

The 5th Workshop NSF Research Coordination Network on Millimeter-Wave Wireless

Panel 2: Academic-Industry Collaboration for
“Moonshot” mmW RCN Contributions

Tuesday, January 29, 2019

Panel 2: Academic-Industry Collaboration for “Moonshot” mmW RCN Contributions

- Theme: “Moonshot” research challenges for **crystalizing academic-industrial collaboration**
- Moderator:
 - Brian Floyd and Ismail Guvenc (NC State University)
- Panelists:
 - Ozge Koymen (Qualcomm)
 - Carlos Cordeiro (Intel)
 - Joonyoung Cho (Samsung)
 - Tim Hancock (DARPA)

What will 6G be?

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CTN

<https://www.comsoc.org/publications/ctn/what-will-6g-be>

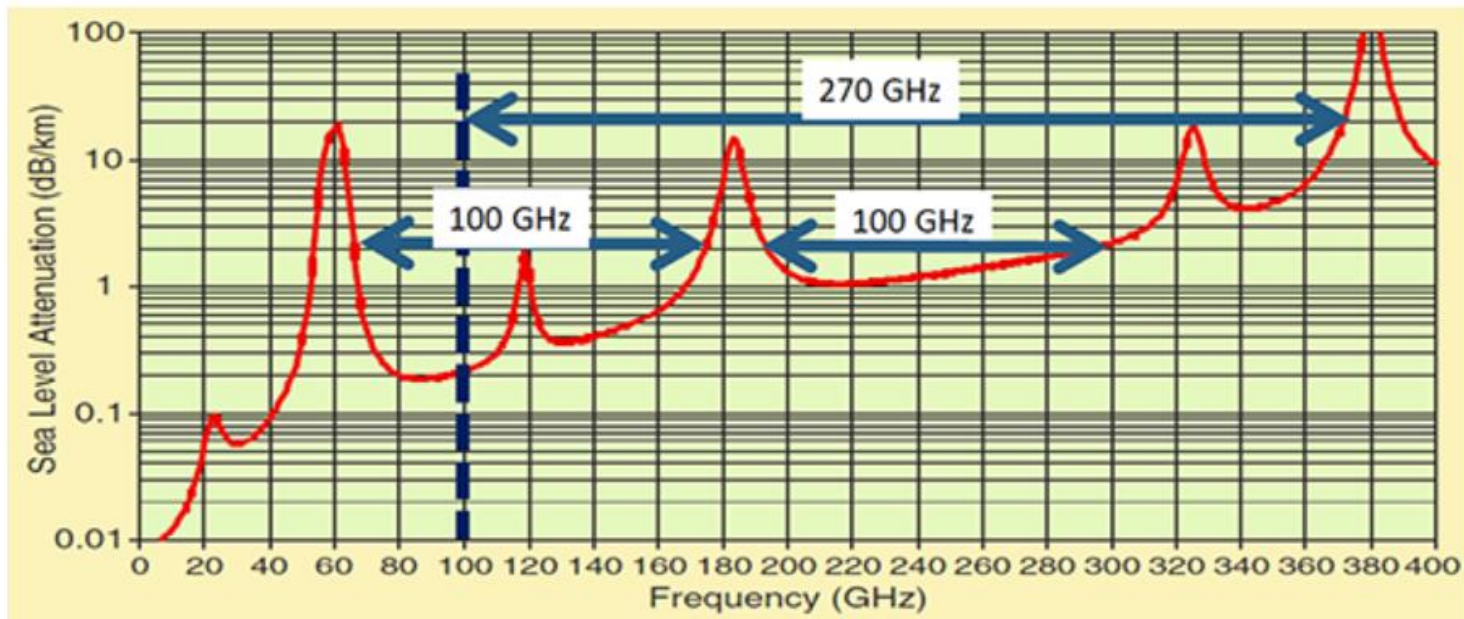
Written By: Alan Gatherer, Editor-in-Chief

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What will 6G be?

