

# Cellular Networking Perspectives

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Vol. 4, No. 7 July, 1995

## In This Issue ...

### ***CTIA IMSI Forum*** p. 1

The CTIA is holding a forum to prompt the development of rules for IMSI allocation in the USA.

### ***Standards Updates*** p. 1

### ***Coming ... Air Interfaces*** p. 1

Starting with the August issue will be a series of articles on TDMA and CDMA digital air interface standards.

### ***IS-41 Trial Assymetry*** p. 1

Why our reports of IS-41 trials are never quite symmetrical.

### ***TR-46 Standards Update*** p. 2

A list of projects in the TR-46 PCS standards committee.

### ***TR-45.2 Standards Update*** p. 2

A list of projects in the TR-46 PCS standards committee.

### ***Status of IS-41 Rev. B Implementation*** p. 3

An updated list of IS-41 Rev. B trials between different vendor's equipment. This report shows notable activity by Plexsys and Celcore.

### ***TIA TR-45.2 Project Status Report*** p. 4

### ***TIA TR-45.4 Subcommittee Public 800 MHz PCS/Microsystems Project Status Report*** p. 5

Projects in TR-45.4, best known for the standardization of a cellular "A" interface (BS to MSC).

**Next issue: August 11, 1995**

## CTIA IMSI Forum

The CTIA is holding a forum to "discuss and define the administrative guidelines and to create an allocation plan for International Mobile Station Identifiers (IMSI)" on July 18-19, 1995 at the J.W. Marriott Hotel in Washington DC. For more information contact Donna Cutshaw of the CTIA at 202•736•3224.

The benefits of using the internationally accepted standard IMSI for mobile identification, instead of MIN, have been described in the December, 1994 and June, 1995 issues of *Cellular Networking Perspectives*.◊

## Standards Updates

In this issue, for the first time, we are reporting on the status of projects in the TIA TR-46 committee responsible for 1800-2200 MHz standards as well on the projects of the TR-45.2 subcommittee on 800 MHz network standards. While there is much activity in TR-46, most of it is oriented toward adopting and modifying cellular standards, and relatively little towards new standards development.

## Coming ... Air Interfaces

Starting in the August, 1995 issue we will be branching out to discuss new advances in wireless air interfaces, specifically IS-136 (TDMA) and IS-95 (CDMA). We will provide concise, non-technical summaries using our traditional network perspective.◊

## IS-41 Trial Assymetry

Many people have asked us why our reports on the status of IS-41 field trials are assymetrical. For example, one company will report a lab trial while their partner reports commercial service. This is due to differences in how companies determine the status of their own projects and the willingness of different carriers to release information. Also, in some cases only one vendor is actually involved in a field trial, when the carrier feels that the other vendor's implementation has been field-proven.◊

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## TR-46 Standards Update

**S**tandards activities for 1800 - 2200 MHz licensed PCS are progressing in TR-46 at a frenetic pace. In some cases this is resulting in new standards and in others, in the adoption of cellular standards for 1800 MHz. TR-46 projects are listed in order of Project Number (PN):

**PCS Requirements (PN-3167)**• An internal document containing systems requirements for networks, including PCS operations, administration and performance.

**Network Reference Model (PN-3169)**• An internal document describing functional elements and interfaces in a PCS network.

**Interconnection (PN-3211)**• A project that concluded by endorsing IS-93, developed by TR-45.2.

**MAP Interworking (PN-3212)**• An attempt to provide a seamless binding of the IS-41 and DCS-1900 inter-system operations. The focus of much work in TR-46.2 WG I.

**"A" Interface Requirements (PN-3307)**• A completed internal document providing Stage I requirements for the Base Station to Switch interface.

**Service Descriptions (IS-104-A, PN-3369)**• A project to go beyond IS-53 and add PCS specific features and services.

**IS-41 MAP (TSB-68, PN-3341)**• Approved for publication, this TSB adopts IS-41 as a PCS MAP, likely to be used with IS-136 TDMA and IS-95 CDMA PCS systems.

**DCS 1900 MAP (IS-652, PN-3342)**• In press as IS-652, this document describes inter-system operations for DCS 1900 ("GSM") networks.

**SS7 "A" Interface (IS-651, PN-3343)**• In press as IS-652, this standard describes a BS to Switch interface for DCS1900 and CDMA systems.

**ISDN "A" Interface (IS-653, PN-3344)**• In ballot. This standard describes an ISDN based "A" interface.

**SS7 Signaling Network Routing (PN-3513)**• SS7 global title

translation types (GTT) for use in DCS-1900 MAP. The E.212 (IMSI) based GTT has been approved by T1S1, but E.164 (international directory number) has been rejected.

