

Cellular Networking Perspectives

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UWCC Morphs into "3G Americas"

3G Americas (www.3gamericas.org) has risen from the ashes of the recently dismantled UWCC. The mandates of the new and old organizations are similar, and even many of the employees remain. The main difference is that ANSI-136 TDMA will play a less significant role. The new plans are for GSM overlays, followed by a phase-out of ANSI-136, rather than a gradual migration.

The new organization will promote what it calls "The five principle wireless technologies of the Americas: GSM, TDMA [ANSI-136], GPRS, EDGE, and UMTS", even though EDGE and UMTS are not yet deployed in North America.

The omission of analog and CDMA from this list is presumably not unintentional.

Founding members of *3G Americas* are:

- US Carriers – AT&T Wireless and Cingular Wireless
- Foreign Carriers – Rogers AT&T Wireless (Canada) and Telecom Personal (Argentina)
- Equipment Vendors – Compaq, Ericsson, Lucent Technologies, Motorola, Nokia, Nortel Networks, Openwave Systems and Siemens

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T1M1.5: Standards for National Security/ Emergency Preparedness OA&M

On March 28, 2002, ATIS announced that Hal Folts of the National Communications System (NCS – www.ncs.gov) will chair T1M1.5 (Emergency Telecommunications Services), known informally as ETS. This group will coordinate all standards being developed within ATIS T1 Technical Subcommittee T1M1 that address national security and emergency preparedness (NS/EP) telecommunications. ETS aims to provide OAM&P support for NS/EP communications to enable the U.S. Government and emergency

response teams to make an immediate and coordinated response to all emergencies, including natural disasters, acts of terrorism, and cyber-attacks.

Their work will include the development of a new service management interface standard to enable emergency recovery operations and telecom service providers to interact online in real time. The interface will eventually support operations of the newly established Information Sharing and Analysis Center for the telecom service providers (Telecom-ISAC).

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Overview of 3GPP TSG CN: Core Network

3GPP TSG CN is responsible for the specifications of the core network part of 3GPP systems (an evolution from the GSM Core Network). The core network encompasses all interfaces between network elements, except those involving the radio access network (RAN). This includes:

- User Equipment – CN (Core Network) layer 3 radio protocols for call control (CC),

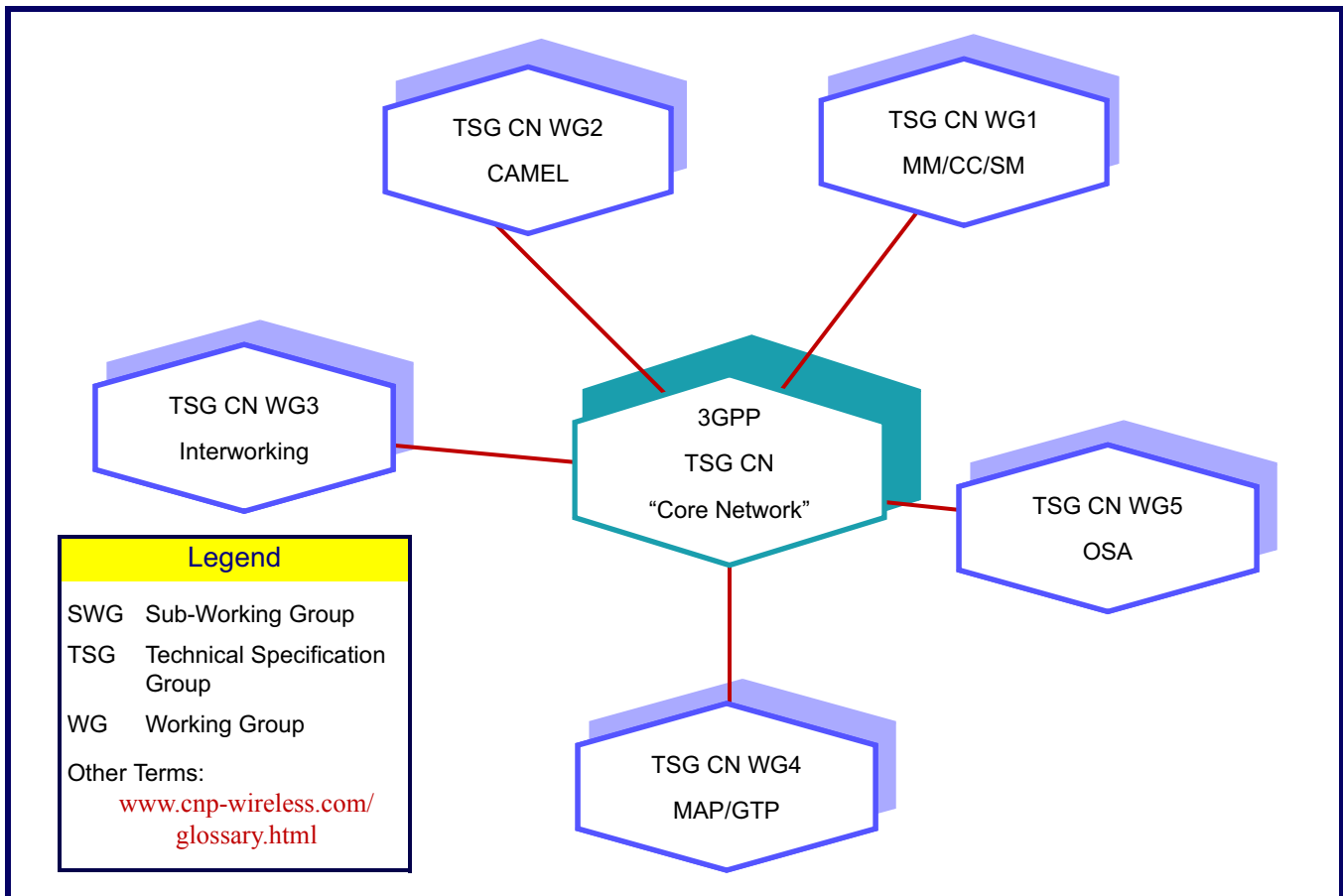
session management (SM) and mobility management (MM).

