Cellular Networking Perspectives

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In This Issue...

Huh?

If there are any acronyms or terms that you are unfamiliar with, check our website glossary, you will probably find them there:

www.cnp-wireless.com/glossary.html

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TR-45 Chairman John Marinho Resigns

John Marinho, chairman of TIA standards committee TR-45 has resigned to can pursue other opportunities within Lucent Technologies. John became involved with analog cellular standards subcommittee TR-45.1 in 1987, and moved to TR-45.2 in 1988 to begin the development of network standards, becoming its chairman in 1989. He has chaired TR-45 since 1994. John's tenure in standards covered all the most exciting developmental years of the cellular and PCS industries and marked the years when wireless technology started to attract the attention of the highest levels of the US government. John has often represented the technical side of the industry to the outside world.

CALEA Confusion Continues

An August 15, 2000 United States Court of Appeal ruling on the FCC CALEA (Communications Assistance for Law Enforcement Agencies) order has thrown uncertainty on the status of joint TIA/ATIS standards J-STD-025 and J-STD-025 Revision A. The court did not mince words, stating that "the [FCC's] decision to modify the J-Standard [J-STD-025] to include the punch list reflects a lack of reasoned decision-making". Standards committees and trade associations are currently trying to determine how to respond, particularly through an ATIS legal summit that was hastily called for September 14th, 2000.

The court ruling does vacate a large part of the FCC rulemaking, which decided that a number of requirements desired by law enforcement, but resisted by the telecom industry, should be implemented. These requirements, known as the 'punch list', were not included in the original version of J-STD-025 but those mandated by the FCC were included in Revision A. The court ruling throws doubt on whether four of these punch list requirements will be required.

Definitely In...

Two Punch List requirements were not part of the court challenge, and therefore wireless carriers will almost certainly need to implement them:

- Content (e.g. voice transmissions) of subject-initiated conference calls
- Timing information

Two capabilities that were part of the court challenge were not overthrown by the court, and therefore also must be implemented:

- Cellsite/sector location
- Access to packet data

Deficiencies

The court specifically decided that several decisions by the FCC did not have adequate justification:

- Broad application of the terms "call identifying information", "origin", "destination", "direction" and "termination".

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- Claims that the punch list capabilities can be implemented through cost-effective methods.
- Provision of digits to law enforcement that may be call content (e.g. post cut-through dialed digits used to access a banking service) in order to obtain digits that are call identifying information (e.g. digits used to establish a call through an inter-exchange carrier).

Under Review

The court ruling vacated the requirement for the following punch list capabilities and remanded them for further proceedings (e.g. another FCC rule-making):

- Post cut-through dialed digit extraction
- Party hold/join/drop information
- Subject-initiated dialing and signaling information
- In-band and out-of-band signaling

What's Next...

The court ruled that the FCC ruling on CALEA "reflects a lack of reasoned decision-making". This means that the FCC did not justify the inclusion of the four punch list capabilities, but does not mean that future FCC actions might not provide adequate justification.

A recommendation from an ad-hoc group that met on August 22-23, 2000 was to suspend ANSI publication of J-STD-025 Revision A (containing all the punch-list items) but no consensus was reached on rescinding its interim standard equivalent (also confusingly known as J-STD-025-A).

For now, it is almost certain that purchasers of J-STD-025 and J-STD-025-A will be notified of the potential impact of the court ruling, but it seems improbable that yet another version will be produced before another round of FCC rule-making.

What is certain is that uncertainty will reign for quite some time to come.

FCC Rulemaking on Priority Access Service

The US FCC released a Second Report and Order on Priority Access Service (PAS, also known as PACA - Priority Access and Channel Assignment) on July 13, 2000. This document is known as FCC-00-242, is part of WT Docket No. 96-86 and is available on the web at:

hraunfoss.fcc.gov:8888/edocs_public/attachmatch/FCC-00-242A1.doc (or .pdf or .txt)

This may trigger the completion of standards to support this service, although carriers will be free to choose whether to implement it.

