

Datasheet

SentriusTM RG1xx-M2 Concentrator Card Pluggable M2.COM LoRaWANTM Adapter

Version 2.4

REVISION HISTORY

Version	Date	Notes	Contributors	Approver
1.0	20 July 2017	Initial Release		Shewan Yitayew
1.1	23 Aug 2017	Corrected RESET polarity		Shewan Yitayew
1.2	26 Oct 2017	Added EN 60950-1:2006 +A11:2009 +A1:2010 +A12:2011 +A2:2013 to the DoC		Josh Bablitch
1.3	29 Nov 2017	Added JSON files for EU and US in Section 8		Shewan Yitayew
2.0	13 Dec 2017	Changed rev # to 2.0 to match engineering release		Jonathan Kaye
2.1	12 Jan 2018	Updated +25°C and +85°C power table values	Shewan Yitayew	Jonathan Kaye
2.2	07 Mar 2018	Fixed minor typo	Seokwoo Yoon	Shewan Yitayew
2.3	19 Dec 2018	Updated logos and URL.	Sue White	Jonathan Kaye
2.4	08 Aug 2019	Fixed JSON typo	Robert Gosewehr	Jonathan Kaye

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1 INTRODUCTION

The Sentiur™ RG1xx-M2 LoRaWAN Concentrator Card combines Laird's long-standing expertise in optimized RF design with the emerging LoRaWAN ecosystem. The Sentiur™ RG1xx-M2 card enables OEMs to integrate a high-performance, certified LoRaWAN gateway interface to any Linux-based platform. Laird's optimum hardware solution expands upon Sentiur™ drivers and reference design for improved RF performance. Comprehensive integration and design services for a custom gateway are also available via Laird's dedicated Engineering Services team. Qualified LoRa antenna solutions are available from Laird.

2 OVERVIEW

The module is designed around the Sentiur™ SX1301 digital baseband chip with an integrated LoRa concentrator IP, which is designed to perform high performance gateway function in the ISM band. The RF front-end consists of two of the SX1257, high performance digital I and Q modulator/demodulator transceiver chips. The SX1257 is designed to operate over the frequency band of 862 – 960 MHz to cover the Europe and North American markets. The RF front-end is terminated with standard U.FL connector. The board form factor and connector pinout are designed to conform to M2.COM specifications. The card requires a single 5-volt supply and it generates its power supply requirements on-board. Standard SPI communication, reset, and power supply to the board are provided through a 75-position host interface connector.

2.1 Key Features

- Optimized RF performance – Improved performance over temperature and frequency
- Superior TX performance – Up to +28 dBm
- Standardized interface – M2 connector with compliance to M2.COM standard E-type key.
- Comprehensive certifications – FCC, IC, CE

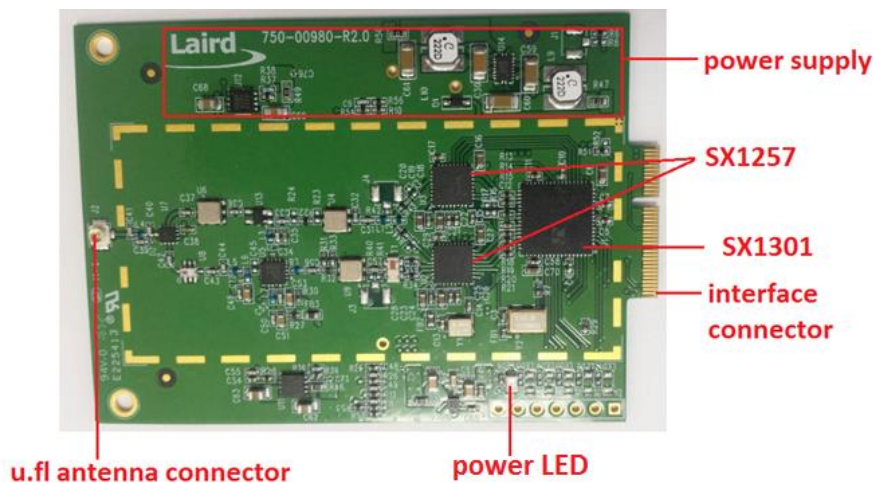


Figure 1: RG1xx board

Application Areas

- Smart metering
- Security and remote sensing
- Agricultural monitoring
- Internet of things (IoT)
- M2M applications

Note: Some of the figures in this document are driven from the Semtech SX1301 and SX1257 datasheets.

