RAK4260 LoRa Module User's Manual v1.0

MAY 2019

Note: All information contained in these materials represents information on the product at the time of publication and is subject to change without notice. Please visit Rakwireless website (www.rakwireless.com) for the latest update.

Table of Contents

1 Overview

1.1 Introduction

ARAK4260 is a Module that designed base on the chip of Micorchip'sATSAMR34J18B.It uses a 32-bit ARM Cortex -M0+ processor and offers up to 256KB of flash and 40KB SRAM. It combined with a UHF transceiver that can support LoRa and FSK modulation.

Features:

- ARM Cortex -M0+ CPU running at up to 48 MHz
- 256K flash 32K SRAM,8kB LP SRAM
- Two Pin Serial Wire Debug (SWD) Programming, Test and Debugging Interfaces
- Operating Voltage: 1.8V- 3.6V,typical value: 3.3V.
- Low Power Consumption
- Temperature Range: -40°C to +85°C (Industrial)
- Total 36 pinout and 22 I/O pinout
- Up to Five Serial Communication Interfaces (SERCOM), each configurable to operate as either of I2C,USART ,SPI ,LINinterface
- Support Peripheral Touch Controller (PTC)
- One Full-Speed (12 Mbps) Universal Serial Bus (USB) 2.0 Interface
- 32-bit Real Time Counter (RTC) with Clock/Calendar Function
- Three 16-bit Timer/Counters (TC)
- Three 16-bit Timer/Counters for Control (TCC), with Extended Functions
- Have four software-selectable sleep modes: Idle, Standby, Backup and Off
- Support LoRaWAN frequency:868MHz,915MHz
- Output power max 20dBm
- High sensitivity down to -148dBm(proprietary narrowband modes)

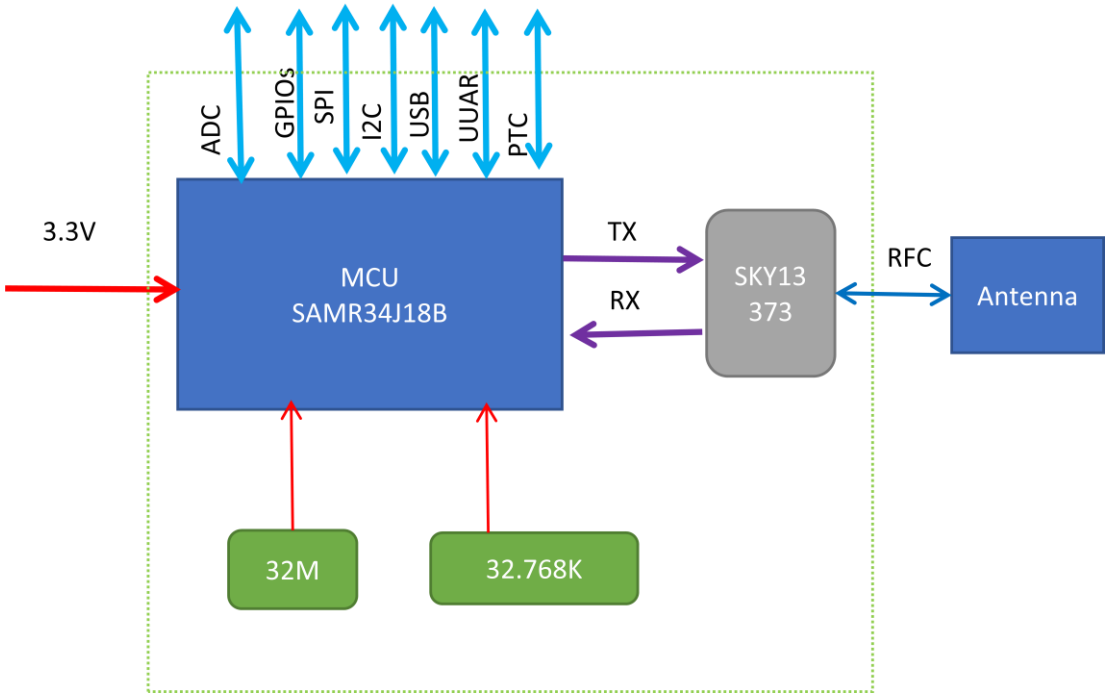
2 RAK4260 LoRa Module

2.1 Overview

The picture below shows the top view of the RAK4260 LoRa Module.

2.2 Functional Block Diagram

Block diagram below shows the external interfaces of RAK4260



2.3 Operating Frequencies

WISDUO-LORARAK4260LoRaModule support all LoRaWAN frequency channels as below. Which is easy to configure while building the firmware from the source code.

