



# AT THE CENTER FREQUENCY

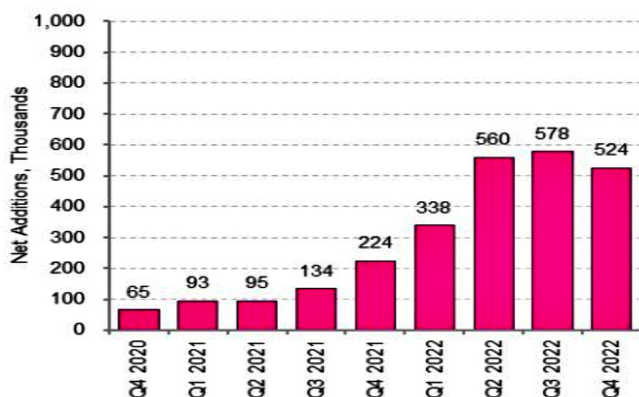
An e-Newsletter from Anatech Electronics

May 2023

## What's News...

### Fixed Wireless Access Broadband On a Roll

T-Mobile and Verizon now have more than 4 million customers using the companies' fixed wireless access (FWA) platforms for residential broadband, according to a report from research firm MoffettNathanson using data provided by Opensignal. In addition, in Leichtman Research Group's latest quarterly assessment of the U.S. home broadband market the two wireless companies added 916,000 FWA customers in the first quarter of this year. Growth in FWA subscribers is also growing internationally and more than 75% of service providers in more than 100 countries are offering it as well, according to Ericsson. The company also predicts that 5G-based FWA connections will reach 235 million by 2028.



### Bending the Waves

NTT DOCOMO has tested what it believes to be world's first trial of redirecting 28 GHz signals from inside a building to the foot of the building outdoors by "bending" the waves. It uses a film-shaped transmissive metasurface attached to a window designed to send

## A Word from Sam Benzacar

### Z-axis Positioning Finally Arrives

By Sam Benzacar



The 911 system has been invaluable since it was first deployed in 1968 and we consider it infallible. However, a lingering problem has been the ability to identify the location of the call when it's made from a mobile device. This isn't the case with a wired landline because the phone is associated with an exact address. However, the number of households with landlines has declined to about 30% last year and more than 70% only have smartphones.

As result, more than 80% of 911 calls are made from these devices, which presents a problem because cell site triangulation yields only the location of the nearest cell site not the exact location of the caller. And while triangulation is increasingly complemented with GPS, satellite signals are too weak to penetrate buildings or other structures.

The most vexing challenge has been determining the vertical dimension or floor level because location information provided by smartphones is limited to the x and y coordinates -- latitude and longitude-- not the vertical (z) dimension. So, if you place a 911 call from inside a multi-story apartment building, for example, you could be on any floor and in any apartment. Researchers have been working to solve this problem for years and the FCC ruled that wireless carriers must provide the "floor-level" indoor location of a 911 caller. This was supposed to be implemented by April 2021 in the top 25 major U.S markets and in the Top 50 markets by April of this year with a vertical accuracy of +/-3 m for 80% of calls.

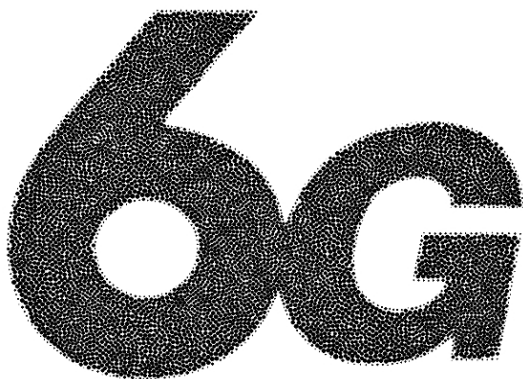
The question is why it has taken so long to solve this problem when a company called NextNav in Tysons, VA, has had a Z-axis solution for years. Their technology uses the barometric pressure sensors that are present in every phone. Changes in atmospheric pressure can be

millimeter-wave signals passing through a glass window in a specific direction. The film-shaped material was attached to the window glass on the interior side, making it easier to install and its transparency did not spoil the landscape and existing design. The transmissive metasurface is also designed not to affect other frequency bands.



### 6G Begins to Take Shape

The European Telecommunications Standards Institute (ETSI) now has an Industry Specification Group (ISG) to undertake preliminary work on the use of terahertz frequencies in 6G communications. According to ETSI, the ISG THz has 31 participating companies and is determining what the priorities should be for using terahertz frequencies for 6G, which is supposed to be coming around the end of the decade. The focus is on high-data-rate mobile applications such as virtual or augmented reality and applications requiring both communication and sensing capabilities, such as holographic telepresence and interactive robotics.



### Microwave Energy Aids Substance Detection

Antares Vision Group and Wavision, a start-up from the Polytechnic University of Turin, Italy, is using microwave technology to detect foreign bodies in packaged products. The system uses sensors that Wavision developed for inspection machines that could replace X-rays and metal detectors. Microwave emissions can determine whether foreign bodies are present in creams, semi-liquids, and liquids, and the machine can see plastic, glass, wood, bones, rubber, insects, and all metals. The

used to estimate the relative height or floor level of a caller within a building with a high level of precision. NextNav's metropolitan beacon system (now called Pinnacle) produces results equal to better than those required by the FCC in both its own tests and those conducted various agencies.

With few other choices, wireless carriers have finally selected the company as the z-axis solution and it's available on an increasing number of smartphones. AT&T has also adopted it for use in its FirstNet nationwide, broadband wireless network for law enforcement, firefighters, and public safety officials.

## We can always find a solution!

[Standard Band Pass Filters library.](#)

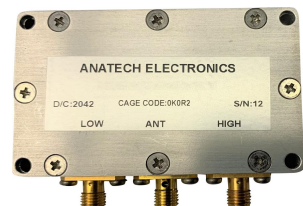
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process is essentially anomaly detection based on dielectric contrast and monitoring the variation of the electric field imposed by the sensing system caused by the presence of a foreign body.

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