3 SPECIFICATION SUMMARY

Category	Feature	Specification
General Radio	Semtech Radios	SX1301 and SX1257 (x2)
	Reference Design	Based on Semtech Rev 1.0 - SX1301 AP1
Connectors	Connector Type	M2.COM E Key - http://www.m2com-standard.org/en-us
	External Antenna	U.FL connector
Power	Consumption	TX (max) – 440 mA
		RX (all channels) – 340 mA
		Idle – 40 mA
Voltage Input	Input	5V (+/- 10%)
RF Characteristics	Frequency Range	RG186-M2: 863 to 870 MHz RG191-M2: 902 to 928 MHz
	RX Sensitivity	Up to -140 dBm
	Max RF TX Output Power (conducted)	Up to +28 dBm (RG191-M2) –see Software Support Up to +25 dBm (RG186-M2) –see Software Support
	Host Interface	SPI
Software	Driver Support	https://github.com/Lora-net/lora_gateway (Laird testing done with Linux)
Temperature	Operating Range	-40°C to +85°C
Physical	Dimensions	75 x 53 x 3.8 mm
	Weight	<11 g
Regulatory	Certifications	FCC/IC/CE
Warranty	12 months	

4 HARDWARE SPECIFICATIONS

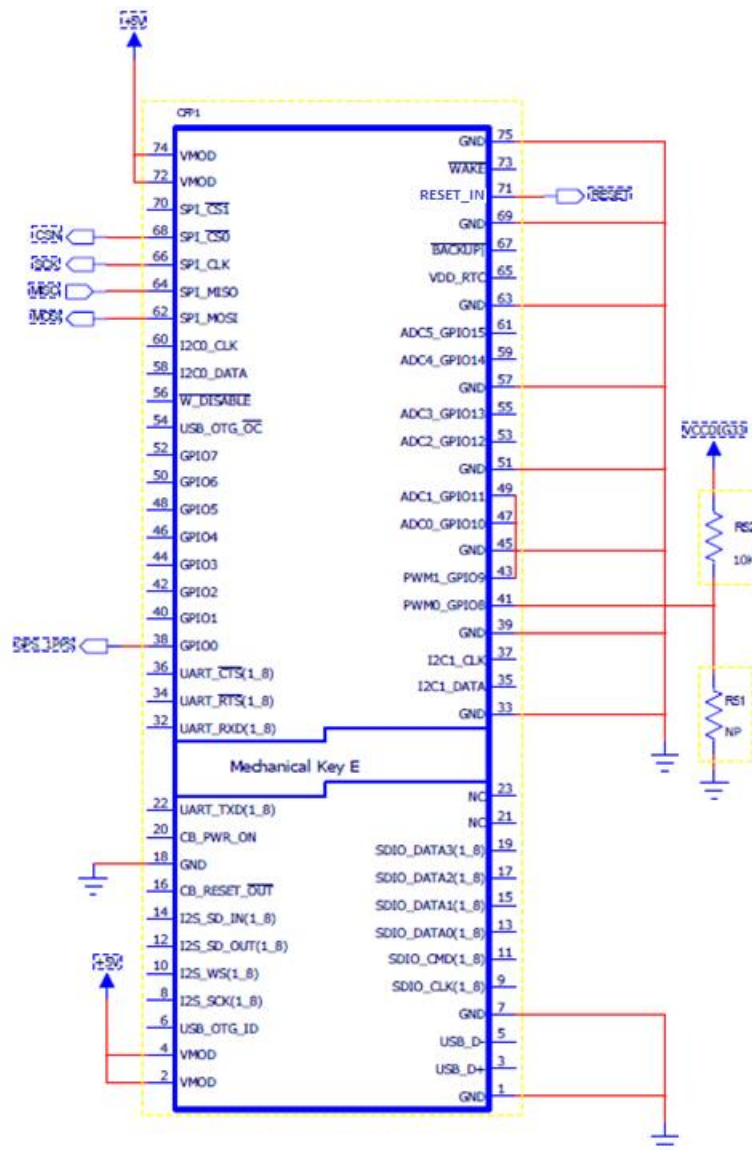


Figure 2: Schematic

5 PIN DEFINITIONS

Table 1: Pin definitions

Pin #	Pin Name	Laird RG1xx-M2 Pinout	Comment
1	GND	Populated	
2	VCC	Populated	+5V
3	USB_D+		
4	VCC	Populated	+5V
5	USB_D-		
6	USB_OTG_ID		
7	GND	Populated	
8	I2S_SCK		
9	SDIO_CLK		
10	I2S_WS		
11	SDIO_CMD		
12	I2S_SD_OUT		
13	SDIO_DATA0		
14	I2S_SD_IN		
15	SDIO_DATA1		
16	CB_RESET_OUT#		
17	SDIO_DATA2		
18	GND	Populated	
19	SDIO_DATA3		
20	CB_PWR_ON		
21	SDIO_WAKE#		
22	UART0_TXD		
23	SDIO_RESET#		
24	CONNECTOR KEY		
25	CONNECTOR KEY		
26	CONNECTOR KEY		
27	CONNECTOR KEY		
28	CONNECTOR KEY		
29	CONNECTOR KEY		
30	CONNECTOR KEY		
31	CONNECTOR KEY		
32	UART0_RXD		
33	GND	Populated	
34	UART0_RTS		
35	I2C1_DATA		
36	UART0_CTS		
37	I2C1_CLK		
38	GPIO_0	Populated	1 PPS signal from a GPS receiver
39	GND	Populated	-
40	GPIO_1		

