Super-Attenuator Control System

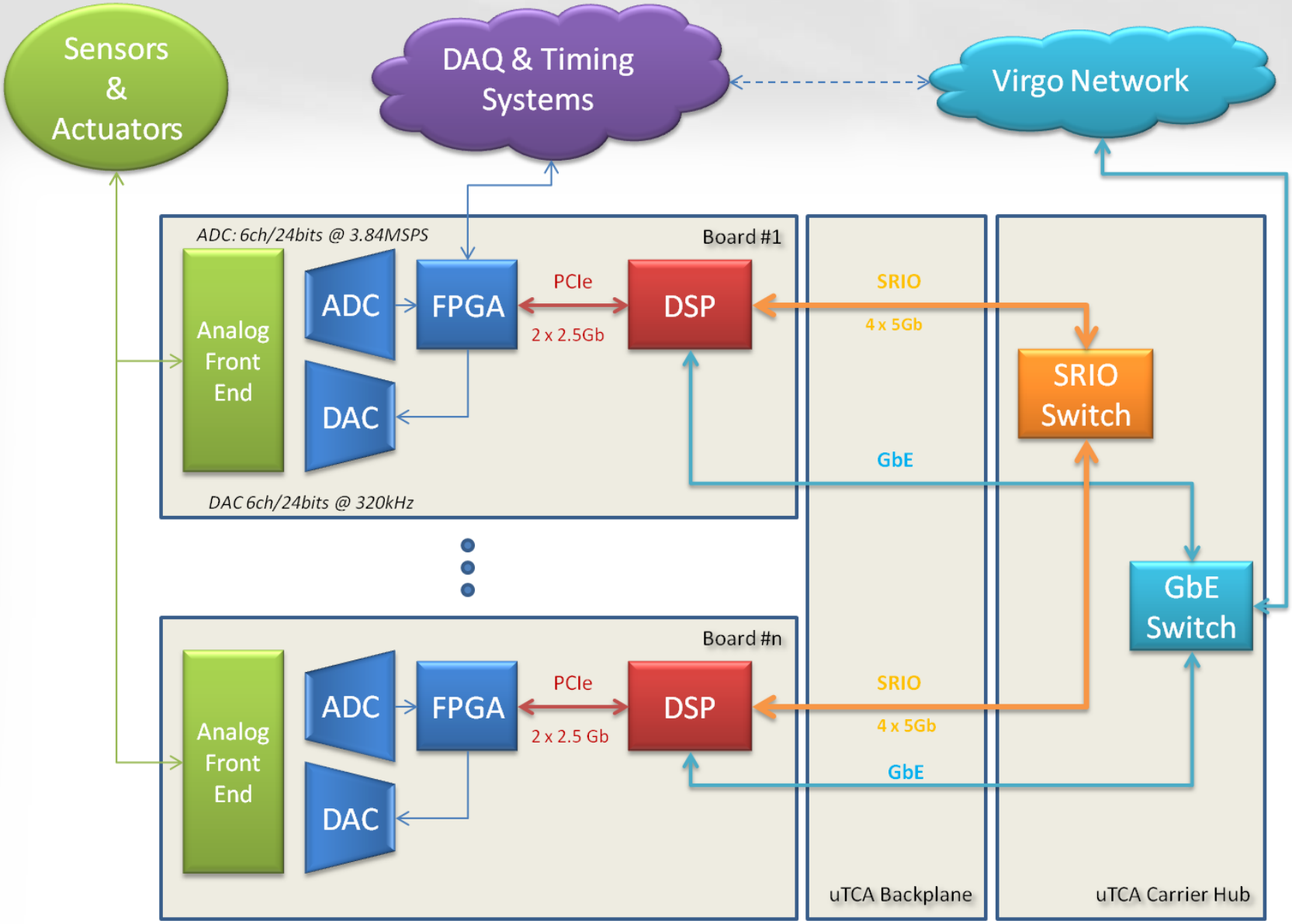
Activities Report

A. Gennai, C. Magazzu, D. Passuello (INFN Pisa)

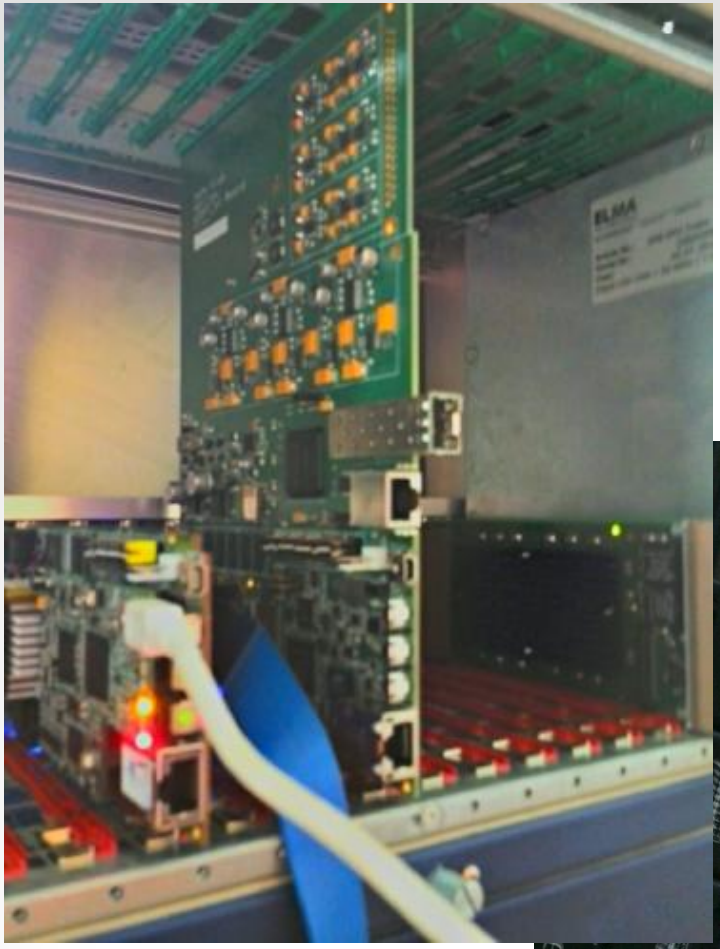
V. Boschi (University of Pisa)

