Qualcomm Technologies International, Ltd.

QCC711.OR.2.1-r00076.1 CS SDK

Release Notes

80-Y7085-4 Rev. AC

April 3, 2025

Revision history

Revision	Date	Description
AA	June 2024	Initial release
AB	March 2025	Editorial updates
AC	April 2025	Editorial updates

Contents

Tables

1 Introduction

Whether downloaded from the Qualcomm ChipCode™ Portal portal, the Qualcomm CreatePoint site, or embedded on Equipment received from Qualcomm Technologies International, Ltd. ("QTIL") or its affiliates, the `QCC711.OR.2.1-r00076.1 CS` software release (the "SW Package") shall be considered (in order of priority): (i) Evaluation Technology under the terms of the Product Kit License Agreement accompanying the release (the "PKLA"), (ii) Deliverables under the terms of your Limited Use Agreement (the "LUA"), or (iii) Licensed Technology under the terms of your Technology License Agreement (the "TLA"), each with QTIL or its affiliate (the PKLA, LUA, or TLA, as applicable, the "Agreement"). The applicable period for which the SW Package is licensed (the "Use Period") starts on the Effective Date of your Agreement or the date you received the SW Package, whichever is later, and expires on the date specified in the Agreement (if any). By receiving and/or using the SW Package, you acknowledge and agree that your use of the SW Package is subject to the terms and conditions of the Agreement. If you do not agree to the terms of the Agreement, have not accepted any such Agreement, or your agreement with QTIL or its affiliate does not include Deliverables, Evaluation Technology, or Licensed Technology, you shall immediately delete the SW Package from all storage media and destroy any and all copies made.

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1.1 Identification

This document provides details on the `QCC711.OR.2.1-r00076.1 CS` release.

The release version is as presented in Table 1-1:

Table 1-1 Release version information

Variant	Build
QCC711	00076.1 **Note**: BTSS patch version: 0x7807.

Instructions for obtaining this release are described in Section 6.1.

2 Features

This chapter lists in Table 2-1 the features that are present in the current release.

Table 2-1 Release features

Feature	OR.2.0-r00017.1 CS	OR.2.1-r00037.1 ES	OR.2.1-r00058.1 FC	OR.2.1-r00076.1 CS
Platform Support				
64 KB Application RAM (up to 16 KB Retained)	●	●	●	●
416 KB Application and Data NVM	●	●	●	●
Programming and Debugging Support for IAR Embedded Workbench	●	●	●	●
Task Scheduler	●	●	●	●
Heap Manager	●	●	●	●
Retained Memory Management	●	●	●	●
APSS Power Voting	●	●	●	●
Deep Sleep (Shutdown)	●	●	●	●
Clock and Power Management	●	●	●	●
Manufacturing Support	●	●	●	●
NVM (RRAM) Driver	●	●	●	●
Ported Arm CMSIS Library	●	●	●	●
Example Linker Scripts (IAR)	●	●	●	●
Runtime Voltage Failure Mitigation (VDIO event handling)	●	●	●	●
Peripherals				
Watchdog	●	●	●	●
Battery Monitor	●	●	●	●
Flexible Timer/Counter (FTC/PWM)	●	●	●	●
Timer	●	●	●	●
GPIO	●	●	●	●
I²C Slave	●	●	●	●
I²C Master	●	●	●	●
LED	●	●	●	●
M2M DMA	●	●	●	●
Voltage and Temperature Sensors	●	●	●	●
SPI	●	●	●	●
SPI Flash	●	●	●	●
UART	●	●	●	●
Qualcomm® Bluetooth Low Energy (BLE)				

