

# Cellular Networking Perspectives

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The structure of the 3GPP2 organization that produces specifications for the cdma2000 family of 2G/3G wireless systems. This includes all the TSGs and Working Groups.

## The HLR: The Wireless Carrier's Secret Weapon

It is no secret that cellular carriers are moving towards IP-based systems. Data services that they provide to their customers will mostly be IP based, if not always delivered through the Internet. The question is whether these services will gradually evolve from existing circuit-switched, voice-oriented systems or will be completely separate from the very start.

The current favored model is that IP-based user-data and signaling-data services will be completely separate from SS7 signaling-data services. But this may be a mistake, particularly in the rejection of the existing HLR in favor of IP-based network entities such as AAA (Authentication, Authorization and Accounting) and DNS (Domain Name Server).

The HLR appears to be tied to legacy protocols of SS7 and TIA/EIA-41 or GSM MAP. This view obscures the useful services provided by the HLR, services that are more difficult to provide in pure IP-based systems, or that are not yet widely available.

## Finding Home

Finding the home system is a problem that has long been solved by cellular MAP (Mobile Application Protocols) such as GSM MAP and TIA/EIA-41. The solution is based on a mobile subscription identifier (MSID, either MIN or IMSI) that not only uniquely identifies the subscription, but also identifies the home system. Based on the first few digits of the IMSI (MCC+MNC) or the MIN (NPA+NXX or 4 digit IRM code), signaling messages can be routed to the home system through a network (usually SS7).

## Serving System Identification

A consequence of contacting the home system HLR every time a new serving system is accessed is that the HLR can easily determine the address of the system currently serving the mobile. When a call, short message or other service needs to be directed to the mobile, the serving system address stored at the HLR provides a simple mechanism to achieve this connectivity.

## Subscriber Profile & Authentication

Once the home system is contacted, subscriber profile information (i.e. a list of services which the subscriber is entitled to) and authentication data can also be transferred to the serving system, allowing it to act as a surrogate for the home system when validating the right of the mobile subscriber to obtain various services and when authenticating the mobile to reduce the likelihood of fraud.

## Comparison with IP Systems

These signaling capabilities are more refined than those available with IP-based systems. Mobile IP, for example, initially had only a registration message and not a de-registration message, meaning that an efficient means to clear out stale data cannot be relied upon.

Note that the benefits of SS7 do not apply to the transmission of user data. SS7 was the first protocol used for transferring short messages, but this was only a stop-gap, as the low bandwidth of most SS7 links, while adequate for signaling, is seriously deficient for even this relatively low bandwidth data.

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## IP-Based Mobility

Wireless IP-based packet data systems generally rely on Simple IP or Mobile IP-based systems to obtain local connectivity with the PSDN (Packet Switched Data Network). This results in a considerable duplication of effort and a number of inefficiencies, particularly in systems supporting both voice and data.

Simple IP systems require that a PPP connection be established between the MS and the local PDSN (Packet Data Switching Network). This makes terminating ('always on') services difficult, because the IP address of the MS changes every time it moves to another system (or to a different PDSN within the same system). It also makes it impossible to guarantee long-lived connection-oriented sessions (e.g. TCP), because the IP address will change over time.

The use of Simple IP also results in the need to maintain a virtual circuit (PPP connection) whenever packet data services are active. In other words, pure packet data services cannot be provided using Simple IP.

Mobile IP is more efficient, but it requires that an additional registration process occur between the serving system ('Foreign Agent' - FA) and the home system ('Home Agent' - HA). Authentication of the mobile must also be repeated. Mobile IP would be an all-round better system if it was not for its difficulties with firewalls, network address translation (NAT) and security algorithms (including VPNs).

The problem with Mobile IP appears to be that without much penetration, IP advances do not take its requirements into account, making it ever more difficult to achieve the penetration that it needs to be considered an important part of the Internet protocol family. Consequently, Simple IP, which works well for mobile-initiated sessions, is more commonly used.

## Integrating MAP with IP

A more efficient system would be to allow IP setup information to be exchanged at the time of registration by TIA/EIA-41 or GSM MAP. The serving system could supply the temporary IP address assigned in the serving system to the HLR. The normal authentication process would already have ensured that the MS is valid, and it could also be used to derive the keys required for packet data authentication. This will reduce the amount of additional configuration data that is required and also the need for any subscriber intervention or provisioning of security data inside the

phone. The HLR could also supply the IP address of the network elements such as the Home AAA, to which accounting records are sent.

