FUJITSU USES AMD ZYNQ™ RFSOC DFE DEVICES TO DELIVER VERSATILE AND POWER-EFFICIENT 5G/4G RADIOS

CUSTOMER

FUJITSU

INDUSTRY

Network/Infrastructure for Wireless Telecommunications

CHALLENGES

Fujitsu's ORAN radio products compete with leading network infrastructure suppliers, and newly emerging ORAN startups. This fiercely competitive environment demands products that can compete on cost, capacity, and energy efficiency.

SOLUTION

Fujitsu needed scalability in different platforms while preserving platform efficiency. The AMD Zynq™ Ultrascale+™ RFSoC DFE solution allowed the company to take its proprietary algorithms and map them onto the flexible hardware architecture of the device. This enabled Fujitsu to deliver a very energy efficient implementation of the algorithm, leading to a great combination of performance, capacity, and low power consumption.

RESULTS

The combination of flexible programmable logic and selective hardening enabled Fujitsu to develop custom power efficient algorithms, which is critically important due to the unique thermal management challenges of radio units. Being able to deliver the processing capability required for high capacity radios at low power consumption is one of the key advantages of AMD Zynq Ultrascale+ RFSoC DFE devices.

AMD TECHNOLOGY AT A GLANCE

AMD Zynq™ UltraScale+™ RFSoC DFE

Fujitsu using AMD Zynq™ RFSoC Digital Front End (DFE) devices to deliver cost-, capacity-, and energy-efficient radios that meet diverse market requirements.

Fujitsu has more than 20 years of radio unit (RU) expertise in wireless communications. It has shipped more than 600,000 RUs since 2004. Today the company delivers only ORAN (Open Radio Access Network)-compliant radio products, and it uses AMD technology in its 5G- and 4G-compatible portfolio for classic radio use. They include products for single Frequency Division Duplex (FDD) and Time Division Duplex (TDD) bands, dual band FDD and TDD products, and triple band FDD products. FDD devices use separate radio frequencies for transmitting and receiving signals. TDD devices use the same frequency channel for both sending and receiving data by dividing the time into separate slots for uplink and downlink transmission. The company uses AMD products in various configurations across the full portfolio of bands.

CHALLENGE

Fujitsu's ORAN radio products compete with the industry's leading and well-known network infrastructure suppliers, as well as newly emerging ORAN startups. This fiercely competitive environment demands products that can compete on cost, capacity, and energy efficiency, while offering both scalability and flexibility. A "one-size-fits-all" approach does not work in this market.

SOLUTION

Fujitsu uses different combinations of AMD products depending on configuration and market requirements. For simpler radio configurations, such as single bands and dual bands, supporting fewer carriers, a single AMD Zynq™ Ultrascale+™ RFSoC DFE device is used. As the radio complexity increases to include more capacity (carriers) and bands, the company scales the solution by adding additional devices from the broad AMD embedded portfolio.

"We were looking for a solution where we could compete with custom silicon solutions," said Patrik Eriksson, vice president and head of radio unit business development at Fujitsu. "We needed scalability in different platforms while preserving platform efficiency. The AMD Zynq Ultrascale+ RFSoC DFE solution allows us to take our proprietary algorithms and map them onto the flexible hardware architecture of the device. This enables us to deliver a very energy efficient implementation while achieving our high performance and capacity requirements."

"It's the combination of flexibility and selective hardening — which supports unique customization at lower power — that are among the main reasons for choosing AMD," Eriksson continued. "Power efficiency is important from a thermal management perspective.

Being able to support the processing requirements of high capacity radios at approximately half the power consumption of traditional FPGAs, is where AMD RFSoC DFE devices bring significant value."

Eriksson added that another advantage for AMD is that many of its adaptive RFSoC devices are pin compatible, which means that Fujitsu does not have to redesign boards and can reuse a lot its IP between different product types.

"This flexibility allows Fujitsu to better compete with the suppliers that can afford the luxury of developing custom silicon solutions," he said.

RESULTS

AMD embedded RFSoC devices provide an optimal solution for Fujitsu's ORAN radio business.

"Power consumption is critical, both from an end-customer perspective and to help operators reduce their electricity bill," Eriksson said." From a thermal management perspective, it is very important to be able to do a lot of heavy processing in the radio, but still consume very low power and dissipate very little power to manage the thermal budget of the product without having to oversize it."

Eriksson added that the Fujitsu team is getting particularly good support from AMD and its global expertise. "We're really happy with AMD support and the company's attitude and willingness to help us with our development," he said.

