

# Cellular Networking Perspectives

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Vol. 11, No. 8 August, 2002

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## Local Number Portability Deadline Extended by FCC – but not Pooling

On July 26<sup>th</sup>, 2002 the US FCC announced an extension in the deadline for local number portability (LNP) support for US wireless carriers by one year – until November 24<sup>th</sup>, 2003. They explicitly rejected a Verizon request to have the LNP mandate removed completely.

The FCC is delaying support for LNP to encourage support for thousands-block pooling, a number conservation technique that was originally supposed to piggy-back on the LNP infrastructure. Ironically, number pooling may make the usage of numbers by wireless carriers less efficient, by forcing carriers to assign numbers according to rate center boundaries. Wireless carriers will have to obtain many more blocks of numbers, something that the ability to share with other carriers will not counterbalance.

Alternatively, if wireless carriers continue to assign numbers over much larger areas, it will be difficult for them to participate in number pooling with landline carriers.

Number pooling could be implemented without using the LNP infrastructure, by simply extending routing from 6 digits (10,000 number blocks) to 7 digits (1,000 number blocks). This would probably be simpler, cheaper and more

robust, but it would undercut, rather than support, the LNP mandate.

Another solution, rather than restricting number blocks to rate centers which are often far too small, would be to allow carriers to assign their blocks of phone numbers within any boundary. However, rate centers are under State, not federal, jurisdiction, which makes this approach a political problem.

It appears that the rate of depletion of North American numbering resources may be slowing, but this may have more to do with the telecom industry's financial troubles – particularly the lack of success of competitive LECs.

This FCC order is at:

[hraunfoss.fcc.gov/edocs\\_public/  
attachmatch/FCC-02-215A1.pdf](http://hraunfoss.fcc.gov/edocs_public/attachmatch/FCC-02-215A1.pdf)

## E911 Mandate Delayed for Smaller US Carriers

On July 26<sup>th</sup>, 2002 the US FCC also announced an extension in the deadline for Enhanced wireless 911 support for non-nationwide carriers – 7 months for the twelve Tier II carriers (serving more than 500,000 subscribers) and 13 months for Tier III (small) carriers.

This extension does not apply to the six US wireless Tier I (nationwide) carriers that serve almost 80% of American wireless subscriptions – AT&T, Cingular, Nextel, Sprint, Verizon and VoiceStream.

**Next Issue: September 4<sup>th</sup>, 2002**

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*Cellular Networking Perspectives* (issn 1195-3233) is published monthly by Cellular Networking Perspectives Ltd., 2636 Toronto Crescent NW, Calgary AB, T2N 3W1, Canada. **Phone:** 1-800-633-5514 (+1-403-274-4749) **Fax:** +1-403-289-6658 **Email:** [cnp-sales@cnp-wireless.com](mailto:cnp-sales@cnp-wireless.com) **Web:** [www.cnp-wireless.com](http://www.cnp-wireless.com)  
**Subscriptions:** CDN\$350 in Canada (incl. GST), US\$350 in the USA and US\$400 elsewhere. Payment by cheque, bank transfer, American Express, Diners Club, MasterCard or Visa. **Delivery:** Email or 1st class mail.  
**Back Issues:** Single issues are \$40 in the US and Canada and \$45 elsewhere, or in bulk at reduced rates.  
**Discounts:** Educational and small businesses: 25% off any order. **Copies:** Each subscriber is licensed to make up to 10 copies of each issue or back issue. Please call for rates to allow more copies.





The final implementation date for all carriers and all aspects of E911 is still set at December 31<sup>st</sup>, 2005.

This FCC order is at:

[hraunfoss.fcc.gov/edocs\\_public/attachmatch/FCC-02-210A1.pdf](http://hraunfoss.fcc.gov/edocs_public/attachmatch/FCC-02-210A1.pdf)

## Revised TIA Engineering Manual

The third edition of the TIA engineering manual is available at:

[www.tiaonline.org/standards/sfg/engineering\\_manual.cfm](http://www.tiaonline.org/standards/sfg/engineering_manual.cfm)

It describes the rules for the operation of technical committees and for the development and publication of standards. TIA is responsible for developing many standards in the area of telecommunications, including analog (AMPS), TDMA (ANSI-136) and CDMA (ANSI-95, IS-2000) wireless standards.

A version of the manual is available with change marks for those who want to review just the changes from the second edition. The second edition (2001) and first edition (1991) are available at the same URL.

