REYAX
TECHNOLOGY CORPORATION, LTD

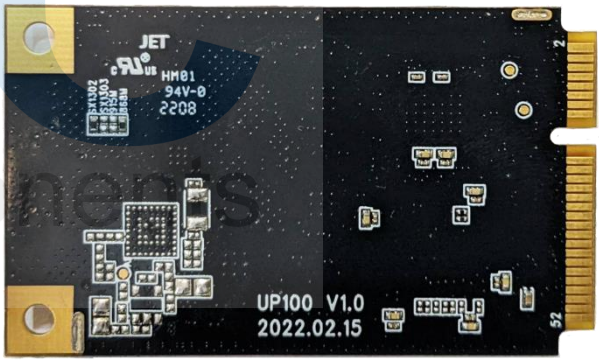
10-JUL-2021 56312E30

RYLR330

LoRaWAN® Gateway mini PCIe card

Datasheet





Represented by:

first FC components
FIRST Components s.r.l.
www.first-components.com
technical@first-components.com
+39 0332 1888005

PRODUCT DESCRIPTION

The RYLR330 is a LoRaWAN® Gateway Module with mini-PCIe form factor based on Semtech® SX1302, SX1250 and SX1261 (special version)for Listen Before Talk feature, which enables easy integration into an existing router or other network equipment with LPWAN Gateway capabilities. It can be used in any embedded platform offering a free mini-PCIe slot with USB/SPI connection. Furthermore, GPS chip and and Crypto Co-processor are integrated onboard.

This RYLR330 is a complete and cost-efficient gateway solution offering up to 10 programmable parallel demodulation paths, 8 x 8 channel LoRa® packet detectors, 8 x SF5-SF12 LoRa® demodulators, and 8 x SF5-SF10 LoRa demodulators. It is capable of detecting an uninterrupted combination of pockets at 8 different spreading factors and 10 channels with continuous demodulation of up to 16 packets.

FEATURES

- Designed based on mini-PCIe form factor 30mm x 59.95mm
- SX1302 baseband processor emulates 8 x 8 channel LoRa® packet detectors, 8 x SF5-SF12 LoRa ® demodulators, 8 x SF5-SF10 LoRa® demodulators, one 125/250/500 KHz high-speed LoRa ® demodulator, and one (G)FSK demodulator
- Tx power up to 26dBm, Rx sensitivity down to -139dBm@SF12, BW 125KHz
- Supports global license-free frequency band (US915, AS923, AU915, KR920, IN865, EU868)
- Supports optional USB/SPI interfaces
- Support Listen Before Talk

