CERN practical days - RF

09:00

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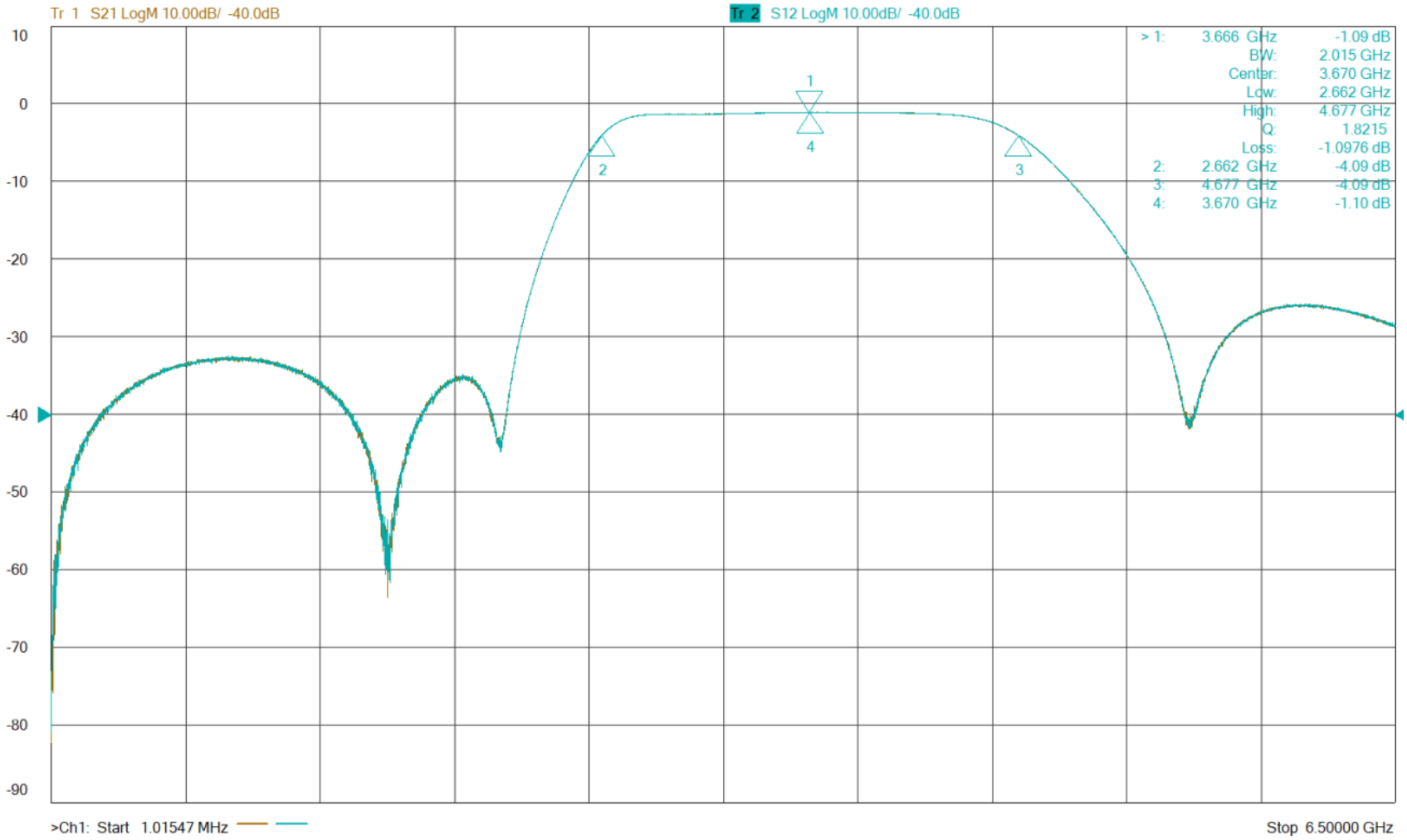
Outline