## ATIS T1 takes 'Tele' out of Telecommunications

ATIS T1 has decided to revise its mission and scope to encompass all communications, not just telecommunications.

T1 may now consider standards in areas that integrate traditional telecommunications with computer/internet communications, such as Voice Over IP (VoIP) as well as standardize a variety of integrated voice and data services.

The change also positions T1 to work on global standards, and not just those destined for North America, although it is still only ANSI-accredited. Its standards may be created to address international needs, but they will not have any international weight unless they are adopted by other national or international standards setting organizations.

## GSM Voice Capacity

3G Americas has published a white paper claiming dramatic advances in GSM voice capacity, even claiming that it can exceed the capacity of CDMA-2000 under some circumstances.

The innovations claimed in this paper are:

- A variable rate voice coder (AMR).
- N=1 frequency re-use (every frequency used in every cell).
- Dynamic power control.
- Discontinuous transmission.
- Dynamic frequency and channel allocation.
- Single Antenna Interference Cancellation.
- The EDGE modulation scheme (8-PSK).
- UMTS (Wideband CDMA).

CDMA proponents can be expected to soon respond to this challenge. They may criticize this because: Not all of the advances listed in the paper will be widely implemented; the estimated capacity gains may not be achieved in practice; and interactions between the techniques may make the combined gains in voice capacity less than expected.

This paper also shows that the capacity gains from UMTS will be relatively modest, perhaps only 25% above GSM.

The white paper is available at:

[www.3gamericas.org/pdfs/whitepaper\\_voice\\_capacity\\_71802.pdf](http://www.3gamericas.org/pdfs/whitepaper_voice_capacity_71802.pdf)

## 3GPP TSG SA: Service and System Aspects

The 3GPP Technical Specification group for Service and System Aspects (TSG SA) is responsible for the architecture and service capabilities of systems based on 3GPP specifications, as well as for cross-TSG coordination.

TSG SA has completed the specifications for most of Release 5, the first All-IP version of 3GPP Standards. However, SA WG 3, responsible for security, and

SA WG 5, responsible for network and performance management, have been given more time to complete their specifications.

Other working groups are focusing on Release 6 and corrections to older specifications. This has included working to reduce the number of open change requests (CRs).

Our **March 2002 issue** provides a detailed description of the structure of TSG SA, its Working Groups (WG) and its Sub-Working Groups (SWG).

## 3GPP TSG SA WG1 (Services)

SA1 is responsible for the services and features for 3G (UMTS). It sets high level requirements for the overall system in a Stage 1 description. This includes:

- Definition of service and feature requirements.
- Framework for services.
- Specification of services and service capabilities (Stage 1).
- Identification of technical and operational issues to meet market requirements.
- Charging and accounting requirements.

Recent major accomplishments by SA1 are the completion of the Release 6 Stage 1 for Wireless LAN and for Digital Rights Management. Less positive is the slippage of work items for IP Framework, Multimedia Broadcast and Multicast Service (MBMS), and Presence Service from Rel 5 to Rel 6.

The status of all active specifications and reports under SA1 control is summarized in **Table 1**.

The last plenary meeting of TSG SA was held from June 10<sup>th</sup> – 13<sup>th</sup>, 2002 in Marco Island, Florida. The next plenaries will be held in September, 2002 in Biarritz, France and in December, 2002 in New Orleans, USA.



