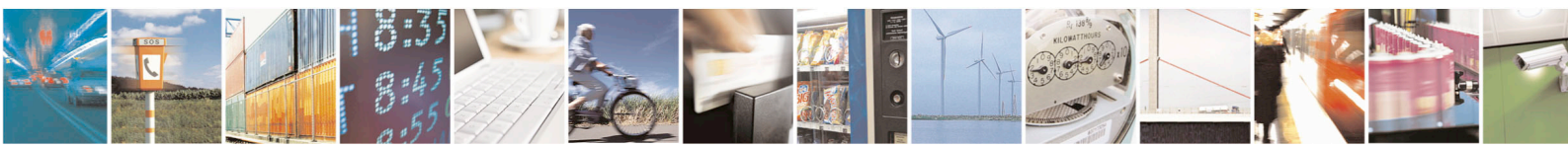
GE910 Product Description

80397ST10107A rev.9 – 2014-05-08

Making machines talk.

APPLICABILITY TABLE

PRODUCT
GE910-QUAD
GE910-GNSS
GE910-QUAD V3



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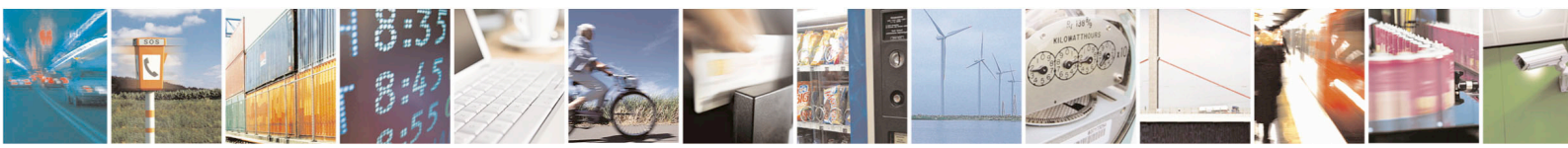

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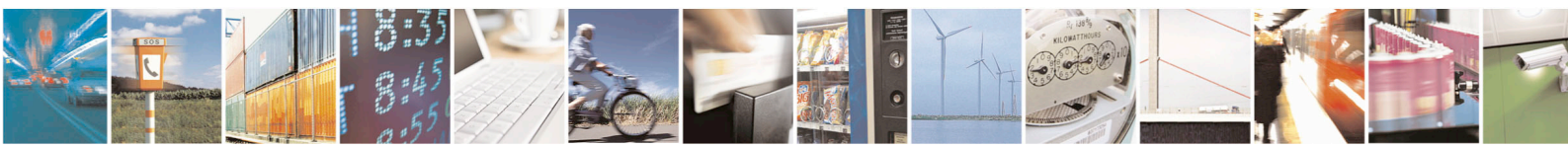

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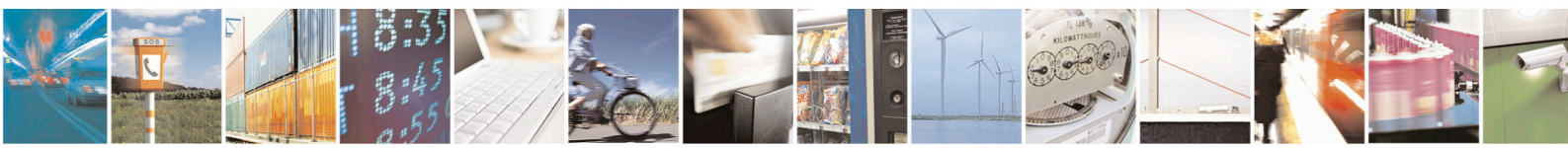

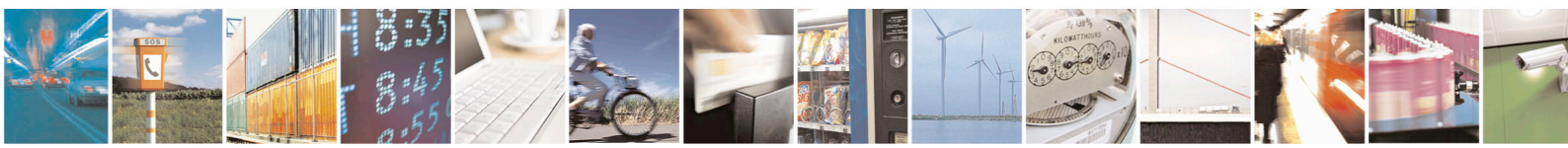

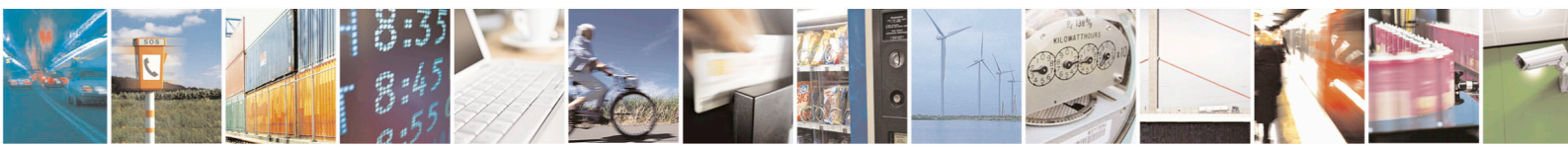

1. Introduction

1.1. Scope

Scope of this document is to give an overview of the Telit GE910 family, which can support GSM/GPRS with data/voice capabilities.

1.2. Audience

This document is intended for customers who are evaluating the GE910 family.

1.3. Contact Information, Support

For general contact, technical support, to report documentation errors and to order manuals, contact Telit Technical Support Center (TTSC) at:

TS-EMEA@telit.com
TS-NORTHAMERICA@telit.com
TS-LATINAMERICA@telit.com
TS-APAC@telit.com

Alternatively, use:

http://www.telit.com/en/products/technical-support-center/contact.php

For detailed information about where you can buy the Telit modules or for recommendations on accessories and components visit:

http://www.telit.com

To register for product news and announcements or for product questions contact Telit Technical Support Center (TTSC).

Our aim is to make this guide as helpful as possible. Keep us informed of your comments and suggestions for improvements.

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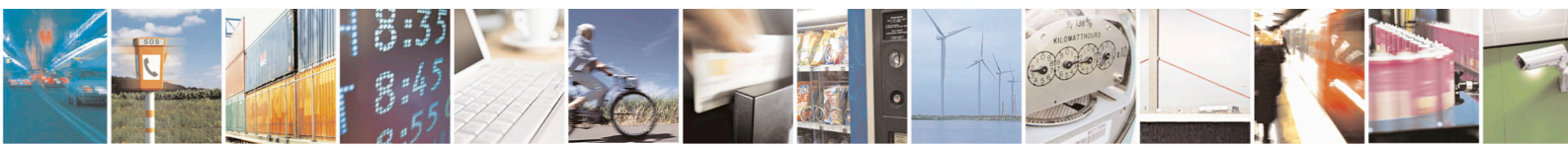


1.4. Document Organization

This document contains the following chapters:

"Chapter 1: "Introduction" provides a scope for this document, target audience, contact and support information, and text conventions.

"Chapter 2: "The GE910 Family" gives an overview of the features of the product.

"Chapter 3: "Product Description" describes in details the characteristics of the product.

"Chapter 4: "Evaluation Kit" provides some basic information about the Evaluation Kit.

"Chapter 5: "Software Features" provides an overview of the software features of the products.

"Chapter 6: "Conformity Assessment Issues" provides some fundamental hints about the conformity assessment that the final application might need.

"Chapter 7: "Safety Recommendation" provides some safety recommendations that must be followed by the customer in the design of the application that makes use of the GE910.

1.5. Text Conventions

Danger – This information MUST be followed or catastrophic equipment failure or bodily injury may occur.

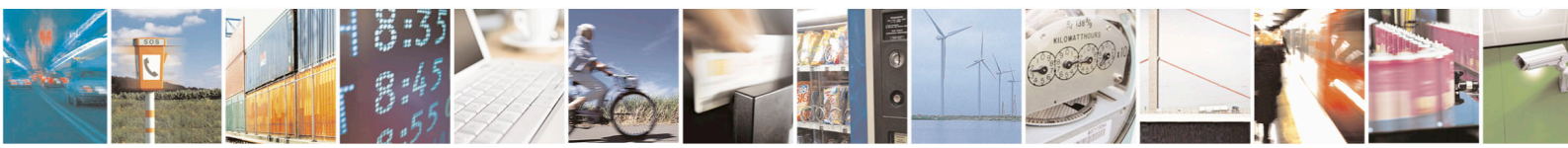
Caution or Warning – Alerts the user to important points about integrating the module, if these points are not followed, the module and end user equipment may fail or malfunction.

Tip or Information – Provides advice and suggestions that may be useful when integrating the module.

All dates are in ISO 8601 format, i.e. YYYY-MM-DD.

1.6. Related Documents

- GE910 Hardware User Guide, 1vv0300962
- Telit Modules Software User Guide, 1VV0300784
- AT Command User Guide, 80000ST10025a
- Telit IP Easy User Guide, 80000ST10028A



2. The GE910 Family

2.1. Product Overview

The GE910 is the GSM/GPRS product line of Telit's xE910 Unified Form Factor Family: m2m cellular modules with common LGA form factor, supporting all the different radio access technologies. With pin-to-pin compatibility across the xE910 Family, a one-time integration enables a seamless path to higher data rates and different wireless technologies with UMTS, HSPA+, CDMA 1xRTT, EV-DO and coming soon LTE.

The GE910-QUAD is Telit's first GSM/GPRS module to provide USB 2.0 full speed interface. It boasts a powerful ARM11 providing plenty of processing power and on board memory to run customers' applications, thereby reducing BOM final cost. The LGA package not only allows space and weight saving in portable devices thanks to its low profile, but it also enhances the mechanical resistance to shock and reduces the integration cost in medium-to-high-volume industrial processes.

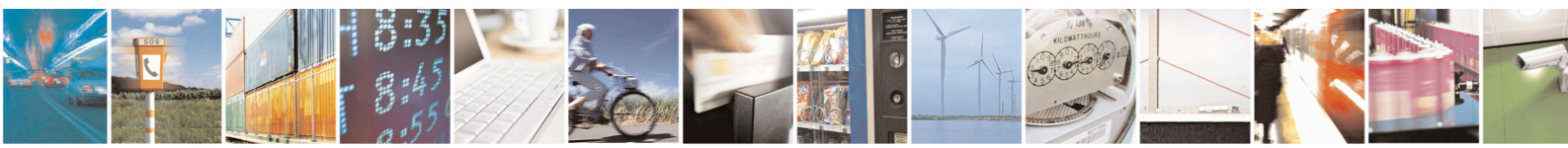
The GE910-QUAD features quad-band GPRS wireless data connectivity, as well as analog and digital voice. Standard plus extended AT command set and built-in TCP/IP and UDP protocol stacks provide augmented functionality, adding value to the end application. The new GE910 product family introduces the smallest GSM/GPRS Land-Grid-Array (LGA) module in Telit’s portfolio.

Furthermore, the GE910 makes it possible to run the customer’s applications inside the module using Python Script Interpreter, thus making it one of the smallest, complete platforms for m2m solutions.

The GE910-QUAD will also feature the Telit AppZone platform: an embedded software environment enabling easy M2M application development with industry standard C code. The Telit AppZone eliminates the need for an external microprocessor, further reducing the application size and design/integration cost. With the GE910 and the Telit AppZone the Time to Market will be faster than ever.

The GE910-GNSS variant is a competitively priced GSM/GPRS & GNSS combo solution supporting both GPS and GLONASS, significantly improving the overall receiver performance, aimed at opening up new m2m location aware telematics segments from automotive and fleet management applications, PDA's and mobile computing to livestock tracking and more.

