# Gobi2000

## User Guide

***80-VK890-3 Rev. A***

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# Revision history

| Revision | Date | Description |
|---|---|---|
| A | December 2008 | Initial release |

# 1 Introduction

## 1.1 Documentation overview

The Gobi2000™ is the second-generation PCI Express™ Mini Card that enables notebook computer wireless data connectivity. This datacard solution delivers WWAN connectivity for the CDMA2000® 1X, 1x EV-DO, UMTS (HSDPA and HSUPA), and GSM/GPRS/EDGE protocols, plus GPS position location, in a single package. The complete Gobi2000 solution includes all hardware and software necessary for embedded wireless connectivity in notebook PCs.

All released Gobi2000 documents are posted at the CDMA Tech Support website (https://support.cdmatech.com) and are available for download.

This Gobi2000 user guide is organized as follows:

Chapter 1 Provides an overview of Gobi2000, provides the list of supported frequencies, operating modes, and defines terms and acronyms used throughout this document.

Chapter 2 Provides standards compliance and regulatory information.

Table 1-1 lists documents referred to throughout the Gobi2000 document set; consult these documents for additional information.

**Table 1-1 Reference documents**

| Ref No. | Document |
|---|---|
| [4] | FCC Regulations - CFR 47, Part 1, 2, 15, 22, and 24 |

## 1.2 Application description

The Gobi2000 platform 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. Table 1-2 lists Gobi2000 frequency range:

**Table 1-2 Gobi2000 supported frequency range**

| Mode | Band | UL frequency (MHz) | DL frequency (MHz) |
|---|---|---|---|
| ***WCDMA Release 99***<br>***HSDPA Release 5***<br>***HSUPA Release 6*** | 1 | 1920-1980 | 2110-2170 |
| | 2 | 1850-1910 | 1930-1990 |
| | 5 | 824-849 | 869-894 |
| | 6 | 830-840 | 875-885 |
| | 8 | 880-915 | 925-960 |
| ***GSM***<br>***GPRS***<br>***EGPRS*** | 850 | 824-849 | 869-894 |
| | 900 | 880-915 | 925-960 |
| | 1800 | 1710-1785 | 1805-1875 |
| | 1900 | 1850-1910 | 1930-1990 |
| ***CDMA2000 1X***<br>***CDMA2000 1xEV-DO***<br>■ Rev. 0<br>■ Rev. A | BC0 | 824-849 | 869-894 |
| | BC1 | 1850-1910 | 1930-1990 |
| ***GPS position location*** | GPS L1 | - | 1574.42 - 1576.42 |

Key connectivity support includes:

- USB 2.0 high-speed
- Universal integrated circuit card (UICC) for RUIM/USIM
- Primary and secondary antenna connectors
- Status LED driver output
- DC power supply input and enable/disable control

# 1.3 Gobi2000 operating modes

Example Gobi2000 platform operating modes and their expected data throughput rates are summarized in Table 1-3. Operating modes are set by the host computer via the USB interface.

**Table 1-3 Gobi2000 operating modes and throughput rates[1]**

| Operating mode | Data throughput rate[2] | |
|---|---|---|
| | Forward link | Reverse link |
| CDMA 1x RTT | 153 kbps | 153 kbps |
| CDMA 1x EV-DO | 3.1 Mbps | 1.8 Mbps |
| WCDMA R99 | 384 kbps | 384 kbps |
| WCDMA - HSDPA | 7.2 Mbps | --- |
| WCDMA - HSUPA | --- | 5.76 Mbps |
| GSM | 14.4 kbps | 14.4 kbps |

**Table 1-3 Gobi2000 operating modes and throughput rates[1]** (cont.)

| Operating mode | Data throughput rate[2] | |
|---|---|---|
| | Forward link | Reverse link |
| GPRS | 85.6 kbps | 42.8 kbps |
| EDGE | 236.8 kbps | 118.4 kbps |

1. GPS position location can be enabled simultaneously with any airlink operating mode, or Rx diversity can be enabled during any CDMA or WCDMA operating mode.
2. Target peak data rates are listed; actual throughput performance varies depending on operating and RF environment conditions.

# 1.4 Terms and acronyms

Table 1-4 defines the terms and acronyms used throughout this document.

**Table 1-4 Terms and acronyms**

| Term | Definition |
|---|---|
| AMSS | Advanced Mobile Subscriber Software |
| CAPI | Computer application programmable interface |
| CDMA | Code Division Multiple Access |
| CE | Mandatory conformity marking on many European products |
| Cell | Cellular band |
| CTIA | Cellular Telecommunications and Internet Association |
| DCS | Digital cellular system at 1800 MHz |
| DDR SDRAM | Dual data rate synchronous dynamic random access memory |
| EDGE | Enhanced Data Rate for GSM Evolution |
| EMC | Electromagnetic compatibility |
| ESD | Electrostatic discharge |
| FCC | Federal Communications Commission |
| GPRS | General packet radio service |
| GPS | Global positioning system |
| GSM | Global System for Mobile communications |
| HSDPA | High speed downlink packet access |
| HSUPA | High speed uplink packet access |
| IMT | International mobile telecommunications |
| ISOD | Interface specification and operational description |
| JTAG | Joint Test Action Group |
| MDM | Mobile Data Modem |
| PA | Power amplifier |