**Table 1: 3GPP SA1 Specification (TS) and Report (TR) Status**

Document	Title	Status
tbd	Location Service Enhancement; Rel 6	• New work item.
tbd	IMS Enhancement; Rel 6	• New work item.
tbd	Push Service; Rel 6	• New work item.
TR 21.905	Vocabulary for 3GPP Specifications	• Rel 5 version being revised.
TR 22.121	Virtual Home Environment (VHE); Stage 1	• Converting the TS to TR.
TR 22.940	IMS Messaging; Stage 1; Rel 6	• Draft of TR 22.940 is now version 0.2.0.
TR 22.944	Report on Service Requirements for UE Functionality Split	• Rel 5 version being revised.
TR 22.950	Priority Service Feasibility Study; Rel 6	• Rel 6 version being published.
TR 22.977	Feasibility Study for Speech Enabled Services; Rel 6	• Draft of TR 22.977 is now version 1.0.0.
TS 22.002	Circuit Bearer Services (BS) supported by a Public Land Mobile Network (PLMN)	• Rel 5 version being revised.
TS 22.003	Circuit Teleservices supported by a PLMN	• Rel 5 version being revised.
TS 22.004	Recommended Set of Supplementary Services	• Rel 99 and Rel 4 versions being revised.
TS 22.011	Service Accessibility	• Rel 4 version being revised.
TS 22.016	International Mobile station Equipment Identities (IMEI)	• Rel 99 and Rel 4 versions being revised.
TS 22.043	Support of Localised Service Area (SoLSA); Service description; Stage 1	• Rel 4 version being revised.
TS 22.057	Mobile Execution Environment (MExE); Service Description, Stage 1	• Rel 5 version being revised.
TS 22.060	General Packet Radio Service (GPRS); Service description, Stage 1	• Rel 4 and Rel 5 versions being revised.
TS 22.071	Location Services (LCS); Service Description; Stage 1	• Rel 5 version being revised. • Rel 6 version being published.
TS 22.078	Customised Applications for Mobile network Enhanced Logic (CAMEL); Service description; Stage 1	• Rel 5 version being revised.
TS 22.101	Service Aspects; Service Principles	• Rel 5 version being revised. • Rel 6 version being published.
TS 22.105	Services and Service Capabilities	• Rel 5 version being revised.
TS 22.127	Stage 1 Service Requirement for the Open Service Access (OSA)	• Rel 5 version being revised. • Rel 6 version being published.
TS 22.129	Handover Requirements between UTRAN and GERAN and others	• Rel 5 version being revised.
TS 22.135	Multicall; Service Description; Stage 1	• Rel 4 version being revised.
TS 22.140	Multimedia Messaging Service (MMS); Stage 1	• Rel 5 version being revised.
TS 22.141	Presence Service; Stage 1	• Rel 6 version being published.
TS 22.146	Multimedia Broadcast/Multicast Service; Stage 1	• Rel 6 version being published.
TS 22.228	Service Requirements for the IP Multimedia Core Network Subsystem (Stage 1)	• Rel 5 version being revised. • Rel 6 version being published.
TS 22.242	Digital Rights Management	• Rel 6 version being published.





## TSG SA WG2 (Architecture)

SA2 is responsible for developing the Stage 2 network architecture and message flows for the 3GPP network. Based on service requirements from

SA1, it identifies the main functions and entities of the network, describes how the entities are linked and defines the information they exchange. The output of SA2 is used by the groups defining the format of messages in Stage 3, along

with Stage 2 for the Radio Access Network from TSG RAN.

The status of specifications and reports under SA2 control is summarized in **Table 2**.

**Table 2: 3GPP SA2 Technical Specification (TS) and Report (TR) Status**

Document	Title	Status
tbd	Location Service (LCS) Enhancements; Stage 2	• New work item.
TR 23.841	Presence Service Architecture	• Rel 6 version being published.
TR 23.846	Multimedia Broadcast and Multicast Service (MBMB)	• Draft of TR 23.846 is now version 1.0.0.
TR 23.871	Enhanced Support for User Privacy in Location Services (LCS)	• Rel 5 version being published.
TS 23.002	Network architecture	• Rel 5 version being published.
TS 23.060	GPRS; Stage 2	• Rel 99, Rel 4 and Rel 5 being revised.
TS 23.107	QoS Concept and Architecture	• Rel 5 version being published.
TS 23.121	Architectural Requirements for Release 1999	• Being revised.
TS 23.127	Virtual Home Environment/Open Service Access	• Rel 5 version being published.
TS 23.171	Virtual Home Environment / Open Service Architecture	• Rel 99 version being revised.
TS 23.207	End-to-End QoS Concept and Architecture	• Rel 5 version being published.
TS 23.221	Architectural requirements	• Rel 4 and R5 versions being revised.
TS 23.228	IP Multimedia Subsystem (IMS); Stage 2	• Rel 5 version being revised.
TS 23.271	Functional stage 2 description of LCS	• Rel 5 version being revised. • Rel 6 version being published.

## TSG SA WG3 (Security)

SA3 is responsible for the security of the 3GPP system including:

- Security requirements.

- Analysis of potential security threats, including those introduced by IP-based services and systems.

Currently, SA3's primary effort is to finalize Rel 5 specifications. It has also begun working on some Release 6 items.

The status of all specifications under its control is summarized in **Table 3**.

