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EMC Test Report

Application for Grant of Equipment Authorization
Class II Permissive Change/Reassessment

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

Model: RocketM5 Titanium

IC CERTIFICATION #:	6545A-RM5T
FCC ID:	SWX-RM5T-DFS
APPLICANT:	Ubiquiti Networks 2580 Orchard Pkwy San Jose, CA 95131
TEST SITE(S):	NTS Silicon Valley 41039 Boyce Road. Fremont, CA. 94538-2435
IC SITE REGISTRATION #:	2845B-3; 2845B-4, 2845B-5, 2845B-7
REPORT DATE:	December 3, 2012
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A2LA ACCREDITED
Testing Cert #0214.26

REVISION HISTORY

Rev#	Date	Comments	Modified By
-	12-3-2012	First release	
1	12-4-2012	Reissued to correct FCC ID #	Dave Guidotti

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SCOPE

An electromagnetic emissions test has been performed on the Ubiquiti Networks model RocketM5 Titanium, 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 KDB 789033, D01, v01r02)

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 KDB 789033 D01, v01r02

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 Ubiquiti Networks model RocketM5 Titanium complied with the requirements of the following regulations:

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

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

The test results recorded herein are based on a single type test of Ubiquiti Networks model RocketM5 Titanium and therefore apply only to the tested sample. The sample was selected and prepared by Jennifer Sanchez of Ubiquiti Networks.

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 5.25 – 5.35 GHz Band
Note: The device may be used outdoors, therefore the spectral density of spurious emissions in the 5.15 – 5.25 GHz band were limited to the -27dBm/MHz limit.

FCC Rule Part	RSS Rule Part	Description	Measured Value / Comments	Limit / Requirement	Result (margin)
15.407(a) (2)		26dB Bandwidth	11a: 23.9MHz HT20: 25.8MHz HT40: 45.5MHz HT10: 11.8MHz	N/A – limits output power if < 20MHz	N/A
15.407(a) (2)	A9.2(2)	Output Power	Sector Antenna: 11a: 7.2mW HT20: 9.1mW HT40: 9.2mW HT10: 4.6mW (Max eirp: 0.921W) Dish Antenna: 11a: 0.7mW HT20: 0.9mW HT40: 0.8mW HT10: 0.4mW (Max eirp: 0.924W)	17dBm (50mW)	Complies
15.407(a) (2)	-	Power Spectral Density	Sector Antenna: 11a: -3.9 dBm/MHz HT20: -3.2dBm/MHz HT40: -6.3dBm/MHz HT10: -3.1dBm/MHz	-3.0 dBm/MHz for Sector Antenna -13.0 dBm for Dish Antenna	Complies
-	A9.2(2) / A9.5 (2)	Power Spectral Density	Dish Antenna: 11a: -13.8dBm/MHz HT20: -13.0dBm/MHz HT40: -16.7dBm/MHz HT10: -13.2dBm/MHz	11.0 dBm / MHz[1]	Complies

[1] Reduced from 11dBm because highest value exceeded the average value by more than 3dB

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: 24.4MHz HT20: 26.3MHz HT40: 45.6MHz HT10: 10.5MHz	N/A – limits output power if < 20MHz	N/A
15.407(a) (2)	A9.2(2)	Output Power	Sector Antenna: 11a: 8.8mW HT20: 8.4mW HT40: 9.2mW HT10: 4.4mW (Max eirp: 0.923W) Dish Antenna: 11a: 0.8mW HT20: 0.9mW HT40: 0.96mW HT10: 0.4mW (Max eirp: 0.957W)	24 dBm / 250mW (eirp < 30dBm)	Complies
15.407(a) (2))		Power Spectral Density	Sector Antenna: 11a: -3.1 dBm/MHz HT20: -3.3dBm/MHz HT40: -6.2dBm/MHz HT10: -3.2dBm/MHz	-3.0 dBm/MHz for Sector Antenna -13dBm for Dish Antenna	Complies
	A9.2(2) / A9.5 (2)	Power Spectral Density	Dish Antenna: 11a: -13.1dBm/MHz HT20: -13.3dBm/MHz HT40: -15.8dBm/MHz HT10: -13.3dBm/MHz	11 dBm / MHz[2]	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

[2] Reduced from 11dBm because highest value exceeded the average value by more than 3dB

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	54.0 dBµV/m @ 5350.0 MHz (0.0 dB)	Refer to page 22	Complies
15.407(a)(6)	-	Peak Excursion Ratio	<13dB	< 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	TCP mechanism is discussed in the Operational Description	The U-NII device shall have the capability to operate with a mean EIRP value lower than 24dBm (250mW)	Complies
15.407 (h2)	A9.4	Dynamic frequency Selection (device with radar detection)	Refer to separate test report, reference R88975	Threshold -62dBm (-64dBm if eirp > 200mW) Channel Availability Check > 60s Channel closing transmission time < 260ms Channel move time < 10s Non occupancy period > 30minutes	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	EUT uses reverse SMA connectors	Unique or integral antenna required	Complies
15.207	RSS GEN Table 2	AC Conducted Emissions	N/A – not performed. Results unchanged from original filing.		
15.109	RSS GEN 7.2.3 Table 1	Receiver spurious emissions	N/A – Receiver tunes above 960MHz	-	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: 16.9 MHz HT20: 18.1 MHz HT40: 36.5 MHz HT10: 9.4 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 Ubiquiti Networks model RocketM5 Titanium is a 2x2, PoE, outdoor access point in the 5 GHz bands, supporting 802.11a/n20/n40. Since the EUT would normally be pole mounted during operation, the EUT was treated as floor-standing equipment during testing to simulate the end-user environment. The electrical rating of the EUT is 48 VDC, .5 Amps.

The sample was received on August 15, 2012 and tested on August 15 and 17, September 7, 12 and 20, October 4, 8, 10, 15, 17, 23, 26, 29 and 30 and November 1, 7 and 9, 2012. The EUT consisted of the following component(s):

Company	Model	Description	Serial Number	FCC ID
Ubiquiti	Rocket M5 Titanium	2x2 outdoor AP	Prototype	SWX-RM5T-DFS
Ubiquiti	Rocket dish	30 dBi dish antenna	-	-
Ubiquiti	Rocket Sector	20 dBi dish antenna	-	-

OTHER EUT DETAILS

The EUT supports 10, 20, and 40MHz bandwidths.

Mode	Frequency channel	Output power in Watts	
		Sector	Dish
802.11a	5270	.007	.001
	5300		
	5320		
	5500	.009	.001
	5580		
	5700		
HT20	5270	.009	.001
	5300		
	5320		
	5500	.008	.001
	5580		
	5700		
HT40	5275	.001	.001
	5310	.009	
	5510		
	5550		
	5675		
HT10	5260	.005	.000
	5300		
	5330		
	5480	.004	.000
	5590		
	5710		

ANTENNA SYSTEM

The EUT has two antenna options: (1) 30dBi dish and (2) 20dBi sector
The antenna connects to the EUT via a reverse sex SMA connector, thereby meeting the requirements of FCC 15.203.

ENCLOSURE

The EUT enclosure is primarily constructed of cast aluminum. It measures approximately 7 cm wide by 17 cm deep by 4 cm high.

MODIFICATIONS

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

SUPPORT EQUIPMENT

No local support equipment was used during testing.

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

Company	Model	Description	Serial Number	FCC ID
Dell	Vostro	Laptop	Elliot # 2011-1626	-
Ubiquiti	UBI-POE-48-5	PoE injector	NA	-

EUT INTERFACE PORTS

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

Port	Connected To	Cable(s)		
		Description	Shielded or Unshielded	Length(m)
Chain 0	Antenna	Coax	Shielded	-
Chain 1	Antenna	Coax	Shielded	-
Ethernet main	PoE port (injector)	Cat 6	Shielded	10
LAN (PoE injector)	Ethernet (laptop)	Cat 5	Unshielded	1

EUT OPERATION

During emissions testing the EUT was transmitting on the channel at the power level called out in the individual tests. In many cases, radiated emissions tests were performed at a higher power setting then the final power measurements. In production, the device will be limited to the power levels reported by the output power measurements.

TEST SITE

GENERAL INFORMATION

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

Site	Registration Numbers		Location
	FCC	Canada	
Chamber 3	769238	2845B-3	41039 Boyce Road Fremont, CA 94538-2435
Chamber 4	211948	2845B-4	
Chamber 5	211948	2845B-5	
Chamber 7	A2LA accreditation	2845B-7	

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

RADIATED EMISSIONS CONSIDERATIONS

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

MEASUREMENT INSTRUMENTATION

RECEIVER SYSTEM

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

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

INSTRUMENT CONTROL COMPUTER

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

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

FILTERS/ATTENUATORS

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

ANTENNAS

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

ANTENNA MAST AND EQUIPMENT TURNTABLE

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

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

INSTRUMENT CALIBRATION

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

TEST PROCEDURES

EUT AND CABLE PLACEMENT

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

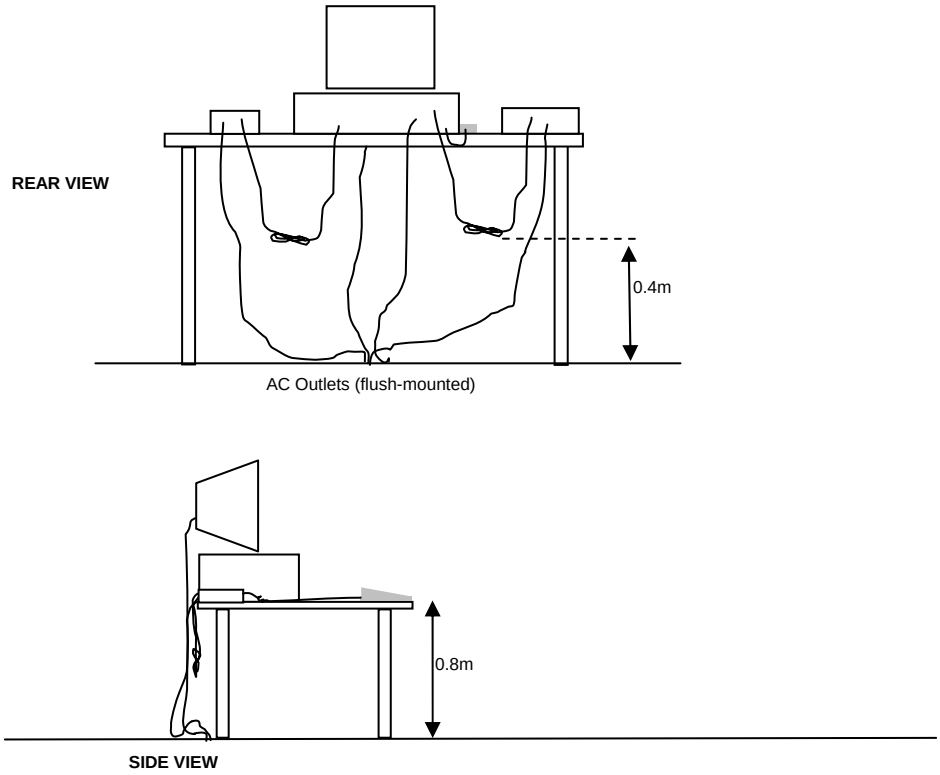
RADIATED EMISSIONS

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

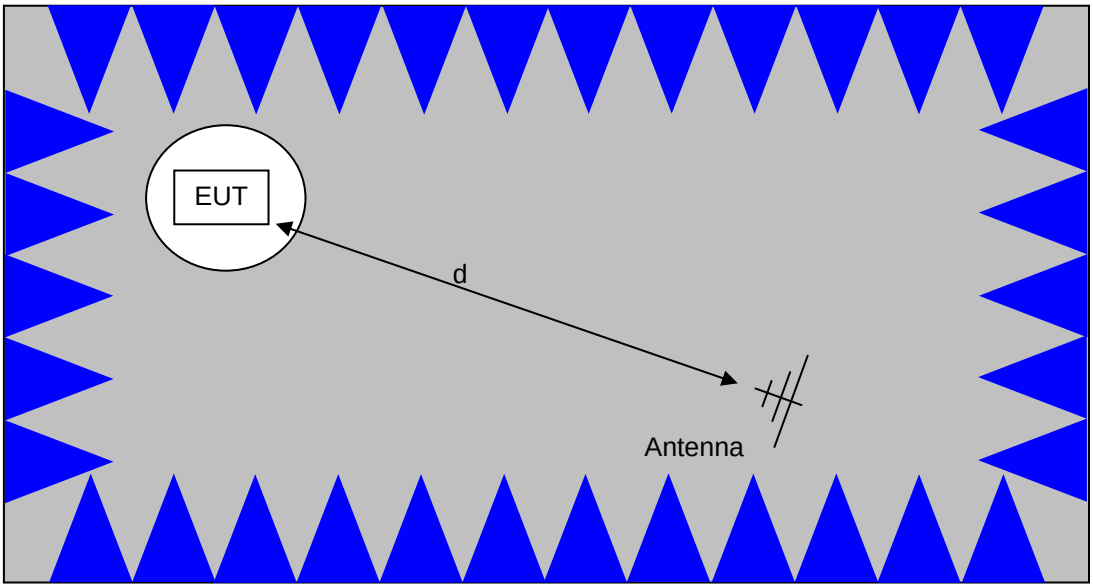
A speaker is provided in the receiver to aid in discriminating between EUT and ambient emissions. Other methods used during the preliminary scan for EUT emissions involve scanning with near field magnetic loops, monitoring I/O cables with RF current clamps, and cycling power to the EUT.

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

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

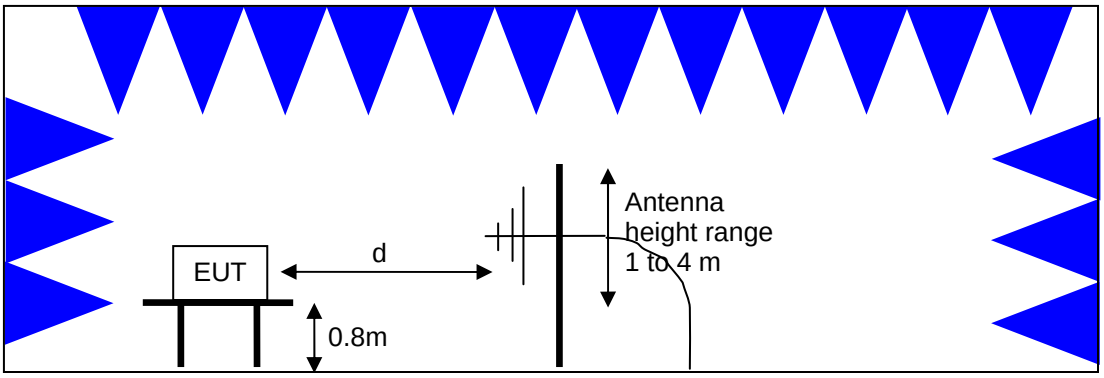


Typical Test Configuration for Radiated Field Strength Measurements



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

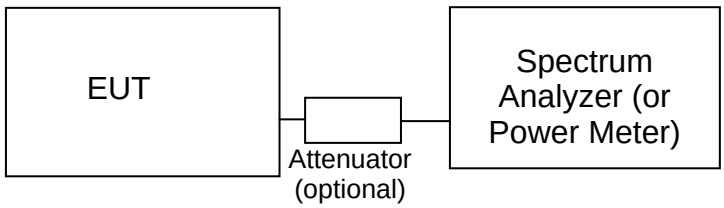
Floor-standing equipment is placed on the floor with insulating supports between the unit and the ground plane.



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

CONDUCTED EMISSIONS FROM ANTENNA PORT

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



Test Configuration for Antenna Port Measurements

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

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

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

BANDWIDTH MEASUREMENTS

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

SPECIFICATION LIMITS AND SAMPLE CALCULATIONS

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

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

GENERAL TRANSMITTER RADIATED EMISSIONS SPECIFICATION LIMITS

The table below shows the limits for the spurious emissions from transmitters that fall in restricted bands[3] (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

[3] 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)[4] 1W (30dBm) eirp	11 dBm/MHz
5470 – 5725	250 mW (24 dBm)[5] 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.

[4] If EIRP exceeds 500mW the device must employ TPC
[5] 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, BE 1000 - 6,000 MHz, 16-Aug-12				
EMCO	Antenna, Horn, 1-18 GHz	3115	1561	7/12/2014
Rohde & Schwarz	EMI Test Receiver, 20 Hz-40 GHz	ESIB40 (1088.7490.40)	2493	12/9/2012
Radiated Emissions, 1000 - 40000MHz, 18-Aug-12				
EMCO	Antenna, Horn, 1-18 GHz	3115	1561	7/12/2014
Hewlett Packard	Head (Inc W1-W4, 1742 , 1743)	84125C	1772	5/1/2013
A.H. Systems	Purple System Horn, 18-40GHz	SAS-574, p/n: 2581	2160	4/17/2013
Hewlett Packard	Microwave Preamplifier, 1-26.5GHz	8449B	2199	2/23/2013
Hewlett Packard	SpecAn 9 kHz - 40 GHz, (SA40) Purple	8564E (84125C)	2415	8/10/2013
Radiated Emissions, 1000 - 18,000 MHz, 12-Sep-12				
Hewlett Packard	SpecAn 30 Hz -40 GHz, SV (SA40) Red	8564E (84125C)	1148	9/15/2012
EMCO	Antenna, Horn, 1-18 GHz	3115	1561	7/12/2014
Micro-Tronics	Band Reject Filter, 5470-5725 MHz	BRC50704-02	1730	8/2/2013
Hewlett Packard	Microwave Preamplifier, 1-26.5GHz	8449B	1780	11/22/2012
Radiated Emissions, 30 - 1,000 MHz, 19-Sep-12				
Sunol Sciences	Biconilog, 30-3000 MHz	JB3	1548	8/9/2014
Rohde & Schwarz	EMI Test Receiver, 20 Hz-7 GHz	ESIB7	1630	5/31/2013
Com-Power Corp.	Preamplifier, 30-1000 MHz	PA-103	1632	7/6/2013
Radiated Emissions, 30 - 1,000 MHz, 20-Sep-12				
Rohde & Schwarz	EMI Test Receiver, 20 Hz-7 GHz	ESIB7	1538	12/6/2012
Sunol Sciences	Biconilog, 30-3000 MHz	JB3	1549	5/25/2013
Com-Power Corp.	Preamplifier, 30-1000 MHz	PAM-103	2380	7/6/2013
Radiated Spurious Emissions, 1000 - 6,500 MHz, 08-Oct-12				
EMCO	Antenna, Horn, 1-18GHz	3115	868	6/19/2014
Rohde & Schwarz	EMI Test Receiver, 20 Hz-7 GHz	ESIB7	1538	12/6/2012
Radiated Emissions, 1,000 - 18,000 MHz, 10-Oct-12				
Hewlett Packard	Microwave Preamplifier, 1-26.5GHz	8449B	263	3/29/2013
EMCO	Antenna, Horn, 1-18 GHz	3115	487	7/19/2014
Hewlett Packard	SpecAn 9 kHz - 40 GHz, FT (SA40) Blue	8564E (84125C)	1393	5/1/2013
Micro-Tronics	Band Reject Filter, 5150-5350 MHz	BRC50703-02	2239	10/4/2013
Radiated Emissions, 1000 - 18,000 MHz, 12-Oct-12				
Hewlett Packard	SpecAn 9 KHz-26.5 GHz, Non-Program	8563E	284	1/13/2013
EMCO	Antenna, Horn, 1-18 GHz	3115	487	7/19/2014
Hewlett Packard	Microwave Preamplifier, 1-26.5GHz	8449B	870	2/23/2013
Rohde & Schwarz	EMI Test Receiver, 20 Hz-7 GHz	ESIB7	1538	12/6/2012

Manufacturer	Description	Model	Asset #	Cal Due
Radiated Spurious Emissions, 1000 - 40,000 MHz, 15-Oct-12				
Narda West	High Pass Filter, 8 GHz	HPF 180	821	3/22/2013
EMCO	Antenna, Horn, 1-18 GHz (SA40-Red)	3115	1142	8/23/2014
Rohde & Schwarz	EMI Test Receiver, 20 Hz-7 GHz	ESIB7	1756	5/21/2013
Hewlett Packard	Microwave Preamplifier, 1-26.5GHz	8449B	2199	2/23/2013
Micro-Tronics	Band Reject Filter, 5470-5725 MHz	BRC50704-02	2240	10/4/2013
Hewlett Packard	SpecAn 9 kHz - 40 GHz, (SA40) Purple	8564E (84125C)	2415	8/10/2013
Radiated Spurious Emissions, 1000 - 40,000 MHz, 17-Oct-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
Rohde & Schwarz	EMI Test Receiver, 20 Hz-7 GHz	ESIB7	1538	12/6/2012
Hewlett Packard	Microwave Preamplifier, 1-26.5GHz	8449B	1780	11/22/2012
Micro-Tronics	Band Reject Filter, 5150-5350 MHz	BRC50703-02	2239	10/4/2013
Radiated Emissions, 1000 - 12,000 MHz, 18-Oct-12				
EMCO	Antenna, Horn, 1-18 GHz (SA40-Red)	3115	1142	8/23/2014
Hewlett Packard	SpecAn 30 Hz -40 GHz, SV (SA40) Red	8564E (84125C)	1148	9/14/2013
Rohde & Schwarz	EMI Test Receiver, 20 Hz-7 GHz	ESIB7	1538	12/6/2012
Micro-Tronics	Band Reject Filter, 5470-5725 MHz	BRC50704-02	1730	8/2/2013
Radio Antenna Port (Power and Spurious Emissions), 24-Oct-12				
Agilent	PSA, Spectrum Analyzer, (installed options, 111, 115, 123, 1DS, B7J, HYX,	E4446A	2139	2/23/2013
Radio Antenna Port (Power and Spurious Emissions), 25-Oct-12				
Agilent	PSA, Spectrum Analyzer, (installed options, 111, 115, 123, 1DS, B7J, HYX,	E4446A	2139	2/23/2013
Radio Antenna Port (Power and Spurious Emissions), 25-Oct-12				
Agilent	PSA, Spectrum Analyzer, (installed options, 111, 115, 123, 1DS, B7J, HYX,	E4446A	2139	2/23/2013
Radio Antenna Port (Power and Spurious Emissions), 27-Oct-12				
Agilent	PSA, Spectrum Analyzer, (installed options, 111, 115, 123, 1DS, B7J, HYX,	E4446A	2139	2/23/2013
Radio Antenna Port (Power and Spurious Emissions), 31-Oct-12				
Agilent	PSA, Spectrum Analyzer, (installed options, 111, 115, 123, 1DS, B7J, HYX,	E4446A	2139	2/23/2013

Manufacturer	Description	Model	Asset #	Cal Due
Radio Antenna Port (Power and Spurious Emissions), 07-Nov-12				
Agilent	PSA, Spectrum Analyzer, (installed options, 111, 115, 123, 1DS, B7J, HYX,	E4446A	2139	2/23/2013
Radio Antenna Port (Power and Spurious Emissions), 09-Nov-12				
Agilent	PSA, Spectrum Analyzer, (installed options, 111, 115, 123, 1DS, B7J, HYX,	E4446A	2139	2/23/2013

Appendix B Test Data

T88756 Pages 28 - 200

Client:	Ubiquiti Networks	Job Number:	J86352
Product	RocketM5 Titanium	T-Log Number:	T88756
		Account Manager:	Michelle Kim
Contact:	Jennifer Sanchez		-
Emissions Standard(s):	FCC 15.E/RSS-210	Class:	-
Immunity Standard(s):	-	Environment:	-

EMC Test Data

For The

Ubiquiti Networks

Product

RocketM5 Titanium

Date of Last Test: 11/9/2012

Client:	Ubiquiti Networks	Job Number:	J86352
Model:	RocketM5 Titanium	T-Log Number:	T88756
		Account Manager:	Michelle Kim
Contact:	Jennifer Sanchez		
Standard:	FCC 15.E/RSS-210	Class:	N/A

RSS 210 and FCC 15.407 (UNII) Radiated Spurious Emissions (Sector Antenna)

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.

Test Location: FT Chamber#5 EUT Voltage: POE

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: 27 °C

Rel. Humidity: 38 %

Summary of Results

Run #	Mode	Channel	Power Setting	Measured Power	Test Performed	Limit	Result / Margin
Run # 1	802.11a Chain A+B	5320MHz	19.0	-	Restricted Band Edge at 5350 MHz	15.209	44.1 dBµV/m @ 5389.6 MHz (-9.9 dB)
Run # 1	802.11a Chain A+B	5500MHz	19.0	-	Restricted Band Edge at 5460 MHz	15.209	49.3 dBµV/m @ 5460.0 MHz (-4.7 dB)
			15.5		Band Edge at 5470 MHz	15 E	65.8 dBµV/m @ 5468.6 MHz (-2.5 dB)
Run # 1	802.11a Chain A+B	5700MHz	12.0	-	Band Edge at 5725 MHz	15 E	67.8 dBµV/m @ 5733.5 MHz (-0.5 dB)
Run # 2	HT20 Chain A+B	5320MHz	19.0	-	Restricted Band Edge at 5350 MHz	15.209	44.0 dBµV/m @ 5389.1 MHz (-10.0 dB)
Run # 2	HT20 Chain A+B	5500MHz	19.0	-	Restricted Band Edge at 5460 MHz	15.209	49.7 dBµV/m @ 5460.0 MHz (-4.3 dB)
			16.0		Band Edge at 5470 MHz	15 E	67.9 dBµV/m @ 5469.1 MHz (-0.4 dB)
Run # 2	HT20 Chain A+B	5700MHz	11.5	-	Band Edge at 5725 MHz	15 E	67.7 dBµV/m @ 5733.5 MHz (-0.6 dB)

Client:	Ubiquiti Networks	Job Number:	J86352
Model:	RocketM5 Titanium	T-Log Number:	T88756
		Account Manager:	Michelle Kim
Contact:	Jennifer Sanchez		
Standard:	FCC 15.E/RSS-210	Class:	N/A

Run #	Mode	Channel	Power Setting	Measured Power	Test Performed	Limit	Result / Margin
Run # 3	HT40 Chain A+B	5310MHz	19.0	-	Restricted Band Edge at 5350 MHz	15.209	44.7 dBµV/m @ 5350.0 MHz (-9.3 dB)
Run # 3	HT40 Chain A+B	5510MHz	19.0	-	Restricted Band Edge at 5460 MHz	15.209	44.2 dBµV/m @ 5390.0 MHz (-9.8 dB)
			10.5		Band Edge at 5470 MHz	15 E	66.6 dBµV/m @ 5470.0 MHz (-1.7 dB)
Run # 3	HT40 Chain A+B	5675MHz	11.0	-	Band Edge at 5725 MHz	15 E	68.1 dBµV/m @ 5737.4 MHz (-0.2 dB)
Run # 4	HT10 Chain A+B	5330MHz	19.0	-	Restricted Band Edge at 5350 MHz	15.209	39.1 dBµV/m @ 5369.3 MHz (-14.9 dB)
Run # 4	HT10 Chain A+B	5480MHz	19.0	-	Restricted Band Edge at 5460 MHz	15.209	43.2 dBµV/m @ 5460.0 MHz (-10.8 dB)
			13.0		Band Edge at 5470 MHz	15 E	67.4 dBµV/m @ 5469.1 MHz (-0.9 dB)
Run # 4	HT10 Chain A+B	5710MHz	14	-	Band Edge at 5725 MHz	15 E	66.1 dBµV/m @ 5725.1 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

Take radiated measurements against the non-restricted band limit, as noted

Antenna: 20dBi Sector
Duty Cycle: >98%

Client:	Ubiquiti Networks	Job Number:	J86352
Model:	RocketM5 Titanium	T-Log Number:	T88756
		Account Manager:	Michelle Kim
Contact:	Jennifer Sanchez		
Standard:	FCC 15.E/RSS-210	Class:	N/A

Run # 1, Band Edge Field Strength - 802.11a, Chain A+B

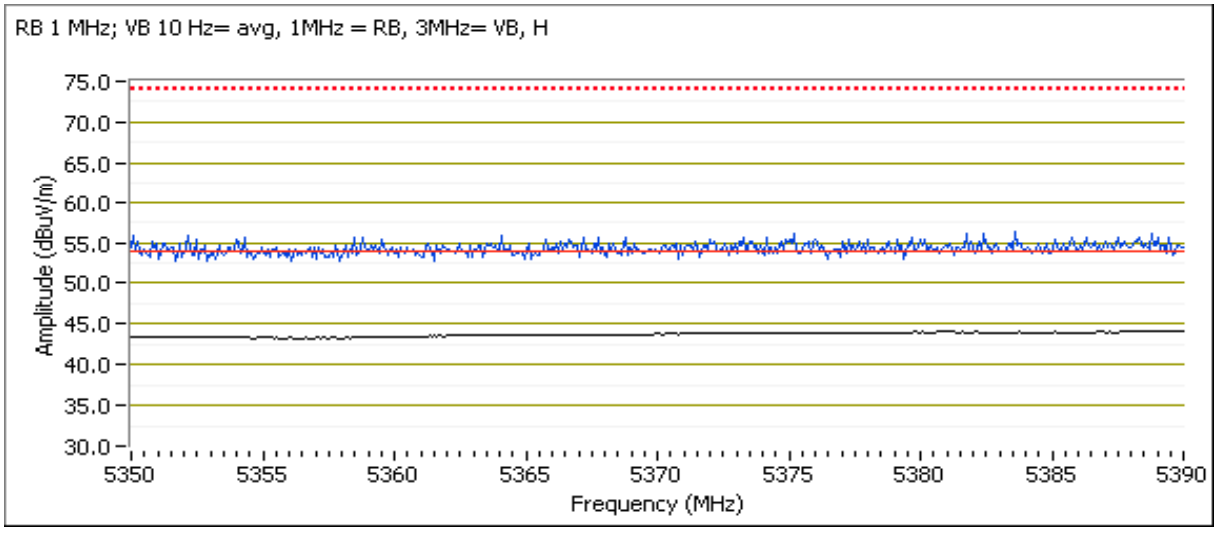
Date of Test: 8/15/2012 Config. Used: 1

Test Engineer: Joseph Cadigal Config Change: none

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

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	
5389.600	44.1	H	54.0	-9.9	AVG	357	1.0	POS; RB 1 MHz; VB: 10 Hz
5388.480	55.1	H	74.0	-18.9	PK	357	1.0	POS; RB 1 MHz; VB: 3 MHz
5388.640	44.0	V	54.0	-10.0	AVG	357	1.0	POS; RB 1 MHz; VB: 10 Hz
5377.250	55.8	V	74.0	-18.2	PK	357	1.0	POS; RB 1 MHz; VB: 3 MHz



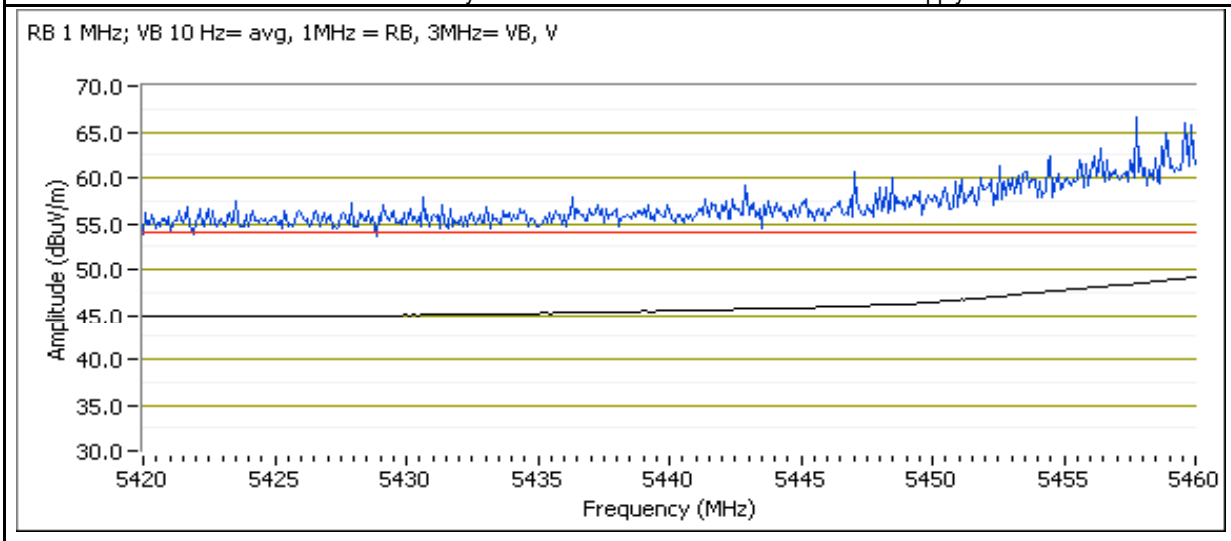
Client:	Ubiquiti Networks	Job Number:	J86352
Model:	RocketM5 Titanium	T-Log Number:	T88756
		Account Manager:	Michelle Kim
Contact:	Jennifer Sanchez		
Standard:	FCC 15.E/RSS-210	Class:	N/A

Run # 1c, EUT on Channel 5500MHz - 802.11a, 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	49.3	V	54.0	-4.7	AVG	360	1.0	POS; RB 1 MHz; VB: 10 Hz
5459.440	64.7	V	74.0	-9.3	PK	360	1.0	POS; RB 1 MHz; VB: 3 MHz
5460.000	45.3	H	54.0	-8.7	AVG	359	1.0	POS; RB 1 MHz; VB: 10 Hz
5443.970	57.6	H	74.0	-16.4	PK	359	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.

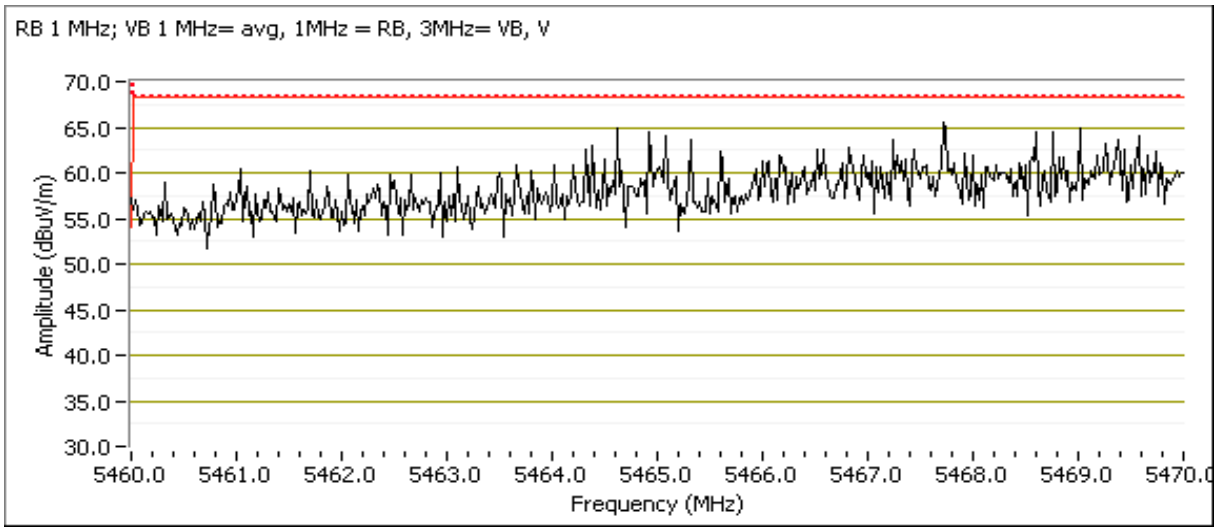


5460 - 5470 MHz Band Edge Radiated Field Strength

Frequency	Level	Pol	15 E		Detector	Azimuth	Height	Comments
MHz	dBµV/m	v/h	Limit	Margin	Pk/QP/Avg	degrees	meters	
5468.600	65.8	V	68.3	-2.5	PK	359	1.0	POS; RB 1 MHz; VB: 1 MHz

For emissions in the 5460-5470MHz frequency range the limit is -27dBm/MHz eirp (68.3dBuV/m). The measurement method required is the same measurement method used to determine the in-band power spectral density or a peak measurement (RB=1MHz, VB>1MHz).

Client:	Ubiquiti Networks	Job Number:	J86352
Model:	RocketM5 Titanium	T-Log Number:	T88756
		Account Manager:	Michelle Kim
Contact:	Jennifer Sanchez		
Standard:	FCC 15.E/RSS-210	Class:	N/A



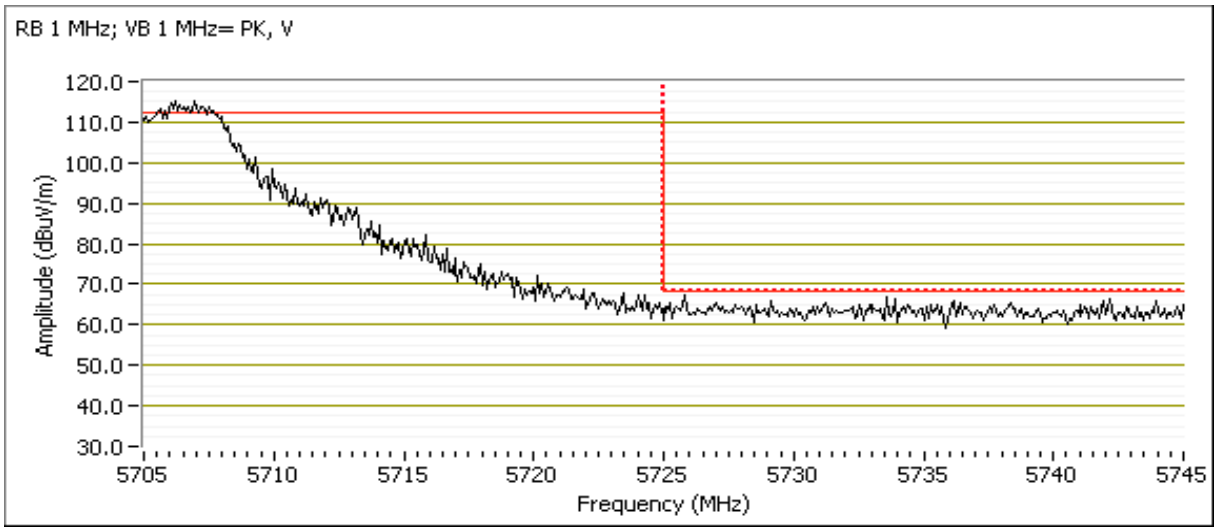
Run # 1d, EUT on Channel 5700MHz - 802.11a, Chain A+B

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	
5733.500	67.8	V	68.3	-0.5	Pk	0	1.0	POS; RB 1 MHz; VB: 1 MHz

For emissions in the 5460-5470MHz frequency range the limit is -27dBm/MHz eirp (68.3dBuV/m). The measurement method required is the same measurement method used to determine the in-band power spectral density or a peak measurement (RB=1MHz, VB>1MHz).

Client:	Ubiquiti Networks	Job Number:	J86352
Model:	RocketM5 Titanium	T-Log Number:	T88756
		Account Manager:	Michelle Kim
Contact:	Jennifer Sanchez		
Standard:	FCC 15.E/RSS-210	Class:	N/A



Run # 2, Band Edge Field Strength - HT20, Chain A+B

Run # 2b, EUT on Channel 5320MHz - HT20, Chain A+B

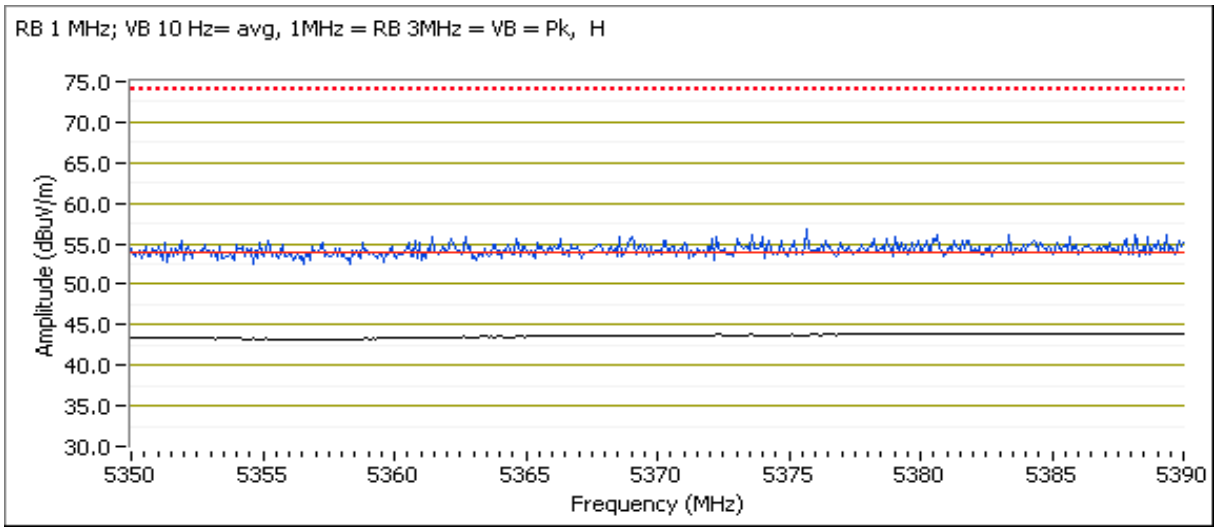
Date of Test: 8/15/2012 Test Location: FT Chamber#5

Test Engineer: Joseph Cadigal 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	
5389.120	44.0	H	54.0	-10.0	AVG	22	1.0	POS; RB 1 MHz; VB: 10 Hz
5384.550	55.8	H	74.0	-18.2	PK	22	1.0	POS; RB 1 MHz; VB: 3 MHz
5389.040	43.9	V	54.0	-10.1	AVG	268	3.2	POS; RB 1 MHz; VB: 10 Hz
5380.860	55.3	V	74.0	-18.7	PK	268	3.2	POS; RB 1 MHz; VB: 3 MHz

Client:	Ubiquiti Networks	Job Number:	J86352
Model:	RocketM5 Titanium	T-Log Number:	T88756
		Account Manager:	Michelle Kim
Contact:	Jennifer Sanchez		
Standard:	FCC 15.E/RSS-210	Class:	N/A



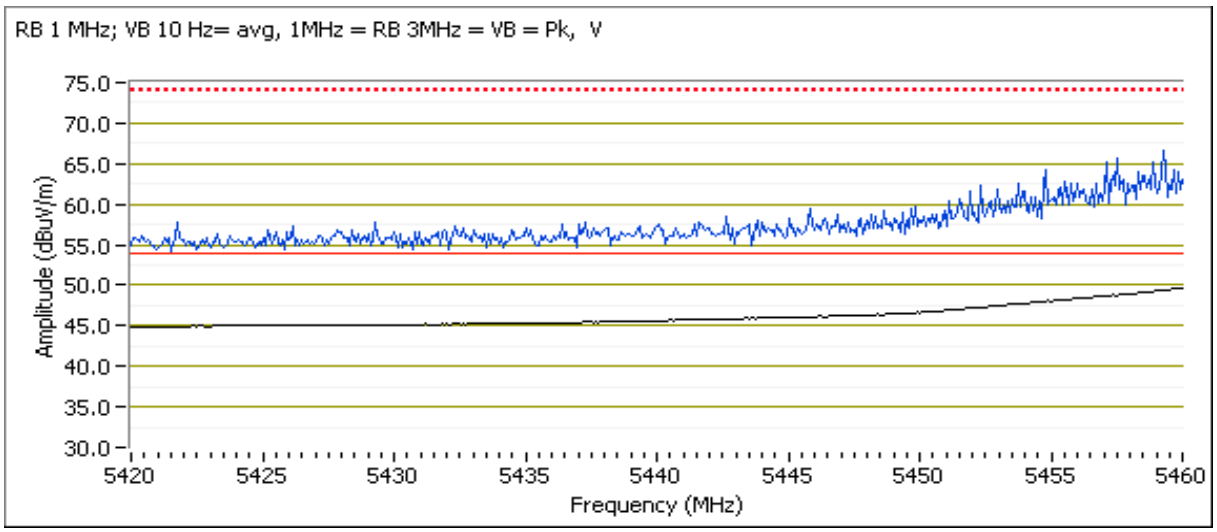
Run # 2c, EUT on Channel 5500MHz - HT20, Chain A+B

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	49.7	V	54.0	-4.3	AVG	0	1.1	POS; RB 1 MHz; VB: 10 Hz
5457.030	61.7	V	74.0	-12.3	PK	0	1.1	POS; RB 1 MHz; VB: 3 MHz
5459.760	45.3	H	54.0	-8.7	AVG	359	1.0	POS; RB 1 MHz; VB: 10 Hz
5453.670	56.8	H	74.0	-17.2	PK	359	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.

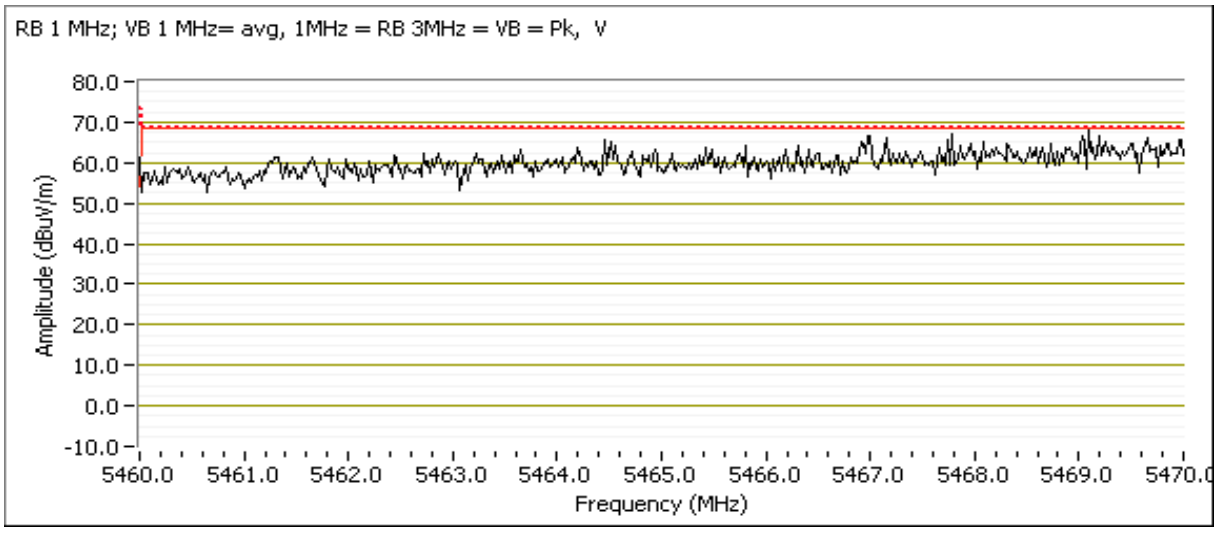
Client:	Ubiquiti Networks	Job Number:	J86352
Model:	RocketM5 Titanium	T-Log Number:	T88756
		Account Manager:	Michelle Kim
Contact:	Jennifer Sanchez		
Standard:	FCC 15.E/RSS-210	Class:	N/A



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	
5469.080	67.9	V	68.3	-0.4	Pk	0	1.1	POS; RB 1 MHz; VB: 1 MHz

For emissions in the 5460-5470MHz frequency range the limit is -27dBm/MHz eirp (68.3dBuV/m). The measurement method required is the same measurement method used to determine the in-band power spectral density or a peak measurement (RB=1MHz, VB>1MHz).



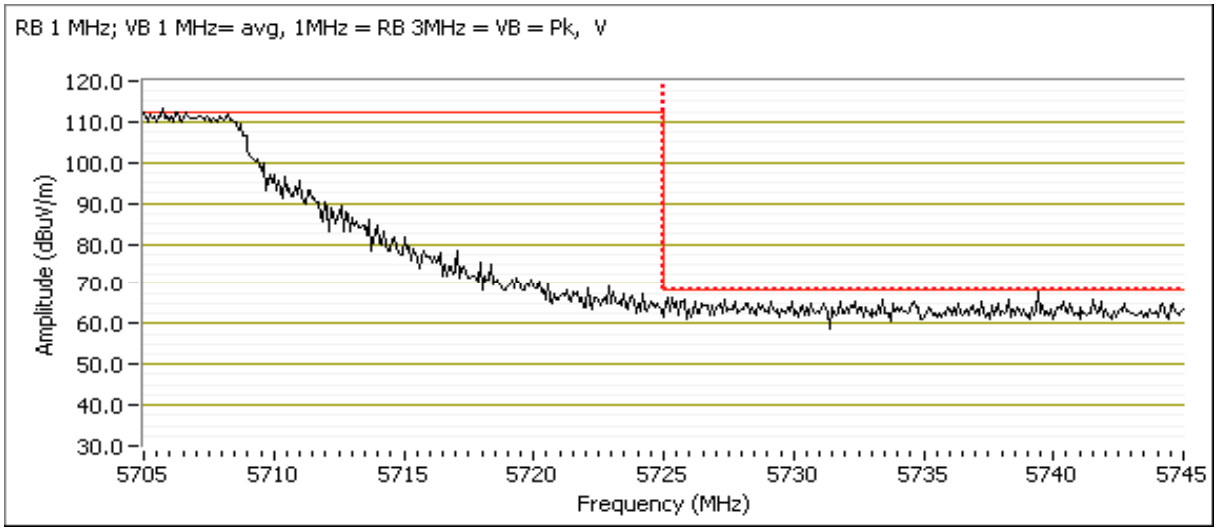
Client:	Ubiquiti Networks	Job Number:	J86352
Model:	RocketM5 Titanium	T-Log Number:	T88756
		Account Manager:	Michelle Kim
Contact:	Jennifer Sanchez		
Standard:	FCC 15.E/RSS-210	Class:	N/A

Run # 2d, EUT on Channel 5700MHz - HT20, Chain A+B

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	
5733.540	67.7	V	68.3	-0.6	PK	360	1.0	POS; RB 1 MHz; VB: 1 MHz

For emissions in the 5460-5470MHz frequency range the limit is -27dBm/MHz eirp (68.3dBuV/m). The measurement method required is the same measurement method used to determine the in-band power spectral density or a peak measurement (RB=1MHz, VB>1MHz).



Client:	Ubiquiti Networks	Job Number:	J86352
Model:	RocketM5 Titanium	T-Log Number:	T88756
		Account Manager:	Michelle Kim
Contact:	Jennifer Sanchez		
Standard:	FCC 15.E/RSS-210	Class:	N/A

Run # 3, Band Edge Field Strength - HT40, Chain A+B

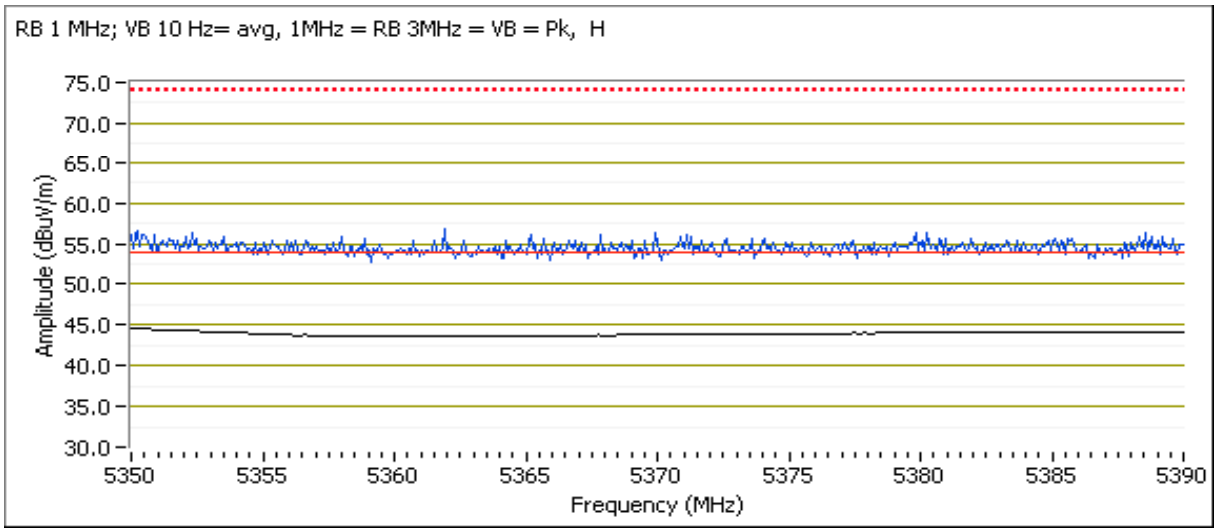
Run # 3b, EUT on Channel 5310MHz - HT40, Chain A+B

Date of Test: 8/15/2012 Test Location: FT Chamber#5

Test Engineer: Joseph Cadigal 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	44.7	H	54.0	-9.3	AVG	359	1.0	POS; RB 1 MHz; VB: 10 Hz
5350.560	56.6	H	74.0	-17.4	PK	359	1.0	POS; RB 1 MHz; VB: 3 MHz
5389.520	44.0	V	54.0	-10.0	AVG	0	1.2	POS; RB 1 MHz; VB: 10 Hz
5373.010	55.1	V	74.0	-18.9	PK	0	1.2	POS; RB 1 MHz; VB: 3 MHz



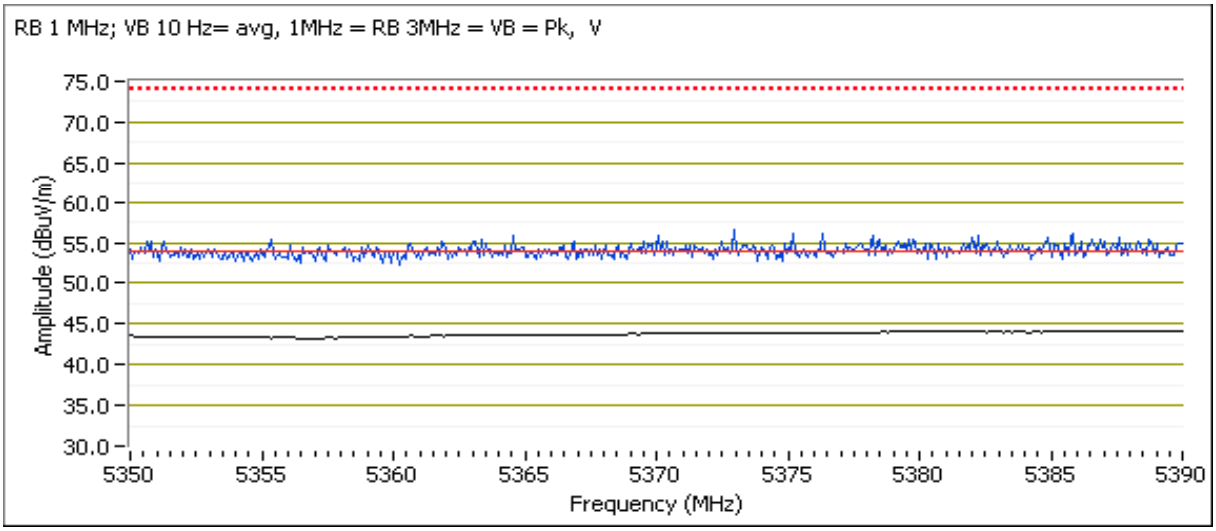
Client:	Ubiquiti Networks	Job Number:	J86352
Model:	RocketM5 Titanium	T-Log Number:	T88756
		Account Manager:	Michelle Kim
Contact:	Jennifer Sanchez		
Standard:	FCC 15.E/RSS-210	Class:	N/A

Run # 3c, EUT on Channel 5510MHz - HT40, 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	
5390.000	44.2	V	54.0	-9.8	AVG	0	1.0	POS; RB 1 MHz; VB: 10 Hz
5377.980	54.4	V	74.0	-19.6	PK	0	1.0	POS; RB 1 MHz; VB: 3 MHz
5389.120	44.1	H	54.0	-9.9	AVG	359	1.0	POS; RB 1 MHz; VB: 10 Hz
5367.960	55.8	H	74.0	-18.2	PK	359	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.

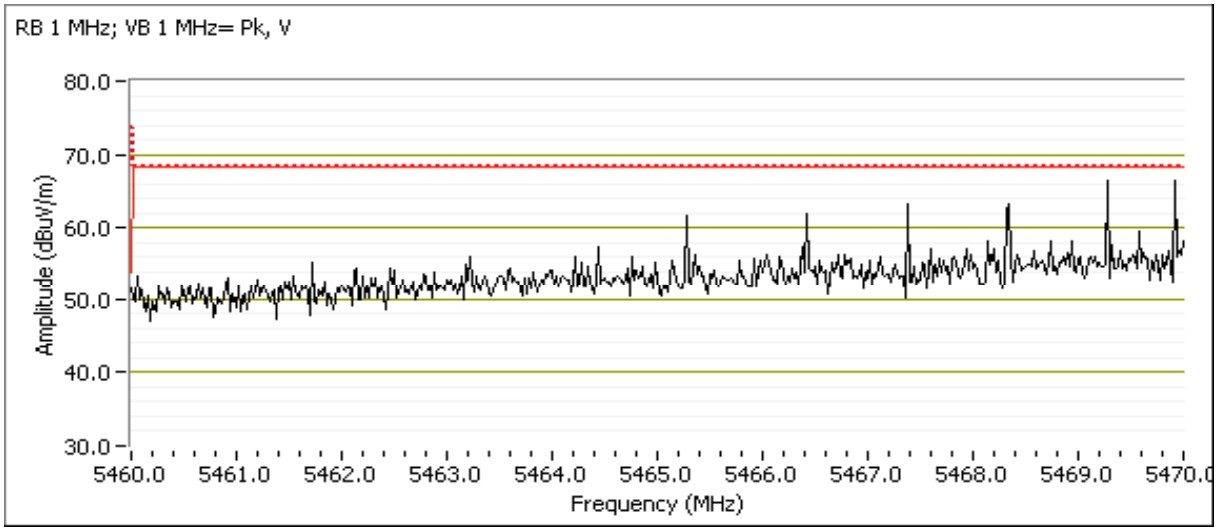


Client:	Ubiquiti Networks	Job Number:	J86352
Model:	RocketM5 Titanium	T-Log Number:	T88756
		Account Manager:	Michelle Kim
Contact:	Jennifer Sanchez		
Standard:	FCC 15.E/RSS-210	Class:	N/A

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	
5470.000	66.6	V	68.3	-1.7	Pk	35	1.2	POS; RB 1 MHz; VB: 1 MHz

For emissions in the 5460-5470MHz frequency range the limit is -27dBm/MHz eirp (68.3dBuV/m). The measurement method required is the same measurement method used to determine the in-band power spectral density or a peak measurement (RB=1MHz, VB>1MHz).



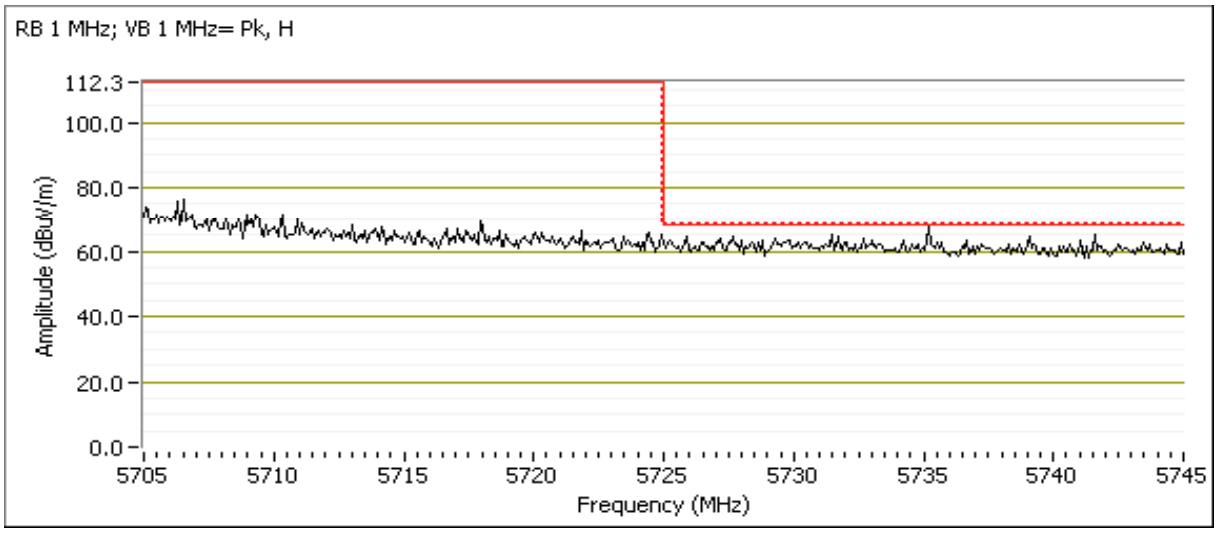
Client:	Ubiquiti Networks	Job Number:	J86352
Model:	RocketM5 Titanium	T-Log Number:	T88756
		Account Manager:	Michelle Kim
Contact:	Jennifer Sanchez		
Standard:	FCC 15.E/RSS-210	Class:	N/A

Run # 3d, EUT on Channel 5675MHz - HT40, Chain A+B

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	
5737.420	68.1	H	68.3	-0.2	Pk	360	1.0	POS; RB 1 MHz; VB: 1 MHz
5731.810	66.1	V	68.3	-2.2	Pk	18	1.1	POS; RB 1 MHz; VB: 1 MHz

For emissions in the 5460-5470MHz frequency range the limit is -27dBm/MHz eirp (68.3dBuV/m). The measurement method required is the same measurement method used to determine the in-band power spectral density or a peak measurement (RB=1MHz, VB>1MHz).



Client:	Ubiquiti Networks	Job Number:	J86352
Model:	RocketM5 Titanium	T-Log Number:	T88756
		Account Manager:	Michelle Kim
Contact:	Jennifer Sanchez		
Standard:	FCC 15.E/RSS-210	Class:	N/A

Run # 4, Band Edge Field Strength - HT10, Chain A+B

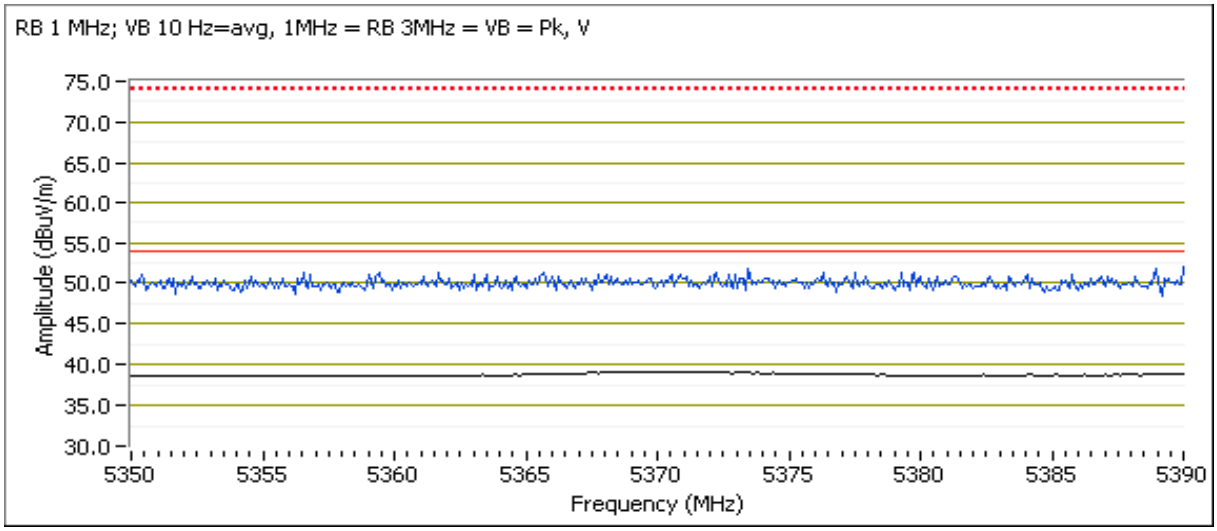
Run # 4b, EUT on Channel 5330MHz - HT10, Chain A+B

Date of Test: 8/17/2012 Test Location: FT Chamber#3

Test Engineer: Joseph Cadigal 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	
5369.320	39.1	V	54.0	-14.9	AVG	0	1.0	POS; RB 1 MHz; VB: 10 Hz
5354.570	50.8	V	74.0	-23.2	PK	0	1.0	POS; RB 1 MHz; VB: 3 MHz
5369.320	39.1	H	54.0	-14.9	AVG	355	1.0	POS; RB 1 MHz; VB: 10 Hz
5368.200	49.9	H	74.0	-24.1	PK	355	1.0	POS; RB 1 MHz; VB: 3 MHz



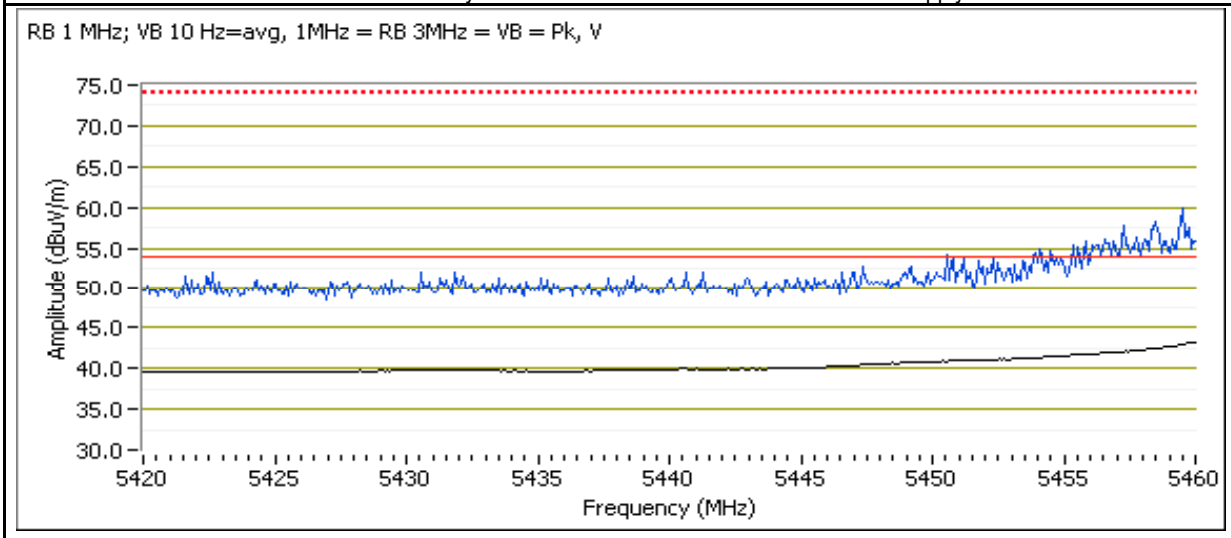
Client:	Ubiquiti Networks	Job Number:	J86352
Model:	RocketM5 Titanium	T-Log Number:	T88756
		Account Manager:	Michelle Kim
Contact:	Jennifer Sanchez		
Standard:	FCC 15.E/RSS-210	Class:	N/A

Run # 4c, EUT on Channel 5480MHz - HT10, 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	43.2	V	54.0	-10.8	AVG	360	1.0	POS; RB 1 MHz; VB: 10 Hz
5458.720	56.2	V	74.0	-17.8	PK	360	1.0	POS; RB 1 MHz; VB: 3 MHz
5459.760	40.6	H	54.0	-13.4	AVG	360	1.0	POS; RB 1 MHz; VB: 10 Hz
5457.680	52.0	H	74.0	-22.0	PK	360	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.

