MTD1000/Evaluation Kit

User Guide

Contents

1. System Overview

1.1 MTD1000

The MTD1000 is a small, economical and low cost, high quality multi-purpose GPS/ GSM tracking solution for personal and vehicle tracking. It can also be used as 2-way telemetry to control relays and transmit short messages. With battery embedded, it can remain on standby for at least 24 hours. It transmits the GPS data by using GPRS/SMS.

For efficient data management, it comes with a memory capacity of 6,000 full detail reports that include position, date, time, system and input/output ports status enabling continuous recording of position and time. The data can be downloaded either over-the-air or stored for downloading at a later time.

The MTD1000 is capable of producing it own unique device ID.

Field Applications:

- Vehicle tracking device (GSM or GSM/ GPS)
- Anti-theft (GSM or GSM/ GPS with tilt sensor or equivalent)
- Personal emergency alert with panic button
- 2-way telemetry

1.2 Family of options available for MTD1000 hardware configurations

Model: MTD1000 - IE2N3F

- Embedded GPS antenna.
- External GSM antenna
- Easy in-vehicle mounting flange installation option.

Model: MTD1000 - EIDN3F

- Embedded GSM/GPRS antenna.
- External GPS antenna

Model: MTD1000 - IIDN3F

- Embedded GSM/GPRS antenna
- Embedded GPS antenna
- Easy in-vehicle mounting flange installation option.

Model: MTD1000 - EEDN3F

- External GSM/GPRS antenna
- External GPS antenna
- Easy in-vehicle mounting flange installation option.

Options available for MTD1000

- With/ Without Panic button
- With Power connector DC jack or 2 pin power connector
- With/ Without Mounting Flange (5mm diameter hole each)
- Adaptor Chargers for Europe or USA

1.3 Understanding the product model of your hardware

The hardware product code as follows in your MTD1000

Model No:	MTD1000	-	x	x	x	x	x	x
			1	2	3	4	5	6

Example 1:

Model No:	MTD1000	-	E	I	D	N	3	F
			1	2	3	4	5	6

(1) External GPS,
(2) Internal GSM,
(3) DC Jack Power Connector,
(4) Without Tilt Sensor,
(5) 3 Input
(6) with Flow Control (CTS/RTS), thus 2 Output

Model number	GPS	GSM	DC Jack Power connector	With/ Without Tilt Sensor	No. of Input ports	With/ Without Flow control
MTD 1000 -	E	I	D	N	3	F

GPS
"E" = External GPS Antenna
"I" = Internal GPS Antenna

GSM
"E" = External GSM Antenna
"I" = Internal GSM Antenna

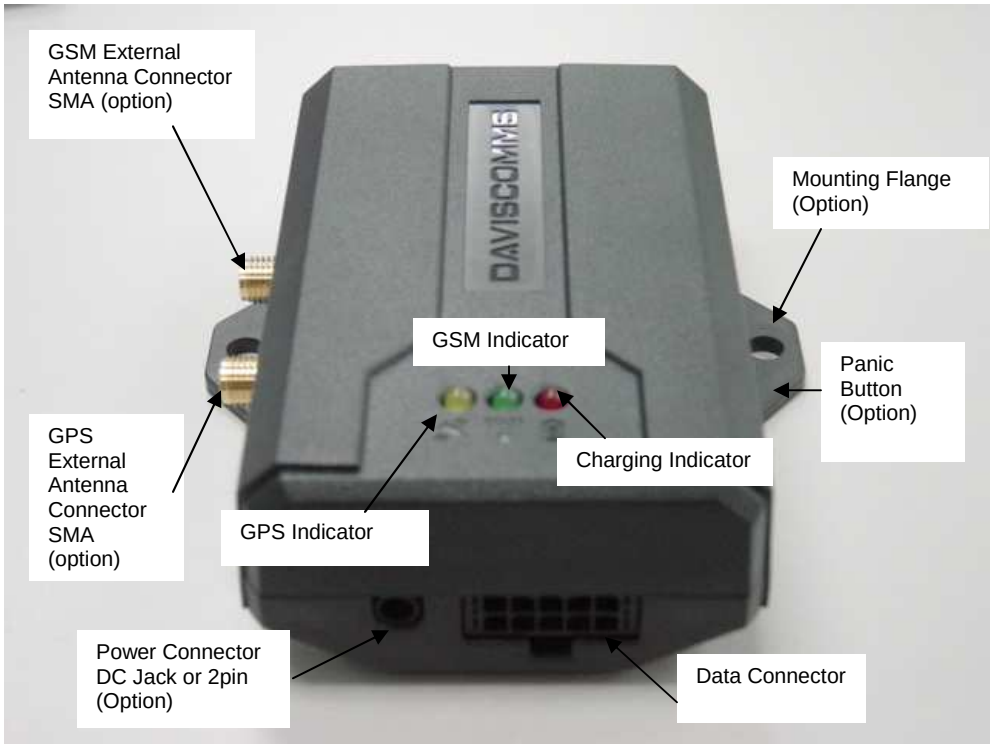
Power Conn
"D" = DC Jack Power Connector
"2" = 2-pin Jack Power Connector

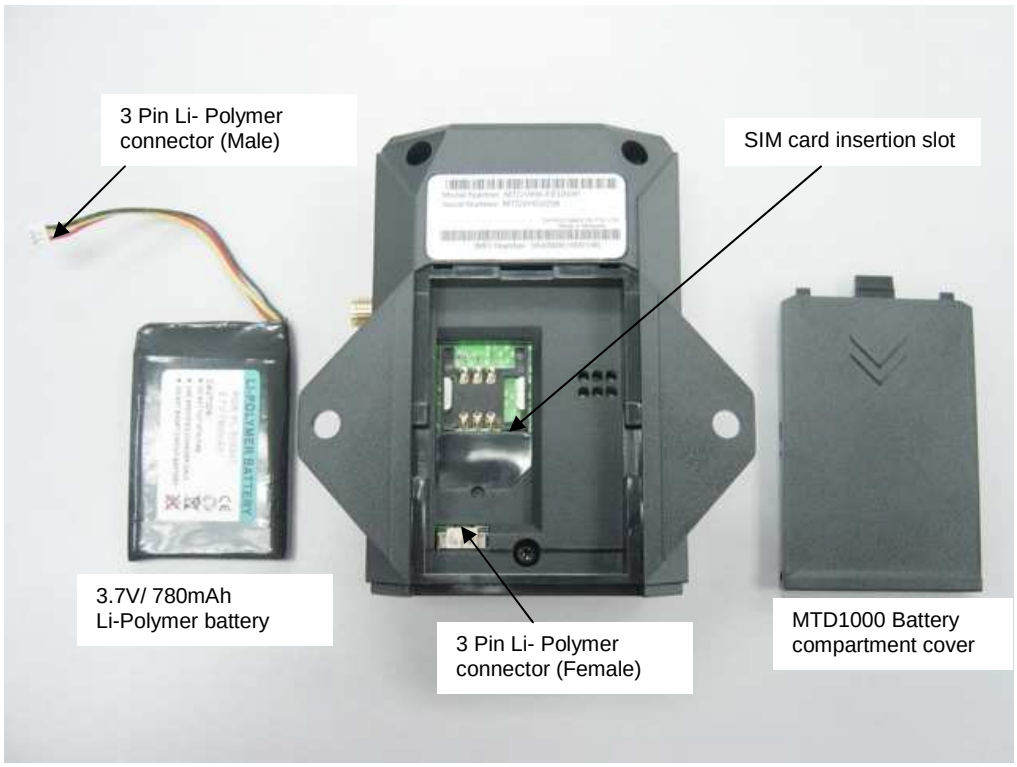
Tilt Sensor
"Y" = With Tilt Sensor
"N" = Without Tilt Sensor

