QLC300NA User Manual

LTE Cat-1 Module

TRACQLC300NAUM001

V1.00

Driving Smarter IoT

www.queclink.com

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Version	Date	Author	Description of Change
1.00	August 8, 2023	Rik xia	Initial

1. Introduction

QLC300NA module is a highly cost-efficient LTE Cat 1 module.The module integrates LTE CAT1 modem baseband and RF transceiver to cover 600MHz~2.7GHz bands for worldwide roaming. The application subsystem runs on a Cortex-R5 processor with integrated application processing subsystem, communication subsystem, audio codec, and embedded pSRAM + flash to enable the most compact single-chip LTE single-mode data module, POC, POS, and other IoT solutions.

1.1. Reference

Table 1: QLC300NA Document Reference

SN	Document Name	Remark
[1]	QLC300NA data sheet	The data sheet of QLC300NA

2. Product Overview

2.1. Description

The QLC300NA is an embedded IoT wireless communication module.

Figure 1. Appearance of QLC300NA

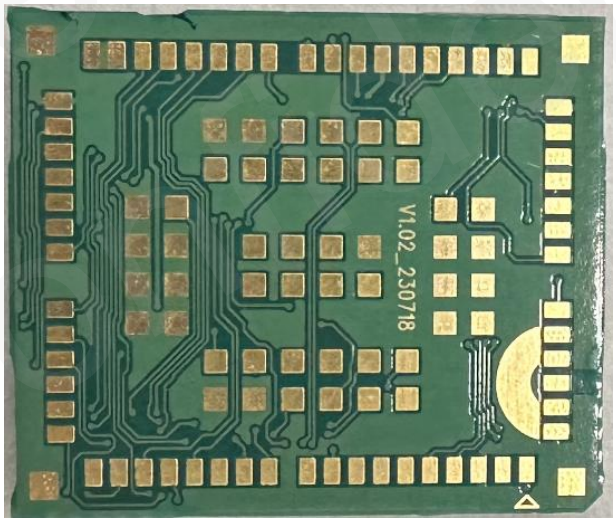

Figure 2. Appearance of QLC300NA

2.2. Pin Definition

The sequence and description of the pins are shown in the following figure.

