ANATECH ELECTRONICS INC

AT THE CENTER FREQUENCY

An e-Newsletter from Anatech Electronics

Sep 2019

# What's News...

## Mid-band Show Promise for High-speed 5G

The U.S. remains the 5G speed leader with current roll-outs achieving up to 1.8 Gb/s downstream data rates, but other countries are notching up very high data rates as well—and unlike the U.S., they're not using millimeter-wave spectrum to achieve it, according to Opensignal. That is, the mid-band spectrum (below 6 GHz) is demonstrating its ability to support data rates near those of the U.S. without resorting to the use of spectrum at much higher frequencies. It's also the most popular region globally for 5G deployment, as it is much less expensive to deploy as propagation distances are longer, requiring less equipment.


## iPhones Come Up Short in Download Speeds: Report

High-end smartphones from OnePlus, LG, and Samsung have the fastest download speeds in the U.S., according to a recent comparison of various phones. The OnePlus 7 Pro, LG V35, LG G8, and Samsung S10 and S10+ models tied for first place with average 4G download speeds above 36 Mb/s. iPhone XS and XS Max users got 4G download speeds over 25 Mb/s, while iPhone 7 and 6s users experienced much lower download speeds of between 16.7 and 18.3 Mb/s. All but one smartphone model in Opensignal's top 10 used chipsets and modems from Qualcomm.

# A Word from Sam Benzacar

## Interference: 5G Hits a Snag

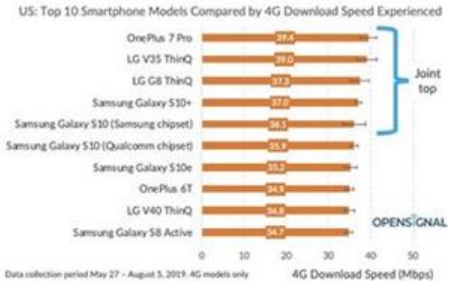
### By Sam Benzacar

In previous newsletters, I've written about what I believe will be an exponential increase in interference within the low- and mid-band spectrum between UHF and 6 GHz in the coming years, as more services operate there. But now the proof is beginning to reveal itself, and we should know: We've been mitigating interference with RF and microwave filter solutions for nearly three decades, and we're seeing more requests recently for filters and filter-based products in the "sub-GHz" region than before.

While this probably seems obvious considering these frequencies are already near saturation, but there's more to it than that. It's getting worse because of the FCC's drive to find more spectrum to for 5G that it needs to accommodate its very high data rates and bandwidth-hungry applications. This is supposed to be taken care of by using millimeter wavelengths where several gigahertz of spectrum is available, but here's the rub: The costs for deploying 5G at these frequencies will be immense, infrastructure will take many years to fully deploy, and it may not work out all that well even then, owing to its problematic propagation characteristics. So, the FCC and wireless industry are investigating how to get more from spectrum below 6 GHz.

What's interesting about this, aside from greater interference potential, is that the U.S. appears to be the only country that hasn't already assumed that (a) relying on millimeter-wave frequencies alone won't solve the problem and (b) the "Race to 5G" will be only won by relying instead on frequencies better suited for the task. There are obviously lots of very smart people who know this but they're being drowned by the marketing hype about the millimeter-wave camp.

Wireless carriers are already optimizing spectral efficiency and frequency reuse using higher-order modulation schemes, MIMO, and other techniques. This leaves two other possibilities for squeezing more from the sub 6 GHz spectrum: refarming existing services to other bands (somewhere) and using frequency-sharing technology like what's about to be used in the 600 MHz band, at 3.5 GHz for the Citizens Broadband Radio Service (CBRS), and possibly at C-band (3.7 to 4.2 GHz) that's been used for 40 years by satellite operators to

