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mmWAVES AND UP (BEYOND NOMADIC)

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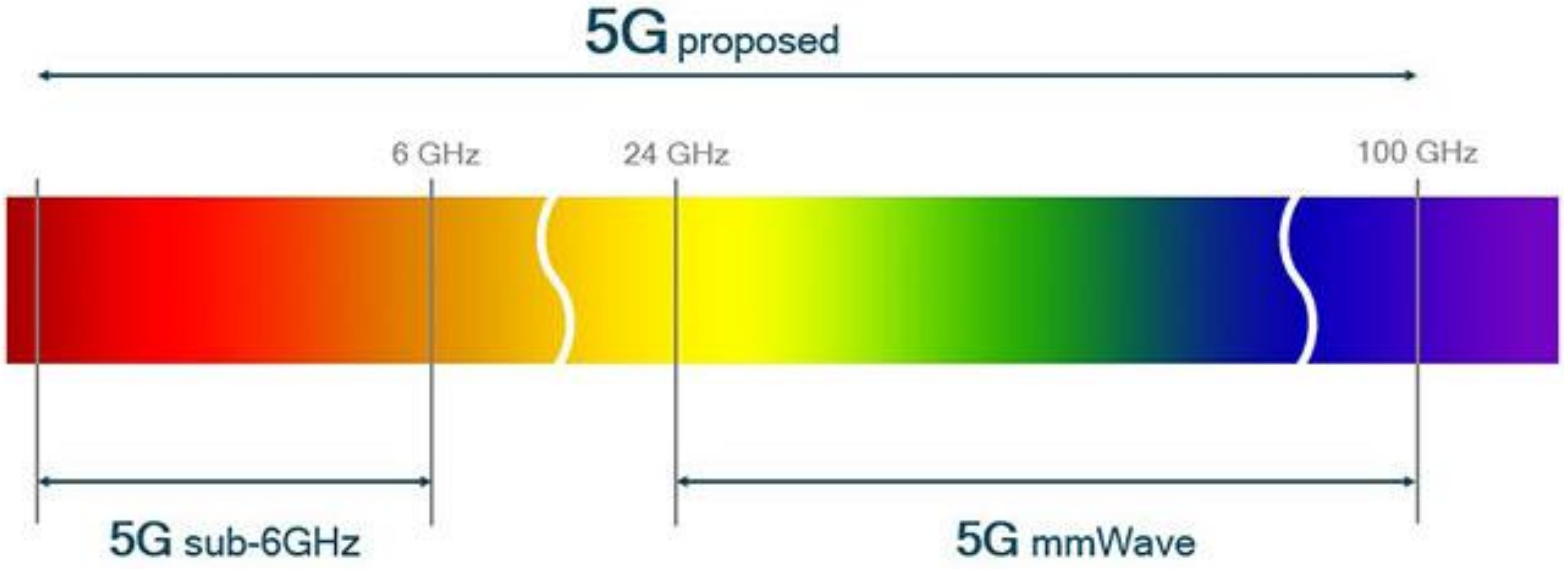
GHENT UNIVERSITY

