

FCM940Q

Hardware Design

Short-Range Products

Version: 1.0.0

Date: 2025-09-04

Status: Preliminary



At Quectel, our aim is to provide timely and comprehensive services to our customers. If you require any assistance, please contact our headquarters:

Quectel Wireless Solutions Co., Ltd.

No. 8 Waipojing Road, Sijing Town, Songjiang District, Shanghai 201601, China

Tel: +86 21 5108 6236

Email: info@quectel.com

Or our local offices. For more information, please visit:

<http://www.quectel.com/support/sales.htm>.

For technical support, or to report documentation errors, please visit:

<http://www.quectel.com/support/technical.htm>.

Or email us at: support@quectel.com.

Legal Notices

We offer information as a service to you. The provided information is based on your requirements and we make every effort to ensure its quality. You agree that you are responsible for using independent analysis and evaluation in designing intended products, and we provide reference designs for illustrative purposes only. Before using any hardware, software or service guided by this document, please read this notice carefully. Even though we employ commercially reasonable efforts to provide the best possible experience, you hereby acknowledge and agree that this document and related services hereunder are provided to you on an “as available” basis. We may revise or restate this document from time to time at our sole discretion without any prior notice to you.

Use and Disclosure Restrictions

License Agreements

Documents and information provided by us shall be kept confidential, unless specific permission is granted. They shall not be accessed or used for any purpose except as expressly provided herein.

Copyright

Our and third-party products hereunder may contain copyrighted material. Such copyrighted material shall not be copied, reproduced, distributed, merged, published, translated, or modified without prior written consent. We and the third party have exclusive rights over copyrighted material. No license shall be granted or conveyed under any patents, copyrights, trademarks, or service mark rights. To avoid ambiguities, purchasing in any form cannot be deemed as granting a license other than the normal non-exclusive, royalty-free license to use the material. We reserve the right to take legal action for noncompliance with abovementioned requirements, unauthorized use, or other illegal or malicious use of the material.

Trademarks

Except as otherwise set forth herein, nothing in this document shall be construed as conferring any rights to use any trademark, trade name or name, abbreviation, or counterfeit product thereof owned by Quectel or any third party in advertising, publicity, or other aspects.

Third-Party Rights

This document may refer to hardware, software and/or documentation owned by one or more third parties ("third-party materials"). Use of such third-party materials shall be governed by all restrictions and obligations applicable thereto.

We make no warranty or representation, either express or implied, regarding the third-party materials, including but not limited to any implied or statutory, warranties of merchantability or fitness for a particular purpose, quiet enjoyment, system integration, information accuracy, and non-infringement of any third-party intellectual property rights with regard to the licensed technology or use thereof. Nothing herein constitutes a representation or warranty by us to either develop, enhance, modify, distribute, market, sell, offer for sale, or otherwise maintain production of any our products or any other hardware, software, device, tool, information, or product. We moreover disclaim any and all warranties arising from the course of dealing or usage of trade.

Privacy Policy

To implement module functionality, certain device data are uploaded to Quectel's or third-party's servers, including carriers, chipset suppliers or customer-designated servers. Quectel, strictly abiding by the relevant laws and regulations, shall retain, use, disclose or otherwise process relevant data for the purpose of performing the service only or as permitted by applicable laws. Before data interaction with third parties, please be informed of their privacy and data security policy.

Disclaimer

- a) We acknowledge no liability for any injury or damage arising from the reliance upon the information.
- b) We shall bear no liability resulting from any inaccuracies or omissions, or from the use of the information contained herein.
- c) While we have made every effort to ensure that the functions and features under development are free from errors, it is possible that they could contain errors, inaccuracies, and omissions. Unless otherwise provided by valid agreement, we make no warranties of any kind, either implied or express, and exclude all liability for any loss or damage suffered in connection with the use of features and functions under development, to the maximum extent permitted by law, regardless of whether such loss or damage may have been foreseeable.
- d) We are not responsible for the accessibility, safety, accuracy, availability, legality, or completeness of information, advertising, commercial offers, products, services, and materials on third-party websites and third-party resources.

Copyright © Quectel Wireless Solutions Co., Ltd. 2025. All rights reserved.

Safety Information

The following safety precautions must be observed during all phases of operation, such as usage, service or repair of any terminal or mobile incorporating the module. Manufacturers of the terminal should notify users and operating personnel of the following safety information by incorporating these guidelines into all manuals of the product. Otherwise, Quectel assumes no liability for customers' failure to comply with these precautions.



Full attention must be paid to driving at all times in order to reduce the risk of an accident. Using a mobile while driving (even with a handsfree kit) causes distraction and can lead to an accident. Please comply with laws and regulations restricting the use of wireless devices while driving.



Switch off the terminal or mobile before boarding an aircraft. The operation of wireless appliances in an aircraft is forbidden to prevent interference with communication systems. If there is an Airplane Mode, it should be enabled prior to boarding an aircraft. Please consult the airline staff for more restrictions on the use of wireless devices on an aircraft.



Wireless devices may cause interference on sensitive medical equipment, so please be aware of the restrictions on the use of wireless devices when in hospitals, clinics or other healthcare facilities.



Terminals or mobiles operating over radio signal and cellular network cannot be guaranteed to connect in certain conditions, such as when the mobile bill is unpaid or the (U)SIM card is invalid. When emergency help is needed in such conditions, use emergency call if the device supports it. In order to make or receive a call, the terminal or mobile must be switched on in a service area with adequate cellular signal strength. In an emergency, the device with emergency call function cannot be used as the only contact method considering network connection cannot be guaranteed under all circumstances.



The terminal or mobile contains a transceiver. When it is ON, it receives and transmits radio frequency signals. RF interference can occur if it is used close to TV sets, radios, computers or other electric equipment.



In locations with explosive or potentially explosive atmospheres, obey all posted signs and turn off wireless devices such as mobile phone or other terminals. Areas with explosive or potentially explosive atmospheres include fueling areas, below decks on boats, fuel or chemical transfer or storage facilities, and areas where the air contains chemicals or particles such as grain, dust or metal powders.

About the Document

Revision History

Version	Date	Author	Description
-	2025-09-04	Stark Xiao/Tina Wu	Creation of the document
1.0.0	2025-09-04	Stark Xiao/Tina Wu	Preliminary

Contents

Safety Information.....	3
About the Document.....	4
Contents.....	5
Table Index.....	7
Figure Index.....	8
1 Introduction.....	9
2 Product Overview.....	10
2.1 Key Features.....	11
3 Application Interfaces.....	12
3.1 Pin Assignment.....	12
3.2 Pin Definitions.....	13
3.3 GPIO Multiplexing.....	17
3.4 Interface Definition.....	18
3.4.1 UART Interface.....	18
3.4.2 SPI Interface.....	19
3.4.3 I2C Interface.....	20
3.4.4 QSPI Interface.....	20
3.4.5 JTAG Interface.....	20
4 Operating Characteristics.....	22
4.1 Power Supply.....	22
4.1.1 Reference Design for Power Supply.....	22
4.2 Reset.....	24
4.3 Download Mode.....	25
5 RF Specifications.....	26
5.1 Wi-Fi Performances.....	26
5.2 Antenna Interface.....	27
5.2.1 Reference Design.....	27
5.2.2 RF Routing Guidelines.....	28
5.2.3 RF Connector Recommendation.....	30
5.2.4 Requirements for Antenna Design.....	32
6 Electrical Characteristics and Reliability.....	33
6.1 Absolute Maximum Ratings.....	33
6.2 Power Supply Ratings.....	33
6.3 Wi-Fi Power Consumption.....	34
6.4 Digital I/O Characteristics.....	35
6.5 ESD Protection.....	35

7 Mechanical Information	37
7.1 Mechanical Dimensions	37
7.2 Recommended Footprint	39
7.3 Top and Bottom Views.....	40
8 Storage, Manufacturing & Packaging.....	41
8.1 Storage Conditions	41
8.2 Manufacturing and Soldering	42
8.3 Packaging Specifications	44
8.3.1 Carrier Tape.....	44
8.3.2 Plastic Reel	45
8.3.3 Mounting Direction.....	45
8.3.4 Packaging Process	46
9 Appendix References	47

Table Index

Table 1 : Basic Information	10
Table 2 : Key Features	11
Table 3 : Parameter Definition	13
Table 4 : Pin Description	13
Table 5 : GPIO Multiplexing	17
Table 6 : Pin Description of UART Interface	18
Table 7 : Pin Description of SPI Interface	19
Table 8 : Pin Description of I2C Interface	20
Table 9 : Pin Description of QSPI Interface	20
Table 10 : Pin Description of JTAG Interface	20
Table 11 : Pin Description of Power Supply and GND Pins	22
Table 12 : Pin Description of RESET_N	24
Table 13 : Wi-Fi Performances	26
Table 14 : Pin Description of ANT_WIFI	27
Table 15 : Requirements for Antenna Design	32
Table 16 : Absolute Maximum Ratings (Unit: V)	33
Table 17 : Module's Power Supply Ratings (Unit: V)	33
Table 18 : Wi-Fi Power Consumption in Non-signaling Mode (Unit: mA)	34
Table 19 : VDD_IO= 3.3 V I/O Requirements (Unit: V)	35
Table 20 : VDD_IO= 1.8 V I/O Requirements (Unit: V)	35
Table 21 : Electrostatic Discharge Characteristics (Unit: kV)	36
Table 22 : Recommended Thermal Profile Parameters	43
Table 23 : Carrier Tape Dimension Table (Unit: mm)	44
Table 24 : Plastic Reel Dimension Table (Unit: mm)	45
Table 25 : Related Documents	47
Table 26 : Terms and Abbreviations	47

Figure Index

Figure 2 : Pin Assignment (Top View)	12
Figure 3 : UART Interface Connection.....	18
Figure 4 : Reference Circuit of Debug UART	19
Figure 5 : Reference Circuit of JTAG Interface.....	21
Figure 6 : Reference Design of Power Supply.....	23
Figure 7 : Power-up Timing.....	23
Figure 8 : Reference Circuit of Reset with a Button.....	24
Figure 9 : Reference Design of Download Mode.....	25
Figure 10 : Reference Design of Antenna Interface	28
Figure 11 : Microstrip Design on a 2-layer PCB	29
Figure 12 : Coplanar Waveguide Design on a 2-layer PCB	29
Figure 13 : Coplanar Waveguide Design on a 4-layer PCB (Layer 3 as Reference Ground).....	29
Figure 14 : Coplanar Waveguide Design on a 4-layer PCB (Layer 4 as Reference Ground).....	29
Figure 15 : Dimensions of the Receptacle (Unit: mm)	30
Figure 16 : Specifications of Mated Plugs (Unit: mm).....	31
Figure 17 : Space Factor of the Mated Connectors (Unit: mm).....	31
Figure 18 : Top and Side Dimensions.....	37
Figure 19 : Bottom Dimension.....	38
Figure 20 : Recommended Footprint	39
Figure 21 : Top and Bottom Views.....	40
Figure 22 : Recommended Reflow Soldering Thermal Profile	42
Figure 23 : Carrier Tape Dimension Drawing (Unit: mm)	44
Figure 24 : Plastic Reel Dimension Drawing	45
Figure 25 : Mounting Direction	45
Figure 26 : Packaging Process	46

1 Introduction

QuecOpen® is a solution where the module acts as the main processor. Constant transition and evolution of both the communication technology and the market highlight its merits. It can help you to:

- Realize embedded applications' quick development and shorten product R&D cycle
- Simplify circuit and hardware structure design to reduce engineering costs
- Miniaturize products
- Reduce product power consumption
- Apply OTA technology
- Enhance product competitiveness and cost-effectiveness

The document defines FCM940Q in QuecOpen® solution and describes its hardware interfaces and air interfaces connected to your applications, which can help you quickly understand the hardware interface characteristics, RF characteristics, electrical characteristics, mechanical specifications and other relevant information of the module.

