Qualcomm Technologies International, Ltd.

QCC512x_QCC302x.SRC.1.0

Release Note

80-CH182-1 Rev AL

December 19, 2019

For additional information or to submit technical questions, go to: https://createpoint.qti.qualcomm.com

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Revision history

Revision	Date	Description
AA	August 2019	Initial release. Alternative document number CS-00417359-RN
AB	August 2019	Update to section 6.1 to present limitaions as a table.
AC	September 2019	Update for Development Conference Release
AD	September 2019	Updated release number
AE	07 October-2019	Updated Release number and list of known issues
AF	09 October-2019	Updated Release number
AG	30 October 2019	Updated Release number and list of known issues
AH	05 November 2019	Updated Release number and list of known issues
AJ	12 November 2019	Updated Release Table, Supported Devices, and added Important reminders section
AK	25 November 2019	Updated Release number and added section for new functionality
AL	20 December 2019	Updated Release number added section for new functionality update list of known and fixed issues

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1 Introduction

The ADK Application Framework provides the Earbud Application source code and supported chip/module binaries.

1.1 Release highlights

Table 1-1 QCC512x_QCC302x.SRC.1.0 releases

ADK	Release	Release highlights
19.3	CS r00017.1	Same contents as r00016.5, adding Fixed Role configurable option
19.2 Beta	ES5 r00016.5	Same contents as r00015.3, introducing Google Fast Pair feature for customer evaluation
19.2 Beta	ES4 r00015.3	Same contents as r00014.4 with additional bug fixes (see list of fixed issues) and support for add-ons.
19.2 Beta	ES3 r00014.4	Customer Release: Earbud Application with Bluetooth Address Management and DFU
19.2 Beta	ES2 r00013.3	Customer Evaluation Release: Earbud Application with Bluetooth Address Management and DFU
19.1 Beta	ES r00012.2	Beta Release: Earbud Application with Bluetooth Address Management and DFU
19.1 Alpha	r00004.1	Alpha Release: Earbud Application with Bluetooth address management

1.2 Development boards and modules supported

The ADK Application Framework supports the CDA Development Board development board, currently Rev2 (20-CF376-H1).

Table 1-2 lists the modules that are currently are supported by the Earbud Application.

Table 1-2 Development modules supported

Module	Description	PCB ID
QCC3020-90VFBGA-AA	QCC3020 module	20-CG607-H3
QCC3026-81WLCSP-AA	QCC3026 module	20-CG263-H3
QCC5121-81WLCSP-AA	QCC5121 module	20-CG259-H3
QCC5124-90VFBGA-AA	QCC5124 module	20-CG585-H3
QCC5125-90VFBGA-AA	QCC5125 module	20-CG594-H3
QCC5126-90VFBGA-AB	QCC5126 ROM v2.1 module	20-CG814-H1
QCC5127-124VFBGA-AB	QCC5127 ROM v2.1 module	20-CG817-H1

1.3 Status definitions

The ADK Application Framework enables customers to develop product using the devices supported.

The ADK Application Framework includes many features; some of which are considered tested and complete, while others are incomplete or have known issues. Table 1-3 and Table 1-4 describe the status of features.

Table 1-3 Application status definitions

Application status	Definition
Alpha	Initial release of the application in the ADK Application Framework. Most of the application functionality is complete but some minor functionality may not be in the version. The application may contain many bugs.
Beta	The application has been released and validated outside the development team. It is considered usable, as a prototype. It is not ready for production releases, but is ready for testing. It may still have bugs.
Evaluation	The application is suitable for evaluation purposes. The main functionality is complete, but there may be some features not fully implemented. There may be known issues. Further development is required to complete the application.
Released	The application is complete and has successfully been tested. Known issues are reported in the release note. No critical issues are known. **NOTE:** A released application may include features that are at either alpha or beta quality levels. By default, these features will be disabled in the application, so issues are not considered critical.

Table 1-4 Feature status definitions

Feature status	Definition
Alpha	Initial release of the feature in an ADK Application Framework. Most of the feature functionality is complete but some minor functionality may not be in the version. The feature may contain many bugs.
Beta	The feature has been released and validated outside the development team. It is considered usable, as a prototype. It is not ready for production releases, but is ready for testing. It may still have bugs.
Released/Supported	The feature has been tested and is considered ready for production.

2 ADK Application Framework contents

2.1 Where to get the ADK Application Framework and tools

The ADK Application Framework is available on ChipCode as the software product, QCC512x_QCC302x.SRC.1.0. It is available as a GIT repository or zip file. Depending on the module being developed, tools to develop and build applications for a ROM v2.0 or v2.1 device are required.

Table 2-1 Release product image and commit

Product	Image	Commit
QCC512x_QCC302x.SRC.1.0	EARBUD_ST.SRC.1.0	r00017.1

NOTE: The software fails to build with long directory paths. Clone the software repository to a directory with a short path length, for example **c:\qtil**

2.2 Contents

The ADK Application Framework release includes the following items:

- Earbud Application
- Binary images and patch files
- Reference documentation for the Earbud Application, ADK Application Framework, libraries and Trap API. For MIB key documentation, see the relevant ADK.

