iBROW

Innovative ultra-BROadband ubiquitous Wireless communications through terahertz transceivers

Project reference: 645369

Instrument: Research and Innovation action

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Timeline:

Start date: 01-Jan-2015
End date: 31-Dec-2017

Budget:

Overall Cost: 3,995,129 EUR
Funding: 3,995,129 EUR (100%)

Project partners:

- University of Glasgow; UK
- Vivid Components Ltd.; D
- Alcatel-Lucent Deutschland AG; D
- Universidade do Algarve; P
- IQE Silicon Compounds Ltd.; UK
- III V Lab; F
- Compound Semiconductor Technologies Global Ltd.; UK
- Technische Universität Braunschweig; D
- Commissariat á l'Energie Atomique Et Aux Energies Alternatives (CEA-LETI); F
- INESC Porto (Instituto De Engenharia De Sistemas E Computadores Do Porto); P
- Optocap Ltd.; UK

Vision and Aim

iBROW is a Horizon 2020 project to develop a novel, energy-efficient and compact ultra-broadband short-range wireless communication transceiver technology, seamlessly interfaced with optical fibre networks and capable of addressing envisaged future network needs.

Predictions indicate that short-range wireless data-rates of tens of Gbps will be required by 2020, and currently available wireless technology cannot support these demands despite significant progress in spectrally efficient techniques. The frequency spectrum currently in use is not expected to be suitable to accommodate these future data-rate requirements, and therefore there is a need to embrace higher frequency bands, namely in the mm-wave and THz bands, above 60 GHz and up to 1 THz. The iBROW consortium aims to:

- Demonstrate low cost and simple wireless transceiver architectures that can achieve at least 10 Gbps as a means to pave the way for future 100 Gbps wireless communications by exploiting the wide available bandwidth in the mm-wave and THz frequency spectrum.
- Demonstrate integrated semiconductor emitters and detectors having enough power/sensitivity for exploiting the full potential of THz spectrum, and allowing for seamless fibre-wireless interfaces.
- Demonstrate a highly compact technology suitable for integration into battery powered portable devices.
- Develop an energy efficient and low power wireless communications technology to reduce the carbon footprint from communication networks.
- Maintain Europe as a leading player in the world industry of wireless communications by enhancing its industrial competitiveness.

iBROW will pursue its main objective through the exploitation of Resonant Tunnelling Diode (RTD) based transceiver technology:

- An all-electronic RTD suitable for integration into cost-effective wireless portable devices and,
- An optoelectronic RTD consisting of the monolithic integration between an RTD and a photodetector and hybrid (discrete) integration with a laser diode, suitable for integration into mm-wave/THz femtocell base-stations connected to high-speed 40/100 Gbps fibre-optic networks.

This will be accomplished by developing the necessary design, manufacturing and communications implementation steps, and demonstrating its deployment in 10 Gbps short-range wireless communication devices up to 10 m, for both mm-wave and THz frequency bands, seamlessly integrated with optical fibre networks. Additionally, iBROW will assess spectral efficiency methods for enabling 100 Gbps wireless access speeds in the long term.