- CN interfaces for call-associated and non-call-associated signaling.
- Signalling between CN nodes supporting functionality such as user information, subscription information and control of network services.
- Interconnection of the CN with external networks (e.g. PSTN, internet).
- CN aspects of the Iu interface (between radio equipment (RNC) and network equipment (e.g. MSC)).

- O&M requirements.
- Interworking with 2nd generation networks, particularly GSM.
- Packet data issues such as mapping of QoS. This includes QoS transparency for IP domain applications, QoS for bearer types and special QoS for optimized applications such as VoIP.

TSG CN is structured into five working groups (TSG CN Working Group 1 through 5, also known as CN1 to CN5). This is illustrated in Figure 1, and each working group is also described below.

Figure 1: TSG CN Organization



Working Group 1 (CC/SM/MM)

TSG CN WG1 (CN1) defines the User Equipment – Core network layer 3 radio protocols for Call Control, Session Management, Mobility Management and SMS. This includes SIP (IETF Session Initiation Protocol) VoIP Call Control and SDP (Session Description Protocol) for the IP Multimedia subsystem (IM).

TSG CN WG 1 Work Items

- Connection Management and Mobility Management, both Circuit Switched and Packet protocols.
- Mobility Management, Call Control, Session Management, Short Message Service, and Location services layer 3 signaling between the user equipment and the core network.
- SIP Call Control and SDP protocols for the IM subsystem.

- Interworking with GSM networks (e.g. handover and roaming) together with CN4
- Signaling between the core network nodes placed under its responsibility together with CN4
- Core network aspects of the Iu interface.

New CN1 Specifications

The following new Release 5 specifications were presented for approval at the March 2002 meeting:

- TS 23.218 *IP Multimedia (IM) Session Handling IP Multimedia call mode*.
- TS 24.228 *Signalling flows for the IP multimedia call control based on SIP and SDP*. A list of outstanding issues has been generated.
- TS 24.229 *IP Multimedia Call Control Protocol based on SIP and SDP Stage 3*.

Note: These specifications depend on IETF draft specifications, which are volatile and not controlled by 3GPP.

CN1 Withdrawals

- For Release 99:- 03.63, 04.63.
- For Release 4: 43.063, 44.063, 44.008, 23.814, 23.108.

