

TNR-HFR updates

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Thanks to Emmanuel Guilhem (CNES) for providing new
fundamental material and documentation

outline

- update about the Calbar software
- TNR PA-HF transfer function

Calbar status (May 2018)

- A working version is already available (A. Vecchio) implemented at ROC by Quynh Nhu Nguyen
- Need to implement PA temperature dependence
- Define treatment of magnetic field measurements
- Currently testing the phase estimation; construct a theoretical model of TNR filters to compare with phase measurements of a known signal

magnetic measurements

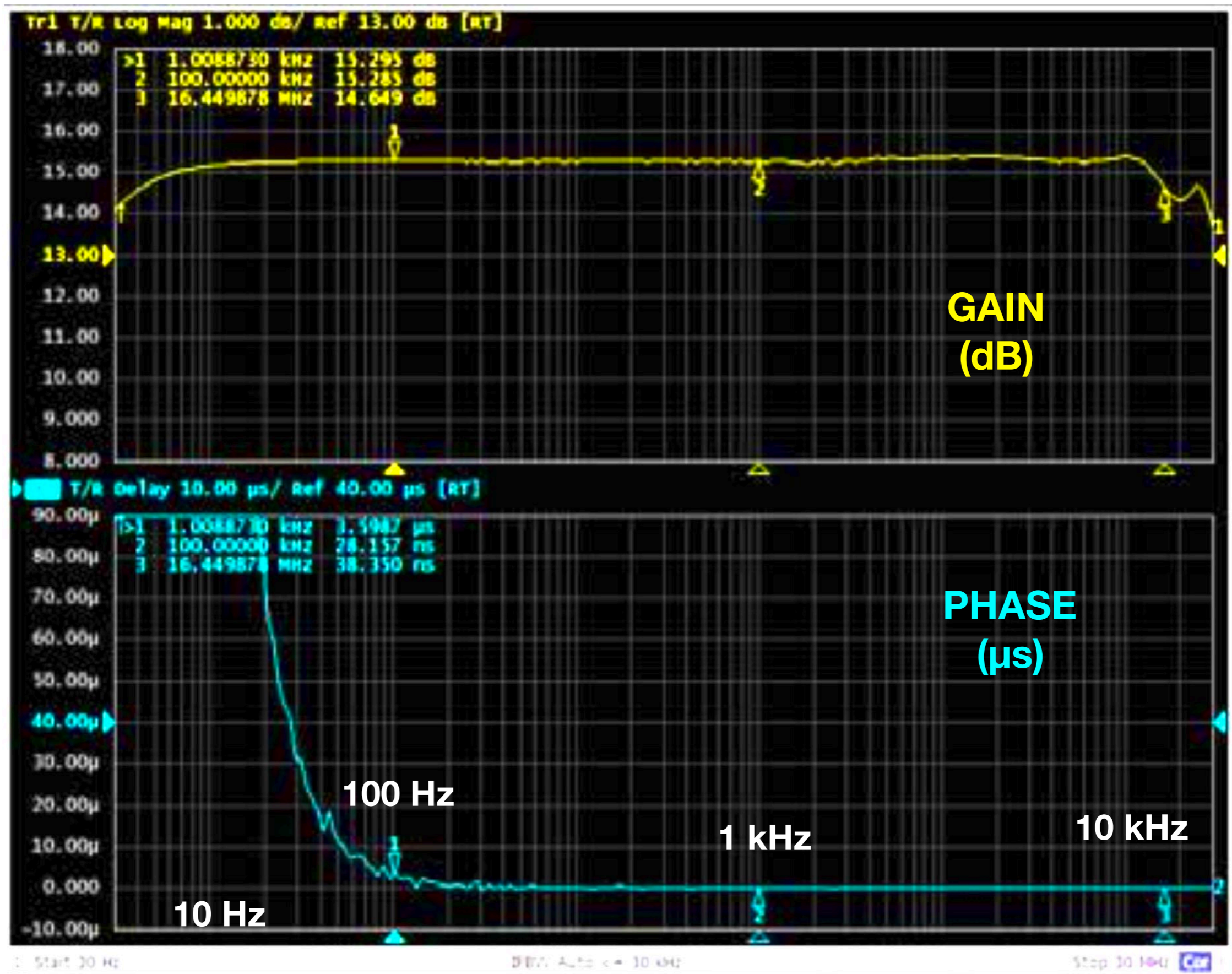
- After discussion with ROC (Xavier B.) we decided not to produce a different output for periods when magnetic field is measured.
This is to avoid too many different types of outputs and files.
- This means using basically the same CDF skeleton also for magnetic data.
An internal flag in the THR CDF files will signal if each individual measurement concerns magnetic field or not. Units (nT vs. mV) must then be associated accordingly.
(will it be enough for the typical user? i.e. is it ok not to provide separate E and B files?)
- During normal activity of instrument, 2 possibilities when magnetic signals are involved:
 - both channels correspond to the same frequency range for E and B (TNR),
we then provide also cross correlation of electromagnetic signal
(direction finding possible)
 - 2 different frequency measurements in the 2 channels (B-TNR and E-HF):
no cross correlation and separate B and E values are provided (but in same file)

Transfer function of TNR HF Pre-amplifier needed for production of L2 TDS files

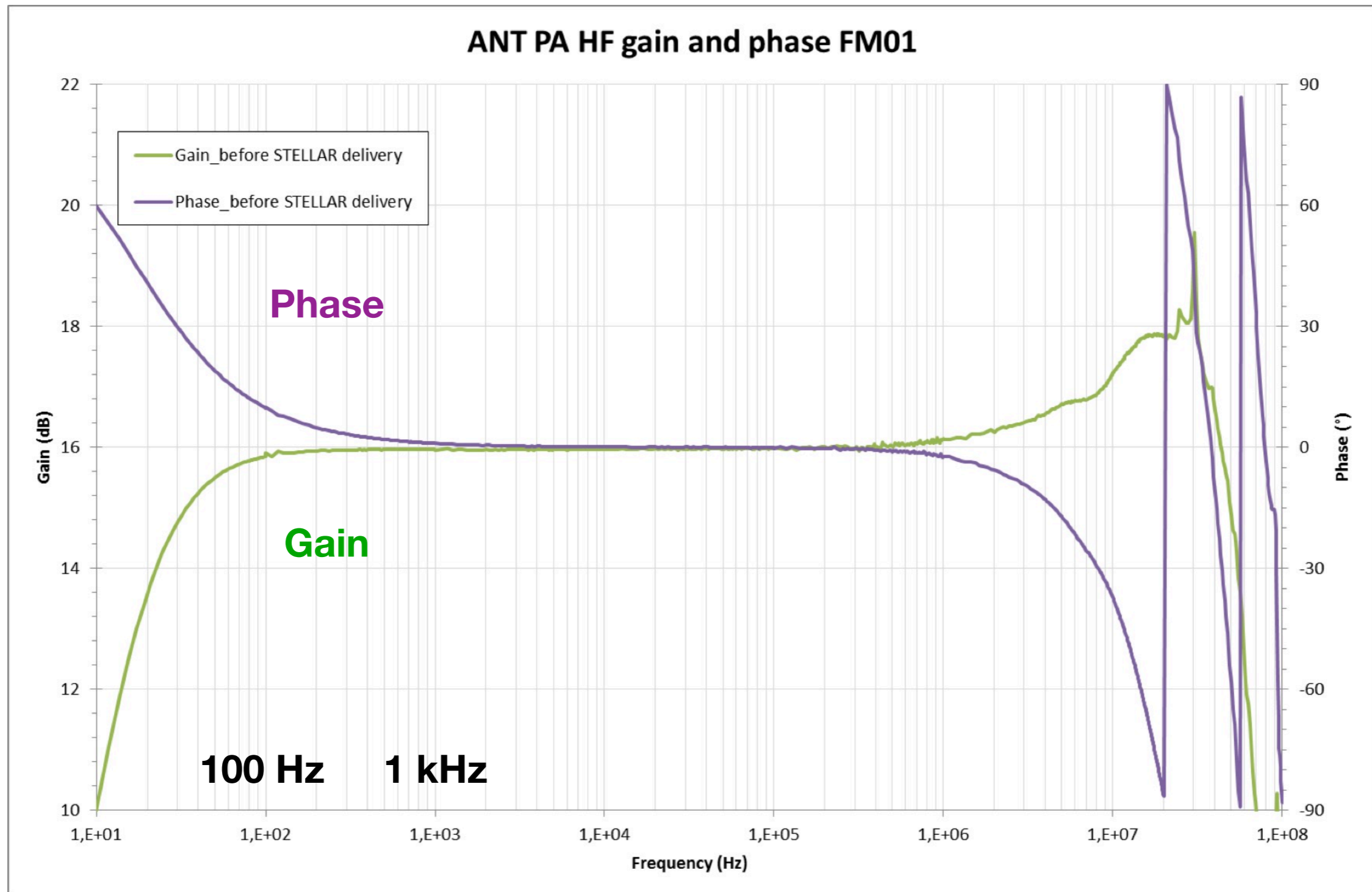
Request: characterisation of PA of TNR which are also used by TDS in their HF frequency domain (starting from 1-100Hz?)

