HE910 Family Product Description

80378ST10085a Rev.10 – 2017-03-01

Making machines talk.

APPLICABILITY TABLE[1]

PRODUCT
HE910-G
HE910-DG
HE910-D
HE910-GL
HE910-EUR
HE910-EUD
HE910-EUG
HE910-NAR
HE910-NAD
HE910-NAG

[1] HE910 is the “type name” of the products marketed as HE910-G & HE910-DG

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Such changes will, nevertheless be incorporated into new editions of this document.

Contents

1. Introduction

1.1. Scope

Scope of this document is to give an overview of the Telit HE910 family, which can support GSM/GPRS/EDGE and WCDMA/HSPA with data/voice capabilities and optional GPS.

1.2. Audience

This document is intended for customers who are evaluating the HE910 family.

1.3. Contact Information, Support

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

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

Alternatively, use:

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

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

http://www.telit.com

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

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

Telit appreciates feedback from the users of our information.

1.4. Document Organization

This document contains the following chapters (sample):

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

"Chapter 2: "Overview" gives the information of product variants and the overview of the characteristics and features of the product.

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

"Chapter 4: "Evaluation Kit" provides a brief description of the Telit Evaluation Kit (EVK2) as far as these modules are concerned.

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

"Chapter 6: "AT Commands" provides the information of compliant.

"Chapter 7: "Conformity Assessment" provides some fundamental hints about the conformity assessment that the final application might need.

"Chapter 8: "Safety Recommendation" provides some safety recommendations that must be follow by the customer in the design of the application that makes use of the HE910 family.

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

- HE910 family Hardware User Guide, 1VV0300925
- Telit Modules Software User Guide, 1VV0300784
- AT Commands Reference Guide, 80378ST10091A
- Telit IP Easy User Guide, 80000ST10028A
- HE Family Ports Arrangements, 1VV0300971
- HE910 Digital Voice Interface Application Note, 80000NT10050A
- SPI Port Application Note, 80000NT10053A
- xE910 Global For Factor Application Note, 80000NT10060A
- SIM Holder Design Guides, 80000NT10001a
- Telit EVK2 User Guide, 1vv0300704

1.7. Document History

Revision	Date	Changes
0	2011-03-23	First issue
1	2011-06-30	Temperature range has been extended to -30°C
2	2012-01-03	Throughput updated to 21.0 Mbps in downlink, for the high-end variants. Document extended to all the HE910 variants
3	2012-02-14	Product variants update
4	2012-04-10	Chapter 3.14, 3.9 and certificates added at Ch.6
5	2012-07-05	Ch. 3.6-3.7 -3.8 and certificates added at Ch.6
6	2012-10-08	Table at Ch. 3.4 (bands supported update); RoHs DoC added at Ch.6
7	2013-05-23	Updated par 3.3 3.4 3.7.1 3.11.9
8	2013-11-27	Updated par 2.3 , 6, 6.1, 6.4
9	2015-05-14	Product variants update Updated par 6.1, 6.2, Added par. 6.6
10	2017-03-01	Updated certificates for new SW release Updated certificates for new product variant

2. Overview

The new HE910 product family introduces the first and smallest hepta-band HSPA+ Land-Grid-Array (LGA) module in the market incorporating a 2G/3G solution built on 40nm CMOS technology.

The LGA package provides ultra low profile in the integrated solution while at the same time enhancing the performance of mechanical resistance to shock and reducing cost in high-volume applications, saving space and weight in portable devices.

The HE910 includes features like HSDPA 21.0 Mbps (Cat 14), HSUPA 5.7 Mbps (Cat 6), digital voice interface, circuit switched data transfer, phonebook and SMS support, embedded TCP/IP protocol stack and custom Telit AT commands.

Due to its low profile, low consumption and advanced connectivity features, HE910 is particularly suitable for applications such as mobile computing devices, PDAs, smartphones, table PCs and consumer electronics in general, both for business and personal life.

HE910 family can also be provided with an optional integrated high sensitivity A-GPS functionality for indoor fixes and simultaneous GPS with voice and data.

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 2002/95/EG)

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

All HE910 variants are quad-band GSM/GPRS/EDGE.

Different 3G-bands combinations are available:

- Three global high-end variants, multi-band, with highest throughput
- One global low-end variant, multi-band, with lower throughput
- Six regional low-end variants, with lower throughput, with and without GPS and available in two different bands allocation
  - EUx for Europe, but also for regions such as Australia, New Zealand, Brazil
  - NAx for North America

Product	Operating Bands 3G [2]	Frequency Bands [MHz]	Throughput DL/UL [Mbps]	Voice	GPS	Rx-Diversity
HE910-G	B5, B8, B2, B1, B4	800/850, 900, AWS1700, 1900, 2100	21/5.7	Y	Y	Y
HE910-DG	B5, B8, B2, B1, B4	800/850, 900, AWS1700, 1900, 2100	21/5.7	N	Y	Y
HE910-D	B5, B8, B2, B1, B4	800/850, 900, AWS1700, 1900, 2100	21/5.7	N	N	Y
HE910-GL	B5, B8, B2, B1, B4	800/850, 900, AWS1700, 1900, 2100	7.2/5.7	Y	N	N
HE910-EUR	B5, B8, B1	800/850, 900, 2100	7.2/5.7	Y	N	N
HE910-EUD	B5, B8, B1	800/850, 900, 2100	7.2/5.7	N	N	N
HE910-EUG	B5, B8, B1	800/850, 900, 2100	7.2/5.7	N	Y	N
HE910-NAR	B5, B2, B4	800/850, AWS1700, 1900	7.2/5.7	Y	N	N
HE910-NAD	B5, B2, B4	800/850, AWS1700, 1900	7.2/5.7	N	N	N
HE910-NAG	B5, B2, B4	800/850, AWS1700, 1900	7.2/5.7	N	Y	N

2.2. Target Market

The HE910 family is designed and developed for applications such as:

- Mobile computing
- In-car telematics
- PDAs

[2] B6&B19 (800 MHz) are subset of B5 (850 MHz) and supported as well, in all the variants

- E-readers
- Tablet PCs
- Consumer electronics
- Broadband connectivity
- Location tracking and Fleet Management application with optional GPS