2.2.1 Earbud Application

The Earbud Application is an Evaluation release with limited functionality. Some supported features are not fully implemented and there are known issues. Further development is required to complete the application.

NOTE: For releases upto an including r00013.3, the Earbud App is located at:

```
apps1:C:\qtil\<path_to_framework_sourcecode>\adk\src\apps\earbud\workspa
ce\<QCC512x-AA_DEV-BRD_R2-AA>\depend_debug_qcc512x_qcc302x\earbud.elf
```

For releases after r00013.3:

```
python pydbg.py -d usb:<usb device id> -f
apps1:C:\qtil\<path_to_framework_sourcecode>\earbud\workspace\
<QCC512x-AA_DEV-BRD_R2-AA>\depend_debug_qcc512x_qcc302x\earbud.elf
```

2.2.2 Binary images and patch files

The ADK Application Framework includes patches for the ROMs and updated App P0 image.

For details of ROM patch images, see the *QCC512x and QCC302x/3x Series ROMs Release Note* (if a ROM v2.0 module is used) or the *QCC512x Version 2.1 ROM Release Note* (if a ROM v2.1 module is used)

Table 2-2 Binary images and patches

Image	Description	Image name	QCC512x_QCC302x ROM v2.0 Build ID / Version	QCC512x_ROM_v21 Build ID / Version
P0 application processor image	This image executes on P0 application processor and provides support for ▪ Bluetooth upper stack ▪ USB stack ▪ Security ▪ License management ▪ Stream management ▪ GPIO	`apps_p0_firmware.xuv`	2019	2019
System/Boot Manager	See the *QCC512x Version 2.x ROM Release Note*	`subsys0_patch0_fw0000503.hcf` `subsys6_patch0_fw0000503.hcf`	1699	1680
Bluetooth Controller	See the *QCC512x Version 2.x ROM Release Note*	`subsys1_patch0_fw000033EF.hcf`	88	24
Qualcomm® Kymera™ Audio	See the *QCC512x Version 2.x ROM Release Note*	`subsys3_patch0_fw000012B2.hcf`	487	486

NOTE: For MIB key related documentation, see the relevant ADK as listed in Table 2-4.

CAUTION: The images listed in Table 2-2 are only supported as part of this release and should not be used in conjunction with other releases, that is,do not copy into existing ADKs.

2.2.3 Evaluation licenses

Evaluation license keys are supplied for all supported devices in Table 2-3

The ADK includes evaluation licenses for:

- Qualcomm® aptX™
- Qualcomm® cVc™
- ANC

Table 2-3 License overview

Qualcomm cVc	Feature	QCC5121	QCC5124	QCC3020	QCC3026	QCC5127	QCC5126
cVc Earbud 1-MIC (1)	LK-VAM-CVC-EB-0010	✓	✓	Enabled	Enabled	✓	✓
cVc Earbud 2-MIC (1)	LK-VAM-CVC-EB-0020	✓	✓	Enabled	Enabled	✓	✓
Qualcomm aptX decoders	**Feature**						
aptX Classic	LK-VAM-APTXLL CLHD	✓	✓	✗	✗	✓	✓
aptX Classic TWS Mono Decoder (1)	LK-VAM-APTX-CLM	✓	✓	Enabled	Enabled	✓	✓
ANC	**Feature**						
Feed-Forward on an earbud (1)	LK-VAM-ANC-FFM	✓	✓	✗	✗	✓	✓
Feed-Back on an earbud	LK-VAM-ANC-FBM	✓	✓	✗	✗	✓	✓
Hybrid or Feed-Back or Feed-Forward on an earbud (1)	LK-VAM-ANC-HYM	✓	✓	✗	✗	✓	✓

Legend:

- The tick indicates the feature can be licensed.
- Enabled indicates the feature is enabled by default enabled and no license is required.
- The cross indicates the feature is not available.

(1) One license is required per earbud. For an earbud pair request 2 keys, 1 for each TWS earbud, with a unique Bluetooth Address for each earbud.

2.3 Related products available from CreatePoint

Table 2-4 lists compatible tools and ADKs released separately and available from CreatePoint.

Table 2-4 Related products

Product	Description
ADK_Toolkit.WIN.0.9.x	Toolkit required to build applications and deploy them to the devices covered in this release note.
Qualcomm_MDE.WIN.2.4.x	Qualcomm Multicore Debug Environment (MDE)

3 ADK Application Framework functionality

3.1 Qualcomm technologies

The ADK Application Framework includes support for:

- Qualcomm TrueWireless™ Stereo (TWS)
- TWS DFU
- Qualcomm aptX audio
- 1 or 2-Microphone cVc noise cancellation technology algorithm optimized for earbud use cases.
- Adaptive Noise Cancellation

NOTE: Not all features are available on all Qualcomm devices and some features require licenses to run. A set of evaluation licenses are included in the ADK Application Framework.

