

# **TRM121 User Manual**

Wireless Data Transceiver Module

|    |  |   |
|----|--|---|
| 1、 | Performance Specification .....            | 3 |
| 2、 | Definition of interface connector pin..... | 5 |
| 3、 | Installation of radio.....                 | 6 |
| 4、 | Main Power Supply.....                     | 6 |
| 5、 | Warning.....                               | 6 |
| 6、 | FCC radiation exposure statement.....      | 7 |
| 7、 | Photo.....                                 | 8 |

## 1、Performance Specification

| <b>Technical specifications</b>                  |   |                   |
|--|---|-------------------|
| Specification name                               | specification requirements  |                   |
| Frequency range                                  | fixed frequency: 410~470MHz<br>frequency hopping: 410~470MHz and 902.4~928MHz |                   |
| Working type                                     | half-duplex   |                   |
| Channel spacing                                  | fixed frequency: 12.5KHz, 25KHz<br>frequency hopping: 280KHz                  |                   |
| Modulation type                                  | GMSK  |                   |
| Operating voltage                                | 3.3V ±10%( TX state, not more than 4V)  |                   |
| Power consumption<br>( typical value)            | Transmitted power<br>(high power)   | 1 W               |
|  | Receive power   | 0.48W             |
| Frequency stability<br>(fixed frequency)         | 410~470MHz: ≤±1.0ppm  |                   |
| Size   | 57×36×7mm   |                   |
| Weight   | 66g   |                   |
| Operating temperature                            | -40~+85°C   |                   |
| Storage temperature                              | -45~+90°C   |                   |
| Antenna interface                                | IPX or MMCX   |                   |
| Antenna impedance                                | 50ohm   |                   |
| Data interface                                   | 20pin   |                   |
| <b>Transmitter specification</b>                 |   |                   |
| Specification name                               | specification requirements  |                   |
| RF output power                                  | High power (1.0W)   | 30±0.3dBm@DC 3.3V |
| RF power stability                               | ±0.3dB  |                   |
| Adjacent channel inhibition<br>(fixed frequency) | >60dB@12.5KHz   |                   |
| Stray amplitude (fixed                           | < -36dBm@12.5KHz  |                   |
| <b>Receiver specification</b>                    |   |                   |
| Specification name                               | specification requirements  |                   |

|   |  |
|---|--|
| <b>Sensitivity</b>                                | 410~470MHz (fixed frequency, Channel spacing 12.5KHz) :<br>Better than -115dBm@BER $10^{-5}$ , 9600bps<br>410~470MHz (frequency hopping, Channel spacing 280KHz) :<br>-109dBm@BER $10^{-5}$ , 115200bps<br>902.4~928MHz (frequency hopping, Channel spacing 280KHz) :<br>-109dBm@BER $10^{-5}$ , 115200bps |
| Co-channel inhibition<br>(fixed frequency)        | > -12dB@12.5KHz  |
| Block (fixed frequency)                           | >70dB@12.5KHz  |
| Adjacent channel selectivity<br>(fixed frequency) | >60dB@12.5KHz  |
| Stray amplitude<br>(fixed frequency)              | < -36dBm@12.5KHz   |
| <b>Modulator</b>                                  |  |
| <b>Specification name</b>                         | <b>Specification requirements</b>  |
| <b>Air rate</b>                                   | fixed frequency: 9600bp,19200bps<br>frequency hopping: 115200bps   |
| <b>Modulation method</b>                          | GMSK   |