Feature	OR.2.0-r00017.1 CS	OR.2.1-r00037.1 ES	OR.2.1-r00058.1 FC	OR.2.1-r00076.1 CS
BLE 5.4 Controller	●	●	●	●
BLE 5.4 Host	●	●	●	●
LE Ping	●	●	●	●
LE Privacy 1.2	●	●	●	●
LE Data Length Extensions	●	●	●	●
LE Secure Connections	●	●	●	●
Simultaneous Central and Peripheral Modes	●	●	●	●
Multiple LE Connections	●	●	●	●
Advertising Extensions	●	●	●	●
Extended Scanning	●	●	●	●
High Duty Cycle Non-Connectable Advertising	●	●	●	●
Channel Selection Algorithm 2	●	●	●	●
2 Mb PHY	●	●	●	●
Whitelist	●	●	●	●
EIR and AD Data Types	●	●	●	●
Fast Data Advertising Interval	●	●	●	●
Advertising Interval Data Type	●	●	●	●
Connection-Oriented L2CAP Channels	●	●	●	●
Enhanced Link Layer Topology	●	●	●	●
Low Duty Cycle Directed Advertising	●	●	●	●
LE Long Range	●	●	●	●
LE Advertisement Extensions	●	●	●	●
RSSI Filtering	●	●	●	●
GATT Caching	●	●	●	●
Advertising Channel Index	●	●	●	●
Periodic Advertising Sync Transfer	●	●	●	●
AoA			●	●
Battery Alert Service (BAS)	●	●	●	●
Constant Tone Extension Service (CTES)	●	●	●	●
Device Information Service (DIS)	●	●	●	●
Generic Access Profile Service (GAPS)	●	●	●	●
Object Transfer Service (OTS)	●	●	●	●
Radio Brownout Detection	●	●	●	●
RF Coexistence via PTA	●	●	●	●
LE Runtime Statistics/Metrics	●	●	●	●
LE Direct Test Mode (DTM)	●	●	●	●
HCI mode			●	●
Periodic Advertising with Responses			●	●
Security				
Boot Time Image Authentication	●	●		

Feature	OR.2.0-r00017.1 CS	OR.2.1-r00037.1 ES	OR.2.1-r00058.1 FC	OR.2.1-r00076.1 CS
Authenticated Firmware Update	●	●	●	●
Update Package Verification	●	●	●	●
Authenticated Debug Unlock	●	●	●	●
Random Number Generator	●	●	●	●
SHA-256 and SHA-512	●	●	●	●
Encryption and Decryption (AES-128/256 GCM, CBC, CTR)	●	●	●	●
Key Derivation (HKDF)	●	●	●	●
ECC Curves: NIST P256 P521	●	●	●	●
Signing and Verification (ECDSA)	●	●	●	●
Shared Secret Derivation (ECDH)	●	●	●	●
Fuse read/write	●	●	●	●
Token Generation				
Tools				
Signing and Update Packaging	●	●	●	●
NVM Programmer	●	●	●	●
OTP Programmer	●	●	●	●
Secure Programmer	●	●	●	●
IAR Flash loader	●	●	●	●
File Encryption	●	●	●	●
BLE Config Tag (CFGTAG)	●	●	●	●
OEM Debug Unlock	●	●	●	●
Batch Programming/Manufacturing	●	●	●	●
Unified Python3 support for tools		●	●	●
Demos (QCLI)				
General Demo (BLE, Crypto, Platform)	●	●	●	●
Peripheral Demo (e-Ink Display, SPI Flash, FTC, GPIO, I²C, M2MDMA, MFP, Sensors, SPI, Timer, UART, WDOG)	●	●	●	●
Beacon Demo (iBeacon, Eddystone)		●	●	●
External host (AT Command)				
AT command for NVM read/write		●	●	●
AT command for Firmware upgrade		●	●	●
AT command for BLE Application support		●	●	●
Build/Debug Env Support				
IAR	●	●	●	●
qccsdk.py command		●	●	●
qccide		●	●	●

