Qualcomm®
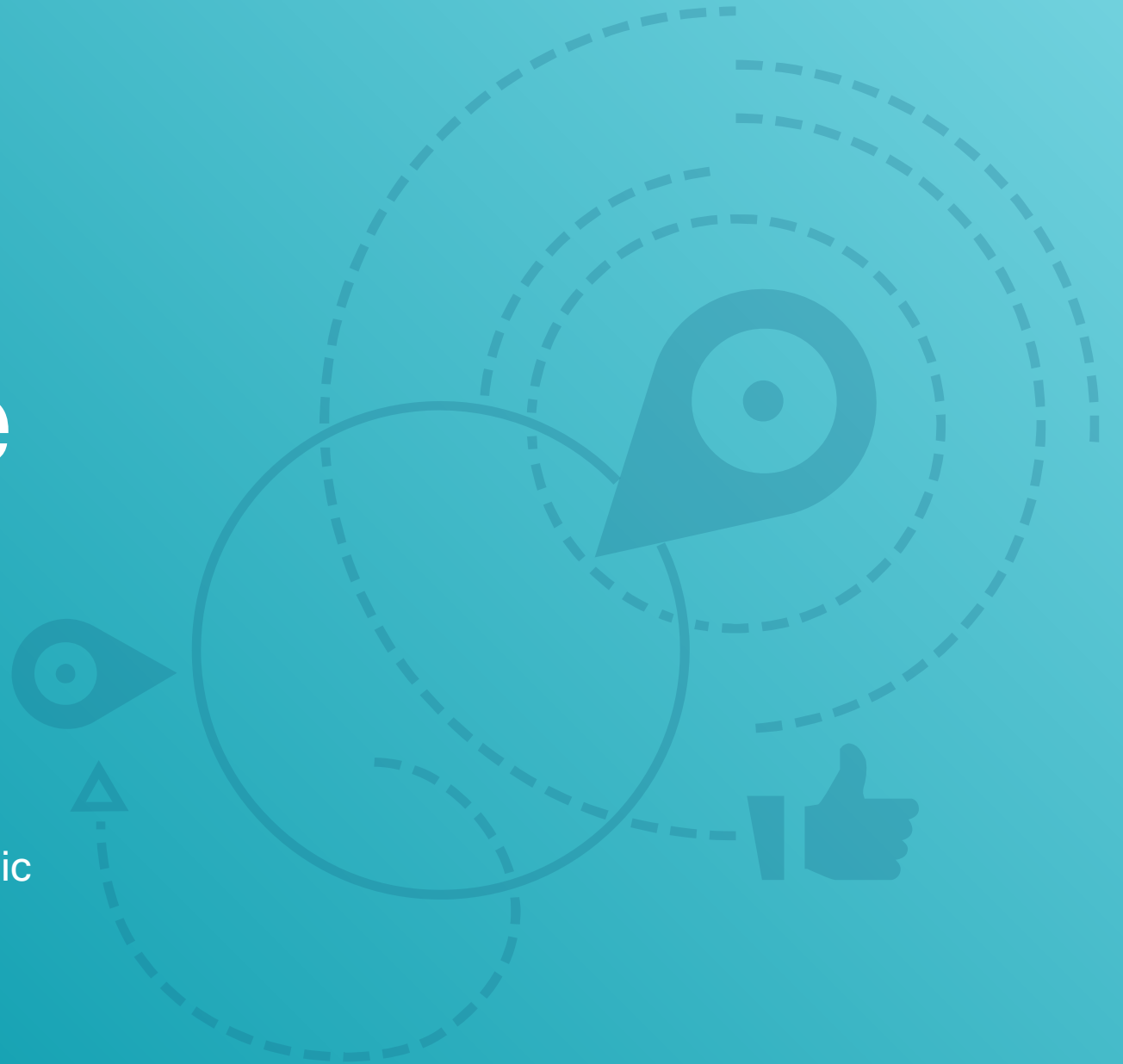
Voice & Music Business Update

Anthony Murray

Senior SVP and General Manager, Voice and Music

Qualcomm Technologies International, Ltd.