CN1 Progress

- 23.972 *Multimedia Telephony*
- 24.008 *Core Network Protocols – Stage 3*
- 24.011 *Point-to-Point (PP) SMS support on the mobile radio interface*
- 29.018 *General Packet Radio Service (GPRS); Serving GPRS Support Node (SGSN) – Visitor Location Register (VLR); Gs interface layer 3 specification* (for Release 99, Release 4, and Release 5)

Working Group 2 (CAMEL)

TSG CN WG2 (CN2) is responsible for the stage 2 and 3 specifications of CAMEL (Customized Applications for Mobile network Enhanced Logic). It is an adaptation of Intelligent Network capabilities designed to support services independently of the serving network. It is intended to facilitate control of operator specific services outside the serving PLMN to help the operator provide subscribers with them even when roaming.

CN2 Work Items

- Stage 2 specification of CAMEL (GSM 03.78 for CAMEL phases 1 and 2, and 3GPP TS 23.078 for CAMEL phase 3 or higher).
- Stage 3 specification of CAMEL (GSM 09.78 for CAMEL phases 1 and 2,

and 3GPP TS 29.078 for CAMEL phase 3 or higher).

- Stage 2 specification of CAMEL control over IP Multimedia Subsystem (3GPP TS 23.278 CAMEL phase 4 or higher).

CN2 Interactions

- SA1 (3GPP TSG SA Working Group 1) defines Stage 1 requirements for CAMEL (GSM 02.78 for CAMEL phases 1 and 2, and 3GPP TS 22.078 for CAMEL phase 3 or higher).
- CN4 implements changes to MAP necessary to support CAMEL, including basic call handling, SMS and supplementary service specifications.
- CN5 specifies OSA interfaces.
- SA5 specifies charging functionalities.
- SA2 specifies the system architecture and GPRS.

Specifications Under Development

- CAMEL Phase 4 is 80% complete. Finalization is expected in June 2002.
- Release 5 versions of 23.078 and 29.078 will not be produced until June 2002. However, this does *not* mean CAMEL 4 will be pushed back to Release 6.
- CN4, CN2, and CN plenary agreed to split CAMEL 4 into subsets.
- 23.078 CAMEL Phase 3 stage 2.
- 29.078 CAMEL Phase 4; CAMEL Application Part (CAP) specification.

Working Group 3 (Interworking with External Networks)

TSG CN Working Group 3 (CN3) specifies bearer capabilities for circuit and packet switched data services, along with interworking functions towards both. These are used to connect the user equipment 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.

Circuit Switched (CS) Domain

- Towards the UE (User Equipment):
 - Layer 1 transport protocols (mainly rate adaptation in GSM, or requirements on layer 1 in 3G).

- Layer 2 transport protocols.
- Signalling issues (i.e. negotiation and mapping of bearer capabilities and QoS information. This includes specifying parameters, parameter values and combinations of them, needed to specify services and to enable the 3G MSC/IWF to select appropriate services towards the fixed network)
- Towards the fixed network:
 - Mapping of signalling information.
 - Mapping of user data, status and control information.
 - Mapping and negotiation of QoS between protocols and revisions.
 - Evolution of bearers at the interworking point with other types of networks.
- Circuit switched domain (within the PLMN):
 - User plane protocols between Media Gateways (Nb interface).
 - Control of the user plane protocols (Nb), together with CN4.
 - Defining parameters and parameter values for the control of Media Gateways (Mc), together with CN4.

Packet Switched (PS) Domain

- Gi interface.
- R reference point (TE – MT) related to the PDP context de/activation (scope of TS 27.060).
- Network interface data transported by the GTP (GPRS Tunneling Protocol).
- Packet data protocols (PDPs), for example IP and PPP.
- services that use these protocols (e.g. Mobile IP and DHCP).
- QoS negotiation and reservation mechanisms.
- Definition of external and 3G internal QoS mechanisms.
- Mapping of QoS parameters.
- Interworking of services (e.g. multimedia) with other protocols.
- Security interworking with external networks (a priority of corporate customers).
- IP Multimedia (IM) core network subsystem.
- Interworking between different Multimedia protocols.