2 Product Overview

FCM940Q is a low-power, cost-effective Wi-Fi 4 module, supporting IEEE 802.11a/b/g/n. The module has multiple interfaces such as UART, SPI, I2C, QSPI and JTAG for various applications.

The module is an SMD module with compact packaging. The general features of the module are as follow:

- Cortex-M4F processor with a main frequency of 60 MHz
- Built-in 1.5 MB Flash and 640 KB SRAM memory
- Support for secondary development
- JTAG download

Table 1: Basic Information

FCM940Q	
Packaging Type	LCC
Pin Counts	44
Dimensions	(12 ±0.15) mm × (12 ±0.15) mm × (2.2 ±0.2) mm
Weight	0.61 g

2.1 Key Features

Table 2: Key Features

Basic Information	
Protocols and Standard	● Wi-Fi protocol: IEEE 802.11a/b/g/n ● All hardware components fully comply with EU RoHS directive
Supply Voltage	VBAT Power Supply: ● 2.6–3.6 V ● Typ. 3.3 V VDD_1V8 Power Supply: ● 1.71–1.89 V; Typ. 1.8 V VDD_IO Power Supply: ● 1.71–1.89 V; Typ. 1.8 V ● 2.6–3.6 V; Typ. 3.3 V
Temperature Ranges	● Normal operating temperature ¹: -40 °C to +85 °C ● Storage temperature: -45 °C to +95 °C
TE-B Kit	FCM940Q-TE-B ²
Antenna Interface	
Antenna Interface	● Antenna interface (ANT_WIFI) ● 50 Ω impedance
Application Interfaces ³	
Application Interfaces	UART, SPI, I2C, QSPI, JTAG

¹ Within this range, the module's indicators comply with IEEE specification requirements.

² Quectel supplies a FCM940Q-TE-B with accessories to develop and test the module. For more details, see [document \[1\]](#).

³ For more details about the interfaces, see [Chapter 3](#).

3 Application Interfaces

3.1 Pin Assignment

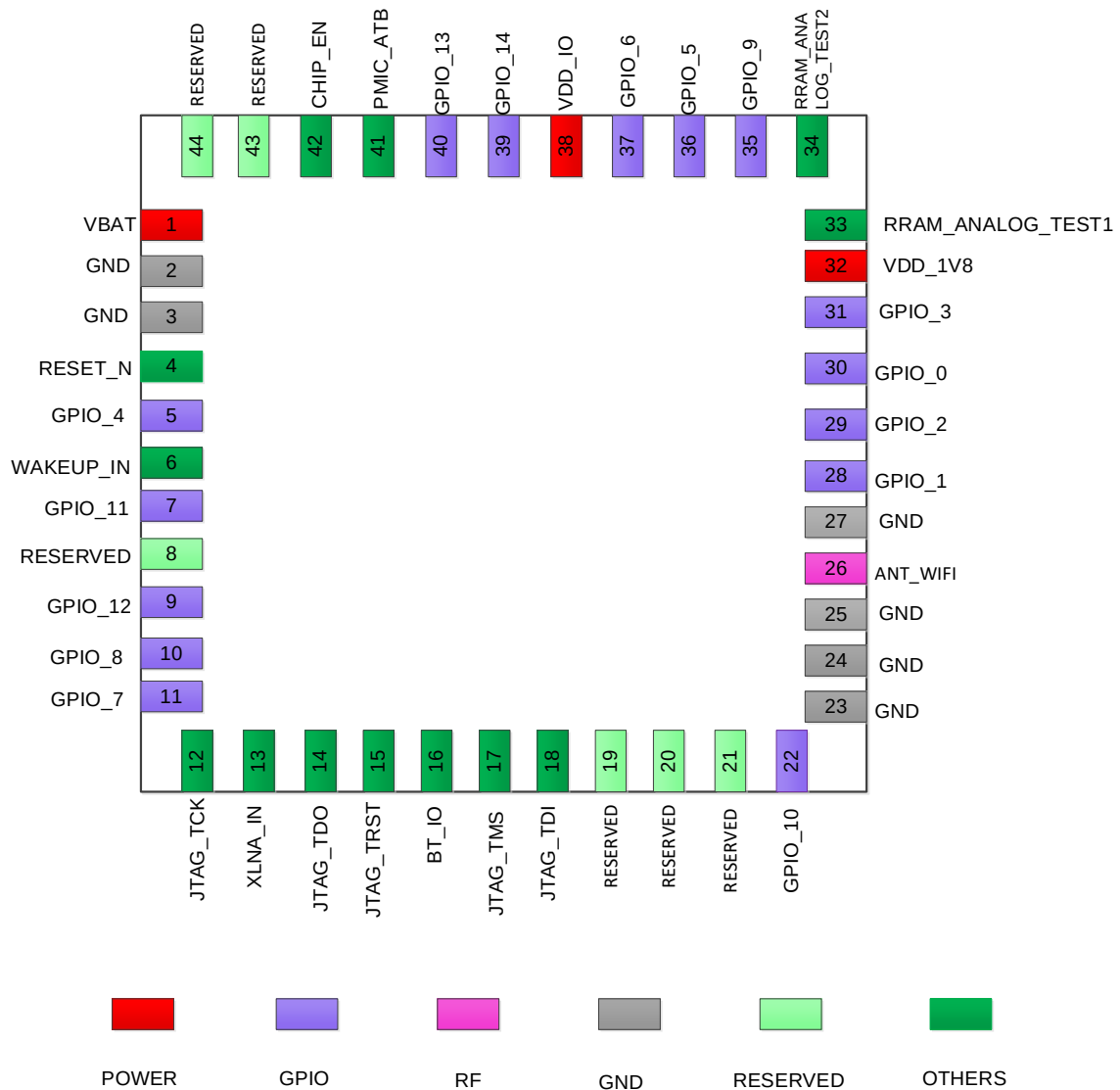


Figure 1: Pin Assignment (Top View)

NOTE

1. Keep all RESERVED and unused pins open.
2. All GND pins should be connected to ground.
3. Ensure that there is no sink current on the pins before turning on the module.
4. The module has 15 GPIO interfaces and 1 JTAG interface by default. In the case of multiplexing, it supports interfaces including UART, SPI, I2C and QSPI. For more details, see **Chapter 3.3** and **Chapter 3.4**.

3.2 Pin Definitions

Table 3: Parameter Definition

Parameter	Description
AIO	Analog Input/Output
DI	Digital Input
DO	Digital Output
DIO	Digital Input/Output
PU	Pull Up
PD	Pull Down
PI	Power Input

DC characteristics include power domain and rated current.

Table 4: Pin Description

Power Supply and GND Pins						
Pin Name	Pin No.	I/O	Status after Reset	Description	DC Characteristics	Comment
VBAT	1	PI	-	Power supply for the module	Vmin = 2.6 V Vnom = 3.3 V Vmax = 3.6 V	It is recommended to provide a current of at least 0.3 A.

VDD_1V8	32	PI	-	Internal 2 GHz PA power supply	Vmin = 1.71 V Vnom = 1.8 V Vmax = 1.89 V	It is recommended to provide a current of at least 0.3 A.
VDD_IO	38	PI	-	Power supply for the module's I/O pins	Vmin = 2.6 V Vnom = 3.3 V Vmax = 3.6 V Vmin = 1.71 V Vnom = 1.8 V Vmax = 1.89 V	
GND	2, 3, 23–25, 27					Connect them to the ground.
Reset						
Pin Name	Pin No.	I/O	Status after Reset	Description	DC Characteristics	Comment
RESET_N	4	DI	-	Reset the module		Hardware reset. Pull it down to GND with an internal 10 kΩ resistor. Active high.
JTAG Interface						
Pin Name	Pin No.	I/O	Status after Reset	Description	DC Characteristics	Comment
JTAG_TCK	12	DI	PD	JTAG test clock	VDD_IO	
JTAG_TDO	14	DO	PD	JTAG test data output		
JTAG_TRST	15	DI	PU	JTAG test reset		
JTAG_TMS	17	DI	PU	JTAG test mode select		
JTAG_TDI	18	DI	PU	JTAG test data input		
WAKEUP Interface						
Pin Name	Pin No.	I/O	Status after Reset	Description	DC Characteristics	Comment
WAKEUP_IN	6	DI	PU	Wake up the	VDD_IO	Active low.

module

GPIO Interfaces

Pin Name	Pin No.	I/O	Status after Reset	Description	DC Characteristics	Comment
GPIO_0	30	DIO	PD	General-purpose input/output	VDD_IO	
GPIO_1	28	DIO	PU	General-purpose input/output		
GPIO_2	29	DIO	PU	General-purpose input/output		
GPIO_3	31	DIO	PD	General-purpose input/output		
GPIO_4	5	DIO	PD	General-purpose input/output		
GPIO_5	36	DIO	PD	General-purpose input/output		
GPIO_6	37	DIO	PD	General-purpose input/output		
GPIO_7	11	DIO	PD	General-purpose input/output		
GPIO_8	10	DIO	PU	General-purpose input/output		
GPIO_9	35	DIO	PD	General-purpose input/output		
GPIO_10	22	DIO	PD	General-purpose input/output		
GPIO_11	7	DIO	PD	General-purpose input/output		
GPIO_12	9	DIO	PU	General-purpose input/output		
GPIO_13	40	DIO	PD	General-purpose input/output		
GPIO_14	39	DIO	PD	General-purpose input/output		

RF Antenna Interface

Pin Name	Pin No.	I/O	Status after Reset	Description	DC Characteristics	Comment
ANT_WIFI	26	AIO	-	Wi-Fi antenna		50 Ω impedance.

interface

Other Interfaces

Pin Name	Pin No.	I/O	Status after Reset	Description	DC Characteristics	Comment
XLNA_IN	13	AIO	-	External 5 GHz LNA input		
BT_IO	16		-			Keep it open.
RRAM_ANALOG_TEST1	33	DI	-	RRAM analog test pin		
RRAM_ANALOG_TEST2	34	DI	-	RRAM analog test pin		
PMIC_ATB	41	DO	-	PMIC control		
CHIP_EN	42	DI	-	Module enable	VDD_IO	

RESERVED Pins

Pin Name	Pin No.	Comment
RESERVED	8, 19–21, 43, 44	Keep it open.

NOTE

To reduce the probability of module damage and extend module service life, do not power up and down frequently.

