

2009-2010

STANDARDS & TECHNOLOGY ANNUAL REPORT

SETTING THE STANDARDS
FOR EMERGING TECHNOLOGIES



TIA is accredited by the American National Standards Institute (ANSI) to develop voluntary industry standards for the information and communications technology (ICT) industry

tiaonline.org

TIA STAFF

EXECUTIVE

Grant E. Seiffert
President
+1.703.907.7701
gseiffert@tiaonline.org

Andrew Kurtzman
Vice President &
Corporate Counsel
+1.703.907.7413
akurtzman@tiaonline.org

Mary Piper Waters
Director of Operations & Executive
Assistant to the President
+1.703.907.7701
mwaters@tiaonline.org

GOVERNMENT AFFAIRS

Danielle Coffey
Vice President, Government Affairs
+1.202.346.3243
dc Coffey@tiaonline.org

Nick Fetchko
Director, International &
Government Affairs
+1.202.342.3246
nfetchko@tiaonline.org

Carolyn Holmes Lee
Director, Legislative &
Government Affairs
+1.202.346.3245
clee@tiaonline.org

Anne Pizzato
Manager, International and
Government Affairs
Phone: +1.202.346.3247
apizzato@tiaonline.org

Rebecca Schwartz
Director, Regulatory &
Government Affairs
+1.202.346.3248
rschwartz@tiaonline.org

Patrick Sullivan
Director, Technical &
Government Affairs
+1.202.346.3244
psullivan@tiaonline.org

Tamara Williams
Staff Assistant
+1.202.346.3240
twilliams@tiaonline.org

TECHNOLOGY & STANDARDS

Cheryl Blum
Vice President,
Technology & Business
Development
+1.703.907.7436
cblum@tiaonline.org

Henry Cuschieri
Associate Vice President,
Technology & Business
Development
+1.703.907.7497
hcuschieri@tiaonline.org

Stephanie Montgomery
Director, Technology & Business
Development
+1.703.907.7735
smontgomery@tiaonline.org

John Derr
Director, Technical Programs
+1.703.907.7791
jderr@tiaonline.org

Victoria Mitchell
Director, Standards Programs
+1.703.907.7779
vmitchell@tiaonline.org

Ronda Coulter
Committee Management
Specialist
+1.703.907.7974
rcoulter@tiaonline.org

Andrew Dryden
Staff Director, International
Standards Programs
+1.703.907.7702
adryden@tiaonline.org

Teesha Jenkins
Committee Management
Specialist
+1.703.907.7706
tjenkins@tiaonline.org

Florence Otieno
Manager, International
Standards Programs
+1.703.907.7556
fotieno@tiaonline.org

ENVIRONMENT, NETWORKING & INTELLIGENCE

Taly Walsh
Vice President, Sustainability,
Networking and Intelligence
+1.703.907.7744
twalsh@tiaonline.org

Florence Sumaray
Director, Marketing
+1.703.907.7471
fsumaray@tiaonline.org

Jeff Hannah
Environmental Program Manager
+1.703.907.7582
jhannah@tiaonline.org

MARKETING, MEMBERSHIP & BUSINESS DEVELOPMENT

John Jacobs
Vice President,
Marketing and Sales
+1.703.907.7747
jjacobs@tiaonline.org

Vacant
Director, Member Relations
+1.703.907.7713

Mike Snyder
Director, Public Relations
+1.703.907.7723
msnyder@tiaonline.org

Brian West
Director, Interactive Media
+1.703.907.7493
bwest@tiaonline.org

Bruce Degn
Director, Member
Recruitment and Sales
+1.703.907.7000
bdegn@tiaonline.org

OPERATIONS

Mary Piper Waters
Director of Operations & Executive
Assistant to the President
+1.703.907.7701
mwaters@tiaonline.org

Bisrat Bainesagn
Senior Network Manager
+1.703.907.7718
bbainesagn@tiaonline.org

Lida Berlejung
Controller
+1.703.907.7720
lberlejung@tiaonline.org

Matthew Langhan
Manager, Network and Internet
Services – Standards Programs
+1.703.907.7482
mlanghan@tiaonline.org

Lisa Maghraoui
Director, Human Resources
+1.703.907.7716
lmagraoui@tiaonline.org

Tuan Nguyen
Senior Web Developer
+1.703.907.7738
tnguyen@tiaonline.org

Lois Parks
Manager, Member Relations
+1.703.907.7739
lparks@tiaonline.org

Jeffrey West
Senior Manager, Network &
Internet Services – Standards
Programs
+1.703.907.7730
jwest@tiaonline.org

Tony Zarafshar
Senior Manager, IT Services
+1.703.907.7775
tzarafshar@tiaonline.org

ABOUT TIA

The Telecommunications Industry Association (TIA) represents the global information and communications technology (ICT) industry through standards development, advocacy, tradeshow, business opportunities, market intelligence and world-wide environmental regulatory analysis. Since 1924, TIA has been enhancing the business environment for broadband, mobile wireless, information technology, networks, cable, satellite and unified communications. Members' products and services empower communications in every industry and market, including healthcare, education, security, public safety, transportation, government, the military, the environment and entertainment.

TABLE OF CONTENTS

MESSAGES FROM THE TIA LEADERSHIP

Letter from the Chairman of the Board and TIA's President.....	3
Letter from the Technical Committee Chairman	5

ENGINEERING COMMITTEE REPORTS

TR-8 Mobile and Personal Private Radio Standards	6
TR-14 Point-to-Point Communications Systems	10
TR-30 Multi-Media Access, Protocols and Interfaces.....	12
TR-34 Satellite Equipment and Systems.....	15
TR-41 User Premises Telecommunications Requirements.....	17
TR-42 UserPremises Telecommunications Cabling	21
TR-45 Mobile and Personal Communications Systems.....	26
TR-47 Terrestrial Mobile Multimedia Multicast (TM3)	34
TR-48 Vehicular Telematics	36
TR-49 Healthcare ICT	39
NEW TR-50 Smart Device Communications	41

TIA GLOBAL INVOLVEMENT

Map of the Worldwide Reach of TIA Standards	30-31
ISO/IEC JTC 1/SC 25 Interconnection of Information Technology Equipment	44
IEC TC 46 Cables, Wires, Waveguides, R.F. Connectors, R.F. and Microwave Passive Components and Accessories	47
IEC TC 76 Optical Radiation Safety and Laser Equipment	50
IEC TC 86 Fibre Optics.....	53
ISO TC 204 Intelligent Transport Systems.....	55
3GPP2 Third Generation Partnership Project 2	58
TIA Standards Development Program Participants.....	60

TIA BOARD MEMBERS

ACS*	Microsoft
ADTRAN	Motorola, Inc.
Alcatel-Lucent	Nokia Siemens Networks
ANDA Networks*	OneChip Photonics
AttivaCorp*	Openwave*
Bechtel Communications, Inc.	Panasonic Computer Solutions Co.
Cisco Systems*	Powerwave Technologies
Corning Incorporated**	Qualcomm Inc.
Ericsson, Inc.	Research In Motion*
FAL Associates**	Sumitomo Electric Lightwave
GENBAND, Inc.	Telcordia Technologies**
Henkels & McCoy*	Tellabs*
ILS Technology*	Tyco Electronics*
Innovative Capital Ventures, Inc.	Ulticom*
Intel Corporation	Walker & Associates
Intersect Inc.	WirefreeComm Inc.
LGE	VNL*

*Executive Committee Member

**Advisor to the Board





TIA and IHS Growing the Partnership

Your project's success is our passion. As your project partner, IHS provides TIA standards along with access to the largest selection of standards and specifications available. One-stop shopping is available on our webstore, global.ihs.com, or by calling any of our regional offices around the world. Search over one million of the most popular and important electronically available standards and specifications. Hardcopy or electronic formats, online access or custom collections, the TIA/IHS partnership delivers.

As your critical information provider, IHS adds value with:

- One-stop shopping – We provide access to more than one million technical documents from over 370 standards organizations, including TIA
- The largest collection of historical standards in the industry
- State-of-the-art standards management tools
- Free DocAlert service
- Standards Order Service – Automatically receive the latest revision of any standard or specification you need
- Free Telecom eNewsletter
- Full Research Center – Step away from the computer and let our team of researchers locate and procure the hard-to-find standard

IHS Info Centers are strategically located worldwide.

Each office can process your order or inquiry in the local language, during local working hours and in local currency. IHS offers the security, accuracy and service you demand at your desktop.

The **TIA/IHS partnership** proves its dedication to telecommunications professionals everywhere by providing superior quality standards, management tools, dependability and dedicated service.

To order call:

USA/Canada: **800 854 7179**
International: **+1 303 397 7956**
Fax: **+1 303 397 2740**
Web: **global.ihs.com**

(TIA Members receive a 25% discount on TIA Standards)



The Source
for Critical Information and Insight™

HEALTHCARE ICT ... VEHICULAR TELEMATICS AND INTELLIGENT TRANSPORTATION

... smart device communications and machine-to-machine connections ... these are some of the most timely and recent technological areas on which TIA is now focusing with our newest standards committees. For many decades, the association has led the way in the wireless, fiber optics and user premises arenas — always on the cutting edge and environmentally responsible — with world-class credibility as an ANSI-accredited standards developing organization (SDO).

This 2009–2010 edition of TIA's *Standards and Technology Annual Report* (STAR) chronicles in some detail our very measurable progress during 2009 and the beginning of the new year. In addition, STAR serves as a tribute to TIA's more than 70 committees, subcommittees, working groups and Technical Advisory Groups (TAGs), as well as the Third Generation Partnership Project 2 (3GPP2) — together comprised of 1,100+ volunteers from our association's members and non-members.

These experts are working to foster global technical compatibility, interoperability, and connectivity of products and services. This report is also a tribute to those who volunteer on behalf of TIA to administer nearly two dozen international Secretariats and U.S. TAGs to international committees. Their collective productivity is immense.

In fact, during recent decades TIA has issued more than 3,500 standards and various other technical documents used throughout the world. We work closely with many SDOs in other regions and in other countries on behalf of consumers and the information and communications technology industry.

TIA's Board of Directors, member companies and staff offer our sincere "Thank You!" to our SDO volunteers for all of their very insightful and plentiful work serving the ICT industry and the general public.

Sincerely,



Shawn Osborne
TIA Chairman



Grant E. Seiffert
TIA President



Shawn Osborne
Ulticom
TIA Chairman



Grant E. Seiffert
TIA President



CONNECTIVITY INNOVATION LEADERSHIP RESPONSIBILITY

**These are the
Telecommunications
Industry Association's
core values. TIA's
mission is to convert
these values into
initiatives that benefit
our members and the
larger global information
and communications
technology industry.**

**Our Values
Mean Business.**

When you join TIA, you gain access, authority and intelligence designed to help you:

- ▶ **Protect your company's interests when standards and policies are being formulated**
- ▶ **Engage peers regularly about market challenges or business opportunities**
- ▶ **Access timely news, information and market intelligence**
- ▶ **Expand your business to overseas markets efficiently and effectively**
- ▶ **Gain a competitive advantage through convergence certification of employees**
- ▶ **Take the lead on green initiatives in the information and communications technology industry**

If you manufacture or supply high-tech equipment, products and services used in communications technologies anywhere in the world, you can not afford not to join TIA!

Companies of all sizes benefit from participating in TIA's Standards, Government, Networking, Market Intelligence and Environmental regulatory and compliance services.

Discover how you can gain a competitive advantage in the broadband economy when leveraging TIA's full range of services by contacting TIA's Membership Department at +1.703.907.7713 or membership@tiaonline.org.

**TELECOMMUNICATIONS
INDUSTRY ASSOCIATION**



Letter from the TIA Technical Committee Chairman

THIS IS MY THIRD YEAR OF SERVING YOU AS CHAIRMAN OF TIA'S TECHNICAL

Committee. It has been another extremely rewarding year and one of great admiration for the work of the Technical Engineering Committees (ECs). In 2009, these committees produced almost 150 technical documents in support of ICT, in areas such as cabling and wiring, data centers, tower structures, user premises equipment, satellite, public safety, wireless communications, mobile TV, telematics and healthcare information technology. I am also pleased to announce the formation of our newest Engineering Committee for Smart Device Communications, TR-50. "Smart Communications" is turning out to be one of the fastest growing areas touching many industries and, from a personal level, one that will be an agent of change in the way people live their lives.

TIA is fully accredited by the American National Standards Institute and the more than 1,000 active TIA and TIA-produced American National standards available today are recognized and deployed worldwide. On the international front, TIA continues its involvement, participation, and active roles as secretariat of many International Groups and US Technical Advisory Groups (TAGs), in the International Electrotechnical Commission (IEC) and the International Organization for Standardization (ISO). TIA administers four International Secretariats and 16 US TAGs to international committees.

TIA is also an active partner and the Secretariat, for over 10 years, to the Third Generation Partnership Project 2 (3GPP2). In terms of partnerships, TIA is also a long-standing Standards Developing Organization (SDO) in the Global Standards Collaboration (GSC), a forum comprised of SDOs from regions all over the world (Canada, China, Europe, Japan, Korea) that meet on a 12–15 month cycle in the interest and spirit of collaboration and information sharing and to foster worldwide coordination in this world of converging technologies.

During a Technical Committee meeting, TIA's president, Grant Seiffert, held a Standards Symposium, a brainstorming session to explore new areas of standardization in ICT of priority to our members and to potential new members. One of the results of this symposium was to place special focus on smart communications and the environment and sustainability. As we move forward with an ongoing focus on new and emerging technologies important to the business directions and initiatives of our members, the Technical Committee formed the Emerging Technologies Subcommittee to explore and take "deep dives" into the relevant areas.

Although it has been a difficult year with the current economic climate, the commitment of our members to TIA standards is strong, and I would like to extend my sincere appreciation to the many companies that volunteer their top technical engineers and professionals, and the hundreds of hours they dedicate, to the development of ICT standards.

Sincerely,



Charles Kenmore
TIA Technical Committee Chairman



Charles Kenmore
ANDA Networks
*TIA Technical
Committee
Chairman*

TR-8: Mobile and Personal Private Radio Standards

ENGINEERING COMMITTEE TR-8 FORMULATES AND MAINTAINS STANDARDS FOR

private radio communications systems and equipment for both voice and data applications. The TR-8 committee addresses all technical matters for systems and services, including definitions, interoperability, compatibility and compliance requirements. The types of systems addressed by these standards include business and industrial dispatch applications, as well as public safety applications such as police, ambulance and fire fighting.



TR-8 develops Project 25 standards, which provide digital communication systems for public safety and first responder applications.

SIGNIFICANT ACCOMPLISHMENTS

TR-8 traces its roots to the early days of use of the two-way land mobile radio. Thus, it is the oldest of the TIA standards committees. Over the years, the committee has been responsible for the formulation of standards that apply to all forms of private land mobile radio. Originally, the standards were for systems that employed analog forms of modulation and included such elements as radio performance, signaling systems, antennas, and propagation and interference models. In more recent years, standards for digital radio systems have taken on more importance, owing to the need for greater spectral efficiency in communication systems and for interoperability among systems from multiple manufacturers. The standards being developed are crucial for the advanced, mission-critical communications systems of today and in the future. TR-8 continues to play an important role in the development of these standards.

2009 OVERVIEW

The TR-8 committee is responsible for standards relating to Private Land Mobile Radio systems and equipment. The committee is made up of 14 active subcommittees, which formulate standards for many of the technologies involved in private radio systems. The work of these subcommittees covers topics from antennas and propagation to equipment measurement and performance, over-the-air protocols,

and infrastructure wireline interface. Mobile radio communications systems are used in a variety of applications including business and industrial applications, transportation systems, and public safety applications. They can range in complexity from analog frequency-modulated technology to advanced digital radio systems to broadband wireless systems. This equipment is often used in critical applications requiring reliable communications. Therefore, issues of redundancy and reliability are of prime importance. In addition, issues of interoperability among communications systems of different jurisdictions and from different manufacturers are important. The standards created by this committee and its subcommittees are intended to promote reliable and interoperable communications systems.

Much of the work of the committee continues to be the formulation and maturation of standards for Project 25. These are standards created by the Association of Public-Safety Officials International (APCO), the National Association of State Telecommunications Directors (NASTD) and agencies of the federal government. Project 25 standards are developed to provide digital voice and data communications systems suited for public safety and first-responder applications. The current Project 25 standards suite consists of 61 documents: 42 TIA standards, 22 of which are ANSI standards; and 19 Telecommunications Systems Bulletins. Several new areas for standardization include Project Phase II, an extension of the

technology to a two-slot TDMA system. This system results in a radio channel efficiency of one talk path for every 6.25 kHz of spectrum. Several standards for the Inter-Sub-System Interface (ISSI), Console Interface and Fixed Station Interface (FSI) have also been worked on and published. These fixed-network standards round out Project 25 to include wireline interface standards.

The work of TR-8 is unique among the various engineering committees in that there is significant participation by users of the technology as well as manufacturers. In order to encourage such participation, much of the initial standards drafting work is carried out in task groups made up of technology users as well as TIA member organizations. This affords user representatives an equal voice with the manufacturers in the early standards drafting work.

TR-8 and its subcommittees meet quarterly, with many of the subcommittees and working groups having frequent additional teleconference calls and face-to-face working sessions. The 2009 quarterly meetings were held in conjunction with Project 25 committee sessions.

2009 ACTIVITIES

Subcommittee TR-8.1, Equipment Measurement Procedures, is responsible for formulation of standards for measurement methods for radio frequency (RF) transmitter and receiver equipment. During the past year, the subcommittee has been drafting an update to TIA-603-C, *Land Mobile FM or PM Communications Equipment Measurement and Performance Standards*, which was balloted. In addition, the subcommittee balloted an addendum for TIA-102.CAAA-C, *Digital C4FM/CQPSK Transceiver Measurement Methods*, which clarifies the requirements for the fading channel simulator. Drafting work was also begun on the transceiver measurement methods for Project 25 Phase II two-slot TDMA transceivers.

Subcommittee TR-8.3, Encryption, is responsible for standards relating to encryption. Document TIA-102.AAAD-A, *Project 25 Digital Land Mobile Radio Block Encryption Protocol*, was published as an upgrade. Work was also done on an upgrade to the TIA-102.AACA, *Over-the-Air Rekeying (OTAR) Protocol*, standard, which remains in the drafting phase.



