ANATECH ELECTRONICS INC

AT THE CENTER FREQUENCY

An e-Newsletter from Anatech Electronics

October 2021

Our appologies for sending the newsletter a second time

Some of the article were not transmitted properly

What's News...

DARPA wants to beam electricity in space with lasers

DARPA has issued an SBIR for the Breakthrough Technologies for Energy Web Dominance project with the goal of developing safe optical power-beaming web networks of free-space lasers to transmit electrical power using aircraft as receivers and relays of optical energy. The network would consist of ground -based lasers sending power to airborne nodes that would use the power for themselves after conversion and then relay the rest to other nodes. DARPA program wants private industry participants to optimize efficiency for systems with an energy flux of 1 kW per square meter and scalable to 100 kW per square meter. The optical waveguides could be as simple as a mirror but will probably consist of several components to redirect power to their intended recipients.

Tracking guns with RFID tags backfires

A Word from Sam Benzacar

A solution has arrived for deploying millimeter-wave 5G

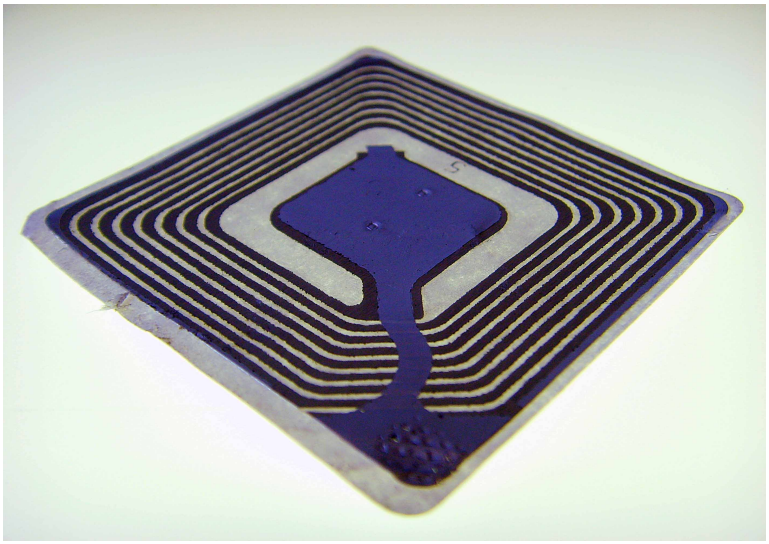
By Sam Benzacar

Last month in this column, I suggested that since deploying 5G infrastructure at millimeter wavelengths is already difficult, doing the same at even higher frequencies would be problematic. I stand by that suggestion, but one thing has changed: It appears there's now a viable solution for "cost-effectively" deploying millimeter-wave infrastructure by using repeaters. Before this, most analysts pegged a figure of nationwide millimeter-wave 5G deployment at about $65 billion.

While the repeater concept is not new, its deployment is just beginning for 5G, and at the moment there are only two companies making the collection of components required to implement it -- Movandi and Pivotal Commware. But don't be surprised if others enter this market because it seems to solve the biggest problem posed by millimeter wavelengths-- the need for vast numbers of small cells almost everywhere to deliver the gigabit-level data rates envision for 5G.

Like everything associated with 5G, the solution is complex, as it requires a combination of active phased-array antennas, AI, and communication to and from cloud-based data centers. That said, the benefit is that it can potentially reduce the amount of infrastructure and thus cost by about 50% because fewer small-cell base stations are required. So not surprisingly, Verizon has adopted this approach in its Ultra Wideband 28 GHz network and others seem to be following their lead. The concept can be used indoors as well as outdoors because the repeaters and their associated high-gain

DoD needs to keep track of its enormous array of guns, and to do this it intends to rely on RFID tags, or at least it did until recently. Quick identification with RFID would simplify and reduce the time required to perform weapons counts and distribution. However, there is considerable concern that using this technology presents a significant security risk, which is why the Marines have already rejected it while the Navy has also halted its deployment efforts. Field tests have shown that the tag can be quickly copied, which would allow thieves in gun rooms and armories to remove them. The tags might also make it possible for enemies to identify US troops at some distance. The initiative for installing RFID tags came after an incident in 2018 in which a machine gun disappeared from the 91st Security Forces group that guards an installation that houses nuclear-tipped missiles.



