# The ESS Database for Elliptical Cavities

THP099

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The large in kind scope of the elliptical superconducting RF linac of the ESS facility implies the *handling of handover conditions between the cavities fabrication and testing phases performed at INFN and STFC, to the assembly of cryomodules at CEA and later to ESS in Lund*.
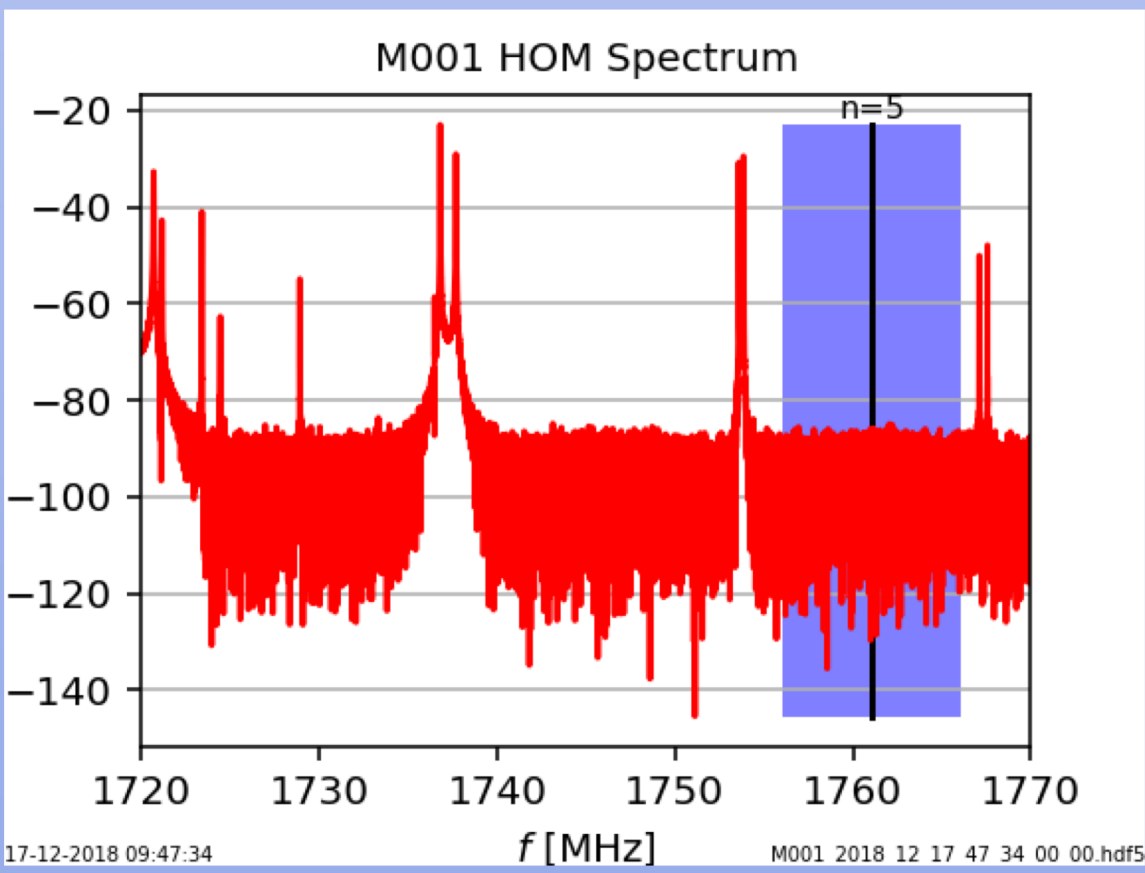
The performance qualification at the test stand, and later the commissioning and operation phases require the availability of the cavity performance and frequency data under all environmental conditions during preparation (e.g. temperature, vacuum in beam line/He vessel/vacuum vessel, tuner state). Availability of the data needs to be guaranteed for the long term maintainability of the accelerator. For these reasons a cavity database has been set up at ESS, integrating the data contained in the handover documentation from the in kind partners and extending it during the activities at ESS after receiving the modules. The database has been used to analyze the preparation steps of the prototype demonstrator cryomodule for the tests at ESS, by benchmarking with the data collected during the tests at CEA, and is currently used during the series cavities handover phases.

