



PCTEST ENGINEERING LABORATORY, INC.

7185 Oakland Mills Road, Columbia, MD 21046 USA

Tel. 410.290.6652 / Fax 410.290.6654

<http://www.pctestlab.com>



MEASUREMENT REPORT FCC Part 22

Applicant Name:

Tecore Networks
7030 Hi Tech Drive
Hanover, MD 20176
USA

Date of Testing:

6/10 - 6/13/2013

Test Site/Location:

PCTEST Lab., Columbia, MD, USA

Test Report Serial No.:

0Y1306171016.QLJ

FCC ID:**QLJRAVEN****APPLICANT:****TECORE NETWORKS****Application Type:** Certification**Model(s):** RAVEN**EUT Type:** NodeB**FCC Classification:** Licensed Non-Broadcast Station Transmitter (TNB)**FCC Rule Part(s):** §2; §22(H)**Test Procedure(s):** ANSI/TIA-603-C-2004, KDB 971168 V02R01**Test Device Serial No.:** *identical prototype* [S/N: N/A]

Mode	Tx Frequency (MHz)	Modulation	Emission Designator	Cond. Power	
				Max. Power (W)	Max. Power (dBm)
WCDMA850	871.4 - 891.6	QPSK	4M20F9W	16.218	42.10
WCDMA850	871.4 - 891.6	16-QAM	4M21G7D	19.770	42.96
WCDMA850	871.4 - 891.6	64-QAM	4M21W7D	17.865	42.52

This equipment has been shown to be capable of compliance with the applicable technical standards as indicated in the measurement report and was tested in accordance with the measurement procedures specified in §2.947. Test results reported herein relate only to the item(s) tested.

I attest to the accuracy of data. All measurements reported herein were performed by me or were made under my supervision and are correct to the best of my knowledge and belief. I assume full responsibility for the completeness of these measurements and vouch for the qualifications of all persons taking them.



Randy Ortanez
President

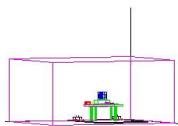


FCC ID: QLJRAVEN		FCC Pt. 22 WCDMA MEASUREMENT REPORT (CERTIFICATION)		Reviewed by: Quality Manager
Test Report S/N: 0Y1306171016.QLJ	Test Dates: 6/10 - 6/13/2013	EUT Type: NodeB		Page 1 of 30

T A B L E O F C O N T E N T S

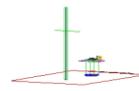
FCC PART 22 MEASUREMENT REPORT.....	3
1.0 INTRODUCTION	4
1.1 SCOPE	4
1.2 TESTING FACILITY.....	4
2.0 PRODUCT INFORMATION.....	5
2.1 EQUIPMENT DESCRIPTION	5
2.2 TEST CONFIGURATION.....	5
2.3 EMI SUPPRESSION DEVICE(S)/MODIFICATIONS	5
3.0 DESCRIPTION OF TESTS	6
3.1 EVALUATION PROCEDURE	6
3.2 CELLULAR - BASE FREQUENCY BLOCKS.....	6
3.3 CELLULAR - MOBILE FREQUENCY BLOCKS.....	6
3.4 OCCUPIED BANDWIDTH	6
3.5 SPURIOUS AND HARMONIC EMISSIONS AT ANTENNA TERMINAL.....	7
3.6 RADIATED SPURIOUS EMISSIONS	7
3.7 FREQUENCY STABILITY / TEMPERATURE VARIATION	8
4.0 TEST EQUIPMENT CALIBRATION DATA	9
5.0 SAMPLE CALCULATIONS	10
6.0 TEST RESULTS.....	11
6.1 SUMMARY.....	11
6.2 CONDUCTED POWER OUTPUT DATA	12
6.3 CELLULAR WCDMA RADIATED MEASUREMENTS	17
6.4 CELLULAR WCDMA FREQUENCY STABILITY MEASUREMENTS	20
7.0 PLOT(S) OF EMISSIONS	22
8.0 CONCLUSION.....	30

FCC ID: QLJRAVEN		FCC Pt. 22 WCDMA MEASUREMENT REPORT (CERTIFICATION)	
Test Report S/N: 0Y1306171016.QLJ	Test Dates: 6/10 - 6/13/2013	EUT Type: NodeB	Reviewed by: Quality Manager Page 2 of 30



MEASUREMENT REPORT

FCC Part 22

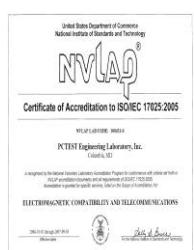
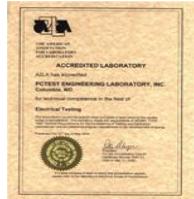


§2.1033 General Information

APPLICANT: Tecore Networks
APPLICANT ADDRESS: 7030 Hi Tech Drive, Hanover, MD 20176
TEST SITE: PCTEST ENGINEERING LABORATORY, INC.
TEST SITE ADDRESS: 7185 Oakland Mills Road, Columbia, MD 21046 USA
FCC RULE PART(S): §2; §22(H)
BASE MODEL: RAVEN
FCC ID: QLJRAVEN
FCC CLASSIFICATION: Licensed Non-Broadcast Station Transmitter (TNB)
MODE: WCDMA
FREQUENCY TOLERANCE: ±0.00025 % (2.5 ppm)
Test Device Serial No.: N/A Production Pre-Production Engineering
DATE(S) OF TEST: 6/10 - 6/13/2013
TEST REPORT S/N: 0Y1306171016.QLJ

Test Facility / Accreditations

Measurements were performed at PCTEST Engineering Lab. located in Columbia, MD 21046, U.S.A.



- PCTEST facility is an FCC registered (PCTEST Reg. No. 159966) test facility with the site description report on file and has met all the requirements specified in Section 2.948 of the FCC Rules and Industry Canada (2451B-1).
- PCTEST Lab is accredited to ISO 17025 by U.S. National Institute of Standards and Technology (NIST) under the National Voluntary Laboratory Accreditation Program (NVLAP Lab code: 100431-0) in EMC, FCC and Telecommunications.
- PCTEST Lab is accredited to ISO 17025-2005 by the American Association for Laboratory Accreditation (A2LA) in Specific Absorption Rate (SAR) testing, Hearing Aid Compatibility (HAC) testing, CTIA Test Plans, and wireless testing for FCC and Industry Canada Rules.
- PCTEST Lab is a recognized U.S. Conformity Assessment Body (CAB) in EMC and R&TTE (n.b. 0982) under the U.S.-EU Mutual Recognition Agreement (MRA).
- PCTEST TCB is a Telecommunication Certification Body (TCB) accredited to ISO/IEC Guide 65 by the American National Standards Institute (ANSI) in all scopes of FCC Rules and Industry Canada Standards (RSS).
- PCTEST facility is an IC registered (2451B-1) test laboratory with the site description on file at Industry Canada.
- PCTEST is a CTIA Authorized Test Laboratory (CATL) for AMPS, CDMA, and EvDO wireless devices and for Over-the-Air (OTA) Antenna Performance testing for AMPS, CDMA, GSM, GPRS, EGPRS, UMTS (W-CDMA), CDMA 1xEVDO, and CDMA 1xRTT.

FCC ID: QLJRAVEN	PCTEST [®] ENGINEERING LABORATORY, INC.			FCC Pt. 22 WCDMA MEASUREMENT REPORT (CERTIFICATION)	Reviewed by: Quality Manager
Test Report S/N: 0Y1306171016.QLJ	Test Dates: 6/10 - 6/13/2013	EUT Type: NodeB			Page 3 of 30

1.0 INTRODUCTION

1.1 Scope

Measurement and determination of electromagnetic emissions (EME) of radio frequency devices including intentional and/or unintentional radiators for compliance with the technical rules and regulations of the Federal Communications Commission and the Industry Canada Certification and Engineering Bureau.

1.2 Testing Facility

The map below shows the location of the PCTEST LABORATORY, its proximity to the FCC Laboratory, the Columbia vicinity, the Baltimore-Washington Interntl (BWI) airport, the city of Baltimore and the Washington, DC area. (See *Figure 1-1*).

These measurement tests were conducted at the PCTEST Engineering Laboratory, Inc. facility located at 7185 Oakland Mills Road, Columbia, MD 21046. The site coordinates are 39° 10'23" N latitude and 76° 49'50" W longitude. The facility is 0.4 miles North of the FCC laboratory, and the ambient signal and ambient signal strength are approximately equal to those of the FCC laboratory. The detailed description of the measurement facility was found to be in compliance with the requirements of § 2.948 according to ANSI C63.4-2009 on February 15, 2012.

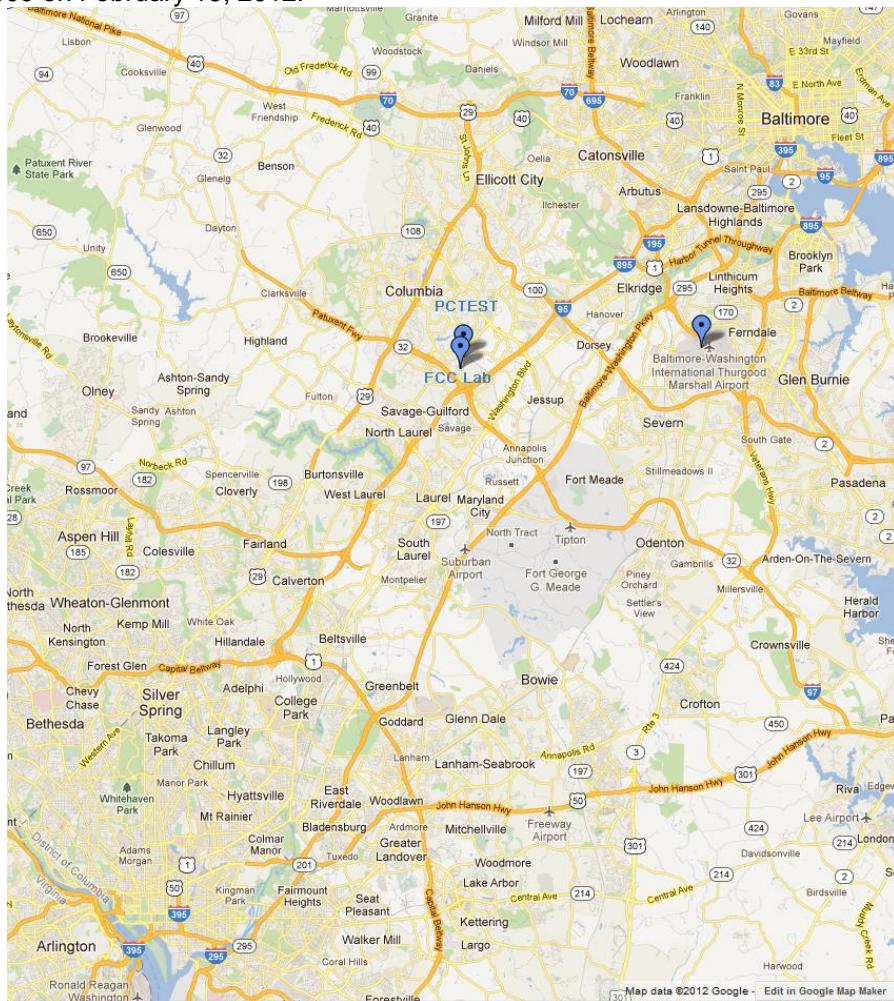


Figure 1-1. Map of the Greater Baltimore and Metropolitan Washington, D.C. area

FCC ID: QLJRAVEN		FCC Pt. 22 WCDMA MEASUREMENT REPORT (CERTIFICATION)		Reviewed by: Quality Manager
Test Report S/N: 0Y1306171016.QLJ	Test Dates: 6/10 - 6/13/2013	EUT Type: NodeB		Page 4 of 30

