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Radio Test Report

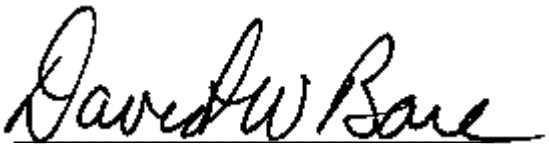
Industry Canada RSS 197
3650 MHz to 3700 MHz

RSS 197

Model: NanoStationM365/NanoBridgeM365

COMPANY:	Ubiquiti Networks 91 E. Tasman Drive San Jose, CA 95134
TEST SITE(S):	Elliott Laboratories 41039 Boyce Road. Fremont, CA. 94538-2435
REPORT DATE:	April 4, 2011
FINAL TEST DATES:	March 11, 14, 16, 17, 18, 21, 22 and 25, 2011

AUTHORIZED SIGNATORY:



David W. Bare
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A2LA ACCREDITED
Testing Cert #2016.01

REVISION HISTORY

Rev#	Date	Comments	Modified By
-	04/04/2011	First release	

TABLE OF CONTENTS

SCOPE

Tests have been performed on the Ubiquiti Networks model NanoStationM365/NanoBridgeM365, pursuant to the relevant requirements of the following standard(s) in order to obtain device certification against the regulatory requirements of the Federal Communications Commission and Industry Canada.

- Industry Canada RSS-Gen Issue 3
- RSS-197 Issue 1, February 2010 Wireless Broadband Access Equipment Operating in the Band 3650-3700 MHz

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 Elliott Laboratories test procedures:

ANSI C63.4:2003
ANSI TIA-603-C August 17, 2004

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

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.

The test results recorded herein are based on a single type test of the Ubiquiti Networks model NanoStationM365/NanoBridgeM365 and therefore apply only to the tested sample. The sample was selected and prepared by Jennifer Sanchez of Ubiquiti Networks.

OBJECTIVE

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

Prior to marketing in the USA, the device requires certification. Prior to marketing in Canada, Class I transmitters, receivers and transceivers require certification.

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 samples of Ubiquiti Networks models NanoStationM365/NanoBridgeM365 complied with the requirements of the standards and frequency bands declared in the scope of this test report.

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.

DEVIATIONS FROM THE STANDARDS

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

TEST RESULTS

RSS-197 – Base and Fixed Stations, 3650 – 3700 MHz

RSS-197	Description	Measured	Limit	Result
Transmitter Modulation, output power and other characteristics				
1	Frequency ranges (Listed for each channel spacing)	5MHz 3653-3697MHz 10MHz 3655-3695MHz 20MHz 3660-3690MHz 25MHz 3662-3688MHz	3650-3700 MHz Note 1	Complies
5.6	EIRP – Total power (Maximum for each channel spacing)	5MHz: 35.8dBm 10MHz: 38.6dBm 20MHz: 41.5dBm 25MHz: 42.4dBm	No limit, Radio must comply with PSD EIRP limit	Complies
	EIRP – PSD (Maximum)	5MHz: 29.9dBm/MHz 10MHz: 29.9dBm/MHz 20MHz: 29.9dBm/MHz 25MHz: 29.9dBm/MHz	1 Watt/MHz	Complies
5.1, 5.7	Emission types	D7D	Must be Digital	Complies
	Emission mask	Device complies with spectral mask – refer to test data	Mask B	Complies
5.2	Occupied (99%) Bandwidth	5MHz: 4.2 MHz 10MHz: 8.5 MHz 20MHz: 16.8 MHz 25MHz: 20.9 MHz	> 1 MHz	Complies
Transmitter spurious emissions				
5.7	At the antenna terminals	-16.0 dBm	-13 dBm/MHz	Complies
	Radiated (erp)	-38.0 dBm		Complies
Receiver spurious emissions				
5.8	Field strength	49.9 dBuV/m @ 3 m	RSS-GEN 7.2.3	
Other details				
4.2	Policies of use	Refer to operational description for details of the implementation.	Device must employ a contention-based protocol.	Complies
5.5	Restriction for Mobile/Portable	Fixed Use	Station operates only when receiving enabling signal	NA
5.3	Frequency stability	F_l – Frequency offset = 3650.02 MHz F_h + Frequency offset = 3699.92332 MHz	F_l – Frequency offset and F_h + Frequency offset remain in band	Complies
RSS-102	RF Exposure	Although RF exposure compliance is addressed at the time of licensing an MPE calculation has been provided to demonstrate compliance with limits at distances of 37.2cm or more from the antennas.		
-	Antenna Gain	This application is for antennas of 13 and 21dBi gain.		

Notes

1) The upper part of the allocated band from 3675 – 3700 MHz requires the device to use an unrestricted contention-based protocol except in low population areas per SRSP 303.65. This system has a restricted contention based protocol.

EXTREME CONDITIONS

Frequency stability is determined over extremes of temperature and voltage. The extremes of voltage were 85 to 115 percent of the nominal value.

The extremes of temperature were -30°C to +50°C as specified in FCC §2.1055(a)(1).

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 (based on a coverage factor (k=2) and were calculated in accordance with NAMAS document NIS 81 and M3003.

Measurement Type	Measurement Unit	Frequency Range	Expanded Uncertainty
RF frequency	Hz	25 to 7,000 MHz	1.7×10^{-7}
RF power, conducted	dBm	25 to 7,000 MHz	± 0.52 dB
Conducted emission of transmitter	dBm	25 to 40,000 MHz	± 0.7 dB
Conducted emission of receiver	dBm	25 to 40,000 MHz	± 0.7 dB
Radiated emission (substitution method)	dBm	25 to 40,000 MHz	± 2.5 dB
Radiated emission (field strength)	dBµV/m	25 to 1,000 MHz 1 to 40 GHz	± 3.6 dB ± 6.0 dB

EQUIPMENT UNDER TEST (EUT) DETAILS

GENERAL

The Ubiquiti Networks models NanoStationM365/NanoBridgeM365 are 3.65GHz CPE. Since the EUT would be pole-mounted during operation, the EUT was treated as table-top equipment during testing to simulate the end-user environment. The electrical rating of the EUT is 24V/0.5A POE.

The sample was received on March 5, 2011 and tested on March 11, 14, 16, 17, 18, 21, 22 and 25, 2011. The EUT consisted of the following component(s):

Company	Model	Description	Serial Number	FCC ID
Ubiquiti Networks	NanoStation M365 / NanoBridge M365	3.65GHz CPE	None	SWX-M365
Ubiquiti Networks	UBI-POE-24-1	PoE injector	None	None

OTHER EUT DETAILS

The following EUT details should be noted: The NanoBridge M365 is identical to the NanoStation M365 except it employs a dish antenna reflector which increases the antenna gain to 21 dBi instead of 13dBi.

The antenna is integral to the device.

ENCLOSURE

The EUT enclosure is primarily constructed of plastic. It measures approximately 45 cm wide by 42 cm deep by 3.5 cm high.

MODIFICATIONS

No modifications were made to the EUT during the time the product was at Elliott.

SUPPORT EQUIPMENT

No local support equipment was used during testing.

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

Company	Model	Description	Serial Number	FCC ID
HP	G42	Laptop	-	-

EUT INTERFACE PORTS

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

Port	Connected To	Cable(s)		
		Description	Shielded or Unshielded	Length(m)
Ethernet	PoE injector	Cat 5	Unshielded	1
Ethernet (PoE injector)	Laptop	Cat 5	Unshielded	10
AC Power (PoE injector)	AC Mains	3 wire	Unshielded	0.5

EUT OPERATION

During emissions testing the EUT was transmitting at various frequencies, bandwidths & data rates.

TESTING

GENERAL INFORMATION

Antenna port measurements were taken at the Elliott Laboratories test site located at 41039 Boyce Road, Fremont, CA 94538-2435.

Radiated spurious emissions measurements were taken at the Elliott Laboratories Anechoic Chambers and/or Open Area Test Site(s) listed below. The sites conform to the requirements of ANSI C63.4: 2003 *American National Standard for Methods of Measurement of Radio-Noise Emissions from Low-Voltage Electrical and Electronic Equipment in the Range of 9 kHz to 40 GHz* and CISPR 16-1-4:2007 - *Specification for radio disturbance and immunity measuring apparatus and methods Part 1-4: Radio disturbance and immunity measuring apparatus Ancillary equipment Radiated disturbances*. They are on file with the FCC and industry Canada.

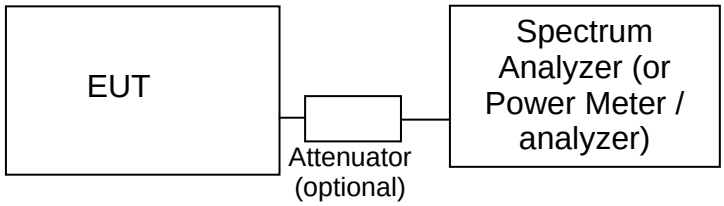
Site	Registration Numbers		Location
	FCC	Canada	
Chamber 4	211948	IC 2845B-4	41039 Boyce Road Fremont, CA 94538-2435
Chamber 7	A2LA Accredited	IC 2845B-7	

In the case of Open Area Test Sites, ambient levels are at least 6 dB below the specification limits with the exception of predictable local TV, radio, and mobile communications traffic.

Considerable engineering effort has been expended to ensure that the facilities conform to all pertinent requirements.

RF PORT MEASUREMENT PROCEDURES

Conducted measurements are performed with the EUT's rf input/output connected to the input of a spectrum analyzer, power meter or modulation analyzer. When required an attenuator, filter and/or dc block is placed between the EUT and the spectrum analyzer to avoid overloading the front end of the measurement device. Measurements are corrected for the insertion loss of the attenuators and cables inserted between the rf port of the EUT and the measurement equipment.



Test Configuration for Antenna Port Measurements

For devices with an integral antenna the output power and spurious emissions are measured as a field strength at a test distance of (typically) 3m and then converted to an eirp using a substitution measurement (refer to RADIATED EMISSIONS MEASUREMENTS). All other measurements are made as detailed below but with the test equipment connected to a measurement antenna directed at the EUT.

OUTPUT POWER

Output power is measured using a power meter and an average sensor head, a spectrum analyzer or a power meter and peak power sensor head as required by the relevant rule part(s). Where necessary measurements are gated to ensure power is only measured over periods that the device is transmitting.

Power measurements made directly on the rf power port are, when appropriate, converted to an EIRP by adding the gain of the highest gain antenna that can be used with the device under test, as specified by the manufacturer.

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. The measurement bandwidth is set to be at least 1% of the instrument's frequency span.

CONDUCTED SPURIOUS EMISSIONS

Initial scans are made using a peak detector (RBW=VBW) and using scan rates to ensure that the EUT transmits before the sweep moves out of each resolution bandwidth (for transmit mode measurements). Where the limits are expressed as an average power the spectrum analyzer is tunes to that frequency with a narrow span (wide enough to capture the emission and its sidebands) and the resolution and video bandwidths are adjusted as required by the reference measurement standards. For transmitter measurements the appropriate detector (average, peak, normal ,sample, quasi-peak) is used when making measurements for licensed devices. For receiver conducted spurious measurements the detector is set to peak.

TRANSMITTER MASK MEASUREMENTS

The transmitter mask measurements are made using resolution bandwidths as specified in the pertinent rule part(s). Where narrower bandwidths are used the measurement is corrected to account for the reduced bandwidth by either using the adjacent channel power function of the spectrum analyzer to sum the power across the required measurement bandwidth. The frequency span of the analyzer is set to ensure the fundamental signal and all significant sidebands are displayed.

The top of the mask may be set by the total output power of the signal, the power of the unmodulated signal or the peak value of the signal in the reference bandwidth being used for the mask measurement.

FREQUENCY STABILITY

The EUT is placed inside a temperature chamber with all support and test equipment located outside of the chamber. The temperature is varied across the specified frequency range in 10 degree increments with frequency measurements made at each temperature step. The EUT is allowed enough time to stabilize at each temperature variation.

The spectrum analyzer is configured to give a 5- or 6-digit display for the marker-frequency function. The spectrum analyzer's built-in frequency counter is used to measure the maximum deviation of the fundamental frequency at each temperature. Where possible the device is set to transmit an unmodulated signal. Where this is not possible the frequency drift is determined by finding a stable point on the signal (e.g. the null at the centre of an OFDM signal) or by calculating a centre frequency based on the upper and lower XdB points (where X is typically 6dB or 10dB) on the signal's skirts.

TRANSIENT FREQUENCY BEHAVIOR:

The TIA/EIA 603 procedure is used to determine compliance with transient frequency timing requirements as the radio is keyed on and off.

The EUTs rf output is connected via a combiner/splitter to the test receiver/spectrum analyzer and to a diode detector. The test receiver or spectrum analyzer video output is connected to an oscilloscope, which is triggered by the output from the diode detector.

Plots showing Ton, T1, and T2 are made when turning on the transmitter and showing T3 when turning off the transmitter.

RADIATED EMISSIONS MEASUREMENTS

Receiver radiated spurious emissions measurements are made in accordance with ANSI ANSI C63.4:2003 by measuring the field strength of the emissions from the device at a specific test distance and comparing them to a field strength limit. Where the field strength limit is specified at a longer distance than the measurement distance the measurement is extrapolated to the limit distance.

Transmitter radiated spurious emissions are initially measured as a field strength. The eirp or erp limit as specified in the relevant rule part(s) is converted to a field strength at the test distance and the emissions from the EUT are then compared to that limit. Emissions within 20dB of this limit are the subjected to a substitution measurement.

All radiated emissions measurements are performed in two phases. A preliminary scan of emissions is conducted in either an anechoic chamber or on an OATS during which all significant EUT frequencies are identified with the system in a nominal configuration. At least two scans are performed across the complete frequency range of interest and at each operating frequency identified in the reference standard. One or more of these is with the antenna polarized vertically while the one or more of these is with the antenna polarized horizontally. Initial scans are made using a peak detector (RBW=VBW) and using scan rates to ensure that the EUT transmits before the sweep moves out of each resolution bandwidth (for transmit mode).

During the preliminary scans, the EUT is rotated through 360°, the antenna height is varied and cable positions are varied to determine the highest emission relative to the limit. For transmitter spurious emissions, where the limit is expressed as an effective radiated power, the eirp or erp is converted to a field strength limit.

Final measurements are made on an OATS or in a semi-anechoic chamber at the significant frequencies observed during the preliminary scan(s) using the same process of rotating the EUT and raising/lowering the measurement antenna to find the highest level of the emission. The field strength is recorded and, for receiver spurious emissions, compared to the field strength limit. For the final measurement the appropriate detectors (average, peak, normal, sample, quasi-peak) are used. For receiver measurements below 1GHz the detector is a Quasi-Peak detector, above 1GHz a peak detector is used and the peak value (RB=VB=1MHz) and average value (RB=1MHz, VB=10Hz) are recorded.

For transmitter spurious emissions, the radiated power of all emissions within 20dB of the calculated field strength limit are determined using a substitution measurement. The substitution measurement is made by replacing the EUT with an antenna of known gain (typically a dipole antenna or a double-ridged horn antenna), connected to a signal source. The output power of the signal generator is adjusted until the maximum field strength from the substitution antenna is similar to the field strength recorded from the EUT. The erp of the EUT is then calculated.

INSTRUMENTATION

An EMI receiver as specified in CISPR 16-1-1 is used for radiated emissions measurements. The receivers used can measure over the frequency range of 9 kHz up to 7000 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.

For measurements above the frequency range of the receivers and for all conducted measurements a spectrum analyzer is utilized because it provides visibility of the entire spectrum along with the precision and versatility required to support engineering analysis.

Measurement bandwidths for the test instruments are set in accordance with the requirements of the standards referenced in this document.

Software control is used to correct the measurements for transducer factors (e.g. antenna) and the insertion loss of cables, attenuators and other series elements to obtain the final measurement value. This provides faster, more accurate readings by performing the conversions described under Sample Calculations within the Test Procedures section of this report. Results are exported in a graphic and/or tabular format, as appropriate.

FILTERS/ATTENUATORS

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

ANTENNAS

A combination of biconical, log periodic or bi-log antennas are used to cover the range from 30 MHz to 1000 MHz. Broadband antennas or tuned dipole antennas are used over the entire 25 to 1000 MHz frequency range as the reference antenna for substitution measurements.

Above 1000 MHz, a dual-ridge guide horn antenna or octave horn antenna are used as reference and measurement antennas.

The antenna calibration factors are included in site factors that are programmed into the test receivers and instrument control software when measuring the radiated field strength.

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.

Table mounted devices are placed on a non-conductive table at a height of 80 centimeters above the floor. Floor mounted equipment is 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. The EUT is positioned on a motorized turntable to allow it to be rotated during testing to determine the angel with the highest level of emissions.

SAMPLE CALCULATIONS

SAMPLE CALCULATIONS - CONDUCTED SPURIOUS EMISSIONS

Measurements are compared directly to the conducted emissions specification limit (decibel form). The calculation is as follows:

$$R_r - S = M$$

where:

R_r = Measured value in dBm
S = Specification Limit in dBm
M = Margin to Specification in +/- dB

SAMPLE CALCULATIONS –RADIATED FIELD STRENGTH

Measurements of radiated field strength are compared directly to the specification limit (decibel form). The receiver and/or control software 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 is sued when measurements are made at a test distance that is different to the specified limit distance 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:

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

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 –RADIATED POWER

The erp/eirp limits for transmitter spurious measurements are converted to a field strength in free space using the following formula:

$$E = \frac{\sqrt{30\ P\ G}}{d}$$

where:

E = Field Strength in V/m
P = Power in Watts
G = Gain of isotropic antenna (numeric gain) = 1
D = measurement distance in meters

The field strength limit is then converted to decibel form (dBuV/m) and the margin of a given emission peak relative to the limit is calculated (refer to *SAMPLE CALCULATIONS –RADIATED FIELD STRENGTH*).

When substitution measurements are required (all signals with less than 20dB of margin relative to the calculated field strength limit) the eirp of the spurious emission is calculated using:

$$P_{EUT} = P_S - (E_S - E_{EUT})$$

and

$$P_S = G + P_{in}$$

where:

P_S = effective isotropic radiated power of the substitution antenna (dBm)
P_{in} = power input to the substitution antenna (dBm)
G = gain of the substitution antenna (dBi)
E_S = field strength the substitution antenna (dBm) at eirp P_S
E_{EUT} = field strength measured from the EUT

Where necessary the effective isotropic radiated power is converted to effective radiated power by subtracting the gain of a dipole (2.2dBi) from the eirp value.

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

Appendix A Test Equipment Calibration Data

Radiated Emissions, 30 - 2,000 MHz, 05-Mar-11

Manufacturer	Description	Model	Asset #	Cal Due
Rohde & Schwarz	EMI Test Receiver, 20 Hz-7 GHz	ESIB7	1538	11/2/2011
EMCO	Antenna, Horn, 1-18 GHz	3115	1561	6/22/2012
Com-Power Corp.	Preamplifier, 30-1000 MHz	PA-103	1632	4/23/2011
Hewlett Packard	SpecAn 9 kHz - 40 GHz, (SA40) Purple	8564E (84125C)	1771	8/26/2011
Hewlett Packard	Microwave Preamplifier, 1-26.5GHz	8449B	1780	11/23/2011
Sunol Sciences	Biconilog, 30-3000 MHz	JB3	2197	12/29/2011

Conducted Emissions - AC Power Ports, 05-Mar-11

Manufacturer	Description	Model	Asset #	Cal Due
EMCO	LISN, 10 kHz-100 MHz	3825/2	1293	3/12/2011
Rohde & Schwarz	EMI Test Receiver, 20 Hz-7 GHz	ESIB7	1538	11/2/2011
Rohde & Schwarz	Pulse Limiter	ESH3 Z2	1594	5/27/2011

Radio Antenna Port (Power and Spurious Emissions), 08-Mar-11

Manufacturer	Description	Model	Asset #	Cal Due
Hewlett Packard	SpecAn 30 Hz -40 GHz, SV (SA40) Red	8564E (84125C)	1148	7/12/2011

Radiated Emissions, Rx mode, 30 - 11,000 MHz, 16-Mar-11

Manufacturer	Description	Model	Asset #	Cal Due
Hewlett Packard	Microwave Preamplifier, 1-26.5GHz	8449B	263	12/8/2011
EMCO	Antenna, Horn, 1-18 GHz	3115	487	7/6/2012
Hewlett Packard	SpecAn 9 kHz - 40 GHz, FT (SA40) Blue	8564E (84125C)	1393	4/14/2011
Rohde & Schwarz	EMI Test Receiver, 20 Hz-7 GHz	ESIB7	1538	11/2/2011
Com-Power Corp.	Preamplifier, 30-1000 MHz	PA-103	1632	4/23/2011
Sunol Sciences	Biconilog, 30-3000 MHz	JB3	2197	12/29/2011

Radio Antenna Port , 18-Mar-11

Manufacturer	Description	Model	Asset #	Cal Due
Agilent	PSA, Spectrum Analyzer, (installed options, 111, 115, 123, 1DS, B7J, HYX,	E4446A	2139	1/26/2012

Radiated Emissions, 30 - 18,000 MHz, 22-Mar-11

Manufacturer	Description	Model	Asset #	Cal Due
Hewlett Packard	Microwave Preamplifier, 1-26.5GHz	8449B	785	5/26/2011
Hewlett Packard	EMC Spectrum Analyzer, 9 KHz - 22 GHz	8593EM	1319	11/22/2011
Hewlett Packard	SpecAn 9 kHz - 40 GHz, FT (SA40) Blue	8564E (84125C)	1393	4/14/2011
Sunol Sciences	Biconilog, 30-3000 MHz	JB3	1548	6/24/2012
EMCO	Antenna, Horn, 1-18 GHz	3115	1561	6/22/2012
Com-Power Corp.	Preamplifier, 30-1000 MHz	PA-103A	2359	2/15/2012

Radiated Emissions, 30 - 37,000 MHz, 22-Mar-11

Manufacturer	Description	Model	Asset #	Cal Due
Hewlett Packard	Microwave Preamplifier, 1-26.5GHz	8449B	263	12/8/2011
EMCO	Antenna, Horn, 1-18 GHz (SA40-Red)	3115	1142	8/2/2012
Hewlett Packard	Head (Inc flex cable, 1143, 2198) Red	84125C	1145	2/17/2012
Hewlett Packard	SpecAn 30 Hz -40 GHz, SV (SA40) Red	8564E (84125C)	1148	7/12/2011
Hewlett Packard	EMC Spectrum Analyzer, 9 KHz - 22 GHz	8593EM	1319	11/22/2011
Sunol Sciences	Biconilog, 30-3000 MHz	JB3	1548	6/24/2012
A.H. Systems	Purple System Horn, 18-40GHz	SAS-574, p/n: 2581	2160	5/7/2011
Com-Power Corp.	Preamplifier, 30-1000 MHz	PA-103A	2359	2/15/2012

Frequency Stability, Part 90 & RSS 197, 25-Mar-11

Manufacturer	Description	Model	Asset #	Cal Due
Fluke Mfg. Inc.	Mulitmeter, True RMS	175	1447	7/8/2011
Agilent	PSA, Spectrum Analyzer, (installed options, 111, 115, 123, 1DS, B7J, HYX,	E4446A	2139	1/26/2012
Thermotron	Temp Chamber (w/ F4 Watlow Controller)	S1.2	2170	7/1/2011

Appendix B Test Data

Client:	Ubiquiti Networks	Job Number:	J82268
Model:	NanoBridgeM365 & NanoStationM365	T-Log Number:	T82413
		Account Manager:	Susan Pelzl
Contact:	Jennifer Sanchez		-
Emissions Standard(s):	FCC 15B, 90Z, RSS	Class:	-
Immunity Standard(s):	-	Environment:	-

EMC Test Data

For The

Ubiquiti Networks

Model

NanoBridgeM365 & NanoStationM365

Date of Last Test: 3/25/2011

Client:	Ubiquiti Networks	Job Number:	J82268
Model:	NanoBridgeM365 & NanoStationM365	T-Log Number:	T82413
		Account Manager:	Susan Pelzl
Contact:	Jennifer Sanchez		
Standard:	FCC 15B, 90Z, RSS	Class:	-

Radiated 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: 3/16/2011
Test Engineer: Joseph Cadigal
Test Location: Fremont Chamber #4
Config. Used: 1
Config Change: none
EUT Voltage: POE

General Test Configuration

The EUT and any local support equipment were located on the turntable for radiated emissions testing. Any remote support equipment was located outside 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.

The test distance and extrapolation factor (if applicable) are detailed under each run description.

Note, preliminary testing indicates that the emissions were maximized by orientation of the EUT and elevation of the measurement antenna. Maximized testing indicated that the emissions were maximized by orientation of the EUT, elevation of the measurement antenna, and manipulation of the EUT's interface cables.

Ambient Conditions:

Temperature: 20-25 °C
Rel. Humidity: 30-40 %

Summary of Results

Run #	Test Performed	Limit	Result	Margin
1	Radiated Emissions 30 - 1000 MHz, Preliminary	FCC B	Eval	-
2	Radiated Emissions 30 - 1000 MHz, Maximized	FCC B	Pass	39.9dBµV/m @ 780.00MHz (-6.1dB)
3	Radiated Emissions 1 GHz - 11 GHz Maximized	RSS GEN	Pass	49.9dBµV/m @ 1560.1MHz (-4.1dB)

Modifications Made During Testing

No modifications were made to the EUT during testing

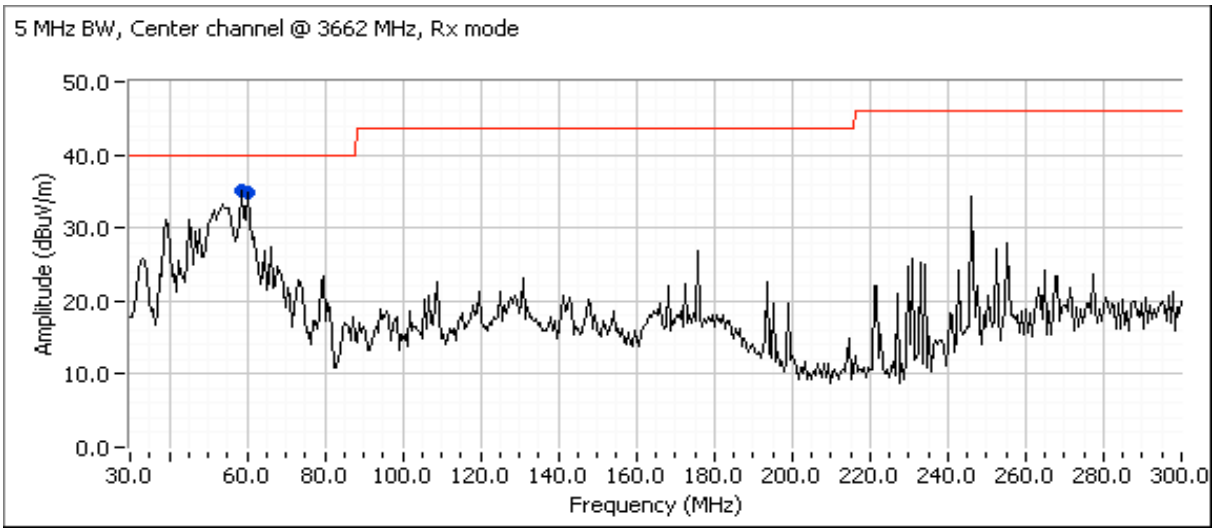
Deviations From The Standard

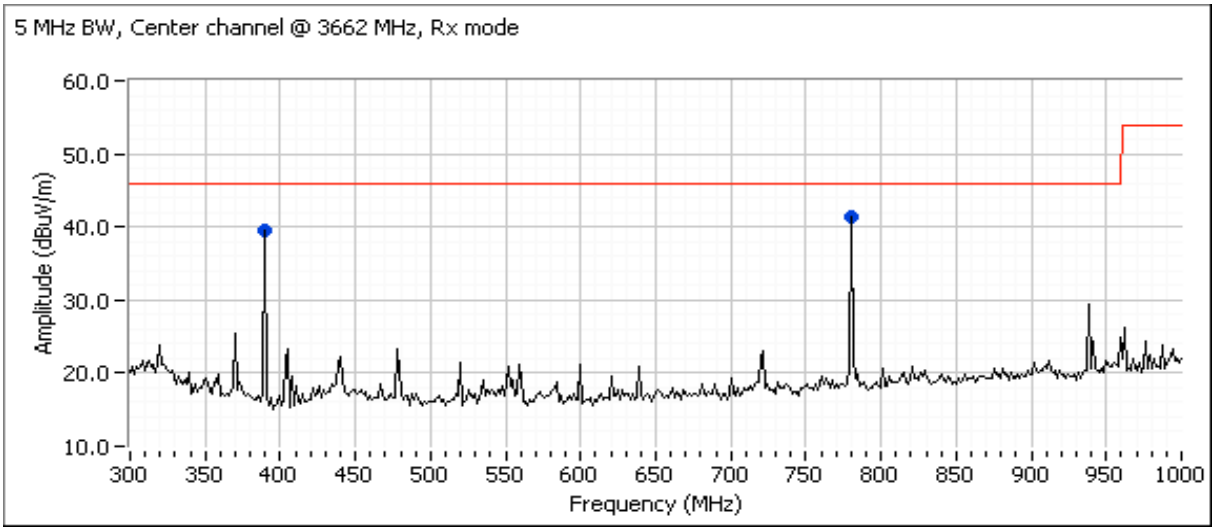
No deviations were made from the requirements of the standard.

Client:	Ubiquiti Networks	Job Number:	J82268
Model:	NanoBridgeM365 & NanoStationM365	T-Log Number:	T82413
		Account Manager:	Susan Pelzl
Contact:	Jennifer Sanchez		
Standard:	FCC 15B, 90Z, RSS	Class:	-

Run #1: Preliminary Radiated Emissions, 30 - 1000 MHz

Frequency Range	Test Distance	Limit Distance	Extrapolation Factor
30 - 1000 MHz	3	3	0.0





Client:	Ubiquiti Networks	Job Number:	J82268
Model:	NanoBridgeM365 & NanoStationM365	T-Log Number:	T82413
		Account Manager:	Susan Pelzl
Contact:	Jennifer Sanchez		
Standard:	FCC 15B, 90Z, RSS	Class:	-

Preliminary peak readings captured during pre-scan

Frequency	Level	Pol	FCC B		Detector	Azimuth	Height	Comments
MHz	dBµV/m	v/h	Limit	Margin	Pk/QP/Avg	degrees	meters	
58.795	35.0	V	40.0	-5.0	Peak	17	1.0	
60.235	34.8	V	40.0	-5.2	Peak	78	1.0	
780.004	41.5	H	46.0	-4.5	Peak	175	1.5	
390.007	39.6	V	46.0	-6.4	Peak	212	1.0	

Preliminary quasi-peak readings (no manipulation of EUT interface cables)

Frequency	Level	Pol	FCC B		Detector	Azimuth	Height	Comments
MHz	dBµV/m	v/h	Limit	Margin	Pk/QP/Avg	degrees	meters	
780.004	39.9	H	46.0	-6.1	QP	176	1.5	QP (1.00s)
390.007	38.2	V	46.0	-7.8	QP	213	1.0	QP (1.00s)
60.235	31.9	V	40.0	-8.1	QP	79	1.0	QP (1.00s)
58.795	29.9	V	40.0	-10.1	QP	15	1.0	QP (1.00s)

Run #2: Maximized Readings From Run #1

Maximized quasi-peak readings (includes manipulation of EUT interface cables)

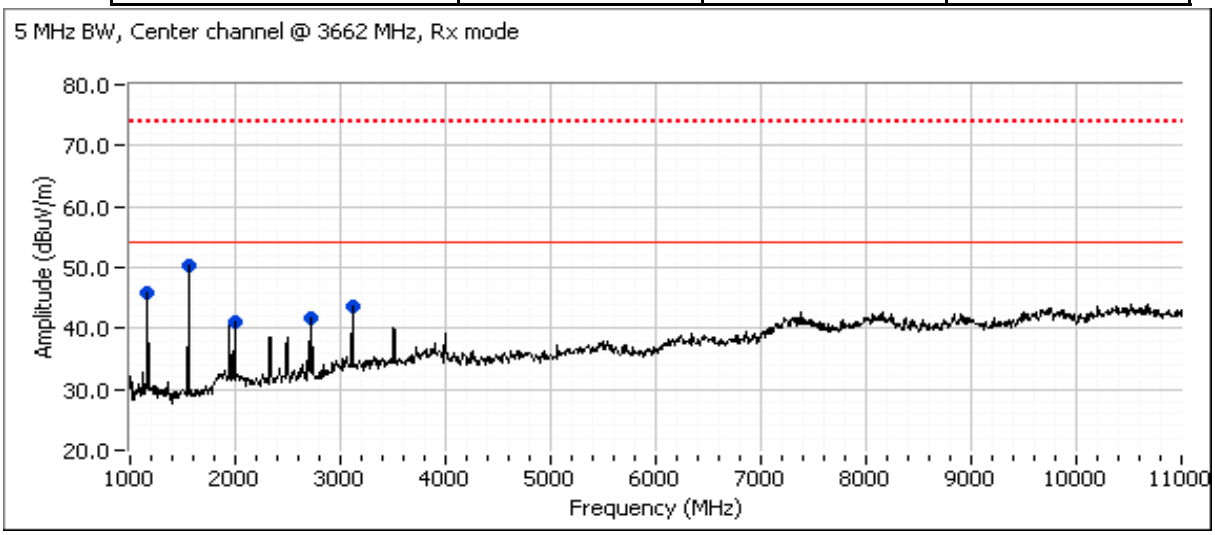
Frequency Range	Test Distance	Limit Distance	Extrapolation Factor
30 - 1000 MHz	3	3	0.0

Frequency	Level	Pol	FCC B		Detector	Azimuth	Height	Comments
MHz	dBµV/m	v/h	Limit	Margin	Pk/QP/Avg	degrees	meters	
780.004	39.9	H	46.0	-6.1	QP	176	1.5	QP (1.00s)
390.007	38.2	V	46.0	-7.8	QP	213	1.0	QP (1.00s)
60.235	31.9	V	40.0	-8.1	QP	79	1.0	QP (1.00s)
58.795	29.9	V	40.0	-10.1	QP	15	1.0	QP (1.00s)

Client:	Ubiquiti Networks	Job Number:	J82268
Model:	NanoBridgeM365 & NanoStationM365	T-Log Number:	T82413
		Account Manager:	Susan Pelzl
Contact:	Jennifer Sanchez		
Standard:	FCC 15B, 90Z, RSS	Class:	-

Run #3: Maximized Readings, 1000 - 11000 MHz

Frequency Range	Test Distance	Limit Distance	Extrapolation Factor
1000 - 18000 MHz	3	3	0.0



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

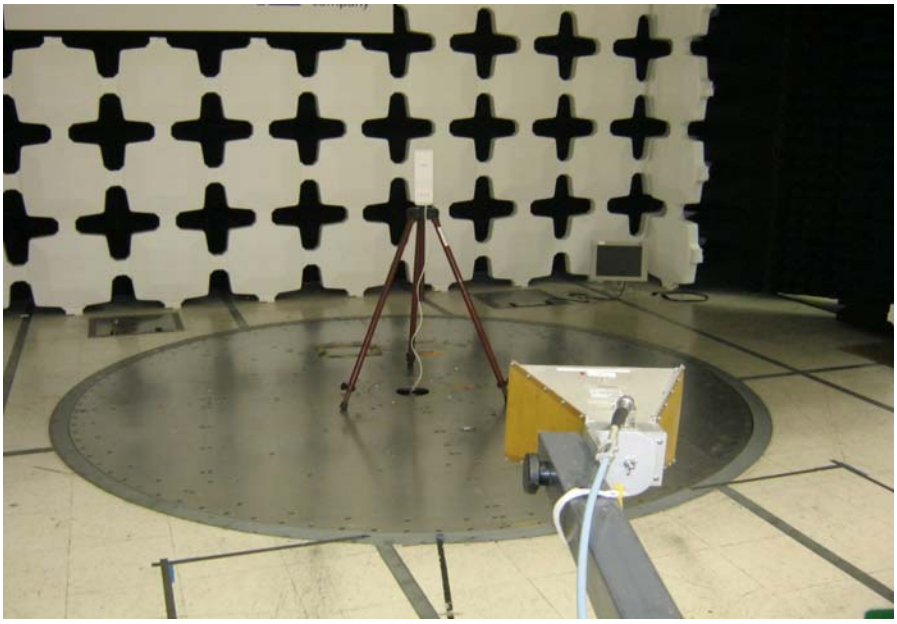
Frequency	Level	Pol	RSS GEN		Detector	Azimuth	Height	Comments
MHz	dBµV/m	v/h	Limit	Margin	Pk/QP/Avg	degrees	meters	
1984.360	41.2	H	54.0	-12.8	Peak	61	1.9	
1560.090	50.2	H	54.0	-3.8	Peak	158	1.0	
1170.060	46.0	H	54.0	-8.0	Peak	164	1.3	
2730.250	41.7	H	54.0	-12.3	Peak	197	1.6	
3120.060	43.7	H	54.0	-10.3	Peak	207	1.3	

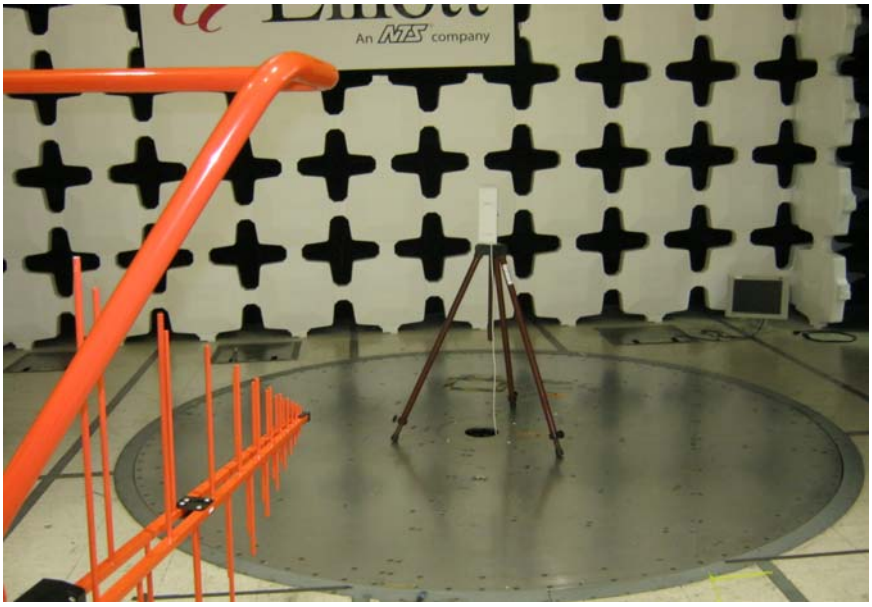
Final peak and average readings

Frequency	Level	Pol	RSS GEN		Detector	Azimuth	Height	Comments
MHz	dBµV/m	v/h	Limit	Margin	Pk/QP/Avg	degrees	meters	
1560.070	49.9	H	54.0	-4.1	AVG	159	1.0	RB 1 MHz;VB 10 Hz;Pk
1170.120	42.9	H	54.0	-11.1	AVG	165	1.3	RB 1 MHz;VB 10 Hz;Pk
2730.020	40.5	H	54.0	-13.5	AVG	199	1.6	RB 1 MHz;VB 10 Hz;Pk
3120.010	40.3	H	54.0	-13.7	AVG	208	1.3	RB 1 MHz;VB 10 Hz;Pk
1560.080	51.4	H	74.0	-22.6	PK	159	1.0	RB 1 MHz;VB 3 MHz;Pk
1982.890	27.1	H	54.0	-26.9	AVG	62	1.9	RB 1 MHz;VB 10 Hz;Pk
3119.860	47.0	H	74.0	-27.0	PK	208	1.3	RB 1 MHz;VB 3 MHz;Pk
1169.990	45.4	H	74.0	-28.6	PK	165	1.3	RB 1 MHz;VB 3 MHz;Pk
2729.810	45.3	H	74.0	-28.7	PK	199	1.6	RB 1 MHz;VB 3 MHz;Pk
1985.340	39.0	H	74.0	-35.0	PK	62	1.9	RB 1 MHz;VB 3 MHz;Pk

Note 1: Above 1 GHz, the limit is based on an average measurement. In addition, the peak reading of any emission above 1 GHz can not exceed the average limit by more than 20 dB.