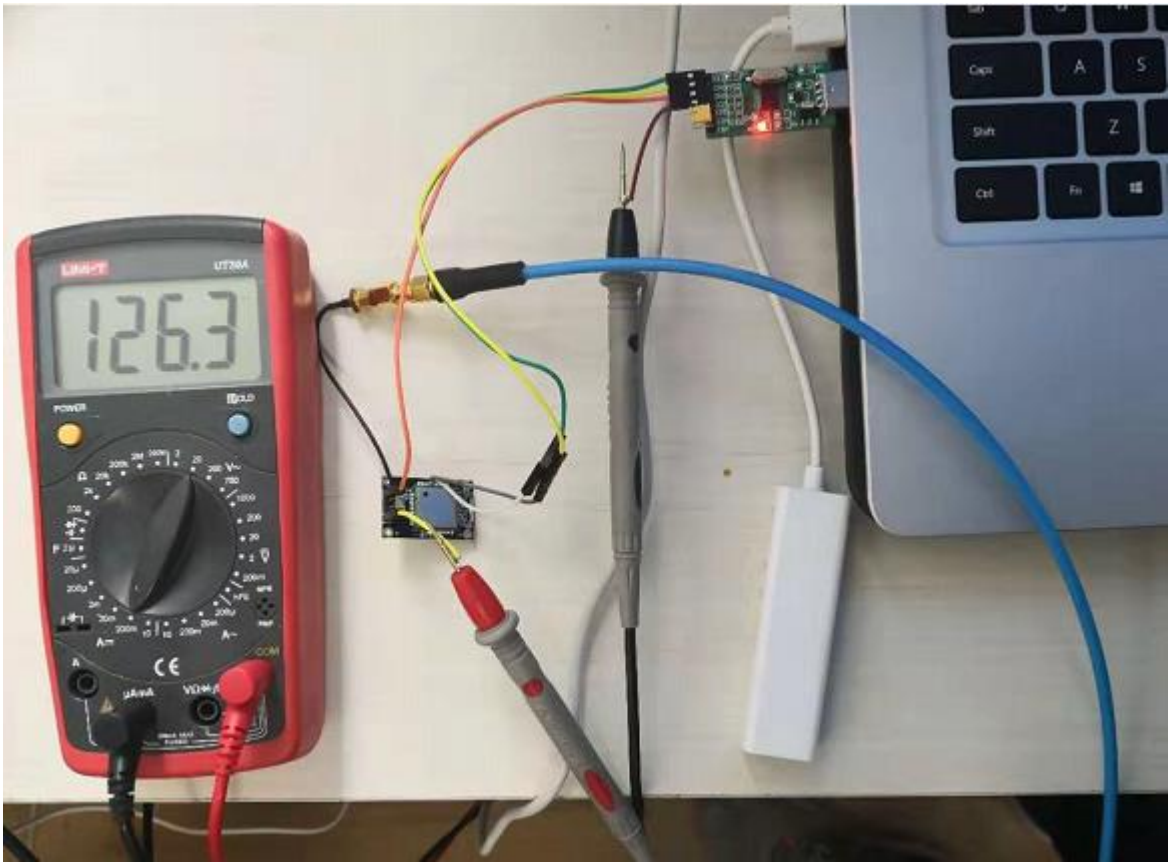
Region	Frequency (MHz)
EU	868(863~870)
AS	923
KR	920
AU	915
US	915(902~928)
IN	865

2.4 Power Consumption

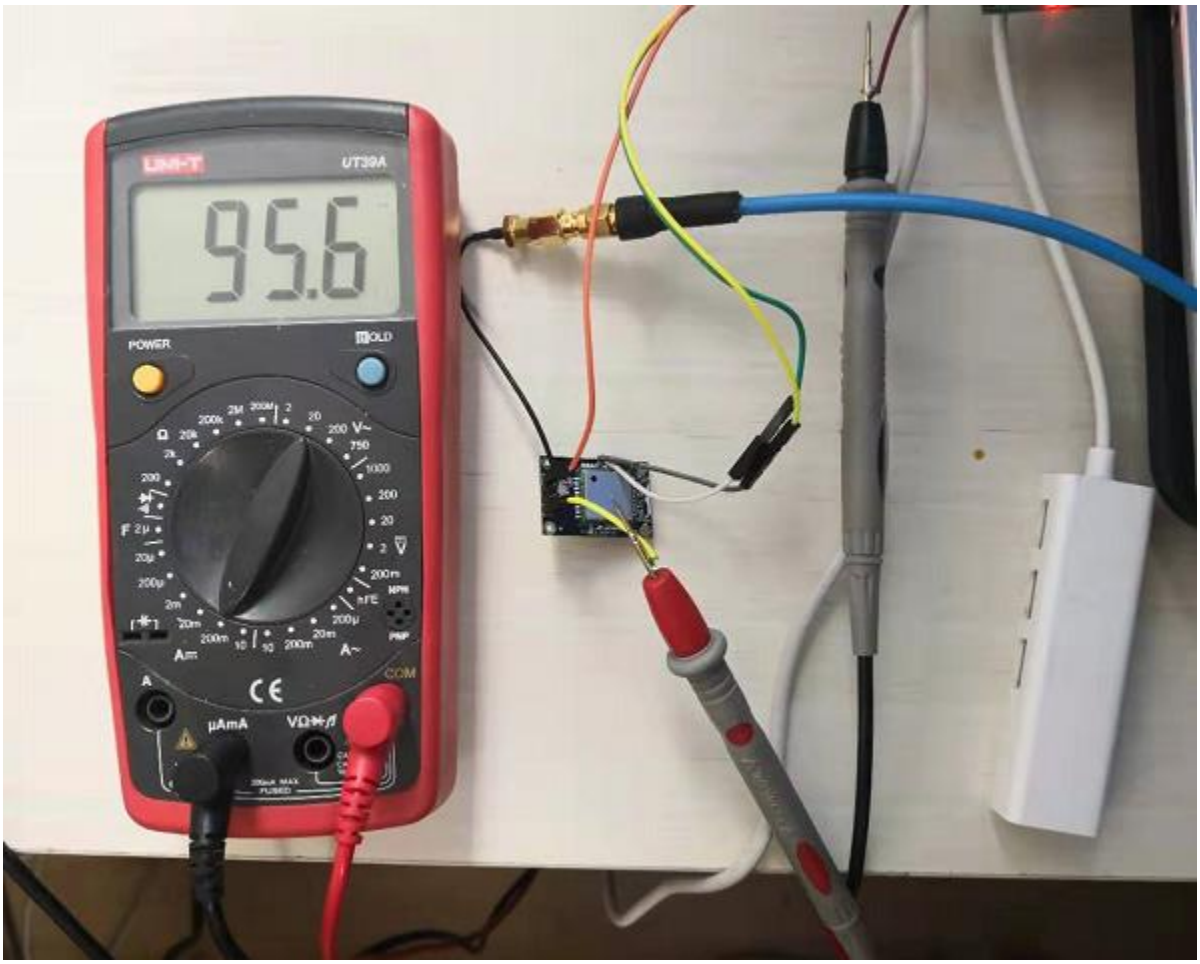
Item	power consumption	condition
OUTPUT POWER 20dB(MAX)	126.3mA	PA_BOOST V=3.3V
OUTPUT POWER 17dB	95.6mA(typical)	PA_BOOST V=3.3V
OUTPUT POWER 14dB	33.1mA	RFO_HF V=3.3V

