



Results on Cavity Simulations and Measurements

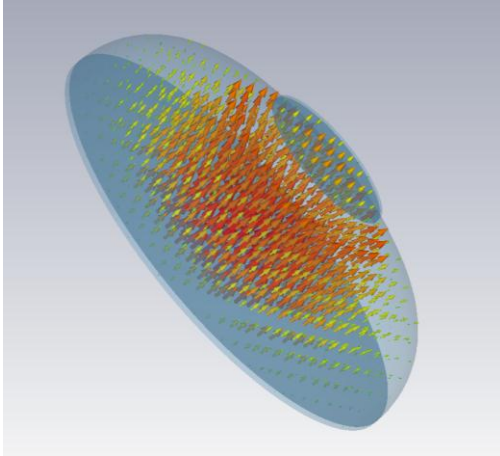
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SLHiPP-1 08-09.12.2011

CERN BE-RF



Simulated First Resonance Frequency



Simulation Codes

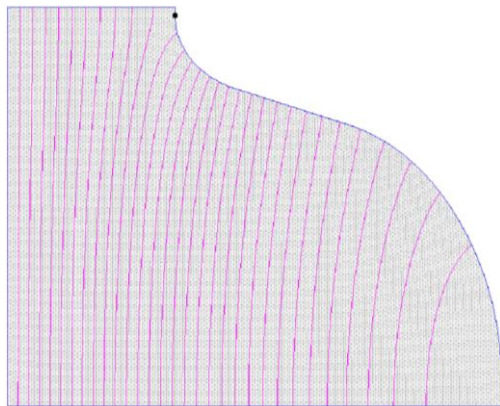
- CST -> most suitable solver settings
- SuperFISH

