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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:

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Testing Cert #2016.01

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REVISION HISTORY

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

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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	Description	Measured	Limit	Result
Transmitter	Modulation, output power an		1	
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
5.0	EIRP – PSD (Maximum)	5MHz: 29.9dBm/MHz 10MHz: 29.9dBm/MHz 20MHz: 29.9dBm/MHz 25MHz: 29.9dBm/MHz	1 Watt/MHz	Complies
	Emission types	D7D	Must be Digital	Complies
5.1, 5.7	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
	rious emissions			
5.8	Field strength	49.9 dBuV/m @ 3 m	RSS-GEN 7.2.3	
Other details	8	1		
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	$F_1 - Frequency offset =$ 3650.02 MHz $F_h + Frequency offset =$ 3699.92332 MHz	F_1 – 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 anten	nas of 13 and 21dBi gain	•
contentio	er part of the allocated band from n-based protocol except in low	n 3675 – 3700 MHz requires t	he device to use an unres	tricted

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 $+50^{\circ}$ 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 x 10 ⁻⁷
RF power, conducted	dBm	25 to 7,000 MHz	$\pm 0.52 \text{ dB}$
Conducted emission of transmitter	dBm	25 to 40,000 MHz	$\pm 0.7 \text{ dB}$
Conducted emission of receiver	dBm	25 to 40,000 MHz	$\pm 0.7 \text{ dB}$
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	$\begin{array}{c} \pm 3.6 \text{ dB} \\ \pm 6.0 \text{ dB} \end{array}$

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	NanoStation	3.65GHz CPE	None	SWX-M365
Networks	M365 /			
	NanoBridge			
	M365			
Ubiquiti	UBI-POE-24-1	PoE injector	None	None
Networks				

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	Cable(s)			
Folt	То	Description	Shielded or Unshielded	Length(m)	
Ethernet	PoE injector	Cat 5	Unshielded	1	
Ethernet (PoE	Laptop	Cat 5	TT 1.11 1	10	
injector)	1 1		Unshielded		
AC Power	AC Mains	3 wire		0.5	
(PoE injector)		5 with	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.

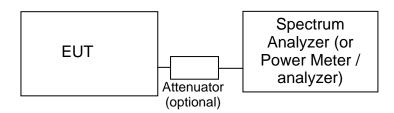
Site	Registratio	on Numbers	Location
Site	FCC	Canada	Location
Chamber 4	211948	IC 2845B-4	41039 Boyce Road
Chamber 7	A2LA Accredited	IC 2845B-7	Fremont, CA 94538-2435

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 markerfrequency 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 nonconductive 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

-	00 - 2,000 WINZ, 05-WIAI-11			
<u>Manufacturer</u>	Description	<u>Model</u>	Asset #	<u>Cal Due</u>
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
	- AC Power Ports, 05-Mar-11			
<u>Manufacturer</u>	Description	<u>Model</u>	<u>Asset #</u>	<u>Cal Due</u>
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
Ronue & Schwarz			1334	5/21/2011
	Power and Spurious Emissions), (O al Dura
<u>Manufacturer</u>	Description	Model	Asset #	Cal Due
Hewlett Packard	SpecAn 30 Hz -40 GHz, SV	8564E (84125C)	1148	7/12/2011
	(SA40) Red			
Radiated Emissions, R	Rx mode, 30 - 11,000 MHz, 16-Mar	-11		
Manufacturer	<u>Description</u>	Model	Asset #	<u>Cal Due</u>
Hewlett Packard	Microwovo Droomplifier 1	8449B		<u>12/8/2011</u>
Hewiell Packard	Microwave Preamplifier, 1-	0449D	263	12/0/2011
	26.5GHz			
EMCO	Antenna, Horn, 1-18 GHz	3115	487	7/6/2012
Hewlett Packard	SpecAn 9 kHz - 40 GHz, FT	8564E (84125C)	1393	4/14/2011
	(SA40) Blue	(0.1.2.0)		.,
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, 1	8-Mar-11			
Manufacturer	Description	Model	Asset #	Cal Due
Agilent	PSA, Spectrum Analyzer,	E4446A	2139	1/26/2012
Aglierit	(installed options, 111, 115, 123,	E1110/(2100	1/20/2012
	1DS, B7J, HYX,			
Radiated Emissions, 3	80 - 18,000 MHz, 22-Mar-11			
Manufacturer	Description	Model	Asset #	Cal Due
Hewlett Packard	Microwave Preamplifier, 1-	8449B	785	5/26/2011
	26.5GHz			3, _ 0, _ 0 , .
Llowlatt Daakard		0500EM	1010	44/00/0044
Hewlett Packard	EMC Spectrum Analyzer, 9 KHz -	8593EM	1319	11/22/2011
	22 GHz			
Hewlett Packard	SpecAn 9 kHz - 40 GHz, FT	8564E (84125C)	1393	4/14/2011
	(SA40) Blue	- · ·		
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			
<u>Manufacturer</u>	Description	Model	<u>Asset #</u>	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	ÈMC Śpectrum 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, F	Part 90 & RSS 197, 25-Mar-11			
<u>Manufacturer</u>	Description	Model	<u>Asset #</u>	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

@Elliott

EMC Test Data

Job Number: J82268
T-Log Number: T82413
Account Manager: Susan Pelzl
-
Class: -
Environment: -

EMC Test Data

For The

Ubiquiti Networks

Model

NanoBridgeM365 & NanoStationM365

Date of Last Test: 3/25/2011

EMC Test Data

	An UZAS company		
Client:	Ubiquiti Networks	Job Number:	J82268
Model	NanaDridga/1/245 & NanaStation/1/245	T-Log Number:	T82413
wouer.	NanoBridgeM365 & NanoStationM365	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

Elliott

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

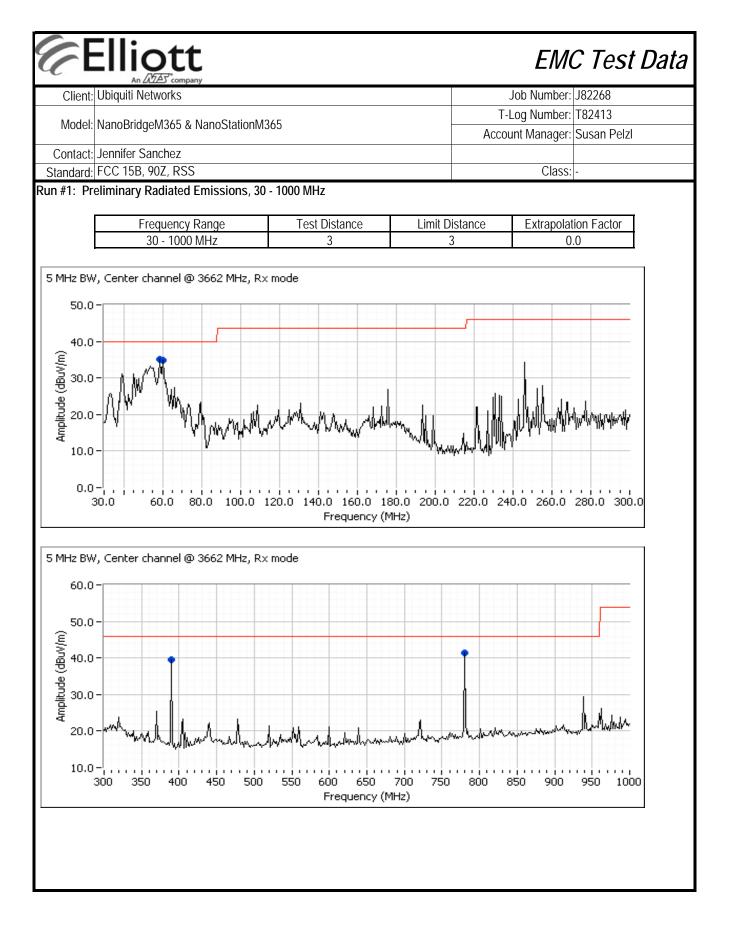
Dum #	Toot Dorformod	Linsit	Decult	Morgin
Run #	Test Performed	Limit	Result	Margin
1	Radiated Emissions	FCC B	Eval	
I	30 - 1000 MHz, Preliminary	T CC D	Evai	-
2	Radiated Emissions	FCC B	Pass	39.9dBµV/m @ 780.00MHz (-6.1dB)
Z	30 - 1000 MHz, Maximized	T CC D	Pass	39.90Bpv/m @ 780.000m z (-0.10B)
2	Radiated Emissions	RSS GEN	Pass	49.9dBµV/m @ 1560.1MHz (-4.1dB)
3	1 GHz - 11 GHz Maximized	K33 GEN	Pd55	49.90Dp V/III @ 1500.10012 (-4.10D)

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-Illbiquiti Networks

EMC Test Data

Cilent	I Ihiguiti Notu	vorks						Job Number:	182268
	Ubiquiti Netv	1011/2					T-Log Number: T82413		
Model:	NanoBridgel	M365 & Na	noStationM	365				•	
							Acco	unt Manager:	Susan Pelzl
	Jennifer San								
Standard:	FCC 15B, 90)Z, RSS						Class:	-
eliminary	peak readir	igs captur						-	
requency	Level	Pol		СВ	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	Н	46.0	-4.5	Peak	175	1.5		
390.007	39.6	V	46.0	-6.4	Peak	212	1.0		
					.				
					T interface ca		11.2.1.1	0	
requency	Level	Pol		CB	Detector	Azimuth	Height	Comments	
MHz	dBµV/m	v/h	Limit	Margin	Pk/QP/Avg	degrees	meters		
780.004	39.9	H V	46.0 46.0	-6.1	QP	176	1.5	QP (1.00s)	
		1/	//6/)	-7.8	QP	213	1.0	QP (1.00s)	
	38.2							OD(100)	
60.235 58.795 un #2: Ma	31.9 29.9 ximized Rea	V V adings Fro	40.0 40.0 om Run #1	-8.1 -10.1	QP QP	79 15	1.0 1.0	QP (1.00s) QP (1.00s)	
60.235 58.795 Jn #2: Ma	31.9 29.9 ximized Rea quasi-peak r	V V adings Fro readings (40.0 40.0 om Run #1 includes ma	-8.1 -10.1	QP QP	79 15 ace cables)	1.0 1.0	QP (1.00s)	tion Factor
60.235 58.795 In #2: Ma	31.9 29.9 ximized Rea quasi-peak r	V V adings Fro readings (quency Ra	40.0 40.0 om Run #1 includes ma	-8.1 -10.1 anipulation of Test D	QP QP of EUT interfa	79 15 ace cables) Limit D	1.0 1.0 istance	QP (1.00s) Extrapola	tion Factor
60.235 58.795 un #2: Ma	31.9 29.9 ximized Rea quasi-peak r	V V adings Fro readings (40.0 40.0 om Run #1 includes ma	-8.1 -10.1 anipulation of Test D	QP QP	79 15 ace cables)	1.0 1.0 istance	QP (1.00s) Extrapola	tion Factor .0
58.795 un #2: Ma aximized (31.9 29.9 ximized Rea quasi-peak r	V V adings Fro readings (quency Ra	40.0 40.0 om Run #1 includes ma nge Hz	-8.1 -10.1 anipulation of Test D	QP QP of EUT interfa	79 15 ace cables) Limit D	1.0 1.0 istance	QP (1.00s) Extrapola	
60.235 58.795 un #2: Ma aximized (31.9 29.9 ximized Rea quasi-peak r Frea 30	V V adings Fro readings (quency Ra quency Ra 0 - 1000 Mi	40.0 40.0 om Run #1 includes ma nge Hz	-8.1 -10.1 anipulation of Test D	QP QP of EUT interfa	79 15 ace cables) Limit D	1.0 1.0 istance	QP (1.00s) Extrapola	
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60.235 58.795 un #2: Ma aximized (requency	31.9 29.9 ximized Rea quasi-peak r Frea 30 Level dBµV/m	V V readings Fro readings (quency Ra - 1000 Mł Pol V/h	40.0 40.0 om Run #1 includes ma nge Hz FC Limit	-8.1 -10.1 anipulation of Test D C B Margin	QP QP of EUT interfa Distance 3 Detector Pk/QP/Avg	79 15 ace cables) Limit D	1.0 1.0 istance 3 Height meters	QP (1.00s) Extrapola Comments	
60.235 58.795 In #2: Ma aximized (requency MHz 780.004	31.9 29.9 ximized Rea quasi-peak r Frea 30 Level dBµV/m 39.9	V V readings Fro readings (quency Ra 0 - 1000 MH Pol V/h H	40.0 40.0 om Run #1 includes ma nge Hz FC Limit 46.0	-8.1 -10.1 anipulation of Test D C B Margin -6.1	QP QP of EUT interfa Distance 3 Detector Pk/QP/Avg QP	79 15 ace cables) Limit D Zimuth degrees 176	1.0 1.0 istance Height meters 1.5	QP (1.00s) Extrapola Comments QP (1.00s)	

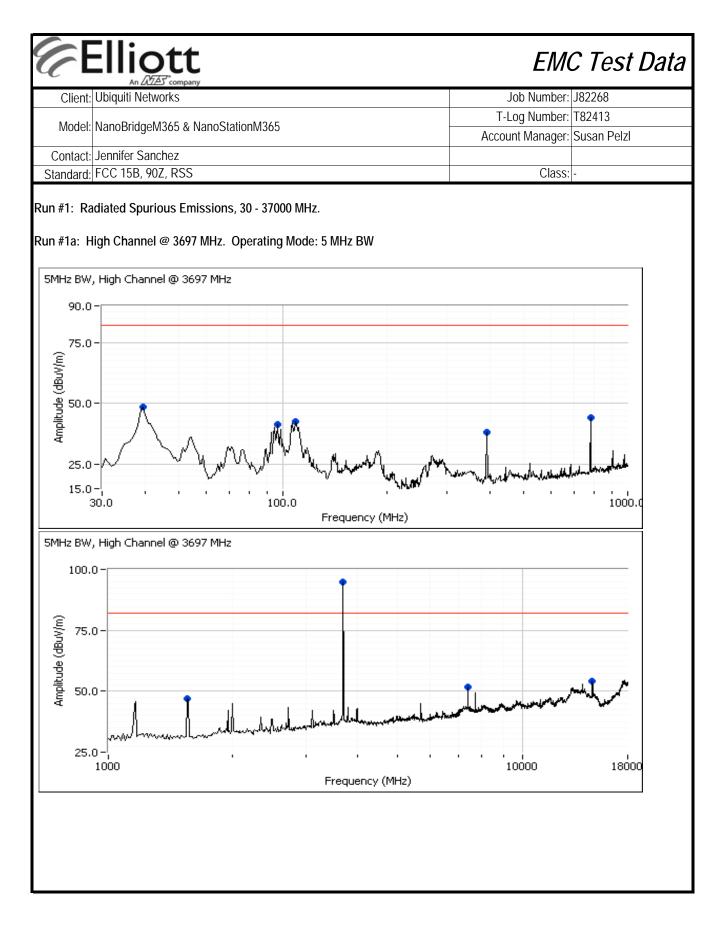
Client:	Ubiquiti Netv	vorks						Job Number:	J82268
							Ţ.	Log Number:	T82413
Model:	NanoBridge	M365 & Na	anoStationM3	365				unt Manager:	
Contact:	Jennifer San	chez						5	
Standard:	FCC 15B, 90	DZ, RSS						Class:	-
ın #3: Ma	aximized Rea	adings, 10	00 - 11000 N	/Hz					
	Free	quency Ra	nge	Test D	istance	Limit D	istance	Extrapolat	ion Factor
	1000) - 18000 I	MHz		3		3	0	.0
5 MHz BV	/, Center cha	annel @ 36	562 MHz, Rx	mode					
80.0	-								
70.0	_								
- 툴 60.0	-								
é									
50.0	-								
Щ			•				under states	allo sea prove	water shaken
9 40.0									
Amplitude (dBuV/m) 2000 4000 4000		1.1.4.		veryanyaha	******				
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30.0 20.0		00 30	00 400	0 5000 F	6000 Frequency (M	7000 1Hz)	8000		
30.0 20.0 : eliminary requency	- }#++++++ *******************************	00 30	ed during p	0 5000 F	6000 Frequency (M	7000 1Hz)	8000		
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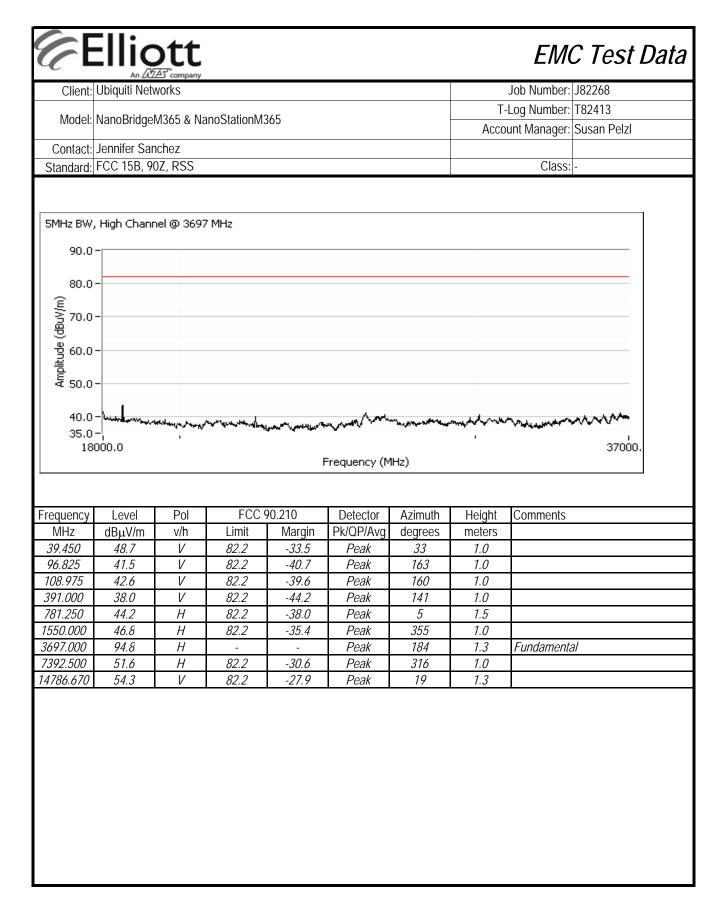
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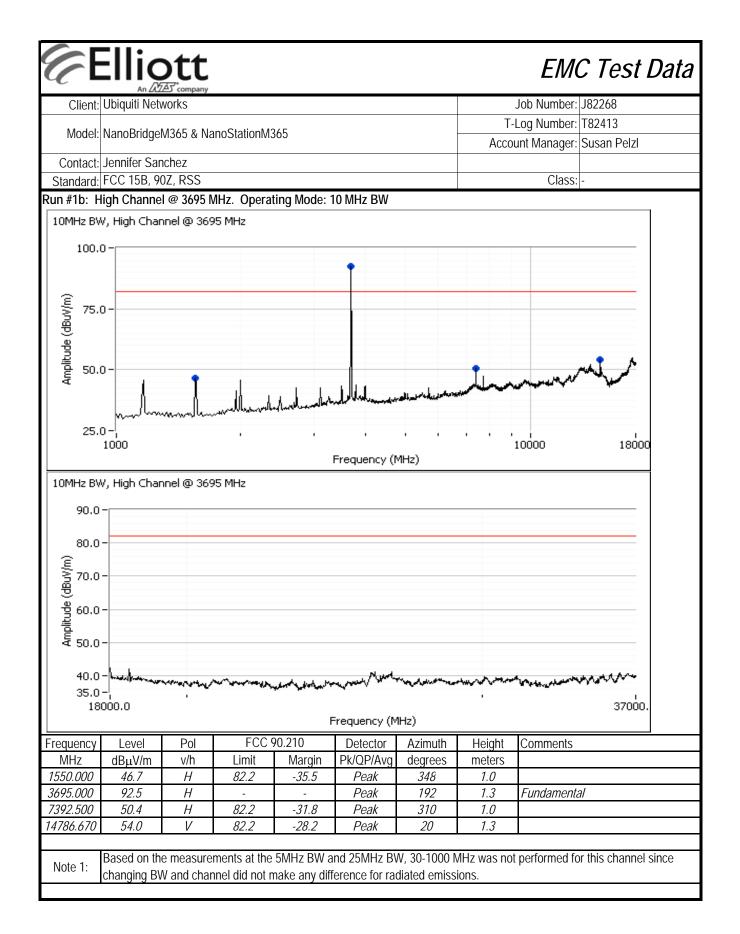
EMC Test Data

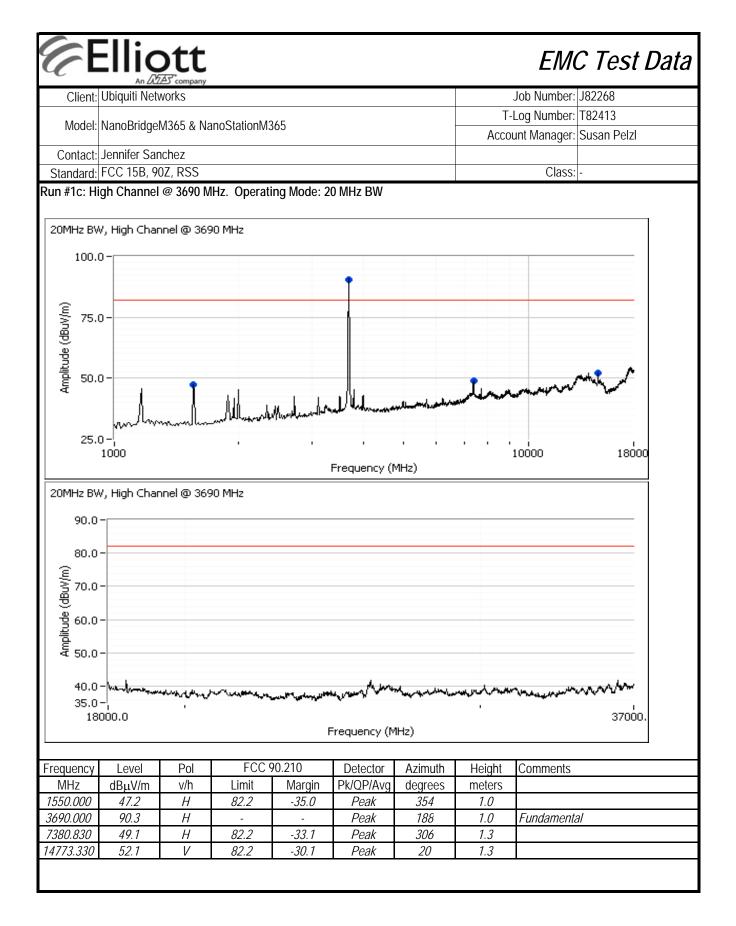
Client: Ubiquiti Networks	Job Number	: J82268
Model: NanoBridgeM365 & NanoStationM365	T-Log Number	: T82413
	Account Manager	: Susan Pelzl
Contact: Jennifer Sanchez		
Standard: FCC 15B, 90Z, RSS	Class	: -

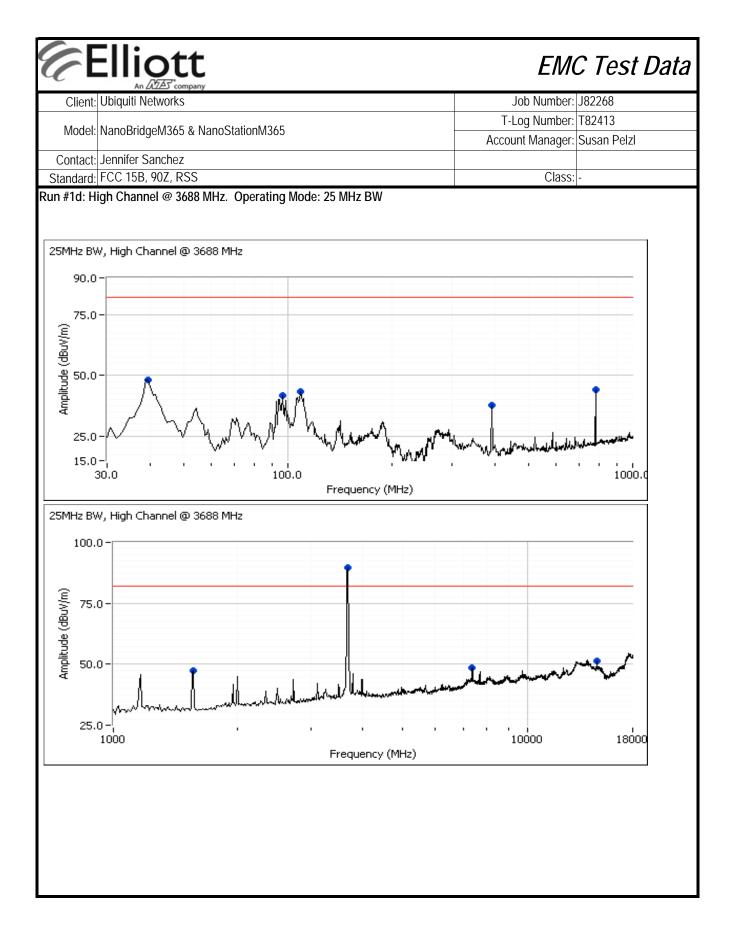
C E		ott			EM	C Test Data	
Client:	Ubiquiti Net	vorks	Job Number: J82268				
Model:	NanoBridge	M365 & Na	noStationM		T-Log Number: T82413		
Contact:	Jennifer Sar	ichez	Account Manager	Susan Peizi			
	FCC 15B, 90				Class	: -	
				SS 197 and FCC Part 9 Spurious Emissions	0		
Test Spec	cific Detail	S					
·			ive of this te on listed abo	ession is to perform final qualificat	tion testing of the EUT wit	h respect to the	
Те	Date of Test: est Engineer: est Location:	Rafael Var		Config. Used Config Change EUT Voltage	: None		
The EUT	est Config and all local s t was located	support equ		ated on the turntable for radiated	spurious emissions testin	g. All remote support	
For radiat	ed emissions	testing the	e measureme	antenna was located 3 meters fror	n the EUT.		
Ambient	Condition	S:		perature: 20-25 °C			
			R	Iumidity: 30-40 %			
Summary	of Result	S			I	1	
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	
Modificat	ions Made	During	Testing				
	cations were	•	•	sting			
	s From Th			f the standard			
			e requiremen	of the standard.			