Subcommittee TR-8.4, Vocoders, is responsible for standards relating to vocoders. The subcommittee balloted to reaffirm TIA-102.BABA, *Project 25 Vocoder Description*. An addendum to that document was also published describing the half-rate vocoder in annex format. In addition, a measurement methods document, TIA-102.BABG, *Project 25 Enhanced Vocoder Methods of Measurement for Performance*, was approved for publication.

Subcommittee TR-8.5, Signaling and Data Transmission, is responsible for standards relating to data applications. In the past year, the subcommittee published two documents relating to location services: TSB-102.BAJA, *Project 25 Location Services Overview*; and TIA-102.BAJB, *Project 25 Tier 1 Location Services*. Several other documents relating to location services, packet data and radio management are being worked on.

Subcommittee TR-8.6, Equipment Performance Recommendation, is responsible for standards relating to transceiver performance. During the last year, the subcommittee worked in conjunction with TR-8.1 on drafting a revision to TIA-603-C, *Land Mobile FM or PM Communications Equipment Measurement and Performance*

As a result of the work of TR-8 and its 14 subcommittees, first responders can communicate over a variety of communications protocols.

The standards being developed are crucial for advanced mission-critical communications systems of today and in the future.

Standards, which is currently in the ballot process. The subcommittee published TIA-102.CAAB-C, *Land Mobile Radio Transceiver Performance Recommendations Project 25 Digital Radio Technology C4FM/CQPSK Modulation*. In addition, the subcommittee is drafting transceiver performance recommendations for Project 25 two-slot TDMA transceiver equipment.

Subcommittee TR-8.8, Broadband Data Systems, is responsible for standards relating to broadband data systems for use in public safety applications. The subcommittee has remained relatively dormant, owing to a change in direction on broadband data systems by the FCC.

Subcommittee TR-8.10, Trunking and Conventional Control, is responsible for standards relating to trunking systems. Several documents relating to Project 25 trunking systems were published. TIA-102.AABG, *Project 25 Conventional Control Messages*, was published as an upgrade from the previous TSB. Two additional upgrades, TIA-102.AABC-C, *Project 25 Trunking Control Channel Messages*, and TIA-102.AABF-B, *Link Control Word Formats and Messages*, were published.

Subcommittee TR-8.11, Antenna Systems, is responsible for formulation of standards

for antennas and antenna subsystems. The subcommittee published TIA-929-A, *Terrestrial Land Mobile Radio Antenna Systems Standard Formats for Digitized Filter Characteristics*, an upgrade to the document. Five more documents relating to antennas and antenna systems are in the drafting process.

Subcommittee TR-8.12, Two-Slot TDMA Systems, is responsible for formulation of standards for two-slot TDMA systems. Document TIA-102.BBAB, *Project 25 TDMA, Phase 2 Two-Slot TDMA Physical Layer Protocol Specification*, was published. An additional document, TSB-102.BBAA, *Two-Slot TDMA Overview*, has been approved for publication. Drafting work continues on the two-slot TDMA Media Access Control document.

Subcommittee TR-8.15, Common Air Interface, is responsible for formulation of standards for the air interface for Project 25 systems. The subcommittee worked on revisions to two of its Common Air Interface documents, the *Operational Description for Conventional Operation* and *Reserve Values* documents. In addition, TIA-102.BAAA-A, *Project 25 FDMA Common Air Interface*, was approved for reaffirmation.

Subcommittee TR-8.17, Radio Frequency (RF) Exposure, is responsible for standards relating to testing, reporting and labeling issues relating to RF exposure limits. The subcommittee published TSB-92-A, *Report on EME Evaluation for RF Cabinet Emissions under FCC MPE Guidelines*, a revision to the original TSB.

Subcommittee TR-8.18, Wireless Systems Compatibility — Interference and Coverage, deals with issues relating to radio propagation and interference. The subcommittee published TSB-88.2-C, *Wireless Communications Systems — Performance in Noise and Interference Limited Situations — Part 2 — Propagation and Noise*. In addition, document TIA-845-A-2, *Radiowave Propagation — Path Loss — Measurement Presentation Format*, was published. Work is continuing to round out the family of documents in the TSB-88 series dealing with propagation and interference.

Subcommittee TR-8.19, Wireline Systems Interfaces, is responsible for standards for radio system network interfaces. Within the year, the



subcommittee published six documents relating to the Project 25 Inter-RF Sub-System Interface (ISSI). These include TIA-102.BACA-A, *Project 25 Inter-RF Subsystem Interface Messages and Procedures for Voice Services*, including two addenda to the document; TIA-102.CACC, *Project 25 Inter-RF Subsystem Interface Conformance Test Procedures*; TIA-102.BACF, *Project 25 Inter-RF Subsystem Interface (ISSI) Messages and Procedures for Packet Data Services*, and TIA-102.CACD, *Project*

25 – Inter-RF Subsystem Interface – Interoperability Test Procedures for Trunked Systems Involving the ISSI. Work is continuing in the areas of ISSI, Console Interface and Fixed Station Interface.

Subcommittee TR-8.25, Compliance Assessment, is responsible for standards for compliance assessment and interoperability issues. The subcommittee published 11 documents in 2009. These include two test conformance and interoperability test documents, along with nine TSB documents relating to the P25 Compliance Assessment Program.

To find out more about participating in TR-8, please contact Ronda Coulter: rcoulter@tiaonline.org, +1.703.907.7974.

TR-8: MOBILE AND PERSONAL PRIVATE RADIO STANDARDS



CHAIR, TR-8: JOHN OBLAK
EF Johnson Technologies

VICE-CHAIR, TR-8: ALAN WILSON
Harris Corporation

SUBCOMMITTEES

TR-8.1 Equipment Measurement Procedures

CHAIR: John Oblak, *EF Johnson Technologies*

TR-8.3 Encryption

CHAIR: David VanderStaay, *Thales Communications, Inc.*

TR-8.4 Vocoders

CHAIR: Richard Frye, *FRYE-COMM Consulting LLC*

TR-8.5 Signaling and Data Transmission

CHAIR: Jim Eastwood, *Motorola, Inc.*

TR-8.6 Equipment Performance Recommendations

CHAIR: Terry Mansfield, *Motorola, Inc.*

TR-8.8 Broadband Data Systems

CHAIR: John Gough, *Harris Corporation*

TR-8.10 Trunking and Conventional Control

CHAIR: John Lambrou, *Motorola, Inc.*

TR-8.11 Antenna Systems

CHAIR: Ronald Jakubowski, *TX RX Systems, Inc.*

TR-8.12 Two-Slot TDMA Systems

CHAIR: Ernest Hofmeister, *Harris Corporation*

TR-8.15 Common Air Interface

CHAIR: Alan Wilson, *Harris Corporation*

TR-8.17 RF Exposure

CHAIR: Robert Speidel, *Harris Corporation*

TR-8.18 Wireless Systems Compatibility Interference and Coverage

CHAIR: Bernie Olson, *Motorola, Inc.*

TR-8.19 Wireline Systems Interfaces

CHAIR: Jerry Drobka, *Motorola, Inc.*

TR-8.25 Compliance Assessment

CHAIR: Tess Zagaruyka, *Datron World Communications*

TR-8 COMMITTEE PARTICIPANTS

ADC, AECOM, Aeroflex, Alcatel-Lucent, APCO Project 25, Aselsan Inc., AT&T, Booz, Allen & Hamilton, Cisco Systems, Inc., CML Microcircuits (USA) Inc., CoCo Comm. Corp, CSI TeleComm., Inc., Daniels Electronics Ltd., Digital Voice Systems, Inc., E.F. Johnson, EADS Public Safety Inc., Ericsson, Inc., Etherstack, Frye-Comm Consulting LLC, General Dynamics C4 Systems, Harris Corporation, Icom America Inc., Institute for Telecommunication, Kenwood USA Corp., Lockheed Martin Corporation, M/A-Com, Inc., Microtronix Systems Ltd., Motorola, Inc., National Technical Systems (NTS), NIST-OLES, Nokia Inc., Nortel Networks, Oregon State Police, Raytheon, RELM Wireless Corp., RTKL Associates Inc., SAIC, Samdale Limited, Sigma Delta Comm., Inc., Sony Wireless Tech Division, Spectrum Watch, State of Florida, Tait Radio Comm., Technisonic Industries Ltd., Telchemy Inc., Telex Comm., Inc., Teltronic S.A.U., Texas Instruments, Inc., Thales Comm., Inc., TranSwitch Corporation, TX RX Systems, Inc., Tyco Electronics, U.S. Dept. of Commerce, U.S. Dept. of Homeland Security, U.S. Dept. of Justice, U.S. Dept. of Commerce, Zetron, Inc.

TR-14: Point-to-Point Communications Systems

SINCE 1959, ENGINEERING COMMITTEE TR-14 HAS BEEN RESPONSIBLE FOR

voluntary standards and recommended practices related to terrestrial fixed point-to-point radio communications equipment and systems (microwave radio), primarily in the frequency bands above 960 MHz.

The work of TR-14 goes beyond the design, fabrication and production of antenna towers. TR-14's specifications allow carriers to effectively and reliably relay communications via antenna towers. TR-14.7's task group, Structural Reliability, deals with structural performance and reliability issues pertinent to the structures utilized in the telecommunications industry. As the industry's support structures continue to age, reliability and maintenance issues will be crucial to the longevity of the industry's infrastructure.

One of TR-14's most popular standards is TIA standard, TIA-222, Revision G, *Structural Standard for Antenna Supporting Structures and Antennas*. The objective of this standard is to provide recognized literature for antenna-supporting structures and antennas pertaining to minimum-load requirements and design criteria for steel and concrete.



The work of TR-14 goes beyond the design, fabrication and production of antenna towers.

SIGNIFICANT ACCOMPLISHMENTS

TR-14.7 is the formulating subcommittee for the popular TIA standard, TIA-222, Revision G, *Structural Standard for Antenna Supporting Structures and Antennas*. The standard provides the requirements for structural design and fabrication of new, and modification of existing, structural antennas, antenna-supporting structures, structural components, guy assemblies, insulators and foundations.

2009 OVERVIEW

TR-14 focused some of its efforts on outreach to the international community to promote the use of TIA-222-G. During the summer, subcommittee leadership traveled to China to begin discussions on the internationalization of the TIA-222 Revision G standard. In the fall, distinguished engineers from China visited to participate in a subcommittee meeting and continue these strategic discussions. The subcommittee looks forward to furthering this relationship and working together to advance tower engineering.

2009 ACTIVITIES

During 2009, the TR-14.7 subcommittee held its annual meeting in Pittsburgh, Pa. Addendum 2 to Revision G of TIA-222 was published. The addendum includes refinements based on recent changes in the reference standards used as the basis for Revision G. Clarifications are made in some sections of the standard based on the subcommittee's desire to provide additional clarification on the standard.

TR-14.7 also continued work on the revision to TIA-1019, *Structural Standards for Steel Gin Poles Used for Installation of Antenna Towers and Antenna Supporting Structures*. First released in 2004, the standard was intended to provide minimum design criteria for the design and use of steel gin poles for installation of antennas and antenna-supporting structures. The standard is being updated to provide minimum loading requirements for towers under construction, alteration or maintenance, and to address specialized equipment such as gin poles, frames, hoists and the temporary supports necessary to safely complete those tasks, along with the design requirements for



To find out more about participating in TR-14, please contact Teesha Jenkins: tjenkins@tiaonline.org, +1.703.907.7706.

TR-14: POINT-TO-POINT COMMUNICATIONS SYSTEMS



CHAIR, TR-14: BRIAN REESE
ReliaPOLE Inspection Services Company

VICE-CHAIR, TR-14:
JOHN ERICHSEN
EET LLC

SUBCOMMITTEE

TR-14.7 Structural Standards for Steel Antenna Towers and Antenna Supporting Structures

CHAIR: Brian Reese, *ReliaPOLE Inspection Services Company*
VICE CHAIR: John Erichsen, *EET LLC*

TR-14 COMMITTEE PARTICIPANTS

4SE Inc., Aero Solutions, LLC, Aluma-Form, Inc., American Tower Corp., AT&T Mobility, B&T Engineering, Inc., Bechtel Telecom., Black & Veatch Telecomm., Broadcast Tower Technologies, Inc., C. Faulkner Engineering, CMX, Crown Castle Int'l. Corp., CSI TeleComm., Inc., Davidson Engineering, LLC, DaVinci Engineering Inc., EET LLC, Ehresmann Engineering, Inc., Electronics Research, Inc., Engineered Endeavors, Inc., FWT, Inc., Genivar, LP, Glen Martin Engineering, Global Tower Partners, Industrial Engineering & Testing, Industry Canada, KCI Technologies, Inc., Malouf Engineering Int'l., MLD Engineering Solutions, Inc., Nello Corporation, NTIA, Paul J. Ford and Company, Power Line Systems, Inc., Radian Communications Services, Rohn Products, RISA Technologies, RTKL Associates Inc., Sabre Towers & Poles, Shively Labs, Sioux Falls Tower Specialists, Stainless LLC, Stealth Concealment Solutions, Inc., Tower Consultants, Inc., Tower Engineering Professionals, Tower Technology, U.S. Dept. of Commerce, Valmont Comm., Walker Engineering Inc., Weisman Consultants, WesTower Comm. Inc.



a gin pole. The standard will consider special construction requirements and processes commonly used when removing an existing antenna from an existing tower, or removing all or a portion of an existing tower. The revised standard will be TIA-1019-A, *Structural Standards for Installation, Alteration and Maintenance of Communication Towers, Antennas and Antenna Supporting Structures*, and is projected to be ready for publication near the end of 2010.

TR-14.7's newly-formed Structural Reliability Task Group is addressing structural performance and reliability issues pertinent to the structures utilized in the telecommunications industry.

TR-30: Multi-Media Access, Protocols and Interfaces



TR-30 standards enable those with disabilities to communicate better.

ENGINEERING COMMITTEE TR-30 WAS CREATED IN 1958 TO DEVELOP

standards related to the functional, electrical and mechanical characteristics of interfaces between data circuit terminating equipment (DCE), data terminal equipment (DTE) and multimedia gateways, the telephone and voice-over-Internet protocol (VoIP) networks, and other DCE and facsimile systems.

SIGNIFICANT ACCOMPLISHMENTS

During its 50 years of existence, TR-30 has produced numerous standards for data, facsimile and telecommunications equipment. Dating back to 1962, the RS-232 standard (now TIA-232-F) provided a standardized interface between terminal equipment and data modems. This standard continues to be in use today. TR-30 has developed many other interface standards similar to TIA-232-F, providing for various speeds and functions as technology advances.

Significant standards have been produced that enable those with disabilities to communicate better. TIA-825-A, *A Frequency Shift Keyed Modem for Use on the Public Switched Telephone Network*, was specifically developed

for communications devices used by individuals with hearing loss. TIA-1001-A, *Transport of TIA-825-A Signals over IP Networks*, assures proper transport of the TIA-825-A signals over modern internet protocol networks.

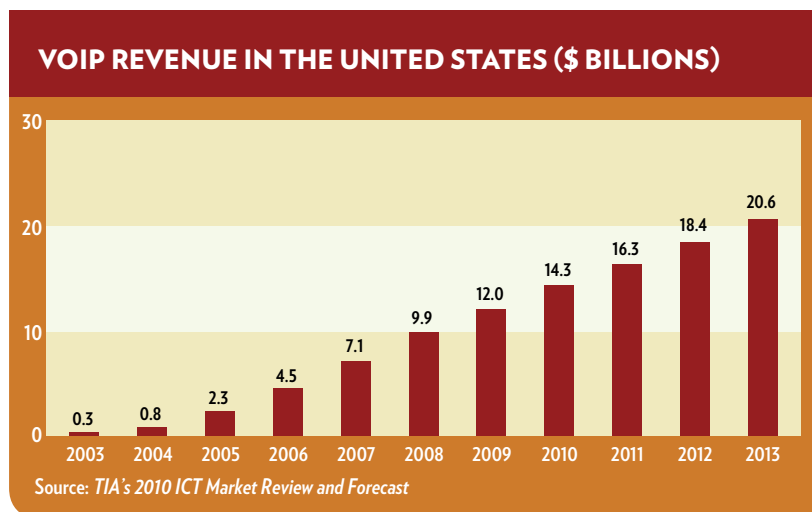
In the area of testing and evaluating equipment, TR-30 has produced a number of standards. Significant among them are: TSB-38-A, *Test Procedure for Evaluation of 2-Wire 4-KHz Voiceband Duplex Modems*, and TIA-921-A, *Network Model for Evaluating Multimedia Transmission Performance over Internet*.

TR-30 provides the U.S. inputs to the ITU-T for the development of recommendations in Study Group 16, Question 14. TR-30 has been the primary input for this work since the question's inception.

2009 OVERVIEW

TR-30 and its subcommittees had another active year in 2009. Each subcommittee met its own goals for the year. TR-30.1 maintained its review of the work taking place in ITU-T Study Group 16 and provided participating company and U.S. contributions to that work. TR-30.2 continued to maintain the many interface standards under its oversight. TR-30.3 continued to develop the revision of ANSI/TIA-921-A, *Network Model for Evaluating Multimedia Transmission Performance Over Internet Protocol*.

TR-30 provides many technical contributions to the work taking place in ITU-T Study Groups 12, *Performance, QoS and QoE*, and 16, *Multimedia Coding, Systems and Applica-*





tions. Many of these contributions become U.S. contributions to the ITU-T work through the U.S. Department of State International Telecommunication Advisory Committee (ITAC) process. In addition to technical contributions, liaisons have been established with a number of the ITU-T study groups.

2009 ACTIVITIES

Subcommittee TR-30.1, Modems, had an active year providing review and contributions to the work of ITU-T Study Group 16, Question 14, *Voiceband modems and facsimile terminals protocols: specification, performance evaluation and interworking with NGN*. The subcommittee has had a long-term relationship with Study Group 16 and works very closely with it. During 2009, TR-30.1 reviewed and provided inputs for the following Study Group 16 work:

- Revision of T.38, *Procedures for real-time Group 3 facsimile communication over IP networks*

- Revision of V.152, *Procedures for supporting voice-band data over IP networks*

- V.153, *Interworking between T.38 and V.152 using IP peering for realtime facsimile services*

- G.IP2IP, *Signal processing functionality and performance of an IP-to-IP voice gateway, optimized for the transport of voice and voice-band data*

Subcommittee TR-30.2, DTE-DCE Interfaces, worked primarily in maintenance mode during 2009. The subcommittee did initiate a new project to revise TIA-678-A, *Data Transmission Systems and Equipment – Serial Asynchronous Automatic Dialing and Control for Character Mode DCE on Wireless Data Services (PN-3-3499-RV2)*. This revision will align references contained in TIA-678 with ITU-T Recommendation V.250, *Serial asynchronous automatic dialing and control*.

