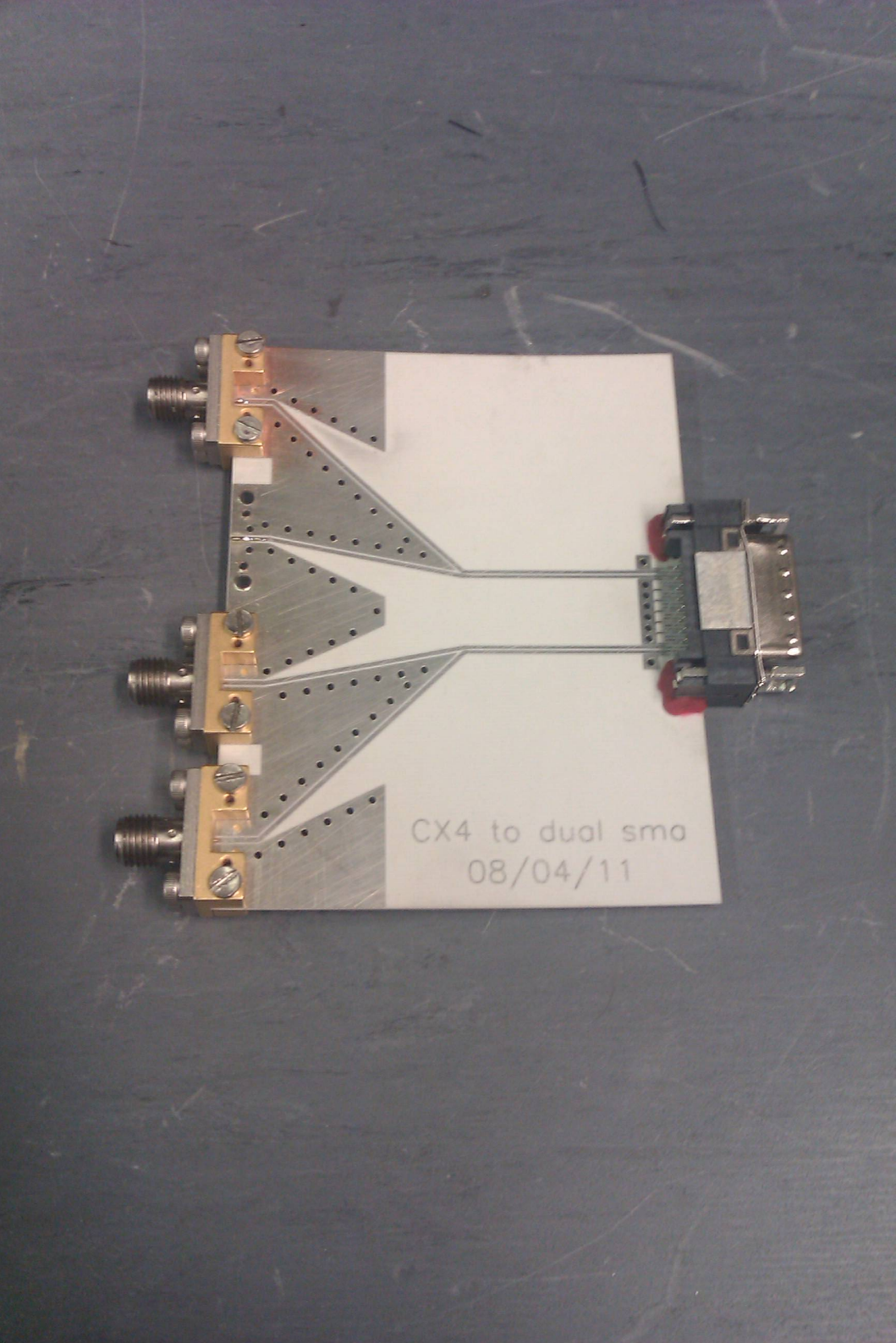


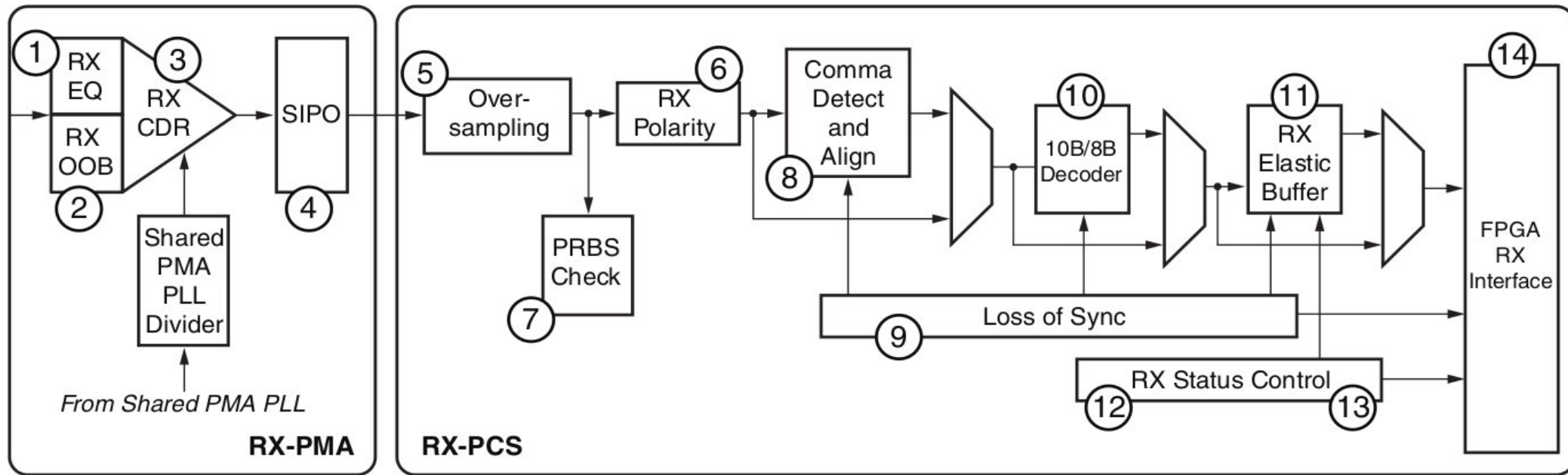
A new approach to high speed digital sampling and its use in radio telescope correlator development