**DCS 1900 MAP, Revised (IS-652-A, PN-3567)**• A work plan and content list have been approved for this revision to the DCS 1900 MAP.

**Frame-Relay "A" Interface (PN-3568)**• A scope, charter, work-plan and contents list have been approved by the group developing a frame relay interface between a BS and PCS Switching Center (PCSC). Frame relay packetizes voice and thus may allow inter-mixed voice and data.

**Network Reference Model (PN-3169)**• Enhancements to the model defined in PN-3169 to accommodate Intelligent Network (IN) concepts, OA&M, 911 and advanced services..

**Privacy & Authentication**• Internal, controlled distribution document set.

## TR-45.2 Standards Update

**E**ngineers in the cellular networking industry are breathing a sigh of relief now that the July 5, 1995 deadline for comments on all 1,407 pages in IS-41 Revision C has passed, for better or for worse.

The status of each major outstanding TR-45.2 project is listed below, in approximate order of completion:

**Cellular Dialing Plan (IS-52 Rev. A, PN-3544)** • ANSI Ballot Completes August, 1995.

**Subscriber Features (IS-53 Rev. A, PN-3545)** • In ANSI Ballot preparation.

**IS-41 Revision C (PN-2991)** • Ballot responses were due back by July 5, 1995.

**International Applications (TSB-29 Rev. B, PN-3173)** • TR-45.2 WG VI is studying the implementation of E.212 mobile identification, international SS7 global title translation requirements and other issues, for incorporation in TSB-29 Revision B, scheduled for ballot in January, 1996.

**Multiple HLR Queries (PN-3528)** • This project will study the requirements for resolving the home system associa-

ted with an ambiguous MIN through multiple queries to candidate HLRs. Currently, this project is scheduled for completion in September, 1995.

**Online Call Record Transfer (IS-124 Rev. A, PN-3293)** • Undergoing revisions, with a ballot scheduled for 1Q'95.

**Subscriber Features (IS-53 Rev. B, PN-3362)** • Task groups are developing Stage I descriptions of the 9 CTIA top priority features. Ballot is scheduled for January, 1996.

**IS-41 Rev. D (PN Pending)**• Task groups will develop Stage II and III descriptions of features and capabilities. Ballot is scheduled for January, 1996.

**Interconnection (IS-93 Rev. A, PN-3295)** • Balloting is scheduled to start in November, 1995. No changes have yet been proposed.

**Emergency Services (PN-3581)** • A new task group is studying the changes to IS-41 and other network standards to support enhanced wireless emergency services (i.e. 9-1-1).

**Law Enforcement Intercept (PN-3580)** • A new task group is studying the changes to network standards to support US law enforcement requirements for lawfully authorized interception of cellular phone calls.

**Wireless Intelligent Network (PN pending)** • A new task group is studying changes to network standards to support the wireless intelligent network (WIN).

**Network Support for CDMA (PN pending)** • A new task group is studying changes to network standards to support the features of the IS-95-A second generation CDMA air interface standard.

**Network Support for TDMA (PN-3579)** • A new task group is studying changes to network standards to support the features of the IS-136 standard for a TDMA air interface incorporating the so-called Digital Control Channel.

**CDMA/TDMA Data Support (no PN)** • This revived task group is developing modifications to IS-41 required to support digital cellular asynchronous fax and data services.◊

