

Cellular Networking Perspectives

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Next Issue: January 5th, 2004

Changes for 2004

There will be no price increase for *Cellular Networking Perspectives* or *Wireless Security Perspectives* for 2004, but the July and August, 2004 issues will be merged. We still expect to exceed our goal of providing at least 72 pages of up-to-date, accurate and concise wireless standards and technology information throughout the year.

We would also like to wish all our customers and their families "Happy Holidays" and all the best for 2004.

ATIS Reorganizes

ATIS (www.atis.org), an important US-based standards organization, announced a reorganization on November 17th 2003 which will take effect on January 1st 2004. The operations of all committees made obsolete by this reorganization will end on April 1st 2004.

This reorganization breaks up the T1 organization (www.t1.org) that, along with the TIA (www.tiaonline.org), has been responsible for the bulk of US telecom industry standardization.

The stated reasons for the restructure were that the committees had no "organizational rationale" and that the current structure had existed without major change for 20 years. The names of the existing committees were also not seen as "user friendly".

The new structure will work in conjunction with the ATIS board's TOPS (Technical Operations) focus groups and council, which will identify industry priorities, assign new standardization projects to ATIS forums and committees, track the work and publish it upon completion.

The new structure is illustrated on [page 7](#).

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New 3G Spectrum in US?

After 10 years of study, the FCC announced a special Thanksgiving present for US wireless carriers and consumers on November 25th 2003 – new AWS spectrum at 1710-1755 and 2110-2155 MHz. Winners of auctions for this spectrum will have the flexibility to provide a wide variety of services, including 3G.

hraunfoss.fcc.gov/edocs_public/attachmatch/FCC-03-251A1.pdf

Information on the FCC's plans for 3G systems can be found at:

www.fcc.gov/3G

Wideband CDMA (W-CDMA) proponents such as AT&T and Cingular are particularly interested in this new spectrum, because it provides the large swaths that they need.

But it is not really all that simple. There is no such thing as new spectrum, not even spectrum that can be classified as unused. Current users include the Department of Defence. The 2150-2155 MHz band was previously allocated to MDS.

The NTIA has produced a plan that could relocate most government users by the end of 2008. Not only could current users stall this process, but they must be compensated from the proceeds of the auctions, something that requires further legislation and FCC rule makings.

Spectrum will be licensed for 15 years (with renewals of 10 years) in geographical areas known as EAs (Economic Areas), REAGs (Regional EA Groupings) and MSAs/RSAs (used for cellular licensing). Blocks of spectrum will be 5, 10 or 15 MHz in size.

US FCC AWS Block	License Area	Number of Licenses
A (1710-1720 and 2110-2120)	EA	176
B (1720-1730 and 2120-2130)	REAG	12
C (1730-1735 and 2130-2135)	REAG	12
D (1735-1740 and 2135-2140)	RSA/MSA	734
E (1740-1755 and 2140-2155)	REAG	12

There will be no spectrum limits and no designation of certain spectrum for designated bidders (such as minorities, small business or new entrants). Instead of this, the FCC will provide 15% bidding credits to 'small businesses' and 25% to 'very small businesses'. Carriers will be able to use most technologies that meet the technical requirements defined by the FCC (e.g. defining power limits and maximum adjacent channel interference levels), assuming that there are

no serious interference problems. Time Division Duplexing (TDD) is, however, currently not allowed. Special restrictions may apply to systems on the Mexican and Canadian border.

Given all these uncertainties, it could be well beyond 2008 before consumers start to see devices offering new high speed capabilities that take advantage of this new ... well ... remarketed spectrum.

Press-to-talk Over Cellular

*Sebastian Thalanany
US Cellular*

PoC (Press-to-talk over Cellular) is a VoIP application that leverages the emerging wireless IP architecture of 3G wireless mobile systems. PoC is an enabler for multimedia features that are expected to provide users with many value-added benefits.

One of the most important attributes of this feature is *Presence*, which allows users to both manage their availability as well as observe the availability of others before engaging in a communication session. The attributes of presence, availability, privacy, convenience, and the user-managed customization of each of these attributes distinguish the PoC feature from legacy dispatch services.

Mobile Presence may include a variety of information transactions such as user preferences (location, availability etc.) and contact information (email address, phone number etc.). This information could leverage features that provide user convenience, enhanced user experience, access to a variety of services and cost savings.

The benefits of Mobile Presence are illustrated by considering an impromptu conference call. With existing systems, the availability of the conference participants needs to be confirmed manually. This wastes time, takes effort and is inconvenient. With Presence, participant availability is easily determined by the user or by applications on the phone.

The PoC system can be extended beyond the 3G cellular system, and may acquire Presence from other sources, such as Wireless LAN systems.

While different and proprietary technologies may be utilized to obtain presence information for PoC, IETF (Internet Engineering Task Force) based SIP (Session Initiation Protocol) standards offer a variety of presence-enabling extensions, allowing inter-working and ubiquitous deployment, since they are based on IP.

Standards development

Specifications for PoC are being developed in 3GPP, 3GPP2 (Third-Generation Partnership projects) and OMA (Open Mobile Alliance). They are being designed to efficiently leverage the resources of the underlying access and core networks, while providing a uniform user experience. In 3GPP2, preliminary discussions are occurring among the TSGs to define standards for inter-operability and optimization of access and core network resources to support efficient operation of PoC.

