Results on Cavity Simulations and Measurements

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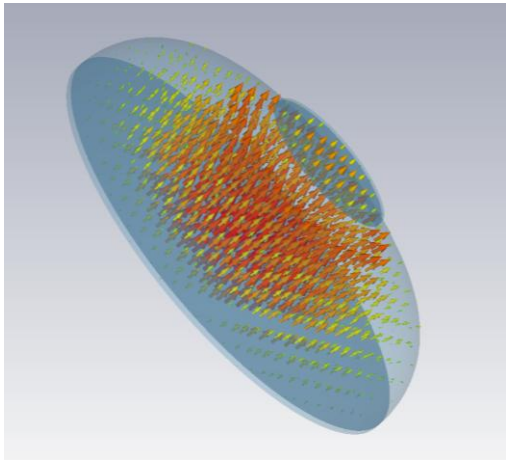
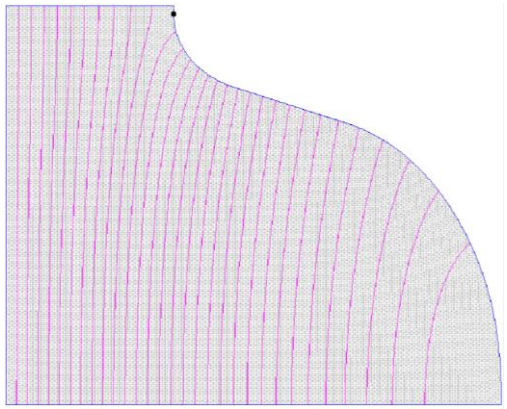
SLHiPP-1 08-09.12.2011

CERN BE-RF

Simulated First Resonance Frequency





Simulation Codes

- CST -> most suitable solver settings
- SuperFISH

Accuracy of the Simulated Value

- **±10 kHz**

Material Properties

- relative permittivity **1.0006** of dry air
- 200 kHz deviation to vacuum

half central cell	half cell dia 140	half cell dia 130
684.475 MHz	**688.280** MHz	**689.987** MHz

