

Measurement campaign at 60 GHz in the living room environment at TUBS

Date: 2009-07-15

Authors:

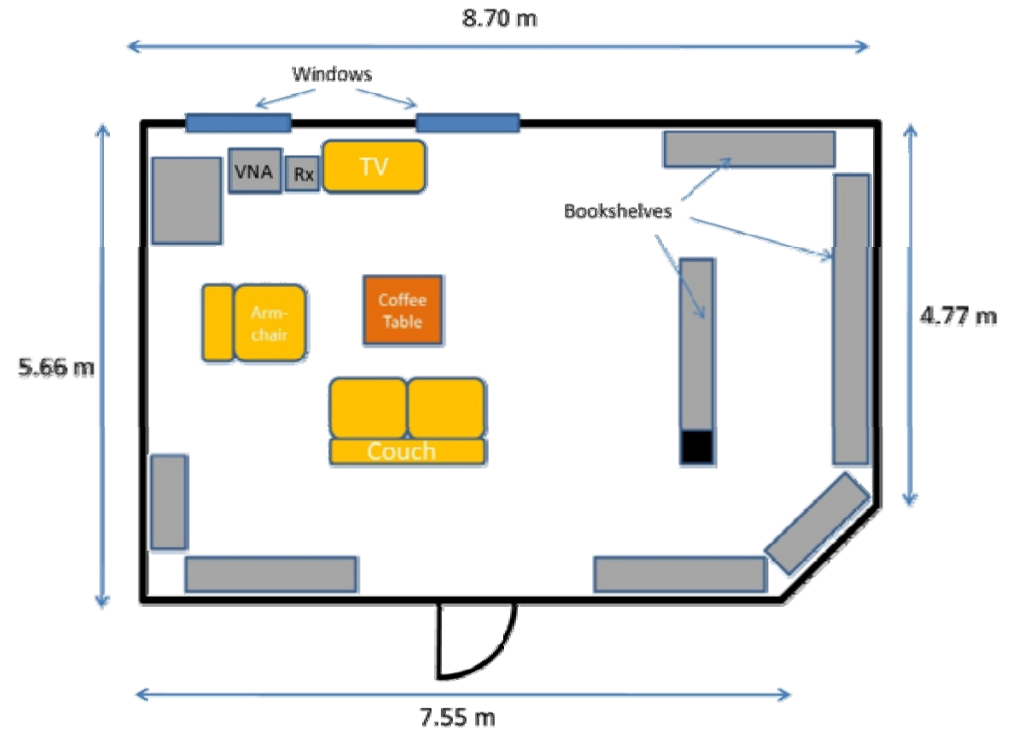
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Abstract

This contribution describes a measurement campaign carried out in the living room environment at TUBS. The scenarios, the set-up, the phenomena and parameters measured are described. A very few first results are presented. More results of the processed measurements will be shown in the up-coming TGad meetings and/or phone conferences.