Measurement tools
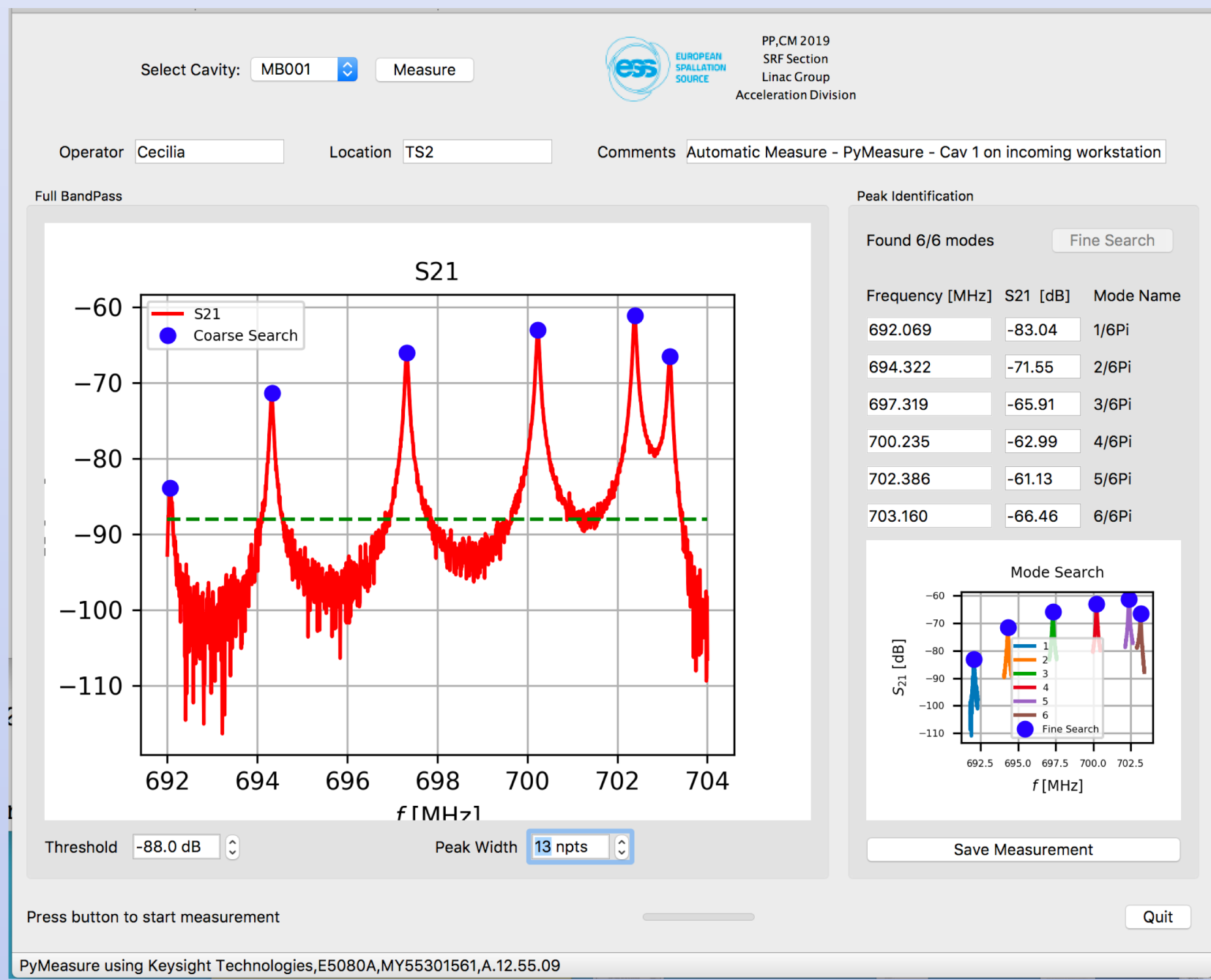
The tool allows to measure cavities **S21 with VNA** and store data automatically in the cavity DB

