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EMC Test Report

Application for Grant of Equipment Authorization

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

Model: RocketM5 Titanium

IC CERTIFICATION #:	6545A-RM5T
FCC ID:	SWX-RM5T
APPLICANT:	Ubiquiti Networks 91 E. Tasman Drive San Jose, CA 95134
TEST SITE(S):	NTS Silicon Valley 41039 Boyce Road. Fremont, CA. 94538-2435
IC SITE REGISTRATION #:	2845B-3; 2845B-4, 2845B-5, 2845B-7
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REVISION HISTORY

Rev#	Date	Comments	Modified By
-	08-27-2012	First release	
1	09-06-2012	Reissued to correct output power limit	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 C

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

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

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

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

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

OBJECTIVE

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

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

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

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

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

STATEMENT OF COMPLIANCE

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

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

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

The test results recorded herein are based on a single type test of 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

DIGITAL TRANSMISSION SYSTEMS (5725 –5850 MHz)

FCC Rule Part	RSS Rule Part	Description	Measured Value / Comments	Limit / Requirement	Result
15.247(a)	RSS 210 A8.2	Digital Modulation	Systems uses OFDM techniques	System must utilize a digital transmission technology	Complies
15.247 (a) (2)	RSS 210 A8.2 (1)	6dB Bandwidth	802.11a: 16.3 MHz HT20: 17.6 MHz HT40: 35.8 MHz HT10: 8.2 MHz	>500kHz	Complies
15.247 (b)	RSS 210 A8.2 (4)	Output Power (point-to-point systems) Sector Antenna	802.11a: 28.5 dBm HT20: 28.3 dBm HT40: 28.0 dBm HT10: 28.7 dBm (0.737 Watts) EIRP = 49.7 dBm[Note 1]	1Watt	Complies
15.247 (b)	RSS 210 A8.2 (4)	Output Power (point-to-point systems) Dish Antenna	802.11a: 28.5 dBm HT20: 27.7 dBm HT40: 28.0 dBm HT10: 28.1 dBm (0.70 Watts) EIRP = 58.5 dBm[Note 1]	1Watt.	Complies
15.247(d)	RSS 210 A8.2 (2)	Power Spectral Density	802.11a: 1.4 dBm/3kHz HT20: -1.7 dBm/3kHz HT40: -4.4 dBm/3kHz HT10: 1.0 dBm/3kHz	Maximum permitted is 8dBm/3kHz	Complies
15.247(c)	RSS 210 A8.5	Antenna Port Spurious Emissions – 30MHz – 40 GHz	All spurious emissions < -20dBc	< -20dBc	Complies
15.247(c) / 15.209	RSS 210 A8.5 Table 2, 3	Radiated Spurious Emissions 30MHz – 40 GHz Sector Antenna	42.6 dBµV/m @ 2340.0 MHz (-11.4 dB)	15.207 in restricted bands, all others < -20dBc	Complies
15.247(c) / 15.209	RSS 210 A8.5 Table 2, 3	Radiated Spurious Emissions 30MHz – 40 GHz Dish Antenna	53.9 dBµV/m @ 11577.8 MHz (-0.1 dB)	15.207 in restricted bands, all others < -20dBc	Complies
Note 1: EIRP calculated using antenna gain of 21 dBi for the sector antenna and 30dBi for the dish antenna for the for the highest EIRP point-to-point system.					

GENERAL REQUIREMENTS APPLICABLE TO ALL BANDS

FCC Rule Part	RSS Rule part	Description	Measured Value / Comments	Limit / Requirement	Result (margin)
15.203	-	RF Connector	EUT uses reverse SMA connectors	Unique or integral antenna required	Complies
15.207	RSS GEN Table 2	AC Conducted Emissions	53.7 dBµV @ 4.864 MHz (-6.3 dB)	Refer to page 19	Complies
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	802.11a: 20.17 MHz HT20: 19.30 MHz HT40: 38.10 MHz HT10: 9.75 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 February 22, 2012 and tested on February 22, July 12, 17, 18, 19, 20, 24 and 25, 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
Ubiquiti	Rocket dish	30 dBi dish antenna	-	-
Ubiquiti	Rocket Sector	20 dBi dish antenna	-	-

OTHER EUT DETAILS

The following EUT details should be noted: the EUT contains a GPS receiver, but this has already been tested.

ANTENNA SYSTEM

The EUT antenna is a 30 dBi dish. A sector antenna can also be used, which has a gain of 21 dBi @ 60 degrees, 20 dBi @ 90 degrees and 19 dBi @ 120 degrees

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

The following equipment was used as local support equipment for testing:

Configuration #1

Company	Model	Description	Serial Number	FCC ID
None	-	-	-	-

Configuration #2

Company	Model	Description	Serial Number	FCC ID
Ubiquiti	-	GPS antenna	-	-

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

Configuration #1

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

Configuration #2

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:

Configuration #1

Port		Cable(s)		
From	To	Description	Shielded/Unshielded	Length(m)
Chain 0	Dish antenna	Coax	Shielded	-
Chain 1	Dish antenna	Coax	Shielded	-
Ethernet main	PoE port (injector)	Cat 6	Shielded	10
LAN (PoE injector)	Ethernet (laptop)	Cat 5	Unshielded	1

Configuration #2

Port		Cable(s)		
From	To	Description	Shielded/Unshielded	Length(m)
Chain 0	Dish antenna	Coax	Shielded	-
Chain 1	Dish antenna	Coax	Shielded	-
GPS	GPS antenna	Coax	Shielded	1
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.

TEST SITE

GENERAL INFORMATION

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

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

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

CONDUCTED EMISSIONS CONSIDERATIONS

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

RADIATED EMISSIONS CONSIDERATIONS

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

MEASUREMENT INSTRUMENTATION

RECEIVER SYSTEM

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

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

INSTRUMENT CONTROL COMPUTER

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

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

LINE IMPEDANCE STABILIZATION NETWORK (LISN)

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

FILTERS/ATTENUATORS

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

ANTENNAS

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

ANTENNA MAST AND EQUIPMENT TURNTABLE

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

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

INSTRUMENT CALIBRATION

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

TEST PROCEDURES

EUT AND CABLE PLACEMENT

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

CONDUCTED EMISSIONS

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

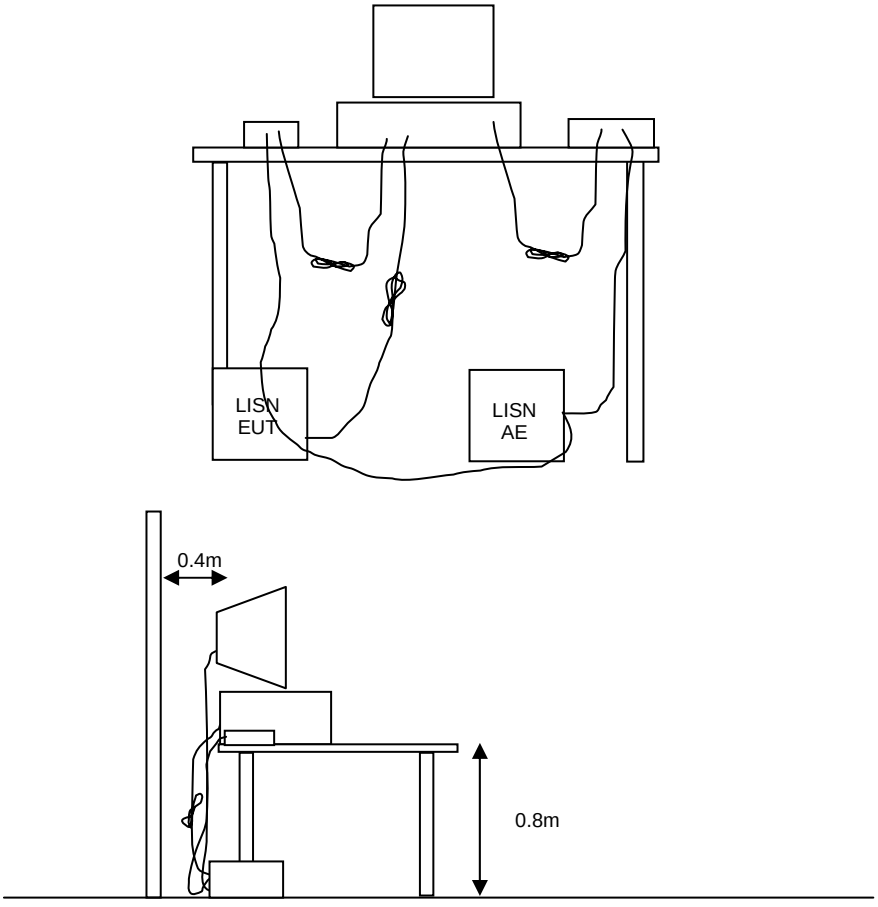


Figure 1 Typical Conducted Emissions Test Configuration

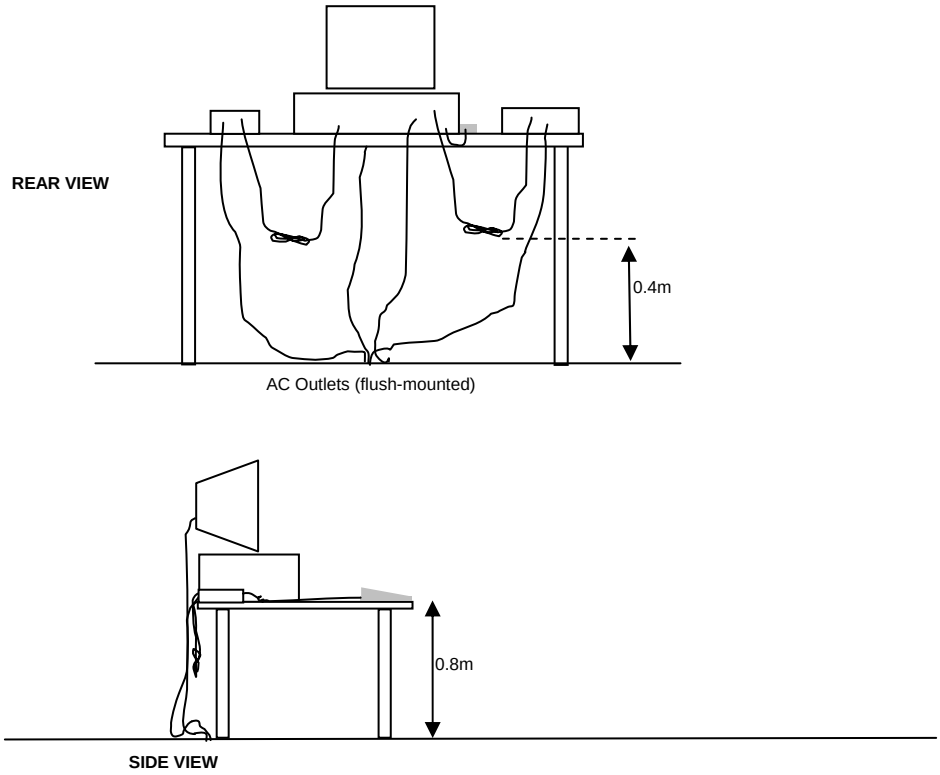
RADIATED EMISSIONS

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

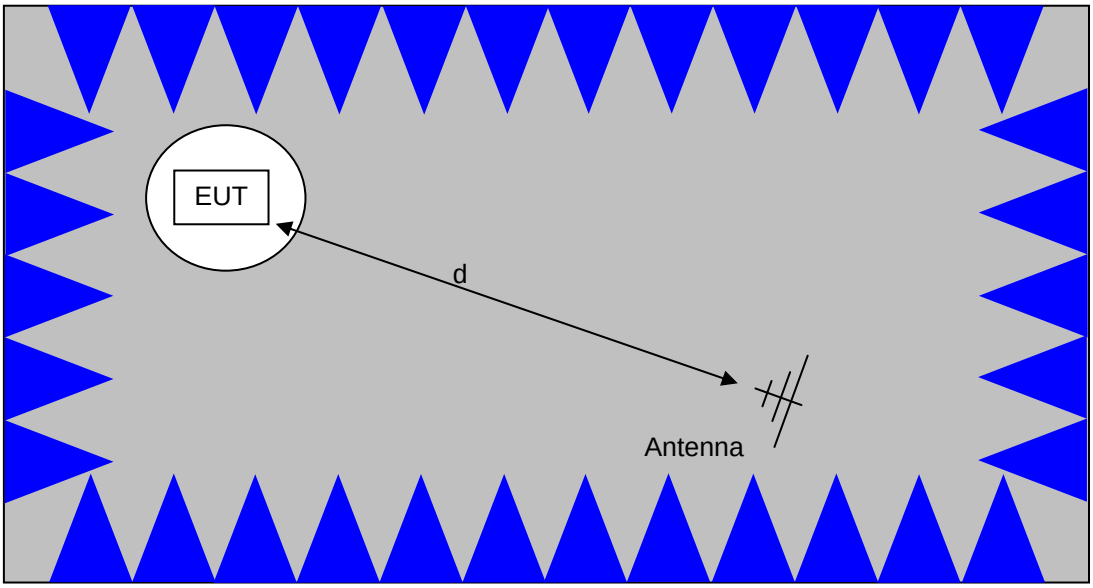
A speaker is provided in the receiver to aid in discriminating between EUT and ambient emissions. Other methods used during the preliminary scan for EUT emissions involve scanning with near field magnetic loops, monitoring I/O cables with RF current clamps, and cycling power to the EUT.

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

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

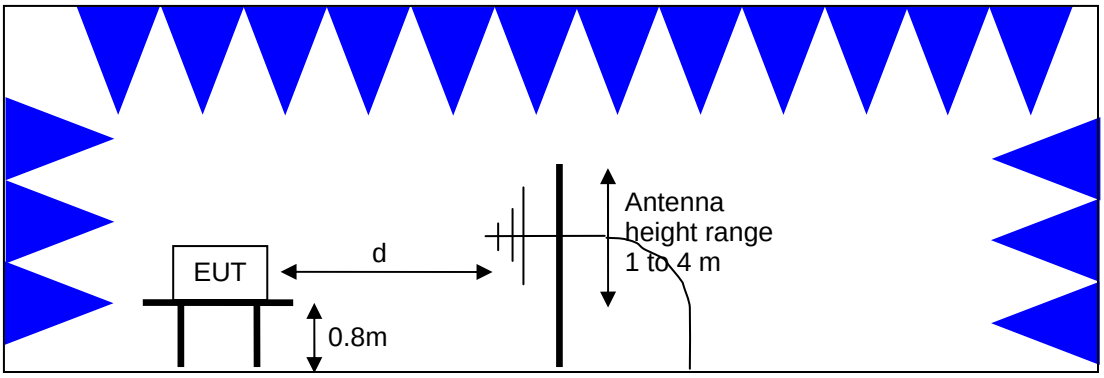


Typical Test Configuration for Radiated Field Strength Measurements



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

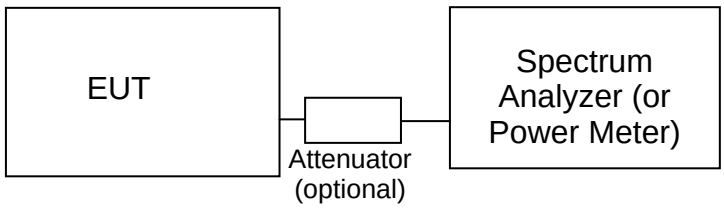
Floor-standing equipment is placed on the floor with insulating supports between the unit and the ground plane.



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

CONDUCTED EMISSIONS FROM ANTENNA PORT

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



Test Configuration for Antenna Port Measurements

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

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

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

BANDWIDTH MEASUREMENTS

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

SPECIFICATION LIMITS AND SAMPLE CALCULATIONS

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

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

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

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

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

GENERAL TRANSMITTER RADIATED EMISSIONS SPECIFICATION LIMITS

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

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

RECEIVER RADIATED SPURIOUS EMISSIONS SPECIFICATION LIMITS

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

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

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

OUTPUT POWER LIMITS – DIGITAL TRANSMISSION SYSTEMS

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

Operating Frequency (MHz)	Output Power	Power Spectral Density
902 – 928	1 Watt (30 dBm)	8 dBm/3kHz
2400 – 2483.5	1 Watt (30 dBm)	8 dBm/3kHz
5725 – 5850	1 Watt (30 dBm)	8 dBm/3kHz

The maximum permitted output power is reduced by 1dB for every dB the antenna gain exceeds 6dBi. Fixed point-to-point applications using the 5725 – 5850 MHz band are not subject to this restriction.

TRANSMIT MODE SPURIOUS RADIATED EMISSIONS LIMITS – FHSS and DTS SYSTEMS

The limits for unwanted (spurious) emissions from the transmitter falling in the restricted bands are those specified in the general limits sections of FCC Part 15 and RSS 210. All other unwanted (spurious) emissions shall be at least 20dB below the level of the highest in-band signal level (30dB if the power is measured using the sample detector/power averaging method).

SAMPLE CALCULATIONS - CONDUCTED EMISSIONS

Receiver readings are compared directly to the conducted emissions specification limit (decibel form) as follows:

$$R_r - S = M$$

where:

R_r = Receiver Reading in dBuV

S = Specification Limit in dBuV

M = Margin to Specification in +/- dB

SAMPLE CALCULATIONS - RADIATED EMISSIONS

Receiver readings are compared directly to the specification limit (decibel form). The receiver internally corrects for cable loss, preamplifier gain, and antenna factor. The calculations are in the reverse direction of the actual signal flow, thus cable loss is added and the amplifier gain is subtracted. The Antenna Factor converts the voltage at the antenna coaxial connector to the field strength at the antenna elements.

A distance factor, when used for electric field measurements above 30MHz, is calculated by using the following formula:

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

where:

F_d = Distance Factor in dB

D_m = Measurement Distance in meters

D_s = Specification Distance in meters

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

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

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

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

$$R_c = R_r + F_d$$

and

$$M = R_c - L_s$$

where:

R_r = Receiver Reading in dBuV/m

F_d = Distance Factor in dB

R_c = Corrected Reading in dBuV/m

L_s = Specification Limit in dBuV/m

M = Margin in dB Relative to Spec

SAMPLE CALCULATIONS - FIELD STRENGTH TO EIRP CONVERSION

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

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

where P is the eirp (Watts)

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

Appendix A Test Equipment Calibration Data

Manufacturer	Description	Model	Asset #	Cal Due
Conducted Emissions - AC Power Ports, 22-Feb-12				
Rohde & Schwarz	Pulse Limiter	ESH3 Z2	1594	5/17/2012
Rohde & Schwarz	EMI Test Receiver, 20 Hz-7 GHz	ESIB7	1630	4/13/2012
Fischer Custom Comm	LISN, 25A, 150kHz to 30MHz, 25 Amp,	FCC-LISN-50-25-2-09	2001	9/15/2012
Radiated Emissions, 1,000 - 12,000 MHz, 12-Jul-12				
EMCO	Antenna, Horn, 1-18 GHz (SA40-Red)	3115	1142	8/2/2012
Hewlett Packard	SpecAn 30 Hz -40 GHz, SV (SA40) Red	8564E (84125C)	1148	8/15/2012
Hewlett Packard	Microwave Preamplifier, 1-26.5GHz	8449B	1780	11/22/2012
Micro-Tronics	Band Reject Filter, 5725-5875 MHz	BRC50705-02	2241	10/4/2012
Rohde & Schwarz	EMI Test Receiver, 20 Hz-40 GHz	ESIB40 (1088.7490.40)	2493	12/9/2012
Radiated Emissions, 1,000 - 40,000 MHz, 17,18,19-Jul-12				
Hewlett Packard	Microwave Preamplifier, 1-26.5GHz	8449B	263	3/29/2013
EMCO	Antenna, Horn, 1-18 GHz (SA40-Blu)	3115	1386	9/21/2012
Hewlett Packard	SpecAn 9 kHz - 40 GHz, FT (SA40) Blue	8564E (84125C)	1393	5/1/2013
Micro-Tronics	Band Reject Filter, 5725-5875 MHz	BRC50705-02	1682	3/23/2013
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
Hewlett Packard	SpecAn 9 kHz - 40 GHz, (SA40) Purple	8564E (84125C)	2415	7/28/2012
Radio Antenna Port , 20-Jul-12				
Agilent	PSA, Spectrum Analyzer, (installed options, 111, 115, 123, 1DS, B7J, HYX,	E4446A	2139	2/23/2013
Radio Antenna Port, 24-Jul-12				
Rohde & Schwarz	Power Meter, Single Channel	NRVS	1422	12/13/2012
Rohde & Schwarz	Power Sensor 100 uW - 2 Watts (w/ 20 dB pad, SN BJ5155)	NRV-Z32	1536	12/8/2012
Anritsu	Anritsu 68347C Signal Generator, 10MHz-20GHz	68347C	1785	6/29/2013
Agilent	PSA, Spectrum Analyzer, (installed options, 111, 115, 123, 1DS, B7J, HYX,	E4446A	2139	2/23/2013
Radio Antenna Port , 25-Jul-12				
Agilent	PSA, Spectrum Analyzer, (installed options, 111, 115, 123, 1DS, B7J, HYX,	E4446A	2139	2/23/2013
Anritsu	Anritsu 68347C Signal Generator, 10MHz-20GHz	68347C	1785	6/29/2013

Appendix B Test Data

T88118 Pages 26 - 90

Client:	Ubiquiti Networks	Job Number:	J86352
Model:	Rocket M5 Titanium	T-Log Number:	T88118
		Account Manager:	Susan Pelzl
Contact:	Jennifer Sanchez		-
Emissions Standard(s):	FCC 15.247, RSS-210, RSS-310, FCC 15B	Class:	-
Immunity Standard(s):	-	Environment:	-

EMC Test Data

For The

Ubiquiti Networks

Model

Rocket M5 Titanium

Date of Last Test: 8/17/2012

Client:	Ubiquiti Networks	Job Number:	J86352
Model:	Rocket M5 Titanium	T-Log Number:	T88118
		Account Manager:	Susan Pelzl
Contact:	Jennifer Sanchez		
Standard:	FCC 15.247, RSS-210, RSS-310, FCC 15B	Class:	N/A

RSS 210 and FCC 15.247 (DTS) Antenna Port Measurements
MIMO and Smart Antenna Systems
Power, PSD, Bandwidth and Spurious Emissions

Test Specific Details

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

Date of Test: 7/20/2012, 7/24/2012, 7/25/2012
Test Engineer: Rafael Varelas / Deniz Demirci
Test Location: FT Lab #4

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

General Test Configuration

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

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

Ambient Conditions:

Temperature:	20.4 °C
Rel. Humidity:	35 %

Client:	Ubiquiti Networks	Job Number:	J86352
Model:	Rocket M5 Titanium	T-Log Number:	T88118
		Account Manager:	Susan Pelzl
Contact:	Jennifer Sanchez		
Standard:	FCC 15.247, RSS-210, RSS-310, FCC 15B	Class:	N/A

Summary of Results

Run #	Pwr setting	Test Performed	Limit	Pass / Fail	Result / Margin
1	19	Output Power (Sector Antenna)	15.247(b)	Pass	802.11a: 28.5 dBm HT20: 28.3 dBm HT40: 28.0 dBm HT10: 28.7 dBm
2	See details below	Output Power (Dish Antenna)	15.247(b)	Pass	802.11a: 28.5 dBm HT20: 27.7 dBm HT40: 28.0 dBm HT10: 28.1 dBm
3	19	Power spectral Density (PSD)	15.247(d)	Pass	802.11a: 1.4 dBm/3kHz HT20: -1.7 dBm/3kHz HT40: -4.4 dBm/3kHz HT10: 1.0 dBm/3kHz
4	19	Minimum 6dB Bandwidth	15.247(a)	Pass	802.11a: 16.3 MHz HT20: 17.6 MHz HT40: 35.8 MHz HT10: 8.2 MHz
5	19	99% Bandwidth	RSS GEN	Pass	802.11a: 20.17 MHz HT20: 19.30 MHz HT40: 38.10 MHz HT10: 9.75 MHz
6	19	Spurious emissions	15.247(b)	Pass	All emissions below -20dBc and -30dBc limits

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:

Antennas used are cross polarized. Point-to-point operation.
For spurious emissions, a limit of -30dBc was applied. This is a worse case limit, as the power was measured peak.

Client:	Ubiquiti Networks	Job Number:	J86352
Model:	Rocket M5 Titanium	T-Log Number:	T88118
		Account Manager:	Susan Pelzl
Contact:	Jennifer Sanchez		
Standard:	FCC 15.247, RSS-210, RSS-310, FCC 15B	Class:	N/A

Run #1: Output Power - 21dBi Sector Antenna

Operating Mode: 802.11a

Transmitted signal on chain is coherent ? No - based on cross polarized antennas

5745 MHz	Chain 1	Chain 2	Chain 3	Chain 4	Total Across All Chains		Limit	
Power Setting Note 3	19.0	19.0						
Output Power (dBm) Note 1	27.2	22.5			28.5 dBm	0.703 W	30.0 dBm	1.000 W
Antenna Gain (dBi) Note 2	21	21				21.0 dBi	Pass	
eirp (dBm) Note 2	48.2	43.5			49.5 dBm	88.457 W		

5785 MHz	Chain 1	Chain 2	Chain 3	Chain 4	Total Across All Chains		Limit	
Power Setting Note 3	19.0	19.0						
Output Power (dBm) Note 1	26.8	22			28.0 dBm	0.637 W	30.0 dBm	1.000 W
Antenna Gain (dBi) Note 2	21	21				21.0 dBi	Pass	
eirp (dBm) Note 2	47.8	43			49.0 dBm	80.209 W		

5825 MHz	Chain 1	Chain 2	Chain 3	Chain 4	Total Across All Chains		Limit	
Power Setting Note 3	19.0	19.0						
Output Power (dBm) Note 1	26.1	21.9			27.5 dBm	0.562 W	30.0 dBm	1.000 W
Antenna Gain (dBi) Note 2	21	21				21.0 dBi	Pass	
eirp (dBm) Note 2	47.1	42.9			48.5 dBm	70.785 W		

Note 1:	Output power measured using a peak power meter
Note 2:	As there is no coherency between chains the total EIRP is the sum of the individual EIRPs and effective antenna gain equals the eirp divide by the sum of the power on each chain.
Note 3:	Power setting - if a single number the same power setting was used for each chain. If multiple numbers the power setting for each chain is separated by a comma (e.g. x,y would indicate power setting x for chain 1, power setting y for chain 2.

