



Voice & Music Business Update

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Megatrends

Major changes happening in audio



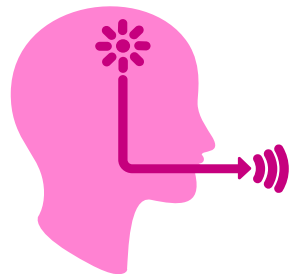
Streaming: The way we listen to music has changed



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



Next generation
Qualcomm® DDFA™
amplifier technology

5 new platforms



CSRA68100: Highly
flexible flash for premium
Headsets and Speakers

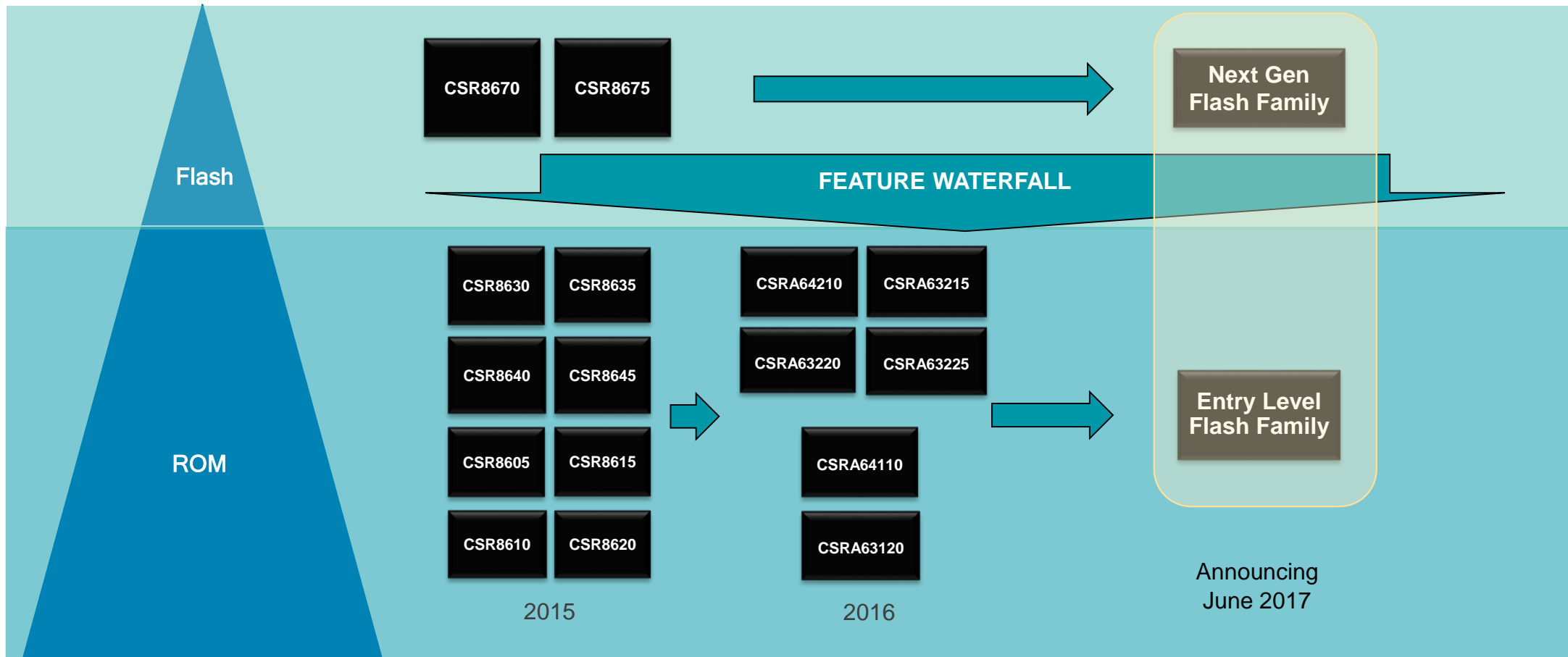


WHS94xx USB-C
Audio SoCs



QC3xxx Entry level
programmable flash for
Headsets & Speakers

Bluetooth® Audio Platform Roadmap (subject to change)

