AirLink
Communications

Redwing GPRS

User Guide

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Important Notice

Because of the nature of wireless communications, transmission and reception of data can never be guaranteed. Data may be delayed, corrupted (i.e., have errors) or be totally lost. Although significant delays or losses of data are rare when wireless devices such as the AirLink Communications modem are used in a normal manner with a well-constructed network, the AirLink modem should not be used in situations where failure to transmit or receive data could result in damage of any kind to the user or any other party, including but not limited to personal injury, death, or loss of property. AirLink Communications, Inc., accepts no responsibility for damages of any kind resulting from delays or errors in data transmitted or received using the AirLink Communications modem, or for failure of the AirLink Communications modem to transmit or receive such data.

Safety and Hazards

Do not operate the AirLink Communications modem in areas where blasting is in progress, where explosive atmospheres may be present, near medical equipment, near life support equipment, or any equipment which may be susceptible to any form of radio interference. In such areas, the AirLink Communications modem **MUST BE POWERED OFF**. The AirLink Communications modem can transmit signals that could interfere with this equipment. Do not operate the AirLink Communications modem in any aircraft, whether the aircraft is on the ground or in flight. In aircraft, the AirLink Communications modem **MUST BE POWERED OFF**. When operating, the AirLink Communications modem can transmit signals that could interfere with various onboard systems. The driver or operator of any vehicle should not operate the AirLink Communications modem while in control of a vehicle. Doing so will detract from the driver or operator's control and operation of that vehicle. In some states and provinces, operating such communications devices while in control of a vehicle is an offence.

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Redwing GPRS User Guide

Table of Contents
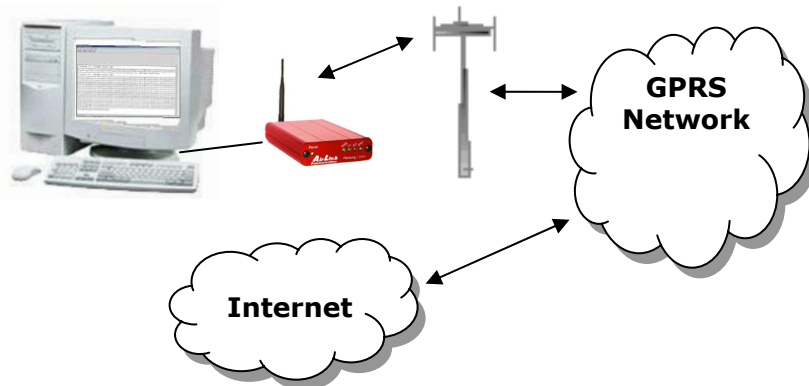
Redwing GPRS
User Guide

1. Introduction

The GSM/GPRS wireless network combines the world's leading wireless standard—the Global System for Mobile Communications (GSM)—with fast, packet-switched access to data networks such as the Internet. Providing this fast access is the General Packet Radio Service (GPRS).

The AirLink GPRS modems are designed to operate in GSM/GPRS networks. Two data services are available in the GSM/GPRS networks: GPRS, a packet switched connection, and SMS, a short message service..

GPRS

GPRS is an IP-based service that offers fast, packet-switched access to data networks such as the Internet. It is a mobile service that improves the peak-time capacity of a GSM network. GPRS gives packet-switched access over GSM to external data networks with high peak transfer capacity. The main objective of GPRS is to offer access to standard data networks such as TCP/IP. GPRS is a non-voice service designed specifically for transmitting data. It breaks data messages into separate packets for transmission from the mobile device and sends them to destinations in an external network.

Most any Internet-based application or service will run on GPRS. GPRS offers peak throughputs of 40 Kbps (53.6 Kbps raw) Because GPRS capacity is shared among active users in the same coverage area, actual throughputs may vary.

1.1 Redwing Product Overview

The AirLink Redwing GPRS is a rugged, full duplex GPRS modem that provides wireless transport capabilities for fixed and mobile applications. GPRS is an efficient and secure wireless technology that works well for fixed or mobile applications.

The Redwing's rugged form factor is ideal for industrial and commercial applications that require real-time communications. The Redwing provides wireless data communications for a variety of applications, such as telemetry, public safety, SCADA, traffic control, traffic metering, transit arrival systems and more.