# Status of IS-41 Rev. B Implementation

# Cellular Networking Perspectives

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Vendor1	Vendor2	Status	Date	Type	Location
Alcatel SEL	Astronet*	Commercial	08/94	H V D S	Mobile, Alabama (BellSouth)
	AT&T	Commercial	03/95	V D S	Orlando, Florida (BellSouth)
		Field Trial	1Q'95	H+	Mobile, Alabama (BellSouth)
	EDS PC	Commercial	08/94	V D S	Mobile, Alabama (BellSouth)
	GTE TSI	Commercial	08/94	V D S	Mobile, Alabama (BellSouth)
	Motorola	Commercial	2Q'95	V D S	Jacksonville, Florida (BellSouth)
		Field Trial	1Q'95	H	Orlando, Florida (BellSouth)
	Nortel*	Field Trial	2Q'95	H V D S	Mobile, Alabama (BellSouth)
Astronet		Development			
AT&T	Alcatel SEL	Field Trial	03/95	H+V D S	Florida (BellSouth)
	GTE TSI	Planning		V DXS	Location not announced (BAM)
	NEC	Commercial		H V D S	Brazil
	Nortel	Planning		H+V DX T	location not announced
Celcore	Alcatel SEL	Lab Trial	05/95	H V D S	Yorkville, TN RSA
	AT&T	Lab Trial	03/95	V DX	St. Louis, Missouri (SWBMS)
	Ericsson	Lab Trial	06/95	V DX	Chicago (Cellular One)
	GTE TSI*	Field Trial	06/95	V D S	Yorkville, TN RSA
EDS PC	Alcatel SEL	Commercial	08/94	V D S	Mobile, Alabama (BellSouth)
	Ericsson	Planning		V X	location not announced
Ericsson	EDS PC	Planning		V X	location not announced
	Motorola	Field Trial		H V D S	location not announced
GTE TSI	Alcatel SEL	Commercial	08/94	V D S	Mobile, Alabama (BellSouth)
	AT&T	Lab Trial	TBD	V DXS	Location not announced (BAM)
Motorola	Alcatel SEL	Commercial	2Q'95	H V D S	Orlando (BellSouth)
	Astronet*	Commercial	4Q'94	V DX	Several locations
	AT&T*	Commercial		V D S	Several locations
	EDS PC*	Commercial		V X	Dedham, MA
	Ericsson*	Commercial		V D S	Piscataway, NJ (Comcast)
	GTE TSI*	Commercial		V DX	Orlando, Florida
	NEC	Commercial		V D S	Brazil
	Nortel (MTX)*	Commercial		H V DX	Denver, CO
Nortel(800CM)*	Commercial		V DX	Raleigh, NC	
NEC	AT&T	Commercial		H V D S	Brazil
	Motorola	Commercial		V D S	Brazil
Nortel	AT&T	Lab Trial	TBD	H V DX	Windsor (Bell Mobility)
	NEC	Commercial	2Q'94	H V D S	Brazil
Plexsys	AT&T	Lab Trial	3Q'95	V D	not announced
	Ericsson	Lab Trial	3Q'95	V D S	Sao Paulo, Brazil
	GTE TSI*	Commercial	2Q'95	V DX	San Maarten(V) / Tennessee(D)
	Motorola	Field Trial	2Q'95	V D	not announced
	Nortel	Field Trial	3Q'95	V D	Tennessee (New Wave)

Explanation: \* Other vendor is using IS-41 Rev. A with TSB-55 for compatibility.

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

Type: Type of test:

H Includes handoff forward and back (+ indicates use of path minimization and/or flash handling)

V Includes validation. A Includes authentication (TSB-51) D Includes call delivery.

X X.25 datalink protocol. S ANSI SS7 datalink. C CCITT SS7 datalink.

T TDMA (IS-54) mobiles. W CDMA (IS-95) digital mobiles.

# TIA TR-45.2 Project Status Report

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### Superseded Interim Standards and TSBs

<b>IS/TSB</b>	<b>Description</b>	<b>Published</b>
IS-41-0	Cellular Radiotelecommunications Inter-System Operations	02/88
IS-41-A	Cellular Radiotelecommunications Inter-System Operations	01/91
IS-52-0	Cellular Subscriber Dialing Plan and Service Codes	11/89
IS-53-0	Cellular Features Description	09/91
TSB-27	IS-41 Application Notes (never published, date is when released to WG I)	07/89
TSB-56-0	Application Level Testing for IS-41 Rev. A, IS-53 Rev. 0	03/93

### ANSI Standards

<b>SP-</b>	<b>ANSI #</b>	<b>TIA IS-</b>	<b>Subject</b>	<b>Status</b>
<b>3544</b>		<b>IS-52-A</b>	<b>Dialing Plan</b>	<b>Ballot due 08/95</b>
<b>3545</b>		<b>IS-53-A</b>	<b>Features</b>	<b>Ballot preparation</b>
<b>n/a</b>		<b>IS-41-C</b>	<b>Intersystem Operations</b>	<b>SP applied for</b>

### Published EIA/TIA Interim Standards

<b>IS</b>	<b>Description</b>	<b>Published</b>
IS-41-B	Cellular Radiotelecommunications Inter-System Operations	12/91
IS-52-A	Uniform Dialing Procedures for use in Cellular Radiotelephone Systems	in press
<b>IS-53-A</b>	<b>Cellular Features Description</b>	<b>in press</b>
IS-93-0	Ai and Di Interfaces Standard (PSTN/MSC)	10/93
IS-124-0	Cellular Inter-System Non-Signaling Data Communications	09/93