Finally, the GE910-QUAD V3 adds to the xE910 family a cost-effective quad-band GSM/GPRS solution, based on the industry’s latest 2G chipset which allows integrators and OEMs to plan on availability for even the longest lifecycle applications. Thanks to low power consumption and reliable 2G connectivity combined with other features giving it unmatched cost-benefit, the GE910-QUAD V3 is highly recommended for new designs requiring a long-term availability 2G solution and benefiting from the easy pin-to-pin compatible upgrade path to UMTS/HSPA and CDMA/EV-DO options. It is also recommended for those existing designs already using some other member of the xE910 family requiring a cost-effective 2G pin-to-pin compliant alternative.



2.2. Target Market

The GE910 Family is designed and developed for the usage in applications such as:

- Telemetry
- Telematics
- Security alarms
- Automated Meter Reading (AMR)
- POS terminals
- PDAs and Mobile Computing
- Automotive and Fleet Management applications

2.3. Product Features

- Quad-band EGSM 850 / 900 / 1800 / 1900 MHz
- GSM/GPRS protocol stack 3GPP Release 4 compliant
- Output power

  - Class 4 (2W) @ 850 / 900 MHz

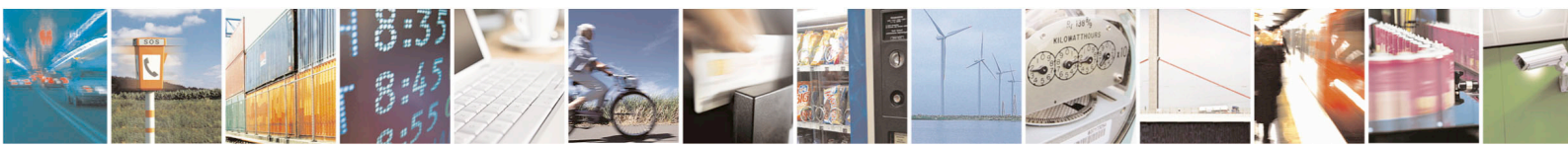
  - Class 1 (1W) @ 1800 / 1900 MHz
- Control via AT commands according to 3GPP 27.005, 27.007 and Telit custom AT commands
- Control via Remote AT commands
- Power consumption (typical values)

  - Idle (registered, power saving): 1.8 mA @ DRX=9 (GE910-QUAD/GNSS)

  - Idle (registered, power saving): 0.8 mA @ DRX=9 (GE910-QUAD V3)
- Serial port multiplexer 3GPP 27.010
- SIM Application Toolkit 3GPP TS 51.014
- SIM Access Profile
- Extended Supply voltage range: 3.10 – 4.50 V DC (3.8 V DC nominal)
- TCP/IP stack access via AT commands
- Sensitivity:

  ≤- 107 dBm (typ.) @ 850 / 900 MHz

  ≤- 107 dBm (typ.) @ 1800 / 1900 MHz
- DARP



- Enhanced Measurement Report support
- Dimensions: 28.2 x 28.2 x 2.25 mm
- Weight: 3.6 grams
- Storage and Operating temperature range -40°C to +85°C

Interfaces

- 10 I/O ports
- Analog audio
- Digital Voice Interface
- 1 A/D
- USB 2.0 Full Speed (GE910-QUAD/GNSS only, not available on GE910-QUAD V3)
- ITU-T V.24 serial link through CMOS UART:

  - Baud rate from 300 to 115.200 bps

Audio

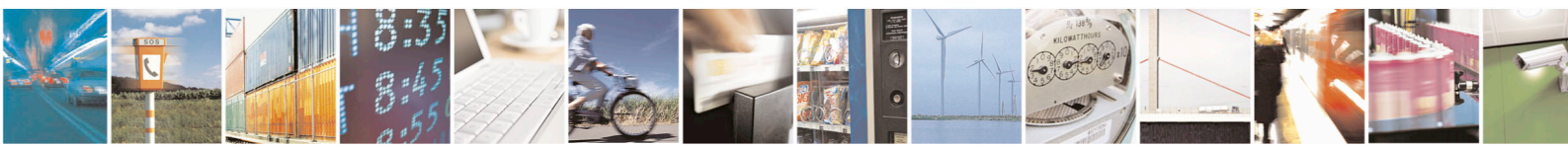
- Telephony
- Half rate, full rate, enhanced full rate and adaptive multi rate voice codecs (HR, FR, EFR, AMR)
- Superior echo cancellation & noise reduction
- Multiple audio profiles pre-programmed and fully configurable
- DTMF

Approvals

- Fully type approved conforming with R&TTE directive
- CE, GCF, FCC, PTCRB, IC

SMS

- Point-to-point mobile originated and mobile terminated SMS
- Concatenated SMS supported
- SMS cell broadcast
- Text and PDU mode
- SMS over GPRS



GPRS data

- GPRS class 10
- Mobile station class B
- Coding scheme 1 to 4
- PBCCH support
- GERAN Feature Package 1 support (NACC, Extended TBF)

GSM Supplementary Services

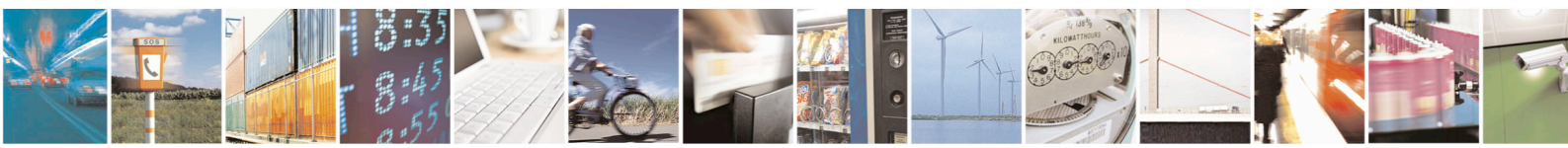
- Call forwarding
- Call barring
- Call waiting & call hold
- Advice of charge
- Calling line identification presentation (CLIP)
- Calling line identification restriction (CLIR)
- Unstructured supplementary services mobile originated data (USSD)
- Closed user group

Additional features

- SIM phonebook
- Fixed dialling number (FDN)
- Real Time Clock
- Alarm management
- Network LED support
- IRA, GSM, 8859-1 and UCS2 character sets
- Jamming detection
- Embedded TCP/IP stack, including TCP, IP, UDP, SMTP, ICMP and FTP protocols
- EASY SCAN ® automatic scan over GSM frequencies (also without SIM card)

Optional GNSS receiver (GE910-GNSS only)

- Frequency Band: GPS (L1), Glonass (L1, FDMA), Galileo (E1)
- Standards: NMEA, RTCM
- 32 Channel GPS Architecture



- Sensitivity:
  - Acquisition: -146 dBm
  - Navigation: -160 dBm
  - Tracking: -162 dBm
- Position accuracy (CEP50): 1.5 m
- Accuracy:
  - Speed: < 0.05 m/s
  - Heading: < 0.01 deg
- Time to first fix (@ -130 dBm)
  - Hot Start: 1 s
  - Cold Start: < 35 s

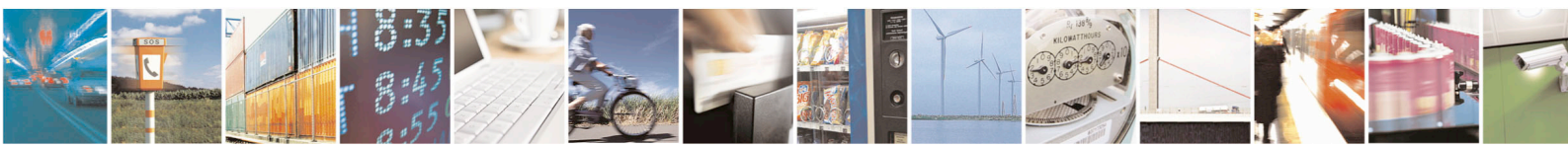
Python* application resources

- Python* script interpreter (the module takes the application code directly in the Python* language)
- Over-the-air application SW update

AppZone application resources (Available soon on GE910-QUAD/GNSS) **

- Programming language: C
- IDE: Eclipse
- 5 MB File system (to be confirmed)
- 2 MB RAM available to AppZone application (to be confirmed)
- Supports: GPIOs, UART, ADC

[**] To be confirmed.

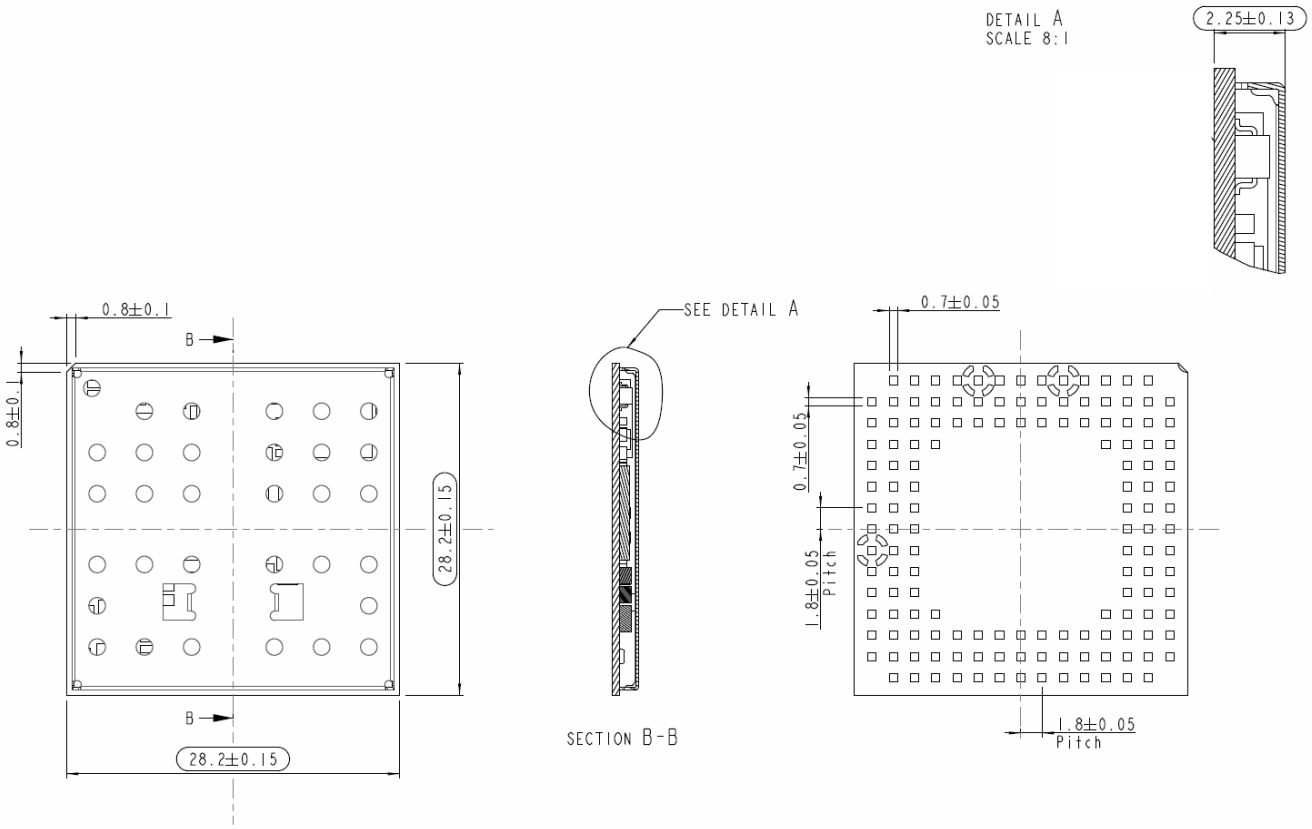


3. Product Description

3.1. Size and 2D mechanical drawing

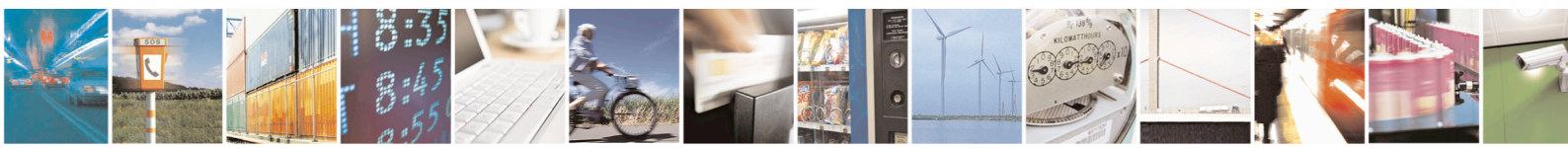
The GE910 overall dimensions are:

- Length: 28.2 mm
- Width: 28.2 mm
- Thickness: 2.25 mm



3.2. Weight

The weight of the GE910 is 3.6 grams.



