

# Cellular Networking Perspectives

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Vol. 2, No. 11 December, 1993

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The latest status of IS-41 Revision A lab and field trials.

## Erratum: FCC Allocation of PCS Frequencies

The October article describing the allocation of frequencies by the FCC contained an error. Cellular carriers are not constrained from applying for PCS spectrum licenses in areas where they currently serve less than 10 percent of the population. They are only restricted to a single 10 MHz license in areas where they serve more than 10 percent of the population. This raises some interesting points:

- A cellular carrier may be able to apply for a 30 MHz MTA license while at the same time being excluded from the 20 MHz license in several BTAs within that MTA.
- Will cellular carriers that qualify as small businesses, rural telephone companies or minority/women owned qualify for an additional 10 MHz BTA license?

These are questions that lawyers will love to be paid to answer.◊

The four new features are:

- Password Call Acceptance.
- Personal Identification Number.
- Voice Mail Access.
- Short Message Service.

## Password Call Acceptance

Password call acceptance (PCA) requires callers to a subscribing mobile to enter a short numeric password, or their call will be rejected or redirected to voice mail. This gives callers control over *who* can call them, at the price of some inconvenience to the caller. This feature has a significant advantage over Selective Call Acceptance which, relying on calling number identification, can only control *what* phones can be used to call them. Subscribers to PCA will have to believe that the inconvenience of distributing their password, and the hassle for those who are allowed to call them, is worth the increased control over their incoming calls.

## Personal Identification Number (PIN)

A personal identification number provides a method of securing access to a phone for personal or network reasons. Unlike a lock code inside a phone, this method prevents unauthorized use of a MIN, not just of a physical phone. For certain classes of calls, the user of the MIN will be required to enter the correct PIN before the call will be allowed to proceed.

This feature may sound similar to Password Call Acceptance, but it is actually very different. Although both features apply to the *calling* party in a call, the PIN applies to mobile originated calls and the password to mobile terminated calls.

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## IS-53 Revision A, Part III - The Last of the Features(?)

It was reported in the last issue of *Cellular Networking Perspectives* that four new features have been added onto the back of the IS-53 Revision A camel. The TIA sub-committee responsible for this standard, TR45.2, has promised not to add any more, although a two-thirds vote could overturn that decision. Even if TR45.2 keeps its promise to stop adding new features, a massive amount of work remains to add new procedures to support the many new features, most of which have a significant IS-41 impact.

*f e d We Wish You a Merry Christmas and a Happy New Year d e f*

*Cellular Networking Perspectives* (issn 1195-3233) is published monthly by Cellular Networking Perspectives Ltd., 2636 Toronto Cr. NW, Calgary AB T2N 3W1. Send all correspondence to this address. **Subscriptions:** CDN\$250 in Canada (incl. GST), US\$250 in the USA and US\$300 elsewhere. Issues are faxed or sent by 1st class mail. Educational and small business discounts: CDN\$150 (incl. GST), US\$150 and US\$200, by mail only.

The network may use this feature when a MIN has been compromised by cloning, or when the combination of recent activity by a MIN, calling location and called number indicates a high probability of fraud. This feature provides a high degree of security without inconveniencing the legitimate subscriber by requiring a new phone number. It does, however, impose a burden on the subscriber to remember their PIN.

Another variant on this feature allows a subscribers to control access to certain types of calls, international for example. Apart from providing subscriber control this variant works in the same way as when network activated. Note that feature activation and PIN modification by the subscriber should always require entry of the PIN!

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### Voice Mail Access

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This feature is not so much a feature as it is a way of eliminating two problems where access to voice mail is difficult to provide conveniently for roamers.

The first problem occurs when a roamer wants to check their own voice mail. The ideal way would be to dial a short code (e.g. \*VM) and then be connected directly to their private voice mail box. This cannot currently be supported while roaming because the access numbers and codes to the voice mailbox will not be known in the visited system and cannot be transported by IS-41. A solution requires the visited system to send the MIN and \*VM feature digits to the home system (HLR) and receive in return a Temporary Local Directory Number (TLDN) that can be used to route a call to the roamer's voice mailbox in their home system. The impact on IS-41 is obviously quite significant.