- Bandwidths
- Transmission
- HOM spectrum
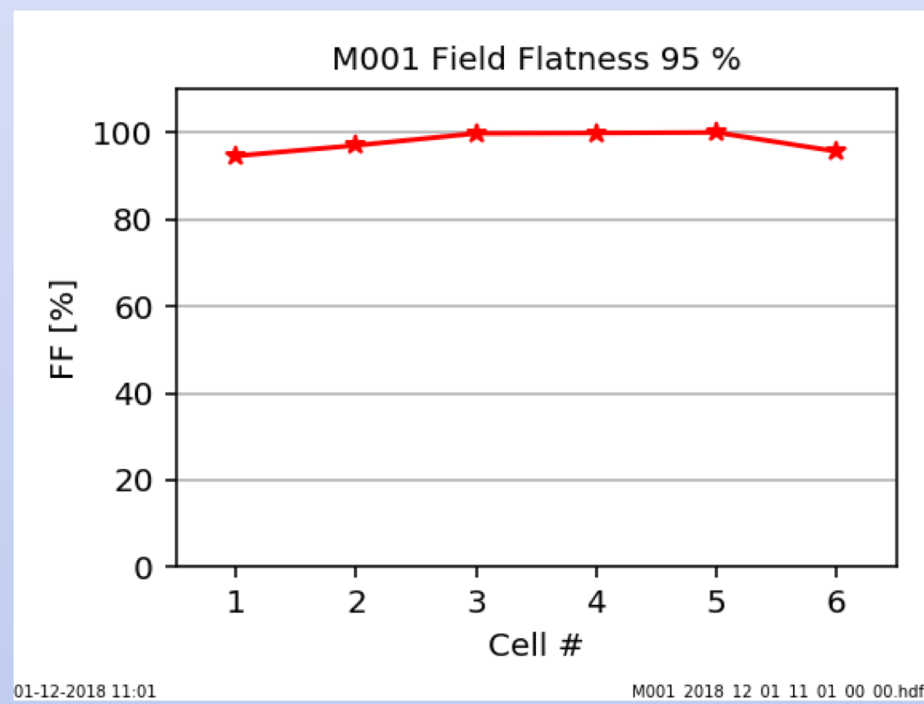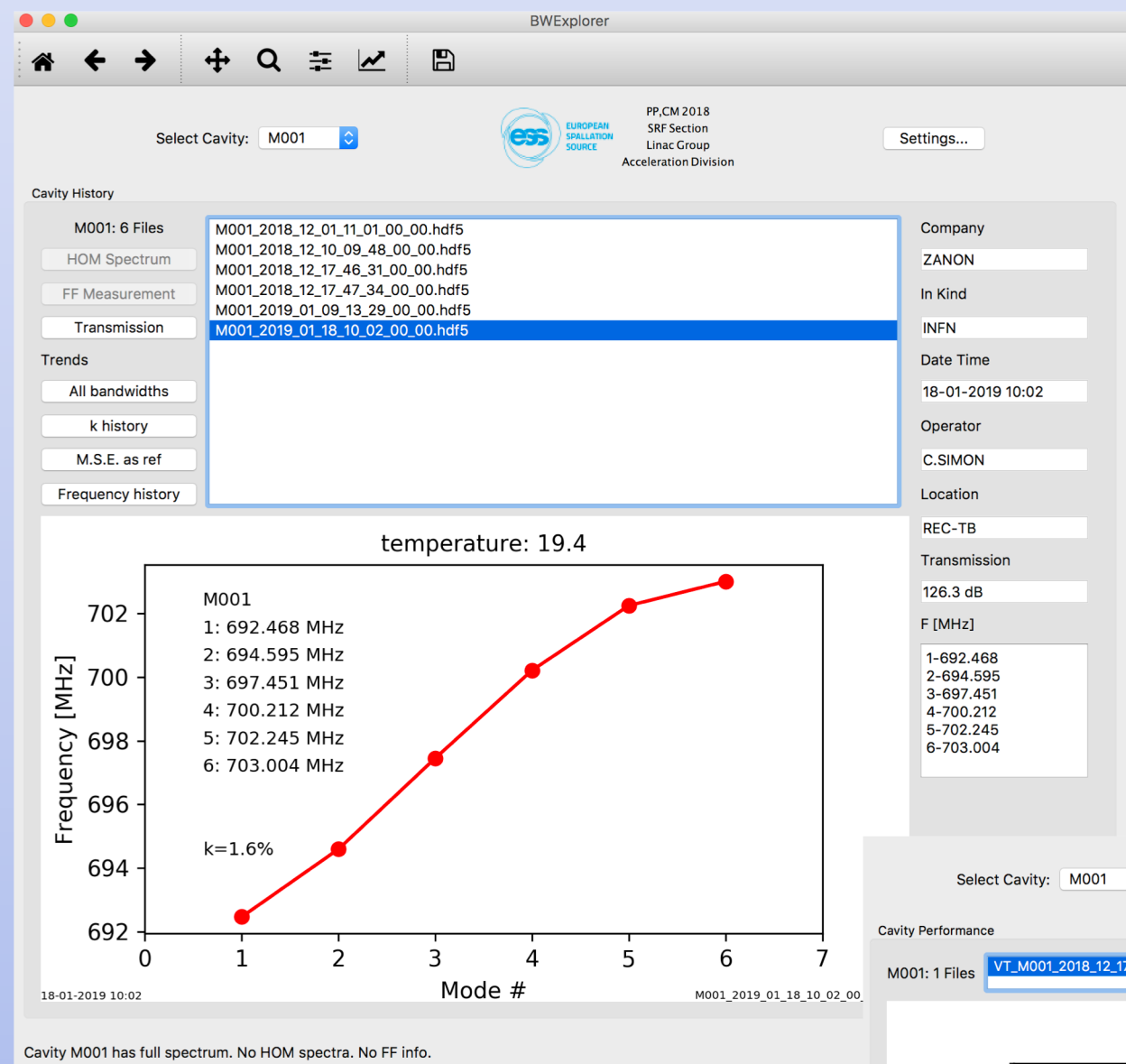- F tracker (e.g. pumpdown)