Pin #	Pin Name	Laird RG1xx-M2 Pinout	Comment
41	PWM0/GPIO_8	Populated	CARD ID [1=US; 0=EU]
42	GPIO_2		
43	PWM1/GPIO_9	Populated	RESERVED
44	GPIO_3		
45	GND	Populated	-
46	GPIO_4		
47	ADC_0/GPIO_10	Populated	RESERVED
48	GPIO_5		
49	ADC_1/GPIO_11	Populated	RESERVED
50	GPIO_6		
51	GND	Populated	-
52	GPIO_7		
53	ADC_2/GPIO_12		
54	USB_OTG_OC#		
55	ADC_3/GPIO_13		
56	SIO_25/W_DISABLE#		
57	GND	Populated	-
58	I2C0_DATA		
59	ADC_4/GPIO_14		
60	I2C0_CLK		
61	ADC_5/GPIO_15		
62	SPI_MOSI	Populated	SPI MOSI
63	GND	Populated	-
64	SPI_MISO	Populated	SPI MISO
65	VDD_RTC		
66	SPI_CLK	Populated	SPI CLOCK
67	BUCKUP#		
68	SPI_CS0#	Populated	SPI CHIP SELECT
69	GND	Populated	-
70	SPI_CS1#		
71	RESET_IN	Populated	RESET
72	VCC	Populated	+5V
73	WAKE#		
74	VCC	Populated	+5V
75	GND	Populated	-

6 J5 SIGNALS DESCRIPTION

SPI interface signals including power, ground and RESET are also available on seven plated through-holes (labeled as J5). These make it easier when hand prototyping or when the M2.COM interface is not being used for host communication.