2.0 PRODUCT INFORMATION

2.1 Equipment Description

The Equipment Under Test (EUT) is the **Tecore NodeB FCC ID: QLJRAVEN**. The NodeB generates an 850MHz band WCDMA signal using QPSK, 16-QAM, and 64-QAM modulations. The signal output level is set to -30dBm and it is fed via a low loss cable to the input of a spectrum analyzer or a 50Ω load, depending on the type of testing performed. All of the settings in the NodeB are set through a connection to a laptop PC via ethernet cable.

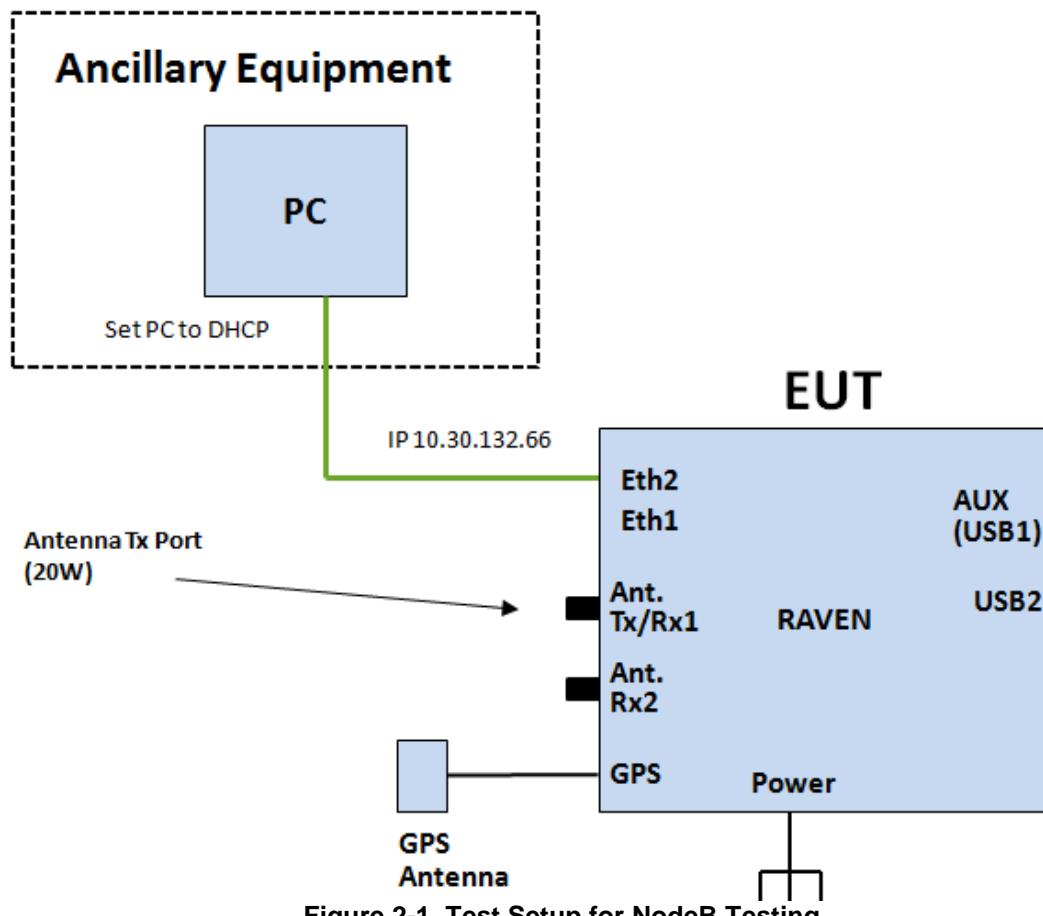


Figure 2-1. Test Setup for NodeB Testing

2.2 Test Configuration

The **Tecore NodeB FCC ID: QLJRAVEN** was tested per the guidance of ANSI/TIA-603-C-2004 and KDB 971168 V02R01. See Section 3.0 of this test report for a description of the radiated and antenna port conducted emissions tests.

2.3 EMI Suppression Device(s)/Modifications

No EMI suppression device(s) were added and no modifications were made during testing.

FCC ID: QLJRAVEN	 PCTEST ENGINEERING LABORATORY, INC.	FCC Pt. 22 WCDMA MEASUREMENT REPORT (CERTIFICATION)		Reviewed by: Quality Manager
Test Report S/N: 0Y1306171016.QLJ	Test Dates: 6/10 - 6/13/2013	EUT Type: NodeB		Page 5 of 30

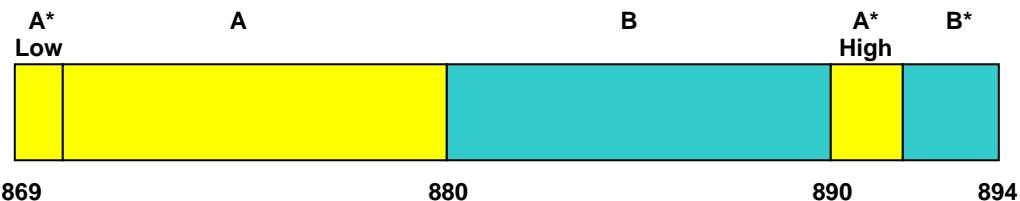
3.0 DESCRIPTION OF TESTS

3.1 Evaluation Procedure

The measurement procedures described in the "Land Mobile FM or PM – Communications Equipment – Measurements and Performance Standards" (ANSI/TIA-603-C-2004) and "Procedures for Compliance Measurement of the Fundamental Emission Power of Licensed Wideband (> 1 MHz) Digital Transmission Systems" were used in the measurement of the measurement of the **Tecore NodeB** FCC ID: **QLJRAVEN**.

Deviation from Measurement Procedure.....None

3.2 Cellular - Base Frequency Blocks



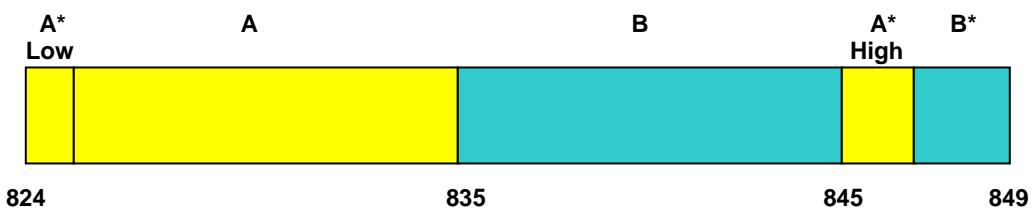
BLOCK 1: 869 – 880 MHz (A* Low + A)

BLOCK 3: 890 – 891.5 MHz (A* High)

BLOCK 2: 880 – 890 MHz (B)

BLOCK 4: 891.5 – 894 MHz (B*)

3.3 Cellular - Mobile Frequency Blocks



BLOCK 1: 824 – 835 MHz (A* Low + A)

BLOCK 3: 845 – 846.5 MHz (A* High)

BLOCK 2: 835 – 845 MHz (B)

BLOCK 4: 846.5 – 849 MHz (B*)

3.4 Occupied Bandwidth

§2.1049, RSS-Gen (4.6.1)

The occupied bandwidth, that is the frequency bandwidth such that, below its lower and above its upper frequency limits, the mean powers radiated are each equal to 0.5 percent of the total mean power radiated by a given emission shall be measured. The spectrum analyzers' "occupied bandwidth" measurement function was used to record the occupied bandwidth in accordance with KDB 971168 V02R01.

FCC ID: QLJRAVEN	 PCTEST ENGINEERING LABORATORY, INC.	FCC Pt. 22 WCDMA MEASUREMENT REPORT (CERTIFICATION)	 Tecore networks	Reviewed by: Quality Manager
Test Report S/N: 0Y1306171016.QLJ	Test Dates: 6/10 - 6/13/2013	EUT Type: NodeB		Page 6 of 30

3.5 Spurious and Harmonic Emissions at Antenna Terminal

§2.1051, 22.917(a)

The level of the carrier and the various conducted spurious and harmonic frequencies is measured by means of a calibrated spectrum analyzer. The spectrum is scanned from the lowest frequency generated in the equipment up to a frequency including its 10th harmonic. On any frequency outside a licensee's frequency block, the power of any emission shall be attenuated below the transmitter power (P) by at least $43 + 10 \log(P)$ dB. Compliance with these provisions is based on the use of measurement instrumentation employing a resolution bandwidth of 100 kHz or greater for Part 22. However, in the 1 MHz bands immediately outside and adjacent to the frequency block a resolution bandwidth of at least one percent of the emission bandwidth of the fundamental emission of the transmitter may be employed. The emission bandwidth is defined as the width of the signal between two points, one below the carrier center frequency and one above the carrier center frequency, outside of which all emission are attenuated at least 26 dB below the transmitter power.