High-Power Multiband RU	Compact Mid-Power RU
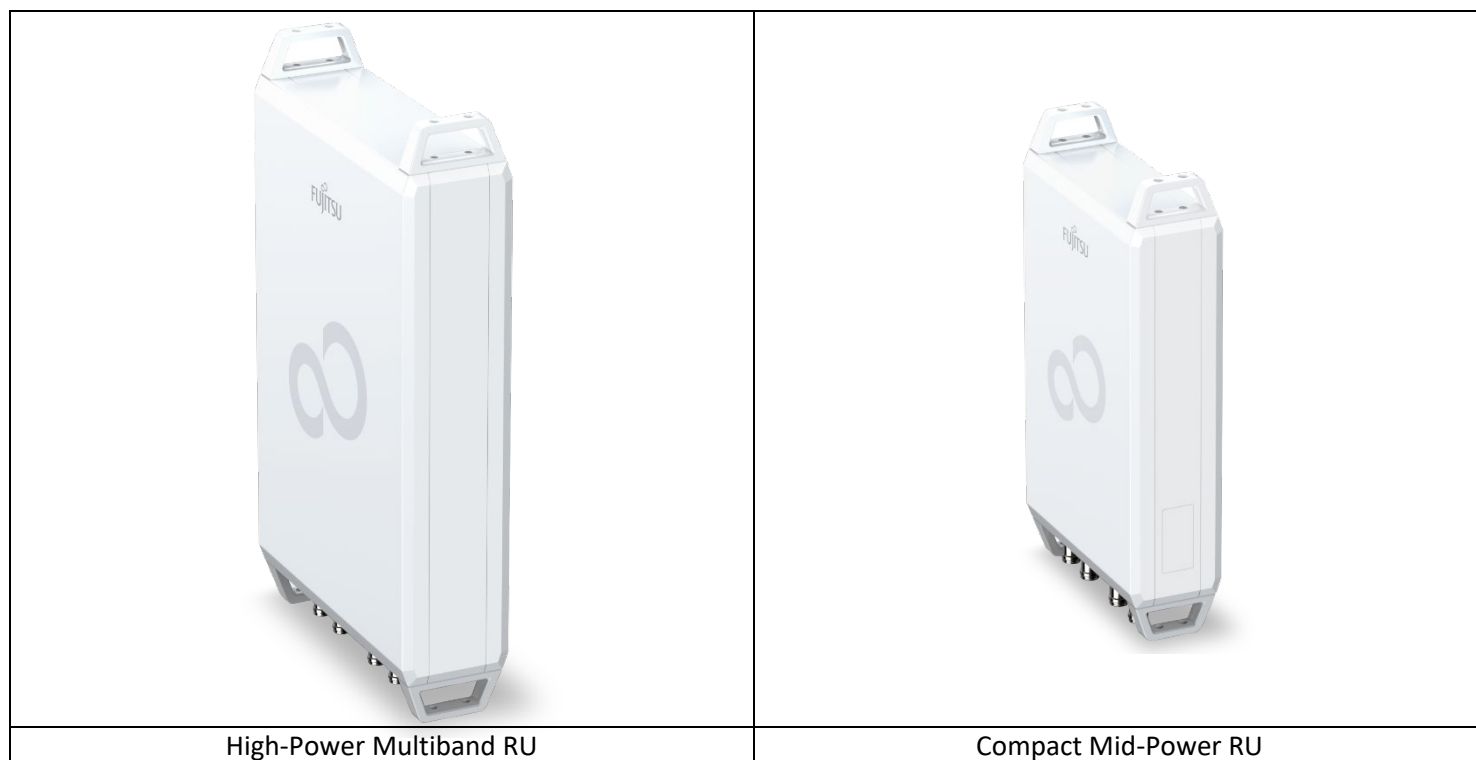
ABOUT FUJITSU

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ABOUT AMD Zynq UltraScale+ RFSoC

The Zynq UltraScale+ RFSoC integrates direct RF-sampling data converters onto an adaptive SoC eliminating the need for external data converters. Its architecture integrates FPGA fabric for flexibility to meet a wide range of requirements with the same foundational hardware. As a heterogeneous compute architecture that includes a full ARM processing subsystem, FPGA fabric, and complete analog/digital programmability across the RF signal chain, Zynq UltraScale+ RFSoCs provides a complete, single chip software-defined radio platform for diverse applications, and the ability to produce radio variants as market dynamics evolve.

ABOUT AMD

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