Client:	Ubiquiti Networks	Job Number:	J86352
Model:	Rocket M5 Titanium	T-Log Number:	T88118
		Account Manager:	Susan Pelzl
Contact:	Jennifer Sanchez		
Standard:	FCC 15.247, RSS-210, RSS-310, FCC 15B	Class:	N/A

Operating Mode: HT20

5745 MHz	Chain 1	Chain 2	Chain 3	Chain 4	Total Across All Chains		Limit	
Power Setting Note 3	19.0	19.0						
Output Power (dBm) Note 1	27	22.3			28.3 dBm	0.671 W	30.0 dBm	1.000 W
Antenna Gain (dBi) Note 2	21	21				21.0 dBi	Pass	
eirp (dBm) Note 2	48	43.3			49.3 dBm	84.475 W		

5785 MHz	Chain 1	Chain 2	Chain 3	Chain 4	Total Across All Chains		Limit	
Power Setting Note 3	19.0	19.0						
Output Power (dBm) Note 1	26.3	22			27.7 dBm	0.585 W	30.0 dBm	1.000 W
Antenna Gain (dBi) Note 2	21	21				21.0 dBi	Pass	
eirp (dBm) Note 2	47.3	43			48.7 dBm	73.656 W		

5825 MHz	Chain 1	Chain 2	Chain 3	Chain 4	Total Across All Chains		Limit	
Power Setting Note 3	19.0	19.0						
Output Power (dBm) Note 1	25.8	21.9			27.3 dBm	0.535 W	30.0 dBm	1.000 W
Antenna Gain (dBi) Note 2	21	21				21.0 dBi	Pass	
eirp (dBm) Note 2	46.8	42.9			48.3 dBm	67.361 W		

Operating Mode: HT40

5755 MHz	Chain 1	Chain 2	Chain 3	Chain 4	Total Across All Chains		Limit	
Power Setting Note 3	19.0	19.0						
Output Power (dBm) Note 1	26.7	22.2			28.0 dBm	0.634 W	30.0 dBm	1.000 W
Antenna Gain (dBi) Note 2	21	21				21.0 dBi	Pass	
eirp (dBm) Note 2	47.7	43.2			49.0 dBm	79.777 W		

5795 MHz	Chain 1	Chain 2	Chain 3	Chain 4	Total Across All Chains		Limit	
Power Setting Note 3	19.0	19.0						
Output Power (dBm) Note 1	26.1	21.9			27.5 dBm	0.562 W	30.0 dBm	1.000 W
Antenna Gain (dBi) Note 2	21	21				21.0 dBi	Pass	
eirp (dBm) Note 2	47.1	42.9			48.5 dBm	70.785 W		

Client:	Ubiquiti Networks	Job Number:	J86352
Model:	Rocket M5 Titanium	T-Log Number:	T88118
		Account Manager:	Susan Pelzl
Contact:	Jennifer Sanchez		
Standard:	FCC 15.247, RSS-210, RSS-310, FCC 15B	Class:	N/A

Operating Mode: HT10

5735 MHz	Chain 1	Chain 2	Chain 3	Chain 4	Total Across All Chains		Limit	
Power Setting Note 3	19.0	19.0						
Output Power (dBm) Note 1	27.3	23			28.7 dBm	0.737 W	30.0 dBm	1.000 W
Antenna Gain (dBi) Note 2	21	21				21.0 dBi	Pass	
eirp (dBm) Note 2	48.3	44			49.7 dBm	92.727 W		

5790 MHz	Chain 1	Chain 2	Chain 3	Chain 4	Total Across All Chains		Limit	
Power Setting Note 3	19.0	19.0						
Output Power (dBm) Note 1	26.6	22.3			28.0 dBm	0.627 W	30.0 dBm	1.000 W
Antenna Gain (dBi) Note 2	21	21				21.0 dBi	Pass	
eirp (dBm) Note 2	47.6	43.3			49.0 dBm	78.924 W		

5840 MHz	Chain 1	Chain 2	Chain 3	Chain 4	Total Across All Chains		Limit	
Power Setting Note 3	19.0	19.0						
Output Power (dBm) Note 1	26.1	22.3			27.6 dBm	0.577 W	30.0 dBm	1.000 W
Antenna Gain (dBi) Note 2	21	21				21.0 dBi	Pass	
eirp (dBm) Note 2	47.1	43.3			48.6 dBm	72.666 W		

Note 1:	Output power measured using a peak power meter
Note 2:	As there is no coherency between chains the total EIRP is the sum of the individual EIRPs and effective antenna gain equals the eirp divide by the sum of the power on each chain.
Note 3:	Power setting - if a single number the same power setting was used for each chain. If multiple numbers the power setting for each chain is separated by a comma (e.g. x,y would indicate power setting x for chain 1, power setting y for chain 2.

Client:	Ubiquiti Networks	Job Number:	J86352
Model:	Rocket M5 Titanium	T-Log Number:	T88118
		Account Manager:	Susan Pelzl
Contact:	Jennifer Sanchez		
Standard:	FCC 15.247, RSS-210, RSS-310, FCC 15B	Class:	N/A

Run #2: Output Power - 30dBi Dish Antenna

Operating Mode: 802.11a

Transmitted signal on chain is coherent ? No - based on cross polarized antennas

5745 MHz	Chain 1	Chain 2	Chain 3	Chain 4	Total Across All Chains		Limit	
Power Setting Note 3	19.0	19.0						
Output Power (dBm) Note 1	27.2	22.5			28.5 dBm	0.703 W	30.0 dBm	1.000 W
Antenna Gain (dBi) Note 2	30	30				30.0 dBi	Pass	
eirp (dBm) Note 2	57.2	52.5			58.5 dBm	702.635 W		

5785 MHz	Chain 1	Chain 2	Chain 3	Chain 4	Total Across All Chains		Limit	
Power Setting Note 3	19.0	19.0						
Output Power (dBm) Note 1	26.8	22			28.0 dBm	0.637 W	30.0 dBm	1.000 W
Antenna Gain (dBi) Note 2	30	30				30.0 dBi	Pass	
eirp (dBm) Note 2	56.8	52			58.0 dBm	637.119 W		

5825 MHz	Chain 1	Chain 2	Chain 3	Chain 4	Total Across All Chains		Limit	
Power Setting Note 3	19.0	19.0						
Output Power (dBm) Note 1	26.1	21.9			27.5 dBm	0.562 W	30.0 dBm	1.000 W
Antenna Gain (dBi) Note 2	30	30				30.0 dBi	Pass	
eirp (dBm) Note 2	56.1	51.9			57.5 dBm	562.262 W		

Client:	Ubiquiti Networks	Job Number:	J86352
Model:	Rocket M5 Titanium	T-Log Number:	T88118
		Account Manager:	Susan Pelzl
Contact:	Jennifer Sanchez		
Standard:	FCC 15.247, RSS-210, RSS-310, FCC 15B	Class:	N/A

Operating Mode: HT20

5745 MHz	Chain 1	Chain 2	Chain 3	Chain 4	Total Across All Chains		Limit	
Power Setting Note 3	17.0	17.0						
Output Power (dBm) Note 1	25.5	21.6			27.0 dBm	0.499 W	30.0 dBm	1.000 W
Antenna Gain (dBi) Note 2	30	30				30.0 dBi	Pass	
eirp (dBm) Note 2	55.5	51.6			57.0 dBm	499.357 W		

5785 MHz	Chain 1	Chain 2	Chain 3	Chain 4	Total Across All Chains		Limit	
Power Setting Note 3	19.0	19.0						
Output Power (dBm) Note 1	26.3	22			27.7 dBm	0.585 W	30.0 dBm	1.000 W
Antenna Gain (dBi) Note 2	30	30				30.0 dBi	Pass	
eirp (dBm) Note 2	56.3	52			57.7 dBm	585.069 W		

5825 MHz	Chain 1	Chain 2	Chain 3	Chain 4	Total Across All Chains		Limit	
Power Setting Note 3	19.0	19.0						
Output Power (dBm) Note 1	25.8	21.9			27.3 dBm	0.535 W	30.0 dBm	1.000 W
Antenna Gain (dBi) Note 2	30	30				30.0 dBi	Pass	
eirp (dBm) Note 2	55.8	51.9			57.3 dBm	535.071 W		

Note 1:	Output power measured using a peak power meter
Note 2:	As there is no coherency between chains the total EIRP is the sum of the individual EIRPs and effective antenna gain equals the eirp divide by the sum of the power on each chain.
Note 3:	Power setting - if a single number the same power setting was used for each chain. If multiple numbers the power setting for each chain is separated by a comma (e.g. x,y would indicate power setting x for chain 1, power setting y for chain 2.

Client:	Ubiquiti Networks	Job Number:	J86352
Model:	Rocket M5 Titanium	T-Log Number:	T88118
		Account Manager:	Susan Pelzl
Contact:	Jennifer Sanchez		
Standard:	FCC 15.247, RSS-210, RSS-310, FCC 15B	Class:	N/A

Operating Mode: HT40

5755 MHz	Chain 1	Chain 2	Chain 3	Chain 4	Total Across All Chains		Limit	
Power Setting Note 3	19.0	19.0						
Output Power (dBm) Note 1	26.7	22.2			28.0 dBm	0.634 W	30.0 dBm	1.000 W
Antenna Gain (dBi) Note 2	30	30				30.0 dBi	Pass	
eirp (dBm) Note 2	56.7	52.2			58.0 dBm	633.694 W		

5795 MHz	Chain 1	Chain 2	Chain 3	Chain 4	Total Across All Chains		Limit	
Power Setting Note 3	19.0	19.0						
Output Power (dBm) Note 1	26.1	21.9			27.5 dBm	0.562 W	30.0 dBm	1.000 W
Antenna Gain (dBi) Note 2	30	30				30.0 dBi	Pass	
eirp (dBm) Note 2	56.1	51.9			57.5 dBm	562.262 W		

Note 1:	Output power measured using a peak power meter
Note 2:	As there is no coherency between chains the total EIRP is the sum of the individual EIRPs and effective antenna gain equals the eirp divide by the sum of the power on each chain.
Note 3:	Power setting - if a single number the same power setting was used for each chain. If multiple numbers the power setting for each chain is separated by a comma (e.g. x,y would indicate power setting x for chain 1, power setting y for chain 2.

Client:	Ubiquiti Networks	Job Number:	J86352
Model:	Rocket M5 Titanium	T-Log Number:	T88118
		Account Manager:	Susan Pelzl
Contact:	Jennifer Sanchez		
Standard:	FCC 15.247, RSS-210, RSS-310, FCC 15B	Class:	N/A

Operating Mode: HT10

5735 MHz	Chain 1	Chain 2	Chain 3	Chain 4	Total Across All Chains		Limit	
Power Setting Note 3	16.5	16.5						
Output Power (dBm) Note 1	26.7	22.6			28.1 dBm	0.650 W	30.0 dBm	1.000 W
Antenna Gain (dBi) Note 2	30	30				30.0 dBi	Pass	
eirp (dBm) Note 2	56.7	52.6			58.1 dBm	649.705 W		

5790 MHz	Chain 1	Chain 2	Chain 3	Chain 4	Total Across All Chains		Limit	
Power Setting Note 3	18.0	18.0						
Output Power (dBm) Note 1	26.6	22.2			27.9 dBm	0.623 W	30.0 dBm	1.000 W
Antenna Gain (dBi) Note 2	30	30				30.0 dBi	Pass	
eirp (dBm) Note 2	56.6	52.2			57.9 dBm	623.047 W		

5840 MHz	Chain 1	Chain 2	Chain 3	Chain 4	Total Across All Chains		Limit	
Power Setting Note 3	12.5	12.5						
Output Power (dBm) Note 1	24.2	20			25.6 dBm	0.363 W	30.0 dBm	1.000 W
Antenna Gain (dBi) Note 2	30	30				30.0 dBi	Pass	
eirp (dBm) Note 2	54.2	50			55.6 dBm	363.027 W		

Note 1:	Output power measured using a peak power meter
Note 2:	As there is no coherency between chains the total EIRP is the sum of the individual EIRPs and effective antenna gain equals the eirp divide by the sum of the power on each chain.
Note 3:	Power setting - if a single number the same power setting was used for each chain. If multiple numbers the power setting for each chain is separated by a comma (e.g. x,y would indicate power setting x for chain 1, power setting y for chain 2.

Client:	Ubiquiti Networks	Job Number:	J86352
Model:	Rocket M5 Titanium	T-Log Number:	T88118
		Account Manager:	Susan Pelzl
Contact:	Jennifer Sanchez		
Standard:	FCC 15.247, RSS-210, RSS-310, FCC 15B	Class:	N/A

Run #3: Power spectral Density

802.11a Mode

Power Setting	Frequency (MHz)	PSD (dBm/3kHz) Note 1					Limit dBm/3kHz	Result
		Chain 1	Chain 2	Chain 3	Chain 4	Total		
19	5751.829 / 5744.956	-4.8	-5.9			-2.3	8.0	Pass
19	5784.956 / 5784.956	-1.6	-1.6			1.4	8.0	Pass
19	5823.707 / 5824.956	-8.0	-4.3			-2.8	8.0	Pass
HT20 Mode								
19	5739.957 / 5748.360	-4.3	-8.1			-2.8	8.0	Pass
19	5784.957 / 5788.077	-2.7	-8.9			-1.7	8.0	Pass
19	5819.649 / 5824.957	-7.8	-3.9			-2.4	8.0	Pass
HT40 Mode								
19	5748.082 / 5754.956	-8.0	-6.9			-4.4	8.0	Pass
19	5789.955 / 5781.207	-9.0	-9.2			-6.1	8.0	Pass
HT10								
19	5737.452 / 5734.952	-1.4	-2.8			1.0	8.0	Pass
19	5787.452 / 5789.954	-3.6	-2.6			0.0	8.0	Pass
19	5837.017 / 5840.579	-5.7	-5.9			-2.8	8.0	Pass

Note 1:	Power spectral density measured using RB=3 kHz, VB=10kHz, analyzer with peak detector and with a sweep time set to ensure a dwell time of at least 1 second per 3kHz. The measurement is made at the frequency of PPSD determined from preliminary scans using RB=3kHz using multiple sweeps at a faster rate over the 6dB bandwidth of the signal.

Client:	Ubiquiti Networks	Job Number:	J86352
Model:	Rocket M5 Titanium	T-Log Number:	T88118
		Account Manager:	Susan Pelzl
Contact:	Jennifer Sanchez		
Standard:	FCC 15.247, RSS-210, RSS-310, FCC 15B	Class:	N/A

Run #3: Signal Bandwidth

802.11a Mode

Power Setting	Frequency (MHz)	Resolution Bandwidth	Bandwidth (MHz) 6dB	99%
19	5745	100kHz	16.3	19.97
19	5785	100kHz	16.3	20.17
19	5825	100kHz	16.4	19.70

HT20 Mode

Power Setting	Frequency (MHz)	Resolution Bandwidth	Bandwidth (MHz) 6dB	99%
19	5745	100kHz	17.6	19.30
19	5785	100kHz	17.6	19.04
19	5825	100kHz	17.6	18.97

HT40 Mode

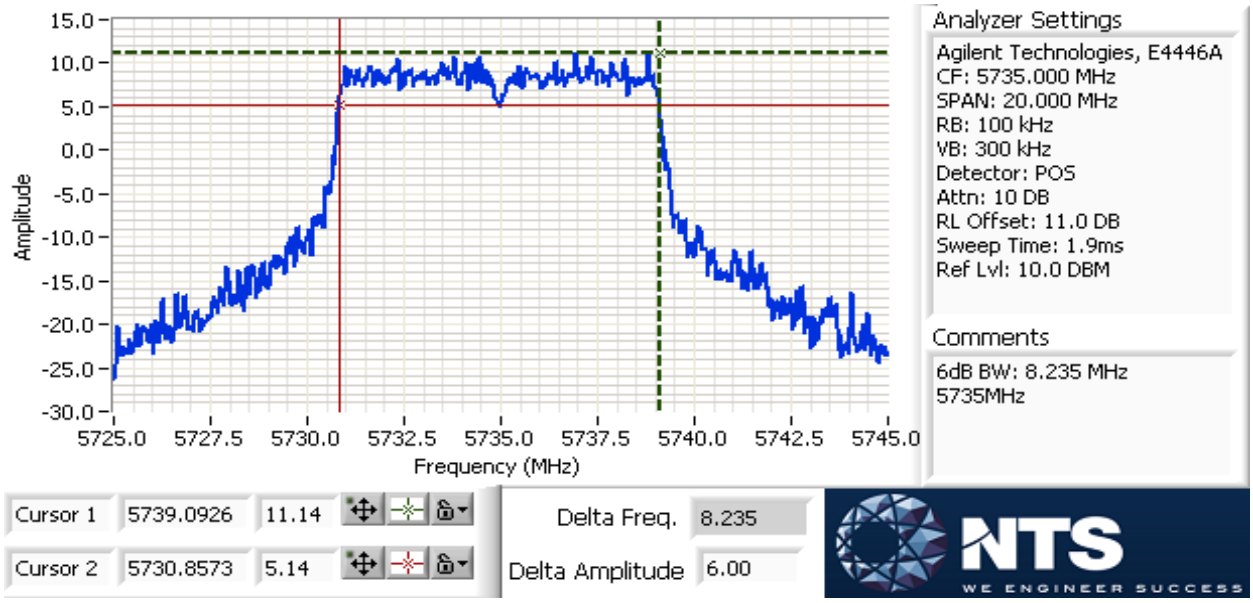
Power Setting	Frequency (MHz)	Resolution Bandwidth	Bandwidth (MHz) 6dB	99%
19	5755	100kHz	36	38.10
19	5795	100kHz	35.8	37.90

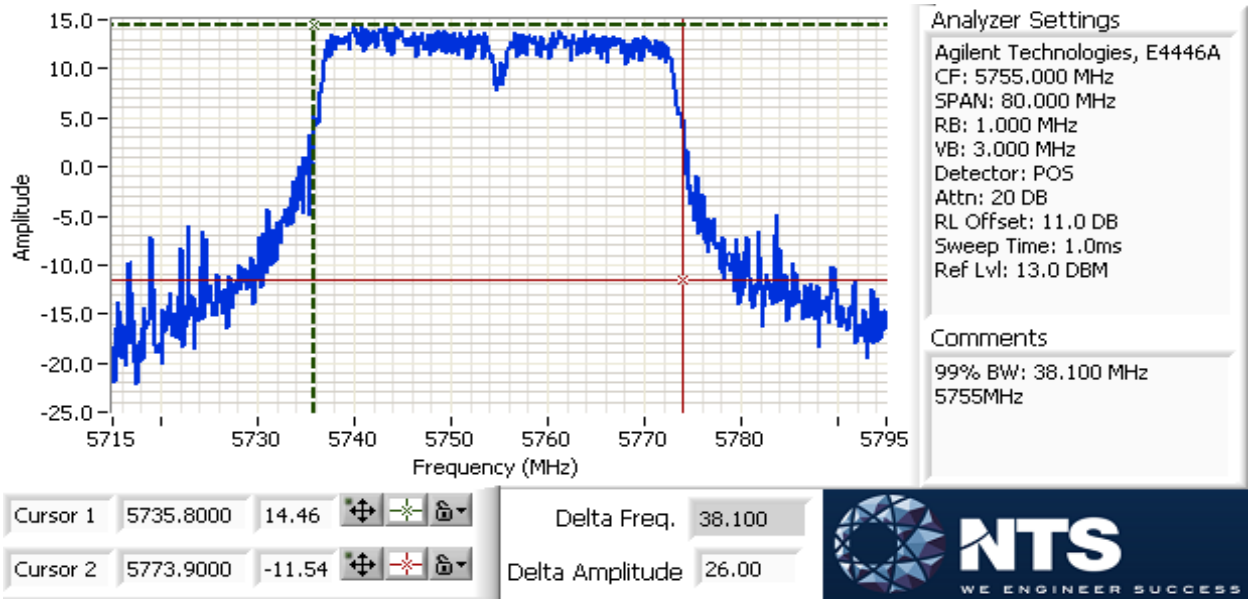
HT10 Mode

Power Setting	Frequency (MHz)	Resolution Bandwidth	Bandwidth (MHz) 6dB	99%
19	5735	100kHz	8.2	9.65
19	5790	100kHz	8.3	9.75
19	5840	100kHz	8.2	9.65

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

Client:	Ubiquiti Networks	Job Number:	J86352
Model:	Rocket M5 Titanium	T-Log Number:	T88118
		Account Manager:	Susan Pelzl
Contact:	Jennifer Sanchez		
Standard:	FCC 15.247, RSS-210, RSS-310, FCC 15B	Class:	N/A





Client:	Ubiquiti Networks	Job Number:	J86352
Model:	Rocket M5 Titanium	T-Log Number:	T88118
		Account Manager:	Susan Pelzl
Contact:	Jennifer Sanchez		
Standard:	FCC 15.247, RSS-210, RSS-310, FCC 15B	Class:	N/A

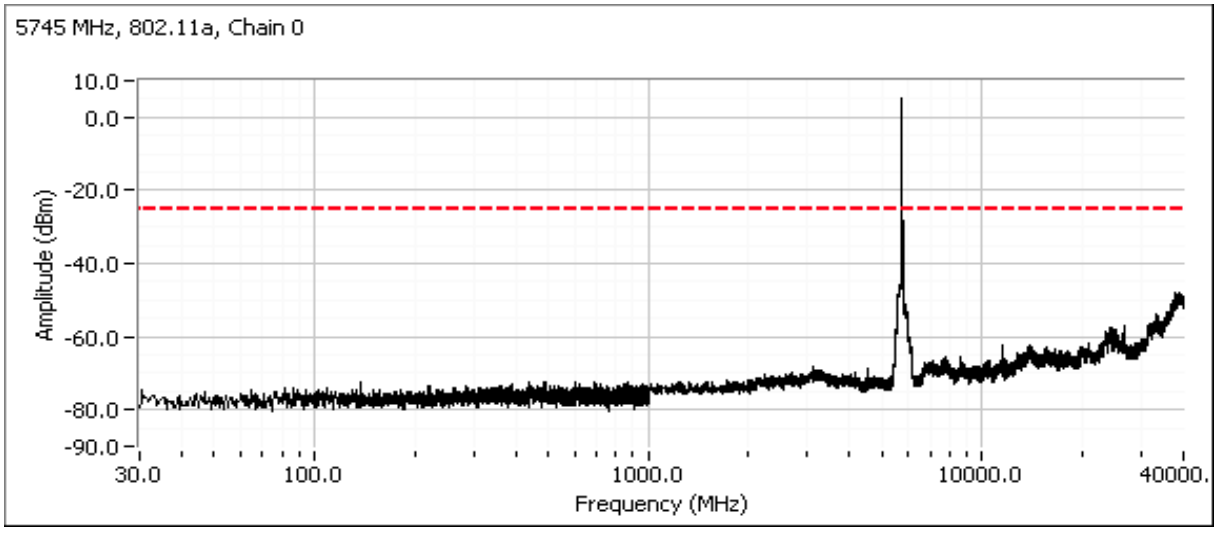
Run #4: Out of Band Spurious Emissions

Power Setting Per Chain				Frequency (MHz)	Limit	Result
#1	#2	#3	#4			
19	19			5745 (802.11a)	-30dBc	Pass
19	19			5785 (802.11a)	-30dBc	Pass
19	19			5825 (802.11a)	-30dBc	Pass
19	19			5745 (HT20)	-30dBc	Pass
19	19			5785 (HT20)	-30dBc	Pass
19	19			5825 (HT20)	-30dBc	Pass
19	19			5755 (HT40)	-20dBc	Pass
19	19			5795 (HT40)	-20dBc	Pass
19	19			5735 (HT10)	-30dBc	Pass
19	19			5790 (HT10)	-30dBc	Pass
19	19			5840 (HT10)	-30dBc	Pass

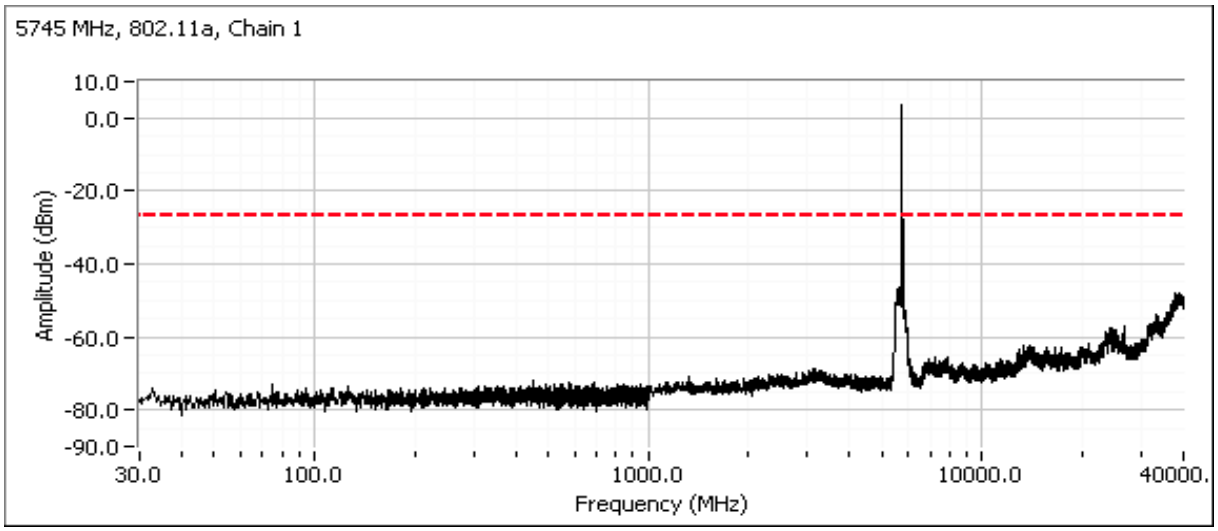
Note 1:	Measured on each chain individually

Plots for low channel

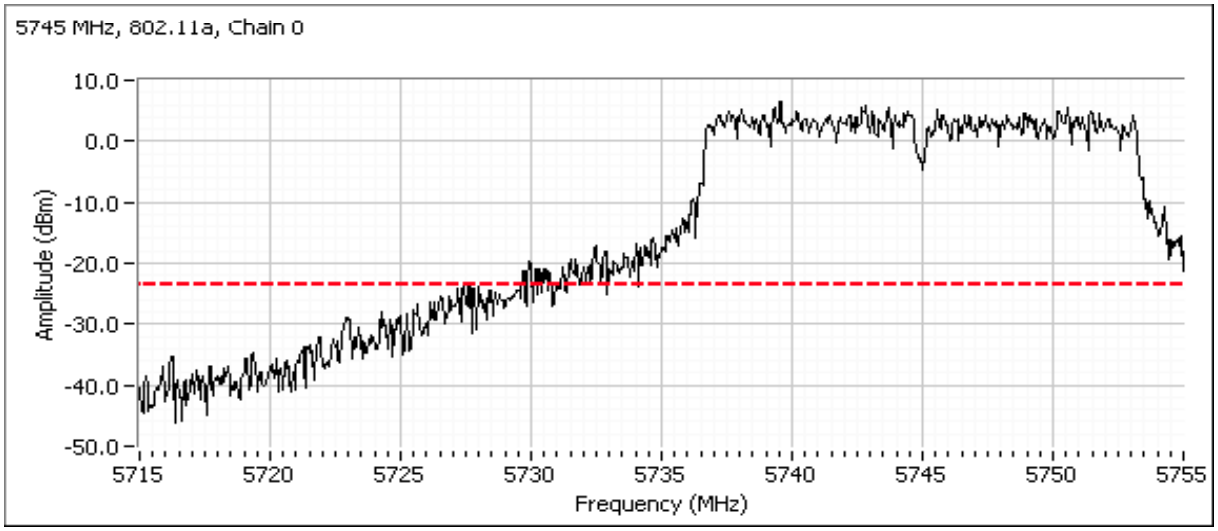
802.11a



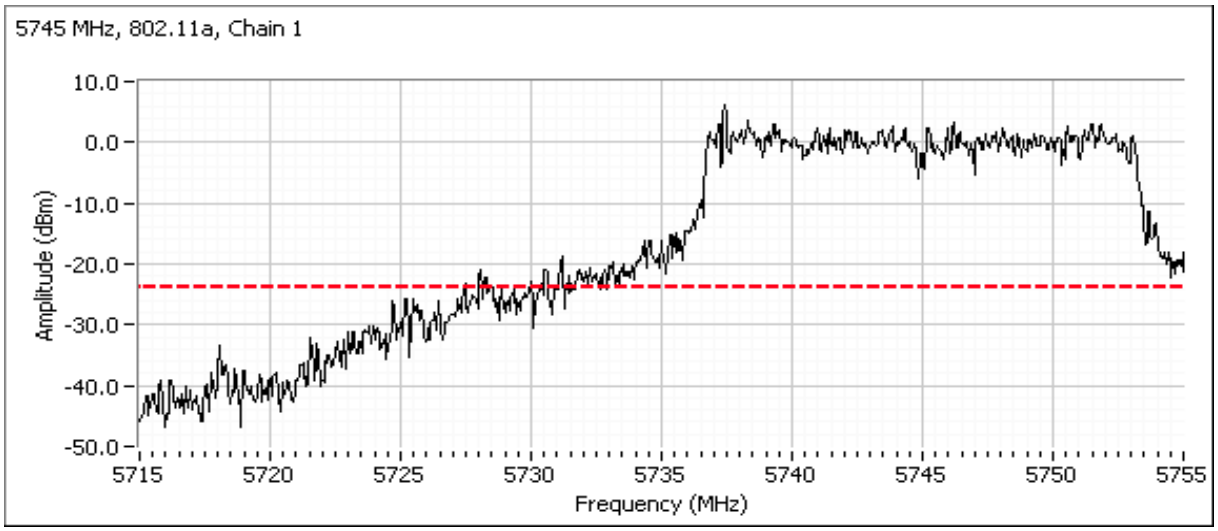
Client:	Ubiquiti Networks	Job Number:	J86352
Model:	Rocket M5 Titanium	T-Log Number:	T88118
		Account Manager:	Susan Pelzl
Contact:	Jennifer Sanchez		
Standard:	FCC 15.247, RSS-210, RSS-310, FCC 15B	Class:	N/A