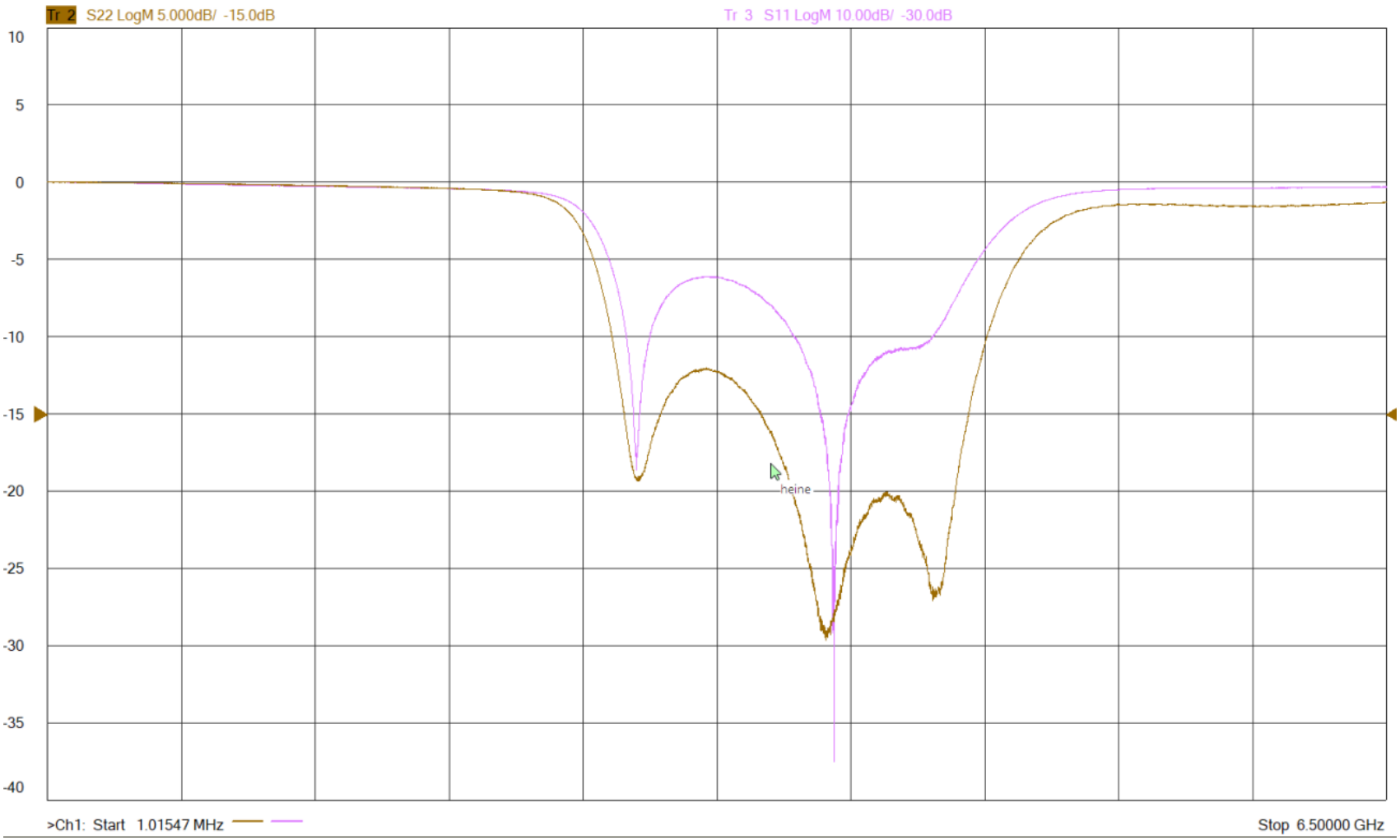
Band Pass Filter (1) - Transmission S_{12}, S_{21}