Receive mode	13.6mA	
Sleep mode	860nA	V=3.3V Backup mode

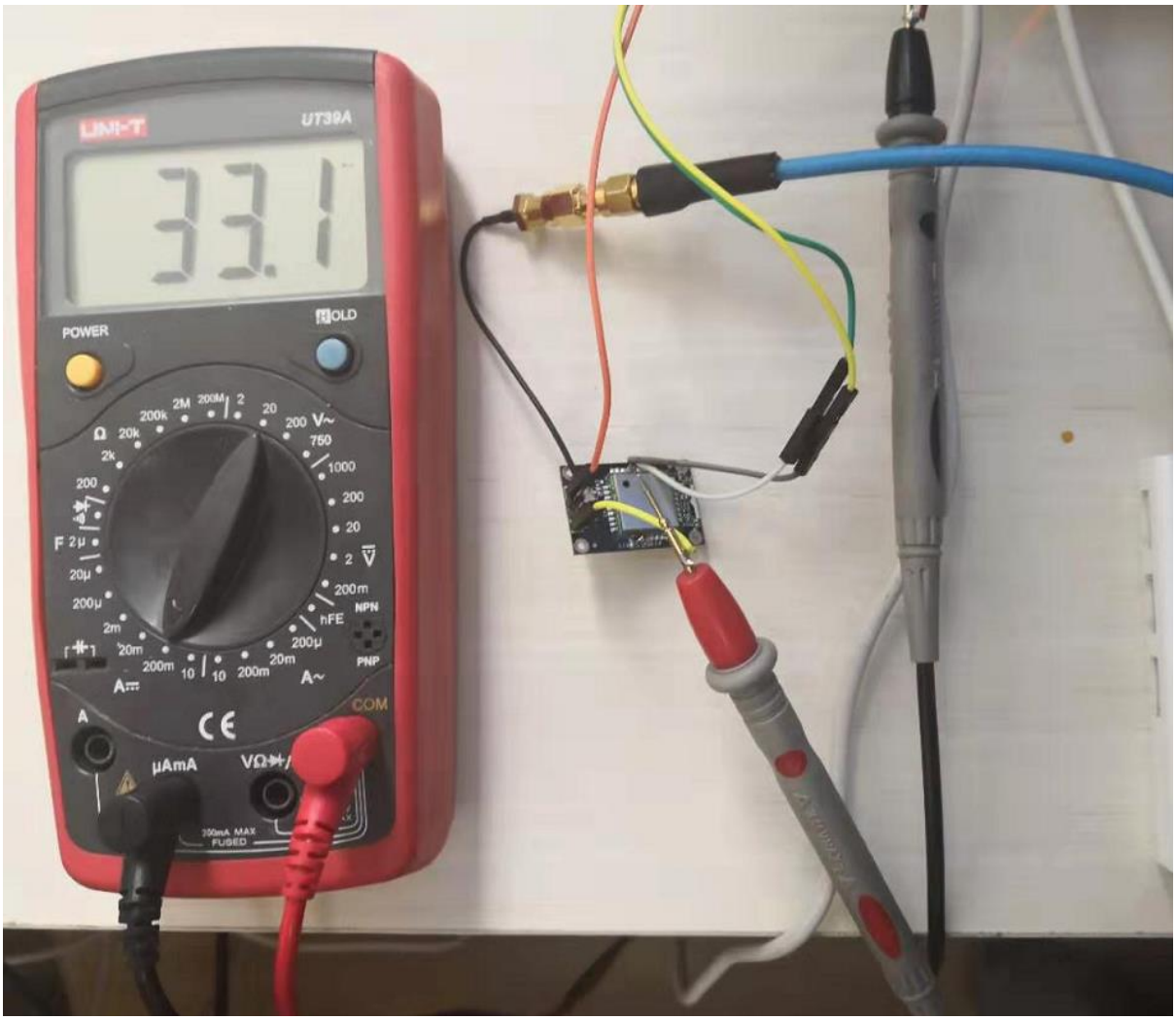
OUTPUT POWER 20dB(MAX)PA_BOOST mode:



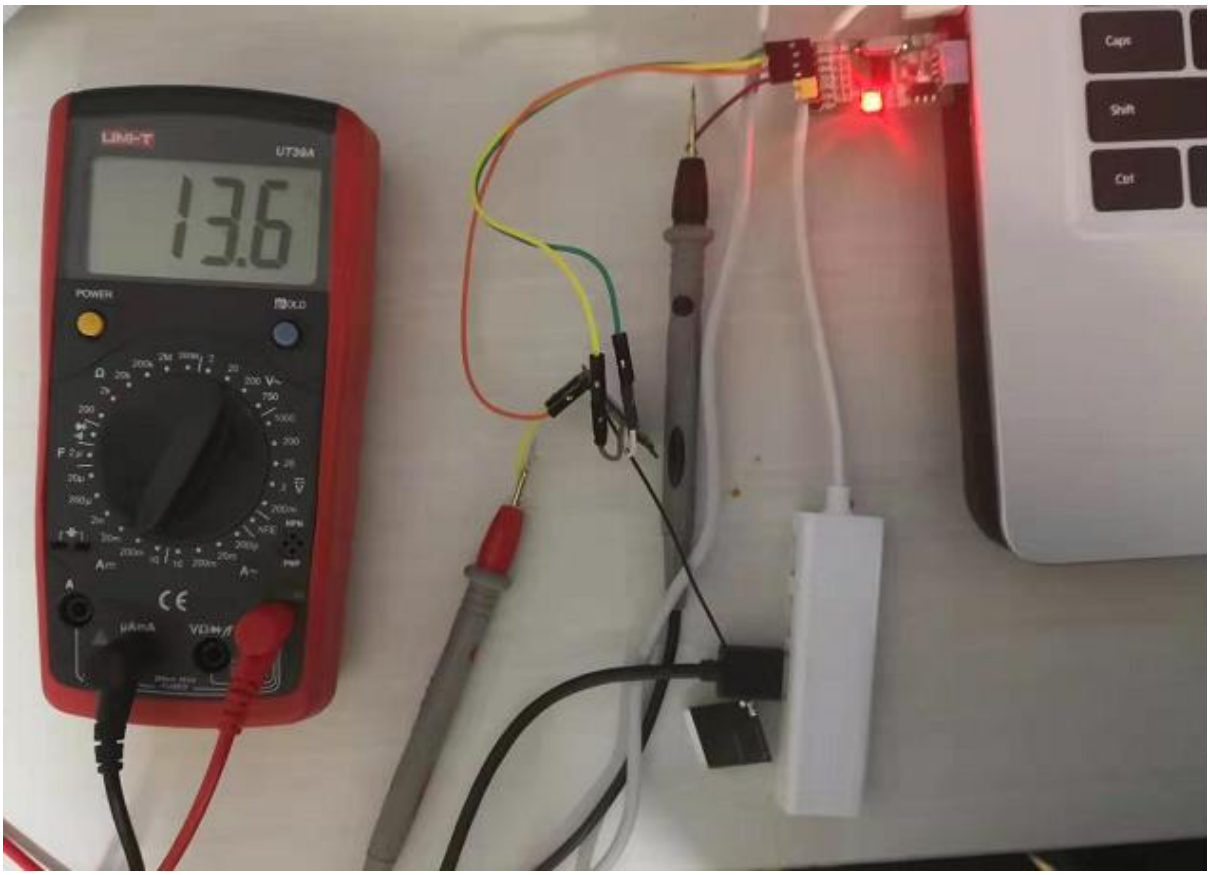
OUTPUT POWER 17dB(PA_BOOST mode):