- Gm interface between CSCF and UE related to interworking to external networks.
- Mm interface between CSCF and Internet.
- QoS protocols (e.g. DiffServ, RSVP).
- RTP for real-time applications.

CN3 Status

CN3 presented the following specifications for information at the March 2002 meeting:

- 29.162 – *Interworking between the IM CN subsystem and IP networks.*
- 29.163 – *Interworking between the IM CN subsystem and CS networks.*
- TS 29.207 – *Policy control over Go interface.*
- TS 29.208 – *End-to-end QoS signaling flows.*

CN3 Work Items

- Revised Work Item Description for *End to End QoS Stage 3* – updated with the new approval date.
- Revised Work Item Description for *Interworking between IM CN subsystem and CS networks* – updated with the new approval date (finalization date: June 2003)
- New Work Item Description for *Interworking between IM CN subsystem and IP networks* – updated by the CN plenary with a new direction (finalization date: March 2003)

Specifications Under Development

- 27.001 – *General on Terminal Adaptation Functions (TAF) for Mobile Stations (MS).*
- 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).*
- 29.061 – *Interworking between the Public Land Mobile Network (PLMN) supporting Packet Based Services and Packet Data Network.*
- 29.414 – *Core Network Nb Data Transport and Transport Signalling.*
- 29.415 – *Core Network Nb Interface User Plane Protocols.*

Working Group 4 (MAP/GTP/BCH/SS)

TSG CN WG4 (CN4) standardizes Stage 2 aspects within the core network, focusing on Supplementary Services, Basic Call Processing, Mobility Management within the Core Network, and Bearer Independent Architecture. CN4 also defines the mobile-specific protocols within the mobile core network.

CN4 Study Areas

- Stage 2 and (jointly with CN3) stage 3 descriptions of the Bearer Independent Architecture.
- Stage 2 and stage 3 (between Core Network entities) of Mobility Management within the Core Network.
- Stage 2 and stage 3 (between Core Network entities) of Circuit-Switched Call Control within the Core Network (e.g. Basic Call Handling).
- Profiling of Call/Transport Control Protocols defined outside 3GPP to be used within the CN (e.g., H.248, RTP).
- Stage 3 (between network entities) of GPRS.
- Stage 2 and stage 3 of Supplementary Services
- Stage 2 and stage 3 of Mobile Number Portability;
- Stage 2 and stage 3 of Subscriber Data Management.

CN4 Work Items:

- Revised Work Item Description on the protocol on the Cx interface. This reflects the change in the expected completion date and the withdrawal of one of the rapporteurs.
- New Work Item Description for the protocol on the Sh interface.

Specifications Under Development

- 23.008 – *Organization of subscriber data.*
- 23.012 – *Location Management Procedures.*
- 23.016 – *Subscriber data management; Stage 2.*
- 23.018 – *Basic call handling; Technical realization.*
- 23.153 – *Out of Band Transcoder Control, Stage 2.*

- 23.205 – *Bearer-independent circuit-switched core network, Stage 2.*
- 29.002 – *Mobile Application Part (MAP) specification.*
- 29.060 – *GPRS Tunnelling Protocol (GTP).*
- 29.232 – *Media Gateway Controller (MGC) – Media Gateway (MGW) interface; stage 3.*

Working Group 5 (OSA)

TSG CN WG5 (CN5) is responsible for Stage 3 of the interfaces specific to the UMTS Open Service Access (OSA). This includes Application Programming Interfaces (APIs) for the OSA, which the UMTS network provides to facilitate service implementations. CN5 work is based on service requirements set by SA1 and an architecture defined by SA2.

CN5 Work Items

- Stage 3 for the interfaces specific to the UMTS OSA.
- Definition of the interface classes, methods and detailed behavior of those classes.
- Functional mapping of OSA interfaces to UMTS network protocols (29.998).

Specifications Under Development

- All OSA Release 4 deliverables (TS and TR) should automatically be upgraded to Release 5 in March 2002, except TS 29.198 Parts: 3, 4, 5, and 12, for which substantial Change Requests (CRs) are expected in June 2002.
- Upgraded TS 29.198, parts 1, 2, 6, 8, 11, and part 7 to version 5.0.0 after implementation of a CR.
- Upgraded TS 29.998 part 1, 4-1, 5-1, 5-4, 6, and 8 to version 5.0.
- TS29.198-13 (Policy Management) is scheduled for delivery as version 1.0.0 in June 2002.
- TS29.198-14 (Presence & Availability Management) is scheduled for delivery as version 1.0.0 in June 2002.
- TS29.998-04-04 (ISC Mapping) is scheduled for delivery as version 1.0.0 in June 2002.

