PETER
NEVERMANN

WIRELESS
TECHNOLOGIES

- Dr. rer. nat. Peter Nevermann: **PhD in radio frequency**
  (RF noise / 18 GHz / low temperatures / GaAs)
- **Antenna design:** 29 antenna patent applications, 14 granted patents
  (Siemens Mobile Phones)
- **Radio equipment certifications** in Europe and the USA
- **Radio performance** – **optimization**
- Design of specialized **test setups** for radio devices
- Training and **consulting**

Expertise

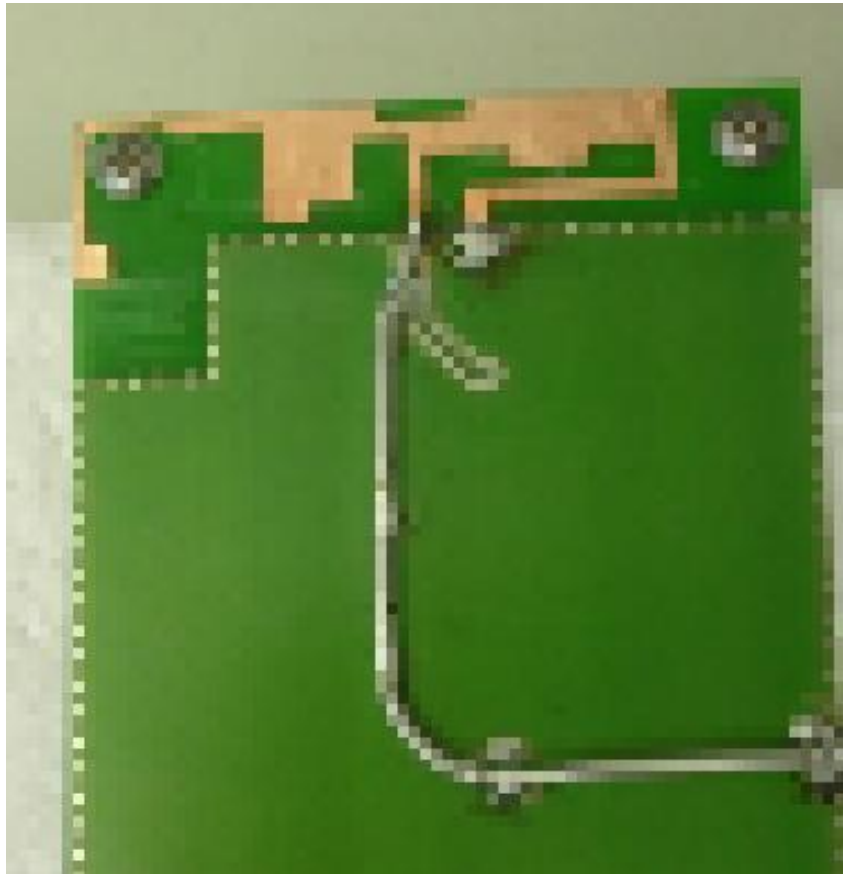
- Over 20 years in antenna design and RF test systems
- 29 antenna related inventions, 14 patents
- Contributions to CTIA, ANSI and Vodafone test specifications
- 7 years with test houses (IMST and 7layers)
- 6 years R&D (Antenna / RF / EMC) with SIEMENS mobile in Germany and San Diego, USA
- 2 years with vodafone Global, Terminal Test Strategy
- 3 years head of antenna R&D with an antenna manufacturer lumberg
- since 2012 with CETECOM (Germany)
- In 2017 with CETECOM in Silicon Valley, USA
- Back in Germany, Focus: 5G mmWave, Radar and OTA on cars and special antenna test (164 MHz CP)
- In 2025: Start company “Peter Nevermann – Wireless Technologies”