@Qualcomm

Megatrends

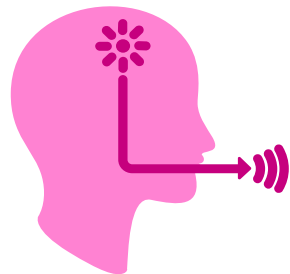## Major changes happening in audio

Streaming: The way we listen to music has changed

Increasing demand for high resolution audio

Consumers are embracing wireless

The emergence of smart assistants and speakers

The removal of the headphone jack

The evolution of hearables

Smart Audio Platform

5 new platforms

Next generation
Qualcomm® DDFA™
amplifier technology

CSRA68100: Highly
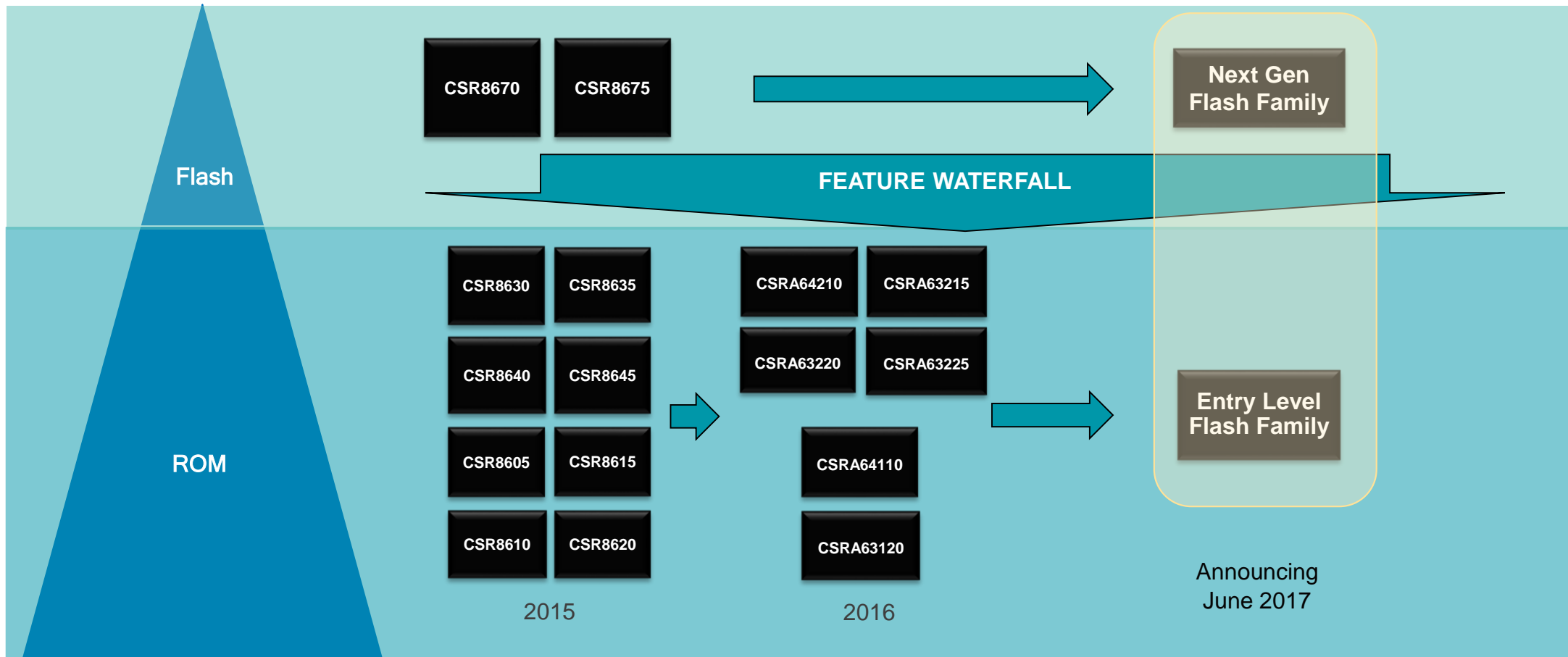flexible flash for premium
Headsets and Speakers