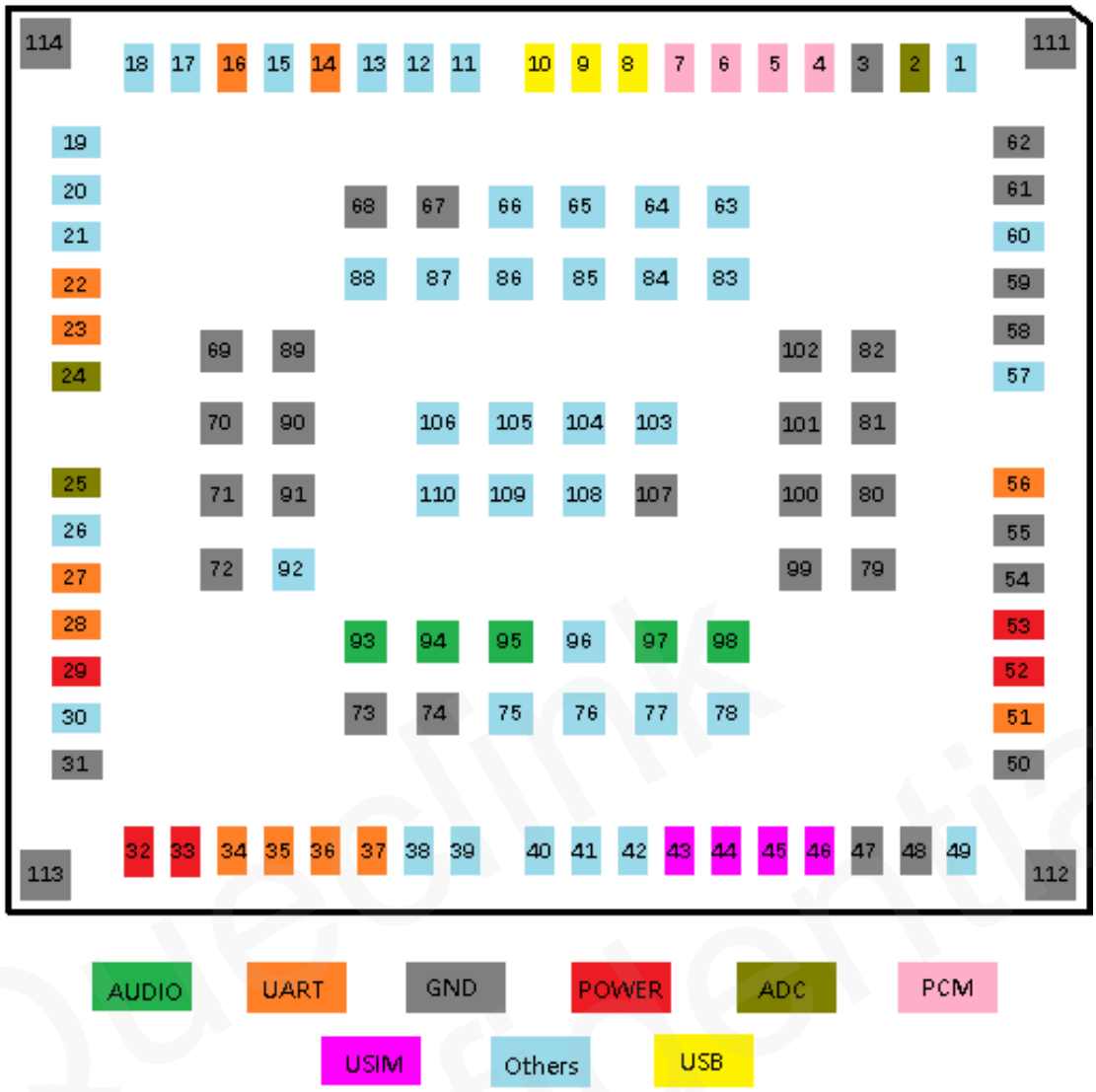

Figure 3. QLC300NA Pin Map

Table 2: QLC300NA Pin Description

PIN NO.	QLC300NA Net Name	Description
1	GPIO20	General purpose input/ output interface
2	AUXADC_IN3	General purpose analog to digital converter interface
4	PCM_CLK	PCM clock output
5	PCM_SYNC	PCM frame synchronization output
6	PCM_IN	PCM data input
7	PCM_OUT	PCM data output
11	I2C3_SDA	I2C3 serial clock
12	I2C3_SCL	I2C3 serial clock
13	GPIO21	General purpose input/ output interface
14	UART4_TXD	Transmit data

16	UART4_RXD	Receive data
18	AP_I2C_3_SCL	AP_I2C3 serial clock
19	AP_I2C_3_SDA	AP_I2C3 serial clock
20	GPIO24	General purpose input/ output interface
21	NETLIGHT	Indicate the module's operation status
22	SPI_MISO	Receive data
23	SPI_MOSI	Transmit data
24	AUXADC_IN1	General purpose analog to digital converter interface
25	AUXADC_IN2	General purpose analog to digital converter interface
26	GPIO22	General purpose input/output interface
27	UART3_TX	Transmit data
28	UART3_RX	Receive data
30	UART1_DTR	Data terminal ready (sleep mode control)
34	UART1_RXD	Receive data
35	UART1_TXD	Transmit data
36	UART1_RTS	Request to send
37	UART1_CTS	Clear to send
38	UART1_DCD	Data carrier detection
39	UART1_RI	Ring indication
40	CI2C2_SCL	I2C1 serial clock.
41	CI2C2_SDA	I2C1 serial clock.
42	USIM_PRESENCE	(U)SIM card insertion detection
63	GPIO25	General purpose input/ output interface
64	GPIO34	General purpose input/ output interface
65	STATUS	Indicate the module's operation status
66	GPIO33	General purpose input/ output interface
76	GPIO10	General purpose input/ output interface
77	GPIO11	General purpose input/ output interface
78	GPIO122	General purpose input/ output interface
83	GRFC_2	General purpose input/ output interface
84	GRFC_1	General purpose input/ output interface
85	GPIO37	General purpose input/ output interface
86	GPIO27	General purpose input/ output interface
87	GPIO35	General purpose input/ output interface
92	GPIO26	General purpose input/ output interface
93	AUD_MICBIAS	AUDIO Interface
94	MIC_P	AUDIO Interface
95	MIC_N	AUDIO Interface
97	AUD_EARP	AUDIO Interface
98	AUD_EARN	AUDIO Interface
8	USB_VBUS	USB Interface