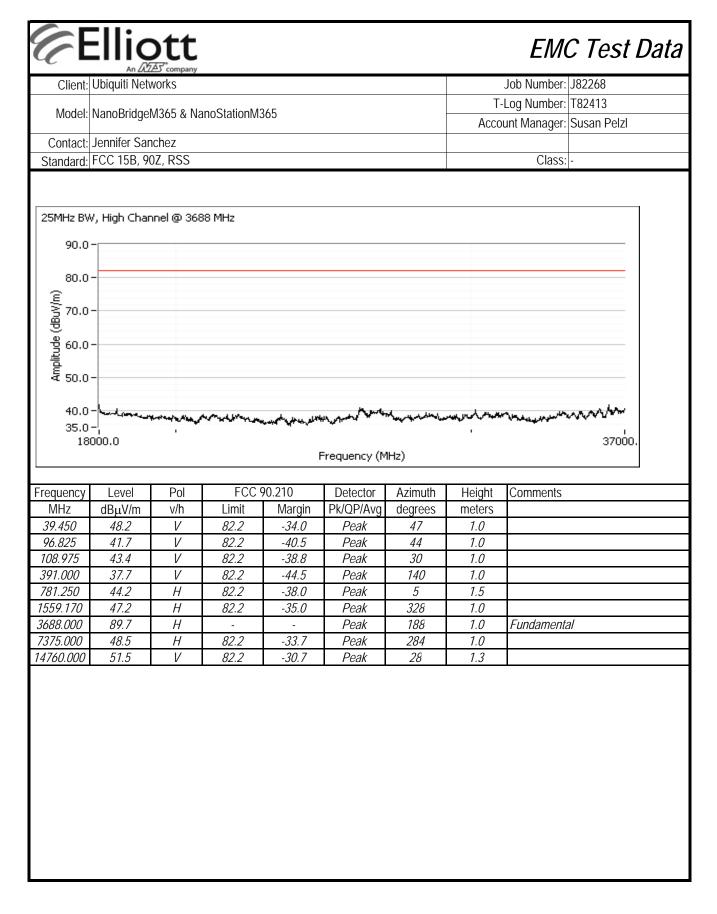






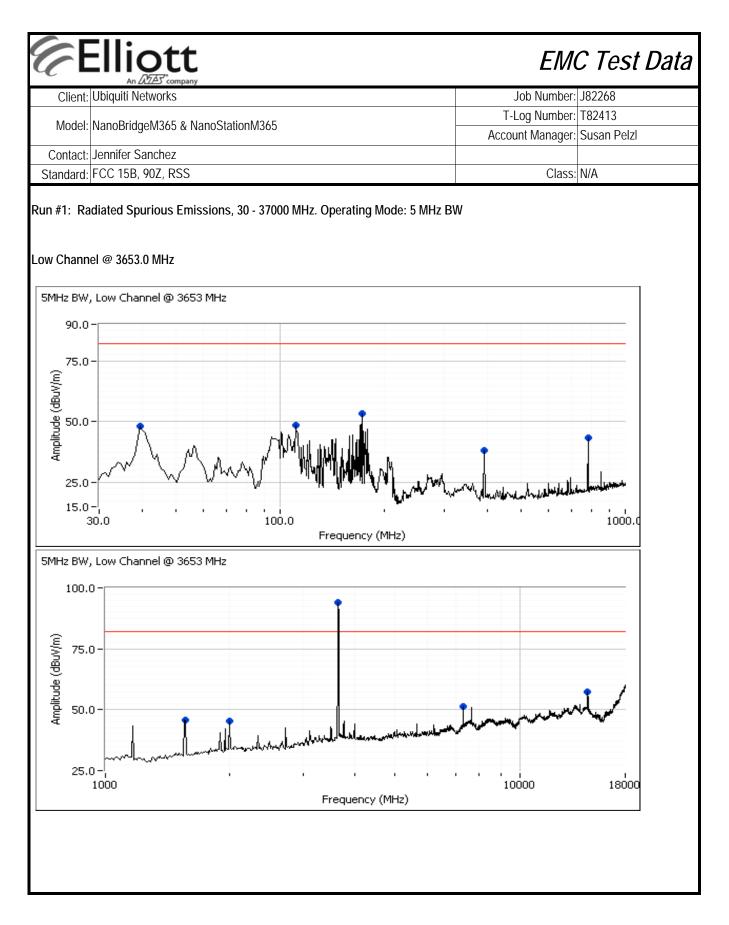


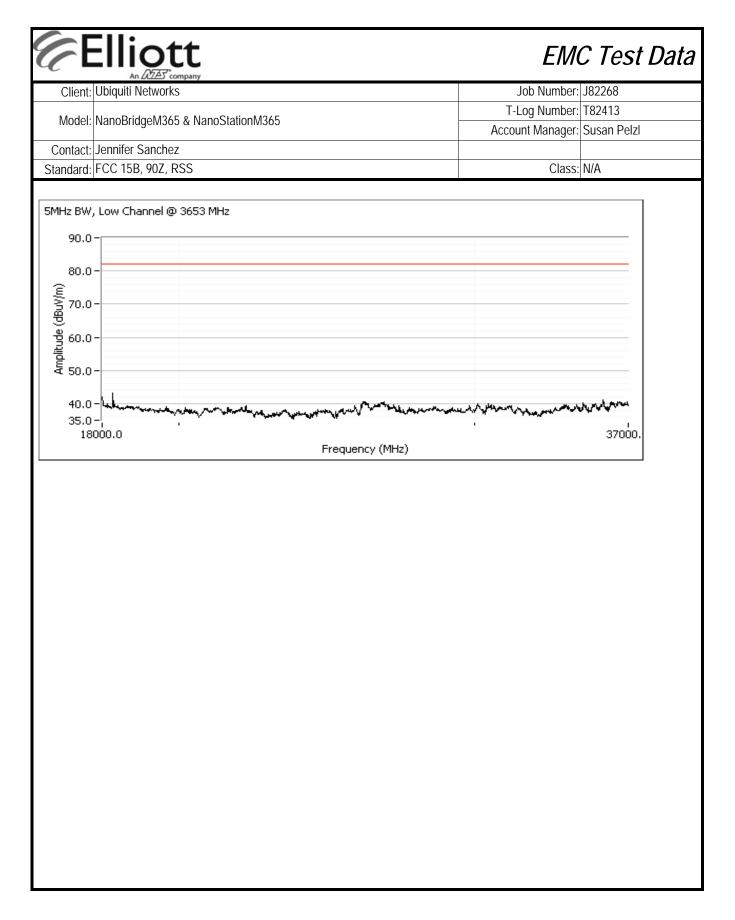


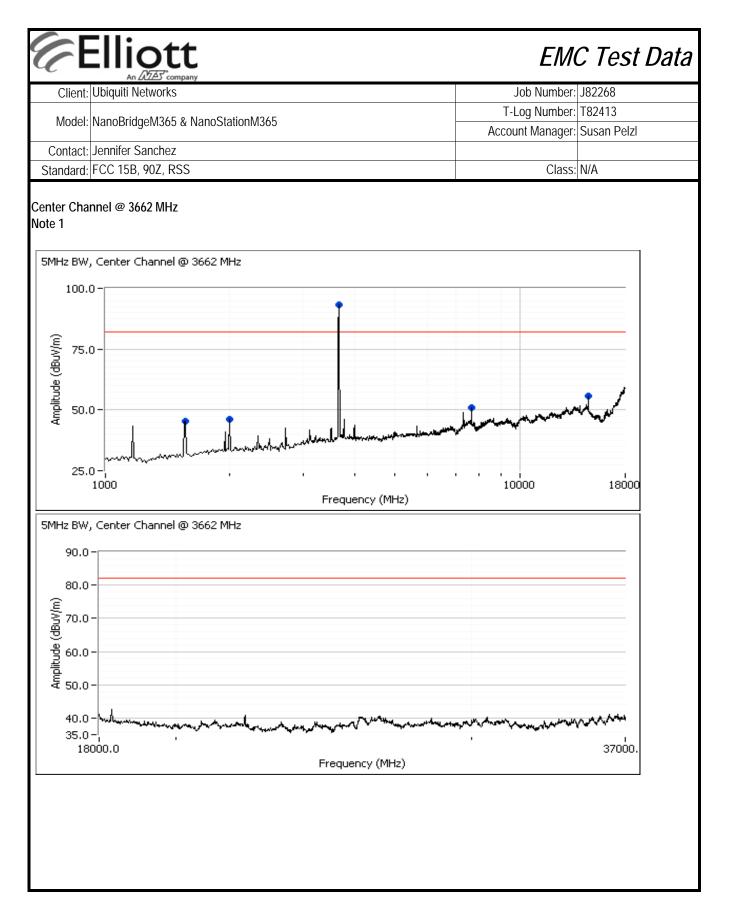


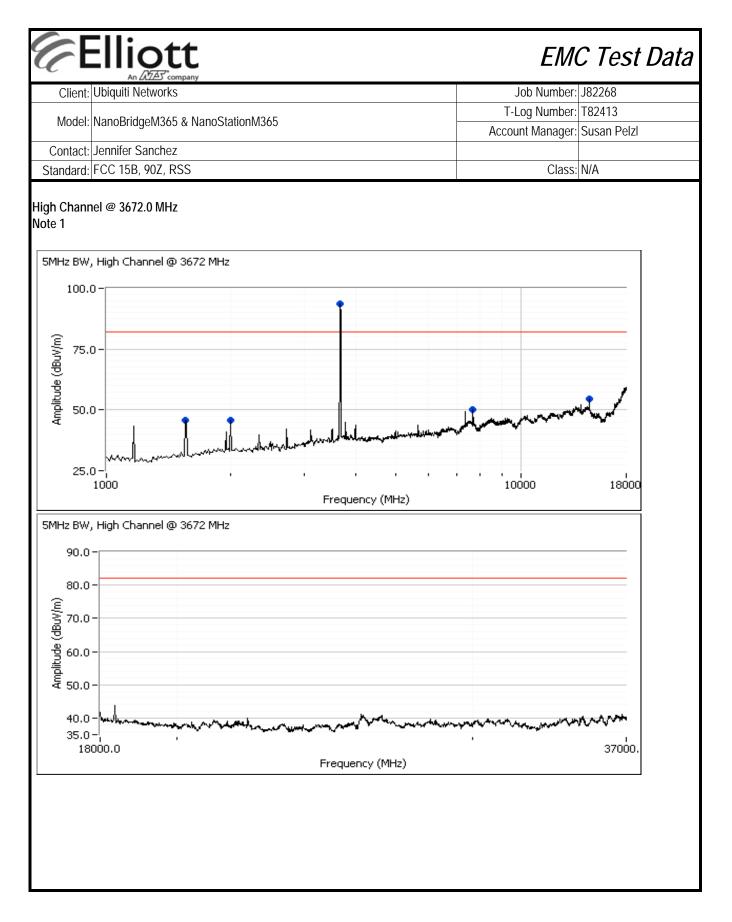
MHzdB μ V/mv/hLimitMarginPk/QP/Avgdegreesmeters14786.67054.3V82.2-27.9Peak191.35MHVerticalFrequencySubstitution measurementsSiteEUT measurementseirp Limiterp LimitMarginMHzPin ¹ Gain ² FS ³ Factor ⁴ FS ⁵ eirp (dBm)erp (dBm)dBmdBmdBAll signals were more than 20dB below the computed FS limit - No subs requiredImage: Compute Computed FS limit - No subs requiredImage: Compute Compute Computed FS limit - No subs requiredImage: Compute Com	Client:	Ubiquiti Netv	vorks						Job Number:	J82268	
Contact: Jennifer Sanchez Account Manager: Susan Peizi Standard: FCC 15B, 90Z, RSS Class: - Prequency Level Pol FCC 90.210 Detector Azimuth Height Comments BW MHz dBµV/m v/h Limit Margin Pk/QP/Avg degrees meters BW MHz dBµV/m v/h Limit Margin Pk/QP/Avg degrees meters BW I4786.670 54.3 V 82.2 -27.9 Peak 19 1.3 5MH Vertical Frequency Substitution measurements Site EUT measurements eirp Limit erp Limit Marg MHz Pin ¹ Gain ² FS ³ Factor ⁴ FS ⁵ eirp (dBm) erp Limit dBm dBm <t< td=""><td>Model</td><td>NanoBridgel</td><td>1365 & Na</td><td>noStationM[*]</td><td>345</td><td></td><td></td><td>T- </td><td>Log Number:</td><td>T82413</td><td></td></t<>	Model	NanoBridgel	1365 & Na	noStationM [*]	345			T-	Log Number:	T82413	
Standard: FCC 15B, 90Z, RSS Class: - Clevel Pol FCC 90.210 Detector Azimuth Height Comments BW MHz dBµV/m v/h Limit Margin Pk/QP/Avg degrees meters - Clevel Pol Step - 27.9 Peak 19 1.3 Step - 1.3 Clevel Pol Comments Site Frequency Substitution measurements Site Factor ⁴ FS ⁵ eirp (dBm) dBm dB MHz Pin ¹ Gain ² FS ³ Factor ⁴ FS ⁵ <th< td=""><td></td><td></td><td></td><td></td><td>505</td><td></td><td></td><td>Αссοι</td><td>unt Manager:</td><td>Susan Pelzl</td><td></td></th<>					505			Αссοι	unt Manager:	Susan Pelzl	
tun #2: Radiated Spurious Emissions, Transmit Mode: Substitution Measurements Frequency Level Pol FCC 90.210 Detector Azimuth Height Comments BW MHz dB μ V/m v/h Limit Margin Pk/QP/Avg degrees meters Image: Comments BW I4786.670 54.3 V 82.2 -27.9 Peak 19 1.3 5MH Vertical Frequency Substitution measurements Site EUT measurements eirp Limit erp Limit Margin dBm											
FrequencyLevelPolFCC 90.210DetectorAzimuthHeightCommentsBWMHz $dB\mu V/m$ v/hLimitMarginPk/QP/AvgdegreesmetersImage: CommentsBW4786.67054.3V82.2-27.9Peak191.35MHterticalTrequencySubstitution measurementsSiteEUT measurementseirp Limiterp LimitMarginMHzPin1Gain2FS3Factor4FS5eirp (dBm)erp (dBm)dBmdBmdBAll signals were more than 20dB below the computed FS limit - No subs requiredImage: Commental AdditionImage: Commental AdditionImage: Commental AdditionInterest field strength (dBm) to the substitution antennaImage: Commental Addition of the Simit - No subs requiredImage: Commental Addition of the Substitution antennaImage: Commental Addition of the Substitution antennaImage: Commental Addition of the Simit - No subs requiredImage: Commental Addition of the Substitution antennaImage: Commental Addition of the Site Factor - this is the site factor to convert from a field strength in dBuV/m to an eirp in dBm.	Standard:	FCC 15B, 90)Z, RSS						Class:	-	
MHzdB μ V/mv/hLimitMarginPk/QP/Avgdegreesmeters14786.67054.3V82.2-27.9Peak191.35MHVerticalFrequencySubstitution measurementsSiteEUT measurementseirp Limiterp LimitMargMHzPin ¹ Gain ² FS ³ Factor ⁴ FS ⁵ eirp (dBm)erp (dBm)dBmdBmdBAll signals were more than 20dB below the computed FS limit - No subs requiredImage: No substitution antennaImage: No substitution antennaImage: No substitution antennaInte 1:Pin is the input power (dBm) to the substitution antennaA dipole has a gain of 2.2dBi.Image: No substitution antennaInte 3:FS is the field strength (dBuV/m) measured from the substitution antenna.Image: No substitution antennaImage: No substitution antennaInte 4:Site Factor - this is the site factor to convert from a field strength in dBuV/m to an eirp in dBm.Image: No substitution antenna	Run #2: Ra	idiated Spur	ious Emis	sions, Tran	smit Mode: S	Substitution	Measureme	ents			
44786.67054.3V82.2-27.9Peak191.35MHVerticalFrequencySubstitution measurementsSiteEUT measurementseirp Limiterp Limiterp LimitMargMHzPin ¹ Gain ² FS ³ Factor ⁴ FS ⁵ eirp (dBm)erp (dBm)dBmdBmdBmdBAll signals were more than 20dB below the computed FS limit - No subs requiredPinit - No subs requiredPinit - No subs requiredPinit - No subs requiredIote 1:Pin is the input power (dBm) to the substitution antennaAdipole has a gain of 2.2dBi.Pinit - No substitution antennaPinit - No substitution antennaIote 3:FS is the field strength (dBuV/m) measured from the substitution antenna.Site Factor - this is the site factor to convert from a field strength in dBuV/m to an eirp in dBm.	requency	Level	Pol	FCC	90.210	Detector	Azimuth	Height	Comments		BW
Vertical Frequency Substitution measurements Site EUT measurements eirp Limit erp Limit erp Limit Marg MHz Pin ¹ Gain ² FS ³ Factor ⁴ FS ⁵ eirp (dBm) erp (dBm) dBm dBm <th< td=""><td>MHz</td><td></td><td></td><td></td><td></td><td>U U</td><td></td><td></td><td></td><td></td><td></td></th<>	MHz					U U					
Trequency Substitution measurements Site EUT measurements eirp Limit erp Limit erp Limit Marg MHz Pin ¹ Gain ² FS ³ Factor ⁴ FS ⁵ eirp (dBm) erp (dBm) dBm dBm<	4786.670	54.3	V	82.2	-27.9	Peak	19	1.3			5MHz
Trequency Substitution measurements Site EUT measurements eirp Limit erp Limit erp Limit Marg MHz Pin ¹ Gain ² FS ³ Factor ⁴ FS ⁵ eirp (dBm) erp (dBm) dBm dBm<	artical										
MHz Pin ¹ Gain ² FS ³ Factor ⁴ FS ⁵ eirp (dBm) erp (dBm) dBm		Substitut	tion measu	rements	Site	FU.	T measurem	ents	eirn Limit	ern Limit	Margir
All signals were more than 20dB below the computed FS limit - No subs required Interview Interview<											•
Interpretation Pin is the input power (dBm) to the substitution antenna Interpretation Gain is the gain (dBi) for the substitution antenna. A dipole has a gain of 2.2dBi. Interpretation FS is the field strength (dBuV/m) measured from the substitution antenna. Interpretation Site Factor - this is the site factor to convert from a field strength in dBuV/m to an eirp in dBm.									dBill	abiii	40
ote 2:Gain is the gain (dBi) for the substitution antenna. A dipole has a gain of 2.2dBi.ote 3:FS is the field strength (dBuV/m) measured from the substitution antenna.ote 4:Site Factor - this is the site factor to convert from a field strength in dBuV/m to an eirp in dBm.	r in orginale				putou r e n		, oquilou			I	
<i>inte 3:</i> FS is the field strength (dBuV/m) measured from the substitution antenna. <i>inte 4:</i> Site Factor - this is the site factor to convert from a field strength in dBuV/m to an eirp in dBm.	ote 1:										
<i>lote 4:</i> Site Factor - this is the site factor to convert from a field strength in dBuV/m to an eirp in dBm.											
v i											
<i>lote 5:</i> [EUT field strength as measured during initial run.							gth in dBuV/	m to an eirp	in dBm.		
	ote 5:	EUT field str	ength as m	neasured du	ring initial rur	۱.					
	Vote 5:										

C		ott			EM	C Test Data	
Client	: Ubiquiti Netv	vorks			Job Number: J82268		
Mode	: NanoBridgel	V1365 & Nand	StationM36	5	T-Log Number: T82413 Account Manager: Susan Pelzl		
Contact	: Jennifer Sar	ichez	Account Manager				
Standard	: FCC 15B, 90	DZ, RSS			Class	: N/A	
				RSS 197 and FCC Part 90 Spurious Emissions)		
Test Spe	cific Detail	S					
·	Objective:			session is to perform final qualificatior	n testing of the EUT with	respect to the	
	Date of Test: est Engineer: fest Location:	Rafael Varel	1 None POE				
The EUT equipme For radia	nt was located	support equip I outside the testing the n	chamber. neasuremen	ocated on the turntable for radiated sp antenna was located 3 meters from the more that a second sec		All remote support	
Summar	y of Result	s		el. Humidity: 30-40 %			
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	
No modii Deviatio	tions Made Tications were ns From Th tions were ma	made to the ne Standar	EUT during t	esting of the standard.			

