International consortium hopes to unlock spectrum above 6 GHz

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The University of Bristol is part of an international consortium that aims to develop concepts and key components for a new 5G mobile radio access technology. The technology is expected to operate in a range of frequency bands between 6 and 100 GHz, including millimetre-wave (mmWave) frequencies.

The use of such extremely high frequencies for mobile communications is challenging but necessary for supporting 5G's extreme mobile broadband service, which will require very high (up to 10 Gbps) data rates, and in some scenarios, also very low end-to-end latencies (less than 5 ms). The project, mmMAGIC, aims to accelerate standardisation of millimetre wave technologies for 5G so that the industry and people will benefit from commercialisation by 2020.

mmMAGIC, co-funded by the European Commission's 5G PPP program, brings together major infrastructure companies - Samsung, Ericsson, Alcatel-Lucent, Huawei, Intel, Nokia; major European operators - Orange, Telefonica; leading universities and research institutes - universities of Aalto, Bristol, Chalmers, Dresden, Fraunhofer HHI Institute, CEA LETI, IMDEA Networks; measurement equipment companies - Keysight Technologies, Rohde & Schwarz; and one small to medium size enterprise (SME) - Qamcom.

The project will develop and design new concepts for mobile radio access technology (RAT) for deployment in the 6-100 GHz range, including novel adaptive and co-operative beam-forming and tracking

techniques to address the specific challenges of millimetre wave mobile propagation. This new RAT is envisaged as a key component in the overall 5G multi-RAT ecosystem.

Professor Andrew Nix, Dean of the Faculty of Engineering and who leads the Communication Systems & Networks (CSN) Group at Bristol, said: "Bristol is investing heavily in 5G technologies such as Massive MIMO and mmWave communications. MmMagic complements our existing programmes, such as Bristol Is Open and the EPSRC-funded TOUCAN project. It also provides a valuable vehicle for collaborating with leading industrial and academic partners and for influencing global 5G standards."

Mark Beach, Professor of Radio Systems Engineering, added: "Use of mmWave radio spectrum will unlock significant additional bandwidth for 5G and beyond wireless connectivity which is not available through our current cellular and Wi-Fi systems. With developments in the field of on-chip antennas and beamformers, this technology will become common place in consumer products in the next five to ten years."

Seamless and flexible integration with other 5G and LTE radio interfaces are foreseen in the design of mmMAGIC's radio network architecture and this will be realised through improved and entirely novel inter-networking functionalities. Self-backhauling and front hauling capabilities are also foreseen, thereby creating a holistic, scalable and economically viable integrated 5G solution to meet the future needs of operators, enabling, for example, ultra-high definition TV and video streaming, virtual reality, immersive experience, and ultra-responsive cloud services in 5G for mobile users.

The project will undertake extensive radio channel measurements in the 6-100 GHz range at multiple locations in Europe, and will develop advanced channel models that will be used for rigorous validation and

feasibility analysis of the proposed concepts and systems, as well as for usage in regulatory and standards fora. The ambition of the project is to pave the way for a European head start in 5G standards and to be a focal point for European and global consensus building on the architecture, key components and spectrum for 5G systems operating above 6 GHz.

The mmMAGIC project is coordinated by Samsung, with Ericsson acting as technical manager. Intel, Fraunhofer HHI, Nokia, Huawei and Samsung will each lead one of the five technical work packages of the project. The project was officially launched at the beginning of July and will last for two years.

Provided by University of Bristol