



Schweizerische Eidgenossenschaft
Confédération suisse
Confederazione Svizzera
Confederaziun svizra

Federal Institute of Metrology METAS



VNA Expert Day at METAS

Introduction

M. Zeier

Purpose of this day

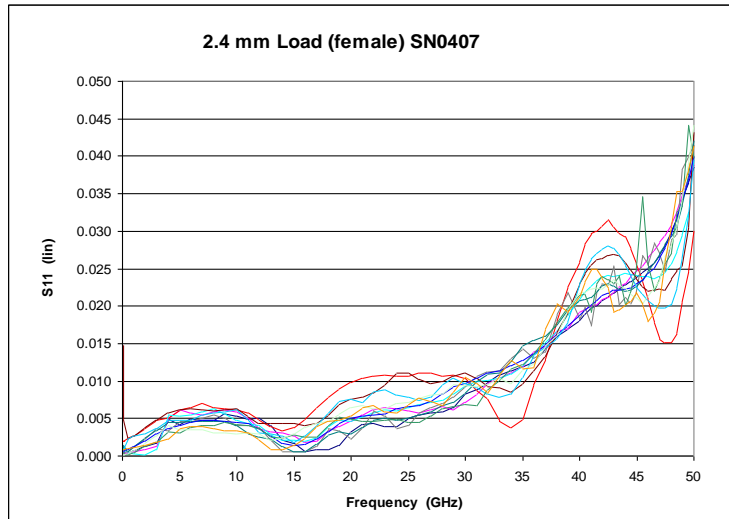
- Give you a comprehensive overview on how coaxial S-parameter traceability is established at METAS
- Show you the major steps of the «Primary Experiment» and how they are supported by VNA Tools II
- Explain to you how the new methodology differs from the old methods
- Show you what the problems are with the old methods and why some old paradigms are not valid anymore

Before 2006

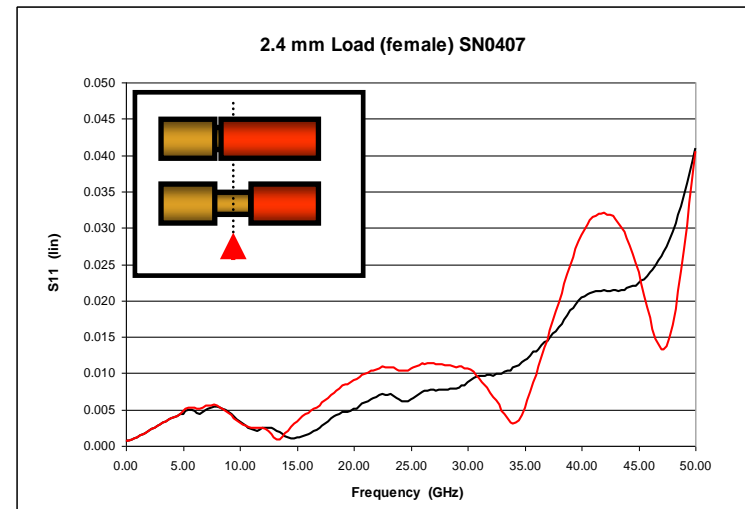
- Effects observed in practical VNA measurements:
 - Inconsistencies between different calibration algorithms
 - Erratic variations in airline based measurements

Indications that the connector might play a role

Measurement comparison



Test with pin gap variation



Project *CoMo70*

- Extension of measurement capabilities to 67 GHz at METAS
- Systematic studies on the influence of the 1.85 mm connector
→ 2006: Project *CoMo70* (with ETHZ, H+S, Agilent)

Findings:

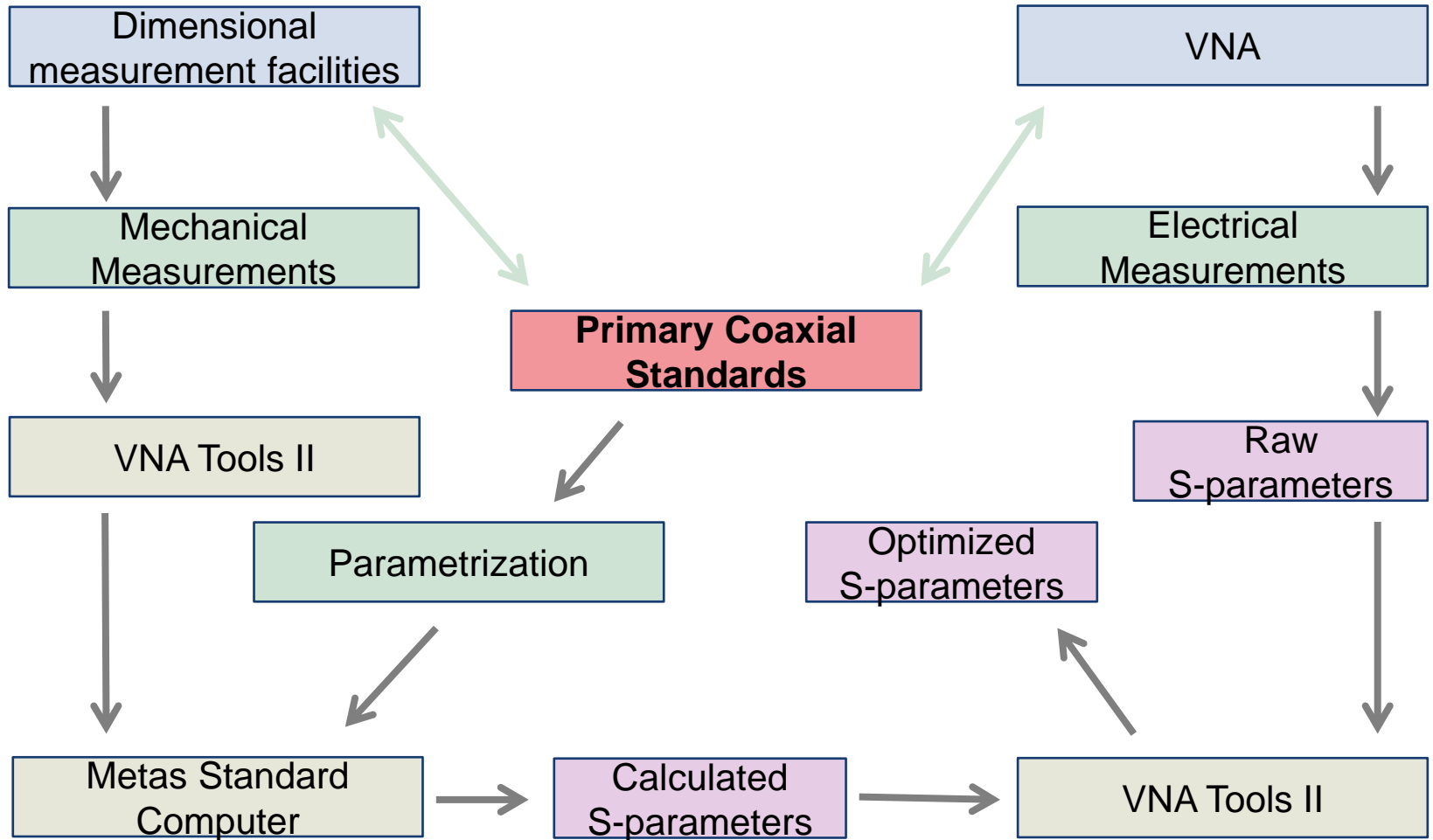
- Connectors can't be neglected (not only for 1.85mm)
- Connector pairs can be separated
→ S-parameters of half-connectors
- Cal standards can be characterized including half-connector
→ removes inconsistencies between cal algorithms
- Pin gap should not be as small as possible
- Airlines are problematic if the pin gap is not controlled

2016

- METAS has implemented the new findings in most connector types (recently in PC-1mm and Type-N)
- Other NMIs started to work on the topic as well (EMRP project «HFCircuits»)
- However
 - Overall acceptance still slow (Ressources, established habits, Euramet VNA Guide)
 - Manufacturers of calkits need to update their products (Market, How do I tell it my customer?, ...)
 - Some officially declared measurement capabilities are questionable (CMCs!)

→ We are interested that others verify and support our findings

«Primary Experiment» at METAS





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Enjoy the day!