3.3 GPIO Multiplexing

The module has 15 GPIO interfaces and 1 JTAG interface by default. Pins are defined as follows:

Table 5: GPIO Multiplexing

Pin Name	Pin No.	Alternate Function 0 (GPIO No.)	Alternate Function 1	Alternate Function 2
GPIO_0	30	GPIO_0	SPI_CLK	-
GPIO_1	28	GPIO_1	SPI_CS	-
GPIO_2	29	GPIO_2	SPI_MOSI	-
GPIO_3	31	GPIO_3	SPI_MISO	-
GPIO_4	5	GPIO_4	QSPI_CLK	-
GPIO_5	36	GPIO_5	QSPI_CS	-
GPIO_6	37	GPIO_6	QSPI_MOSI[0]	-
GPIO_7	11	GPIO_7	QSPI_MOSI[1]	-
GPIO_8	10	GPIO_8	-	-
GPIO_9	35	GPIO_9	I2C_SDA	-
GPIO_10	22	GPIO_10	I2C_SCL	-
GPIO_11	7	GPIO_11	QSPI_MOSI[2]	UART_TX
GPIO_12	9	GPIO_12	QSPI_MOSI[3]	UART_RX
GPIO_13	40	GPIO_13	UART_TX	-
GPIO_14	39	GPIO_14	UART_RX	-

NOTE

1. After the module is powered down, all of its GPIO interfaces must be driven low. Otherwise, the current leakage may make the module enter an abnormal status.
2. The maximum number of each application interface multiplexed with GPIO interfaces is not available simultaneously. For more details, see **Chapter 3.3** and **Chapter 3.4**

3.4 Interface Definition

3.4.1 UART Interface

In the case of multiplexing, the module supports 1 debug UART, which is used for partial log output, the baud rate is 115200 bps.

Table 6: Pin Description of UART Interface

Pin Name	Pin No.	Multiplexing Function	I/O	Description	Comment
GPIO_13	40	UART_TX	DO	Debug UART transmit	For other multiplexing UART configuration, see .
GPIO_14	39	UART_RX	DI	Debug UART receive	

The debug UART connection between the module and the MCU is shown below:

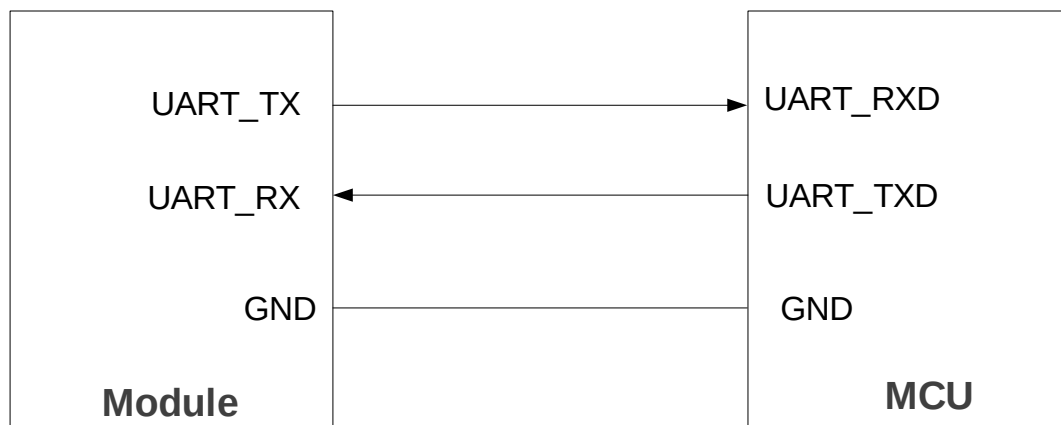


Figure 2: UART Interface Connection

The reference design of debug UART is shown below:

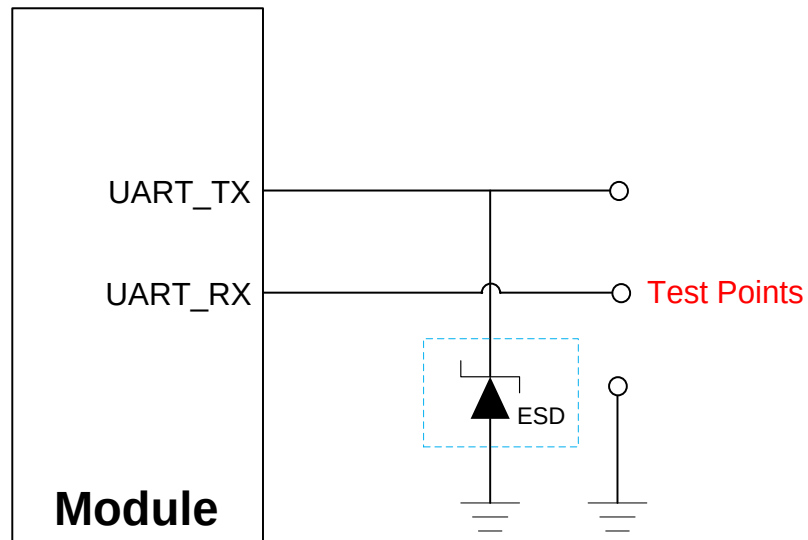


Figure 3: Reference Circuit of Debug UART

3.4.2 SPI Interface

In the case of multiplexing, the module supports 1 SPI interface, which supports slave mode only. The maximum clock frequency is 20 MHz.

Table 7: Pin Description of SPI Interface

Pin Name	Pin No.	Multiplexing Function	I/O	Description
GPIO_0	30	SPI_CLK	DI	SPI clock
GPIO_1	28	SPI_CS	DI	SPI chip select
GPIO_2	29	SPI_MOSI	DI	SPI master-out slave-in
GPIO_3	31	SPI_MISO	DO	SPI master-in slave-out

3.4.3 I2C Interface

In the case of multiplexing, the module supports 1 I2C interface.

Table 8: Pin Description of I2C Interface

Pin Name	Pin No.	Multiplexing Function	I/O	Description
GPIO_9	35	I2C_SDA	OD	I2C serial data
GPIO_10	22	I2C_SCL	OD	I2C serial clock

3.4.4 QSPI Interface

In the case of multiplexing, the module supports 1 QSPI interface, which supports master mode.

Table 9: Pin Description of QSPI Interface

Pin Name	Pin No.	Multiplexing Function	I/O	Description
GPIO_4	5	QSPI_CLK	DO	QSPI clock
GPIO_5	36	QSPI_CS	DO	QSPI chip select
GPIO_6	37	QSPI_MOSI[0]	DO	QSPI master-out slave-in 0
GPIO_7	11	QSPI_MOSI[1]	DO	QSPI master-out slave-in 1
GPIO_11	7	QSPI_MOSI[2]	DO	QSPI master-out slave-in 2
GPIO_12	9	QSPI_MOSI[3]	DO	QSPI master-out slave-in 3

3.4.5 JTAG Interface

The module supports 1 JTAG interface by default. It is used for firmware download.

Table 10: Pin Description of JTAG Interface

Pin Name	Pin No.	I/O	Description
JTAG_TCK	12	DI	JTAG test clock

JTAG_TDO	14	DO	JTAG test data output
JTAG_TRST	15	DI	JTAG test reset
JTAG_TMS	17	DI	JTAG test mode select
JTAG_TDI	18	DI	JTAG test data input

The connection between the module and the JTAG programmer is shown below:

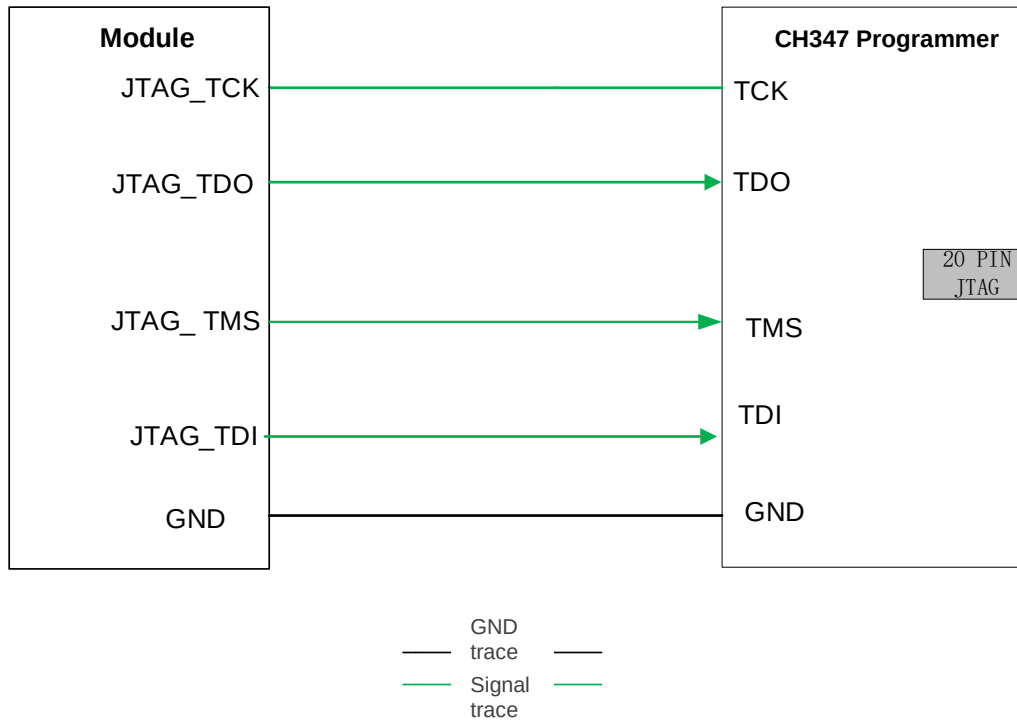


Figure 4: Reference Circuit of JTAG Interface

4 Operating Characteristics

4.1 Power Supply

Table 11: Pin Description of Power Supply and GND Pins

Pin Name	Pin No.	I/O	Description	Min.	Typ.	Max.	Unit
VBAT	1	PI	Power supply for the module	2.6	3.3	3.6	V
VDD_1V8	32	PI	Internal 2 GHz PA power supply	1.71	1.8	1.89	V
VDD_IO	38	PI	Power supply for the module's I/O pins	1.71	1.8	1.89	V
				2.6	3.3	3.6	V
GND	2, 3, 23–25, 27						

4.1.1 Reference Design for Power Supply

The module is powered by VBAT, and it is recommended to use a power supply chip that can provide sufficient current of at least 0.3 A. For better power supply performance, it is recommended to parallel 22 μ F, 1 μ F and 100 nF filter capacitors near the module's VBAT pin. C4 is reserved for debugging and not mounted by default. In addition, it is recommended to add a TVS diode near the VBAT to improve the surge voltage bearing capacity of the module. As per design rules, the longer the VBAT trace is, the wider it should be. The module's internal 2 GHz PA is powered by VDD_1V8, and it is recommended to use a power supply chip that can provide sufficient current of at least 0.3 A.

The following reference design takes VBAT as an example, and the reference design of VDD_1V8 is the same.

