Beyond 2020 Heterogeneous Wireless Network with Millimetre-Wave Small-Cell Access and Backhauling

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www.miwaves.eu
MiWaveS at a Glance

- Large scale integrating project (IP)
- 15 partners
- **Project coordinator**: Dr. Laurent Dussopt (CEA-LETI, Fr).
- **Project officer**: Pertti Jauhiainen (EC).
- **Call**: FP7-ICT-2013-11
- **Objective**: ICT-2013.1.1 Future networks
- **Contract**: CNECT-ICT-619563
- **Total cost**: 11 349 195 €
- **EC funding**: 7 358 113 €
Consortium

Coordination:

Research institutes

Universities

Large companies

Small-Medium Enterprises
Rationale: Beyond 4G Cellular Networks

- **Heterogeneous networks**: small cells within macro cells
  - Improve user data rate near the access point
  - Offload data from the macro cell to the small cell
  - Reduce transmit power (terminal and BS)
  - Flexible deployment in dense areas

- **Millimeter-wave small cells**
  - **Spectrum resources** available worldwide (60 GHz, 71-86 GHz)
  - **Multi-Gbps data rates**
  - **No interference** with macro cell
S&T Objectives

- **Objective 1**: mobile access with up to 5 Gbps data rate through mmW radios and above 10 Gbps aggregate capacity for backhaul.
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- **Objective 2**: Reduction of the overall EMF exposure (reduction of 3G/4G traffic, higher free-space attenuation at mmW, high directivity antennas)

- **Objective 3**: Reduction of the power consumption per bit transmitted (access and backhaul) (green radio) (mmW radios, directive antennas, short distance links).

- **Objective 4**: improvement of flexibility, QoS, robustness, security for operator networks (split of data and signaling traffic, priority traffic on the 3G/4G network, mmW directive and short-range access links, self-organizing network).
Project structure

WP8: Project management

WP1: Heterogeneous wireless network with mmW small-cell access and backhauling

WP2: Network mechanisms and algorithms

WP3: Radio technology

WP4: Antenna technology and EMF exposure

WP5: Integration of analog frontend, implementation of baseband algorithms, and prototyping

WP6: MmW access and backhauling proof of concept for heterogeneous wireless networks

WP7: Dissemination, standardisation, exploitation

WP8: Project management
Targeted results

- **Definition** and **specification** of an heterogeneous wireless network with mmW access and backhaul.

- Proof of concept of **networking functions and algorithms** for mmW access and backhaul (Data routing, antenna beam-steering and beam-forming).

- Demonstration of the **radio** and **antenna technologies** for 60 GHz and E-band communications.

- **EMF exposure** assessment of users.

- Demonstration of an heterogeneous network prototype with mmW backhaul and access links.

- Contribution to **standards, regulation** and **scientific dissemination**.
Final Demonstration

Proof of Concept of mmW Access and Backhaul

KPIs: Max. throughput, power cons., beamforming perf., latency.
Industrial Advisory Board

- Mr David Owens, Telefonica O2, network performance manager.
- Dr Evangelia Georgiadou, OTE, engineer.
- Dr Guillaume Vivier, SEQUANS, director of advanced technology.
- Dr Ralf Imer, Vodafone, senior manager wireless access innovation.
Thank you for your attention