Gobi2000™ Module Dell Latitude™ XT2 PP12S Radiated Emissions Report

80-VP949-9 Rev B

December 3, 2009

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December 3, 2009

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80-VP949-9 Rev B

Table of Contents

List of Tables

1 Summary

1.1 Purpose

QUALCOMM Incorporated submits this test report and associated test data in consideration of Regulatory Type Approval for the following Qualcomm manufactured product.

This report contains radiated maximum output power and radiated spurious emissions test results for the Gobi2000™ module while installed in a Dell Latitude™ XT2 PP12S notebook. This test report supports a Class II Permissive change for J9CGOBI2000-D in reference to FCC Part 22 and Part 24 regulations.

Test results and associated data are provided to demonstrate that the Gobi2000 radiated transmit power and radiated emissions when installed in a host notebook computer comply with CFR 47 Parts 22 and 24. The antenna parameters for the notebook computer are further detailed in the attachments associated with the permissive change filing.

Testing was only completed for GPRS modes as this mode had the highest peak power in the original filing J9CGOBI2000-D. The other modes of operations will have lesser peak power as they utilize the same transmit antenna as GPRS and the conducted test results demonstrate that GRPS has the highest peak power.

Note that a change of ID was completed on June 24, 2009 to generate FCC ID J9CGOBI2000-D from J9CGOBI2000 originally granted January 06, 2009. The Gobi2000™ module is electrically and mechanically identical between the two filings.

1.2 Module Description

The Gobi2000™ module includes a universal embedded-data-connectivity modem in the form of a PCI Express Mini Card, plus the associated software suite for notebook PC applications. The data I/O and power interface to Gobi2000 card is provided via the PCI Express mini-card connector built into the notebook computer.

1.3 Standards References

Table 1.3-1 Standards References

Document Reference Title
FCC CFR47 Part 22; Subpart H
FCC CFR47 Part 24; Subpart E
TIA/EIA 603C (2004)

1.4 Test Result Executive Summary

Table 1.4-1 Radiated Transmit Power Summary

Mode	Band	Max ERP	Max ERP (W)
GPRS	850 MHz	29.48	0.887

Mode	Band	Max EIRP	Max EIRP (W)
GPRS	1900 MHz	32.10	1.622

Table 1.4-2 Radiated Emissions Test Summary

No.	Requirement	Result
1	Part 22 Radiated Emissions	**Pass**
2	Part 24 Radiated Emissions	**Pass**

No emissions within 15dB of the limits were observed.

2 Product Description and Declaration

The following declarations are made regarding test of the Gobi2000™ Module.

2.1 System Configuration

The Gobi2000 module is a universal embedded-data-connectivity modem in the form of PCI Express mini-card.

Table 2.1-1 Module Summary

WWAN Module Model	Gobi2000™
WWAN Module FCC ID	J9CGOBI2000-D
WWAN Module Description	Gobi2000™ module is a PCI Express Mini Card with WWAN connectivity for the WCDMA/HSPA, GSM/GPRS/EDGE and CDMA2000 1x/1x-EVDO protocols, plus GPS position location.
Host(s) Tested:	Dell Latitude™ XT2 PP12S
WWAN Technologies	GSM/GPRS/EDGE CDMA 1x Rel0 CDMA EV-DO Rev A WCDMA/HSPA
Equipment Categories	GPRS Category 10 EDGE Category 10 HSDPA Category 8 (Release 6) HSUPA Category 5 (Release 6)
TX Frequencies	GSM/GPRS/EDGE: 824.2 – 848.8 MHz GSM/GPRS/EDGE: 1850.2 – 1909.8 MHz CDMA 1x/EV-DO: 824.7 – 848.31 MHz CDMA 1x/EV-DO: 1851.25 – 1908.75 MHz WCDMA/HSPA: 826.4 – 846.6 MHz WCDMA/HSPA: 1852.4 – 1907.5 MHz Bands Not used in the United States: GSM/GPRS/EDGE: 880.2 – 914.8 MHz GSM/GPRS/EDGE: 1710.2 – 1784.8 MHz WCDMA/HSPA: 1922.6 – 1977.4 MHz
Duty Cycle(s)	CDMA/WCMDA: 100% GPRS 1 uplink slot: 12.5% GPRS 2 uplink slots: 25%
Power Supply	3.3Vdc supplied by host notebook computer

3 Test Facility and Equipment

3.1 Test Site

All applicable tests were performed at the test facilities noted in

Table 3.1-1.

