SNAPDRAGON® 8 GEN 3 MOBILE PLATFORM

The Snapdragon® 8 Gen 3 Mobile Platform delivers premium-level performance across all your mobile experiences. Achieve newfound creativity using generative AI, intelligently capture one-of-a-kind content, get lost in console-defying 240 FPS mobile gaming, or jam out to boundless studio-quality lossless audio—all backed by the world's fastest mobile connectivity. Possibilities, ignited.

Generative AI excellence

Our leading Qualcomm® AI Engine was developed with on-device generative AI in mind. Fueling a new era of generative AI-powered virtual assistants, transform the way you interact and ideate. Text, voice, and image inputs form creative content, intelligent responses, and bring some of the most awe-inspiring use cases to life—with the ability to run on-device for ultimate speed and privacy.

- Our first AI Engine to support multi-modal generative AI models, including popular large language models (LLM), language vision models (LVM), and transformer network-based automatic speech recognition (ASR) up to 10B parameters—solely on-device
- World's fastest stable diffusion enables you to generate an image at a fraction of a second; quickly generate multiple options to pick from or create various social media posts in an instant
- LLM models can run up to 20 tokens/sec*, one of the fastest in the smartphone industry, so your personal AI assistant can respond to you swiftly
- On-device personalization: Qualcomm® Sensing Hub can securely use your data, like favorite activities, fitness level, and location, to make the AI virtual assistant give you more personalized responses
- Up to 98% faster Qualcomm® Hexagon™ NPU performance and up to 40% performance/watt
- Up to 3.5x AI performance increase on the Qualcomm Sensing Hub

*Based on 7B Llama 2

Intelligent capture

Delight in intelligent capture with the world's smartest AI-powered camera in your pocket. Thanks to our leading Cognitive ISP, you can intelligently snap one-of-a-kind content with generative AI voice-activated photo and video editing. Plus, individually optimize different components of your shots in real-time in up to 12 layers for more detail, vibrancy, and authenticity with Semantic Segmentation—available on front and back cameras. Even in the darkest of dark, Night Vision video capture powered by AI lets you achieve incredible content.

- Video Object Eraser by Arcsoft for video capture removes unwanted people and objects at the tap of a finger
- Two always-sensing cameras in the front and back allow for easy QR code scanning, face unlock, and more
- Zoom Anyplace, powered by Samsung's first 200 MP image sensor optimized for Snapdragon, allows capture of multiple videos, object tracking, and 2x and 4x zoom—all in 4K
- First HDR photo technology from Dolby enables capture and playback of images with greater range of colors, tones, and shades to reflect the full creative vision of the photographer
- Truepic photo capture with C2PA standard support lets you snap a photo with Truepic's cryptographic seal to prove the photo is real and not generative AI
- Vlogger's View lets you share both your selfie camera and rear camera video simultaneously, putting you in the action as you share and narrate
- Photo Expansion intuitively extends a photo beyond what was captured

Console-defying gaming

Seize heart-pumping, console-defying action fueled by the full suite of Snapdragon Elite Gaming™ features. Authentic immersion—with lifelike, multi-source lighting—is powered by Hardware-Accelerated Ray Tracing with Global Illumination, a first-in-mobile feature brought to you by Unreal Engine 5.2. Plus, sharpen your competitive edge with ultra-smooth, lag-free graphics from an unprecedented 240 FPS on 240 Hz displays.

- Maximize mobile gaming performance by upscaling game scenes up to 8K external displays with Snapdragon Game Super Resolution
- Adreno Frame Motion Engine 2.0 generates even higher quality scenes, doubling the frame rate while maintaining the same power consumption

Premium-level performance

Magnify passions with premium-level performance, powering real-life graphics and accelerated responsiveness that exceeds expectations. Our Qualcomm® Kryo™ CPU reaches remarkable heights with new CPU subsystem, now featuring five gold cores. An upgraded Qualcomm® Adreno™ GPU augments gaming and streaming with incredibly fast, crisp, and smooth graphics—all backed by extreme battery life.

- Kryo CPU 30% better performance and 20% power efficiency
- 25% better GPU performance and 25% power efficiency, plus 40% better Ray Tracing
- 10% overall power savings

Studio-quality audio, everywhere

Hear music just as the artists intended, uniting the best in premium audio and connectivity. Snapdragon Sound™ with new Qualcomm® Expanded Personal Area Network Technology (XPAN) for uninterrupted lossless audio when away from your phone or moving from room to room—all the while consuming ultra-low power. Plus, gameplay sound is synced to the millisecond, meaning zero lag from onscreen action to earbud.

- Supports 24-bit 96 kHz lossless music over Bluetooth® wireless technology

Limitless connectivity

Wander virtually anywhere with best-in-class 5G, Wi-Fi, and Bluetooth technologies converging into smooth work and play experiences. Achieve breakthrough 5G performance and speeds with the Snapdragon® X75 Modem-RF System, designed with AI hardware acceleration. Plus, the Qualcomm® FastConnect™ 7800 Mobile Connectivity System features leading Wi-Fi 7 that offers unstoppable speeds and reliability.