By taking this approach, the need to provide a second identifier rooted in the home system (the NAI - very much like an email address) is eliminated.

Another advantage of this approach is that automatic registration cancellation - a basic part of MAP protocols - can be used instead of the less efficient methods (e.g. time-out) used in Mobile IP, or the requirement to use Mobile IP extensions that are not universally available. Changes to MS data stored in the home system, such as the authentication information or the AAA IP address, could also be updated through the normal authentication and profile updating procedures.

An integrated approach does not solve the problems in providing terminating packet service using 'Mobile IP'.

This approach would not prevent a pure-IP system from being developed, but it would provide a transitional method that could be used until pure-IP is available, with all its kinks worked out.

**Feedback?** Your feedback to this article is welcome. Send your comments to the editor at [David.Crowe@cnp-wireless.com](mailto:David.Crowe@cnp-wireless.com). Note that your comments will be considered for publication in a future issue, unless you explicitly note that they are private.

## 3GPP Feature Status

**Table 1** provides the status of selected 3GPP Release 6 (or later) features, as of TSG #19 (March 2003).

The working assumptions for 3GPP feature schedules are that Stage 1 (requirements and description), Stage 2 (network impact) and Stage 3 (protocol encoding) each take an average of six months to complete.

Blue texts indicate updates since the last report.

### **For a Good Chuckle...**

[www.cnp-wireless.com/acronyms.html](http://www.cnp-wireless.com/acronyms.html)

...has a collection of humorous definitions for common telecom and computer acronyms.

Some of these might be construed to belittle your favorite technology, but you may send us your favorite acronym barb. You'll help us spread the light-hearted spirit of the wireless world.

## 3GPP TSG RAN Update

3GPP TSG Radio Access Network (TSG RAN) defines the functions, requirements and interfaces of the UTRA network in both FDD and TDD modes. This includes: Radio performance; the physical layer, layer 2 and layer 3 RR (Radio Resource) specifications in UTRAN; specification of the access network interfaces (Iu, Iub and Iur); definition of the Operations and Maintenance (O&M) requirements in UTRAN; and conformance testing for Base Stations.

The main topic of the discussion at the most recent meeting was how to identify the capabilities of user equipment. One approach is to use the International Mobile Station Equipment Identity Software Version (IMEI-SV) and the other is to use a bitmap. A bitmap is more applicable if it is necessary to identify a mix of capabilities provided by a specific revision level, but it is less extensible unless a large number of bits are provided.

An agreement is anticipated, at the next TSG RAN meeting, on which approach to use over the Iu interface and which network release to include it in. The meeting agreed to ask TSG SA2 to analyze the architecture for both solutions before a decision is made. During the meeting, a show of hands requested by the chairman indicated that the preferred solution on the Iu Interface was the bitmap.

This meeting agreed to remove Layer 3 Filtering (the linear option) function in Rel 5, upon request from several operators, to simplify the Radio System. It was too late to remove it from Rel 99 and Rel 4.

Work on Rel 5 is almost complete. Most of the work has now turned towards corrections to this release and resolution of performance issues.

Work is progressing on Rel 6. MBMS (Multimedia Broadcast and Multimedia Service) is one of the active work items. It is hoped that Stage 2 for the MBMS RAN can be finalized by September 2003, provided TSG SA2 does not change any of its previous decisions.

TSG RAN officers were re-elected by acclamation. The Chairman is Francois Courau (Alcatel) and the Vice-Chairmen are Eisuke Fukuda (Fujitsu) and Donal Zelmer (Cingular).