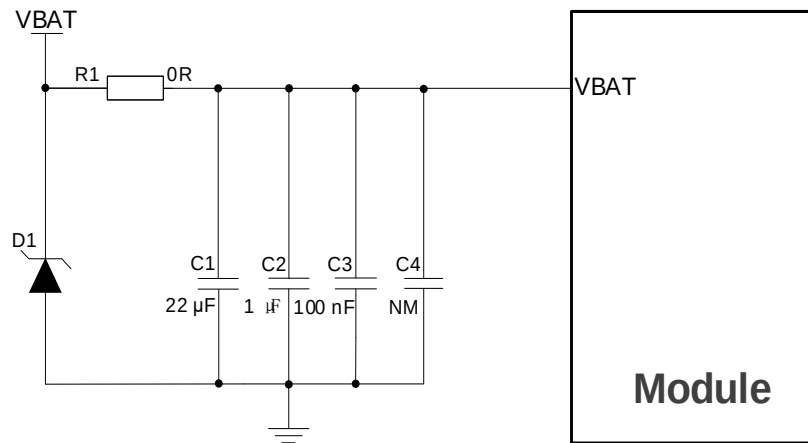


Figure 5: Reference Design of Power Supply

When VBAT and DD_1V8 are powered up, keep CHIP_EN at a high level, and the module will start automatically.

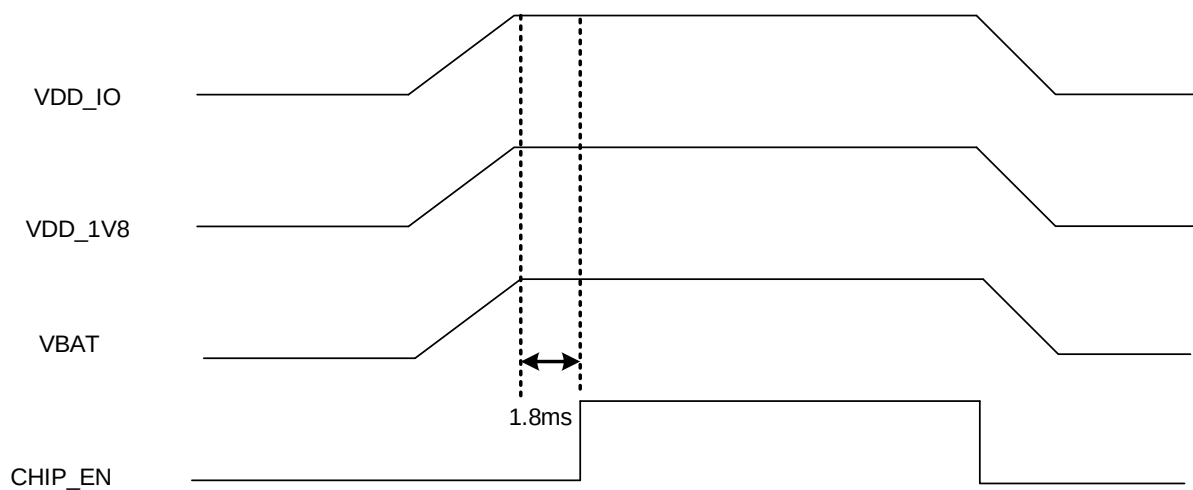


Figure 6: Power-up Timing

4.2 Reset

Pull RESET_N down for at least 200 ms and then release it to reset the module. In order to avoid module restart due to abnormal interference, it is recommended to route the trace as short as possible and surround it with ground.

Table 12: Pin Description of RESET_N

Pin Name	Pin No.	I/O	Description	Comment
RESET_N	4	DI	Reset the module	Hardware reset. Pull it down to GND with an internal 10 kΩ resistor. Active high.

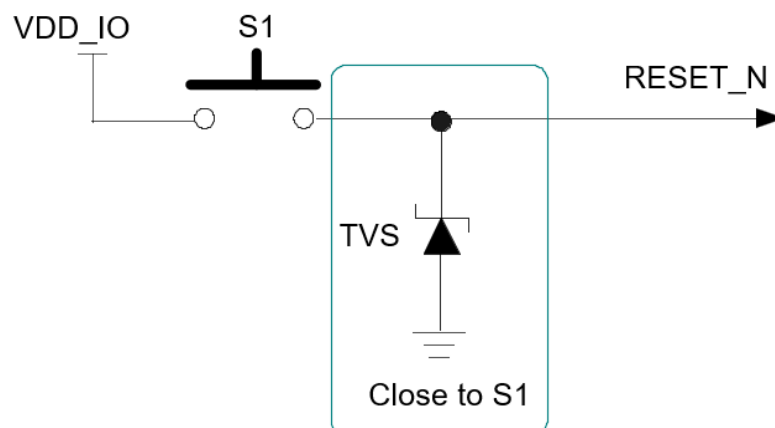


Figure 7: Reference Circuit of Reset with a Button

4.3 Download Mode

When the module downloads the firmware through the JTAG interface, a JTAG programmer with a CH347 chip is required. Pull GPIO_1, GPIO_2 and GPIO_3 up to VDD_IO first, then download firmware through the programmer.

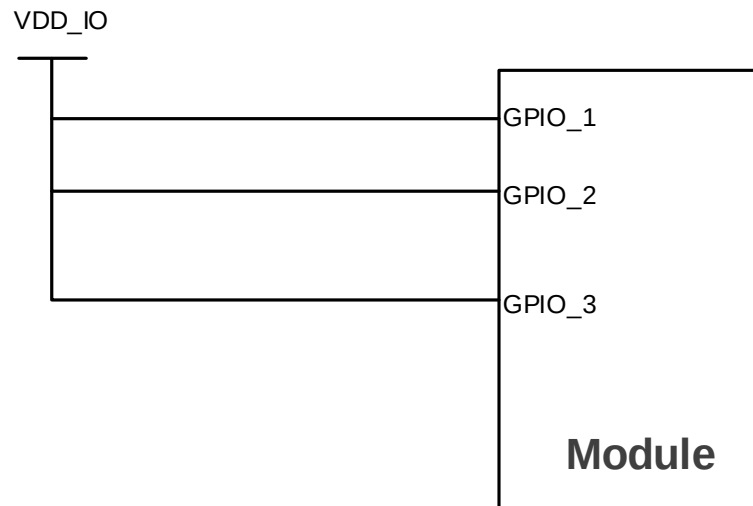


Figure 8: Reference Design of Download Mode

5 RF Specifications

5.1 Wi-Fi Performances

Table 13: Wi-Fi Performances

Operating Frequency			
● 2.4 GHz: 2.400–2.4835 GHz ● 5 GHz: 5.150–5.850 GHz			
Modulation			
DBPSK, DQPSK, CCK, BPSK, QPSK, 16QAM			
Encryption Mode			
WIFI Open, WPA, WPA2, WPA3-SAE, WPA2-WPA3			
Operating Mode			
● AP ● STA			
Transmission Data Rate			
● 802.11b: 1 Mbps, 2 Mbps, 5.5 Mbps, 11 Mbps ● 802.11a/g: 6 Mbps, 9 Mbps, 12 Mbps, 18 Mbps, 24 Mbps ● 802.11n: HT20 (MCS 0–MCS 3)			
Condition (VBAT = 3.3 V; Temp.: 25 °C)	EVM	Typ.; Unit: dBm; Tolerance: ±2 dB	
		Transmit Power	Receiver Sensitivity
2.4 GHz	≤ 35 %	802.11b @ 1 Mbps	11
		802.11b @ 11 Mbps	-99
	≤ -5 dB	802.11g @ 6 Mbps	10
		802.11g @ 24 Mbps	-92
	≤ -16 dB		-84

5 GHz	802.11n, HT20 @ MCS 0, BPSK	≤ -5 dB	11	-92
	802.11n, HT20 @ MCS 3, 16QAM	≤ -16 dB	10	-83
	802.11a @ 6 Mbps	≤ -5 dB	11	-90
	802.11a @ 24 Mbps	≤ -16 dB	10	-82
	802.11n, HT20 @ MCS 0, BPSK	≤ -5 dB	11	-90
	802.11n, HT20 @ MCS 3, 16QAM	≤ -16 dB	10	-80

NOTE

The module supports the above frequency bands in hardware, but actual applications may be subject to local regulations.

5.2 Antenna Interface

The module provides one antenna interface design: LCC antenna interface. It is required to conduct a comprehensive functional test for the RF design before mass production of terminal products. The entire content of this chapter is provided for illustration only. Analysis, evaluation and determination are still necessary when designing target products.

Table 14: Pin Description of ANT_WIFI

Pin Name	Pin No.	I/O	Description	Comment
ANT_WIFI	26	AIO	Wi-Fi antenna interface	50 Ω impedance

5.2.1 Reference Design

The circuit of pin antenna interface is shown below. For better RF performance, it is recommended to reserve a dual-L type circuit and add an ESD protection component. Components (R1, C1, C2, C3 and D1) of the dual-L type circuit should be placed as close to the antenna as possible. C1, C2 and D1 are not mounted by default and a 0 Ω resistor is mounted on R1.

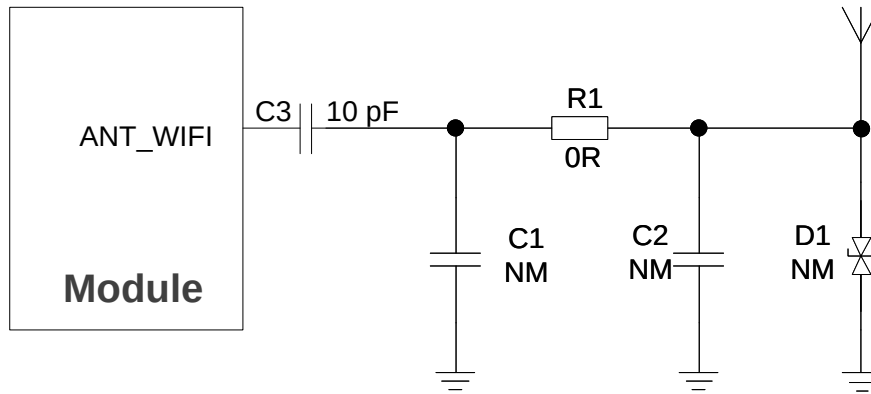


Figure 9: Reference Design of Antenna Interface

NOTE

1. It is recommended to reserve ESD protection components for the antenna interfaces and the junction capacitance should not exceed 0.05 pF.
2. Notes on C3:
 - 1) If there is DC power at the antenna port, place a capacitor on C3 to prevent short circuit to ground. The capacitance value is recommended to be 10 pF, which can be adjusted according to the debugging results.
 - 2) If there is no DC power in the peripheral design:
 - a) Do not reserve C3.
 - b) If C3 has already been reserved, it should be mounted with components, and it is recommended to use 0 Ω resistors. You can also match the components according to the debugging results.

5.2.2 RF Routing Guidelines

For user's PCB, the characteristic impedance of all RF traces should be controlled to 50 Ω . The impedance of the RF traces is usually determined by the trace width (W), the materials' dielectric constant, the height from the reference ground to the signal layer (H), and the spacing between RF traces and grounds (S). Microstrip or coplanar waveguide is typically used in RF layout to control characteristic impedance. The following are reference designs of microstrip or coplanar waveguide with different PCB structures.