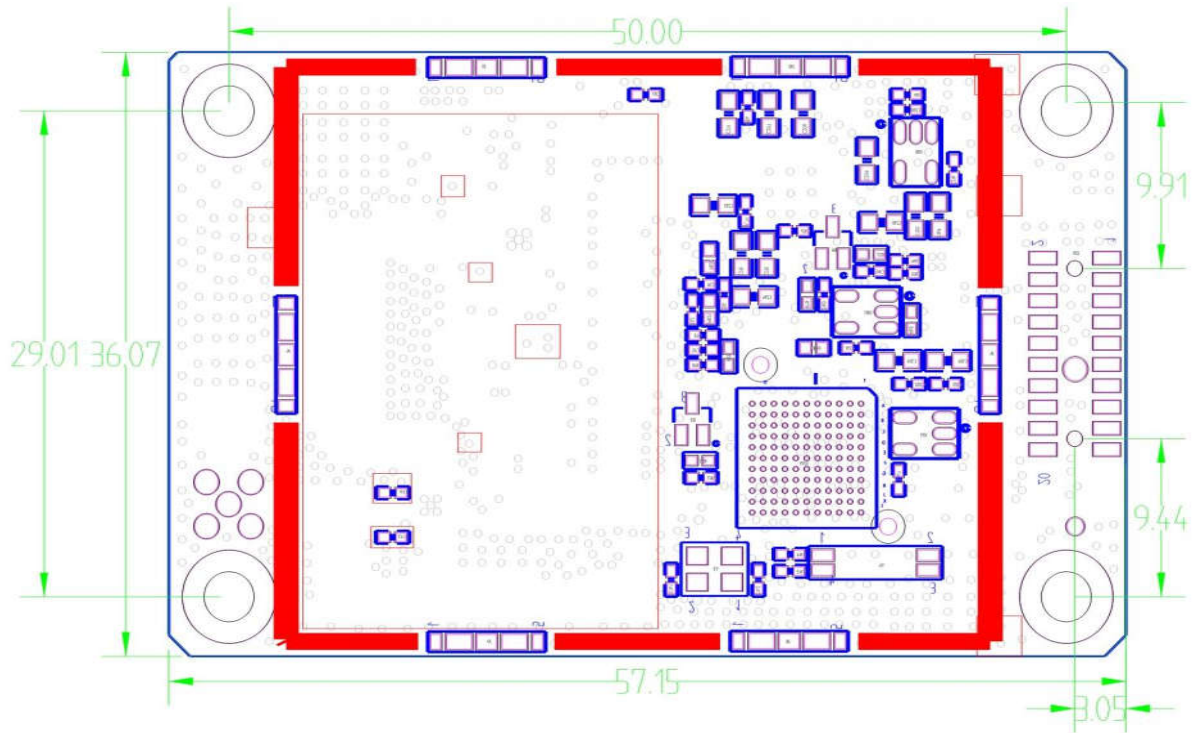
The installation height of this product is 15 meters and the service area is 3km.

## 2、 Definition of interface connector pin

| Pin No. | Input/output | definition |
|---------|--------------|------------|
| 1       | Input        | VCC        |
| 2       | Inp          | VCC        |
| 3       | Input/output | GND        |
| 4       | Input/output | GND        |
| 5       | NC           | No use     |
| 6       | Input        | Enable     |
| 7       | Output       | RXD        |
| 8       | NC           | No use     |
| 9       | Input        | TXD        |
| 10      | NC           | No use     |
| 11      | NC           | No use     |
| 12      | NC           | No use     |
| 13      | NC           | No use     |
| 14      | NC           | No use     |
| 15      | NC           | No use     |
| 16      | NC           | No use     |
| 17      | Inp          | Config     |
| 18      | NC           | No use     |
| 19      | NC           | No use     |
| 20      | NC           | No use     |

### 3、 Installation of radio

Figure 1 shown the installation dimension of data transceiver module, firmly fitted the radio modem onto the mounting surface of user system by holes on radio modem 4 corners.



**Figure 1 Radio Modem installation dimension**

### 4、 Main Power Supply

TRM121 can operate with any 3.3V power supply, which comes from data interface connector with good filtered. The power must supply 1A current at least and featured with current-limiting, even if you make radio modem operating on low power mode (0.5W).

### 5、 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 undesired operation.

## UHF Antenna specification

| Technical parameters         |            |
|------------------------------|------------|
| Frequency range (MHz)        | 410~470    |
| Bandwidth (MHz)              | 20         |
| Polarization mode            | Vertical   |
| Gain (dBi)                   | 4          |
| Input impedance ( $\Omega$ ) | 50         |
| Voltage standing wave ratio  | $\leq 2.0$ |
| Maximum power (W)            | 20         |
| Joint type                   | TNC        |
| Antenna length (mm)          | 293        |
| Antenna weight (g)           | 50         |
| Extreme wind speed (km/h)    | 90         |

Remark: Antenna structure for elastic whip, and resistance to bending.



# UHF Antenna Specification

## Technical Parameters

| Technical indicators         | QT900L     |
|------------------------------|------------|
| Frequency range (MHz)        | 902.4~928  |
| Bandwidth(MHz)               | 26         |
| Polarization mode            | Vertical   |
| Gain (dBi)                   | 3          |
| Input impedance ( $\Omega$ ) | 50         |
| Voltage standing wave ratio  | $\leq 1.5$ |
| Maximum power(W)             | 20         |
| Joint type                   | R-SMA      |
| Antenna length(cm)           | 19.6       |
| Antenna weight (g)           | 40         |





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.