Client:	Ubiquiti Networks	Job Number:	J82268
Model:	NanoBridgeM365 & NanoStationM365	T-Log Number:	T82413
		Account Manager:	Susan Pelzl
Contact:	Jennifer Sanchez		
Standard:	FCC 15B, 90Z, RSS	Class:	-





Client:	Ubiquiti Networks	Job Number:	J82268
Model:	NanoBridgeM365 & NanoStationM365	T-Log Number:	T82413
		Account Manager:	Susan Pelzl
Contact:	Jennifer Sanchez		
Standard:	FCC 15B, 90Z, RSS	Class:	-

RSS 197 and FCC Part 90
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: 3/22/2011
Test Engineer: Rafael Varelas
Test Location: FT Chamber #7

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

General Test Configuration

The EUT and all local support equipment were located on the turntable for radiated spurious emissions testing. All remote support equipment was located outside the chamber.

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

Ambient Conditions:

Temperature: 20-25 °C
Rel. Humidity: 30-40 %

Summary of Results

Run #	Mode	Channel	BW		Test Performed	Limit	Result / Margin
-	Data Rate MCS 0	High	All		Radiated Emissions, 30 MHz-37GHz	FCC 90.210 Mask B	All emissions are more than 20dB below the limit

Modifications Made During Testing

No modifications were made to the EUT during testing

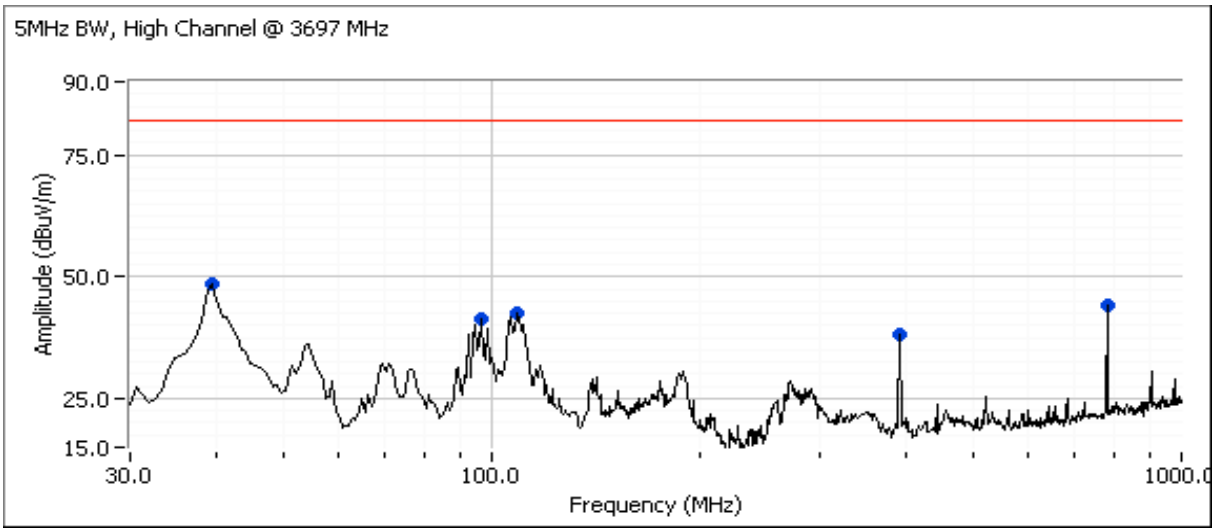
Deviations From The Standard

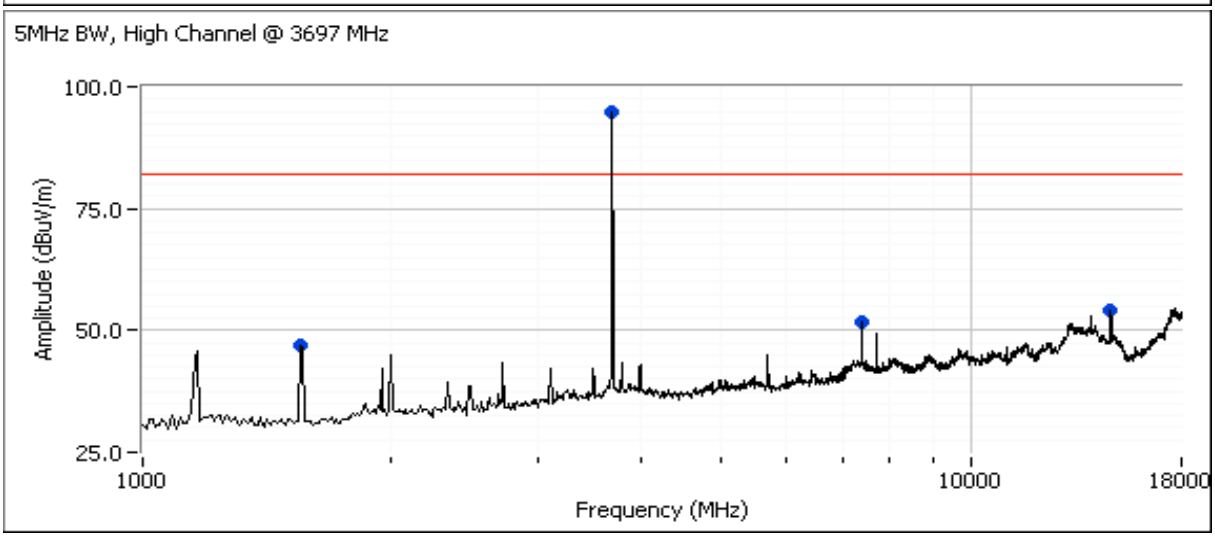
No deviations were made from the requirements of the standard.

Client:	Ubiquiti Networks	Job Number:	J82268
Model:	NanoBridgeM365 & NanoStationM365	T-Log Number:	T82413
		Account Manager:	Susan Pelzl
Contact:	Jennifer Sanchez		
Standard:	FCC 15B, 90Z, RSS	Class:	-

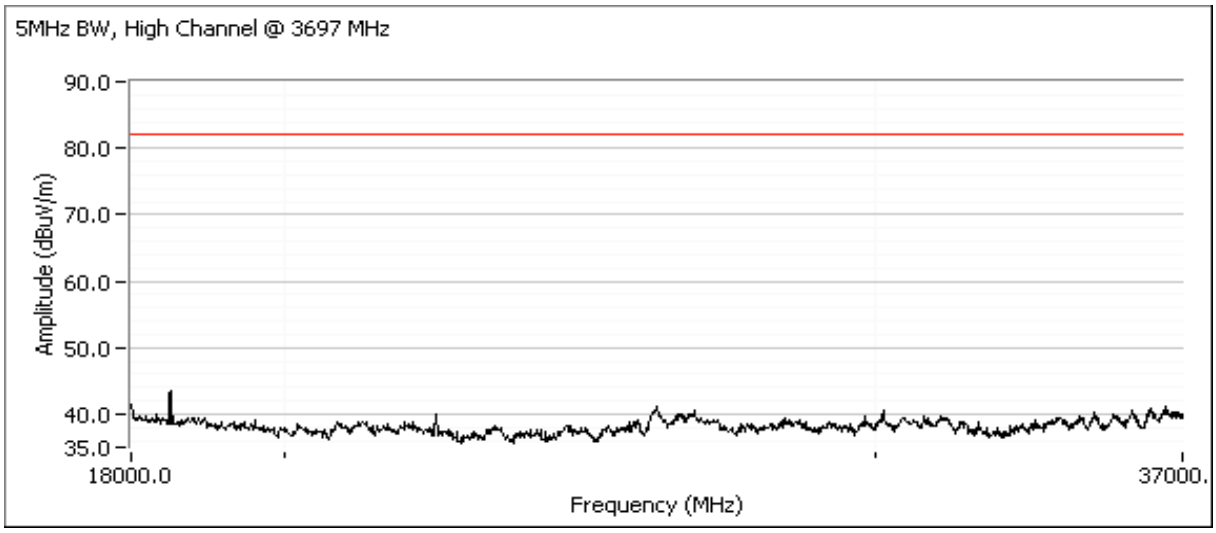
Run #1: Radiated Spurious Emissions, 30 - 37000 MHz.

Run #1a: High Channel @ 3697 MHz. Operating Mode: 5 MHz BW





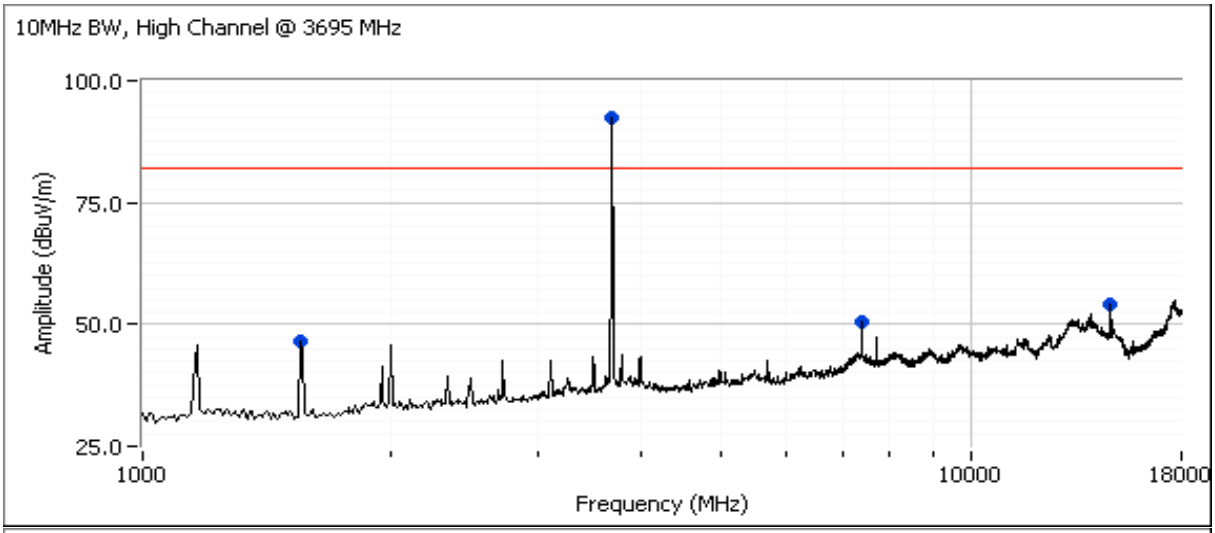
Client:	Ubiquiti Networks	Job Number:	J82268
Model:	NanoBridgeM365 & NanoStationM365	T-Log Number:	T82413
		Account Manager:	Susan Pelzl
Contact:	Jennifer Sanchez		
Standard:	FCC 15B, 90Z, RSS	Class:	-

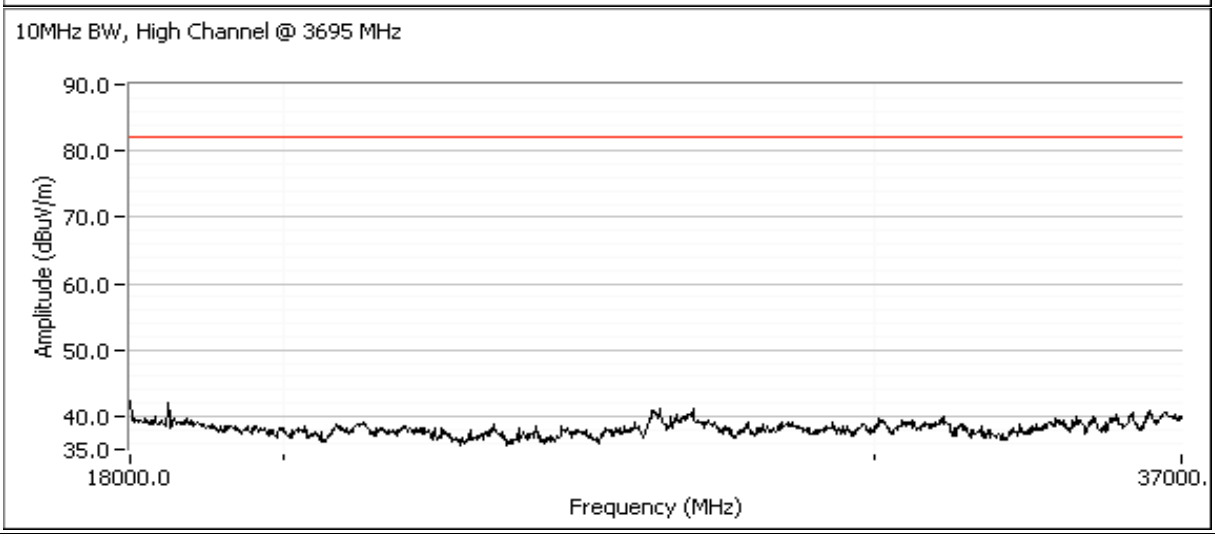


Frequency	Level	Pol	FCC 90.210		Detector	Azimuth	Height	Comments
MHz	dBµV/m	v/h	Limit	Margin	Pk/QP/Avg	degrees	meters	
39.450	*48.7*	*V*	*82.2*	*-33.5*	*Peak*	*33*	*1.0*	
96.825	*41.5*	*V*	*82.2*	*-40.7*	*Peak*	*163*	*1.0*	
108.975	*42.6*	*V*	*82.2*	*-39.6*	*Peak*	*160*	*1.0*	
391.000	*38.0*	*V*	*82.2*	*-44.2*	*Peak*	*141*	*1.0*	
781.250	*44.2*	*H*	*82.2*	*-38.0*	*Peak*	*5*	*1.5*	
1550.000	*46.8*	*H*	*82.2*	*-35.4*	*Peak*	*355*	*1.0*	
3697.000	*94.8*	*H*	*-*	*-*	*Peak*	*184*	*1.3*	*Fundamental*
7392.500	*51.6*	*H*	*82.2*	*-30.6*	*Peak*	*316*	*1.0*	
14786.670	*54.3*	*V*	*82.2*	*-27.9*	*Peak*	*19*	*1.3*	

Client:	Ubiquiti Networks	Job Number:	J82268
Model:	NanoBridgeM365 & NanoStationM365	T-Log Number:	T82413
		Account Manager:	Susan Pelzl
Contact:	Jennifer Sanchez		
Standard:	FCC 15B, 90Z, RSS	Class:	-

Run #1b: High Channel @ 3695 MHz. Operating Mode: 10 MHz BW



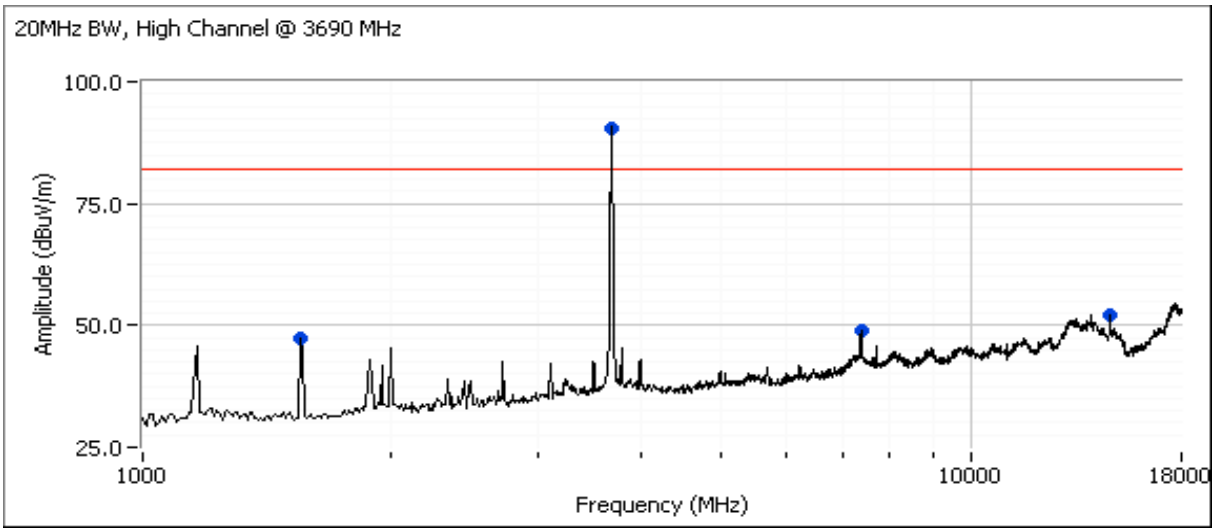


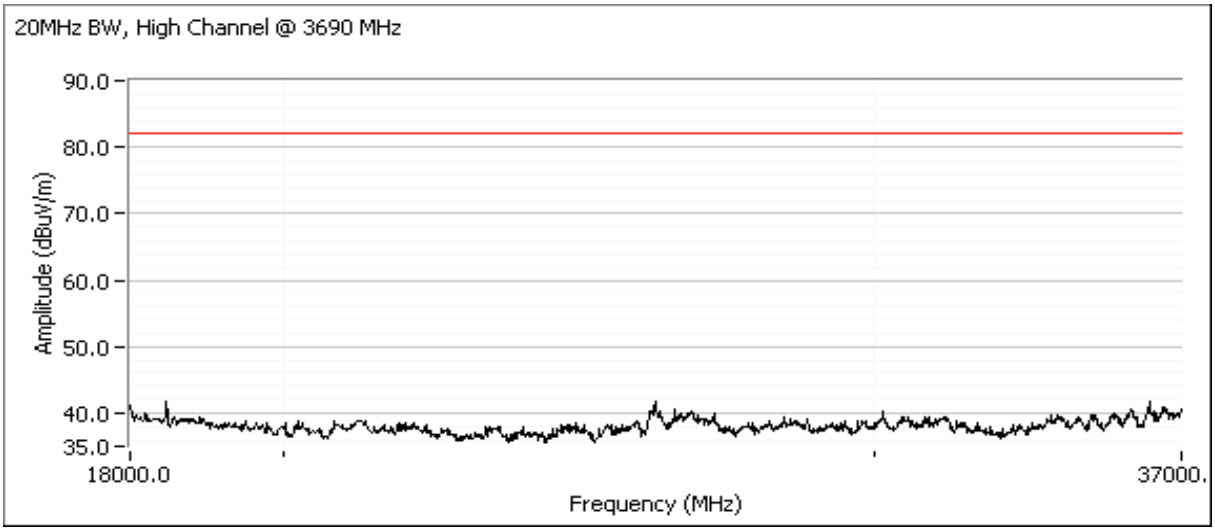
Frequency	Level	Pol	FCC 90.210		Detector	Azimuth	Height	Comments
MHz	dBµV/m	v/h	Limit	Margin	Pk/QP/Avg	degrees	meters	
1550.000	*46.7*	*H*	*82.2*	*-35.5*	*Peak*	*348*	*1.0*	
3695.000	*92.5*	*H*	-	-	*Peak*	*192*	*1.3*	*Fundamental*
7392.500	*50.4*	*H*	*82.2*	*-31.8*	*Peak*	*310*	*1.0*	
14786.670	*54.0*	*V*	*82.2*	*-28.2*	*Peak*	*20*	*1.3*	

Note 1:	Based on the measurements at the 5MHz BW and 25MHz BW, 30-1000 MHz was not performed for this channel since changing BW and channel did not make any difference for radiated emissions.

Client:	Ubiquiti Networks	Job Number:	J82268
Model:	NanoBridgeM365 & NanoStationM365	T-Log Number:	T82413
		Account Manager:	Susan Pelzl
Contact:	Jennifer Sanchez		
Standard:	FCC 15B, 90Z, RSS	Class:	-

Run #1c: High Channel @ 3690 MHz. Operating Mode: 20 MHz BW

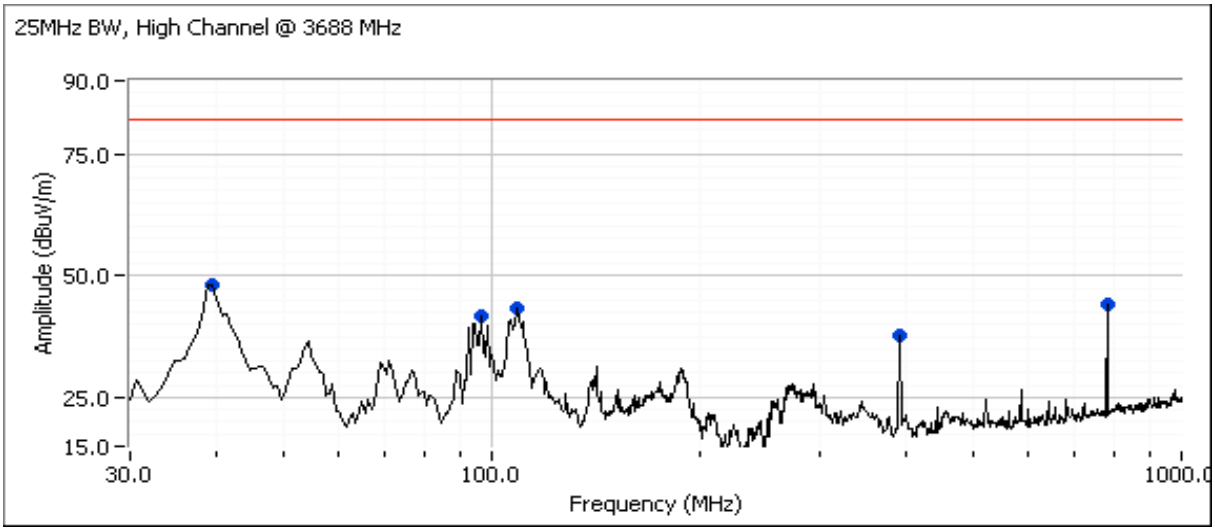


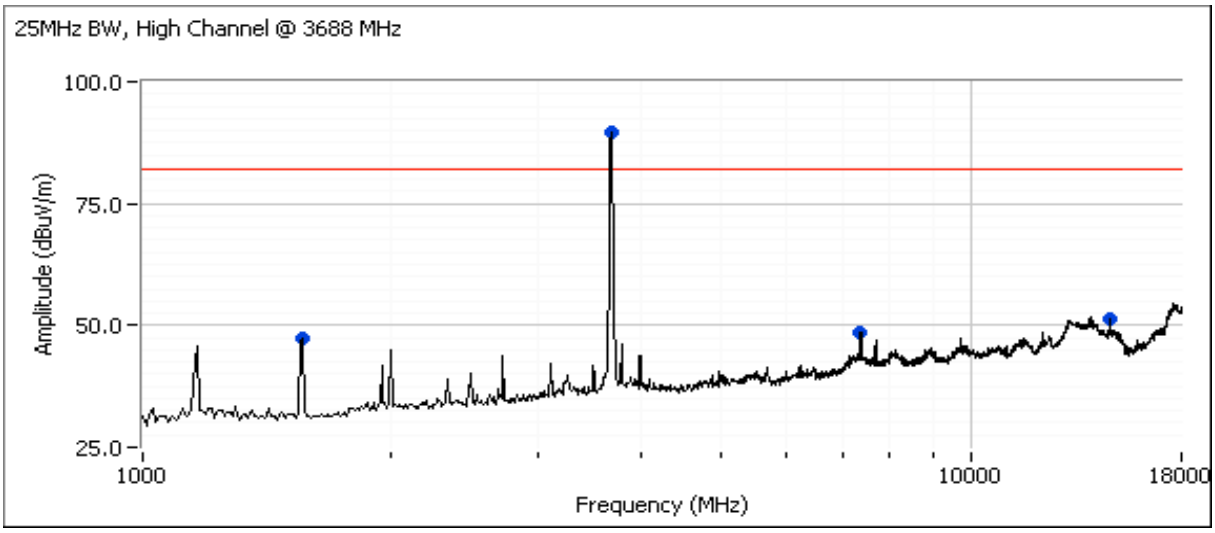


Frequency	Level	Pol	FCC 90.210		Detector	Azimuth	Height	Comments
MHz	dBµV/m	v/h	Limit	Margin	Pk/QP/Avg	degrees	meters	
1550.000	*47.2*	*H*	*82.2*	*-35.0*	*Peak*	*354*	*1.0*	
3690.000	*90.3*	*H*	*-*	*-*	*Peak*	*188*	*1.0*	*Fundamental*
7380.830	*49.1*	*H*	*82.2*	*-33.1*	*Peak*	*306*	*1.3*	
14773.330	*52.1*	*V*	*82.2*	*-30.1*	*Peak*	*20*	*1.3*	

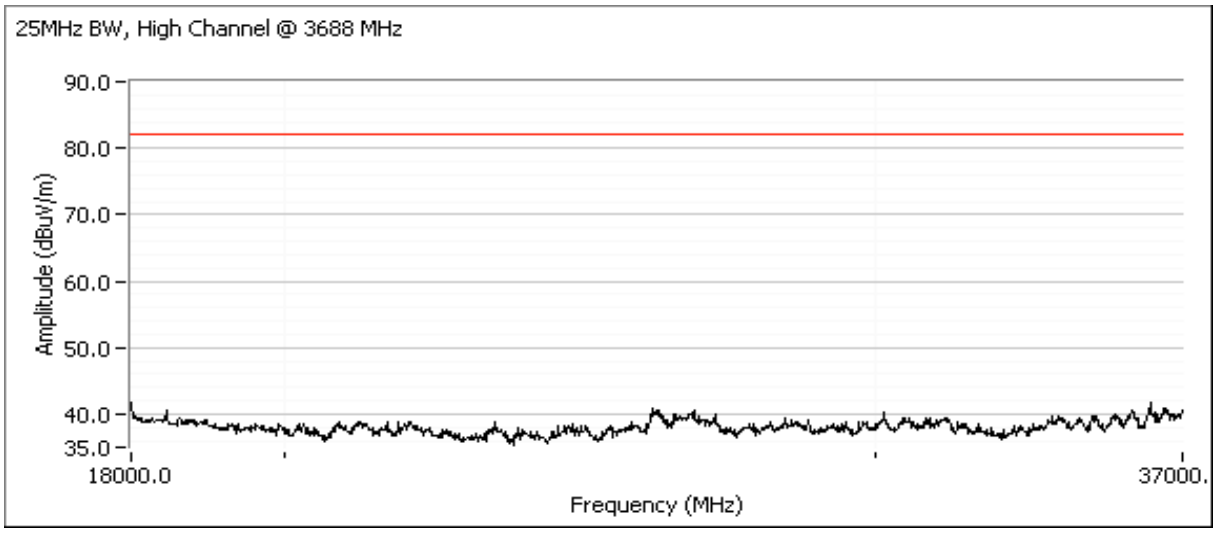
Client:	Ubiquiti Networks	Job Number:	J82268
Model:	NanoBridgeM365 & NanoStationM365	T-Log Number:	T82413
		Account Manager:	Susan Pelzl
Contact:	Jennifer Sanchez		
Standard:	FCC 15B, 90Z, RSS	Class:	-

Run #1d: High Channel @ 3688 MHz. Operating Mode: 25 MHz BW





Client:	Ubiquiti Networks	Job Number:	J82268
Model:	NanoBridgeM365 & NanoStationM365	T-Log Number:	T82413
		Account Manager:	Susan Pelzl
Contact:	Jennifer Sanchez		
Standard:	FCC 15B, 90Z, RSS	Class:	-



Frequency	Level	Pol	FCC 90.210		Detector	Azimuth	Height	Comments
MHz	dBµV/m	v/h	Limit	Margin	Pk/QP/Avg	degrees	meters	
39.450	*48.2*	*V*	*82.2*	*-34.0*	*Peak*	*47*	*1.0*	
96.825	*41.7*	*V*	*82.2*	*-40.5*	*Peak*	*44*	*1.0*	
108.975	*43.4*	*V*	*82.2*	*-38.8*	*Peak*	*30*	*1.0*	
391.000	*37.7*	*V*	*82.2*	*-44.5*	*Peak*	*140*	*1.0*	
781.250	*44.2*	*H*	*82.2*	*-38.0*	*Peak*	*5*	*1.5*	
1559.170	*47.2*	*H*	*82.2*	*-35.0*	*Peak*	*328*	*1.0*	
3688.000	*89.7*	*H*	-	-	*Peak*	*188*	*1.0*	*Fundamental*
7375.000	*48.5*	*H*	*82.2*	*-33.7*	*Peak*	*284*	*1.0*	
14760.000	*51.5*	*V*	*82.2*	*-30.7*	*Peak*	*28*	*1.3*	

Client:	Ubiquiti Networks	Job Number:	J82268
Model:	NanoBridgeM365 & NanoStationM365	T-Log Number:	T82413
		Account Manager:	Susan Pelzl
Contact:	Jennifer Sanchez		
Standard:	FCC 15B, 90Z, RSS	Class:	-

Run #2: Radiated Spurious Emissions, Transmit Mode: Substitution Measurements

Frequency	Level	Pol	FCC 90.210		Detector	Azimuth	Height	Comments	BW
MHz	dBµV/m	v/h	Limit	Margin	Pk/QP/Avg	degrees	meters		
14786.670	54.3	V	82.2	-27.9	Peak	19	1.3		5MHz

Vertical

Frequency	Substitution measurements			Site	EUT measurements			eirp Limit	erp Limit	Margin
MHz	Pin[1]	Gain[2]	FS[3]	Factor[4]	FS[5]	eirp (dBm)	erp (dBm)	dBm	dBm	dB
All signals were more than 20dB below the computed FS limit - No subs required										

Note 1:	Pin is the input power (dBm) to the substitution antenna
Note 2:	Gain is the gain (dBi) for the substitution antenna. A dipole has a gain of 2.2dBi.
Note 3:	FS is the field strength (dBuV/m) measured from the substitution antenna.
Note 4:	Site Factor - this is the site factor to convert from a field strength in dBuV/m to an eirp in dBm.
Note 5:	EUT field strength as measured during initial run.

Client:	Ubiquiti Networks	Job Number:	J82268
Model:	NanoBridgeM365 & NanoStationM365	T-Log Number:	T82413
		Account Manager:	Susan Pelzl
Contact:	Jennifer Sanchez		
Standard:	FCC 15B, 90Z, RSS	Class:	N/A

RSS 197 and FCC Part 90
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: 3/21/2011
Test Engineer: Rafael Varelas
Test Location: Chamber #7

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

General Test Configuration

The EUT and all local support equipment were located on the turntable for radiated spurious emissions testing. All remote support equipment was located outside the chamber.

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

Ambient Conditions:

Temperature: 20-25 °C
Rel. Humidity: 30-40 %

Summary of Results

Run #	Mode	Channel	BW		Test Performed	Limit	Result / Margin
-	Data Rate MCS 0	All	All		Radiated Emissions, 30 MHz-37GHz	FCC 90.210 Mask B	All emissions are more than 20dB below the limit

Modifications Made During Testing

No modifications were made to the EUT during testing

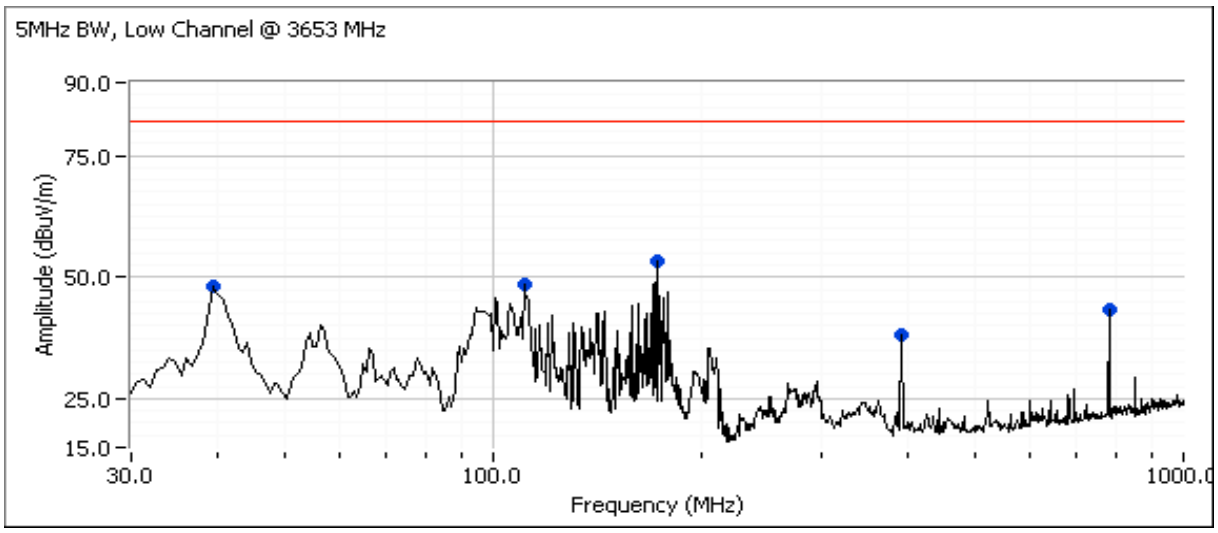
Deviations From The Standard

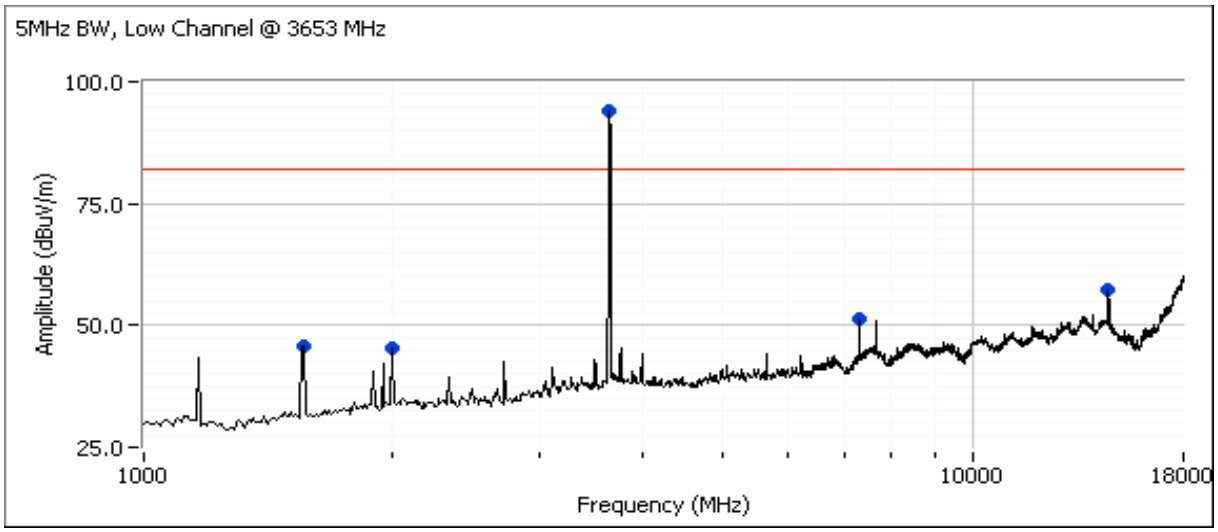
No deviations were made from the requirements of the standard.

