

What's News....

Feds: 5G bad for weather forecasting

While the FCC continues to auction spectrum at 24 GHz for 5G networks, NASA, NOAA, and the Navy are continuing their mission to keep it from causing interference. Their stated reason is that emissions at 24 GHz will interfere with the satellite-based measurements of atmospheric water vapor made at frequencies just below those being auctioned. A Navy memo to the FCC noted that "it is expected that interference will result in a partial-to-complete loss of remotely sensed water-vapor measurements and could affect Navy and Marine Corps forecasts of tropical cyclones as well as rain, ice, and snow." The affected agencies want the FCC to rule that out-of-band interference limits will be tightened to -57 dBm.



Carriers Rolling Out NB-IoT

Sprint is testing narrowband IoT (NB-IoT) technology and will deploy it if there is customer demand, while AT&T has launched NB-IoT throughout its network. T-Mobile also has a nationwide NB-IoT network, and Verizon earlier began to deploy NB-IoT in the guard bands next to its LTE-M network. Dish Networks is also planning to deploy an NB-IoT network and is currently working on deals with vendors.

A Word from Sam Benzacar

Wi-fi Marches Forward, Unnoticed



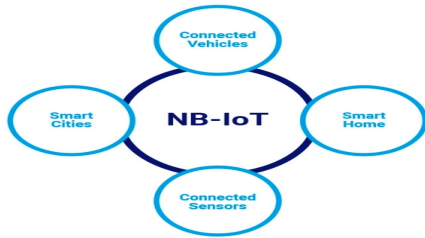
With 5G getting all the attention, Wi-Fi seems to have taken a back seat, accepted by everyone as a commodity we can't live without but not advancing much from a technological perspective. However, Wi-Fi is moving forward nicely in lockstep with 5G and lots of interesting advances are taking place that will propel this technology's capabilities impressively.

The most obvious of these has been the need to extend Wi-Fi range to cover large homes and other areas, which was first accomplished by range extenders that take the existing signal from the router and rebroadcast it. The problem with this approach is that the signal strength from the range extender is directly related to what it receives, so if the input signal is weak, data rates decrease.

The next solution is mesh networking capabilities, which all other short-range communications solutions have as a necessity if they're to serve IoT applications. Unlike range extenders, mesh networks don't require every node to connect directly to the router (a star topology) but rather to each other (in a mesh). In addition to mostly solving the signal strength problem, Wi-Fi mesh networks can be scaled to cover a very large area. I own one of these systems and it works very well.

The next advance is 802.11ax that the Wi-Fi Alliance has rebranded as Wi-Fi 6, which increases downstream data rates by 37% versus 802.11ac and is supported by some routers and will be standard in the next crop of smartphones. The rebranding was long overdue, and it is beginning to apply to its predecessors as well (a bit too late, unfortunately), to simplify what has become an alphabet soup of variations in the standards.

However, speed isn't the biggest benefit of Wi-Fi 6. It's the ability to serve more dense device environments more effectively, in response to the huge number of Wi-Fi-enabled devices in many locations. Another feature of Wi-



Pravda: Russia Ups EW Against Europe

The Russian news outlet Pravda recently reported that the country has deployed EW systems in its Baltic Fleet Kaliningrad that are designed to disrupt communication between warships, aircraft and ground military units in Eastern and Central Europe, as well as in the Baltic region at a maximum distance of 1,864 miles. The “Murmansk-BN” jammer is targeted at high frequency communications systems, including the High Frequency Global Communications System. The HFGCS is a worldwide network of transmitters which provides command and control communications between ground agencies and US military aircraft and ships.



NEXRAD Upgrades at Halfway Point

The eight-year plan for upgrading the 25-year-old U.S. NEXRAD weather radar network has reached the midpoint. The National Weather Service, Air Force, and FAA are funding the \$150 million to refurbish 159 stations, with an expected completion date of 2023. Upgrades include signal processing and computing power, as well as refurbishing transmitters and the pedestals on which the radar antennas rotate.



SpaceX launches first broadband satellites

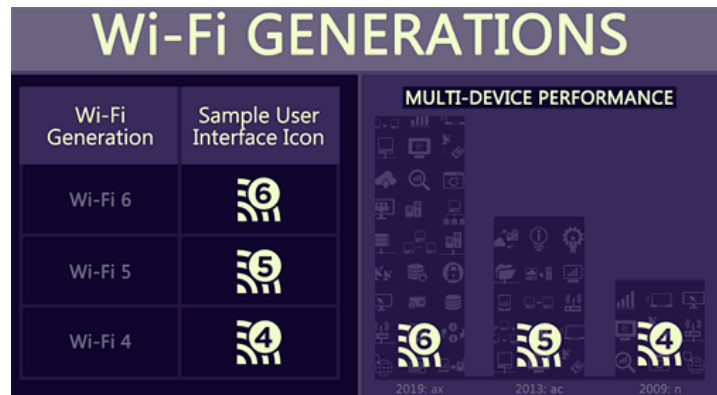
Elon Musk, never one to “go small” has initiated its first efforts to provide broadband from space, with the launch by SpaceX of 60 of its Starlink satellites from Cape Canaveral (note their dense packing in the spacecraft). That’s just the beginning though, as the plan is to have up to 12,000 of them in geostationary orbit, presumably making inexpensive service available anywhere. That

Fi 6 is deterministic scheduling that takes the place of the listen-before-talk approach to interference mitigation and uses the same MAC layer as cellular so handoffs between the two services should be much better. And like 5G, Wi-Fi 6 also has lower latency and uses the OFDMA architecture, which provides other benefits as well.

One of the biggest problems with wireless services operating in unlicensed ISM bands is interference, and even though Bluetooth, Wi-Fi, and other services inherently act to reduce it, the current 2.4 GHz and 5 GHz allocations are overflowing. The good news is that the FCC has added some new channels at 5 GHz and is adding even more at 6 GHz, possibly 120 MHz of bandwidth, which would open entirely new possibilities for Wi-Fi.

Another interesting development is the incorporation of the shared Citizens Band Radio Service (CBRS) frequencies around 3.5 GHz into Wi-Fi solutions, effectively merging unlicensed (Wi-Fi) and licensed (CBRS) services. Products from companies such as Commscope and Cisco are already addressing this. If Licensed Assisted Access (LAA) frequencies, Wi-Fi, and CBRS come together in some form, an entirely new class of service would be created.

Finally, there’s 802.11ad (Wi-Gig) and 802.11ay that operate at 2.4, 5, and 60 GHz to deliver downstream rates of nearly 7 Gb/s. The 60-GHz component adds lots of bandwidth usable over very short distances while the lower frequencies serve traditional applications. Taken together, all these advances are turning Wi-Fi into a formidable, collaborative service whose applications will range far beyond what they are today. Stay tuned.



would be good news for the more than 20 million people in the U.S. and far more elsewhere who still have nothing approaching decent Internet access.



Anatech Electronics will be exhibiting at the 2019 IEEE MTT-S International Microwave Symposium being held in Boston, MA. We would like to talk to you about your current or upcoming projects. Please stop by.

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