

**Project: IEEE P802.15 Working Group for Wireless Personal Area Networks
(WPANs)**

Submission Title: Simulation Results of a Phased Array at 300 GHz

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Abstract: A concept of a phased array operating at 300 GHz with horn elements and some simulation results are presented.

Purpose: Provide Information to the Interest Group.

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Simulation Results of a Phased Array at 300 GHz

Outline

- Motivation
- Concept of a Phased Array Antenna at 300 GHz
- Performance in Simulations
 - Gain
 - Matching
- Summary

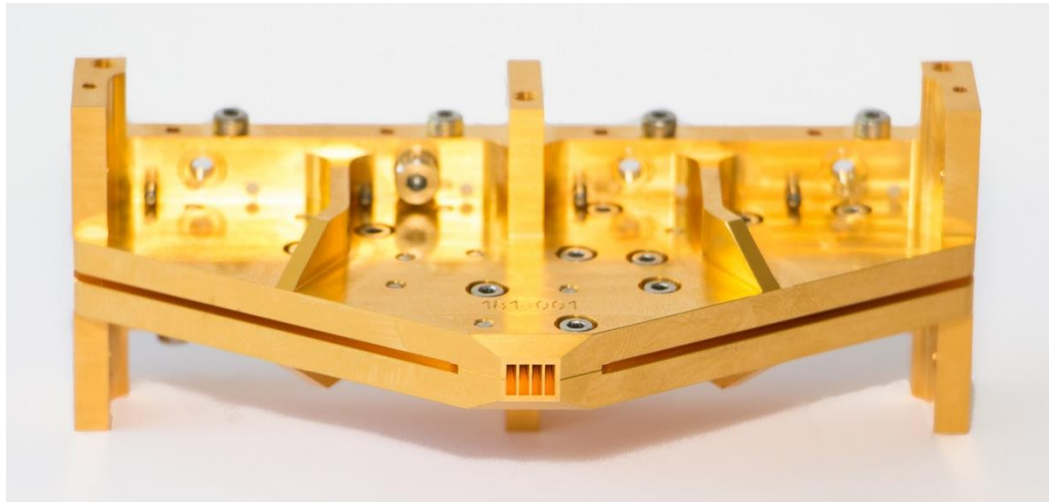
Antenna Requirements at 300 GHz

- Huge path loss (100 dB @ 10m @ 300 GHz):
 - For a system with ...
 - ~50 GHz bandwidth
 - transmit power of -4 dBm
 - noise figure 6.7 dB
 - Distance of 2 m
 - an **SNR of 10 dB**
 - requires at least a **gain of 20 dBi** at Rx and Tx
- Antenna shall perform spatial filtering (small HPBW).