Table 3.1-1 Test Site Locations

Test Section Part 22/Part 24	Test Site
Maximum Transmit Power	EMC Lab in Building X. This EMC test facility is accredited and listed in the Technology International Lab network, and has been assigned the certificate number 00-042.
Radiated Emissions	EMC Lab in Building X. This EMC test facility is accredited and listed in the Technology International Lab network, and has been assigned the certificate number 00-042.

3.2 Laboratory Test Equipment

All measurements were made with instruments whose operation and accuracy have been verified by an accredited calibration laboratory with traceability to National standards.

The test equipment used for radiated measurements is contained in Appendix A of this report.

3.3 Measurement Uncertainty Summary

Calibration of the instrumentation used for measurements is performed to ANSI/NCSL, Z540-1-1994, ISO-9001-1994, and ISO 10012-1:1992, and is traceable to NIST reference standards.

Calculated measurement uncertainties for the manual radiated emissions measurements performed in the Qualcomm EMC Lab are as shown in Table 3.3-1 below. The uncertainty values below were calculated using the methodologies defined in ETR 028 (Second Edition, March 1994), ANSI/INCSL Z540-2-1997, NAMAS NIS 81 (May 1994), and NIST TN 1297 (1994 Edition).

Radiated uncertainty value achieved is documented in the 80-31351-1 X1, Qualcomm EMC Lab Uncertainty Report.

Table 3.3-1 Radiated Measurement Uncertainties

Measured Parameter	Calculated Expanded Measurement Uncertainty for a 95% Confidence Level (k = 2 Coverage Factor)	Maximum Measurement Uncertainty (UE) Required in EN 301 908-1 v3.2.1
Effective radiated RF power	± 2.63 dB 30 - 180 MHz	± 6 dB
Effective radiated RF power	± 2.63 dB 180 - 1000 MHz	± 3 dB
Effective radiated RF power	± 2.82 dB 1 GHz to 12.75 GHz	± 3 dB

4 Test Setup, Method and Procedure

4.1 Test Frequencies

GPRS low, mid, and high channels were tested at the frequencies defined in Table 4.1-1. No other modes were tested.

Table 4.1-1 Gobi2000 Test Channels

	850 MHz						1900 MHz					
	Low		Mid		High		Low		Mid		High	
	Ch	Freq	Ch	Freq	Ch	Freq	Ch	Freq	Ch	Freq	Ch	Freq
GSM	128	824.2	190	836.6	251	848.8	512	1850.2	661	1880	810	1909.8
CDMA	1013	824.7	384	836.52	777	848.31	25	1851.25	600	1880	1175	1908.75
WCDMA	UL: 4132 DL: 4357	826.4	UL: 4182 DL: 4407	836.4	UL: 4233 DL: 4458	846.6	UL: 9262 DL: 9847	1852.4	UL: 9400 DL: 9800	1880	UL: 9538 DL: 9763	1907.6

4.2 Test Procedures

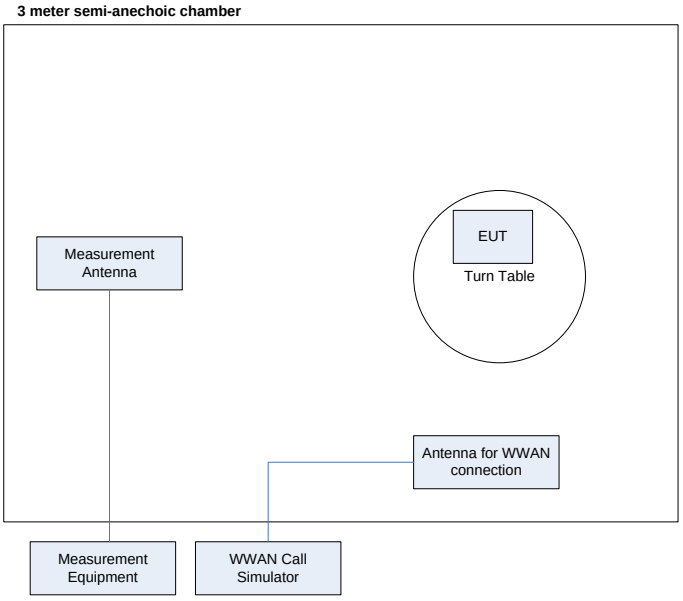
For all testing, the Gobi2000™ module was configured to transmit at maximum power for all testing per the procedure defined in Appendix B.

