HE910 Family Product Description

80378ST10085a  Rev.11 – 2017-06-01
## APPLICABILITY TABLE

<table>
<thead>
<tr>
<th>PRODUCT</th>
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<tbody>
<tr>
<td>HE910-G</td>
</tr>
<tr>
<td>HE910-DG</td>
</tr>
<tr>
<td>HE910-D</td>
</tr>
<tr>
<td>HE910-GL</td>
</tr>
<tr>
<td>HE910-EUR</td>
</tr>
<tr>
<td>HE910-EUD</td>
</tr>
<tr>
<td>HE910-EUG</td>
</tr>
<tr>
<td>HE910-NAR</td>
</tr>
<tr>
<td>HE910-NAD</td>
</tr>
<tr>
<td>HE910-NAG</td>
</tr>
</tbody>
</table>

1 HE910 is the "type name" of the products marketed as HE910-G & HE910-DG
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Contents

1. Introduction .................................................................................................................. 6
   1.1. Scope .................................................................................................................... 6
   1.2. Audience .............................................................................................................. 6
   1.3. Contact Information, Support ............................................................................. 6
   1.4. Document Organization ....................................................................................... 7
   1.5. Text Conventions ................................................................................................. 7
   1.6. Related Documents .............................................................................................. 8
   1.7. Document History ................................................................................................. 9

2. Overview ........................................................................................................................ 10
   2.1. Product variants .................................................................................................... 11
   2.2. Target Market ....................................................................................................... 12
   2.3. Features ............................................................................................................... 13
   2.4. Approvals ............................................................................................................ 16

3. General Product Description ....................................................................................... 17
   3.1. Dimensions and 2D mechanical drawing .......................................................... 17
   3.2. Weight ................................................................................................................ 18
   3.3. Environmental requirements ............................................................................. 18
       3.3.1. Temperature range ....................................................................................... 18
       3.3.2. RoHS compliance ....................................................................................... 18
   3.4. Operating Frequency ......................................................................................... 18
   3.5. Transmitter output power ................................................................................... 20
   3.6. Sensitivity ............................................................................................................ 21
   3.7. Antenna ............................................................................................................... 21
       3.7.1. Frequency band of GSM/WCDMA antenna .............................................. 21
       3.7.2. Frequency band of GPS antenna (for GPS variant only) ...................... 22
       3.7.3. Antenna Diversity ...................................................................................... 22
   3.8. Supply voltage .................................................................................................... 22
   3.9. Power consumption ............................................................................................ 23
   3.10. Logic level ......................................................................................................... 23
   3.11. Input and Outputs ............................................................................................. 24
       3.11.1. General Purpose I/Os ............................................................................. 24
       3.11.2. Power on monitor (PWR_MON) ............................................................. 24
3.11.3. Power on/off control (ON_OFF) ........................................ 24
3.11.4. Auxiliary power output for accessory (VAUX) .......... 24
3.11.5. SIM Reader ................................................................. 24
3.11.6. Converters ................................................................. 24
3.11.7. Audio Interface .......................................................... 24
3.11.8. Serial ports ............................................................... 24
3.11.9. USB port ................................................................. 25
3.11.10. User Interface ......................................................... 25
3.12. Features ................................................................. 25
3.12.1. Speech Coding .......................................................... 25
3.12.2. SMS ........................................................... 25
3.12.3. RTC Bypass out ......................................................... 25
3.12.4. Data Transmission capabilities ........................................ 25
3.12.5. Local security management ........................................ 26
3.12.6. Call control ............................................................... 26
3.12.7. Phonebook ............................................................. 26
3.12.8. Characters management ................................................ 26
3.12.9. SIM related functions .................................................. 26
3.12.10. Call status indication .................................................. 26
3.12.11. Automatic answer ..................................................... 26
3.12.12. Supplementary services .............................................. 26
3.13. Mounting the modules on your board ...................... 27
3.14. Packing system ......................................................... 27
4. Evaluation Kit ............................................................. 28
5. AT Commands .............................................................. 29
6. Conformity assessment issues ........................................ 30
6.1. Declaration of Conformity ................................................. 30
6.2. R&TTE Notified Body statement of Opinion ................ 36
6.3. FCC certificates .......................................................... 38
6.4. IC certificates ............................................................. 44
7. Safety Recommendations ............................................... 47
8. List of acronyms .......................................................... 49
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:


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**

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**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

<table>
<thead>
<tr>
<th>Revision</th>
<th>Date</th>
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<td>2011-03-23</td>
<td>First issue</td>
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<td>2011-06-30</td>
<td>Temperature range has been extended to -30°C</td>
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<td>2</td>
<td>2012-01-03</td>
<td>Throughput updated to 21.0 Mbps in downlink, for the high-end variants. Document extended to all the HE910 variants</td>
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<td>2012-02-14</td>
<td>Product variants update</td>
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<td>4</td>
<td>2012-04-10</td>
<td>Chapter 3.14, 3.9 and certificates added at Ch.6</td>
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<td>2012-07-05</td>
<td>Ch. 3.6-3.7-3.8 and certificates added at Ch.6</td>
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<td>2012-10-08</td>
<td>Table at Ch. 3.4 (bands supported update); RoHs DoC added at Ch.6</td>
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<td>7</td>
<td>2013-05-23</td>
<td>Updated par 3.3 3.4 3.7.1 3.11.9</td>
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<td>Product variants update Updated par 6.1, 6.2, Added par. 6.6</td>
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<td>10</td>
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<td>Updated certificates for new SW release Updated certificates for new product variant</td>
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<td>11</td>
<td>2017-06-01</td>
<td>Updated RED certificates Updated SAFETY RECOMMENDATIONS</td>
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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)

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**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.

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**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
<table>
<thead>
<tr>
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<th></th>
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<tbody>
<tr>
<td>HE910-G</td>
<td>B5, B8, B2, B1, B4</td>
<td>800/850, 900, AWS1700, 1900, 2100</td>
<td>21/5.7</td>
<td>Y</td>
<td>Y</td>
<td>Y</td>
</tr>
<tr>
<td>HE910-DG</td>
<td>B5, B8, B2, B1, B4</td>
<td>800/850, 900, AWS1700, 1900, 2100</td>
<td>21/5.7</td>
<td>N</td>
<td>Y</td>
<td>Y</td>
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<tr>
<td>HE910-D</td>
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<td>800/850, 900, AWS1700, 1900, 2100</td>
<td>21/5.7</td>
<td>N</td>
<td>N</td>
<td>Y</td>
</tr>
<tr>
<td>HE910-GL</td>
<td>B5, B8, B2, B1, B4</td>
<td>800/850, 900, AWS1700, 1900, 2100</td>
<td>7.2/5.7</td>
<td>Y</td>
<td>N</td>
<td>N</td>
</tr>
<tr>
<td>HE910-EUR</td>
<td>B5, B8, B1</td>
<td>800/850, 900, 2100</td>
<td>7.2/5.7</td>
<td>Y</td>
<td>N</td>
<td>N</td>
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<tr>
<td>HE910-EUD</td>
<td>B5, B8, B1</td>
<td>800/850, 900, 2100</td>
<td>7.2/5.7</td>
<td>N</td>
<td>N</td>
<td>N</td>
</tr>
<tr>
<td>HE910-EUG</td>
<td>B5, B8, B1</td>
<td>800/850, 900, 2100</td>
<td>7.2/5.7</td>
<td>N</td>
<td>Y</td>
<td>N</td>
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<tr>
<td>HE910-NAR</td>
<td>B5, B2, B4</td>
<td>800/850, AWS1700, 1900</td>
<td>7.2/5.7</td>
<td>Y</td>
<td>N</td>
<td>N</td>
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<tr>
<td>HE910-NAD</td>
<td>B5, B2, B4</td>
<td>800/850, AWS1700, 1900</td>
<td>7.2/5.7</td>
<td>N</td>
<td>N</td>
<td>N</td>
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<tr>
<td>HE910-NAG</td>
<td>B5, B2, B4</td>
<td>800/850, AWS1700, 1900</td>
<td>7.2/5.7</td>
<td>N</td>
<td>Y</td>
<td>N</td>
</tr>
</tbody>
</table>

