GL865-DUAL/QUAD V3 Product Description

80400ST10120A Rev.6 – 2014-04-10

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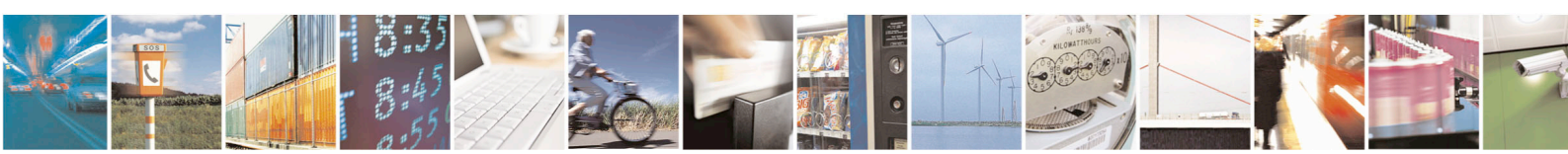

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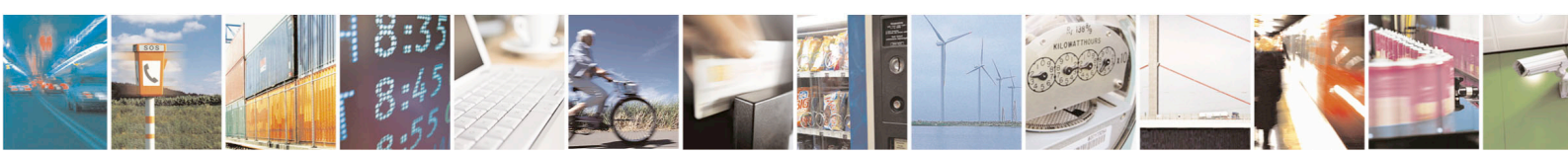
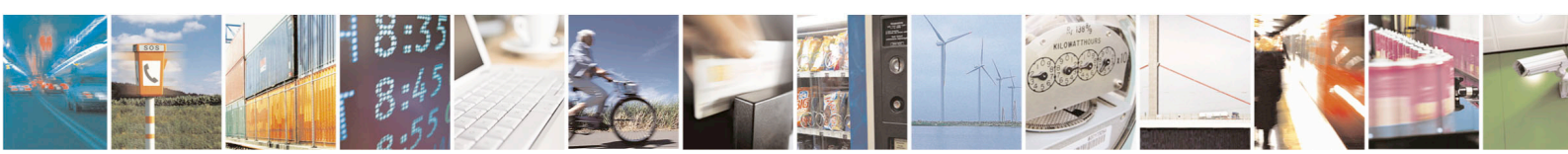


APPLICABLE PRODUCTS

PRODUCT
GL865-DUAL V3
GL865-QUAD V3



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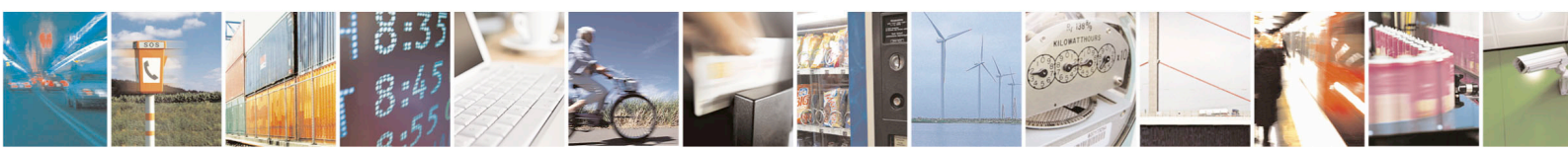

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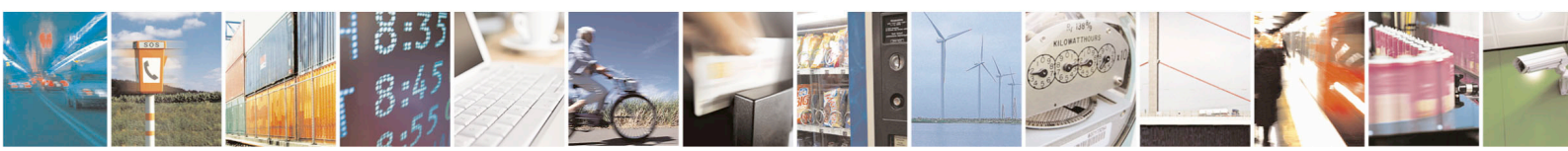

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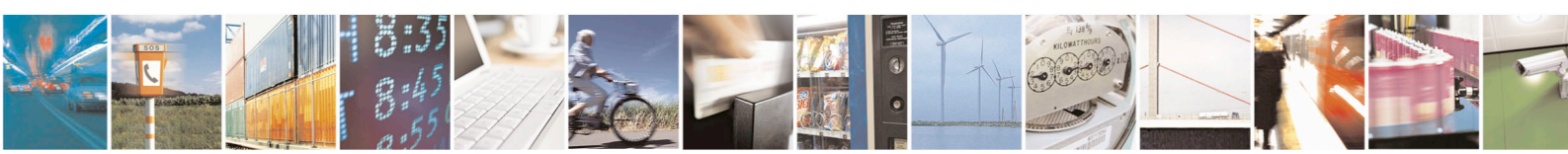


1. Introduction

1.1. Scope

Scope of this document is giving an overview of the Telit GL865-DUAL/QUAD V3 module, which is a compact GSM/GPRS module with data and voice capabilities.

1.2. Audience

This document is intended for customers who are evaluating the GL865-DUAL/QUAD V3.

1.3. Contact Information, Support

For general contact, technical support, to report documentation errors and to order manuals, contact Telit's 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's 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.

Telit appreciates feedback from the users of our information.

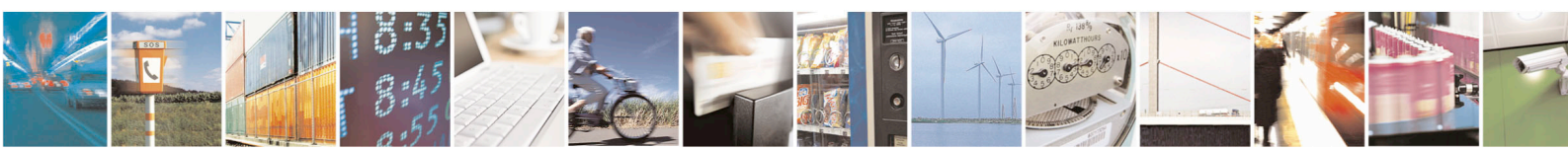
1.4. Document Organization

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 GL865-DUAL/QUAD V3" 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 follow by the customer in the design of the application that makes use of the GL865-DUAL/QUAD V3.

"Chapter 8: "List of acronyms"

"Chapter 9: "Document history"

1.5. Text Conventions

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

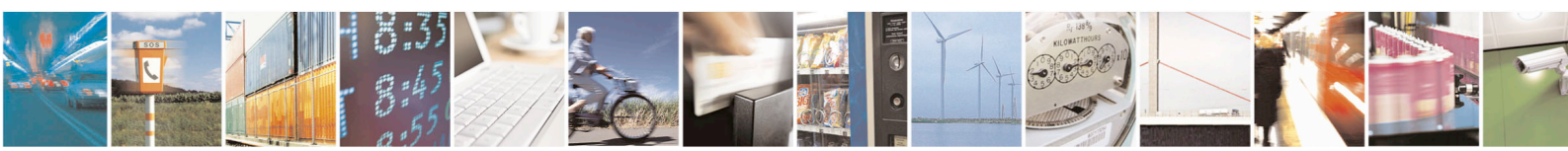
Caution or Warning – Alerts the user to important points about integrating the module, if these points are not followed, the module and end user equipment may fail or malfunction.

