QUALCOMM
CDMA Technologies

Gobi™2000 Module FCC MPE Evaluation

80-VN379-205 Rev. A

December 15, 2008

Submit technical questions to:
regulatory.support@qualcomm.com

QUALCOMM Incorporated
5775 Morehouse Drive
San Diego, CA 92121-1714
U.S.A.

Terms and Conditions of Usage

This document may refer to or describe parts whose manufacture, use, sale, offer for sale, or importation into the United States are limited or prohibited by one or more U.S. Federal Court injunctions against QUALCOMM Incorporated. This document is not to be construed as an offer to sell such parts for use or importation into the U.S., nor should it be construed as assistance in making, using, selling, offering to sell, or the importation of any product in the U.S. containing such parts. This document is intended solely to provide information for those products that are outside the scope of the injunction. Recipient's download and/or use of the information in this document constitutes agreement with these terms.

December 15, 2008

Gobi™2000 Module FCC MPE Evaluation
80-VN379-205 Rev. A

Revision History

Date	Change Description	Revision	Editor(s)
12/15/08	Initial Release	A	John Forrester

Gobi™2000 Module FCC MPE Evaluation

FCC Part 22 & 24 Certification	
FCC ID:	J9CGOBI2000
Model:	Gobi2000

STATEMENT OF CERTIFICATION

The data, data evaluation and equipment configuration represented herein are a true and accurate representation of the measurements of the sample's radio frequency interference emissions characteristics as of the dates and at the times of the test under the conditions herein specified.

Report Prepared by:	QUALCOMM Incorporated 5775 Morehouse Drive San Diego, CA 92121-1714

1. Introduction

In this application, Qualcomm seeks modular approval for the Gobi™2000 Module wireless modem for use in mobile configuration. Based on the FCC CFR 47 §1.1310, 2.1091, we have concluded that the Gobi™2000 Module will comply with the FCC rules on RF exposure for mobile devices if the antenna again does not exceed 7 dBi in cellular and 3.5 dBi in PCS. The following analysis demonstrates such compliance. The analysis includes both cellular and PCS bands which operates in North America.

The conducted transmit power levels used for the calculations are based on worst case maximum transmit power conditions. The nominal conducted transmit power for production modules will be lower then the values used in the calculations.

2. Product Declarations

Table 1 summarizes transmitter parameters associated with this permissive change application.
The WWAN modes of operation reflect the Gobi™2000 Module parameters associated with this FCC ID J9CGOBI2000.

Table 1 WWAN Transmitter Declarations

Mode	Equipment Category	Max Transmitter Duty Cycle	Band Name	Available in U.S.	Transmitter Range (MHz)	Maximum Conducted Power		Max Antenna Gain (dBi)
						(dBm)	(W)	
GPRS/EDGE	GPRS/EDGE Cat 12 (Max 2 UL TX Slots)	25%	850 MHz - US Cellular	Yes	824-849	33.00	1.995	7.00
			900 MHz - EGSM	No	880-915	33.00	1.995	7.00
			1800 MHz - DCS	No	1710-1785	30.00	1.000	3.50
			1900 MHz - US PCS	Yes	1850-1910	30.00	1.000	3.50
WCDMA/HSPA	R5 HSDPA Cat 8 R6 HSUPA Cat 6	100%	Band 1 2.1 GHz	No	1920-1980	25.00	0.316	3.50
			Band 2 1900 MHz	Yes	1850-1910	25.00	0.316	3.50
			Band 5 850 MHz	Yes	824-849	25.00	0.316	7
			Band 6 800 MHz (Japan)	No	830-840	25.00	0.316	7.00
			Band 8 900 MHz	No	880-915	25.00	0.316	7.00
CDMA2000	1x EVDO Release 0 EVDO Revision A	100%	BC0 850 MHz	Yes	824-849	25.00	0.316	7
			BC1 1900 MHz	Yes	1850-1910	25.00	0.316	3.5

3. RF Exposure Limit

According to FCC CFR 47 §1.1310: the criteria listed in Table 2 shall be used to evaluate the environmental impact of human exposure to radio-frequency (RF) radiation as specified in 1.1307(b).

Table 2 Limits for Maximum Permissible Exposure (MPE)

Frequency Range (MHz)	Electric Field Strength (V/m)	Magnetic Field Strength (A/m)	Power Density (mW/cm^2)	Average Time (Minutes)
(A) Limits For Occupational / Control Exposures (f = frequency)				
30-300	61.4	0.163	1.0	6
300-1500	…	…	f/300	6
1500-100,000	…	…	5.0	6
(B) Limits For General Population / Uncontrolled Exposure (f = frequency)				
30-300	27.5	0.073	0.2	30
300-1500	…	…	f/1500	30
1500-100,000	…	…	1.0	30

4. RF Evaluation

Maximum Permissible Exposure (MPE) Calculations are completed using the power density formula defined in OET65:

Power Density (mW/cm^2) = (P_{out} * G *) / ($4\pi R^2$), where:

- P_{out} = output power to antenna (mW) * * %DutyCycle
- G = gain of antenna in linear scale
- R = distance between observation point and center of the radiator (cm)

Table 3 shows duty cycles for typical technologies.

Table 3 Technology Duty Cycles for MPE Calculations

Technology	Duty Cycle
CDMA2000	100%
WCDMA	100%
GSM	12.5%
GPRS Cat 10 (2 Uplink Transmit Slots)	25.0%
GPRS Cat 12 (4 Uplink Transmit Slots)	50.0%

The MPE calculations for the WWWAN standalone transmitters at a separation distance of 20 cm are shown in Table 3 per the transmit power and antenna gain values declared in Table 1.

Table 4 Maximum Permissible Exposure (MPE) Calculations

Technology	Frequency (MHz)	Max Antenna Gain (dBi)	Maximum Conducted Power		Peak Radiated Power			Duty Cycle	Average Radiated Power		Power Density @ 20cm (mW/cm^2)	MPE Limit (mW/cm^2)	MPE Margin (dB)
			(dBm)	(W)	EIRP (dBm)	EIRP (W)	ERP (W)		EIRP (dBm)	EIRP (W)			
GPRS 850 (2 UL Slots)	824	7	33	1.995	40.00	10.00	6.1	25%	33.98	2.50	0.497	0.549	0.4
WCDMA 850 MHz	824	7	25	0.316	32.00	1.58	1.0	100%	32.00	1.58	0.315	0.549	2.4
CDMA 850 MHz	824	7	25	0.316	32.00	1.58	1.0	100%	32.00	1.58	0.315	0.549	2.4
GPRS 1900 (2 UL Slots)	1850	3.5	29.5	0.891	33.00	2.00	1.2	25%	26.98	0.50	0.099	1.000	10.0
WCDMA 1900 MHz	1850	3.5	25	0.316	28.50	0.71	0.4	100%	28.50	0.71	0.141	1.000	8.5
CDMA 1900 MHz	1850	3.5	25	0.316	28.50	0.71	0.4	100%	28.50	0.71	0.141	1.000	8.5

5. Conclusion

The Gobi™2000 Module meets the mobile 20 cm separation distance as specified in Section 2.1091 of the FCC rules. An appropriate RF exposure compliance statement will be placed in the User's Guide.