OUTPUT POWER 14dB(RFO_HF mode):

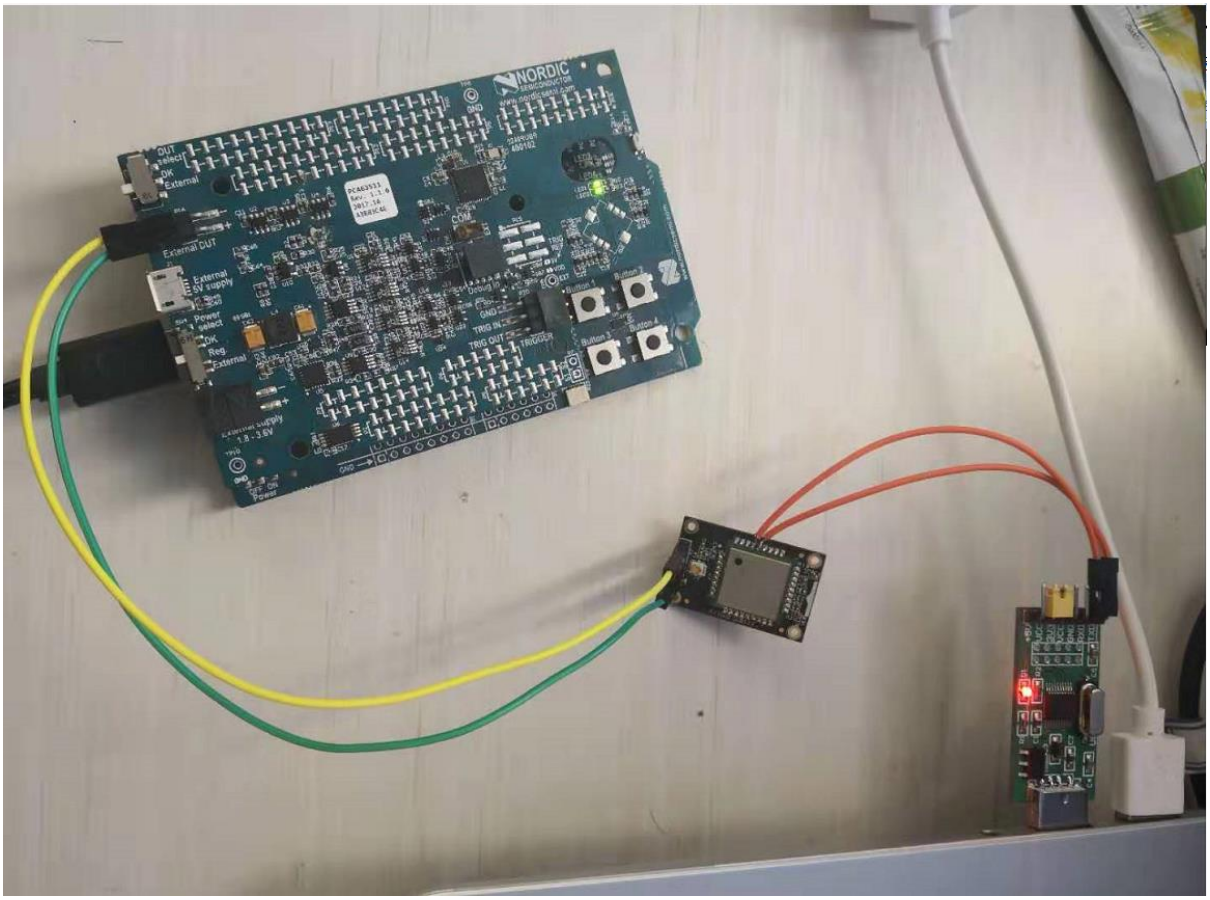


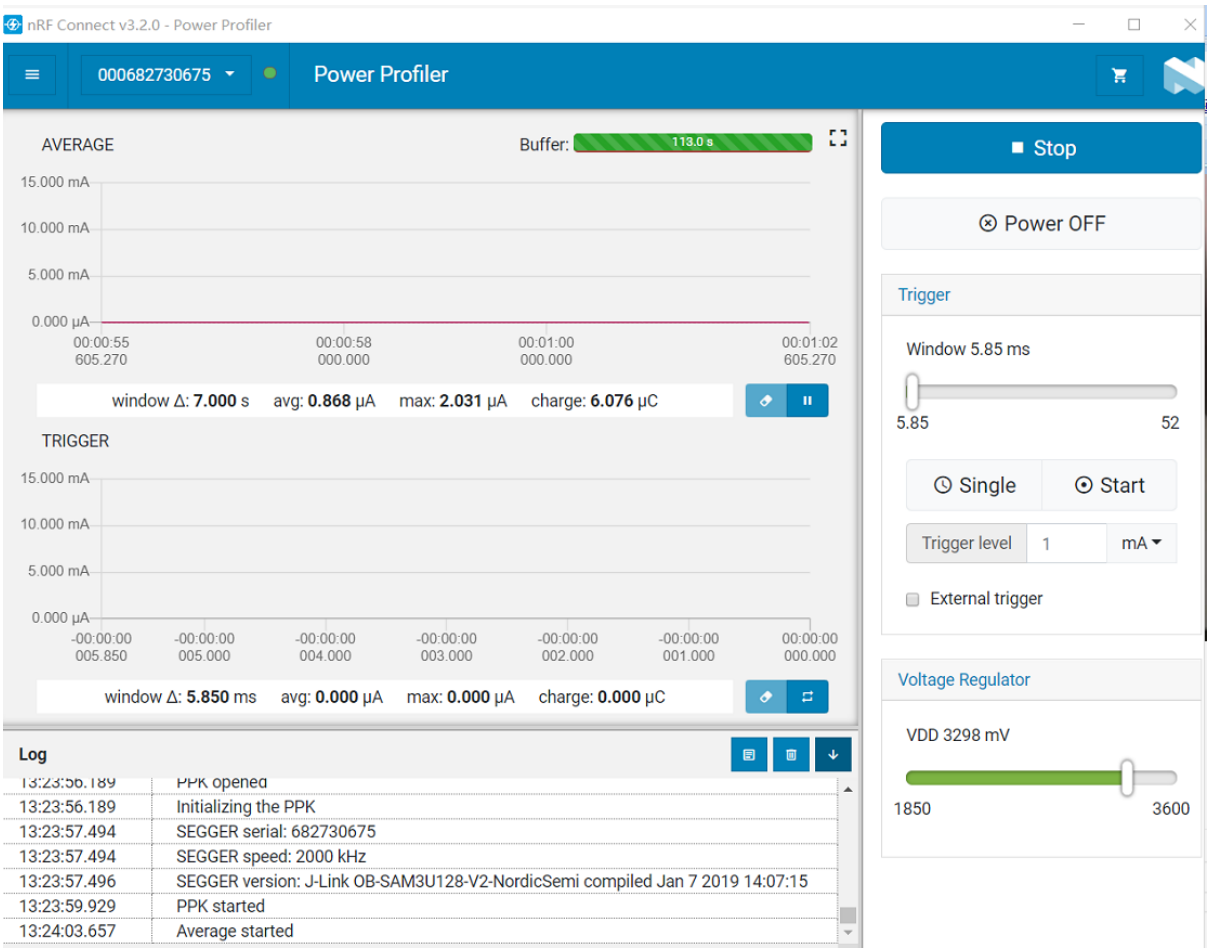
Receive mode:



Sleep mode(Backup mode):

Prepared (also subject responsible if other)		No.		
Hairui Tao				
