5G NB-IOT USB KIT

USB Dongle BC660 Technical Specifications & User Manual

Purpose of the Document

The purpose of this document is to explain the technical specifications and manual for using the 5G NB-IoT USB Dongle.

Document History

Version	Author	Date	Description
A	5G HUB	09.18.2022	Initial Document

Table of Contents

1 Package contents:

1.1 Cat NB2 NB-IoT USB Dongle Package:

- LTE Cat NB2 USB dongle with LTE antenna connector.

1.2 Download

Download and Install LTE&GNSS modem driver for Windows OS:
https://github.com/5ghub/5G-NB-IoT/tree/master/Driver

Download and Install QNavigator and QCOM tools for Quectel BG95 here:
https://github.com/5ghub/5G-NB-IoT/tree/master/Tools

All the following software can be installed from the GitHub location here:
https://github.com/5ghub/5G-NB-IoT

2 General Description

2.1 Overview

The NB-IoT USB dongle is a cellular USB stick form factor based on Quectel BC660 chipset. BC660 is a high-performance NB-IoT module with extremely low power consumption.

The USB dongle has on-board LTE antennas. It features a wireless modem. The wireless modem is BC660 which is an embedded IoT (LTE Cat-NB2) wireless communication module. BC660 wireless modem provides a maximum data rate of 127Kbps downlink and 158.5Kbps uplink. It features ultra-low power consumption, provides data connectivity on LTE/5G networks, and supports half-duplex FDD operation in LTE networks.

The USB dongle provides rich sets of Internet protocols, industry-standard interfaces (USB/UART/SPI/ADC/GPIO/RI/Status Indicator) and abundant functionalities. The board offer a high integration level and enables integrators and developers to easily design their applications and take advantage of the board low power consumption, many functionalities, and USB drivers for Windows 7/8/8.1/10, Linux and Android.

The USB dongle is a rich hardware board that can be used for the 4G LTE wireless technology and enables a variety of smart applications for devices. It enables large number of applications such as wireless POS, smart metering, tracking, smart transportation, smart buildings, smart city, smart homes, bike sharing, smart wearables, smart parking, home appliances, security and asset tracking, agricultural and environmental monitoring.

2.2 Key Features

- Quectel BC660 Cat NB2 module
- Data rate of 127Kbps downlink and 158.5Kbps uplink
- On-board LTE antenna
- Supports LTE NB-IoT Cat NB2
- Global Frequency Band B1/B2/B3/B4/B5/B8/B12/B13/B17/B18/B19/B20/B25/B28/B66/B70/B85
- Supports the protocols TCP/UDP/PPP/ SSL/ TLS/ FTP(S)/ HTTP(S)/ NITZ/ PING/ MQTT
- Supports SMS
- Compact board size of 59mm x 25mm
- Nano USIM card slot
- Works with Windows, Linux, or Android
- Ready for smart wearables, smart applications, and development (smart home, smart city, smart transportation, smart metering, smart farming, smart waste management, asset tracking, location, navigation, mapping, and timing applications). Application such as Gas Detector, Soil PH Tester, Optical Sensor, Machinery Alarm System, Irrigation Controller, Elevator, Asset Tracking Electronics, Person/Pet Tracking, Water/Gas Metering, Smart Parking System, Fire Hydrant, Smoke Alarm, Trash Bin, Street Lighting
- The board is powered via the USB connector
- Interfaces with external sensors through UART. Each of the general purpose I/O pins on the board can be used for digital input or digital output.