3.2 Functional support

Table 3-1 provides an overview of features supported by the Earbud Application.

Table 3-1 Supported functionality

	Feature	Earbud Application
ANC	Feed forward	Alpha
	Feed back	Alpha
	Hybrid	Alpha
cVc	cVc 1 Mic Headset Narrow Band	✓
	cVc 1 Mic Headset Wide Band	✓
	cVc 2 Mic Headset Narrow Band	✓
	cVc 2 Mic Headset Wide Band	✓
Codecs	aptX Classic decoder	✓
	aptX Classic mono decoder	✓
	SBC decoder	✓
	SBC encoder	✓
	AAC-LC decoder	✓
Device Firmware Updates (primary and secondary earbuds)	Over The Air (OTA) (Bluetooth BR/EDR)	✓
	Over The Air (OTA) (Bluetooth low energy)	✓

	Feature	Earbud Application
BAM	Bluetooth Address Management (ability for single address pairing)	✓
Earbud Application Features	Motion/idle detection	✓
	In/out of ear detection	✓
	Charger case lid open/closed detection	Not supported
	In/out charger case detection	✓
GPIO	▪ LED indications ▪ Button events ▪ other uses	✓
DSP	Downloadable capability extendable with a third-party DSP library (QCC512x devices only)	Evaluation
	Downloadable capability with Qualcomm DSP library (QCC512x devices only)	✓
Google Fast Pair	Fast pairing using Bluetooth Low Energy and proximity	✓
TrueWireless Stereo (TWS)	TrueWireless Stereo Mono-Headsets (Single Earbud)	✓
	The ability to forward the voice call from the primary to the secondary device	✓
	The ability to forward the voice call microphone from the secondary to the primary device	✓
Tones and Voice Prompts	Tone prompts	✓
	SBC prompts	✓
Voice Assistant	Button Activated Voice Assistant	Not supported
	Voice trigger phrase activated Voice Assistant	Not supported

3.3 Bluetooth profiles and support

Bluetooth applications can be developed using the CAA. The Bluetooth stack consists of the components listed in Table 3-2.

Table 3-2 Bluetooth components

Component	Description
Bluetooth profiles	Bluetooth profiles are delivered in source code and as precompiled libraries. These libraries are designed to be linked to the main application executing on the P1 application processor. Customers can modify the profile source code and rebuild the libraries if necessary.
Bluetooth upper-stack	The Bluetooth upper-stack implements the RFCOMM and GATT layers of the Bluetooth stack. These are included in the P0 application processor image delivered with the ADK Application Framework.
Bluetooth controller subsystem	The Bluetooth controller subsystem implements the controller functionality below the HCI interface. This functionality is implemented in the target device Bluetooth subsystem ROM. Details of Bluetooth controller functionality are provided in the relevant device release notes.

For profiles available in the ADK Application Framework, see Sections 3.3.1 to 0. Not every profile is included in all applications.

For details of Bluetooth qualifications, see Section 5.3.

3.3.1 Basic rate/enhanced data rate (BR/EDR) profiles

Table 3-3 Bluetooth BR/EDR profiles

Profile	Version
Headset Profile (HSP)	1.2
Hands-free Profile (HFP)	1.7.1
Advanced Audio Distribution Profile (A2DP)	1.3.1
Audio/Video Remote Control Profile (AVRCP)	1.6
Serial Port Profile (SPP)	1.2
DI (Device ID) Profile	1.3
Audio/Video Control Transport Profile (AVCTP)	1.4
Audio/Video Distribution Transport Profile (AVDTP)	1.3
Message Access Profile (MAP)	1.1
Phone Book Access Profile (PBAP) *	1.1.1
Generic A/V Distribution Profile (GAVDP)	1.3
RFCOMM	1.2
Bluetooth Transport Discovery Service Profile (TDS)	1.0

3.3.2 Bluetooth GATT profiles

Table 3-4 Bluetooth GATT profiles

Profile	Version
Find Me Profile (FMP)	1.0
HID over GATT Profile (HOGP)	1.0
Heart Rate Profile (HRP)	1.0
Proximity Profile (PXP)	1.0.1
Scan Parameters Profile (ScPP)	1.0
Running Speed and Cadence Profile (RSCP)	1.0

3.3.3 Bluetooth GATT services

Table 3-5 Bluetooth GATT services

Service	Version
Battery Service (BAS)	1.0
Device Information Service (DIS)	1.1
Link Loss Service (LLS)	1.0.1
Heart Rate Service (HRS)	1.0
Immediate Alert Service (IAS)	1.0
Tx Power Service (TPS)	1.0
Running Speed and Cadence Service (RSCS)	1.0

3.4 Fixed Role

Fixed role allows an earbud to be always set to primary or secondary device. An earbud can also set to 'normal' where it can role switch with it's peer as normal. The later is the default configuration for this releases. If fixed roles are assigned each earbud pair must have one primary and one secondary device.