3.6 Radiated Spurious Emissions

22.917(a)

The radiated test facilities consisted of an indoor 3 meter semi-anechoic chamber used for final measurements and exploratory measurements, when necessary. The measurement area is contained within the semi-anechoic chamber which is shielded from any ambient interference. For measurements above 1GHz absorbers are arranged on the floor between the turn table and the antenna mast in such a way so as to maximize the reduction of reflections. For measurements below 1GHz, the absorbers are removed. An ETS Lindgren Model 2188 raised turntable is used for radiated measurement. It is a continuously rotatable, remote-controlled, metallic turntable and 2 meters (6.56 ft.) in diameter. The turn table is flush with the raised floor of the chamber in order to maintain its function as a ground plane. A 78cm high PVC support structure is placed on top of the turntable. A ¾" (~1.9cm) sheet of high density polyethylene is used as the table top and is placed on top of the PVC supports to bring the total height of the table to 80cm.

The equipment under test was transmitting with its output port terminated in a 50Ω load and is placed on top of the test table at a distance of 3 meters from the receive antenna. The receive antenna height is adjusted between 1 and 4 meter height, the turntable is rotated through 360 degrees, and the EUT is manipulated through all orthogonal planes representative of its typical use to achieve the highest reading on the receive spectrum analyzer. Radiated spurious emission levels are also investigated with the receive antenna horizontally and vertically polarized.

Per the guidance of ANSI/TIA-603-C-2004, a half-wave dipole is then substituted in place of the EUT. For emissions above 1GHz, a horn antenna is substituted in place of the EUT. The substitute antenna is driven by a signal generator with the level of the signal generator being adjusted to obtain the same receive spectrum analyzer level previously recorded from the spurious emission from the EUT. The power of the emission is calculated using the following formula:

$$P_d \text{ [dBm]} = P_g \text{ [dBm]} - \text{cable loss} \text{ [dB]} + \text{antenna gain} \text{ [dBd/dBi]}$$

Where, P_d is the dipole equivalent power, P_g is the generator output into the substitution antenna, and the antenna gain is the gain of the substitute antenna used relative to either a half-wave dipole (dBd) or an isotropic source (dBi). The substitute level is equal to $P_g \text{ [dBm]} - \text{cable loss} \text{ [dB]}$.

The calculated P_d levels are then compared to the absolute spurious emission limit of -13dBm which is equivalent to the required minimum attenuation of $43 + 10\log_{10}(\text{Power} \text{ [Watts]})$ specified in 22.917(a).

FCC ID: QLJRAVEN	FCC Pt. 22 WCDMA MEASUREMENT REPORT (CERTIFICATION)		Reviewed by: Quality Manager
Test Report S/N: 0Y1306171016.QLJ	Test Dates: 6/10 - 6/13/2013	EUT Type: NodeB	Page 7 of 30

3.7 Frequency Stability / Temperature Variation

§2.1055, 22.355

Frequency stability testing is performed in accordance with the guidelines of ANSI/TIA-603-C-2004. The frequency stability of the transmitter is measured by:

- a.) **Temperature:** The temperature is varied from -30°C to +50°C in 10°C increments using an environmental chamber.
- b.) **Primary Supply Voltage:** The primary supply voltage is varied from 85% to 115% of the nominal value for non hand-carried battery and AC powered equipment.

Specification – For Part 22, the frequency stability of the transmitter shall be maintained within $\pm 0.00025\%$ ($\pm 2.5 \text{ ppm}$) of the center frequency.

Time Period and Procedure:

1. The carrier frequency of the transmitter is measured at room temperature (20°C to provide a reference).
2. The equipment is turned on in a “standby” condition for fifteen minutes before applying power to the transmitter. Measurement of the carrier frequency of the transmitter is made within one minute after applying power to the transmitter.
3. Frequency measurements are made at 10°C intervals ranging from -30°C to +50°C. A sufficient stabilization period at each temperature shall be used prior to each frequency requirement.

FCC ID: QLJRAVEN	 PCTEST ENGINEERING LABORATORY, INC.	FCC Pt. 22 WCDMA MEASUREMENT REPORT (CERTIFICATION)		 Reviewed by: Quality Manager
Test Report S/N: 0Y1306171016.QLJ	Test Dates: 6/10 - 6/13/2013	EUT Type: NodeB		

4.0 TEST EQUIPMENT CALIBRATION DATA

Test Equipment Calibration is traceable to the National Institute of Standards and Technology (NIST).

Manufacturer	Model	Description	Cal Date	Cal Interval	Cal Due	Serial Number
-	RE1	Radiated Emissions Cable Set (UHF/EHF)	3/29/2013	Annual	3/29/2014	N/A
-	RE2	Radiated Emissions Cable Set (VHF/UHF)	3/29/2013	Annual	3/29/2014	N/A
Agilent	8447D	Broadband Amplifier	5/31/2013	Annual	5/31/2014	2443A01900
Agilent	N9020A	MXA Signal Analyzer	10/9/2012	Annual	10/9/2013	US46470561
Espec	ESX-2CA	Environmental Chamber	4/16/2013	Annual	4/16/2014	17620
ETS Lindgren	3117	1-18 GHz DRG Horn (Medium)	7/22/2011	Biennial	7/22/2013	125518
ETS Lindgren	3160-09	18-26.5 GHz Standard Gain Horn	5/30/2012	Biennial	5/30/2014	135427
ETS Lindgren	3164-08	Quad Ridge Horn Antenna	11/7/2012	Biennial	11/7/2014	128338
Mini-Circuits	VHF-1200+	High Pass Filter	1/17/2013	Annual	1/17/2014	30923
Mini-Circuits	SSG-4000HP	USB Synthesized Signal Generator			N/A	11208010032
Mini-Circuits	PWR-SENS-4RMS	USB Power Sensor	4/17/2013	Annual	4/17/2014	11210140001
Mini-Circuits	TVA-11-422	RF Power Amp			N/A	QA1303002
Rohde & Schwarz	TS-PR18	1-18 GHz Pre-Amplifier	5/31/2013	Annual	5/31/2014	100071
Rohde & Schwarz	TS-PR26	18-26.5 GHz Pre-Amplifier	5/31/2013	Annual	5/31/2014	100040
Rohde & Schwarz	ESU26	EMI Test Receiver	2/25/2013	Annual	2/25/2014	100342
Sunol	JB5	Bi-Log Antenna (30M - 5GHz)	1/26/2012	Biennial	1/26/2014	A051107

Table 4-1. Test Equipment

FCC ID: QLJRAVEN	 PCTEST ENGINEERING LABORATORY, INC.	FCC Pt. 22 WCDMA MEASUREMENT REPORT (CERTIFICATION)		 Tecore networks	Reviewed by: Quality Manager
Test Report S/N: 0Y1306171016.QLJ	Test Dates: 6/10 - 6/13/2013	EUT Type: NodeB			

5.0 SAMPLE CALCULATIONS

Emission Designator

Emission Designator = 4M25F9W

WCDMA BW = 4.25 MHz

F = Frequency Modulation

9 = Composite Digital Info

W = Combination (Audio/Data) (Measured at the 99.75% power bandwidth)

Spurious Radiated Emission

Example: Channel 4407 WCDMA Mode 2nd Harmonic (1762.8 MHz)

The receive spectrum analyzer reading at 3 meters with the EUT on the turntable was -81.0 dBm. The gain of the substituted antenna is 8.1 dBi. The signal generator connected to the substituted antenna terminals is adjusted to produce a reading of -81.0 dBm on the spectrum analyzer. The loss of the cable between the signal generator and the terminals of the substituted antenna is 2.0 dB at 1762.8 MHz. So 6.1 dB is added to the signal generator reading of -30.9 dBm yielding -24.80 dBm. The fundamental EIRP was 25.50 dBm so this harmonic was $25.50 \text{ dBm} - (-24.80) = 50.3 \text{ dBc}$.

FCC ID: QLJRAVEN	 PCTEST ENGINEERING LABORATORY, INC.	FCC Pt. 22 WCDMA MEASUREMENT REPORT (CERTIFICATION)		 Reviewed by: Quality Manager
Test Report S/N: 0Y1306171016.QLJ	Test Dates: 6/10 - 6/13/2013	EUT Type: NodeB		Page 10 of 30

6.0 TEST RESULTS

6.1 Summary

Company Name: Tecore Networks
 FCC ID: QLJRAVEN
 FCC Classification: Licensed Non-Broadcast Station Transmitter (TNB)
 Mode(s): WCDMA

FCC Part Section(s)	Test Description	Test Limit	Test Condition	Test Result	Reference
TRANSMITTER MODE (Tx)					
2.1049, 22.917(a)	Occupied Bandwidth	N/A	CONDUCTED	PASS	Section 7.0
2.1051, 22.917(a)	Band Edge / Conducted Spurious Emissions	> $43 + 10\log_{10}(P[\text{Watts}])$ at Band Edge and for all out-of-band emissions		PASS	Section 7.0
2.1046	Transmitter Conducted Output Power	N/A		PASS	Section 6.2
2.1053, 22.917(a)	Undesirable Emissions	> $43 + 10\log_{10}(P[\text{Watts}])$ for all out-of-band emissions	RADIATED	PASS	Section 6.3
2.1055, 22.355	Frequency Stability	< 2.5 ppm		PASS	Section 6.4

Table 6-1. Summary of Test Results

Notes:

- 1) All modes of operation and modulations were investigated. The test results shown in the following sections represent the worst case emissions.
- 2) The analyzer plots shown in Section 7.0 were all taken with a correction table loaded into the analyzer. The correction table was used to account for the losses of the cables, filters, and attenuators used as part of the system at all frequencies of interest.
- 3) All antenna port conducted emissions testing was performed on a test bench with the antenna port of the EUT connected to the spectrum analyzer through calibrated cable, filters, and attenuators.

FCC ID: QLJRAVEN		FCC Pt. 22 WCDMA MEASUREMENT REPORT (CERTIFICATION)		Reviewed by: Quality Manager
Test Report S/N: 0Y1306171016.QLJ	Test Dates: 6/10 - 6/13/2013	EUT Type: NodeB		Page 11 of 30

6.2 Conducted Power Output Data

§2.1046

The NodeB was set to transmit in all three available modulations of WCDMA mode at -30dBm through a laptop PC. A NodeB output power level of -30dBm was used to ensure that the amplifier would operate in its linear region. The output of the NodeB was connected through a calibrated cable and 36dB of external attenuation to a signal analyzer. The signal analyzers' "Channel Power" function was used to measure the conducted output powers in accordance to the guidance of KDB 971168 V02R01.