4.2.1 Transmitter maximum output power

Maximum output power was tested per the procedure defined in Section 2.2.17 of TIA/EIA 603C.

To maximize the measured emissions levels, the receive antenna was moved between a 1 and 4 meter height, and the EUT was rotated from 0 to 360 degrees.

Figure 4-1 Radiated Test Setup



4.2.2 Radiated Emissions

Radiated emissions were tested per the procedure defined in Section 2.2.12 of TIA/EIA 603C.

To maximize the measured emissions levels, the receive antenna was moved between a 1 and 4 meter height, and the EUT was rotated from 0 to 360 degrees.

5 Test Results Summary

This section summarizes the results of the tests, having compared the measured data against the applicable criteria from FCC Part 22 and Part 24. Measurement test data can be found in the Appendix sections.

5.1 Test Result Summary

5.1.1 Radiated Maximum Transmit Output Power

Table 5.1-1 GPRS 850MHz ERP Test Result Summary

	GSM850					
Channel	**128**		**190**		**251**	
	(dBm ERP)	(W ERP)	(dBm ERP)	(W ERP)	(dBm ERP)	(W ERP)
	29.48	0.887	29.08	0.908	29.28	0.847

Table 5.1-2 GPRS 1900 MHz EIRP Result Summary

	GSM1900					
Channel	**512**		**661**		**810**	
	(dBm EIRP)	(W EIRP)	(dBm EIRP)	(W EIRP)	(dBm EIRP)	(W EIRP)
	32.30	1.698	32.10	1.622	32.00	1.585

5.1.2 Radiated Emissions Result Summary

Table 5.1-3 GPRS 850 MHz Part22 Highest Emissions Results

Channel	Freq	Emission ERP (dBm)	Spec (dBm)	Margin
190	2509.8	-41.4	-13	-28.4
251	2546.4	-42.4	-13	-29.4
128	2472.6	-44.5	-13	-31.5
251	2546.4	-44.8	-13	-31.8
128	2472.6	-47.5	-13	-34.5

Table 5.1-4 GPRS 1900 MHz Part 24 Highest Emissions Results

Channel	Freq	Emission EIRP (dBm)	Spec (dBm)	Margin
512	3700.4	-34.3	-13	-21.3
512	3700.4	-37.1	-13	-24.1
512	5550.6	-38.3	-13	-25.3
661	5640	-38.7	-13	-25.7
810	3819.6	--39.2	-13	-26.2

5.2 Measured Data

All measured data is contained in Appendix A .

A Radiated Emissions Test Data

A.1 Overview

Job Number: 10465
Doc Path: \\fuelcell\voodoo\EMC Lab and Test Data\2009\09052 Dell AMG Notebook Pt 22 24
Project Title: Gobi2000 Regulatory Certification Testing
Completion date: 11/05/2009
EUT: Gobi2000 Module/ Dell Latitude™ XT2 PP12S
Temperature: 23 ^{o}C
Relative Humidity: 42%
Barometric Pressure: 753mm
EMC Engineer: Paul Jayne

A.2 Test Equipment

Table 5.2-1 Test equipment for radiated emission

Manufacturer	Model No.	Serial No.	Description	Cal Due Date
Agilent	E4440A	K130220	PSA Spectrum Analyzer	1/7/2010
ARA	DRG-118/A	1033	Dual Ridge Horn Antenna 1 - 18 GHz	06/16/10
EMCO	3115	9612-5043	Horn Antenna 1 - 18 GHz	10/25/10
ARA	LPD-2010/A	1035	LPDA Antenna	09/05/10
Chase	CBL6140A	F88117	Green X Wing/Bilog Antenna 30 MHz - 2 GHz	04/02/10
Agilent	8447D OPT 010	K101421	Low Frequency Pre-Amplifier 100 kHz - 1.3 GHz	08/03/10
Coleman	N-Type	TakeupReel	Take Up Reel	02/15/10
Gore	N-Type	3	Gore Cable 3, pre-amp to SA	02/15/10
Gore	N-Type	21	Gore Cable 21, test receiver/antenna to pre-amp	02/15/10
Gore	N-Type	14	Gore Cable 14, bulkhead to takeup reel	02/15/10

