



Qualcomm® QCC5141 Occluded Earbud Reference Design

Premium tier occluded earbud reference design with Qualcomm TrueWireless™ Mirroring and Qualcomm® Hybrid Active Noise Cancellation (ANC)

The truly wireless earbud industry is growing rapidly and consumers are demanding much richer functionality from their devices, so it is important for manufacturers to stay ahead of the curve by bringing innovative new features to market quickly.

The Qualcomm QCC5141 Occluded Earbud Reference Design with Qualcomm TrueWireless Mirroring and Qualcomm Hybrid ANC is designed to provide a flexible development platform for innovation that supports the latest ADK features and helps to reduce development time.

This reference design platform is based on the QCC5141 Bluetooth Audio SoC and is designed for the high-end premium segment with support for the following features:

- Qualcomm TrueWireless Mirroring with support for dynamic role swapping and single Bluetooth address management
- Qualcomm Hybrid ANC with hardware leak-through
- Qualcomm® aptX™ Adaptive audio codec support
- 2-mic Qualcomm® cVc™ echo cancellation and noise reduction technology
- Support for Amazon AMA Tap-to-talk Voice Assistant for Android
- OTA DFU support
- Support for Google FastPair

Additional features planned for future ADK releases include and not limited to:

- Qualcomm® Adaptive Hybrid ANC with hardware leak-through
- 3-mic cVc echo cancellation and noise reduction technology
- Always On Voice support for Amazon Alexa Voice Services and Google Assistant¹

Kit Contents

- Welcome Guide
- Left and right Earbud
- Ear interfaces small, medium, large
- Charger case
- USB cable



¹ Our reference design platform includes features designed to support Amazon Alexa Voice Services and Google Assistant technology. In order to use voice assistants, the customer must obtain the voice assistant technology directly from the relevant voice assistant provider and our ADK, then compile a custom software build.

Qualcomm QCC5141 Occluded Earbud Reference Design, Qualcomm TrueWireless Mirroring, Qualcomm Hybrid ANC, Qualcomm Adaptive Hybrid ANC, Qualcomm aptX and Qualcomm cVc are products of Qualcomm Technologies, Inc. and/or its subsidiaries.

Qualcomm

QCC5141

QCC5141 Occluded Earbud Reference Design Applications

- Premium tier truly wireless earbuds

Features

- Based on QCC5141 - a member of the Qualcomm® QCC5100-series that is designed to offer extremely low-power performance for extended playback time and battery life
- Single-chip Bluetooth containing the power management, audio DSP, application processor, Bluetooth RF, GPIO and audio inputs and outputs
- Qualcomm TrueWireless Mirroring technology with support for dynamic role switching
- Support for Qualcomm Hybrid ANC
- Support for Amazon Tap-to-talk Voice Assistant for Android
- cVc 2-mic echo cancellation and noise reduction technology for superior audio when in a voice call
- Software delivered as a binary image using ADK20.2 with support for modifications via the ADK workspace
- Infrared sensor for in/out of ear detection
- 1-button sensor touch control and LED user interface
- Software OTA support via GAIA v3
- 10mm 32Ω speaker to handle audio to support comprehensive range frequency response audio play back in a small form factor
- Support for voice prompts
- Earbud uses a 6-layer rigid-flex PCB design
- 85mAh / 545mAh battery (earbud/charging case)
- Ear interface rubbers supplied in small, medium and large sizes
- FCC Pre-Certification Testing has been performed and the FCC testing requirements have been met

To learn more visit: [qualcomm.com](https://www.qualcomm.com) or createpoint.qti.qualcomm.com

Power Consumption and Playback Hours

Test Cases	Power Consumption ²	Playback Hours
A2DP streaming + ANC OFF	~7.6mA	11.2Hrs
A2DP streaming + ANC ON	~10.0mA	~8.5Hrs
A2DP streaming + ANC ON + PTT VA	~10.2mA	8.4Hrs
A2DP streaming + ANC ON + WuW VA	~11.9mA	~7.1Hrs
HFP call with 2-Mic cVc active + ANC OFF	~10.9mA	~7.8Hrs
HFP call with 2-Mic cVc active + ANC ON	~13.6mA	~6.3Hrs

²Average of primary and secondary earbuds, no LED, 32ohm load, speaker output 90dB SPL, AAC codec at 44.1kHz
Test results based on internal testing using ADK 20.2 AP17

Specifications

Bluetooth Version	5.2
Bluetooth RF Tx/Rx Performance (conducted)	Max. RF Tx Power: ~12dBm (typ) Rx sensitivity (BR): ~95dBm (typ)
FCC Pre-Scan 12dBm	Pass
Antenna Performance Efficiency	>10%
Qualcomm TrueWireless Range	Outdoor, no Wi-Fi interference: >30m Indoor, no Wi-Fi interference: >50m Indoor, with Wi-Fi interference: >50m
2-mic cVc noise reduction technology POLQA ³ score	Narrow Band: MOS3.57 Wide Band: MOS3.61
Digital Assistant	Support for Amazon Voice Services Support for Google Audio Accessories

²2-mic cVc Objective Headset Measurement results per ITU-T standard

Ordering Information

Product	Part Number
QCC5141 - Occluded Earbud Reference Design with Qualcomm TrueWireless Mirroring, Qualcomm Hybrid ANC	DK-QCC5141-EarbudRD-A-0
Qualcomm® Bluetooth Developer Licence (ADK)	DL-BDEV-10002-1A-0

Qualcomm QCC5100 is a product of Qualcomm Technologies, Inc. and/or its subsidiaries.

©2020 Qualcomm Technologies, Inc. and/or its affiliated companies. All Rights Reserved. Qualcomm and Qualcomm TrueWireless are trademarks or registered trademarks of Qualcomm Incorporated. aptX and cVc are trademarks or registered trademarks of Qualcomm Technologies International, Ltd. Other products and brand names may be trademarks or registered trademarks of their respective owners.

1020A

Qualcomm