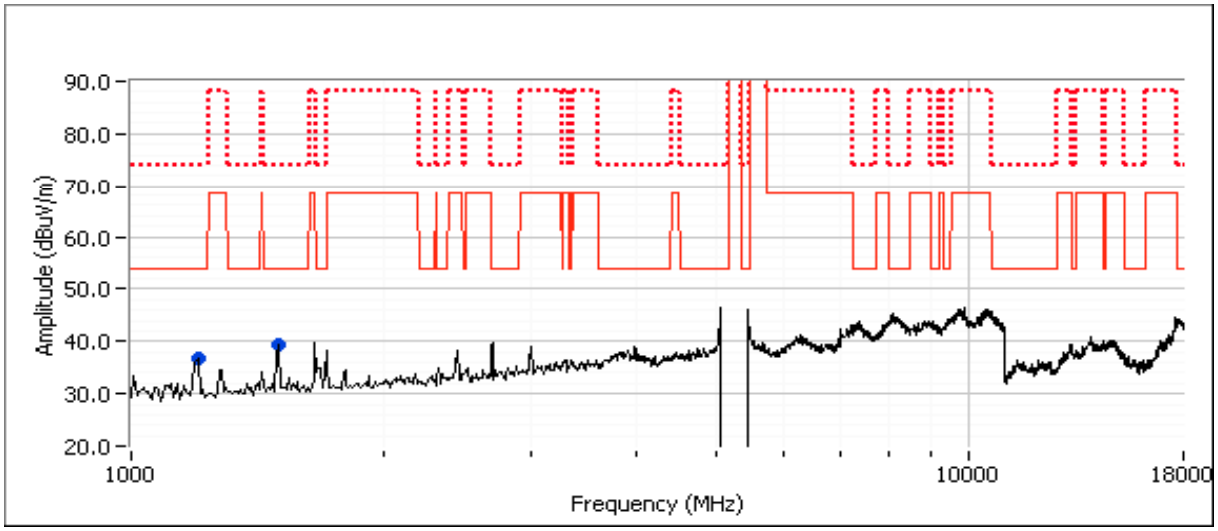
Client:	Biscotti, Inc.	Job Number:	J89805
Model:	W0001 - Module 802.11abgn 2x2	T-Log Number:	T89809
		Account Manager:	Deepa Shetty
Contact:	Nadeem Ahmed		
Standard:	FCC 15.247, 15.E	Class:	N/A

Run # 3d: EUT on Channel #54 5270MHz - 802.11n40, Chain A+B

Spurious Radiated Emissions:

Frequency	Level	Pol	15.209 / 15E		Detector	Azimuth	Height	Comments
MHz	dBµV/m	v/h	Limit	Margin	Pk/QP/Avg	degrees	meters	
1200.020	34.6	V	54.0	-19.4	AVG	315	1.3	RB 1 MHz;VB 10 Hz;Peak
1500.080	34.5	V	54.0	-19.5	AVG	307	1.0	RB 1 MHz;VB 10 Hz;Peak
1500.350	43.6	V	74.0	-30.4	PK	307	1.0	RB 1 MHz;VB 3 MHz;Peak
1199.800	43.4	V	74.0	-30.6	PK	315	1.3	RB 1 MHz;VB 3 MHz;Peak

Note 1:	For emissions in restricted bands, the limit of 15.209 was used which requires average and peak measurements.
Note 2:	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).



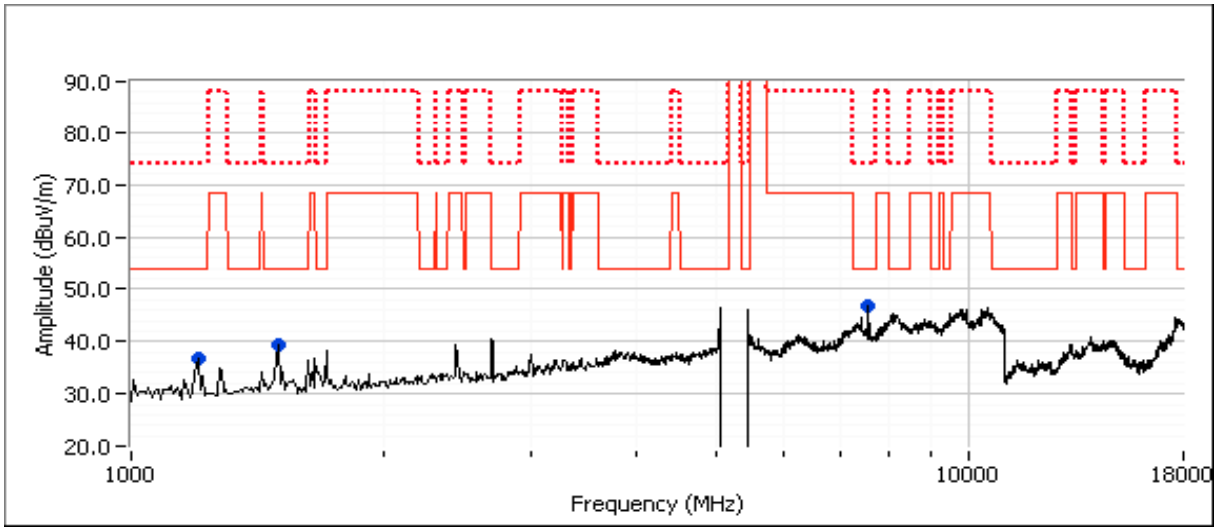
Client:	Biscotti, Inc.	Job Number:	J89805
Model:	W0001 - Module 802.11abgn 2x2	T-Log Number:	T89809
		Account Manager:	Deepa Shetty
Contact:	Nadeem Ahmed		
Standard:	FCC 15.247, 15.E	Class:	N/A

Run # 3f: EUT on Channel #62 5310MHz - 802.11n40, Chain A+B

Spurious Radiated Emissions:

Frequency	Level	Pol	15.209 / 15E		Detector	Azimuth	Height	Comments
MHz	dBµV/m	v/h	Limit	Margin	Pk/QP/Avg	degrees	meters	
7578.780	38.1	H	54.0	-15.9	AVG	340	2.5	RB 1 MHz;VB 10 Hz;Peak
1498.760	37.3	H	54.0	-16.7	AVG	213	1.3	RB 1 MHz;VB 10 Hz;Peak
1200.100	33.5	V	54.0	-20.5	AVG	152	1.3	RB 1 MHz;VB 10 Hz;Peak
7578.590	49.7	H	74.0	-24.3	PK	340	2.5	RB 1 MHz;VB 3 MHz;Peak
1200.260	44.3	V	74.0	-29.7	PK	152	1.3	RB 1 MHz;VB 3 MHz;Peak
1499.900	43.8	H	74.0	-30.2	PK	213	1.3	RB 1 MHz;VB 3 MHz;Peak

Note 1:	For emissions in restricted bands, the limit of 15.209 was used which requires average and peak measurements.
Note 2:	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).



Client:	Biscotti, Inc.	Job Number:	J89805
Model:	W0001 - Module 802.11abgn 2x2	T-Log Number:	T89809
		Account Manager:	Deepa Shetty
Contact:	Nadeem Ahmed		
Standard:	FCC 15.247, 15.E	Class:	N/A

Run # 3g: EUT on Channel #102 5510MHz - 802.11n40, Chain A+B

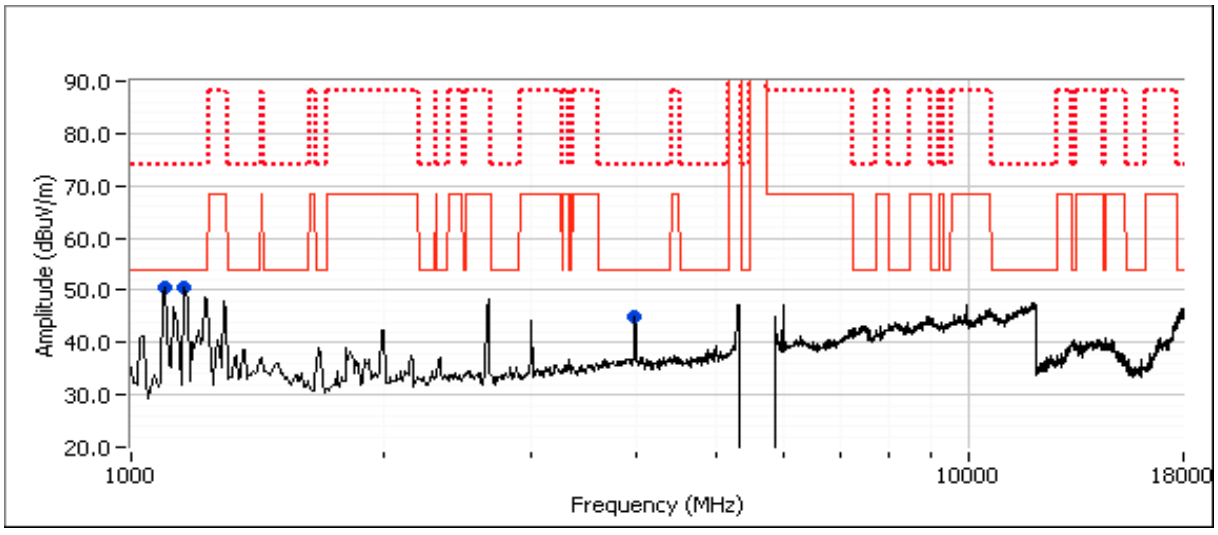
Date of Test: 12/13/2012 Test Location: FT7

Test Engineer: Rafael Varelas Config Change: None

Spurious Radiated Emissions:

Frequency	Level	Pol	15.209 / 15E		Detector	Azimuth	Height	Comments
MHz	dBµV/m	v/h	Limit	Margin	Pk/QP/Avg	degrees	meters	
1099.660	41.9	V	54.0	-12.1	AVG	209	1.8	RB 1 MHz;VB 10 Hz;Peak
1100.060	54.2	V	74.0	-19.8	PK	209	1.8	RB 1 MHz;VB 3 MHz;Peak
1157.050	41.8	V	54.0	-12.2	AVG	215	1.9	RB 1 MHz;VB 10 Hz;Peak
1161.880	55.3	V	74.0	-18.7	PK	215	1.9	RB 1 MHz;VB 3 MHz;Peak
3990.050	34.9	V	54.0	-19.1	AVG	193	1.0	RB 1 MHz;VB 10 Hz;Peak
3984.650	53.7	V	74.0	-20.3	PK	193	1.0	RB 1 MHz;VB 3 MHz;Peak

Note 1:	For emissions in restricted bands, the limit of 15.209 was used which requires average and peak measurements.
Note 2:	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).



Client:	Biscotti, Inc.	Job Number:	J89805
Model:	W0001 - Module 802.11abgn 2x2	T-Log Number:	T89809
		Account Manager:	Deepa Shetty
Contact:	Nadeem Ahmed		
Standard:	FCC 15.247, 15.E	Class:	N/A

Run # 3h: EUT on Channel #110 5550MHz - 802.11n40, Chain A+B

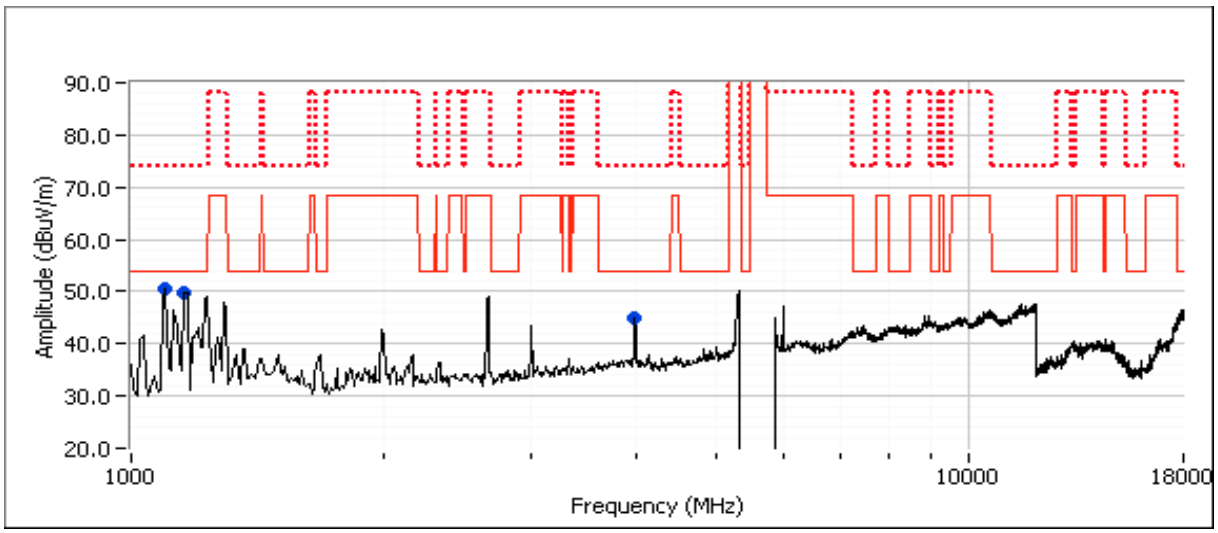
Date of Test: 12/13/2012 Test Location: FT7

Test Engineer: Rafael Varelas Config Change: None

Spurious Radiated Emissions:

Frequency	Level	Pol	15.209 / 15E		Detector	Azimuth	Height	Comments
MHz	dBµV/m	v/h	Limit	Margin	Pk/QP/Avg	degrees	meters	
1099.680	40.8	V	54.0	-13.2	AVG	203	1.0	RB 1 MHz;VB 10 Hz;Peak
1100.030	53.8	V	74.0	-20.2	PK	203	1.0	RB 1 MHz;VB 3 MHz;Peak
3991.980	34.8	V	54.0	-19.2	AVG	196	1.0	RB 1 MHz;VB 10 Hz;Peak
3984.680	53.2	V	74.0	-20.8	PK	196	1.0	RB 1 MHz;VB 3 MHz;Peak
1163.810	40.0	V	54.0	-14.0	AVG	211	1.2	RB 1 MHz;VB 10 Hz;Peak
1161.970	54.0	V	74.0	-20.0	PK	211	1.2	RB 1 MHz;VB 3 MHz;Peak

Note 1:	For emissions in restricted bands, the limit of 15.209 was used which requires average and peak measurements.
Note 2:	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).
Note 3:	Scans made between 18 - 40GHz with the measurement antenna moved around the card and its antennas 20-50cm from the device indicated there were no signifcant emissions in this frequency range



Client:	Biscotti, Inc.	Job Number:	J89805
Model:	W0001 - Module 802.11abgn 2x2	T-Log Number:	T89809
		Account Manager:	Deepa Shetty
Contact:	Nadeem Ahmed		
Standard:	FCC 15.247, 15.E	Class:	N/A

Run # 3i: EUT on Channel #134 5670MHz - 802.11n40, Chain A+B

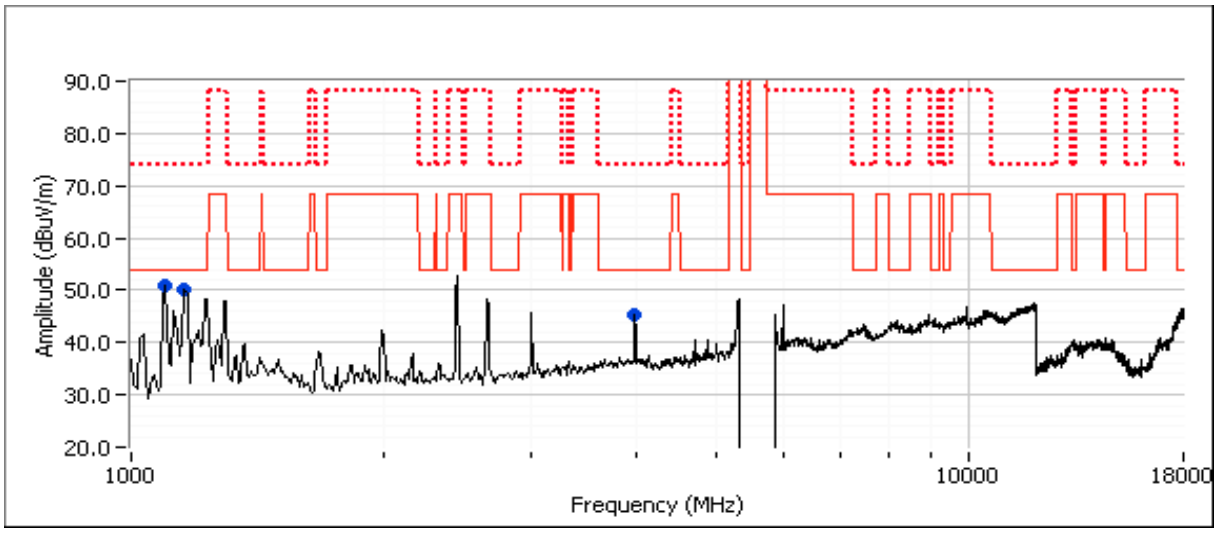
Date of Test: 12/13/2012 Test Location: FT7

Test Engineer: Rafael Varelas Config Change: None

Spurious Radiated Emissions:

Frequency	Level	Pol	15.209 / 15E		Detector	Azimuth	Height	Comments
MHz	dBµV/m	v/h	Limit	Margin	Pk/QP/Avg	degrees	meters	
1099.680	41.0	V	54.0	-13.0	AVG	177	1.0	RB 1 MHz;VB 10 Hz;Peak
1099.700	53.5	V	74.0	-20.5	PK	177	1.0	RB 1 MHz;VB 3 MHz;Peak
3991.140	34.9	V	54.0	-19.1	AVG	191	1.0	RB 1 MHz;VB 10 Hz;Peak
3986.670	53.7	V	74.0	-20.3	PK	191	1.0	RB 1 MHz;VB 3 MHz;Peak
1157.050	39.9	H	54.0	-14.1	AVG	170	1.4	RB 1 MHz;VB 10 Hz;Peak
1156.990	44.4	H	74.0	-29.6	PK	170	1.4	RB 1 MHz;VB 3 MHz;Peak

Note 1:	For emissions in restricted bands, the limit of 15.209 was used which requires average and peak measurements.
Note 2:	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).



Client:	Biscotti, Inc.	Job Number:	J89805
Model:	W0001 - Module 802.11abgn 2x2	T-Log Number:	T89809
		Account Manager:	Deepa Shetty
Contact:	Nadeem Ahmed		
Standard:	FCC 15.247, 15.E	Class:	N/A

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

Summary of Results

Run #	Test Performed	Limit	Pass / Fail	Result / Margin
1	Power, 5150 - 5250MHz	15.407(a) (1), (2)	PASS	802.11a: 10.4 dBm 802.11n 20MHz: 13.0 dBm 802.11n n40MHz: 13.4 mW
1	PSD, 5150 - 5250MHz	15.407(a) (1), (2)	PASS	802.11a: -1.9 dBm/MHz 802.11n 20MHz: 1.1 dBm/MHz 802.11n n40MHz: -1.0 dBm/MHz
1	Power, 5250 - 5350MHz	15.407(a) (1), (2)	PASS	802.11a: 10.0 dBm 802.11n 20MHz: 15.0 dBm 802.11n n40MHz: 12.3 dBm
1	PSD, 5250 - 5350MHz	15.407(a) (1), (2)	PASS	802.11a: -3.0 dBm/MHz 802.11n 20MHz: 2.8 dBm/MHz 802.11n n40MHz: 0.6 dBm/MHz
1	Power, 5470 - 5725MHz	15.407(a) (1), (2)	Pass	802.11a: 7.0 dBm 802.11n 20MHz: 14.2 dBm 802.11n n40MHz: 11.9 dBm
1	PSD, 5470 - 5725MHz	15.407(a) (1), (2)	PASS	802.11a: -5.6 dBm/MHz 802.11n 20MHz: 2.1 dBm/MHz 802.11n n40MHz: -2.7 dBm/MHz
1	26dB Bandwidth	15.407 (Information only)	-	> 20MHz for all modes
1	99% Bandwidth	RSS 210 (Information only)	N/A	802.11a: 17.0 MHz 802.11n 20MHz: 18.4 MHz 802.11n n40MHz: 36.9 MHz
2	Peak Excursion Envelope	15.407(a) (6) 13dB	PASS	7.4 dBm
3	Antenna Conducted - Out of Band Spurious	15.407(b) -27dBm/MHz	To be reviewed	All emissions below the -27dBm/MHz limit

Client:	Biscotti, Inc.	Job Number:	J89805
Model:	W0001 - Module 802.11abgn 2x2	T-Log Number:	T89809
		Account Manager:	Deepa Shetty
Contact:	Nadeem Ahmed		
Standard:	FCC 15.247, 15.E	Class:	N/A

Test Specific Details

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

Date of Test: 12/30/2012; 01/07/13
Test Engineer: R. Varelas, M. Birgani
Test Location: FT Lab# 4a

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

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: 20-23 °C
Rel. Humidity: 30-40 %

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.