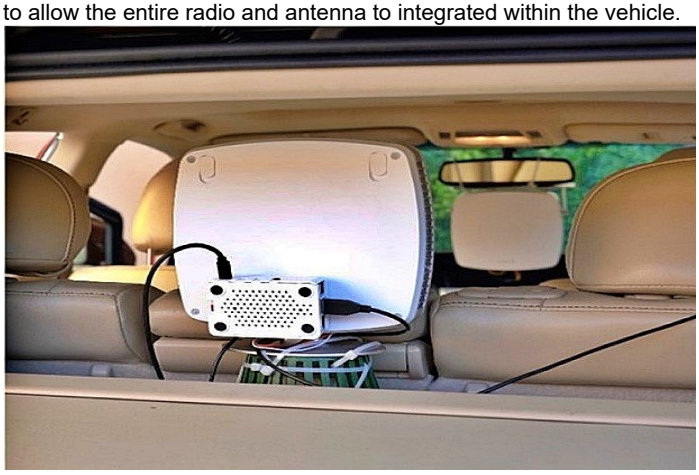
ITU creates first 5G "non-cellular" standard

The ITU just announced the world's first non-cellular 5G technology standard designed to allow enterprises to autonomously manage networks without operators. It's called ETSI DECT-2020 NR and it will be included as part of the 5G standards in IMT-2020. The standard eliminates some network infrastructure and a single point of failure. It would allow companies to operate without intermediaries or subscription fees and store and consume data as they see fit, which could be on the premises or in a cloud data center, or almost anything in between.

The standard supports the use of shared spectrum over internationally recognized frequencies including 1.9 GHz. Non-cellular 5G is different than cellular 5G as it has a decentralized network, so every device becomes a node and a route, which essentially makes each one a base station that can determine the best propagation path. The standard claims to be the first 5G technology that supports shared spectrum and multiple networks within frequencies used for mobile communications.

antennas increase EIRP and can steer the beam in real-time based on traffic patterns and other data. Beam steering and higher output power should also help reduce the cost of fixed wireless access deployments.

What I found most interesting is that one of these companies, Movandi, has demonstrated that it is possible to achieve continuous millimeter-wave coverage in a moving vehicle using Verizon's network, even when conducting a Zoom call. They mounted two of their repeaters inside the car, one behind the front window and another at the rear window (see figure) and connected to the network with a Samsung 5G-enabled smartphone. The test managed to achieve data rates up to 3 Gb/s in the downlink path while traveling around De Anza Boulevard in Cupertino, Calif., at 30 mph, never falling below 1 Gb/s. According to the company, it didn't seem to matter much how the phone was held or where. It's the first time I've ever seen this demonstrated but it shows that millimeter-wave mobility is achievable, and the technology can be scaled downward to allow the entire radio and antenna to integrated within the vehicle.



So, while operating it 200 GHz still seems like a fantasy to me, it appears that making millimeter-waves "work" for 5G has now become economically feasible.

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Power Dividers Isolators
Directional Couplers Circulators

New Compass Call takes to the air

The new Air Force EC-37B Compass Call EW aircraft has completed its inaugural flight. The aircraft will update the existing fleet of 10 EC-130H Compass Call aircraft and requires transferring Lockheed Martin's Lockheed Martin-built mission systems to the new airframe. The developer, L3Harris Technologies, chose the Gulfstream G550 Conformal Airborne Early Warning Aircraft airframe for the new aircraft. It will have a variety of new sensors as well as communication capability to provide enhanced stand-off jamming.

Compass Call has been a key EW platform for many years with the mission of massively disrupting enemy command and control communications, radar, and navigation systems. The aircraft will have a modular design to enable rapid new technology insertion and is considerably faster than the EC-130H, weighs less, is smaller, and should cost less to operate.

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