WHS94xx USB-C
Audio SoCs

QC3xxx Entry level
programmable flash for
Headsets & Speakers

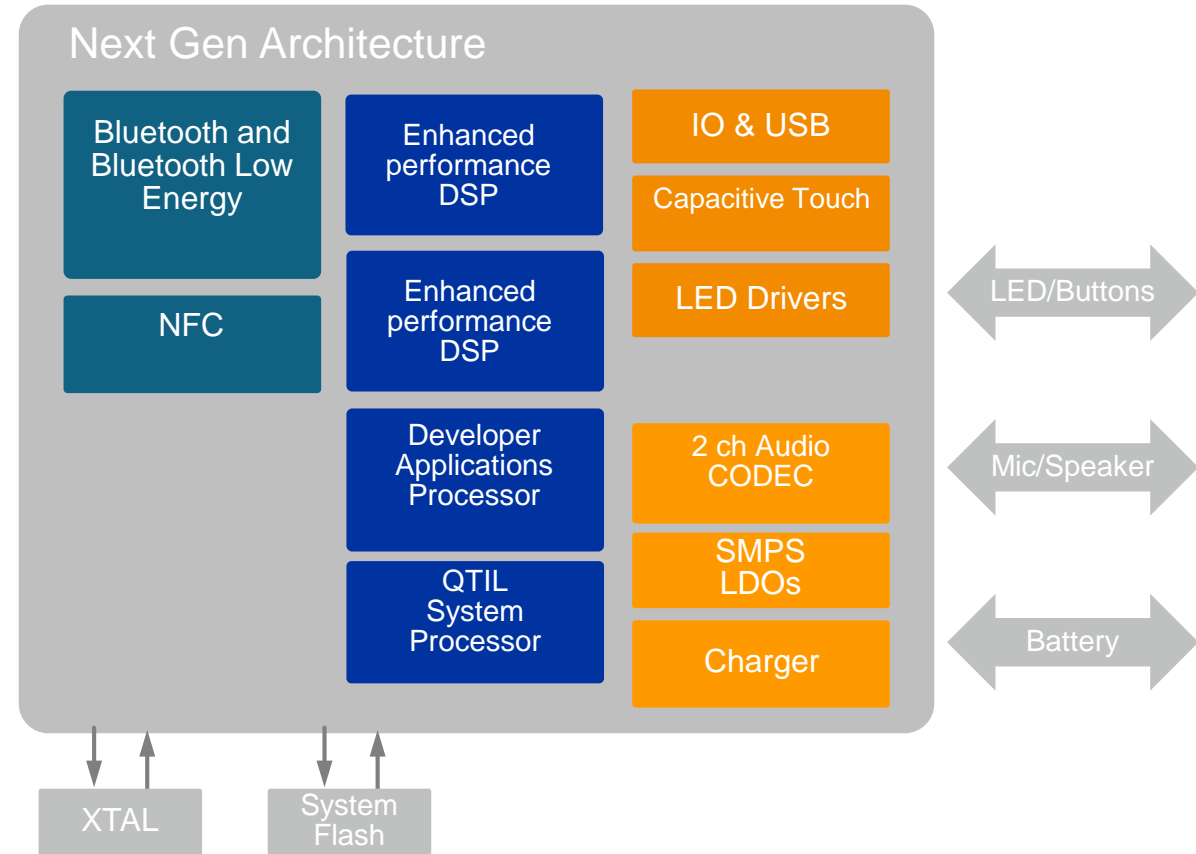# Bluetooth® Audio Platform Roadmap (subject to change)

Flash

ROM

CSR8670 CSR8675 → Next Gen Flash Family

FEATURE WATERFALL

CSR8630 CSR8635   CSRA64210 CSRA63215

CSR8640 CSR8645   CSRA63220 CSRA63225

CSR8605 CSR8615   CSRA64110

CSR8610 CSR8620   CSRA63120

→ Entry Level Flash Family

2015   2016

Announcing June 2017

CSR86xx, CSRA63xxx and CSRA64xxx are products of Qualcomm Technologies International, Ltd.