Adam Coates
University of Oxford

adam.coates@astro.ox.ac.uk

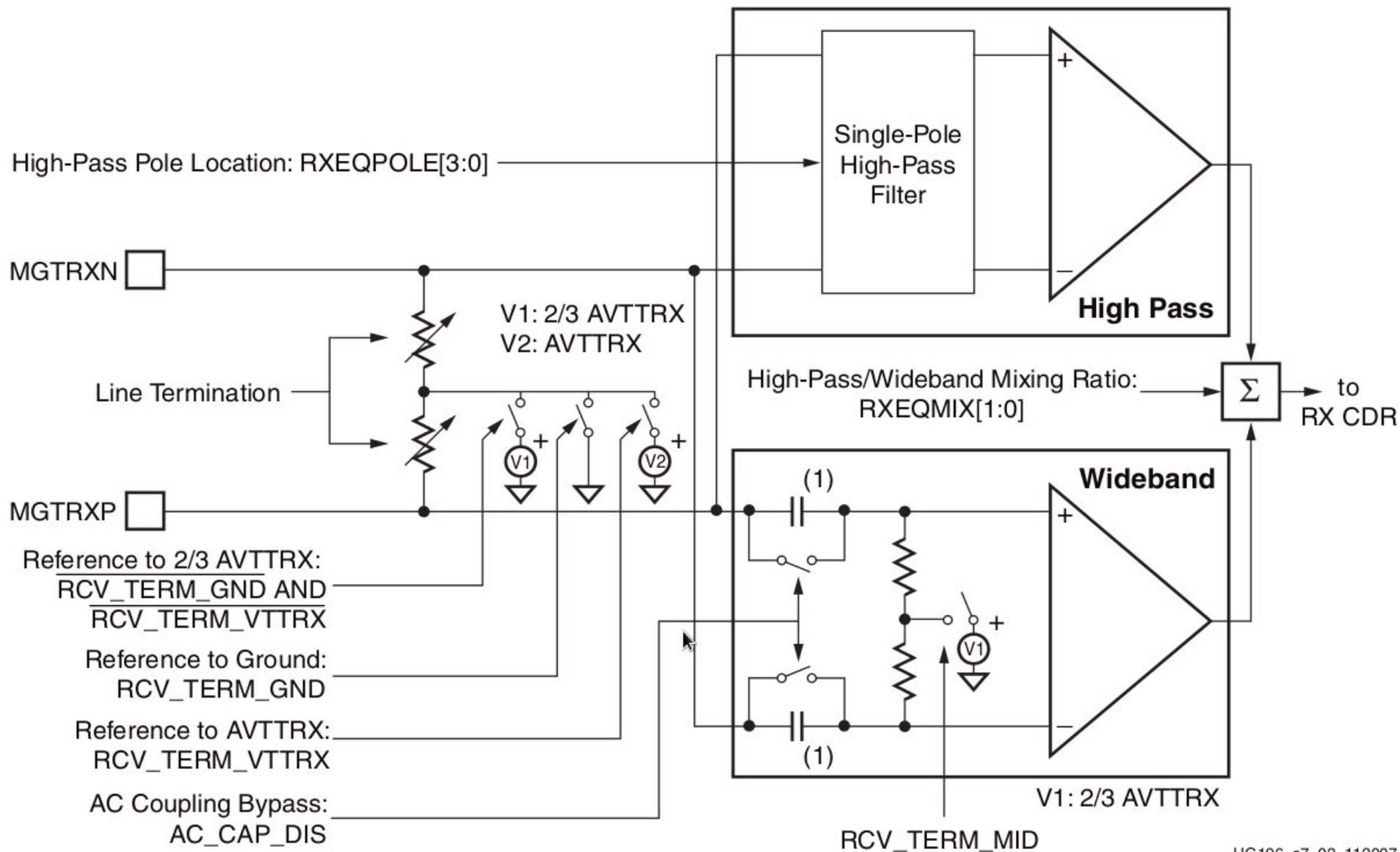


