Wideband, High-Performance / High-Power 5G NR gNB (Epiq Sidekiq X4 Radio)

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Epiq Solutions’ Sidekiq X4 Software Defined Radio (SDR)

- High performance multi-channel RF transceiver
- PCIe interface with host computer
  - High pin count (HPC) interface to attach to COTS FPGA mezzanine cards (FMC)
Comparing X4 to Commonly Used SDRs

<table>
<thead>
<tr>
<th></th>
<th>Sidekiq X4</th>
<th>USRP B210</th>
<th>USRP N310</th>
<th>USRP X410</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>RFIC</strong></td>
<td>2 x ADRV9009</td>
<td>AD9361</td>
<td>2 x AD9371</td>
<td>Xilinx Zynq ZU28DR RFSoC</td>
</tr>
<tr>
<td><strong>Instantaneous</strong></td>
<td>400 MHz</td>
<td>56 MHz</td>
<td>100 MHz</td>
<td>400 MHz</td>
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<tr>
<td><strong>Bandwidth</strong></td>
<td></td>
<td></td>
<td></td>
<td></td>
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<tr>
<td><strong>Max Sample Rate</strong></td>
<td>491.52 MS/s</td>
<td>61.44 MS/s</td>
<td>153.6 MS/s</td>
<td>491.52 MS/s</td>
</tr>
<tr>
<td><strong>ADC/DAC Precision</strong></td>
<td>16-bit A/D 14-bit D/A</td>
<td>12-bit A/D 12-bit D/A</td>
<td>16-bit A/D 14-bit D/A</td>
<td>12-bit A/D 14-bit D/A</td>
</tr>
<tr>
<td><strong>Frequency Range</strong></td>
<td>75MHz - 6GHz</td>
<td>70MHz – 6GHz</td>
<td>10MHz – 6GHz</td>
<td>1MHz – 7.2GHz</td>
</tr>
</tbody>
</table>

- FR1 max bandwidth: 100 MHz
- FR2 max bandwidth: 400 MHz
Why use Epiq Solutions SDRs?

- Multitude of form factors
  - Low size, weight, and power (SWaP) options
  - High performance options (like the x4)
- Field-tested (SDRs include RF shield covers)
- More hardware choices for the OAI community
Demo Setup

- Epiq Solutions’ Sidekiq X4 running as OAI gNB
  - 100 MHz channel bandwidth
  - SISO antenna config

- OAI 5G CN

- COTS UE
  - Quectel RM500Q-GL

- gNB Host Computer Specs
  - Intel NUC Extreme
  - CPU: Intel i9-11900KB
    - 3.30 GHz, turbo up to 4.9 GHz
    - 8 cores, 16 threads
    - avx512 support
  - OAI source code: 2022.wk42b (Sidekiq integration not yet publicly available)
  - Native OAI LDPC decoding (using CPU)