Tune-Up Procedure

1. Description :

The Gobi 3000 and Gobi 3000Udevices are WWAN datacards implemented in a PCI Express full-size mini card form factor, the datacard and host PC software combination deliver multiband, multimode WWAN connectivity in a single hardware configuration. Gobi3000 supports CDMA2000® 1x EV-DO,UMTS,and GSM. The Gobi3000 devices also have an internal GPS receiver that can operate standalone or in simultaneous operation with its WWAN radios. Gobi3000U has the same HW/SW features as Gobi3000, but does not operate in 1x/1x EV-DO mode. Aside from this difference, all references below to Gobi3000 also apply to Gobi3000U.

The Gobi3000 module mounts in a notebook PC's internal PCI-E full-size mini card slot and connects to the notebook’s antenna system via RF cables embedded within the notebook. The Gobi3000 host PC software enables communication between the connection manager software and the Gobi3000 module via a HS-USB interface. The host PC hard drive stores multiple network carrier specific modem firmware images, and up to six firmware images may be programmed into the Gobi3000 flash memory. After the connection manager selects a specific network carrier image for use, if the image is already present in the flash, the Gobi3000 device runs the specified image from its on-board memory. If the image is not present in flash, the host PC software downloads the selected image into the Gobi3000, where it is authenticated and then programmed into the flash memory. Programming the image into the flash takes approximately 30 seconds. When executing from an image already in flash, initialization time is a few seconds

2. Qualcomm chipsets

The Gobi3000 device uses the following Qualcomm chipset components.

Baseband and RF: MDM6600 (Gobi3000), MDM6200 (Gobi3000U)

Power: PM8028™ IC

The MDM6600/MDM6200 device is the Qualcomm third-generation data modem designed exclusively for 3G data card applications without voice or multimedia features. It is a single-chip device that integrates the ARM1136-J™ processor core; two low-power, high-performance modem DSPs; and radioOne® RF into a single package.

3. Modem capabilities

WCDMA R99

All modes and data rates for WCDMA frequency division duplex (FDD), with the following restrictions:

The downlink supports the following specifications:

- Up to four physical channels, including the broadcast channel (BCH), if present
- Up to three dedicated physical channels (DPCHs)
- Spreading factor (SF) range support from 4 to 256
- Support for the following transmit diversity modes:

– Space-time transmit diversity (STTD)

– Time-switched transmit diversity (TSTD)

– Closed-loop feedback transmit diversity (CLTD)

- The uplink supports the following specifications:

– One physical channel, eight TrCH, and 16 TrBks starting at any frame boundary

– A maximum data rate of 384 kbps

- SMS (CS and PS)
- PS data rate – 384 kbps DL/384 kbps UL
- Supports receive diversity in all bands

HSDPA

- Downlink Category 8 (7.2 Mbps) or 10 (14.4 Mbps), depending on carrier support
- HS-DSCH (HS-SCCH, HS-PDSCH, and HS-DPCCH) and the R99 transport channels, as defined in 3GPP specifications
- A maximum of four simultaneous HS-SCCH channels, as defined in the 3GPP specifications
- A maximum of 10 HS-PDSCH channels, both QPSK and 16 QAM modulation
- CQI and ACK/NACK on HS-DPCCH channel, as defined in the 3GPP specifications
- All incremental redundancy versions for HARQ, as defined in the 3GPP specifications
- Can switch between HS-PDSCH and DPCH channel resources, as directed by the network
- Network activation of compressed mode by SF/2 or HLS on the DPCH for conducting inter-frequency or inter-RAT measurements when the HS-DSCH is active
- STTD on both associated DPCH and HS-DSCH simultaneously
- CLTD mode 1 on the DPCH when the HS-PDSCH is active
- STTD on HS-SCCH when either STTD or CLTD mode 1 are configured on the associated DPCH
- TFC selection limitation on the UL factoring in transmissions on the HS-DPCCH, as required in TS 25.133

- Supports receive diversity in all bands
- Supports equalizer on all bands
- Supports Type 3i Receiver requirements

HSUPA – Support the release 6, March 2006 standard for HSUPA, including the following features:

- E-DCH data rates of up to 5.76 Mbps for 2 ms TTI (UE category 6) uplink
- N E-AGCH, E-RGCH and E-HICH channels for downlink, as defined in the 3GPP specifications. E-RGCH and E-HICH support serving and non-serving radio links, with up to four radio links in the E-DCH active set
- STTD on all HSUPA downlink channels
- CLTD mode 1 on HS-PDSCH and DPCH, along with HSUPA channels
- All incremental redundancy versions for HARQ and maximum number of HARQ retransmissions, as defined in 3GPP specifications
- E-DCH channel on the uplink, as defined in the 3GPP specifications, with support for up to four E-DPDCH channels
- HSUPA channels simultaneously with R99 and HSDPA channels, as defined in the 3GPP specifications
- Switch between HSUPA channels and DPCH channel resources, as directed by the network
- Handover using compressed mode with simultaneous E-DCH and HS-DSCH interactive/background and streaming QoS classes

GSM R99

- Supports CS SMS

GPRS

- Packet-switched data (GPRS)
- DTM (simple class A) operation
- Multislot class 10 data services
- CS schemes – CS1, CS2, CS3, and CS4
- GEA1, GEA2, and GEA3 ciphering
- Maximum of four Rx time slots per frame

EDGE

- EDGE E2 power class for 8 PSK
- DTM (simple class A), multislot class 10
- Downlink coding schemes – CS 1-4, MCS 1-9
- Uplink coding schemes – CS 1-4, MCS 1-9
- BEP reporting
- Enhanced DTM
- PS handover

- RSACCH
- RFACCH
- HMSC
- SRB loopback and test mode B
- 8-bit and 11-bit RACH
- PBCCH support
- One-phase/two-phase access procedures
- Link adaptation and incremental redundancy
- NACC, extended UL TBF

CDMA1x (IS-2000)

- Supports RC1, 2, 3, 4, and 5
- Supports SO-2, 9, 32, 35, 55
- Does not support circuit switched data calls
- Forward quick paging channel (F-QPCH)
- Supports receive diversity in all bands
- Supports up to 153.6 kbps data throughput on both forward and reverse links
- Quasi-linear interference cancellation (QLIC™)

CDMA 1xEV-DO Rev A (IS-856)

- High-speed peak data rates of 3.1 Mbps on the downlink and 1.8 Mbps on the uplink
- Handoffs between IS-2000 and IS-856 systems
- Supports receive diversity in all bands
- Full time simultaneous HDR (SHDR)

GPS

- Standalone
- gpsOneXTRA™ assistance for enhanced standalone GPS performance

4. RF performance characteristics

The transmit power and receiver sensitivity minimum and maximum limits as below

The typical results are the mean value measured across multiple channels within each band at +25ºC and 3.3 V. Typical performance may vary over time and environment and is not guaranteed.

Radio mode	Band	Min	Set point	Max
1X	BC0	22	24	24.5
	BC1	22	24	24.7
	BC6	22.7	23.5	24.7
1XEV-DO	BC0	22	24	24.5
	BC1	22	24	24.7
	BC6	22.7	23.5	24.7
WCDMA R99	1	21.7	24	24.5
	2	21.7	24	24.7
	3	22.5	24	24.5
	5/6	22.0	24	24.5
	8	22.0	24	24.5
GSM/EGPRS	850/900	31	32.5	33
	1800/1900	27.5	29.5	31

5. Power Supply

5.1 Safe Sequencing

Power down the +3.3V_aux supply before connecting or disconnecting Gobi3000 from the PCI-E connector. Disconnecting Gobi3000 from its PCI-E connector while DC voltage is applied on the +3.3V_aux pins may cause permanent damage.

5.2 RF Compliance Testing

RF compliance tests require a stable power supply capable of sourcing >3A connected to the Gobi3000 device. Qualcomm recommends using a lab bench power supply (e.g. Keithley 340x series) with remote sense leads connected directly to the PCI-E connector's +3.3V_aux power supply pins. Most wall adapter devices do not use remote sensing and so are unsuitable for RF compliance testing.

The Gobi3000 debug fixture (20-N0211-P1) supports this type connection via J36. See [Q13] for a description of debug test fixture features. Use an oscilloscope to monitor voltage and current during max uplink transmit power operation (GSM, WCDMA, CDMA2000) to ensure the remote sense lead wiring provides stable operation with no significant transients.