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

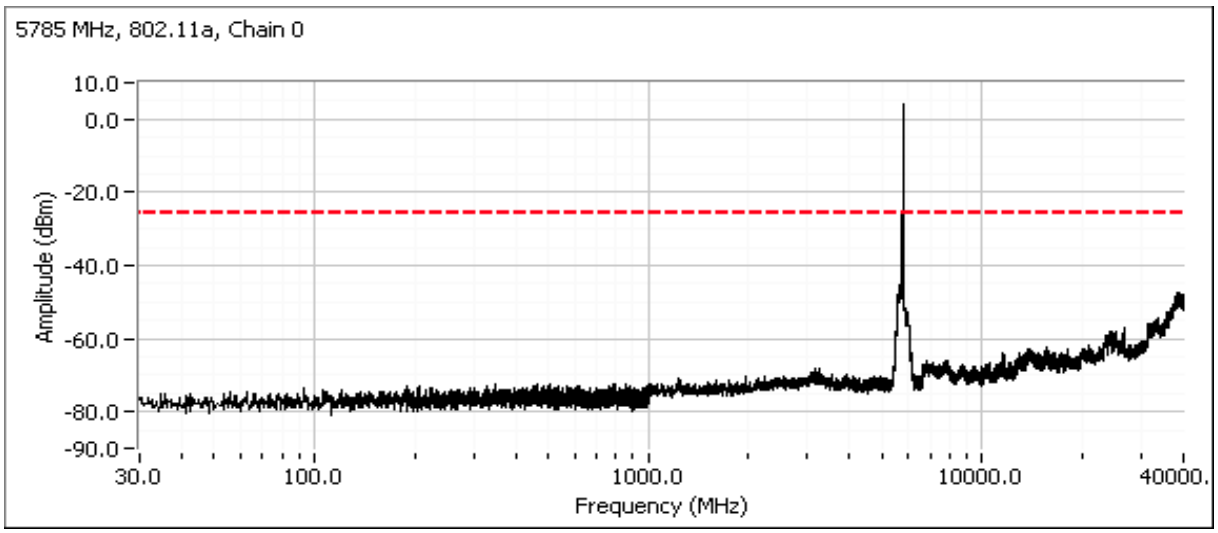


Client:	Ubiquiti Networks	Job Number:	J86352
Model:	Rocket M5 Titanium	T-Log Number:	T88118
		Account Manager:	Susan Pelzl
Contact:	Jennifer Sanchez		
Standard:	FCC 15.247, RSS-210, RSS-310, FCC 15B	Class:	N/A

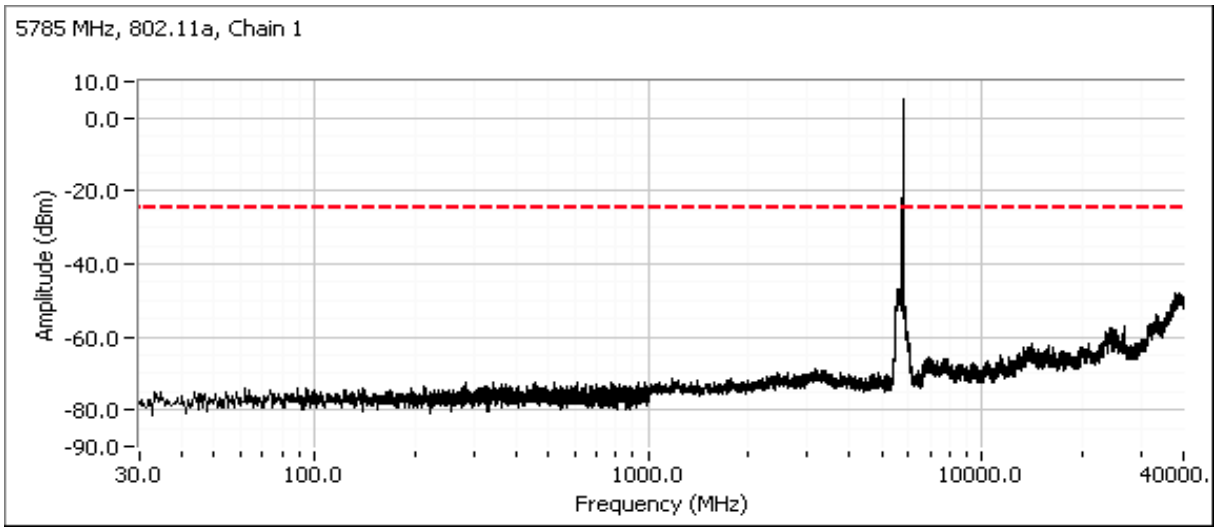


Plots for center channel

802.11a

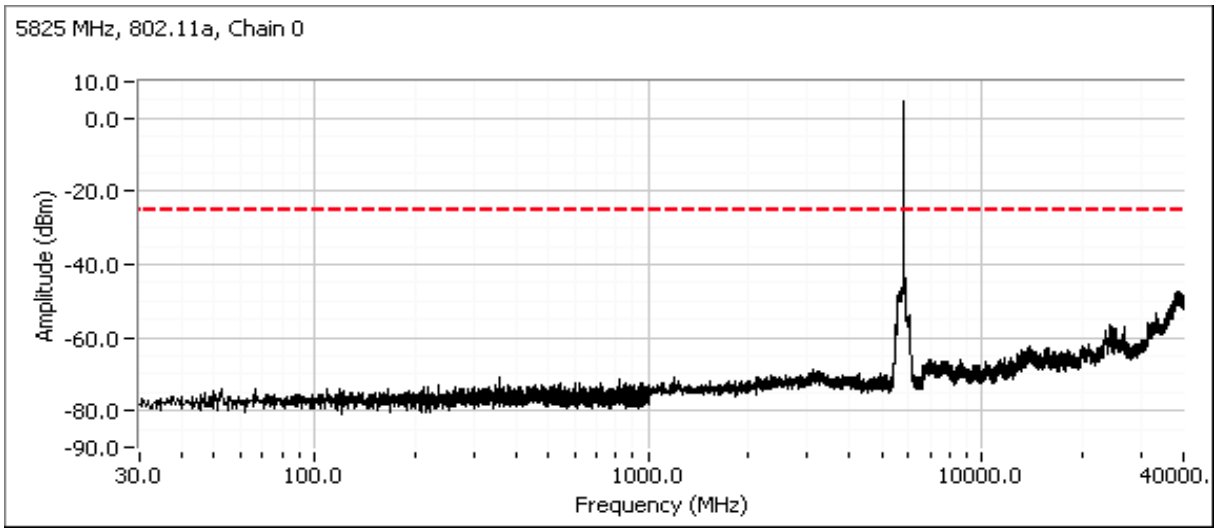


Client:	Ubiquiti Networks	Job Number:	J86352
Model:	Rocket M5 Titanium	T-Log Number:	T88118
		Account Manager:	Susan Pelzl
Contact:	Jennifer Sanchez		
Standard:	FCC 15.247, RSS-210, RSS-310, FCC 15B	Class:	N/A

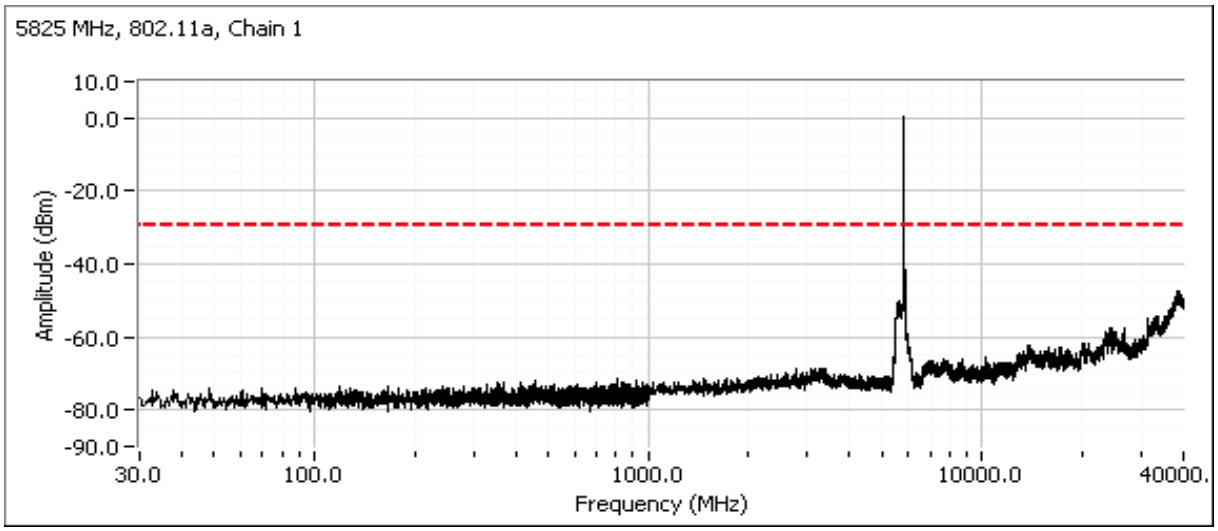


Plots for high channel

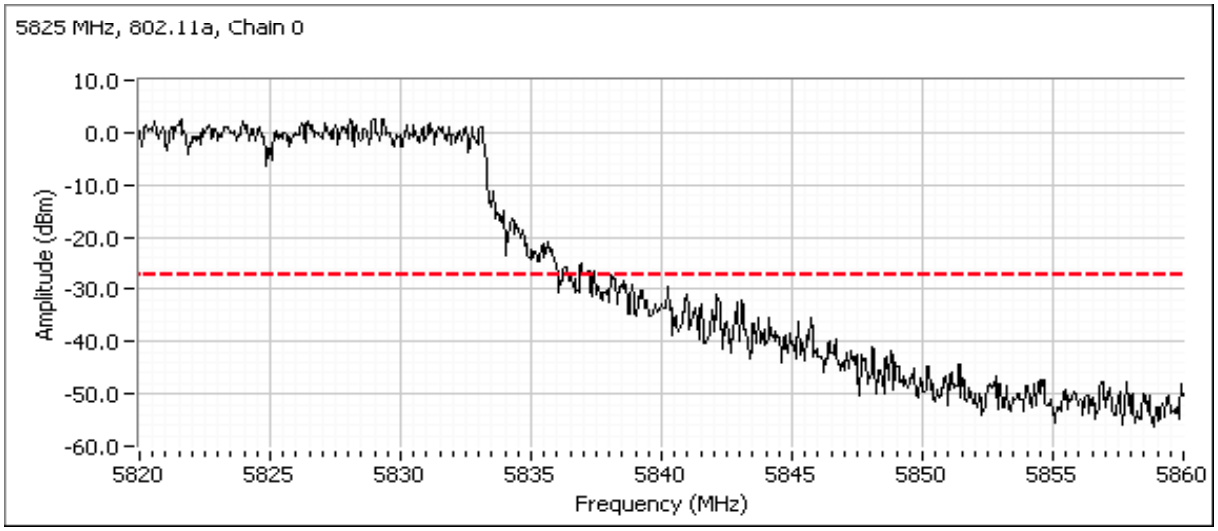
802.11a



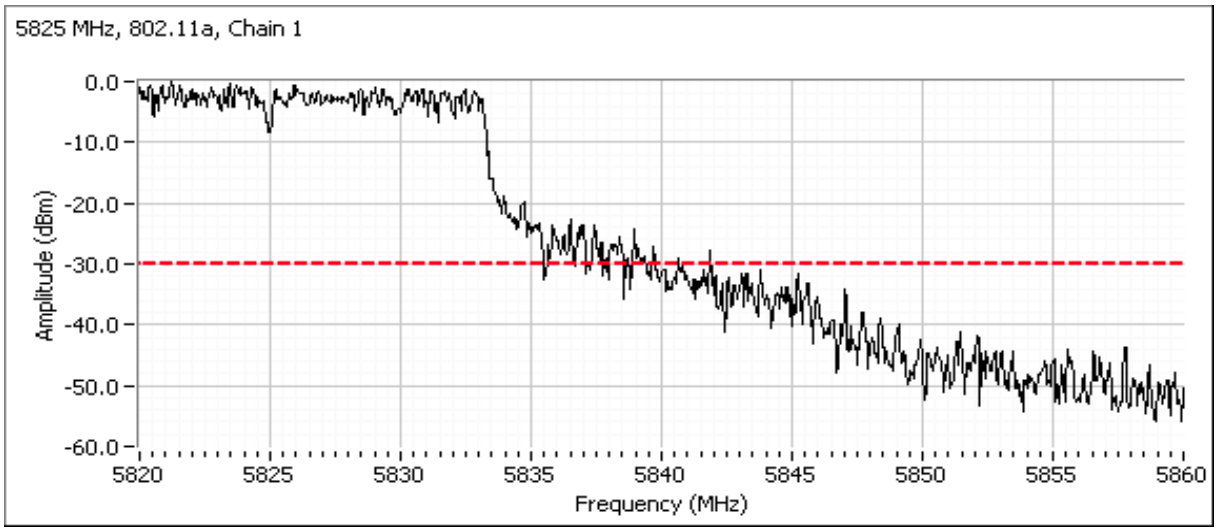
Client:	Ubiquiti Networks	Job Number:	J86352
Model:	Rocket M5 Titanium	T-Log Number:	T88118
		Account Manager:	Susan Pelzl
Contact:	Jennifer Sanchez		
Standard:	FCC 15.247, RSS-210, RSS-310, FCC 15B	Class:	N/A



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

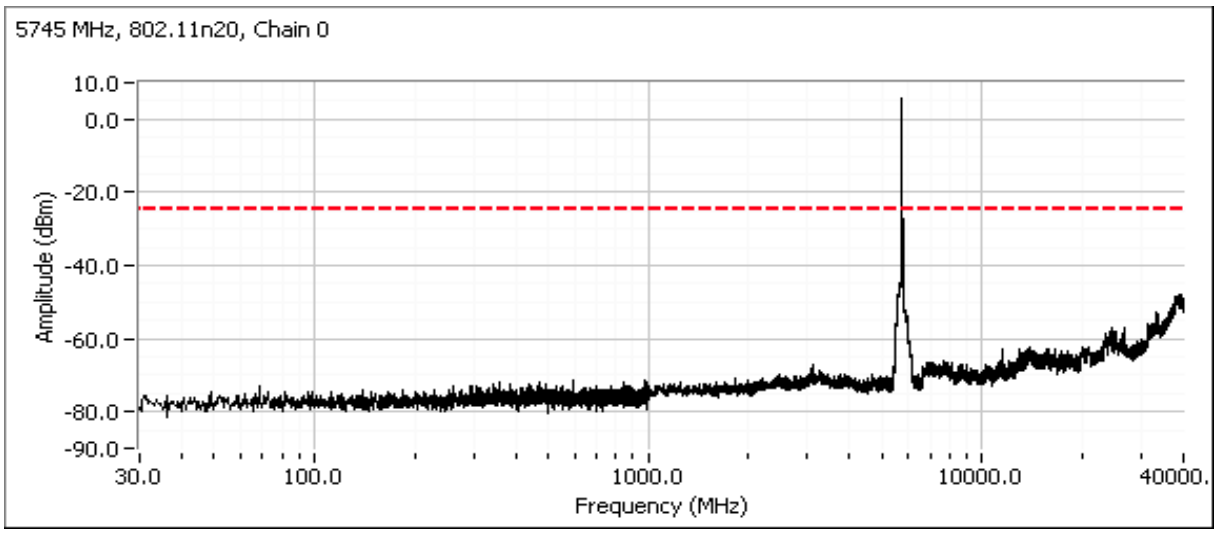


Client:	Ubiquiti Networks	Job Number:	J86352
Model:	Rocket M5 Titanium	T-Log Number:	T88118
		Account Manager:	Susan Pelzl
Contact:	Jennifer Sanchez		
Standard:	FCC 15.247, RSS-210, RSS-310, FCC 15B	Class:	N/A

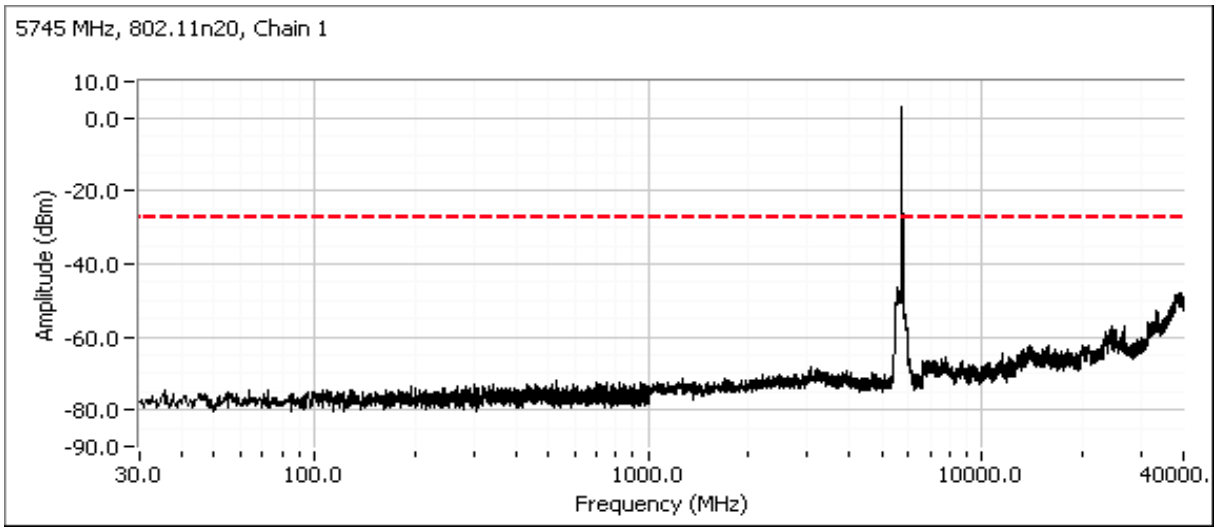


Plots for low channel

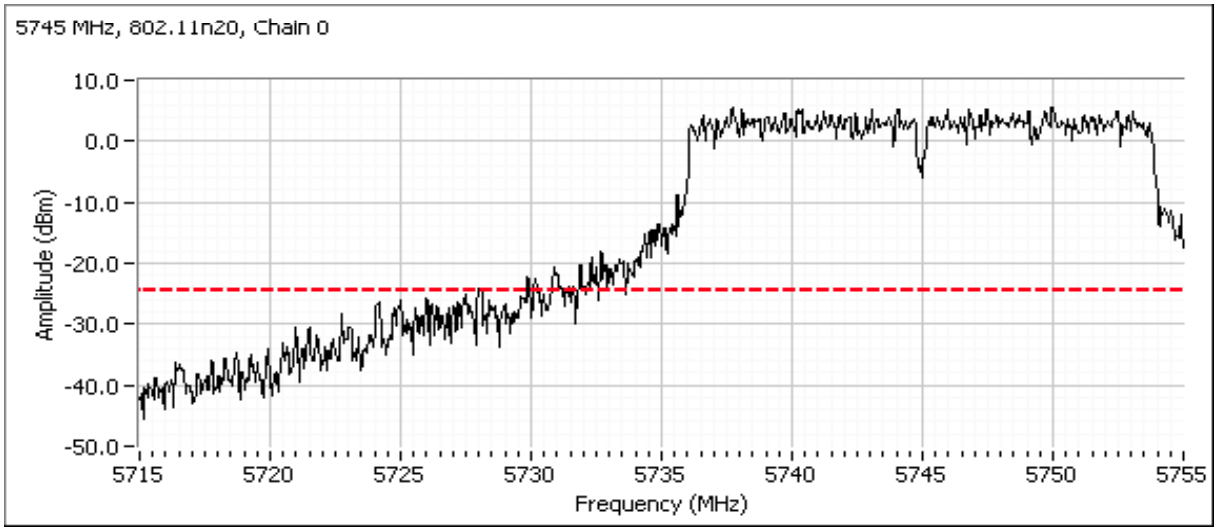
HT20



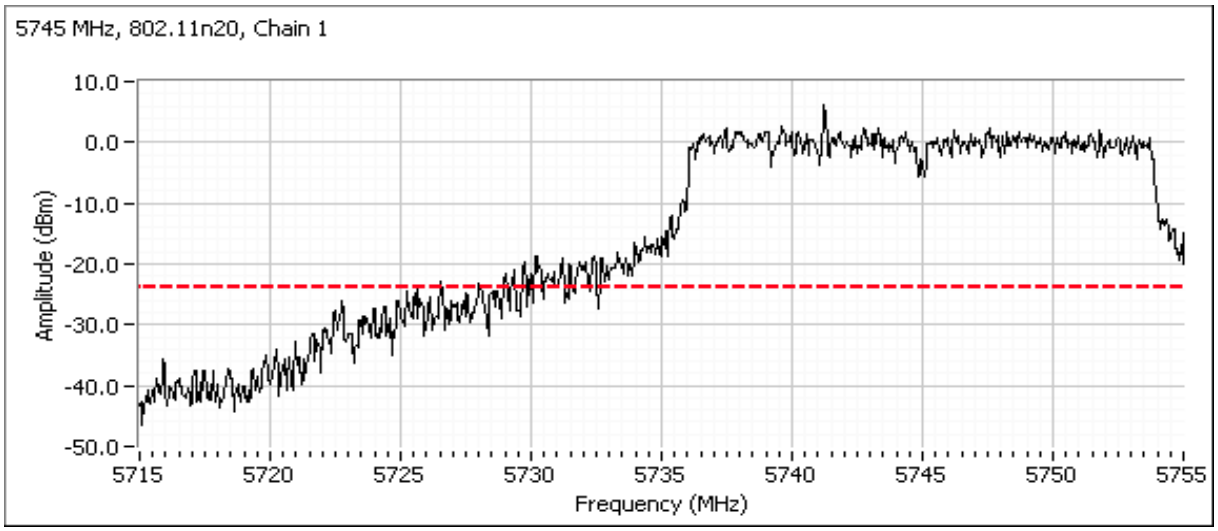
Client:	Ubiquiti Networks	Job Number:	J86352
Model:	Rocket M5 Titanium	T-Log Number:	T88118
		Account Manager:	Susan Pelzl
Contact:	Jennifer Sanchez		
Standard:	FCC 15.247, RSS-210, RSS-310, FCC 15B	Class:	N/A



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

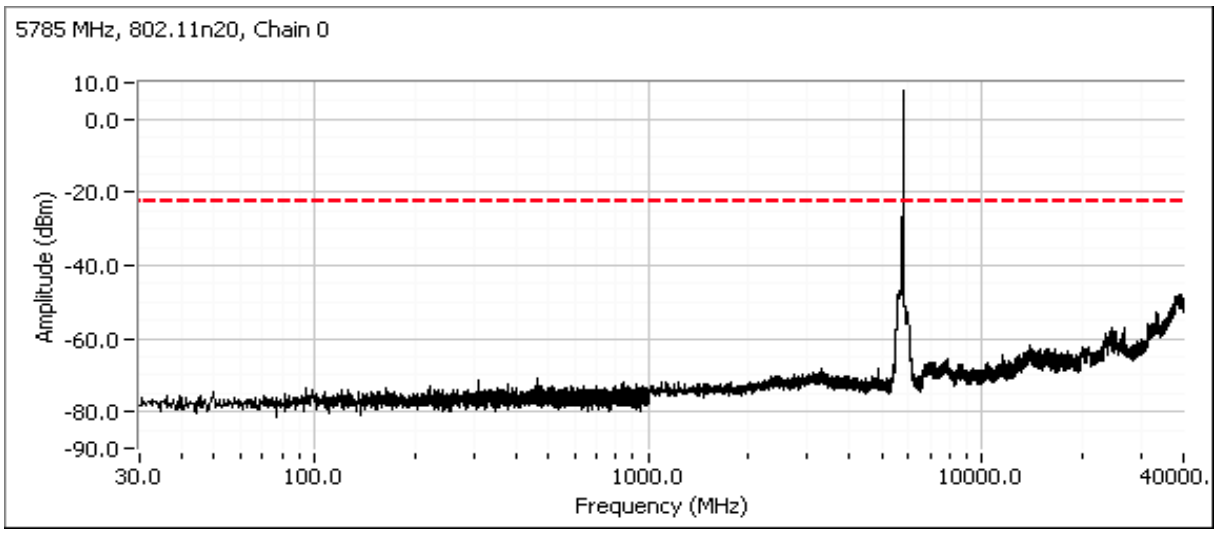


Client:	Ubiquiti Networks	Job Number:	J86352
Model:	Rocket M5 Titanium	T-Log Number:	T88118
		Account Manager:	Susan Pelzl
Contact:	Jennifer Sanchez		
Standard:	FCC 15.247, RSS-210, RSS-310, FCC 15B	Class:	N/A

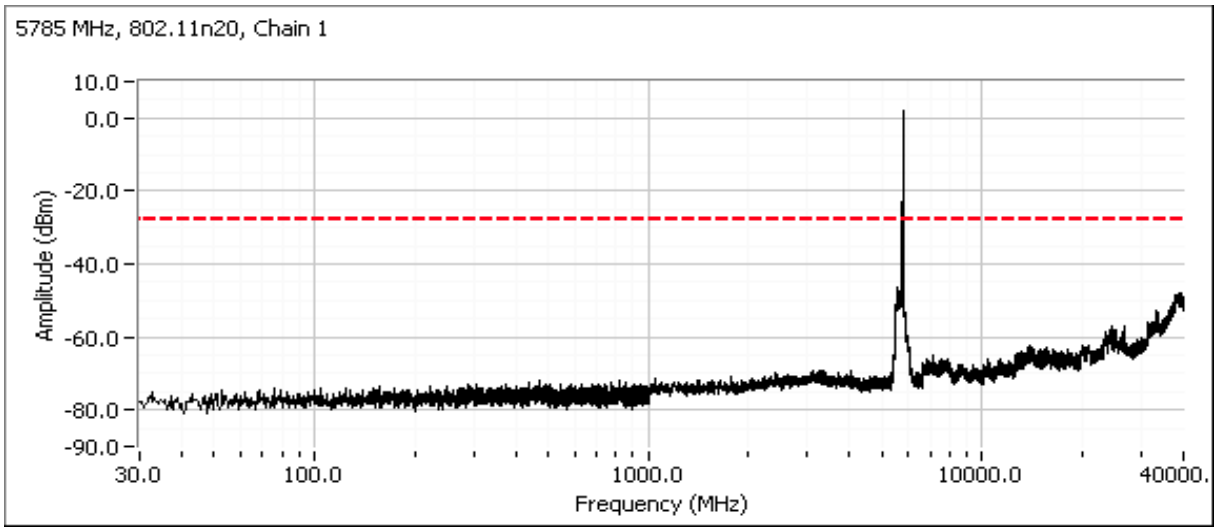


Plots for center channel

HT20

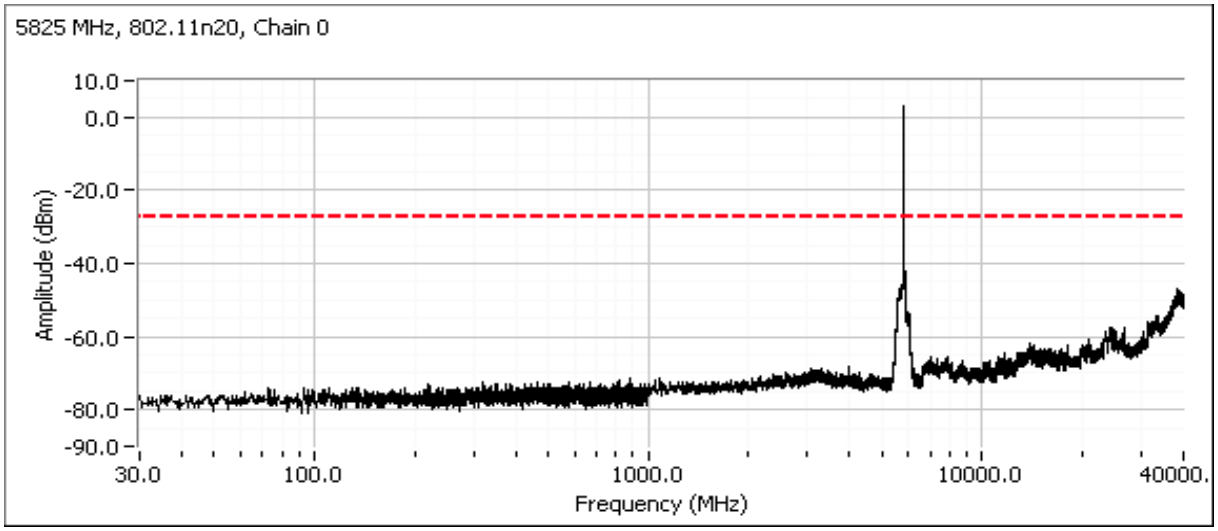


Client:	Ubiquiti Networks	Job Number:	J86352
Model:	Rocket M5 Titanium	T-Log Number:	T88118
		Account Manager:	Susan Pelzl
Contact:	Jennifer Sanchez		
Standard:	FCC 15.247, RSS-210, RSS-310, FCC 15B	Class:	N/A