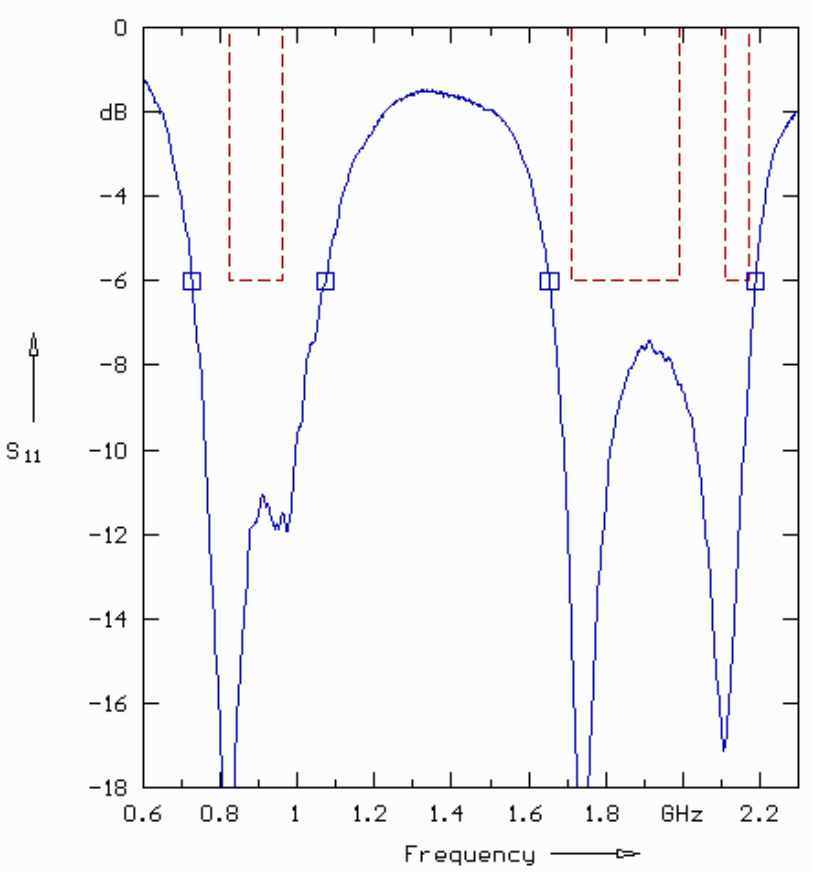
Portfolio

1. General consulting in the field of radio communications
2. Preparation of a summary of the approval requirements (applicable standards and limits) for a specific radio product for Europe and the USA
3. Support with device approval, e.g., waiver procedures in the USA or preparation of a CE declaration
4. “Newsletter”: Information about new developments in standardization and legislation, possibly with explanations of what this means for a customer
5. Preparation of a summary of technical differences between various radio technologies
6. Software development
    1. For controlling base station simulators or
    2. evaluation of measurement results (including graphics)
7. Design of measurement setups and/or creation of test plans
8. Antenna design, especially for the IoT industry
9. Optimization of antenna matching: 13 MHz – 8 GHz
10. Troubleshooting: Reduction of spurious emissions, especially in the GHz range
11. Troubleshooting: Reduction of system “self-” interference and improvement of the sensitivity of receiver systems
12. Layout and circuitry reviews
13. Training:
    7. Antenna integration,
    8. device approval
    9. Details of various radio technologies
14. Approval management (project management) in the form of an interface between manufacturer and test laboratory
15. Support with technically complex measurements (e.g., 3D pattern of an 80 GHz FMCW RADAR in normal mode)

Antenna Design

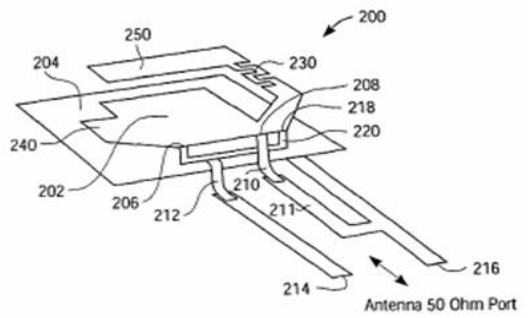
- **Design und Optimization**
  - Antenna Design: Multi-band and Multi-resonance
  - Optimized performance





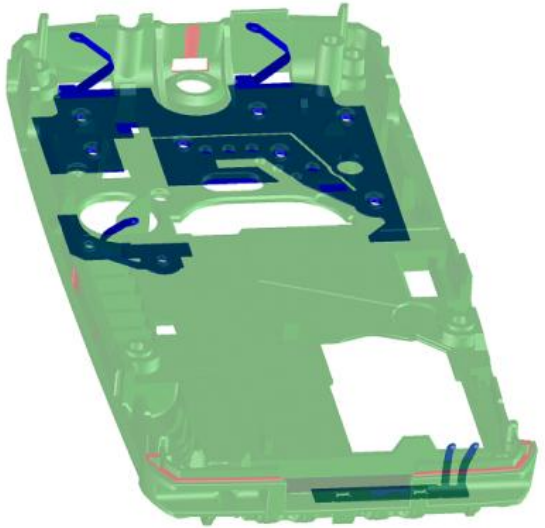
Dr. Peter Nevermann

Antenna Design



Design and Optimization

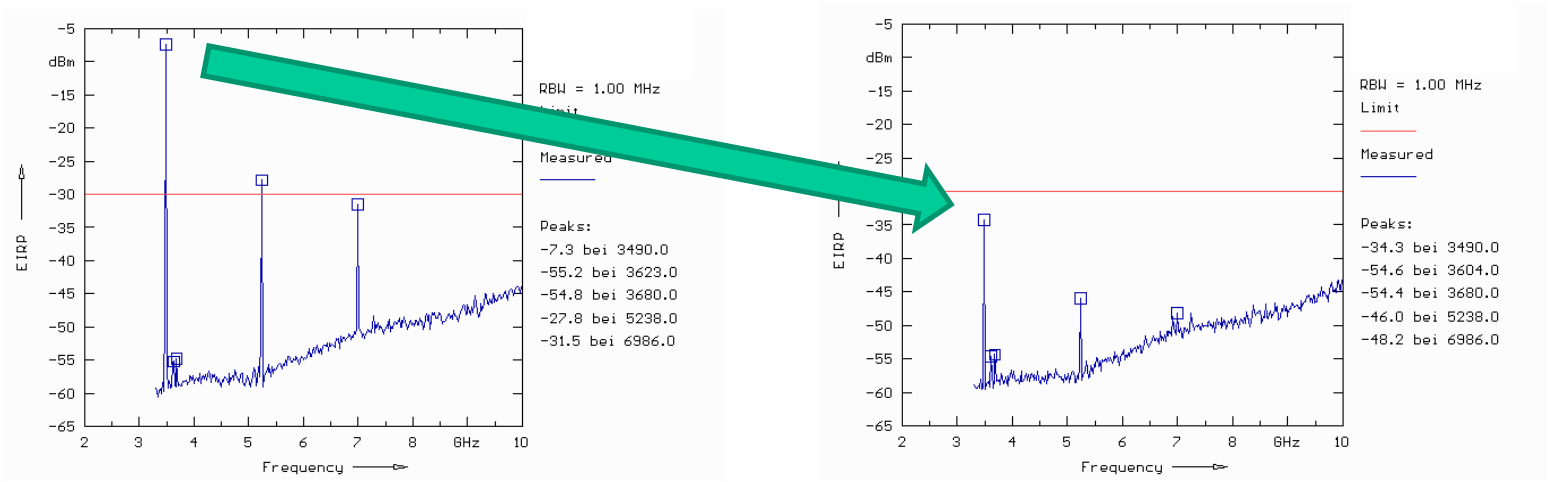
- New concepts
- Patents (including support on patent lawsuits)
- From mono-band in difficult environments
- to penta-band
- Also 434/868 dual-band and
- 13 MHz NFC antenna matching
- Wi-Fi diversity antennas
- Over 40 projects