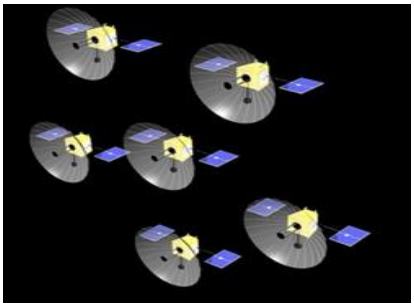



## FCC

The FCC's Enforcement Bureau has proposed fines and issued a formal industry warning concerning devices that allegedly caused interference to the FAA's terminal doppler weather radar station in San Juan, Puerto Rico. The bureau proposed three $25,000 fines against wireless internet service providers Boom Solutions, Integra Wireless, and WinPR. This comes after news that millimeter-wave frequencies to be used for 5G may reduce the ability of NOAA (and thus the Department of Defense as well) to measure moisture levels from space.

## UK Military Developing Its Own Smallsats

The UK is planning to use a cluster of military radar satellites designed in collaboration with Airbus in Project Oberon. A network of small spacecraft will be able to visualize the Earth's surface in all weather conditions and at night with very high resolution. The satellites would also have sensors to locate the use of radio transmissions. The UK currently does not have its own Earth observation system, relying instead on commercial imagery. The new satellites would use carbon-fiber antennas designed by Oxford Space Systems that stow away for launch but spring into shape once in orbit, using a "wrapped rib" structure.

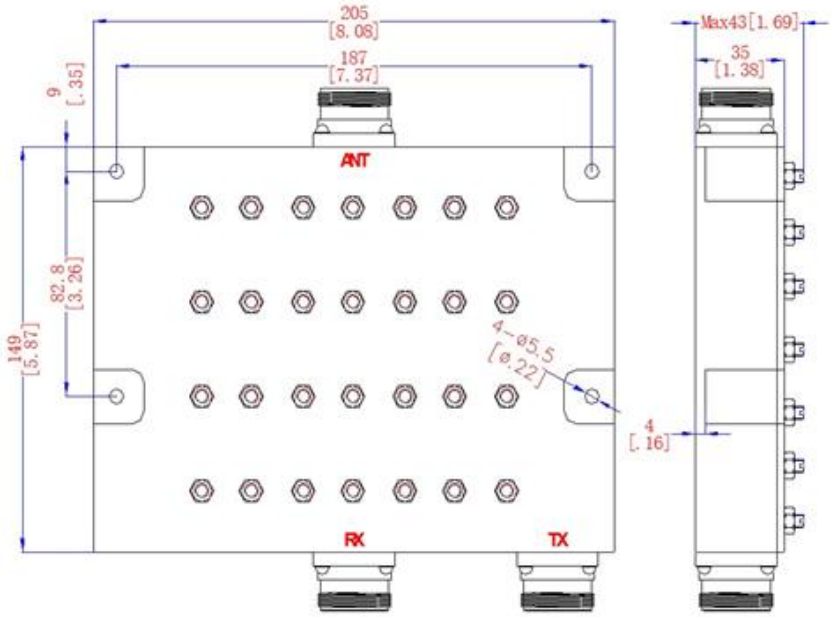


downstream television content to cable head-ends. None of these approaches can entirely ensure that interference won't appear when multiple services use the same frequencies, 5G is inserted between existing services, or after existing services are booted from their current homes. In each of these scenarios, interference is one of the top issues raised during the FCC rulemaking process. This doesn't include a proposal by the Wi-Fi Alliance to expand this service into the 5.925 to 7.125 GHz band, and other possibilities being pursued by the FCC.

All the above are being examined at a rapid pace as the clock is ticking on 5G as the President has decided that the U.S. must lead the world in 5G deployment. Stay tuned for updates.

## Getting Ready for 5G:

**Anatech Electronics introduces New High power S-Band Cavity Duplexer : AE2247-2072DB5478.**
**Passband1: 2200-2295 , Passband2: 2025-2120 MHz , Isolation: 105dB , Power Handling: 400W (CW)**

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