PUBLIC

KU LEUVEN

SPECTRUM TO ACHIEVE > Gbps



60 GHz provides the spectrum to offer consistent Gbps communications

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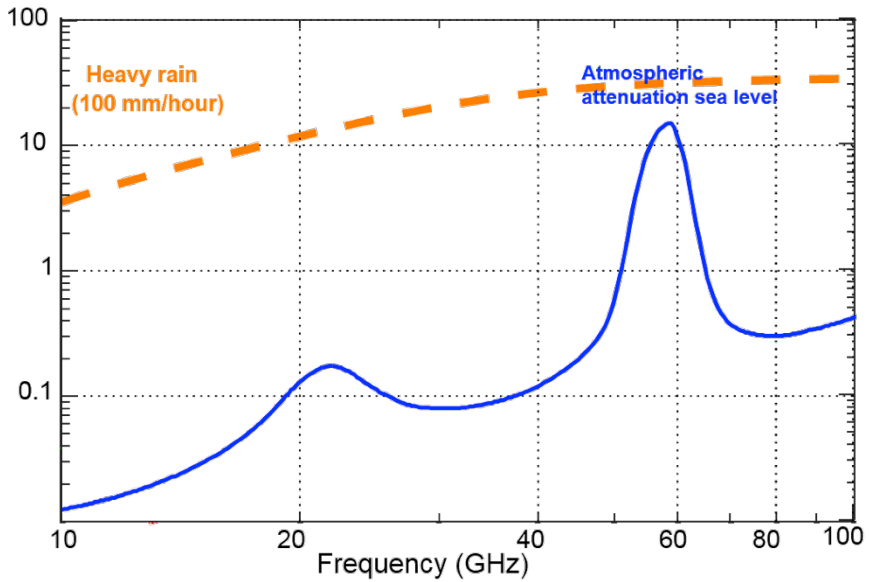
OPPORTUNITIES AND CHALLENGES FOR 60GHz

- Opportunities
  - huge amount of bandwidth available
  - multi-Gbps data rate
  - low latency
  - high capacity with dense spatial reuse (high directivity beams)
  - unlicensed
- Challenges
  - high EIRP needed for link budget
  - link reliability (high path loss, blockage)
  - device cost and power consumption

FCC Adopts New Rules for Unlicensed V-Band, Extending the Coverage to 57-71 GHz

Expanded Spectrum Greatly Increases Market Potential for Vubiq Networks



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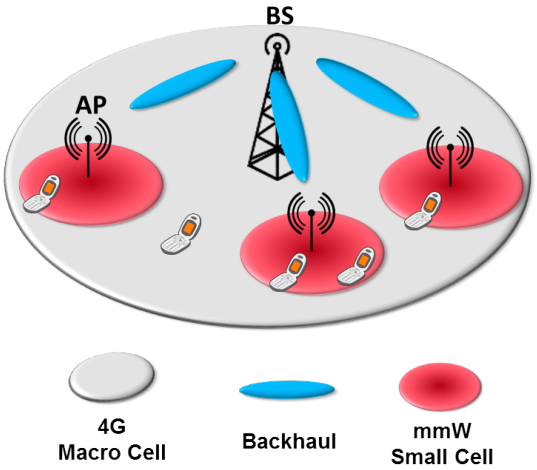
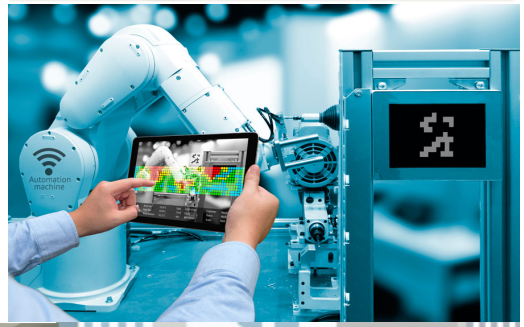
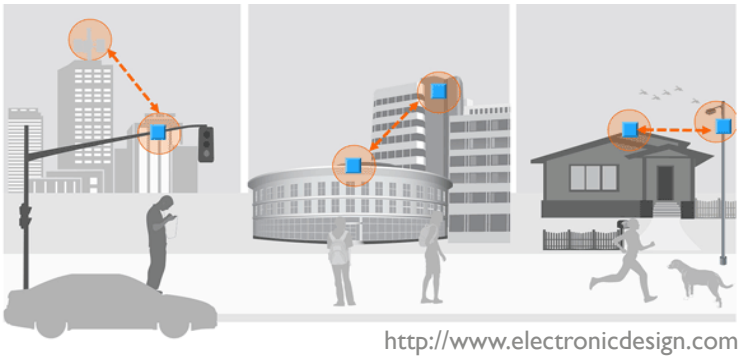
MARKETS