9	USB_DP	USB Interface
10	USB_DM	USB Interface
75	FORCE_USB	FORCE Download
15	PWRKEY	Turn on the Module
17	RESET_IN	Reset the Module
29	VDD_EXT	Provide 1.8V power supply for external circuit
32	VBAT_BB	Power supply
33	VBAT_BB	Power supply
43	USIM_VDD	(U)SIM Interface
44	USIM_RST	(U)SIM Interface
45	USIM_DATA	(U)SIM Interface
46	USIM_CLK	(U)SIM Interface
47	USIM_GND	(U)SIM Interface
51	CP_UART_RXD	Receive data
52	VBAT_RF	Power supply
53	VBAT_RF	Power supply
56	CP_UART_TXD	Transmit data
57	GPIO54	General purpose input/ output interface
60	ANT_MAIN	Antenna Interface
88	GPIO53	General purpose input/ output interface
99	GPIO31	General purpose input/ output interface
3,31,48, 50,54,55, 58,59,61, 62, 67~74, 79~82, 89~91, 100~102, 107, 111~114	GND	Ground
49,96, 103~106, 108~110	NO CONNECT	NO CONNECT

3. Getting Started

3.1. Module & EVB

The QLC300NA_EVB can be used to test the module.

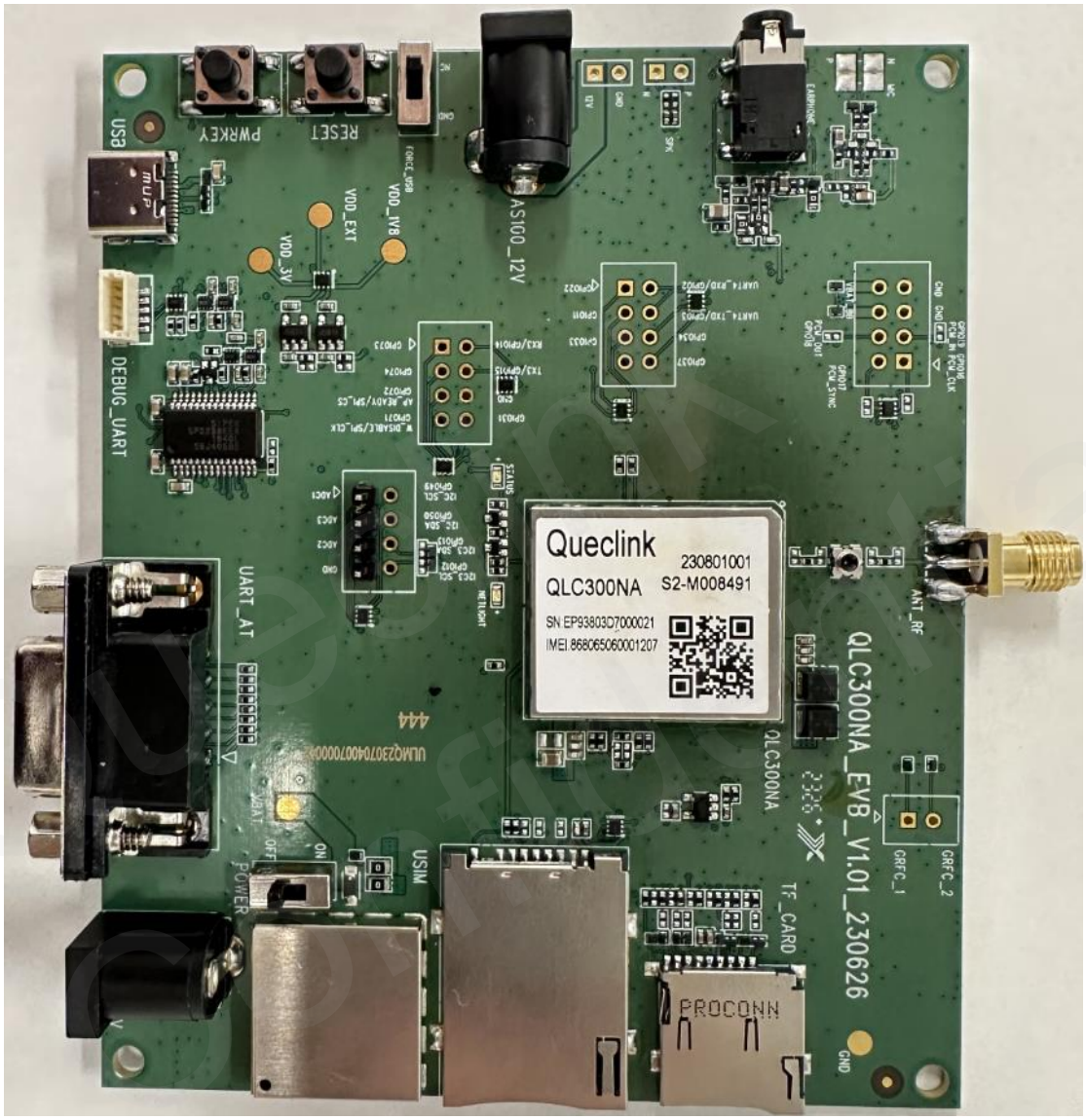

Figure 4. EVB & Module

3.2. Power on the Module

Connect the 12V charger to the EVB, switch the POWER to ON position and then press the power key.

Note: The Force_USB switch should be in the position as the Figure5 shows.

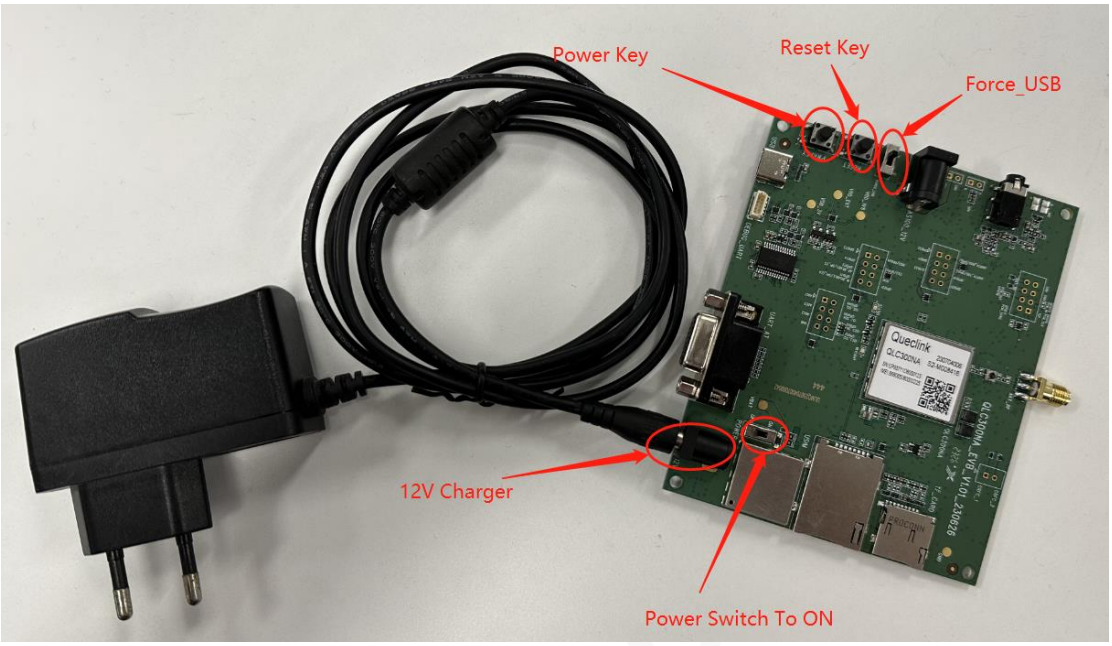

Figure 5. Power on the Module

3.3. Send Commands via USB Interface

Connect the EVB to Type-C cable interface to send commands to the module.

Step 1: Install the **DrvInstaller_Queclinkx64 or DrvInstaller_Queclink** USB driver on your PC.

Step 2: Power on the module.

Step 3: Connect the module to the USB interface. You will find the one COM port (Queclink Modem Device) on PC management, select it on QCOM tool.