Client:	Ubiquiti Networks	Job Number:	J82268
Model:	NanoBridgeM365 & NanoStationM365	T-Log Number:	T82413
		Account Manager:	Susan Pelzl
Contact:	Jennifer Sanchez		
Standard:	FCC 15B, 90Z, RSS	Class:	N/A

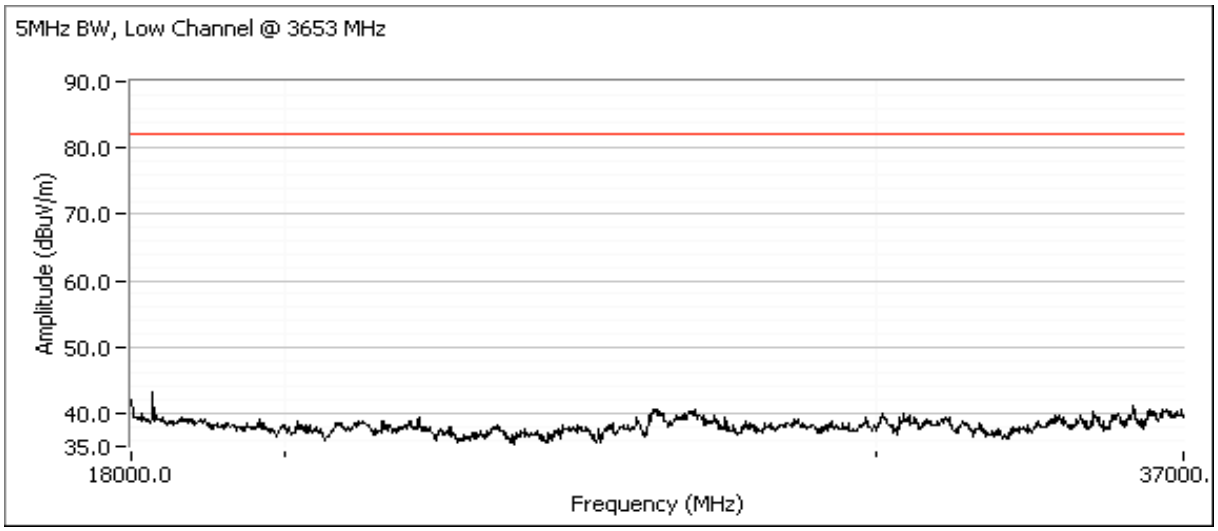
Run #1: Radiated Spurious Emissions, 30 - 37000 MHz. Operating Mode: 5 MHz BW

Low Channel @ 3653.0 MHz



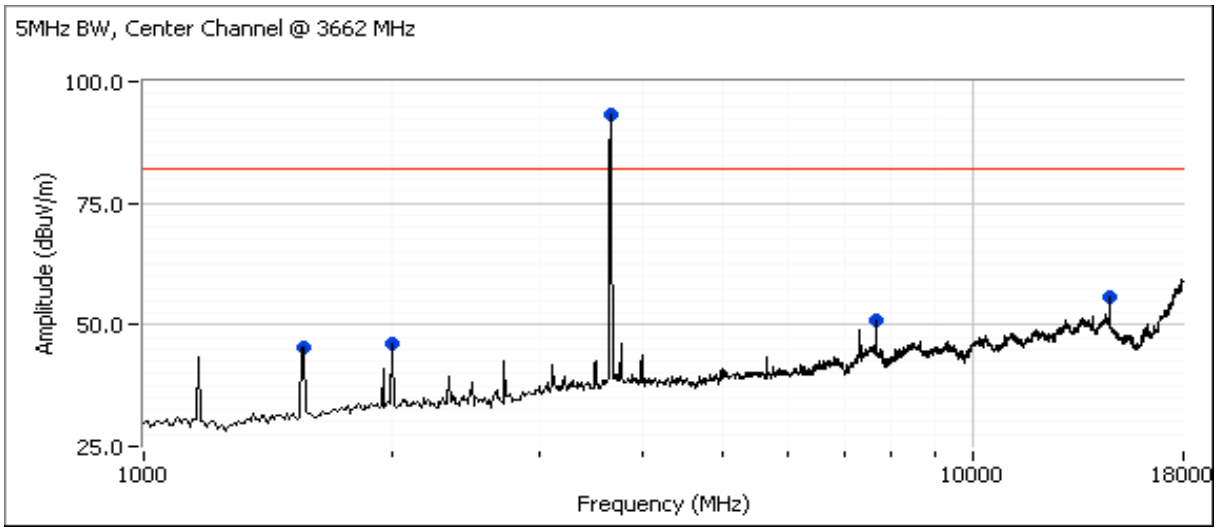


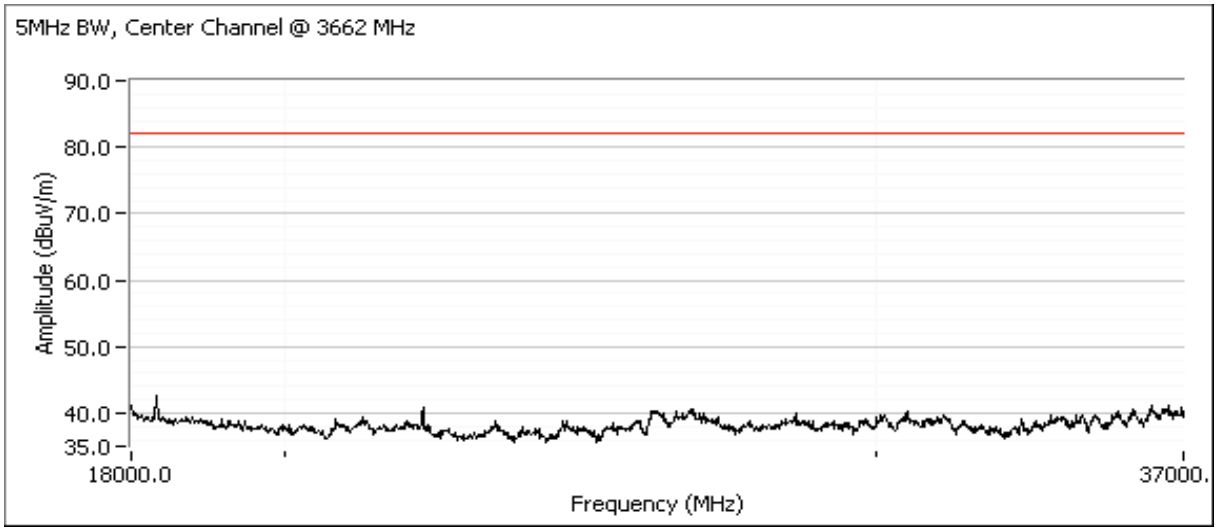
Client:	Ubiquiti Networks	Job Number:	J82268
Model:	NanoBridgeM365 & NanoStationM365	T-Log Number:	T82413
		Account Manager:	Susan Pelzl
Contact:	Jennifer Sanchez		
Standard:	FCC 15B, 90Z, RSS	Class:	N/A



Client:	Ubiquiti Networks	Job Number:	J82268
Model:	NanoBridgeM365 & NanoStationM365	T-Log Number:	T82413
		Account Manager:	Susan Pelzl
Contact:	Jennifer Sanchez		
Standard:	FCC 15B, 90Z, RSS	Class:	N/A

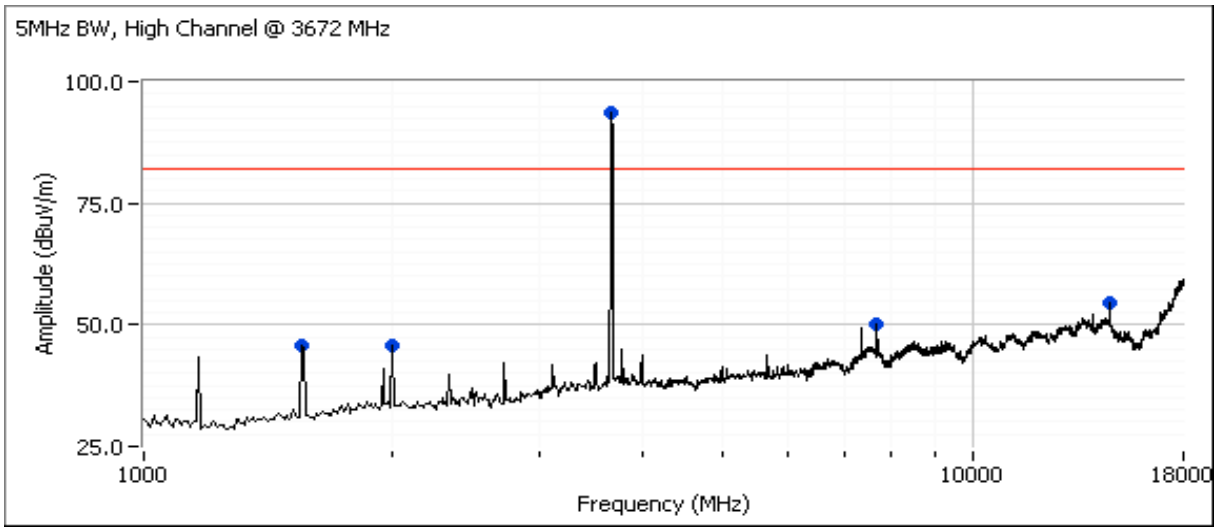
Center Channel @ 3662 MHz
Note 1

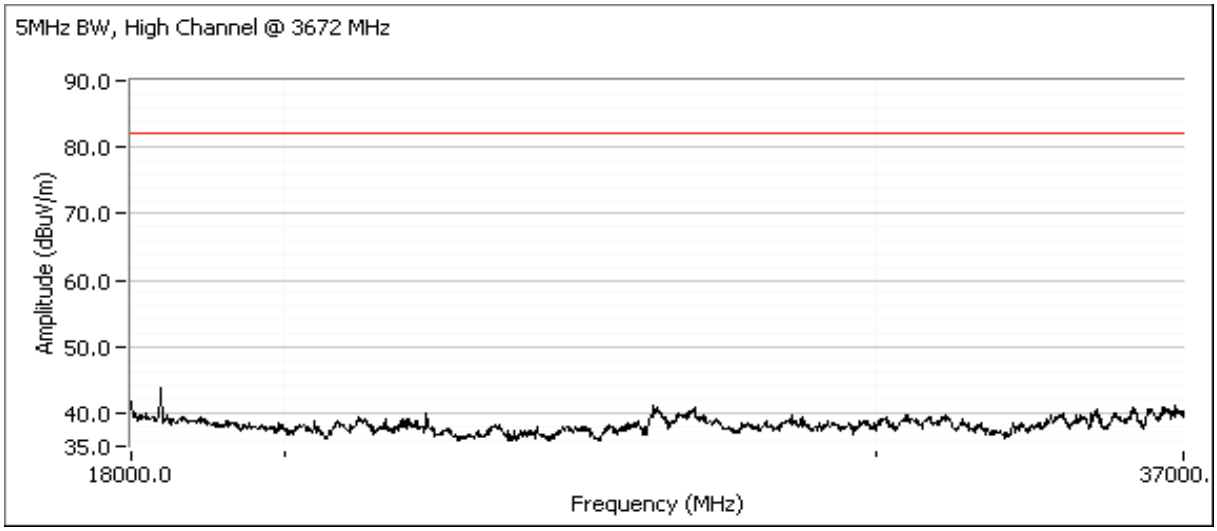




Client:	Ubiquiti Networks	Job Number:	J82268
Model:	NanoBridgeM365 & NanoStationM365	T-Log Number:	T82413
		Account Manager:	Susan Pelzl
Contact:	Jennifer Sanchez		
Standard:	FCC 15B, 90Z, RSS	Class:	N/A

High Channel @ 3672.0 MHz
Note 1





Client:	Ubiquiti Networks	Job Number:	J82268
Model:	NanoBridgeM365 & NanoStationM365	T-Log Number:	T82413
		Account Manager:	Susan Pelzl
Contact:	Jennifer Sanchez		
Standard:	FCC 15B, 90Z, RSS	Class:	N/A

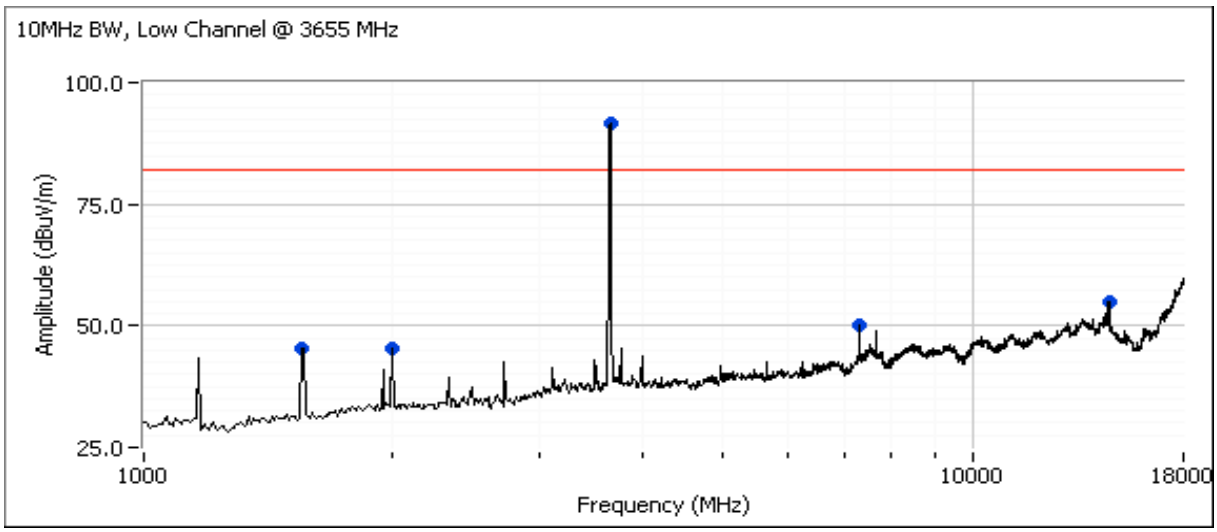
Frequency	Level	Pol	FCC 90.210		Detector	Azimuth	Height	Comments	Channel
MHz	dBµV/m	v/h	Limit	Margin	Pk/QP/Avg	degrees	meters		3653
39.450	*48.0*	*V*	*82.2*	*-34.2*	*Peak*	*105*	*1.0*		*3653*
111.000	*48.7*	*V*	*82.2*	*-33.5*	*Peak*	*330*	*2.0*		3653
173.775	*53.4*	*V*	*82.2*	*-28.8*	*Peak*	*140*	*4.0*		*3653*
391.000	*38.0*	*V*	*82.2*	*-44.2*	*Peak*	*60*	*1.0*		3653
781.250	*43.3*	*H*	*82.2*	*-38.9*	*Peak*	*4*	*1.5*		*3653*
1559.170	*45.8*	*H*	*82.2*	*-36.4*	*Peak*	*346*	*1.0*		3653
1990.000	*45.4*	*H*	*82.2*	*-36.8*	*Peak*	*209*	*1.6*		*3653*
3653.000	*94.0*	*H*	-	-	*Peak*	*184*	*1.3*	*Fundamental*	3653
7305.000	*51.3*	*H*	*82.2*	*-30.9*	*Peak*	*315*	*1.0*		*3653*
14613.330	57.2	V	82.2	-25.0	Peak	329	1.3		3653
1559.170	*45.3*	*H*	*82.2*	*-36.9*	*Peak*	*329*	*1.0*		*3662*
1990.000	*46.1*	*H*	*82.2*	*-36.1*	*Peak*	*230*	*1.3*		*3662*
3662.000	*93.3*	*H*	-	-	*Peak*	*191*	*1.0*	*Fundamental*	*3662*
7660.830	*50.8*	*V*	*82.2*	*-31.4*	*Peak*	*347*	*1.9*		*3662*
14653.330	*55.7*	*V*	*82.2*	*-26.5*	*Peak*	*19*	*1.3*		*3662*
1550.000	*45.8*	*H*	*82.2*	*-36.4*	*Peak*	*345*	*1.0*		*3672*
1990.000	*45.6*	*H*	*82.2*	*-36.6*	*Peak*	*173*	*1.0*		*3672*
3672.000	*93.5*	*H*	-	-	*Peak*	*195*	*1.3*	*Fundamental*	*3672*
7672.500	*50.2*	*V*	*82.2*	*-32.0*	*Peak*	*350*	*1.0*		*3672*
14693.330	*54.5*	*V*	*82.2*	*-27.7*	*Peak*	*11*	*1.3*		*3672*

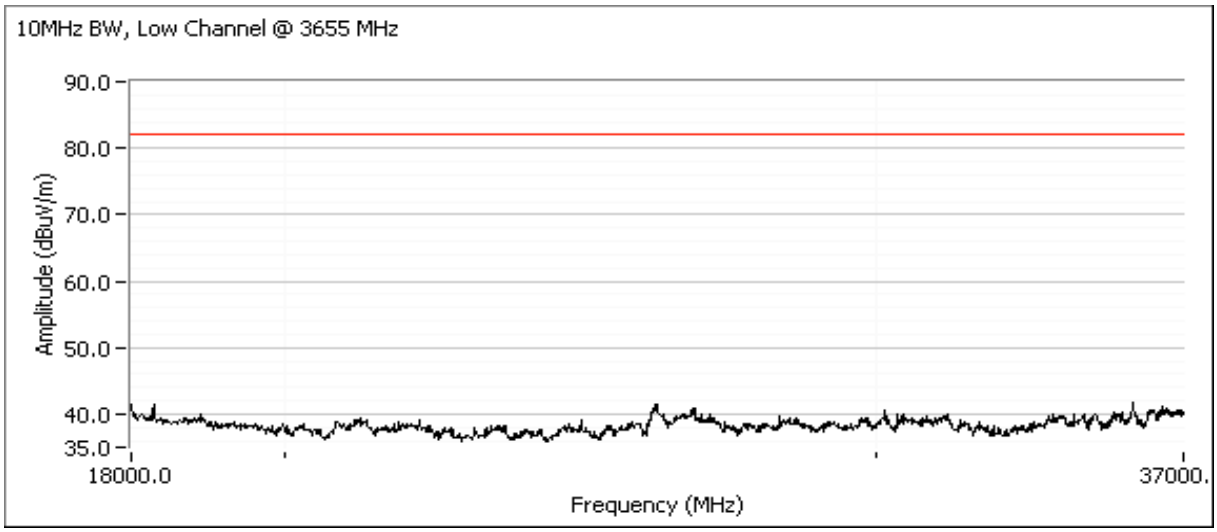
Note 1:	Based on the measurements at the 5MHz BW and 25MHz BW, 30-1000 MHz was not performed for this channel since changing BW and channel did not make any difference for radiated emissions.

Client:	Ubiquiti Networks	Job Number:	J82268
Model:	NanoBridgeM365 & NanoStationM365	T-Log Number:	T82413
		Account Manager:	Susan Pelzl
Contact:	Jennifer Sanchez		
Standard:	FCC 15B, 90Z, RSS	Class:	N/A

Run #2: Radiated Spurious Emissions, 30 - 37000 MHz. Operating Mode: 10 MHz BW

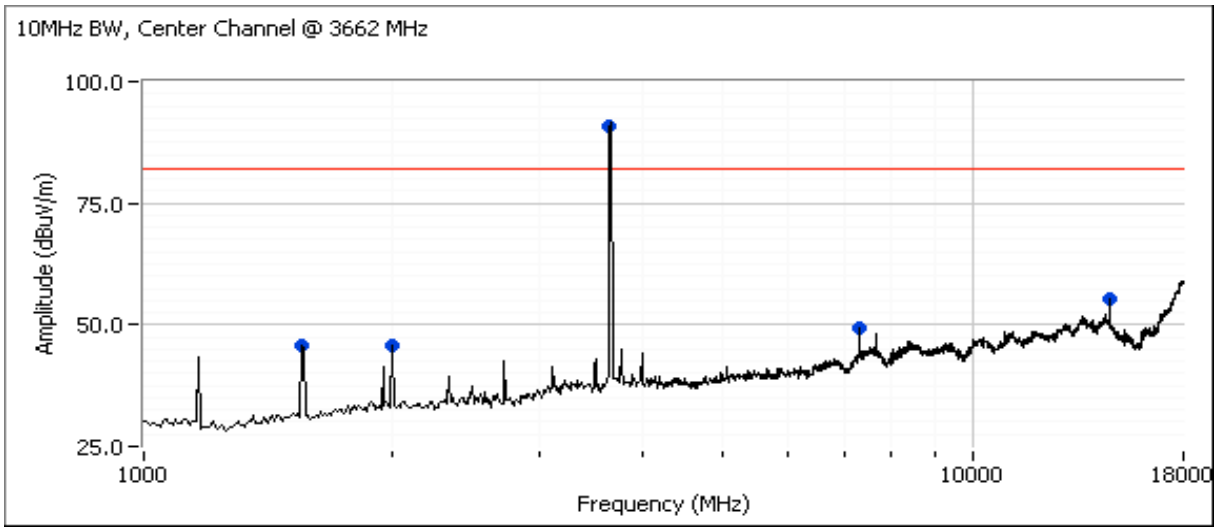
Low Channel @ 3655 MHz
Note 1

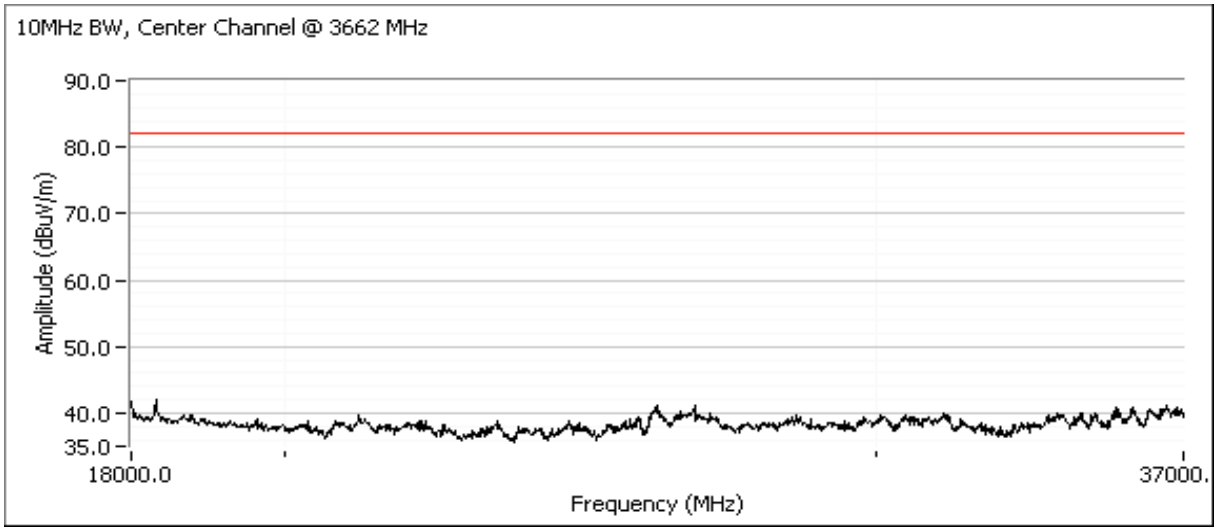




Client:	Ubiquiti Networks	Job Number:	J82268
Model:	NanoBridgeM365 & NanoStationM365	T-Log Number:	T82413
		Account Manager:	Susan Pelzl
Contact:	Jennifer Sanchez		
Standard:	FCC 15B, 90Z, RSS	Class:	N/A

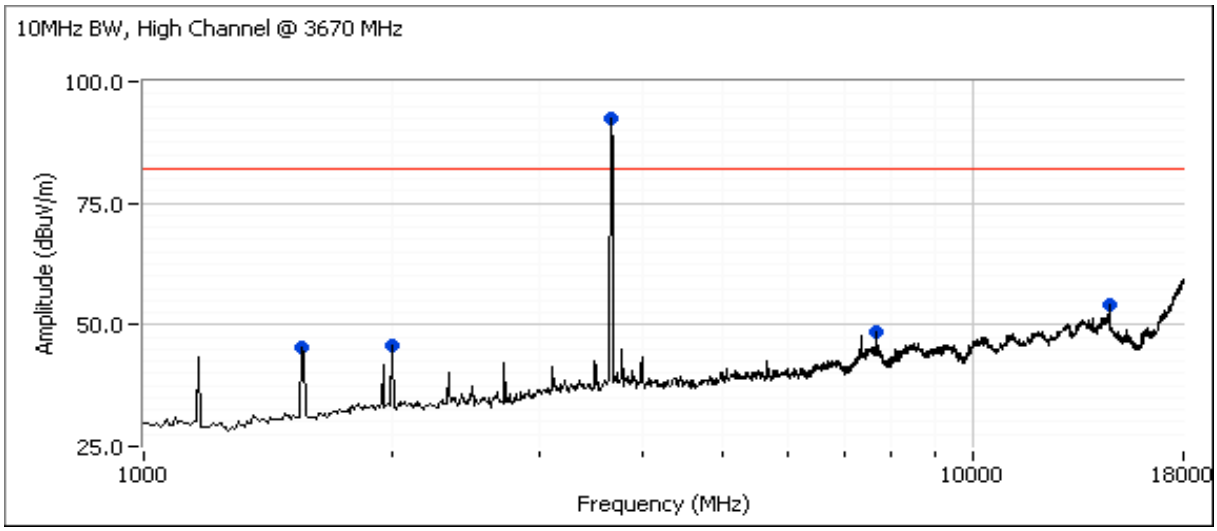
Center Channel @ 3662 MHz
Note 1

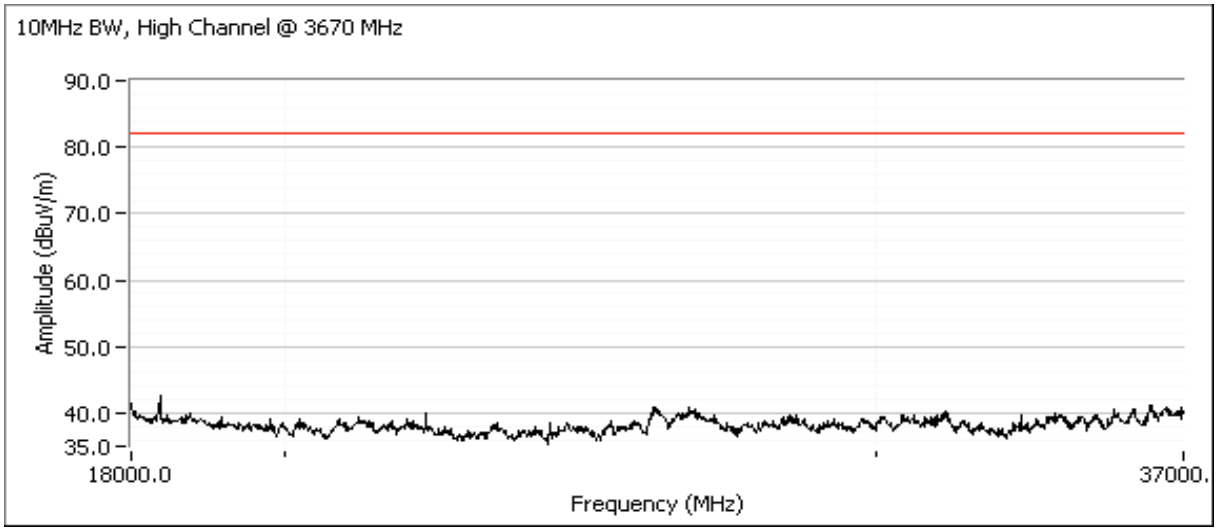




Client:	Ubiquiti Networks	Job Number:	J82268
Model:	NanoBridgeM365 & NanoStationM365	T-Log Number:	T82413
		Account Manager:	Susan Pelzl
Contact:	Jennifer Sanchez		
Standard:	FCC 15B, 90Z, RSS	Class:	N/A

High Channel @ 3670 MHz
Note 1





Client:	Ubiquiti Networks	Job Number:	J82268
Model:	NanoBridgeM365 & NanoStationM365	T-Log Number:	T82413
		Account Manager:	Susan Pelzl
Contact:	Jennifer Sanchez		
Standard:	FCC 15B, 90Z, RSS	Class:	N/A

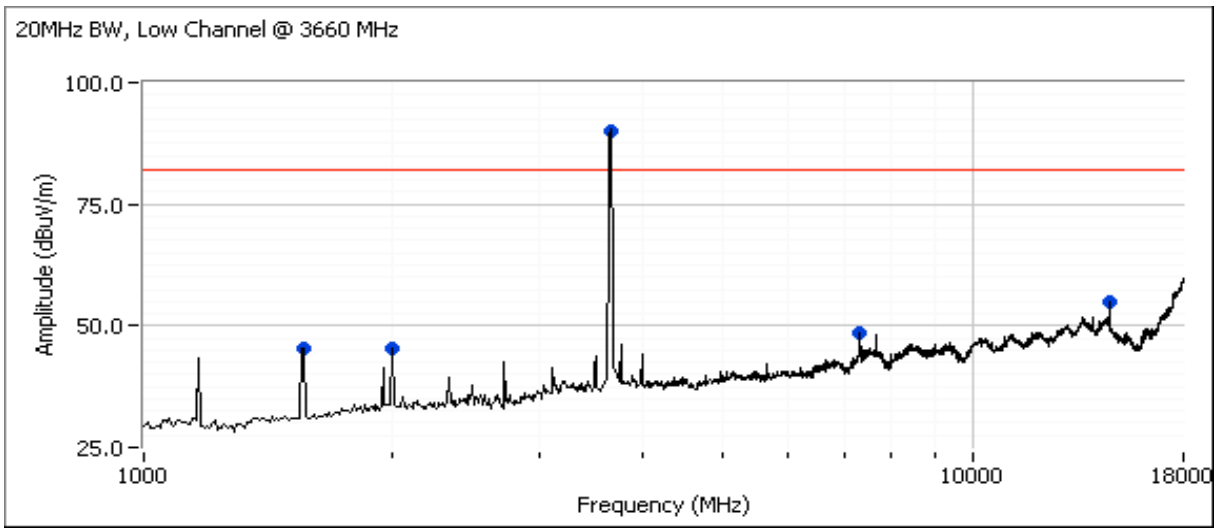
Frequency	Level	Pol	15.209 / 15.247		Detector	Azimuth	Height	Comments	Channel
MHz	dBµV/m	v/h	Limit	Margin	Pk/QP/Avg	degrees	meters		
1550.000	*45.3*	*H*	*82.2*	*-36.9*	*Peak*	*335*	*1.0*		*3655*
1990.000	*45.4*	*H*	*82.2*	*-36.8*	*Peak*	*218*	*1.3*		*3565*
3655.000	*91.5*	*H*	*-*	*-*	*Peak*	*185*	*1.0*	*Fundamental*	*3655*
7310.830	*50.3*	*H*	*82.2*	*-31.9*	*Peak*	*308*	*1.0*		*3655*
14626.670	*55.0*	*V*	*82.2*	*-27.2*	*Peak*	*326*	*1.6*		*3565*
1550.000	*45.8*	*H*	*82.2*	*-36.4*	*Peak*	*347*	*1.0*		*3662*
1990.000	*45.6*	*H*	*82.2*	*-36.6*	*Peak*	*177*	*1.0*		*3662*
3662.000	*90.7*	*H*	*-*	*-*	*Peak*	*187*	*1.3*	*Fundamental*	*3662*
7322.500	*49.3*	*H*	*82.2*	*-32.9*	*Peak*	*297*	*1.0*		*3662*
14653.330	*55.5*	*V*	*82.2*	*-26.7*	*Peak*	*19*	*1.3*		*3662*
1550.000	*45.4*	*H*	*82.2*	*-36.8*	*Peak*	*342*	*1.0*		*3670*
1990.000	*45.9*	*H*	*82.2*	*-36.3*	*Peak*	*206*	*1.3*		*3670*
3670.000	*92.4*	*H*	*-*	*-*	*Peak*	*180*	*1.3*	*Fundamental*	*3670*
7666.670	*48.5*	*V*	*82.2*	*-33.7*	*Peak*	*348*	*1.9*		*3670*
14680.000	*54.0*	*V*	*82.2*	*-28.2*	*Peak*	*354*	*1.3*		*3670*

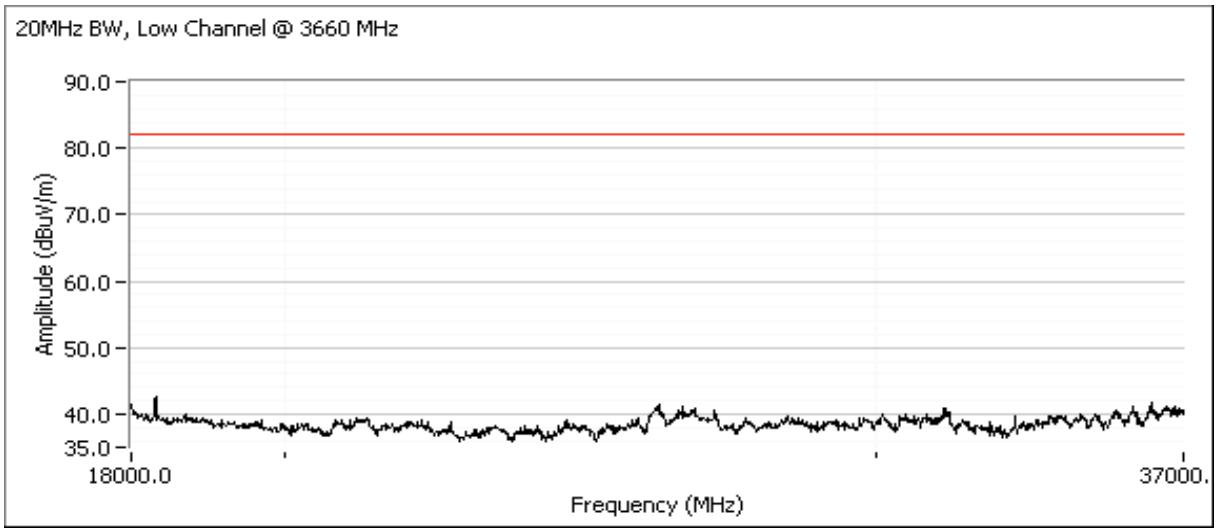
Note 1:	Based on the measurements at the 5MHz BW and 25MHz BW, 30-1000 MHz was not performed for this channel since changing BW and channel did not make any difference for radiated emissions.

Client:	Ubiquiti Networks	Job Number:	J82268
Model:	NanoBridgeM365 & NanoStationM365	T-Log Number:	T82413
		Account Manager:	Susan Pelzl
Contact:	Jennifer Sanchez		
Standard:	FCC 15B, 90Z, RSS	Class:	N/A

Run #3: Radiated Spurious Emissions, 30 - 37000 MHz. Operating Mode: 20 MHz BW

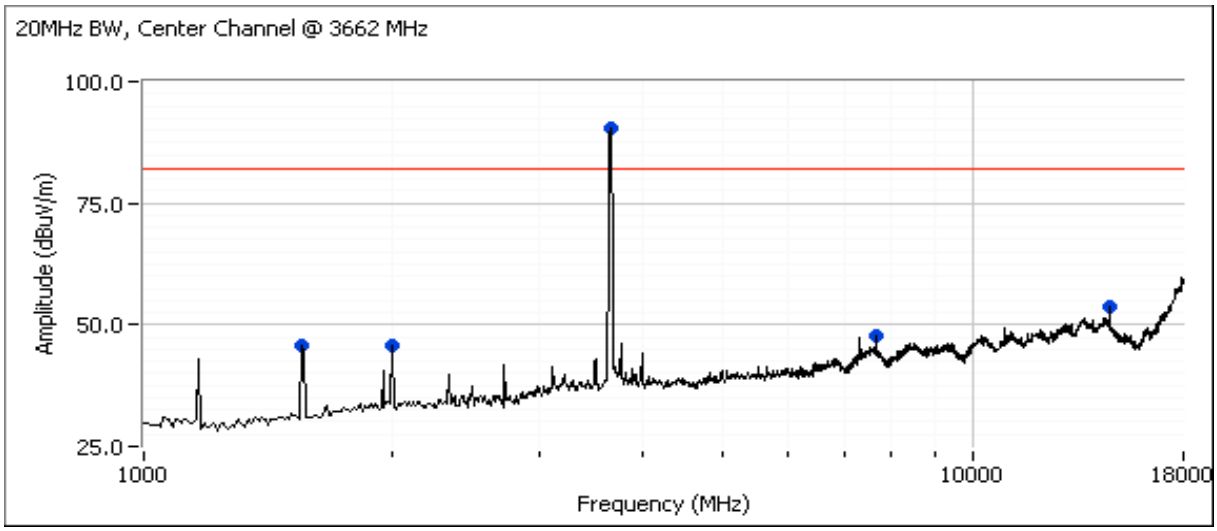
Low Channel @ 3660 MHz
Note 1

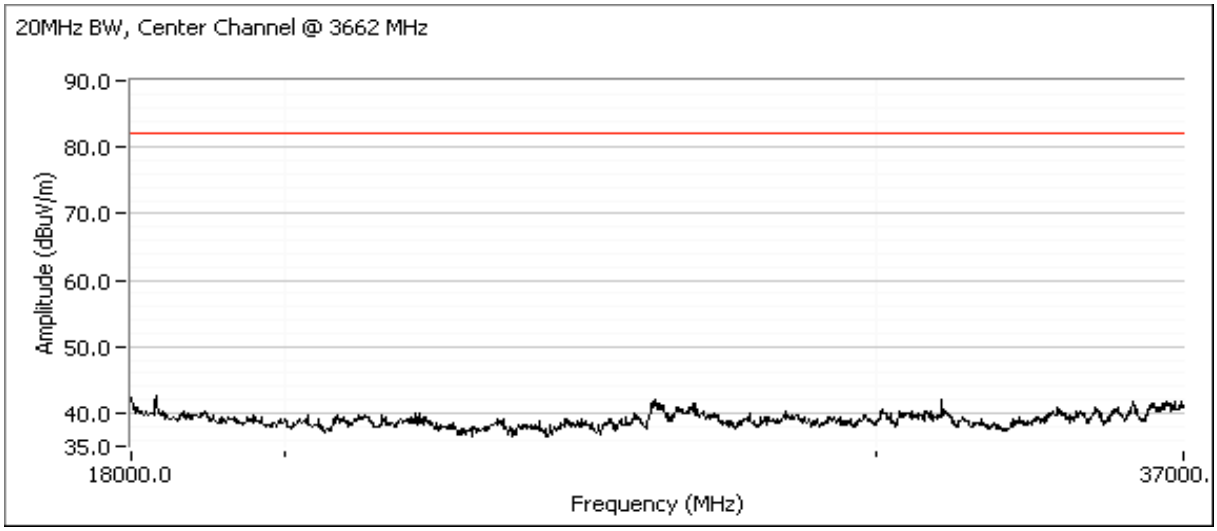




Client:	Ubiquiti Networks	Job Number:	J82268
Model:	NanoBridgeM365 & NanoStationM365	T-Log Number:	T82413
		Account Manager:	Susan Pelzl
Contact:	Jennifer Sanchez		
Standard:	FCC 15B, 90Z, RSS	Class:	N/A

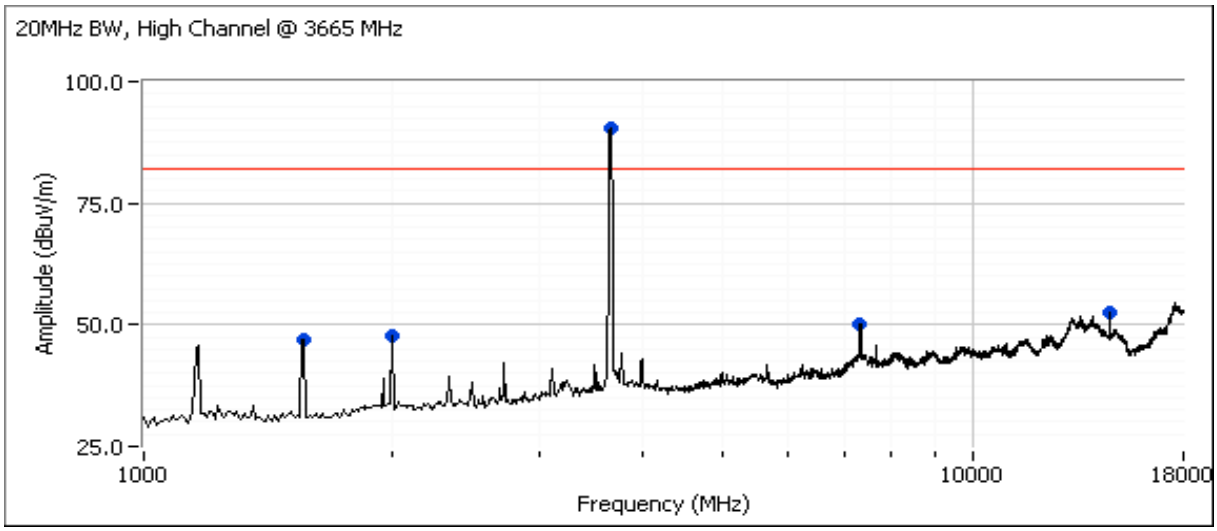
Center Channel @ 3662 MHz
Note 1

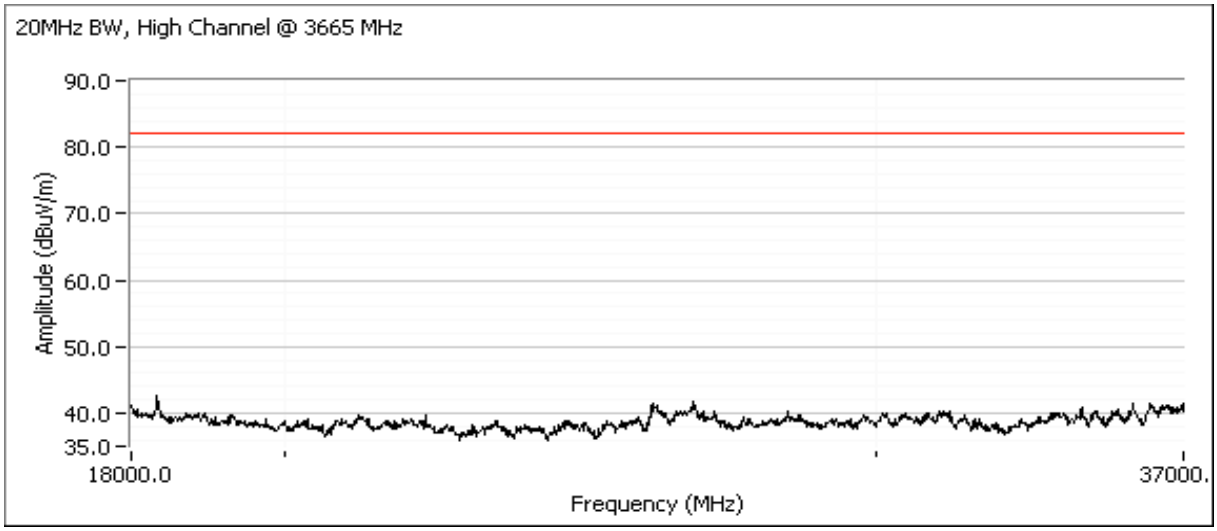




Client:	Ubiquiti Networks	Job Number:	J82268
Model:	NanoBridgeM365 & NanoStationM365	T-Log Number:	T82413
		Account Manager:	Susan Pelzl
Contact:	Jennifer Sanchez		
Standard:	FCC 15B, 90Z, RSS	Class:	N/A