Measurement principles

First Resonance Frequency

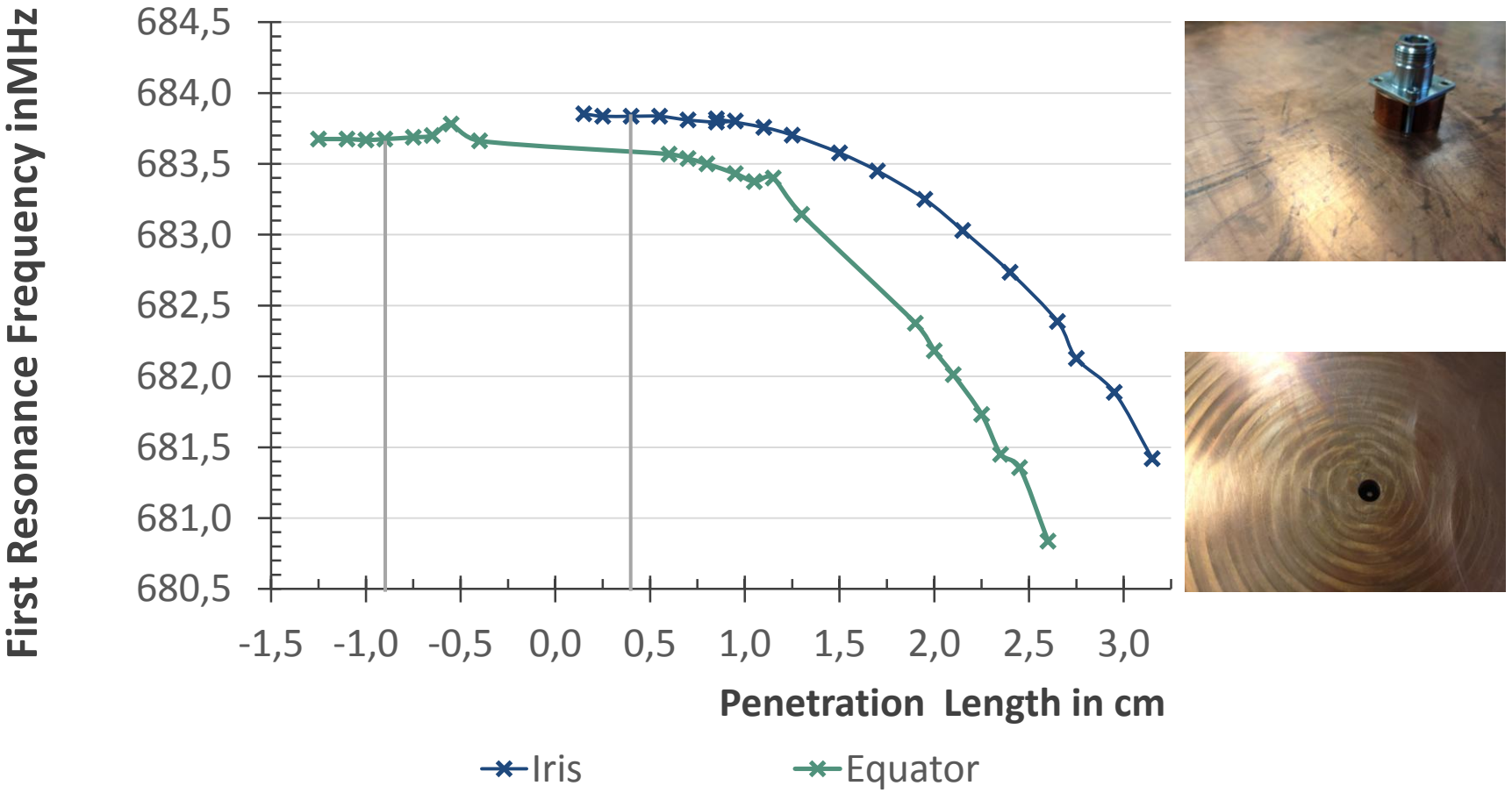
S21 Parameter maximum

- noise level 100 dB

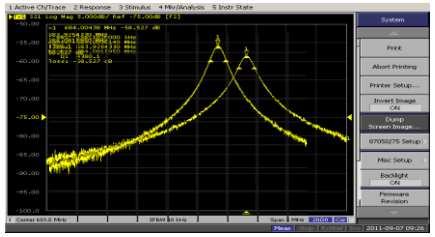
Q Value as quality indicator