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

- 1vv0301018 GL865-DUAL/QUAD V3 Hardware User Guide
- Telit GSM/GPRS Family Software User Guide, 1vv0300784
- Audio settings application note , 80000NT10007a
- GL865/GL868 V3 Digital Voice Interface Application Note, 80000NT10104a
- SIM Integration Design Guide Application Note, 80000NT10001a
- AT Commands Reference Guide, 80000ST10025a
- Telit EVK2 User Guide, 1vv0300704



2. The GL865-DUAL/QUAD V3

2.1. Product Overview

The GL865-DUAL/QUAD V3 is the new generation module in GL865 family. It is based on the latest Intel 2G chipset, protecting our customers' design investments with a long-term availability solution. The new V3 variant features VQFN packaging in lieu of LCC castellation of the original GL865, maintaining full pad-level compatibility and thereby providing a soft transition replacement to the highly popular and widely deployed GL865-DUAL/QUAD.

Simple drop-in migration and technology upgrade path to 3G high-speed performance is also available with pin-to-pin compatible HSPA companion module UL865.

It is highly recommended for new designs requiring global 2G coverage and 3G scalability in a sleek and robust QFN package, which implies easy integration and low impact on final application costs. Ease of production and small foot print makes it the ideal solution for applications in security alarms, automated meter reading, and POS terminals.

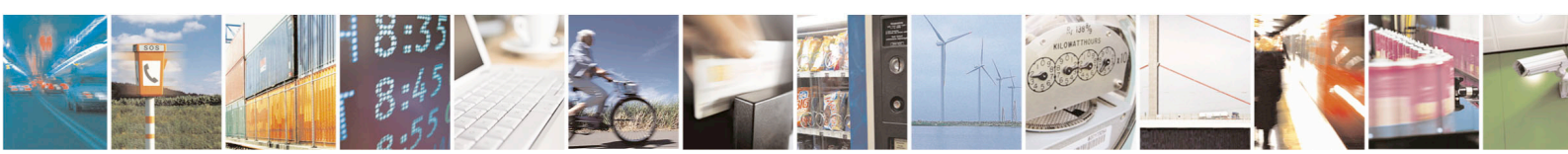
The GL865-DUAL/QUAD V3 operates with 1.8V GPIOs versus its predecessor's 2.8V, minimizing power consumption and making it even more ideally suited for battery powered and wearable device applications.

The GL865-DUAL/QUAD V3 can be easily bundle-designed with Telit's GPS or GPS/GLONASS receivers for applications requiring location awareness such as fleet management and track-and-tracing; with the aid of available reference designs and global technical integration support from Telit.

The GL865-DUAL/QUAD V3 makes it possible to run the customer's application inside the module by means its embedded Python Script Interpreter, thus making it a complete SMT platform for m2m solutions.

All Telit modules, support Over-the-Air firmware update by means Premium FOTA Management. By embedding Red Bend Software vRapid Mobile® agent, a proven and battletested technology powering hundreds of millions of cellular handsets world-wide Telit is able to update its products by transmitting only a delta file, which represents the difference between one firmware version and another.

As a part of Telit’s corporate policy of environmental protection, all products comply to the RoHS (Restriction of Hazardous Substances) directive of the European Union (EU Directive 2011/65/EU).



2.2. Target Market

GL865-DUAL/QUAD V3 is designed and developed for the usage in applications, such as:

- Battery powered, wearable devices
- Automated Meter Reading (AMR)
- Security alarms
- Non-video surveillance
- Self-powered asset tracking
- POS terminals

2.3. Product Features

- GL865-DUAL V3: Dual-band GSM 900 / 1800 MHz
- GL865-QUAD V3: Quad-band GSM 850 / 900 / 1800 / 1900 MHz
- GSM/GPRS protocol stack 3GPP Release 4 compliant
- Output power

  - Class 4 (2W) @ 900 MHz

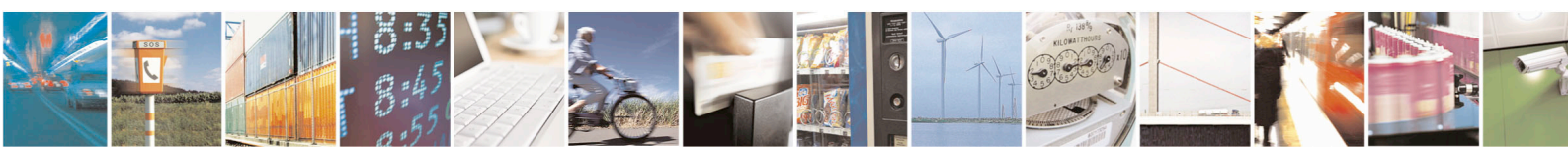
  - Class 1 (1W) @ 1800 MHz
- Control via AT commands according to 3GPP 27.005, 27.007 and Telit custom AT commands
- Control via Remote AT commands
- Power consumption (typical values)

  - Power off: 2 uA

  - Idle: 0.8 mA @ DRX=9
- 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:

  ≤- 108 dBm (typ.) @ 850/900 MHz

  ≤- 107 dBm (typ.) @ 1800/1900 MHz
- DARP/SAIC support
- Enhanced Measurement Report support



- Dimensions: 24.4 x 24.4 x 2.6 mm
- Weight: 2.8 grams
- Storage and Operating temperature range: -40°C to +85°C
- RoHS compliant

Interfaces

- 8 I/O ports maximum
- Analog audio (balanced)
- Digital Voice Interface
- 2 A/D plus 1 D/A converters
- Buzzer output
- ITU-T V.24 serial link through CMOS UART:

  - Baud rate from 300 to 115.200 bps

  - Autobauding up to 115.200 bps

Audio

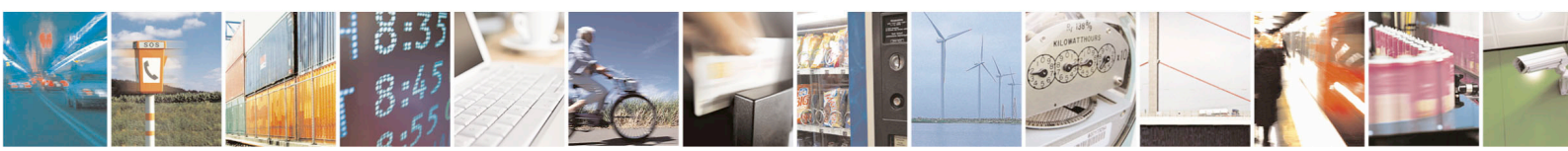
- Telephony, emergency call
- Half rate, full rate, enhanced full rate and adaptive multi rate voice codecs (HR, FR, EFR, AMR)
- Superior echo cancellation & noise reduction
- Multiple audio profiles pre-programmed and fully configurable
- Embedded DTMF decoder

Approvals

- Fully type approved conforming with R&TTE directive
- GCF
- FCC, IC, PTCRB, ANATEL (GL865-QUAD V3 only)

