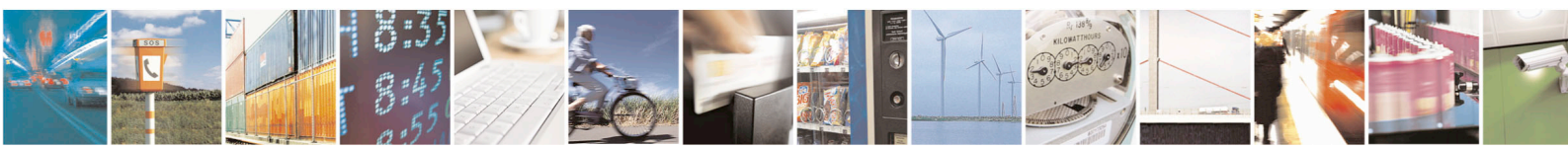
UL865 Product Description

80420ST10586A Rev.2 – 2014-04-28

Making machines talk.

APPLICABILITY TABLE

PRODUCT
UL865-EUR
UL865-EUD
UL865-NAR
UL865-NAD
UL865-N3G



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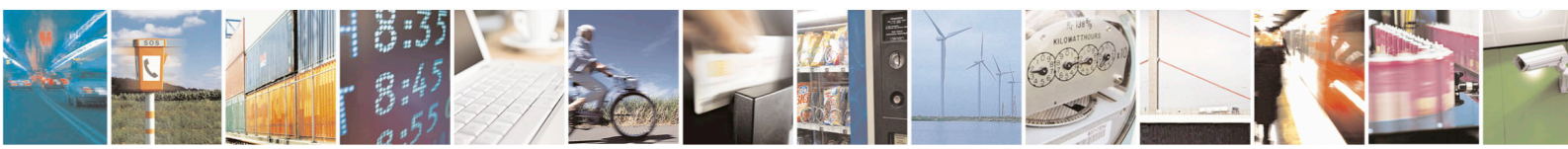
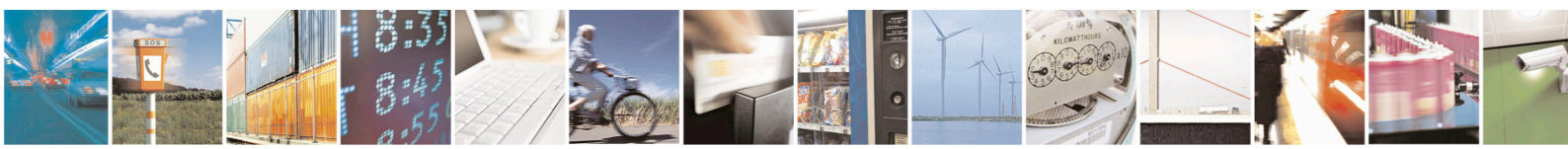
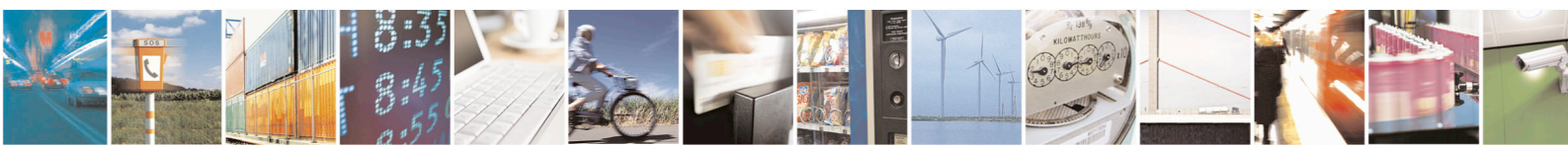


Contents





1. Introduction

1.1. Scope

Scope of this document is to give an overview of the Telit UL865 module, which can support GSM/GPRS/EDGE and WCDMA/HSPA with data/voice capabilities.

1.2. Audience

This document is intended for customers who are evaluating the UL865 product.

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

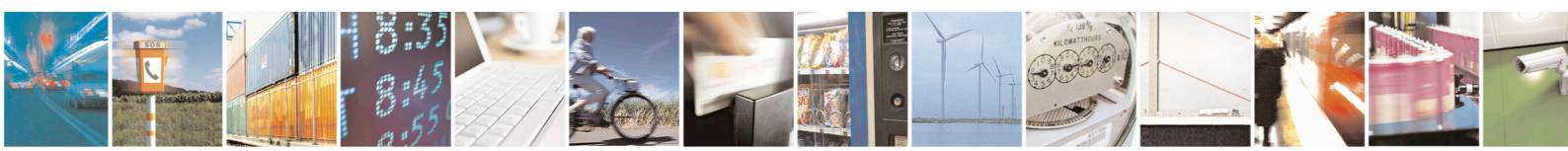
For detailed information about where you can buy the Telit modules or for recommendations on accessories and components visit:

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.

Telit appreciates feedback from the users of our information.



1.4. 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.

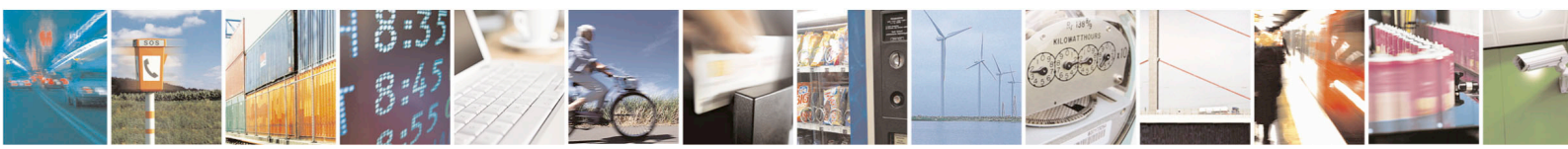
All dates are in ISO 8601 format, i.e. YYYY-MM-DD.

1.5. Related Documents

- UL865 Hardware User Guide, 1VV0301050
- Telit EVK2 User Guide, 1vv0300704

1.6. Document History

Revision	Date	Changes
0	2013-02-04	First issue
1	2014-01-07	Updated Ch. 2.1, 3.2. Added certifications in Ch.7
2	2014-04-28	Layout of table at Ch.2.1. Ch.2.3



2. Overview

The UL865 Series further enriches the xL865 Family with a number of UMTS/HSPA variants targeted at European (EMEA) and North American (NA) markets. The dual-band UMTS/HSPA, dual-band GSM/GPRS engine in the UL865 Series is voice-capable supporting digital (DVI) interface. It delivers UMTS/HSPA 3GPP Release 7 compliant data communications and is equipped with a high-speed USB 2.0 port, eight I/O ports, two A/D and one D/A converters. For streamlined application development and system integration the company offers RIL drivers for all major operating systems. The UL865 features a VQFN packaging that is fully pad-level compatible with its 2G companion, the GL865-DUAL V3.
As a part of Telit's corporate policy of environmental protection, all Telit products comply with the RoHS (Restriction of Hazardous Substances) directive of the European Union (EU Directive 2011/65/EU)