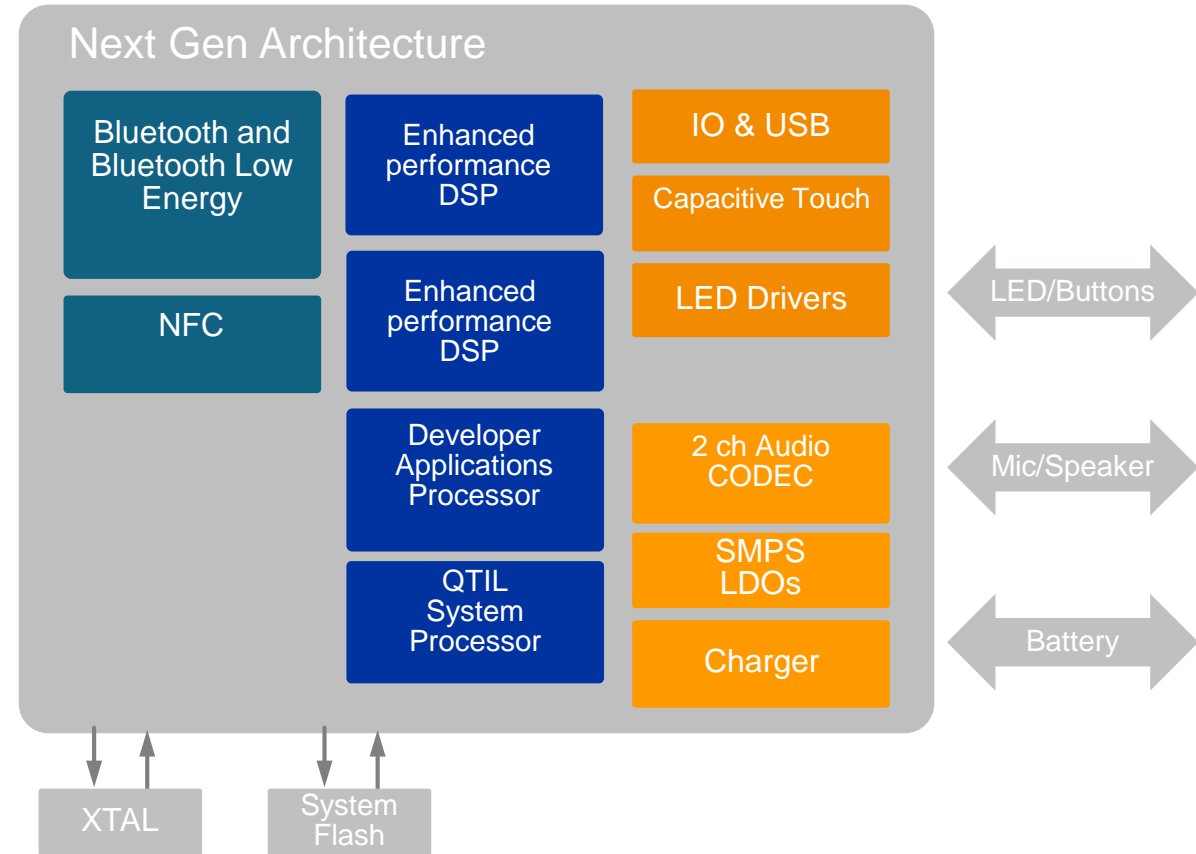


CSRA68100

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



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:

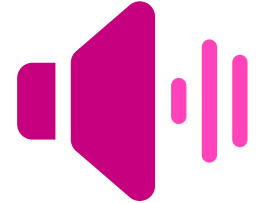
- Supports increased customization
- Designed to deliver rich set of audio features not typically associated with lower tier
- Advanced developer tools
- Flexible environment for developing quality Bluetooth products, even at lower price points