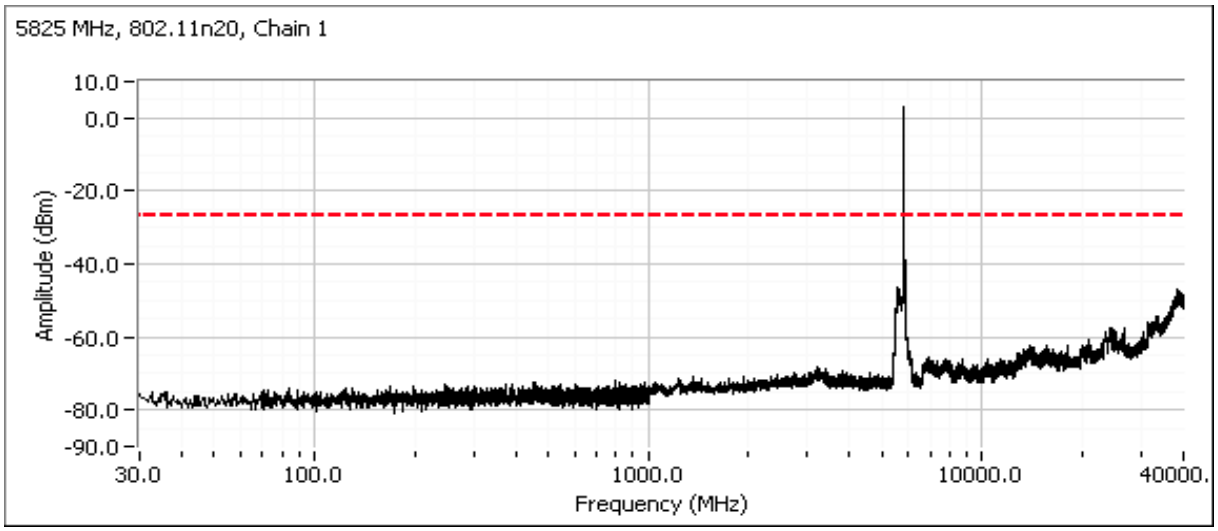


Plots for high channel

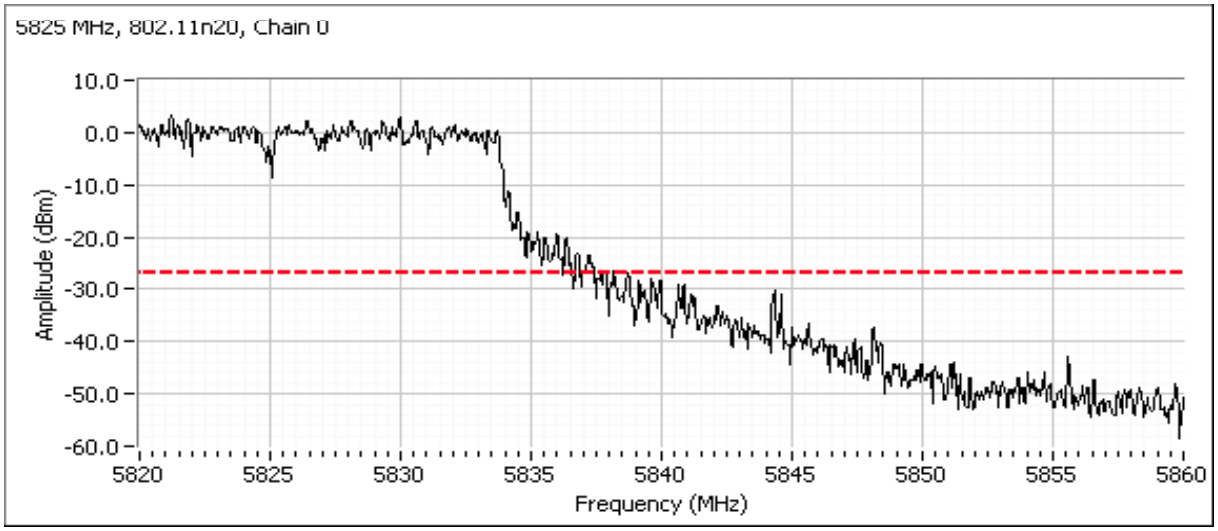
HT20



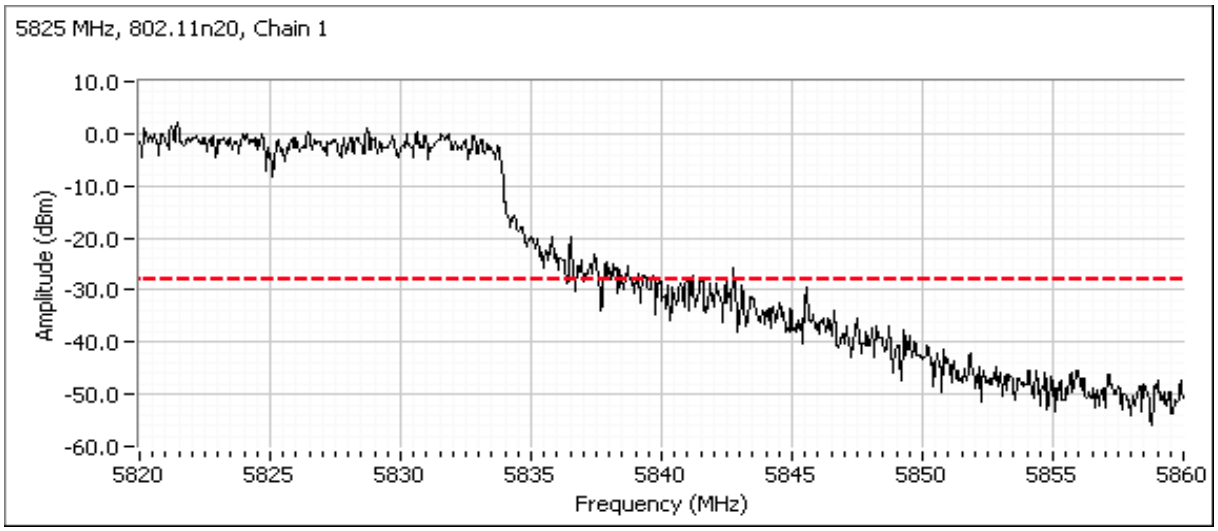
Client:	Ubiquiti Networks	Job Number:	J86352
Model:	Rocket M5 Titanium	T-Log Number:	T88118
		Account Manager:	Susan Pelzl
Contact:	Jennifer Sanchez		
Standard:	FCC 15.247, RSS-210, RSS-310, FCC 15B	Class:	N/A



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

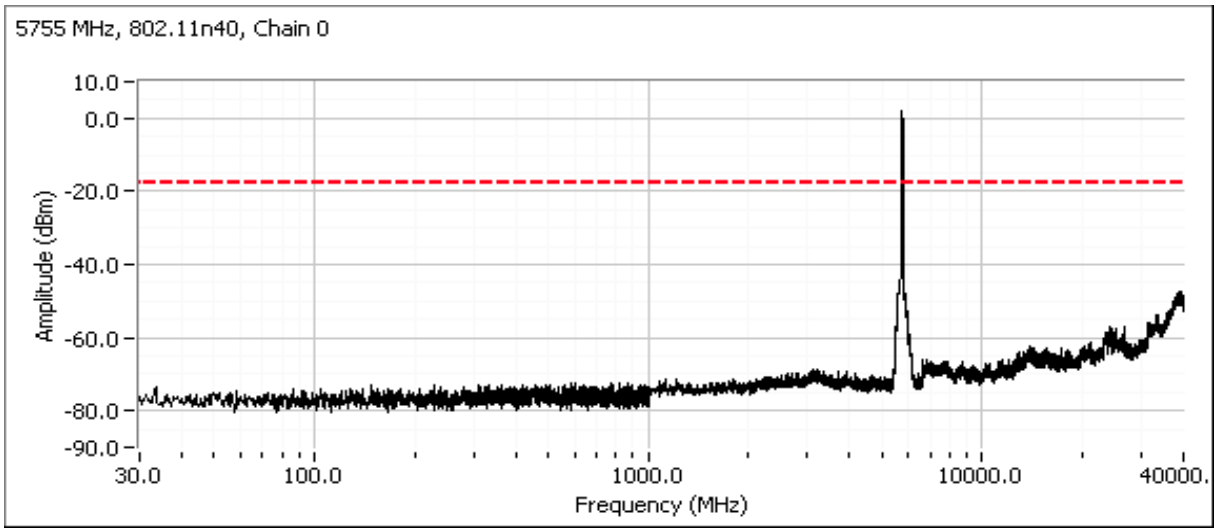


Client:	Ubiquiti Networks	Job Number:	J86352
Model:	Rocket M5 Titanium	T-Log Number:	T88118
		Account Manager:	Susan Pelzl
Contact:	Jennifer Sanchez		
Standard:	FCC 15.247, RSS-210, RSS-310, FCC 15B	Class:	N/A

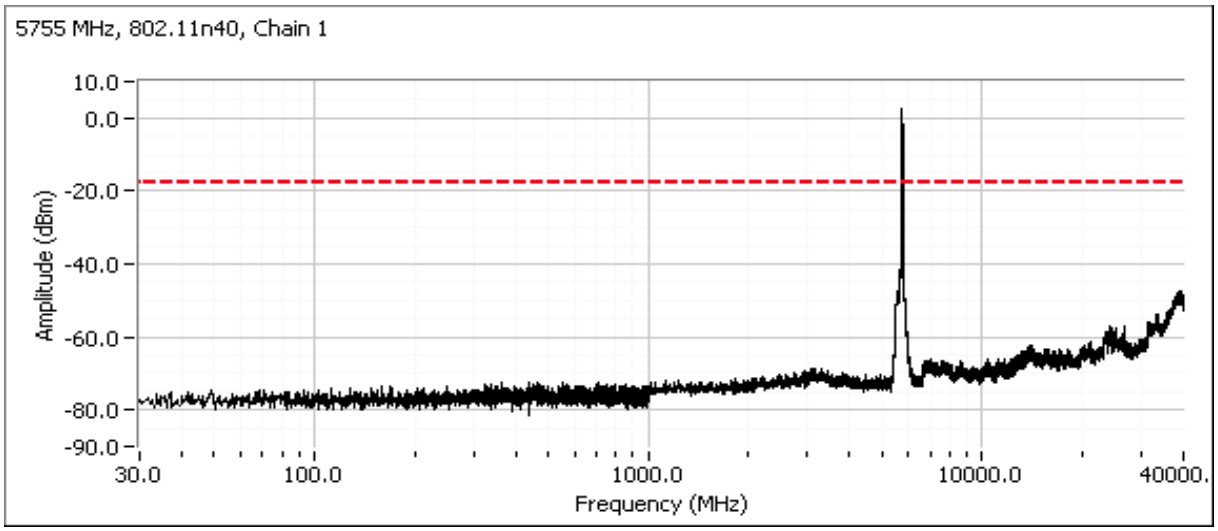


Plots for low channel

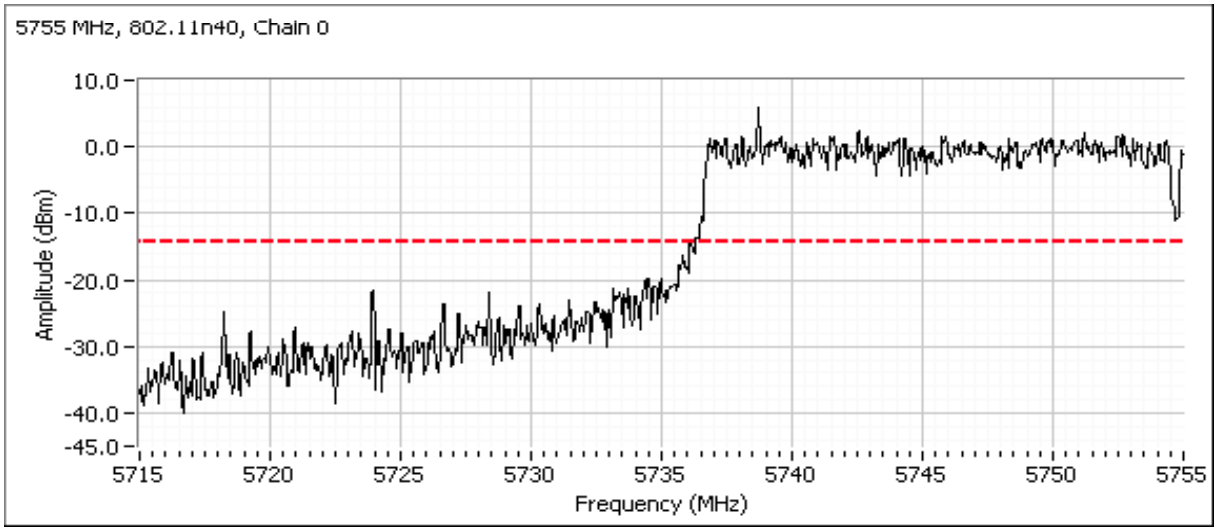
HT40



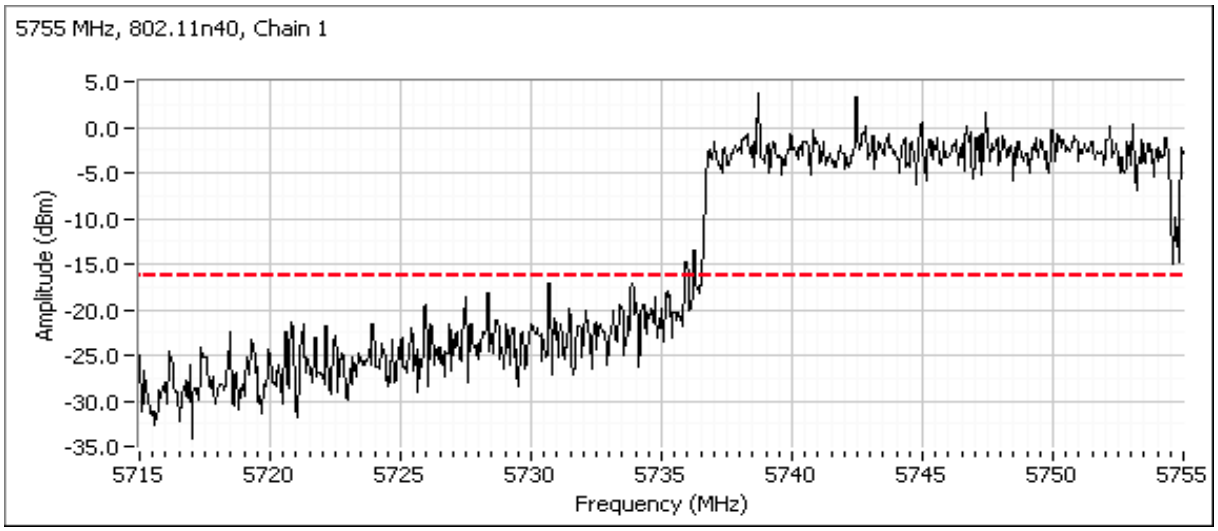
Client:	Ubiquiti Networks	Job Number:	J86352
Model:	Rocket M5 Titanium	T-Log Number:	T88118
		Account Manager:	Susan Pelzl
Contact:	Jennifer Sanchez		
Standard:	FCC 15.247, RSS-210, RSS-310, FCC 15B	Class:	N/A



Additional plot from 5715 - 5755 MHz showing compliance with -20dBc at the band edge.

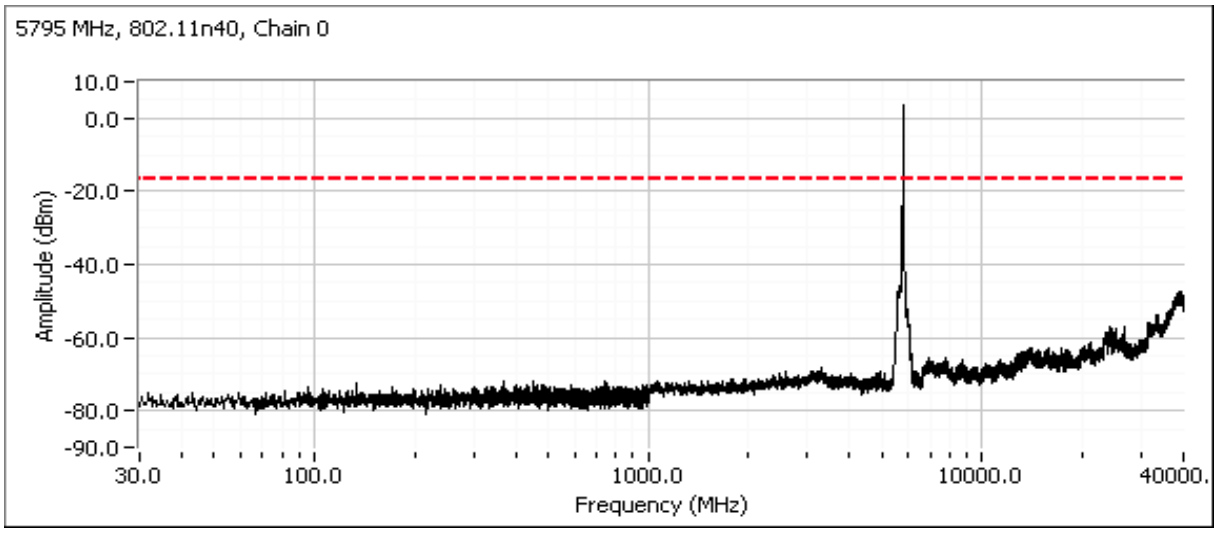


Client:	Ubiquiti Networks	Job Number:	J86352
Model:	Rocket M5 Titanium	T-Log Number:	T88118
		Account Manager:	Susan Pelzl
Contact:	Jennifer Sanchez		
Standard:	FCC 15.247, RSS-210, RSS-310, FCC 15B	Class:	N/A

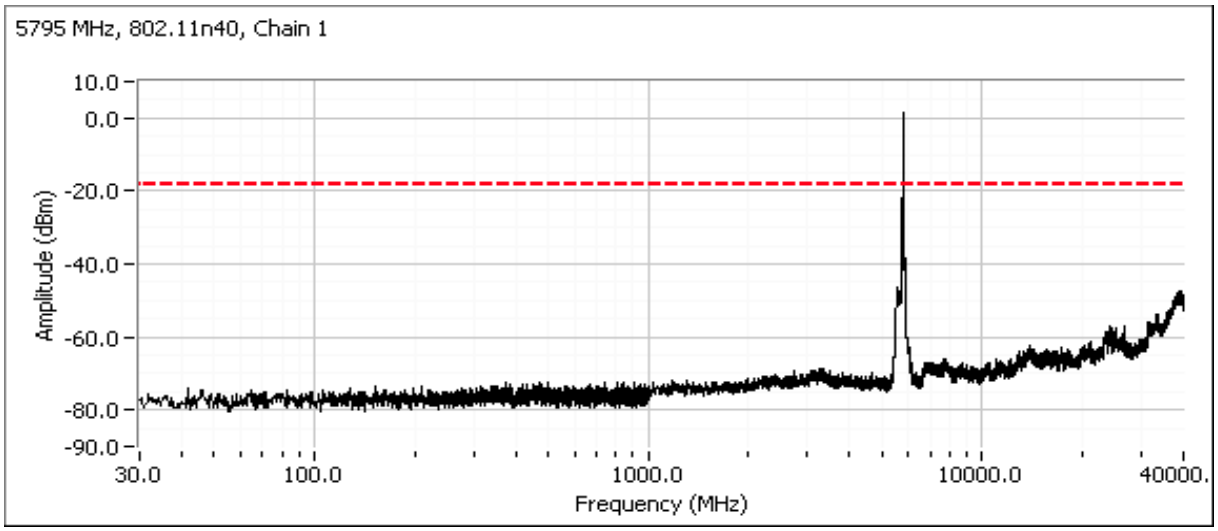


Plots for high channel

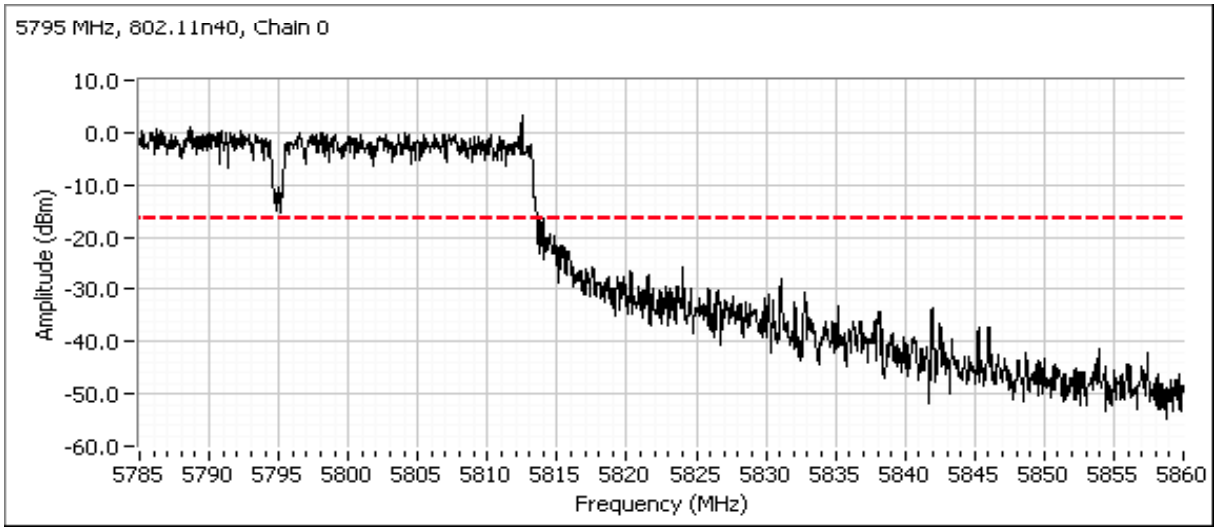
HT40



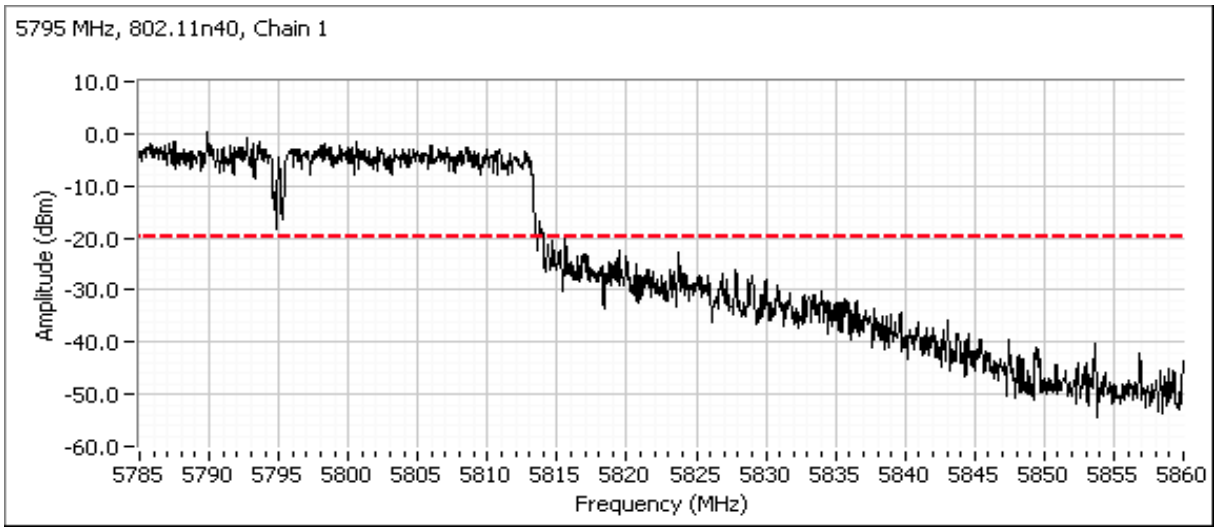
Client:	Ubiquiti Networks	Job Number:	J86352
Model:	Rocket M5 Titanium	T-Log Number:	T88118
		Account Manager:	Susan Pelzl
Contact:	Jennifer Sanchez		
Standard:	FCC 15.247, RSS-210, RSS-310, FCC 15B	Class:	N/A



Additional plot from 5820 - 5860 MHz showing compliance with -20dBc at the band edge.