**Table 1: 3GPP Release 6 Feature Status Update**

Feature	Status
Evolution of Transport in the Universal Terrestrial Radio Access Network (UTRAN)	Not much recent activity, but work is still planned in the field of interworking between IP and ATM.
Evolutions of transport in the Core Network (CN)	TSG CN#19 agreed to delete this feature. It previously contained "Preferred Framing Protocol for Bearer Independent CS Architecture", but there was no longer any support in CN4.
Release 6 Improvements to the Radio Interface	<ul style="list-style-type: none"> <li>• Improvement of inter-frequency and inter system measurement (RAN1) – Proposed completion date is September 2003.</li> <li>• Multiple Input Multiple Output antennas (MIMO) (RAN1). Joint discussions with 3GPP2 are continuing. Completion date is June 2003, but work involving others will also be needed afterwards. Estimated at 30% complete.</li> <li>• Improving Receiver Performance Requirements for the FDD User Equipment (RAN4) – Completion date is September 2003, but if no further work is presented at the next RAN4, the completion date will be moved to June 2003.</li> <li>• FDD Base Station Classification (RAN4) – completed.</li> <li>• Terminal Power Saving Feature (RAN2) – Feature dropped.</li> <li>• UMTS 850 (RAN4) – work has started, and is about 10% complete. The scheduled completion date is March 2004. Other frequency bands, such as UMTS 800, were approved at RAN#19. Coordination of work will be necessary between these different frequency bands.</li> </ul>
Emergency Call Enhancements	<p>Emergency calls for Internet Protocol (IP) and Packet Switch (PS) calls with Universal Subscriber Identity Module (USIM)</p> <ul style="list-style-type: none"> <li>• Stage 1 Requirements are defined in TS 22.228 from SA1. Requirements for the CS domain are defined in TS 22.101, with detailed requirements for IMS to come later. There is no support for this capability in Rel 5 IMS.</li> <li>• Stage 2 Architecture covered by SA2 is targeted for September 2003.</li> <li>• Stage 3 Protocol development is being led by CN1. Completion is targeted for December 2003.</li> <li>• There is a new WI Description from SA2 to cover both enhancements for emergency calls using VoIP with (U)SIM and those from UEs without UICC/(U)SIM (i.e. no subscription identity) in Networks using IMS. They were two separate features before.</li> </ul>
Location Based Service (LCS) Enhancements	<p>Stage 1: The Work Item Description (WID) was approved at SA#18, and Stage 1 requirements are under development.</p> <p>Stage 2 Architecture: Planned to be completed by September 2003.</p> <p>Stage 3 Protocols: Not started, but scheduled for completion by CN1 in March 2004 for most aspects and by external bodies for inter-GMLC interface. No RAN nor GERAN impacts are foreseen.</p>
Security Enhancements	<ul style="list-style-type: none"> <li>• Network Domain Security (NDS)/IP (TS 33.210) was approved at SA#18 (December 2002).</li> <li>• Network Domain Security; Authentication Framework (NDS/AF) WID was approved at SA#19. Completion is scheduled for March 2004.</li> </ul>
IP Multimedia Subsystem (IMS) Phase 2	<p>CN#19 still believes Stage 3 for IMS will be completed by December 2003, but this is closely dependent on the progress made by IETF.</p> <ul style="list-style-type: none"> <li>• IMS Local Service Stage 3: Nothing started.</li> <li>• Mm Interface (CSCF to external IP multimedia network) Stage 3 (TR 29.962): Completed by CN3 at CN#19 (March 2003), but still to be reviewed by CN1 and SA2.</li> <li>• Interworking between IMS and CS networks (and Mg interface (BGCF to MGCF – interworking with CS)) Stage 3, in TS 29.163, to be completed in September 2003 by CN3.</li> <li>• Mn Interface (IM-MGW to MGCF) Enhancements – Stage 3, in TS 29.332, to be completed by CN4 in December 2003.</li> <li>• Mp (MRFC – MRFP) Interface Protocol Definitions – Stage 3, in TS 29.333, to be completed by CN4 in December 2003.</li> <li>• Lawful Interception in the 3GPP Rel 6 Architecture – The WID, approved at SA#19, will be worked by SA3 to be completed in December 2003.</li> </ul>