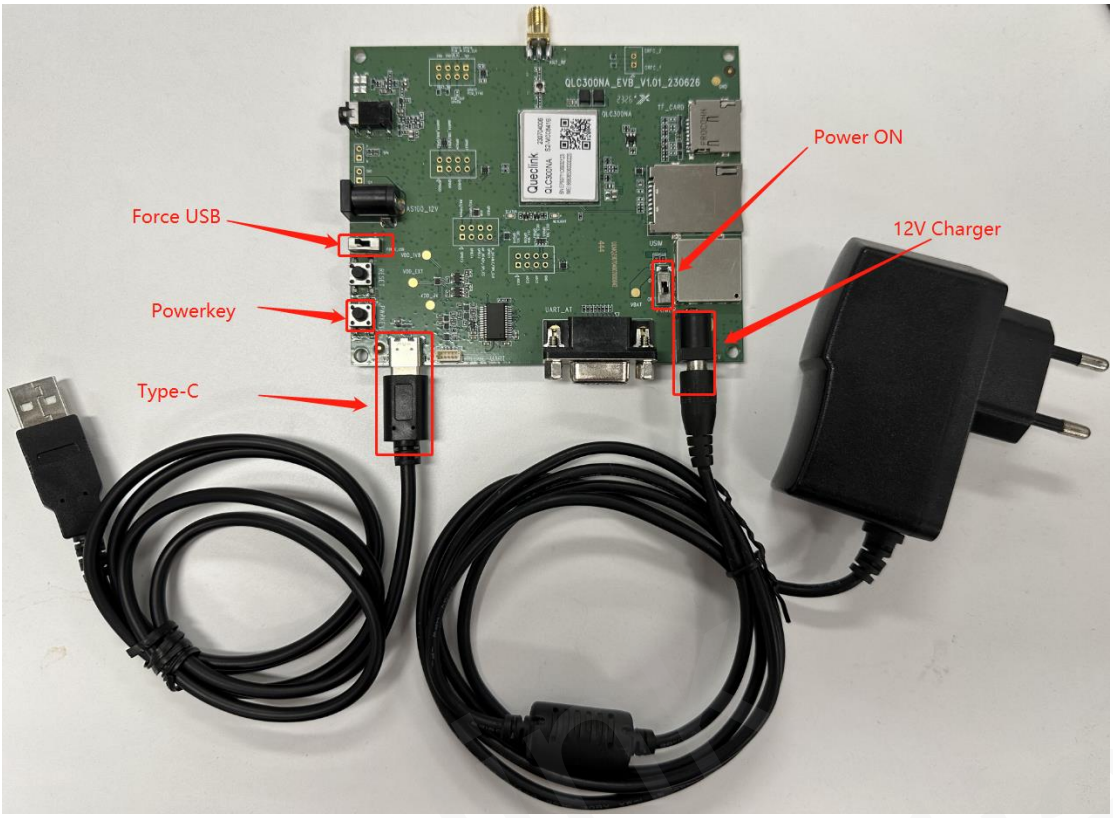

Figure 6. Connect USB Cable to Module

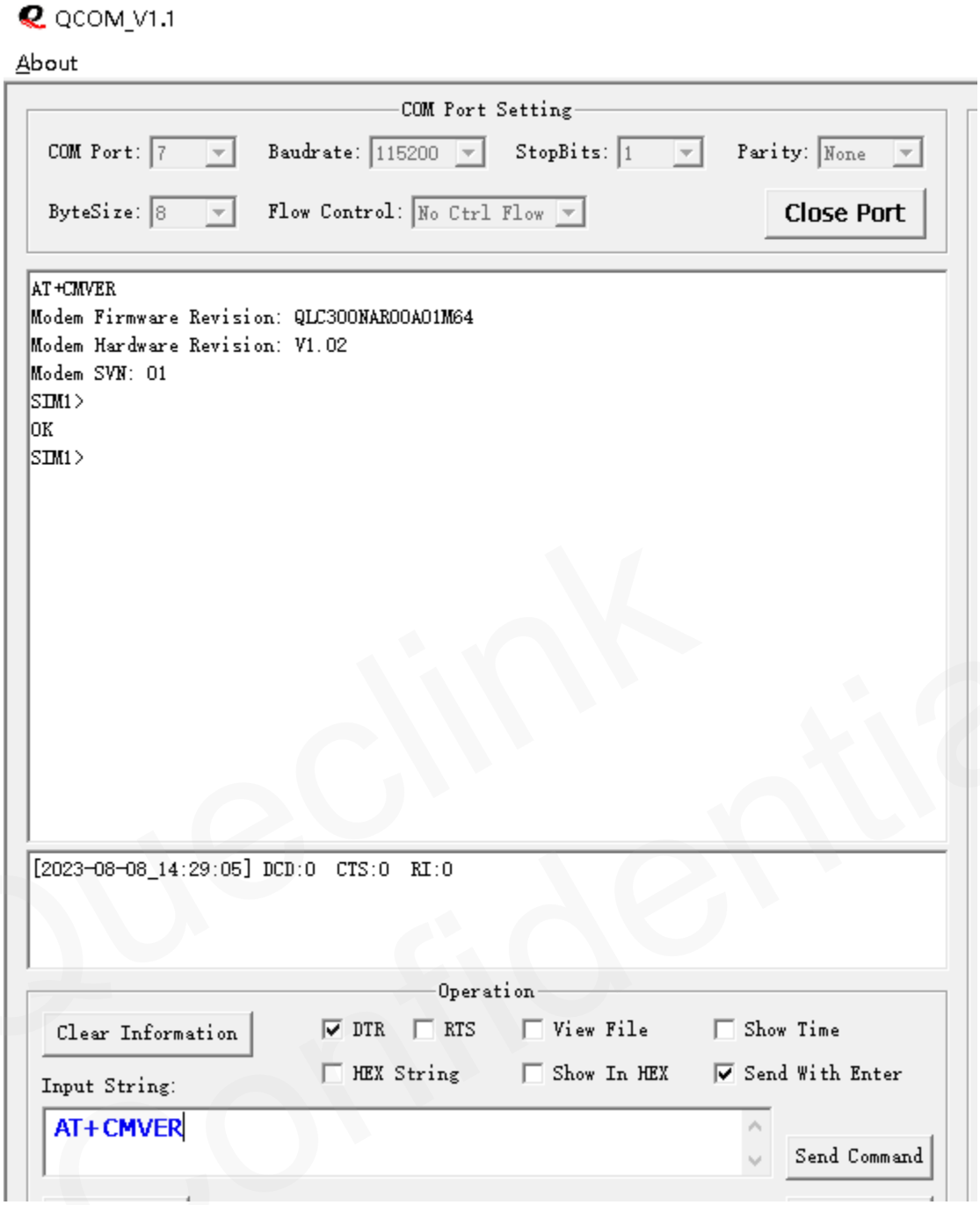

Figure 7. Send Commands via QCOM Tool

3.4. Upgrade the Firmware

Step 1: Connect the 12V charger to the USB Cable.
Step 2: Switch the Power to ON position and the Force_USB to low as Figure 8 shows.
Step 3: Press the power key to turn on the module.
Step 4: Use the **Queclink_Firmware_Upgrade_Tool_MDM** tool to upgrade.

