**IST-2003-507581 WINNER****D 7.4 version 1.0*****Inputs to Standardisation and Regulation Activities***

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Abstract:

This deliverable identifies and explains the relevant regulation and standardisation bodies and the approach WINNER has taken towards them for contributing. The main focus is on the regulatory bodies ECC PT1 and ITU-R WP8F and the standardisation body 3GPP. A list of WINNER contributions is also given.

Keyword list:

Regulation, Standardisation, ITU-R WP8F, ECC PT1, 3GPP Long Term Evolution

Disclaimer:

Executive Summary

Dissemination of results and having impact on the standardisation and regulation processes for Systems Beyond 3G is one of the goals of the WINNER project. Task 7.8 has the task to identify the relevant standardisation and regulation bodies and derives ways to contribute to them. It keeps track of their progress and identify topics to which WINNER could contribute.

This deliverable identifies and explains the relevant bodies and the approach WINNER has taken towards them. The main focus is on

- the regulatory bodies CEPT ECC PT1 and ITU-R WP8F. A large number of contributions has been worked out and submitted to them
- the 3G Long Term Evolution process of the 3GPP standardisation body. A first contribution has been submitted to that

This deliverable also lists these contributions.

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List of Acronyms and Abbreviations

3G	3 rd Generation mobile communication systems
3GPP	3 rd Generation Partnership Project
ECC	Electronic Communications Committee
ETSI	European Telecommunications Standardisation Institute
ITU	International Telecommunications Union
LTE	Long Term Evolution
RAN	Radio Access Network
SI	Study Item (in 3GPP)
TR	3GPP Technical Report
TS	3GPP Technical Specification
TSG	3GPP Technical Specification Group
UE	User Equipment
UMTS	Universal Mobile Telecommunication System
UTRA	UMTS Terrestrial Radio Access
WG	Working Group
WI	Work Item (in 3GPP)
WRC	World Radiocommunication Conference
WWRF	Wireless World Research Forum

1. Introduction

This document contains the collection of the contributions from all WINNER workpackages to Regulation and Standardisation bodies. The bodies that are relevant for WINNER are identified as well as the issues on which WINNER could and should contribute. Furthermore, the specific goals that WINNER wants to achieve with the contributions are explained.

2. Regulation

Regulation activities started rather early in the WINNER project in order to influence the regulatory process. The major initial goal is to make sure that sufficient spectrum will be made available for Systems Beyond 3G / IMT-2000. Important for WINNER is the frequency regulation of ITU-R and the preparations for the WRC 2007.

2.1 Relevant Regulation Bodies

2.1.1 ITU-R WP8F

One of the principal tasks of ITU-R is to oversee and facilitate the complex inter-governmental negotiations needed to develop legally binding agreements between sovereign states. These agreements are embodied in the ITU Radio Regulations (RR) and in regional plans adopted for services such as Broadcasting and Mobile Services. In addition to the legally binding RR, the ITU-R issues Recommendations. These are widely accepted and practically have the status of a standard the National Regulatory Authorities widely conform to.

The actual use of radio spectrum is regulated on a national basis by the National Regulatory Authorities in conformance with the ITU's regulatory framework, i.e. the ITU Radio Regulations (RR).

The Radio Regulations are reviewed and, if necessary, revised by the World Radiocommunication Conference (WRC). The WRCs take place in intervals of approximately three years. The next WRC is scheduled for 2007.

The ITU-R Working Party WP8F is responsible for the overall system aspects of IMT-2000 and systems beyond IMT-2000. WP8F has several Working Groups, e.g., WG Spectrum, WG Services, WG Technology. All WG's have further a number of Sub Working Groups, SWG's

As an example, the Working Group on Technology has the responsibility to:

- provide the technology input into the WRC-2007 preparations in terms of the assumptions of the potential capabilities and trends in radio access technology
- develop liaison with external research and standardisation fora

- update the relevant IMT-2000 radio interface related recommendations.
- The Working Groups on Future Services and Market Aspects (WG SERV) and Spectrum (WG SPEC) may be relevant as well.

WP8F invites generally contributions on (see [1])

- radio interface(s),
- radio access network-related issues,
- spectrum-related issues,
- service/traffic characteristics, and
- market estimations.

However, each meeting defines in more detail the areas requiring contributions to the next meeting.

One important topic for WINNER is that WP8F is working to develop a methodology for calculating the spectrum requirements for the future developments of IMT-2000 and systems beyond IMT-2000. Most of the contributions from WINNER have addressed the spectrum calculations methodology. As a result the major parts of the already stable methodology originate from WINNER. When the methodology is completely agreed, the next task is the estimation of the spectrum requirements by using the methodology.

2.1.2 ECC PT1

The CEPT Electronic Communications Committee (ECC) considers and develops policies on electronic communications activities in a European context, taking into account European and international legislations and regulations. It develops European common positions and proposals, as appropriate, for use in the framework of international and regional bodies. It is split into Working Groups, Project Teams and Task Groups. The Project Team 1 (PT 1) is named 'UMTS / IMT-2000 and Systems Beyond' and it deals e.g. with European inputs to ITU-R WP8F.

The on-going activities of the Working Group ECC PT1 are:

- To consider how the additional spectrum for IMT-2000, identified at WRC-2000, should be arranged for use and develop appropriate ECC Decision(s);
- To respond to relevant Mandates on UMTS to CEPT from the European Commission;
- To co-ordinate positions for input to ITU-R Working Party 8F on IMT-2000, future development on IMT-2000 and systems beyond IMT-2000;
- To consider the sharing and compatibility issues in the bands identified as additional spectrum for IMT-2000 at WRC-2000, and develop appropriate ECC Decisions, Recommendations or Reports;

On request from the Conference Preparatory Group (CPG) contribute to the preparation of CEPT positions for WRCs on IMT-2000 related issues.

