

Nokia ReefShark: a major leap in base station economics

Executive Summary

Making the most of 5G with advanced chipsets

The coming era of 5G networks opens a whole new world for Communications Service Providers (CSPs). They have the chance to win new business and new revenues by offering fast, advanced services that will transform how we live and work and how the world connects.

To achieve this potential, 5G networks must support massive increases in scale, with billions of connected devices and machines and millions of network nodes. 5G, especially at higher frequency bands, requires more antennas and antenna sites, making site acquisition even more challenging, especially in dense urban and megacity environments.

However, this huge increase in scale doesn't have to be challenging. But it does mean that existing network architectures and the components they use must evolve, adopting technologies and techniques to enable CSPs to deploy 5G networks quickly and with minimum Total Cost of Ownership (TCO). Networks must adopt an architecture-driven approach.

Highest quality chipset for each network element

Using its heritage in silicon innovation and handset design, along with developments in Artificial Intelligence (AI), Nokia has developed the ReefShark chipsets for its 5G network solutions.

ReefShark is based on 3GPP 5G New Radio specifications, which help offset deployment costs and TCO, while fulfilling architecture-driven network requirements.

Large Scale Integration is taken to new heights, incorporating cutting-edge systems design and nanometer chip technology. This means ReefShark chipsets pack more capabilities and functionality into smaller hardware, compared to products that use discrete components. Energy consumption is also reduced substantially to cut operational costs.

Based on years of AI innovation from Nokia Bell Labs, these chipsets embed the highest quality, performance and efficiency in each network element - massive Multiple Input Multiple Output (mMIMO) antennas, radio and baseband.

The ReefShark chipset decreases mMIMO antenna size by half, with an 50-60 percent reduction in energy use, giving many more deployment options to CSPs.

Similarly, the ReefShark chipset boosts baseband compute capacity through plug-in units fitted into the commercially available Nokia AirScale baseband module. AirScale is software upgradeable to full 5G functionality, and these plug-in units triple throughput from Nokia's already market-leading 28 Gbps today, to up to 84 Gbps per module.

Additionally, AirScale baseband module chaining supports base station throughputs of up to 6 terabits per second, which will allow CSPs to meet the growing densification demands and support the massive enhanced mobile broadband needs of people and devices in megacities.

The ReefShark chipset family comprises:

ReefShark Digital Front End for LTE and 5G radio systems. Supports mMIMO

ReefShark RFIC and transceiver: radio head with mMIMO. Base station Front End processing and beamforming

ReefShark integrated transceiver: mMIMO, LTE and 5G radio system

ReefShark Baseband Processor: The ReefShark Baseband Processor is a Baseband System on a Chip (SoC), providing an All-in-One Base Station (AIO-BTS).

AI-enabled networks

The development of ReefShark chipset technology is founded on embedded AI-driven architecture, which provides continuous, real-time and complex cognitive processing. Continuous 24/7 learning from live data and applying complex decision models in real time creates unprecedented performance in networks.

AI is implemented in the ReefShark design for radio, boosting beamforming capabilities and embedded in the baseband to use augmented deep learning to trigger smart, rapid actions by the autonomous, cognitive network to deliver the best network optimization and overall system performance.

With ReefShark-enabled products, CSPs can take advantage of leading-edge SoCs, designed to open the world of new business opportunities that 5G will bring.

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