Abstract - Next generation wireless networks (5G) have to cope with significant traffic increase due to heterogeneity of different applications such as high quality video and cloud based applications. Such requirements create the need for a revolutionary change in architecture rather than a series of local and incremental technology updates. A dense heterogeneous deployment of small cells such as pico/femto cells in addition to high power macro cells is foreseen as one of the potential solutions to achieve these requirements. Such a deployment requires innovation at all layers of communication protocol stack (PHY, MAC and higher layers). Moreover, all the new algorithms also need validation in a real-time testbed. However, the ever increasing complexity in all layers of current and future generations of cellular wireless systems has made an end-to-end demonstration of the network limited to industrial research labs or large academic institutions. SDR prototyping for showing such algorithms requires a need to overcome several challenges which arise due to the use of different design flows to address different components of the system (i.e. RF, baseband, and protocol stack). In addition, the components may lack a common abstraction layer. This can result in complications and delays during system development and integration. The NI LabVIEW graphical system design software is able to address these challenges by providing a common development environment for all the heterogeneous elements in the NI SDR system (i.e., the GPP, RTOS, FPGA, converters and RF components), with tight hardware/software integration and a good abstraction layer. This integrated design environment is the primary reason we chose NI LabVIEW SDR platform for prototyping and it enabled us to quickly reach an initial working version of our demonstration system and rapidly iterate on that design. In this demo, we show a LabVIEW based PXI platform in which LTE-like SISO OFDM PHY Layer is integrated with an open source NS-3 protocol stack to prototype PHY/MAC cross layer algorithms [1] within EU FP7 CROWD project (http://www.ict-crowd.eu), which proposes Software Defined Networking (SDN) framework as a solution to tame dense deployment of wireless networks.

References:
[1] R. Gupta, T. Vogel, N. Kundargi, A. Ekbal, A. Morelli, V. Mancuso, V. Sciancalepore, R. Ford, and S. Rangan. LabVIEW based Platform for prototyping dense LTE Networks in CROWD Project. In The 23rd Annual European Conference on Networks and Communications (EuCNC), 2014.