Architecture of Data Storage

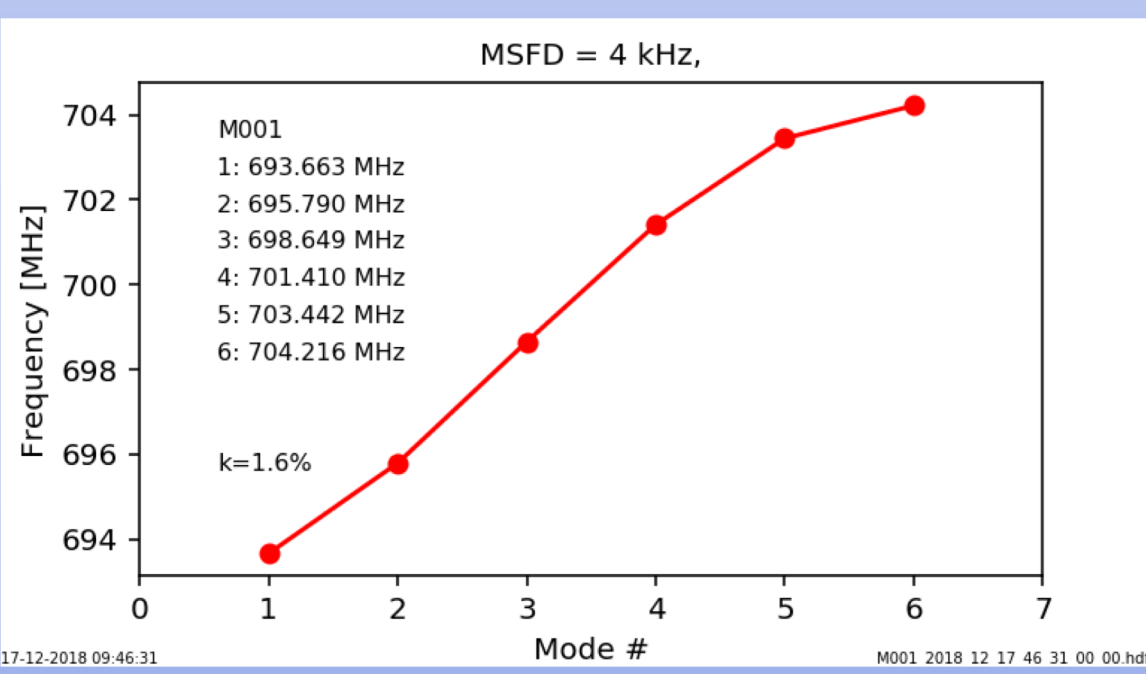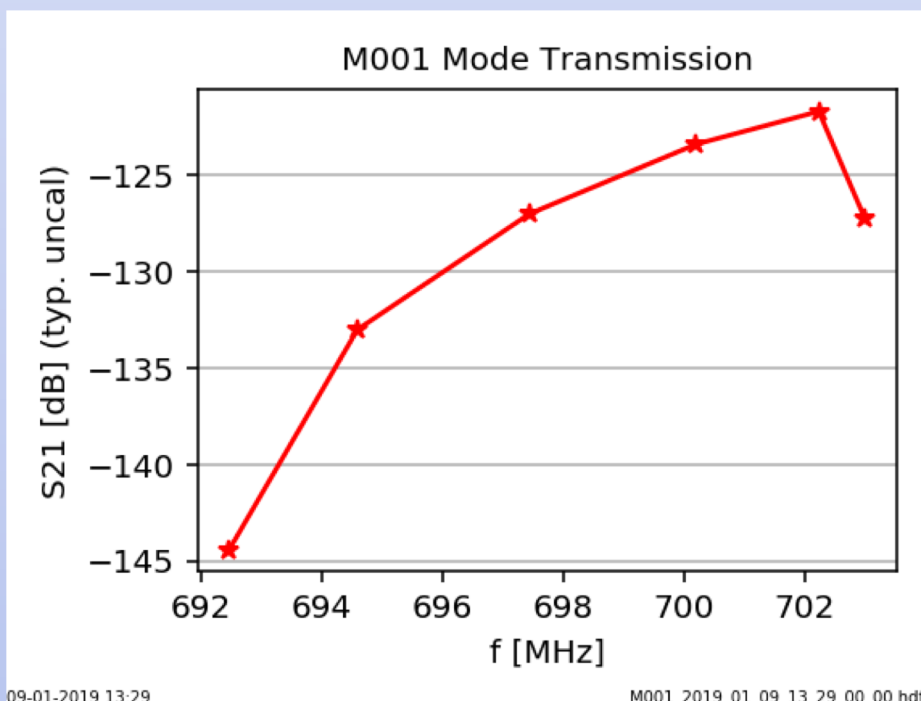

Existing Tools (ESS Gitlab), all open

Browsers: Bandwidth & VT Measurements