Date of Test: 1/7/2013
Test Engineer: Deniz Demirci
Test Location: FT Lab# 4a

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

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

Note 1:	Output power measured using a spectrum analyzer (see plots below). RBW=1MHz, VB=3 MHz, # of points in sweep ≥ 2*span/RBW, RMS detector, power averaging on (transmitted signal was continuous) and power integration over 50 MHz for 20MHz BW and 80MHz for 40MHz BW (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 >=3xRB
Note 5:	For MIMO systems the total output power and total PSD are calculated form the sum of the powers of the individual chains (in linear terms). The antenna gain used to determine the EIRP and limits for PSD/Output power depends on the operating mode of the MIMO device. If the signals on the non-coherent between the transmit chains then the gain used to determine the limits is the highest gain of the individual chains and the EIRP is the sum of the products of gain and power on each chain. If the signals are coherent then the effective antenna gain is the sum (in linear terms) of the gains for each chain and the EIRP is the product of the effective gain and total power.

Client:	Biscotti, Inc.	Job Number:	J89805
Model:	W0001 - Module 802.11abgn 2x2	T-Log Number:	T89809
		Account Manager:	Deepa Shetty
Contact:	Nadeem Ahmed		
Standard:	FCC 15.247, 15.E	Class:	N/A

MIMO Device - 5150-5250 MHz Band

	Chain 1	Chain 2	Chain 3	Coherent	Effective[5]	EIRP (mW)	EIRP (dBm)
Antenna Gain (dBi):	5.5	5.5		No	5.5	71.2	18.5

Power

Frequency (MHz)	Software Setting	26dB BW (MHz)	Measured Output Power[1] dBm			Total		Limit (dBm)	Max Power (W)	Pass or Fail
			Chain 1	Chain 2	Chain 3	mW	dBm			
11a Single Chain										
5180	15.0	26.6	10.4			11.0	10.4	17.0	0.011	PASS
5200	15.0	31.0	10.3			10.8	10.3	17.0		PASS
5240	15.0	31.8	10.2			10.4	10.2	17.0		PASS
n20										
5180	12.0	26.3	7.4	11.6		19.9	13.0	17.0	0.020	PASS
5200	12.0	26.3	7.9	11.4		20.1	13.0	17.0		PASS
5240	12.0	26.3	7.2	11.6		19.6	12.9	17.0		PASS
n40										
5190	9.0	39.1	2.7	5.2		5.2	7.1	17.0	0.022	PASS
5230	13.0	38.8	9.8	10.9		22.0	13.4	17.0		PASS

PSD

Frequency (MHz)	99%[4] BW	Total Power	PSD[2] dBm/MHz			Total PSD		Limit		Pass or Fail
			Chain 1	Chain 2	Chain 3	mW/MHz	dBm/MHz	FCC	RSS 210[3]	
11a Single Chain										
5180	16.9	10.4	-2.2			0.6	-2.2	4.0	4.5	PASS
5200	16.9	10.3	-1.9			0.6	-1.9	4.0	4.5	PASS
5240	16.9	10.2	-2.2			0.6	-2.2	4.0	4.5	PASS
n20										
5180	18.1	13.0	-5.1	-0.4		1.2	0.9	4.0	4.5	PASS
5200	18.1	13.0	-4.7	-0.3		1.3	1.1	4.0	4.5	PASS
5240	18.0	12.9	-5.3	-0.3		1.2	0.9	4.0	4.5	PASS
n40										
5190	36.5	7.1	-12.3	-9.7		0.2	-7.8	4.0	4.5	PASS
5230	36.6	13.4	-4.8	-3.3		0.8	-1.0	4.0	4.5	PASS

Client:	Biscotti, Inc.	Job Number:	J89805
Model:	W0001 - Module 802.11abgn 2x2	T-Log Number:	T89809
		Account Manager:	Deepa Shetty
Contact:	Nadeem Ahmed		
Standard:	FCC 15.247, 15.E	Class:	N/A

MIMO Device - 5250-5350 MHz Band

	Chain 1	Chain 2	Chain 3	Coherent	Effective[5]	EIRP (mW)	EIRP (dBm)
Antenna Gain (dBi):	5.5	5.5		No	5.5	113.2	20.5

Power

Frequency (MHz)	Software Setting	26dB BW (MHz)	Measured Output Power[1] dBm			Total		Limit (dBm)	Max Power (W)	Pass or Fail
			Chain 1	Chain 2	Chain 3	mW	dBm			
11a Single Chain										
5260	15.0	22.7	10.0			10.0	10.0	24.0	0.010	PASS
5300	15.0	20.7	9.3			8.6	9.3	24.0		PASS
5320	15.0	20.6	9.4			8.7	9.4	24.0		PASS
n20										
5260	15.0	26.3	9.3	13.7		31.9	15.0	24.0	0.032	PASS
5300	15.0	25.0	10.2	13.2		31.0	14.9	24.0		PASS
5320	13.0	24.7	9.1	12.0		23.8	13.8	24.0		PASS
n40										
5270	13.0	42.1	4.6	10.2		13.4	11.3	24.0	0.017	PASS
5310	13.0	39.3	7.5	10.5		16.9	12.3	24.0		PASS

PSD

Frequency (MHz)	99%[4] BW	Total Power	PSD[2] dBm/MHz			Total PSD		Limit		Pass or Fail
			Chain 1	Chain 2	Chain 3	mW/MHz	dBm/MHz	FCC	RSS 210[3]	
11a Single Chain										
5260	17.0	10.0	-3.0			0.5	-3.0	11.0	11.0	PASS
5300	17.0	9.3	-3.3			0.5	-3.3	11.0	11.0	PASS
5320	17.0	9.4	-3.5			0.4	-3.5	11.0	11.0	PASS
n20										
5260	18.2	15.0	-2.6	1.3		1.9	2.8	11.0	11.0	PASS
5300	18.4	14.9	-2.1	-1.0		1.4	1.5	11.0	11.0	PASS
5320	18.2	13.8	-2.7	0.0		1.5	1.8	11.0	11.0	PASS
n40										
5270	36.6	11.3	-10.2	-4.9		0.4	-3.8	11.0	11.0	PASS
5310	36.6	12.3	-7.4	-4.1		0.6	-2.4	11.0	11.0	PASS

Client:	Biscotti, Inc.	Job Number:	J89805
Model:	W0001 - Module 802.11abgn 2x2	T-Log Number:	T89809
		Account Manager:	Deepa Shetty
Contact:	Nadeem Ahmed		
Standard:	FCC 15.247, 15.E	Class:	N/A

MIMO Device - 5470-5725 MHz Band

	Chain 1	Chain 2	Chain 3	Coherent	Effective[5]	EIRP (mW)	EIRP (dBm)
Antenna Gain (dBi):	5.5	5.5		No	5.5	94.4	19.7

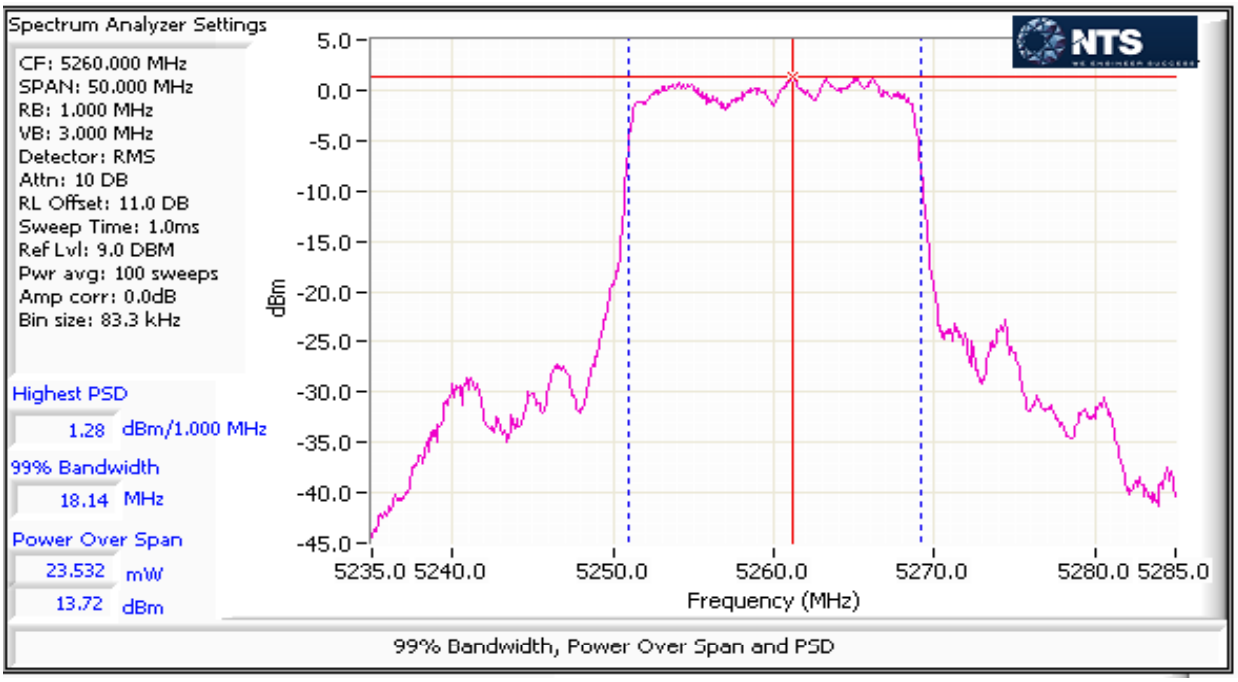
Power

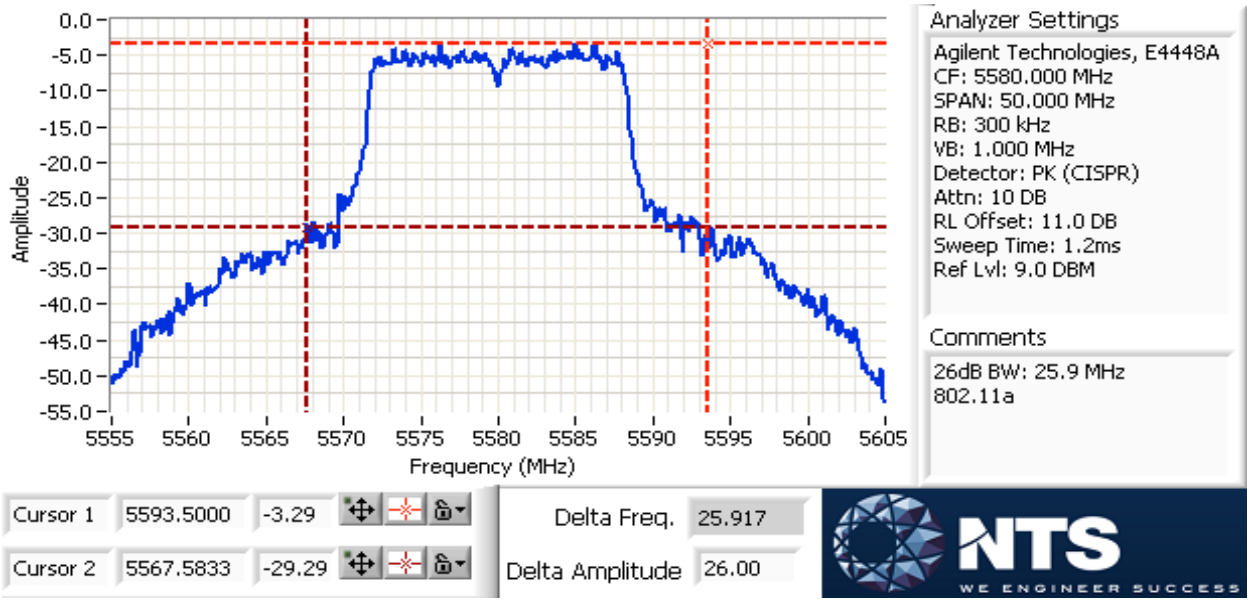
Frequency (MHz)	Software Setting	26dB BW (MHz)	Measured Output Power[1] dBm			Total		Limit (dBm)	Max Power (W)	Pass or Fail
			Chain 1	Chain 2	Chain 3	mW	dBm			
11a Single Chain										
5500	15.0	19.6	6.7			4.6	6.7	23.9		PASS
5580	15.0	19.5	7.0			5.0	7.0	23.9	0.005	PASS
5700	15.0	19.5	6.9			4.8	6.9	23.9		PASS
n20										
5500	15.0	25.0	7.4	13.3		26.6	14.2	24.0		PASS
5580	15.0	25.8	7.0	12.1		21.2	13.3	24.0	0.027	PASS
5700	15.0	24.8	6.6	9.5		13.6	11.3	24.0		PASS
n40										
5510	13.0	40.8	4.5	9.8		12.3	10.9	24.0		PASS
5550	15.0	40.3	7.0	10.2		15.5	11.9	24.0	0.015	PASS
5670	15.0	38.9	4.7	8.6		10.1	10.1	24.0		PASS

PSD

Frequency (MHz)	99%[4] BW	Total Power	PSD[2] dBm/MHz			Total PSD		Limit		Pass or Fail
			Chain 1	Chain 2	Chain 3	mW/MHz	dBm/MHz	FCC	RSS 210[3]	
11a Single Chain										
5500	16.9	6.7	-6.0			0.3	-6.0	11.0	11.0	PASS
5580	17.0	7.0	-5.6			0.3	-5.6	11.0	11.0	PASS
5700	16.9	6.9	-5.7			0.3	-5.7	11.0	11.0	PASS
n20										
5510	18.1	14.2	-4.2	1.0		1.6	2.1	11.0	11.0	PASS
5550	18.2	13.3	-4.7	-0.2		1.3	1.1	11.0	11.0	PASS
5670	18.2	11.3	-5.1	-2.7		0.8	-0.7	11.0	11.0	PASS
n40										
5510	36.6	10.9	-10.3	-4.4		0.5	-3.4	11.0	11.0	PASS
5550	36.9	11.9	-7.6	-4.4		0.5	-2.7	11.0	11.0	PASS
5670	36.6	10.1	-10.0	-5.9		0.4	-4.5	11.0	11.0	PASS

Client:	Biscotti, Inc.	Job Number:	J89805
Model:	W0001 - Module 802.11abgn 2x2	T-Log Number:	T89809
		Account Manager:	Deepa Shetty
Contact:	Nadeem Ahmed		
Standard:	FCC 15.247, 15.E	Class:	N/A





Client:	Biscotti, Inc.	Job Number:	J89805
Model:	W0001 - Module 802.11abgn 2x2	T-Log Number:	T89809
		Account Manager:	Deepa Shetty
Contact:	Nadeem Ahmed		
Standard:	FCC 15.247, 15.E	Class:	N/A

Run #2: Peak Excursion Measurement

a mode: Device meets the requirement for the peak excursion

Freq	Peak Excursion(dB)		Freq	Peak Excursion(dB)		Freq	Peak Excursion(dB)	
(MHz)	Value	Limit	(MHz)	Value	Limit	(MHz)	Value	Limit
5180	6.2	13.0	5260	6.6	13.0	5500	6.3	13.0
5200	6.2	13.0	5300	6.5	13.0	5580	6.7	13.0
5240	6.4	13.0	5320	7.0	13.0	5700	6.0	13.0

20MHz: Device meets the requirement for the peak excursion

Freq	Peak Excursion(dB)		Freq	Peak Excursion(dB)		Freq	Peak Excursion(dB)	
(MHz)	Value	Limit	(MHz)	Value	Limit	(MHz)	Value	Limit
5180	6.1	13.0	5260	5.7	13.0	5500	5.4	13.0
5200	5.7	13.0	5300	6.0	13.0	5580	5.5	13.0
5240	5.8	13.0	5320	5.8	13.0	5700	5.9	13.0

40MHz: Device meets the requirement for the peak excursion

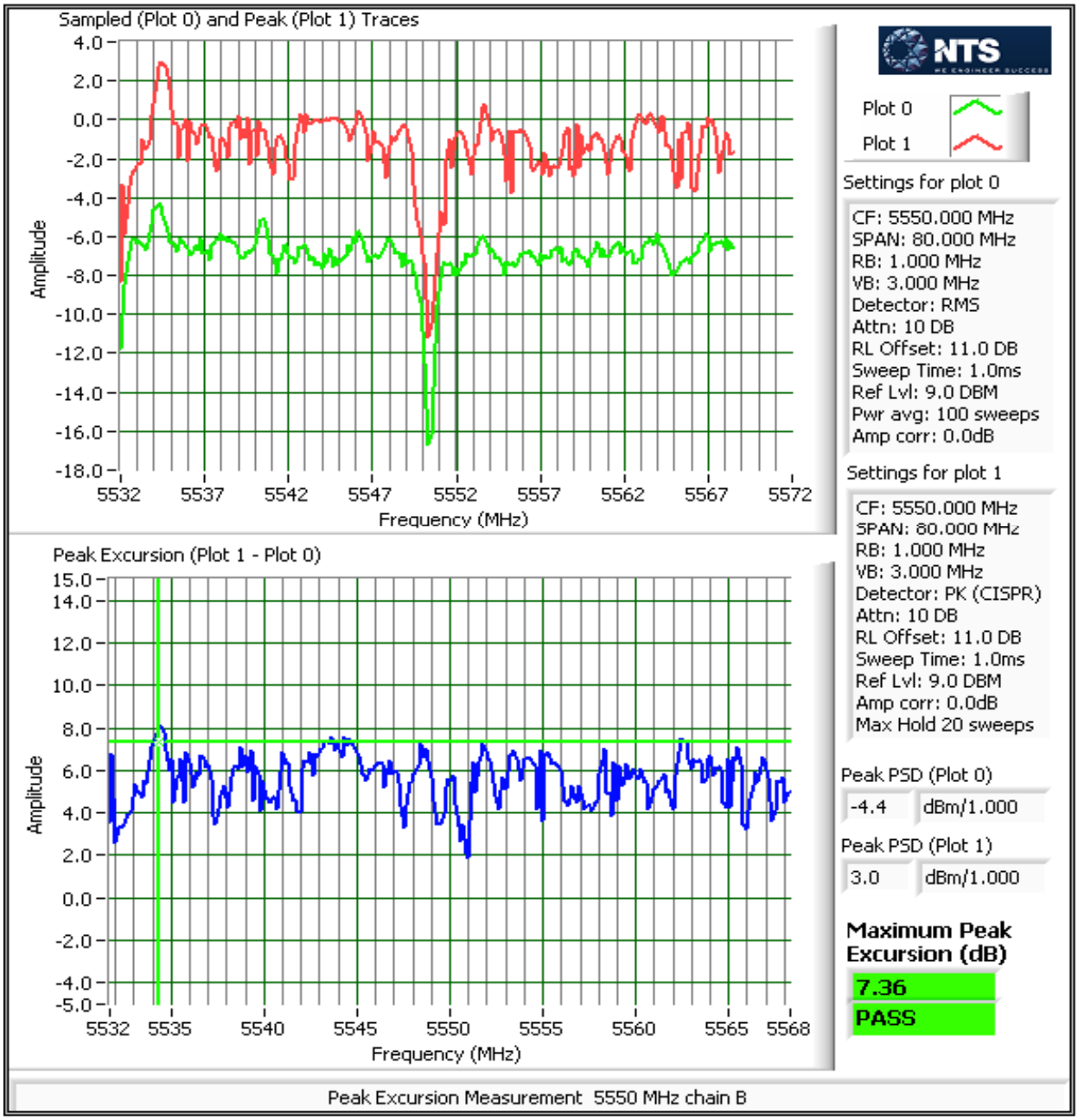
Freq	Peak Excursion(dB)		Freq	Peak Excursion(dB)		Freq	Peak Excursion(dB)	
(MHz)	Value	Limit	(MHz)	Value	Limit	(MHz)	Value	Limit
5190	6.9	13.0	5270	6.6	13.0	5510	7.1	13.0
5230	7.2	13.0	5310	6.8	13.0	5550	7.4	13.0
						5670	6.8	13.0