CSRA68100

Next Generation Flash

CSRA68100 for premium wireless speakers and headphones:

- New generation highly flexible Bluetooth® audio flash programmable

- Drives innovation and feature differentiation at premium end

- 4 times more processing power than CSR8675

- Advanced features on single chip platform:
  - Superior audio quality
  - Voice control
  - Far-field echo cancellation
  - Sensor Processing
  - Audio Post Processing

Next Gen Architecture

Bluetooth and Bluetooth Low Energy	Enhanced performance DSP	IO & USB
		Capacitive Touch
NFC	Enhanced performance DSP	LED Drivers

LED/Buttons

Developer Applications Processor	2 ch Audio CODEC
QTIL System Processor	SMPS LDOs
	Charger

Mic/Speaker

Battery

XTAL   System Flash

Initial Target Segments:
High-end Speakers, High-end Headphones

New Bluetooth® wireless audio SoCs

Building on leading Bluetooth audio platforms

**QCC3xxx family entry-level for mid to low-cost Bluetooth headsets and speakers:**

- Supports increased customization

- Designed to deliver rich set of audio features not typically associated with lower tier

- Advanced developer tools

- Flexible environment for developing quality Bluetooth products, even at lower price points

USB-C Audio SoC
WHS9420 and WHS9410

- USB-C connection becoming more common on mobiles

- USB-C headphones and speakers offer high quality wired audio option

- New platforms combine our expertise from mobile and wireless audio

- **WHS9420:** integrated ANC supports very high quality audio over the USB connection with up to 192kHz/24-bit audio support and very high quality DAC output

- **WHS9410:** entry level solution designed to bring quality audio performance to lower tier products
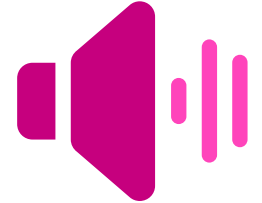
Smart Audio Platform
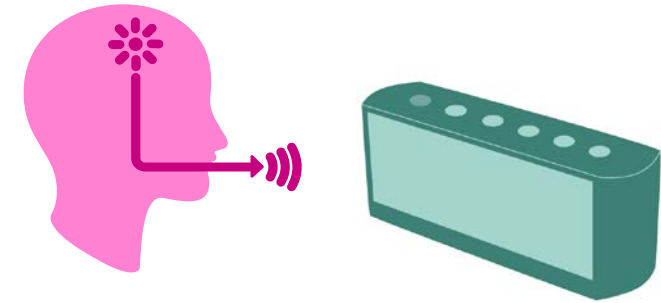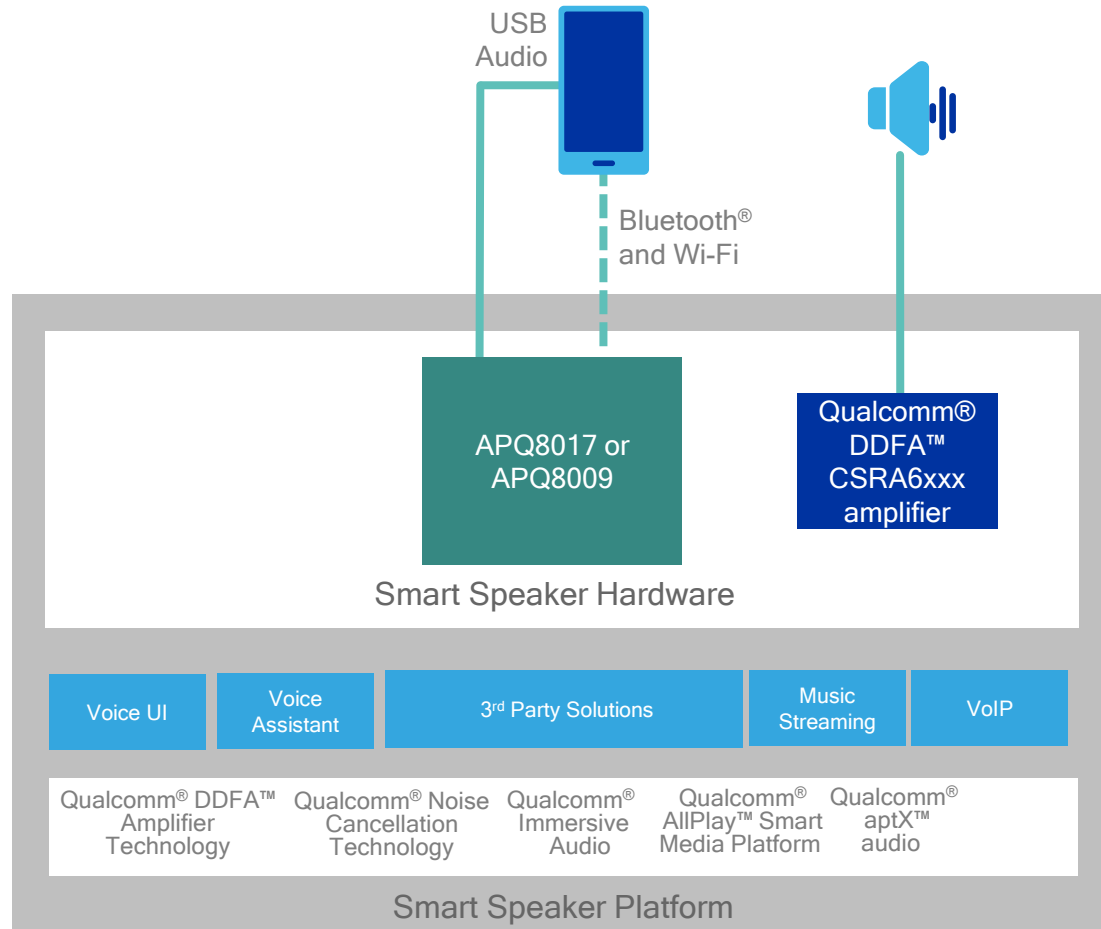
- Unique combination of processing power, connectivity options, voice UI and premium audio technologies