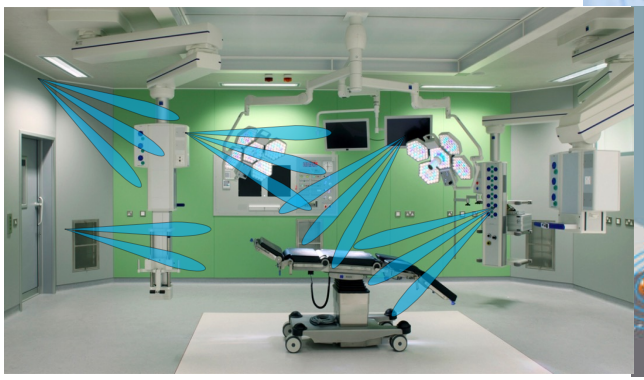
- Small cell access (outdoor)
- Back/fronthaul (LoS)
- Last-mile fixed wireless access
- Indoor wireless networks
- Connected transport/mobility
- Industry 4.0 – smart factories
- Healthcare: surgery rooms







http://www.electronicdesign.com



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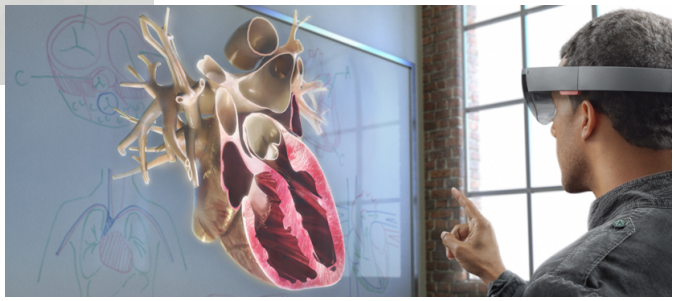
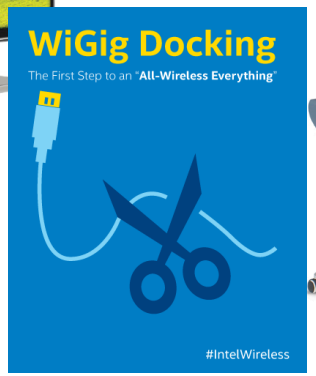
APPLICATIONS

- Wireless VR/AR
- Interactive and connected gaming
- 4K/8K/16K UHD mobile/fixed video
- Wireless docking
- Kiosk or data showers
- Remote controlled surgery
- Mission critical communication





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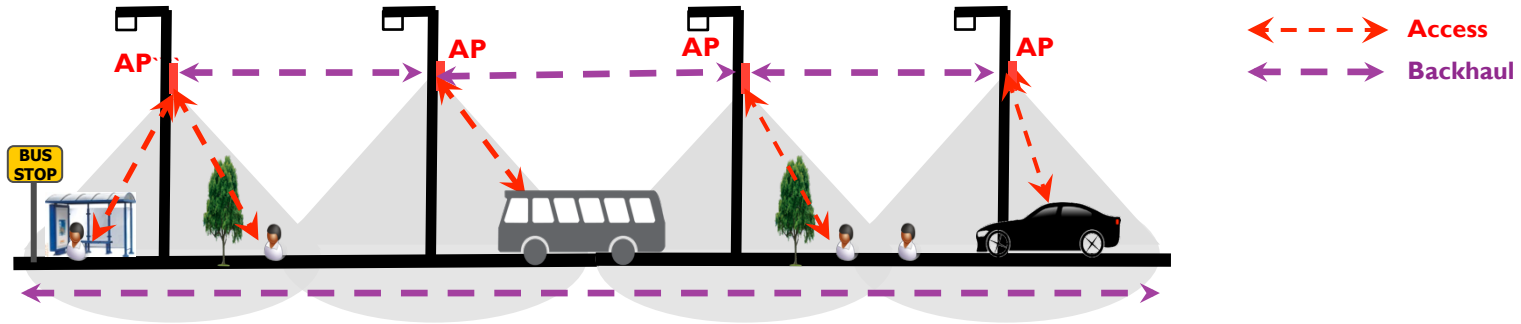
ARCHITECTURE: OUTDOOR