GPRS Low Ch 850MHz

EUT: Gobi2000 module with Dell Latitude™ XT2 PP12S
Mode: GPRS; 2UL slots
Band: 850 MHz
Channel: Low – Ch 128
Test: Radiated ERP and Emissions

Channel	Freq	Measurement BW	Ant Pol (V/H)	SA reading (dBuV/m)	Signal Generator Reading (dBm)	Antenna Gain (dBd)	Antenna Gain (dBi)	ERP (dBm)	EIRP (dBm)	Spec (dBm ERP)	Margin
128	824.2	1 MHz	H	127.4	23.5	5.98	8.15	29.48	31.65	38.5	-9.02
128	824.2	1 MHz	V	128.3	23.7	5.98	8.15	29.68	31.85	38.5	-8.82
128	1648.4	1 MHz	H	47.3	-56.8	4.43	6.6	-52.37	-50.2	-13	-39.37
128	1648.4	1 MHz	V	48.3	-55.2	4.43	6.6	-50.77	-48.6	-13	-37.77
128	2472.6	1 MHz	H	50.9	-54.3	6.83	9	-47.47	-45.3	-13	-34.47
128	2472.6	1 MHz	V	55.8	-51.3	6.83	9	-44.47	-42.3	-13	-31.47
128	3296.8	1 MHz	V	Noise Floor							
128	3296.8	1 MHz	H	Noise Floor							
128	4121	1 MHz	H	Noise Floor							
128	4121	1 MHz	V	Noise Floor							
128	4945.2	1 MHz	V	Noise Floor							
128	5769.4	1 MHz	H	Noise Floor							
128	5769.4	1 MHz	V	Noise Floor							
128	6593.6	1 MHz	H	Noise Floor							
128	6593.6	1 MHz	V	Noise Floor							
128	7417.8	1 MHz	H	Noise Floor							
128	7417.8	1 MHz	V	Noise Floor							
128	8242	1 MHz	H	Noise Floor							

A.4 GPRS Mid Ch 850MHz

EUT: Gobi2000 module with Dell Latitude™ XT2 PP12S
Mode: GPRS; 2UL slots
Band: 850 MHz
Channel: Mid – Ch 190
Test: Radiated ERP and Emissions

Channel	Freq	Measurement BW	Ant Pol (V/H)	SA reading (dBuV/m)	Signal Generator Reading (dBm)	Antenna Gain (dBd)	Antenna Gain (dBi)	ERP (dBm)	EIRP (dBm)	Spec (dBm ERP)	Margin
190	836.6	1 MHz	H	127.6	23.1	5.98	8.15	29.08	31.25	38.5	-9.42
190	836.6	1 MHz	V	128.9	23.9	5.98	8.15	29.88	32.05	38.5	-8.62
190	1673.2	1 MHz	H	53.1	-51.4	4.43	6.6	-46.97	-44.8	-13	-33.97
190	1673.2	1 MHz	V	49.1	-55.6	4.43	6.6	-51.17	-49	-13	-38.17
190	2509.8	1 MHz	H	50	-54.9	6.83	9	-48.07	-45.9	-13	-35.07
190	2509.8	1 MHz	V	62.3	-48.2	6.83	9	-41.37	-39.2	-13	-28.37
190	3346.4	1 MHz	V	Noise Floor							
190	3346.4	1 MHz	H	Noise Floor							
190	4183	1 MHz	H	Noise Floor							
190	4183	1 MHz	V	Noise Floor							
190	5019.6	1 MHz	H	Noise Floor							
190	5019.6	1 MHz	V	Noise Floor							
190	5856.2	1 MHz	H	Noise Floor							
190	5856.2	1 MHz	V	Noise Floor							
190	6692.8	1 MHz	H	Noise Floor							
190	6692.8	1 MHz	V	Noise Floor							
190	7529.4	1 MHz	H	Noise Floor							
190	7529.4	1 MHz	V	Noise Floor							
190	8366	1 MHz	H	Noise Floor							

A.5 GPRS High Ch 850MHz

EUT: Gobi2000 module with Dell Latitude™ XT2 PP12S
Mode: GPRS; 2UL slots
Band: 850 MHz
Channel: High – Ch 251
Test: Radiated ERP and Emissions