**Table 1: 3GPP Release 6 Feature Status Update**

Feature	Status
Push Services	<ul style="list-style-type: none"> <li>• Stage 1: Completed in TS 22.174.</li> <li>• Stage 2: WID was approved in December 2002. Work is scheduled for completion by SA2 in December 2003.</li> <li>• Stage 3 protocols: Work has not begun.</li> </ul>
Multimedia Messaging Service (MMS) Enhancements	Enhancements in many areas are under consideration. Work has started on some topics, but the detailed scope for Rel 6 is still to be defined. Work is performed in cooperation with the Open Mobile Alliance (OMA).
Mobile Execution Environment (MExE)	<ul style="list-style-type: none"> <li>• The work item “MExE Rel 6 Improvements and Investigation” was closed, because of lack of contributions.</li> <li>• The work item “MExE Run-Time Independent Framework Feasibility Study” (TR 22.857) was completed in December 2002.</li> </ul>
Operations, Administration, Maintenance & Provisioning (OAM&P)	<ul style="list-style-type: none"> <li>• User Equipment Management (UEM) is about 10% complete.</li> <li>• Trace Management is about 55% complete.</li> <li>• Performance Management is about 20% complete.</li> <li>• Network Infrastructure Management is about 10% complete.</li> </ul>
Charging Management	The existing Rel 5 TS documentation structure (32.200, 32.205, 32.215, 32.225, 32.235) will be replaced in Rel 6.
Presence Service	<ul style="list-style-type: none"> <li>• Stage 1: Approved at TSG SA#13 (September 2001) in TS 22.141.</li> <li>• Stage 2: Published at TSG SA#17 (September 2002) in TS 23.141.</li> <li>• Stage 3: Being developed by CN1 for completion by June 2003.</li> <li>• Security Aspects: Being developed by SA3 for completion by December 2003.</li> </ul>
Multimedia Broadcast/Multicast Service (MBMS)	<ul style="list-style-type: none"> <li>• Stage 1: Approved at TSG SA#13 (September 2001) in TS 22.146.</li> <li>• Stage 2: TS 23.246 is scheduled for completion by September 2003.</li> <li>• Radio Aspects Stage 2 and Stage 3 (TS 25.346): Work is ongoing.</li> <li>• Stage 3 for Core Network: Targeted for December 2003.</li> <li>• Security Aspect: Work is ongoing in SA3.</li> <li>• Codec Aspects: Work has just started in SA4.</li> <li>• Stage 3 for GERAN: Work has just started.</li> </ul>
Speech Recognition and Speech Enabled Services (SES)	<ul style="list-style-type: none"> <li>• Stage 1: Approved at TSG #17 (September 2002) in TR 22.977 and TS 22.243.</li> <li>• Stage 2: Work has begun, but is behind schedule.</li> <li>• Stage 3: Work has not begun.</li> <li>• Work has just begun on a new SA4 work item for a codec to support a speech recognition framework for automated voice services.</li> </ul>
Packet Switched Streaming (PSS)	• A new SA4 work item with enhancements was approved at TSG #18. The main specifications for PSS Rel 6 (new TS 26.244 and TS 26.245) will be restructured. This is scheduled for completion by SA4 in December 2003.
Generic User Profile (GUP)	<ul style="list-style-type: none"> <li>• Stage 1 in TS 22.240 was approved at TSG SA#19.</li> <li>• Stage 2 work is progressing for completion by September 2003.</li> <li>• Stage 3 work by CN4 has not begun.</li> <li>• T2 (3GPP TSG WG 2) has identified impacts on TS 23.241 and TS 24.241.</li> </ul>
Digital Rights Management (DRM)	<ul style="list-style-type: none"> <li>• Stage 1: TS 22.242 is complete.</li> <li>• Stage 2 and 3: Work has been deferred to the Open Mobile Alliance (OMA).</li> </ul>
Wireless Local Access Network (WLAN) / Universal Mobile Telecommunications System (UMTS) Interwork	<ul style="list-style-type: none"> <li>• Stage 1: Approved at TSG SA#17 (September 2002) in TR 22.934. A few outstanding issues remain to be addressed.</li> <li>• Stage 2: TR 23.934 and TS 23.234 are targeted for completion by June 2003.</li> <li>• Stage 3: Work has not begun.</li> <li>• WLAN interworking security in TR 33.934 is in progress.</li> <li>• Stage 3 work by CN4 has not yet started.</li> </ul>
Priority Service	<ul style="list-style-type: none"> <li>• Stage 1: Modifications to TR 22.950 are continuing.</li> <li>• SA1 will clarify by June 2003 what other work is needed.</li> </ul>

**Table 1: 3GPP Release 6 Feature Status Update**

Feature	Status
Network Sharing	<ul style="list-style-type: none"> <li>• Stage 1: TR 22.951 was approved at TSG SA#18.</li> <li>• Stage 2: Anticipated to be completed by September 2003.</li> <li>• Stage 3: Not started.</li> </ul>
Quality of Service (QoS) Improvements	<ul style="list-style-type: none"> <li>• Work on the “Feasibility Study on Dynamic Policy Control Enhancements for End-to-End QoS” is ongoing in TR 23.917.</li> <li>• A new work item on Policy-based control of DiffServ was approved at TSG #18.</li> </ul>
Open Service Access (OSA) Improvements	<ul style="list-style-type: none"> <li>• TSG approval has been delayed from September 2003 to December 2003 to align with Parlay 5.0.</li> <li>• Stage 1: CN5 asked SA1 to report on the status of OSA Rel 6 requirements.</li> <li>• CN5 is continuing to work on Stage 2 and Stage 3.</li> </ul>

**RAN1 (Radio Layer 1)**

3GPP TSG RAN1 (RAN1) specifies the physical layer of the radio interface for the mobile (UE) and UTRAN. This includes 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 RAN1 as well. RAN1 has created a number of email discussion lists on specific topics. Occasionally, these groups may have their own *ad hoc* meetings.