Troubleshooting / Training and Consulting

Design and System Improvement

- Optimization of antenna matching
- Selection of off-the-shelf antennas
- Troubleshooting:
  - Mitigation of harmonics
  - Improvement of radio receiver performance (sensitivity)
  - Improvement of EMC behavior: e.g., ESD or RF immunity

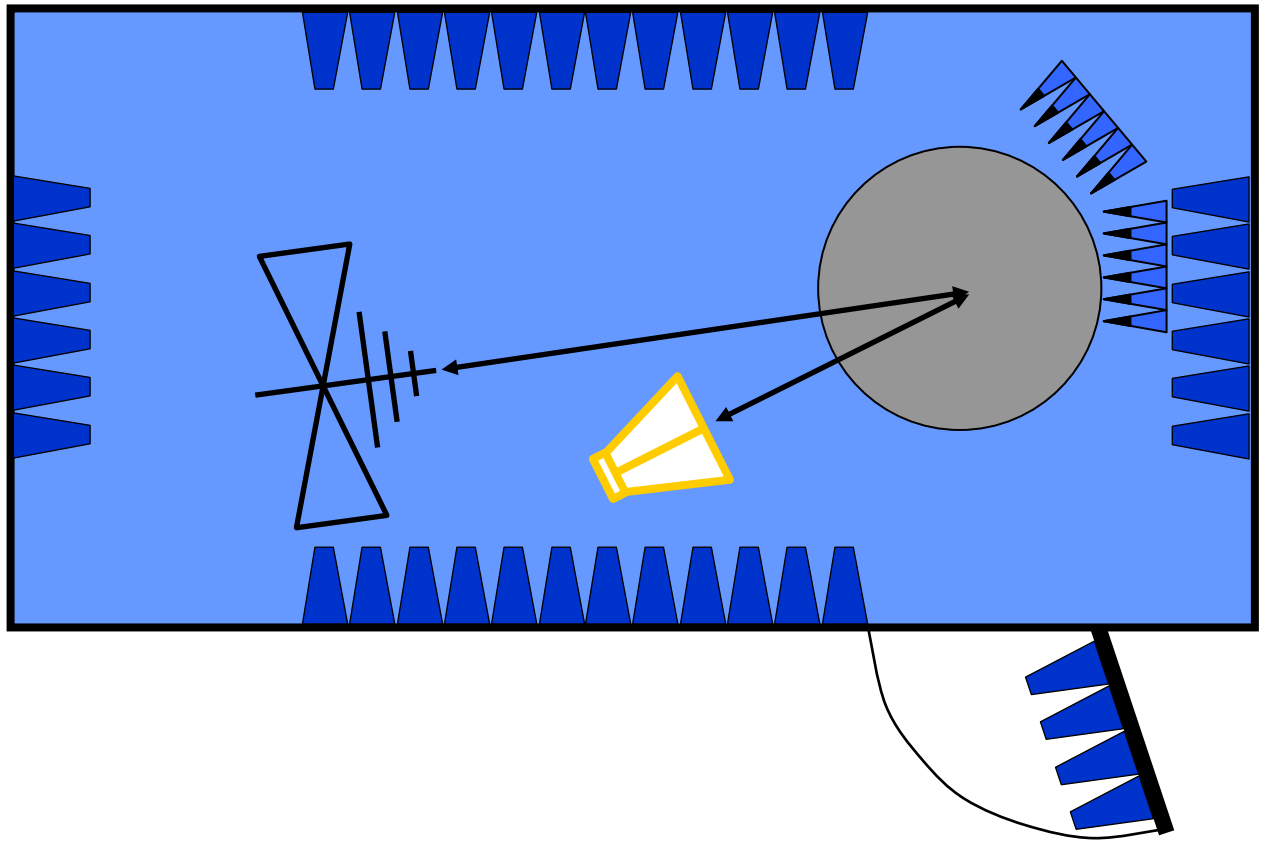


- **Training courses:**
  - Training covering: Integration of antennas, EMC, device certification procedures (EU vs. USA), layout review, …
  - Development of approval concepts, e.g., for device variants