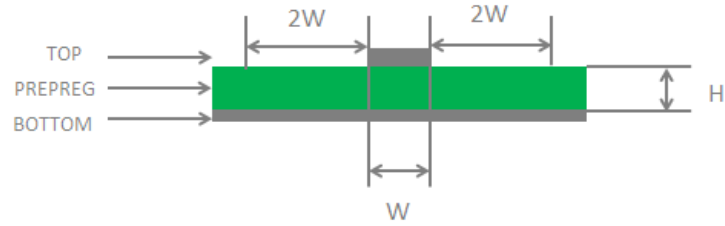


Figure 10: Microstrip Design on a 2-layer PCB

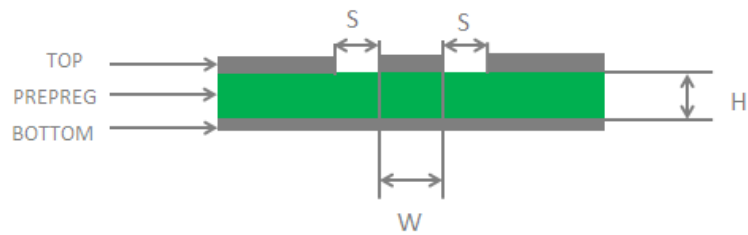


Figure 11: Coplanar Waveguide Design on a 2-layer PCB

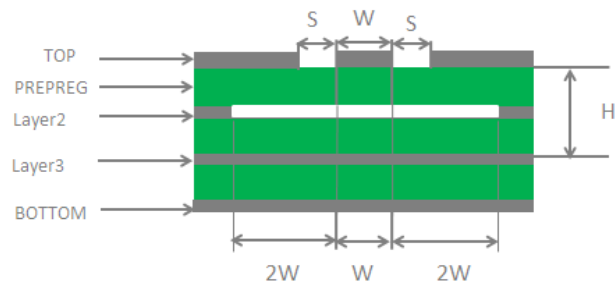


Figure 12: Coplanar Waveguide Design on a 4-layer PCB (Layer 3 as Reference Ground)

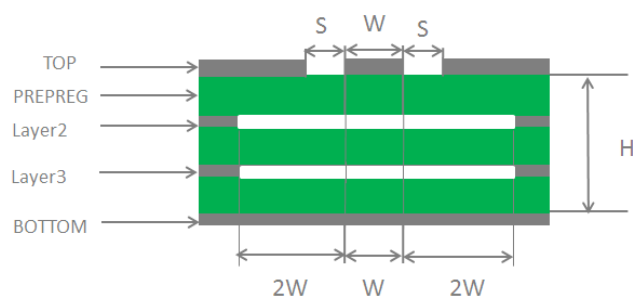


Figure 13: Coplanar Waveguide Design on a 4-layer PCB (Layer 4 as Reference Ground)

To ensure RF performance and reliability, follow the principles below in RF layout design:

- Use an impedance simulation tool to accurately control the characteristic impedance of RF traces to 50 Ω .
- The GND pins adjacent to RF pins should not be designed as thermal relief pads, and should be fully connected to ground.
- The distance between the RF pins and the RF connector should be as short as possible and all the right-angle traces should be changed to curved ones. The recommended trace angle is 135°.
- There should be clearance under the signal pin of the antenna connector or solder joint.
- The reference ground of RF traces should be complete. Meanwhile, adding some ground vias around RF traces and the reference ground could help to improve RF performance. The distance between the ground vias and RF traces should be at least twice the width of RF signal traces ($2 \times W$).
- Keep RF traces away from interference sources (such as DC-DC, (U)SIM/USB/SDIO high frequency digital signals, display signals, and clock signals), and avoid intersection and paralleling between traces on adjacent layers.

For more details about RF layout, see **document [2]**.

5.2.3 RF Connector Recommendation

If the RF connector is used for antenna connection, it is recommended to use U.FL-R-SMT connector provided by Hirose.

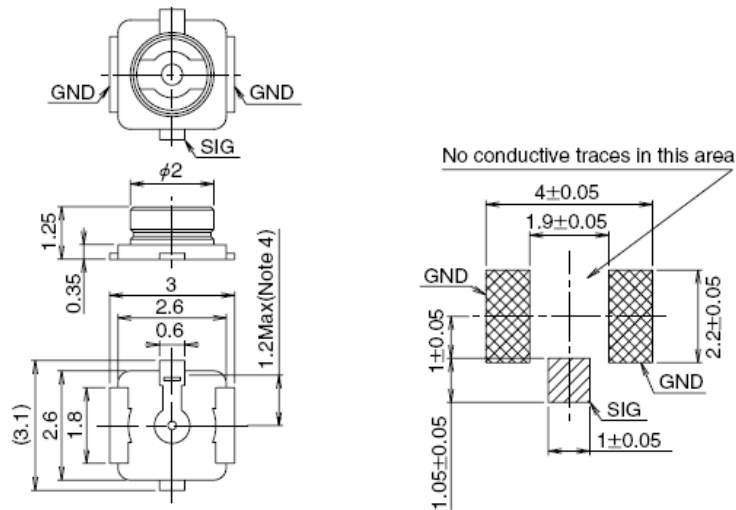


Figure 14: Dimensions of the Receptacle (Unit: mm)

U.FL-LP series mated plugs listed in the following figure can be used to match the U.FL-R-SMT.

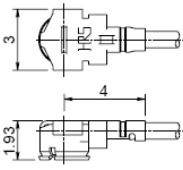
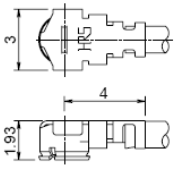
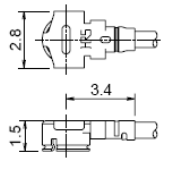
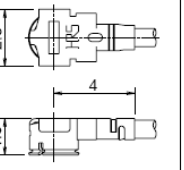
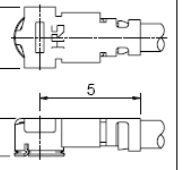
Part No.	U.FL-LP-040	U.FL-LP-066	U.FL-LP(V)-040	U.FL-LP-062	U.FL-LP-088
					
Mated Height	2.5mm Max. (2.4mm Nom.)	2.5mm Max. (2.4mm Nom.)	2.0mm Max. (1.9mm Nom.)	2.4mm Max. (2.3mm Nom.)	2.4mm Max. (2.3mm Nom.)
Applicable cable	Dia. 0.81mm Coaxial cable	Dia. 1.13mm and Dia. 1.32mm Coaxial cable	Dia. 0.81mm Coaxial cable	Dia. 1mm Coaxial cable	Dia. 1.37mm Coaxial cable
Weight (mg)	53.7	59.1	34.8	45.5	71.7
RoHS	YES				

Figure 15: Specifications of Mated Plugs (Unit: mm)

The following figure describes the space factor of mated connectors.

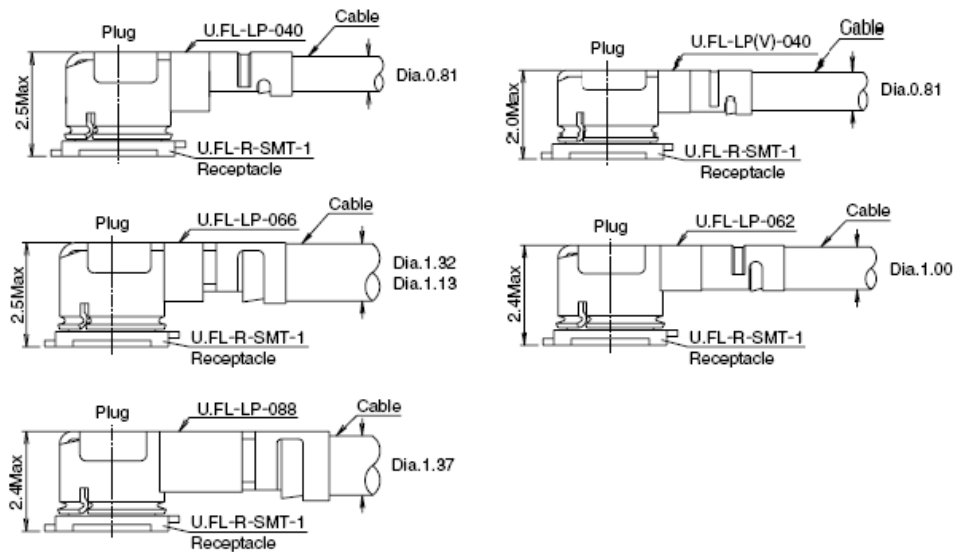


Figure 16: Space Factor of the Mated Connectors (Unit: mm)

For more details, visit <http://www.hirose.com>.

5.2.4 Requirements for Antenna Design

Table 15: Requirements for Antenna Design

Parameter	Requirements
Frequency Range (GHz)	● 2.4 GHz: 2.400–2.4835 GHz ● 5 GHz: 5.150–5.850 GHz
Antenna Interface	● VSWR: ≤ 2 (Typ.) ● Max input power: 50 W ● Input impedance: 50 Ω ● Vertical polarization ● Cable insertion loss: < 1 dB

6 Electrical Characteristics and Reliability

6.1 Absolute Maximum Ratings

Table 16: Absolute Maximum Ratings (Unit: V)

Parameter	Min.	Max.
VBAT	-0.3	4.0
VDD_1V8	-0.3	1.98
VDD_IO	-0.3	4.0
	-0.3	1.98

NOTE

Exceeding the conditions of use as shown above may cause permanent damage to the module.

6.2 Power Supply Ratings

Table 17: Module's Power Supply Ratings (Unit: V)

Parameter	Description	Condition	Min.	Typ.	Max.
VBAT	Power supply for the module	The actual input voltages must be kept between the minimum and maximum values	2.6	3.3	3.6

VDD_1V8	Internal 2 GHz PA power supply	The actual input voltages must be kept between the minimum and maximum values	1.71	1.8	1.89
VDD_IO	Power supply for the module's I/O pins	The actual input voltages must be kept between the minimum and maximum values	1.71	1.8	1.89
			2.6	3.3	3.6

6.3 Wi-Fi Power Consumption

Test conditions for module power consumption are as follows:

- Ambient temperature 25 °C
- Typical power domain
- Duty Cycle: 10%
- 50 Ω impedance

The above power consumption data are the typical values for your reference only. Actual values may vary among different modules due to differences in internal components, software versions and test ambient temperatures. For more details, contact Quectel Technical Support.

Table 18: Wi-Fi Power Consumption in Non-signaling Mode (Unit: mA)

Condition			I _{VBAT} (AVG)	I _{VDD_IO} (AVG)
2.4 GHz	802.11b	Tx @1 Mbps	11.23	57.52
		Tx @11 Mbps	11.20	55.32
	802.11g	Tx @ 6 Mbps	11.97	56.45
		Tx @ 24 Mbps	11.72	53.23
	802.11n	Tx HT20 @ MCS0	11.99	57.37
		Tx HT20 @ MCS 3	11.72	53.45
	802.11a	Tx @ 6 Mbps	13.18	62.44
		Tx @ 24 Mbps	12.84	56.43
5 GHz	802.11n	Tx HT20 @ MCS 0	13.20	62.71

Tx HT20 @ MCS 3	12.84	57.00
-----------------	-------	-------

6.4 Digital I/O Characteristics

Table 19: VDD_IO= 3.3 V I/O Requirements (Unit: V)

Parameter	Description	Min.	Max.
V _{IH}	High-level input voltage	2.4	VBAT
V _{IL}	Low-level input voltage	0	0.8
V _{OH}	High-level output voltage	2.4	VBAT
V _{OL}	Low-level output voltages	0	0.4

Table 20: VDD_IO= 1.8 V I/O Requirements (Unit: V)

Parameter	Description	Min.	Max.
V _{IH}	High-level input voltage	1.17	VBAT
V _{IL}	Low-level input voltage	0	0.63
V _{OH}	High-level output voltage	1.35	VBAT
V _{OL}	Low-level output voltage	0	0.45

6.5 ESD Protection

Static electricity occurs naturally and it may damage the module. Therefore, applying proper ESD countermeasures and handling methods is imperative. For example, wear anti-static gloves during the development, production, assembly and testing of the module; add ESD protection components to the ESD sensitive interfaces and points in the product design.

