

User Manual for Transmitter Module

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1 Introduction

This manual describes the characteristics and precautions of the wireless transmission module of the transmitter.

2 Main Characteristics

No.	Parameter	Characteristics
1	Frequency	2.4GHz/5GHz
2	Band width	10MHz
3	Power	26dBm@2.4GHz; 24dBm@5GHz
4	Modulation	OFDM
5	Constellation	BPSK, QPSK,16QAM
6	FEC	LDPC (1/2, 2/3, 3/4, 5/6)
7	Duplex	TDD
8	Downlink throughput	2Mbps ~ 10Mbps
9	Uplink throughput	600kbps
10	Encryption	AES256
11	Telemetry baud rate	9600/57600/115200bps
12	Configuration baud rate	115200bps
13	Interface	Ethernet,*1,Serial*2,S.BUS*1
14	Dimension	35X65mm
15	Rated voltage/current	DC12V/1.5A (or 3S lithium battery)
16	Working temperature	-20°C ~55°C

3 Connector Pins Definition

Name	Pin	Type	Description
MCU_USART1_TX	1	DO	UART1 transmit
MCU_USART1_RX	2	DI	UART1 receive
MCU_USART2_TX	3	DO	UART2 transmit
MCU_USART2_RX	4	DI	UART2 receive
MCU_USART6_TX	5	DO	UART6 transmit
MCU_USART6_RX	6	DI	UART6 receive
GND	7	GND	Ground

MCU_USART3_TX	8	DO	UART3 transmit
BIND_KEY	9	BIND	Binding signal
SYNCIO/MCU_UART4_TX	10	DO	UART4 transmit
PVIN	11	PI	Power input(12V±5%, 2A)
PVIN	12	PI	
PVIN	13	PI	
PVIN	14	PI	
GND	15	Gnd	Ground
GND	16	Gnd	
GND	17	Gnd	
GND	18	Gnd	
FEA_TDP	19	AIO/PU	Ethernet in/out differential positive signal of interface 1
FEA_TDN	20	AIO/PU	Ethernet in/out differential negative signal of interface 1
FEA_RDP	21	AIO/PU	Ethernet in/out differential positive signal of interface 2
FEA_RDN	22	AIO/PU	Ethernet in/out differential negative signal of interface 2

4 Configuration Command

The command format is as follows:

STST

```
{ "calMode": "enable", "keepMode": "keepTx", "power": "26", "loFreq": "2417", "antennaMode": "ant1" }
```

Command parsing:

```
"calMode": "enable"      // Enter Test Mode
"keepMode": "keepTx"     // Only send mode
"keepMode": "keepRx"     // Only accept mode
"keepMode": "Normal"     //
"power": "XXX"           // Input power value:XXX
"loFreq": "XXX"          // Input frequency point value :XXX
"antennaMode": "ant1"    //Select antenna 1 for transmission
"antennaMode": "ant2"    //Select antenna 2 for transmission
```

5 Notice

1) During mounting

- Please do not use metals for a chassis setting this module.

- Please do not mount parts under this module except a specified connector.

2) During operation

- The products might receive the radio wave interference from electronic devices such as Wireless LAN devices, Bluetooth devices and so on that radiate electromagnetic wave.

- Confirm that operation temperature is within the specified range described in product specification.

- Products should be used at rated voltage.

- Check the polarity of product before power on. No reverse connecting.

- No direct contacting with water, oil, acid or alkaline.

- No crushing, nail penetrating or disassembling products.

- No discarding. Dispose based on the local policy and law.

3) Storage

- No storage in a condition with a relative humidity exceeding 85% or with corrosive gases. It is easy to cause the damage and corrosion of the module, resulting in disconnection.

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- For long-term storage, place the product in a well-ventilated condition at -10°C ~50°C, with a relative humidity below 85%.

FCC Statement:

FEDERAL COMMUNICATIONS COMMISSION 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 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 not expressly approved by the grantee of this device could void the user's authority to operate the 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.