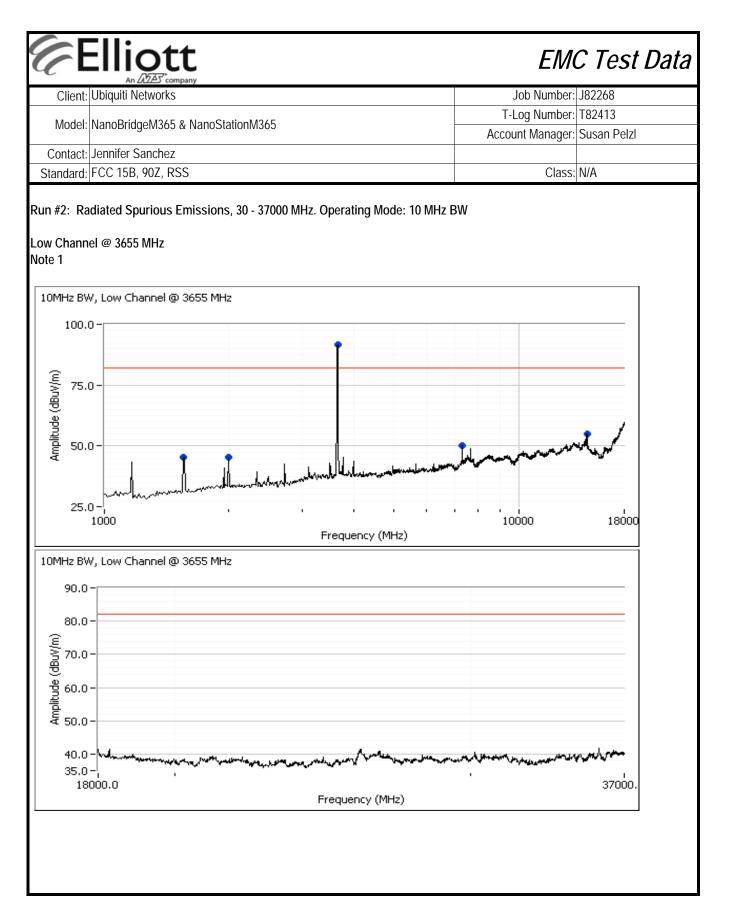


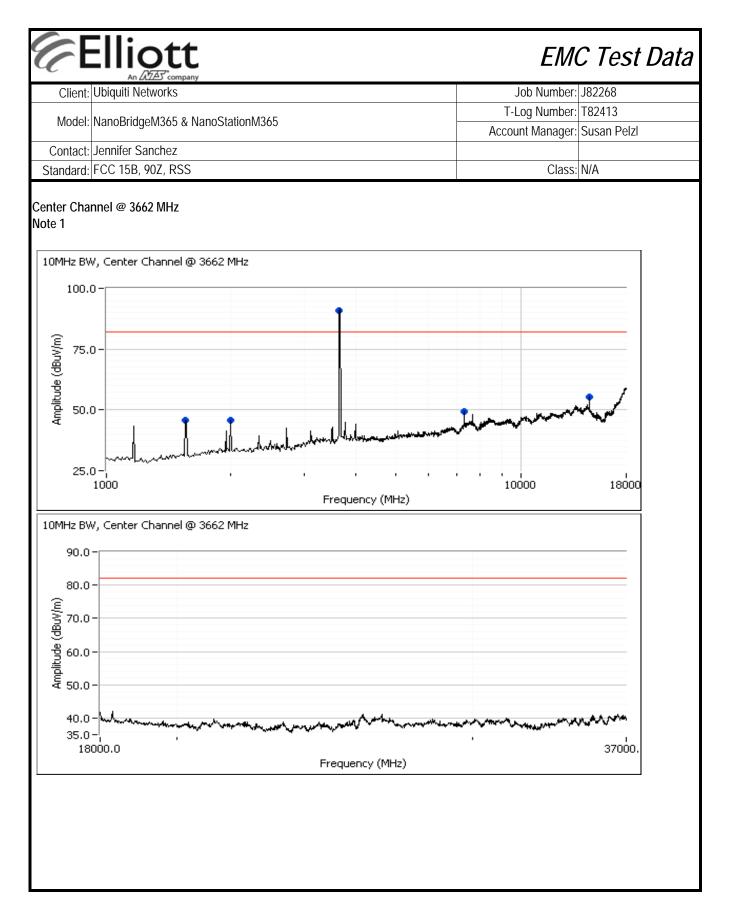


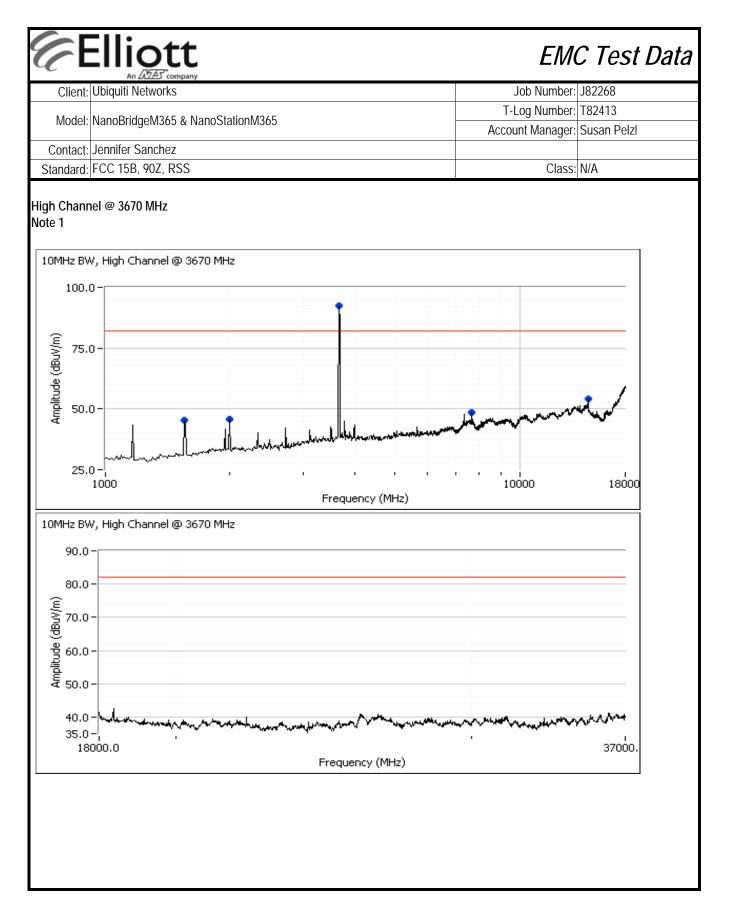




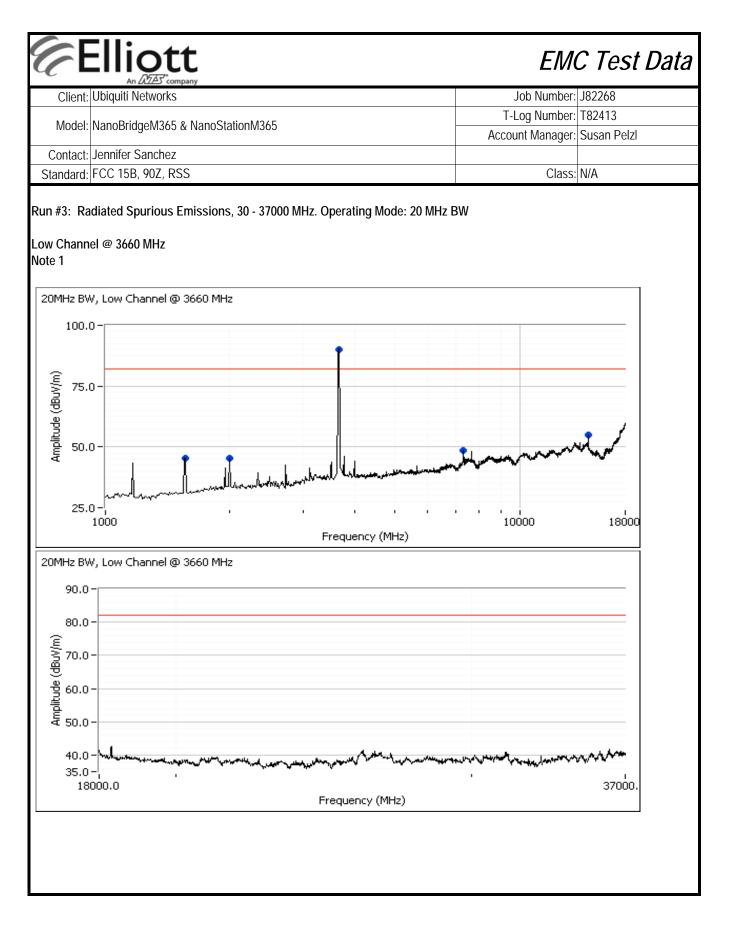
Client:	Ubiquiti Netwo	orks						Job Number:	J82268
Model:	NanoBridgeM	1365 & Nano	StationM36	5				Log Number: unt Manager:	
Contact:	Jennifer Sand	hez					71000	ant managon	
	FCC 15B, 902							Class:	N/A
requency	Level	Pol	FCC	90.210	Detector	Azimuth	Height	Comments	Channe
MHz	dBµV/m	v/h	Limit	Margin	Pk/QP/Avg	degrees	meters	Comments	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	Н	82.2	-38.9	Peak	4	1.5		3653
559.170	45.8	Н	82.2	-36.4	Peak	346	1.0		3653
990.000	45.4	Н	82.2	-36.8	Peak	209	1.6		3653
3653.000	94.0	Н	-	-	Peak	184	1.3	Fundamenta	
7305.000	51.3	H	82.2	-30.9	Peak	315	1.0		3653
4613.330	57.2	V	82.2	-25.0	Peak	329	1.3		3653
559.170	45.3	Н	82.2	-36.9	Peak	329	1.0		3662
990.000	46.1	H	82.2	-36.1	Peak	230	1.3		3662
8662.000	93.3	Н	-	-	Peak	191	1.0	Fundamenta	
660.830	50.8	V	82.2	-31.4	Peak	347	1.9		3662
4653.330	55.7	V	82.2	-26.5	Peak	19	1.3		3662
550.000	45.8	Н	82.2	-36.4	Peak	345	1.0		3672
990.000	45.6	Н	82.2	-36.6	Peak	173	1.0		3672
8672.000	93.5	Н	-	-	Peak	195	1.3	Fundamenta	al 3672
7672.500	50.2	V	82.2	-32.0	Peak	350	1.0		3672
4693.330	54.5	V	82.2	-27.7	Peak	11	1.3		3672
					rence for radia				this channel since

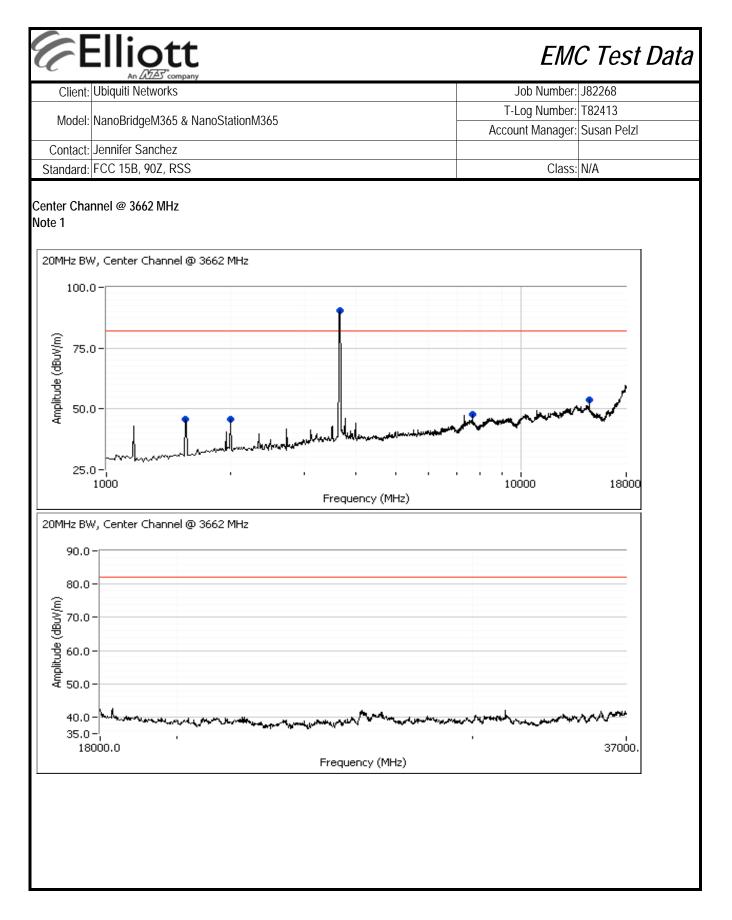


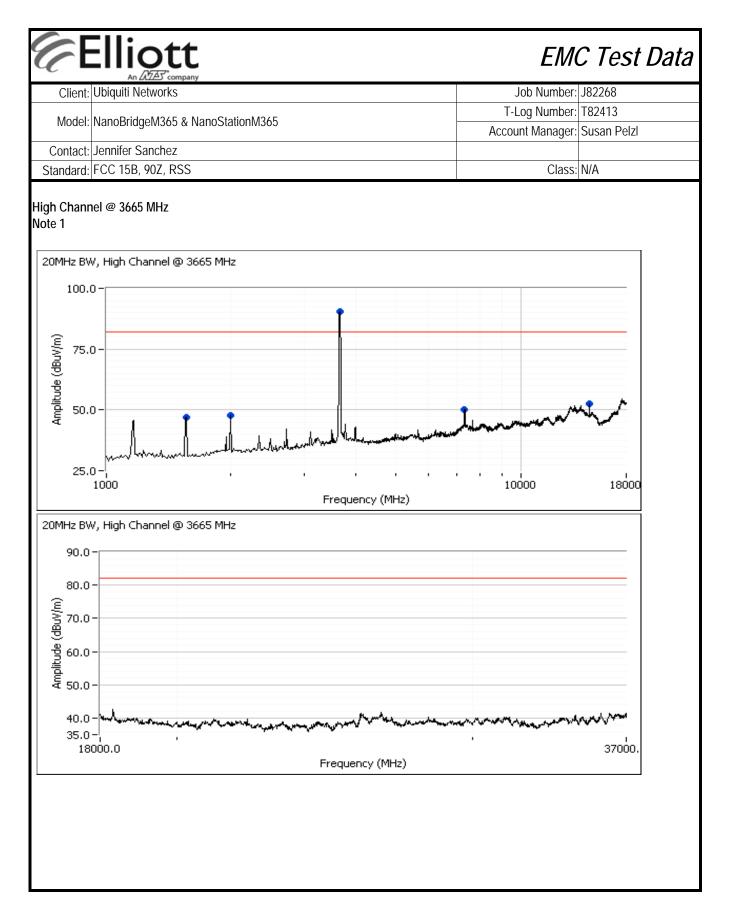




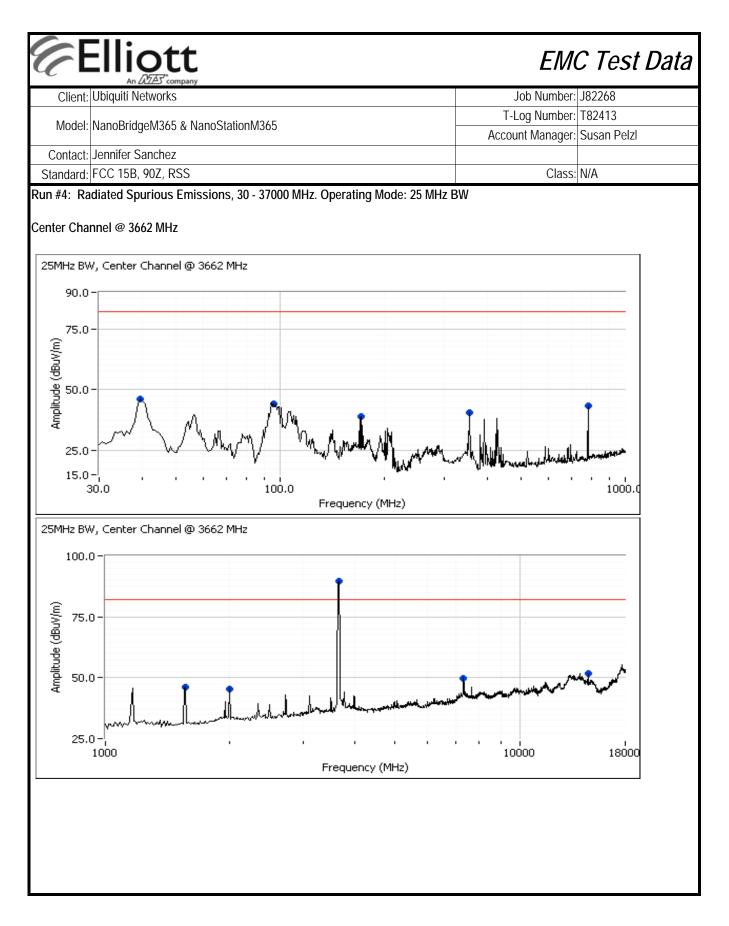
C.IIem'rt	Jbiquiti Netw							Job Number:	182268
							Ţ.	Log Number:	
Model: N	VanoBridgeN	1365 & Nan	oStationM36	5		-		unt Manager: S	
Contact: J	Jennifer Sand	chez						_	
Standard: F	FCC 15B, 902	Z, RSS						Class: I	N/A
equency	Level	Pol		/ 15.247	Detector	Azimuth	Height	Comments	Channe
MHz	dBµV/m	v/h	Limit	Margin	Pk/QP/Avg	degrees	meters	-	0/55
550.000	45.3	H	82.2	-36.9	Peak	335	1.0	-	3655
990.000	45.4	H	82.2	-36.8	Peak	218	1.3	F	3565
655.000	<i>91.5</i>	H	-	-	Peak	<i>185</i>	1.0	Fundamental	
310.830	50.3	H	82.2	-31.9	Peak	308	1.0		3655
626.670	55.0	V	82.2	-27.2	Peak	326	1.6		3565
550.000	45.8	Н	82.2	-36.4	Peak	347	1.0		3662
790.000	45.6	H	82.2	-36.6	Peak	177	1.0		3662
662.000	90.7	H	-	-	Peak	187	1.3	Fundamental	
322.500	49.3	H	82.2	-32.9	Peak	297	1.0	i unuumentui	3662
653.330	55.5	V	82.2	-26.7	Peak	19	1.3		3662
550.000	45.4	Н	82.2	-36.8	Peak	342	1.0		3670
990.000	45.9	Н	82.2	-36.3	Peak	206	1.3		3670
670.000	92.4	Н	-	-	Peak	180	1.3	Fundamental	
666.670	48.5	V	82.2	<i>-33.</i> 7	Peak	348	1.9		3670
680.000	54.0	V	82.2	-28.2	Peak	354	1.3		3670
C	changing Bvv	<u>ano cnann</u>	<u>ei dia not ma</u>	ike any diffe	rence for radia	itea emissior	15.		

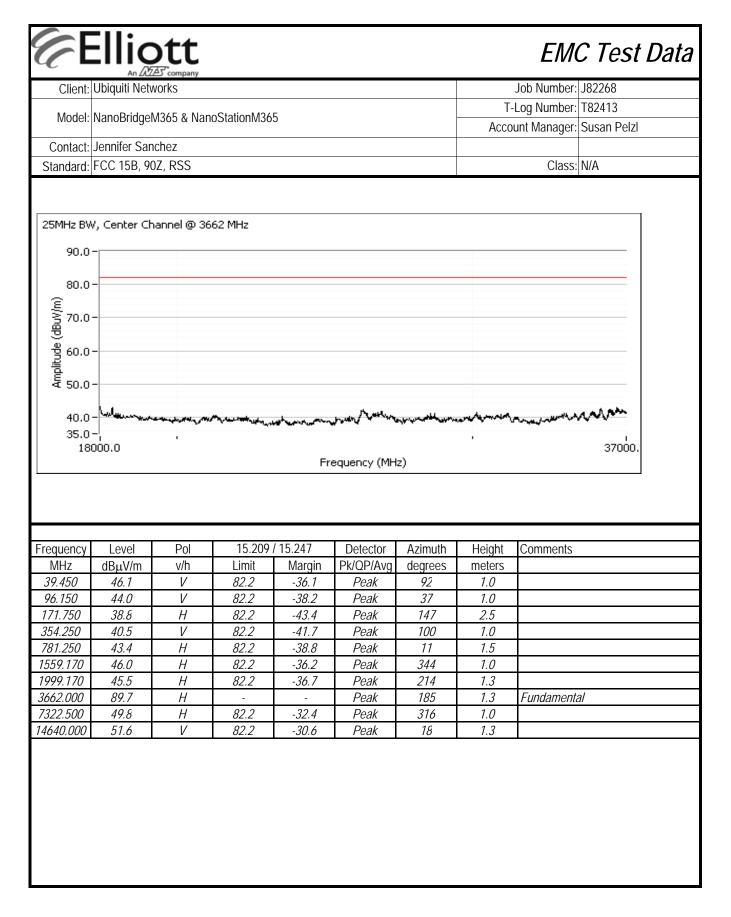






Client	Ubiquiti Netw	Company Orks						Job Number: J82268			
								Log Number:			
Model:	NanoBridgeN	1365 & Nan	oStationM36	5				unt Manager:			
Contact:	Jennifer Sand	chez						5			
Standard:	FCC 15B, 90	Z, RSS						Class:	N/A		
requency	Level	Pol	15.209	/ 15.247	Detector	Azimuth	Height	Comments	Channe		
MHz	dBµV/m	v/h	Limit	Margin	Pk/QP/Avg	degrees	meters				
1559.170	45.3	Н	82.2	-36.9	Peak	348	1.0		3660		
999.170	45.3	Н	82.2	-36.9	Peak	216	1.3		3660		
660.000	90.0	Н	-	-	Peak	188	1.0	Fundamenta	al 3660		
328.330	48.4	Н	82.2	-33.8	Peak	296	1.3		3660		
4653.330	55.0	V	82.2	-27.2	Peak	355	1.9		3660		
550.000	45.6	Н	82.2	-36.6	Peak	353	1.0		3662		
990.000 990.000	45.6 45.6	<u>н</u> Н	82.2 82.2	-30.0 -36.6	Peak	353 204	<u>1.0</u> 1.3		3662		
562.000	45.8 90.5	<u>н</u> Н	02.2	-30.0	Peak	204 182	1.3	Fundamenta			
660.830	90.3 47.7	<u> </u>	- 82.2	-34.5	Peak	354	1.5	FUIIUdIIIEIIId	<u>3662</u>		
1640.000	53.9	 	82.2 82.2	-34.5	Peak		1.9		3662		
040.000	00.7		02.2	20.0	T CUK	10	1.0		5002		
559.170	46.8	Н	82.2	-35.4	Peak	349	1.0		3665		
999.170	47.6	Н	82.2	-34.6	Peak	42	1.3		3665		
665.000	90.6	Н	-	-	Peak	190	1.3	Fundamenta	al 3665		
328.330	50.3	Н	82.2	-31.9	Peak	309	1.0		3665		
1666.670	52.4	V	82.2	-29.8	Peak	15	1.3		3665		
Note 1:					rence for radia		•	lenormed for	this channel since		





		Company							C Test	Data
Client:	Ubiquiti Netw	vorks						Job Number:		
Model:	NanoBridgel	M365 & Nan	oStationM36	5				Log Number:		
	,			•			Αссоι	unt Manager:	Susan Pelzl	
	Jennifer Sar									
Standard:	FCC 15B, 90	DZ, RSS						Class:	N/A	
Run #5: Ra	diated Spur	ious Emissi	ons, Transr	nit Mode: Si	ubstitution N	leasuremen	ts			
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		tion management	omonto	0"		[moocure:	anto			
Frequency		ution measur		Site	r measurem		eirp Limit	erp Limit	Margin	
MHz	Pin ¹	Gain ²	FS ³	Factor ⁴	eirp (dBm)		dBm	dBm	dB	
MHz	dBµV/m	v/h	Limit	Margin	Pk/QP/Avg	degrees	meters			
All signals	s were more i	than 20dB be	elow the com	puted FS lin	nit					
Note 1	Pin is the ing	ut nouver (di) to the or	hatitution on	toppo					
Note 1: Note 2:			/		A dipole has	a gain of 2 C				
Note 2: Note 3:					he substitutio		LUDI.			
Note 3: Note 4:					a field strengt		to an oirn in	dBm		
Note 5:	EUT field str				a lielu strenyt			udili.		

EMC Test Data

	An ZALED Company		
Client:	Ubiquiti Networks	Job Number:	J82268
Model	NanoBridgeM365 & NanoStationM365	T-Log Number:	T82413
wouer.		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

Elliott

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.

E		Dtt Art company						EM	C Test	t Data
Client:	Ubiquiti Net	works						Job Number:	J82268	
Madal	NonoDridgo		Ctation 12/	F			T-I	Log Number:	T82413	
wodel:	маповподе	M365 & Nano	0219110111130	5			Αссоι	unt Manager:	Susan Pelz	
Contact:	Jennifer Sa	nchez								
Standard:	FCC 15B, 9	0Z, RSS						Class:	N/A	
No modific Deviation No deviati Run #1: Ou	cations were s From Th ons were ma t put Power Date of Test:	e During To made to the ne Standar ade from the and Power S 3/11/2011 Rafael Varel	EUT during f d requirements Spectral Den	s of the stand	Systems	config. Used: nfig Change:				
Τe	est Location:		45			UT Voltage:				
Power	Software		Magaira	d Output Day	Та	tal ⁵			1	
Frequency		Modulation		d Output Po				Limit (dBm)	Max Power	Pass or Fa
(MHz) 5 <i>MHz Mod</i>	Setting ¹		Chain 1	Chain 2	Chain 3	mW	dBm		(W)	
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				2			F			.
Frequency	99 % ⁴	Modulation		SD ³ dBm/MI	Ηz		PSD⁵	Li	mit	Pass or Fa
(MHz)	BW	moudiation	Chain 1	Chain 2	Chain 3	mW/MHz	dBm/MHz			
5 MHz Mod	ò							1	1	
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 2: Note 3: Note 4: Note 5:	Output power power was i was configu PSD measu until the disp 99% Bandw For MIMO s linear terms Based on al	oove results,	using RBW= er the span (ted sweep si 3=1MHz, VB ew "peaks". d in accorda otal output po Power and P	100kHz VBV span > 2x ch uch that the a =3MHz, dete nce with RS2 ower and tota 2SD for all typ	V=300kHz , c lannel bandw analyzer was cotor = rms, s S GEN - RB al PSD are ca	letector = rm idth). Transi only sweepi weep time 10 > 1% of spar alculated form	mitted signal ng when the D seconds, m a and VB >=3 n the sum of D had highes	was not con device was t hax hold. Mu xRB the powers o t PSD and Po	tinuous but t ransmitting. Itiple sweeps f the individu	he analyze s were mad al chains (Higher
Note 6:		s had lower P					0			

EMC Test Data

(7 E	Elliott An DES [*] company	EM	C Test Data
Client:	Ubiquiti Networks	Job Number:	J82268
Madal	NanoBridgeM365 & NanoStationM365	T-Log Number:	T82413
would.	Natioditugewisos & Natiostationwisos	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

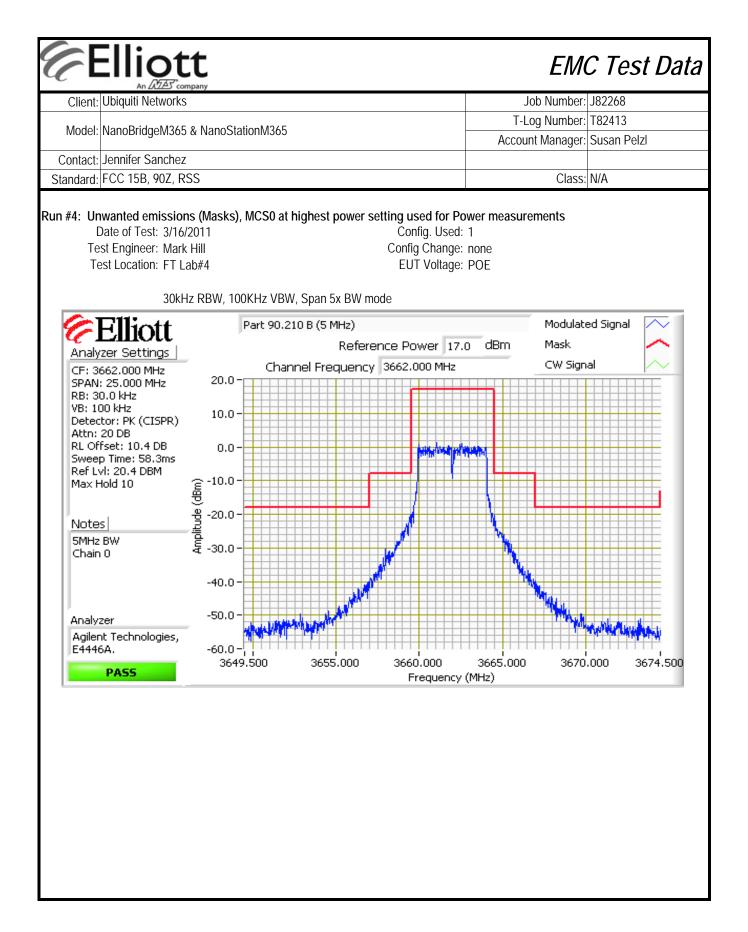
Limits from 90.321(a): Base and fixed stations are limited to 25 watts/25 MHz equivalent isotropically radiated power (EIRP). In any event, the peak EIRP power density shall not exceed 1 Watt in any one-megahertz slice of spectrum (30dBm/MHz).