3 Fixes and updates

- The current release supports *Bluetooth Core Specification*, version 5.4:
  - Complete version 5.4 controller certification. QDID: D061740.
  - Complete version 5.4 host certification. QDID: D063922.
- The nvm and secure programmer tools in previous releases required python2.7, python3.7, and J-LINK version v6.89. They now require python3.11 and J-LINK version v7.86.
- In the PAwR usage scenario, a new command-line interface (CLI) option is added to set the synchronization timeout. The default value is set to 12.8 seconds. Users can use this CLI to set a new value, which is suggested to be 8 times the periodic advertising interval. This option fixes the lost sync issue when the scanner changes the sync subevent or the PA interval is too large.
- In the PAwR use case, the issue of crashing after establishing a connection while transmitting periodic advertisements has been resolved. This ensures the coexistence of periodic advertising and connections.
- In the retain mode advertising scenario, there is now support for sending scan response data, and for configuring multiple advertising payloads to BTSS before entering retain mode. Once in retain mode, a device can cyclically transmit multiple different payloads for advertising.
- In the retain mode advertising scenario, several crash issues have been fixed. These include a crash:
  - Caused by setting up a connection when re-entering retain mode.
  - Caused by setting scan response data after exiting retain mode.
  - When disabling advertising after exiting retain mode.

4 Limitations

This chapter lists the limitations for the current release.

Limitations with IAR EWARM:

- Only IAR EWARM 8.11 (and greater) are supported by this SDK release.
- If a watchdog bite occurs when a debugger is attached, it can cause subsequent resets triggered by the debugger to fail and the chip becomes unresponsive. The chip can be recovered by power cycling the chip. Note that an alternative workaround for IAR is to change the reset logic in `pre_reset_cspy.mac` from "`_writeMemory32(0x5A5A0100, 0x50006828, "Memory");`" to "`__writeMemory32(0x00D1ED1E, 0x50006828, "Memory");`". This alternative reset method does not work with an older J-Link hardware.

Limitations with SPI:

- For SPI master and SPI slave transfer, SPI Master/Slave can use DMA to transfer the data from flash to SPI connected devices. When SPI is used for this purpose, the source address of an SPI DMA transfer should be a system address mapped from a flash address. When SPI works in this mode, if the data length to be transmitted is in 4*n+3 format (where n is a non-negative integer), the last byte of data transmitted is corrupted. A workaround is to pad the data (with zeros) so that the total amount transferred does not equal the mentioned length (add one more byte at the END of the transmission, or ignore the last byte if receiving 4*n+3 bytes). Application code should handle this padding on both the sending and receiving side.

NOTE: If the source address of an SPI transfer is SRAM, or RRAM, no such issue exists.

5 Known issues

This chapter lists the known issues for the `QCC711.OR.2.1-r00076.1 CS` release.

Known issues with BLE:

- When QCC711 performs a PAwR scanner sync (where QCC711 is the PAwR advertiser) by actively creating and then terminating a sync after a synchronization has been established, QCC711 repeats these steps for about an hour and a scanner cannot sync with the advertiser after terminating the sync. A workaround is implemented to prevent unrecoverable situations; using the `CreatePAwRSync` command to resync allows operations to continue.
- When using three QCC711s flashed with an HCI mode bin (one as a PAwR advertiser and two as PAwR scanners) for data interaction, the scanner unexpectedly receives a response too late when attempting to set response data. This issue occurs only under limited parameter combinations using HCI mode.

6 Deliverable download and build

Released software and documents are downloaded from Qualcomm-hosted servers and third-party vendor websites.

6.1 Deliverables

The `QCC711.OR.2.1-r00076.1 CS` release consists of proprietary software by Qualcomm Technologies, Inc. (QTI) and by third-party vendors.

- The QTI proprietary software is hosted on ChipCode (http://chipcode.qualcomm.com). It consists of board-specific archives that contain proprietary modules for inclusion in the target system builds. QTI does not provide the source code for these components.
- The QTI proprietary Qualcomm Development Acceleration Resource Toolkit – Connectivity (QDART-Connectivity) is hosted on Qualcomm CreatePoint at https://createpoint.qti.qualcomm.com/tools/#.

6.1.1 QTI packages on ChipCode

The QTI proprietary packages listed in Table 6-1 are downloaded from a private access customer support account. The variable `<customer_name>` indicates specific customer route since each customer is given a dedicated link to ChipCode.