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.
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: 28.2 mm
- 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 |

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.

<table>
<thead>
<tr>
<th>Mode</th>
<th>Freq. (MHz)</th>
<th>TX</th>
<th>Freq. RX (MHz)</th>
<th>Channels</th>
<th>TX - RX offset</th>
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<tbody>
<tr>
<td>GSM850</td>
<td>824 ~ 849</td>
<td>869 ~ 894</td>
<td>128 ~ 251</td>
<td>45 MHz</td>
<td></td>
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<tr>
<td>EGSM900</td>
<td>890 ~ 915</td>
<td>935 ~ 960</td>
<td>0 ~ 124</td>
<td>45 MHz</td>
<td></td>
</tr>
<tr>
<td>DCS1800</td>
<td>1710 ~ 1785</td>
<td>1805 ~ 1880</td>
<td>512 ~ 885</td>
<td>95 MHz</td>
<td></td>
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<tr>
<td>PCS1900</td>
<td>1850 ~ 1910</td>
<td>1930 ~ 1990</td>
<td>512 ~ 810</td>
<td>80 MHz</td>
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<tr>
<td>WCDMA800 * (band VI)</td>
<td>830~840</td>
<td>875~885</td>
<td>Tx: 4162 ~ 4188 Additional: 812, 837 Rx: 4387 ~ 4413</td>
<td>45MHz</td>
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### HE910 Family Product Description

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<th>Frequency Range 1</th>
<th>Frequency Range 2</th>
<th>Additional 1</th>
<th>Additional 2</th>
<th>Frequency Range 3</th>
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<td>WCDMA850 (band V)</td>
<td>824 ~ 849</td>
<td>869 ~ 894</td>
<td>Tx: 4132 ~ 4233</td>
<td>additional 782, 787, 807, 812, 837, 862</td>
<td>Rx: 4357 ~ 4458</td>
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<tr>
<td>WCDMA900 (band VIII)</td>
<td>880 ~ 915</td>
<td>925 ~ 960</td>
<td>Tx: 2712 ~ 2863</td>
<td>Rx: 2937 ~ 3088</td>
<td>45MHz</td>
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<td>WCDMA1700 (band IV)</td>
<td>1710 ~ 1755</td>
<td>2110 ~ 2155</td>
<td>Tx: 1312 ~ 1513</td>
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<td>Rx: 1537 ~ 1738</td>
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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.

---

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<th>WCDMA1900</th>
<th>Tx: 9262 ~ 9538</th>
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<td>1850 ~ 1910</td>
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<td>1930 ~ 1990</td>
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<td>WCDMA2100</td>
<td>Tx: 9612 ~ 9888</td>
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<td>(Band I)</td>
<td>Rx: 10562 ~ 10838</td>
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<td>1920 ~ 1980</td>
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<td>2110 ~ 2170</td>
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3.6. Sensitivity

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<th>Typical</th>
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<td>GSM 850</td>
<td>-109.5 dBm</td>
<td>BER Class II &lt;2.44%</td>
</tr>
<tr>
<td>GSM 900</td>
<td>-109 dBm</td>
<td>BER Class II &lt;2.44%</td>
</tr>
<tr>
<td>DCS1800</td>
<td>-110 dBm</td>
<td>BER Class II &lt;2.44%</td>
</tr>
<tr>
<td>PCS 1900</td>
<td>-109.5 dBm</td>
<td>BER Class II &lt;2.44%</td>
</tr>
<tr>
<td>WCDMA FDD B1</td>
<td>-111 dBm</td>
<td>BER &lt;0.01%</td>
</tr>
<tr>
<td>WCDMA FDD B2</td>
<td>-110 dBm</td>
<td>BER &lt;0.01%</td>
</tr>
<tr>
<td>WCDMA FDD B4</td>
<td>-111 dBm</td>
<td>BER &lt;0.01%</td>
</tr>
<tr>
<td>WCDMA FDD B5</td>
<td>-111 dBm</td>
<td>BER &lt;0.01%</td>
</tr>
<tr>
<td>WCDMA FDD B8</td>
<td>-110 dBm</td>
<td>BER &lt;0.01%</td>
</tr>
</tbody>
</table>

3.7. Antenna

3.7.1. Frequency band of GSM/WCDMA antenna

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

<table>
<thead>
<tr>
<th>ANTENNA REQUIREMENTS</th>
</tr>
</thead>
<tbody>
<tr>
<td>Frequency range</td>
</tr>
<tr>
<td>Depending by frequency band(s) provided by the network operator, the customer shall use the most suitable antenna for that/those band(s)</td>
</tr>
<tr>
<td>Bandwidth (GSM/EDGE)</td>
</tr>
<tr>
<td>70 MHz in GSM850, 80 MHz in GSM900, 170 MHz in DCS &amp; 140 MHz PCS band</td>
</tr>
<tr>
<td>Bandwidth (WCDMA)</td>
</tr>
<tr>
<td>70 MHz in WCDMA Band V</td>
</tr>
<tr>
<td>80 MHz in WCDMA Band VIII</td>
</tr>
<tr>
<td>460 MHz in WCDMA Band IV</td>
</tr>
<tr>
<td>140 MHz in WCDMA Band II</td>
</tr>
<tr>
<td>250 MHz in WCDMA Band I</td>
</tr>
<tr>
<td>Impedance</td>
</tr>
<tr>
<td>50 ohm</td>
</tr>
<tr>
<td>Input power</td>
</tr>
<tr>
<td>&gt; 33dBm(2 W) peak power in GSM</td>
</tr>
<tr>
<td>&gt; 24dBm Average power in WCDMA</td>
</tr>
<tr>
<td>VSWR absolute max</td>
</tr>
<tr>
<td>≤ 5:1 (limit to avoid permanent damage)</td>
</tr>
<tr>
<td>VSWR recommended</td>
</tr>
<tr>
<td>≤ 2:1 (limit to fulfil all regulatory requirements)</td>
</tr>
</tbody>
</table>

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.