SMS

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



- SMS over GPRS

Circuit switched data transmission

- Asynchronous non-transparent CSD up to 9.6 kbps
- V.110

GPRS data

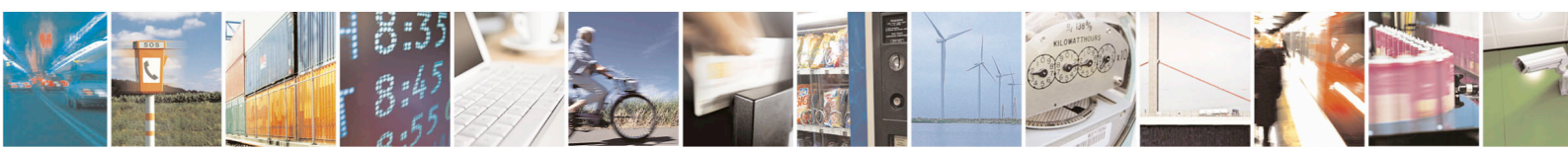
- GPRS class 10
- Mobile station class B
- Coding scheme 1 to 4
- PBCCH support
- GERAN Feature Package 1 support (NACC, Extended TBF)

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

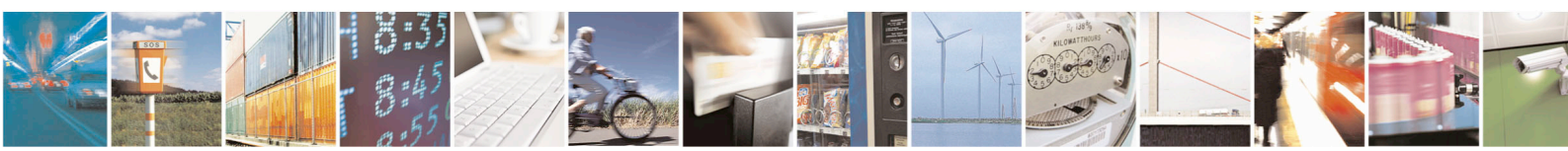
Additional features

- 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)



Python* application resources

- Python* script interpreter (module takes the application code directly in the Python* language)
- Memory: 800 kB of NV memory for the user scripts and 1 MB RAM for the Python* engine usage
- Over-the-air application SW update

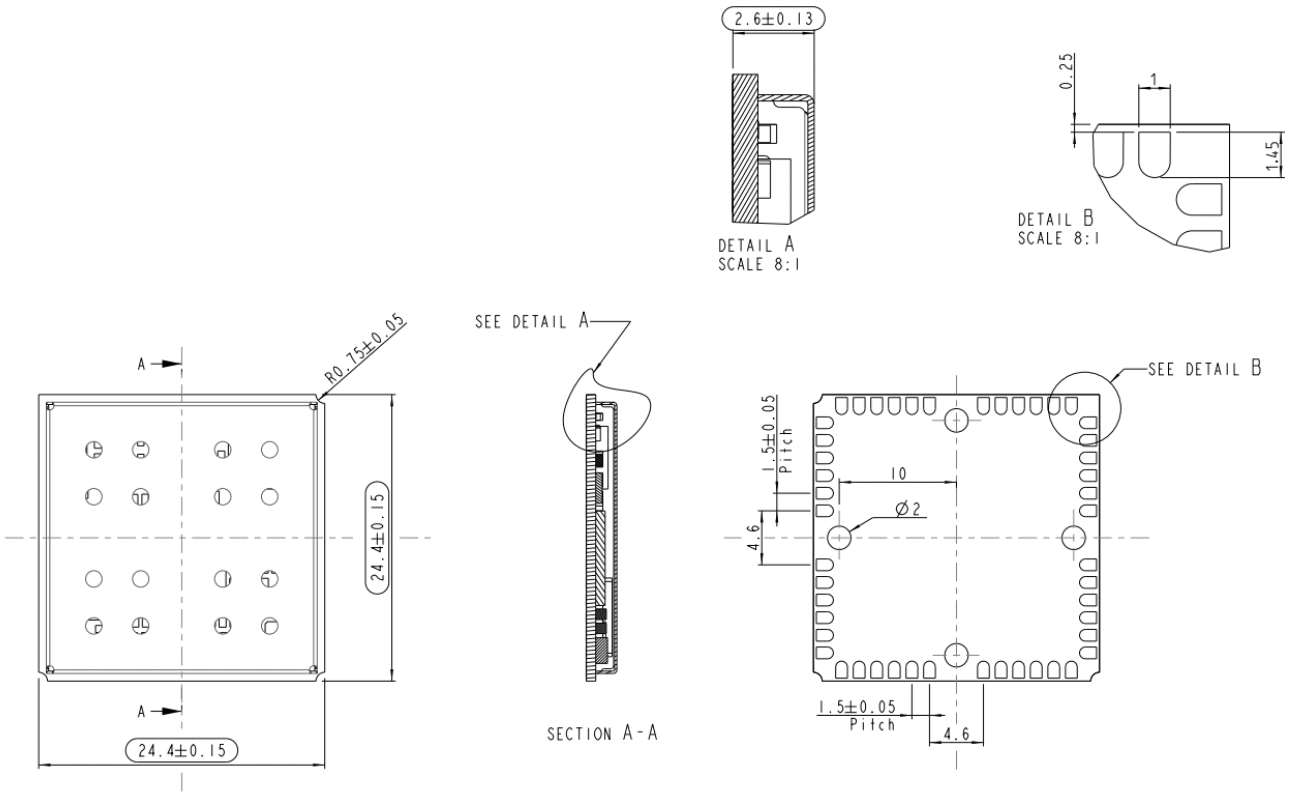


3. Product Description

3.1. Size and 2D mechanical drawing

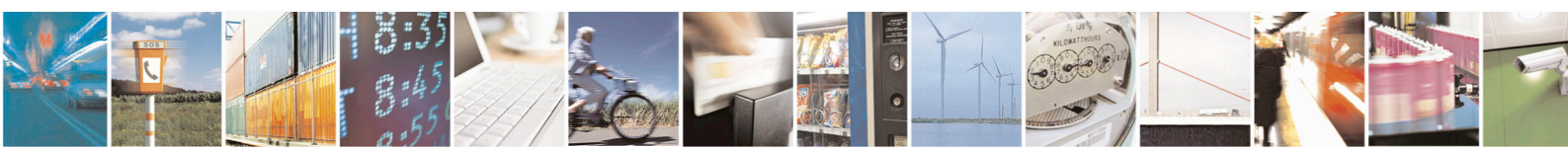
The Telit GL865-DUAL/QUAD V3 module overall dimensions are:

- Length: 24.4 mm
- Width: 24.4 mm
- Thickness: 2.6 mm



3.2. Weight

The weight of the GL865-DUAL/QUAD V3 is 2.8 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 GL865-DUAL/QUAD V3 product comply with the RoHS (Restriction of Hazardous Substances) directive of the European Union (EU Directive 2011/65/EU).

3.4. Operating Frequencies

The operating frequencies in GSM, DCS and 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
GSM 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

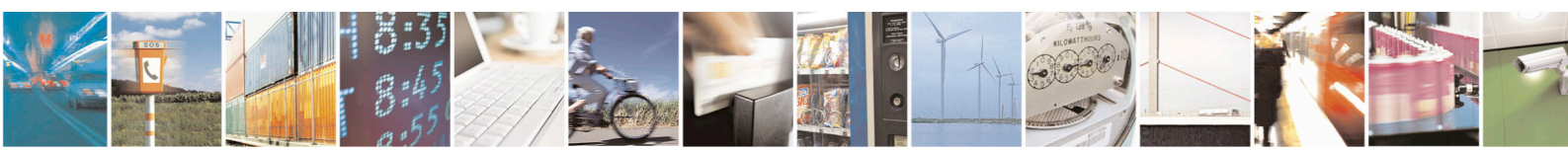
3.5. Transmitter output power

The GL865-DUAL/QUAD V3 transceiver modules operating mode in GSM 850 / 900 bands 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 the module in GSM 850 / 900 bands is better than –108 dBm (2.4% BER Class II - static channel) in normal operating conditions.