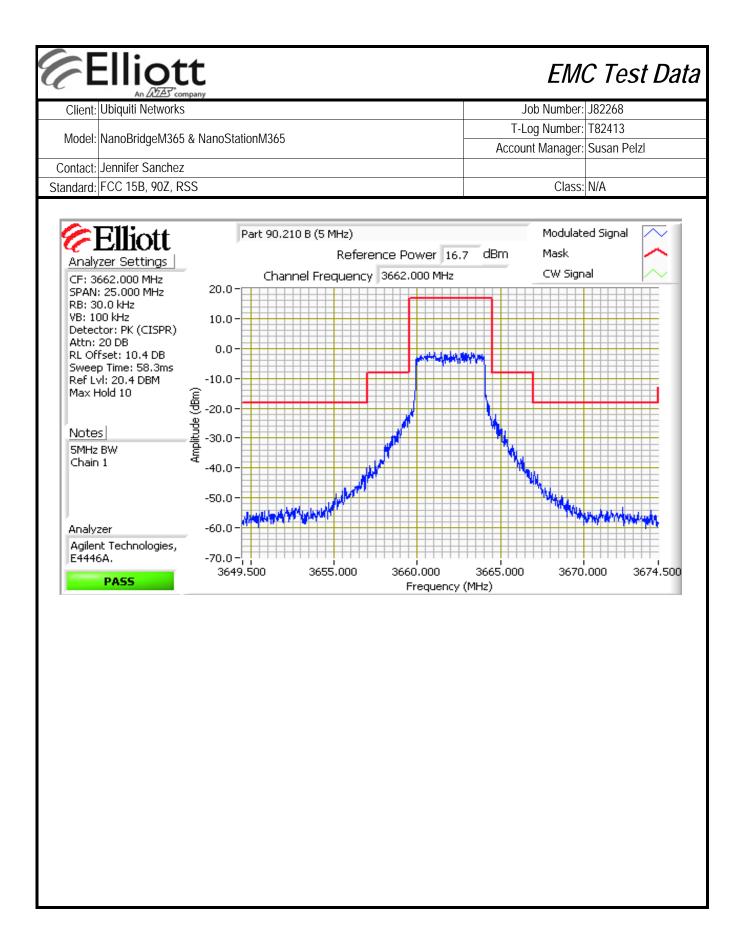
		Chain 1	Chain 2	Chain 3	Coherent	Effective ⁵	EIRP (mW)	EIRP (dBm)	
Antenna	a Gain (dBi):	13	13		Yes	16.0	5523.0	37.4	
it accounts	for maximu	m antenna g	gain at this p	ower settin	g.				
Software	Madulation	Measure	d Output Pov	wer ² dBm	To	otal	EIRP	Limit (eirp)	Deee or Fail
Setting ¹	wouldtion	Chain 1	Chain 2	Chain 3	mW	dBm	dBm	dBm	Pass or Fail
ò						•			
30, 27	MCS 0	15.3	16.1		74.6	18.7	34.7	44.0	PASS
30, 27	MCS 0	15.4	15.7		71.8	18.6	34.6	44.0	PASS
32, 28	MCS 0	15.9	16.1		79.5	19.0	35.0	44.0	PASS
de									
29, 26	MCS 0	15.0	15.6		67.9	18.3	34.3	44.0	PASS
31, 27	MCS 0	15.9	15.8		76.9	18.9	34.9	44.0	PASS
32, 27	MCS 0	16.0	15.8		78.0	18.9	34.9	44.0	PASS
de									
36, 31	MCS 0	17.1	17.7		110.7	20.4	36.5	44.0	PASS
36, 31	MCS 0	17.4	17.6		112.5	20.5	36.5	44.0	PASS
38, 34	MCS 0	18.3	18.5		138.4	21.4	37.4	44.0	PASS
de	-					-		-	
36, 33	MCS 0	17.0	17.9		112.7	20.5	36.5	44.0	PASS
	it accounts Software Setting ¹ 30, 27 30, 27 32, 28 de 29, 26 31, 27 32, 27 de 36, 31 36, 31 38, 34 de	Software Setting1 Modulation 30, 27 MCS 0 30, 27 MCS 0 30, 27 MCS 0 32, 28 MCS 0 de 29, 26 MCS 0 32, 27 MCS 0 32, 27 de 32, 27 MCS 0 36, 31 MCS 0 36, 31 38, 34 MCS 0 38, 34	Antenna Gain (dBi): 13 it accounts for maximum antenna g Modulation Measure Software Modulation Measure Setting ¹ Modulation Measure 30, 27 MCS 0 15.3 30, 27 MCS 0 15.4 32, 28 MCS 0 15.9 de MCS 0 15.9 31, 27 MCS 0 15.9 32, 27 MCS 0 15.9 32, 27 MCS 0 15.0 31, 27 MCS 0 15.9 32, 27 MCS 0 15.9 36, 31 MCS 0 17.1 36, 31 MCS 0 17.4 38, 34 MCS 0 18.3	Antenna Gain (dBi): 13 13 it accounts for maximum antenna gain at this postimal Modulation Measured Output Power Software Modulation Measured Output Power Chain 1 Chain 2 30, 27 MCS 0 15.3 16.1 30, 27 MCS 0 15.4 15.7 32, 28 MCS 0 15.9 16.1 de Modulation 15.0 15.6 31, 27 MCS 0 15.9 15.6 31, 27 MCS 0 15.9 15.8 32, 27 MCS 0 15.9 15.8 32, 27 MCS 0 17.1 17.7 36, 31 MCS 0 17.4 17.6 38, 34 MCS 0 18.3 18.5	Antenna Gain (dBi):1313it accounts for maximum antenna gain at this power settinSoftware Setting1ModulationMeasured Output Power2 dBm Chain 1Software Setting1ModulationMeasured Output Power2 dBm Chain 1Chain 230, 27MCS 015.316.130, 27MCS 015.415.732, 28MCS 015.916.1de29, 26MCS 015.932, 27MCS 015.915.832, 27MCS 016.015.8de36, 31MCS 017.136, 31MCS 017.417.638, 34MCS 018.318.5	Antenna Gain (dBi): 13 13 Yes it accounts for maximum antenna gain at this power setting. Modulation Measured Output Power ² dBm To Software Setting ¹ Modulation Measured Output Power ² dBm To 30, 27 MCS 0 15.3 16.1 74.6 30, 27 MCS 0 15.4 15.7 71.8 32, 28 MCS 0 15.9 16.1 79.5 de MCS 0 15.9 15.8 76.9 31, 27 MCS 0 15.9 15.8 76.9 32, 28 MCS 0 15.9 15.8 76.9 31, 27 MCS 0 15.9 15.8 76.9 32, 27 MCS 0 16.0 15.8 78.0 de MCS 0 17.1 17.7 110.7 36, 31 MCS 0 17.4 17.6 112.5 38, 34 MCS 0 18.3 18.5 138.4	Antenna Gain (dBi): 13 13 Yes 16.0 it accounts for maximum antenna gain at this power setting. Measured Output Power ² dBm Total Software Setting ¹ Modulation Measured Output Power ² dBm Total Mage Chain 1 Chain 2 Chain 3 mW dBm 30, 27 MCS 0 15.3 16.1 74.6 18.7 30, 27 MCS 0 15.4 15.7 71.8 18.6 32, 28 MCS 0 15.9 16.1 79.5 19.0 de January 16.1 79.5 19.0 January 16.1 January 17.5 January 17.5 31, 27 MCS 0 15.9 15.6 67.9 18.3 31, 27 MCS 0 15.9 15.8 76.9 18.9 32, 27 MCS 0 17.1 17.7 110.7 20.4 36, 31 MCS 0 17.4 17.6 112.5 20.5 38, 34 MCS 0 18.3 18.5 138.4 21.4	Antenna Gain (dBi): 13 13 Yes 16.0 5523.0 it accounts for maximum antenna gain at this power setting. Measured Output Power ² dBm Total EIRP Software Setting ¹ Modulation Measured Output Power ² dBm Total BIRP 30, 27 MCS 0 15.3 16.1 74.6 18.7 34.7 30, 27 MCS 0 15.4 15.7 71.8 18.6 34.6 32, 28 MCS 0 15.9 16.1 79.5 19.0 35.0 de 29, 26 MCS 0 15.9 15.6 67.9 18.3 34.3 31, 27 MCS 0 15.9 15.8 76.9 18.9 34.9 32, 27 MCS 0 15.9 15.8 78.0 18.9 34.9 de 36, 31 MCS 0 17.1 17.7 110.7 20.4 36.5 36, 31 MCS 0 17.4 17.6 112.5 20.5 36.5 36, 31 MCS 0 1	Antenna Gain (dBi): 13 13 Yes 16.0 5523.0 37.4 ait accounts for maximum antenna gain at this power setting. Software Setting ¹ Measured Output Power ² dBm Chain 1 Total Chain 2 Total MW EIRP dBm Limit (eirp) dBm 30, 27 MCS 0 15.3 16.1 74.6 18.7 34.7 44.0 30, 27 MCS 0 15.4 15.7 71.8 18.6 34.6 44.0 30, 27 MCS 0 15.9 16.1 79.5 19.0 35.0 44.0 32, 28 MCS 0 15.9 16.1 79.5 19.0 35.0 44.0 31, 27 MCS 0 15.9 15.8 76.9 18.9 34.9 44.0 36, 31 MCS 0 17.1 17.7 110.7 20.4 36.5 44.0 36, 31 MCS 0 17.4 17.6 112.5 20.5 36.5 44.0 36, 31 MCS 0 17.4 17.6

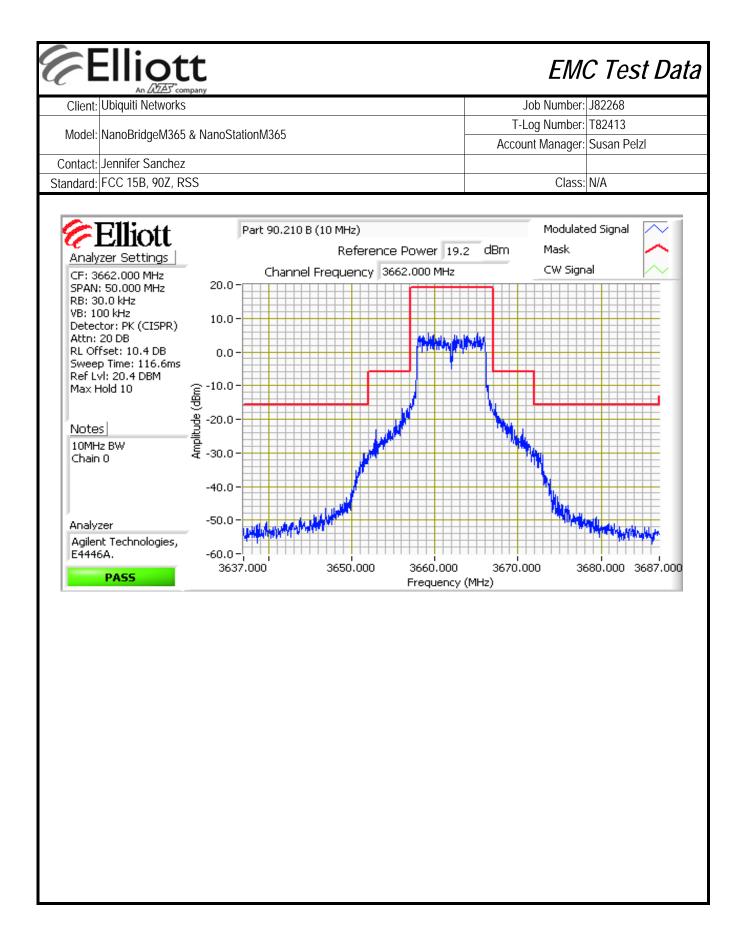
Cliont	Ubiquiti Net	company						Job Number:	182268	
Client.		WORKS						Log Number:		
Model:	NanoBridge	eM365 & Nano	StationM36	5				unt Manager:		
Contact:	Jennifer Sa	nchez						5		
Standard:	FCC 15B, 9	0Z, RSS						Class	N/A	
PSD Frequency	99% ⁴		D	SD ² dBm/Mł	J-7	Tota	PSD	PSD EIRP	Limit (eirp)	<u> </u>
(MHz)	99% BW	Modulation	P Chain 1	Chain 2	Chain 3	mW/MHz	dBm/MHz	dBm/MHz	dBm/MHz	Pass or Fa
5 MHz Mod					Chain 3		UDITI/IVIFIZ	UDITI/IVITIZ	UDITI/IVITIZ	L
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 Mo	de									
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
<u>20 MHz Mo</u>		M00.0	F 0	()		7.0	0.0	25.0	20.0	DACC
3660	16.8	MCS 0	5.8	6.2		7.9	9.0	25.0	30.0	PASS
3662 3665	16.8 16.8	MCS 0 MCS 0	5.9 7.0	6.0 7.0		7.9 9.9	9.0 10.0	25.0 26.0	30.0 30.0	PASS PASS
25 MHz Mo		10103.0	7.0	7.0		7.7	10.0	20.0	30.0	FA33
3662	21.1	MCS 0	4.8	5.4		6.5	8.1	24.1	30.0	PASS
Note 2: Note 3:	Output pow power was was configu the channel The psd wa max hold. I is provided 99% Bandw For MIMO s linear terms mode of the the limits is chain. If the	ng is the softw er measured integrated ove ured with a gai with the high is measured u Multiple sweep below. width measure systems the to systems the to systems the to systems the to systems the to the highest ga e signals are of the product o	using RBW= er the span (ted sweep si est power is using the follo os were mace d in accorda tal output po ha gain used e. If the sign ain of the inc coherent the	100kHz VBV span > 2x ch uch that the a provided bel owing analyz le until the di nce with RSS wer and tota I to determine tals on the no lividual chain n the effectiv	V=300kHz , c annel bandw analyzer was ow. er settings: splay had no <u>S GEN - RB</u> I PSD are ca e the EIRP a on-coherent t is and the EI e antenna ga	letector = rm ridth). Transi only sweepi RB=1MHz, V new "peaks" > 1% of spar ilculated form nd limits for F petween the t RP is the sur	mitted signal ng when the B=3MHz, de '. The plot for and VB >=3 the sum of PSD/Output transmit chai n of the prod	was not con device was t tector = rms, or the channe BXRB the powers c power depen ns then the ucts of gain a	tinuous but the ransmitting. sweep time of the individue ds on the op- gain used to and power or	ne analyzer The plot for 10 seconds hest power al chains (i erating determine n each
Note 6		9, Chain $1 = J$		o guin ana tu						
	5.000 0	., enam i *3								

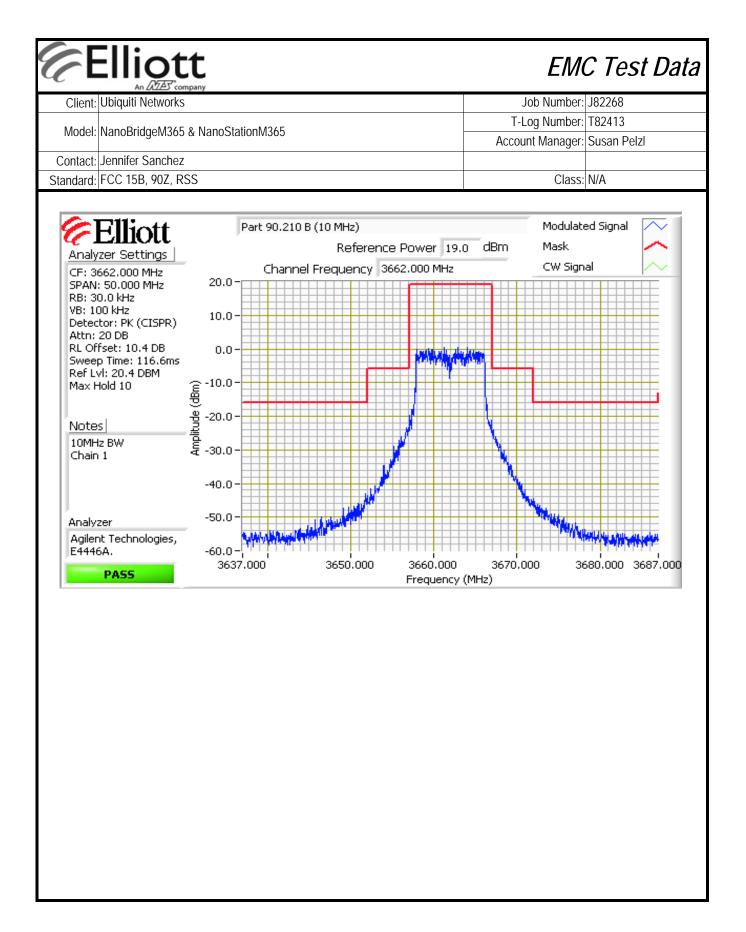
Model:	Ubiquiti Net	works						Job Number:		
	NanoBridge	M365 & Nand	oStationM36	5			T-Log Number: T82413 Account Manager: Susan Pelzl			
Contact:	Jennifer Sa	nchez					Acco	unt manager.		
	FCC 15B, 9							Class:	N/A	
imits from 9 he peak EIF E Te	90.321(a): Ba RP power de Date of Test:	Rafael Varel	stations are t exceed 1 W	limited to 25	watts/25 MF ne-megahertz Cor	Iz equivalent	ctrum (30dB 1 none		ver (EIRP). Ir	n any even
	Antonn		Chain 1	Chain 2	Chain 3	Coherent	Effective ⁵		EIRP (dBm)]
Power - Lim		a Gain (dBi): 5 for maximu	21 m antenna (21 nain at this r	nower settin	Yes	24.0	17465.3	42.4	
Frequency (MHz)	Software Setting ¹	Modulation		d Output Pov Chain 2			otal dBm	EIRP dBm	Limit (eirp) dBm	Pass or F
5 MHz Mod	0	<u> </u>								
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
0 MHz Mo				-			•	-		
3655	23,18	MCS 0	11.8	11.3		28.6	14.6	38.6	44.0	PASS
	23,18	MCS 0	11.7	11.3		28.3	14.5	38.5	44.0	PASS
3662	23,19	MCS 0	11.5	11.6		28.6	14.6	38.6	44.0	PASS
3662 3670								T		
3662 3670 20 MHz Mo						52.0	17.2	41.2	44.0	PASS
3662 3670 20 MHz Moo 3660	27,24	MCS 0	14.1	14.2						
3662 3670 20 MHz Moo 3660 3662	27,24 28,25	MCS 0	14.4	14.6		56.4	17.5	41.5	44.0	PASS
3662 3670 20 MHz Moo 3660 3662 3665	27,24 28,25 28,24						17.5 17.4	41.5 41.4	44.0 44.0	
3662 3670 20 MHz Moo 3660 3662	27,24 28,25 28,24	MCS 0	14.4	14.6		56.4				PASS PASS PASS

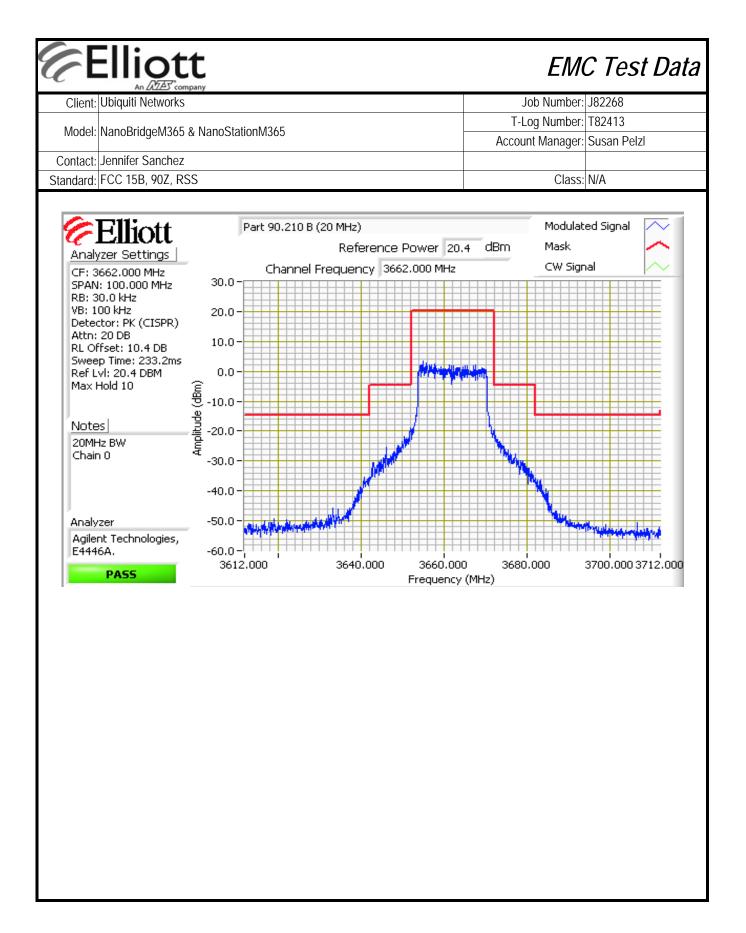
Client	Ubiquiti Ne	tworks						Job Number:	J82268	
				_				Log Number		
Model:	NanoBridge	eM365 & Nano	StationM36	5				unt Manager:		
Contact	Jennifer Sa	nchez								
Standard	FCC 15B, 9	90Z, RSS						Class	: N/A	
PSD Frequency	99 % ⁴		P	SD ² dBm/Mł	47	Tota	I PSD	PSD EIRP	Limit (eirp)	
(MHz)	BW	Modulation	Chain 1	Chain 2	Chain 3	mW/MHz	dBm/MHz	dBm/MHz	dBm/MHz	Pass or Fa
5 MHz Moa			Ondin 1		Ondin 5	11100/101112	dDin/minz	dDin/iviniz	dDin/iviniz	
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 Mo							•		-	
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 20 MHz Mo	8.5	MCS 0	2.9	2.8		3.9	5.9	29.9	30.0	PASS
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 Mo										
3662	20.9	MCS 0	3.2	2.6		3.9	5.9	29.9	30.0	PASS
Noto 1.	Dowor cotti	ng is the softw	aro cotting	ucod to cot th		vor				
Note 1:		ver measured					is sween tim	e 10 second	s max hold	The total
		integrated over	0							
Note 2:	•	ured with a gai		•			•			5
	0	I with the high	•		5	, <u>, , , , , , , , , , , , , , , , , , </u>	5		5	- F
		as measured u	•		•				•	
Note 3:		Multiple swee	os were mad	le until the di	splay had no	new "peaks	". The plot for	or the channe	el with the hig	ghest power
	is provided					10/ 0				
Note 4:		vidth measure							f the individu	ial ahaina /i
		systems the to s). The antenr								
		e MIMO device								
		the highest ga								
Note 5:		e signals are o								
Note 5:	chain. If th				•					
Note 5:		the product o	t the effectiv	e yanı anu il	nui pomon					