### Published Telecommunications Systems Bulletins (TSBs)

<b>TSB</b>	<b>Description</b>	<b>WG</b>	<b>Published</b>
TSB-29-A	International Implementation of Cellular Systems Compliant with TIA-553	VI	09/92
TSB-41	Technical Notes for IS-41 Revision B	I	11/94
TSB-51	Inter-System Authentication, Signaling Message Encryption and Voice Privacy	I	02/93
TSB-55	IS-41 Rev. A/B Forward Compatibility	I	05/94
TSB-56-A	Application Level Testing for IS-41 Rev. B, IS-53 Rev. 0 and TSB-51	II	06/94
TSB-64	Wideband Spread Spectrum Intersystem Operations	I	02/94
TSB-65	Mobile Border System Problems	I	04/94

### Projects in Ballot Process (PN = TIA Project Number)

<b>PN</b>	<b>Title</b>	<b>Editor</b>	<b>WG</b>	<b>IS/TSB</b>
<b>2991</b>	<b>Cellular Radio Telecommunications Intersystem Operations</b> <i>(Ballot comments due July 5, 1995)</i>	<b>Terry Watts</b>	<b>I</b>	<b>IS-41-C</b>

# TR-45.2 Report, cont'd

## Active TR45.2 Projects (PN = TIA Project Number)

PN	Title	Editor/Chair	WG	IS/TSB
3173	International Implementation of Cellular Radiotelephone	Steve Jones	VI	TSB-29-B
3293	Cellular Inter-System Non-Signaling Data Communications	Kirk Carlson	IV	IS-124-A
3295	Ai and Di Interfaces Standard		VII	IS-93-A
3362	Cellular Features Description (Rev. B)	Terry Watts	I	IS-53-B
<b>3528</b>	<b>Multiple HLR Query ("Double Dipping")</b>	<b>Terry Jacobson</b>	<b>VI</b>	<b>n/a</b>
<b>3579</b>	<b>IS-41 Support for IS-136 (advanced TDMA)</b>	<b>ch: Peter Musgrove</b>	<b>II</b>	<b>IS-41-D</b>
<b>3580</b>	<b>Law Enforcement Intercept Requirements</b>	<b>ch: Peter Musgrove</b>	<b>0</b>	<b>IS-41-D</b>
<b>3581</b>	<b>Enhanced Wireless 9-1-1 Emergency Services</b>	<b>ch: Jeff Crollick</b>	<b>0</b>	<b>IS-41-D</b>
n/a	Cellular Radio Telecommunications Intersystem Operations Systems Compliant with ANSI/EIA/TIA-553	Terry Watts	III	IS-41-D
n/a	<b>Data Services for Digital Cellular</b>	<b>ch: Michel Houde</b>	<b>II</b>	<b>IS-41-D</b>
n/a	<b>IS-41 Support for IS-95-A (advanced CDMA)</b>	<b>ch: Sam Broyles</b>	<b>II</b>	<b>IS-41-D</b>
n/a	<b>Wireless Intelligent Network</b>	<b>ch: Huel Halliburton</b>	<b>II</b>	<b>IS-41-D</b>

## TIA TR-45.4 Subcommittee Public 800 MHz PCS/Microsystems Project Status Report

## *Cellular Networking Perspectives*

### Published Documents

#	Description	WG	Published
<b>EIA/TIA-634</b>	<b>MSC-BS "A" Interface Standard</b>	<b>II</b>	<b>in press</b>
IS-94	Mobile Station - Land Station Compatibility Specification for Analog Cellular Auxiliary PCS (CAPCS)	III	05/94
<b>TSB-104</b>	<b>PCS Service Description</b>	<b>I</b>	<b>06/94</b>

### Completed Internal Documents

PN	Description	WG	Editor
3142	Cellular Microcell/Microsystems Requirements Document	III	Steve Jones
3296	MSC-BS Interface (A-Interface) Requirements for Public 800 MHz	II	Mike Burke

### Active TR45.4 Projects (PN=TIA Project Number)

PN	Description	Editor	WG	IS/TSB
3158	Microsystems (A2 Interface)	Steve Jones	III	<b>cancelled</b>
3277	Cellular Microcell/Microsystems Requirements Document	Steve Jones	III	<b>cancelled</b>
<b>3539</b>	<b>MSC-BS Interface (A-Interface) Standard</b>		<b>II</b>	<b>IS-634-A</b>
n/a	<b>Frame Relay Based "A" Interface</b>		<b>II</b>	<b>IS-634-A/B</b>