<table>
<thead>
<tr>
<th>Frequency range</th>
<th>1575.42MHz (GPS L1 band)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Bandwidth</td>
<td>+/- 1.023MHz</td>
</tr>
</tbody>
</table>

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 downlink data rate 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:

<table>
<thead>
<tr>
<th>Nominal Supply Voltage</th>
<th>3.8V</th>
</tr>
</thead>
<tbody>
<tr>
<td>Operating Voltage Range</td>
<td>3.4 ~ 4.2V</td>
</tr>
<tr>
<td>Extended Operating Voltage Range</td>
<td>3.1 ~ 4.5V</td>
</tr>
</tbody>
</table>
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:

<table>
<thead>
<tr>
<th>Mode</th>
<th>Average (mA)</th>
<th>Mode description</th>
</tr>
</thead>
<tbody>
<tr>
<td>SWITCHED OFF</td>
<td>40nA</td>
<td>Module supplied but Switched Off</td>
</tr>
<tr>
<td>AT+CFUN=5</td>
<td>1.2</td>
<td>Disabled TX and RX, DRX7</td>
</tr>
<tr>
<td>AT+CFUN=1</td>
<td>19</td>
<td>Normal mode: full functionality of the module</td>
</tr>
<tr>
<td>AT+CFUN=1</td>
<td>16.5</td>
<td>Disabled TX and RX, module is not registered on the network, DRX9 (1.1mA in case of DRX5)</td>
</tr>
</tbody>
</table>

Operative mode (WCDMA)

<table>
<thead>
<tr>
<th>Mode</th>
<th>Average (mA)</th>
<th>Mode description</th>
</tr>
</thead>
<tbody>
<tr>
<td>WCDMA Voice</td>
<td>152</td>
<td>WCDMA voice call (TX = 10dBm)</td>
</tr>
<tr>
<td>WCDMA HSDPA (0dBm)</td>
<td>187</td>
<td>WCDMA data call (Cat 14. TX = 0dBm)</td>
</tr>
<tr>
<td>WCDMA HSDPA (22dBm)</td>
<td>494</td>
<td>WCDMA data call (Cat 14. TX = 22dBm)</td>
</tr>
</tbody>
</table>

Operative mode (EDGE)

<table>
<thead>
<tr>
<th>Mode</th>
<th>Average (mA)</th>
<th>Mode description</th>
</tr>
</thead>
<tbody>
<tr>
<td>EDGE 4TX+2RX</td>
<td>495</td>
<td>EDGE Sending data mode</td>
</tr>
<tr>
<td>GSM900 PL5</td>
<td>484</td>
<td></td>
</tr>
<tr>
<td>DCS1800 PL0</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

Operative mode (GSM)

<table>
<thead>
<tr>
<th>Mode</th>
<th>Average (mA)</th>
<th>Mode description</th>
</tr>
</thead>
<tbody>
<tr>
<td>GSM900 CSD PL5</td>
<td>220</td>
<td>GSM VOICE CALL</td>
</tr>
<tr>
<td>DCS1800 CSD PL0</td>
<td>167</td>
<td></td>
</tr>
<tr>
<td>GPRS 4TX+2RX</td>
<td>580</td>
<td>GPRS Sending data mode</td>
</tr>
<tr>
<td>GSM900 PL5</td>
<td>438</td>
<td></td>
</tr>
<tr>
<td>DCS1800 PL0</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

(*) 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 supports 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

EU DECLARATION OF CONFORMITY [20378DOC00006A]

1. HE910 (product name)
3. This declaration of conformity is issued under the sole responsibility of the manufacturer
4. Quad-Band GSM850/EGSM1800/DCS1800 and Penta-Band FDD III/WiMAX Wireless Module with GPS receiver
   SW Version(s) 12.00.003 / 12.00.004 / 12.00.005 / 12.00.006 / 12.01.007 / 12.00.008
   Operating frequency bands and related max radio frequency power transmitted:
   - GSM 850: 35.5 dBm, EDGE 900: 21 dBm
   - DCS 1800: 30.5 dBm, EDGE 1900: 27 dBm
   FDD 1900: 24 dBm

5. The object of the declaration described above is in conformity with the relevant Community harmonisation:
   European Directive 2014/53/EU (RED)

6. The conformity with the essential requirements set out in Art. 3 of the 2014/53/EU has been demonstrated against
   the following harmonised standards:

<table>
<thead>
<tr>
<th></th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>EN 62211:2008</td>
<td></td>
</tr>
<tr>
<td>EN 301 489-1 V2.1.1, Draft EN 301 489-52 V1.1.0</td>
<td>3.1 (b): Electromagnetic Compatibility</td>
</tr>
<tr>
<td>Final draft EN 301 482-3 V2.1.1</td>
<td></td>
</tr>
<tr>
<td>EN 300 440 V2.1.1 / EN 301 511 V2.1.1</td>
<td>3.2: Effective use of spectrum allocated</td>
</tr>
<tr>
<td>EN 201 008-1 V1.1.1 / EN 201 008-2 V1.1.1</td>
<td></td>
</tr>
</tbody>
</table>

   has been followed with the involvement of the following Notified Body:
   Dekra Testing and Certification, S.A.U., Parque Tecnologico de Andalucia, C/ Severo Ochoa 2, 28690 Campanillas –
   Malaga – SPAIN, Notified Body No: 1000

Thus, the CE mark is placed on the product

8. The product can be considered compliant to the essential requirements set out in Art. 3 of 2014/53/EU only in combination
   with the above mentioned SW version(s).

9. The Technical Documentation (TD) relevant to the product described above and which supports this Declaration of
   Conformity, is held at: Telit Communications S.p.A., Via Stazione di Piovezzo 58/B – 34010 Sgonico – TRIESTE – ITALY

Trieste, 2017-05-12

Quality Director
Guido Vracher

Quality Manager
Cesare Robelli

EU Type Examination Certificate No. 20161581011
Technical Documentation: HE910_35631_rev4


Fabricante: Telit Communications S.p.A.
Via Stazione di Piovezzo 58/B
34010 Sgonico (TV) – ITALY
Phone: +39 040 410 111
Fax: +39 040 410 333

Cap. Soc. € 5,000,000
C.F. / P.IVA: 01218620288
R.E.A. TV 040511

Dissociata, esente dall'obbligo di decorrenza e consenso della nazione (n.d.PD 1/10 1999)

(firma)

Telit Communications PLC

Med 243 2017/02 Rev. 1. This declaration is issued according to 798/2009/EC.
EU DECLARATION OF CONFORMITY [20378DOC00007A]

1. HE910-D (product name)
3. This declaration of conformity is issued under the sole responsibility of the manufacturer.
4. Quad-Band GSM900/EGSM900/DCS1800/PCS1900 and Penta-Band FDD MIII/VIII Wireless Module
   SW Version(s): 12.00.023 / 12.00.024 / 12.00.025 / 12.00.026 / 12.00.027 / 12.00.028 / 12.00.085 / 12.00.086