Frequency [MHz]	Mode	Modulation	Conducted Power [dBm]	Conducted Power [Watts]	
871.4	WCDMA850	QPSK	42.03	15.959	
		16QAM	42.10	16.218	
		64QAM	41.98	15.776	
881.4		QPSK	42.84	19.231	
		16QAM	42.96	19.770	
		64QAM	42.89	19.454	
891.6		QPSK	42.33	17.100	
		16QAM	42.52	17.865	
		64QAM	42.36	17.219	

Table 6-2. Maximum Average Conducted Power



Plot 6-1. Maximum Conducted Power (Low Ch – 871.4MHz - QPSK)

FCC ID: QLJRAVEN	 PCTEST ENGINEERING LABORATORY, INC.	FCC Pt. 22 WCDMA MEASUREMENT REPORT (CERTIFICATION)	Reviewed by: Quality Manager
Test Report S/N: 0Y1306171016.QLJ	Test Dates: 6/10 - 6/13/2013	EUT Type: NodeB	Page 12 of 30



Plot 6-2. Maximum Conducted Power (Low Ch – 871.4MHz – 16QAM)



Plot 6-3. Maximum Conducted Power (Low Ch – 871.4MHz – 64QAM)

FCC ID: QLJRAVEN	 PCTEST ENGINEERING LABORATORY, INC.	FCC Pt. 22 WCDMA MEASUREMENT REPORT (CERTIFICATION)	 Reviewed by: Quality Manager
Test Report S/N: 0Y1306171016.QLJ	Test Dates: 6/10 - 6/13/2013	EUT Type: NodeB	Page 13 of 30



Plot 6-4. Maximum Conducted Power (Mid Ch – 881.4MHz - QPSK)



Plot 6-5. Maximum Conducted Power (Mid Ch – 881.4MHz – 16QAM)

FCC ID: QLJRAVEN	 PCTEST ENGINEERING LABORATORY, INC.	FCC Pt. 22 WCDMA MEASUREMENT REPORT (CERTIFICATION)	Reviewed by: Quality Manager
Test Report S/N: 0Y1306171016.QLJ	Test Dates: 6/10 - 6/13/2013	EUT Type: NodeB	Page 14 of 30



Plot 6-6. Maximum Conducted Power (Mid Ch – 881.4MHz – 64QAM)



Plot 6-7. Maximum Conducted Power (High Ch – 891.6MHz - QPSK)

FCC ID: QLJRAVEN	 PCTEST Engineering Laboratory, Inc.	FCC Pt. 22 WCDMA MEASUREMENT REPORT (CERTIFICATION)	Reviewed by: Quality Manager
Test Report S/N: 0Y1306171016.QLJ	Test Dates: 6/10 - 6/13/2013	EUT Type: NodeB	Page 15 of 30



Plot 6-8. Maximum Conducted Power (High Ch – 891.6MHz – 16QAM)



Plot 6-9. Maximum Conducted Power (High Ch – 891.6MHz – 64QAM)

FCC ID: QLJRAVEN		FCC Pt. 22 WCDMA MEASUREMENT REPORT (CERTIFICATION)		Reviewed by: Quality Manager
Test Report S/N: 0Y1306171016.QLJ	Test Dates: 6/10 - 6/13/2013	EUT Type: NodeB		Page 16 of 30

6.3 Cellular WCDMA Radiated Measurements

§2.1053, 22.917(a)

Field Strength of SPURIOUS Radiation

OPERATING FREQUENCY: 871.40 MHz
 CHANNEL: 4357
 MODULATION SIGNAL: WCDMA
 DISTANCE: 3 meters
 LIMIT: -13.00 dBm

FREQUENCY (MHz)	LEVEL @ ANTENNA TERMINALS (dBm)	SUBSTITUTE ANTENNA GAIN (dBd)	SPURIOUS EMISSION LEVEL (dBm)	EUT POL (H/V)	MARGIN (dB)
1125.20	-44.32	3.23	-41.09	H	-28.09
1250.20	-39.23	4.50	-34.73	H	-21.73
1375.00	-55.79	5.49	-50.30	H	-37.30
1500.00	-54.91	6.40	-48.51	H	-35.51
1750.00	-50.68	3.70	-46.98	H	-33.98

Table 6-3. Radiated Spurious Data (Cellular WCDMA Mode – Ch. 4357)

NOTES:

1. This unit was tested while powered by an AC power source.
2. The output of the NodeB was terminated in 50Ω for radiated spurious emissions testing.
3. The EUT was placed flat on the test table top while its output port was terminated with a 50Ω load. The data reported in the table above was measured in this test setup.

FCC ID: QLJRAVEN	 PCTEST ENGINEERING LABORATORY, INC.	FCC Pt. 22 WCDMA MEASUREMENT REPORT (CERTIFICATION)		Reviewed by: Quality Manager
Test Report S/N: 0Y1306171016.QLJ	Test Dates: 6/10 - 6/13/2013	EUT Type: NodeB		Page 17 of 30

Cellular WCDMA Radiated Measurements (Cont'd)

§2.1053, 22.917(a)

Field Strength of SPURIOUS Radiation

OPERATING FREQUENCY: 881.40 MHz
 CHANNEL: 4407
 MODULATION SIGNAL: WCDMA
 DISTANCE: 3 meters
 LIMIT: -13.00 dBm

FREQUENCY (MHz)	LEVEL @ ANTENNA TERMINALS (dBm)	SUBSTITUTE ANTENNA GAIN (dBd)	SPURIOUS EMISSION LEVEL (dBm)	EUT POL (H/V)	MARGIN (dB)
1125.00	-44.20	3.23	-40.97	H	-27.97
1250.00	-39.77	4.50	-35.27	H	-22.27
1375.00	-57.71	5.49	-52.22	H	-39.22
1500.00	-56.01	6.40	-49.61	H	-36.61
1750.00	-52.48	3.70	-48.78	H	-35.78

Table 6-4. Radiated Spurious Data (Cellular WCDMA Mode – Ch. 4407)

NOTES:

1. This unit was tested while powered by an AC power source.
2. The output of the amplifier was terminated in 50Ω for radiated spurious emissions testing.
3. The EUT was placed flat on the test table top while its output port was terminated with a 50Ω load. The data reported in the table above was measured in this test setup.

FCC ID: QLJRAVEN	 PCTEST ENGINEERING LABORATORY, INC.	FCC Pt. 22 WCDMA MEASUREMENT REPORT (CERTIFICATION)		Reviewed by: Quality Manager
Test Report S/N: 0Y1306171016.QLJ	Test Dates: 6/10 - 6/13/2013	EUT Type: NodeB		Page 18 of 30

Cellular WCDMA Radiated Measurements (Cont'd)

§2.1053, 22.917(a)

Field Strength of SPURIOUS Radiation

OPERATING FREQUENCY: 891.60 MHz
 CHANNEL: 4458
 MODULATION SIGNAL: WCDMA
 DISTANCE: 3 meters
 LIMIT: -13.00 dBm

FREQUENCY (MHz)	LEVEL @ ANTENNA TERMINALS (dBm)	SUBSTITUTE ANTENNA GAIN (dBd)	SPURIOUS EMISSION LEVEL (dBm)	EUT POL (H/V)	MARGIN (dB)
1125.00	-52.58	3.23	-49.35	H	-36.35
1250.00	-39.31	4.50	-34.81	H	-21.81
1375.00	-50.78	5.49	-45.29	H	-32.29
1500.00	-51.13	6.40	-44.73	H	-31.73
1665.38	-49.40	4.57	-44.83	H	-31.83

Table 6-5. Radiated Spurious Data (Cellular WCDMA Mode – Ch. 4458)

NOTES:

1. This unit was tested while powered by an AC power source.
2. The output of the amplifier was terminated in 50Ω for radiated spurious emissions testing.
3. The EUT was placed flat on the test table top while its output port was terminated with a 50Ω load. The data reported in the table above was measured in this test setup.

FCC ID: QLJRAVEN	 PCTEST ENGINEERING LABORATORY, INC.	FCC Pt. 22 WCDMA MEASUREMENT REPORT (CERTIFICATION)	 Tecore networks	Reviewed by: Quality Manager
Test Report S/N: 0Y1306171016.QLJ	Test Dates: 6/10 - 6/13/2013	EUT Type: NodeB		Page 19 of 30

6.4 Cellular WCDMA Frequency Stability Measurements

§2.1055, 22.355

OPERATING FREQUENCY: 881,400,000 Hz

CHANNEL: 4407

REFERENCE VOLTAGE: 120 VAC

DEVIATION LIMIT: ± 0.00025 % or 2.5 ppm

VOLTAGE (%)	POWER (VAC)	TEMP (°C)	FREQUENCY (Hz)	Freq. Dev. (Hz)	Deviation (%)
100 %	120.00	+ 20 (Ref)	881,399,981	-19	-0.0000022
100 %		- 30	881,399,996	-4	-0.0000005
100 %		- 20	881,399,994	-6	-0.0000007
100 %		- 10	881,400,010	10	0.0000011
100 %		0	881,400,012	12	0.0000014
100 %		+ 10	881,399,991	-9	-0.0000010
100 %		+ 20	881,400,010	10	0.0000011
100 %		+ 30	881,399,991	-9	-0.0000010
100 %		+ 40	881,399,979	-21	-0.0000024
100 %		+ 50	881,399,992	-8	-0.0000009
115 %		+ 20	881,400,014	14	0.0000016
BATT. ENDPOINT	102.00	+ 20	881,399,997	-3	-0.0000003

Table 6-6. Frequency Stability Data (Cellular WCDMA Mode – Ch. 4407)

FCC ID: QLJRAVEN	 PCTEST ENGINEERING LABORATORY, INC.	FCC Pt. 22 WCDMA MEASUREMENT REPORT (CERTIFICATION)		Reviewed by: Quality Manager
Test Report S/N: 0Y1306171016.QLJ	Test Dates: 6/10 - 6/13/2013	EUT Type: NodeB		Page 20 of 30

Cellular WCDMA Frequency Stability Measurements (Cont'd)