TR-30.2 is also closely following the development of ITU-T draft recommendation V.amat,

Asynchronous serial command interface for assistive and multi-functional communication devices. The work on this draft recommendation is taking place in ITU-T Study Group 16, Question 14. Having been asked by this question's Rapporteur for its input, TR-30.2 will begin drafting a response about the open areas in the SG 16 question.

Subcommittee TR-30.3, Data Communications Equipment Evaluation and Transmission Interfaces, continues to focus on improving and revising ANSI/TIA-921-A, *Network Model for*

Evaluating Multimedia Transmission Performance Over Internet Protocol and the ITU-T version Recommendation G.1050, *Network model for evaluating multimedia transmission performance over Internet Protocol*. TR-30.3 is now concentrating its efforts on another revision of the standard with four primary objectives: reduction in the number of test cases; algorithm modifications; an annex to verify model conformance; and an annex providing guidelines to the application of the standard. TR-30.3 provides inputs to ITU-T Study Group 12 where similar work is being done on Recom-

To find out more about participating in TR-30, please contact Ronda Coulter: rcoulter@tiaonline.org, +1.703.907.7974.

TR-30: MULTI-MEDIA ACCESS, PROTOCOLS AND INTERFACES



CHAIR, TR-30: FRED LUCAS
FAL Associates

SUBCOMMITTEES

TR-30.1 Modems

CHAIR: Keith Chu, *Mindspeed Technologies*

TR-30.2 DTE-DCE Interfaces

CHAIR: Fred Lucas, *FAL Associates*

TR-30.3 Data Communications Equipment Evaluation and Network Interfaces

CHAIR: Jack Douglas, *PacketStorm Communications*

TR-30 COMPANY PARTICIPANTS

ADTRAN, Airvana, Inc., Anue Systems, Berk-Tek, Broadcom Corp., Cisco Systems, Inc., Conexant Systems, Inc., CSI Telecommunications, Inc., Defense Information Systems Agency, FAL Associates, Intel Corporation, LSI Corporation, Mindspeed Technologies, Motorola Inc., Nokia Siemens Networks, Nortel Networks, PacketStorm Comm., Inc., Panasonic Corp. of North America, Sony Wireless Tech Division, Telchemy, Inc., Telcordia Technologies

TR-34: Satellite Equipment and Systems

SINCE 1995, ENGINEERING COMMITTEE TR-34 HAS BEEN RESPONSIBLE FOR

developing voluntary standards related to satellite communications systems, including both the space and earth segments. The committee focuses on standards for space-borne and terrestrial hardware; interfaces on standards for satellite and terrestrial systems; and the efficient use of spectrum and orbital resources, including sharing between satellite and terrestrial services.

The committee is comprised of one subcommittee, which addresses how best to accomplish inter-service spectrum sharing by developing standards for achieving interoperability between satellite systems, as well as among satellite and terrestrial systems, networks and services.

Among the many accomplishments of TR-34 is the development of a suite of standards housed within the TIA-1040 series, which provide an introduction to the physical layer specification for the Satellite Earth Systems Broadband Satellite Multimedia (SES BSM) Regenerative Satellite Mesh – A (RSM-A) air interface family.

On the international front, TR-34 contributed to the joint standards work with the European Telecommunications Standards Institute (ETSI) SES BSM, which resulted in the standard on Connection Control Protocol (C2P) protocol activities.

SIGNIFICANT ACCOMPLISHMENTS

The TR-34 committee was first convened in 1995. The key suite of documents it developed is the RMS-A Air Interface. This suite of standards, in the TIA-1040 series, provides an introduction to the physical layer specification for the SES BSM RSM-A air interface family. It consists of a general description of the organization of the physical layer with reference to the parts of this multi-part deliverable, where each function is specified in more detail.

Another key area of development is the joint standards work with the ETSI SES BSM, which resulted in the standard on C2P protocol activities. The TIA-1073.002 *Satellite Network Modem System (SNMS) Encryption Requirements* standard addresses the following issues: how inputs from ETSI Digital Video Broadcasting (ETSI/DVB) can be utilized in the Satellite Network System (SNMS) standard; how connection request profiles relate to channel capacity; and how Return Channel Satellite Terminals (RCSTs) determine their rate

parameters from the profiles. The standards also support important functionality such as Quality of Service (QoS), encryption and the generation of dummy traffic.

In addition, the TR-34 committee developed TIA-1039 *QoS Signaling for IP QoS Support*, which defines the quality of service signaling standard for use within IPv4 and IPv6 network-layer protocols. This mechanism will allow the necessary resources to be allocated to a flow (or group of flows) as they traverse the communications network. This signaling scheme is designed to work “in-band” and requires routers. Thus, QoS is set up in real time across the network without a separate, out-of-band, software signaling structure like Resource Reservation Protocol (RSVP). The resource “requests” and, when needed, the “response” messages are incorporated into the user data packets themselves, allowing the QoS requirements to be set up during the initial network traversal from sender to receiver (and back if needed), streamlining the packet management process.



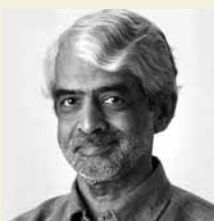
The committee focuses on standards for space-borne and terrestrial hardware.

2009 OVERVIEW

TR-34 and its subcommittee continued joint activity between TIA and ETSI with respect to mobile satellite communications, including the joint publication of the GMR-1 3G satellite air interface standard.

To find out more about participating in TR-34, please contact Ronda Coulter: rcoulter@tiaonline.org, +1.703.907.7974.

TR-34: SATELLITE EQUIPMENT AND SYSTEMS



CHAIR, TR-34:
PRAKASH CHITRE
ViaSat, Inc.

SUBCOMMITTEE

TR-34.1 Communications and Interoperability

CHAIR: Tony Noerpel, *Hughes Network Systems*

TR-34 COMMITTEE PARTICIPANTS

AASKI Technology, Inc., Advantech Satellite Networks, Anagran, Inc., Cisco Systems, Inc., Comtech EF Data, CSI Telecommunications, Inc., Defense Information Systems Agency, Gilat Satellite Networks Ltd., Globalstar, Hughes Network Systems, LLC, Lockheed Martin Corporation, MITRE Corp., RTKL Associates Inc., Telcordia Technologies, ViaSat, Inc.

2009 ACTIVITIES

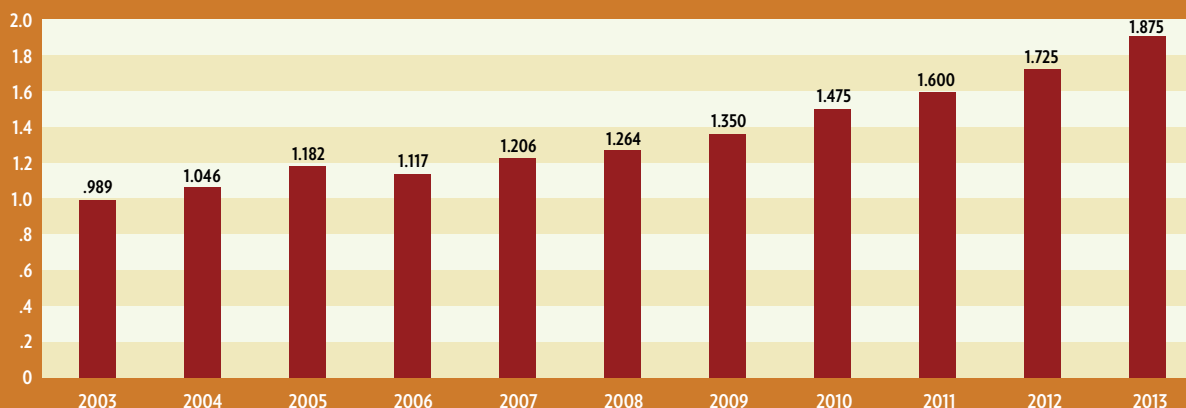
Subcommittee TR-34.1, Communications and Interoperability, held two meetings, one in February 2009 and another in October 2009. This group routinely meets at TIA Headquarters in Arlington, Va. In 2009, TR-34.1 completed joint publication with ETSI Satellite SES BSM of ETSI TS 102-602 *Satellite Earth Stations and Systems (SES); Broadband Satellite Multimedia (BSM), Connections Control Protocol (C2P) for DVB-RCS Specifications* and ETSI TR 102-603 *Satellite Earth Stations and Systems (SES), Broadband Satellite Multimedia (BSM), Connections Control Protocol (C2P) for DVB-RCS Background Information*.

The TR-34.1 chair submitted all TR-34.1 satellite air interface standards to the NIST Smart Grid Interoperability Panel, and the TR-34.1 Chair represents the committee on this panel.

GMR-1, which is a jointly-developed mobile satellite air interface with ETSI, has been upgraded to GMR-1 3G (ETSI T/S 101 376, v3.1.1): *GEO-Mobile Radio Interface Specifications (Release 3); Third Generation Satellite Packet Radio Service*. This upgrade accommodates third-generation 3GPP-compatible technology and is included in the ITU Radiocommunication Study Group 4 Draft New Recommendation ITU-R M.1457-SAT *Detailed specifications of the radio interfaces for the satellite component of International Mobile Telecommunications-2000 (IMT-2000)*. GMR-1 3G is designed for use in L-band and S-band mobile satellite licensed spectrum.

The TR-34.1 chair represented TIA in the DVB-RCS Technical Module throughout 2009.

MSS REVENUE WORLDWIDE (\$ BILLIONS)



Source: TIA's 2010 ICT Market Review and Forecast

TR-41: User Premises Telecommunications Requirements

SINCE 1976, ENGINEERING COMMITTEE TR-41 HAS BEEN DEVELOPING VOLUNTARY standards for telecommunications terminal equipment and systems, specifically those used for voice services, integrated voice and data services, and Internet Protocol (IP) applications. Together with its three subcommittees and eight working groups, the committee develops performance and interface criteria for equipment, systems and private networks, as well as the information necessary to ensure their proper interworking with each other, with public networks, with IP telephony infrastructures and with carrier-provided private-line services.

TR-41 develops criteria for preventing harm to the telephone network, which become mandatory when adopted by the Administrative Council for Terminal Attachments (ACTA). The committee is also engaged in providing input on product safety issues, identifying environmental considerations for user premises equipment and addressing the administrative aspects of product approval processes.

SIGNIFICANT ACCOMPLISHMENTS

Among TR-41's first products were Recommended Standards RS-464 on PBXs, RS-470 on Telephones, and RS-504 on Hearing Aid Compatibility. RS-504 was adopted verbatim as Part 68.316 of the FCC Rules. Other standards include EIA/TIA-571 on Environmental Considerations, TIA/EIA-596 on Network Channel Terminating Equipment, TIA/EIA-631 on RF Immunity, TIA/EIA-777 on Caller ID Performance, TIA/EIA-810 and TIA-920 on Narrowband and Wideband Voice Performance of Digital Telephones, TIA/EIA-811 on VoIP Feature Telephones, TIA-912 on VoIP Voice Gateways, and TIA-1003 on Wireless LAN IP Telephony Endpoints. Many of these documents have now gone through multiple revisions.

When the FCC deregulated connection to the public switched network in 2000, TR-41 transformed the Part 68 rules into the TIA-968 Network Harms Criteria standard, which became a mandatory requirement for terminal equipment after it was adopted by ACTA. This document has had several amendments and has recently gone through a major revision. TIA-1083, a much-improved Hearing Aid Compatibility (HAC) standard, was adopted in 2007, and the major wireline cordless telephone manufacturers have

voluntarily agreed to make their products compliant with it no later than the beginning of 2010.

TR-41 has also created a number of Telecommunications Systems Bulletins (TSBs), which are documents intended to provide important information to industry in cases where a standard would not be appropriate. The TSBs created by TR-41 include TSB-31 on Part 68 Network Protection Measurement Guidelines, TSB-32 on Private Network Transmission Plans, TSB-116 on VoIP Voice Quality Recommendations, the TSB-129, *Regulatory Approval Guide*, and TSB-146 on VoIP Telephony Support of Emergency Calling Services.

2010 OVERVIEW

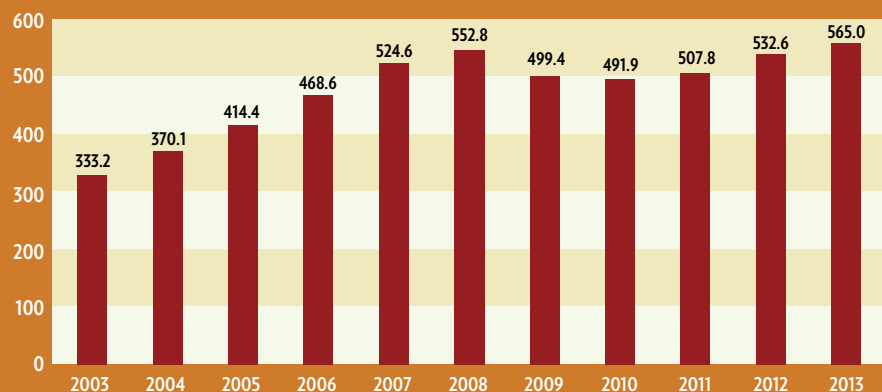
TR-41 will be continuing its work in the areas of performance standards for analog and digital wireline terminals, network harms criteria, and environmental and product safety considerations. Several projects involving revisions to existing standards are either in the final stages of the drafting work or have already been approved for submission to ballot and should be completed in the first half of 2010. This will allow additional projects that have been on hold, awaiting resources in terms of individuals and meeting time slots, to kick off.

Consideration will be given to incorporating



TR-41.3 member companies participate in the annual Hearing Loss Association of America (HLAA) convention to demonstrate TIA-1083 compliant products.

ENTERPRISE AND CONSUMER TELECOMMUNICATIONS REVENUE IN THE UNITED STATES (\$ BILLIONS)



Source: TIA's 2010 ICT Market Review and Forecast

a modified magnetic noise weighting function that includes a temporal component as an amendment to the TIA-1083-A HAC standard. This suggestion was received through liaison with the group responsible for the C63.19 HAC standard for cell phones and will be coordinated with them to keep both standards in synch in this regard. A completely new project addressing electrical surge protection of home networking systems related to Smart Grid Technologies is expected to result in a standard before the end of 2010.

2009 ACTIVITIES

TR-41 held three week-long meetings with its subcommittees and working groups in 2009. The normal August face-to-face meeting was replaced by a series of Web-based teleconferences as a cost measure in recognition of the difficult economic times. Additional interim teleconference meetings were conducted as needed. Elections for all TR-41 leadership positions were scheduled for the November meeting. Steve Whitesell of VTech was reaffirmed as TR-41 chair. Al Baum of Uniden and James Bress of AST Technology Labs were re-elected as TR-41.3 Chair and Vice-Chair, respectively. Randy Ivans of Underwriters Laboratories was also

reaffirmed as TR-41.7 chair. A recognition event was held in conjunction with the November meeting to acknowledge the contributions made by committee members to publish TIA standards.

TR-41 exchanged liaison information with a number of standards bodies, councils and associations during 2009, including ACTA, the Alliance for Telecommunications Industry Solutions (ATIS) Network Interface, Power and Protection Committee (NIPP), Industry Canada's Terminal Attachment Program Advisory Committee (TAPAC), the Rehabilitation Engineering Research Center (RERC) on Telecommunications Access, Underwriters Laboratories (UL), and the U.S. National Committee providing input to the IEC 62368: *Hazard-Based Safety Standard for ITE/Telecom/Audio-Video Equipment*.

TR-41 participants serve as official TIA Representatives to Accredited Standards Committee C63 addressing electromagnetic compatibility issues and to the UL/CSA Technical Harmonization Committee for developing a North American version of the IEC 62368 Hazard-Based Safety Standard. The Institute of Electrical and Electronics Engineers (IEEE) Subcommittee on Telephone Instrument Testing (STIT) collocated with TR-41 for

two meetings, allowing joint sessions to be held with a number of the TR-41.3 working groups. TR-41.3 member companies Panasonic, Uniden and VTech again participated in the annual HLA convention by demonstrating TIA-1083-compliant products and getting out the message to look for product with the TIA-1083 compliance logo on store shelves.

TR-41.3, Analog and Digital Wireline Terminals, continued its work on creating a revision of TIA-1083, *Telecommunications — Telephone Terminal Equipment — Handset Magnetic Measurement Procedures and Performance Requirements*, which will include test procedures for products with a digital interface, such as VoIP telephones. The document was submitted to industry ballot and passed, but the resolution of editorial comments led to substantial restructuring of the document. In the process, the possibility of making the document applicable to digital phones using a much wider variety of codecs than G.711 and L16-256, as specified in the balloted version, was raised. This was felt to be a worthwhile objective and will be incorporated before re-balloting the document.

Work continued on adding requirements for speakerphones and answering devices to the TIA-470 series of documents. A draft of TIA-470.120-C, *Telecommunications — Telephone Terminal Equipment — Handsfree Acoustics Performance Requirements for Analog Telephones*, speakerphone standard was balloted in May, but substantial revisions as a result of comment resolution required sending the document for re-ballot at the end of 2009. With a new editor and a much reorganized draft, the TIA-470.330-C, *Telecommunications — Telephone Terminal Equipment — Performance Requirements for Telephone Answering Devices — Telephone Terminal Equipment*, answering device standard is now making good progress toward completion in 2010.

Work has also started on the “D” version of many of the 470 subdocuments. Revisions of TIA-470.210-D, *Telecommunication— Telephone Terminal Equipment – Resistance and Impedance Performance Requirements for Analog Telephones*, and TIA-470.310-D, *Telecommunications – Telephone Terminal Equipment – Cordless Telephone Range Measurement Procedures*, were completed and approved for publication by TR-41.3. The TIA-470.000-D overview document has been sent for re-ballot and should become available in early 2010. Projects were also opened for the creation of TIA-470.110-D, *Telecommunications – Telephone Terminal Equipment – Handset Acoustic Performance Requirements for Analog Terminals*, on handset transmission performance and TIA-470.220-D, *Telecommunications - Telephone Terminal Equipment – Alerting Response and Acoustic Output Performance Requirements for Analog Wireline Telephones*, on alerter performance.