PAS allows users to request priority access to available radio channels. If their priority request is validated by the system, it will be queued, and a radio channel will be assigned to the user who had been waiting the longest in the highest priority queue.

The FCC order does not consider the issue of priority access to outgoing trunks (known as PACA Egress), which means that PAS calls might obtain a radio channel only to be stopped by the lack of trunks to the PSTN.

Applicability

The FCC has defined PAS as an optional service that is applicable to all CMRS (Commercial Mobile Radio Service) carriers. They recognize that for some technologies, such as satellite and analog systems, there may be difficulties, but their assumption is that carriers will simply decide that it is not cost-effective to upgrade these systems to support PAS.

The lack of support for analog may become a big issue. Although TDMA (TIA/EIA-136), CDMA (TIA/EIA-95 and IS-2000) and GSM digital standards provide some support for PAS (in standards at least), no analog standards do, yet the US National Communications Service stated at an August, 2000 TR-45.2 meeting that this is a critical issue for them. Although a primitive version of PAS could be implemented on analog systems, PAS users would have no indication about their position in the queue for a channel, or even whether they have been queued.

The FCC has decided to use the carrot approach to encourage implementation, rather than a regulatory stick, hoping that CMRS carriers are attracted by the additional revenues that PAS will bring.

Balancing Access

The FCC has decided that although PAS amounts to discrimination against some users, it can be legally justified.

To prevent PAS users from occupying all the spectrum, the FCC will allow carriers to limit the amount of spectrum devoted to PAS, allowing non-PAS users to continue to complete calls even when PAS users are still queuing.

Characteristics

The major technical decision made by the FCC is that PAS will have five queuing levels, defined as:

1. Executive leadership and policy makers,
2. Disaster response and military command and control,
3. Public health, safety and law enforcement command,
4. Public services, utilities and public welfare, and
5. Disaster recovery.

The FCC order confirms several characteristics that are part of the current definition in TIA/EIA-664-517:

- PAS will not disconnect calls in progress.
- A feature code (*XX) will need to be prefixed to dialed digits to obtain priority.

Standards

The FCC order does not require that a particular standard be implemented, but does recognize the definition of PACA in IS-53 Revision A (now known as TIA/EIA-664). It will likely be in the best interests of the customer (NCS and other government agencies) as well as equipment vendors and CMRS carriers to adhere to standards to minimize costs and maximize compatibility.

TIA TR-45.3 TDMA Digital Air Interface Standards

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Note: 1. IS- Interim Standard, TSB- Telecommunications Systems Bulletin, PN- Project Number, SP- ANSI Standards Proposal.
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.

First Generation (IS-54)

Standard	Description	Status
TIA/EIA-627	ANSI version of TDMA Dual-Mode Air Interface Standard	Published 06/96
TIA/EIA-627-1	Addendum to TDMA dual-mode air interface standard	Published 04/98
TIA/EIA-628	TDMA mobile station minimum performance standards	Published 06/96
TIA/EIA-629	TDMA base station minimum performance standards	Published 06/96
TIA/EIA-635	TDMA full-rate voice coder (3:1)	Published 06/96
IS-54-B	Original TDMA Dual-Mode Air Interface Standard (replaced by TIA/EIA-627)	Published 01/92
IS-55	TDMA mobile station minimum performance standards (Replaced by TIA/EIA-628)	Published
IS-56	TDMA base station minimum performance standards (replaced by TIA/EIA-629)	Published
TSB-46	Verification of Authentication for IS-54-B Mobiles	Published 03/93
TSB-47	IS-54 Implementation Issues	Published 05/94
TSB-50	User Interface for Authentication Key Entry	Published 03/93

Second Generation (IS-136 Revision 0 - Digital Control Channel)

Standard	Description	Status
IS-136.1/2-1	Addenda to IS-136 Rev. 0	Published 12/94
IS-130	Data services radio link protocol (RLP)	Published 04/95
IS-135	Asynchronous data and fax services	Published 04/95
IS-136.1	Digital Control Channel (DCCH)	Published 12/94
IS-136.2	FSK control channel, analog voice channel, TDMA traffic channel	Published 12/94
IS-137	TDMA/analog mobile minimum performance standards	Published 12/94
IS-138	TDMA/analog base station minimum performance standards	Published 12/94