Channel	Freq	Measurement BW	Ant Pol (V/H)	SA reading (dBuV/m)	Signal Generator Reading (dBm)	Antenna Gain (dBd)	Antenna Gain (dBi)	ERP (dBm)	EIRP (dBm)	Spec (dBm ERP)	Margin
251	848.8	1 MHz	H	128.1	23.3	5.98	8.15	29.28	31.45	38.5	-9.22
251	848.8	1 MHz	V	129.6	24.2	5.98	8.15	30.18	32.35	38.5	-8.32
251	1697.6	1 MHz	H	50.8	-55.2	4.43	6.6	-50.77	-48.6	-13	-37.77
251	1697.6	1 MHz	V	51.7	-54.3	4.43	6.6	-49.87	-47.7	-13	-36.87
251	2546.4	1 MHz	H	53.4	-51.6	6.83	9	-44.77	-42.6	-13	-31.77
251	2546.4	1 MHz	V	58.6	-49.2	6.83	9	-42.37	-40.2	-13	-29.37
251	3395.2	1 MHz	H	Noise Floor							
251	3395.2	1 MHz	V	Noise Floor							
251	4244	1 MHz	H	Noise Floor							
251	4244	1 MHz	V	Noise Floor							
251	5092.8	1 MHz	H	Noise Floor							
251	5092.8	1 MHz	V	Noise Floor							
251	5941.6	1 MHz	H	Noise Floor							
251	5941.6	1 MHz	V	Noise Floor							
251	6790.4	1 MHz	H	Noise Floor							
251	6790.4	1 MHz	V	Noise Floor							
251	7639.2	1 MHz	H	Noise Floor							
251	7639.2	1 MHz	V	Noise Floor							
251	8488	1 MHz	H	Noise Floor							

A.6 GPRS Low Ch 1900MHz

EUT: Gobi2000 module with Dell Latitude™ XT2 PP12S
Mode: GPRS; 2UL slots
Band: 1900 MHz
Channel: Low – Ch 512
Test: Radiated EIRP and Emissions

Channel	Freq	Measurement BW	Ant Pol (V/H)	SA reading (dBuV/m)	Signal Generator Reading (dBm)	Antenna Gain (dBd)	Antenna Gain (dBi)	ERP (dBm)	EIRP (dBm)	Spec (dBm EIRP)	Margin
512	1850.2	1 MHz	V	130.6	24.4	5.73	7.9	30.13	32.3	33	-0.7
512	1850.2	1 MHz	V	126.4	20.9	5.73	7.9	26.63	28.8	33	-4.2
512	3700.4	1 MHz	H	67.4	-45.2	8.73	10.9	-36.47	-34.3	-13	-21.3
512	3700.4	1 MHz	V	62.7	-48	8.73	10.9	-39.27	-37.1	-13	-24.1
512	5550.6	1 MHz	H	61.2	-49.3	8.83	11	-40.47	-38.3	-13	-25.3
512	5550.6	1 MHz	V	62.4	-48.2	8.83	11	-39.37	-37.2	-13	-24.2
512	7400.8	1 MHz	H	Noise Floor							
512	7400.8	1 MHz	V	Noise Floor							
512	1850.2	1 MHz	V	Noise Floor							
512	9251	1 MHz	V	Noise Floor							
512	11101.2	1 MHz	H	Noise Floor							
512	11101.2	1 MHz	V	Noise Floor							
512	12951.4	1 MHz	H	Noise Floor							
512	12951.4	1 MHz	V	Noise Floor							
512	14801.6	1 MHz	H	Noise Floor							
512	14801.6	1 MHz	V	Noise Floor							
512	16651.8	1 MHz	H	Noise Floor							
512	16651.8	1 MHz	V	Noise Floor							
512	18502	1 MHz	H	Noise Floor							

A.7 GPRS Mid Ch 1900MHz

EUT: Gobi2000 module with Dell Latitude™ XT2 PP12S
Mode: GPRS; 2UL slots
Band: 1900 MHz
Channel: Mid – Ch 661
Test: Radiated EIRP and Emissions