Following a decision to facilitate revision of the TIA-920 wideband digital transmission performance document by breaking it into subdocuments, work has progressed on drafts of the TIA-920.110-A, *Telecommunications Telephone Terminal Equipment Transmission Requirements for Wideband Digital Wireline*

Telephones with Handsets, and TIA-920.130-A, *Telecommunications Telephone Terminal Equipment Transmission Requirements for Wideband Digital Wireline Telephones with Headset*. Both documents were submitted for initial ballot, but the desire to make them applicable for a wider variety of codecs and to incorporate terminology more widely used outside the traditional telephone industry has required substantial revision. They are now expected to be available about mid-year 2010. The TIA-920.000-A, *Telecommunications Telephone Terminal Equipment Overview of Acoustic Requirements for Wideband Digital Wireline Telephones* overview document has been completed and will be forwarded for publication when the handset and headset documents are ready.

TR-41.7, Environmental and Safety Considerations, continues to advise Underwriters Laboratories (UL) on matters dealing with telephone



TIA-1083 Compliance logo

safety. Early in 2009, the subcommittee responded to questions about overcurrent protection devices by suggesting changes UL should make to its outline of investigation for these devices. TR-41.7 also responded to a request to review apparent inconsistencies in UL 60950-21 concerning isolation requirements and grounding practices for remote feed circuits. It was

determined that there was no problem with grounding these circuits if a solid and reliable ground is used.

The expertise of TR-41.7 is also highly valued by other organizations involved with product safety. A member of the U.S. National Committee for IEC TC 108 on the IEC 62638 *Hazard Based Standard for ITE/Telecom/Audio-Video Equipment* indicated “it would be very, very, helpful” for TR-41.7 to review a proposal for power cross testing to be added to that standard. The review was completed and comments were forwarded to the U.S. National Committee.

Work has continued on developing a Telecom Circuit Overcurrent Protectors Application Guide to be published as a TSB. This work is an outgrowth of an earlier project that resulted in the UL outline of investigation for these types of devices.

An initial draft of the TIA-631-B, *Telecommunications – Telephone Terminal Equipment – Radio Frequency Immunity Requirements*, RF immunity standard was reviewed at the November meeting. The main items included in this draft revision were a clear statement in the scope that the standard applies specifically to telephones with handsets, but that guidance to extending the document to cover speakerphones, answering systems and telephones with headsets is being added in an informative



annex. The document is expected to be submitted for ballot early 2010.

TR-41.7 also reviewed a proposal for a new standard dealing with electrical protection of home networking systems related to Smart Grid technologies at its November meeting. Products such as smart home appliances, TV set-top boxes, etc., generally have connections to the AC power grid and some form of communications system, each with its own ground. This raises questions about surges on the AC power line (due, for example, to nearby lightning strikes) affecting the communications side of the equipment. The subcom-

mittee agreed to open a project on this subject. This is expected to be a fast-track project with a document ready to ballot by mid-year 2010.

TR-41.9, Technical and Administrative Regulatory Considerations, completed its revision of the FCC Part 68 harms criteria and published TIA-968-B, *Telecommunications – Telephone Terminal Equipment* –

To find out more about participating in TR-41, please contact Ronda Coulter: rcoulter@tiaonline.org, +1.703.907.7974.

Technical Requirements for Connection of Terminal Equipment to the Telephone Network, in August 2009. The document was then submitted to ACTA and formally adopted in September as the “presumptively valid technical criteria for the protection of the public switched telephone network from harms caused by the connection of terminal equipment” to technical criteria for preventing harm to the network. The revised document has an entirely new structure along the lines of equipment interface types, which should make it much easier for manufacturers to identify the relevant requirements for their products.

An amendment, TSB-31-C-1, *Telecommunications – Telephone Terminal Equipment – Rationale and Measurement Guidelines for U.S. Network Protection – Addendum 1*, was published in February 2009 to provide additional clarification of the hearing-aid compatibility and receive volume control test procedures for products with digital interfaces, such as VoIP telephones. A new project was also kicked off to create a TSB-31-D version of the measurement guidelines document that would align its test procedures with the restructured format of TIA-968-B.

Updates were made to the list of Frequently Asked Questions (FAQs) maintained by TR-41.9. These FAQs can be found on the TR-41 page at the TIA website. The additions include clarification of the definition of a component that must be tested for compliance using three host devices and information related to user configuration changes of equipment that might cause it to become non-compliant with Part 68 or TIA-968-B. TR-41.9 also continued its work to revise TSB-129-A, *Telecommunications – Telephone Terminal Equipment – U.S. Network Connections Regulatory Approval Guide*, and expects to send that document to ballot in mid 2010.

TR-41: USER PREMISES TELECOMMUNICATIONS REQUIREMENTS



CHAIR, TR-41: STEPHEN R. WHITESELL
VTech Communications

VICE-CHAIR, TR-41: VACANT

SECRETARY, TR-41: PHILLIP HAVENS
Littelfuse, Inc.

SUBCOMMITTEES

TR-41.3 Analog & Digital Wireline Terminals

CHAIR: Al Baum, *Uniden America Corporation*
VICE CHAIR: James Bress, *AST Technology Labs, Inc.*

TR-41.7 Environmental and Safety Considerations

CHAIR: Randy Ivans, *Underwriters Laboratories*
VICE-CHAIR: Vacant

TR-41.9 Technical and Administrative Regulatory Considerations

CHAIR: Vacant
AD-HOC CHAIR: Phillip Havens, *Littelfuse, Inc.*
VICE CHAIR: Vacant

TR-41 COMMITTEE PARTICIPANTS

ADTRAN, Allied Telephone and Data Corp., Avaya, Belden Networks Div., Berk-Tek, Broadcom Corp., Cisco Systems, Inc., CML Microcircuits (USA) Inc., CommScope Network Solutions, Conexant Systems, Inc., Corning Inc., CSI Telecomm., Inc., EMBARQ Corp., Ericsson Inc., FAL Associates, Fluke Networks, G.R.A.S. Sound & Vibration, Hewlett-Packard, Industry Canada, Intel Corp., Intertek Testing Services, Intrado, ITW Linx, Littelfuse Inc., LSI Corp., Microsoft Corp., Microtronix Systems Ltd., Motorola Inc., National Comm. System, National Technical Systems (NTS), NeuStar Inc., Nokia Siemens Networks, Nortel Networks, Panasonic Corp. of North America, Panduit Corp., Plantronics, RTKL Associates Inc., Sigma Delta Comm., Inc., Sony Wireless Tech Division, Sprint Nextel, Telchemy, Inc., Telcordia Technologies, Texas Instruments, Inc., The Siemon Company, Tyco Electronics, U.S. Dept. of Commerce, UL Underwriters Laboratories Inc., Uniden America Corp., Verizon Comm., VTech Comm., Wiltec Technologies

TR-42: User Premises Telecommunications Cabling

FORMED IN 1999, ENGINEERING COMMITTEE TR-42 IS RESPONSIBLE FOR

developing and maintaining voluntary standards for telecommunications cabling and infrastructure in user-owned buildings such as commercial buildings, residential buildings, homes, data centers, industrial buildings and now healthcare facilities, as well as all applications of fiber optic cable and cabling systems. The committee's standards cover requirements for network architecture, copper and optical fiber cabling components (such as cables, connectors and cable assemblies), installation and field testing, in addition to the administration, pathways, spaces, grounding and bonding to support the cabling.

TR-42 and its 12 subcommittees address the performance and requirements for telecommunications cabling (phone), data cabling (Ethernet) or both (VoIP, for example). If you've accessed the Internet, connected to someone via a Web cam, used a Voice over Internet Protocol (VoIP) phone system, or downloaded digital music or video files, the documents of TR-42 helped make that possible. The road to IP convergence is paved with the cabling standards from TR-42.

TR-42 is perhaps most recognized as the creator of the ANSI/TIA-568 standards, which address the performance and requirements for telecommunications cabling in commercial and customer-owned buildings. Other documents specifically address other types of customer-owned buildings, component standards for optical fiber cabling and for balanced twisted-pair copper, and supporting cabling technologies for building automation systems, wireless LANs and outside plant.

SIGNIFICANT ACCOMPLISHMENTS

In February 2009, TR-42 published a new standard: ANSI/TIA-568C.0, *Generic Telecommunications Cabling for Customer Premises*. This publication created a foundation for three types of documents (common standards, premises standards and component standards) and now becomes the TR-42 standard covering cabling topologies, design, distances and outlet configurations, as well as specifics for cabling infrastructure in all locations. Later In 2009, TR-42 published the ANSI/TIA-568-C.2, *Balanced Twisted-Pair Telecommunications Cabling and Components Standard*, covering the component and performance requirements for balanced twisted-pair cabling.

2009 OVERVIEW

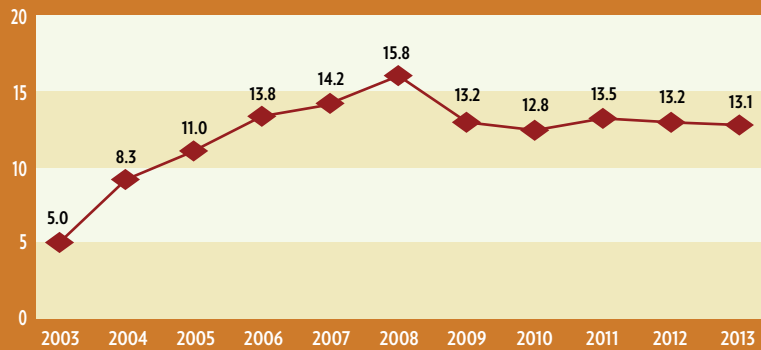
TR-42 completed several significant steps to complete the ANSI/TIA-568 suite of documents and finish the process for those documents.

Chief among them was the creation of the new standard, ANSI/TIA-568C.0, *Generic Telecommunications Cabling for Customer Premises*. With this foundation established, documents can now be focused on exceptions and allowances appropriate for a specific type of premise. As an example, ANSI/TIA-568-C.1, *Commercial Building Telecommunications Cabling*, builds on the 568-C.0 standard listing the appropriate exceptions and allowances for office-oriented commercial building cabling. TIA-568-C.1 was published with TIA-568-C.0. The publication of ANSI/TIA-568-C.2, *Balanced Twisted-Pair Telecommunications Cabling and Components Standard*, completed the third revision of the 568 standard, since ANSI/TIA-568-C.3, *Optical Fiber Cabling Components Standard*, was published in 2008. TR-42 absorbed the TIA FO-4 Engineering Committee and its subcommittees (now TR-42.11, TR-42.12, TR-42.13 and TR-42.15) and created a new subcommittee, TR-42.16, for bonding and grounding. At the same time, TR-42 continually addresses



TR-42 continually addresses new technologies such as 10Gb Ethernet and Power over Ethernet Plus.

FIBER MILES DEPLOYED IN THE UNITED STATES (\$ BILLIONS)



Source: TIA's 2010 ICT Market Review and Forecast

new technologies such as 10 Gigabit Ethernet and Power over Ethernet Plus (PoE Plus).

New projects being addressed in 2010 include cabling for healthcare facilities, incorporation of green initiatives and the ongoing revisions of existing documents to recognize the 'ANSI/TIA'-568-C.0 standard, as well as other new technologies. TR-42 also began revisions to the other documents to more firmly establish the base of common standards via revisions to current documents (administration, pathways and spaces, outside plant, building automation systems, and bonding and grounding). In some cases, there are also parallel efforts to revise existing premises standards (ANSI/TIA-942) to build on the ANSI/TIA-568-C.0 foundation and consolidate the information in the documents into a specific, focused content for that type of premise.

2009 ACTIVITIES

TR-42.1, Generic Telecommunications Cabling and Premise Cabling, published ANSI/TIA-568-C.0, *Generic Telecommunications Cabling for Customer Premises*, and ANSI/TIA-568-C.1, *Commercial Building Telecommunications Cabling*, setting the stage for the reorganization of the TR-42 suite of documents. In 2009, the subcommittee completed Addenda, ANSI/TIA-942-2, *Telecommunications Infrastructure Standard for Data Centers Addendum 2 – Additional Media and Guidelines for Data Centers*, and TSB-185, *Environmental Classification (MICE) Tutorial*, for the MICE (Mechanical, Ingress, Climatic and Chemical, and Electromagnetic)

Classification Tutorial. Projects were started for a revision of the TIA-862, *Building Automation Cabling Standard for Commercial Buildings*, Building Automation Standard (BAS), as well as for the creation of a new Healthcare Facilities Standard (to be numbered ANSI/TIA-1179).

TR-42.2, Residential Telecommunications Infrastructure, reaffirmed the content of ANSI/TIA-570-B, *Residential Telecommunications Infrastructure Standard*.

TR-42.3, Commercial Building, Telecommunications Pathways and Spaces, completed development of the addendum to TIA-1005, *Telecommunications Infrastructure Standard for Industrial Premises*, for industrial pathways and spaces and turned it over to TR-42.9. Publication is expected in early 2010 pending ANSI approval. The subcommittee continued development of TIA-569-C, *Telecommunications Pathways and Spaces*, edited to apply to "generic" premises (the previous revision, TIA-569-B, was for commercial buildings) — publication is expected in 2010. The subcommittee is also developing addendum TIA-568-C.1-1, *Commercial Building Telecommunications Cabling Standard, Addendum 1 Pathway and Spaces*, to contain additional requirements, exceptions and allowances to TIA-569-C relevant to pathways and spaces in commercial buildings. Publication is expected in 2010.

TR-42.4, Customer-Owned Outside Plant Telecommunications Infrastructure, is balloting a revision to ANSI/TIA-758-A, *Customer-Owned Outside Plant Telecommunications Infrastructure*. The revision will include content from TIA-590-A, *Physical Location and Protection of Below-Ground Fiber Optic Cable Plant*, on outdoor installation of optical fiber cabling so that document can be withdrawn. Additionally, it will modify the document to follow the new release of the standard structure implemented by TR-42 and to modify or add requirements as appropriate.

TR-42.5, Telecommunications Infrastructure Terms and Symbols, serves as the clearing-house for terms, symbols, units of measurement and acronyms used in the TR-42 suite of documents.

TR-42.6, Telecommunications Infrastructure

and Equipment Administration, successfully completed the publication of the first addendum to TIA-606-A, TIA-606-A-1, *Administration Standard for Commercial Telecommunications Infrastructure Addendum 1 – Administration of Equipment Rooms and Data Center Computer Rooms*. TR-42.6 also began the task of integrating the data center administration methodology into the existing commercial administration standard. A project to revise the ANSI/TIA-606-A standard will be undertaken in 2010, with emphasis on broadening its scope so it will become a common standard for cabling administration.

TR-42.7, Telecommunications Copper Cabling Systems, focused on publishing ANSI/TIA-568-C.2, *Commercial Building Telecommunications Cabling Standard Part 2: Balanced Twisted-Pair Telecommunications Cabling and Components*, which contains all the requirements and performance criteria for category 3, 5e, 6 and 6A components (connecting hardware, patch cords and cable) and cabling (channels and permanent links), as well as laboratory verification procedures. TR-42.7 continued to maintain a relationship with IEEE 802.3 to ensure that twisted-pair cabling will provide support of the PoE Plus application, which led to the publication of TSB-184, *Guidelines for Supporting Power Delivery Over Balanced Twisted-Pair Cabling*. 2009 also saw the publication of ANSI/TIA-1152, *Requirements for Field Test Instruments and Measurements for Balanced Twisted-Pair Cabling*. In addition, further work was carried out examining the effects of balance on alien crosstalk performance.

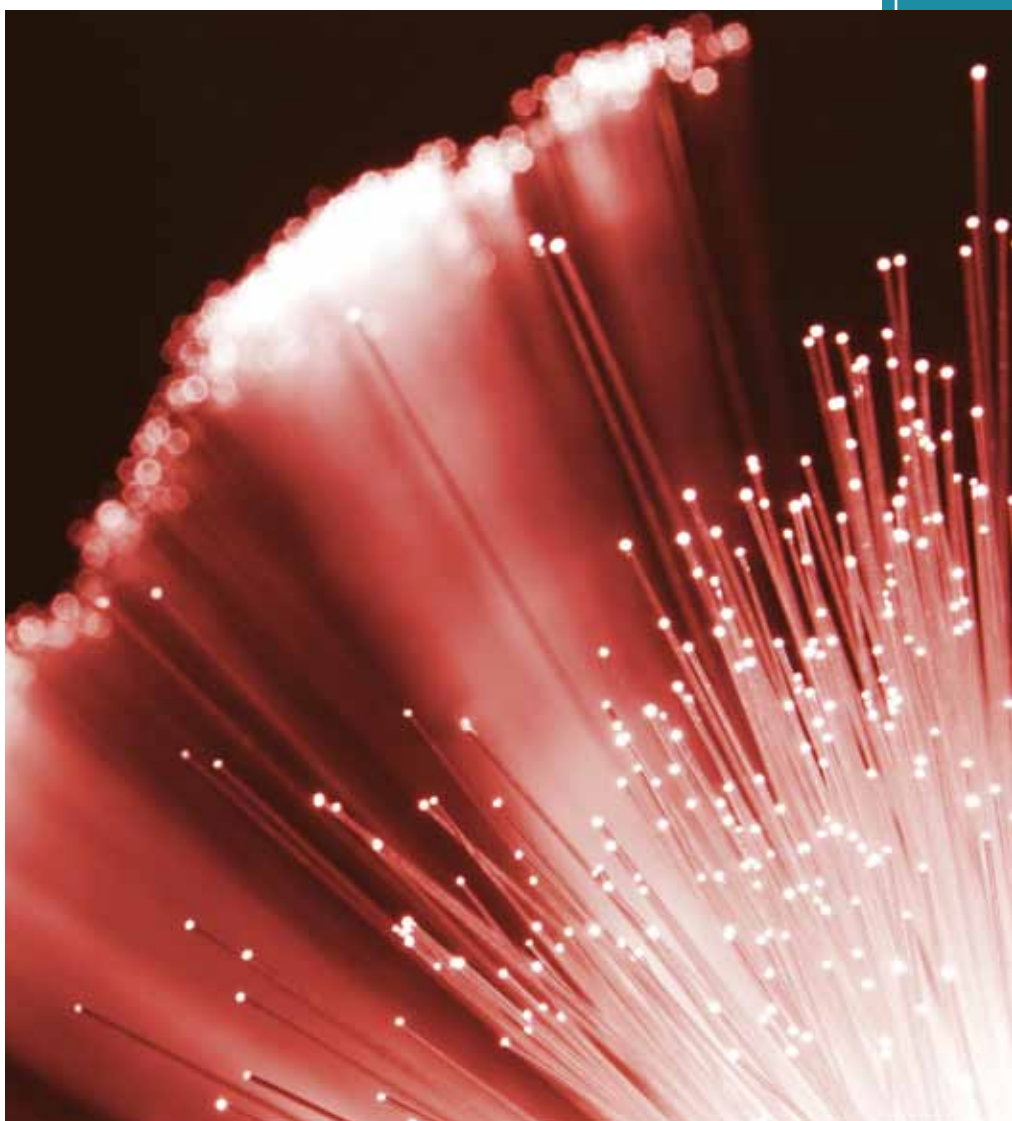
Two new projects were initiated in 2009 — one on test methods and fixtures for measurements to 1000 MHz (to be published as ANSI/TIA-1183) and another on shared pathways and shared sheaths (to be published as TSB-190) to address the placement of different category cabling in the same pathway and the operation of different applications within the same sheath.