§2.1055, 22.355

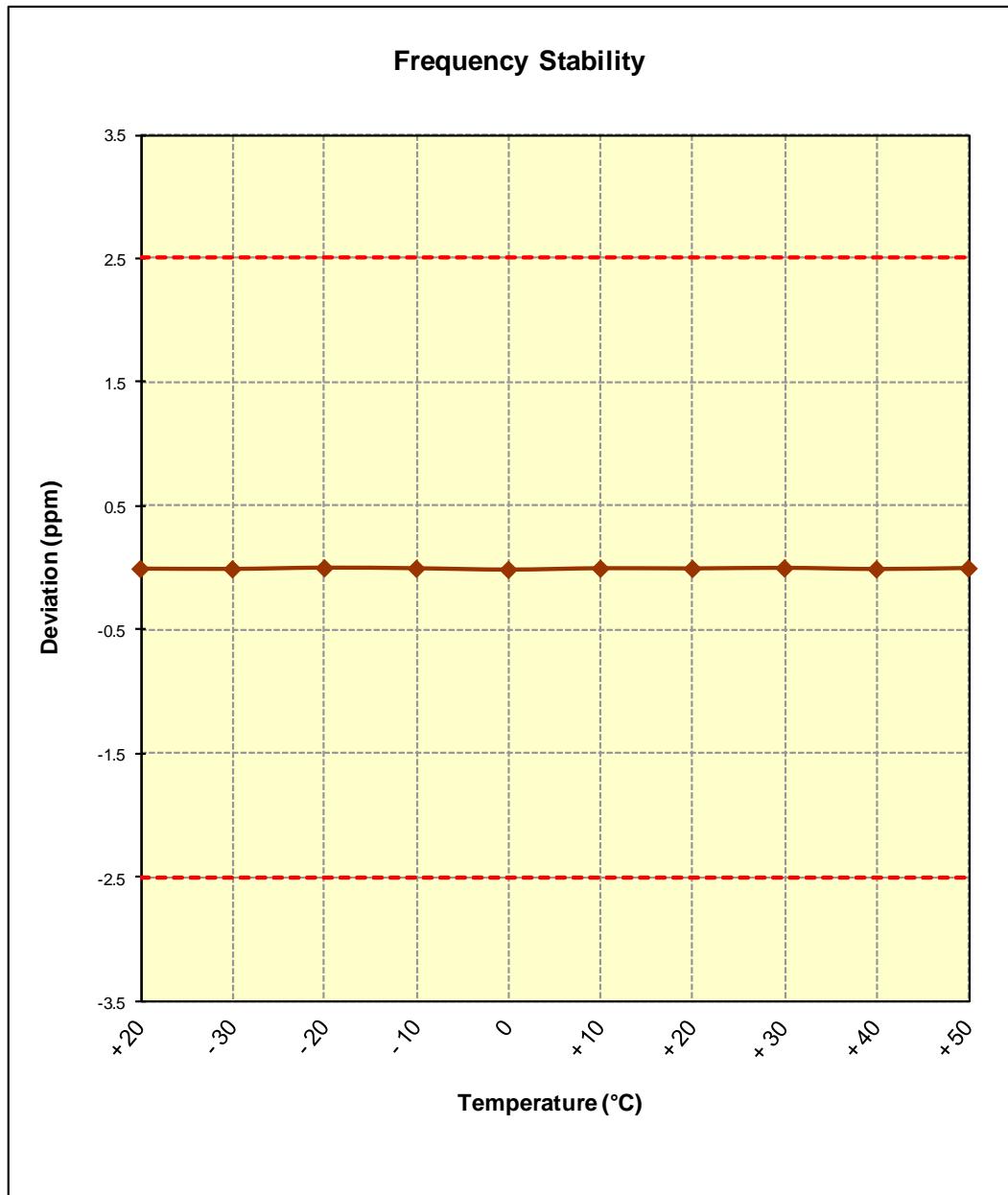
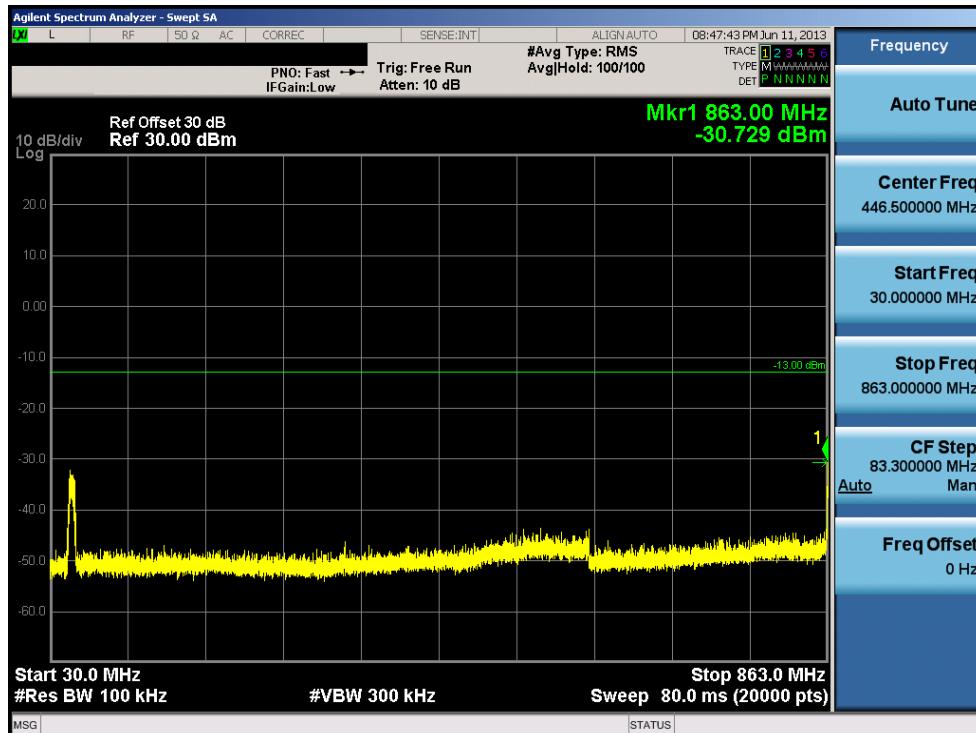


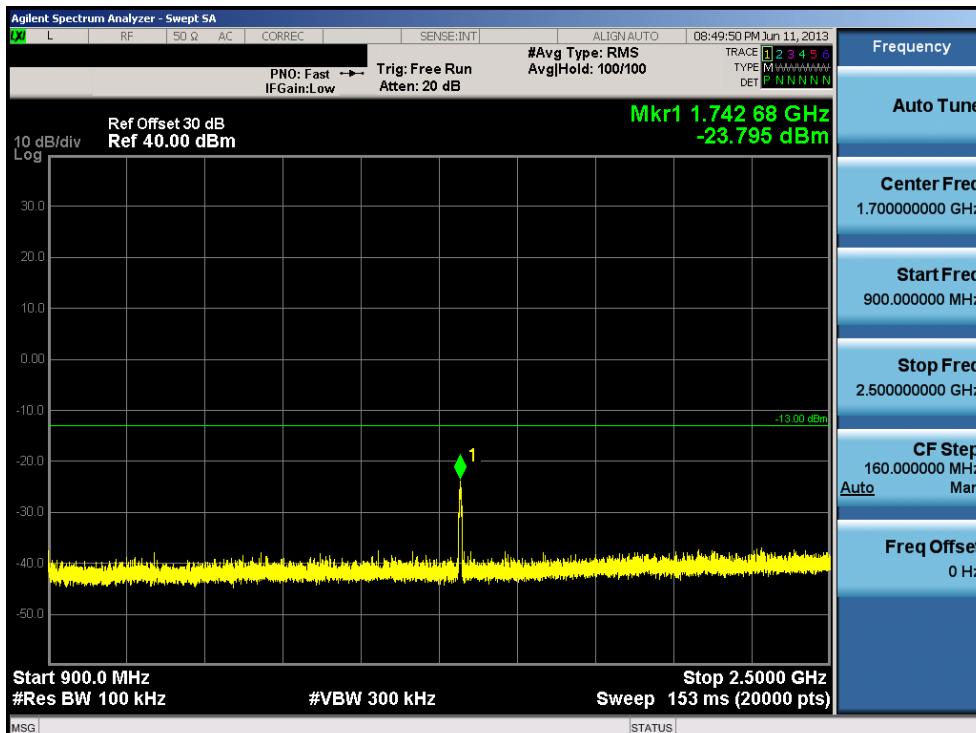
Figure 6-1. Frequency Stability Graph (Cellular WCDMA Mode – Ch. 4407)

FCC ID: QLJRAVEN	 PCTEST ENGINEERING LABORATORY, INC.	FCC Pt. 22 WCDMA MEASUREMENT REPORT (CERTIFICATION)	 Reviewed by: Quality Manager
Test Report S/N: 0Y1306171016.QLJ	Test Dates: 6/10 - 6/13/2013	EUT Type: NodeB	Page 21 of 30

7.0 PLOT(S) OF EMISSIONS

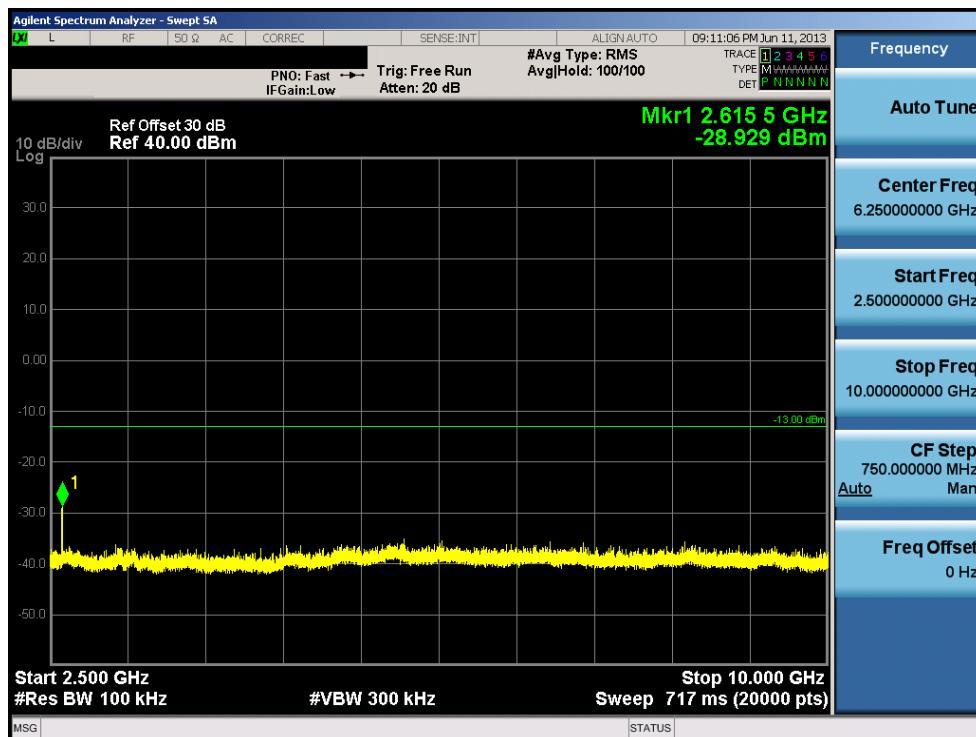


Plot 7-1. Conducted Spurious Plot (Cellular WCDMA Mode – Ch. 4357)