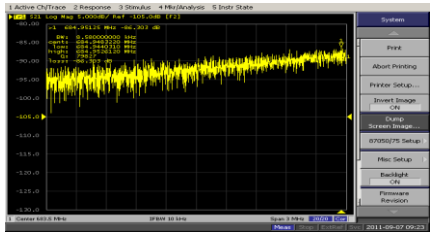
- theoretical value 22000

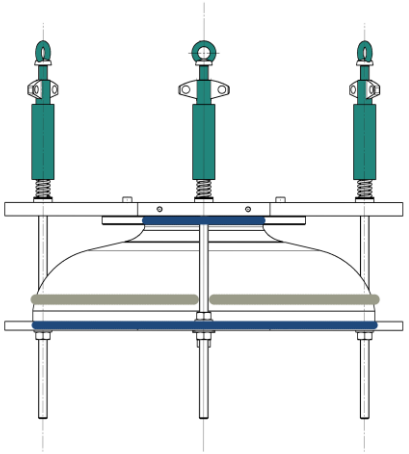
Antenna fiting



Problems and Solutions

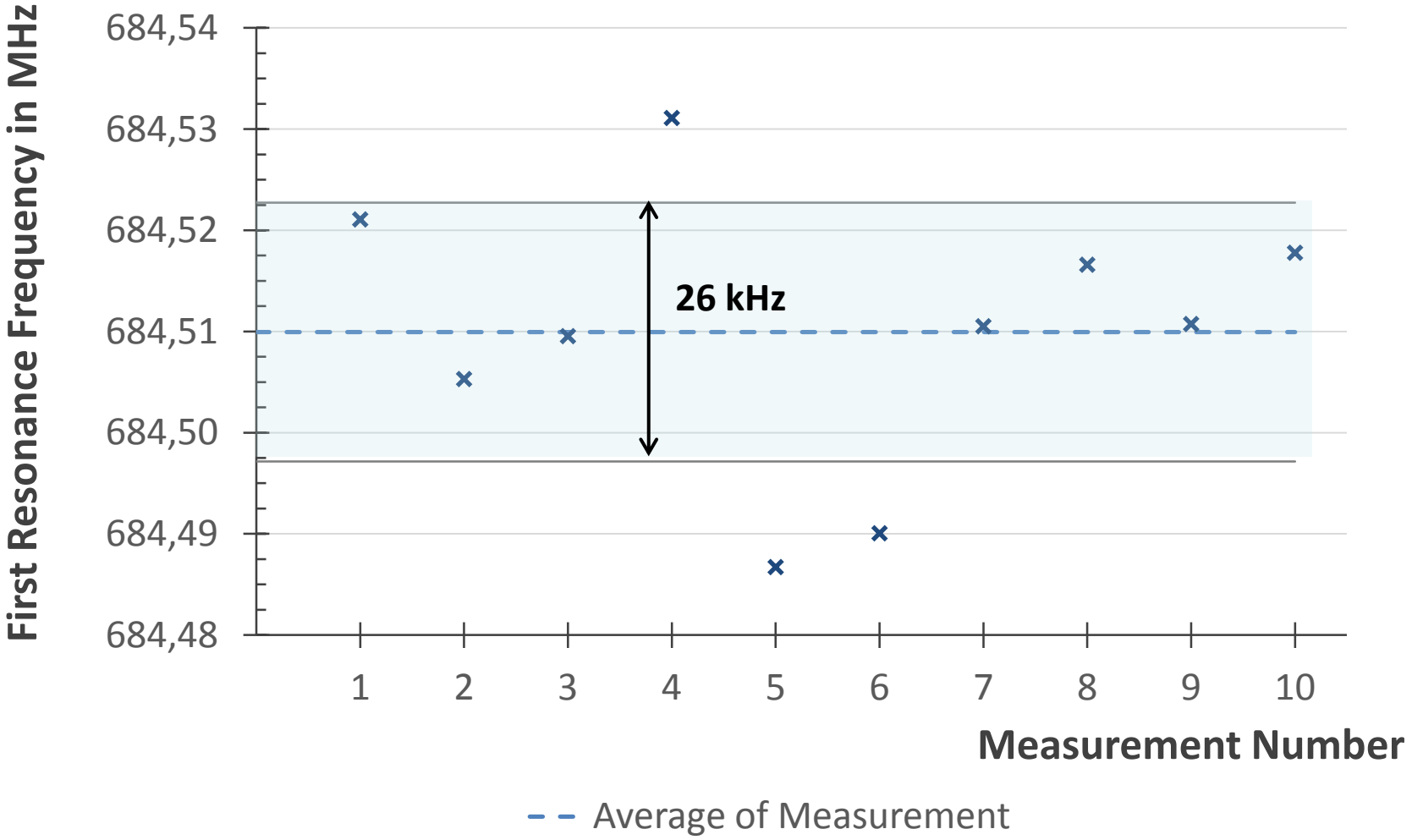




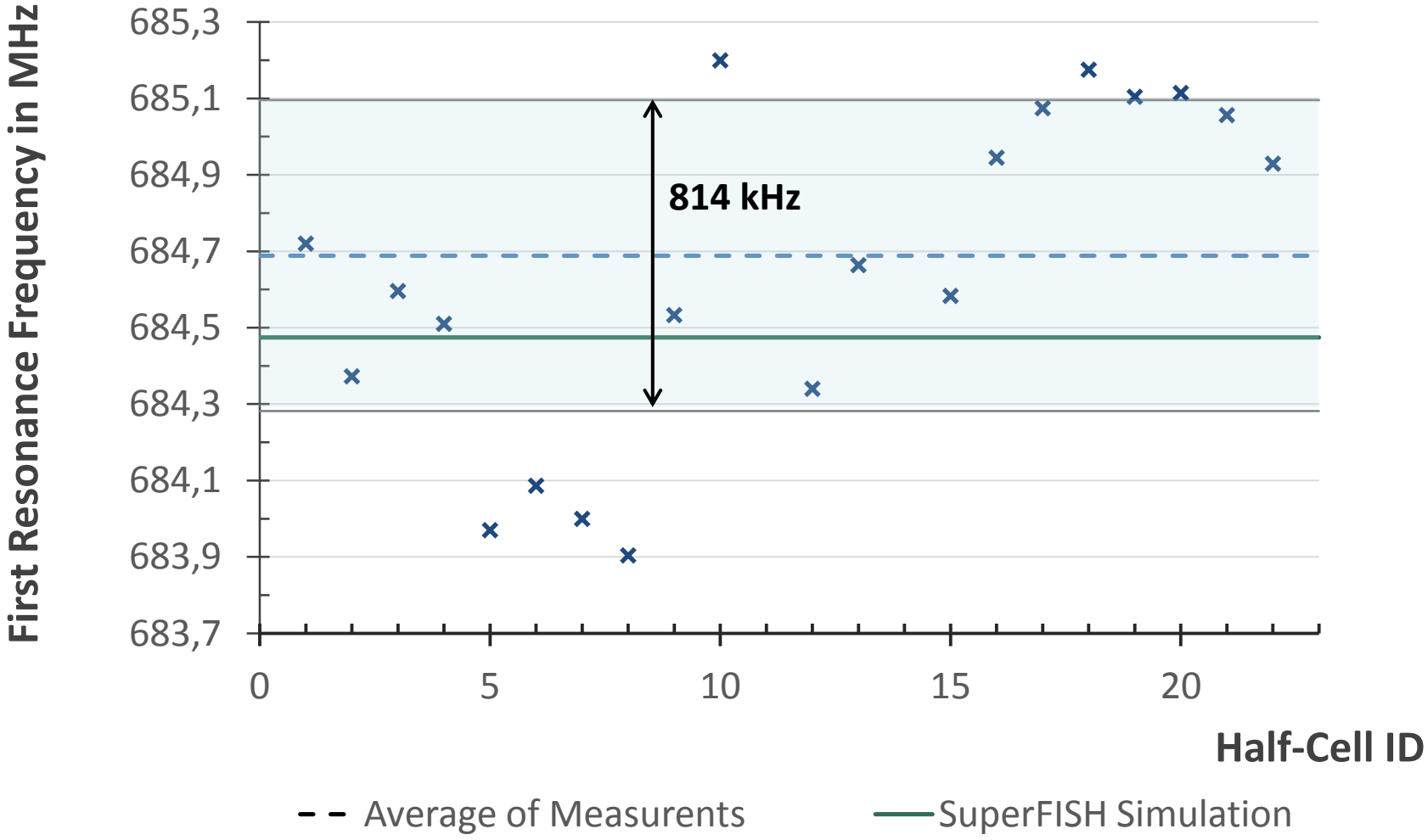