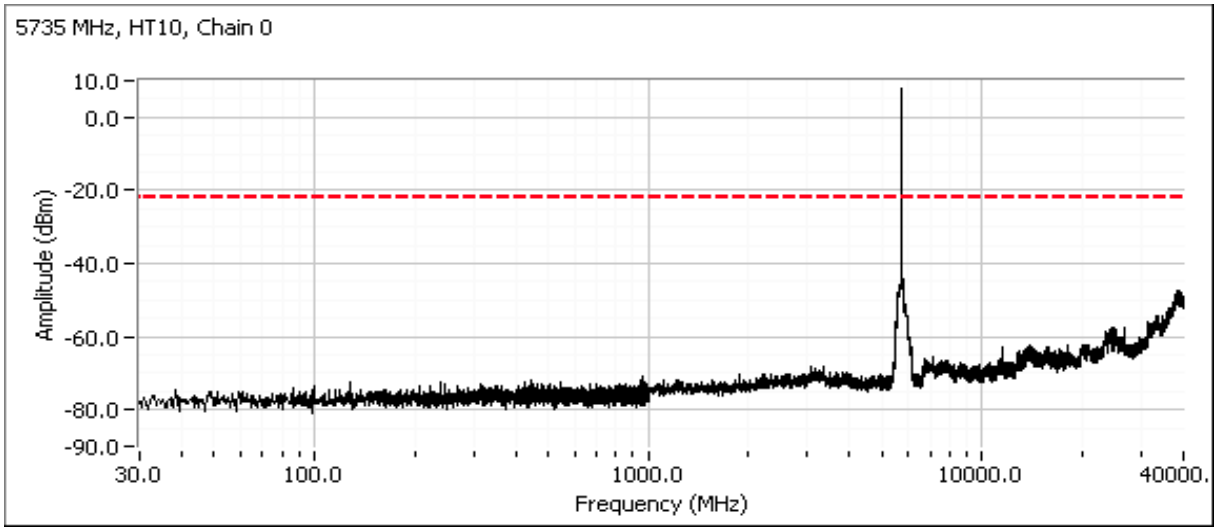


Client:	Ubiquiti Networks	Job Number:	J86352
Model:	Rocket M5 Titanium	T-Log Number:	T88118
		Account Manager:	Susan Pelzl
Contact:	Jennifer Sanchez		
Standard:	FCC 15.247, RSS-210, RSS-310, FCC 15B	Class:	N/A

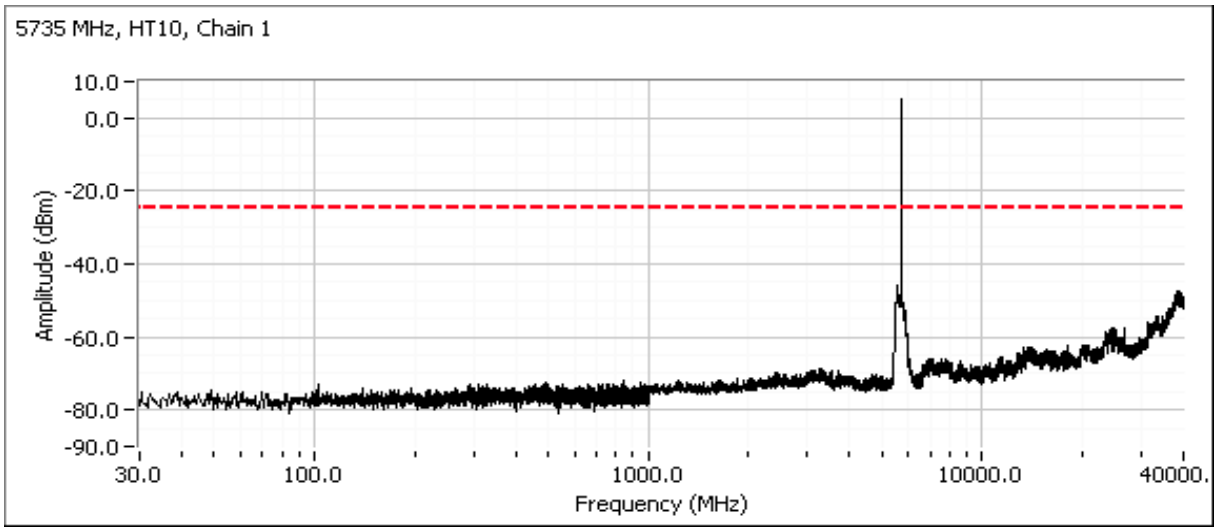


Plots for low channel

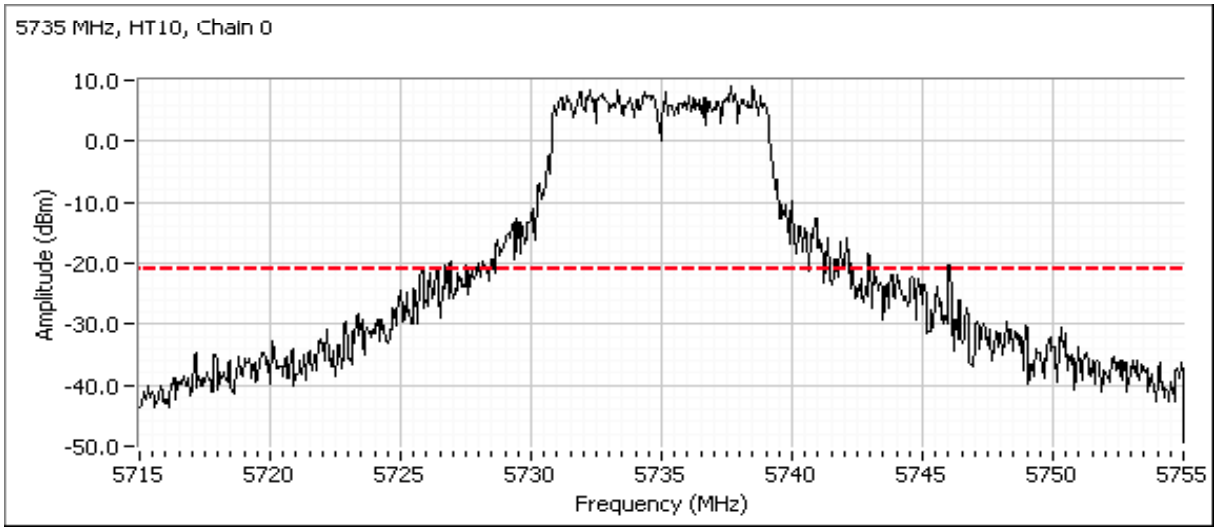
HT10



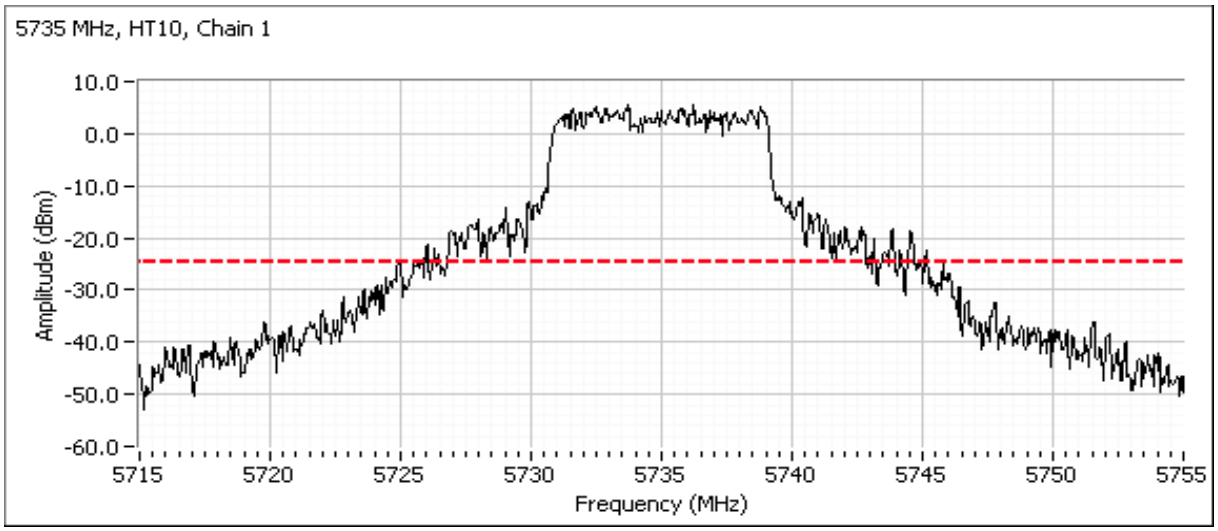
Client:	Ubiquiti Networks	Job Number:	J86352
Model:	Rocket M5 Titanium	T-Log Number:	T88118
		Account Manager:	Susan Pelzl
Contact:	Jennifer Sanchez		
Standard:	FCC 15.247, RSS-210, RSS-310, FCC 15B	Class:	N/A



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

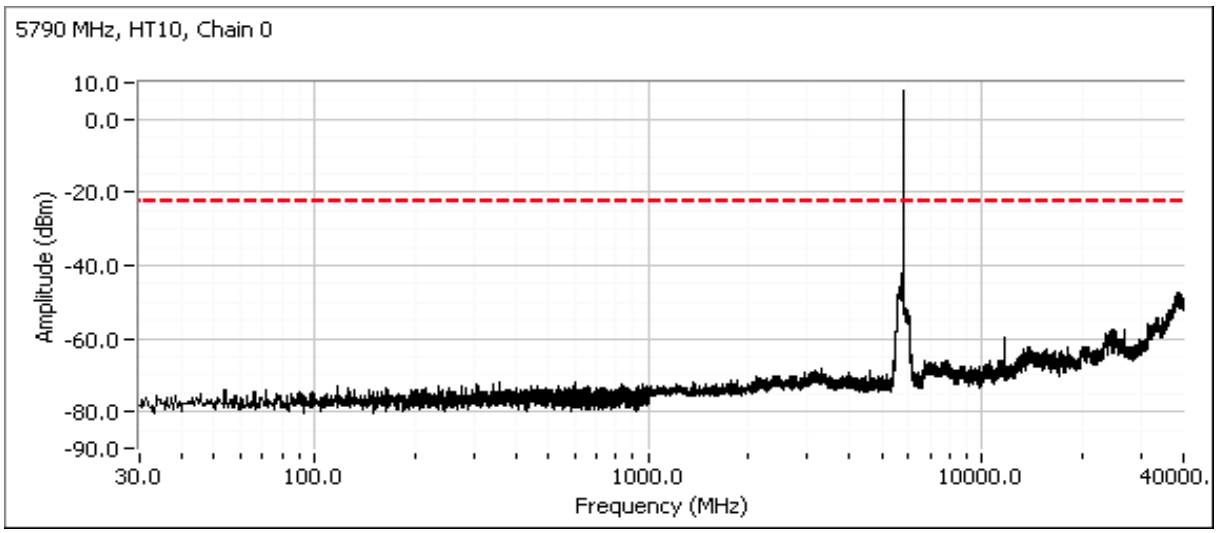


Client:	Ubiquiti Networks	Job Number:	J86352
Model:	Rocket M5 Titanium	T-Log Number:	T88118
		Account Manager:	Susan Pelzl
Contact:	Jennifer Sanchez		
Standard:	FCC 15.247, RSS-210, RSS-310, FCC 15B	Class:	N/A

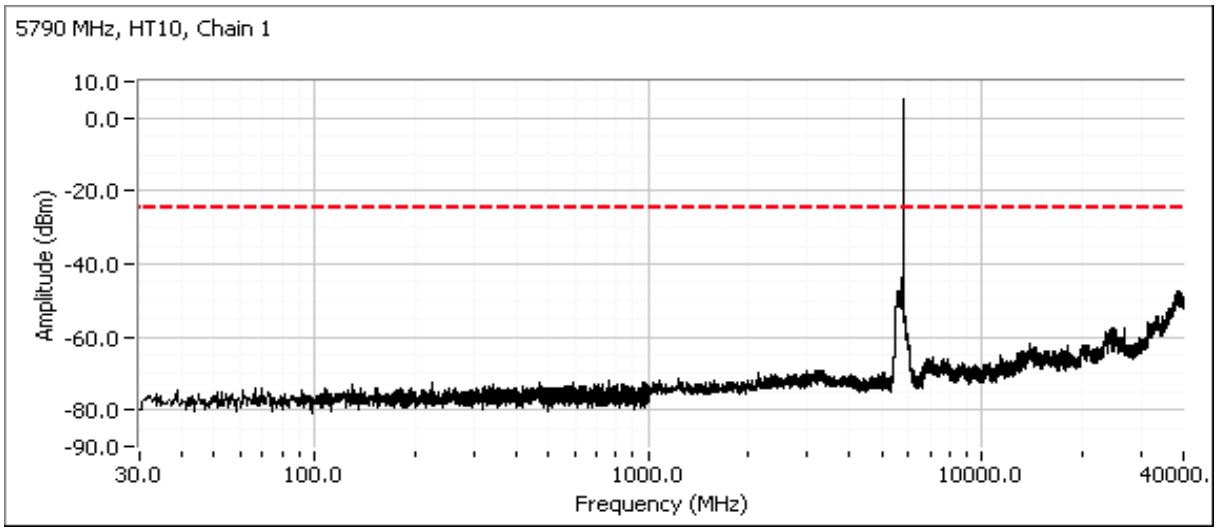


Plots for center channel

HT10

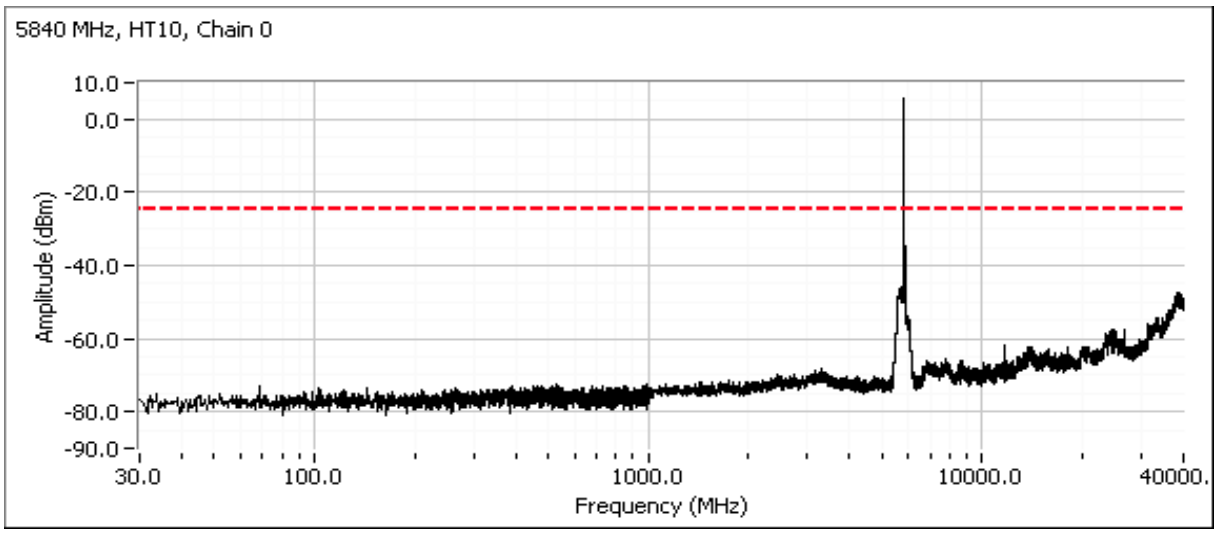


Client:	Ubiquiti Networks	Job Number:	J86352
Model:	Rocket M5 Titanium	T-Log Number:	T88118
		Account Manager:	Susan Pelzl
Contact:	Jennifer Sanchez		
Standard:	FCC 15.247, RSS-210, RSS-310, FCC 15B	Class:	N/A

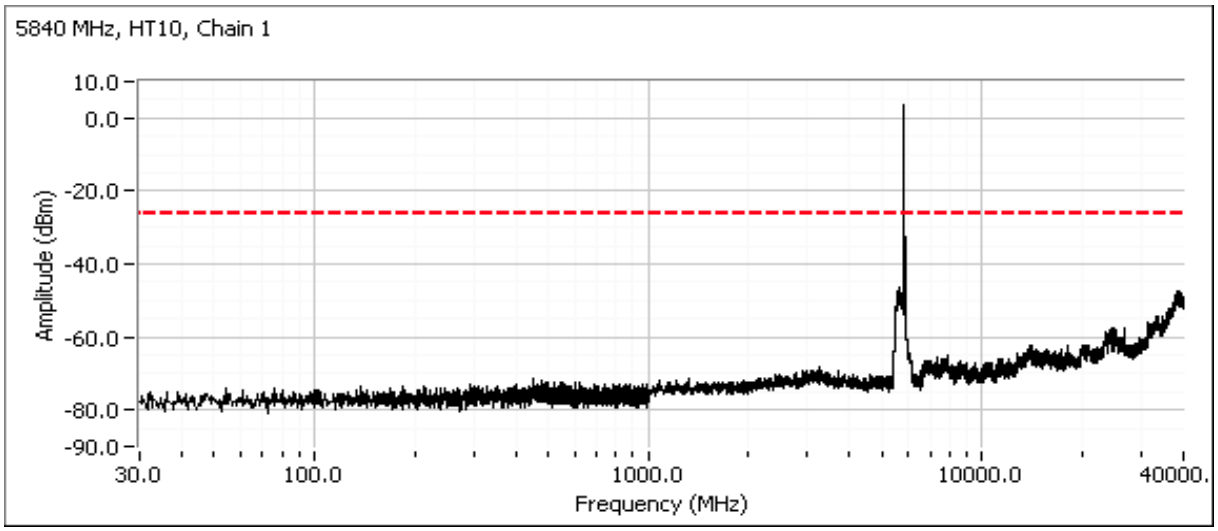


Plots for high channel

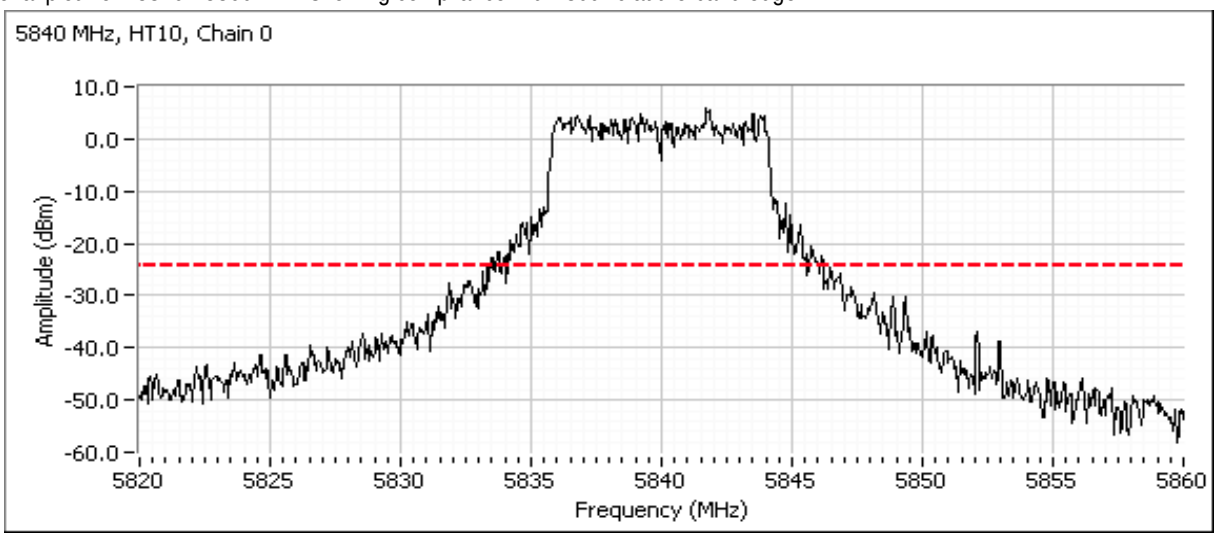
HT10



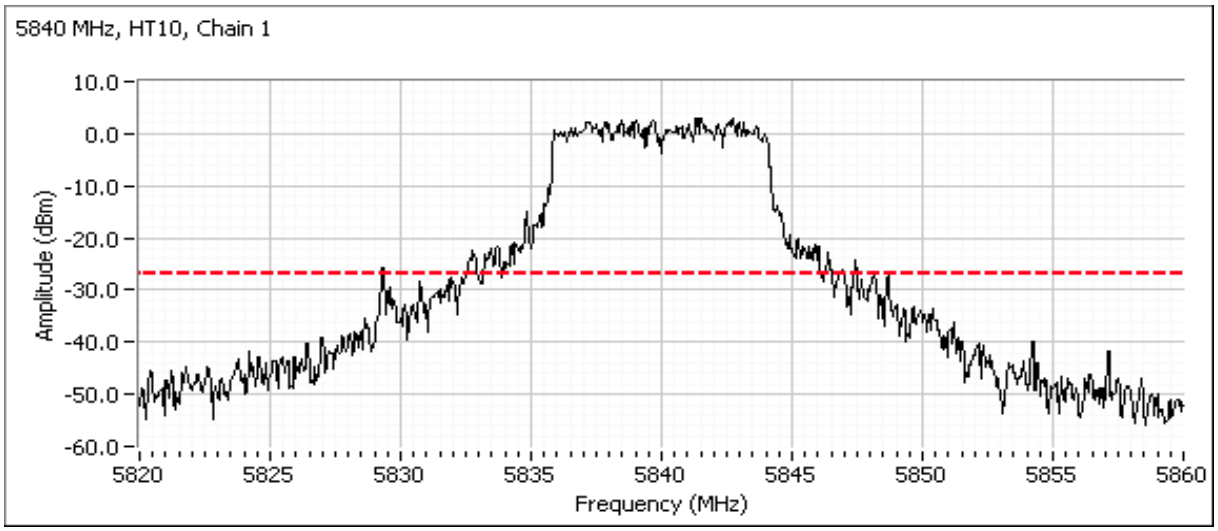
Client:	Ubiquiti Networks	Job Number:	J86352
Model:	Rocket M5 Titanium	T-Log Number:	T88118
		Account Manager:	Susan Pelzl
Contact:	Jennifer Sanchez		
Standard:	FCC 15.247, RSS-210, RSS-310, FCC 15B	Class:	N/A



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



Client:	Ubiquiti Networks	Job Number:	J86352
Model:	Rocket M5 Titanium	T-Log Number:	T88118
		Account Manager:	Susan Pelzl
Contact:	Jennifer Sanchez		
Standard:	FCC 15.247, RSS-210, RSS-310, FCC 15B	Class:	N/A



Client:	Ubiquiti Networks	Job Number:	J86352
Model:	Rocket M5 Titanium	T-Log Number:	T88118
		Account Manager:	Susan Pelzl
Contact:	Jennifer Sanchez		
Standard:	FCC 15.247, RSS-210, RSS-310, FCC 15B	Class:	N/A

RSS 210 and FCC 15.247 (DTS) Radiated Spurious Emissions

Test Specific Details

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

General Test Configuration

The EUT and all local support equipment were located on the turntable for radiated spurious emissions testing. All remote support equipment was located approximately 30 meters from the EUT.

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

Ambient Conditions:

Temperature: 20.6 °C
Rel. Humidity: 33 %

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

Run #	Mode	Channel	Power Setting	Measured Power	Test Performed	Limit	Result / Margin
1a	802.11a	low	19	-	Radiated Emissions, 1 - 40GHz	FCC Part 15.209 / 15.247(c)	42.6 dBµV/m @ 2340.0 MHz (-11.4 dB)
1b	802.11a	center	19	-	Radiated Emissions, 1 - 40GHz	FCC Part 15.209 / 15.247(c)	42.5 dBµV/m @ 2340.0 MHz (-11.5 dB)
1c	802.11a	high	19	-	Radiated Emissions, 1 - 40GHz	FCC Part 15.209 / 15.247(c)	All emissions are under limit
2a	HT20	low	19	-	Radiated Emissions, 1 - 40GHz	FCC Part 15.209 / 15.247(c)	All emissions are under limit
2b	HT20	center	19	-	Radiated Emissions, 1 - 40GHz	FCC Part 15.209 / 15.247(c)	All emissions are under limit
2c	HT20	high	19	-	Radiated Emissions, 1 - 40GHz	FCC Part 15.209 / 15.247(c)	All emissions are under limit
3a	HT40	low	19	-	Radiated Emissions, 1 - 40GHz	FCC Part 15.209 / 15.247(c)	All emissions are under limit
3b	HT40	high	19	-	Radiated Emissions, 1 - 40GHz	FCC Part 15.209 / 15.247(c)	All emissions are under limit
4a	HT10	low	19	-	Radiated Emissions, 1 - 40GHz	FCC Part 15.209 / 15.247(c)	All emissions are under limit
4b	HT10	center	19	-	Radiated Emissions, 1 - 40GHz	FCC Part 15.209 / 15.247(c)	All emissions are under limit
4c	HT10	high	19	-	Radiated Emissions, 1 - 40GHz	FCC Part 15.209 / 15.247(c)	42.3 dBµV/m @ 2340.1 MHz (-11.7 dB)

Client:	Ubiquiti Networks	Job Number:	J86352
Model:	Rocket M5 Titanium	T-Log Number:	T88118
		Account Manager:	Susan Pelzl
Contact:	Jennifer Sanchez		
Standard:	FCC 15.247, RSS-210, RSS-310, FCC 15B	Class:	N/A

Modifications Made During Testing

No modifications were made to the EUT during testing

Deviations From The Standard

No deviations were made from the requirements of the standard.

Notes

Testing performed using the 21dBi sector antenna (antenna configured to the 60deg positions)
Emissions in the 4500-5500 MHz range were evaluated using the ESIB (pre-amp on) with band reject filter located at the antenna. No significant emissions observed.
Preliminary testing showed no emissions below 1GHz and above 12GHz related to the radio

Client:	Ubiquiti Networks	Job Number:	J86352
Model:	Rocket M5 Titanium	T-Log Number:	T88118
		Account Manager:	Susan Pelzl
Contact:	Jennifer Sanchez		
Standard:	FCC 15.247, RSS-210, RSS-310, FCC 15B	Class:	N/A

Run #1: Radiated Spurious Emissions, 1000 - 40,000 MHz. Operating Mode: 802.11a

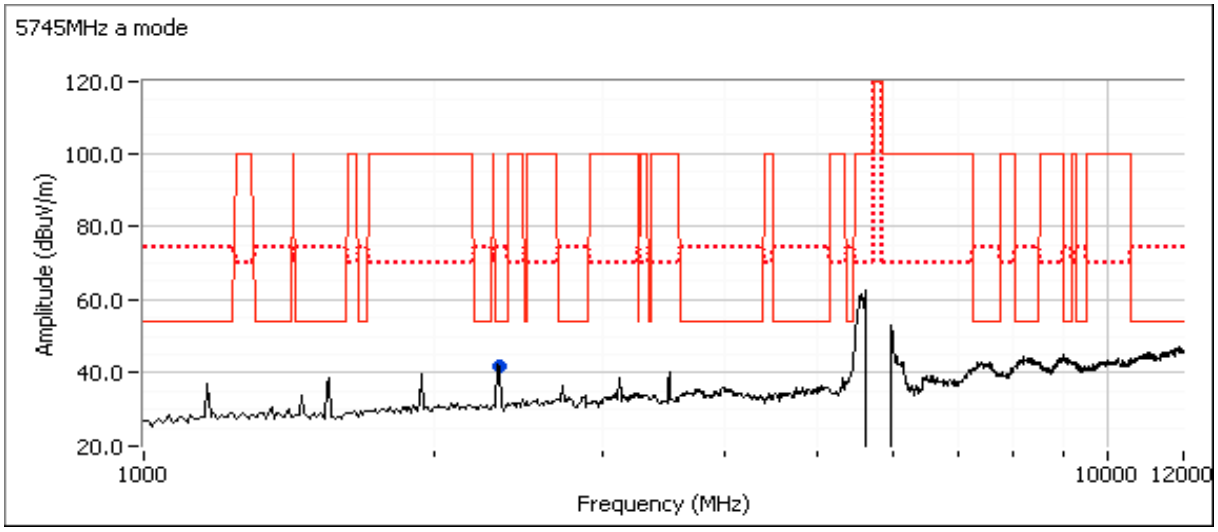
Date of Test: 7/18/2012
Test Engineer: Jack Liu
Test Location: FT7

Run #1a: Low Channel @ 5745 MHz

Spurious Emissions:

Frequency	Level	Pol	15.209 / 15.247		Detector	Azimuth	Height	Comments
MHz	dBµV/m	v/h	Limit	Margin	Pk/QP/Avg	degrees	meters	
2340.010	42.6	V	54.0	-11.4	AVG	196	1.7	RB 1 MHz;VB 10 Hz;Peak
2340.000	45.4	V	74.0	-28.6	PK	196	1.7	RB 1 MHz;VB 3 MHz;Peak

Note 1:	For emissions in restricted bands, the limit of 15.209 was used. For all other emissions, the limit was set 30dB below the level of the fundamental and measured in 100kHz.
Note 2:	Signal is not in a restricted band but the more stringent restricted band limit was used.

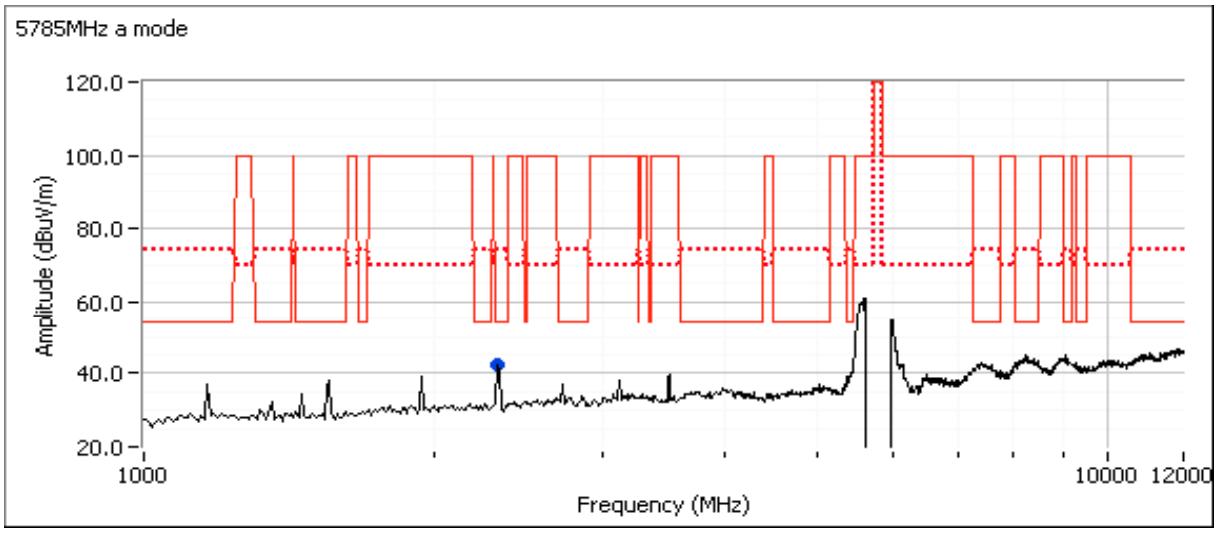


Client:	Ubiquiti Networks	Job Number:	J86352
Model:	Rocket M5 Titanium	T-Log Number:	T88118
		Account Manager:	Susan Pelzl
Contact:	Jennifer Sanchez		
Standard:	FCC 15.247, RSS-210, RSS-310, FCC 15B	Class:	N/A

Run #1b: Center Channel @ 5785 MHz

Frequency	Level	Pol	15.209 / 15.247		Detector	Azimuth	Height	Comments
MHz	dBµV/m	v/h	Limit	Margin	Pk/QP/Avg	degrees	meters	
2339.990	42.5	V	54.0	-11.5	AVG	203	1.7	RB 1 MHz;VB 10 Hz;Peak
2339.950	45.2	V	74.0	-28.8	PK	203	1.7	RB 1 MHz;VB 3 MHz;Peak

Note 1:	For emissions in restricted bands, the limit of 15.209 was used. For all other emissions, the limit was set 30dB below the level of the fundamental and measured in 100kHz.
Note 2:	Signal is not in a restricted band but the more stringent restricted band limit was used.