2.1.3 ECC TG3

The ongoing activities of the Working Group ECC TG3 are (revised version March 2005):

- ECC TG3 shall develop provisions for a CEPT regulation on the basis of further impact analysis initially considering a PSD limit of -55 dBm/MHz in the band 3.1-10.6 GHz for indoor UWB communication applications, taking into account technical studies, measurement campaigns and mitigation techniques including those used in the TG3 report and in ECC Report 64.
- Complementary regulatory measures required for the protection of radiocommunication services from harmful interference shall be identified and developed.
- For specific UWB applications, such as Ground- and Wall-Probing-Radar imaging systems, draft final regulatory deliverables shall be developed for consideration at the ECC meeting in October 2005.
- ECC TG3 shall provide the following deliverables for consideration at the following ECC meetings:
- June 2005: Provisional technical parameters and regulatory provisions for indoor UWB communication applications
- October 2005: draft final deliverables for CEPT regulation, based on the form agreed by ECC at its June 2005 meeting

- ECC TG3 shall provide a detailed work plan in October 2005 based on the latest developments.
- ECC TG3 shall coordinate European positions in preparation for ITU-R TG1/8 on Ultra Wide-band issues.
- ECC TG3 shall consult with relevant European organisations in particular ETSI.

Currently the TG3 is working on an impact analysis trying to define suitable European limits for the UWB emissions. WINNER brought up the fact that possibly too high limits for UWB could cause serious interference to the possible systems beyond IMT-2000 in the bands below 6 GHz.

2.2 WINNER Contributions

2.2.1 WINNER principles and way of contribution

The process is sketched Figure 2-1. WINNER contributes mainly to ECC PT1 with a view that the WINNER contributions would become agreed European contributions to the ITU-R WP8F. WP8F is responsible for the ITU preparations on WRC-2007 agenda Item 1.4 dealing with the frequency related matters of the future development of IMT-200 and systems beyond IMT-2000. The outputs from WP8F will be delivered to the ITU Conference Preparatory meeting, CPM, and the outputs of the CPM will finally go to the WRC as ITU's own input. It is also important to communicate with individual administrations as shown in the diagram.

Suitable results will also be presented at WWRF.

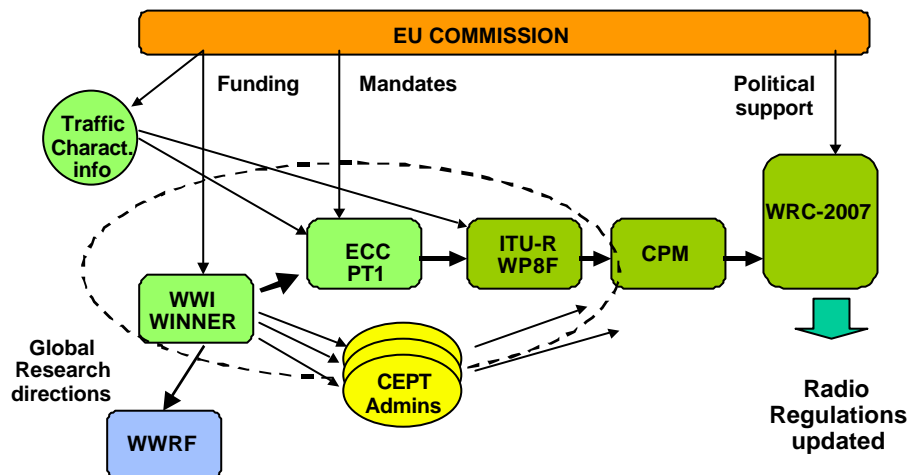


Figure 2-1: Way of WINNER contributions to the regulatory process

2.2.2 Submitted Contributions

- “Research activities on spectrum in Wireless World Initiative – New Radio (WINNER) – Requirements estimation methodology”, Ericsson, Nokia, Siemens, Telefonica, submitted to ITU-R, 06. Feb. 2004, Document 8F/144-E.
This contribution has been prepared and submitted by WP 6.
- “Requirements from Proposed Spectrum Calculation Methodology on Market Study”, Ericsson, Nokia, Siemens, RWTH AU, submitted to CEPT ECC PT1, Mainz 2-4 June 2004, Document ECC PT1(04)119.
The document was agreed with minor modifications by PT1 and has been submitted as a European contribution to ITU-R WP8F meeting #13 held in Berlin 16-23 June 2004, Document 8F/221-E
- “First preliminary view on the suitable frequency ranges for systems beyond IMT-2000 from a technical perspective”, Ericsson, Nokia, Siemens, RWTH AU, submitted to CEPT ECC PT1, Mainz 2-4 June 2004, Document ECC PT1(04)120.

