The ESS Database for Elliptical Cavities

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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

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

Existing Tools (ESS Gitlab), all open

MEASUREMENTS @ IKC
- After fabrication
- Intermediate handover
- Outgoing

MEASUREMENTS @ ESS
- Incoming
- Preparation TS2/Linac

MEASUREMENTS @ IKC
- After fabrication
- Intermediate handover
- Outgoing

MEASUREMENTS @ Section
- After fabrication
- Intermediate handover
- Outgoing

Browser: Bandwidth & VT Measurements

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

- Field Flatness measurement
- Transmission monitoring
- Cold Spectrum

Browser: data trends

- MSE, Mean Spectrum Error
- Pi-mode frequency history
- MSE cavity e-mode expectation
- MSE cavity time evolution
- String AS of GDA (tuner mount...)

Browsers: data analysis

- MEASUREMENTS @ IKC
- MEASUREMENTS @ ESS
- MEASUREMENTS @ Section

Live Staging Area
(typ. text files or xls)

Script

Tagging (in metadata)

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

ESS Scope

Measurement&Calibration DB
(ownCloud service)

https://nwa01.esss.lu.se/download/index.php/login

Normalized Data
(HDF files, metadata)

ESS Asset Management
ID Installation Structure

Performance of the first series module cavities