James Klein
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MPD: *The defense market for RF and microwave components through subsystems appears to be more lucrative than in recent years, especially in the area of electronic warfare. If your company sells into the defense market, what are your thoughts about how it will perform in 2017?*

JK: It's been an exciting few years in the defense industry as systems become more autonomous coupled with the increased focus on applying electronically scanned arrays for EW, radar and communications applications. Many new technologies rely on the advantages of GaN versus previous solutions, including increased thermal reliability, frequency availability and extended product lifetime. We also see the transition of tube based systems to solid state amplifiers based on GaAs and GaN technologies which increase reliability significantly.

The emergence of GaN in the defense industry will continue to grow. As the industry continues to focus on size, weight, power and cost (SWaP-C) constraints, GaN and its variety of flavors will help meet demands while improving the capabilities of new and legacy radar systems, as well as EW applications. We expect GaN to grow at over a 20% CAGR for next few years.

MPD: *The fifth generation of cellular is rapidly approaching and the immense scope of 5G seems almost certain to present significant opportunities for the RF and microwave industry. What is your perspective on this issue?*

JK: Explosive growth in data consumption is driving the need to extend data rates and improve user experience. The next generation network presents significant opportunities for the RF and microwave industry. As a leading RF supplier, Qorvo views this expansion of network capacity in two categories characterized by frequency spectrum and mobile or fixed wireless. In near term cellular base station (4.5G) upgrades which operate above 2.6 GHz and below 6 GHz will drive enhanced user experience through additional channel bandwidths. In the longer term, true 5G mmWave fixed wireless access will drive and significantly increase bandwidth to fixed users. Both of these applications offer a significant RF challenge to the industry.

Qorvo is a full voting member of 3GPP, which allows us to advise the standards body on 4.5 and 5G RF solutions. With the development of the 5G standard and global allocation of frequency spectrum, we are well positioned to deliver a broad range of 5G connectivity solutions. Our strategy is to support the 4.5G rollouts as well as the evolving 5G ecosystem.

Currently 5G mmWave is still in the early validation of technologies. Qorvo is actively involved with global network providers with 5G field trials to prepare for the rollout of initial networks by 2020. To date, Qorvo has participated in over 20 customer field trials.

MPD: *The Internet of Things (IoT) might better be called the Wireless Internet of Things, as without RF and microwave technology, little could be accomplished. If your company is selling into this market, please provide your perspective on IoT and its prospects for the RF and microwave industry.*

JK: This is an exciting time for the RF industry. Market research estimates that there will be about 50 billion IoT devices by 2020. Beyond smart home networking, demand is growing to connect a variety of devices including HVAC, energy, security, home health and remote controls. All of these devices will connect to the internet wirelessly utilizing innovative ultra-low power wireless data communication SoCs. Currently these IoT systems are being addressed with 802.15.4, ZigBee and Bluetooth Low Energy (BLE) RF technology. Wi-Fi will continue to be the enabling technology for higher data rate applications, like video streaming. IoT will require a number of wireless technology solutions as new applications are developed.

At Qorvo we are strategically positioned to address the IoT market with a broad ranging portfolio of RF technology, from market-leading high power RF solutions to innovative ultra-low power, short-range wireless personal area network (WPAN) SoCs.

MPD: *In your opinion, what are the RF and microwave technologies to watch in 2017?*

JK: All eyes will continue to be on GaN in 2017. It's the technology of choice in the defense industry as contractors look to develop smaller, more powerful radar and EW solutions. We're also starting to see GaN enter the commercial market and it's already being deployed in cellular base stations. GaN costs continue to align with market volumes and device packaging has certainly made a steep function improvement in costs making GaN the technology of choice for many high power applications.

When it comes to the mobile industry, RF filters are the technology to watch. Added band and frequency requirements in smartphones and Wi-Fi systems will make next-generation devices rely heavily on BAW and SAW filters. For instance, carrier aggregation relies significantly on filters to allow for increased uplink and downlink capabilities of mobile devices. We all know that the number of mobile devices is growing and as it does frequency and bandwidth will continue to be limited. Filters will help solve this issue improving connectivity and the user experience of these devices.