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

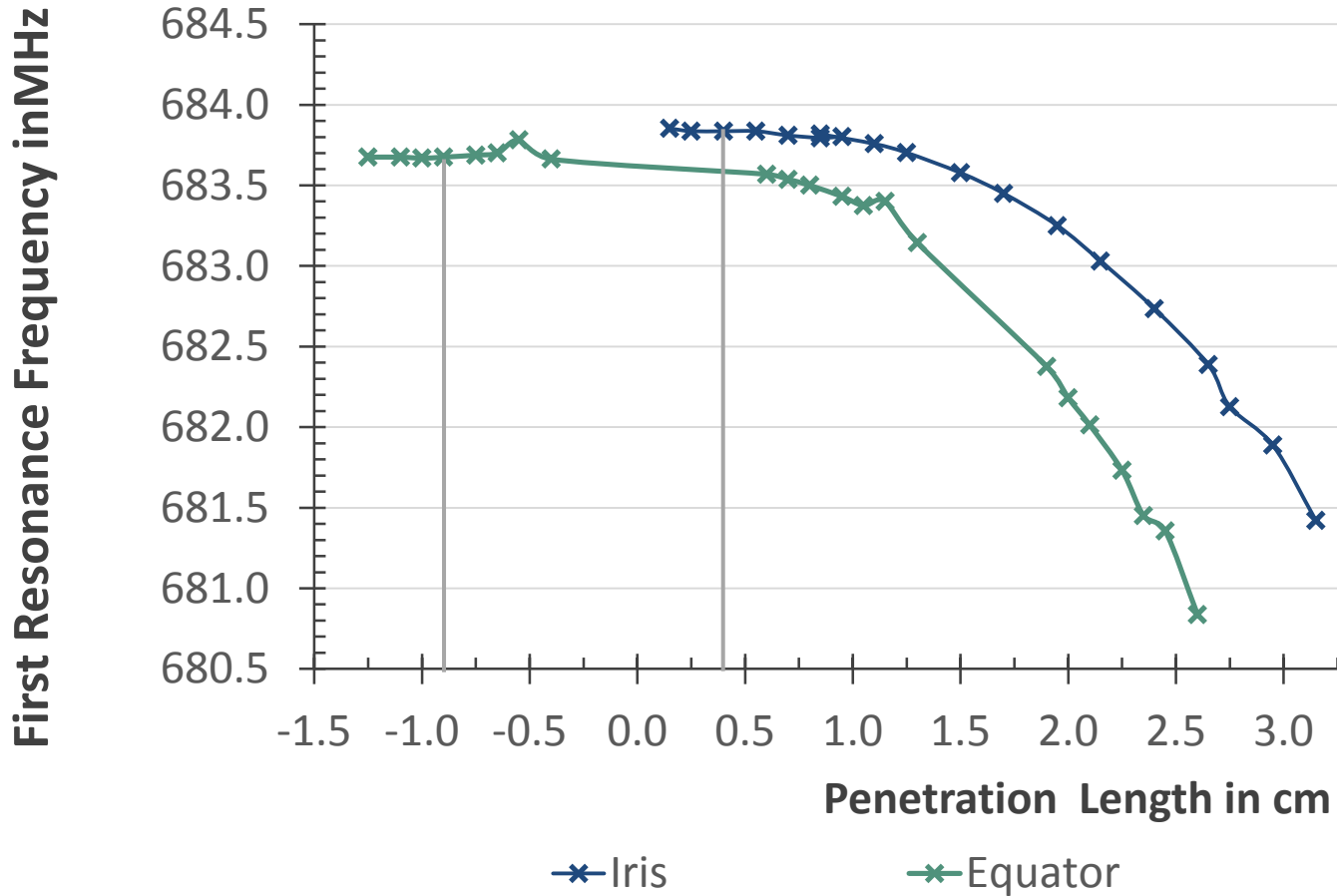
- noise level 100 dB

Q Value as quality indicator

- theoretical value 22000

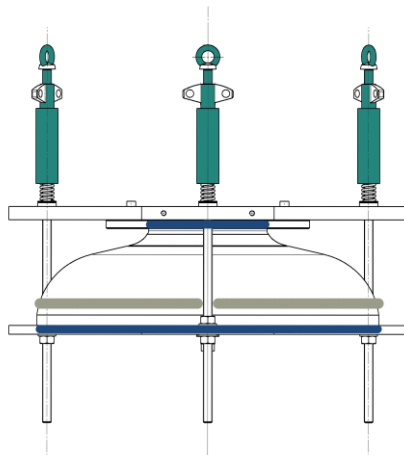
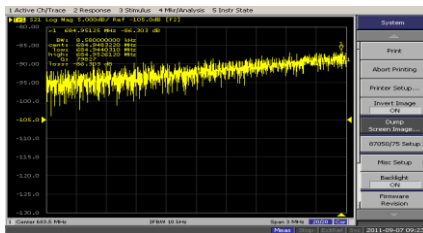
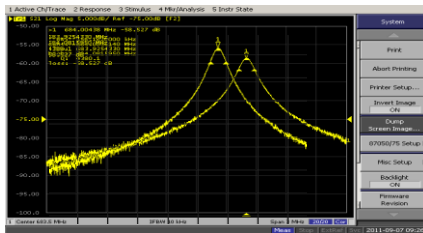