PoC call flow overview

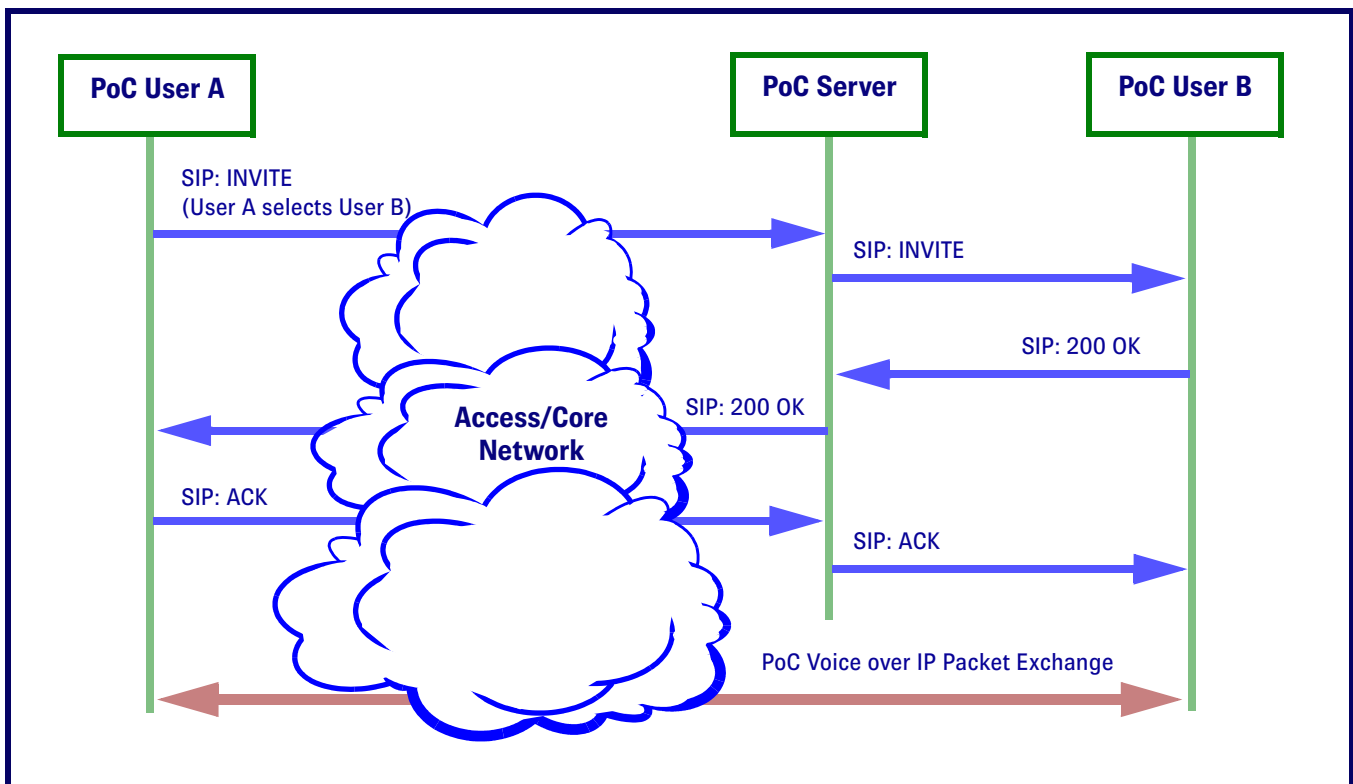
An overview of a SIP-based call control between a PoC mobile client (User A or User B) and a PoC server is shown in **Figure 1**. In a 3GPP2 architectural context, the access and core networks are defined according to the 3GPP2 standards for IMS (IP Multimedia Subsystem). The PoC feature efficiently leverages the procedures and protocols defined in the access and core networks and at the application layer to deliver an attractive user experience.

About the Author

Sebastian Thalanany is a systems architect at US Cellular, and vice-chair of the 3GPP2 TSG-X ERA (Evolution, Requirements and Architecture) group. He has over 15 years of experience in the communications industry, where he actively contributed to the design of wireless mobile systems. He continues to be engaged in the emerging wireless IP mobility standards in 3GPP2 and IETF. He can be reached at:

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Figure 1: Press-to-Talk Over Cellular (PoC) Call Flow Overview



3GPP TSG CN (Core Network) Update

The 3GPP Technical Specification Group for Core Networks (TSG CN) defines Layer 3 protocols for the interface between User Equipment and the Core Network (CN), signaling between CN network nodes, interconnection with external networks, CN aspects of the Iu interface, OA&M requirements and packet-related matters such as mapping of QoS.

At the TSG CN#21 meeting in Frankfurt, Germany on September 17 – 19th, 2003 several contentious issues were finally resolved. Agreements were reached on:

- How to fix incorrect charging of prepaid customers due to Mobile Number Portability (MNP), including:
 - » CRs (Change Requests) for ‘Any Time Interrogation’ (ATI) as the solution for Specialized Resource Functions (SRF).
 - » CRs for the IN-based solution had already been agreed to at CN meeting #20.
 - » Minor cleanup to ATI solution may be required at TSG CN meeting #22.
- CRs for one-step HLR interrogation for Service Change and Unrestricted Digital Information Fallback (SCUDIF).
- Addition of a JAVA code annex to the Open Service Access (OSA) specifications.

- A CR to clarify codec negotiation during Transcoder Free Operation.

Ian Sharp of Nortel Networks was elected as TSG CN vice-chair.

TSG CN WG1 (MM/CC/SM)

3GPP TSG CN Working Group 1 (CN1) defines the User Equipment – Core Network Layer 3 radio protocols (Call Control, Session Management, Mobility Management and SMS), including SIP Call Control and SDP protocols for the IM subsystem.