2.3 Overview Diagrams

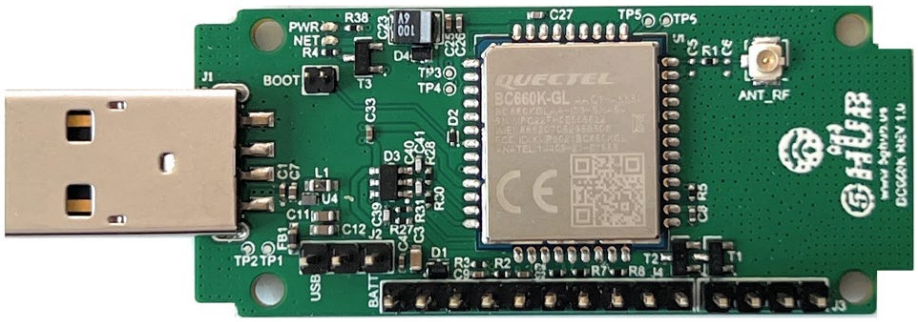

Figure 1. USB Dongle Overview Diagram – Top View

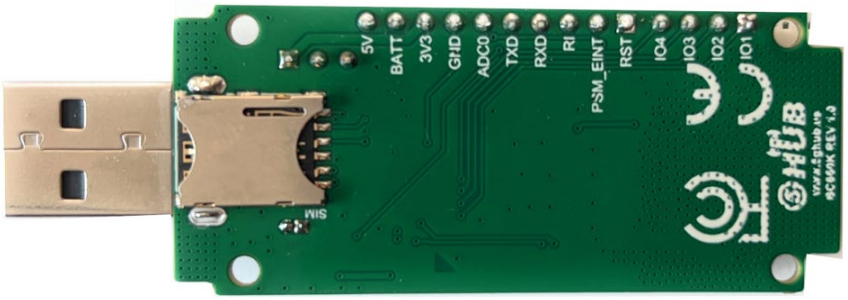

Figure 2. USB Dongle Overview Diagram – Bottom View

2.4 Physical Characteristics

The width and length of the USB dongle is 25 mm (width) by 59 mm (length). The board have four screw holes in opposite corner that allows to use the USB dongle inside an enclosure or to be attached to a surface or case.

The size of the BC660 module is also shown below which is ultra-compact size for an LTE modem.

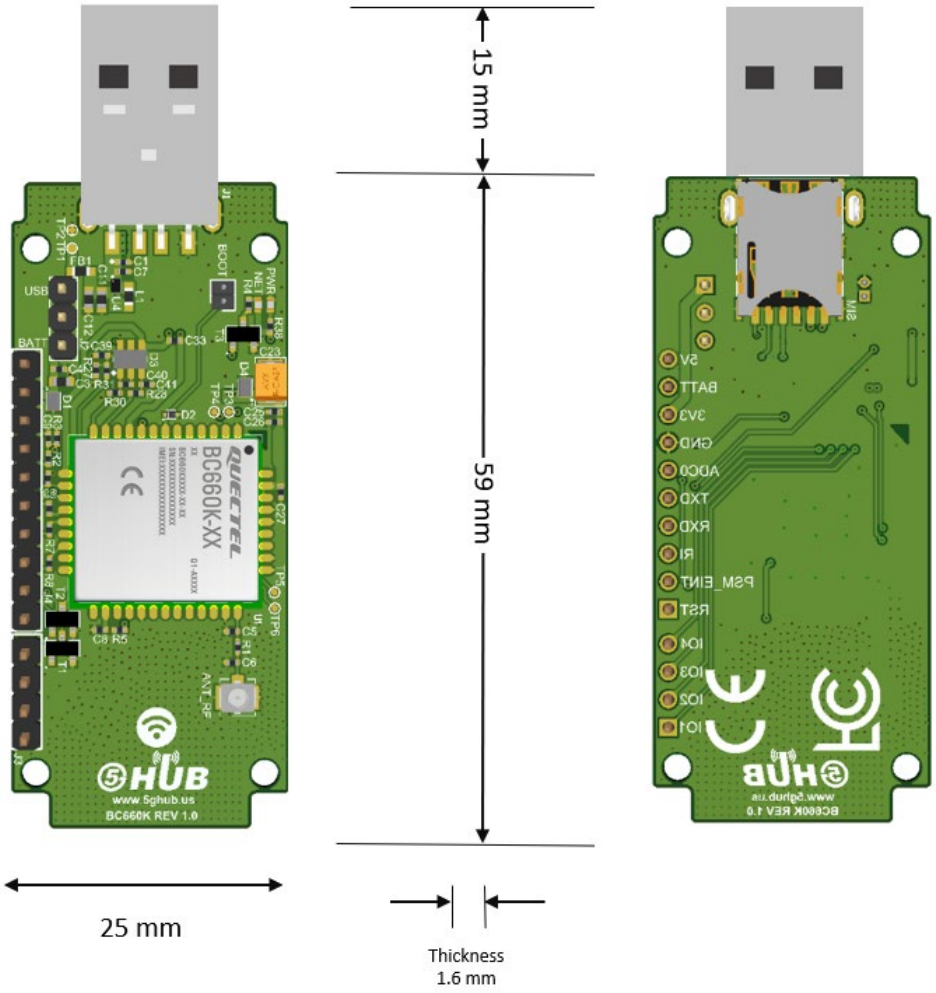

Figure 3. Physical Characteristics.