Living Room Scenario

- **Living Room Scenario**
 - Similar to scenario from [1]
 - Typical furniture

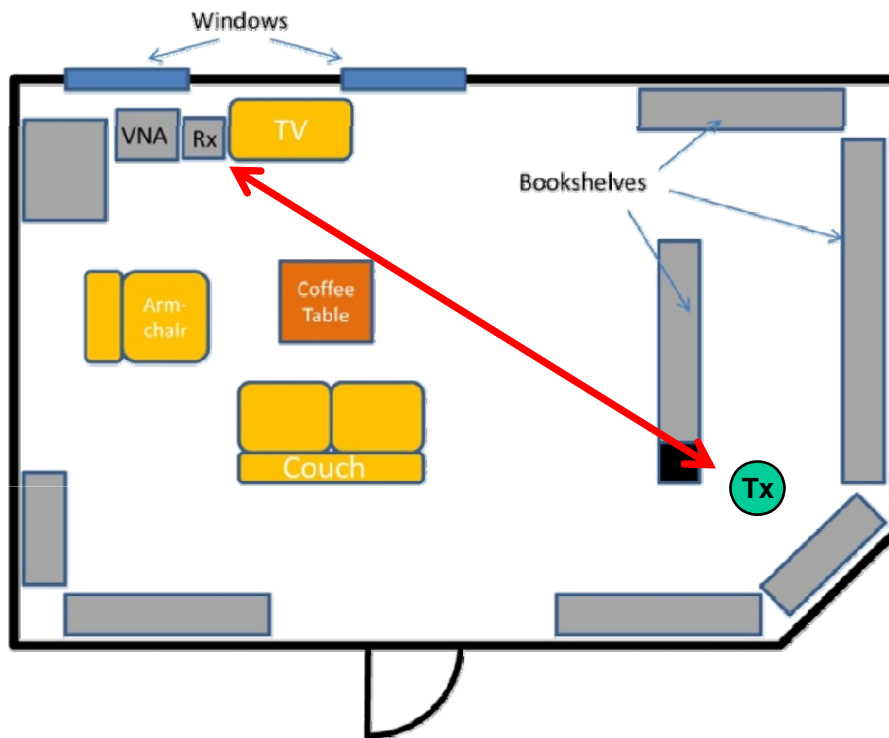


Measurement Campaign

- **Measurement Equipment as used in [2]**
- **AoA vs. AoD measurements**
 - Polarization (HH,VV,HV)
 - Horn-Horn, Open-Open
 - NLOS
- **Grid Measurements → small scale behaviour**
- **Dynamic Measurements**
- **Different Tx Positions**
 - Horn-Horn
 - Open-Open