Front of Redwing
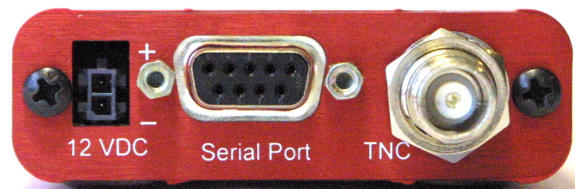
Back of Redwing

2. Redwing Network Connection

The AirLink Redwing GPRS modems are capable of providing network connections for GPRS and SMS data.

2.1 Internet (TCP/IP) Connections via GPRS

When using the Redwing GPRS, remote access to is done via a PPP (TCP/IP) connection to the GPRS network. The GPRS carrier actually provides Internet connectivity, and, therefore, it becomes the ISP for that session. Applications such as web browsing, email, FTP, etc should work as they would normally.
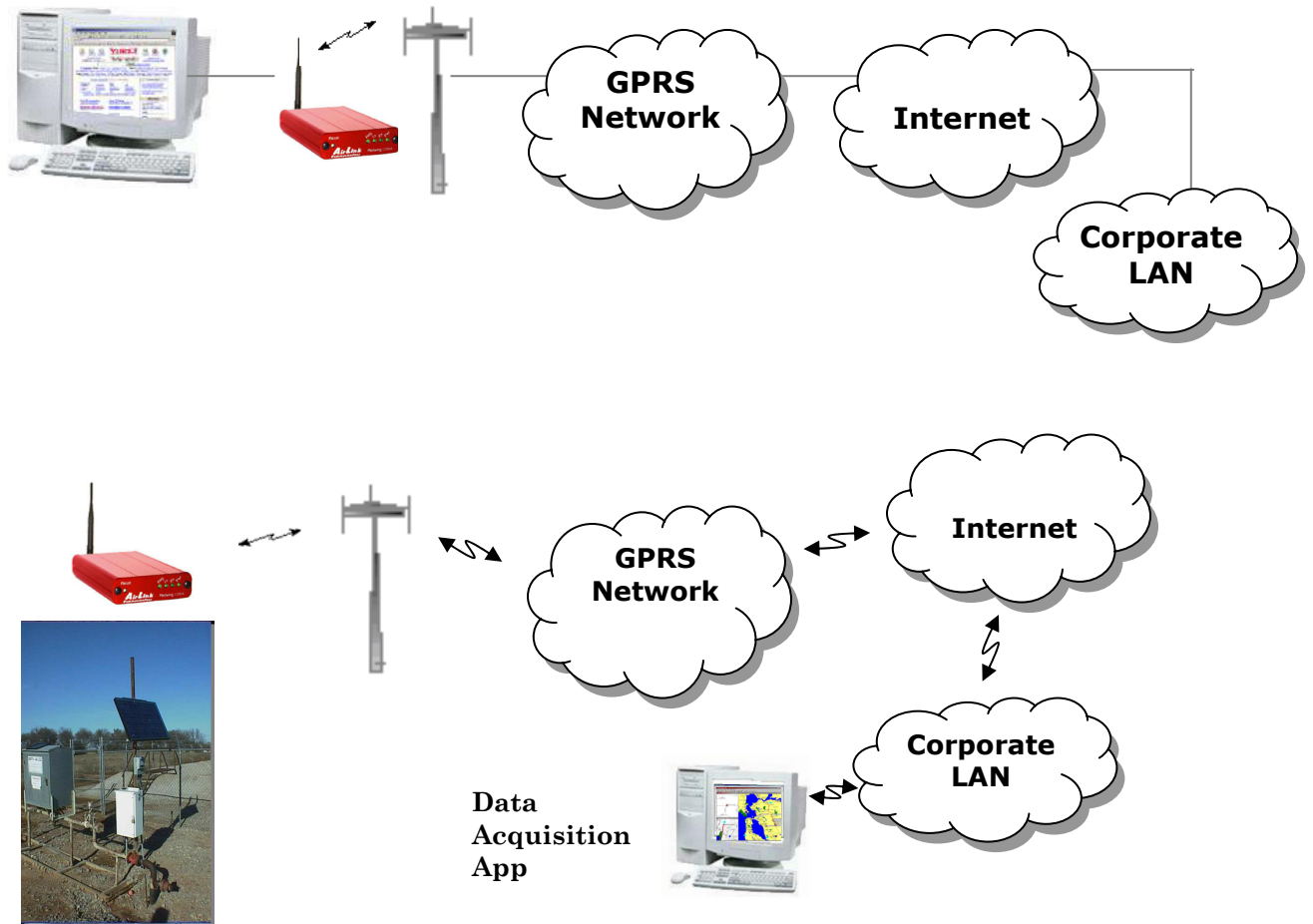
3. Redwing GPRS Configuration

Configuration of the Redwing GPRS modem is done using a terminal emulation program like HyperTerminal in Windows.