M. Bitossi, C. Carissimi (EGO)

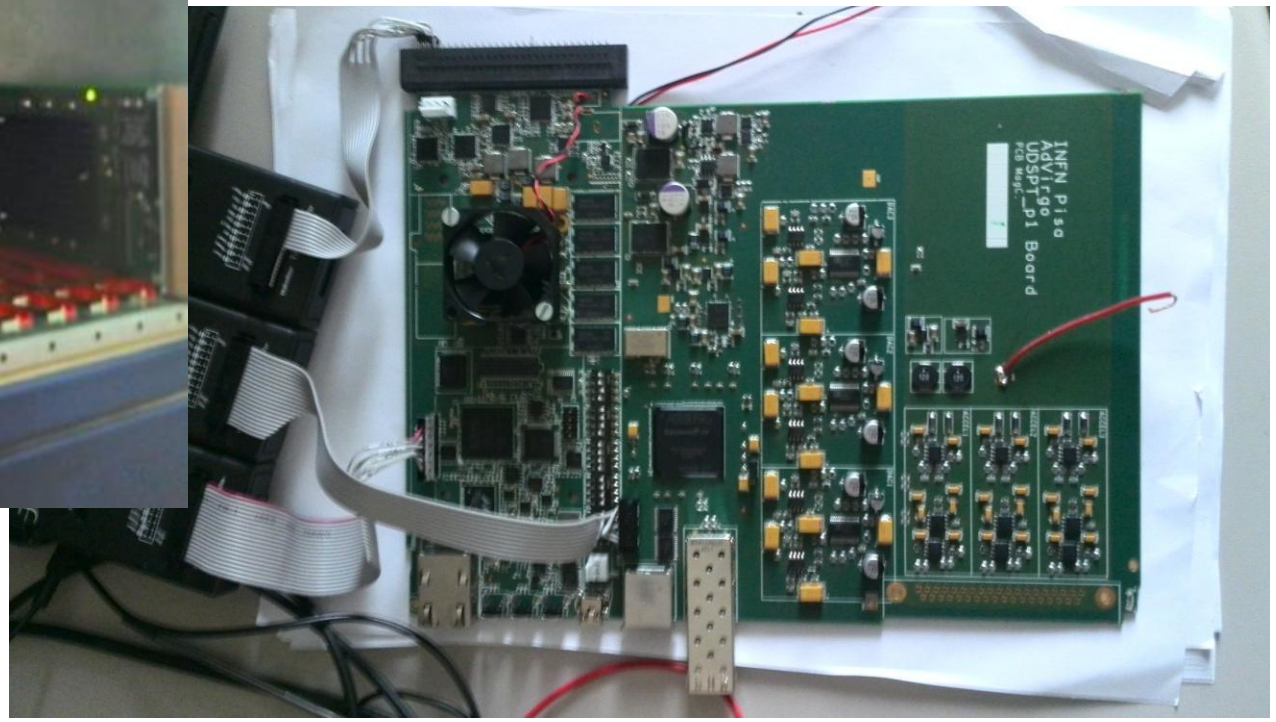
System Block Diagram



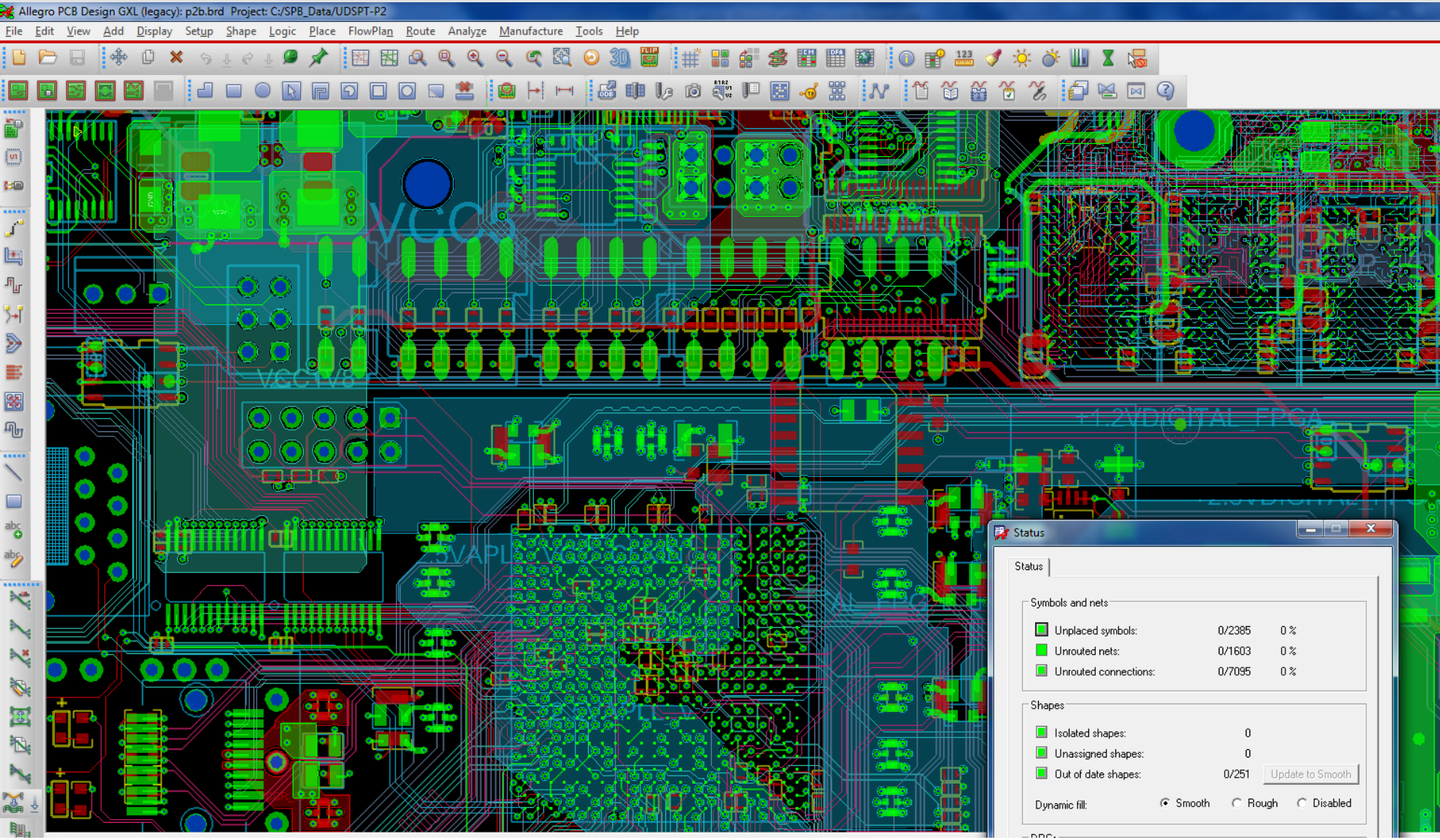
Board Testing



- First set of boards (4 pcs – 24 inputs / 24 outputs) produced last August and today under intensive test