Channel	Freq	Measurement BW	Ant Pol (V/H)	SA reading (dBuV/m)	Signal Generator Reading (dBm)	Antenna Gain (dBd)	Antenna Gain (dBi)	ERP (dBm)	EIRP (dBm)	Spec (dBm EIRP)	Margin
661	1880	1 MHz	H	130.2	24.2	5.73	7.9	29.93	32.1	33	-0.9
661	1880	1 MHz	V	127.2	22.3	5.73	7.9	28.03	30.2	33	-2.8
661	3760	1 MHz	H	64.8	-50.2	8.73	10.9	-41.47	-39.3	-13	-26.3
661	3760	1 MHz	V	62.7	-52.6	8.73	10.9	-43.87	-41.7	-13	-28.7
661	5640	1 MHz	H	65.6	-49.7	8.83	11	-40.87	-38.7	-13	-25.7
661	5640	1 MHz	V	63.1	-52.5	8.83	11	-43.67	-41.5	-13	-28.5
661	7520	1 MHz	H	Noise Floor							
661	7520	1 MHz	V	Noise Floor							
661	9400	1 MHz	H	Noise Floor							
661	9400	1 MHz	V	Noise Floor							
661	11280	1 MHz	H	Noise Floor							
661	11280	1 MHz	V	Noise Floor							
661	13160	1 MHz	H	Noise Floor							
661	13160	1 MHz	V	Noise Floor							
661	15040	1 MHz	H	Noise Floor							
661	15040	1 MHz	V	Noise Floor							
661	16920	1 MHz	H	Noise Floor							
661	16920	1 MHz	V	Noise Floor							
661	18800	1 MHz	H	Noise Floor							

A.8 GPRS High Ch 1900MHz

EUT: Gobi2000 module with Dell Latitude™ XT2 PP12S
Mode: GPRS; 2UL slots
Band: 1900 MHz
Channel: High – Ch 810
Test: Radiated EIRP and Emissions

Channel	Freq	Measurement BW	Ant Pol (V/H)	SA reading (dBuV/m)	Signal Generator Reading (dBm)	Antenna Gain (dBd)	Antenna Gain (dBi)	ERP (dBm)	EIRP (dBm)	Spec (dBm EIRP)	Margin
810	1909.8	1 MHz	H	128.9	24.1	5.73	7.9	29.83	32.0	33	-1
810	1909.8	1 MHz	V	126	21	5.73	7.9	26.73	28.9	33	-4.1
810	3819.6	1 MHz	H	59.2	-50.4	8.73	10.9	-41.67	-39.5	-13	-26.5
810	3819.6	1 MHz	V	59.8	-50.1	8.73	10.9	-41.37	-39.2	-13	-26.2
810	5729.4	1 MHz	H	Noise Floor							
810	5729.4	1 MHz	V	Noise Floor							
810	7639.2	1 MHz	H	Noise Floor							
810	7639.2	1 MHz	V	Noise Floor							
810	9549	1 MHz	H	Noise Floor							
810	9549	1 MHz	V	Noise Floor							
810	11458.8	1 MHz	H	Noise Floor							
810	11458.8	1 MHz	V	Noise Floor							
810	13368.6	1 MHz	H	Noise Floor							
810	13368.6	1 MHz	V	Noise Floor							
810	15278.4	1 MHz	H	Noise Floor							
810	15278.4	1 MHz	V	Noise Floor							
810	17188.2	1 MHz	H	Noise Floor							
810	17188.2	1 MHz	V	Noise Floor							
810	19098	1 MHz	H	Noise Floor							

B Base Station Emulator Settings and Test Procedures

B.1 For CDMA2000 1x/EVDO

Use CDMA2000 Rev 6 protocol in the call box.

1) Test for Reverse/Forward TCH RC1, Reverse/Forward TCH RC2, and RC3 Reverse FCH and demodulation of RC 3, 4 or 5.
    a. Set up a call using Fundamental Channel Test Mode 1 (RC1, SO 2) with 9600 bps data rate only.
    b. As per C.S0011 or TIA/EIA-98-F Table 4.4.5.2-1, set the test parameters as shown in Table 5-2.
    c. Send continuously '0' power control bits to the module.
    d. Measure the output power at MODULE antenna connector as recorded on the power meter with values corrected for cables losses.
    e. Repeat step b through d for Fundamental Channel Test Mode:
        i. RC1, SO55
        ii. RC2, SO9
        iii. RC2, SO55
        iv. RC3, SO55
2) Test for RC 3 Reverse FCH, RC3 Reverse SCH0 and demodulation of RC 3, 4 or 5.
    a. Set up a call using Supplemental Channel Test Mode 3 (RC 3, SO 32) with 9600 bps Fundamental Channel and 9600 bps SCH0 data rate.
    b. As per C.S0011 or TIA/EIA-98-F Table 4.4.5.2-2, set the test parameters as shown in Table 5-3.
    c. Send alternating '0' and '1' power control bit to the module
    d. Determine the active channel configuration. If the desired channel configuration is not the active channel configuration, increase Îor by 1 dB and repeat the verification. Repeat this step until the desired channel configuration becomes active.
    e. Measure the output power at the UNDP-1 antenna connector.
    f. Decrease Îor by 0.5 dB.
    g. Determine the active channel configuration. If the active channel configuration is the desired channel configuration, measure the output power at the module antenna connector.
    h. Repeat step f and g until the output power no longer increases or the desired channel configuration is no longer active. Record the highest output power achieved with the desired channel configuration active.
    i. Repeat step a through h ten times and average the result.
3) Test for RC3 Reverse FCH, RC 3 DCCH and demodulation of RC3, 4 or 5.
    a. Use the same procedure as described in 2).