Table 21: Electrostatic Discharge Characteristics (Unit: kV)

Model	Test Result	Reference Standard
Human Body Model	± 2	ANSI/ESDA/JEDEC JS-001
Charge Device Model	± 0.5	ANSI/ESDA/JEDEC JS-002

7 Mechanical Information

This chapter describes the mechanical dimensions of the module. All dimensions are measured in millimeter (mm), and the dimensional tolerances are ± 0.2 mm unless otherwise specified.

7.1 Mechanical Dimensions

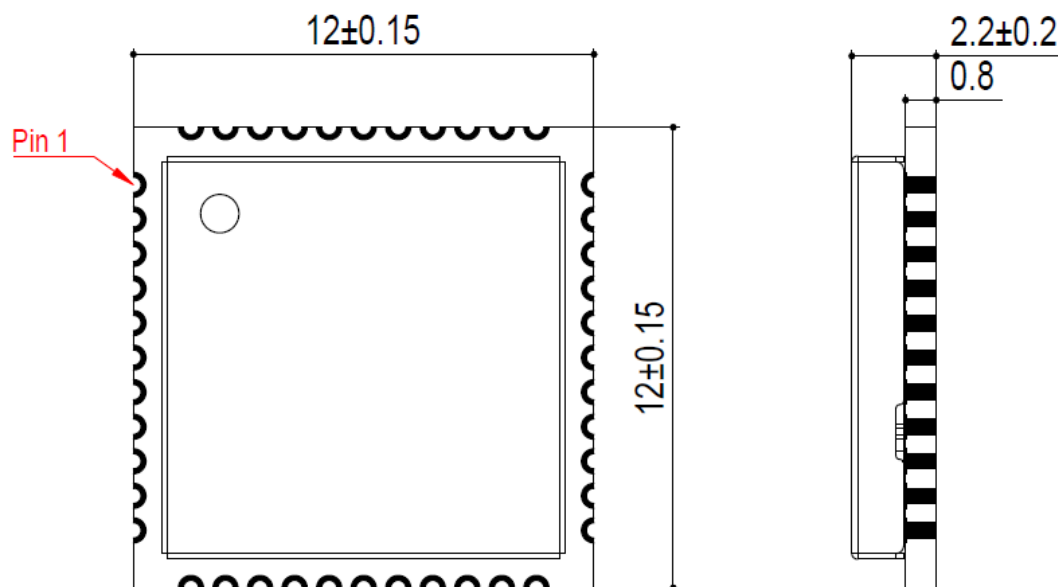


Figure 17: Top and Side Dimensions

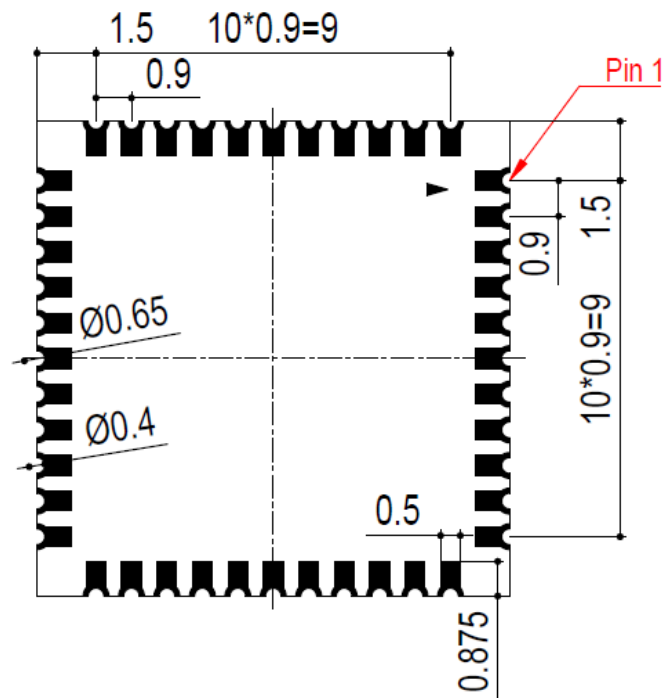


Figure 18: Bottom Dimension

NOTE

The module's coplanarity standard: ≤ 0.13 mm.

7.2 Recommended Footprint

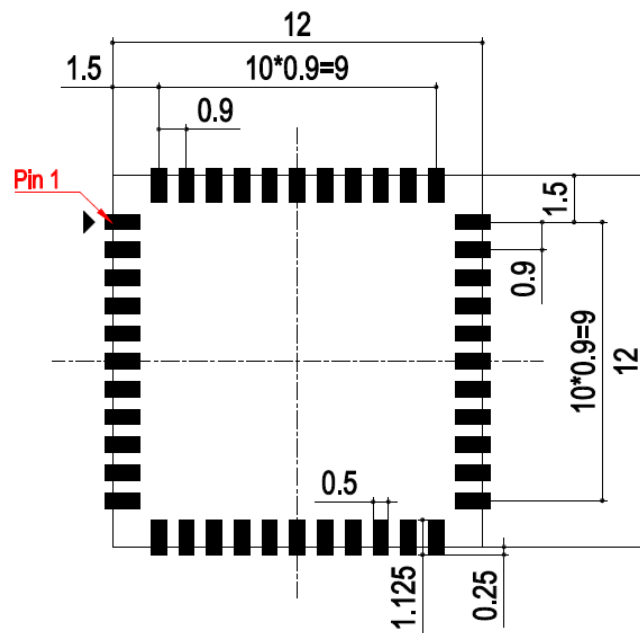


Figure 19: Recommended Footprint

NOTE

Keep at least 3 mm between the module and other components on the motherboard to improve soldering quality and maintenance convenience.

7.3 Top and Bottom Views

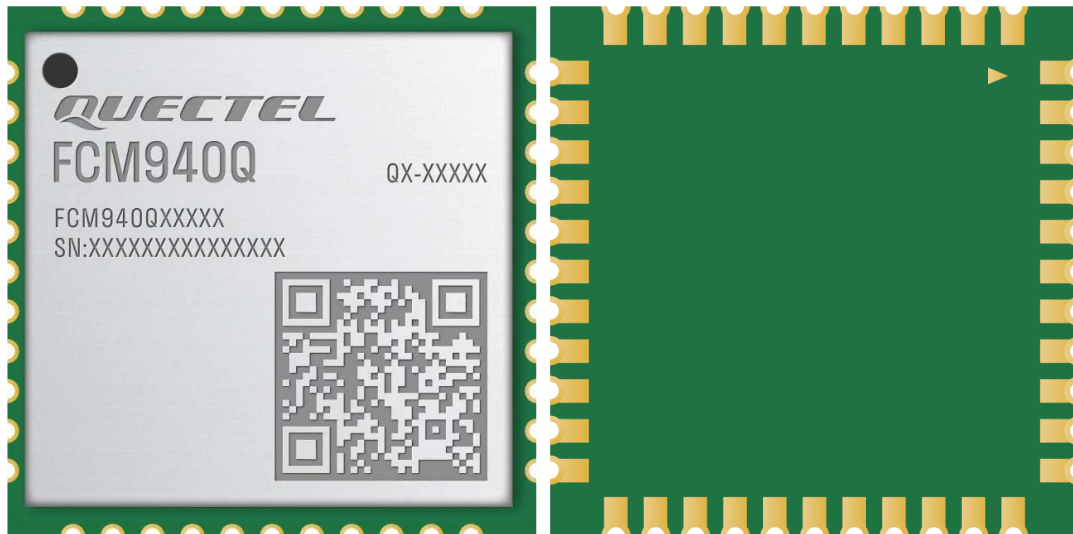


Figure 20: Top and Bottom Views

NOTE

Images above are for illustration purpose only and may differ from the actual module. For authentic appearance and label, please refer to the module received from Quectel.

8 Storage, Manufacturing & Packaging

8.1 Storage Conditions

The module is provided with vacuum-sealed packaging. MSL of the module is rated as 3. The storage requirements are shown below.

1. Recommended storage condition: the temperature should be 23 ± 5 °C and the relative humidity should be 35–60 %.
2. Shelf life (in a vacuum-sealed packaging): 12 months in recommended storage condition.
3. Floor life: 168 hours ⁴ in a factory where the temperature is 23 ± 5 °C and relative humidity is below 60 %. After the vacuum-sealed packaging is removed, the module must be processed in reflow soldering or other high-temperature operations within 168 hours. Otherwise, the module should be stored in an environment where the relative humidity is less than 10 % (e.g., a dry cabinet).
4. The module should be pre-baked to avoid blistering, cracks and inner-layer separation in PCB under the following circumstances:
 - The module is not stored in Recommended Storage Condition;
 - Violation of the third requirement mentioned above;
 - Vacuum-sealed packaging is broken, or the packaging has been removed for over 24 hours;
 - Before module repairing.
5. If needed, the pre-baking should follow the requirements below:
 - The module should be baked for 24 hours at 120 ± 5 °C;
 - The module must be soldered to PCB within 24 hours after the baking, otherwise it should be put in a dry environment such as in a dry cabinet.

⁴ This floor life is only applicable when the environment conforms to *IPC/JEDEC J-STD-033*. It is recommended to start the solder reflow process within 24 hours after the package is removed if the temperature and moisture do not conform to, or are not sure to conform to *IPC/JEDEC J-STD-033*. And do not unpack the modules in large quantities until they are ready for soldering.

NOTE

1. To avoid blistering, layer separation and other soldering issues, extended exposure of the module to the air is forbidden.
2. Take out the module from the package and put it on high-temperature-resistant fixtures before baking. If shorter baking time is desired, see *IPC/JEDEC J-STD-033* for the baking procedure.
3. Pay attention to ESD protection, such as wearing anti-static gloves, when touching the modules.

8.2 Manufacturing and Soldering

Push the squeegee to apply the solder paste on the surface of stencil, thus making the paste fill the stencil openings and then penetrate to the PCB. Apply proper force on the squeegee to produce a clean stencil surface on a single pass. To guarantee module soldering quality, the thickness of stencil for the module is recommended to be 0.13–0.15 mm. For more details, see **document [3]**.

The recommended peak reflow temperature should be 235–246 °C, with 246 °C as the absolute maximum reflow temperature. To avoid damage to the module caused by repeated heating, it is recommended that the module should be mounted only after reflow soldering for the other side of PCB has been completed. The recommended reflow soldering thermal profile (lead-free reflow soldering) and related parameters are shown below.

