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N.A.T. and Heinrich Hertz Institute to Demonstrate Next-Generation 5G Massive MIMO Base Station System at Mobile World Congress

At Mobile World Congress in Barcelona, N.A.T., a leading supplier of embedded boards and systems based on open standards, and the Heinrich Hertz Institute (HHI), which is the Fraunhofer Institute for Telecommunications, will demonstrate how the effective bandwidth of the CPRI link in a next-generation 5G massive multiple input, multiple output (MIMO) base station system can be significantly increased using IQ Compression.

Working with Integrated Device Technology, Inc.® (IDT®), N.AT. and HHI have developed a solution that can enable mobile operators to select a compression ratio between 2:1 and 3:1, offering up to three times the effective bandwidth in a base station transceiver (BTS) system.

“Fraunhofer Heinrich Hertz Institute’s SDR group successfully integrated the IDT compression IP into its eight antenna radio head used for prototyping next-generation 5G Massive MIMO systems,” said Tom Wirth, Head of SDR Group, Fraunhofer Heinrich Hertz Institute. “Our SDR-based platform using NAT’s MicroTCA technology, leverages IDT’s compression techniques and thus can easily scale up to dozens of antennas on the access link, providing higher data rates by advanced beamforming techniques for the evolution of 4G towards 5G networks.”

“IDT compression IP has been deployed in carrier production networks enabling a number of use cases from optimizing capacity of fiber optic links between Remote Radio Units and Baseband Units, to dramatically enabling network coverage via microwave front haul,” said Sailesh Chittipeddi, CTO, IDT. “The current implementation by Fraunhofer HHI, working with NAT platforms leveraging Xilinx FPGAs, provides a turnkey platform to our OEM customers as well as global carriers to enable bandwidth optimized front haul solutions, enabling high capacity 4G advanced and 5G networks to reach many underserviced areas with more economical deployments.”

“The trends in wireless network evolution indicate that we are close to a split in network architecture and technologies, and even commercial practices as 4G deployments mature and 5G technologies are still to be fully defined,” said Heiko Körte, Vice President and Director of Sales and Marketing at N.A.T. GmbH. “Operators will have to look for new means to meet the demands placed upon them by customers and investors more efficiently and effectively. The 5G MIMO approach has the elements to provide flexibility necessary in future wireless networks, and with an off-the-shelf

platform based on MicroTCA, emerging solutions may break new ground toward low-cost, high density mobile infrastructure."

The demonstration, hosted on both the N.A.T. stand (6B40) and the HHI stand (7G31) consists of products from both organisations:

- N.A.T.: MicroTCA chassis (NATIVE-C2) with integrated management module (NAT-MCH) and power module (NAT-PM-AC600) and a N.A.T. processor module providing the spectrum analysis display. The carrier-grade, fully redundant chassis can host up to 12 AMCs and provides two 1GbE and two 10GbE connections per slot while, in addition to the system management, the NAT-MCH also contains fully managed switches for 1GbE and 10GbE. The MCH also contains a central clock generation and distribution module specially dedicated to telecoms applications. The processor board in AMC form factor is based on the third generation Intel® Core™ processor providing up to 16GB of memory and three 1GbE interfaces and other high speed lanes connected to the backplane. The system is powered by up to two fully managed 600W power modules. All components are remotely manageable and hot-swap capable.
- Fraunhofer HHI's radio head consists of stacked analog and digital boards in the AMC form factor. The digital board contains a Xilinx Zynq XC7Z045, a clock distribution network with synchronization in- and outputs, 4 x 10 Gbps lanes for CPRI and 10 GbE to the front panel via QSFP, as well as high speed lanes connected to the backplane. The analog board contains up to 4x AD9361 SoC devices, which can be fully synchronized up to 4 GHz, each SoC supporting two transceivers, a tunable carrier frequency between 70 MHz up to 6 GHz, and < 56 MHz analog bandwidth. Dozens of radio heads can be synchronized if more than 8 antennas are required.

About Fraunhofer Heinrich Hertz Institute
The Fraunhofer Heinrich Hertz Institute is a world leader in the development of mobile and fixed broadband communication networks and multimedia systems. From photonic components and systems through fiber optic sensor systems to video coding and transmission, the Fraunhofer HHI works together with its international partners from research and industry. For more information, visit: http://www.hhi.fraunhofer.de

About N.A.T.
Founded in 1990 with the aim of developing high-performance network interfaces for industrial computers, N.A.T is a privately owned and financed company with headquarters in Bonn, Germany and certified distributors and sales agents worldwide. The company has developed substantial knowledge in networking technologies across a wide range of open, standards-based architectures including VMEbus, CompactPCI, PCI, PCI Express, PMC, Industry Pack Modules, and M-Modules. N.A.T. was at the forefront when the AdvancedTCA, MicroTCA and AMC standards were introduced and is today one of the leading suppliers for board and system level products based on AMC and MicroTCA. The product portfolio includes line interfaces, network processors, single- and multicore data engines, management and system controllers, 19" rack mountable chassis, power supplies and of course the communication protocols and middle-ware to build turn-key and application-ready systems. For more information, please visit www.nateurope.com.

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