   Operating frequency bands and related max. radio-frequency power transmitted:
   - GSM 900: 33.5 dBm, EDGE 900: 28 dBm
   - DCS 1800: 30.5 dBm, EDGE 1800: 27 dBm
   - FDD I/VIII: 24dBm

5. The object of the declaration described above is in conformity with the relevant Community harmonisation:
   European Directive 2014/53/EU (RED)
6. The conformity with the essential requirements set out in Art.3 of the 2014/53/EU has been demonstrated against
   the following harmonized standards:

<table>
<thead>
<tr>
<th></th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>EN 301 489-1 V2.1.1, Draft EN 301 489-52 V1.1.0</td>
<td>3.1 (b): Electromagnetic Compatibility</td>
</tr>
<tr>
<td>EN 301 511 V12.5.1</td>
<td>3.2 Effective use of spectrum allocated</td>
</tr>
<tr>
<td>EN 301 908-1 V11.1.1 / EN 301 908-2 V11.1.1</td>
<td></td>
</tr>
</tbody>
</table>

   been followed with the involvement of the following Notified Body:

   Thus, the CE mark is placed on the product.
8. The product can be considered compliant to the essential requirements set out in Art 3 of 2014/53/EU only in combination
   with the above mentioned SW version(s).
9. The Technical Document (TD) 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, 5/6 – 34010 Sgonico – TRIESTE – ITALY

   Trieste, 2017-05-12

   Quality Director
   Guido Wachter

   Quality Manager
   Cesare Rassu

   EU-Type Examination Certificate No. L1461RCE.001
   Technical Document: HE910_51611_rev
   www.Telit.com/RED

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   Page 31 of 50
EU DECLARATION OF CONFORMITY [20378DOC00016A]

1. **HE910-EUR** (product name)


3. This declaration of conformity is issued under the sole responsibility of the manufacturer.

4. Quad-Band GSM/GPRS/EDGE GS856/GSM900/GSM1800/PCS1900 and Tri-Band WCDMA FDD/HSPA /W/VII Wireless Module

   SW Version(s): 12.00.206 / 12.00.204 / 12.00.205 / 12.00.208 / 12.00.207 / 12.00.209

   Operating frequency bands and related max radio-frequency power transmitted:
   - GSM/GPRS 800: 3.3 dBm, EDGE 900: 26 dBm
   - DCS/PCS 1900: 20 dBm, EDGE 1800: 27 dbm
   - WCDMA FDD/HSPA 2100: 22.5 dbm

5. The object of the declaration describes above is in conformity with the relevant Community harmonisation European Directive 2014/53/EU (RED)

6. The conformity with the essential requirements set out in Art.3 of the 2014/53/EU has been demonstrated against the following harmonized standards:

<table>
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</tr>
<tr>
<td>EN 301 511 V12.5.1 / EN 301 908-1 V11.1.1 / EN 301 908-2 V11.1.1</td>
<td>3.2: Effective use of the spectrum allocated</td>
</tr>
</tbody>
</table>

7. The conformity assessment procedures referred to in Article 17 and detailed in Annex III of Directive 2014/53/EU have been followed with the involvement of the following Notified Body:

   Deloit Teasling and Certification, S.A.U., Parque Tecnológico de Andalucía, C/ Severo Ochoa 2, 29006 Campaniles – Málaga – SPAIN, Notified Body No. 1909

   Thus, is placed on the product.

8. The product can be considered compliant to the essential requirements set out in Art.3 of 2014/53/EU only in combination with the above-mentioned SW version(s).

9. The Technical Documentation (TD) relevant to the product described above and which supports this Declaration of Conformity, is held at Telit Communications S.p.A. – Via Stazioni di Presezzo, 5/b – 34010 Sgonico – TRIESTE – ITALY

Trieste, 2017-05-12

Quality Director
Guido Waltcher

Quality Manager
Cesare Robelli

EU-Type Examination Certificate No. E6881RCB.002

Technical Documentation: HE910-EUX_61881_Rev1
www.Telit.com/RED
HE910 Family Product Description

80378ST10085a- Rev.1 - 2017-06-01

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# EU DECLARATION OF CONFORMITY (20378DOC00031A)

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 GSM/GPRS/EDGE 03/0350/EGSM1800/DCS1800/PCS1900 and Tri-Band WCDMA, FDD/HSPA 1/F/VII Wireless Module
   - SW Version(s): 12.00.223 / 12.00.224 / 12.00.225 / 12.00.226 / 12.00.227 / 12.00.229

   Operating frequency bands and related max radio-frequency power transmitted:
   - E-GSM/GPRS 900: 33 dBm, EDGE 900: 28 dBm
   - DCS/GPRS 1800: 30 dBm, EDGE 1800: 27 dBm
   - WCDMA FDD/HSPA 1/F/VII: 25 dBm

5. The object of the declaration described above is in conformity with the relevant Community harmonisation:
   - European Directive 2014/53/EU (RED)
6. The conformity with the essential requirements set out in Art.3 of the 2014/53/EU has been demonstrated against the following harmonised standards:

<table>
<thead>
<tr>
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</thead>
<tbody>
<tr>
<td>EN 30114:2008</td>
<td>3.1 (b): Electromagnetic Compatibility</td>
</tr>
<tr>
<td>EN 301 489-1 V2.1.1, Draft EN 301 489-52 V1.1.0</td>
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</tr>
</tbody>
</table>

7. The conformity assessment procedure referred to in Article 17 and detailed in Annex III of Directive 2014/53/EU has been followed with the involvement of the following Notified Body:
   - Dekra Testing and Certification, S.A.U., Parque Tecnológico de Andalucía, Cl. Severo Ochoa 2, 28590 Compañías – Málaga – SPAIN, Notified Body No. 1609

   **TRUST**<br>**CE** is placed on the product

8. This product can be considered compliant to the essential requirements set out in Art. 3 of 2014/53/EU only in combination with the above-mentioned SW version(s).

