

Qualcomm® X105 5G Modem-RF

Designed to accelerate the industry to high-performance 5G Advanced, featuring the first Rel-19 modem for mobile and more, built for the agentic AI era.

The Qualcomm X105 5G Modem-RF is our latest 5G Advanced platform, built on the industry's first 3GPP Release 19 architecture and designed as a clear precursor to 6G. It delivers unmatched performance, power efficiency, and spectrum flexibility, accelerating adoption of 5G Advanced across smartphones, FWA, automotive, XR, PCs, and IoT.

Powered by the 5th-generation Qualcomm® 5G AI Processor, the Qualcomm X105 5G Modem-RF uses agentic AI within the modem to improve performance and user experience.

Key innovations include integrated 5G NR over satellite support, the first quad-frequency GNSS (L1, L2, L5 and L6), Qualcomm® Turbo DSDA with up to 60% faster* data rates, and the first 6 nm RF transceiver, reducing power consumption by 30%* and extending battery life*. With 500MHz of aggregated bandwidth, 6- and 8-layer MIMO, peak download speeds of 14.8 Gbps (13.1 Gbps on sub-6GHz), and peak upload speeds of 4.2 Gbps on sub-6GHz, the Qualcomm X105 5G Modem-RF sets a new benchmark for 5G performance.

* Compared to the previous generation.

Highlights

New, Groundbreaking Modem-RF Architecture for Unlocking 5G Advanced

The Qualcomm X105 5G Modem-RF introduces a new modem-RF architecture, making it the first to support 3GPP Rel-19, paving the way for 6G. It is designed to speed up the adoption of 5G Advanced, enhancing device performance and user experience.



Exceptional AI-Powered User Experience and Performance

The Qualcomm X105 5G Modem-RF features the 5th-generation, integrated Qualcomm 5G AI Processor, introducing agentic AI support for the ultimate 5G Advanced user experience and peak performance.



Unmatched 5G Advanced Performance and Spectrum Flexibility

The Qualcomm X105 5G Modem-RF delivers outstanding performance and spectrum flexibility. It is the first 5G modem to reach peak download speeds of 14.8 Gbps, and 13.1 Gbps specifically on sub-6GHz.



Block Diagram



Qualcomm X105 5G Modem-RF Target Applications

- Smartphones
- Fixed Wireless Access
- Automotive
- PCs
- Mobile Broadband
- Industrial IoT
- Robotics
- Satellite

Features

5th-generation Qualcomm 5G AI Processor with dedicated tensor accelerator hardware, optimized for 5G Advanced and ready for agentic AI

- Qualcomm 5G Agentic AI Suite
- Agentic AI for:
 - OTT-traffic detection for apps (chatbots, social media)
 - 5G gaming traffic prioritization
 - Smooth 5G-to-Wi-Fi transitions
 - 8Rx/6Rx/4Rx antenna management for mobile/ FWA
- Agentic AI for enabling advanced sensing software that can predict and adapt to real RF conditions, such as cell congestion detection and mitigation, and mobility condition
- Next-gen modem-RF architecture with world's first 6 nm node RFIC transceiver (sub-6/mmW), reducing power consumption by 30%* and reducing PCB footprint by 15%*
- 3GPP Rel-19 hardware readiness
- Designed to drive 5G Advanced in all segments—smartphones, MBB, FWA, automotive, IIoT, robotics, etc.
- Advanced satellite communications integrated with NR-NTN, NB-NTN, and RFFE modules and filters
- Qualcomm® Advanced Modem-RF Software Suite
 - Location Suite
 - World's first integrated quad-band GNSS support across L1, L2, L5 and L6
 - Qualcomm Turbo DSDA—with 60% higher throughput (in comparison to previous generation) with Multi-SIM CA support
 - Smart Network Selection
 - On-device, context-based performance enhancements for user scenarios (high-speed trains, subway mode, garage exit mode, border mode, quality connection mode, data stall detection and mitigation, etc.)
 - Qualcomm® Smart Transmit™ Plus with enhanced spatial averaging of power support—up to 1.5 dB gain in simultaneous Tx in comparison to previous generation

Specifications

Modem Name: Qualcomm X105 5G Modem-RF System

- 5G Peak Download Speed: 14.8 Gbps (FR1+FR2)
- 5G Peak Download Speed: 13.1 Gbps (FR1) with 500MHz BD and 1024 QAM
- 5G Peak Upload Speed: 4.2 Gbps with 4Tx UL CA

Cellular Modem-RF Specs

- DL Carrier Aggregation: 6F+T CA (500MHz) with 1024 QAM
- DL: TDD/FDD with 1024 QAM
- DL: Turbo DSDA enhancements, including Multi-SIM CA support (up to 60%* higher throughput)
- DL: 3rd-gen 6Rx for smartphones and FWA CPEs (with 10% higher downlink throughput compared to previous generation)
- UL: Switched uplink with 3CC support
- UL: Rel-17 Switched uplink with Multi-SIM support (enhancing DSDA UL)
- UL: 2Tx, 3Tx, 4Tx support
- Supplemental uplink with TDD
- Supports all global 5G bands (0.6 to 41GHz)
- NB-IoT for extended coverage

Performance Enhancement Technologies

- Smart Transmit Plus technology with enhanced uplink support and spatial averaging
- RFFE: New Qualcomm® QET8200 Envelope Tracker enabling smaller footprint* and improved performance* in FR1 bands
- RFFE: New L-PAMiDS for FR1 low and mid bands, enabling Power Class 2 for single-chain FDD
- RFFE: Support for NTN bands
- Qualcomm 5G PowerSave
- Power benefits from new 6 nm transceiver (RFIC) architecture
- Rel-17 power features

Cellular Technology

- 3GPP Rel-19 hardware
- FR1+FR2 CA
- DL CA with 500MHz bandwidth and 1024 QAM
- 6-layer and 8-layer MIMO support
- FDD+FDD sub-6 uplink carrier aggregation
- FDD+TDD sub-6 downlink carrier aggregation with mmWave DC
- 1024-QAM sub-6
- Dynamic Spectrum Sharing (DSS)
- LTE, WCDMA, LAA, GSM/EDGE, CBRS, mmWave
- 5G SA (standalone) and NSA (non-standalone)

* Compared to the previous generation.

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