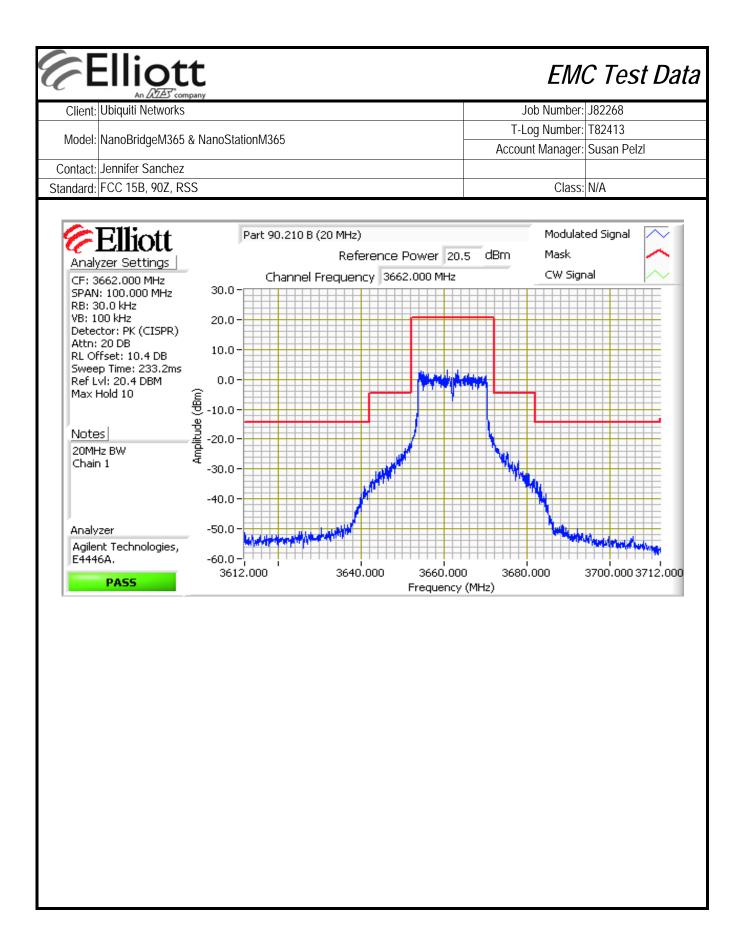


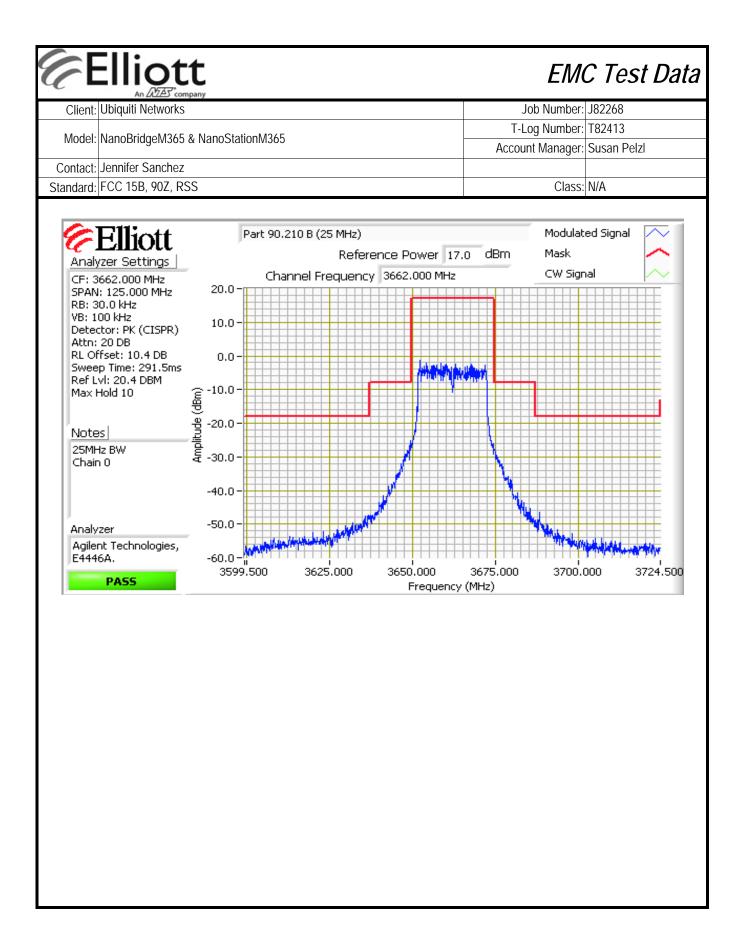


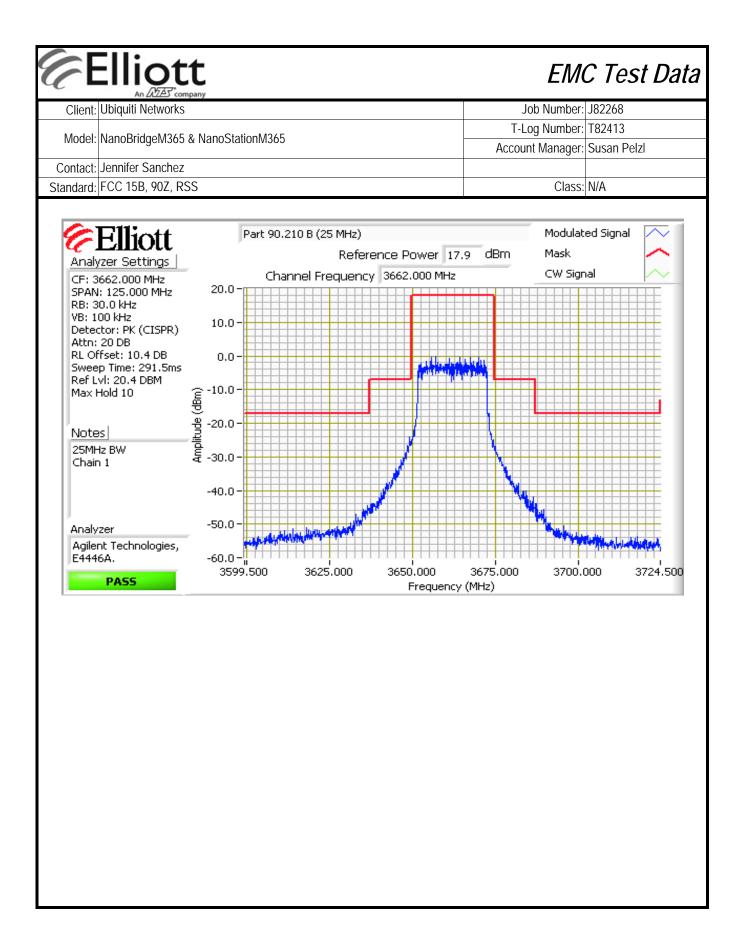


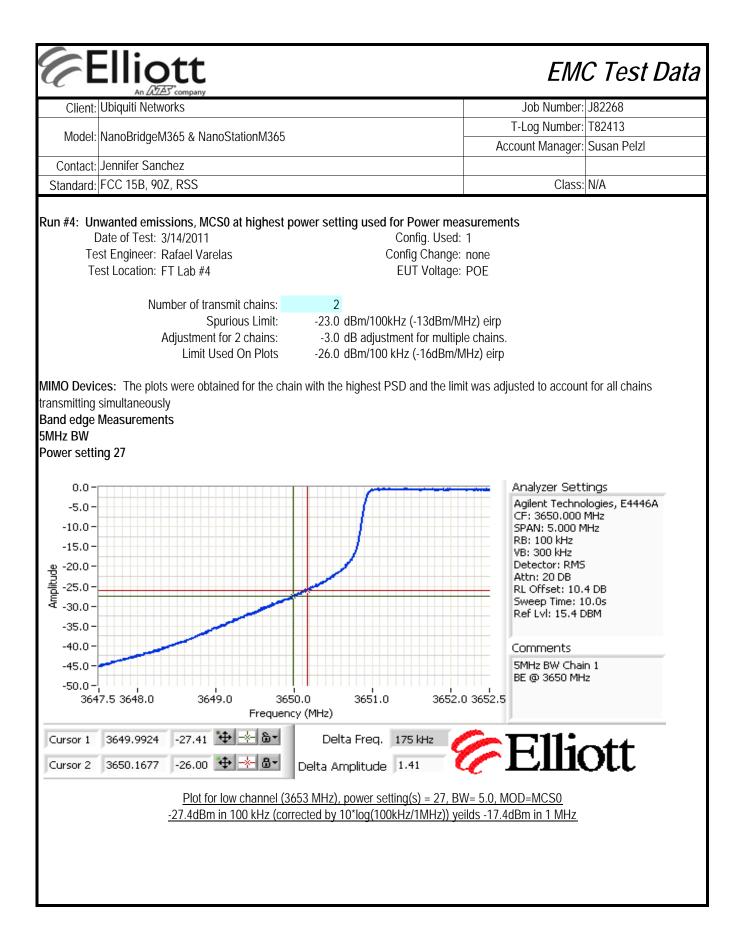


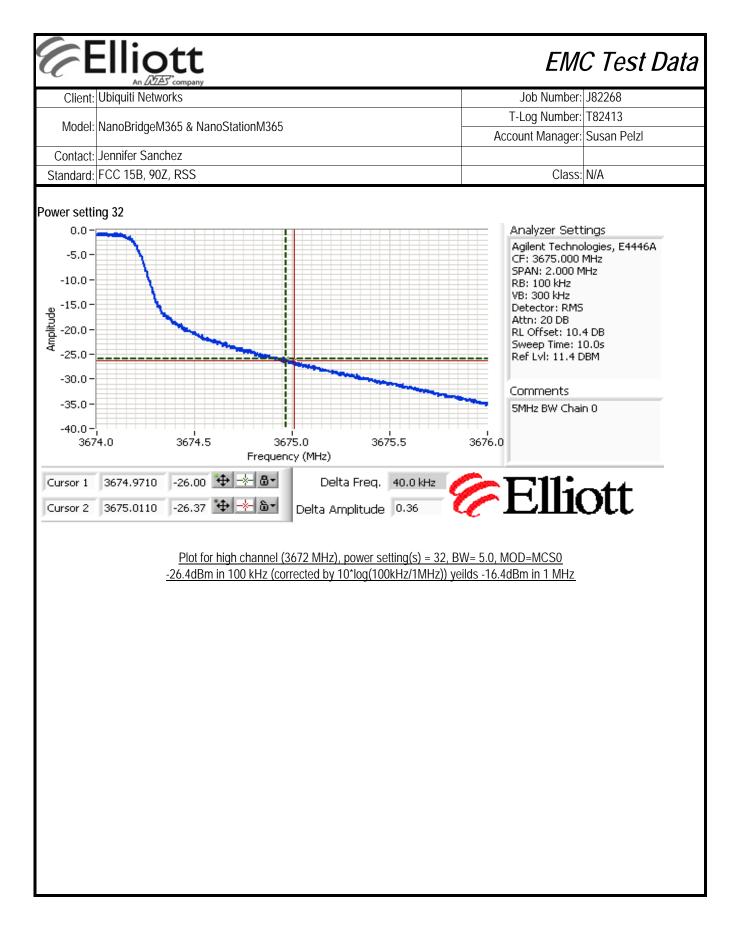


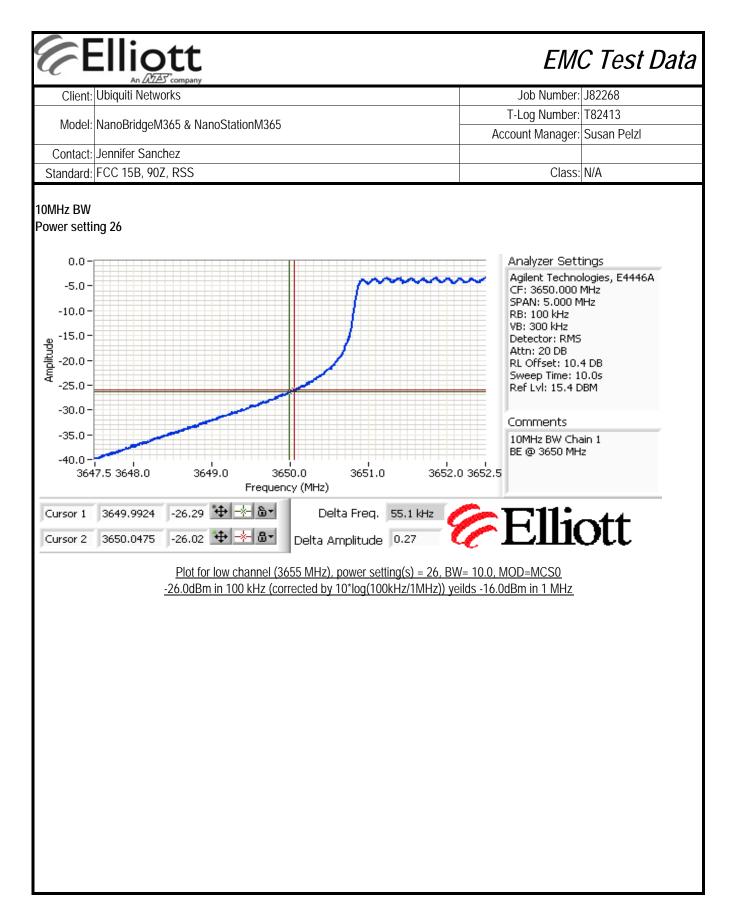


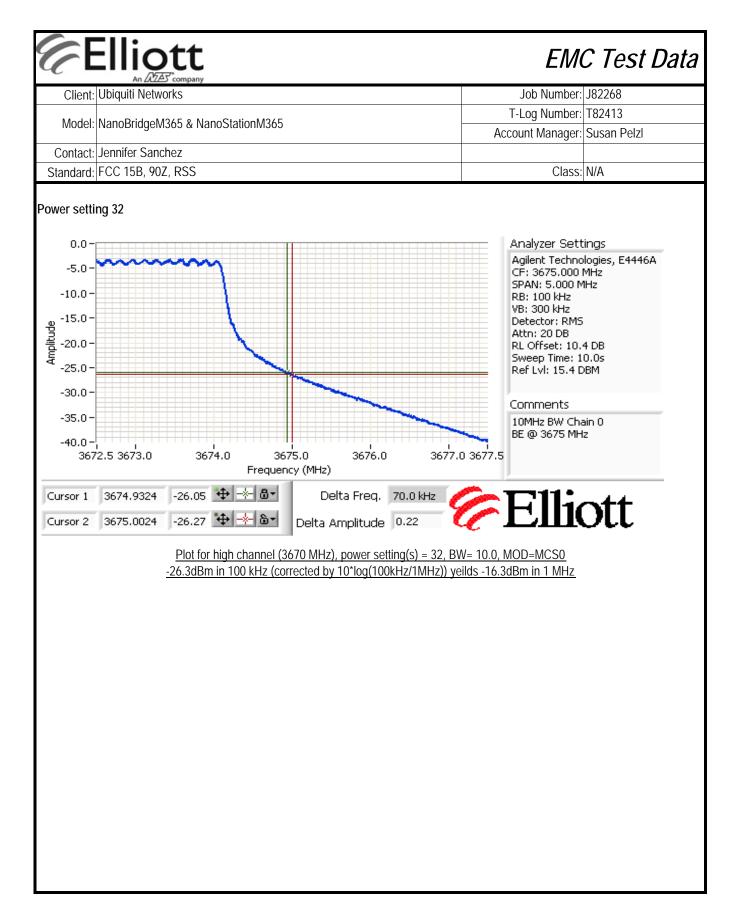


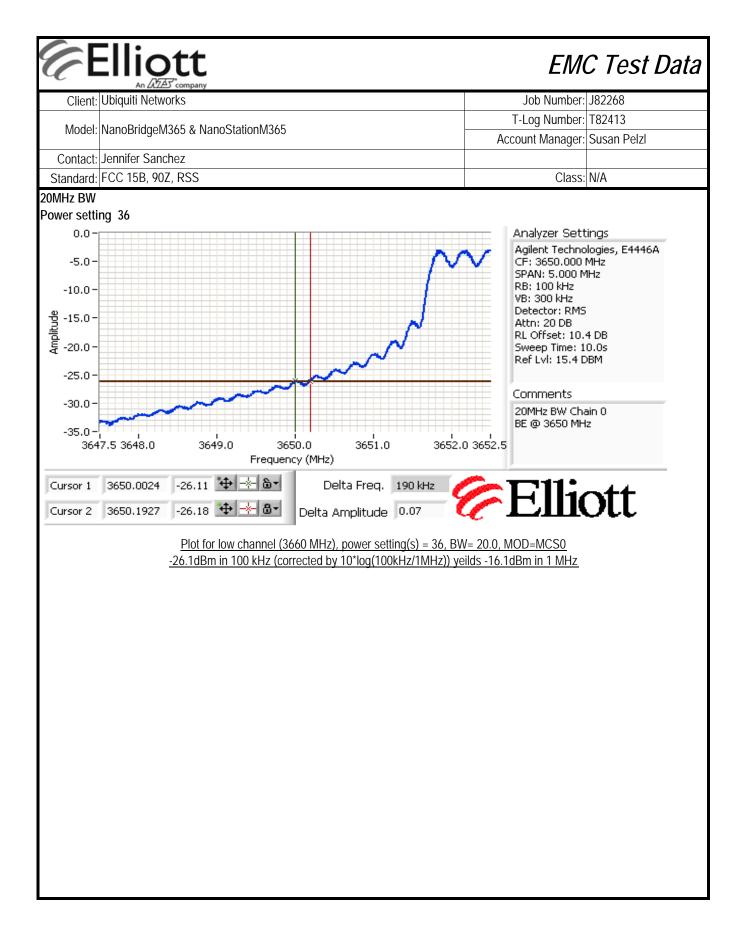


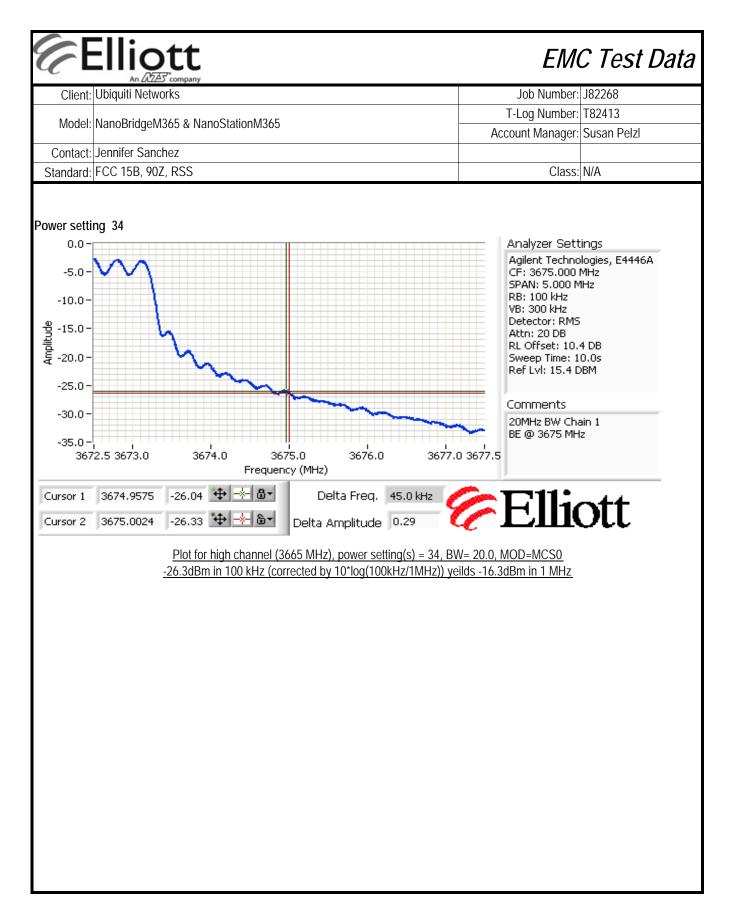


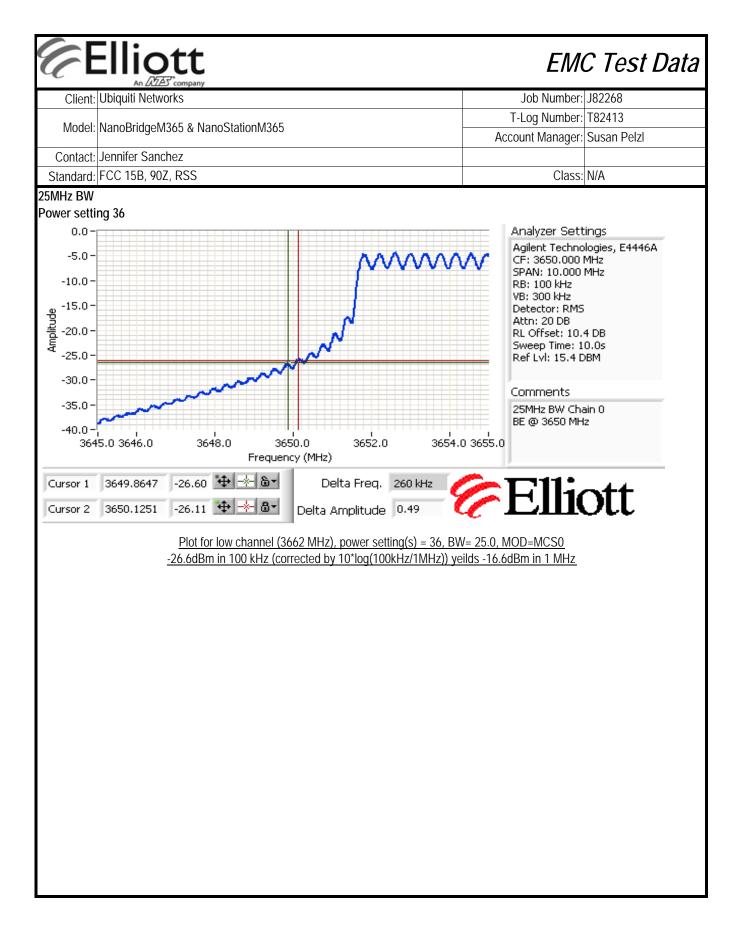


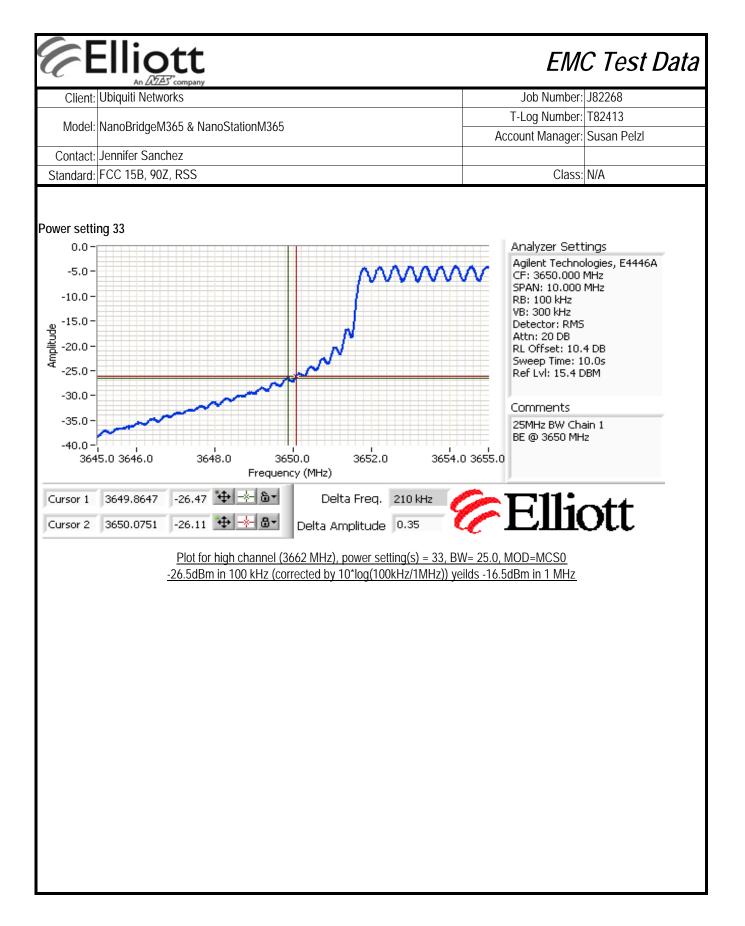


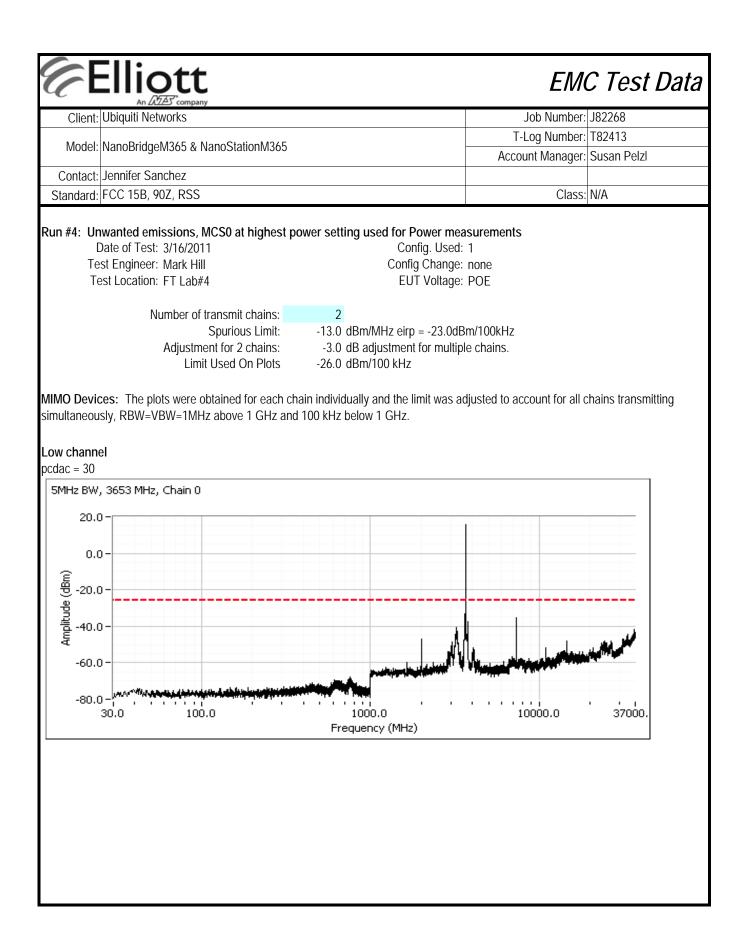


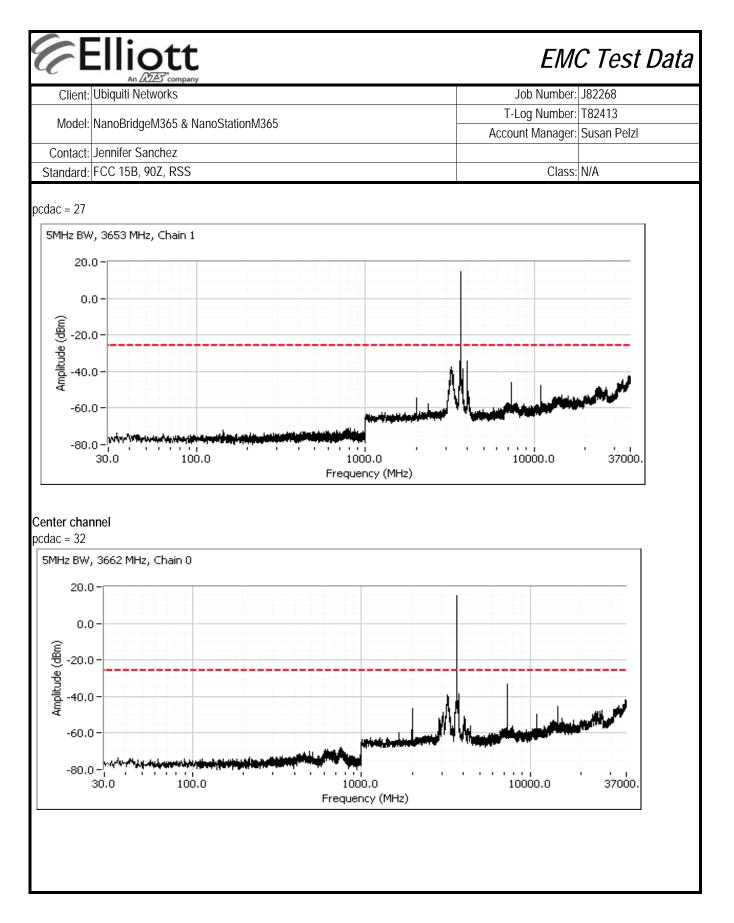


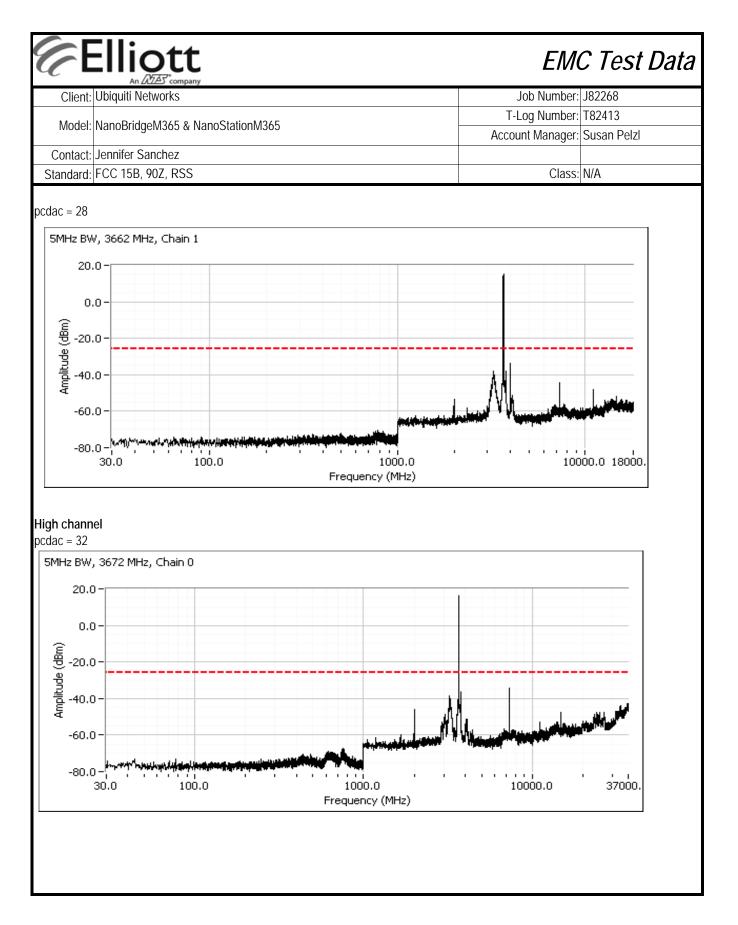


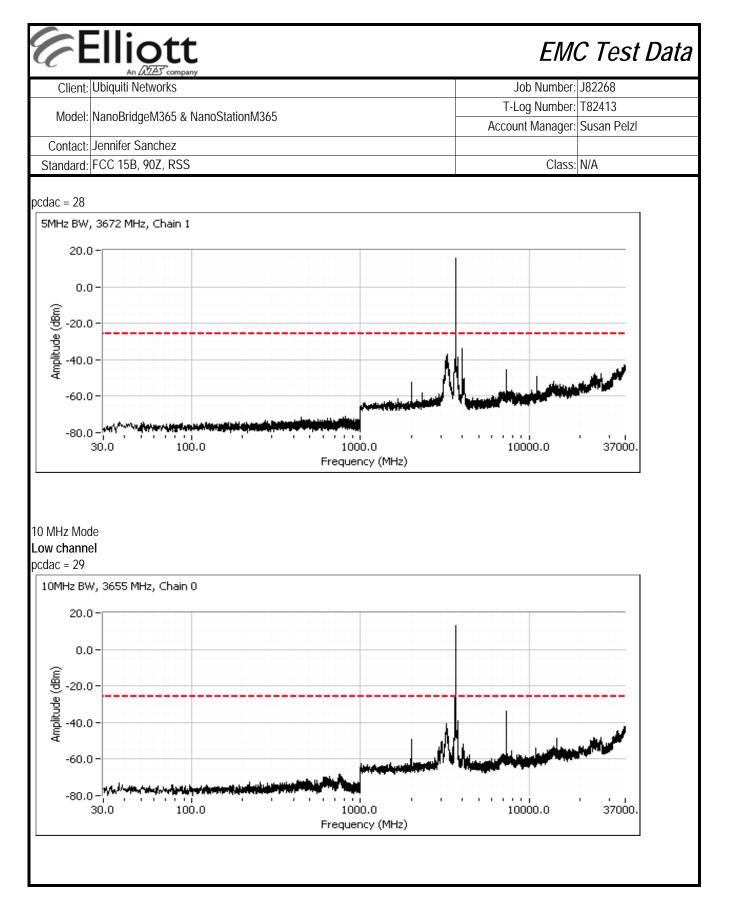


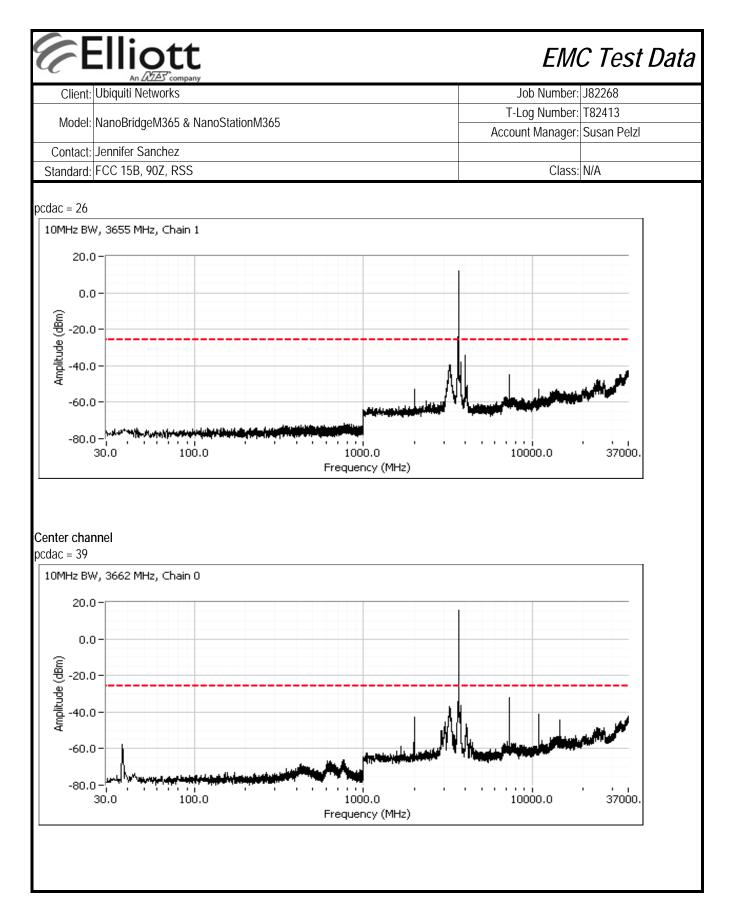


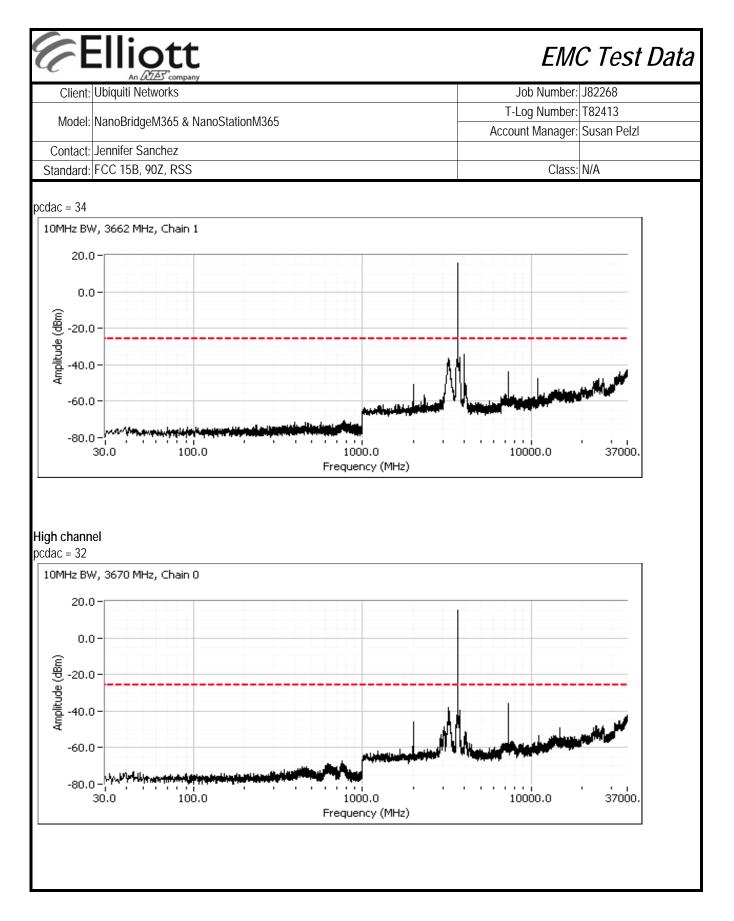


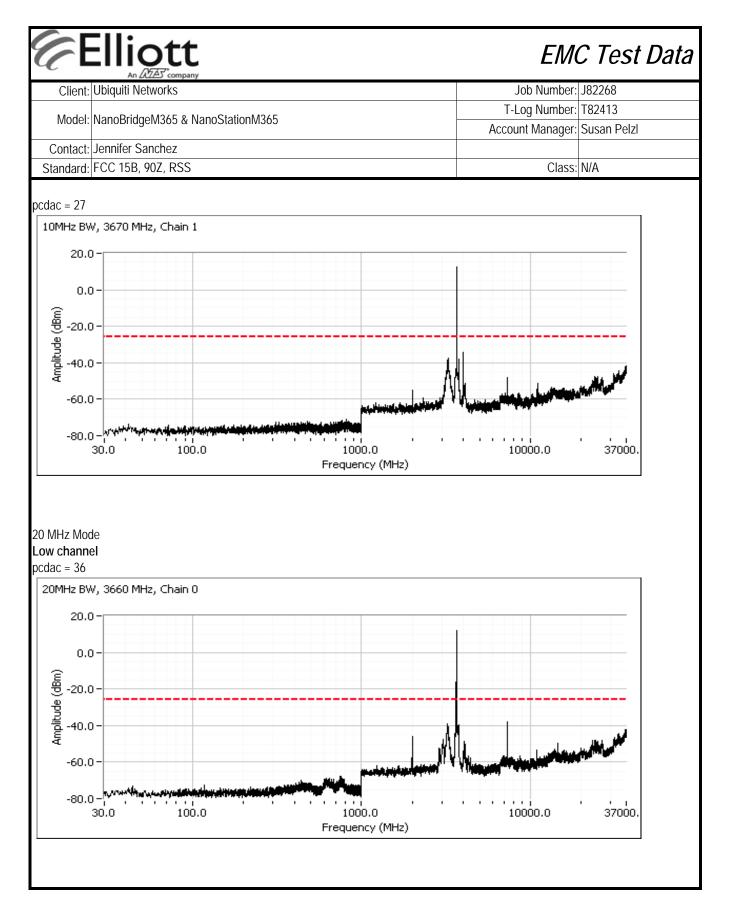


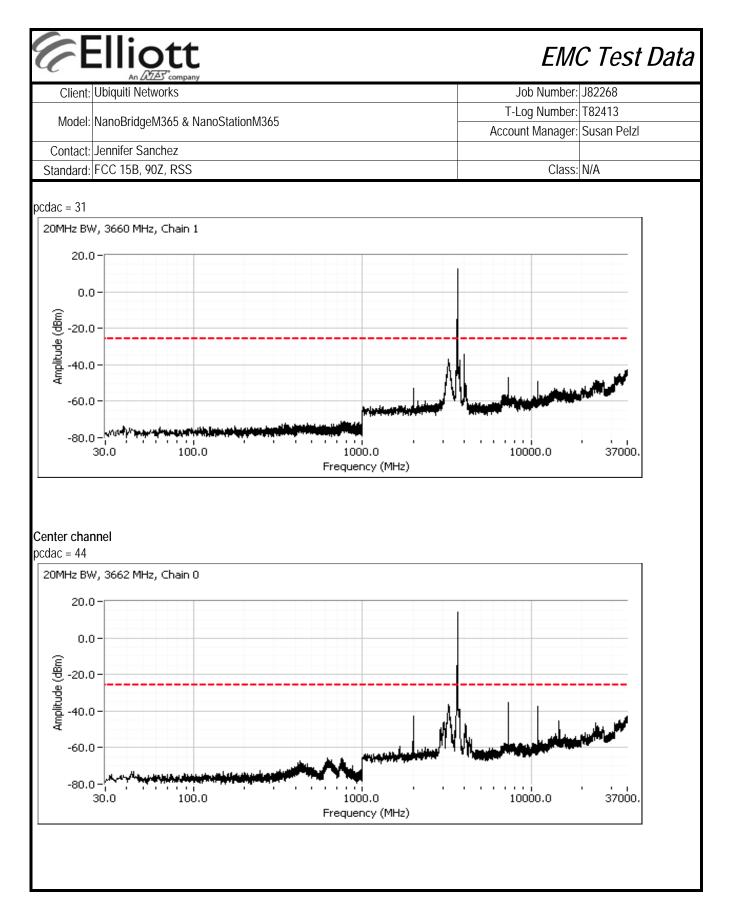


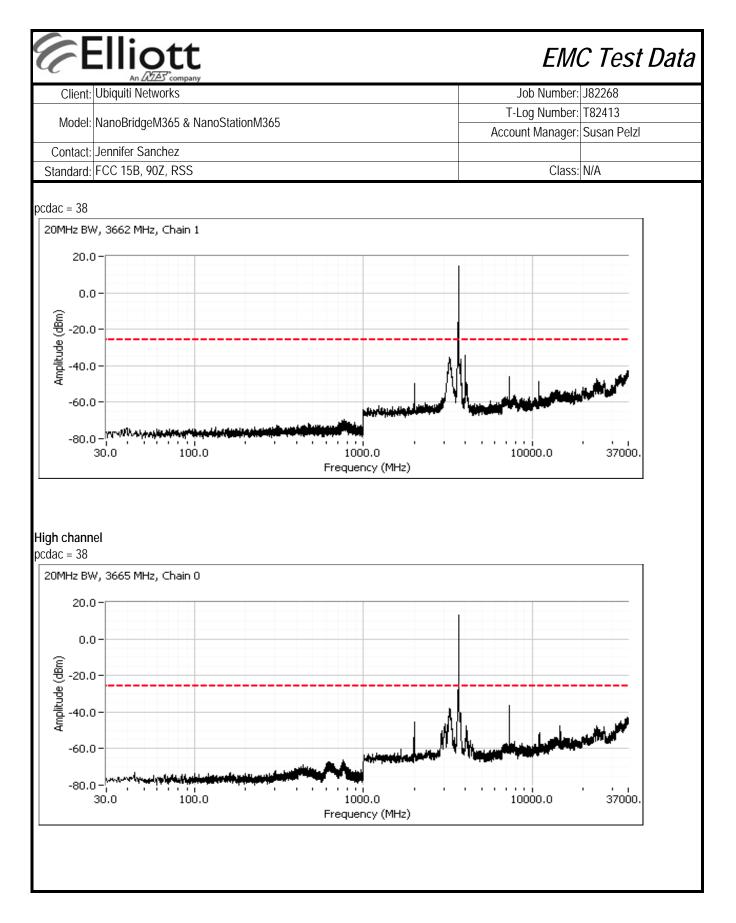


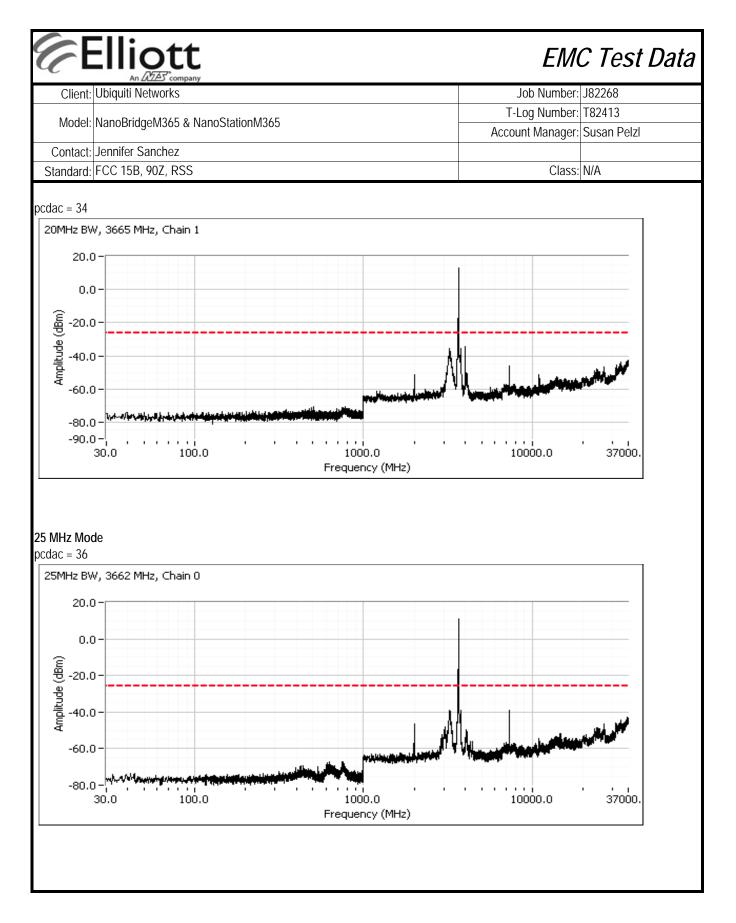


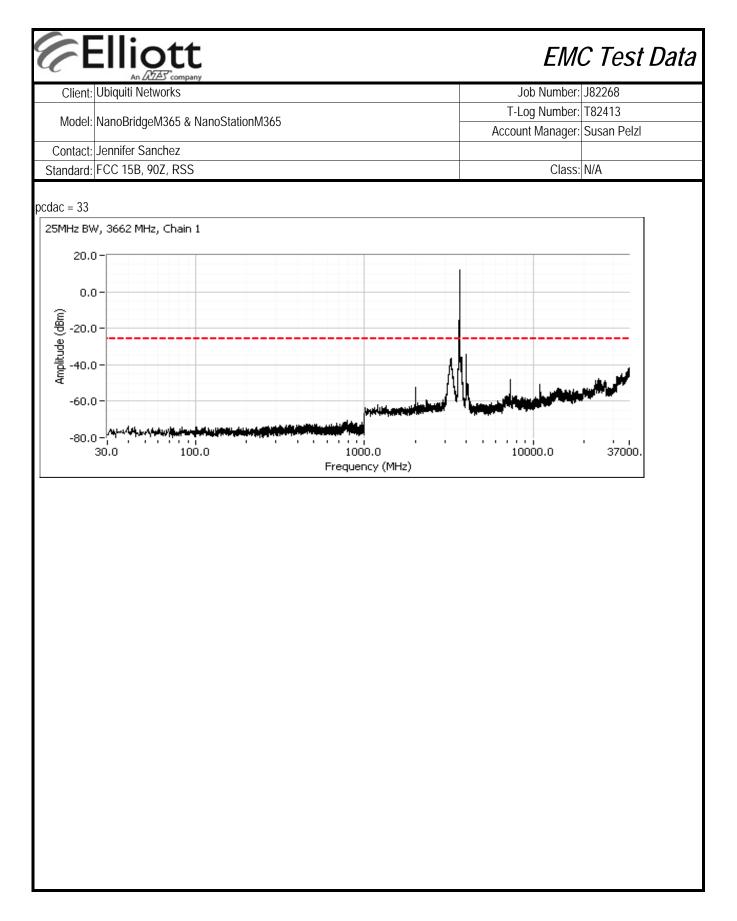












E					EMO	C Test Da
Client:	Ubiquiti Netv	vorks			Job Number:	J82268
Model	NonoDridge	124E 9 NoneStationN24E		T-Log Number		T82413
wodel:	manosnagel	W365 & NanoStationM365		Αссоι	Int Manager:	Susan Pelzl
Contact:	Jennifer Sar	ichez				
Standard:	FCC 15B, 90	DZ, RSS			Class:	N/A
·	Objective:	The objective of this test session is specification listed above.	to perform final qualificatio	on testing of th	e EUT with r	espect to the
	n #	S Test Performed	Limit	Pass / Fail	Result / Mar	ain
	2	Power, NanoStation	RSS-197	Pass	5 MHz: 34.8 10 MHz: 33. 20 MHz: 36. 25 MHz: 36.	dBm 0 dBm 7 dBm
2	2	PSD, NanoStation	1 Watt/MHz RSS-197	Pass	5 MHz: 28.7 10 MHz: 24. 20 MHz: 25. 25 MHz: 24.	3 dBm/MHz 0 dBm/MHz
	3	Power, NanoBridge	RSS-197	Pass	5 MHz: 35.8 10 MHz: 38. 20 MHz: 41. 25 MHz: 42.	4 dBm 5 dBm 3 dBm
3	3	PSD, NanoBridge	1 Watt/MHz RSS-197	Pass	5 MHz: 29.8 10 MHz: 29. 20 MHz: 29. 25 MHz: 29.	7 dBm/MHz 8 dBm/MHz
2	1	Antenna Conducted Out of Band Spurious	-13dBm/MHz	Pass	All emission -13dBm/MH	s below the

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.

6		D tt						EMO	C Tesi	' Data
Client:	Ubiquiti Net	works						Job Number:	J82268	
			0	-			T-	Log Number:	T82413	
Model:	NanoBridge	M365 & Nano	StationM36	5			Αссоι	unt Manager:	Susan Pelz	
Contact:	Jennifer Sar	nchez								
Standard:	FCC 15B, 9	0Z, RSS						Class:	N/A	
No modific Deviation	cations were s From Th	e During Te made to the ne Standar ade from the r	EUT during t	Ū	lard.					
E Te Te	ate of Test:	Rafael Varel		sity - MIMO	C Coi	onfig. Used: nfig Change: UT Voltage:	none			
Power	Software		Magaura		uar ² dDm	Та	1-1 ⁵	1	May Dawar	
Frequency		Modulation		d Output Po			otal ⁵	Limit (dBm)	Max Power	Pass or Fa
(MHz)	Setting ¹		Chain 1	Chain 2	Chain 3	mW	dBm	. ,	(W)	
5 <i>MHz Mod</i> 3662	20	MCS0	13.3	15.6		57.7	17.6	1		1
3662	20	MCS4	13.1	15.0		54.3	17.3	-	_	-
3662	20	MCS7	13.2	15.4		55.6	17.4	-		-
PSD Frequency	99 % ⁴		D	SD ³ dBm/MF	17	Total	PSD ⁵	Lii	mit	
(MHz)	99% BW	Modulation	Chain 1	Chain 2	Chain 3	mW/MHz	dBm/MHz			Pass or Fa
(IVITIZ) 5 MHz Mode				Chain Z	Cridin 3		UDITI/IVIEZ			
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 2:	Output power was i	ng is the softw er measured ntegrated ove	using RBW= er the span (100kHz VBV span > 2x ch	V=300kHz , c annel bandw	letector = rm idth). Trans	mitted signal	was not cont	tinuous but t	
Note 3:	PSD measu until the disp	red with a gain red using RE blay had no n	3=1MHz, VB ew "peaks".	=3MHz, dete	ctor = rms, s	weep time 1	0 seconds, m	nax hold. Mu	ransmitting. Itiple sweeps	s were mad
Noto 5:		idth measure ystems the to).							f the individu	al chains (
Note 6:	Based on al	bove results, had lower P		5.			•			•

EMC Test Data