9. The Technical Documentation (TD) 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

   **Trieste, 2017.05.12**

   **Quality Director**
   Guido Vacheri

   **Quality Manager**
   Cesare Hochetti

---

EU-Type Examination Certificate No. 0100/RGB.002  
Technical Documentation: HE910-EUX, 01681, Rev1

---

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Page 33 of 50
HE910 Family Product Description

EU DECLARATION OF CONFORMITY [20378DOC00015A]

1. HE910-EUG (product name)
3. This declaration of conformity is issued under the sole responsibility of the manufacturer
4. Quad-Band: GSM/EDGE; GMS/EDGE 900/1800/1900; and Tri-Band WCDMA FDD/HSPA (VII)
5. Wireless Module with GPS receiver

Operating frequency bands and related max radio-frequency power transmitted:
- GSM/EDGE 900: 33 dBm
- EDGE 900: 28 dBm
- DCS/PCS 1800: 30 dBm
- EDGE 900: 27 dBm
- WCDMA FDD/HSPA 2100: 23.5 dBm
- GPS: 1575 MHz receiver only

5. The object of the declaration described above is in conformity with the relevant Community harmonisation:
   - European Directives 2014/53/EU (RED)

6. The conformity with the essential requirements set out in Art.3 of the 2014/53/EU has been demonstrated against the following harmonized standards:

<table>
<thead>
<tr>
<th></th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>EN 61000-1:2008</td>
<td>3.1 (a): Health and Safety of the User</td>
</tr>
<tr>
<td>EN 301 489-1 V2.1.1 Draft EN 301 489-3 V1.1.1</td>
<td>3.1 (b): Electromagnetic Compatibility</td>
</tr>
<tr>
<td>EN 301 489-3 V2.1.1 Final draft EN 301 489-3 V1.1.1</td>
<td>3.1 (b): Electromagnetic Compatibility</td>
</tr>
<tr>
<td>EN 300 440 V2.1.1</td>
<td>3.2: Effective use of spectrum allocated</td>
</tr>
<tr>
<td>EN 301 611 V1.2.1, EN 301 008-1 V1.1.1, EN 301 008-2 V1.1.1</td>
<td>3.2: Effective use of spectrum allocated</td>
</tr>
</tbody>
</table>

7. The conformity assessment procedure referred to in Article 17 and detailed in Annex II of Directive 2014/53/EU has been followed with the involvement of the following Notified Body:

Thus, 

8. The product can be considered compliant to the essential requirements set out in Art.3 of 2014/53/EU only in combination with the above-mentioned BW version(s).

9. The Technical Documentation (TD) relevant to the product described above and which supports this Declaration of Conformity, is held at Telit Communications S.p.A., Via Stazione di Premesse, 58 – 34010 Sgonico – TRIESTE – ITALY

Trieste, 2017-05-12

Quality Director
Guido Welscher

Quality Manager
Cesare Rotaelli

EU-Type Examination Certificate No. 61661RCB.002
Technical Documentation: HEO10-EUX_01681_Rev1
www.telit.com/RED

Telit Communications S.p.A.
Via Stazione di Premesse, 58
34910 Sgonico (TV) – ITALY
Phone: +39 64 2002 702
Fax: +39 64 2002 725

CSC. Inc. 61661RCB.002
Ponente VA 37221600203
CSC. Inc. 61661RCB.002
N. I.R.A. 16 11007

Società sussidiaria di attività di distribuzione e coordinamento della parte di Telit Communications PLC con sede in Louisiana (US 3967 loc. C.C.)

Mod 215 2017-05-12 Rev. 1. This declaration is issued according to 2014/53/EC

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EU DECLARATION OF CONFORMITY [20378DOC000008A]

1 HE910-GL (product name)
2 Telit Communications S.p.A. – Via Stazione di Prosecco, 5/8 – 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 VII/VIII/WII Wireless Module
SW Version(s): 12.00.106 / 12.00.107 / 12.00.111-12060 / 12.00.108

Operating frequency bands and related max radio frequency power transmitted:
- GSM 900: 33.5 dBm, EDGE 900: 29 dBm
- DCS 1800: 30.5 dBm, EDGE 1800: 27 dBm
- FDD I / VII: 24 dBm

5 The object of the declaration described above is in conformity with the relevant Community harmonisation: European Directive 2014/53/EU (RED)
6 The conformity with the essential requirements set out in Art.3 of the 2014/53/EU has been demonstrated against the following harmonised standards:

<table>
<thead>
<tr>
<th></th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>EN 301 489-1 V1:1.1</td>
<td>3.1 (b): Electromagnetic Compatibility</td>
</tr>
<tr>
<td>Draft EN 301 400-52 V1:1.0</td>
<td>3.2: Effective use of spectrum allocated</td>
</tr>
<tr>
<td>EN 301 551 V12.5.1</td>
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</tr>
<tr>
<td>EN 301 908-1 V11.1.1 / EN 301 908-2 V11.1.1</td>
<td></td>
</tr>
</tbody>
</table>

7 The conformity assessment procedure referred to in Article 17 and detailed in Annex III of Directive 2014/53/EU has been followed with the involvement of the following Notified Body:
Deed Testing and Certification, S.A.U., Parque Tecnológico de Andalucía, C/ Severe Ochoa 2, 29690 Campanillas – Málaga – SPAIN, Notified Body No. 1909
Thus, is placed on the product
8 The product can be considered compliant to the essential requirements set out in Art.3 of 2014/53/EU only in combination with the above mentioned SW version(s).
9 The Technical Documentation (TD) 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, 5b – 34010 Sgonico – TRIESTE – ITALY

Trieste, 2017-05-12

Quality Director
Guido Watcher

Quality Manager
Cesare Robelli

EU Type Examination Certificate No. 513619CB-01
Technical Documentation: HE910_5343_rev1
www.Telit.com/RED

Telit Communications S.p.A.
Via Stazione di Prosecco n. 68
34010 Sgonico (TV) – ITALY
Phone: +39 040 412 111
Fax: +39 040 412 2301

Cap. Soc. € 3.000.000
Partita IVA E011053301
Cod.Fisc. 01711140206

Società senza titolo di attività di direzione e coordinamento
di fatture di Telit Communications PLC
una sede in Londra (art.2417 bis C.C.)

Telit Communications PLC
6.2. RED Notified Body statement of Opinion

**DEKRA**

DEKRA Testing and Certification, S.A.U.
Designated by the
Secretario de Estado para la Sociedad de la Información y la Agenda Digital
(Ministerio de Energía, Turismo y Agenda Digital)
to act as Notified Body in accordance with the Directive 2014/53/EU of 16 April 2014

**Directive 2014/53/EU – EU-TYPE EXAMINATION CERTIFICATE**

<table>
<thead>
<tr>
<th>Identification Number:</th>
<th>51681RCE.001</th>
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<tbody>
<tr>
<td>Issue date:</td>
<td>2017-05-12</td>
</tr>
</tbody>
</table>

**MANUFACTURER DETAILS:**

- Company name: Telit Communications S.p.A.
- Address: Via Stazione di Porto, 8/B
  I-34010 Sgonico (Thiene), Italy

**EQUIPMENT DETAILS:**

- Type of equipment: 2.5G, 3.5G Wireless Module
- Brand name: Telit
- Model name: HE910, HE910-D, HE910-GL, UES910-GL
- HW version: 0 0 0 0
- SW versions:
  - 12.09.003 12.09.023 12.09.106 12.09.458
  - 12.09.006 12.09.026 12.09.107
  - 12.09.005 12.09.025 12.09.117 B009
  - 12.09.006 12.09.026 12.09.108
  - 12.09.007 12.09.027
  - 12.09.008 12.09.020
  - 12.09.006