Approved	Checked	Date	Rev	Reference
Ken Yu			V0.1	



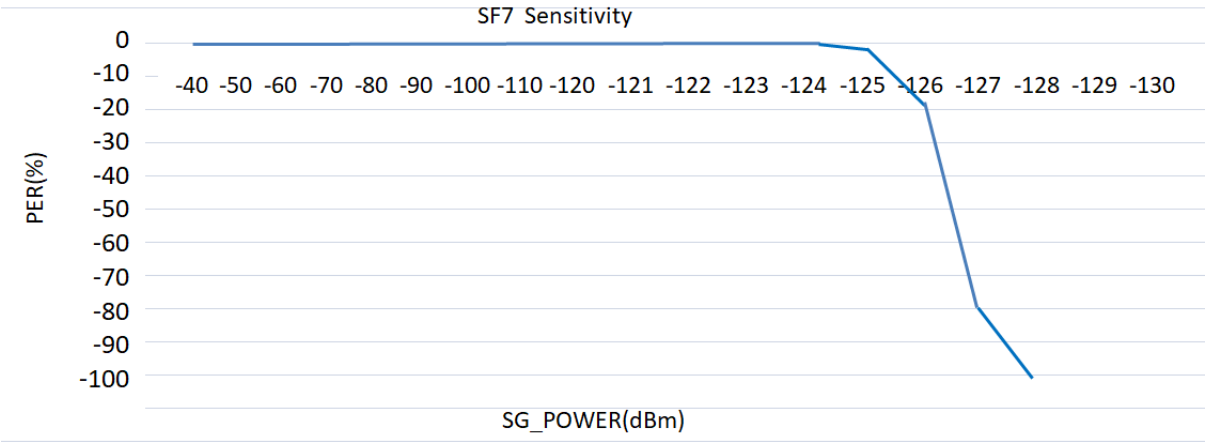


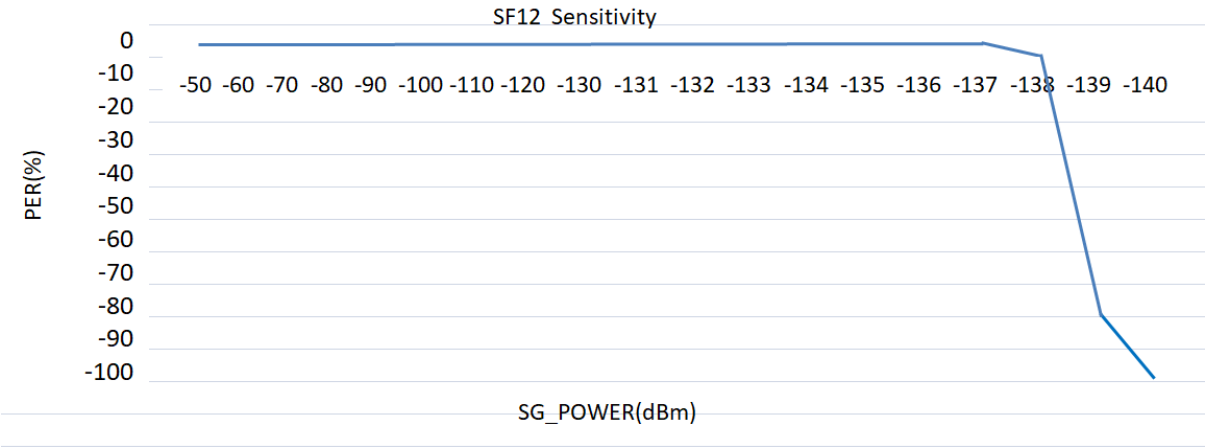
2.5 Sensitivity Level

The following chart shows the receiving sensitivity of RAK4260 at 868Mhz.