Work in progress, feedback from TDS team needed!

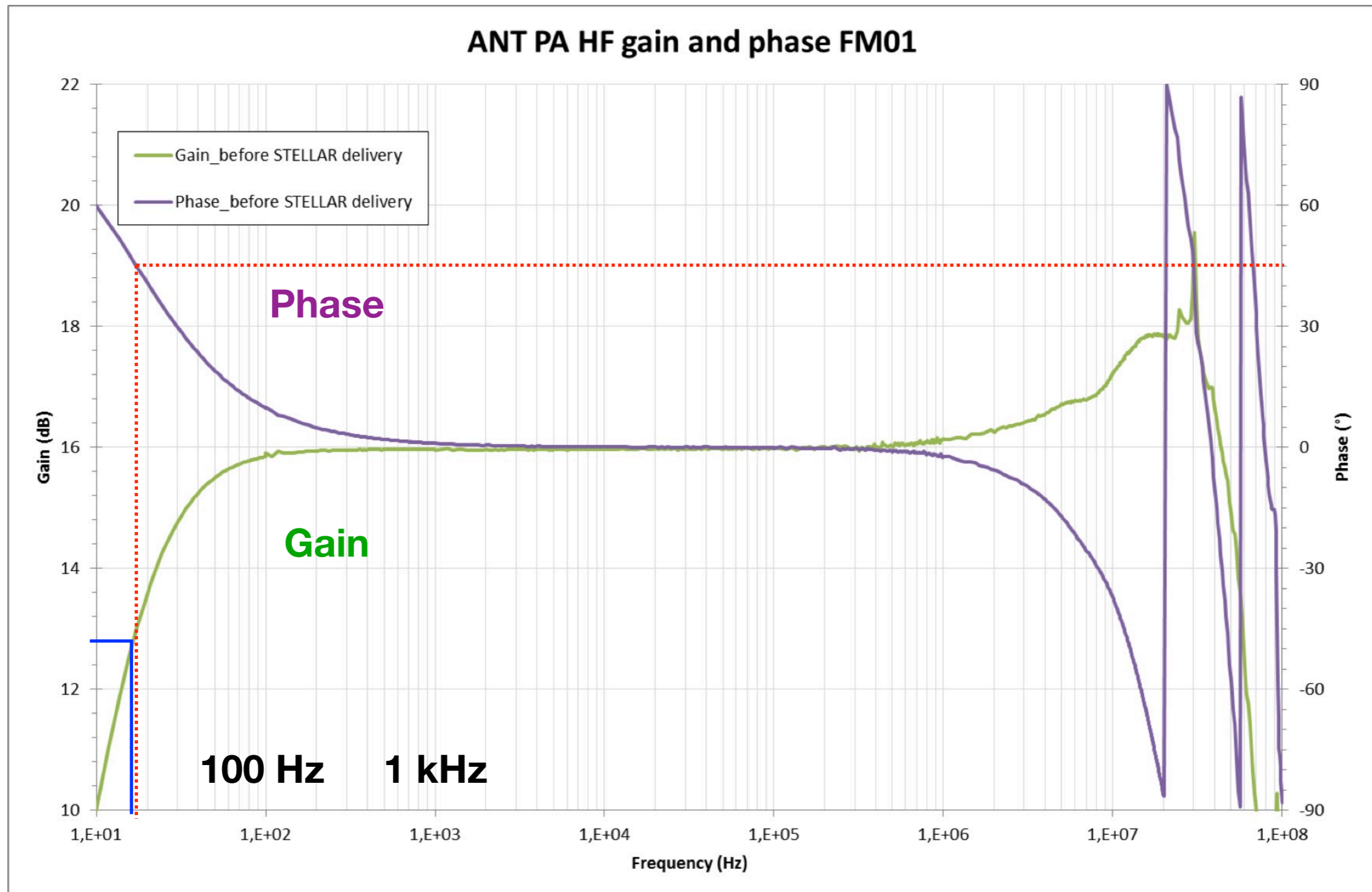
@ Lesia (Moustapha D.)



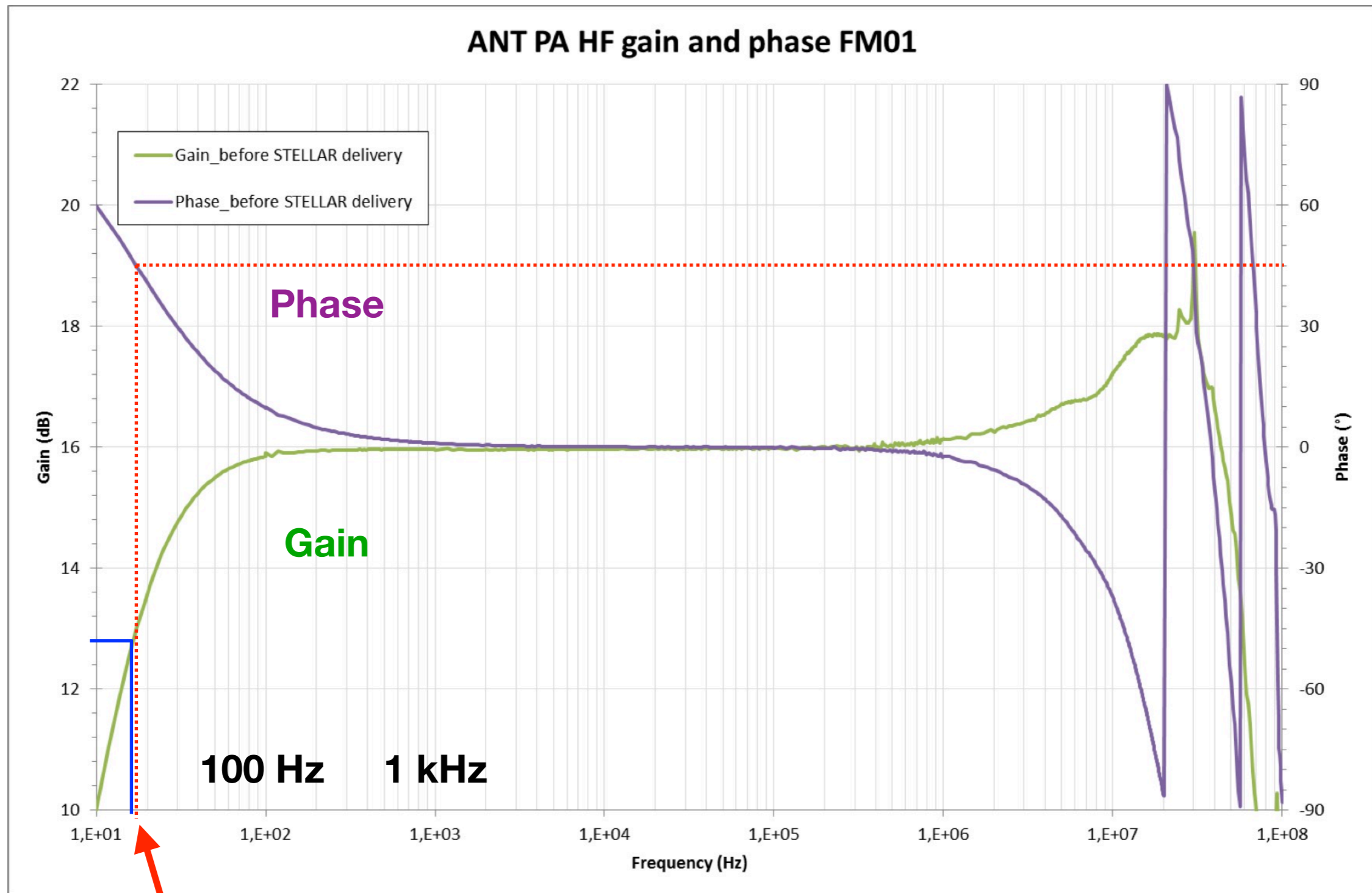
Documentation from Emmanuel Guilhem (CNES)