High Channel @ 3665 MHz
Note 1





Client:	Ubiquiti Networks	Job Number:	J82268
Model:	NanoBridgeM365 & NanoStationM365	T-Log Number:	T82413
		Account Manager:	Susan Pelzl
Contact:	Jennifer Sanchez		
Standard:	FCC 15B, 90Z, RSS	Class:	N/A

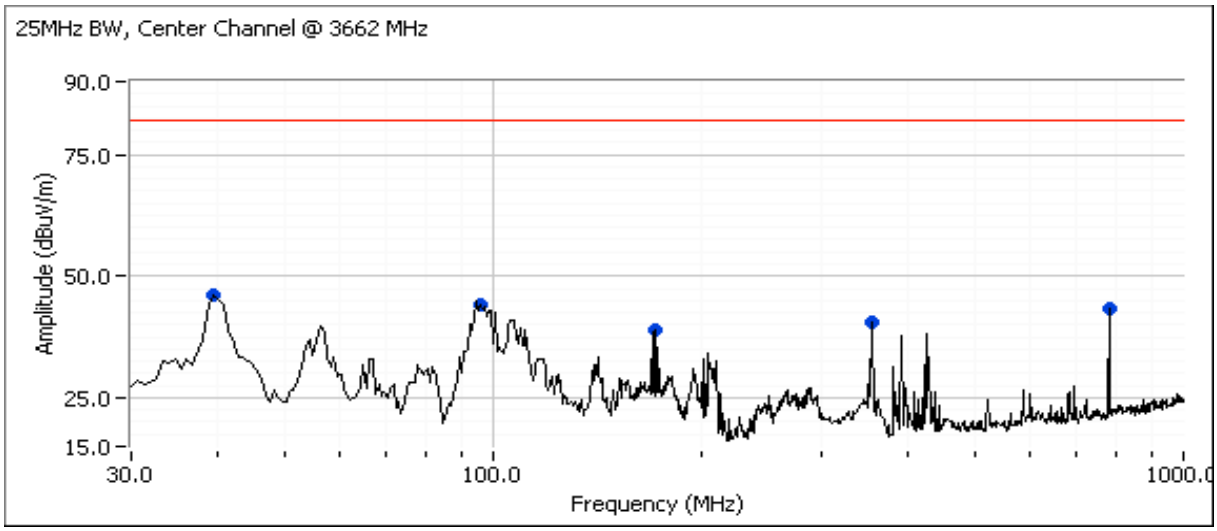
Frequency	Level	Pol	15.209 / 15.247		Detector	Azimuth	Height	Comments	Channel
MHz	dBµV/m	v/h	Limit	Margin	Pk/QP/Avg	degrees	meters		
1559.170	*45.3*	*H*	*82.2*	*-36.9*	*Peak*	*348*	*1.0*		*3660*
1999.170	*45.3*	*H*	*82.2*	*-36.9*	*Peak*	*216*	*1.3*		*3660*
3660.000	*90.0*	*H*	*-*	*-*	*Peak*	*188*	*1.0*	*Fundamental*	*3660*
7328.330	*48.4*	*H*	*82.2*	*-33.8*	*Peak*	*296*	*1.3*		*3660*
14653.330	*55.0*	*V*	*82.2*	*-27.2*	*Peak*	*355*	*1.9*		*3660*
1550.000	*45.6*	*H*	*82.2*	*-36.6*	*Peak*	*353*	*1.0*		*3662*
1990.000	*45.6*	*H*	*82.2*	*-36.6*	*Peak*	*204*	*1.3*		*3662*
3662.000	*90.5*	*H*	*-*	*-*	*Peak*	*182*	*1.3*	*Fundamental*	*3662*
7660.830	*47.7*	*V*	*82.2*	*-34.5*	*Peak*	*354*	*1.9*		*3662*
14640.000	*53.9*	*V*	*82.2*	*-28.3*	*Peak*	*18*	*1.3*		*3662*
1559.170	*46.8*	*H*	*82.2*	*-35.4*	*Peak*	*349*	*1.0*		*3665*
1999.170	*47.6*	*H*	*82.2*	*-34.6*	*Peak*	*42*	*1.3*		*3665*
3665.000	*90.6*	*H*	*-*	*-*	*Peak*	*190*	*1.3*	*Fundamental*	*3665*
7328.330	*50.3*	*H*	*82.2*	*-31.9*	*Peak*	*309*	*1.0*		*3665*
14666.670	*52.4*	*V*	*82.2*	*-29.8*	*Peak*	*15*	*1.3*		*3665*

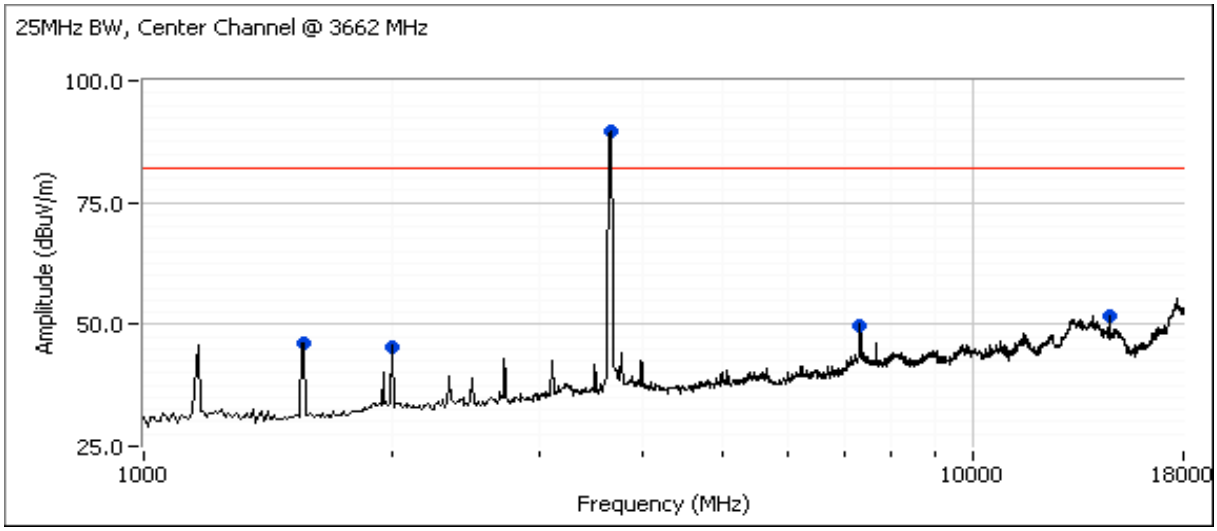
Note 1:	Based on the measurements at the 5MHz BW and 25MHz BW, 30-1000 MHz was not performed for this channel since changing BW and channel did not make any difference for radiated emissions.

Client:	Ubiquiti Networks	Job Number:	J82268
Model:	NanoBridgeM365 & NanoStationM365	T-Log Number:	T82413
		Account Manager:	Susan Pelzl
Contact:	Jennifer Sanchez		
Standard:	FCC 15B, 90Z, RSS	Class:	N/A

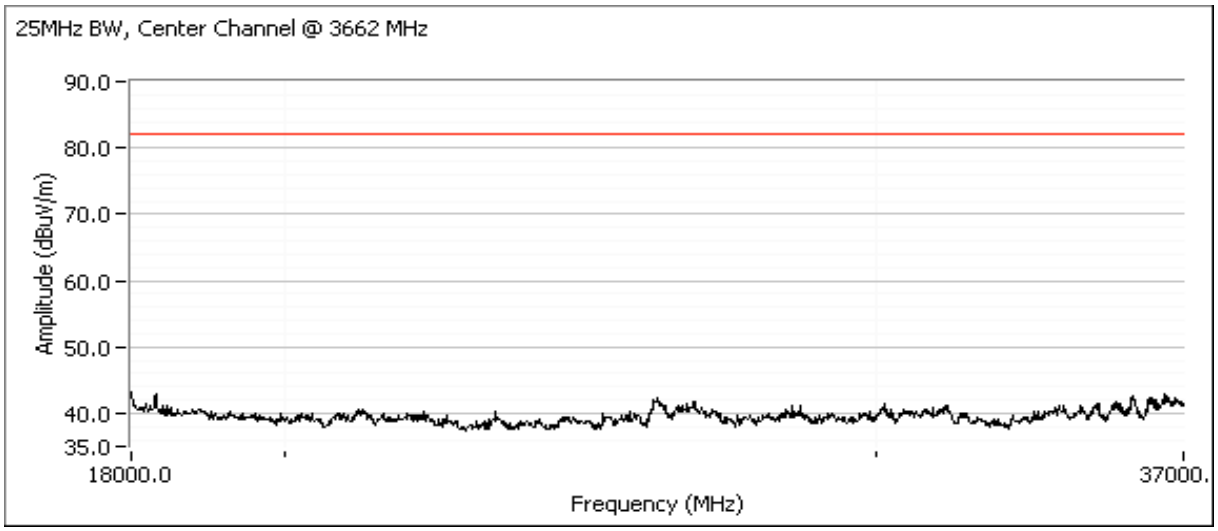
Run #4: Radiated Spurious Emissions, 30 - 37000 MHz. Operating Mode: 25 MHz BW

Center Channel @ 3662 MHz





Client:	Ubiquiti Networks	Job Number:	J82268
Model:	NanoBridgeM365 & NanoStationM365	T-Log Number:	T82413
		Account Manager:	Susan Pelzl
Contact:	Jennifer Sanchez		
Standard:	FCC 15B, 90Z, RSS	Class:	N/A



Frequency	Level	Pol	15.209 / 15.247		Detector	Azimuth	Height	Comments
MHz	dBµV/m	v/h	Limit	Margin	Pk/QP/Avg	degrees	meters	
39.450	*46.1*	*V*	*82.2*	*-36.1*	*Peak*	*92*	*1.0*	
96.150	*44.0*	*V*	*82.2*	*-38.2*	*Peak*	*37*	*1.0*	
171.750	*38.8*	*H*	*82.2*	*-43.4*	*Peak*	*147*	*2.5*	
354.250	*40.5*	*V*	*82.2*	*-41.7*	*Peak*	*100*	*1.0*	
781.250	*43.4*	*H*	*82.2*	*-38.8*	*Peak*	*11*	*1.5*	
1559.170	*46.0*	*H*	*82.2*	*-36.2*	*Peak*	*344*	*1.0*	
1999.170	*45.5*	*H*	*82.2*	*-36.7*	*Peak*	*214*	*1.3*	
3662.000	*89.7*	*H*	*-*	*-*	*Peak*	*185*	*1.3*	*Fundamental*
7322.500	*49.8*	*H*	*82.2*	*-32.4*	*Peak*	*316*	*1.0*	
14640.000	*51.6*	*V*	*82.2*	*-30.6*	*Peak*	*18*	*1.3*	

Client:	Ubiquiti Networks	Job Number:	J82268
Model:	NanoBridgeM365 & NanoStationM365	T-Log Number:	T82413
		Account Manager:	Susan Pelzl
Contact:	Jennifer Sanchez		
Standard:	FCC 15B, 90Z, RSS	Class:	N/A

Run #5: Radiated Spurious Emissions, Transmit Mode: Substitution Measurements

Frequency	Level	Pol	FCC 90.210		Detector	Azimuth	Height	Comments	Channel
MHz	dBµV/m	v/h	Limit	Margin	Pk/QP/Avg	degrees	meters		
14613.330	57.2	V	82.2	-25.0	Peak	329	1.3		3653

Horizontal & Vertical

Frequency	Substitution measurements			Site	EUT measurements			eirp Limit	erp Limit	Margin
MHz	Pin[1]	Gain[2]	FS[3]	Factor[4]	FS[5]	eirp (dBm)	erp (dBm)	dBm	dBm	dB
MHz	dBµV/m	v/h	Limit	Margin	Pk/QP/Avg	degrees	meters			
All signals were more than 20dB below the computed FS limit										

Note 1:	Pin is the input power (dBm) to the substitution antenna
Note 2:	Gain is the gain (dBi) for the substitution antenna. A dipole has a gain of 2.2dBi.
Note 3:	FS is the field strength (dBuV/m) measured from the substitution antenna.
Note 4:	Site Factor - this is the site factor to convert from a field strength in dBuV/m to an eirp in dBm.
Note 5:	EUT field strength as measured during initial run.

Client:	Ubiquiti Networks	Job Number:	J82268
Model:	NanoBridgeM365 & NanoStationM365	T-Log Number:	T82413
		Account Manager:	Susan Pelzl
Contact:	Jennifer Sanchez		
Standard:	FCC 15B, 90Z, RSS	Class:	N/A

RSS-197 and FCC 90Z - Antenna Port Measurements

Power, PSD, Bandwidth and Spurious Emissions

Test Specific Details

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

Summary of Results

Run #	Test Performed	Limit	Pass / Fail	Result / Margin
2	Power, NanoStation	Part 90	Pass	5 MHz: 35.0dBm 10 MHz: 34.9dBm 20 MHz: 37.4dBm 25 MHz: 36.5dBm
2	PSD, NanoStation	1 Watt/MHz 90.1321(a)	Pass	5 MHz: 29.1dBm/MHz 10 MHz: 26.4dBm/MHz 20 MHz: 26.0dBm/MHz 25 MHz: 24.1dBm/MHz
2	99% Bandwidth	-	N/A	5 MHz: 4.2 MHz 10 MHz: 8.5 MHz 20 MHz: 16.8 MHz 25 MHz: 21.1 MHz
3	Power, NanoBridge	Part 90	Pass	5 MHz: 35.8dBm 10 MHz: 38.6dBm 20 MHz: 41.5dBm 25 MHz: 42.4dBm
3	PSD, NanoBridge	1 Watt/MHz 90.1321(a)	Pass	5 MHz: 29.9dBm/MHz 10 MHz: 29.9dBm/MHz 20 MHz: 29.9dBm/MHz 25 MHz: 29.9dBm/MHz
4	Mask and Antenna Conducted Out of Band Spurious	Within Mask and -13dBm/MHz out of	Pass	All emissions below the Mask and -13dBm/MHz limit

General Test Configuration

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

Test Notes

The NanoStation and NanoBridge are the same radio but the NanoBridge uses a reflector for the antenna to increase gain to 21 dBi from the integrated 13dBi Patch antenna.

Client:	Ubiquiti Networks	Job Number:	J82268
Model:	NanoBridgeM365 & NanoStationM365	T-Log Number:	T82413
		Account Manager:	Susan Pelzl
Contact:	Jennifer Sanchez		
Standard:	FCC 15B, 90Z, RSS	Class:	N/A

Modifications Made During Testing

No modifications were made to the EUT during testing

Deviations From The Standard

No deviations were made from the requirements of the standard.

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

Date of Test: 3/11/2011 Config. Used: 1
Test Engineer: Rafael Varelas Config Change: none
Test Location: FT Lab #4 EUT Voltage: POE

Power

Frequency (MHz)	Software Setting[1]	Modulation	Measured Output Power[2] dBm			Total[5]		Limit (dBm)	Max Power (W)	Pass or Fail
			Chain 1	Chain 2	Chain 3	mW	dBm			
5 MHz Mode										
3662	20	MCS0	13.3	15.6		57.7	17.6	-	-	-
3662	20	MCS4	13.1	15.3		54.3	17.3	-		-
3662	20	MCS7	13.2	15.4		55.6	17.4	-		-

PSD

Frequency (MHz)	99%[4] BW	Modulation	PSD[3] dBm/MHz			Total PSD[5]		Limit		Pass or Fail
			Chain 1	Chain 2	Chain 3	mW/MHz	dBm/MHz			
5 MHz Mode										
3662	-	MCS0	7.3	9.6		14.5	11.6	-	-	-
3662	-	MCS4	7.2	9.4		14.0	11.4	-	-	-
3662	-	MCS7	7.1	9.3		13.6	11.3	-	-	-

Note 1:	Power setting is the software setting used to set the output power.
Note 2:	Output power measured using RBW=100kHz VBW=300kHz , detector = rms, sweep time 10 seconds, max hold. The total power was integrated over the span (span > 2x channel bandwidth). Transmitted signal was not continuous but the analyzer was configured with a gated sweep such that the analyzer was only sweeping when the device was transmitting.
Note 3:	PSD measured using RB=1MHz, VB=3MHz, detector = rms, sweep time 10 seconds, max hold. Multiple sweeps were made until the display had no new "peaks".
Note 4:	99% Bandwidth measured in accordance with RSS GEN - RB > 1% of span and VB >=3xRB
Note 5:	For MIMO systems the total output power and total PSD are calculated form the sum of the powers of the individual chains (in linear terms).
Note 6:	Based on above results, Power and PSD for all types of modulations.MCS 0 had highest PSD and Power values. Higher MCS values had lower PSD and Power values and thus all other BW mode testing was performed using the lowest MCS value.

Client:	Ubiquiti Networks	Job Number:	J82268
Model:	NanoBridgeM365 & NanoStationM365	T-Log Number:	T82413
		Account Manager:	Susan Pelzl
Contact:	Jennifer Sanchez		
Standard:	FCC 15B, 90Z, RSS	Class:	N/A

Run #2: Bandwidth, Output Power and Power Spectral Density - MIMO Systems

Limits from 90.321(a): Base and fixed stations are limited to 25 watts/25 MHz equivalent isotropically radiated power (EIRP). In any event, the peak EIRP power density shall not exceed 1 Watt in any one-megahertz slice of spectrum (30dBm/MHz).

	Chain 1	Chain 2	Chain 3	Coherent	Effective[5]	EIRP (mW)	EIRP (dBm)
Antenna Gain (dBi):	13	13		Yes	16.0	5523.0	37.4

Power - Limit accounts for maximum antenna gain at this power setting.

Frequency (MHz)	Software Setting[1]	Modulation	Measured Output Power[2] dBm			Total		EIRP	Limit (eirp)	Pass or Fail
			Chain 1	Chain 2	Chain 3	mW	dBm	dBm	dBm	
5 MHz Mode										
3653	30, 27	MCS 0	15.3	16.1		74.6	18.7	34.7	44.0	PASS
3662	30, 27	MCS 0	15.4	15.7		71.8	18.6	34.6	44.0	PASS
3672	32, 28	MCS 0	15.9	16.1		79.5	19.0	35.0	44.0	PASS
10 MHz Mode										
3655	29, 26	MCS 0	15.0	15.6		67.9	18.3	34.3	44.0	PASS
3662	31, 27	MCS 0	15.9	15.8		76.9	18.9	34.9	44.0	PASS
3670	32, 27	MCS 0	16.0	15.8		78.0	18.9	34.9	44.0	PASS
20 MHz Mode										
3660	36, 31	MCS 0	17.1	17.7		110.7	20.4	36.5	44.0	PASS
3662	36, 31	MCS 0	17.4	17.6		112.5	20.5	36.5	44.0	PASS
3665	38, 34	MCS 0	18.3	18.5		138.4	21.4	37.4	44.0	PASS
25 MHz Mode										
3662	36, 33	MCS 0	17.0	17.9		112.7	20.5	36.5	44.0	PASS

Client:	Ubiquiti Networks	Job Number:	J82268
Model:	NanoBridgeM365 & NanoStationM365	T-Log Number:	T82413
		Account Manager:	Susan Pelzl
Contact:	Jennifer Sanchez		
Standard:	FCC 15B, 90Z, RSS	Class:	N/A

PSD

Frequency (MHz)	99%[4] BW	Modulation	PSD[2] dBm/MHz Chain 1	Chain 2	Chain 3	Total PSD mW/MHz	dBm/MHz	PSD EIRP dBm/MHz	Limit (eirp) dBm/MHz	Pass or Fail
5 MHz Mode										
3653	4.2	MCS 0	9.4	10.3		19.5	12.9	28.9	30.0	PASS
3662	4.2	MCS 0	9.4	9.8		18.3	12.6	28.6	30.0	PASS
3672	4.2	MCS 0	9.9	10.2		20.3	13.1	29.1	30.0	PASS
10 MHz Mode										
3655	8.5	MCS 0	6.4	6.9		9.3	9.7	25.7	30.0	PASS
3662	8.5	MCS 0	7.1	7.0		10.1	10.1	26.1	30.0	PASS
3670	8.5	MCS 0	7.6	7.1		10.9	10.4	26.4	30.0	PASS
20 MHz Mode										
3660	16.8	MCS 0	5.8	6.2		7.9	9.0	25.0	30.0	PASS
3662	16.8	MCS 0	5.9	6.0		7.9	9.0	25.0	30.0	PASS
3665	16.8	MCS 0	7.0	7.0		9.9	10.0	26.0	30.0	PASS
25 MHz Mode										
3662	21.1	MCS 0	4.8	5.4		6.5	8.1	24.1	30.0	PASS

Note 1:	Power setting is the software setting used to set the output power.
Note 2:	Output power measured using RBW=100kHz VBW=300kHz , detector = rms, sweep time 10 seconds, max hold. The total power was integrated over the span (span > 2x channel bandwidth). Transmitted signal was not continuous but the analyzer was configured with a gated sweep such that the analyzer was only sweeping when the device was transmitting. The plot for the channel with the highest power is provided below.
Note 3:	The psd was measured using the following analyzer settings: RB=1MHz, VB=3MHz, detector = rms, sweep time 10 seconds, max hold. Multiple sweeps were made until the display had no new "peaks". The plot for the channel with the highest power is provided below.
Note 4:	99% Bandwidth measured in accordance with RSS GEN - RB > 1% of span and VB >=3xRB
Note 5:	For MIMO systems the total output power and total PSD are calculated form the sum of the powers of the individual chains (in linear terms). The antenna gain used to determine the EIRP and limits for PSD/Output power depends on the operating mode of the MIMO device. If the signals on the non-coherent between the transmit chains then the gain used to determine the limits is the highest gain of the individual chains and the EIRP is the sum of the products of gain and power on each chain. If the signals are coherent then the effective antenna gain is the sum (in linear terms) of the gains for each chain and the EIRP is the product of the effective gain and total power.
Note 6	Chain 0 = J9, Chain 1 = J10.

Client:	Ubiquiti Networks	Job Number:	J82268
Model:	NanoBridgeM365 & NanoStationM365	T-Log Number:	T82413
		Account Manager:	Susan Pelzl
Contact:	Jennifer Sanchez		
Standard:	FCC 15B, 90Z, RSS	Class:	N/A

Run #3: Bandwidth, Output Power and Power Spectral Density - MIMO Systems

Limits from 90.321(a): Base and fixed stations are limited to 25 watts/25 MHz equivalent isotropically radiated power (EIRP). In any event, the peak EIRP power density shall not exceed 1 Watt in any one-megahertz slice of spectrum (30dBm/MHz).

Date of Test: 3/14/2011
Test Engineer: Rafael Varelas
Test Location: FT Lab #4

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

	Chain 1	Chain 2	Chain 3	Coherent	Effective[5]	EIRP (mW)	EIRP (dBm)
Antenna Gain (dBi):	21	21		Yes	24.0	17465.3	42.4

Power - Limit accounts for maximum antenna gain at this power setting.

Frequency (MHz)	Software Setting[1]	Modulation	Measured Output Power[2] dBm			Total		EIRP	Limit (eirp)	Pass or Fail
			Chain 1	Chain 2	Chain 3	mW	dBm	dBm	dBm	
5 MHz Mode										
3653	16,12	MCS 0	9.0	8.4		14.9	11.7	35.7	44.0	PASS
3662	17,12	MCS 0	9.2	8.4		15.2	11.8	35.8	44.0	PASS
3672	17,13	MCS 0	8.9	8.6		15.0	11.8	35.8	44.0	PASS
10 MHz Mode										
3655	23,18	MCS 0	11.8	11.3		28.6	14.6	38.6	44.0	PASS
3662	23,18	MCS 0	11.7	11.3		28.3	14.5	38.5	44.0	PASS
3670	23,19	MCS 0	11.5	11.6		28.6	14.6	38.6	44.0	PASS
20 MHz Mode										
3660	27,24	MCS 0	14.1	14.2		52.0	17.2	41.2	44.0	PASS
3662	28,25	MCS 0	14.4	14.6		56.4	17.5	41.5	44.0	PASS
3665	28,24	MCS 0	14.5	14.2		54.5	17.4	41.4	44.0	PASS
25 MHz Mode										
3662	30,26	MCS 0	15.5	15.3		69.4	18.4	42.4	44.0	PASS

Client:	Ubiquiti Networks	Job Number:	J82268
Model:	NanoBridgeM365 & NanoStationM365	T-Log Number:	T82413
		Account Manager:	Susan Pelzl
Contact:	Jennifer Sanchez		
Standard:	FCC 15B, 90Z, RSS	Class:	N/A

PSD

Frequency (MHz)	99%[4] BW	Modulation	PSD[2] dBm/MHz Chain 1	Chain 2	Chain 3	Total PSD mW/MHz	dBm/MHz	PSD EIRP dBm/MHz	Limit (eirp) dBm/MHz	Pass or Fail
5 MHz Mode										
3653	4.2	MCS 0	3.1	2.5		3.8	5.8	29.8	30.0	PASS
3662	4.2	MCS 0	3.2	2.5		3.9	5.9	29.9	30.0	PASS
3672	4.2	MCS 0	3.0	2.7		3.9	5.9	29.9	30.0	PASS
10 MHz Mode										
3655	8.5	MCS 0	3.1	2.5		3.8	5.8	29.8	30.0	PASS
3662	8.5	MCS 0	3.1	2.5		3.8	5.8	29.8	30.0	PASS
3670	8.5	MCS 0	2.9	2.8		3.9	5.9	29.9	30.0	PASS
20 MHz Mode										
3660	16.8	MCS 0	2.7	2.6		3.7	5.7	29.7	30.0	PASS
3662	16.8	MCS 0	2.9	2.8		3.9	5.9	29.9	30.0	PASS
3665	16.8	MCS 0	2.9	2.4		3.7	5.7	29.7	30.0	PASS
25 MHz Mode										
3662	20.9	MCS 0	3.2	2.6		3.9	5.9	29.9	30.0	PASS

Note 1:	Power setting is the software setting used to set the output power.
Note 2:	Output power measured using RBW=100kHz VBW=300kHz , detector = rms, sweep time 10 seconds, max hold. The total power was integrated over the span (span > 2x channel bandwidth). Transmitted signal was not continuous but the analyzer was configured with a gated sweep such that the analyzer was only sweeping when the device was transmitting. The plot for the channel with the highest power is provided below.
Note 3:	The psd was measured using the following analyzer settings: RB=1MHz, VB=3MHz, detector = rms, sweep time 10 seconds, max hold. Multiple sweeps were made until the display had no new "peaks". The plot for the channel with the highest power is provided below.
Note 4:	99% Bandwidth measured in accordance with RSS GEN - RB > 1% of span and VB >=3xRB
Note 5:	For MIMO systems the total output power and total PSD are calculated form the sum of the powers of the individual chains (in linear terms). The antenna gain used to determine the EIRP and limits for PSD/Output power depends on the operating mode of the MIMO device. If the signals on the non-coherent between the transmit chains then the gain used to determine the limits is the highest gain of the individual chains and the EIRP is the sum of the products of gain and power on each chain. If the signals are coherent then the effective antenna gain is the sum (in linear terms) of the gains for each chain and the EIRP is the product of the effective gain and total power.
Note 6	Chain 0 = J9, Chain 1 = J10.

Client:	Ubiquiti Networks	Job Number:	J82268
Model:	NanoBridgeM365 & NanoStationM365	T-Log Number:	T82413
		Account Manager:	Susan Pelzl
Contact:	Jennifer Sanchez		
Standard:	FCC 15B, 90Z, RSS	Class:	N/A

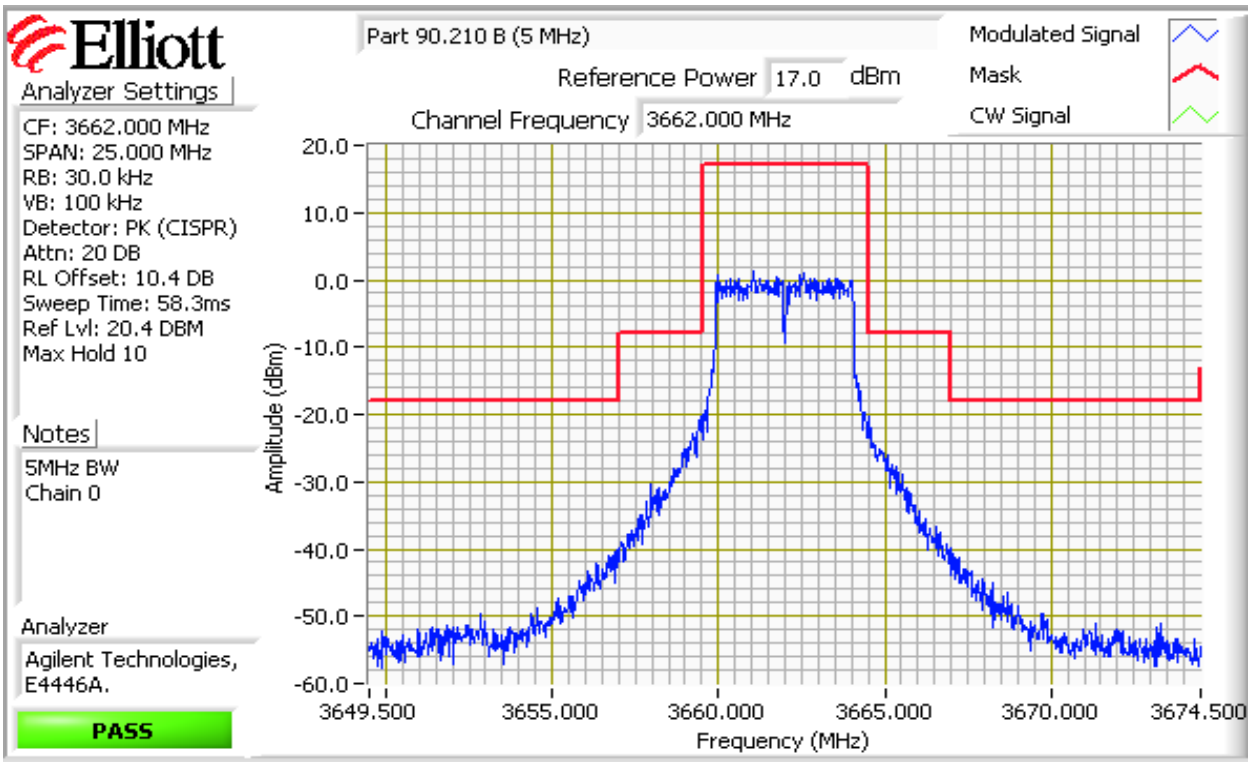
Run #4: Unwanted emissions (Masks), MCS0 at highest power setting used for Power measurements

Date of Test: 3/16/2011 Config. Used: 1

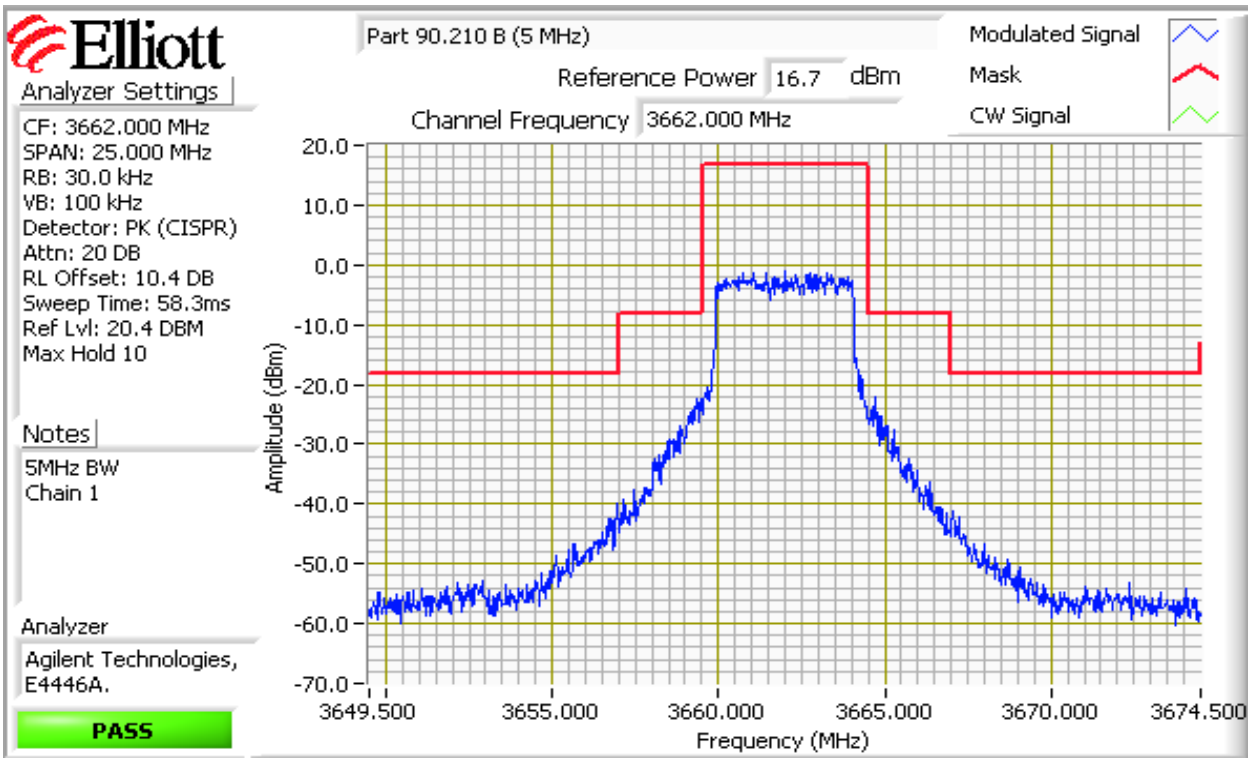
Test Engineer: Mark Hill Config Change: none

Test Location: FT Lab#4 EUT Voltage: POE

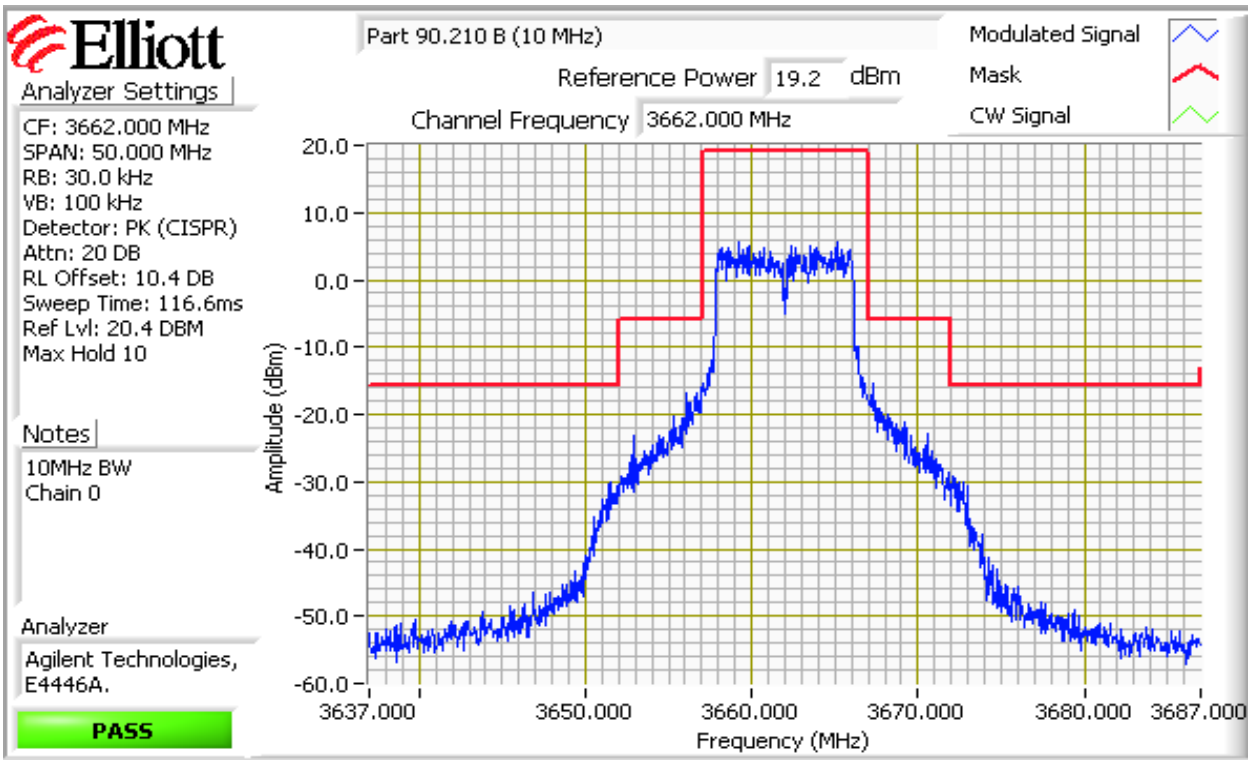
30kHz RBW, 100KHz VBW, Span 5x BW mode



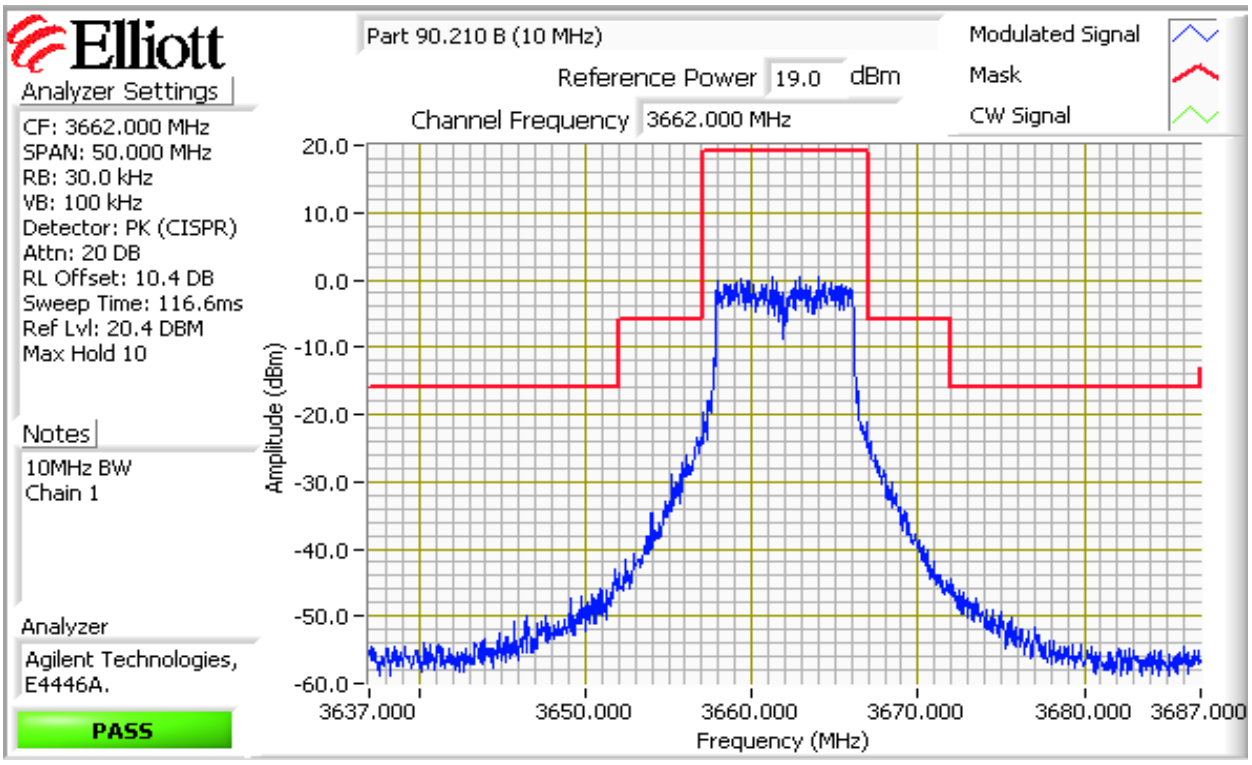
Client:	Ubiquiti Networks	Job Number:	J82268
Model:	NanoBridgeM365 & NanoStationM365	T-Log Number:	T82413
		Account Manager:	Susan Pelzl
Contact:	Jennifer Sanchez		
Standard:	FCC 15B, 90Z, RSS	Class:	N/A