PCB

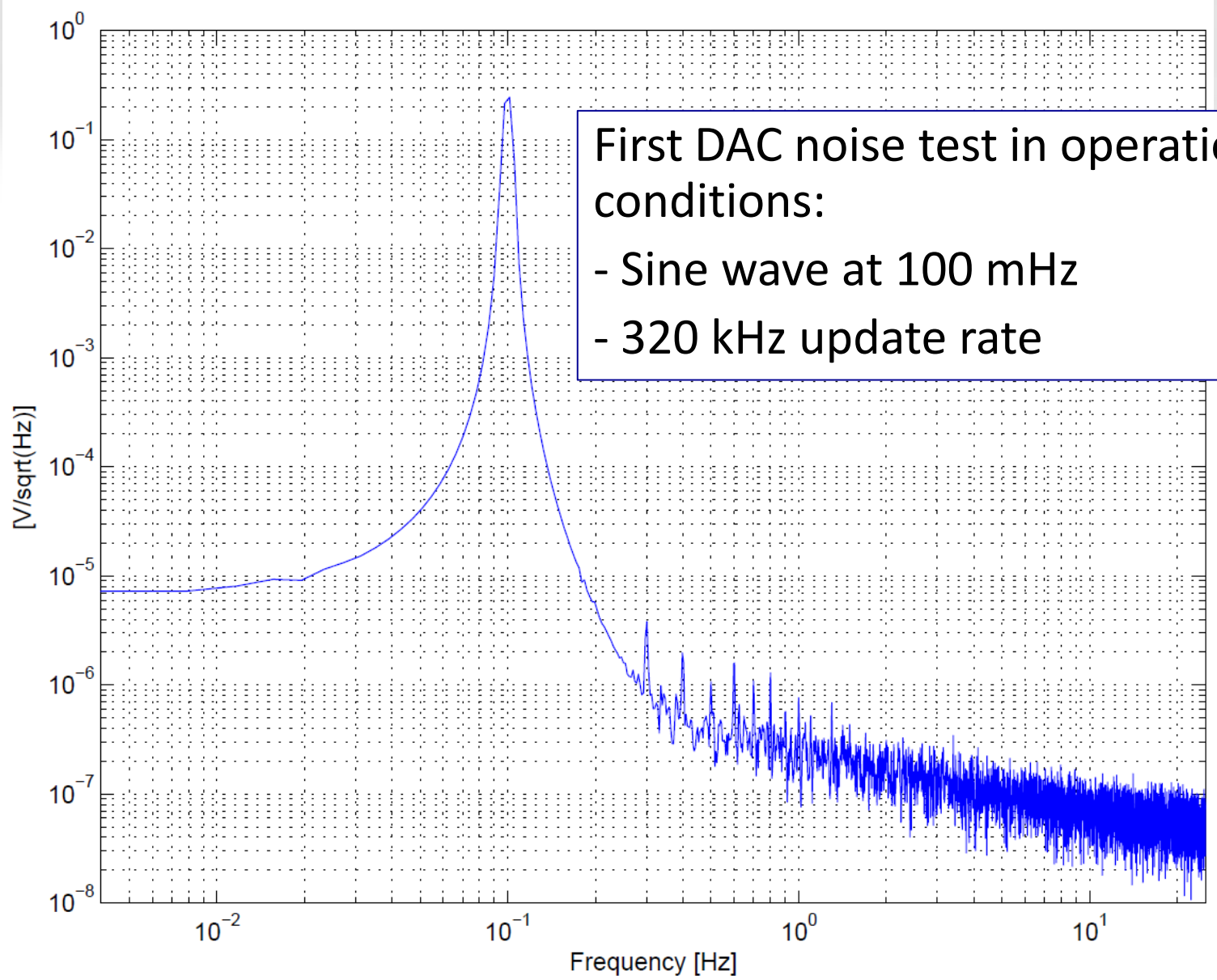

Allegro PCB Design GXL (legacy): p2b.brd Project: C:/SPB_Data/UDSPT-P2
File Edit View Add Display Setup Shape Logic Place FlowPlan Route Analyze Manufacture Tools Help
VCC3
VCC1V8
1.2VDIGITAL_FPGA
Status
Status
Symbols and nets
Unplaced symbols: 0/2385 0 %
Unrouted nets: 0/1603 0 %
Unrouted connections: 0/7095 0 %
Shapes
Isolated shapes: 0
Unassigned shapes: 0
Out of date shapes: 0/251
Update to Smooth
Dynamic fill: Smooth Rough Disabled