Antenna fitting





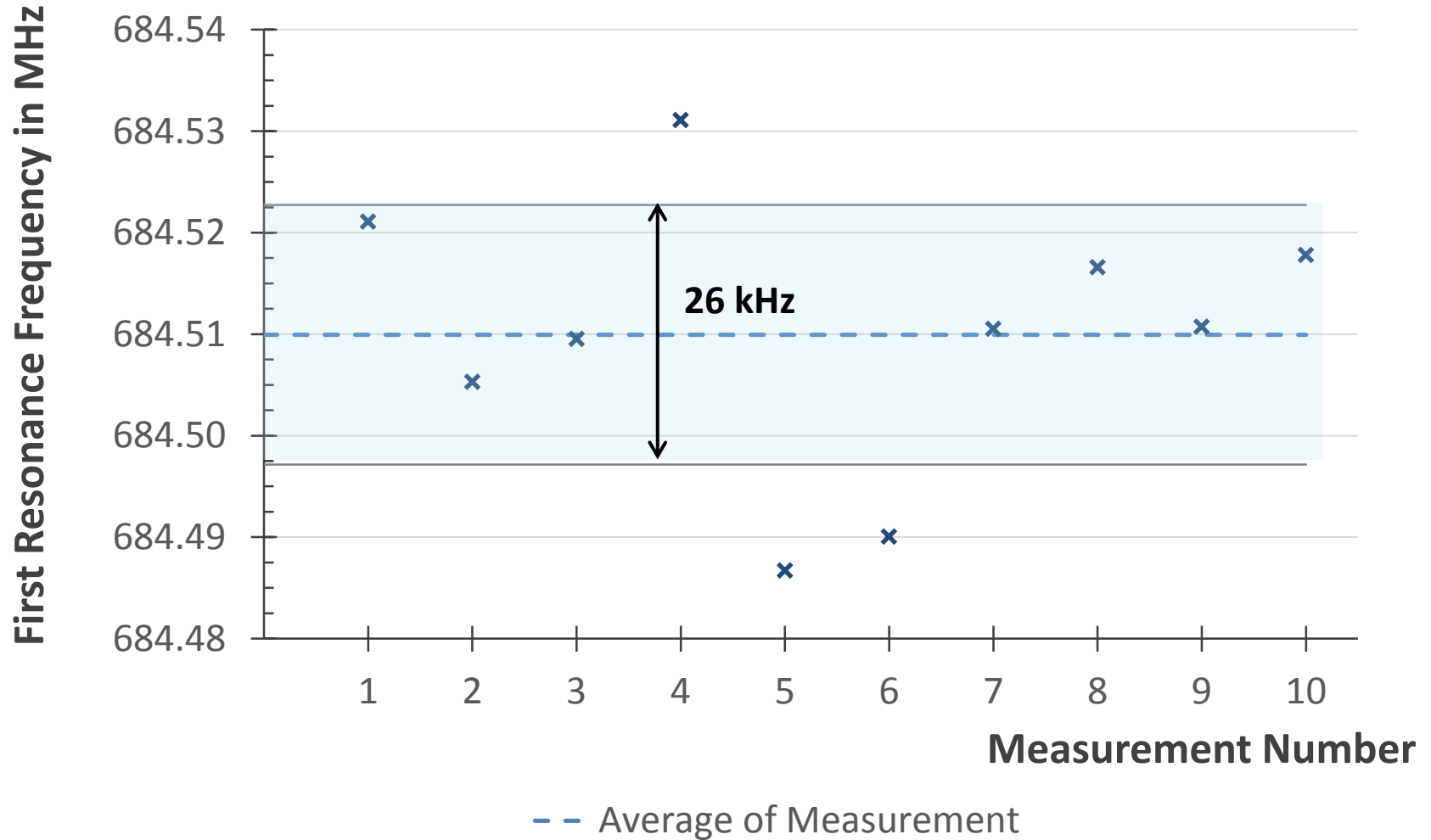
Problems and Solutions



- 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