The second voice mail problem occurs if calls can be routed to a mobile, and its associated voice mailbox, without passing through the home system by a Gateway MSC that has no knowledge of or connection to the called mobile's voice mail system. The solution to this problem also uses the TLDN technique. The gateway MSC will send the MIN of the mobile to the HLR (as it does now) and receive a TLDN that will allow connection to the roamer's voice mailbox. This requires HLR modifications, but no IS-41 changes.

It should be noted that neither of the above problems exist if a separate directory number is assigned to each voice mailbox.

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### Short Message Service

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Short message service allows the provision of pager-like services in a cellular phone. The advanced display capabilities of digital and NAMPS phones can be used to display short alpha-numeric messages. This can be used to display the phone number of a calling party, for example, or short messages like "ET Phone Home".

Short Message Service can provide cellular phones with some advantages over pagers. As an example, when a phone number is displayed, it can be stored by the phone and dialed just by pressing SEND. Voice mail notification can be enhanced, if calling number identification is available, by displaying the number of each caller who has left messages. However, with all the advantages of integration of paging functions with a cellular phone, short message service will not displace pagers until the battery life of a cellular phone can be increased dramatically.

The TIA will not be standardizing the types of services that provide short messages, any more than it currently standardizes the types of voice information that can be transmitted. The TIA TR-45.2 sub-committee will simply define an interface between a message centre and cellular network entities as an extension to IS-41. It will be up to the industry to feed stock quotes, weather warnings and pager messages into the message centres.

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### Summary

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This concludes, after three parts, our description of the new features intended for IS-53 Revision A. In the next issue we discuss why most of these features will not be implemented, at least not according to the specification provided by the TIA. We still believe that there is significant value in this exercise, but this lays more in the translation of features to IS-41 capabilities than in the IS-53 document. We will pick up this trail in the fourth and final instalment in the December issue of *Cellular Networking Perspectives*. ◊

### Back Issues Available

Back issues are available from July, 1992 to the present. Articles in recent issues are:

#### **March, 1993**

Wireless '93 in review • Multi-Lingual Cellular ... Mais Oui! • TR45.2 News • Status of IS-41 Rev. A Implementation.

#### **April, 1993**

TR-45.2 News. IS-41 Explained. TR-45.2 International Working Group VI.

#### **May, 1993**

IS-41 Rev. A Status Report. IS-41 Rev. B Status. NovAtel. DMH. IS-41 Enables Innovation. TR45.2 Project Status.

#### **June, 1993**

Wireless Terminal Location Management, Part I. Brace for the Standards Flood. TR-45.2 Working Group Report.

#### **July, 1993**

ITN Named CTIA Backbone IS-41 Network Provider. New TIA Standardization Efforts Loom. Wireless Terminal Location Management, Part II. TR-45.2 Grows More Tentacles. TR-45.2 Continues to Pump Standards Out. IS-41 Rev. B Trial Update. IS-41 Rev. A Implementation Status.

#### **August, 1993**

Bellcore Relinquishes Control of the NANP. Smart Cards, Dumb Phones? A+ Interface Looks for a Home. Wireless Terminal Location Management Part III - Lessons for PCS. TR45.2 Standards Update. Goldilocks and the Three IS-41 Addressing Types. Status of IS-41 Rev. B Implementation.

#### **October, 1993**

FCC Allocates PCS Frequencies • IS-53 Revision A, Part I - Cellular Feature Overload • TR-45.2 Standards Update • Taking MINs to the Max - Problems with International Roaming • TIA TR-45.2 Project Status Report.

