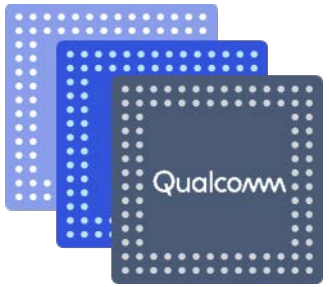
SDM670/SDM710 Android Performance Overview

Qualcomm Technologies, Inc.

80-PD126-30 Rev. D



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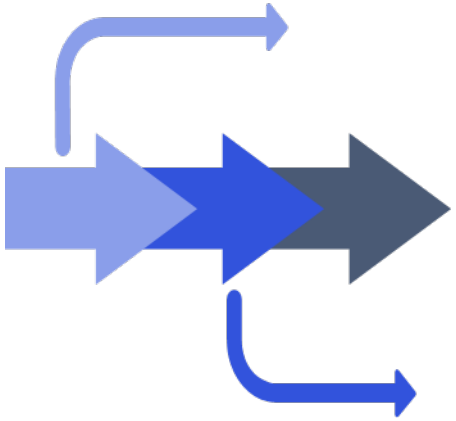
Revision History

Revision	Date	Description
A	September 2017	Initial release
B	November 2017	Updated Slide 6 with the Fmax value
C	April 05, 2018	Document updated to align with the SDM710 and SDM670 CS details and configuration; read in entirety
D	April 16, 2018	Numerous changes were made to this document; it should be read in its entirety

Contents



Hardware Features – SDM660 vs. SDM670 vs. SDM710

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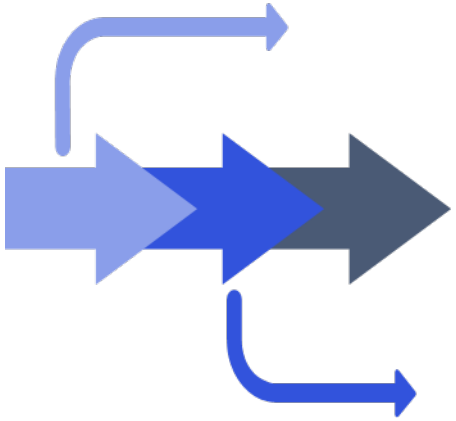
Feature	SDM660	SDM670	SDM710
CPU/L2 $	▪ Qualcomm® Kryo™ CPU (Kryo 260) ▪ Kryo Gold – Quad high-performance cores 2.2 GHz, L2 – 1 MB ▪ Kryo Silver – Quad low-power cores 1.8 GHz, L2 – 1 MB	▪ Kryo CPU (Kryo 360), L3 cache – 1 MB ▪ Kryo Gold – Dual high-performance cores 2.0 GHz, L2 cache per core – 256 KB ▪ Kryo Silver – Hexa low-power cores 1.7 GHz, L2 cache per core – 128 KB	▪ Kryo CPU (Kryo 360), L3 cache – 1 MB ▪ Kryo Gold – Dual high-performance cores 2.2 GHz, L2 cache per core – 256 KB ▪ Kryo Silver – Hexa low-power cores 1.7 GHz, L2 cache per core – 128 KB
GPU	Qualcomm® Adreno™ GPU 512 with Qualcomm® Universal Bandwidth Compression – 650 MHz, 272 KB GMEM	Adreno GPU 615 with Qualcomm Universal Bandwidth Compression 2.0 – 430 MHz, 512 KB GMEM	Adreno GPU 616 with Qualcomm Universal Bandwidth Compression 2.0 – 500 MHz, 512 KB GMEM
Memory	2 × 16-bit LPDDR4/LPDDR4X 1866 MHz 6 GB and 8 GB	2 × 16-bit LPDDR4X 1866 MHz 6 GB and 8 GB	2 × 16-bit LPDDR4X 1866 MHz 6 GB and 8 GB
Display	1600 × 2560	FHD+	QHD+
Governor	Interactive	SchedUtil	SchedUtil



Performance Improvements

Hardware Performance Improvements from SDM660

- SDM670:
  - Kryo 360 CPU with Fmax of 2.0 GHz with 1 MB L3 cache and 10 nm FinFET process
  - GPU is upgraded to Adreno GPU 615 with Fmax of 430 MHz
  - Display engine is improved to Adreno DPU 775
- SDM710:
  - Kryo 360 CPU with Fmax of 2.2 GHz with 1 MB L3 cache and 10 nm FinFET process
  - GPU is upgraded to Adreno GPU 616 with Fmax of 500 MHz
  - Display engine is improved to Adreno DPU 775