Antenna with Electronic Beam Steering

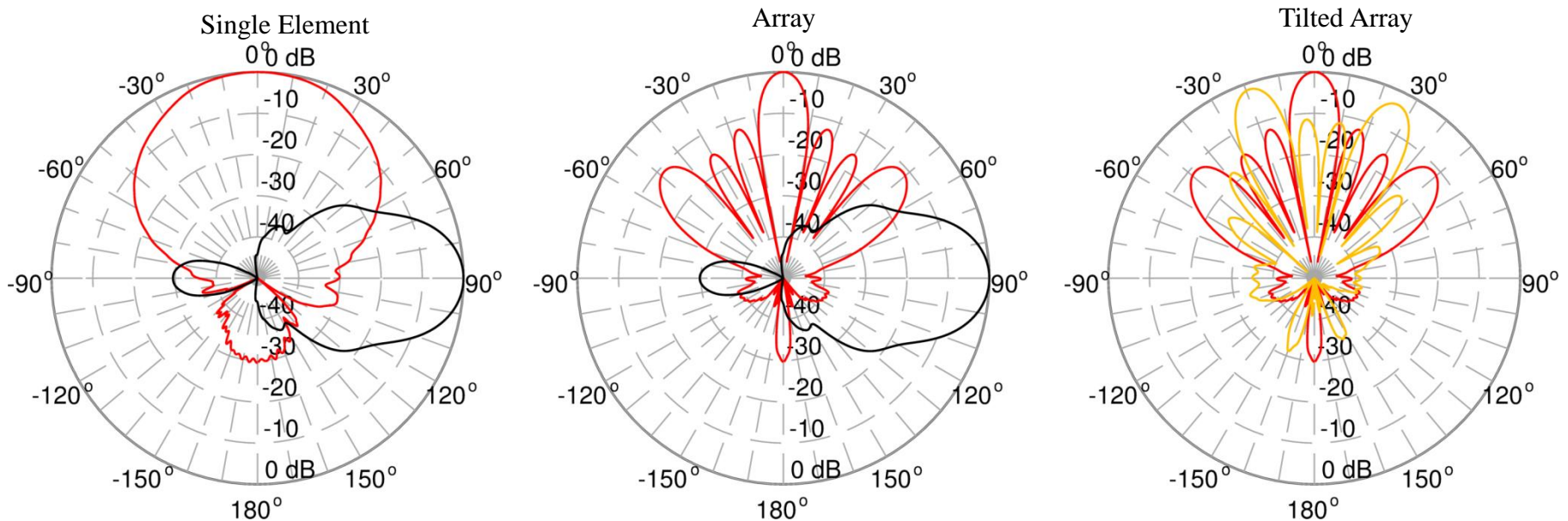
- Electronic beam steering is a key technique to a (consumer) market
- Within TERAPAN (collaboration project Fraunhofer IAF, University of Stuttgart, Technische Universität Braunschweig) a phased array approach has been selected.
- Number of elements is limited to 4 (at Rx and Tx).
- Paper with more details has been accepted for ISAP 2016.

Antenna Concept



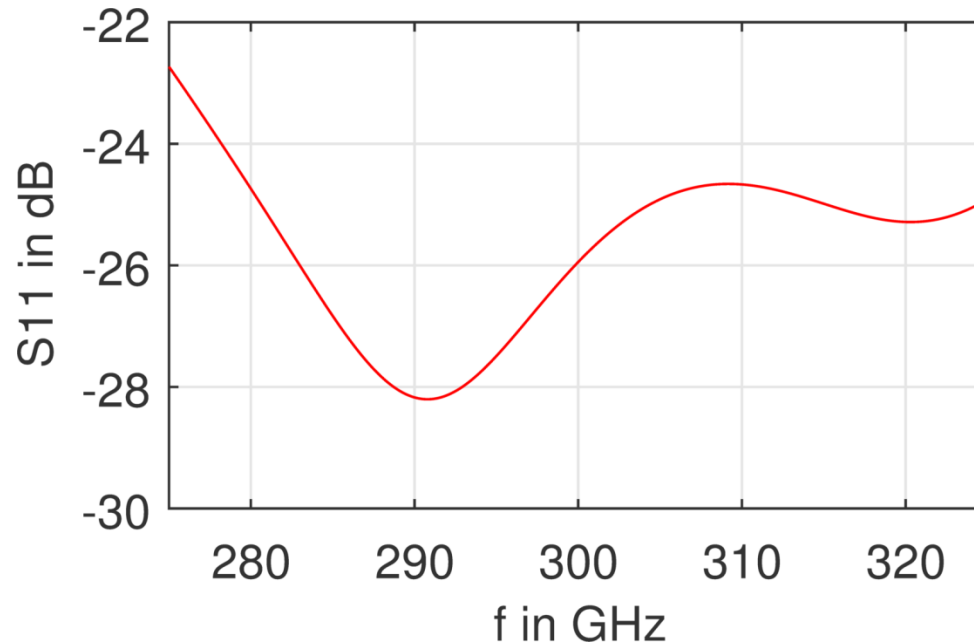
- Phased array with four horn elements
- fed by WR-3 wave guides
- 1.25 mm element spacing due to the milling process
- Grating lobes will occur.

Simulated Gain and HPBW at 300 GHz



- 14.8/20.7 dBi gain of a single element/whole array
- Array HPBW 10.3°/ 23.6° **horizontal/vertical**

Impedance Matching



- $S_{11} < -22$ dB over the whole frequency range

Summary

- Requirements for 300 GHz antennas have been briefly reviewed
- A phased array with horn elements has been introduced
- Some simulation results have been shown

**Vielen Dank für
Ihre Aufmerksamkeit.**

Thank you for paying attention!