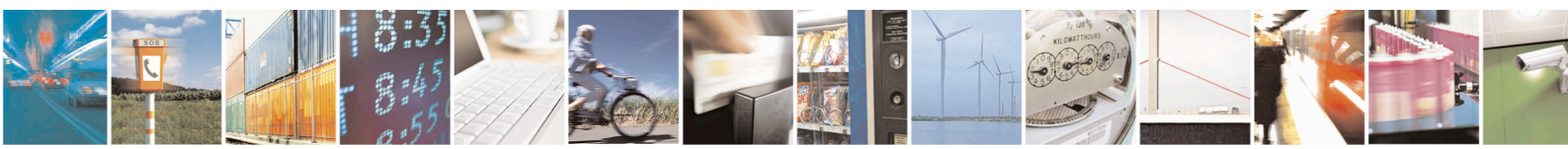
NOTE:

Some of the performances of the Telit modules depend on S/W version installed on the module itself. The Telit modules S/W group is continuously working in order to add new features and improve the overall performances. The Telit modules are easily upgraded by the developer using the Telit Flash Programmer.

NOTE:

In order to meet the competitive OEM and vertical market stringent requirements, Telit supports its customers with a dedicated Support Policy with:

- Telit Evaluation Kit EVK2 to help you to develop your application;
- A website with all updated information available;
- An high level specialist technical support to assist you in your development;



2.1. Product variants

The following table describes the variants of UL865 series, available for both EUx and NAx configurations as dual band in 2G&3G, plus an additional 3G-only variant for the North American Market.

Variants	Freq. Bands 2G (MHz)	Freq. Bands 3G (MHz)	Features
UL865-EUR	900/1800	900/2100	Data&Voice
UL865-EUD	900/1800	900/2100	Data-only
UL865-NAR	850/1900	850/1900	Data&Voice
UL865-NAD	850/1900	850/1900	Data-only
UL865-N3G	N.A.	850/1900	Data&Voice

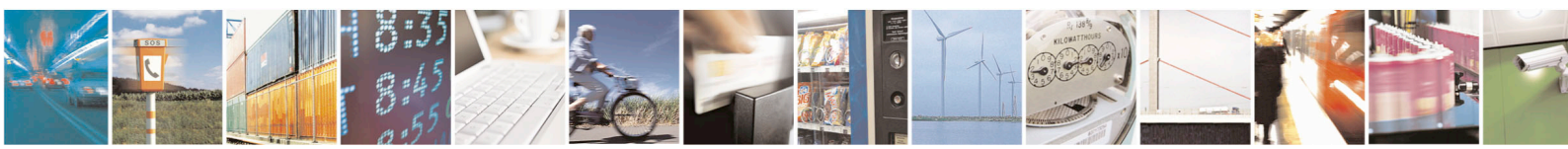
2.2. Target Market

The UL865 is designed and developed for applications such as:

- Point-of-Sales (POS) terminals
- mHealth Monitoring
- Security alarms with cameras
- Battery powered devices
- Telemetry
- Telematics, including Mapping and Infotainment
- Handheld scanners and logistics devices

2.3. Features

- Advanced E-GPRS/WCDMA/HSDPA/HSUPA Software protocol stack (Layer 1 to 3) – Version: 3GPP Release 7
- GSM Quad band (900/1800 MHz for EUx, 850/1900 MHz for NAx)



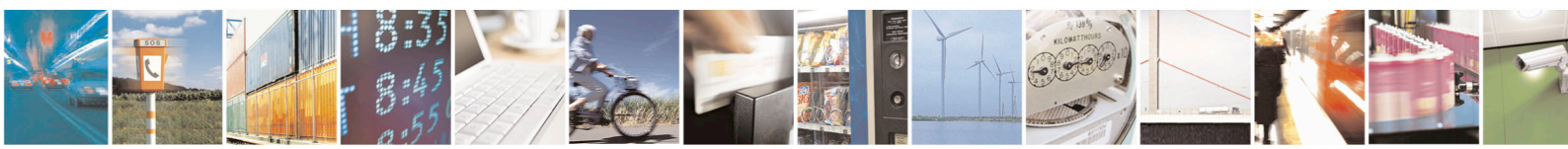
- WCDMA dual-band: B1&B8 for the EUx models and B2&B5 for the NAx models
- HSDPA up 7.2Mbps
- HSUPA up to 5.76Mbps
- WCDMA up to 384kbps downlink/uplink
- DTM (Dual Transfer Mode)
- CPC (DRX/DTX) (Continuous Packet Connectivity)
- DARP
- Control via AT commands according to 3GPP TS27.005, 27.007 and Telit customized AT commands
- Serial port multiplexer 3GPP TS27.010
- SIM application Tool Kits 3GPP TS 51.014
- Power consumption (typical values)
  - Stand-by current 2G, DRX9, 1.2 mA
  - Stand-by current 3G, DRX7, 1.8 mA
- Output power
  - Class 4 (2W) @ 850 / 900 MHz, GSM
  - Class 1 (1W) @ 1800 / 1900 MHz, GSM
  - Class E2 (0.5W) @ 850/900 MHz, EDGE
  - Class E2 (0.4W) @ 1800/1900 MHz, EDGE
  - Class 3 (0.25W) @ 850/900/1900/2100 MHz, WCDMA

Interfaces

- I/O ports including multi-functional I/Os
- I2S for digital audio interface
- USB 2.0 HS
- 1 UART
- 1 Auxiliary serial port (RX/TX only)
- 1 I2C
- 1.8V/3V SIM interface

Audio

- Telephony, emergency call
- HR, FR, EFR, AMR for GSM and AMR for WCDMA voice codec
- Spatial Noise Suppression



- Multiple audio profiles pre-programmed and fully configurable
- DTMF

SMS

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

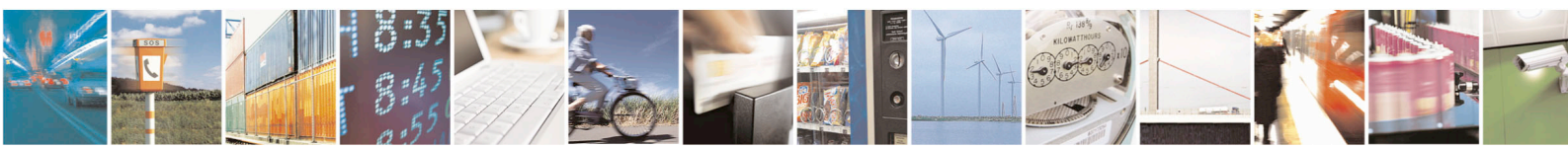
Data transmission

- HSPA: category 8 in downlink e category 6 in uplink
  - DL up to 7.2Mbps
  - UL up to 5.76Mbps
- WCDMA: up to 384kbps downlink/uplink
- Asynchronous non-transparent CSD up to 9.6kbps
- GPRS class 10 for NAx variants and class 33 for EUx variants
- EDGE class 10 for NAx variants and class 33 for EUx variants
- Coding scheme 1 to 4 (GPRS) & Modulation Coding scheme 1 to 9 (EDGE)