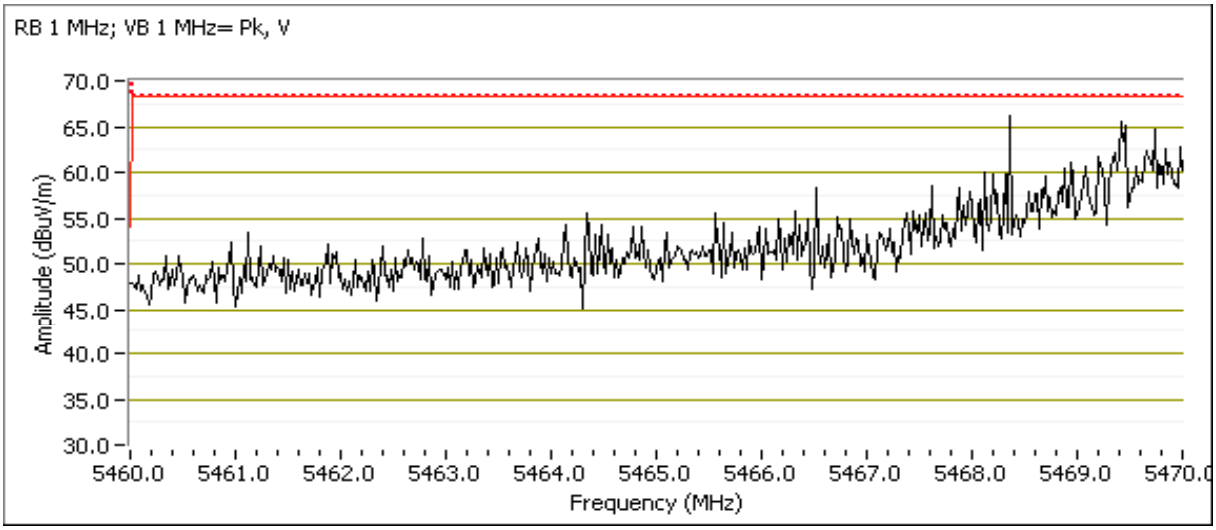


Client:	Ubiquiti Networks	Job Number:	J86352
Model:	RocketM5 Titanium	T-Log Number:	T88756
		Account Manager:	Michelle Kim
Contact:	Jennifer Sanchez		
Standard:	FCC 15.E/RSS-210	Class:	N/A

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	
5469.120	67.4	V	68.3	-0.9	Pk	360	1.0	POS; RB 1 MHz; VB: 1 MHz

For emissions in the 5460-5470MHz frequency range the limit is -27dBm/MHz eirp (68.3dBuV/m). The measurement method required is the same measurement method used to determine the in-band power spectral density or a peak measurement (RB=1MHz, VB>1MHz).



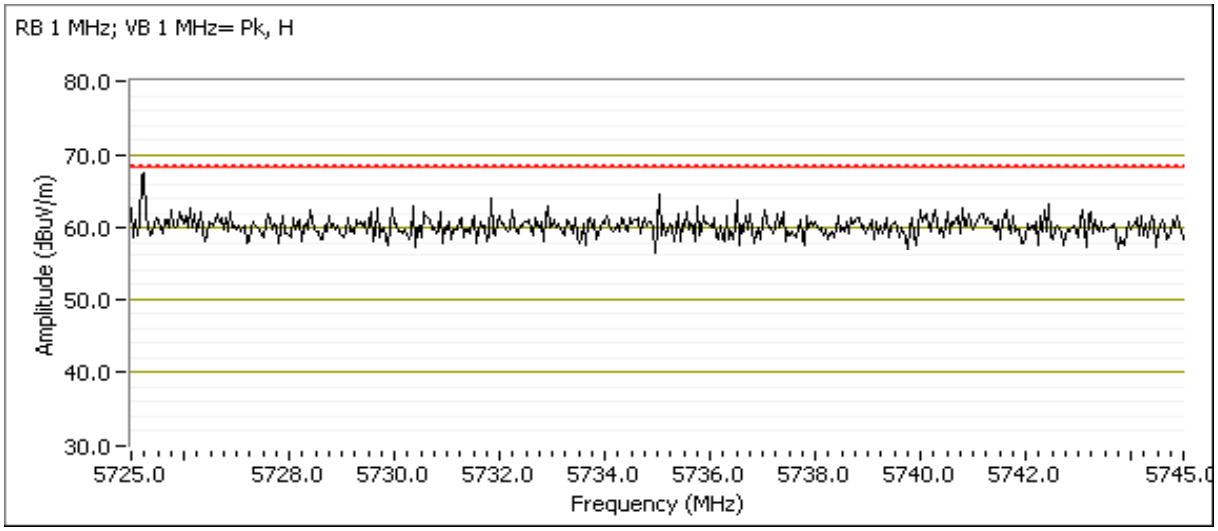
Client:	Ubiquiti Networks	Job Number:	J86352
Model:	RocketM5 Titanium	T-Log Number:	T88756
		Account Manager:	Michelle Kim
Contact:	Jennifer Sanchez		
Standard:	FCC 15.E/RSS-210	Class:	N/A

Run # 4d, EUT on Channel 5710MHz - HT10, Chain A+B

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	
5725.120	66.1	H	68.3	-2.2	Pk	17	1.1	POS; RB 1 MHz; VB: 1 MHz
5725.040	63.2	V	68.3	-5.1	Pk	360	1.0	POS; RB 1 MHz; VB: 1 MHz

For emissions in the 5460-5470MHz frequency range the limit is -27dBm/MHz eirp (68.3dBuV/m). The measurement method required is the same measurement method used to determine the in-band power spectral density or a peak measurement (RB=1MHz, VB>1MHz).



Client:	Ubiquiti Networks	Job Number:	J86352
Model:	RocketM5 Titanium	T-Log Number:	T88756
		Account Manager:	Michelle Kim
Contact:	Jennifer Sanchez		
Standard:	FCC 15.E/RSS-210	Class:	N/A

RSS 210 and FCC 15.407 (UNII) Radiated Spurious Emissions (Sector Antenna)

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.

Test Location: FT Chamber #3 EUT Voltage: POE

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: 27 °C
Rel. Humidity: 38 %

Summary of Results

Run #	Mode	Channel	Power Setting	Measured Power	Test Performed	Limit	Result / Margin
Run #1	802.11a Chain A+B	5270MHz	19.0	-	Radiated Emissions, 1 - 40 GHz	FCC 15.209 / 15 E	64.7 dBµV/m @ 5755.2 MHz (-3.6 dB)
		5300MHz	19.0	-			65.7 dBµV/m @ 5772.8 MHz (-2.6 dB)
		5320MHz	19.0	-			47.6 dBµV/m @ 4964.0 MHz (-6.4 dB)
Run #1	802.11a Chain A+B	5500MHz	19.0	-	Radiated Emissions, 1 - 40 GHz	FCC 15.209 / 15 E	66.0 dBµV/m @ 5873.3 MHz (-2.3 dB)
		5580MHz	19.0	-			66.4 dBµV/m @ 5844.6 MHz (-1.9 dB)
		5700MHz	19.0	-			67.4 dBµV/m @ 5878.0 MHz (-0.9 dB)

Client:	Ubiquiti Networks	Job Number:	J86352
Model:	RocketM5 Titanium	T-Log Number:	T88756
		Account Manager:	Michelle Kim
Contact:	Jennifer Sanchez		
Standard:	FCC 15.E/RSS-210	Class:	N/A

Run #	Mode	Channel	Power Setting	Measured Power	Test Performed	Limit	Result / Margin
Run # 2	HT20 Chain A+B	5270MHz	19.0	-	Radiated Emissions, 1 - 40 GHz	FCC 15.209 / 15 E	65.5 dBµV/m @ 5752.8 MHz (-2.8 dB)
		5300MHz	19.0	-			65.6 dBµV/m @ 5750.0 MHz (-2.7 dB)
		5320MHz	19.0	-			47.5 dBµV/m @ 4967.1 MHz (-6.5 dB)
Run # 2	HT20 Chain A+B	5500MHz	19.0	-	Radiated Emissions, 1 - 40 GHz	FCC 15.209 / 15 E	68.2 dBµV/m @ 5865.3 MHz (-0.1 dB)
		5580MHz	19.0	-			67.2 dBµV/m @ 5867.3 MHz (-1.1 dB)
		5700MHz	19.0	-			48.6 dBµV/m @ 4981.9 MHz (-5.4 dB)

Run #	Mode	Channel	Power Setting	Measured Power	Test Performed	Limit	Result / Margin
Run # 3	HT40 Chain A+B	5275MHz	19.0	-	Radiated Emissions, 1 - 40 GHz	FCC 15.209 / 15 E	68.2 dBµV/m @ 5802.9 MHz (-0.1 dB)
		-	19.0	-			-
		5310MHz	19.0	-			41.1 dBµV/m @ 5043.4 MHz (-12.9 dB)
Run # 3	HT40 Chain A+B	5510MHz	19.0	-	Radiated Emissions, 1 - 40 GHz	FCC 15.209 / 15 E	67.0 dBµV/m @ 5862.5 MHz (-1.3 dB)
		5550MHz	19.0	-			65.2 dBµV/m @ 5865.9 MHz (-3.1 dB)
		5675MHz	12.5	-			68.2 dBµV/m @ 5725.0 MHz (-0.1 dB)

Client:	Ubiquiti Networks	Job Number:	J86352
Model:	RocketM5 Titanium	T-Log Number:	T88756
		Account Manager:	Michelle Kim
Contact:	Jennifer Sanchez		
Standard:	FCC 15.E/RSS-210	Class:	N/A

Run #	Mode	Channel	Power Setting	Measured Power	Test Performed	Limit	Result / Margin
Run # 4	HT10 Chain A+B	5260MHz	19.0	-	Radiated Emissions, 1 - 40 GHz	FCC 15.209 / 15 E	67.8 dBµV/m @ 5800.6 MHz (-0.5 dB)
		5300MHz	19.0	-			67.3 dBµV/m @ 5735.8 MHz (-1.0 dB)
		5330MHz	19.0	-			57.7 dBµV/m @ 5756.3 MHz (-10.6 dB)
Run # 4	HT10 Chain A+B	5480MHz	13.0	-	Radiated Emissions, 1 - 40 GHz	FCC 15.209 / 15 E	68.1 dBµV/m @ 5736.5 MHz (-0.2 dB)
		5590MHz	13.5	-			67.1 dBµV/m @ 5793.3 MHz (-1.2 dB)
		5710MHz	13.0	-			67.4 dBµV/m @ 5725.6 MHz (-0.9 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.

Notes

No radio related emissions observed below 1GHz in preliminary testing.

Test Procedure Comments:

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

Antenna: 20dBi Sector
Duty Cycle: >98%

Client:	Ubiquiti Networks	Job Number:	J86352
Model:	RocketM5 Titanium	T-Log Number:	T88756
		Account Manager:	Michelle Kim
Contact:	Jennifer Sanchez		
Standard:	FCC 15.E/RSS-210	Class:	N/A

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

Date of Test: 8/17/2012 Test Location: FT Chamber#3

Test Engineer: Joseph Cadigal Config Change: none

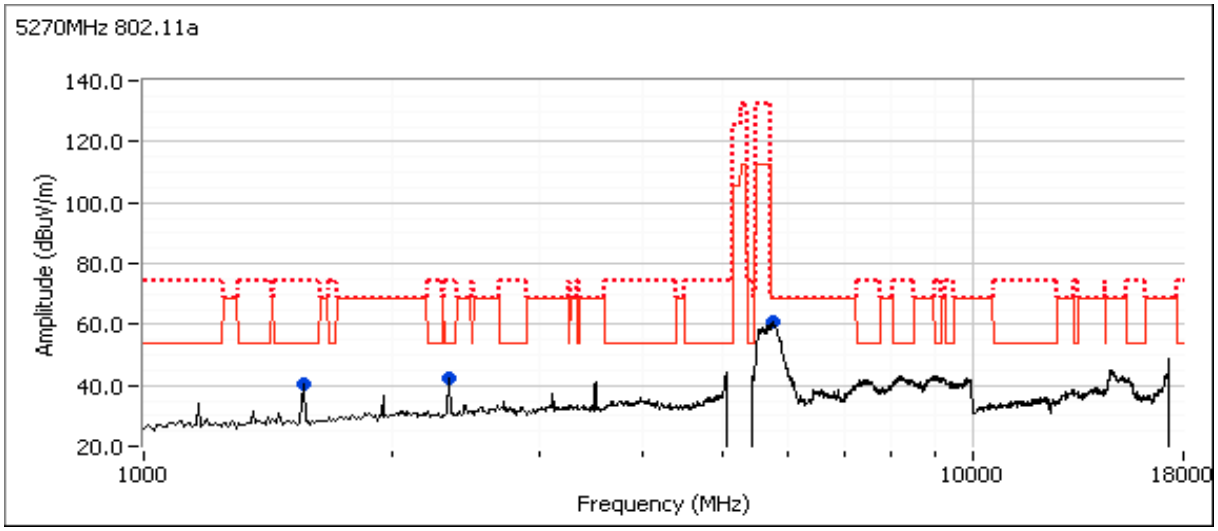
For emissions in restricted bands, the limit of 15.209 was used. For all other emissions, the limit is -27dBm eirp (68.3dBuV/m @3m).

Run #1a: EUT on Channel 5270MHz - 802.11a, 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	
5755.150	64.7	V	68.3	-3.6	PK	6	1.3	
2325.300	25.6	V	54.0	-28.4	AVG	144	1.0	
1555.160	24.5	V	54.0	-29.5	AVG	144	1.0	
2327.700	37.4	V	74.0	-36.6	PK	144	1.0	
1554.790	34.9	V	74.0	-39.1	PK	144	1.0	

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 the same measurement method used to determine the in-band power spectral density or a peak measurement (RB=1MHz, VB>1MHz).



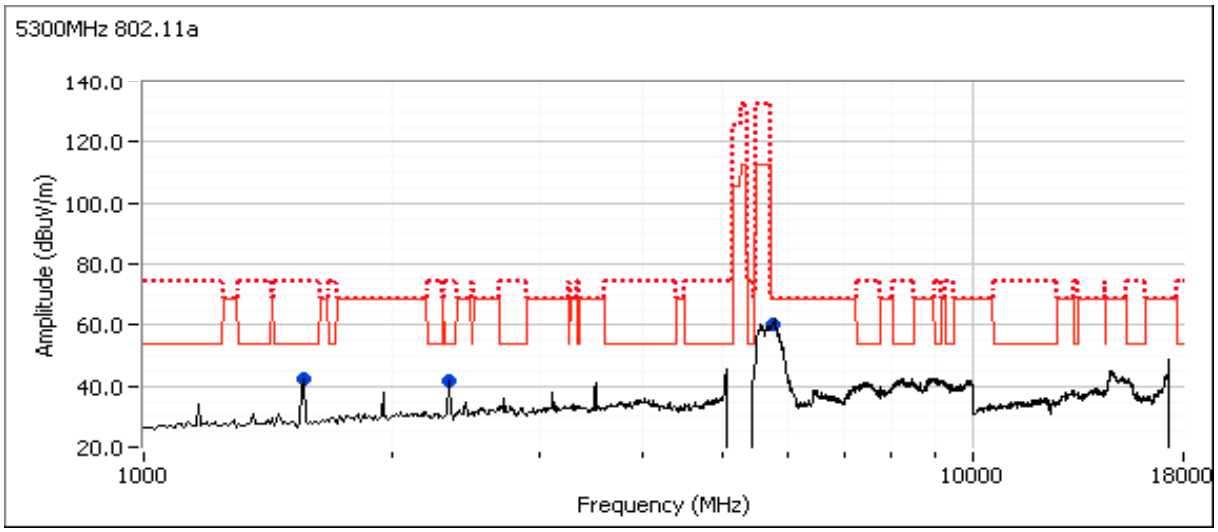
Client:	Ubiquiti Networks	Job Number:	J86352
Model:	RocketM5 Titanium	T-Log Number:	T88756
		Account Manager:	Michelle Kim
Contact:	Jennifer Sanchez		
Standard:	FCC 15.E/RSS-210	Class:	N/A

Run #1b: EUT on Channel 5300MHz - 802.11a, 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	
5772.810	65.7	V	68.3	-2.6	PK	3	1.3	
1559.990	40.7	V	54.0	-13.3	AVG	151	1.0	
2323.950	25.5	V	54.0	-28.5	AVG	143	1.0	
1560.070	43.2	V	74.0	-30.8	PK	151	1.0	
2324.470	37.1	V	74.0	-36.9	PK	143	1.0	

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 the same measurement method used to determine the in-band power spectral density or a peak measurement (RB=1MHz, VB>1MHz).
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:	Ubiquiti Networks	Job Number:	J86352
Model:	RocketM5 Titanium	T-Log Number:	T88756
		Account Manager:	Michelle Kim
Contact:	Jennifer Sanchez		
Standard:	FCC 15.E/RSS-210	Class:	N/A

Run #1c: EUT on Channel 5320MHz - 802.11a, Chain A+B

Date of Test: 10/4/2012 Test Location: FT Chamber#7

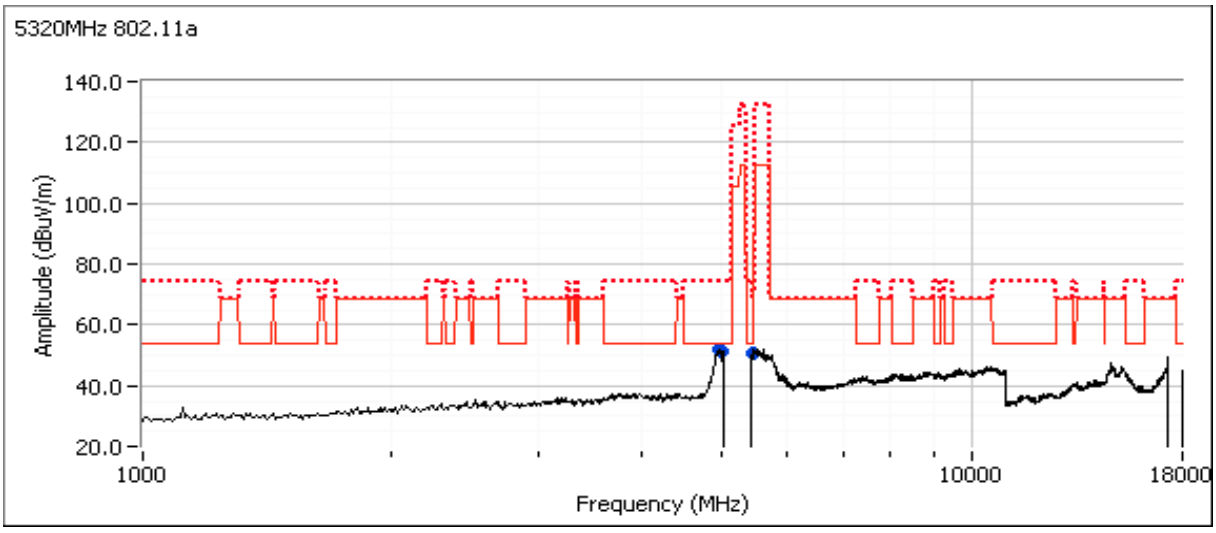
Test Engineer: Joseph Cadigal Config Change: none

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	
4963.990	47.6	H	54.0	-6.4	AVG	341	1.0	RB 1 MHz;VB 10 Hz;Peak
5451.800	46.9	H	54.0	-7.1	AVG	347	1.0	RB 1 MHz;VB 10 Hz;Peak
5000.760	45.5	H	54.0	-8.5	AVG	347	1.0	RB 1 MHz;VB 10 Hz;Peak
4966.120	59.1	H	74.0	-14.9	PK	341	1.0	RB 1 MHz;VB 3 MHz;Peak
5451.540	58.3	H	74.0	-15.7	PK	347	1.0	RB 1 MHz;VB 3 MHz;Peak
5001.400	57.1	H	74.0	-16.9	PK	347	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 the same measurement method used to determine the in-band power spectral density or a peak measurement (RB=1MHz, VB>1MHz).
Note 3:	Taken measurement with bandedge setup (no pre-amp or filter).

Re-scan 10/4



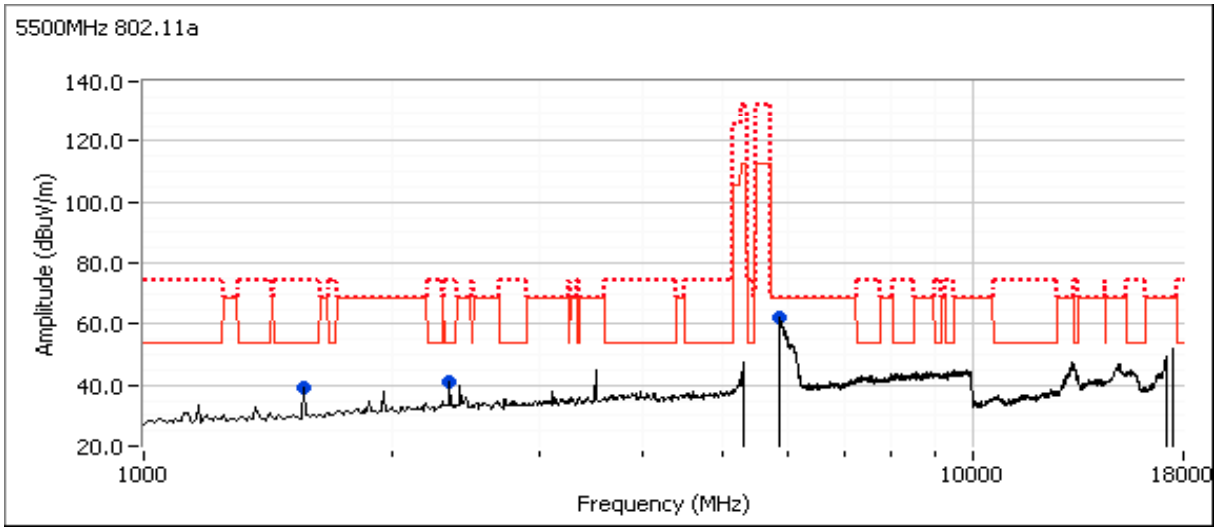
Client:	Ubiquiti Networks	Job Number:	J86352
Model:	RocketM5 Titanium	T-Log Number:	T88756
		Account Manager:	Michelle Kim
Contact:	Jennifer Sanchez		
Standard:	FCC 15.E/RSS-210	Class:	N/A

Run #1d: EUT on Channel 5500MHz - 802.11a, 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	
5873.250	66.0	H	68.3	-2.3	PK	16	1.3	
2339.980	42.2	V	54.0	-11.8	AVG	137	1.0	
1560.000	39.0	V	54.0	-15.0	AVG	164	1.3	
2340.020	46.0	V	74.0	-28.0	PK	137	1.0	
1559.960	42.6	V	74.0	-31.4	PK	164	1.3	

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 the same measurement method used to determine the in-band power spectral density or a peak measurement (RB=1MHz, VB>1MHz).



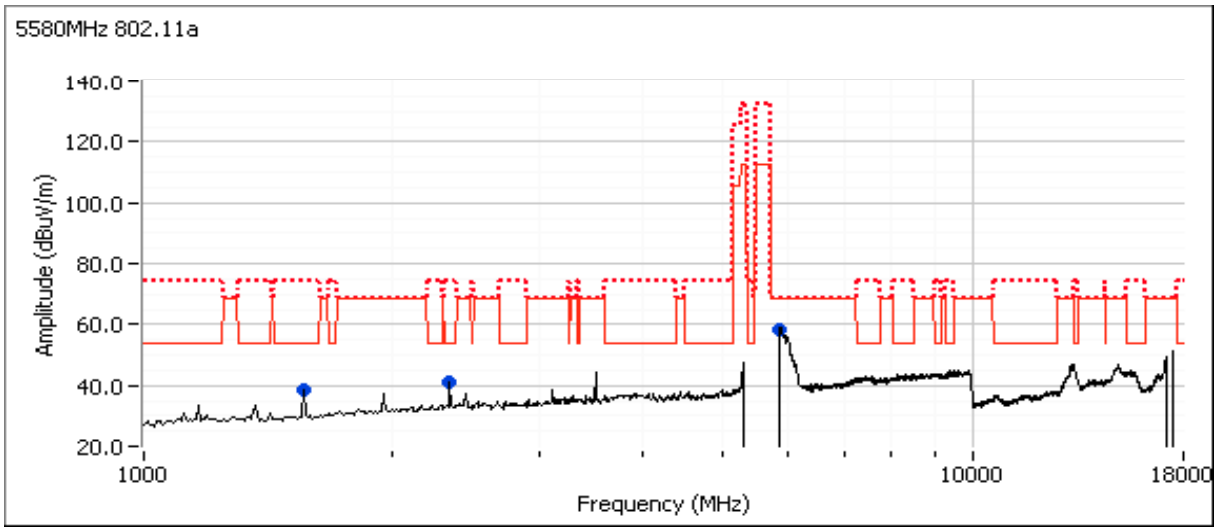
Client:	Ubiquiti Networks	Job Number:	J86352
Model:	RocketM5 Titanium	T-Log Number:	T88756
		Account Manager:	Michelle Kim
Contact:	Jennifer Sanchez		
Standard:	FCC 15.E/RSS-210	Class:	N/A

Run #1e: EUT on Channel 5580MHz - 802.11a, 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	
5844.560	66.4	V	68.3	-1.9	PK	29	1.3	Note 2
2340.010	40.7	V	54.0	-13.3	AVG	228	1.6	
1559.990	39.4	V	54.0	-14.6	AVG	157	1.0	
2340.060	44.6	V	74.0	-29.4	PK	228	1.6	
1560.060	42.6	V	74.0	-31.4	PK	157	1.0	

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 the same measurement method used to determine the in-band power spectral density or a peak measurement (RB=1MHz, VB>1MHz).
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



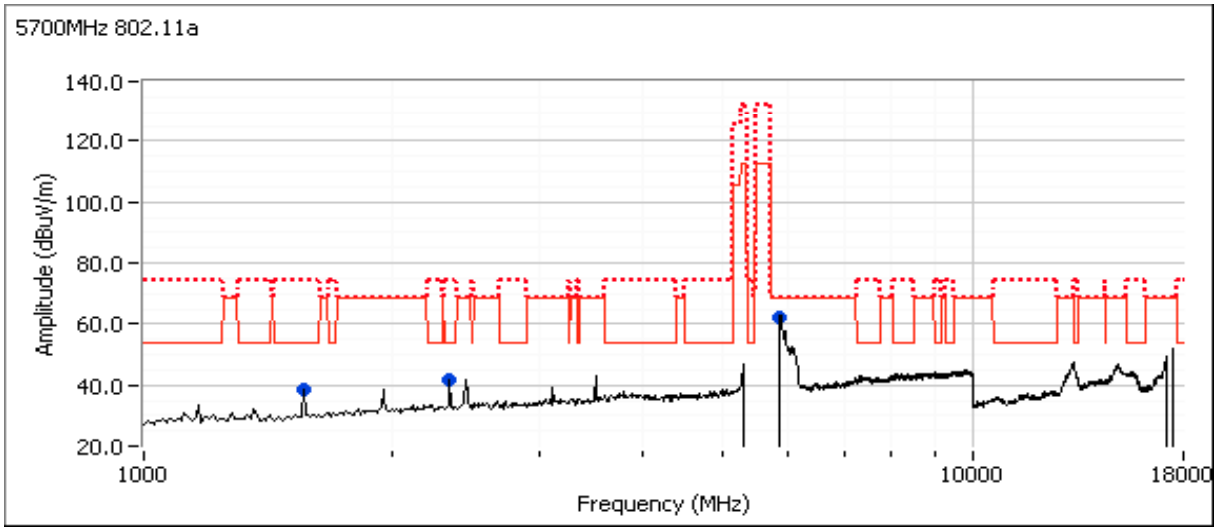
Client:	Ubiquiti Networks	Job Number:	J86352
Model:	RocketM5 Titanium	T-Log Number:	T88756
		Account Manager:	Michelle Kim
Contact:	Jennifer Sanchez		
Standard:	FCC 15.E/RSS-210	Class:	N/A

Run #1f: EUT on Channel 5700MHz - 802.11a, 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	
5877.970	67.4	V	68.3	-0.9	PK	25	1.3	Note 3
2339.990	40.5	V	54.0	-13.5	AVG	182	1.0	
1560.020	38.2	V	54.0	-15.8	AVG	157	1.3	
2340.000	45.0	V	74.0	-29.0	PK	182	1.0	
1560.060	41.6	V	74.0	-32.4	PK	157	1.3	

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 the same measurement method used to determine the in-band power spectral density or a peak measurement (RB=1MHz, VB>1MHz).
Note 3:	Taken measurement with bandedge setup.



Client:	Ubiquiti Networks	Job Number:	J86352
Model:	RocketM5 Titanium	T-Log Number:	T88756
		Account Manager:	Michelle Kim
Contact:	Jennifer Sanchez		
Standard:	FCC 15.E/RSS-210	Class:	N/A

Run # 2, Radiated Spurious Emissions, 1-40GHz, HT20, Chain A+B

Date of Test: 8/17/2012 Test Location: FT Chamber#4

Test Engineer: Joseph Cadigal Config Change: none

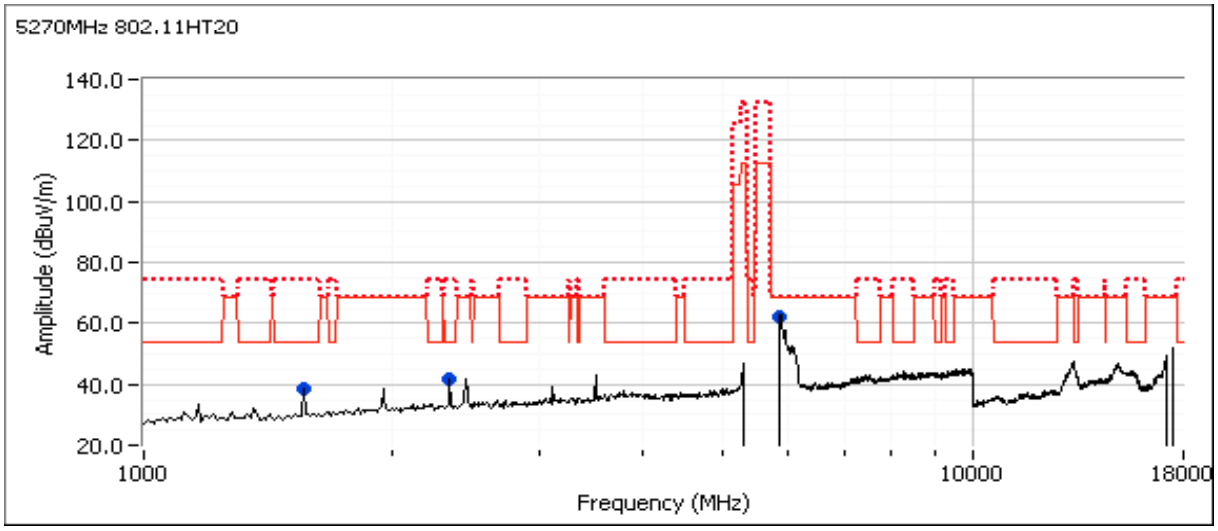
For emissions in restricted bands, the limit of 15.209 was used. For all other emissions, the limit is -27dBm eirp (68.3dBuV/m @3m).

Run # 2a: EUT on Channel 5270MHz - HT20, 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	
5752.770	65.5	H	68.3	-2.8	PK	26	1.3	Note 3
2339.980	40.3	V	54.0	-13.7	AVG	217	1.6	
1559.960	37.6	V	54.0	-16.4	AVG	122	1.3	
2340.030	44.3	V	74.0	-29.7	PK	217	1.6	
1559.990	41.5	V	74.0	-32.5	PK	122	1.3	

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 the same measurement method used to determine the in-band power spectral density or a peak measurement (RB=1MHz, VB>1MHz).



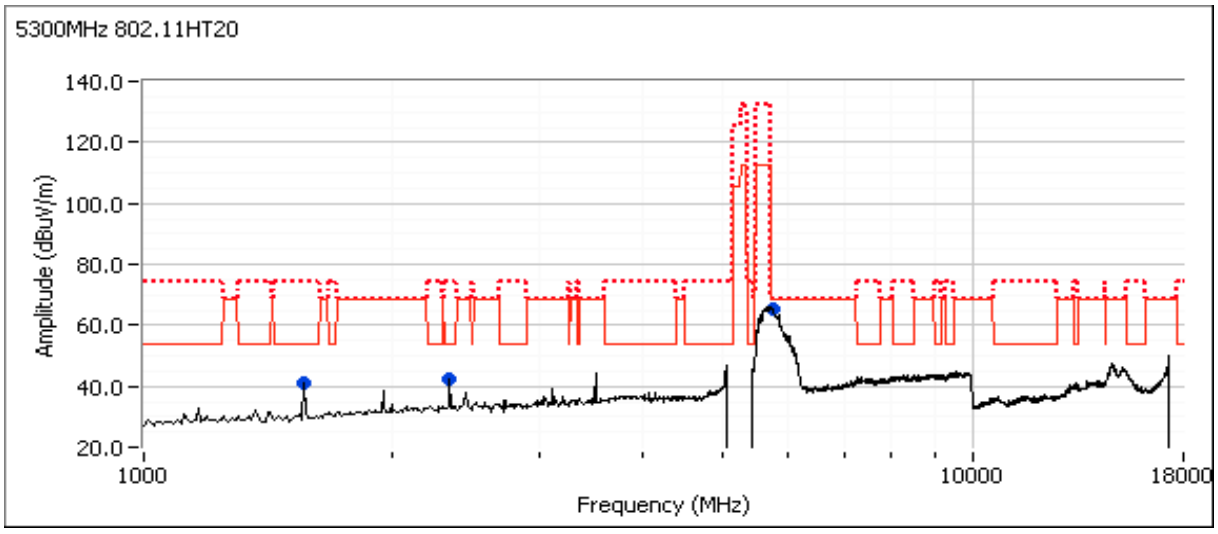
Client:	Ubiquiti Networks	Job Number:	J86352
Model:	RocketM5 Titanium	T-Log Number:	T88756
		Account Manager:	Michelle Kim
Contact:	Jennifer Sanchez		
Standard:	FCC 15.E/RSS-210	Class:	N/A

Run # 2b: EUT on Channel 5300MHz - HT20, 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	
5750.030	65.6	H	68.3	-2.7	PK	40	1.3	Note 3
2339.990	42.1	V	54.0	-11.9	AVG	153	1.0	
1560.040	38.0	V	54.0	-16.0	AVG	159	1.0	
2339.960	45.6	V	74.0	-28.4	PK	153	1.0	
1559.920	41.6	V	74.0	-32.4	PK	159	1.0	

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 the same measurement method used to determine the in-band power spectral density or a peak measurement (RB=1MHz, VB>1MHz).
Note 3:	Taken measurement with bandedge setup.
Note 4:	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:	Ubiquiti Networks	Job Number:	J86352
Model:	RocketM5 Titanium	T-Log Number:	T88756
		Account Manager:	Michelle Kim
Contact:	Jennifer Sanchez		
Standard:	FCC 15.E/RSS-210	Class:	N/A

Run # 2c: EUT on Channel 5320MHz - HT20, Chain A+B

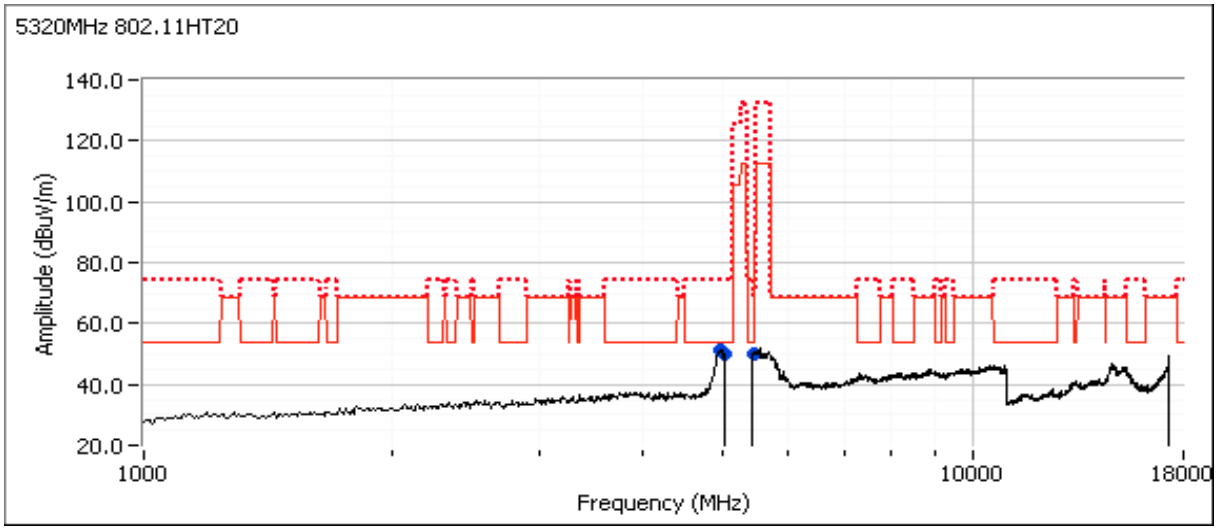
Date of Test: 10/4/2012 Test Location: FT Chamber#7

Test Engineer: Joseph Cadigal 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	
4967.060	47.5	H	54.0	-6.5	AVG	342	1.0	RB 1 MHz;VB 10 Hz;Peak
5448.900	46.9	H	54.0	-7.1	AVG	336	1.0	RB 1 MHz;VB 10 Hz;Peak
5039.310	45.4	H	54.0	-8.6	AVG	342	1.0	RB 1 MHz;VB 10 Hz;Peak
4965.580	59.4	H	74.0	-14.6	PK	342	1.0	RB 1 MHz;VB 3 MHz;Peak
5448.660	57.9	H	74.0	-16.1	PK	336	1.0	RB 1 MHz;VB 3 MHz;Peak
5041.600	56.6	H	74.0	-17.4	PK	342	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 the same measurement method used to determine the in-band power spectral density or a peak measurement (RB=1MHz, VB>1MHz).
Note 3:	Taken measurement with bandedge setup.



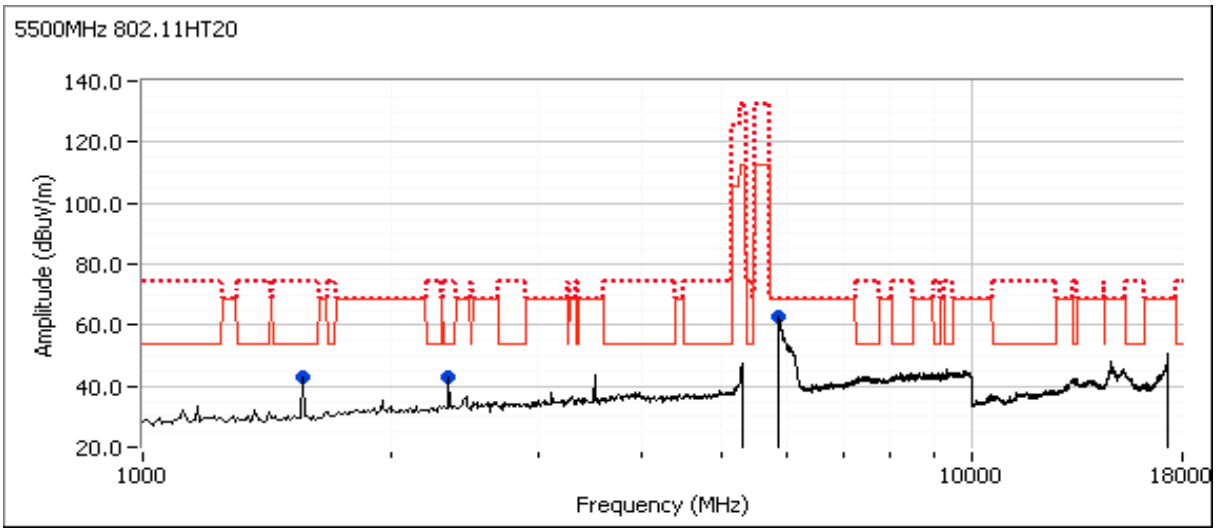
Client:	Ubiquiti Networks	Job Number:	J86352
Model:	RocketM5 Titanium	T-Log Number:	T88756
		Account Manager:	Michelle Kim
Contact:	Jennifer Sanchez		
Standard:	FCC 15.E/RSS-210	Class:	N/A

Run # 2d: EUT on Channel 5500MHz - HT20, 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	
5865.320	68.2	H	68.3	-0.1	PK	357	1.0	Note 3
2339.980	39.0	V	54.0	-15.0	AVG	219	1.5	
1565.810	23.9	V	54.0	-30.1	AVG	154	1.0	
2340.020	43.9	V	74.0	-30.1	PK	219	1.5	
1564.680	35.0	V	74.0	-39.0	PK	154	1.0	

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 the same measurement method used to determine the in-band power spectral density or a peak measurement (RB=1MHz, VB>1MHz).
Note 3:	Taken measurement with bandedge setup.



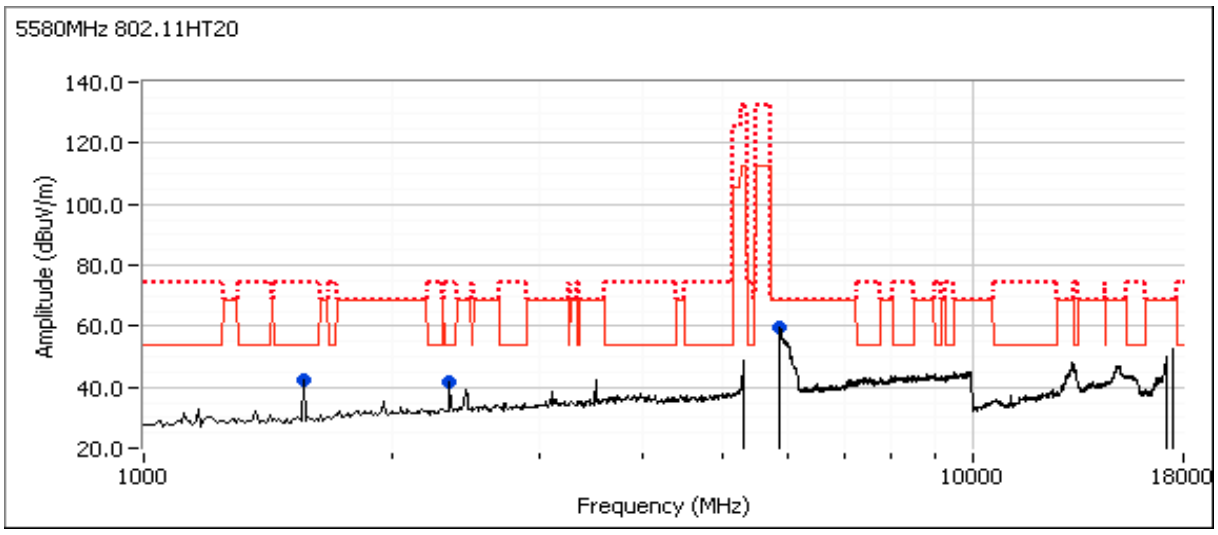
Client:	Ubiquiti Networks	Job Number:	J86352
Model:	RocketM5 Titanium	T-Log Number:	T88756
		Account Manager:	Michelle Kim
Contact:	Jennifer Sanchez		
Standard:	FCC 15.E/RSS-210	Class:	N/A

Run # 2e: EUT on Channel 5580MHz - HT20, 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	
5867.310	67.2	V	68.3	-1.1	PK	355	1.0	
2340.000	40.3	V	54.0	-13.7	AVG	191	1.0	
2339.840	44.9	V	74.0	-29.1	PK	191	1.0	
1568.190	24.6	V	54.0	-29.4	AVG	136	1.0	
1568.990	35.2	V	74.0	-38.8	PK	136	1.0	

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 the same measurement method used to determine the in-band power spectral density or a peak measurement (RB=1MHz, VB>1MHz).
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:	Ubiquiti Networks	Job Number:	J86352
Model:	RocketM5 Titanium	T-Log Number:	T88756
		Account Manager:	Michelle Kim
Contact:	Jennifer Sanchez		
Standard:	FCC 15.E/RSS-210	Class:	N/A

Run # 2f: EUT on Channel 5700MHz - HT20, Chain A+B

Date of Test: 10/4/2012 Test Location: FT Chamber#7

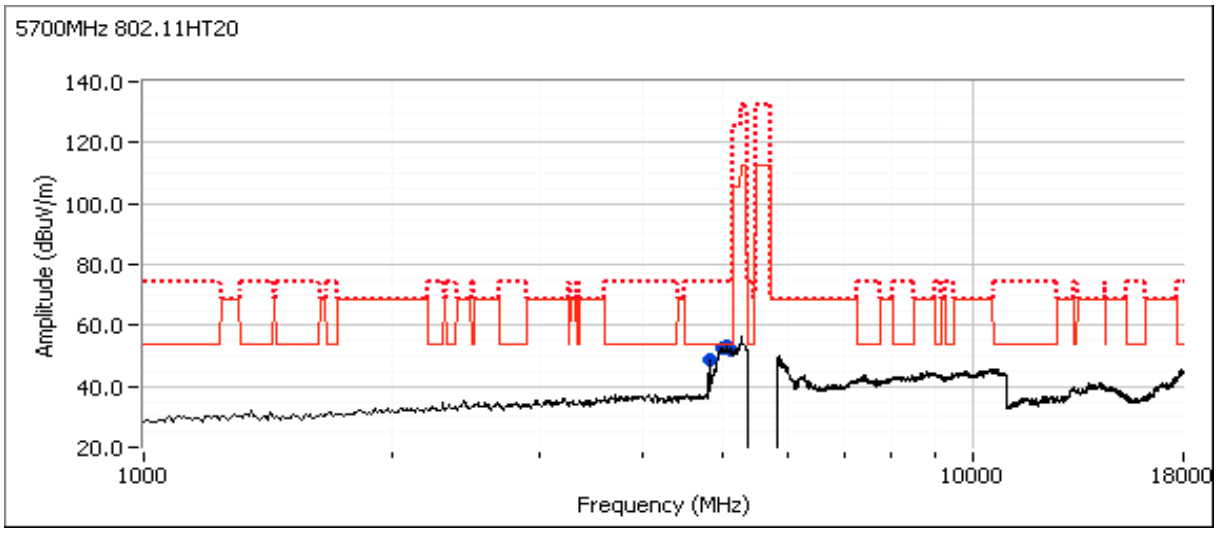
Test Engineer: Joseph Cadigal Config Change: none

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	
4981.930	48.6	H	54.0	-5.4	AVG	348	1.0	RB 1 MHz;VB 10 Hz;Peak
5114.670	47.9	H	54.0	-6.1	AVG	335	1.0	RB 1 MHz;VB 10 Hz;Peak
5059.850	47.7	H	54.0	-6.3	AVG	348	1.0	RB 1 MHz;VB 10 Hz;Peak
5115.430	60.8	H	74.0	-13.2	PK	335	1.0	RB 1 MHz;VB 3 MHz;Peak
4983.540	60.4	H	74.0	-13.6	PK	348	1.0	RB 1 MHz;VB 3 MHz;Peak
5061.760	59.0	H	74.0	-15.0	PK	348	1.0	RB 1 MHz;VB 3 MHz;Peak
4823.060	32.0	H	54.0	-22.0	AVG	80	1.3	RB 1 MHz;VB 10 Hz;Peak
4824.810	43.5	H	74.0	-30.5	PK	80	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 the same measurement method used to determine the in-band power spectral density or a peak measurement (RB=1MHz, VB>1MHz).

Re-scan 10/4



Client:	Ubiquiti Networks	Job Number:	J86352
Model:	RocketM5 Titanium	T-Log Number:	T88756
		Account Manager:	Michelle Kim
Contact:	Jennifer Sanchez		
Standard:	FCC 15.E/RSS-210	Class:	N/A

Run # 3, Radiated Spurious Emissions, 1-40GHz, HT40, Chain A+B

Date of Test: 9/7/2012 Test Location: FT Chamber#5

Test Engineer: Joseph Cadigal Config Change: none

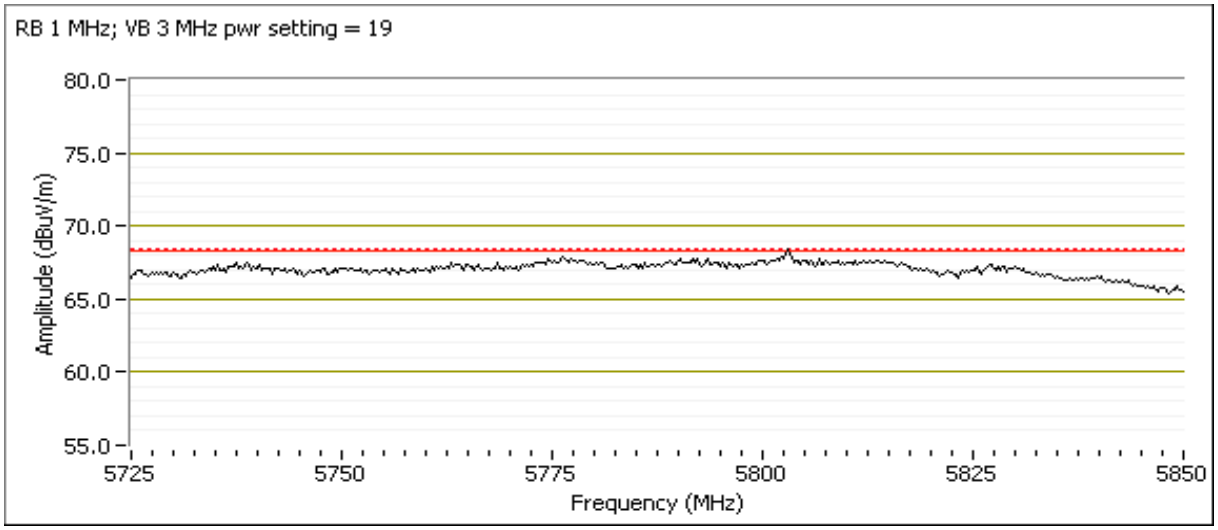
For emissions in restricted bands, the limit of 15.209 was used. For all other emissions, the limit is -27dBm eirp (68.3dBuV/m @3m).

Run # 3d: EUT on Channel 5275MHz - HT40, Chain A+B

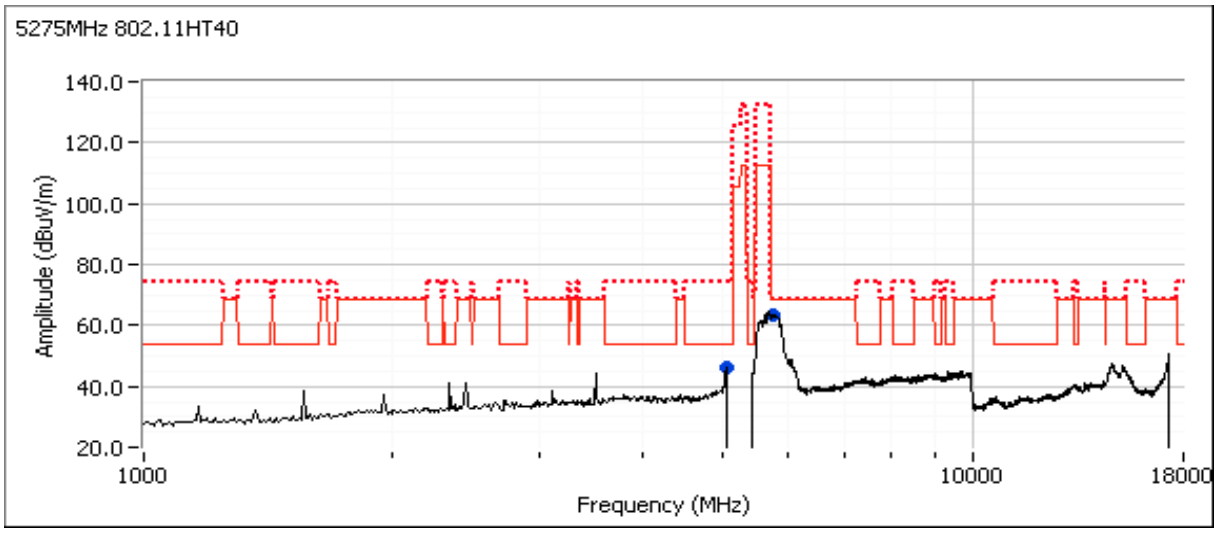
Spurious Radiated Emissions:

Frequency	Level	Pol	15.209 / 15E		Detector	Azimuth	Height	Comments
MHz	dBµV/m	v/h	Limit	Margin	Pk/QP/Avg	degrees	meters	
5802.910	68.2	V	68.3	-0.1	PK	11	1.0	POS Vavg:100; RB 1 MHz; VB: 3 MH
5042.900	40.9	V	54.0	-13.1	AVG	94	1.0	
5042.030	51.8	V	74.0	-22.2	PK	94	1.0	

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 the same measurement method used to determine the in-band power spectral density or a peak measurement (RB=1MHz, VB>1MHz).



Client:	Ubiquiti Networks	Job Number:	J86352
Model:	RocketM5 Titanium	T-Log Number:	T88756
		Account Manager:	Michelle Kim
Contact:	Jennifer Sanchez		
Standard:	FCC 15.E/RSS-210	Class:	N/A



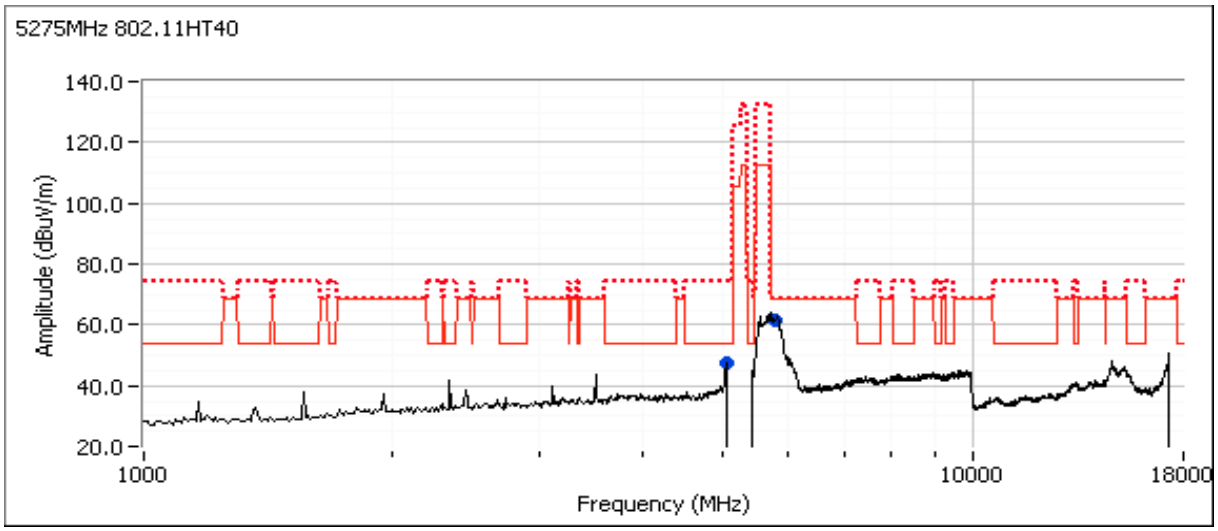
Run # 3f: EUT on Channel 5310MHz - HT40, Chain A+B

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	
5043.410	41.1	H	54.0	-12.9	AVG	66	2.5	
5775.400	55.2	V	68.3	-13.1	PK	360	1.5	
5041.330	52.4	H	74.0	-21.6	PK	66	2.5	

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 the same measurement method used to determine the in-band power spectral density or a peak measurement (RB=1MHz, VB>1MHz).

Client:	Ubiquiti Networks	Job Number:	J86352
Model:	RocketM5 Titanium	T-Log Number:	T88756
		Account Manager:	Michelle Kim
Contact:	Jennifer Sanchez		
Standard:	FCC 15.E/RSS-210	Class:	N/A



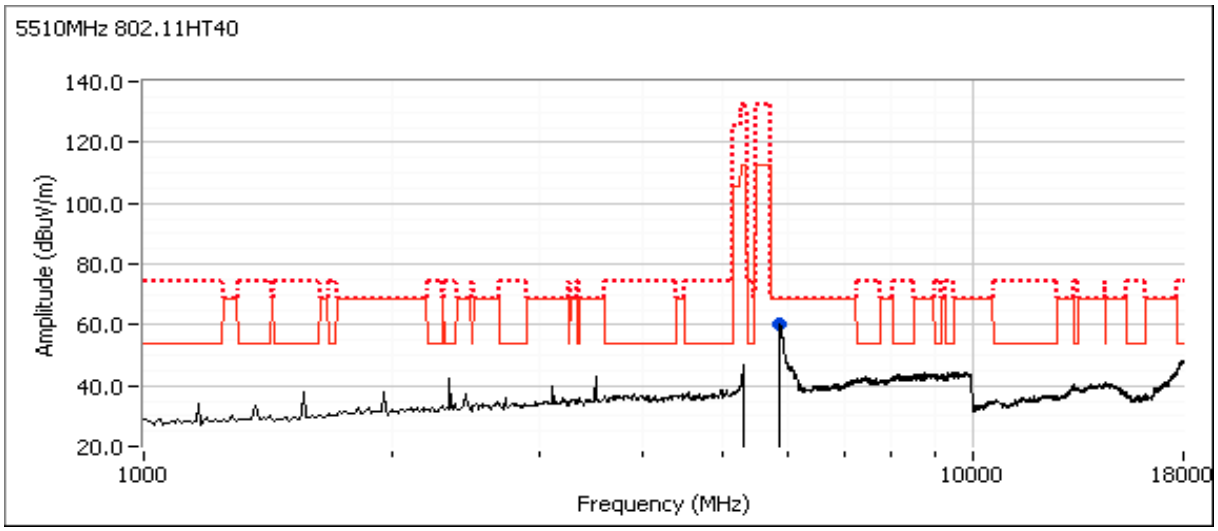
Run # 3g: EUT on Channel 5510MHz - HT40, Chain A+B

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	
5862.520	67.0	V	68.3	-1.3	PK	6	1.0	

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 the same measurement method used to determine the in-band power spectral density or a peak measurement (RB=1MHz, VB>1MHz).

Client:	Ubiquiti Networks	Job Number:	J86352
Model:	RocketM5 Titanium	T-Log Number:	T88756
		Account Manager:	Michelle Kim
Contact:	Jennifer Sanchez		
Standard:	FCC 15.E/RSS-210	Class:	N/A



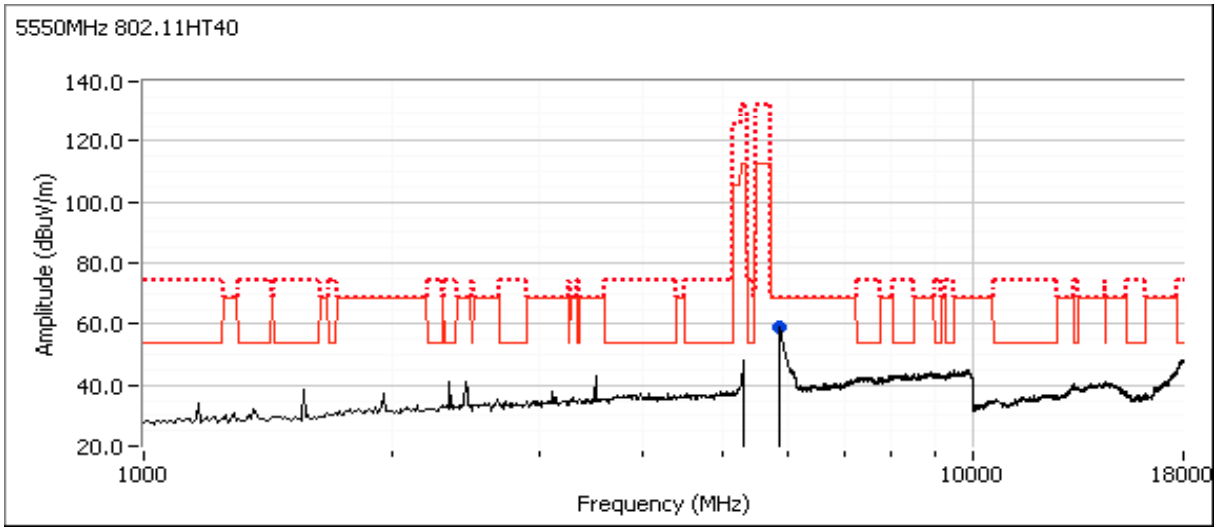
Client:	Ubiquiti Networks	Job Number:	J86352
Model:	RocketM5 Titanium	T-Log Number:	T88756
		Account Manager:	Michelle Kim
Contact:	Jennifer Sanchez		
Standard:	FCC 15.E/RSS-210	Class:	N/A

Run # 3h: EUT on Channel 5550MHz - HT40, 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	
5865.900	65.2	V	68.3	-3.1	PK	345	1.0	

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 the same measurement method used to determine the in-band power spectral density or a peak measurement (RB=1MHz, VB>1MHz).
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



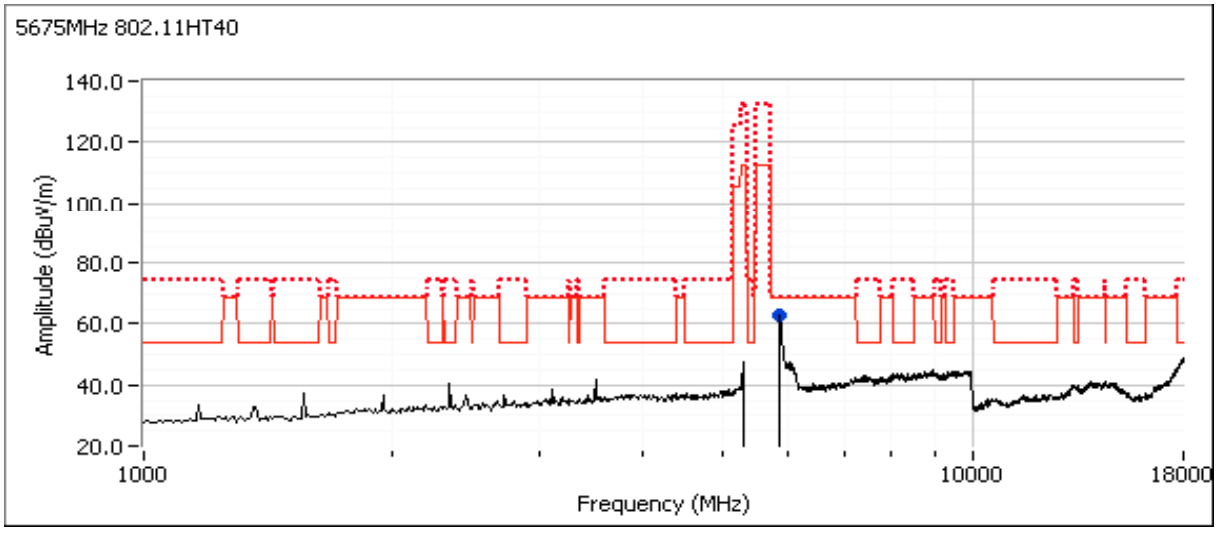
Client:	Ubiquiti Networks	Job Number:	J86352
Model:	RocketM5 Titanium	T-Log Number:	T88756
		Account Manager:	Michelle Kim
Contact:	Jennifer Sanchez		
Standard:	FCC 15.E/RSS-210	Class:	N/A

Run # 3i: EUT on Channel 5675MHz - HT40, Chain A+B

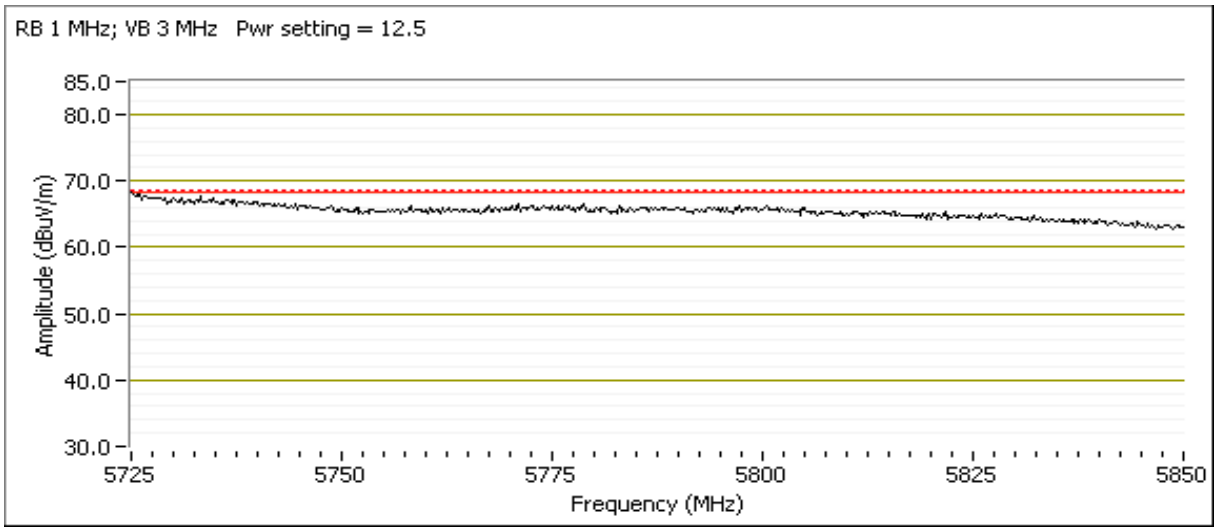
Spurious Radiated Emissions:

Frequency	Level	Pol	15.209 / 15E		Detector	Azimuth	Height	Comments
MHz	dBµV/m	v/h	Limit	Margin	Pk/QP/Avg	degrees	meters	
5725.000	68.2	V	68.3	-0.1	PK	352	1.13	VAVG 100, Note 3, pwr set = 12.5

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 the same measurement method used to determine the in-band power spectral density or a peak measurement (RB=1MHz, VB>1MHz).
Note 3	Bandedge measurement setup.