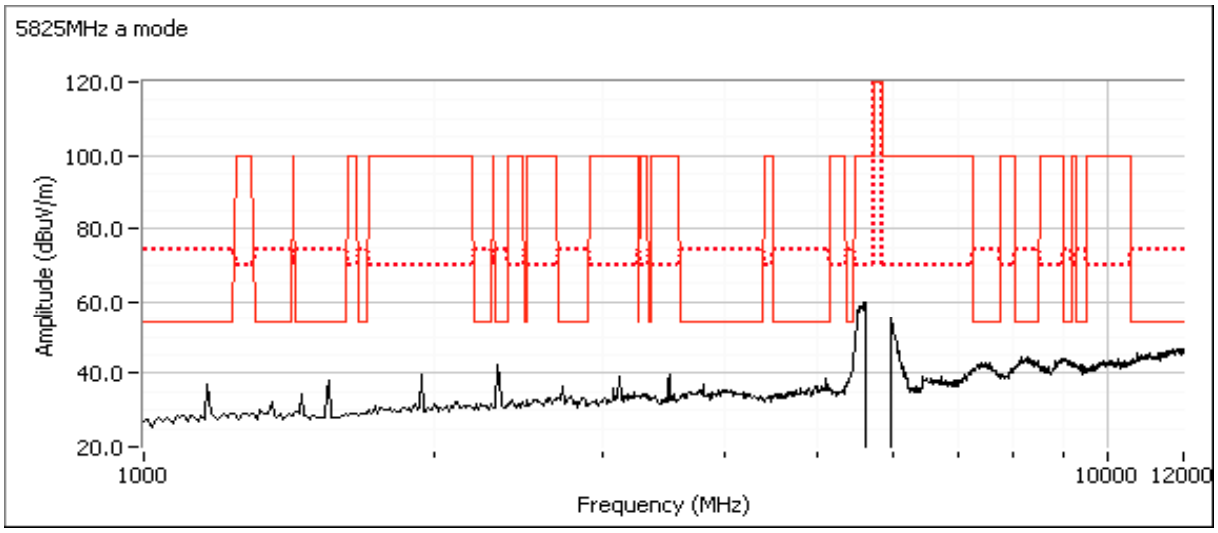
Client:	Ubiquiti Networks	Job Number:	J86352
Model:	Rocket M5 Titanium	T-Log Number:	T88118
		Account Manager:	Susan Pelzl
Contact:	Jennifer Sanchez		
Standard:	FCC 15.247, RSS-210, RSS-310, FCC 15B	Class:	N/A

Run #1c: High Channel @ 5825 MHz

Spurious Emissions:

Frequency	Level	Pol	15.209 / 15.247		Detector	Azimuth	Height	Comments
MHz	dBµV/m	v/h	Limit	Margin	Pk/QP/Avg	degrees	meters	
-	-	-	-	-	-	-	-	

Note 1:	For emissions in restricted bands, the limit of 15.209 was used. For all other emissions, the limit was set 30dB below the level of the fundamental and measured in 100kHz.
Note 2:	Signal is not in a restricted band but the more stringent restricted band limit was used.



Client:	Ubiquiti Networks	Job Number:	J86352
Model:	Rocket M5 Titanium	T-Log Number:	T88118
		Account Manager:	Susan Pelzl
Contact:	Jennifer Sanchez		
Standard:	FCC 15.247, RSS-210, RSS-310, FCC 15B	Class:	N/A

Run #2: Radiated Spurious Emissions, 1000 - 40,000 MHz. Operating Mode: HT20

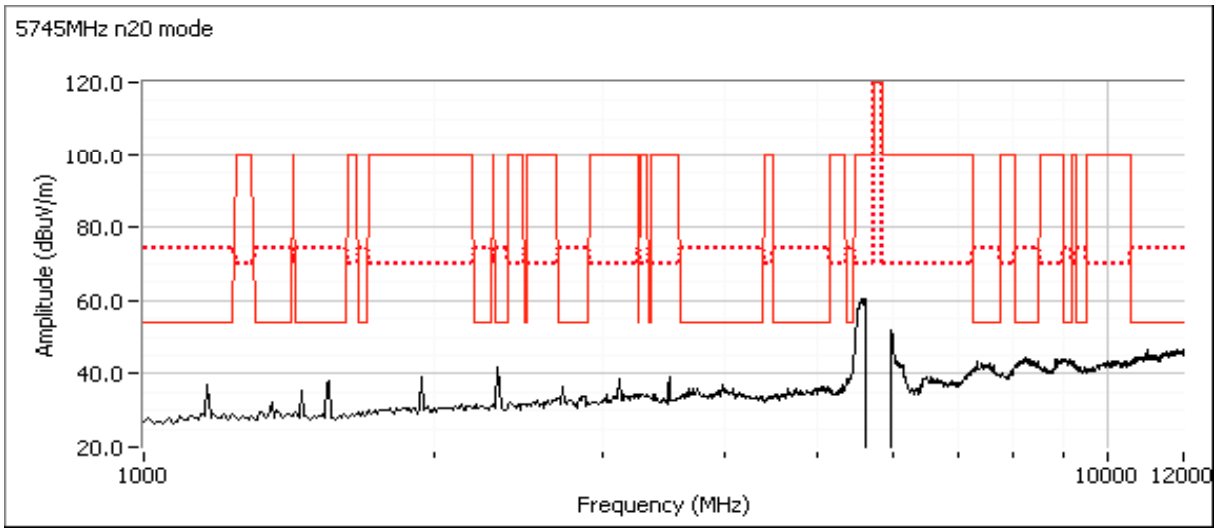
Date of Test: 7/18/2012
Test Engineer: Jack Liu
Test Location: FT7

Run #2a: Low Channel @ 5745 MHz

Spurious Emissions:

Frequency	Level	Pol	15.209 / 15.247		Detector	Azimuth	Height	Comments
MHz	dBµV/m	v/h	Limit	Margin	Pk/QP/Avg	degrees	meters	
-	-	-	-	-	-	-	-	

Note 1:	For emissions in restricted bands, the limit of 15.209 was used. For all other emissions, the limit was set 30dB below the level of the fundamental and measured in 100kHz.
Note 2:	Signal is not in a restricted band but the more stringent restricted band limit was used.

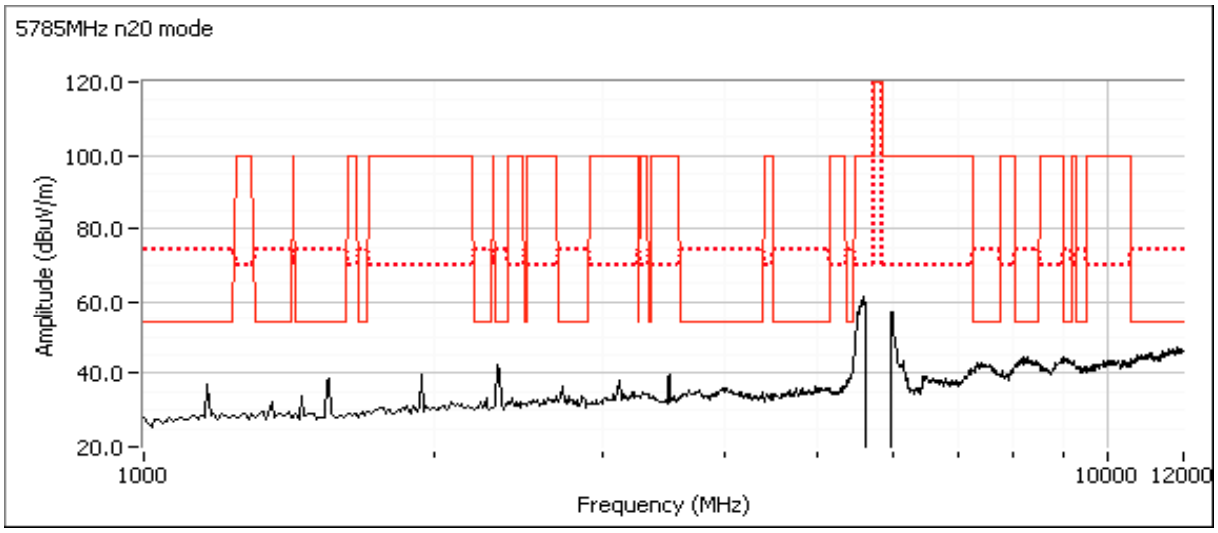


Client:	Ubiquiti Networks	Job Number:	J86352
Model:	Rocket M5 Titanium	T-Log Number:	T88118
		Account Manager:	Susan Pelzl
Contact:	Jennifer Sanchez		
Standard:	FCC 15.247, RSS-210, RSS-310, FCC 15B	Class:	N/A

Run #2b: Center Channel @ 5785 MHz

Frequency	Level	Pol	15.209 / 15.247		Detector	Azimuth	Height	Comments
MHz	dBµV/m	v/h	Limit	Margin	Pk/QP/Avg	degrees	meters	
-	-	-	-	-	-	-	-	

Note 1:	For emissions in restricted bands, the limit of 15.209 was used. For all other emissions, the limit was set 30dB below the level of the fundamental and measured in 100kHz.
Note 2:	Signal is not in a restricted band but the more stringent restricted band limit was used.



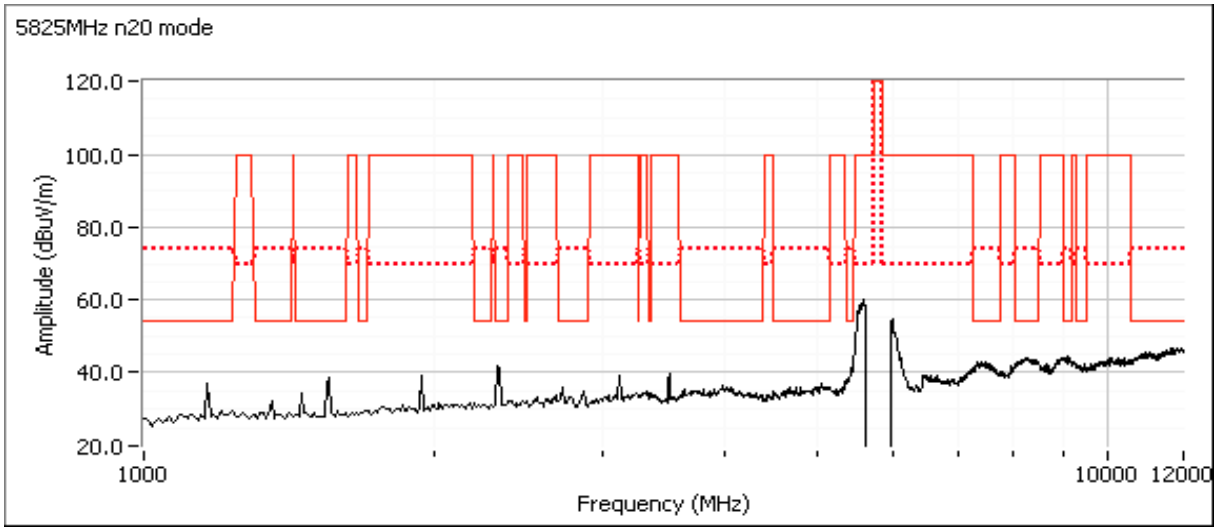
Client:	Ubiquiti Networks	Job Number:	J86352
Model:	Rocket M5 Titanium	T-Log Number:	T88118
		Account Manager:	Susan Pelzl
Contact:	Jennifer Sanchez		
Standard:	FCC 15.247, RSS-210, RSS-310, FCC 15B	Class:	N/A

Run #2c: High Channel @ 5825 MHz

Spurious Emissions:

Frequency	Level	Pol	15.209 / 15.247		Detector	Azimuth	Height	Comments
MHz	dBµV/m	v/h	Limit	Margin	Pk/QP/Avg	degrees	meters	
-	-	-	-	-	-	-	-	

Note 1:	For emissions in restricted bands, the limit of 15.209 was used. For all other emissions, the limit was set 30dB below the level of the fundamental and measured in 100kHz.
Note 2:	Signal is not in a restricted band but the more stringent restricted band limit was used.



Client:	Ubiquiti Networks	Job Number:	J86352
Model:	Rocket M5 Titanium	T-Log Number:	T88118
		Account Manager:	Susan Pelzl
Contact:	Jennifer Sanchez		
Standard:	FCC 15.247, RSS-210, RSS-310, FCC 15B	Class:	N/A

Run #3: Radiated Spurious Emissions, 1000 - 40,000 MHz. Operating Mode: HT40

Run #3a: Low Channel @ 5755 MHz

Date of Test: 7/18/2012

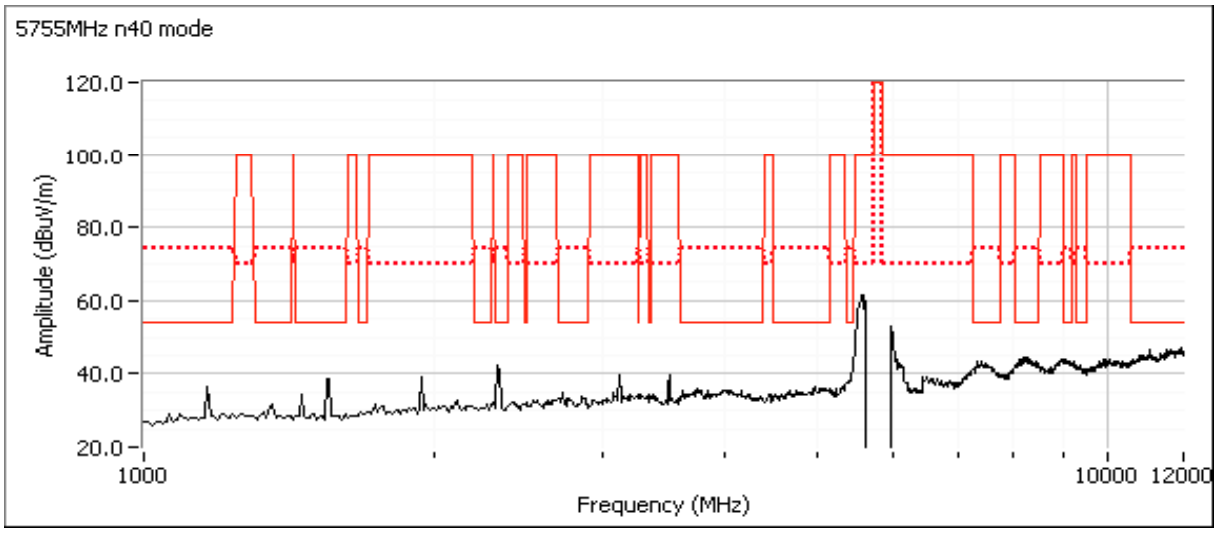
Test Engineer: Jack Liu

Test Location: FT7

Spurious Emissions:

Frequency	Level	Pol	15.209 / 15.247		Detector	Azimuth	Height	Comments
MHz	dBµV/m	v/h	Limit	Margin	Pk/QP/Avg	degrees	meters	
-	-	-	-	-	-	-	-	

Note 1:	For emissions in restricted bands, the limit of 15.209 was used. For all other emissions, the limit was set 30dB below the level of the fundamental and measured in 100kHz.
Note 2:	Signal is not in a restricted band but the more stringent restricted band limit was used. Refer to RF Port result.



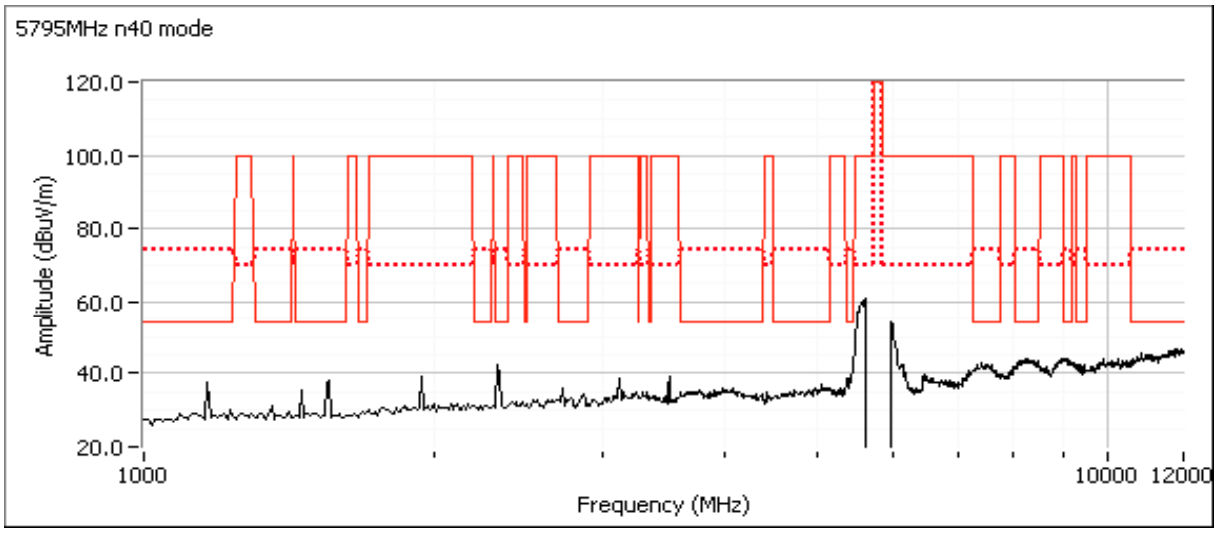
Client:	Ubiquiti Networks	Job Number:	J86352
Model:	Rocket M5 Titanium	T-Log Number:	T88118
		Account Manager:	Susan Pelzl
Contact:	Jennifer Sanchez		
Standard:	FCC 15.247, RSS-210, RSS-310, FCC 15B	Class:	N/A

Run #3c: High Channel @ 5795 MHz

Spurious Emissions:

Frequency	Level	Pol	15.209 / 15.247		Detector	Azimuth	Height	Comments
MHz	dBµV/m	v/h	Limit	Margin	Pk/QP/Avg	degrees	meters	
-	-	-	-	-	-	-	-	

Note 1:	For emissions in restricted bands, the limit of 15.209 was used. For all other emissions, the limit was set 30dB below the level of the fundamental and measured in 100kHz.
Note 2:	Signal is not in a restricted band but the more stringent restricted band limit was used. Refer to RF Port result.



Client:	Ubiquiti Networks	Job Number:	J86352
Model:	Rocket M5 Titanium	T-Log Number:	T88118
		Account Manager:	Susan Pelzl
Contact:	Jennifer Sanchez		
Standard:	FCC 15.247, RSS-210, RSS-310, FCC 15B	Class:	N/A

Run #4: Radiated Spurious Emissions, 1000 - 40,000 MHz. Operating Mode: 802.11 HT10

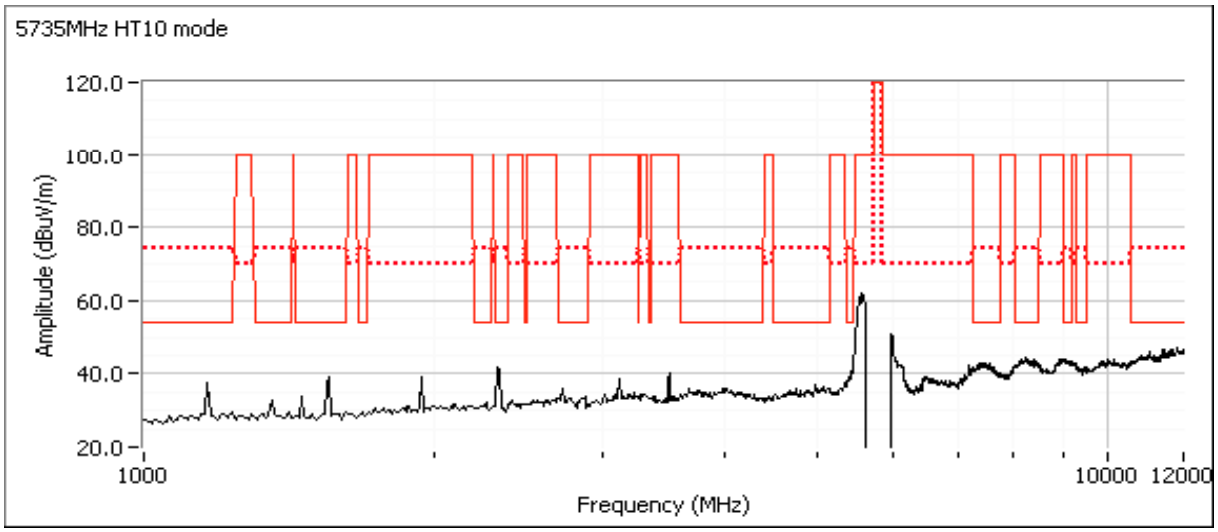
Run #4a: Low Channel @ 5735 MHz

Date of Test: 7/18/2012
Test Engineer: Jack Liu
Test Location: FT7

Spurious Emissions:

Frequency	Level	Pol	15.209 / 15.247		Detector	Azimuth	Height	Comments
MHz	dBµV/m	v/h	Limit	Margin	Pk/QP/Avg	degrees	meters	
-	-	-	-	-	-	-	-	

Note 1:	For emissions in restricted bands, the limit of 15.209 was used. For all other emissions, the limit was set 30dB below the level of the fundamental and measured in 100kHz.
Note 2:	Signal is not in a restricted band but the more stringent restricted band limit was used. Refer to RF Port result.



Client:	Ubiquiti Networks	Job Number:	J86352
Model:	Rocket M5 Titanium	T-Log Number:	T88118
		Account Manager:	Susan Pelzl
Contact:	Jennifer Sanchez		
Standard:	FCC 15.247, RSS-210, RSS-310, FCC 15B	Class:	N/A

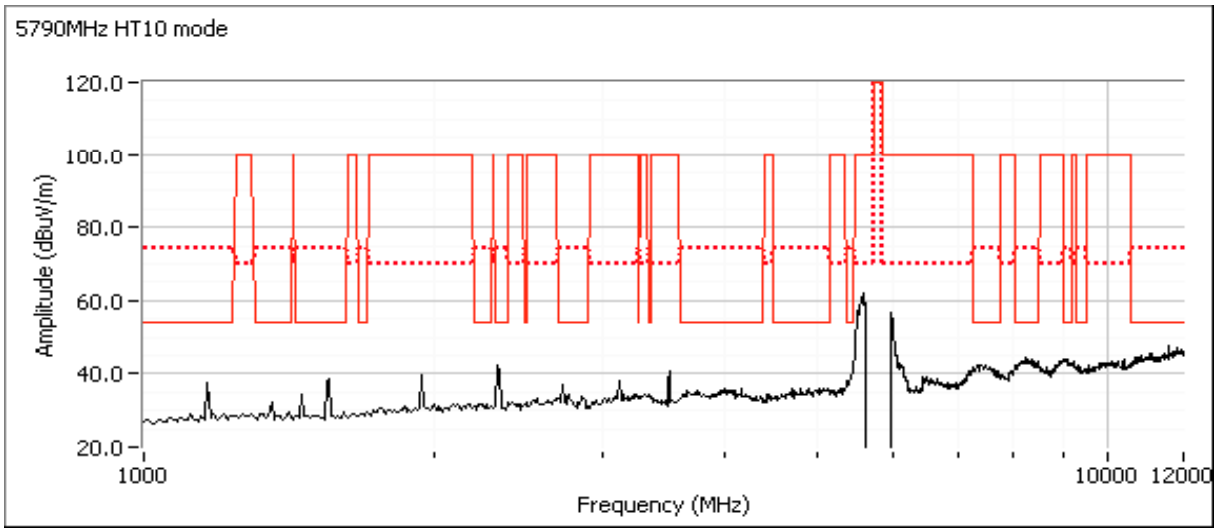
Run #4b: MIddle Channel @ 5790 MHz

Date of Test: 7/19/2012
Test Engineer: Jack Liu
Test Location: FT 7

Spurious Emissions:

Frequency	Level	Pol	15.209 / 15.247		Detector	Azimuth	Height	Comments
MHz	dBµV/m	v/h	Limit	Margin	Pk/QP/Avg	degrees	meters	
-	-	-	-	-	-	-	-	

Note 1:	For emissions in restricted bands, the limit of 15.209 was used. For all other emissions, the limit was set 30dB below the level of the fundamental and measured in 100kHz.
Note 2:	Signal is not in a restricted band but the more stringent restricted band limit was used. Refer to RF Port result.



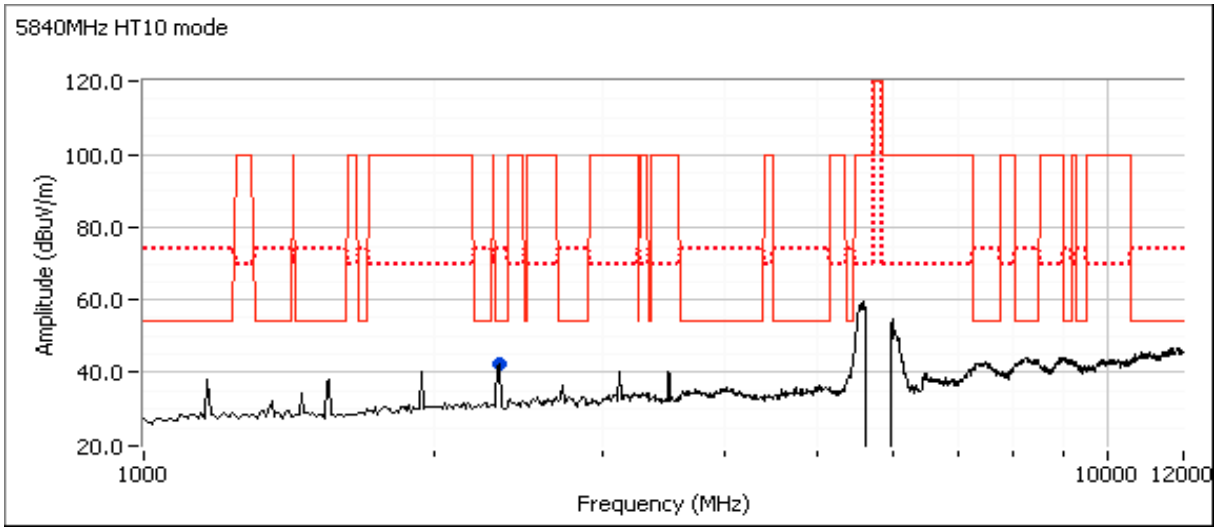
Client:	Ubiquiti Networks	Job Number:	J86352
Model:	Rocket M5 Titanium	T-Log Number:	T88118
		Account Manager:	Susan Pelzl
Contact:	Jennifer Sanchez		
Standard:	FCC 15.247, RSS-210, RSS-310, FCC 15B	Class:	N/A

Run #4c: High Channel @ 5840 MHz

Spurious Emissions:

Frequency	Level	Pol	15.209 / 15.247		Detector	Azimuth	Height	Comments
MHz	dBµV/m	v/h	Limit	Margin	Pk/QP/Avg	degrees	meters	
2340.050	42.3	V	54.0	-11.7	AVG	195	1.6	RB 1 MHz;VB 10 Hz;Peak
2339.900	45.1	V	74.0	-28.9	PK	195	1.6	RB 1 MHz;VB 3 MHz;Peak

Note 1:	For emissions in restricted bands, the limit of 15.209 was used. For all other emissions, the limit was set 30dB below the level of the fundamental and measured in 100kHz.
Note 2:	Signal is not in a restricted band but the more stringent restricted band limit was used. Refer to RF Port result.