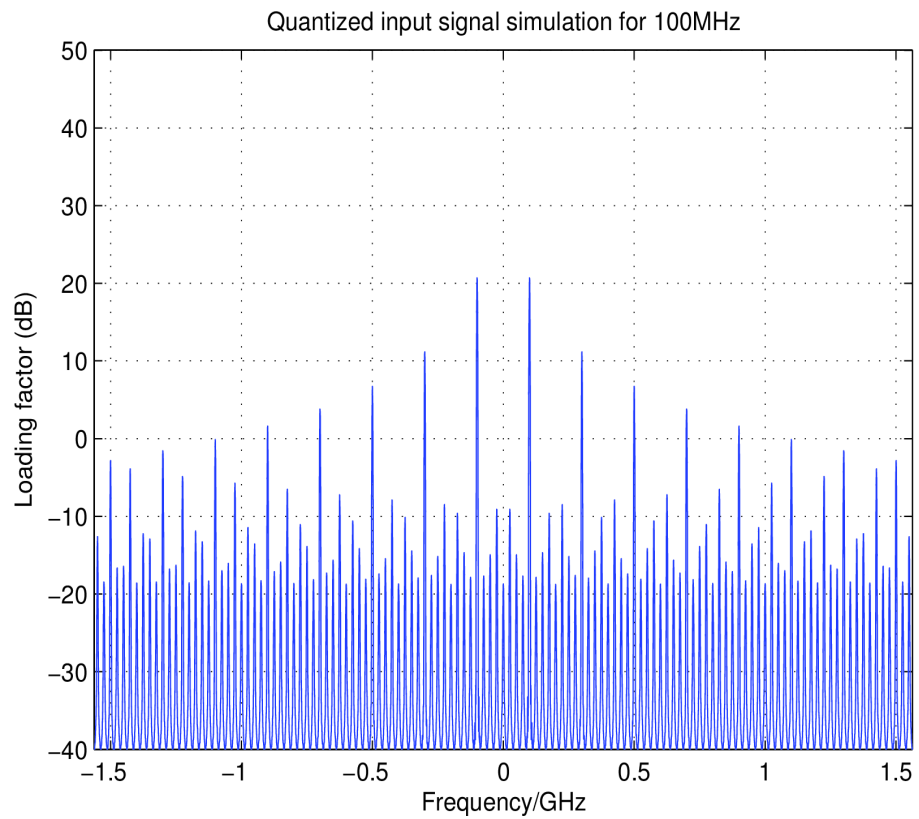
Transceiver Block diagram



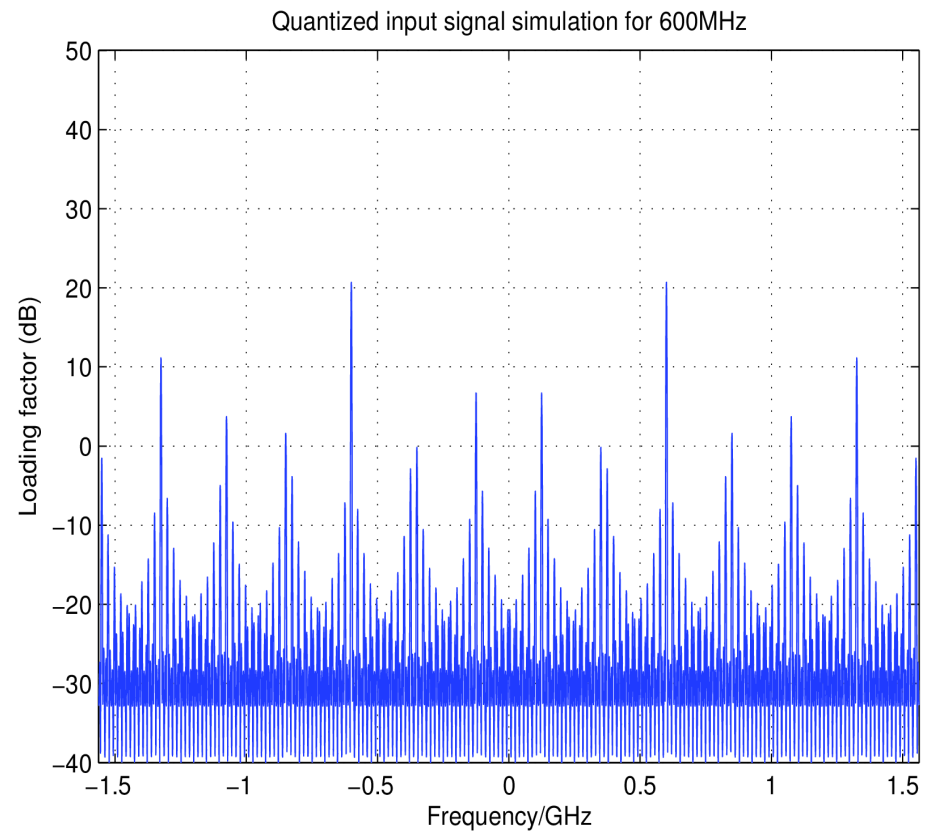