Receive Power@Ipex	-40	-50	-60	-70	-80	-90	-100	-110	-120	-121	-122	-123	-124	-125	-126	-127	-128	-129	-130
SF7 PER(%)	0	0	0	0	0	0	0	0	0	0	0	0	0	-3	-20	-78	-100	-100	-100

Receive Power@Ipex	-50	-60	-70	-80	-90	-100	-110	-120	-130	-131	-132	-133	-134	-135	-136	-137	-138	-139	-140
SF12 PER(%)	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	-0	-7	-80	-140





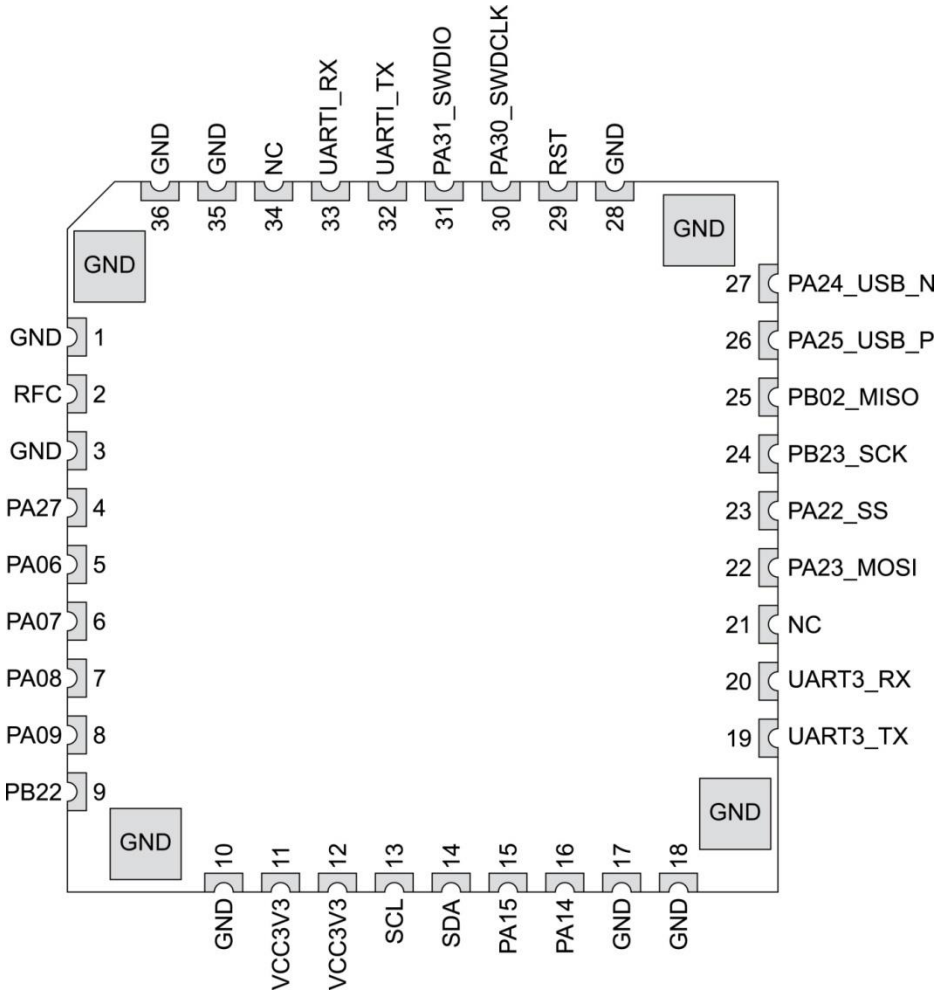
2.6 Board Pin Out& Pin Definition

RAK4260 pinout are defined as below:

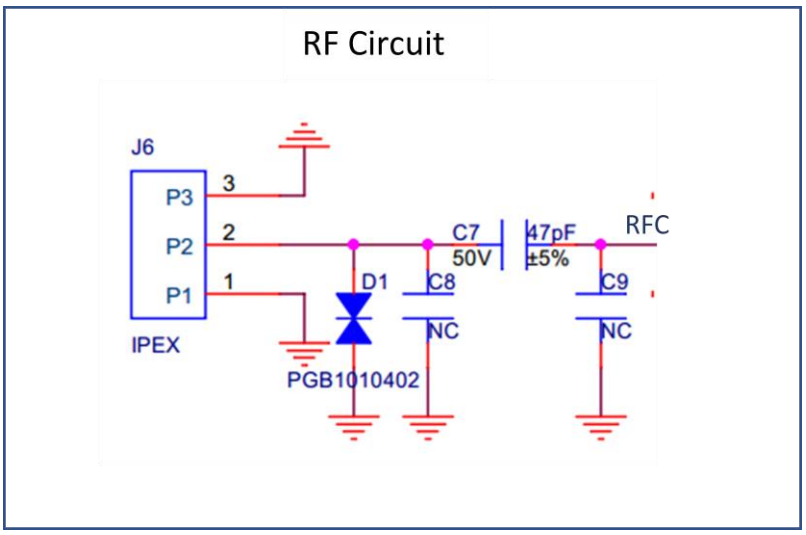
PIN	NAME	I/O	Description
1	GND	-	Ground
2	RFC		RF port
3	GND	-	Ground
4	PA27	I/O	EIC/GCLK
5	PA06	I/O	EIC/RSTC/ADC/PTC/OPAMP/TC/CCL/SERCOM0
6	PA07	I/O	EIC/RSTC/ADC/OPAMP/TC/CCL/SERCOM0
7	PA08	I/O	ADC/PTC/TC/CCL/SERCOM0/SERCOM2
8	PA09	I/O	EIC/ADC/PTC/TC/CCL/SERCOM0/SERCOM2
9	PB22	I/O	SERCOM5/TC/GCLK/CCL
10	GND	-	Ground
11	VCC3V3		3V3 power in
12	VCC3V3	-	3V3 power in
13	PA17_SCL	I/O	EIC/PTC/TC/GCLK/CCL/SERCOM1/SERCOM3
14	PA16_SDA	I/O	EIC/PTC/TC/GCLK/CCL/SERCOM1/SERCOM3