Client:	Ubiquiti Networks	Job Number:	J86352
Model:	RocketM5 Titanium	T-Log Number:	T88756
		Account Manager:	Michelle Kim
Contact:	Jennifer Sanchez		
Standard:	FCC 15.E/RSS-210	Class:	N/A



Client:	Ubiquiti Networks	Job Number:	J86352
Model:	RocketM5 Titanium	T-Log Number:	T88756
		Account Manager:	Michelle Kim
Contact:	Jennifer Sanchez		
Standard:	FCC 15.E/RSS-210	Class:	N/A

Run # 4, Radiated Spurious Emissions, 1-40GHz, HT10, Chain A+B

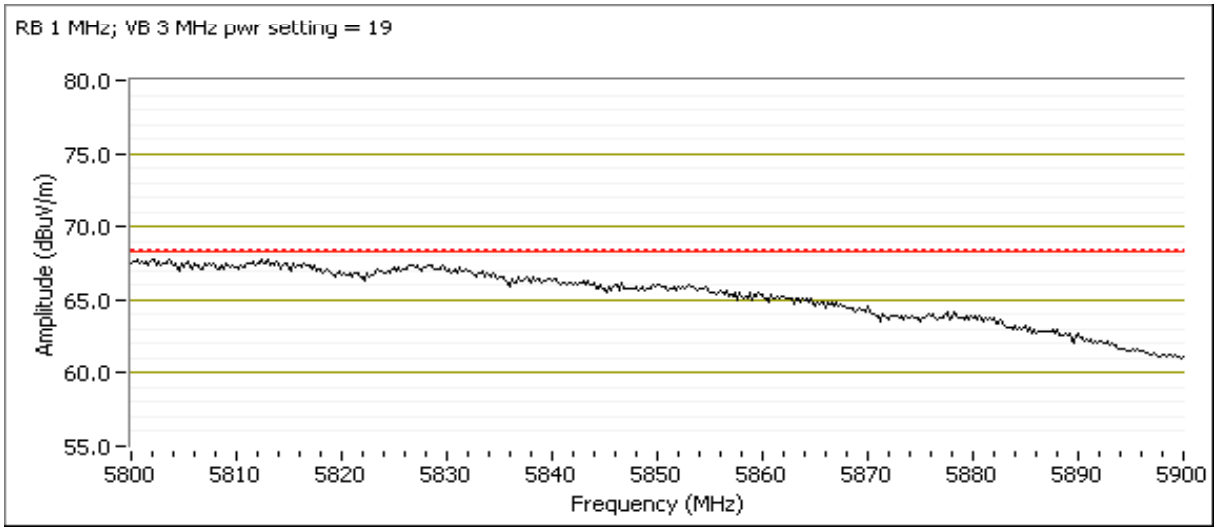
Date of Test: 9/7/2012 & 9/12/12 Test Location: FT Chamber#5
Test Engineer: Joseph Cadigal & John Caizzi Config Change: none.

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).
Run # 4d: EUT on Channel 5260MHz - HT10, Chain A+B

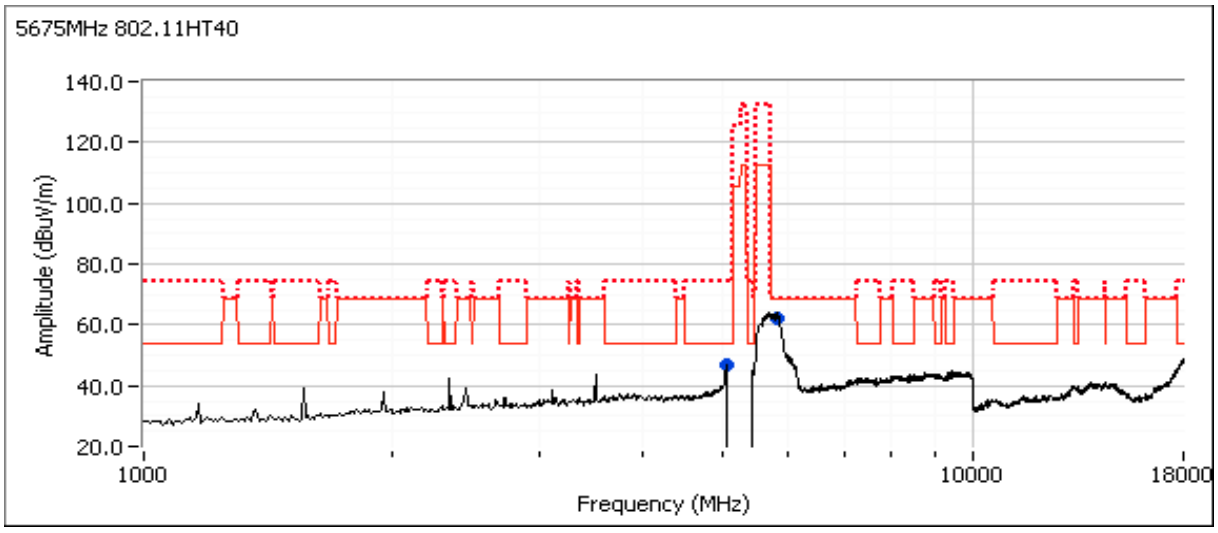
Spurious Radiated Emissions:

Frequency	Level	Pol	15.209 / 15E		Detector	Azimuth	Height	Comments
MHz	dBµV/m	v/h	Limit	Margin	Pk/QP/Avg	degrees	meters	
5800.600	67.8	V	68.3	-0.5	PK	349	1.0	POS Vavg:100; RB 1 MHz; VB: 3 MH
5043.810	41.4	H	54.0	-12.6	AVG	211	1.5	
5044.130	52.7	H	74.0	-21.3	PK	211	1.5	

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 the same measurement method used to determine the in-band power spectral density or a peak measurement (RB=1MHz, VB>1MHz).



Client:	Ubiquiti Networks	Job Number:	J86352
Model:	RocketM5 Titanium	T-Log Number:	T88756
		Account Manager:	Michelle Kim
Contact:	Jennifer Sanchez		
Standard:	FCC 15.E/RSS-210	Class:	N/A



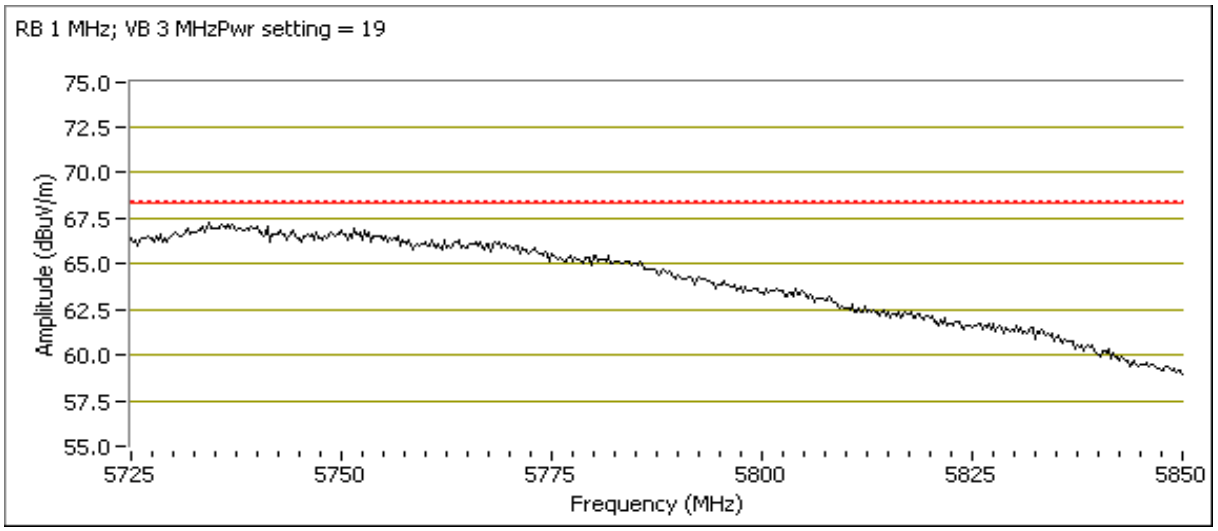
Client:	Ubiquiti Networks	Job Number:	J86352
Model:	RocketM5 Titanium	T-Log Number:	T88756
		Account Manager:	Michelle Kim
Contact:	Jennifer Sanchez		
Standard:	FCC 15.E/RSS-210	Class:	N/A

Run # 4e: EUT on Channel 5300MHz - HT10, Chain A+B

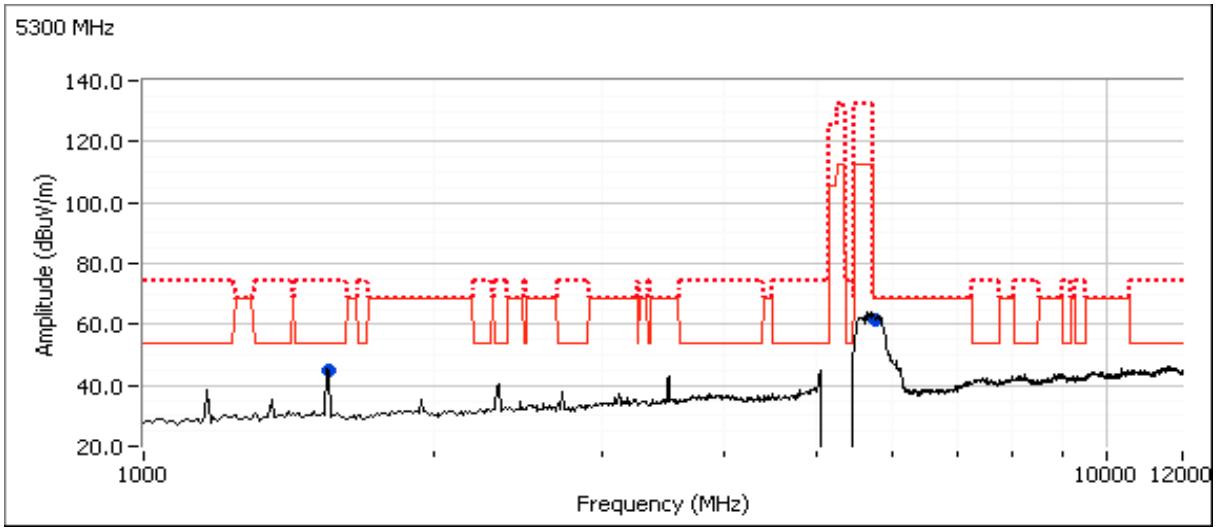
Spurious Radiated Emissions:

Frequency	Level	Pol	15.209 / 15E		Detector	Azimuth	Height	Comments
MHz	dBµV/m	v/h	Limit	Margin	Pk/QP/Avg	degrees	meters	
5735.770	67.3	H	68.3	-1.0	Pk	341	1.0	POS Vavg:100; RB 1 MHz; VB: 3 MH
1560.020	43.1	V	54.0	-10.9	AVG	100	1.5	RB 1 MHz;VB 10 Hz;Peak
1559.850	46.1	V	74.0	-27.9	PK	100	1.5	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 the same measurement method used to determine the in-band power spectral density or a peak measurement (RB=1MHz, VB>1MHz).
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:	Bandedge measurement setup.



Client:	Ubiquiti Networks	Job Number:	J86352
Model:	RocketM5 Titanium	T-Log Number:	T88756
		Account Manager:	Michelle Kim
Contact:	Jennifer Sanchez		
Standard:	FCC 15.E/RSS-210	Class:	N/A



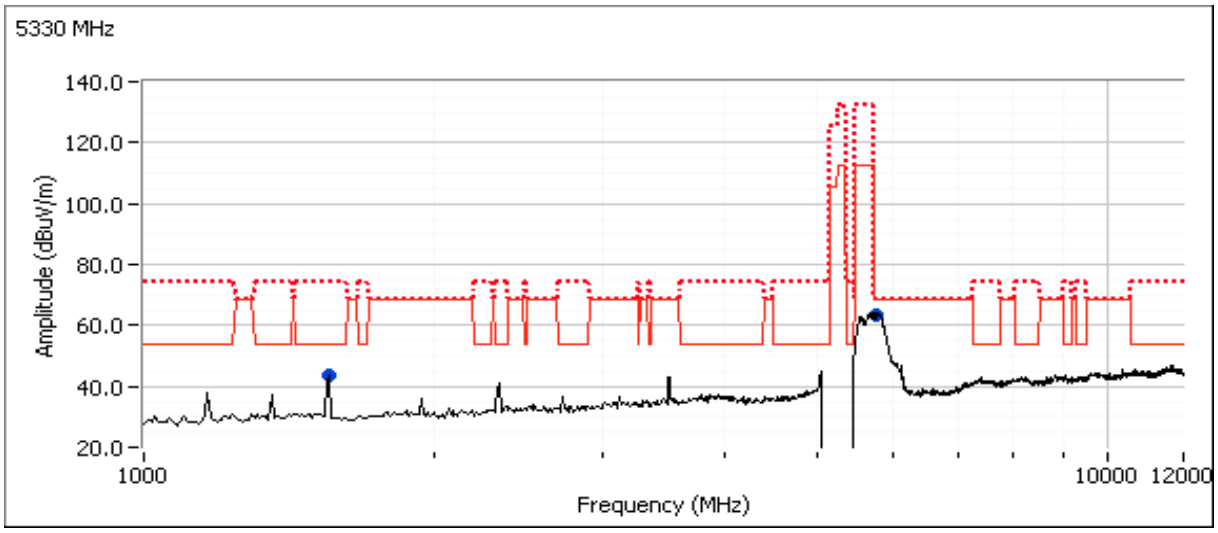
Run # 4f: EUT on Channel 5330MHz - HT10, Chain A+B

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	
5756.250	57.7	V	68.3	-10.6	PK	360	1.5	RB 1 MHz;VB 3 MHz;Peak
1559.980	43.0	V	54.0	-11.0	AVG	97	1.5	RB 1 MHz;VB 10 Hz;Peak
1560.030	45.8	V	74.0	-28.2	PK	97	1.5	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 the same measurement method used to determine the in-band power spectral density or a peak measurement (RB=1MHz, VB>1MHz).

Client:	Ubiquiti Networks	Job Number:	J86352
Model:	RocketM5 Titanium	T-Log Number:	T88756
		Account Manager:	Michelle Kim
Contact:	Jennifer Sanchez		
Standard:	FCC 15.E/RSS-210	Class:	N/A



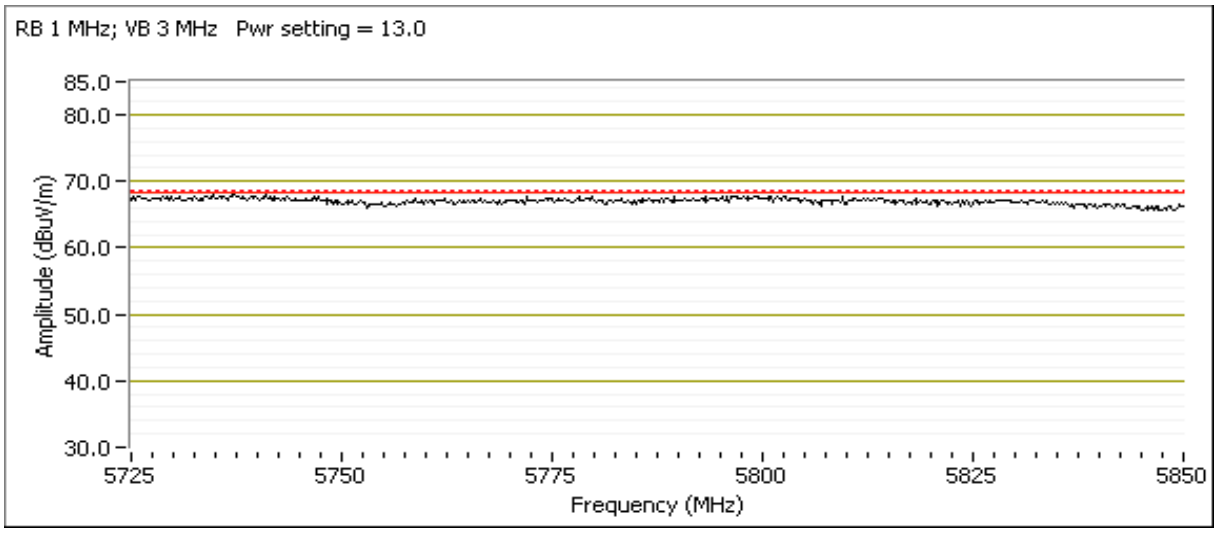
Run # 4g: EUT on Channel 5480MHz - HT10, Chain A+B

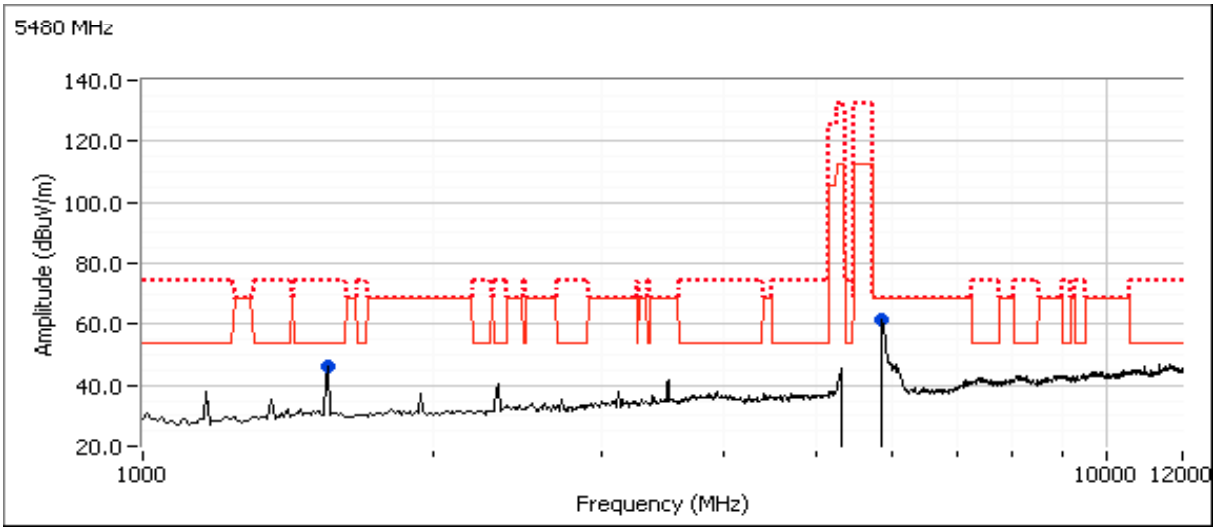
Spurious Radiated Emissions:

Frequency	Level	Pol	15.209 / 15E		Detector	Azimuth	Height	Comments
MHz	dBµV/m	v/h	Limit	Margin	Pk/QP/Avg	degrees	meters	
5736.460	68.1	V	68.3	-0.2	Pk	358	1.06	VAVG 100, Note 3, pwr set = 13.0

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 the same measurement method used to determine the in-band power spectral density or a peak measurement (RB=1MHz, VB>1MHz).
Note 3:	Bandedge measurement setup.

Client:	Ubiquiti Networks	Job Number:	J86352
Model:	RocketM5 Titanium	T-Log Number:	T88756
		Account Manager:	Michelle Kim
Contact:	Jennifer Sanchez		
Standard:	FCC 15.E/RSS-210	Class:	N/A





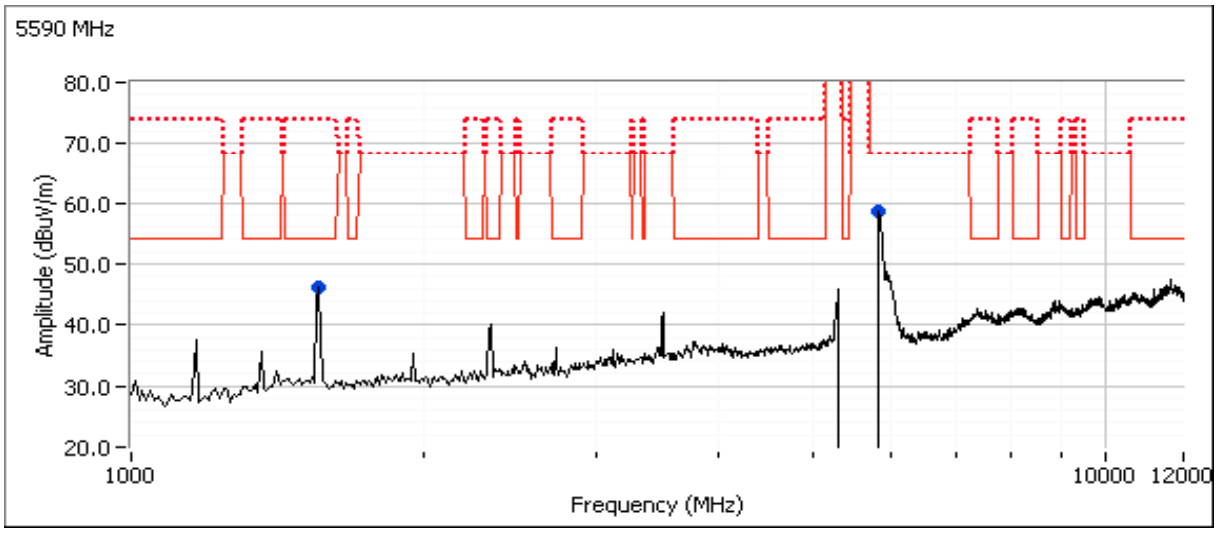
Client:	Ubiquiti Networks	Job Number:	J86352
Model:	RocketM5 Titanium	T-Log Number:	T88756
		Account Manager:	Michelle Kim
Contact:	Jennifer Sanchez		
Standard:	FCC 15.E/RSS-210	Class:	N/A

Run # 4h: EUT on Channel 5590MHz - HT10, Chain A+B

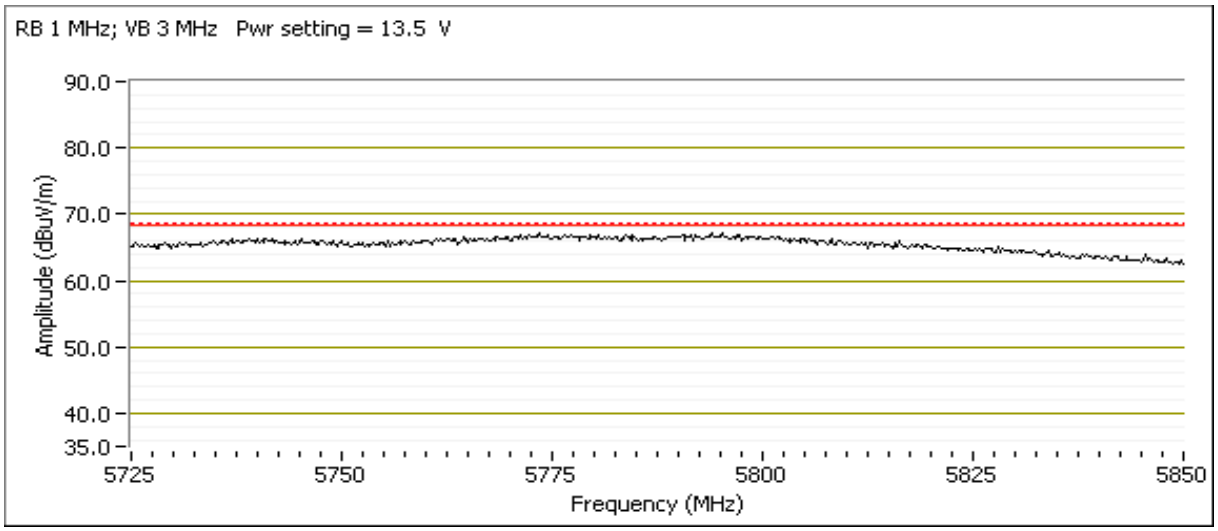
Spurious Radiated Emissions:

Frequency	Level	Pol	15.209 / 15E		Detector	Azimuth	Height	Comments
MHz	dBµV/m	v/h	Limit	Margin	Pk/QP/Avg	degrees	meters	
5793.330	67.1	V	68.3	-1.2	Pk	0	1.03	VAVG 100, Note 4, pwr set = 13.5

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 the same measurement method used to determine the in-band power spectral density or a peak measurement (RB=1MHz, VB>1MHz).
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:	Bandedge measurement setup.



Client:	Ubiquiti Networks	Job Number:	J86352
Model:	RocketM5 Titanium	T-Log Number:	T88756
		Account Manager:	Michelle Kim
Contact:	Jennifer Sanchez		
Standard:	FCC 15.E/RSS-210	Class:	N/A



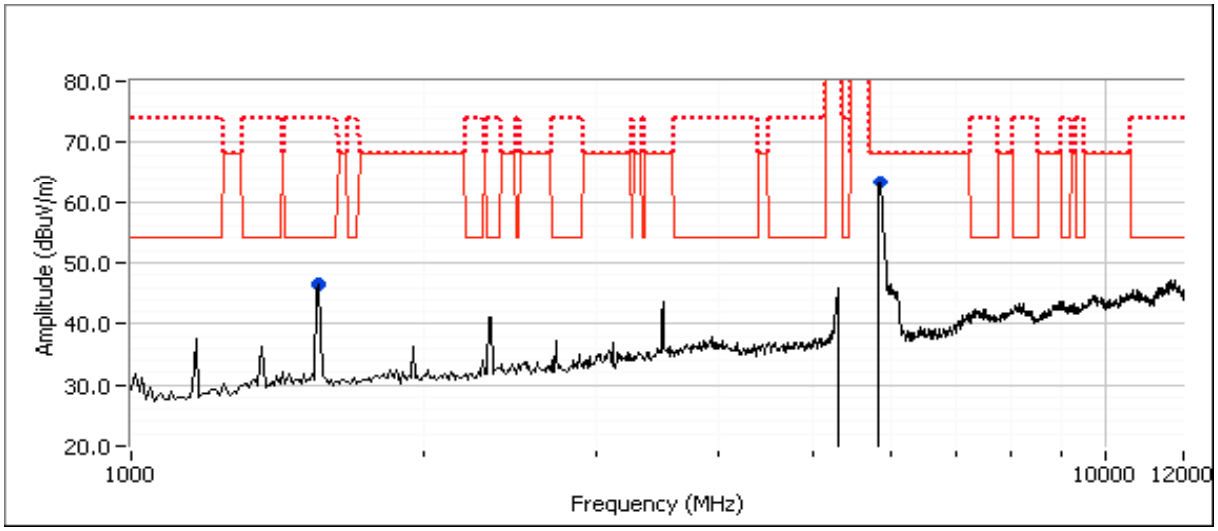
Client:	Ubiquiti Networks	Job Number:	J86352
Model:	RocketM5 Titanium	T-Log Number:	T88756
		Account Manager:	Michelle Kim
Contact:	Jennifer Sanchez		
Standard:	FCC 15.E/RSS-210	Class:	N/A

Run # 4i: EUT on Channel 5710MHz - HT10, Chain A+B

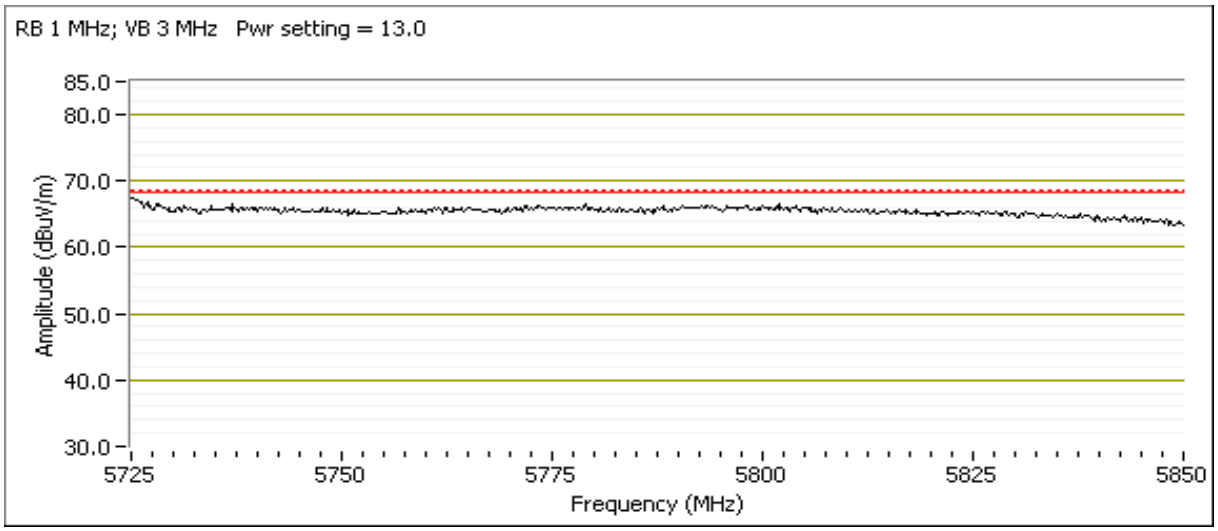
Spurious Radiated Emissions:

Frequency	Level	Pol	15.209 / 15E		Detector	Azimuth	Height	Comments
MHz	dBµV/m	v/h	Limit	Margin	Pk/QP/Avg	degrees	meters	
1560.050	45.9	V	54.0	-8.1	AVG	99	1.5	RB 1 MHz;VB 10 Hz;Peak
1559.990	48.5	V	74.0	-25.5	PK	99	1.5	RB 1 MHz;VB 3 MHz;Peak
5725.620	67.4	V	68.3	-0.9	Pk	1	1.05	VAVG 100, Note 4, pwr set = 13.0

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 the same measurement method used to determine the in-band power spectral density or a peak measurement (RB=1MHz, VB>1MHz).



Client:	Ubiquiti Networks	Job Number:	J86352
Model:	RocketM5 Titanium	T-Log Number:	T88756
		Account Manager:	Michelle Kim
Contact:	Jennifer Sanchez		
Standard:	FCC 15.E/RSS-210	Class:	N/A



Client:	Ubiquiti Networks	Job Number:	J86352
Model:	RocketM5 Titanium	T-Log Number:	T88756
		Account Manager:	Michelle Kim
Contact:	Jennifer Sanchez		
Standard:	FCC 15.E/RSS-210	Class:	N/A

RSS 210 and FCC 15.407 (UNII) Radiated Spurious Emissions (Dish Antenna)

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: 27 °C
Rel. Humidity: 38 %

Summary of Results

Run #	Mode	Channel	Power Setting	Measured Power	Test Performed	Limit	Result / Margin
Run # 1	802.11a Chain A+B	5320MHz	6.5	-	Restricted Band Edge at 5350 MHz	15.209	52.7 dBµV/m @ 5365.0 MHz (-1.3 dB)
Run # 1	802.11a Chain A+B	5500MHz	6.0	-	Restricted Band Edge at 5460 MHz	15.209	52.5 dBµV/m @ 5353.1 MHz (-1.5 dB)
					Band Edge at 5470 MHz	15 E	63.4 dBµV/m @ 5466.1 MHz (-4.9 dB)
Run # 1	802.11a Chain A+B	5700MHz	10.0	-	Band Edge at 5725 MHz	15 E	67.7 dBµV/m @ 5725.4 MHz (-0.6 dB)
Run # 2	HT20 Chain A+B	5320MHz	6.5	-	Restricted Band Edge at 5350 MHz	15.209	52.3 dBµV/m @ 5356.4 MHz (-1.7 dB)
Run # 2	HT20 Chain A+B	5500MHz	6.0	-	Restricted Band Edge at 5460 MHz	15.209	52.2 dBµV/m @ 5455.6 MHz (-1.8 dB)
					Band Edge at 5470 MHz	15 E	63.3 dBµV/m @ 5468.7 MHz (-5.0 dB)
Run # 2	HT20 Chain A+B	5700MHz	9.5	-	Band Edge at 5725 MHz	15 E	67.9 dBµV/m @ 5725.0 MHz (-0.4 dB)
Run # 3	HT40 Chain A+B	5310MHz	2.5	-	Restricted Band Edge at 5350 MHz	15.209	54.0 dBµV/m @ 5350.0 MHz (0.0 dB)

Client:	Ubiquiti Networks	Job Number:	J86352
Model:	RocketM5 Titanium	T-Log Number:	T88756
		Account Manager:	Michelle Kim
Contact:	Jennifer Sanchez		
Standard:	FCC 15.E/RSS-210	Class:	N/A

Run #	Mode	Channel	Power Setting	Measured Power	Test Performed	Limit	Result / Margin
Run # 3	HT40 Chain A+B	5510MHz	4.0	-	Restricted Band Edge at 5460 MHz	15.209	52.5 dBµV/m @ 5455.9 MHz (-1.5 dB)
					Band Edge at 5470 MHz	15 E	68.0 dBµV/m @ 5469.6 MHz (-0.3 dB)
Run # 3	HT40 Chain A+B	5675MHz	6.0	-	Band Edge at 5725 MHz	15 E	67.2 dBµV/m @ 5728.6 MHz (-1.1 dB)
Run # 4	HT10 Chain A+B	5330MHz	6.5	-	Restricted Band Edge at 5350 MHz	15.209	52.5 dBµV/m @ 5353.5 MHz (-1.5 dB)
Run # 4	HT10 Chain A+B	5480MHz	4.5	-	Restricted Band Edge at 5460 MHz	15.209	49.7 dBµV/m @ 5458.7 MHz (-4.3 dB)
					Band Edge at 5470 MHz	15 E	68.2 dBµV/m @ 5469.8 MHz (-0.1 dB)
Run # 4	HT10 Chain A+B	5710MHz	10.0	-	Band Edge at 5725 MHz	15 E	66.2 dBµV/m @ 5725.2 MHz (-2.1 dB)

Modifications Made During Testing

No modifications were made to the EUT during testing

Deviations From The Standard

No deviations were made from the requirements of the standard.

Test Procedure Comments:

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

Antenna: 30dBi Dish
Duty Cycle: >98%

Client:	Ubiquiti Networks	Job Number:	J86352
Model:	RocketM5 Titanium	T-Log Number:	T88756
		Account Manager:	Michelle Kim
Contact:	Jennifer Sanchez		
Standard:	FCC 15.E/RSS-210	Class:	N/A

Run # 1, Band Edge Field Strength - 802.11a, Chain A+B

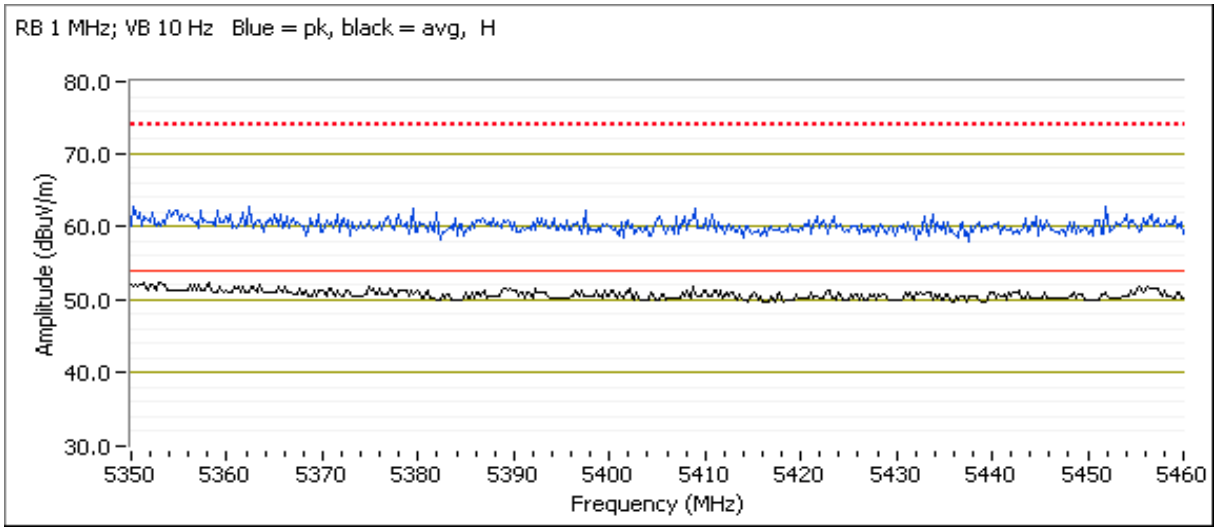
Date of Test: 10/8/2012
Test Engineer: John Caizzi
Test Location: Chamber 4

Config. Used: 1
Config Change: none
EUT Voltage: 48 VDC PoE

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

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	
5456.750	52.6	V	54.0	-1.4	AVG	4	1.01	
5458.200	64.0	V	74.0	-10.0	PK	4	1.01	
5364.990	52.7	H	54.0	-1.3	AVG	6	1.05	
5366.530	62.1	H	74.0	-11.9	PK	6	1.05	



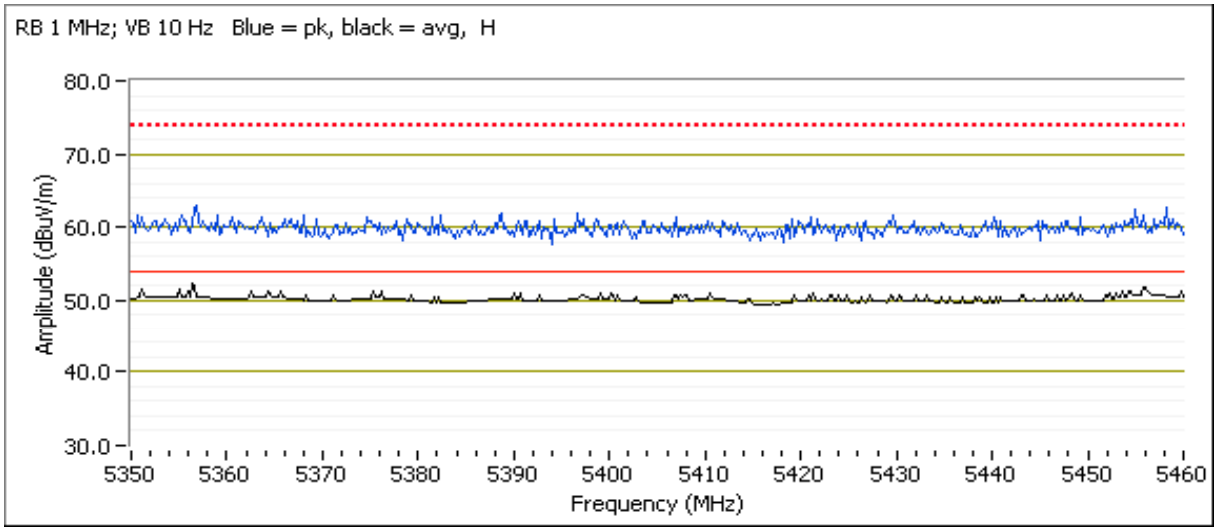
Client:	Ubiquiti Networks	Job Number:	J86352
Model:	RocketM5 Titanium	T-Log Number:	T88756
		Account Manager:	Michelle Kim
Contact:	Jennifer Sanchez		
Standard:	FCC 15.E/RSS-210	Class:	N/A

Run # 1c, EUT on Channel 5500MHz - 802.11a, 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	
5353.090	52.5	H	54.0	-1.5	AVG	7	1.00	
5419.000	61.5	H	74.0	-12.5	PK	7	1.00	

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

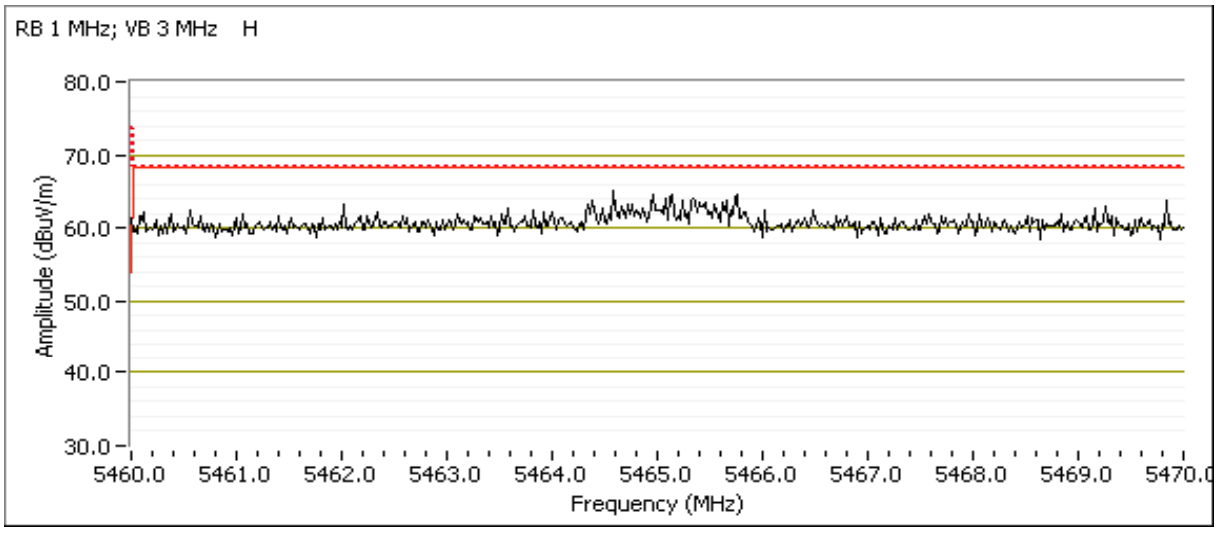


Client:	Ubiquiti Networks	Job Number:	J86352
Model:	RocketM5 Titanium	T-Log Number:	T88756
		Account Manager:	Michelle Kim
Contact:	Jennifer Sanchez		
Standard:	FCC 15.E/RSS-210	Class:	N/A

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	
5466.070	63.4	H	68.3	-4.9	PK	6	1.0	

For emissions in the 5460-5470MHz frequency range the limit is -27dBm/MHz eirp (68.3dBuV/m). The measurement method required is the same measurement method used to determine the in-band power spectral density or a peak measurement (RB=1MHz, VB>1MHz).



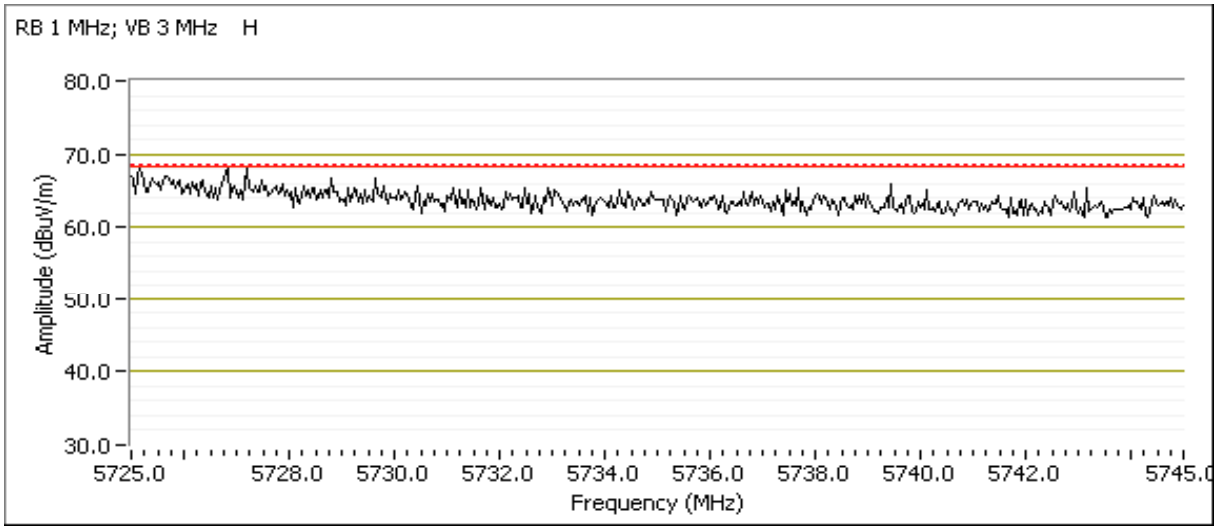
Client:	Ubiquiti Networks	Job Number:	J86352
Model:	RocketM5 Titanium	T-Log Number:	T88756
		Account Manager:	Michelle Kim
Contact:	Jennifer Sanchez		
Standard:	FCC 15.E/RSS-210	Class:	N/A

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

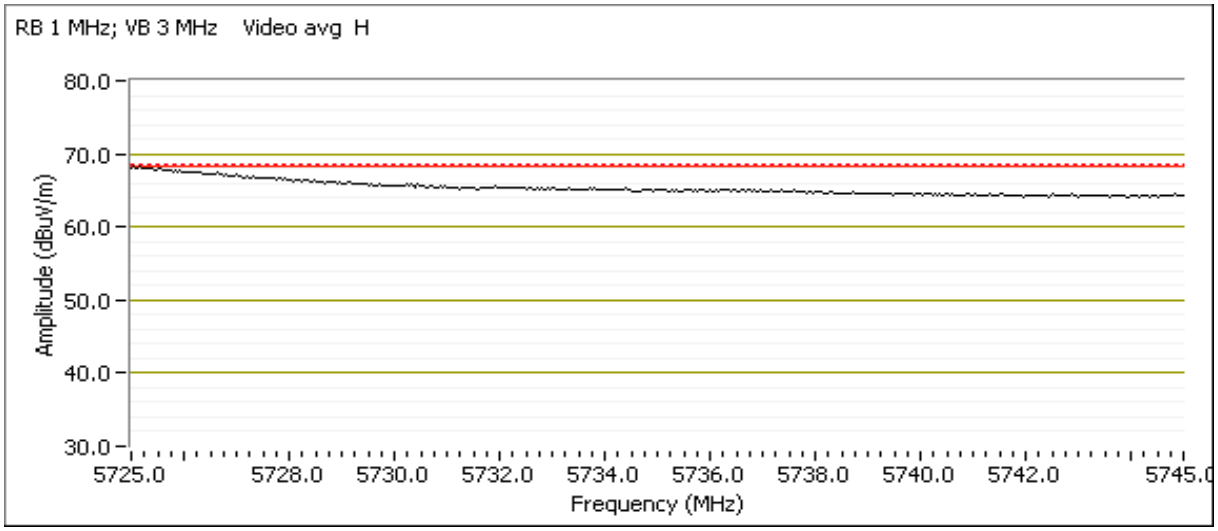
5725 MHz Band Edge Radiated Field Strength

Frequency	Level	Pol	15 E		Detector	Azimuth	Height	Comments
MHz	dBµV/m	v/h	Limit	Margin	Pk/QP/Avg	degrees	meters	
5725.400	67.7	H	68.3	-0.6	Pk	4	1.00	Vavg = 100

For emissions in the 5460-5470MHz frequency range the limit is -27dBm/MHz eirp (68.3dBuV/m). The measurement method required is the same measurement method used to determine the in-band power spectral density or a peak measurement (RB=1MHz, VB>1MHz).



Client:	Ubiquiti Networks	Job Number:	J86352
Model:	RocketM5 Titanium	T-Log Number:	T88756
		Account Manager:	Michelle Kim
Contact:	Jennifer Sanchez		
Standard:	FCC 15.E/RSS-210	Class:	N/A



Client:	Ubiquiti Networks	Job Number:	J86352
Model:	RocketM5 Titanium	T-Log Number:	T88756
		Account Manager:	Michelle Kim
Contact:	Jennifer Sanchez		
Standard:	FCC 15.E/RSS-210	Class:	N/A

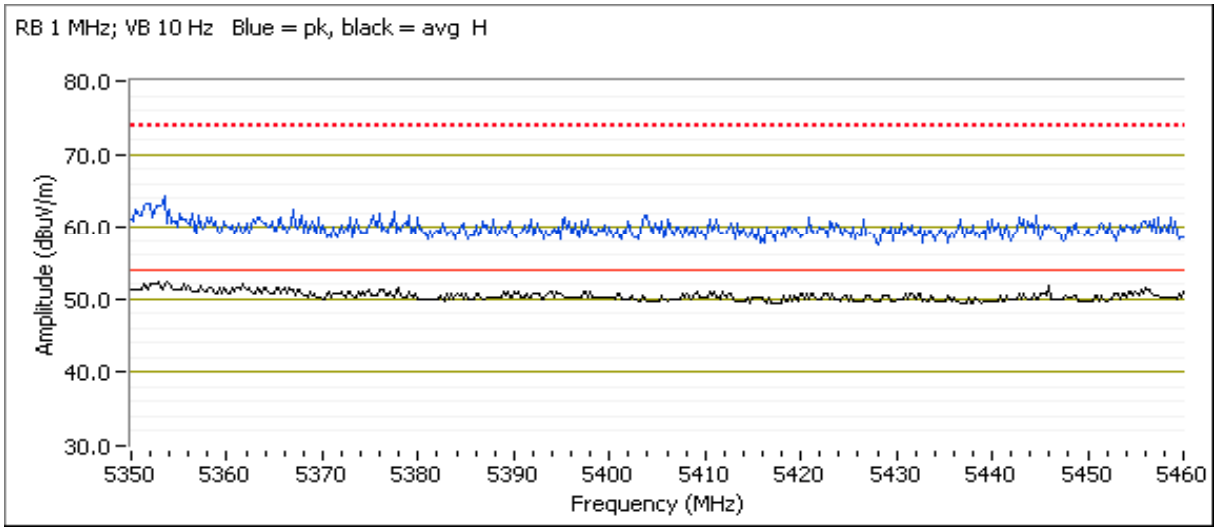
Run # 2, Band Edge Field Strength - HT20, Chain A+B

Date of Test: 10/8/2012 Test Location: Chamber 4
Test Engineer: John Caizzi Config Change: none

Run # 2b, EUT on Channel 5320MHz - HT20, Chain A+B

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	
5356.390	52.3	H	54.0	-1.7	AVG	6	1.02	
5453.610	63.0	H	74.0	-11.0	PK	6	1.02	



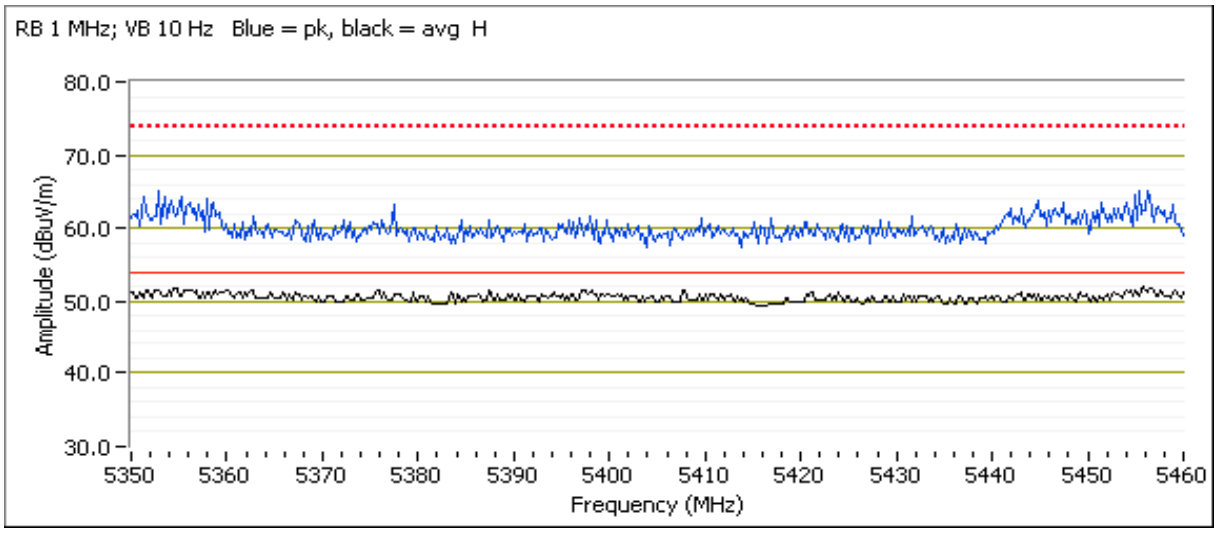
Client:	Ubiquiti Networks	Job Number:	J86352
Model:	RocketM5 Titanium	T-Log Number:	T88756
		Account Manager:	Michelle Kim
Contact:	Jennifer Sanchez		
Standard:	FCC 15.E/RSS-210	Class:	N/A

Run # 2c, EUT on Channel 5500MHz - HT20, 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	
5455.590	52.2	H	54.0	-1.8	AVG	6	1.01	
5454.270	62.0	H	74.0	-12.0	PK	6	1.01	

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

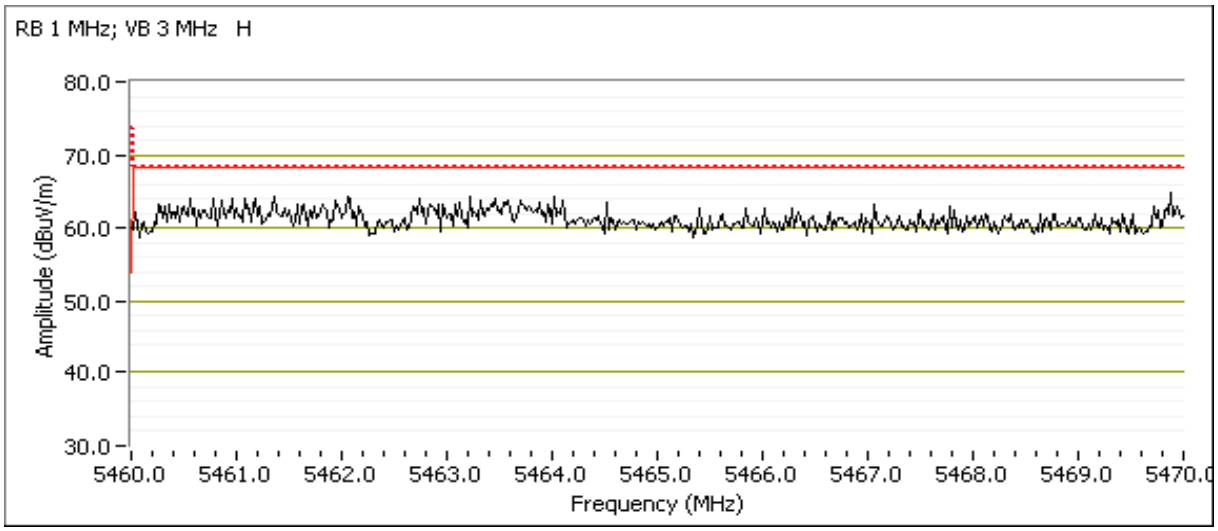


Client:	Ubiquiti Networks	Job Number:	J86352
Model:	RocketM5 Titanium	T-Log Number:	T88756
		Account Manager:	Michelle Kim
Contact:	Jennifer Sanchez		
Standard:	FCC 15.E/RSS-210	Class:	N/A

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	
5468.680	63.3	H	68.3	-5.0	PK	6	1.01	

For emissions in the 5460-5470MHz frequency range the limit is -27dBm/MHz eirp (68.3dBuV/m). The measurement method required is the same measurement method used to determine the in-band power spectral density or a peak measurement (RB=1MHz, VB>1MHz).



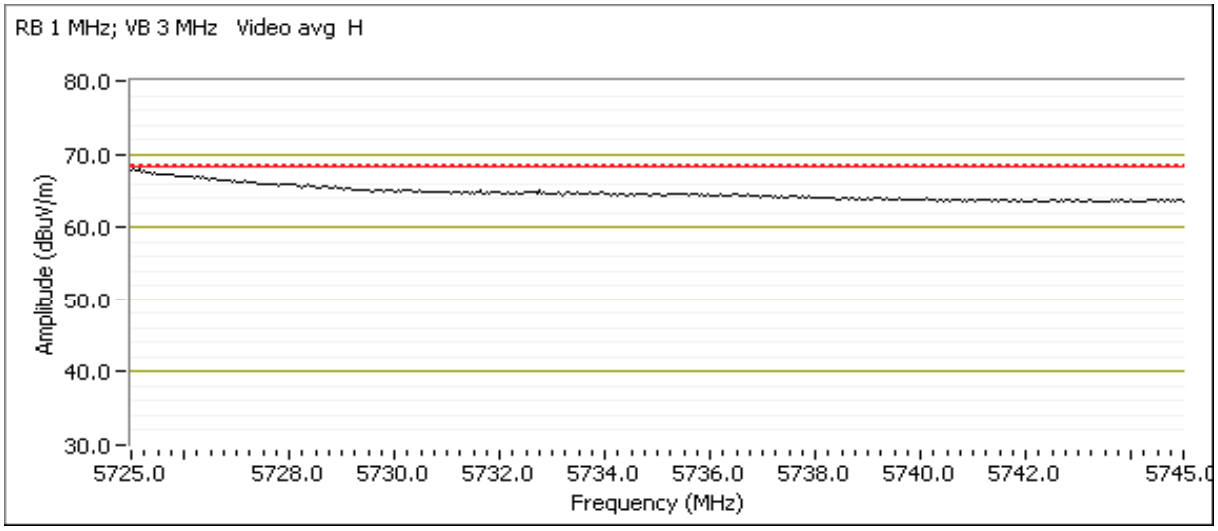
Client:	Ubiquiti Networks	Job Number:	J86352
Model:	RocketM5 Titanium	T-Log Number:	T88756
		Account Manager:	Michelle Kim
Contact:	Jennifer Sanchez		
Standard:	FCC 15.E/RSS-210	Class:	N/A

Run # 2d, EUT on Channel 5700MHz - HT20, Chain A+B

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	67.9	H	68.3	-0.4	Pk	5	1.02	Vavg = 100

For emissions in the 5460-5470MHz frequency range the limit is -27dBm/MHz eirp (68.3dBuV/m). The measurement method required is the same measurement method used to determine the in-band power spectral density or a peak measurement (RB=1MHz, VB>1MHz).



Client:	Ubiquiti Networks	Job Number:	J86352
Model:	RocketM5 Titanium	T-Log Number:	T88756
		Account Manager:	Michelle Kim
Contact:	Jennifer Sanchez		
Standard:	FCC 15.E/RSS-210	Class:	N/A

Run # 3, Band Edge Field Strength - HT40, Chain A+B

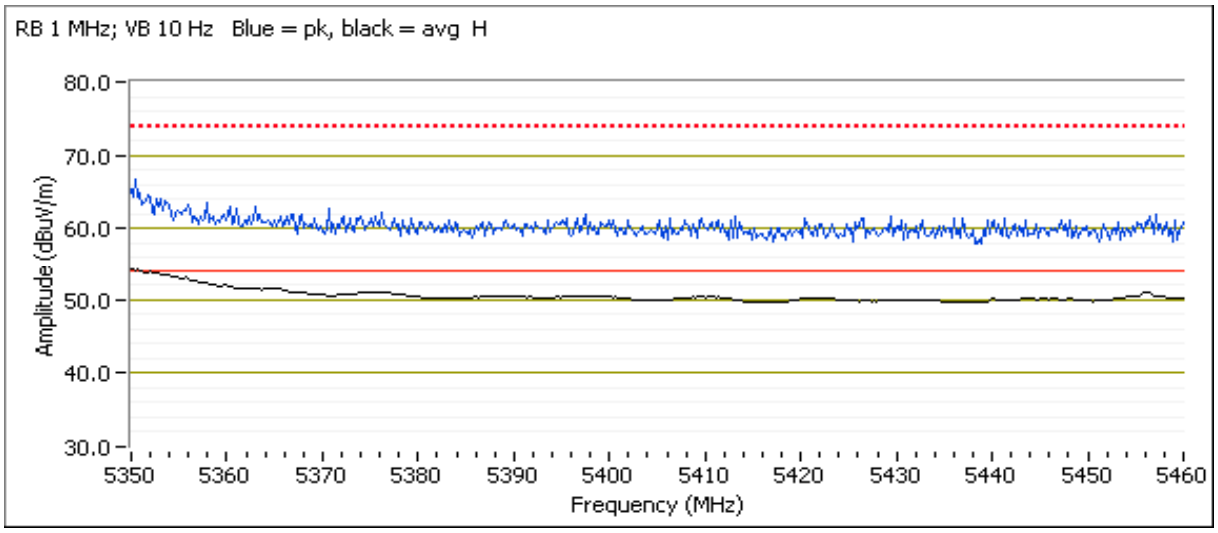
Date of Test: 10/8/2012 Test Location: Chamber 4

Test Engineer: John Caizzi Config Change: none

Run # 3b, EUT on Channel 5310MHz - HT40, Chain A+B

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	54.0	H	54.0	0.0	AVG	4	1.01	
5350.560	65.5	H	74.0	-8.5	PK	4	1.01	



Client:	Ubiquiti Networks	Job Number:	J86352
Model:	RocketM5 Titanium	T-Log Number:	T88756
		Account Manager:	Michelle Kim
Contact:	Jennifer Sanchez		
Standard:	FCC 15.E/RSS-210	Class:	N/A

Run # 3c, EUT on Channel 5510MHz - HT40, Chain A+B

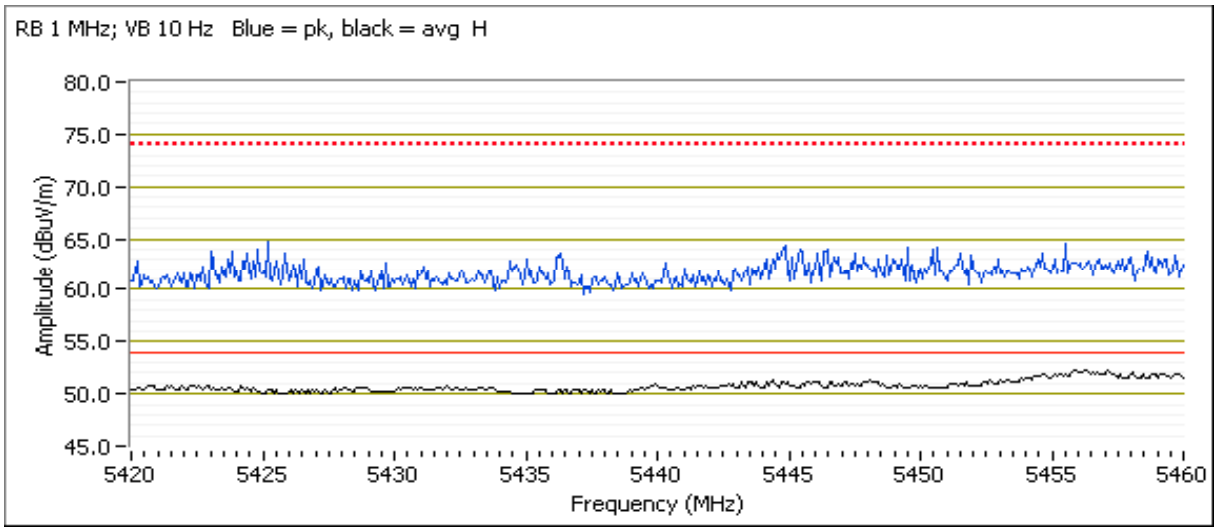
Date of Test: 10/8/2012 Test Location: Chamber 4

Test Engineer: M. Birgani 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	
5455.910	52.5	H	54.0	-1.5	AVG	7	1.0	
5454.950	64.6	H	74.0	-9.4	PK	7	1.0	

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

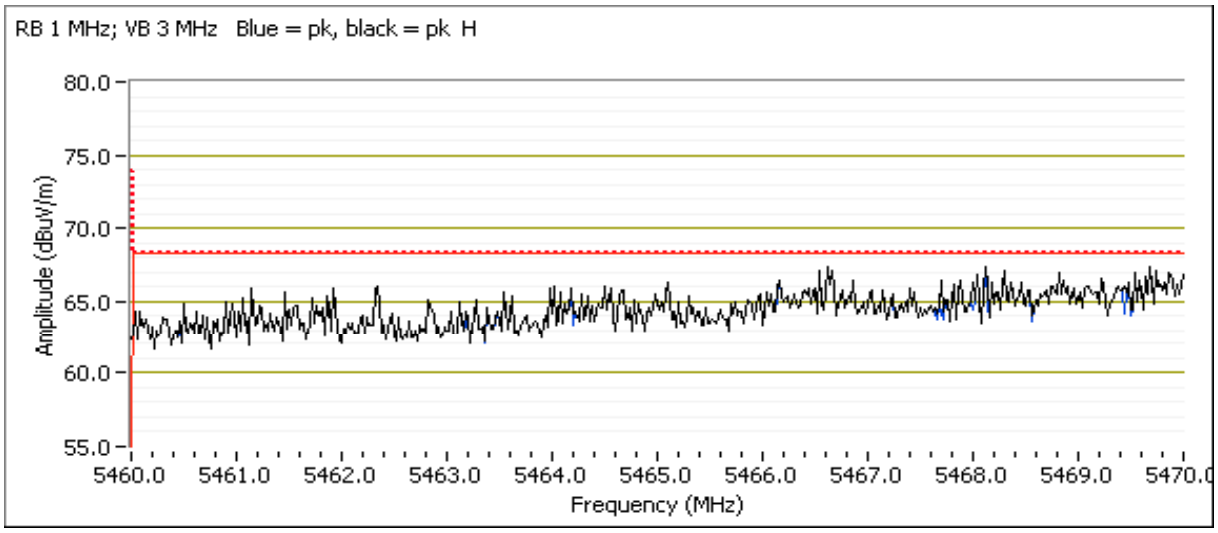


Client:	Ubiquiti Networks	Job Number:	J86352
Model:	RocketM5 Titanium	T-Log Number:	T88756
		Account Manager:	Michelle Kim
Contact:	Jennifer Sanchez		
Standard:	FCC 15.E/RSS-210	Class:	N/A

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	
5469.560	68.0	H	68.3	-0.3	PK	7	1.0	

For emissions in the 5460-5470MHz frequency range the limit is -27dBm/MHz eirp (68.3dBuV/m). The measurement method required is the same measurement method used to determine the in-band power spectral density or a peak measurement (RB=1MHz, VB>1MHz).