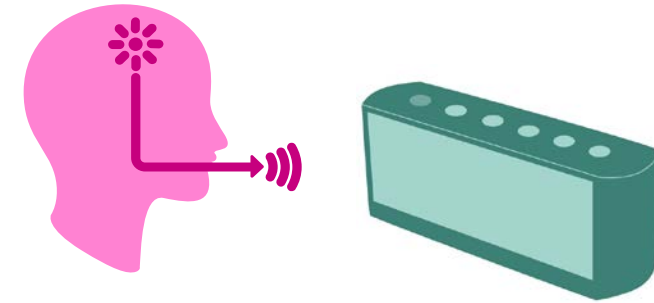
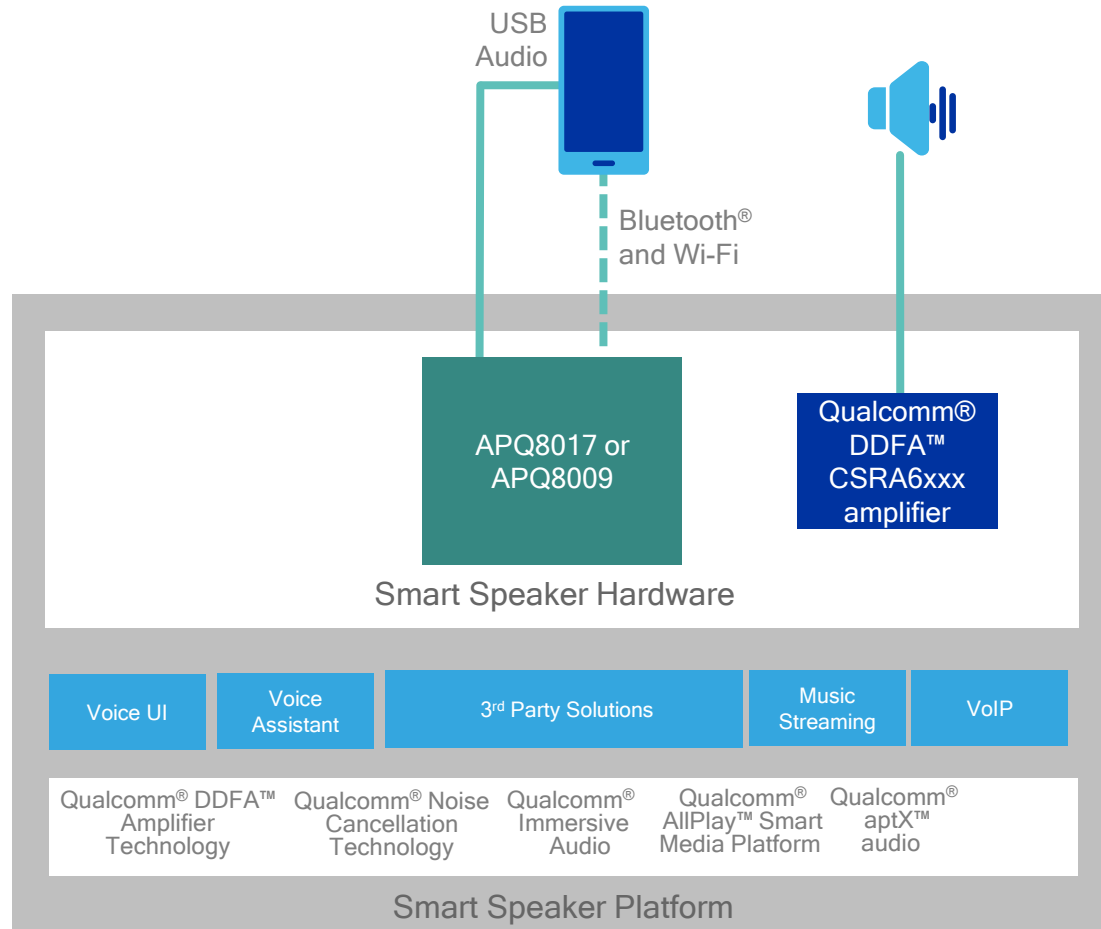
USB-C Audio SoC

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

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

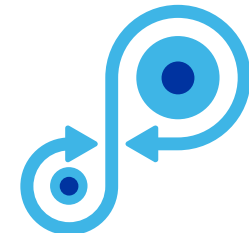
World leading audio heritage and expertise

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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