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



The GL865-DUAL/QUAD V3 supports also the Downlink Advance Receiver Performance (DARP) feature for single antenna interference cancellation (SAIC).

3.7. Antenna

The antenna and antenna transmission line on PCB for a Telit GL865-DUAL/QUAD V3 device shall 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	70 MHz in GSM 850, 80 MHz in GSM 900, 170 MHz in DCS and 140 MHz in PCS band

For further information please refer to the GL865-DUAL/QUAD V3 Hardware User Guide.

3.8. Supply voltage

The external power supply must be connected to VBATT & VBATT_PA signals 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

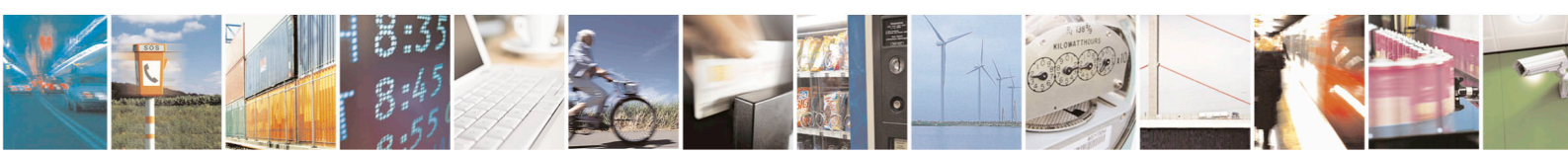
(*) Please refer to the GL865-DUAL/QUAD V3 Hardware User Guide to use the product with the extended operating voltage range.

3.9. Power consumption

The current consumptions of the Telit GL865-DUAL/QUAD V3 in power-off and idle modes are:

Switched off current typical (Module power supplied only on VBATT_PA pin, the VBATT pin is not power supplied.)	2 uA (typical)
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 GL865-DUAL/QUAD V3 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 GL865-DUAL/QUAD V3 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 GL865-DUAL/QUAD V3 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 GL865-DUAL/QUAD V3 also supports SMS over GPRS

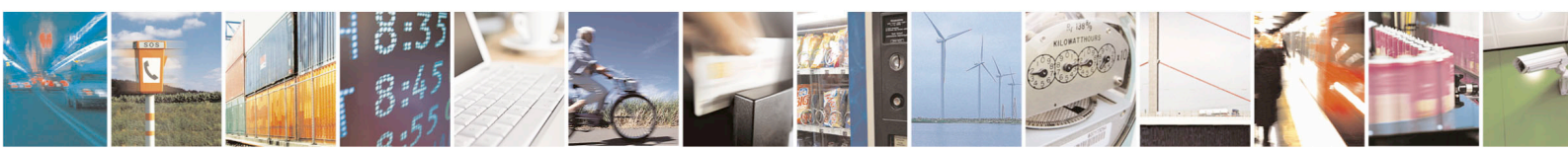
3.14. Real Time Clock and Alarm

The GL865-DUAL/QUAD V3 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 battery can be added to increase the RTC autonomy during power off of the main battery (power supply).

3.15. Enhanced Measurement Report

The GL865-DUAL/QUAD V3 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 GL865-DUAL/QUAD V3 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).

As for circuit switched data, the GL865-DUAL/QUAD V3 supports asynchronous non-transparent data up to 9.6 Kbps. Moreover, it supports the V.110.

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 GL865-DUAL/QUAD V3 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 (ADN) 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)

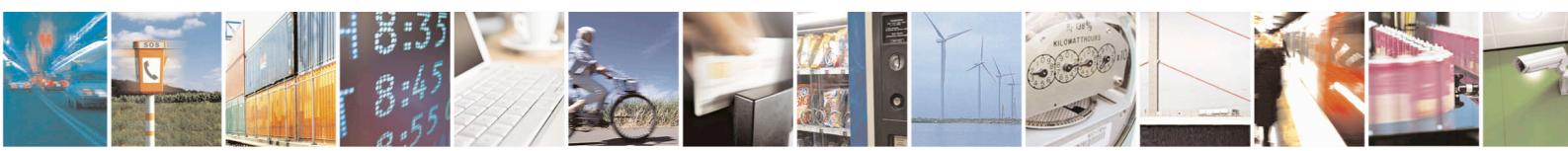
The automatic answer is supported. The user/application can specify the number of rings after which the module will automatically answer.

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 GL865-DUAL/QUAD V3 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.

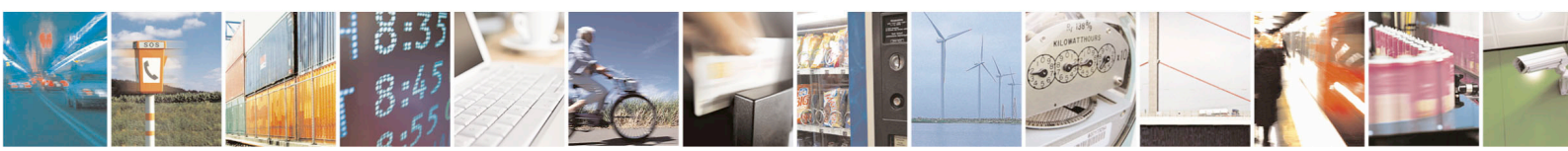
3.26. Buzzer output

The GPIO7 pad, when configured as Buzzer Output, is controlled by the GL865-DUAL/QUAD V3 module and will drive a Buzzer driver with appropriate square waves.

This permits to your application to easily implement Buzzer feature with ringing tones or melody played at the call incoming, tone playing on SMS incoming or simply playing a tone or melody when needed.

3.27. RF Transmission Monitor (RFTXMON)

As alternate function of the GPIO5, the GL865-DUAL/QUAD V3 can provide the RF transmission monitor. When the alternate function is activated, the pin of GPIO5 will rise when the transmitter is active and fall after the transmitter activity is completed. Please refer to the GL865-DUAL/QUAD V3 Hardware User Guide for further information.



3.28. RF Transmission Control

The GPIO4 pin, when configured as RF Transmission Control Input, permits to disable the Transmitter when the GPIO is set to Low by the application.

In the design is necessary to add a resistor 47K pull up to 2.8V, this pull up must be switched off when the module is in off condition.

3.29. TTY (Telephone Text)

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

3.30. Logic level specifications

Where not specifically stated, all the interface circuits work at 1.8V CMOS logic levels (versus 2.8V of the original GL865-DUAL/QUAD). To get more detailed information about the logic level specifications used in the GL865-DUAL/QUAD V3, please check the Hardware User Guide.

3.31. Audio

3.31.1. Analog

The GL865-DUAL/QUAD V3 offers one audio line balanced. The GL865-DUAL/QUAD V3 has a built-in echo canceller and a noise suppressor. For more details, please refer to the GL865-DUAL/QUAD V3 Hardware User Guide.

3.31.2. Digital

The GL865-DUAL/QUAD V3 offers the digital voice interface. For more details, please refer to the Digital Voice Interface Application Note.