**Table 3: SA3 Specification Status**

Document	Title	Status
tbd	Digital Rights Management Security	• New work item.
tbd	Network Domain Security; Authentication Framework (NDS/AF)	• New work item.
TS 22.022	Personalisation of Mobile Equipment (ME); Mobile Functionality Specification	• Rel 99 and Rel 4 versions being revised.
TS 23.210	3G Security; Network Domain Security; IP Network Layer Security	• Rel 5 version being published.
TS 33.102	3G Security; Security Architecture	• Rel 99 and Rel 4 versions being revised. • Rel 5 being published.
TS 33.107	3G Security; Lawful Interception Architecture and Functions	• Rel 5 version being revised.
TS 33.108	3G Security; Handover Interface for Lawful Interception	• Rel 5 version being published.
TS 33.203	3G Security; Access Security for IP-based Services	• Rel 5 version being published.





## TSG SA WG4 (Codec)

SA4 develops specifications for speech, audio, video, and multimedia codecs (coders/decoders), in both circuit-switched and packet-switched environments. This includes quality evaluation,

end-to-end performance, and interoperability aspects with existing mobile and fixed networks.

Recently, two international organizations established liaisons with SA4:

- Multimedia Telecommunication Consortium (IMTC – [www.imtc.org](http://www.imtc.org)).
- Internet Streaming Media Alliance (ISMA – [www.isma.tv](http://www.isma.tv)).

SA4 specifications are summarized in **Table 4**.

**Table 4: SA4 Codec Specification Status**

Document	Title	Status
TS 26.103	Speech Codec List for GSM and UMTS	• Rel 99, Rel 4 and Rel 5 versions being revised.
TS 26.140	Multimedia Messaging Service (MMS); Media Formats and Codecs	• Rel 5 version being published.
TS 26.234	Transparent End-to-end Packet Switched Streaming Service (PSS); Protocols and Codecs	• Rel 4 and Rel 5 versions being revised.
TS 28.062	Inband Tandem Free Operation (TFO) of Speech Codecs; Service Description; Stage 3	• Rel 4 and Rel 5 versions being revised.

## TSG SA WG5 (Telecom Management)

SA5 is responsible for:

- The management framework and requirements for management of the 3G system.

- Delivering the architecture descriptions of the telecommunication management network (TMN).

- Coordinating all 3GPP work pertinent to telecom management.

At the June 2002 TSG SA#16 meeting, a new chair was elected (Michael Truss of Motorola) and two new vice chairs

(Tom Richter of Cingular and Christian Toche of Nortel Networks).

Subworking Group D was created to take responsibility for performance and trace management from SWG B, which retains only the responsibility for charging management.

**Table 5** summarizes the SA5 specifications.

**Table 5: SA5 Specification (TS) and Report (TR) Status**

Document	Title	Status
tbd	Trace Management	• New work item.
TR 32.802	User Equipment Management UEM Feasibility Study	• Rel 5 version being published
TS 32.111-3	Telecommunication Management; Fault Management; Part 3: Alarm Integration Reference Point: CORBA Solution Set	• Rel 4 version being revised.
TS 32.111-4	Telecommunication Management; Fault Management; Part 4: Alarm Integration Reference Point: CMIP Solution Set	• Rel 4 and Rel 5 versions being revised.
TS 32.200	Telecommunication Management; Charging management; Charging Principles	• Rel 4 and Rel 5 versions being revised.
TS 32.205	Charging Management; Charging Data Description for the Circuit Switched (CS) domain	• Rel 4 and Rel 5 versions being revised.
TS 32.215	Charging Management; 3G Charging Data Description for the Packet Switched (PS) Domain	• Rel 4 and Rel 5 versions being revised.
TS 32.225	Charging Data Description for IP Multimedia Subsystem	• Draft of TS 32.225 is now version 1.5.0.
TS 32.235	Charging Management; Charging Data Description for Application Services	• Rel 4 version being revised.
TS 32.304	Notification Management; Notification Integration Reference Point: CMIP Solution Set	• Rel 5 version being revised.
TS 32.321	Telecommunication management; Test management IRP; Requirements	• Draft of TS 32.321 is now version 1.0.0.
TS 32.322	Telecommunication management; Test management IRP; Information Service	• Draft of TS 32.322 is now version 1.0.0.