AoA vs. AoD – Antennas/NLOS

- **NLOS**



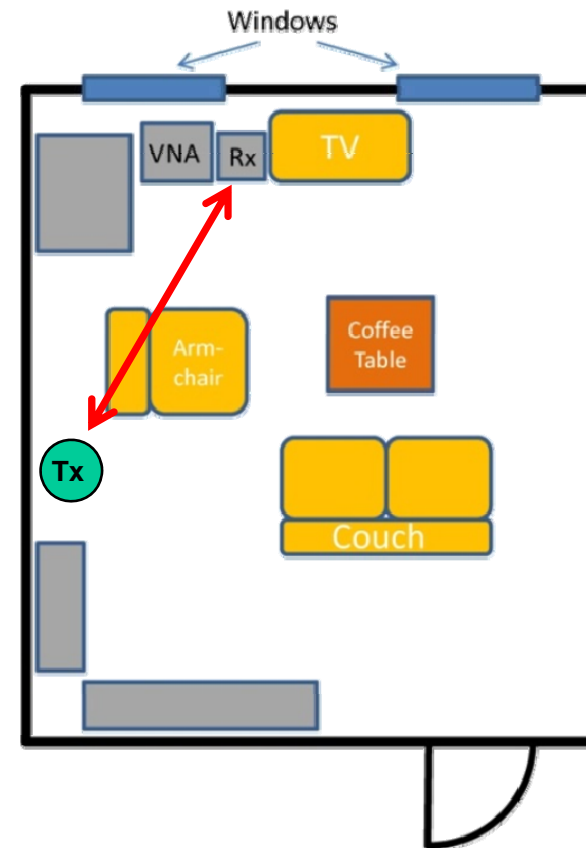
- **Antennas**

- Horn-Horn vs. Open-Open

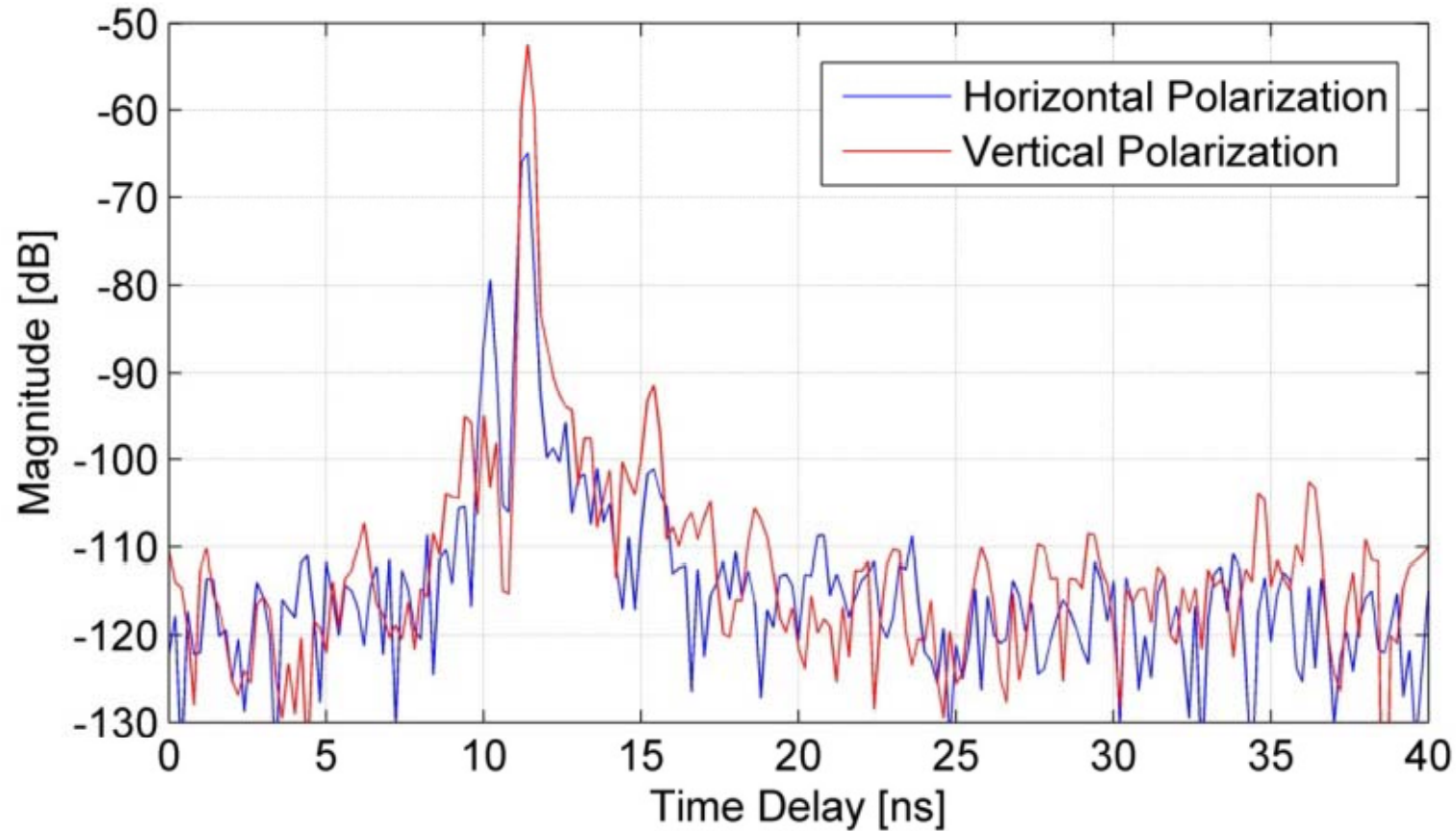


AoA vs. AoD - Polarization

- **Horn-Horn Configuration**
 - Horizontal – Horizontal
 - Vertical – Vertical
 - Horizontal – Vertical
- **Example (see next slide):**
 - 12 dB higher reflection loss for horizontal polarization



AoA vs. AoD - Polarization



- **Proposal: Comparison with results from Sawada et al.[4] and Maltsev et. al. [5].**