Support in Setting up Measurement Concepts at Customer Sites

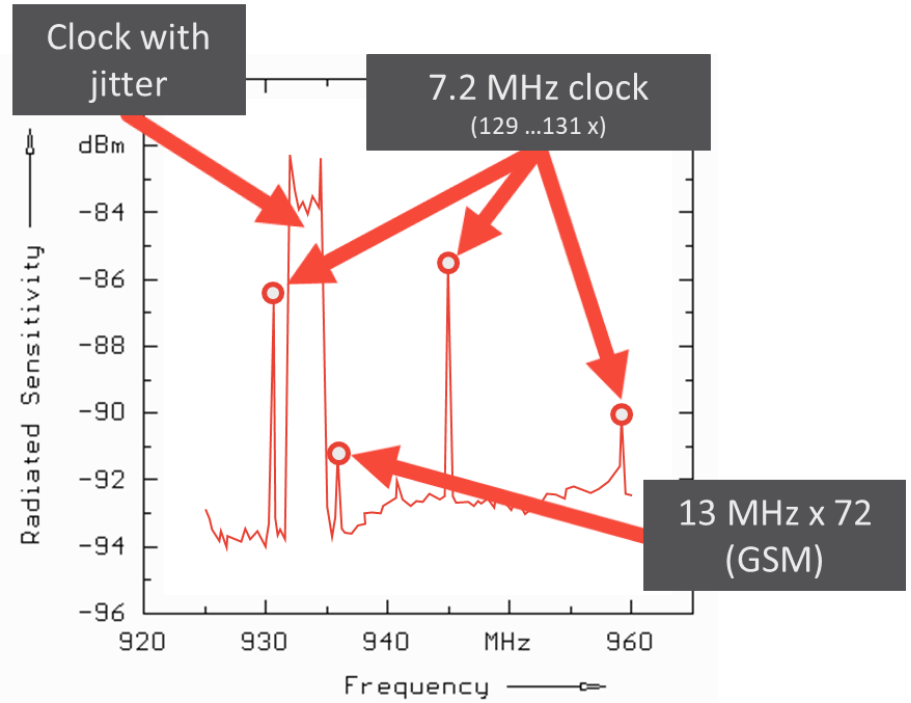
Measurement Technology:

- Support with automation of measurement procedures
- Automatic measurement report generation
- Expansion of EMC chamber to an OTA (antenna) test site
- Business plan for an OTA chamber for vehicles (8 million project)

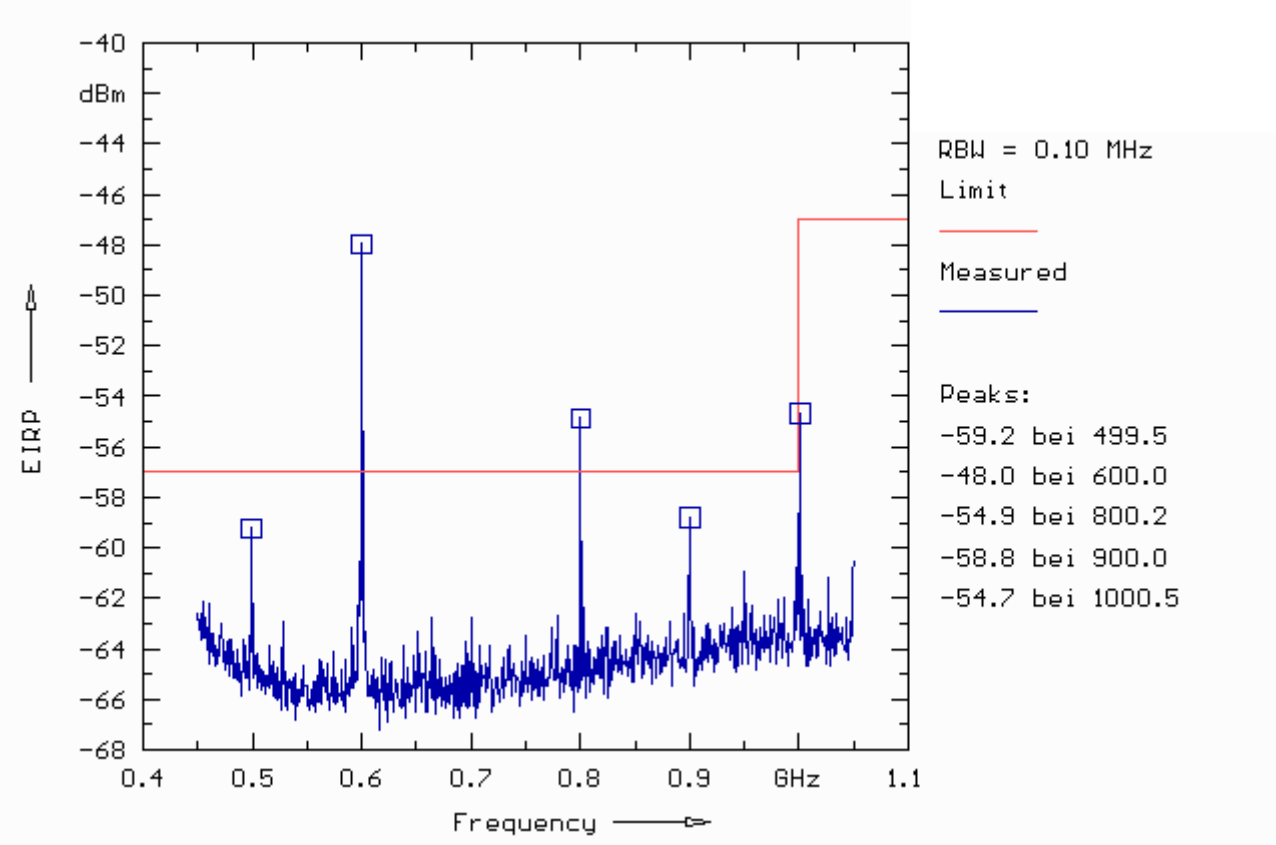


Experience in Handling of Special Tests for Development Phase

- **Antenna and the Whole System**
  - Classical OTA-Tests: Including wearables
  - LTE Quality Tests
  - Self-Interference