MOBILE MULTI-USER, MULTI-GIGABIT ACCESS



- Streetlight use case offering 60GHz Access
- Backhaul: fiber or 60 GHz
- Benefits of 60 GHz backhaul
  - Drastic capacity increase
  - Lower installation and maintenance costs
    - No expensive fiber networks to access networks
    - Small form factor
    - Hybrid (analog + digital) beamsteering
  - Reduced service deployment time
  - Low latency at < 0.5ms RTT per hop

Support of high mobility!

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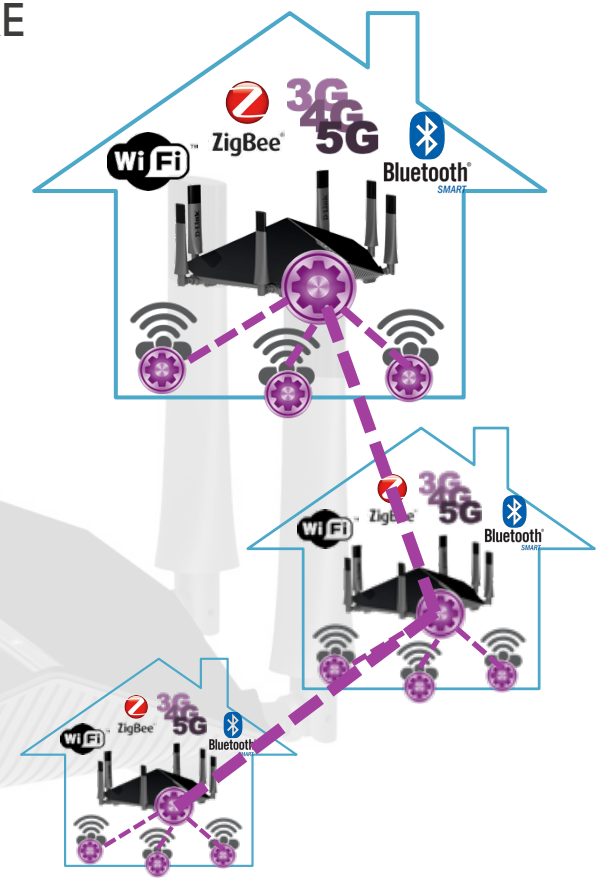
ARCHITECTURE - INDOOR

SELF-MANAGING MULTI-BAND GATEWAY OF THE FUTURE

FEATURES

- Multi-band (2.4GHz, 5GHz, 60GHz, 868MHz…)
- Multi-technology (IEEE802.11, IEEE 802.15.4, NR…)
- Smart antennas: diversity, beamsteering, massive MIMO
- Intelligent coordination (centralized @AP, distributed @STA, inter-AP) taking into account wireless dynamics, interference, and traffic requirements
- Smooth handovers
  - Horizontal (intra-technology, inter-AP) for mobility support
  - vertical (inter-technology) handovers for load balancing
- Upgradable at all levels (NTW, MAC. PHY)



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mmWAVE COMMUNICATIONS ROADMAP

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DRONE-ASSISTED WIRELESS ACCESS

TARGET

- Mission critical communication
- Ad hoc events

FEATURES

- 60 GHz access and backhaul
- Ad hoc deployment
- Advanced beamsteering
- Massive number of users

Mobility and high dynamics!

