Product Brief

FPGA and SoC

altera™
An Intel Company

Altera® Direct RF-Series FPGAs

Wideband System Solutions, a Game-Changing Analog-Enabled Direct RF-Series FPGA Portfolio

Up to Eight Channels of
64 Gsps
ADC/DAC Converter Integrated with an SoC FPGA

Combined with up to
25 TFLOPS
of Digital Signal Processing (FP16)

Up to
2x
Better Fabric Performance/Watt
vs. Competing 7 nm FPGAs

The Intel® Direct RF Series FPGAs wideband system solutions offer integrated data converters with high sample rates up to 64 Gsps, wide radio frequency (RF) input bandwidth of up to 36 GHz, and FPGA programmability. All this in a single package, providing significant size, weight, power, and cost (SWaPC) as well as low RF-to-baseband latency advantages.

This integration allows instantaneous bandwidths of up to 32 GHz and frequency agility in small packages, sizes ranging from 45 mm x 32 mm to 45 mm x 56 mm, providing up to 10x value to the defense industrial base by enabling tough missions at the tactical edge to scale, which were previously not achievable.

Intel's resilient supply chain, the Intel Quartus® software integrated RF tool chain, and chiplet based integration in package result in reduced system-level components, high reliability and subsequently lower total cost of ownership and accelerate time to market for critical missions.

The wideband Direct RF-Series, consisting of Intel Stratix® 10 AX FPGAs and Intel Agilex® 9 FPGAs, leverage Intel's industry-leading multi-chip packaging, proprietary Embedded Multi-Die Interconnect Bridge (EMIB), and Advanced Interface Bus (AIB) to deliver composable system solutions to the marketplace in an accelerated fashion. An example of this composable system solution is shown in Figure 1.

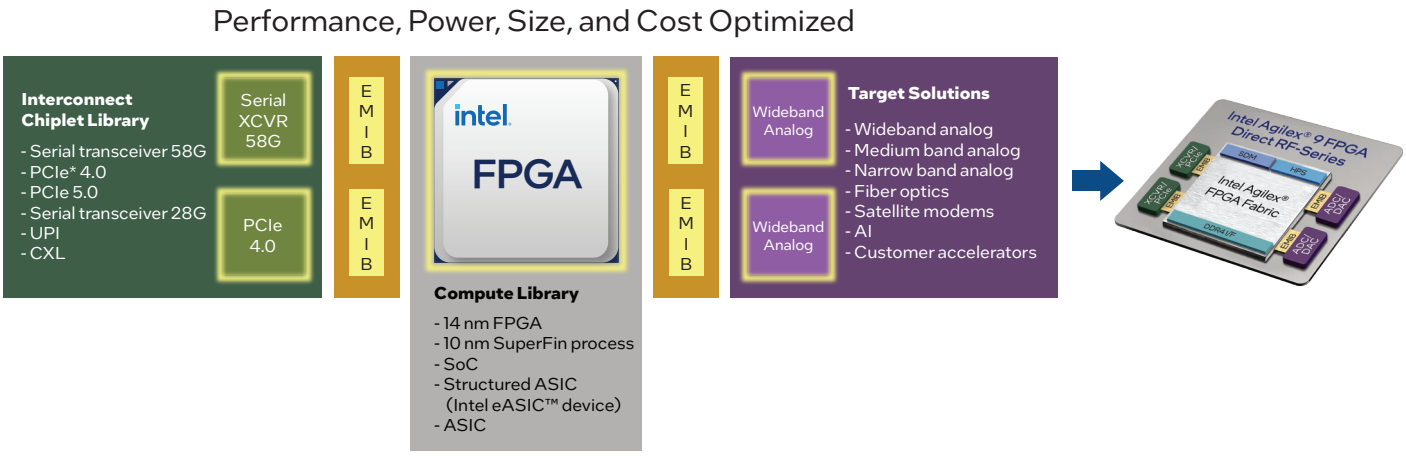

Figure 1. Composable Chiplet Solution Example – Wideband Direct RF FPGA

Low antenna-to-baseband latency is achieved by a combination of EMIB and AIB – with no added latency from a JESD204B protocol and transceivers – hardened intellectual property (IP) cores, monolithic FPGA core fabric featuring the Intel Hyperflex™ architecture, and other system innovations.

Intel's wideband system solution provides frequency agility by offering simultaneous wideband and narrowband tracking.

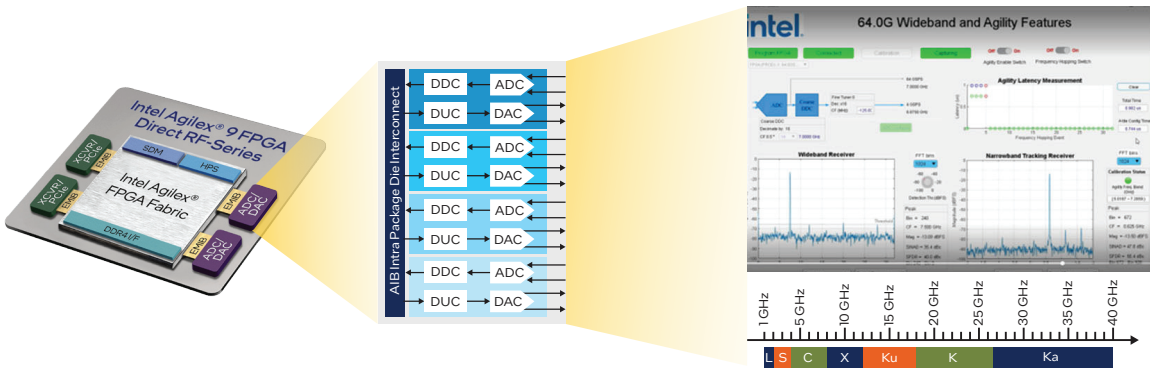

Figure 2. Simultaneous Wideband and Narrow Band Frequency Agility

Frequency agility enables the ability to quickly frequency of shift receivers and transmitters to account for atmospheric effects, jamming, mutual interference with friendly sources, or to make it more difficult, to locate the radar broadcaster through radio direction finding.

A high-level overview of the portfolio is provided in Table 1:

Intel Direct RF-Series FPGAs, Wideband Portfolio		
Intel Stratix 10 AX	**AGRW014**	**AGRW027**
Intel Stratix 10 FPGA 14 nm FinFET	Intel Agilex 9 FPGA 10 nm SuperFin	Intel Agilex 9 FPGA 10 nm SuperFin
8 channel ADC/DACs 64 Gsps, 10 bits	4 channel ADC/DACs 64 Gsps, 10 bits	8 channel ADC/DACs 64 Gsps, 10 bits
Up to 56G transceivers	Up to 58G transceivers	Up to 58G transceivers
2.8M LEs	1.4M LEs	2.7M LEs
Quad-core Arm* Cortex*-A53 processor	Quad-core Arm Cortex-A53 processor	Quad-core Arm Cortex-A53 Processor
11,520 multipliers	9,520 multipliers	17,056 multipliers
50 mm x 50 mm	32 mm x 45 mm	42.5 mm x 52.5 mm

Table 1. Wideband Direct RF Product Features

For More Information

- Direct RF-Series FPGAs portfolio page: www.intel.com/directrf
- Intel Quartus Prime Software page: www.intel.com/quartus
- Performance Metrics for Direct RF Transceivers: An Update to Traditional Metrics and Implementation Example white paper (available upon request)
- Artificial Intelligence Based Waveform Classification and other Reference Designs are available - contact sales at www.intel.com/directrf

For enquiries, please contact an Intel sales representative.

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