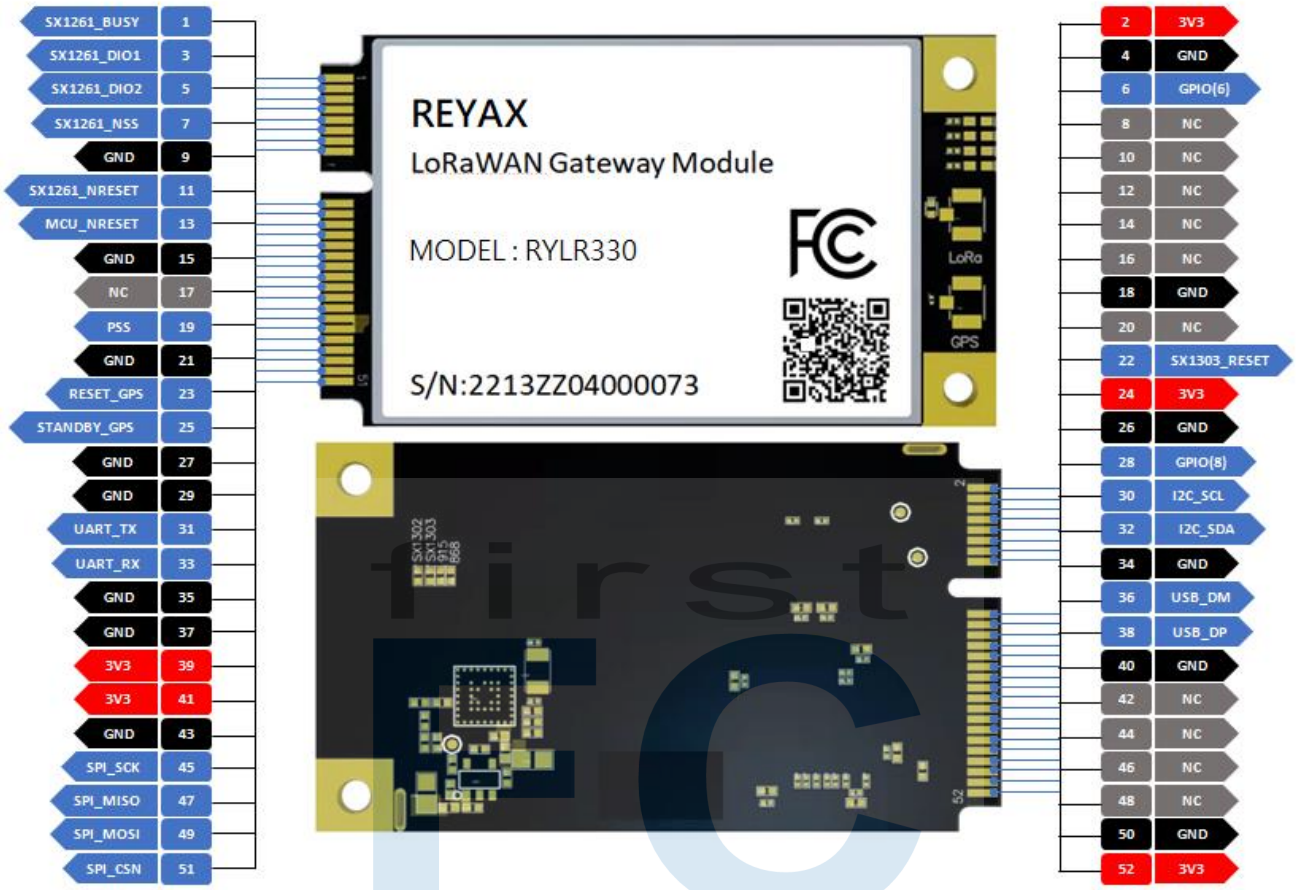
APPLICTIONS

- IoT Applications
- Mobile Equipment
- Home Security
- Industrial Monitoring and Control Equipment

CERTIFICATION

- FCC

PIN DESCRIPTION



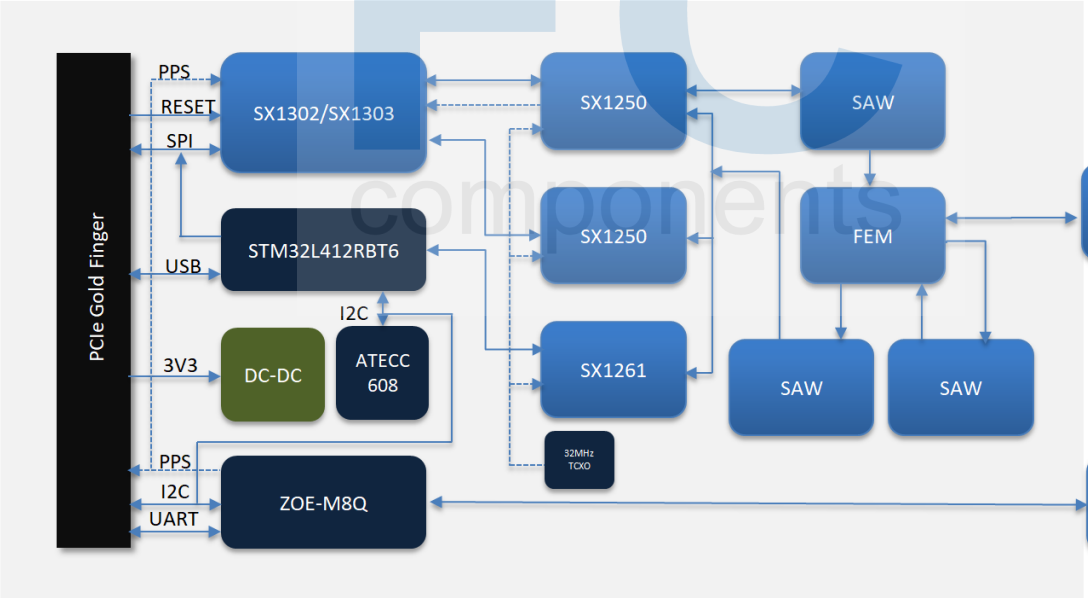
Pin	Name	I/O	Description
1	SX1261_BUSY	DO	No connection by default
2	3V3	PI	3.3V DC supply
3	SX1261_DIO1	IO	No connection by default
4	GND		Ground
5	SX1261_DIO2	IO	No connection by default
6	GPIO(6)	IO	No connection by default
7	SX1261_NSS	DI	No connection by default
8	NC		No connection
9	GND		Ground
10	NC		No connection