2.3. Features

- Advanced E-GPRS/WCDMA/HSDPA/HSUPA Software protocol stack (Layer 1 to 3) – Version: 3GPP Release 7
- GSM Quad band (850, 900, 1800, 1900)
- WCDMA Multi-band (I, II, IV, V, VI , VIII and XIX)
- HSDPA up 21.0Mbps (for the high-end variants; up to 7.2 Mbps for the others)
- HSUPA up to 5.76Mbps
- WCDMA up to 384kbps downlink/uplink
- DTM (Dual Transfer Mode)
- Receive Diversity, type3i interference cancellation receiver
- 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, DRX5, 1.1 mA
  - Stand-by current 3G, DRX7, 1.2 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) @ 850/900/1700/1900/2100 MHz, WCDMA

- Sensitivity:
  - - 109 dBm (typ.) @ 850 / 900 MHz (GSM)
  - - 110 dBm (typ.) @ 1800 / 1900 MHz (GSM)
  - - 111 dBm (typ.) @ 850/900/1700/1900 / 2100 MHz (WCDMA)

Interfaces

- 10 general I/O ports maximum including multi-functional I/Os
- I2S for digital audio interface
- USB 2.0 HS
- 2 UART
- SPI
- 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 14 in downlink e category 6 in uplink
  - DL up to 21.0Mbps
  - UL up to 5.76Mbps
- WCDMA: up to 384kbps downlink/uplink
- EDGE: DL up to 296kbps, UL up to 236.8kbps
- GPRS: DL up to 107kbps, UL up to 85.6kbps
- GPRS class 10 for Global and NAx variants; class 33 for EUx variants
- EDGE class 10 for Global and NAx variants; class 33 for EUx variants
- Asynchronous non-transparent CSD up to 9.6kbps
- Coding scheme 1 to 4 (GPRS) & Modulation Coding scheme 1 to 9 (EDGE)

Optional GPS receiver

- Advanced real time hardware correlation engine for enhanced sensitivity (better than -165 dBm for A-GPS)
- Fast Acquisition giving rapid Time-to-First-Fix (TTFF)
- Capability to monitor up to 28 channels
- Stand Alone and Assisted mode (SUPL 1.0)
- Integrated LNA

Main characteristics:

Accuracy: 3m

Hot start autonomous: 1.8 sec.

Warm start autonomous: 30 sec.

Cold start autonomous: 42 sec.

L1 1575.42 MHz

GPS NMEA 0183 output format

Datum WGS-84

For further information, please refer to the HE910 family Hardware User Guide.

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

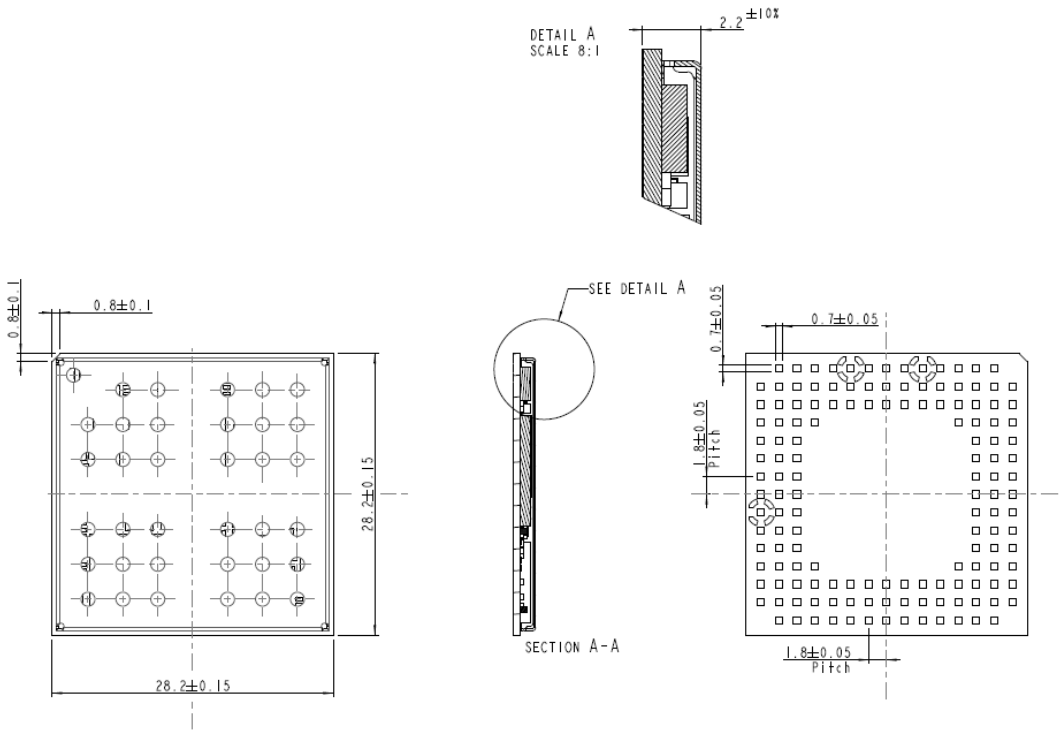
2.4. Approvals

- Fully type approved confirming with R&TTE directive
- CE, GCF (Global and EUx variants)
- FCC, IC, PTCRB (NAx variants)
- RoHS and REACH (all versions)

3. General Product Description

3.1. Dimensions and 2D mechanical drawing

HE910 has a Land-Grid-Array (LGA) package, with 144 pads.



The overall dimensions of HE910 family are:

- Length: 28.2 mm
- Width: 28.2mm
- Thickness: 2.2 mm

3.2. Weight

The module weight of HE910 family is about 9 grams.

3.3. Environmental requirements

3.3.1. Temperature range

Storage and Operating Temperature Range	-40°C ~ +85°C

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3.3.2. RoHS compliance

As a part of Telit corporate policy of environmental protection, the HE910 family complies with the RoHS (Restriction of Hazardous Substances) directive of the European Union (EU directive 2011/65/EU).

