

## What's News....

### Wireless traffic, investment growing fast

Americans used an amazing 28% more mobile data in 2018 than the year before, 28.58 trillion megabytes, according to the CTIA's 2019 Annual Wireless Industry Survey. There were 21.5 million more devices (for a total of 421.7 million) connected to mobile networks last year. Half were smartphones but data-only products such as watches, IoT devices, and connected cars represent the major growth areas. In addition, wireless carriers spent \$27.4 billion on infrastructure and related CAPEX, \$1.8 billion more than in 2017. There are now about 394,000 5G-capable cell sites in operation.



(CTIA)

### TV white spaces: Theaters cry foul

As Microsoft pushes its proposal at the FCC for using the so-called TV white spaces to expand Internet access to rural areas, various music industry organizations and microphone manufacturers such as Shure are cautioning that use of these frequencies could interfere with wireless microphones. Microsoft's plan covers only licensed wireless mics, not unlicensed ones of which there are huge number. While the organizations all say they strongly in support of Microsoft's overall goal, they want assurance that if the plan is implemented, all wireless mics will be protected from interference.

## A Word from Sam Benzacar

### Device For the Future : Part One

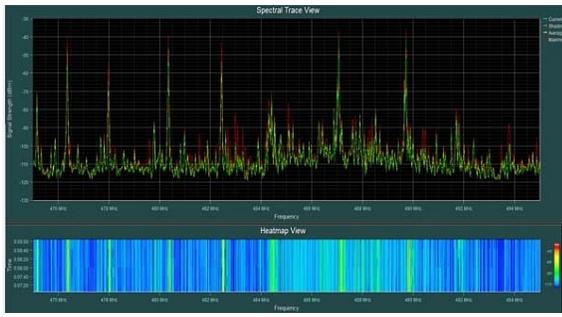


In my conversations with customers, members of the industry, and in the course of traversing the Web I sometimes come across a technological development that really stands out. One of the most impressive has immense potential for 5G and is indicative of what will be required to effectively integrate millimeter-wave bands in a smartphone. The product I'm referring to is the QTM052 RF system on chip (RFSoc) revealed by Qualcomm back in 2017 and has since revised and reduced in size by 25%.

Although its largest target market is end-user devices and small cell base stations, Verizon is using it in the company's 28-GHz fixed wireless access systems, and AT&T has committed to using it as well. As you can see from the photo, the device is very small, measuring 18 x 5-mm, but inside are a complete 5G NR transceiver including front-end components and RF power amplifier, power management IC, and an entire 24-element phased-array antenna. Equally amazing is that it operates between 26.5 to 29.5 GHz, 27.5 to 28.35, and anywhere within 37 and 40 GHz as well, with total available bandwidth of 800 MHz. The module supports up to 2x2 MIMO with dual polarization in both the downlink and the uplink.

Put four of these in the corners of a smartphone and when combined with the company's Snapdragon X50 modem, they can perform beamforming, steering, and tracking, and route signals to each module based on signal and environmental conditions. It helps solve the most significant issue with using millimeter-wave frequencies in a hand-held mobile device: propagating signals in and out when it's in your hand, moving around at various angles, or in your pocket or pocketbook.

The patch and dipole antennas provide spherical coverage in each polarization and beam steering of +/-45 deg. The power amplifier can deliver 10 to 15 dBm output power at 28 GHz, although it typically operates backed off to 6 to 8 dBm. An EIRP up to 35 dBm can be achieved thanks to the 5 dBi gain of a half-wave patch antenna, but the 2x2 array provides another 6 dB of summation gain and 6 dB beamforming gain. Using only one polarization, 3 dB gain



can be achieved for a total of 20 dB. One module has typical DC power dissipation with four transmit channels in operation of 380 mW or less.

This device is probably not the only one because others may be lurking within the confines of other semiconductor companies and phone manufacturers (Huawei comes to mind). But so far it appears only Qualcomm has publicly announced such a device with a reasonable amount of information.