One of the hottest topics was a debate on Quality of Service (QoS) for the Multimedia Broadcast and Multicast Service (MBMS). The working assumption in RAN is that the QoS requirements will not change. This

means that a new codec can be introduced, but only if it does not require new bearer capabilities.

Dirk Gerstenberger of Ericsson was elected as chairman. Vice-chairmen are Masafumi Usuda of NTT DoCoMo and Juho Lee of Samsung Electronics.

Table 2 lists RAN1 specification updates.

**Table 2: 3GPP TSG RAN Working Group 1 (RAN1) Radio Layer 1 Specification Update**

Document	Specification Title	Status
TS 25.212	Multiplexing and Channel Coding (FDD)	Rel 5 version being revised.
TS 25.213	Spreading and Modulation (FDD)	
TS 25.214	Physical Layer Procedures (FDD)	
TS 25.215	Physical Layer Measurements (FDD)	Rel 99, Rel 4, and Rel 5 versions being revised.
TS 25.221	Physical Channels and Mapping of Transport Channels onto Physical Channels (TDD)	Rel 5 version being revised.
TS 25.222	Multiplexing and Channel Coding (TDD)	
TS 25.223	Spreading and Modulation (TDD)	
TS 25.224	Physical Layer Procedures (TDD)	
TS 25.225	Physical Layer Measurements (TDD)	

**RAN2 (Radio Layer 2 and Radio Layer 3 Radio Resource)**

TSG RAN Working Group 2 defines 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.

Good progress was made at this meeting on the Multimedia Broadcast Multicast Service (MBMS) RAN architecture, with convergence on several previously contentious issues.

There also was discussion on the interactions between Core Network Paging and Radio Resource Control out-of-service mechanisms. A cross-TSG discussion (CNI, SA2, GERAN and RAN2) has been proposed for April 24<sup>th</sup> – 25<sup>th</sup>, 2003. It will first determine whether the problem exists and, if so, produce a solution.

Future work of this group will be focussed on Rel 99 corrections, IP Multimedia Subsystem support, MBMS and other Rel 6 work items.

The new chairman of RAN2 is Denis Fauconnier of Nortel, and the vice-chairman is Francesco Grilli of Qualcomm Europe.

Table 3 lists RAN2 specification updates.

**RAN3 (UTRAN Architecture)**

3GPP TSG RAN Working Group 3 (RAN3) defines the overall UTRAN architecture and protocols for the Iu, Iur and Iub interfaces. The use of IP protocol for the transport layer in UTRAN is studied in this group.

**Table 3: 3GPP TSG RAN Working Group 2 (RAN2) Radio Layer 2 and 3 Specification Updates**

Document	Specification Title	Status
TS 25.302	Services Provided by the Physical Layer	Rel 5 version being revised.
TS 25.305	Stage 2 Functional Specification of User Equipment (UE) Positioning in UTRAN	Rel 4 and Rel 5 versions being revised.
TS 25.306	UE Radio Access Capabilities	Rel 99, Rel 4, and Rel 5 versions being revised.
TS 25.308	High Speed Downlink Packet Access (HSDPA); Overall Description; Stage 2	Rel 5 version being revised.
TS 25.321	MAC (Medium Access Control) Protocol Specification	Rel 99, Rel 4, and Rel 5 versions being revised.
TS 25.322	RLC (Radio Link Control) Protocol Specification	
TS 25.324	Broadcast/Multicast Control BMC	
TS 25.331	RRC Protocol Specification	
TR 25.993	IP Transport in UTRAN	Rel 6 version being revised.
TS 34.109	Terminal Logical Test Interface; Special Conformance Testing Functions	Rel 99, Rel 4, and Rel 5 versions being revised.

There seems to be some confusion about new measurements being defined in RAN3 for High Speed Downlink Packet Access. It was clarified that no new physical

measurements are being defined, however RAN3 is discussing a new measurement report required for the data that Node B is sending to the Radio Network Controller.

The new RAN3 chairman is Alexander Vesely of Siemens. The vice-chairmen are James Miller of InterDigital and Chenghock Ng of NEC.