Client:	Ubiquiti Networks	Job Number:	J86352
Model:	RocketM5 Titanium	T-Log Number:	T88756
		Account Manager:	Michelle Kim
Contact:	Jennifer Sanchez		
Standard:	FCC 15.E/RSS-210	Class:	N/A

Run # 3d, EUT on Channel 5675MHz - HT40, Chain A+B

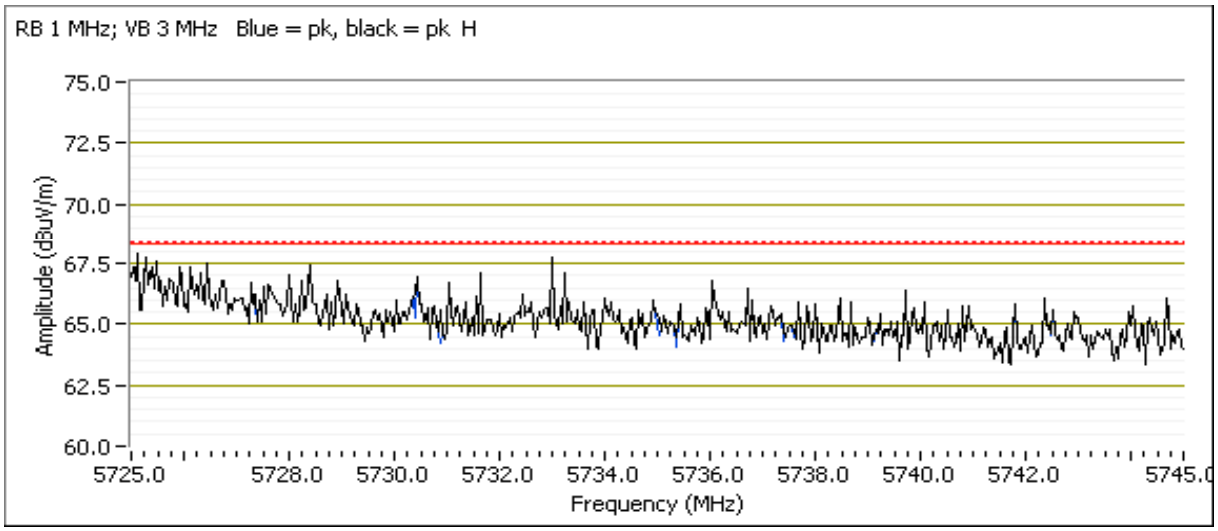
Date of Test: 10/8/2012 Test Location: Chamber 4

Test Engineer: M. Birgani 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	
5728.610	67.2	H	68.3	-1.1	PK	4	1.0	

For emissions in the 5460-5470MHz frequency range the limit is -27dBm/MHz eirp (68.3dBuV/m). The measurement method required is the same measurement method used to determine the in-band power spectral density or a peak measurement (RB=1MHz, VB>1MHz).



Client:	Ubiquiti Networks	Job Number:	J86352
Model:	RocketM5 Titanium	T-Log Number:	T88756
		Account Manager:	Michelle Kim
Contact:	Jennifer Sanchez		
Standard:	FCC 15.E/RSS-210	Class:	N/A

Run # 4, Band Edge Field Strength - HT10, Chain A+B

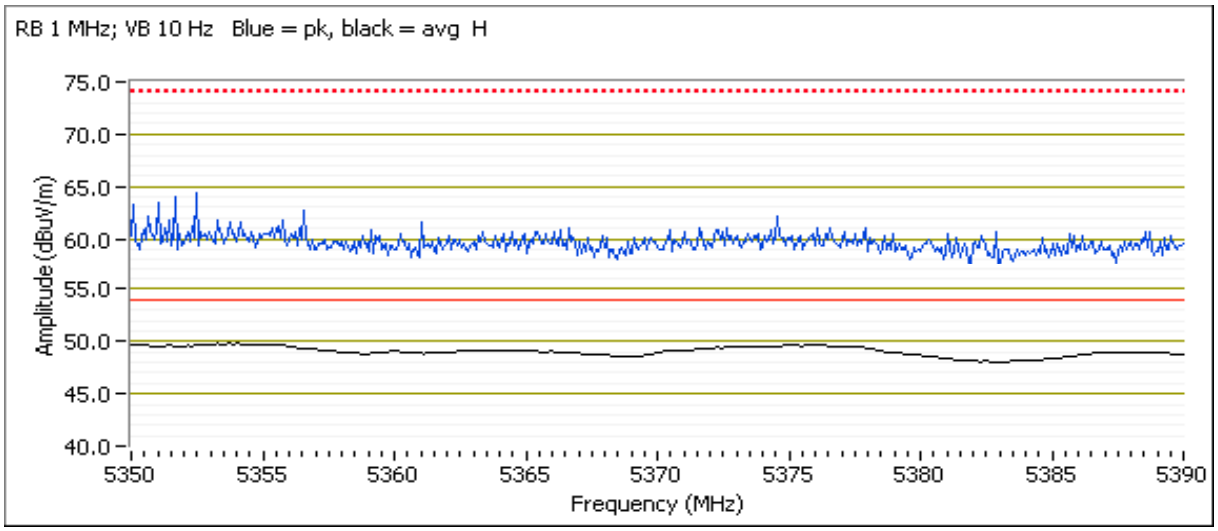
Run # 4b, EUT on Channel 5330MHz - HT10, Chain A+B

Date of Test: 10/8/2012 Test Location: Chamber 4

Test Engineer: M. Birgani 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	
5353.530	52.5	H	54.0	-1.5	AVG	5	1.0	
5378.940	65.9	H	74.0	-8.1	PK	5	1.0	



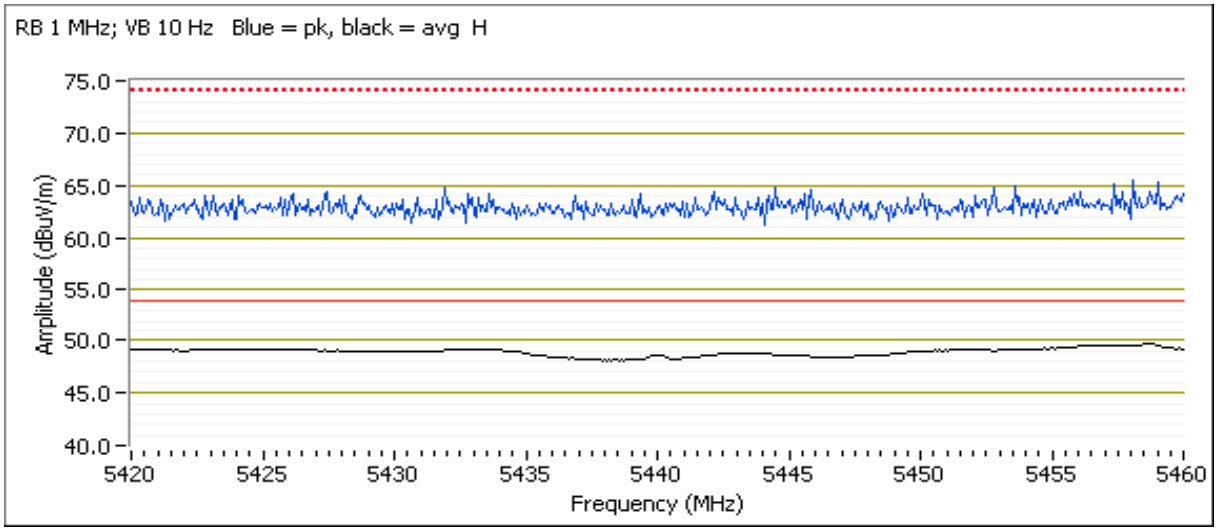
Client:	Ubiquiti Networks	Job Number:	J86352
Model:	RocketM5 Titanium	T-Log Number:	T88756
		Account Manager:	Michelle Kim
Contact:	Jennifer Sanchez		
Standard:	FCC 15.E/RSS-210	Class:	N/A

Run # 4c, EUT on Channel 5480MHz - HT10, 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	
5458.720	49.7	H	54.0	-4.3	AVG	5	1.0	
5456.550	62.9	H	74.0	-11.1	PK	5	1.0	

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

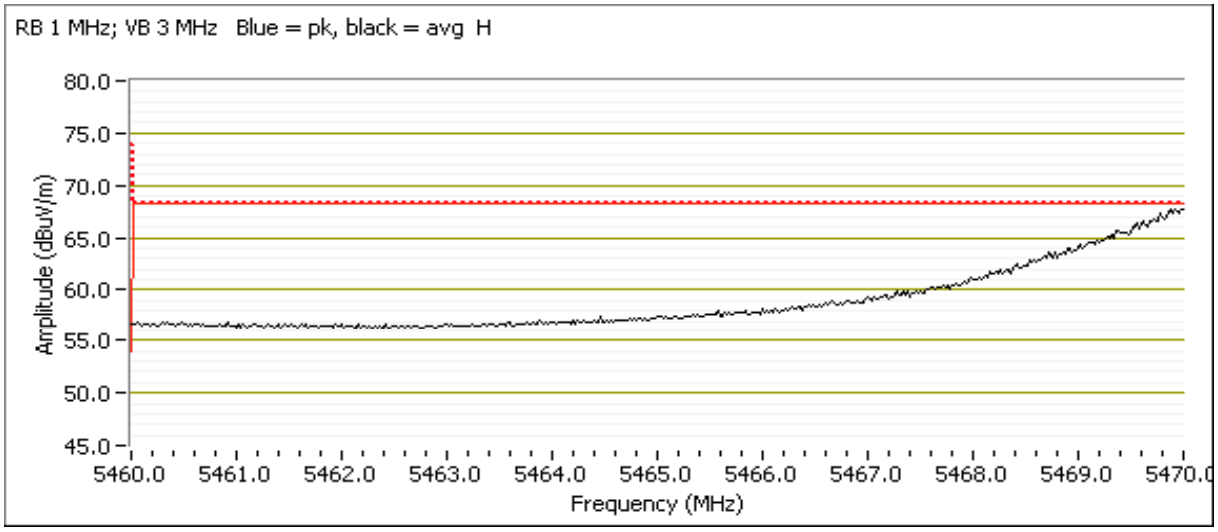


Client:	Ubiquiti Networks	Job Number:	J86352
Model:	RocketM5 Titanium	T-Log Number:	T88756
		Account Manager:	Michelle Kim
Contact:	Jennifer Sanchez		
Standard:	FCC 15.E/RSS-210	Class:	N/A

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	
5469.840	68.2	H	68.3	-0.1	Pavg	5	1.0	

For emissions in the 5460-5470MHz frequency range the limit is -27dBm/MHz eirp (68.3dBuV/m). The measurement method required is the same measurement method used to determine the in-band power spectral density or a peak measurement (RB=1MHz, VB>1MHz).



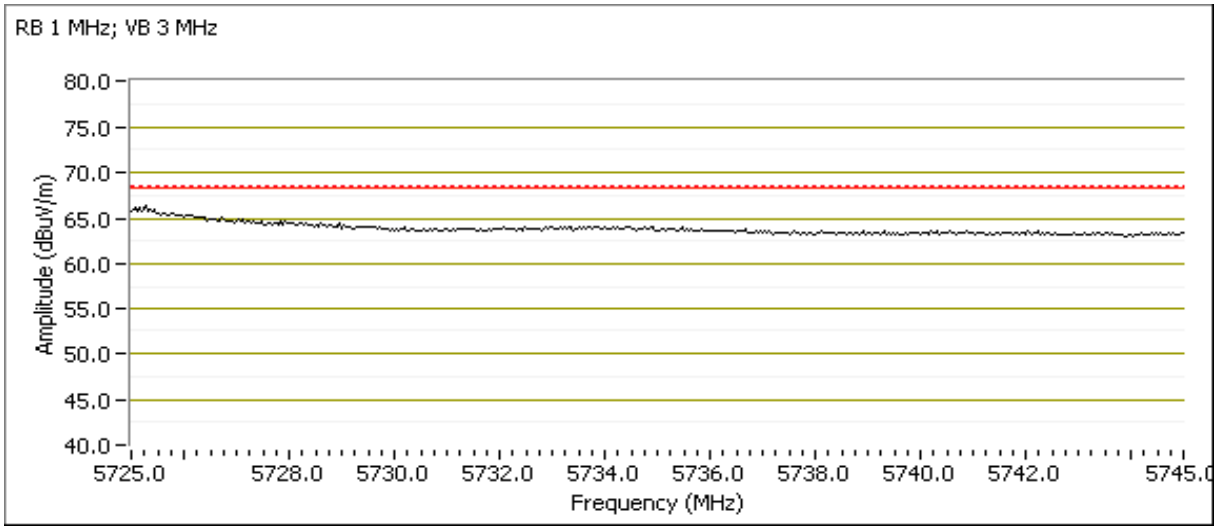
Client:	Ubiquiti Networks	Job Number:	J86352
Model:	RocketM5 Titanium	T-Log Number:	T88756
		Account Manager:	Michelle Kim
Contact:	Jennifer Sanchez		
Standard:	FCC 15.E/RSS-210	Class:	N/A

Run # 4d, EUT on Channel 5710MHz - HT10, Chain A+B

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	
5725.160	66.2	H	68.3	-2.1	Pavg	5	1.0	POS Vavg:100; RB 1 MHz; VB: 3 MH

For emissions in the 5460-5470MHz frequency range the limit is -27dBm/MHz eirp (68.3dBuV/m). The measurement method required is the same measurement method used to determine the in-band power spectral density or a peak measurement (RB=1MHz, VB>1MHz).



Client:	Ubiquiti Networks	Job Number:	J86352
Model:	RocketM5 Titanium	T-Log Number:	T88756
		Account Manager:	Michelle Kim
Contact:	Jennifer Sanchez		
Standard:	FCC 15.E/RSS-210	Class:	N/A

RSS 210 and FCC 15.407 (UNII) Radiated Spurious Emissions (Dish Antenna)

Test Specific Details

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

Date of Test: 10/10/2012 Config. Used: 1

Test Location: FT Chamber#7 EUT Voltage: POE

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: 25 °C

Rel. Humidity: 40 %

Summary of Results

Run #	Mode	Channel	Power Setting	Measured Power	Test Performed	Limit	Result / Margin
Run #1	802.11a Chain A+B	5270MHz	12.0	-	Radiated Emissions, 1 - 40 GHz	FCC 15.209 / 15 E	52.6 dBµV/m @ 5455.9 MHz (-1.4 dB)
		5300MHz	11.0	-			52.7 dBµV/m @ 5456.0 MHz (-1.3 dB)
		5320MHz	8.0	-			52.8 dBµV/m @ 5447.2 MHz (-1.2 dB)
Run #1	802.11a Chain A+B	5500MHz	12.5	-	Radiated Emissions, 1 - 40 GHz	FCC 15.209 / 15 E	52.7 dBµV/m @ 5351.4 MHz (-1.3 dB)
		5580MHz	19.0	-			53.9 dBµV/m @ 5362.9 MHz (-0.1 dB)
		5700MHz	7.0	-			52.4 dBµV/m @ 5372.2 MHz (-1.6 dB)

Client:	Ubiquiti Networks	Job Number:	J86352
Model:	RocketM5 Titanium	T-Log Number:	T88756
		Account Manager:	Michelle Kim
Contact:	Jennifer Sanchez		
Standard:	FCC 15.E/RSS-210	Class:	N/A

Run #	Mode	Channel	Power Setting	Measured Power	Test Performed	Limit	Result / Margin
Run # 2	HT20 Chain A+B	5270MHz	9.0	-	Radiated Emissions, 1 - 40 GHz	FCC 15.209 / 15 E	53.4 dBµV/m @ 5456.3 MHz (-0.6 dB)
		5300MHz	19.0	-			53.0 dBµV/m @ 5442.4 MHz (-1.0 dB)
		5320MHz	19.0	-			52.4 dBµV/m @ 5026.2 MHz (-1.6 dB)
Run # 2	HT20 Chain A+B	5500MHz	13.0	-	Radiated Emissions, 1 - 40 GHz	FCC 15.209 / 15 E	53.7 dBµV/m @ 5093.3 MHz (-0.3 dB)
		5580MHz	18.0	-			53.6 dBµV/m @ 5365.5 MHz (-0.4 dB)
		5700MHz	8.0	-			53.5 dBµV/m @ 5456.7 MHz (-0.5 dB)
Run # 3	HT40 Chain A+B	5275MHz	5.5	-	Radiated Emissions, 1 - 40 GHz	FCC 15.209 / 15 E	52.5 dBµV/m @ 5425.8 MHz (-1.5 dB)
		5310MHz	5.0	-			52.6 dBµV/m @ 5128.0 MHz (-1.4 dB)
Run # 3	HT40 Chain A+B	5510MHz	8.0	-	Radiated Emissions, 1 - 40 GHz	FCC 15.209 / 15 E	53.4 dBµV/m @ 5104.0 MHz (-0.6 dB)
		5550MHz	9.0	-			53.8 dBµV/m @ 5120.1 MHz (-0.2 dB)
		5675MHz	1.5	-			53.1 dBµV/m @ 5350.0 MHz (-0.9 dB)
Run # 4	HT10 Chain A+B	5260MHz	5.0	-	Radiated Emissions, 1 - 40 GHz	FCC 15.209 / 15 E	53.9 dBµV/m @ 5453.3 MHz (-0.1 dB)
		5300MHz	7.0	-			51.8 dBµV/m @ 5451.83 MHz (-2.2 dB)
		5330MHz	7.5	-			53.3 dBµV/m @ 5453.50 MHz (-0.7 dB)
Run # 4	HT10 Chain A+B	5480MHz	13.0	-	Radiated Emissions, 1 - 40 GHz	FCC 15.209 / 15 E	53.1 dBµV/m @ 5117.7 MHz (-0.9 dB)
		5590MHz	16.0	-			53.1 dBµV/m @ 4962.2 MHz (-0.9 dB)
		5710MHz	10.5	-			68.0 dBµV/m @ 5865.8 MHz (-0.3 dB)

Client:	Ubiquiti Networks	Job Number:	J86352
Model:	RocketM5 Titanium	T-Log Number:	T88756
		Account Manager:	Michelle Kim
Contact:	Jennifer Sanchez		
Standard:	FCC 15.E/RSS-210	Class:	N/A

Modifications Made During Testing

No modifications were made to the EUT during testing

Deviations From The Standard

No deviations were made from the requirements of the standard.

Test Procedure Comments:

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

Antenna: 30dBi Dish
Duty Cycle: >98%

Notes

No radio related emissions observed below 1GHz in preliminary testing.

Client:	Ubiquiti Networks	Job Number:	J86352
Model:	RocketM5 Titanium	T-Log Number:	T88756
		Account Manager:	Michelle Kim
Contact:	Jennifer Sanchez		
Standard:	FCC 15.E/RSS-210	Class:	N/A

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

Date of Test: 10/10/2012 Test Location: FT Chamber #7

Test Engineer: Jack Liu Config Change: none

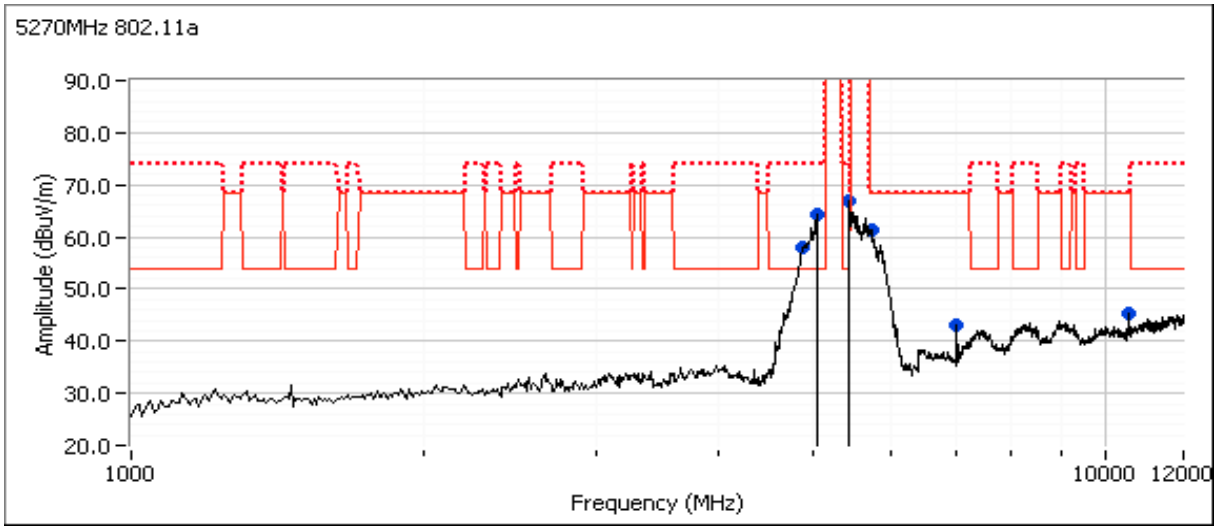
For emissions in restricted bands, the limit of 15.209 was used. For all other emissions, the limit is -27dBm eirp (68.3dBuV/m @3m).

Run #1d: EUT on Channel 5270MHz - 802.11a, Chain A+B

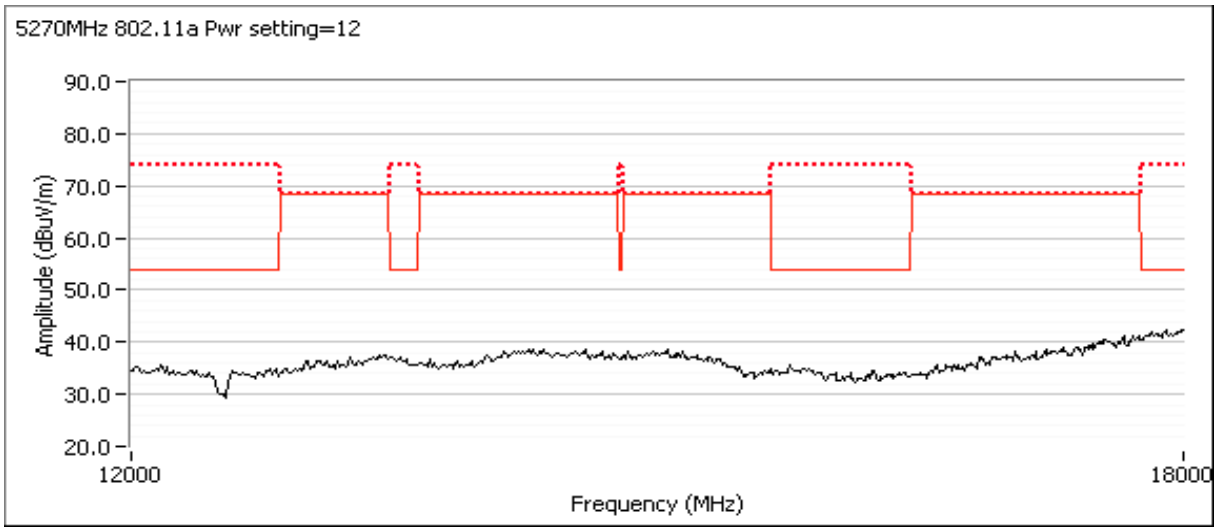
Spurious Radiated Emissions:

Frequency	Level	Pol	15.209 / 15E		Detector	Azimuth	Height	Comments
MHz	dBµV/m	v/h	Limit	Margin	Pk/QP/Avg	degrees	meters	
5455.920	52.6	H	54.0	-1.4	AVG	14	1.3	Pwr Setting =12
5452.830	63.3	H	74.0	-10.7	PK	14	1.3	Pwr Setting =12
4999.900	52.5	H	54.0	-1.5	AVG	16	1.3	Pwr Setting =12
4990.800	62.8	H	74.0	-11.2	PK	16	1.3	Pwr Setting =12
4897.230	44.3	H	54.0	-9.7	AVG	15	1.2	Pwr Setting =12
4897.100	54.4	H	74.0	-19.6	PK	15	1.2	Pwr Setting =12
5744.490	60.1	H	68.3	-8.2	PK	15	1.2	Pwr Setting =12
7026.600	47.3	V	68.3	-21.0	PK	15	1.3	Pwr Setting =19
10539.400	59.3	V	68.3	-9.0	PK	14	1.3	Pwr Setting =19

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 the same measurement method used to determine the in-band power spectral density or a peak measurement (RB=1MHz, VB>1MHz).



Client:	Ubiquiti Networks	Job Number:	J86352
Model:	RocketM5 Titanium	T-Log Number:	T88756
		Account Manager:	Michelle Kim
Contact:	Jennifer Sanchez		
Standard:	FCC 15.E/RSS-210	Class:	N/A



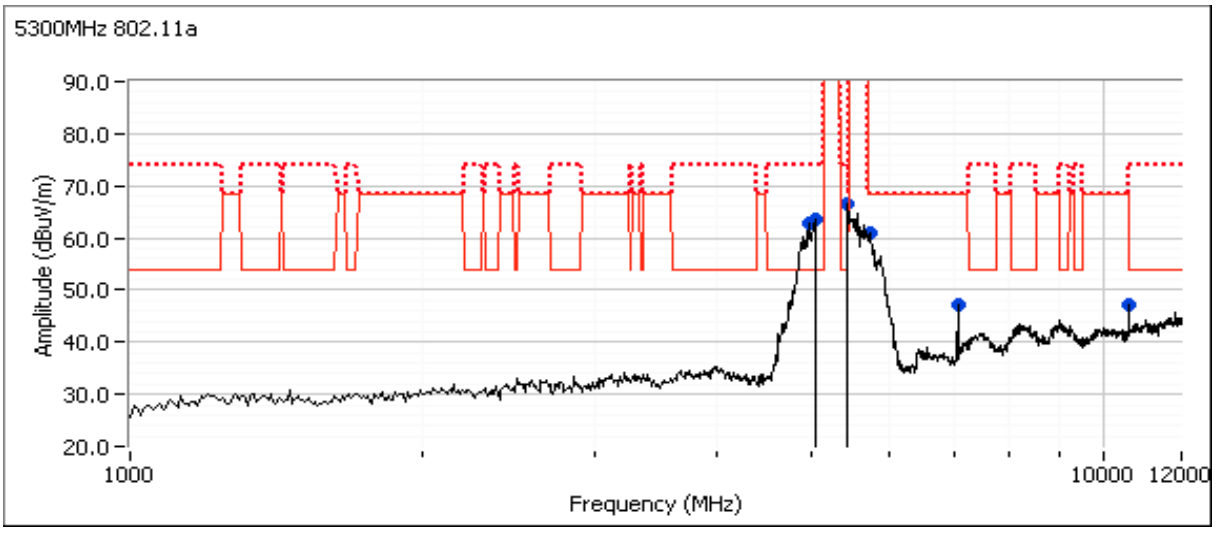
Client:	Ubiquiti Networks	Job Number:	J86352
Model:	RocketM5 Titanium	T-Log Number:	T88756
		Account Manager:	Michelle Kim
Contact:	Jennifer Sanchez		
Standard:	FCC 15.E/RSS-210	Class:	N/A

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

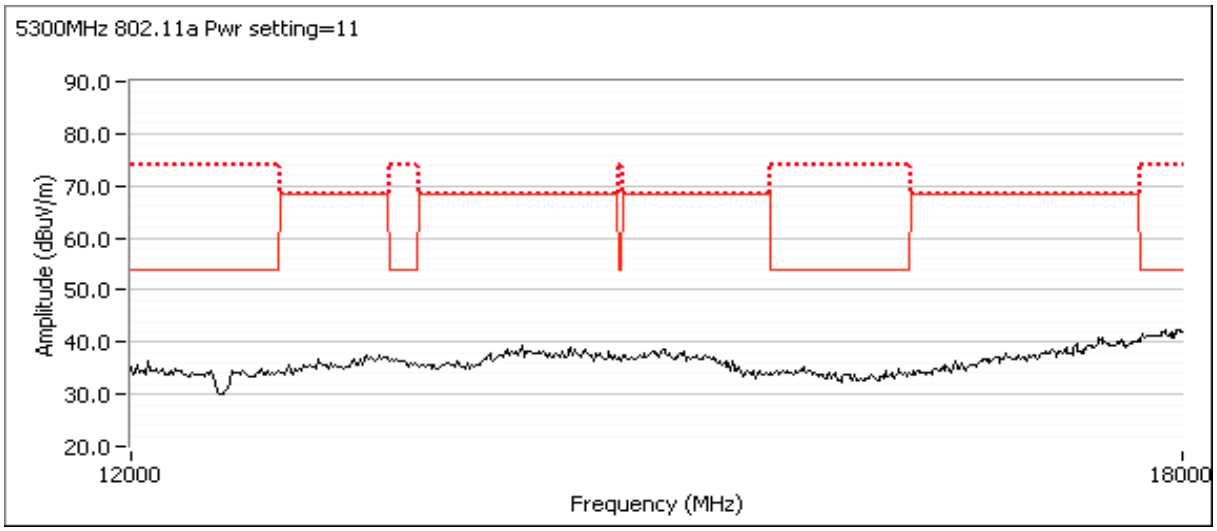
Spurious Radiated Emissions:

Frequency	Level	Pol	15.209 / 15E		Detector	Azimuth	Height	Comments
MHz	dBµV/m	v/h	Limit	Margin	Pk/QP/Avg	degrees	meters	
5456.030	52.7	H	54.0	-1.3	AVG	15	1.2	
5459.170	63.4	H	74.0	-10.6	PK	15	1.2	
4972.100	51.3	H	54.0	-2.7	AVG	15	1.2	
4989.350	62.7	H	74.0	-11.3	PK	15	1.2	
4969.800	49.6	H	54.0	-4.4	AVG	15	1.2	
4969.130	60.7	H	74.0	-13.3	PK	15	1.2	
5729.840	62.8	H	68.3	-5.5	PK	15	1.2	
7066.680	52.3	V	68.3	-16.0	PK	15	1.3	
10599.160	58.2	V	68.3	-10.1	PK	15	1.1	
10603.520	44.8	V	54.0	-9.2	AVG	16	1.1	
10603.010	57.2	V	74.0	-16.8	PK	16	1.1	

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 the same measurement method used to determine the in-band power spectral density or a peak measurement (RB=1MHz, VB>1MHz).
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:	Ubiquiti Networks	Job Number:	J86352
Model:	RocketM5 Titanium	T-Log Number:	T88756
		Account Manager:	Michelle Kim
Contact:	Jennifer Sanchez		
Standard:	FCC 15.E/RSS-210	Class:	N/A



Client:	Ubiquiti Networks	Job Number:	J86352
Model:	RocketM5 Titanium	T-Log Number:	T88756
		Account Manager:	Michelle Kim
Contact:	Jennifer Sanchez		
Standard:	FCC 15.E/RSS-210	Class:	N/A

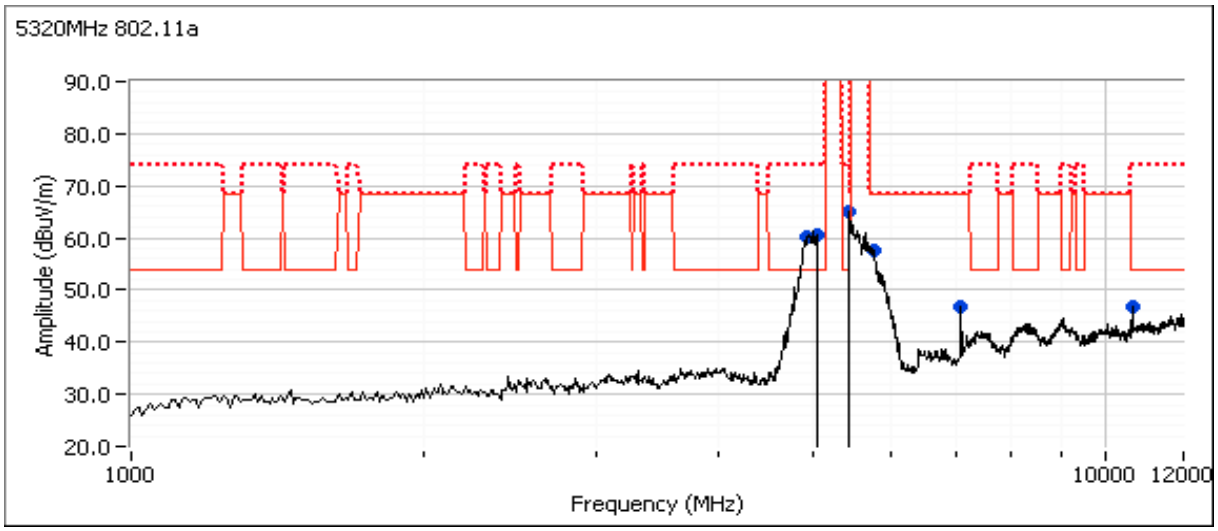
Run #1f: EUT on Channel 5320MHz - 802.11a, Chain A+B

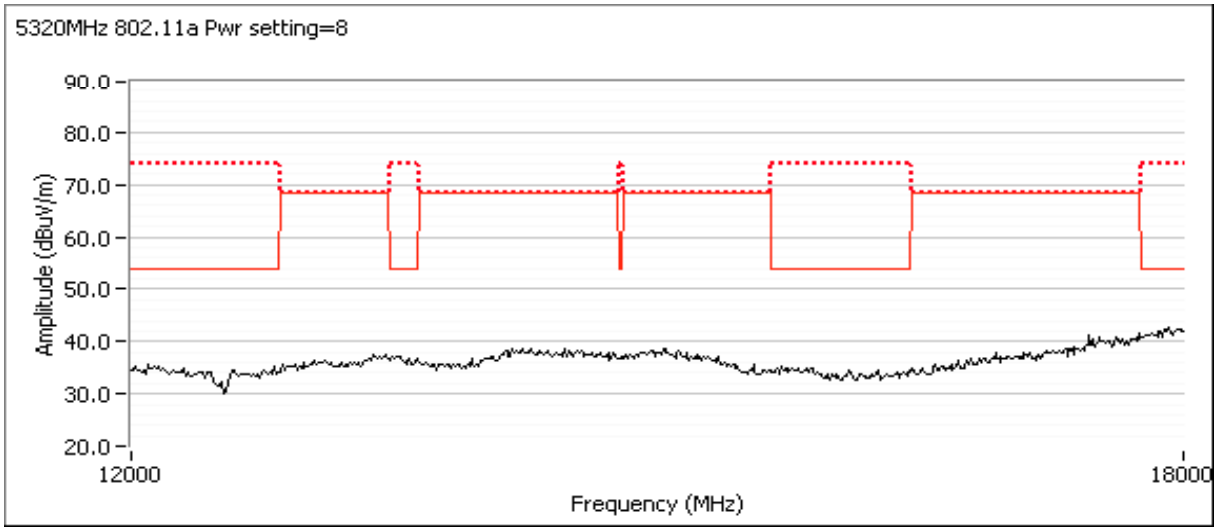
Spurious Radiated Emissions:

Frequency	Level	Pol	15.209 / 15E		Detector	Azimuth	Height	Comments
MHz	dBµV/m	v/h	Limit	Margin	Pk/QP/Avg	degrees	meters	
5447.170	52.8	V	54.0	-1.2	AVG	15	1.2	
5459.280	61.9	V	74.0	-12.1	PK	15	1.2	
4969.550	49.8	H	54.0	-4.2	AVG	16	1.2	
4968.010	59.4	H	74.0	-14.6	PK	16	1.2	
4973.970	50.4	H	54.0	-3.6	AVG	15	1.2	
4991.350	61.3	H	74.0	-12.7	PK	15	1.2	
5742.360	59.6	H	68.3	-8.7	PK	14	1.2	
7093.350	51.7	V	68.3	-16.6	PK	15	1.3	
10638.640	47.2	V	54.0	-6.8	AVG	14	1.1	
10638.840	57.3	V	74.0	-16.7	PK	14	1.1	

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 the same measurement method used to determine the in-band power spectral density or a peak measurement (RB=1MHz, VB>1MHz).

Client:	Ubiquiti Networks	Job Number:	J86352
Model:	RocketM5 Titanium	T-Log Number:	T88756
		Account Manager:	Michelle Kim
Contact:	Jennifer Sanchez		
Standard:	FCC 15.E/RSS-210	Class:	N/A





Client:	Ubiquiti Networks	Job Number:	J86352
Model:	RocketM5 Titanium	T-Log Number:	T88756
		Account Manager:	Michelle Kim
Contact:	Jennifer Sanchez		
Standard:	FCC 15.E/RSS-210	Class:	N/A

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

Date of Test: 10/10/2012 Test Location: FT Chamber #7

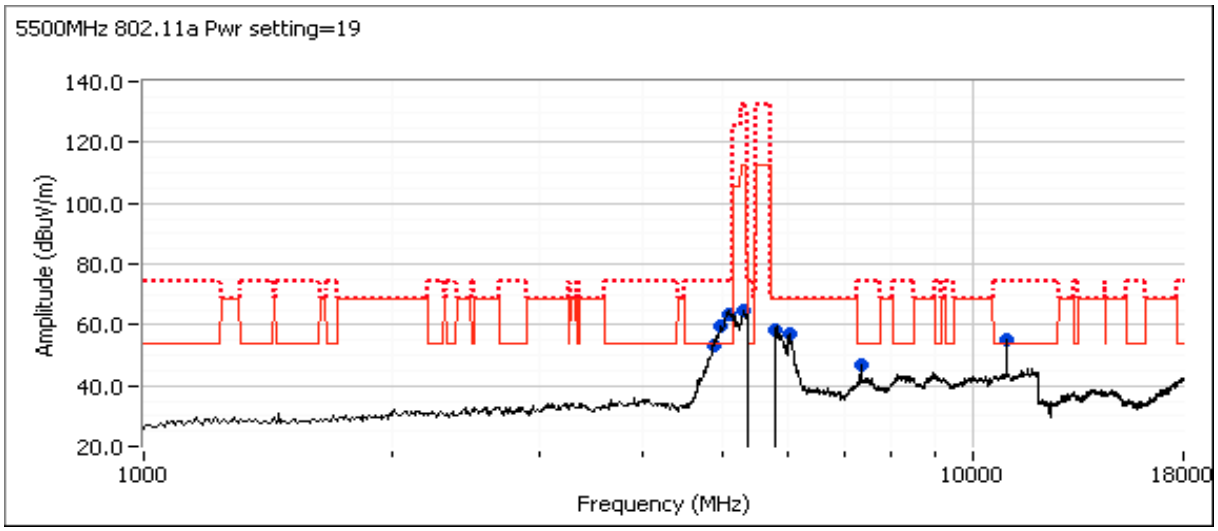
Test Engineer: Joseph Cadigal Config Change: none

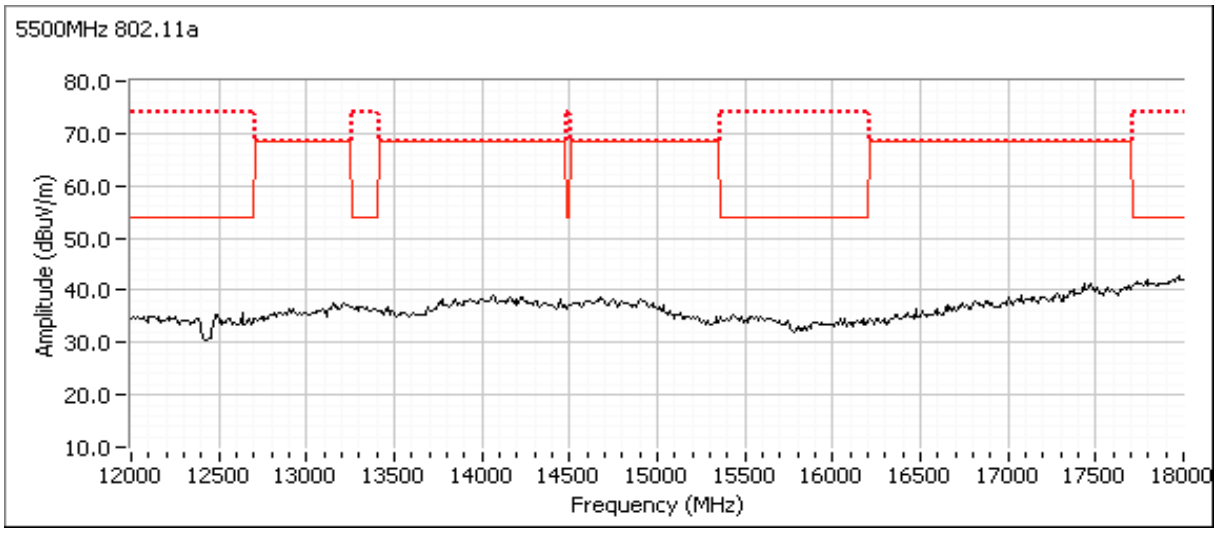
Spurious Radiated Emissions:

Frequency	Level	Pol	15.209 / 15E		Detector	Azimuth	Height	Comments
MHz	dBµV/m	v/h	Limit	Margin	Pk/QP/Avg	degrees	meters	
5351.360	52.7	V	54.0	-1.3	AVG	11	1.3	note 3
5354.890	64.1	V	74.0	-9.9	PK	11	1.3	note 3
5084.410	52.3	H	54.0	-1.7	AVG	19	1.3	note 3
5084.190	64.2	H	74.0	-9.8	PK	19	1.3	note 3
11008.420	52.1	H	54.0	-1.9	AVG	11	1.3	RB 1 MHz;VB 10 Hz;Peak
11008.870	63.9	H	74.0	-10.1	PK	11	1.3	RB 1 MHz;VB 3 MHz;Peak
6014.000	61.5	H	68.3	-6.8	PK	16	1.3	RB 1 MHz;VB 3 MHz;Peak
4960.050	49.8	H	54.0	-4.2	AVG	19	1.3	RB 1 MHz;VB 10 Hz;Peak
4960.080	61.6	H	74.0	-12.4	PK	19	1.3	RB 1 MHz;VB 3 MHz;Peak
4890.970	46.4	H	54.0	-7.6	AVG	19	1.3	RB 1 MHz;VB 10 Hz;Peak
4891.550	57.4	H	74.0	-16.6	PK	19	1.3	RB 1 MHz;VB 3 MHz;Peak
5797.730	56.4	H	68.3	-11.9	PK	19	1.3	RB 1 MHz;VB 3 MHz;Peak
7340.010	40.8	H	54.0	-13.2	AVG	20	1.3	RB 1 MHz;VB 10 Hz;Peak
7339.910	48.3	H	74.0	-25.7	PK	20	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 the same measurement method used to determine the in-band power spectral density or a peak measurement (RB=1MHz, VB>1MHz).
Note 3:	Using bandedge setup to take measurement

Client:	Ubiquiti Networks	Job Number:	J86352
Model:	RocketM5 Titanium	T-Log Number:	T88756
		Account Manager:	Michelle Kim
Contact:	Jennifer Sanchez		
Standard:	FCC 15.E/RSS-210	Class:	N/A





Client:	Ubiquiti Networks	Job Number:	J86352
Model:	RocketM5 Titanium	T-Log Number:	T88756
		Account Manager:	Michelle Kim
Contact:	Jennifer Sanchez		
Standard:	FCC 15.E/RSS-210	Class:	N/A

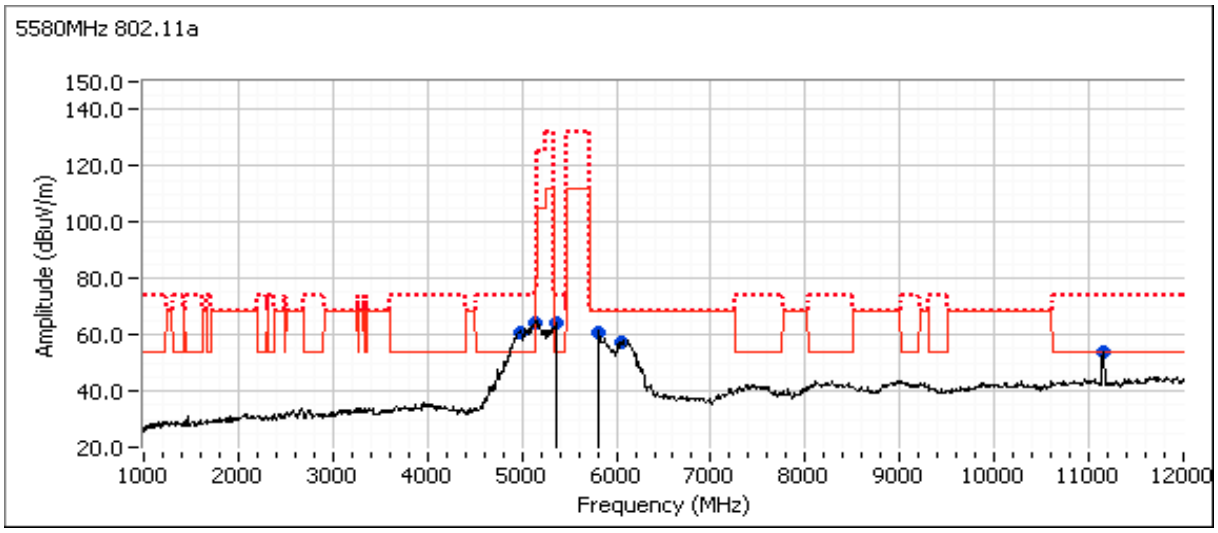
Run #1h: EUT on Channel 5580MHz - 802.11a, Chain A+B

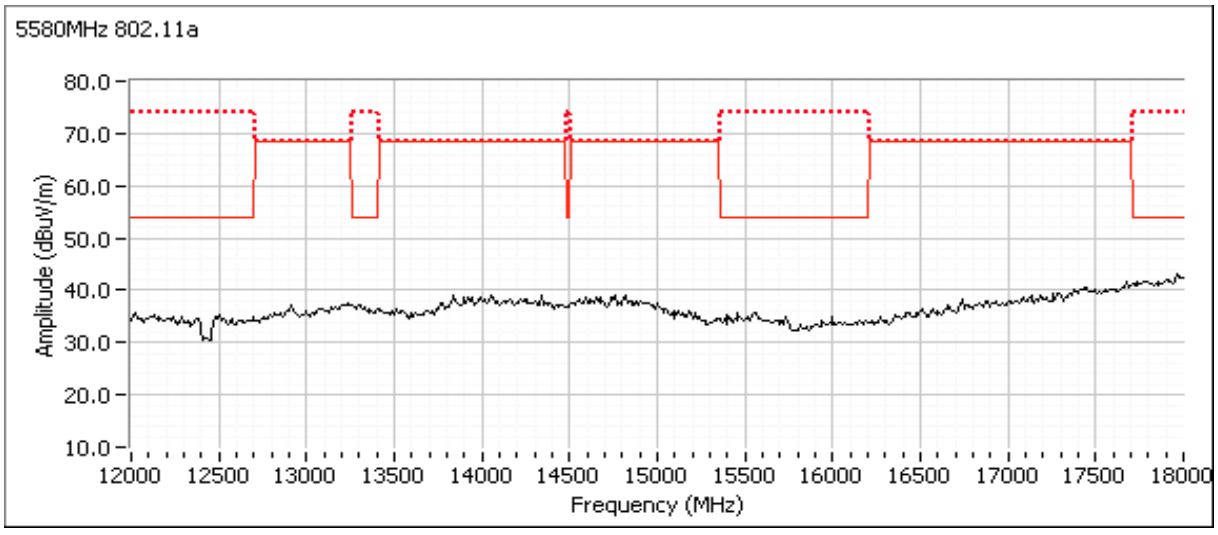
Spurious Radiated Emissions:

Frequency	Level	Pol	15.209 / 15E		Detector	Azimuth	Height	Comments
MHz	dBµV/m	v/h	Limit	Margin	Pk/QP/Avg	degrees	meters	
5362.910	53.9	H	54.0	-0.1	AVG	18	1.3	note 4
5365.310	65.5	H	74.0	-8.5	PK	18	1.3	note 4
5822.750	65.0	H	68.3	-3.3	PK	12	1.3	RB 1 MHz;VB 3 MHz;Peak
5368.100	52.5	V	54.0	-1.5	AVG	14	1.3	RB 1 MHz;VB 10 Hz;Peak
5368.480	63.8	V	74.0	-10.2	PK	14	1.3	RB 1 MHz;VB 3 MHz;Peak
6066.580	58.9	H	68.3	-9.4	PK	16	1.3	RB 1 MHz;VB 3 MHz;Peak
4984.060	53.4	H	54.0	-0.6	AVG	18	1.3	RB 1 MHz;VB 10 Hz;Peak
4986.200	65.6	H	74.0	-8.4	PK	18	1.3	RB 1 MHz;VB 3 MHz;Peak
11144.670	37.7	V	54.0	-16.3	AVG	18	1.0	RB 1 MHz;VB 10 Hz;Peak
11145.020	49.5	V	74.0	-24.5	PK	18	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 the same measurement method used to determine the in-band power spectral density or a peak measurement (RB=1MHz, VB>1MHz).
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:	Using bandedge setup to take measurement

Client:	Ubiquiti Networks	Job Number:	J86352
Model:	RocketM5 Titanium	T-Log Number:	T88756
		Account Manager:	Michelle Kim
Contact:	Jennifer Sanchez		
Standard:	FCC 15.E/RSS-210	Class:	N/A





Client:	Ubiquiti Networks	Job Number:	J86352
Model:	RocketM5 Titanium	T-Log Number:	T88756
		Account Manager:	Michelle Kim
Contact:	Jennifer Sanchez		
Standard:	FCC 15.E/RSS-210	Class:	N/A

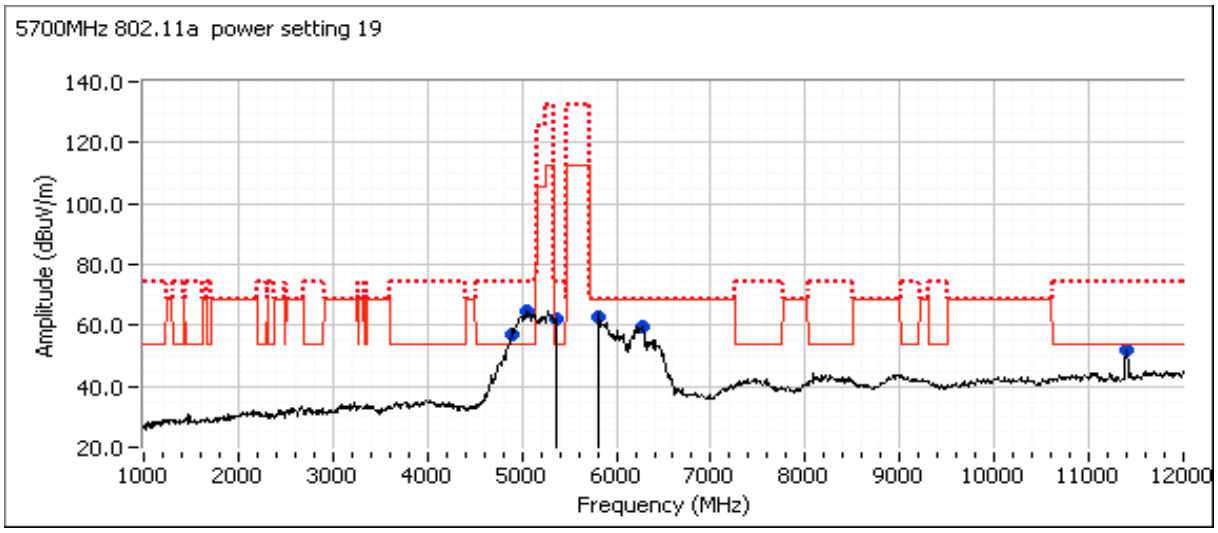
Run #1i: EUT on Channel 5700MHz - 802.11a, Chain A+B

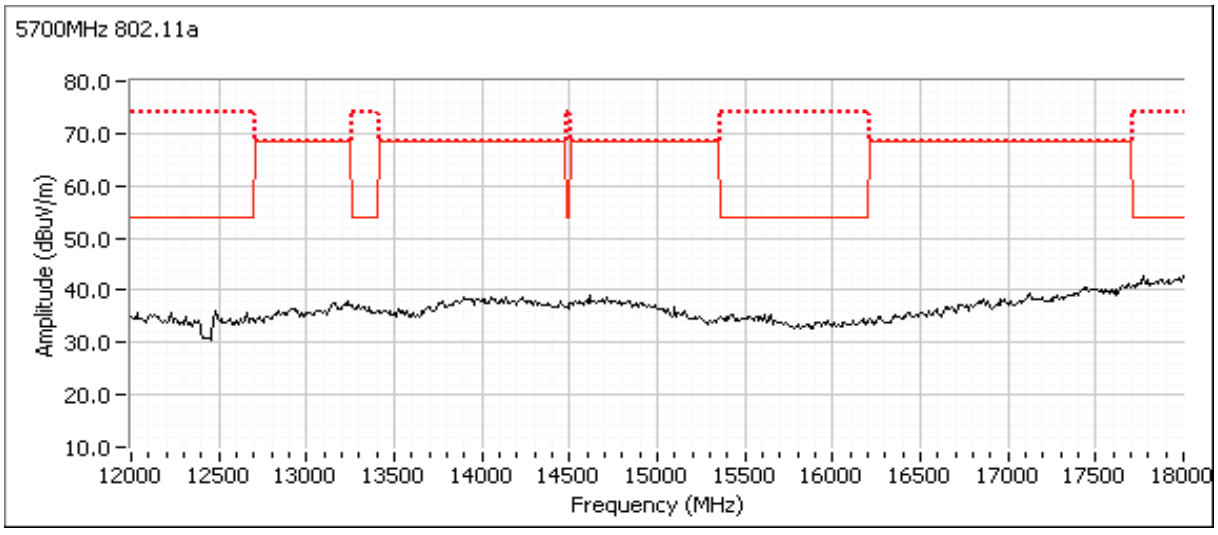
Spurious Radiated Emissions:

Frequency	Level	Pol	15.209 / 15E		Detector	Azimuth	Height	Comments
MHz	dBµV/m	v/h	Limit	Margin	Pk/QP/Avg	degrees	meters	
5372.170	52.4	V	54.0	-1.6	AVG	12	1.3	note 3
5374.170	64.0	V	74.0	-10.0	PK	12	1.3	note 3
5809.330	64.7	H	68.3	-3.6	PK	12	1.3	note 3
5053.990	51.7	H	54.0	-2.3	AVG	17	1.3	note 3
5054.830	63.6	H	74.0	-10.4	PK	17	1.3	note 3
11403.350	49.0	V	54.0	-5.0	AVG	12	1.0	RB 1 MHz;VB 10 Hz;Peak
11403.740	61.2	V	74.0	-12.8	PK	12	1.0	RB 1 MHz;VB 3 MHz;Peak
6282.490	60.0	H	68.3	-8.3	PK	16	1.3	RB 1 MHz;VB 3 MHz;Peak
4893.990	50.7	H	54.0	-3.3	AVG	16	1.3	RB 1 MHz;VB 10 Hz;Peak
4893.160	62.2	H	74.0	-11.8	PK	16	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 the same measurement method used to determine the in-band power spectral density or a peak measurement (RB=1MHz, VB>1MHz).
Note 3:	Using bandedge setup to take measurement

Client:	Ubiquiti Networks	Job Number:	J86352
Model:	RocketM5 Titanium	T-Log Number:	T88756
		Account Manager:	Michelle Kim
Contact:	Jennifer Sanchez		
Standard:	FCC 15.E/RSS-210	Class:	N/A





Client:	Ubiquiti Networks	Job Number:	J86352
Model:	RocketM5 Titanium	T-Log Number:	T88756
		Account Manager:	Michelle Kim
Contact:	Jennifer Sanchez		
Standard:	FCC 15.E/RSS-210	Class:	N/A

Run # 2, Radiated Spurious Emissions, 1-40GHz, HT20, Chain A+B

Date of Test: 10/10/2012 Test Location: FT Chamber#7

Test Engineer: Joseph Cadigal Config Change: none

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).

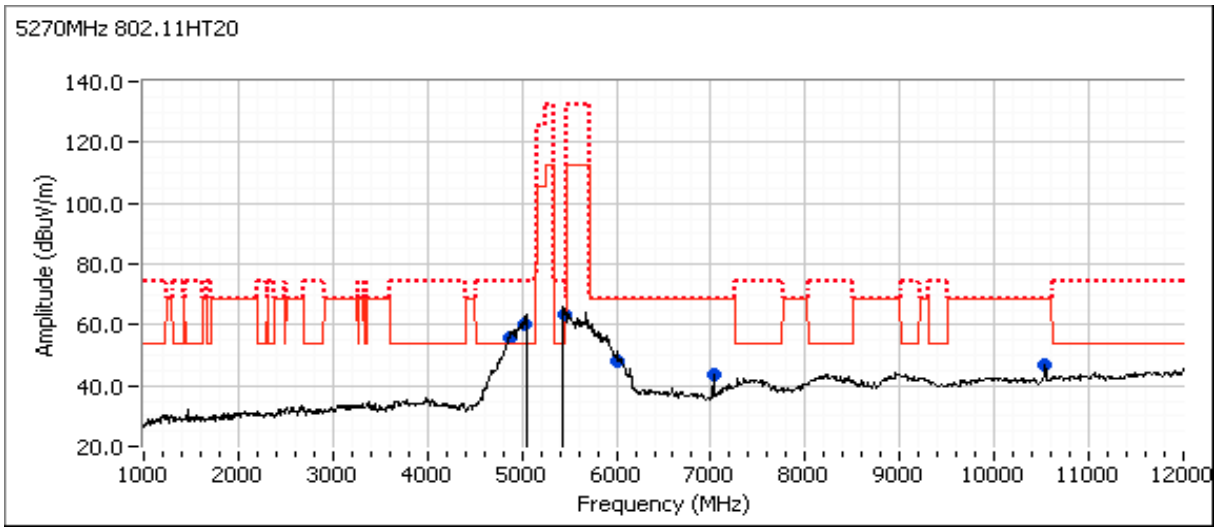
Run # 2d: EUT on Channel 5270MHz - HT20, Chain A+B

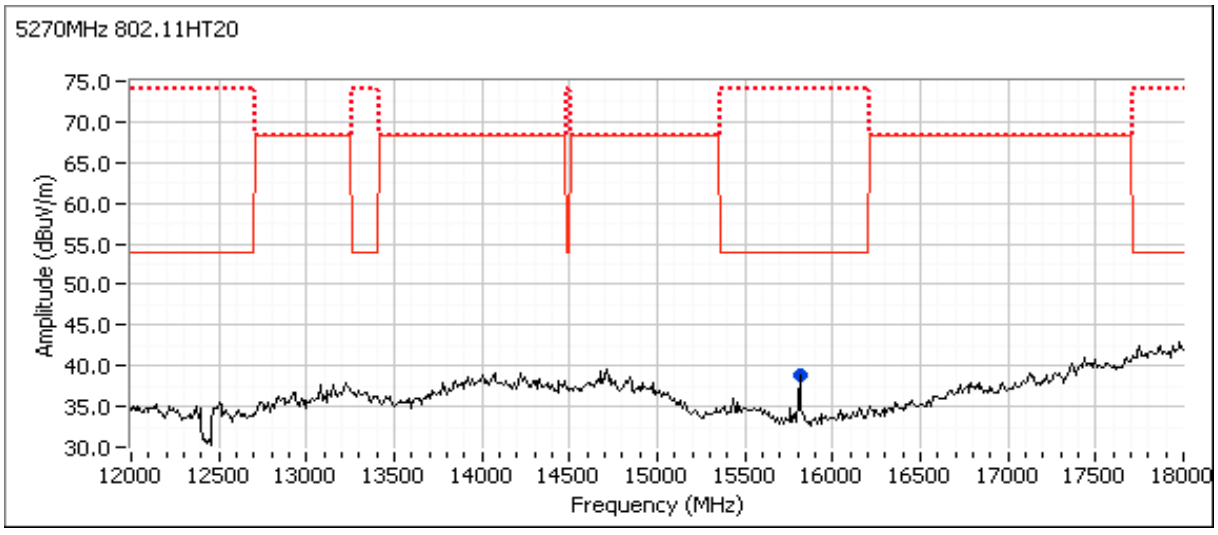
Spurious Radiated Emissions:

Frequency	Level	Pol	15.209 / 15E		Detector	Azimuth	Height	Comments
MHz	dBµV/m	v/h	Limit	Margin	Pk/QP/Avg	degrees	meters	
5456.310	53.4	V	54.0	-0.6	AVG	11	1.3	note 3
5455.190	64.9	V	74.0	-9.1	PK	11	1.3	note 3
5022.100	50.4	V	54.0	-3.6	AVG	11	1.3	note 3
5021.960	62.3	V	74.0	-11.7	PK	11	1.3	note 3
4877.900	50.3	V	54.0	-3.7	AVG	11	1.3	RB 1 MHz;VB 10 Hz;Peak
4877.540	62.0	V	74.0	-12.0	PK	11	1.3	RB 1 MHz;VB 3 MHz;Peak
10534.530	54.0	V	68.3	-14.3	PK	13	1.3	RB 1 MHz;VB 3 MHz;Peak
6026.100	50.9	H	68.3	-17.4	PK	16	1.3	RB 1 MHz;VB 3 MHz;Peak
7026.590	43.8	V	68.3	-24.5	PK	16	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 the same measurement method used to determine the in-band power spectral density or a peak measurement (RB=1MHz, VB>1MHz).
Note 3:	Using bandedge setup to take measurement

Client:	Ubiquiti Networks	Job Number:	J86352
Model:	RocketM5 Titanium	T-Log Number:	T88756
		Account Manager:	Michelle Kim
Contact:	Jennifer Sanchez		
Standard:	FCC 15.E/RSS-210	Class:	N/A





Client:	Ubiquiti Networks	Job Number:	J86352
Model:	RocketM5 Titanium	T-Log Number:	T88756
		Account Manager:	Michelle Kim
Contact:	Jennifer Sanchez		
Standard:	FCC 15.E/RSS-210	Class:	N/A

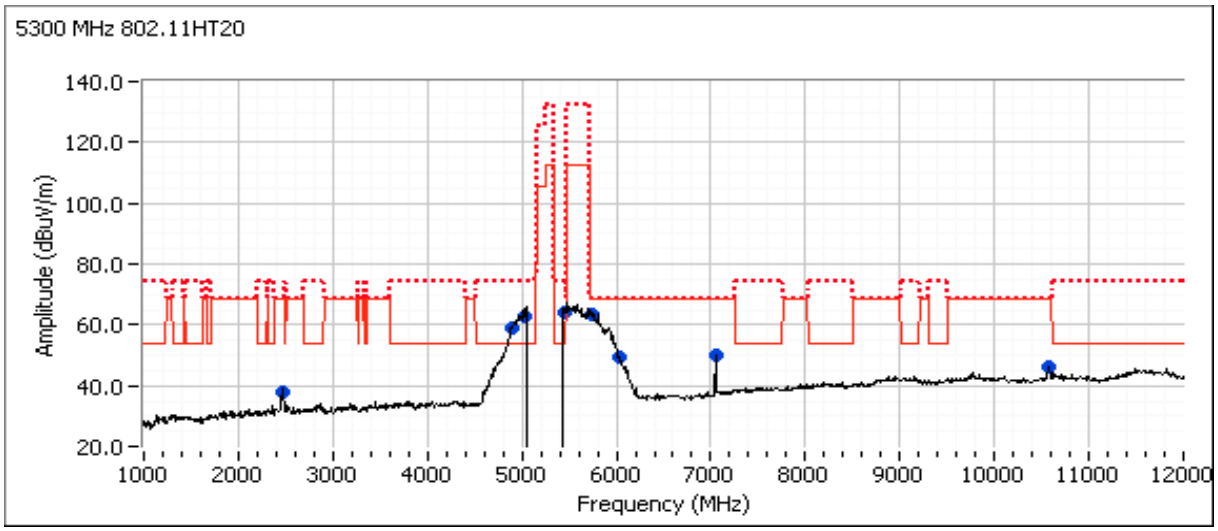
Run # 2e: EUT on Channel 5300MHz - HT20, Chain A+B

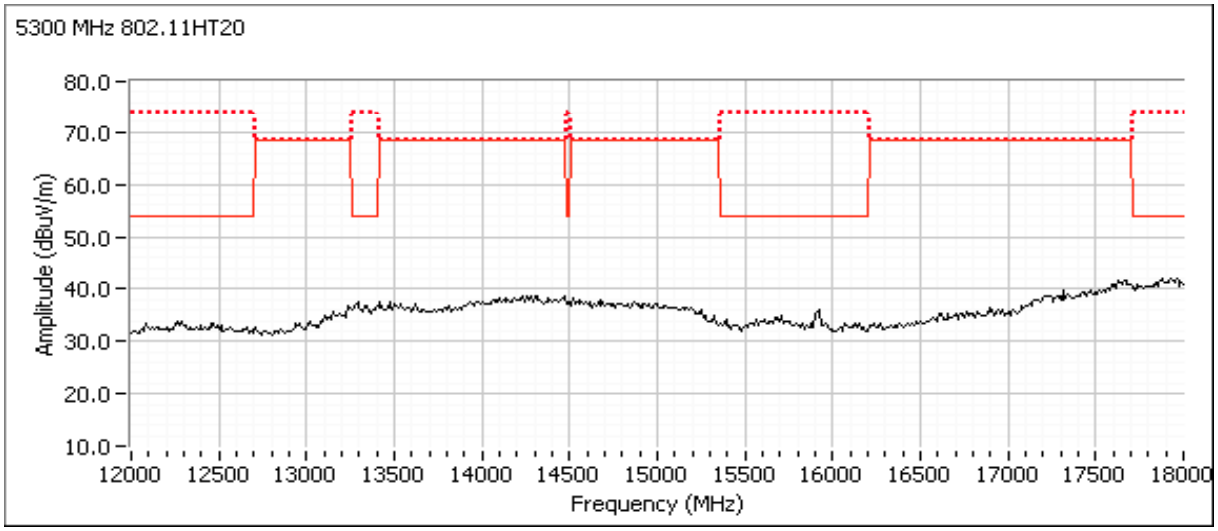
Spurious Radiated Emissions:

Frequency	Level	Pol	15.209 / 15E		Detector	Azimuth	Height	Comments
MHz	dBµV/m	v/h	Limit	Margin	Pk/QP/Avg	degrees	meters	
5442.440	53.0	H	54.0	-1.0	AVG	21	1.3	note 4
5442.070	65.0	H	74.0	-9.0	PK	21	1.3	note 4
5032.890	50.9	V	54.0	-3.1	AVG	15	1.3	note 4
5032.120	62.2	V	74.0	-11.8	PK	15	1.3	note 4
5739.310	53.8	V	68.3	-14.5	AVG	15	1.3	note 4
5738.490	65.2	V	68.3	-3.1	PK	15	1.3	note 4
4908.770	49.1	V	54.0	-4.9	AVG	15	1.3	note 4
4908.170	61.0	V	74.0	-13.0	PK	15	1.3	note 4
10568.420	50.0	V	68.3	-18.3	PK	17	1.0	RB 1 MHz;VB 3 MHz;Peak
6024.850	55.6	H	68.3	-12.7	PK	19	1.3	RB 1 MHz;VB 3 MHz;Peak
7054.960	44.6	V	68.3	-23.7	PK	19	1.3	RB 1 MHz;VB 3 MHz;Peak
2472.440	40.3	H	68.3	-28.0	PK	27	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 the same measurement method used to determine the in-band power spectral density or a peak measurement (RB=1MHz, VB>1MHz).
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:	Using bandedge setup to take measurement

Client:	Ubiquiti Networks	Job Number:	J86352
Model:	RocketM5 Titanium	T-Log Number:	T88756
		Account Manager:	Michelle Kim
Contact:	Jennifer Sanchez		
Standard:	FCC 15.E/RSS-210	Class:	N/A