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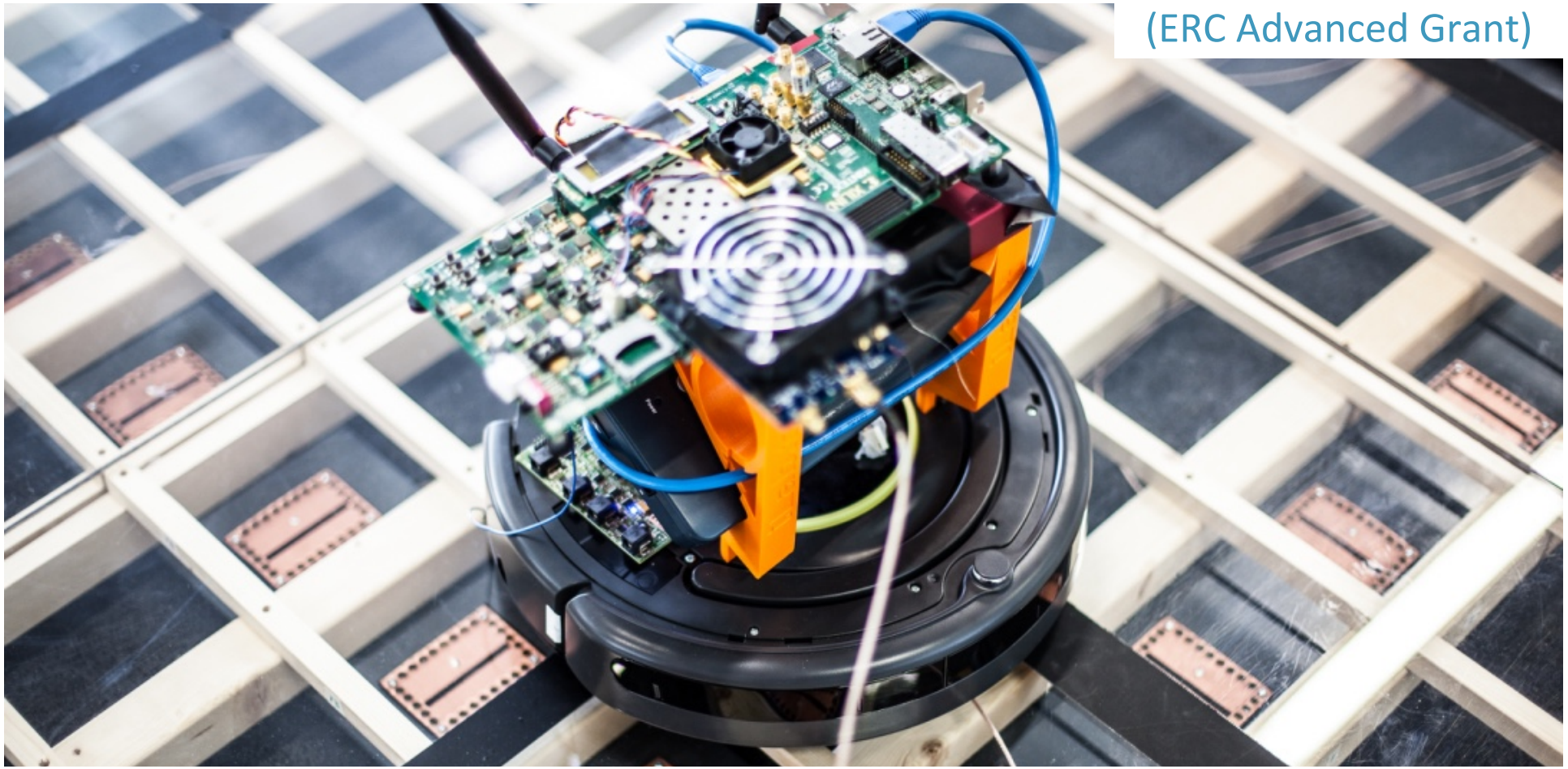
(ERC Advanced Grant)



ATTO: a novel concept for 100 Gbps wireless

ORCA-PROJECT.EU

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