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

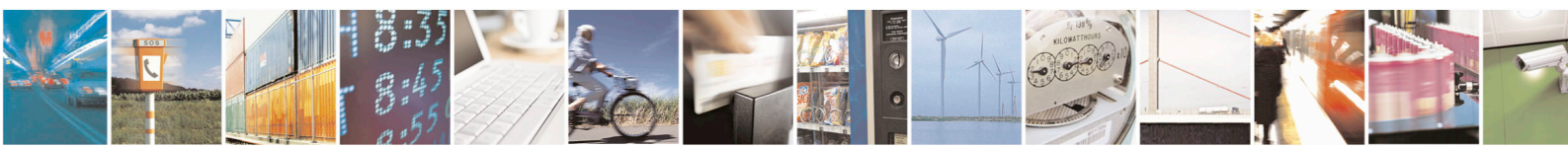
Additional features



- SIM phonebook
- Fixed Dialling Number (FDN)
- Call control & status indication
- SIM phonebook
- Character management (IRA, UCS2, GSM)
- USIM 3GPP Rel.7
- Real Time Clock
- Automatic answer
- Alarm management
- Embedded TCP/IP stack, including TCP, IP, UDP, and FTP protocols
- CSD for Video Telephony support

2.4. Approvals

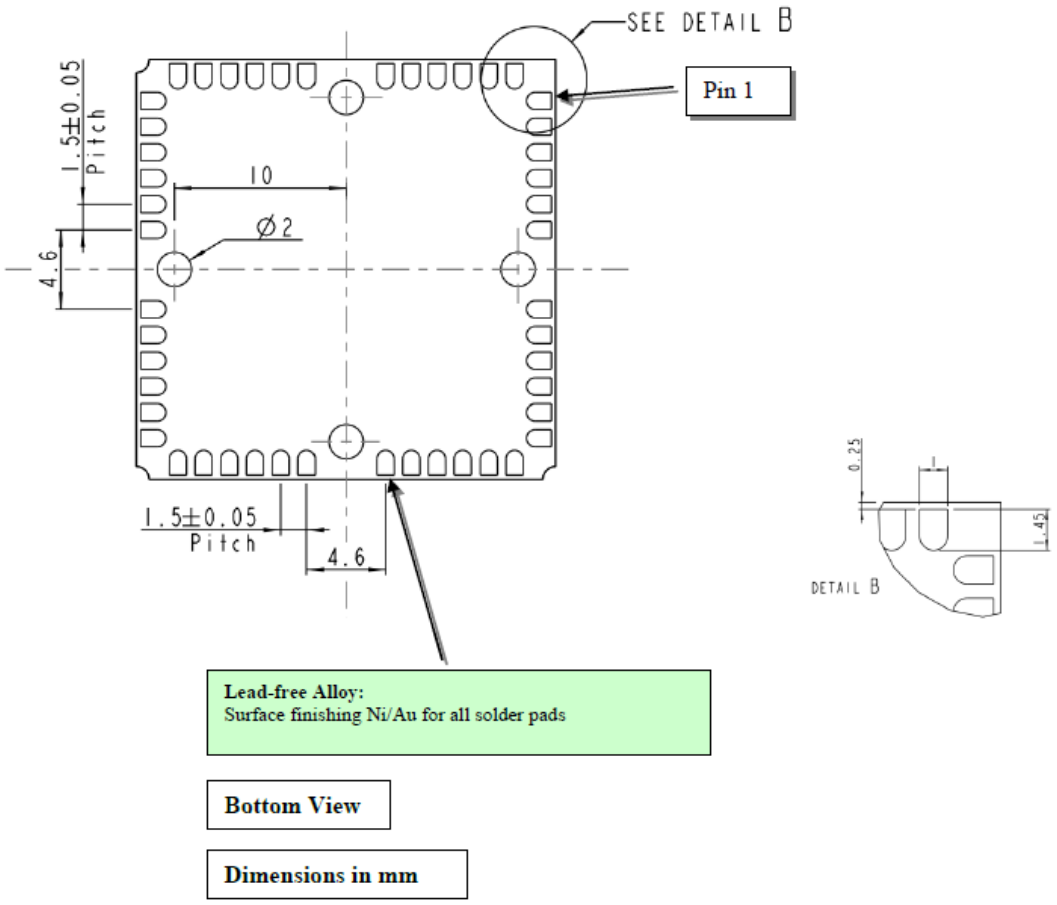
- Fully type approved confirming with R&TTE directive
- CE, GCF
- FCC, IC, PTCRB
- AT&T
- RoHS and REACH (all variants)



3. General Product Description

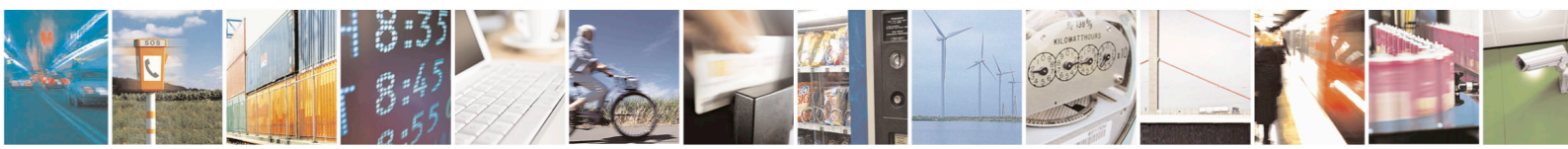
3.1. Dimensions and 2D mechanical drawing

UL865 has a QFN package, with 48 pads.



The overall dimensions of UL865 are:

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



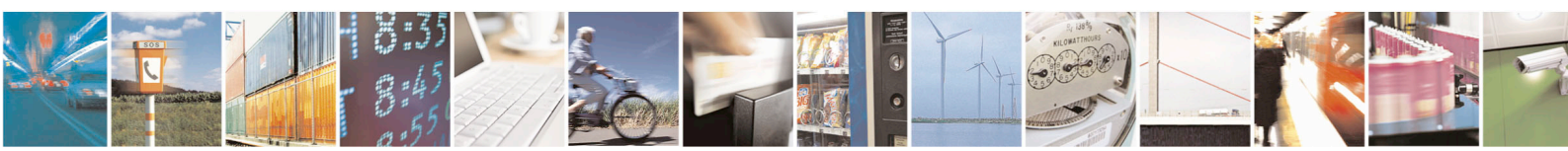
3.2. Environmental requirements

3.2.1. Temperature range

Operating Temperature Range	–40°C ~ +85°C

3.2.2. RoHS compliance

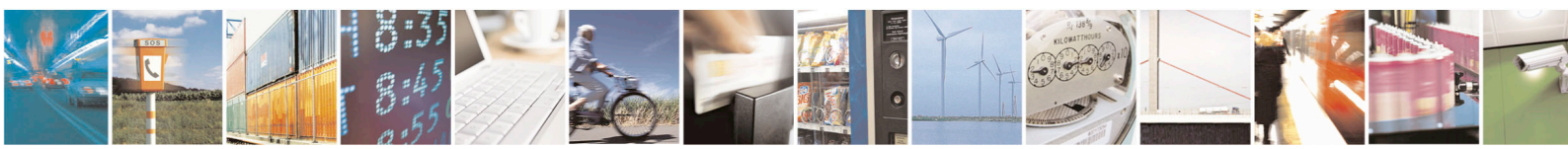
As a part of Telit corporate policy of environmental protection, the UL865 complies with the RoHS (Restriction of Hazardous Substances) directive of the European Union (EU directive 2011/65/EU). REACH compliant as well.