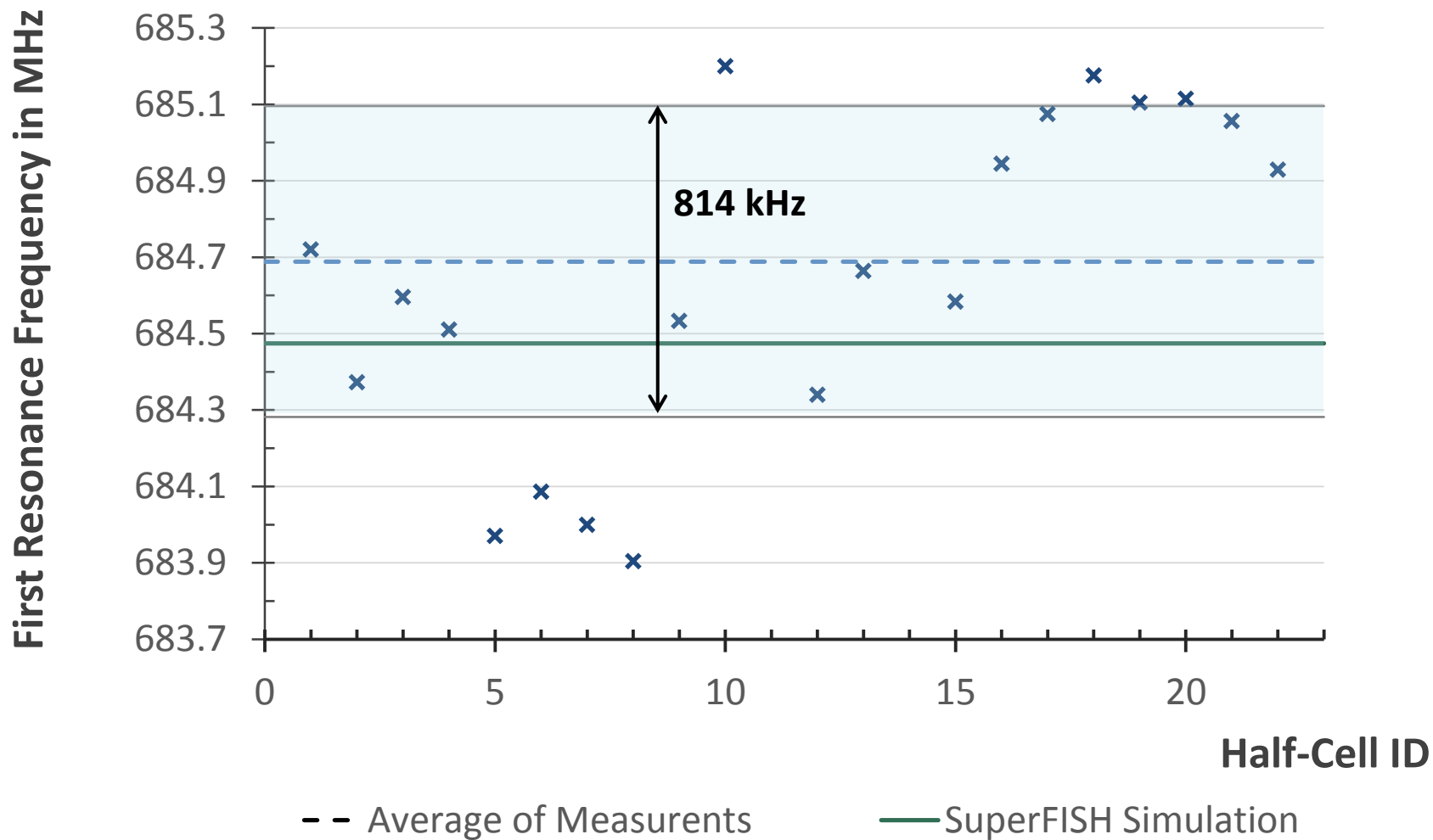


Reproducibility _ half central cell ID 4



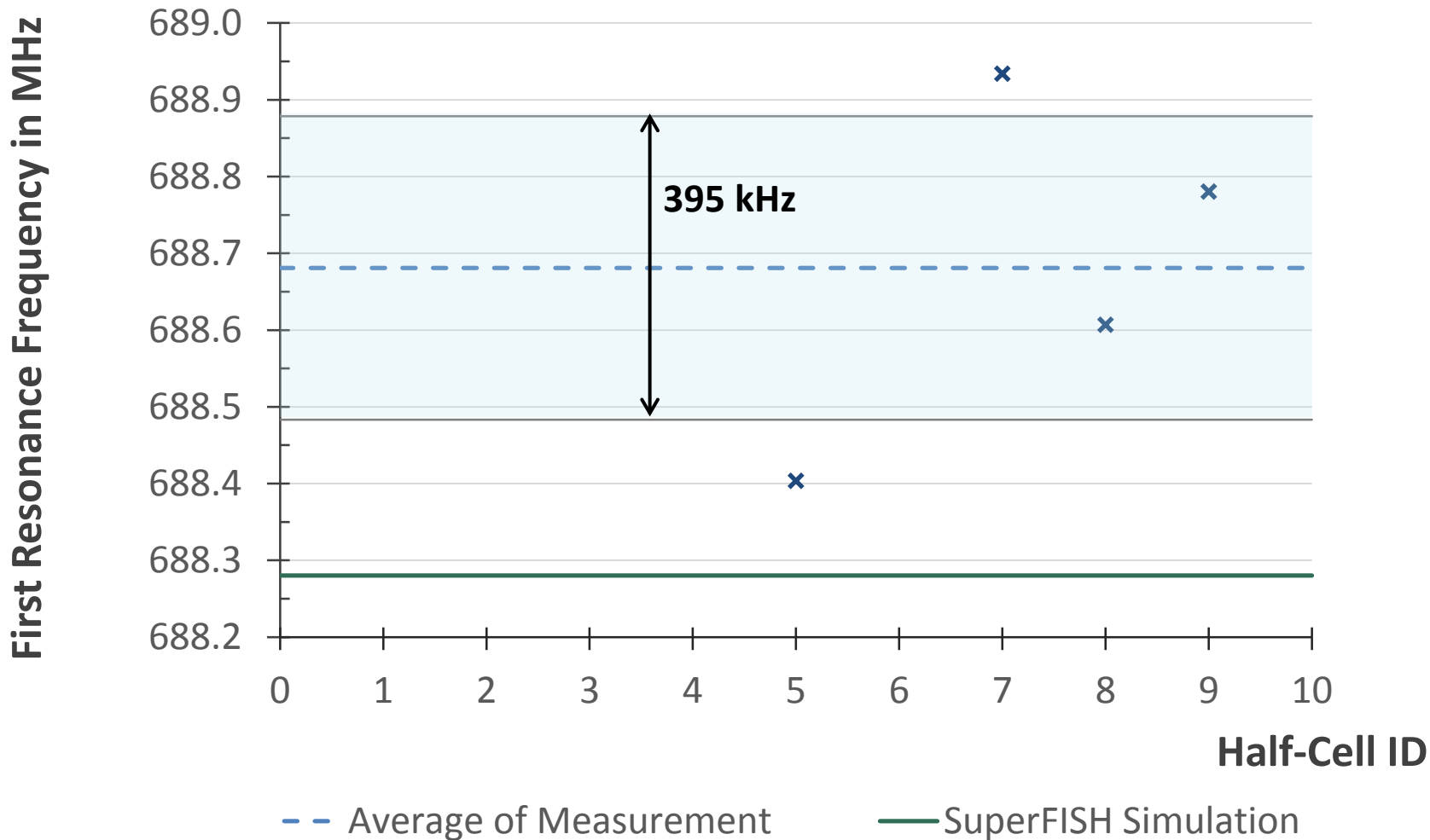