Number of Input Port
(Maximum 7 IO ports with maximum 4 output ports)
e.g. "1" = 1 Input Port
"7" = 7 Input Port

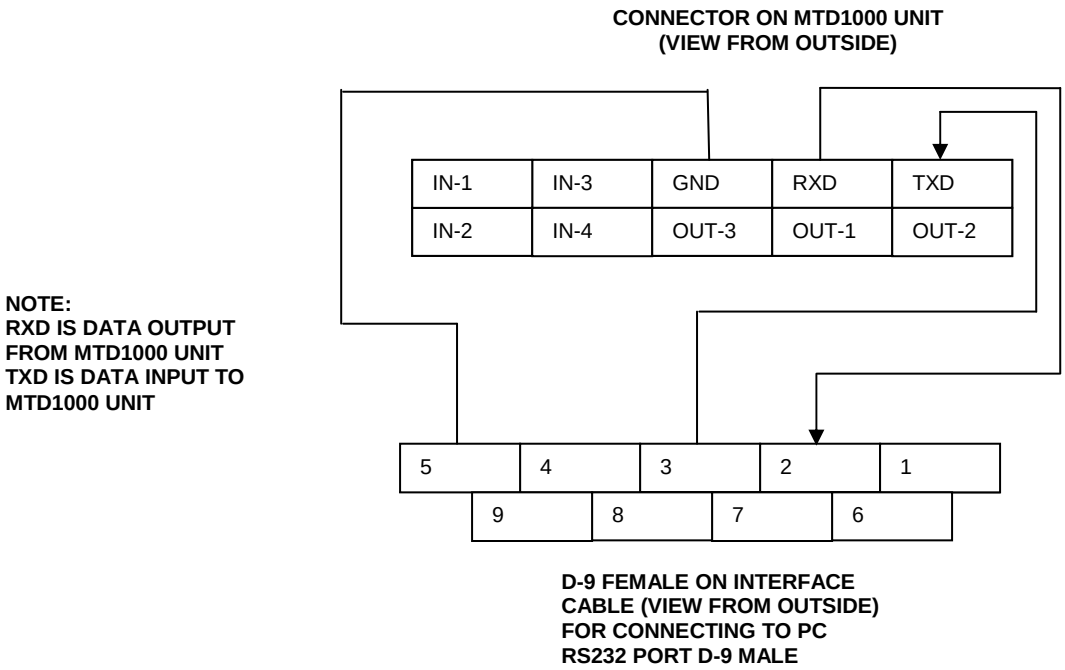
Serial with or without Flow Control
"F" = Serial with Flow Control (CTS/RTS) = 2 Input Port used
"S" = Serial without Flow Control = 0 Input Port used

1.4 Parts Description of MTD1000





1.5 Data connector pin functions and RS232 TX & RX connection diagram



D-9 Ports Description

Pin 1 Data Carrier Detect
Pin 2 Received Data, RxD
Pin 3 Transmitted Data, TxD
Pin 4 Data Terminal Ready
Pin 5 Signal Ground, GND
Pin 6 Data set ready
Pin 7 Request to send
Pin 8 Clear to send
Pin 9 Ring Indicators

2. Product Package Overview

2.1 MTD1000 Evaluation kit package description

In the MTD1000 evaluation kit box, you will receive 10 items as described below.

i. MTD1000 device (GSM/GPRS/ GPS)

The communication device that processes the GSM/GPRS and GPS functions.

ii. Power Adapter

1X Power adaptor (100 – 240V~ 50/60Hz 650mA Max) for the MTD1000 device

1X Power adaptor (100 – 240V~ 50/60Hz 650mA Max) for the evaluation kit

Power DC jack dimension: 3.5mm*1.35 mm

iii. GPS antenna (SMA connector) for the MTD1000 device

The receiver component required to receive GPS data to the MTD1000 device for a location fix.

iv. RS232 standard 9 pin D female/ male connector cable

The interface cable which connect the evaluation kit serial connection (male) to the serial comport (female) of your PC.

v. 10pin male data cable harness to RS232 standard 9 pin D male connector cable

The cable that interfaces from the MTD1000 to a serial comport connection of your PC.

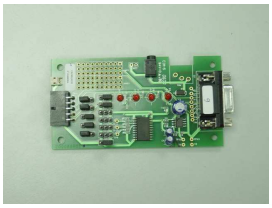
vi. GSM/GPRS antenna (SMA right angle)

The receiver component required to receive GSM/GPRS data to the MTD1000 device in a network cell location.

vii. Li- Polymer battery for MTD1000

An alternative solution to power up the MTD1000 without a power adaptor up to 24 hours.

Voltage/ current specification: (3.7V/ 780mAh)



viii. Evaluation PCB board (For development purposes on the MTD functionalities)

The communications unit which allows you to configure the input and output of the MTD1000.

xi. 10 pin male/male data cable harness

For connection from the evaluation board to the MTD1000 device

2.2 Installation and starting up on the MTD1000

Step 1

- Insert the SIM card (Not included in package)
- Connect the Li-Polymer battery to the into the MTD1000

Note: Do not use the internal Li-Ion battery beyond standard operating temperature of -10C to +50C. The MTD1000 can function directly from DC power supply adaptor without the internal Li-Ion battery.