11	SX1261_NRESET	DI	No connection by default
12	NC		No connection
13	MCU_NRESET	DI	RESET signal for MCU
14	NC		No connection
15	GND		Ground
16	NC		No connection
17	NC		No connection
18	GND		Ground
19	PPS	DO	Time pulse output
20	NC		No connection
21	GND		Ground
22	SX1302_RESET	DI	SX1302_RESET
23	RESET_GPS	DI	GSP module reset input
24	3V3	PI	3.3V DC supply
25	STANDBY_GPS	DI	GPS module external interrupt input
26	GND		Ground
27	GND		Ground
28	GPIO(8)		No connection by default
29	GND		Ground
30	ISC_SCL	IO	HOST SCL
31	UART_TX	DI	HOST UART_TX
32	I2C_SDA	IO	HOST SDA
33	UART_RX	DO	HOST UART_RX
34	GND		Ground
35	GND		Ground
36	USB_DM	IO	USB differential data (-)
37	GND		Ground
38	USB_DP	IO	USB differential data (+)
39	3V3	PI	3.3V DC supply
40	GND		Ground

first components

41	3V3	PI	3.3V DC supply
42	NC		No connection
43	GND		Ground
44	NC		No connection
45	SPI_SCK	IO	No connection by default
46	NC		No connection
47	SPI_MISO	IO	No connection by default
48	NC		No connection
49	SPI_MOSI	IO	No connection by default
50	GND		Ground
51	SPI_CSN	IO	No connection by default
52	3V3	PI	3.3V DC supply

BLOCK DIAGRAM



Operating Frequencies

The board supports the following LoRaWAN frequency channels, allowing easy configuration while building the firmware from the source code.

Region	Frequency (MHz)
North America	US915
Asia	AS923
Australia	AU915
Korea	KR920
Europe	EU868
India	IN865

RF Characteristics

The following table gives typically sensitivity level of the UP100 gateway module.

Signal bandwidth (KHz)	Spreading factor	Sensitivity (dBm)
125	12	-139
125	7	-125
250	12	-136
250	7	-123
500	12	-134
500	7	-120

Electrical Requirements

Stressing the device above one or more of the ratings listed in the Absolute Maximum Rating section may cause permanent damage. These are stress ratings only. Operating the module at these or any conditions other than those specified in the Operating Conditions sections of the specification should be avoided. Exposure to Absolute Maximum Rating conditions for extended periods may affect device reliability.

The operating condition range defines those limits within which the functionality of the device is guaranteed. Where application information is given, it is advisory only and does not form part of the specification.

Absolute Maximum Rating

The limiting values given below are following the Absolute Maximum Rating System (IEC 134).

Symbol	Description	Condition	Min	Max
3V3	Module supply voltage	Input DC voltage at 3V3 pins	-0.3V	3.6V
USB	USB D+/D- pins	Input DC voltage at USB interface pins		3.6V
RESET	UP100 reset pin	Input DC voltage at RESET input pin	-0.3V	3.6V
SPI	SPI interface	Input DC voltage at SPI interface pin	-0.3V	3.6V
GPS_PPS	GPS PPS input	Input DC voltage at GPS_PPS input pin	-0.3V	3.6V

Tstg	Storage temperature		-40 °C	85 °C

WARNING:
The product is not protected against overvoltage or reversed voltages. If necessary, voltage spikes exceeding the power supply voltage specification, given in table above, must be limited to values within the specified boundaries by using appropriate protection devices

Maximum ESD

Parameter	Min	Typical	Max	Remarks
ESD_HBM			1000V	Charged Device Model JESD22-C101 CLASS III
ESD_CDM			1000V	Charged Device Model JESD22-C101 CLASS III

NOTE:
Although this module is designed to be as robust as possible, electrostatic discharge (ESD) can damage this module. This module must be protected at all times from ESD when handling or transporting. Static charges may easily produce potentials of several kilovolts on the human body or equipment, which can discharge without detection. Industry-standard ESD handling precautions should be used at all times.

Power Consumption

Version	Mode	Condition	Max
SPI Version	Active mode (TX)	The power of the TX channel is 26dBm and 3.3V supply.	410mA
	Active mode (RX)	TX disabled and RX enabled	45mA
USB Version	Active mode (TX)	The power of the TX channel is 26dBm and 3.3V supply.	443mA
	Active mode (RX)	TX disabled and RX enabled	60mA

Power Supply Range

Input voltage at 3V3 must be above the normal operating range minimum limit to switch on the module.

Symbol	Parameter	Min	Typical	Max
3V3	Module supply operating input voltage	3V	3.3V	3.6V

ORDER INFORMATION

Ordering No.	Interface	Band
RYLR330-915-USB	USB	US915、AS923、AU915、KR920
RYLR330-915-SPI	SPI	US915、AS923、AU915、KR920
RYLR330-868-USB	USB	EU868、IN865
RYLR330-868-SPI	SPI	EU868、IN865

first FC components