



- **SAMBA3G-G**
- HSPA+ and quad-band GSM/EDGE data
- **transmission USB modem**
-
- Preliminary



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Version history:

This table provides a summary of the document revisions.

Version	Author	Changes	Modified
1.0.3	F. Beqiri	- Updated FCC and IC Statement for USA and Canada	15/05/2018
1.0.2	F. Beqiri	- Added IC Statement for Canada	19/04/2018
1.0.1	F. Beqiri	- Images throughout the document updated	06/02/2018
1.0.0	F. Beqiri	- Initial version	22/11/2017

Cautions

The information furnished herein by FALCOM is believed to be accurate and reliable. However, no responsibility is assumed for its use. Please, read carefully the safety precautions.

If you have any technical questions regarding this document or the product described in it, please contact your vendor.

General information about FALCOM and its range of products are available at the following Internet address: <http://www.falcom.de/>

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Note

Because our products are being continuously improved, specifications and information given in this document are subject to change by FALCOM without notice.

1 INTRODUCTION

This manual is focussed on the GSM/GPRS/EDGE/UMTS data solutions of the enhanced performance SAMBA3G-G USB modem from FALCOM GmbH.

1.1 General

SAMBA3G-G is a 3.75G modem providing up to six-band HSPA+ and quad-band GSM/EDGE data transmission in a compact form factor. The 3G USB modem establishes a wireless connection to the Internet by means of mobile radio technology and thus enables the communication between the connected device and the Internet service. This modem features data-rates of up to 7.2 Mb/s DL (downlink), a rich set of internet protocols, a single-band 2100MHz UMTS/HSDPA radio for data connectivity and extended operating temperature range. It is ideally suited to industrial M2M (Machine to Machine) applications. The SAMBA3G-G provides a SIM card reader and an internal HSDPA/GSM antenna to simplify the setup and use. The physical interface to the modem application is made through an embedded USB port which simplifies setup and operation of the modem. It allows direct connection and supports full access via USB port. Thus HSDPA/GSM can be controlled through a single USB port from any host device. It has an integrated LED indicator that shows the complete modem status.

Technology	Description
GPRS	General Packet Radio Service (GPRS) is a high-speed, data-only service that is an add-on to the GSM (Global System for Mobile Communications) cellular network - a type of network used to provide cellular phone service. The SAMBA3G-G Modem provides reliable data connections to GPRS 900 MHz (GSM), GPRS 900 (GSM), and 1800 MHz (DCS) networks. When in regions where GPRS is not available, user can still establish 14.4 kbps GSM data connections.
EDGE	Enhanced Data rates for GSM Evolution (EDGE) is a third-generation (3G) high-speed mobile data and Internet access technology, with downlink/uplink up to 236.8 kb/s. The average rates are fast enough to support a wide range of advanced data services, including streaming audio and video, fast Internet access and large file downloads.
HSDPA	High-Speed Downlink Packet Access (HSDPA) is a 3G (third generation) mobile telephony communications protocol in the High-Speed Packet Access (HSPA) family, which allows networks based on Universal Mobile Telecommunications System (UMTS) to have higher data transfer speeds and capacity. Current HSDPA on SAMBA3G-G supports down-link speed of up to 7.2 Mbits/s and up-link speed of up to 5.76 Mb/s.

1.2 AT command support


SAMBA3G-G supports AT commands according to the 3GPP Technical Specifications TS 27.007 [1], 27.005 [2], 27.010 [3], and the u-blox AT command extension.

- For the complete list of the supported AT commands and their syntax see the u-blox AT Commands Manual [4].

1.3 Packaging

- SAMBA3G-G is shipped in a 50 pcs bulk carton box
- Overall size: 170mm x 120mm x 56mm
- Weight: 2.8 kg

1.4 Labelling

Font label of SAMBA3G-G	Back label of SAMBA3G-G
None	 <p>SAMBA3G-G</p> <p>S/N: 12345(303)12345678 IMEI: 352023001234600</p> <p>RoHS Compliant CE FCC ID: QIXSAMBA3G-G IC: 5383A-SAMBA3GG Anatel: HHHH-AA-FFFF</p> <p>FALCOM GmbH , 98704 Langewiesen , Made in Germany</p>