3.32. Serial Ports

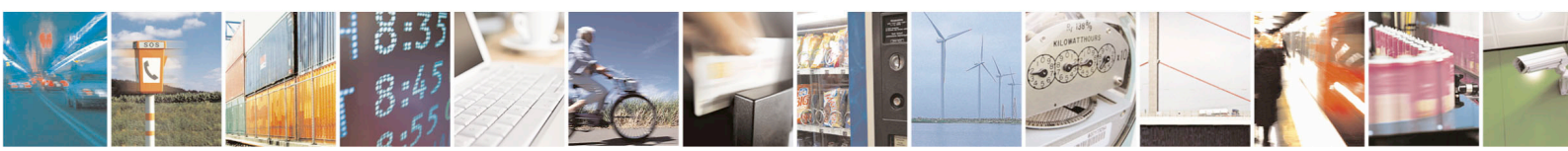
Two serial ports are available on the module:

- MODEM SERIAL PORT 1 (Main, ASC0)
- MODEM SERIAL PORT 2 (Auxiliary, ASC1)

3.33. Converters

3.33.1. ADC Converter

The GL865-DUAL/QUAD V3 has two on board ADC, which are 11-bit converters. They are able to read a voltage level in the range of 0÷2 volts applied on the ADC pin input, store and convert it into 11 bit word.



3.33.2. DAC Converter

The GL865-DUAL/QUAD V3 has one on board DAC, which is a 10 bit converter, able to generate an analogue value based a specific input in the range from 0 up to 1023. However, an external low-pass filter is necessary. See the Hardware User Guide for the details.

3.34. Mounting the GL865-DUAL/QUAD V3 on your Board

The Telit GL865-DUAL/QUAD V3 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 GL865-DUAL /QUAD V3 Hardware User Guide.

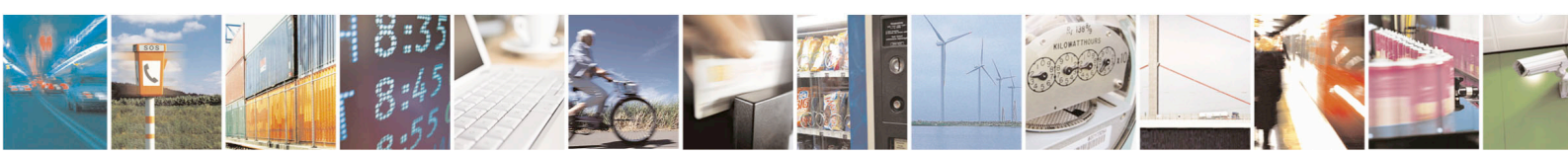
3.35. Packing system

The Telit GL865-DUAL/QUAD V3 is supplied on trays of 20 pieces each.

The GL865-DUAL/QUAD V3 can be also packaged on reels of 200 pieces each.

For further information on GL865-DUAL/QUAD V3 packing system please refer to the GL865-DUAL/QUAD V3 Hardware User Guide.

The level of moisture sensibility of GL865-DUAL/QUAD V3 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

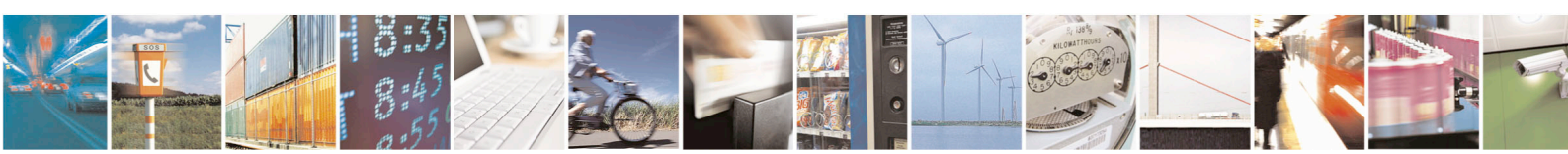
In order to assist the customer in the development of the application, Telit offers the EVK2 Evaluation Kit that can be ordered separately. The EVK2 has a SIM card holder, the RS 232 serial port level translator, a direct UART connection, audio and antenna connector.

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 GL865-DUAL/QUAD V3 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 GL865-DUAL/QUAD V3 Hardware User Guide and EVK2 User Manual.



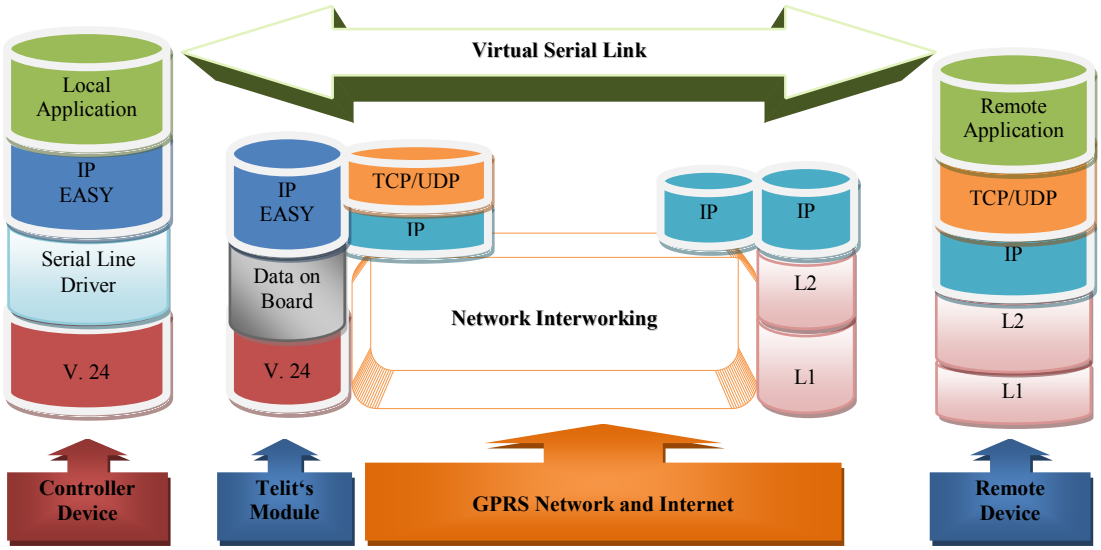
5. Software Features

5.1. IP Easy Extension

5.1.1. Overview

The IP Easy feature allows the Telit GL865-DUAL/QUAD V3 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 GL865-DUAL/QUAD V3 module, regardless of all the software stacks underlying.



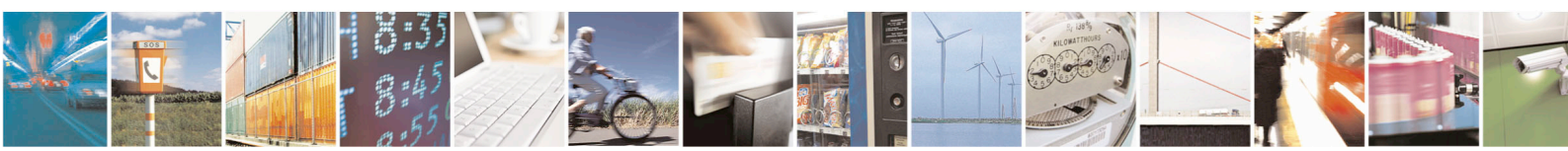
This particular implementation allows to the devices interfacing to the Telit GL865-DUAL/QUAD V3 module the use of the GPRS and Internet packet service without the need to have an internal TCP/IP stack since this function is embedded in the module.

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

5.2. Multisocket

The multisocket is an extension of Telit IP Easy 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 IP Easy User Guide.