Performances

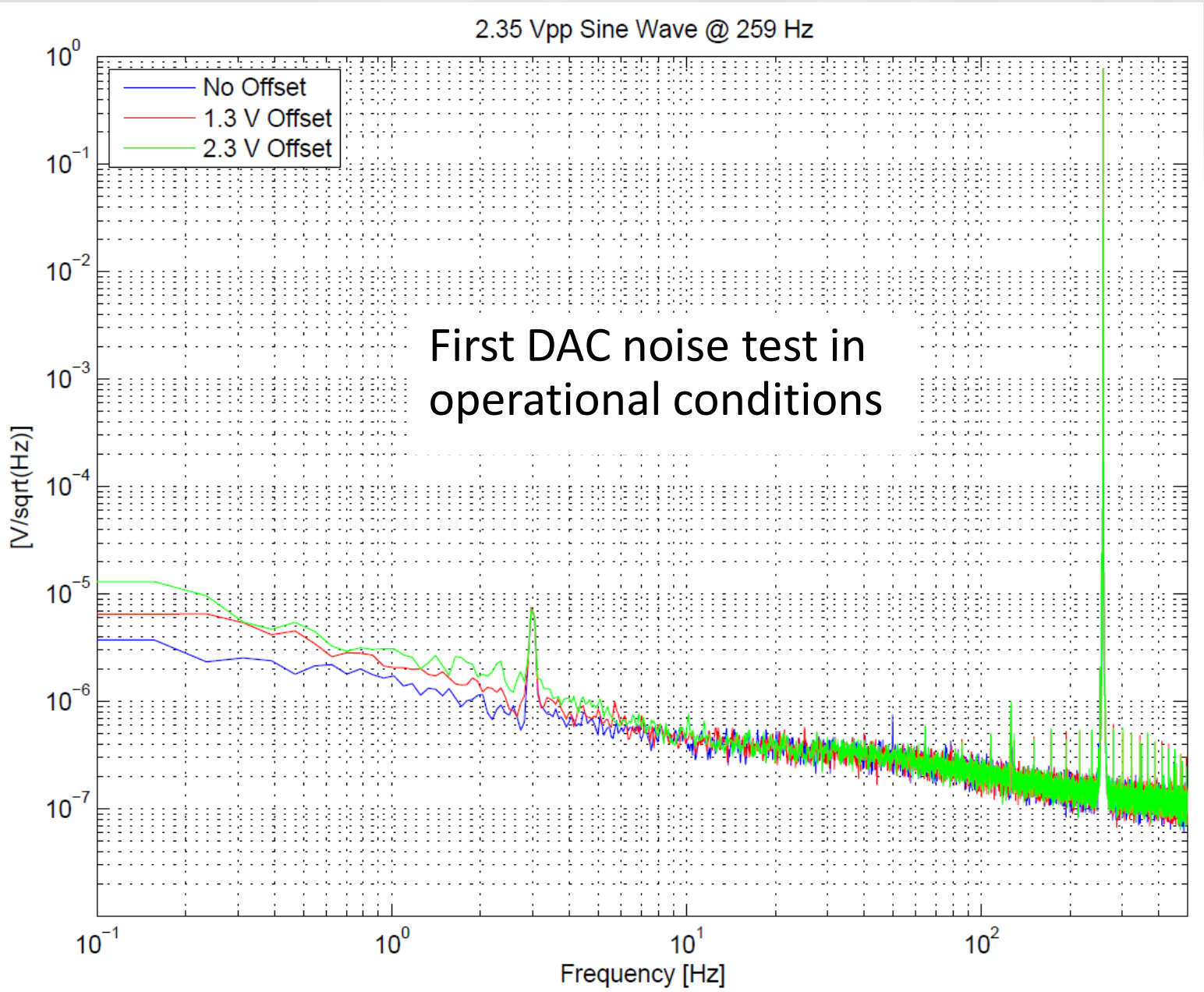
- **Digital I/O**
  - Gb Ethernet(tested up to 30 MB/sec)
  - PCIe (tested up to 400 MB/sec)
  - SRIO (tested up to 1.6 GB/sec)
- **DSP Software**
  - Tested operation up to 320 kHz sampling rate (3.125 usec interrupt request repetition cycle - synchronous with TOLM)
  - Matrix(n,m)*Vector(m,1) double precision multiplication requires 0.5*nm+n+m nanoseconds →