Table 5-2 Parameters for Max. Power with a single traffic code channel, SR1

Parameter	Units	Value
$\hat{I}_{or}$	dBm/1.23 MHz	-104
$\frac{\text{Pilot } E_c}{I_{or}}$	dB	-7
$\frac{\text{Traffic } E_c}{I_{or}}$	dB	-7.4

Table 5-3 Parameters for Max. Power with multiple traffic code channel, SR1

Parameter	Units	Value
$\frac{\text{Pilot } E_c}{I_{or}}$	dB	-7
$\frac{\text{Traffic } E_c}{I_{or}}$	dB	-7.4

1xEV-DO

1) Use 1xEV-DO Rel 0 protocol in the call box.
    a. RTAP
        - Select Test Application Protocol to RTAP
        - Set RTAP Rate to 9.6 kbps
        - Generator Info -> Termination Parameters -> Max Forward Packet Duration -> 16 Slots
        - Set Îor to -60 dBm/1.23 MHz
        - Send continuously ‘0’ power control bits
        - Measure the power at UNDP-1 antenna connector
        - Repeat above steps for RTAP Rate = 19.2 kbps, 38.4 kbps, 76.8 kbps and 153.6 kbps respectively
2) Use 1xEV-DO Rev A protocol in the call box.
    a. RETAP
        - Select Test Application Protocol to RETAP
        - F-Traffic Format -> 4 (1024, 2, 128) Canonical (307.2k, QPSK)
        - Set R-Data Pkt Size to 128
        - Protocol Subtype Config -> Release A Physical Layer Subtype -> Subtype 2
          ->PL Subtype 2 Access Channel MAC Subtype -> Default (Subtype 0)
        - Generator Info -> Termination Parameters -> Max Forward Packet Duration -> 16 Slots
          ->ACK R-Data After -> Subpacket 0 (All ACK)
        - Set Îor to -60 dBm/1.23 MHz
        - Send continuously ‘0’ power control bits
        - Measure the power at the antenna connector

- Repeat above steps for R-Data Pkt Size = 256, 512, 768, 1024, 1536, 2048, 3072, 4096, 6144, 8192, 12288 respectively.
- Repeat above steps for R-Data Pkt Size = 256, 512, 768, 1024, 1536, 2048, 3072, 4096, 6144, 8192, 12288 respectively.

B.2 For WCDMA/HSDPA/HSUPA

Configure the call box to support all WCDMA tests in respect to the 3GPP 34.121 (listed in Table 5-4).

Rel99

1) Set a Test Mode 1 loop back with a 12.2kbps Reference Measurement Channel (RMC)
2) Set and send continuously Up power control commands to the module

HSDPA Rel 6

1) Establish a Test Mode 1 look back with both 1 12.2kbps RMC channel and an H-Set1 Fixed Reference Channel (FRC). With the 8820 this is accomplished by setting the signal Channel Coding to "Fixed Reference Channel" and configuring for HSET-1 QKSP.
2) Set beta values and HSDPA settings for HSDPA Sebtest1 according to Table 5-4
3) Send continuously Up power control commands to the module
4) Measure the power at the UNDP-1 antenna connector using the power meter with modulated average detector
5) Repeat the measurement for the HSDPA Subtest2, 3 and 4 as given in Table 5-4