3.4. 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 ~ 849	869 ~ 894	128 ~ 251	45 MHz
EGSM900	890 ~ 915	935 ~ 960	0 ~ 124	45 MHz
	880 ~ 890	925 ~ 935	975 ~ 1023	45 MHz
DCS1800	1710 ~ 1785	1805 ~ 1880	512 ~ 885	95MHz
PCS1900	1850 ~ 1910	1930 ~ 1990	512 ~ 810	80MHz
WCDMA800 * (band VI)	830~840	875~885	Tx: 4162 ~ 4188 Additional: 812, 837 Rx: 4387 ~ 4413	45MHz

			Additional: 1037, 1062	
WCDMA800 * (band XIX)	830~845	875~890	Tx: 312~363 Additional: 387, 412, 437 Rx: 712~763 Additional: 787, 812, 837	45MHz
WCDMA850 (band V)	824 ~ 849	869 ~ 894	Tx: 4132 ~ 4233 additional 782, 787, 807, 812, 837, 862 Rx: 4357 ~ 4458 additional 1007, 1012, 1032, 1037, 1062, 1087	45MHz
WCDMA900 (band VIII)	880 ~ 915	925 ~ 960	Tx: 2712 ~ 2863 Rx: 2937 ~ 3088	45MHz
WCDMA1700 (band IV)	1710 ~ 1755	2110 ~ 2155	Tx: 1312 ~ 1513 additional 1662, 1687, 1712, 1737, 1762, 1787, 1812, 1837, 1862 Rx: 1537 ~ 1738 additional 1887, 1912, 1937, 1962, 1987, 2012, 2037, 2062, 2087	400MHz

WCDMA1900 (band II)	1850 ~ 1910	1930 ~ 1990	Tx: 9262 ~ 9538 additional 12, 37, 62, 87, 112, 137, 162, 187, 212, 237, 262, 287 Rx: 9662 ~ 9938 additional 412, 437, 462, 487, 512, 537, 562, 587, 612, 637, 662, 687	80MHz
WCDMA2100 (Band I)	1920 ~ 1980	2110 ~ 2170	Tx: 9612 ~ 9888 Rx: 10562 ~ 10838	190MHz

*note : Band VI & Band XIX are subset of Band V and supported in all the variants, starting from the sw release 12.00.xx4

3.5. Transmitter output power

The HE910 family 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 HE910 family 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 HE910 family transceiver output of WCDMA mode in 850/900/1700/1900/2100MHz bands is class 3 in accordance with the specifications which determine the nominal 0.25W peak RF power (+24dBm) on 50ohm.

3.6. Sensitivity

Band	Typical	Note
GSM 850	-109.5 dBm	BER Class II <2.44%
GSM 900	-109 dBm	BER Class II <2.44%
DCS1800	-110 dBm	BER Class II <2.44%
PCS 1900	-109.5 dBm	BER Class II <2.44%
WCDMA FDD B1	-111 dBm	BER <0.01%
WCDMA FDD B2	-110 dBm	BER <0.01%
WCDMA FDD B4	-111 dBm	BER <0.01%
WCDMA FDD B5	-111 dBm	BER <0.01%
WCDMA FDD B8	-110 dBm	BER <0.01%

3.7. Antenna

3.7.1. Frequency band of GSM/WCDMA antenna

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

ANTENNA 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 (GSM/EDGE)	70 MHz in GSM850, 80 MHz in GSM900, 170 MHz in DCS & 140 MHz PCS band
Bandwidth (WCDMA)	70 MHz in WCDMA Band V 80 MHz in WCDMA Band VIII 460 MHz in WCDMA Band IV 140 MHz in WCDMA Band II 250 MHz in WCDMA Band I
Impedance	50 ohm
Input power	> 33dBm(2 W) peak power in GSM > 24dBm Average power in WCDMA
VSWR absolute max	≤ 5:1 (limit to avoid permanent damage)
VSWR recommended	≤ 2:1 (limit to fulfil all regulatory requirements)

For further information, please refer to the HE910 family Hardware User Guide.

3.7.2. Frequency band of GPS antenna (for GPS variant only)

The GPS antenna must fulfill the following requirements.

Frequency range	1575.42MHz (GPS L1 band)
Bandwidth	+/- 1.023MHz

The HE910 Module contains an integrated LNA and pre-select SAW filter. This allows the module to work well with a passive GPS antenna. If the antenna cannot be located near the HE910, then an active antenna (that is an antenna with a low noise amplifier built in) can be used.

For further information, please refer to the chapter 7 of the HE910 family Hardware User Guide ("GPS receiver")

3.7.3. Antenna Diversity

The high end variants of this product family are characterized by an higher downlik datarate and are including an input for a second RX antenna to improve the radio sensitivity. This function is called "Antenna Diversity"

For further information, please refer to the chapter 6.7 of the HE910 family Hardware User Guide.

Note:

If the RX Diversity is not used/connected, disable the Diversity functionality using the AT#RXDIV command (ref to the AT User Guide for the proper syntax) and leave the correspondent pad unconnected

3.8. 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	3.1 ~ 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.

Refer to the Hardware User Guide for all the requirements and notes.

3.9. Power consumption

The HE910 power consumptions are described in the following table

HE910		
Mode	**Average (mA)**	**Mode description**
SWITCHED OFF		Module supplied but Switched Off
Switched Off	40uA	
IDLE mode (WCDMA)		
AT+CFUN=5	1.2	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	0.8	Disabled TX and RX; DRX9 (1.1mA in case of DRX5)
Operative mode (WCDMA)		
WCDMA Voice	152	WCDMA voice call (TX = 10dBm)
WCDMA HSDPA (0dBm)	187	WCDMA data call (Cat 14, TX = 0dBm)
WCDMA HSDPA (22dBm)	494	WCDMA data call (Cat 14, TX = 22dBm)
Operative mode (EDGE)		
EDGE 4TX+2RX		EDGE Sending data mode
GSM900 PL5	495	
DCS1800 PL0	484	
Operative mode (GSM)		
CSD TX and RX mode		GSM VOICE CALL
GSM900 CSD PL5	220	
DCS1800 CSD PL0	167	
GPRS 4TX+2RX		GPRS Sending data mode
GSM900 PL5	580	
DCS1800 PL0	438	

(*) Depending on network configuration and not under module control

For further information, please refer to the HE910 family Hardware User Guide.

3.10. 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 HE910 family, please refer to the HE910 family Hardware User Guide.

3.11. Input and Outputs

3.11.1. General Purpose I/Os

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

3.11.2. Power on monitor (PWR_MON)

The PWR_MON indicates the status of the module running properly.

3.11.3. Power on/off control (ON_OFF)

External power on/off control input. Refer to the HE910 family Hardware User Guide for more details of Power on timing.

3.11.4. Auxiliary power output for accessory (VAUX)

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

3.11.5. SIM Reader

The HE910 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 HE910 family Hardware User Guide.

3.11.6. Converters

The HE910 family has 1 ADC.