Client:	Ubiquiti Networks	Job Number:	J86352
Model:	Rocket M5 Titanium	T-Log Number:	T88118
		Account Manager:	Susan Pelzl
Contact:	Jennifer Sanchez		
Standard:	FCC 15.247, RSS-210, RSS-310, FCC 15B	Class:	N/A

RSS 210 and FCC 15.247 (DTS) Radiated Spurious Emissions

Test Specific Details

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

General Test Configuration

The EUT and all local support equipment were located on the turntable for radiated spurious emissions testing. All remote support equipment was located approximately 30 meters from the EUT.

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

Ambient Conditions:

Temperature: 20.6 °C
Rel. Humidity: 33 %

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

Run #	Mode	Channel	Power Setting	Measured Power	Test Performed	Limit	Result / Margin
1a	802.11a	low	19	-	Radiated Emissions, 1 - 40GHz	FCC Part 15.209 / 15.247(c)	52.2 dBµV/m @ 11490.0 MHz (-1.8 dB)
1b	802.11a	center	19	-	Radiated Emissions, 1 - 40GHz	FCC Part 15.209 / 15.247(c)	47.0 dBµV/m @ 11568.6 MHz (-7.0 dB)
1c	802.11a	high	19	-	Radiated Emissions, 1 - 40GHz	FCC Part 15.209 / 15.247(c)	53.8 dBµV/m @ 11648.7 MHz (-0.2 dB)
2a	n20	low	17	-	Radiated Emissions, 1 - 40GHz	FCC Part 15.209 / 15.247(c)	53.1 dBµV/m @ 11488.3 MHz (-0.9 dB)
2b	n20	center	19	-	Radiated Emissions, 1 - 40GHz	FCC Part 15.209 / 15.247(c)	51.7 dBµV/m @ 11564.9 MHz (-2.3 dB)
2c	n20	high	19	-	Radiated Emissions, 1 - 40GHz	FCC Part 15.209 / 15.247(c)	53.6 dBµV/m @ 11645.6 MHz (-0.4 dB)
3a	n40	low	19	-	Radiated Emissions, 1 - 40GHz	FCC Part 15.209 / 15.247(c)	48.8 dBµV/m @ 11508.7 MHz (-5.2 dB)
3b	n40	high	19	-	Radiated Emissions, 1 - 40GHz	FCC Part 15.209 / 15.247(c)	49.0 dBµV/m @ 11584.1 MHz (-5.0 dB)
4a	HT10	low	16.5	-	Radiated Emissions, 1 - 40GHz	FCC Part 15.209 / 15.247(c)	53.7 dBµV/m @ 11469.9 MHz (-0.3 dB)
4b	HT10	center	18.0	-	Radiated Emissions, 1 - 40GHz	FCC Part 15.209 / 15.247(c)	53.9 dBµV/m @ 11577.8 MHz (-0.1 dB)
4c	HT10	high	12.5	-	Radiated Emissions, 1 - 40GHz	FCC Part 15.209 / 15.247(c)	53.8 dBµV/m @ 11678.6 MHz (-0.2 dB)

Client:	Ubiquiti Networks	Job Number:	J86352
Model:	Rocket M5 Titanium	T-Log Number:	T88118
		Account Manager:	Susan Pelzl
Contact:	Jennifer Sanchez		
Standard:	FCC 15.247, RSS-210, RSS-310, FCC 15B	Class:	N/A

Modifications Made During Testing

No modifications were made to the EUT during testing

Deviations From The Standard

No deviations were made from the requirements of the standard.

Notes

Testing performed using the 30dBi dish antenna
Preliminary testing showed no emissions below 1GHz and above 12GHz related to the radio
Emissions in the 4500-5500 MHz range were evaluated using the ESIB (pre-amp on) with band reject filter located at the antenna. No significant emissions observed.

Client:	Ubiquiti Networks	Job Number:	J86352
Model:	Rocket M5 Titanium	T-Log Number:	T88118
		Account Manager:	Susan Pelzl
Contact:	Jennifer Sanchez		
Standard:	FCC 15.247, RSS-210, RSS-310, FCC 15B	Class:	N/A

Run #1: Radiated Spurious Emissions, 1000 - 40,000 MHz. Operating Mode: 802.11a

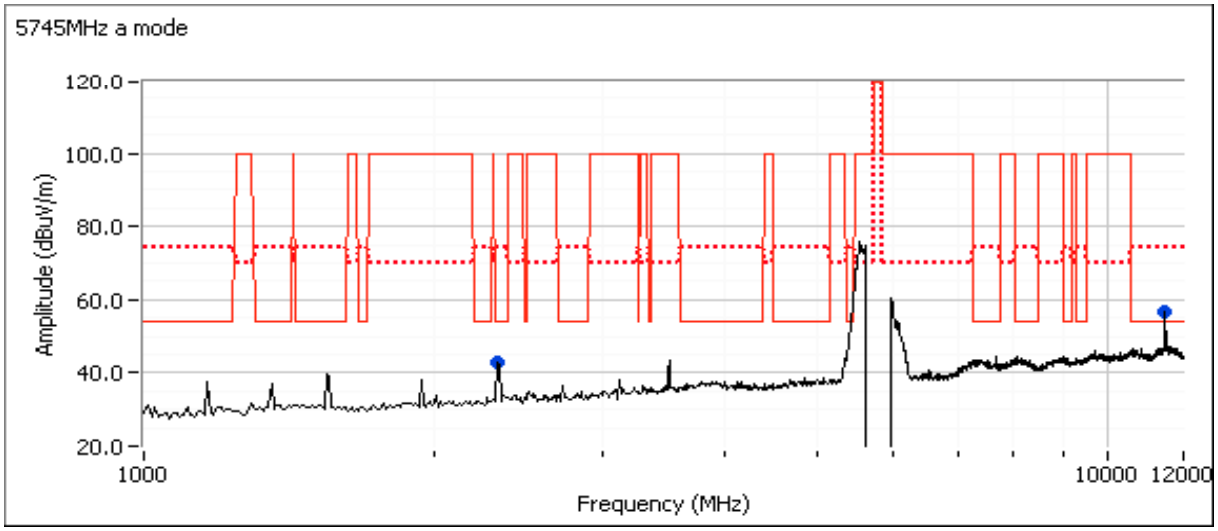
Date of Test: 7/12/2012
Test Engineer: Jack Liu
Test Location: FT 5

Run #1a: Low Channel @ 5745 MHz

Spurious Emissions:

Frequency	Level	Pol	15.209 / 15.247		Detector	Azimuth	Height	Comments
MHz	dBµV/m	v/h	Limit	Margin	Pk/QP/Avg	degrees	meters	
11490.000	52.2	H	54.0	-1.8	AVG	360	1.5	
11489.540	63.6	H	74.0	-10.4	PK	360	1.5	
2340.140	42.2	H	54.0	-11.8	AVG	225	1.0	
2340.340	46.1	H	74.0	-27.9	PK	225	1.0	

Note 1:	For emissions in restricted bands, the limit of 15.209 was used. For all other emissions, the limit was set 30dB below the level of the fundamental and measured in 100kHz.
Note 2:	Signal is not in a restricted band but the more stringent restricted band limit was used.

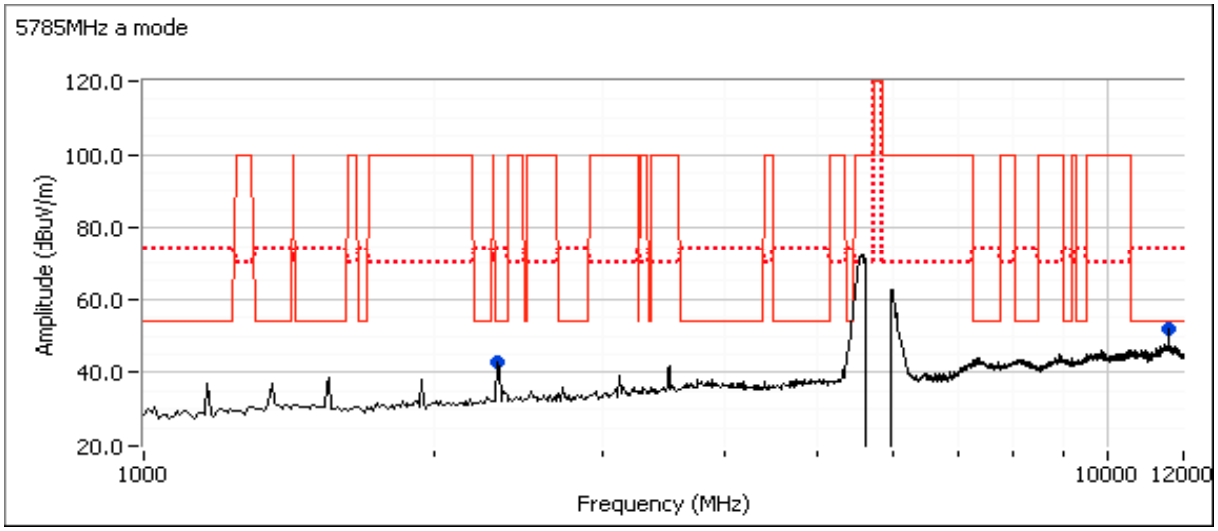


Client:	Ubiquiti Networks	Job Number:	J86352
Model:	Rocket M5 Titanium	T-Log Number:	T88118
		Account Manager:	Susan Pelzl
Contact:	Jennifer Sanchez		
Standard:	FCC 15.247, RSS-210, RSS-310, FCC 15B	Class:	N/A

Run #1b: Center Channel @ 5785 MHz
Spurious Emissions:

Frequency	Level	Pol	15.209 / 15.247		Detector	Azimuth	Height	Comments
MHz	dBµV/m	v/h	Limit	Margin	Pk/QP/Avg	degrees	meters	
11568.600	47.0	H	54.0	-7.0	AVG	360	1.0	
11569.130	58.3	H	74.0	-15.7	PK	360	1.0	
2340.070	41.3	H	54.0	-12.7	AVG	230	1.0	
2339.820	46.0	H	74.0	-28.0	PK	230	1.0	

Note 1:	For emissions in restricted bands, the limit of 15.209 was used. For all other emissions, the limit was set 30dB below the level of the fundamental and measured in 100kHz.
Note 2:	Signal is not in a restricted band but the more stringent restricted band limit was used.

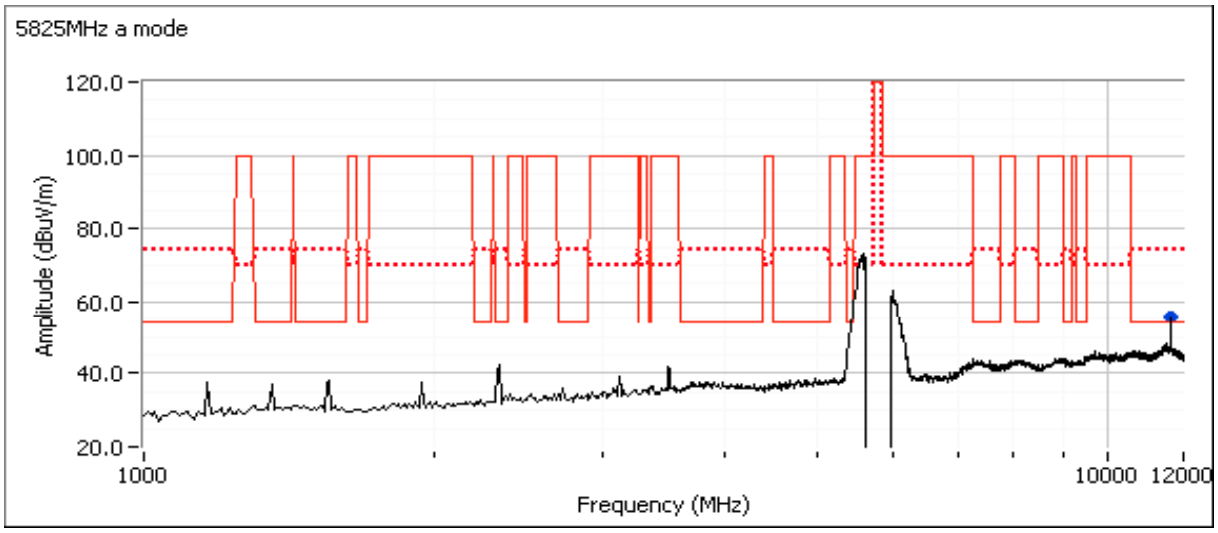


Client:	Ubiquiti Networks	Job Number:	J86352
Model:	Rocket M5 Titanium	T-Log Number:	T88118
		Account Manager:	Susan Pelzl
Contact:	Jennifer Sanchez		
Standard:	FCC 15.247, RSS-210, RSS-310, FCC 15B	Class:	N/A

Run #1c: High Channel @ 5825 MHz
Spurious Emissions:

Frequency	Level	Pol	15.209 / 15.247		Detector	Azimuth	Height	Comments
MHz	dBµV/m	v/h	Limit	Margin	Pk/QP/Avg	degrees	meters	
11648.730	53.8	H	54.0	-0.2	AVG	3	1.5	RB 1 MHz;VB 10 Hz;Peak
11649.600	65.3	H	74.0	-8.7	PK	3	1.5	RB 1 MHz;VB 3 MHz;Peak

Note 1:	For emissions in restricted bands, the limit of 15.209 was used. For all other emissions, the limit was set 30dB below the level of the fundamental and measured in 100kHz.
Note 2:	Signal is not in a restricted band but the more stringent restricted band limit was used.



Client:	Ubiquiti Networks	Job Number:	J86352
Model:	Rocket M5 Titanium	T-Log Number:	T88118
		Account Manager:	Susan Pelzl
Contact:	Jennifer Sanchez		
Standard:	FCC 15.247, RSS-210, RSS-310, FCC 15B	Class:	N/A

Run #2: Radiated Spurious Emissions, 1000 - 40,000 MHz. Operating Mode: 802.11n20

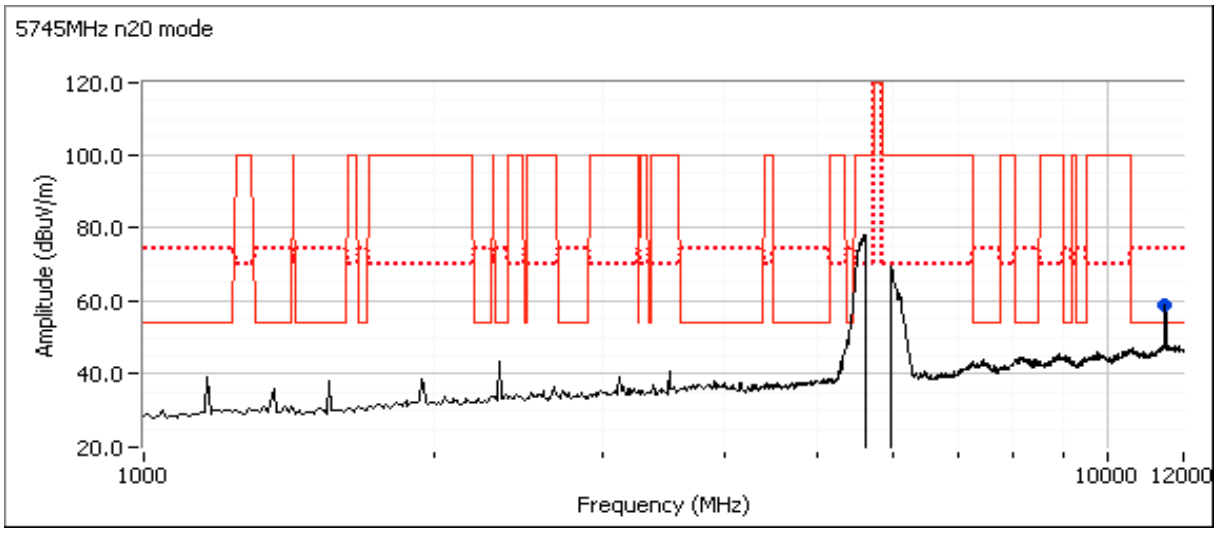
Date of Test: 7/17/2012
Test Engineer: Jack Liu
Test Location: FT 7

Run #2a: Low Channel @ 5745 MHz

Spurious Emissions:

Frequency	Level	Pol	15.209 / 15.247		Detector	Azimuth	Height	Comments
MHz	dBµV/m	v/h	Limit	Margin	Pk/QP/Avg	degrees	meters	
11488.280	53.1	H	54.0	-0.9	AVG	357	1.3	Setting 17
11488.680	65.1	H	74.0	-8.9	PK	357	1.3	Setting 17

Note 1:	For emissions in restricted bands, the limit of 15.209 was used. For all other emissions, the limit was set 30dB below the level of the fundamental and measured in 100kHz.
Note 2:	Signal is not in a restricted band but the more stringent restricted band limit was used.



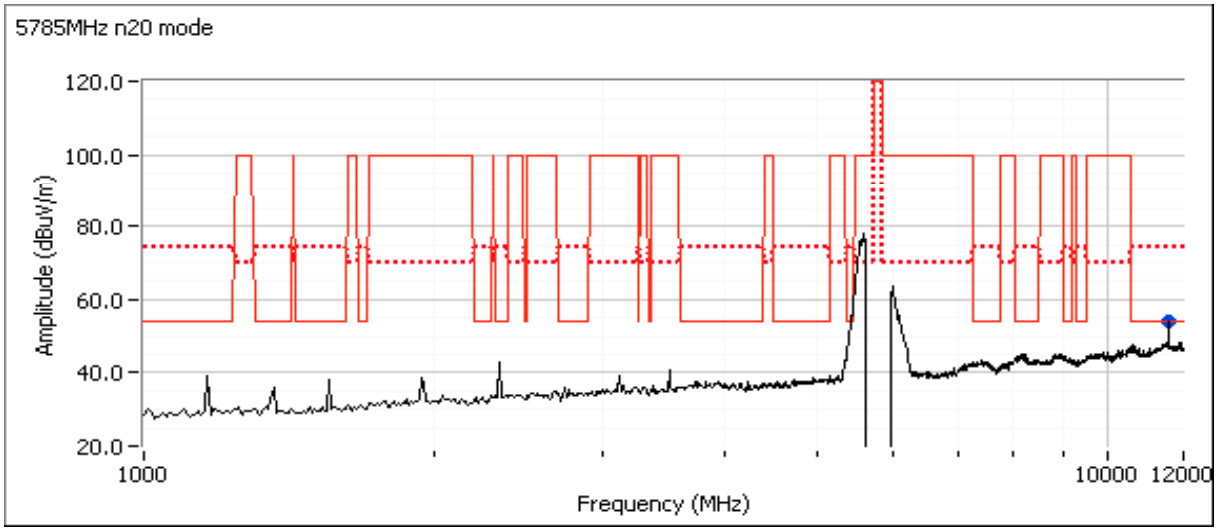
Client:	Ubiquiti Networks	Job Number:	J86352
Model:	Rocket M5 Titanium	T-Log Number:	T88118
		Account Manager:	Susan Pelzl
Contact:	Jennifer Sanchez		
Standard:	FCC 15.247, RSS-210, RSS-310, FCC 15B	Class:	N/A

Run #2b: Center Channel @ 5785 MHz

Spurious Emissions:

Frequency	Level	Pol	15.209 / 15.247		Detector	Azimuth	Height	Comments
MHz	dBµV/m	v/h	Limit	Margin	Pk/QP/Avg	degrees	meters	
11564.870	51.7	H	54.0	-2.3	AVG	356	1.3	
11564.990	63.7	H	74.0	-10.3	PK	356	1.3	

Note 1:	For emissions in restricted bands, the limit of 15.209 was used. For all other emissions, the limit was set 20dB below the level of the fundamental and measured in 100kHz.
Note 1:	For emissions in restricted bands, the limit of 15.209 was used. For all other emissions, the limit was set 30dB below the level of the fundamental and measured in 100kHz.
Note 2:	Signal is not in a restricted band but the more stringent restricted band limit was used.



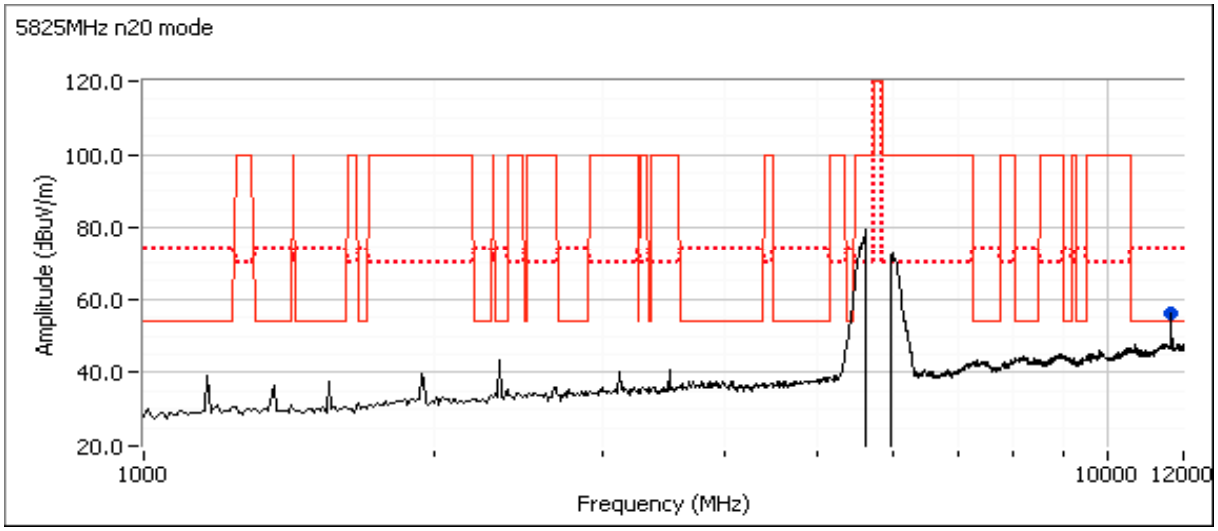
Client:	Ubiquiti Networks	Job Number:	J86352
Model:	Rocket M5 Titanium	T-Log Number:	T88118
		Account Manager:	Susan Pelzl
Contact:	Jennifer Sanchez		
Standard:	FCC 15.247, RSS-210, RSS-310, FCC 15B	Class:	N/A

Run #2c: High Channel @ 5825 MHz

Spurious Emissions:

Frequency	Level	Pol	15.209 / 15.247		Detector	Azimuth	Height	Comments
MHz	dBµV/m	v/h	Limit	Margin	Pk/QP/Avg	degrees	meters	
11645.620	53.6	V	54.0	-0.4	AVG	352	1.2	
11643.940	66.3	V	74.0	-7.7	PK	352	1.2	

Note 1:	For emissions in restricted bands, the limit of 15.209 was used. For all other emissions, the limit was set 30dB below the level of the fundamental and measured in 100kHz.
Note 2:	Signal is not in a restricted band but the more stringent restricted band limit was used.



Client:	Ubiquiti Networks	Job Number:	J86352
Model:	Rocket M5 Titanium	T-Log Number:	T88118
		Account Manager:	Susan Pelzl
Contact:	Jennifer Sanchez		
Standard:	FCC 15.247, RSS-210, RSS-310, FCC 15B	Class:	N/A

Run #3: Radiated Spurious Emissions, 1000 - 40,000 MHz. Operating Mode: 802.11n40

Run #3a: Low Channel @ 5755 MHz

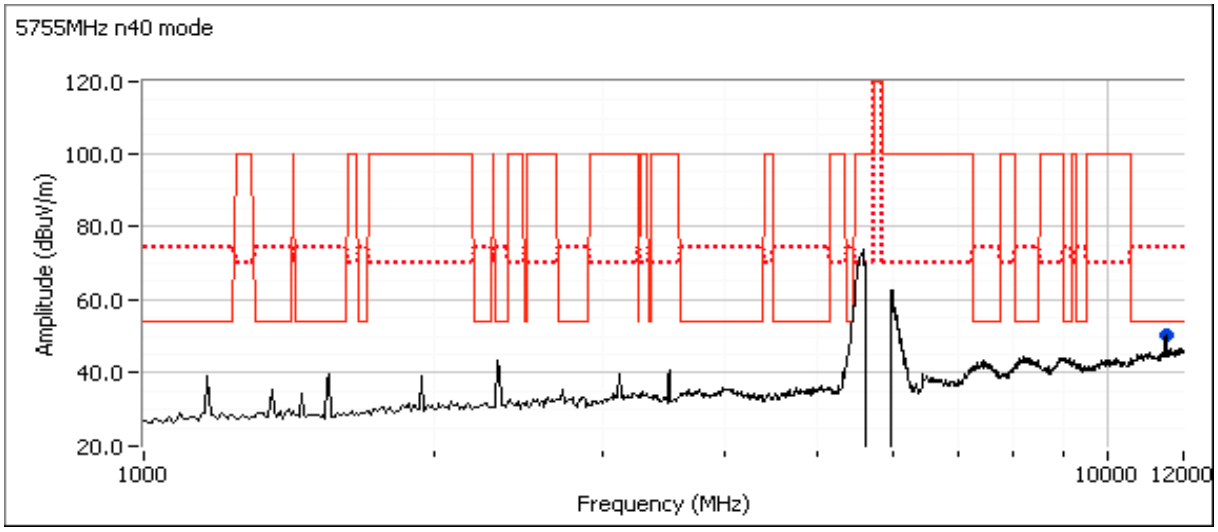
Date of Test: 7/17/2012 Test Location: FT7

Test Engineer: Jack Liu

Spurious Emissions:

Frequency	Level	Pol	15.209 / 15.247		Detector	Azimuth	Height	Comments
MHz	dBµV/m	v/h	Limit	Margin	Pk/QP/Avg	degrees	meters	
11508.720	48.8	H	54.0	-5.2	AVG	354	1.3	RB 1 MHz;VB 10 Hz;Peak
11506.290	60.8	H	74.0	-13.2	PK	354	1.3	RB 1 MHz;VB 3 MHz;Peak

Note 1:	For emissions in restricted bands, the limit of 15.209 was used. For all other emissions, the limit was set 30dB below the level of the fundamental and measured in 100kHz.
Note 2:	Signal is not in a restricted band but the more stringent restricted band limit was used. Refer to RF Port result.



Client:	Ubiquiti Networks	Job Number:	J86352
Model:	Rocket M5 Titanium	T-Log Number:	T88118
		Account Manager:	Susan Pelzl
Contact:	Jennifer Sanchez		
Standard:	FCC 15.247, RSS-210, RSS-310, FCC 15B	Class:	N/A

Run #3c: High Channel @ 5795 MHz

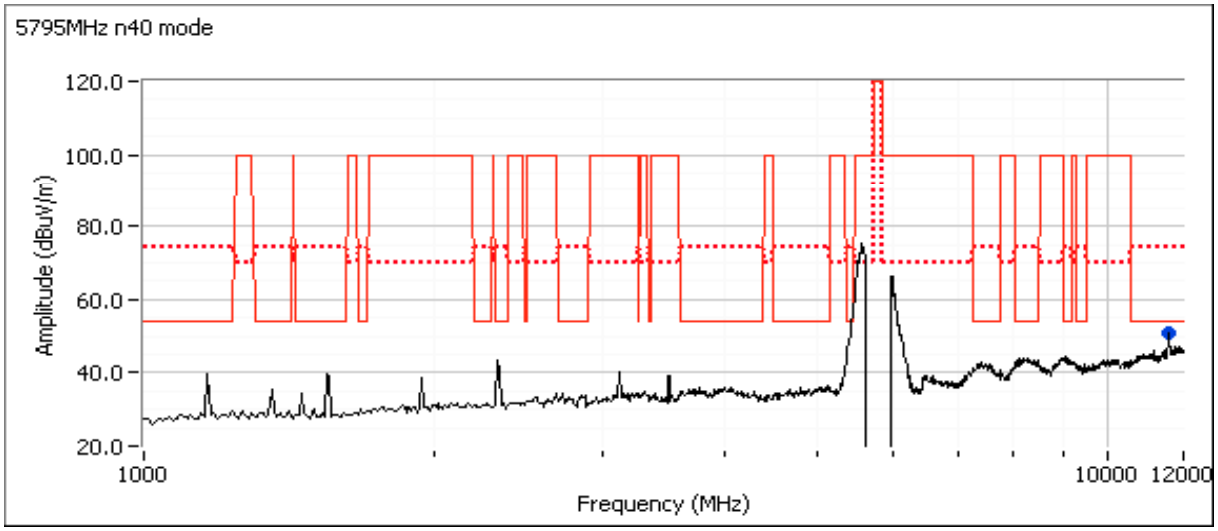
Date of Test: 7/18/2012 Test Location: FT7

Test Engineer: Jack Liu

Spurious Emissions:

Frequency	Level	Pol	15.209 / 15.247		Detector	Azimuth	Height	Comments
MHz	dBµV/m	v/h	Limit	Margin	Pk/QP/Avg	degrees	meters	
11584.100	49.0	H	54.0	-5.0	AVG	353	1.3	RB 1 MHz;VB 10 Hz;Peak
11586.470	61.1	H	74.0	-12.9	PK	353	1.3	RB 1 MHz;VB 3 MHz;Peak

Note 1:	For emissions in restricted bands, the limit of 15.209 was used. For all other emissions, the limit was set 30dB below the level of the fundamental and measured in 100kHz.
Note 2:	Signal is not in a restricted band but the more stringent restricted band limit was used. Refer to RF Port result.