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

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Intersystem Operations Capability	Vendor and Radio Technology									
	Alcatel	Ericsson			LG	Lucent			Motorola	
	CDMA	Analog	CDMA	TDMA	CDMA	Analog	CDMA	TDMA	Analog	CDMA
Authentication (CAVE)	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓
IS-778 Authentication Enhancements			⌚		⌚					
CNAP/CNAR			🧪	✓	✓		🧪	🧪		
CNIP/CNIR	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓
Data (IS-737)	✓		✓	✓	✓					✓
Inter-MSC handoff: Analog to...		✓		✓		✓		✓	✓	
Inter-MSC handoff: CDMA to...	✓		✓		✓	✓	✓		✓	✓
Inter-MSC handoff: TDMA to...		✓		✓		✓		✓	✓	
International (IS-751 IMSI and IS-807)	✓		✓	✓	🧪		🧪	🧪		
Hyperband handoff (TSB-76)	✓			✓			✓	✓		✓
LNP Phase I (IS-756)	✓	✓	✓	✓		✓	✓	✓	✓	✓
LNP Phase II (IS-756-A)	✓	✓	✓	✓		2Q'02	2Q'02	2Q'02	⌚	⌚
MWN	✓	✓	✓	✓	✓		✓	✓	✓	✓
Origination Triggers	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓
Over-the-air Activation (IS-725)	✓		✓	🧪	✓		✓	⌚		✓
SMS Origination	✓		✓	✓	✓		🧪	✓		✓
SMS Termination	✓		✓	✓	✓		✓	✓	✓	✓
Termination Triggers	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓
Voice Privacy - basic	✓			✓	✓		✓	✓		
Voice Privacy - EPE										
WIN Phase I (IS-771)	✓	✓	✓	✓	🧪	✓	✓	✓	⌚	⌚
WIN Phase II (Prepaid)	✓		🧪		⌚	2Q'02	2Q'02	2Q'02	⌚	⌚

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

Intersystem Operations Capability	Vendor and Radio Technology								
	NEC		Nortel (MSC/BS)			Telos			
	Analog	CDMA	Analog	CDMA	TDMA	Analog	CDMA	TDMA	
Authentication (CAVE)		✓	✓	✓	✓	✓	✓	✓	
IS-778 Authentication Enhancements									
CNAP/CNAR				✓	✓				
CNIP/CNIR	✓	✓	✓	✓	✓	✓	✓	✓	
Data (IS-737)		✓		✓	✓			Ⓢ	
Inter-MSC handoff: Analog to...	✓		✓		✓	✓			
Inter-MSC handoff: CDMA to...	✓	✓	✓	✓		✓	✓		
Inter-MSC handoff: TDMA to...			✓		✓	✓		✓	
International (IS-751 IMSI and IS-807)				Ⓢ	Ⓢ			Ⓢ	
Hyperband handoff (TSB-76)				✓	✓				
LNP Phase I (IS-756)			✓	✓	✓	✓	✓	✓	
LNP Phase II (IS-756-A)			✓	✓	✓	3Q'01	3Q'01	3Q'01	
MWN	✓	✓	✓	✓	✓		✓	✓	
Origination Triggers	✓	✓	✓	✓	✓	✓	✓	✓	
Over-the-air Activation (IS-725)				✓	✓		✓	✓	
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	
Symbols	
✓	In field trial or commercial service.
XQ'XX	Specifies the quarter during which commercial availability is expected (e.g. 4Q'01).
Ⓢ	In lab trial.
Ⓢ	Under Development
	Shading indicates a capability that is not technically feasible at present, or for which no standard yet exists.
Bold type	Company names in bold type have indicated a change in status since the last report.
Red	Text and figures in red indicate specific changes since the last report (visible only in electronic edition of newsletter).