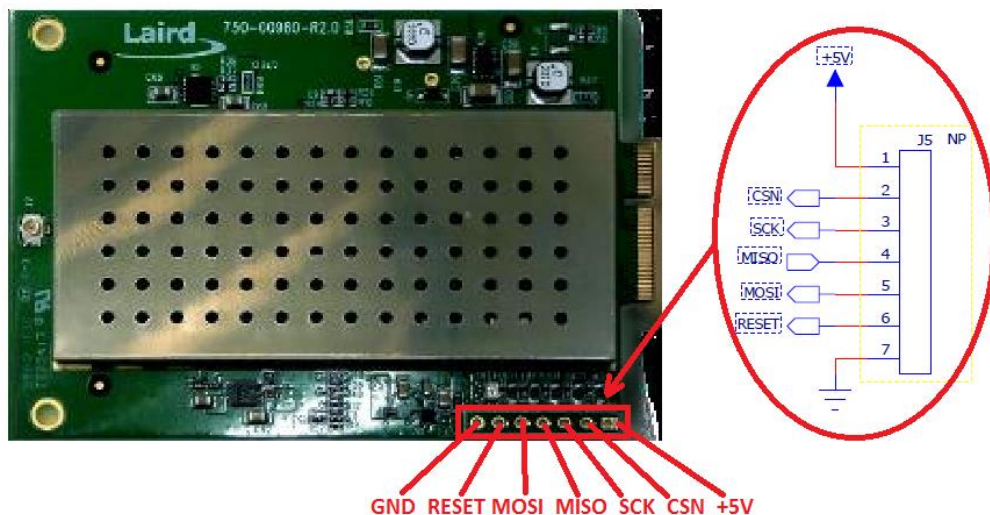


Figure 3: J5 signals description

7 MECHANICAL DETAILS

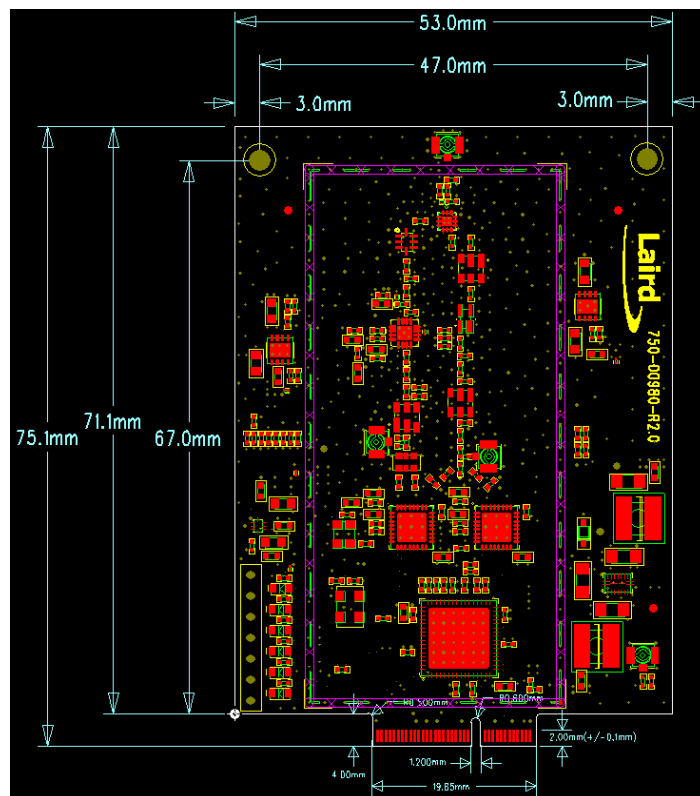


Figure 4: RG1xx-M2 mechanical drawing

8 SOFTWARE SUPPORT

A driver/HAL to build a gateway using a RG186-M2 or RG191-M2 concentrator board is available from the following GitHub link: https://github.com/Lora-net/lora_gateway

Radio TX power tables optimized for RG191-M2 and RG186-M2 are shown in [Table 2](#) (RG191-M2) and [Table 3](#) (RG186-M2).

IMPORTANT!

The RG186-M2 and RG191-M2 are certified with these power table values. Using different radio power table values other than those published may invalidate regulatory certification.

Table 2: RG191-M2 Radio TX power table

RF Registers			RG191-M2 Conducted TX power		
dig	mix	pa	at -40°C	at 25°C	at +85°C
0	10	3	28 dBm	26.8 dBm	25 dBm
0	9	3	27 dBm	26.2 dBm	24.2 dBm
0	8	3	26 dBm	24.8 dBm	22 dBm
0	12	2	25 dBm	21.7 dBm	18.8 dBm
0	11	2	24 dBm	20.9 dBm	18.2 dBm
0	10	2	22 dBm	17.8 dBm	16.2 dBm
0	15	1	19 dBm	16.8 dBm	13.8 dBm
0	12	1	16 dBm	13.2 dBm	9.3 dBm
0	11	1	15 dBm	11.4 dBm	7.5 dBm
0	10	1	14 dBm	10.5 dBm	6.5 dBm
1	10	1	13 dBm	9.5 dBm	5.5 dBm
0	9	1	12 dBm	7.8 dBm	3.6 dBm
0	8	1	10 dBm	6.5 dBm	2.2 dBm
0	13	0	5 dBm	3.4 dBm	1.1 dBm
0	10	0	2 dBm	-0.3 dBm	-5.5 dBm
0	8	0	0 dBm	-4.1 dBm	-8.1 dBm

Table 3: RG186-M2 Radio TX power table

RF Registers			RG186-M2 Conducted TX power		
dig	mix	pa	at -40°C	at +25°C	at +85°C
0	14	2	25 dBm	21 dBm	19.3 dBm
0	13	2	24 dBm	20.2 dBm	18 dBm
0	12	2	22 dBm	18.7 dBm	15.8 dBm
0	11	2	21 dBm	16.9 dBm	15.2 dBm
0	10	2	19 dBm	14.8 dBm	13.2 dBm
0	15	1	16 dBm	13.8 dBm	10.8 dBm
0	13	1	14 dBm	11.8 dBm	8 dBm
0	12	1	13 dBm	10.2 dBm	6.3 dBm
0	11	1	12 dBm	8.4 dBm	4.5 dBm
0	10	1	10 dBm	6.5 dBm	2.5 dBm
0	9	1	9 dBm	4.8 dBm	0.6 dBm

RF Registers			RG186-M2 Conducted TX power		
dig	mix	pa	at -40°C	at +25°C	at +85°C
0	8	1	6 dBm	2.5 dBm	-1.8 dBm
0	13	0	4 dBm	1.5 dBm	-1.8 dBm
0	12	0	3 dBm	0.1 dBm	-3.6 dBm
0	9	0	0 dBm	-3.3 dBm	-7.5 dBm
0	8	0	-3 dBm	-7.1 dBm	-11.1 dBm

An example of a JSON file for EU and US with the above power tables is available from the *Software Downloads* section on the Laird Sentrius RG1xx product page: <https://connectivity.lairdtech.com/wireless-modules/lorawan-solutions/sentrius-rg1xx-lora-enabled-gateway-wi-fi-bluetooth-ethernet>.

The following are sample JSON files – one for the US and one for EU.