Client:	Ubiquiti Networks	Job Number:	J86352
Model:	RocketM5 Titanium	T-Log Number:	T88756
		Account Manager:	Michelle Kim
Contact:	Jennifer Sanchez		
Standard:	FCC 15.E/RSS-210	Class:	N/A

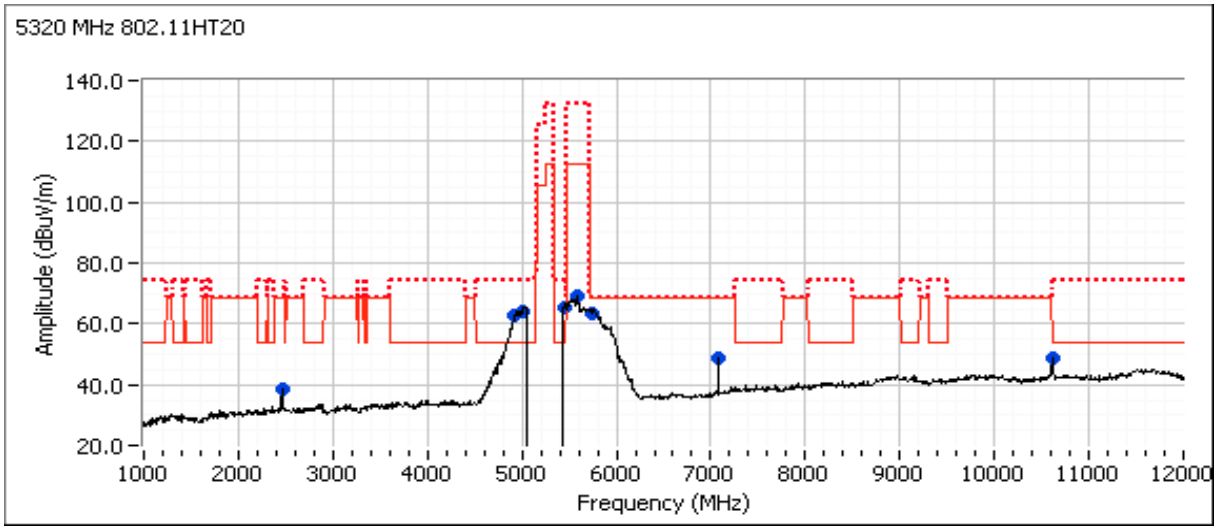
Run # 2f: EUT on Channel 5320MHz - HT20, Chain A+B

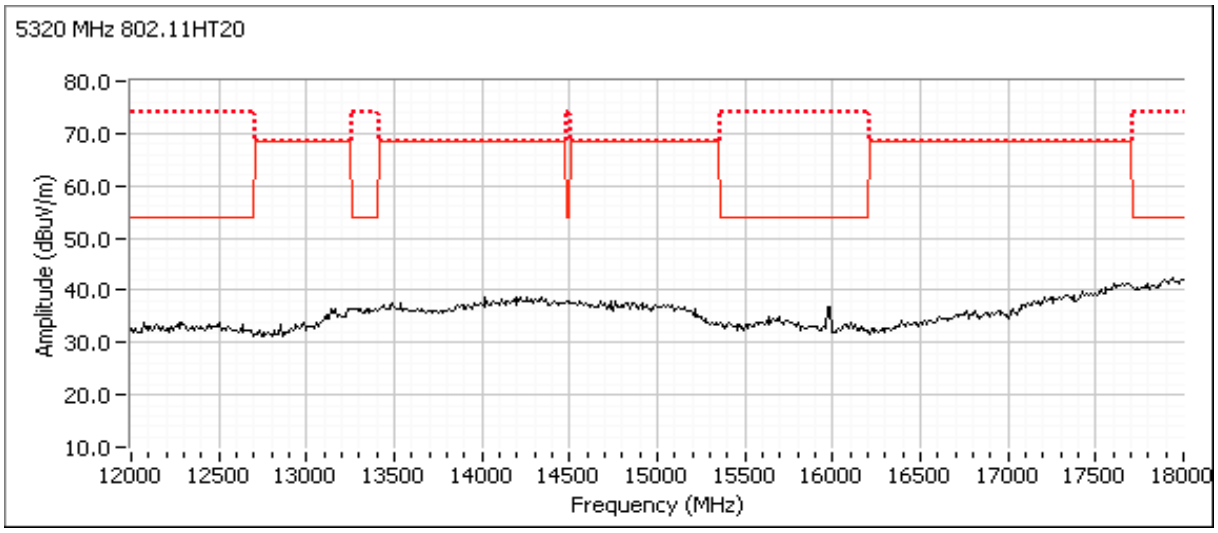
Spurious Radiated Emissions:

Frequency	Level	Pol	15.209 / 15E		Detector	Azimuth	Height	Comments
MHz	dBµV/m	v/h	Limit	Margin	Pk/QP/Avg	degrees	meters	
5026.180	52.4	V	54.0	-1.6	AVG	21	1.3	note 3
5025.900	64.5	V	74.0	-9.5	PK	21	1.3	note 3
4915.770	52.3	V	54.0	-1.7	AVG	21	1.3	note 3
4916.810	63.6	V	74.0	-10.4	PK	21	1.3	note 3
5440.980	52.0	V	54.0	-2.0	AVG	21	1.3	note 3
5442.460	63.3	V	74.0	-10.7	PK	21	1.3	note 3
5741.590	64.7	V	68.3	-3.6	PK	21	1.3	note 3
2470.320	40.1	V	68.3	-28.2	PK	13	1.6	RB 1 MHz;VB 3 MHz;Peak
7074.310	44.5	V	68.3	-23.8	PK	19	1.3	RB 1 MHz;VB 3 MHz;Peak
10610.710	38.4	V	54.0	-15.6	AVG	19	1.0	RB 1 MHz;VB 10 Hz;Peak
10610.420	49.6	V	74.0	-24.4	PK	19	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 the same measurement method used to determine the in-band power spectral density or a peak measurement (RB=1MHz, VB>1MHz).
Note 3:	Using bandedge setup to take measurement

Client:	Ubiquiti Networks	Job Number:	J86352
Model:	RocketM5 Titanium	T-Log Number:	T88756
		Account Manager:	Michelle Kim
Contact:	Jennifer Sanchez		
Standard:	FCC 15.E/RSS-210	Class:	N/A





Client:	Ubiquiti Networks	Job Number:	J86352
Model:	RocketM5 Titanium	T-Log Number:	T88756
		Account Manager:	Michelle Kim
Contact:	Jennifer Sanchez		
Standard:	FCC 15.E/RSS-210	Class:	N/A

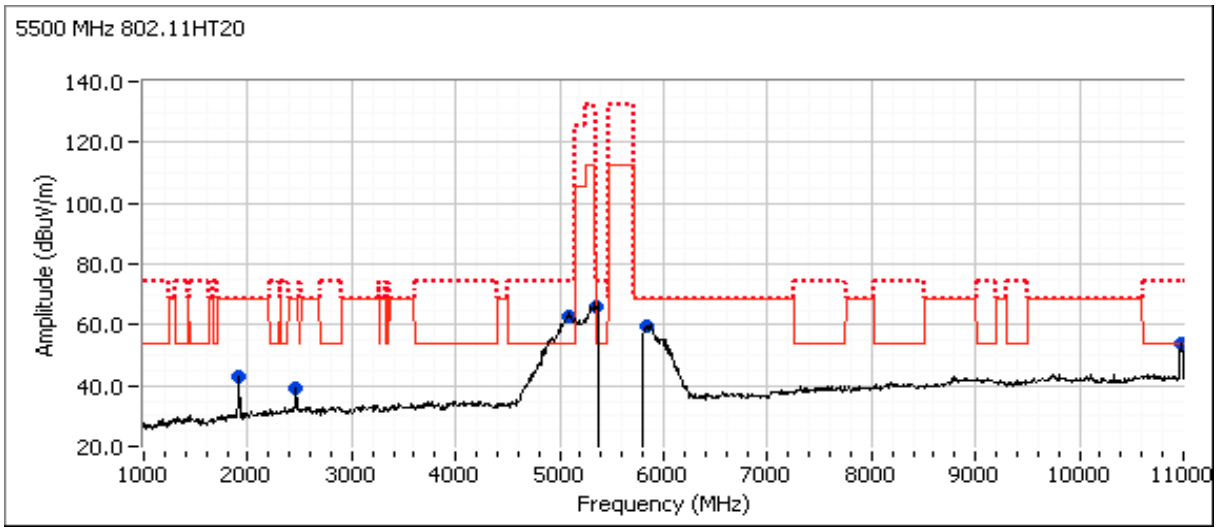
Run # 2g: EUT on Channel 5500MHz - HT20, Chain A+B

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	
5093.300	53.7	V	54.0	-0.3	AVG	23	1.3	note 3
5091.870	65.6	V	74.0	-8.4	PK	23	1.3	note 3
4861.070	47.5	V	54.0	-6.5	AVG	23	1.3	note 3
4860.980	59.4	V	74.0	-14.6	PK	23	1.3	note 3
5365.210	53.0	H	54.0	-1.0	AVG	13	1.3	note 3
5365.440	64.7	H	74.0	-9.3	PK	13	1.3	note 3
10973.540	37.9	H	54.0	-16.1	AVG	12	1.3	RB 1 MHz;VB 10 Hz;Peak
10972.930	49.9	H	74.0	-24.1	PK	12	1.3	RB 1 MHz;VB 3 MHz;Peak
2458.510	39.1	H	68.3	-29.2	PK	23	1.3	RB 1 MHz;VB 3 MHz;Peak
4859.850	35.9	V	54.0	-18.1	AVG	23	1.3	RB 1 MHz;VB 10 Hz;Peak
4861.000	47.4	V	74.0	-26.6	PK	23	1.3	RB 1 MHz;VB 3 MHz;Peak
2472.740	39.3	V	68.3	-29.0	PK	217	1.3	RB 1 MHz;VB 3 MHz;Peak
1914.760	37.4	V	68.3	-30.9	PK	314	2.5	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 the same measurement method used to determine the in-band power spectral density or a peak measurement (RB=1MHz, VB>1MHz).
Note 3:	Using bandedge setup to take measurement

Client:	Ubiquiti Networks	Job Number:	J86352
Model:	RocketM5 Titanium	T-Log Number:	T88756
		Account Manager:	Michelle Kim
Contact:	Jennifer Sanchez		
Standard:	FCC 15.E/RSS-210	Class:	N/A



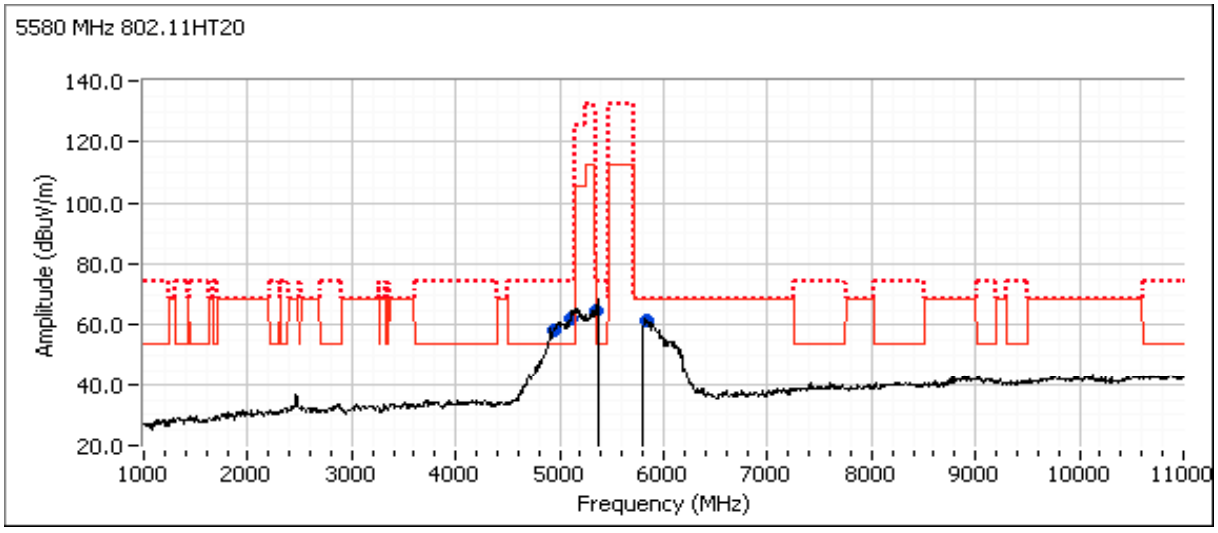
Run # 2h: EUT on Channel 5580MHz - HT20, Chain A+B

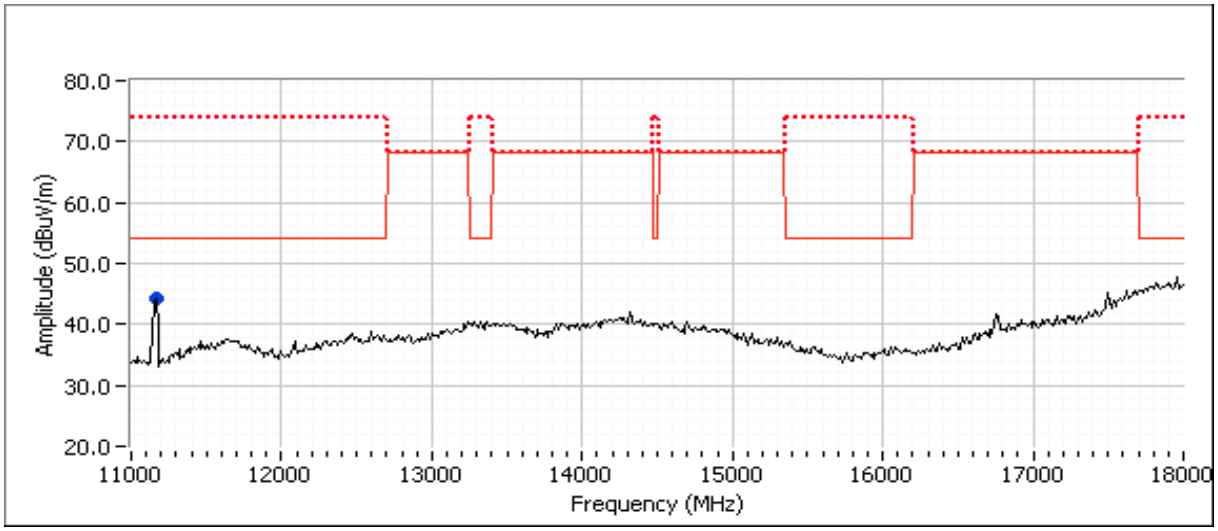
Spurious Radiated Emissions:

Frequency	Level	Pol	15.209 / 15E		Detector	Azimuth	Height	Comments
MHz	dBµV/m	v/h	Limit	Margin	Pk/QP/Avg	degrees	meters	
5365.520	53.6	V	54.0	-0.4	AVG	24	1.3	note 4
5365.300	65.2	V	74.0	-8.8	PK	24	1.3	note 4
5101.120	42.0	V	54.0	-12.0	AVG	16	1.3	RB 1 MHz;VB 10 Hz;Peak
5103.770	53.7	V	74.0	-20.3	PK	16	1.3	RB 1 MHz;VB 3 MHz;Peak
4950.520	44.4	V	54.0	-9.6	AVG	16	1.3	RB 1 MHz;VB 10 Hz;Peak
4950.810	56.3	V	74.0	-17.7	PK	16	1.3	RB 1 MHz;VB 3 MHz;Peak
5832.630	64.6	V	68.3	-3.7	PK	24	1.3	RB 1 MHz;VB 3 MHz;Peak
11160.200	52.2	V	54.0	-1.8	AVG	0	1.2	RB 1 MHz;VB 10 Hz;Peak
11161.730	64.8	V	74.0	-9.2	PK	0	1.2	RB 1 MHz;VB 3 MHz;Peak

Client:	Ubiquiti Networks	Job Number:	J86352
Model:	RocketM5 Titanium	T-Log Number:	T88756
		Account Manager:	Michelle Kim
Contact:	Jennifer Sanchez		
Standard:	FCC 15.E/RSS-210	Class:	N/A

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 the same measurement method used to determine the in-band power spectral density or a peak measurement (RB=1MHz, VB>1MHz).
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:	Using bandedge setup to take measurement





Client:	Ubiquiti Networks	Job Number:	J86352
Model:	RocketM5 Titanium	T-Log Number:	T88756
		Account Manager:	Michelle Kim
Contact:	Jennifer Sanchez		
Standard:	FCC 15.E/RSS-210	Class:	N/A

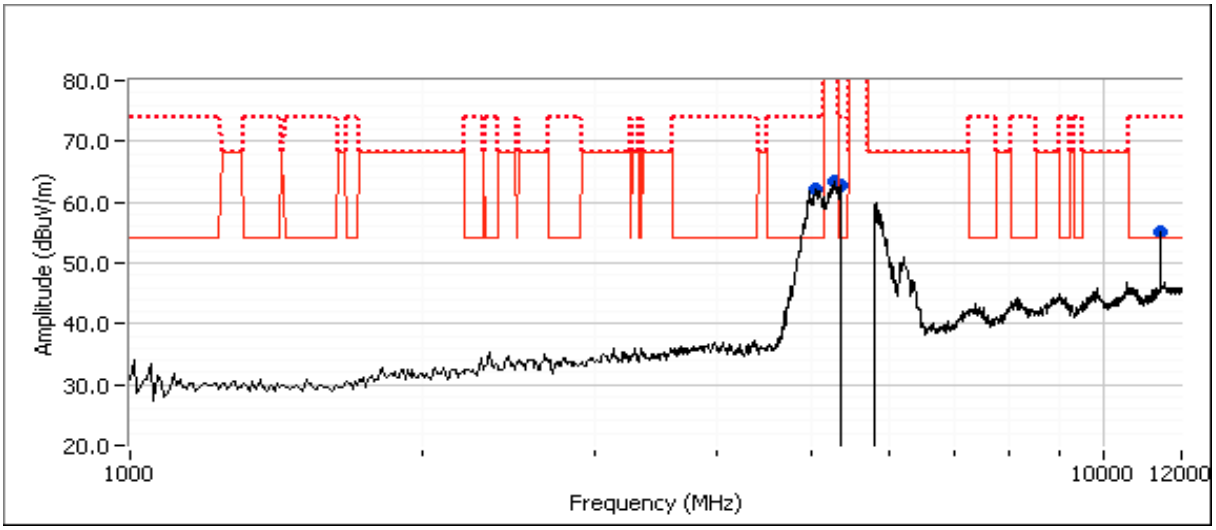
Run # 2i: EUT on Channel 5700MHz - HT20, Chain A+B

Date of Test: 10/15/2012
Test Engineer: John Caizzi
Test Location: FT Chamber#7
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	
5080.790	53.6	H	54.0	-0.4	AVG	0	1.21	note 3
5087.850	65.5	H	74.0	-8.5	PK	0	1.21	note 3
5456.690	53.5	H	54.0	-0.5	AVG	0	1.19	note 3
5422.080	65.1	H	74.0	-8.9	PK	0	1.19	note 3
5266.000	67.4	H	68.3	-0.9	Pk	0	1.22	Vavg = 100, note 3
11396.870	50.1	V	54.0	-3.9	AVG	0	1.00	
11398.270	61.6	V	74.0	-12.4	PK	0	1.00	

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 the same measurement method used to determine the in-band power spectral density or a peak measurement (RB=1MHz, VB>1MHz).
Note 3:	Used bandedge setup to take measurement.
Note 4:	12-18 GHz scan not done, since scan on middle channel showed no emissions above 12 GHz.



Client:	Ubiquiti Networks	Job Number:	J86352
Model:	RocketM5 Titanium	T-Log Number:	T88756
		Account Manager:	Michelle Kim
Contact:	Jennifer Sanchez		
Standard:	FCC 15.E/RSS-210	Class:	N/A

Run # 3, Radiated Spurious Emissions, 1-40GHz, HT40, Chain A+B

Date of Test: 10/15/2012 & 10/17/12 Test Location: FT Chamber#7 & Chamber 5

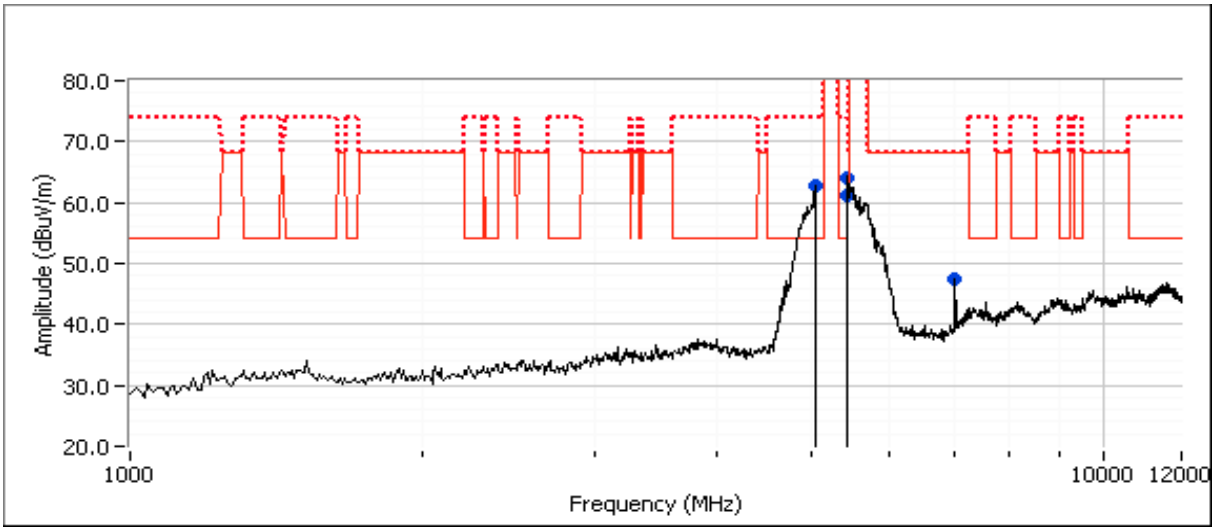
Test Engineer: John Caizzi Config Change: none

Run # 3d: EUT on Channel 5275MHz - HT40, 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	
5138.220	51.5	H	54.0	-2.5	AVG	358	1.15	
5110.120	65.4	H	74.0	-8.6	PK	358	1.15	
5425.830	52.5	V	54.0	-1.5	AVG	359	1.14	
5395.190	64.2	V	74.0	-9.8	PK	359	1.14	
5489.460	62.7	V	68.3	-5.6	PK	0	1.12	

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 the same measurement method used to determine the in-band power spectral density or a peak measurement (RB=1MHz, VB>1MHz).



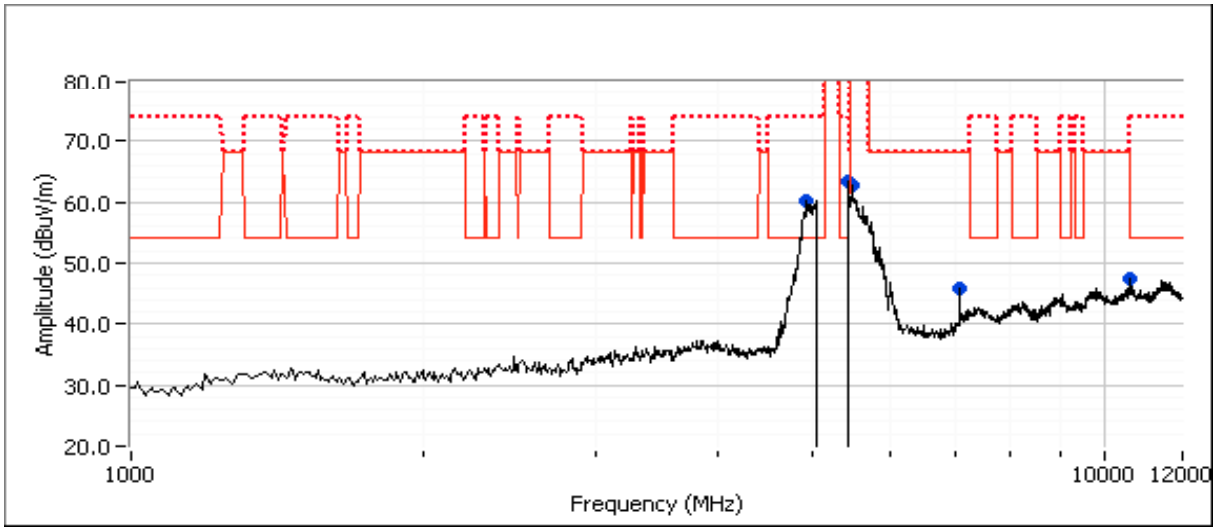
Client:	Ubiquiti Networks	Job Number:	J86352
Model:	RocketM5 Titanium	T-Log Number:	T88756
		Account Manager:	Michelle Kim
Contact:	Jennifer Sanchez		
Standard:	FCC 15.E/RSS-210	Class:	N/A

Run # 3f: EUT on Channel 5310MHz - HT40, 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	
5127.960	52.6	H	54.0	-1.4	AVG	357	1.17	
5051.600	64.5	H	74.0	-9.5	PK	357	1.17	
5536.750	64.9	H	68.3	-3.4	PK	359	1.15	
10614.270	47.2	V	54.0	-6.8	AVG	359	1.05	
10614.000	58.3	V	74.0	-15.7	PK	359	1.05	
7080.000	46.0	V	68.3	-22.3	Peak	357	1.0	

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 the same measurement method used to determine the in-band power spectral density or a peak measurement (RB=1MHz, VB>1MHz).



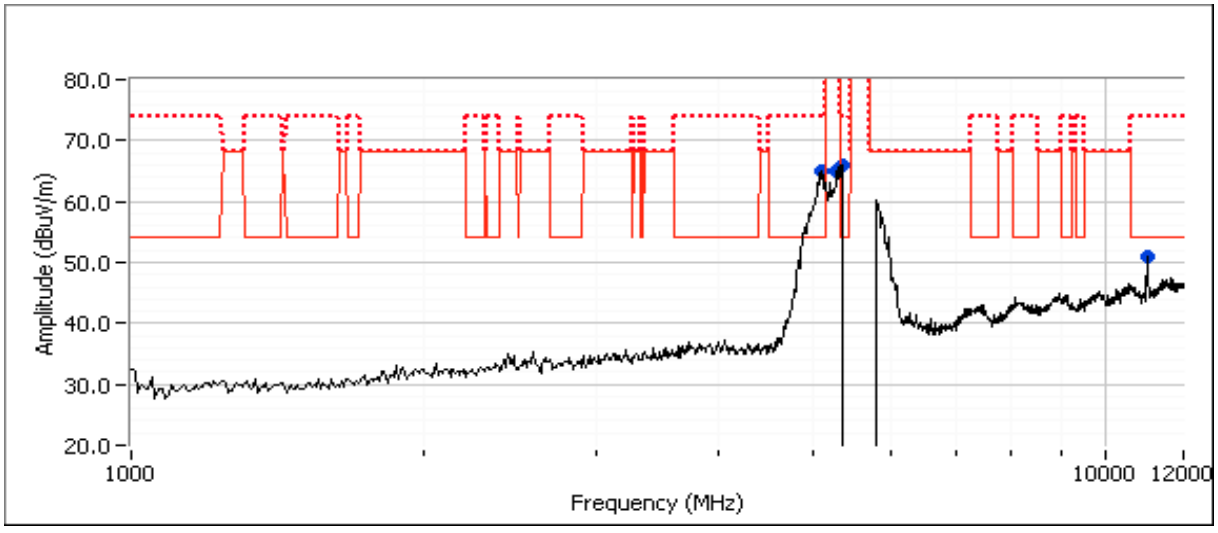
Client:	Ubiquiti Networks	Job Number:	J86352
Model:	RocketM5 Titanium	T-Log Number:	T88756
		Account Manager:	Michelle Kim
Contact:	Jennifer Sanchez		
Standard:	FCC 15.E/RSS-210	Class:	N/A

Run # 3g: EUT on Channel 5510MHz - HT40, 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	
5104.020	53.4	H	54.0	-0.6	AVG	0	1.20	note 3
5099.130	65.1	H	74.0	-8.9	PK	0	1.20	note 3
5294.210	60.9	H	68.3	-7.4	Pk	0	1.19	note 3, Vavg = 100
11018.400	49.1	V	54.0	-4.9	AVG	0	1.09	
11016.800	61.3	V	74.0	-12.7	PK	0	1.09	

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 the same measurement method used to determine the in-band power spectral density or a peak measurement (RB=1MHz, VB>1MHz).
Note 3:	Used bandedge setup to take measurement.
Note 4:	12-18 GHz scan not done, since scan on middle channel showed no emissions above 12 GHz.



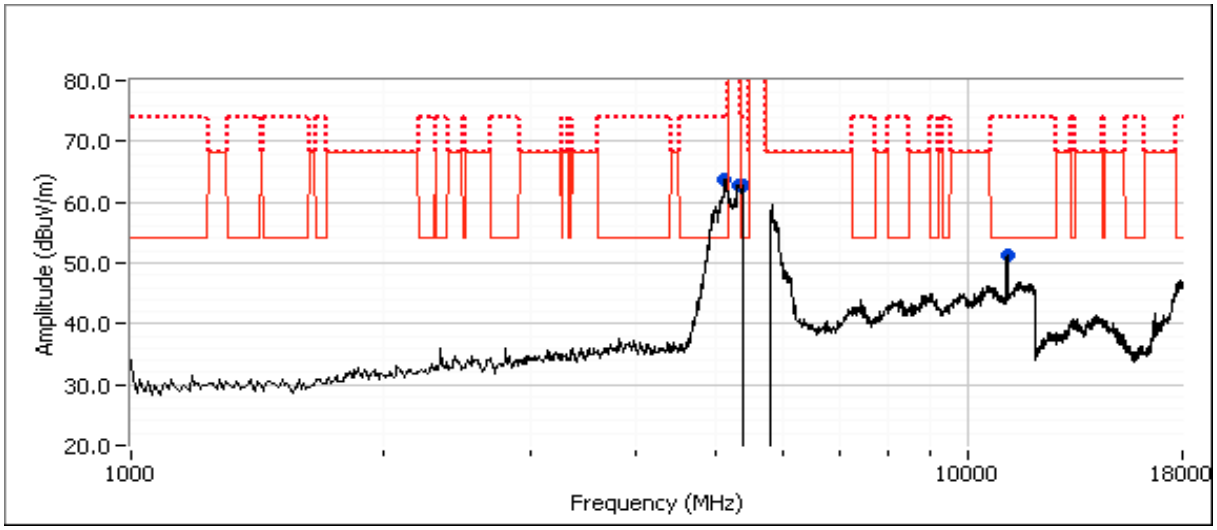
Client:	Ubiquiti Networks	Job Number:	J86352
Model:	RocketM5 Titanium	T-Log Number:	T88756
		Account Manager:	Michelle Kim
Contact:	Jennifer Sanchez		
Standard:	FCC 15.E/RSS-210	Class:	N/A

Run # 3h: EUT on Channel 5550MHz - HT40, 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	
5120.070	53.8	H	54.0	-0.2	AVG	0	1.20	note 4
5120.390	65.2	H	74.0	-8.8	PK	0	1.20	note 4
5456.030	52.9	H	54.0	-1.1	AVG	0	1.18	note 4
5455.070	64.9	H	74.0	-9.1	PK	0	1.18	note 4
5152.200	61.2	H	68.3	-7.1	Pk	0	1.21	Vavg = 100, note 4
11101.470	50.5	V	54.0	-3.5	AVG	0	1.17	
11101.070	62.2	V	74.0	-11.8	PK	0	1.17	

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 the same measurement method used to determine the in-band power spectral density or a peak measurement (RB=1MHz, VB>1MHz).
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:	Used bandedge setup to take measurement.



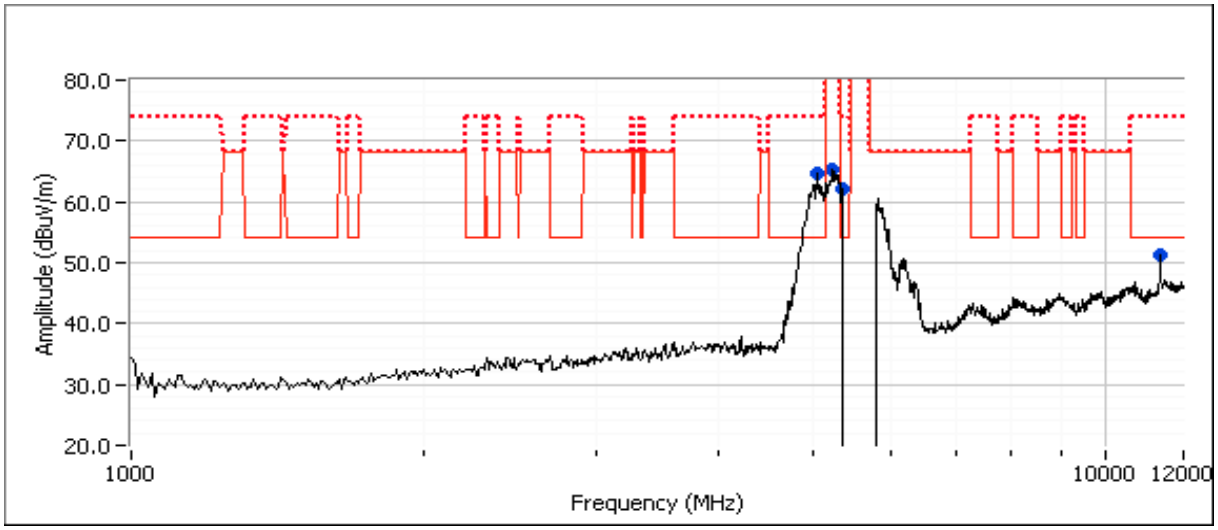
Client:	Ubiquiti Networks	Job Number:	J86352
Model:	RocketM5 Titanium	T-Log Number:	T88756
		Account Manager:	Michelle Kim
Contact:	Jennifer Sanchez		
Standard:	FCC 15.E/RSS-210	Class:	N/A

Date of Test: 10/15/2012 Test Location: FT Chamber #7
Test Engineer: M. Birgani Config Change: -
Run # 3i: EUT on Channel 5675MHz - HT40, 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	
5059.930	52.5	H	54.0	-1.5	AVG	0	1.2	
5045.270	63.6	H	74.0	-10.4	PK	0	1.2	
5350.000	53.1	H	54.0	-0.9	AVG	0	1.3	
5351.600	63.1	H	74.0	-10.9	PK	0	1.3	
11362.600	39.9	V	54.0	-14.1	AVG	0	1.3	
11366.070	51.2	V	74.0	-22.8	PK	0	1.3	

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 the same measurement method used to determine the in-band power spectral density or a peak measurement (RB=1MHz, VB>1MHz).
Note 3:	12-18 GHz scan not done, since scan on middle channel showed no emissions above 12 GHz.



Client:	Ubiquiti Networks	Job Number:	J86352
Model:	RocketM5 Titanium	T-Log Number:	T88756
		Account Manager:	Michelle Kim
Contact:	Jennifer Sanchez		
Standard:	FCC 15.E/RSS-210	Class:	N/A

Run # 4, Radiated Spurious Emissions, 1-40GHz, HT10, Chain A+B

Date of Test: 10/15/2012 Test Location: FT Chamber #7

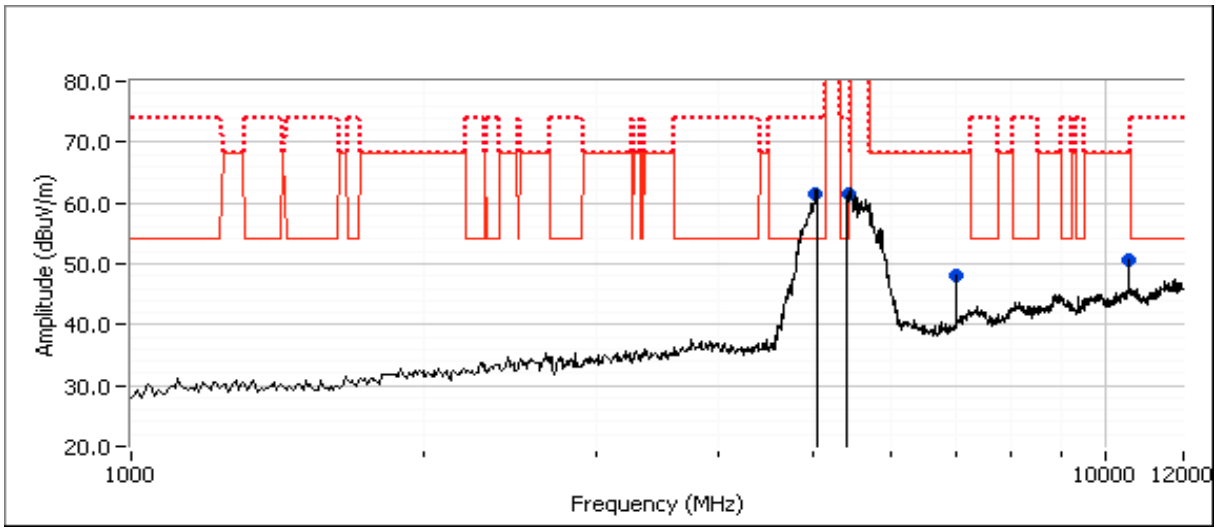
Test Engineer: M. Birgani Config Change: -

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).

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	
10530.000	50.7	V	68.3	-17.6	Peak	1	1.0	
7020.000	48.0	V	68.3	-20.3	Peak	1	1.0	
5000.000	53.5	H	54.0	-0.5	AVG	1	1.2	
4984.930	63.8	H	74.0	-10.2	PK	1	1.2	
5453.300	53.9	V	54.0	-0.1	AVG	1	1.2	
5451.000	66.0	V	74.0	-8.0	PK	1	1.2	

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 the same measurement method used to determine the in-band power spectral density or a peak measurement (RB=1MHz, VB>1MHz).



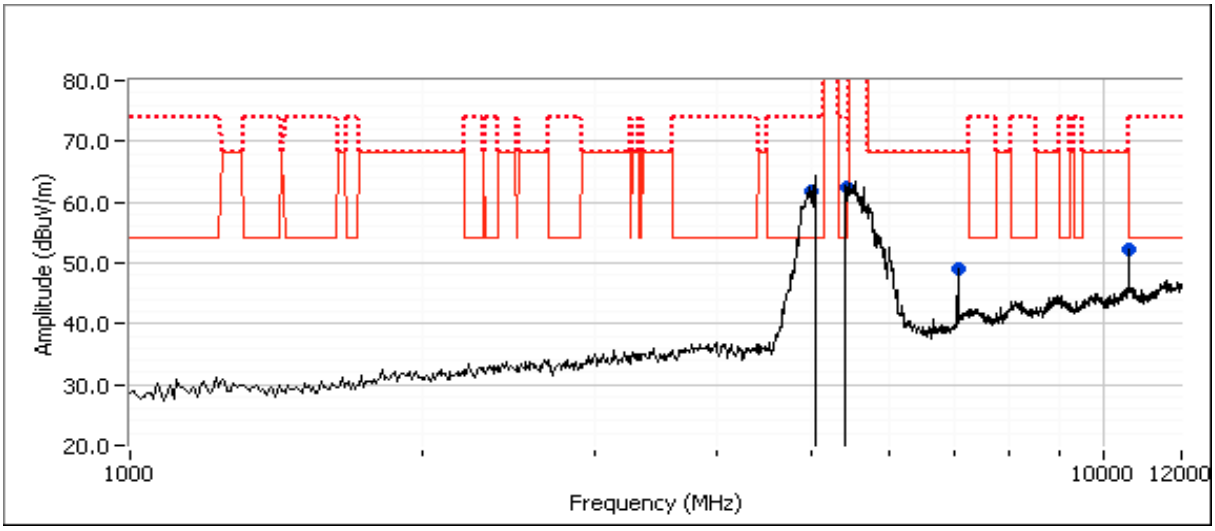
Client:	Ubiquiti Networks	Job Number:	J86352
Model:	RocketM5 Titanium	T-Log Number:	T88756
		Account Manager:	Michelle Kim
Contact:	Jennifer Sanchez		
Standard:	FCC 15.E/RSS-210	Class:	N/A

Date of Test: 10/15/2012 Test Location: FT Chamber #7
Test Engineer: M. Birgani Config Change: -
Run # 4e: EUT on Channel 5300MHz - HT10, 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	
5451.830	51.8	H	54.0	-2.2	AVG	0	1.2	
5451.540	62.1	H	74.0	-11.9	PK	0	1.2	
4999.940	50.7	H	54.0	-3.3	AVG	0	1.2	
4975.800	60.1	H	74.0	-13.9	PK	0	1.2	
10601.500	40.2	V	54.0	-13.8	AVG	0	1.0	
10603.000	51.3	V	74.0	-22.7	PK	0	1.0	
7070.000	48.9	V	68.3	-19.4	Peak	0	1.0	

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 the same measurement method used to determine the in-band power spectral density or a peak measurement (RB=1MHz, VB>1MHz)

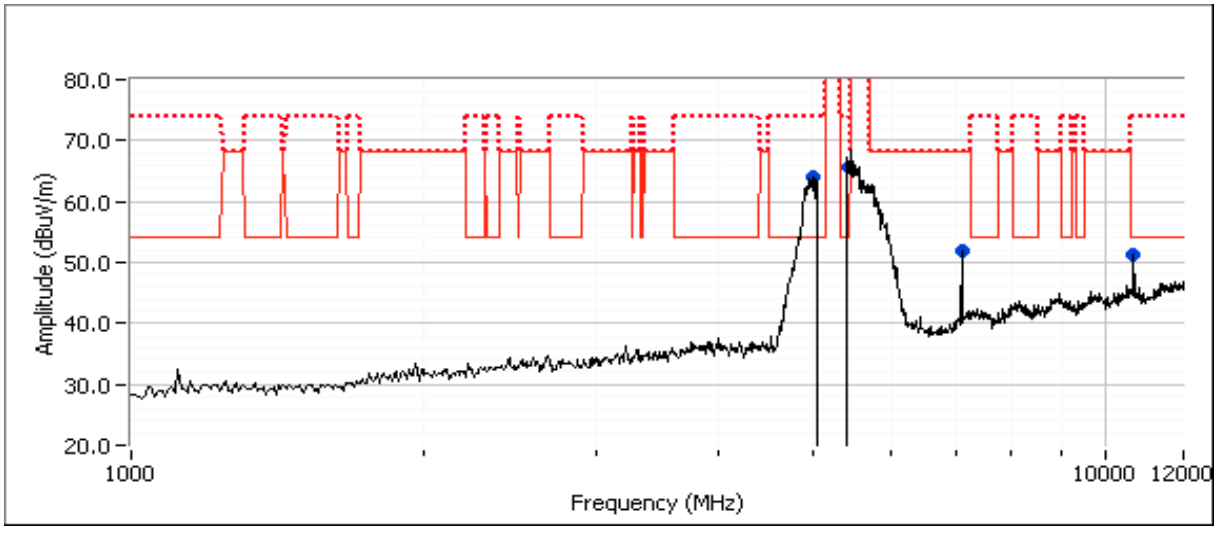


Client:	Ubiquiti Networks	Job Number:	J86352
Model:	RocketM5 Titanium	T-Log Number:	T88756
		Account Manager:	Michelle Kim
Contact:	Jennifer Sanchez		
Standard:	FCC 15.E/RSS-210	Class:	N/A

Date of Test: 10/15/2012 Test Location: FT Chamber #7
Test Engineer: M. Birgani Config Change: -
Run # 4f: EUT on Channel 5330MHz - HT10, 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	
5453.500	53.3	V	54.0	-0.7	AVG	0	1.2	
5458.500	64.3	V	74.0	-9.7	PK	0	1.2	
4976.250	50.1	V	54.0	-3.9	AVG	0	1.2	
4982.170	62.3	V	74.0	-11.7	PK	0	1.2	
10659.000	41.6	V	54.0	-12.4	AVG	0	1.0	
10666.270	52.8	V	74.0	-21.2	PK	0	1.0	
7110.000	51.8	V	68.3	-16.5	Peak	0	1.6	

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 the same measurement method used to determine the in-band power spectral density or a peak measurement (RB=1MHz, VB>1MHz).



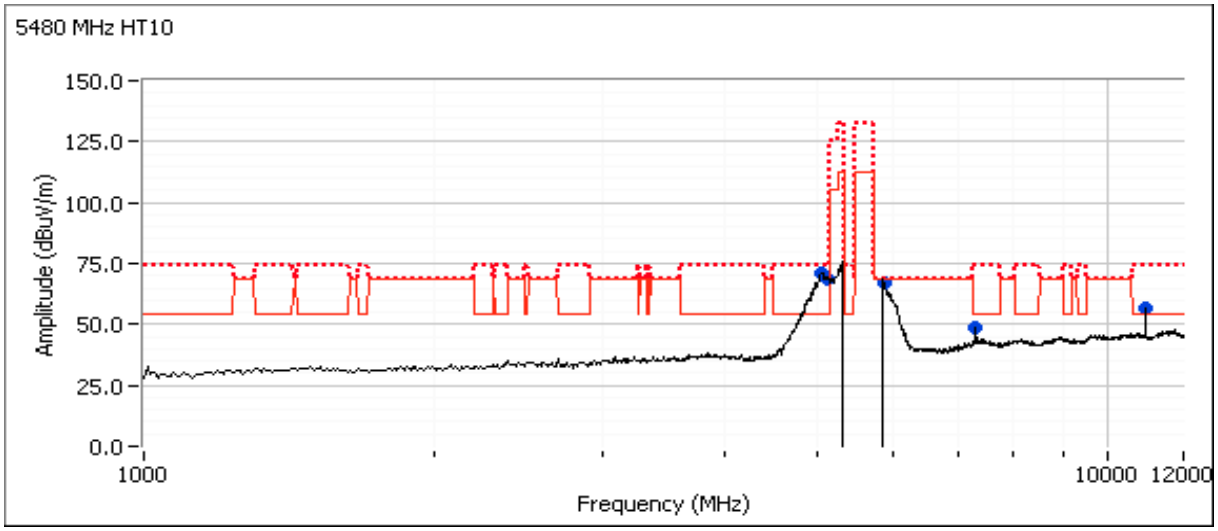
Client:	Ubiquiti Networks	Job Number:	J86352
Model:	RocketM5 Titanium	T-Log Number:	T88756
		Account Manager:	Michelle Kim
Contact:	Jennifer Sanchez		
Standard:	FCC 15.E/RSS-210	Class:	N/A

Date of Test: 10/17/2012 Test Location: FT Chamber#5
Test Engineer: Joseph Cadigal Config Change: -
Run # 4g: EUT on Channel 5480MHz - HT10, 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	
5117.730	53.1	H	54.0	-0.9	AVG	0	1.3	note 3
5109.790	64.3	H	74.0	-9.7	PK	0	1.3	note 3
5060.560	52.9	H	54.0	-1.1	AVG	0	1.3	note 3
5055.390	64.2	H	74.0	-9.8	PK	0	1.3	note 3
5863.080	65.5	H	68.3	-2.8	PK	0	1.3	note 3
5119.600	72.8	H	74.0	-1.2	PK	0	1.3	RB 1 MHz;VB 3 MHz;Peak
7306.670	45.5	H	54.0	-8.5	AVG	0	1.3	RB 1 MHz;VB 10 Hz;Peak
7306.590	52.1	H	74.0	-21.9	PK	0	1.3	RB 1 MHz;VB 3 MHz;Peak
10955.630	40.2	H	54.0	-13.8	AVG	162	1.3	RB 1 MHz;VB 10 Hz;Peak
10955.100	51.3	H	74.0	-22.7	PK	162	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 the same measurement method used to determine the in-band power spectral density or a peak measurement (RB=1MHz, VB>1MHz).
Note 3:	Used bandedge setup to take measurement.
Note 4:	12-18 GHz scan not done, since scan on middle channel showed no emissions above 12 GHz.



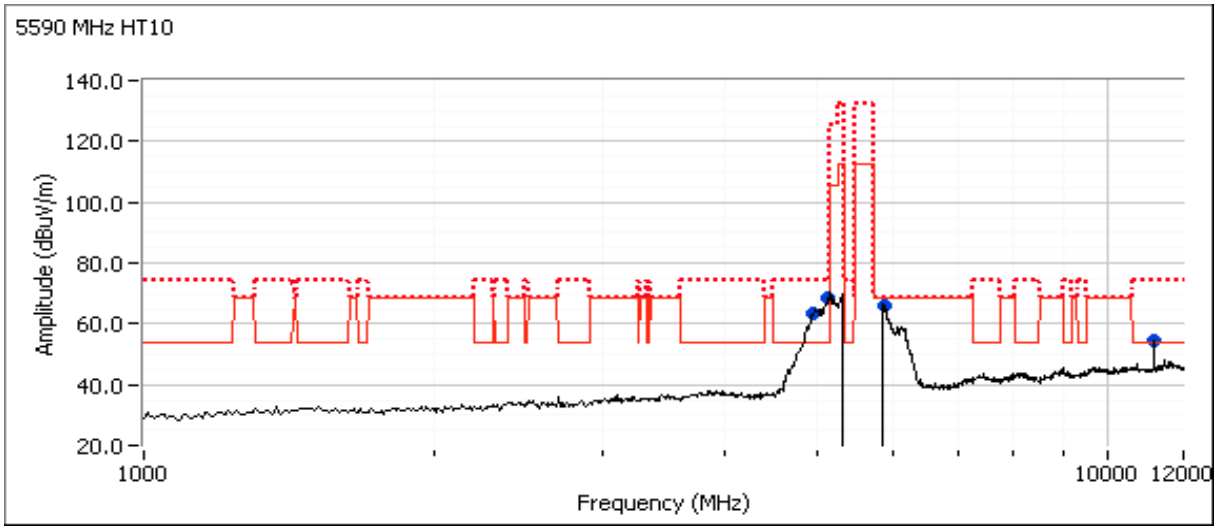
Client:	Ubiquiti Networks	Job Number:	J86352
Model:	RocketM5 Titanium	T-Log Number:	T88756
		Account Manager:	Michelle Kim
Contact:	Jennifer Sanchez		
Standard:	FCC 15.E/RSS-210	Class:	N/A

Run # 4h: EUT on Channel 5590MHz - HT10, 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	
4962.220	53.1	H	54.0	-0.9	AVG	0	1.0	note 4
4963.580	65.5	H	74.0	-8.5	PK	0	1.0	note 4
5146.430	52.7	H	54.0	-1.3	AVG	0	1.0	note 4
5140.200	64.3	H	74.0	-9.7	PK	0	1.0	note 4
11181.060	42.3	V	54.0	-11.7	AVG	5	1.0	RB 1 MHz;VB 10 Hz;Peak
11179.760	53.4	V	74.0	-20.6	PK	5	1.0	RB 1 MHz;VB 3 MHz;Peak
5868.370	63.0	H	68.3	-5.3	PK	358	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 the same measurement method used to determine the in-band power spectral density or a peak measurement (RB=1MHz, VB>1MHz).
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:	Used bandedge setup to take measurement.



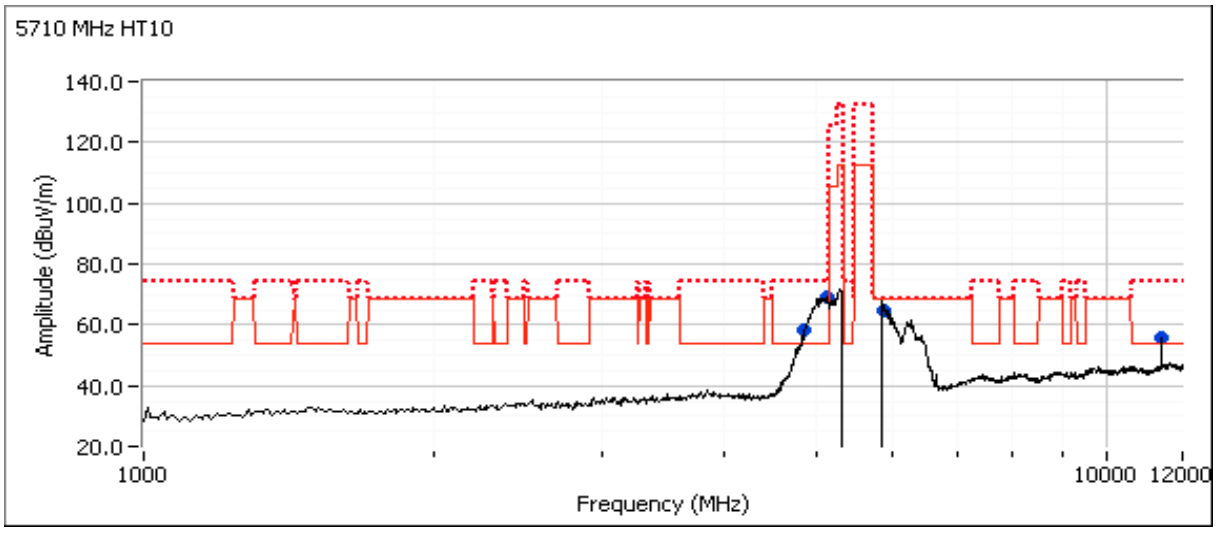
Client:	Ubiquiti Networks	Job Number:	J86352
Model:	RocketM5 Titanium	T-Log Number:	T88756
		Account Manager:	Michelle Kim
Contact:	Jennifer Sanchez		
Standard:	FCC 15.E/RSS-210	Class:	N/A

Run # 4i: EUT on Channel 5710MHz - HT10, 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	
5865.760	68.0	H	68.3	-0.3	PK	356	1.3	note 3
5120.040	52.3	H	54.0	-1.7	AVG	356	1.3	note 3
5118.730	63.0	H	74.0	-11.0	PK	356	1.3	note 3
4859.760	48.3	H	54.0	-5.7	AVG	356	1.3	note 3
4860.410	59.9	H	74.0	-14.1	PK	356	1.3	note 3
11418.070	52.3	H	54.0	-1.7	AVG	356	1.3	RB 1 MHz;VB 10 Hz;Peak
11418.530	64.4	H	74.0	-9.6	PK	356	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 the same measurement method used to determine the in-band power spectral density or a peak measurement (RB=1MHz, VB>1MHz).
Note 3:	Used bandedge setup to take measurement.



Client:	Ubiquiti Networks	Job Number:	J86352
Model:	RocketM5 Titanium	T-Log Number:	T88756
		Account Manager:	Michelle Kim
Contact:	Jennifer Sanchez		
Standard:	FCC 15.E/RSS-210	Class:	N/A

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

Test Specific Details

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

Summary of Results

Run #	Test Performed	Limit	Pass / Fail	Result / Margin
1	Power, 5250 - 5350MHz	15.407(a) (1), (2)	Pass	802.11a: 7.2 mW
1	PSD, 5250 - 5350MHz	15.407(a) (1), (2)	Pass	802.11a: -3.0 dBm/MHz
1	Max EIRP 5250 - 5350MHz	TPC required if EIRP≥ 500mW (27dBm). EIRP ≥ 200mW (23dBm) DFS threshold = -64dBm.	Pass	EIRP = 28.6 dBm (722 mW)
1	Power, 5470 - 5725MHz	15.407(a) (1), (2)	Pass	802.11a: 8.8 mW
1	PSD, 5470 - 5725MHz	15.407(a) (1), (2)	Pass	802.11a: -3.1 dBm/MHz
1	Max EIRP 5470 - 5725MHz	TPC required if EIRP≥ 500mW (27dBm). EIRP ≥ 200mW (23dBm) DFS threshold	Pass	EIRP = 29.5 dBm (881 mW)
1	26dB Bandwidth	15.407 (Information only)	-	> 20MHz for all modes
1	99% Bandwidth	RSS 210 (Information only)	N/A	802.11a: 16.9 MHz

Client:	Ubiquiti Networks	Job Number:	J86352
Model:	RocketM5 Titanium	T-Log Number:	T88756
		Account Manager:	Michelle Kim
Contact:	Jennifer Sanchez		
Standard:	FCC 15.E/RSS-210	Class:	N/A

Run #	Test Performed	Limit	Pass / Fail	Result / Margin
2	Peak Excursion Envelope	15.407(a) (6) 13dB	Pass	8.99 dB
3	Antenna Conducted - Out of Band Spurious	15.407(b) -27dBm/MHz	Pass	All emissions below the -27dBm/MHz limit

General Test Configuration

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

Ambient Conditions:

Temperature:	25 °C
Rel. Humidity:	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.

Client:	Ubiquiti Networks	Job Number:	J86352
Model:	RocketM5 Titanium	T-Log Number:	T88756
		Account Manager:	Michelle Kim
Contact:	Jennifer Sanchez		
Standard:	FCC 15.E/RSS-210	Class:	N/A

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

Date of Test:	10/23/2012	Config. Used:	1
Test Engineer:	Joseph Cadigal	Config Change:	none
Test Location:	FT EMC LAB #4	EUT Voltage:	POE

Note 1:	Output power measured using a spectrum analyzer (see plots below). RBW=1MHz, VB=3 MHz, sample detector, power averaging on (transmitted signal was continuous) and power integration over 40/60 MHz (method SA-1 of KDB 789033).
Note 2:	Measured using the same analyzer settings used for output power.
Note 3:	For RSS-210 the limit for the 5150 - 5250 MHz band accounts for the antenna gain as the maximum eirp allowed is 10dBm/MHz. The limits are also corrected for instances where the highest measured value of the PSD exceeds the average PSD (calculated from the measured power divided by the measured 99% bandwidth) by more than 3dB by the amount that the measured value exceeds the average by more than 3dB.
Note 4:	99% Bandwidth measured in accordance with RSS GEN - RB > 1% of span and VB >=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:	Ubiquiti Networks	Job Number:	J86352
Model:	RocketM5 Titanium	T-Log Number:	T88756
		Account Manager:	Michelle Kim
Contact:	Jennifer Sanchez		
Standard:	FCC 15.E/RSS-210	Class:	N/A

MIMO Device - 5250-5350 MHz Band

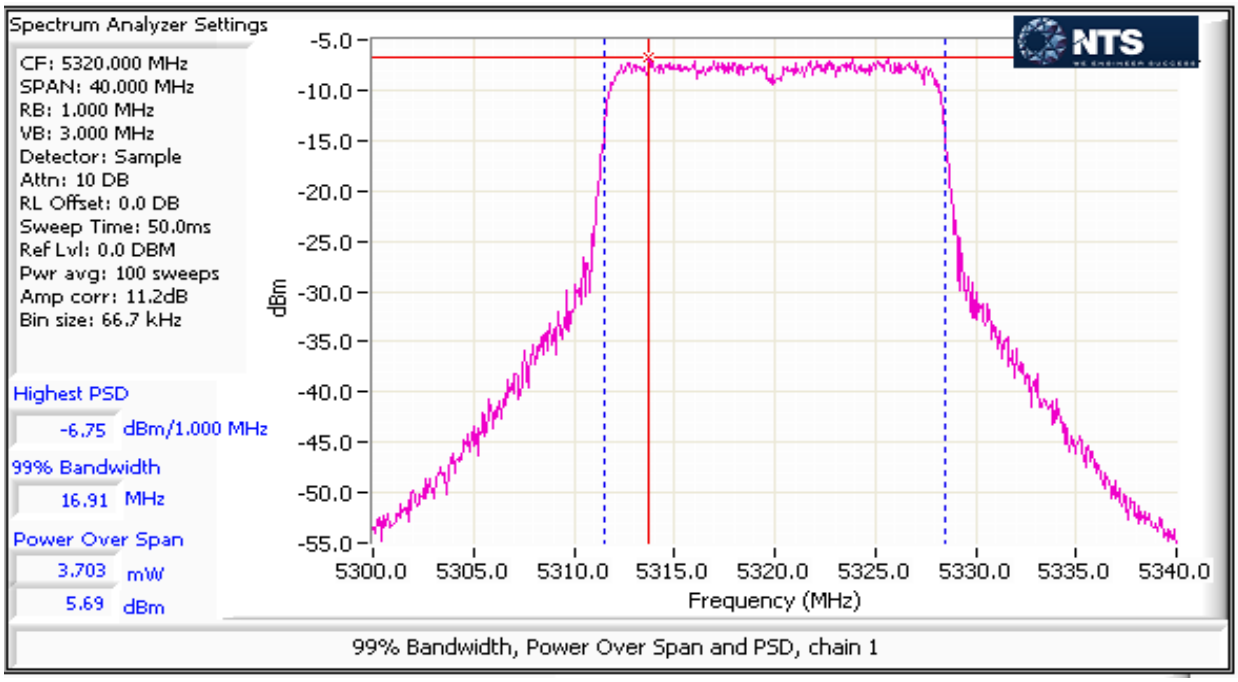
	Chain 1	Chain 2	Chain 3	Coherent	Effective[5]	EIRP (mW)	EIRP (dBm)
Antenna Gain (dBi):	20	20		No	20.0	722.2	28.6

Power

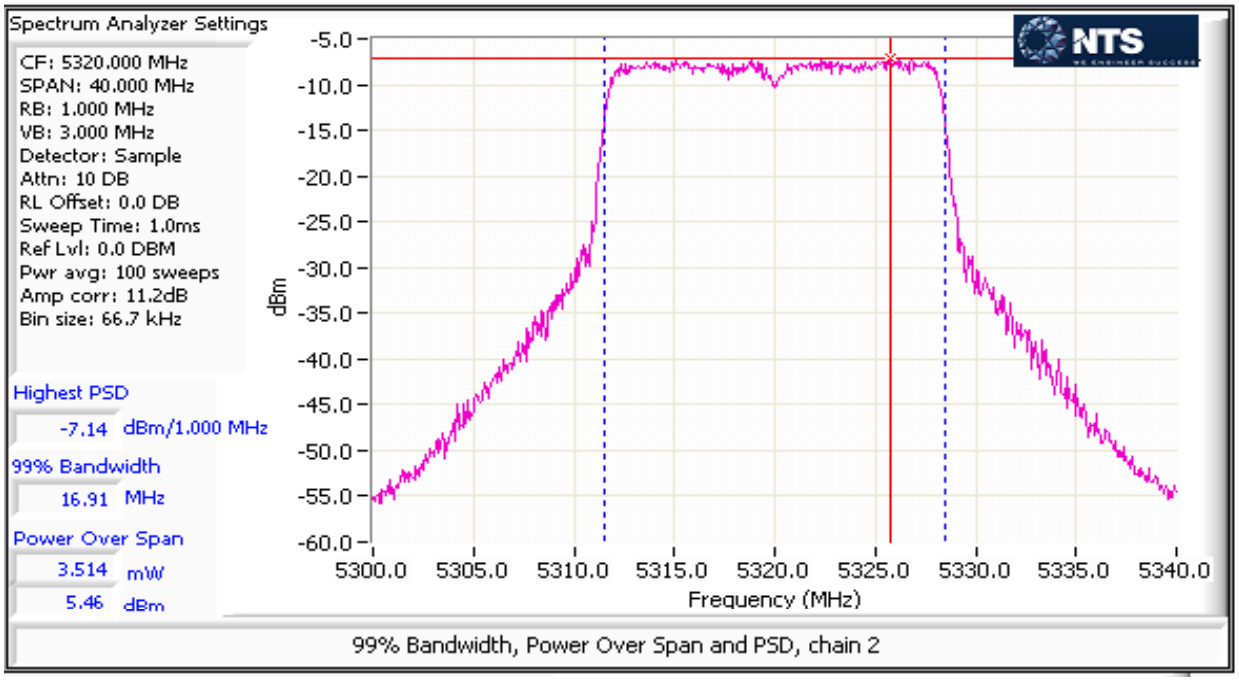
Frequency (MHz)	Software Setting	26dB BW (MHz)	Measured Output Power[1] dBm			Total		Limit (dBm)	Max Power (W)	Pass or Fail
			Chain 1	Chain 2	Chain 3	mW	dBm			
20MHz Mode										
5270	13.0	24.7	5.1	5.1		6.5	8.1	10.0	0.007	PASS
5300	13.0	23.9	5.5	5.1		6.8	8.3	10.0		PASS
5320	13.0	24.3	5.7	5.5		7.2	8.6	10.0		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]	
20MHz Mode										
5270	16.9	8.1	-7.3	-7.4		0.4	-4.3	-3.0	11.0	PASS
5300	16.9	8.3	-6.9	-7.3		0.4	-4.1	-3.0	11.0	PASS
5320	16.9	8.6	-6.8	-7.1		0.4	-3.9	-3.0	11.0	PASS



Client:	Ubiquiti Networks	Job Number:	J86352
Model:	RocketM5 Titanium	T-Log Number:	T88756
		Account Manager:	Michelle Kim
Contact:	Jennifer Sanchez		
Standard:	FCC 15.E/RSS-210	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):	20	20		No	20.0	881.3	29.5