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)

Client:	Biscotti, Inc.	Job Number:	J89805
Model:	W0001 - Module 802.11abgn 2x2	T-Log Number:	T89809
		Account Manager:	Deepa Shetty
Contact:	Nadeem Ahmed		
Standard:	FCC 15.247, 15.E	Class:	N/A



Client:	Biscotti, Inc.	Job Number:	J89805
Model:	W0001 - Module 802.11abgn 2x2	T-Log Number:	T89809
		Account Manager:	Deepa Shetty
Contact:	Nadeem Ahmed		
Standard:	FCC 15.247, 15.E	Class:	N/A

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

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

Number of transmit chains:	2	
Maximum Antenna Gain:	5.5	dBi
Spurious Limit:	-27.0	dBm/MHz eirp
Adjustment for 2 chains:	-3.0	dB adjustment for multiple chains.
Limit Used On Plots [Note 1]:	-35.5	dBm/MHz Peak Limit (RB=VB=1MHz)

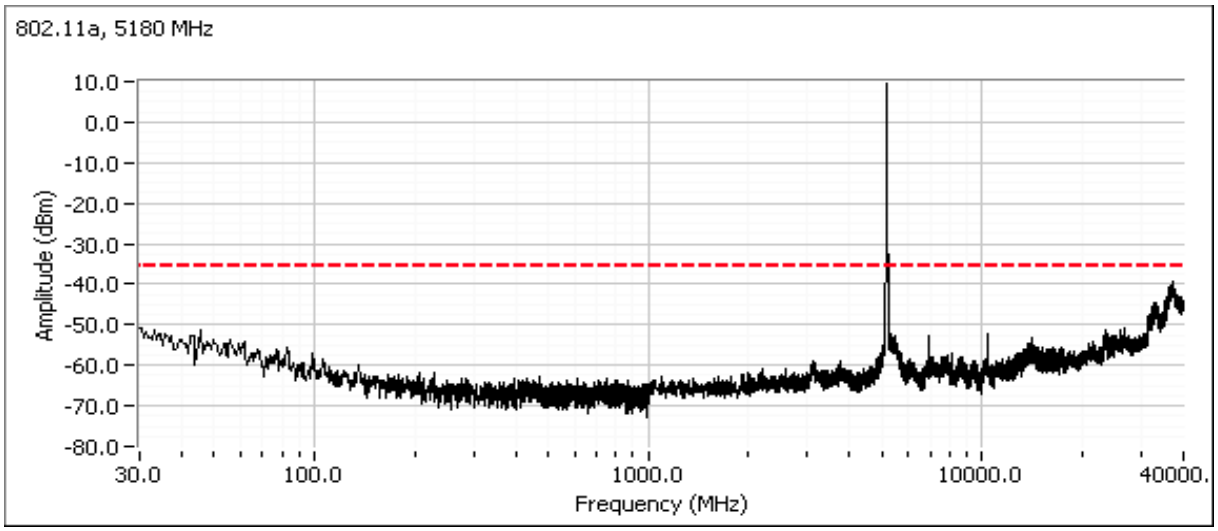
Note 1:	The -27dBm/MHz limit is an eirp limit. The limit for antenna port conducted measurements is adjusted to take into consideration the maximum antenna gain (limit = -27dBm - antenna gain). Radiated field strength measurements for signals more than 50MHz from the bands and that are close to the limit 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 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

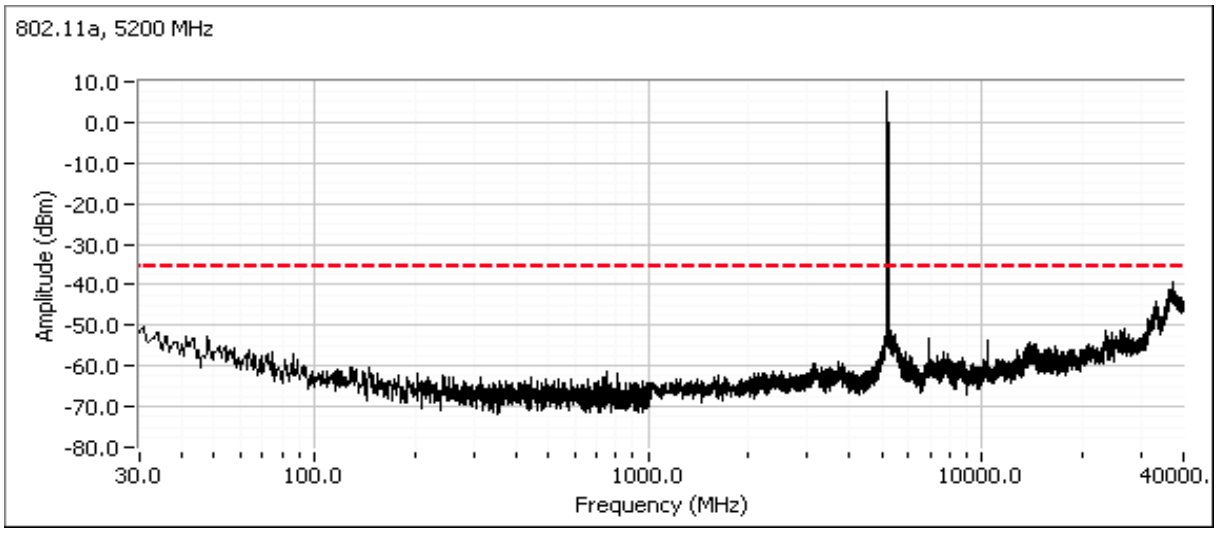
Low channel, 5150 - 5250 MHz Band

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

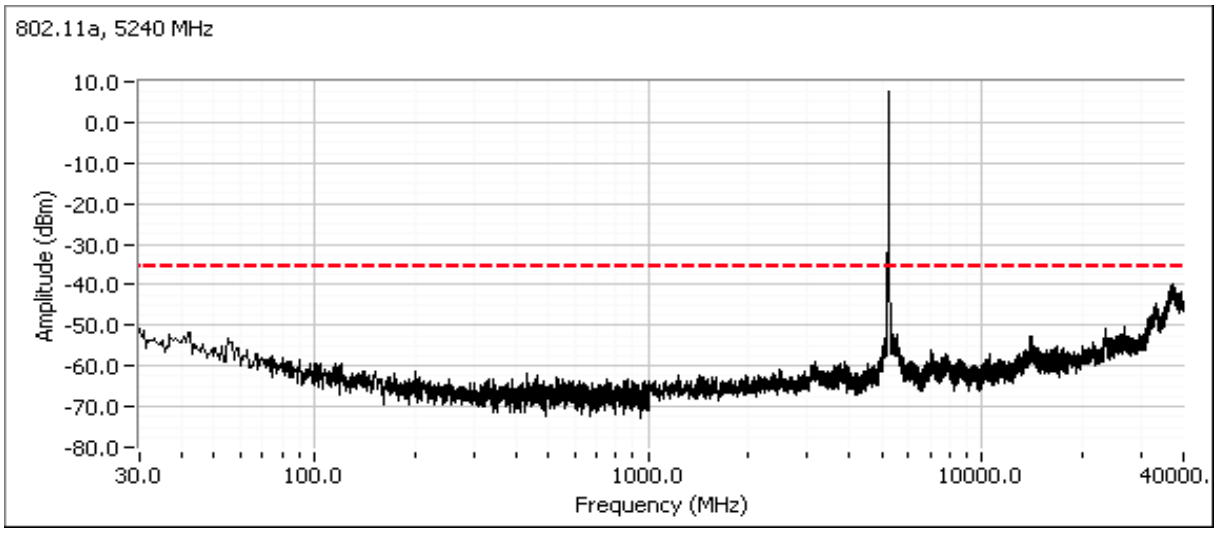


Client:	Biscotti, Inc.	Job Number:	J89805
Model:	W0001 - Module 802.11abgn 2x2	T-Log Number:	T89809
		Account Manager:	Deepa Shetty
Contact:	Nadeem Ahmed		
Standard:	FCC 15.247, 15.E	Class:	N/A

Center channel, 5150 - 5250 MHz Band



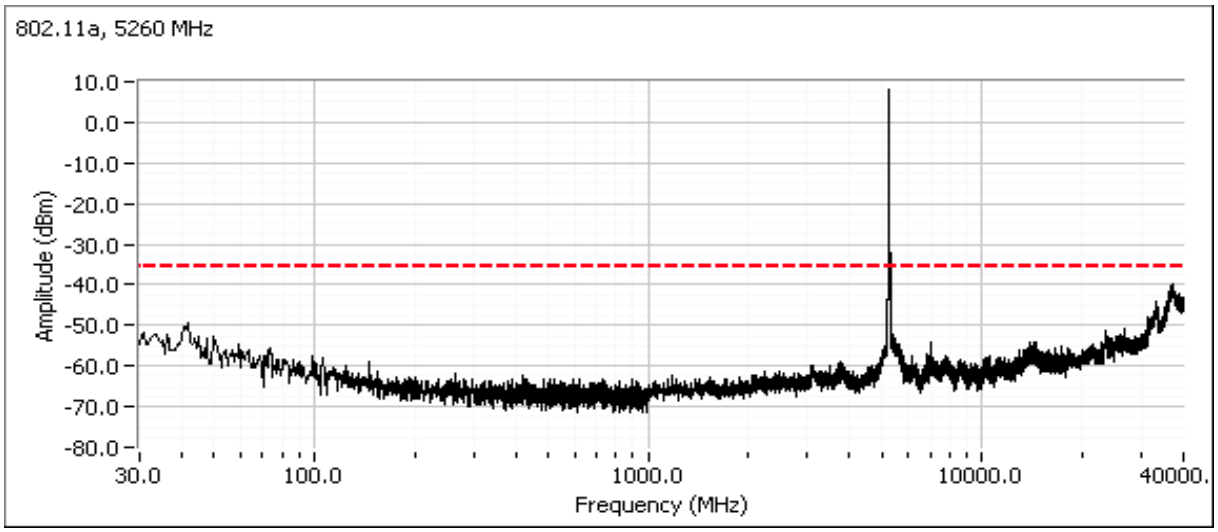
High channel, 5150 - 5250 MHz Band



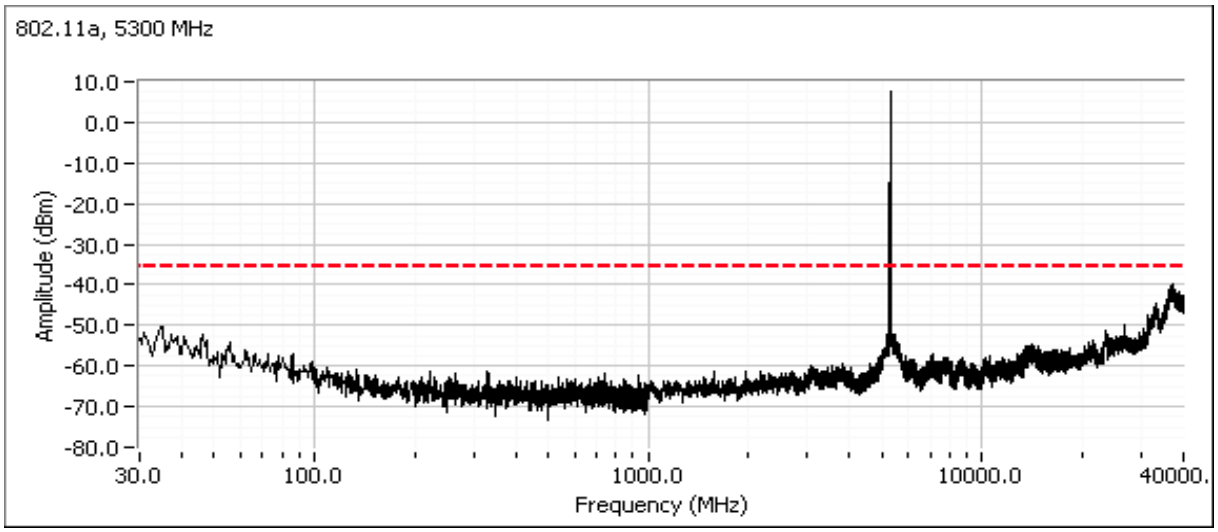
Client:	Biscotti, Inc.	Job Number:	J89805
Model:	W0001 - Module 802.11abgn 2x2	T-Log Number:	T89809
		Account Manager:	Deepa Shetty
Contact:	Nadeem Ahmed		
Standard:	FCC 15.247, 15.E	Class:	N/A

Low channel, 5250 - 5350 MHz Band

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



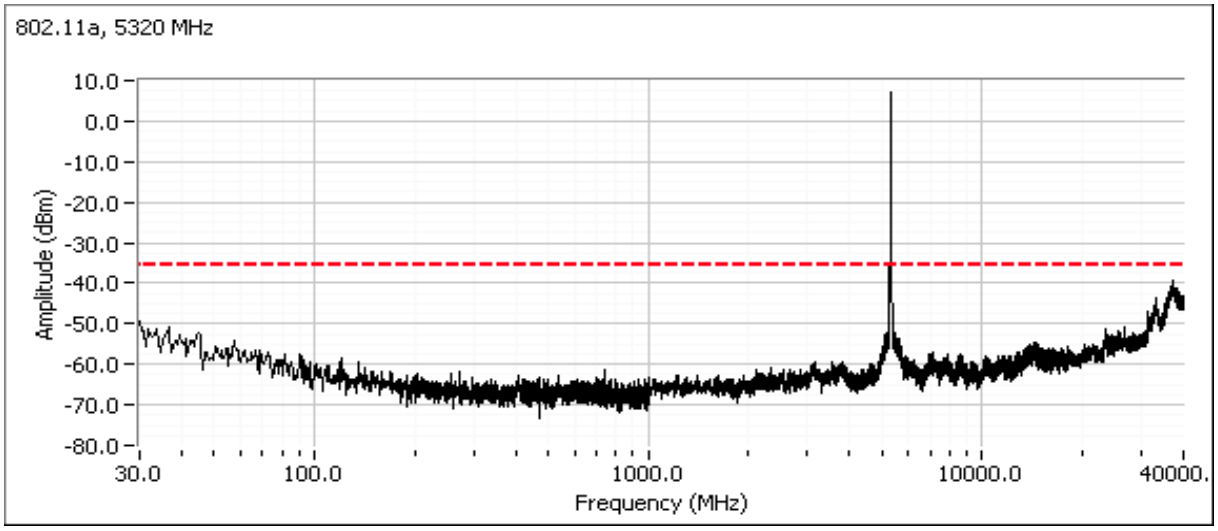
Center channel, 5250 - 5350 MHz Band



Client:	Biscotti, Inc.	Job Number:	J89805
Model:	W0001 - Module 802.11abgn 2x2	T-Log Number:	T89809
		Account Manager:	Deepa Shetty
Contact:	Nadeem Ahmed		
Standard:	FCC 15.247, 15.E	Class:	N/A

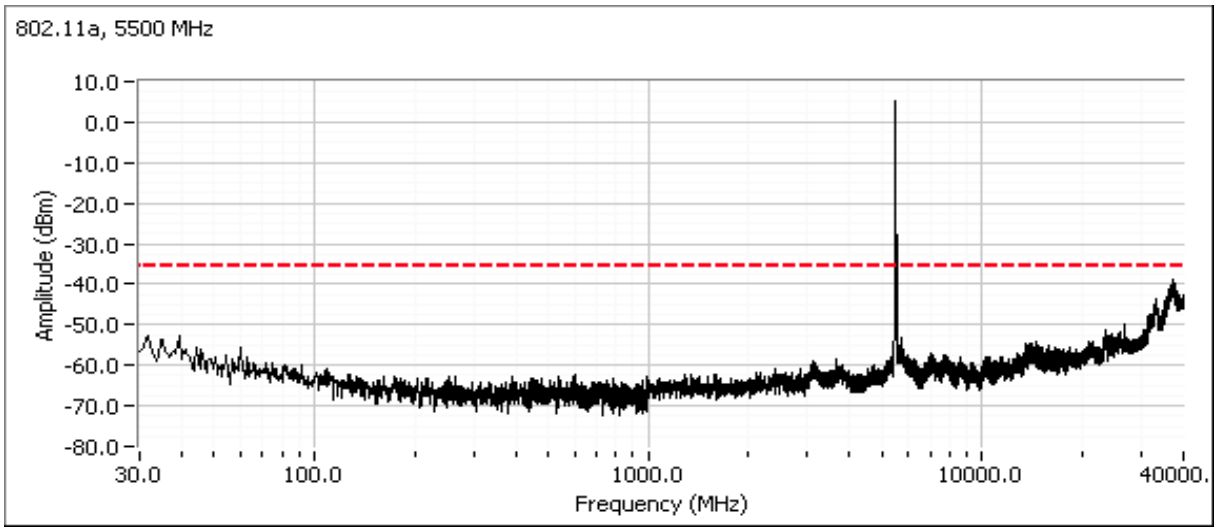
High channel, 5250 - 5350 MHz Band

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



Low channel, 5470 - 5725 MHz Band

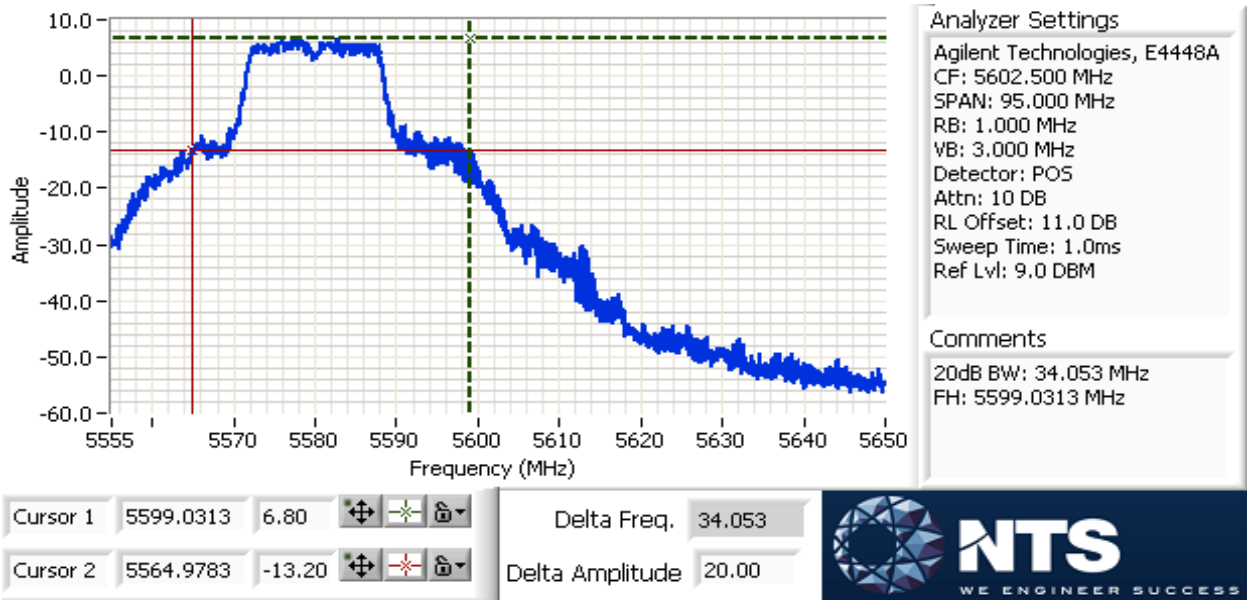
Wide-band plot, RB=VB=1MHz (Peak measurements versus limit).