1.5 Used abbreviations

Abbreviation	Description
ETSI	European Telecommunications Standards Institute
GSM	Global System for Mobile communications
IMEI	International Mobile station Equipment Identity
ME	Mobile Equipment
EDGE	Enhanced Data rates for GSM Evolution
GPRS	General Packet Radio Service
GMSK	Gaussian Minimum Shift Keying
UMTS	Universal Mobile Telecommunications System
HSDPA	High Speed Downlink Packet Access
HSPA	High Speed Packet Access
PLMN	Public Land Mobile Network
PIN	Personal Identification Number
PUK	Personal Unblocking Key
RP	Receive Protocol
SIM	Subscriber Identity Module
SMS	Short Message Service
SMS/PP	Short Message Service/Point-to-Point
TA	Terminal Adapter

Abbreviation	Description
TE	Terminal Equipment
TP	Transmit Protocol
MS	Mobile Station
USB	Universal Serial Bus
PTM	Point To Multipoint
NOM	Network Operation Mode
PPP	Point to Point Protocol
PSK	Phase Shift Keying
CSD	Circuit Switched Data
APN	Access Point Naming
IP	Internet Protocol
PDP	Packet Data Protocol
RF	Radio Frequency
UMTS	Universal Mobile Telecommunications System
HSDPA	High-Speed Downlink Packet Access
IC	Industry Canada

Table 1: Used abbreviations

1.6 Related documents

- [1] 3GPP TS 27.007 - AT command set for User Equipment (UE)
- [2] 3GPP TS 27.005 - Use of Data Terminal Equipment - Data Circuit terminating; Equipment (DTE - DCE) interface for Short Message Service (SMS) and Cell Broadcast Service (CBS)
- [3] 3GPP TS 27.010 - Terminal Equipment to User Equipment (TE-UE) multiplexer protocol
- [4] u-blox AT Commands Manual, Docu No UBX-13002752

2 SECURITY

IMPORTANT FOR THE EFFICIENT AND SAFE OPERATION OF YOUR GSM-MODEM, READ THIS INFORMATION BEFORE USE!

Your cellular engine SAMBA3G-G is one of the most exciting and innovative electronic products ever developed. With it you can stay in contact with your office, your home, emergency services and others, wherever service is provided.

This chapter contains important information for the safe and reliable use of the SAMBA3G-G modem. Please read this chapter carefully before starting to use the cellular engine SAMBA3G.

2.1 General information

Your SAMBA3G-G device utilizes the GSM standard for cellular technology. GSM is a newer radio frequency („RF“) technology than the current FM technology that has been used for radio communications for decades. The GSM standard has been established for use in the European community and elsewhere. Your SAMBA3G-G is actually a low power radio transmitter and receiver. It sends out and receives radio frequency energy. When you use your modem, the cellular system handling your calls controls both the radio frequency and the power level of your cellular modem.

2.2 Exposure to RF energy

There has been some public concern about possible health effects of using a GSM modem. Although research on health effects from RF energy has focused for many years on the current RF technology, scientists have begun research regarding newer radio technologies, such as GSM. After existing research had been reviewed, and after compliance to all applicable safety standards had been tested, it has been concluded that the product is fit for use.

If you are concerned about exposure to RF energy there are things you can do to minimize exposure. Obviously, limiting the duration of your calls will reduce your exposure to RF energy. In addition, you can reduce RF exposure by operating your cellular modem efficiently by following the guidelines below.

2.3 Driving

Check the laws and regulations on the use of cellular devices in the area where you drive. Always obey them. Also, when using your modem while driving, please pay full attention to driving, pull off the road and park before making or answering a data call if driving conditions so require. When applications are prepared for mobile use they should fulfil road-safety instructions of the current law!

2.4 Electronic devices

Most electronic equipment, for example in hospitals and motor vehicles is shielded from RF energy. However, RF energy may affect some malfunctioning or improperly shielded electronic equipment.

2.5 Vehicle electronic equipment

Check your vehicle manufacturer's representative to determine if any on board electronic equipment is adequately shielded from RF energy.

2.6 Medical electronic equipment

Consult the manufacturer of any personal medical devices (such as pacemakers, hearing aids, etc.) to determine if they are adequately shielded from external RF energy.