Production spread _ half central cell



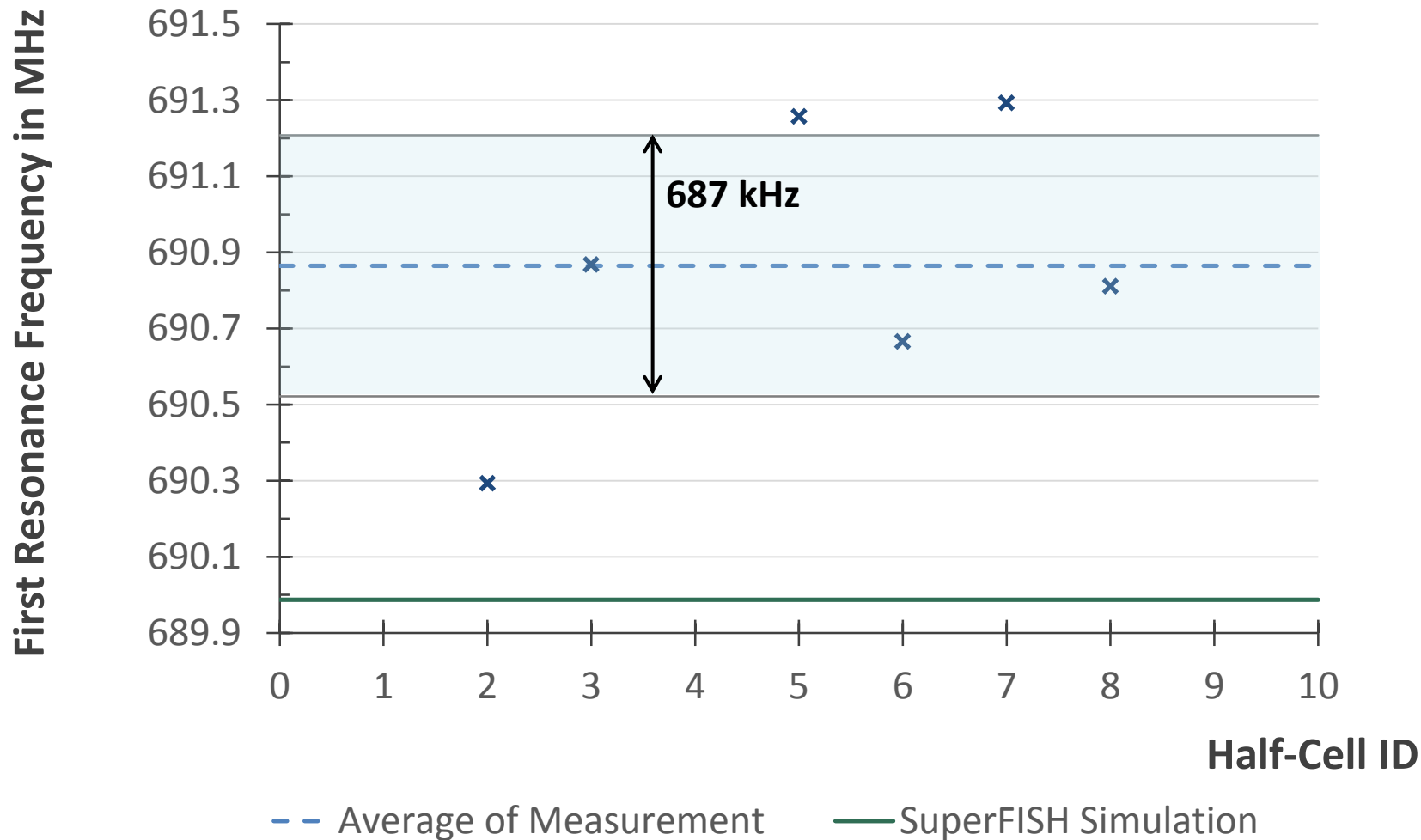


Production spread _ half cell dia 140