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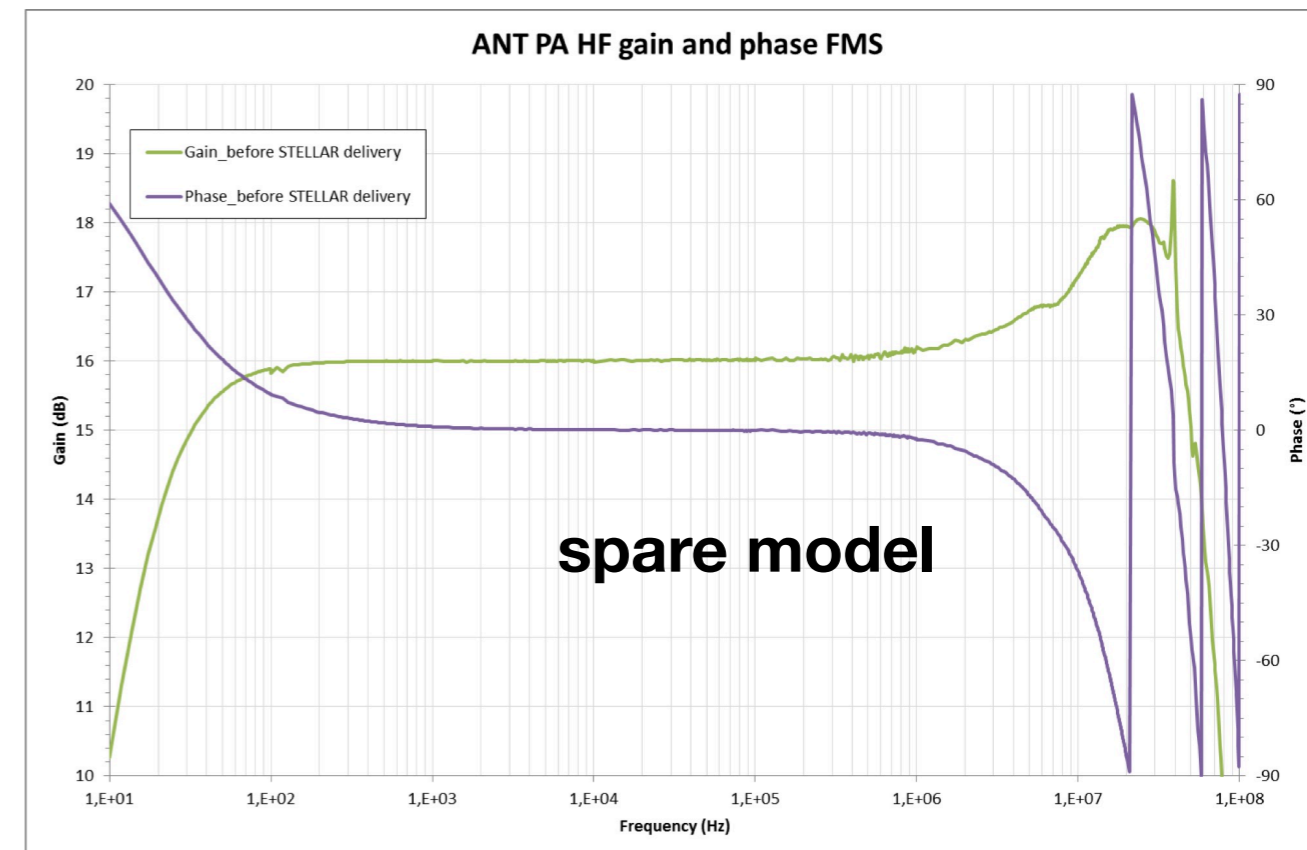