TR-42.8, Telecommunications Optical Fiber Cabling Systems, identified some inadvertent errors in the 2008 publication of ANSI/TIA-568-C.3, *Optical Fiber Cabling Components*. An erratum corrected the errors, and ANSI/TIA-568-C.3 was redistributed to all purchasers of the 2008 version. Two projects have been assigned to task groups: one on polarity of

24-fiber arrays that will help support 100 Giga-bit Ethernet, and another on loss budgets.

TR-42.9, Industrial Telecommunications Infrastructure, published the first addendum, on industrial pathways and spaces, ANSI/TIA-1005, *Industrial Pathways and Spaces*, jointly working with TR-42.3. In 2010, work will continue on restructuring the standard to harmonize with the ANSI/TIA-568-C series standards and ANSI/TIA-569-C draft. In addition, new projects for new technologies for industrial premises, such as plastic optical fiber will be considered.

TR-42.11, Optical Systems, completed balloting of a new Polarization Mode Dispersion (PMD) measurement technique that is pending ANSI approval and publication. ANSI/TIA-455-243



(FOTP-243) establishes a PMD measurement method that can be performed from a single end of the cable under test and is optimized for measuring installed cabling. The subcommittee is currently working to revise TIA-526-14,

OFSTP-14 – Optical Power Loss Measurement of Installed Multimode Fiber Cable Plant, the procedure for measurement of installed multimode cabling attenuation, and is expected to adopt IEC 61280-4-1 edition 2 as TIA 526-14-B in 2010.

To find out more about participating in TR-42, please contact Teesha Jenkins: tjenkins@tiaonline.org, +1.703.907.7706.

TR-42.12, Optical Fibers and Cables, continues to work on a full slate of projects, many related to the fiber optic test procedures (FOTPs), fiber

TR-42: USER PREMISES TELECOMMUNICATIONS CABLING



CHAIR, TR-42: BOB JENSEN
Fluke Networks

VICE CHAIR, TR-42: VALERIE MAGUIRE
The Siemon Company

SUBCOMMITTEES

TR-42.1 Generic Telecommunications Cabling and Premise Cabling

CHAIR: Henry Franc, *Belden*

VICE CHAIR: Glenn Sexton, *Northwest Information Services*

TR-42.2 Residential Telecommunications Infrastructure

CHAIR: John Pryma, *Consultant*

VICE CHAIR: Ray Emplit, *Wiremold/Legrand*

TR-42.3 Commercial Building Telecommunications Pathways and Spaces

CHAIR: Ray Emplit, *Wiremold/Legrand*

VICE CHAIR: Rich Jones, *Richard Jones Consulting*

TR-42.4 Customer-owned Outside Plant Telecommunications Infrastructure

CHAIR: Julie Roy, *C2 Consulting*

VICE CHAIR: Jamie Silva, *Corning Cable Systems*

TR-42.5 Telecommunications Infrastructure Terms and Symbols

CHAIR: Paul Kish, *Belden*

VICE CHAIR: Ray Emplit, *Wiremold*

TR-42.6 Telecommunications Infrastructure and Equipment Administration

CHAIR: Steve Huffaker, *JP Morgan Chase*

VICE CHAIR: Jonathan Jew, *J&M Consultants*

TR-42.7 Telecommunications Copper Cabling Systems

CHAIR: Sterling Vaden, *Optical Cable Corporation*

VICE CHAIR: Valerie Maguire, *The Siemon Company*

TR-42.8 Telecommunications Optical Fiber Cabling Systems

CHAIR: Bob Jensen, *Fluke Networks*

VICE CHAIR: Herb Congdon, *Tyco Electronics*

TR-42.9 Industrial Telecommunications Infrastructure

CHAIR: Brad Woodman, *Molex, Inc.*

VICE CHAIR: Bob Lounsbury, *ODVA*

TR-42.11 Optical Systems

CHAIR: Paul Kolesar, *CommScope*

VICE CHAIR: Dave Mazzaresse, *OFS*

TR-42.12 Optical Fibers and Cables

CHAIR: Mike Kinard, *OFS*

VICE CHAIR: Brett Lane, *Panduit*

TR-42.13 Passive Optical Devices and Components

CHAIR: Osman Gebizlioglu, *Telcordia Technologies, Inc.*

TR-42.16 Premises Telecommunications Bonding and Grounding

CHAIR: Mark Harger, *Harger*

VICE CHAIR: Rich Jones, *Richard Jones Consulting*

specifications, cable specifications and related documents. The publication of the TIA-492AAAD specification (also called OM4) becomes the lead in specification of multimode optical fibers to support 40 Gb/s and 100 Gb/s data rates. The subcommittee is also working with the other TR-42 subcommittees and with ICEA on cabling for multi-dwelling units (MDUs), a significant emerging segment of FTTX topologies. The subcommittee continues its efforts

in dissemination, discussion and coordination of information flowing to and from the related international standards bodies.

TR-42.13, Passive Optical Devices and Components, continues work on the evaluation and performance parameters of optical fiber connectors including the effective use and testing of adhesive materials, Hardened Fiber Optic Connectors (HFOC) and Multi-Fiber Connector (MT ferrule) geometry. In 2010, the focus will be on new technologies such as passive optical devices based on new technologies including bend-insensitive optical fiber and OM4 fiber.

TR-42.16, Premises Telecommunications Bonding and Grounding, previously a working group under Subcommittee TR-42.3 was established in 2008 to develop premises telecommunications bonding and grounding requirements. The subcommittee started the revision of ANSI-J-STD- 607-A, to become TIA-607-B, *Commercial Building Grounding (Earthing) and Bonding Requirements for Telecommunications*, after TR-41 relinquished control to TR-42. The subcommittee has completed the first draft and will be conducting a subcommittee review in early 2010. An aggressive development schedule will continue through 2010, with plans to conduct an industry ballot in mid-2010 and a published document by the end of the year.

TR-42 COMMITTEE PARTICIPANTS

ADC TeleComm., Inc., Allied Telephone and Data Corp., Anixter Inc, AT&T, Avaya, Baxter Enterprises, Bechtel Telecom, Bel Stewart Connectors, Belden Networks Division, Berk-Tek, Broadcom Corp., BTR Netcom Inc, C2 Consulting, Chatsworth Products, Inc., Cisco Systems, Inc., CommScope Inc., Connectivity Technologies, Inc., Continental Automated Buildings Association, Corning Inc., CSI TeleComm., Inc., Defense Information Systems Agency, Defense Supply Center, Columbus, Direct Optical Research Co., Draka Comteq Optical Fibre, DYMO (RHINO), Emtelle US Inc, ERICO Inc., EXFO E.O. Engineering, Inc., Exuperior Photonics, Inc., FiberSource Inc., Fluke Networks, Furukawa Industrial S.A., Gemalto inc., General Cable, Graybar, Greenlee Textron Inc., Harger, Inc., HARTING, Inc. of North America, HellermannTyton, Henkels & McCoy Inc., Homaco, Hubbell Premise Wiring, Ideal Industries, Inc., Intertek Testing Services, ITW Linx, J&M Consultants, Inc., JDSU, JPMorgan Chase & Co., KITCO Fiber Optics, Leviton Network Solutions, MC Comm., Megger, Molex Inc., Motorola Inc., National Technical Systems (NTS), NetGemini, Inc., NIES (Nexans Intel. Ent. Solutions), Nortel Networks, Northwest Information Services, Noyes Fiber Systems, ODVA Open DeviceNet Vendor Association, Inc., OFS, Optical Cable Corp., Ortronics, Inc., Panasonic Electric Works Laboratory of America, Panduit Corp., Phoenix Contact, Photon Kinetics, Inc., PPC, Quabbin Wire & Cable Co., Inc., Richard Jones Consulting, RIT Technologies Inc., RTKL Associates Inc., Russound, Siemon Company, Signamax Connectivity Systems, Inc., Soapstone Networks, Solvay Solexis, Sumitomo Electric Lightwave Corp, Superior Essex, Surtec America, Telcordia Technologies, Inc., Tellabs, Inc., The Fiber Optic Association, The Siemon Company, The Wiremold Company, Tyco Electronics, U.S. Dept. of Commerce, UL Underwriters Laboratories Inc., US Conec LTD, Vanco International, Wiltec Technologies, Xtellus Dynamic Optics, Yazaki N.A., Y-Connect

TR-45: Mobile and Personal Communications Systems

ENGINEERING COMMITTEE TR-45, ESTABLISHED IN 1980, DEVELOPS

performance, compatibility, interoperability and service standards for mobile and personal communications systems. These standards pertain to, but are not restricted to, service information, wireless terminal equipment, wireless base station equipment, wireless switching office equipment, ancillary apparatus, auxiliary applications, internetwork and intersystem operations, interfaces and wireless packet data technologies.

SIGNIFICANT ACCOMPLISHMENTS

In mid-1980, Engineering Committee TR-45 standardized the original analog standard known as IS-3, also called the AMPS Standard TIA/EIA-553 for wireless mobile communications systems. TR-45 went on to develop the first intersystem core network standard for roaming in the industry (ANSI-41, originally known as IS-41), which remains in use today. Later, TR-45 created the first Cellular Digital Standard, IS-54, the TDMA Standard — currently identified as ANSI-136. After the IS-54 standard, TR-45 created the IS-95 standard (TIA/EIA-95 and ANSI/TIA-95) in 1993, relying upon CDMA technology, which led to the development of CDMA High Speed Data (EV-DO) and the high-speed wireless broadband networks of today. Needless to say, TR-45 and its subcommittees have created many other standards over the years, but the four standards highlighted above are the cornerstones of much of the mobile wireless industry. These standards not only provide multiple radio interfaces but also trace the evolution from circuit-switched voice, circuit-switched data and packet data services to all IP-based radio access networks, capabilities and services.

In 1998, Committee TR-45 set in motion the creation of 3GPP2, the international standards partnership program involving Association of Radio Industries and Businesses, Japan (ARIB), Telecommunications Technology Association, Korea (TTA), Telecommunications Technology Committee, Japan (TTC), China Communica-

tions Standards Association (CCSA) and TIA, established to facilitate the globalization of third-generation (3G) standards. The inaugural meeting of 3GPP2 was held in January 1999. In February 2009, the Partnership Project commemorated its 10th anniversary with a celebration hosted in Shanghai, China.

2009 OVERVIEW

The TR-45 Subcommittees and Ad-Hoc Groups were extremely active in 2009 in the development of standards (most in conjunction with 3GPP2) to support inter-technology interworking between HRPD (High Rate Packet Data) and E-UTRAN (evolved UMTS Terrestrial Radio Access Network), cdma2000® 1X and E-UTRAN, and WiMAX and HRPD, the suite of standards for support of femtocells for 1X and HRPD, and continued work on the cdma2000® packet data standards and related features and capabilities such as MIPv6 enhancements and Broadcast Multicast Service (BCMCS) enhancements.

The groups also continued to work on updates to the ITU-R IMT M.1457 for Release 9. Both TR-45.3 and TR-45.5 submitted updates to ITU-R Working Party 5D for the TDMA-Single Carrier (SC) Radio Interface Technology (RIT)

* cdma2000® is the trademark for the technical nomenclature for certain specifications and standards of the Organizational Partners (OPs) of 3GPP2. Geographically (and as of the date of publication), cdma2000® is a registered trademark of the Telecommunications Industry Association (TIA-USA) in the United States.



Regional regulatory activities are also a key focus of the subcommittees...

and for the CDMA-MC RIT, respectively. Looking forward to 2010, TR-45 registered with ITU-R Working Party 5D as an Evaluation Group for IMT-Advanced Candidate RITs. The TR-45. IMT Ad-Hoc Group was re-activated to prepare for the evaluation process in 2009 and 2010.

Regional regulatory activities were also a key focus of the subcommittees, with ongoing work on Lawfully Authorized Electronic Surveillance (LAES) for WLAN and cdma2000® interworking as well as new standards development, jointly with ATIS WTSC, on Commercial Mobile Alert Service (CMAS).

TR-45, through the ESN/UI MID/ MEID Ad-Hoc Group (EUMAG), continues to support the industry on global numbering issues related to migration to Mobile Equipment Identifier (MEID) and E-UIM_ID. One of the primary ongoing issues addressed by the EUMAG during 2009, which will continue in 2010, is research of (with the support of industry participants and the ESN/UI MID Administrators) ESN assignments for UIM IDs derived from ESNs. The ESN Administrator and EUMAG continue to research candidate ranges for the voluntary return of ESN Manufacturer Codes from manufacturers. The EUMAG also continues to partner with other industry groups such as the CDMA Development Group (CDG) in its stellar efforts to reach out and educate companies around the world on the critical need for migration to MEID.

TR-45 groups, as in the past, were actively involved in the preparation of various presentations to address the High Interest Subjects discussed during the Global Standards Collaboration (GSC) 14 meeting held in July 2009.

Going forward, 2010 looks to be another busy year with work on enhancements to cdma2000® 1x, HRPD and femtocells, as well as new work relative to GREEN networks and Machine-to-Machine (M2M) communications. TR-45 will also continue working in support of regulatory

capabilities for LAES and joint work with the ATIS WTSC (Wireless Technology Subcommittee) on CMAS, as well as new joint standards work on interference and co-existence.

2009 ACTIVITIES

Subcommittee TR-45.3, Time Division Digital Technology, is authorized to develop performance, compatibility and interoperability standards for equipment that makes use of the Time Division Multiple Access (TDMA) technology for radio access in a system that supports any combination of international, public, non-public or residential mobile and personal communications.

In 2009, TR-45.3 continued to work jointly with the ATIS Wireless Technologies and Systems Committee (WTSC) Radio Access Network (RAN) Subcommittee to provide updates to the ITU-R Working Party 5D on the TDMA-Single Carrier (SC) in Recommendation ITU-R on IMT-2000. TR-45.3 published the following standards to further support ANSI TIA/EIA-136-G.

- SP-3-4027.360-AD1[E] 136HS *Indoor Overview*, to be published as TIA/EIA-136.360-1[E]
- SP-3-4027.361-AD1[E] 136HS *Indoor*

Physical Layer, to be published as TIA/EIA-136.361-1[E]

- SP-3-4027.362-AD1[E] 136HS *Indoor RLC/MAC*, to be published as TIA/EIA-136.362-1[E]

- SP-3-4027.110-RV2-AD1[E] *RF Channel Assignments*, to be published as TIA/EIA-136.110-B-1[E]

- SP-3-4027.330-AD1[E] *Packet Data Service Overview*, to be published as TIA/EIA-136.330-1[E]

- SP-3-4027.335-AD1[E] *Packet Data Service Radio Resource Management*, to be published as TIA/EIA-136.335-1[E]

- SP-3-4027.370-RV3-AD1[E], to be published as TIA/EIA-136.370-C-1[E]

- SP-3-4027.376-RV3-AD1[E], to be published as TIA/EIA-136.376-C-1[E]

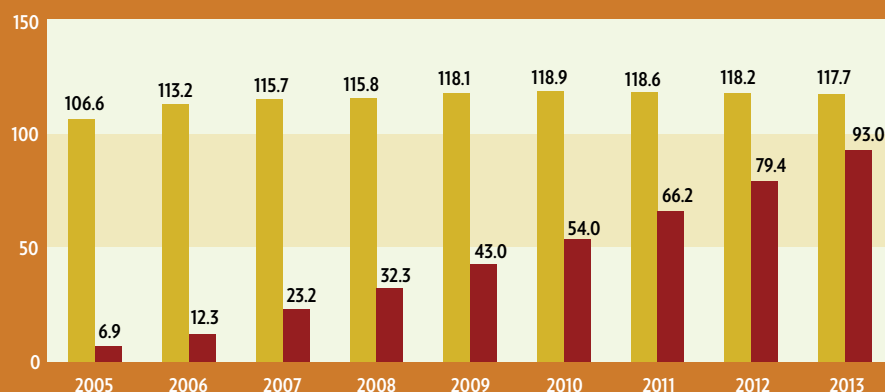
- SP-3-4027.377-RV3-AD1[E], to be published as TIA/EIA-136.377-C-1[E]

- SP-3-4027.440-RV3-AD1[E], to be published as TIA/EIA-136.440-C-1[E]

Looking forward to 2010, Subcommittee TR-45.3 will continue to work jointly with ATIS WTSC-RAN on providing updates to IMT-2000 TDMA-SC in ITU-R M.1457.

Subcommittee TR-45.4, Radio to Switching Technology, is responsible for standards that pertain to the interface between the radio network and those network elements that comprise the infrastructure. Subcommittee

WIRELESS SERVICES REVENUE BY CATEGORY IN THE UNITED STATES (\$ BILLIONS)



Source: TIA's 2010 ICT Market Review and Forecast

VOICE DATA

TR-45.4 continues to work closely with 3GPP2 TSG-A on the development of these standards in support of services to wireless subscribers, service definitions, ancillary apparatus and auxiliary applications related to the Radio Access Network (RAN).