$$BW = 2.015\,\text{GHz}, \quad f = 2.66\,\text{GHz} \ldots 4.67\,\text{GHz}$$

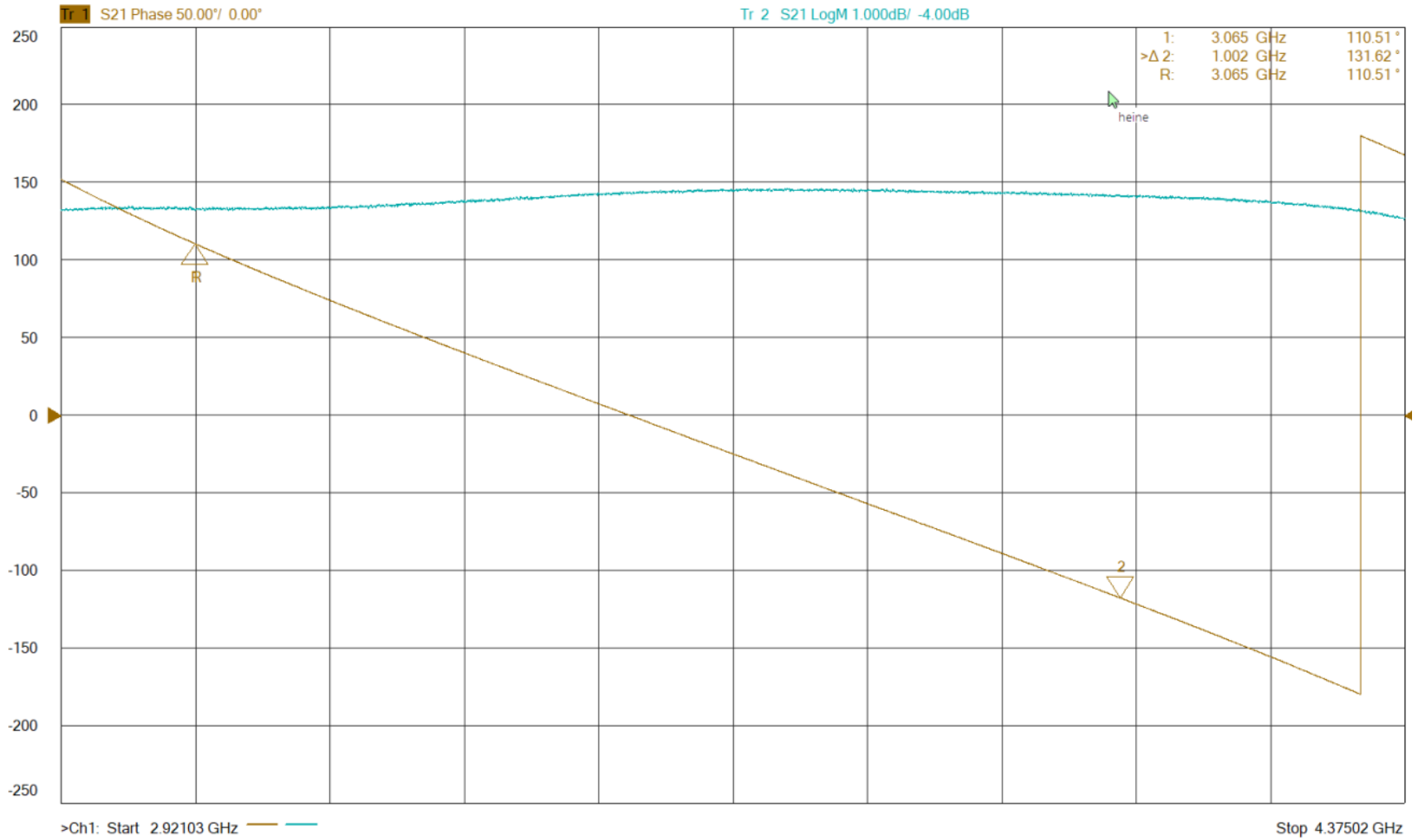
$$S_{21} \approx S_{12} \Rightarrow \text{Reciprocal}$$

