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# Qualcomm Innovates to Optimize Spectrum Usage with Revolutionary MU-MIMO for Wi-Fi

## --Qualcomm Introduces 802.11ac Wi-Fi with Multi-user MIMO to Triple Network and Device Performance and Efficiency--

SAN DIEGO, April 3, 2014 /PRNewswire/ -- Qualcomm Incorporated (NASDAQ: QCOM) today announced that its subsidiary, [Qualcomm Atheros, Inc.](#), is delivering the first Qualcomm® VIVE™ 4-stream 802.11ac solutions with multi-user MIMO (MU-MIMO) to greatly improve Wi-Fi® performance for the growing number of connected devices in homes, offices and public hotspots. Enhanced with Qualcomm Atheros' innovative algorithm-based technology, the new solutions offer two to three times more network capacity and are designed to optimize the way Wi-Fi devices are served to make the most of that additional capacity.

MU-MIMO is a revolutionary new way for Wi-Fi networks to operate. With standard Wi-Fi, clients are served sequentially; during this time, only one device is sending and receiving information, thus only a small portion of network capacity is being used. The accumulation of these sequential events creates a drop in throughput and capacity as more devices join the network. This situation can be further exacerbated when combined with the growing amount of on-demand high resolution video content. MU-MIMO enables simultaneous transmission to groups of clients, making more efficient use of available Wi-Fi network capacity and speeding up transmissions.

"Great connectivity is not just about increasing the absolute speed. It's about making better use of network and airtime efficiency to support the growing number of connected devices, services and applications," said Dan Rabinovitsj, senior vice president, Qualcomm Atheros, Inc. "After seven years of MU-MIMO development and testing, we've gained a deep understanding of real-world channel behavior with this advanced Wi-Fi technology in crowded environments. These insights have led to the creation of our precision-based algorithm technology that, along with technologies like the Qualcomm Internet Processor and StreamBoost™, maximizes Wi-Fi performance for all connected devices."

"The ever-increasing number of connected devices in homes and businesses require sufficient bandwidth to provide the best experience for users," said Patrick Lo, chief executive officer, NETGEAR. "MU-MIMO, as the next logical step in the 802.11ac evolution, fulfills this need, and Qualcomm Atheros' early provisioning of this technology is timely."

Qualcomm Atheros pioneered MU-MIMO and created highly sophisticated algorithms that manage the complexities of simultaneous connections to optimize the experience for all devices on a VIVE 11ac network. With a more precise view of the environment, Qualcomm Atheros' algorithm-based technology is designed to dynamically adapt to changes in channel conditions, device movement and application requirements to maximize throughput and device performance. This not only makes the best use of the available bandwidth, but also maintains better connections in complex multi-user networks.

In order to extract the maximum benefits of MU-MIMO, it must be used on both sides of the connection. To accelerate the benefits of MU-MIMO for more Wi-Fi users, Qualcomm Atheros is providing a complete ecosystem of solutions for networking products, as well as smartphones, tablets, computers, consumer electronics and automobiles.

### 3- and 4-Stream 802.11ac MU-MIMO for Networks

Qualcomm Atheros is introducing the QCA9980 and QCA9982 solutions for routers and gateways, and the QCA9990 and QCA9992 solutions for enterprise access points. These 3- and 4-stream, single-chip solutions feature MU-MIMO, 256-QAM modulation, and explicit and implicit beamforming to meet carrier and enterprise requirements for next-generation performance and agility to support more connected devices. The QCA998x and QCA999x are expected to sample in the second quarter of 2014.

### 1- and 2-stream 802.11ac MU-MIMO for Mobile Devices, Consumer Electronics (CE) and Automobiles

The latest smartphones are using 1-stream 11ac, while many mobile, CE and vehicles are moving to 2-stream 11ac to accommodate more bandwidth-intensive media applications. Qualcomm Atheros has laid the foundation for a wide variety of mobile and consumer devices to take advantage of MU-MIMO. The necessary receiver hardware is built into Qualcomm VIVE 11ac solutions for smartphones, tablets, connected TVs and other media devices, enabling customers to quickly transition their next designs to support the revolutionary new MU-MIMO features.

MU-MIMO is built into all of Qualcomm Atheros' latest 11ac client solutions, and is supported on the industry-leading Qualcomm® Snapdragon™ 805 and 801 mobile processors.

- The QCA6174, designed for tablets and high-end smartphones, combines 2-stream 11ac with *Bluetooth*® 4.1 to provide more than 600 Mbps throughput to handle the most demanding media downloads and streaming needs over Wi-Fi.
- Qualcomm Atheros' popular WCN3680 integrates 1-stream 11ac, Bluetooth 4.1 and FM into the industry-leading Snapdragon mobile processors, providing high-performance, low-power connectivity for smartphones and tablets from leading vendors.
- The QCA9378 is Qualcomm Atheros' new 2-stream VIVE solution for connected TVs, set-top boxes and other entertainment devices. It is designed to provide the best possible experiences for 4k video, gaming, audio and other latency-sensitive media applications.
- The QCA6574 is the first automotive solution to combine 2-stream 11ac and Bluetooth 4.1 for in-car communication, media infotainment and point-to-point connections.

#### **About Qualcomm Incorporated**

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