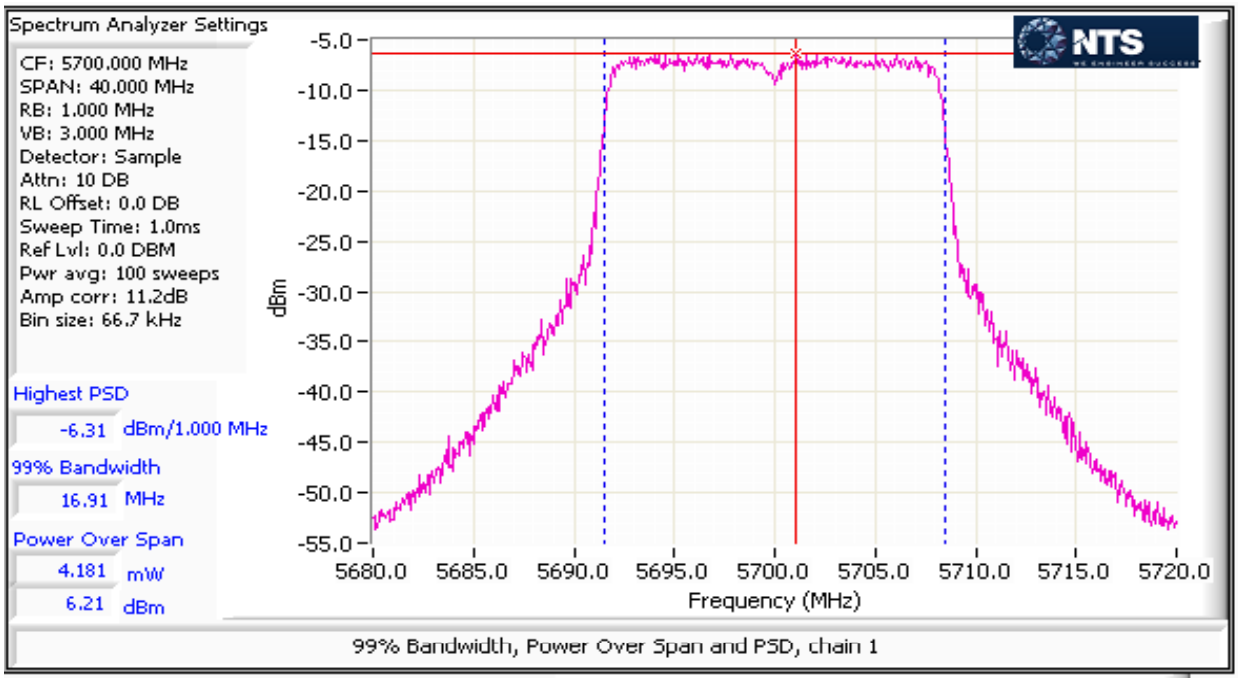
Power

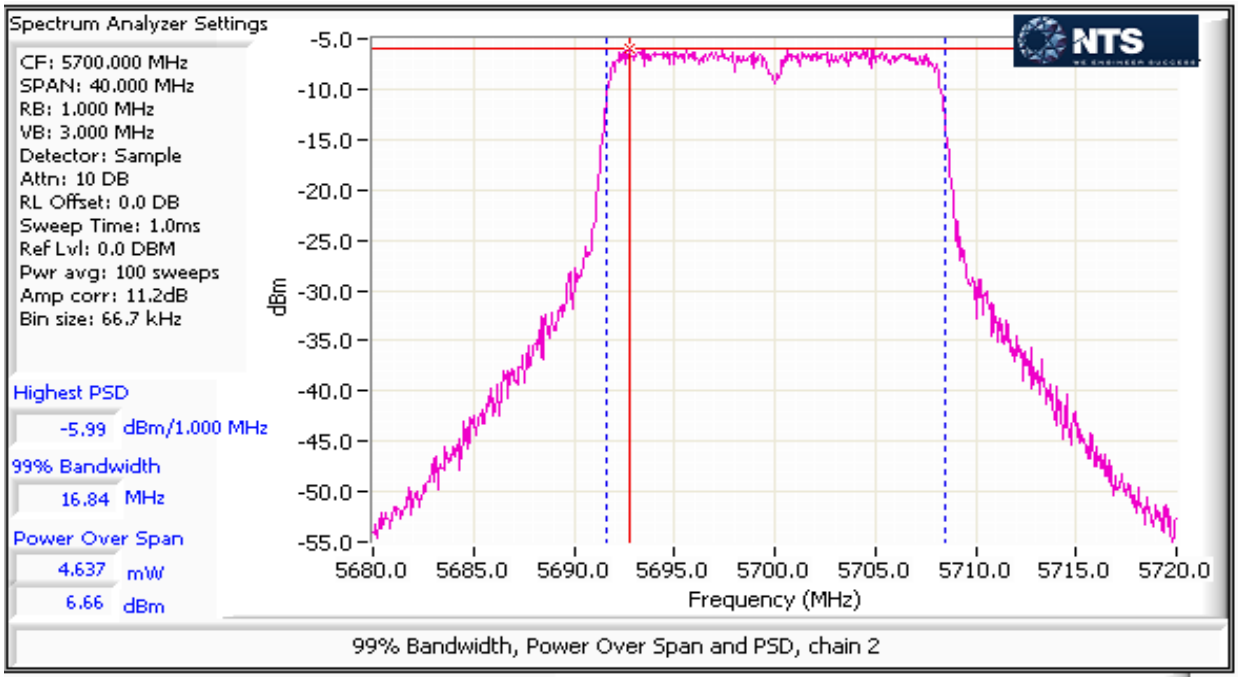
Frequency (MHz)	Software Setting	26dB BW (MHz)	Measured Output Power[1] dBm			Total		Limit (dBm)	Max Power (W)	Pass or Fail
			Chain 1	Chain 2	Chain 3	mW	dBm			
20MHz Mode										
5500	13.0	24.7	6.1	6.5		8.6	9.3	10.0	0.009	PASS
5580	13.0	25.3	6.1	6.5		8.5	9.3	10.0		PASS
5700	13.0	25.7	6.2	6.7		8.8	9.5	10.0		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]	
20MHz Mode										
5500	16.9	9.3	-6.4	-5.9		0.5	-3.1	-3.0	11.0	PASS
5580	16.9	9.3	-6.6	-6.1		0.5	-3.3	-3.0	11.0	PASS
5700	16.8	9.5	-6.3	-6.0		0.5	-3.1	-3.0	11.0	PASS

Client:	Ubiquiti Networks	Job Number:	J86352
Model:	RocketM5 Titanium	T-Log Number:	T88756
		Account Manager:	Michelle Kim
Contact:	Jennifer Sanchez		
Standard:	FCC 15.E/RSS-210	Class:	N/A





Client:	Ubiquiti Networks	Job Number:	J86352
Model:	RocketM5 Titanium	T-Log Number:	T88756
		Account Manager:	Michelle Kim
Contact:	Jennifer Sanchez		
Standard:	FCC 15.E/RSS-210	Class:	N/A

Run #2: Peak Excursion Measurement

20MHz: Device meets the requirement for the peak excursion

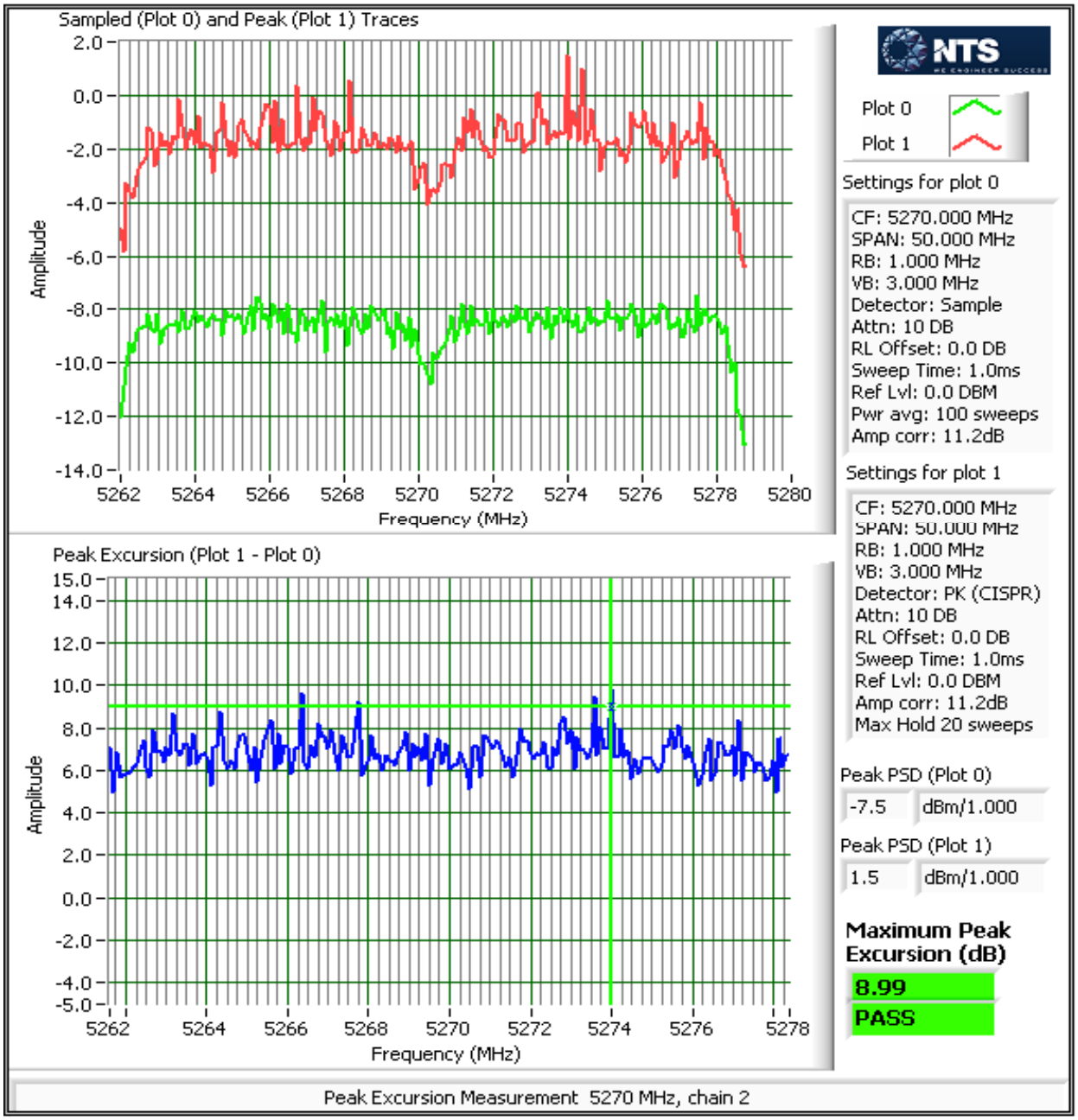
Freq	Peak Excursion(dB)		Freq	Peak Excursion(dB)		Freq	Peak Excursion(dB)	
(MHz)	Value	Limit	(MHz)	Value	Limit	(MHz)	Value	Limit
			5270	8.99 / 7.33	13.0	5500	6.62 / 8.35	13.0
			5300	7.28 / 7.83	13.0	5580	8.09 / 8.36	13.0
			5320	6.96 / 8.27	13.0	5700	6.95 / 7.74	13.0

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:	Ubiquiti Networks	Job Number:	J86352
Model:	RocketM5 Titanium	T-Log Number:	T88756
		Account Manager:	Michelle Kim
Contact:	Jennifer Sanchez		
Standard:	FCC 15.E/RSS-210	Class:	N/A



Client:	Ubiquiti Networks	Job Number:	J86352
Model:	RocketM5 Titanium	T-Log Number:	T88756
		Account Manager:	Michelle Kim
Contact:	Jennifer Sanchez		
Standard:	FCC 15.E/RSS-210	Class:	N/A

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

Date of Test: 10/23/2012 Config. Used: 1

Test Engineer: Vishal Narayan, Joseph Cadigal Config Change: none

Test Location: FT EMC LAB #4 EUT Voltage: POE

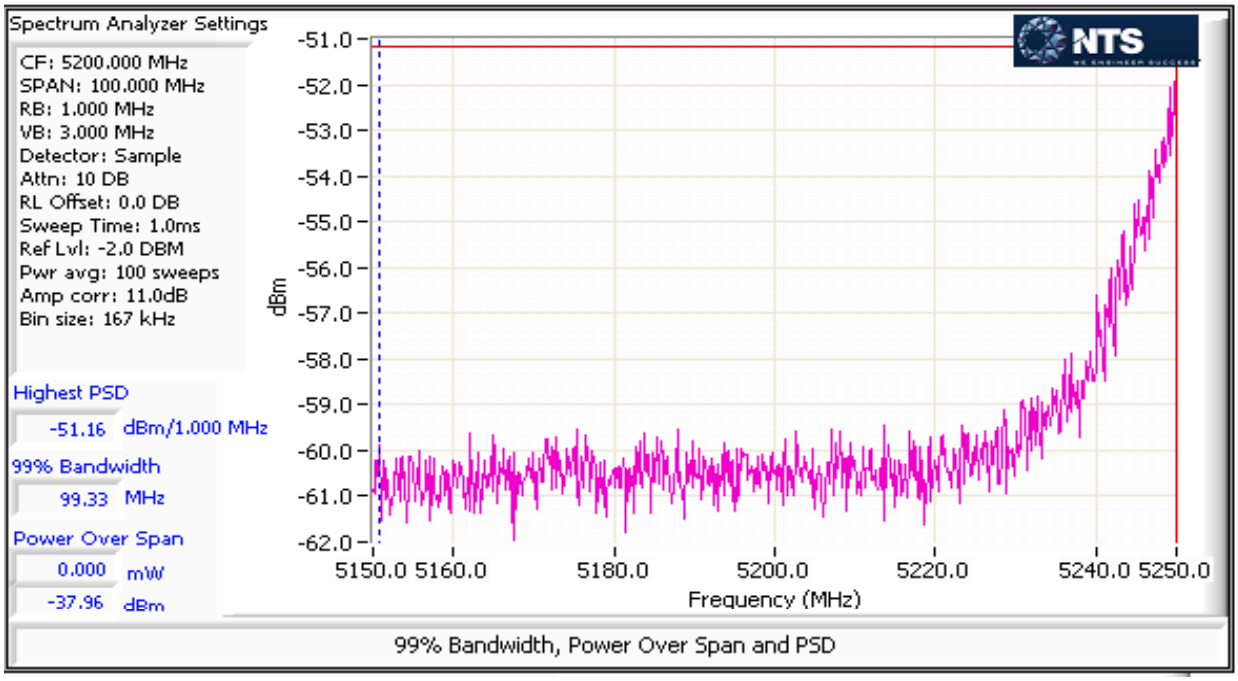
Note 1:	Compliance with the -27dBm/MHz requirement demonstrated via radiated measurements, except at the 5250MHz bandedge.
Note 4:	If the device is for outdoor use then the -27dBm eirp limit also applies in the 5150 - 5250 MHz band.

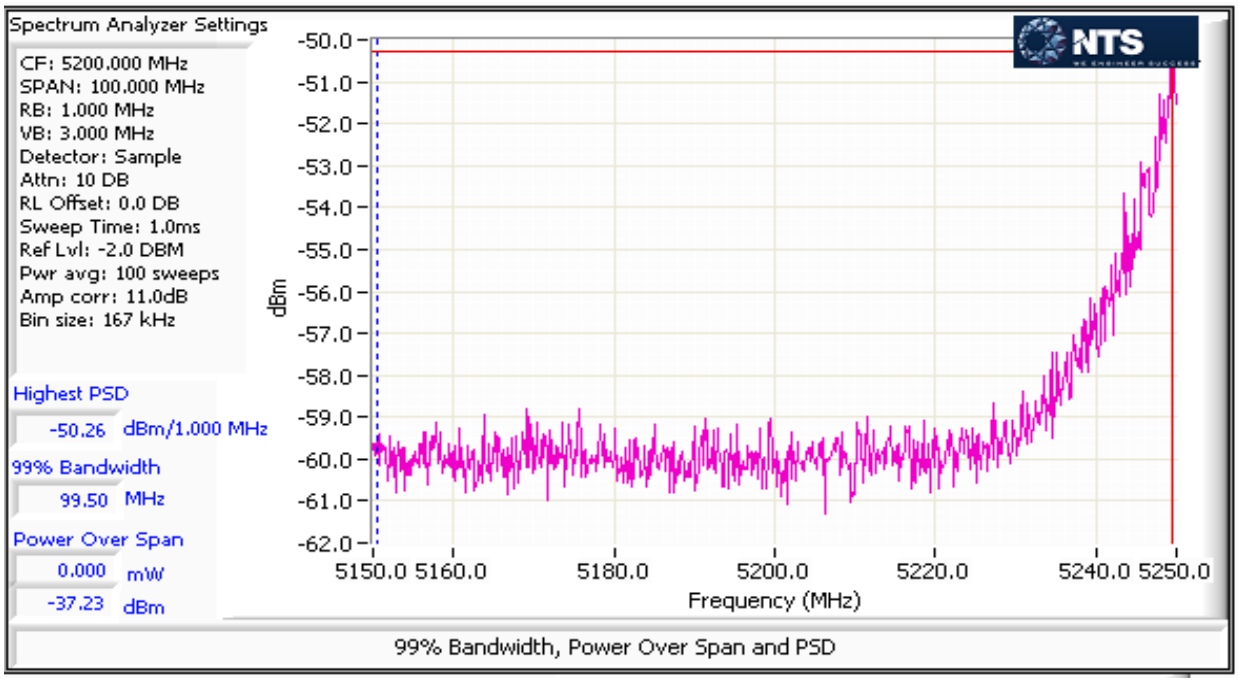
Low channel, 5250 - 5350 MHz Band Edge @ 5250 MHz for devices operating 5250-5350MHz only

Plots for each chain showing compliance with the -27dBm/MHz limit in the 5150 - 5250 MHz band. Start and stop frequencies set to 5150-5250 MHz, RB=1MHz, VB=3MHz, power averaging enabled (100 traces):

	Power Setting	Band edge Level		Antenna Gain (dBi)	EIRP		Total EIRP dBm/MHz	Limit dBm/MHz	Result
		dBm/MHz	mW/MHz		mW/MHz	dBm/MHz			
Chain 1	15	-51.2	0.00001	20.0	0.0007656	-31.2	-27.7	-27	PASS
Chain 2		-50.3	0.00001	20.0	0.0009419	-30.3			

Client:	Ubiquiti Networks	Job Number:	J86352
Model:	RocketM5 Titanium	T-Log Number:	T88756
		Account Manager:	Michelle Kim
Contact:	Jennifer Sanchez		
Standard:	FCC 15.E/RSS-210	Class:	N/A

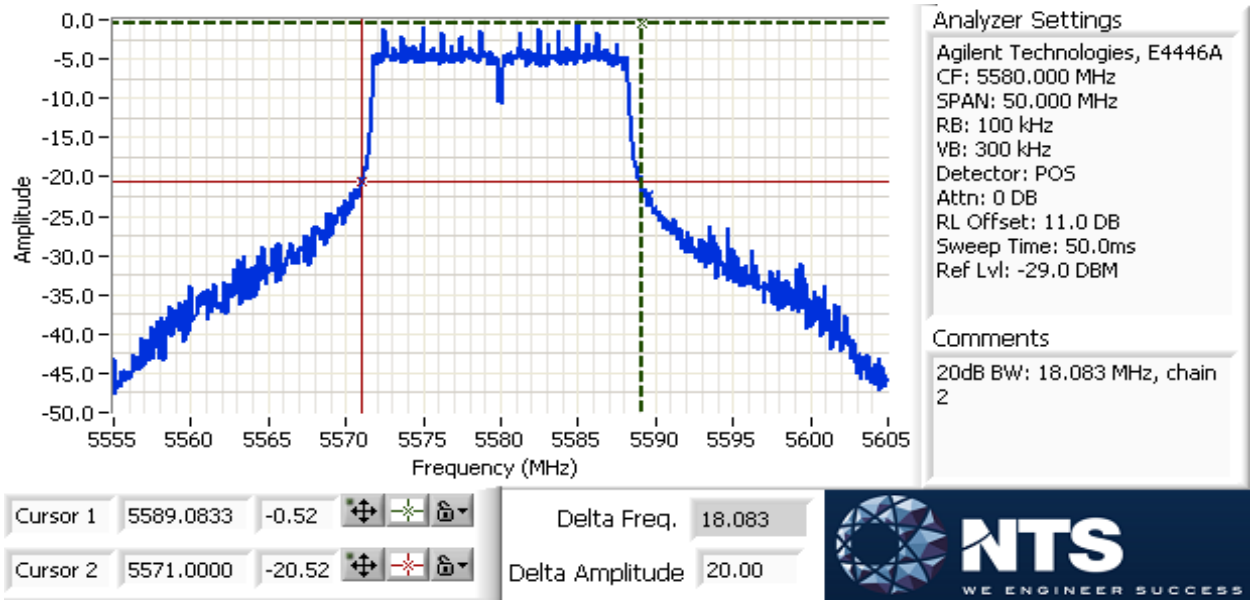


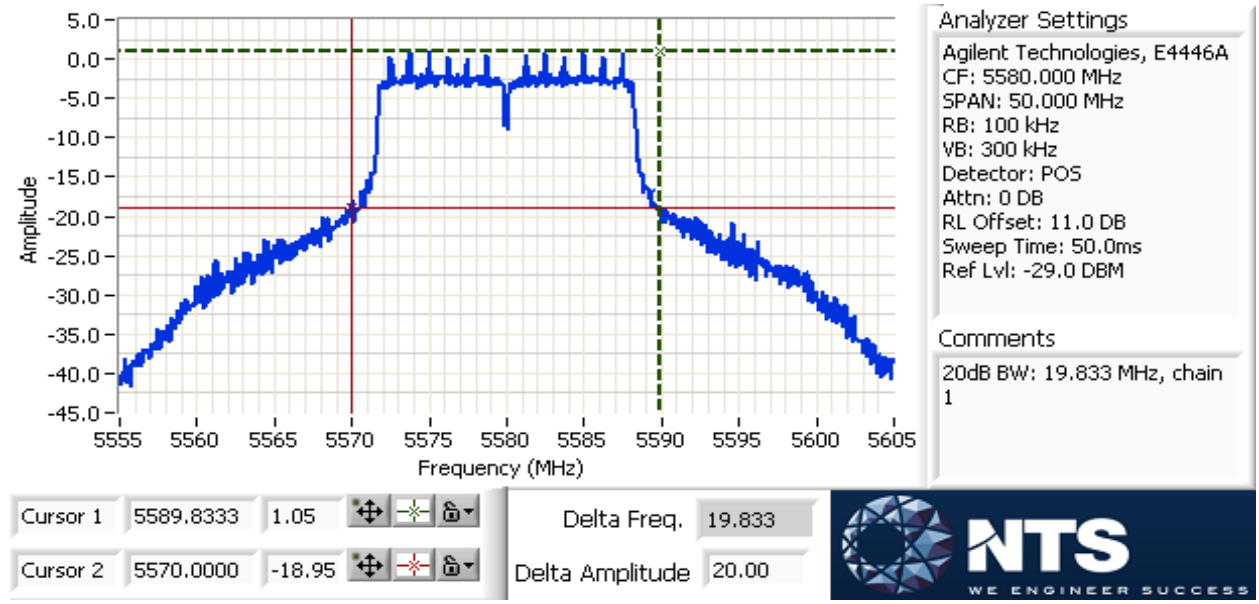


Client:	Ubiquiti Networks	Job Number:	J86352
Model:	RocketM5 Titanium	T-Log Number:	T88756
		Account Manager:	Michelle Kim
Contact:	Jennifer Sanchez		
Standard:	FCC 15.E/RSS-210	Class:	N/A

Center channel, 5470 - 5725 MHz Band

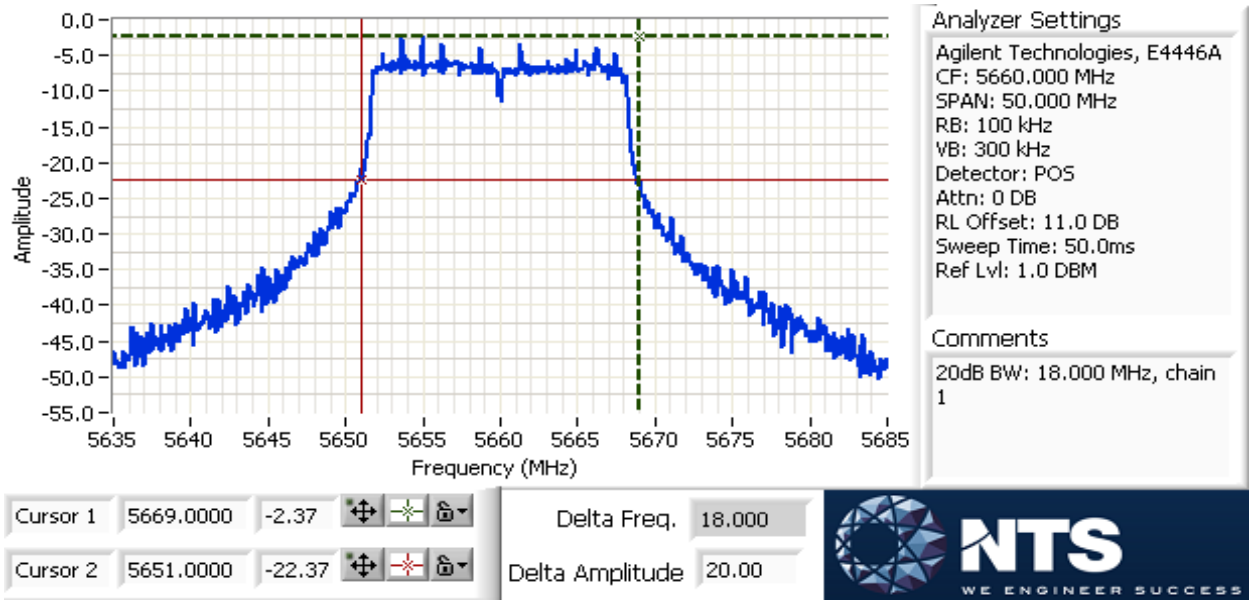
For master devices - This plot is showing hat the 20dB bandwidth of the channel closest to 5600 MHz does not spill into the 5600-5650 MHz band. RB > 1% of span.

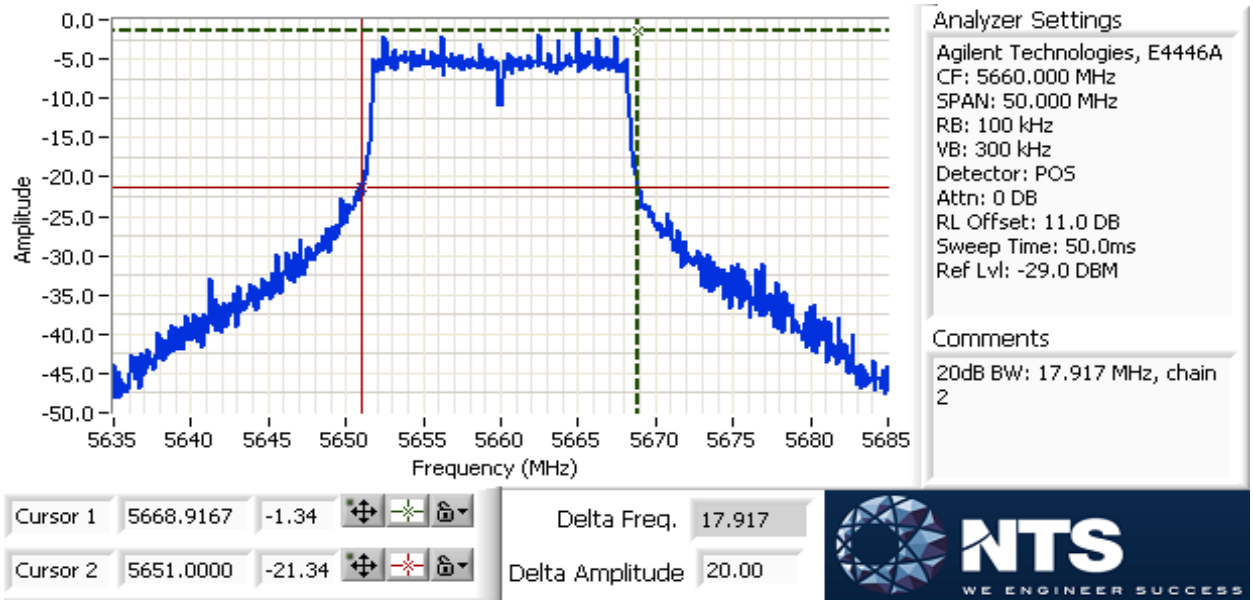




Client:	Ubiquiti Networks	Job Number:	J86352
Model:	RocketM5 Titanium	T-Log Number:	T88756
		Account Manager:	Michelle Kim
Contact:	Jennifer Sanchez		
Standard:	FCC 15.E/RSS-210	Class:	N/A

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:	Ubiquiti Networks	Job Number:	J86352
Model:	RocketM5 Titanium	T-Log Number:	T88756
		Account Manager:	Michelle Kim
Contact:	Jennifer Sanchez		
Standard:	FCC 15.E/RSS-210	Class:	N/A

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

Test Specific Details

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

Summary of Results

Run #	Test Performed	Limit	Pass / Fail	Result / Margin
1	Power, 5250 - 5350MHz	15.407(a) (1), (2)	Pass	802.11a: 0.7 mW
1	PSD, 5250 - 5350MHz	15.407(a) (1), (2)	Pass	802.11a: -13.8 dBm/MHz
1	Max EIRP 5250 - 5350MHz	TPC required if EIRP≥ 500mW (27dBm). EIRP ≥ 200mW (23dBm) DFS threshold = -64dBm.	-	EIRP = 28.7 dBm (749 mW)
1	Power, 5470 - 5725MHz	15.407(a) (1), (2)	Pass	802.11a: 0.9 mW
1	PSD, 5470 - 5725MHz	15.407(a) (1), (2)	Pass	802.11a: -13.1 dBm/MHz
1	Max EIRP 5470 - 5725MHz	TPC required if EIRP≥ 500mW (27dBm). EIRP ≥ 200mW (23dBm) DFS threshold = -64dBm.	-	EIRP = 29.5 dBm (897 mW)

Client:	Ubiquiti Networks	Job Number:	J86352
Model:	RocketM5 Titanium	T-Log Number:	T88756
		Account Manager:	Michelle Kim
Contact:	Jennifer Sanchez		
Standard:	FCC 15.E/RSS-210	Class:	N/A

Run #	Test Performed	Limit	Pass / Fail	Result / Margin
1	26dB Bandwidth	15.407 (Information only)	Pass	> 20MHz for all modes
1	99% Bandwidth	RSS 210 (Information only)	Pass	802.11a: 16.9 MHz
2	Peak Excursion Envelope	15.407(a) (6) 13dB	N/A	Refer to Sector Antenna results
3	Antenna Conducted - Out of Band Spurious	15.407(b) -27dBm/MHz	Pass	All emissions below the -27dBm/MHz limit

General Test Configuration

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

Ambient Conditions:

Temperature:	25 °C
Rel. Humidity:	37 %

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:	Ubiquiti Networks	Job Number:	J86352
Model:	RocketM5 Titanium	T-Log Number:	T88756
		Account Manager:	Michelle Kim
Contact:	Jennifer Sanchez		
Standard:	FCC 15.E/RSS-210	Class:	N/A

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

Date of Test: 10/26/2012 Config. Used: 1

Test Engineer: Joseph Cadigal Config Change: none

Test Location: FT EMC LAB #4 EUT Voltage: POE

Note 1:	Output power measured using a spectrum analyzer (see plots below). RBW=1MHz, VB=3 MHz, sample detector, power averaging on (transmitted signal was continuous) and power integration over 40/60 MHz (method SA-1 of KDB 789033).
Note 2:	Measured using the same analyzer settings used for output power.
Note 3:	For RSS-210 the limit for the 5150 - 5250 MHz band accounts for the antenna gain as the maximum eirp allowed is 10dBm/MHz. The limits are also corrected for instances where the highest measured value of the PSD exceeds the average PSD (calculated from the measured power divided by the measured 99% bandwidth) by more than 3dB by the amount that the measured value exceeds the average by more than 3dB.
Note 4:	99% Bandwidth measured in accordance with RSS GEN - RB > 1% of span and VB >=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.

MIMO Device - 5250-5350 MHz Band

	Chain 1	Chain 2	Chain 3	Coherent	Effective[5]	EIRP (mW)	EIRP (dBm)
Antenna Gain (dBi):	30	30		No	30.0	748.6	28.7

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			
20MHz Mode										
5270	3.0	25.3	-4.7	-5.1		0.7	-1.9	0.0	0.001	PASS
5300	3.0	24.5	-4.3	-4.6		0.7	-1.4	0.0		PASS
5320	3.0	24.5	-4.1	-4.4		0.7	-1.3	0.0		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]	
20MHz Mode										
5270	16.9	-1.9	-17.2	-17.4		0.0	-14.3	-13.0	11.0	PASS
5300	16.8	-1.4	-16.8	-17.1		0.0	-13.9	-13.0	11.0	PASS
5320	16.9	-1.3	-16.7	-16.9		0.0	-13.8	-13.0	11.0	PASS

Client:	Ubiquiti Networks	Job Number:	J86352
Model:	RocketM5 Titanium	T-Log Number:	T88756
		Account Manager:	Michelle Kim
Contact:	Jennifer Sanchez		
Standard:	FCC 15.E/RSS-210	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):	30	30		No	30.0	896.6	29.5

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			
20MHz Mode										
5500	2.5	24.4	-5.0	-3.2		0.8	-1.0	0.0	0.001	PASS
5580	3.5	25.3	-4.1	-2.9		0.9	-0.5	0.0		PASS
5700	2.0	24.7	-3.7	-4.4		0.8	-1.0	0.0		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]	
20MHz Mode										
5500	16.9	-1.0	-17.6	-15.7		0.0	-13.5	-13.0	11.0	PASS
5580	16.9	-0.5	-16.8	-15.5		0.0	-13.1	-13.0	11.0	PASS
5700	16.9	-1.0	-16.1	-16.9		0.0	-13.5	-13.0	11.0	PASS

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

Date of Test: 10/25/2012 Test Location: FT Lab#4

Test Engineer: Jack Liu EUT Voltage: POE

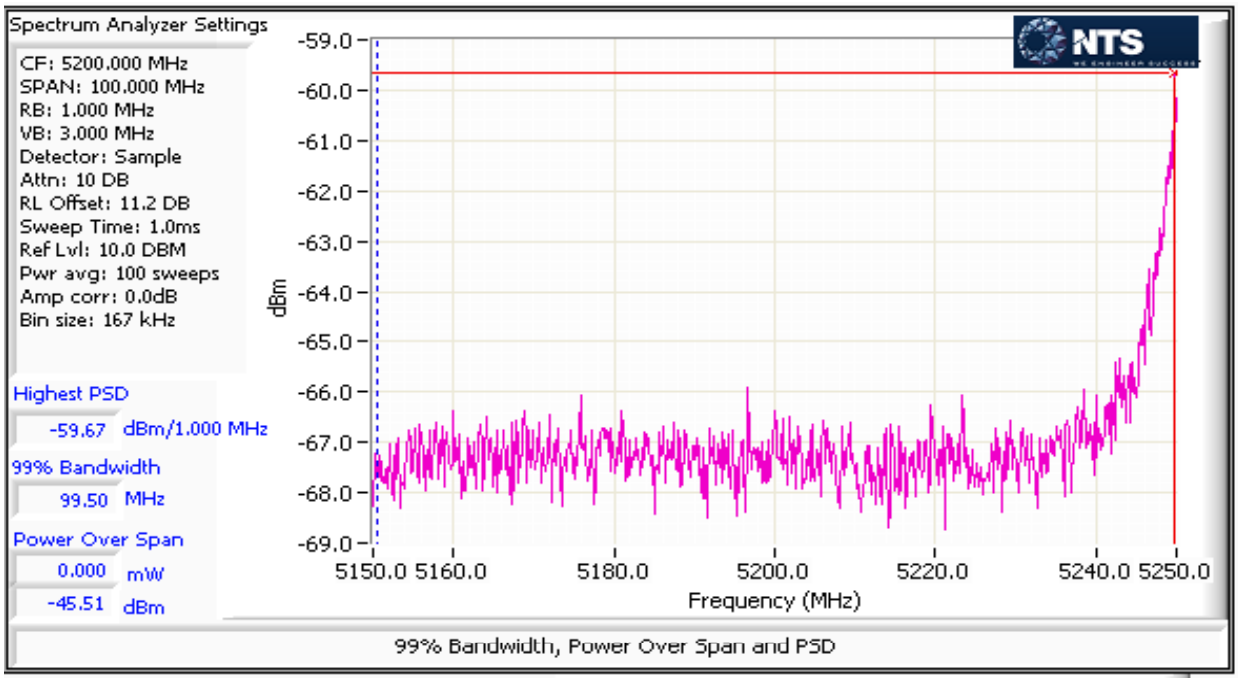
Note 1:	Compliance with the -27dBm/MHz requirement demonstrated via radiated measurements, except at the 5250MHz bandedge.
Note 4:	If the device is for outdoor use then the -27dBm eirp limit also applies in the 5150 - 5250 MHz band.

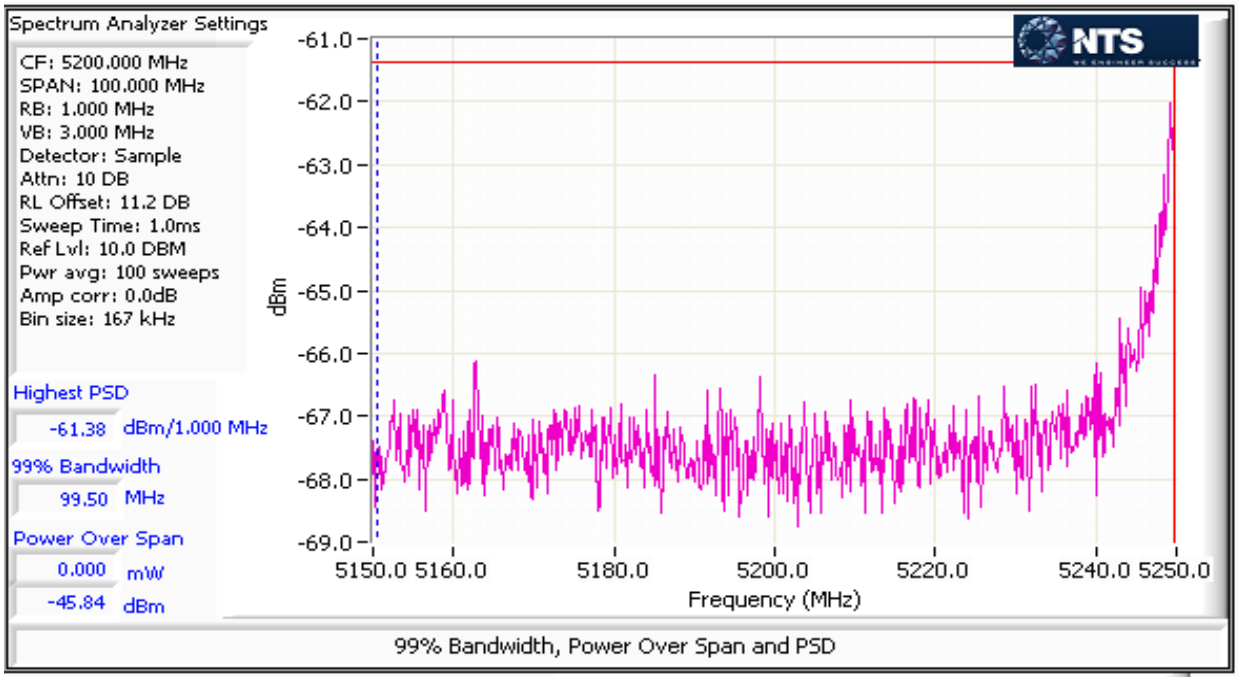
Low channel, 5250 - 5350 MHz Band Edge @ 5250 MHz for devices operating 5250-5350MHz only

Plots for each chain showing compliance with the -27dBm/MHz limit in the 5150 - 5250 MHz band. Start and stop frequencies set to 5150-5250 MHz, RB=1MHz, VB=3MHz, power averaging enabled (100 traces):

	Power Setting	Band edge Level		Antenna Gain (dBi)	EIRP		Total EIRP dBm/MHz	Limit dBm/MHz	Result
		dBm/MHz	mW/MHz		mW/MHz	dBm/MHz			
Chain 1	7	-59.7	0.00000	30.0	0.0010789	-29.7	-27.4	-27	PASS
Chain 2		-61.4	0.00000	30.0	0.0007278	-31.4			

Client:	Ubiquiti Networks	Job Number:	J86352
Model:	RocketM5 Titanium	T-Log Number:	T88756
		Account Manager:	Michelle Kim
Contact:	Jennifer Sanchez		
Standard:	FCC 15.E/RSS-210	Class:	N/A





Client:	Ubiquiti Networks	Job Number:	J86352
Model:	RocketM5 Titanium	T-Log Number:	T88756
		Account Manager:	Michelle Kim
Contact:	Jennifer Sanchez		
Standard:	FCC 15.E/RSS-210	Class:	N/A

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

Test Specific Details

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

Summary of Results

Run #	Test Performed	Limit	Pass / Fail	Result / Margin
1	Power, 5250 - 5350MHz	15.407(a) (1), (2)	Pass	HT20: 9.1 mW
1	PSD, 5250 - 5350MHz	15.407(a) (1), (2)	Pass	HT20: -3.2 dBm/MHz
1	Max EIRP 5250 - 5350MHz	TPC required if EIRP≥ 500mW (27dBm). EIRP ≥ 200mW (23dBm) DFS threshold = -64dBm.	Pass	EIRP = 29.6 dBm (914.4 mW)
1	Power, 5470 - 5725MHz	15.407(a) (1), (2)	Pass	HT20: 8.4 mW
1	PSD, 5470 - 5725MHz	15.407(a) (1), (2)	Pass	HT20: -3.3 dBm/MHz
1	Max EIRP 5470 - 5725MHz	TPC required if EIRP≥ 500mW (27dBm). EIRP ≥ 200mW (23dBm) DFS threshold	Pass	EIRP = 29.2 dBm (839.4 mW)

Client:	Ubiquiti Networks	Job Number:	J86352
Model:	RocketM5 Titanium	T-Log Number:	T88756
		Account Manager:	Michelle Kim
Contact:	Jennifer Sanchez		
Standard:	FCC 15.E/RSS-210	Class:	N/A

Run #	Test Performed	Limit	Pass / Fail	Result / Margin
1	26dB Bandwidth	15.407 (Information only)	-	> 20MHz for all modes
1	99% Bandwidth	RSS 210 (Information only)	N/A	HT20: 18.1 MHz
2	Peak Excursion Envelope	15.407(a) (6) 13dB	N/A	Refer to Sector Antenna results
3	Antenna Conducted - Out of Band Spurious	15.407(b) -27dBm/MHz	Pass	All emissions below the -27dBm/MHz limit

General Test Configuration

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

Ambient Conditions:

Temperature:	20.6 °C
Rel. Humidity:	38 %

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:	Ubiquiti Networks	Job Number:	J86352
Model:	RocketM5 Titanium	T-Log Number:	T88756
		Account Manager:	Michelle Kim
Contact:	Jennifer Sanchez		
Standard:	FCC 15.E/RSS-210	Class:	N/A

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

Date of Test: 10/29/2012, 10/30/2012 Config. Used: 1

Test Engineer: Rafael Varelas, Joseph Cadigal Config Change: None

Test Location: FT Lab #4 EUT Voltage: POE

Note 1:	Output power measured using a spectrum analyzer (see plots below). RBW=1MHz, VB=3 MHz, sample detector, power averaging on (transmitted signal was continuous) and power integration over 40/60 MHz (method SA-1 of KDB 789033).
Note 2:	Measured using the same analyzer settings used for output power.
Note 3:	For RSS-210 the limit for the 5150 - 5250 MHz band accounts for the antenna gain as the maximum eirp allowed is 10dBm/MHz. The limits are also corrected for instances where the highest measured value of the PSD exceeds the average PSD (calculated from the measured power divided by the measured 99% bandwidth) by more than 3dB by the amount that the measured value exceeds the average by more than 3dB.
Note 4:	99% Bandwidth measured in accordance with RSS GEN - RB > 1% of span and VB >=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.

MIMO Device - 5250-5350 MHz Band

	Chain 1	Chain 2	Chain 3	Coherent	Effective[5]	EIRP (mW)	EIRP (dBm)
Antenna Gain (dBi):	20	20		No	20.0	914.4	29.6

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			
20MHz Mode										
5270	14.0	27.0	6.6	6.5		9.0	9.6	10.0		PASS
5300	13.5	25.8	6.3	6.3		8.5	9.3	10.0	0.009	PASS
5320	13.5	27.3	6.7	6.5		9.1	9.6	10.0		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]	
20MHz Mode										
5270	18.1	9.6	-6.2	-6.3		0.5	-3.2	-3.0	11.0	PASS
5300	18.1	9.3	-6.4	-6.7		0.4	-3.5	-3.0	11.0	PASS
5320	18.1	9.6	-6.2	-6.4		0.5	-3.3	-3.0	11.0	PASS

Client:	Ubiquiti Networks	Job Number:	J86352
Model:	RocketM5 Titanium	T-Log Number:	T88756
		Account Manager:	Michelle Kim
Contact:	Jennifer Sanchez		
Standard:	FCC 15.E/RSS-210	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):	20	20		No	20.0	839.4	29.2

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			
20MHz Mode										
5500	12.5	25.9	5.7	5.6		7.4	8.7	10.0	0.008	PASS
5580	12.5	26.2	6.0	6.4		8.4	9.2	10.0		PASS
5700	12.5	26.2	5.9	6.6		8.4	9.2	10.0		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]	
20MHz Mode										
5500	18.1	8.7	-7.1	-7.2		0.4	-4.1	-3.0	11.0	PASS
5580	18.1	9.2	-6.8	-6.3		0.4	-3.5	-3.0	11.0	PASS
5700	18.1	9.2	-6.7	-6.0		0.5	-3.3	-3.0	11.0	PASS

Run #2: Peak Excursion Measurement

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
			5270	8.2	13.0	5500		13.0
			5300	8.0	13.0	5580		13.0
			5320	8.1	13.0	5700		13.0

Note: Per KDB 789033 D01, v01r02 F)1) - Compliance with the peak excursion requirement can be demonstrated by testing performed on a single channel for each mode of operation

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:	Ubiquiti Networks	Job Number:	J86352
Model:	RocketM5 Titanium	T-Log Number:	T88756
		Account Manager:	Michelle Kim
Contact:	Jennifer Sanchez		
Standard:	FCC 15.E/RSS-210	Class:	N/A

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

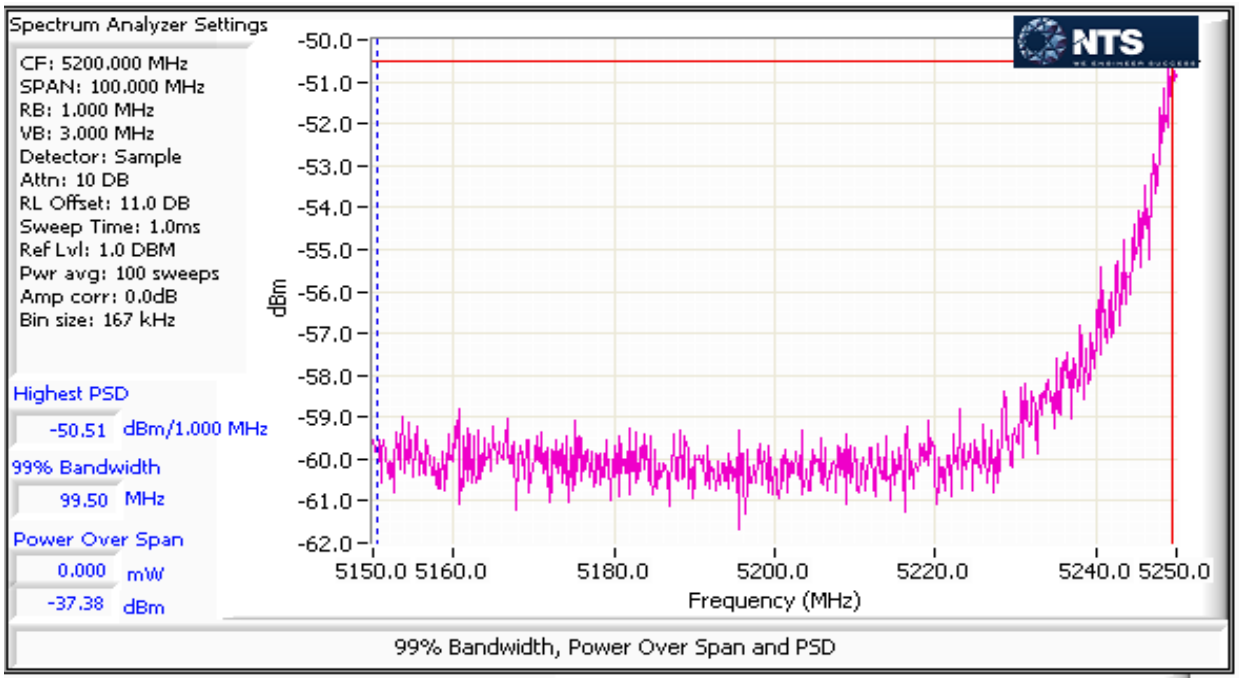
Date of Test: 10/29/2012 Config. Used: 1
Test Engineer: Rafael Varelas Config Change: None
Test Location: FT Lab #4 EUT Voltage: POE

Note 1:	Compliance with the -27dBm/MHz requirement demonstrated via radiated measurements, except at the 5250MHz bandedge.
Note 4:	If the device is for outdoor use then the -27dBm eirp limit also applies in the 5150 - 5250 MHz band.

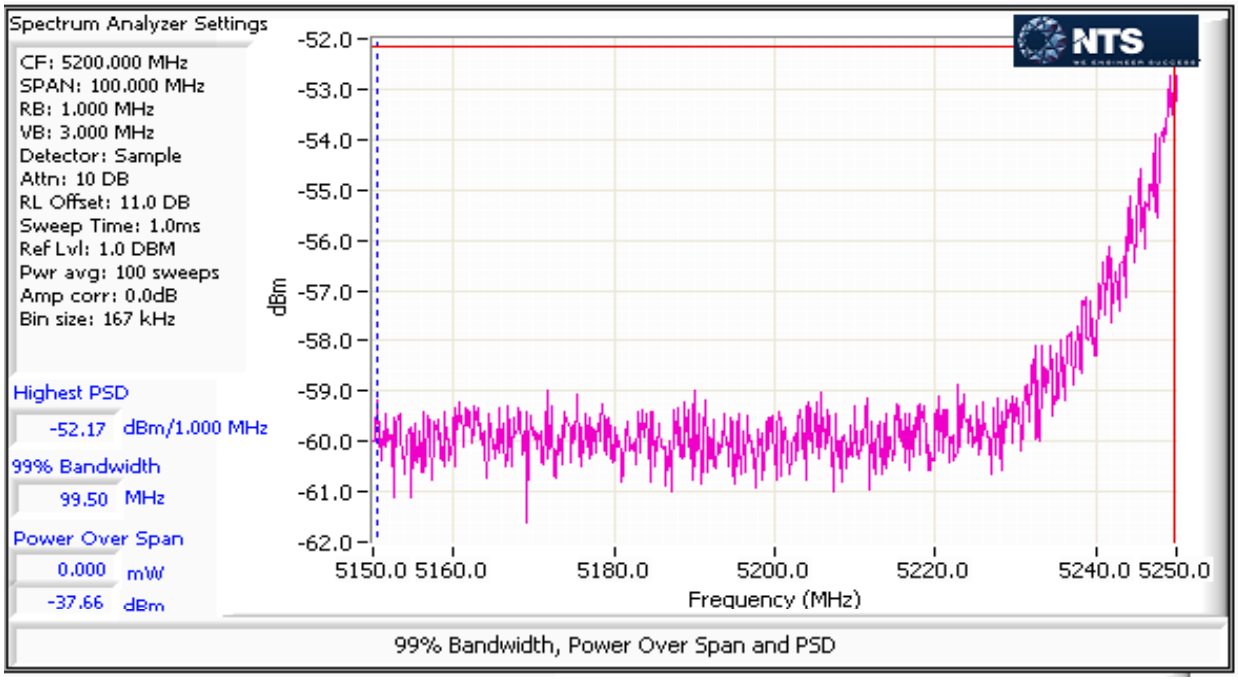
Low channel, 5250 - 5350 MHz Band Edge @ 5250 MHz for devices operating 5250-5350MHz only

Plots for each chain showing compliance with the -27dBm/MHz limit in the 5150 - 5250 MHz band. Start and stop frequencies set to 5150-5250 MHz, RB=1MHz, VB=3MHz, power averaging enabled (100 traces):

	Power Setting	Band edge Level dBm/MHz	Band edge Level mW/MHz	Antenna Gain (dBi)	EIRP mW/MHz	EIRP dBm/MHz	Total EIRP dBm/MHz	Limit dBm/MHz	Result
Chain 1	14	-50.5	0.00001	20.0	0.0008913	-30.5	-28.3	-27	PASS
Chain 2		-52.2	0.00001	20.0	0.0006026	-32.2			



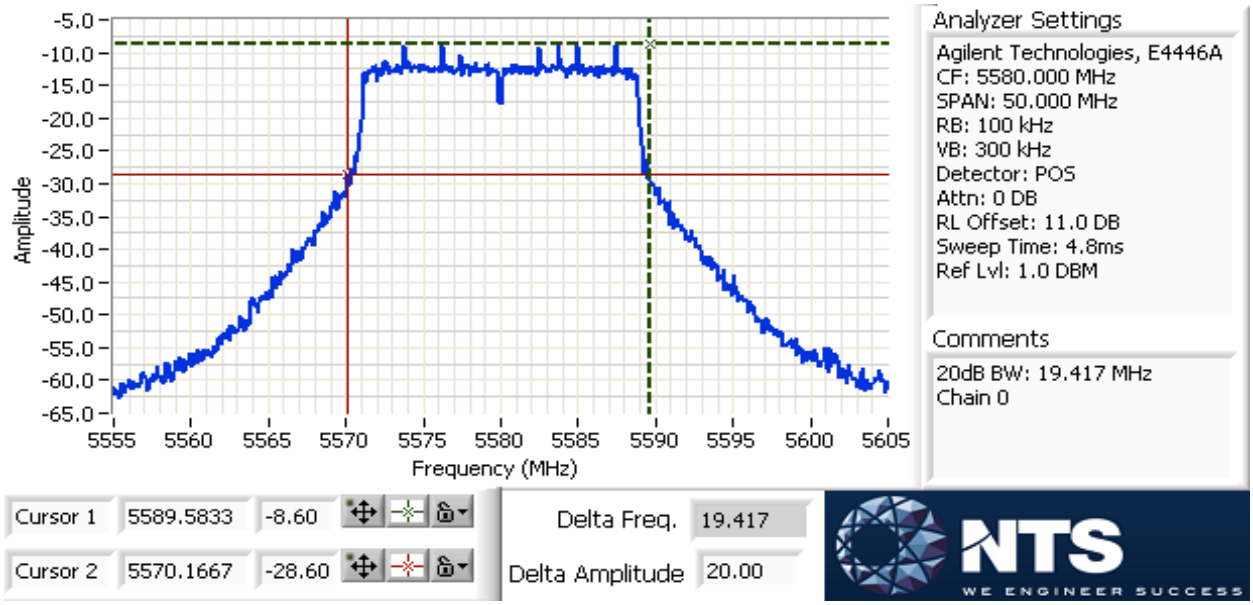
Client:	Ubiquiti Networks	Job Number:	J86352
Model:	RocketM5 Titanium	T-Log Number:	T88756
		Account Manager:	Michelle Kim
Contact:	Jennifer Sanchez		
Standard:	FCC 15.E/RSS-210	Class:	N/A

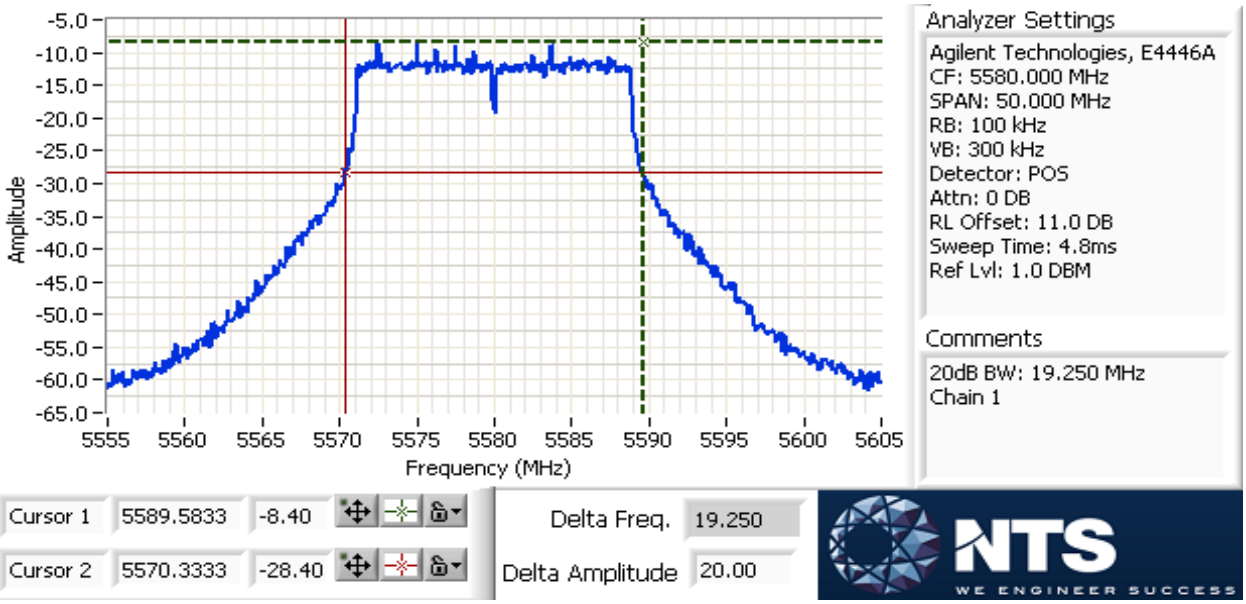


Client:	Ubiquiti Networks	Job Number:	J86352
Model:	RocketM5 Titanium	T-Log Number:	T88756
		Account Manager:	Michelle Kim
Contact:	Jennifer Sanchez		
Standard:	FCC 15.E/RSS-210	Class:	N/A

Center channel, 5470 - 5725 MHz Band

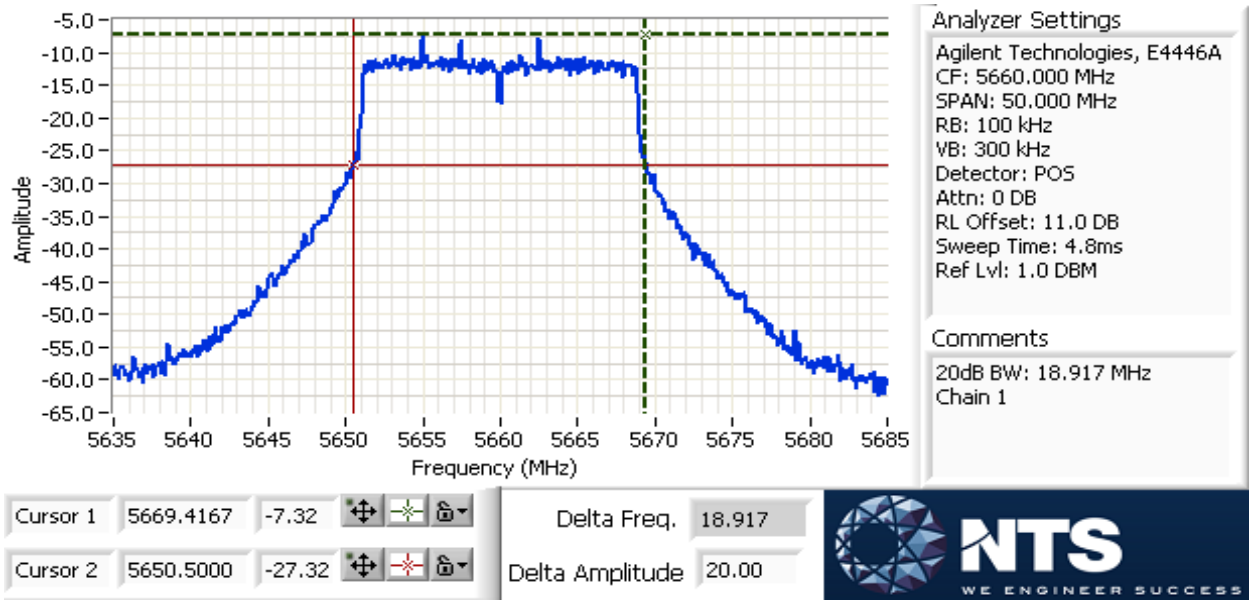
For master devices - This plot is showing hat the 20dB bandwidth of the channel closest to 5600 MHz does not spill into the 5600-5650 MHz band. RB > 1% of span.

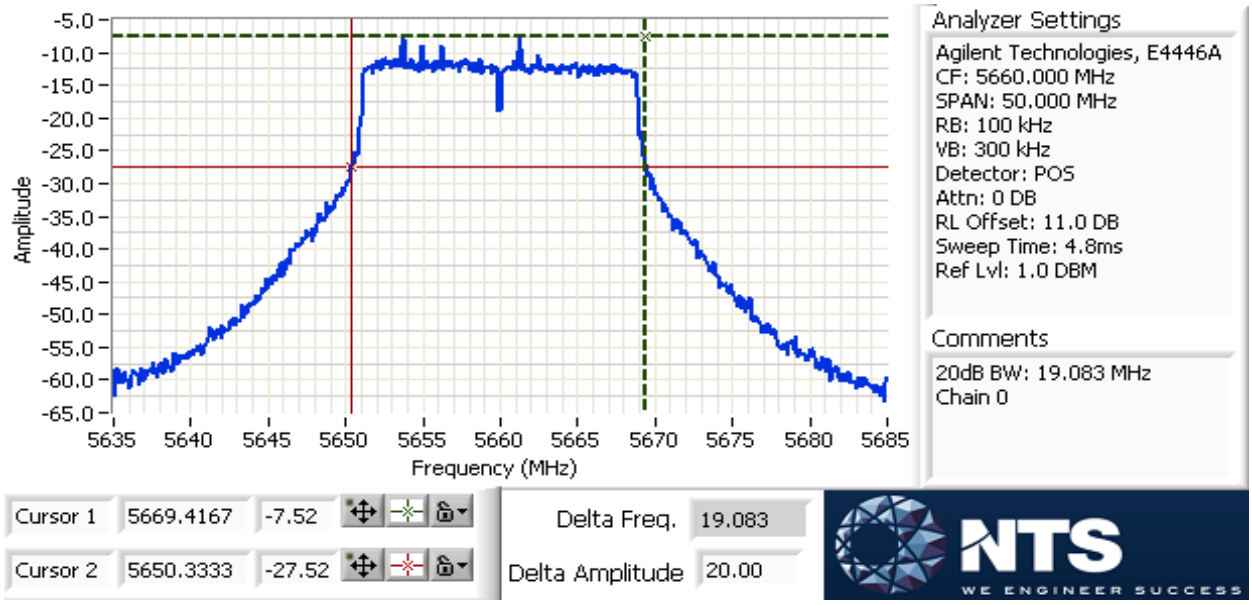




Client:	Ubiquiti Networks	Job Number:	J86352
Model:	RocketM5 Titanium	T-Log Number:	T88756
		Account Manager:	Michelle Kim
Contact:	Jennifer Sanchez		
Standard:	FCC 15.E/RSS-210	Class:	N/A

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:	Ubiquiti Networks	Job Number:	J86352
Model:	RocketM5 Titanium	T-Log Number:	T88756
		Account Manager:	Michelle Kim
Contact:	Jennifer Sanchez		
Standard:	FCC 15.E/RSS-210	Class:	N/A

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

Test Specific Details

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

Summary of Results

Run #	Test Performed	Limit	Pass / Fail	Result / Margin
1	Power, 5250 - 5350MHz	15.407(a) (1), (2)	Pass	HT20: 0.9 mW
1	PSD, 5250 - 5350MHz	15.407(a) (1), (2)	Pass	HT20: -13 dBm/MHz
1	Max EIRP 5250 - 5350MHz	TPC required if EIRP≥ 500mW (27dBm). EIRP ≥ 200mW (23dBm) DFS threshold = -64dBm.	Pass	EIRP = 29.7 dBm (923.7 mW)
1	Power, 5470 - 5725MHz	15.407(a) (1), (2)	Pass	HT20: 0.9 mW
1	PSD, 5470 - 5725MHz	15.407(a) (1), (2)	Pass	HT20: -13.3 dBm/MHz
1	Max EIRP 5470 - 5725MHz	TPC required if EIRP≥ 500mW (27dBm). EIRP ≥ 200mW (23dBm) DFS threshold = -64dBm.	Pass	EIRP = 29.5 dBm (890.7 mW)
1	26dB Bandwidth	15.407 (Information only)	-	> 20MHz for all modes
1	99% Bandwidth	RSS 210 (Information only)	N/A	HT20: 18.1 MHz
2	Peak Excursion Envelope	15.407(a) (6) 13dB	N/A	Refer to Sector Antenna results
3	Antenna Conducted - Out of Band Spurious	15.407(b) -27dBm/MHz	Pass	All emissions below the -27dBm/MHz limit

Client:	Ubiquiti Networks	Job Number:	J86352
Model:	RocketM5 Titanium	T-Log Number:	T88756
		Account Manager:	Michelle Kim
Contact:	Jennifer Sanchez		
Standard:	FCC 15.E/RSS-210	Class:	N/A

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:	25 °C
Rel. Humidity:	38 %

Modifications Made During Testing

No modifications were made to the EUT during testing

Deviations From The Standard

No deviations were made from the requirements of the standard.