The document was agreed with minor modifications by PT1 and has been submitted as a European contribution to ITU-R WP8F meeting #13 held in Berlin 16-23 June 2004 , Document 8F/224-E

- “Proposed Spectrum Calculation Methodology for Future Development of IMT-2000 and Systems Beyond IMT-2000”, Ericsson, Nokia, Siemens, RWTH AU, submitted to CEPT ECC PT1, Mainz 2-4 June 2004, Document ECC PT1(04)121.
The document was agreed with minor modifications by PT1 and has been submitted as a European contribution to ITU-R WP8F meeting #13 held in Berlin 16-23 June 2004, Document 8F/227-E
- “Radio Aspects Information Required by Proposed Spectrum Requirements Calculation Methodology”, Ericsson, Nokia, Portugal Telecom Inovacao, RWTH AU, Siemens, Telefonica, submitted to CEPT ECC PT1, Cambridge 6-8 September 2004, Document ECC PT1(04)168 and 8F/304
- “On the applying of Additional Weighting Factors in Spectrum Calculation Methodology”, Ericsson, Nokia, Portugal Telecom Inovacao, RWTH AU, Siemens, Telefonica, submitted to CEPT ECC PT1, Cambridge 6-8 September 2004, Document ECC PT1(04)169 and 8F/314
- “Further View on the Technical Radio Aspects Concerning Suitable Frequency Ranges for Systems Beyond IMT-2000”, Ericsson, Nokia, Portugal Telecom Inovacao, RWTH AU, Siemens, Telefonica, submitted to CEPT ECC PT1, Cambridge 6-8 September 2004, Document ECC PT1(04)170 and 8F/313
- “Proposed Amendments to "Working Document towards Methodology for Calculation of Spectrum Requirements for the Future Developments of IMT-200 and Systems Beyond IMT-2000 from the Year 2010 onwards", Document ECC PT1(04)174.
The document was agreed with minor modifications by PT1 and is contributed as a European contribution to ITU-R WP8F meeting #14 as Document 8F/328-E
- “Sensitivity of Algorithm for calculation of system capacity required to fulfill mean delay requirements”, Document ECC PT1(04)175.
The document was agreed with minor modifications by PT1 and is contributed as a European contribution to ITU-R WP8F meeting #14 as Document 8F/330-E
- “Proposed modifications to "working document towards methodology for calculation of spectrum requirements for the future developments of imt -2000 and systems beyond IMT-2000 from the year 2010 onwards"", Document ECC PT1(05)014 and 8F/379.
- “RAT group approach for spectrum requirements calculation methodology”, Document ECC PT1(05)015 and 8F/375.
- “Further information on required radio parameters for the spectrum requirement calculation methodology”, Document ECC PT1(05)016 and 8F/374.
- “Estimation of Packet Size statistics for evolved and new services in IMT-2000 and systems beyond IMT-2000”, Document ECC PT1(05)017 and 8F/405.
- “Test Case and Validation results for Spectrum Requirement Calculation methodology”, Document ECC PT1(05)085 and 8F/495.
- “Update of Required Radio Parameters for the Spectrum Requirements Calculation Methodology”, Document ECC PT1(05)086 and 8F/485.
- “Initial version of the tool for calculating the spectrum requirements for future development of IMT-2000 and systems beyond IMT-2000 and the usage instructions for the tool”, Document ECC PT1(05)087 and 8F/483.
- “Proposed editorial update, corrections and modifications to “working document towards methodology for calculation of spectrum requirements for the future development of imt -2000 and systems beyond IMT 2000 from the year 2010 onwards”, Document ECC PT1(05)088 and 8F/486.

- “Traffic distribution to rat groups and radio environments in the Methodology for calculating the spectrum requirements for the future development of IMT-2000 and systems beyond IMT-2000”, Document ECC PT1(05)089 and 8F/464r1.
- “Proposed redefinition of mobility classes and mapping to radio environments in [IMT.METH]”, Document ECC PT1(05)090 and 8F/465.
- “Proposed Radio Parameter Values for RAT Group 1”, Document ECC PT1(05)091 and 8F/484.
- “Proposed radio parameter values of RAT Group 2 for Preliminary Draft New Report [Imt.Rad.Aspects] and spectrum calculation methodology”, Document ECC PT1(05)092 and 8F/482.
- “Proposal for an Alternative Traffic Class Definition in the Scenario Framework of PDNR [IMT.METH]”, Document ECC PT1(05)093 and 8F/463.
- “Consequences from UWB to the Preferred Spectrum Range for Systems Beyond IMT-2000”, Document ECC PT1(05)094.
- “Extended and Amended Sensitivity analysis of the algorithm for calculation of the system capacity required to fulfill mean delay and delay percentile requirements”, Document 8F/399.
- “Possible Impact of UWB on Candidate Frequency Bands for “Systems Beyond IMT-2000” in the Frequency Range below 6 GHz”, Document 8F/526.
- “Consequences from UWB to the Preferred Spectrum Range for Systems Beyond IMT-2000”, Document ECC TG3#8_41.
- “Input to the ITU-R “Questionnaire on the Services and Market for the Future Development of IMT-2000 and Systems Beyond IMT-2000” from WINNER project”, France Telecom, Nokia, submitted to ITU-R WP8F meeting#15 held in Geneva 1-8 February 2005, Document 8F/402-E
This contribution was prepared by WP1.

One of the contributions listed above, 8F/402-E, was prepared in response to an open circular letter from the ITU, inviting information on predictions for services and markets for the future development of IMT-2000 and Systems Beyond IMT-2000. WINNER was one of a number of independent research activities to submit a response. Following the collection of responses to this questionnaire, the ITU started an activity to prepare a report, IMT.MARKET, based on these responses and identifying the related information which is necessary to progress the work of the ITU. In recognition of the particular input from WINNER, a request was made from the ITU for WINNER to supply a suitable person to act as a responsible editor of this report, representing the views of the global research community. As a result, a member of the WINNER project, representing both WP1 and T7.8 has been actively supporting the ITU activity in this domain.

3. Standardisation

There is currently no body that explicitly deals with the standardisation of radio access of Systems Beyond 3G. However, a lot of work is going on in 3GPP / 3GPP2 on the enhancement of current 3G systems as well as on the evolution to systems beyond 3G. In November 2004 the 3GPP standardisation body initiated work on the 3G Long Term Evolution (LTE) in order to evolve the UTRA Radio Interface as well as the UTRA Network in the medium and long term. Looking at the requirements discussed and approved by 3GPP for this evolution, there are quite some similarities and commonalities with the WINNER goals. Several subgroups of IEEE 802 are working on advanced radio systems (e.g., 802.11 on WLANs, 802.16 on air interface for fixed broadband wireless access systems, 802.20 on Mobile Wireless Access).