3.1 Configuration Procedure

1. Attach the antennas, DB-9 cable and power to the back of the modem.

2. Power on the modem, and ensure the **Pwr** light is lit.

3. Attach the modem to the back of the PC with the provided DB-9 cable.

   (Note, if you did not order a cable with your modem, you need a straight-thru RS-232 cable to attach to the modem.)

4. Select **Start→ Programs→ Accessories→ Communications→ HyperTerminal**.

5. Enter the name of the connection and select **OK**.

6. For "Connect using" select the COM port that the modem is on (do *not* select a modem driver), then select **OK**.
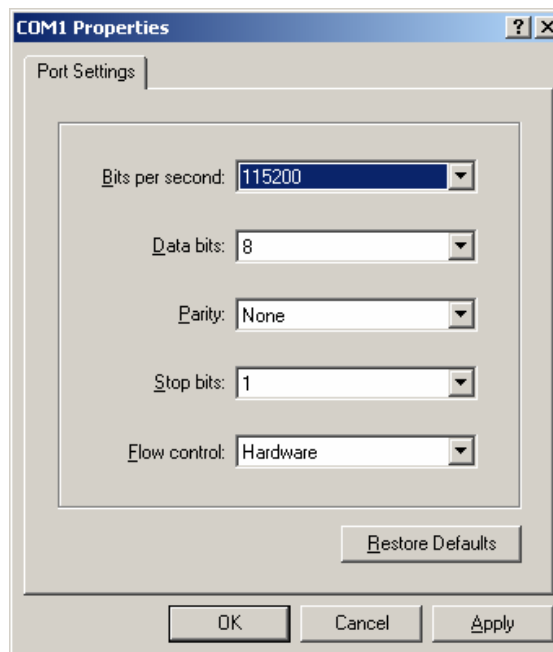
7. Select **115200** for the "Bits per second." Ensure Data Bits: **8**, Parity: **None**, Stop bits: **1** and Flow control: **Hardware**. Then select **OK**.

    (These are the factory default settings for a GPRS modem. If you get garbled characters when typing AT commands, change these settings and reconnect to the modem. For example, change the baud rate to 57,600 bits per second and connect again, etc.)
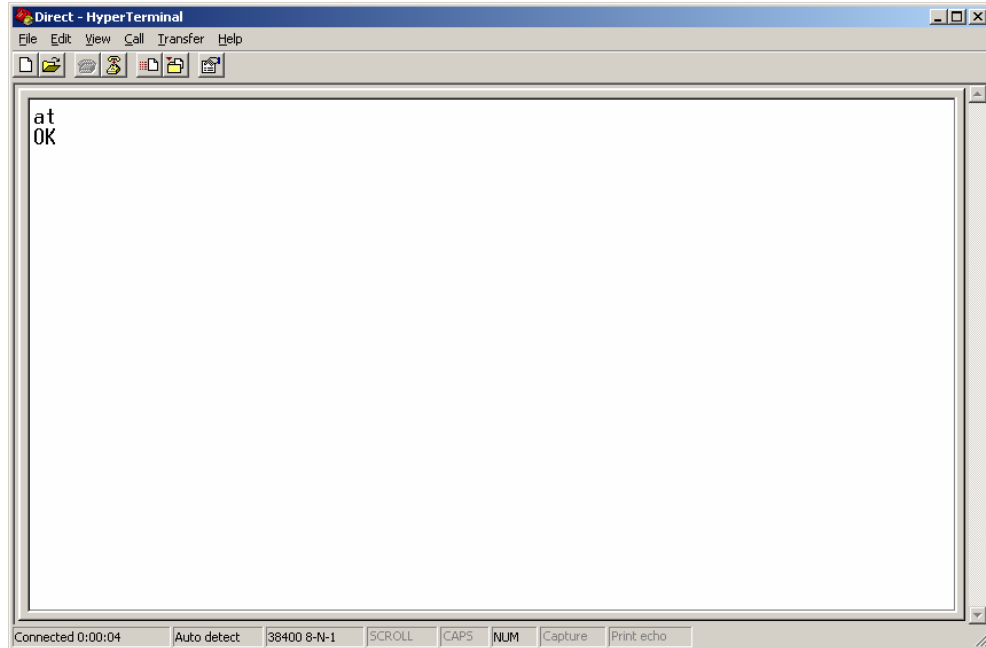
8. Type **AT** followed by **[Enter]**. You should receive an "OK" in response.

