ANATECH ELECTRONICS INC

AT THE CENTER FREQUENCY

An e-Newsletter from Anatech Electronics

August 2022

What's News...

Infrastructure Market is Accelerating

By any yardstick, deployment of 5G wireless infrastructure is booming. The CTIA reports that the industry spent $30 billion in networks last year, a 5-year high and the third year of increased capital expenditures. And in the past five years, wireless carriers have spent nearly $140 billion for a total investment of more than $600 billion, not including spectrum acquired at auction. In the last two years, more cell sites have been added than the previous 7 years combined. The research group IDTechEx predicts that by 2031 45 million cells will have been deployed, primarily for millimeter-wave frequencies.

Energy Harvesting Tag Start-up Gets Cash

Wiliot, an IoT startup that has developed low-cost Bluetooth sensors to manage inventory and reduce waste across grocery, medicine, apparel and myriad other industries, has

A Word from Sam Benzacar

The millimeter-wave debacle revisited

By Sam Benzacar

One of the big reveals when the 5G standards were released was that it would expand the frequencies used by wireless carriers well into the millimeter-wave spectrum, a region previously used only by satellite communications, defense systems, point-to-point microwave links, and some scientific applications. As I've noted previously in this column, there are good reasons why few have dared to tread there, not the least of which are extremely challenging propagation characteristics, very short range, and the need to rely on complex technologies to make communications possible. I found it interesting that, except for a few bold journalists, hardly anyone has asked whether, with all these challenges, it will be economically feasible, at least initially, to use these frequencies. But some researchers and financial organizations have begun to ask this question, finally.

For proof of how expensive millimeter-wave deployment will actually be, consider that back in 2019 Google conducted a study for the Defense Innovation Board to determine how many millimeter-wave base stations will be needed. The researchers used 425 MHz of spectrum at 28 GHz and compared it with 250 MHz of spectrum at 3.4 GHz. They deployed millimeter-wave infrastructure on 72,325 macro cell towers and rooftops, and deduced that coverage would be available to just 11.6% of the U.S. population at speeds at 100 Mb/s and 3.9% coverage at 1 Gb/s.

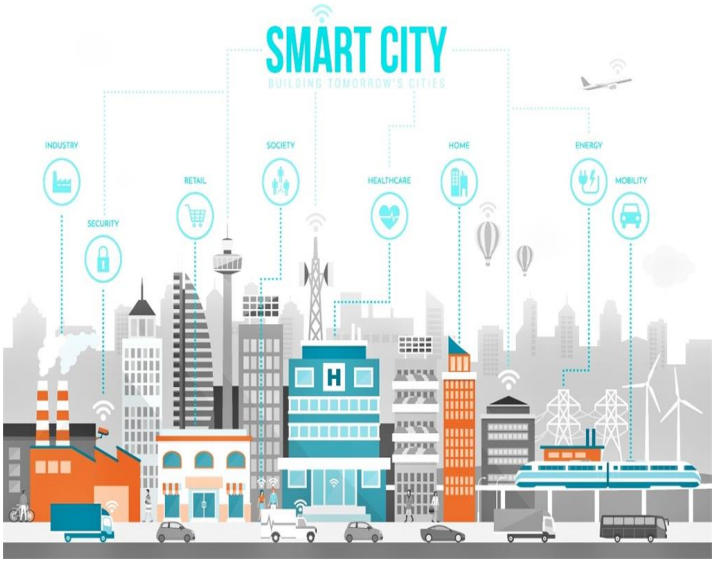
In comparison, at frequencies below 6 GHz, the same tower sites covered 57.4% of the population at 100 Mb/s and 21.2% of the population at 1 Gb/s. Using a database of utility poles in the U.S., they determined that using 28 GHz as the study frequency about 13 million and $400 billion in capital expenditures will be required to deliver 100 Mb's to 72% of the U.S. population and 1 Gb/s to 55% of the population. Even with the deep pockets of wireless carriers, this is an astronomical amount of money.

raised $200 million from SoftBank Vision Fund 2. The company's battery-free sensor is the size of a postage stamp and attaches to food packaging, vaccine vials, clothes, pill bottles, and thousands of other products. The tags harvest power from Wi-Fi, cellular, and Bluetooth signals and the stickers can sense temperature, fill level, motion, location changes, humidity and proximity in real-time. Data is fed into a private Wiliot cloud server for analysis.

Part of Arlington, VA is Getting "Smart"

AT&T and JBG Smith, a developer of upscale, mixed-use properties in the Washington, DC market, plan to create the first 5G smart city at scale in National Landing1 in Arlington, VA, with first network infrastructure deployments planned for the first half of next year. JBG Smith's National Landing portfolio spans 6.8 million square feet of existing office space, 2,856 residential units, and 7.2 million square feet of commercial, multi-family and retail development. The company is also the development partner for Amazon's second headquarters and master developer for Virginia Tech's forthcoming $1 billion Innovation Campus.

What's more disturbing is that the U.S. is an outlier as it concerns the use of millimeter-wave frequencies, being almost the only country that is so heavily invested in this region of the spectrum. This being said, the FCC has been feverishly finding ways to squeeze more out of the frequencies below about 7 GHz as it is becoming more clear than ever that relying on very high frequencies as a fundamental element of 5G might be a great idea in the long run, but for the near future it's a Sisyphean challenge.



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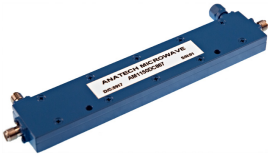
Vertical (X-axis) location technology

Vertical (Z-axis) location technology from NextNav is coming to the nation's FirstNet nationwide public safety broadband networks soon, according to the company. The solution is one of very few that have solved this long-standing gap in positioning required so first responders can accelerate their responses. Currently, cell site triangulation for 911 callers using mobile phones from multi-story buildings is extremely difficult because the Z-axis accuracy is wholly inadequate. Wireless carriers have agreed with the FCC to implement Z-axis solutions from companies like NextNav and Polaris Wireless by April of next year.



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