Step 2

Adjust the battery cover into the catch and slide it into the back cover latch fully.

Step 3

Connect the GSM/GPRS antenna to the GSM External Antenna Connector.
Screw in the SMA connector firmly.

Step 4

Connect the GPS antenna to the GPS External Antenna Connector.
Screw in the SMA connector firmly.

Step 5

An example of the MTD1000 hardware setup with the 10 pin data harness cable/ RS232 for AT command communications and firmware flashing. (Recommended)

2.3 LED indicators

2.3.1) RED LED (Charging Indicator)

- Red LED constant on:
  - Li-ion battery is charging
- Red LED off: Charging completed

Charge the battery by plugging in power adapter connector into the power connector of the unit. Use power adapter with similar or better ratings to prevent damage to the power adapter. If not sure, use only power adapter provided in the package.

2.3.2) GREEN LED (GSM Indicator)

- Green LED constant on: Invalid SIM Card or SIM Card not detected
- Slow blink (200ms on & 2s off). Device has found GSM network & registered.

Green LED Blinking:

- Fast blink (200ms on & 600ms off). The device has voice or data line connected.

2.3.3) Yellow LED (GPS Indicator)

- Yellow LED constant on: GPS data valid.
- Yellow LED off: GPS data invalid.

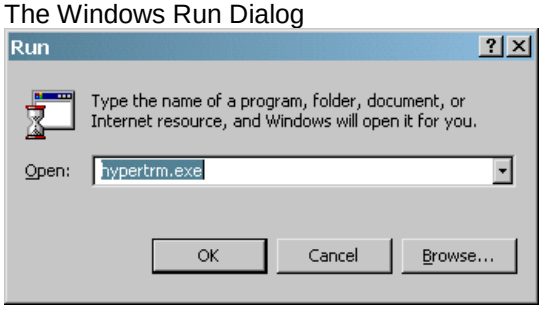
3. Interfacing the MTD1000 / Evaluation kit for AT commands communication

3.1 Hyper-terminal settings

How to create a hyper-terminal connection from your PC to your device

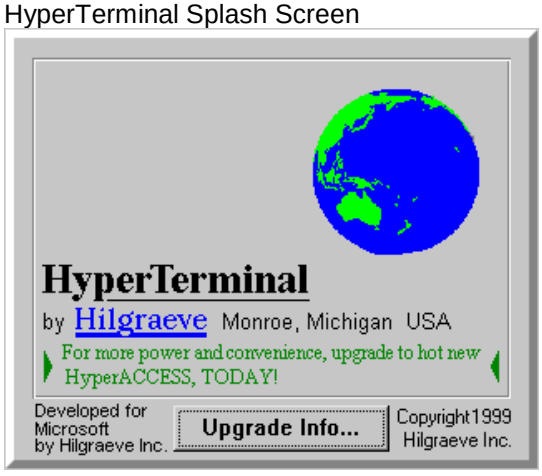
Step 1 On the Windows Start menu, select Run.... The Run dialog appears.

The Windows Run Dialog



Step 2 In the Open: field, type hypertrm.exe, and click OK. The HyperTerminal splash screen appears while HyperTerminal loads.

HyperTerminal Splash Screen



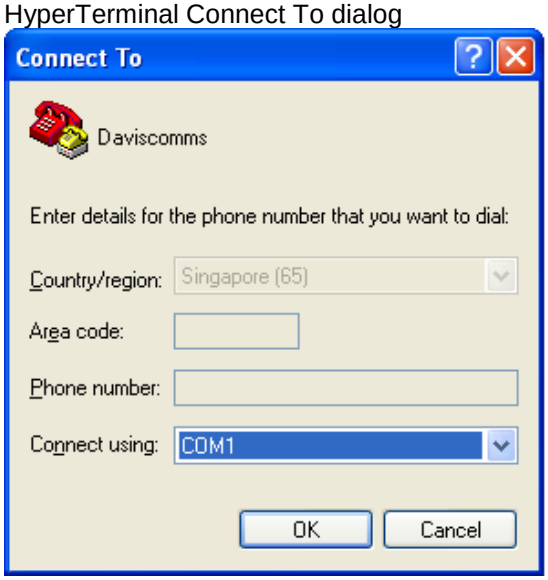
HyperTerminal then appears; open to the Connection Description dialog.

Step 3 On the Connection Description screen, for Name type "Daviscomms" or any name you would prefer and select an icon for the definition, and click OK. The Connect to dialog appears.

HyperTerminal Connection Description dialog

Step 4 On the Connect To dialog, select your primary COM port (COM1 e.g. the example above) for the Connect using: field, and click OK. (The Country/region:, Area code: and Phone number: fields are not used.) The COM 1 Properties dialog appears.

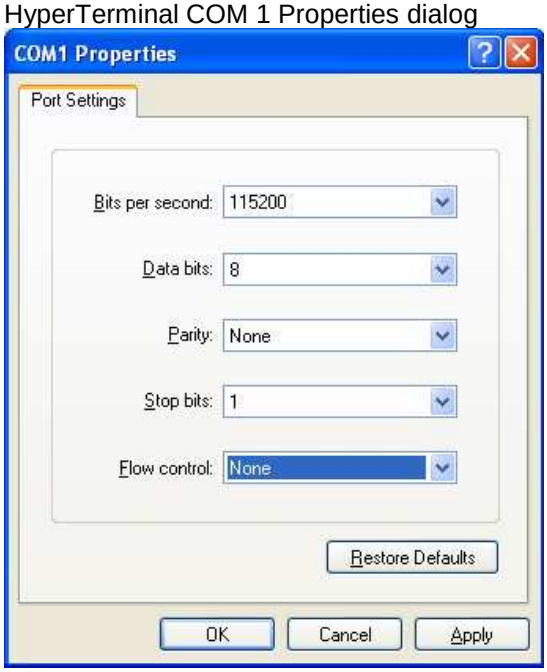
HyperTerminal Connect To dialog



Step 5 At the COM 1 Properties dialog, make the following selections, and then click OK:

- Bits per sec: 115200
- Data bits: 8
- Parity: none
- Stop bits: 1
- Flow control: none

HyperTerminal COM 1 Properties dialog



Note The settings in the Hyper Terminal need to be set correctly; otherwise, strange-looking or garbage characters may show up on the screen. If you are experiencing problems, make sure the router or modem is powered on, you are attached to the proper Com Port and verify your cabling is working.