3.1 Relevant Standardisation Bodies

3.1.1 3GPP

The 3rd Generation Partnership Project (3GPP) is a collaboration agreement that brings together a number of telecommunications standards bodies which are known as Organizational Partners. The current

Organizational Partners are ARIB Japan, CCSA - China, ETSI - Europe, T1 - USA, TTA - Korea, and TTC - Japan. The aim of 3GPP is to develop specifications for UMTS, and the ongoing development of GSM/EDGE. These specifications are then translated into standards by the relevant standardisation bodies.

The original scope of 3GPP was to produce globally applicable Technical Specifications and Technical Reports for a 3rd Generation Mobile System based on evolved GSM core networks and the radio access technologies that they support (i.e., Universal Terrestrial Radio Access (UTRA) Frequency Division Duplex (FDD) and Time Division Duplex (TDD) modes). The scope was subsequently amended to include the maintenance and development of the Global System for Mobile communication (GSM) Technical Specifications and Technical Reports including evolved radio access technologies (e.g. General Packet Radio Service (GPRS) and Enhanced Data rates for GSM Evolution (EDGE)).

3.1.1.1 3GPP Structure

The diagram below shows the organisational structure of 3GPP.

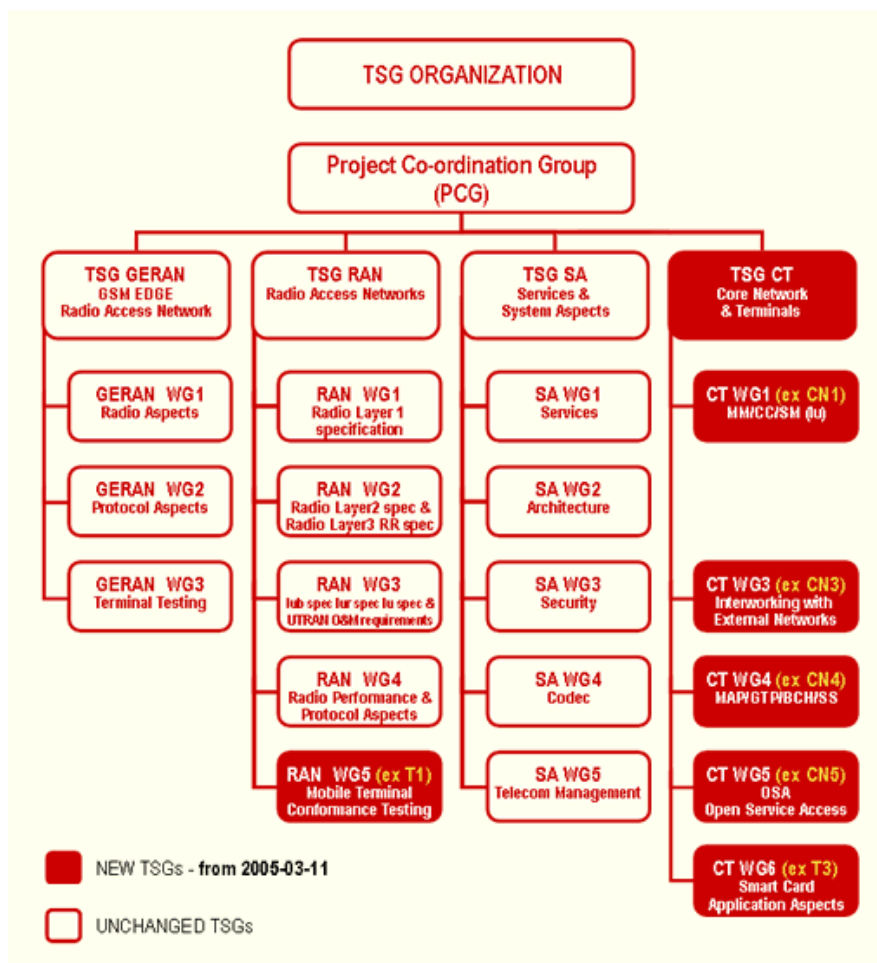


Figure 3-1: 3GPP structure

The main work is split between 4 Technical Specification Groups (TSGs), dealing with the UMTS Radio Access Network (most relevant for WINNER), Services and System Aspects, Core Network and Terminals, and the GSM/EDGE RAN development.

Each TSG is split into a number of Working Groups, focussing on a specific part of the technical area covered by the TSG. The 3GPP TSG RAN (Radio Access Network) is split into five Working Groups:

- RAN WG1 Radio Layer 1, which works on the physical layer of the radio Interface for User Equipment (UE) and UTRAN. This includes the specification of the physical channel structures, the mapping of transport channels to physical channels, spreading, modulation, physical layer

multiplexing, channel coding and error detection. The physical layer procedures and the measurements provided to upper layers are specified in WG1 as well.