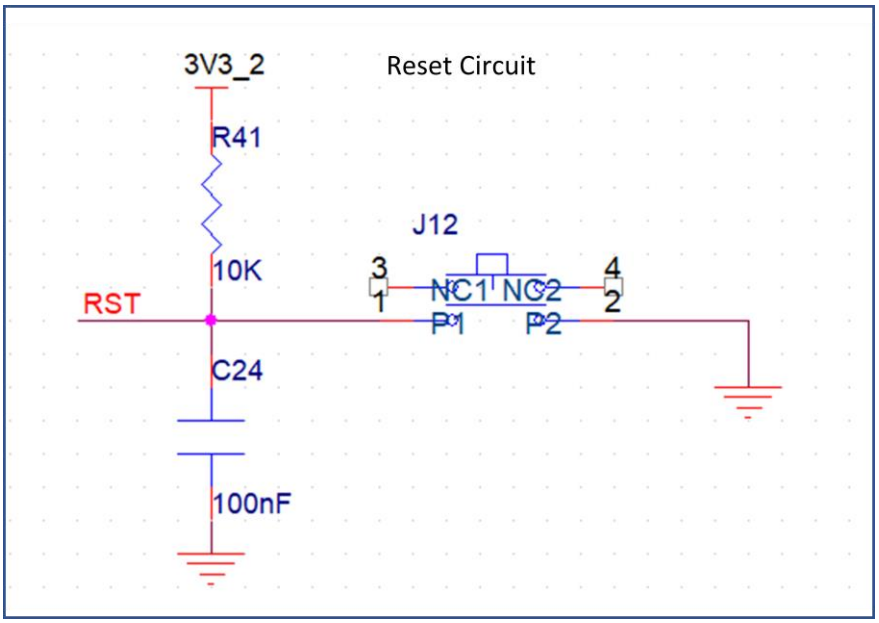
15	PA15	I/O	EIC/TC/GCLK/SERCOM2/SERCOM4
16	PA14	I/O	EIC/TC/GCLK/SERCOM2/SERCOM4
17	GND	-	Ground
18	GND	-	Ground
19	PA18_UART3_TX	I/O	EIC/PTC/TC/AC/CCL/SERCOM1/SERCOM3
20	PA19_UART3_RX	I/O	EIC/PTC/TC/AC/CCL/SERCOM1/SERCOM3
21	NC	-	NO Connect
22	PA23_MOSI	I/O	EIC/PTC/TC/AC/CCL/GCLK/SERCOM3/SERCOM5
23	PA22_SS	I/O	EIC/PTC/TC/AC/CCL/SERCOM3/SERCOM5
24	PB23_SCK	I/O	EIC/SERCOM5/TC/GCLK/CCL
25	PB02_MISO	I/O	EIC/ADC/SERCOM5/TC/SUPC/CCL
26	PA25_USB_P	I/O	EIC/SERCOM3/SERCOM5/TC/USB_DP/CCL
27	PA24_USB_N	I/O	EIC/SERCOM3/SERCOM5/TC/USB_DM/CCL
28	GND	-	Ground
29	RST		MCU reset
30	PA30_SWDCLK	I/O	SWDCLK
31	PA31_SWDIO	I/O	SWDIO
32	PA04_UART1_TX	I/O	EIC/RSTC/VREFB/ADC/AC/OPAMP/TC/CCL/SERCOM0
33	PA05_UART1_RX	I/O	EIC/RSTC/ADC/AC/OPAMP/TC/CCL/SERCOM0
34	NC	-	NO Connect
35	GND	-	Ground
36	GND	-	Ground
37	GND	-	Ground
38	GND	-	Ground
39	GND	-	Ground
40	GND	-	Ground