- World's first 5G modem with an integrated AI tensor hardware accelerator achieves better speeds, coverage, mobility, link robustness, and location accuracy
- 2.5x AI processing power from the predecessor at the hardware level, for faster, power-efficient operation, better location accuracy, and connectivity
- Only Wi-Fi system supporting High Band Simultaneous Multi-Link for blazing fast, low-latency performance

All comparisons made are in reference to previous generation, Snapdragon 8 Gen 2 Mobile Platform. Results will vary, depending on OEM implementation and other factors. Battery life varies significantly based on device, setting, usage, and other factors. Snapdragon and Qualcomm branded products are products of Qualcomm Technologies, Inc. and/or its subsidiaries. Materials are subject to change without notice.

87-71408-1 Rev G

SPECIFICATIONS & FEATURES

Artificial Intelligence

Qualcomm® AI Engine
- Qualcomm® Adreno™ GPU
- Qualcomm® Kryo™ CPU
- Qualcomm® Hexagon™ NPU
  - Fused AI accelerator architecture
  - Hexagon scalar, vector, and tensor accelerators
  - Hexagon Direct Link
  - Upgraded Micro Tile Inferencing
  - Upgraded power delivery system
  - Support for mix precision (INT8+INT16)
  - Support for all precisions (INT4, INT8, INT16, FP16)[1]

Qualcomm® Sensing Hub
- Dual micro NPUs for audio and sensors
- Dual Always-Sensing ISPs to support two concurrent Always-Sensing Cameras
- Support for INT4 precision

5G Modem-RF System

Snapdragon® X75 5G Modem-RF System
- 5G Advanced-ready, 5G mmWave and sub-6 GHz, 5G standalone (SA) and non-standalone (NSA) modes, standalone mmWave and mmWave-sub-6 dual connectivity, FDD, TDD

Downlink: Up to 10 Gbps

Uplink: Up to 3.5 Gbps
- Global 5G multi-SIM, including Qualcomm DSDA Gen 2
- mmWave: 8 carriers, 2x2 MIMO
- Sub-6 GHz: 4x4 MIMO
- Converged mmWave-sub-6 transceiver

Qualcomm® 5G AI Suite Gen 2 includes:
- Sensor-modem-RF solution for mmWave beam management
- AI-enhanced channel state feedback
- AI-enhanced antenna tuning
- AI-enhanced GNSS Location Gen 2
- Qualcomm® 5G AI Processor Gen 2 with dedicated tensor hardware accelerator
- Qualcomm® 5G PowerSave Gen 4
- Qualcomm® Smart Transmit™ Gen 4 technology with Snapdragon® Satellite support
- Qualcomm® Wideband Envelope Tracking
- Qualcomm® Power RF Efficiency Suite
- Qualcomm® 5G Ultra-Low Latency Suite

3GPP Release 17 and Release 18 support

Multimode support: 5G NR, NR-DC, EN-DC, LTE, CBRS, WCDMA, HSPA, TD-SCDMA, CDMA 1x, EV-DO, GSM/EDGE

Wi-Fi & Bluetooth®

Qualcomm® FastConnect™ 7800 System
- Wi-Fi Generation: Wi-Fi 7
- Peak Speed: 5.8 Gbps
- 802.11be, 802.11ax, 802.11ac, 802.11a/b/g/n
- Wi-Fi Spectral Bands: 6 Ghz, 5 GHz, 2.4 GHz
- Channel Bandwidth: 320/240/160/80/40/20 MHz
- 8-stream sounding (for 8x8 MU-MIMO)
- MIMO Configuration: 2x2 (2-stream)
- MU-MIMO (Uplink & Downlink)
- 4K QAM
- OFDMA (Uplink & Downlink)
- High Band Simultaneous (HBS) Multi-Link
- Wi-Fi Security: WPA3-Enterprise, WPA3- Enhanced Open, WPA3 Easy Connect, WPA3-Personal

Integrated Bluetooth
- Bluetooth Audio: Snapdragon Sound™ Technology with support for Qualcomm XPAN Technology, Qualcomm® aptX™ Voice, aptX Lossless, aptX Adaptive, and LE Audio
- Bluetooth Features: Bluetooth 5.4, LE Audio, Dual Bluetooth antennas

Camera

Qualcomm Spectra™ Image Signal Processor
- Cognitive ISP, Triple 18-bit ISPs

Real-time Semantic Segmentation photo and video processing (up to 12 layers)

Engine for Visual Analytics 4.0, including hardware acceleration for iToF depth sensors up to 1080p30

Support for DCG HDR image sensors

Support for Staggered HDR image sensors

Support for QDOL HDR image sensors

Support for Less Blanking HDR image sensors

Support for Multi-Frame HDR image sensors

Support for triple video capture from HDR image sensors, with seamless switching between any HDR mode
- Up to 36 MP triple camera @ 30 FPS with Zero Shutter Lag
- Up to 64+36 MP dual camera @ 30 FPS with Zero Shutter Lag
- Up to 108 MP single camera @ 30 FPS with Zero Shutter Lag
- Up to 200 megapixel photo capture