(7 E	Elliott An DES [*] company	EMC Test Data			
Client:	Ubiquiti Networks	Job Number:	J82268		
Madal	NanoBridgeM365 & NanoStationM365	T-Log Number:	T82413		
would.	Natioditugewisos & Natiostationwisos	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	a Gain (dBi):	13	13		Yes	16.0	4710.8	36.7	
Power - Lin	nit accounts	for maximu	m antenna g	gain at this p	oower settin	ıg.				-
Frequency	Software	Modulation	Measure	d Output Po	wer ² dBm	To	otal	EIRP	Limit (eirp)	Pass or Fail
(MHz)	Setting ¹	wouldtion	Chain 1	Chain 2	Chain 3	mW	dBm	dBm	dBm	rass ui raii
5 MHz Mod	9				-	-	-		-	
3697	31, 28	MCS 0	15.8	15.7		75.2	18.8	34.8	44.0	PASS
10 MHz Mo	de									
3695	28, 25	MCS 0	14.0	14.0		50.2	17.0	33.0	44.0	PASS
20 MHz Mo	de									
3690	36, 33	MCS 0	17.4	18.0		118.0	20.7	36.7	44.0	PASS
25 MHz Mo	de									
3688	36, 33	MCS 0	17.5	17.7		115.1	20.6	36.6	44.0	PASS

(MHz) I 5 MHz Mode 3697 10 MHz Mode 3695 3695 10 MHz Mode	oBridgeM nifer Sanc 15B, 902	5 [°] company prks 365 & Nanc hez		5 SD ² dBm/MF Chain 1		Total	T-I Accou	Job Number: .og Number: Int Manager: Class:	T82413 Susan Pelzl	
Model: Nand Contact: Jenn Standard: FCC PSD Frequency 9 (MHz) H 5 MHz Mode 3697 10 10 MHz Mode 3695 20 20 MHz Mode 3690 1	oBridgeM nifer Sanc 2 15B, 902 2 99% ⁴ BW	365 & Nanc hez Z, RSS Modulation	P	SD ² dBm/Mł		Total	T-I Accou	og Number: Int Manager: Class:	T82413 Susan Pelzl	
Contact: Jenn Standard: FCC PSD Frequency 9 (MHz) H 5 MHz Mode 3697 10 MHz Mode 3695 20 MHz Mode 3690 1	hifer Sanc 2 15B, 902 99% ⁴ BW № 4.2	hez Z, RSS Modulation	P	SD ² dBm/Mł		Total	Ассон	nt Manager: Class:	Susan Pelzl	
Standard: FCC PSD Frequency 9 (MHz) 1 5 MHz Mode 3697 10 MHz Mode 3695 20 MHz Mode 3690 1	2 15B, 902 99% ⁴ BW № 4.2	Z, RSS Modulation				Total			N/A	
Standard: FCC PSD Frequency 9 (MHz) 1 5 MHz Mode 3697 10 MHz Mode 3695 20 MHz Mode 3690 1	2 15B, 902 99% ⁴ BW № 4.2	Z, RSS Modulation				Total			N/A	
PSD Frequency 9 (MHz) 1 5 MHz Mode 3697 3695 3 20 MHz Mode 3 3690 1	99% ⁴ BW	Nodulation				Total	DOD			
Frequency 9 (MHz) I 5 MHz Mode 3697 3697 4 3695 3 20 MHz Mode 3 3690 1	BW 4.2					Tota	DOD			
(MHz) I 5 MHz Mode 3697 10 MHz Mode 3695 3695 10 MHz Mode 3695 3695 10 MHz Mode 3695 3690 11 MHz Mode	BW 4.2					Tota	DOD			
5 MHz Mode 3697 10 MHz Mode 3695 20 MHz Mode 3690	4.2		Chain 0	Chain 1			PSD	PSD EIRP	Limit (eirp)	Pass or Fail
3697 10 MHz Mode 3695 20 MHz Mode 3690		MCS 0			Chain 2	mW/MHz	dBm/MHz	dBm/MHz	dBm/MHz	1 433 01 1 41
10 MHz Mode 3695 3 20 MHz Mode 3 3690 1		MCS 0								
3695 20 MHz Mode 3690 1	8.5		9.7	9.7		18.7	12.7	28.7	30.0	PASS
20 MHz Mode 3690 1	8.5									
3690 1		MCS 0	5.3	5.2		6.7	8.3	24.3	30.0	PASS
						-	-			
25 MHz Modo	16.8	MCS 0	5.7	6.3		8.0	9.0	25.0	30.0	PASS
3688 2	20.9	MCS 0	4.8	5.2		6.3	8.0	24.0	30.0	PASS
					ne output pow		+!	. 10		The total
	•		•		V=300kHz,d		•			
		•		•	annel bandw		•			5
	•	0	•		analyzer was	only sweep	ng when the	device was li	ransmilling.	The plot for
	ned was u	<u>nin ine nigne</u> moasurod u	est power is	provided bel	ow. er settings: F		B-3MH2 do	toctor - rms	swoon timo	10 soconds
					splay had no					
	ovided be				spiay hau no	пем реакз			n with the hig	nesi powei
			d in accorda	nce with RS9	S GEN - RB :	> 1% of spar	and VB $>=3$	xRB		
					I PSD are ca				f the individu	al chains (in
					e the EIRP ar					
mod	le of the N	IIMO device	e. If the sign	als are non-o	coherent betw	ween the trar	nsmit chains	then the gair	n used to det	ermine the
Note 5: limits	s is the hi	ghest gain c	of the individ	ual chains ar	nd the EIRP i	s the sum of	the products	of gain and	power on ea	ch chain. If
					a gain is the s					
				d total power				-		
Note 6 Chai	in 0 = J9,	Chain 1 = J	10.							