NOTE: Fixed Role is only available form release r00017.1

3.4.1 Enable Fixed Role

The value of this setting is stored in the USR2 PSKey. This value can be set in two ways:

- Using the ps_cfg filesystem. subsys7_psflash.htf contains an example of this. Note that if the PSKey is not set the earbud will default to being able to role swap.
- Calling PeerFindRole_SetFixedRole(peer_find_role_fixed_role_t role) from within the source code. Where role is an enum of type peer_find_role_fixed_role_t with
  peer_find_role_fixed_role_not_set = 0
  peer_find_role_fixed_role_primary = 1
  peer_find_role_fixed_role_secondary =2
  Any setting written using this function will be written to PSKey USR2 for persistence, overwriting any value set using the ps_cfg filesystem.

3.5 Google Fast Pair

The Google Fast Pair Service (GFPS) facilitates first time pairing for audio devices such as earbuds, that support A2DP/HFP profiles with minimal user interaction. Fast pair service is supported by Android 6.0 or higher versions.

Once paired with an Android device, it allows reconnection to the same device, and subsequent pairing to other Android devices that uses the same Google account. This is done by using the account key filter generated during first time pairing of the audio device.

NOTE: For release r00017.1, and releases after r00017,1 Google Fast Pair is enabled by default. For release r00016.5, this feature is disabled by default.

3.5.1 Disable Google Fast Pair

Fast Pair module code is available under **domains/bt**. This module gets build by default. To disable the feature in the product, `INCLUDE_FAST_PAIR` needs to be removed from the project defines.

3.5.2 Enable Google Fast Pair

Fast Pair module code is available under **domains/bt**. This module gets build by default. To enable the feature in the product, `INCLUDE_FAST_PAIR` needs to be added to the project defines.

3.5.3 Generating scrambled ASPK (Anti Spoofing Private Key)

The modulus, seed and ASPK are available from Google, the user needs to provide them in the `user_defined_mod_seed_aspk.json file` which is located in the **adk\tools\packages\menus** directory.

(By default the ADK 19.x's registered ASPK is provided. The modulus is the last 32 bytes of `rsa_decrypt_constant_mod[]`, (that is, from index 112 to 127) referred from the `rsa_pss_constants.c` file. The seed value is a random number, which if changed needs to be updated in the `fast_pair_session_data.c` file.

To generate the scrambled ASPK, use the Qualcomm Multicore Development Environment (MDE), and select **Scramble ASPK** from the **Tools** menu. The resulting output needs to be added to `SCRAMBLED_ASPK` in the `earbud_config.h` file.

NOTE: Every time a Setup DFU Security is performed, the modulus value in the `rsa_pss_constants.c` file is changed.

3.6 Audio capabilities

QCC512x, QCC302x and QCC303x parts include audio capabilities implemented in ROM firmware, which can be extended dynamically by extra downloadable capabilities.

Some audio capabilities require licenses to run. For information, contact your QTIL representative.

3.6.1 Built-In ROM capabilities

See the *QCC512x and QCC302x/3x Series ROMs Release Note* and *QCC512x Version 2.1 ROM Release Note.*

3.6.2 Downloadable capabilities

Table 3-6 and Table 3-7 describe the downloadable capabilities provided by Qualcomm. These downloadable capabilities have the file extension:

`.edkcs`.

NOTE: `download_async_wbs.edkcs` is the downloadable bundle that included `download_async_wbs_encode` and `download_async_wbs_decode` capabilities. An example of the use of these capabilities can be found on the Earbud Application.

For a full list of supported chips, see Table 1-2.

Table 3-6 Downoad audio capabilities for QCC512x/QCC302x/QCC303x ROM 2.0 chips

Capability ID / Capability Filename	License required?	Description	Devices supported
0x4007 download_aec_reference	N	A downloadable version of AEC reference Capability. The AEC reference Operator overrides the real endpoints connected to it to provide the synchronization and latency control required for the proper operation of an acoustic echo canceller. This downloadable version of the AEC reference capability is the enhanced version of the on-chip AEC reference capability by adding Time-to-play support in the speaker path.	All
0x4082 download_anc_tuning	Y	Used during ANC tuning to route audio data to the tuning tool on the external PC using USB. The tuning requires a license valid for the ANC mode being tuned.	QCC5120 QCC5121 QCC5124 QCC5125
0x406d download_aptx_demux	N	A capability that takes a stereo AptX stream and splits it into two mono AptX streams	All
0x4071 download_aptx_encode	N	A stereo AptX classic encoder	All
0x4073 download_aptxhd_encode	N	A stereo AptX high definition encoder	All
0x407d download_async_wbs_encode	N	A downloadable version of the asynchronous WBS encode capability which handles encoding and sending of wideband 16 kHz audio without the need to connect to a SCO transport. It can be used with the asynchronous wideband speech decode capability to transport audio over an asynchronous connectionless links (ACL).	All
0x405e Download_rtp_decode	N	A downloadable version of the rtp decode capability. This version of rtp decode MUST be used if using aptX adaptive functionality	All
0x4066 download_splitter	N	A downloadable version of the splitter capability. This capability provides bug fixes and a full implementation of the splitter capability API	All
0x407f download_switched_passthrough_consumer	N	A capability, which can either act like a basic_passthrough capability or a consumer capability that can consume all input data.	All
0x4001 self test and pass through	N	An example download capability for testing the download capability feature	All
0x4051 download_aptx_decode	N	A stereo AptX classic decoder	All