3.11.7. Audio Interface

The HE910 Module is not provided by an Analog Audio section. One DIGITAL AUDIO bus is available.

In order to develop an application including an Analog Audio it is necessary to add a dedicated CODEC on the Application design (ref to the HE910 Digital Voice Interface Application Note).

3.11.8. Serial ports

Two serial ports are available.

- Full RS232-C
- Simplified serial port (RX/TX only) for debugging

3.11.9. USB port

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

This port is compliant with the USB 2.0 HS.
The USB FS is supported for AT interface and data communication.

3.11.10. 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 HE910 AT command User Guide for complete details.

3.12. Features

3.12.1. Speech Coding

The HE910 family support the following voice codecs:

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

3.12.2. SMS

The HE910 family 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 HE910 supports also SMS over GPRS

3.12.3. 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.

3.12.4. Data Transmission capabilities

The HE910 family supports:

- HSPA: D/L up to 21.0Mbps, U/L up to 5.76Mbps
- EDGE:D/L up to 296kbps, U/L up to 236.8kbps

- GPRS: D/L up to 107kbps, U/L up to 85.6kbps
- Asynchronous non-transparent CSD up to 9.6kbps for GSM, 14.4kbps for WCDMA
- Coding scheme 1 to 4 (GPRS) & Modulation Coding scheme 1 to 9 (EDGE)

3.12.5. 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.

3.12.6. Call control

The calling cost control function is supported.

3.12.7. Phonebook

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

3.12.8. Characters management

The HE910 family supports the IRA, GSM, PCCP437, 8859-1 and UCS2 character sets, in TEXT and PDU mode.

3.12.9. 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.

3.12.10. Call status indication

The call status indication is supported.

3.12.11. 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.

3.12.12. Supplementary services

The following supplementary services are supported for HE910-xxG and HE910-xxR family:

- 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)

3.13. 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.

3.14. Packing system

According to SMT process, for picking & placing movement requirements, HE910 family is packaged on trays. Each tray contains 36 pieces in size of 135.9 x 322.6.

Packaging in reel is available as well, as described in details in the Hardware User Guide.

The level of moisture sensibility of HE910 family is “3”, according with standard IPC/JEDEC J-STD-020, take care of all the relative requirements for using this kind of components. Special care for handling is highly required.

4. Evaluation Kit

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

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

The development of the applications utilizing the Telit HE910 family 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 HE910 family 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. Conformity assessment issues

6.1. Declaration of Conformity

Telit

EU DECLARATION OF CONFORMITY

1 **HE910** (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 Quad-Band GSM850/EGSM900/DCS1800/PCS1900 and Penta-Band FDD I/II/IV/V/VIII Wireless Module with GPS receiver

5 The object of the declaration described above is in conformity with the relevant Community harmonisation: European Directive 1999/5/EC (R&TTE)

6 The conformity with the essential requirements of the 1999/5/EC has been demonstrated against the following harmonized standards:

Harmonized Standard reference	Article of Directive 1999/5/EC
EN 60950-1:2006 + A11:2009 + A1:2010 + A12:2011 + AC:2011 + A2:2013 EN 62311:2008	3.1 (a): Health and Safety of the User
EN 301 489-1 V1.9.2 EN 301 489-7 V1.3.1 EN 301 489-3 V1.6.1 EN 301 489-24 V1.5.1	3.1 (b): Electromagnetic Compatibility
EN 301 511 V12.1.1 EN 301 908-1 V7.1.1 EN 301 908-2 V6.2.1 EN 300 440-2 V1.4.1	3.2 : Effective use of spectrum allocated

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 Tecnológico 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, **2016-12-05**

Quality Director
Guido Walcher

Quality Manager
Cesare Robelli

Notified Body No.: 50108.001

Technical Construction File: HE910_50108_Rev1

Telit Communications S.p.A.
Via Stazione di Prosecco n. 5/B
34010 Sgonico (TS) - ITALY
Phone +39 040 4192 111
Fax +39 040 4192 333

Cap. Soc. € 3.000.000
Partita IVA 03711600266
Cod.Fisc. 03711600266
Nr. R.E.A. TS-120027

Società soggetta all'attività di direzione e coordinamento da parte di Telit Communications PLC con sede in Londra (art.2497 bis C.C.)

Società con socio unico (Telit Communications PLC)

Mod 0236 2016-05 Rev.1 This declaration is issued according to 768/2008/EC

EU DECLARATION OF CONFORMITY

1 **HE910-D** (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 Quad-Band GSM850/EGSM900/DCS1800/PCS1900 and Penta-Band FDD I/II/IV/V/VIII Wireless Module

5 The object of the declaration described above is in conformity with the relevant Community harmonisation: European Directive 1999/5/EC (R&TTE)

6 The conformity with the essential requirements of the 1999/5/EC has been demonstrated against the following harmonized standards:

Harmonized Standard reference	Article of Directive 1999/5/EC
EN 60950-1:2006 + A11:2009 + A1:2010 + A12:2011 + AC:2011 + A2:2013 EN 62311:2008	3.1 (a): Health and Safety of the User
EN 301 489-1 V1.9.2 EN 301 489-7 V1.3.1 EN 301 489-24 V1.5.1	3.1 (b): Electromagnetic Compatibility
EN 301 511 V12.1.1 EN 301 908-1 V7.1.1 EN 301 908-2 V6.2.1	3.2 : Effective use of spectrum allocated

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 Tecnológico 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, **2016-12-05**

Quality Director
Guido Walcher

Quality Manager
Cesare Robelli

Notified Body No.: 50108.001

Technical Construction File: HE910_50108_Rev1

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Società soggetta all'attività
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da parte di Telit Communications PLC
con sede in Londra (art.2497 bis C.C.)