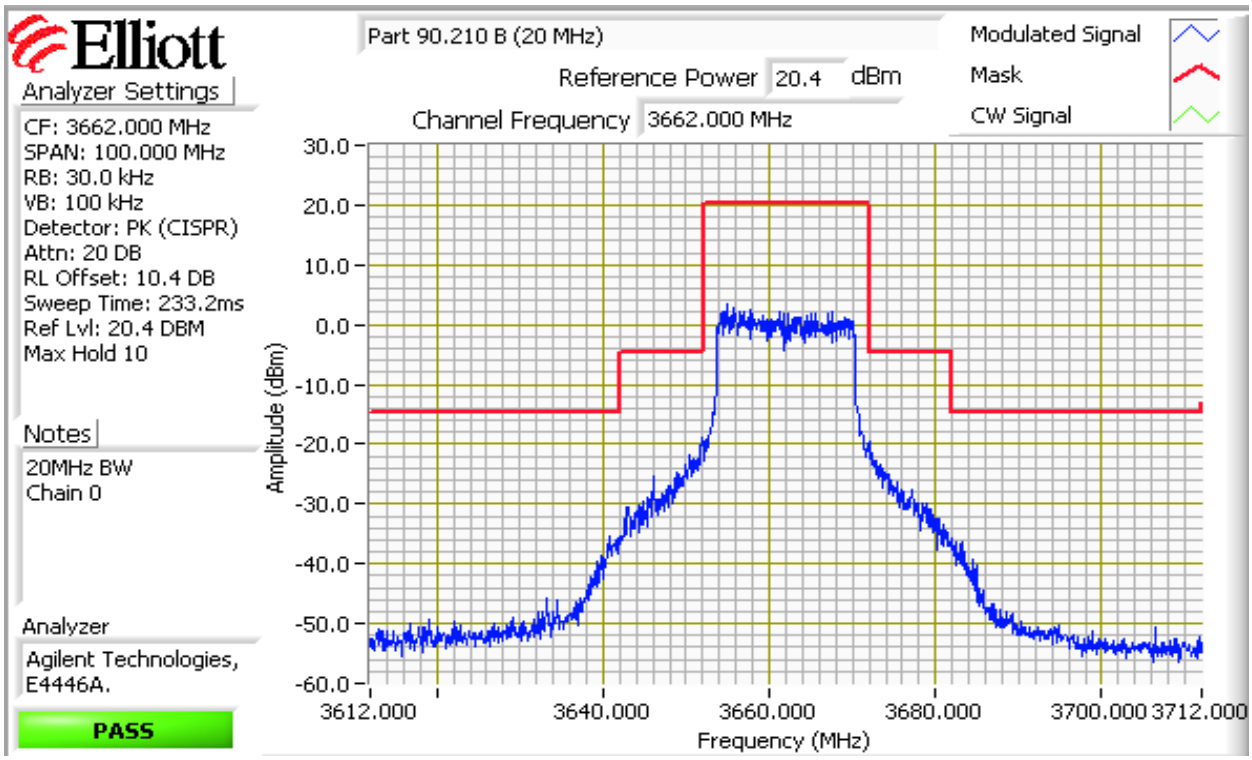
Client:	Ubiquiti Networks	Job Number:	J82268
Model:	NanoBridgeM365 & NanoStationM365	T-Log Number:	T82413
		Account Manager:	Susan Pelzl
Contact:	Jennifer Sanchez		
Standard:	FCC 15B, 90Z, RSS	Class:	N/A



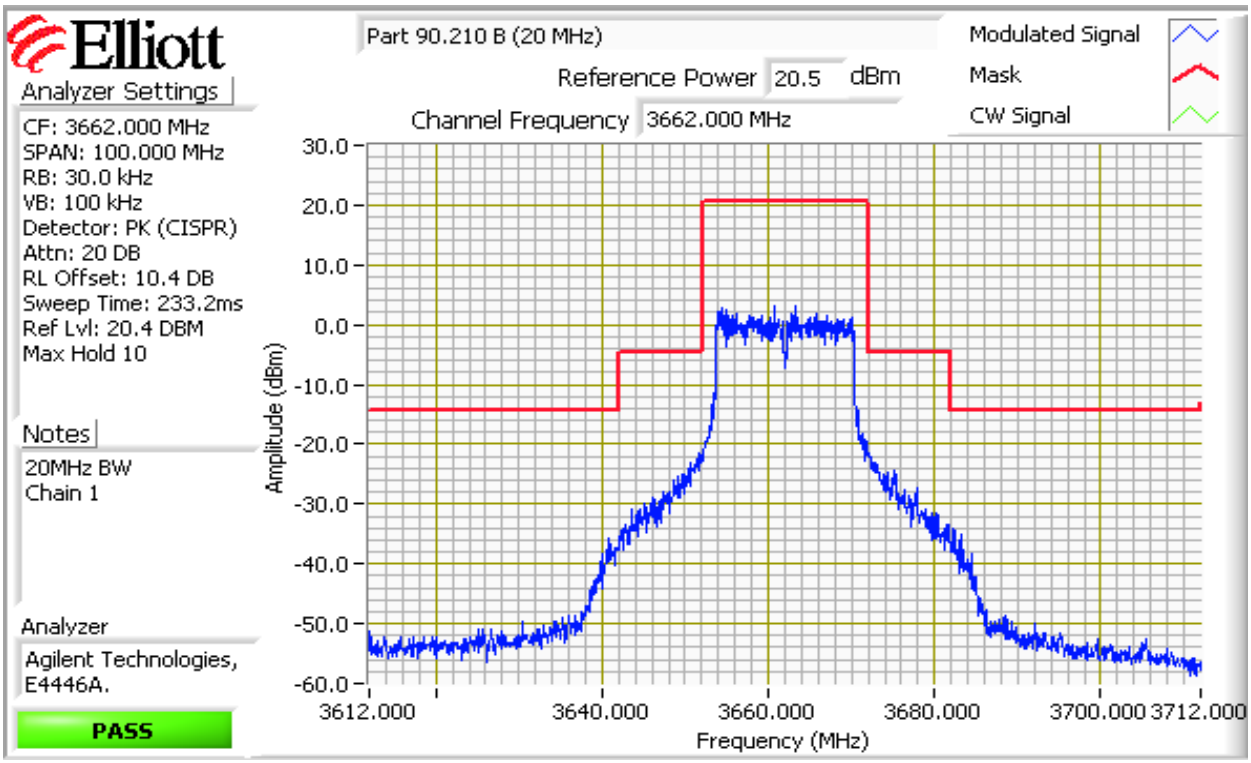
Client:	Ubiquiti Networks	Job Number:	J82268
Model:	NanoBridgeM365 & NanoStationM365	T-Log Number:	T82413
		Account Manager:	Susan Pelzl
Contact:	Jennifer Sanchez		
Standard:	FCC 15B, 90Z, RSS	Class:	N/A



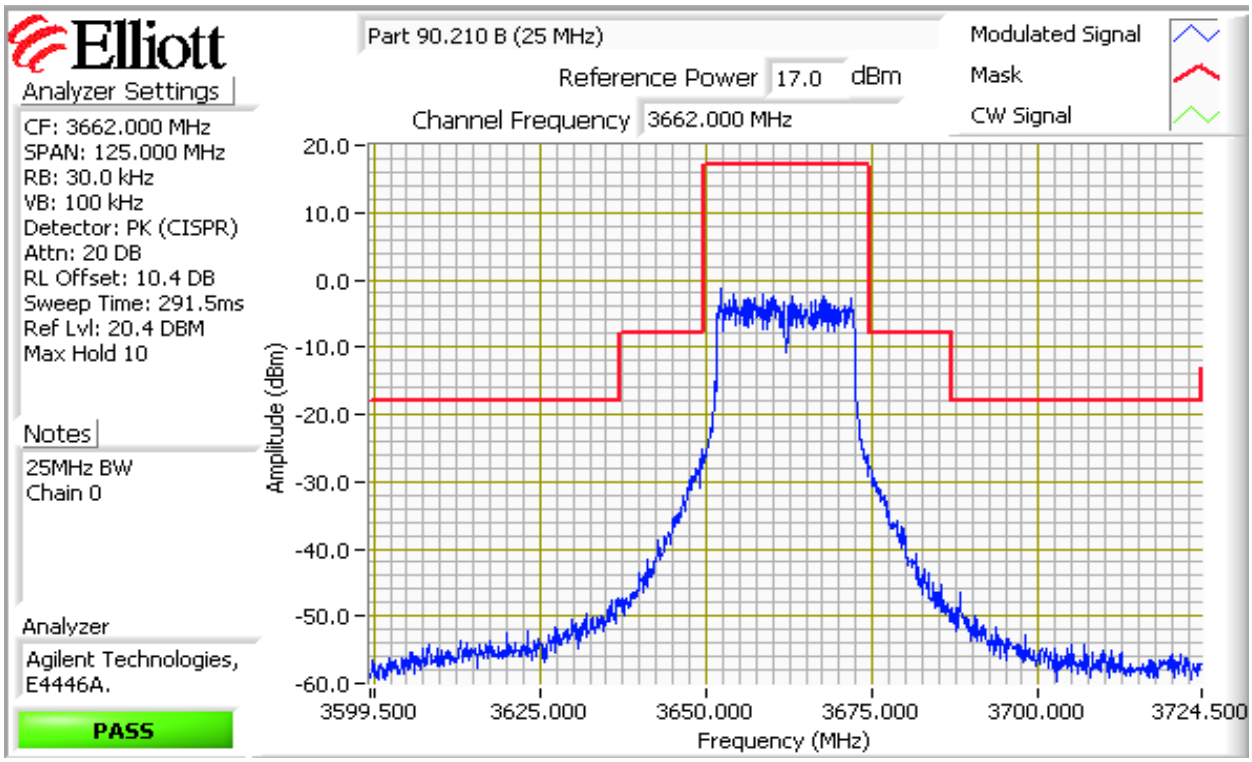
Client:	Ubiquiti Networks	Job Number:	J82268
Model:	NanoBridgeM365 & NanoStationM365	T-Log Number:	T82413
		Account Manager:	Susan Pelzl
Contact:	Jennifer Sanchez		
Standard:	FCC 15B, 90Z, RSS	Class:	N/A



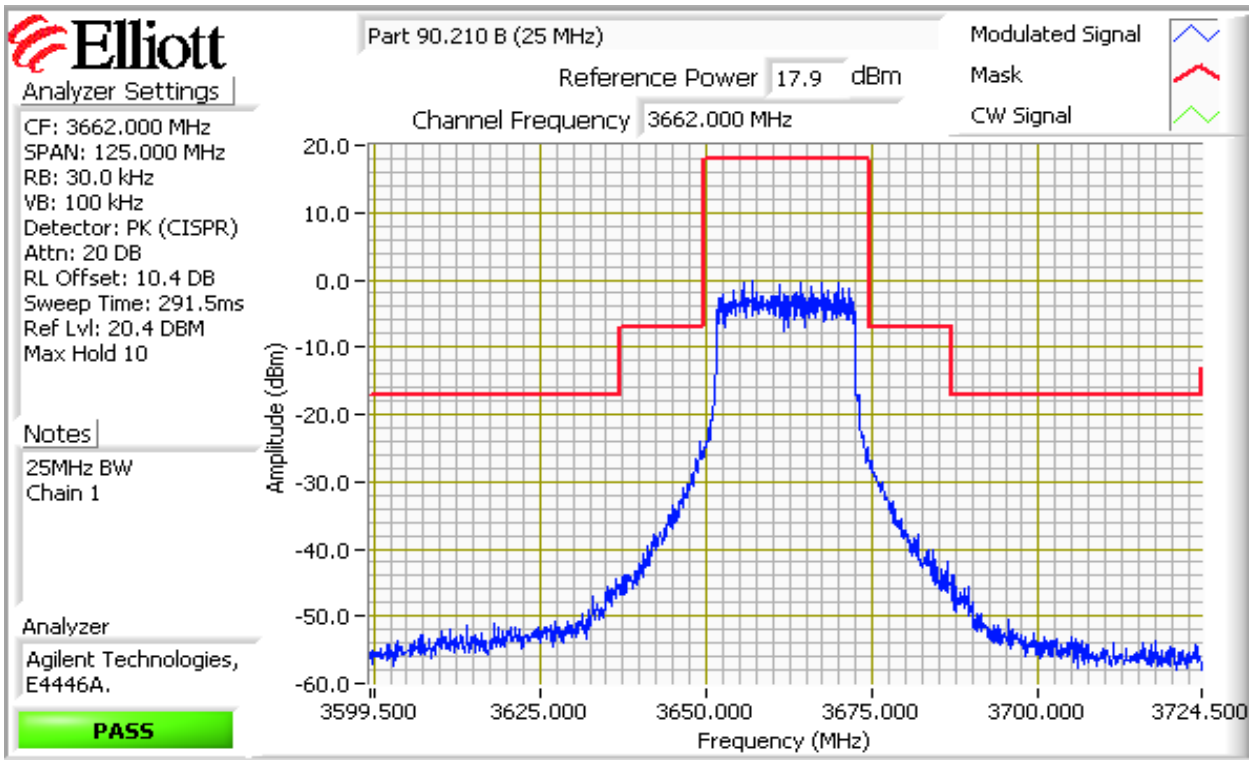
Client:	Ubiquiti Networks	Job Number:	J82268
Model:	NanoBridgeM365 & NanoStationM365	T-Log Number:	T82413
		Account Manager:	Susan Pelzl
Contact:	Jennifer Sanchez		
Standard:	FCC 15B, 90Z, RSS	Class:	N/A



Client:	Ubiquiti Networks	Job Number:	J82268
Model:	NanoBridgeM365 & NanoStationM365	T-Log Number:	T82413
		Account Manager:	Susan Pelzl
Contact:	Jennifer Sanchez		
Standard:	FCC 15B, 90Z, RSS	Class:	N/A



Client:	Ubiquiti Networks	Job Number:	J82268
Model:	NanoBridgeM365 & NanoStationM365	T-Log Number:	T82413
		Account Manager:	Susan Pelzl
Contact:	Jennifer Sanchez		
Standard:	FCC 15B, 90Z, RSS	Class:	N/A



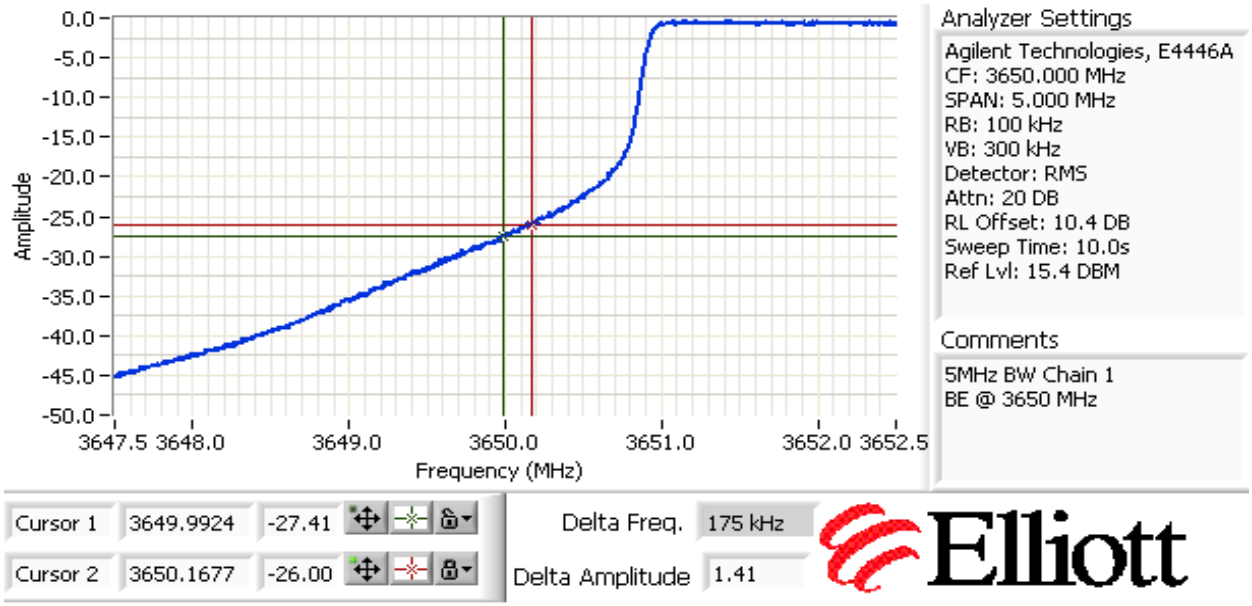
Client:	Ubiquiti Networks	Job Number:	J82268
Model:	NanoBridgeM365 & NanoStationM365	T-Log Number:	T82413
		Account Manager:	Susan Pelzl
Contact:	Jennifer Sanchez		
Standard:	FCC 15B, 90Z, RSS	Class:	N/A

Run #4: Unwanted emissions, MCS0 at highest power setting used for Power measurements

Date of Test: 3/14/2011 Config. Used: 1
Test Engineer: Rafael Varelas Config Change: none
Test Location: FT Lab #4 EUT Voltage: POE

Number of transmit chains: 2
Spurious Limit: -23.0 dBm/100kHz (-13dBm/MHz) eirp
Adjustment for 2 chains: -3.0 dB adjustment for multiple chains.
Limit Used On Plots -26.0 dBm/100 kHz (-16dBm/MHz) eirp

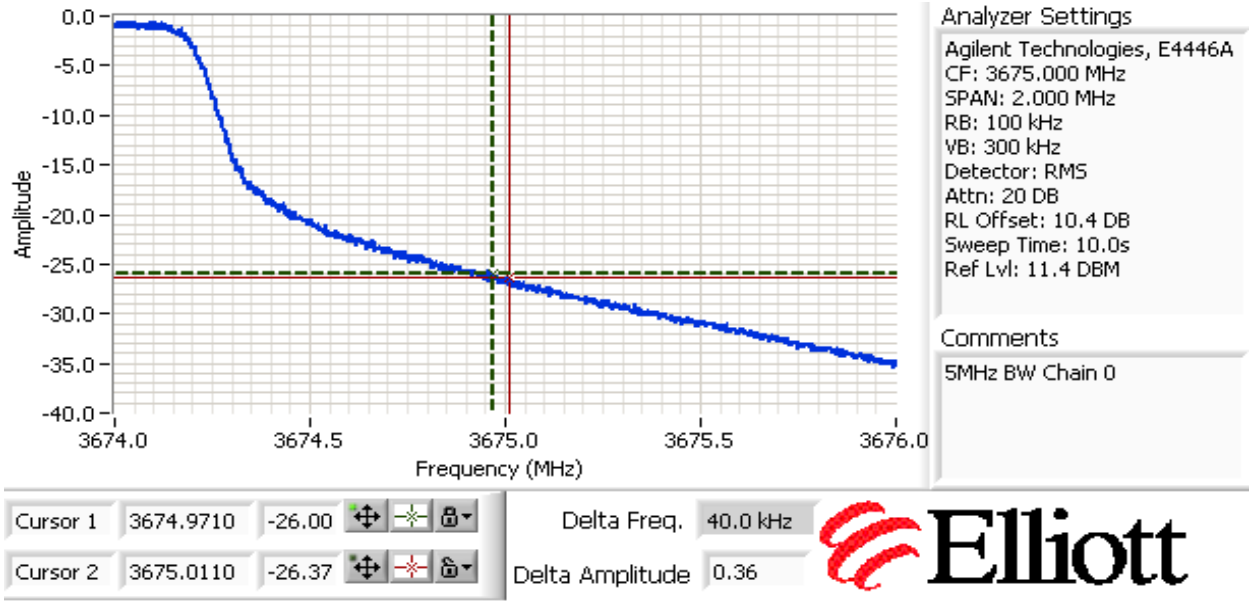
MIMO Devices: The plots were obtained for the chain with the highest PSD and the limit was adjusted to account for all chains transmitting simultaneously
Band edge Measurements
5MHz BW
Power setting 27



Plot for low channel (3653 MHz), power setting(s) = 27, BW= 5.0, MOD=MCS0
-27.4dBm in 100 kHz (corrected by 10*log(100kHz/1MHz)) yeilds -17.4dBm in 1 MHz

Client:	Ubiquiti Networks	Job Number:	J82268
Model:	NanoBridgeM365 & NanoStationM365	T-Log Number:	T82413
		Account Manager:	Susan Pelzl
Contact:	Jennifer Sanchez		
Standard:	FCC 15B, 90Z, RSS	Class:	N/A

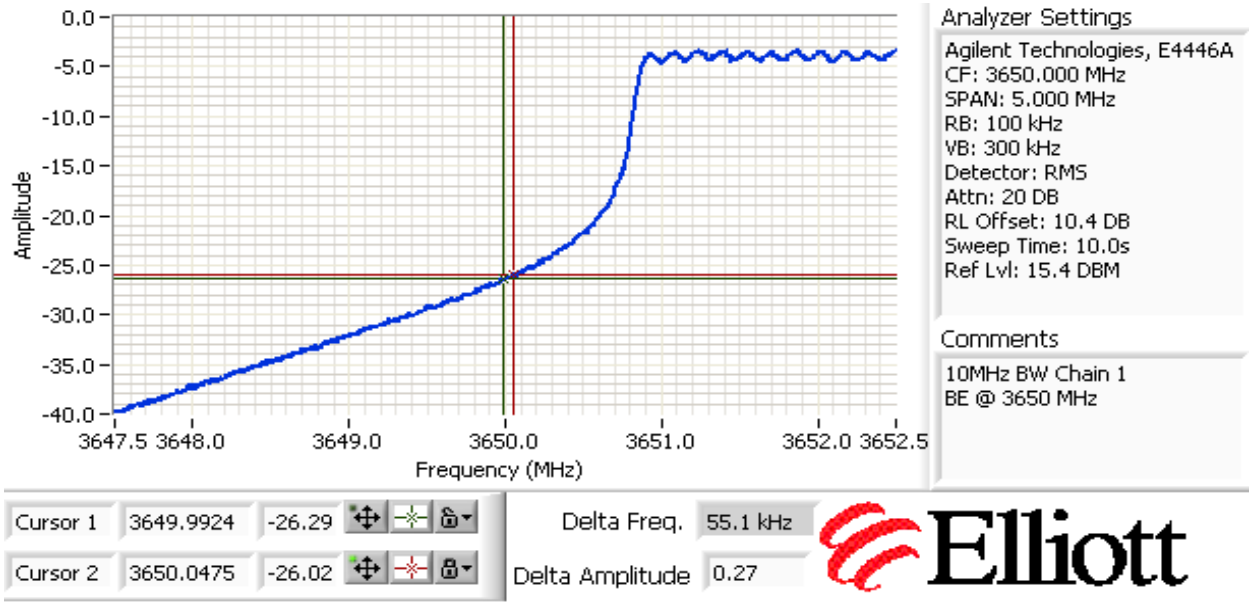
Power setting 32



Plot for high channel (3672 MHz), power setting(s) = 32, BW= 5.0, MOD=MCS0
-26.4dBm in 100 kHz (corrected by 10*log(100kHz/1MHz)) yeilds -16.4dBm in 1 MHz

Client:	Ubiquiti Networks	Job Number:	J82268
Model:	NanoBridgeM365 & NanoStationM365	T-Log Number:	T82413
		Account Manager:	Susan Pelzl
Contact:	Jennifer Sanchez		
Standard:	FCC 15B, 90Z, RSS	Class:	N/A

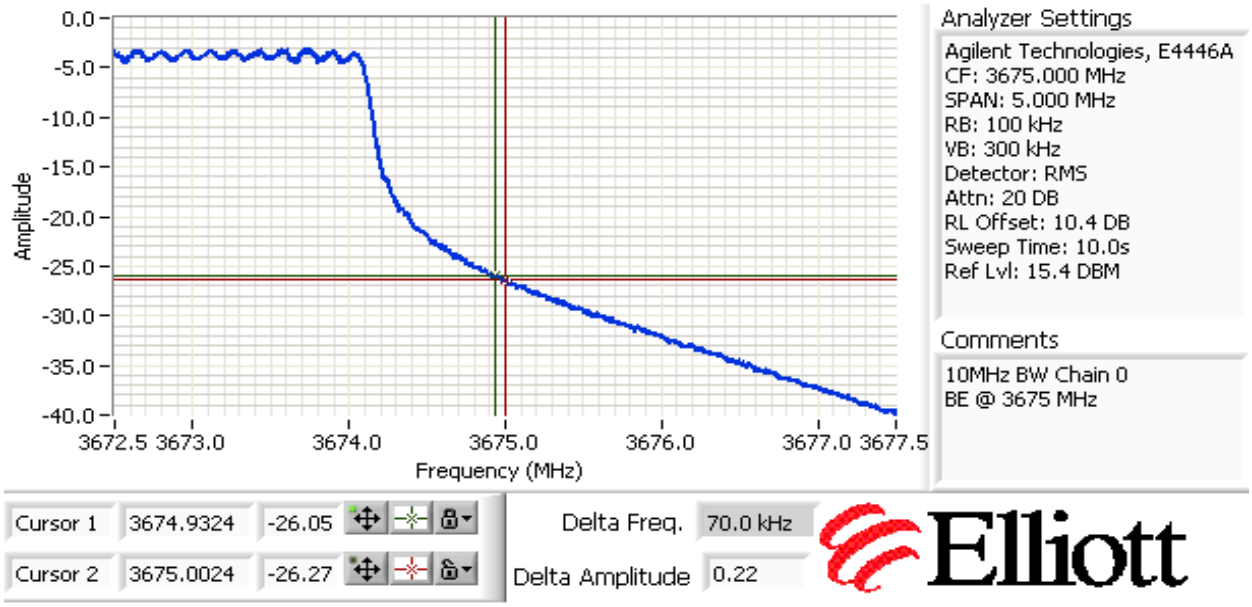
10MHz BW
Power setting 26



Plot for low channel (3655 MHz), power setting(s) = 26, BW= 10.0, MOD=MCS0
-26.0dBm in 100 kHz (corrected by 10*log(100kHz/1MHz)) yeilds -16.0dBm in 1 MHz

Client:	Ubiquiti Networks	Job Number:	J82268
Model:	NanoBridgeM365 & NanoStationM365	T-Log Number:	T82413
		Account Manager:	Susan Pelzl
Contact:	Jennifer Sanchez		
Standard:	FCC 15B, 90Z, RSS	Class:	N/A

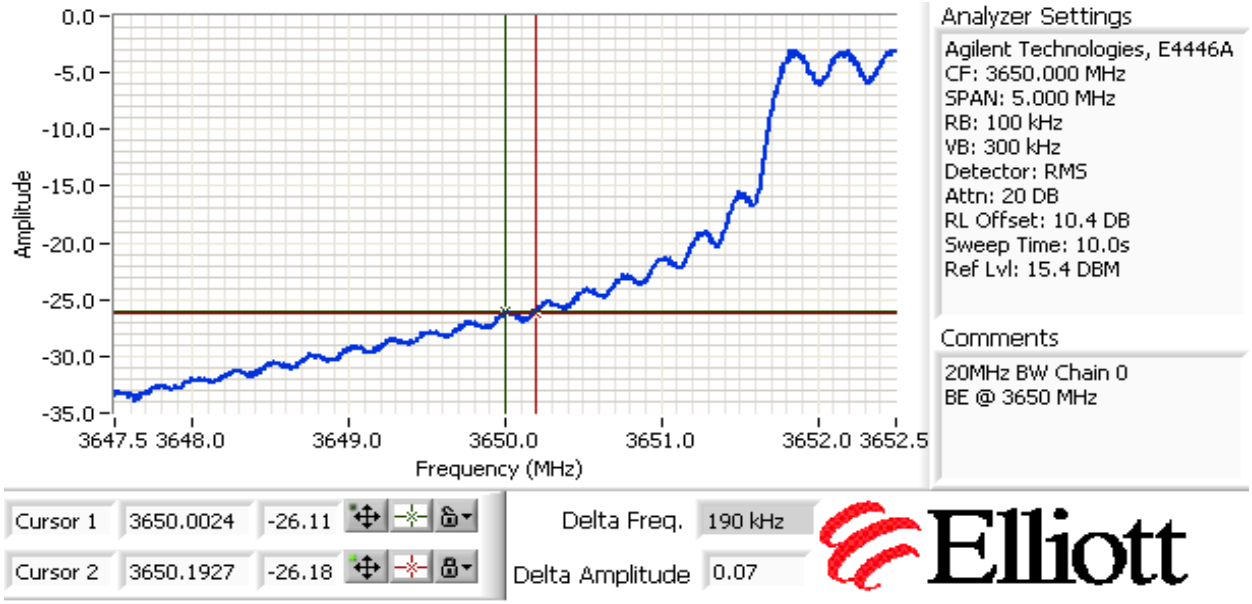
Power setting 32



Plot for high channel (3670 MHz), power setting(s) = 32, BW= 10.0, MOD=MCS0
-26.3dBm in 100 kHz (corrected by 10*log(100kHz/1MHz)) yeilds -16.3dBm in 1 MHz

Client:	Ubiquiti Networks	Job Number:	J82268
Model:	NanoBridgeM365 & NanoStationM365	T-Log Number:	T82413
		Account Manager:	Susan Pelzl
Contact:	Jennifer Sanchez		
Standard:	FCC 15B, 90Z, RSS	Class:	N/A

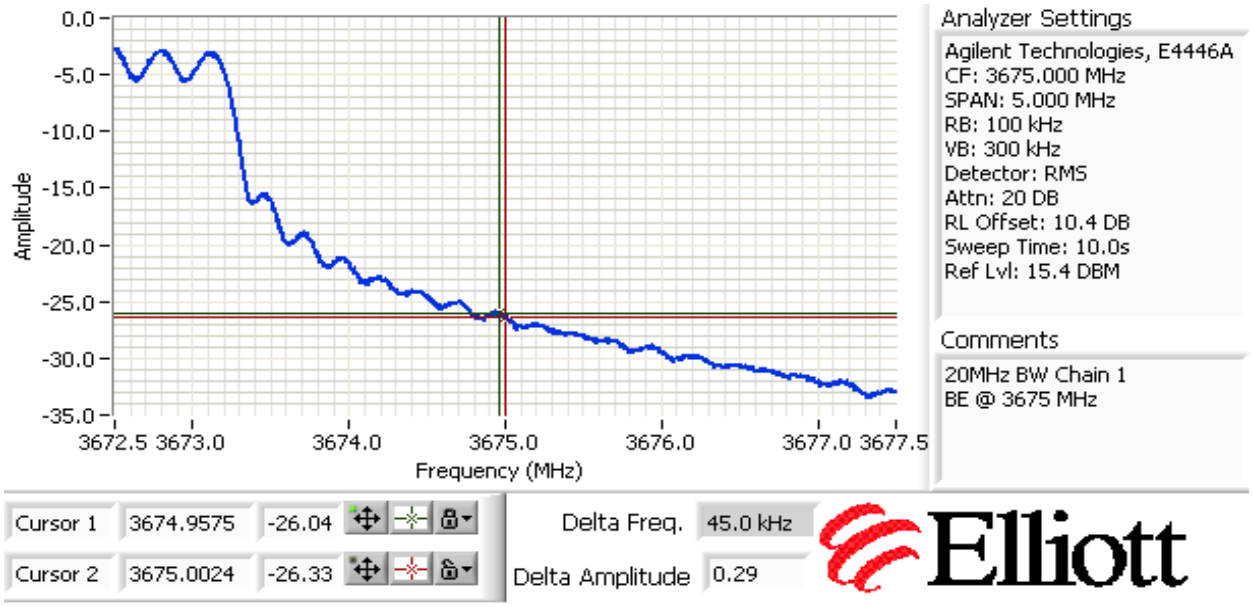
20MHz BW
Power setting 36



Plot for low channel (3660 MHz), power setting(s) = 36, BW= 20.0, MOD=MCS0
-26.1dBm in 100 kHz (corrected by 10*log(100kHz/1MHz)) yeilds -16.1dBm in 1 MHz

Client:	Ubiquiti Networks	Job Number:	J82268
Model:	NanoBridgeM365 & NanoStationM365	T-Log Number:	T82413
		Account Manager:	Susan Pelzl
Contact:	Jennifer Sanchez		
Standard:	FCC 15B, 90Z, RSS	Class:	N/A

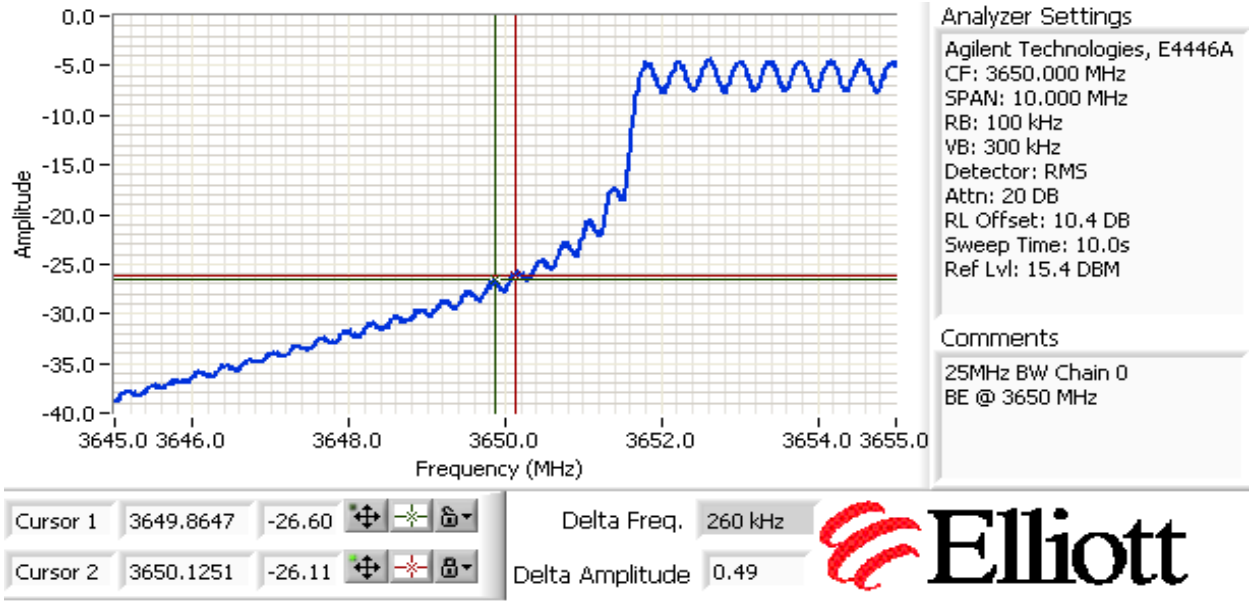
Power setting 34



Plot for high channel (3665 MHz), power setting(s) = 34, BW= 20.0, MOD=MCS0
-26.3dBm in 100 kHz (corrected by 10*log(100kHz/1MHz)) yeilds -16.3dBm in 1 MHz

Client:	Ubiquiti Networks	Job Number:	J82268
Model:	NanoBridgeM365 & NanoStationM365	T-Log Number:	T82413
		Account Manager:	Susan Pelzl
Contact:	Jennifer Sanchez		
Standard:	FCC 15B, 90Z, RSS	Class:	N/A

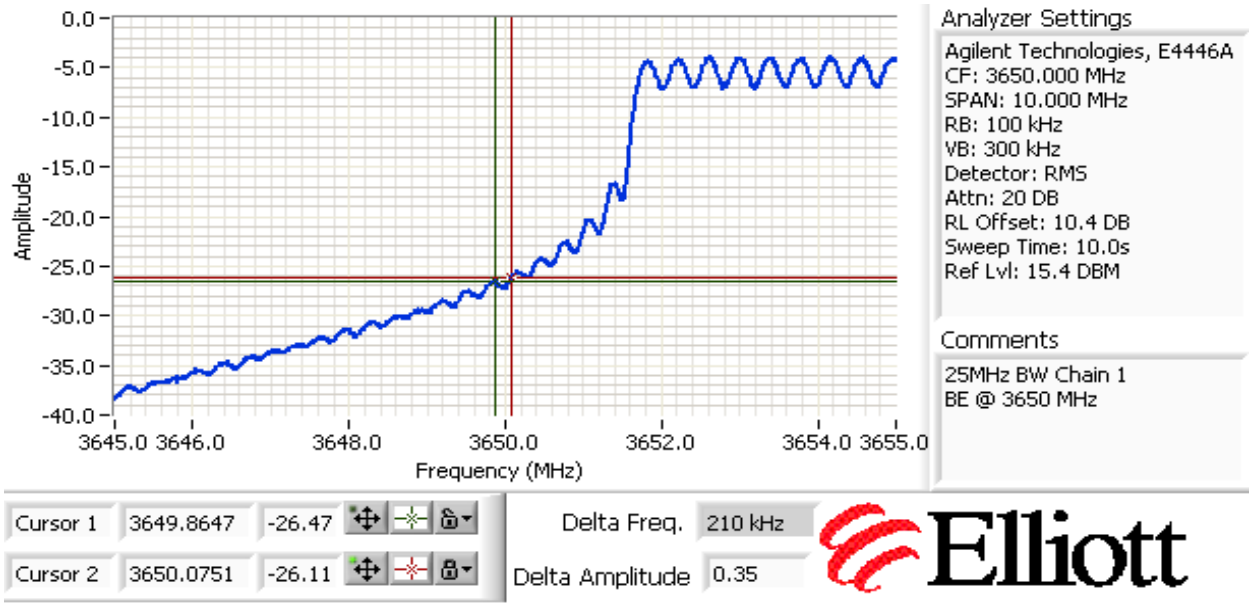
25MHz BW
Power setting 36



Plot for low channel (3662 MHz), power setting(s) = 36, BW= 25.0, MOD=MCS0
-26.6dBm in 100 kHz (corrected by 10*log(100kHz/1MHz)) yeilds -16.6dBm in 1 MHz

Client:	Ubiquiti Networks	Job Number:	J82268
Model:	NanoBridgeM365 & NanoStationM365	T-Log Number:	T82413
		Account Manager:	Susan Pelzl
Contact:	Jennifer Sanchez		
Standard:	FCC 15B, 90Z, RSS	Class:	N/A

Power setting 33



Plot for high channel (3662 MHz), power setting(s) = 33, BW= 25.0, MOD=MCS0
-26.5dBm in 100 kHz (corrected by 10*log(100kHz/1MHz)) yeilds -16.5dBm in 1 MHz

Client:	Ubiquiti Networks	Job Number:	J82268
Model:	NanoBridgeM365 & NanoStationM365	T-Log Number:	T82413
		Account Manager:	Susan Pelzl
Contact:	Jennifer Sanchez		
Standard:	FCC 15B, 90Z, RSS	Class:	N/A

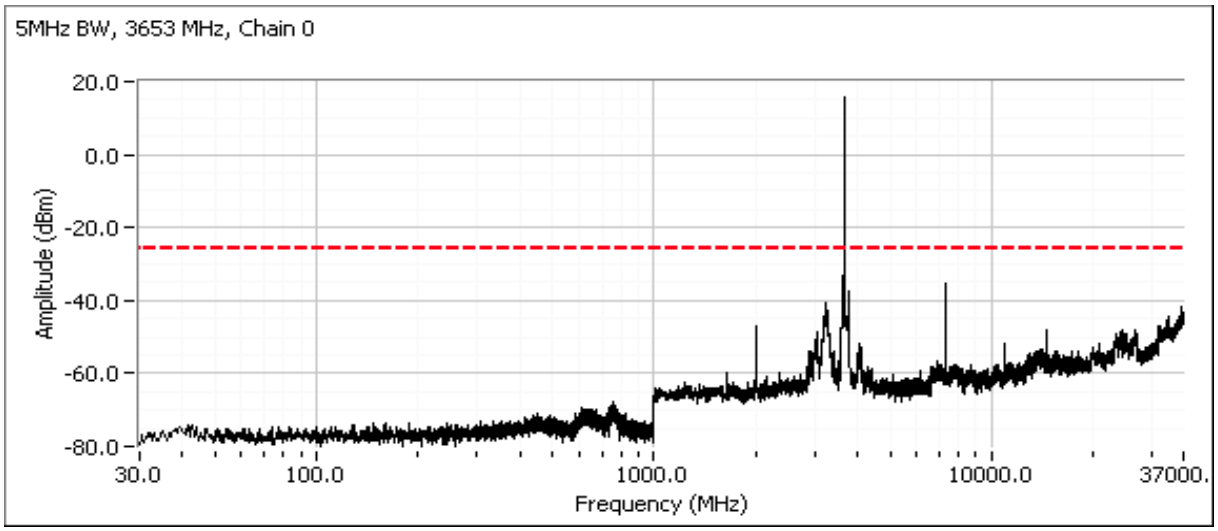
Run #4: Unwanted emissions, MCS0 at highest power setting used for Power measurements

Date of Test:	3/16/2011	Config. Used:	1
Test Engineer:	Mark Hill	Config Change:	none
Test Location:	FT Lab#4	EUT Voltage:	POE

Number of transmit chains:	2	
Spurious Limit:	-13.0	dBm/MHz eirp = -23.0dBm/100kHz
Adjustment for 2 chains:	-3.0	dB adjustment for multiple chains.
Limit Used On Plots	-26.0	dBm/100 kHz

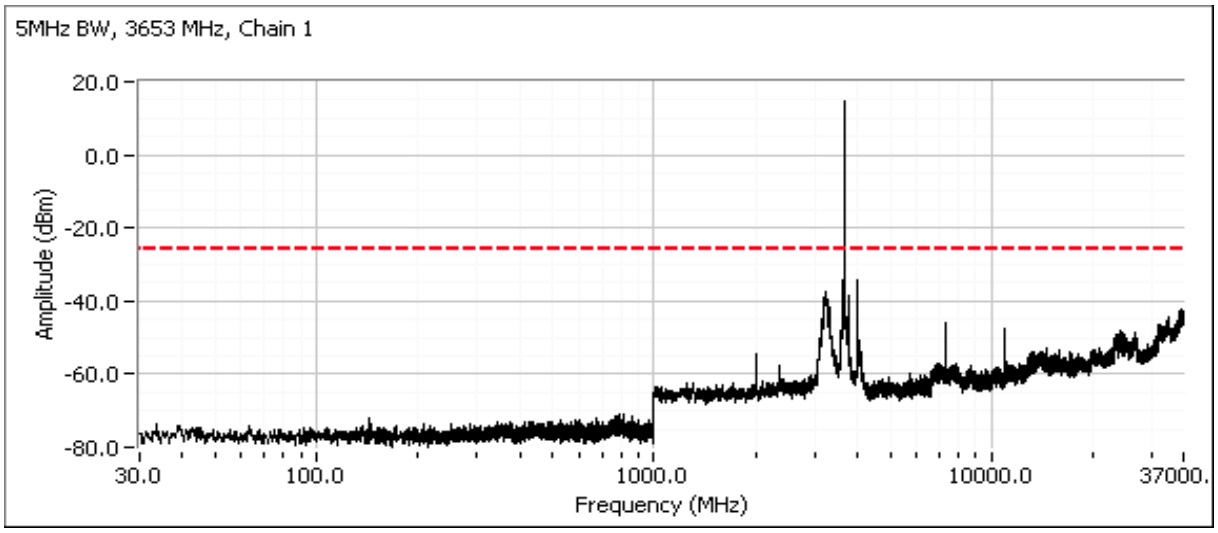
MIMO Devices: The plots were obtained for each chain individually and the limit was adjusted to account for all chains transmitting simultaneously, RBW=VBW=1MHz above 1 GHz and 100 kHz below 1 GHz.