**SCOPE OF OPINION:**

<table>
<thead>
<tr>
<th>Essential requirements</th>
<th>Specifications / Standards</th>
<th>Submitted documents</th>
</tr>
</thead>
<tbody>
<tr>
<td>Article 3.1(b): EMF exposure</td>
<td>EN 62311:2008</td>
<td>Calculation</td>
</tr>
<tr>
<td>Article 3.2: EMC</td>
<td>EN 301 489-1 V2.1.1, Draft EN 301 489-52 V1.1.0 Final draft EN 301 489-3 V2.1.1</td>
<td>Test reports</td>
</tr>
</tbody>
</table>

**OPINION:**

Our opinion in accordance with Annex III of DIRECTIVE 2014/53/EU OF THE EUROPEAN PARLIAMENT AND OF THE COUNCIL of 16 April 2014 on radio 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 DEKRA Testing and Certification, S.A.U. in Málaga (Spain)

**Nombre:** Ricardo Orjés  
**Position:** Responsible of Certification

---

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DEKRA Testing and Certification, S.A.U.
Designated by the
Secretaría de Estado para la Sociedad de la Información y la Agenda Digital
(Ministerio de Energía, Turismo y Agenda Digital)
to act as Notified Body in accordance with the Directive 2014/53/EU of 16 April 2014

Directive 2014/53/EU – EU-TYPE EXAMINATION CERTIFICATE

Identification Number: 51664RC, B, 002
Issue date: 2017-05-12

MANUFACTURER DETAILS:
Company name: Telit Communications S.p.A.
Address: Via Stazione di Prosecco, 5/F
I-34010 Sgonico (Trieste), Italy

EQUIPMENT DETAILS:
Type of equipment: 2.5G, 3.5G Wireless Module
Brand name: Telit
Model name:
HW version:
SW versions:

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<th>Version</th>
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<td>12.06.203</td>
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<td>12.06.204</td>
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<td>12.06.215</td>
<td>12.06.205</td>
<td>12.06.225</td>
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<td>12.06.216</td>
<td>12.06.206</td>
<td>12.06.226</td>
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<td>12.06.207</td>
<td>12.06.227</td>
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<td>12.06.218</td>
<td>12.06.208</td>
<td>12.06.228</td>
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</table>

SCOPE OF OPINION:

<table>
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<th>Specifications / Standards</th>
<th>Submitted documents</th>
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<td>EN 62311:2008</td>
<td>Calculation</td>
</tr>
<tr>
<td>Article 3.1(b): EMC</td>
<td>EN 301 489-1 V2.1.1, Draft EN 301 489-52 V1.1.0 Final draft EN 301 489-3 V2.1.1</td>
<td>Test reports</td>
</tr>
<tr>
<td>Article 3.2: Radio spectrum use</td>
<td>EN 300 440 V2.1.1</td>
<td>Test reports</td>
</tr>
<tr>
<td></td>
<td>EN 301 551 V12.5.1</td>
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<td>EN 301 908-1 V11.1.1</td>
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</tr>
<tr>
<td></td>
<td>EN 301 908-2 V11.1.1</td>
<td></td>
</tr>
</tbody>
</table>

OPINION:

Our opinion in accordance with Annex III of DIRECTIVE 2014/53/EU OF THE EUROPEAN PARLIAMENT AND OF THE COUNCIL of 16 April 2014 on radio 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 DEKRA Testing and Certification, S.A.U. in Málaga (Spain)

Nombre: Ricardo Orjues
Position: Responsible of Certification

*SIGNATURE*
6.3. **FCC certificates**

**TCB**

**GRANT OF EQUIPMENT AUTHORIZATION**

Certification
Issued Under the Authority of the
Federal Communications Commission

By:

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

Date of Grant: 03/13/2012
Application Dated: 03/13/2012

Tellit 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

Tellit Communications S.p.A.

**Equipment Class:** Part 15 Class B Computing Device Peripheral

**Notes:** WWAN Module

**Modular Type:** Single Modular

<table>
<thead>
<tr>
<th>Grant Notes</th>
<th>FCC Rule Parts</th>
<th>Frequency Range (MHz)</th>
<th>Output Watts</th>
<th>Frequency Tolerance</th>
<th>Emission Designator</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>15B</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

Single Modular Approval.

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TCB

ORANT OF EQUIPMENT AUTHORIZATION

Issued Under the Authority of the Federal Communications Commission by:

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

Date of Grant: 03/13/2012
Application Filed: 03/13/2012

Telit Communications S.p.A.
Viale Stazione di Prosecco 5/b
Trieste, 34016
Italy

Attention: Brian T. Zeller, Global VP, Quality Technology

NOT TRANSFERABLE

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

FCC IDENTIFIER: N7HE910
Name of Grantee: Telit Communications S.p.A.
Equipment Class: PC3 Licensed Transmitter
Notes: WWAN Module
Modular Type: Single Modular

<table>
<thead>
<tr>
<th>Grant Notes</th>
<th>FCC Rule Parts</th>
<th>Frequency</th>
<th>Output Power</th>
<th>Frequency</th>
<th>Emission</th>
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</thead>
<tbody>
<tr>
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<td></td>
<td>Range (MHz)</td>
<td>Watts</td>
<td>Tolerance (dB)</td>
<td>Designator</td>
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<td>22H</td>
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<td>894.2 - 894.4</td>
<td>1.955</td>
<td>1.0 PM</td>
<td>360K0XW</td>
</tr>
<tr>
<td>23H</td>
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<td>1712.4 - 1712.6</td>
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<td>0.985</td>
<td>1.0 PM</td>
<td>48M20F9W</td>
</tr>
</tbody>
</table>

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 2.1001, is 0.22 dB for part 22H, 3.31 dB for part 27 and 6.45 dB for part 24E. The antennainstalled for this transmitter must be installed to provide a separation distance of 25 cm 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 endusers 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 B device change application containing data pertinent to RF Exposure, spurious emissions, ERP/ ERP, 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 Certification

**Certificate**

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:** 09/28/2012

**Application Dated:** 08/28/2012

Telit Communications S.p.A.

Viale Stazione di Prosecco 5th

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 herein for use under the Commission's Rules and Regulations listed below.

**FCC IDENTIFIER:** 80378ST10085a

**Name of Granter:** 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

<table>
<thead>
<tr>
<th>Grant Notes</th>
<th>FCC Rule Parts</th>
<th>Frequency</th>
<th>Output Power</th>
<th>Frequency Tolerance</th>
<th>Emission Designation</th>
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<tr>
<td>Single Modular Approval</td>
<td>15B</td>
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</tbody>
</table>

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TCB

GRANT OF EQUIPMENT AUTHORIZATION

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 6/b
Trieste, 34100
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, herein for use under the Commission's Rules and Regulations listed below.

FCC IDENTIFIER: R7HE910G

Name of Grantee: Telit Communications S.p.A.