In 2009, Subcommittee TR-45.4 approved several standards for publication, including:

- ▶ TIA-878-B-1, *High Rate Packet Data (HRPD) Interoperability Specification (IOS) Radio Access Network Interfaces with Session Control in the Access Network*
- ▶ TIA-878-C-1, *High Rate Packet Data (HRPD) Interoperability Specification (IOS) Radio Access Network Interfaces with Session Control in the Access Network*
- ▶ TIA-1142, *Interoperability Specification (IOS) for Evolved High Rate Packet Data (eHRPD) Radio Access Network Interfaces and Interworking with Enhanced Universal Terrestrial Radio Access Network (E-UTRAN)*
- ▶ TIA-1143, *Interoperability Specification (IOS) for High Rate Packet Data (HRPD) Radio Access Network Interfaces and Interworking with World Interoperability for Microwave Access (WiMAX)*
- ▶ TIA-1878-B-1, *High Rate Packet Data (HRPD) Interoperability Specification (IOS) Radio Access Network Interfaces with Session Control in the Packet Control Function*
- ▶ TIA-1878-C-1, *High Rate Packet Data (HRPD) Interoperability Specification (IOS) Radio Access Network Interfaces with Session Control in the Packet Control Function*
- ▶ TIA-2001-E-1, *Interoperability Specification (IOS) for cdma2000® Access Network Interfaces*

Looking forward to 2010, Subcommittee TR-45.4 expects to complete standards on HRPD IOS-C addendum 2, E-UTRAN-eHRPD IOS addendum 1, Femto IOS, MSC Pool and more.

Subcommittee TR-45.5, Spread Spectrum Digital Technology, continues to be the industry leader in the publica-

tion of standards for Third Generation (3G) and beyond cdma2000®. TR-45.5, in conjunction with 3GPP2 TSG-C, continues working on the next revision of the cdma2000® Standards for Spread Spectrum Systems series. Numerous cdma2000®-related standards were published (or approved for publication) in 2009. Among the published standards are:

- ▶ TIA-1170, *Recommended Minimum Performance Standards for cdma2000® Ultra Mobile Broadband (UMB) Access Network*
- ▶ TIA-1171, *Recommended Minimum Performance Standards for cdma2000® Ultra Mobile Broadband Access Terminal*
- ▶ TIA-1122-A, *VoIP Codecs and Protocols for cdma2000® Spread Spectrum Systems*
- ▶ TIA-1149-0, *Commercial Mobile Alert Service (CMAS) Over CDMA Systems*
- ▶ TIA-1081-A, *Generic Key Exchange Protocol for cdma2000® High Rate/ Packet Data Air Interface*
- ▶ TIA-801-B, *Position Determination Service for cdma2000® Spread Spectrum Systems*
- ▶ TIA-801-B [SF], *Position Determination Service for cdma2000® Spread Spectrum Systems Software Distribution*
- ▶ TIA-919-B, *Signaling Conformance Specification for High Rate Packet Data Air Interface*
- ▶ TIA-1172, *Test Application Specification for cdma2000® Ultra Mobile Broadband Air Interface*
- ▶ TIA-1122-A, *VoIP Codecs and Protocols for cdma2000® Spread Spectrum Systems*
- ▶ TIA-856-B-2, *cdma2000® High Rate Packet Data Air Interface Specification*
- ▶ TIA-2000.1-E, *Introduction to cdma2000® Spread Spectrum Systems*
- ▶ TIA-2000.2-E, *Physical Layer Standard for cdma2000® Spread Spectrum Systems*
- ▶ TIA-2000.3-E, *Medium Access Control (MAC) Standard for cdma2000® Spread Spectrum*

Systems

- ▶ TIA-2000.4-E, *Signaling Link Access Control (LAC) Standard for cdma2000® Spread Spectrum Systems*
- ▶ TIA-2000.5-E, *Upper Layer (Layer 3) Signaling Standard for cdma2000® Spread Spectrum Systems*
- ▶ TIA-1140, *WiMAX™ — HRPD Interworking: Air Interface Specification*
- ▶ TIA-1138 – *E-UTRAN – HRPD and cdma2000® 1x Connectivity and Interworking Air Interface Specification*
- ▶ TSB-58-I, *Administration of Parameter Value Assignments for cdma2000® Spread Spectrum Standards*
- ▶ TIA-820-D, *Removable User Identity Module for Spread Spectrum Systems*
- ▶ TIA-1080-A, *cdma2000® Application on UICC for Spread Spectrum Systems*
- ▶ *Signaling Test Specification for Mobile Station Equipment Identifier (MEID) Support for cdma2000® Spread Spectrum System*
- ▶ TIA-1030-D, *Band Class Specification for cdma2000® Spread Spectrum Systems*
- ▶ TIA-1173, *Signaling Test Specification for EUTRAN-cdma2000® Connectivity and Interworking*
- ▶ TIA-916-1, *Recommended Minimum Performance Specification for Mobile Stations with Position Service*

During 2009, TR-45.5 provided updates to the ITU-R WP5D Global Core Specifications (GCS) and Roadmap, M.1580 and M.1581, as well as Recommendations M.1457-9 relative to CDMA-MC. Furthermore, the subcommittee actively participated in the joint development of CMAS standards with ATIS. In addition, TR-45.5 has started reviewing contributions pertaining to M2M systems.

TR-45.8, Core Networks, is focused on developing performance, compatibility and interoperability standards for equipment supporting wireless packet data that is independent from, and may be adjunct to, a system that supports any combination of public, non-public or residential mobile and personal communica-



TR-45 Ad Hoc Authentication Group (AHAG), continued to develop drafts of procedures and conduct reviews of requirements related to a great number of security and authentication related topics and issues. During 2009, the AHAG published revision D2 of the *Common Cryptographic Algorithms* and developed PN-3-0361, *Femtocell Security Framework*.

During 2010, the AHAG anticipates recommending that TR-45 approve the *Femtocell Security Framework* as TIA-1169 for publishing.

TR-45 Electronic Serial Number (ESN)/User Identification Module ID (UIM) Mobile Equipment Identity (MEID) Ad Hoc Group (EUMAG), continues to support TIA and partnering organizations on global numbering issues and administrative initiatives. Through TIA, EUMAG has led the industry by providing recommendations on numbering topics of paramount concern to the industry, including the migration to MEID and E-UIMID. MEID global hexadecimal administration, UIM ID administration, ESN reclamation/re-use, and ESN administration including supporting guidelines are under the direction of EUMAG.

One of the primary ongoing issues addressed by the EUMAG during 2009 and continuing in 2010 (with the support of industry participants and the ESN/UIM ID Administrators) is research of ESN assignments for UIM IDs derived from ESNs. The ESN Administrator and EUMAG continue to research candidate ranges for the voluntarily return of ESN Manufacturer Codes from manufacturers. The “virgin” ESN (i.e., those code blocks that have never been assigned to a manufacturer) resources have been exhausted. EUMAG facilitated publication of the updated *ESN Manufacturers Code Assignment Guidelines and Procedures*, which promotes the use of particular identified codes for ESN

tions. In addition, TR-45.8 develops circuit-switched core network, packet data core network and multimedia core network standards. These standards pertain to service definition and network interface standards for support of interoperability and inter-system operations, for interfaces between those network elements that comprise the infrastructure, in support of seamless service to wireless subscribers, other mobile and personal communication network systems, auxiliary systems, and to other networks. TR-45.8 is also developing standards pertaining to regional regulatory capabilities. The subcommittee continues to work closely with 3GPP2 TSG-X and 3GPP2 TSG-S to convert specifications developed in 3GPP2 into TIA standards.

In 2009, Subcommittee TR-45.8 approved 22 standards for publication. Key among these were two versions of the *E-UTRAN — eHRPD Connectivity and Interworking: Core Network Aspects*, two versions of *Mobile Application Part (MAP)*, two standards developed jointly with ATIS for the *CMAS Joint ATIS/TIA CMAS Mobile Device Behavior Specification* and *Joint ATIS/TIA CMAS Federal Alert Gateway to CMSP Gateway Interface Specification*, a new revision of *cdma2000® Packet Data Network*, a new revision of *Enhanced Wireless 9-1-1 Phase 2, Lawfully Authorized Electronic Surveillance (LAES)* for

Wireless Local Area Network (WLAN) Interworking, *MAP Support for Mobile Equipment Identifier (MEID)*, and *WiMAX-HRPD Interworking: Core Network Aspects*.

In addition, the following System Requirements and Stage 1 standards were published: *System Requirements for Femtocell Systems*, *Packet-Switched Video Telephony Stage 1 Requirements*; *Network Evolution System Requirements Document*; *Evolution of UMB SRD, HRPD/1xRTT and 3GPP E-UTRAN (LTE) Interworking and Inter-Technology Handoff Stage 1 Requirements*; *HRPD-cdma2000® 1x Interoperability for Voice and Data System Requirements* and new versions of *Wireless Feature Description* and *System Requirements for MSC Pool*. Two revised architecture specifications were also published: *ALL IP Network Architecture Model* and *UMB Network Architecture Model*.

Looking forward to 2010, Subcommittee TR-45.8 will continue to play a significant role in joint standards development work with ATIS to support CMAS. A new project has been initiated, *Joint ATIS/TIA Certification and Testing of the CMAS C-interface*. The ad hoc Lawful Intercept Group (LIG) will continue its study on LAES support in femtocells. Additionally, TR-45.8 will continue its ongoing efforts to convert 3GPP2 core network, system requirements, and network architecture specifications into TIA standards.

CONTINUED ON PAGE 32

THE WORLDWIDE REACH

Fiber Optics

- User Premises Telecommunications Cabling Infrastructure (TR-42)
- Fibre Optics (IEC TC86)
- Fibre Optics US Technical Advisory Group (IEC TC86 US TAG)
- Optical Radiation Safety and Laser Equipment (IEC TC76)
- Optical Radiation Safety and Laser Equipment US Technical Advisory Group (IEC TC76 US TAG)

- BICSI
- IEC International Electrotechnical Commission
- ICEA Insulated Cable Engineers Association

Mobile Communications

- Mobile and Personal Private Radio Standards (TR-8)
- Point-to-Point Communications Systems (TR-14)
- Mobile and Personal Communications Systems (TR-45)
- Terrestrial Mobile Multimedia Multicast (TR-47)
- Third Generation Partnership Project (3GPP2) Secretariat and Partner

- ARIB Association of Radio Industries and Businesses – Japan
- CCSA China Communications Standards Association – China
- TTA Telecommunications Technology Association – Korea
- TTC Telecommunications Technology Committee – Japan
- ETSI European Telecommunications Standards Institute
- APCO Association of Public-Safety Communications Officials International
- Project MESA Public Safety Partnership Project
- FLO (Forward Link Only) Forum
- DVB Digital Video Broadcasting Project
- CDG CDMA Development Group
- MEF Metro Ethernet Forum
- ATIS Alliance for Telecommunications Industry Solutions



tiaonline.org



TIA MANAGED Committees



OTHER ORGANIZATIONS

OF TIA STANDARDS

- ANSI American National Standards Institute
- SES Standards Engineering Society
- IEC USNC IEC United States National Committee
- INCITS International Committee for Information Technology Standards
- ECCB Electronics Components Certification Board

ETSI European
Telecommunications
Standards Institute

Satellite

Satellite Equipment
and Systems (TR-34)

User Premises and Components

- Multi-Media Access, Protocols and Interfaces (TR-30)
- User Premises Telecommunications Requirements (TR-41)
- User Premises Telecommunications Cabling Infrastructure (TR-42)
- Cables, Wires, Waveguides, R.F. Connectors, and Accessories for Communication and Signaling (IEC TC46)
- Cables, Wires, Waveguides, R.F. Connectors, and Accessories for Communication and Signaling US Technical Advisory Group (IEC TC46 US TAG)
- Interconnection of Information Technology Equipment (JTC1/SC25)

Device-to-Device Communications

- Vehicular Telematics (TR-48)
- ISO Intelligent Transport Systems US Technical Advisory Group (ISO TC204 USTAG)
- ISO Intelligent Transport Systems Secretariat (ISO TC204)
- Healthcare Information Communications Technology (TR-49)
- Smart Device Communications (TR-50)

- ACTA Advisory Council on Terminal Attachments
- ATIS Alliance for Telecommunications Industry Solutions
- BICSI
- ETSI European Telecommunications Standards Institute
- ISO International Organization for Standardization
- IEC International Electrotechnical Commission
- ITU International Telecommunication Union

- ISO - International Organization for Standardization
- American National Standards Institute (ANSI) - Health IT Standards Panel (HITSP)

CONTINUED FROM PAGE 29

assignments, and June 30, 2010, was the last date for receipt of an ESN MFR Code Block request (see, ESN Guidelines Version 2.1: Section 5.13).

The EUMAG continues to reach out and work closely with related industry fora. Under the direction of TR-45, EUMAG sustains a working

relationship with 3GPP2 on MEID, expanded UIM ID and other related topics. Additionally, the work of the EUMAG includes maintaining the editorship of the *TIA ESN Assignment Guidelines & Procedures*, the *TIA MEID Global Hexadecimal Administrator (GHA) Assignment Guidelines and Procedures*, and of the *3GPP2 User Identification Module ID Manufacturer's Code Assignment Guidelines and Procedures*.

The first Global Wireless Equipment Identifier Numbering Resources & Administration Joint Experts Meeting (JEM) was held in September

2009. The JEM addressed Global Wireless Equipment Numbering Identifier Resources and Administration, moderated by the EUMAG Chair and hosted by the TIA GHA (MEID) Administrator and the GSMA GDA (IMEI) Administrator.

As a leader in the industry, the EUMAG continues to educate through outreach awareness programs, working closely with the CDMA Development Group (CDG) in the management of the ESN exhaust timeline and transition to MEID. In addition to ongoing ESN Administrator visits with mobile station

To find out more about participating in TR-45, please contact Teesha Jenkins: tjenkins@tiaonline.org, +1.703.907.7706.

TR-45: MOBILE AND PERSONAL COMMUNICATIONS SYSTEMS



TR-45 CHAIR: JANE BROWNLEY
Alcatel-Lucent

TR-45 VICE CHAIR: GERARD FLYNN
Verizon Wireless

TR-45 SECRETARY: VICTORIA MITCHELL
TIA

SUBCOMMITTEES AND AD HOC GROUPS

TR-45.3 Time Division Digital Technology
CHAIR: Peter Musgrove, *AT&T*

TR-45.4 Radio to Switching Technology
CHAIR: David Ott, *Qualcomm Inc.*

TR-45.5 Spread Spectrum Digital Technology
CHAIR: Orlett Pearson, *Alcatel-Lucent*

TR-45.8 Core Networks
CHAIR: Betsy Covell, *Alcatel-Lucent*

TR-45 Ad Hoc Authentication Group (AHAG)
CHAIR: Frank Quick, *Qualcomm Inc.*

TR-45 Ad-Hoc Group on UIM/ESN/MEID (EUMAG)
CHAIR: Gary Pellegrino, *CommFlow Resources*

TR-45 Ad-Hoc on Electronic Media Documentation (AHM)
CHAIR: Peter Nurse, *Sigma Delta Communications*

TR-45 Ad-Hoc on International Mobile Telecommunications (AHIMT)
CHAIR: Peter Nurse, *Sigma Delta Communications*

TR-45 COMPANY PARTICIPANTS

Aeroflex, AirCell, LLC, Airvana, Inc., Alcatel-Lucent, ALLTEL Comm., Inc., Apple, AT&T, Bell Canada, Bridgewater Systems Inc., CDMA Development Group, Cingular Wireless, Cisco Systems, Inc., CML Microcircuits (USA) Inc., CommFlow Resources Inc., CSI TeleComm., Inc., Defense Information Systems Agency, Dolby Laboratories Inc., Ericsson Inc., FBI, FTR&D LLC, Fujitsu Network Comm., Gemalto Inc., Hitachi Telecom (USA) Inc., Huawei Technologies USA, Hughes Network Systems, LLC, Intel Corp., Intrado, Intrado, IP Fabrics, Kyocera Telecomm. Research Corp., LG InfoComm U.S.A., Inc., Lockheed Martin Corp., Motorola Inc., Movius Interactive Corp., National Comm. System, NeuStar Inc., Nokia Inc., Nortel Networks, ORCA SYSTEMS, INC., Panasonic Corp. of North America, Prysmian Cables and Systems, Qualcomm, Research In Motion Corp., Rogers Wireless, Rohde & Schwarz, Inc., RTKL Associates Inc., Samsung Electronics, Samsung Telecom America, Sierra Wireless America, Inc., Sigma Delta Comm., Inc., Sprint Nextel, SS8 Networks, Inc., Starent Networks Corp., Tata Systems, Telcordia Technologies, TeleCommunication Systems, Inc., TerreStar Networks, Texas Instruments, Inc., US Cellular, UTStarcom, Inc., Verizon Comm., VIA Telecom, ZTE USA Inc.

manufacturers, TIA and CDG made visits in 2009 to many infrastructure vendors and carriers, including China Telecom in China; Zoom, Multi-Links, Starcomms, and Visafone in Africa; and Reliance Communications in India, to help the industry understand MEID and E-UIMID implementation urgency and to assist in any issues that may exist. TIA and CDG also held a successful CDMA Numbering Roundtable in Mumbai, India, with attendees from Indonesia such as BTBakari, Gemalto, Eastcompeace and Bluefish in November 2009.

TIA has posted ESN and MEID resource documents developed by the EUMAG and related information on the TIA Website. A list of answers to Frequently Asked Questions (FAQs) and the milestone timelines for ESN migration to MEID, as well as related links, are available on the Website. Moreover, a TIA ESN white paper, developed by EUMAG under the auspices of the TIA Wireless Communication Division (WCD) as recommended by TR-45 to raise awareness of ESN exhaust and the need to continue expedited migration to MEIDs can also be found online.

MEID assignments have been ongoing since the initial ones were made in January 2006. MEID and E-UIMID system implementations continue industry-wide.

TR-45 Ad Hoc Group on Electronic Media Documentation (AHM),

continues to recommend the use of electronic methods to support the work of Committee TR-45. In 2009, the implementation of the electronic sign-in capability and Web-based calendar, both championed by the AHM, were actualized. In 2010, AHM plans to champion the use of software (e-tools) to support collaborative development of standards.

TR-45, Ad Hoc Group on International Mobile Telecommunications (AHIMT), at the direction of Committee TR-45, registered as an independent evalua-



tion group of the proposals for candidate radio interface technologies for the terrestrial components of radio interface(s) for IMT-Advanced. TR-45 amended the scope and charter of the AHIMT to include its function as an independent evaluation group. In general, the scope of the AHIMT is to evaluate selected proposals to establish, to the extent possible, whether the proponents have demonstrated compliance with the requirements of IMT-Advanced and to assist formulating groups within TR-45 with submission of proposals as requested.