- Thermal Drift
  - metrology
- Spring loaded rods
- Ring at the waist line
  - Q-value increases until sudden drop
- Size of the groove
  - increase by a few tenth of a mm
- Alcohol
  - strongly improves Q-value and frequency stability
  - shows drift over time due to evaporation
- Distilled Water
  - unclear why it works as distilled water should be an insulator

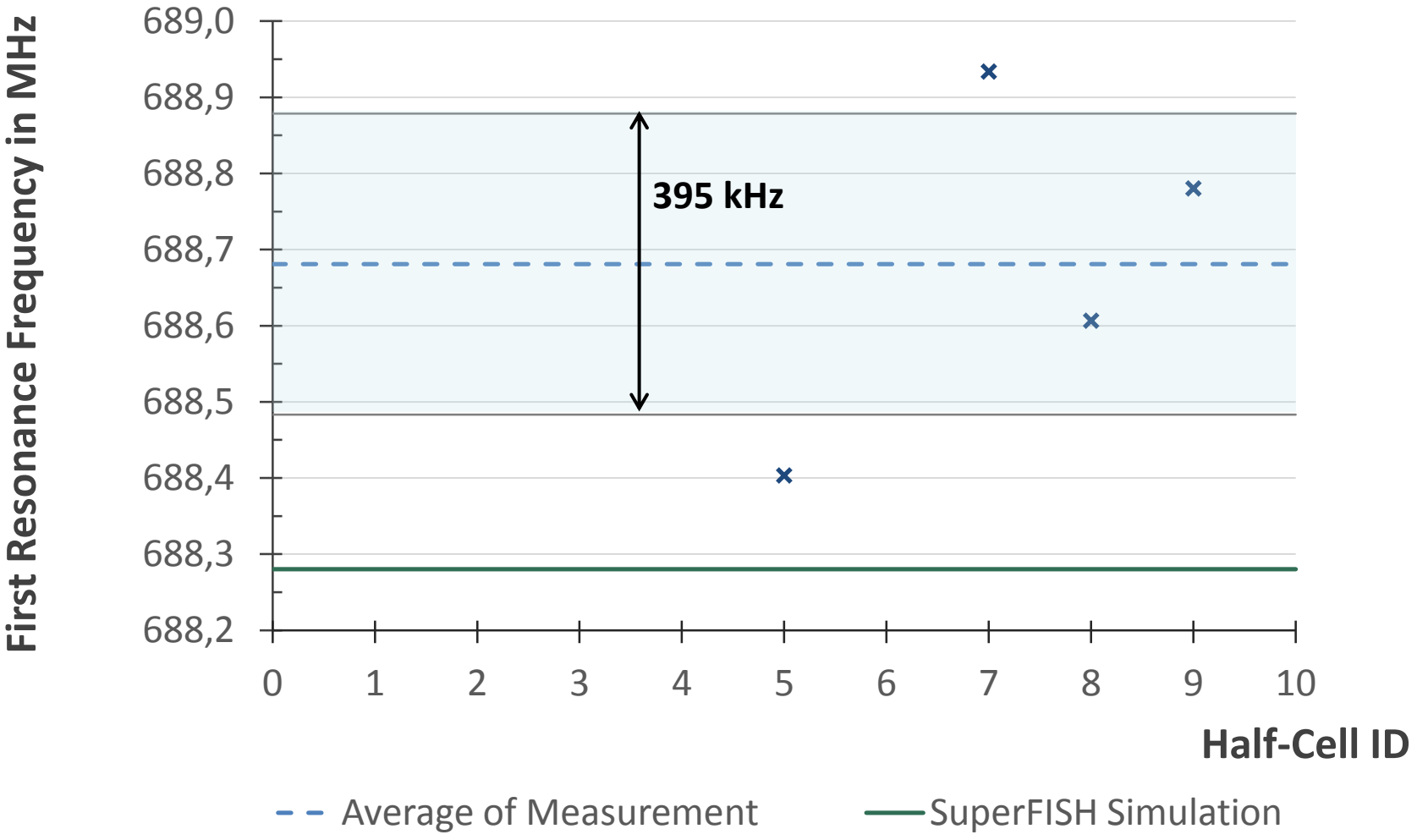
Reproducibility _ half central cell ID 4