- RAN WG2 Radio Layer 2 & Radio Layer 3 RR, which is in charge of the Radio Interface architecture and protocols (MAC, RLC, PDCP), the specification of the Radio Resource Control protocol, the strategies of Radio Resource Management and the services provided by the physical layer to the upper layers.
- RAN WG3 Iub, Iur, Iu & UTRAN Operation and Maintenance (O&M) requirements, which is responsible for the Overall UTRAN architecture, and the specification of protocols in the Iu, Iur and Iub interfaces. The use of IP protocol for the transport layer in the UTRAN is studied in this group.
- RAN WG4 Radio Performance and Protocol aspects RF parameters and BS conformance, which works on the RF aspects of UTRAN. RAN4 performs simulations of diverse RF system scenarios and derives the minimum requirements for transmission and reception parameters, and for channel demodulation. Once these requirements are set the group defines the test procedures that will be used to verify them (only for Base Stations). Requirements for other radio elements, like Repeaters, are specified in the RAN4 as well.
- RAN WG5 has been founded at the RAN plenary #27 in March 2005 as the successor of the former working group T1. The terms of reference for this WG have to be finalised. It will be concerned with conformance testing.

Thus, the main interests of WINNER concentrate on RAN WGs 1, 2 and 4.

Remark: the work split between the different Working Groups may change according to on-going considerations in 3GPP.

3.1.1.2 3GPP work methods

Generally, the role of the TSG plenary is to define and agree the topics to be studied and worked upon, their requirements and timescales, and to approve specifications, as proposed by the WGs. It is the role of the WGs to carry out the actual technical work and to develop proposals for specifications.

Work within 3GPP is contribution driven, and where possible decisions are made on a consensus basis, although voting is possible in the case where consensus cannot be achieved.

3.1.1.3 3GPP contributions

Contributions to 3GPP can have different purposes.

Generally they can introduce concepts for information or discussion (towards some goal), or they can introduce clear proposals for decision (e.g. choices of technologies, texts to be used in specifications, changes to existing text in specifications). Depending on the part of 3GPP being targeted, and the topic of the contribution, these may be technical or more general.

Other types of contributions are possible (e.g. liaison statements from recognised other bodies).

Contributions to 3GPP should be sourced from one or more 3GPP member organisations, or some other part of the 3GPP organisation.

3.1.1.4 Goal of WINNER Contributions

The WINNER Board identified three paths for WINNER participation:

- WINNER could participate simply to learn what 3GPP is thinking and take that into consideration for WINNER itself
- WINNER could contribute to help 3GPP to reach its targets
- WINNER could contribute to influence 3GPP in a direction that WINNER sees beneficial for its own objectives, e.g., to ease the migration from 3GPP LTE towards WINNER

The Board gave a clear preference towards the third path, although the first path is also essential, to ensure that WINNER becomes a logical migration from 3GPP LTE.

Additional goals for contributions are to

- raise the awareness of the 3GPP community towards WINNER regarding both specific technical solutions and general system concepts.

3.1.2 3GPP Long Term Evolution (LTE)

The introduction of a new air interface for highrate packet transmission in DL has been the subject of a Study Item (SI) of RAN WG1 from 2002 to 2004. The SI was restricted to so called “textbook OFDM”, i.e., basic OFDM without advanced features. It was finalised in the RAN WG1 meeting #37 (May 2004, Montreal) with the following conclusions (the final report can be found in 3GPP TR 25.892 [2]):

- OFDM for packet traffic is feasible
- there is a substantial performance gain compared to WCDMA with Rake-reception
- there is a slight gain compared to WCDMA with advanced receivers

A first Workshop on the Long Term Evolution (LTE) of the 3GPP RAN was held in Nov. 2004 in Toronto on RAN level to investigate what are the main changes that could be brought forward to evolve the UTRA Radio Interface as well as the UTRA Network in the medium and long term. During this Workshop a set of main requirements for 3GPP RAN LTE were identified and agreed; this outcome is summarised in the 3GPP RAN document ref. [3], REV-WS044].

3.1.2.1 3GPP LTE Timeplan

At the 3GPP RAN plenary meeting #26 in Athens in Dec.2004 a proposal supported by 26 companies for the RAN Evolution Process has been agreed, as documented in 3GPP RAN ref. [8]

The work of the 3GPP LTE is scheduled in two phases (see Fig. 3-2 [8])

- a Study Item (SI) phase from Jan. 05 to June 06. The outcome of this phase will be one or more Technical Reports (TRs) (e.g. [6],[7]). The proposed Study Item is described in 3GPP RAN ref. [5]
- a subsequent phase with one or several Work Items (WIs) from July 06 to June 07. The outcome of this phase will be Technical Specifications (TS), which will lead to standards.

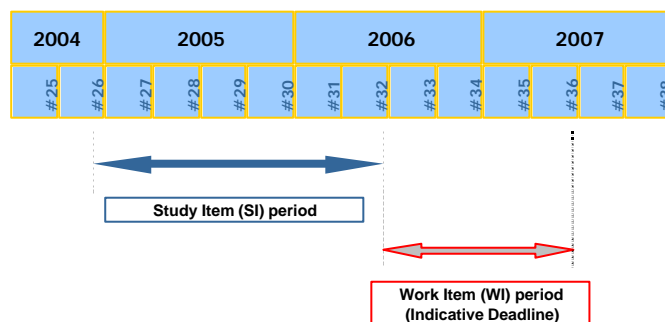


Figure 3-2: 3GPP LTE phases

The Study Item phase basically constitutes the time window of opportunity for WINNER contributions. For this Study Item phase the 3GPP RAN Plenary has approved a quite ambitious timeplan given in [9], see Fig.3-2. Main milestones for the radio interface definition are highlighted in that figure; they stand between November 2005 and June 2006.

A second Workshop on the RAN LTE was held in March 2005 in Tokyo with intensive discussions on the process and timeplan of the LTE work as well as the requirements for the evolution of the air interface and the network architecture. The following documents have been agreed at the immediately following RAN plenary meeting #27:

- a workplan [9], [REV-05055 = RP-050167]
- a set of requirements [RP-050155]

The requirements have been finalised and approved at the RAN LTE workshop in May 2005 in Québec and the subsequent RAN plenary #28, respectively. They can be found in TR25.913 [10].