Turn your SAMBA3G-G device OFF in health care facilities when any regulations posted in the area instruct you to do so. Hospitals or health care facilities may be using RF monitoring equipment.

2.7 Aircraft

Turn your SAMBA3G-G OFF before boarding any aircraft. Use it on the ground only with crew permission. Do not use it in the air.

To prevent possible interference with aircraft systems, Federal Aviation Administration (FAA) regulations require you to have permission from a crew member to use your modem while the plane is on the ground. To prevent interference with cellular systems, local RF regulations prohibit using your modem whilst airborne.

2.8 Children

Do not allow children to play with your SAMBA3G-G device. It is not a toy. Children could hurt themselves or others (by poking themselves or others in the eye with the antenna, for example). Children could damage the modem or make calls that increase your modem bills.

2.9 Blasting areas

To avoid interfering with blasting operations, turn your unit OFF when in a "blasting area" or in areas posted: "turn off two-way radio". Construction crew often uses remote control RF devices to set off explosives.

2.10 Potentially explosive atmospheres

Turn your SAMBA3G-G device **OFF** when in any area with a potentially explosive atmosphere. It is rare, but your modems or their accessories could generate sparks. Sparks in such areas could cause an explosion or fire resulting in bodily injury or even death.

Areas with a potentially explosive atmosphere are often, but not always, clearly marked. They include fuelling areas such as petrol stations; below decks on boats; fuel or chemical transfer or storage facilities; and areas where the air contains chemicals or particles, such as grain, dust or metal powders.

Do not transport or store flammable gas, liquid or explosives, in the compartment of your vehicle, which contains your modem or accessories.

Before using your modem in a vehicle powered by liquefied petroleum gas (such as propane or butane) ensure that the vehicle complies with the relevant fire and safety regulations of the country in which the vehicle is to be used.

2.11 Non-ionizing radiation

The SAMBA3G-G comes with an internal antenna. Therefore, care should be taken to install the modem in such a position that no part of the human body will normally rest within 20 cm of any part of the modem. It is also recommended to use the modem not close to medical devices as for example hearing aids and pacemakers.


3 SAFETY STANDARDS

Your GSM mobile complies with all applicable RF safety standards.

The GSM mobile meets the safety standards for RF receivers and the standards and recommendations for the protection of public exposure to RF electromagnetic energy established by government bodies and professional organizations, such as directives of the European Community, Directorate General V in matters of radio frequency electromagnetic energy.

4 TECHNICAL DATA

4.1 Product specifications

 Operation beyond the operating conditions is not recommended and extended exposure beyond them may affect device reliability.

FEATURES		DESCRIPTION
POWER SUPPLY RANGE		<ul style="list-style-type: none"> +5 VDC through USB port, compliant with USB 2.0 specification
DIMENSIONS		<ul style="list-style-type: none"> Size: 89mm x 38mm x 13,7mm ±2 (L x B x H) Weight: 35 g
OPERATING TEMP. RANGE		<ul style="list-style-type: none"> -40 °C to +85 °C Normal temperature range*: -20 °C to +65 °C Storage temperature : -40 °C to +90 °C
Frequency bands		<ul style="list-style-type: none"> Band I (2100 MHz), Band II (1900 MHz), Band IV (1700 MHz), Band V (850 MHz), Band VI (800 MHz), Band VIII (900 MHz) Compliant to GSM Phase 2/2+
Transmit power	HSDPA	<ul style="list-style-type: none"> Power Class 3 (24 dBm)
	EDGE	<ul style="list-style-type: none"> Power Class E2 (27 dBm) for GSM/E-GSM bands Power Class E2 (26 dBm) for DCS/PCS bands
	GPRS	<ul style="list-style-type: none"> Power Class 4 (33 dBm) for GSM/E-GSM bands Power Class 1 (30 dBm) for DCS/PCS bands
DATA	HSDPA	<ul style="list-style-type: none"> Data downlink transfer: max. 7.2 Mb/s. Data uplink transfer: max. 5.76 Mb/s.
	EDGE	<ul style="list-style-type: none"> EDGE data downlink/uplink transfer: max. 236.8 kbps. Modulation and Coding Scheme: MCS 1 - 9.
	GPRS	<ul style="list-style-type: none"> GPRS multi-slot class 12 , coding scheme CS1-CS4 EDGE multi-slot class 12 , coding scheme MCS1-MCS9
	CSD	<ul style="list-style-type: none"> Downlink/Uplink up to 14.4 kbps
Additional features		<ul style="list-style-type: none"> Embedded TCP/IP and UDP/IP stack including direct link mode for TCP and UDP sockets
		<ul style="list-style-type: none"> SMS
		<ul style="list-style-type: none"> Standard and extended AT command set Minimal power consumption
		<ul style="list-style-type: none"> Modem firmware upgradeable via USB or via over-the-air
MMS		<ul style="list-style-type: none"> MMS compliant
FAX		<ul style="list-style-type: none"> Group 3: class 1, class 2
SIM Interface		<ul style="list-style-type: none"> Slot for small SIM cards 3/1.8 V Mini-SIM (2FF) according to ISO / IEC 7810: 2003, ID-000
USB COMMUNICATION		<ul style="list-style-type: none"> USB 2.0 Full Speed (12 Mbit/s) slave interface
ANTENNA		<ul style="list-style-type: none"> Internal