3.3. Environmental requirements

3.3.1. Temperature range

Storage and Operating Temperature Range	–40°C ÷ +85°C

3.3.2. RoHS compliance

As a part of Telit's corporate policy of environmental protection, the GE910 Family products comply with the RoHS (Restriction of Hazardous Substances) directive of the European Union (EU Directive 2002/95/EG).

3.4. Operating Frequency

The operating frequencies in GSM, DCS, PCS modes are conform to the GSM specifications.

Mode	Freq. TX (MHz)	Freq. RX (MHz)	Channels (ARFC)	TX – RX offset
GSM 850	824.2 – 848.8	869.2 – 893.8	124 – 251	45 MHz
EGSM 900	890.0 – 914.8	935.0 – 959.8	0 – 124	45 MHz
	880.2 – 889.8	925.2 – 934.8	975 –1023	45 MHz
DCS-1800	1710.2 – 1784.8	1805.2 – 1879.8	512 – 885	95 MHz
PCS-1900	1850.2 – 1909.8	1930.2 – 1989.8	512 – 810	80 MHz

3.5. Transmitter output power

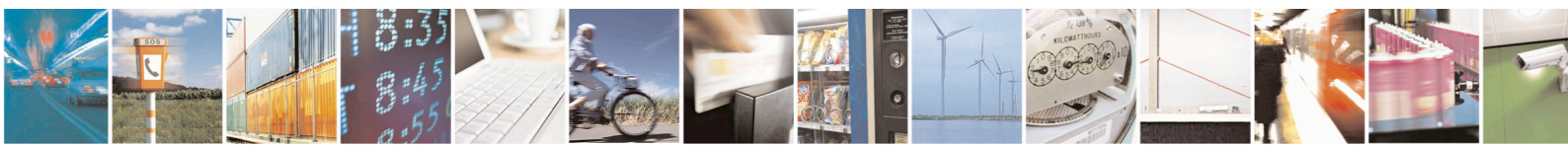
The GE910 transceiver modules in GSM–850/900 operating mode is class 4 in accordance with the specifications which determine the nominal 2W peak RF power (+33dBm) on 50 Ohm. In the DCS–1800/PCS–1900 bands, the operating mode is class 1 in accordance with the specifications which determine the nominal 1W peak RF power (+30dBm) on 50 Ohm.

3.6. Receiver sensitivity

Sensitivity of GE910 module in GSM 850/900 bands is better than –107 dBm (2.4% BER Class II – static channel) in normal operating conditions.

Sensitivity of GE910 module in GSM 1800/1900 bands is better than –107 dBm (2.4% BER Class II – static channel) in normal operating conditions.

The GE910 supports also the Downlink Advance Receiver Performance (DARP) feature for single antenna interference cancellation (SAIC).



3.7. Antenna

The antenna that the customer chooses to use should fulfill the following requirements:

Frequency range	Depending by frequency band(s) provided by the network operator, the customer shall use the most suitable antenna for that/those band(s).
Bandwidth	80 MHz in EGSM 900, 70 MHz if GSM 850, 170 MHz in DCS, 140 MHz PCS band

For further information please refer to the GE910 Hardware User Guide.

3.8. Supply voltage

The external power supply must be connected to VBATT signal and must fulfill the following requirements:

Nominal Supply Voltage	3.8 V
Normal Operating Voltage Range	3.40 V – 4.20 V
Extended Operating Voltage Range (*)	3.10 V – 4.50 V

(*) Please refer to the GE910 Hardware User Guide for using the product with the extended operating voltage range.

3.9. Power consumption

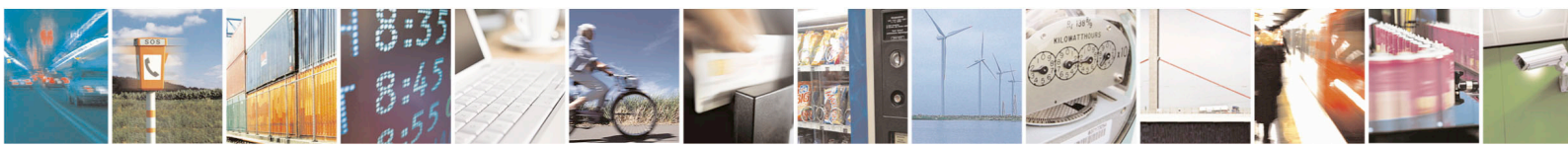
The current consumption of the Telit GE910-QUAD/GNSS in idle mode (GSM only) is:

Idle registered, power saving	1.8 mA @ DRX=9 (AT+CFUN=5)

The current consumption of the Telit GE910-QUAD V3 in idle mode (GSM only) is:

Idle registered, power saving	0.8 mA @ DRX=9 (AT+CFUN=5)

Please check the HW User Guide for further details about all other power consumption figures.



3.10. The user interface

The user interface is managed by AT commands according to ITU-T V.250, 3GPP 27.007 and 27.005 specifications. Moreover, custom AT commands are also available. Please refer to the AT Command User Guide for details.

3.11. Speech CODEC

The GE910 supports the following voice codec:

- HR – Half Rate
- FR – Full Rate
- EFR – Enhanced Full Rate
- AMR-HR, AMR Half Rate
- AMR-FR, AMR Full Rate

3.12. SIM Reader

The GE910 supports phase 2 SIM at 1.8V and 3V ONLY with an external SIM connector. For 5V SIM, an external level translator can be added.

3.13. SMS

The GE910 supports the following SMS types:

- Mobile Terminated (MT) class 0 – 3 with signaling of new incoming SMS, SIM full, SMS read
- Mobile Originated class 0 – 3 with writing, saving in SIM and sending
- Cell broadcast compatible with CB DRX with signaling of new incoming SMS.

The GE910 also supports SMS over GPRS

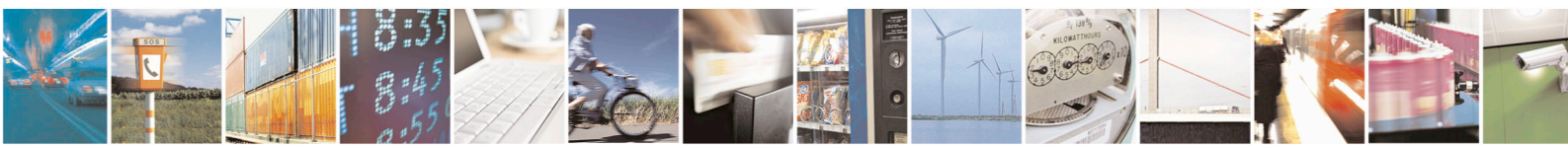
3.14. Real Time Clock and Alarm

The GE910 supports the Real Time Clock and Alarm functions through AT commands. An alarm output pin can be configured to indicate the alarm with a hardware line output.

Furthermore the Voltage Output of the RTC power supply is provided so that a backup capacitor can be added externally to increase the RTC autonomy.

3.15. Enhanced Measurement Report

The GE910 supports the Enhanced Measurement Report on SACCH channel according to 3GPP TS 44.018 version 4.22.0 Release 4 (par. 3.4.1.2, 9.1.54, 9.1.55) and 3GPP TS 45.008 version 4.17.0 Release 4 (par. 8.4.8).



3.16. Data transmission capabilities

The Telit GE910 is a mobile station class B supporting GPRS Class 10, coding schemes 1 to 4 and PBCCH. Moreover, it supports GERAN feature package 1, which consist in supporting the Extended Uplink TBF and Network Assisted Cell Change (NACC).

3.17. Local security management

The local security management can be done with the lock of Subscriber Identity module (SIM). The security code will be requested at power–up.

3.18. Call control

The call cost control function is supported.

3.19. Phonebook

This function allows the storage of the telephone numbers in SIM memory. The capability depends on SIM version and its embedded memory.

3.20. Characters management

The GE910 supports the IRA, GSM, 8859-1 and UCS2 characters sets, in TEXT and PDU mode.

3.21. SIM related functions

Fixed Dialing Numbers (FDN), Abbreviated Dialing Number (I) and PIN insertion are supported

Extension at the PIN2 for the PUK2 insertion capability for lock condition is supported too.

3.22. Call status indication

The call status indication is supported.

3.23. Automatic answer (Voice, Data)

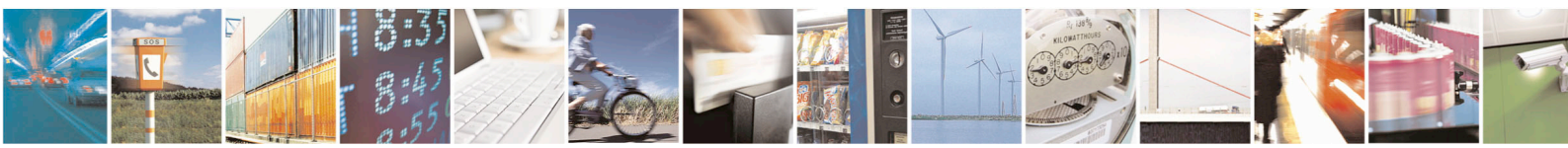
The automatic answer is supported. The user/application can specify the number of rings after which the module will automatically answer.

The user/application can set the number of rings by means of the command ATS0=<n>.

3.24. Supplementary services (SS)

The following supplementary services are supported:

- Call Barring,
- Call Forwarding,
- Calling Line Identification Presentation (CLIP),



- Calling Line Identification Restriction (CLIR),
- Call Waiting, other party call Waiting Indication,
- Call Hold, other party Hold / Retrieved Indication,
- Closed User Group supplementary service (CUG),
- Advice of Charge,
- Unstructured SS Mobile Originated (MO)

3.25. Acoustic signaling

The acoustic signaling of the GE910 on the selected acoustic device are the following:

- Call waiting;
- Ringing tone;
- SMS received tone;
- Busy tone;
- Power on/off tone;
- Off Hook dial tone;
- Congestion tone;
- Connected tone;
- Call dropped;
- No service tone;
- Alarm tone.

3.26. TTY (Telephone Text)

The TTY feature is supported. Please refer to 3GPP TS 26.226 and 3GPP TS 26.231 for details.

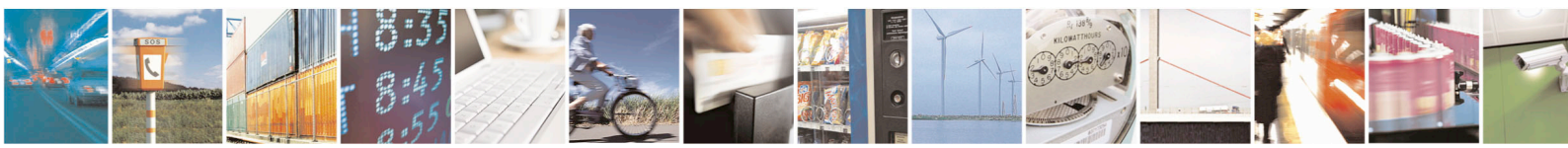
3.27. Logic level specifications

Where not specifically stated, all the interface circuits work at 1.8V CMOS logic levels. To get more detailed information about the logic level specifications used in the GE910, please check with the Hardware User Guide.