HSUPA Rel 6

1) Use UL RMC 12.2kbps and FRC H-Set1 QPSK, Test Mode 1 loop back. With the 8820 this is accomplished by setting the signal Channel Coding to "E-DCH Test Channel" and configuring the equipment category to Cat6_10ms.
2) Set the Absolute Grant for HSUPA Subtest1 according to Table 5-4
3) Set the UNDP power to be at least 5dB lower than the Maximum output power
4) Send power control bits to give one TPC_cmd = +1 command to the UNDP. If UNDP doesn't send any E-DPCH data with decreased E-TFCI within 500ms, then repeat this process until the decreased E-TFCI is reported.
5) Confirm that the E-TFCI transmitted by the UNDP is equal to the target E-TFCI in Table 5-4. If the E-TFCI transmitted by the UNDP is not equal to the target E-TFCI, then send power control bits to give one TPC_cmd = -1 command to the UE. If UE sends any E-DPCH data with decreased E-TFCI within 500 ms, send new power control bits to give one TPC_cmd = -1 command to the UE. Then confirm that the E-TFCI transmitted by the UE is equal to the target E-TFCI in Table 5-4. If the E-TFCI transmitted by the UE is not equal to the target E-TFCI, then fail the UE
6) Repeat the measurement for the HSUPA Subtest2, 3, 4 and 5 as given in Table 5-4

Table 5-4 3GPP Rel99/HSPA Subtest Settings

	Mode	**Rel99**	**Rel6 HSDPA**	**Rel6 HSDPA**	**Rel6 HSDPA**	**Rel6 HSDPA**	**Rel6 HSUPA**	**Rel6 HSUPA**	**Rel6 HSUPA**	**Rel6 HSUPA**	**Rel6 HSUPA**
	Subtest	**-**	**1**	**2**	**3**	**4**	**1**	**2**	**3**	**4**	**5**
WCDMA General Settings	Loopback Mode	Test Mode 1	Test Mode 1				Test Mode 1				
	Rel99 RMC	12.2kbps RMC	12.2kbps RMC				12.2kbps RMC				
	HSDPA FRC	Not Applicable	H-Set1				H-Set1				
	HSUPA Test	Not Applicable	Not Applicable				HSUPA Loopback				
	Power Control Algorithm	Algorithm2	Algorithm2				Algorithm2				
	βc	Not Applicable	2/15	12/15	15/15	15/15	11/15	6/15	15/15	2/15	15/15
	βd	Not Applicable	15/15	15/15	8/15	4/15	15/15	15/15	9/15	15/15	15/15
	βec	Not Applicable	-	-	-	-	209/225	12/15	30/15	2/15	24/15
	βc/βd	8/15	2/15	12/15	15/8	15/4	11/15	6/15	15/9	2/15	15/15
	βhs	Not Applicable	4/15	24/15	30/15	30/15	22/15	12/15	30/15	4/15	30/15
	βed	Not Applicable	Not Applicable				1309/225	94/75	47/15 47/15	56/75	134/15
HSDPA Specific Settings	DACK	Not Applicable	8				8				
	DNAK	Not Applicable	8				8				
	DCQI	Not Applicable	8				8				
	Ack-Nack repetition factor	Not Applicable	3				3				
	CQI Feedback (Table 5.2B.4)	Not Applicable	4ms				4ms				
	CQI Repetition Factor (Table 5.2B.4)	Not Applicable	2				2				
	Ahs = βhs/βc	Not Applicable	30/15				30/15				
HSUPA Specific Settings	D E-DPCCH	Not Applicable	Not Applicable				6	8	8	5	7
	DHARQ	Not Applicable	Not Applicable				0	0	0	0	0
	AG Index	Not Applicable	Not Applicable				20	12	15	17	21
	ETFCI (from 34.121 Table C.11.1.3)	Not Applicable	Not Applicable				75	67	92	71	81
	Associated Max UL Data Rate kbps	Not Applicable	Not Applicable				242.1	174.9	482.8	205.8	308.9
	Reference E_TFCIs	Not Applicable	Not Applicable				E-TFCI 11 E-TFCI PO 4 E-TFCI 67 E-TFCI PO 18 E-TFCI 71 E-TFCI PO 23 E-TFCI 75 E-TFCI PO 26 E-TFCI 81 E-TFCI PO 27		E-TFCI 11 E-TFCI PO 4 E-TFCI 67 E-TFCI PO 18 E-TFCI 71 E-TFCI PO 23 E-TFCI 75 E-TFCI PO 26 E-TFCI 81 E-TFCI PO 27		

B.3 For GSM/GPRS/EGDE

- Configure the call box to support GPRS test.
- Configure for desired number of uplink transmit lots.
- Set MS_TX level to 0 (850 MHz) or 2 (1900MHz) to configure EUT to transmit at maximum output power.