5.3. Jamming Detection

5.3.1. Overview

The Jammer Detect feature allows the GL865-DUAL/QUAD V3 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 GL865-DUAL/QUAD V3 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.

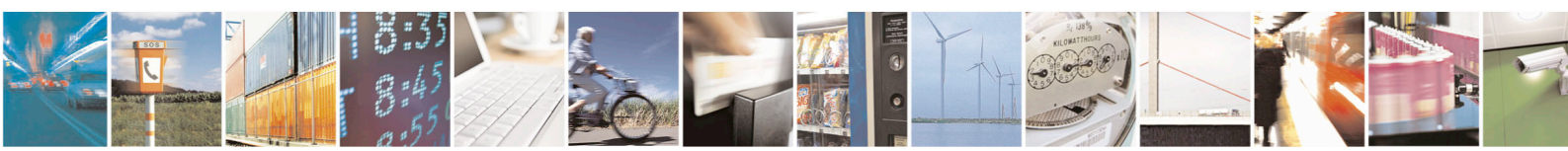
To access the three virtual interfaces, both the GSM engine and the customer application must contain MUX components, which communicate over the multiplexer protocol.

In Multiplexer mode, AT commands and data are encapsulated in 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.



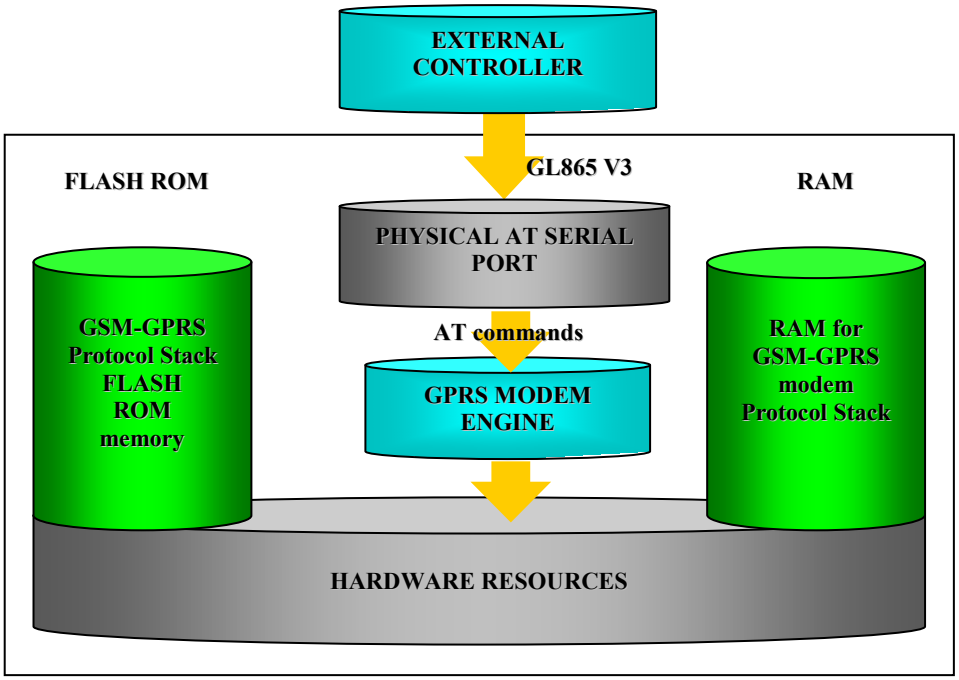
5.5. Easy Script Extension - Python interpreter

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.

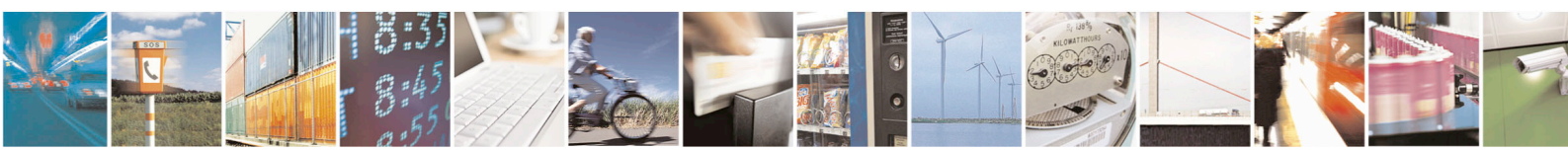
The Easy Script Extension is aimed at low complexity applications where the application was usually done by a small microcontroller that managed some I/O pins and the GL865-DUAL/QUAD V3 through the AT command interface.

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 feature already embedded in the GL865:

- Python script interpreter engine v. 1.5.2+
- 800 kB of Non Volatile Memory room for the user scripts and data
- 1 MB RAM reserved for Python engine usage



5.5.2. Python 1.5.2+ Copyright Notice

The Python code implemented in the Telit module is copyrighted by Stichting Mathematisch Centrum, this is the license:

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Copyright (c) 1995-2001 Corporation for National Research Initiatives; All Rights Reserved.

Copyright (c) 2001, 2002, 2003, 2004 Python Software Foundation; All Rights Reserved.

Copyright (c) 2001-2008 Python Software Foundation; All Rights Reserved.

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While CWI is the initial source for this software, a modified version is made available by the Corporation for National Research Initiatives (CNRI) at the Internet address ftp://ftp.python.org.

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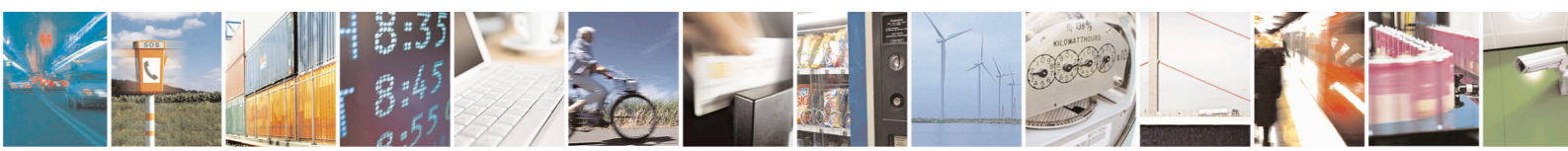
NOTE: More details about the Python modules are available in the Easy Script in Python User Guide.

5.6. SAP: SIM Access Profile

5.6.1. 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.



5.6.2. 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.

5.6.3. 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:

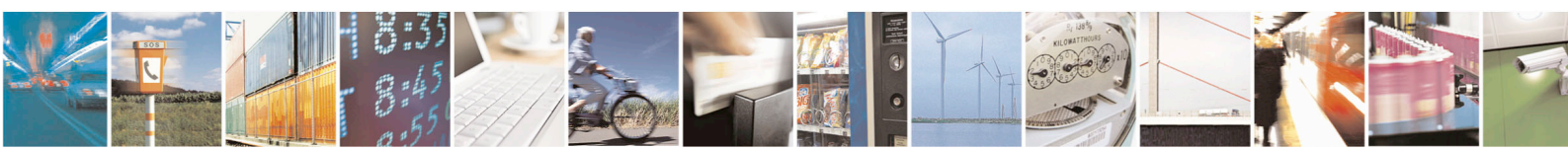
- Connection management
- Transfer APDU
- Transfer ATR
- Power SIM on
- Report Status
- Error Handling

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.



5.7. Premium FOTA Management (PFM) Service

The premium FOTA Management Service provides a cost-effective, fast, secure and reliable way for wirelessly reflashing the firmware on mobile devices, ensuring that embedded software is up-to-date with the latest enhancements and features.