Other AT commands may now be issued to the modem. See Section **Using AT Commands** for a list of AT commands

3.2 Modem Activation

The Redwing GPRS modem requires a SIM [Subscriber Identity Module] for the modem's account activation. Units will usually be shipped with a SIM installed and be ready to operate. If a SIM is installed, and the modem is in GSM/GPRS coverage, the status indicators will look like the following:

where the status indicators have the following meanings:

GSM   indicates GSM coverage if **+RSCI=0**
         indicates GPRS coverage if **+RSCI=1**

Tx   indicates the radio is transmitting

Radio The OEM module radio is on and ready to transmit and receive

Pwr   The power is on.

If there is no SIM installed or there is no GSM/GPRS coverage, the **GSM** indicator will be off.

Indicating no GSM/GPRS coverage or no SIM installed

Connect up to configure the modem as in the **Local Configuration** Section .

If you are unfamiliar with using AT commands, please review the **Using AT Commands** Section first.

3.2.1 SIM Check

You can check if a SIM [Subscriber Identity Module] is in the Redwing with the **AT+CIMI** command. If a SIM is in the modem, you will see a response like the following:

at+cimi

310380006255650

OK

The number is the IMSI [International Mobile Subscriber Identity] which is unique to each SIM.

If there is no SIM, there will be a blank response like the following:

 at+cimi

OK

3.2.2 PDP Context

Check if the PDP context is correct with the command:

AT+CGDCONT?

You should get a response like:

at+cgdcont?

+CGDCONT:1,"IP","proxy","",0,0

OK

If you get a blank response, you need to set the PDP context. You need the APN [Access Point Name] which you can obtain from the carrier rep or from whomever you received the account. Most companies will be using a custom APN that allows them to communicate with all

To set the PDP context:

at+cgdcont=1,"IP","apn_obtained_from_carrier"

at&w

You only need to do this once after powering up. Henceforth, the modem will use this setting to attach to the GPRS network.

4. Using AT Commands

Use a terminal emulation program to connect up to the modem either locally (via the serial port of a computer) or remotely (over an existing internet connection on a PC to the modem at a remote location). Set up to connect to the modem by either method described in Section **Error! Reference source not found.**.

Sample AT Commands

Here is an example of entering AT commands, changing some settings, saving and resetting the modem. (Note that any command you are unsure of is explained in *The AT Commands* section.)

Type **AT** and press the Enter key.   **AT\<enter>**

You should get a response of "**0**" or "**OK**".

To turn on echo and verbose modes, type the following:
        ATE1V1\<enter>

You should see an "**OK**" response if Verbose Mode was properly activated (**V1**)

If you should see a "**0**" response, your modem is in Terse Mode and the **V1** command did not adhere.

Try **ATV1** again by itself if that happens. You should see an "**OK**" response now.

To set the baud rate, (like 115200), type the following:

ATS23=115200,8N1\<enter>

You should get an "**OK**" (if in Verbose Mode)

Note: Command settings take effect immediately unless otherwise noted in the description.

Note: HyperTerm needs to be disconnected and reconnected after each baud rate change to have it take effect.

4.1 Redwing GPRS Specific AT Commands

These AT commands are specific to the Redwing GPRS devices and GPRS networks.

Command	Description
A/	Reissue the last command
A	Answer a call
Dn	Mobile-initiated call to dialable number n
DL	redial last telephone number used
E	set command echo mode
H	disconnect existing connection
I	display product identification information
O	switch from command mode to data mode
S0	set number of rings before automatically answering the call
S1	count the number of incoming rings
S2	set the character used to escape from data mode
S3	set termination character for a command prompt
S4	set response formatting character
S5	set editing character for a command prompt
S6	set pause before blind dialing
S7	set number of seconds to wait for connection to complete
S8	set number of seconds to wait when there is a comma dial modifier
S10	set disconnection delay after indicating the absence of data carrier
S12	set the escape code guard time
S13	set the disconnection delay after a call has been terminated
V	set result code format mode
X	set CONNECT result code format and call monitoring
Z	set all current parameters to a user-defined profile
&C	set circuit Data Carrier Detect (DCD) function mode
&D	set circuit Data Terminal Ready (DTR) function mode
&F	set all current parameters to manufacturer defaults
&V	display current configuration
&W	store current parameter to user-defined profile

