Direct-RF 7GHz ADC and DAC IP

Overview
Socionext’s new high-speed ADC and DAC IP is a breakthrough for transceiver architectures. Use it to build direct-RF transceivers which can directly process signals in the range between 400MHz and 7.2GHz. The IP is available for ASIC projects in TSMC’s N7FF and N6 semiconductor processes.

Highlights
- Signal Bandwidth 400MHz - 7.2GHz
- Sampling Frequency up to 31.5GHz
- 12-bit Resolution
- TSMC N7FF/N6

Target Applications
- Direct RF Transceivers (carrier up to 7.2GHz)
- Macro Cell Base Station
- Small Cells
- Active Antennas
- Remote Radio Heads (RRH)
- Cable TV
- Satellite Communications
- Factory Automation

Specifications

<table>
<thead>
<tr>
<th>Item</th>
<th>ADC</th>
<th>DAC</th>
</tr>
</thead>
<tbody>
<tr>
<td>Analog BW</td>
<td>400MHz - 7.2GHz</td>
<td>400MHz - 7.2GHz</td>
</tr>
<tr>
<td>Sampling Rate</td>
<td>31.5/15.7/7.9GHz</td>
<td>31.5/15.7/7.9GHz</td>
</tr>
<tr>
<td>Resolution</td>
<td>12-bit</td>
<td>12-bit</td>
</tr>
<tr>
<td>Input/Output Range</td>
<td>1.6Vpp, diff (over100Ω)</td>
<td>1.0Vpp, diff (over100Ω)</td>
</tr>
<tr>
<td>NSD</td>
<td>-149dBFs/Hz</td>
<td>-149dBFs/Hz</td>
</tr>
<tr>
<td>SFDR</td>
<td>&gt;70dBc, [-1dBFS]</td>
<td>&gt;68dBc, [-7dBFS]</td>
</tr>
<tr>
<td>IMD 2-tone</td>
<td>&gt;70dBc, [2 x -11dBFS]</td>
<td>&gt;68dBc, [2 x -11dBFS]</td>
</tr>
<tr>
<td>Power Consumption</td>
<td>300mW/channel</td>
<td>400mW/channel</td>
</tr>
</tbody>
</table>
Application Examples

1. Direct RF Transceiver
Directly receive and transmit in the frequency band from 400MHz to 7.2GHz without analog mixers.

2. Traditional Transceiver for Higher Frequencies
Build a traditional mixer-based receiver supporting higher frequency bands and offering a large 7GHz bandwidth in the baseband.

3. Multi-channel Transceiver
Use multiple instances of the IP to create multi-channel transceivers capable of MIMO and beamforming.