Equipment Class: PCS Licensed Transmitter

Notes: 2G/3G module, HE910 NAG; HE910 NAR; HE910 NAD

Modular Type: Single Modular

<table>
<thead>
<tr>
<th>Frequency</th>
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<tbody>
<tr>
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<td>824.4 - 848.4</td>
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<td>1852.2 - 1999.8</td>
<td>0.483</td>
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<tr>
<td>1800.0 - 1900.0</td>
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<td>1852.4 - 1907.6</td>
<td>0.233</td>
<td>2.5 PM</td>
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<tr>
<td>1712.4 - 1752.6</td>
<td>0.233</td>
<td>2.5 PM</td>
</tr>
</tbody>
</table>

Single Modular Approval. Power listed is conducted. The maximum antenna gain including cable loss for compliance with radiation power limits. RF exposure requirements and the categorical exclusion requirements of 1.10916 and 2.20616 for 800MHz bands, 1.02 dB for 1900 MHz bands and 0.32 dB for 1900 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 or 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 may include 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 pre-market change application containing data pertinent to RF Exposure, spurious emissions, EIRP/RRP, and host and 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:

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

Date of Grant: 07/06/2015
Application Dated: 07/09/2015

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

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 Modulator

Grant Notes
FCC Rule Parts
Output
Frequency
Watts
Range (MHz)
Tolerance

15B
TCB

GRANT OF EQUIPMENT AUTHORIZATION

Certification

Issued Under the Authority of the
Federal Communications Commission

By:

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

Date of Grant: 07/06/2015
Application Date: 07/06/2015

Telit Communications S.p.A.
Viale Stazione di Prosecco 6/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 herewith for use under the Commission's Rules and Regulations listed below.

FCC IDENTIFIER: 87HE910GL

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 Designation |
---|---|---|---|---|---|
22H | 824.2 - 848.2 | 1.095 | 1.0 PM | 240KGXW |
22H | 824.2 - 848.2 | 0.977 | 1.0 PM | 248KG7W |
24E | 1850.2 - 1909.8 | 0.077 | 1.0 PM | 241KGXW |
24E | 1850.2 - 1909.8 | 0.724 | 1.0 PM | 252KG7W |
22H | 826.4 - 848.6 | 0.06 | 1.0 PM | 4M07G9W |
24E | 1852.4 - 1907.6 | 0.436 | 1.0 PM | 4M10G9W |
27 | 1712.4 - 1752.6 | 0.228 | 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: 850 MHz: 4.14 dBi, 1900 MHz: 6.30 dBi, 1900 MHz: 3.01 dBi.
6.4. IC certificates

FCB Technical Acceptance Certificate

DB Number: UK00004

ISSUED TO
Telit Communications S.p.A.
Via Stazione Di Presepe 5/B
20010 - Busto Arsizio
Italy

CERTIFICATION No.
H181A-HEMW

DESCRIPTION
CE Mot 3G Module

TYPE OF EQUIPMENT
Cellular Mobile GSE (928-940 MHz)
FKB Mobile (1575-1576 MHz)
Air-to-ground Wireless Services (1710-1785 MHz and 2110-2170 MHz)

LISTING TYPE
Original Family

MODEL(S)
HE910, HE910-D, HE910-6A, HE810-01

ANTENNA INFORMATION
External

RF EVALUATION TYPE
RF Evaluation

SPECIFICATION(S)
RFS-134 Issue 2 September 2005
RFS-134 Issue 5 February 2009
RFS-134 Issue 2 February 2009

MANUFACTURING No.
H181A

REPRESENTATIVE No.
731A

IC DATS FACILITY No.
8435A

IC DATS FACILITY
A Test Lab Tech. Corp.
No. 1491, Changmen Street, Taichung County 331, R.O.C.
Taichung, 40772
Tel: 886-3-271-0180 x800
Fax: 886-3-271-0190
Email: murphy@at-tac.com.tw

Frequency Range (MHz) Power Output (W) Occupied Bandwidth (KHz) Emission Designator

| E24.2-940.0 | 1.855 | 240.12 | 26KDWG |
| E24.4-940.0 | 0.587 | 240.60 | 26KDWG |
| E24.4-940.0 | 0.446 | 406.52 | 4MDFW |
| 1712.4-1750 | 0.226 | 406.61 | 4MDFW |
| 1880.0-2100 | 0.393 | 241.24 | 26KDWG |
| 1880.0-2100 | 0.380 | 262.04 | 26KDWG |
| 1880.4-2100 | 0.243 | 409.64 | 4MDFW |

Authorized by:

Title of Signatory: Certification Manager

Issue Date: 13 March 2012

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## FCB Technical Acceptance Certificate

**CB Number:** UK00004

### ISSUED TO
Telit Communications S.p.A.
Via Sanzione D’Mesacco Srl
54010 - Trieste
Italy

### CERTIFICATION No.
85328-HE910A

### DESCRIPTION
- 80378ST10085a
- 2G/GSM/GPRS Module
- Cellular Mobile GSM (934-849 MHz)
- PCS Mobile (1800-1910 MHz)
- Advanced Wireless Services (1710-1755 MHz)
- Cellular Mobile New Technologies (825-849/925-960 MHz)
- Modular Approval

### LISTING TYPE
Genuine Family

### MODEL(S)
- HER1106, HE910-NAR, HE910-NAD

### ANTENNA INFORMATION
- Exposed

### RF EVALUATION TYPE
- RF Evaluation

### SPECIFICATION(S)
- RSS-123 Issue 2 September 2005
- RSS-123 Issue 2 February 2009

### MANUFACTURING No.
5131A

### REPRESENTATIVE No.
7392A

### IC OAKS FACILITY No.
7384A

### IC OAKS FACILITY
A Test Lab Techscope Corp.
No. 140-1, Chings-an Street, Tengyuan County 334, R.O.C.
Beido City, TAIWAN
Post Code: 334
Tel: 886-3-271-0188 x8001
Fax: 886-3-271-0190
Email: murphy@sbl-abs.com.tw

### Frequency Range (MHz) | Power Output (W) | Occupied Bandwidth (KHz) | Emission Designator
--- | --- | --- | ---
824.2 – 848.8 | 1.648 | 240 | 244K0GW
824.2 – 848.8 | 0.457 | 240 | 244K0GW
1800.2 – 1800.9 | 0.703 | 240 | 244K0GW
1800.2 – 1800.9 | 0.340 | 240 | 244K0GW
826.4 – 840.4 | 0.236 | 4083 | 4M08F9W
1802.4 – 1807.6 | 0.234 | 4073 | 4M07F9W
1712.4 – 1732.5 | 0.233 | 4070 | 4M07F9W

### Authorised by:
[Signature]

### Issue Date:
20 June 2012

### Title of Signatory:
Certification Manager

### Certification Manager Number:
CC0600187

### 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. License applicants, where applicable to use certified equipment, are advised to consult the issuing office and check the existing rules and conditions for the permit of use of radio equipment and the conditions of operation. This certificate is issued on condition that the holder comply and will continue to comply with requirements and procedures issued by the issuing authority.