UG196_c7_01_112707

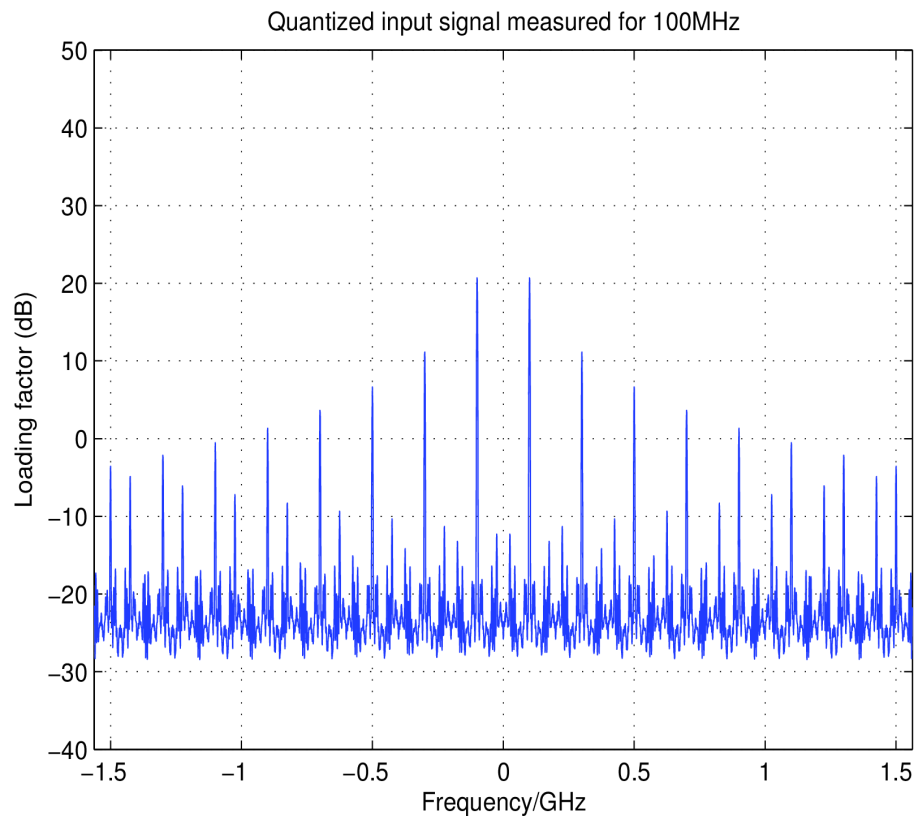
Figure 7-1: GTP RX Block Diagram