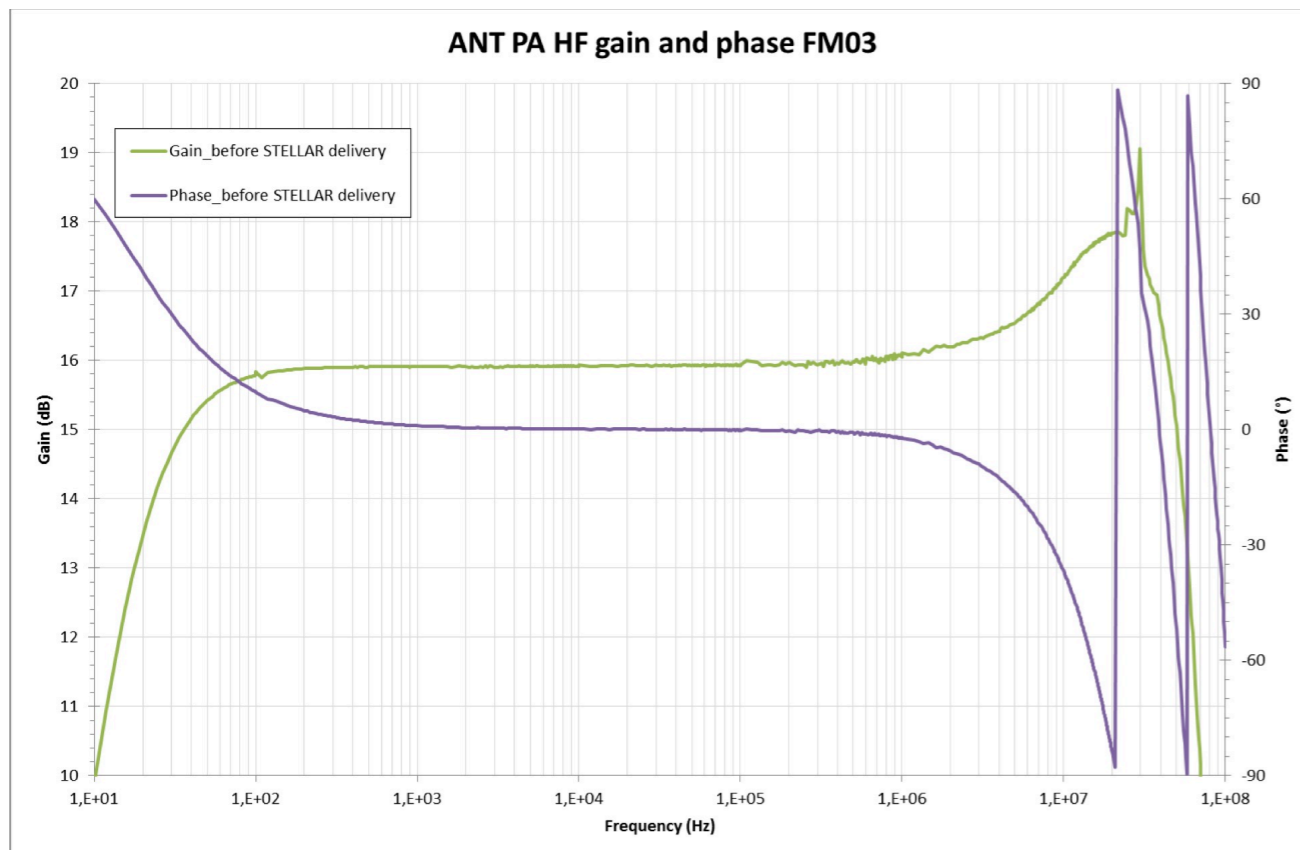
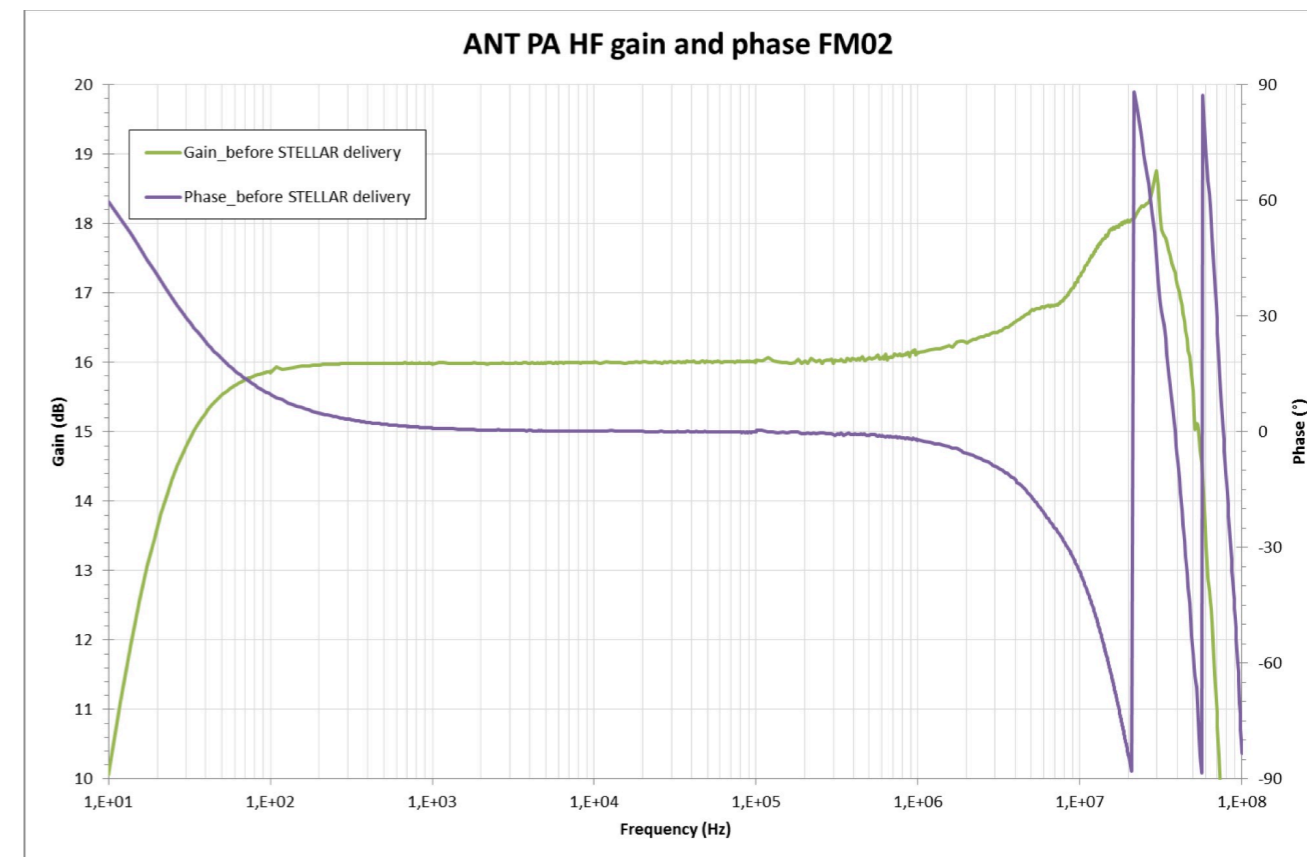
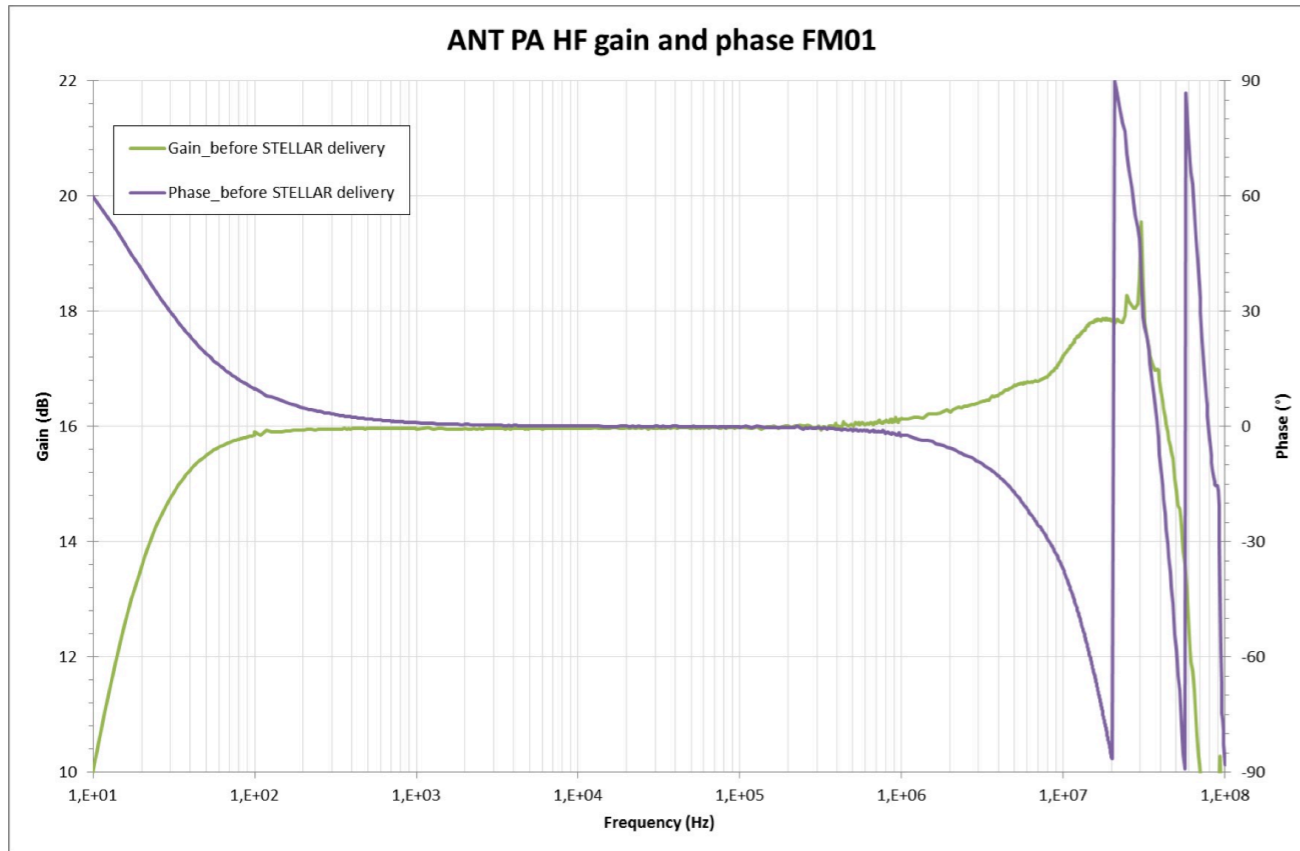