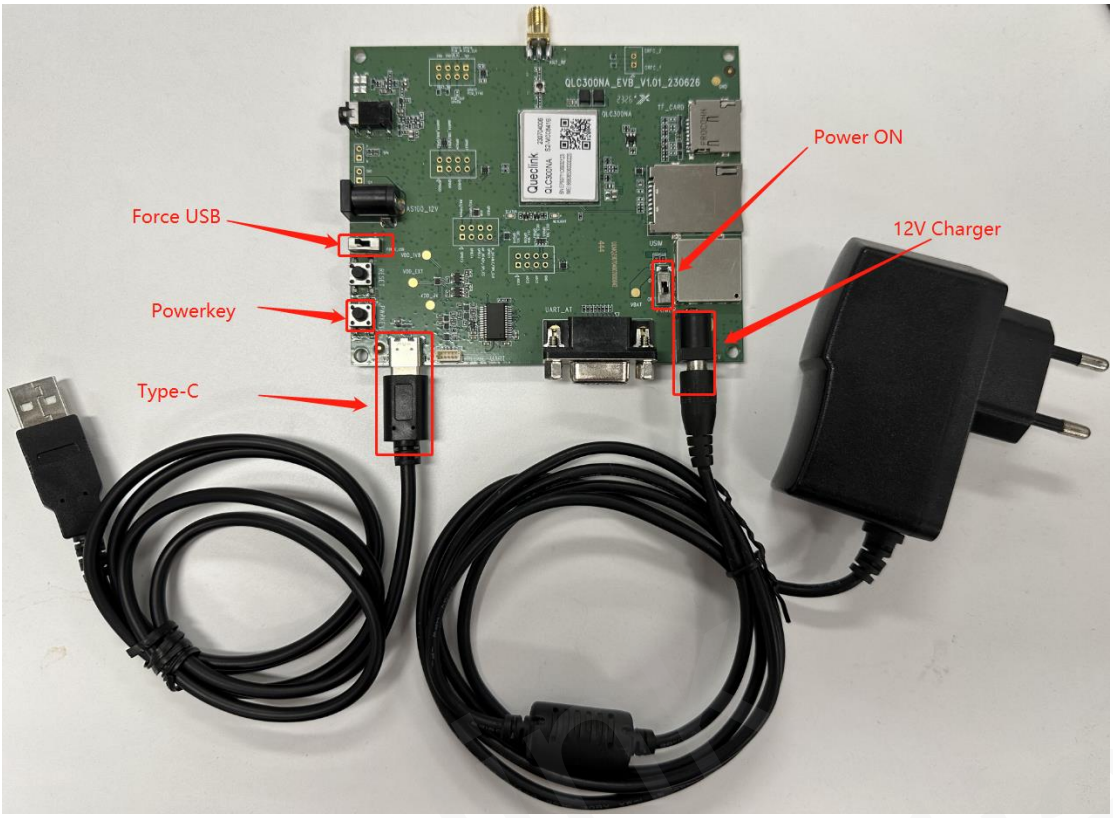

Figure 8. Upgrade the Firmware

OEM/Integrators Installation Manual

Important Notice to OEM integrators

1. This module is limited to OEM installation ONLY.
2. This module is limited to installation in mobile or fixed applications, according to Part 2.1091(b).
3. The separate approval is required for all other operating configurations, including portable configurations with respect to Part 2.1093 and different antenna configurations
4. For FCC Part 15.31 (h) and (k): The host manufacturer is responsible for additional testing to verify compliance as a composite system. When testing the host device for compliance with Part 15 Subpart B, the host manufacturer is required to show compliance with Part 15 Subpart B while the transmitter module(s) are installed and operating. The modules should be transmitting and the evaluation should confirm that the module's intentional emissions are compliant (i.e. fundamental and out of band emissions). The host manufacturer must verify that there are no additional unintentional emissions other than what is permitted in Part 15 Subpart B or emissions are complaint with the transmitter(s) rule(s).

The Grantee will provide guidance to the host manufacturer for Part 15 B requirements if needed.

Important Note

notice that any deviation(s) from the defined parameters of the antenna trace, as described by the instructions, require that the host product manufacturer must notify to Queclink that they wish to change the antenna trace design. In this case, a Class II permissive change application is required to be filed by the USI, or the host manufacturer can take responsibility through the change in FCC ID (new application) procedure followed by a Class II permissive change application.

End Product Labeling

When the module is installed in the host device, the FCC ID label must be visible through a window on the final device or it must be visible when an access panel, door or cover is easily re-moved. If not, a second label must be placed on the outside of the final device that contains the following text: “Contains FCC ID: YQD-QLC300NA”

The FCC ID can be used only when all FCC compliance requirements are met.

Antenna Installation

(1) The antenna must be installed such that 20 cm is maintained between the antenna and users,

(2) The transmitter module may not be co-located with any other transmitter or antenna.

(3) Only antennas of the same type and with equal or less gains as shown below may be used with this module. Other types of antennas and/or higher gain antennas may require additional authorization for operation.

Antenna type	LTE band2	LTE band4	LTE band5	LTE band12	LTE band13

	Gain	Gain	Gain	Gain	Gain
Paddle Antenna	2.56 dBi	3.13 dBi	0.85 dBi	0.33 dBi	1.49 dBi

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.

Federal Communication Commission Interference Statement

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 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.

Any changes or modifications not expressly approved by the party responsible for compliance could void the user's authority to operate this equipment. This transmitter must not be co-located or operating in conjunction with any other antenna or transmitter.

List of applicable FCC rules

This module has been tested and found to comply with part 22, part 24, part 27 requirements for Modular Approval.
The modular transmitter is only FCC authorized for the specific rule parts (i.e., FCC transmitter rules) listed on the grant, 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 circuity), 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.

This device is intended only for OEM integrators under the following conditions: (For module device use)

1) The antenna must be installed such that 20 cm is maintained between the antenna and users, and
2) The transmitter module may not be co-located with any other transmitter or antenna.
As long as 2 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.

Radiation Exposure Statement

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