Without these correct settings, the device may display information, but does not accept any keystrokes, making it appear as if it is hung, or has crashed. If the default settings do not produce better results, your router may have been configured to use non-standard settings. To verify, try to connect at different speeds until you get a valid prompt.

Step 6 To prove you have a valid connection to a modem, type "AT" and you should receive "OK" back from the MTD1000 device.

You should now be communicating with the MTD1000 device at com-port 1.

Please refer to the MTD1000 Commands guide for the operation of the device.

3.2 Evaluation Kit

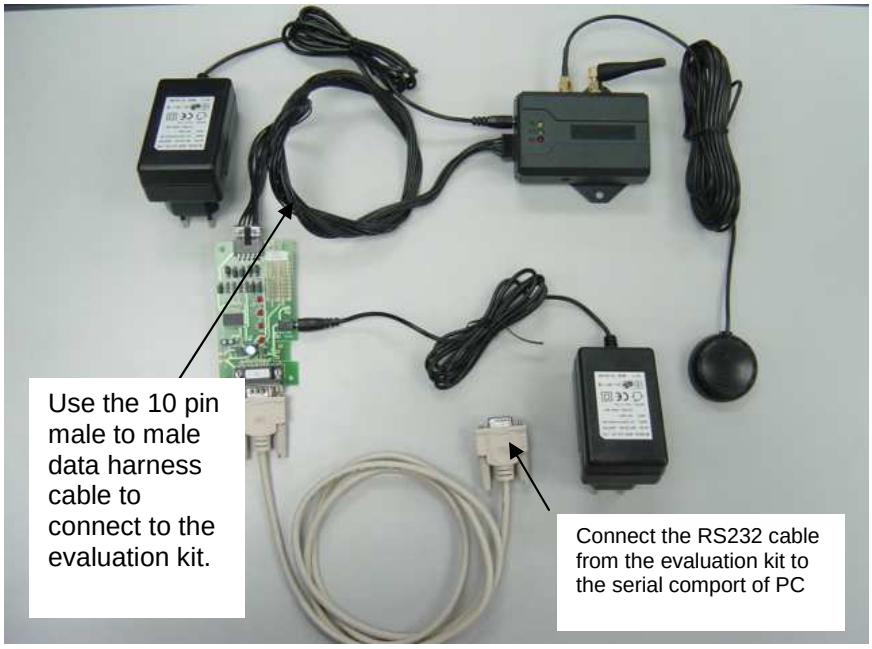
3.2.1 Evaluation kit usage description

The evaluation kit is used for development purposes to test the MTD1000 unit on its functionalities on GSM/GPRS/GPS applications.

You will not require to power up the evaluation kit if only for AT commands communication to the MTD-1000 unit.

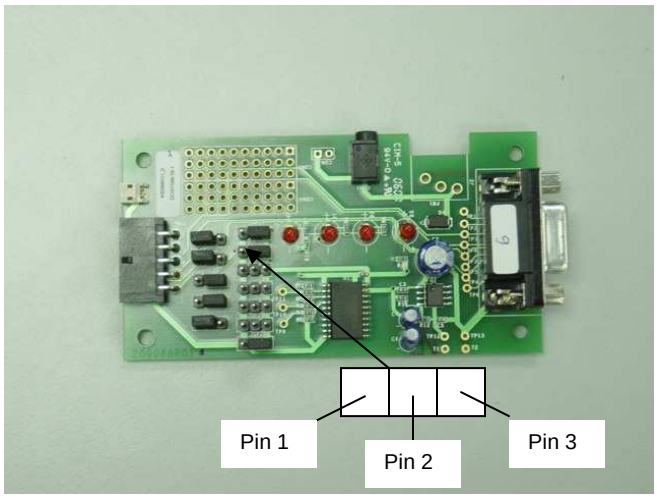
Configuring the jumpers requires the evaluation kit to be powered up by the external power adaptor

3.2.2 Full hardware setup for MTD1000 with evaluation board



MTD1000 hardware setup with the evaluation PCB board for AT commands communication..

3.3 Jumper pin orientation



3.3.1 Possible jumper selection configurations

JUP 11		
RTS	4	IN 4
JUP 12		
CTS	3	IN 3
JUP 13		
IN 6	8	01
JUP 14		
IN 7	10	02
JUP 15		
3	6	IN 5

JUP 21		
0 V	IN 1	5 V
JUP 22		
0 V	IN 2	5 V
JUP 23		
0 V	IN 4	5 V
JUP 24		
0 V	IN 3	5 V
JUP 25		
0 V	IN 6	5 V
JUP 26		
0 V	IN 7	5 V
JUP 27		
0 V	IN 5	5 V

Enabling the selection of jumper position in JUP 11 (RTS):

Pin 1	Pin 2	Pin 3
RTS		

(Mini-jumper) (RTS is selected)

Disabling the selection of jumper position in JUP 11 (RTS)

Pin 1	Pin 2	Pin 3
		IN 4

(Mini-jumper) (RTS is de-selected)

3.3.2 Jumper default positions description

3.2.2.1 2 output port option:

1. JUP21 and JUP22 short PIN2 and PIN3 to make the Input Port 1 and Input Port 2 be pulled to +5V position
2. JUP11 and JUP12 short PIN2 and PIN3 to get MTD1000 to be ready of RS232 flow control function.
3. JUP13 and JUP14 PIN2 and PIN3 are shorted.
4. JUP15 PIN1 and PIN2 are shorted. JUP27 shorts PIN2 and PIN3.
5. JUP23, JUP24, JUP25 and JUP26 are opened.

3.2.2.2 3 output port option:

1. JUP21 and JUP22 short PIN2 and PIN3 to make the Input Port 1 and Input Port 2 be pulled to +5V position
2. JUP11 and JUP12 short PIN2 and PIN3 to get MTD1000 to be ready of RS232 flow control function.
3. JUP13 and JUP14 PIN2 and PIN3 are shorted.
4. JUP15 PIN2 and PIN3 are shorted. JUP27openned.
5. JUP23, JUP24, JUP25 and JUP26 are opened.

*Note: The default jumper configuration is set for users to communicate to the MTD1000 Models **IE2N3F, EIDN3F, IIDN3F, EEDN3F** in AT commands mode via hyper-terminal.*

4. Firmware Downloading

4.1 TR-800 GSM/GPRS Module Firmware Downloader

There is NO need to perform the firmware download for the MTD1000 unit (unless requested by Daviscomms). The MTD1000 is already loaded with the latest firmware.
However if require the follow steps in this section will show you how the process is being carried out.