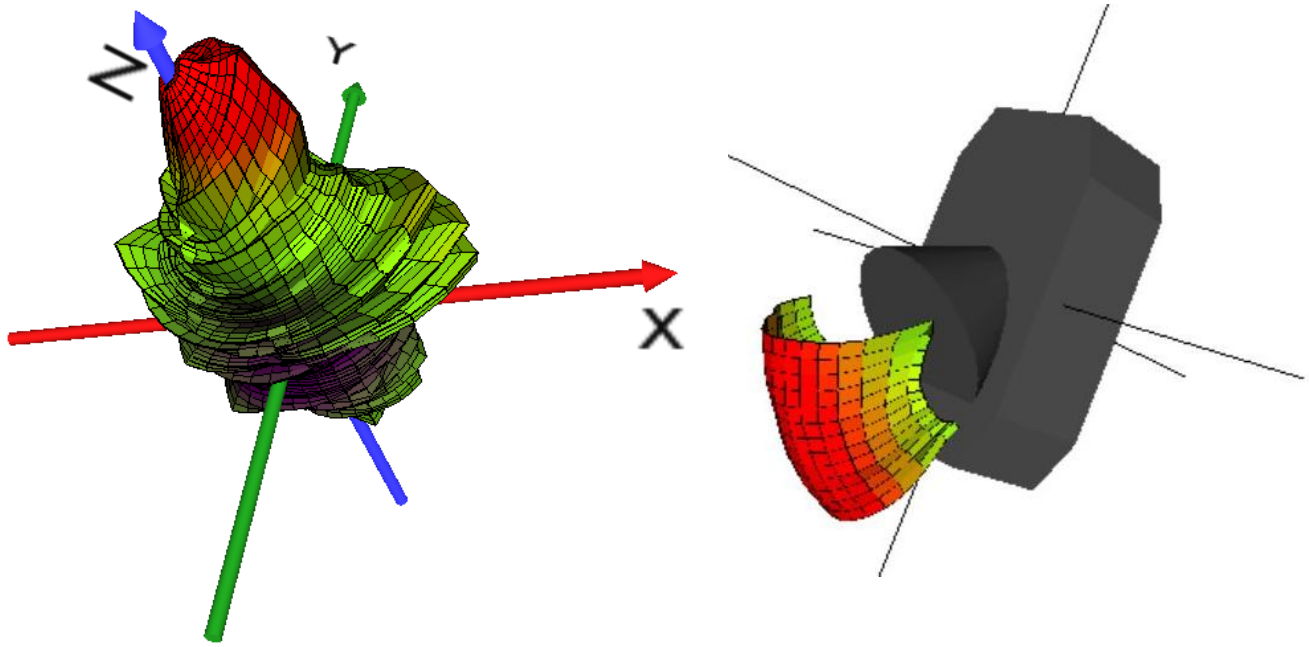


- **Extreme fast RSE-Tests**
  - Transmit but also idle mode and down to 300 MHz



Experience in Performing “exotic” Tests

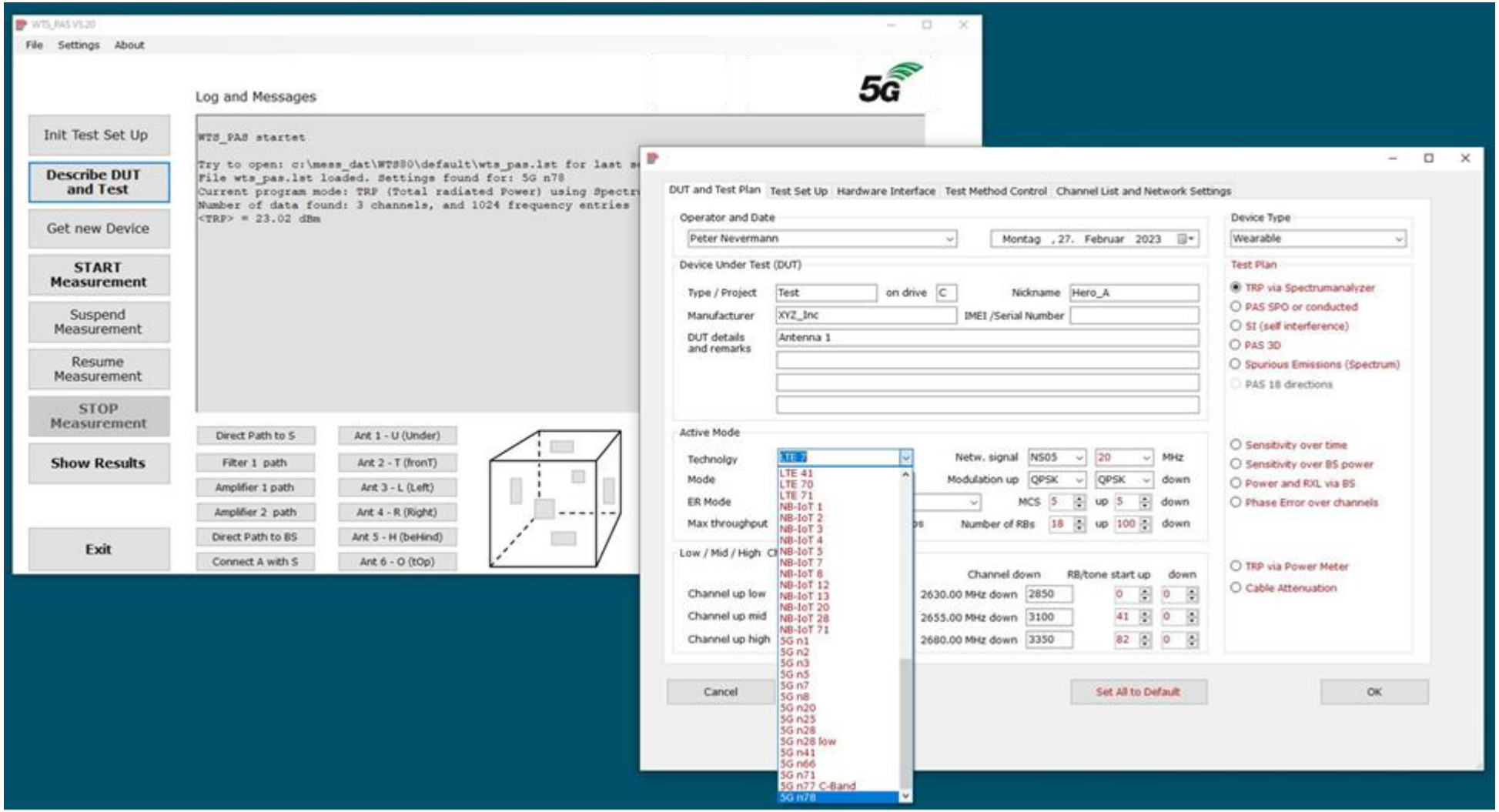
- **Antennas**
  - Antenna radiation patterns, even at 80 GHz
  - Measurement and evaluation of circularly polarized antennas in the MHz range
  - 3D antenna pattern presentation (interactive) with free tools
- **EMC**
  - Automated DUST status monitoring
  - Special antenna stress tests with multiple RF power amplifiers (Mil)
- **Certification**
  - Creation of optimized approval strategies
  - Regarding the treatment of variants
  - Or the consolidation of tests results for multiple countries



(Note: Special measurement equipment is required in the lab: e.g., special spectrum analyzers and mixers for the high GHz range or larger chambers for covering the MHz range)

