

eM300-8a V2R1 V200R001 User Manual

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1 Product Overview

Description

Huawei eLTE-IoT module series are the wireless modules designed for the Internet of Things (IoT) industry, providing narrowband and low-power-consumption radio data bearer for interconnection with the network. Huawei eLTE-IoT module series also provide a UART port for integration into various industrial devices.

Highlights

The eLTE-IoT eM300-8a V2R1 V200R001 module has the following characteristics:

- Support for the 902-928 MHz frequency band
- eLTE-IoT data service
- High sensitivity and low power consumption
- Support for UART ports, meeting the integration and interconnection requirements of most industrial devices
- Support for remote management
- Support for authentication without SIM cards

Appearance

Figure 1-1 shows the appearance of the module.

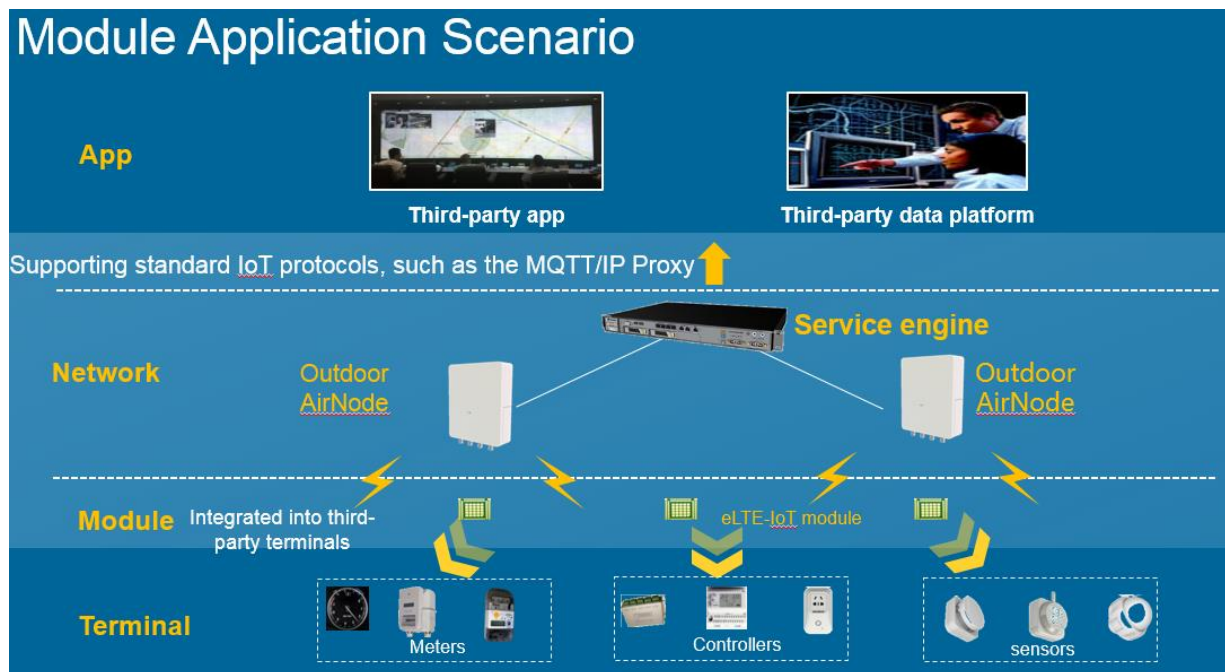
Figure 1-1 Appearance of the module



2 Application Scenarios

The eLTE-IoT module provides narrowband IoT access for customers in vertical industries. It is applicable to the fixed IoT access scenarios of enterprise and industry customers, meeting the requirements of low power consumption, high sensitivity, and deep coverage.

Figure 2-1 Example of IoT application scenarios of the eLTE-IoT module in vertical industries



3 Technical Specifications

3.1 Hardware Specifications

Table 3-1 shows the hardware specifications of the eLTE-IoT module.