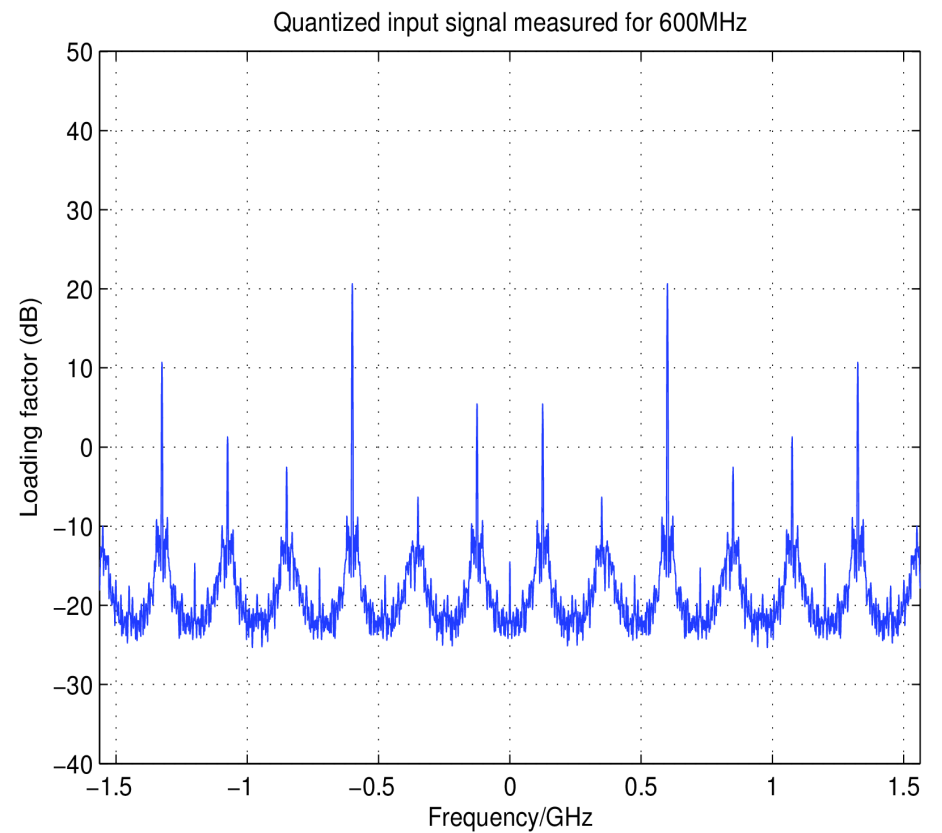


Simulated sampling of a sine wave

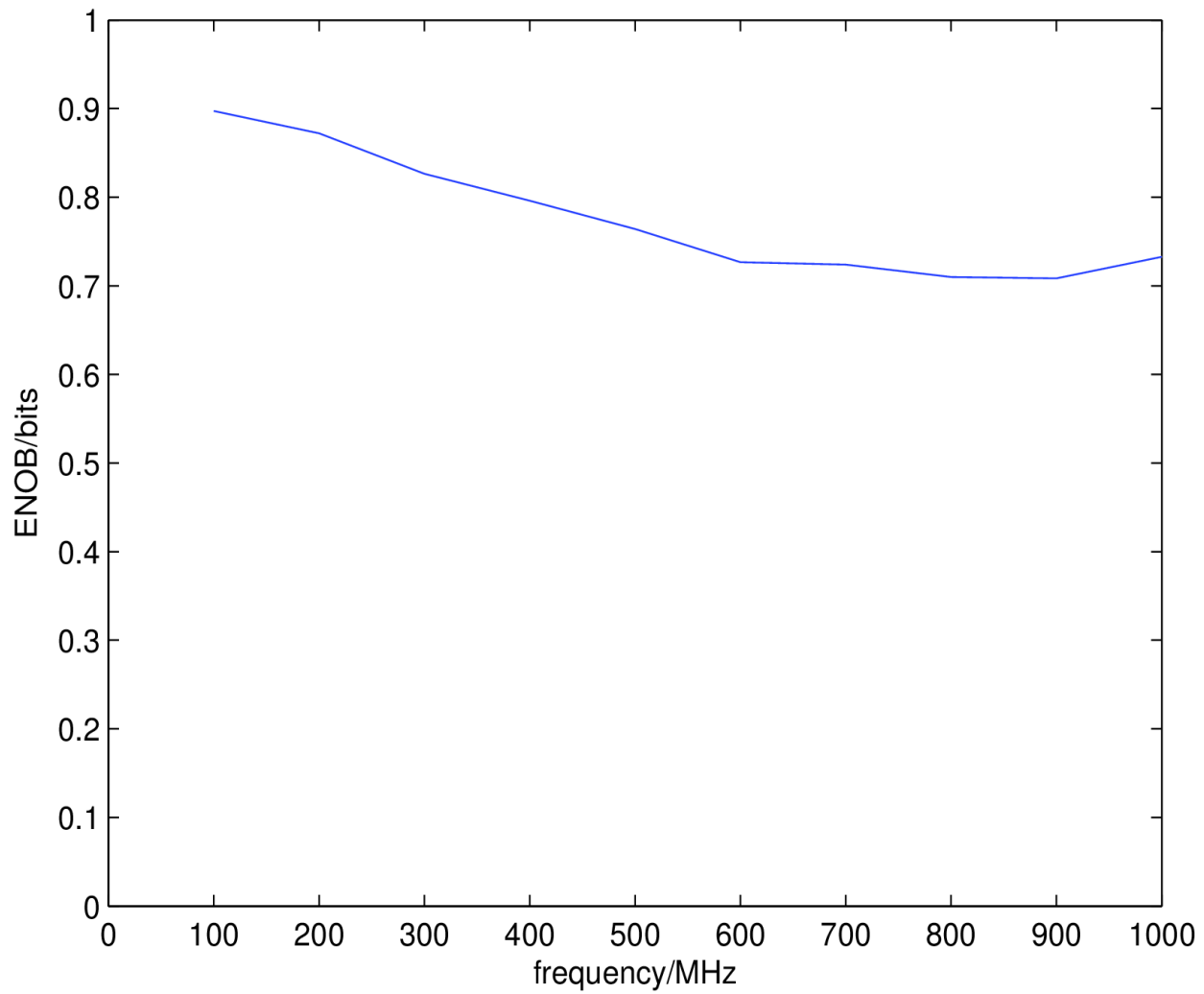