EMC Test Data

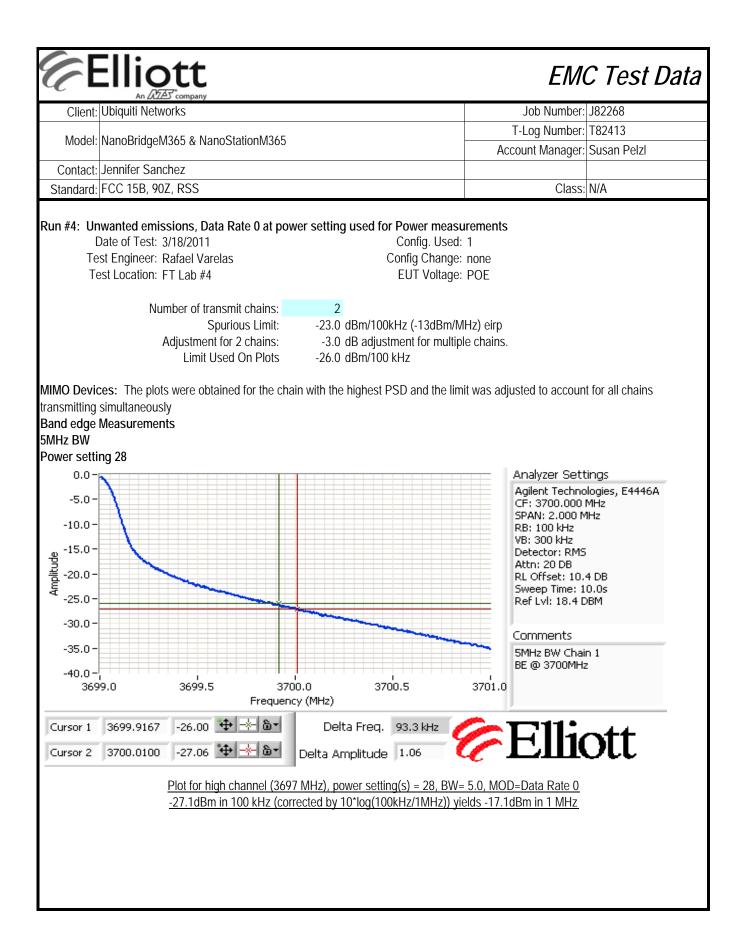
(7 E	Elliott An DES [*] company	EMC Test Data			
Client:	Ubiquiti Networks	Job Number:	J82268		
Madal	NanoBridgeM365 & NanoStationM365	T-Log Number:	T82413		
would.	Natioditugewisos & Natiostationwisos	Account Manager:	Susan Pelzl		
Contact:	Jennifer Sanchez				
Standard:	FCC 15B, 90Z, RSS	Class:	N/A		

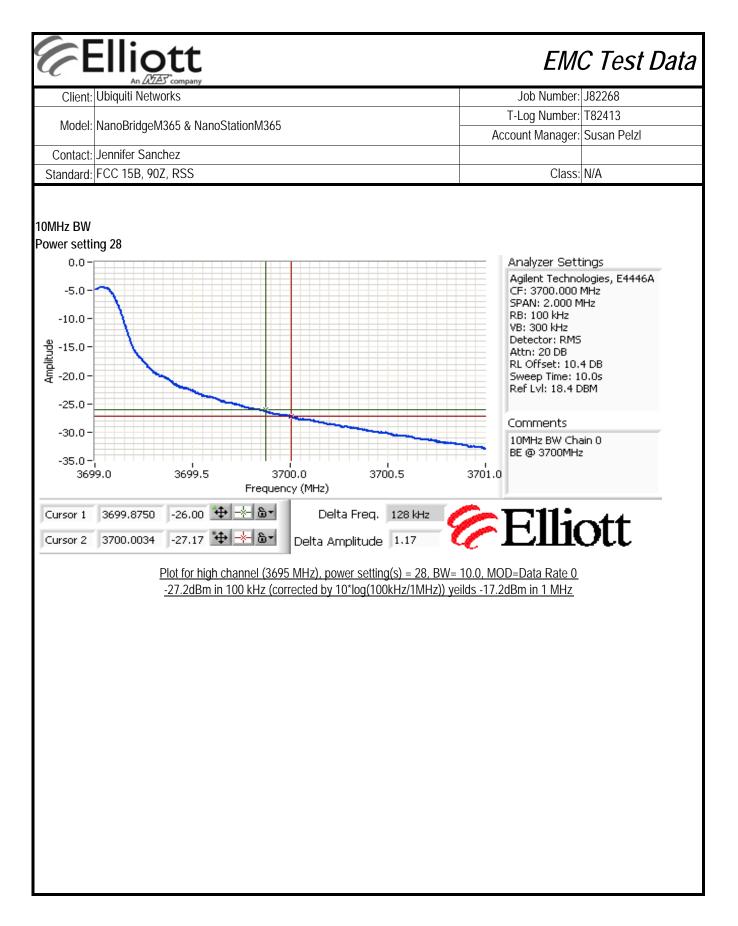
Run #3: Bandwidth, Output Power and Power Spectral Density - MIMO Systems

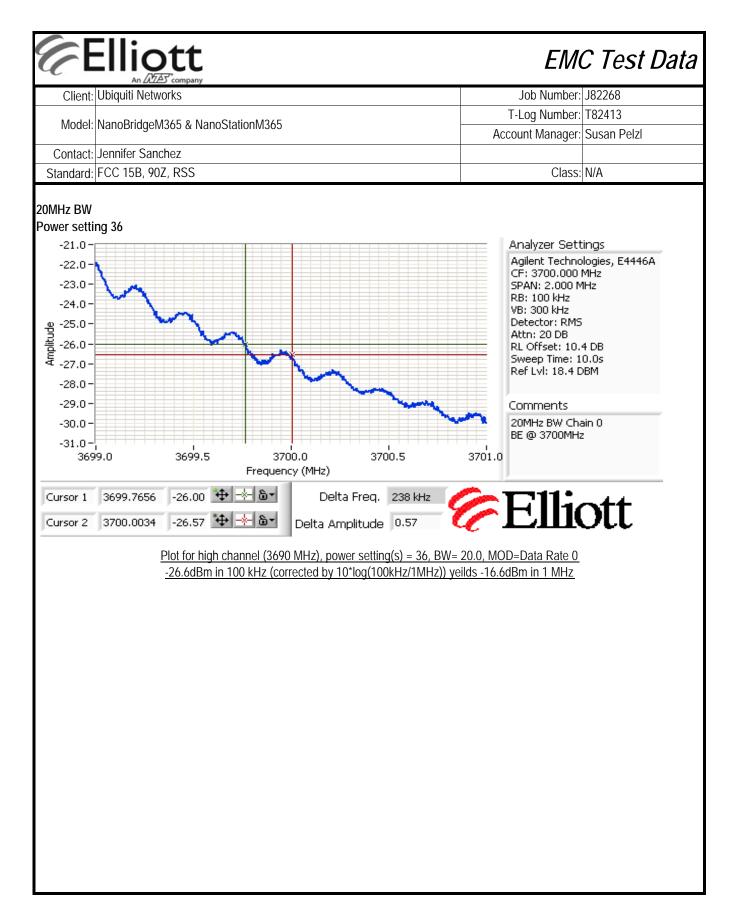
Limits from 90.321(a): Base and fixed stations are limited to 25 watts/25 MHz equivalent isotropically radiated power (EIRP). In any event, the peak EIRP power density shall not exceed 1 Watt in any one-megahertz slice of spectrum (30dBm/MHz).

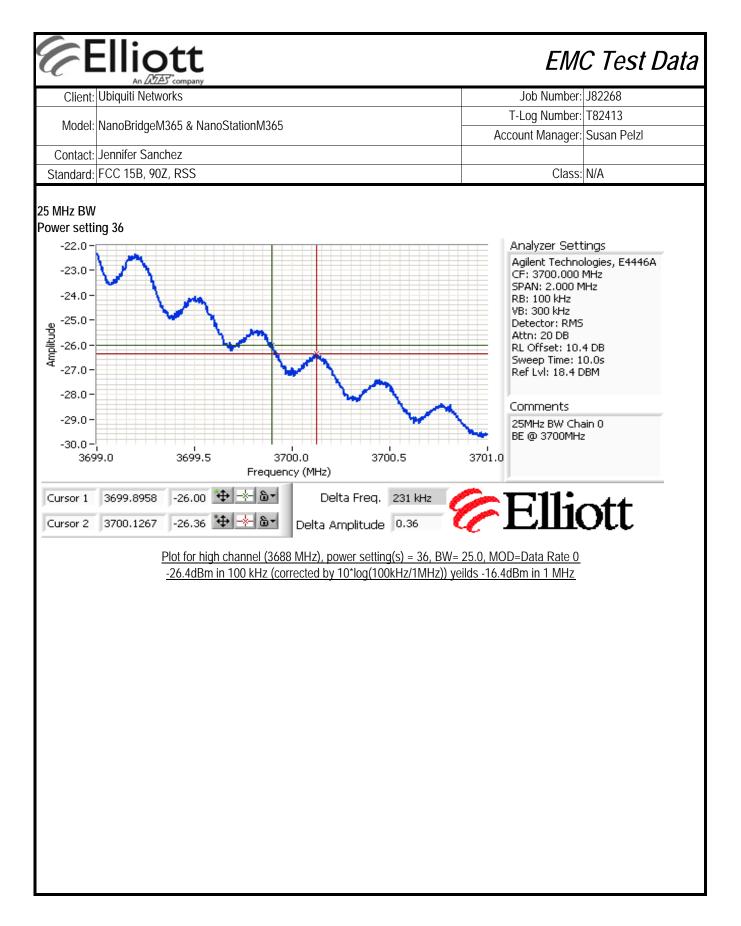
			Chain 1	Chain 2	Chain 3	Coherent	Effective ⁵	EIRP (mW)	EIRP (dBm)	
	Antenna	a Gain (dBi):	21	21		Yes	24.0	17103.9	42.3	
Power - Lin	nit accounts	for maximu	m antenna g	gain at this p	oower settin	ıg.				-
Frequency	Software	Modulation	Measure	d Output Po	wer ² dBm	To	otal	EIRP	Limit (eirp)	Pass or Fail
(MHz)	Setting ¹	wouldtion	Chain 1	Chain 2	Chain 3	mW	dBm	dBm	dBm	rass ui raii
5 MHz Mod	е									
3697	20, 14	MCS 0	8.9	8.7		15.2	11.8	35.8	44.0	PASS
10 MHz Mo	de									
3695	24, 21	MCS 0	11.1	11.7		27.7	14.4	38.4	44.0	PASS
20 MHz Mo	de									
3690	30, 26	MCS 0	14.3	14.6		55.8	17.5	41.5	44.0	PASS
25 MHz Mo	de									
3688	31, 28	MCS 0	15.0	15.6		67.9	18.3	42.3	44.0	PASS

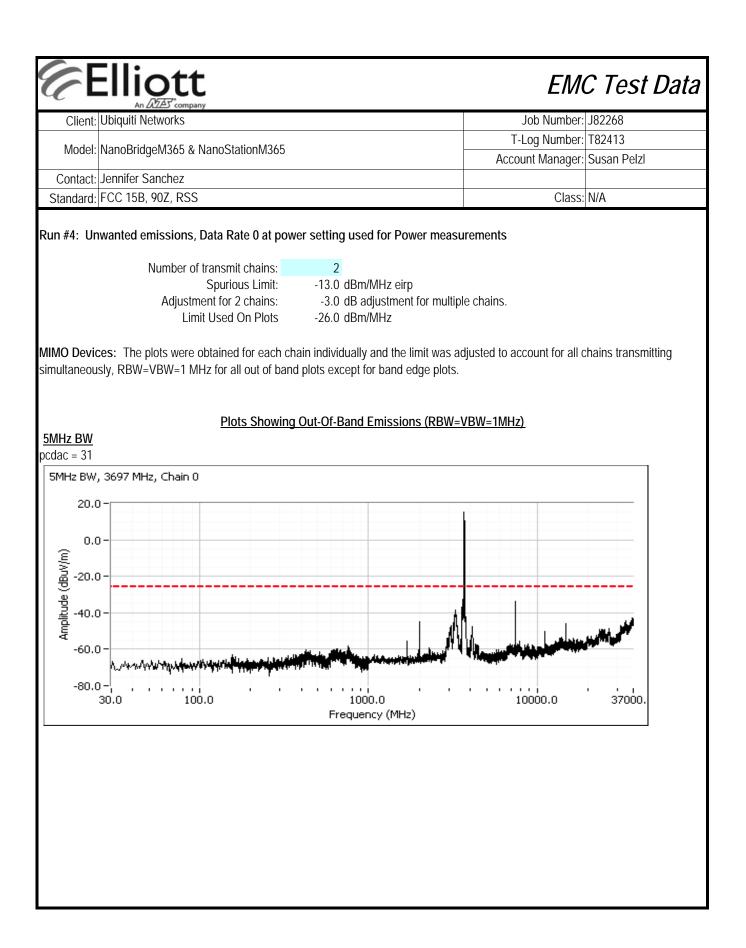
	-11.									
								EM	C Test	[•] Data
Client	: Ubiquiti Ne	tworks						Job Number:	J82268	
			0	-			T-I	_og Number:	T82413	
Model	NanoBridge	eM365 & Nand	oStationM36	5			Αссоι	Int Manager:	Susan Pelz	
Contact	: Jennifer Sa	inchez								
Standard	: FCC 15B, 9	90Z, RSS						Class:	N/A	
PSD	4						l		l	
Frequency	99 % ⁴		P	SD ² dBm/Mł	-17	Tota	PSD	PSD EIRP	Limit (eirp)	
(MHz)	BW	Modulation	Chain 0	Chain 1	Chain 2	mW/MHz	dBm/MHz	dBm/MHz	dBm/MHz	Pass or Fai
5 MHz Mod			Onuin o	Ondin 1		111107/101112	dDI1//WI12	dDI1//WITZ	dDI1//WI12	
3697	4.2	MCS 0	2.8	2.8		3.8	5.8	29.8	30.0	PASS
10 MHz Mo		11		1			1		1	1
3695	8.5	MCS 0	2.4	3.0		3.7	5.7	29.7	30.0	PASS
20 MHz Mo	-									
3690	16.8	MCS 0	2.6	3.0		3.8	5.8	29.8	30.0	PASS
25 MHz Mc	1		2.5	2.1		2.0	ГО	20.0	20.0	DACC
3688	20.9	MCS 0	2.5	3.1		3.8	5.8	29.8	30.0	PASS
Note 1:	Power setti	ng is the softw	vare setting (used to set th	ne output pov	ver.				
11010 11		er measured					s, sweep tim	e 10 seconds	s, max hold.	The total
Nata Di	power was	integrated over	er the span (span > 2x ch	annel bandw	vidth). Trans	nitted signal	was not con	tinuous but tl	ne analyzer
Note 2:	was configu	ured with a gat	ted sweep s	uch that the a	analyzer was	only sweepi	ng when the	device was t	ransmitting.	The plot for
	the channe	I with the high	est power is	provided bel	OW.					
		as measured u	•		0				•	
Note 3:		• •	ps were mad	le until the di	splay had no	new "peaks	". The plot fo	or the channe	el with the hig	hest power
	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.									
Noto 1:	99% Bandwidth measured in accordance with RSS GEN - RB > 1% of span and VB >=3xRB									
Note 4:	99% Bandy			ower and tota	il PSD are ca	alculated forn	n the sum of t	the powers o	f the individu	al chains (in
Note 4:	99% Bandy For MIMO s	systems the to	otal output po							
	99% Bandy For MIMO s linear terms	systems the to s). The antenr	otal output po na gain usec	I to determine	e the EIRP a	nd limits for I	PSD/Output p	ower depen	ds on the op	erating
Note 4: Note 5:	99% Bandy For MIMO s linear terms mode of the	systems the to	ital output po na gain usec e. If the sigr	I to determine als are non-e	e the EIRP a coherent bety	nd limits for I ween the trar	PSD/Output p nsmit chains	ower depen then the gai	ds on the op n used to det	erating ermine the
	99% Bandy For MIMO s linear terms mode of the limits is the	systems the to s). The antenr e MIMO device	tal output po na gain usec e. If the sigr of the individ	I to determine hals are non-e lual chains ar	e the EIRP a coherent betw nd the EIRP i	nd limits for I ween the trar is the sum of	PSD/Output p nsmit chains the products	oower depen then the gain of gain and	ds on the op n used to det power on ea	erating ermine the ch chain. If
	99% Bandw For MIMO s linear terms mode of the limits is the the signals is the produ	systems the to s). The antenr e MIMO device highest gain o	tal output po na gain usec e. If the sigr of the individ then the effe tive gain an	I to determine hals are non- lual chains ar hotive antenna	e the EIRP a coherent betw nd the EIRP i a gain is the	nd limits for I ween the trar is the sum of	PSD/Output p nsmit chains the products	oower depen then the gain of gain and	ds on the op n used to det power on ea	erating ermine the ch chain. If