Capability ID / Capability Filename	License required?	Description	Devices supported
0x4081 download_aptx_adaptive_decode	Y	A decoder for aptX Adaptive sources	All
0x4080 download_aptx_adaptive_demux	N	A demultiplexor for aptX Adaptive sources.	All

For a full list of supported chips, see Table 1-2.

Table 3-7 Downloadable audio capabilities for QCC512x ROM 2.1 chips

Capability ID / Capability Filename	License required?	Description	Devices supported
0x4082 download_anc_tuning	Y	Used during ANC tuning to route audio data to the tuning tool on the external PC using USB. The tuning requires a license valid for the ANC mode being tuned.	All
0x4068 download_usb_audio	N	-	All
0x4065 download_spdif_decode	N	-	All
0x4001 self test and pass through	N	An example download capability for testing the download capability feature	All
0x4055 download_celt_encode	N	Celt encoder capability	All
0x4056 download_celt_decode	N	Celt decoder capability	All
0x4055 & 0x4056 download_celt	N	Celt encoder and decoder capability	All
0x408e download_va_graph_manager	N	A downloadable capability that configures the VA chain operators to reduce MIPS consumption and to enable low power mode. It manages VAD and QVA, for low power, also cVc.	All
0x4081 download_aptx_adaptive_decode	Y	A decoder for aptX Adaptive sources	All
0x4080 download_aptx_adaptive_demux	N	A demultiplexor for aptX Adaptive sources.	All

4 Important reminders

Table 4-1contains important information that the Qualcomm Engineering team wants to highlight to avoid issues affecting production launch for customers.

Table 4-1 Important reminders

Headline	Description
Do not set PSKEY_PANIC_ON_FAULT MIB Key	PSKEY_PANIC_ON_FAULT is not set and should not be set in the default configuration. It should only be enabled for testing purposes. Setting it results in a panic of the chip whenever the Bluetooth subsystem raises a fault, for example, when boot-time radio calibration is out of range due to antenna mismatch.

5 Testing and regulatory compliance

5.1 System testing

This ADK Application Framework release, including the Earbud Application, have undergone testing on the combination of hardware listed in Table 1-2.

For the list of limitations, see Chapter 7.

5.2 USB compliance testing

The USB interface has been qualified to USB 2.0 (FS) and USB Type-C.

5.3 Bluetooth compliance and qualifications

- Bluetooth development tool qualification

  The ADK is qualified as a Bluetooth development tool under listing

  D035292 “QCC302x/3x, QCC512x/3x ADK 6.x Development Tool”

  https://launchstudio.bluetooth.com/ListingDetails/55114

- Bluetooth AVCTP/AVDTP services qualification

  AVCTP/AVDTP services have been qualified under listing

  D030931 “QTIL Bluetooth Developers ADK A/V protocols”

  https://launchstudio.bluetooth.com/ListingDetails/2005

- Bluetooth upper-stack qualification

  The Bluetooth upper-stack has been qualified under listing

- D043816 “QCC302x/3x, QCC512x ADK 6.x (BT5.1)”

  https://launchstudio.bluetooth.com/ListingDetails/84658

- Bluetooth HCI controller qualification

  For Bluetooth HCI controller listings, see the relevant device *QCC512x/QCC302x ROM Release Note*.

6 Functional restrictions

For known issues, see Chapter 7.

6.1 General restrictions

- LEDs and Voice Prompts not configurable
- ANC does not turn on or off across both earbuds if using a button
- Multipoint is not supported

6.2 Audio functional restrictions

- Some audio processing capabilities cannot yet be executed on the second audio core, for example cVc or decoders. It should only be used for extra audio processing functionality such as the supplied DBE/VSE capabilities.
- Some audio interfaces are not supported by software and/or the development board. For supported interfaces, see *QCC512x Version 2.1 ROM Release Note* and *QCC512x and QCC302x/3x Series ROMs Release Note*

6.3 Bluetooth functional restrictions

- Secure Connections are disabled by default.

  QTIL has identified in interoperability testing, deficiencies within third party devices that are likely to cause issues if the BR/EDR Secure Connections feature is enabled. For this reason, Secure Connections is not enabled by default by the Earbud Application.

  This feature can be enabled for use in an environment where the peer is known.