8.1 Sample JSON File for US

```
{
  "gateway_conf":{
    "gateway_ID":"C0EE400000000000",
    "autoquit_threshold":5,
    "country_code": "US"
  },
  "SX1301_conf":{
    "lorawan_public":true,
    "clksrc":1,
    "antenna_gain":2,
    "lbt_cfg":{
      "enable":false
    },
    "tx_lut_0":{
      "pa_gain":0,
      "mix_gain":8,
      "rf_power":0,
      "dig_gain":0
    },
    "tx_lut_1":{
      "pa_gain":0,
      "mix_gain":10,
      "rf_power":2,
      "dig_gain":0
    },
    "tx_lut_2":{
      "pa_gain":0,
      "mix_gain":13,
```

```
"rf_power":5,  
  "dig_gain":0  
},  
"tx_lut_3":{  
  "pa_gain":1,  
  "mix_gain":8,  
  "rf_power":10,  
  "dig_gain":0  
},  
"tx_lut_4":{  
  "pa_gain":1,  
  "mix_gain":9,  
  "rf_power":12,  
  "dig_gain":0  
},  
"tx_lut_5":{  
  "pa_gain":1,  
  "mix_gain":10,  
  "rf_power":13,  
  "dig_gain":1  
},  
"tx_lut_6":{  
  "pa_gain":1,  
  "mix_gain":10,  
  "rf_power":14,  
  "dig_gain":0  
},  
"tx_lut_7":{  
  "pa_gain":1,  
  "mix_gain":11,  
  "rf_power":15,  
  "dig_gain":0  
},  
"tx_lut_8":{  
  "pa_gain":1,  
  "mix_gain":12,  
  "rf_power":16,  
  "dig_gain":0  
},  
"tx_lut_9":{  
  "pa_gain":1,
```

```
"mix_gain":15,  
  "rf_power":19,  
  "dig_gain":0  
},  
"tx_lut_10":{  
  "pa_gain":2,  
  "mix_gain":10,  
  "rf_power":22,  
  "dig_gain":0  
},  
"tx_lut_11":{  
  "pa_gain":2,  
  "mix_gain":11,  
  "rf_power":24,  
  "dig_gain":0  
},  
"tx_lut_12":{  
  "pa_gain":2,  
  "mix_gain":12,  
  "rf_power":25,  
  "dig_gain":0  
},  
"tx_lut_13":{  
  "pa_gain":3,  
  "mix_gain":8,  
  "rf_power":26,  
  "dig_gain":0  
},  
"tx_lut_14":{  
  "pa_gain":3,  
  "mix_gain":9,  
  "rf_power":27,  
  "dig_gain":0  
},  
"tx_lut_15":{  
  "pa_gain":3,  
  "mix_gain":10,  
  "rf_power":28,  
  "dig_gain":0  
},  
"radio_0":{
```

```
"enable":true,
"type":"SX1257",
"freq":904300000,
"rssi_offset":-166.0,
"tx_enable":true,
"tx_freq_min":923000000,
"tx_freq_max":928000000
},
"radio_1":{
  "enable":true,
  "type":"SX1257",
  "freq":905000000,
  "rssi_offset":-166.0,
  "tx_enable":false
},
"chan_multiSF_0":{
  "enable":true,
  "radio":0,
  "if":-400000
},
"chan_multiSF_1":{
  "enable":true,
  "radio":0,
  "if":-200000
},
"chan_multiSF_2":{
  "enable":true,
  "radio":0,
  "if":0
},
"chan_multiSF_3":{
  "enable":true,
  "radio":0,
  "if":200000
},
"chan_multiSF_4":{
  "enable":true,
  "radio":1,
  "if":-300000
},
"chan_multiSF_5":{
```

```
    "enable":true,  
    "radio":1,  
    "if":-100000  
  },  
  "chan_multiSF_6":{  
    "enable":true,  
    "radio":1,  
    "if":100000  
  },  
  "chan_multiSF_7":{  
    "enable":true,  
    "radio":1,  
    "if":300000  
  },  
  "chan_Lora_std":{  
    "enable":true,  
    "radio":0,  
    "if":300000,  
    "bandwidth":500000,  
    "spread_factor":8  
  },  
  "chan_FSK":{  
    "enable":false  
  }  
}  
}
```