Table 3-1 Hardware specifications of the eM300-8a V2R1 V200R001 module

Category		Description
Technical standard	eLTE-IoT	Litefire 1.1 System bandwidth: 1.8 MHz, subcarrier bandwidth: UL: 3.75 KHz, DL: 15 KHz/3.75 KHz
Working frequency	eLTE-IoT	902-928 MHz
External Interface		Support for UART ports (<1000bytes receiving block@9600 baud rate in low power mode,>=1000bytes receiving block@57600 baud rate in normal mode) Package: 94PIN-LCC+LGA
Transmit power	eLTE-IoT	26±1dBm
Receiver sensitivity	eLTE-IoT	Downlink receiver sensitivity reaches -136 dBm, meeting the 5 km suburban coverage requirement.
Power consumption		eM300-8a: 22.4uw@PSM; 0.46w@Tx=20dBm
Power		VBAT supply voltage: 3.3V ~ 3.8V Typical supply voltage: 3.6V VDD_EXT supply voltage: 1.8V or 3.0V
Dimension		19.9× 23.6× 2.2mm
Weight		< 3g
Temperature		Operating temperature: -40°C to +75°C Storage temperature: -40°C to +85°C

Humidity	5% to 95%
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NOTE

It is recommended that the devices be deployed on live networks within 3 months after arrival, or stored in the following environment:

- Temperature: -10°C to 35°C
- Relative humidity (RH): 30% to 85%

The temperature and humidity equipment and dehumidification equipment must be installed in the storage environment to monitor and adjust temperature and humidity.

3.2 Software Specifications

Table 3-2 shows the software specifications of the eLTE-IoT module.

Table 3-2 Software specifications of the eLTE-IoT module

Item	Description
eLTE-IoT	Support the eLTE-IoT protocol: <ul style="list-style-type: none"> ✓ Support uplink frequency hopping (HP) sending to comply with the regulations on unlicensed spectra in Latin America. ✓ Support authentication without SIM cards ✓ Support deregistration on the core network ✓ Support HTTP persistent connection and support network-initiated downlink query function if power saving is not required ✓ Support uplink ALOHA access ✓ Support the RLC ARQ mechanism to ensure the reliable transmission of services ✓ Support open loop power control to meet the dynamic receive power range requirement of base stations
Performance	Data transmission capability: UL: 10 kbit/s(Max) ; DL: 15 kbit/s(Max)
Communication interface	Support AT command and interconnection with external devices through serial ports
Upgrade	Support
Certification	Federal Communications Commission (FCC) certification
Product maintenance	Support the maintenance and commissioning through the serial port

3.3 900M Antenna Specifications

Parameters	Range	Unit
Frequency Band	902-928	MHz
Bandwidth (typ.)	30	MHz
Peak Gain (typ.)	2.5	dBi
VSWR	2 (max)	
Polarization	Linear	
Pattern	Omni-directional	
Impedance	50	Ω
Dimensions		mm
Connector	RP-SMA	



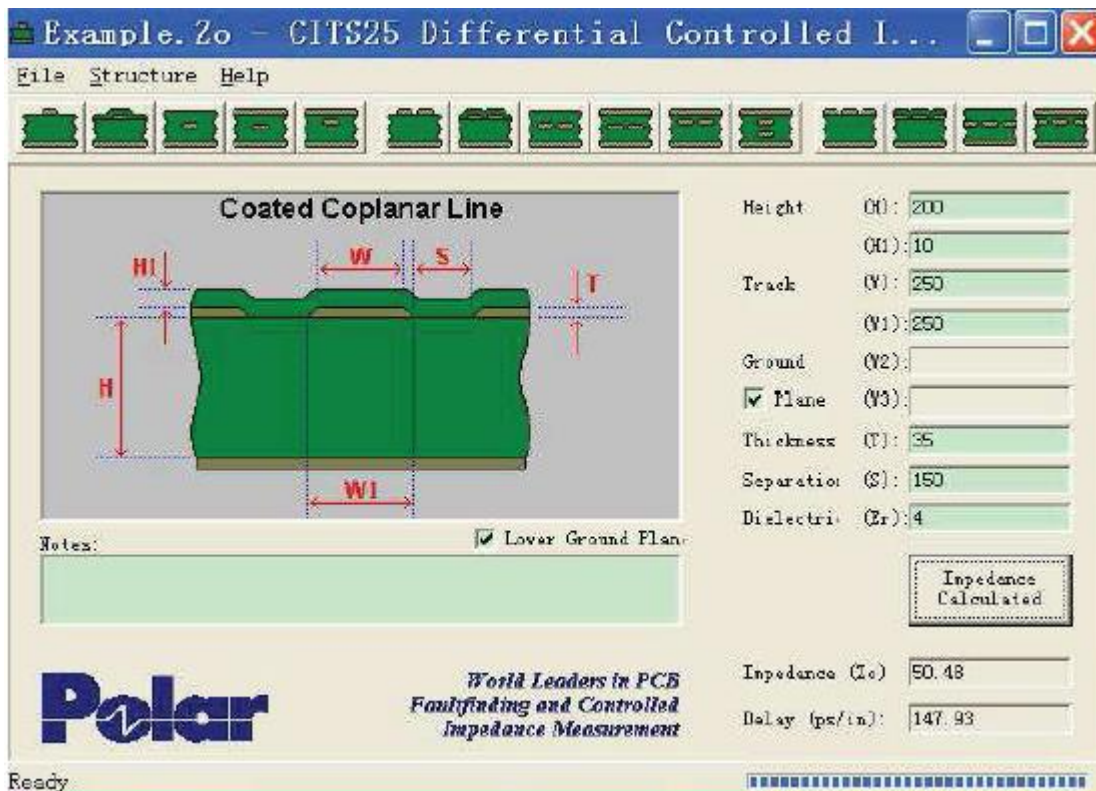
3.4 eLTE-IoT Module eM300-8a Antenna Design Guide