**Table 5: SA5 Specification (TS) and Report (TR) Status (continued)**

Document	Title	Status
TS 32.323	Telecommunication management; Test management IRP; CORBA Solution Set	• Draft of TS 32.323 is now version 1.0.0.
TS 32.324	Telecommunication management; Test management IRP; CMIP Solution Set	• Draft of TS 32.324 is now version 1.0.0.
TS 32.403	Performance Management (PM); Performance Measurements – UMTS and combined UMTS/GSM	• Rel 5 version being revised.
TS 32.421	Subscriber and Equipment Trace: Trace Concept and Requirements	• Draft of TS 32.421 is now version 1.0.0.
TS 32.603	3G Configuration Management: Basic Configuration Management IRP: CORBA Solution Set	• Rel 4 version being revised.
TS 32.611	3G Configuration Management (CM); Bulk CM Integration Reference Point (IRP); Requirements	• Rel 5 version being revised.
TS 32.612	3G Configuration Management: Bulk Configuration Management IRP: Information Service	• Rel 4 version being revised.
TS 32.613	3G Configuration Management: Bulk CM IRP: CORBA Solution Set	• Rel 4 version being revised.
TS 32.614	3G Configuration Management: Bulk Configuration Management IRP: CMIP Solution Set	• Rel 4 version being revised.
TS 32.615	3G Configuration Management (CM); Bulk CM Integration Reference Point (IRP); eXtensible Markup Language (XML) File Format Definition	• Rel 5 version being revised.
TS 32.622	Configuration Management; Generic Network Resources IRP: Network Resource Model	• Rel 4 version being revised.
TS 32.624	3G Configuration Management: Generic Network Resources IRP: CMIP Solution Set	• Rel 4 version being revised.
TS 32.625	Telecommunication Management; 3G Configuration Management; Generic Network Resources IRP: Bulk CM XML File Format Definition	• Draft of TS 32.625 is now version 1.0.0.
TS 32.631	3G Configuration Management: Core Network Resources IRP: Requirements	• Rel 5 version being revised.
TS 32.632	3G Configuration Management: Core Network Resources IRP: Network Resource Model	• Rel 4 version being revised.
TS 32.633	Core Network Resources IRP: CORBA Solution Set	• Rel 4 version being revised.
TS 32.635	Telecommunication Management; 3G Configuration Management; Generic Network Resources IRP: Bulk CM XML File Format Definition	• Draft of TS 32.635 is now version 1.0.0.
TS 32.642	3G Configuration Management: UTRAN Network Resources IRP: Network Resource Model	• Rel 4 version being revised.
TS 32.645	Telecommunication Management; 3G Configuration Management; UTRAN Network Resources IRP: Bulk CM XML File Format Definition	• Draft of TS 32.645 is now version 1.0.0.
TS 32.652	3G Configuration Management: GERAN Network Resources IRP: Network Resource Model	• Rel 4 version being revised.
TS 32.655	Telecommunication management; 3G Configuration Management; GERAN network resources IRP: Bulk CM XML File Format Definition	• Draft of TS 32.655 is now version 1.0.0.
TS 32.671	Telecommunication management; 3G Configuration Management; State Management IRP: Requirements	• Draft of TS 32.671 is now version 1.0.0.
TS 32.672	Telecommunication management; 3G Configuration Management; State Management IRP: Information service	• Draft of TS 32.672 is now version 1.0.0.
TS 52.402	Telecommunication Management; Performance Management (PM); Performance Measurements - GSM	• Rel 99 and Rel 4 versions being revised.