**Table 4** lists RAN3 specification updates.

**Table 4: 3GPP TSG RAN Working Group 3 (RAN3) UTRAN Architecture Specification Updates**

Document	Title	Status
tbd	Remote Control of Electrical Tilting Antennas	New Work Items.
tbd	Network Assisted Cell Change from UTRAN to GERAN – Network Aspects	
tbd	Iu Enhancements for IMS Support in the RAN	
TS 25.401	UTRAN Overall Description	Rel 6 version being published.
TS 25.413	UTRAN Iu Interface RANAP Signalling	Rel 99, Rel 4, and Rel 5 versions being revised.
TS 25.414	UTRAN Iu Interface Data Transport and Transport Signalling	
TS 25.419	UTRAN Iu-BC Interface: Service Area Broadcast Protocol	Rel 4 and Rel 5 versions being revised.
TS 25.423	UTRAN Iur Interface RNSAP Signalling	Rel 99, Rel 4, and Rel 5 versions being revised.
TS 25.425	UTRAN Iur Interface User Plane Protocols for Common Transport Channel Data Streams	Rel 5 version being revised
TS 25.433	UTRAN Iub Interface NBAP Signalling	Rel 99, Rel 4, and Rel 5 versions being revised.
TS 26.450	UTRAN Iu-pc Interface General Aspects and Principles	Rel 6 version being published.
TS 26.452	UTRAN Iu-pc Interface: Signalling Transport	
TS 26.453	UTRAN Iu-pc Interface Positioning Calculation Application Part (PCAP) Signalling	Rel 5 version being revised. Rel 6 version being published.
TS 29.108	Application of the Radio Access Network Application Part (RANAP) on the E-Interface	Rel 99, Rel 4, and Rel 5 versions being revised.

## RAN4 (Radio Performance and Protocol)

3GPP TSG RAN Working Group 4 (RAN4) specifies the RF aspects of UTRAN. This includes simulations of diverse RF system scenarios and the minimum requirements for transmission and reception parameters, and for channel demodulation. Once these requirements are set, the group defines test procedures that will be used to verify them.

Requirements for other radio elements, like Repeaters, are also specified in RAN4.

At the most recent RAN4 meeting, there was discussion on whether Rel 5 or Rel 6 should include the remaining HSDPA (High Speed Downlink Packet Access) tests. One view was that tests not completed by June 2003 should be included in Rel 6. Others felt the decision should be based on whether the test is essential. It was finally decided

that if a company can persuade RAN4 that a new test is necessary in Rel 5, then it will be included.

RAN4 is working on Layer 3 Filtering. Several input papers were presented, but no consensus was reached.

The new chairman is Howard Benn of Motorola. The vice-chairman is Takaharu Nakamura of Fujitsu Ltd.

**Table 5** lists RAN4 specification updates.

**Table 5: 3GPP TSG RAN Working Group 4 (RAN4) Radio Performance and Protocol Specification Update**

Document	Specification Title	Status
tbd	DS-CDMA Introduction in the 800 MHz Band	New Work Items.
tbd	UMTS at 1.7/2.1 GHz	
tbd	Feasibility Study for Low Output Powers for General Purpose FDD Base Stations	New Feasibility Study.
TS 25.101	UE Radio Transmission and Reception (FDD)	Rel 99, Rel 4, and Rel 5 versions being revised. Rel 6 version being published.
TS 25.102	UTRA (UE) TDD; Radio Transmission and Reception	Rel 5 version being revised.
TS 25.104	UTRA (BS) FDD; Radio Transmission and Reception	Rel 4, Rel 5, and Rel 6 versions being revised.
TS 25.105	UTRA (BS) TDD; Radio Transmission and Reception	Rel 99, Rel 4, and Rel 5 versions being revised.
TS 25.106	UTRA Repeater Radio Transmission and Reception	Rel 4 and Rel 5 versions being revised.
TS 25.113	Base Station and Repeater Electromagnetic Compatibility (EMC)	Rel 5 version being revised.
TS 25.123	Requirements for Support of Radio Resource Management (TDD)	Rel 99, Rel 4, and Rel 5 versions being revised.
TS 25.133	Requirements for Support of Radio Resource Management (FDD)	Rel 99, Rel 4, Rel 5, and Rel 6 versions being revised.
TS 25.141	Base Station Conformance Testing (FDD)	Rel 99, Rel 4, and Rel 5 versions being revised.
TS 25.142	Base Station Conformance Testing (TDD)	
TS 25.143	UTRAN Iu Interface RANAP Signalling	Rel 4 and Rel 5 versions being revised.
TR 25.952	TDD Base Station Classification	Rel 5 version being revised.
TS 34.124	Electromagnetic Compatibility (EMC) Requirements for Mobile Terminals and Ancillary Equipment	Rel 99, Rel 4, and Rel 5 versions being revised.