8.2 Sample JSON File for EU

```
{
  "gateway_conf":{
    "gateway_ID":"C0EE400000000000",
    "autoquit_threshold":5,
    "country_code": "EU"
  },
  "SX1301_conf":{
    "lorawan_public":true,
    "clksrc":1,
    "antenna_gain":2,
    "lbt_cfg":{
      "enable":false
    },
    "tx_lut_0":{
      "pa_gain":0,
      "mix_gain":8,
      "rf_power":-3,
      "dig_gain":0
    },
    "tx_lut_1":{
      "pa_gain":0,
      "mix_gain":9,
      "rf_power":0,
      "dig_gain":0
    },
    "tx_lut_2":{
      "pa_gain":0,
      "mix_gain":12,
      "rf_power":3,
      "dig_gain":0
    },
    "tx_lut_3":{
      "pa_gain":0,
      "mix_gain":13,
      "rf_power":4,
      "dig_gain":0
    },
    "tx_lut_4":{
      "pa_gain":1,
      "mix_gain":8,
```

```
"rf_power":6,  
  "dig_gain":0  
},  
"tx_lut_5":{  
  "pa_gain":1,  
  "mix_gain":9,  
  "rf_power":9,  
  "dig_gain":0  
},  
"tx_lut_6":{  
  "pa_gain":1,  
  "mix_gain":10,  
  "rf_power":10,  
  "dig_gain":0  
},  
"tx_lut_7":{  
  "pa_gain":1,  
  "mix_gain":11,  
  "rf_power":12,  
  "dig_gain":0  
},  
"tx_lut_8":{  
  "pa_gain":1,  
  "mix_gain":12,  
  "rf_power":13,  
  "dig_gain":0  
},  
"tx_lut_9":{  
  "pa_gain":1,  
  "mix_gain":13,  
  "rf_power":14,  
  "dig_gain":0  
},  
"tx_lut_10":{  
  "pa_gain":1,  
  "mix_gain":15,  
  "rf_power":16,  
  "dig_gain":0  
},  
"tx_lut_11":{  
  "pa_gain":2,
```

```
"mix_gain":10,  
"rf_power":19,  
"dig_gain":0  
},  
"tx_lut_12":{  
  "pa_gain":2,  
  "mix_gain":11,  
  "rf_power":21,  
  "dig_gain":0  
},  
"tx_lut_13":{  
  "pa_gain":2,  
  "mix_gain":12,  
  "rf_power":22,  
  "dig_gain":0  
},  
"tx_lut_14":{  
  "pa_gain":2,  
  "mix_gain":13,  
  "rf_power":24,  
  "dig_gain":0  
},  
"tx_lut_15":{  
  "pa_gain":2,  
  "mix_gain":14,  
  "rf_power":25,  
  "dig_gain":0  
},  
"radio_0":{  
  "enable":true,  
  "type":"SX1257",  
  "freq":867500000,  
  "rssi_offset":-166.0,  
  "tx_enable":true,  
  "tx_freq_min":863000000,  
  "tx_freq_max":870000000  
},  
"radio_1":{  
  "enable":true,  
  "type":"SX1257",  
  "freq":868500000,
```

```
"rssi_offset":-166.0,  
"tx_enable":false  
,  
"chan_multiSF_0":{  
  "enable":true,  
  "radio":1,  
  "if":-400000  
,  
"chan_multiSF_1":{  
  "enable":true,  
  "radio":1,  
  "if":-200000  
,  
"chan_multiSF_2":{  
  "enable":true,  
  "radio":1,  
  "if":0  
,  
"chan_multiSF_3":{  
  "enable":true,  
  "radio":0,  
  "if":-400000  
,  
"chan_multiSF_4":{  
  "enable":true,  
  "radio":0,  
  "if":-200000  
,  
"chan_multiSF_5":{  
  "enable":true,  
  "radio":0,  
  "if":0  
,  
"chan_multiSF_6":{  
  "enable":true,  
  "radio":0,  
  "if":200000  
,  
"chan_multiSF_7":{  
  "enable":true,  
  "radio":0,
```

```
"if":400000
},
"chan_Lora_std":{
  "enable":true,
  "radio":1,
  "if":-200000,
  "bandwidth":250000,
  "spread_factor":7
},
"chan_FSK":{
  "enable":true,
  "radio":1,
  "if":300000,
  "bandwidth":125000,
  "datarate":50000
}
}
}
```

9 FCC AND ISED CANADA REGULATORY STATEMENTS

Model	US/FCC	CANADA/IC
RG191-M2	SQG-1001	3147A-1001

The OEM must follow the regulatory guidelines and warnings listed below to inherit Laird's modular approval.

The RG191-M2 holds full modular approvals and is certified for integration to products only by OEM integrators under the following conditions:

1. The antenna(s) must be installed such that a minimum separation distance of 20 cm is always maintained between the radiator (antenna) and all persons.
2. The transmitter module must not be operating in conjunction with any other antenna or transmitter, except in accordance with FCC multi-transmitter product procedures.

If the two conditions above are met, further transmitter testing is not required. However, the OEM integrator is still responsible for testing their end-product for any additional compliance requirements required with this module installed (for example, digital device emissions, PC peripheral requirements, RF Exposure/SAR, etc.).