Società con socio unico
(Telit Communications PLC)

Mod 0236 2016-05 Rev.1 This declaration is issued according to 768/2008/EC

EU DECLARATION OF CONFORMITY

1 **HE910-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 Quad-Band GSM850/EGSM900/DCS1800/PCS1900 and Tri-Band FDD I/V/VIII Wireless Module

5 The object of the declaration described above is in conformity with the relevant Community harmonisation: European Directive 1999/5/EC (R&TTE)

6 The conformity with the essential requirements of the 1999/5/EC has been demonstrated against the following harmonized standards:

Harmonized Standard reference	Article of Directive 1999/5/EC
EN 60950-1:2006 + A11:2009 + A1:2010 + A12:2011 + AC:2011 + A2:2013 EN 62311:2008	3.1 (a): Health and Safety of the User
EN 301 489-1 V1.9.2 EN 301 489-7 V1.3.1 EN 301 489-24 V1.5.1	3.1 (b): Electromagnetic Compatibility
EN 301 511 V12.1.1 EN 301 908-1 V7.1.1 EN 301 908-2 V6.2.1	3.2 : Effective use of spectrum allocated

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 Tecnológico 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, **2016-12-05**

Quality Director
Guido Walcher

Quality Manager
Cesare Robelli

Notified Body No.: 50108.002

Technical Construction File: HE910_EUX_50108_Rev1

Telit Communications S.p.A.
Via Stazione di Prosecco n. 5/B
34010 Sgonico (TS) - ITALY
Phone +39 040 4192 111
Fax +39 040 4192 333

Cap. Soc. € 3.000.000
Partita IVA 03711600266
Cod.Fisc. 03711600266
Nr. R.E.A. TS-120027

Società soggetta all'attività di direzione e coordinamento da parte di Telit Communications PLC con sede in Londra (art.2497 bis C.C.)

Società con socio unico (Telit Communications PLC)

Mod 0236 2016-05 Rev.1 This declaration is issued according to 768/2008/EC

EU DECLARATION OF CONFORMITY

1 **HE910-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 Quad-Band GSM850/EGSM900/DCS1800/PCS1900 and Tri-Band FDD I/V/VIII Wireless Module

5 The object of the declaration described above is in conformity with the relevant Community harmonisation: European Directive 1999/5/EC (R&TTE)

6 The conformity with the essential requirements of the 1999/5/EC has been demonstrated against the following harmonized standards:

Harmonized Standard reference	Article of Directive 1999/5/EC
EN 60950-1:2006 + A11:2009 + A1:2010 + A12:2011 + AC:2011 + A2:2013 EN 62311:2008	3.1 (a): Health and Safety of the User
EN 301 489-1 V1.9.2 EN 301 489-7 V1.3.1 EN 301 489-24 V1.5.1	3.1 (b): Electromagnetic Compatibility
EN 301 511 V12.1.1 EN 301 908-1 V7.1.1 EN 301 908-2 V6.2.1	3.2 : Effective use of spectrum allocated

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 Tecnológico 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, **2016-12-05**

Quality Director
Guido Walcher

Quality Manager
Cesare Robelli

Notified Body No.: 50108.002

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Società con socio unico
(Telit Communications PLC)

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EU DECLARATION OF CONFORMITY

1 **HE910-EUG** (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 Quad-Band GSM850/EGSM900/DCS1800/PCS1900 and Tri-Band FDD I/V/VIII Wireless Module with GPS receiver

5 The object of the declaration described above is in conformity with the relevant Community harmonisation: European Directive 1999/5/EC (R&TTE)

6 The conformity with the essential requirements of the 1999/5/EC has been demonstrated against the following harmonized standards:

Harmonized Standard reference	Article of Directive 1999/5/EC
EN 60950-1:2006 + A11:2009 + A1:2010 + A12:2011 + AC:2011 + A2:2013 EN 62311:2008	3.1 (a): Health and Safety of the User
EN 301 489-1 V1.9.2 EN 301 489-7 V1.3.1 EN 301 489-3 V1.6.1 EN 301 489-24 V1.5.1	3.1 (b): Electromagnetic Compatibility
EN 301 511 V12.1.1 EN 301 908-1 V7.1.1 EN 301 908-2 V6.2.1 EN 300 440-2 V1.4.1	3.2 : Effective use of spectrum allocated

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 Tecnológico 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, **2016-12-05**

Quality Director
Guido Walcher

Quality Manager
Cesare Robelli

Notified Body No.: 50108.002

Technical Construction File: HE910_EUX_50108_Rev1

Telit Communications S.p.A.
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Cod.Fisc. 03711600266
Nr. R.E.A. TS-120027

Società soggetta all'attività di direzione e coordinamento da parte di Telit Communications PLC con sede in Londra (art.2497 bis C.C.)

Società con socio unico (Telit Communications PLC)

Mod 0236 2016-05 Rev.1 This declaration is issued according to 768/2008/EC

EU DECLARATION OF CONFORMITY

1 **HE910-GL** (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 Quad Band GSM850/EGSM900/DCS1800/PCS1900 and Tri Band FDD I/V/VIII Wireless Module

5 The object of the declaration described above is in conformity with the relevant Community harmonisation: European Directive 1999/5/EC (R&TTE)

6 The conformity with the essential requirements of the 1999/5/EC has been demonstrated against the following harmonized standards:

Harmonized Standard reference	Article of Directive 1999/5/EC
EN 60950-1:2006 + A11:2009 + A1:2010 + A12:2011 + AC:2011 + A2:2013 EN 62311:2008	3.1 (a): Health and Safety of the User
EN 301 489-1 V1.9.2 EN 301 489-7 V1.3.1 EN 301 489-24 V1.5.1	3.1 (b): Electromagnetic Compatibility
EN 301 511 V12.1.1 EN 301 908-1 V7.1.1 EN 301 908-2 V6.2.1	3.2 : Effective use of spectrum allocated

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 Tecnológico 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, **2016-12-05**

Quality Director
Guido Walcher

Quality Manager
Cesare Robelli

Notified Body No.: 50108.001

Technical Construction File: HE910_50108_Rev1

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Società soggetta all'attività
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con sede in Londra (art.2497 bis C.C.)

Società con socio unico
(Telit Communications PLC)

Mod 0236 2016-05 Rev.1 This declaration is issued according to 768/2008/EC

6.2. R&TTE Notified Body statement of Opinion

AT4 wireless
a DEKRA company

AT4 wireless, S.A.U.

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: 50108CNB.001
Issue date: 2016-12-05

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: 2.5G, 3.5G Wireless Module
Brand name: Telit
Family name: HE910

Model name:	HE910	HE910-D	HE910-GL
HW version:	0	0	0
SW versions:	12.00.003	12.00.023	12.00.106
	12.00.004	12.00.024	12.00.107
	12.00.005	12.00.025	12.00.117-B080
	12.00.006	12.00.026	12.00.118
	12.00.007	12.00.027	
	12.00.008	12.00.086	
		12.00.028	

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 + A2:2013	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 301 489-3 V1.6.1 [1] EN 301 489-7 V1.3.1; EN 301 489-24 V1.5.1	Test report
Article 3.2: Radio spectrum use	EN 300 440-2 V1.4.1 [1]; EN 301 511 V12.1.1 EN 301 908-1 V7.1.1; EN 301 908-2 V6.2.1	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 3 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_02 // AT4 wireless, S.A.U., Parque Tecnológico de Andalucía, C/Severo Ochoa 2, 29590 Campanillas (Málaga), Spain // http://www.at4wireless.com

AT4 wireless, S.A.U.