- CN1 had one interim meeting between TSG CN meetings #20 and #21 to review a large volume of corrections to the ‘frozen’ releases (pre-Rel 6). An additional meeting is being planned for late January 2004 to provide sufficient time for Rel 6 discussions.
- TR 24.841 on ‘Presence’ for Rel 6 has been circulated for information. It is estimated that it will be completed by March 2004.
- The ‘Conferencing’ TR 29.847 was provided for information. This will be elevated from Report (TR) to Specification (TS) status once the IETF drafts on which it depends have stabilized.
- A first draft of TS 24.234 for the WLAN Interworking Stage 3 has been produced.

Table 1: 3GPP TSG CN Working Group 1 Specification Update – Layer 3 Protocols

Document	Title	Status
TS 23.009	Handover Procedures	Rel 5 being revised
TS 24.011	Point-to-Point (PP) Short Message Service (SMS) Support on Mobile Radio Interface	Rel 6 being revised.
TS 24.229	IP Multimedia Call Control Protocol Based on SIP and SDP; Stage 3	Rel 5 being revised. Rel 6 being published.
TS 29.018	General Packet Radio Service (GPRS); Serving GPRS Support Node (SGSN) – Visitors Location Register (VLR) Gs Interface – Layer 3 Specification	Rel 99, Rel 4 and Rel 5 being revised.
TS 43.068	Voice Group Call Service (VGCS); Stage 2	Rel 4 and Rel 5 being revised. Rel 6 being published
TS 43.069	Voice Broadcast Service (VBS); Stage 2	Rel 4 and Rel 5 being revised.
TS 44.065	Mobile Station (MS) - Serving GPRS Support Node (SGSN); Subnetwork Dependent Convergence Protocol (SNDP)	Rel 5 and Rel 6 being revised.

TSG CN WG2 (CAMEL)

3GPP TSG CN Working Group 2 (CN2) specifies Stage 2 and Stage 3 for CAMEL (Customized Applications for Mobile network Enhanced Logic) which provides IN-like mechanisms to support services consistently and independently of the serving network. This is intended to allow control of operator-specific services from outside the

serving PLMN (e.g. from the home system) and to help the operator provide operator-specific services to their subscribers while roaming.

- A correction to Rel 99 CAMEL Phase 3 handling of Start-Delta and Stop-Delta operations for TS 23.078.
- Most of the time was spent addressing CAMEL Phase 4 (Rel 5) change requests.

Table 2: 3GPP TSG CN Working Group 2 Specification Update – CAMEL

Document	Title	Status
TS 29.078	Customized Applications for Mobile Network Enhanced Logic; CAMEL Application Part (CAP) Specification	Rel 5 version being revised.

TSG CN WG3 (Interworking with External Networks)

3GPP TSG CN Working Group 3 (CN3) specifies bearer capabilities for circuit and packet switched data services, and the necessary interworking functions towards both the UE in the UMTS PLMN and the terminal equipment in the external network. In addition, CN3 is responsible for end-to-end QoS for the UMTS core network in Release 5 and beyond.

Highlights of the most recent meeting include:

- Draft TS 29.209 v.0.01 for the Stage 3 specification of Policy Control over the Gq interface was produced.
- ‘Diameter’ was tentatively chosen over ‘Radius’ for use on the Gmb interface between the GGSN) and and the BM-SC for MBMS. A final decision is expected at the next CN3 meeting.

Table 3: 3GPP TSG CN Working Group 3 Specification Update – External Interworking

Document	Title	Status
TS 23.910	Circuit Switched Data Bearer Services	Rel 4, and Rel 5 being revised.
TS 24.022	Radio Link Protocol (RLP) for Circuit Switched Bearer and Teleservices	Rel 5 being revised.
TS 27.001	General on Terminal Adaptation Functions (TAF) for Mobile Stations (MS)	Rel 99, Rel 4 and Rel 5 being revised.
TS 27.060	Packet Domain; Mobile Station (MS) Supporting Packet Switched Services	Rel 5 being revised.
TS 29.007	General Requirements on Interworking between the Public Land Mobile Network (PLMN) and the Integrated Services Digital Network (ISDN) or Public Switched Telephone Network (PSTN)	Rel 99, Rel 4 and Rel 5 being revised.
TS 29.163	Interworking between the IP Multimedia (IM) Core Network (CN) Interworking between the IP Multimedia (IM) Core Network (CN)	Rel 6 being published.
TR 29.962	Signalling Interworking between the 3GPP Profile of SIP and non-3GPP SIP Usage	Rel 6 being revised.

TSG CN WG4 (MAP/GTP/BCH/SS)

3GPP TSG CN Working Group 4 (CN4) specifies Core Network Stage 2 for Supplementary Services, Basic Call Processing, Mobility Management and for the Bearer Independent Architecture. CN4 also specifies mobile-specific protocols.

Highlights of the most recent meeting include:

- Agreement on Rel 6 CRs for Subscriber Data Handling in the IP Multimedia Subsystem (IMS) related to Public Service Identity and sharing public identifies across multiple User Equipment.
- Rel 6 CRs that specify interim location-based routing for North American emergency calling were approved. This allows routing based on the best position information available at the start of the call, which will increase the likelihood of calls being routed to the correct PSAP.
- SA1 and SA2 have been asked to clarify their requirements for ‘Presence’ for Release 6.

- GUP TS 29.240 will be presented for information in December 2003 and is scheduled for approval at the March 2004 meeting.