Table 6-1 QTI packages

Software package	Software location at ChipCode
QCC711.OR.2.1	`<customer_name>/qcc711-or-2-1.`

6.1.2 Reference documentation

Table 6-2 lists the supporting documents available for this release.

Table 6-2 Reference documentation

Document number	Title
80-Y7085-4 (this document)	*QCC711.OR.2.1-r00076.1 CS SDK Release Notes*
80-70852-1	*QCC711 Development Kit Quick Start Guide*
80-70851-1	*QCC711 Bluetooth Low Energy QAPI v2.1 API Reference*
80-77358-1	*QCC711 Bluetooth Low Energy Throughput Testing Guide*
80-77903-1	*QCC711 HCI Mode User Guide*
80-70850-1	*QCC711 v2.1 Bluetooth Low Energy Software Programming Guide*
80-68818-1	*QCC711 with External Host - Bluetooth Low Energy Application User Guide*

7 Performance measurement

7.1 BLE throughput/performance

This section lists measured BLE throughput and performance data.

7.1.1 BLE throughput

Table 7-1 lists BLE throughput measurements.

NOTE: All data was obtained using two QCC711 devices (acting as central and peripheral) using the QAPI interface provided by the SDK on the APSS.

Table 7-1 BLE throughput

Test case name	Summary	Results (Kbps)
BLE, Min MTU, 1M PHY	*Maximum throughput using payload size of 23 using 1 Mb w/HCI QAPI*	*299.4*
BLE, Max MTU, 1M PHY	*Maximum throughput using payload size of 517 using 1 Mb w/HCI QAPI*	*285.6*
BLE, Max MTU, 1M PHY (paired)	*Maximum throughput using payload size of 517 using 1 Mb encrypted link w/HCI QAPI*	*267.2*
BLE, Min MTU, 2M PHY[1]	*Maximum throughput using payload size of 23 using 2 Mb w/HCI QAPI*	*397*
BLE, Max MTU, 2M PHY	*Maximum throughput using payload size of 517 using 2 Mb w/HCI QAPI*	*388.4*
BLE, Max MTU, 2M PHY (paired)	*Maximum throughput using payload size of 517 using 2 Mb encrypted link w/HCI QAPI*	*357.4*
BLE, Max MTU, DLE, 1M PHY	*Maximum throughput using payload size of 517 using 1 Mb with data length extensions w/HCI QAPI*	*760.4*
BLE, Max MTU, DLE, 1M PHY (paired)	*Maximum throughput using payload size of 517 using 1 Mb with data length extensions encrypted link w/HCI QAPI*	*739.6*
BLE, Max MTU, DLE, 2M PHY	*Maximum throughput using payload size of 517 using 2 Mb with data length extensions w/HCI QAPI*	*1398*
BLE, Max MTU, DLE, 2M PHY (paired)	*Maximum throughput using payload size of 517 using 2 Mb with data length extensions encrypted link w/HCI QAPI*	*1209.8*

7.2 Boot time transitions

Table 7-2 Boot time transitions

Use case	Average
Cold Boot	*155.56 ms*

7.3 RoT time transitions

Table 7-3 RoT time transitions

Use case	Average
*Start RoT Session**	*13.5 ms*
End RoT Session	*103 µs*
Time to Verify Update - BTSS, APSS, TME	*613 ms*
Time to Verify Update - APSS Large	*628 ms*
Time to Verify Update - APSS Small	*529 ms*
Time to Encrypt - 128 bit, 450 bytes	*7.6 ms*
Time to Encrypt - 128 bit, 900 bytes	*7.8 ms*
Time to Encrypt - 256 bit, 450 bytes	*7.6 ms*
Time to Encrypt - 256 bit, 900 bytes	*7.8 ms*
Time to Decrypt - 128 bit, 450 bytes	*7.5 ms*
Time to Decrypt - 128 bit, 900 bytes	*7.6 ms*
Time to Decrypt - 256 bit, 450 bytes	*7.5 ms*
Time to Decrypt - 256 bit, 900 bytes	*7.7 ms*
Time to get random Number, 32 Bytes	*6.9 ms*
Time to write to NVM: 1 k bytes, all different	*5.2 ms*
Time to write to NVM: 2 k bytes, all different	*10.6 ms*
Time to write to NVM: 1 k bytes, all same	*454 µs*
Time to write to NVM: 2 k bytes, all same	*903 µs*

* Start RoT Session, must be done before all other operations requiring the RoT.