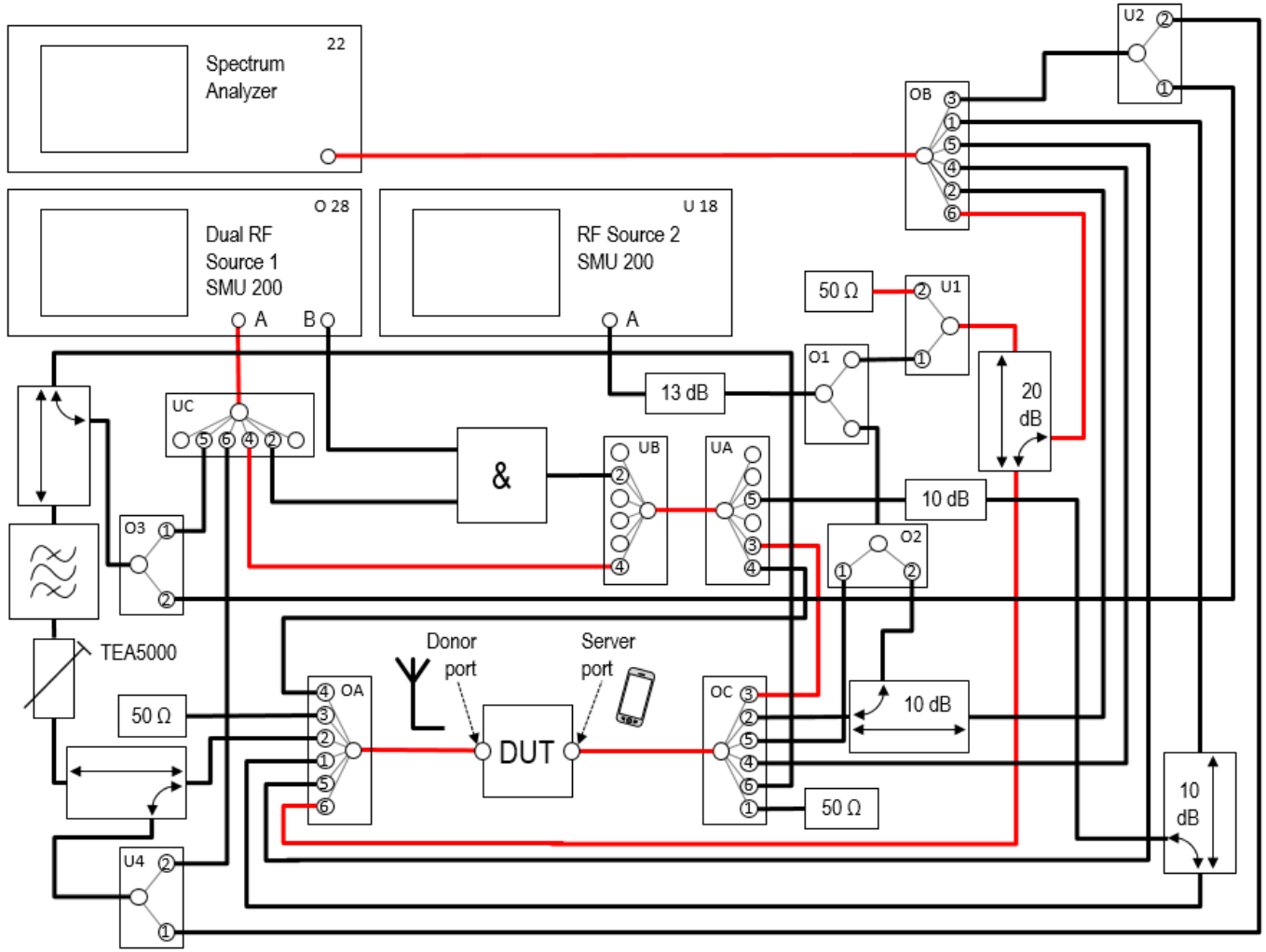
Software Development

- **Scripts („DOS“)**
- **Customer specific**
- **C#**
  - WTS_PAS
  - PN-Tools

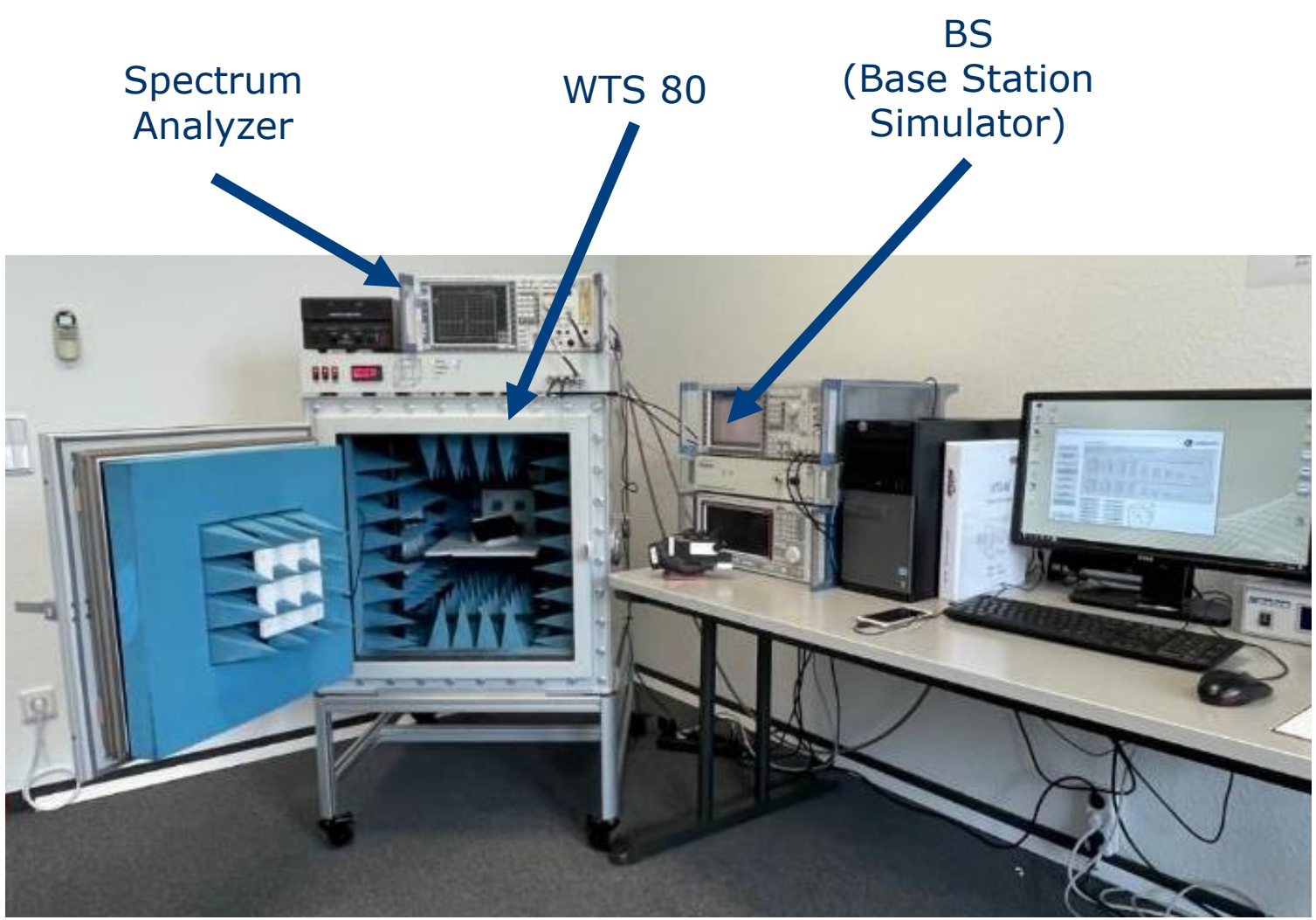


Design and Construction of Special Measurement Setups

- **Special – Setups:**
  - Setup of specific RF test systems (Example on the right: Booster test station)
  - Coexistence (ANSI C63.27)
  - Antenna pattern of military antennas
  - Setup of THz laboratory
  - Antenna calibration laboratory
  - Or alike …