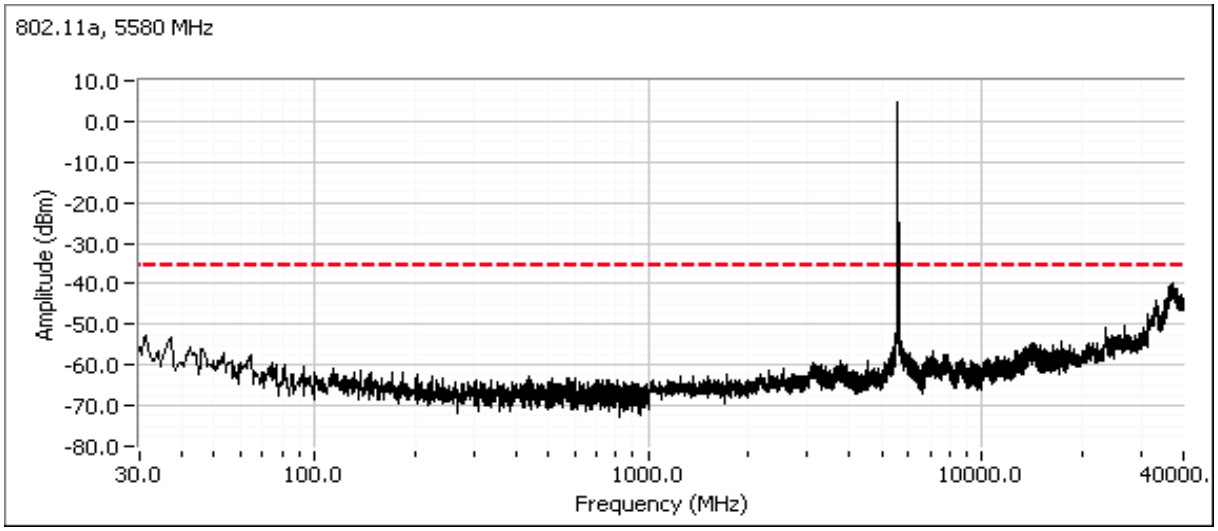
Client:	Biscotti, Inc.	Job Number:	J89805
Model:	W0001 - Module 802.11abgn 2x2	T-Log Number:	T89809
		Account Manager:	Deepa Shetty
Contact:	Nadeem Ahmed		
Standard:	FCC 15.247, 15.E	Class:	N/A

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.



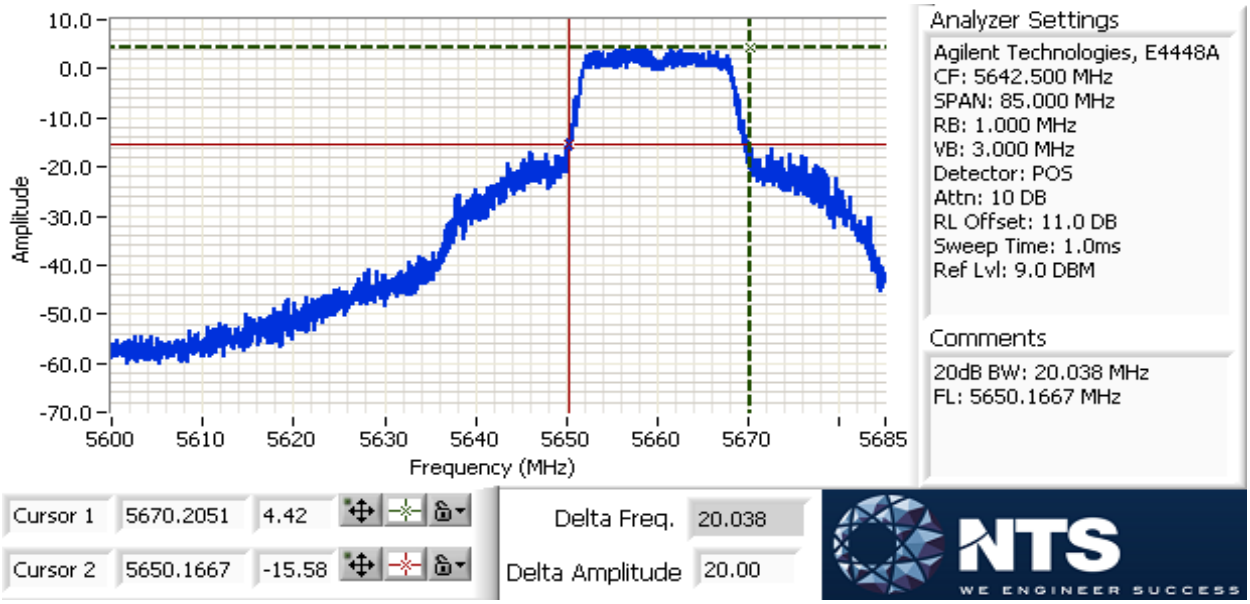
Wide-band plot, RB=VB=1MHz (Peak measurements versus limit).



Client:	Biscotti, Inc.	Job Number:	J89805
Model:	W0001 - Module 802.11abgn 2x2	T-Log Number:	T89809
		Account Manager:	Deepa Shetty
Contact:	Nadeem Ahmed		
Standard:	FCC 15.247, 15.E	Class:	N/A

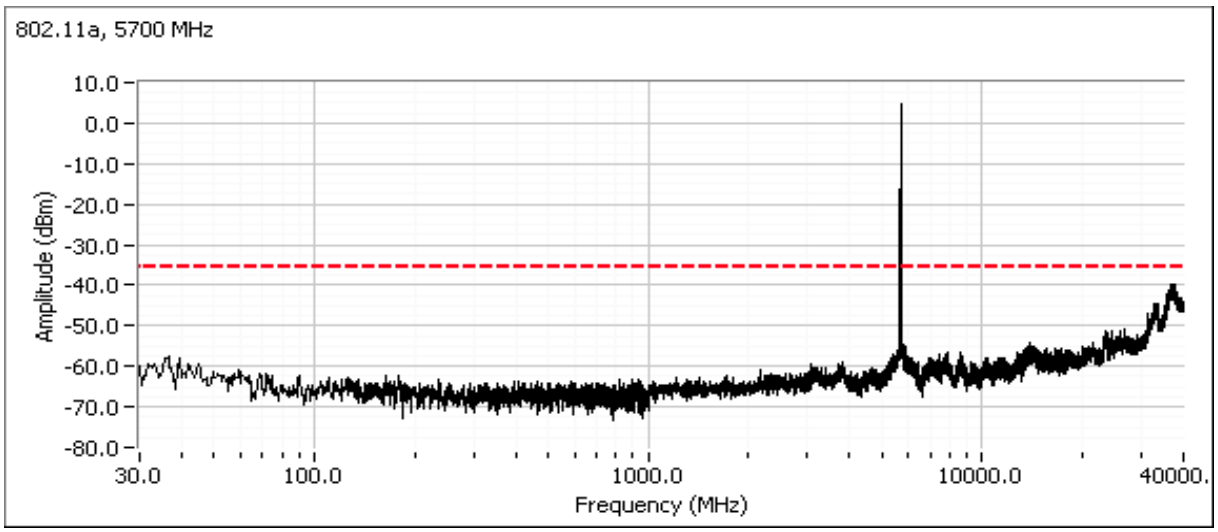
Channel adjacent to 5650 MHz (Master Device)

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.



High channel, 5470 - 5725 MHz Band

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

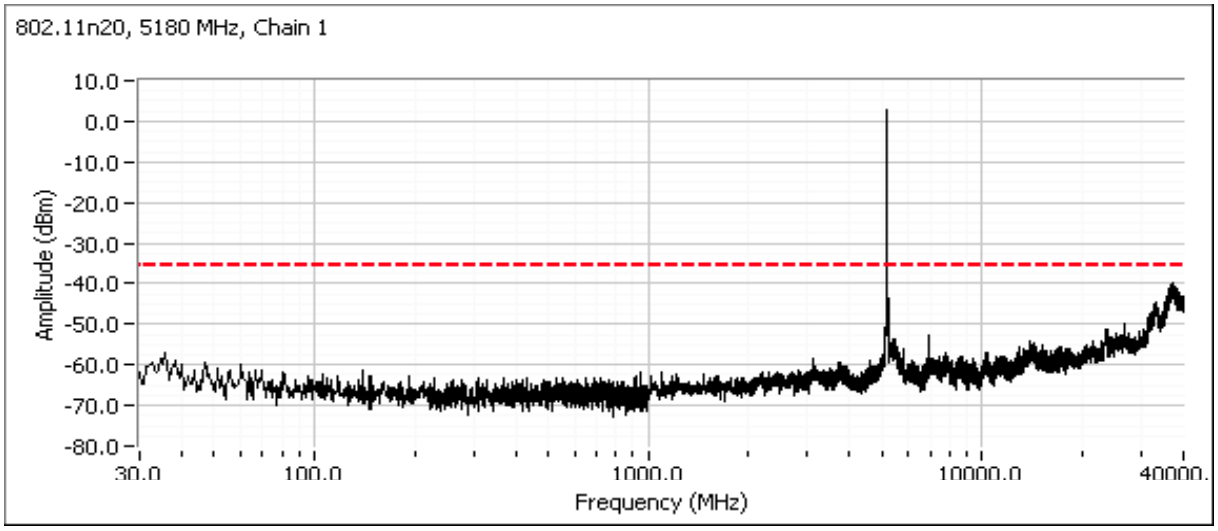


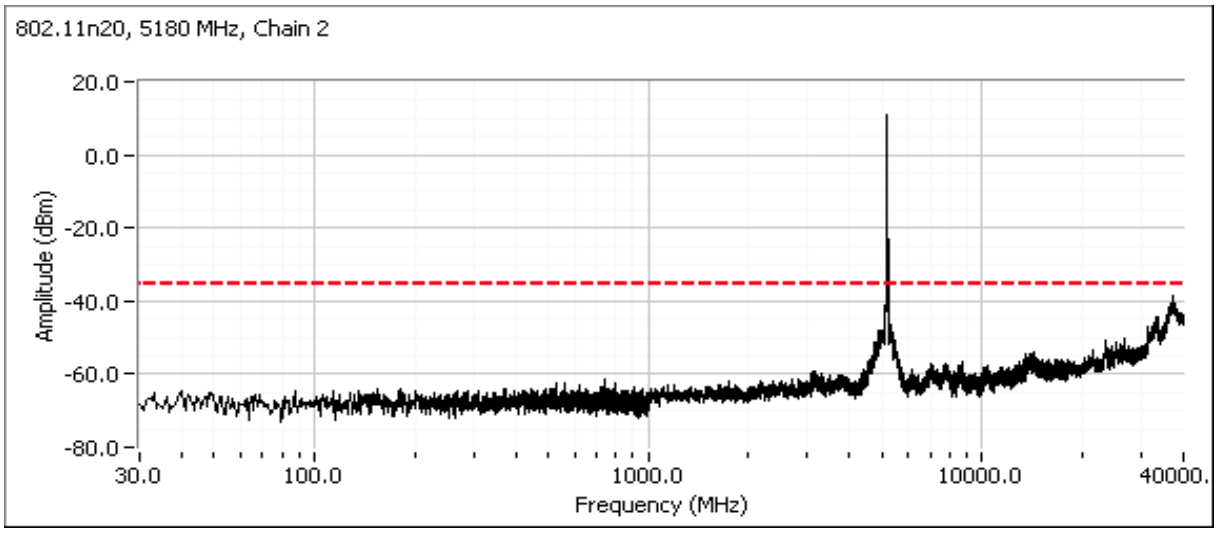
Client:	Biscotti, Inc.	Job Number:	J89805
Model:	W0001 - Module 802.11abgn 2x2	T-Log Number:	T89809
		Account Manager:	Deepa Shetty
Contact:	Nadeem Ahmed		
Standard:	FCC 15.247, 15.E	Class:	N/A

802.11n20

Low channel, 5150 - 5250 MHz Band

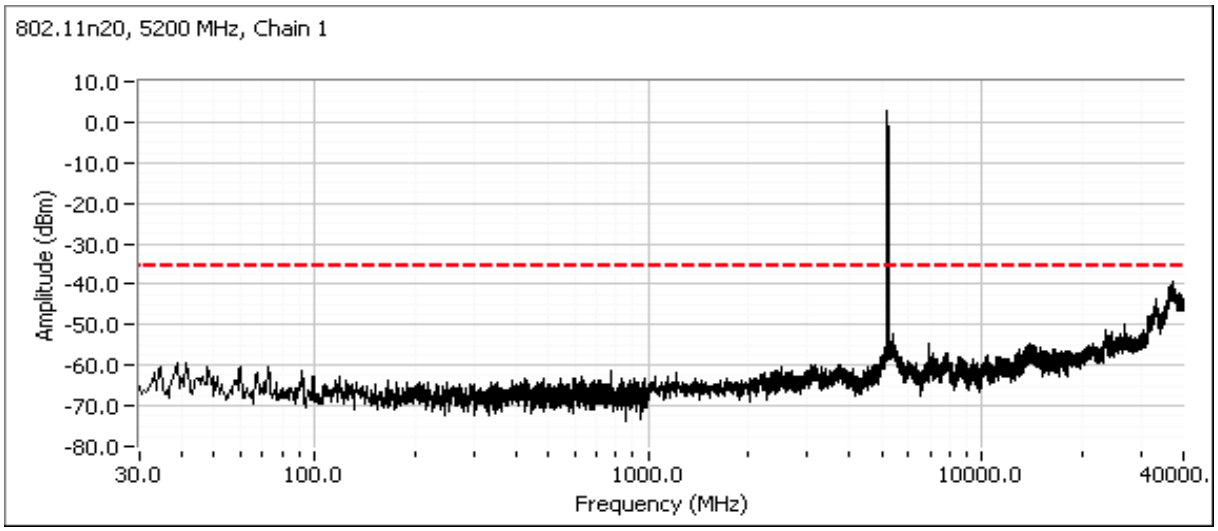
Compliance with the radiated limits for the restricted band immediately below 5150MHz is demonstrated through the radiated emissions tests.

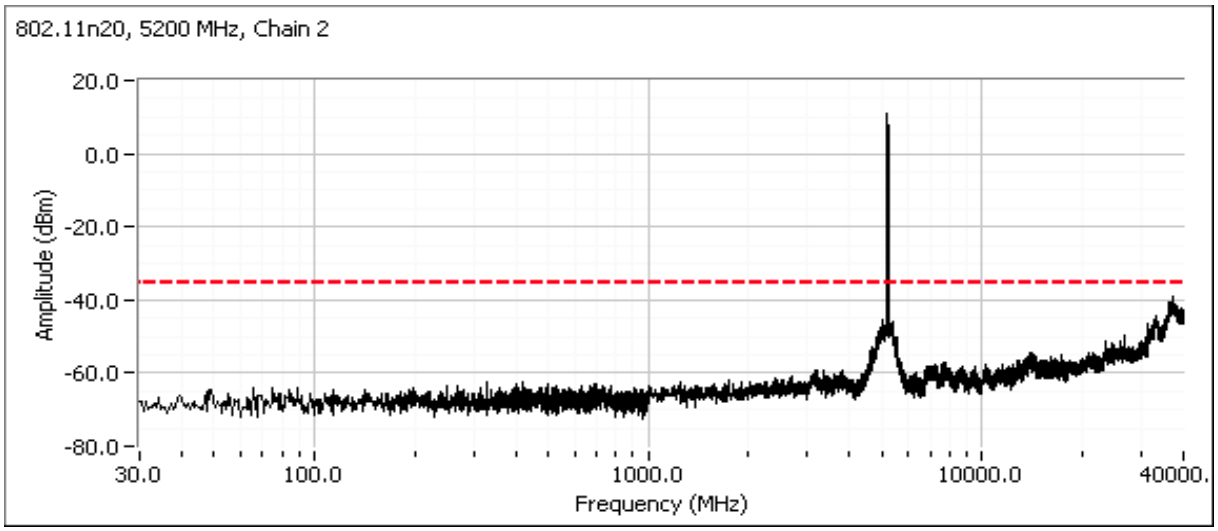




Client:	Biscotti, Inc.	Job Number:	J89805
Model:	W0001 - Module 802.11abgn 2x2	T-Log Number:	T89809
		Account Manager:	Deepa Shetty
Contact:	Nadeem Ahmed		
Standard:	FCC 15.247, 15.E	Class:	N/A

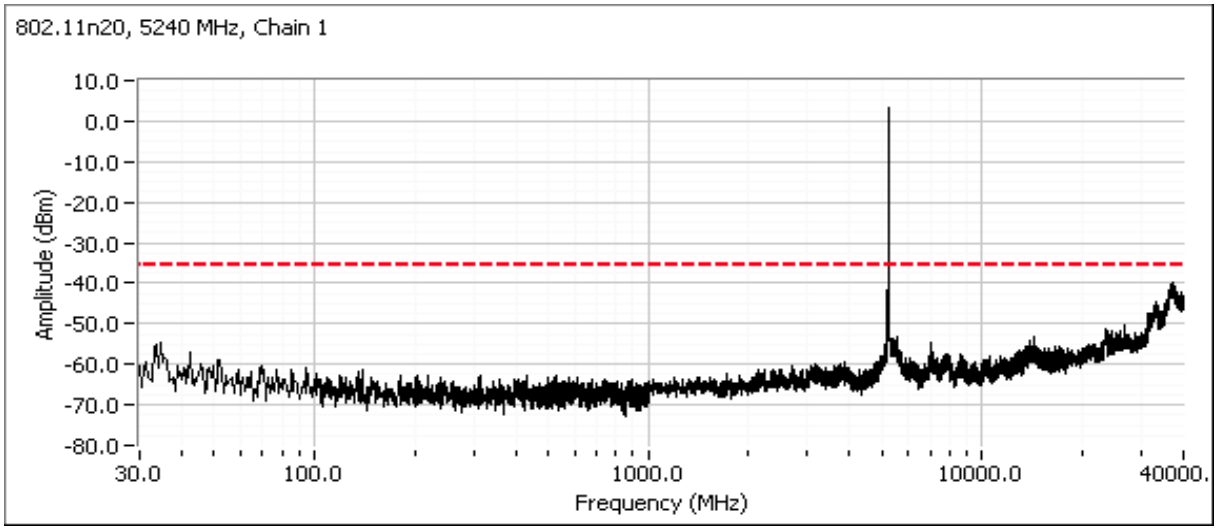
Center channel, 5150 - 5250 MHz Band

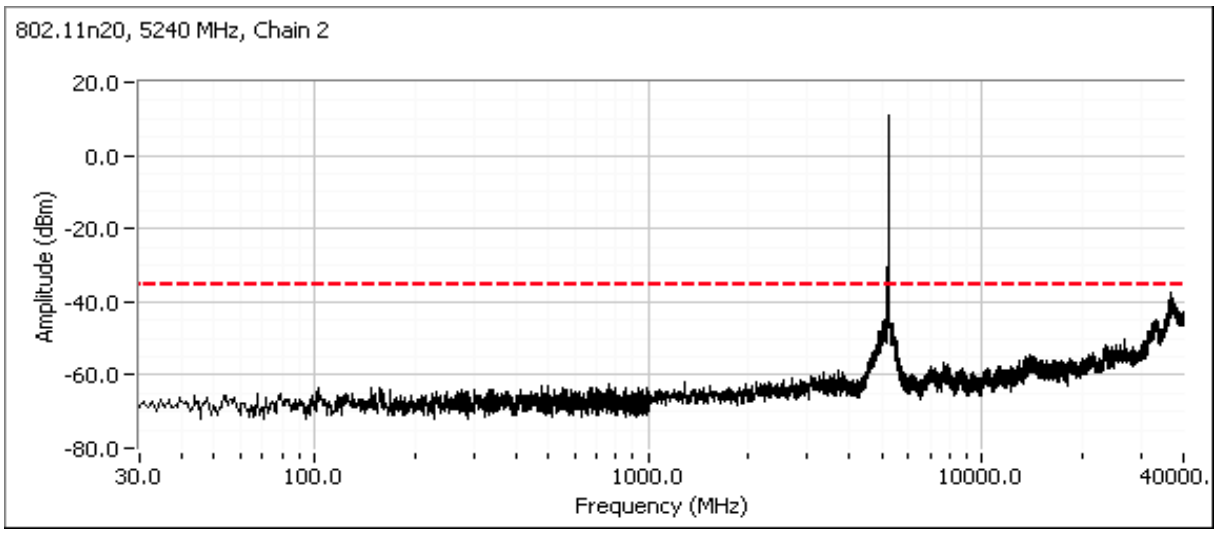




Client:	Biscotti, Inc.	Job Number:	J89805
Model:	W0001 - Module 802.11abgn 2x2	T-Log Number:	T89809
		Account Manager:	Deepa Shetty
Contact:	Nadeem Ahmed		
Standard:	FCC 15.247, 15.E	Class:	N/A