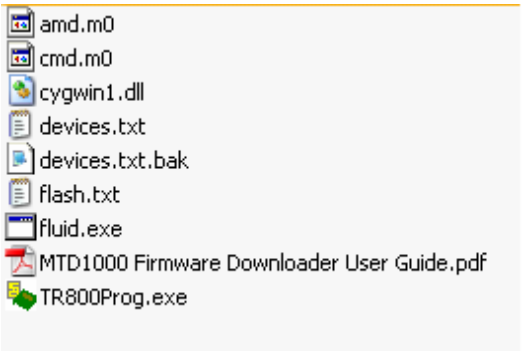
4.2 Hardware set-up for flashing of firmware

Step 1: Connect serial cable from PC host to MTD1000 via the Communication Cable as mentioned in section 2.1.4.

Step 2: Remove the internal battery and plug in the power source of The Product.

Step 3: Copy the whole TR-800 Programmer 4.0 folder into your PC.

Step 4: Run TR800Prog.exe.



TR-800 Programmer File v4.0

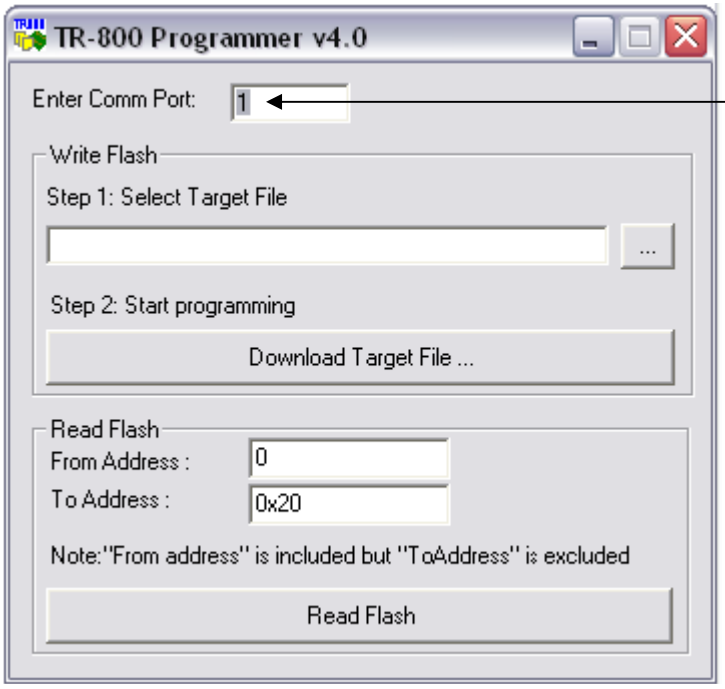
4.3 Use of the MTD1000 firmware downloader setup guide

This Setup Guide is applicable for the following hardware and software version:

- TR-800 Programmer: Version 4.0
- The Product – MTD1000

4.4 TR-800 programmer graphics user interface (GUI) setup

After running the TR-800Prog.exe, the below dialogue box will appear and please follow the steps to complete the set-up:



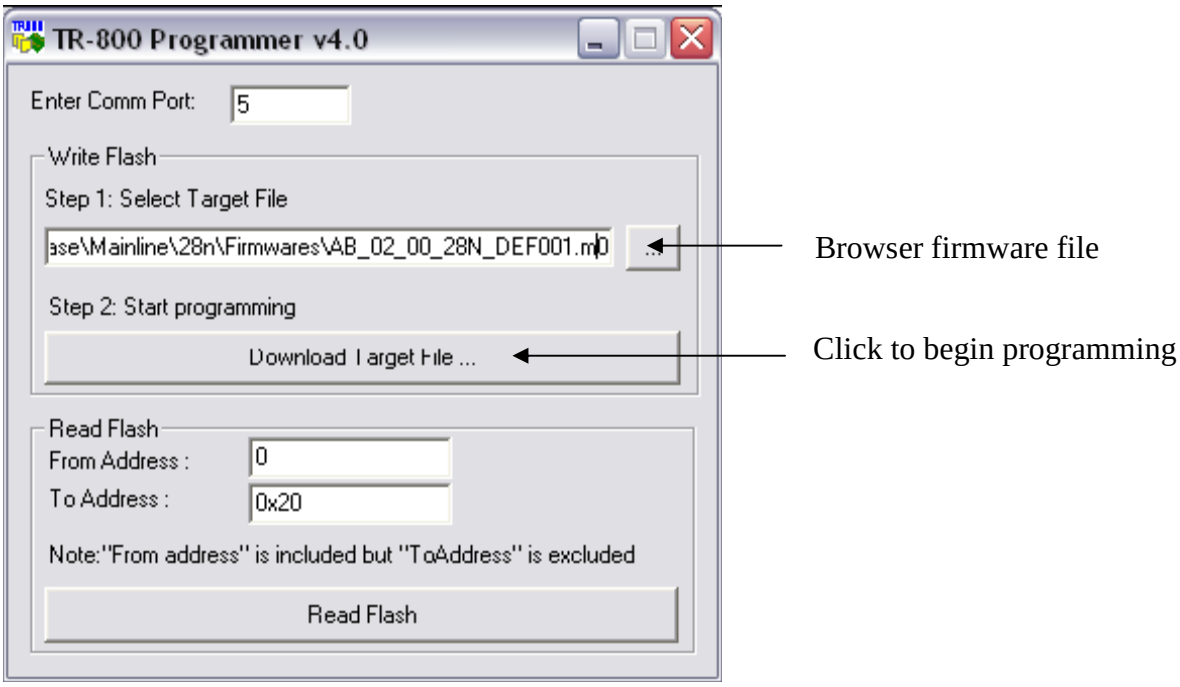
Key in COM port number

TR-800 PROGRAMMER

Step 1: Enter your COM Port number. The default value is 1. The programmer will set the COM port to the following settings:

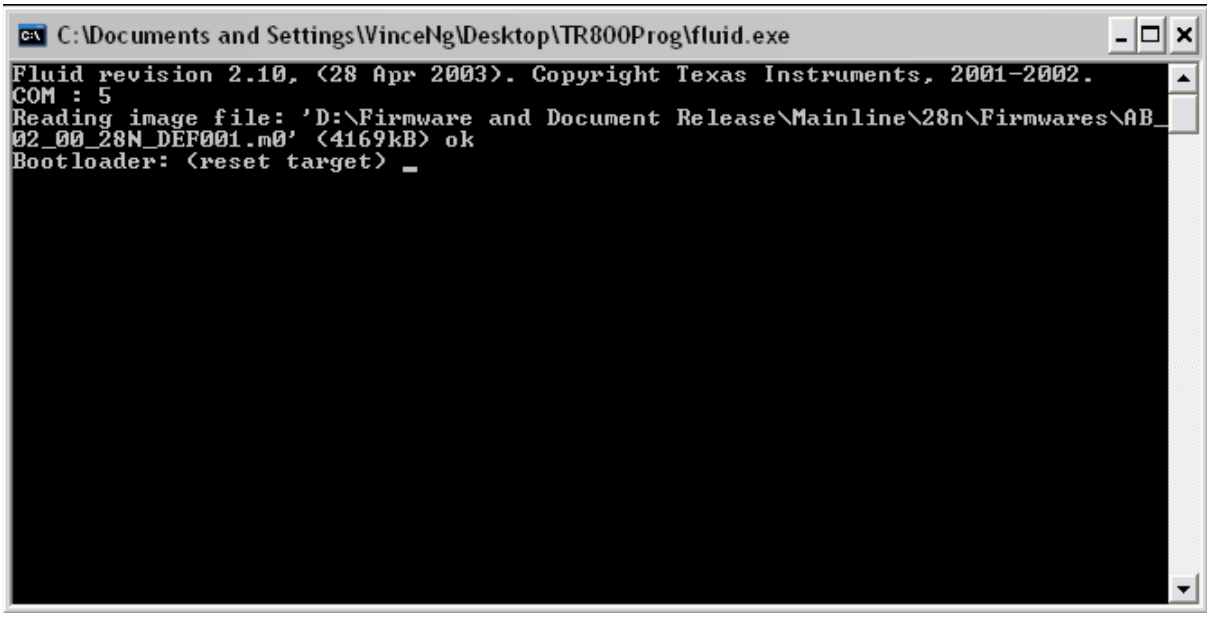
COM Port Baud Rate = 115200 bps
Data Bits = 8
Parity = None
Stop Bit = 1
Flow Control = None

Step 2: Browse for the m0 file (firmware file) to be programmed into the module. Ensure that the path and file name of the m0 file is correct before proceeding.



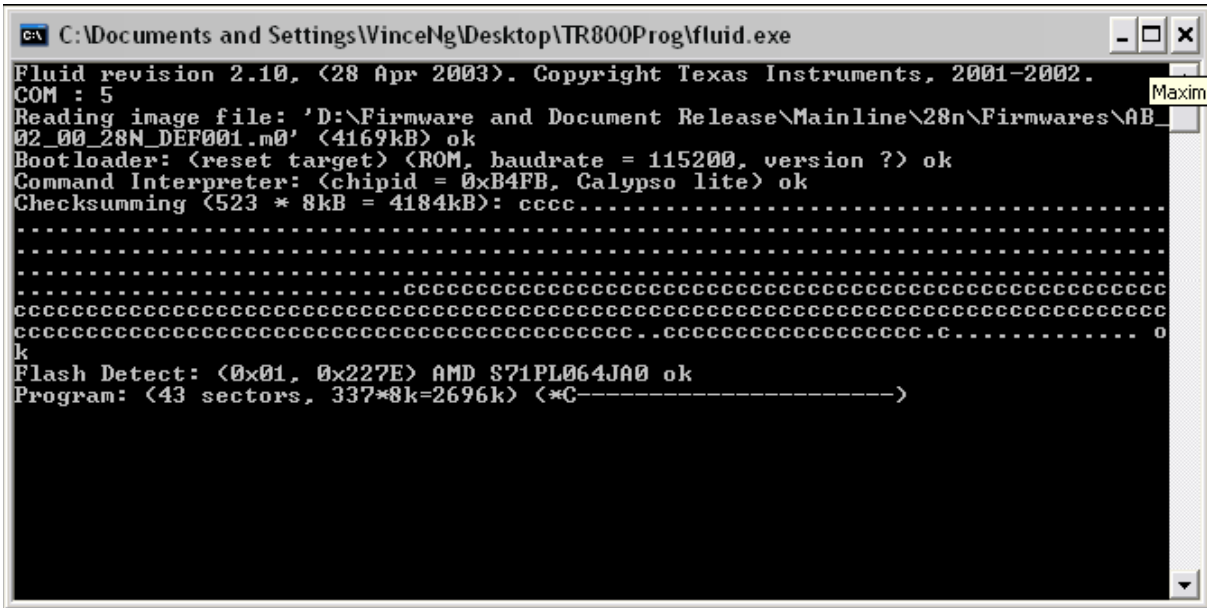
Step 3: Click the “Download Target File” button to begin programming.

Step 4: A new console window will be displayed as below:



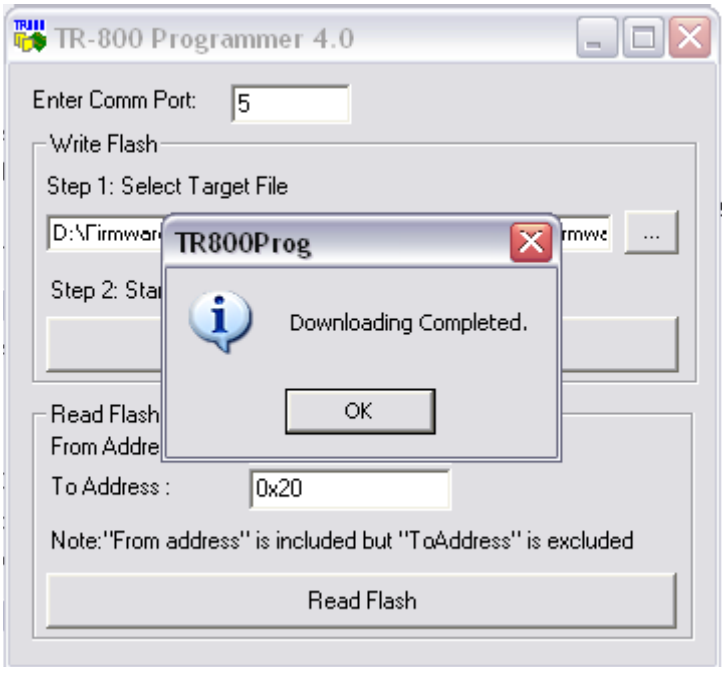
Step 5: Totally power off the Product and re-Power it up.

Step 6: The flashing process will run automatically. Wait for the process to be completed.