3.28. Audio

3.28.1. Analog

The Base Band Chip of the GE910 provides one differential input for audio to be transmitted (Uplink) and a balanced BTL output for audio to be received (downlink). The GE910 has a built-in echo canceller and a noise suppressor. For more details, please refer to the GE910 Hardware User Guide.



3.28.2. Digital

The GE910 offers the digital voice interface. For more details, please refer to the Digital Voice Interface Application Note.

3.29. Serial Ports

Two serial ports are available on the module:

- Main serial port (full RS232), up to 115,200 bps
- AUX serial port (RX & TX only), 115,200 bps

3.30. Converters

3.30.1. ADC Converter

The GE910 has two on board ADC, for further information please refer to the GE910 Hardware User Guide.

3.31. Mounting the GE910 on your Board

The Telit GE910 module has been designed to be compliant with a standard lead-free SMT process. For detailed information about PCB pad design and conditions to use in SMT process please check with the GE910 Hardware User Guide.

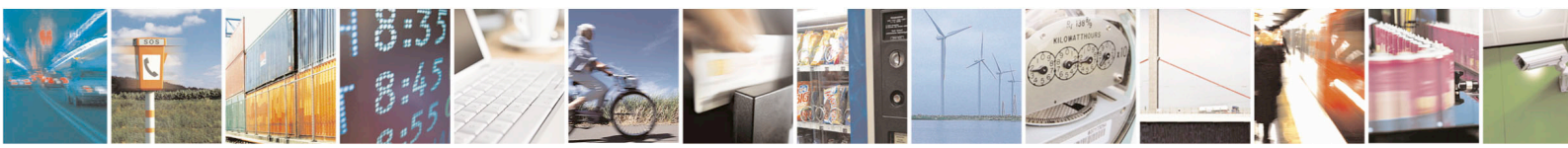
3.32. Packing system

According to SMT process, for picking & placing movement requirements, GE910 family is packaged on trays. Each tray contains 20 pieces in size of 176 x 329.

The GE910 can be also packaged on reels of 200 pieces each.

For further information on GE910 packing system please refer to the GE910 Hardware User Guide.

The level of moisture sensibility of GE910 family is “3”, according with standard IPC/JEDEC J-STD-020, take care of all the relative requirements for using this kind of components. Special care for handling is highly required.



4. Evaluation Kit

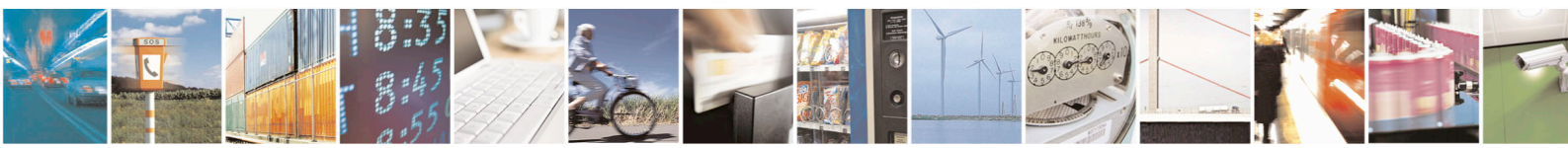
In order to assist the customer in the development of the application, Telit offers the EVK2 Evaluation Kit that can be ordered separately. The EVK2 has a SIM card holder, the RS 232 serial port level translator, a direct UART connection, audio and antenna connector.

The EVK2 provides a fully functional solution for a complete data or phone application. The standard serial RS232 9 pin connector placed on the Evaluation Kit allows the connection of the EVK2 system with a PC or other DTE.

The development of the applications utilizing the Telit GE910 module must present a proper design of all the interfaces towards and from the module (e.g. power supply, audio paths, level translators), otherwise a decrease in the performance will be introduced or, in the worst case, a wrong design can even lead to an operating failure of the module.

In order to assist the hardware designer in his project phase, the EVK2 board presents a series of different solutions, which will cover the most common design requirements on the market, and which can be easily integrated in the OEM design as building blocks or can be taken as starting points to develop a specific one.

For a detailed description of the Telit Evaluation Kit, please refer to the documentation provided with the Telit GE910 Hardware User Guide and EVK2 User Manual.



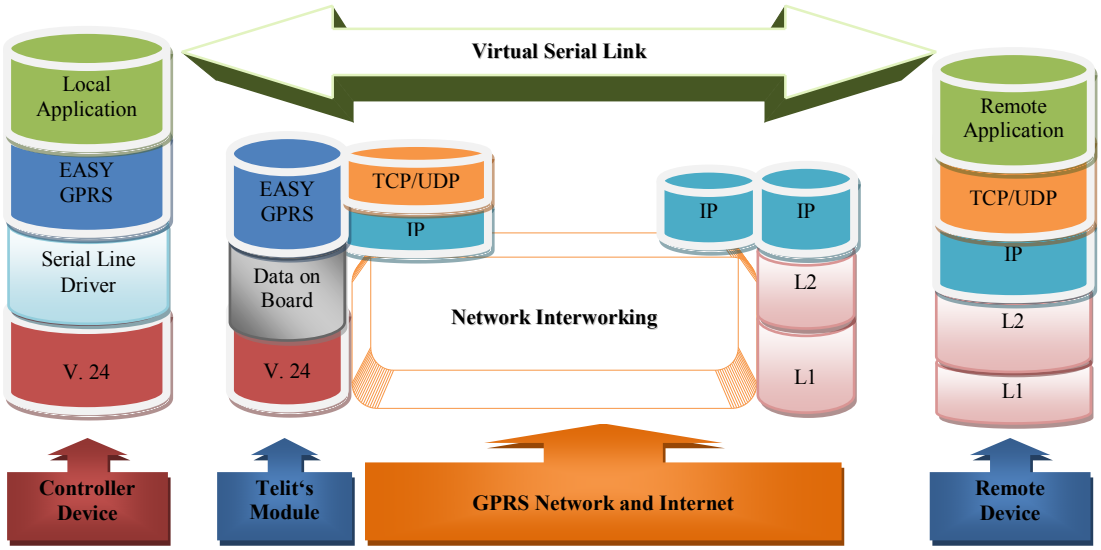
5. Software Features

5.1. Easy GPRS Extension

5.1.1. Overview

The Easy GPRS feature allows the Telit GE910 user to contact a device in internet and establish with it a raw data flow over the GPRS and Internet networks.

This feature can be seen as a way to obtain a "virtual" serial connection between the Application Software on the Internet machine involved and the controller of the Telit GE910 module, regardless of all the software stacks underlying.



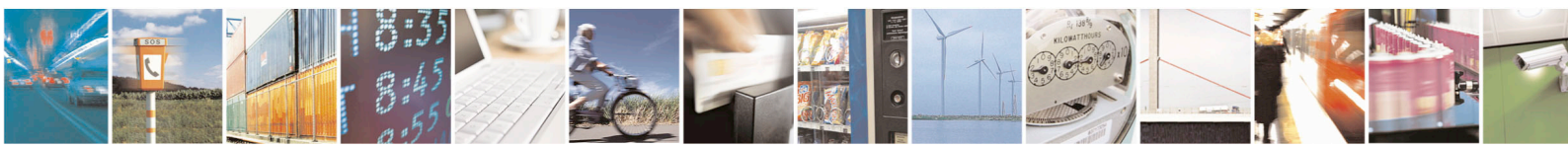
This particular implementation allows to the devices interfacing to the Telit GE910 module the use of the GPRS and Internet packet service without the need to have an internal TCP/IP stack since this function is embedded in the module.

For more detailed information regarding the use of the Easy GPRS feature, please consult Easy GPRS User Guide and AT Commands Reference Guide.

5.2. Multisocket

The multisocket is an extension of Telit Easy GPRS feature, which allows the user to have two contexts activated (that means two different IP address), more than one socket connection (with a maximum of 6) and simultaneous FTP client service.

For more detailed information please consult the Easy GPRS User Guide.



5.3. Jamming Detection

5.3.1. Overview

The Jammer Detect feature allows the GE910 to detect the presence of a disturbing device such as a Communication Jammer and give indication to the user.

This feature can be very important in alarm, security and safety applications that rely on the module for the communications. In these applications, the presence of a Jammer device can compromise the whole system reliability and functionality and therefore shall be recognized and reported to the local system for countermeasure actions.

5.4. CMUX

CMUX (Converter-Multiplexer) is a multiplexing protocol implemented in the GE910 that can be used to send any data, SMS, or TCP data.

5.4.1. Architecture

The Multiplexer mode enables one serial interface to transmit data to four different customer applications. This is achieved by providing four virtual channels using a Multiplexer (MUX).

This is especially advantageous when a data/GPRS call is ongoing. Using the Multiplexer features, e.g. controlling the module or using the SMS service, can be done via the additional channels without disturbing the data flow; access to the second UART is not necessary.

Furthermore, several accesses to the module can be created with the Multiplexer. This is of great advantage when several independent electronic devices or interfaces are used.

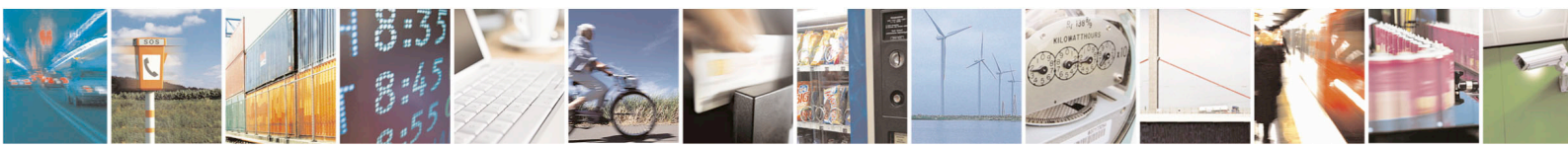
To access the three virtual interfaces, both the GSM engine and the customer application must contain MUX components, which communicate over the multiplexer protocol.

In Multiplexer mode, AT commands and data are encapsulated into packets. Each packet has channel identification and may vary in length.

5.4.2. Features

- 3GPP 27.010 CMUX Basic Option used
- CMUX implementation support four full DLCI (Serial Port)
- Every CMUX instance has its own user profile storage in NVM
- Independent setting of unsolicited message.
- Every CMUX instance has its own independent flow control

NOTE: More details about the Multiplexer mode are available in the CMUX User Guide.



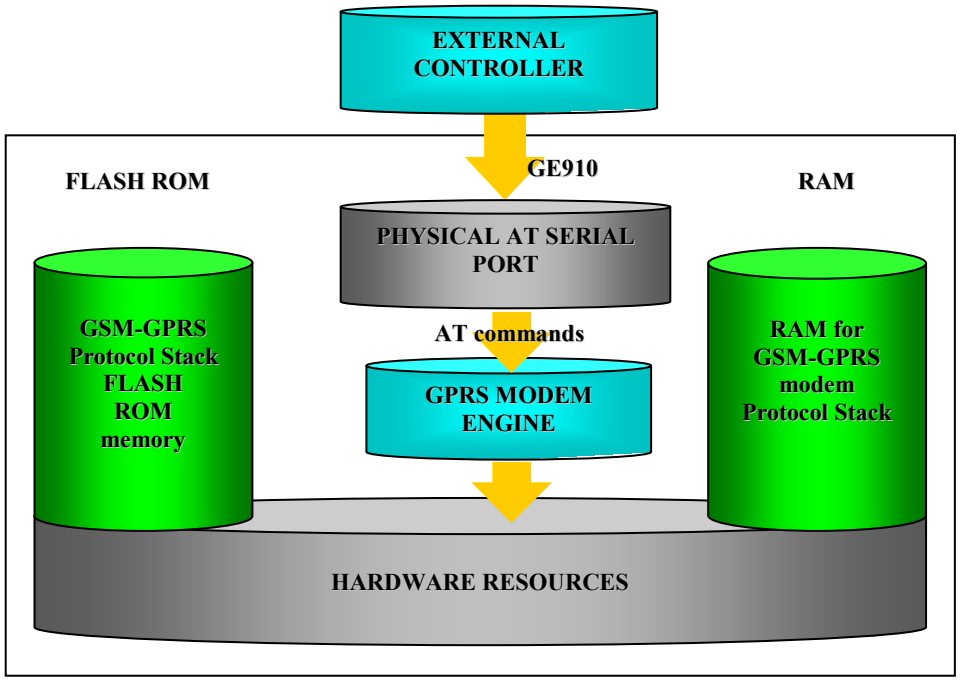
5.5. Easy Script Extension – Python interpreter

5.5.1. Overview

The Easy Script Extension is a feature that allows driving the modem "internally", writing the controlling application directly in a nice high level language: Python.