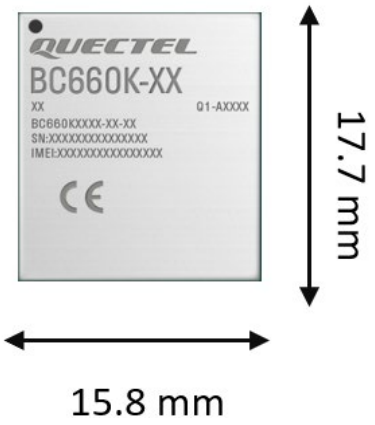

Figure 4. BC660 ultra-compact modem

2.5 Peripherals – IO Connections

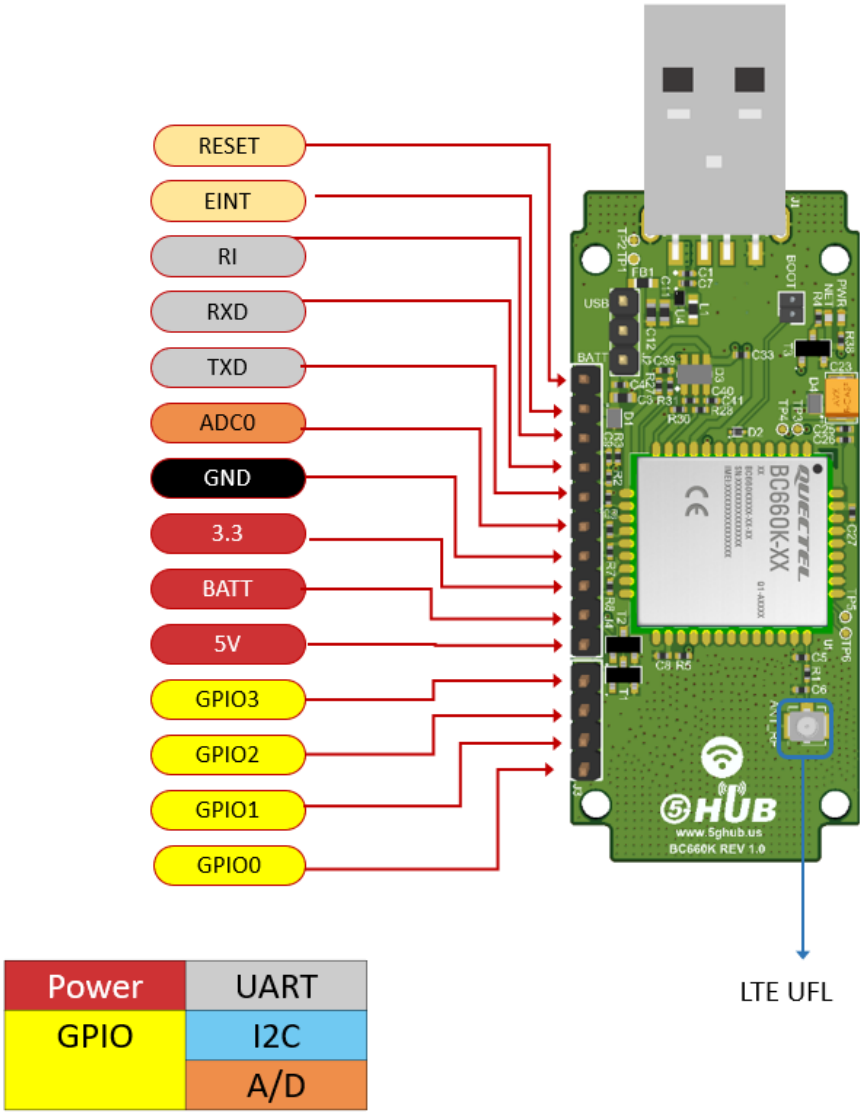

Figure 5. USB Dongle Connectors

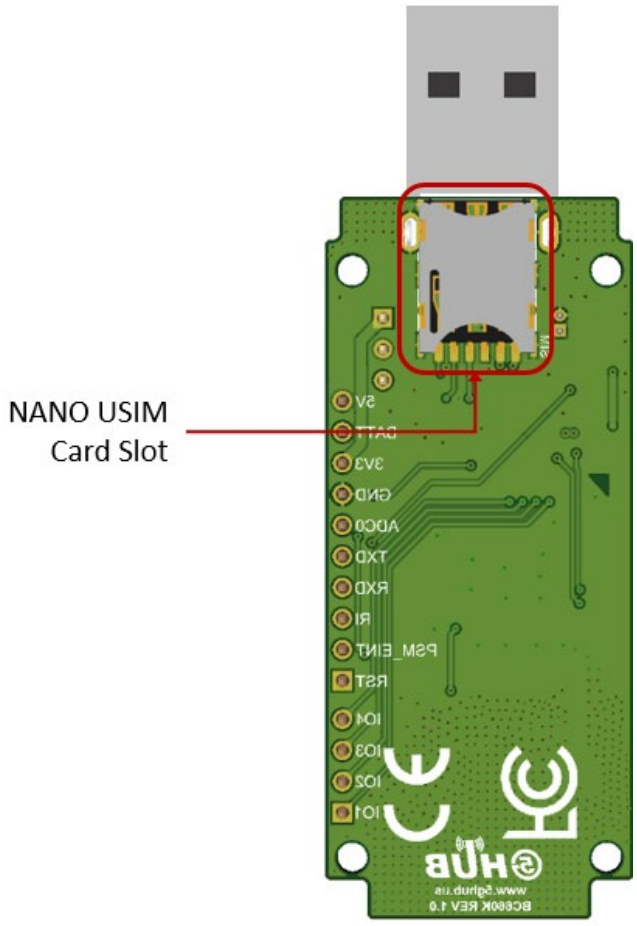

Figure 6. USB Dongle Bottom Side – Key Components

2.6 Hardware Specification

Technical Specification	
NB-IoT Module	Quectel BC660
Dimension	25 mm (width) by 59 mm (length)
Weight	18 grams
Power Supply	USB (5V)
LED	Power LED and Netlight LED
Interfacing Logic Voltage Level (Operating Voltage)	3.3V
Voltage output	5V, 3.3V
GPIO	4 connected to BC660
ADC	1 connected to BC660
USB	1
UART	1 connected to BC660
BATT	1
BOOT	1 for firmware upgrade
USIM	Nano
Antenna	1 main antenna
Band	B1/B2/B3/B4/B5/B8/B12/B13/B17/B18/B19/ B20/B25/B28/B66/B70/B85

2.7 PIN Description

PIN	Direction	Description
USB Connector	I	The USB dongle is powered from the USB port (3.8V-5V)
LED1(Power)	O	LED on powering on the USB
LED (NET)	O	Indicate the BC660 network activity status
3.3V	O	3.3V generated by the on-board regulator. Maximum current drawn is 3A. The regulator also provides power to BC660
5V	O	5V generated from the board. The board is supplied with power from USB connector (typical 5V)
BATT	I	To provide power source from external battery (3.3V). If powered from battery, no connection through USB port is needed
GND		Ground
UART (TX)	O	UART TX line to communicate with BC660
UART (RX)	I	UART RTX line to communicate with BC660
RI	O	Ring indication
EINT	I	External interrupt pin dedicated to waking up the module from Deep/Light Sleep mode
ADC0	I	Connected to BG77. General purpose analogue to digital converter
ADC1	I	Connected to BG77. General purpose analogue to digital converter
GPIO1	IO	Connected to BC660. General purpose IO
GPIO2	IO	Connected to BC660. General purpose IO
GPIO3	IO	Connected to BC660. General purpose IO
GPIO4	IO	Connected to BC660. General purpose IO
SPI	IO	Connected to BG77.
USIM	I	Used to insert a Nano USIM. Connected to BG77