Some of the important requirements are:

- efficient support of the various types of services, especially from the PS domain (e.g. Voice over IP, Presence)
- significantly increased peak data rate e.g. 100 Mbps (downlink) and 50 Mbps (uplink)
- increase "cell edge bitrate" whilst maintaining same site locations as deployed today
- significantly improved spectrum efficiency (e.g. 2-4 x Rel6)
- possibility for a Radio-access network latency (user-plane UE – RNC (or corresponding node above Node B) - UE) below 5 ms (one way)
- scaleable bandwidth - 1.25, 2.5, 5, 10, (15), 20 MHz
- support for inter-working with existing 3G systems and non-3GPP specified systems
- reasonable system and terminal complexity, cost, and power consumption
- backwards compatibility is highly desirable, but the trade off versus performance and/or capability enhancements should be carefully considered.
- the system should be optimised for low mobile speed but also support high mobile speed

The basic physical layer parameters (e.g., the multiple access scheme for uplink and downlink) should be fixed until Dec. 2005. If WINNER wants to contribute to these basic parameters and assumptions, this basically constitutes the window of opportunity. Later contributions to specific aspects will of course be possible during the whole Study Item phase.

RAN WG1 started with the RAN 1 #40bis meeting (04.-08.04.2005, Beijing) with the LTE work, the other WGs will start in June 05. The first topics are the evaluation methodology for the new air interface as well as the multiple access scheme definition.

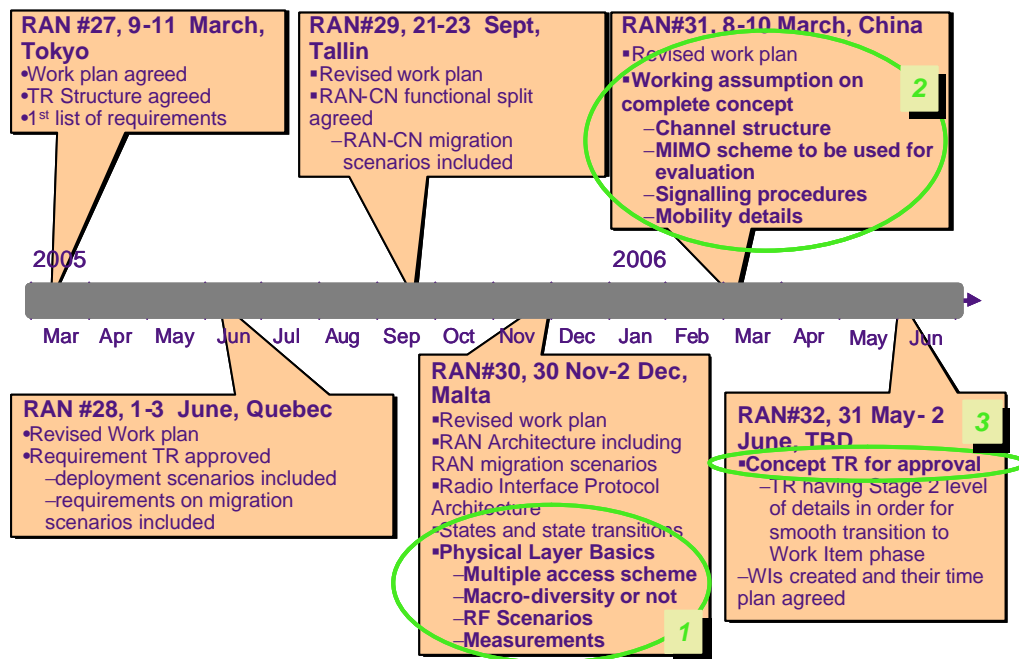


Figure 3-3: 3GPP LTE Study Item timeplan

Note: the referenced documents of this section can be found on the 3GPP homepage: www.3gpp.org

3.1.3 3GPP 2

The 3rd Generation Partnership Project 2 (3GPP2) like its sister project 3GPP (see previous section) is a collaborative effort between Standards Development Organizations known as Organizational Partners.: ARIB – Japan, CCSA – China, TTA – North America, TTC – Korea and TTC – Japan.

In addition the project has welcomed Market Representation Partners falling within the 3GPP2 scope: The CDMA Development Group, the IPv6 Forum and the International 450 Association.

The concept of partnership project was pioneered by the ETSI with the creation of the 3GPP focusing on the evolution of the GSM technology (see previous section). The 3GPP2 was created to develop global specifications for ANSI / TIA / EIA-41 Cellular Radiotelecommunication Intersystem Operations network evolution to 3G and the supported radio transmission technologies.

The 3GPP2 Technical Specification Group Access Network Interfaces (TSG-A) is responsible for the specifications of interfaces between the radio access network and core network, as well as within the Access Network. The TSG-A addresses the following areas of work: physical links, transports and signaling; support for access network mobility; 3G capability (e.g., high speed data support); Abis interface; inter-operability specification; support for 3GPP2 Radio Access technologies

The TSG-A is split into four Working Groups:

- WG1: Program Management
- WG2: TrFO/RTO
- WG3: IOS Enhancements
- WG4: Emerging Technologies,

The 3GPP2 Technical Specification Group cdma2000[®] (TSG-C) is responsible for the radio access part, including its internal structure, of systems based on 3GPP2 specifications. The TSG-C addresses the following areas of work: Radio Layer 1 specifications; Radio Layer 2 specifications; Radio Layer 3 specifications; MS/BS radio performance specifications; Radio link protocol; Support for enhanced privacy, authentication and encryption; Digital Speech Codecs and related minimum performance specifications; Video Codec selection and specification of related video services; Data and other ancillary services support; Conformance test plans; Removable User Identity Module (R-UIM); Location-based services support.