IMPORTANT NOTE: If these conditions cannot be met (for certain configurations or co-location with another transmitter), then the FCC and Industry Canada authorizations are no longer considered valid and the FCC ID and IC Certification Number cannot be used on the final product. In these circumstances, the OEM integrator is responsible for re-evaluating the end product (including the transmitter) and obtaining a separate FCC and Industry Canada authorization.

LSR 001-0002 center-fed 900 MHz dipole antenna and LSR 080-0001 U.FL to Reverse Polarity SMA connector

Power Exposure Information

Federal Communication Commission (FCC) Radiation Exposure Statement:

To comply with FCC RF exposure limits for general population/uncontrolled exposure, the antenna(s) used for this transmitter must be installed to provide a separation distance of at least 20 cm from all persons and operating in conjunction with any other antenna or transmitter.

9.1 OEM Responsibilities

WARNING: The OEM must ensure that FCC and Industry Canada labelling requirements are met. This includes a clearly visible label on the outside of the OEM enclosure specifying the appropriate Laird FCC and ISED Canada identifier for this product.

Contains FCC ID: SQG-1001

Contains IC: 3147A-1001

The OEM of the RG191-M2 module must only use the approved antenna(s) which have been certified with this module. The OEM integrator must not provide information to the end user regarding how to install or remove this RF module or change RF related parameters in the user manual of the end-product.

The user manual for the end-product must also include the following information in a prominent location:

To comply with FCC and Industry Canada RF exposure limits for general population/uncontrolled exposure, the antenna(s) used for this transmitter must be installed to provide a separation distance of at least 20 cm from all persons and operating in conjunction with any other antenna or transmitter, except in accordance with FCC multi-transmitter product procedures. If the size of the end product is larger than 8x10cm, then the following FCC part 15.19 statement has to also be available on visible on outside of device:

The enclosed device complies with Part 15 of the FCC Rules. Operation is subject to the following two conditions: (1) This device may not cause harmful interference, and (2) This device must accept any interference received, including interference that may cause undesired operation

Label and text information should be in a size of type large enough to be readily legible, consistent with the dimensions of the equipment and the label. However, the type size for the text is not required to be larger than eight point.

CAUTION: The OEM should have their device which incorporates the RG191-M2 tested by a qualified test house to verify compliance with FCC Part 15 Subpart B limits for unintentional radiators.

WARNING: Changes or modifications not expressly approved by Laird could void the user's authority to operate the equipment.

FCC Interference Statement

This equipment has been tested and found to comply with the limits for a Class B digital device, pursuant to Part 15 of the FCC Rules. These limits are designed to provide reasonable protection against harmful interference in a residential installation. This equipment generates, uses, and can radiate radio frequency energy and, if not installed and used in accordance with the instructions, may cause harmful interference to radio communications. However, there is no guarantee that interference will not occur in an installation. If this equipment does cause harmful interference to radio or television reception, which can be determined by turning the equipment off and on, the user is encouraged to correct the interference by one or more of the following measures:

- Re-orient or relocate the receiving antenna
- Increase the separation between the equipment and the receiver
- Connect the equipment to an outlet on a circuit different from that to which the receiver is connected.
- Consult the dealer or an experienced radio/TV technician for help.

FCC Warning:

"THIS DEVICE COMPLIES WITH PART 15 OF THE FCC RULES OPERATION IS SUBJECT TO THE FOLLOWING TWO CONDITIONS: (1) THIS DEVICE MAY NOT CAUSE HARMFUL INTERFERENCE, AND (2) THIS DEVICE MUST ACCEPT ANY INTERFERENCE RECEIVED, INCLUDING INTERFERENCE THAT MAY CAUSE UNDESIRE OPERATION.

Industry Canada (IC) Warning:

This device complies with Industry Canada license-exempt RSS standard(s). Operation is subject to the following two conditions: (1) this device may not cause interference, and (2) this device must accept any interference, including interference that may cause undesired operation of the device.

French equivalent is:

Le présent appareil est conforme aux CNR d'Industrie Canada applicable aux appareils radio exempts de licence. L'exploitation est autorisée aux deux conditions suivantes : (1) l'appareil ne doit pas produire de brouillage, et (2) l'utilisateur de l'appareil doit accepter tout brouillage radioélectrique subi, même si le brouillage est susceptible d'en compromettre le fonctionnement.

ISED Radiation Exposure Statement

To comply with ISED Canada RF exposure limits for general population / uncontrolled exposure, the antenna(s) used for this transmitter must be installed to provide a separation distance of at least 20 cm from all persons and must not be operating in conjunction with any other antenna or transmitter.