Third Generation - IS-136 Revision A (ACELP Voice Coder)

Standard	Description	Status
IS-136.1-A	Enhanced digital control channel (9-1-1, OTA, Calling Name ID, One-button Callback, Private Networks (enhanced), PACA)	Published 10/96
IS-136.1-A-1/2	IS-136 Rev. A corrections (two addenda)	Published 11/96, 12/97
IS-136.2-A	FSK control channel, analog voice channel, TDMA traffic channel	Published 10/96
IS-130-A	Data Services Radio Link Protocol (RLP)	Published 09/97
IS-137-A	Mobile minimum performance standards for IS-136-A	Published 07/96
IS-138-A	Base station minimum performance standards for IS-136-A	Published 07/96
IS-641-A	Enhanced full-rate (ACELP) voice coder, Revision A	Published 05/96
IS-684	**Isochronous radio link protocol for data (for STU-III). Replaced by TIA/EIA-136-320**	**Published 07/96**

IS-686	Enhanced full rate voice coder performance standards	Published 12/96
IS-727	Discontinuous transmission (DTX) with ACELP (IS-641) voice coder, including generation of comfort noise	Published 07/98
TSB-73	IS-136 Rev. 0/Rev. A compatibility issues	Published 07/96
TSB-77	Interoperable Implementation Issues in IS-641 (ACELP voice coder)	Published 07/97
TSB-105	Audit order clarification	Published 03/99
TSB-108	Determining when R-DATA is encrypted	Published 03/99

Fourth Generation - TIA/EIA-136 Revision 0

Standard	Description	Status
TIA/EIA-136	SMS enhancements, double/triple rate channels (symmetrical/asymmetrical), EPE and charge rate indicator.	Published 03/99
TIA/EIA-136-010	Optional mobile station facilities	Published 03/99
TIA/EIA-136-020	SOC, BSMC and carrier specific HLPI assignments	Published 03/99
TIA/EIA-136-100	Introduction to channels	Published 03/99
TIA/EIA-136-12x	Digital control channel (DCCH) layer 1 (136-121), 2 (136-122) and 3 (136-123)	Published 03/99
TIA/EIA-136-13x	Digital traffic channel (DTC) layer 1 (136-131), 2 (136-132) and 3 (136-133)	Published 03/99
TIA/EIA-136-140	Analog (FSK) control channel	Published 03/99
TIA/EIA-136-150	Analog voice channel	Published 03/99
TIA/EIA-136-2x0	Minimum performance requirements for ACELP voice coder (136-210), VSELP voice coder (136-220), mobile station (136-270) and base station (136-280)	Published 03/99
TIA/EIA-136-420	VSELP voice coder	Published 03/99
TIA/EIA-136-510	Authentication and encryption of signaling information, user data and voice	Published 03/99
TIA/EIA-136-7x0	SMS: Introduction to teleservices (700), text/numeric messaging (710), Over-the-Air Activation (OATS; 720) and Over-the-Air Programming for intelligent roaming (OPTS;	Published 03/99
TIA/EIA-136-910	Informative information	Published 03/99
TIA/EIA-136-110	RF channel assignments	Published 03/99

Fifth Generation - TIA/EIA-136 Revision A

Standard	Description	Status
TIA/EIA-136-A	**Revised parts include 136-010, 020, 100, 121,131,133,140,150,270, 280, 510, 700, 710, 720 and 910. New parts are listed separately**	**Published 12/99**
TIA/EIA-136-310-1	Radio link protocol 1 (for data services)	
TIA/EIA-136-350-1	Data services control	
TIA/EIA-136-410-1	ACELP voice coder	
TIA/EIA-136-430	US1 voice coder (GSM compatible)	
TIA/EIA-136-511	List of messages subject to encryption	
TIA/EIA-136-620-1	TSAR: teleservice allowing segmentation and reassembly	
TIA/EIA-136-630	BATS: broadcast short message	
TIA/EIA-136-730-1	OPTS: over-the-air programming teleservice to support intelligent roaming	
TIA/EIA-136-750	GUTS: general UDP transport service	
IS-839	**R-UIM Overview, Operation, and File Structure Support in TIA/EIA-136, Rev B**	**Ballot 07/00**
IS-842	**GSM Hosted SMS Teleservice (GHOST)**	**Ballot 07/00**