- Pins supporting I2C:PA08,PA09,PA16_SDA, PA17_SCL, PA22_SS, PA23_MOSI



2.7 Typical Application Circuit

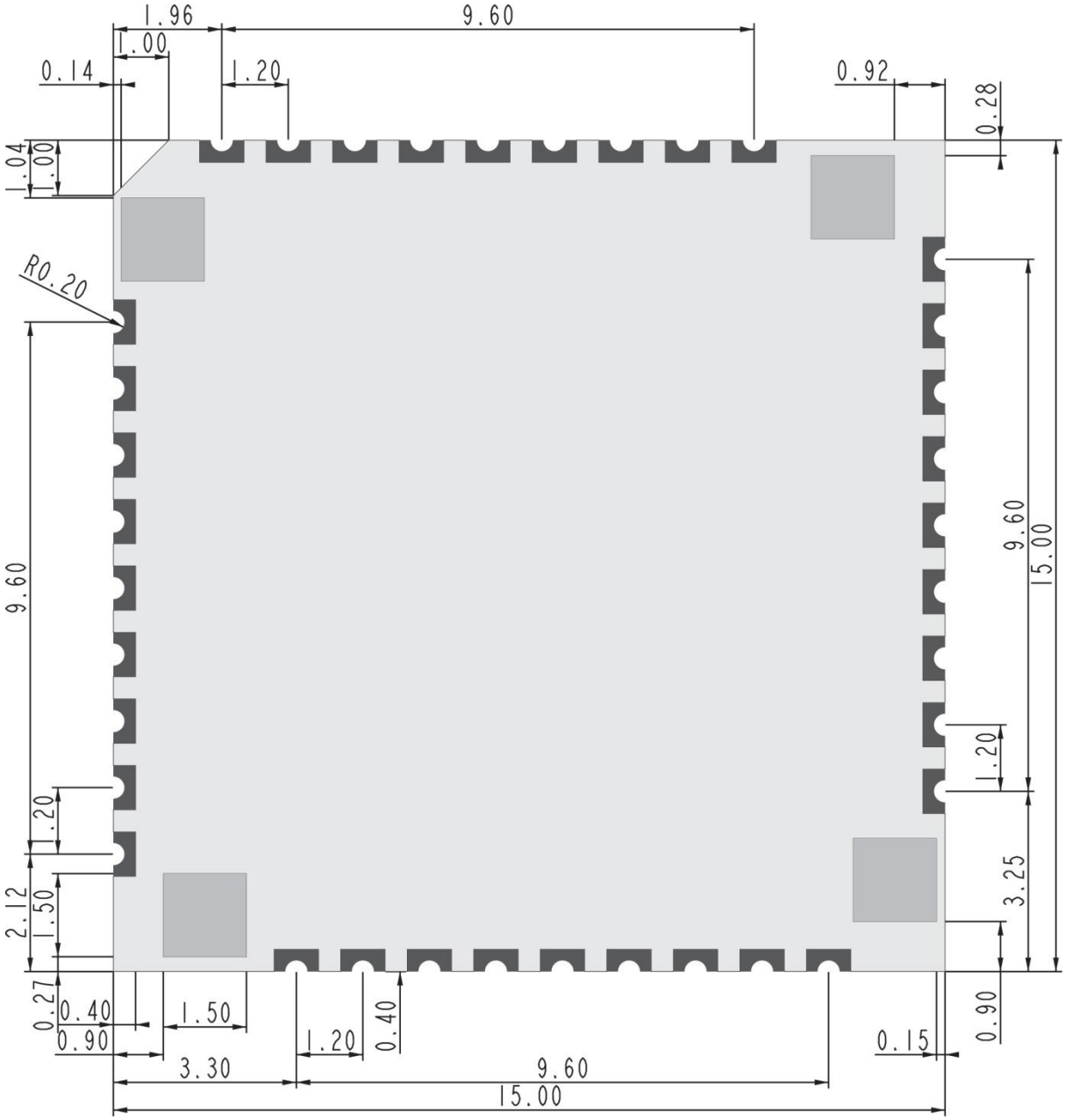


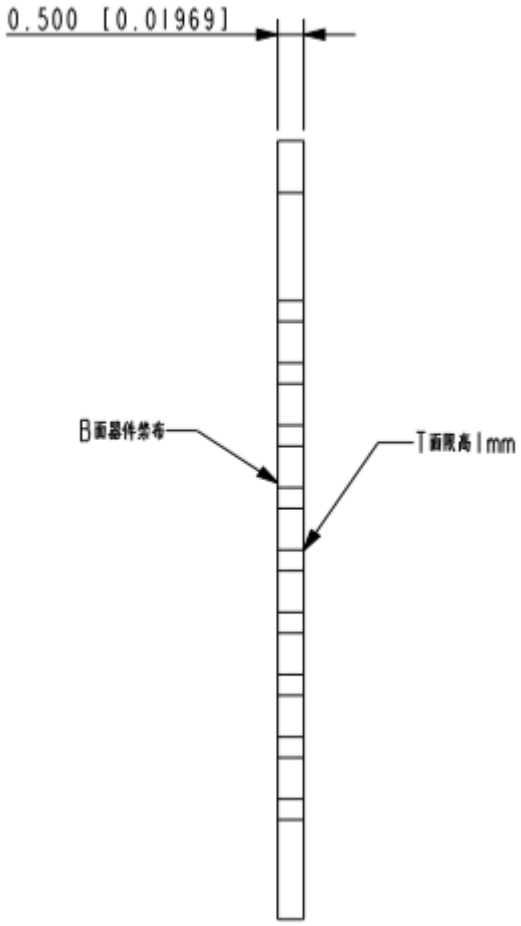


2.8 Mechanical Dimensions

The mechanical dimension of RAK4260 is shown below:

Prepared (also subject responsible if other)		No.		
Hairui Tao				
Approved	Checked	Date	Rev	Reference
Ken Yu			V0.1	





3 Source Code

4 Required Software

4.1 Uploading Firmware

5 Contact Information

Shenzhen
Email: ken.yu@rakwireless.com
Tel: 0755-26506594

Prepared (also subject responsible if other)		No.		
Hairui Tao				
Approved	Checked	Date	Rev	Reference
Ken Yu			V0.1	

Fax: 0755-86152201

Website: http://www.rakwireless.com/en

FCC Statement

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 undesired operation.

Changes or modifications to this unit not expressly approved by the party responsible for compliance could void the user's authority to operate the equipment.

NOTE: 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 a particular 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 try to correct the interference by one or more of the following measures:

-- Reorient or relocate the receiving antenna.

-- Increase the separation between the equipment and receiver.

-- Connect the equipment into 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.

This device and its antenna(s) must not be co-located or operation in conjunction with any other antenna or transmitter.

To maintain compliance with FCC's RF Exposure guidelines, This equipment should be installed and operated with minimum distance of 20cm from your body.

Integration instructions for host product manufacturers according to KDB 996369 D03 OEM Manual v01

2.2 List of applicable FCC rules

CFR 47 FCC PART 15 SUBPART C has been investigated. It is applicable to the modular.

2.3 Specific operational use conditions

This module is stand-alone modular. If the end product will involve the Multiple simultaneously transmitting condition or different operational conditions for a stand-alone modular transmitter in a host, host manufacturer have to consult with module manufacturer for the installation method in end system.

2.4 Limited module procedures

Not applicable

2.5 Trace antenna designs

Not applicable

2.6 RF exposure considerations

To maintain compliance with FCC's RF Exposure guidelines, This equipment should be installed and operated with minimum distance of 20cm from your body.

2.7 Antennas

This radio transmitter FCC ID: **2AF6B-RAK4260H** has been approved by Federal Communications Commission to operate with the antenna types listed below, with the maximum permissible gain indicated. Antenna types not included in this list that have a gain greater than the maximum gain indicated for any type listed are strictly prohibited for use with this device.

Internal Identification	Antenna Description	Antenna type and antenna number	Operate frequency band	Maximum antenna gain
Antenna 1	LoRa Antenna	Integral Antenna	902 MHz – 908 MHz	3.00 dBi

2.8 Label and compliance information

The final end product must be labeled in a visible area with the following" Contains FCC ID: **2AF6B-RAK4260H**"

2.9 Information on test modes and additional testing requirements

Host manufacturer is strongly recommended to confirm compliance with FCC requirements for the transmitter when the module is installed in the host..

2.10 Additional testing, Part 15 Subpart B disclaimer

Host manufacturer is responsible for compliance of the host system with module installed with all other applicable requirements for the system such as Part 15 B

Revision History

Revision	Description	Date
1.00	Initial version	2018-09-10