REMARQUE IMPORTANTE

Déclaration IC d'exposition aux radiations

Pour se conformer à Industrie Canada RF limites d'exposition pour la population générale / exposition non contrôlée, l'antenne utilisée pour ce transmetteur doit être installée pour fournir une distance d'au moins 20 cm de toutes les personnes et ne doit pas fonctionner en conjonction avec toute autre antenne ou transmetteur.

Modular Approval

OEM integrator is still responsible for testing their end-product for any additional compliance requirements required with this module installed (for example, digital device emissions, PC peripheral requirements, etc.).

Approbation modulaire

OEM intégrateur est toujours responsable de tester leur produit final pour les exigences de conformité supplémentaires nécessaires à ce module installé (par exemple, les émissions de périphériques numériques, les exigences de périphériques PC, etc.)

IMPORTANT NOTE:

If these conditions cannot be met (for example certain laptop configurations or co-location with another transmitter), then the Canada authorization is no longer considered valid and the IC ID cannot be used on the final product. In these circumstances, the OEM integrator will be responsible for re-evaluating the end-product (including the transmitter) and obtaining a separate Canada authorization.

NOTE IMPORTANTE:

Dans le cas où ces conditions ne peuvent être satisfaites (par exemple pour certaines configurations d'ordinateur portable ou de certaines co-localisation avec un autre émetteur), l'autorisation du Canada n'est plus considéré comme valide et l'ID IC ne peut pas être utilisé sur le produit final. Dans ces circonstances, l'intégrateur OEM sera chargé de réévaluer le produit final (y compris l'émetteur) et l'obtention d'une autorisation distincte au Canada.

Le produit final doit être étiqueté dans un endroit visible avec l'inscription suivante: " RG191-M2 Contient des IC: 3147A-1001";

10 CE REGULATORY

The RG186-M2 has been tested for compliance with relevant standards for the EU market. The RG186-M2 module has been tested with LSR 001-0028 center-fed 868 MHz dipole antenna and LSR 080-0001 U.FL to Reverse Polarity SMA connector.

The OEM should consult with a qualified test house before entering their device into an EU member country to make sure all regulatory requirements have been met for their complete device.

Reference the Declaration of Conformities listed below for a full list of the standards that the modules were tested to. Test reports are available upon request.

10.1 Antenna Information

The following antennas have been certified with the RG1xx-M2 cards.

- RG186-M2 – LSR 001-0028 center-fed 868 MHz dipole antenna and LSR 080-0001 U.FL to Reverse Polarity SMA connector
- RG191-M2 – LSR 001-0002 center-fed 900 MHz dipole antenna and LSR 080-0001 U.FL to Reverse Polarity SMA connector

10.2 EU Declarations of Conformity

Manufacturer	Laird
Products	RG186-M2
Product Description	Sentrius™ Concentrator Card – Pluggable M2.COM LoRaWAN™ Adapter
EU Directives	2014/53/EU – Radio Equipment Directive (RED)

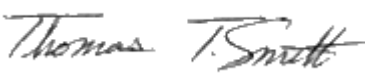


Reference standards used for presumption of conformity:

Article Number	Requirement	Reference standard(s)
3.1a	Low voltage equipment safety	EN 60950-1:2006 +A11:2009 +A1:2010 +A12:2011 +A2:2013
3.1b	Protection requirements – Electromagnetic compatibility	EN 301 489-1 v2.2.0 (2017-03) EN 301 489-3 v2.1.1 (2017-03)
3.2	Means of the efficient use of the radio frequency spectrum (ERM)	EN 300 220-1 v3.1.1 (2017-02) EN 300 220-2 v3.1.1 (2017-02)

Declaration:

We, Laird, declare under our sole responsibility that the essential radio test suites have been carried out and that the above product to which this declaration relates is in conformity with all the applicable essential requirements of Article 3 of the EU Radio Equipment Directive 2014/53/EU, when used for its intended purpose.

Place of Issue:	Laird W66N220 Commerce Court, Cedarburg, WI 53012 USA tel: +1-262-375-4400 fax: +1-262-364-2649
Date of Issue:	15 June 2017
Name of Authorized Person:	Thomas T Smith, Director of EMC Compliance
Signature of Authorized Person:	

11 ORDERING INFORMATION

RG186-M2	LoRaWAN Concentrator Card – M2.COM Interface (Europe)	July 2017
RG191-M2	LoRaWAN Concentrator Card – M2.COM Interface (N. America)	July 2017

12 ADDITIONAL ASSISTANCE

Please contact your local sales representative or our support team for further assistance:

Email: wireless.support@lairdtech.com

Phone: Americas: +1-800-492-2320

Europe: +44-1628-858-940

Hong Kong: +852 2923 0610

Web: <https://connectivity.lairdtech.com/wireless-modules/lorawan-solutions/sentrius-rg1xx-lora-enabled-gateway-wi-fi-bluetooth-ethernet>