TSG CN WG5 (OSA)

3GPP TSG CN Working Group 5 (CN5) specifies the Stage 3 for the UMTS Open Service Access (OSA). This includes APIs to facilitate service implementations. The work of CN5 is based on the Service Requirements from SA1 and the Architecture defined by SA2.

CN5 is currently only reviewing CRs every 6 months, to synchronize with the development of the Parlay specifications and also with CN1 Presence work.

Rel 6 Work is continuing, although the approval date has been delayed from March 2004 to December 2004 to mesh with Parlay 5.0.

Table 4: 3GPP TSG CN Working Group 4 Specification Update – MAP, GTP, BCH and SS

Document	Title	Status
tbd	Support for Subscriber Certificate	New Work Item
TS 23.003	Numbering, Addressing and Identification	Rel 99, Rel 4, and Rel 5 being revised. Rel 6 being published.
TS 23.008	Organization of Subscriber Data	Rel 5 being revised.
TS 23.018	Basic Call Handling; Technical Realization	Rel 5 being revised. Rel 6 being published
TS 23.079	Support of Optimal Routing (SOR); Technical Realization	Rel 5 being revised.
TS 23.153	Out of Band Transcoder Control - Stage 2	Rel 4 and Rel 5 being revised.
TS 29.010	Information Element Mapping between Mobile Station – Base Station System (MS - BSS), and Base Station System – Mobile- Services Switching Centre (BSS - MSC); Signalling Procedures and the Mobile Application Part (MAP)	Rel 5 being revised. Rel 6 being published.
TS 29.060	General Packet Radio Service (GPRS); GPRS Tunnelling Protocol (GTP) across the Gn and Gp Interface	Rel 4, Rel 5, and Rel 6 being revised.
TS 29.228	IP Multimedia (IM) Subsystem Cx and Dx Interfaces; Signalling Flows and Message Contents	Rel 5 being revised. Rel 6 being published.
TS 29.234	Wireless LAN Interworking	Draft submitted for information

Table 5: 3GPP TSG CN Working Group 5 Specification Update – OSA (Open Service Access)

Document	Title	Status
TS 29.198-02	Application Programming Interface (API); Part 2: Common data	Rel 5 being revised.
TS 29.198-03	Application Programming Interface (API); Part 3: Framework	
TS 29.198-04-1	Application Programming Interface (API); Part 4: Call Control; Sub-part 1: Call control common definitions	
TS 29.198-04-4	Application Programming Interface (API); Part 4: Call Control; Sub-part 4: Multimedia call control SCF	
TS 29.198-05	Application Programming Interface (API); Part 5: Generic User Interaction	
TS 29.198-06	Application Programming Interface (API); Part 6: Mobility	
TS 29.198-07	Application Programming Interface (API) Part 7: Terminal Capabilities	
TS 29.198-08	Application Programming Interface (API); Part 8: Data Session Control	
TS 29.198-11	Application Programming Interface (API) Part 11: Account Management	
TS 29.198-12	Application Programming Interface (API) Part 12: Charging	
TS 29.198-13	API Part 13: Policy Management SCF	

Meeting Schedule

The most recent plenary meeting of TSG CN was held September 16th – 19th 2003 in Frankfurt, Germany. Upcoming meetings are scheduled for:

- December 15th – 18th 2003 in Hawai'i, USA.
- January 27th–29th 2004. CN1 Rel 6 discussions in Sophia Antipolis, France.
- March 15th– 17th 2004 in Phoenix, Arizona.

- June 7th – 9th 2004 in Seoul, Korea.
- September 13th – 15th 2004 in the United States.
- December 13th – 15th 2004 in Athens, Greece.

For a complete schedule of 3GPP meetings consult:

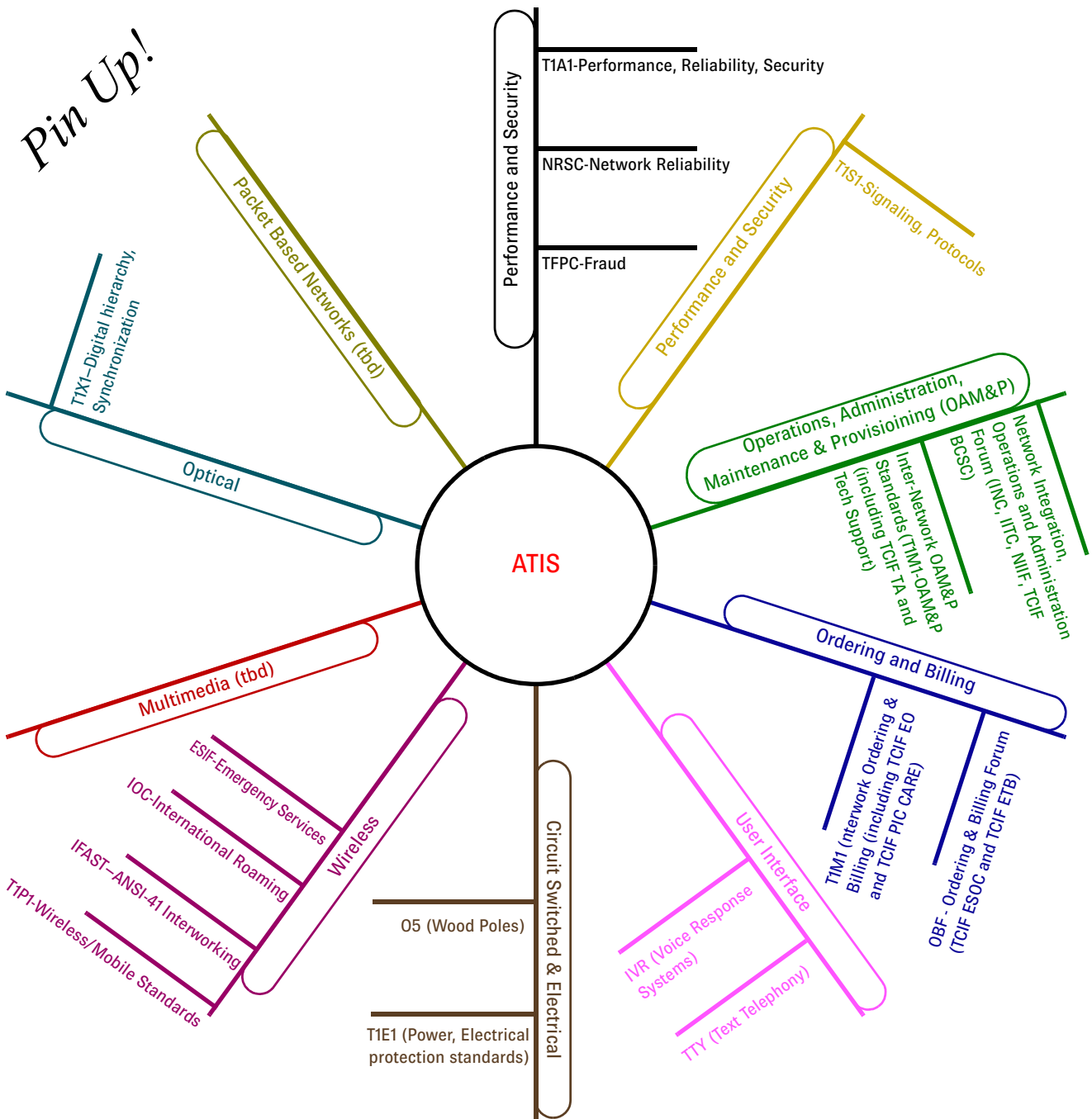
www.3gpp.org/Meetings/meetings.htm

New Structure of ATIS Forums and Committees

Cellular Networking Perspectives

Editor: David.Crowe@cnp-wireless.com

First Publication



3GPP2 TSG-C/ TIA TR-45.5 cdma2000 Standards

Cellular Networking Perspectives

Editor: David.Crowe@cnp-wireless.com

Last published December, 2002

- Note:
1. IS- Interim Standard, TSB- Telecommunications Systems Bulletin, PN- Project Number, SP- ANSI Standards Proposal.
 2. TSG-C standards are identified as C.[P|R|S]dddd-[0|A..Z] vX.Y where P=Project, R=Report, S=Specification, dddd=Document number, 0,A,Z is the revision number (0 sometimes omitted), X is the publication number (0 for pre-publication) and Y the internal editing revision (which we omit).
 3. Published TIA standards can be obtained from Global Engineering Documents at 1-800-854-7179.
 4. **Bold Type** indicates a modification since the previous publication of this information.
- Thanks to Lisa Collichio (Qualcomm) for her assistance compiling the information in this table.

TSG-C Specification Cross-Reference

Specification	Description	Status
C.R1000-0	Requirements Mapping for CDMA2000	See TSB2000
C.R1001-0	Parameter value assignments	See TSB58-B
C.R1001-A	Parameter value assignments	See TSB58-C
C.R1001-B	Parameter value assignments	See TSB58-D
C.R1001-C	Parameter value assignments	See TSB58-E
C.R1001-D	Parameter value assignments	See TSB58-F
C.S0001-0	cdma2000 Air Interface: Introduction	See IS-2000.1
C.S0002-0	cdma2000 Air Interface: Physical Layer	See IS-2000.2
C.S0003-0	cdma2000 Air Interface: Medium Access Control (MAC)	See IS-2000.3
C.S0004-0	cdma2000 Air Interface: Signaling Link Access Control (LAC)	See IS-2000.4
C.S0005-0	cdma2000 Air Interface: Upper Layer (Layer 3) Signaling	See IS-2000.5
C.S0006-0	cdma2000 Air Interface: Analog	See IS-2000.6
C.S000X-1	cdma2000 Revision A (X=1-6)	See IS-2000.X-A
C.S0007-0	Direct spread spectrum on ANSI-41 (DS-41)	See IS-834
C.S0008-0	Multi-carrier specification for spread spectrum systems on GSM MAP (MC-MAP)	See IS-833
C.S0009-0	Speech service option	See TIA/EIA-96-C
C.S0010-0	Base station minimum performance	See TIA/EIA-97-C
C.S0010-A	Base station minimum performance	See TIA/EIA-97-D
C.S0010-B	Base station minimum performance	See TIA/EIA-97-E
C.S0011-0	Mobile station minimum performance	See TIA/EIA-98-C
C.S0011-A	Mobile station minimum performance	See TIA/EIA-98-D
C.S0011-B	Mobile station minimum performance	See TIA-98-E
C.S0012-0	Minimum performance for Speech Service Option 1	See TIA/EIA-125-A
C.S0013-0	MS loopback test	See TIA/EIA-126-C
C.S0013-A	MS loopback service option	See TIA/EIA-126-D