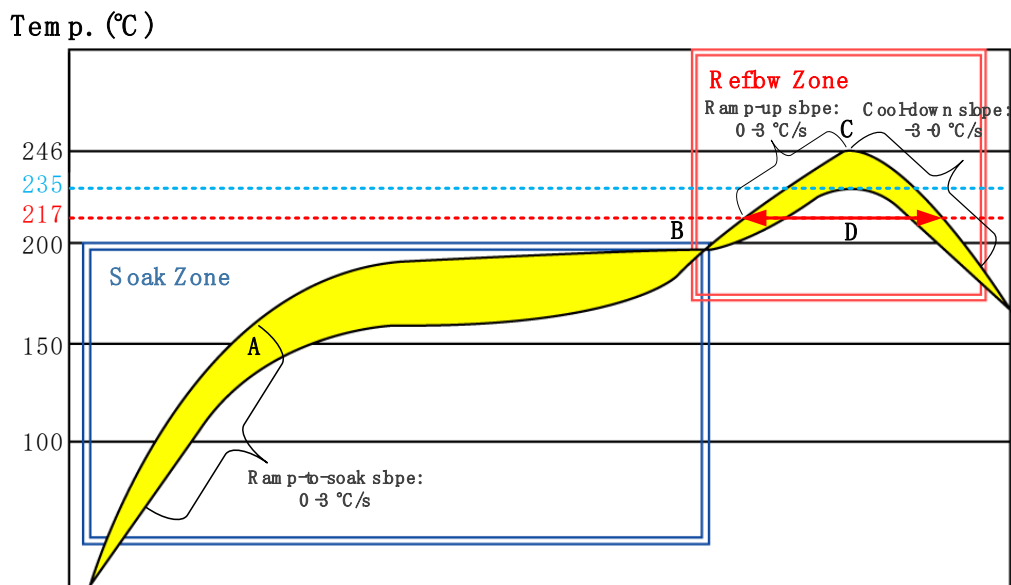


Figure 21: Recommended Reflow Soldering Thermal Profile

Table 22: Recommended Thermal Profile Parameters

Factor	Requirements
Soak Zone	
Ramp-to-soak Slope	0–3 °C/s
Soak Time (between A and B: 150 °C and 200 °C)	70–120 s
Reflow Zone	
Ramp-to-soak Slope	0–3 °C/s
Reflow Time (D: over 217°C)	40–70 s
Max Temperature	235–246 °C
Cool-down Slope	-3–0 °C/s
Reflow Cycle	
Max Reflow Cycle	1

NOTE

1. The above profile parameter requirements are for the measured temperature of the solder joints. Both the hottest and coldest spots of solder joints on the PCB should meet the above requirements.
2. During manufacturing and soldering, or any other processes that may contact the module directly, NEVER wipe the module's shielding can with organic solvents, such as acetone, ethyl alcohol, isopropyl alcohol, trichloroethylene.
3. The shielding can for the module is made of Cupro-Nickel base material. It is tested that after 12 hours' Neutral Salt Spray test, the laser engraved label information on the shielding can is still clearly identifiable and the QR code is still readable, although white rust may be found.
4. If a conformal coating is necessary for the module, do not use any coating material that may chemically react with the PCB or shielding cover, and prevent the coating material from flowing into the module.
5. Avoid using ultrasonic technology for module cleaning since it can damage crystals inside the module.
6. Avoid using materials that contain mercury (Hg), such as adhesives, for module processing, even if the materials are RoHS compliant and their mercury content is below 1000 ppm (0.1 %).
7. Corrosive gases may corrode the electronic components inside the module, affecting their reliability and performance, and potentially leading to a shortened service life that fails to meet the designed lifespan. Therefore, do not store or use unprotected modules in environments containing corrosive gases such as hydrogen sulfide, sulfur dioxide, chlorine, and ammonia.
8. Due to the complexity of the SMT process, please contact Quectel Technical Support in advance

for any situation that you are not sure about, or any process (e.g., selective soldering, ultrasonic soldering) that is not mentioned in **document [4]**.

8.3 Packaging Specifications

This chapter outlines the key packaging parameters and processes. All figures below are for reference purposes only, as the actual appearance and structure of packaging materials may vary in delivery.

The modules are packed in a tape and reel packaging as specified in the sub-chapters below.

8.3.1 Carrier Tape

Carrier tape dimensions are illustrated in the following figure and table:

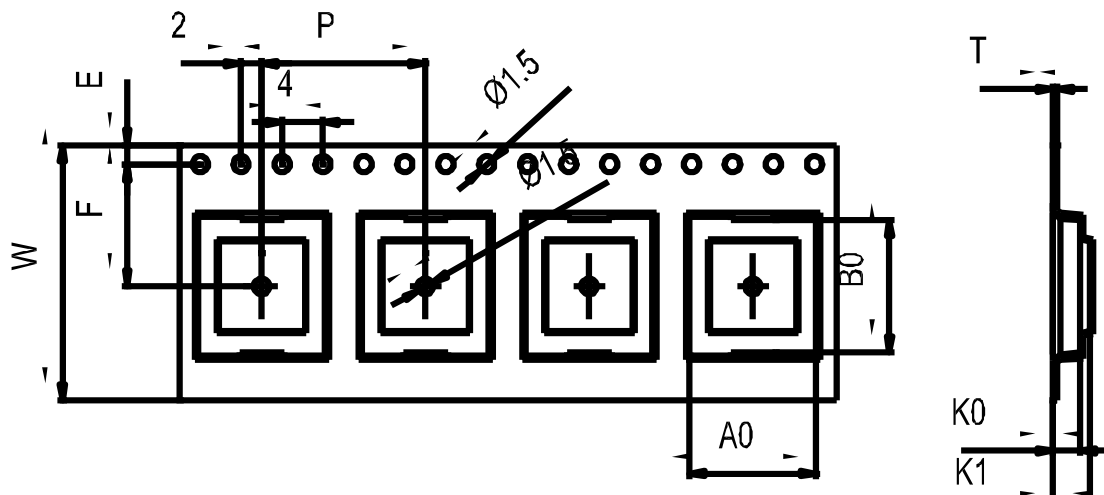


Figure 22: Carrier Tape Dimension Drawing (Unit: mm)

Table 23: Carrier Tape Dimension Table (Unit: mm)

W	P	T	A0	B0	K0	K1	F	E
24	20	0.4	12.4	12.4	2.95	3.9s	11.5	1.75

8.3.2 Plastic Reel

Plastic reel dimensions are illustrated in the following figure and table:

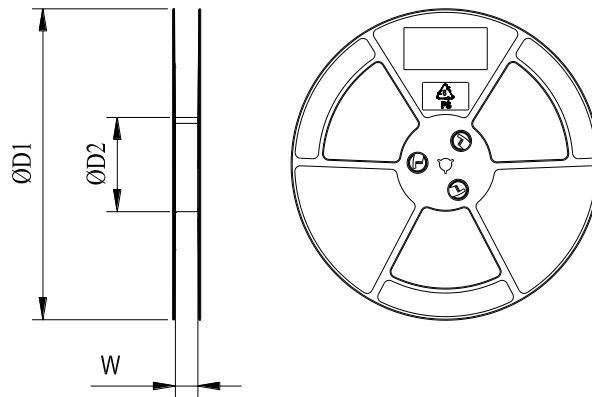


Figure 23: Plastic Reel Dimension Drawing

Table 24: Plastic Reel Dimension Table (Unit: mm)

ØD1	ØD2	W
380	100	24.5

8.3.3 Mounting Direction

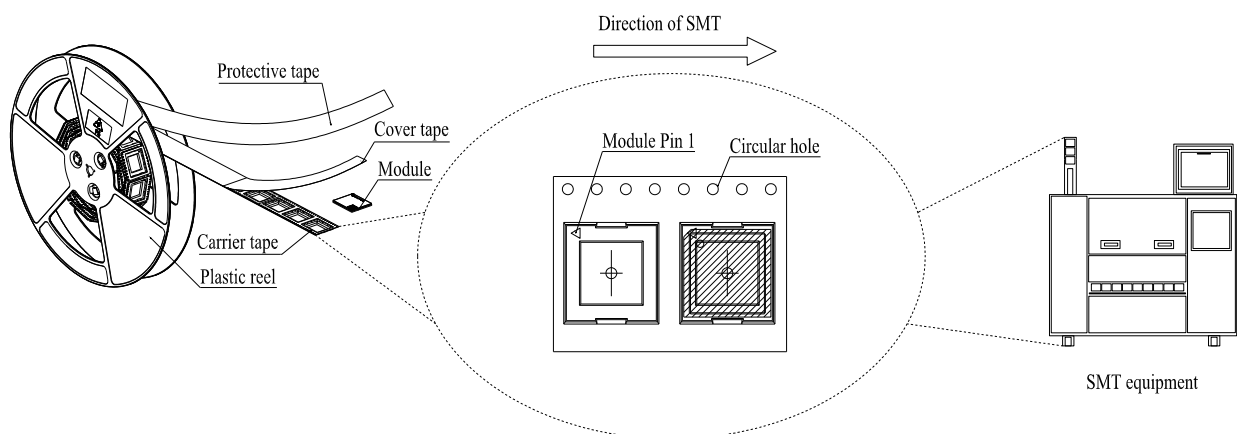
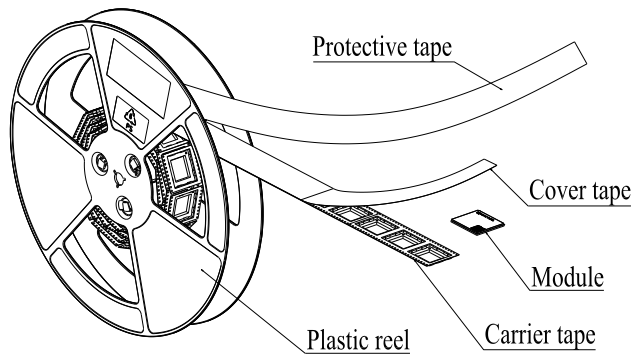


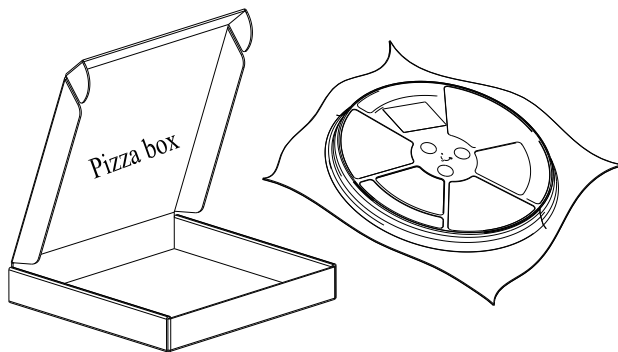
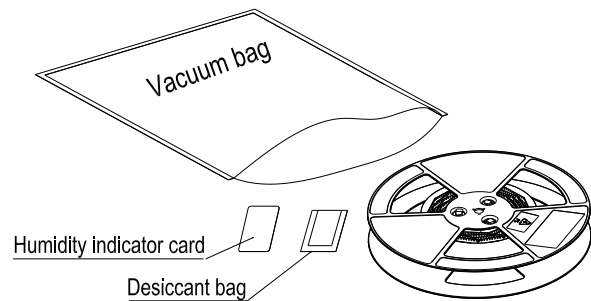
Figure 24: Mounting Direction

8.3.4 Packaging Process



Wind the heat-sealed carrier tape onto a plastic reel and apply a protective tape for additional protection. 1 plastic reel can pack 1000 modules.