3.3. Operating Frequency

The operating frequencies in GSM850, EGSM900, DCS1800, PCS1900, WCDMA modes are compliant to the 3GPP and WCDMA specifications.

Mode	Freq. TX (MHz)	Freq. RX (MHz)	Channels	TX - RX offset
GSM850	824.2 ~ 848.8	869.2 ~ 893.8	128 ~ 251	45 MHz
EGSM900	890.0 ~ 914.8	935.0 ~ 959.8	0 ~ 124	45 MHz
	880.2 ~ 889.8	925.2 ~ 934.8	975 ~ 1023	45 MHz
DCS1800	1710.2 ~ 1784.8	1805.2 ~ 1879.8	512 ~ 885	95MHz
PCS1900	1850.2 ~ 1909.8	1930.2 ~ 1989.8	512 ~ 810	80MHz
WCDMA850 (band V)	826.4 ~ 846.6	871.4 ~ 891.6	Tx: 4132 ~ 4233 Rx: 4357 ~ 4458	45MHz
WCDMA900 (band VIII)	882.4 ~ 912.6	927.4 ~ 957.6	Tx: 2712 ~ 2863 Rx: 2937 ~ 3088	45MHz
WCDMA1900 (band II)	1852.4 ~ 1907.6	1932.4 ~ 1987.6	Tx: 9262 ~ 9538 Rx: 9662 ~ 9938	80MHz
WCDMA2100 (Band I)	1922.4 ~ 1977.6	2112.4 ~ 2167.6	Tx: 9612 ~ 9888 Rx: 10562 ~ 10838	190MHz



3.4. Transmitter output power

The UL865 transceiver output of GSM/GPRS mode in 850/900MHz bands are class 4 in accordance with the specifications which determine the nominal 2W peak RF power (+33dBm) on 50ohm. In the 1800/1900MHz bands are class 1 in accordance with the specification which determines the nominal 1W peak RF power (+30dBm) on 50ohm.

The UL865 transceiver output of EDGE mode in 850/900MHz bands are class E2 in accordance with the specifications which determine the nominal 0.5W peak RF power (+27dBm) on 50ohm. In the 1800/1900MHz bands are class E2 in accordance with the specification which determine the nominal 0.4W peak RF power (+26dBm) on 50ohm.

The UL865 transceiver output of WCDMA mode in 850/900/1900/2100MHz bands is class 3 in accordance with the specifications which determine the nominal 0.25W peak RF power (+24dBm) on 50ohm.

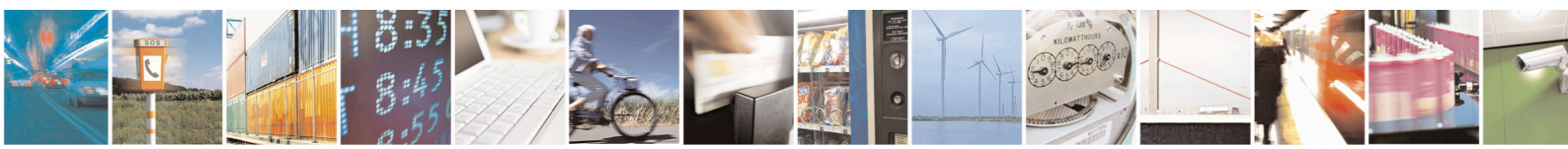
3.5. Supply voltage

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

Nominal Supply Voltage	3.8V
Operating Voltage Range	3.4 ~ 4.2V
Extended Operating Voltage Range	3.22 ~ 4.5V

CAUTION:

The operating voltage MUST not be exceeded; Special care must be taken when designing the application's power supply section to avoid an excessive voltage drop. If the voltage drop is exceeding the limits it could cause a Power Off of the module.



3.6. Power consumption

The UL865 power consumptions are described in the following table

UL865		
Mode	**Average (mA)**	**Mode description**
SWITCHED OFF		Module supplied but Switched Off
Switched Off	180 uA	
IDLE mode (WCDMA)		
AT+CFUN=5	1.8	Disabled TX and RX; DRX7
IDLE mode (GSM/EDGE)		
AT+CFUN=1	19	Normal mode: full functionality of the module
AT+CFUN=4	16.5	Disabled TX and RX; module is not registered on the network
AT+CFUN=5	1.2	Disabled TX and RX; DRX9 (1.3mA in case of DRX5)
Operative mode (WCDMA)		
WCDMA Voice	152	WCDMA voice call (TX = 10dBm)
WCDMA HSDPA (0dBm)	187	WCDMA data call (Cat 8, TX = 0dBm)
WCDMA HSDPA (22dBm)	494	WCDMA data call (Cat 8, TX = 24dBm)
Operative mode (EDGE)		
EDGE 4TX+1RX		EDGE Sending data mode
GSM 850/900 - G8	495	
DCS1800/ PCS1900 – G7	484	
Operative mode (GSM)		
CSD TX and RX mode		GSM VOICE CALL
GSM 850/900 CSD PL5	220	
DCS1800/ PCS1900 CSD PL0	167	
GPRS 4TX+1RX		GPRS Sending data mode
GSM 850/900 PL5	580	
DCS1800/ PCS1900 PL0	438	

Depending on network configuration and not under module control

3.7. Logic level

Where not specifically stated, the most of interface circuits work at 1.8V CMOS logic levels. To get more detailed information about the logic level specifications used for UL865, please refer to the Hardware User Guide.

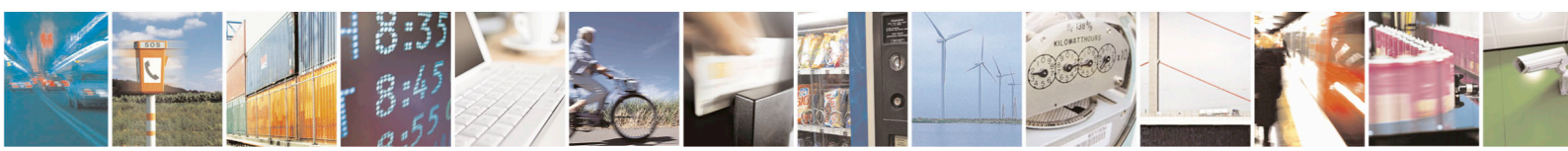
3.8. Input and Outputs

3.8.1. General Purpose I/Os

Pins of general purpose I/Os can be configured by AT command in three different ways as input, output and alternative function.