C.S0014-0	Enhanced Variable Rate Voice Coder (EVRC)	See IS-127
C.S0014-0-1	EVRC addendum to remove 'bit exact'	See IS-127-1
C.S0014-0-2	EVRC addendum to add TTY/TDD symbol support	See IS-127-2
C.S0014-0-3	EVRC addendum 3	See IS-127-3
C.S0015-0	Short Message Service (SMS)	See IS-637-A
C.S0015-A	Short Message Service (SMS)	See TIA-637-B
C.S0016-0	Over-the air service provisioning (OTASP)	See IS-683-A
C.S0016-A	Over-the air service provisioning (OTASP)	See IS-683-B
C.S0016-B	Over-the air service provisioning (OTASP)	See IS-683-C
C.S0017-0	14.4 kbps data, without STU-III	See IS-707-A
C.S0017-0-1	Radio link protocol (RLP) modifications and additional packet data support	See IS-707-A-1
C.S0017-0-2	64kbps data, plus TTY/TDD support	See IS-707-A-2
C.S0017-0-3	Addendum 3 for IS-707 (High speed packet data service option 33)	See IS-707-3
C.S0018-0	Minimum performance for EVRC	See IS-718
C.S0019-0	Bit exact specification for EVRC	See IS-719
C.S0020-0	High rate (13 kbps) speech coder	See IS-733
C.S0020-0-1	TTY/TDD support for high rate speech coder	See IS-733-1
C.S0020-0-2	TTY/TDD support for high rate speech coder	See IS-733-2
C.S0021-0	Minimum performance for high rate speech coder	See IS-736-A
C.S0022-0	Location services	See IS-801
C.S0022-0-1	Location services addendum	See IS-801-1
C.S0023-0	Removable user identity module (R-UIM)	See IS-820
C.S0023-0-1	Removable user identity module (R-UIM)	See IS-820-1
C.S0023-A	Removable user identity module (R-UIM)	See IS-820-A
C.S0024-0	High rate packet data air interface	See IS-856
C.S0024-0-1	High rate packet data air interface (addendum 1)	See IS-856-1
C.S0024-0-2	High rate packet data air interface (addendum 2)	See IS-856-2
C.S0025-0	Markov service option (MSO) for determining frame error rates	See IS-871
C.S0026-0	Test data service option (TDSO)	See IS-870
C.S0026-0-1	Test data service option (TDSO)	See IS-807-1
C.S0028-0	TTY/TDD minimum performance specification	See IS-889
C.S0029-0	Test application specification for high rate packet data air interface (HRPD)	See IS-890
C.S0029-0-1	Test application specification for high rate packet data air interface	See IS-890-1
C.S0030-0	Selectable mode voice coder	See IS-893
C.S0031-0	Signaling conformance tests	See IS-898
C.S0032-0	Minimum performance standards for CDMA2000 HRPD	See TIA-864
C.S0033-0	Minimum performance for CDMA2000 HRPD access terminal	See TIA-866
C.S0034	Selectable Mode Voice Coder Minimum Performance	See IS-894
C.S0035-0	CDMA Card Application Toolkit	See TIA-915
C.S0036-0	Minimum performance standards for GPS equipped CDMA mobiles	See TIA-98-E
C.S0037-0	Signaling conformance for CDMA2000 wireless IP networks	See TIA-918

C.S0038-0	Signaling conformance for HRPD air interface	See TIA-919
C.S0039-0	Enhanced subscriber privacy for CDMA2000 high rate packet data	See TIA-925
C.S0040	IP Based Over-the-Air Handset Configuration Management (IOTA-HCM)	See TIA-1010
C.S0042-0	Circuit-switched video conferencing services	See TIA-926
C.S0047	Link Layer Assisted Robust Header Compression Service Option for Voice	See TIA-923
C.S0048	ME (Mobile Equipment) Conformance Testing	See TIA-1013
C.P0050	File Formats for Multimedia Services	See TIA-1015

First Wave - Cellular

Standard	Description	Status
IS-95	CDMA Dual-Mode Air Interface Standard (Authentication Appendix Nov. 1992)	Published 07/93
IS-96	CDMA Option 1: Voice Coder (Speech Service Option)	Published 04/94
IS-97	Base Station minimum performance standards for IS-95-A	Published 12/94
IS-98	Mobile Station (MS) minimum performance standards	Published 12/94
IS-126	Service option 2: Loopback	Published 12/94 Rescinded 08/98

Second Wave - Cellular and PCS

Standard	Description	Status
J-STD-008	IS-95 adapted for 1.8-2.0 Ghz frequency band	Published 07/96 Rescinded 11/99
J-STD-018	Mobile minimum performance standards (for J-STD-008)	Published 07/96 Rescinded 02/01
J-STD-019	Base station minimum performance standards	Published 07/96 Rescinded 02/01
IS-95-A	IS-95 Revised (Authentication Appendix "A" Nov. 1994)	Published 05/95
IS-96-A	CDMA Voice Coder	Published 05/95
IS-97-A	Base Station minimum performance standards for IS-95-A	Published 07/96
IS-98-A	Mobile minimum performance standards for IS-95-A	Published 07/96
IS-98-A-1	Additional tests for IS-95 mobile stations	Published 09/97
IS-99	Data Services (9.6kbps Fax and Circuit Switched Data)	Published 07/95 Rescinded 10/00
IS-125	Voice coder minimum performance standards	Published 05/95 Rescinded 10/00
IS-126-A	Mobile station loopback service option	Published 07/96 Rescinded 08/98
IS-637	Short message service (rate set 1)	Published 12/95
TSB-58	Parameter value assignments	Published 12/95