Client:	Ubiquiti Networks	Job Number:	J86352
Model:	Rocket M5 Titanium	T-Log Number:	T88118
		Account Manager:	Susan Pelzl
Contact:	Jennifer Sanchez		
Standard:	FCC 15.247, RSS-210, RSS-310, FCC 15B	Class:	N/A

Run #4: Radiated Spurious Emissions, 1000 - 40,000 MHz. Operating Mode: 802.11 HT10

Run #4a: Low Channel @ 5735 MHz

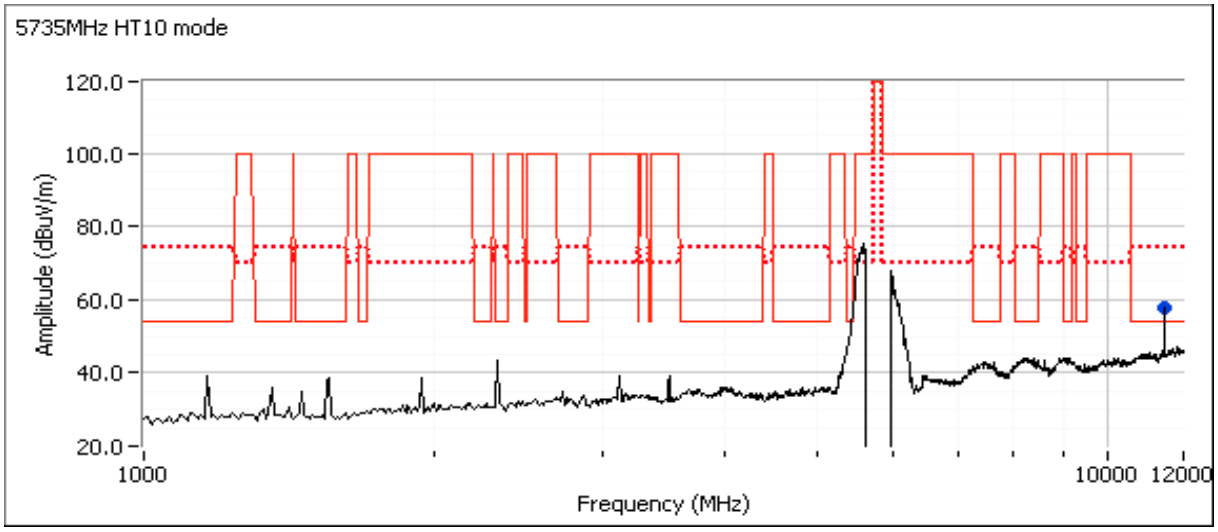
Date of Test: 7/18/2012 Test Location: FT7

Test Engineer: Jack Liu

Spurious Emissions:

Frequency	Level	Pol	15.209 / 15.247		Detector	Azimuth	Height	Comments
MHz	dBµV/m	v/h	Limit	Margin	Pk/QP/Avg	degrees	meters	
11469.860	53.7	H	54.0	-0.3	AVG	352	1.3	Setting 16.5
11469.700	64.9	H	74.0	-9.1	PK	352	1.3	Setting 16.5

Note 1:	For emissions in restricted bands, the limit of 15.209 was used. For all other emissions, the limit was set 30dB below the level of the fundamental and measured in 100kHz.
Note 2:	Signal is not in a restricted band but the more stringent restricted band limit was used. Refer to RF Port result.



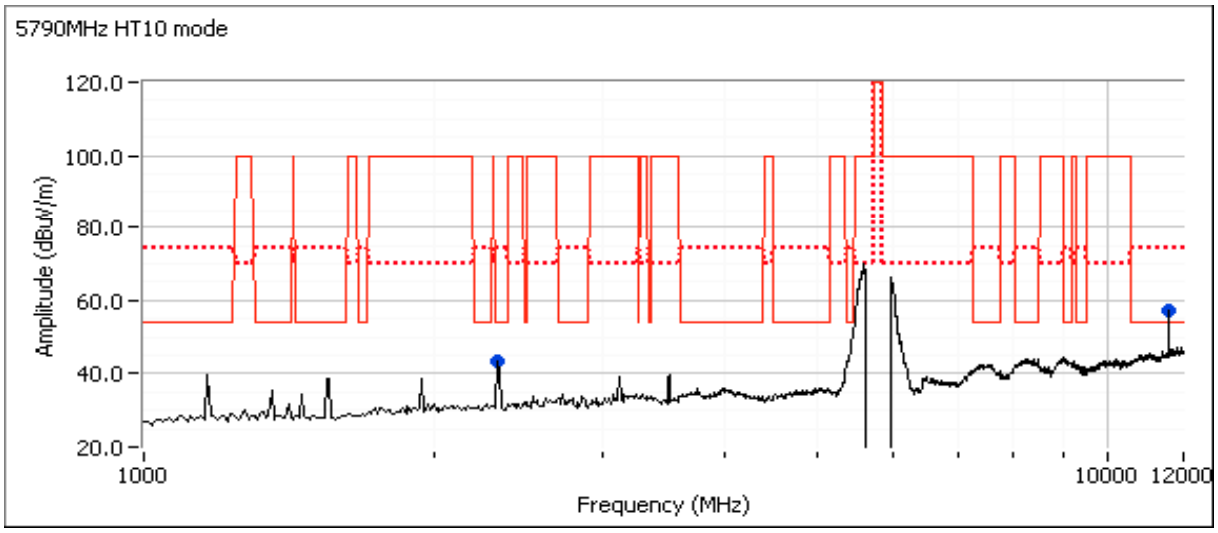
Client:	Ubiquiti Networks	Job Number:	J86352
Model:	Rocket M5 Titanium	T-Log Number:	T88118
		Account Manager:	Susan Pelzl
Contact:	Jennifer Sanchez		
Standard:	FCC 15.247, RSS-210, RSS-310, FCC 15B	Class:	N/A

Run #4b: MIddle Channel @ 5790 MHz

Spurious Emissions:

Frequency	Level	Pol	15.209 / 15.247		Detector	Azimuth	Height	Comments
MHz	dBµV/m	v/h	Limit	Margin	Pk/QP/Avg	degrees	meters	
11577.770	53.9	H	54.0	-0.1	AVG	349	1.3	Setting 18
11575.640	65.4	H	74.0	-8.6	PK	349	1.3	Setting 18
2339.990	44.0	V	54.0	-10.0	AVG	227	1.4	Setting 19
2340.100	46.6	V	74.0	-27.4	PK	227	1.4	Setting 19

Note 1:	For emissions in restricted bands, the limit of 15.209 was used. For all other emissions, the limit was set 30dB below the level of the fundamental and measured in 100kHz.
Note 2:	Signal is not in a restricted band but the more stringent restricted band limit was used. Refer to RF Port result.



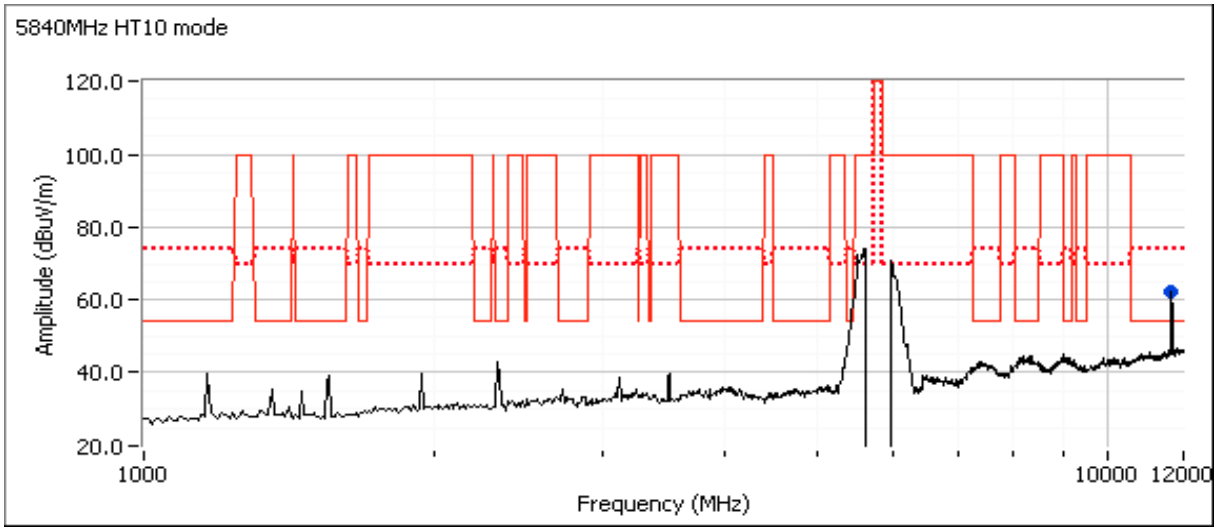
Client:	Ubiquiti Networks	Job Number:	J86352
Model:	Rocket M5 Titanium	T-Log Number:	T88118
		Account Manager:	Susan Pelzl
Contact:	Jennifer Sanchez		
Standard:	FCC 15.247, RSS-210, RSS-310, FCC 15B	Class:	N/A

Run #4c: High Channel @ 5840 MHz

Spurious Emissions:

Frequency	Level	Pol	15.209 / 15.247		Detector	Azimuth	Height	Comments
MHz	dBµV/m	v/h	Limit	Margin	Pk/QP/Avg	degrees	meters	
11678.580	53.8	H	54.0	-0.2	AVG	350	1.3	Setting 12.5
11678.720	68.6	H	74.0	-5.4	PK	350	1.3	Setting 12.5

Note 1:	For emissions in restricted bands, the limit of 15.209 was used. For all other emissions, the limit was set 30dB below the level of the fundamental and measured in 100kHz.
Note 2:	Signal is not in a restricted band but the more stringent restricted band limit was used. Refer to RF Port result.



Client:	Ubiquiti Networks	Job Number:	J86352
Model:	Rocket M5 Titanium	T-Log Number:	T88118
		Account Manager:	Susan Pelzl
Contact:	Jennifer Sanchez		
Standard:	FCC 15.247, RSS-210, RSS-310, FCC 15B	Class:	-

Conducted Emissions

(Elliott Laboratories Fremont Facility, Semi-Anechoic Chamber)

Test Specific Details

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

Date of Test: 2/22/2012
Test Engineer: Alika Hirano
Test Location: Fremont Chamber #3
Config. Used: 2
Config Change: None
EUT Voltage: Refer to individual run

General Test Configuration

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

Ambient Conditions:

Temperature: 19 °C
Rel. Humidity: 38 %

Summary of Results

Run #	Test Performed	Limit	Result	Margin
1	CE, AC Power,120V/60Hz	Class A	Pass	53.7 dBµV @ 4.864 MHz (-6.3 dB)

Modifications Made During Testing

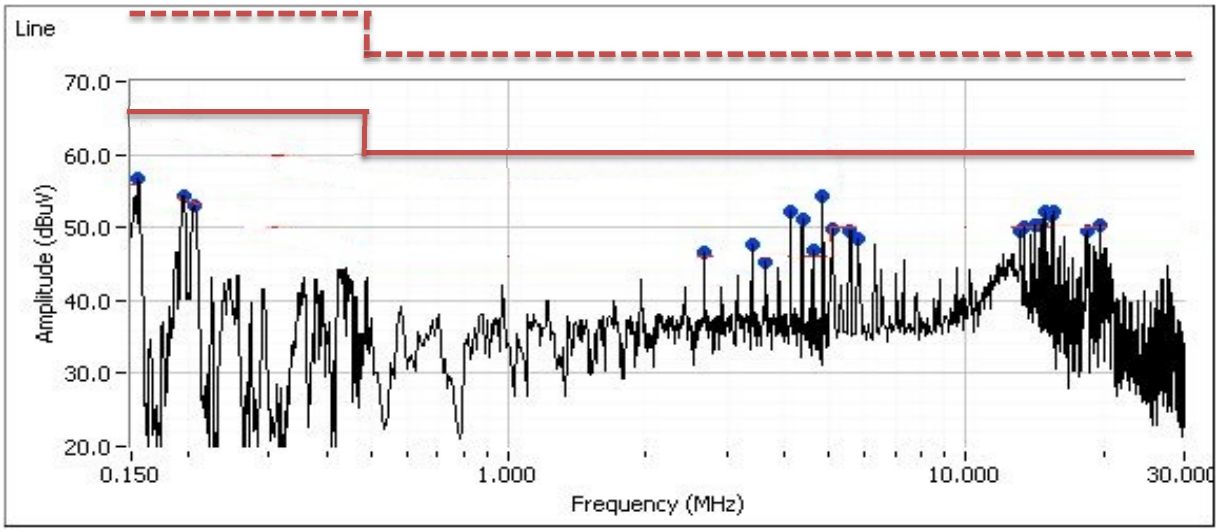
No modifications were made to the EUT during testing

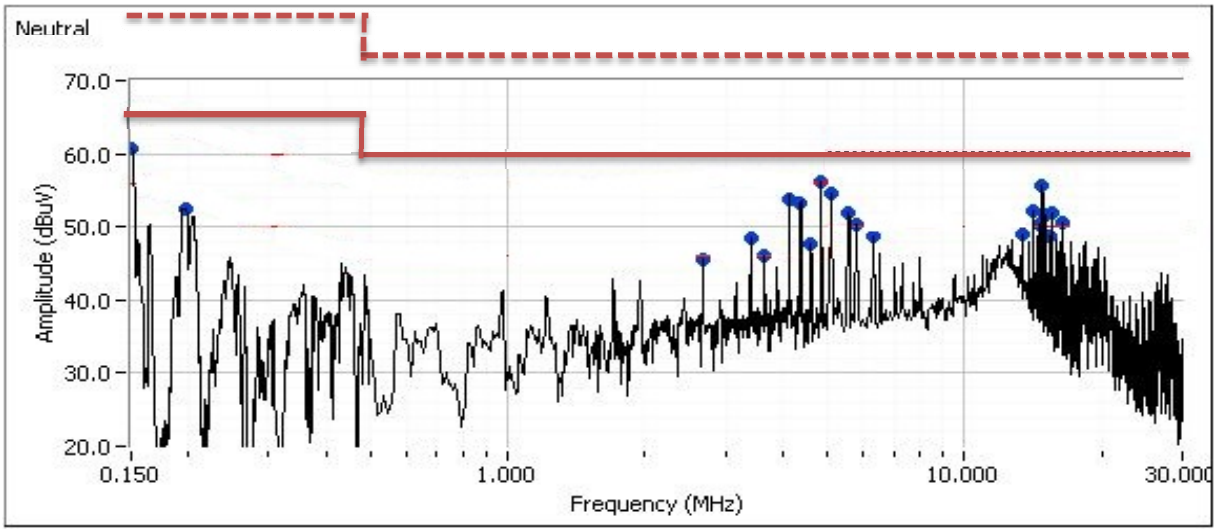
Deviations From The Standard

No deviations were made from the requirements of the standard.

Client:	Ubiquiti Networks	Job Number:	J86352
Model:	Rocket M5 Titanium	T-Log Number:	T88118
		Account Manager:	Susan Pelzl
Contact:	Jennifer Sanchez		
Standard:	FCC 15.247, RSS-210, RSS-310, FCC 15B	Class:	-

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





Client:	Ubiquiti Networks	Job Number:	J86352
Model:	Rocket M5 Titanium	T-Log Number:	T88118
		Account Manager:	Susan Pelzl
Contact:	Jennifer Sanchez		
Standard:	FCC 15.247, RSS-210, RSS-310, FCC 15B	Class:	-

Run #1: (continued)

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

Frequency	Level	AC	Class A		Detector	Comments
MHz	dBµV	Line	Limit	Margin	QP/Ave	
4.864	56.1	Neutral	60.0	-3.9	Peak	
14.835	55.6	Neutral	60.0	-4.4	Peak	
0.151	60.7	Neutral	66.0	-5.3	Peak	
5.108	54.7	Neutral	60.0	-5.3	Peak	
4.866	54.3	Line 1	60.0	-5.7	Peak	
4.134	53.8	Neutral	60.0	-6.2	Peak	
4.378	53.3	Neutral	60.0	-6.7	Peak	
14.839	52.3	Line 1	60.0	-7.7	Peak	
14.107	52.3	Neutral	60.0	-7.7	Peak	
4.137	52.2	Line 1	60.0	-7.8	Peak	
15.569	52.1	Line 1	60.0	-7.9	Peak	
5.594	52.0	Neutral	60.0	-8.0	Peak	
15.565	51.8	Neutral	60.0	-8.2	Peak	
15.329	51.6	Line 1	60.0	-8.4	Peak	
15.080	51.6	Neutral	60.0	-8.4	Peak	
4.378	51.1	Line 1	60.0	-8.9	Peak	
0.155	56.6	Line 1	66.0	-9.4	Peak	
16.296	50.6	Neutral	60.0	-9.4	Peak	
5.837	50.4	Neutral	60.0	-9.6	Peak	
14.109	50.3	Line 1	60.0	-9.7	Peak	
14.598	50.3	Line 1	60.0	-9.7	Peak	
19.710	50.3	Line 1	60.0	-9.7	Peak	
14.593	50.2	Neutral	60.0	-9.8	Peak	
13.380	50.1	Line 1	60.0	-9.9	Peak	
5.109	49.7	Line 1	60.0	-10.3	Peak	
5.596	49.6	Line 1	60.0	-10.4	Peak	
13.138	49.6	Line 1	60.0	-10.4	Peak	
18.489	49.6	Line 1	60.0	-10.4	Peak	
13.378	49.1	Neutral	60.0	-10.9	Peak	
6.323	48.8	Neutral	60.0	-11.2	Peak	
15.323	48.7	Neutral	60.0	-11.3	Peak	
5.839	48.4	Line 1	60.0	-11.6	Peak	
3.405	48.4	Neutral	60.0	-11.6	Peak	
0.195	54.2	Line 1	66.0	-11.8	Peak	
3.406	47.7	Line 1	60.0	-12.3	Peak	
4.621	47.6	Neutral	60.0	-12.4	Peak	

Client:	Ubiquiti Networks	Job Number:	J86352
Model:	Rocket M5 Titanium	T-Log Number:	T88118
		Account Manager:	Susan Pelzl
Contact:	Jennifer Sanchez		
Standard:	FCC 15.247, RSS-210, RSS-310, FCC 15B	Class:	-

Run #1: (continued)

Frequency	Level	AC	Class A		Detector	Comments
MHz	dBµV	Line	Limit	Margin	QP/Ave	
0.206	52.9	Line 1	66.0	-13.1	Peak	
4.622	46.8	Line 1	60.0	-13.2	Peak	
2.677	46.5	Line 1	60.0	-13.5	Peak	
0.199	52.4	Neutral	66.0	-13.6	Peak	
3.648	46.0	Neutral	60.0	-14.0	Peak	
2.675	45.6	Neutral	60.0	-14.4	Peak	
3.649	45.2	Line 1	60.0	-14.8	Peak	

Final quasi-peak and average readings

Frequency	Level	AC	Class A		Detector	Comments
MHz	dBµV	Line	Limit	Margin	QP/Ave	
4.864	53.7	Neutral	60.0	-6.3	AVG	AVG (0.10s)
4.866	53.6	Line 1	60.0	-6.4	AVG	AVG (0.10s)
14.835	53.0	Neutral	60.0	-7.0	AVG	AVG (0.10s)
14.839	52.2	Line 1	60.0	-7.8	AVG	AVG (0.10s)
4.134	51.5	Neutral	60.0	-8.5	AVG	AVG (0.10s)
5.108	51.3	Neutral	60.0	-8.7	AVG	AVG (0.10s)
15.565	51.3	Neutral	60.0	-8.7	AVG	AVG (0.10s)
5.109	50.8	Line 1	60.0	-9.2	AVG	AVG (0.10s)
15.569	50.5	Line 1	60.0	-9.5	AVG	AVG (0.10s)
4.137	50.3	Line 1	60.0	-9.7	AVG	AVG (0.10s)
4.378	50.3	Line 1	60.0	-9.7	AVG	AVG (0.10s)
14.107	50.2	Neutral	60.0	-9.8	AVG	AVG (0.10s)
4.378	50.1	Neutral	60.0	-9.9	AVG	AVG (0.10s)
14.109	49.9	Line 1	60.0	-10.1	AVG	AVG (0.10s)
5.594	49.2	Neutral	60.0	-10.8	AVG	AVG (0.10s)
15.080	48.4	Neutral	60.0	-11.6	AVG	AVG (0.10s)
5.596	48.3	Line 1	60.0	-11.7	AVG	AVG (0.10s)
16.296	48.3	Neutral	60.0	-11.7	AVG	AVG (0.10s)
14.593	47.4	Neutral	60.0	-12.6	AVG	AVG (0.10s)
5.837	47.2	Neutral	60.0	-12.8	AVG	AVG (0.10s)
15.323	47.1	Neutral	60.0	-12.9	AVG	AVG (0.10s)
3.405	46.5	Neutral	60.0	-13.5	AVG	AVG (0.10s)
3.406	46.4	Line 1	60.0	-13.6	AVG	AVG (0.10s)
13.378	46.4	Neutral	60.0	-13.6	AVG	AVG (0.10s)
5.839	46.1	Line 1	60.0	-13.9	AVG	AVG (0.10s)

Client:	Ubiquiti Networks	Job Number:	J86352
Model:	Rocket M5 Titanium	T-Log Number:	T88118
		Account Manager:	Susan Pelzl
Contact:	Jennifer Sanchez		
Standard:	FCC 15.247, RSS-210, RSS-310, FCC 15B	Class:	-

Run #1: (continued)

Frequency MHz	Level dBµV	AC Line	Class A Limit	Class A Margin	Detector QP/Ave	Comments
19.710	45.8	Line 1	60.0	-14.2	AVG	AVG (0.10s)
14.598	45.4	Line 1	60.0	-14.6	AVG	AVG (0.10s)
13.380	45.3	Line 1	60.0	-14.7	AVG	AVG (0.10s)
6.323	44.5	Neutral	60.0	-15.5	AVG	AVG (0.10s)
2.675	43.5	Neutral	60.0	-16.5	AVG	AVG (0.10s)
3.648	43.5	Neutral	60.0	-16.5	AVG	AVG (0.10s)
3.649	43.1	Line 1	60.0	-16.9	AVG	AVG (0.10s)
2.677	42.9	Line 1	60.0	-17.1	AVG	AVG (0.10s)
4.864	55.9	Neutral	73.0	-17.1	QP	QP (1.00s)
4.866	55.7	Line 1	73.0	-17.3	QP	QP (1.00s)
4.622	42.4	Line 1	60.0	-17.6	AVG	AVG (0.10s)
14.835	55.3	Neutral	73.0	-17.7	QP	QP (1.00s)
14.839	54.9	Line 1	73.0	-18.1	QP	QP (1.00s)
18.489	41.0	Line 1	60.0	-19.0	AVG	AVG (0.10s)
4.134	54.0	Neutral	73.0	-19.0	QP	QP (1.00s)
4.621	40.9	Neutral	60.0	-19.1	AVG	AVG (0.10s)
15.329	40.9	Line 1	60.0	-19.1	AVG	AVG (0.10s)
5.109	53.5	Line 1	73.0	-19.5	QP	QP (1.00s)
13.138	40.4	Line 1	60.0	-19.6	AVG	AVG (0.10s)
5.108	53.4	Neutral	73.0	-19.6	QP	QP (1.00s)
15.565	53.4	Neutral	73.0	-19.6	QP	QP (1.00s)
0.151	59.3	Neutral	79.0	-19.7	QP	QP (1.00s)
15.569	53.3	Line 1	73.0	-19.7	QP	QP (1.00s)
4.378	53.2	Line 1	73.0	-19.8	QP	QP (1.00s)
4.378	53.2	Neutral	73.0	-19.8	QP	QP (1.00s)
4.137	52.9	Line 1	73.0	-20.1	QP	QP (1.00s)
0.155	58.5	Line 1	79.0	-20.5	QP	QP (1.00s)
14.109	52.5	Line 1	73.0	-20.5	QP	QP (1.00s)
14.107	52.4	Neutral	73.0	-20.6	QP	QP (1.00s)
5.594	51.9	Neutral	73.0	-21.1	QP	QP (1.00s)
15.080	51.2	Neutral	73.0	-21.8	QP	QP (1.00s)
5.596	51.1	Line 1	73.0	-21.9	QP	QP (1.00s)
16.296	50.2	Neutral	73.0	-22.8	QP	QP (1.00s)
0.151	43.0	Neutral	66.0	-23.0	AVG	AVG (0.10s)
14.593	50.0	Neutral	73.0	-23.0	QP	QP (1.00s)
5.837	49.9	Neutral	73.0	-23.1	QP	QP (1.00s)
13.378	49.7	Neutral	73.0	-23.3	QP	QP (1.00s)

Client:	Ubiquiti Networks	Job Number:	J86352
Model:	Rocket M5 Titanium	T-Log Number:	T88118
		Account Manager:	Susan Pelzl
Contact:	Jennifer Sanchez		
Standard:	FCC 15.247, RSS-210, RSS-310, FCC 15B	Class:	-

Run #1: (continued)

Frequency MHz	Level dBµV	AC Line	Class A Limit	Class A Margin	Detector QP/Ave	Comments
15.323	49.4	Neutral	73.0	-23.6	QP	QP (1.00s)
14.598	49.3	Line 1	73.0	-23.7	QP	QP (1.00s)
5.839	49.1	Line 1	73.0	-23.9	QP	QP (1.00s)
13.380	49.0	Line 1	73.0	-24.0	QP	QP (1.00s)
3.405	48.6	Neutral	73.0	-24.4	QP	QP (1.00s)
3.406	48.4	Line 1	73.0	-24.6	QP	QP (1.00s)
19.710	48.2	Line 1	73.0	-24.8	QP	QP (1.00s)
18.489	47.1	Line 1	73.0	-25.9	QP	QP (1.00s)
6.323	47.1	Neutral	73.0	-25.9	QP	QP (1.00s)
15.329	46.7	Line 1	73.0	-26.3	QP	QP (1.00s)
0.195	52.3	Line 1	79.0	-26.7	QP	QP (1.00s)
3.648	46.1	Neutral	73.0	-26.9	QP	QP (1.00s)
4.622	46.0	Line 1	73.0	-27.0	QP	QP (1.00s)
3.649	45.7	Line 1	73.0	-27.3	QP	QP (1.00s)
2.675	45.7	Neutral	73.0	-27.3	QP	QP (1.00s)
0.195	38.5	Line 1	66.0	-27.5	AVG	AVG (0.10s)
13.138	45.3	Line 1	73.0	-27.7	QP	QP (1.00s)
2.677	45.2	Line 1	73.0	-27.8	QP	QP (1.00s)
0.155	38.1	Line 1	66.0	-27.9	AVG	AVG (0.10s)
4.621	44.8	Neutral	73.0	-28.2	QP	QP (1.00s)
0.199	50.8	Neutral	79.0	-28.2	QP	QP (1.00s)
0.199	37.2	Neutral	66.0	-28.8	AVG	AVG (0.10s)
0.206	49.9	Line 1	79.0	-29.1	QP	QP (1.00s)
0.206	31.5	Line 1	66.0	-34.5	AVG	AVG (0.10s)

End of Report

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