Customers, who want to benefit from this service, must pass through the Telit certification program, where Telit will assist the customer in validating the correct implementation of FOTA.

5.7.1. FOTA (Firmware Over The Air)

Telit, which has signed a partnership agreement with the worldwide leader of Firmware OTA technology Red Bend, has integrated its unique vCurrent® Mobile client software in its m2m product portfolio. Telit is therefore able to upgrade its products by transmitting only a delta file, which represents the difference between one firmware version and another.

See "PFM Application Note" for details in www.telit.com > Product > GSM/GPRS > Product Family > Application Notes.

5.8. AT Commands

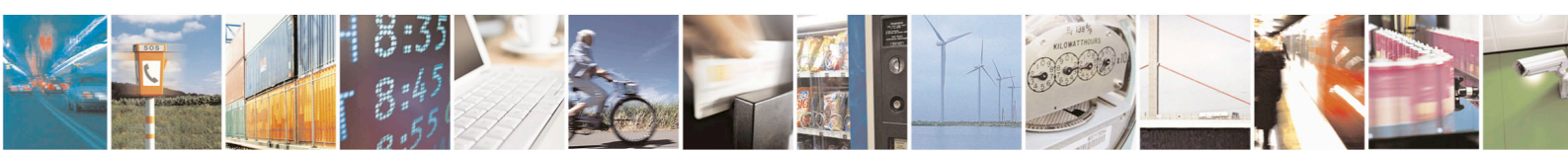
The Telit GL865-DUAL/QUAD V3 module can be driven via the serial interface using the standard AT commands.

The Telit GL865-DUAL/QUAD V3 module is compliant with:

1. Hayes standard AT command set 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 GL865-DUAL/QUAD V3 module supports also Telit proprietary AT commands for special purposes.

For a more information about AT commands supported by the GL865-DUAL/QUAD V3 module please refer to document AT Commands Reference Guide.



6. Conformity Assessment Issues

6.1. GL865-DUAL V3 CE Declaration of Conformity

Telit Communications S.p.A.

EC DECLARATION OF CONFORMITY

1. **GL865-DUAL V3** (product 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. Dual Band EGSM900/DCS1800 Radio 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 standard:

EN 301 511 V9.0.2	For article 3.2 : Effective use of spectrum allocated

The product has also been verified against the following harmonized standards:

EN 60950-1:2006 + A11:2009 + A1 2010 + A12:2011	For article 3.1 (a): Health and Safety of the User
EN 301 489-1 V1.8.1 EN 301 489-7 V1.3.1	For article 3.1 (b): Electromagnetic Compatibility

7. The conformity assessment procedure referred to in Article 10, and detailed in Annex IV of Directive 1999/05/EC has been followed with the involvement of the following Notified Body for article 3.2:
   RFI Global Services Ltd Pavilion A, Ashwood Park, Ashwood Way RG23 8BG BASINGSTOKE United Kingdom Notified Body Number 0889
   Thus, CE 0889 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

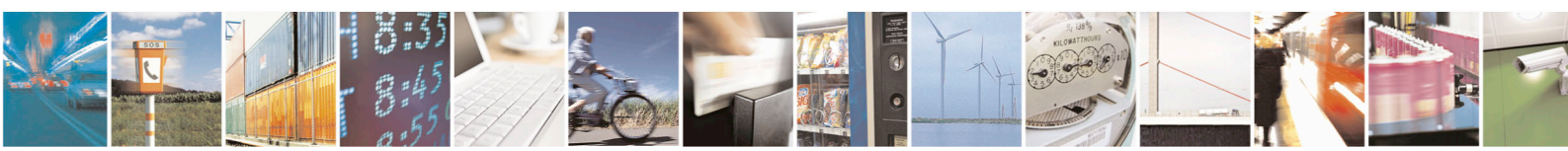
Trieste, *2013-01-22*

Quality Director
Guido Walcher

Quality Manager
Cesare Robelli

NBO number:	UL-UK-NOTA1 SD382641D06
Technical Construction File:	TCF882461D05

Mod 0211 2010-11 Rev.2 - This declaration of conformity is issued in compliance with 768/2008/EC



6.2. GL865-DUAL V3 EU RoHs Declaration of Conformity

EU RoHs DECLARATION OF CONFORMITY

1. *Product name*: **GL865-DUAL 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*: Dual Band EGSM900/DCS1800 Radio 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.

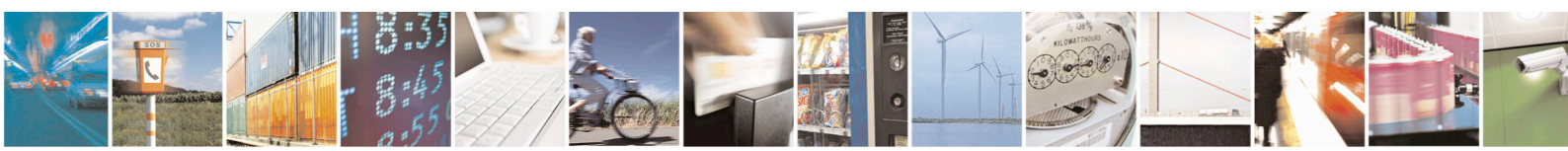
Signed for and on behalf of Telit Communications S.p.A.

Trieste, 2013-01-28

Quality Director
Guido Welcher

Quality & Environmental Management System Manager
Paolo Solinas

Mod 0215 2013-01 Rev.4 This Declaration of Conformity is issued in compliance with 768/2008/EC



6.3. GL865-QUAD V3 CE Declaration of Conformity

Telit Communications S.p.A.

EC DECLARATION OF CONFORMITY

1. **GL865-QUAD V3** (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:

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 Via Stazione di Prosecco, 5/b 34010 Sgonico (TRIESTE) ITALY

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

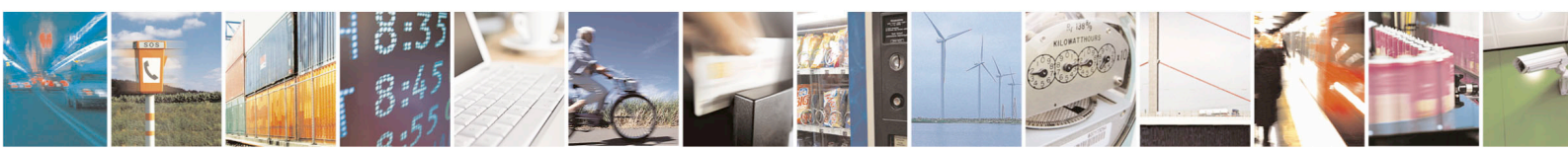
Trieste, 2013-12-05

R&D Manager
Antonino Sgroi

Quality Director
Guido Walcher

NBO number:	41223CNB.001
Technical Construction File :	41223_GL865-QUAD_V3_rev1

Mod 0211 2011-11 Rev.1 - This declaration of conformity is issued in compliance with 768/2008/EC



6.4. GL865-QUAD V3 EU RoHS Declaration of Conformity

EU RoHs DECLARATION OF CONFORMITY

Telit Communications S.p.A.

1. *Product name*: **GL865-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.