I am very sure that in the advent of 5G many other devices will be popping out of the woodwork; an interesting journey. Stay tuned.

## Air Force Develops Microwave Drone Killer

Researchers from the Air Force Research Laboratory at Kirtland Air Force Base have created a microwave weapon capable of taking out drones called the Tactical High-Power Microwave Operational Responder (THOR). It reportedly costs about \$10 million apiece, can down up to 50 drones simultaneously. The platform is mobile and can be deployed in less than 3 hours by connecting its three parts, after which it can be operated remotely from a laptop, positioning its antenna quickly over a 360-deg. range. The Air Force recently stated that multiple-drone attacks are a priority for its directed-energy weapons system development efforts, which includes both microwave laser systems.



## Ford showed its C-V2X

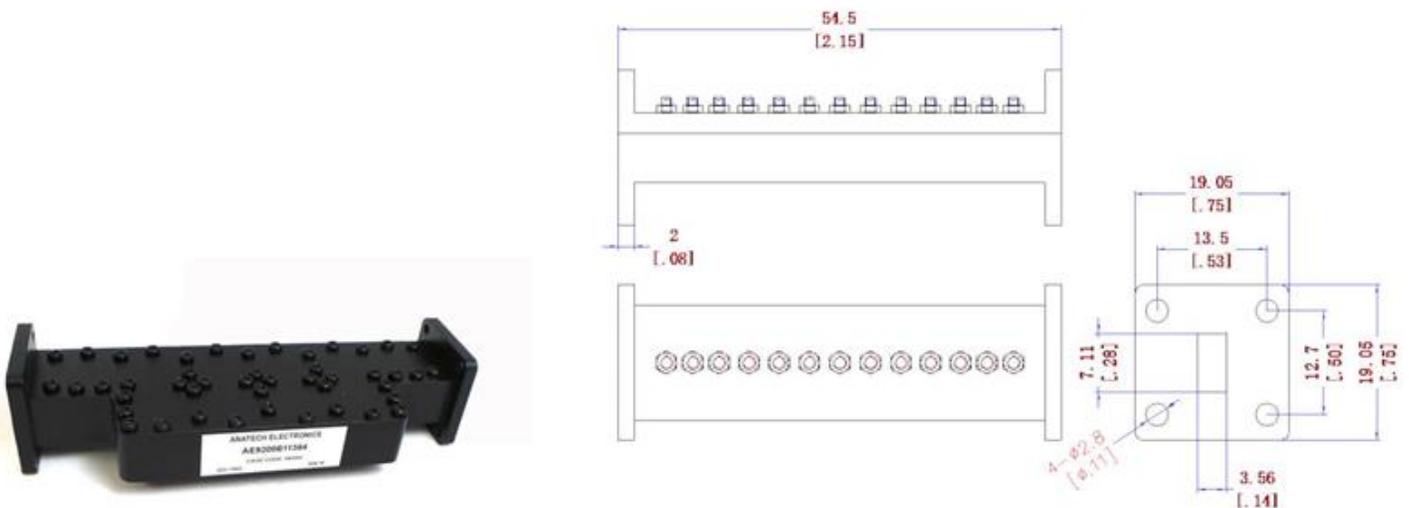
Ford showed off its cellular vehicle-to-everything (C-V2X) technology at the recent meeting of the Intelligent Transportation Society of America, including a roadside module that lets vehicles communicate with pedestrians and bicyclists. Called an interpreter, the device uses cellular, Bluetooth and other short-range solutions to notify pedestrians of oncoming vehicles via their smartphones. The company also demonstrated a system that intelligently makes decisions concerning right-of-way at intersections by establishes a "discussion" between vehicles.



## Getting Ready for 5G:

Anatech Electronics introduce New Ka band 30.5GHz Waveguide Band Pass Filter.

Featuring a center frequency of 30.5GHz, a bandwidth of 1000MHz, an Insertion Loss 1dB Max, and a Power Handling is 20 Watts.



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