To check fullfilment of specification or handling the handover conditions.
Browse, display & analyze cavities measurements at cold & warm.
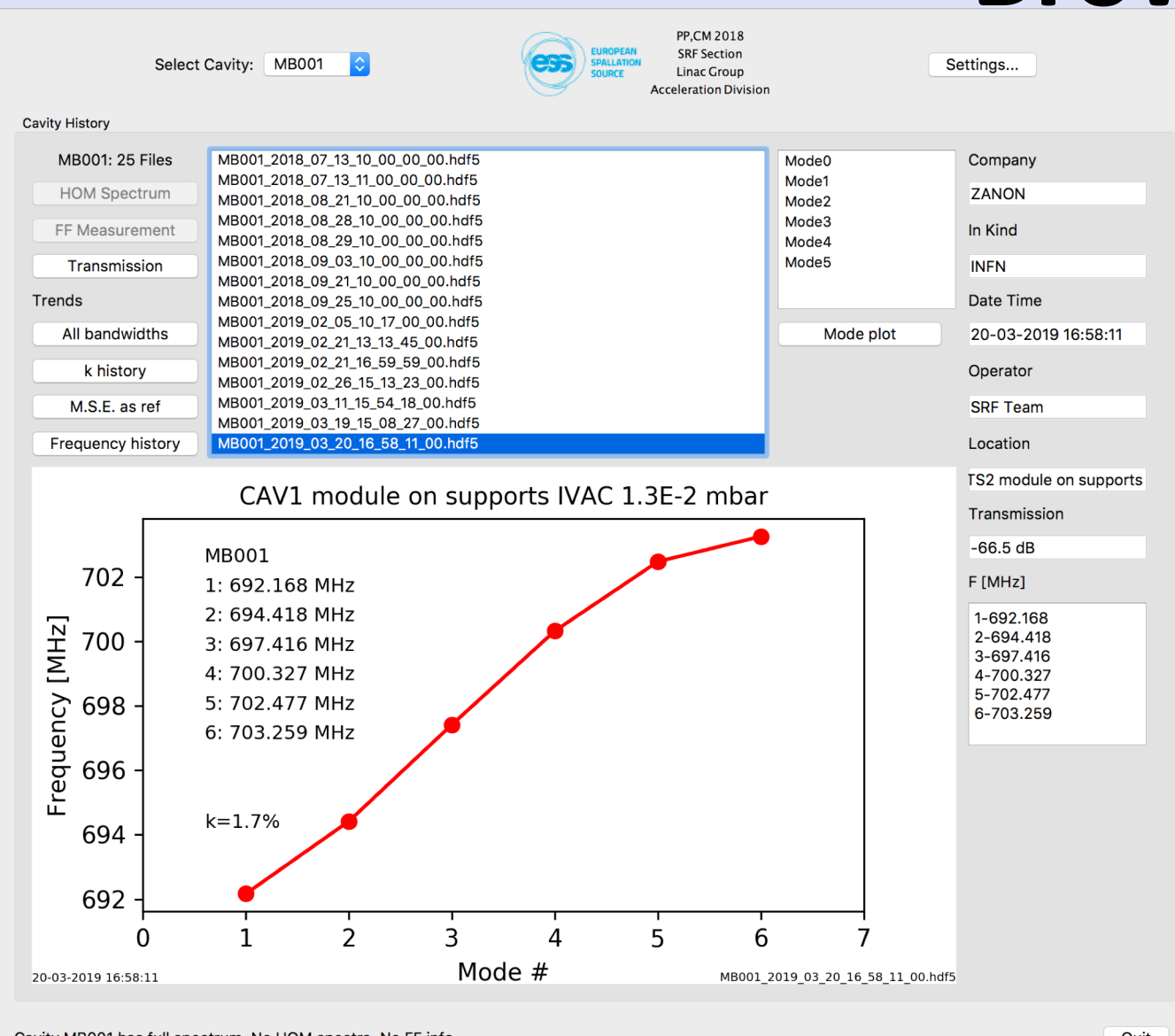