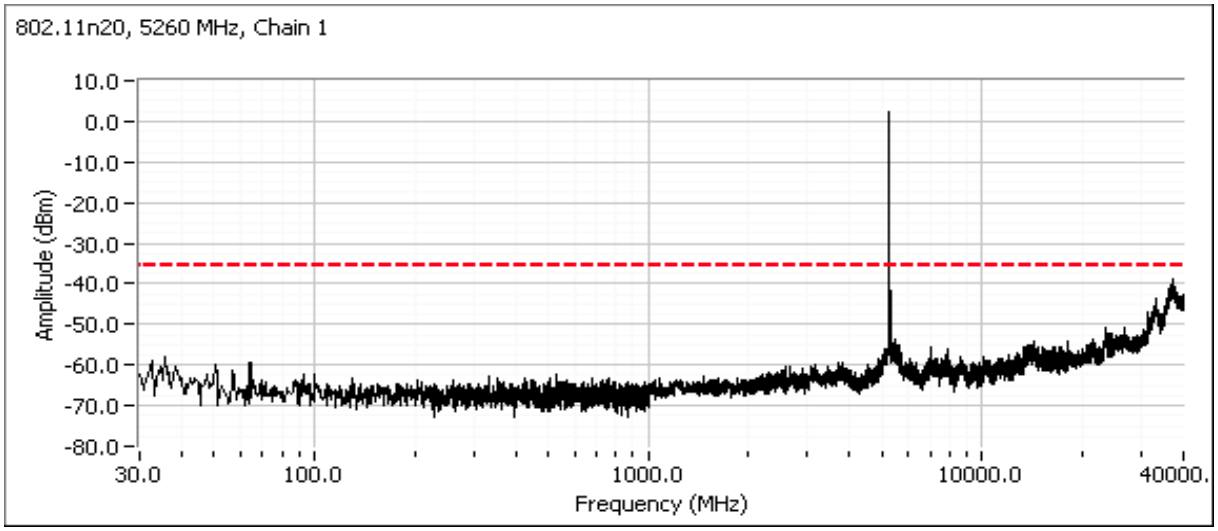
High channel, 5150 - 5250 MHz Band

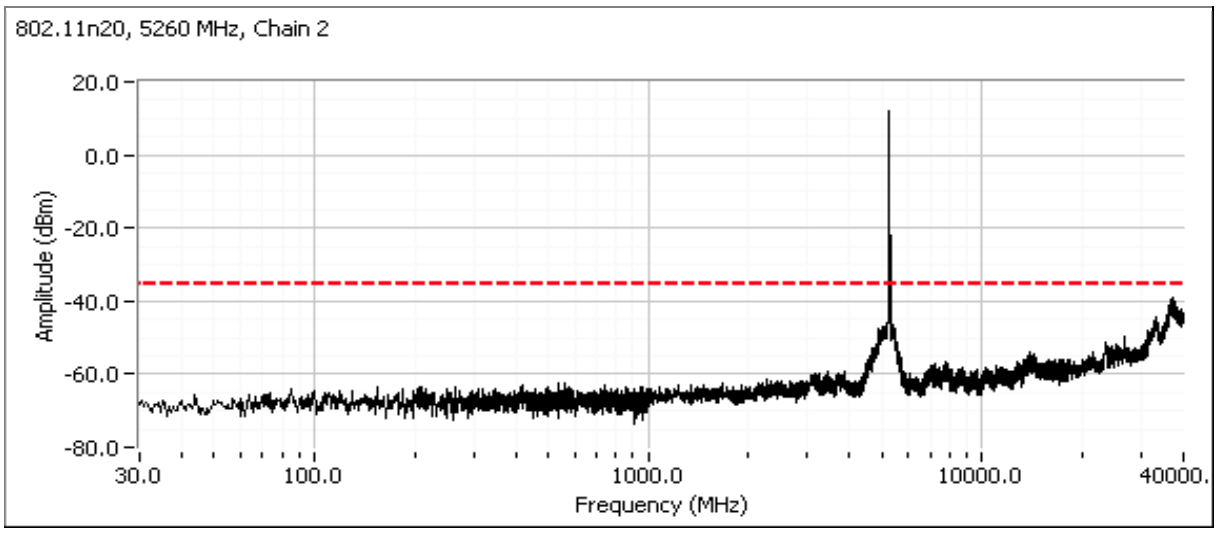




Client:	Biscotti, Inc.	Job Number:	J89805
Model:	W0001 - Module 802.11abgn 2x2	T-Log Number:	T89809
		Account Manager:	Deepa Shetty
Contact:	Nadeem Ahmed		
Standard:	FCC 15.247, 15.E	Class:	N/A

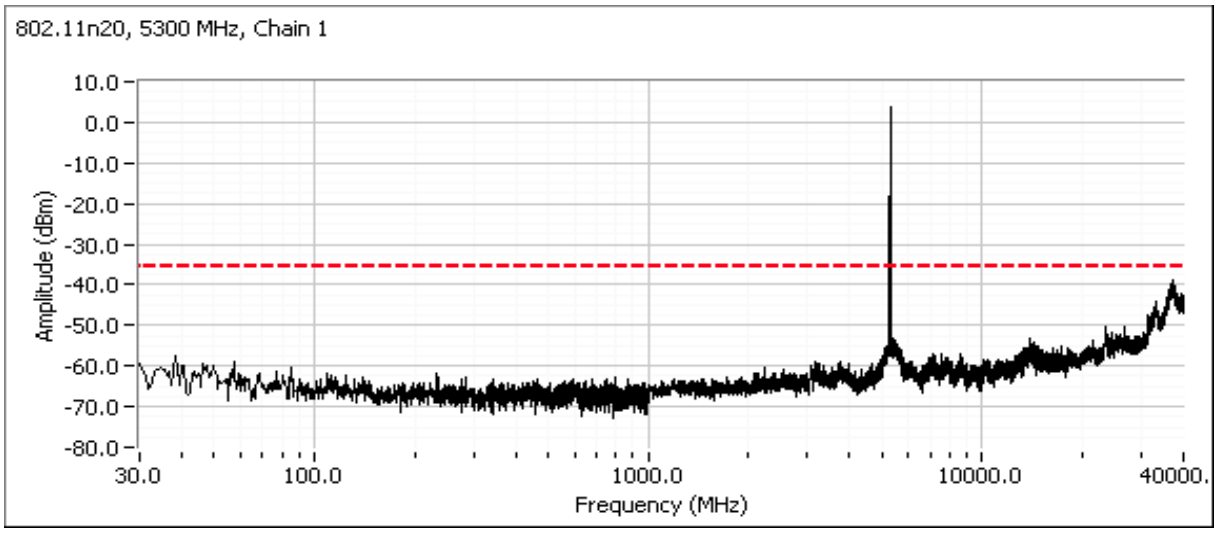
Low channel, 5250 - 5350 MHz Band
Wide-band plot, RB=VB=1MHz (Peak measurements versus limit).

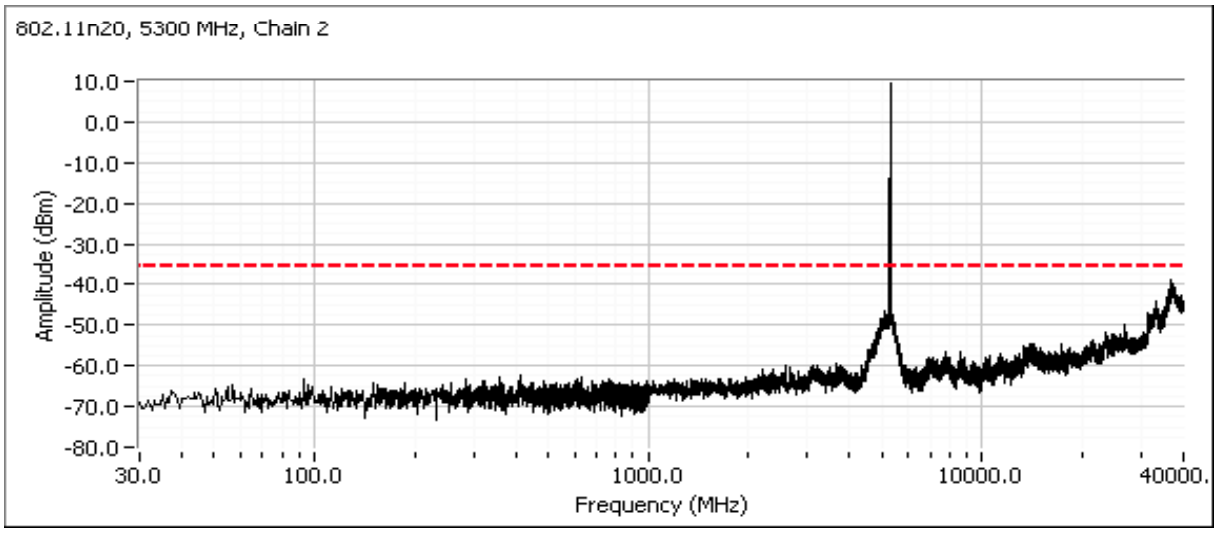




Client:	Biscotti, Inc.	Job Number:	J89805
Model:	W0001 - Module 802.11abgn 2x2	T-Log Number:	T89809
		Account Manager:	Deepa Shetty
Contact:	Nadeem Ahmed		
Standard:	FCC 15.247, 15.E	Class:	N/A

Center channel, 5250 - 5350 MHz Band

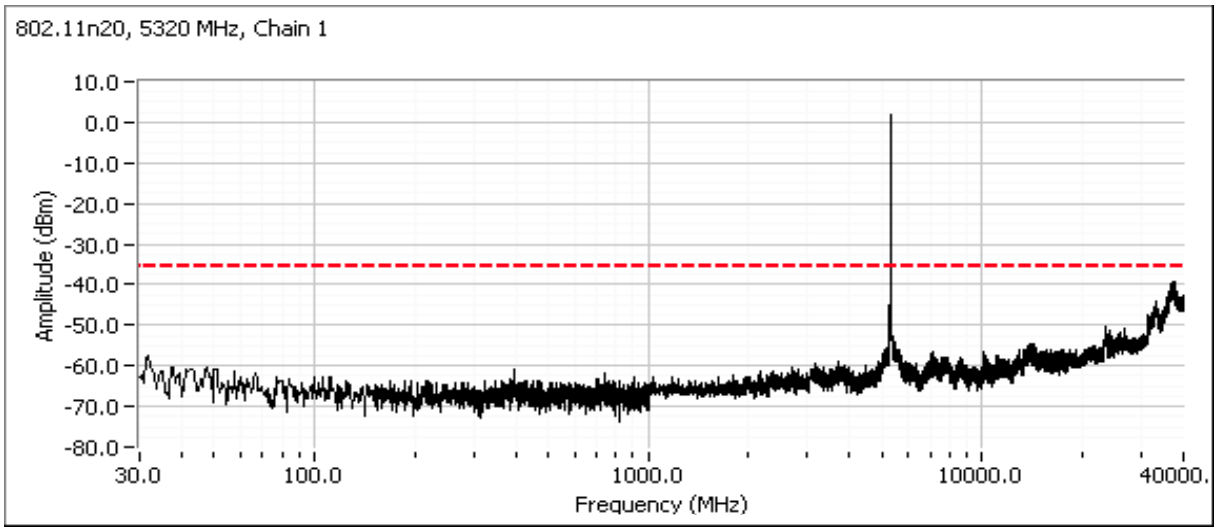


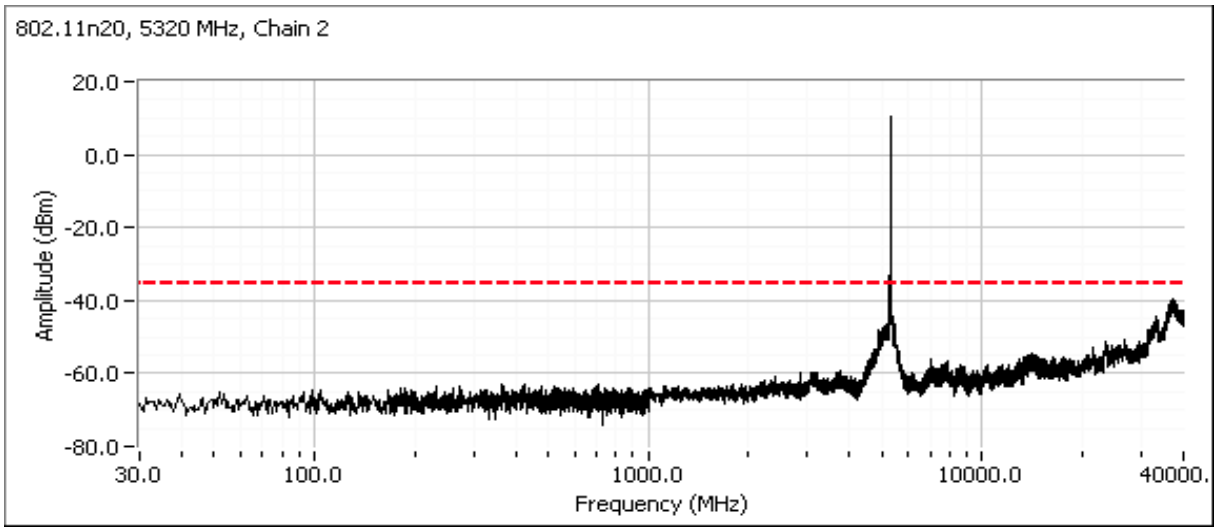


Client:	Biscotti, Inc.	Job Number:	J89805
Model:	W0001 - Module 802.11abgn 2x2	T-Log Number:	T89809
		Account Manager:	Deepa Shetty
Contact:	Nadeem Ahmed		
Standard:	FCC 15.247, 15.E	Class:	N/A

High channel, 5250 - 5350 MHz Band

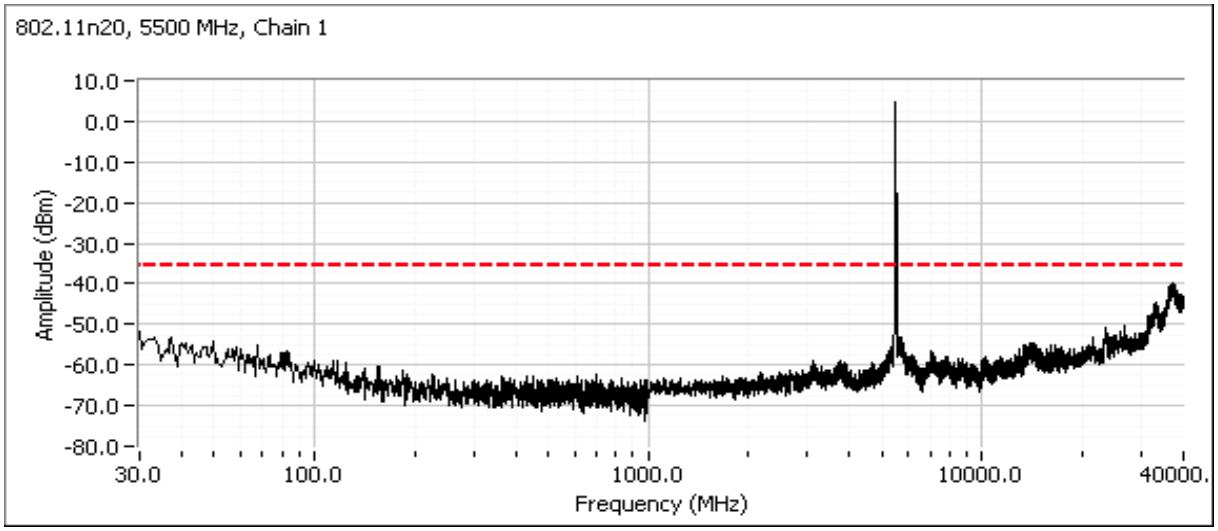
Note - compliance with the radiated limits for the restricted band immediately above 5350MHz is demonstrated through the radiated emissions tests.

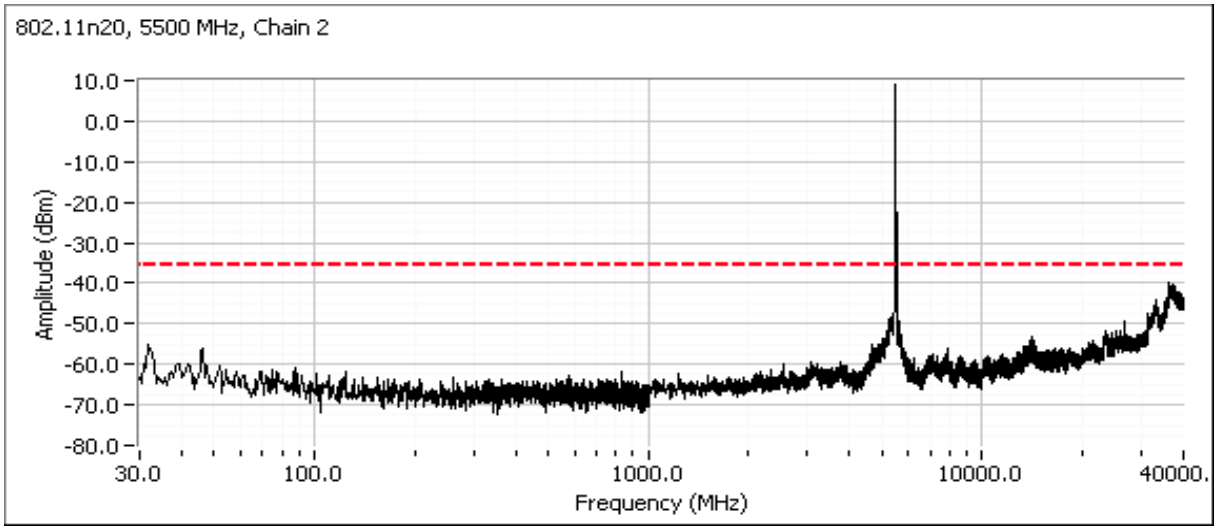




Client:	Biscotti, Inc.	Job Number:	J89805
Model:	W0001 - Module 802.11abgn 2x2	T-Log Number:	T89809
		Account Manager:	Deepa Shetty
Contact:	Nadeem Ahmed		
Standard:	FCC 15.247, 15.E	Class:	N/A