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 RIEL. 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
Forbury House - Churchfield Road - Wokingham - Berkshire - KT12 3TD - United Kingdom

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FCB Technical Acceptance Certificate

CD Number: U00004

ISSUED TO: 
> TELIT COMMUNICATIONS S.P.A.
Via Suzzoni 8 - 27100 Pavia, Italy

CERTIFICATION No.: 80378ST10085a - Rev.1

DESCRIPTION: 2G/3.5G Module

TYPE OF EQUIPMENT: Advanced Wireless Services (900:1800 MHz and 1900:3100 MHz)
Cellular Mobile GSM (850/1900 MHz)
GSM Mode (900/1800 MHz)
GSM Module Approval

MODEL(S): HE910-GL

TYPE OF LISTING: Single Mode

ANTENNA INFORMATION: Max gain: 850 MHz: 4.1 dB, 1700 MHz: 6.3 dB, 1900 MHz: 3.01 dB

RF EVALUATION TYPE: RF Evaluation

SPECIFICATIONS(S): R33-123 Issue 3 January 2015
R33-123 Issue 4 January 2015
R33-123 Issue 5 February 2015

MANUFACTURING No.: 8114

REPRESENTATIVE No.: 46214-1

IC OATS Facility No.: A11 Wirewams, S.A.
Parque Tecnologico de Andalucia
28006 Casablanca, Malaque Espasa
Tel: 34 952 31 06 07, Fax: 34 952 31 00 10
Contact: Juan Carlos Solora, E-mail: jsolora@atmel.com

Authorized by:

TUV SUD Lead FCB

Issue Date: 06 July 2015
Number: CD010102

Patent: The present document is a TUV SUD FCB Compliance Certificate and is subject to the following conditions:
- This certificate is only valid if it is in the possession of the holder.
- The certificate must be kept for at least five years from the date of issue.
- The certificate must be renewed every five years.
- The certificate must be used in accordance with the requirements of the relevant TUV SUD FCB scheme.

For further details, please contact: TUV SUD, Customer Services +49 69 95114-0

CD010102 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:

The Directive 2014/53/EU regarding radio equipment is available at:


while the applicable Directives (Low Voltage and EMC) are available at:


https://ec.europa.eu/growth/sectors/electrical-engineering/emc-directive_en
8. **List of acronyms**

<table>
<thead>
<tr>
<th>Acronym</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>3GPP</td>
<td>3rd Generation Partnership Project</td>
</tr>
<tr>
<td>ADC</td>
<td>Analog to Digital Converter</td>
</tr>
<tr>
<td>ADN</td>
<td>Abbreviated Dialing Number</td>
</tr>
<tr>
<td>A-GPS</td>
<td>Assisted GPS</td>
</tr>
<tr>
<td>AMR</td>
<td>Adaptive Multi Rate</td>
</tr>
<tr>
<td>AT</td>
<td>Attention Commands</td>
</tr>
<tr>
<td>AWS</td>
<td>Advanced Wireless Services</td>
</tr>
<tr>
<td>BER</td>
<td>Bit Error Rate</td>
</tr>
<tr>
<td>BGA</td>
<td>Ball Grid Array</td>
</tr>
<tr>
<td>CLIP</td>
<td>Calling Line Identification Presentation</td>
</tr>
<tr>
<td>CLIR</td>
<td>Calling Line Identification Restriction</td>
</tr>
<tr>
<td>CMOS</td>
<td>Complementary Metal-Oxide Semiconductor</td>
</tr>
<tr>
<td>CSD</td>
<td>Circuit Switched Data</td>
</tr>
<tr>
<td>DAC</td>
<td>Digital to Analog Converter</td>
</tr>
<tr>
<td>DARP</td>
<td>Downlink Advanced Receiver Performance</td>
</tr>
<tr>
<td>DTMF</td>
<td>Dual Tone Multi Frequency</td>
</tr>
<tr>
<td>FDN</td>
<td>Fixed Dialing Number</td>
</tr>
<tr>
<td>FTP</td>
<td>File Transfer Protocol</td>
</tr>
<tr>
<td>GSM</td>
<td>Global System for Mobile communication</td>
</tr>
<tr>
<td>GPRS</td>
<td>General Packet Radio Service</td>
</tr>
<tr>
<td>GPS</td>
<td>Global Positioning System</td>
</tr>
<tr>
<td>HSPA</td>
<td>High Speed Packet Access</td>
</tr>
<tr>
<td>HSUPA</td>
<td>High Speed Uplink Packet Access</td>
</tr>
<tr>
<td>H/W</td>
<td>Hardware</td>
</tr>
<tr>
<td>LED</td>
<td>Light Emitting Diode</td>
</tr>
<tr>
<td>MO</td>
<td>Mobile Originated</td>
</tr>
<tr>
<td>MT</td>
<td>Mobile Terminated</td>
</tr>
<tr>
<td>OEM</td>
<td>Other Equipment Manufacturer</td>
</tr>
<tr>
<td>Abbreviation</td>
<td>Description</td>
</tr>
<tr>
<td>--------------</td>
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</tr>
<tr>
<td>PCB</td>
<td>Printed Circuit Board</td>
</tr>
<tr>
<td>PCM</td>
<td>Pulse Code Modulation</td>
</tr>
<tr>
<td>PDA</td>
<td>Personal Digital Assistant</td>
</tr>
<tr>
<td>PDU</td>
<td>Protocol Data Unit</td>
</tr>
<tr>
<td>PIN</td>
<td>Personal Identification Number</td>
</tr>
<tr>
<td>POS</td>
<td>Point Of Sales</td>
</tr>
<tr>
<td>PWM</td>
<td>Pulse Width Modulation</td>
</tr>
<tr>
<td>RF</td>
<td>Radio Frequency</td>
</tr>
<tr>
<td>RoHS</td>
<td>Restriction of Hazardous Substances</td>
</tr>
<tr>
<td>RTC</td>
<td>Real Time Clock</td>
</tr>
<tr>
<td>SAIC</td>
<td>Single Antenna Interface Cancellation</td>
</tr>
<tr>
<td>SIM</td>
<td>Subscriber Identity Module</td>
</tr>
<tr>
<td>SMD</td>
<td>Surface Mounted Device</td>
</tr>
<tr>
<td>SMS</td>
<td>Short Message Service</td>
</tr>
<tr>
<td>S/W</td>
<td>Software</td>
</tr>
<tr>
<td>TBD</td>
<td>To Be Determined</td>
</tr>
<tr>
<td>TCP/IP</td>
<td>Transmission Control Protocol/Internet Protocol</td>
</tr>
<tr>
<td>TTSC</td>
<td>Telit Technical Support Center</td>
</tr>
<tr>
<td>UART</td>
<td>Universal Asynchronous Receiver and Transmitter</td>
</tr>
<tr>
<td>USB</td>
<td>Universal Serial Bus</td>
</tr>
<tr>
<td>USIM</td>
<td>Universal Subscriber Identity Module</td>
</tr>
<tr>
<td>WCDMA</td>
<td>Wideband Code Division Multiple Access</td>
</tr>
</tbody>
</table>