Documentation from Emmanuel Guilhem (CNES)

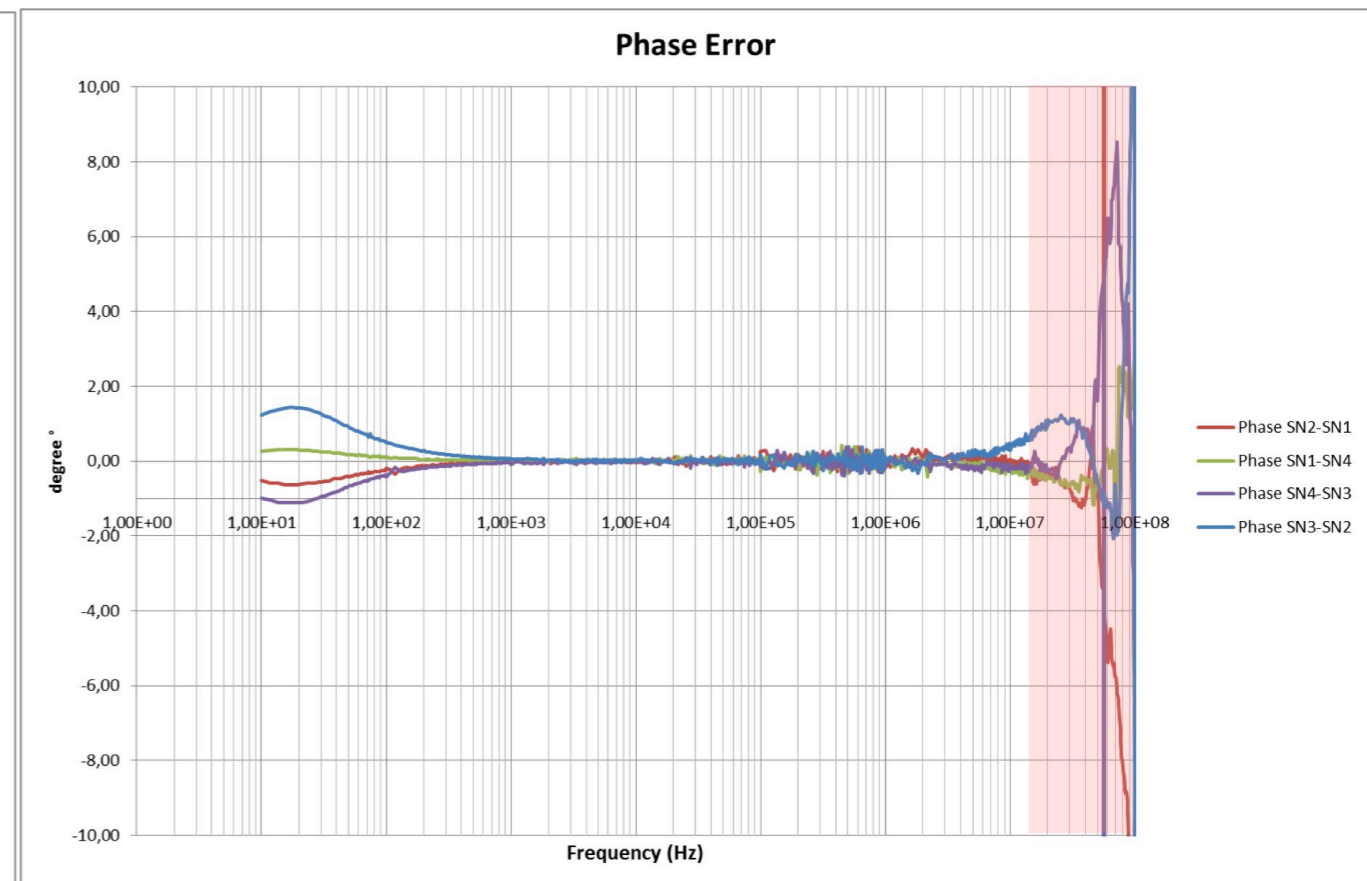
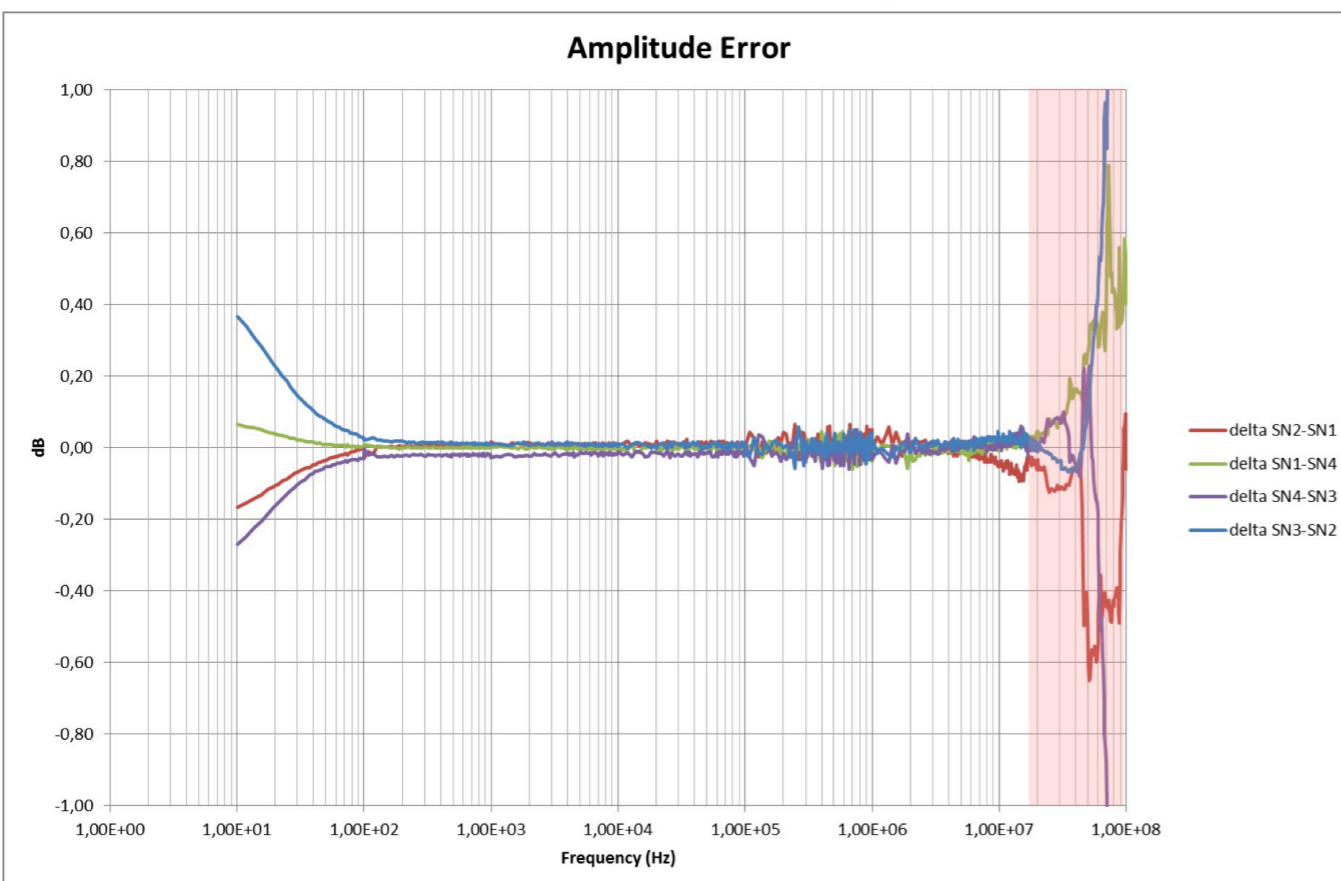
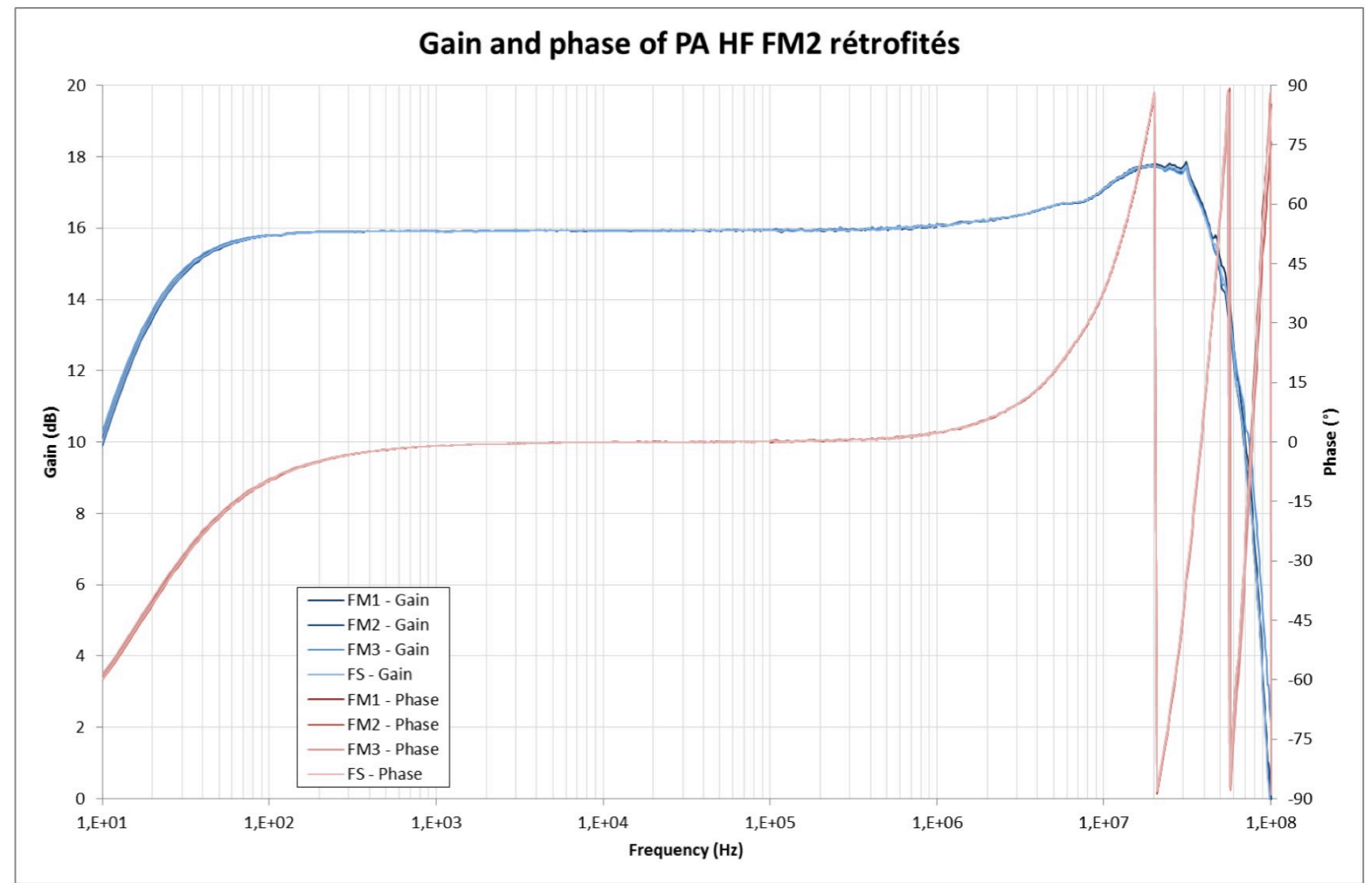


Very good matching with PA nominal cutoff frequency: 18 Hz

Phase and gain for all PA (all quite similar)