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

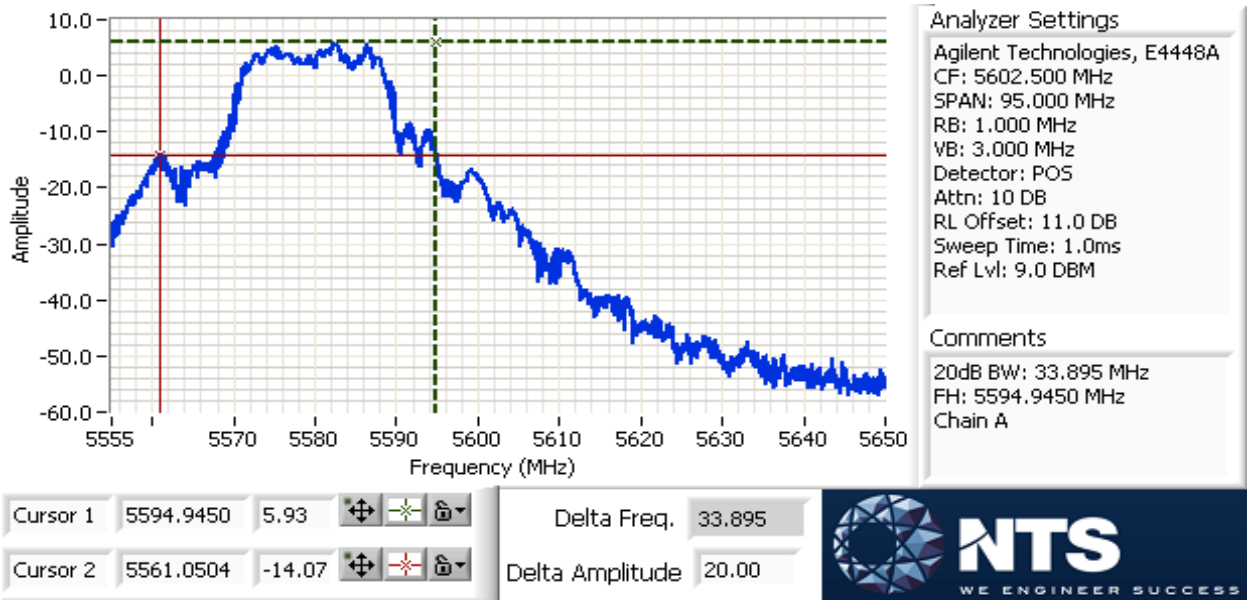


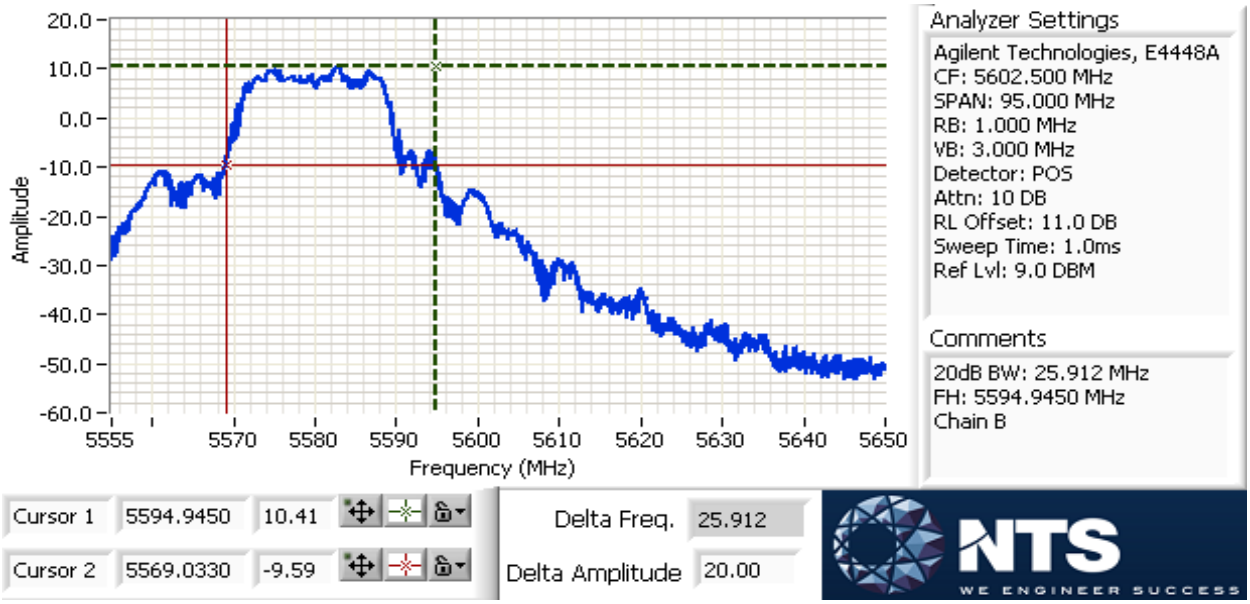


Client:	Biscotti, Inc.	Job Number:	J89805
Model:	W0001 - Module 802.11abgn 2x2	T-Log Number:	T89809
		Account Manager:	Deepa Shetty
Contact:	Nadeem Ahmed		
Standard:	FCC 15.247, 15.E	Class:	N/A

Center channel, 5470 - 5725 MHz Band

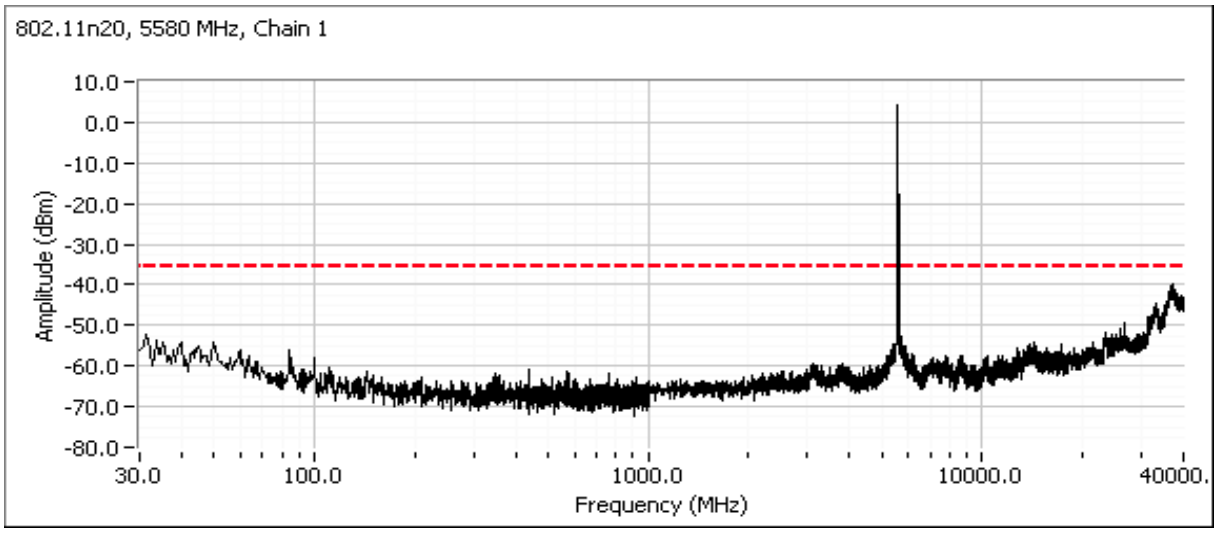
For master devices - This plot is showing hat the 20dB bandwidth of the channel closest to 5600 MHz does not spill into the 5600-5650 MHz band. RB > 1% of span.

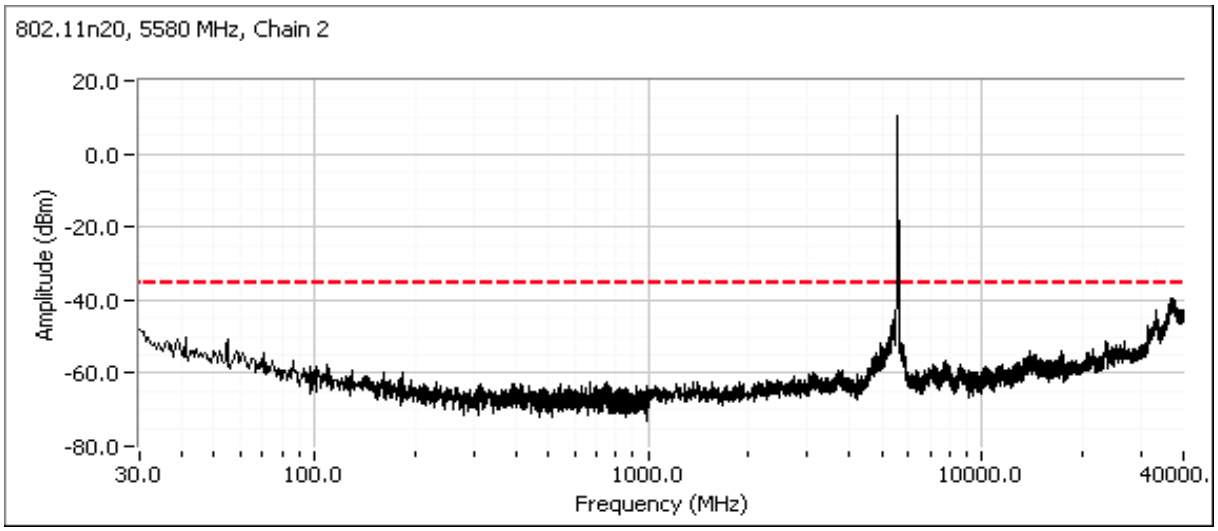




Client:	Biscotti, Inc.	Job Number:	J89805
Model:	W0001 - Module 802.11abgn 2x2	T-Log Number:	T89809
		Account Manager:	Deepa Shetty
Contact:	Nadeem Ahmed		
Standard:	FCC 15.247, 15.E	Class:	N/A

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

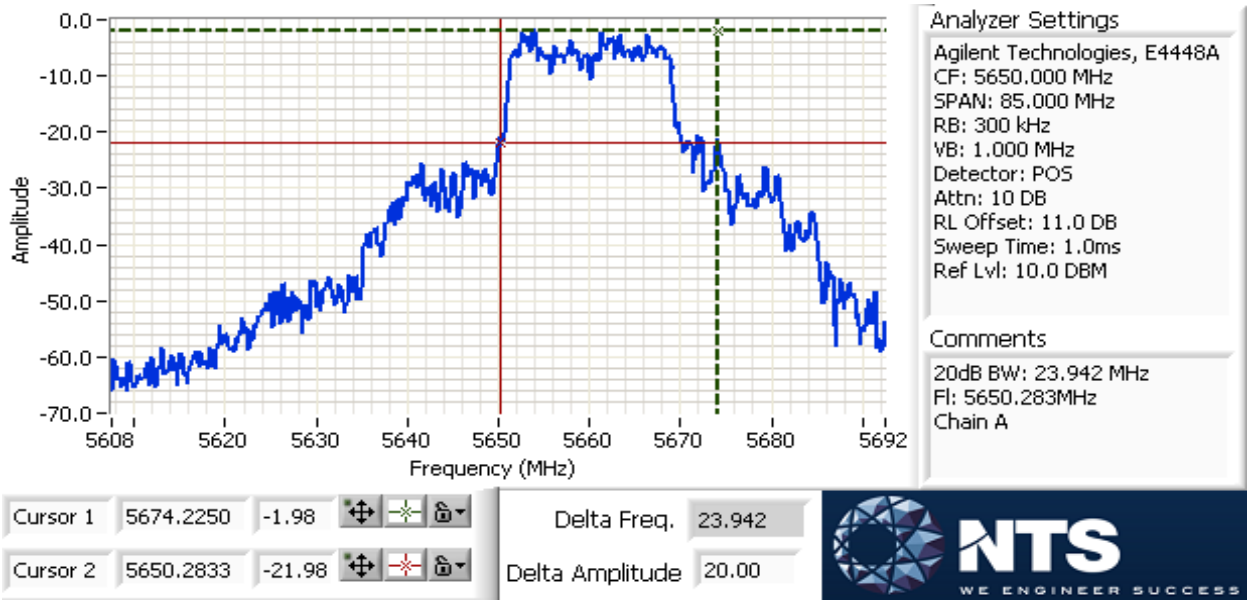


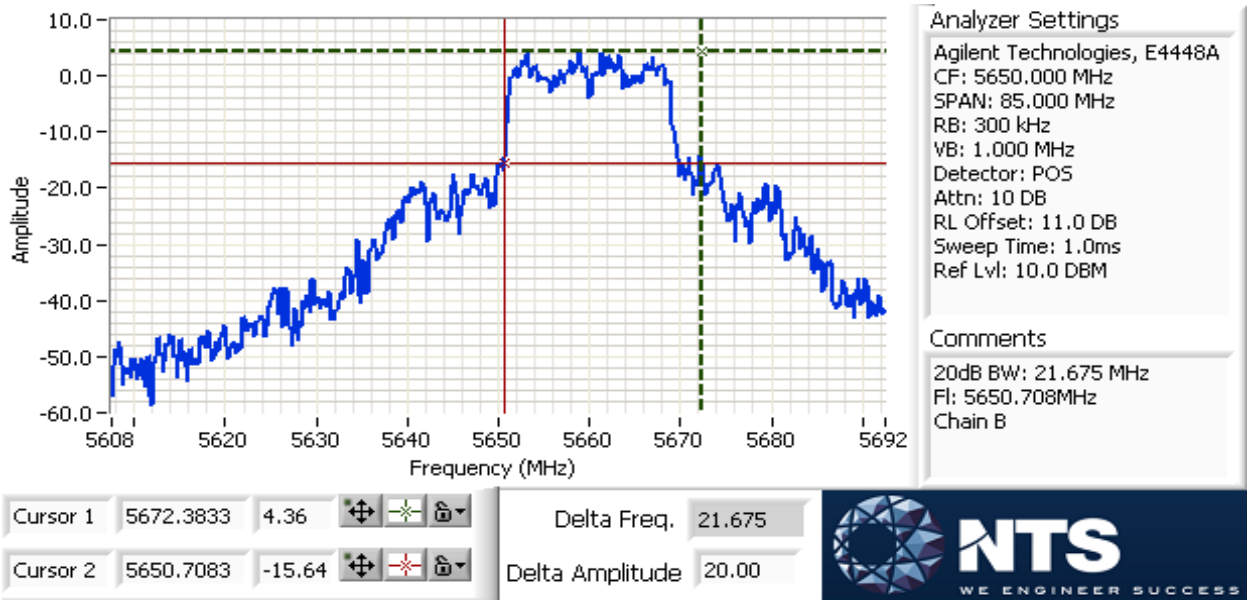


Client:	Biscotti, Inc.	Job Number:	J89805
Model:	W0001 - Module 802.11abgn 2x2	T-Log Number:	T89809
		Account Manager:	Deepa Shetty
Contact:	Nadeem Ahmed		
Standard:	FCC 15.247, 15.E	Class:	N/A

Channel adjacent to 5650 MHz (Master Device)

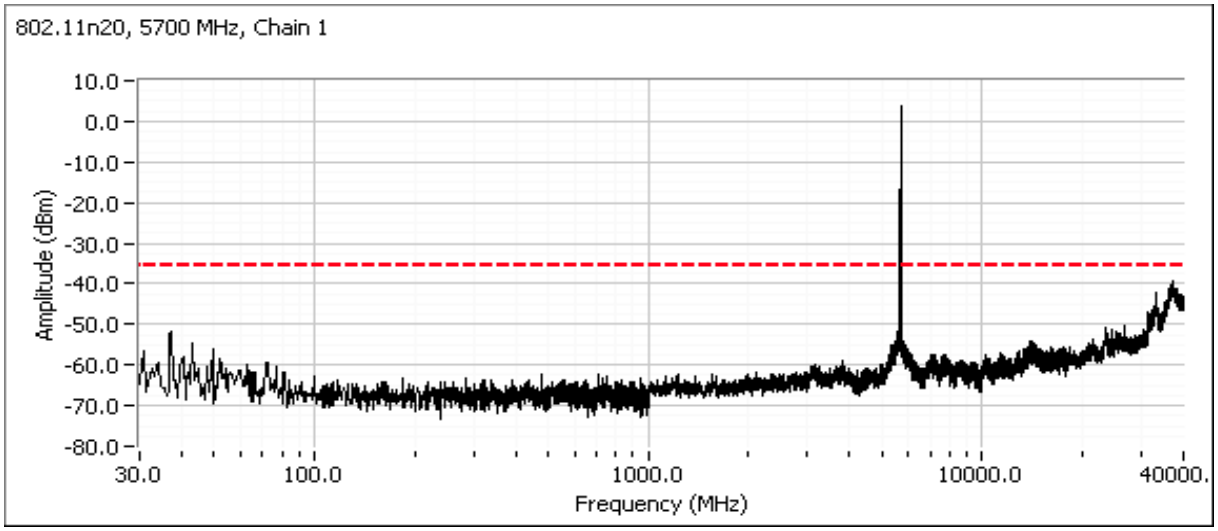
Plots showing that the 20dB bandwidth of the channel closest to 5650 MHz does not spill into the 5600-5650 MHz band. RB > 1% of span.

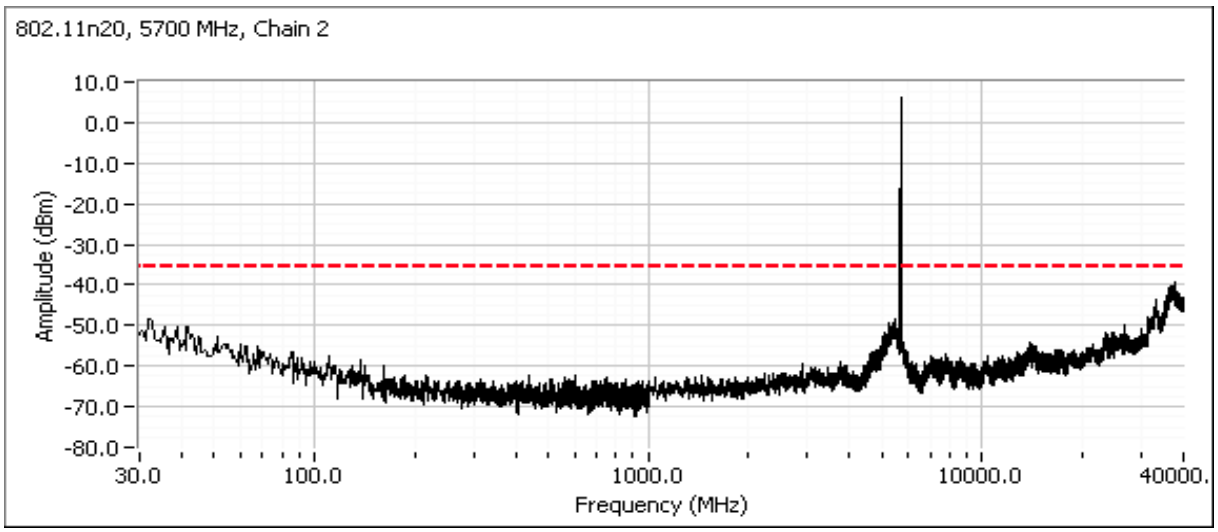




Client:	Biscotti, Inc.	Job Number:	J89805
Model:	W0001 - Module 802.11abgn 2x2	T-Log Number:	T89809
		Account Manager:	Deepa Shetty
Contact:	Nadeem Ahmed		
Standard:	FCC 15.247, 15.E	Class:	N/A