7.4 Power measurements

7.4.1 No LP mode power measurements

Table 7-4 lists no LP mode power measurements.

NOTE: All data was obtained using one QCC711 device using the General demo.

Table 7-4 No LP mode power measurements

Use case	Average (v2.1)
NON_CON ADV (Tx) at 4 dBm (120 msec interval, 12-byte payload) (No LP mode)	*2.038 mA*
NON_CON ADV (Tx) at 4 dBm (250 msec interval, 12-byte payload) (No LP mode)	*2.014 mA*
NON_CON ADV (Tx) at 4 dBm (1000 msec interval, 12-byte payload) (No LP mode)	*1.996 mA*
NON_CON ADV (Tx) at 4 dBm (1200 msec interval, 12-byte payload) (No LP mode)	*1.995 mA*
BLE Passive Scan with 10 ms window and 400 ms interval (No LP mode)	*2.05 mA*

7.4.2 LP mode power measurements

Table 7-5 lists LP mode power measurements.

NOTE: All data was obtained using one QCC711 device using the General demo.

Table 7-5 LP mode power measurements

Use case	Average (v2.1)
Periodic APSS + BTSS wake-up (120 msec interval) for NON_CON ADV (Tx) at 4 dBm (12-byte payload) (LP mode)	*1.992 mA*
Periodic APSS + BTSS wake-up (250 msec interval) for NON_CON ADV (Tx) at 4 dBm (12-byte payload) (LP mode)	*0.961 mA*
Periodic APSS + BTSS wake-up (1000 msec interval) for NON_CON ADV (Tx) at 4 dBm (12-byte payload) (LP mode)	*0.242 mA*
Periodic APSS + BTSS wake-up (1200 msec interval) for NON_CON ADV (Tx) at 4 dBm (12-byte payload) (LP mode)	*0.201 mA*

7.4.3 Retain mode power measurements

Table 7-6 lists retain mode power measurements.

NOTE: All data was obtained using one QCC711 device using the General demo.