* The cellular module is fully functional and meets the 3GPP specification across the specified temperature range.

Table 2: Product specifications

Coding scheme	1 Timeslot	2 Timeslots	4 Timeslots
CS-1:	9.05 kbps	18.1 kbps	36.2 kbps
CS-2:	13.4 kbps	26.8 kbps	53.6 kbps
CS-3:	15.6 kbps	31.2 kbps	62.4 kbps
CS-4:	21.4 kbps	42.8 kbps	85.6 kbps

Table 3: GPRS Coding schemes and maximum network data rates over air interface

Please note that the values listed above are the maximum ratings which, in practice, are influenced by a great variety of factors, primarily, for example, traffic variations and network coverage.

EDGE is four times as efficient as GPRS. GPRS use four coding schemes (CS-1 to 4, see table 3) while EDGE use nine Modulation and Coding Schemes (MCS-1 to 9, see table 3.1).

Coding and modulation scheme (MCS)	Speed	Modulation
MCS-1:	8.80 kbit/s/slot	GMSK
MCS-2:	11.2 kbit/s/slot	GMSK
MCS-3:	14.8 kbit/s/slot	GMSK
MCS-4:	17.6 kbit/s/slot	GMSK
MCS-5:	22.4 kbit/s/slot	8-PSK
MCS-6:	29.6 kbit/s/slot	8-PSK
MCS-7:	44.8 kbit/s/slot	8-PSK
MCS-8:	54.4 kbit/s/slot	8-PSK
MCS-9:	59.2 kbit/s/slot	8-PSK

Table 3.1: EDGE Coding schemes

5 INTERFACES IN OVERVIEW

The table below lists all interfaces available on the SAMBA3G-G modem:

Interface specifications	
USB	USB A-type plug connector is used to connect the modem to a USB host.
LED	Used to show the status of the modem.
SIM	SIM card reader for small SIM cards (3/1.8V).

Table 4: Modem interfaces

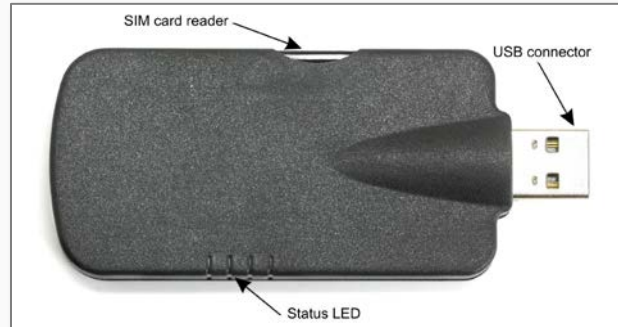


Figure 1: View of SAMBA3G-G interfaces.

5.1 4pin USB Type A connector

The physical interface to the modem application is made through the USB connector which simplifies setup and operation of the modem. It allows direct connection to a USB host port and it gives you maximum life from your laptop's battery in that it draws power directly from the USB port and only uses the battery when plugged in.