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

Date of Test:	10/30/2012	Config. Used:	1
Test Engineer:	Joseph Cadigal	Config Change:	none
Test Location:	FT EMC Lab #4	EUT Voltage:	POE

Note 1:	Output power measured using a spectrum analyzer (see plots below). RBW=1MHz, VB=3 MHz, sample detector, power averaging on (transmitted signal was continuous) and power integration over 40/60 MHz (method SA-1 of KDB 789033).
Note 2:	Measured using the same analyzer settings used for output power.
Note 3:	For RSS-210 the limit for the 5150 - 5250 MHz band accounts for the antenna gain as the maximum eirp allowed is 10dBm/MHz. The limits are also corrected for instances where the highest measured value of the PSD exceeds the average PSD (calculated from the measured power divided by the measured 99% bandwidth) by more than 3dB by the amount that the measured value exceeds the average by more than 3dB.
Note 4:	99% Bandwidth measured in accordance with RSS GEN - RB > 1% of span and VB >=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:	Ubiquiti Networks	Job Number:	J86352
Model:	RocketM5 Titanium	T-Log Number:	T88756
		Account Manager:	Michelle Kim
Contact:	Jennifer Sanchez		
Standard:	FCC 15.E/RSS-210	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):	30	30		No	30.0	923.7	29.7

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			
20MHz Mode										
5270	4.5	25.0	-3.2	-3.6		0.9	-0.4	0.0	0.001	PASS
5300	4.0	25.0	-3.3	-3.4		0.9	-0.3	0.0		PASS
5320	4.0	25.0	-3.3	-3.7		0.9	-0.4	0.0		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]	
20MHz Mode										
5270	18.1	-0.4	-16.0	-16.5		0.0	-13.2	-13.0	11.0	PASS
5300	18.1	-0.3	-16.0	-16.1		0.0	-13.0	-13.0	11.0	PASS
5320	18.0	-0.4	-16.1	-16.5		0.0	-13.3	-13.0	11.0	PASS

Date of Test: 11/1/2012
Test Engineer: Rafael Varelas
Test Location: FT EMC Lab #4

Config. Used: 1
Config Change: none
EUT Voltage: POE

MIMO Device - 5470-5725 MHz Band

	Chain 1	Chain 2	Chain 3	Coherent	Effective[5]	EIRP (mW)	EIRP (dBm)
Antenna Gain (dBi):	30	30		No	30.0	890.7	29.5

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			
20MHz Mode										
5500	3.0	27.3	-5.1	-2.4		0.9	-0.5	0.0	0.001	PASS
5580	3.5	26.4	-4.2	-3.1		0.9	-0.6	0.0		PASS
5700	2.5	26.3	-3.2	-3.9		0.9	-0.5	0.0		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]	
20MHz Mode										
5500	18.1	-0.5	-17.9	-15.1		0.0	-13.3	-13.0	11.0	PASS
5580	18.1	-0.6	-17.2	-16.0		0.0	-13.5	-13.0	11.0	PASS
5700	18.1	-0.5	-16.0	-16.7		0.0	-13.3	-13.0	11.0	PASS

Client:	Ubiquiti Networks	Job Number:	J86352
Model:	RocketM5 Titanium	T-Log Number:	T88756
		Account Manager:	Michelle Kim
Contact:	Jennifer Sanchez		
Standard:	FCC 15.E/RSS-210	Class:	N/A

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

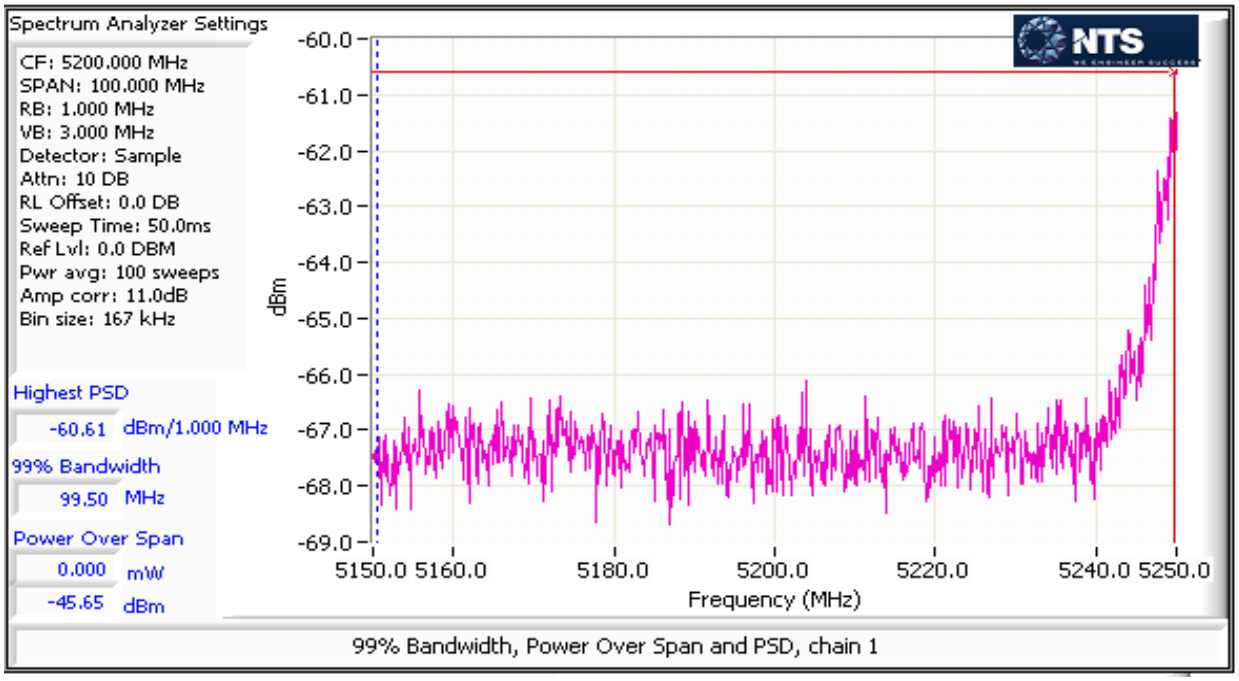
Date of Test: 10/30/2012 Config. Used: 1
Test Engineer: Joseph Cadigal Config Change: none
Test Location: FT EMC Lab#4 EUT Voltage: POE

Note 1:	Compliance with the -27dBm/MHz requirement demonstrated via radiated measurements, except at the 5250MHz bandedge.
Note 4:	If the device is for outdoor use then the -27dBm eirp limit also applies in the 5150 - 5250 MHz band.

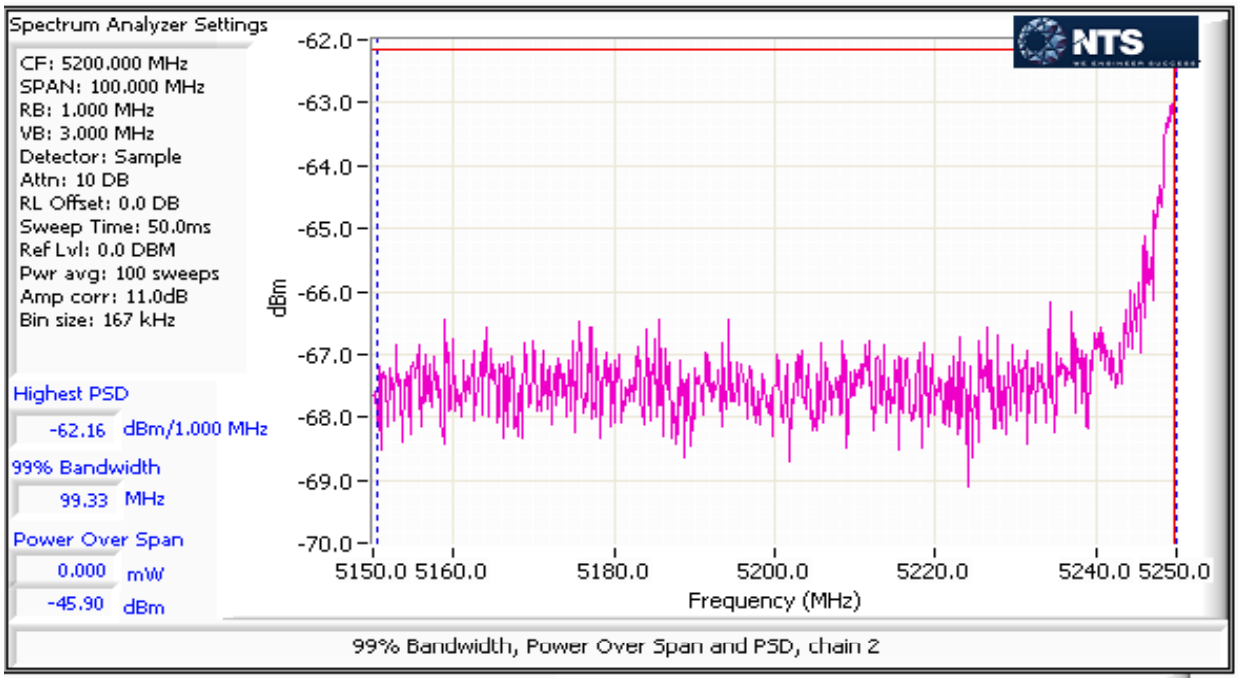
Low channel, 5250 - 5350 MHz Band Edge @ 5250 MHz for devices operating 5250-5350MHz only

Plots for each chain showing compliance with the -27dBm/MHz limit in the 5150 - 5250 MHz band. Start and stop frequencies set to 5150-5250 MHz, RB=1MHz, VB=3MHz, power averaging enabled (100 traces):

	Power Setting	Band edge Level dBm/MHz	Band edge Level mW/MHz	Antenna Gain (dBi)	EIRP mW/MHz	EIRP dBm/MHz	Total EIRP dBm/MHz	Limit dBm/MHz	Result
Chain 1	6	-60.6	0.00000	30.0	0.000869	-30.6	-28.3	-27	PASS
Chain 2		-62.2	0.00000	30.0	0.0006081	-32.2			



Client:	Ubiquiti Networks	Job Number:	J86352
Model:	RocketM5 Titanium	T-Log Number:	T88756
		Account Manager:	Michelle Kim
Contact:	Jennifer Sanchez		
Standard:	FCC 15.E/RSS-210	Class:	N/A



Client:	Ubiquiti Networks	Job Number:	J86352
Model:	RocketM5 Titanium	T-Log Number:	T88756
		Account Manager:	Michelle Kim
Contact:	Jennifer Sanchez		
Standard:	FCC 15.E/RSS-210	Class:	N/A

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

Test Specific Details

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

Date of Test: 11/1/2012 & 11/7/12
Test Engineer: Rafael Varelas & John Caizzi
Test Location: FT Lab #4
Config. Used: 1
Config Change: None
EUT Voltage: POE

Summary of Results

Run #	Test Performed	Limit	Pass / Fail	Result / Margin
1	Power, 5250 - 5350MHz	15.407(a) (1), (2)	Pass	HT40: 9.2 mW
1	PSD, 5250 - 5350MHz	15.407(a) (1), (2)	Pass	HT40: -6.3 dBm/MHz
1	Max EIRP 5250 - 5350MHz	TPC required if EIRP≥ 500mW (27dBm). EIRP ≥ 200mW (23dBm) DFS threshold = -64dBm.	Pass	EIRP = 29.6 dBm (920.5 mW)
1	Power, 5470 - 5725MHz	15.407(a) (1), (2)	Pass	HT40: 9.2 mW
1	PSD, 5470 - 5725MHz	15.407(a) (1), (2)	Pass	HT40: -6.2 dBm/MHz
1	Max EIRP 5470 - 5725MHz	TPC required if EIRP≥ 500mW (27dBm). EIRP ≥ 200mW (23dBm) DFS threshold = -64dBm.	Pass	EIRP = 29.7 dBm (923.4 mW)

Client:	Ubiquiti Networks	Job Number:	J86352
Model:	RocketM5 Titanium	T-Log Number:	T88756
		Account Manager:	Michelle Kim
Contact:	Jennifer Sanchez		
Standard:	FCC 15.E/RSS-210	Class:	N/A

Run #	Test Performed	Limit	Pass / Fail	Result / Margin
1	26dB Bandwidth	15.407 (Information only)	-	> 20MHz for all modes
1	99% Bandwidth	RSS 210 (Information only)	N/A	HT40: 36.3 MHz
2	Peak Excursion Envelope	15.407(a) (6) 13dB	Pass	7.1 dB
3	Antenna Conducted - Out of Band Spurious	15.407(b) -27dBm/MHz	Pass	All emissions below the -27dBm/MHz limit

General Test Configuration

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

Ambient Conditions:

Temperature:	21.6 °C
Rel. Humidity:	37 %

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:	Ubiquiti Networks	Job Number:	J86352
Model:	RocketM5 Titanium	T-Log Number:	T88756
		Account Manager:	Michelle Kim
Contact:	Jennifer Sanchez		
Standard:	FCC 15.E/RSS-210	Class:	N/A

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, sample detector, power averaging on (transmitted signal was continuous) and power integration over 80 MHz (method SA-1 of KDB 789033).
Note 2:	Measured using the same analyzer settings used for output power.
Note 3:	For RSS-210 the limit for the 5150 - 5250 MHz band accounts for the antenna gain as the maximum eirp allowed is 10dBm/MHz. The limits are also corrected for instances where the highest measured value of the PSD exceeds the average PSD (calculated from the measured power divided by the measured 99% bandwidth) by more than 3dB by the amount that the measured value exceeds the average by more than 3dB.
Note 4:	99% Bandwidth measured in accordance with RSS GEN - RB > 1% of span and VB >=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.

MIMO Device - 5250-5350 MHz Band

	Chain 1	Chain 2	Chain 3	Coherent	Effective[5]	EIRP (mW)	EIRP (dBm)
Antenna Gain (dBi):	20	20		No	20.0	920.5	29.6

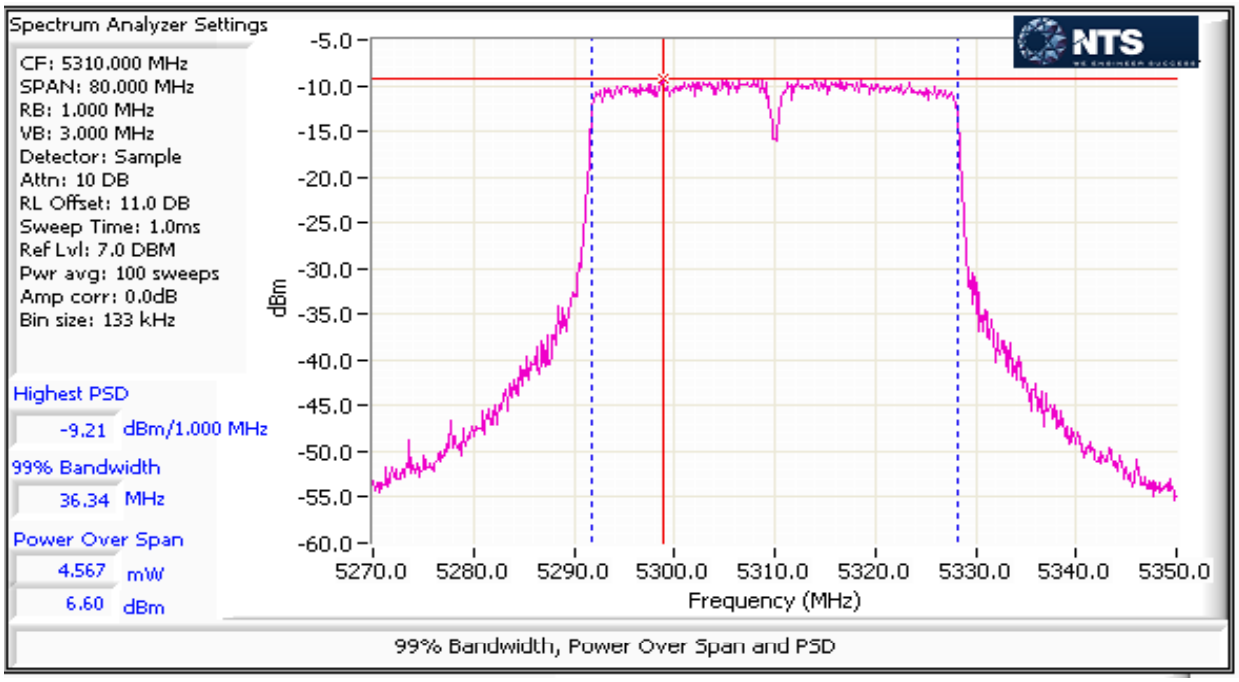
Power

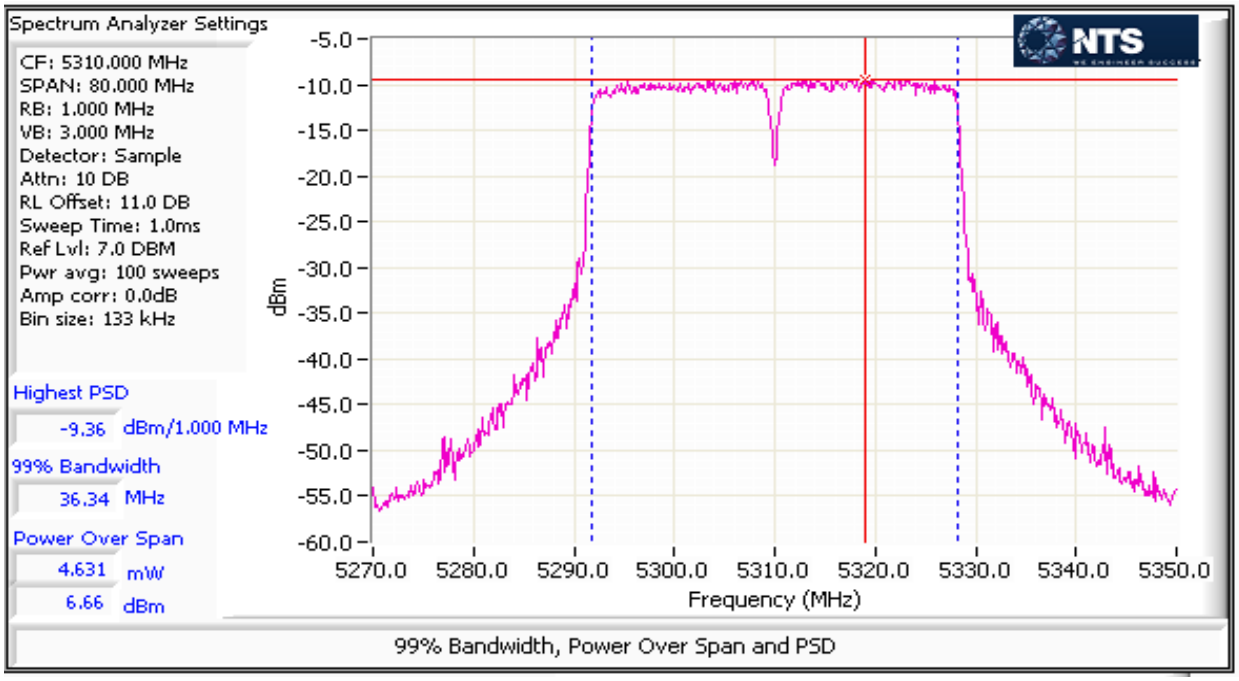
Frequency (MHz)	Software Setting	26dB BW (MHz)	Measured Output Power[1] dBm			Total		Limit (dBm)	Max Power (W)	Pass or Fail
			Chain 1	Chain 2	Chain 3	mW	dBm			
40MHz Mode										
5275	3.0	49.2	-3.2	-3.8		0.9	-0.5	10.0	0.001	PASS
5310	13.0	47.9	6.6	6.7		9.2	9.6	10.0	0.009	PASS

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]	
40MHz Mode										
5275	36.5	-0.5	-19.0	-19.7		0.0	-16.3	-3.0	11.0	PASS
5310	36.3	9.6	-9.2	-9.4		0.2	-6.3	-3.0	11.0	PASS

Client:	Ubiquiti Networks	Job Number:	J86352
Model:	RocketM5 Titanium	T-Log Number:	T88756
		Account Manager:	Michelle Kim
Contact:	Jennifer Sanchez		
Standard:	FCC 15.E/RSS-210	Class:	N/A





Client:	Ubiquiti Networks	Job Number:	J86352
Model:	RocketM5 Titanium	T-Log Number:	T88756
		Account Manager:	Michelle Kim
Contact:	Jennifer Sanchez		
Standard:	FCC 15.E/RSS-210	Class:	N/A

MIMO Device - 5470-5725 MHz Band

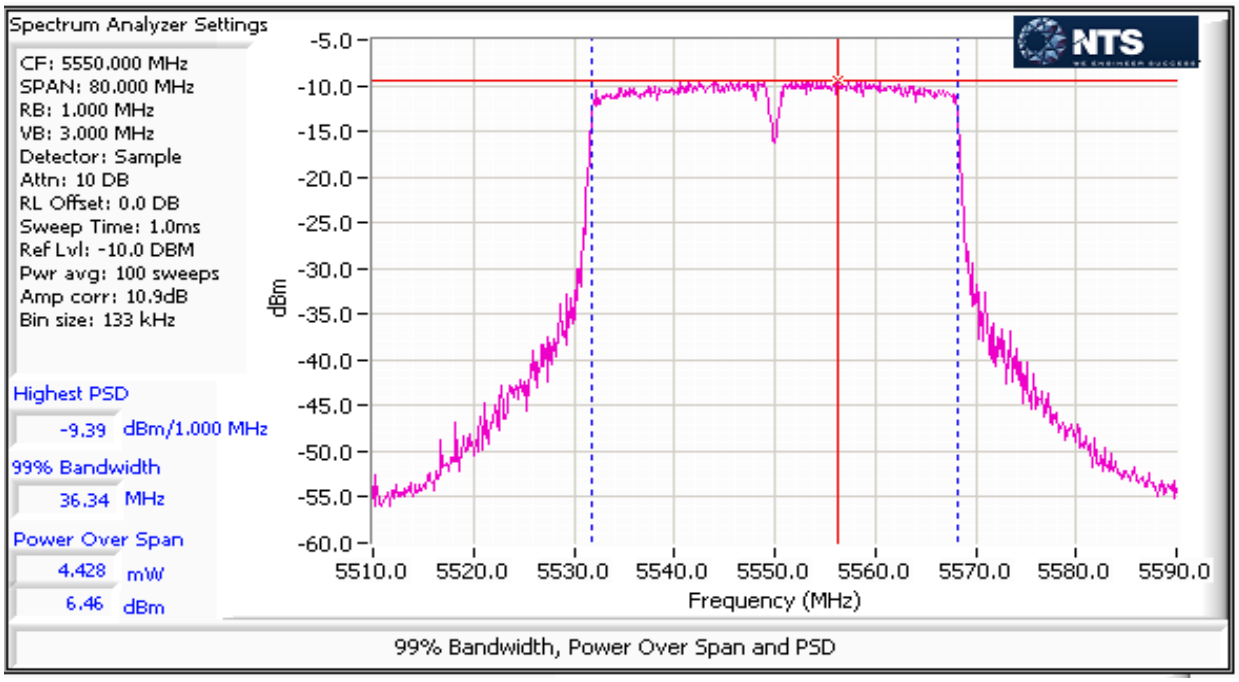
	Chain 1	Chain 2	Chain 3	Coherent	Effective[5]	EIRP (mW)	EIRP (dBm)
Antenna Gain (dBi):	20	20		No	20.0	923.4	29.7

Power

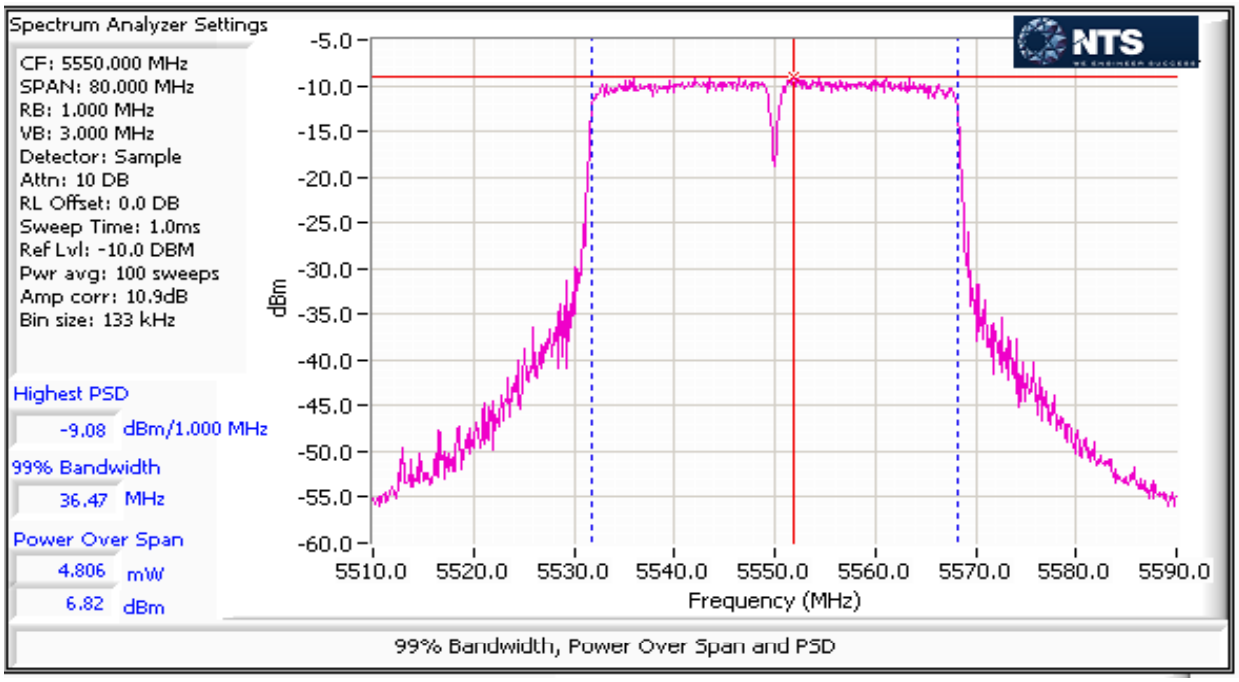
Frequency (MHz)	Software Setting	26dB BW (MHz)	Measured Output Power[1] dBm			Total		Limit (dBm)	Max Power (W)	Pass or Fail
			Chain 1	Chain 2	Chain 3	mW	dBm			
40MHz Mode										
5510	10.5	47.5	3.8	4.7		5.3	7.3	10.0	0.009	PASS
5550	12.5	47.5	6.5	6.8		9.2	9.7	10.0		PASS
5675	11.0	47.1	4.6	5.1		6.1	7.9	10.0		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]	
40MHz Mode										
5510	36.3	7.3	-12.1	-11.2		0.1	-8.6	-3.0	11.0	PASS
5550	36.3	9.7	-9.4	-9.1		0.2	-6.2	-3.0	11.0	PASS
5675	36.5	7.9	-11.2	-10.4		0.2	-7.8	-3.0	11.0	PASS



Client:	Ubiquiti Networks	Job Number:	J86352
Model:	RocketM5 Titanium	T-Log Number:	T88756
		Account Manager:	Michelle Kim
Contact:	Jennifer Sanchez		
Standard:	FCC 15.E/RSS-210	Class:	N/A



Run #2: Peak Excursion Measurement

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
			5275	7.1	13.0			

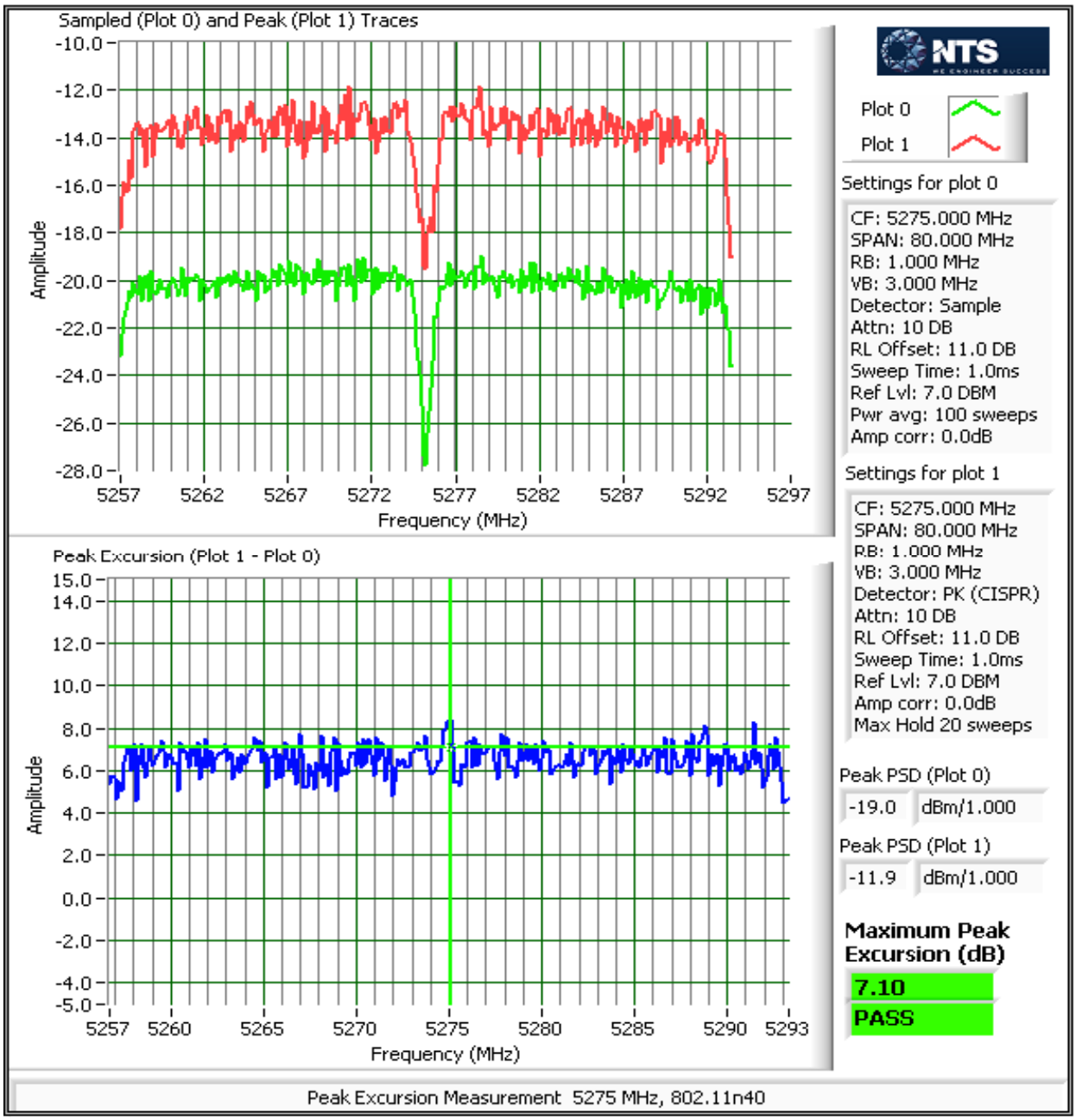
Note: Per KDB 789033 D01, v01r02 F)1) - Compliance with the peak excursion requirement can be demonstrated by testing performed on a single channel for each mode of operation

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:	Ubiquiti Networks	Job Number:	J86352
Model:	RocketM5 Titanium	T-Log Number:	T88756
		Account Manager:	Michelle Kim
Contact:	Jennifer Sanchez		
Standard:	FCC 15.E/RSS-210	Class:	N/A



Client:	Ubiquiti Networks	Job Number:	J86352
Model:	RocketM5 Titanium	T-Log Number:	T88756
		Account Manager:	Michelle Kim
Contact:	Jennifer Sanchez		
Standard:	FCC 15.E/RSS-210	Class:	N/A

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

Date of Test: 11/1/2012
Test Engineer: Rafael Varelas
Test Location: FT EMC Lab #4

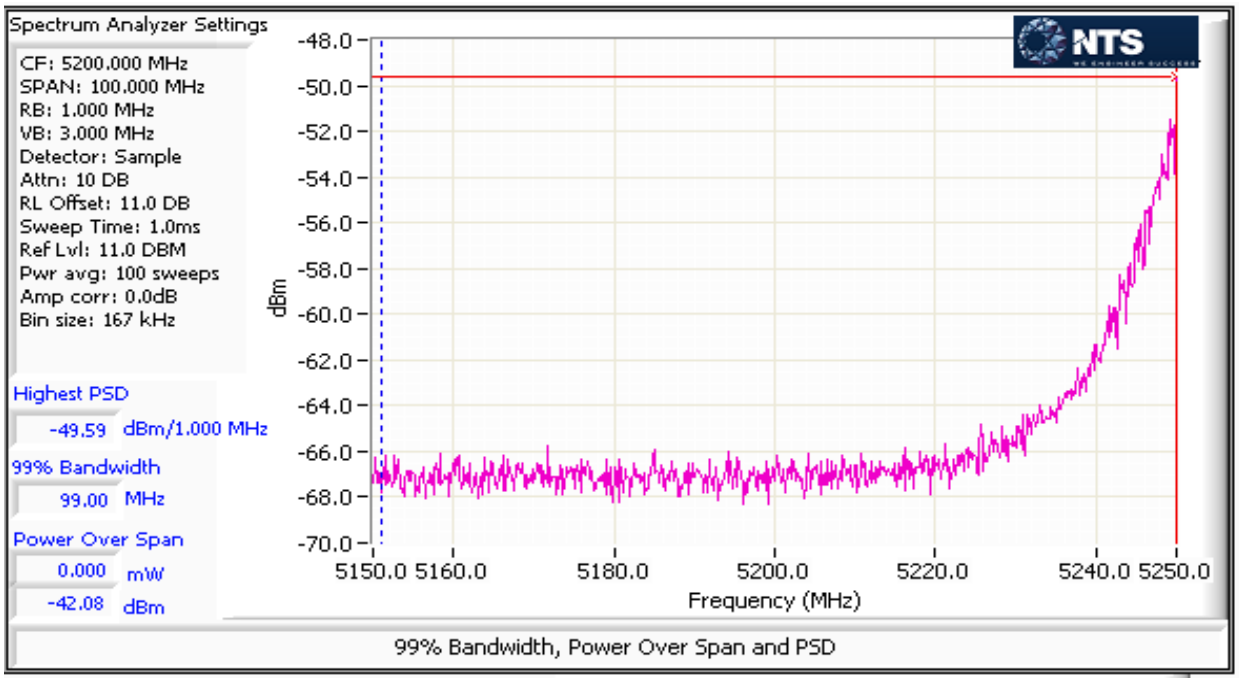
Config. Used: 1
Config Change: none
EUT Voltage: POE

Note 1:	Compliance with the -27dBm/MHz requirement demonstrated via radiated measurements, except at the 5250MHz bandedge.
Note 4:	If the device is for outdoor use then the -27dBm eirp limit also applies in the 5150 - 5250 MHz band.

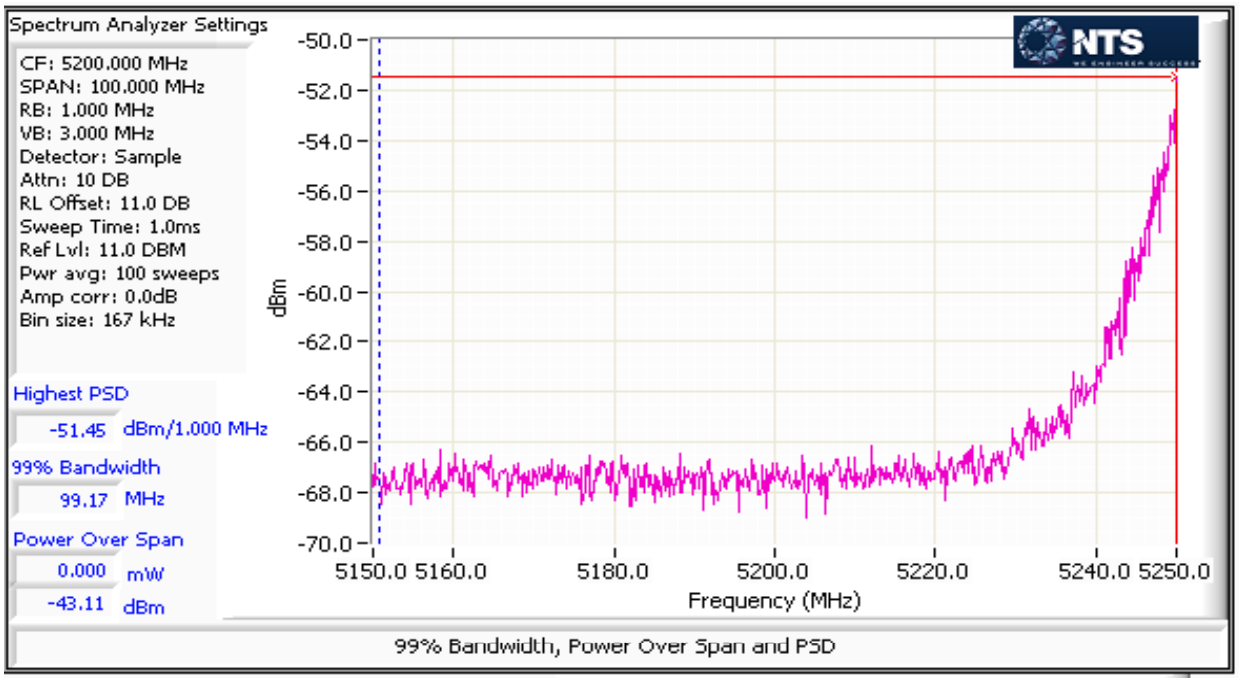
Low channel, 5250 - 5350 MHz Band Edge @ 5250 MHz for devices operating 5250-5350MHz only

Plots for each chain showing compliance with the -27dBm/MHz limit in the 5150 - 5250 MHz band. Start and stop frequencies set to 5150-5250 MHz, RB=1MHz, VB=3MHz, power averaging enabled (100 traces):

	Power Setting	Band edge Level dBm/MHz	Band edge Level mW/MHz	Antenna Gain (dBi)	EIRP mW/MHz	EIRP dBm/MHz	Total EIRP dBm/MHz	Limit dBm/MHz	Result
Chain 1	3	-49.6	0.00001	20.0	0.0010965	-29.6	-27.4	-27	PASS
Chain 2		-51.5	0.00001	20.0	0.0007079	-31.5			

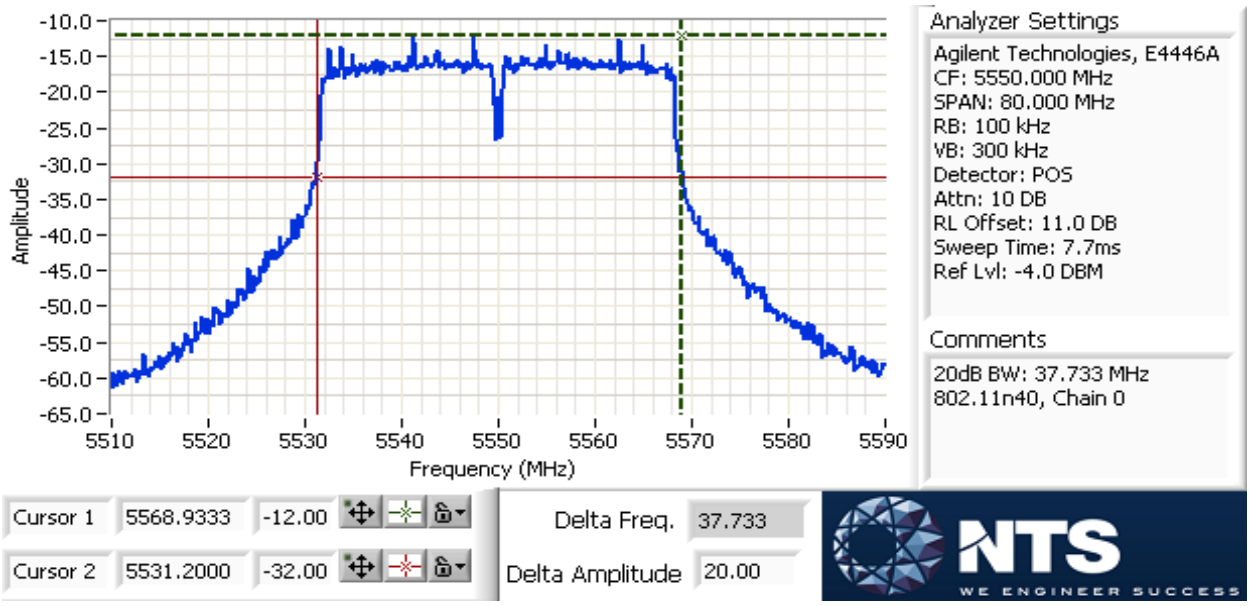


Client:	Ubiquiti Networks	Job Number:	J86352
Model:	RocketM5 Titanium	T-Log Number:	T88756
		Account Manager:	Michelle Kim
Contact:	Jennifer Sanchez		
Standard:	FCC 15.E/RSS-210	Class:	N/A

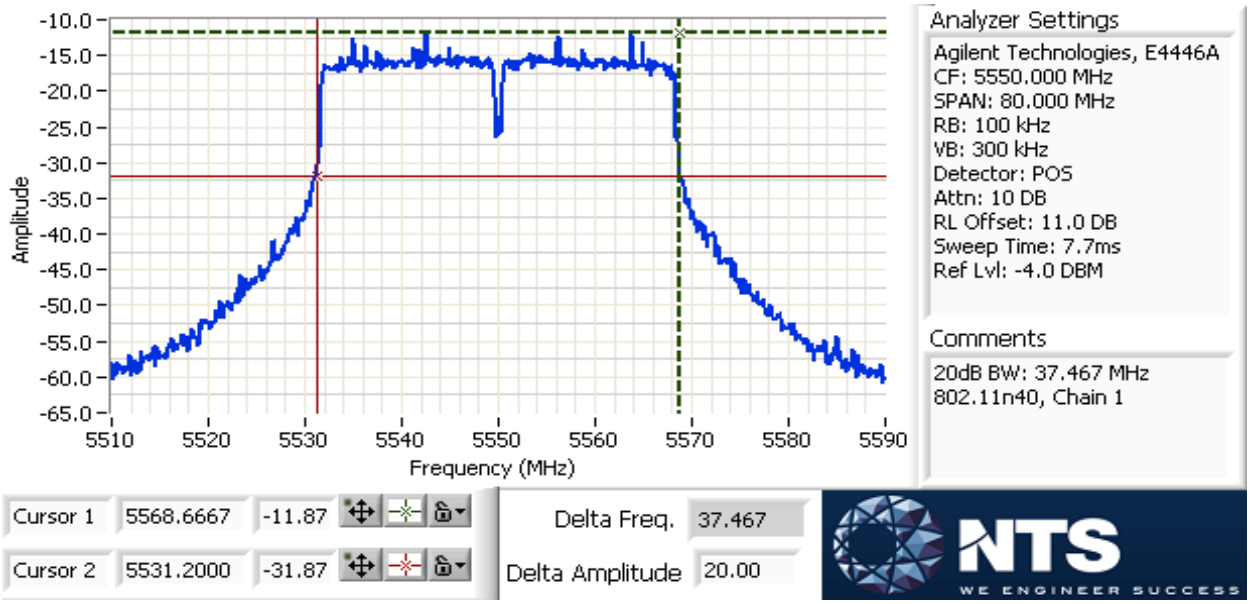


Center channel, 5470 - 5725 MHz Band

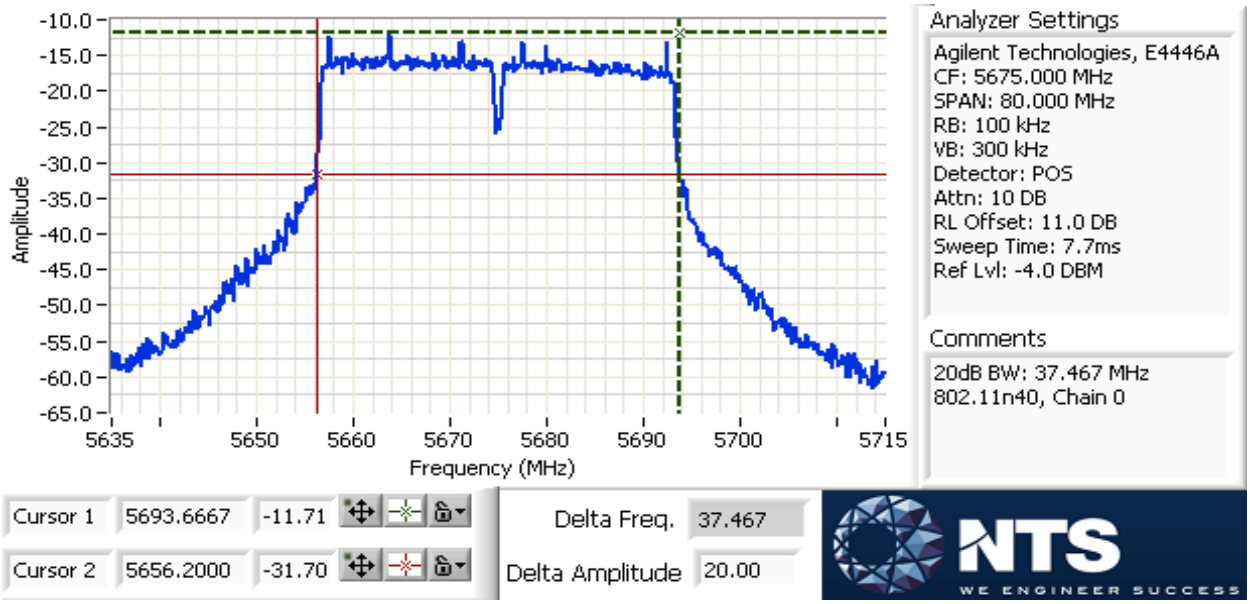
For master devices - This plot is showing that the 20dB bandwidth of the channel closest to 5600 MHz does not spill into the 5600-5650 MHz band. RB > 1% of span.



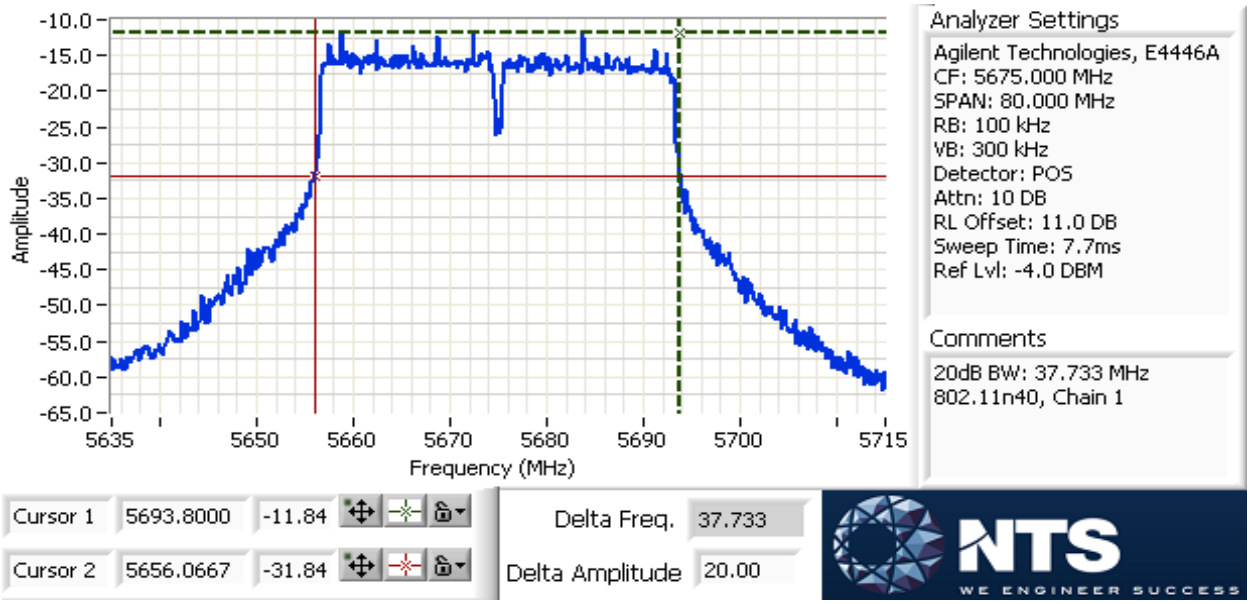
Client:	Ubiquiti Networks	Job Number:	J86352
Model:	RocketM5 Titanium	T-Log Number:	T88756
		Account Manager:	Michelle Kim
Contact:	Jennifer Sanchez		
Standard:	FCC 15.E/RSS-210	Class:	N/A



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:	Ubiquiti Networks	Job Number:	J86352
Model:	RocketM5 Titanium	T-Log Number:	T88756
		Account Manager:	Michelle Kim
Contact:	Jennifer Sanchez		
Standard:	FCC 15.E/RSS-210	Class:	N/A



Client:	Ubiquiti Networks	Job Number:	J86352
Model:	RocketM5 Titanium	T-Log Number:	T88756
		Account Manager:	Michelle Kim
Contact:	Jennifer Sanchez		
Standard:	FCC 15.E/RSS-210	Class:	N/A

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

Test Specific Details

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

Date of Test: 11/7/2012 & 11/9/2012
Test Engineer: John Caizzi
Test Location: Lab 4

Config. Used: 1
Config Change: none
EUT Voltage: POE

Summary of Results

Run #	Test Performed	Limit	Pass / Fail	Result / Margin
1	Power, 5250 - 5350MHz	15.407(a) (1), (2)	Pass	HT40: 0.8 mW
1	PSD, 5250 - 5350MHz	15.407(a) (1), (2)	Pass	HT40: -16.7 dBm/MHz
1	Max EIRP 5250 - 5350MHz	TPC required if EIRP≥ 500mW (27dBm). EIRP ≥ 200mW (23dBm) DFS threshold = -64dBm.	Pass	EIRP = 29.1 dBm (814.2 mW)
1	Power, 5470 - 5725MHz	15.407(a) (1), (2)	Pass	HT40: 0.96 mW
1	PSD, 5470 - 5725MHz	15.407(a) (1), (2)	Pass	HT40: -15.8 dBm/MHz
1	Max EIRP 5470 - 5725MHz	TPC required if EIRP≥ 500mW (27dBm). EIRP ≥ 200mW (23dBm) DFS threshold = -64dBm.	Pass	EIRP = 29.8 dBm (957.3 mW)
1	26dB Bandwidth	15.407 (Information only)	NA	> 20MHz for all modes

Client:	Ubiquiti Networks	Job Number:	J86352
Model:	RocketM5 Titanium	T-Log Number:	T88756
		Account Manager:	Michelle Kim
Contact:	Jennifer Sanchez		
Standard:	FCC 15.E/RSS-210	Class:	N/A

Run #	Test Performed	Limit	Pass / Fail	Result / Margin
1	99% Bandwidth	RSS 210 (Information only)	N/A	HT40: 36.5 MHz
2	Peak Excursion Envelope	15.407(a) (6) 13dB	N/A	Refer to Sector Antenna results
3	Antenna Conducted - Out of Band Spurious	15.407(b) -27dBm/MHz	Pass	All emissions below the -27dBm/MHz limit

General Test Configuration

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

Ambient Conditions:

Temperature:	22 °C
Rel. Humidity:	50 %

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:	Ubiquiti Networks	Job Number:	J86352
Model:	RocketM5 Titanium	T-Log Number:	T88756
		Account Manager:	Michelle Kim
Contact:	Jennifer Sanchez		
Standard:	FCC 15.E/RSS-210	Class:	N/A

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, sample detector, power averaging on (transmitted signal was continuous) and power integration over 40/60 MHz (method SA-1 of KDB 789033).
Note 2:	Measured using the same analyzer settings used for output power.
Note 3:	For RSS-210 the limit for the 5150 - 5250 MHz band accounts for the antenna gain as the maximum eirp allowed is 10dBm/MHz. The limits are also corrected for instances where the highest measured value of the PSD exceeds the average PSD (calculated from the measured power divided by the measured 99% bandwidth) by more than 3dB by the amount that the measured value exceeds the average by more than 3dB.
Note 4:	99% Bandwidth measured in accordance with RSS GEN - RB > 1% of span and VB >=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.
Note 6:	ART pwr setting used was 31.5 from the RX switch table.

MIMO Device - 5250-5350 MHz Band

	Chain 1	Chain 2	Chain 3	Coherent	Effective[5]	EIRP (mW)	EIRP (dBm)
Antenna Gain (dBi):	30	30		No	30.0	814.2	29.1

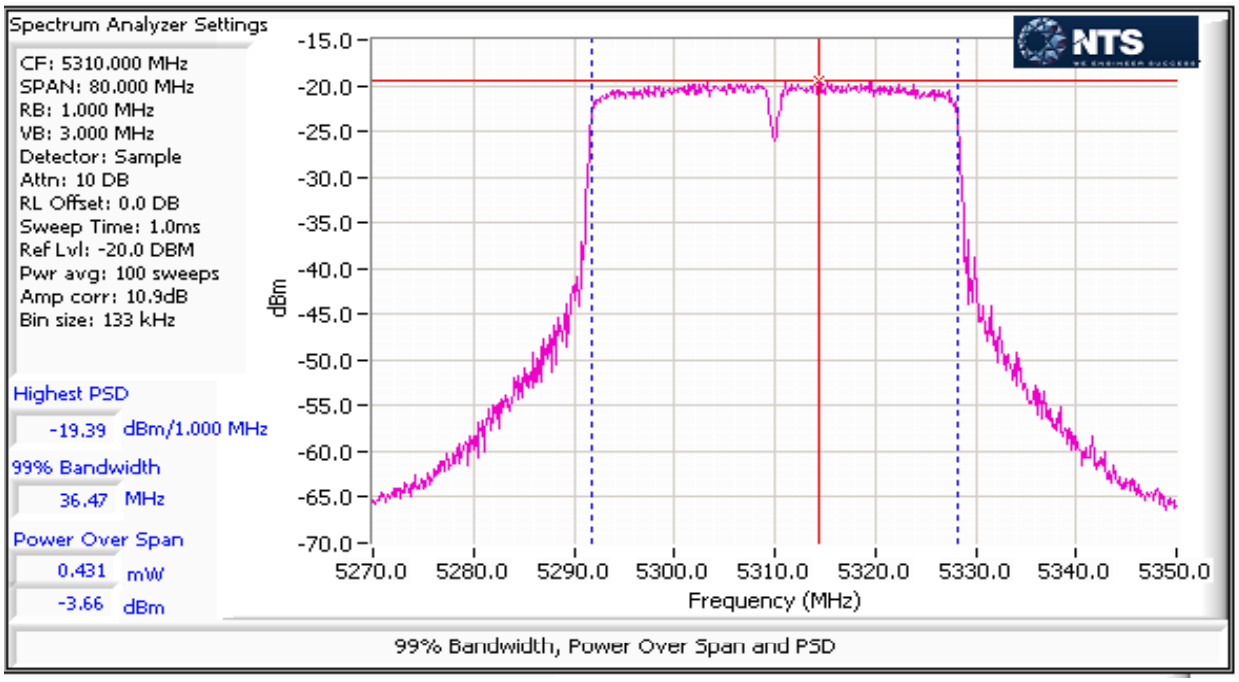
Power

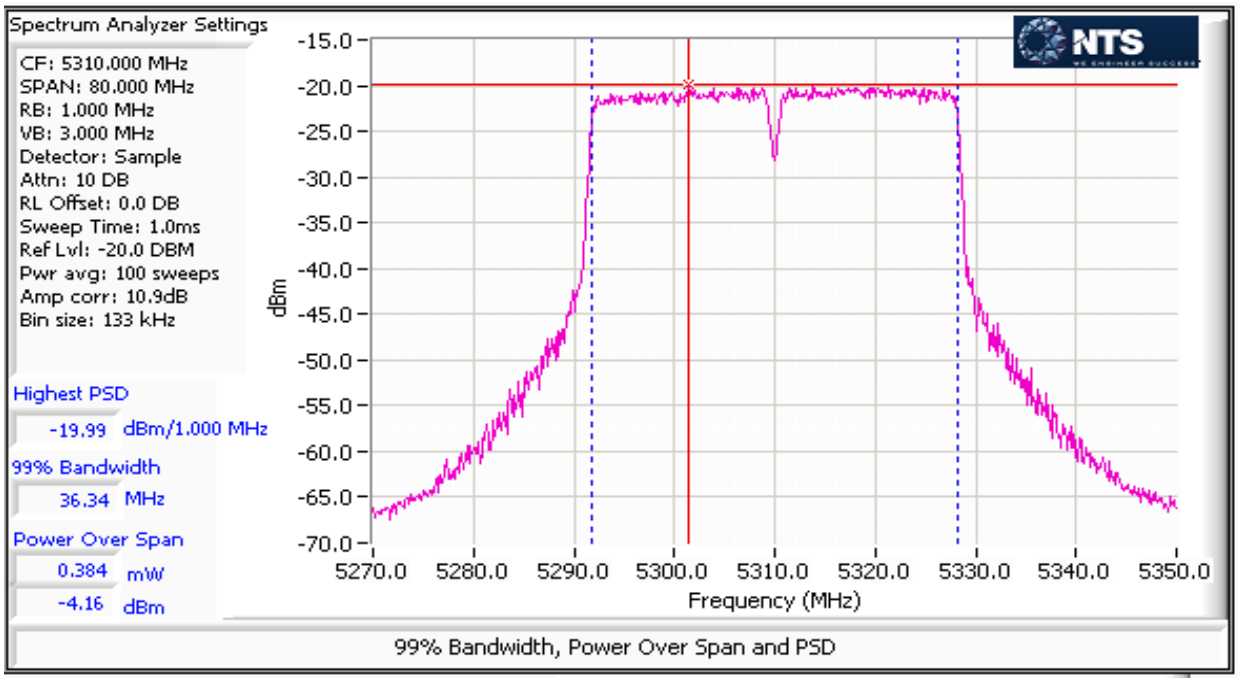
Frequency (MHz)	Software Setting	26dB BW (MHz)	Measured Output Power[1] dBm			Total		Limit (dBm)	Max Power (W)	Pass or Fail
			Chain 1	Chain 2	Chain 3	mW	dBm			
40MHz Mode										
5275	Note 6	50.0	-12.7	-12.4		0.1	-9.5	0.0	0.001	PASS
5310	2.5	45.5	-3.7	-4.2		0.8	-0.9	0.0		PASS

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]	
40MHz Mode										
5275	36.5	-9.5	-28.6	-28.3		0.0	-25.5	-13.0	11.0	PASS
5310	36.5	-0.9	-19.4	-20.0		0.0	-16.7	-13.0	11.0	PASS

Client:	Ubiquiti Networks	Job Number:	J86352
Model:	RocketM5 Titanium	T-Log Number:	T88756
		Account Manager:	Michelle Kim
Contact:	Jennifer Sanchez		
Standard:	FCC 15.E/RSS-210	Class:	N/A





Client:	Ubiquiti Networks	Job Number:	J86352
Model:	RocketM5 Titanium	T-Log Number:	T88756
		Account Manager:	Michelle Kim
Contact:	Jennifer Sanchez		
Standard:	FCC 15.E/RSS-210	Class:	N/A

MIMO Device - 5470-5725 MHz Band

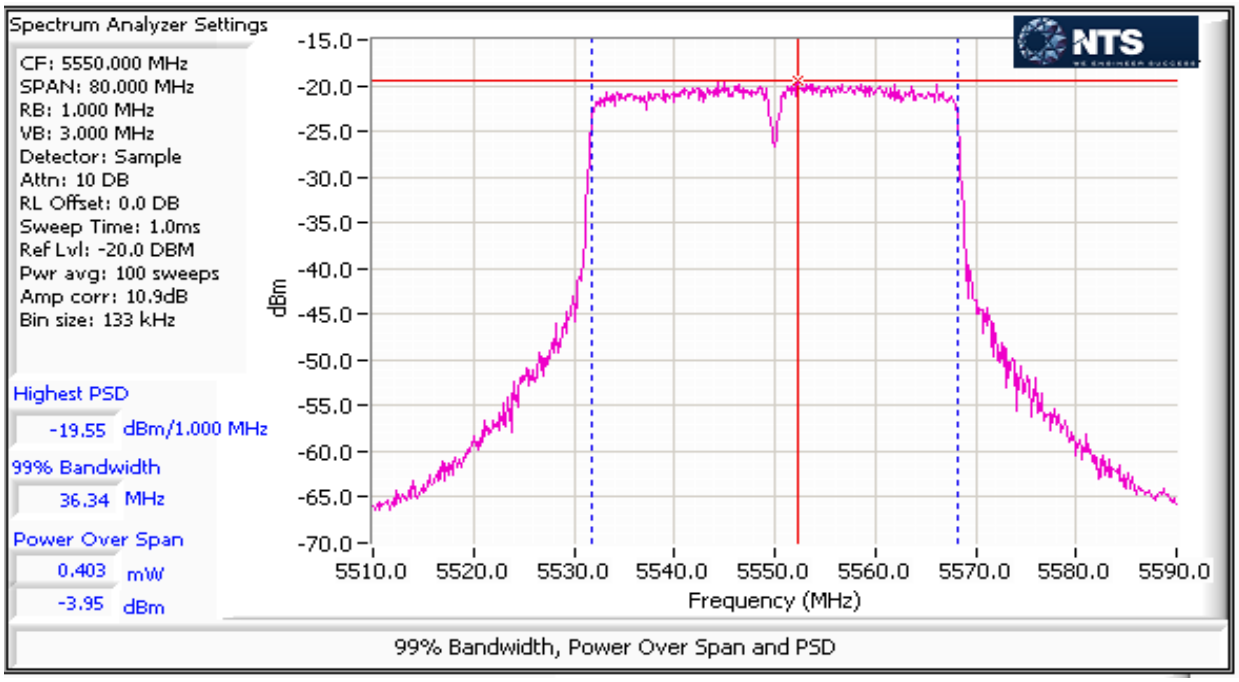
	Chain 1	Chain 2	Chain 3	Coherent	Effective[5]	EIRP (mW)	EIRP (dBm)
Antenna Gain (dBi):	30	30		No	30.0	957.3	29.8

Power

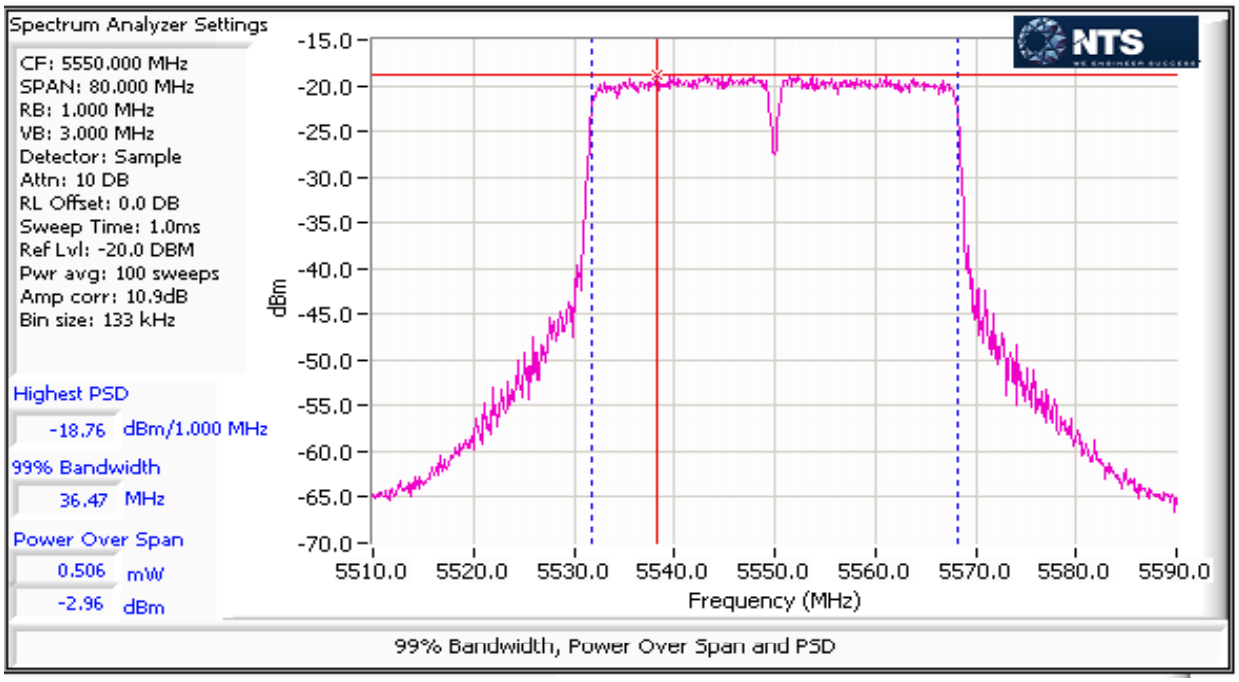
Frequency (MHz)	Software Setting	26dB BW (MHz)	Measured Output Power[1] dBm			Total		Limit (dBm)	Max Power (W)	Pass or Fail
			Chain 1	Chain 2	Chain 3	mW	dBm			
40MHz Mode										
5510	3.0	45.6	-4.0	-2.5		0.96	-0.2	0.0	0.001	PASS
5550	2.5	47.7	-4.0	-3.0		0.9	-0.4	0.0		PASS
5675	1.5	45.7	-4.3	-4.4		0.7	-1.3	0.0		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]	
40MHz Mode										
5510	36.5	-0.2	-19.7	-18.1		0.0	-15.8	-13.0	11.0	PASS
5550	36.5	-0.4	-19.6	-18.8		0.0	-16.1	-13.0	11.0	PASS
5675	36.5	-1.3	-20.1	-20.2		0.0	-17.2	-13.0	11.0	PASS



Client:	Ubiquiti Networks	Job Number:	J86352
Model:	RocketM5 Titanium	T-Log Number:	T88756
		Account Manager:	Michelle Kim
Contact:	Jennifer Sanchez		
Standard:	FCC 15.E/RSS-210	Class:	N/A



Client:	Ubiquiti Networks	Job Number:	J86352
Model:	RocketM5 Titanium	T-Log Number:	T88756
		Account Manager:	Michelle Kim
Contact:	Jennifer Sanchez		
Standard:	FCC 15.E/RSS-210	Class:	N/A

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

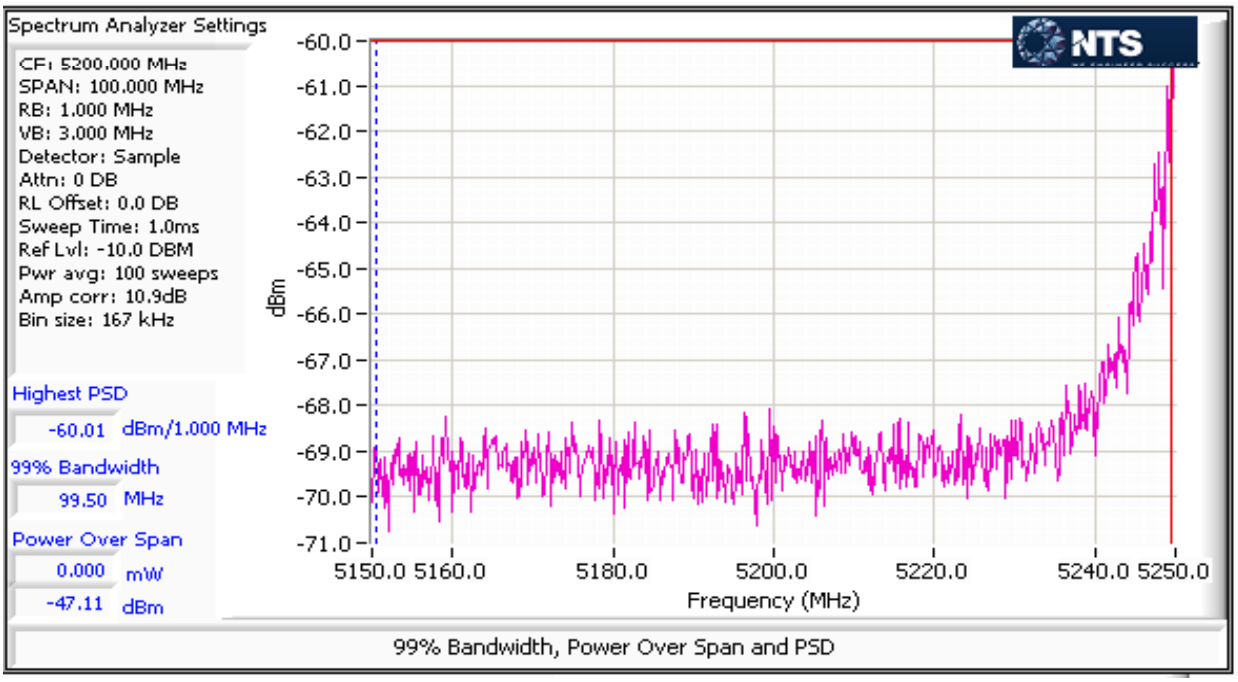
Date of Test: 11/9/2012
Test Engineer: John Caizzi
Test Location: Lab 4

Config. Used: 1
Config Change: none
EUT Voltage: -48 VDC PoE

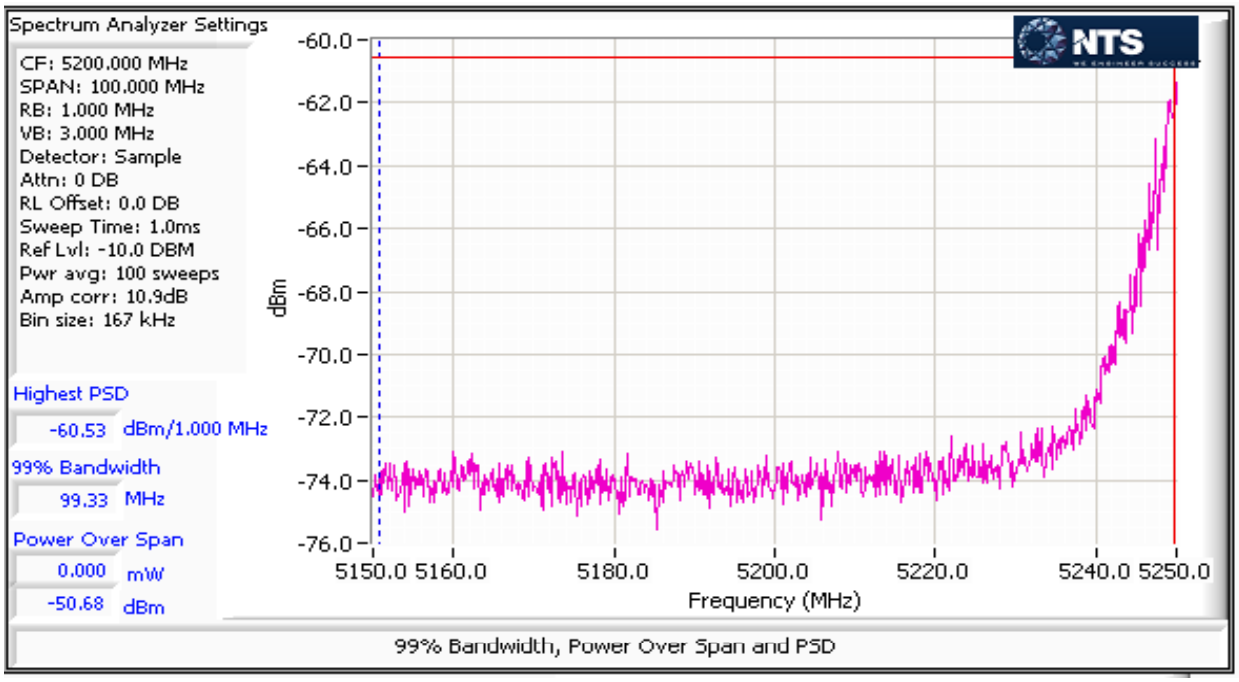
Note 1:	Compliance with the -27dBm/MHz requirement demonstrated via radiated measurements, except at the 5250MHz bandedge.
Note 2:	ART pwr setting used was 31.5 from the RX switch table.
Note 4:	If the device is for outdoor use then the -27dBm eirp limit also applies in the 5150 - 5250 MHz band.