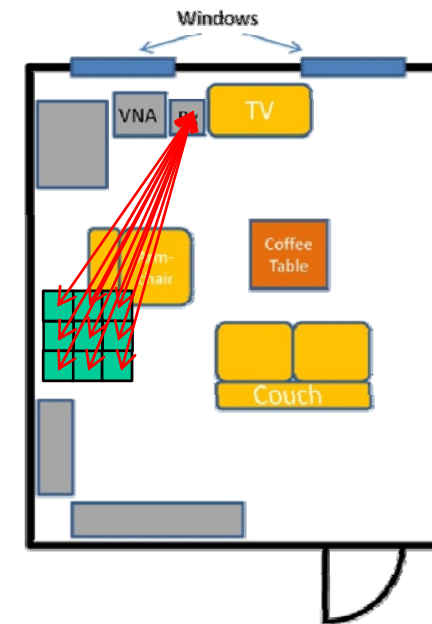
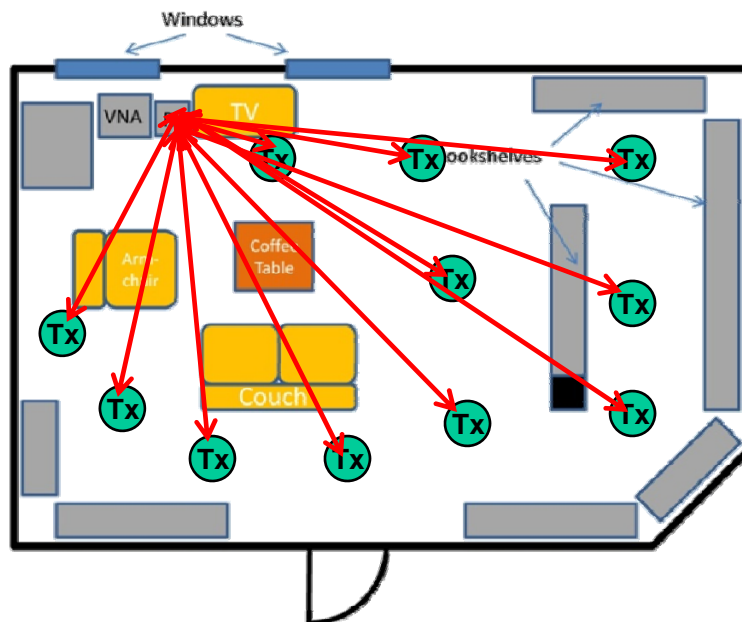
Grid Measurements / Tx positions