Third Wave - Integrated Cellular and PCS

Standard	Project	Description	Status
TIA/EIA-95-B	SP-3693	IS-95 for 800 MHz and 1800 MHz frequencies (including J-STD-008)	Published 03/99
TIA/EIA-96-C	SP-4138	CDMA Voice Coder (8kbps)	Published 08/98
TIA/EIA-97-B	SP-3814	Minimum performance standards for base stations	Published 08/98
TIA/EIA-97-C	SP-4384	Minimum performance standards for base stations (merges TIA/EIA-97-B and J-STD-019)	Published 09/99
TIA/EIA-98-B	SP-3815	MS minimum performance standards	Published 08/98
TIA/EIA-98-C	SP-4383	Merges TIA/EIA-98-B and J-STD-018	Published 11/99
TIA/EIA-125-A	SP-4682	Correction of errors in speech service option 1	Published 08/00
TIA/EIA-126-B	SP-4136	ANSI version of IS-126 (MS loopback option)	Published 08/98
TIA/EIA-126-C	SP-4578	Mobile Station loopback test	Published 08/00
TIA/EIA-637-A	SP-4391	Short message service (including service negotiation, 14.4kbps transmission, PCS and TIA/EIA-95 support)	Published 09/99
IS-96-B		CDMA Voice Coder (8kbps)	Published 07/96
IS-127		Option 3: enhanced variable rate voice coder (EVRC)	Published 01/97
IS-127-1	PN-4146	Addendum #1 to IS-127	Published 08/98
IS-127-2		Addendum #2 to IS-127: TTY/TDD capabilities	Published 09/99
IS-127-3	PN-3292-AD3	Addendum #3 to IS-127	Published 09/01
IS-127-3	PN-3292-AD4	Addendum #4 to IS-127	Development
IS-657		Packet data services (Internet, CDPD)	Published 07/96 Rescinded 10/00
IS-658	PN-4374	Data Services Interworking Function Interface (e.g. modem pool). Transferred to TR-45.4 for Revision A.	Published 07/96
IS-683	PN-3569	Over the air activation (OTA) and service provisioning (Authentication Appendix A published 03/96)	Published 02/97
IS-683-A	PN-3889	OTA update: Roaming system selection and programming lock	Published 06/98
IS-707	PN-3676	14.4 kbps data services (including synch. data, fax, STU-III and packet data)	Published 02/98
IS-718	PN-3648	Minimum performance standards for EVRC voice coder	Published 07/98
IS-733	PN-3972	Speech Service Option 17: High rate CDMA voice coder (13kbps)	Published 03/98
IS-733-1		Addendum #1 to IS-733: TTY/TDD capabilities	Published 09/99
IS-733-2	PN-3972-AD2	Addendum #2 to IS-733	Published 09/01
IS-736	PN-3973	Minimum performance specification for IS-733 (13kbps voice coder)	Published 11/98
IS-736-A	PN-4653	Corrections to testing procedures in IS-736	Published 08/00
TIA-127-A	PN-3292-UGR	Upgrade EVRC to ANSI	Ballot 09/03
TIA-733	PN-3972-UGR	Upgrade 13 kbps CDMA voice coder to ANSI	Ballot 09/03
TSB-58-A	PN-4158	Parameter value assignments for TIA/EIA-95-B	Published 04/99
TSB-74		14.4 kbps radio link protocol and inter-band operations	Published 12/95 Rescinded 04/99
TSB-79	PN-3823	IS-637 update for 14.4kbps SMS, service negotiation and Y2K	Published 02/97

3G Version (cdma2000, IS-2000, 1xRTT, 1xEVDO)

Standard	Project	Description	Status
TIA/EIA-97-D		Minimum performance standards for IS-2000 base stations	Published 06/01
TIA/EIA-97-E	SP-4384-RV5	Minimum performance standards for IS-2000 base stations	Published 02/03
TIA/EIA-98-D		MS minimum performance standards	Published 06/01
TIA/EIA-98-E	SP-4383-RV5	MS minimum performance standards	Published 02/03
TIA/EIA-99	PN-4617	9.6 kbps data service option for IS-2000	Published
TIA/EIA-126-D	SP-4578-RV4	Mobile Station loopback test	Published 06/01
TIA/EIA-637-B	SP-4391-RV2	Short message service	Published 01/02
IS-683-B	SP-4742	OTA update, including preferred user zone list	Published 12/01
IS-707-A	PN-4145	Revision to IS-707 to be consistent with TIA/EIA-95 capabilities	Published 04/99
IS-707-A-1	PN-4541	Adds CDMA2000 radio link protocol 3E support to 14.4kbps data	Published 12/99
IS-707-A-2	PN-4692	Data support for IS-2000-A	Published 03/01
IS-707-A-3		Addendum 3 for IS-707 (High speed packet data service option 33). Only chapter 12 is being modified.	Published 02/03
IS-801	PN-4535	Position determination services (e.g. for E911 Phase II)	Published 11/99
IS-801-1	PN-4535-AD1	Addendum to position determination	Published 03/01
IS-834	PN-4707	Direct Spread Specification for CDMA on ANSI-41 (DS41) Upper Layers Air Interface	Published 03/00
IS-856	PN-4875	High Rate Packet Data Air Interface Specification (1XEV DO)	Published 11/00
IS-856-1	PN-4875-AD1	Addendum 1 to CDMA2000 High Rate Packet Data Air Interface Specification (1XEV DO)	Published 01/02
IS-856-2	PN-4875-AD2	Addendum 2 to CDMA2000 High Rate Packet Data Air Interface	Published 10/02
IS-870	PN-4877	Test Data Service Option (TDSO) for CDMA2000 spread spectrum systems	Published 04/01
IS-870-1	PN-4877-AD1	Test Data Service Option (TDSO) for CDMA2000 spread spectrum systems	Published 10/02
IS-871	PN-4876	Markov Service Option (MSO) for determining frame error rates	Published 04/01
IS-889	PN-4905	Minimum Performance Specification for Text Telephone (TTY) Signal Detector and Regenerator	Published 08/02
IS-889-A	PN-4905-RV1	Minimum Performance Specification for Text Telephone (TTY/TDD) Signal Detector and Regenerator	Ballot 08/03
IS-890	PN-0018	Test application specification for high rate packet data air interface (HRPD)	Published 07/01
IS-890-1	PN-0018-AD1	Test application specification for high rate packet data air interface	Published 10/02
IS-893	PN-4575	Selectable mode voice coder (speech and capacity-sensitive, formerly known as EVRC)	Published
IS-893-1	PN-4575-AD1	Selectable mode voice coder (speech and capacity-sensitive, formerly known as EVRC)	Ballot 10/03
IS-894	PN-0029	Selectable mode voice coder minimum performance	Ballot 01/02
IS-2000.1-0	PN-4427	CDMA2000 Introduction and Overview	Published 08/99