3.8.2. Power on monitor (PWR_MON)

The PWR_MON indicates the status of the module running properly.



3.8.3. Power on/off control (ON_OFF)

External power on/off control input. Refer to the Hardware User Guide for more details of Power on timing.

3.8.4. Auxiliary power output for accessory (VAUX)

A regulated 1.8V power output is provided for an external device.

3.8.5. SIM Reader

The UL865 family supports 1 SIM/USIM at 1.8V and 3V ONLY with and external SIM connector. For 5V SIM, an external level translator can be added. Refer to the UL865 Hardware User Guide.

3.8.6. Converters

The UL865 family has 2 ADC and 1DAC.

3.8.7. Audio Interface

A Digital Audio bus is available.

3.8.8. Serial ports

Two serial ports are available.

- Full RS232-C
- Auxiliary serial port (RX/TX only)

3.8.9. USB port

The USB2.0 High Speed has a clock rate of 480MHz

3.8.10. User Interface

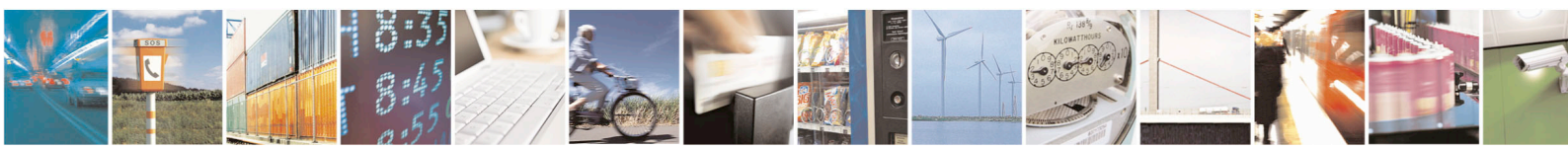
The user interface is managed by AT commands according to ITU-T V.250, 3GPP 27.007 and 27.005 specifications. Please refer to the AT command User Guide for complete details.

3.9. Features

3.9.1. Speech Coding

The UL865 support the following voice codecs:

- Adaptive Multi Rate for WCDMA
- Half Rate, Full Rate, Enhanced Full Rate, Adaptive Multi Rate for GSM



3.9.2. SMS

The UL865 supports the following SMS types:

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

The module supports also SMS over GPRS

3.9.3. RTC Bypass out

The VRTC pin brings out the Real Time Clock supply, which is separate from the rest of the digital part, allowing having only RTC going on when all the other parts of the device are off.
To this power output a backup capacitor can be added in order to increase the RTC autonomy during power off of the battery. NO Devices must be powered from this pin.

3.9.4. Data Transmission capabilities

The UL865 supports:

- HSPA: D/L up to 7.2Mbps, U/L up to 5.76Mbps
- Asynchronous non-transparent CSD up to 9.6kbps for GSM, 14.4kbps for WCDMA
- EDGE Class 10 for NAx variants and Class 33 for EUx variants
- Coding scheme 1 to 4 (GPRS) & Modulation Coding scheme 1 to 9 (EDGE)

3.9.5. Local security management

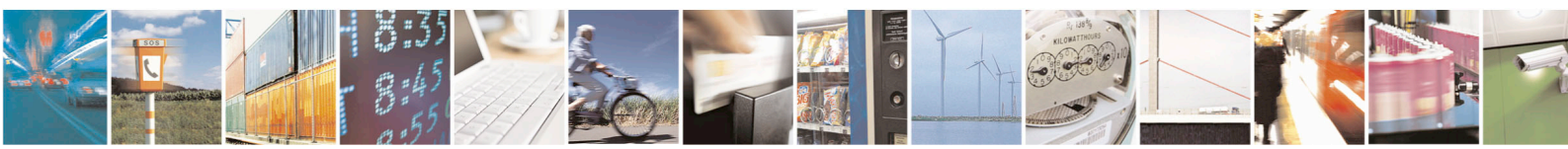
The local security management can be done with the lock of Universal Subscriber Identity Module (USIM), and the security code will be requested at power-up.

3.9.6. Call control

The calling cost control function is supported.

3.9.7. Phonebook

This function allows storing the telephone numbers into SIM memory. The capability depends on the SIM version and its embedded memory.



3.9.8. Characters management

The UL865 supports the IRA, GSM, PCCP437, 8859-1 and UCS2 character sets, in TEXT and PDU mode.

3.9.9. SIM related functions

Activation and deactivation of the numbers stored in phone book FDN (Fixed Dialing Numbers), ADN (Abbreviated Dialing Number) and PIN insertion are supported. Extension at the PIN2 for the PUK2 insertion capability for lock condition is supported too.

3.9.10. Call status indication

The call status indication is supported.

3.9.11. Automatic answer

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

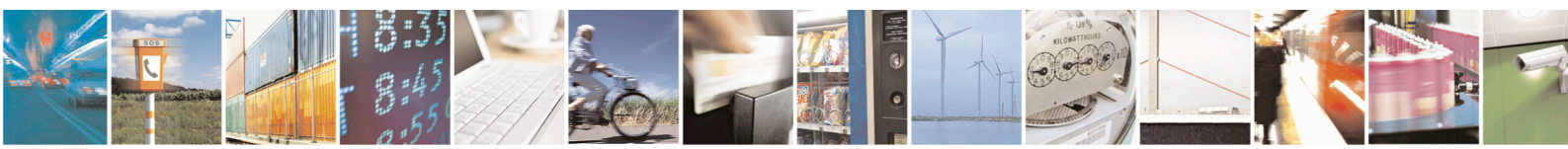
3.9.12. Supplementary services

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)

3.10. Mounting the modules on your board

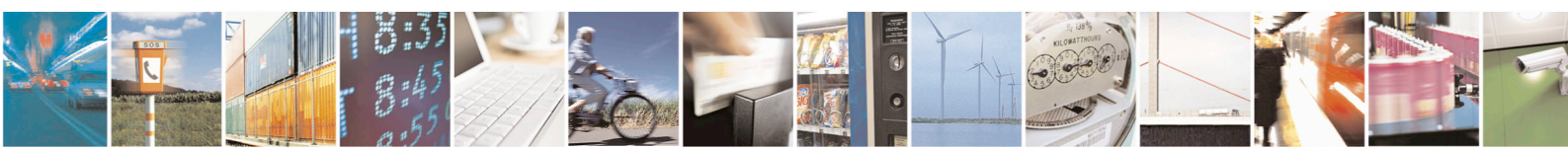
The modules have been designed in order to be compliant with a standard lead-free SMT process. For detailed information about PCB pad design and conditions to use in SMT process, please refer to the respective Hardware User Guide.