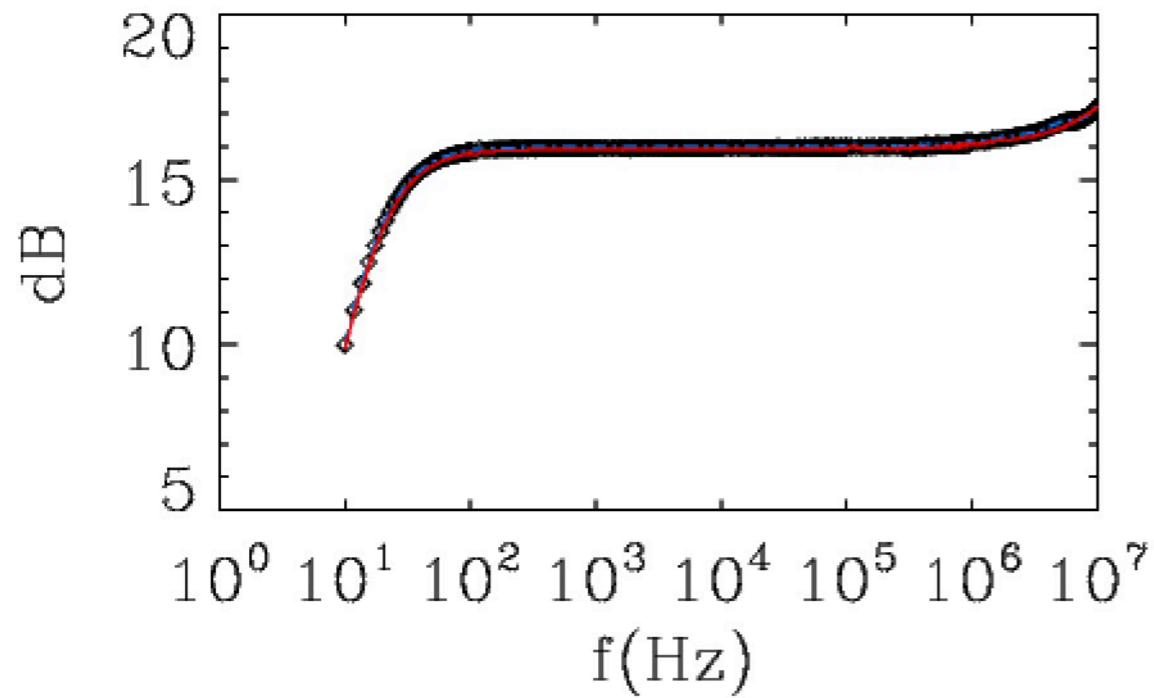


All sensors together

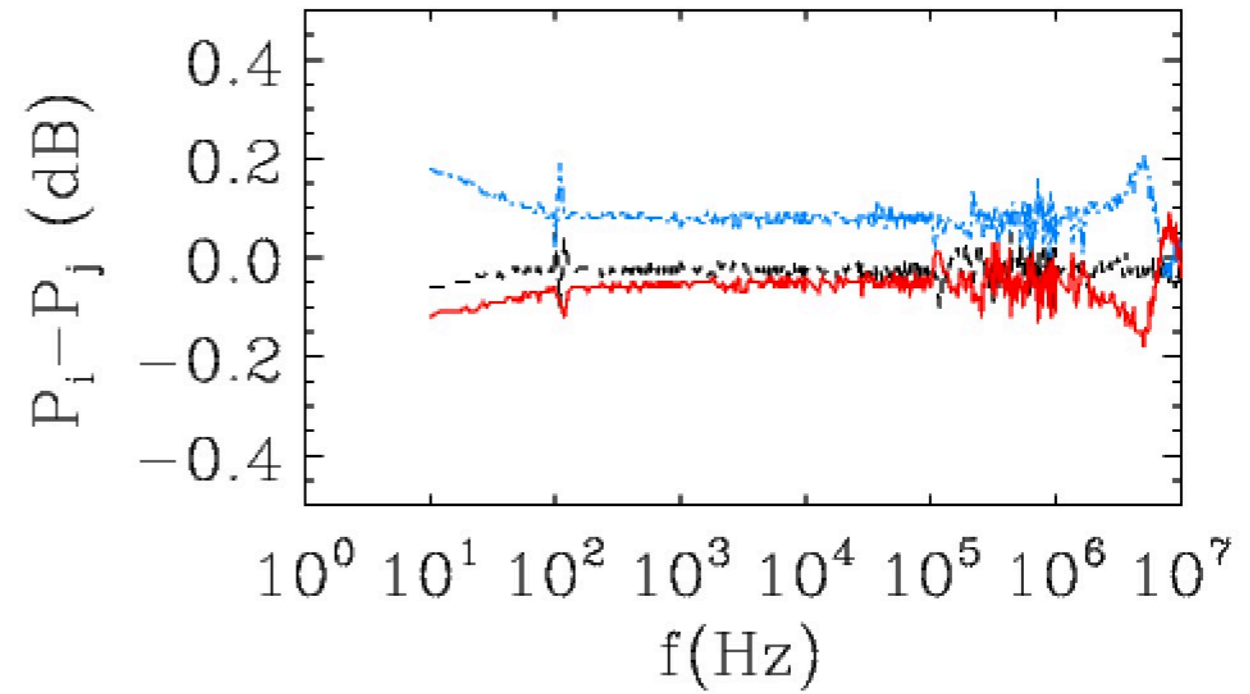


Differences between PA

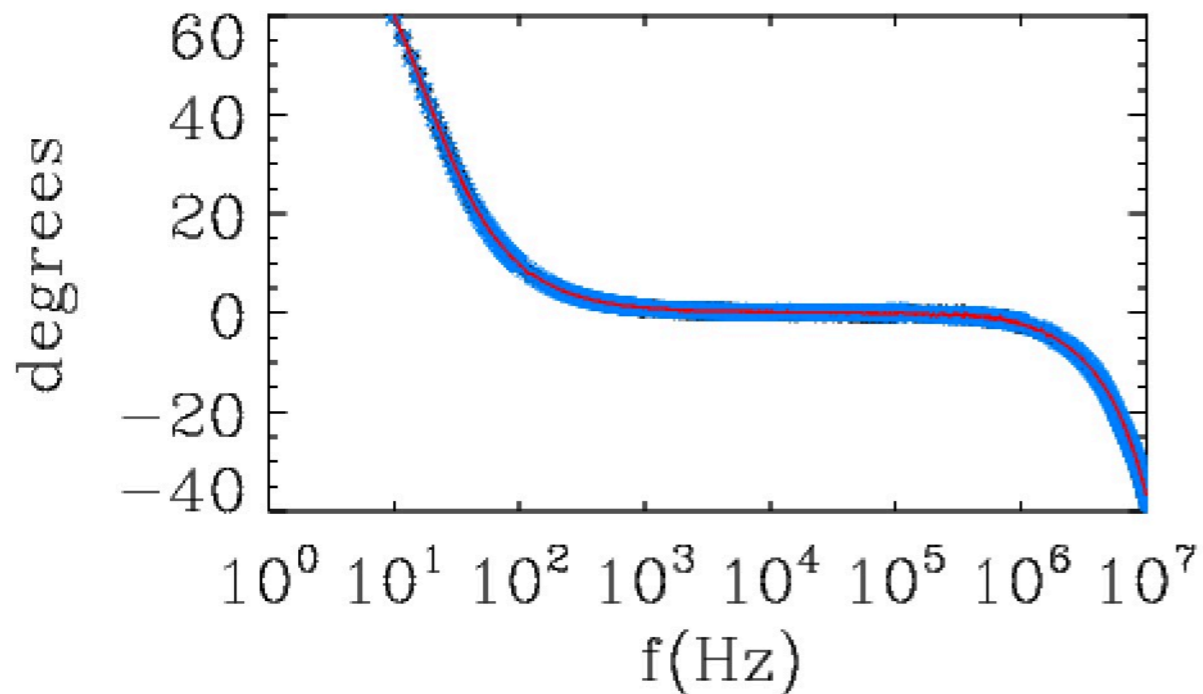
Gain 3 sensors



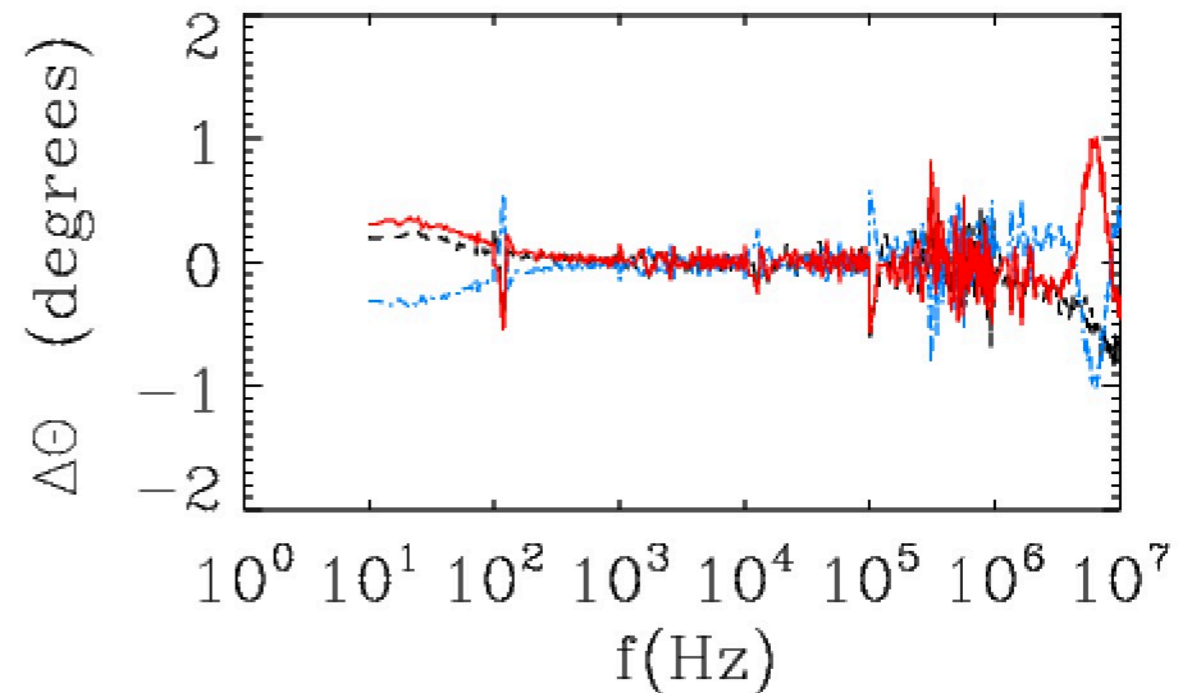
Gain 3 sensors



Phase 3 sensors

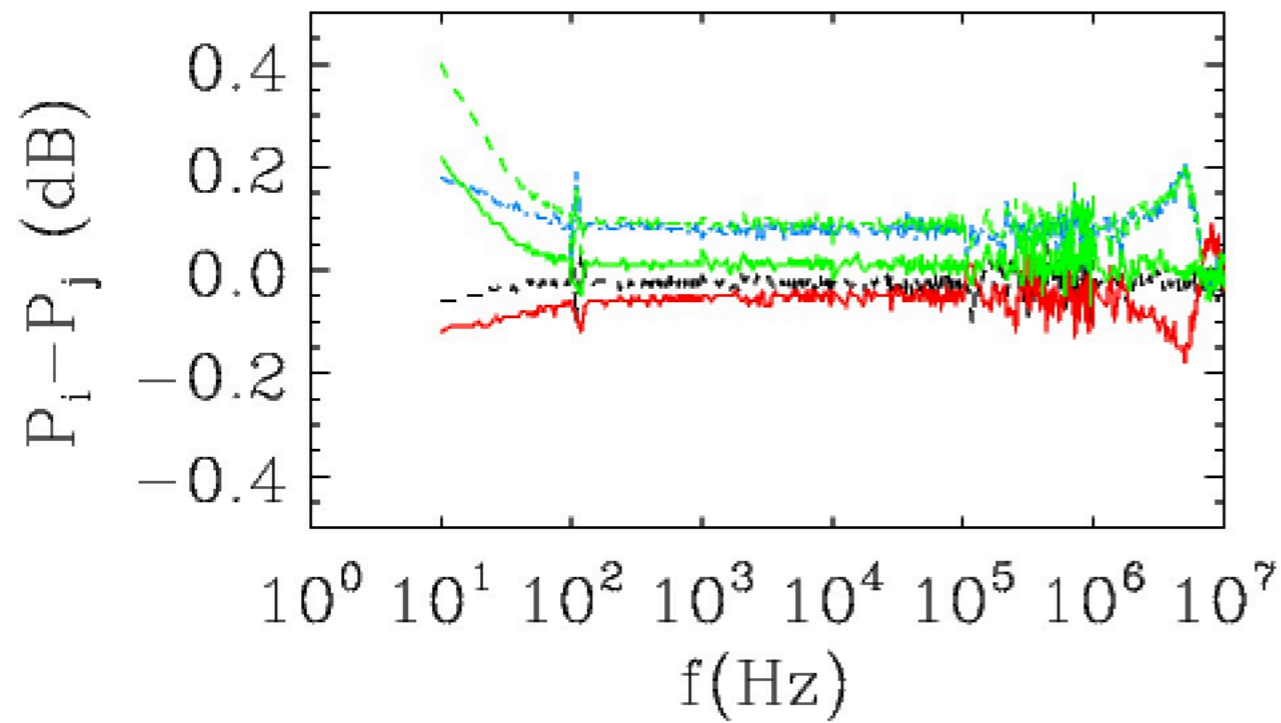


Phase 3 sensors

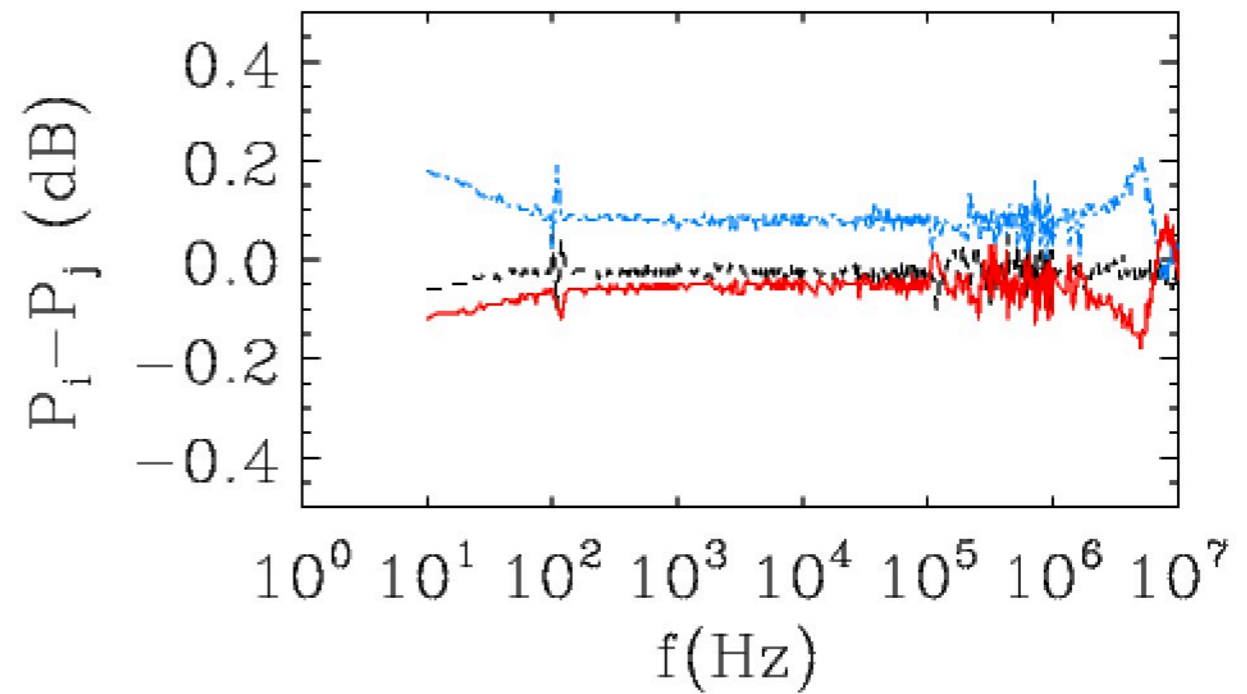


Differences between PA

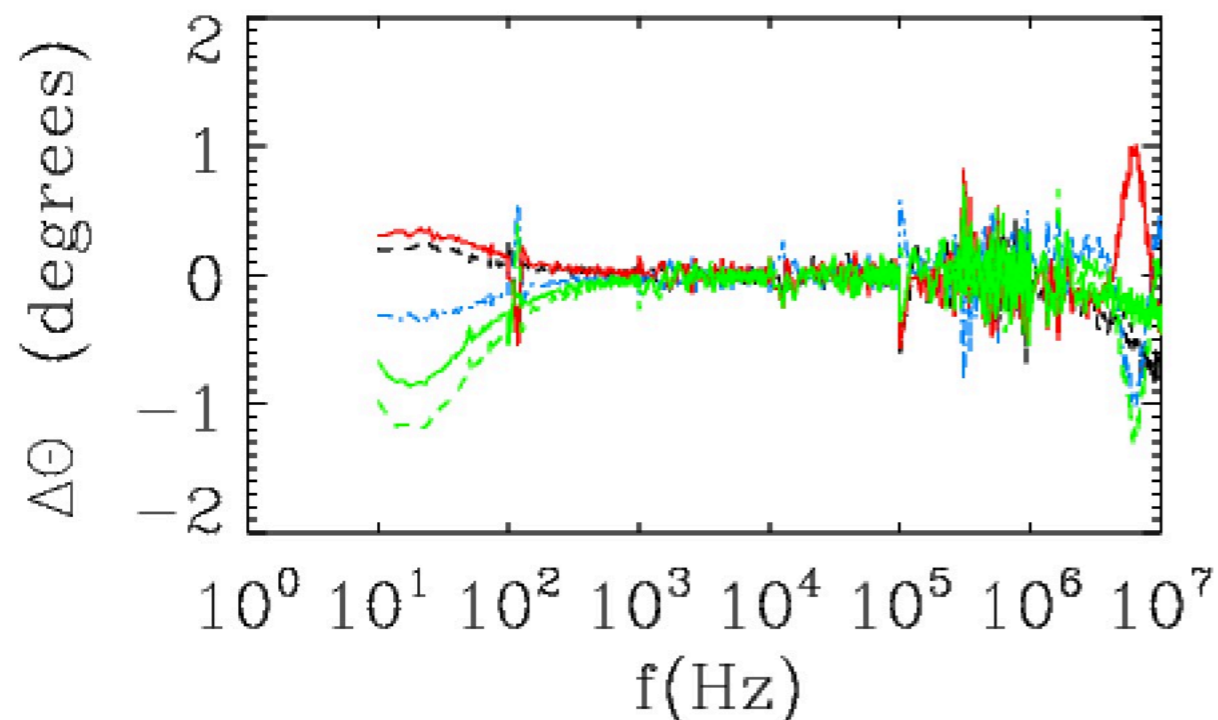
Gain 3 sensors



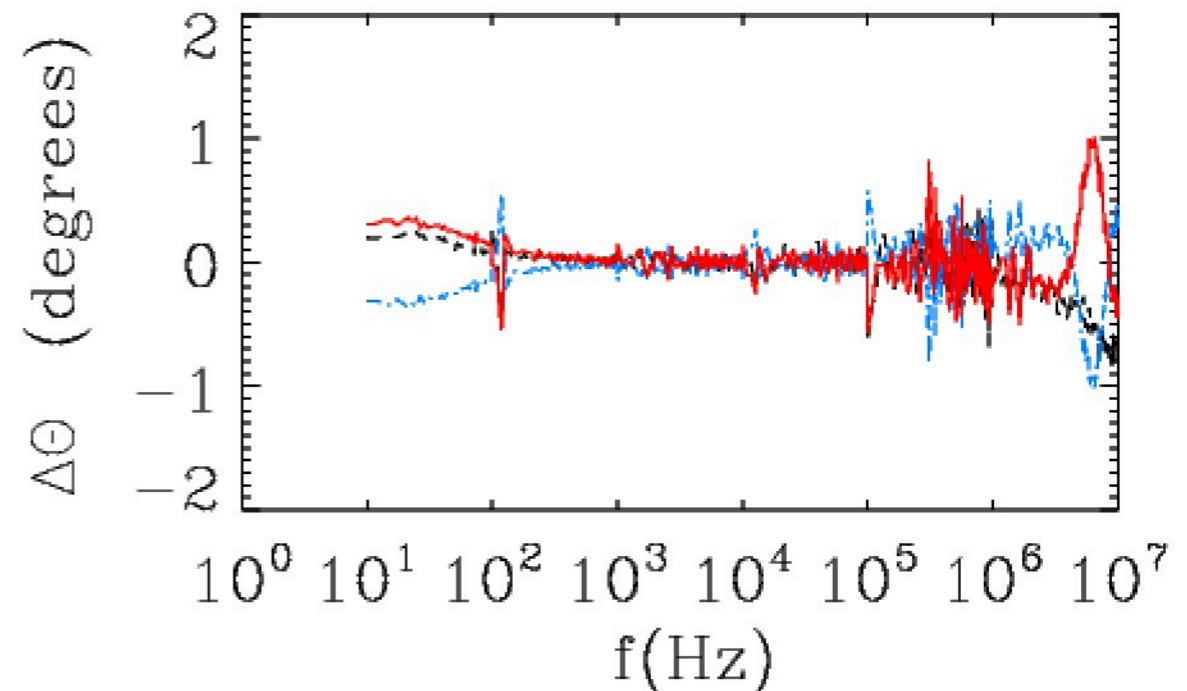