Trend-1: More bits, more spectrum



- Moonshot problems in the lower mmW band?
Higher mmW band?

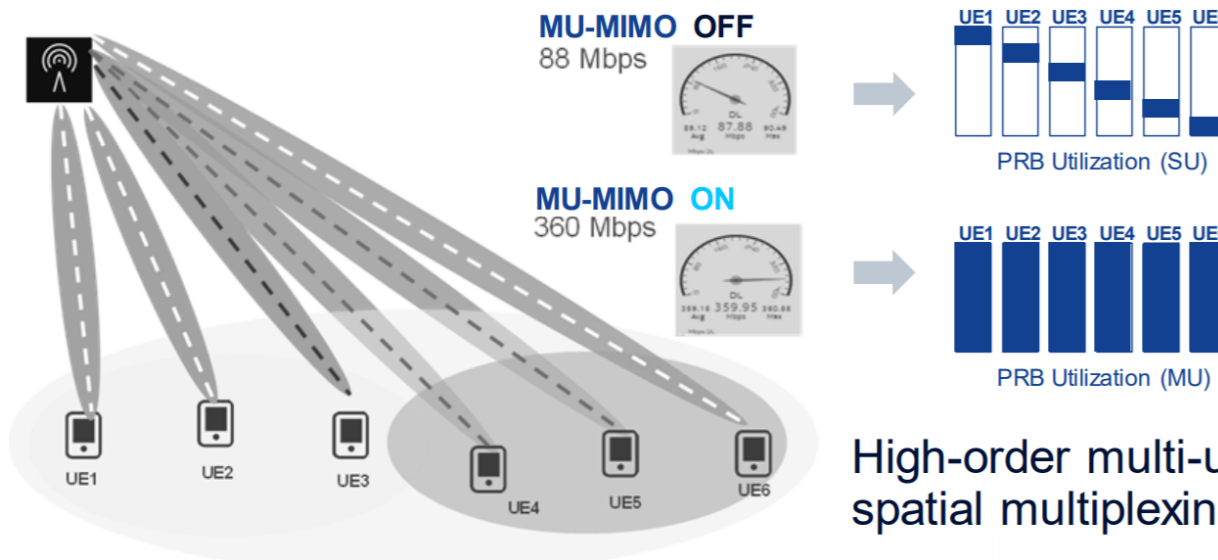
What will 6G be?

Trend-2: Increased emphasis on spatial bandwidth

- Better bits / second / m³, Satellite communications (aerial transmitters?)
- Massive MIMO done right and making impact
 - Digital beamforming versus hybrid beamforming
 - Beam alignment / tracking mobility with narrow beams
 - Channel models for different use cases / frequencies
 - [From CSP/NET breakout] Benchmark channel data for evaluations

NOKIA

Massive MIMO field performance: TD-LTE 2600



High-order multi-user
spatial multiplexing

What will 6G be?

Trend-3: New technologies

- On-chip mmW antennas, metasurfaces
- AI and machine learning
- ??

ITU Focus Group on ML for Future Networks Including 5G

Working Group 1: Use, cases, services and requirements (representative usecases)

4.3 ML-based Mobility Pattern Prediction

4.4 Load balance and cell splitting/merging

4.6 ML-based Self Organizing Networks

4.7 ML-based QoE optimization

4.9 ML-based network management for Industry 4.0

4.10 Intelligent 5G for Automated & Connected Vehicles

4.11 ML-based correlations between Transport KPIs and Radio KPIs

4.15 End-to-end network operation automation - Fault detection and recovery

4.20 Big data and machine learning aided channel modeling and channel prediction

4.21 Machine Learning based Link Adaptation Optimization

4.23 Data-Driven Architecture for Machine Learning at the Edge

Kim Mahler, Fraunhofer Institute
(from CSP/NET breakout session)

What will 6G be?

Trend-4: New applications and verticals

- VR/AR
- Smart cities
- Drones / urban air mobility
- V2X
- Industrial automation
- Integrated communications/radar



Will there really be killer -apps?
Are there unique challenges for mmW?