Band Pass Filter (2) - Input/Output Reflection S_{11}, S_{22}



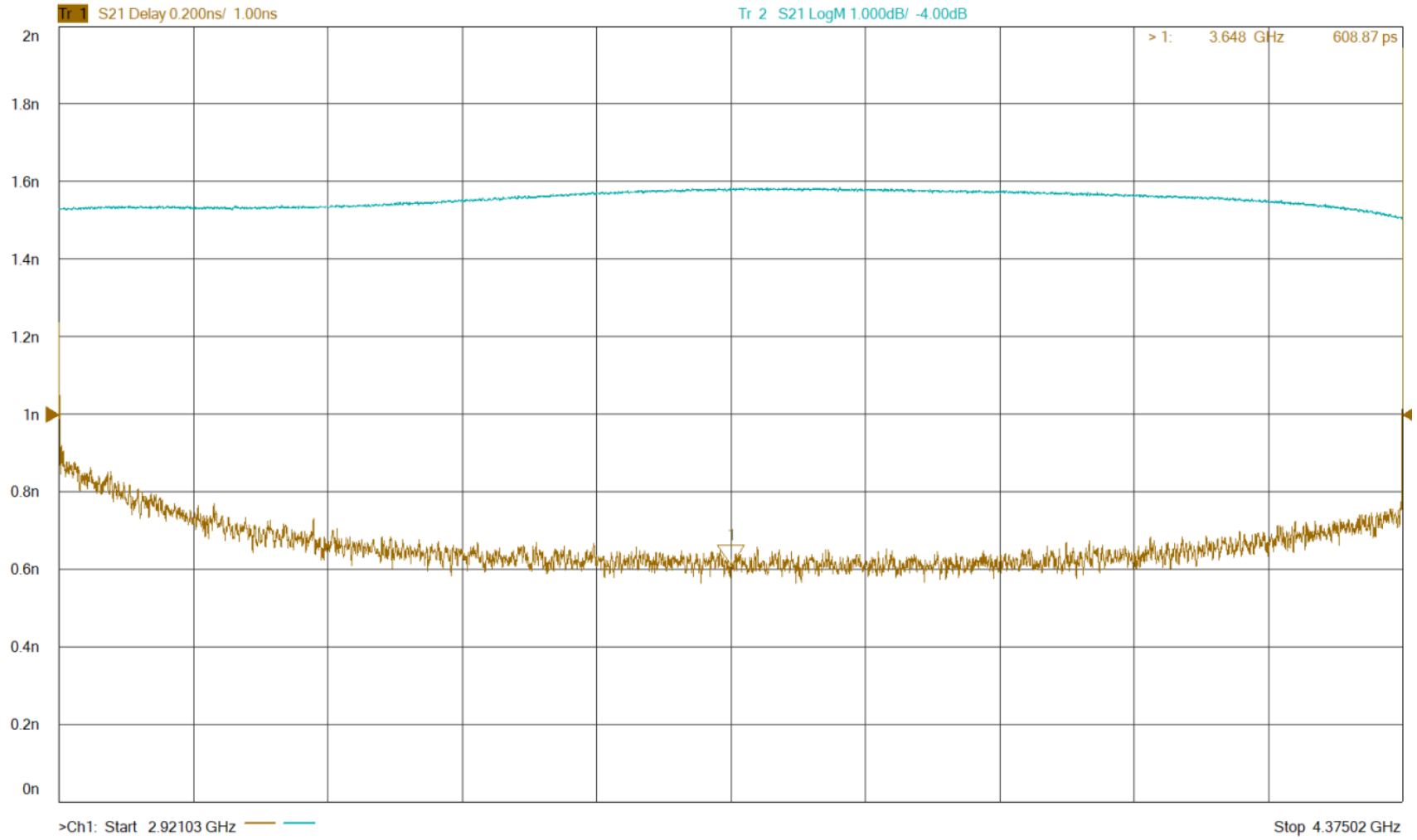
$$S_{11} \neq S_{22} \Rightarrow \text{Non symmetric}$$

Band Pass Filter (3) - Phase $\angle S_{12}$



$$t_g = -\frac{\mathrm{d}}{\mathrm{d}\omega}\angle S_{12} \approx -\frac{\Delta\angle S_{12}\ [\mathrm{rad}]}{\Delta\omega} = \frac{2.297\,\mathrm{rad}}{1.002\,\mathrm{GHz}} = zuwenig$$

Band Pass Filter (3) - Group Delay t_g



From group delay plot: $t_g = 608.87\,\text{ps}$

Strip-Line BPM (1) - Intro

Reflectometry for 500 MHz and 50 Ohm

a. Connector

b. Strip line

- Four 14cm strips
- Short-circuit termination

Strip-Line BPM (2) - Time Domain Reflectometry

- Measuring S11 in time domain to check acceptance criteria
  a. Connector: + 0.5
  b. Strip line: -/+ 0.2
- Repeat for all strip lines