Caution: Any changes or modifications to this device not explicitly approved by manufacturer could void your authority to operate this equipment.

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.

This equipment complies with FCC radiation exposure limits set forth for an uncontrolled environment.

This equipment should be installed and operated with minimum distance 60cm between the radiator & your body.

## IC WARNING

Cet appareil contient des émetteurs / récepteurs exemptés de licence conformes aux RSS (RSS) d'Innovation, Sciences et Développement économique Canada. Le fonctionnement est soumis aux deux conditions suivantes :

(1) Cet appareil ne doit pas causer d'interférences.

(2) Cet appareil doit accepter toutes les interférences, y compris celles susceptibles de provoquer un fonctionnement indésirable de l'appareil.

Cet équipement est conforme aux limites d'exposition au rayonnement ISED établies pour un environnement non contrôlé.

Cet équipement doit être installé et utilisé à une distance minimale de 60 cm entre le radiateur et votre corps.

7、Photo



## 2.2 List of applicable FCC rules

This module meets the requirements of Part 15 Subpart C Section 15.247, FCC CFR Title 47 Part 90, FCC CFR Title 47 Part 2.

## 2.4 Limited module procedures

This module is an single module.

## 2.6 RF exposure considerations

Integration is strictly limited to fixed categorized end-products where a separation distance of at least 60 cm between the radiating part and any human body can be assured during normal operating conditions.

## 2.7 Antennas

This module only allows connection one of the two antennas in the instruction manual. If other antennas are used, re-evaluation is required.

## 2.9 Information on test modes and additional testing requirements<sup>5</sup>

This module is test stand-alone, if more another modules work together with this module, please evaluation the multiple RF exposure.

## 2.10 Additional testing, Part 15 Subpart B disclaimer

The final end product must be labeled in a visible area with the following “Contains TX FCC ID: 2ABNA-TRM121” .If the size of the end product is smaller than 8x10cm, then additional FCC part 15.19 statement is required to be available in the users manual: 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.

**IMPORTANT NOTE:**

Integration is strictly limited to mobile/fixed categorized end-products where a separation distance of at least 60 cm between the radiating part and any human body can be assured during normal operating conditions.

**IMPORTANT NOTE:**

In the event that these conditions can not be met (for example certain laptop configurations or co-location with another transmitter).then the FCC authorization is no longer considered valid and the FCC ID can not 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 FCC authorization.

**IMPORTANT NOTE:**

This module is intended for OEM integrator only and the OEM integrators are instructed to ensure that the end user has no manual instructions to remove or install the device. The OEM integrator is still responsible for the FCC compliance requirement of the end product, which integrates this module.

**LABEL OF THE END PRODUCT:**

The final end product must be labeled in a visible area with the following “Contains TX FCC ID: 2ABNA-TRM121” .If the size of the end product is smaller than 8x10cm, then additional FCC part 15.19 statement is required to be available in the users manual: 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.

**IMPORTANT NOTE:**

Integration is strictly limited to mobile/fixed categorized end-products where a separation distance of at least 60 cm between the radiating part and any human body can be assured during normal operating conditions.

**IMPORTANT NOTE:**

In the event that these conditions can not be met (for example certain laptop configurations or co-location with another transmitter).then the IC authorization is no longer considered valid and the IC ID can not 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 IC authorization.

**IMPORTANT NOTE:**

This module is intended for OEM integrator only and the OEM integrators are instructed to ensure that the end user has no manual instructions to remove or install the device. The OEM integrator is still responsible for the IC compliance requirement of the end product, which integrates this module.

**LABEL OF THE END PRODUCT:**

The final end product must be labeled in a visible area with the following “Contains TX IC: 11648A-TRM121” .If the size of the end product is smaller than 8x10cm, then additional IC statement is required to be available in the users manual:

Cet appareil contient des émetteurs / récepteurs exemptés de licence conformes aux RSS (RSS) d'Innovation, Sciences et Développement économique Canada. Le fonctionnement est soumis aux deux conditions suivantes :

- (1) Cet appareil ne doit pas causer d'interférences.
- (2) Cet appareil doit accepter toutes les interférences, y compris celles susceptibles de provoquer un fonctionnement indésirable de l'appareil.

Cet équipement est conforme aux limites d'exposition au rayonnement ISED établies pour un environnement non contrôlé.

Cet équipement doit être installé et utilisé à une distance minimale de 60 cm entre le radiateur et votre corps.