## Meeting Dates

The latest plenary meeting of TSG RAN was held from March 11<sup>th</sup> – 14<sup>th</sup>, 2003 in Birmingham, UK. The next plenaries will be held: June 3<sup>rd</sup> – 6<sup>th</sup>, 2003 in Hammenlinna, Finland; September 16<sup>th</sup> – 19<sup>th</sup>, 2003 in Berlin, Germany; and December 9<sup>th</sup> – 12<sup>th</sup>, 2003 in Hawaii, USA.

The 3GPP meeting calendar can be found at:

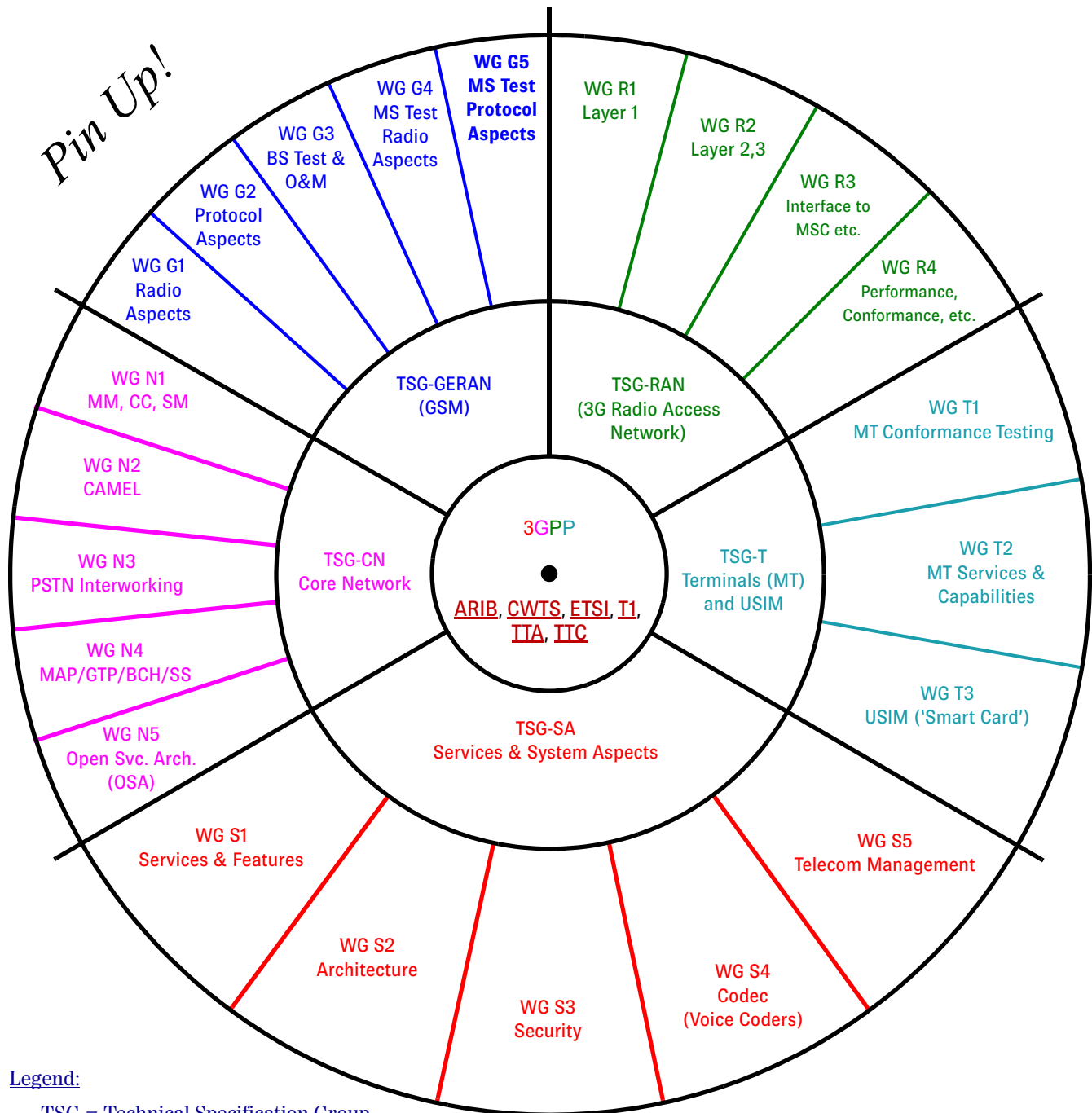
[www.3gpp.org/Meetings/meetings.htm](http://www.3gpp.org/Meetings/meetings.htm)