PN-WT has Access to Special Laboratories

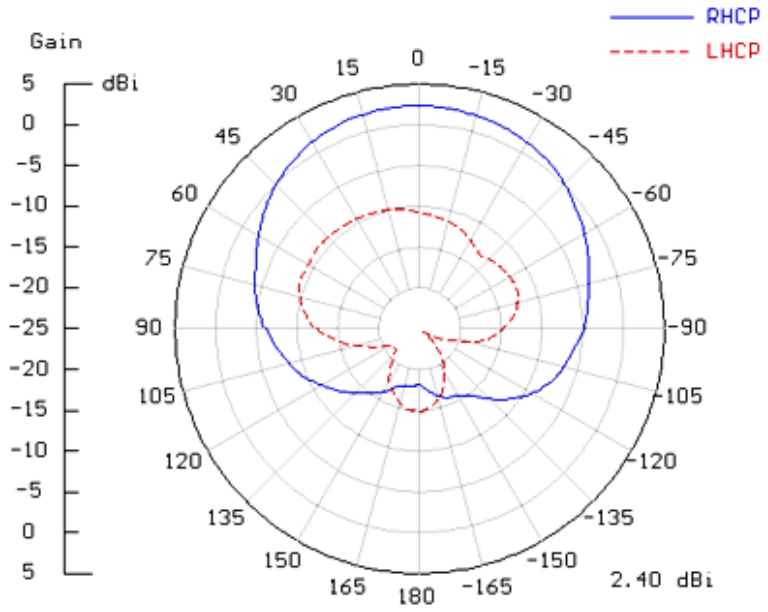


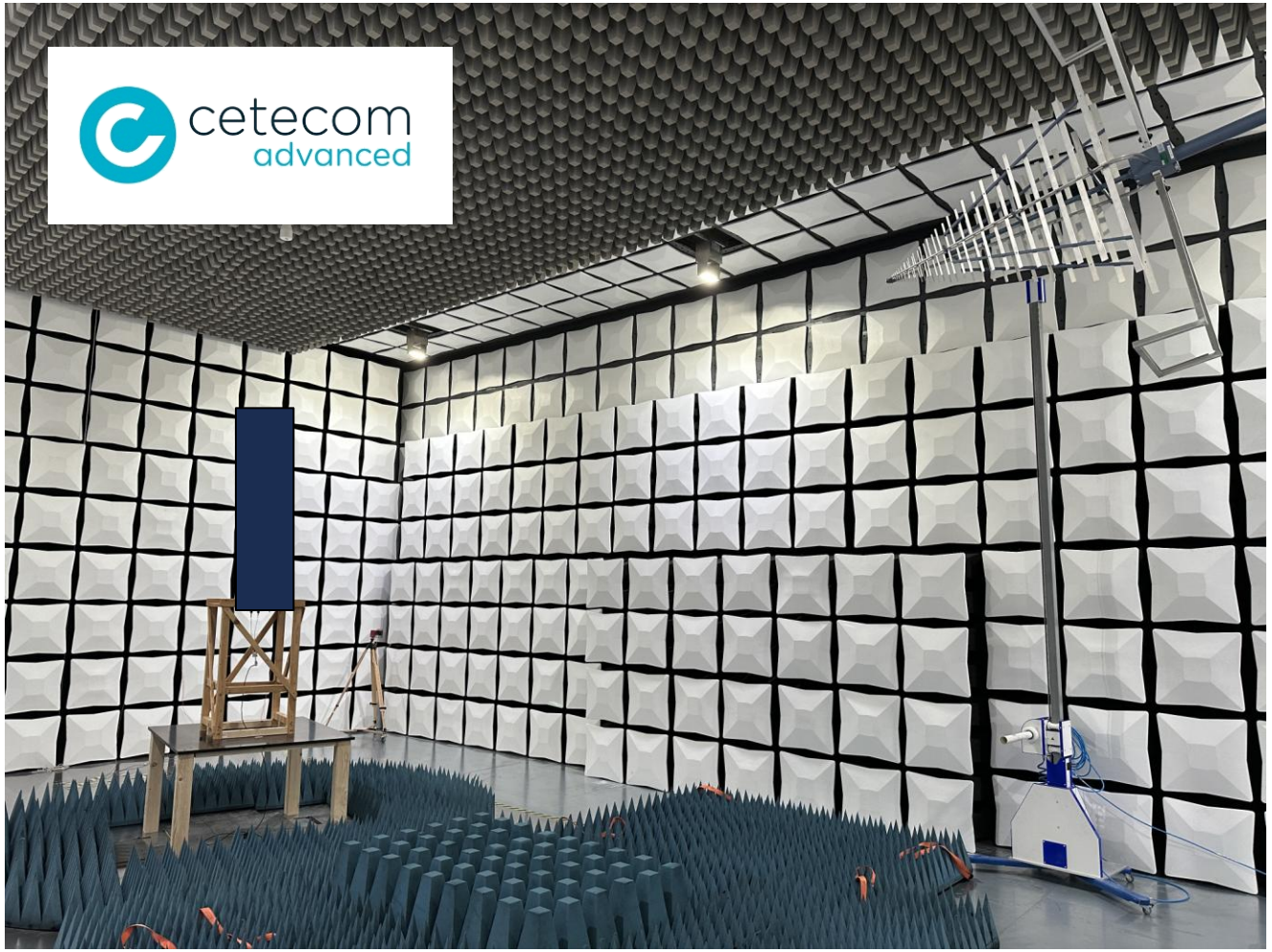
VNA

PN-WT has Access to larger EMC/Antenna Chambers

Antenna Pattern Test:

- Circular polarized
- e.g. for: VHF und UHF
  Military- and/or satellite antennas
- 6 m measurement distance





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