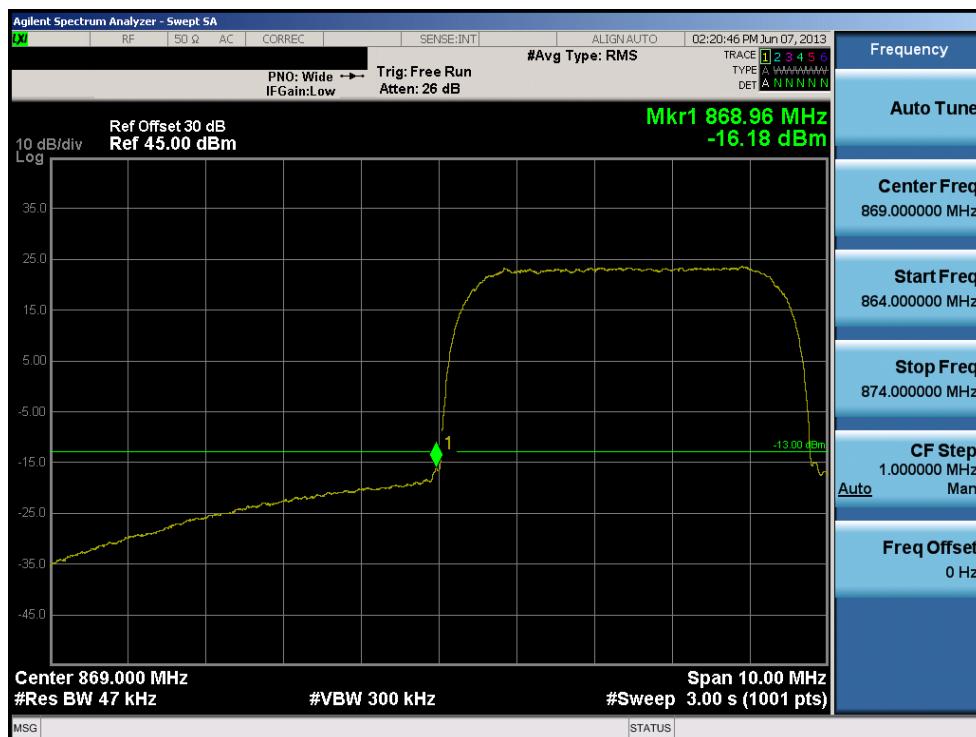


Plot 7-2. Conducted Spurious Plot (Cellular WCDMA Mode – Ch. 4357)

FCC ID: QLJRAVEN	 PCTEST ENGINEERING LABORATORY, INC.	FCC Pt. 22 WCDMA MEASUREMENT REPORT (CERTIFICATION)	 Tecore networks	Reviewed by: Quality Manager
Test Report S/N: 0Y1306171016.QLJ	Test Dates: 6/10 - 6/13/2013	EUT Type: NodeB		Page 22 of 30



Plot 7-3. Conducted Spurious Plot (Cellular WCDMA Mode – Ch. 4357)

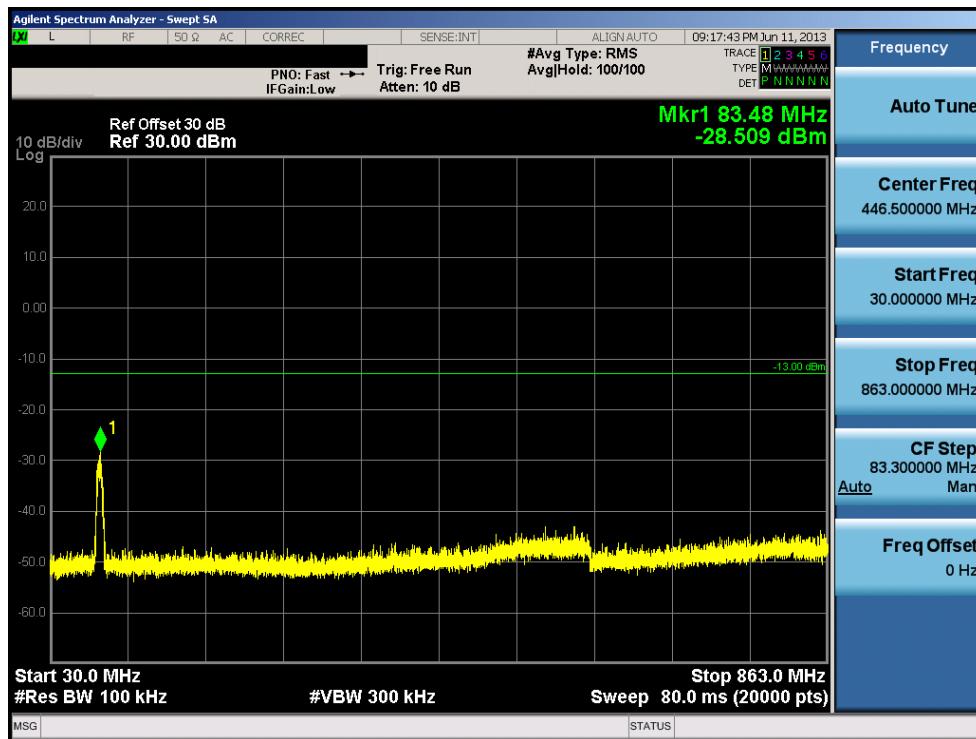


Plot 7-4. Band Edge Plot (Cellular WCDMA Mode – Ch. 4357)

FCC ID: QLJRAVEN		FCC Pt. 22 WCDMA MEASUREMENT REPORT (CERTIFICATION)		Reviewed by: Quality Manager
Test Report S/N: 0Y1306171016.QLJ	Test Dates: 6/10 - 6/13/2013	EUT Type: NodeB		Page 23 of 30

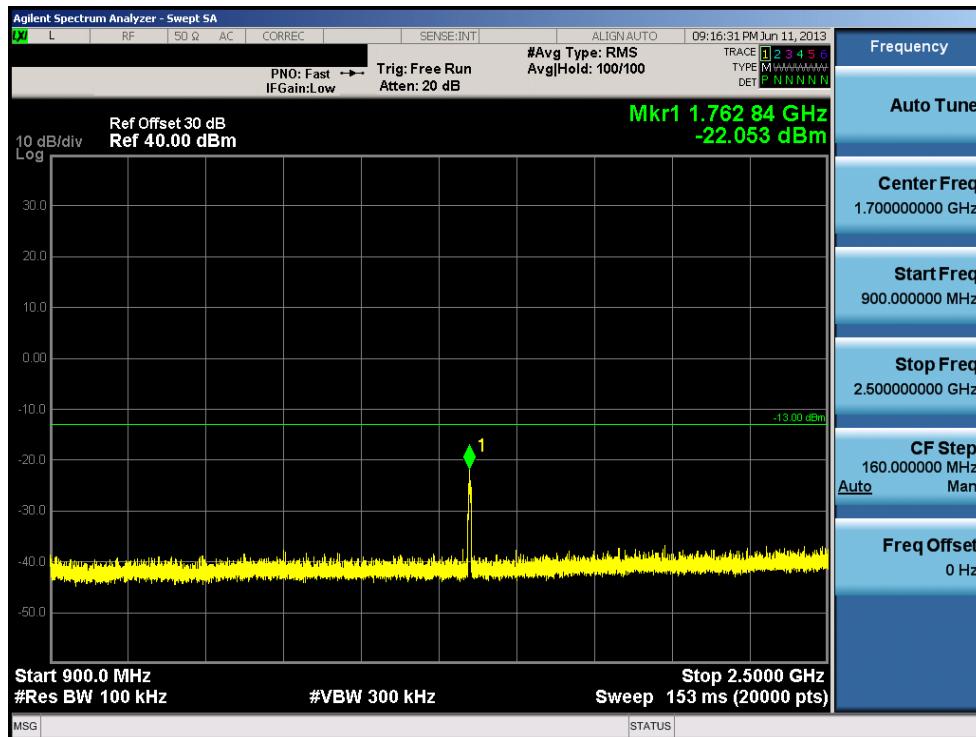


Plot 7-5. Extended Band Edge Plot (Cellular WCDMA Mode – Ch. 4357)

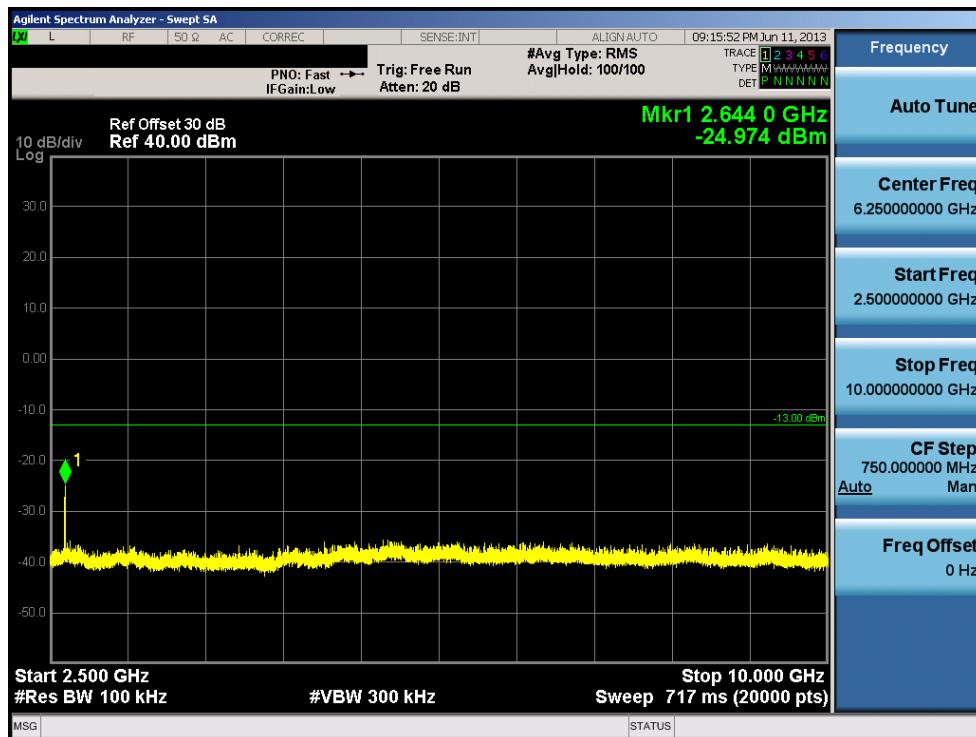


Plot 7-6. Conducted Spurious Plot (Cellular WCDMA Mode – Ch. 4407)