Figure 2: Pinout of the USB connector

The following table lists the pin configuration of the USB connector on the SAMBA3G-G, viewed from face of plug.

PIN	NAME	DESCRIPTION
1	VCC	+ 5V
2	D -	Data -
3	D +	Data +
4	GND	Ground

Table 5: Pinout of the USB connector on the SAMABA3G modem

5.2 SIM-Card Reader

The SIM interface controls 3 and 1.8V SIM cards. This interface is fully compliant with GSM 11.11 recommendations concerning SIM functions.

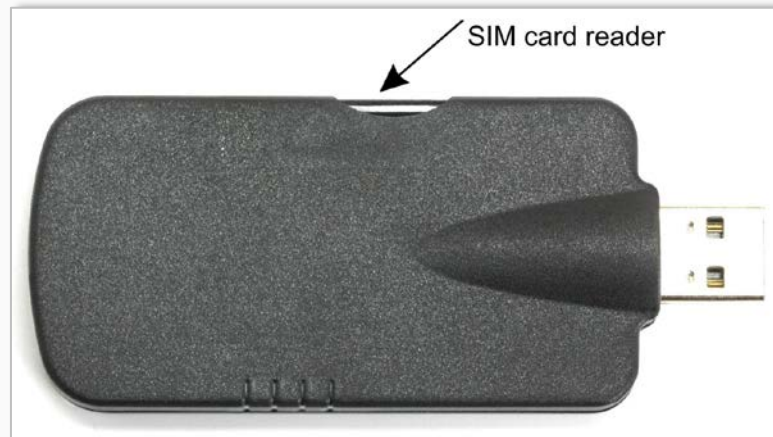


Figure 4: SIM Card interface

6 SYSTEM REQUIREMENTS

Check your hardware and software and see if they satisfy the requirements below. If you are not sure, please consult your vendor or operator.

6.1 Hardware & software requirements

Hardware & software requirements

- A valid SIM card (with GPRS/3G enabled).
- 1 x Free compatible USB port
- Approximately 6 Mb of free hard disk space.
- Pentium 90 or higher.
- Operating systems: Windows® XP (32bit), Vista (32bit), 7 (32bit) & (64bit), 10 (32bit) & (64bit)
- CD-ROM drive.

For data applications, you need.

- Browser and email client

6.2 Setting up the modem

6.2.1 Serial communication with SAMBA3G-G

SAMBA3G-G modem includes a high-speed USB 2.0 compliant interface with maximum 480 Mb/s data rate. The modem itself acts as a USB device and can be connected to any USB host. The USB is the suitable interface for transferring high speed data between SAMBA3G-G modem and a host processor, available for AT commands, data communication and for diagnostic purposes. The USB_D+ / USB_D- lines carry the USB serial data and signalling.

USB drivers are available for the following operating system platforms:

- Windows XP (32bit)
- Windows Vista (32bit)
- Windows 7 (32bit) & (64bit)
- Windows 10 (32bit) & (64bit)

This chapter describes how to install your SAMBA3G-G in Windows. It is recommended that all-important files in your computer are backed up before the installation.

6.2.2 Inserting the SIM card:

SAMBA3G-G requires a small SIM card, which is provided by your mobile phone service provider. This contains the telephone number of SAMBA3G-G will use, as well as other customer information. To use UMTS services the SIM card should be UMTS-enabled.

1) Insert a SIM card:

- Insert the SIM card into the corresponding SIM card reader of the modem as shown in figure below and slide it forward until it stops. The bevelled corner of the SIM card has to be on the left side of SIM card reader and the golden contact area is facing downwards. Make sure that the SIM card is sit firmly into the SIM card reader slot. See also figures below.



Figure 5.a: Insert the SIM Card.



Figure 5.b: Push it forward into the SIM-holder until it stops.



Figure 5.c: To remove the SIM, press the edge of card using your finger nail or a pointed object.

2) Remove the SIM card:

- To remove the SIM card, just press the inserted SIM card by using your finger nail or a pointed object. The SIM card will jump out when you release it. Finally, take it out.

Important: Do **not** insert or remove the SIM card when the device is under power.

Keep all miniature SIM cards out small children's reach. The SIM card and its contacts can be damaged by scratches or bending, so be careful when handling, inserting or removing the SIM card.