3.11. Packing system

According to SMT process, for picking & placing movement requirements, UL865 is packaged on trays. Each tray contains 20 pieces in size of 176 x 329.

The level of moisture sensibility of UL865 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

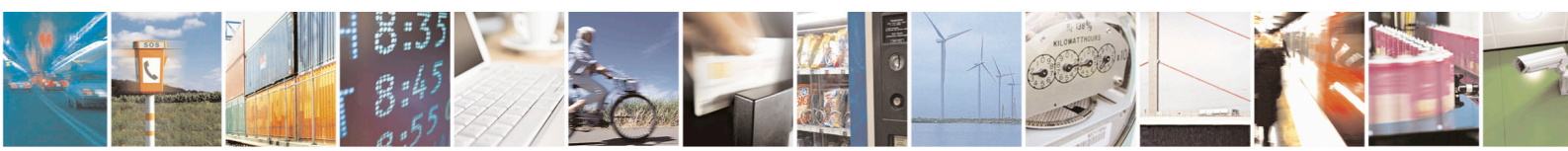
In order to assist the customer in the development of the application, Telit offers the EVK2 Evaluation Kit that can be ordered separately. The EVK2 has a SIM card holder, the RS 232 serial port level translator, a direct UART connection, audio and antenna connector.

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 UL865 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 performances 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 family 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 respective Hardware User Guide and EVK2 User Manual.



5. AT Commands

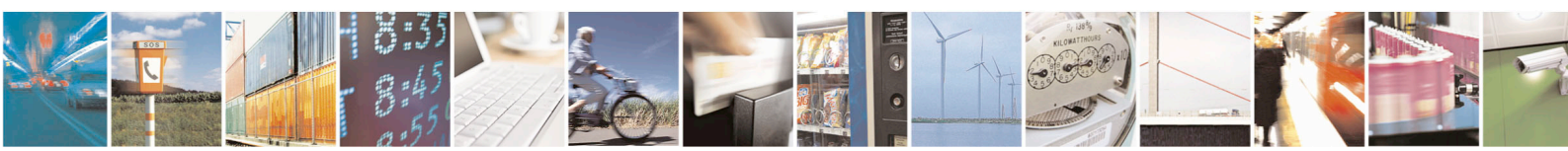
The UL865 can be driven via the serial and USB interface using the standard AT commands.

The modules are compliant with:

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

Moreover, the modules support also Telit proprietary AT commands for special purposes.

For more information about the AT commands supported by the modules, please refer to the AT Commands Reference Guide.



6. 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.

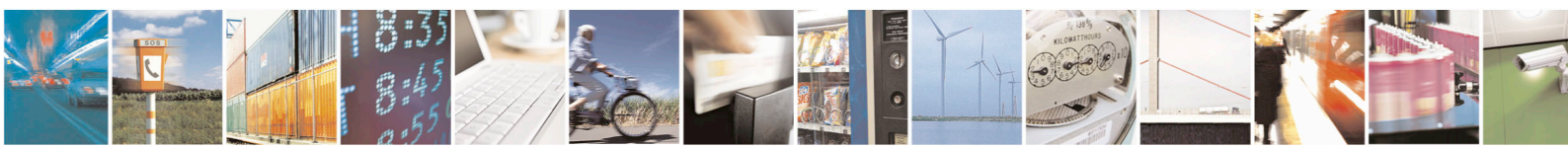
Do not disassemble the product; any mark of tampering will compromise the warranty validity. We recommend following the instructions of the hardware user guides for a correct wiring of the product. The product has to be supplied with a stabilized voltage source and the wiring has to be conforming to 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 carefully the instruction for its use. Do not insert or remove the SIM when the product is in power saving mode.
The system integrator is responsible of the functioning of the final product; therefore, care has to be taken to the external components of the module, as well as of any project or installation issue, because the risk of disturbing the WCDMA/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 of 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 equipments 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 equipments is available, while the applicable Directives (Low Voltage and EMC) are available at:

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



7. Conformity assessment issues

Telit Communications S.p.A.

CE DECLARATION OF CONFORMITY

1. **UL865-EUR** (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 2G EGSM900 / DCS1800 and Dual Band 3G FDD I / FDD VIII 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:

EN 301 511 V9.0.2 EN 301 908-1 V5.2.1 EN 301 908-2 V5.2.1	RF spectrum use (R&TTE art. 3.2)
EN 301 489-1 V1.9.2 EN 301 489-7 V1.3.1 EN 301 489-24 V1.5.1	EMC (R&TTE art. 3.1b)
EN 60950-1:2006 + A11:2009 + A1:2010 + A12:2011 + AC:2011 EN 62311:2008	Health & Safety (R&TTE art. 3.1a)

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 Andalucía, 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

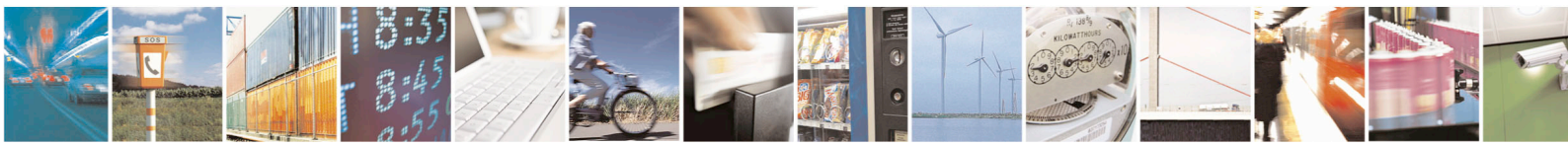
Trieste, ***2013-12-16***

Quality Director
Guido Walcher

Cellular EMEA Manager
Antonino Sgroi

NBO number:	40099CNB.001
Technical Construction File:	UL865-EUX_40099_Rev_1

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



Telit Communications S.p.A.

