WINNER II (Wireless World Initiative New Radio)

The goal of WINNER is to develop a single ubiquitous radio access system adaptable to a comprehensive range of mobile communication scenarios from short range to wide area. This will be based on a single radio access technology with enhanced capabilities compared to existing systems or their evolutions.

At A Glance: WINNER II

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Total Cost: € 22.425.717m
EC Contribution: € 12.500.000m

Main Objectives

WINNER II is a continuation of the WINNER I project, which developed the overall system concept. WINNER II will develop and optimise this concept towards a detailed system definition. All investigations will take place within the context of a system view to enable a focused development of a system rather than individual components. In addition limited trials will be performed in order to assess some key elements of the WINNER II system.

The radio interface will support the challenging requirements of systems beyond 3G. It will be scalable in terms of carrier bandwidth and carrier frequency range and it will allow deployment in newly identified and “re-farmed” frequency bands. The system will support a wide range of usage and radio environments providing a significant improvement in performance and Quality of Service. The resulting system specification will meet future market demands and will provide optimum user experience.
The radio interface will optimise the use of spectral resources, e.g. through the exploitation of actual channel conditions and multiple antenna technology. New networking topologies (e.g. relaying) will support cost-effective deployments. Support of advanced resource management and handover will ease the deployment of the WINNER system enabling seamless service provision and global roaming.

The project will also contribute to the global research, regulatory and standardisation activities. The WINNER approach targets a globally harmonised system. The project objectives are shared by a strong Consortium of major players in the mobile and wireless communication industry including manufacturers, network operators, R&D centres and the academic domain.

**Technical Approach**

The targeted ubiquitous WINNER I and II radio system is characterised by:

- transmission speed, latency, capacity and range appropriate to the user and service requirements covering, e.g., low data rates up to peak data rates of approximately 1 Gbps;
- a toolbox of system elements, such as modulation and multiple access scheme and network topology, which can be used adaptively in the most appropriate combination to efficiently support any given situation;
- a minimum number of variants for the new radio interface system elements, with high commonality, to ease implementation and reconfigurability;
- flexible and cost efficient network deployment concepts;
- high spectral efficiency supported by employing efficient spectrum sharing and flexible spectrum use methods;
- support for precise positioning with the new radio interface;
- efficient point-to-multipoint data distribution;
- low transmission power in order to minimise power consumption of mobile terminals, to reduce interference to other systems and to ensure compliance with EMC and EMF regulations;
- suitable complexity, evaluated with respect to signal processing and power consumption;
- scalable functionality, complexity, implementation effort and performance for innovative wireless services;
- jointly optimised protocol layers within the radio system taking into account the core network architecture including Internet Protocols;
- support for mobility management and interworking with various wireless access technologies;
- the capability to be integrated into an overall network and framework including interworking and coexistence with legacy systems.

**Expected Impact**

WINNER I developed the system concept based on a thorough technology assessment of promising key technologies and their optimal combinations. Based on these achievements WINNER II will improve and enhance the concept by detailed simulations and optimisation in order to develop a system specification. This specification will provide significant inputs to future standardisation and will be the baseline for later product development and system deployment. Some basic functionalities will be shown in limited trials.