AHIMT activities in 2009 were primarily in response to the ITU-R WP5D *Liaison Statement to Independent Evaluation Groups on Expectations and Timeframes on the Evaluation of Candidate IMT-Advanced Technologies*. The AHIMT began its work in earnest after the receipt of the candidate proposals in October 2009. Via face-to-face meetings, supplemented by discussion on its email reflector, the

work of the AHIMT is based on input contributions from member organizations, and the output of the AHIMT is approved by Committee TR-45 prior to transmittal to external organizations. The work of the AHIMT also includes interaction with the candidate technology proponents and other evaluation groups, and monitoring the ITU Correspondence Group for the evaluation groups. The AHIMT chair has participated in related workshops in Dresden, Beijing and San Diego thus far. The AHIMT is conducting an assessment of the candidate technologies utilizing the ITU-R evaluation guidelines. TR-45 approved an Interim Report on the activities of AHIMT to the February 2010 meeting of the ITU-R WP5D. In 2010, the TR-45, AHIMT plans to continue its assessment and to complete a Final Report for submission to the June 2010 meeting of ITU-R WP5D subject to the approval of Committee TR-45.

TR-47: Terrestrial and Non-Terrestrial Mobile Multimedia Multicast (TM³)



These standards are key enablers for the convergence of television and mobile phones.

SINCE 2005, ENGINEERING COMMITTEE TR-47 HAS BEEN RESPONSIBLE FOR THE development and maintenance of voluntary downlink standards for terrestrial and non-terrestrial mobile multimedia multicast systems. These standards are intended to be employed by users and suppliers to promote compatible and interoperable systems to support multicast audio, video and data requirements for a wide range of commercial and public services.

The Engineering Committee and its two subcommittees focus on standards for radio interfaces, testing methodologies, performance/service and reliability/control standards, and equipment design/implementation guides as they relate to terrestrial and non-terrestrial mobile multimedia multicast.

SIGNIFICANT ACCOMPLISHMENTS

A number of standards were developed and approved during 2009 by the TR-47 subcommittees including several dealing with Forward Link Only Air Interface. These standards are key enablers for the convergence of television and mobile phones and have resulted in a wireless application known as Mobile TV, which offers high quality TV services and other multimedia streams over cellular phones. Summaries of those standards are presented in the subcommittee sections below.

In addition to those accomplishments, the committee and its two subcommittees completed an Emergency Alerts System requirements review and an initial document for the committee's use and sharing with other organizations.

2009 OVERVIEW

Significant work was accomplished by the committee to support growing deployments of mobile multimedia multicast systems. Committee participants continued their steady work pace, building on past accomplishments.

With the high level of global cooperation required to support growing market needs, the committee continues to interact with a number of external organizations including the Associa-

tion of Radio Industries and Businesses (ARIB), European Telecommunications Standards Institute (ETSI), 3rd Generation Partnership Project (3GPP), Digital Video Broadcasting (DVB) Project, and the FLO Forum (Forward Link Only Forum).

2009 ACTIVITIES

TR-47.1, TM³ Based on Forward Link Only Air Interface Subcommittee, is responsible for the development and maintenance of downlink standards for a subclass of terrestrial and non-terrestrial mobile multimedia multicast systems.

The subclass is characterized by the combination of the following features, among others: purpose-built; high spectral efficiency; multiple simultaneous services; layered modulation and service support; advanced coding; customized transport methods, statistical multiplexing of variable-rate services; high-quality audio, video and data; and content protection. The subclass provides multiple coverage areas (wide and local) within a single radio frequency (RF) channel, and supports different quality of service (QoS) for different services within a single RF channel and a single service. In addition, it promotes fast switching time between services, minimized receiver power consumption without sacrificing the time-diversity performance or the speed of service switching regardless of the

service rate, and a deterministic frame structure based on a time synchronizing signal such as a Global Positioning System (GPS).

These standards are intended to be employed by users and suppliers to promote compatible and interoperable systems to support multicast audio, video and data requirements for a wide range of commercial and public services.

This subcommittee developed and ratified five standards published in 2009:

- ▶ TIA-1102 Rev. A, *Minimum Performance Specification for Terrestrial Mobile Multimedia Multicast Forward Link Only Devices*
- ▶ TIA-1103 Rev. A, *Minimum Performance Specification for Terrestrial Mobile Multimedia Multicast Forward Link Only Transmitters*
- ▶ TIA-1099 Rev. A, *Forward Link Only Air Interface Specification for Terrestrial and Non-Terrestrial Mobile Multimedia Multicast*
- ▶ TIA-1146, *Forward Link Only Conditional Access (Open CA) Specification*
- ▶ TIA-1178, *Forward Link Only System Information (SI) Specification*

The subcommittee members anticipate additional new and significant projects for 2010.

TR-47.2, TM³ Based on Digital Video Broadcasting for Handheld Air Interface, is responsible for the development and maintenance of downlink standards for a subclass of terrestrial and non-terrestrial mobile multimedia multicast systems based on Digital Video Broadcasting for Handheld (DVB-H) devices technology.

TR-47.2 specifications encompass, but are not limited to, transmission systems, implementation guides, validation of transmission



To find out more about participating in TR-47, please contact Teesha Jenkins: tjenkins@tiaonline.org, +1.703.907.7706.

TR-47: TERRESTRIAL MOBILE MULTIMEDIA MULTICAST (TM³)



CHAIR, TR-47: JERRY UPTON

Jerry Upton Consulting

VICE-CHAIR, TR-47: KEN BIHOLAR

Alcatel-Lucent

SUBCOMMITTEES

TR-47.1 TM³ Based on Forward Link Only Technology

CHAIR: Carl Stevenson, *WK3C Wireless LLC*

TR-47.2 TM³ Based on DVB-H Technology

CHAIR: Ken Biholar, *Alcatel-Lucent*

TR-47 COMMITTEE PARTICIPANTS

Airvana, Inc., Alcatel-Lucent, Corning Inc., Dolby Laboratories Inc., Electronics Research, Inc., Ericsson Inc., FLO Forum, FTR&D LLC, Harris Corporation, Intel Corporation, J. Upton Consulting, Kyocera Telecomm. Research Corp., LG InfoComm U.S.A., Inc., Motorola Inc., National Comm. System, Nokia, Nortel Networks, Panduit Corporation, Qualcomm, Rogers Wireless, Rohde & Schwarz, Inc., Samsung Telecomm. America, SkyTerra Comm., Sprint Nextel, Texas Instruments, Inc., Verizon Comm., WK3C Wireless LLC

systems, and appropriate ETSI documents related to DVB-H devices. These standards are intended to be employed by users and suppliers to promote compatible and interoperable systems to support multicast audio, video and data requirements for a wide range of commercial and public services.

A new project was completed to support satellite hybrid systems consistent with standardization work in ETSI and the DVB Project. The new specification, TIA-1168, *Terrestrial Mobile Multimedia Multicast Based on Digital Video Broadcasting for Handheld Devices Using Satellite, Terrestrial or Hybrid Networks Operating Below 3 GHz*, was published in 2009. A number of liaisons continue with other organizations.

TR-48: Vehicular Telematics

SINCE 2007, ENGINEERING COMMITTEE TR-48 HAS BEEN RESPONSIBLE FOR THE development and maintenance of voluntary standards relating to vehicular telematics equipment and services and intended to be employed in support of vehicular telematics.

Telematics service providers have the capability to transmit vital automobile crash information to emergency responders immediately following an incident. This data has the potential to assist in the prediction and identification of critical injuries, as well as to provide information for victim extrication efforts. Additionally, crash data will allow emergency responders to more accurately predict what rescue and medical equipment will be needed at the scene.

TIA-48 recognizes that the delivery of consumer (e.g., crash) and commercial (e.g., trucking, and specifically hazmat) telematics data to Intelligent Transport Systems (ITS) and emergency response agencies in real time would enhance public safety. When available on a timely basis to transportation and other agencies, such data can save the lives of victims and responders, help alleviate congestion and reduce the number of ensuing additional incidents. The key is data interoperability among all the organizations affected by and responding to the emergency, not just those in transportation.



TSPs have the capability to transmit vital automobile crash information to emergency responders immediately following an accident.

SIGNIFICANT ACCOMPLISHMENTS

TR-48 began work on a standard for Emergency Information Delivery Protocol, to be published as TIA-1153. The project goal is to enable sharing incident data and information among TSPs and appropriate organizations.

Although COMCARE has developed the general approach to delivering consumer telematics data, the issue is whether this approach will work for other incident or sensor types. To cover the near-term situation that most emergency agencies do not have interfaces to XML standards, an emergency incident Website could be developed to display a wide variety of incident data. The project scope is twofold:

Conduct research on related telematics emergency information delivery efforts including, but not limited to, COMCARE Vehicular Emergency Data Set (VEDS), Healthcare Information Technology Standards Panel (HITSP) Emergency Responder Electronic Health Record (ER-EHR), IEEE Vehicular Technology Society/ Intelligent Transportation Systems (VTS/ITS) Common Incident Management Message Sets, and SAE Location Referencing Message Specification (LRMS) and Message Set Dictionary, and OASIS Common Alerting Protocol (CAP) and

Emergency Data Exchange Language (EDXL).

Determine feasibility and describe the architecture, protocol, core services middleware, interfaces, registration and policies for a common middleware protocol for emergency information exchange.

2009 OVERVIEW

Telematics service providers have the capability to transmit vital automobile crash information to emergency responders immediately following an incident. The key is data interoperability between all the organizations affected by and responding to the emergency, not just those in transportation.

Information from telematics service providers and commercial fleet tracking companies is generally not available to the emergency response community, despite their ability to provide critical information such as crash data, vehicle location and, in the case of trucks, cargo content. Rapid identification of substances posing potential public health and environmental threats would allow immediate notification of the proper agencies in case of vehicle collision or spill. Evacuation orders or emergency instructions could be rapidly disseminated via alerting systems. Commercial

drivers and the general public could additionally benefit from more timely traffic emergency situation alerts, rather than the current, often multi-step, generally voice, and cumbersome notification of ITS systems by public safety organizations.

Over several years, COMCARE and its members have designed an approach and architecture that would radically improve this information flow, linking automotive and trucking entities on the one hand with emergency response and traffic agencies on the other. Most of the effort has focused on consumer telematics. The issue at hand is whether the same approach and architecture can be used for trucking data and other mobile sensor information. Similarly, can it be used in reverse for standards-based emergency alerting such as weather, terrorist, Amber and traffic alerts? The committee believes it can serve both needs and is economically and architecturally sound. However, the issue has not been subjected to intensive discussions beyond consumer telematics.

Detailed requirements work indicates that the solution needs to be agnostic as to legacy agency IT applications and local/regional networks. Most emergency agencies today do not have the ability to accept data from external sources; they do not yet have interfaces to the XML standards identified above. However, almost all do have Internet connections, or could get them easily. An interim step to allow rapid sharing of such data cheaply is to provide the data using the above messaging standards to an “emergency incident Website” and display it on an electronic map. This would be available to all emergency response agencies. Agency subscribers would be able to see only their area and adjacent jurisdictions. Over time, registration for the Website could become registration for the core services described above or governed by them.

2009 ACTIVITIES

TR-48 held monthly and ad hoc teleconferences and issued 12 meeting reports in 2009 with the following highlights:

Kevin Lu, TR-48 Chair, participated in the SAE International’s DSRC (Dedicated Short Range Communication) Technical Committee, which sets the SAE Standard J2735_200911 on DSRC Message Set Dictionary. This SAE Standard specifies a message set, and its data frames and data elements specifically



for use by applications intended to utilize the 5.9 GHz Dedicated Short Range Communications for Wireless Access in Vehicular Environments (DSRC/WAVE) communications systems. Although the scope of this standard is focused on DSRC, this message set, and its data frames and data elements have been designed, to the extent possible, to also be of potential use for applications that may be deployed in conjunction with other wireless communications technologies.

Dave Kraft, TR-48 Vice Chair, participated in the American Trucking Association (ATA) Technology and Maintenance Council (TMC) and the Wireless Roadside Inspection (WRI) Program conducted by the Federal Motor Carrier Safety Administration (FMCSA) and the National Transportation Research Center Inc. (NTRCI). The focus is on improving motor carrier safety through wireless roadside inspections that use real-time data to establish the identities of the commercial motor vehicles, carriers and drivers and to electronically examine driver status and vehicle condition. These data will be collected from the vehicle and provided wirelessly, either from the vehicle or from the carrier’s operations center. One of the WRI Pilot Tests will utilize Commercial Mobile Radio Systems (CMRS) to transmit Safety Data Message Sets (SDMS), including data from Electronic On-Board Recorders (EOBRs).



Dave Kraft also represented TR-48 at the Harmonization Council meeting on April 17, 2009, during the First International Summit on the State of the Connected Vehicle with Primary Focus on Policy and Strategy for Deployment sponsored by CVTA (the Connected Vehicle

Trade Association) and SAE International in Detroit.

A highlight of TR-48 activities was included in TIA presentations by Dan Bart and Russell Shields during the Global Standards Collaboration meeting GSC-14 in Geneva, Switzerland, July 13-16, 2009.

In addition, TR-48 tracks the development of other vehicular telematics standards such as the ISO TC204 WG16 (Wide Area Communications/Protocols and Interfaces) and WG 17 (Nomadic Devices in ITS Systems), and the ITU-T SG16's Vehicle Gateway Platforms (VGP) Ad Hoc Group; and related activities of the GENIVI Alliance, the 'ng Connect Program,' the ITS America's North American Traffic Working Group (NATWG), and the National Information Exchange Model (NIEM) and Unified Incident Command and Decision Support (UICDS).

To find out more about participating in TR-48, please contact Ronda Coulter: rcoulter@tiaonline.org, +1.703.907.7974.

TR-48: VEHICULAR TELEMATICS



CHAIR, TR-48: KEVIN LU
Telcordia Technologies, Inc.

VICE-CHAIR, TR-48: DAVE KRAFT
Qualcomm, Inc.

TR-48 COMMITTEE PARTICIPANTS

Alcatel-Lucent, COMCARE, Hughes Network Systems, LLC, Intertek Testing Services, OnStar Corp., Qualcomm Inc., Rogers Wireless, Sigma Delta Comm., Inc., Telcordia Technologies, Inc., Ygomi LLC

TR-49: Healthcare ICT

ENGINEERING COMMITTEE TR-49, ONE OF TIA'S NEWEST ENGINEERING

Committees, founded in 2007, is responsible for development and maintenance of standards for healthcare ICT applications that involve medical devices, network infrastructure, applications and operations support.

SIGNIFICANT ACCOMPLISHMENTS

Due to the complexity of both the technical and the market ecosystem surrounding tele-health, the committee Chair, together with TIA staff Cheryl Blum and Henry Cuschieri, established a TIA Health ICT Forum. The goal of this forum is to broaden the discussion beyond standards development and to look at health ICT opportunities, requirements and challenges. The forum identified the following potential areas of interest:

The creation of a health records/standards template. It is noted that other bodies are looking at this, but there are still issues of how to use defined formats.

The delivery of information and issues of security, authentication, and authorization.

The use of clearinghouses to take care of privacy issues and authorize access to information. Is this of value to industry and are there certain interfaces to standardize?

The use of sensors/monitors to gather medical information. These devices can be connected to cell phones and used to collect information.

Transmission to monitoring centers and healthcare facilities and the development of ways to communicate between sensors.

2009 ACTIVITIES

The committee continued to take actions to investigate the various ICT areas at the heart of the tele-healthcare ecosystem:

- ▶ Device systems
- ▶ Network infrastructure
- ▶ Applications/services
- ▶ Operations support

The committee met several times during the year and stimulated increased participation.

The committee focused on data integrity and encryption considerations, which are a part of the evolving frameworks for the delivery of communications and multimedia services over Internet protocol (IP) networks. These frameworks provide the ability to seamlessly access and provision services over wireless and wire-line devices, make Internet and Web technologies available nearly anywhere, and support cutting-edge services combining multimedia, geolocation and context awareness. These frameworks can provide a powerful new way to deliver health information technology (HIT) services, especially for those requiring mobility. The committee is working synergistically with



The committee proposed that one of its work areas be standardization of services and architectures to support health information technology on a future service-enabled network for healthcare.



To find out more about participating in TR-49, please contact Ronda Coulter: rcoulter@tiaonline.org, +1.703.907.7974.

TR-49: HEALTHCARE ICT



CHAIR, TR-49: SHOSHANA LOEB
Telcordia Technologies, Inc.

TR-49 COMMITTEE PARTICIPANTS

Alcatel-Lucent, AT&T, Belden Networks Division, CommScope Network Solutions, Harris Corp., Motorola Inc., Nortel Networks, Panasonic Corp. of North America, Panduit Corporation, Qualcomm, Inc., Sigma Delta Comm., Inc., Telcordia Technologies, Tyco Electronics

the Healthcare Information Technology Standards Panel (HITSP), a federally-funded panel with the objective of harmonizing standards in the healthcare industry to enable and advance interoperability of HIT applications. TR-49 has used the HITSP defined-use cases in the past and is now looking at its activities in the area of maintaining the integrity of consumer information, especially electronic medical records and their registries and clearinghouses.

The committee developed its defined work product and is prepared to start with a focused standard activity in the area of data integrity and encryption-preserving interfaces to medical information in the next quarter.

Members will continue to support the TIA Health ICT Forum to explore market needs as the Health ICT continues to evolve in anticipation of a major paradigm shift in the market.



NEW

TIA TR-50: Smart Device Communications

TIA'S NEWEST ENGINEERING COMMITTEE TR-50, SMART DEVICE COMMUNICATIONS,

was established in December 2009 and is responsible for the development and maintenance of access-agnostic interface standards for monitoring and bi-directional communication of events and information among smart devices and other devices, applications or networks.

These standards development efforts pertain to, but are not limited to, the functional areas as noted:

- ▶ Requirements
- ▶ System architecture
- ▶ Cross-industry communications
- ▶ Leverage existing (and future) physical infrastructure
- ▶ Information models (state diagrams)
- ▶ Security (e.g., data content, mutual authentication)
- ▶ End-to-end performance and scalability of equipment and networks
- ▶ Network management/operations
- ▶ Device management (including discovery and identity)
- ▶ Protocols
- ▶ Minimum performance, conformance and interoperability testing

Dr. Jeff Smith of Numerex and Mr. Jim Wert of ILS Technology were elected chair and vice chair of TR-50, respectively, in early 2010.

TR-50's goal is to develop a smart device communications framework that can operate over different underlying transport networks such as wireless and wired and that can be adapted to a given transport network by means of an adaptation/convergence layer. The TR-50 framework will make its functionality available to applications through a well-defined application programming interface (API) that is agnostic to the vertical application domain, such as e-Health, the Smartgrid, industrial automation.