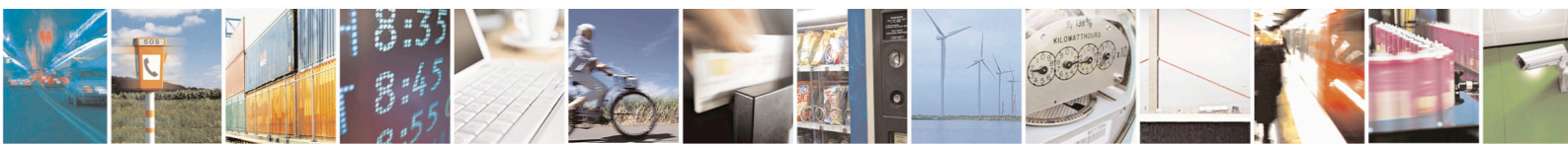
The Easy Script Extension is aimed at low complexity applications where the application was usually done by a small microcontroller that manages some I/O pins and the GE910 through the AT command interface.

A schematic of such a configuration can be:



In order to not use any external controller, and further simplify the programming of the sequence of operations, the customer can benefit of these features already embedded in the GE910:

- Python script interpreter engine
  - GE910-QUAD/GNSS: v. 2.7.2 multi thread
  - GE910-QUAD V3: v. 1.5.2+ single thread
- Non Volatile Memory room for the user scripts and data
  - GE910-QUAD/GNSS: 2MB
  - GE910-QUAD V3: 800kB
- RAM reserved for Python engine usage
  - GE910-QUAD/GNSS: 2MB
  - GE910-QUAD V3: 1MB



5.6. Telit AppZone (Available soon on GE910-QUAD/GNSS)

5.6.1. Overview

The Telit AppZone platform is a software development environment embedded in the GE910 module. It makes the M2M module itself able to perform all the key tasks that normally would require an external microprocessor. With Telit AppZone you can:

- Develop software applications using high-level, standard C language
- Host applications in the dedicated internal memory space
- Run applications in the GE910 module
- Manage peripherals, communicate with the module and connect to the network

Everything without the need of an external micro controller, either and external flash memory.

This integrated, “all-in-one” solution significantly reduces BOM (Bill of Material) and design/integration cost and TTM (Time to Market).

Boosting a powerful ARM11 with plenty of processing power and on board memory, The GE910 module is ideally suited to embed the AppZone platform.

5.6.2. Key features

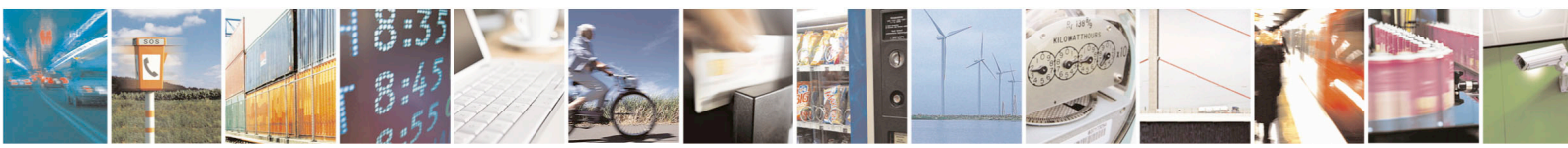
The Telit AppZone environment ensures:

- Fast interrupt latency for applications requiring real-time actions
- Run AT command based scripts
- Multi-tasking of up to 5 tasks simultaneously, each with its own priority, with IPC (Inter Process Communication) to exchange signals between the concurrent tasks
- OTA (Over-The-Air) applications update
- Protected memory area, dedicated to customer applications

5.6.3. Technical Specifications (*)

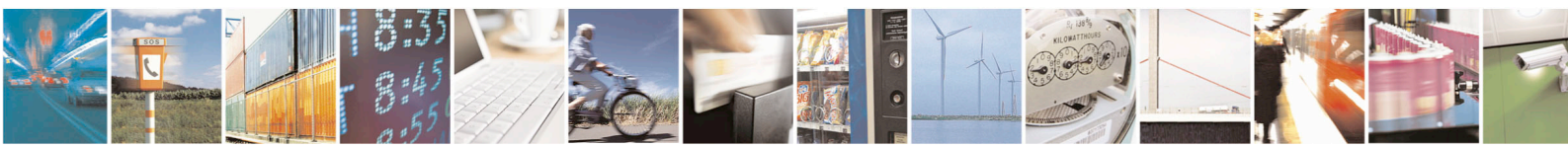
The following list summarizes the main technical specifications of the Telit AppZone platform integrated in the GE910 module.

- Programming Language: Standard C
- IDE: Eclipse
- Dedicated File System: 5MB
- Separate App RAM Space: 2MB
- Same API’s used for Telit G30 module
- GPIO’s: 10
- ADC: 2 (10 bits resolution)
- Standard Interfaces: IP Socket (BSD)



- UART
- AT commands tunneling
- Deep Sleep – RTC control (60µA power consumption in Deep Sleep mode)
- 2 HW timers and SW timers
- Recovery Mechanism
- SSL
- OTA Supported

(*) To be confirmed.



5.7. SAP: SIM Access Profile

5.7.1. Architecture

The SAP feature allows the module to use the SIM of a remote SIM Server. This feature is implemented using special AT Command on a Virtual circuit of the CMUX interface.

5.7.2. Implementation features

- SAP is based on 3GPP 27.010 CMUX Basic Option used
- Only SAP Client features
- Logic HW flow control is recommended on the Virtual instance selected for the SAP command.

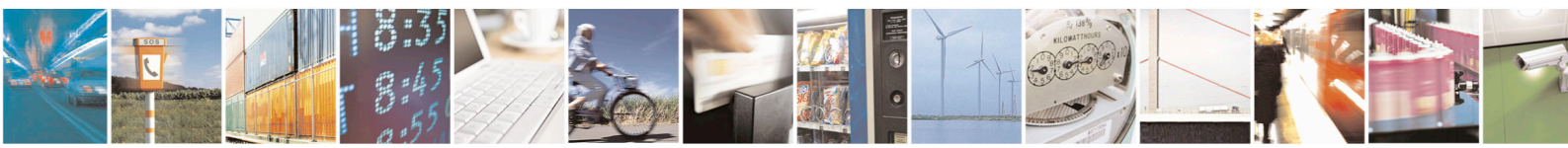
5.7.3. Remote SIM Message Command Description

The module sends request commands to the client application through a binary message that is crowned in the CMUX message. The client application shall extract the message and send it to the SAP server, through the appropriate protocols (e.g. by RFCOMM, that is the Bluetooth serial port emulation entity).

The client application shall extract all the messages sent by SAP server and put them in the CMUX message, to be sent to the module.

The module fulfills the following feature requirements:

- Connection management
- Transfer APDU
- Transfer ATR
- Power SIM on
- Report Status
- Error Handling



Every feature needs some procedures support:

Feature	Procedure
Connection Management	Connect
	Report Status
	Transfer ATR
	Disconnection Initiated by the Client
	Disconnection Initiated by the Server
Transfer APDU	Transfer APDU
Transfer ATR	Transfer ATR
Power SIM on	Power SIM on
	Transfer ATR
Report Status	Report Status
Error Handling	Error Response

Report Status, Disconnection Initiated by the Server and Error Response are independent messages sent by server. The other procedures consist of couples of messages, started by client.

NOTE: More details about the SAP are available in the SAP User Guide.

5.8. AT Commands

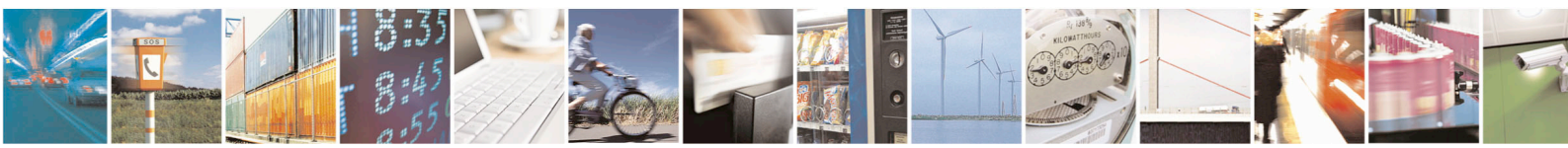
The Telit GE910 module can be driven via the serial interface using the standard AT commands.

The Telit GE910 module is compliant with:

1. Hayes standard AT command set, in order to maintain the compatibility with existing SW programs.
2. 3GPP 27.007 specific AT command and GPRS specific commands.
3. 3GPP 27.005 specific AT commands for SMS (Short Message Service) and CBS (Cell Broadcast Service)

Moreover the GE910 module supports also Telit proprietary AT commands for special purposes.

For more information about AT commands supported by the GE910 module please refer to the document AT Commands Reference Guide.



6. Conformity Assessment Issues

6.1. GE910-QUAD/GNSS Declaration of Conformity

Telit Communications S.p.A.

EC DECLARATION OF CONFORMITY

1. **GE910** (Product name); **GE910-QUAD** (Model name)
2. Telit Communications S.p.A Via Stazione di Prosecco, 5/b 34010 Sgonico –TRIESTE- ITALY (manufacturer)
3. This declaration of conformity is issued under the sole responsibility of the manufacturer
4. Quad Band GSM850/EGSM900/DCS1800/PCS1900 GPRS Wireless Module

5. The object of the declaration described above is in conformity with the relevant Community harmonisation: European Directive 1999/05/EC (R&TTE)
6. The conformity with the essential requirements of the 1999/05/EC has been demonstrated against the following harmonized standards:

RF spectrum use (R&TTE art. 3.2)	EN 301 511 V9.0.2
EMC (R&TTE art. 3.1b)	EN 301 489-1 V1.9.2 EN 301 489-7 V1.3.1
Health & Safety (R&TTE art. 3.1a)	EN 60950-1:2006 + A11:2009 + A1:2010 + A12:2011

7. The conformity assessment procedure referred to in Article 10 and detailed in Annex IV of Directive 1999/5/EC has been followed with the involvement of the following Notified Body:
   AT4 wireless, S.A., Parque Tecnologico de Andalucia, C/ Severo Ochoa 2, 29590 Campanillas – Málaga SPAIN, Notified Body No: 1909
   Thus, CE 1909 is placed on the product
8. The Technical Construction File (TCF) relevant to the product described above and which supports this Declaration of Conformity, is held at: Telit Communications S.p.A Via Stazione di Prosecco, 5/b 34010 Sgonico (TRIESTE) ITALY

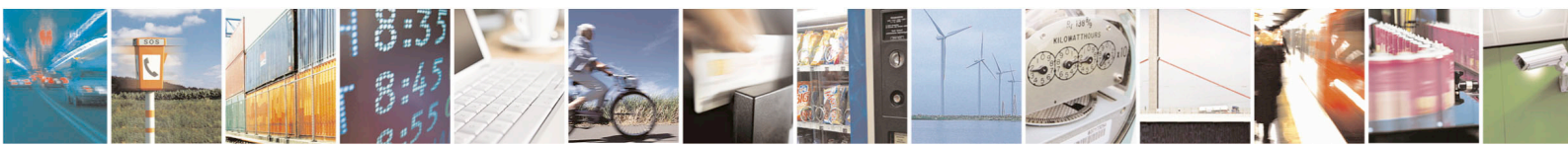
Signed for and on behalf of Telit Communications S.p.A

Trieste, *2012-07-18*

Cellular EMEA Manager	Quality Director	Quality Manager
Antonino Sgrsi	Guido Walcher	Cesare Robelli

NBO number:	34942CN8.001
Technical Construction File :	34942C_GE910-QUAD_rev1

Mod 0211 2010-11 Rev.1 - This declaration of conformity is issued in compliance with 768/2008/EC



Telit Communications S.p.A.