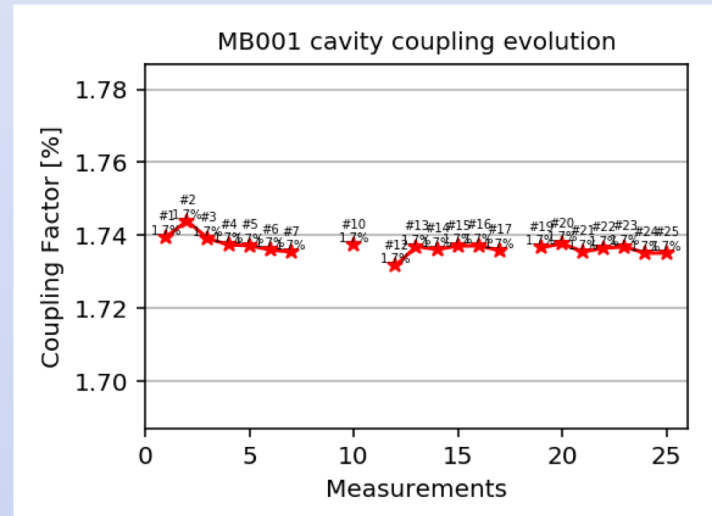Field Flatness measurement

Transmission monitoring
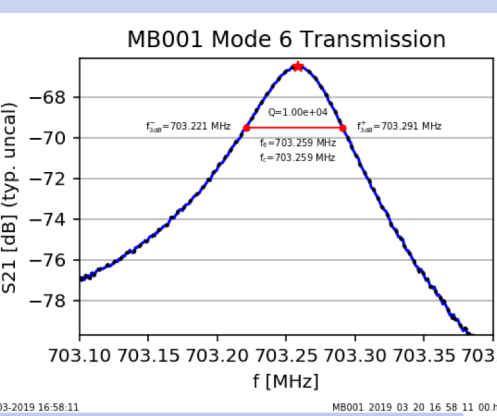
Cold Spectrum