Low channel, 5250 - 5350 MHz Band Edge @ 5250 MHz for devices operating 5250-5350MHz only

Plots for each chain showing compliance with the -27dBm/MHz limit in the 5150 - 5250 MHz band. Start and stop frequencies set to 5150-5250 MHz, RB=1MHz, VB=3MHz, power averaging enabled (100 traces):



Client:	Ubiquiti Networks	Job Number:	J86352
Model:	RocketM5 Titanium	T-Log Number:	T88756
		Account Manager:	Michelle Kim
Contact:	Jennifer Sanchez		
Standard:	FCC 15.E/RSS-210	Class:	N/A



	Power Setting	Band edge Level dBm/MHz	Band edge Level mW/MHz	Antenna Gain (dBi)	EIRP mW/MHz	EIRP dBm/MHz	Total EIRP dBm/MHz	Limit dBm/MHz	Result
Chain 1	Note 2	-60.0	0.00000	30.0	0.0009977	-30.0	-27.3	-27	PASS
Chain 2		-60.5	0.00000	30.0	0.0008851	-30.5			

Client:	Ubiquiti Networks	Job Number:	J86352
Model:	RocketM5 Titanium	T-Log Number:	T88756
		Account Manager:	Michelle Kim
Contact:	Jennifer Sanchez		
Standard:	FCC 15.E/RSS-210	Class:	N/A

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

Test Specific Details

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

Date of Test: 11/9/2012
Test Engineer: John Caizzi
Test Location: Lab 4

Config. Used: 1
Config Change: none
EUT Voltage: PoE

Summary of Results

Run #	Test Performed	Limit	Pass / Fail	Result / Margin
1	Power, 5250 - 5350MHz	15.407(a) (1), (2)	Pass	802.11n10: 4.6 mW
1	PSD, 5250 - 5350MHz	15.407(a) (1), (2)	Pass	802.11n10: -3.1 dBm/MHz
1	Max EIRP 5250 - 5350MHz	TPC required if EIRP≥ 500mW (27dBm). EIRP ≥ 200mW (23dBm) DFS threshold = -64dBm.	Pass	EIRP = 26.6 dBm (461.9 mW)
1	Power, 5470 - 5725MHz	15.407(a) (1), (2)	Pass	802.11n10: 4.4 mW
1	PSD, 5470 - 5725MHz	15.407(a) (1), (2)	Pass	802.11n10: -3.2 dBm/MHz
1	Max EIRP 5470 - 5725MHz	TPC required if EIRP≥ 500mW (27dBm). EIRP ≥ 200mW (23dBm) DFS threshold = -64dBm.	Pass	EIRP = 26.4 dBm (440.1 mW)
1	26dB Bandwidth	15.407 (Information only)	-	10.5MHz worse case
1	99% Bandwidth	RSS 210 (Information only)	N/A	802.11n10: 9.4 MHz
2	Peak Excursion Envelope	15.407(a) (6) 13dB	Pass	8.3 dB
3	Antenna Conducted - Out of Band Spurious	15.407(b) -27dBm/MHz	Pass	All emissions below the -27dBm/MHz limit

Client:	Ubiquiti Networks	Job Number:	J86352
Model:	RocketM5 Titanium	T-Log Number:	T88756
		Account Manager:	Michelle Kim
Contact:	Jennifer Sanchez		
Standard:	FCC 15.E/RSS-210	Class:	N/A

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:	22 °C
Rel. Humidity:	41 %

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:	Ubiquiti Networks	Job Number:	J86352
Model:	RocketM5 Titanium	T-Log Number:	T88756
		Account Manager:	Michelle Kim
Contact:	Jennifer Sanchez		
Standard:	FCC 15.E/RSS-210	Class:	N/A

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, sample detector, power averaging on (transmitted signal was continuous) and power integration over 20 MHz (method SA-1 of KDB 789033).
Note 2:	Measured using the same analyzer settings used for output power.
Note 3:	For RSS-210 the limit for the 5150 - 5250 MHz band accounts for the antenna gain as the maximum eirp allowed is 10dBm/MHz. The limits are also corrected for instances where the highest measured value of the PSD exceeds the average PSD (calculated from the measured power divided by the measured 99% bandwidth) by more than 3dB by the amount that the measured value exceeds the average by more than 3dB.
Note 4:	99% Bandwidth measured in accordance with RSS GEN - RB > 1% of span and VB >=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.

MIMO Device - 5250-5350 MHz Band

	Chain 1	Chain 2	Chain 3	Coherent	Effective[5]	EIRP (mW)	EIRP (dBm)
Antenna Gain (dBi):	20	20		No	20.0	461.9	26.6

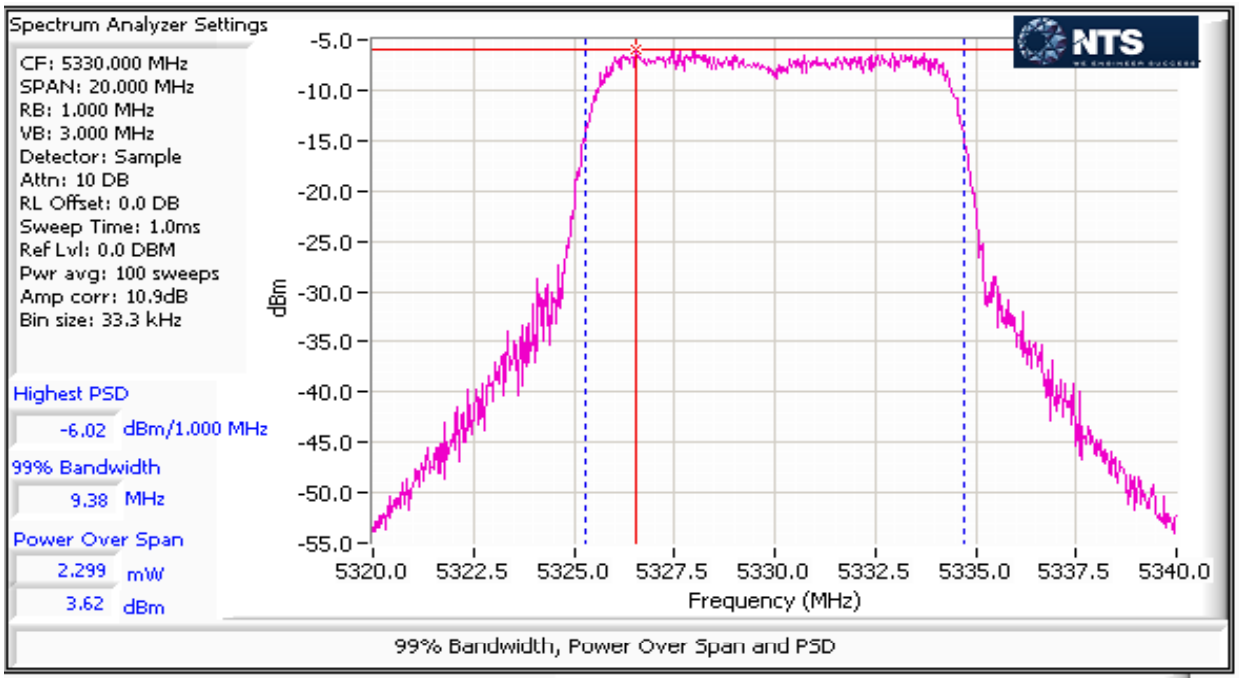
Power

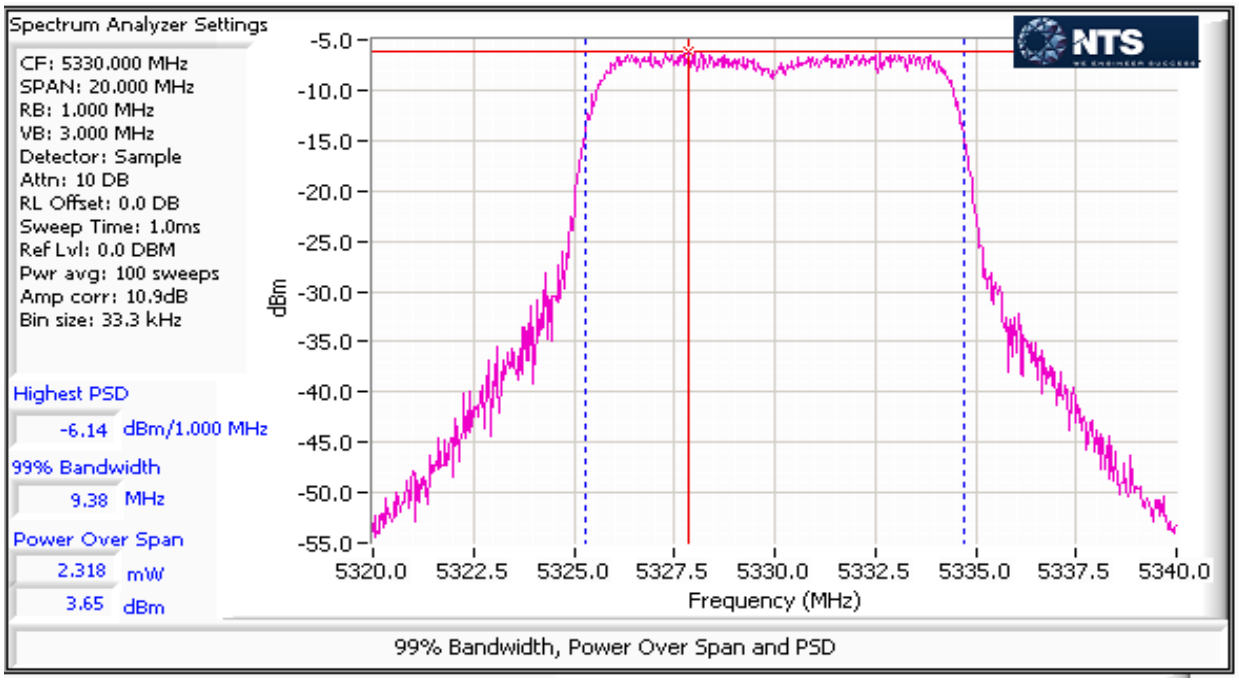
Frequency (MHz)	Software Setting	26dB BW (MHz)	Measured Output Power[1] dBm			Total		Limit (dBm)	Max Power (W)	Pass or Fail
			Chain 1	Chain 2	Chain 3	mW	dBm			
10MHz Mode										
5260	11.0	11.8	2.7	2.6		3.7	5.6	7.7	0.005	PASS
5300	11.5	12.3	3.7	3.3		4.4	6.5	7.9		PASS
5330	11.5	12.2	3.6	3.7		4.6	6.6	7.9		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]	
10MHz Mode										
5260	9.4	5.6	-6.7	-6.6		0.4	-3.6	-3.0	11.0	PASS
5300	9.4	6.5	-6.2	-6.4		0.5	-3.3	-3.0	11.0	PASS
5330	9.4	6.6	-6.0	-6.1		0.5	-3.1	-3.0	11.0	PASS

Client:	Ubiquiti Networks	Job Number:	J86352
Model:	RocketM5 Titanium	T-Log Number:	T88756
		Account Manager:	Michelle Kim
Contact:	Jennifer Sanchez		
Standard:	FCC 15.E/RSS-210	Class:	N/A





Client:	Ubiquiti Networks	Job Number:	J86352
Model:	RocketM5 Titanium	T-Log Number:	T88756
		Account Manager:	Michelle Kim
Contact:	Jennifer Sanchez		
Standard:	FCC 15.E/RSS-210	Class:	N/A

MIMO Device - 5470-5725 MHz Band

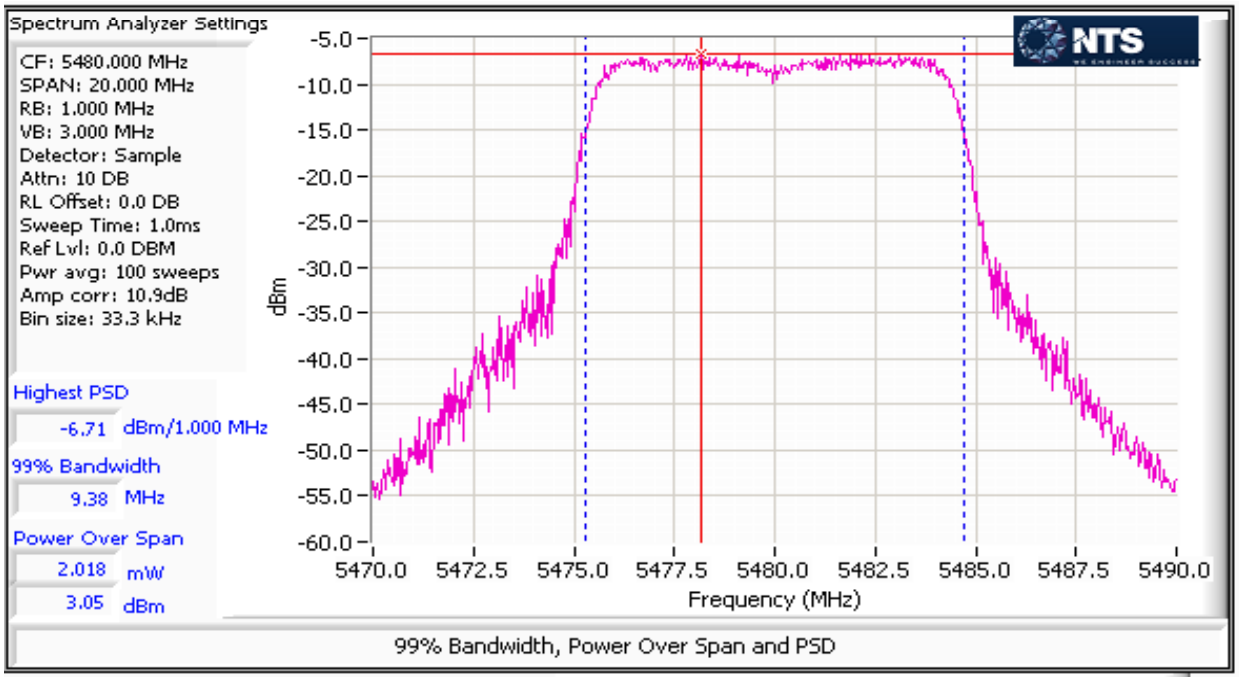
	Chain 1	Chain 2	Chain 3	Coherent	Effective[5]	EIRP (mW)	EIRP (dBm)
Antenna Gain (dBi):	20	20		No	20.0	440.1	26.4

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			
10MHz Mode										
5480	11.5	11.7	3.1	3.8		4.4	6.44	7.7	0.004	PASS
5590	11.0	13.1	2.9	3.7		4.3	6.3	8.2		PASS
5710	10.5	12.3	2.9	3.8		4.3	6.36	7.9		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]	
10MHz Mode										
5480	9.4	6.4	-6.7	-5.7		0.5	-3.19	-3.0	11.0	PASS
5590	9.4	6.3	-6.5	-5.8		0.5	-3.16	-3.0	11.0	PASS
5710	9.4	6.4	-6.9	-5.9		0.5	-3.4	-3.0	11.0	PASS



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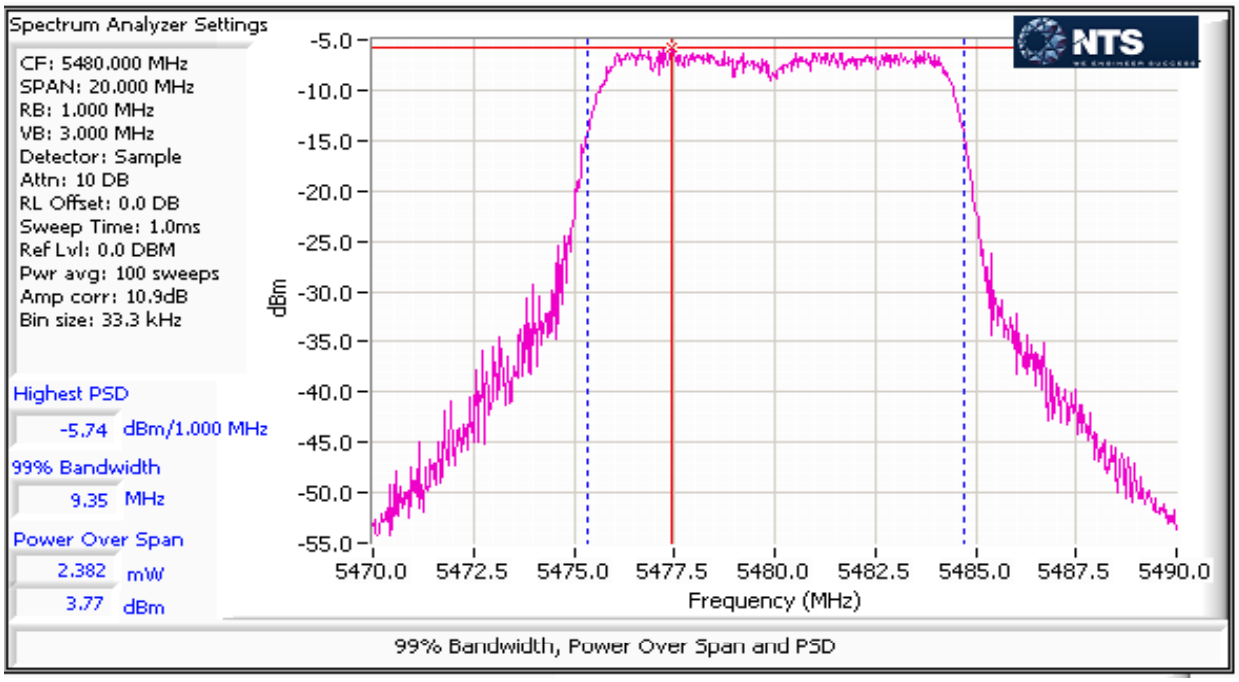
Model:	RocketM5 Titanium	T-Log Number:	T88756
		Account Manager:	Michelle Kim
Contact:	Jennifer Sanchez		
Standard:	FCC 15.E/RSS-210	Class:	N/A



Run #2: Peak Excursion Measurement

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
			5260	8.3	13.0	5480		13.0
			5300		13.0	5590		13.0
			5330		13.0	5710		13.0

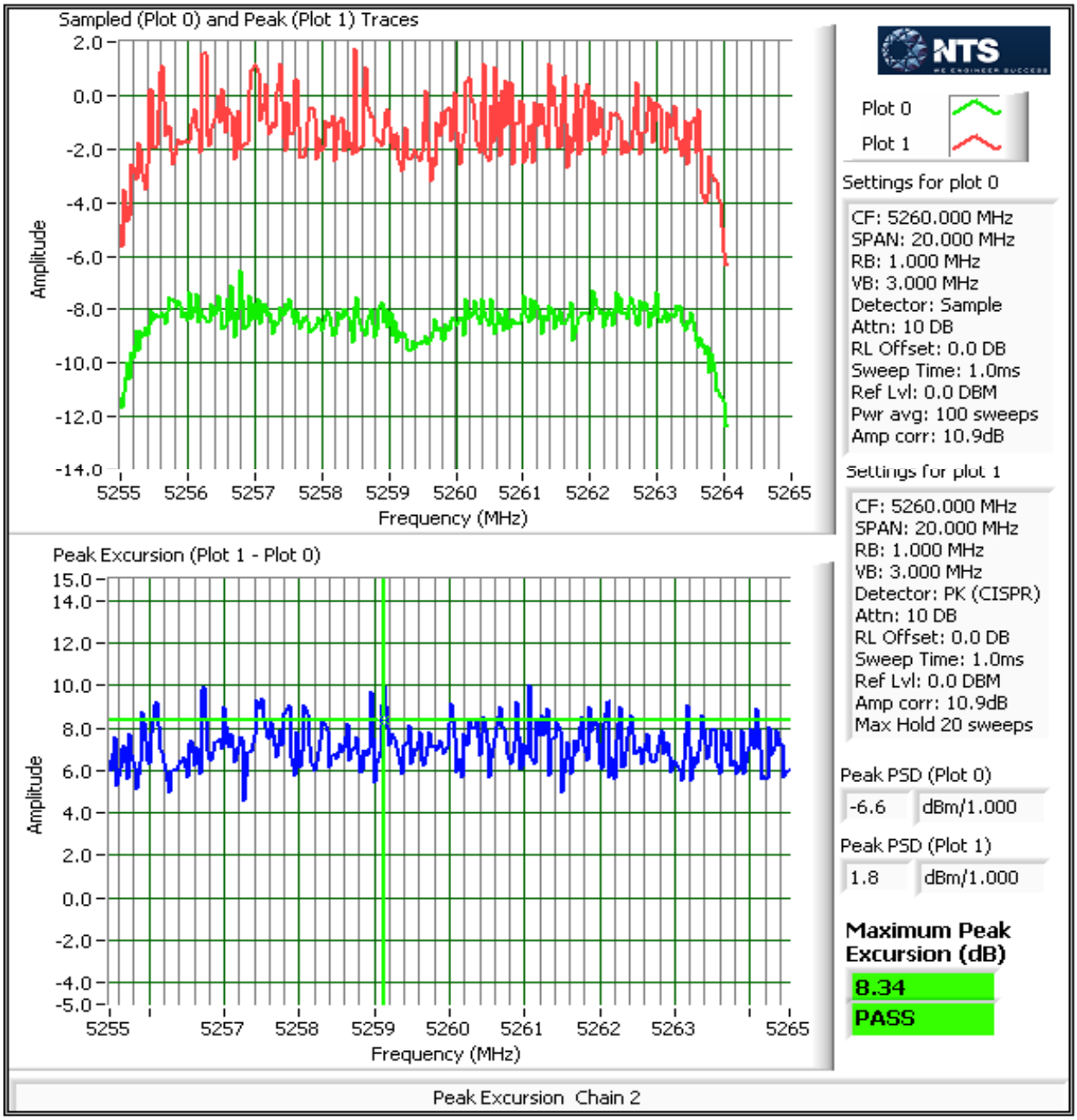
Note: Per KDB 789033 D01, v01r02 F)1) - Compliance with the peak excursion requirement can be demonstrated by testing performed on a single channel for each mode of operation

Client:	Ubiquiti Networks	Job Number:	J86352
Model:	RocketM5 Titanium	T-Log Number:	T88756
		Account Manager:	Michelle Kim
Contact:	Jennifer Sanchez		
Standard:	FCC 15.E/RSS-210	Class:	N/A

Plots Showing Peak Excursion

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

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



Client:	Ubiquiti Networks	Job Number:	J86352
Model:	RocketM5 Titanium	T-Log Number:	T88756
		Account Manager:	Michelle Kim
Contact:	Jennifer Sanchez		
Standard:	FCC 15.E/RSS-210	Class:	N/A

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

Date of Test: 11/9/2012
Test Engineer: John Caizzi
Test Location: Lab 4

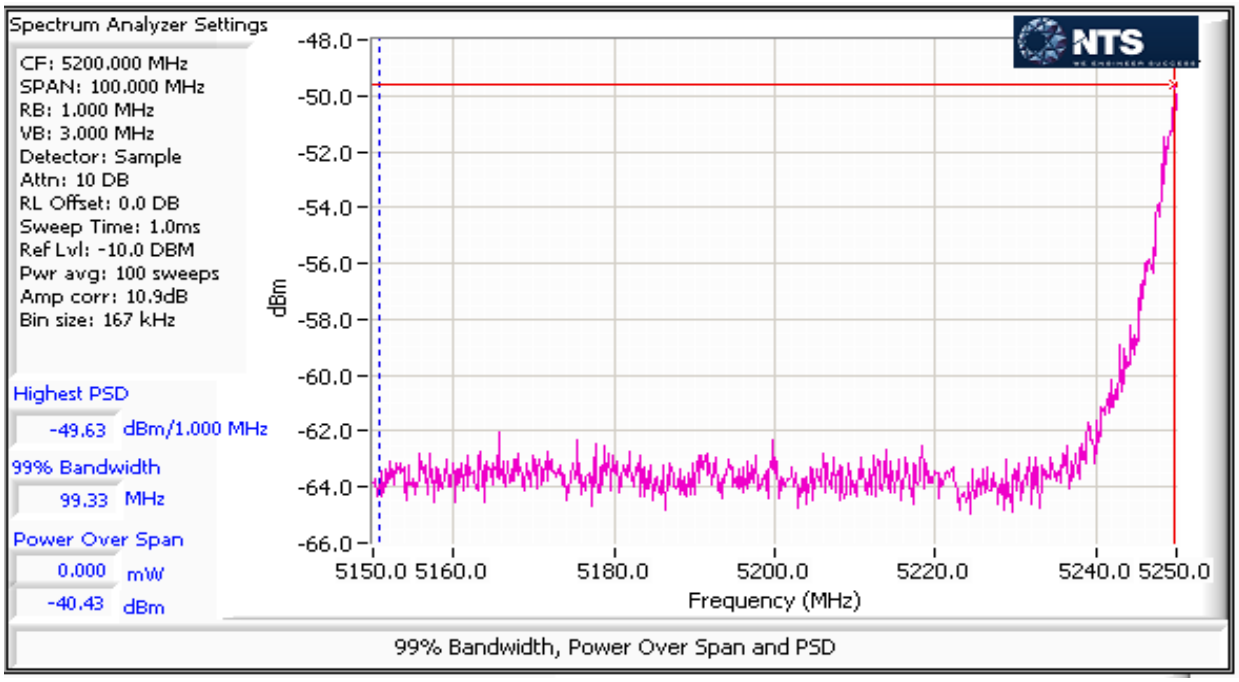
Config. Used: 1
Config Change: none
EUT Voltage: -48 VDC PoE

Note 1:	Compliance with the -27dBm/MHz requirement demonstrated via radiated measurements, except at the 5250MHz bandedge.
Note 4:	If the device is for outdoor use then the -27dBm eirp limit also applies in the 5150 - 5250 MHz band.

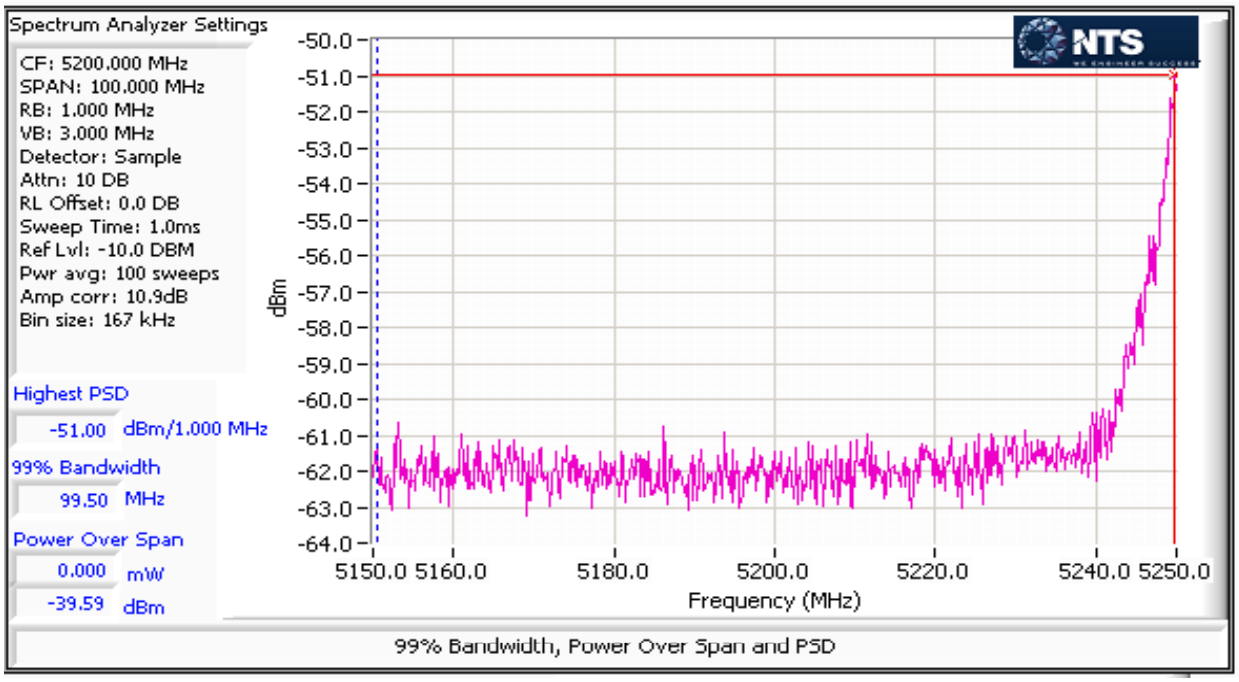
Low channel, 5250 - 5350 MHz Band Edge @ 5250 MHz for devices operating 5250-5350MHz only

Plots for each chain showing compliance with the -27dBm/MHz limit in the 5150 - 5250 MHz band. Start and stop frequencies set to 5150-5250 MHz, RB=1MHz, VB=3MHz, power averaging enabled (100 traces):

	Power Setting	Band edge Level		Antenna Gain (dBi)	EIRP		Total EIRP	Limit	Result
		dBm/MHz	mW/MHz		mW/MHz	dBm/MHz	dBm/MHz	dBm/MHz	
Chain 1	13.5	-49.6	0.00001	20.0	0.0010889	-29.6	-27.3	-27	PASS
Chain 2		-51.0	0.00001	20.0	0.0007943	-31.0			

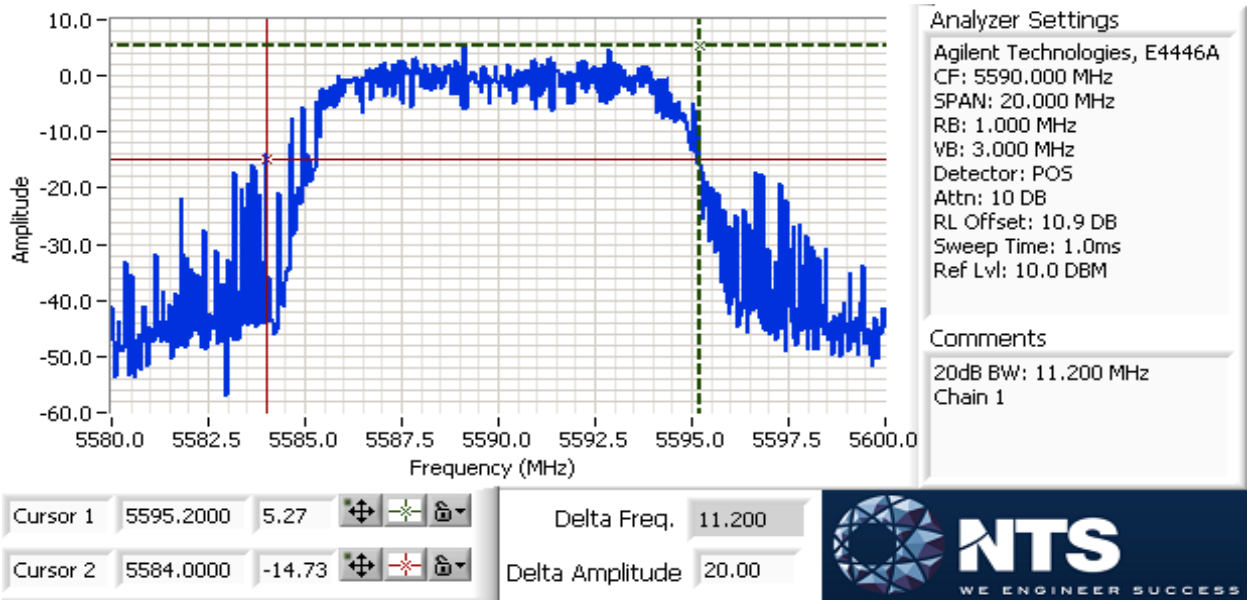


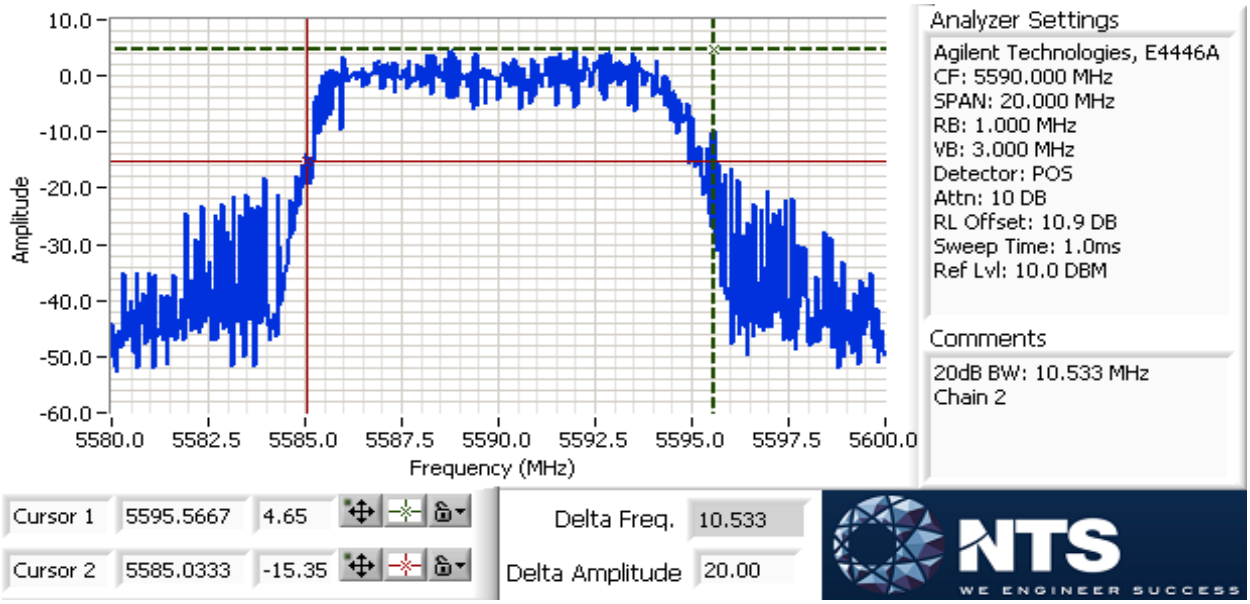
Client:	Ubiquiti Networks	Job Number:	J86352
Model:	RocketM5 Titanium	T-Log Number:	T88756
		Account Manager:	Michelle Kim
Contact:	Jennifer Sanchez		
Standard:	FCC 15.E/RSS-210	Class:	N/A



Client:	Ubiquiti Networks	Job Number:	J86352
Model:	RocketM5 Titanium	T-Log Number:	T88756
		Account Manager:	Michelle Kim
Contact:	Jennifer Sanchez		
Standard:	FCC 15.E/RSS-210	Class:	N/A

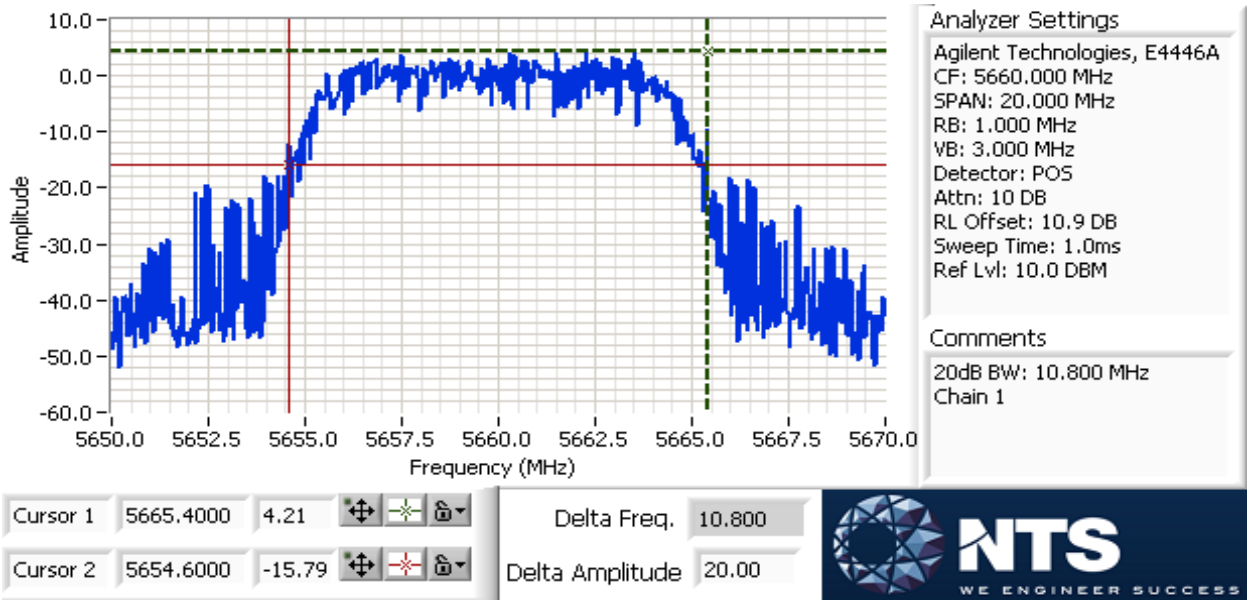
Center channel, 5470 - 5725 MHz Band
For master devices - This plot is showing hat the 20dB bandwidth of the channel closest to 5600 MHz does not spill into the 5600-5650 MHz band. RB > 1% of span.

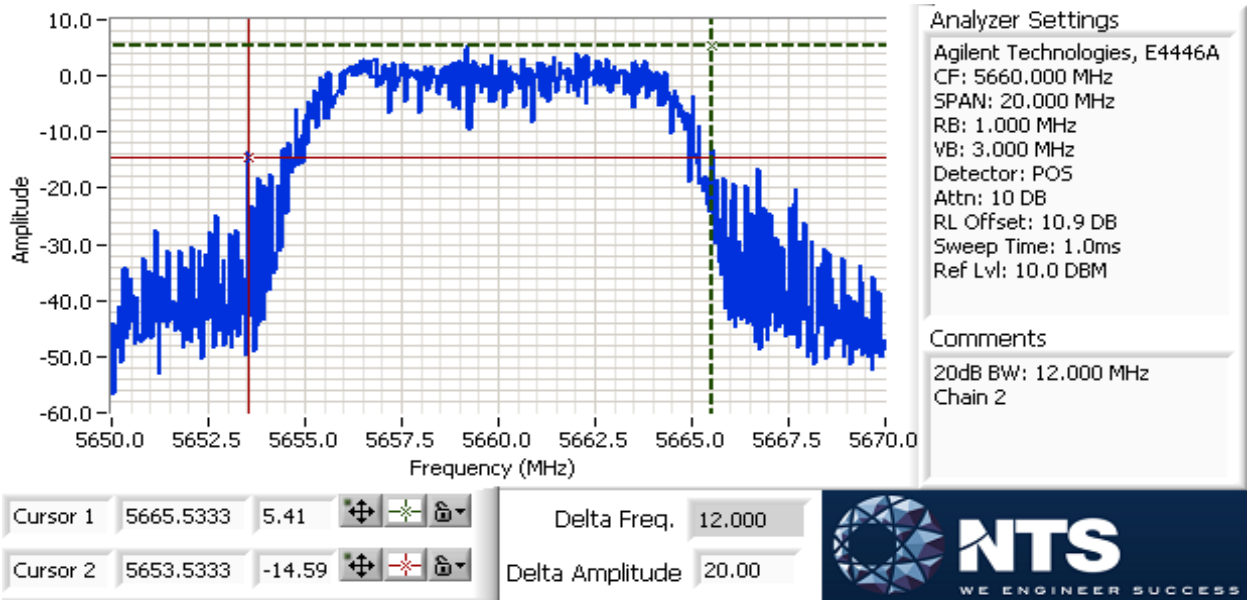




Client:	Ubiquiti Networks	Job Number:	J86352
Model:	RocketM5 Titanium	T-Log Number:	T88756
		Account Manager:	Michelle Kim
Contact:	Jennifer Sanchez		
Standard:	FCC 15.E/RSS-210	Class:	N/A

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:	Ubiquiti Networks	Job Number:	J86352
Model:	RocketM5 Titanium	T-Log Number:	T88756
		Account Manager:	Michelle Kim
Contact:	Jennifer Sanchez		
Standard:	FCC 15.E/RSS-210	Class:	N/A

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

Test Specific Details

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

Date of Test: 11/9/2012
Test Engineer: John Caizzi
Test Location: Lab 4

Config. Used: 1
Config Change: none
EUT Voltage: 48 VDC PoE

Summary of Results

Run #	Test Performed	Limit	Pass / Fail	Result / Margin
1	Power, 5250 - 5350MHz	15.407(a) (1), (2)	Pass	802.11n10: 0.4 mW
1	PSD, 5250 - 5350MHz	15.407(a) (1), (2)	Pass	802.11n10: -13.2 dBm/MHz
1	Max EIRP 5250 - 5350MHz	TPC required if EIRP≥ 500mW (27dBm). EIRP ≥ 200mW (23dBm) DFS threshold = -64dBm.	Pass	EIRP = 26.3 dBm (430.5 mW)
1	Power, 5470 - 5725MHz	15.407(a) (1), (2)	Pass	802.11n10: 0.4 mW
1	PSD, 5470 - 5725MHz	15.407(a) (1), (2)	Pass	802.11n10: -13.3 dBm/MHz
1	Max EIRP 5470 - 5725MHz	TPC required if EIRP≥ 500mW (27dBm). EIRP ≥ 200mW (23dBm) DFS threshold = -64dBm.	Pass	EIRP = 26.5 dBm (442.3 mW)
1	26dB Bandwidth	15.407 (Information only)	-	11.7 MHz
1	99% Bandwidth	RSS 210 (Information only)	N/A	802.11n10: 9.4 MHz
2	Peak Excursion Envelope	15.407(a) (6) 13dB	N/A	Refer to Sector Antenna results
3	Antenna Conducted - Out of Band Spurious	15.407(b) -27dBm/MHz	Pass	All emissions below the -27dBm/MHz limit

Client:	Ubiquiti Networks	Job Number:	J86352
Model:	RocketM5 Titanium	T-Log Number:	T88756
		Account Manager:	Michelle Kim
Contact:	Jennifer Sanchez		
Standard:	FCC 15.E/RSS-210	Class:	N/A

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:	22 °C
Rel. Humidity:	41 %

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:	Ubiquiti Networks	Job Number:	J86352
Model:	RocketM5 Titanium	T-Log Number:	T88756
		Account Manager:	Michelle Kim
Contact:	Jennifer Sanchez		
Standard:	FCC 15.E/RSS-210	Class:	N/A

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, sample detector, power averaging on (transmitted signal was continuous) and power integration over 20 MHz (method SA-1 of KDB 789033).
Note 2:	Measured using the same analyzer settings used for output power.
Note 3:	For RSS-210 the limit for the 5150 - 5250 MHz band accounts for the antenna gain as the maximum eirp allowed is 10dBm/MHz. The limits are also corrected for instances where the highest measured value of the PSD exceeds the average PSD (calculated from the measured power divided by the measured 99% bandwidth) by more than 3dB by the amount that the measured value exceeds the average by more than 3dB.
Note 4:	99% Bandwidth measured in accordance with RSS GEN - RB > 1% of span and VB >=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.

MIMO Device - 5250-5350 MHz Band

	Chain 1	Chain 2	Chain 3	Coherent	Effective[5]	EIRP (mW)	EIRP (dBm)
Antenna Gain (dBi):	30	30		No	30.0	430.5	26.3

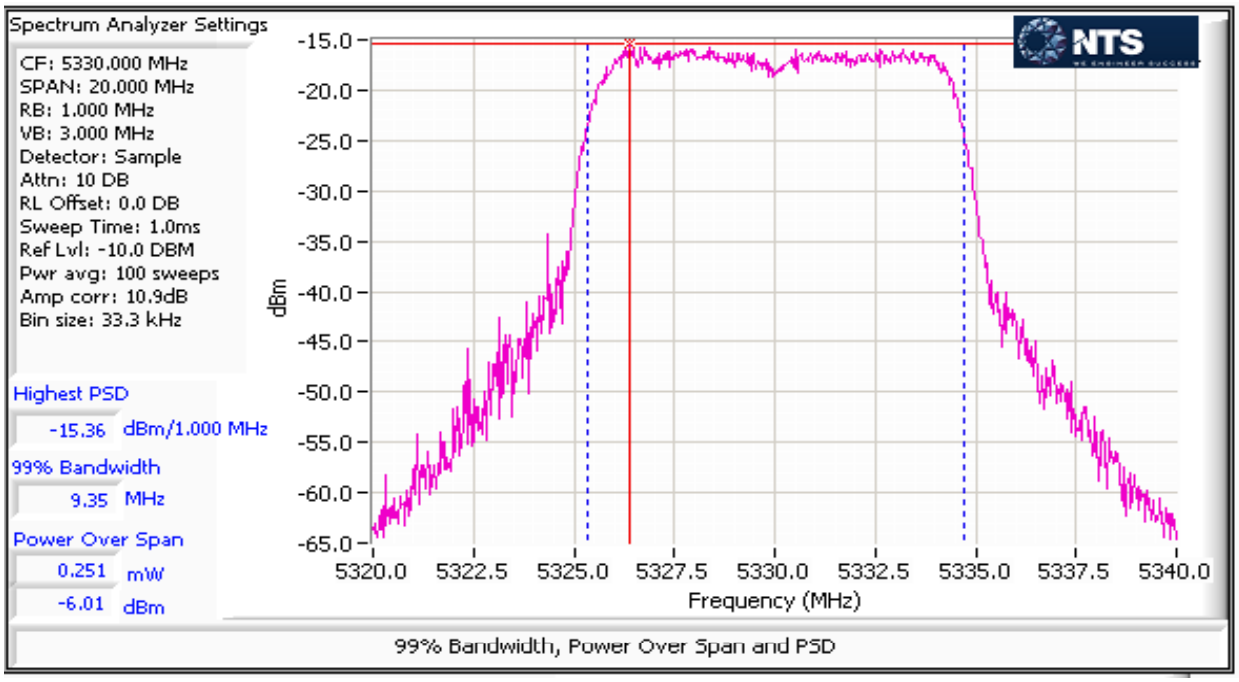
Power

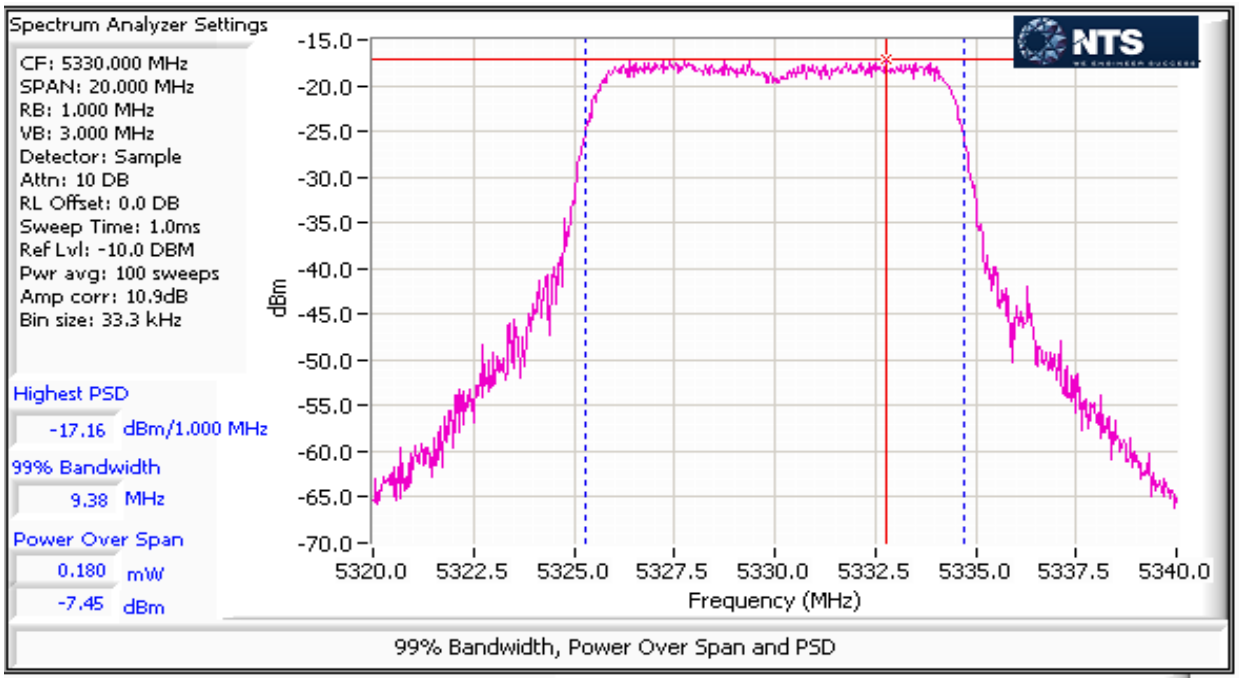
Frequency (MHz)	Software Setting	26dB BW (MHz)	Measured Output Power[1] dBm			Total		Limit (dBm)	Max Power (W)	Pass or Fail
			Chain 1	Chain 2	Chain 3	mW	dBm			
10MHz Mode										
5260	2.5	11.8	-7.0	-8.0		0.4	-4.5	-2.3	0.000	PASS
5300	2.5	12.3	-6.4	-7.9		0.4	-4.0	-2.1		PASS
5330	2.5	12.2	-6.0	-7.5		0.4	-3.7	-2.1		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]	
10MHz Mode										
5260	9.3	-4.5	-16.9	-17.3		0.0	-14.1	-13.0	11.0	PASS
5300	9.4	-4.0	-15.6	-17.3		0.0	-13.4	-13.0	11.0	PASS
5330	9.4	-3.7	-15.4	-17.2		0.0	-13.2	-13.0	11.0	PASS

Client:	Ubiquiti Networks	Job Number:	J86352
Model:	RocketM5 Titanium	T-Log Number:	T88756
		Account Manager:	Michelle Kim
Contact:	Jennifer Sanchez		
Standard:	FCC 15.E/RSS-210	Class:	N/A





Client:	Ubiquiti Networks	Job Number:	J86352
Model:	RocketM5 Titanium	T-Log Number:	T88756
		Account Manager:	Michelle Kim
Contact:	Jennifer Sanchez		
Standard:	FCC 15.E/RSS-210	Class:	N/A

MIMO Device - 5470-5725 MHz Band

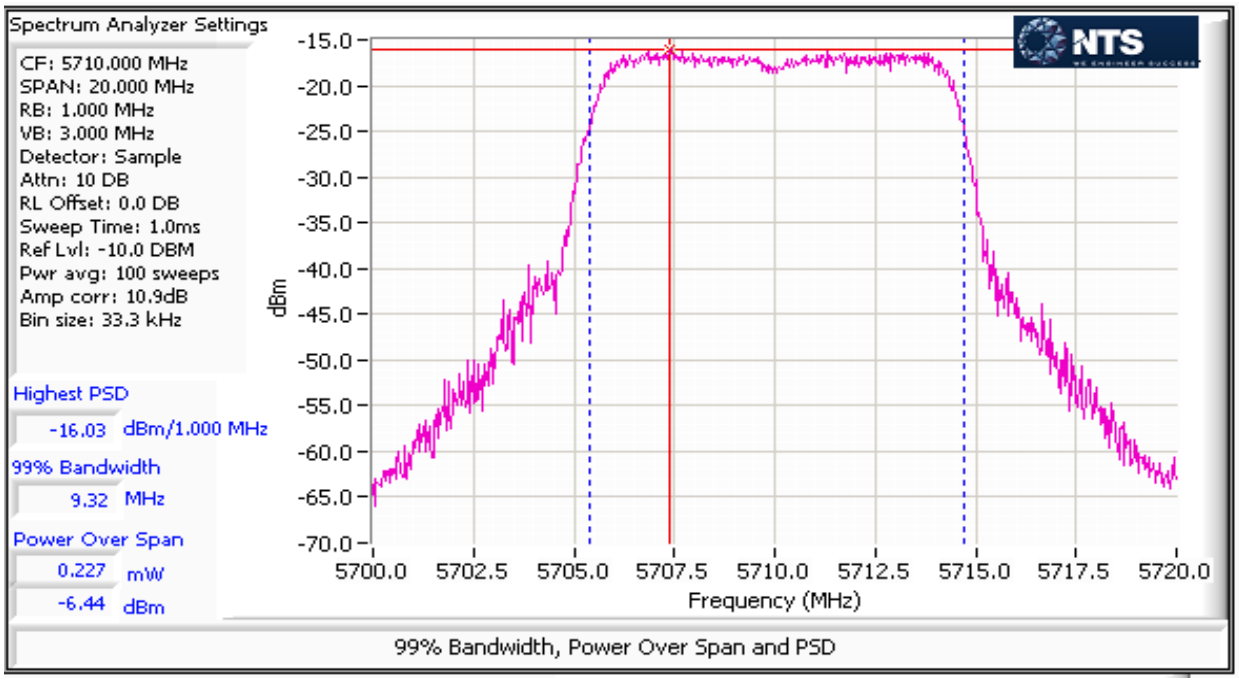
	Chain 1	Chain 2	Chain 3	Coherent	Effective[5]	EIRP (mW)	EIRP (dBm)
Antenna Gain (dBi):	30	30		No	30.0	442.3	26.5

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			
10MHz Mode										
5480	1.5	11.7	-8.2	-5.6		0.4	-3.7	-2.3	0.000	PASS
5590	2.0	13.1	-7.7	-6.9		0.4	-4.3	-1.8		PASS
5710	1.5	12.3	-6.4	-6.7		0.4	-3.5	-2.1		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]	
10MHz Mode										
5480	9.3	-3.7	-17.8	-15.2		0.0	-13.32	-13.0	11.0	PASS
5590	9.4	-4.3	-17.2	-16.6		0.0	-13.9	-13.0	11.0	PASS
5710	9.3	-3.5	-16.0	-16.5		0.0	-13.26	-13.0	11.0	PASS



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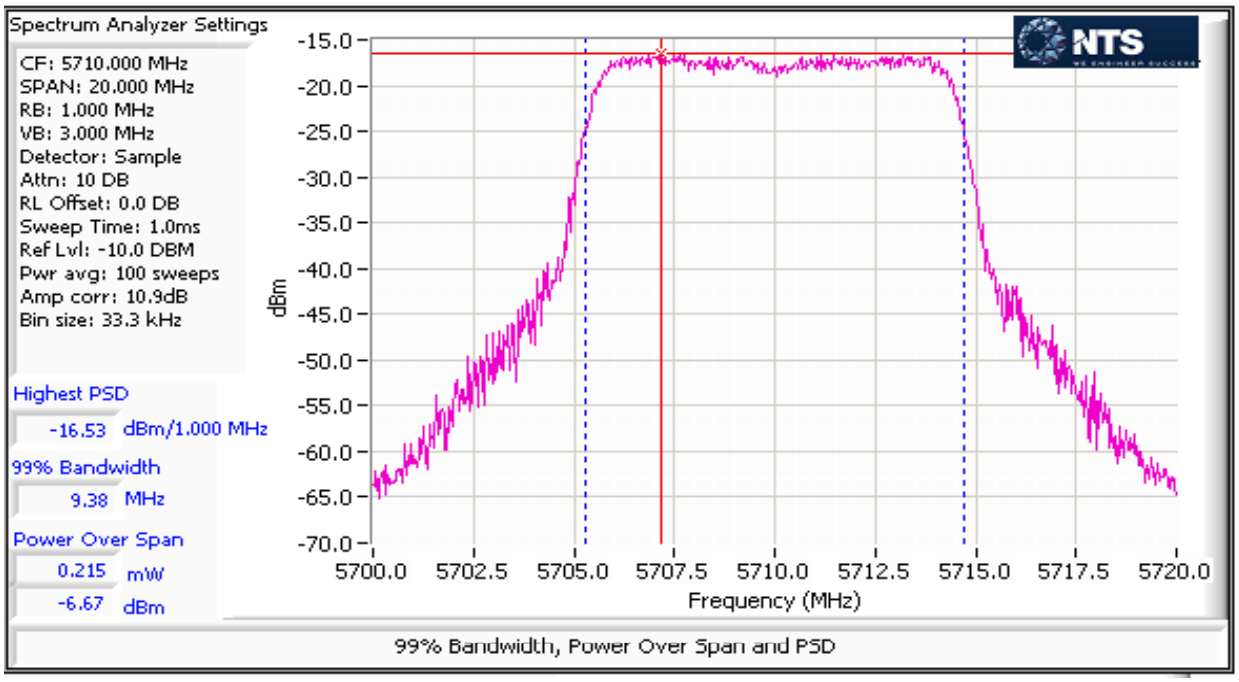
Model:	RocketM5 Titanium	T-Log Number:	T88756
		Account Manager:	Michelle Kim
Contact:	Jennifer Sanchez		
Standard:	FCC 15.E/RSS-210	Class:	N/A



Client:	Ubiquiti Networks	Job Number:	J86352
Model:	RocketM5 Titanium	T-Log Number:	T88756
		Account Manager:	Michelle Kim
Contact:	Jennifer Sanchez		
Standard:	FCC 15.E/RSS-210	Class:	N/A

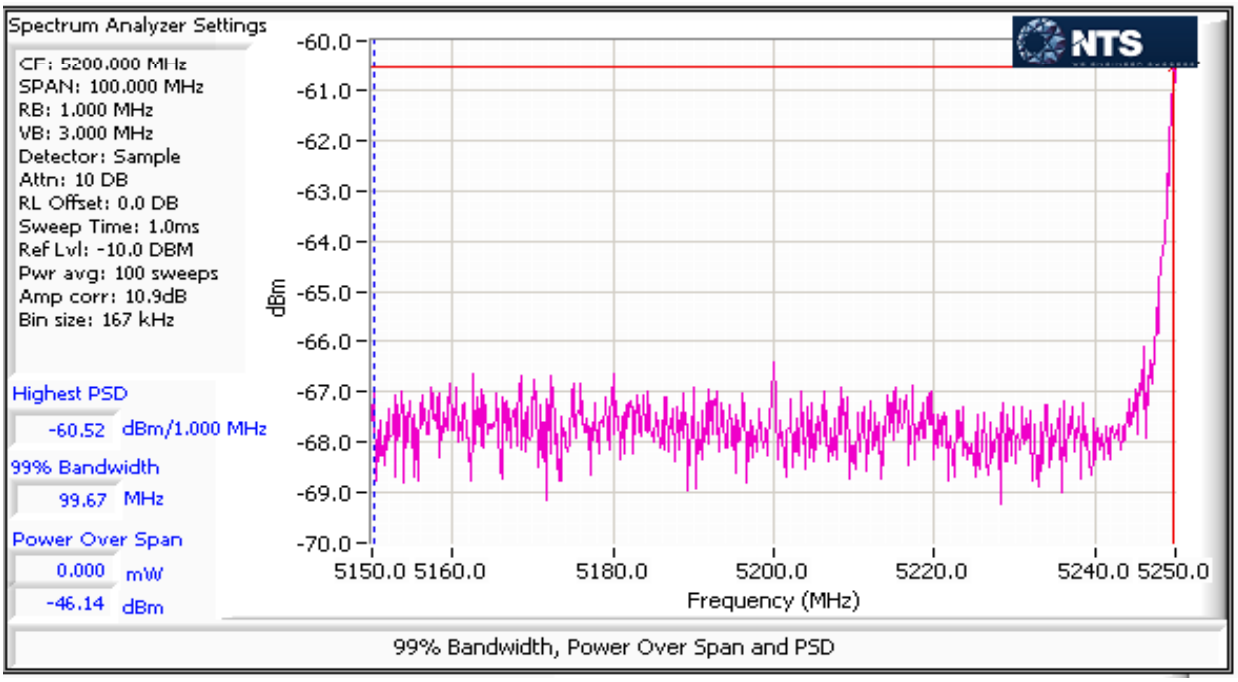
Run #3: Out Of Band Spurious Emissions - Antenna Conducted

Note 1:	Compliance with the -27dBm/MHz requirement demonstrated via radiated measurements, except at the 5250MHz bandedge.
Note 4:	If the device is for outdoor use then the -27dBm eirp limit also applies in the 5150 - 5250 MHz band.

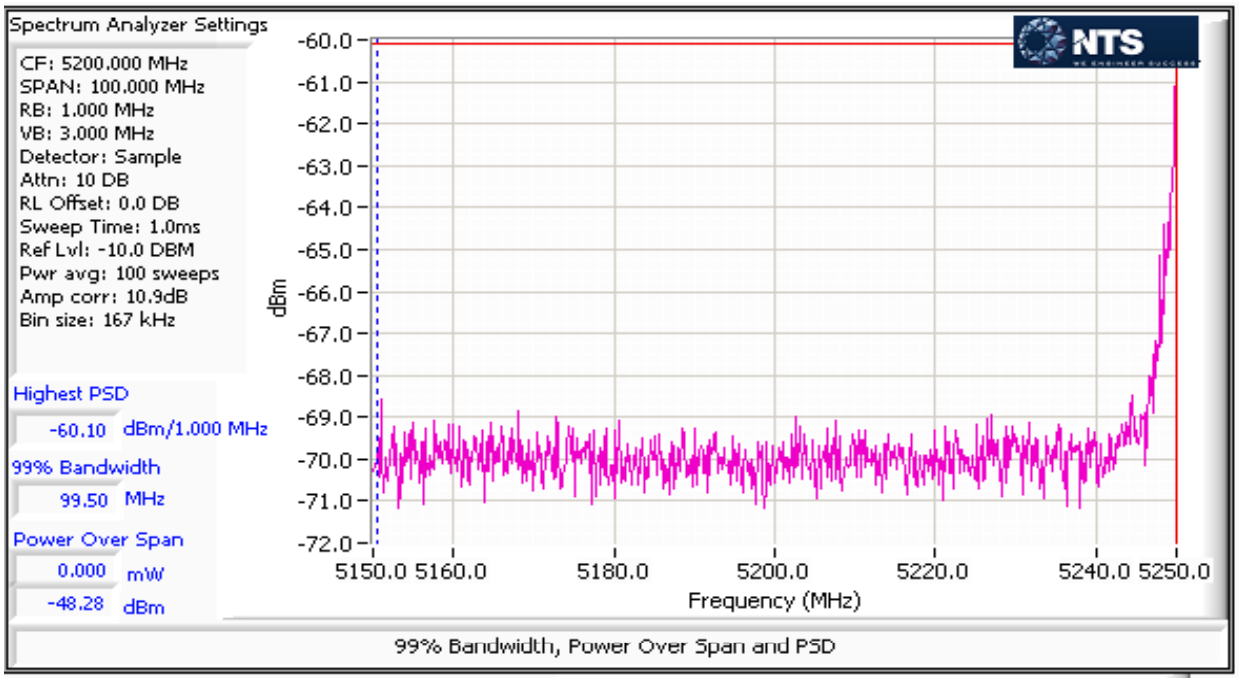
Low channel, 5250 - 5350 MHz Band Edge @ 5250 MHz for devices operating 5250-5350MHz only

Plots for each chain showing compliance with the -27dBm/MHz limit in the 5150 - 5250 MHz band. Start and stop frequencies set to 5150-5250 MHz, RB=1MHz, VB=3MHz, power averaging enabled (100 traces):

	Power Setting	Band edge Level dBm/MHz	Band edge Level mW/MHz	Antenna Gain (dBi)	EIRP mW/MHz	EIRP dBm/MHz	Total EIRP dBm/MHz	Limit dBm/MHz	Result
Chain 1	5.0	-60.5	0.00000	30.0	0.0008872	-30.5	-27.3	-27	PASS
Chain 2		-60.1	0.00000	30.0	0.0009772	-30.1			



Client:	Ubiquiti Networks	Job Number:	J86352
Model:	RocketM5 Titanium	T-Log Number:	T88756
		Account Manager:	Michelle Kim
Contact:	Jennifer Sanchez		
Standard:	FCC 15.E/RSS-210	Class:	N/A



End of Report

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