AT-THE CENTER FREQUENCY

ANATECH ELECTRONICS INC

An e-Newsletter from Anatech Electronics

February 2025

What's News...

FCC Fines Pirate Radio Stations

The FCC has proposed fines against four alleged pirate radio operators in Connecticut and Ohio, with penalties ranging from $40,000 to $60,000. While not the largest fines the agency has issued, these enforcement actions stem from incidents in 2024, confirmed by FCC field agents under the PIRATE Act. This legislation established a base fine of $20,000 per observed instance of illegal broadcasting, doubling the pre-PIRATE Act penalty.

Source: Pinterest

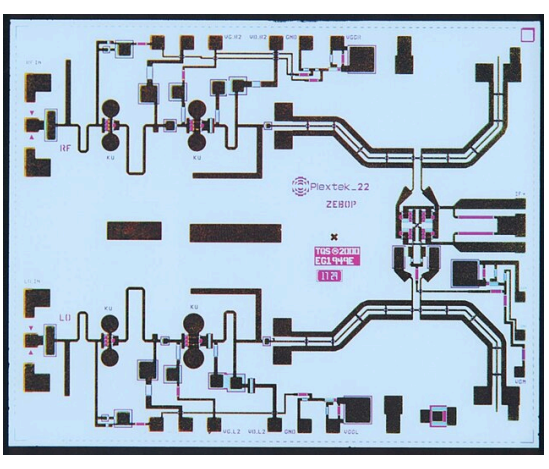
China Gets New Microwave Weapon

China’s NORINCO has advanced its counter-drone capabilities with the Hurricane-3000 High-Power Microwave (HPM) Weapon System. Recent reports indicate successful field tests of the system, designed to combat the rising threat of drone swarms. Despite its promising performance, the Hurricane-3000 has yet to be deployed by the People's Liberation Army (PLA). The system can detect targets up to 6 kilometers away, track them optically within a 4-kilometer range, and precisely neutralize even micro-drones beyond 3 kilometers.

Source: Jesus Roman | X Account

Report: MMIC Market to Reach $29 Billion by 2030

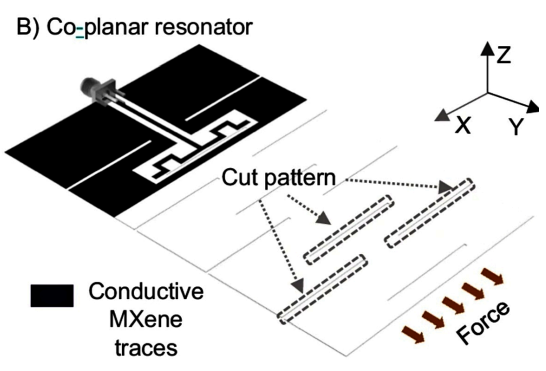
According to a new report by MarketsandMarkets, the global monolithic microwave IC market is projected to grow from USD 14.53 billion in 2025 to USD 23.91 billion by 2030, at a CAGR of 10.5% during the forecast period. The rising demand for high data throughput in cellular and wireless networks, driven by the growing popularity of multimedia applications and broadband Internet, is fueling this expansion. Frequency bands such as K-band (18–27 GHz) and Ka-band (26.5–40 GHz) offer substantial spectrum availability, making them ideal for high-capacity wireless communication. Their adoption is increasing to meet the expanding bandwidth requirements of modern networks.



Source: Wikipedia

Drexel Creates Kirigami Antennas

Researchers at Drexel University and the University of British Columbia believe kirigami, the ancient Japanese art of cutting and folding paper to create intricate three-dimensional designs, could provide a model for manufacturing the next generation of antennas. The Drexel-UBC team showed how kirigami — a variation of origami — can transform a single sheet of acetate coated with conductive MXene ink into a flexible 3D microwave antenna whose transmission frequency can be adjusted by pulling or squeezing to slightly shift its shape. The figure shows the prototype of the MXene-based Kirigami resonant surface in the unstrained states. The next phase of this research will explore new materials and geometries for the antennas.



Source: Drexel University

A Word from Sam Benzacar

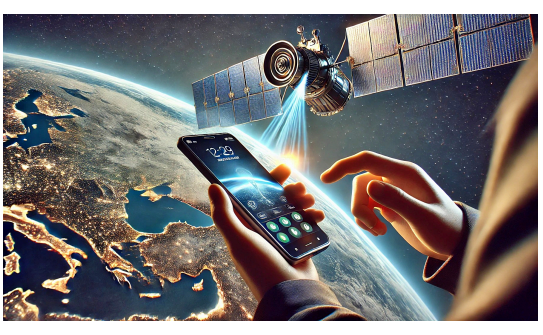
The Rise of Non-Terrestrial Networks

If you thought 5G was a big deal, non-terrestrial networks (NTNs) would be an even bigger one and could reduce dependence on terrestrial base stations while also replacing millions of small cells required for 5G’s high-frequency operations. How big a deal? Once all the pieces are in place to make NTNs commercially viable for voice, text, and data, analysts predict that the global market could reach $60 billion a year. Early adoption will focus on emergency messaging and rural broadband expansion through 2026. Between 2027 and 2030, hybrid integration will introduce expanded voice and data services, automatic terrestrial-to-satellite switching, and increased affordability. By 2030–2035, satellite-to-cell services may become mainstream, with some nations prioritizing satellite connectivity over traditional infrastructure. Beyond 2035, improved latency and cost reductions could lead to full NTN integration, reducing reliance on terrestrial cell towers.

Despite their advantages, NTNs face challenges, including bandwidth constraints, higher latency, significant infrastructure costs, and regulatory hurdles in spectrum allocation. However, as technology advances and costs decline, NTNs may eventually carry a substantial share of global mobile traffic, and the first efforts are already underway. For example, T-Mobile and SpaceX are testing Starlink Direct-to-Cell (DTC), initially supporting text messaging, but later expanding to voice and data. AT&T, partnering with AST SpaceMobile, is developing a satellite-based 5G network, while Verizon and Amazon’s Project Kuiper aim to expand rural broadband. Vodafone has demonstrated satellite-based mobile video calls and plans a European commercial launch by 2025.

Satellite networks differ significantly from terrestrial 5G millimeter-wave technology, which provides high bandwidth in dense urban areas but requires extensive small-cell deployment. While NTNs have broad coverage, they offer lower capacity and higher latency, making them unlikely to replace millimeter-wave use in cities where high-density capacity is crucial. Instead, NTNs will complement terrestrial networks, reducing reliance on sub-6 GHz base stations in rural areas while keeping mmWave infrastructure necessary for urban cores.

The 3GPP’s upcoming Release 19, expected in 2025, may introduce enhancements like regenerative NTN architecture, improved indoor access, and expanded IoT NTN applications. Regardless of the final implementation, NTNs are set to play a crucial role in the future of global communications, ushering in a new era of connectivity.



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