AI-based face detection, AI for 3A (auto-focus, auto-exposure, and auto-white balance)

Rec. 2020 color gamut photo and video capture

Up to 10-bit color depth photo and video capture

8K HDR video capture + 64 MP photo capture

10-bit HEIF: HEIC photo capture, HEVC video capture

Google Ultra HDR photo capture

Video capture HDR formats: HDR10+, HDR10, HLG, Dolby Vision,

8K HDR video capture @ 30 FPS

4K video capture @ 120 FPS

Slow-mo video capture at 720p @ 960 FPS

Bokeh Engine 2 for video capture

Pro Sight video capture

Night Vision video capture with RAW AI Noise Reduction in 4K 60 FPS

Computational HDR video capture: Up to 4 exposures (with QDOL image sensors)

Video super resolution

Multi-Frame Noise Reduction (MFNR)

Locally Motion Compensated Temporal Filtering

Truepic photo capture with C2PA-compliant certificate authority

Audio

Qualcomm Aqstic™ audio codec

Qualcomm Aqstic smart speaker amplifier

Total Harmonic Distortion + Noise (THD+N)

Playback: -108dB

Qualcomm® Audio and Voice Communication Suite

Spatial audio with head-tracking

Display

On-Device Display Support:
- 4K @ 60 Hz
- QHD+ @ 144 Hz

Maximum External Display Support:
- Up to 8K @ 30 Hz
- Up to 1080 @ 240 Hz

Variable Refresh Rate support for 240 Hz to 1 Hz
- 10-bit color depth, Rec. 2020 color gamut
- HDR10, HDR10+, HDR vivid, and Dolby Vision

CPU

Qualcomm® Kryo™ CPU
- 64-bit Architecture
- 1 Prime core, up to 3.4 GHz[2]
- 5 Performance cores, up to 3.2 GHz
- 2 Efficiency cores, up to 2.3 GHz

Visual Subsystem

Adreno GPU
- Real-time Hardware-Accelerated Ray Tracing with Global Illumination
- Support for Unreal Engine 5 Lumen Global Illumination and Reflections System
- Snapdragon Game Super Resolution
- Adreno Frame Motion Engine 2.0
- Snapdragon Game Post Processing Accelerator
- HDR gaming (10-bit color depth, Rec. 2020 color gamut)
- Snapdragon Shadow Denoiser
- API support: OpenGL® ES 3.2, OpenCL™ 3.0 FP, Vulkan® 1.3
- Hardware-accelerated H.265, VP9, AV1 decoder
- HDR Playback Codec support for HDR10+, HDR10, HLG, and Dolby Vision

Security

Trust Management Engine (Root of Trust), along with platform-level security foundations

Support for Android's DICE-based remote key provisioning

Qualcomm® Trusted Execution Environment & Services (TEE) for use cases requiring higher processing assurance

Qualcomm® Type-1 Hypervisor for isolation from the high-level OS

Secure Processing Unit (SPU) with support for the Android latest Strongbox SW components

Qualcomm® wireless edge services (WES) for secure attestation and provisioning

Qualcomm® 3D Sonic Sensor and Qualcomm 3D Sonic Max (fingerprint sensor)

Location

Concurrent GPS, Glonass, BeiDou, Galileo, QZSS, NavIC

Triple frequency GNSS (L1/L2C/L5)

Sensor-Assisted Positioning 6.0
- With global map aiding
- Urban pedestrian navigation with sidewalk accuracy
- Global freeway lane-level vehicle navigation

Charging

Qualcomm® Quick Charge™ 5 Technology

Memory

Support for LP-DDR5x memory, up to 4800 MHz

Memory Density: Up to 24 GB

General Specifications

Full suite of Snapdragon Elite Gaming™ features

4 nm Process Technology

USB Version 3.1 Gen 2; USB Type-C Support

Storage: UFS 4.0

Part Number: SM8650-AB, SM8650-AC, SM8650-AA

Snapdragon

* Frequency numbers rounded up for formatting

1. FP16 support varies based on different SKUs. Consult OEM specifications for device capability.
2. Snapdragon 8 Gen 3 Mobile Platform also available in 3.0 Ghz or 3.3 GHz CPU version. Maximum CPU speed will vary based on platform version. Consult OEM specifications for device CPU speed.

Certain optional features available subject to Carrier and OEM selection for an additional fee. Snapdragon and Qualcomm branded products are products of Qualcomm Technologies, Inc. and/or its subsidiaries. Qualcomm wireless edge services are offered by Qualcomm Technologies, Inc. and/or its subsidiaries. Qualcomm, Snapdragon Elite Gaming, Snapdragon Sound, Snapdragon, Adreno, FastConnect, Kryo, Smart Transmit, Qualcomm Spectra, Qualcomm Aqstic, and Quick Charge are trademarks or registered trademarks of Qualcomm Incorporated. aptX is a trademark or registered trademark of Qualcomm Technologies International, Ltd. ©2023 Qualcomm Technologies, Inc. and/or its affiliated companies. All rights reserved.