6.2.3 Setup HyperTerminal program

To communicate with the SAMBA3G-G modem, start the HyperTerminal program or another terminal program, and then use the AT commands available in the corresponding manual.

To start the HyperTerminal go to:

- **START – PROGRAMS – ACCESSORIES – COMMUNICATION – HYPERTERMINAL**, then start the software **HyperTerminal**, assign the name of your choice (e.g. SAMBA3G-G), click on the icon of your choice, then click OK. On the appeared dialog box choose:
 - Connect using, e.g. COM3 (COM port assigned to "SAMAB3G-G")
 - Then click on **OK**. On the properties of the selected COM port choose:
 - Properties, choose 115200 bps – 8 bits data – no parity – 1 stop bit – hardware flow control
 - Finally click on **OK**.

Once **HyperTerminal** or other terminal program is opened and configured (see **Fig. 11**), use AT commands to perform your specific settings.

To test the SAMBA3G-G modem type on the terminal screen:

AT<enter>

Modem responds:

OK

If you don't see the characters you are typing, enter **ATE1** and then press **Enter** key.

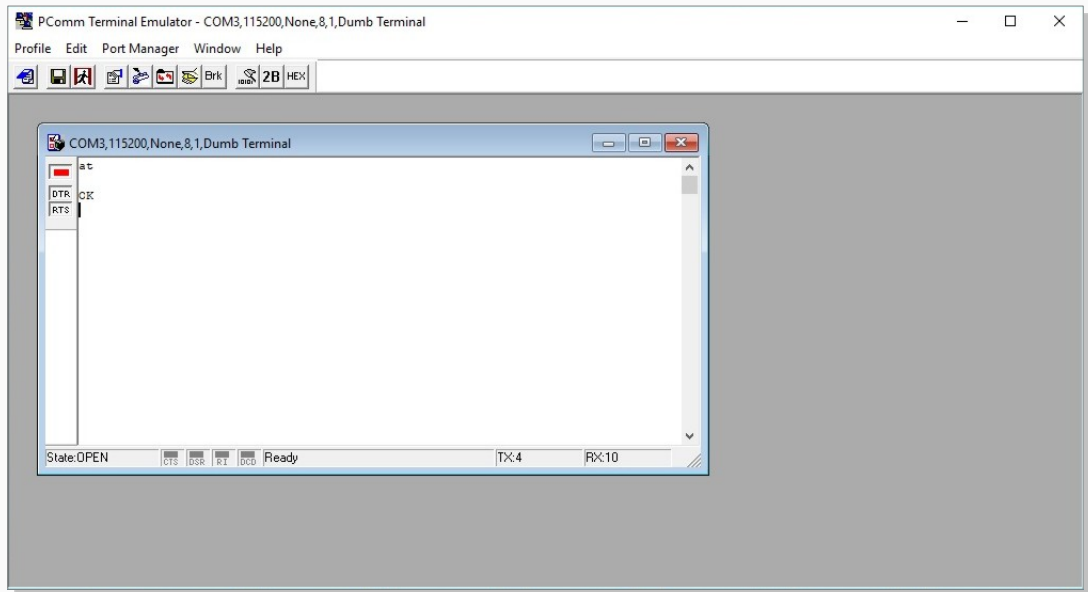


Figure 11: PComm terminal screen.

To enter the PIN code of the used SIM card type on the terminal screen:

AT+CPIN=pin<enter> // pin = PIN code of your SIM card

Modem responds:

OK

The SAMBA3G-G will go into the search mode and the Status LED will operate as described in **Table 6**.