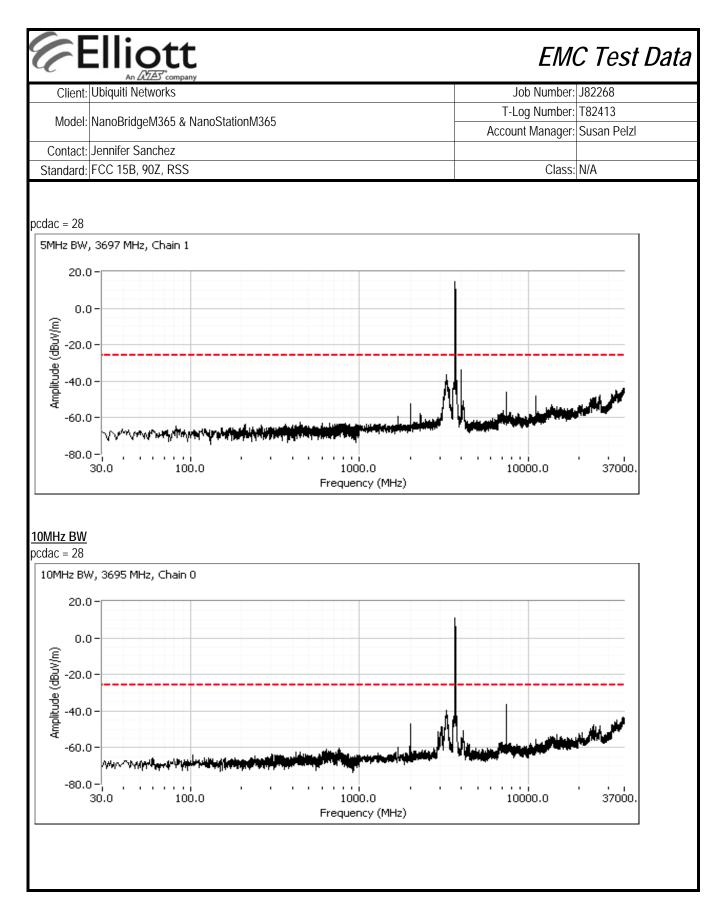


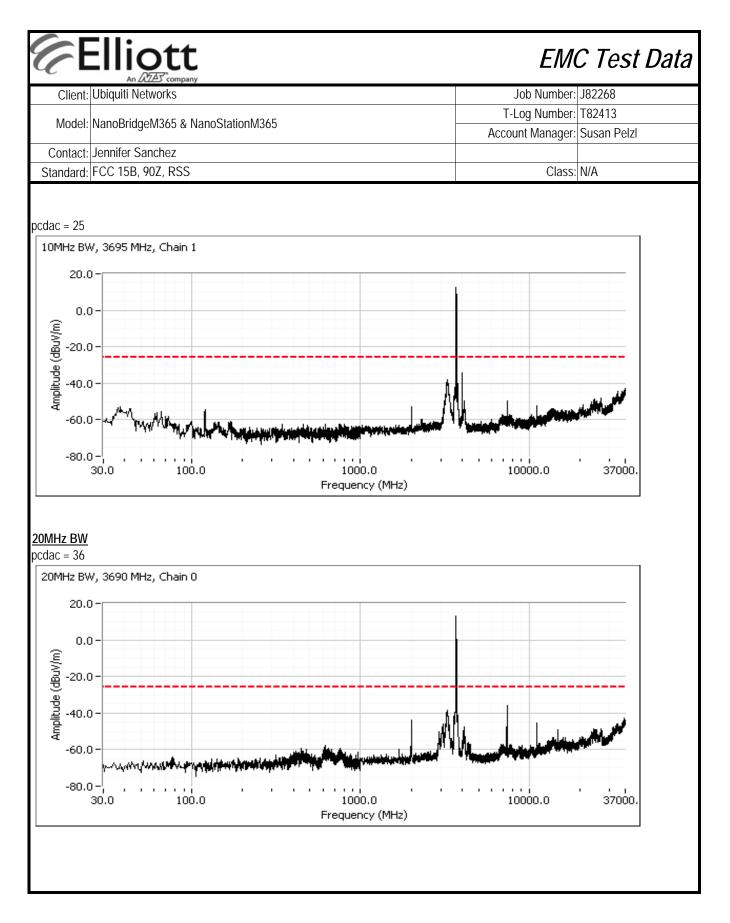


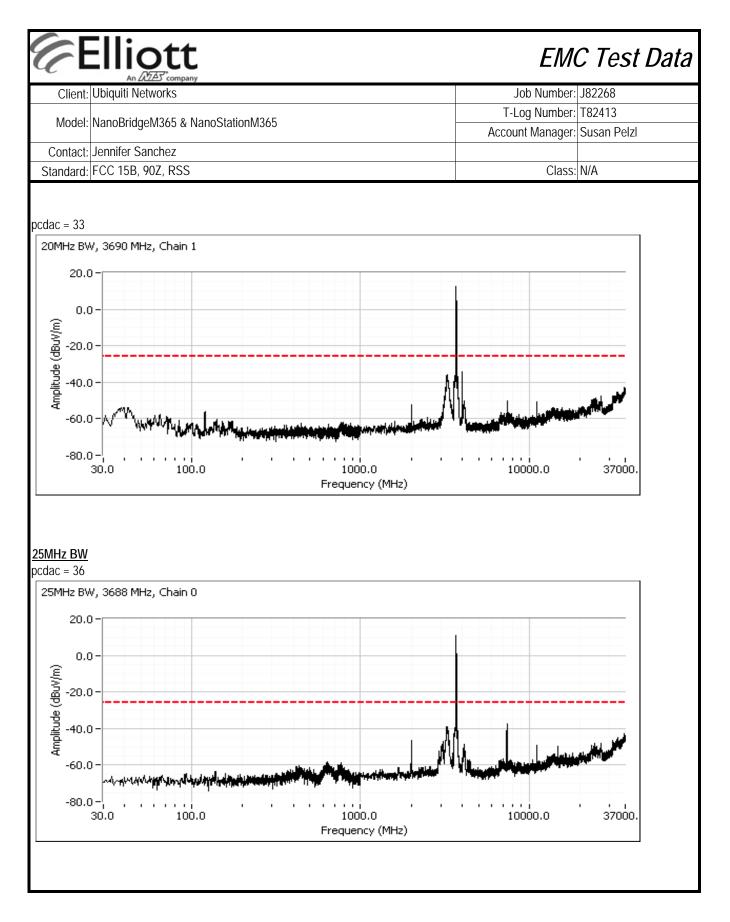


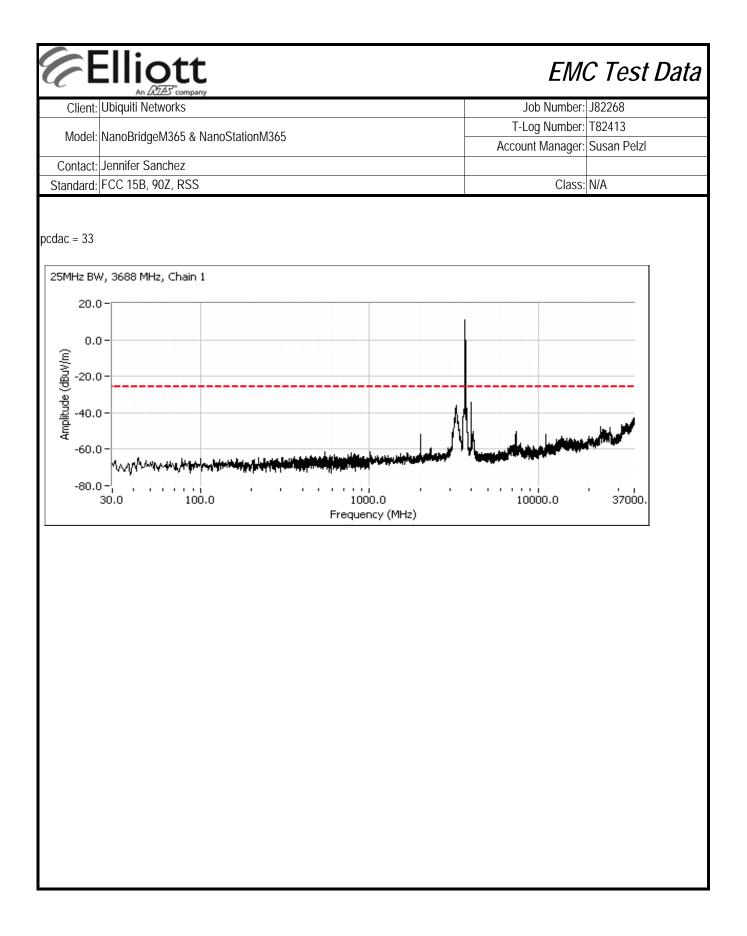












Ellic	A company				C Test
Client: Ubiquiti Netv	vorks			Job Number:	
Model: NanoBridge	A365 & NanoStationM365			Log Number: unt Manager:	
Contact: Jennifer San					
Standard: FCC 15B, 90	IZ, RSS			Class:	N/A
		nd FCC Part 9 ency Stability	0		
est Specific Detail					
Objective:	The objective of this test session is to pe specification listed above.	erform final qualification	on testing of th	ne EUT with r	respect to the
	3/25/2011 0:00	Config. Used			
Test Engineer: Test Location:		Config Change	e: none e: 120V / 60H:	7	
	s connected to the measurement instrum	ent's RF port, via an	attenuator or o	dc-block if ne	cessary. The
	connected to the measurement instrum nmental chamber.	ent's RF port, via an 22 °C 33 %	attenuator or o	dc-block if ne	cessary. The
The EUT's RF port was placed inside an enviro Ambient Conditions Summary of Result	connected to the measurement instrum nmental chamber. Comperature: Rel. Humidity:	22 °C 33 %			
The EUT's RF port was placed inside an enviro Ambient Conditions Summary of Result Run #	s connected to the measurement instrum nmental chamber. S: Temperature: Rel. Humidity: S Test Performed	22 °C 33 % Limit	Result	Value /	^r Margin
The EUT's RF port was placed inside an enviro Ambient Conditions Summary of Result	s connected to the measurement instrum nmental chamber. s: Temperature: Rel. Humidity: s Test Performed Frequency and Voltage Stability	22 °C 33 %		Value /	

Client: Ubiquiti Networks Job Number: J82268 Model: NanoBridgeM365 & NanoStationM365 T-Log Number: T82413 Contact: Jennifer Sanchez Susan Pelz Standard: FCC 15B, 90Z, RSS Class: N/A Run #1: Temperature Vs. Frequency (Fixed stations in the 3650-3675 MHz band) Standard: For all tests: Unmodulated signal using mode QAM16 at frequency 3662.5 MHz with power setting of 27 dBm vitic	Ê	lliott	EM	C Test Data
Model: NanoBridgeM365 & NanoStationM365 Account Manager: Susan Pelz Contact: Jennifer Sanchez Image: Susan Pelz Standard: FCC 15B, 90Z, RSS Class: N/A Run #1: Temperature Vs. Frequency (Fixed stations in the 3650-3675 MHz band) Image: Susan Pelz Note 1: For all tests: Unmodulated signal using mode QAM16 at frequency 3662.5 MHz with power setting of 27 dBm image: Susan Pelz	Client: Ub	biquiti Networks	Job Number:	J82268
Contact: Jennifer Sanchez Standard: FCC 15B, 90Z, RSS Run #1: Temperature Vs. Frequency (Fixed stations in the 3650-3675 MHz band) Noto 1: For all tests: Units 1: For all tests: Units 1: For all tests: Units 1: For all tests:	Model	anoPridaoM245 & NanoStationM245	T-Log Number:	T82413
Standard: FCC 15B, 90Z, RSS Class: N/A Run #1: Temperature Vs. Frequency (Fixed stations in the 3650-3675 MHz band) For all tests: Unmodulated signal using mode QAM16 at frequency 3662.5 MHz with power setting of 27 dBm vitility	WOUEI. Ma		Account Manager:	Susan Pelzl
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 vertices and the setting of	Contact: Je	ennifer Sanchez		
For all tests: Unmodulated signal using mode QAM16 at frequency 3662.5 MHz with power setting of 27 dBm v	tandard: FC	CC 15B, 90Z, RSS	Class:	N/A
Analyzor softings wore as follow: DRW_VRW_ 1kHz and Shan_5kHz		8 8 I I	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.	lote 2:	Frequency stability is to be specified in the station authorization.		

Temperature	Reference Frequency	Measured frequency	Drift	<u>Limit</u>
(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

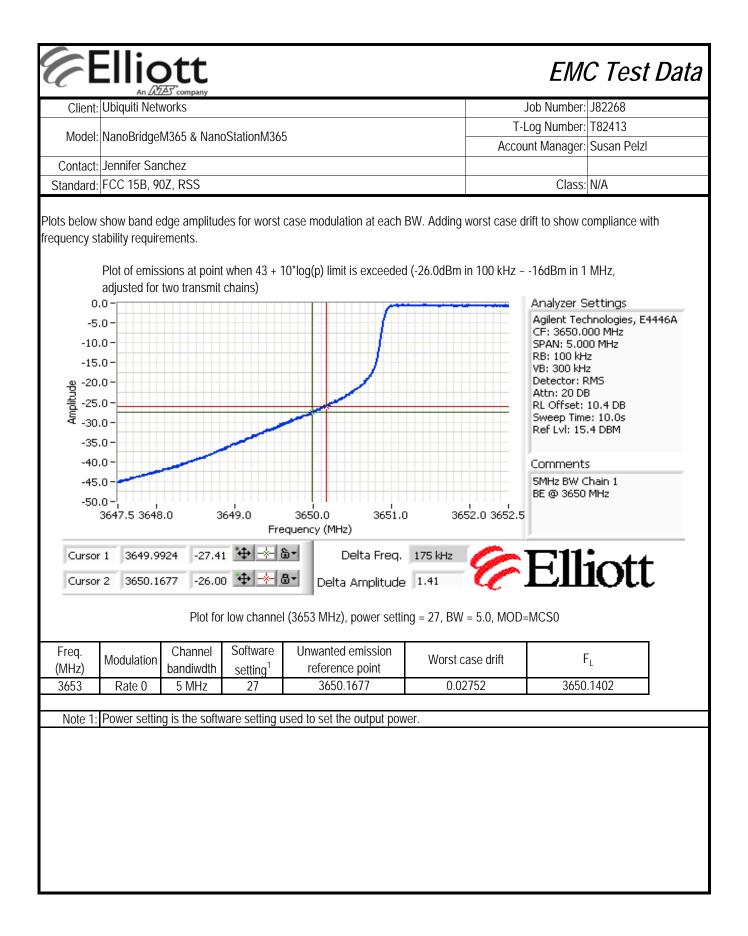
Run #2: Voltage Vs. Frequency

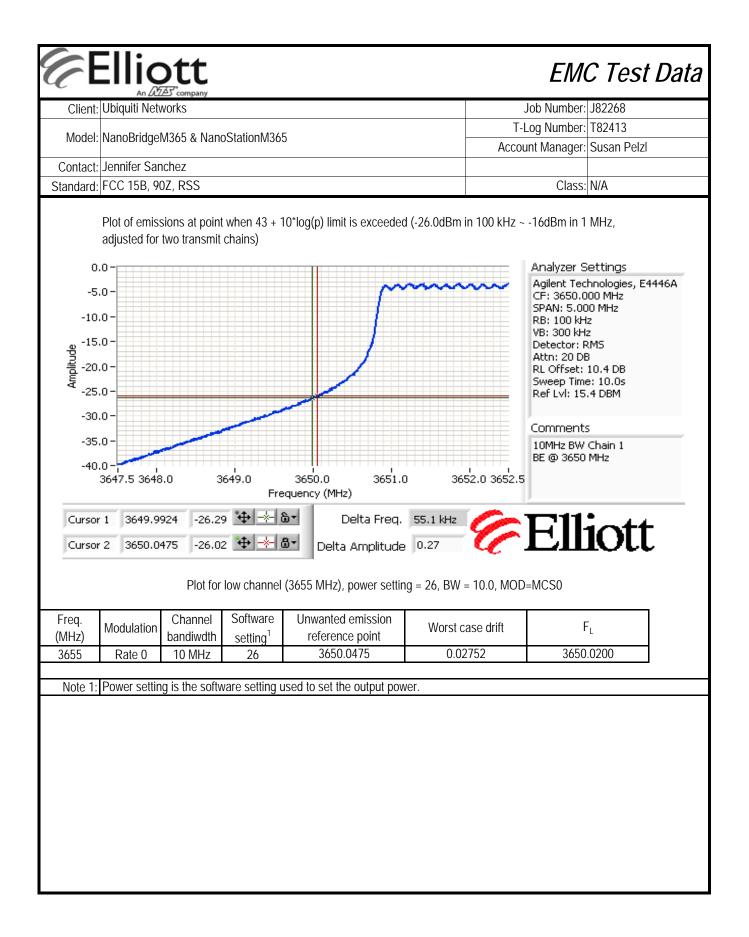
Nominal Voltage is 120 VAC

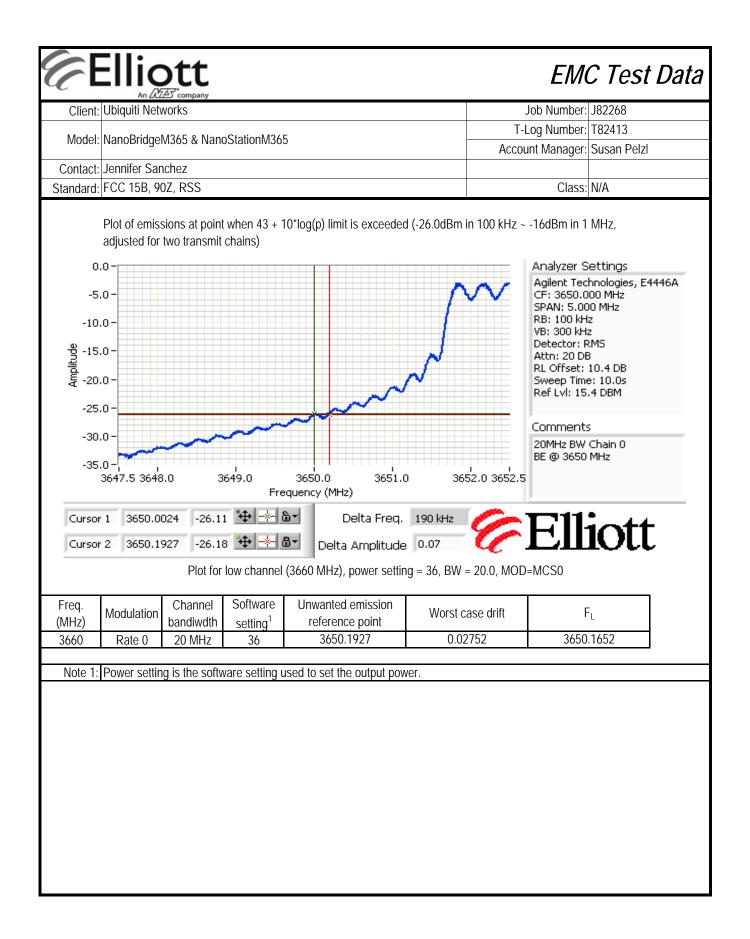
	<u> </u>			
<u>Voltage</u>	Reference Frequency	Frequency Drift	<u>Drift</u>	<u>Limit</u>
120V	(MHz)	(MHz)	(Hz)	(Hz)
85%	3652.992740	3652.993080	340	Note 2
115%	3652.992740	3652.992740	0	Note 2

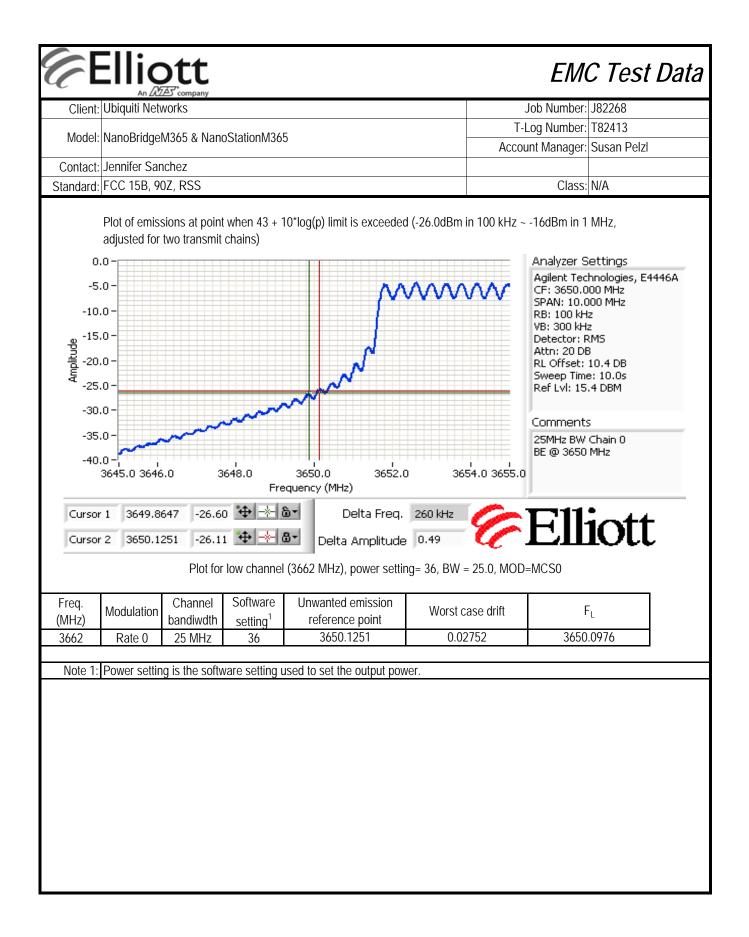
Worst case drift: 27520 Hz

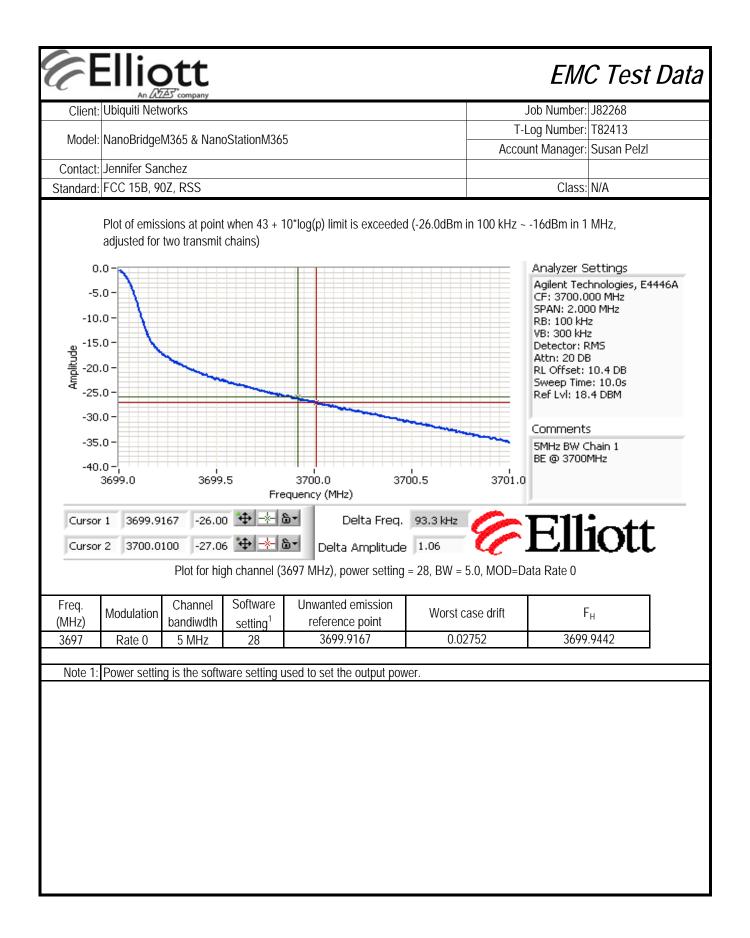
7.53 ppm

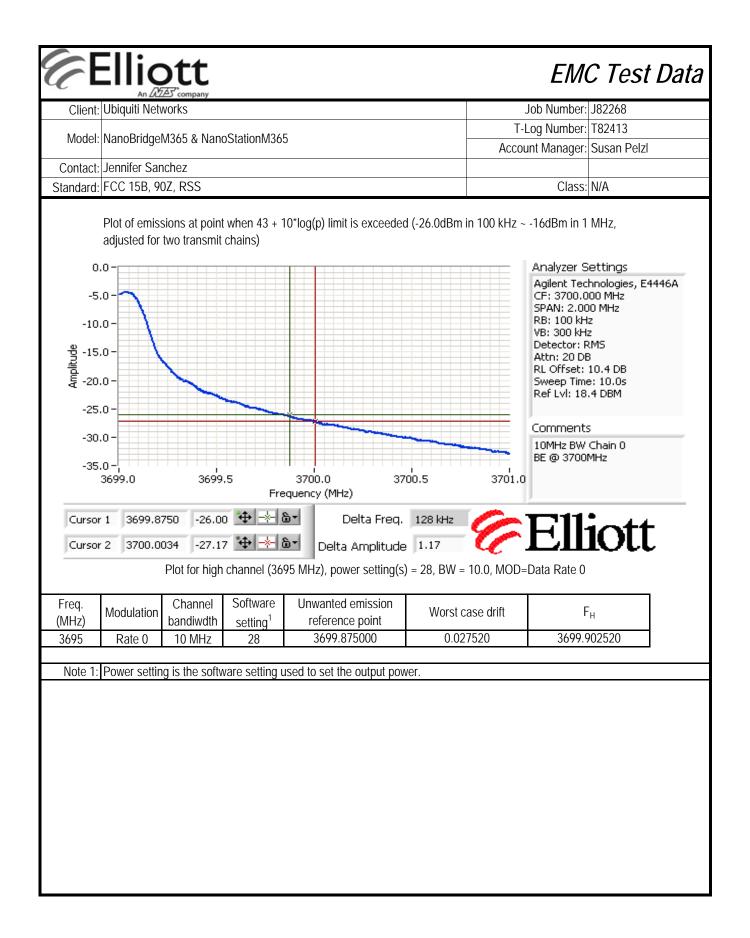


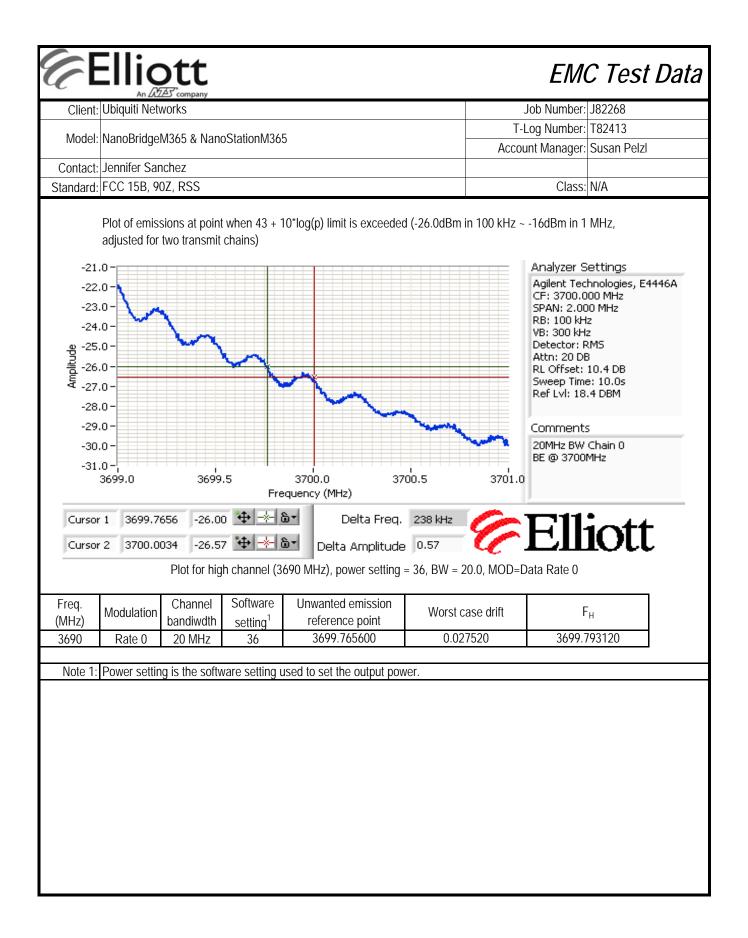


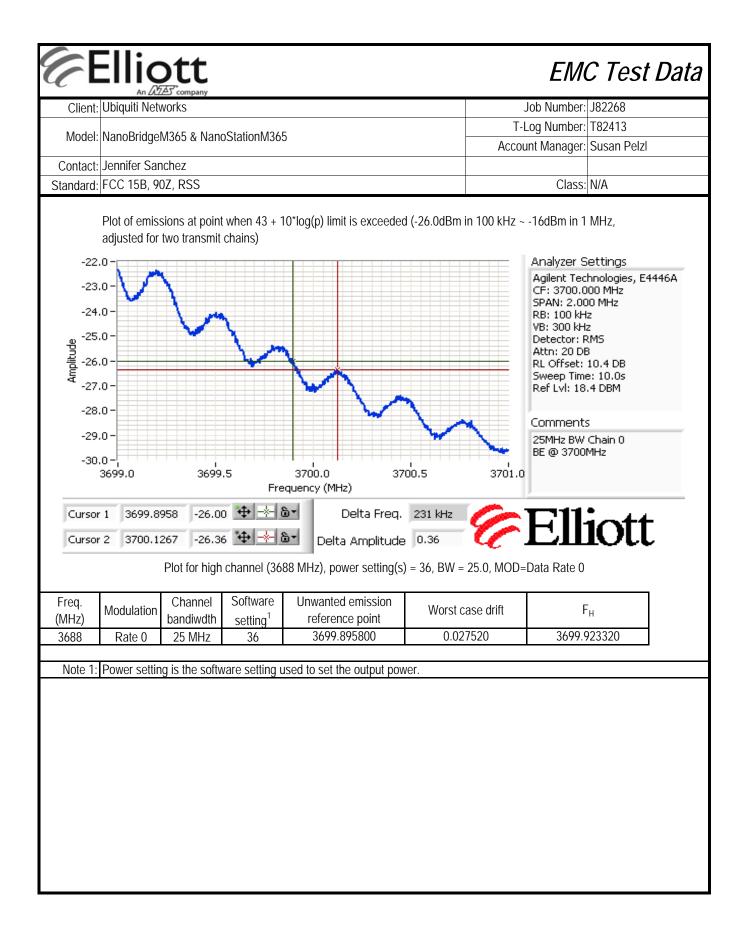












END OF REPORT

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