Software-defined RF repeater and IRS control platform

Simplify, cost and power-reduce RF control applications

As 3GPP systems are moving to higher frequency ranges (upper FR1 bands, FR2 bands and future FR3 bands), RF propagation characteristics worsen—limited coverage through windows, around buildings and so on. Part of the set of the solutions to this challenge is the RF repeater and/or intelligent reflective surface (IRS), which is an analog subsystem that receives signals from a host base station and transmits an amplified version to the end-user (and vice versa).

Background

Even when the main signal path in the RF repeater is not actively processed/conditioned, there is a baseline functionality required in the repeater or IRS: To control UL/DL switching of the RF subsystem(s) at very precise timing. To implement this functionality, a basic RF sniffer/synchronization function is implemented in the repeater that provides support for all LTE or 5G/NR waveform decoding required to do this RF control.

Software-defined modem

The RF control function involves 3 key processing steps after RF de-modulation: ADC (sample signal), processing (DSP) for decoding and embedded management/control. NXP promotes a software-defined solution based on the LA9310 DSP that can either operate stand-alone or in conjunction with a host processor to implement all components.

Specifications and benefits

- Targeting LTE, 5G, FR1 and FR2 applications
- Low-speed GPIO/I^{2}C/SPI and high-speed SerDes (PCIe) IO to host processor
- Integrated DSP (80GFLOPS) and Arm®-M4
- Aggressive DC power, ~1 W (LA9310 only)
- Enabled with software libraries/tools or 3rd party software partners

System architecture