ANATECH ELECTRONICS INC

AT THE CENTER FREQUENCY

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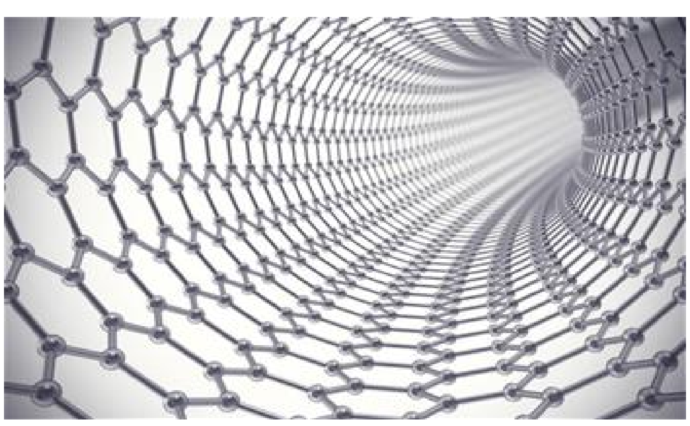
What's News....

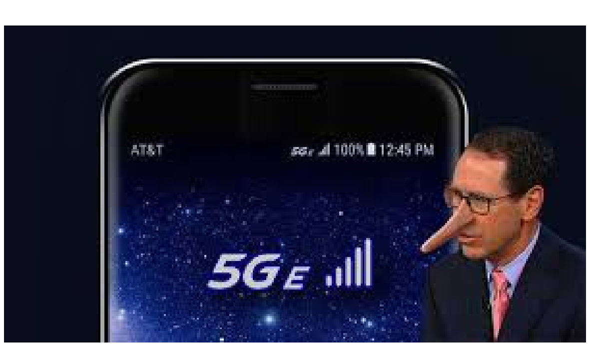
Carbon nanotube antennas?

Researchers have tested antennas made of "shear-aligned" nanotube films that matched the performance of copper while being thinner as well. Lead author Amram Bengio of the results presented in the Journal of Applied Physics performed the research while earning his doctorate at Rice University. The antennas were tested at the National Institute of Standards and Technology facility in Boulder, Colorado. Radiation efficiency measurements of microstrip patch antennas had radiation efficiency of 94% at 10 and 14 GHz, equivalent to copper antennas. Continued work will focus on aligned carbon nanotube antennas for aerospace industry as well as for 5G.



5G hype continues apace

AT&T, which received universal guffaws last year when it branded its LTE-Advanced service "5G Evolution" and launched a 19-city 5G network still has no smartphones to offer customers. Nevertheless, CEO John Donovan told attendees on a Credit Suisse conference call that the company is the "world leader" in 5G. AT&T says its initial 5G service costs $70 per month for just 15 Gbytes of data and plans to have 29 cities operational by the end of the year.



G/ATOR GaN radar passes crucial test

Northrop Grumman's AN/TPS-80 Ground/Air Task-Oriented Radar (G/ATOR) Blocks 1 and 2 has passed an initial operational test and evaluation test. The system is a multi-mission AESA radar that provides 360-deg. coverage, employs digital beam forming, and uses GaN MMICs at each antenna element. It is designed to detect fixed-wing aircraft, helicopters, cruise missiles, UAS, rockets, artillery, and mortar rounds. Previous versions used GaAs MMICs but the latest batch have been upgraded to GaN because of its lower input power, higher

A Word from Sam Benzacar

IMS2019

I've now exhibited at the IMS2019 International Microwave Symposium, and many many others in previous years (can't reveal my age), which over time covered everything from the emergence of GaAs and the MMIC, to all the generations of cellular, the high and lows of the defense budget, and the rise of GaN, among others. But this year's show in Boston had one very significant difference: Yes, it was 5G, to no one's surprise, but until now all vendors could promote were solutions for 5G when it arrived, and now that it's almost here should have a huge impact on the microwave industry.

That's not to say 5G was the only interesting topic at this year's IMS, as advances in almost every technology were represented, from small-signal and RF power devices, to antennas, materials, design tools, and many other technologies. Of course, not all of them will reap major benefits from the wireless applications that 5G will enable for the first time. And it's arguable that semiconductor vendors will see the most benefit of all, as they serve so many of those applications. However, 5G is challenging the industry to develop solutions it's never had to tackle before.

One of those challenges is how to make use of millimeter-wave spectrum for terrestrial wireless applications. As most readers know, propagation at these frequencies makes communications almost impossible, except over very short and line-of-sight distances. But 5G not only has a mandate to use these frequencies, it needs them if low-latency, gigabit-per-second downstream data rates are to be achieved. That will require truly enormous numbers of small cells both indoors and outdoors everywhere coverage must be provided.

It will also require the use of advanced antenna technologies including massive multiuser MIMO, digital beamforming, as well as the first use of phased-array architectures such as AESA that are currently the domain of defense radars. Papers at IMS this year as well as some exhibits focused on advances in millimeter-wave technology, from the device level to complete chipsets.

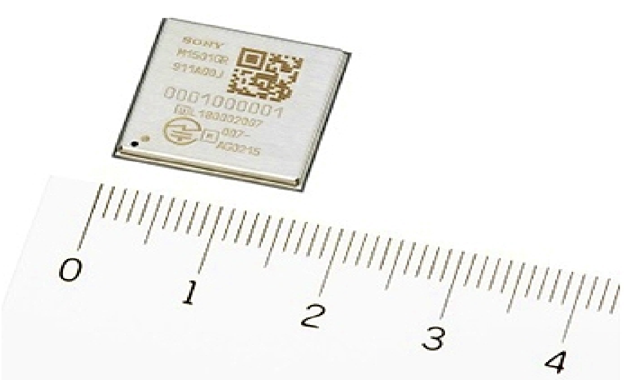
Integrating millimeter-wave capability and phased-array antennas in small cell base stations is difficult enough, but in a smartphone is a vastly greater challenge. It's not just because there is little internal real estate available,but that signals at millimeter-wave frequencies are attenuated by almost anything placed in their path – like your hand. And unlike fixed terminals whose operating environment is reasonably static,smartphones are operated in an unlimited number of positions.

To summarize, IMS in Boston was a terrific experience, and I only wish I had the time to attend more sessions, as they provided interesting solutions to the many hurdles the industry will need to surmount to bring the full capabilities of 5G to fruition.

efficiency, and higher RF output power. G/ATOR is currently the only GaN-based ground-based radar in the DoD inventory.

Sony’s new device for low-power networks

Sony’s Eltres low-power wide area network will use small ICs and and antennas to relay a sensor data to a base station that can more than 60 mi away. Sony uses an example in which a drone monitoring an offshore platform could use the network to transmit location and sensor data. It’s first-generation device, the CXM1501GR, along with a 20-mW RF power amplifier can transmit a 128-bit signal at up to 6.35 Kb/s moving at more than 60 mph. It can automatically switch between 23 channels between 923.6 MHz and 928 MHz, and to circumvent interference it repeats each signal four times. The chip measures 16 x 16 and will operate from one coin-cell battery for several months.



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