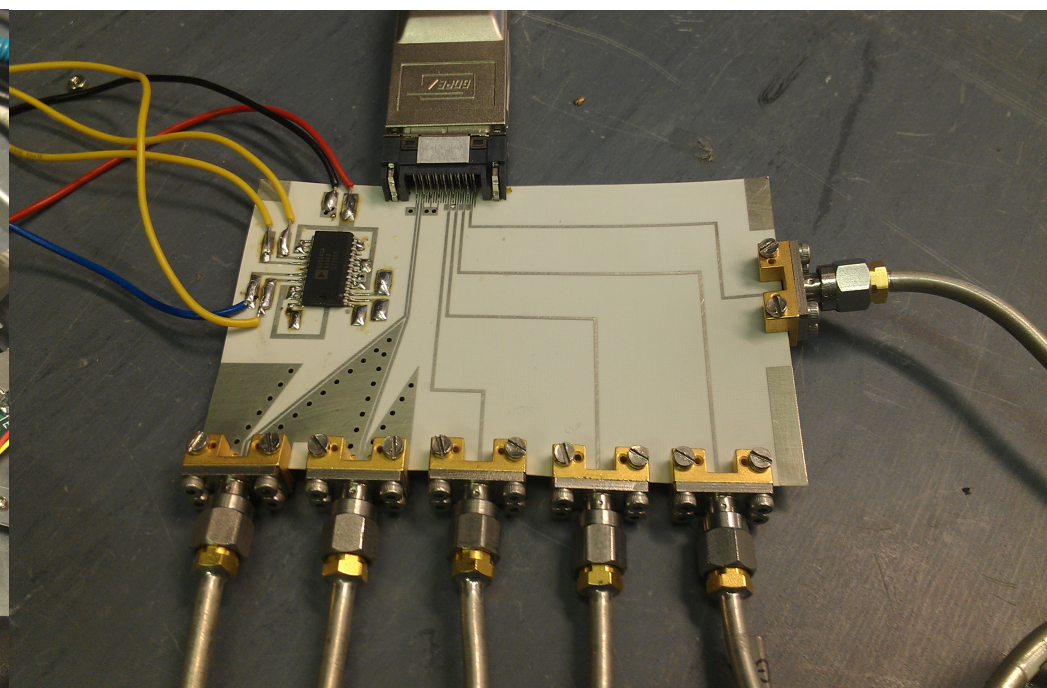
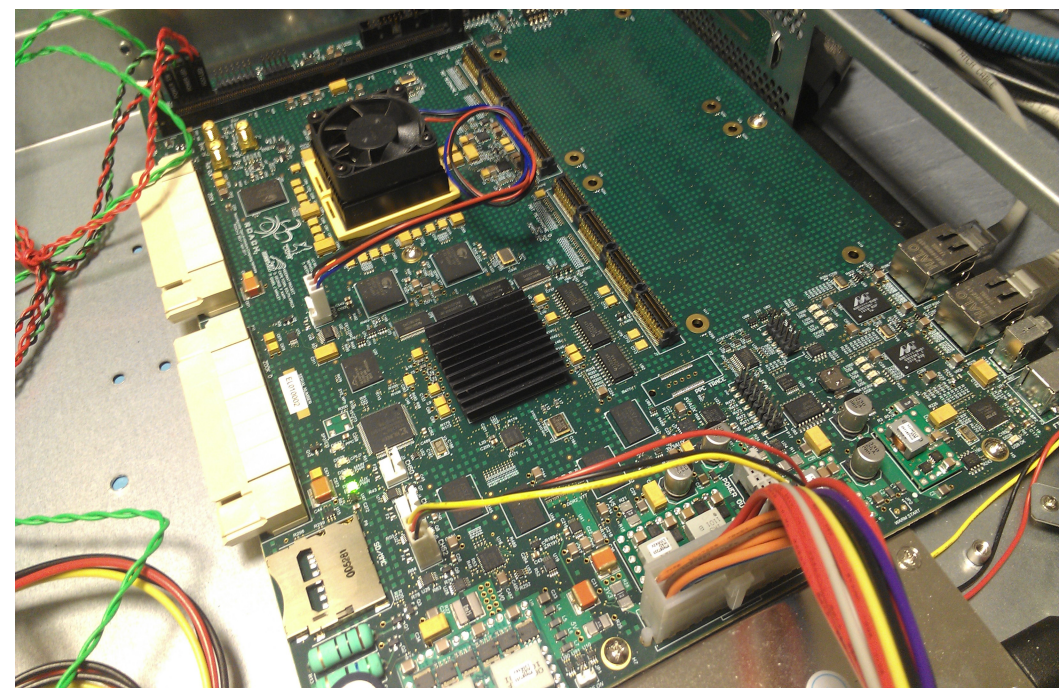
Measured sampling of a sine wave