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: 50108CNB.002
Issue date: 2016-12-05

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: 2.5G, 3.5G Wireless Module
Brand name: Telit
Family name: HE910

Model name:	HE910-EUG	HE910-EUR	HE910-EUD
HW version:	0	0	0
SW version:	12.00.213	12.00.203	12.00.223
	12.00.214	12.00.204	12.00.224
	12.00.215	12.00.205	12.00.225
	12.00.216	12.00.206	12.00.226
	12.00.217	12.00.207	12.00.227
	12.00.218	12.00.208	12.00.228

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 + A2:2013	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 301 489-3 V1.6.1 (1) EN 301 489-7 V1.3.1; EN 301 489-24 V1.5.1	Test report
Article 3.2: Radio spectrum use	EN 300 440-2 V1.4.1 (1); EN 301 511 V12.1.1 EN 301 908-1 V7.1.1; EN 301 908-2 V6.2.1	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_02 // AT4 wireless, S.A.U., Parque Tecnológico de Andalucía, C/Severo Ochoa 2, 29590 Campanillas (Málaga), Spain // http://www.at4wireless.com

6.3. FCC certificates

TCB

GRANT OF EQUIPMENT AUTHORIZATION

Certification

Issued Under the Authority of the Federal Communications Commission By:

TCB

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

Date of Grant: 03/13/2012

Application Dated: 03/13/2012

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

Attention: Brian Tucker , Global VP, Quality

NOT TRANSFERABLE

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

FCC IDENTIFIER: RI7HE910
Name of Grantee: Telit Communications S.p.A.
Equipment Class: Part 15 Class B Computing Device Peripheral
Notes: WWAN Module
Modular Type: Single Modular

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

Single Modular Approval.

TCB

GRANT OF EQUIPMENT AUTHORIZATION

Certification

Issued Under the Authority of the

Federal Communications Commission

By:

TCB

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

Date of Grant: 03/13/2012

Application Dated: 03/13/2012

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

Attention: Brian Tucker , Global VP, Quality

NOT TRANSFERABLE

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

FCC IDENTIFIER: RI7HE910
Name of Grantee: Telit Communications S.p.A.
Equipment Class: PCS Licensed Transmitter
Notes: WWAN Module
Modular Type: Single Modular

Grant Notes	FCC Rule Parts	Frequency Range (MHZ)	Output Watts	Frequency Tolerance	Emission Designator
	22H	824.2 - 824.2	1.995	1.0 PM	300KGXW
	22H	824.2 - 848.8	0.997	1.0 PM	300KG7W
	22H	826.4 - 846.4	0.446	1.0 PM	4M20F9W
	27	1712.4 - 1752.6	0.226	1.0 PM	4M20F9W
	24E	1850.2 - 1909.8	0.993	1.0 PM	300KGXW
	24E	1850.2 - 1909.8	0.38	1.0 PM	300KG7W
	24E	1852.4 - 1907.6	0.243	1.0 PM	4M20F9W

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 5.22 dBi for part 22H, 3.31 dBi for part 27 and 6.45 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.

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

TCB

GRANT OF EQUIPMENT AUTHORIZATION

TCB

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

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

Date of Grant: 06/28/2012
Application Dated: 06/28/2012

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

Attention: Brian Tucker , Global VP, Quality

NOT TRANSFERABLE

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

FCC IDENTIFIER: RI7HE910NA
Name of Grantee: Telit Communications S.p.A.
Equipment Class: Part 15 Class B Computing Device Peripheral
Notes: 2G/3.5G module, HE910-NAG; HE910-NAR; HE910-NAD
Modular Type: Single Modular

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

Single Modular Approval.

TCB

GRANT OF EQUIPMENT AUTHORIZATION

TCB

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

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

Date of Grant: 06/28/2012
Application Dated: 06/28/2012

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

Attention: Brian Tucker , Global VP, Quality

NOT TRANSFERABLE

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

FCC IDENTIFIER: RI7HE910NA
Name of Grantee: Telit Communications S.p.A.
Equipment Class: PCS Licensed Transmitter
Notes: 2G/3.5G module, HE910-NAG; HE910-NAR; HE910-NAD
Modular Type: Single Modular

Grant Notes	FCC Rule Parts	Frequency Range (MHZ)	Output Watts	Frequency Tolerance	Emission Designator
	22H	824.2 - 848.8	1.648	2.5 PM	244KGXW
	22H	824.2 - 848.8	0.467	2.5 PM	249KG7W
	22H	826.4 - 846.4	0.238	2.5 PM	4M09F9W
	24E	1850.2 - 1909.8	0.793	2.5 PM	247KGXW
	24E	1850.2 - 1909.8	0.34	2.5 PM	249KG7W
	24E	1852.4 - 1907.6	0.234	2.5 PM	4M07F9W
	27	1712.4 - 1752.6	0.233	2.5 PM	4M08F9W

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 5.29 dBi for 850MHz bands, 4.02 dBi for 1900 MHz bands and 6.32 dBi for 1700 MHz band. The antenna(s) used for this transmitter must be installed to provide a separation distance of at least 20cm from all persons and must not be co-located or operated in conjunction with any antenna or transmitter not described under this FCC id, except in accordance with FCC multi-transmitter product procedures. The final product operating with this transmitter must include operating instructions and antenna installation instructions, for end-users and installers to satisfy RF exposure compliance requirements. Compliance of this device in all final product configurations is the responsibility of the Grantee. Installation of this device into specific final products may require the submission of a Class II permissive change application containing data pertinent to RF Exposure, spurious emissions, ERP/EIRP, and host/module authentication, or new application if appropriate. This device contains GSM functions that are not operational in the U.S. Territories. This filing is only applicable for U.S. operations.