IS-2000.2-0	PN-4428	CDMA2000 Physical Layer	Published 08/99
IS-2000.3-0	PN-4429	CDMA2000 Media Access Control (MAC) layer	Published 08/99
IS-2000.4-0	PN-4430	CDMA2000 Signaling Layer 2 Link Access Control (LAC)	Published 08/99
IS-2000.5-0	PN-4431	CDMA2000 Signaling Layer 3	Published 08/99
IS-2000.6-0	PN-4432	CDMA2000 Analog Operation	Published 08/99
IS-2000.X-0-1	PN-4698-AD2	First addendum for IS-2000. Revises all 6 parts	Published 05/00
IS-2000.X-0-2	PN-4698-AD2	Addendum for IS-2000. Revises all 6 parts	Published 08/01
IS-2000.X-A	PN-4693	CDMA2000 (all 6 (X=1-6) parts revised)	Published 03/00
IS-2000.X-A-1	PN-4698-AD1	Addendum for IS-2000-A. Revised parts 2 through 5	Published 11/00
IS-2000.X-A-2		Second addendum for IS-2000-A. Revises all 6 parts.	Published 04/02
IS-2000.X-B		CDMA2000. All 6 parts being revised (X=1..6)	Published 05/02
IS-2000.X-C		CDMA2000. All 6 parts being revised (X=1..6)	Published 05/02
IS-2000.X-D	C.P000X-D	CDMA2000 Release D in 6 parts.	Development
TIA-683-C		Over-the-air service provisioning for cdma2000	Published 03/03
TIA-707-B	PN-4145	Upgrade IS-707-A to ANSI	Ballot 10/03
TIA-864	PN-4913	Minimum performance standards for CDMA2000 high rate packet data access network	Published 02/02
TIA-864-1	PN-4913	Addendum 1 of TIA-864	Ballot 08/03
TIA-866	PN-4916	Minimum performance for CDMA2000 high rate packet data access terminal (TSG-C.P9012)	Published 02/02
TIA-866-1	PN-4916	Addendum 1 for TIA-866	Ballot 08/03
TIA-898	PN-0031	Signaling conformance tests for CDMA2000	Published 12/01
TIA-907	PN-0046	Video streaming	Development
TIA-916	PN-0058	Minimum performance recommendations for IS-801-1 (GPS) CDMA mobiles (e.g. test specifications)	Published 04/02
TIA-918	PN-0056	Signaling conformance tests for CDMA2000 wireless IP networks	Published 05/02
TIA-919	PN-0057	Signaling conformance for CDMA2000 high rate packet data networks (1XRTT)	Published 05/02
TIA-923	PN-0069	Link Layer Assisted Robust Header Compression Service Option for Voice	Published 05/03
TIA-924	PN-0070	Packet Based Video Conferencing	Development
TIA-925	PN-0071	Enhanced Subscriber Privacy for CDMA2000 High Rate Packet Data	Published 09/02
TIA-926	PN-0072	Circuit Switched Video Conferencing Services	Published 12/02
TIA-1011	PN-0112	MMS Media Format and Codecs for cdma2000	Ballot 10/03
TIA-1013	PN-0114	Mobile Equipment (ME) Conformance Testing for cdma2000	Ballot 09/03
TIA-1015	PN-0116	3GPP2 File Formats for Multimedia Services	Ballot 08/03
TSB-58-B	PN-4691	Parameter value assignments for IS-2000	Published 12/99
TSB-58-C		Parameter value assignments for IS-2000-A	Published 05/00
TSB-58-D	PN-4691-RV4	Parameter value assignments for IS-2000-B	Published 05/01
TSB-58-E	PN-4619-RV5	Parameter value assignments for IS-2000-C	Published 01/02
TSB-58-F	PN-4691-RV6	Parameter value assignments	Ballot 10/02
TSB-2000	PN-4534	Capabilities requirements mapping for CDMA2000 standards	Published 09/99

GSM MAP and Smart Card Support

Standard	Project	Description	Status
IS-820	PN-4690	R-UIM (Removable "Smart Card")	Published 05/00
IS-820-1	PN-4690-AD1	CDMA Removable UIM Addendum 1	Published 06/01
IS-820-A	PN-4690-RV1	R-UIM (Removable "Smart Card")	Published 09/02
IS-833	PN-4706	Multi-carrier specification for CDMA systems on GSM MAP (MC-MAP) lower layers air interface	Published 03/00
TIA-915	PN-0051	CDMA Card Application Toolkit	Published 02/03