CE DECLARATION OF CONFORMITY

1. **UL865-EUD** (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 2G EGSM900 / DCS1800 and Dual Band 3G FDD I / FDD VIII 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:

EN 301 511 V9.0.2 EN 301 908-1 V5.2.1 EN 301 908-2 V5.2.1	RF spectrum use (R&TTE art. 3.2)
EN 301 489-1 V1.9.2 EN 301 489-7 V1.3.1 EN 301 489-24 V1.5.1	EMC (R&TTE art. 3.1b)
EN 60950-1:2006 + A11:2009 + A1:2010 + A12:2011 + AC:2011 EN 62311:2008	Health & Safety (R&TTE art. 3.1a)

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 Andalucía, 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

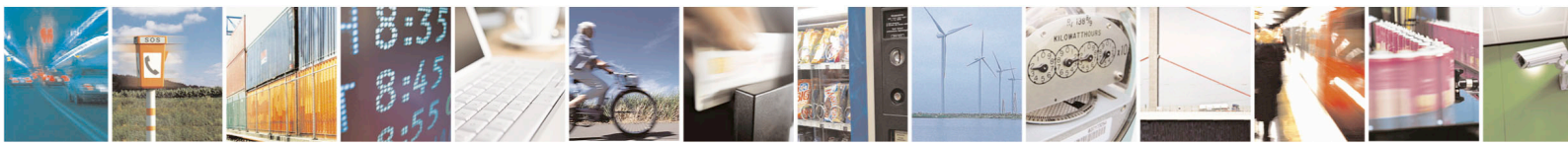
Trieste, ***2013-12-16***

Quality Director
Guido Walcher

Cellular EMEA Manager
Antonino Sgroi

NBO number:	40099CNB.001
Technical Construction File:	UL865-EUX_40099_Rev_1

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



7.1. RTT&E Notified Body statement of Opinion

AT4 wireless, S.A.

Designated by the

Secretaría de Estado de Telecomunicaciones y para la Sociedad de la Información
(Ministerio de Industria, Energía y Turismo)

to act as Notified Body in accordance with the R&TTE Directive 1999/5/EC of 9 March 1999

Directive 1999/5/EC – Notified Body Expert Opinion

Identification Number: 40099CNB.001
Issue date: 2013-12-16

APPLICANT DETAILS:

Company name: Telit Communications S.p.A.
Address: Via Stazione di Prosecco, 5/b
34010 Sgonico [TS]
Italy

MANUFACTURER DETAILS:

Company name: Telit Communications S.p.A.
Address: Via Stazione di Prosecco, 5/b
34010 Sgonico [TS]
Italy

EQUIPMENT DETAILS:

Type of equipment: 2G, 3G Wireless Module
Brand name: Telit
Model names: UL865-EUR
UL865-EUD
HW version: 0
SW version: UL865-EUR: 12.00.604
UL865-EUD: 12.00.614

SCOPE OF OPINION:

Essential requirements	Specifications / Standards	Submitted documents
Article 3.1(a): Electrical safety	EN 60950-1:2006 + A11:2009 + A1:2010 + A12:2011 + AC:2011	Test report
Article 3.1(a): EMF exposure	EN 62311:2008	Calculation
Article 3.1(b): EMC	EN 301 489-1 V1.9.2 EN 301 489-7 V1.3.1 EN 301 489-24 V1.5.1	Test report
Article 3.2: Radio spectrum use	EN 301 511 V9.0.2 EN 301 908-1 V5.2.1 EN 301 908-2 V5.2.1	Test report

OPINION:

Our opinion in accordance with Annex IV of DIRECTIVE 1999/5/EC OF THE EUROPEAN PARLIAMENT AND OF THE COUNCIL of 9 March 1999 on radio equipment and telecommunications terminal equipment and the mutual recognition of their conformity is that the equipment complies with the requirements of that directive stated in the above scope.

This opinion has 1 annex with 2 pages and it is only valid in conjunction with it.

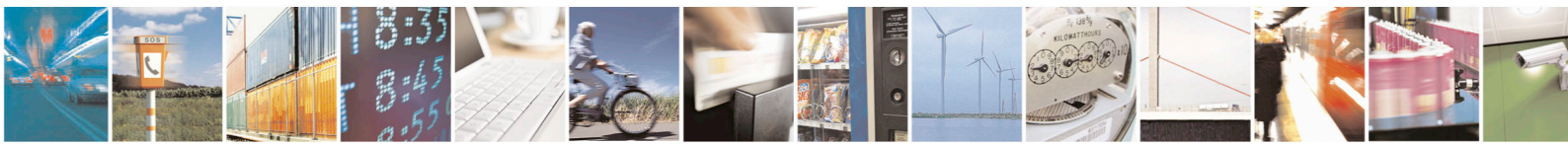
Signed on behalf of AT4 wireless, S.A. in Málaga (Spain)

Name: Ricardo Orejas Rodríguez
Position: Responsible of 1999/5/EC Dir. NB No. 1909

Marking: The product shall be marked with CE and our notified body number as shown below.

CE 1909

FDT46_01 // AT4 wireless, S.A., Parque Tecnológico de Andalucía, C/Severo Ochoa 2, 29590 Campanillas (Málaga), Spain // http://www.at4wireless.com



7.2. 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: 11/06/2013

Application Dated: 11/06/2013

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

Attention: Brian Tucker , Global VP, Quality

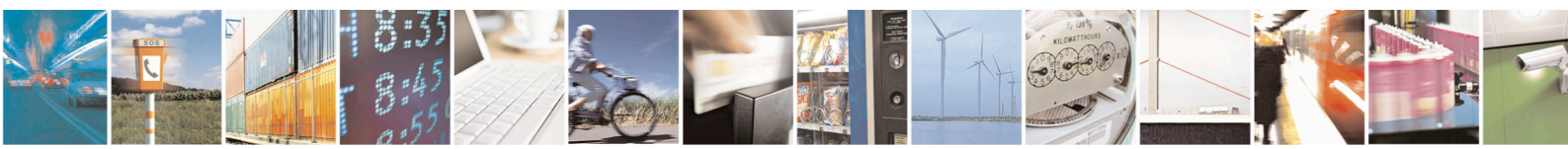
NOT TRANSFERABLE

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: RI7UL865NA
Name of Grantee: Telit Communications S.p.A.
Equipment Class: PCS Licensed Transmitter
Notes: 2G/3G module

Grant Notes	FCC Rule Parts	Frequency Range (MHZ)	Output Watts	Frequency Tolerance	Emission Designator
	22H	824.2 - 848.8	1.7378	1.0 PM	319KGXW
	22H	824.2 - 848.8	0.309	1.0 PM	319KG7W
	24E	1850.2 - 1909.8	1.0715	1.0 PM	320KGXW
	24E	1850.2 - 1909.8	0.4571	1.0 PM	320KG7W
	22H	826.4 - 846.6	0.1914	1.0 PM	4M59F9W
	24E	1852.4 - 1907.6	0.2018	1.0 PM	4M63F9W

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 6.93 dBi for part 22H and 2.51 dBi for part 24E. 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.