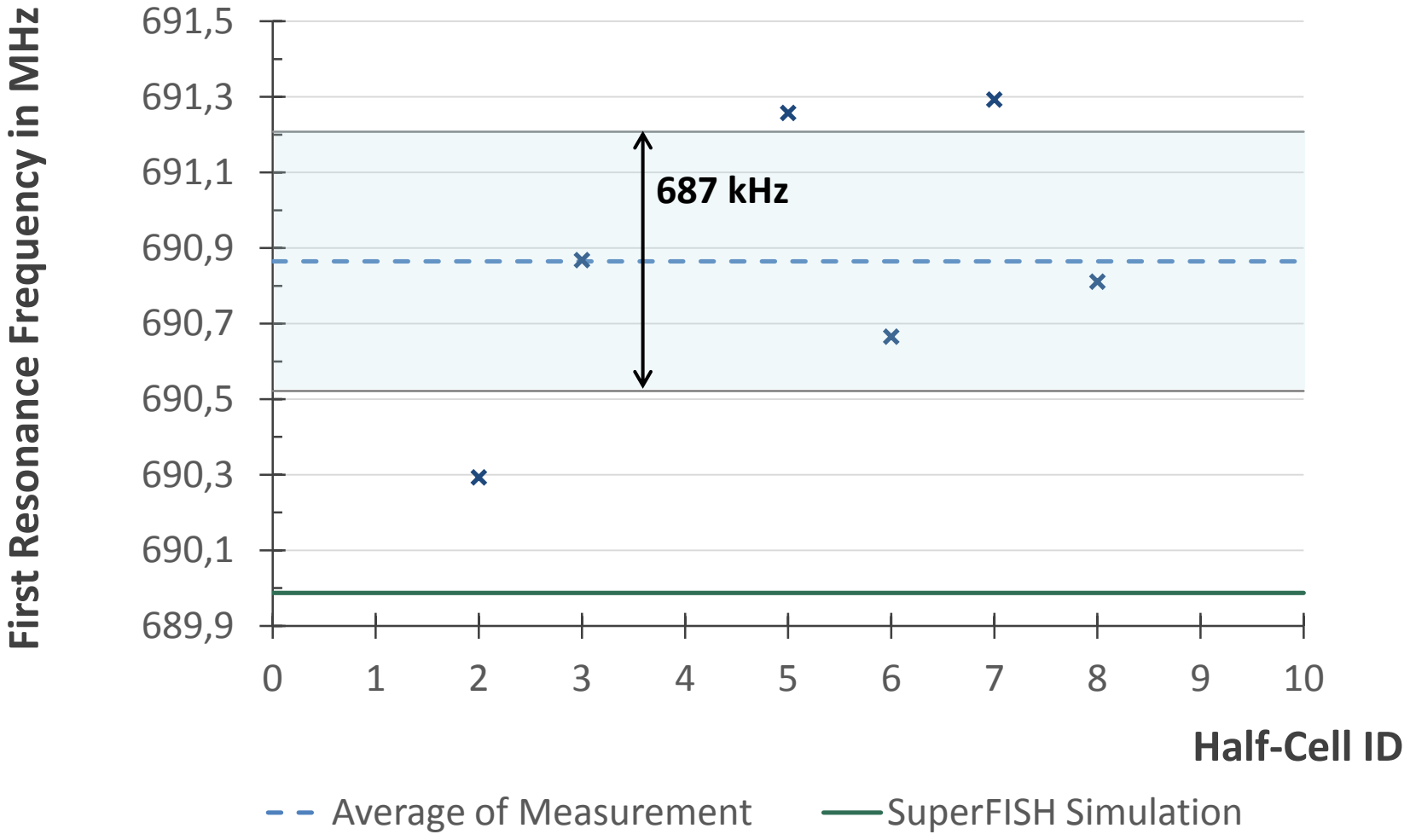
Production spread _ half central cell



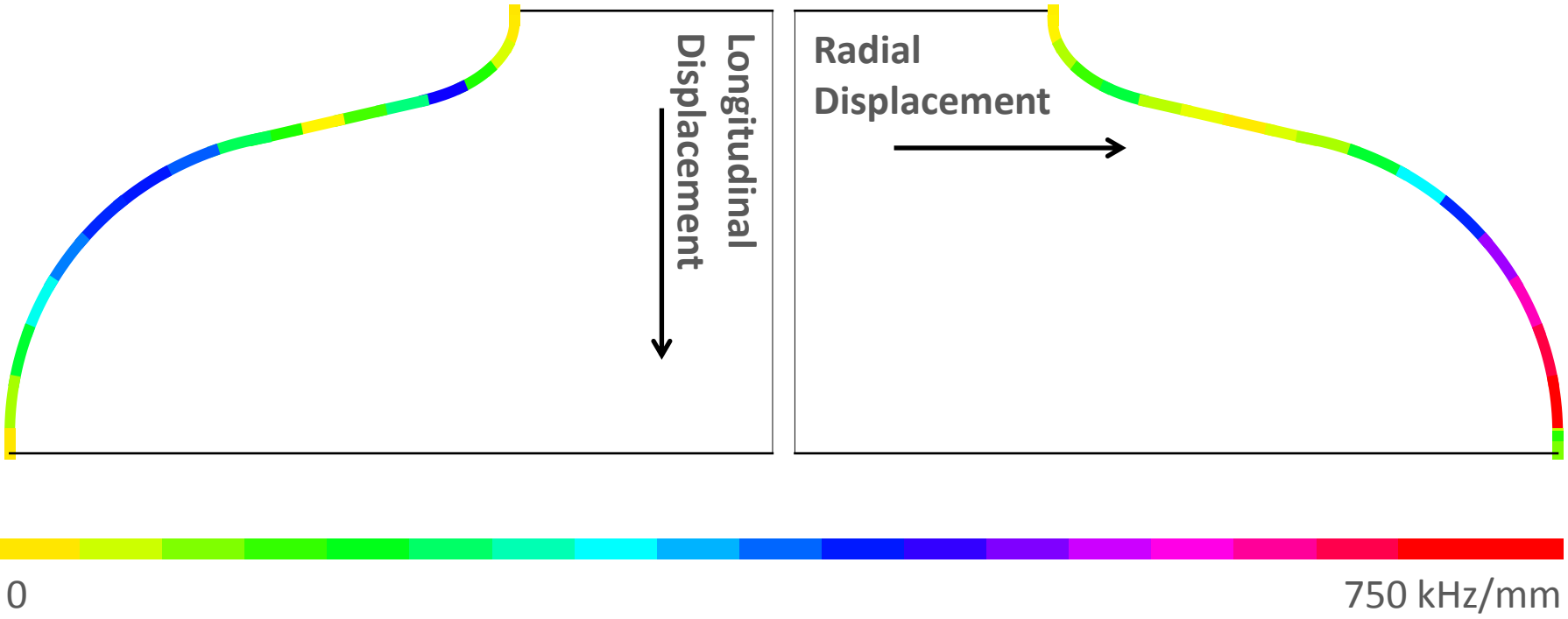
Production spread _ half cell dia 140



Production spread _ half cell dia 130