Effective number of bits



Future Developments

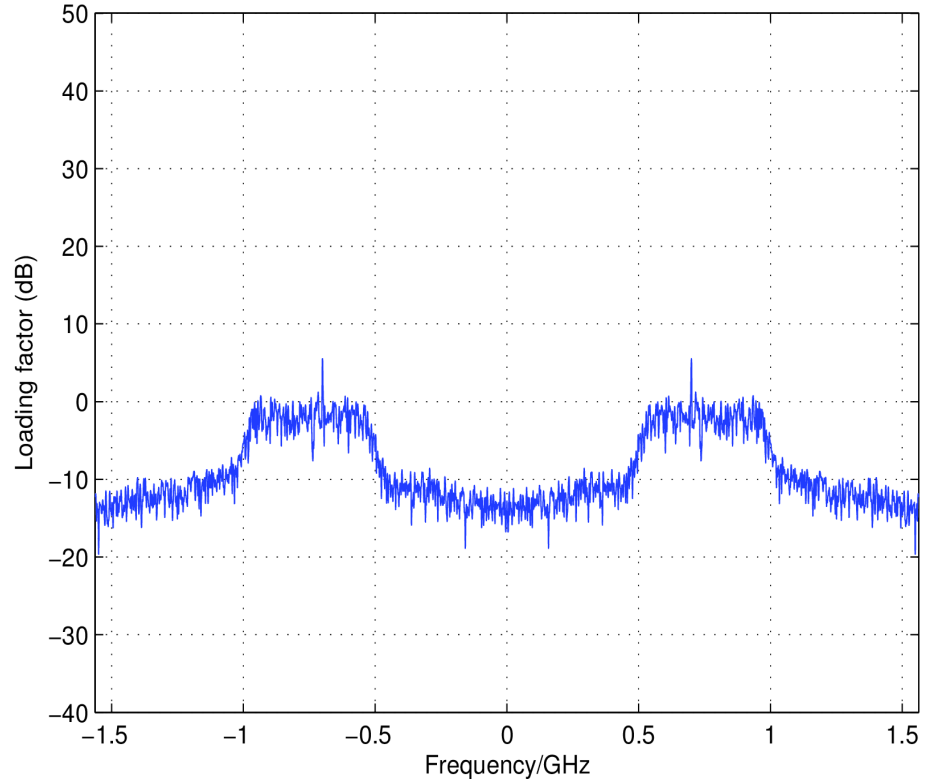


Future Developments

| | |
|---------------|---------------------------|
| Device family | MAX Data receive capacity |
| Vertex 5 | 156 Gb/s |
| Vertex 6 | 585 Gb/s |
| Vertex 7 | 1392 Gb/s |

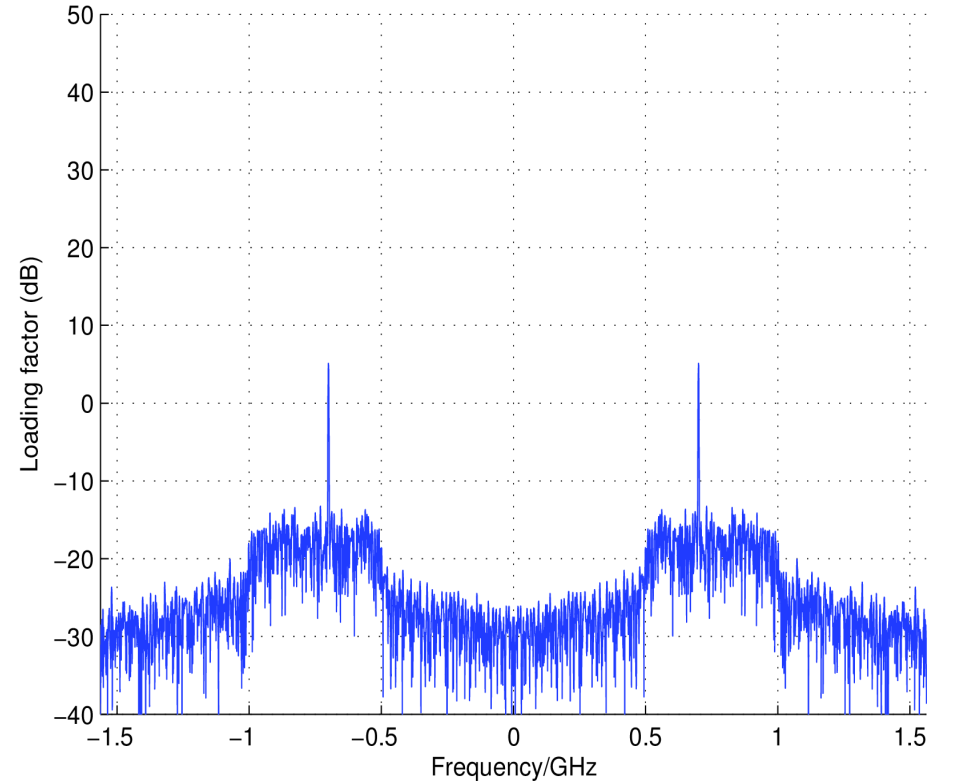
| configuration | Max Sampling speed With interleaving | |
|---------------|---|-----------------------|
| | Roach 1 (Vertex 5) | Roach 2 (Vertex 6) |
| 1 bit | 25 GS/s | 105.6 GS/s |
| 2 bit | 6.25 GS/s | 33 GS/s |
| 3 bit | 3.125 GS/s | 13.2 GS/s |
| 4 bit | | 6.6 GS/s |

Simulation auto correlation of broadband noise source with single frequency at 700MHz



Simulated Auto and Cross correlation

Simulation cross correlation of broadband noise source with single frequency at 700MHz



Measured Auto and Cross correlation