  State space with 3 inputs, 3 outputs and 12 states in less than 200 nsec

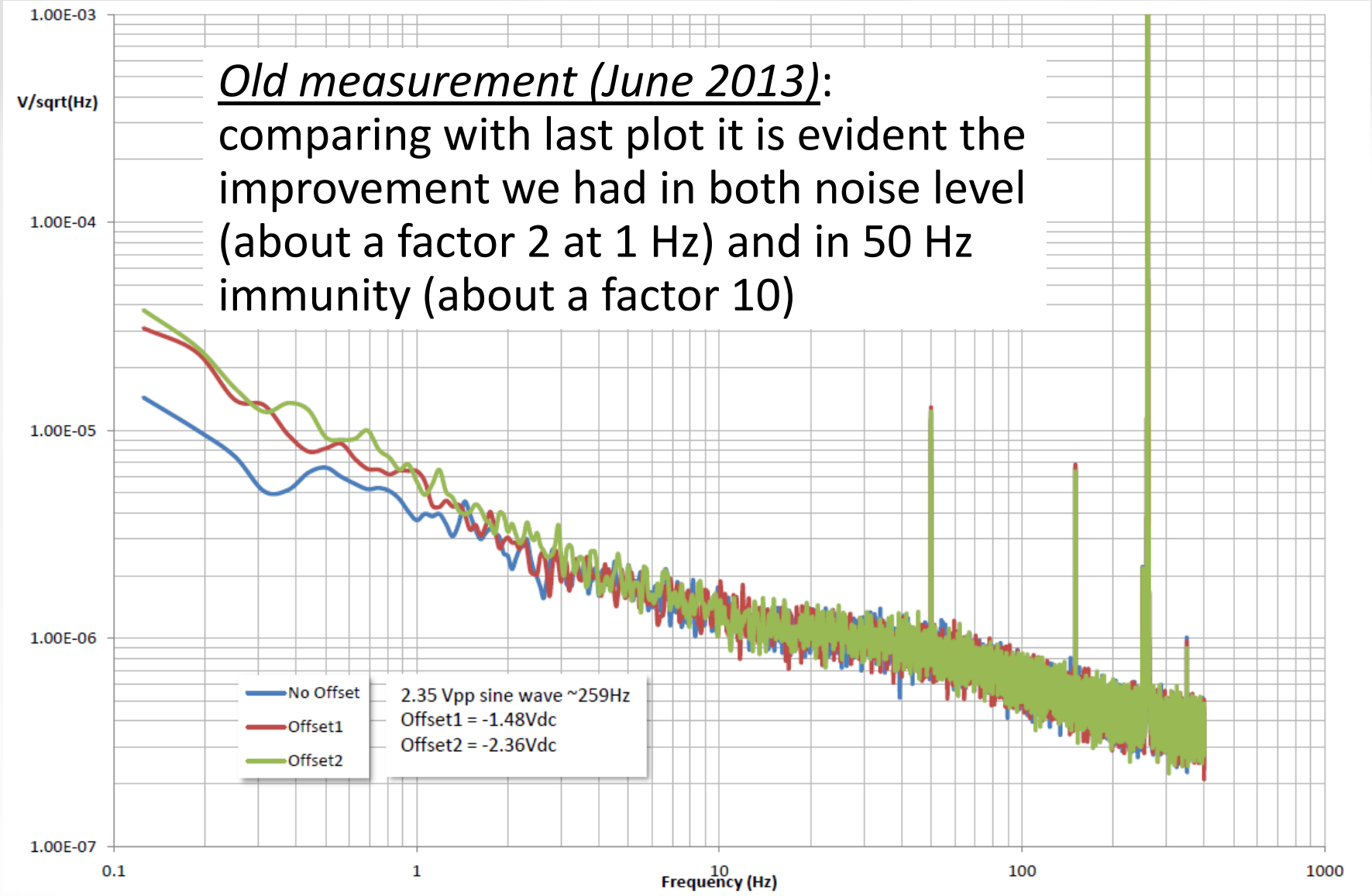
Performances – DAC



Performances – DAC