Table 7-6 Retain mode power measurements

Use case	Average (v2.1)
Shutdown	*1.13 µA*
Periodic BTSS wake-up for NON_CON ADV (Tx) in (Retain mode) (20 msec interval, 4 dBm Tx power, 0-byte payload)	261.66 µA
Periodic BTSS wake-up for NON_CON ADV (Tx) in (Retain mode) (120 msec interval, 4 dBm Tx power, 0-byte payload)	*55.04 µA*
Periodic BTSS wake-up for NON_CON ADV (Tx) in (Retain mode) (250 msec interval, 4 dBm Tx power, 0-byte payload)	*27.71 µA*
Periodic BTSS wake-up for NON_CON ADV (Tx) in (Retain mode) (1000 msec interval, 4 dBm Tx power, 0-byte payload)	*8.14 µA*
Periodic BTSS wake-up for NON_CON ADV (Tx) in (Retain mode) (1200 msec interval, 4 dBm Tx power, 0-byte payload)	*7.02 µA*
Periodic BTSS wake-up for CON ADV (Tx) in (Retain mode) (1000 msec interval, 4 dBm Tx power, 0-byte payload)	*9.87 µA*
Periodic BTSS wake-up for NON_CON ADV (Tx) in (Retain mode) (20 msec interval, 4 dBm Tx power, 12-byte payload)	*361.75 µA*
Periodic BTSS wake-up for NON_CON ADV (Tx) in (Retain mode) (120 msec interval, 4 dBm Tx power, 12-byte payload)	*74.95 µA*
Periodic BTSS wake-up for NON_CON ADV (Tx) in (Retain mode) (250 msec interval, 4 dBm Tx power, 12-byte payload)	*37.46 µA*
Periodic BTSS wake-up for NON_CON ADV (Tx) in (Retain mode) (1000 msec interval, 4 dBm Tx power, 12-byte payload)	*10.62 µA*
Periodic BTSS wake-up for NON_CON ADV (Tx) in (Retain mode) (1200 msec interval, 4 dBm Tx power, 12-byte payload)	*9.09 µA*
Periodic BTSS wake-up for CON ADV (Tx) in (Retain mode) (1000 msec interval, 4 dBm Tx power, 12-byte payload)	*12.39 µA*
Periodic BTSS wake-up for NON_CON ADV (Tx) in (Retain mode) (20 msec interval, 4 dBm Tx power, 31-byte payload)	*511.99 µA*
Periodic BTSS wake-up for NON_CON ADV (Tx) in (Retain mode) (120 msec interval, 4 dBm Tx power, 31-byte payload)	*106.35 µA*
Periodic BTSS wake-up for NON_CON ADV (Tx) in (Retain mode) (250 msec interval, 4 dBm Tx power, 31-byte payload)	*52.82 µA*
Periodic BTSS wake-up for NON_CON ADV (Tx) in (Retain mode) (1000 msec interval, 4 dBm Tx power, 31-byte payload)	*14.42 µA*
Periodic BTSS wake-up for NON_CON ADV (Tx) in (Retain mode) (1200 msec interval, 4 dBm Tx power, 31-byte payload)	*12.35 µA*
Periodic BTSS wake-up for CON ADV (Tx) in (Retain mode) (1000 msec interval, 4 dBm Tx power, 31-byte payload)	*16.26 µA*

Use case	Average (v2.1)
Periodic BTSS wake-up for NON_CON ADV (Tx) in (Retain mode) (20 msec interval, 0 dBm Tx power, 31-byte payload)	*425.64 µA*
Periodic BTSS wake-up for NON_CON ADV (Tx) in (Retain mode) (120 msec interval, 0 dBm Tx power, 31-byte payload)	*87.81 µA*
Periodic BTSS wake-up for NON_CON ADV (Tx) in (Retain mode) (250 msec interval, 0 dBm Tx power, 31-byte payload)	*44.31 µA*
Periodic BTSS wake-up for NON_CON ADV (Tx) in (Retain mode) (1000 msec interval, 0 dBm Tx power, 31-byte payload)	*12.29 µA*
Periodic BTSS wake-up for NON_CON ADV (Tx) in (Retain mode) (1200 msec interval, 0 dBm Tx power, 31-byte payload)	*10.52 µA*
Periodic BTSS wake-up for CON ADV (Tx) in (Retain mode) (1000 msec interval, 0 dBm Tx power, 31-byte payload)	*14.06 µA*

Terms and definitions

Term	Definition
AES	Advanced encryption standard
API	Application programming interface
APSS	Applications subsystem
BLE	Qualcomm Bluetooth Low Energy
BTSS	Bluetooth Subsystem
CLI	Command-line interface
DMA	Dynamic memory allocation
FTC	Flexible timer/counter
GAP	Generic Access Profile
GATT	Generic attribute profile
GPIO	General purpose input/output
I²C	Inter-integrated circuit interface
L2CAP	Logical link control and adaption protocol
LE	Low energy
LED	Light-emitting diode
MFP	Multi-function pin
NVM	Non-volatile memory
OEM	Original equipment manufacturer
OTP	One-time programmable
PHY	Physical layer
PIO	Programmable input/output
PTA	Packet traffic arbitrator
PWM	Pulse width modulation
QAPI	Qualcomm application programming interface
QCLI	Qualcomm command-line interface
QTI	Qualcomm Technologies Inc. (QTI)
QTIL	Qualcomm Technologies International, Ltd.
RRAM	Resistive random-access memory
RSSI	Received signal strength indication
SDK	Software development kit
SHA	Secure hash algorithm
SPI	Serial peripheral interface
SW	Software

Term	Definition
UART	Universal asynchronous receiver transmitter

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