The TSG-C is split into four Working Groups:

- WG1: Application Services
- WG2: Signaling and Protocols
- WG3: Physical Layer
- WG4: Performance

3.1.4 IEEE

The IEEE 802.11 Working Group provides WLAN standards. Currently, the initial solutions standardized within 802.11 a, b, g Task Groups are enhanced within the 802.11 e, h, i Task Groups. Also Next Generation High Throughput WLAN systems are prepared within the newly created 802.11 n Task Group.

The 802.15.x Working Group defines Personal Area Networks (PANs) and provides short distance wireless networks standards.

The IEEE 802.16 Working Group on Broadband Wireless Access Standards develops standards and recommended practices to support the development and deployment of broadband Wireless Metropolitan Area Networks. IEEE 802.16 is a unit of the IEEE 802 LAN/MAN Standards Committee.

It has published in July 2004 the 802.16-2004 Standard entitled 'Air Interface for Fixed Broadband Wireless Access Systems', which was elaborated by the Task Group 802.16d.

Task Group 802.16e is developing an amendment providing mobility features to 802.16-2004 with the following main topics for consolidation: hand-over, security, physical layer aspects w.r.t. mobility.

Currently final approval is planned for March 2005 and publication as standard for May 2005.

Tasks Groups 802.16f and 802.16g deal with Network Management Information Base (MIB) and Management Plane Procedures and Services.

The IEEE 802.20 Working Group deals with the 'Mobile Wireless Interface' for cellular type systems, with the aim to specify an interface for interoperable mobile broadband wireless access systems, operating in licensed bands below 3.5 GHz, optimized for IP-data transport, with peak data rates per user in excess of 1 Mbps and mobility support up to 250 km/h. The targets are spectral efficiencies, sustained user data rates and numbers of active users that are significantly higher than achieved by existing mobile systems. Currently there seems to be no progress in that Working Group. It is not clear whether a standard will be produced.

The IEEE 802.21 Working Group is developing standards to enable handover and interoperability between heterogeneous network types including both 802 and non 802 networks. This standardisation work defines extensible 802 media access independent mechanisms that enable the optimization of handover between heterogeneous 802 systems and may facilitate handover between 802 systems and cellular systems. The purpose is to improve the user experience of mobile devices by facilitating handover between 802 networks whether or not they are of different media types, including both wired and wireless, where handover is not otherwise defined and to make it possible for mobile devices to perform seamless handover where the network environment supports it. These mechanisms may also be useable for handovers between 802 networks and non 802 networks

WINNER is currently observing the standardisation process in IEEE, especially in 802.11.

3.2 WINNER Contributions

Currently the 3GPP LTE is considered the most important and most interesting standardisation body where WINNER can contribute, thus providing the focus of the standardisation work and the following sections. There is no similar activity in 3GPP2 yet.

Approval of the WINNER contributions to the standardisation bodies will be done in accordance with the WINNER Management Handbook.

3.2.1 General Guidelines

In general, contributions should emerge from the WINNER work as it has been planned in the Technical Annex. Therefore, normally there should be no technical work carried out from WINNER resources in order to create standardisation contributions. Some work will be required to prepare and present contributions, and it should be possible to take parameters defined in 3GPP LTE into account for WINNER simulation work and, thus, provide results that are relevant for 3GPP, provided this does not entail alteration of the simulation code. In the event that extra technical resource is required to create standardisation contributions, this must be approved in advance. Organisations can use their internal resource to expand the scope of WINNER technical work to encompass 3GPP aspects, although consideration would need to be given as to whether the resulting contributions should be identified as WINNER contributions, or company contributions (perhaps “WINNER related”).

WINNER as a research project cannot submit contributions to 3GPP, since only 3GPP members are entitled to do so, and only industrial companies can be a member of 3GPP. This means that a contribution always has to be signed by one or several companies, one of which is submitting and presenting it.

The contributions should be provided by the people who have performed the related work in the WPs. Any other WINNER organisation(s) may offer to co-source a contribution. Presentation of contributions should be made by those organisation(s) available to do so within the relevant 3GPP meeting, taking into account their ability to do so (e.g. their involvement in, or understanding of, the subject matter).

The general policy is that any contribution that is an outcome of WINNER work and is approved by WINNER can be submitted by any partner who is member of 3GPP. The contribution should include an appropriate acknowledgement note.

3.2.2 Types of Contributions and suitable 3GPP RAN Groups

Three basic types of contributions have been identified:

- General overview papers for information. Typically, these papers should be presented to the Joint Working Group Meetings on LTE, where several or all RAN Working Groups (WGs) convene. It might also make sense to present them to the RAN Plenary.
- Technical contributions (e.g., procedures, algorithms, results) for discussion. These papers should be presented to the appropriate RAN WG(s). These can contain technical discussions and results against the WINNER context (WINNER goals, scope, timescales, assumptions, requirements, assessment criteria and methodology) and/or against the 3GPP context.

- Technical contributions for decision, also to be presented to the appropriate WG(s). Any technical work and contribution supporting a proposal for decision must be justified within the 3GPP context (3GPP goals, scope, timescales, assumptions, requirements, assessment criteria and methodology), not (or in addition to) the WINNER context.

Note that any conclusions drawn as the basis of results, whether as part of a technical contribution for discussion or decision, must be ones which the WINNER project sees as being reasonable for the predicted life of the WINNER project. Conclusions which take the form of working assumptions/initial decisions etc. which may be subject to change later in the project should be included only in such a way as to not cause a problem for WINNER (loss of credibility, or divergence of direction between 3GPP and WINNER) should those decisions later be changed within WINNER. This should not prevent the use of such conclusions within 3GPP contributions, but rather the manner of use and style of presentation should be managed.