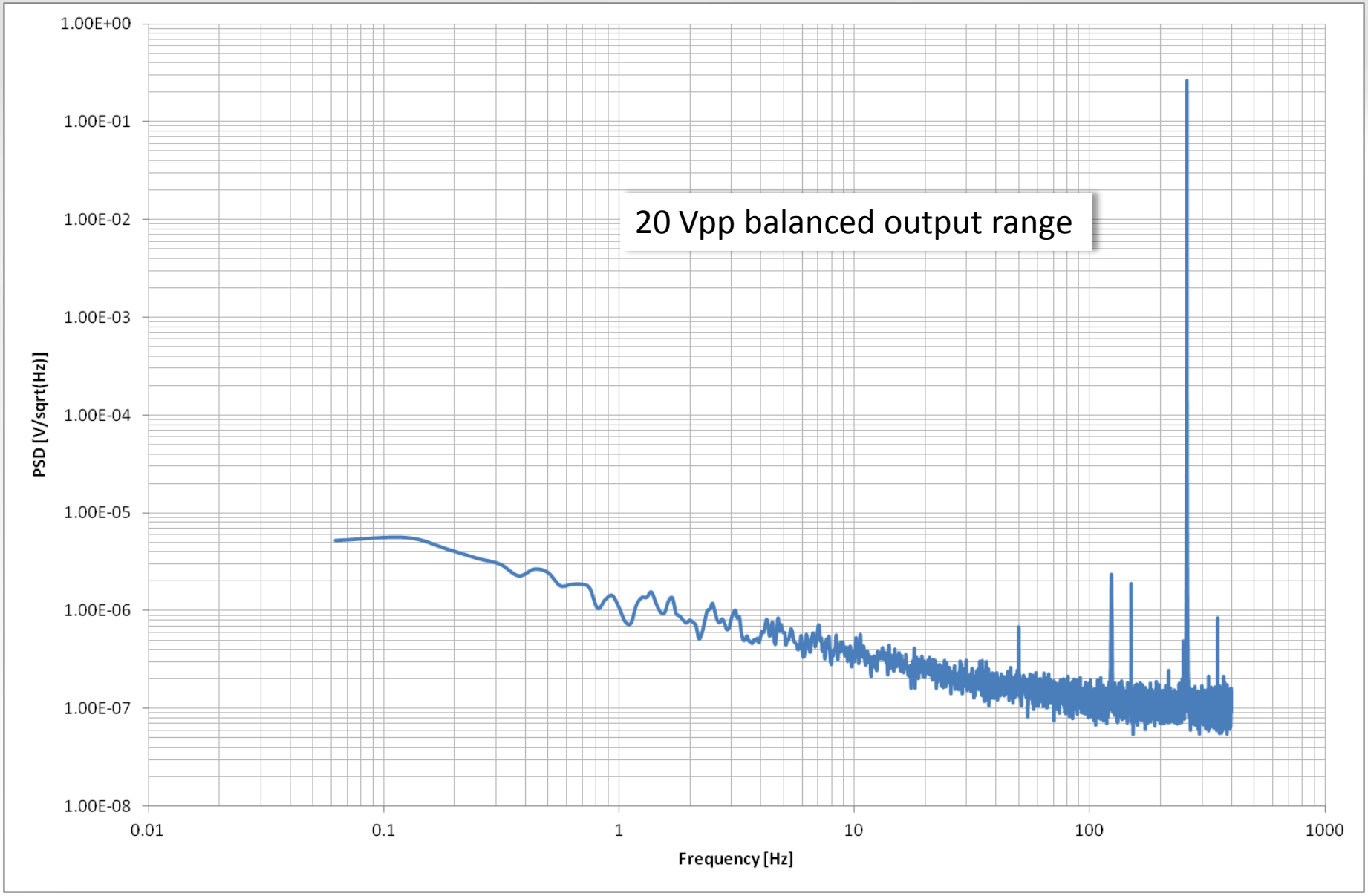


DAC performances on prototype board

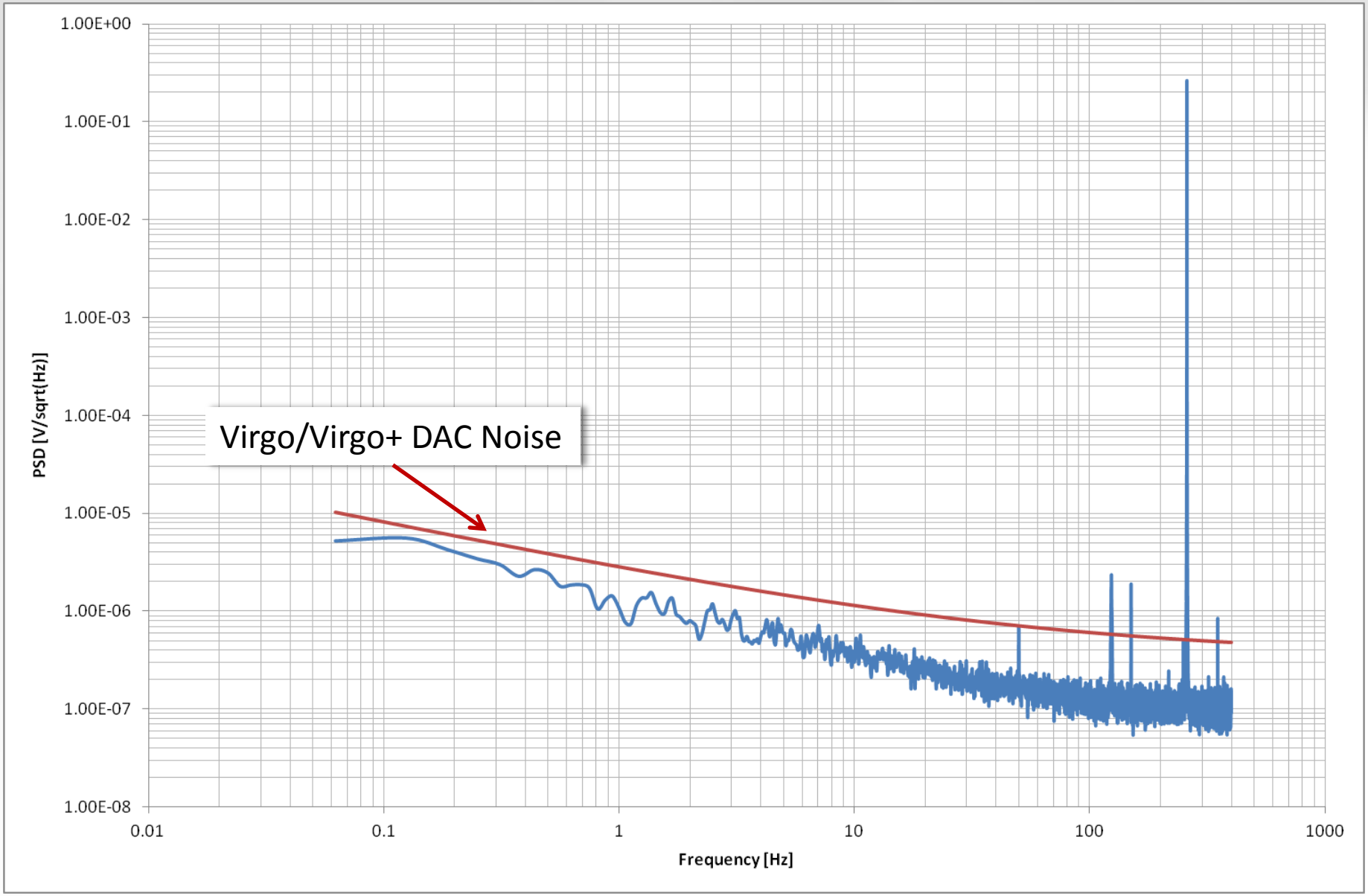


Old measurement (June 2013):
comparing with last plot it is evident the improvement we had in both noise level (about a factor 2 at 1 Hz) and in 50 Hz immunity (about a factor 10)

