

# Qualcomm Announces Breakthrough Connectivity Features in the Snapdragon 820 Processor

**-Upgraded X12 LTE modem includes the most advanced LTE and Wi-Fi feature set of any publicly announced integrated modem and application processor for use in mobile devices-**

HONG KONG, Sept. 14, 2015 /PRNewswire/ -- Qualcomm Incorporated (NASDAQ: QCOM) today announced that its wholly-owned subsidiary, Qualcomm Technologies, Inc. (QTI), has integrated its newly upgraded X12 LTE modem into its upcoming Qualcomm® Snapdragon™ 820 processor, providing leading 4G LTE and Wi-Fi technologies for premium tier mobile devices. The new Snapdragon 820 processor addresses unprecedented demand for blazing fast connectivity and seamless services. The Snapdragon 820 processor's upgraded X12 LTE modem offers:

- LTE Advanced speeds
  - Cat 12 (up to 600 Mbps) in the downlink
  - Cat 13 (up to 150 Mbps) in the uplink
  - Up to 4x4 MIMO on one downlink LTE carrier
- Breakthrough connectivity support in unlicensed spectrum:
  - 2x2 MU-MIMO (802.11ac)
  - Multi-gigabit 802.11ad
  - LTE-U and LTE+Wi-Fi Link Aggregation (LWA)
- Comprehensive service across connection types
  - Next Gen HD Voice and Video calling over LTE and Wi-Fi
  - Call Continuity across Wi-Fi, LTE, 3G, and 2G
- RF front end innovations
  - Advanced Closed Loop Antenna Tuner
  - Qualcomm RF360™ front end solution with CA
  - Wi-Fi/LTE antenna sharing

This is the first publicly announced processor for use in mobile devices to support LTE Category 12 in the downlink and Category 13 in the uplink, providing up to 33 percent and 200 percent improvement over its predecessor's download and upload speeds, respectively. Also available as a discrete chipset, the X12 LTE modem has demonstrated peak download speeds of up to 600 Mbps through 3x downlink carrier aggregation and 256-QAM, as well as peak upload speeds of up to 150 Mbps through 2x uplink carrier aggregation and 64-QAM. The Snapdragon 820 processor is also the first publicly announced processor to offer LTE support for 4x4 Multi-Input Multi-Output (MIMO), designed to double download throughput speeds on a single LTE carrier. In addition, it features Uplink Data Compression (UDC), a feature that is currently unique to select Snapdragon LTE modems, and engineered to enhance the user experience in a wide range of applications, including accelerating web page loading times. The Snapdragon 820 processor is also the first publicly announced processor with Advanced Closed Loop Antenna Tuning when paired with the QFE2550 Antenna Tuner, designed to dynamically optimize RF performance in real network conditions, particularly for challenging metallic industrial designs in premium tier handsets. Advanced Closed Loop Antenna Tuning is designed to reduce dropped calls, improve cell edge throughput and even lower power consumption.

In addition to its leading LTE features, the Snapdragon 820 processor also supports superior Wi-Fi performance and connectivity experiences through Qualcomm® VIVE™ 802.11ac with Qualcomm® MU | EFX MU-MIMO technology, along with tri-band support, through multi-gigabit 802.11ad (11ad) Wi-Fi. With 2x2 802.11ac (11ac) plus MU-MIMO technology, devices will have the ability to achieve a range increase of up to 50 percent over the 1x1 configuration. The peak rate of 2x2

80 MHz 11ac is up to 867 Mbps, while the 11ad peak rate is up to 4.6 Gbps. Additionally, 11ad offers up to a five time increase in user throughput with similar power consumption as 11ac. With dynamic session transfer between 11ad and 11ac, devices will have the ability to achieve high performance connectivity in a power-efficient way. The high bandwidth and speeds offered by 11ac Wi-Fi, 11ad Wi-Fi, and MU-MIMO brings new-levels of performance designed to improve overall quality of service, and enhance user experiences for applications such as streaming 4K video, doing peer-to-peer large file sharing, using media kiosks, docking wirelessly, hard disk backups and more.

The Snapdragon 820 processor features advanced convergence technologies between LTE and Wi-Fi, and between licensed and unlicensed spectrum:

- **LTE-Unlicensed (LTE-U).** The Snapdragon 820 processor is the first publicly announced processor for use in mobile devices to offer comprehensive LTE-U support when paired with the WTR3950, increasing mobile network capacity and user throughput by aggregating LTE in licensed and unlicensed bands.
- **LTE and Wi-Fi Link Aggregation (LWA).** LWA is another method of aggregating licensed and unlicensed spectrum. It is designed to allow mobile operators to utilize their Wi-Fi infrastructure to augment licensed LTE network capacity with unlicensed spectrum capacity.
- **Next-generation Wi-Fi calling.** The X12 LTE modem supports next-generation HD Voice over LTE (VoLTE) and Video over LTE (ViLTE) calling services using the IP Multimedia Subsystem, with support for call continuity between LTE and Wi-Fi. Making use of the cognitive capabilities of Qualcomm® Zeroth™, the X12 LTE modem monitors real-time Wi-Fi quality to decide if and when to shift the call from LTE to Wi-Fi or back.
- **Antenna sharing.** The new modem supports several antenna sharing schemes between LTE and Wi-Fi, designed to make it easier for manufacturers to design devices with advanced technologies like LTE-U, 4x4 LTE MIMO, and 2-stream Wi-Fi, with attractive form factors and minimal performance impact on either technology.

"The Qualcomm Snapdragon 820 processor with X12 LTE modem is a new industry leader, offering highly differentiated features that put OEMs and carriers on the cutting edge, including the latest advances in LTE and Wi-Fi connectivity," said Alex Katouzian, senior vice president, product management, Qualcomm Technologies, Inc. "With technologies like 4K video, virtual reality and cognitive computing rapidly evolving, it's important to provide consumers with the speed and bandwidth to create a more compelling mobile experience."

The Snapdragon 820 processor continues QTI's long-standing tradition of integrating industry-leading modem features. It also includes support for services such as LTE-Broadcast and dual-SIM LTE carrier aggregation devices. Devices based on the Snapdragon 820 processor are expected to be available in 1H of 2016.

#### **About Qualcomm Incorporated**

Qualcomm Incorporated (NASDAQ: QCOM) is a world leader in 3G, 4G and next-generation wireless technologies. Qualcomm Incorporated includes Qualcomm's licensing business, QTL, and the vast majority of its patent portfolio. Qualcomm Technologies, Inc., a wholly-owned subsidiary of Qualcomm Incorporated, operates, along with its subsidiaries, substantially all of Qualcomm's engineering, research and development functions, and substantially all of its products and services businesses, including its semiconductor business, QCT. For more than 30 years, Qualcomm ideas and inventions have driven the evolution of digital communications, linking people everywhere more closely to information, entertainment and each other. For more information, visit Qualcomm's [website](#), [OnQ blog](#), [Twitter](#) and [Facebook](#) pages.

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