EC DECLARATION OF CONFORMITY

1. **GE910** (Product name); **GE910-GNSS** (Model name)
2. Telit Communications S.p.A Via Stazione di Prosecco, 5/b 34010 Sgonico –TRIESTE- ITALY (manufacturer)
3. This declaration of conformity is issued under the sole responsibility of the manufacturer
4. Quad Band GSM850/EGSM900/DCS1800/PCS1900 GPRS **and GPS** Wireless Module

5. The object of the declaration described above is in conformity with the relevant Community harmonisation: European Directive 1999/05/EC (R&TTE)
6. The conformity with the essential requirements of the 1999/05/EC has been demonstrated against the following harmonized standards:

RF spectrum use (R&TTE art. 3.2)	EN 301 511 V9.0.2 **EN 300 440-2 V1.4.1**
EMC (R&TTE art. 3.1b)	EN 301 489-1 V1.9.2 **EN 301 489-3 V1.4.1** EN 301 489-7 V1.3.1
Health & Safety (R&TTE art. 3.1a)	EN 60950-1:2006 + A11:2009 + A1:2010 + A12:2011 + AC: 2011 EN 62311:2008

7. The conformity assessment procedure referred to in Article 10 and detailed in Annex IV of Directive 1999/5/EC has been followed with the involvement of the following Notified Body:
   AT4 wireless, S.A., Parque Tecnologico de Andalucia. C/ Severo Ochoa 2, 29590 Campanillas – Málaga
   SPAIN, Notified Body No: 1909

   The, CE 1909 is placed on the product

8. The Technical Construction File (TCF) relevant to the product described above and which supports this Declaration of Conformity, is held at: Telit Communications S.p.A Via Stazione di Prosecco, 5/b 34010 Sgonico (TRIESTE) ITALY

Signed for and on behalf of Telit Communications S.p.A

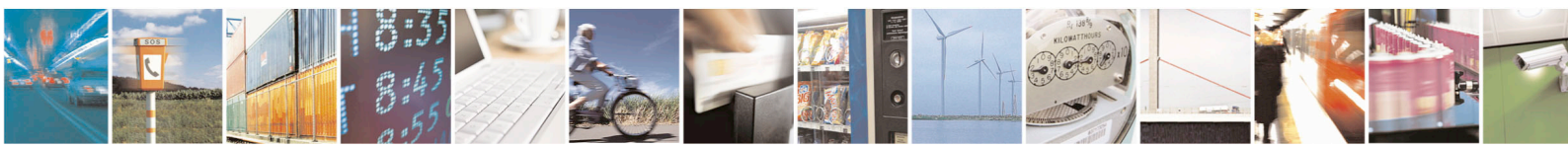
Trieste, 2013-08-21

Cellular EMEA Manager
Antonino Sgroi

Quality Director
Guido Walcher

NBO number:	38584CN6.001
Technical Construction File:	GE910-GNSS_GC-QUAD_38584_Rev_1

Mod 0211 2010-11 Rev.1 - This declaration of conformity is issued in compliance with 768/2008/EC



6.2. GE910-QUAD/GNSS FCC Certificate

TCB GRANT OF EQUIPMENT AUTHORIZATION TCB

Certification
Issued Under the Authority of the
Federal Communications Commission
By:

British Approvals Board for
Telecommunications (BA
Balfour House Churchfield Road
Walton-on-Thames, Surrey, KT12 2TD
United Kingdom

Date of Grant: 07/17/2012
Application Dated: 07/17/2012

Telit Communications S.p.A.
Viale Stazione di Prosecco 5/b
Trieste, 34010
Italy

Attention: Brian Tucker , Global VP, Quality

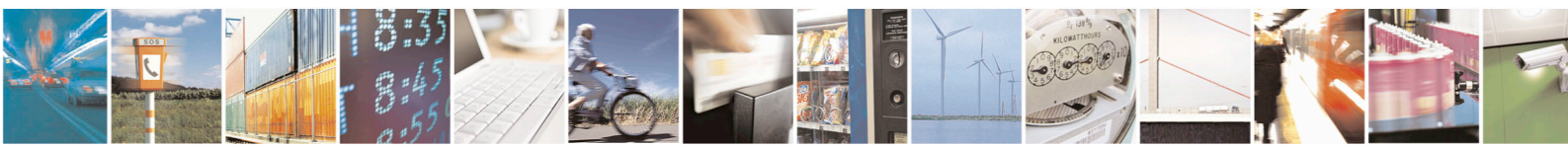
NOT TRANSFERABLE

EQUIPMENT AUTHORIZATION is hereby issued to the named GRANTEE, and is VALID ONLY for the equipment identified hereon for use under the Commission's Rules and Regulations listed below.

FCC IDENTIFIER: RI7GE910
Name of Grantee: Telit Communications S.p.A.
Equipment Class: PCS Licensed Transmitter
Notes: 2G module
Modular Type: Single Modular

Grant Notes	FCC Rule Parts	Frequency Range (MHz)	Output Watts	Frequency Tolerance	Emission Designator
	22H	824.2 - 848.8	1.683	2.5 PM	245KGXW
	24E	1850.2 - 1909.8	0.927	2.5 PM	245KGXW

Single Modular Approval. Power listed is conducted. The maximum antenna gain including cable loss for compliance with radiated power limits, RF exposure requirements and the categorical exclusion requirements of 2.1091 is 8.32 dBi for 850MHz bands, 3.34 dBi and for 1900 MHz bands. The antenna(s) used for this transmitter must be installed to provide a separation distance of at least 20cm from all persons and must not be co-located or operate in conjunction with any antenna or transmitter not described under this FCC Id, except in accordance with FCC multi-transmitter product procedures. The final product operating with this transmitter must include operating instructions and antenna installation instructions, for end-users and installers to satisfy RF exposure compliance requirements. Compliance of this device in all final product configurations is the responsibility of the Grantee. Installation of this device into specific final products may require the submission of a Class II permissive change application containing data pertinent to RF Exposure, spurious emissions, ERP/EIRP, and host/module authentication, or new application if appropriate. This device contains GSM functions that are not operational in the U.S. Territories. This filing is only applicable for U.S. operations.



TCB

GRANT OF EQUIPMENT AUTHORIZATION

TCB

Certification
Issued Under the Authority of the
Federal Communications Commission
By:

TUV SUD BABT
Forsyth House Churchfield Road
Walton-on-Thames, Surrey, KT12 2TD
United Kingdom

Date of Grant: 05/20/2013
Application Dated: 05/20/2013

Telit Communications S.p.A.
Viale Stazione di Prosecco 5/b
Trieste, 34010
Italy

Attention: Brian Tucker , Global VP, Quality

NOT TRANSFERABLE

EQUIPMENT AUTHORIZATION is hereby issued to the named GRANTEE, and is VALID ONLY for the equipment identified hereon for use under the Commission's Rules and Regulations listed below.

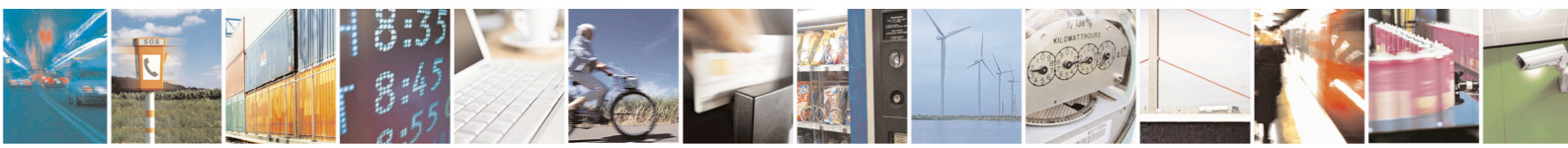
FCC IDENTIFIER: RI7GE910G
Name of Grantee: Telit Communications S.p.A.
Equipment Class: PCS Licensed Transmitter
Notes: Quad band GSM/GPRS module
Modular Type: Single Modular

Grant Notes	FCC Rule Parts	Frequency Range (MHZ)	Output Watts	Frequency Tolerance	Emission Designator
	22H	824.2 - 848.8	1.854	0.027 PM	248KGXW
	24E	1850.2 - 1909.8	1.117	0.024 PM	246KGXW

Single Modular Approval. Power listed is conducted. The maximum antenna gain including cable loss for compliance with radiated power limits, RF exposure requirements and the categorical exclusion requirements of 2.1091 is 8.02 dBi for 850MHz bands, 2.75 dBi and for 1900 MHz bands. The antenna(s) used for this transmitter must be installed to provide a separation distance of at least 20cm from all persons and must not be co-located or operated in conjunction with any antenna or transmitter not described under this FCC id, except in accordance with FCC multi-transmitter product procedures. The final product operating with this transmitter must include operating instructions and antenna installation instructions, for end-users and installers to satisfy RF exposure compliance requirements.

Compliance of this device in all final product configurations is the responsibility of the Grantee. Installation of this device into specific final products may require the submission of a Class II permissive change application containing data pertinent to RF Exposure, spurious emissions, ERP/EIRP, and host/module authentication, or new application if appropriate.

This device contains GSM functions that are not operational in the U.S. Territories. This filing is only applicable for U.S. operations.



6.3. GE910-QUAD/GNSS IC Certificate

ZERTIFIKAT ◆ CERTIFICATE ◆ 認証証書 ◆ СЕРТИФИКАТ ◆ CERTIFICADO ◆ CERTIFICAT

TÜV SÜD BABT

FCB Technical Acceptance Certificate

CB Number: UK00004

ISSUED TO	Telit Communications S.p.A Via Stazione Di Prosecco 5/B 34010 Trieste Italy
CERTIFICATION No.	5131A- GE910
DESCRIPTION	2G Module
TYPE OF EQUIPMENT	Cellular Mobile GSM (824-849 MHz) PCS Mobile (1850-1910 MHz) Modular Approval
MODEL(S)	GE910-QUAD; GE910-GNSS
LISTING TYPE	Additional to Existing Family
ANTENNA INFORMATION	External
ATE VALIDATION TYPE	RF Evaluation
SPECIFICATION(S)	RSS-132 Issue 3 January 2013 RSS-133 Issue 6 January 2013
MANUFACTURING No.	5131A
REPRESENTATIVE No	7925A
IC OATS FACILITY No	7581A
IC OATS FACILITY	A Test Lab Techno. Corp No. 140-1, Changan Street, Taoyuan County 334, R.O.C Bade City, TAIWAN Post Code: 334 Tel: 886-3-271 0188 x800, Fax: 886-3-271 0190 Email: murphy@at-lab.com.tw

Frequency Range (MHz)	Power Output (W)	Occupied Bandwidth (KHz)	Emission Designator
824.2 – 848.8	1.776	246	246KGXW
1650.2 – 1909.8	1.062	245	245KGXW

Authorised by:

Issue Date: 30 May 2013

Title of Signatory: Certification Supervisor

Number: CD/000189 Issue: 3

I hereby state that the subject equipment was tested and found in compliance with the above-noted specification

Certification of equipment means only that the equipment has met the requirements of the above noted specification. Licence applications, where applicable, to use certified equipment, are acted on accordingly by the issuing office and will depend on the existing radio environment, service and location of operation. This certificate is issued on condition that the holder complies and will continue to comply with requirements and procedures issued by Industry Canada

J'atteste par la présente, que le matériel a fait l'objet d'essai et a été jugé conforme à la spécification ci-dessus.