- Cold Test
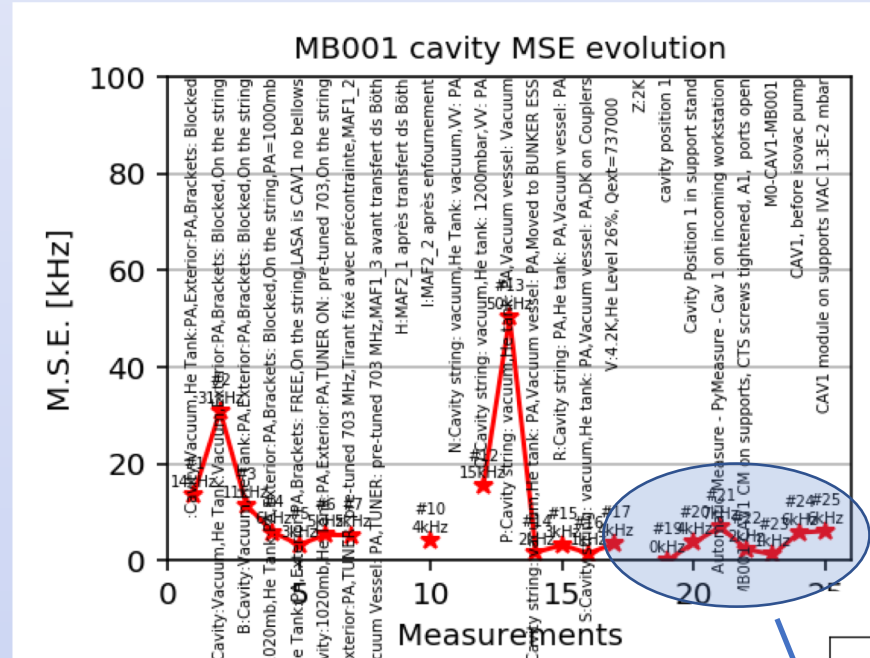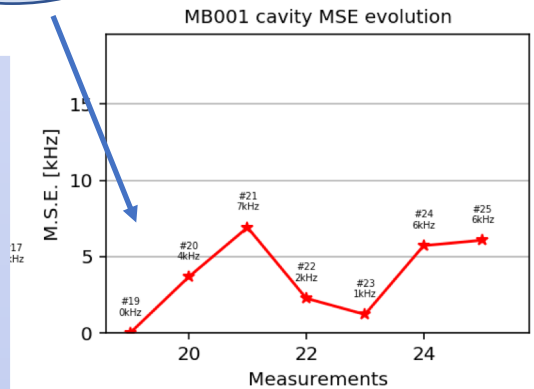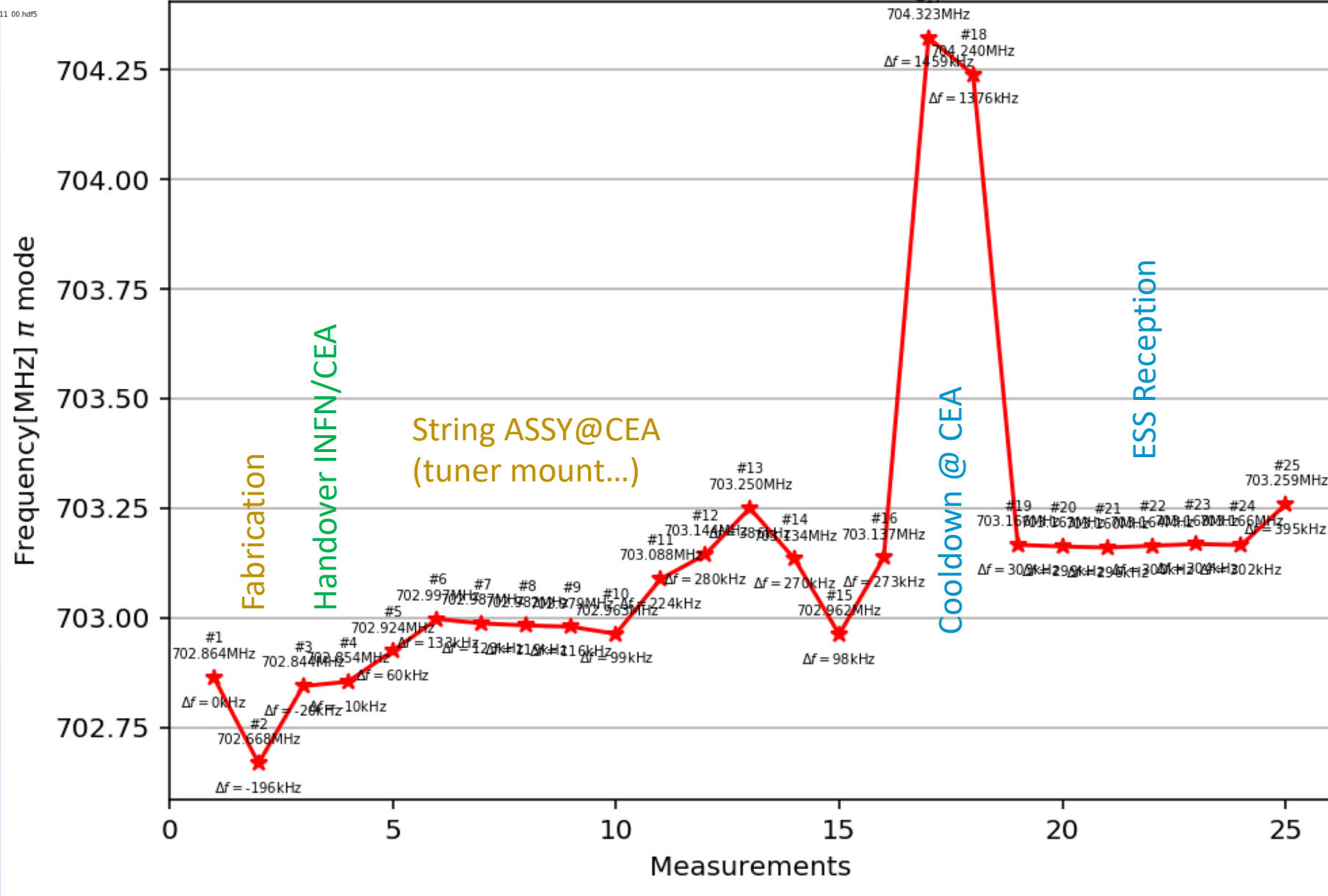- RF calibration