TCB

GRANT OF EQUIPMENT AUTHORIZATION

Certification

Issued Under the Authority of the
Federal Communications Commission
By:

TCB

TUV SUD BABT
Octagon House, Concorde Way,
Segensworth North,
Fareham, PO15 5RL
United Kingdom

Date of Grant: 07/06/2015

Application Dated: 07/06/2015

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: RI7HE910GL
Name of Grantee: Telit Communications S.p.A.
Equipment Class: **Part 15 Class B Computing Device Peripheral**
Notes: **2G/3.5G Module**
Modular Type: **Single Modular**

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

TCB

GRANT OF EQUIPMENT AUTHORIZATION

Certification

Issued Under the Authority of the Federal Communications Commission

By:

TCB

TUV SUD BABT
Octagon House, Concorde Way,
Segensworth North,
Fareham, PO15 5RL
United Kingdom

Date of Grant: 07/06/2015

Application Dated: 07/06/2015

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

Attention: Brian Tucker , Global VP, Quality

NOT TRANSFERABLE

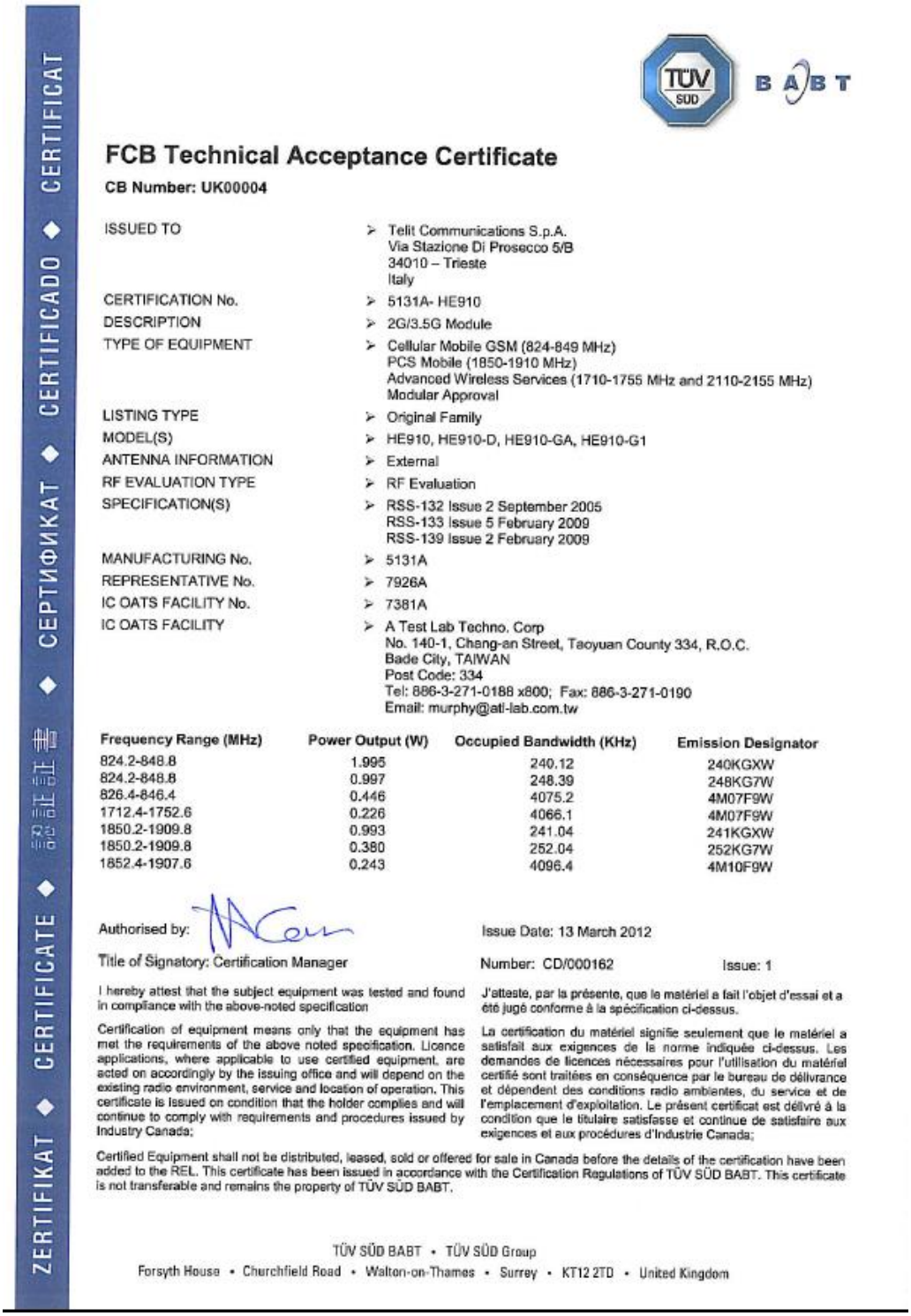
EQUIPMENT AUTHORIZATION is hereby issued to the named GRANTEE, and is VALID ONLY for the equipment identified hereon for use under the Commission's Rules and Regulations listed below.

FCC IDENTIFIER: RI7HE910GL
Name of Grantee: Telit Communications S.p.A.
Equipment Class: PCS Licensed Transmitter
Notes: 2G/3.5G Module
Modular Type: Single Modular

Grant Notes	FCC Rule Parts	Frequency Range (MHZ)	Output Watts	Frequency Tolerance	Emission Designator
	22H	824.2 - 848.2	1.995	1.0 PM	240KGXW
	22H	824.2 - 848.2	0.977	1.0 PM	248KG7W
	24E	1850.2 - 1909.8	0.977	1.0 PM	241KGXW
	24E	1850.2 - 1909.8	0.724	1.0 PM	252KG7W
	22H	826.4 - 846.6	0.46	1.0 PM	4M07G9W
	24E	1852.4 - 1907.6	0.436	1.0 PM	4M10G9W
	27	1712.4 - 1752.6	0.226	1.0 PM	4M07F9W

Single Modular Approval. Power output listed is conducted. This device is approved for mobile and fixed use with respect to RF exposure compliance, and may only be marketed to OEM installers. The antenna(s) used for this transmitter, as described in this filing, must be installed to provide a separation distance of at least 20 cm from all persons. Installers and end-users must be provided with operating conditions for satisfying RF exposure compliance. Maximum permitted antenna gain/cable loss: 850 MHz: 4.14 dBi, 1700 MHz: 6.30 dBi, 1900 MHz: 3.01 dBi.

