

## RS485 Cloud Communication Assembly(for Certificate)

### 1 Scope

The assembly is designed to the application scenarios of KohlerKonnnect, it works as a bridge unit between Kohler intelligent devices and upper network devices, such as intelligent gateway or router

### 2 Related Standards

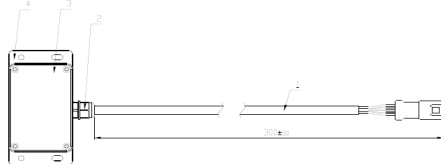
- 2.1 Wi-Fi: in compliance with 802.11b/g/n, WEB, WPA/WPA2, PSK/Enterprise
- 2.2 Bluetooth: in compliance with BQB certificate
- 2.3 RF: in compliance with EN300328-1 and EN300328-2)
- 2.4 EMC: in compliance with EN301489-1 and EN301489-17)
- 2.5 CE/CB/FCC certificated
- 2.6 In compliance with RoHS directives

### 3 Specification

- 3.1 Operation Conditions
  - 3.1.1 Operation temperature: -10℃~55℃
  - 3.1.2 Operation humidity: below RH98%
  - 3.1.3 Storage temperature: -40℃~71℃
- 3.2 Supply Voltage: DC4.5V – DC 7V

### 4 Outline structure and Electrical Interface

#### 4.1 Structural drawing



#### 4.2 Pin-out of connect: 4, RS485 supported,

| Wire Color | HW Label | I/O | Description   |
|------------|----------|-----|---------------|
| White Wire | RS485_A  | -   | RS485_A(3.3V) |
| Blue Wire  | RS485_B  | -   | RS485_B(3.3V) |
| Red Wire   | 12V      | In  | Power         |
| Black Wire | GND      | In  | GND           |

### 5 Features of Assembly

#### 5.1 General Features

##### 5.1.1 OS of mobile devices

- Above Android 4.4.2 or iOS 8.0

##### 5.2.2 Quick wireless connection and communication mode selection

- Received the command of network paring
- Wi-Fi module and BLE module start paring operation concurrently
- Wi-Fi module stays in paring operation for 30sec, it quits the process automatically if timer is out
- BLE module stays in paring operation for additional 90sec, it quits the process automatically if timer is out
- (Whichever any communication mode is established, the assembly will record the mode flag (Wi-Fi or BLE) and quit the paring process
- Power off the unselected module to reduce the power consumption

## 5.2 Features of Bluetooth Module

### 5.2.1 Support firmware upgrade by OTA

### 5.2.2 Wireless connection and binding

- Binding Principles
  - ✓ Max binding devices: 7pcs
  - ✓ The 1<sup>st</sup> device will be kicked out if the 8<sup>th</sup> device joined

### 5.2.3 RF specification

- in compliance with BLE protocol

## 5.3 Features of Wi-Fi module

### 5.3.1 Support Station and Soft AP mode

### 5.3.2 Support multiple cloud services access, such as Azure and AWS

### 5.3.3 Support firmware upgrade by OTA

### 5.3.4 Quick wireless connection

- User registration, log-in, acquiring device list, binding and unbundling
- Implement the quick wireless connection with SSID and passcode

### 5.3.5 RF specification

| Parameter | Description                                                                                       |
|-----------|---------------------------------------------------------------------------------------------------|
| frequency | 2.412 ~ 2.462Ghz                                                                                  |
| Standard  | 802.11b/g/n Single channel                                                                        |
| odulation | 11b: DBPSK, DQPSK,CCK for DSSS<br>11g: BPSK, QPSK, 16QAM, 64QAM for OFDM<br>11n: MCS0~7,OFDM *    |
| Data rate | 11b:1, 2, 5.5 and 11Mbps<br>11g:6, 9, 12, 18, 24, 36, 48 and 54 Mbps<br>11n: MCS0~7, up to 72Mbps |
| Antenna   | PCB Antenna (Default)                                                                             |

## 6. Hardware Specification

### 6.1 Bluetooth module

- An ultra-low power 2.4G wireless system on chip, integrated an ARM® Cortex™ M0 32bit processor @ 16MHz and BLE stack/profile
- 256K Flash memory, 16K RAM
- Support PCB antenna or external antenna (alternatively)

### 6.2 Wi-Fi Module

- Comprised an ARM® Cortex™ M4 32bit processor @ 100MHz and a IEEE 802.11 b/g/n compliant RF chip
- 512K on-chip flash, 2M external flash, and 128K RAM
- Support PCB antenna and IPEX external antenna (alternatively)

## 7. Statement

### 7.1 FCC Statements:

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.

Note: This product 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 product 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 product 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.

Please take attention that changes or modification not expressly approved by the party responsible for compliance could void the user's authority to operate the equipment.

### 7.2 IC Statements

This device complies with Industry Canada licence-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.

Le présent appareil est conforme aux CNR d'Industrie Canada applicables aux appareils radioexempts 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.

This equipment should be installed and operated with a minimum distance 20cm between the radiator and your body

Cet équipement doit être installé et utilisé à une distance minimale de 20 cm entre le radiateur et votre corps

## 8. Device Installation and User Manual

The IoT module is a proprietary product designed and manufactured by Shanghai Kohler Electronics. , Ltd. for integration into telematics control units manufactured by Shanghai Kohler Electronics. , Ltd. For **appliance** OEMs.

Comment [CV1]:

**i.** The module is limited to installation ONLY in an integrated device manufactured by Shanghai Kohler Electronics. , Ltd.

**ii.** During manufacturing process of the integrated device, the module is soldered onto the pcb of the integrated device.

**iii.** The antenna is integral PCB trace Antenna and maximum gain is 2 dBi for WiFi and 0dBi for BT.

This module has been approved by FCC to operate with the antenna types with the maximum permissible gain indicated. Antenna types not included in this list, having a gain greater than the maximum gain indicated for that type, are strictly prohibited for use with this device.

**iv.** Automotive OEM is responsible for ensuring that the end-user has no manual instructions to remove or install module.

**v.** The module is limited to installation in mobile applications, according to Part 2.1091(b).

**vi.** No other operation configurations are allowed.

**vii.** Changes or modifications to this system by other than a facility authorized by Continental could void authorization to use this equipment.

**viii.** The module must be installed to provide a separation distance of at least 20 cm from all persons and must not be co-located or operate in conjunction with any other antenna or transmitter.

**ix.** The integrator is responsible for fulfilling FCC and RSS requirements for the integrated device.

If Continental chooses to re-use modular approval, then the TCU shall be clearly labeled with an external label containing the integrated modem's FCC ID or IC. For example, the label can include text "Contains device with FCC ID: N82-KOHLER021 or IC:4554A-KOHLER021.