Place the packaged plastic reel, humidity indicator card and desiccant bag into a vacuum bag, and vacuumize it.



Place the vacuum-packed plastic reel into a pizza box.

Place the 4 packaged pizza boxes into 1 carton and seal it. 1 carton can pack 4000 modules.

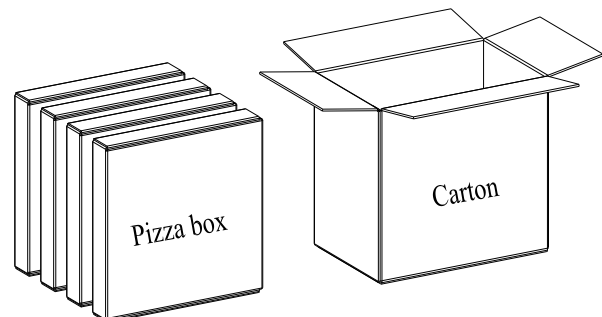


Figure 25: Packaging Process

9 Appendix References

Table 25: Related Documents

Document Name
[1] Quectel_FCM940Q_TE-B_User_Guide
[2] Quectel_RF_Layout_Application_Note
[3] Quectel_Module_Stencil_Design_Requirements
[4] Quectel_Module_SMT_Application_Note

Table 26: Terms and Abbreviations

Abbreviation	Description
AP	Access Point
BPSK	Binary Phase Shift Keying
CCK	Complementary Code Keying
DBPSK	Differential Binary Phase Shift Keying
DC	Direct Current
DQPSK	Differential Quadrature Reference Phase Shift Keying
ESD	Electrostatic Discharge
EVM	Error Vector Magnitude
GND	Ground
GPIO	General-Purpose Input/Output
I/O	Input/Output

High Frequency Crystal OscillatorI2C	Inter-Integrated Circuit
JTAG	Joint Test Action Group
LCC	Leadless Chip Carrier (package)
LNA	Low-Noise Amplifier
Mbps	Million Bits Per Second
MCU	Microcontroller Unit
MISO	Master In Slave Out
MOSI	Master Out Slave In
MSL	Moisture Sensitivity Levels
PA	Power Amplifier
PCB	Printed Circuit Board
QAM	Quadrature Amplitude Modulation
QPSK	Quadrature Phase Shift Keying
QSPI	Quad Serial Peripheral Interface
RoHS	Restriction of Hazardous Substances
SMT	Surface Mount Technology
SPI	Serial Peripheral Interface
SRAM	Static Random Access Memory
STA	Station
TVS	Transient Voltage Suppressor
Tx	Transmit
UART	Universal Asynchronous Receiver/Transmitter
(U)SIM	(Universal) Subscriber Identity Module
V _{IH}	High-level Input Voltage
V _{IL}	Low-level Input Voltage

V _{max}	Maximum Voltage
V _{min}	Minimum Voltage
V _{nom}	Nominal Voltage
V _{OH}	High-level Output Voltage
V _{OL}	Low-level Output Voltage
VSWR	Voltage Standing Wave Ratio
WPA	Wi-Fi Protected Access
XO	X'tal (crystal) Oscillator

FCC Statement

Warning: 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

The device must not be co-located or operating in conjunction with any other antenna or transmitter. 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.

FCC Radiation Exposure Statement

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

Does not comply with the use restrictions of the product:

Portable devices used close with human's body (within 20cm), Like Cell phone, Notebook etc.

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

2.2 List of applicable FCC rules

FCC Part 15 Subpart C 15.247 & 15.209 & 15.407.

2.3 Specific operational use conditions

The module can be used for mobile applications with a maximum 0.2dBi antenna. The host manufacturer installing this module into their product must ensure that the final product complies with the FCC requirements by a technical assessment or evaluation to the FCC rules, including the transmitter operation. The host manufacturer 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 shown in this manual.

2.4 Limited module procedures

Not applicable. The module is a Single module and complies with the requirement of FCC Part 15.212.

2.5 Trace antenna designs

Not applicable. The module has its own antenna, and doesn't need a host's printed board micro strip trace antenna etc.

2.6 RF exposure considerations

The module must be installed in the host equipment such that at least 20cm is maintained between the antenna and user's body; and if RF exposure statement or module layout is changed, then the host product manufacturer is required to take responsibility of the module through a change in FCC ID or new application. The FCC ID of the module cannot be used on the final product. In these circumstances, the host manufacturer will be responsible for reevaluating the end product (including the transmitter) and obtaining a separate FCC authorization.

2.7 Antennas

Antenna Specification are as follows:

Type: External Antenna

Gain: 2.4G:0.2dBi;5G:U-NII-1:-0.7dBi;U-NII-2A:-0.8dBi;U-NII-2C:-1.2dBi;U-NII-3:-1.5dBi;

This device is intended only for host manufacturers under the following conditions: The transmitter module may not be co-located with any other transmitter or antenna; The module shall be only used with the internal antenna(s) that has been originally tested and certified with this module. The antenna must be either permanently attached or employ a "unique" antenna coupler.

As long as the conditions above are met, further transmitter test will not be required. However, the host manufacturer is still responsible for testing their end-product for any additional compliance requirements required with this module installed (for example, digital device emissions, PC peripheral requirements, etc).

2.8 Label and compliance information

Host product manufacturers need to provide a physical or e-label stating "Contains FCC ID: XMR2025FCM940Q" with their finished product.

2.9 Information on test modes and additional testing requirements

Host manufacturer must perform test of radiated & conducted emission and spurious emission, etc according to the actual test modes for a stand-alone modular transmitter in a host, as well as for multiple simultaneously transmitting modules or other transmitters in a host product. Only when

all the test results of test modes comply with FCC requirements, then the end product can be sold legally.

2.10 Additional testing, Part 15 Subpart B disclaimer

The modular transmitter is only FCC authorized for FCC Part 15 Subpart C 15.247 & 15.209 & 15.407 and that the host product manufacturer is responsible for compliance to any other FCC rules that apply to the host not covered by the modular transmitter grant of certification. If the grantee markets their product as being Part 15 Subpart B compliant (when it also contains unintentional-radiator digital circuitry), then the grantee shall provide a notice stating that the final host product still requires Part 15 Subpart B compliance testing with the modular transmitter installed.

Federal Communication Commission Statement (FCC, U S)

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 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 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.

FCC Caution:

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

IMPORTANT NOTES

Co-location warning:

This transmitter must not be co-located or operating in conjunction with any other antenna or transmitter.

OEM integration instructions:

This device is intended only for OEM integrators under the following conditions:

The transmitter module may not be co-located with any other transmitter or antenna. The module shall be only used with the external antenna(s) that has been originally tested and certified with this module.

As long as the 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 (for example, digital device emissions, PC peripheral requirements, etc.).

Validity of using the module certification:

In the event that these conditions cannot be met (for example certain laptop configurations or co-location with another transmitter), then the FCC authorization for this module in combination with the host equipment is no longer considered valid and the FCC ID of the module 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.

End product labeling:

The final end product must be labeled in a visible area with the following: "Contains Transmitter Module **FCC ID: XMR2025FCM940Q**"

Information that must be placed in the end user manual:

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 shown in this manual.

IC Statement

This device complies with Industry Canada license-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 radio exempts 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.

The device is compliance with RF field strength limits, users can obtain Canadian information on RF exposure and compliance.

IC Radiation Exposure Statement

This equipment complies with IC radiation exposure limits set forth for an uncontrolled environment. This equipment should be installed and operated with minimum distance 20cm between the radiator & your body.

Déclaration d'exposition aux radiations:

Cet équipement est conforme aux limites d'exposition aux rayonnements IC établies pour un environnement non contrôlé. Cet équipement doit être installé et utilisé avec un minimum de 20 cm de distance entre la source de rayonnement et votre corps.

The user manual for local area network devices shall contain instructions related to the restrictions mentioned in the above sections, namely that:

- (i) the device for operation in the band 5150-5250 MHz is only for indoor use to reduce the potential for harmful interference to co-channel mobile satellite systems;
- (ii) the maximum antenna gain permitted for devices in the bands 5250-5350 MHz and 5470-5725 MHz shall comply with the e.i.r.p. limit; and
- (iii) the maximum antenna gain permitted for devices in the band 5725-5825 MHz shall comply with the e.i.r.p. limits specified for point-to-point and non point-to-point operation as appropriate.

(i) Les dispositifs fonctionnant dans la bande 5150-5250 MHz sont réservés uniquement pour une utilisation à l'intérieur afin de réduire les risques de brouillage préjudiciable aux systèmes de satellites mobiles utilisant les mêmes canaux.

(ii) le gain d'antenne maximal autorisé pour les appareils dans les bandes 5250-5350 MHz et 5470-5725 MHz doivent respecter le pire limiter; et

(iii) le gain d'antenne maximal autorisé pour les appareils dans la bande 5725-5825 MHz doivent respecter le pire limites spécifiées pour le point-à-point et l'exploitation non point à point, le cas échéant.

Users should also be advised that high-power radars are allocated as primary users (i.e. priority users) of the bands 5250-5350 MHz and 5650-5850 MHz and that these radars could cause interference and/or damage to LE-LAN devices.

Les utilisateurs de radars de haute puissance sont désignés utilisateurs principaux (c.-à-d., qu'ils ont la priorité) pour les bandes 5250-5350 MHz et 5650-5850 MHz et que ces radars pourraient causer du brouillage et/ou des dommages aux dispositifs LAN-EL.

End Product Labeling

This transmitter module is authorized only for use in device where the antenna may be installed such that 20 cm may be maintained between the antenna and users. The final end product must be labeled in a visible area with the following: "Contains IC:10224A-2025FCM940Q".

Étiquetage du produit final

Ce module émetteur n'est autorisé que pour une utilisation dans un dispositif où l'antenne peut être installée de telle sorte que 20 cm puissent être maintenus entre l'antenne et les utilisateurs. Le produit final doit être étiqueté dans une zone visible avec la mention suivante: "contient IC:10224A-2025FCM940Q".

This radio transmitter [10224A-2025FCM940Q] has been approved by Innovation, Science and Economic Development Canada to operate with the antenna types listed below, with the maximum permissible gain indicated. Antenna types not included in this list that have a greater gain than the maximum gain indicated for any type listed are strictly prohibited for use with this device.

Antenna Specification are as follows:

Type: External Antenna

Gain: 2.4G:0.2dBi;5G:U-NII-1:-0.7dBi;U-NII-2A:-0.8dBi;U-NII-2C:-1.2dBi;U-NII-3:-1.5dBi;

Ce émetteur radio [10224A-2025FCM940Q] a été approuvé par Innovation, Sciences et Développement économique Canada pour fonctionner avec les types d'antennes énumérés ci-dessous, avec le gain maximal autorisé indiqué. Les types d'antennes non inclus dans cette liste et dont le gain est supérieur au gain maximal indiqué pour tout type énuméré sont strictement interdits pour une utilisation avec cet appareil.

Spécifications de l'antenne :

Type : Antenne externe

Gain: 2,4 GHz: 0,2 dBi ; 5 GHz - U-NII-1: -0,7 dBi ; U-NII-2A: -0,8 dBi ; U-NII-2C: -1,2 dBi ; U-NII-3: -1,5 dBi