# Status of IS-41 Rev. C & TIA/EIA-41-D (ANSI-41) Implementations

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Last published April, 2002

Intersystem Operations Capability	Vendor and Radio Technology									
	Alcatel	Ericsson			LG	Lucent			Motorola	
	CDMA	Analog	CDMA	TDMA	CDMA	Analog	CDMA	TDMA	Analog	CDMA
Authentication (CAVE)	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓
Authentication Enhancements (IS-778)			⌚		⌚					
Circuit Data (IS-737)	✓	■	✓	✓	✓	■			■	✓
CNAP/CNAR (IS-764)		✓	✓	✓	✓		📞	📞		
CNIP/CNIR	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓
E911 Phase 1 (J-STD-034)		✓	✓	✓						
E911 Phase 2 (J-STD-036)		✓	✓	✓						
Inter-MSC handoff from analog	■	✓	■	✓	■	✓	■	✓	✓	■
Inter-MSC handoff from CDMA	✓		✓	■	✓	✓	✓	■	✓	✓
Inter-MSC handoff from TDMA	■	✓	■	✓	■	✓	■	✓	✓	■
International (IS-751/IS-807)	✓	■	✓	✓	📞	■	📞	📞	■	
Hyperband handoff (TSB76)	✓	■		✓		■	✓	✓	■	✓
LNP Phase I (IS-756)	✓	✓	✓	✓		✓	✓	✓	✓	✓
LNP Phase II (IS-756-A)	✓	✓	✓	✓		2Q'02	2Q'02	2Q'02	⌚	⌚
Message Waiting Notification (MWN)	✓	✓	✓	✓	✓		✓	✓	✓	✓
Origination Triggers	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓
Over-the-air Activation (IS-725-A)	✓	■	✓	✓	✓	■	✓	⌚	■	✓
Removable UIM (IS-808)										
Roamer DB Verification (IS-847)										
Segmentation (IS-812)										
SMS – Broadcast (IS-824)		■	✓	✓		■			■	
SMS – MDN-Based (IS-841)		■	✓	✓		■			■	
SMS – Origination	✓	■	✓	✓	✓	■	📞	✓	■	✓
SMS – Termination	✓		✓	✓	✓		✓	✓	✓	✓
Termination Triggers	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓
Voice Privacy - basic	✓	■		✓	✓	■	✓	✓	■	
Voice Privacy - EPE	■	■	■		■	■	■		■	■
WIN Phase I (IS-771)	✓	✓	✓	✓	📞	✓	✓	✓	⌚	⌚
WIN Phase II (Prepaid – IS-826)	✓	✓	✓	✓	⌚	2Q'02	2Q'02	2Q'02	⌚	⌚



# Status of IS-41 Rev. C & TIA/EIA-41-D (ANSI-41) Implementations

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Intersystem Operations Capability	Vendor and Radio Technology								
	NEC		Nortel (MSC/BS)			Telos			
	Analog	CDMA	Analog	CDMA	TDMA	Analog	CDMA	TDMA	
Authentication (CAVE)		✓	✓	✓	✓	✓	✓	✓	✓
Authentication Enhancements (IS-778)									
Circuit Data (IS-737)		✓		✓	✓			⌚	
CNAP/CNAR				✓	✓				
CNIP/CNIR	✓	✓	✓	✓	✓	✓	✓	✓	✓
E911 Phase 1 (J-STD-034)			✓	✓	✓				
E911 Phase 2 (J-STD-036)			✓	✓	✓				
Inter-MSC handoff from analog	✓		✓		✓				
Inter-MSC handoff from CDMA	✓	✓	✓	✓					
Inter-MSC handoff from TDMA			✓		✓				✓
International (IS-751/IS-807)				⚡	⚡			⌚	
Hyperband handoff (TSB76)				✓	✓				
LNP Phase I (IS-756)			✓	✓	✓	✓	✓	✓	✓
LNP Phase II (IS-756-A)			✓	✓	✓				
Message Waiting Notification (MWN)	✓	✓	✓	✓	✓			✓	✓
Origination Triggers	✓	✓	✓	✓	✓	✓	✓	✓	✓
Over-the-air Activation (IS-725-A)				✓	✓			✓	✓
Removable UIM (IS-808)									
Roamer DB Verification (IS-847)									
Segmentation (IS-812)									
SMS – Broadcast (IS-824)									
SMS – MDN-Based (IS-841)				⚡					
SMS Origination		✓		✓	✓			✓	✓
SMS Termination		✓	✓	✓	✓			✓	✓
Termination Triggers	✓	✓	✓	✓	✓	✓	✓	✓	✓
Voice Privacy - basic		✓							
Voice Privacy - EPE									
WIN Phase I (IS-771)			✓	✓	✓	✓	✓	✓	✓
WIN Phase II (Prepaid)			✓	✓	✓				⌚

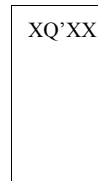
### Terms & Acronyms

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

### Symbols



In field trial or commercial service.



Specifies the quarter during which commercial availability is expected (e.g. 4Q'01).



In lab trial.



Under Development



A capability that is not applicable to the technology in this column.



**Red and bold** indicate a change in status since the last report.



A capability being reported for the first time.



A new capability that is not applicable to the technology in this column.