Browsers: data trends

coupling

Q-values

MSE, Mean Spectrum Error
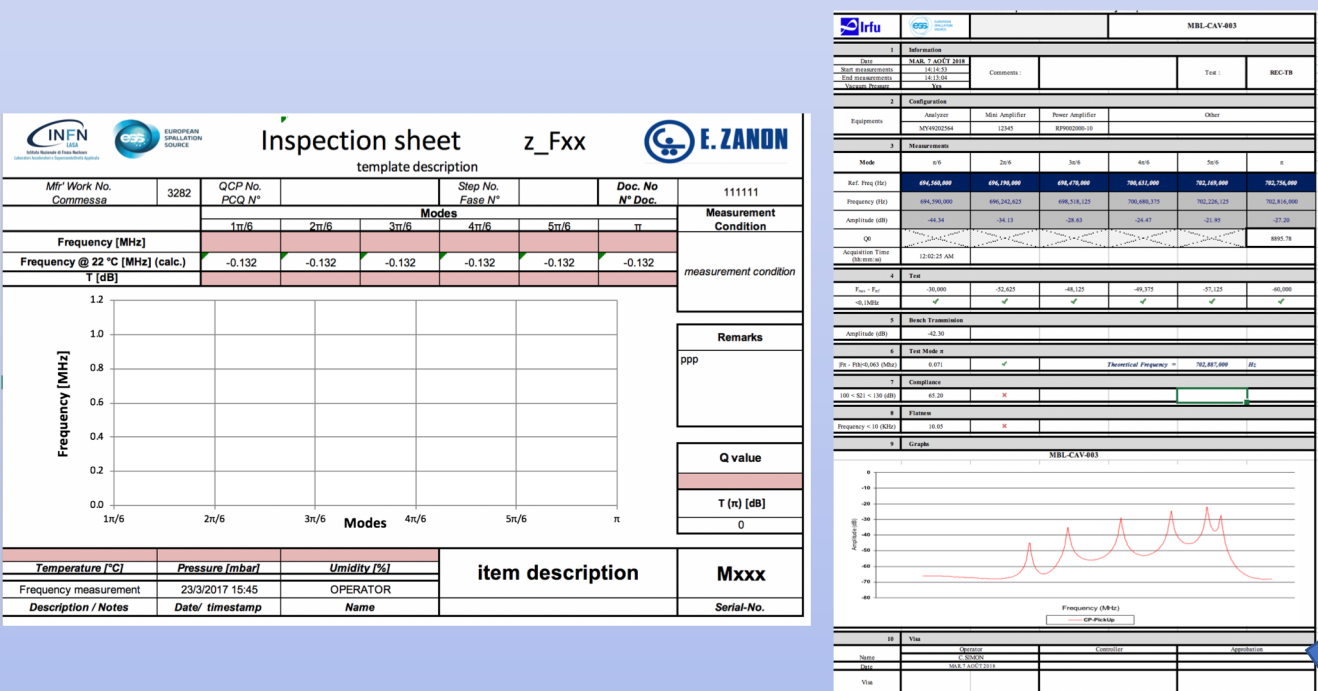
Pi-mode frequency history

Performances of the first series module cavities

ESS Scope

MEASUREMENTS @ IKC
- After fabrication
- Intermediate handover
- Outgoing

Measurement&Calibration DB (ownCloud service)
https://meas01.esss.lu.se/owncloud/index.php/login

Live Staging Area (typ. text files or xls)

Transfer

Save

Script

Normalized Data (HDF files, metadata)

Tagging (in metadata)

ESS Asset Management ID Installation Structure

Script

https://gitlab.esss.lu.se/SRF_Section

MEASUREMENTS @ IKC
- After fabrication
- Intermediate handover
- Outgoing

MEASUREMENTS @ ESS
- Incoming
- Preparation TS2/Linac