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



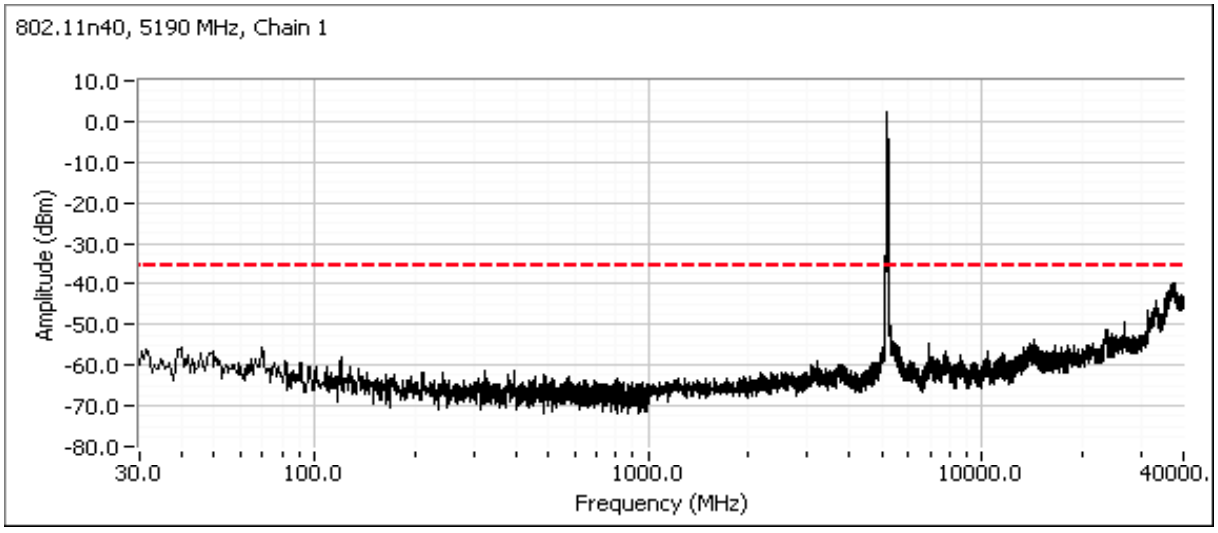


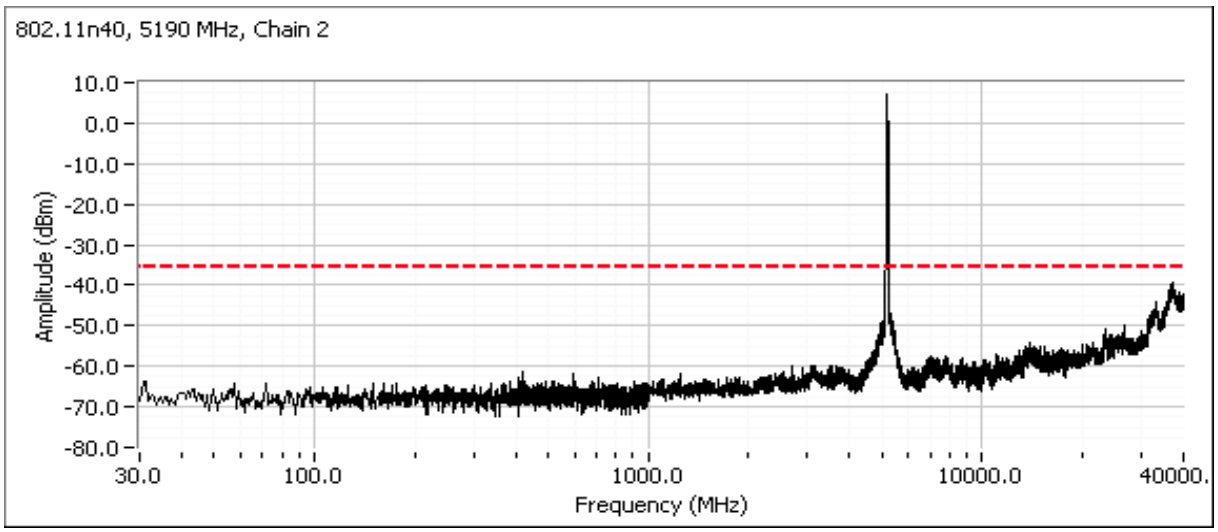
Client:	Biscotti, Inc.	Job Number:	J89805
Model:	W0001 - Module 802.11abgn 2x2	T-Log Number:	T89809
		Account Manager:	Deepa Shetty
Contact:	Nadeem Ahmed		
Standard:	FCC 15.247, 15.E	Class:	N/A

802.11n40

Low channel, 5150 - 5250 MHz Band

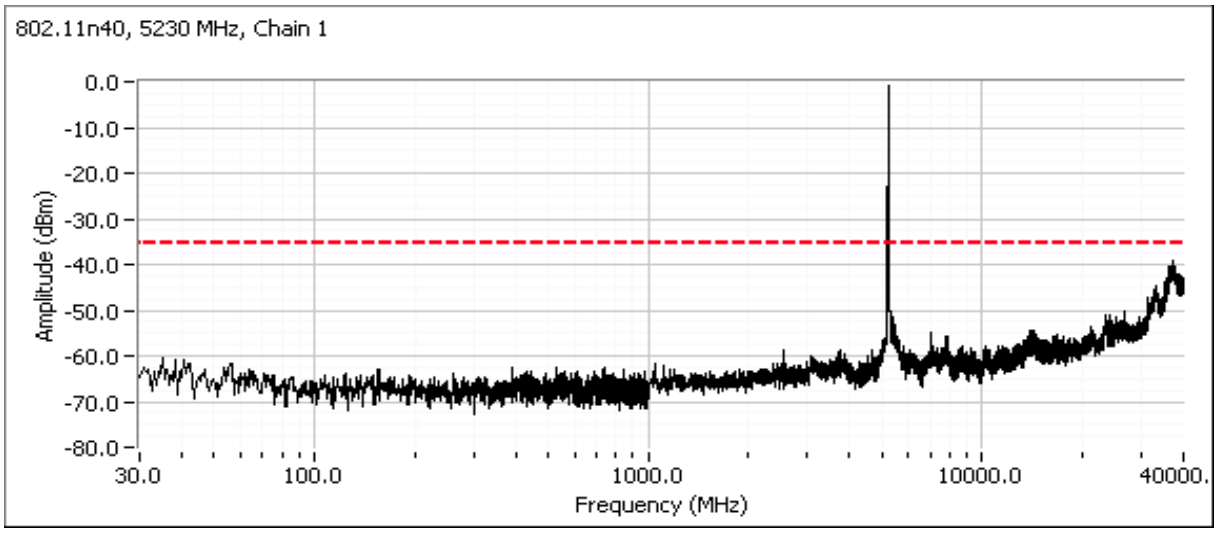
Compliance with the radiated limits for the restricted band immediately below 5150MHz is demonstrated through the radiated emissions tests.

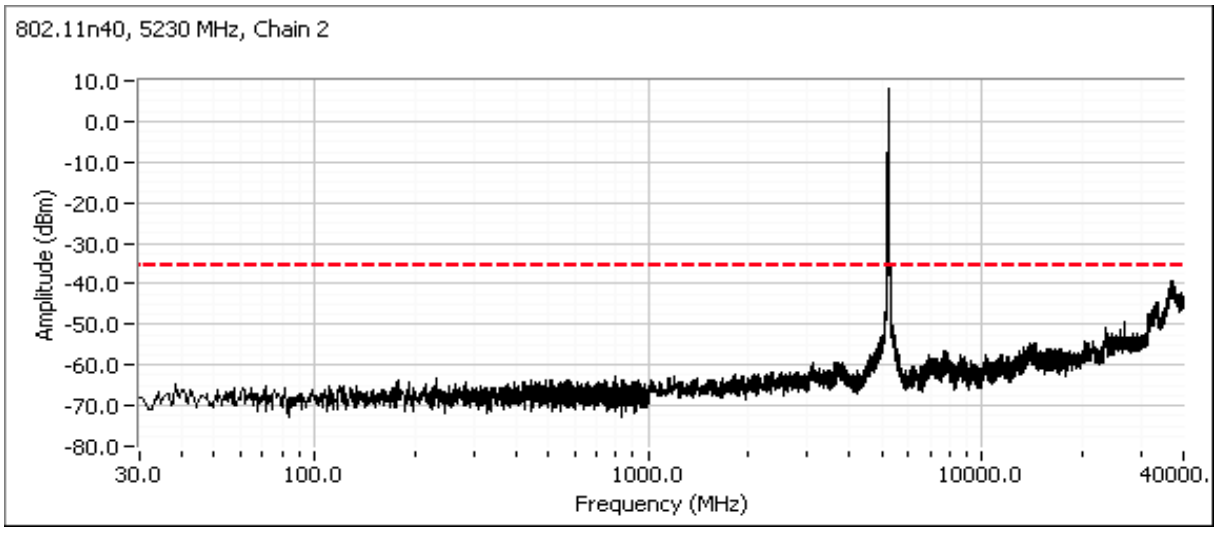




Client:	Biscotti, Inc.	Job Number:	J89805
Model:	W0001 - Module 802.11abgn 2x2	T-Log Number:	T89809
		Account Manager:	Deepa Shetty
Contact:	Nadeem Ahmed		
Standard:	FCC 15.247, 15.E	Class:	N/A

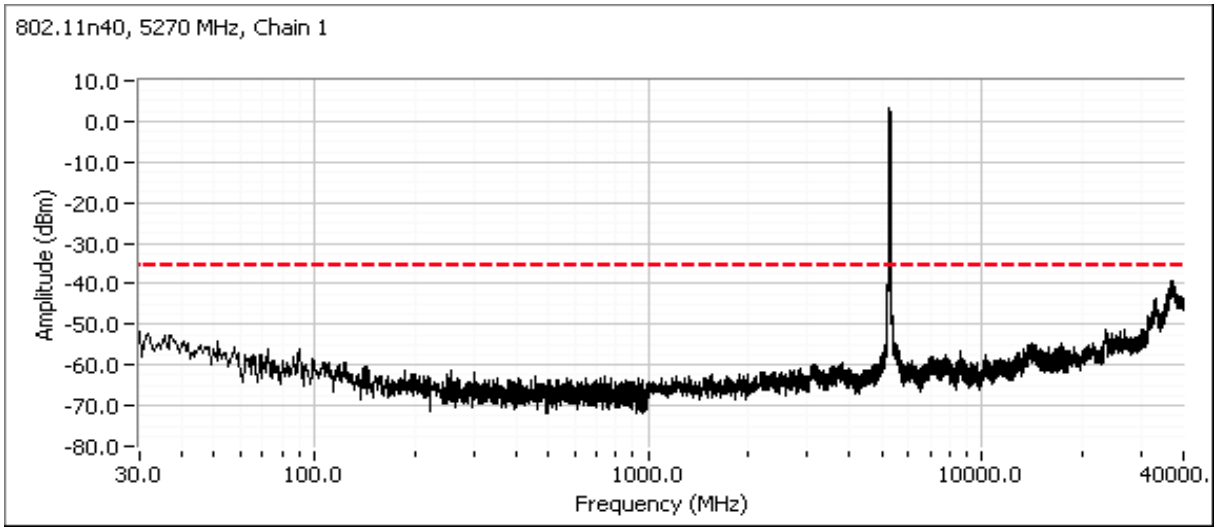
High channel, 5150 - 5250 MHz Band

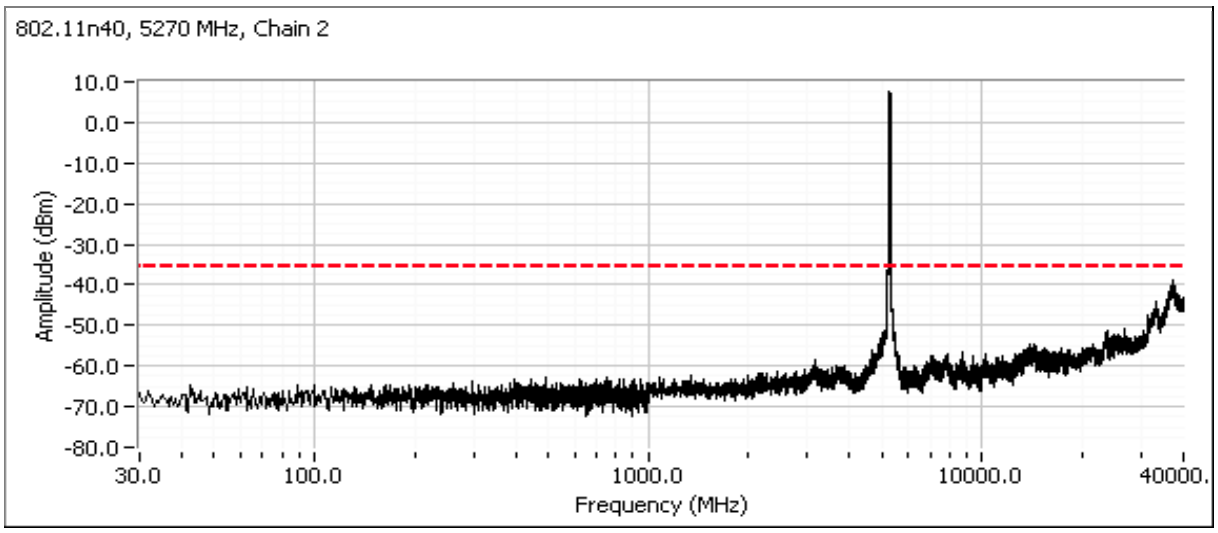




Client:	Biscotti, Inc.	Job Number:	J89805
Model:	W0001 - Module 802.11abgn 2x2	T-Log Number:	T89809
		Account Manager:	Deepa Shetty
Contact:	Nadeem Ahmed		
Standard:	FCC 15.247, 15.E	Class:	N/A

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

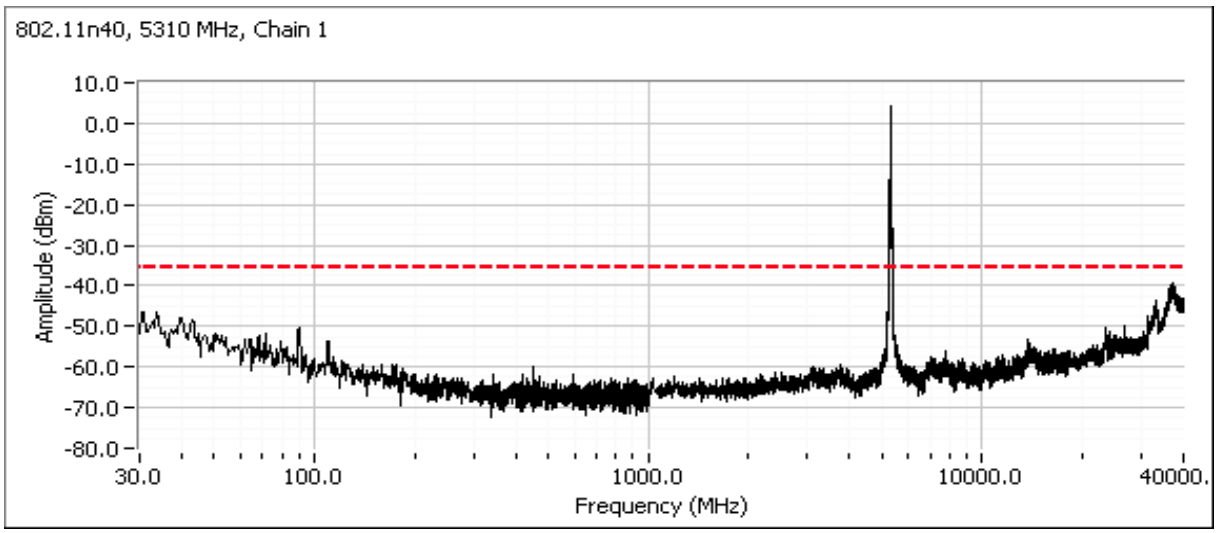


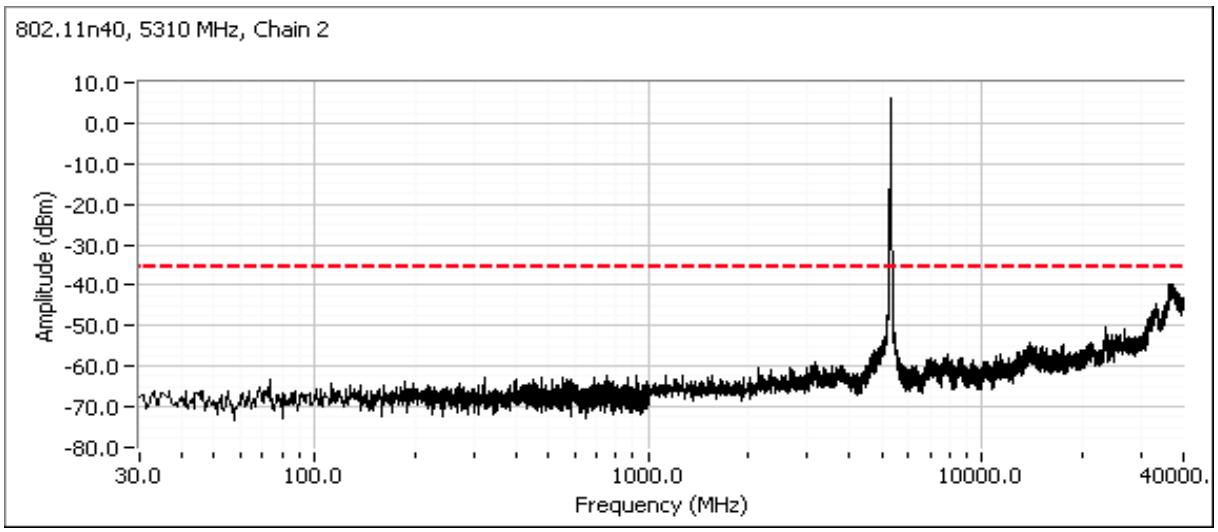


Client:	Biscotti, Inc.	Job Number:	J89805
Model:	W0001 - Module 802.11abgn 2x2	T-Log Number:	T89809
		Account Manager:	Deepa Shetty
Contact:	Nadeem Ahmed		
Standard:	FCC 15.247, 15.E	Class:	N/A

High channel, 5250 - 5350 MHz Band

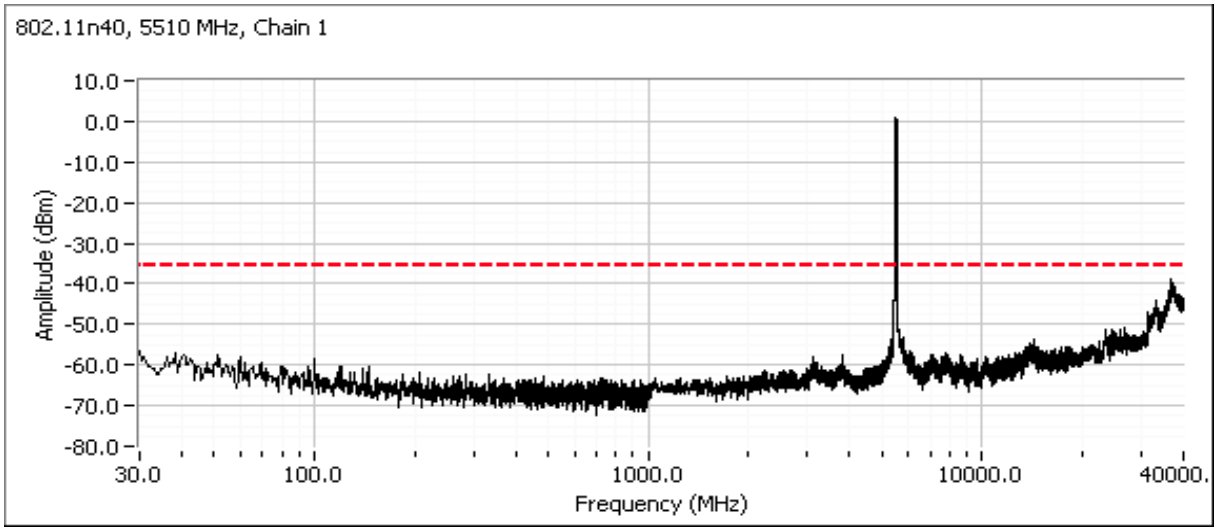
Note - compliance with the radiated limits for the restricted band immediately above 5350MHz is demonstrated through the radiated emissions tests.