Software Performance Improvement Features

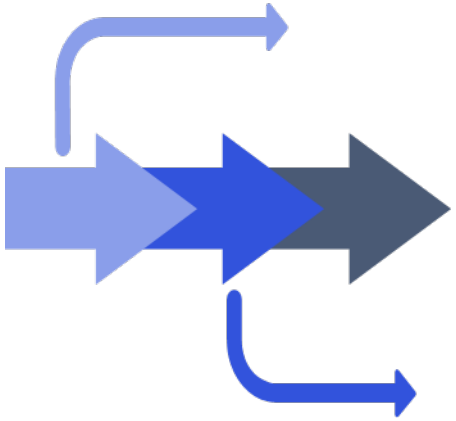
- ARM EAS-Z scheduler
  - SDM670/SDM710 chipsets use ARM EAS-Z scheduler extensions with QTI zone scheduler features
    - Ensures simpler and efficient software maintenance from a scheduler perspective
  - The following zone scheduler features are added on EAS:
    - Colocation
    - Frequency aggregation
    - Core isolation and core control
    - Enhanced task placement
    - New task differentiation

Software Performance Improvement Features (cont.)

- SchedUtil governor
  - Scheduler events-driven dynamic clock and voltage scaling (DCVS) governor
  - Light-weight DCVS governor tightly coupled with EAS
    - Designed to work in tandem with the scheduler
  - Sets the frequency based on the load reported by the scheduler
  - Integrates the following QTI zone value-add features for power and performance parity or improvement:
    - Frequency aggregation
    - Go high-speed frequency
    - Task differentiation
    - Predictive DCVS

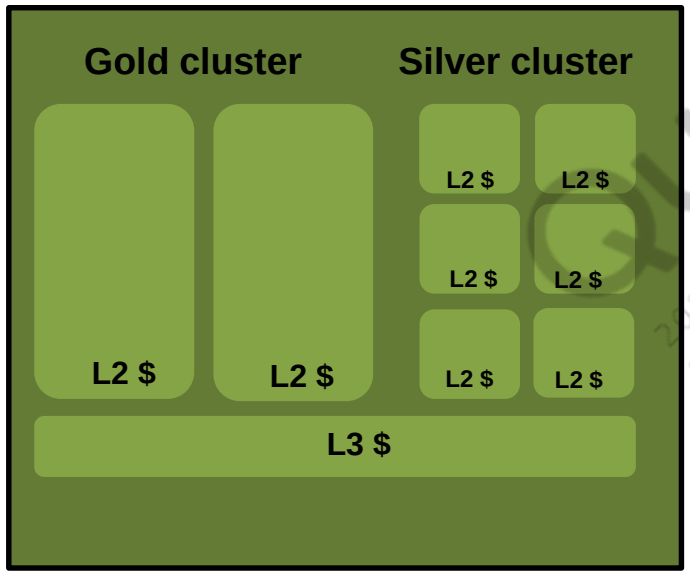
Software Performance Improvement Features (cont.)

- I/O C-groups
  - Provides an infrastructure to configure I/O parameters for a set of tasks in a C group
  - Improves the APP launches where I/O activity consumes time
- Learning framework
  - Improves user experience (UX) scenarios
  - Collects data for use cases and arrives at optimal settings for multiple use cases
    - All optimal settings for multiple use cases are stored in a database on the device which is continuously updated and applied for all future occurrences of the profiled use cases
  - Improves the launch latencies



SDM670/SDM710 CPU Benchmarks

SDM670/SDM710 CPU – Kryo 360



High-performance Kryo 360 CPU

Estimated 10% to 30% improvement in performance

Two big CPU cores and six little CPU cores

Optimized for performance and power efficiency

Improvement in DoU and battery life

10 nm process node in SDM670/SDM710 vs.14 nm in SDM660

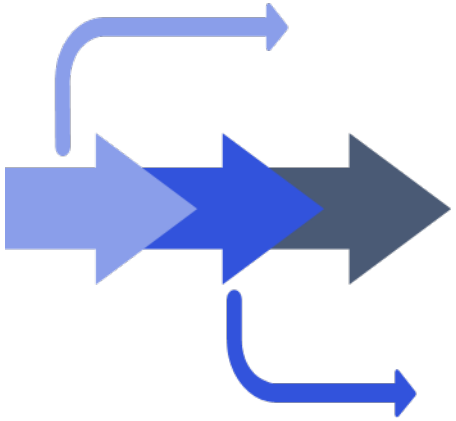
Performance Dashboard

- See the *Performance Dashboard for SDM710.LA.1.0 Linux Android Release* (80-PE565-5A) document for reference performance dashboard of SDM710/SDM670.

References

Documents	
Title	**Number**
Qualcomm Technologies, Inc.	
SDM670 Device Specification	80-PB873-1
SDM710 Device Specification	80-PG301-1
Energy Aware Scheduling and SchedUtil Overview	80-P9301-86
SDM660/SDA660 Device Specification	80-P7747-1
Performance Dashboard for SDM710.LA.1.0 Linux Android Release	80-PE565-5A

Acronyms	
Acronym or term	**Definition**
DCVS	Dynamic clock and voltage scaling
DDR	Double data rate
GPU	Graphics processing unit
UBWC	Universal bandwidth compression
UX	User experience



Questions?

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