Strip-Line BPM (3) - Frequency Domain Characterization

- Strip-line length from S11
- Comparision with group delay
- Cross-talk from S21
  - Minimum at Hz

RF - cavaties (1) - Intro

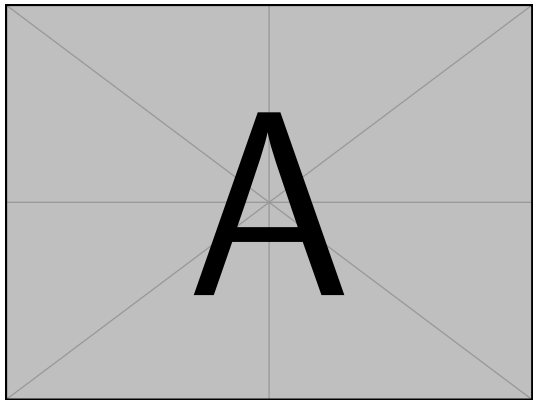
- Multi cell cavity in X-band
- Operating mode at 11.424 GHz
- Under coupled antenna

RF - cavaties (2) - Transmission measurement

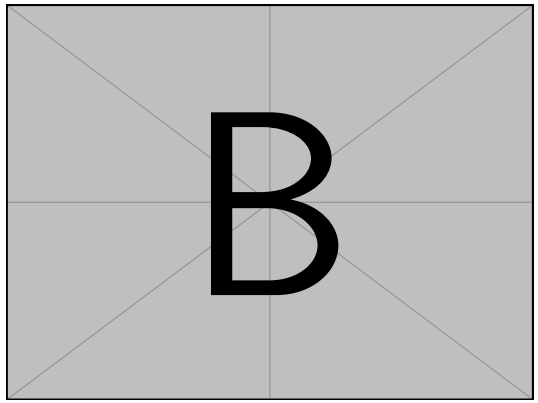
- Identify different modes
- Calculated Q from the $3dB$ bandwidth
- Cross-talk from S21
  - Minimum at Hz

Useless Repetition (Manfred Wendt)

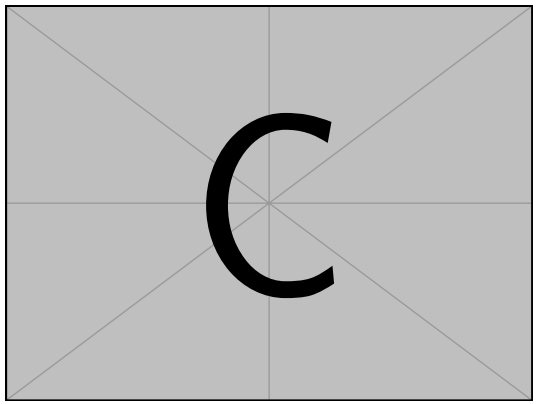
- Stuff
- More Stuff



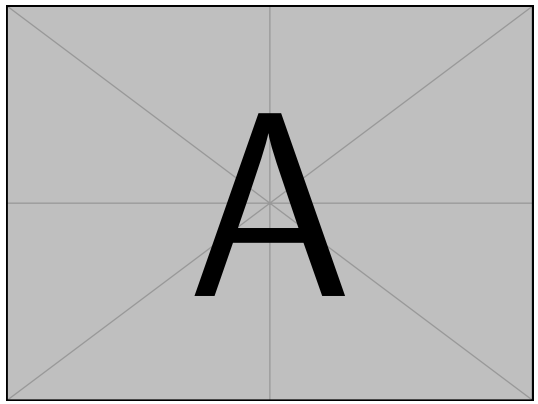
(a) Caption a



(b) Caption b



(c) Caption c



(d) Caption d

RF Cavity, Coupling, Smith Chart (Fritz Caspers)

- Two Antennas in cavaty
  - Longitudinal field antenna
  - Coupling loop
- Under-, over- and critical coupling

Resume

- Last session with Michele
- We learned, that...
- Whatever ...