- Flexible platform based on APQ8009 or APQ8017 hardware

- Range of software configurations available to support range of use cases and tiers

- Developer platform and modules available

USB Audio

Bluetooth® and Wi-Fi

APQ8017 or APQ8009

Qualcomm® DDFA™ CSRA6xxx amplifier

Smart Speaker Hardware

Voice UI	Voice Assistant	3rd Party Solutions	Music Streaming	VoIP

Qualcomm® DDFA™ Amplifier Technology   Qualcomm® Noise Cancellation Technology   Qualcomm® Immersive Audio   Qualcomm® AllPlay™ Smart Media Platform   Qualcomm® aptX™ audio

Smart Speaker Platform

Qualcomm® DDFA™ Digital Amplifier Technology

Next generation, high performance

- Direct Digital Feedback Amplifier

- Removes the problems of open-loop digital amplifier caused by imperfect switching waveforms and power supply variation

- True Digital Class D architecture with closed loop-operation maintains excellent audio performance

- All the advantages of Class D amps combined with the performance of linear

- Result of more than ten years research and development

- Enables DDFA on a much broader range of devices

KPI	Performance
SNR	113dB (A-wt, 20Hz to 20KHz)
Dynamic Range	113dB (A-wt, 20Hz to 20KHz)
THD+N	<0.002% (20Hz to 20KHz)
Noise floor modulation	<2dB (-60dBFS to 0dBFS)
Residual noise	35µVrms @ 1Khz
Stereo Crosstalk	-103dB @ 1Khz
PSRR	69dB @ 1Khz

Qualcomm®
DDFA™

Audio Platforms

Uniquely positioned to address new market demands

World leading audio heritage and expertise

Flexibility of platforms – customize and innovate

World class development tools and support

Unparalleled breadth of portfolio

Connectivity options – Bluetooth®, Wi-Fi, USB-C
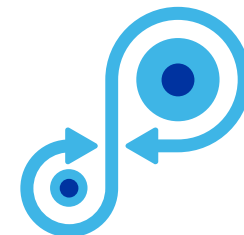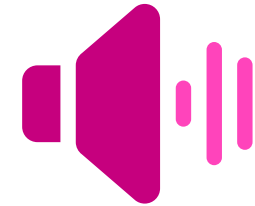
Thank you

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