- **Different Tx Positions**

- Horn-Horn
- Open-Open
- Path Loss Model, Calibration

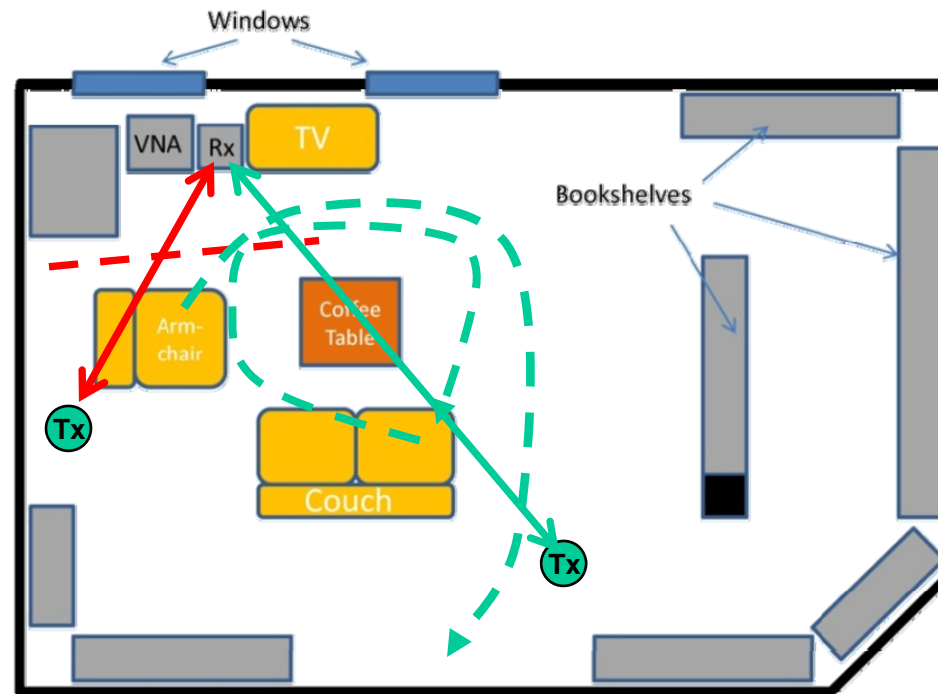
- **Grid Measurements**

- Small Scale Fading

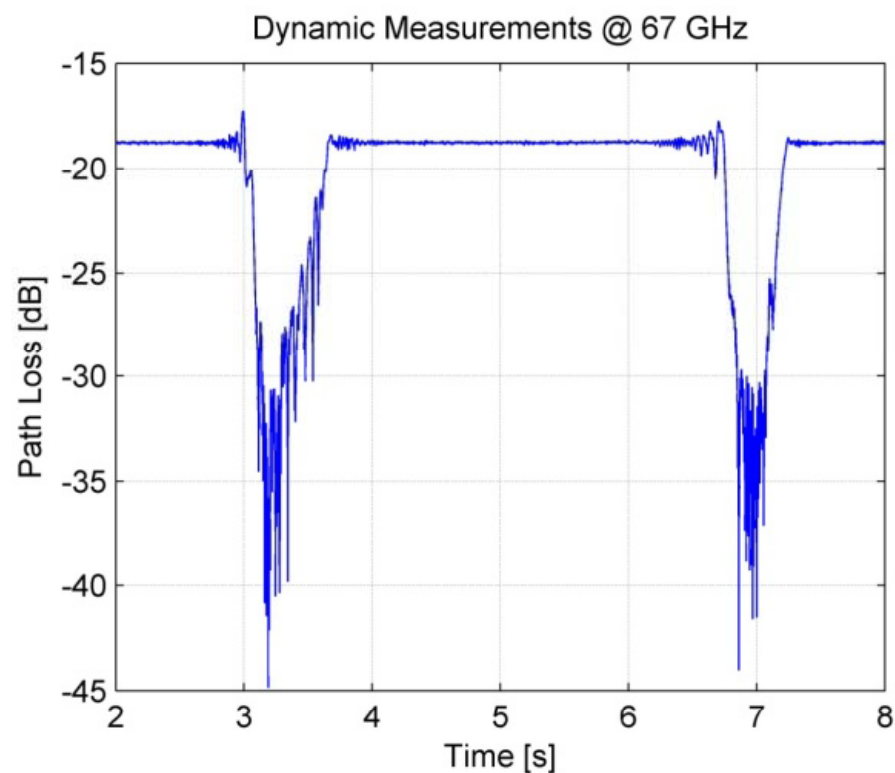


Dynamic Measurements

- **Single Person moving around**
- **Single Frequency: 67 GHz**
- **Horn-Horn, Open-Open Configuration**



Dynamic Measurements – Exemplary Result



- **Next Steps: Parameterize single shadowing events, compare results with literature [6] and develop a shadowing model**

Outlook on Ray Tracing Activities at TUBS

- **Polarization Model from Maltsev et. al. [5] has been implemented**
- **Next Steps**
 - Finish 3D models with furniture for Conference Room and Living Room
 - Calibrate RayTracing Simulations with measurements
 - Build statistical models from Ray Tracing results

References

- [1] E. Perahia, R. Maslennikov, “Simulation Scenario Floor Plans”, doc.: IEEE 802.11-09/0499r0
- [2] M. Jacob, T. Kürner, P. Chambelin, “Deterministic Channel Modeling for 60 GHz WLAN”, doc.: IEEE 802.11-09/0302r0
- [3] A. Maltsev et. al, “Polarization model for 60 GHz”, doc.: IEEE 802.11-09/0431r0
- [4] H. Sawada et al., “Propagation measurements and considerations in conference room, living room and cubicle environments Part 1”, doc.: IEEE 802.11-09/0721r1
- [5] A. Maltsev et. al, “Experimental Investigation of Polarization Impact on 60 GHz WLAN Systems”, doc.: IEEE 802.11-09/0552r0
- [6] M. Jacob, T. Kürner, “Influence of moving people on the 60 GHz channel –a literature study”, doc.: IEEE 802.11-09/0744r0