Command	Description
+CGDCONT=cid,PDP_type, APN [?]	Define the PDP context. Must be defined before a connection can be made to the GRPS network. Needs to be configured only once, the parameters are saved and used each time a connection is made to the GPRS network. **cid** = PDP Context Identifier: numeric parameter that specifies a PDP context definition. **PDP_type** = Packet Data Protocol type = "IP" **APN** = Access Point Name a logical name that is used to select the GGSN or the external packet data network. Can only be what's defined on the SIM **AT+CGDCONT = 1,"IP","proxy"** **AT+CGDCONT = 1,"IP","public"**
+COPS?	Returns the currently selected network operator. **AT+COPS?** **AT&T Wireless** **OK**
+CREG	network registration
+GMI	request manufacturer identification
+GMM	request TA model identification
+GMR	request TA revision identification
+GSN	request TA serial number identification – International Mobile Equipment Identification (IMEI)
+ICCID?	Returns the 20 digit SIM ID **AT+ICCID?** **89310380101024729959** **OK**
+IPR	set fixed local rate

Command	Description
+RCIQ?	Returns the current cell information. **AT+RCIQ?** **Serving Cell Info:** **BSIC: 5** **TCH: 563** **RSSI: -82dBm** **LAC: 6035** **Cell ID: 4043** **Dedicated Channel Info:** **TCH: 564** **Channel Mode: 0** **OK** If there is not coverage, or unit has not yet registered: **AT+RCIQ?** **+RCIQ:** **Not Registered with Network** BSIC = Base Transceiver Station Identity Code TCH = Traffic Channel RSSI = Received Signal Strength Indicator LAC = Location Area Code

4.2　Redwing AT Command Summary

Following is a summary of all the AT commands for the Redwing GPRS. For more information on these commands, see **AT Command Reference Guide** for the RIM OEM Radio Modem 1902G and 1802G.

Command	Description
A/	reissue the last command
+++AT	ESC from data mode to command mode
ATA	answer a call
ATD	mobile-initiated call to dialable number
ATD><mem><n>	initiate call to phone number in memory <mem>
ATD><n>	initiate call to phone number in current memory
ATD><str>	initiate call to phone number in memory with corresponding alphanumeric field
ATDL	redial last telephone number used
ATE	set command echo mode
ATH	disconnect existing connection
ATI	display product identification information
ATL	set monitor speaker volume
ATM	set monitor speaker mode
ATO	switch from command mode to data mode
ATP	select pulse dialing
ATQ	set result code presentation mode
ATS0	set number of rings before automatically answering the call
ATS1	count the number of incoming rings
ATS2	set the character used to escape from data mode
ATS3	set termination character for a command prompt
ATS4	set response formatting character
ATS5	set editing character for a command prompt
ATS7	set number of seconds to wait for connection to complete
ATS8	set number of seconds to wait when there is a comma dial modifier
ATS10	set disconnection delay after indicating the absence of data carrier
ATS12	set the escape code guard time
ATS13	set the disconnection delay after a call has been terminated
ATV	set result code format mode
ATX	set CONNECT result code format and call monitoring

Command	Description
ATZ	set all current parameters to a user-defined profile
AT&C	set circuit Data Carrier Detect (DCD) function mode
AT&D	set circuit Data Terminal Ready (DTR) function mode
AT&F	set all current parameters to manufacturer defaults
AT&V	display current configuration
AT&W	store current parameter to user-defined profile
AT+DR	V.42bis data compression reporting control
AT+DS	V.42bis data compression control
AT+GCAP	request complete terminal adaptor (TA) capabilities list
AT+GMI	request manufacturer identification
AT+GMM	request TA model identification
AT+GMR	request TA revision identification
AT+GSN	request TA serial number identification – International Mobile Equipment Identification (IMEI)
AT+ICF	set terminal equipment to terminal adaptor (TE-TA) control character framing
AT+IFC	set TE-TA local data flow control
AT+ILRR	set TE-TA local rate reporting mode
AT+IMODE	set the interface communication mode
AT+IPR	set fixed local rate
AT+CAOC	set advice of charge
AT+CBST	select bearer service type
AT+CCFC	call forwarding number and conditions control
AT+CCUG	closed User Group control
AT+CCWA	call Waiting Control
AT+CEER	extended error report
AT+CGMI	request manufacturer identification
AT+CGMM	request model identification
AT+CGMR	request revision identification
AT+CGSN	request product serial number identification (Identical with +GSN)
AT+CSCS	select TE Character Set
AT+CSTA	select Type of Address
AT+CHLD	call hold and multiparty
AT+CIMI	request international mobile subscriber identity
AT+CLCC	list current calls of ME

