

SIGFOX NETWORK & STAR NETWORK protocols user guide

1VV0301109 Rev.3 -2015-01-07



APPLICABILITY TABLE

PRODUCT
LE51-868 S

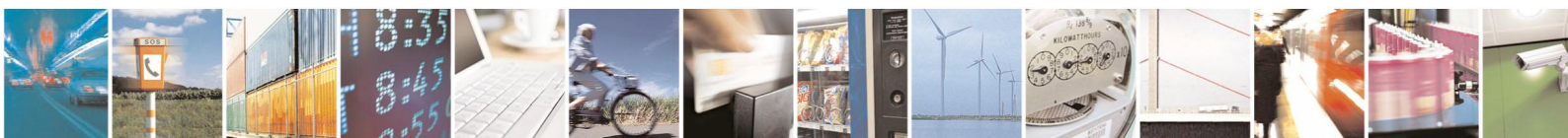
SW Version

GP.S03.02.00-B002



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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: “LE51 Star Network Protocol-SIGFOX architecture”](#) gives an overview of the features of the product.

[“Chapter 3: “Configuring LE51-SIGFOX module”](#) describes in details how to configure the product.

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

- [1] Star Network Protocol Stack User Guide 1vv0300873
- [2] LE51-868 S RF module User Guide 1VV0301131



2. LE51 Star Network Protocol-SIGFOX architecture

The LE51-868 adds to the Star Network Protocol Telit proprietary technology the possibility to use SIGFOX long range technology.

LE51-868 S, with up to 35 mW output power and -126dBm@ 600 bps sensitivity is suited for short range to long range applications.

LE51-868 can be used to create local communications network in a star architecture and for long-chain communication with the new, “smart repeater” function to long range communication with natural gateway to Sigfox network.

2.1. SIGFOX network

One of the keys to SIGFOX’s incredibly competitive low throughput Machine-to-Machine and Internet of Things communication technology ultimately lies in its radio technology. This UNB , that stands for Ultra Narrow Band, technology uses free frequency radio bands (no license needed) to transmit data over a very narrow spectrum to and from connected objects.

Designed for low throughput transmission (10b/s and 1kb/s typical range), the UNB Wireless technology benefits from a high level of sensitivity. Data transportation becomes very long range (distances up to 40km in open field) and communication with buried, underground equipment becomes possible, all this being achieved with high reliability and minimal power consumption. Furthermore, the narrow throughput transmission combined with sophisticated signal processing provides effective protection against interference. This also ensures that the integrity of the data transmitted is respected.

SIGFOX provides an end-to-end solution for your transmission chain, from your equipment through to your information system. With a clear Internet focus and a specifically designed and tailored cloud service, SIGFOX’s network uses web communication protocols that make it easy to integrate your applications.

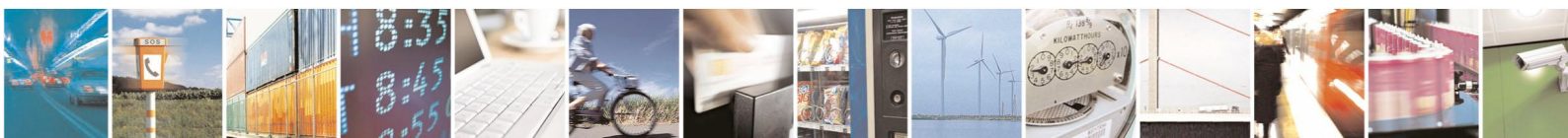
SIGFOX’s network is designed around a hierarchical structure:

- UNB modems communicate with base stations, or cells, covering large areas of several hundred square kilometers,
- Base stations route messages to servers,
- Servers check data integrity and route the messages to your information system.

2.2. Star Network Protocol

The Star Network Protocol Stack is dedicated to point to point and star communications, with broadcast, smart repeater, addressed secured, IO copy functionalities.

Ready to use and easy to handle (also usable for cable replacement) with Data encryption (AES128) available, Cyclic wake up (the module wakes up periodically and listens the radio link).



3. Configuring LE51-SIGFOX module

In order to exit from data mode and be able to configure the module, the user shall send the command '+++
' and wait the answer **OK<cr>**.

Once in Command mode it will be possible either to get or to set a register value.

In order to get a register value, the user shall send:

- **ATSxxx?< cr>**, where 'xxx' is the register address.
- The answer will be: **Sxxx=yy<cr>**, where 'xxx' is the register address and 'yy' the register value (up to 255, it depends to the available values).

In order to set a new register value, the user shall send:

- **ATSxxx=yy<cr>**, where 'xxx' is the register address and 'yy' the register value (up to 255, it depends to the available values).
- The answer will be **OK<cr>** or **ERROR<cr>**, it depends to the register value or register address or command syntax

3.1. Star Network Protocol Stack registers

Except some differences reported below, LE51868S is fully compatible over the air with LE50-868 in transparent and addressed secured modes and for a full description of the Star Network Protocol Stack registers refer to [1].

By the way, due to the specific HW solution, some of the Star Network Protocol Stack register had to be modified.

Below it is reported the list of the modified registers and their possible values in the LE51 module.

Register	Access	Register Name	Possible Values	Description
201	R/W	Radio baud rate	0: 4.8 kbps 1: 9.6 kbps 2: 19.2 kbps 3: 38.4 kbps 4: 100 kbps	This register sets the data rate on the RF link (for Star Network Protocol Stack)
202	R/W	Output Power	0 : -8 dBm 1 : -5 dBm 2 : -2 dBm 3 : +1 dBm	