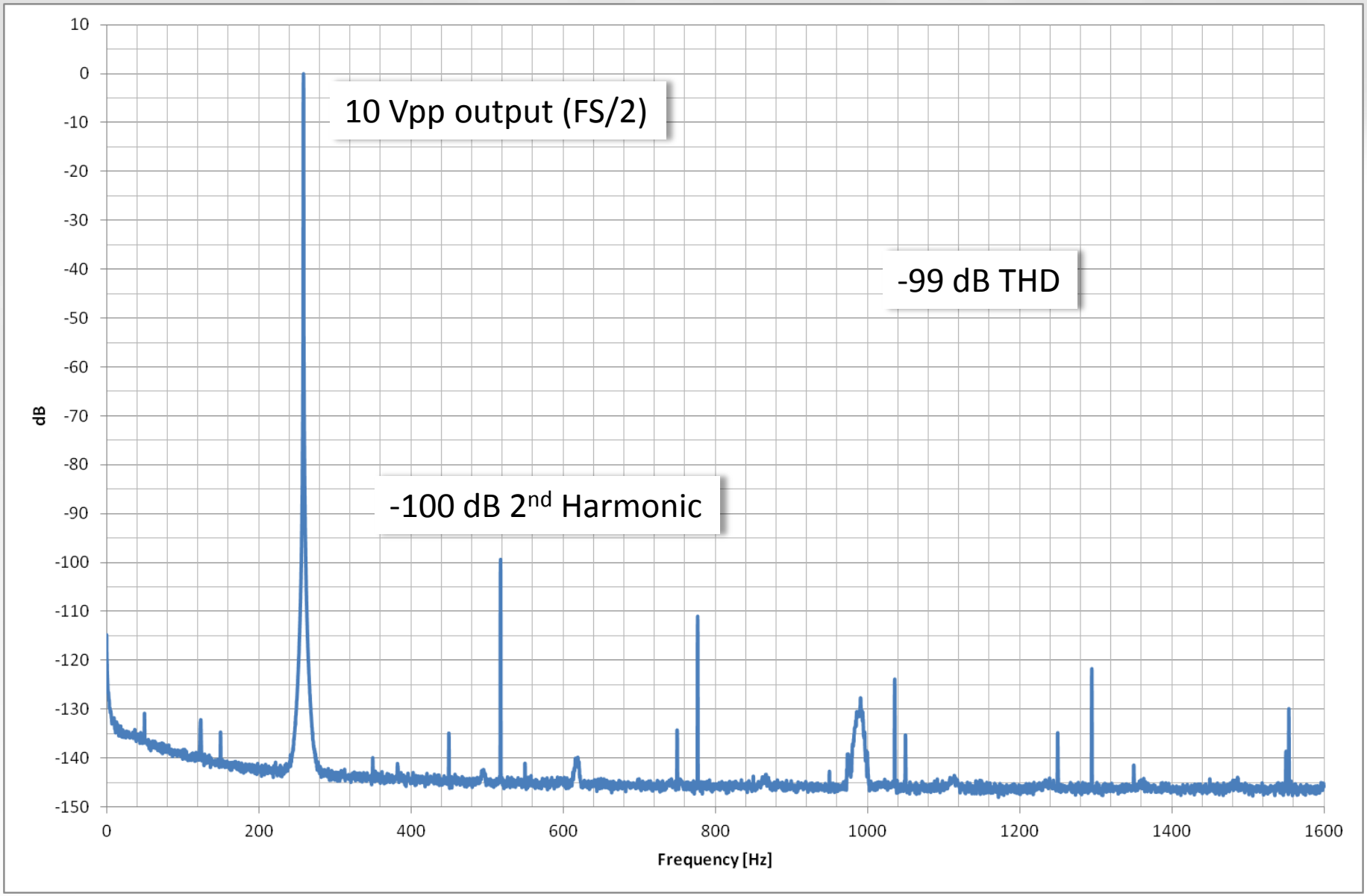
Performances –DAC Noise



Performances –DAC Noise



Performances –DAC Distortion (preliminary)



Production Summary

- **Only two minor problems were detected**
  - In certain operational conditions one of the two PCIe links is affected by noise generated by a dc-dc converter
  - Analog I/O connector is too large and overlaps contiguous boards
  - A new release production is in progress to solve both problems

- **Mass Production**
  - Starting from the beginning of new year we will be able to prepare few boards each week
  - ~20 boards/month a regime (boards for 1 suspension each month)

Components Procurement

- **Passive components**

  Passive components are provided by the firm in charge of boards assembly

  Estimated passive cost is 500 €/board

- **Active components**

  Active components will be purchased directly by us. We need about 25’000 components that will be split in 3 main orders (EBV, AVNET, ARROW) plus few minor orders (3 to 5).

  Offers are arriving in these days: most of the money for active components will be committed within the end of November (cost in the range of 150 k €)