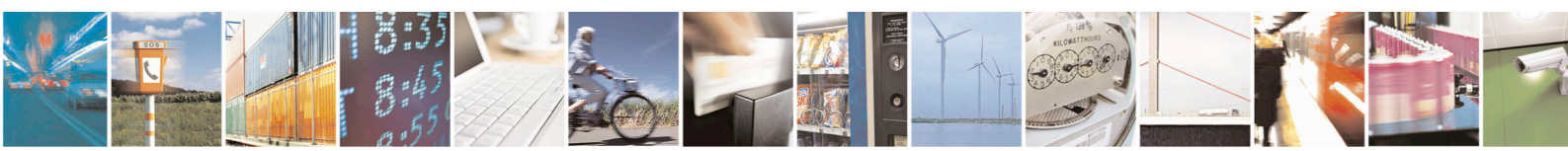
Signed for and on behalf of Telit Communications S.p.A.

Trieste, 2013-12-12

Quality Director
Guido Walcher

Quality & Environmental Management System Manager
Paola Selinas

Mod 0215 2013-01 Rev.4 – This Declaration of Conformity is issued in compliance with 768/2008/EC



6.5. GL865-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: 11/22/2013
Application Dated: 11/21/2013

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

Attention: Brian Tucker , Global VP, Quality

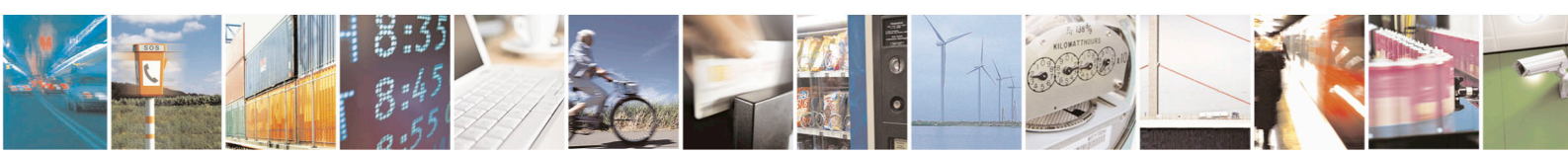
NOT TRANSFERABLE

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: RI7GL865Q3
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	1.734	0.035 PM	248KGXW
	24E	1850.2 - 1909.8	0.993	0.014 PM	249KGXW

Single Modular Approval. Output Power is conducted power at the antenna terminal. 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.



6.6. GL865-QUAD V3 IC Certificate

ZERTIFIKAT ◆ CERTIFICATE ◆ 증명서 ◆ 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-GL865Q3
DESCRIPTION	Quad band GSM/GPRS Module
TYPE OF EQUIPMENT	Cellular Mobile GSM (824-849 MHz) PCS Mobile (1850-1910 MHz) Modular Approval
MODEL(S)	GL865-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 OATS FACILITY No.	7361A-1
IC OATS 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	1.734	248	248KGXW
1850.2-1909.8	0.993	249	249KGXW

Authorised by: T. I. Turgman

Issue Date: 22 November 2013

Title of Signatory: Technical Certifier

Number: CD/006047 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. Licence applications, where applicable to use certified equipment, are acted on accordingly by the issuing office and will depend on the prevailing 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.

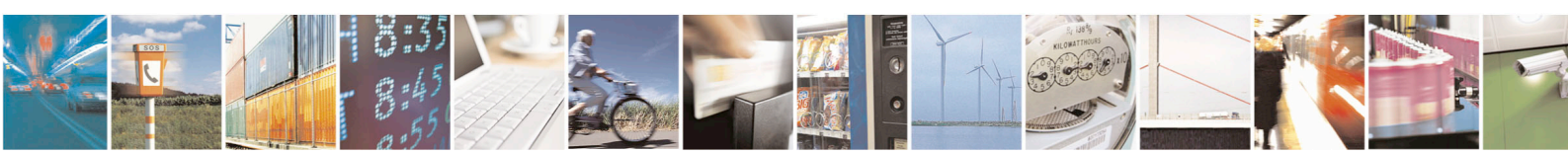
La certification du matériel signifie seulement que le matériel a satisfait aux exigences de la norme indiquée ci-dessus. Les demandes de licences nécessaires pour l'utilisation du matériel certifié sont traitées en conséquence par le bureau de délivrance et dépendent des conditions radio ambiantes, 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@babt.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 the 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 for its use carefully. 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.

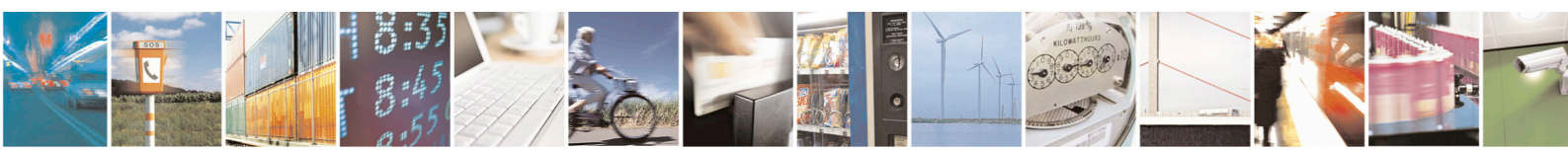
Every module has to be equipped with a proper antenna with specific characteristics. The antenna has to be installed with care to avoid any interference with other electronic devices and has to guarantee a minimum distance from the body (20 cm). In case this requirement cannot be satisfied, the system 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/rtte/dir99-5.htm

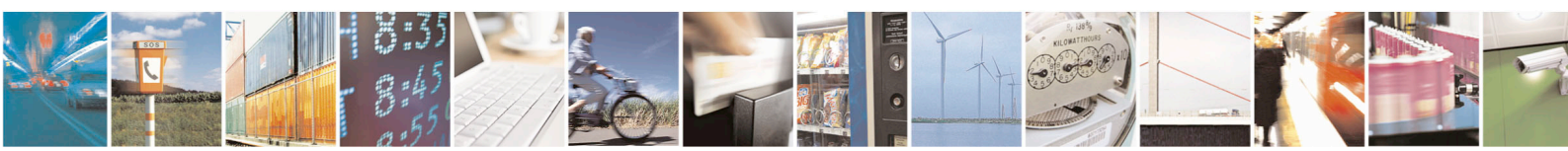
The text of the Directive 99/05 regarding telecommunication equipment is available, while the applicable Directives (Low Voltage and EMC) are available at:

http://ec.europa.eu/enterprise/electr_equipment/index_en.htm

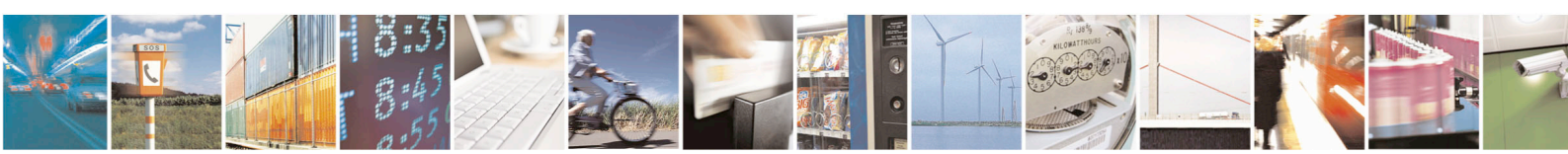


8. List of acronyms

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
CSD	Circuit Switched Data
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	2012-11-22	First issue
1	2013-01-30	Added Chapter 6 Conformity Assessment Issues, Updated power consumption
2	2013-07-18	Updated Temperature Range Updated RoHS EU Directive Updated Mechanical Drawing
3	2013-08-05	Updated Supply voltage Update Packing system
4	2013-09-05	Added GL865-QUAD V3 variant
5	2014-01-02	Added GL865-QUAD V3 certificates
6	2014-04-10	Updated power consumption