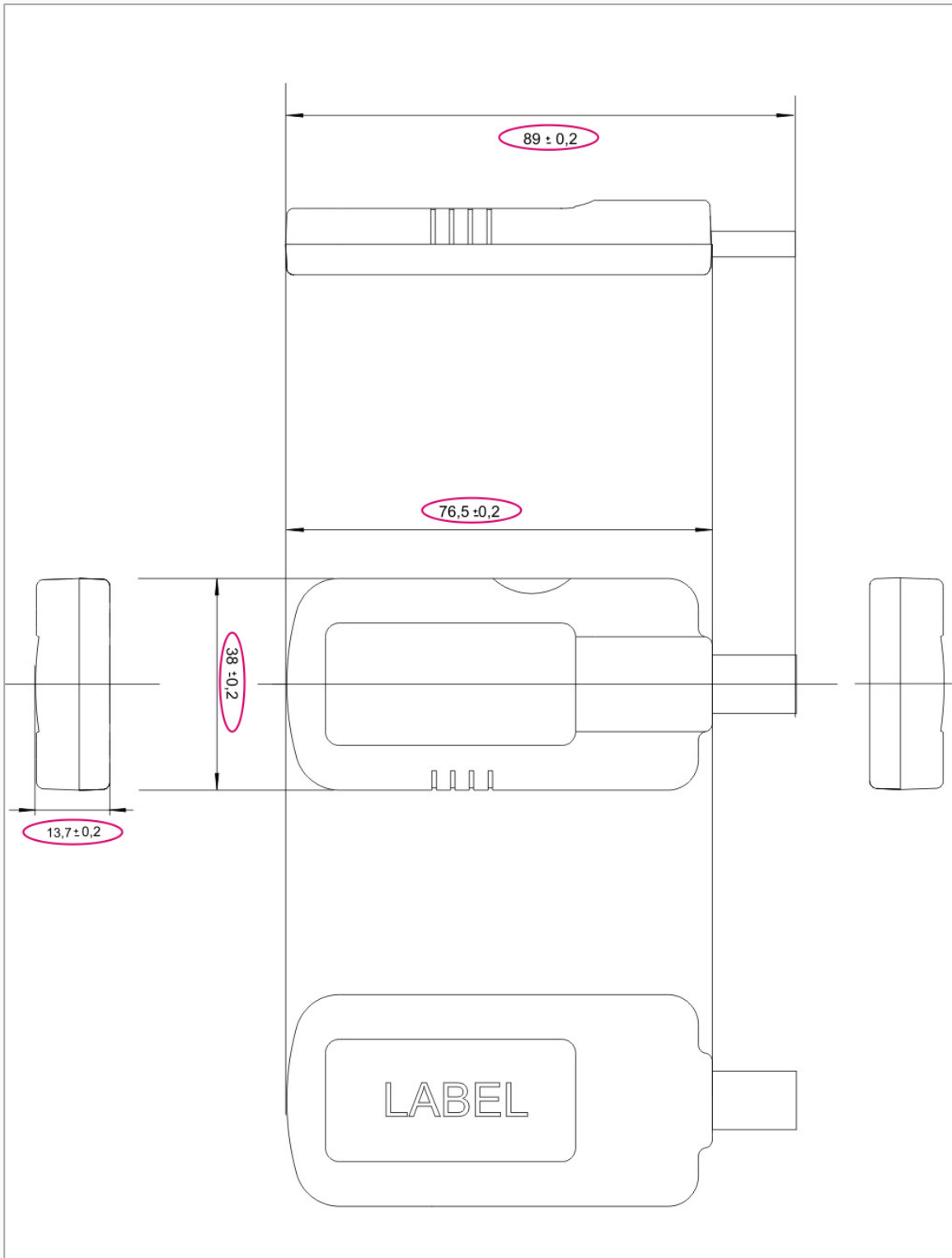
The SAMBA-3G-G has inside a parser function that converts some of Telit G864 AT commands to u-blox AT Commands. Please contact FALCOM for more detailed information about the list of Telit G864 AT commands which are then internally parsed into u-blox AT Commands.

6.2.4 Connecting Internet

For more information how to connect the modem to the internet using GPRS or 3G settings and TCP settings, please refer to the u-blox AT Commands Manual [4].

7 HOUSING

The necessary dimensions for the housing can be found in the drawing below.



8 RF EXPOSURES

8.1 FCC and IC Statement (USA and Canada) - English

This device contains 850/900/1900 MHz GSM/GPRS functions and 800/850/900/1700/2100 MHz UMTS functions and is operational in these frequencies, respectively.

Following frequency bands are not operational (must not be used) in U.S. Territories.

- GSM: 900 MHz
- UMTS: 800/900/2100 MHz

The external antennas used for this portable application must provide a separation distance of at least 0 cm from all persons and must not be co-located or operating in conjunction with any other antenna or transmitter.

