



Ubiquitous Connectivity Radios

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Ubiquitous Connectivity (Radio) I

- Joint optimisation and operation between
 - radio interface and
 - Systemfor different system deployment concepts
 - Spectrum sharing and use of different technologies in the same band within the
 - boundaries of the respective licensing conditions,
 - co-existence and
 - robustness between different access technologies
 - Cross-layer optimisation of air-interface should be carried out with the view of radio environment awareness for achieving
 - high spectral efficiency,
 - system capacity and
 - Quality of Service (QoS)
 - Design of the different new radio interface systems with maximum commonality in order to develop a flexible platform to
 - achieve economy of scale and
 - international roaming
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Ubiquitous Connectivity (Radio) II

- Radio access:
 - new and evolutionary radio access concepts,
 - further evolution of existing radio access systems and
 - their integration in the evolving network infrastructurewith efficient support of wide range of
 - data rates,
 - power aspects,
 - mobility and
 - multiuser support
 - With respect to efficient spectrum usage multiuser access schemes with
 - service oriented variable throughput and
 - situation-aware radio interfacesshould be developed and optimised
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Ubiquitous Connectivity (Radio) III

- Impact of frequency bands for future systems such as
 - potential new bands after the identification at WRC 2007,
 - bands for fixed wireless access,
 - WLAN bands
 - and microwave frequency bands above 50 GHz)on the
 - radio interface performance
 - including a scientific and biomedical study of the impact of newly identified frequency bands on the human body
 - Identification and investigation of alternative frequency bands to minimise
 - radiation and the
 - impact on the human body
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Ubiquitous Connectivity (Radio)

Deployment Concepts ..(1/2)



Rationale

- Increase in required peak data rate, and new frequency bands, impose significant impact on range, power and cost of networks

Research Priorities

- New deployment concepts,
 - multihop,
 - cooperative relayingto increase range for economic coverage
- Integration of cellular with other access technologies (broadcast)
- Decentralised and self-organising network topologies to avoid planning, improve availability and reliability
- Investigation on operator-less radio access concepts (e.g., disaster relief, campus net, etc.)
- Adaptive antennas, diversity reception, beamforming, MIMO
- Antenna with small visual impact for more acceptable deployment and new materials, techniques and structures for multiband operations

Ubiquitous Connectivity (Radio)

Deployment Concepts ..(2/2)



- Antenna integrated RF solutions
- Cognitive (spectrum agile) radio systems
- Interference mitigation and coexistence
- Spectrum sharing techniques
- Mutual impact of coexistence and licensing issues
- Algorithm architecture for co-design of
 - digital BB modems and
 - BB and RF
- New architectures of RF front-ends matching with microelectronics, using advanced technologies
- Efficient A/D co-simulation techniques
- System level (SoC – System on Chip, NoC – Network on Chip) methodology and tools