FCC ID: QLJRAVEN		FCC Pt. 22 WCDMA MEASUREMENT REPORT (CERTIFICATION)		Reviewed by: Quality Manager
Test Report S/N: 0Y1306171016.QLJ	Test Dates: 6/10 - 6/13/2013	EUT Type: NodeB		Page 24 of 30

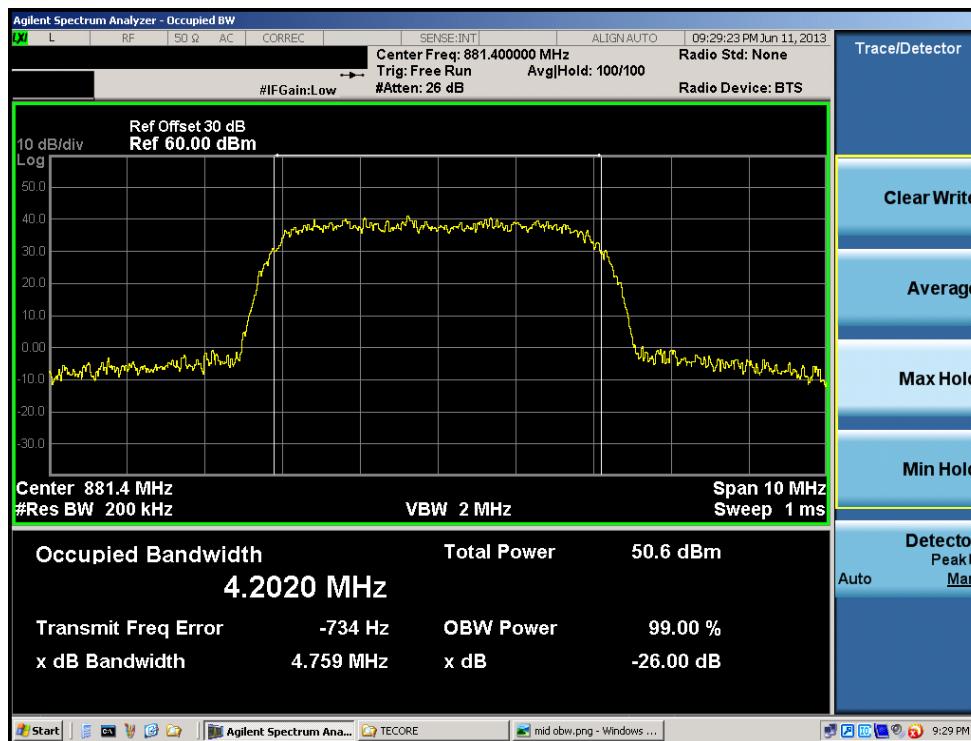


Plot 7-7. Conducted Spurious Plot (Cellular WCDMA Mode – Ch. 4407)

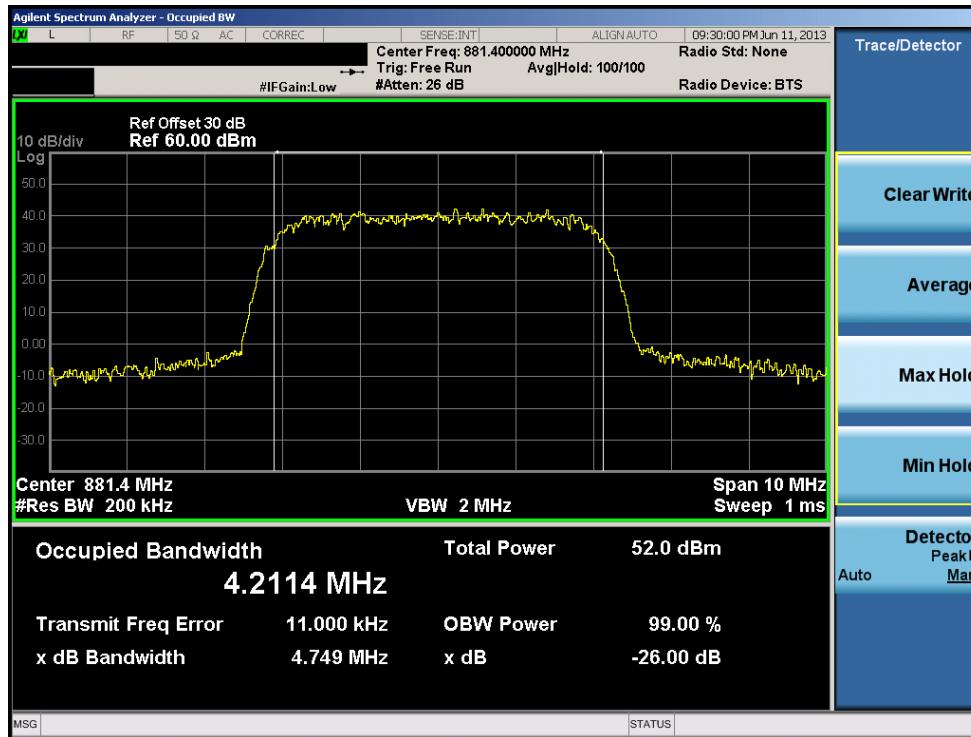


Plot 7-8. Conducted Spurious Plot (Cellular WCDMA Mode – Ch. 4407)

FCC ID: QLJRAVEN	 PCTEST ENGINEERING LABORATORY, INC.	FCC Pt. 22 WCDMA MEASUREMENT REPORT (CERTIFICATION)		Reviewed by: Quality Manager
Test Report S/N: 0Y1306171016.QLJ	Test Dates: 6/10 - 6/13/2013	EUT Type: NodeB		Page 25 of 30

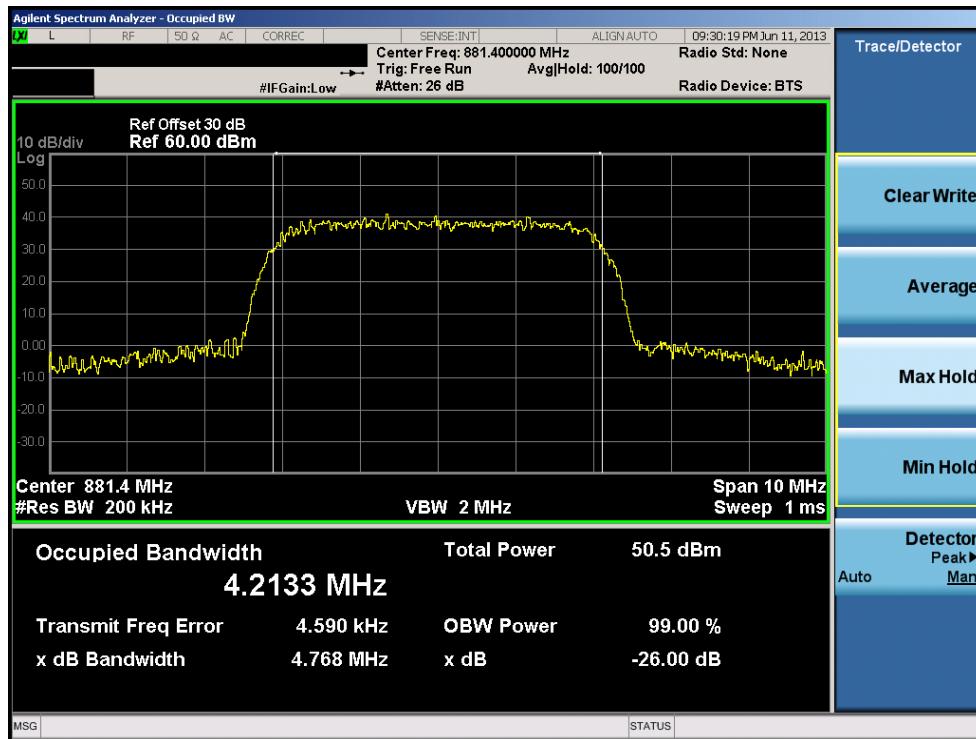


Plot 7-9. Occupied Bandwidth Plot (Cellular WCDMA Mode – Ch. 4407 - QPSK)

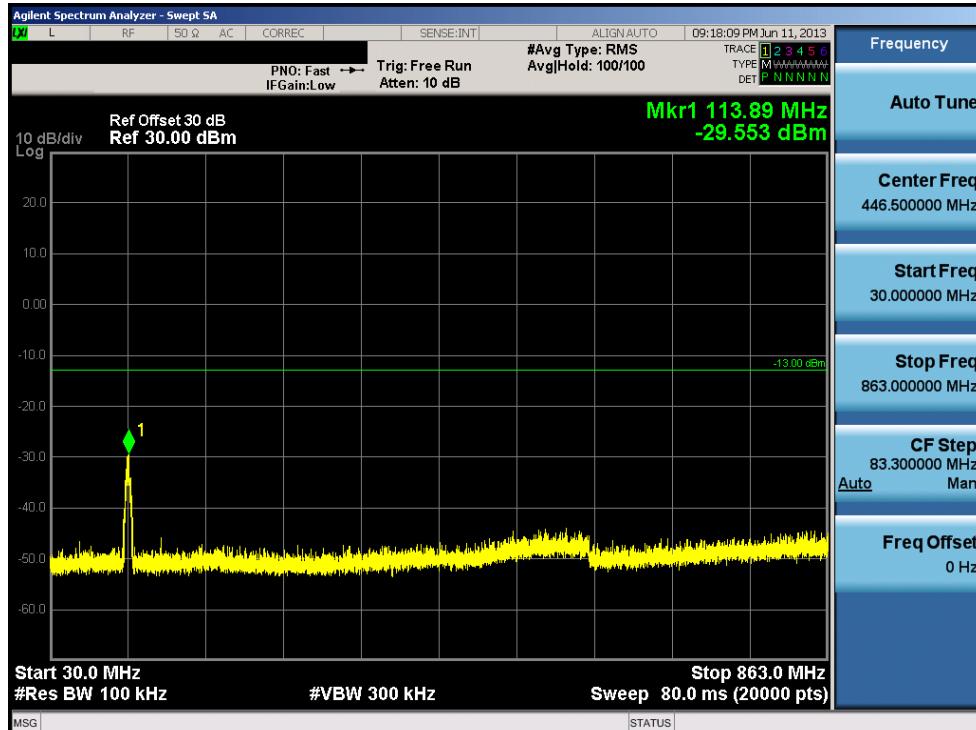


Plot 7-10. Occupied Bandwidth Plot (Cellular WCDMA Mode – Ch. 4407 – 16QAM)