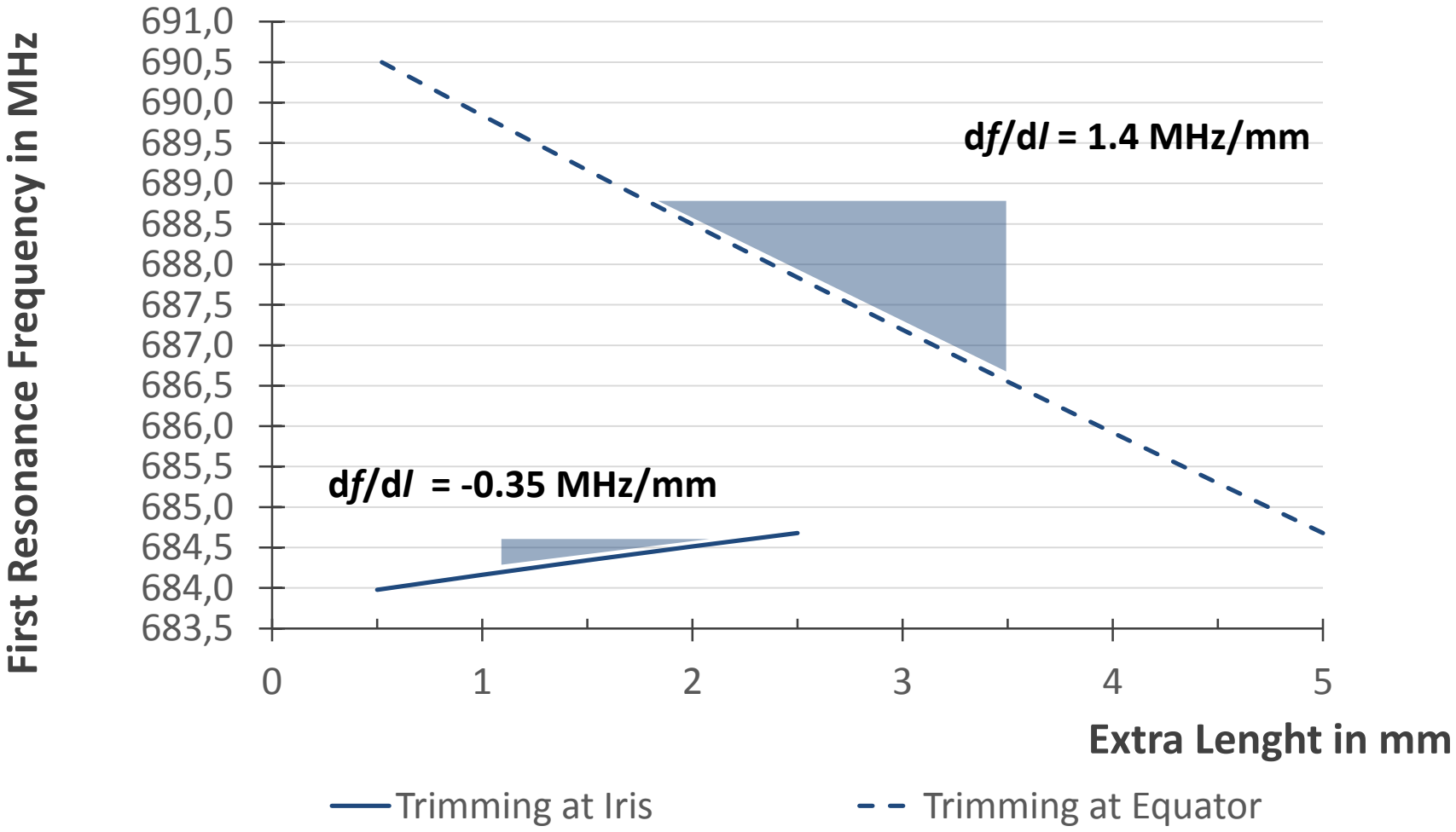


Sensitivity study with SuperFISH



Tolerances amount to 1.1 MHz in a worst case scenario

Trimming at the Iris and Equator



The End

Thank you for your attention!