RAN WG1 is dealing with the Physical Layer, RAN WG2 with MAC/Scheduling, so these 2 WGs are currently the appropriate bodies for **technical** contributions from WINNER. If appropriate, channel modelling contributions could also be made to RAN WG4.

3.2.3 Areas of Contribution and Timeplan

In order to prepare contributions it is important to take into account the requirements approved by 3GPP for the LTE work, which are provided in the technical report TR25.913 [10].

Besides for general overview papers, the specific technical areas in which WINNER could contribute to 3GPP LTE have to be identified in close collaboration with the WP leaders. Initial ideas are

- Channel Models.
- Multiple Access Schemes for the DL
- Uplink transmission schemes

In order to facilitate the identification of areas for potential WINNER contributions, the following responsibilities are assigned:

Task 7.8 monitors the 3GPP LTE process, and provide information on which technical areas are of interest to 3GPP, within which timescales. This information should be communicated to the WP leaders.

Based on this information, WP leaders should identify whether there is technical work ongoing (or completed) within their groups which would benefit WINNER if presented in a 3GPP contribution, and make recommendations to prepare such contributions. Contributions must also have some interest to 3GPP (towards their goals) to be successful. Further information or guidance on specific topics can be sought from T7.8 if needed.

In the following we line out the timeplan for contributions based on the current 3GPP RAN LTE timeplan in [9]. Note: this is for RAN Plenary. The technical discussions and decisions on the topics take place in the RAN WG meetings before the RAN relevant plenary meetings. Explicit long-term timeplans for the meetings of the WGs are usually not available, so it has to be checked for each contribution whether it fits to the agenda of the envisaged meeting for presentation. Moreover, to have a chance to be sufficiently discussed in 3GPP, the technical proposals should be submitted to the earliest meeting possible.

Until RAN Plenary meeting #30 (**Dec. 05**), contributions on:

- Physical layer basics (Multiple access scheme for UL and DL, macro-diversity yes/no, measurements)
- Radio Interface Protocol Architecture
- States and State Transitions (sleep modes, ...)

Until RAN Plenary meeting #31 (**March 06**), contributions on:

- Working assumption on complete concept (Channel structure, MIMO scheme to be used for evaluation, Signalling procedures, Mobility details)

Until RAN Plenary meeting #32 (**June 06**), contributions on:

- System evaluations against requirements

For RAN 1 the RAN1 #40bis meeting in Apr. 05 decided that texts on **concept descriptions** have to be proposed **until the June 20th, 2005, RAN1 AdHoc meeting** at the latest for inclusion in the RAN 1 TR25.912 on the Study Item in order to be considered. This holds for downlink as well as uplink proposals.

3.2.4 Submitted Contributions

- A first contribution titled “The WINNER project, and related resources available to 3GPP” co-sourced by 11 WINNER partners and prepared by Philips has been presented at the RAN plenary meeting #28 on June 01st - 03rd 2005 in Québec [REV-05077, RP-050376]. It gives an overview over the WINNER project and contains a list of all finalised public WINNER deliverables with a short description of each of them as well as a list of deliverables soon to be released. A list of non-public deliverables is also included with a note stating that further information on these is available on request.
- WP5 has prepared a contribution on the Enhanced Spatial Channel Model (SCME) that is planned to be presented at the RAN WG4 meeting in August 2005.

4. References

- [1] ITU-R WP8F, WG Technology, Sub Working Group 3: Circular Letter on Research, Revision 1 to Document 8F/TEMP/38-E, Oct. 2003
- [2] 3GPP RAN TR 25.892 Feasibility Study for Orthogonal Frequency Division Multiplexing (OFDM) for UTRAN enhancement
- [3] 3GPP RAN RP-040415 Summary of Requirements identified during 3GPP Long Term Evolution Workshop, Toronto 02-03.11.04
- [4] 3GPP RAN RP-040554 Proposed 3GPP TSG RAN Process for Evolved UTRA and UTRAN RAN#26, Athens 08-10.12.04
- [5] 3GPP RAN RP-040461 Proposed Study Item on evolved UTRA and UTRAN, RAN#26, Athens, 08.-10.12.04
- [6] 3GPP TR 25.812 v0.0.1, “Requirements for Evolved UTRA and UTRAN (Release x)”, March 2005.
- [7] 3GPP TR 25.912, v0.0.0, ‘Feasibility study for evolved Universal Terrestrial Radio Access (UTRA) and Universal Terrestrial Radio Access Network (UTRAN), Rel. 7’, March 2005.
- [8] 3GPP RAN RP-040554: “Proposed 3GPP TSG RAN process for Evolved UTRA and UTRAN”, RAN #26, Athens, 08-10.12.04
- [9] 3GPP RAN RP-050167: “Workplan: Evolved UTRA and UTRAN”, RAN#27, Tokyo, March 2005
- [10] 3GPP RAN TR 25.913: “Requirements for Evolved UTRA and UTRAN (Release 7)”, v 2.0.0, June 2005. Available under RP-050384.

5. Summary

An overview over the standardisation and regulation bodies that are relevant for WINNER is given. WINNER has already intensively contributed to the regulatory process in ECC PT1 and ITU-R WP8F for the preparation of the WRC 2007. A procedure for standardisation contributions has also been established, currently mainly targeting the 3GPP Long Term Evolution. These bodies have been identified as having highest priority for WINNER. The approach WINNER takes towards other bodies that are currently only observed is continuously checked and will be revised if necessary.