



AI summary

The Rise Of Mmwave Frequency Bands For Satellite And Terrestrial Network Connectivity

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Thursday, 21 May 2026

Participants

Christophe Bauer

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Kevin French

Publisher, Talk Satellite Co

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Summary

The session explored the adoption of millimetre wave (mmWave) frequency bands, focusing on their applications in satellite and terrestrial networks. Christophe Bauer highlighted Elve Inc.'s innovations in manufacturing travelling wave tube amplifiers (TWTAs), emphasising their ability to unlock high-frequency bands such as Q-, V-, E-, and W-bands. These bands, ranging from 20 GHz to 300 GHz, enable unprecedented data throughput, crucial for evolving technologies like AI, machine-to-machine communication, and LEO constellations. Traditional TWTAs are labour-intensive, but Elve's 3D-printed folded waveguide approach reduces costs, increases scalability, and improves efficiency. Competitive advantages such as reduced power consumption and faster production cycles were noted as transformative for both commercial and military applications.



The discussion also addressed the convergence of satellite and terrestrial industries, with mmWave bands playing a key role in bridging these domains. Christophe explained that while 99% of global data flows through terrestrial systems, satellite connectivity is growing rapidly, driven by LEO constellations and multi-orbit systems. Elve's TWTAs outperform solid-state power amplifiers (SSPAs) in power and efficiency, and they are better suited for high-frequency applications. Comparisons to laser communication highlighted the latter's limitations in cloud penetration and connection speed. However, each technology was acknowledged to have unique use cases depending on operational needs and environmental factors.

Regulatory and market challenges were also considered, particularly in regions like Asia-Pacific, where frameworks and adoption vary by country. Regulatory latency and spectrum allocation were noted as critical barriers, but Christophe stressed the importance of collaboration with operators to secure filings and utilise spectrum effectively. He also highlighted Elve's partnerships with companies like Nokia and Ericsson to demonstrate the viability of mmWave for urban and rural connectivity. The session concluded with a discussion on scaling production, with Elve planning to expand its manufacturing capacity significantly to meet growing demand for mmWave technologies globally.

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Takeaways

Millimetre-Wave Spectrum Unlocks High Data Transmission Potential

The session highlighted the transformative potential of millimetre-wave spectrum (20 GHz to 300 GHz) for satellite and terrestrial connectivity, enabling data transmission speeds up to 100 Gbps. These frequency bands, such as Q-band, V-band, and W-band, offer significant advantages in terms of bandwidth availability, despite being underutilised historically.

ELV's Revolutionary Manufacturing Approach For TWTAs

ELV has re-engineered the traditional manufacturing process of Travelling Wave Tube Amplifiers (TWTAs) by employing 3D-printed folded waveguides, significantly reducing production time and costs. This innovation allows ELV to manufacture frequency-agnostic amplifiers at scale, achieving higher efficiency and affordability compared to competing technologies.

Convergence Of Satellite And Terrestrial Networks

The session underscored the ongoing convergence of terrestrial and satellite communication networks, driven by the proliferation of Low Earth Orbit constellations and growing data demands from AI and IoT. This integration is reshaping industries by addressing spectrum scarcity and enhancing global connectivity.

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