Low channel
pcdac = 30



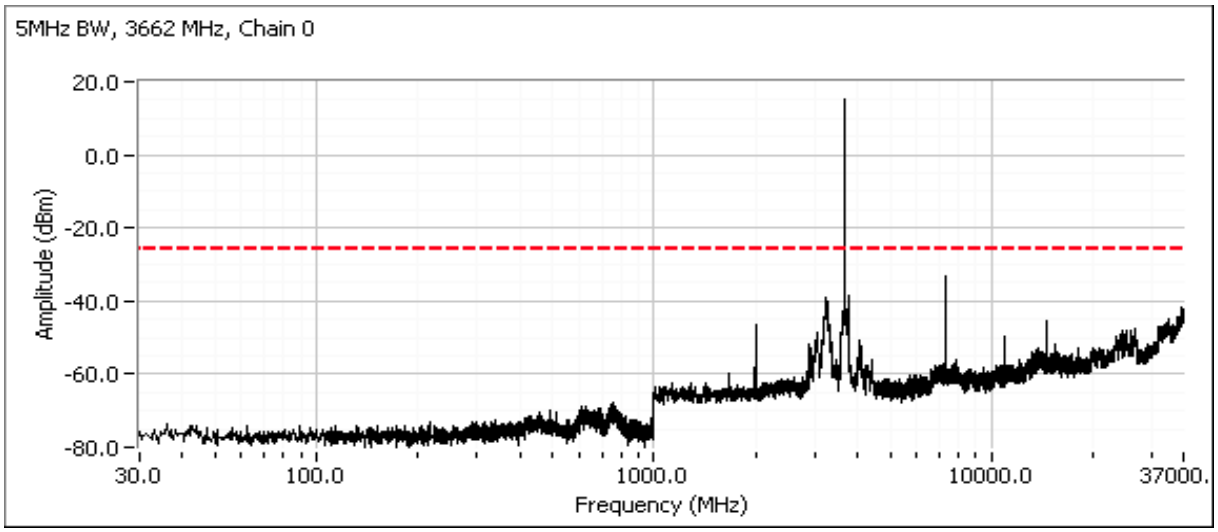
Client:	Ubiquiti Networks	Job Number:	J82268
Model:	NanoBridgeM365 & NanoStationM365	T-Log Number:	T82413
		Account Manager:	Susan Pelzl
Contact:	Jennifer Sanchez		
Standard:	FCC 15B, 90Z, RSS	Class:	N/A

pcdac = 27



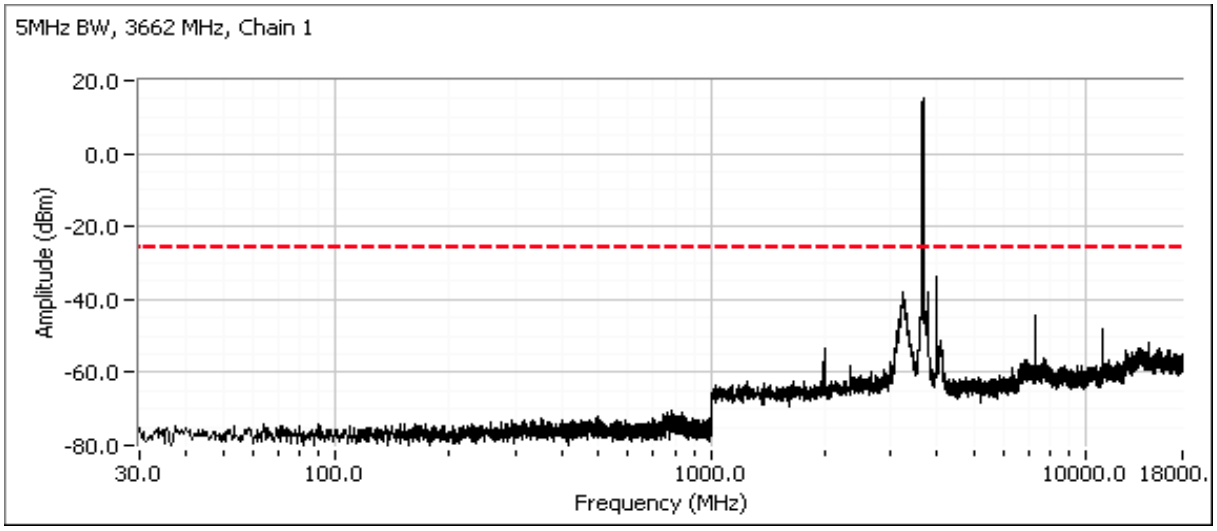
Center channel

pcdac = 32



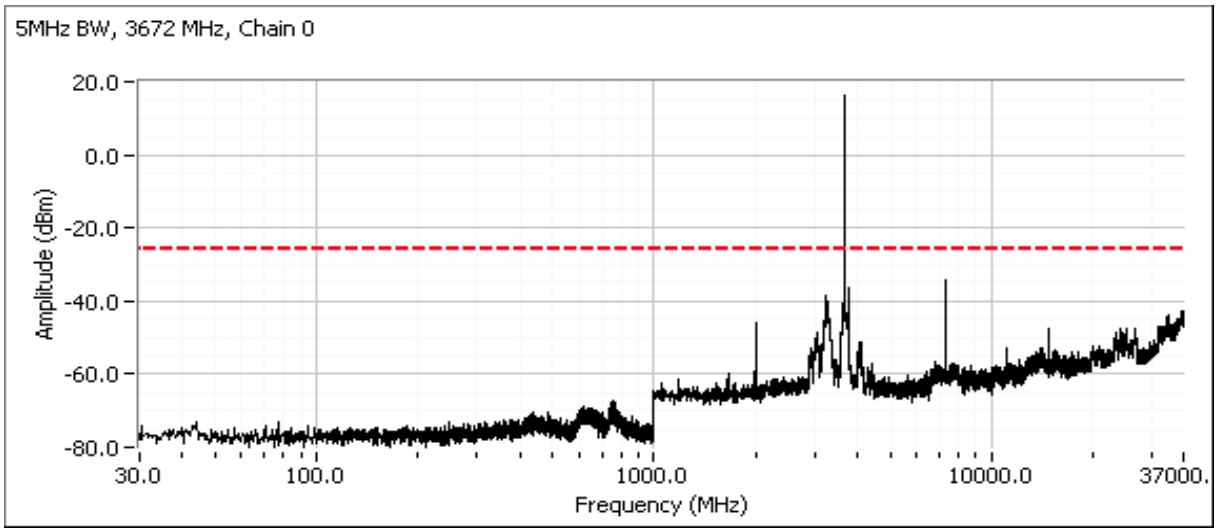
Client:	Ubiquiti Networks	Job Number:	J82268
Model:	NanoBridgeM365 & NanoStationM365	T-Log Number:	T82413
		Account Manager:	Susan Pelzl
Contact:	Jennifer Sanchez		
Standard:	FCC 15B, 90Z, RSS	Class:	N/A

pcdac = 28



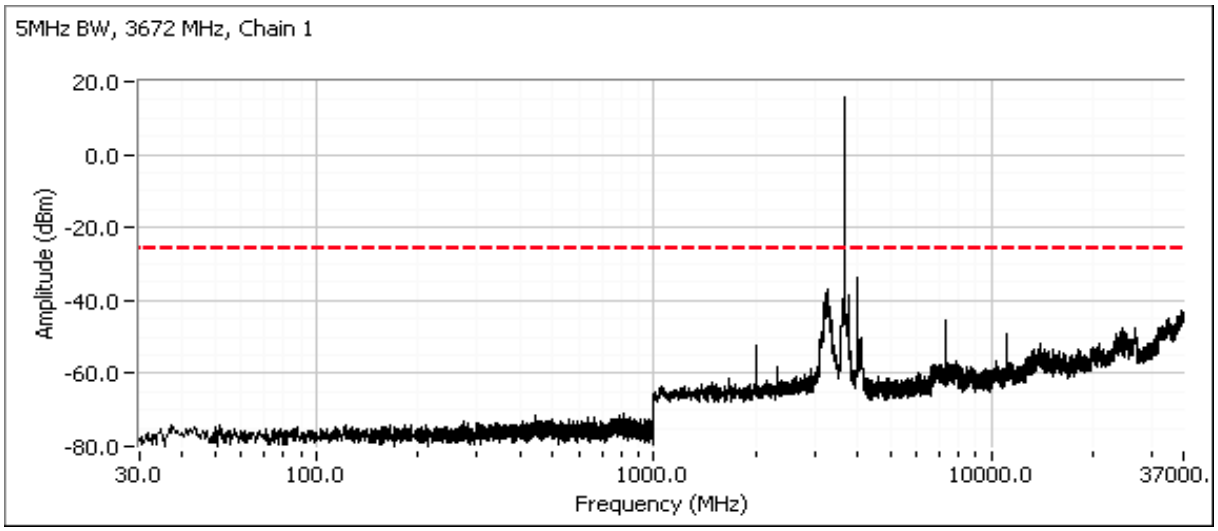
High channel

pcdac = 32



Client:	Ubiquiti Networks	Job Number:	J82268
Model:	NanoBridgeM365 & NanoStationM365	T-Log Number:	T82413
		Account Manager:	Susan Pelzl
Contact:	Jennifer Sanchez		
Standard:	FCC 15B, 90Z, RSS	Class:	N/A

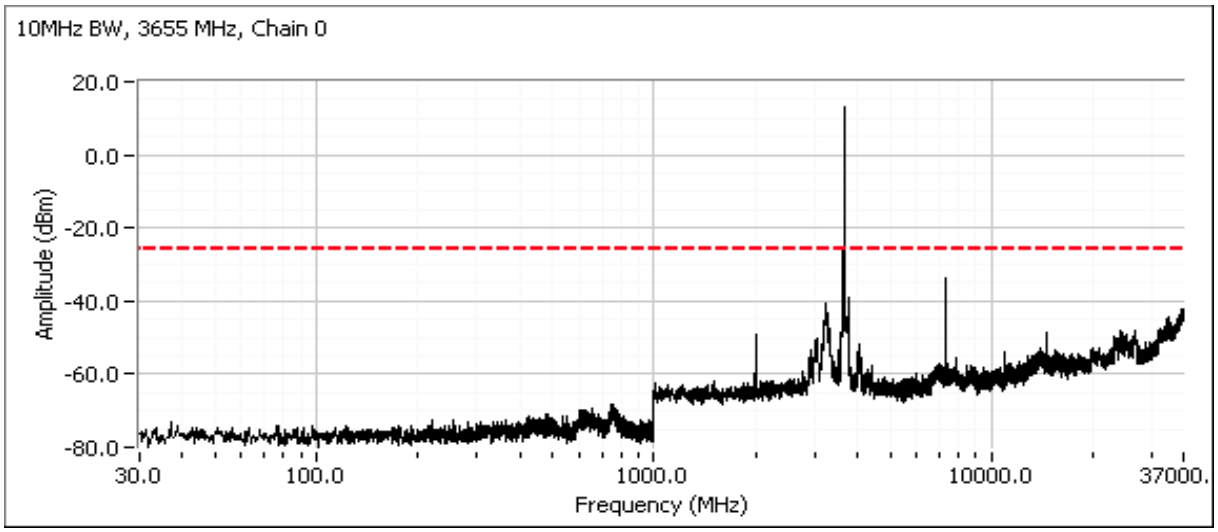
pcdac = 28



10 MHz Mode

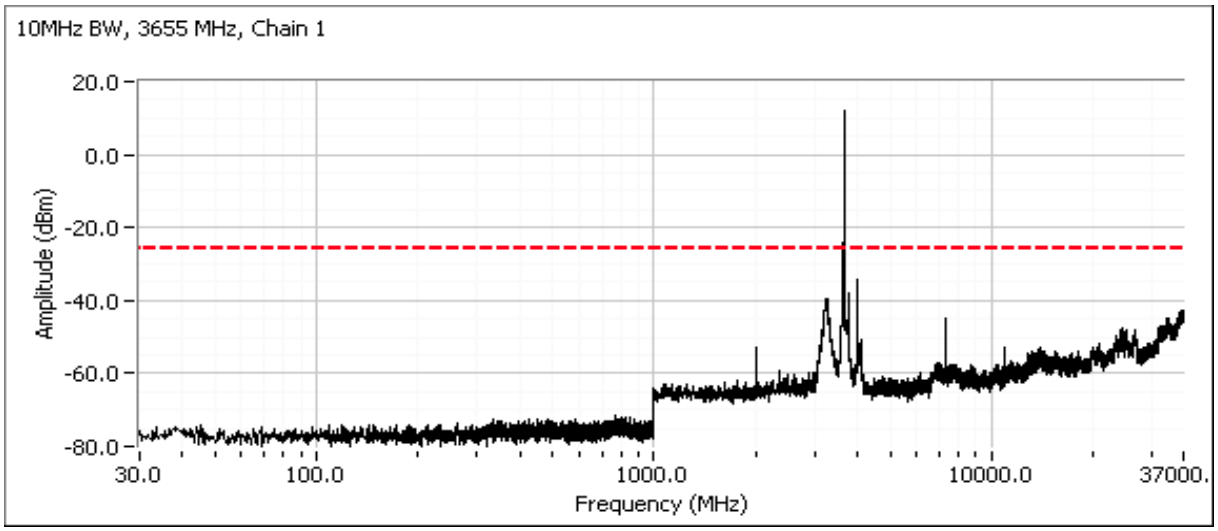
Low channel

pcdac = 29



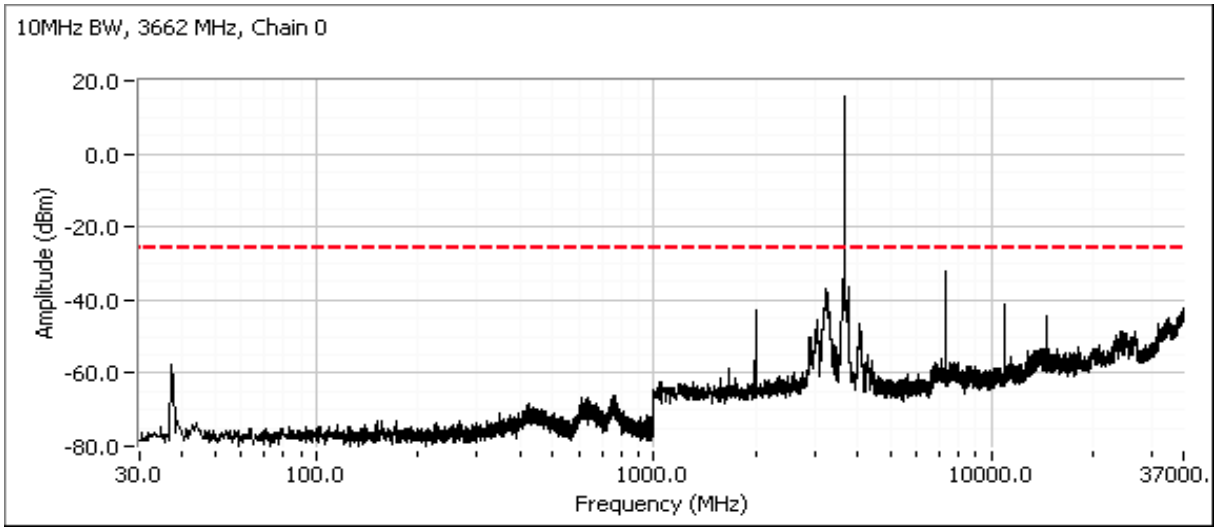
Client:	Ubiquiti Networks	Job Number:	J82268
Model:	NanoBridgeM365 & NanoStationM365	T-Log Number:	T82413
		Account Manager:	Susan Pelzl
Contact:	Jennifer Sanchez		
Standard:	FCC 15B, 90Z, RSS	Class:	N/A

pcdac = 26



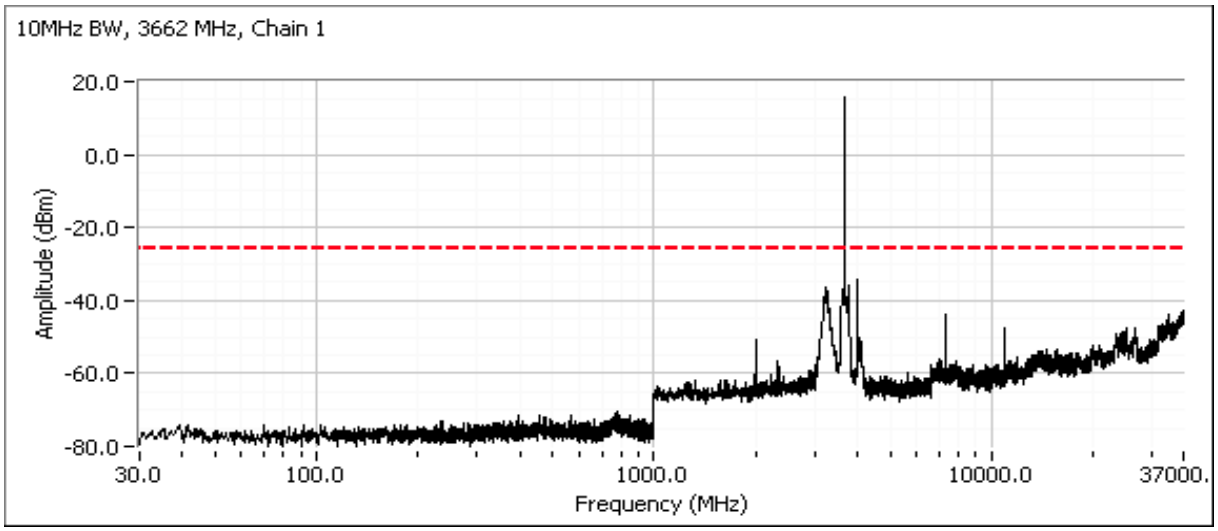
Center channel

pcdac = 39



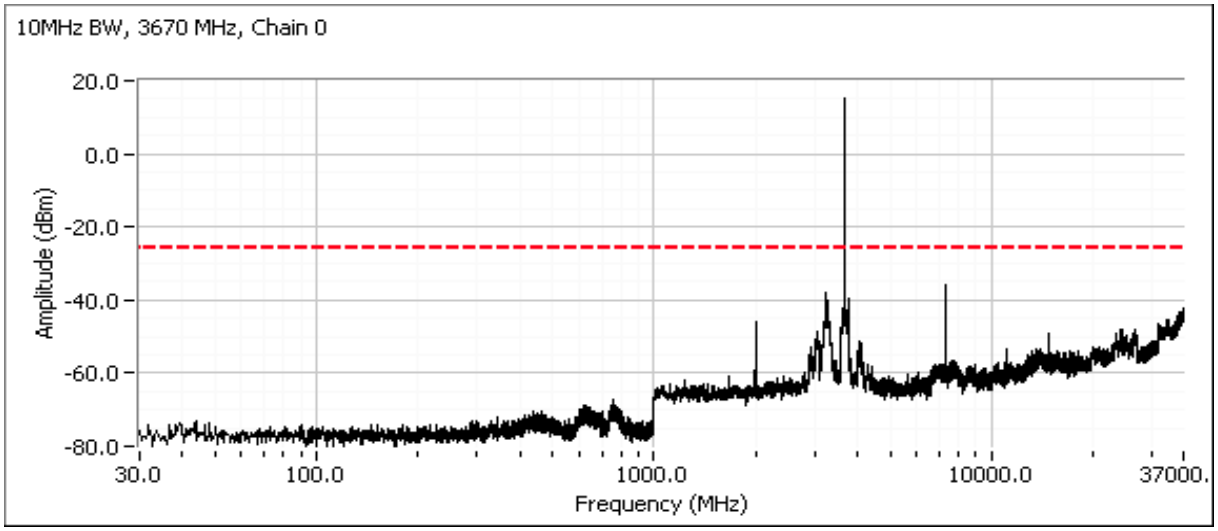
Client:	Ubiquiti Networks	Job Number:	J82268
Model:	NanoBridgeM365 & NanoStationM365	T-Log Number:	T82413
		Account Manager:	Susan Pelzl
Contact:	Jennifer Sanchez		
Standard:	FCC 15B, 90Z, RSS	Class:	N/A

pcdac = 34



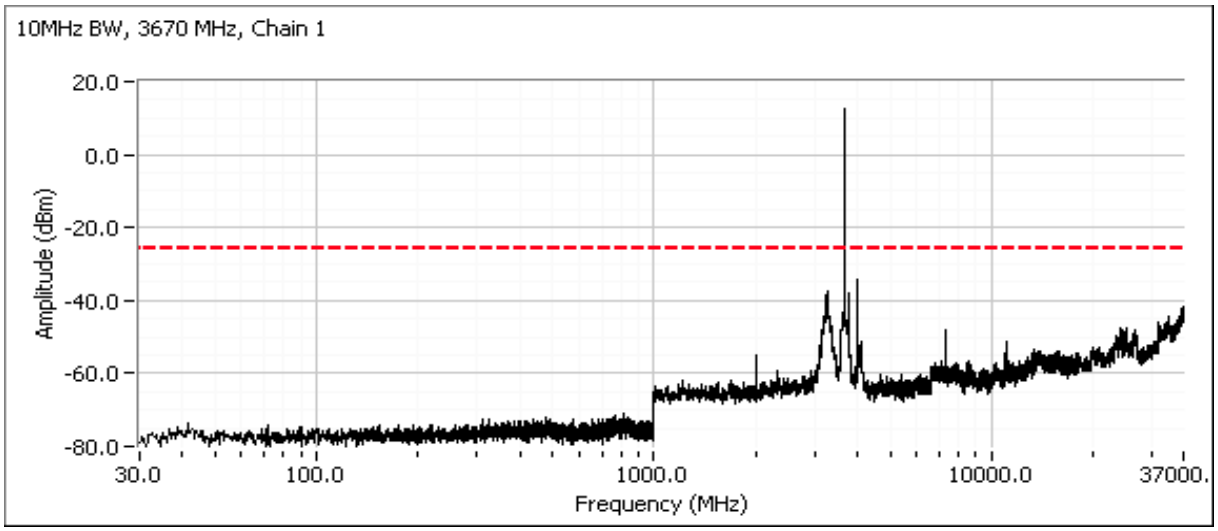
High channel

pcdac = 32



Client:	Ubiquiti Networks	Job Number:	J82268
Model:	NanoBridgeM365 & NanoStationM365	T-Log Number:	T82413
		Account Manager:	Susan Pelzl
Contact:	Jennifer Sanchez		
Standard:	FCC 15B, 90Z, RSS	Class:	N/A

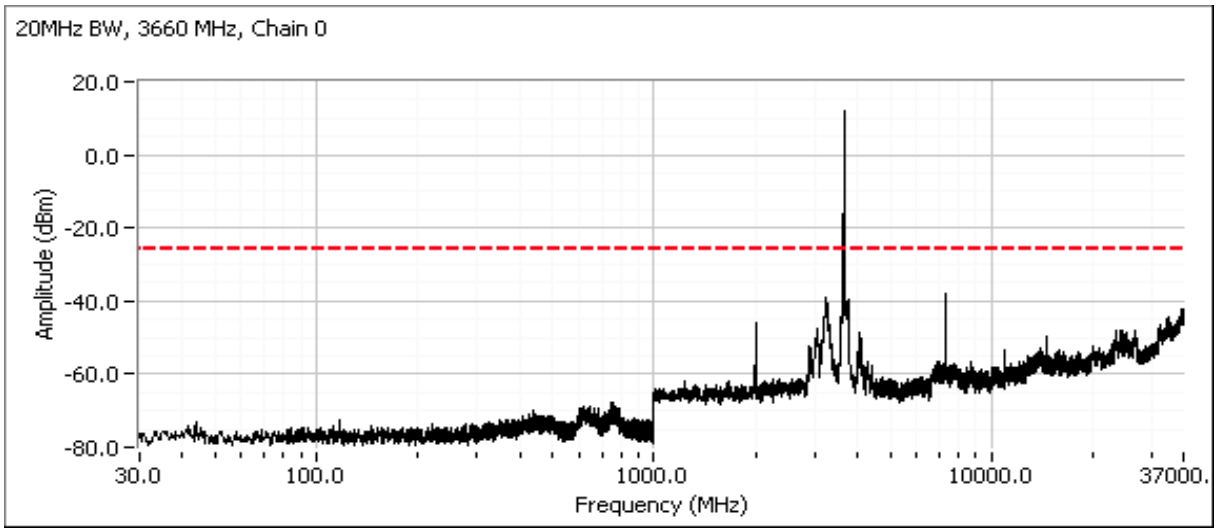
pcdac = 27



20 MHz Mode

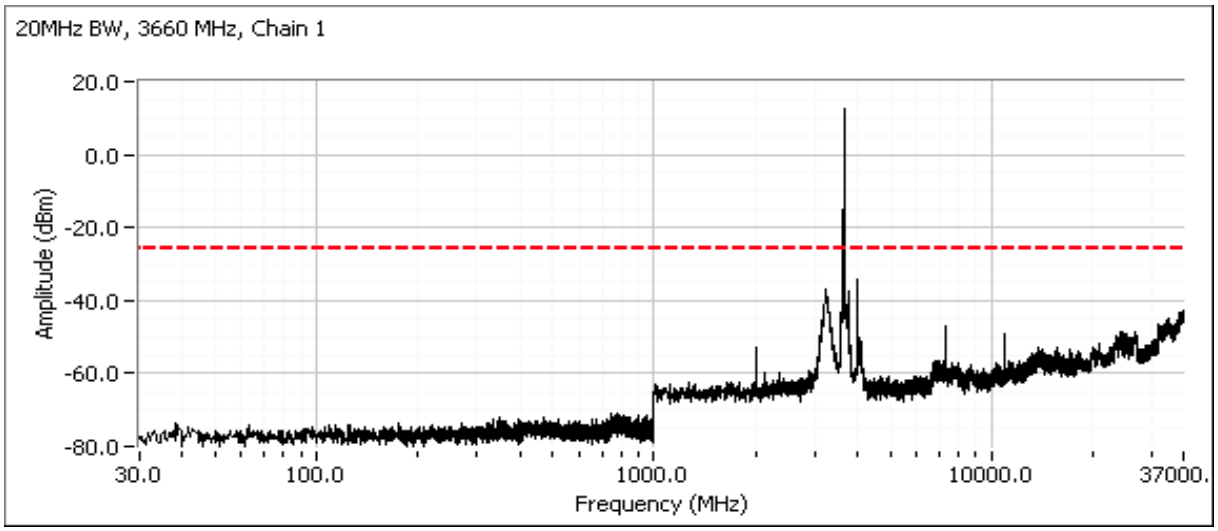
Low channel

pcdac = 36



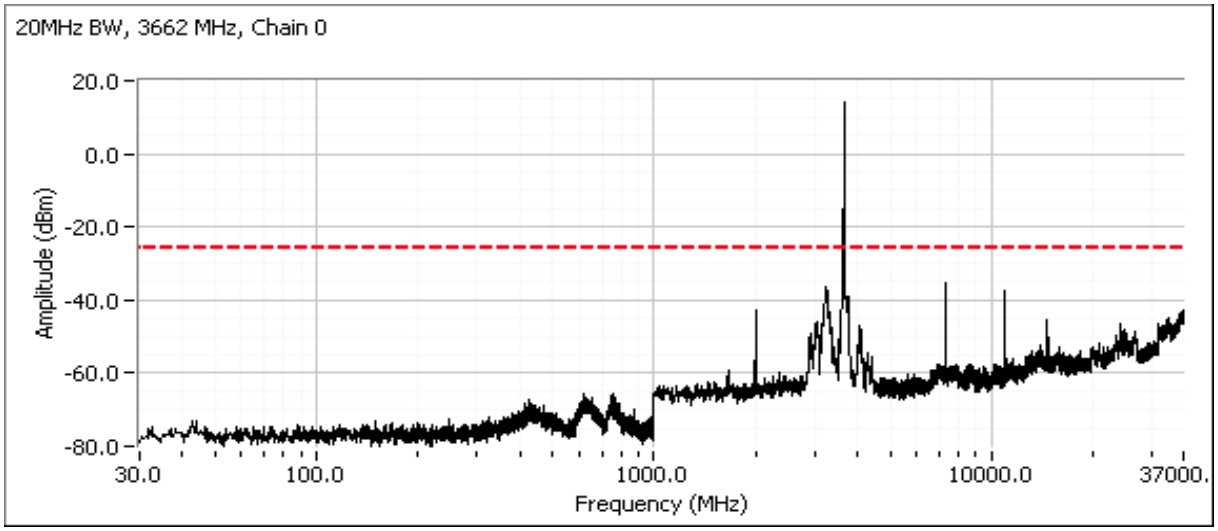
Client:	Ubiquiti Networks	Job Number:	J82268
Model:	NanoBridgeM365 & NanoStationM365	T-Log Number:	T82413
		Account Manager:	Susan Pelzl
Contact:	Jennifer Sanchez		
Standard:	FCC 15B, 90Z, RSS	Class:	N/A

pcdac = 31



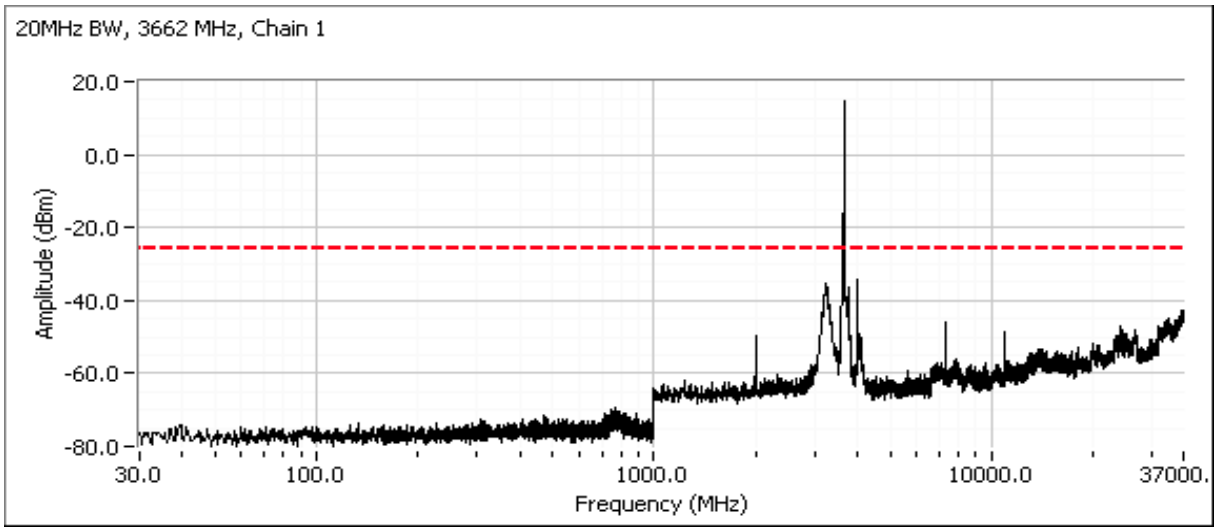
Center channel

pcdac = 44



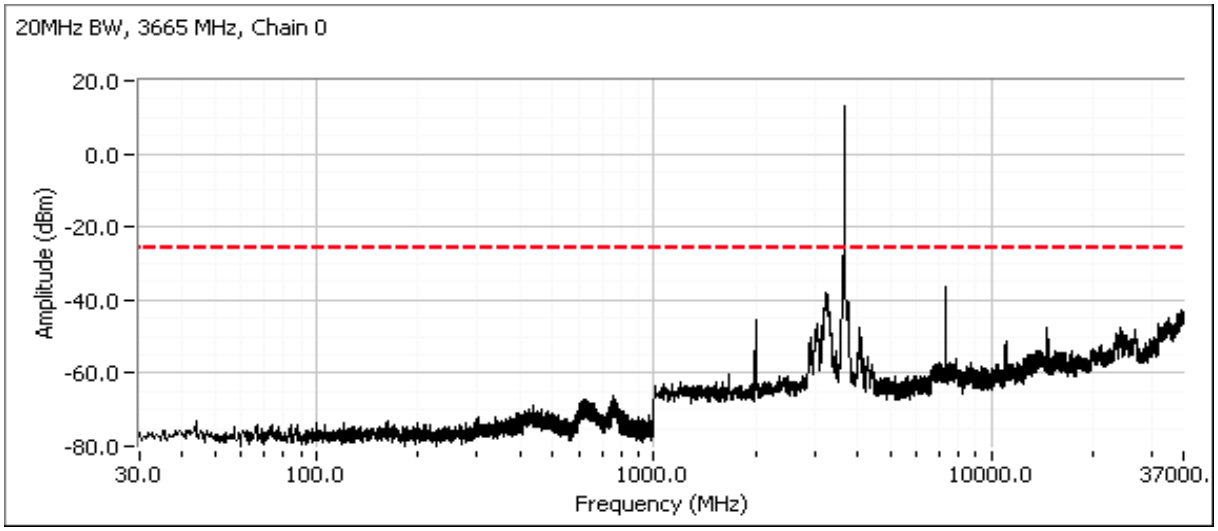
Client:	Ubiquiti Networks	Job Number:	J82268
Model:	NanoBridgeM365 & NanoStationM365	T-Log Number:	T82413
		Account Manager:	Susan Pelzl
Contact:	Jennifer Sanchez		
Standard:	FCC 15B, 90Z, RSS	Class:	N/A