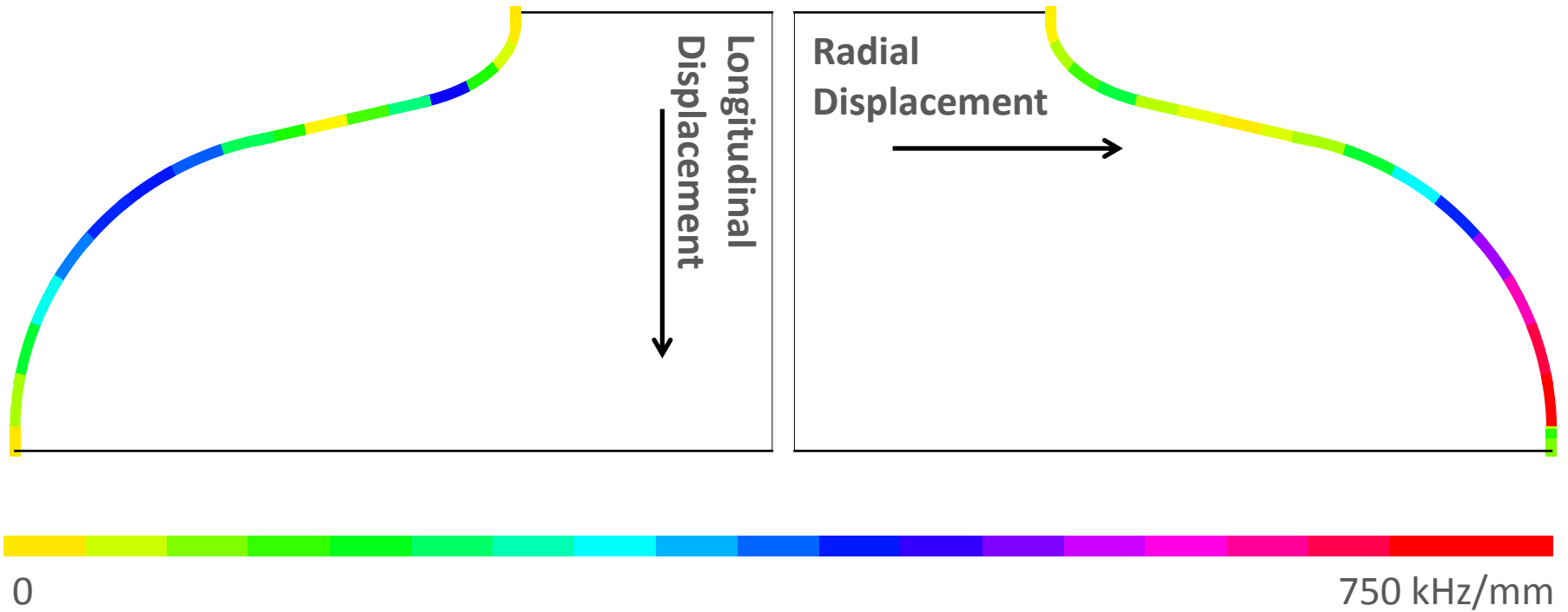


Production spread _ half cell dia 130





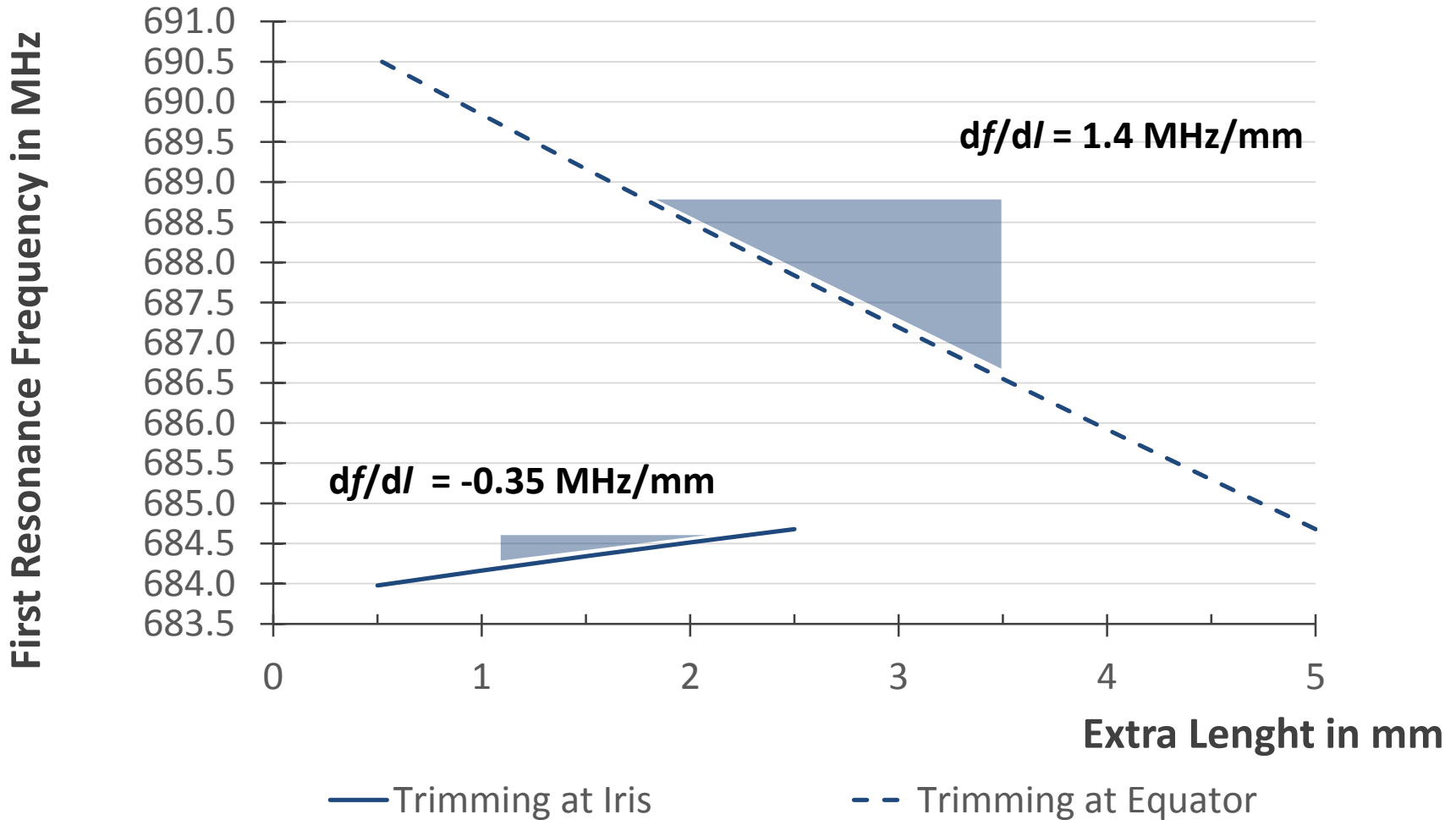
Sensitivity study with SuperFISH



Tolerances amount to 1.1 MHz in a worst case scenario



Trimming at the Iris and Equator





The End

Thank you for your attention!