# Structure of 3GPP Standards Groups for GSM, GPRS, UMTS/W-CDMA

## Cellular Networking Perspectives

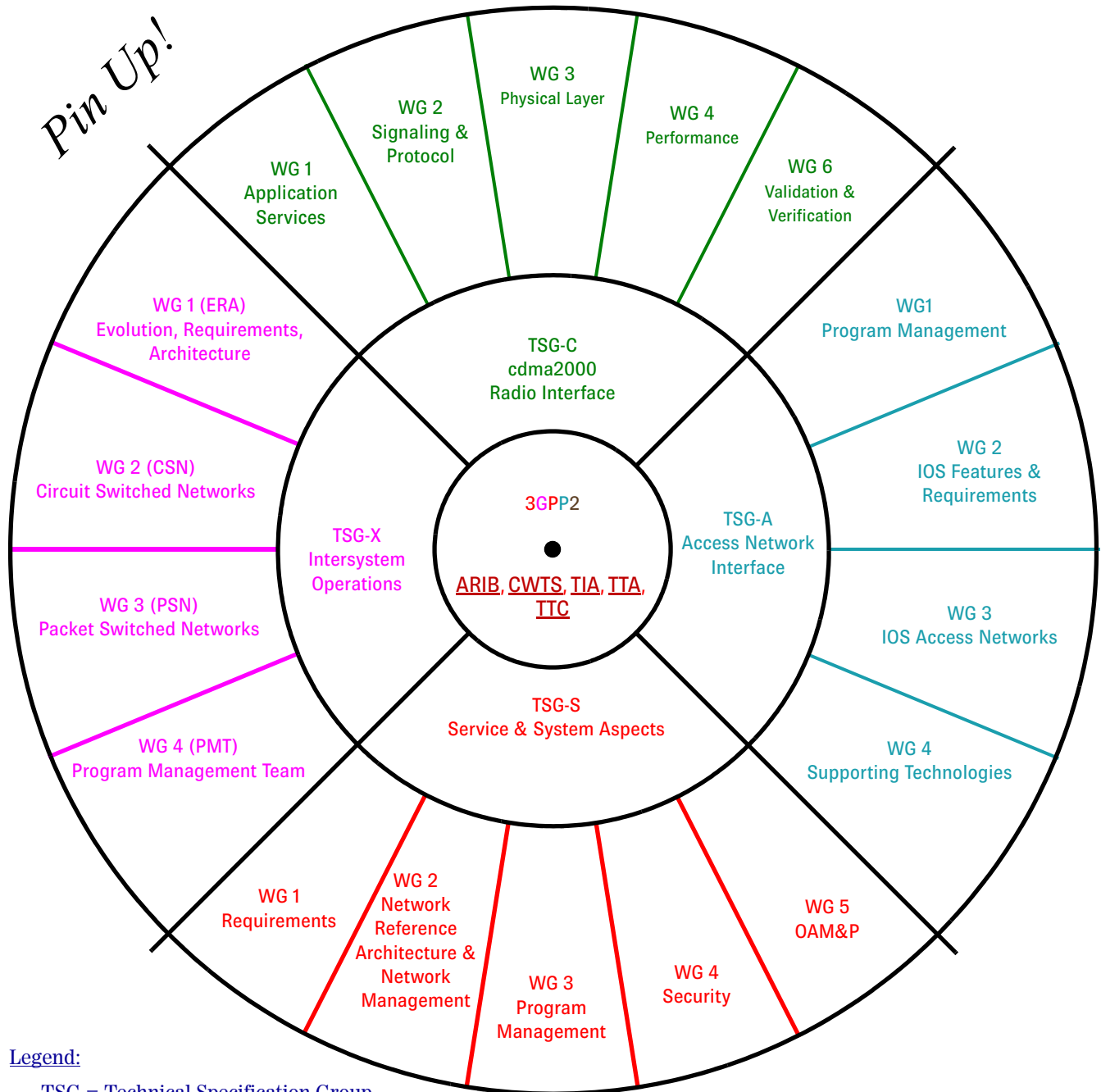
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# Structure of 3GPP2 Standards Groups for cdma2000



Legend:

TSG = Technical Specification Group

WG = Working Group

Other acronyms: [www.cnp-wireless.com/glossary.html](http://www.cnp-wireless.com/glossary.html)