pcdac = 38



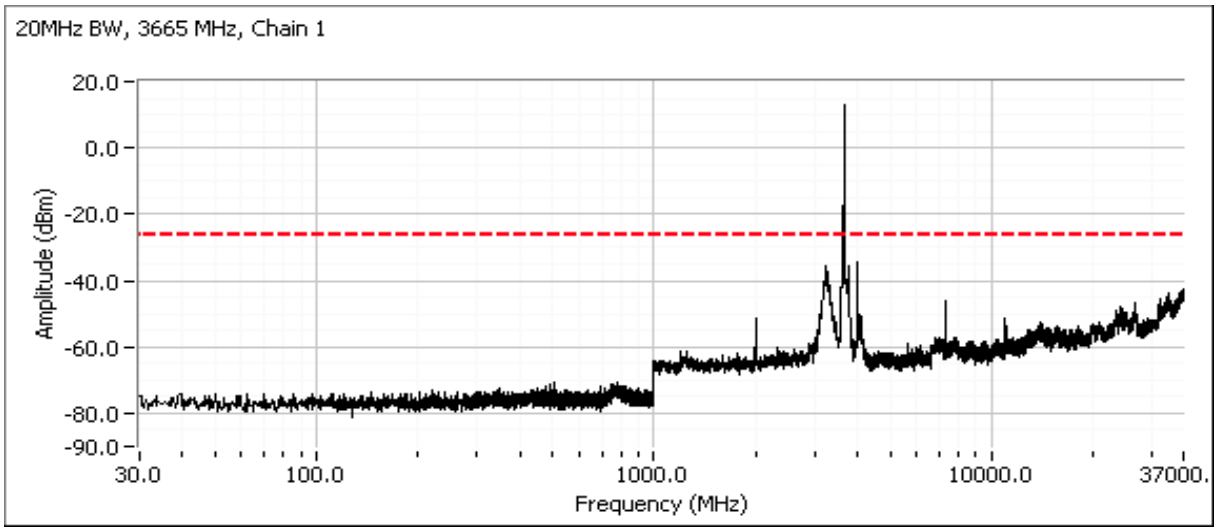
High channel

pcdac = 38



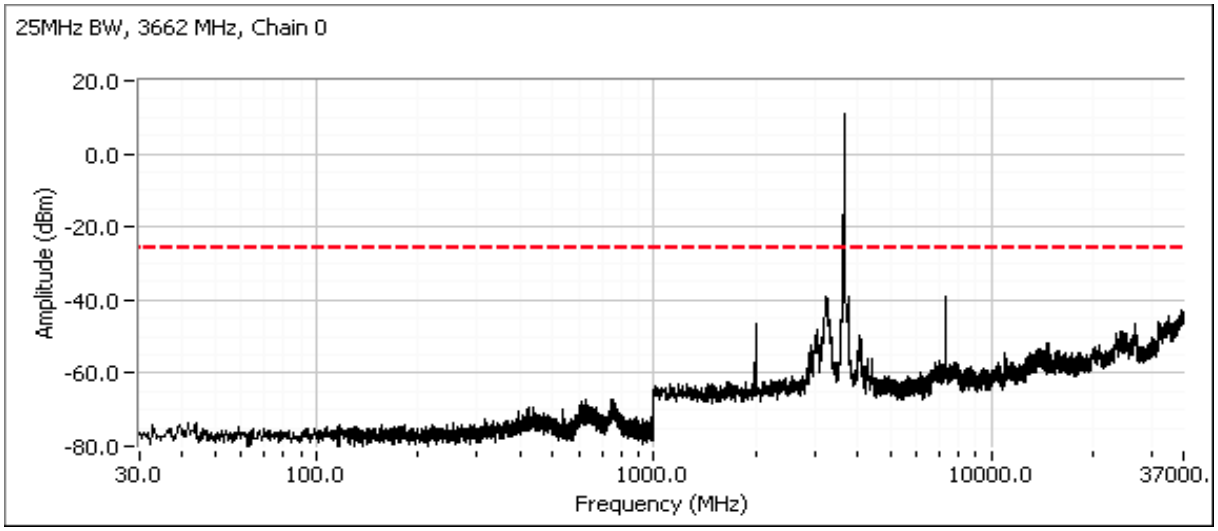
Client:	Ubiquiti Networks	Job Number:	J82268
Model:	NanoBridgeM365 & NanoStationM365	T-Log Number:	T82413
		Account Manager:	Susan Pelzl
Contact:	Jennifer Sanchez		
Standard:	FCC 15B, 90Z, RSS	Class:	N/A

pcdac = 34



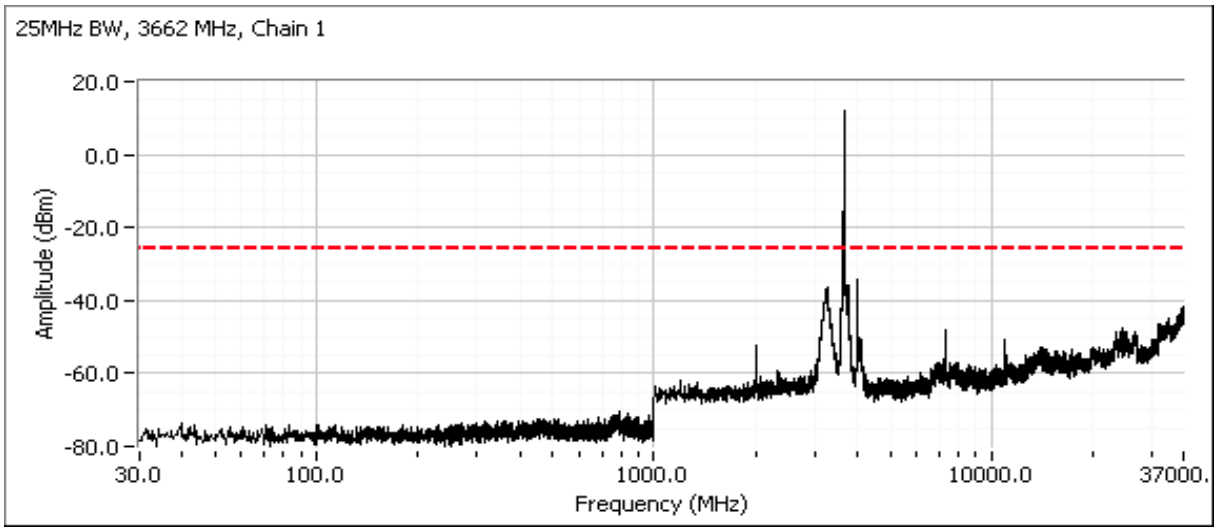
25 MHz Mode

pcdac = 36



Client:	Ubiquiti Networks	Job Number:	J82268
Model:	NanoBridgeM365 & NanoStationM365	T-Log Number:	T82413
		Account Manager:	Susan Pelzl
Contact:	Jennifer Sanchez		
Standard:	FCC 15B, 90Z, RSS	Class:	N/A

pcdac = 33



Client:	Ubiquiti Networks	Job Number:	J82268
Model:	NanoBridgeM365 & NanoStationM365	T-Log Number:	T82413
		Account Manager:	Susan Pelzl
Contact:	Jennifer Sanchez		
Standard:	FCC 15B, 90Z, RSS	Class:	N/A

RSS-197 - Antenna Port Measurements

Power, PSD, Bandwidth and Spurious Emissions

Test Specific Details

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

Summary of Results

Run #	Test Performed	Limit	Pass / Fail	Result / Margin
2	Power, NanoStation	RSS-197	Pass	5 MHz: 34.8 dBm 10 MHz: 33.0 dBm 20 MHz: 36.7 dBm 25 MHz: 36.6 dBm
2	PSD, NanoStation	1 Watt/MHz RSS-197	Pass	5 MHz: 28.7 dBm/MHz 10 MHz: 24.3 dBm/MHz 20 MHz: 25.0 dBm/MHz 25 MHz: 24.0 dBm/MHz
3	Power, NanoBridge	RSS-197	Pass	5 MHz: 35.8 dBm 10 MHz: 38.4 dBm 20 MHz: 41.5 dBm 25 MHz: 42.3 dBm
3	PSD, NanoBridge	1 Watt/MHz RSS-197	Pass	5 MHz: 29.8 dBm/MHz 10 MHz: 29.7 dBm/MHz 20 MHz: 29.8 dBm/MHz 25 MHz: 29.8 dBm/MHz
4	Antenna Conducted Out of Band Spurious	-13dBm/MHz	Pass	All emissions below the -13dBm/MHz limit

General Test Configuration

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

Test Notes

The NanoStation and NanoBridge are the same radio but the NanoBridge uses a reflector for the antenna to increase gain to 21 dBi from the integrated 13dBi Patch antenna.

Client:	Ubiquiti Networks	Job Number:	J82268
Model:	NanoBridgeM365 & NanoStationM365	T-Log Number:	T82413
		Account Manager:	Susan Pelzl
Contact:	Jennifer Sanchez		
Standard:	FCC 15B, 90Z, RSS	Class:	N/A

Modifications Made During Testing

No modifications were made to the EUT during testing

Deviations From The Standard

No deviations were made from the requirements of the standard.

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

Date of Test: 3/17/2011 Config. Used: 1
Test Engineer: Rafael Varelas Config Change: none
Test Location: FT Lab #4 EUT Voltage: POE

Power

Frequency (MHz)	Software Setting[1]	Modulation	Measured Output Power[2] dBm			Total[5]		Limit (dBm)	Max Power (W)	Pass or Fail
			Chain 1	Chain 2	Chain 3	mW	dBm			
5 MHz Mode										
3662	20	MCS0	13.3	15.6		57.7	17.6	-	-	-
3662	20	MCS4	13.1	15.3		54.3	17.3	-		-
3662	20	MCS7	13.2	15.4		55.6	17.4	-		-

PSD

Frequency (MHz)	99%[4] BW	Modulation	PSD[3] dBm/MHz			Total PSD[5]		Limit		Pass or Fail
			Chain 1	Chain 2	Chain 3	mW/MHz	dBm/MHz			
5 MHz Mode										
3662	-	MCS0	7.3	9.6		14.5	11.6	-	-	-
3662	-	MCS4	7.2	9.4		14.0	11.4	-	-	-
3662	-	MCS7	7.1	9.3		13.6	11.3	-	-	-

Note 1:	Power setting is the software setting used to set the output power.
Note 2:	Output power measured using RBW=100kHz VBW=300kHz , detector = rms, sweep time 10 seconds, max hold. The total power was integrated over the span (span > 2x channel bandwidth). Transmitted signal was not continuous but the analyzer was configured with a gated sweep such that the analyzer was only sweeping when the device was transmitting.
Note 3:	PSD measured using RB=1MHz, VB=3MHz, detector = rms, sweep time 10 seconds, max hold. Multiple sweeps were made until the display had no new "peaks".
Note 4:	99% Bandwidth measured in accordance with RSS GEN - RB > 1% of span and VB >=3xRB
Note 5:	For MIMO systems the total output power and total PSD are calculated form the sum of the powers of the individual chains (in linear terms).
Note 6:	Based on above results, Power and PSD for all types of modulations.MCS 0 had highest PSD and Power values. Higher MCS values had lower PSD and Power values and thus all other BW mode testing was performed using the lowest MCS value.

Client:	Ubiquiti Networks	Job Number:	J82268
Model:	NanoBridgeM365 & NanoStationM365	T-Log Number:	T82413
		Account Manager:	Susan Pelzl
Contact:	Jennifer Sanchez		
Standard:	FCC 15B, 90Z, RSS	Class:	N/A

Run #2: Bandwidth, Output Power and Power Spectral Density - MIMO Systems

Limits from 90.321(a): Base and fixed stations are limited to 25 watts/25 MHz equivalent isotropically radiated power (EIRP). In any event, the peak EIRP power density shall not exceed 1 Watt in any one-megahertz slice of spectrum (30dBm/MHz).

	Chain 1	Chain 2	Chain 3	Coherent	Effective[5]	EIRP (mW)	EIRP (dBm)
Antenna Gain (dBi):	13	13		Yes	16.0	4710.8	36.7

Power - Limit accounts for maximum antenna gain at this power setting.

Frequency (MHz)	Software Setting[1]	Modulation	Measured Output Power[2] dBm			Total		EIRP	Limit (eirp)	Pass or Fail
			Chain 1	Chain 2	Chain 3	mW	dBm	dBm	dBm	
5 MHz Mode										
3697	31, 28	MCS 0	15.8	15.7		75.2	18.8	34.8	44.0	PASS
10 MHz Mode										
3695	28, 25	MCS 0	14.0	14.0		50.2	17.0	33.0	44.0	PASS
20 MHz Mode										
3690	36, 33	MCS 0	17.4	18.0		118.0	20.7	36.7	44.0	PASS
25 MHz Mode										
3688	36, 33	MCS 0	17.5	17.7		115.1	20.6	36.6	44.0	PASS

Client:	Ubiquiti Networks	Job Number:	J82268
Model:	NanoBridgeM365 & NanoStationM365	T-Log Number:	T82413
		Account Manager:	Susan Pelzl
Contact:	Jennifer Sanchez		
Standard:	FCC 15B, 90Z, RSS	Class:	N/A

PSD

Frequency (MHz)	99%[4] BW	Modulation	PSD[2] dBm/MHz Chain 0	Chain 1	Chain 2	Total PSD mW/MHz	dBm/MHz	PSD EIRP dBm/MHz	Limit (eirp) dBm/MHz	Pass or Fail
5 MHz Mode										
3697	4.2	MCS 0	9.7	9.7		18.7	12.7	28.7	30.0	PASS
10 MHz Mode										
3695	8.5	MCS 0	5.3	5.2		6.7	8.3	24.3	30.0	PASS
20 MHz Mode										
3690	16.8	MCS 0	5.7	6.3		8.0	9.0	25.0	30.0	PASS
25 MHz Mode										
3688	20.9	MCS 0	4.8	5.2		6.3	8.0	24.0	30.0	PASS

Note 1:	Power setting is the software setting used to set the output power.
Note 2:	Output power measured using RBW=100kHz VBW=300kHz , detector = rms, sweep time 10 seconds, max hold. The total power was integrated over the span (span > 2x channel bandwidth). Transmitted signal was not continuous but the analyzer was configured with a gated sweep such that the analyzer was only sweeping when the device was transmitting. The plot for the channel with the highest power is provided below.
Note 3:	The psd was measured using the following analyzer settings: RB=1MHz, VB=3MHz, detector = rms, sweep time 10 seconds, max hold. Multiple sweeps were made until the display had no new "peaks". The plot for the channel with the highest power is provided below.
Note 4:	99% Bandwidth measured in accordance with RSS GEN - RB > 1% of span and VB >=3xRB
Note 5:	For MIMO systems the total output power and total PSD are calculated form the sum of the powers of the individual chains (in linear terms). The antenna gain used to determine the EIRP and limits for PSD/Output power depends on the operating mode of the MIMO device. If the signals are non-coherent between the transmit chains then the gain used to determine the limits is the highest gain of the individual chains and the EIRP is the sum of the products of gain and power on each chain. If the signals are coherent then the effective antenna gain is the sum (in linear terms) of the gains for each chain and the EIRP is the product of the effective gain and total power.
Note 6	Chain 0 = J9, Chain 1 = J10.

Client:	Ubiquiti Networks	Job Number:	J82268
Model:	NanoBridgeM365 & NanoStationM365	T-Log Number:	T82413
		Account Manager:	Susan Pelzl
Contact:	Jennifer Sanchez		
Standard:	FCC 15B, 90Z, RSS	Class:	N/A

Run #3: Bandwidth, Output Power and Power Spectral Density - MIMO Systems

Limits from 90.321(a): Base and fixed stations are limited to 25 watts/25 MHz equivalent isotropically radiated power (EIRP). In any event, the peak EIRP power density shall not exceed 1 Watt in any one-megahertz slice of spectrum (30dBm/MHz).

	Chain 1	Chain 2	Chain 3	Coherent	Effective[5]	EIRP (mW)	EIRP (dBm)
Antenna Gain (dBi):	21	21		Yes	24.0	17103.9	42.3

Power - Limit accounts for maximum antenna gain at this power setting.

Frequency (MHz)	Software Setting[1]	Modulation	Measured Output Power[2] dBm			Total		EIRP	Limit (eirp)	Pass or Fail
			Chain 1	Chain 2	Chain 3	mW	dBm	dBm	dBm	
5 MHz Mode										
3697	20, 14	MCS 0	8.9	8.7		15.2	11.8	35.8	44.0	PASS
10 MHz Mode										
3695	24, 21	MCS 0	11.1	11.7		27.7	14.4	38.4	44.0	PASS
20 MHz Mode										
3690	30, 26	MCS 0	14.3	14.6		55.8	17.5	41.5	44.0	PASS
25 MHz Mode										
3688	31, 28	MCS 0	15.0	15.6		67.9	18.3	42.3	44.0	PASS

Client:	Ubiquiti Networks	Job Number:	J82268
Model:	NanoBridgeM365 & NanoStationM365	T-Log Number:	T82413
		Account Manager:	Susan Pelzl
Contact:	Jennifer Sanchez		
Standard:	FCC 15B, 90Z, RSS	Class:	N/A

PSD

Frequency (MHz)	99%[4] BW	Modulation	PSD[2] dBm/MHz Chain 0	Chain 1	Chain 2	Total PSD mW/MHz	dBm/MHz	PSD EIRP dBm/MHz	Limit (eirp) dBm/MHz	Pass or Fail
5 MHz Mode										
3697	4.2	MCS 0	2.8	2.8		3.8	5.8	29.8	30.0	PASS
10 MHz Mode										
3695	8.5	MCS 0	2.4	3.0		3.7	5.7	29.7	30.0	PASS
20 MHz Mode										
3690	16.8	MCS 0	2.6	3.0		3.8	5.8	29.8	30.0	PASS
25 MHz Mode										
3688	20.9	MCS 0	2.5	3.1		3.8	5.8	29.8	30.0	PASS

Note 1:	Power setting is the software setting used to set the output power.
Note 2:	Output power measured using RBW=100kHz VBW=300kHz , detector = rms, sweep time 10 seconds, max hold. The total power was integrated over the span (span > 2x channel bandwidth). Transmitted signal was not continuous but the analyzer was configured with a gated sweep such that the analyzer was only sweeping when the device was transmitting. The plot for the channel with the highest power is provided below.
Note 3:	The psd was measured using the following analyzer settings: RB=1MHz, VB=3MHz, detector = rms, sweep time 10 seconds, max hold. Multiple sweeps were made until the display had no new "peaks". The plot for the channel with the highest power is provided below.
Note 4:	99% Bandwidth measured in accordance with RSS GEN - RB > 1% of span and VB >=3xRB
Note 5:	For MIMO systems the total output power and total PSD are calculated form the sum of the powers of the individual chains (in linear terms). The antenna gain used to determine the EIRP and limits for PSD/Output power depends on the operating mode of the MIMO device. If the signals are non-coherent between the transmit chains then the gain used to determine the limits is the highest gain of the individual chains and the EIRP is the sum of the products of gain and power on each chain. If the signals are coherent then the effective antenna gain is the sum (in linear terms) of the gains for each chain and the EIRP is the product of the effective gain and total power.
Note 6	Chain 0 = J9, Chain 1 = J10.

Client:	Ubiquiti Networks	Job Number:	J82268
Model:	NanoBridgeM365 & NanoStationM365	T-Log Number:	T82413
		Account Manager:	Susan Pelzl
Contact:	Jennifer Sanchez		
Standard:	FCC 15B, 90Z, RSS	Class:	N/A

Run #4: Unwanted emissions, Data Rate 0 at power setting used for Power measurements

Date of Test:	3/18/2011	Config. Used:	1
Test Engineer:	Rafael Varelas	Config Change:	none
Test Location:	FT Lab #4	EUT Voltage:	POE

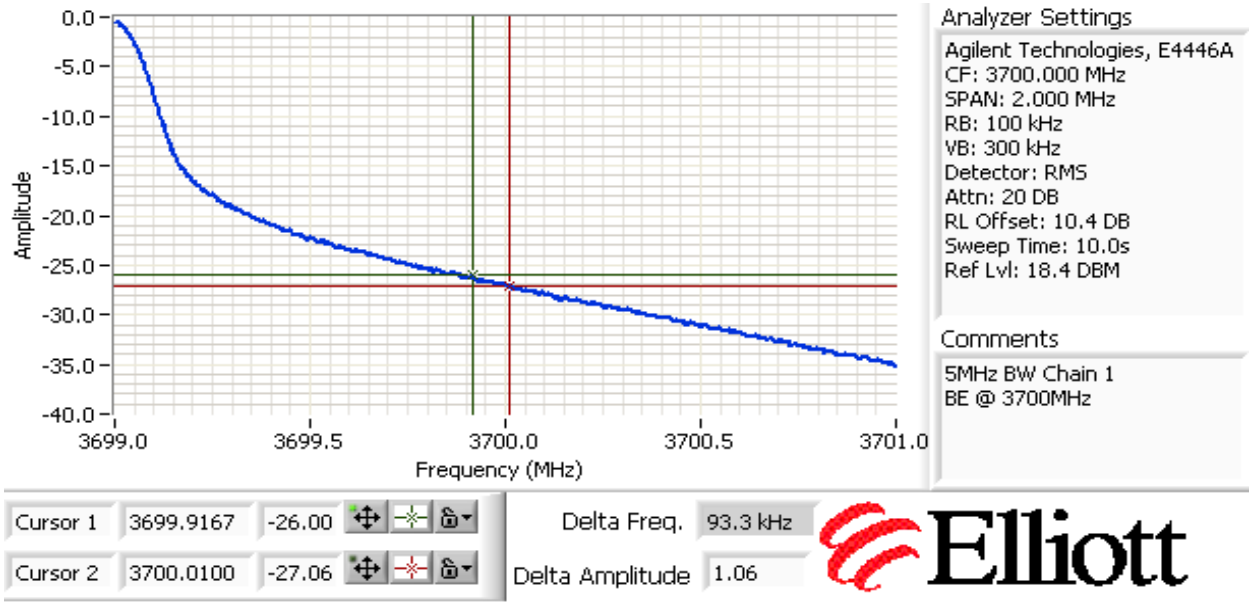
Number of transmit chains:	2	
Spurious Limit:	-23.0	dBm/100kHz (-13dBm/MHz) eirp
Adjustment for 2 chains:	-3.0	dB adjustment for multiple chains.
Limit Used On Plots	-26.0	dBm/100 kHz

MIMO Devices: The plots were obtained for the chain with the highest PSD and the limit was adjusted to account for all chains transmitting simultaneously

Band edge Measurements

5MHz BW

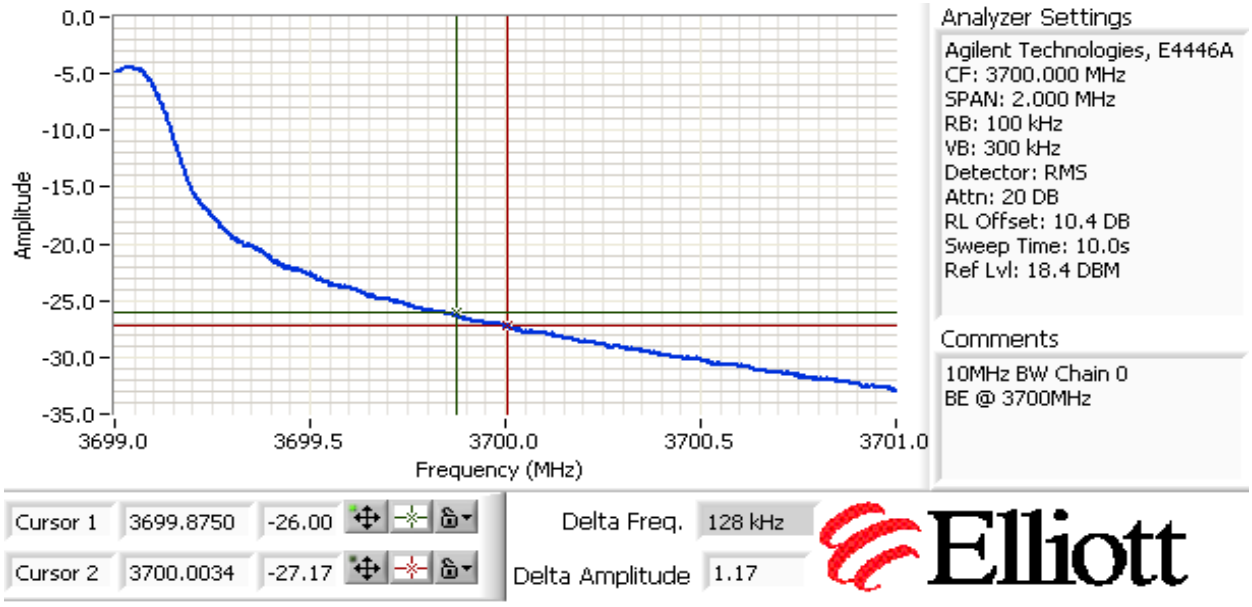
Power setting 28



Plot for high channel (3697 MHz), power setting(s) = 28, BW= 5.0, MOD=Data Rate 0
-27.1dBm in 100 kHz (corrected by 10*log(100kHz/1MHz)) yields -17.1dBm in 1 MHz

Client:	Ubiquiti Networks	Job Number:	J82268
Model:	NanoBridgeM365 & NanoStationM365	T-Log Number:	T82413
		Account Manager:	Susan Pelzl
Contact:	Jennifer Sanchez		
Standard:	FCC 15B, 90Z, RSS	Class:	N/A

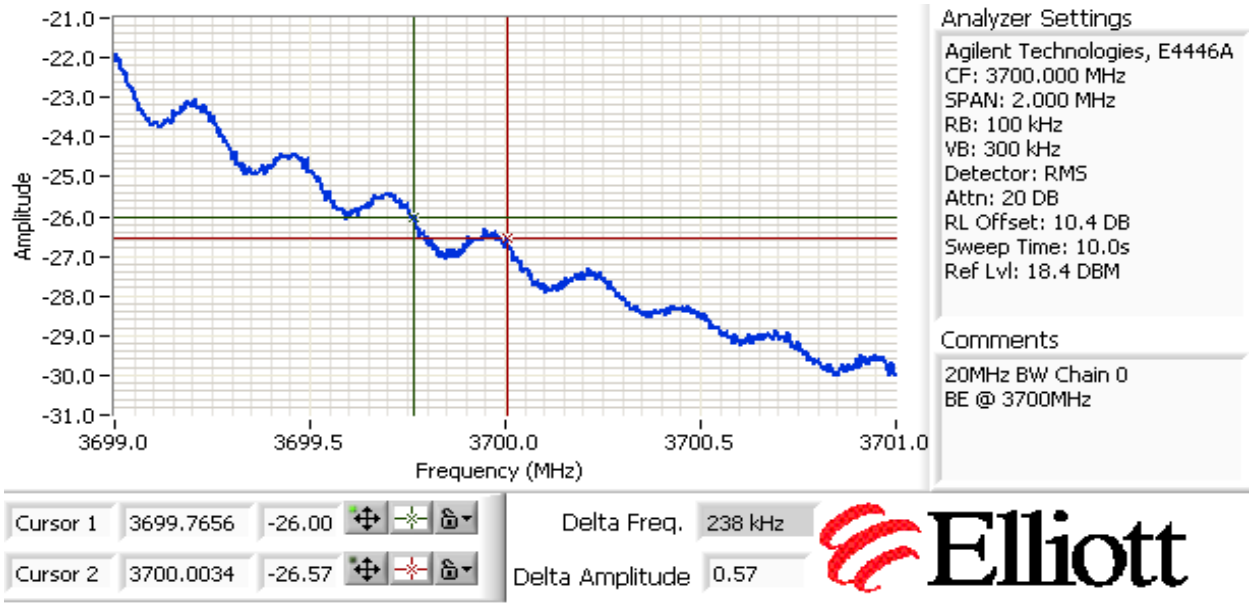
10MHz BW
Power setting 28



Plot for high channel (3695 MHz), power setting(s) = 28, BW= 10.0, MOD=Data Rate 0
-27.2dBm in 100 kHz (corrected by 10*log(100kHz/1MHz)) yeilds -17.2dBm in 1 MHz

Client:	Ubiquiti Networks	Job Number:	J82268
Model:	NanoBridgeM365 & NanoStationM365	T-Log Number:	T82413
		Account Manager:	Susan Pelzl
Contact:	Jennifer Sanchez		
Standard:	FCC 15B, 90Z, RSS	Class:	N/A

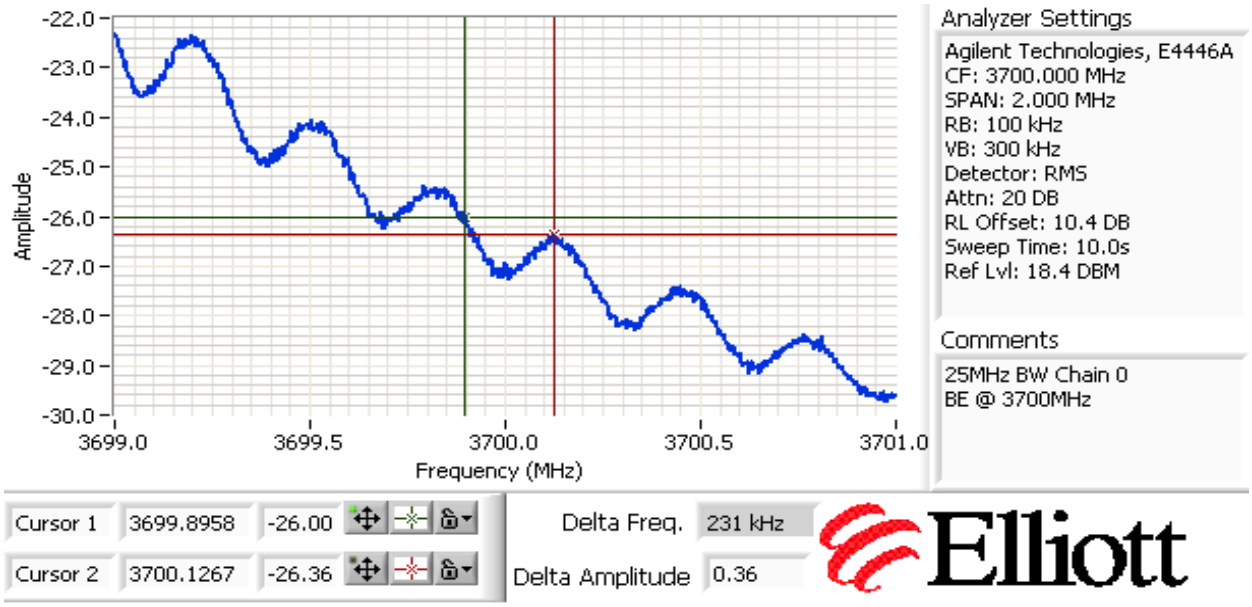
20MHz BW
Power setting 36



Plot for high channel (3690 MHz), power setting(s) = 36, BW= 20.0, MOD=Data Rate 0
-26.6dBm in 100 kHz (corrected by 10*log(100kHz/1MHz)) yeilds -16.6dBm in 1 MHz

Client:	Ubiquiti Networks	Job Number:	J82268
Model:	NanoBridgeM365 & NanoStationM365	T-Log Number:	T82413
		Account Manager:	Susan Pelzl
Contact:	Jennifer Sanchez		
Standard:	FCC 15B, 90Z, RSS	Class:	N/A

25 MHz BW
Power setting 36



Plot for high channel (3688 MHz), power setting(s) = 36, BW= 25.0, MOD=Data Rate 0
-26.4dBm in 100 kHz (corrected by 10*log(100kHz/1MHz)) yeilds -16.4dBm in 1 MHz

Client:	Ubiquiti Networks	Job Number:	J82268
Model:	NanoBridgeM365 & NanoStationM365	T-Log Number:	T82413
		Account Manager:	Susan Pelzl
Contact:	Jennifer Sanchez		
Standard:	FCC 15B, 90Z, RSS	Class:	N/A

Run #4: Unwanted emissions, Data Rate 0 at power setting used for Power measurements

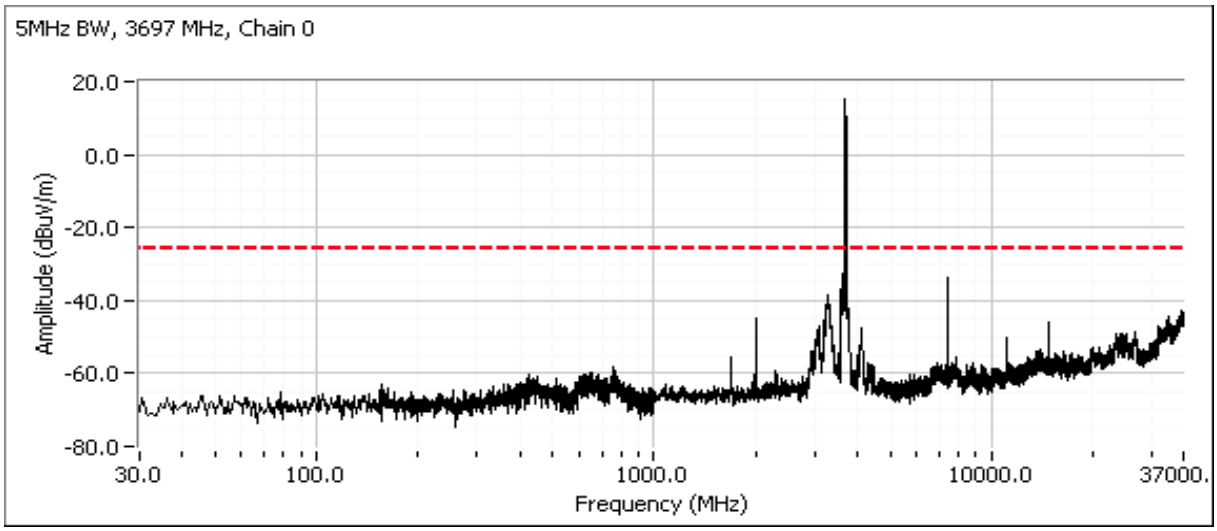
Number of transmit chains:	2	
Spurious Limit:	-13.0	dBm/MHz eirp
Adjustment for 2 chains:	-3.0	dB adjustment for multiple chains.
Limit Used On Plots	-26.0	dBm/MHz

MIMO Devices: The plots were obtained for each chain individually and the limit was adjusted to account for all chains transmitting simultaneously, RBW=VBW=1 MHz for all out of band plots except for band edge plots.