6.4. IC certificates



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

TÜV SÜD BABT

FCB Technical Acceptance Certificate

CB Number: UK00004

ISSUED TO	➢ Telit Communications S.p.A. Via Stazione Di Prosecco 5/B 34010 – Trieste Italy
CERTIFICATION No.	➢ 5131A- HE910
DESCRIPTION	➢ 2G/3.5G Module
TYPE OF EQUIPMENT	➢ Cellular Mobile GSM (824-849 MHz) PCS Mobile (1850-1910 MHz) Advanced Wireless Services (1710-1755 MHz and 2110-2155 MHz) Modular Approval
LISTING TYPE	➢ Original Family
MODEL(S)	➢ HE910, HE910-D, HE910-GA, HE910-G1
ANTENNA INFORMATION	➢ External
RF EVALUATION TYPE	➢ RF Evaluation
SPECIFICATION(S)	➢ RSS-132 Issue 2 September 2005 RSS-133 Issue 5 February 2009 RSS-139 Issue 2 February 2009
MANUFACTURING No.	➢ 5131A
REPRESENTATIVE No.	➢ 7926A
IC OATS FACILITY No.	➢ 7381A
IC OATS FACILITY	➢ A Test Lab Techno. Corp No. 140-1, Chang-an Street, Taoyuan County 334, R.O.C. Bade City, TAIWAN Post Code: 334 Tel: 886-3-271-0188 x800; Fax: 886-3-271-0190 Email: murphy@atl-lab.com.tw

Frequency Range (MHz)	Power Output (W)	Occupied Bandwidth (KHz)	Emission Designator
824.2-848.8	1.995	240.12	240KGXW
824.2-848.8	0.997	248.39	248KG7W
826.4-846.4	0.446	4075.2	4M07F9W
1712.4-1752.6	0.226	4066.1	4M07F9W
1850.2-1909.8	0.993	241.04	241KGXW
1850.2-1909.8	0.380	252.04	252KG7W
1852.4-1907.6	0.243	4096.4	4M10F9W

Authorised by:

Issue Date: 13 March 2012

Title of Signatory: Certification Manager

Number: CD/000162 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
Forsyth House • Churchfield Road • Walton-on-Thames • Surrey • KT12 2TD • United Kingdom

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

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- HE910NA
DESCRIPTION	➢ 2G/3.5G Module
TYPE OF EQUIPMENT	➢ Cellular Mobile GSM (824-849 MHz) PCS Mobile (1850-1910 MHz) Advanced Wireless Services (1710-1755 MHz) Cellular Mobile New Technologies (824-849MHz) Modular Approval
LISTING TYPE	➢ Original Family
MODEL(S)	➢ HE910NAG, HE910-NAR, HE910-NAD
ANTENNA INFORMATION	➢ External
RF EVALUATION TYPE	➢ RF Evaluation
SPECIFICATION(S)	➢ RSS-132 Issue 2 September 2005 RSS-133 Issue 5 February 2009 RSS-139 Issue 2 February 200
MANUFACTURING No.	➢ 5131A
REPRESENTATIVE No.	➢ 7926A
IC OATS FACILITY No.	➢ 7381A
IC OATS FACILITY	➢ A Test Lab Techno. Corp No. 140-1, Chang-an Street, Taoyuan County 334, R.O.C. Bade City, TAIWAN Post Code: 334 Tel: 886-3-271-0188 x800; Fax: 886-3-271-0190 Email: murphy@ati-lab.com.tw

Frequency Range (MHz)	Power Output (W)	Occupied Bandwidth (KHz)	Emission Designator
824.2 – 848.8	1.648	244	244KGXW
824.2 – 848.8	0.467	249	249KG7W
1850.2 – 1909.8	0.793	247	247KGXW
1850.2 – 1909.8	0.340	249	249KG7W
826.4 – 846.4	0.238	4085	4M09F9W
1852.4 – 1907.6	0.234	4073	4M07F9W
1712.4-1752.6	0.233	4080	4M08F9W

Authorised by: Issue Date: 28 June 2012

Title of Signatory: Certification Manager Number: CD/000187 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
Forsyth House • Churchfield Road • Walton-on-Thames • Surrey • KT12 2TD • United Kingdom

CERTIFICAT ◆ CERTIFICADO ◆ СЕРТИФИКАТ ◆ 認証書 ◆ CERTIFICATE ◆ CERTIFIKAT

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-HE910GL
DESCRIPTION	➢	2G/3.5G Module
TYPE OF EQUIPMENT	➢	Advanced Wireless Services (1710–1755 MHz and 2110–2155 MHz) Cellular Mobile GSM (824-849 MHz) Cellular Mobile New Technologies (824–849MHz) PCS Mobile (1850–1910 MHz) Modular Approval
MODEL(S)	➢	HE910-GL
TYPE OF LISTING:	➢	Single New
ANTENNA INFORMATION	➢	Max gain: 850 MHz: 4.14 dBi, 1700 MHz: 6.30 dBi, 1900 MHz: 3.01 dBi
RF EVALUATION TYPE	➢	RF Evaluation
SPECIFICATION(S)	➢	RSS-132 Issue 3 January 2013 RSS-133 Issue 6 January 2013 RSS-139 Issue 2 February 2009
MANUFACTURING No.	➢	5131A
REPRESENTATIVE No.	➢	5131B
IC OATS FACILITY No.	➢	4621A-1
IC OATS FACILITY	➢	AT4 Wireless, S.A. Parque Tecnologico de Andalucia 29590 Campanillas Malaga Espana Tel: 34 952 61 93 67; Fax: 34 952 61 91 13 Contact: Juan Carlos Soler; E-mail: jsoler@at4wireless.com

Authorised by:

Title of Signatory: TUV SUD Lead FCB
On Behalf of TÜV SÜD BABT

Issue Date: 06 July 2015
Number: CD/010102 Issue: 1

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 existing radio environment, service and location of operation. This certificate is issued on condition that the holder complies and will continue to comply with requirements and procedures issued by Industry Canada;

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

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

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

CD/010102 Issue 1

Page 1 of 2

7. Safety Recommendations

READ CAREFULLY

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

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

Do not disassemble the product; any mark of tampering will compromise the warranty validity. We recommend following the instructions of the hardware user guides for a correct wiring of the product. The product has to be supplied with a stabilized voltage source and the wiring has to be conforming to the security and fire prevention regulations. The product has to be handled with care, avoiding any contact with the pins because electrostatic discharges may damage the product itself. Same cautions have to be taken for the SIM, checking 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/

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