TIA TR-45.4/3GPP2 TSG-A Radio to Switching Technology ("A" Interface) Standards

Cellular Networking Perspectives

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- Note:
1. IS- Interim Standard, TSB- Telecommunications Systems Bulletin, PN- Project Number, SP- ANSI Standards Proposal, A.Pxxxx - TSG-A project, A.Rxxxx - TSG-A report, A.Sxxxx - TSG-A specification.
 2. Bold Type indicates a modification since the previous publication of this information.
 3. Published TIA standards can be obtained from TIA at www.tiaonline.org/standards/search_n_order.cfm

Thanks to Steve Jones (MALR.) for his assistance compiling the information in this table.

Published Standards

Standard	Project	Description	Status
TIA/EIA-634-B	SP-4277	ANSI version of IS-634-A	Published 04/99
TIA/EIA-828-A	SP-4604-A	BTS-BSC (A bis) interface for cdma2000 systems	Published 07/01
TIA/EIA-829	PN-4683	Tandem free operation (eliminates intermediate vocoders in mobile-to-mobile calls with compatible vocoders)	Published 06/00
IS-634-0		MSC-BS "A" Interface Standard	Published 12/95
IS-634-A	PN-3539	MSC-BS Interface, including support for IS-95-A, EIA/TIA-553-A, IS-41-C, SMS, data and frame relay	Published 10/98
IS-2001	PN-4545	cdma2000 Access Network Interface ("A" Interface) based on 3GPP2 TSG-A IOS V4.1	Published 12/00
IS-2001-1	PN-4545-AD1	Addendum 1 for IS-2001	Published
IS-2001-A	PN-4545-RV1	cdma2000 Access Network Interface based on IOS v4.2	Published 08/01
TIA-878		1xEVDO (HRPD) interoperability specification (IOS) for cdma2000 "A" interface	In press
TSB80		IS-634-0 Addendum (corrections, SMS, subrate voice frame format)	Published 11/96
TSB104		PCS Service Description (now IS-104 in committee TR-46)	Published 06/94

Active TIA TR-45.4 Projects

Standard	Project	Description	Status
TIA/EIA-634-C	SP-4377	Revision of BS-MSC "A" interface	Project cancelled
TIA/EIA-658-A	PN-3473-RV1	Data services interworking function for cdma2000 (L-interface)	Development
TIA/EIA-895	SP-0030	CDMA tandem free operation (elimination of voice coders in mobile-to-mobile calls)	In press
IS-828	PN-4604	BTS-BSC (A bis) interface for cdma2000 systems	Ballot failed
TIA-2001-B	SP-4545-RV2	cdma2000 Access Network Interface based on IOS v4.3	Ballot 01/02

Active 3GPP2 TSG-A Projects

Standard	Description	Status
A.P0006	IP-based Radio Access Network "A" interface between base station and MSC	Development
A.P0007	Support for 1xEV-DO (CDMA) between RAN and elements and to the Core Network	Development
A.S0001-A	Same as IS-2001	Published 01/01
A.S0001-B	Same as IS-2001-A	Published 08/01
A.S0003	BTS-BSC (A bis) interface for cdma2000 systems (see IS-828)	Published 03/00
A.S0003-A	BTS-BSC (A bis) interface for cdma2000 systems (see IS-828-A)	Published 07/01
A.S0004	CDMA tandem free operation (eliminates intermediate vocoders) - See TIA/EIA-895	Published 12/99
A.S0004-0.1	Addendum to CDMA tandem free operations	Published 01/01
A.S0004-A	Revision A of tandem free operations	Published 07/01
A.S0007-0	1xEV-DO interoperability specification (IOS) for cdma2000 "A" interface (see IS-878)	Published 07/01
A.S0011	Interoperability specification (IOS) for cdma2000	Published 12/01
	Part 1 - Overview	
A.S0012	Part 2 - Transport	Published 12/01
A.S0013	Part 3 - Features	Published 12/01
A.S0014	Part 4 - A1, A2, A5 interfaces	Published 12/01
A.S0015	Part 5 - A3, A7 interfaces	Published 12/01
A.S0016	Part 6 - A8, A9 interfaces	Published 12/01
A.S0017	Part 7 - A10, A11 interfaces	Published 12/01