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

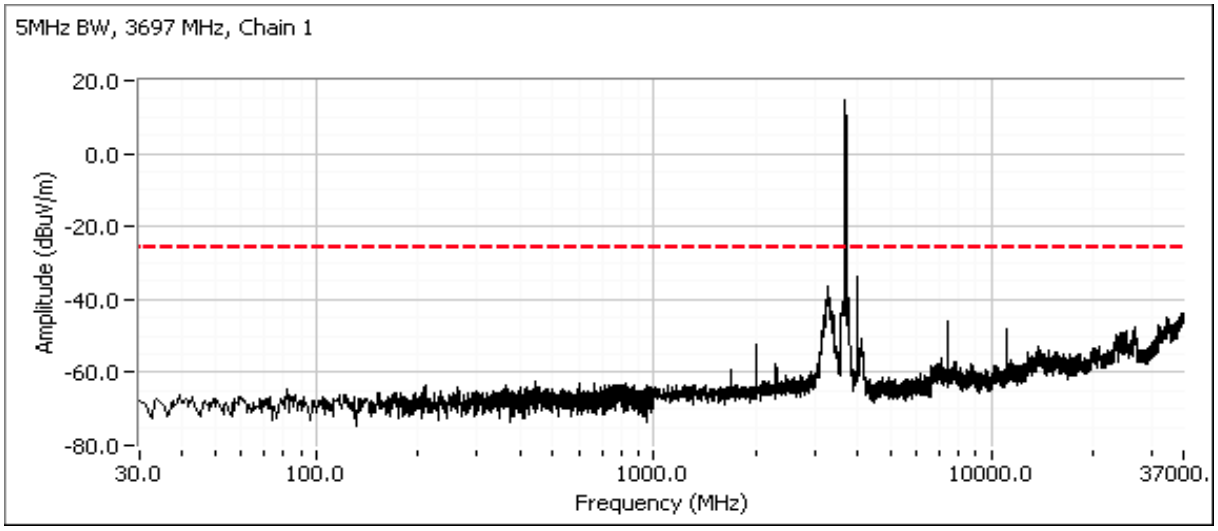
5MHz BW

pcdac = 31



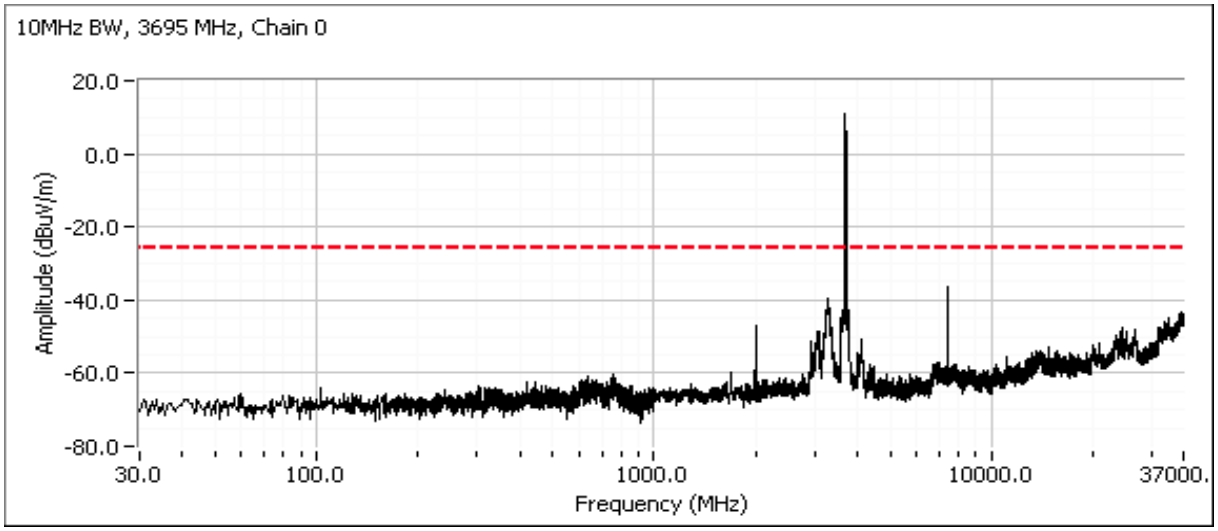
Client:	Ubiquiti Networks	Job Number:	J82268
Model:	NanoBridgeM365 & NanoStationM365	T-Log Number:	T82413
		Account Manager:	Susan Pelzl
Contact:	Jennifer Sanchez		
Standard:	FCC 15B, 90Z, RSS	Class:	N/A

pcdac = 28



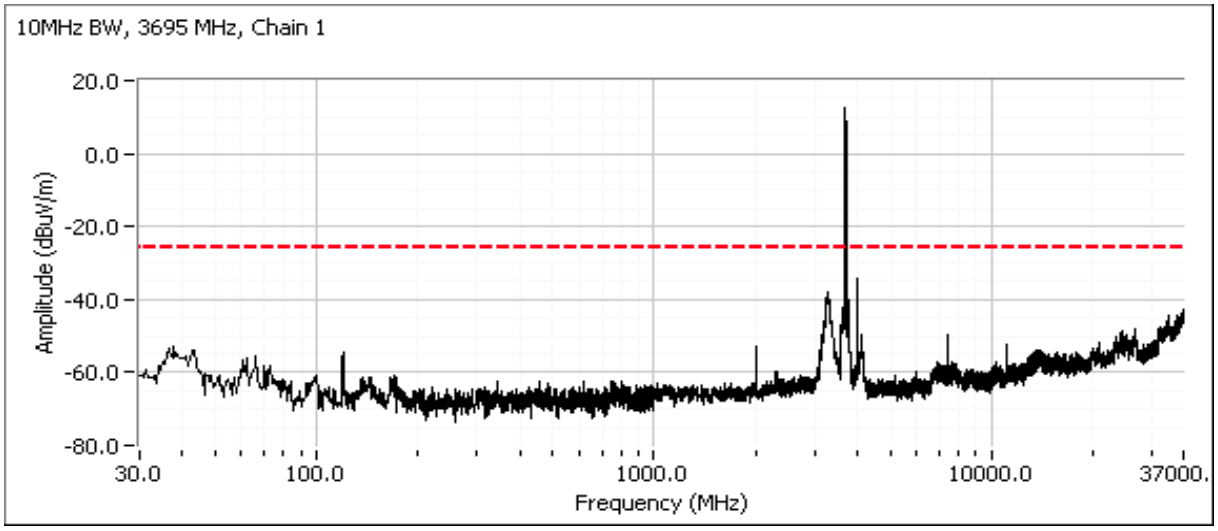
<u>10MHz BW</u>

pcdac = 28



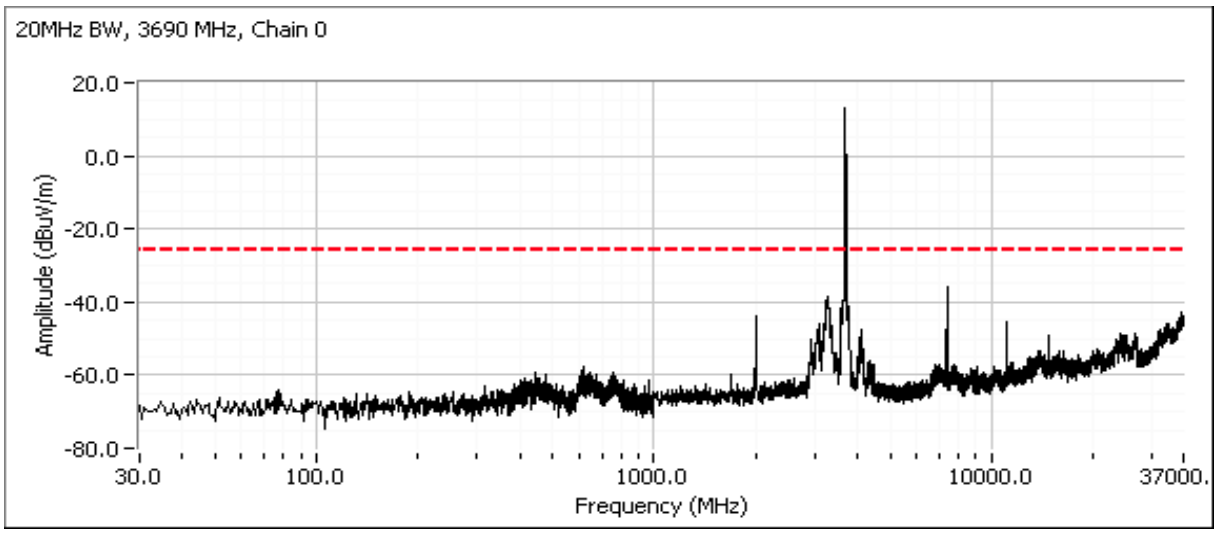
Client:	Ubiquiti Networks	Job Number:	J82268
Model:	NanoBridgeM365 & NanoStationM365	T-Log Number:	T82413
		Account Manager:	Susan Pelzl
Contact:	Jennifer Sanchez		
Standard:	FCC 15B, 90Z, RSS	Class:	N/A

pcdac = 25



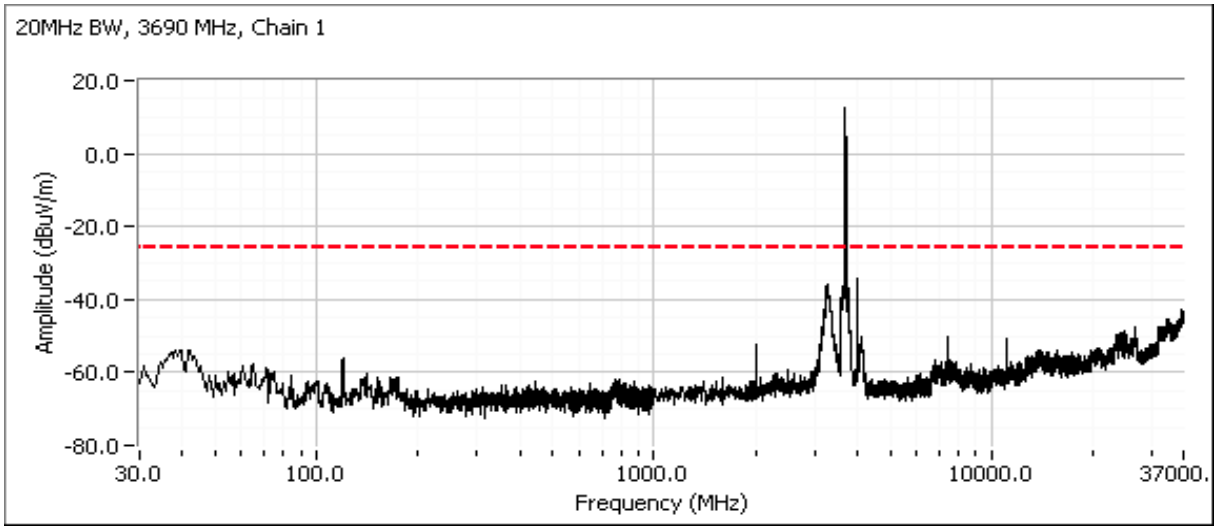
<u>20MHz BW</u>

pcdac = 36



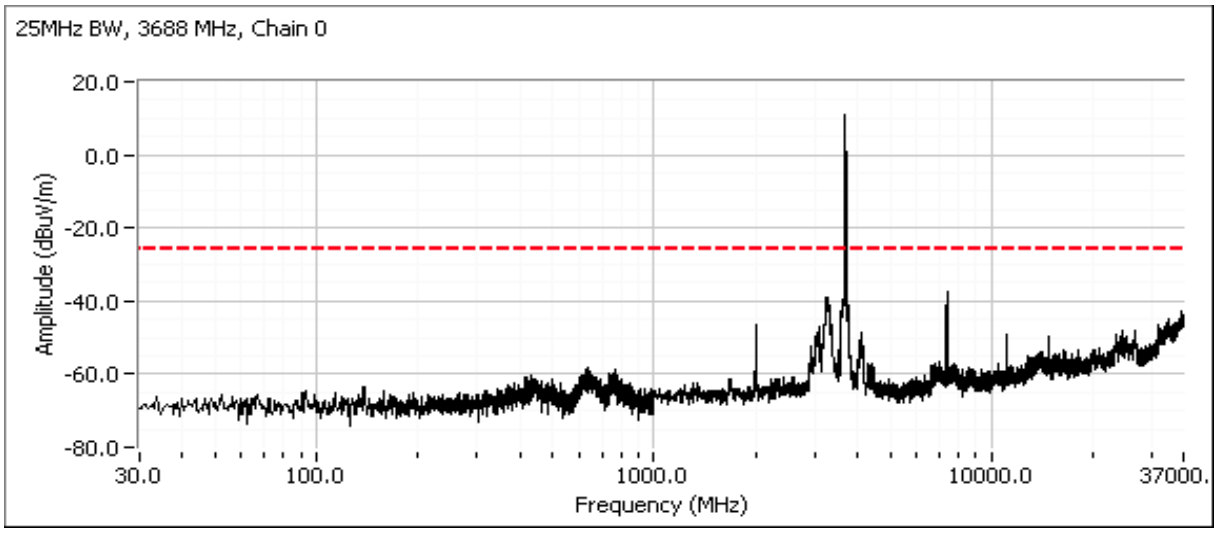
Client:	Ubiquiti Networks	Job Number:	J82268
Model:	NanoBridgeM365 & NanoStationM365	T-Log Number:	T82413
		Account Manager:	Susan Pelzl
Contact:	Jennifer Sanchez		
Standard:	FCC 15B, 90Z, RSS	Class:	N/A

pcdac = 33



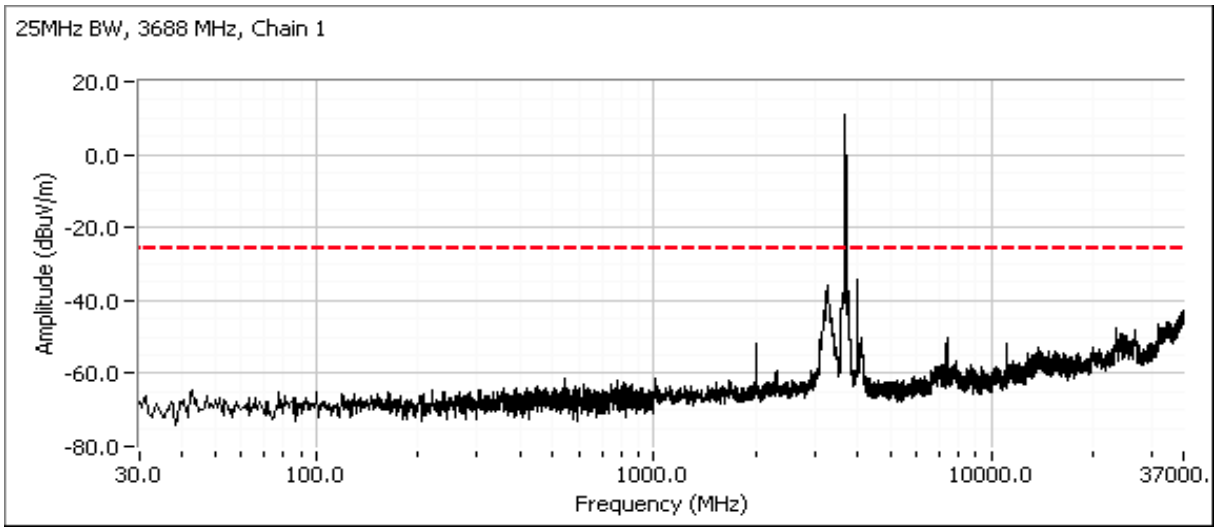
25MHz BW

pcdac = 36



Client:	Ubiquiti Networks	Job Number:	J82268
Model:	NanoBridgeM365 & NanoStationM365	T-Log Number:	T82413
		Account Manager:	Susan Pelzl
Contact:	Jennifer Sanchez		
Standard:	FCC 15B, 90Z, RSS	Class:	N/A

pcdac = 33



Client:	Ubiquiti Networks	Job Number:	J82268
Model:	NanoBridgeM365 & NanoStationM365	T-Log Number:	T82413
		Account Manager:	Susan Pelzl
Contact:	Jennifer Sanchez		
Standard:	FCC 15B, 90Z, RSS	Class:	N/A

RSS 197 and FCC Part 90
Frequency Stability

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: 3/25/2011 0:00
Test Engineer: John Caizzi
Test Location: Lab 4

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

General Test Configuration

The EUT's RF port was connected to the measurement instrument's RF port, via an attenuator or dc-block if necessary. The EUT was placed inside an environmental chamber.

Ambient Conditions:

Temperature: 22 °C
Rel. Humidity: 33 %

Summary of Results

Run #	Test Performed	Limit	Result	Value / Margin
1-2	Frequency and Voltage Stability	Part 90.213	Pass	27520 Hz / 7.53 ppm

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:	J82268
Model:	NanoBridgeM365 & NanoStationM365	T-Log Number:	T82413
		Account Manager:	Susan Pelzl
Contact:	Jennifer Sanchez		
Standard:	FCC 15B, 90Z, RSS	Class:	N/A

Run #1: Temperature Vs. Frequency (Fixed stations in the 3650-3675 MHz band)

Note 1:	For all tests: Unmodulated signal using mode QAM16 at frequency 3662.5 MHz with power setting of 27 dBm was used. Analyzer settings were as follow: RBW=VBW= 1kHz and Span=5kHz.
Note 2:	Frequency stability is to be specified in the station authorization.

Temperature	Reference Frequency	Measured frequency	Drift	Limit
(Celsius)	(MHz)	(MHz)	(Hz)	(Hz)
-30	3652.992740	3653.020090	27350	Note 2
-20	3652.992740	3653.020260	27520	Note 2
-10	3652.992740	3653.015930	23190	Note 2
0	3652.992740	3653.008760	16020	Note 2
10	3652.992740	3653.000750	8010	Note 2
20	3652.992740	3652.992740	0	Note 2
30	3652.992740	3652.987400	5340	Note 2
40	3652.992740	3652.985400	7340	Note 2
50	3652.992740	3652.990580	2160	Note 2

Run #2: Voltage Vs. Frequency

Nominal Voltage is 120 VAC

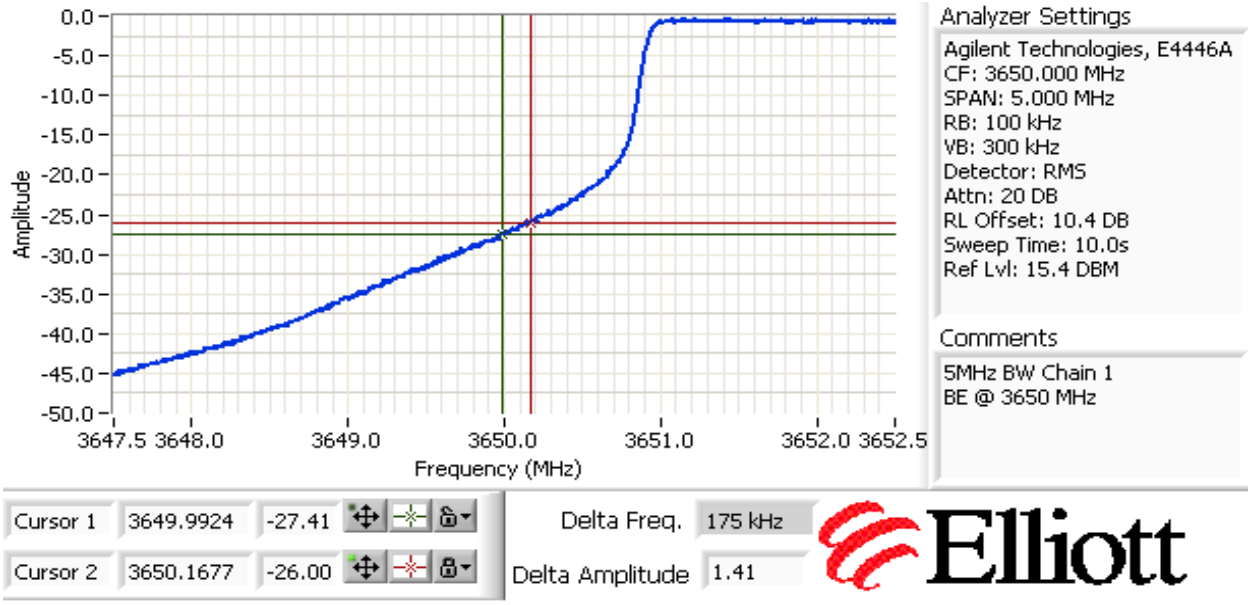
Voltage	Reference Frequency	Frequency Drift	Drift	Limit
120V	(MHz)	(MHz)	(Hz)	(Hz)
85%	3652.992740	3652.993080	340	Note 2
115%	3652.992740	3652.992740	0	Note 2

Worst case drift: 27520 Hz
7.53 ppm

Client:	Ubiquiti Networks	Job Number:	J82268
Model:	NanoBridgeM365 & NanoStationM365	T-Log Number:	T82413
		Account Manager:	Susan Pelzl
Contact:	Jennifer Sanchez		
Standard:	FCC 15B, 90Z, RSS	Class:	N/A

Plots below show band edge amplitudes for worst case modulation at each BW. Adding worst case drift to show compliance with frequency stability requirements.

Plot of emissions at point when 43 + 10*log(p) limit is exceeded (-26.0dBm in 100 kHz ~ -16dBm in 1 MHz, adjusted for two transmit chains)



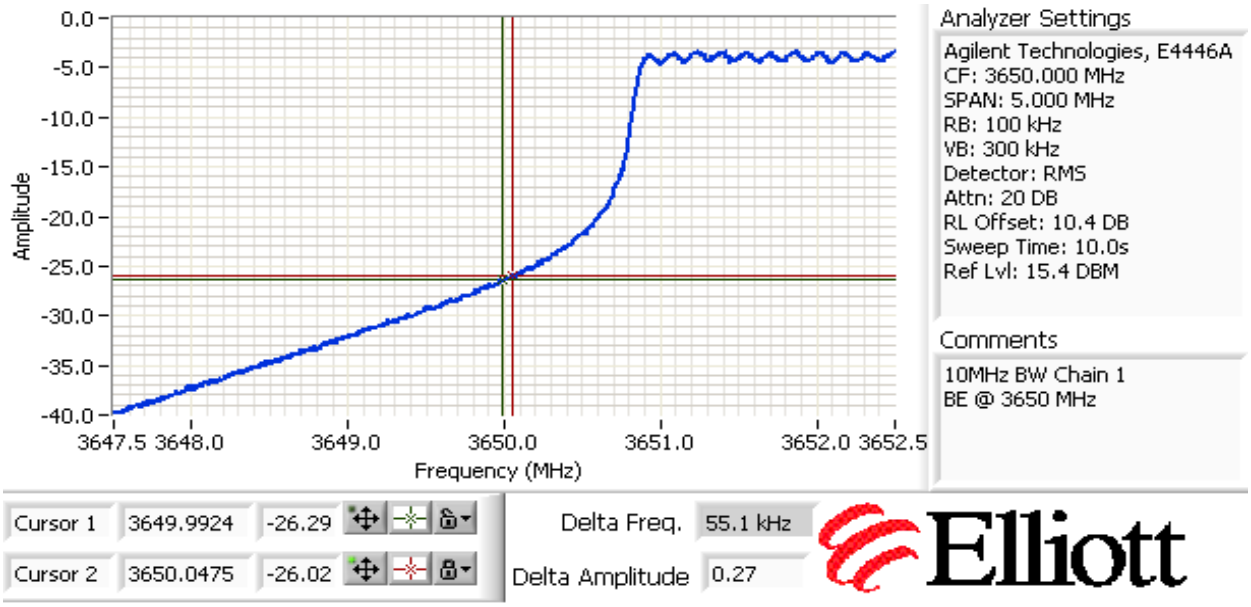
Plot for low channel (3653 MHz), power setting = 27, BW = 5.0, MOD=MCS0

Freq. (MHz)	Modulation	Channel bandiwdth	Software setting[1]	Unwanted emission reference point	Worst case drift	F_L
3653	Rate 0	5 MHz	27	3650.1677	0.02752	3650.1402

Note 1:	Power setting is the software setting used to set the output power.

Client:	Ubiquiti Networks	Job Number:	J82268
Model:	NanoBridgeM365 & NanoStationM365	T-Log Number:	T82413
		Account Manager:	Susan Pelzl
Contact:	Jennifer Sanchez		
Standard:	FCC 15B, 90Z, RSS	Class:	N/A

Plot of emissions at point when 43 + 10*log(p) limit is exceeded (-26.0dBm in 100 kHz ~ -16dBm in 1 MHz, adjusted for two transmit chains)



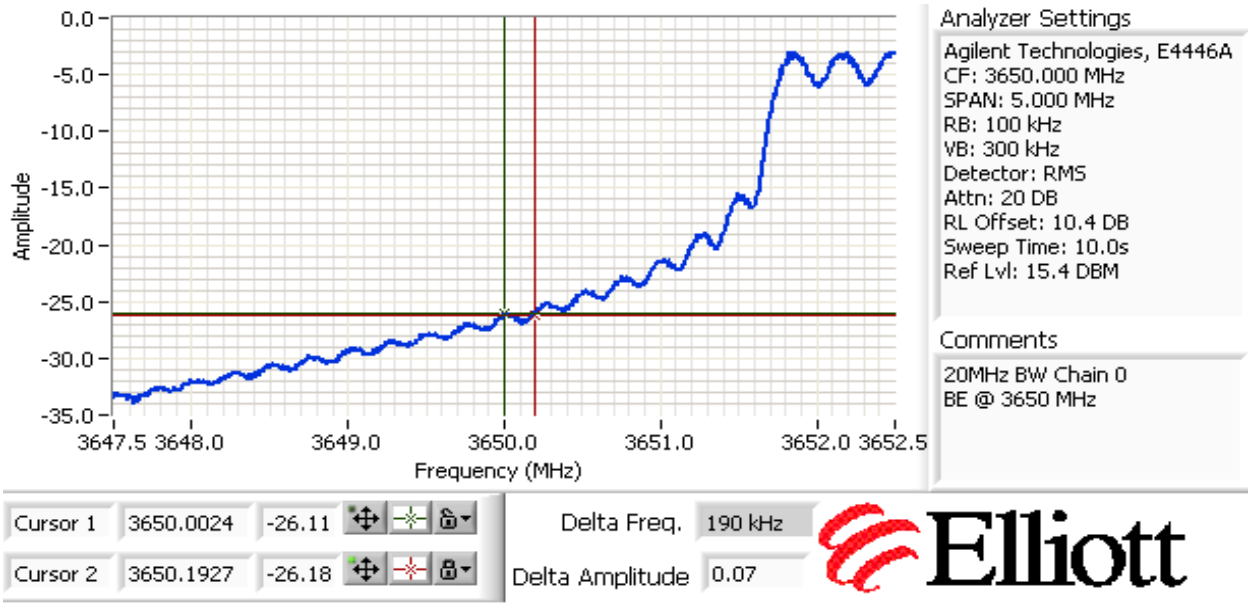
Plot for low channel (3655 MHz), power setting = 26, BW = 10.0, MOD=MCS0

Freq. (MHz)	Modulation	Channel bandiwdth	Software setting[1]	Unwanted emission reference point	Worst case drift	F_L
3655	Rate 0	10 MHz	26	3650.0475	0.02752	3650.0200

Note 1:	Power setting is the software setting used to set the output power.

Client:	Ubiquiti Networks	Job Number:	J82268
Model:	NanoBridgeM365 & NanoStationM365	T-Log Number:	T82413
		Account Manager:	Susan Pelzl
Contact:	Jennifer Sanchez		
Standard:	FCC 15B, 90Z, RSS	Class:	N/A

Plot of emissions at point when 43 + 10*log(p) limit is exceeded (-26.0dBm in 100 kHz ~ -16dBm in 1 MHz, adjusted for two transmit chains)



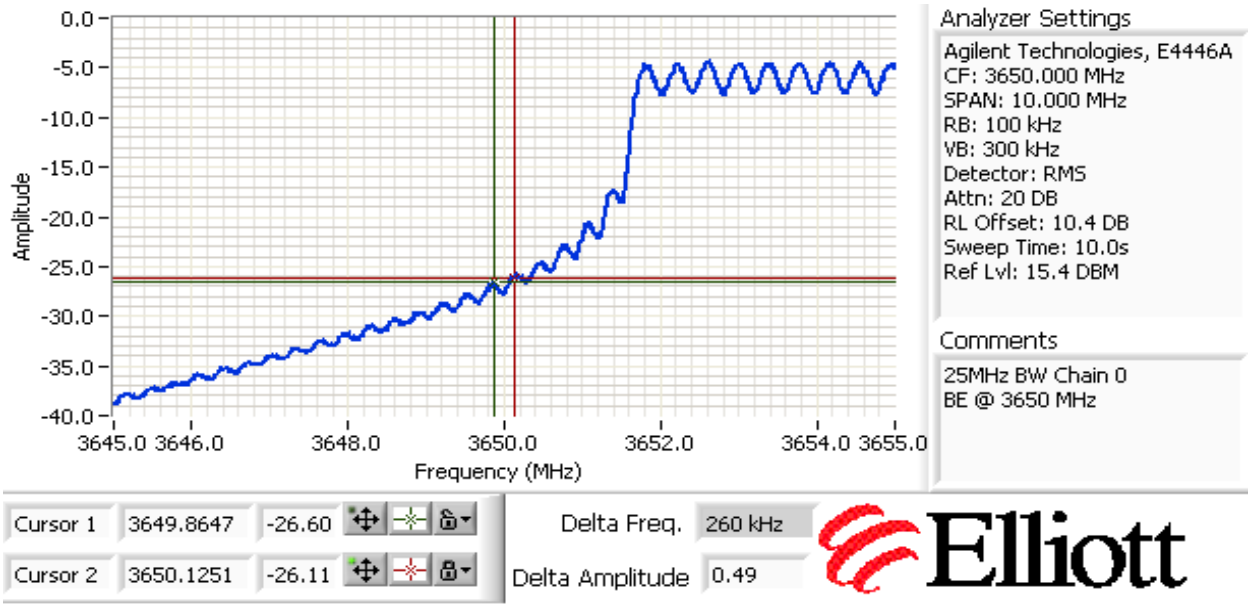
Plot for low channel (3660 MHz), power setting = 36, BW = 20.0, MOD=MCS0

Freq. (MHz)	Modulation	Channel bandiwdth	Software setting[1]	Unwanted emission reference point	Worst case drift	F_L
3660	Rate 0	20 MHz	36	3650.1927	0.02752	3650.1652

Note 1:	Power setting is the software setting used to set the output power.

Client:	Ubiquiti Networks	Job Number:	J82268
Model:	NanoBridgeM365 & NanoStationM365	T-Log Number:	T82413
		Account Manager:	Susan Pelzl
Contact:	Jennifer Sanchez		
Standard:	FCC 15B, 90Z, RSS	Class:	N/A

Plot of emissions at point when 43 + 10*log(p) limit is exceeded (-26.0dBm in 100 kHz ~ -16dBm in 1 MHz, adjusted for two transmit chains)



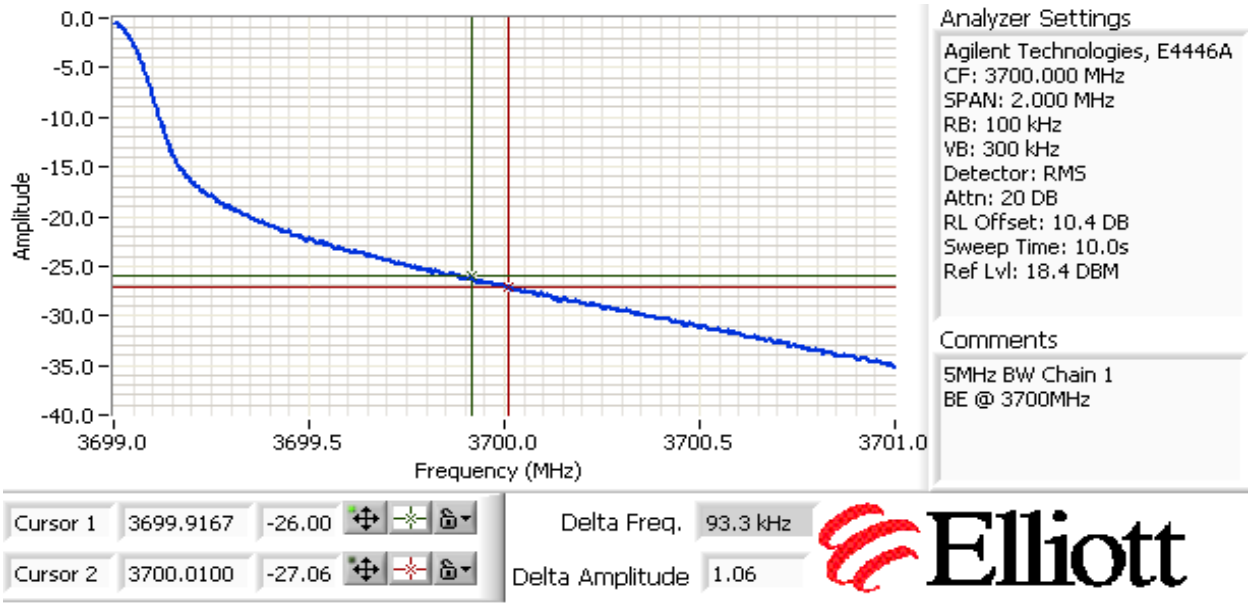
Plot for low channel (3662 MHz), power setting= 36, BW = 25.0, MOD=MCS0

Freq. (MHz)	Modulation	Channel bandiwdth	Software setting[1]	Unwanted emission reference point	Worst case drift	F_L
3662	Rate 0	25 MHz	36	3650.1251	0.02752	3650.0976

Note 1:	Power setting is the software setting used to set the output power.

Client:	Ubiquiti Networks	Job Number:	J82268
Model:	NanoBridgeM365 & NanoStationM365	T-Log Number:	T82413
		Account Manager:	Susan Pelzl
Contact:	Jennifer Sanchez		
Standard:	FCC 15B, 90Z, RSS	Class:	N/A

Plot of emissions at point when 43 + 10*log(p) limit is exceeded (-26.0dBm in 100 kHz ~ -16dBm in 1 MHz, adjusted for two transmit chains)



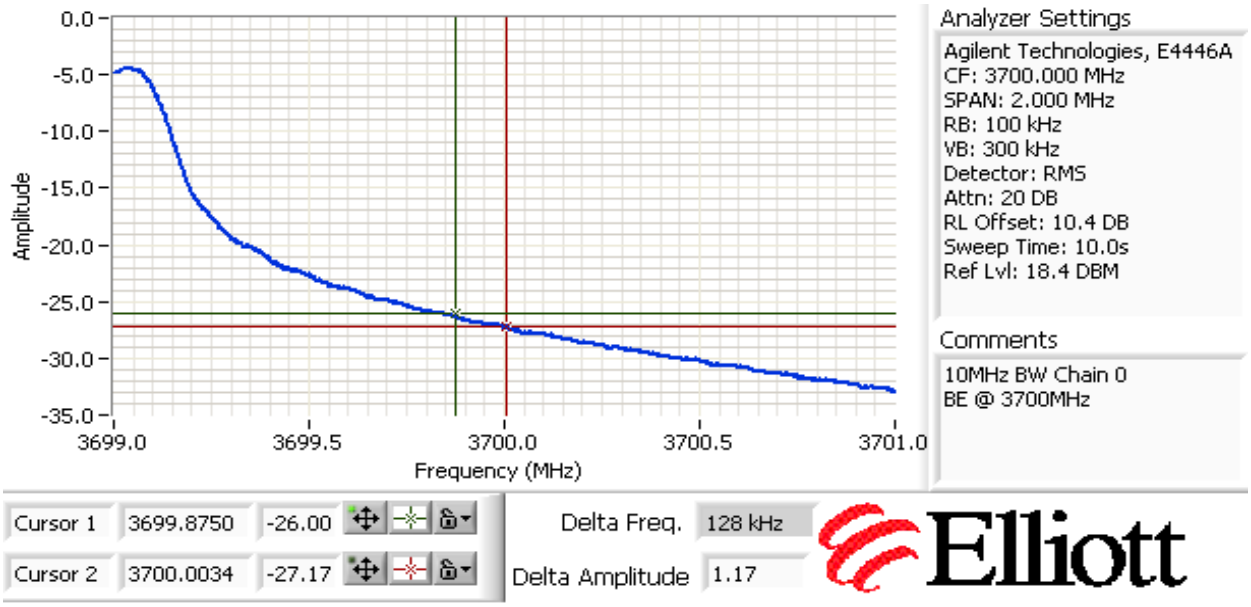
Plot for high channel (3697 MHz), power setting = 28, BW = 5.0, MOD=Data Rate 0

Freq. (MHz)	Modulation	Channel bandiwdth	Software setting[1]	Unwanted emission reference point	Worst case drift	F_H
3697	Rate 0	5 MHz	28	3699.9167	0.02752	3699.9442

Note 1: Power setting is the software setting used to set the output power.

Client:	Ubiquiti Networks	Job Number:	J82268
Model:	NanoBridgeM365 & NanoStationM365	T-Log Number:	T82413
		Account Manager:	Susan Pelzl
Contact:	Jennifer Sanchez		
Standard:	FCC 15B, 90Z, RSS	Class:	N/A

Plot of emissions at point when 43 + 10*log(p) limit is exceeded (-26.0dBm in 100 kHz ~ -16dBm in 1 MHz, adjusted for two transmit chains)



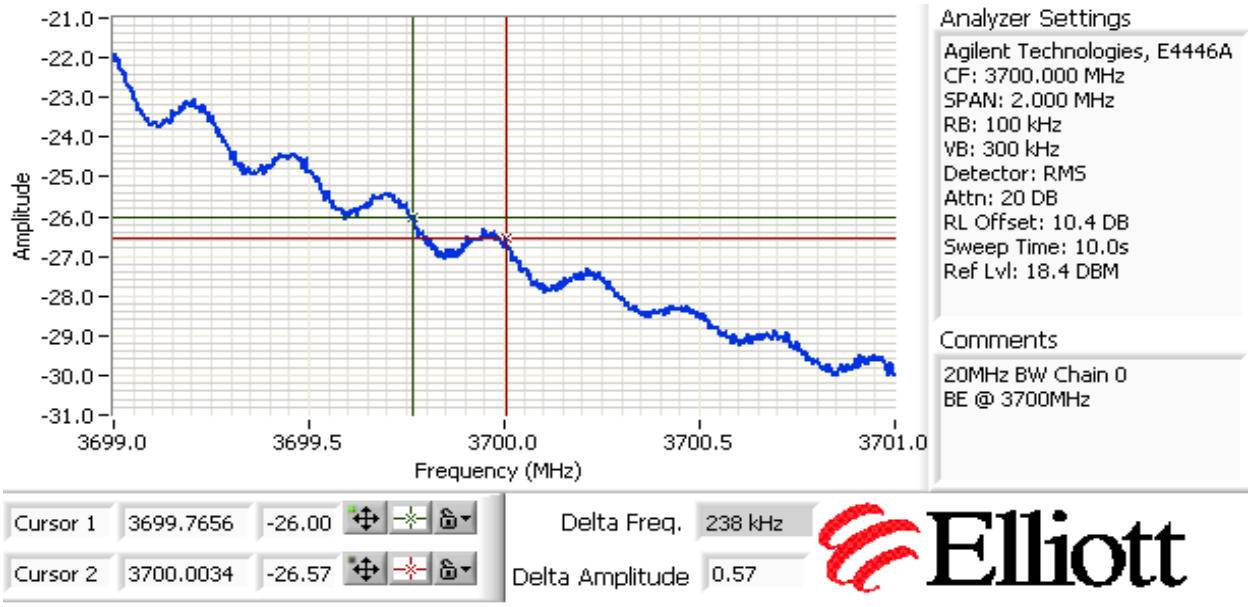
Plot for high channel (3695 MHz), power setting(s) = 28, BW = 10.0, MOD=Data Rate 0

Freq. (MHz)	Modulation	Channel bandiwdth	Software setting[1]	Unwanted emission reference point	Worst case drift	F_H
3695	Rate 0	10 MHz	28	3699.875000	0.027520	3699.902520

Note 1:	Power setting is the software setting used to set the output power.

Client:	Ubiquiti Networks	Job Number:	J82268
Model:	NanoBridgeM365 & NanoStationM365	T-Log Number:	T82413
		Account Manager:	Susan Pelzl
Contact:	Jennifer Sanchez		
Standard:	FCC 15B, 90Z, RSS	Class:	N/A

Plot of emissions at point when 43 + 10*log(p) limit is exceeded (-26.0dBm in 100 kHz ~ -16dBm in 1 MHz, adjusted for two transmit chains)



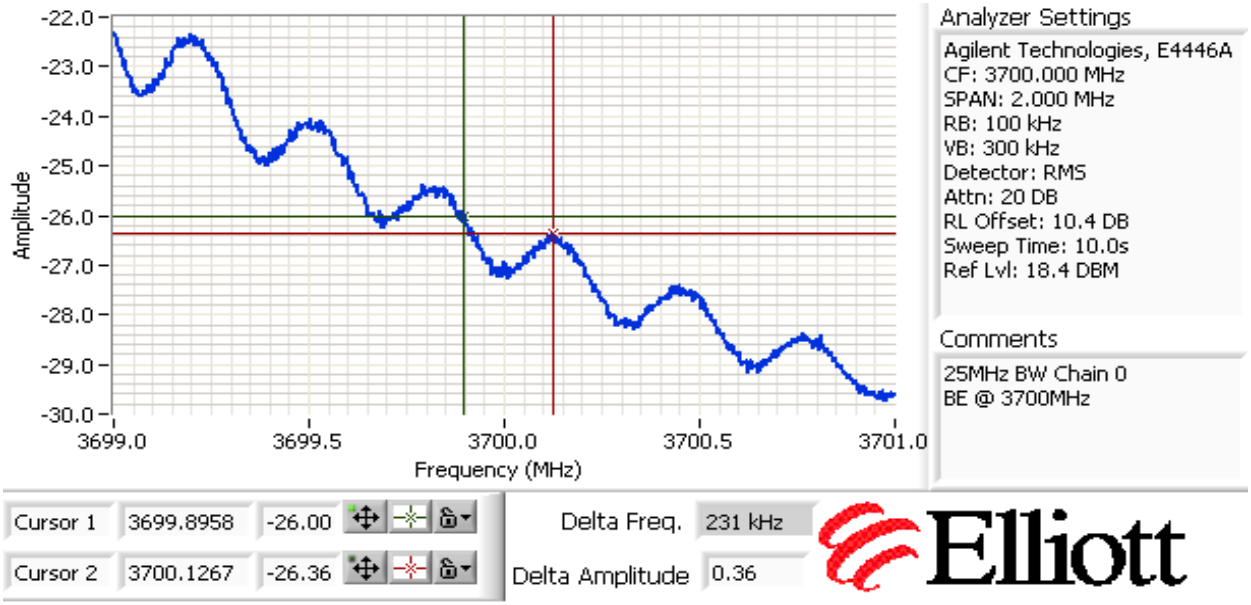
Plot for high channel (3690 MHz), power setting = 36, BW = 20.0, MOD=Data Rate 0

Freq. (MHz)	Modulation	Channel bandiwdth	Software setting[1]	Unwanted emission reference point	Worst case drift	F_H
3690	Rate 0	20 MHz	36	3699.765600	0.027520	3699.793120

Note 1:	Power setting is the software setting used to set the output power.

Client:	Ubiquiti Networks	Job Number:	J82268
Model:	NanoBridgeM365 & NanoStationM365	T-Log Number:	T82413
		Account Manager:	Susan Pelzl
Contact:	Jennifer Sanchez		
Standard:	FCC 15B, 90Z, RSS	Class:	N/A

Plot of emissions at point when 43 + 10*log(p) limit is exceeded (-26.0dBm in 100 kHz ~ -16dBm in 1 MHz, adjusted for two transmit chains)



Plot for high channel (3688 MHz), power setting(s) = 36, BW = 25.0, MOD=Data Rate 0

Freq. (MHz)	Modulation	Channel bandiwdth	Software setting[1]	Unwanted emission reference point	Worst case drift	F_H
3688	Rate 0	25 MHz	36	3699.895800	0.027520	3699.923320

Note 1:	Power setting is the software setting used to set the output power.

END OF REPORT

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