Product Specifications

LM-130H1 EVB
Dual-mode LoRa® Evaluation Board
VER 1.0

GlobalSat WorldCom Corporation

16F., No. 186, Jian 1st Rd, Zhonghe Dist.,

New Taipei City 23553, Taiwan

Tel: 886.2.8226.3799/ Fax: 886.2.8226.3899
lora@globalsat.com.tw
www.globalsat.com.tw

USGlobalSat Incorporated

14740 Yorba Court Chino, CA 91710

Tel: 888.323.8720 / Fax: 909.597.8532
sales@usglobalsat.com
www.usglobalsat.com

General Information

The LM-130H1 EVB is a LoRaWAN™ end-node device based on the GlobalSat LM-130H1 module which is a LoRaWAN™ certified module. The LM-130H1 EVB is a standalone battery powered node with power management, it includes humidity and temperature sensors to generate data, which are transmitted either on a regular schedule (can be configured) or initiated by a button-press. This node provides a convenient platform to quickly demonstrate the long-range and low power consumption capabilities of the modem, as well as interoperability when connected to LoRaWAN™ v1.0.2 compliant gateways and the infrastructure. The LM-130H1 EVB also provides a standard USB interface for connection to a host computer, providing a bridge to the UART interface of the LM-130H1 module. As with all LoRaWAN™ compliant of products, it can also help developers to develop the applications rapidly, including hardware and software design by using high level ASCII command to control the protocol, before the end product is ready.

■ **The LM-130H1 EVB Contents**

1. LM-130H1 EVB

2. RPSMA antenna

3. UART to USB wire connector

Features

- LoRaWAN^{TM} Compliant Evaluation Board

- RF ISM band, supports EU868/ US915/ AS923 MHz

- Support Class A/ Class C

- 2-way duplex communication

- Push button (trigger event) and humidity/ temperature sensor

- Configurable payload and report interval

- Build-in 820mA battery

- LED status indication

- For local LoRaWAN^{TM} compatibility, coverage, payload evaluation

Hardware Specifications

Item	Parameters
LoRa® Module	GlobalSat LoRa® module LM-130H1
Frequency	863-870MHz (EU) 902-928MHz (US) 920-928MHz (ROA)
RF Output Power	Max. 20dBm
Receiving Sensitivity	-132dBm @ 980bps
Dimensions	71 x 55 x 15 mm (not including antenna)
Interface	UART
Battery	Re-chargeable Li-polymer battery 820mAh Over current protection
Sensor	Temperature/ Humidity SHT3x-DIS
LED Indicator	Power on: Green LED on. Power off: Green LED off Charging: Red LED on Full battery: Red LED off Data transmitting: Blue LED blinking with 0.2 second interval change End data transmitting: Blue LED off
Operation Conditions	Temperature -20℃ ~ 60℃; Humidity 5% ~ 95%

Item	Parameters
Micro USB	Charging @ 500mA
Button	Power switch : On/ Off
	Push button: Send report

Firmware Behavior

Active report mode: On (Default)

LM-130H1 EVB reports default data to gateway **by interval automatically**. The Active report mode default set to "On".

- Configurable report interval. (default = 10 seconds)

- Default payload includes "GS130", battery voltage, temperature and humidity sensor data. Payload is **not** modifiable when active report mode is on.

- The push button is disabled when active report mode set to on.

Active report mode: Off

LM-130H1 EVB will send report with default data to gateway once the **push button is pressed**.

- Default payload includes "GS130", battery voltage, temperature and humidity sensor data.

- Please refer "AAT2 Tx= [parameter1], [parameter2],[parameter3]" AT command to send self-define payload.

LoRaWAN™ Configuration

Activation of an end-device can be achieved in two ways, either via "Over-The-Air Activation (OTAA)" when an end-device is deployed or reset, or via "Activation By Personalization (ABP)" in which the two steps of end-device personalization and activation are done as one step.

■ **Over-the-Air Activation**

For over-the-air activation, end-devices must follow a join procedure prior to participating in data exchanges with the network server. An end-device has to go through a new join procedure every time it has lost the session context information.

The join procedure requires the end-device to be personalized with the following information before its starts the join procedure: a globally unique end-device identifier (DevEUI), the application identifier (AppEUI) and an AES-128 key (AppKey).

■ **Activation by Personalization**

Under certain circumstances, end-devices can be activated by personalization. Activation by personalization directly ties an end-device to a specific network by-passing the join request join accept procedure.

Activating an end-device by personalization means that the DevAddr and the two session keys NwkSKey and AppSKey are directly stored into the end-device instead of the DevEUI, AppEUI and AppKey. The end-device is equipped with the required information for participating in a specific LoRa network when started. Each device should have a unique set of NwkSKey and AppSKey. Compromising the keys **of one device shouldn't compromise the security of the communications of other devices.**

Operation Mode

■ **Bi-directional end-devices (Class A)**: End-devices of Class A allow for bi-directional communications whereby each end-device's uplink transmission is followed by two short downlink receive windows. The transmission slot scheduled by the end-device is based on its own communication needs with a small variation based on a random time basis (ALOHA-type of protocol). This Class A operation is the lowest power end-device system for applications that only require downlink communication from the server shortly after the end-device has sent an uplink transmission. Downlink communications from the server at any other time will have to wait until the next scheduled uplink.

■ **Bi-directional end-devices with maximal receive slots (Class C)**: End-devices of Class C have nearly continuously open receive windows, only closed when transmitting.