#### **November, 1993**

IS-41 Rev. A Compatibility Guidelines • IS-93: Timely or Time Bomb? • IS-53 Revision A, Part II - More Cellular Features • TR-45.2 Standards Update • Status of IS-41 Rev. B Implementation.

The price of a back issue is:

CDN\$25 Canadian fax number

US\$25 US fax number

US\$30 Other fax numbers

Subscribers may fax requests for back issues and be invoiced later.

# Summary of Features to be Included in TIA IS-53 Revision A

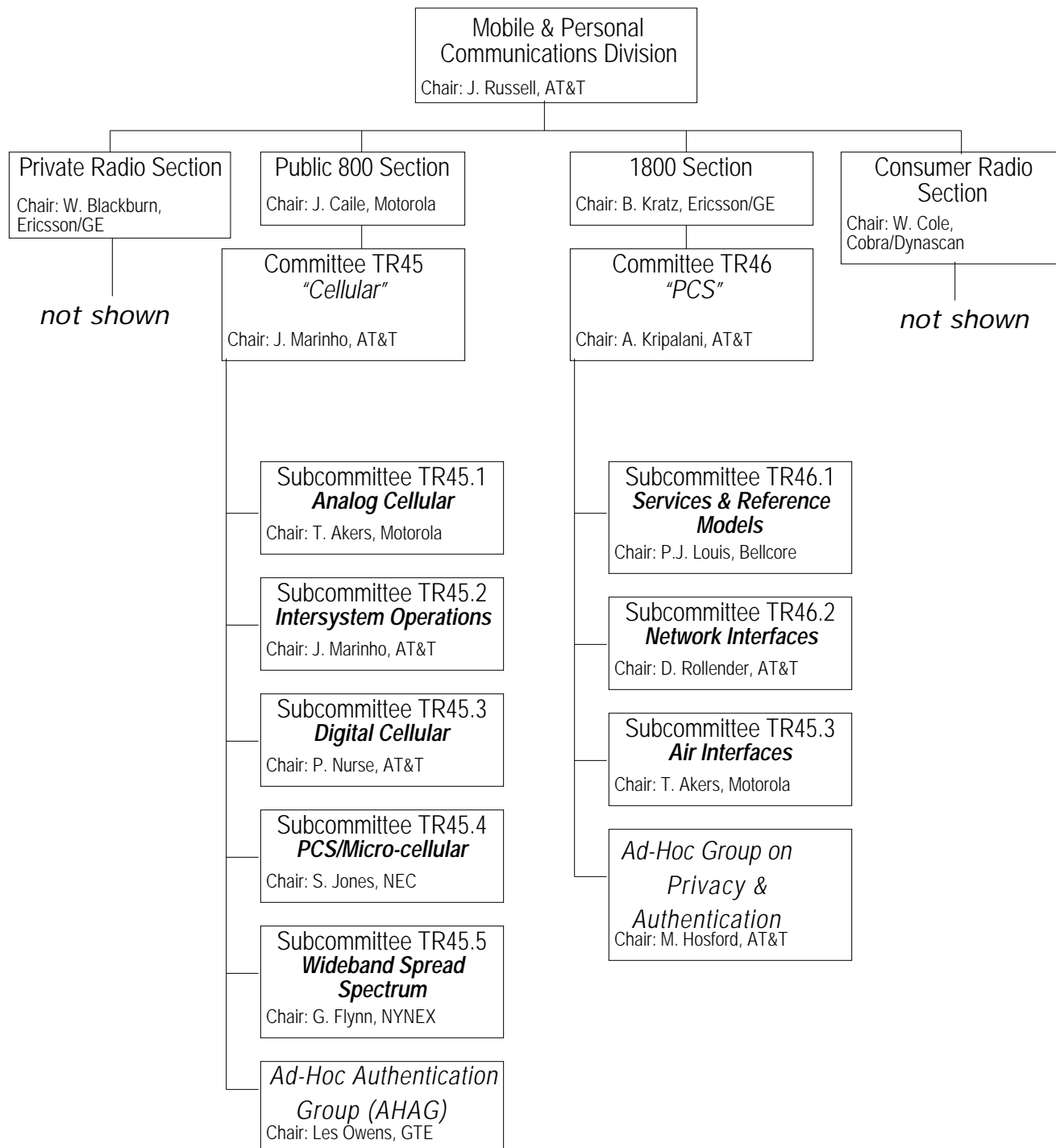
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	Present in IS-53 Rev. 0?	Restricted to ... Terminals	Requires Calling Number ID?	Described in Newsletter Issue
<b>Call Forwarding</b>				
CF-Unconditional	4			Oct/93
CF-Busy	✓			Oct/93
CF-No Answer	✓			Oct/93
<i>CF-Default (Voice Mail)</i>				Oct/93
<i>Selective Call Acceptance</i>			✓	Oct & Nov/93
<b>Multi Party Calling</b>				
Call Waiting	✓			Oct/93
Three Way Calling	✓			Oct/93
Call Transfer				Oct/93
Conference Calling				Oct/93
<b>Incoming Call Control</b>				
Call Delivery				Oct/93
Do Not Disturb				Oct/93
<i>Selective Call Acceptance</i>			✓	Oct & Nov/93
Password Call Acceptance				Dec/93
<b>Calling Number Id</b>				
Calling Number Id Presentation		NAMPS/TDMA/CDMA	✓	Nov/93
Calling Number Id Restriction			✓	Nov/93
<b>Group Calling</b>				
Flexible Alerting (Extension Phone Service)				Nov/93
Mobile Access Hunting				Nov/93
<b>Data Services</b>				
Short Message Service		NAMPS/TDMA/CDMA		Dec/93
<b>Enhanced Voice Services</b>				
Preferred Language Service				Nov/93
Voice Privacy		TDMA/CDMA		Nov/93
<b>Voice Mail</b>				
Voice Mail Access				Dec/93
Message Waiting Notification				Nov/93
... enhanced		NAMPS/TDMA/CDMA		Nov/93
<i>CF-Default (Voice Mail)</i>				Oct/93
<b>Security</b>				
Personal Identification Number				Dec/93
<b>Others</b>				
Priority Access & Channel Assignment				Nov/93
Remote Feature Control				Nov/93
<b>Note: Features in italics are listed in more than one category.</b>				