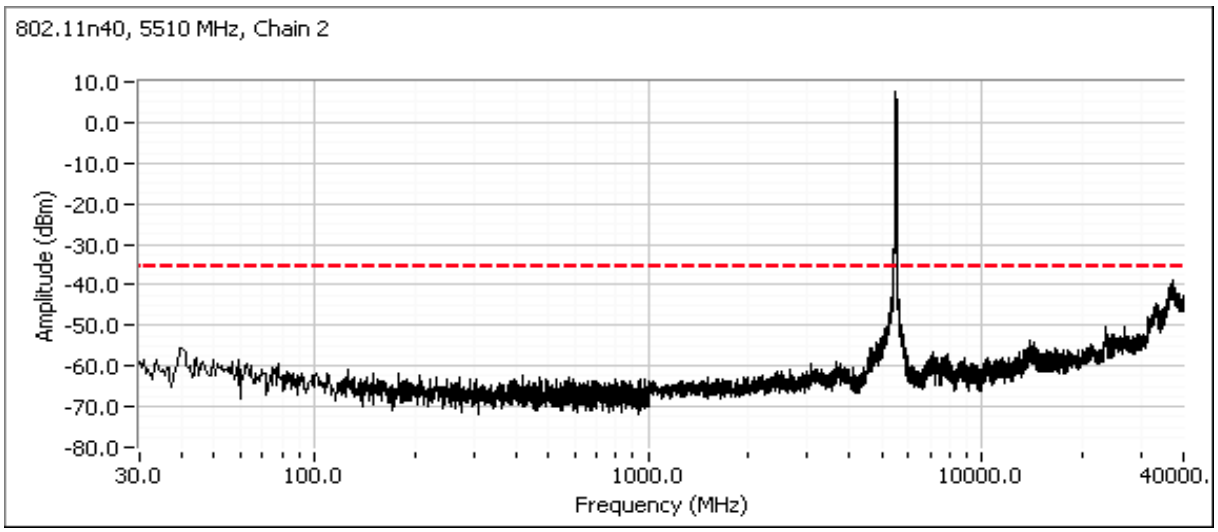




Client:	Biscotti, Inc.	Job Number:	J89805
Model:	W0001 - Module 802.11abgn 2x2	T-Log Number:	T89809
		Account Manager:	Deepa Shetty
Contact:	Nadeem Ahmed		
Standard:	FCC 15.247, 15.E	Class:	N/A

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

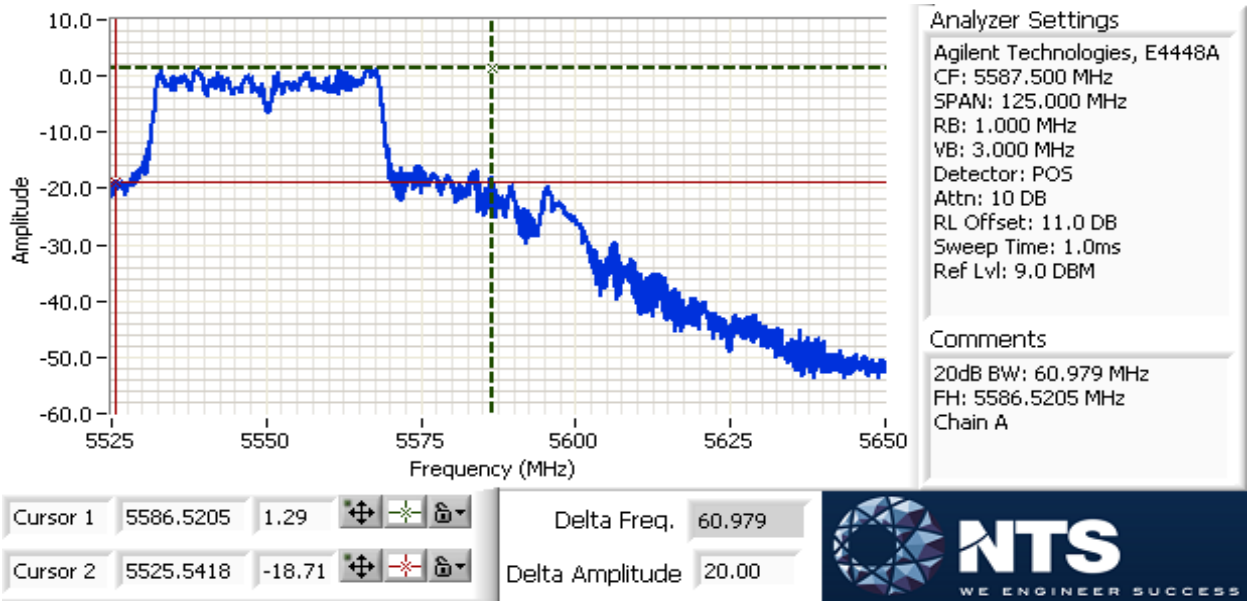


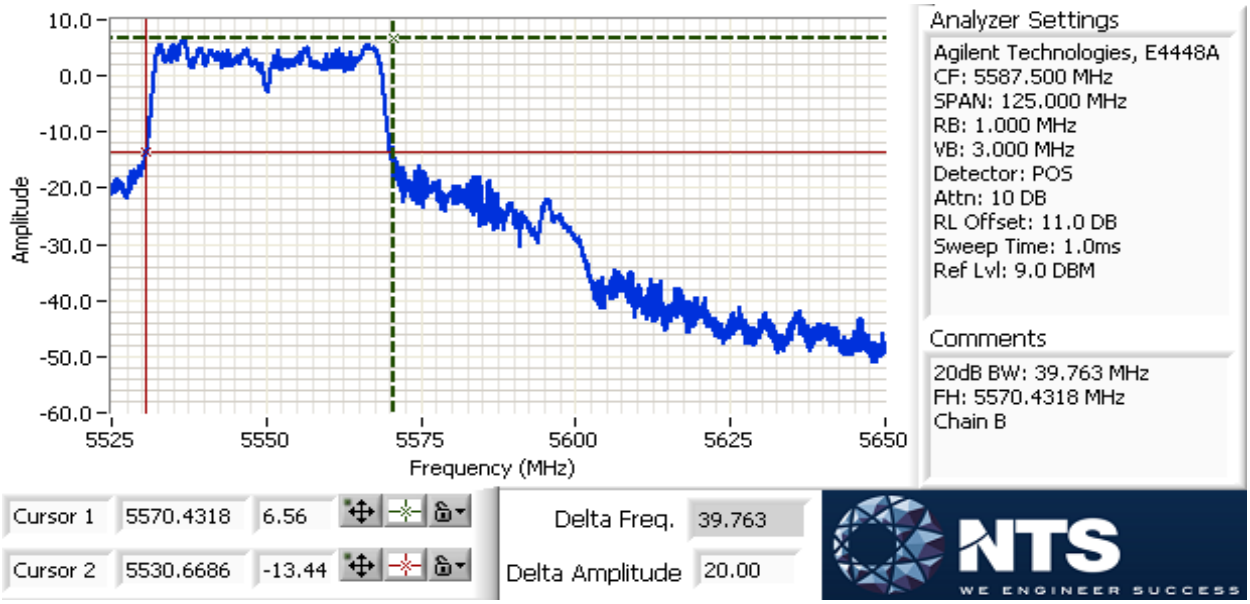


Client:	Biscotti, Inc.	Job Number:	J89805
Model:	W0001 - Module 802.11abgn 2x2	T-Log Number:	T89809
		Account Manager:	Deepa Shetty
Contact:	Nadeem Ahmed		
Standard:	FCC 15.247, 15.E	Class:	N/A

Center channel, 5470 - 5725 MHz Band

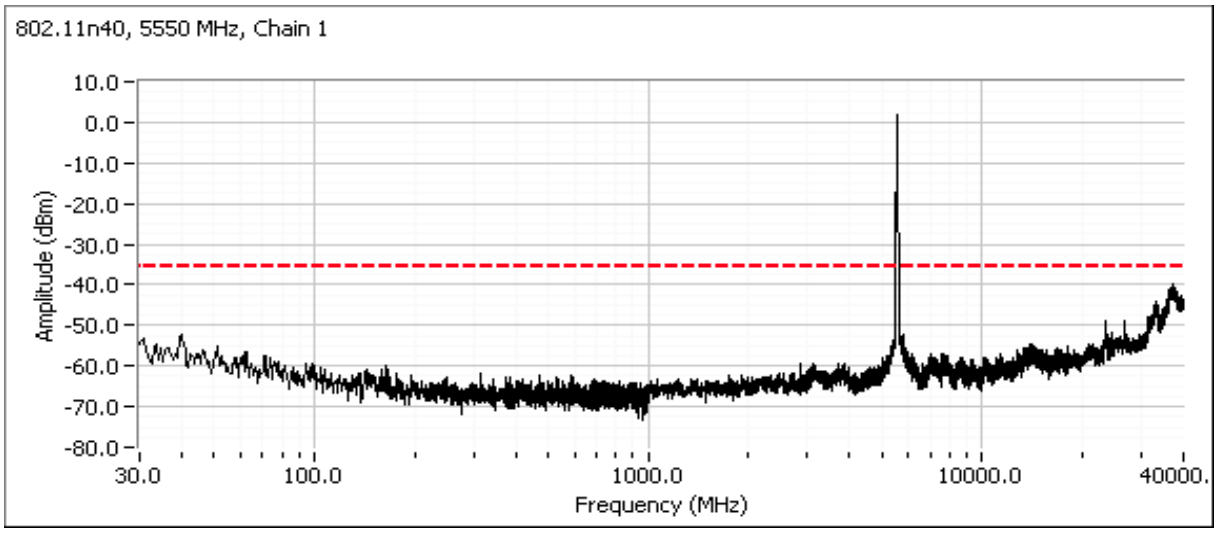
For master devices - This plot is showing hat the 20dB bandwidth of the channel closest to 5600 MHz does not spill into the 5600-5650 MHz band. RB > 1% of span.

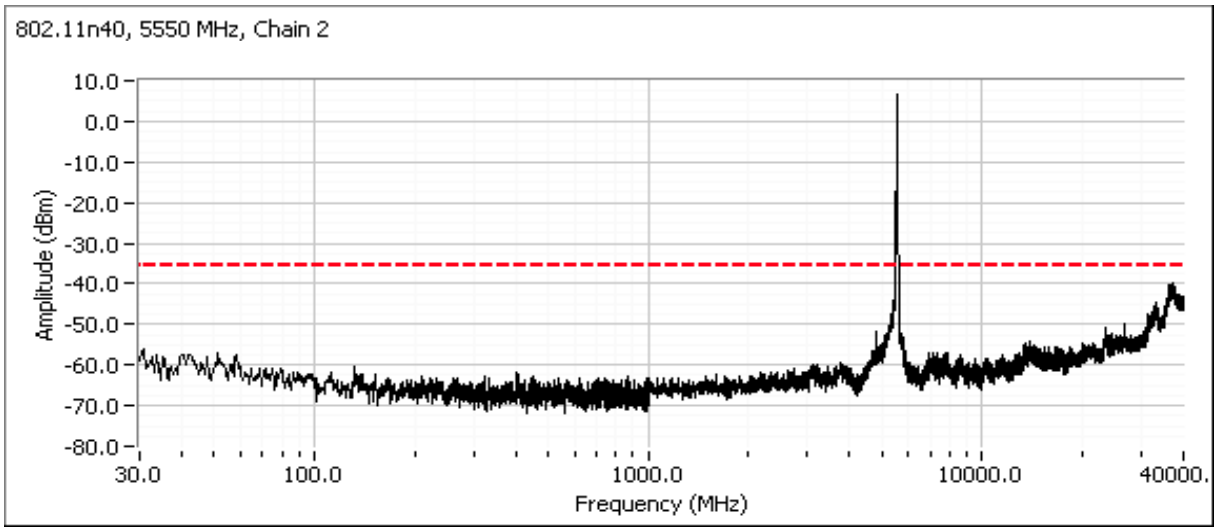




Client:	Biscotti, Inc.	Job Number:	J89805
Model:	W0001 - Module 802.11abgn 2x2	T-Log Number:	T89809
		Account Manager:	Deepa Shetty
Contact:	Nadeem Ahmed		
Standard:	FCC 15.247, 15.E	Class:	N/A

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

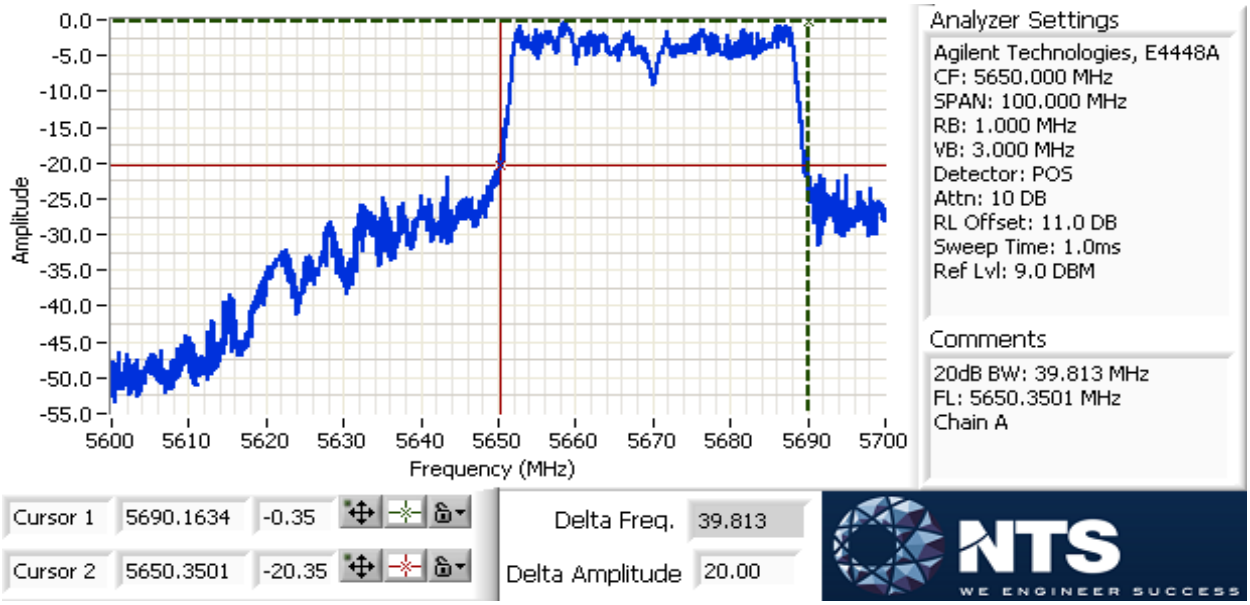


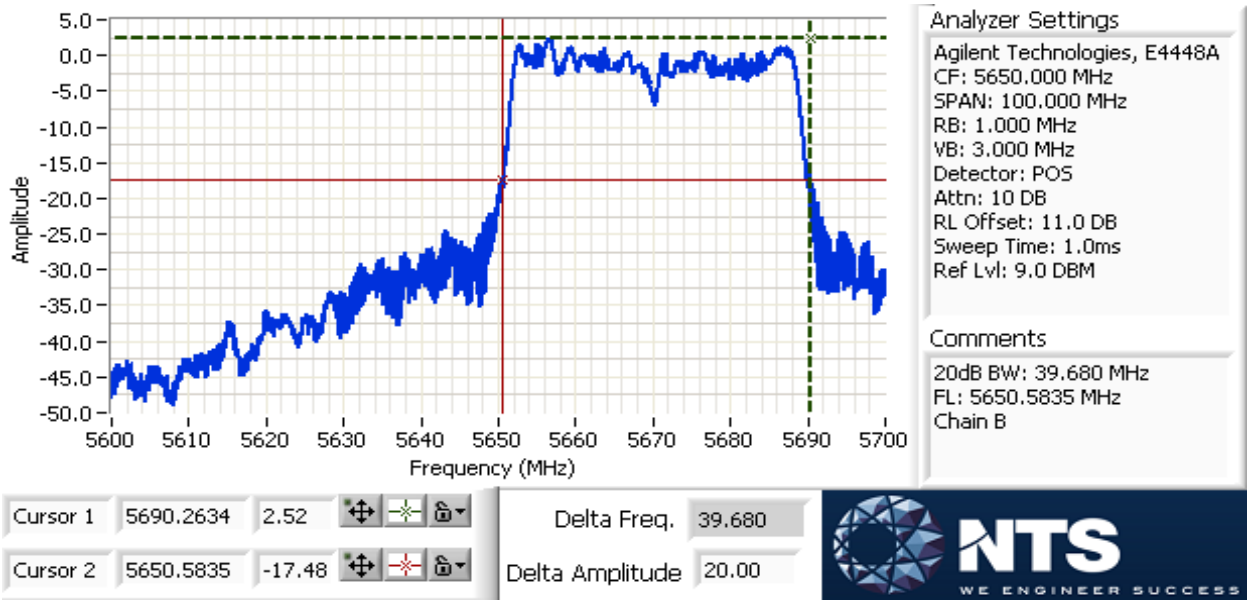


Client:	Biscotti, Inc.	Job Number:	J89805
Model:	W0001 - Module 802.11abgn 2x2	T-Log Number:	T89809
		Account Manager:	Deepa Shetty
Contact:	Nadeem Ahmed		
Standard:	FCC 15.247, 15.E	Class:	N/A

Channel adjacent to 5650 MHz (Master Device)

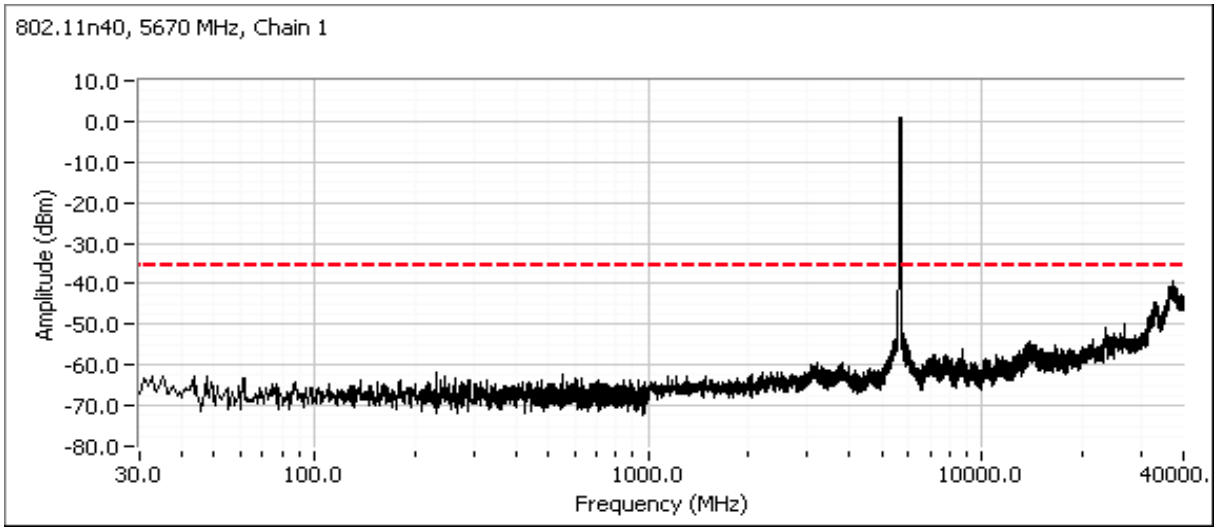
Plots showing that the 20dB bandwidth of the channel closest to 5650 MHz does not spill into the 5600-5650 MHz band. RB > 1% of span.

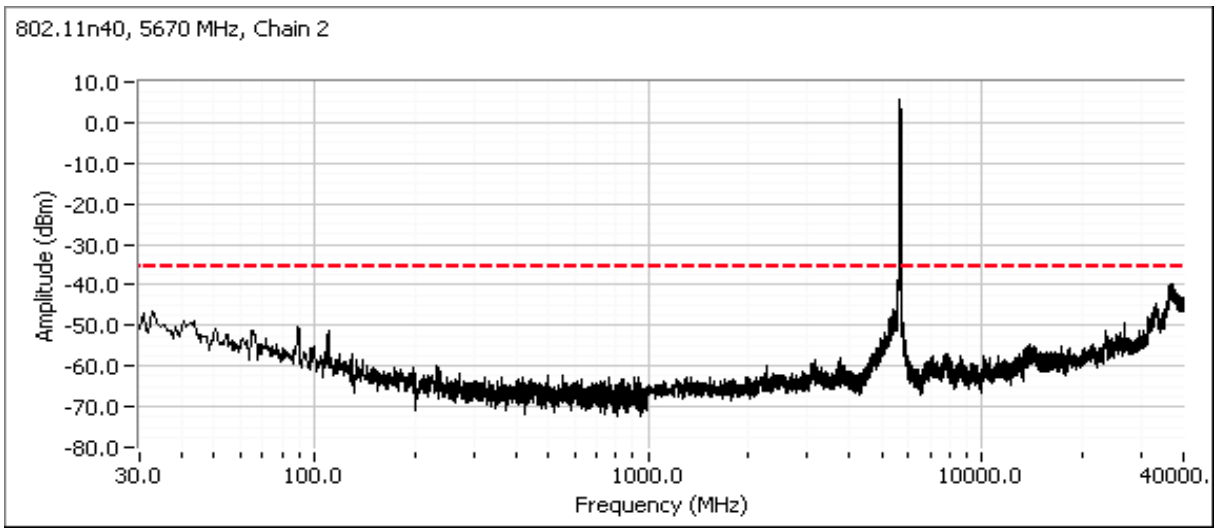




Client:	Biscotti, Inc.	Job Number:	J89805
Model:	W0001 - Module 802.11abgn 2x2	T-Log Number:	T89809
		Account Manager:	Deepa Shetty
Contact:	Nadeem Ahmed		
Standard:	FCC 15.247, 15.E	Class:	N/A

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





End of Report

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