La certification du matériel signifie seulement que le matériel a satisfait aux exigences de la norme indiquée ci-dessus. Les demandes de licences nécessaires pour l'utilisation du matériel certifié sont traitées en conséquence par le bureau de délivrance et dépendent des conditions radioélectriques et service où de l'emplacement d'exploitation. Le présent certificat est délivré à la condition que le titulaire satisfasse et continue de satisfaire aux exigences et aux procédures d'Industrie Canada;

Certified Equipment shall not be distributed, leased, sold or offered for sale in Canada before the date of the certification have been added to the RCL. This certificate has been issued in accordance with the Certification Regulations of TÜV SÜD BABT. The certificate is not transferable and remains the property of TÜV SÜD BABT

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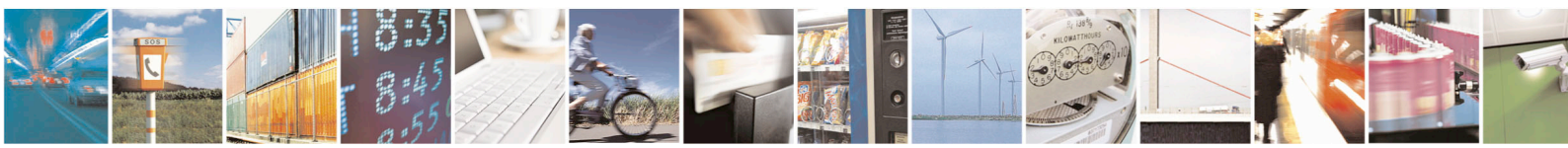
Octagon House • Concorde Way • Fareham • Hampshire • PO15 5RL • United Kingdom



6.4. GE910-QUAD Eu RoHs Declaration of Conformity

EU RoHs DECLARATION OF CONFORMITY

1. *Product name*: **GE910-QUAD**
2. *Manufacturer*: Telit Communications S.p.A Via Stazione di Prosecco, S/b 34010 Sgonico (TRIESTE) ITALY
3. This declaration of conformity is issued under the sole responsibility of the manufacturer
4. *Object of declaration*: Quad Band GSM850/EGSM900/DCS1800/PCS1900 GPRS Wireless Module

5. The object of declaration described above is in conformity with Directive 2011/65/EU of the European Parliament and of the Council of 8 June 2011 on the restriction of the use of certain hazardous substances in electrical and electronic equipment

6. The conformity with the applicable requirements of the Directive 2011/65/EU has been demonstrated against the following harmonized standard:

EN 50581:2012	Technical documentation for the assessment of electrical and electronic products with respect to the restriction of hazardous substances

7. The technical documentation relevant to the product described above and which supports this Declaration of Conformity, is held at: Telit Communications S.p.A Via Stazione di Prosecco, S/b 34010 Sgonico (TRIESTE) ITALY.

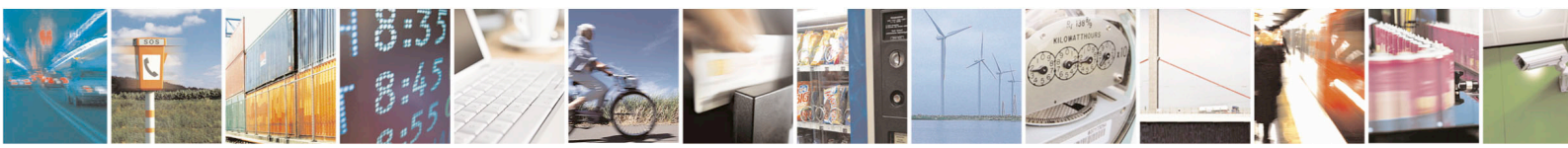
Signed for and on behalf of Telit Communications S.p.A.

Trieste, 2013-02-28

Quality Director
Guido Wachler

Quality & Environmental Management System Manager
Paolo Solinas

Mod 0215 2011-01 Rev.7 - This Declaration of Conformity is issued in compliance with: 768/2008/EC



6.5. GE910-QUAD V3 Declaration of Conformity

Telit Communications S.p.A.

EC DECLARATION OF CONFORMITY

1. **GE910-QUAD V3** (Model name)
2. Telit Communications S.p.A - Viale Stazione di Prosecco, 5/b 34010 Sgonico –TRIESTE- ITALY (manufacturer)
3. This declaration of conformity is issued under the sole responsibility of the manufacturer
4. Quad Band GSM850/EGSM900/DCS1800/PCS1900 GPRS Wireless Module

5. The object of the declaration described above is in conformity with the relevant Community harmonisation: European Directive 1999/05/EC (R&TTE)
6. The conformity with the essential requirements of the 1999/05/EC has been demonstrated against the following harmonized standards:

Article 3.2: Radio spectrum use	EN 301 511 V9.0.2
Article 3.1(b): EMC	EN 301 489-1 V1.9.2 EN 301 489-7 V1.3.1
Article 3.1(a): Electrical Safety and EMF Exposure	EN 60950-1:2006 + A11:2009 + A1:2010 + A12:2011+AC:2011 EN 62311:2008

7. The conformity assessment procedure referred to in Article 10 and detailed in Annex IV of Directive 1999/5/EC has been followed with the involvement of the following Notified Body:
   AT4 wireless, S.A., Parque Tecnologico de Andalucia, C/ Severo Ochoa 2, 29590 Campanillas – Málaga SPAIN, Notified Body No: 1909
   Thus, CE 1909 is placed on the product
8. The Technical Construction File (TCF) relevant to the product described above and which supports this Declaration of Conformity, is held at: Telit Communications S.p.A - Viale Stazione di Prosecco, 5/b 34010 Sgonico (TRIESTE) ITALY

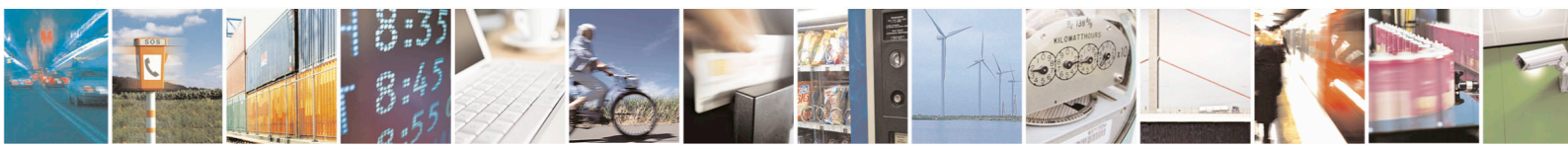
Signed for and on behalf of Telit Communications S.p.A
Trieste, 2013-12-05

R&D Manager
Antonino Sgro

Quality Director
Guido Walcher

NBO number:	40559CNB.001
Technical Construction File :	40559_GE910 QUAD_V3_rev1

Mod 0211 2010-11 Rev.1 - This declaration of conformity is issued in compliance with 768/2008/EC



6.6. GE910-QUAD V3 EU RoHs Declaration of Conformity

EU RoHs DECLARATION OF CONFORMITY

1. *Product name*: **GE910-QUAD V3**
2. *Manufacturer*: Telit Communications S.p.A Via Stazione di Prosecco, 5/b 34010 Sgonico (TRIESTE)-ITALY
3. This declaration of conformity is issued under the sole responsibility of the manufacturer.
4. *Object of declaration*: Quad Band GSM850/EGSM900/DCS1800/PCS1900 GPRS Wireless Module

5. The object of declaration described above is in conformity with Directive 2011/65/EU of the European Parliament and of the Council of 8 June 2011 on the restriction of the use of certain hazardous substances in electrical and electronic equipment.
6. The conformity with the applicable requirements of the Directive 2011/65/EU has been demonstrated against the following harmonized standard:

EN 50581:2012	Technical documentation for the assessment of electrical and electronic products with respect to the restriction of hazardous substances

7. The technical documentation relevant to the product described above and which supports this Declaration of Conformity, is held at: Telit Communications S.p.A Via Stazione di Prosecco, 5/b 34010 Sgonico (TRIESTE) ITALY.

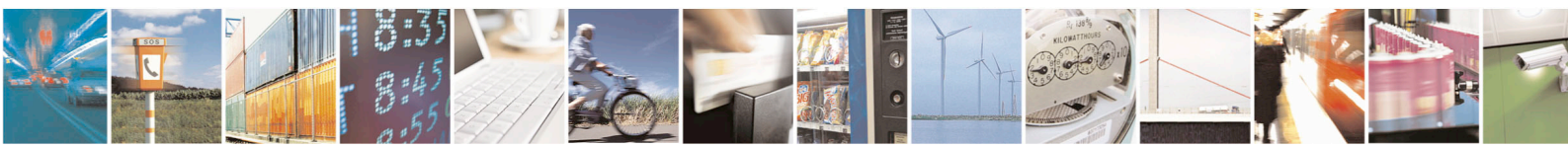
Signed for and on behalf of Telit Communications S.p.A.

Trieste, 2013-12-18

Quality Director
Carlo Velcher

Quality & Environmental Management System Manager
Paolo Somas

Mod 9216 2013 01 Rev.4 This Declaration of Conformity is issued in compliance with 768/2008/EC



6.7. GE910-QUAD V3 FCC Certificate

TCB

GRANT OF EQUIPMENT AUTHORIZATION

TCB

Certification
Issued Under the Authority of the
Federal Communications Commission
By:

TUV SUD BABT
Forsyth House Churchfield Road
Walton-on-Thames, Surrey, KT12 2TD
United Kingdom

Date of Grant: 10/23/2013
Application Dated: 10/22/2013

Telit Communications S.p.A.
Viale Stazione di Prosecco 5/b
Trieste, 34010
Italy

Attention: Brian Tucker , Global VP, Quality

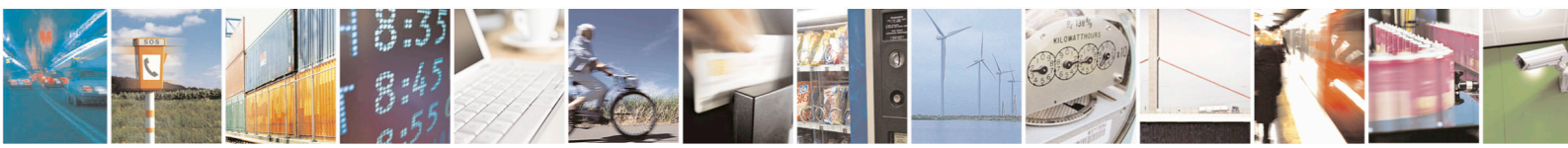
NOT TRANSFERABLE

EQUIPMENT AUTHORIZATION is hereby issued to the named GRANTEE, and is VALID ONLY for the equipment identified hereon for use under the Commission's Rules and Regulations listed below.