**Table 1-4 Terms and acronyms** (cont.)

| Term | Definition |
|---|---|
| PCI | Peripheral component interconnect |
| PCS | Personal communication system |
| PHY | Physical layer (USB transceiver) |
| PM, PMIC | Power management, power management integrated circuit |
| QDL | Qualcomm Down Loader |
| RFR | Radio frequency receiver |
| RoHS | Restriction of hazardous substances |
| RTR | Radio frequency transceiver |
| RUIM | Removable user identity module |
| TIA/EIA | Telecommunication Industry Association/Electronic Industries Alliance |
| TS | Technical specification |
| TXCO | Temperature-compensated crystal oscillator |
| UICC | Universal integrated circuit card |
| ULPI | USB transceiver macrocell interface + low pin interface |
| UMTS | Universal Mobile Telecommunications System |
| Gobi2000 | Gobi2000 refers to a particular Qualcomm product |
| USB | Universal serial bus |
| USIM | Universal subscriber identity module |
| VCTCXO | Voltage controlled temperature-compensated crystal oscillator |
| WCDMA | Wideband Code Division Multiple Access |
| WLAN | Wireless local area network |
| WHQL | Windows® Hardware Quality Labs |
| WWAN | Wireless wide area network |

# 2 Standards and Regulatory Compliance

## 2.1 Standards and certification

The Gobi2000 platform conforms to the following standards and certification requirements:

- CDMA
  - TIA/EIA IS-98E (CDMA2000 1X)
  - TIA/EIA IS-866 (1x EV-DO)
- UMTS (WCDMA)
  - TS 25.101
- GSM
  - TS 45.005
- FCC
  - 47 CFR Part 1 – RF radiation exposure limits
  - 47 CFR Part 2 – Equipment authorization
  - 47 CFR Part 15 – Unintentional radiators
  - 47 CFR Part 22 – Cellular
  - 47 CFR Part 24 – PCS
- CE
  - EMC protection requirements
    - EN 301 489-1 – Common technical requirements
    - EN 301 489-7 – GSM and DCS
    - EN 301 489-24 – WCDMA 2100
  - Effective use of spectrum to avoid unwanted interference requirements
    - EN 301 908-1 – General requirements
    - EN 301 908-2 – WCDMA 900/2100
    - EN 301 511 – GSM900/GSM1800
    - EN 301 607-1 – GSM900/GSM1800
- CTIA/GCF/PTCRB
- Safety

- EN 50360/61 full carrier certification (carriers TBD)

- Microsoft® WHQL certification
- RoHS compliance

# 2.2 Regulatory information

## 2.2.1 Safety warnings

Do not operate the Gobi2000 platform in the following environments:

- In active blasting areas
- In potentially explosive environments such as refuelling points, fuel depots, or chemical plants
- Near medical equipment, especially life support equipment that might be susceptible to radio interference
- In an aircraft as follows:
  - Gobi2000 transmissions could interfere with aircraft electrical and communication systems. Like cell phones, using the Gobi2000 platform in an aircraft is illegal in some jurisdictions.
  - If cell phone usage is permitted while the aircraft is on the ground, normal Gobi2000 operation is also permitted.

## 2.2.2 North American compliance

The Gobi2000 platform has been authorized for mobile operation in North America. The initial authorization grant does not permit end-user installation.

A permissive change will be submitted to add end-user installation and/or portable usage conditions. The permissive change application includes detailed information on Gobi2000's two-way authentication procedure, preventing use of the module in unauthorized notebooks.

For mobile applications, the following conditions must be met:

1. Maintain at least a 20 cm separation between the antenna and the user's body.
2. Radiated transmit power must be equal to or lower than that specified in the FCC Grant of Equipment Authorization for FCC ID: J9CGOBI2000.
3. To comply with FCC/IC regulations limiting both maximum RF output power and human exposure to RF radiation, maximum antenna gain (including cable loss) must not exceed:
   - Cellular band < 7.5 dBi
   - PCS band < 3.5 dBi
4. Independent Gobi2000 operation — the Gobi2000 platform must not be colocated or jointly operated with any other transmitter or antenna within the host device.

5. Installation of the Gobi2000 module into a host device can only be completed by authorized personnel unless the FCC certification addresses FCC host/module authentication requirements.
6. A label with the following statements must be attached to the host end product:
   - This device contains Tx FCC ID: J9CGOBI2000
   - This equipment contains equipment certified under IC: 2723A-GOBI2000
   - Other regional required regulatory markings
7. The host end product must include a user manual that clearly defines operating requirements and conditions that must be observed to ensure compliance with current FCC/IC RF exposure guidelines.
8. The host end product must also pass the FCC Part 15 unintentional emission testing requirement and be properly authorized per FCC Part 15.

For portable devices, in addition to conditions 3 through 6 described above, a separate approval is required to satisfy the SAR requirements of FCC Part 2.1093 and IC RSS-102.