RF Sampling Architecture
Overview

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Traditional super heterodyne receiver

- Traditional architecture for measuring wide-bandwidth signals
  - Mixer down-converts RF/μ-wave band to IF band
  - Quadrature demodulator down-converts IF to BB
    - Utilize dual ADC to capture I/Q signals
    - ADC sampling speed needed to support half bandwidth of original signal

- Key issues
  - 1\textsuperscript{st} mixer stage tunes frequency to fixed IF band
  - BB I/Q amplitude/phase balance impact signal integrity
RF sampling receiver

- Eliminate
  - Quadrature demodulator
  - RF synthesizer
- Replace: Dual ADC with one RF-sampling ADC
- Supports:
  - Higher signal bandwidths
  - Direct sampling of RF bands
RF sampling architecture

• Spectral performance
  – Support wide-bandwidth signals (or multi-mode)
  – Support for very large bandwidths not previously obtainable due to ADC sampling rate limitations

• Size and power dissipation
  – Size and power dissipation improvement by eliminating mixer, RF synthesizer, and BB signal conditioning components

• Flexibility
  – Wide bandwidth signals, multi-band applications and DPD expansion bandwidth
  – Higher density systems (MIMO, beam-forming, radar arrays)
  – Easier implementation for multiple standards or configurations (SDR)
Questions?

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