7 Fixed issues

7.1 Fixed issues

Table 7-1 ADK fixed issues r00013.3

ID	Description
B-291093/ ACBU-9031	If the application has the VM watchdog enabled, and is disabled using the BlueTest **Disable Application** command, then the firmware panics (`PANIC_VM_SW_WD_EXPIRED`) at the point the watchdog expires.
B-290070	Application subsystem firmware panics during image section authentication at boot on encrypted device.
VMCSA-919	Occasional when streaming aptX, glitches are heard.
VMCSA-1607	LED patterns are occassionally incorrect.
VMCSA-2082	Voice prompts are occassionally not heard.
VMCSA-1801	Pairing a handset after using the delete all paired devices function may cause a panic.
VMCSA-1578	The delete paired devices function does not work.
VMCSA-2129	The volume of an HPF call cannot be changed during the call.
VMCSA-1996	HFP control buttons do not work reliably on the secondary earbud.

Table 7-2 ADK fixed issues r00014.4

ID	Description
VMCSA-1586	Switching between two paired handsets is occassionally unreliable.
VMCSA-2102	Link loss between earbuds is occassionally unreliable.
VMCSA-1570	Making a call after pausing A2DP where digital mics are used, may cause a panic.
VMCSA-2322	Integrate audio packages into CAA: Cannot build audio capabilities.
VMCSA-2236	Using a button to perform factory reset can lead to instabilities.
VMCSA-2078	Power off now only happens after a timeout or critical battery.
VMCSA-1514	If the primary earbud is placed in the case during a voice call the voice call is handed back to the handset. If the earbud is then taken out of the case the voice call remains with the handset
VMCSA-2192	Repeatedly turning Bluetooth on and Off at the handset can result in the earbuds panicing.
VMCSA-2274	Using digital mics may cause a panic during a voice call.
VMCSA-2305	If the secondary earbud is taken out of the case during a voice call then it does not receive any audio.

Table 7-3 ADK fixed issues r00015.3

ID	Description

B-293619	When attempting to create a new audio project from with qmde, an error is displayed indicating the path "....." does not exist.
	Workaraound:
	Change the following line in
	`earbud/workspace/[platform]/earbud.wsroot`
	`<alias name="wsroot">../../../../../bin/qcc512x_rom_v21</alias>`
	to::
	`<alias name="wsroot">../../../adk/bin/qcc512x_rom_v21</alias>`

VMCSA-2674	EB devices not visible in scanned device list for iOS GAIA app
B-283988	Sections must be of at least one sector (4K), even if not being used (for example RWFS), or ImageUpgrade fails with a `PANIC_HYDRA_ASSERTION_FAILED`.
B-284000	Reading an ADC using BlueTest3 or the TestEngine API `TEAdcGet()` fails.
B-279566	The `ChargerConfigure()` API allows use of external charger pass transistor in pre-charge mode. The on-chip charger on CSRA68105, QCC512x, and QCC30xx devices does not support this mode of operation. **Workaround:** Do not use `ChargerConfigure(CHARGER_USE_EXTERNAL_RESISTOR_FOR_PRE_CHARGE, TRUE)` in application code.
B-290070	Application subsystem firmware panics during image section authentication at boot on encrypted device.

Table 7-4 ADK fixed issues r00017.1

ID	Description
VMCSA-2949	Sys Control button is not invoking events on QCC3020 modules
B-277894	`ImageUpgradeSinkGetPosition()` takes long time, in the order of seconds, for larger image section if the given image section has not been written or the current write position is not near the end of image section.
VMCSA-2232	A2DP does not yet restart after a role swap.
VMCSA-2108	Peer DFU defective when link loss caused during DFU image download
VMCSA-2405	Aborting DFU process in Secondary device doesn't allow us to start DFU again
VMCSA-2498	Prevent connected/disconnected voice prompts during static handover
VMCSA-2499	DFU Upgrade can be triggered even when device is in out of case state
VMCSA-891	HFP control buttons do not work reliably on the secondary earbud.

8 Known issues and limitations

8.1 Limitations of the Earbud Application

The Earbud Application is an Customer Evaluation release and consequently has some limitations, instability and missing fuctionality, see Table 8-1.