Sixth Generation - TIA/EIA-136 Revision B - UWC-136 - ITU-R 3G Specification

Standard	Description	Status
TIA/EIA-136-B	**Revision B. Only new parts are listed**	**Published 03/00**
TIA/EIA-136-230	US1 (GSM) voice coder minimum performance requirements	
TIA/EIA-136-290	RF minimum performance for 200 kHz and 1.6MHz bearers	
TIA/EIA-136-330	Packet data service - overview	

TIA/EIA-136-331	Packet data service - physical layter	
TIA/EIA-136-332	Packet data service - medium access control (MAC)	
TIA/EIA-136-333	Packet data service - logical link control. Based on GSM 04.64.	
TIA/EIA-136-334	Packet data service - subnetwork dependent convergence protocol. Based on GSM 04.65.	
TIA/EIA-136-335	Packet data service - radio resource management	
TIA/EIA-136-336	Packet data service - mobility management	
TIA/EIA-136-337	Packet data service - tunneling of signaling messages. Subset of GSM 09.18	
TIA/EIA-136-34X	Outdoor high-speed packet data service: Overview (340), Physical layer (341) and MAC (342)	
TIA/EIA-136-36X	Indoor high-speed packet data service: Overview (360), Physical layer (361) and MAC (362)	
TIA/EIA-136-511	Messages subject to encryption	
TIA/EIA-136-610	R-DATA/SMDPP Transport	
TIA/EIA-136-740	Broadcast short messages	
TIA/EIA-136-760	Charge-rate indication teleservice (CIT)	
TIA/EIA-136-900	Introduction to Annexes and Appendixes	
TIA/EIA-136-905	Normative information	
TIA/EIA-136-932	Packet data services - Stage 2 description	
TIA/EIA-136-933	Packet data services - Description of MAC layer	
TIA/EIA-136-940	Capacity and performance characteristics of UWC-136 (TIA/EIA-136-B)	
IS-823	**Modification to ACELP voice coder to transmit TTY/TDD tones**	**Published 05/00**

Seventh Generation - TIA/EIA-136 Revision C

Standard	Description	Status
TIA/EIA-136-C	**Revised parts include 000-C, 005-B, 010-C, 020-C, 110-B, 121-B, 123-C, 131-C, 133-C, 700-C**	**Ballot**
TIA/EIA-136-030	**UIM overview and operation**	
TIA/EIA-136-033	**R-UIM/ME file structure**	
TIA/EIA-136-034	**R-UIM/ME interface procedures**	
TIA/EIA-136-037	**R-UIM/ME application toolkit**	
TIA/EIA-136-240	**AMR minimum performance**	
TIA/EIA-136-241	**Noise suppression minimum performance**	
TIA/EIA-136-351	**EGPRS-136 - AT commands**	
TIA/EIA-136-370	**EGPRS-136 - Overview**	
TIA/EIA-136-376	**EGPRS-136 - Mobility management**	
TIA/EIA-136-377	**EGPRS-136 - GS interface specifications**	
TIA/EIA-136-440	**AMR adaptive multirate (also used in GSM and UMTS)**	
TIA/EIA-136-670	**Broadcast teleservices over GSM SMS (TOGS)**	
TIA/EIA-136-740	**SAMPS - Satellite assisted (i.e. GPS) mobile positioning service**	
TIA/EIA-136-972	**EGPRS-136 - Stage 2 descriptions**	

Eighth Generation - TIA/EIA-136 Revision D

Standard	Description	Status
TIA/EIA-136-D	**Enhanced authentication (EPE and AKA), GHOST, analog SAMPS, multilingual SMS, R-UIM and handoff**	**Development**