Note: Do not remove the module, power off the Product or close the TR-800 Programmer software during this period. Doing so might cause unforeseen damage to the module.

Step 7: If the downloading is successful, a "Downloading Completed" window will be displayed as follow:



If the downloading is not successful, a "Fail. Please Try Again" window will be displayed.
In case the downloading fails, repeat the set-up procedure from step 1.

5. Terminology

5.1 GSM
Global System for Mobile Communications. A digital cellular phone technology based on TDMA that is the predominant system in worldwide.

5.2 SIM CARD
Subscriber Identity Module (SIM) smart card that contains user account information

5.3 GPS
Global Positioning System, a worldwide MEO satellite navigational system formed by 24 satellites orbiting the earth and their corresponding receivers on the earth

5.4 GPRS
General Packet Radio Services (GPRS) is a packet-based wireless communication service that promises data rates from 56 up to 114 Kbps and continuous connection to the Internet for mobile phone and computer users. The higher data rates allow users to take part in video conferences and interact with multimedia Web sites and similar applications using mobile handheld

5.5 SMS
Short Messaging System, service for sending short text messages to mobile phones

5.6 Hyper-terminal

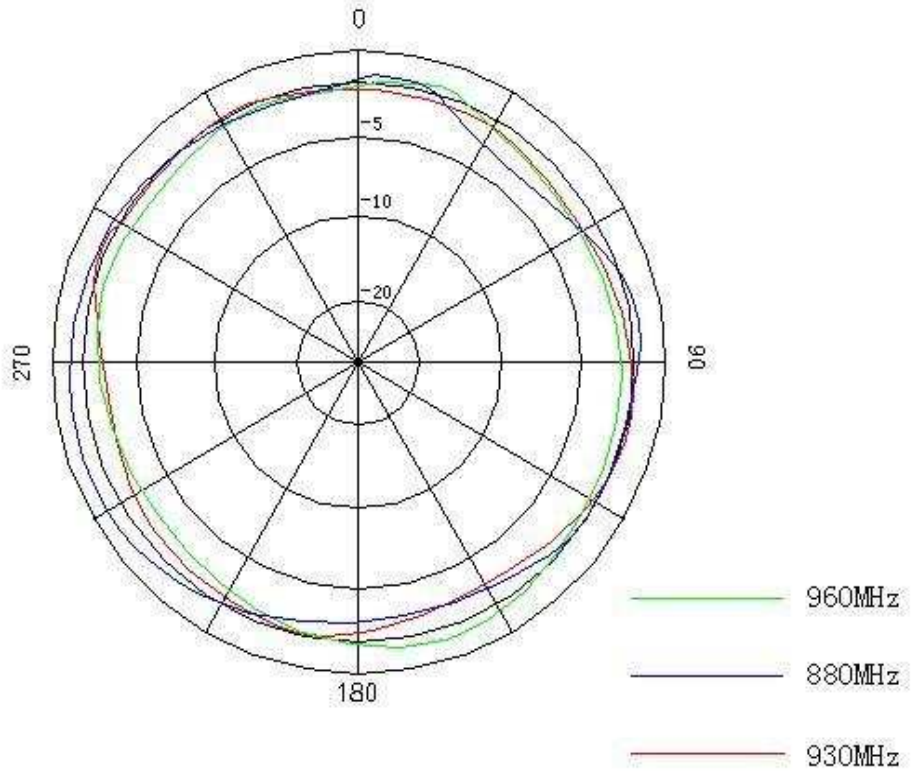
Hyper-terminal is a terminal emulation program that comes standard with every PC running Windows 95/98, Windows 2000 or NT. Hyper-terminal allows you to configure the MTD1000 unit through the serial port on the PC.