TCB

GRANT OF EQUIPMENT AUTHORIZATION

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

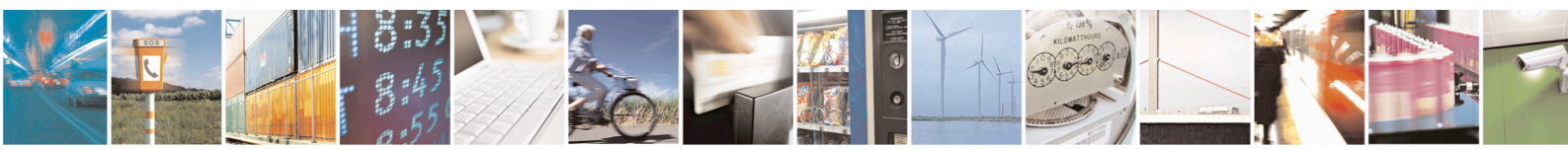
Attention: Brian Tucker , Global VP, Quality

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: RI7UL865NA
Name of Grantee: Telit Communications S.p.A.
Equipment Class: Part 15 Class B Computing Device Peripheral
Notes: 2G/3G module

Grant Notes	FCC Rule Parts	Frequency Range (MHZ)	Output Watts	Frequency Tolerance	Emission Designator
	15B				



7.3. IC certificates

ZERTIFIKAT ◆ CERTIFICATE ◆ 認証書 ◆ 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- UL865NA
DESCRIPTION	2G/3G Module
TYPE OF EQUIPMENT	Cellular Mobile GSM (824-849 MHz)/PCS Mobile (1850-1910 MHz) Cellular Mobile New Technologies (824-849MHz) Modular Approval
LISTING TYPE	Original Family
MODEL(S)	UL865-NAR; UL865-NAD
ANTENNA INFORMATION	External (Max gain: 850MHz: 6.93 dBi, 1900MHz: 2.51dBi)
RF EVALUATION TYPE	RF Evaluation
SPECIFICATION(S)	RSS-132 Issue 3 RSS-133 Issue 6
MANUFACTURING No.	5131A
REPRESENTATIVE No.	5131B
IC OATS FACILITY No.	2324G-1
IC OATS FACILITY	Compliance Certification Services Inc.No.11, Wugong 6th Rd, Wugu Dist, New Taipei City 24891, TAIWAN Tel: 886-2-2299-9720; Fax: 886-2-2298-4045; Email: service@ccsrf.com

Frequency Range (MHz)	Power Output (W)	Occupied Bandwidth (KHz)	Emission Designator
824.2 - 848.8	1.7378	319.326	319KGXW
824.2 - 848.8	1.6596	319.476	319KGXW
824.2 - 848.8	0.3090	319.169	319KG7W
826.4 - 846.6	0.1914	4593	4M59F9W
826.4 - 846.6	0.1667	4591	4M59F9W
826.4 - 846.6	0.1660	4585	4M59F9W
1850.2 - 1909.8	1.0715	320.32	320KGXW
1850.2 - 1909.8	1.0233	320.32	320KGXW
1850.2 - 1909.8	0.4571	320.32	320KG7W
1852.4 - 1907.6	0.2018	4634	4M63F9W
1852.4 - 1907.6	0.1730	4634	4M63F9W
1852.4 - 1907.6	0.1738	4634	4M63F9W

Authorised by:

Issue Date: 05 November 2013

Title of Signatory: TUV SUD Lead FCB

Number: CD/000272 Issue: 1

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

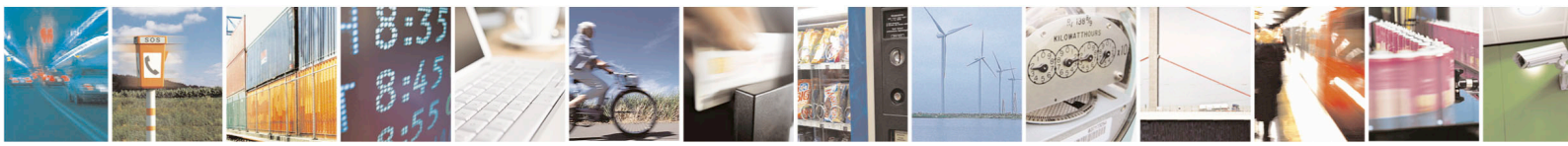
J'atteste, par la présente, que le matériel a fait l'objet d'essai et a été jugé conforme à la spécification ci-dessus.

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;

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;

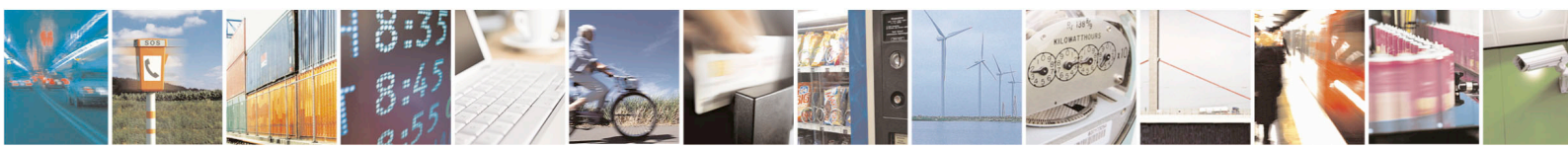
Certified Equipment shall not be distributed, leased, sold or offered for sale in Canada before the details of the certification have been added to the REL. This certificate has been issued in accordance with the Certification Regulations of TÜV SÜD BABT. This certificate is not transferable and remains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

TÜV SÜD BABT • TÜV SÜD Group
Octagon House • Concorde Way • Fareham • Hampshire • PO15 5RL • United Kingdom



8. List of acronyms

3GPP	3rd Generation Partnership Project
ADC	Analog to Digital Converter
ADN	Abbreviated Dialing Number
A-GPS	Assisted GPS
AMR	Adaptive Multi Rate
AT	Attention Commands
AWS	Advanced Wireless Services
BER	Bit Error Rate
BGA	Ball Grid Array
CLIP	Calling Line Identification Presentation
CLIR	Calling Line Identification Restriction
CMOS	Complementary Metal-Oxide Semiconductor
CSD	Circuit Switched Data
DAC	Digital to Analog Converter
DARP	Downlink Advanced Receiver Performance
DTMF	Dual Tone Multi Frequency
FDN	Fixed Dialing Number
FTP	File Transfer Protocol
GSM	Global System for Mobile communication
GPRS	General Packet Radio Service
GPS	Global Positioning System
HSPA	High Speed Packet Access
HSUPA	High Speed Uplink Packet Access
H/W	Hardware
LED	Light Emitting Diode
MO	Mobile Originated



MT	Mobile Terminated
OEM	Other Equipment Manufacturer
PCB	Printed Circuit Board
PCM	Pulse Code Modulation
PDA	Personal Digital Assistant
PDU	Protocol Data Unit
PIN	Personal Identification Number
POS	Point Of Sales
PWM	Pulse Width Modulation
RF	Radio Frequency
RoHS	Restriction of Hazardous Substances
RTC	Real Time Clock
SAIC	Single Antenna Interface Cancellation
SIM	Subscriber Identity Module
SMD	Surface Mounted Device
SMS	Short Message Service
S/W	Software
TBD	To Be Determined
TCP/IP	Transmission Control Protocol/Internet Protocol
TTSC	Telit Technical Support Center
UART	Universal Asynchronous Receiver and Transmitter
USB	Universal Serial Bus
USIM	Universal Subscriber Identity Module
WCDMA	Wideband Code Division Multiple Access