FCC Statement for USA:

This device complies with Part 15 of the FCC Rules. Operation is subject to the following two conditions:

- (1) This device may not cause interference; and
- (2) This device must accept any interference, including interference that may cause undesired operation of the device.

Statement according to FCC part 15.21:

Modifications not expressly approved by this company could void the user's authority to operate the equipment.

Statement according to FCC part 15.105:

NOTE: This equipment has been tested and found to comply with the limits for a Class B digital device, pursuant to Part 15 of the FCC Rules. These limits are designed to provide reasonable protection against harmful interference in a residential installation. This equipment generates, uses and can radiate radio frequency energy and, if not installed and used in accordance with the instructions, may cause harmful interference to radio communications.

However, there is no guarantee that interference will not occur in a particular installation. If this equipment does cause harmful interference to radio or television reception, which can be determined by turning the equipment off and on, the user is encouraged to try to correct the interference by one or more of the following measures:

- Reorient or relocate the receiving antenna.
- Increase the separation between the equipment and receiver.
- Connect the equipment into an outlet on a circuit different from that to which the receiver is connected.
- Consult the dealer or an experienced radio/TV technician for help.

IC Statement for Canada

This device complies with Industry Canada's licence-exempt RSSs. Operation is subject to the following two conditions:

- (1) This device may not cause interference; and
- (2) This device must accept any interference, including interference that may cause undesired operation of the device.

8.2 Déclaration FCC et IC (USA at Canada) - French

Cet appareil contient des fonctions 850/900/1900 MHz GSM/GPRS et 800/850/900/1700/2100 MHz UMTS et est opérationnel dans ces fréquences, respectivement.

Les bandes de fréquences suivantes ne sont pas opérationnelles (ne doivent pas être utilisés) dans le territoire fédéral américain:

- GSM: 900 MHz
- UMTS: 800/900/2100 MHz

L'antenne externe utilisé pour cette application portable doit être placée à une distance d'au moins 0 cms de toute personne et ne doit pas être placée ou manié en combinaison avec nulle autre antenne ou transmetteur..

Déclaration FCC partie pur USA:

Cet appareil satisfait aux règles de la FCC, partie 15. La mise en service est sujette aux deux conditions suivantes:

- (1) cet appareil ne doit pas causer d'interférences préjudiciables et
- (2) cet appareil doit accepter toute interférence reçue, interférences, qui peuvent causer des actions indésirés, inclus.

Déclaration en accord avec FCC partie 15.21:

Des modifications n'ayant pas été expressément approuvées par cette société, pourraient annuler l'autorisation de l'utilisateur d'opérer cet équipement.

Déclaration en accord avec FCC partie 15.105:

NOTE: Cet équipement a été testé et satisfait aux limites d'un appareil digital, classe B, en accord avec la partie 15 des règles de la FCC. Ces limitations sont déterminées pour assurer une protection raisonnable contre les interférences préjudiciables lors d'une installation résidentielle. Cet appareil génère, utilise et peut répandre de l'énergie radiofréquence et, s'il n'est pas installé et utilisé en accord avec les instructions, peut causer des interférences préjudiciables à la radiocommunication.

Cependant, il n'y a pas de garantie que des interférences n'auront pas lieu dans une installation particulière. Si l'équipement pose des interférences préjudiciables à la réception radio ou télévision, ce qui peut être déterminé en allumant et éteignant l'équipement, l'utilisateur est encouragé à essayer de rectifier les interférences par l'une ou l'autre des mesures suivantes:

- Réorientez ou relocalisez l'antenne réceptrice.
- Augmentez la distance entre l'équipement et le récepteur.
- Connectez l'équipement à une prise dans un circuit différent de celui auquel le récepteur est connecté.
- Consultez votre revendeur ou un technicien radio/télévision expérimenté pour du support.

Déclaration Industrie Canada

Le présent appareil est conforme aux CNR d'Industrie Canada applicables aux appareils radio exempts de licence. L'exploitation est autorisée aux deux conditions suivantes:

- (1) l'appareil ne doit pas produire de brouillage;
- (2) l'appareil doit accepter tout brouillage radioélectrique subi, même si le brouillage est susceptible d'en compromettre le fonctionnement.