Table 8-1 Earbud Application known limitations

Limitation	Status	Workaround/Future resolution
Earbuds unable to communicate with each other to negotiate Primary role. “Peer ind role process”. When it fails the internal state machines of the two earbuds get out of step and can cause audio or voice to only be heard on one earbud.	Work around	Reset the earbuds.
Voice prompt are not currently synchronized between the earbuds and voice prompts are only heard on the earbud that generated the event which caused the voice prompt to play. This results in different voice prompts being heard in either one or both earbuds.	Workaround	Suggest the use of tone prompts only until a fix is rolled out
DFU will fail and cause instability in the Earbuds behavior if either earbud is removed from the case during the process	Work around	Do not remove the earbuds from the case during DFU. Reset the earbuds if the process fails or panics

8.2 Known issues on Earbud Application

Table 8-2 ADK known issues

ID	Description
VMCSA-1559	If earbuds are left out of the case are not connected to the handset, they remain connectable and powered on.
VMCSA-1978	Occassionally when streaming aptX, audio is not heard.
VMCSA-1951	Occasional audio glitches can be heard during HFP call where HV1 and HV2 Bluetooth packets are used.
VMCSA-1950	Occasional audio glitches can be heard during HFP call where HV1 and HV2 Bluetooth packets are used.
VMCSA-1987	Pairing a fourth handset stops the earbuds connecting.
VMCSA-2165	Removing an earbud from the case during DFU results in the DFU failing.
VMCSA-2182	During DFU if the link to the handset is lost then DFU fails.

ID	Description
VMCSA-2207	Earbuds can panic if a WeChat voice message is stopped shortly after it starts.
VMCSA2233/ B-291782	Improvements have been made in r00013.3 and r00014.2 to speed up Handover/Role switch time following an In-case event, but it can still take upwards of 10 seconds. Further improvements are being investigated.
VMCSA-2095	Earbuds cannot be turned off using a button.
VMCSA-2529	Implement Enter Dormant on Handset Disconnection
B-295603	When trying to debug a running application within QMDE, selecting the ACAT Tab and pressing the play icon does not work. Workaround: From a command prompt, execute the following command [path to ADK_Toolkit]/tools/python27/python.exe -i -m acat_tab -a [path to source code]/adk/bin/qcc512x_qcc302x/audio/tools/acat/ACAT.py -d device://trb/usb2trb/[device address] -t [path to ADK_Toolkit]/tools/pythontools -w [path to source code]\earbud\workspace\[Template name]\earbud.x2w substituting the following as required [path to ADK_Toolkit] e.g C:/qtil/ADK_Toolkit_0.9.1.9_x64 [path to source code] e.g. c:\work\QCC512x_QCC302x.SRC.1.0 [device address] e.g /155262/qcc5120 [Template name] e.g. QCC3020-AA_DEV-BRD-R2-AA
B-295604	When trying to debug a running application within QMDE, selecting the Bluestack Tab and pressing the play icon does not work. Workaround: Edit adk\tools\packages\tabs\py_dbg_tab.py Change lines 443-445 from: if args.tab_type: here = os.path.abspath(os.path.dirname(__file__)) command_line.append(os.path.join(here, args.tab_type)) to: if args.tab_type: command_line.append(args.tab_type)
VMCSA-3324	Device name for LE advertisement must not be over 15 characters. Application may reset if this is the case.
VMCSA-3182	When streaming audio form one phone, if bt is stopped and another phone is paired, resuming music sometimes does not produce musing in the secondary earbud. Workaround: Place earbuds in case and out of case to recover.

8.3 Known issues: Binary images and patch files

8.3.1 P0 application processor image

Table 8-3 Apps P0: known issues

ID	Description
B-269539	Application subsystem P1 application does not receive `MessageSubsystemEventReport` on subsystem panic/watchdog event.
B-248765	Production Test disables App P1 (Customer Application) code but leaves the CSB service running preventing BTSS reset. **Workaround:** Ensure that the CSB service is not enable by P1 code during production testing.
B-237646	Device Firmware Upgrade (DFU) over USB HID hangs occasionally. This is believed to be a bug in the Windows USB drivers when the device is being used for audio output over USB and performing an upgrade over USB. This issue has not been observed on any other operating system version. **Workaround:** Reset the device, do not set the device as a USB audio output and start the update again.
B-268521	The chip may be configured to wake on UART receive, specifically PIO state change. However, if the chip enters in deep-sleep and, if the incoming data packet on the UART interface is short, the chip will briefly exit deep-sleep but fail to start the UART receiver and, the UART packet will be lost. If the packet is long enough to wake the chip and start the UART receiver, the initial octets will still be lost.
B-274006	ATT Stream signaling does not follow the lifetime model of other streams. When used with GATT, be aware that ATT stream message processing flow can mean that the stream can be destroyed before the GATT library has processed the remote disconnect message. If the stream has been destroyed, attempts to access it will fail as if the stream buffer is full. Applications that split the disconnect message signaling across multiple messages will need to take extra precautions by calling `SinkIsValid()` before accessing the stream buffer.
B-279362	Application subsystem firmware panic `PANIC_IPC_UNHANDLED_MESSAGE_ID` observed on calling `TestCodecStereoLb`, `TestPcmToneIf`, `TestPcmExtLbIf`, `TestDeepSleep`, `TestCfgXtalFtrim`, `TestPcmLbIf` trap APIs. There is no workaround for this issue.
B-278393	Application can arbitrarily request to destroy streams for read-write file-system. It is probable that read/write operation may be in-progress during such requests. This may cause panic due to incomplete operation. **Workaround:** These destruction requests should be deferred in such scenarios for graceful and defined behavior rather than abrupt undefined panics.