RF Exposure warning

This equipment must be installed and operated in accordance with provided instructions and 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 co-located or operating in conjunction with any other antenna or transmitter. End-users and installers must be provide with antenna installation instructions and transmitter operating conditions for satisfying RF exposure compliance.

This radio transmitter FCC ID: 2AQVB-TS101A-N has been approved by FCC to operate with the antenna types listed below with the maximum permissible gain and required antenna impedance for each antenna type 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.

Antenna List

2.4G Antenna Information

Antenna Information				
Item.	Brand Name	Part No.	Type	Gain(dBi)
1	Be-Comfortable	N12-7418-R0A (Main)	Dipole	2.98
2	Be-Comfortable	N12-7417-R0A (Aux)	Dipole	3.14

5G Antenna Information

Antenna Information				
Item.	Brand Name	Part No.	Type	Gain(dBi)
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2	Be-Comfortable	N12-7417-R0A (Aux)	Dipole	3.61

Note: The antenna connector is Reverse SMA type.

Information for OEMs and host integrators

The OEM or integrator is obligated to adhere to these requirements and restrictions as a condition for using the module's certification.

The OEM or integrator is responsible to perform the required additional host regulatory testing and/or obtaining the required host approvals for compliance.

Per KDB 996369 D03 OEM Manual section 2.2 to 2.12, this module is intended for OEM

integrators under the following conditions:

2.2 List of applicable FCC rules

This module has been tested for compliance to FCC Part 15 Subpart C (15.247) and Subpart E (15.407).

2.3 Summarize the specific operational use conditions

The module is tested for standalone mobile RF exposure use condition. Any other usage conditions such as co-location with other transmitter(s) will need a separate reassessment through a class II permissive change application or new certification.

2.4 Limited module procedures

Not applicable, this device is a single modular approval and meets FCC 47 CFR 15.212 requirement.

2.5 Trace antenna designs

Not applicable. This module has its own antenna, and does not need a host's printed board micro strip trace antenna, etc.

2.6 RF exposure considerations

This equipment complies with FCC mobile radiation exposure limits set forth for an uncontrolled environment. This equipment should be installed and operated with a minimum distance of 20cm between the radiator & your body. A separate SAR/Power Density evaluation is required to confirm compliance with relevant FCC portable RF exposure rules.

2.7 Antennas

This module has been approved to operate with the antenna types listed below, with the maximum permissible gain indicated.

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IMPORTANT: The final host product must have an integral antenna which is not removable by the end-user.

2.8 Label and compliance information

Label of the end product:

The final end product must be labeled in a visible area with the following: “Contains FCC ID: 2AQVB-TS101A-N”. The grantee's FCC ID can be used only when all FCC compliance requirements are met

2.9 Information on test modes and additional testing requirements

This transmitter is tested in a standalone mobile RF exposure condition and any co-located or simultaneous transmission with other transmitter(s) class II permissive change re-evaluation or new certification.

2.10 Additional testing, Part 15 Subpart B disclaimer

This transmitter module is tested as a subsystem and its certification does not cover the FCC Part 15 Subpart B (unintentional radiator) rule requirement applicable to the final host. The final host will still need to be reassessed for compliance to this portion of rule requirements if applicable. As long as all conditions above are met, further transmitter test will not be required. However, the OEM integrator is still responsible for testing their end-product for any additional compliance requirements required with this module installed.

IMPORTANT NOTE: In the event that these conditions cannot 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 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 FCC authorization.

Manual Information To the End User

The OEM integrator has to be aware not to provide information to the end user regarding how to install or remove this RF module in the user’s manual of the end product which integrates this module. The end user manual shall include all required regulatory information/warning as show in this manual.

OEM/Host manufacturer responsibilities

OEM/Host manufacturers are ultimately responsible for the compliance of the Host and Module. The final product must be reassessed against all the essential requirements of the FCC rule such as FCC Part 15 Subpart B before it can be placed on the US market. This includes reassessing the transmitter module for compliance with the Radio and EMF essential requirements of the FCC rules. This module must not be incorporated into any other device or system without retesting for compliance as multi-radio and combined equipment.