FCC ID: QLJRAVEN		FCC Pt. 22 WCDMA MEASUREMENT REPORT (CERTIFICATION)		Reviewed by: Quality Manager
Test Report S/N: 0Y1306171016.QLJ	Test Dates: 6/10 - 6/13/2013	EUT Type: NodeB		Page 26 of 30

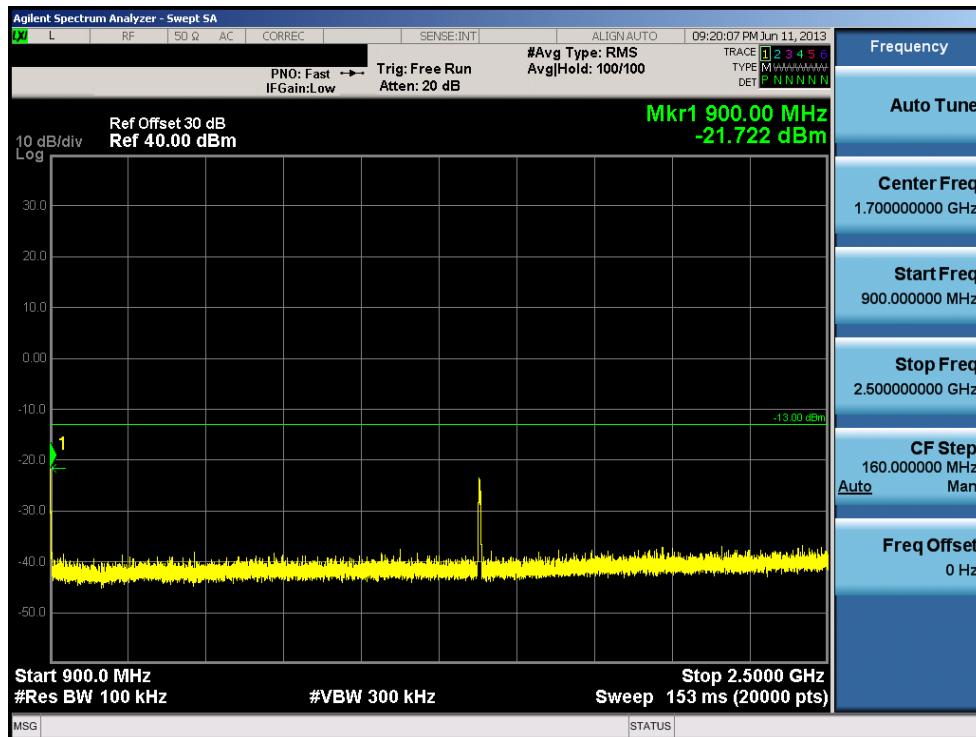


Plot 7-11. Occupied Bandwidth Plot (Cellular WCDMA Mode – Ch. 4407 – 64QAM)

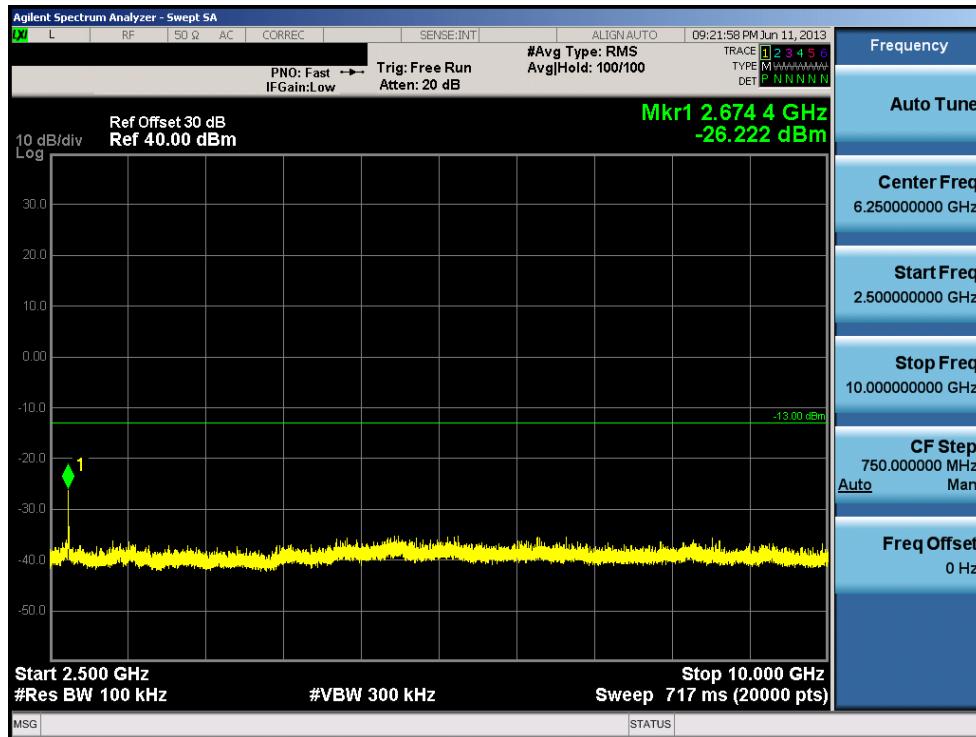


Plot 7-12. Conducted Spurious Plot (Cellular WCDMA Mode – Ch. 4458)

FCC ID: QLJRAVEN	 PCTEST Engineering Laboratory, Inc.	FCC Pt. 22 WCDMA MEASUREMENT REPORT (CERTIFICATION)	Reviewed by: Quality Manager
Test Report S/N: 0Y1306171016.QLJ	Test Dates: 6/10 - 6/13/2013	EUT Type: NodeB	Page 27 of 30



Plot 7-13. Conducted Spurious Plot (Cellular WCDMA Mode – Ch. 4458)

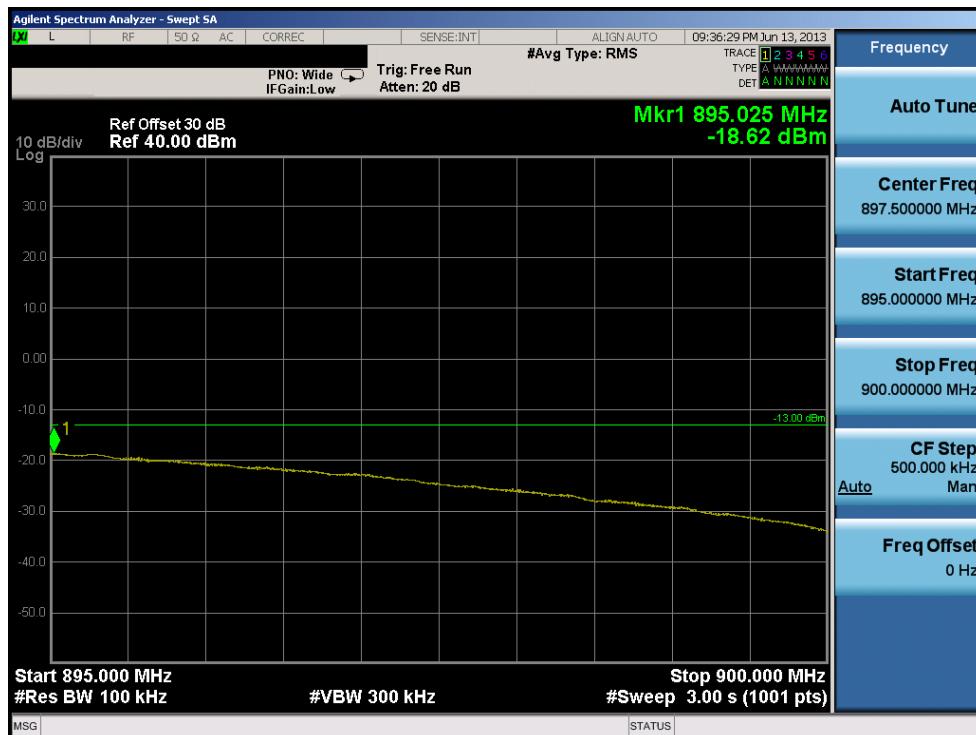


Plot 7-14. Conducted Spurious Plot (Cellular WCDMA Mode – Ch. 4458)

FCC ID: QLJRAVEN		FCC Pt. 22 WCDMA MEASUREMENT REPORT (CERTIFICATION)		Reviewed by: Quality Manager
Test Report S/N: 0Y1306171016.QLJ	Test Dates: 6/10 - 6/13/2013	EUT Type: NodeB		Page 28 of 30



Plot 7-15. Band Edge Plot (Cellular WCDMA Mode – Ch. 4458)



Plot 7-16. Extended Band Edge Plot (Cellular WCDMA Mode – Ch. 4458)

FCC ID: QLJRAVEN	 PCTEST ENGINEERING LABORATORY, INC.	FCC Pt. 22 WCDMA MEASUREMENT REPORT (CERTIFICATION)	 Tecore networks	Reviewed by: Quality Manager
Test Report S/N: 0Y1306171016.QLJ	Test Dates: 6/10 - 6/13/2013	EUT Type: NodeB		Page 29 of 30

8.0 CONCLUSION

The data collected relate only to the item(s) tested and show that the **Tecore NodeB** **FCC ID: QLJRAVEN** complies with all the requirements of Parts 2 and 22 of the FCC rules.

FCC ID: QLJRAVEN	 PCTEST ENGINEERING LABORATORY, INC.	FCC Pt. 22 WCDMA MEASUREMENT REPORT (CERTIFICATION)		 Tecore networks	Reviewed by: Quality Manager
Test Report S/N: 0Y1306171016.QLJ	Test Dates: 6/10 - 6/13/2013	EUT Type: NodeB		Page 30 of 30	