FCC IDENTIFIER: RI7GE910Q3
Name of Grantee: Telit Communications S.p.A.
Equipment Class: PCS Licensed Transmitter
Notes: Quad Band GSM/GPRS module
Modular Type: Single Modular

Grant Notes	FCC Rule Parts	Frequency Range (MHZ)	Output Watts	Frequency Tolerance	Emission Designator
	22H	824.2 - 848.8	1.71	2.5 PM	248KGXW
	24E	1850.2 - 1909.8	1.074	2.5 PM	244KGXW

Power out is conducted at the antenna terminal. Single Modular Approval. This device is to be used only for mobile and fixed application. 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, except in accordance with FCC multi-transmitter evaluation procedures as documented in this filing. End-Users must be provided with transmitter operation conditions for satisfying RF exposure compliance. OEM integrators must insure that the end user has no manual instructions to remove or install this module. For mobile and fixed operating configurations the antenna gain, including cable loss, must not exceed 6.43 dBi at 850 MHz and 3.0 dBi at 1900 MHz as defined in 2.1091 for satisfying RF exposure compliance. Under no conditions may an antenna gain be used that would exceed the ERP and/or EIRP power limits as specified in Part 22, and 24. The Grantee is responsible for providing the documentation required for modular use.



6.8. GE910-QUAD V3 IC Certificate

ZERTIFIKAT ◆ CERTIFICATE ◆ 認証証書 ◆ СЕРТИФИКАТ ◆ CERTIFICADO ◆ CERTIFICAT

TÜV SÜD BABT

FCB Technical Acceptance Certificate

CB Number: UK0004

ISSUED TO	Telit Communications S.p.A. Via Stazione Di Prosecco 5/B Trieste 34010 Italy
CERTIFICATION No.	5131A-GE910Q3
DESCRIPTION	Quad Band GSM/GPRS module
TYPE OF EQUIPMENT	Cellular Mobile GSM (824-849 MHz) PCS Mobile (1850-1910 MHz) Modular Approval
MODEL(S)	GE910-QUAD V3
TYPE OF LISTING:	Single
ANTENNA INFORMATION	GSM 850: 6.43 dBi; PCS 1900: 3.00 dBi
RF EVALUATION TYPE	RF Evaluation
SPECIFICATION(S)	RSS-132 Issue 3 January, 2013 RSS-133 Issue 6 January, 2013
MANUFACTURING No.	5131A
REPRESENTATIVE No.	5131B
IC CATS FACILITY No.	7381A-1
IC CATS FACILITY	A Test Lab Techno Corp. No. 140-1, Changan Street, Bade City, Taoyuan County 334, Taiwan (R.O.C.) Tel: 886-3-2710188 #200 Fax: 886-3-2710190 Contact: Joyce Liao; E-mail: joyce@atl-lab.com.tw

Frequency Range (MHz)	Power Output (W)	Occupied Bandwidth (KHz)	Emission Designator
824.2-848.8	1.710	248	248KGXW
1850.2-1909.8	1.074	244	244KGXW

Authorised by: Issue Date: 01 November 2013

Title of Signatory: TUV SUD Lead FCB Number: CD/006044 Issue: 1

On Behalf of TÜV SÜD BABT

I hereby attest that the subject equipment was tested and found in compliance with the above noted specification

Certification of equipment means only that the equipment has met the requirements of the above noted specification. License applications, where applicable to use certified equipment, are acted on accordingly by the issuing office and will depend on the existing radio environment, service and location of operation. This certificate is issued on condition that the holder complies and will continue to comply with requirements and procedures issued by Industry Canada;

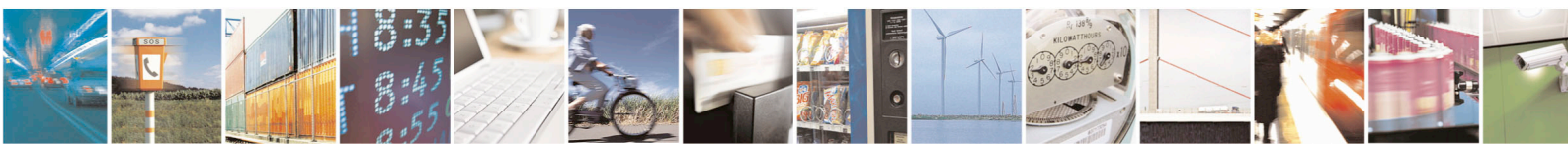
J'atteste, par la présente, que le matériel a fait l'objet d'essai et a été jugé conforme à la spécification ci-dessus.

La certification du matériel signifie seulement que le matériel a satisfait aux exigences de la norme indiquée ci-dessus. Les demandes de licences nécessaires pour l'utilisation du matériel certifié sont traitées en conséquence par le bureau de délivrance et dépendent des conditions radio ambiantes, du service et de l'emplacement d'exploitation. Le présent certificat est délivré à la condition que le titulaire satisfasse et continue de satisfaire aux exigences et aux procédures d'Industrie Canada;

Certified Equipment shall not be distributed, leased, sold or offered for sale in Canada before the details of the certification have been added to the REL. This certificate has been issued in accordance with the Certification Regulations of TÜV SÜD BABT.
For further details related to this certification, please contact Customer.Services@sbl.com

TÜV SÜD BABT • TÜV SÜD Group

Octagon House • Concorde Way • Fareham • Hampshire • PO15 5RL • United Kingdom



7. Safety Recommendations

READ CAREFULLY

Be sure the use of this product is allowed in the country and in the environment required. The use of this product may be dangerous and has to be avoided in the following areas:

- Where it can interfere with other electronic devices in environments such as hospitals, airports, aircrafts, etc.
- Where there is risk of explosion such as gasoline stations, oil refineries, etc. It is responsibility of the user to enforce the country regulation and the specific environment regulation.

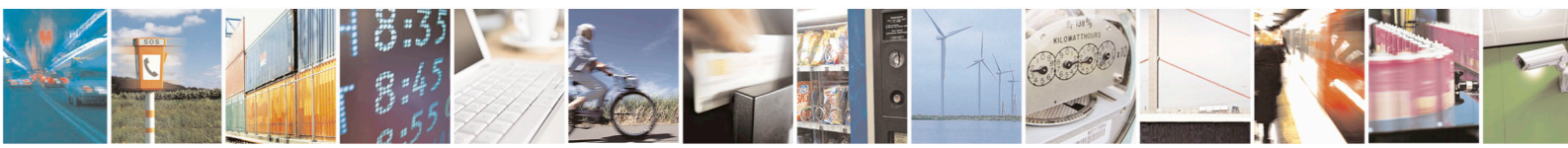
Do not disassemble the product; any mark of tampering will compromise the warranty validity. We recommend following the instructions of the hardware user guides for a correct wiring of the product. The product has to be supplied with a stabilized voltage source and the wiring has to be conforming to the security and fire prevention regulations. The product has to be handled with care, avoiding any contact with the pins because electrostatic discharges may damage the product itself. Same cautions have to be taken for the SIM, checking the instruction carefully for its use. Do not insert or remove the SIM when the product is in power saving mode.
The system integrator is responsible for the functioning of the final product; therefore, care has to be taken to the external components of the module, as well as any project or installation issue, because the risk of disturbing the GSM network or external devices or having impact on the security. Should there be any doubt, please refer to the technical documentation and the regulations in force. Every module has to be equipped with a proper antenna with specific characteristics. The antenna has
to be installed with care in order to avoid any interference with other electronic devices and has to guarantee a minimum distance from the body (20 cm). In case this requirement cannot be satisfied, the system integrator has to assess the final product against the SAR regulation.

The European Community provides some Directives for the electronic equipment introduced on the market. All the relevant information's are available on the European Community website:

http://ec.europa.eu/enterprise/sectors/rtte/documents/

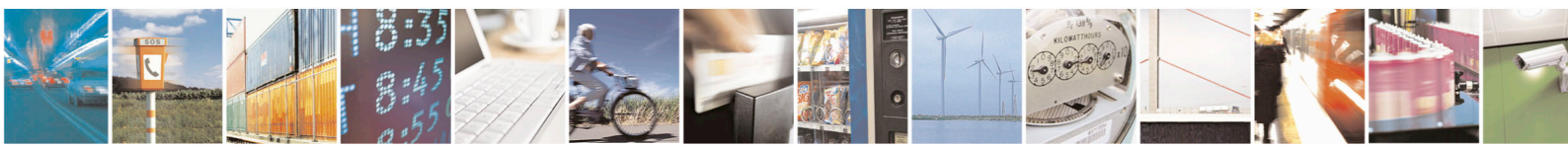
The text of the Directive 99/05 regarding telecommunication equipment is available, while the applicable Directives (Low Voltage and EMC) are available at:

http://ec.europa.eu/enterprise/sectors/electrical/

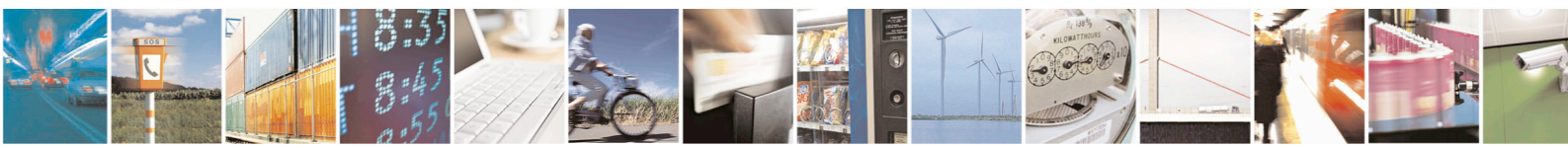


8. List of acronyms

ACM	Accumulated Call Meter
ASCII	American Standard Code for Information Interchange
AT	Attention commands
CB	Cell Broadcast
CBS	Cell Broadcasting Service
CCM	Call Control Meter
CLIP	Calling Line Identification Presentation
CLIR	Calling Line Identification Restriction
CMOS	Complementary Metal-Oxide Semiconductor
CR	Carriage Return
CTS	Clear To Send
DAI	Digital Audio Interface
DCD	Data Carrier Detected
DCE	Data Communications Equipment
DRX	Data Receive
DSR	Data Set Ready
DTA	Data Terminal Adaptor
DTE	Data Terminal Equipment
DTMF	Dual Tone Multi Frequency
DTR	Data Terminal Ready
EMC	Electromagnetic Compatibility
ETSI	European Telecommunications Equipment Institute
FTA	Full Type Approval (ETSI)
GPRS	General Radio Packet Service
GSM	Global System for Mobile communication
HF	Hands Free
IMEI	International Mobile Equipment Identity
IMSI	International Mobile Subscriber Identity
IRA	International Reference Alphabet
ITU	International Telecommunications Union
IWF	Inter-Working Function
LCD	Liquid Crystal Display
LED	Light Emitting Diode
LF	Linefeed
ME	Mobile Equipment
MMI	Man Machine Interface
MO	Mobile Originated
MS	Mobile Station
MT	Mobile Terminated
OEM	Other Equipment Manufacturer
PB	Phone Book
PDU	Protocol Data Unit



PH	Packet Handler
PIN	Personal Identity Number
PLMN	Public Land Mobile Network
PUCT	Price per Unit Currency Table
PUK	PIN Unblocking Code
RACH	Random Access Channel
RLP	Radio Link Protocol
RMS	Root Mean Square
RTS	Ready To Send
RI	Ring Indicator
SCA	Service Center Address
SIM	Subscriber Identity Module
SMD	Surface Mounted Device
SMS	Short Message Service
SMSC	Short Message Service Center
SS	Supplementary Service
TIA	Telecommunications Industry Association
UDUB	User Determined User Busy
USSD	Unstructured Supplementary Service Data



9. Document History

Revision	Date	Changes
0	2012-03-15	First issue
1	2012-06-28	Minor changes
2	2012-10-12	Note about USB 2.0 FS availability
3	2012-11-09	Updated product features, CE, FCC and IC certificates
4	2012-12-03	Added info on GE910-GNSS variant and AppZone
5	2013-04-15	Updated module thickness, Conformity Assessments Issues and Packing System
6	2013-05-29	Added GE910-QUAD V3, updated Temperature Range
7	2013-09-11	Updated 3.8 “Supply voltage” Updated “Conformity Assessment Issues”
8	2014-01-02	Added GE910-QUAD V3 certificates
9	2014-05-08	Updated 2.3 “Product Features” and 3.9 “Power Consumption”