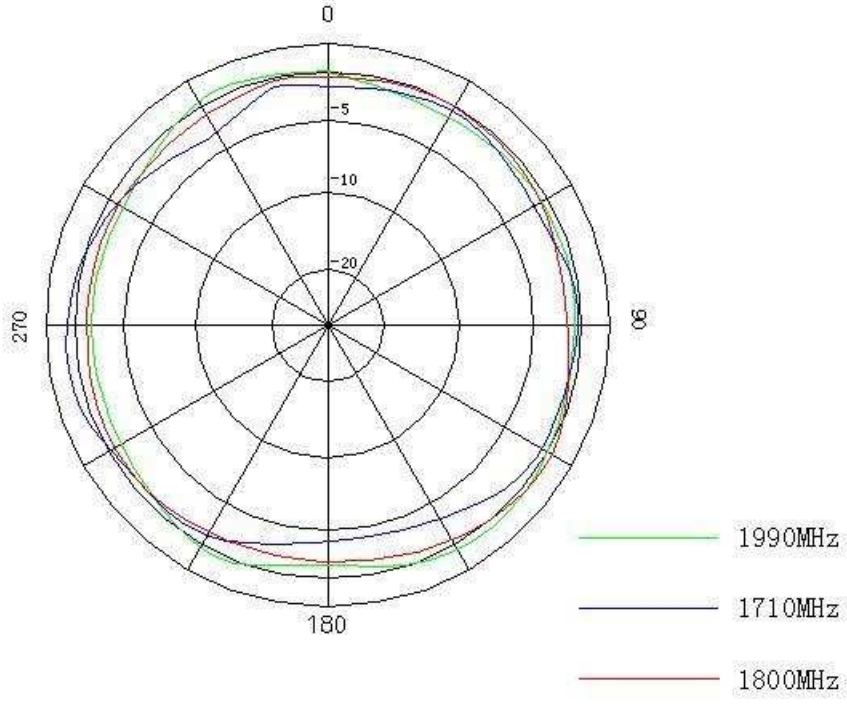
6. GSM Antenna

GSM/GPRS/AMPS ANTENNA FOR AUTOMOBILE SPECIFICATION

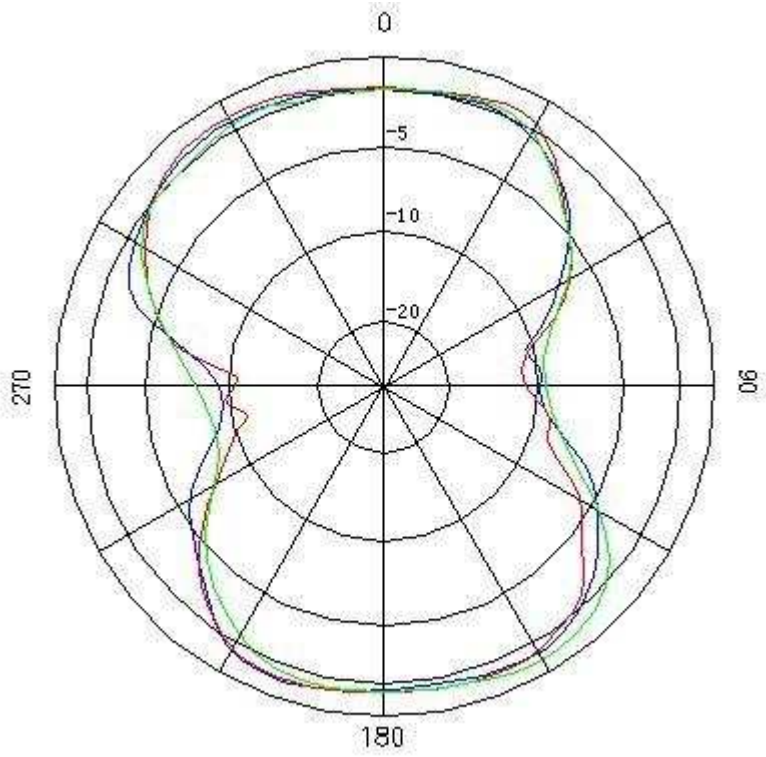
Vertical pattern

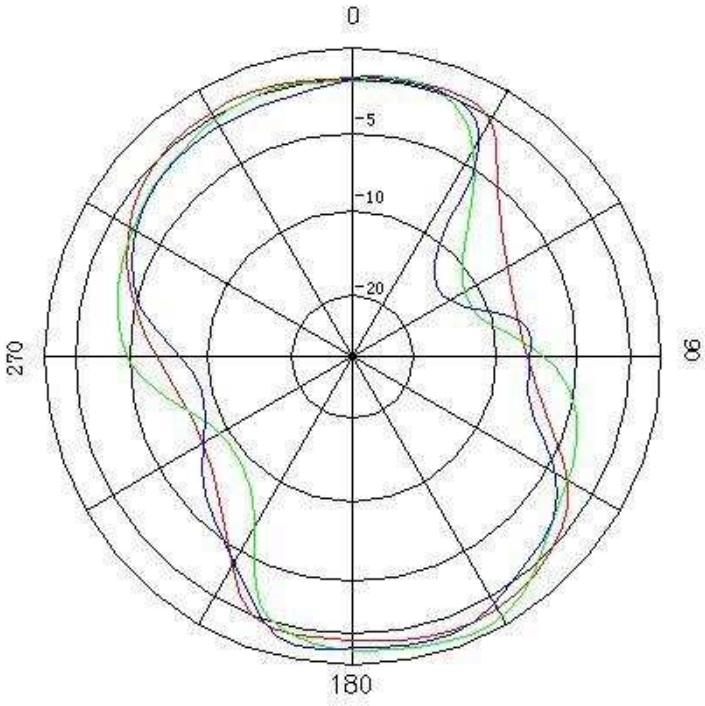
Electrical Specification		**Mechanical Specification**	
Product type	GSM/ GPRS/AMPRS antenna	**Product type**	Right SMA or RP-SMA
Model Type	BH015	**Model Type**	BH015
Frequency Range	800/1900/900/1800Mhz	**Height**	46.5mm
Impedance	50 ohms	**Max diameter**	9.0mm
VSWR	1:1:5	**Min Diameter**	6.0mm
Gain (Typical)	2.15db	**Connector**	SMA RA
Gain (Max)	2.5db	**Lightning protection**	Yes
Polarization	Vertical		
Radiation	0mni		
Max Power	20V		
Maximum Input Power	50w		



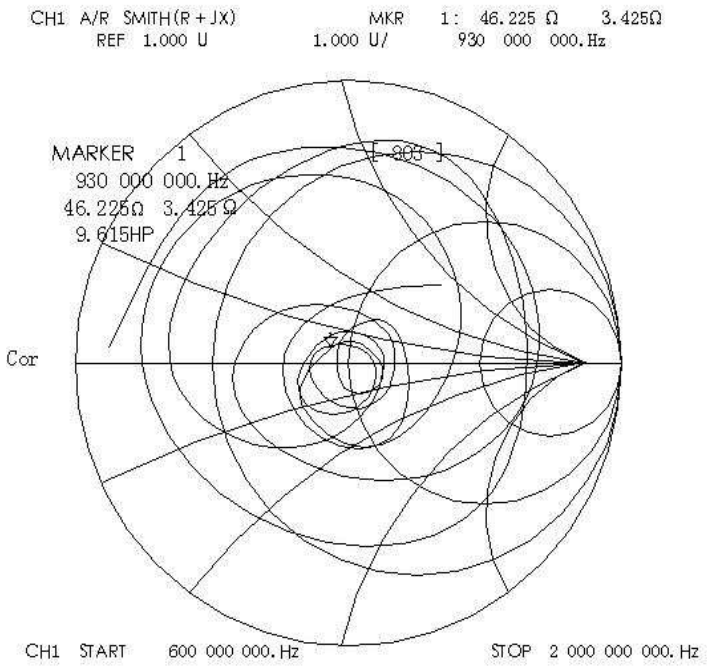


Vertical pattern at 960Mhz





Impedance circle diagram（Smith circle diagram



Usage: Connecting the SMA connector which is at the end of the antenna with the equipment directly.

Regulatory and Warning Information

Radio Frequency Interface Requirements

Tested To Comply With FCC Standards

Note: This equipment has been tested and found to comply with Part 15 of the FCC rules. Operation is subject to the condition that this device does not cause harmful interference. This equipment generates, uses, and can radiate radio frequency energy and, if not installed and used in accordance with the user's guide, may cause harmful interference to radio communications. There is no guarantee that interference will not occur in a particular installation. If this equipment does cause harmful interference to any electronic devices, the user is encouraged to consult the dealer for help.

This equipment complies with part 15 of the FCC Rules. Operation is subject to the following two conditions: (1) this equipment may not cause harmful interference, and (2) this equipment must accept any interference received, including interference that may cause undesired operation. Any changes or modifications made without the approval by the party responsible for compliance could void the user's authority to operate this equipment.

Note: The manufacturer is not responsible for any interference caused by unauthorized modifications made by the user to this equipment. Such modifications could void the user's authority to operate the equipment.

RF Exposure Guidelines

The antenna(s) used for this transmitter must be installed to provide a separation distance of at least 20 cm from all persons and must not be co-located or operating in conjunction with any other antenna or transmitter.