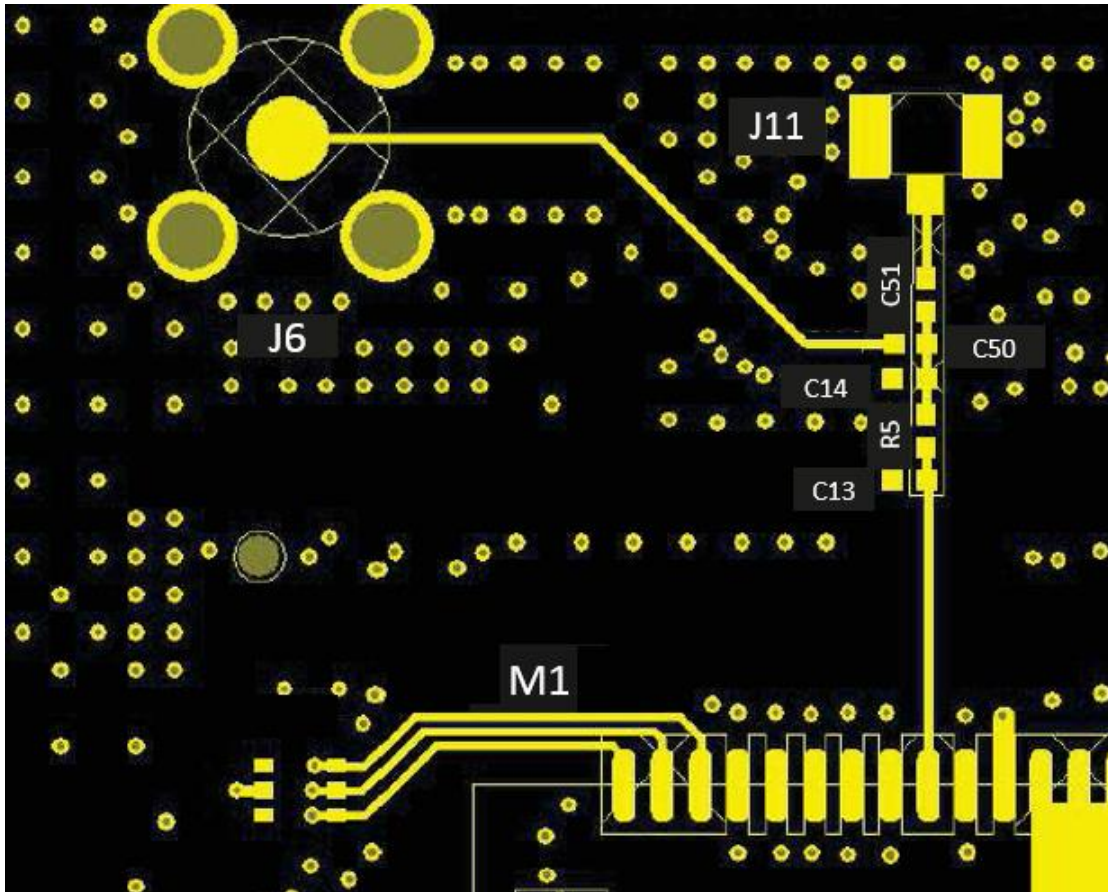
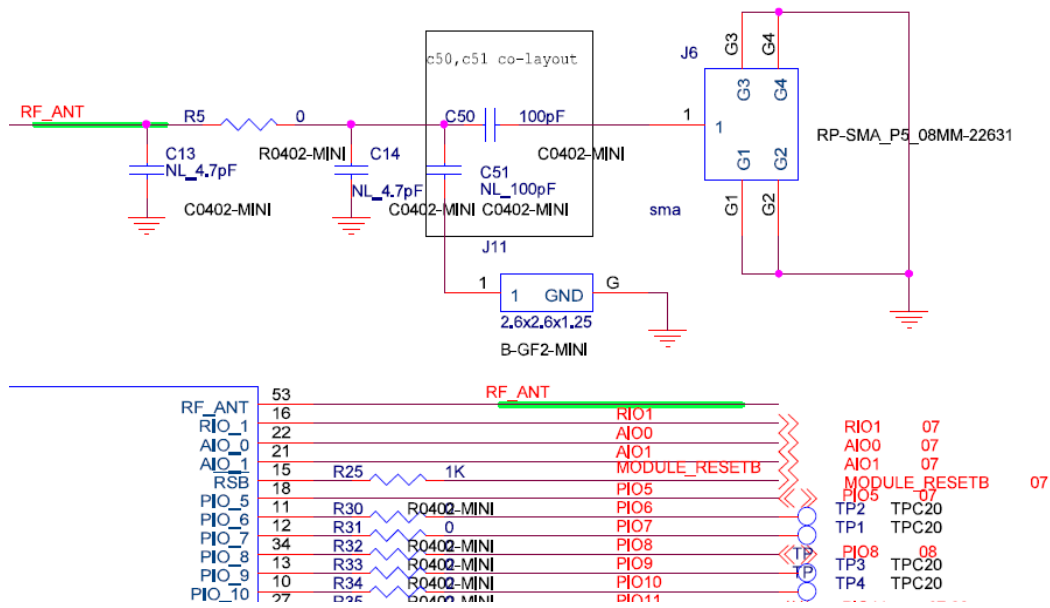
Users should connect antennas to eM300-8a’s antenna pads through micro-strip line or other types of RF trace and the trace impedance must be controlled in 50Ω. Reference Design recommends that the total insert on loss between the antenna pads and antennas should meet the following requirements:

Trace loss

Frequency	loss
902MHz-928MHz	<0.5dB

To facilitate the antenna tuning and certification test ,a RF connector and an antenna matching circuit should be added.The following figure is the recommended circuit.





Antenna matching circuit (RF_ANT)

In figure ,the componenets R5,C13,C14and C50 or C51 are used for antenna matching.
 The value of componnets can only be achieved after the antenna tuning and usually provided by antenna vendor.By default,the R5 are 0Ω resistors,and the C13,C14 are 4.7pF, and they are reserved for tuning

The RF test connector is used for the conducted RF performance test, and should be placed as close as to the module's RF_ANT pin. The traces impedance between eM300-8a and antenna must be controlled in 50Ω.

4 Services and Applications

Data Services

The eLTE-IoT module performs IoT data backhaul after being integrated by devices through the serial port.

Local Management and Maintenance

The eLTE-IoT module supports the maintenance and commissioning through the serial port.

Remote Management and Maintenance

The eLTE-IoT module support remote device management.

5 Standards Compliance

Communication Protocol

Table 5-1 shows the standards and communication protocols that the eLTE-IoT module complies with.

Table 5-1 Communication protocol

Item	Description
Wireless	eLTE-IoT

6 Packing List

Table 6-1 shows the packing list of the eLTE-IoT module.

Table 6-1 Packing list of the eLTE-IoT module

Item	Quantity	Description
eM300-8a V2R1	1	Standard option

7 FCC Regulations

FCC Regulations:

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

RF Exposure Information

This device complies with FCC radiation exposure limits set forth for an uncontrolled environment. In order to avoid the possibility of exceeding the FCC radio frequency exposure limits, human proximity to the antenna shall not be less than 20cm (8 inches) during normal operation.

IMPORTANT NOTE:

This module is intended for OEM integrator. The OEM integrator is still responsible for the FCC compliance requirement of the end product, which integrates this module. 20cm minimum distance has to be able to be maintained between the antenna and the users for the host this module is integrated into. Under such configuration, the FCC radiation exposure limits set forth for a population/uncontrolled environment can be satisfied.

Any changes or modifications not expressly approved by the manufacturer could void the user's authority to operate this equipment.

USERS MANUAL OF THE END PRODUCT:

In the user's manual of the end product, the end user has to be informed to keep at least 20cm separation with the antenna while this end product is installed and operated. The end user has to be informed that the FCC radio-frequency exposure guidelines for an uncontrolled environment can be satisfied. The end user has to also be informed that any changes or modifications not expressly approved by the manufacturer could void the user's authority to operate this equipment. 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 user's manual: This device complies with Part 15 of 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 OF THE END PRODUCT:

The final end product must be labeled in a visible area with the following " Contains TX FCC ID: QISEM300-8AMC". 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 the label: This device complies with Part 15 of 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.

A Acronyms and Abbreviations

PSM	Power Save Model
IOT	Internet Of Things