Gain 3 sensors



Phase 3 sensors

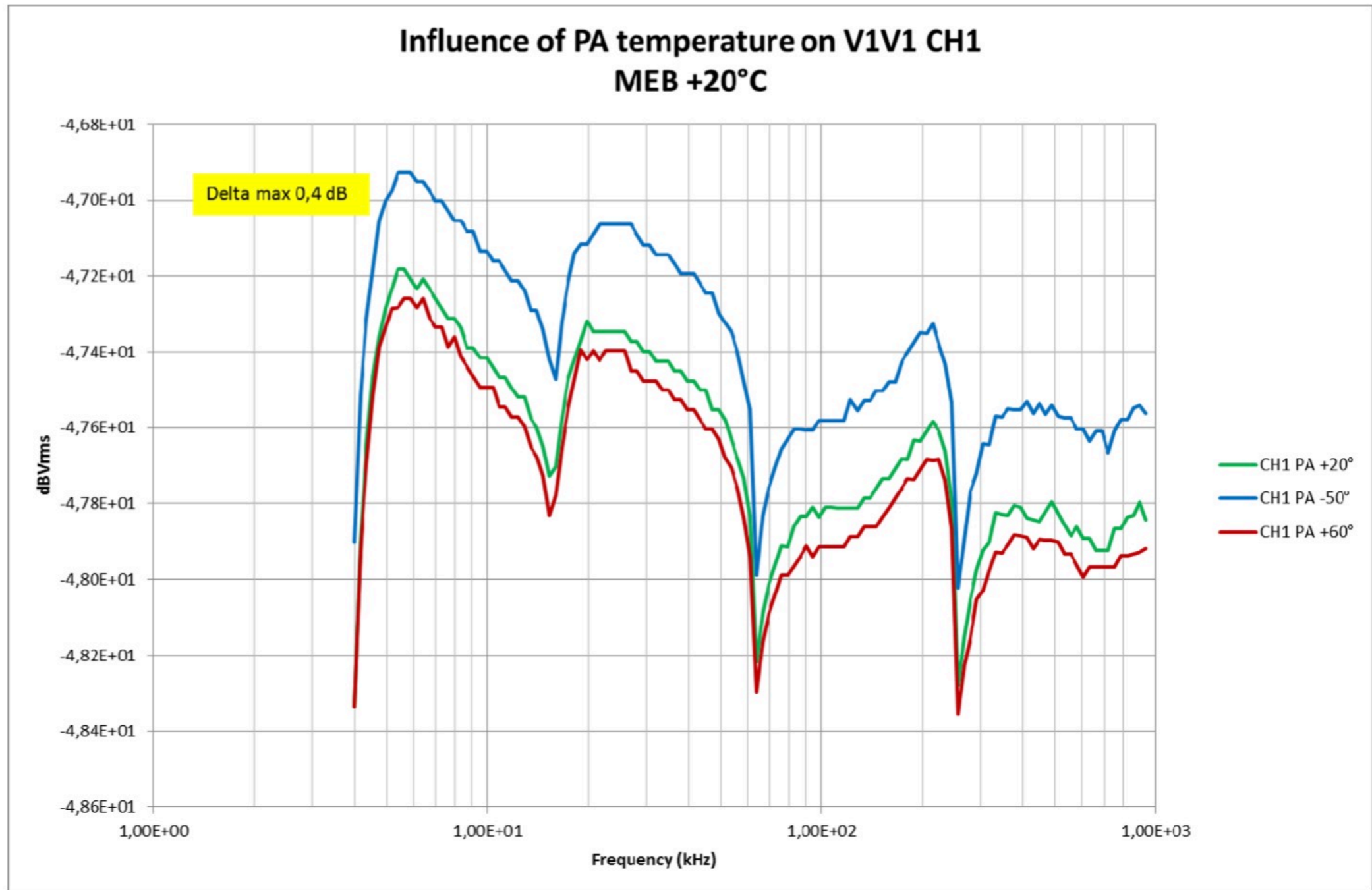


Phase 3 sensors



Temperature dependence

4.1.1.2 Influence of Preamplifier temperature on Electric measurements



A little influence of the preamplifier temperature can be seen: 0,4dB.

conclusion

- Some implementations still needed in the Calbar (update temperature tables, finalising B treatment + check of phases)
However, these do not modify further the existing outputs and the implementation into ROC pipeline.
- **Data available from CNES for the TNR HF PA (good news!).**
Then possible to construct the needed transfer function for TDS.
How should we proceed? Calculate a transfer function and pass on to TDS team?
Or does TDS team prefers to get data of these plot and derive them the needed information?
In any case, is it agreed that TDS software will produce the final L2 data?
- Archive this additional material from CNES (plots, data, documentations) into some RPW resources? ROC?