8.3.2 Bluetooth upper-stack known issues

Table 8-4 Bluetooth upper stack: known issues

ID	Description
TF-17982	Interoperability testing has revealed several issues with BR/EDR Secure Connections encryption with a range of devices, typically, mobile phones, from multiple manufacturers that are already deployed in the field. Although the issues have different underlying causes, the net result is that the BR/EDR link is dropped (usually for security reasons). The link is most likely to be dropped with high volumes of inbound data such as when operating as an A2DP sink. In some testing scenarios, the link was typically dropped after about half an hour of streaming. This can give a poor user experience. There is some evidence that some of the failure modes are more likely to be encountered in noisier environments or when the third-party device is performing coexistence with co-located Wi-Fi. If BR/EDR Secure Connections encryption is not required for use case, QTIL recommends that BR/EDR Secure Connections be left turned off in the application. This causes the system to use the legacy E0 encryption (the same as existing CSR8670 and CSR8675 devices). If BR/EDR Secure Connections encryption is required, QTIL advises that you test extensively with the mobile phones with which you intend to operate and, if necessary, advise end users of potential interoperability issues if they use untested phones. QTIL does not recommend that devices try to determine automatically whether to use BR/EDR Secure Connections. If BR/EDR Secure Connections encryption was a security requirement, then the device would become vulnerable to a downgrade attack. In contrast, if legacy encryption is acceptable from a security perspective then using it all the time provides better user experience. These issues do not affect Qualcomm® Bluetooth Low Energy Secure Connections.

Document references

Document	Reference
QCC512x and QCC302x/3x Series ROMs Release Note	80-CG310-1/CS-00410777-RN
QCC512x Version 2.1 ROM Release Note	80-CH076-1/ CS-00414324-RN

Terms and definitions

Term	Definition
A2DP	Bluetooth Advanced Audio Distribution Profile
ACL	Asynchronous Connection-Less
ADK	Audio Development Kit
ANC	Active Noise Cancellation
API	Application Programming Interface
aptX	High-quality audio codec
AVCTP	Bluetooth Audio Video Control Transport Protocol
AVDTP	Bluetooth Audio Video Distribution Transport Protocol
AVRCP	Bluetooth Audio Video Remote Control Profile
BAM	Bluetooth Address Management
Bluetooth	Set of technologies providing audio and data transfer over short-range radio connections
BTSS	Bluetooth Sub-System
BR/EDR	Basic Rate/Extended Data Rate
CS	CS Quality: All regulatory compliance testing and are available for commercial shipments.
CSB	Connectionless Slave Broadcast
CTS	Clear To Send
cVc	Clear Voice Capture, Audio enhancement and noise suppression algorithms
DFU	Device Firmware Upgrade
DI	Bluetooth Device Identification profile
ES	ES Quality: Validation is still proceeding and is available for evaluation
GAIA	Generic Application Interface Architecture, an end-to-end system for supporting host application access to on chip applications
GATT	General Attribute Profile
GPIO	General Purpose Input Output
HCI	Host Controller Interface
HFP	Bluetooth Hands Free Profile
HID	Human Interface Device
HSP	Bluetooth Headset Profile
IDE	Integrated Development Environment
I/O	Input Output
KCC	Qualcomm® Kalimba™ C Compiler
KSE	Kymera Simulation Environment
LCD	Liquid Crystal Display
LE	(Bluetooth) Low Energy
LED	Light Emitting Diode
Low Energy	(Bluetooth) Low Energy
ULP	Ultra Low Power mode

Term	Definition
MDE	(Qualcomm) MultiCore Debug Environment.
NFC	Near Field Communication
NOP	No Operation
OBPM	Operator Based Parameter Manager
OS	Operating System
P0	Processor number 0. The first processor in either the Application or Audio subsystem
P1	Processor number 1. The second processor in either the Application or Audio subsystem
PC	Personal Computer
PSU	Power Supply Unit
PWM	Pulse Width Modulation
QSPI	Quad Serial Peripheral Interface. This term is interchangeable with SQIF
QTIL	Qualcomm Technologies International Ltd, a subsidiary of Qualcomm.
eSCO	Enhanced SCO
ROM	Read Only Memory
RTS	Ready To Send
SCO	Synchronous Connection Oriented voice link
SD	Secure Digital
SDIO	Secure Digital Input Output
SQIF	Serial Quad I/O Flash memory. This term is interchangeable with QSPI
SPI	Serial Peripheral Interface
SVA	Qualcomm® Snapdragon™ Voice Activation
TBridge	Transaction Bridge debug interface
TWS	Qualcomm TrueWireless Stereo, a Qualcomm method of providing synchronized stereo audio from two sink devices
UART	Universal Asynchronous Receiver Transmitter
USB	Universal Serial Bus
VAD	Voice Activity Detect
VM	Virtual Machine
XTAL	The Crystal Oscillator