Command	Description
AT+CLCK	facility lock
AT+CLIP	calling line identification presentation
AT+CLIR	calling line identification restriction
AT+CLVL	set the volume
AT+CMEE	report mobile equipment error
AT+COLP	connected line identification presentation
AT+COPS	operator selection
AT+CPAS	mobile equipment activity status
AT+CPBF	find phone book entries
AT+CPBR	read current phone book entries
AT+CPBS	select phone book memory storage
AT+CPBW	write phone book entry
AT+CPIN	enter PIN
AT+CPWD	change password
AT+CR	service reporting control
AT+CRC	set cellular result codes for incoming call indication
AT+CREG	network registration
AT+CRLP	select radio link protocol parameters for originating non-transparent data call
AT+CSQ	signal quality report

4.3 Redwing SMS Command Summary

Command	Description
AT+CMGD	delete SMS message
AT+CMGF	select SMS message format
AT+CMGL	list SMS messages from preferred store
AT+CMGR	read SMS message
AT+CMGS	send SMS message
AT+CMGW	write SMS message to memory
AT+CMSS	send SMS message from storage
AT+CMGC	send SMS Command
AT+CNMI	new SMS message indications
AT+CPMS	preferred SMS Message Storage

Command	Description
AT+CRES	restore SMS settings
AT+CSAS	save SMS settings
AT+CSCA	SMS Service Center Address
AT+CSCB	select cell broadcast SMS messages
AT+CSDH	show SMS text mode parameters
AT+CSMP	set SMS text mode parameters
AT+CSMS	select Message Service

4.4 Redwing GPRS Commands

Command	Description
AT+CGDCONT	define PDP context
AT+CGQREQ	quality of service profile (requested)
AT+CGQMIN	quality of service profile (minimum acceptable)
AT+CGACT	context activation
AT+CGATT	GPRS attach or detach
AT+CGPADDR	show PDP address
AT+CGCLASS	GPRS mobile station class
AT+CGEREP	control unsolicited GPRS event reporting
AT+CGREG	network registration status
AT+CGSMS	select service for MO SMS messages

4.5 RIM Specific AT Commands

Command	Description
ATRIMRADIO	turn the radio on or off using the software
ATRIMDEVICE	perform a hard reset of the modem
AT+ICCID	return integrated circuit card identification from the SIM card
AT+RCIQ	query cell parameter information
AT+RSCI	RIM select coverage indicator. Indicates which network is providing coverage

5. Redwing GPRS Technical Specifications

5.1 Physical Characteristics

Weight: < 1 lb.

Size: 3.3" wide x 2" high x 6.8" long

RF Antenna Connector: 50 Ohm TNC

Serial Interface: RS232 DB-9F

Rugged aluminum case

5.2 Power Specifications

Input Voltage: 10 VDC to 28 VDC

Idle Input Current: 20 mA at 12V

Typical Transmit/Receive: 80ma at 12VDC

Max Input Current 150 ma at 12 VDC

5.3 Environmental

Operating ranges: -30°C to +70°C*

(<10%duty cycle limit above 60 °C)

Humidity: 5%-95%Non-condensing

5.4 RF Features

Network: 1900/850 MHz GSM/GPRS

Transmit frequency: 1850-1910 MHz and 824-849 MHz

Receiver frequency: 1930-1990 MHz and 869-894 MHz

Transmit power range at antenna port: 1.0 W for 1900 MHz and
    0.8W for 850 MHz

Transmitter can reduce output power when near a base station as per GSM
    specifications

Receiver sensitivity: typical -107 dBm (2.2439% bit error rate)

Multislot Class 8

FCC certified (FCC Identifier GGL-R1902G)

Industry Canada certified (certification #4481A-R1902G)

5.5 Status LED Display

GSM   indicates GSM coverage if **+RSCI=0**
indicates GPRS coverage if **+RSCI=1**

Tx   indicates the radio is transmitting

Radio The OEM module radio is on and ready to transmit and receive

Pwr   The power is on.

5.6 Application Interface Features

RS232, 1200 bps to 115.2 kbps