# Structure of TIA Mobile & Personal Communications Committees

## *Cellular Networking Perspectives*

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# Status of IS-41 Rev. A Implementation

# Cellular Networking Perspectives

Vendor1	Vendor2	Status	Completion	HVD	D/L	Location
Astronet	AT&T	Commercial	06/93	-VD	X	Baltimore/Washington (BAM)
	GTE TSI	Commercial	06/93	-VD	X	Baltimore/Washington (BAM)
	NTI	<b>Field Trial</b>	<b>10/93</b>	<b>-VD</b>	<b>X</b>	<b>Texas</b>
AT&T	Astronet	Commercial	06/93	-VD	X	Baltimore/Washington (BAM)
	<b>EDS</b>	<b>Lab Trial</b>		<b>-V-</b>	<b>XS</b>	
	Ericsson	Commercial	12/92	HVD	S	Salt Lake City (McCaw)
	GTE TSI	Commercial	06/92	-V-	X	Baltimore/Washington (BAM)
		Commercial	06/93	--D	X	Baltimore/Washington (BAM)
		Commercial	02/93	-V-	S	Tampa, Fresno
		Field Trial	02/93	--D	S	Tampa, Fresno
	Motorola	Commercial	05/92	HVD	X	Fresno (GTE/Contel)
		Commercial	10/92	HVD	S	(McCaw)
	NTI	Commercial	05/92	HVD	X	Detroit (Ameritech)
		Commercial		-VD	S	(McCaw)
EDS	<b>AT&amp;T</b>	<b>Lab Trial</b>		<b>-V-</b>	<b>XS</b>	
	<b>Ericsson</b>	<b>Field Trial</b>	<b>11/93</b>	<b>-V-</b>	<b>S</b>	<b>Los Angeles (L.A. Cellular)</b>
	Motorola	Commercial	08/92	-V-	X	Atlanta (PacTel)
	<b>NTI</b>	<b>Lab Trial</b>		<b>-VD</b>	<b>X</b>	<b>Ft. Myers, FL (Palmer)</b>
Ericsson	AT&T	Commercial	12/92	HVD	S	Portland and others (McCaw)
	EDS	Field Trial		-V-	S	Los Angeles (L.A. Cellular)
	Motorola	Commercial	12/92	-VD	S	Stockton and others (McCaw)
		Commercial	07/93	H--	S	Albany
	NTI	Commercial	12/92	HVD	S	Tampa and Minneapolis (McCaw)
GTE TSI	Astronet	Commercial	06/93	-VD	X	Baltimore/Washington (BAM)
	AT&T	Commercial	06/92	-V-	X	Baltimore/Washington (BAM)
		Commercial	06/93	--D	X	Baltimore/Washington (BAM)
		Commercial	02/93	-V-	S	Tampa, Fresno
		Field Trial	02/93	--D	S	Tampa, Fresno
	Ericsson	Planning		-VD	S	Mexico
	Motorola	Commercial	06/93	-VD	X	Toledo
	NTI	Commercial	01/93	-V-	X	Spokane (US West)
		Field Trial	09/92	-VD	S	Greensboro (GTE Mobilnet)
			Commercial	02/93	HVD	X
Motorola	AT&T	Commercial	05/92	HVD	X	Sacramento (PacTel)
		Commercial	10/92	HVD	S	Dallas (McCaw)
	EDS	Commercial	08/92	-V-	X	Los Angeles (PacTel)
	Ericsson	Commercial	12/92	-VD	S	Dallas (McCaw)
		Commercial	07/93	H--	X	Syracuse
	GTE TSI	Commercial	06/93	-VD	X	Toledo
	<b>NEC</b>	<b>Field Trial</b>	<b>4Q/93</b>	<b>HVD</b>	<b>X</b>	<b>Brazil</b>
	NTI	Commercial		-VD	S	(McCaw)
	Commercial	02/93	HVD	X	Philadelphia(Metrophone)	
NEC	AT&T	Lab Test	06/93	HVD	X	Brazil (Telebras)
	<b>Motorola</b>	<b>Field Trial</b>	<b>4Q/93</b>	<b>HVD</b>	<b>X</b>	<b>Brazil</b>
NTI	<b>Astronet</b>	<b>Field Trial</b>	<b>10/93</b>	<b>-VD</b>	<b>X</b>	<b>Texas</b>
	AT&T	Commercial	05/92	HVD	X	Windsor(Bell Cellular)
		Commercial		-VD	S	(McCaw)
	Ericsson	Commercial	12/92	HVD	S	Ft. Myers (ICN/Palmer)
	<b>EDS</b>	<b>Lab Trial</b>		<b>-VD</b>	<b>X</b>	<b>Ft. Myers, FL (Palmer)</b>
	GTE TSI	Commercial	01/93	-V-	X	Spokane (US West)
		Field Trial	09/92	-VD	S	Greensboro (GTE Mobilnet)
	Motorola	Commercial		-VD	S	(McCaw)
	Commercial	02/93	HVD	X	Allentown(Vanguard)	

Explanation:

Status:

Completion:

HVD:

D/L:

Location:

Development, Planning, Lab Trial, Field Trial or Commercial.

Date of actual or expected completion of listed phase of testing.

Type of Test ("H" - Includes Handoff, "V" - Includes Validation, "D" - Includes Call Delivery).

Datalink Protocol (X - X.25 Level 2, S - ANSI SS7 or C - CCITT #7).

Location of Vendor1 equipment and carrier (usually listed for first trial only).