TR-50 works with other TIA engineering committees and non-TIA standards fora (international or national standards) to ensure

end-to-end functionality and interoperability, to avoid overlap or duplication of work, and to foster collaboration and coordination among organizations addressing various components of smart device communications systems.

TR 50.1, Requirements and Architecture, was established shortly after the committee's formation. Peter Nurse of Sigma Delta Communications and Mitch Tseng of Huawei were elected chair and vice chair of the subcommittee, respectively.

Subcommittee TR-50.1 has been assigned the authority of a formulating group (as defined in the *TIA Engineering Manual*), which includes the authority to develop and maintain publications such as TIA Standards, American National Standards and TIA Telecommunications Systems Bulletins (TSBs). Such publications pertain to the access-agnostic, such as physical layer, and graphical user interface-agnostic, monitoring and bi-directional communication of events and information among smart devices and other devices, applications or networks. The scope of work of Subcommittee TR-50.1 includes publications pertaining to requirements that are to be agnostic to the application, such as e-Health, the Smartgrid, industrial automation, but will reflect the requirements of the applications of interest. Examples of such publications include use cases and stage-1 descriptions.

TR-50.1's scope of work also includes publications pertaining to system architecture designed to be agnostic to the application, but reflecting the requirements of the applica-

tions of interest, including their information models. Such publications include, for example, descriptions of the functional elements, definitions of relationships between functional elements, definitions of relationships between functional elements and elements external to the system, data flow diagrams, control flow diagrams, and definitions of the application program interface, state diagrams and stage-2 descriptions.

Lastly, TR-50.1 will undertake the development and maintenance of publications pertaining to data models. These models will be designed to be agnostic to the application, but will reflect the requirements of the applications of interest. Examples of such publications include stage-3 descriptions and XML schema.

Subcommittee TR-50.1 will be taking account security (data content, authentication, signaling), end-to-end performance and scalability of equipment and networks, and device management (including discovery and identity). In addition, preliminary discussions within TR-50.1 indicate that the standardization effort should take place at the gateway level. However, further work is needed to confirm this position.

In particular, TR-50.1 recognizes that extensive work is needed to define the smart device communications universe and its components (definition of terms). In order to clarify this work, review of related use cases is under way.

TR-50 is exploring cooperation opportunities with academic institutions, in particular with Georgia Institute of Technology (GT or Georgia Tech). Meetings have taken place with GT information Security Center (ISC), GT Center for Experimental Research in Computer Systems (CERCS) and the GT Smart Antenna Research Lab (SARL). TR-50 has approved the investigation of ways to cooperate more closely with Georgia Tech, particularly in the area of security, as this is considered critical for smart device communications, through some kind of association, possibly with GTISC.

TR-50 aims to determine “zones” of standardization for which TIA can take a global leading role and provide an original contribution worldwide (where TIA can differentiate itself effectively). Such an area could be deemed an “Engineering Area of Global Leadership and Expertise” or EAGLE™.

TR-50 has tentatively put together a meeting plan for the balance of 2010, including participation at the Connected World Conference in Chicago in June with a keynote address by the TR-50 Chairman on “The Coming of Age of M2M Standards”; participation in October in Los Angeles at TMC (Technology Marketing Corporation)’s ITEXPO West 2010, which includes several shows directly related to smart device communications; and other types of collaboration with Standards Developing Organizations (SDOs) and similar groups.

TR-50 has embarked on outreach initiatives, including the promotion of the TR-50 meetings and activities through press releases and articles, as well as participation at related conferences and trade shows, such as the CTIA M2M Zone on March 24, 2010, in Las Vegas, where Dr. Smith, TR-50’s Chair, was invited to participate on the panel on M2M Enabled Supply Chains & Networked Device Management and “Connectivity Week” in May 2010 in Santa Clara, Calif., where Jim Wert, TR-50’s vice chair, was an invited speaker.

To find out more about participating in TR-50, please contact Ronda Coulter: rcoulter@tiaonline.org, +1.703.907.7974.

TR-50: SMART DEVICE COMMUNICATIONS



CHAIR, TR-50: JEFFREY SMITH
Numerex

VICE-CHAIR, TR-50: JIM WERT
ILS Technology

SUBCOMMITTEE

TR 50.1, Requirements and Architecture

CHAIR: Peter Nurse, *Sigma Delta Communications*

VICE-CHAIR: Mitch Tseng, *Huawei*

TR-50 COMMITTEE PARTICIPANTS

Allan Angus, Alcatel-Lucent, Cisco Systems, Inc., Ericsson, Farance Inc, Huawei, ILS Technology, Intel, Intercon Systems, LG Electronics, Mitsubishi Electric, Motorola Inc., Numerex, Qualcomm, Inc., Samsung, Sigma Delta Communications, Inc., Sprint, Thales Communications, Inc., Tyco Electronics, Ulticom, Verizon, VIA Telecom, VoCAL, WirefreeCom, Inc., WK3C Wireless LLC

TIA Global Involvement



In addition to facilitating the development of standards in the United States, TIA promotes the use of U.S. standards internationally and advocates U.S. policy and technical positions in international and regional standards organizations. TIA is active in numerous international standards development activities through participation in the International Electrotechnical Commission (IEC), International Organization for Standardization (ISO) and the International Telecommunication Union (ITU).

U.S. positions on technical — and certain policy — issues under consideration within the IEC and ISO technical committee structures are developed by approved U.S. Technical Advisory Groups (TAGs) and forwarded to the international bodies as a U.S. position. US TAGs also nominate the experts who will represent the United States in technical committee discussions at IEC and ISO meetings around the world. International standards development technical committees are administered by secretariats.

Currently, TIA administers four International secretariats and 16 US TAGs to International Technical Standards Committees. TIA is also an active partner in 3GPP2. TIA shares members, co-develops standards and houses the secretariat of 3GPP2. The following sections highlight some of these activities.

The graphical illustration on page 32 depicts the Worldwide Reach of TIA Standards and our commitment to working with other organizations globally in the development of standards for the entire ICT industry.

ISO/IEC JTC 1/SC 25: Interconnection of Information Technology Equipment

TIA SERVES AS THE ADMINISTRATOR OF THE U.S. TECHNICAL ADVISORY GROUP

(US TAG) of Subcommittee 25, a committee of the Joint Technical Committee on Information Technology (JTC-1), operating under the auspices of the International Organization for Standardization (ISO) and the International Electrotechnical Commission (IEC).

SC25 focuses on the standardization of microprocessor systems and of interfaces, protocols, architectures and associated interconnecting media for information technology equipment and networks, generally for commercial and residential environments, to support embedded and distributed computing environments, storage systems and other input/output components. This scope includes requirements for components but excludes component specifications. It excludes the development of standards for public networks and interfaces to public networks.

2009 OVERVIEW

At the end of the Report Period, there were 243 active projects assigned to JTC 1/SC 25. Of these, 188 are published IEC or ISO/IEC Standards, Technical Reports, Amendments and Corrigenda. A total of eight documents with 549 pages was published from October 2008 to September 2009, not including 74 parts of ISO/IEC 29341 with 2,700 pages ready for publication at the last plenary. Of the remaining 40 projects, 12 are at Final Draft International Standard or Final Draft Amendment stage. A complete listing of the Projects including published standards and technical reports from JTC1/SC25 is included in the program of work as distributed SC 25 Secretary.

The most recent meeting of JTC 1/SC25 was held September 11, 2009, in Beijing, China. Eighteen countries were represented. Currently there are 30 participating or "P" member countries and 16 observer or "O" member countries. SC25's next meeting will be hosted in the United States and organized by TIA in Seattle, Wash., in October 2010.

ISO/IEC JTC 1/SC 25 is organized into three working groups and one project team, each of which is responsible for specific aspects of information technology infrastructure:

► ISO/IEC JTC 1/SC 25/ WG1, Home Electronic Systems

► ISO/IEC JTC 1/SC 25/ WG3, Customer Premises Cabling

► ISO/IEC JTC 1/SC 25/WG4 Interconnection of Computer Systems and Attached Equipment

► ISO/IEC JTC 1/SC 25 PTTT, Project Team for Taxonomy and Terminology

2009 ACTIVITIES

ISO/IEC JTC 1/SC 25/WG1 — Home Electronic Systems produces standards for home and building systems. The scope of WG1 includes the control of equipment for environmental comfort (heating, ventilation and cooling), energy management (for conservation and utility cost-containment), lighting and window coverings, audio/video entertainment, telecommunications, life safety and health (including tele-medicine), security, home computer networks and appliances. Home networks may be enabled by structured cabling, wireless technologies and power line carrier. This Working Group also considers similar network and management functions in commercial buildings.

The scope of WG1 encompasses access to external services via residential gateways. A residential gateway links the home network, which is based on local area network (LAN) technology, with an external network, based on wide area network (WAN) technology such

as the Internet. The gateway also provides data security, privacy and safety for devices on the home network.

In addition to the gateway project, WG1 is writing standards for home electronic system architecture, product interoperability, data security, functional safety, device discovery and energy management. The architecture standard accommodates national and regional standards around the world. More than 12 countries send experts to participate in WG1 meetings held twice a year. WG1 maintains liaisons with the ITU-T and with other standards bodies involved with multi-media systems, cabling systems, applications and safety.

WG1 approved more than 20 documents in 2009 and is working on more than 15 active projects.

ISO/IEC JTC 1/SC 25/WG3 — Customer Premises Cabling develops building telecommunications and LAN cabling standards. These standards support a wide variety of applications including voice, data, video and building automation. Participants from more than 20 countries participate in WG3.

WG3 liaises closely with TIA TR-42, which develops respective cabling standards for both the U.S. and international markets, providing the primary technical basis to formulate the U.S. contributions and ballot responses for SC 25 WG3.

Collaboration with IEC committees, TC

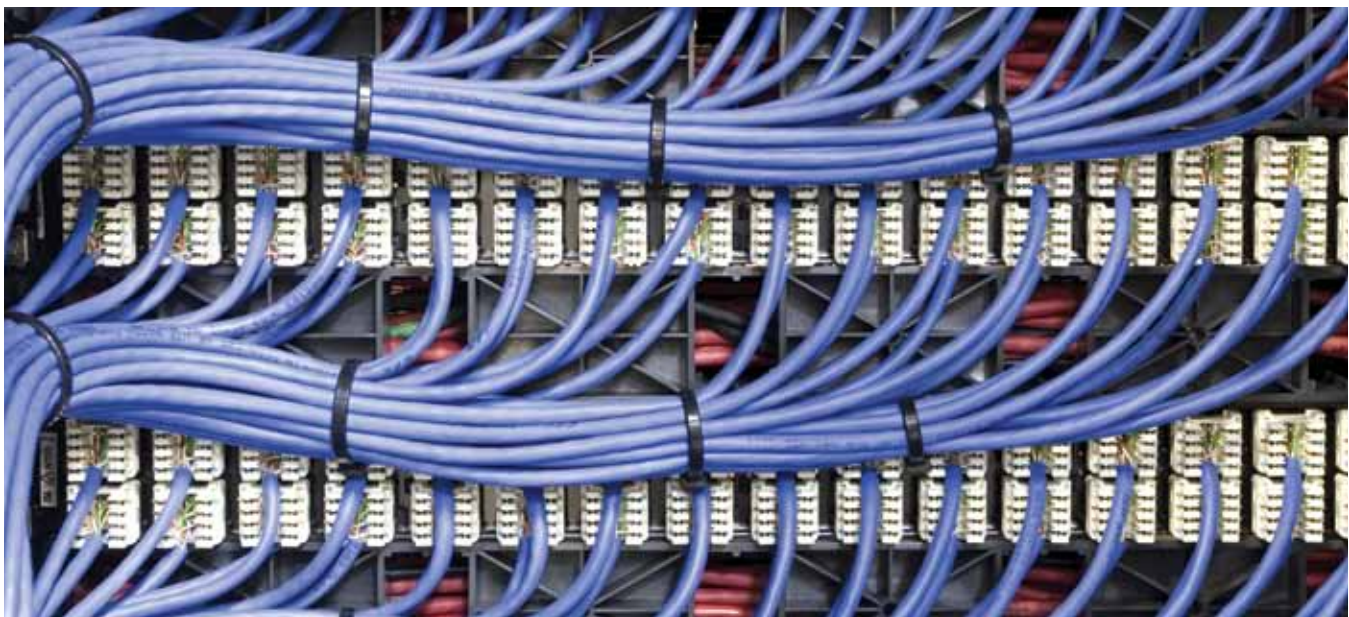
46 — Cables, wires, waveguides, R.F. connectors, R.F. and microwave passive components and accessories, TC 48 — Electromechanical components and mechanical structures for electronic equipment and TC 86 — Fiber Optics provides the cable and connector components standards referenced by this working group to ensure performance and reliability for systems configured according to its cabling standards. These IEC committees also specify the environmental conditions and test methods supporting the performance and reliability requirements.

Bilateral exchange with regional and national standards organizations, such as TIA, CENELEC, and others, maintains harmonization between international and regional standards.

Close cooperation with IEC TC 86 is providing test specifications for installed cabling systems and assemblies including amendments and a revision of ISO/IEC 14763-3: Information Technology — Implementation and operation of customer premises cabling — Part 3: Testing of optical fibre cabling.

ISO/IEC JTC 1/SC 25/WG4 — Microprocessor Systems and Interconnection of Computer Systems and Attached Equipment develops standardization of microprocessor systems and of interfaces and protocols for the interconnection of computer systems and computer peripheral equipment.

There are about 25 active projects, and the working group published eight standards



in 2009. Most of these projects, initiated by industry, expanded and reviewed in detail in the International Committee for Information Technology Standards (INCITS) SCSI Technical Committee (T10), the INCITS Fibre Channel Technical Committee (T11), the IEEE MSC, and other standards developing organizations, and used in commonly available computer products. The latest interfaces used in almost all computing systems are included in WG4's program of work.

The Project Team for Taxonomy and Terminology (PTTT) resulted from a special meeting held

in March 2006, which provided recommendations to make use of the established cooperation between ITU-T and ISO/IEC JTC 1 in the development of specifications with common or aligned text through the formation a project team formed directly under SC25.

The U.S. experts of WG1 met jointly with PTTT in Beijing during the week of September 7, 2009. The United States was represented by Ron Ambrosio, IBM; Dr. Tim Schoechle, CyberL-YNX - Gateway Corporation; and Dr. Ken Wacks, Home & Building Systems.

ISO/IEC JTC 1/SC 25: INTERCONNECTION OF INFORMATION TECHNOLOGY EQUIPMENT



US TAG CHAIR: JOHN SIEMON
The Siemon Company



**ISO/IEC JTC1/SC 25 WG 1 —
Home Electronic System**
US TAG CHAIR: DR. KEN WACKS
MIT



**ISO/IEC JTC1/SC 25 WG 3 —
Customer Premises Cabling**
US TAG CHAIR: DAVID HESS
Nexans

ISO/IEC JTC 1/SC 25 COMMITTEE PARTICIPANTS

ADC, Bel Stewart Connectors, Berk Tek NEXANS, Brocade Communications, Inc., CommScope Network Solutions, Corning Inc., Echelon Corp., EMC Corp., Erico Inc., Fluke Networks, IBM, Intel Corp., J&M Consultants, Inc., Leviton Network Solutions, Lonmark International, Microsoft, Molex Inc., ODVA Inc., Panasonic Corp. of NA, Panduit Corp., PPC, Rockwell Automation, Siemon Company, Sony/JW Associates, Surtec America, Tyco Electronics, Universal Devices Inc., Wiremold Company, Fiber Channel Industry Association, Storage Networking Industry Association

IEC/TC 46: Cables, Wires, Waveguides, R.F. Connectors, R.F. and Microwave Passive Components and Accessories

TIA SERVES AS THE ADMINISTRATOR OF THE U.S. TECHNICAL ADVISORY GROUP

(US TAG) of Technical Committee 46, operating under the auspices of the International Electrotechnical Commission (IEC). The United States holds the international Secretariat of this committee, which is also operated by TIA via the U.S. National Committee of the IEC.

IEC TC 46 focuses on establishing and maintaining standards for the terminology, design, characteristics, related test methods and requirements for quality assessment of metallic conductors, wires, waveguide, RF connectors, RF and microwave passive components and accessories for analog and digital transmission systems, and equipment for communications networks and cabling

TC 46 has internal IEC liaisons with SC 48B — Connectors, SC 65C — Industrial networks, SC 86A — Fibres and cables and TC 100 — Audio, video and multimedia systems and equipment. Liaison relationships are also maintained with the International Telecommunication Union (ITU) and the Radiocommunication (ITU-R) and Telecommunication (ITU-T) divisions.

IEC TC 46 is scheduled to meet in October 2010 in Seattle, Wash., as part of the 74th IEC General Meeting. TIA is a sponsor of this event.

2009-2010 OVERVIEW

The committee is comprised of 24 participating or “P” member countries and 13 countries participating as observers, “O” members. The committee has three subcommittees (SC 46A — Coaxial Cables, SC 46C — Wires and Symmetric Cables, and SC 46F — RF and Microwave Passive Components). Each of the subcommittees has its own working groups and project teams.

In addition, TC 46 is directly responsible for three working groups that develop standards in specific areas: WG 5 on screening effectiveness, WG 6 on passive intermodulation measurement (PIM) and WG 9 on metallic cable assemblies for ICT.

Thirty-four current publications have been issued by TC 46 and 20 of these are due for maintenance over the next three years.

2009-2010 ACTIVITIES

TC 46 Key Projects:

- ▶ To complete the revision of the IEC 62037 Passive Intermodulation Measurement (PIM)

test procedures.

- ▶ To complete the update of the IEC 726 vocabulary standard.
- ▶ To evaluate and develop combined electromagnetic screening effectiveness tests for coaxial and symmetrical cables.
- ▶ To perform comparative measurements between the tube-in-tube and absorbing clamp method (CENELEC EN 50289-1-14) using coaxial and symmetrical (CATV) connectors.
- ▶ To investigate coupling attenuation of symmetrical cables up to 1 GHz with the triaxial setup.
- ▶ To investigate UTP cables/connectors using the triaxial method.
- ▶ To evaluate the feasibility and develop a test, as appropriate, for lightning effects withstand capability of coaxial cables following the ITU-T K.21, K.44 and K.66 standards.

IEC SC 46A, Coaxial Cables, focuses on the preparation and maintenance of standards for coaxial cables and cable assemblies for analog and digital transmission systems. Currently

these are for general purpose and RF cables of rigid, semi-rigid and flexible construction used on transmission lines, cabled distribution and similar systems.

SC 46A Key Projects:

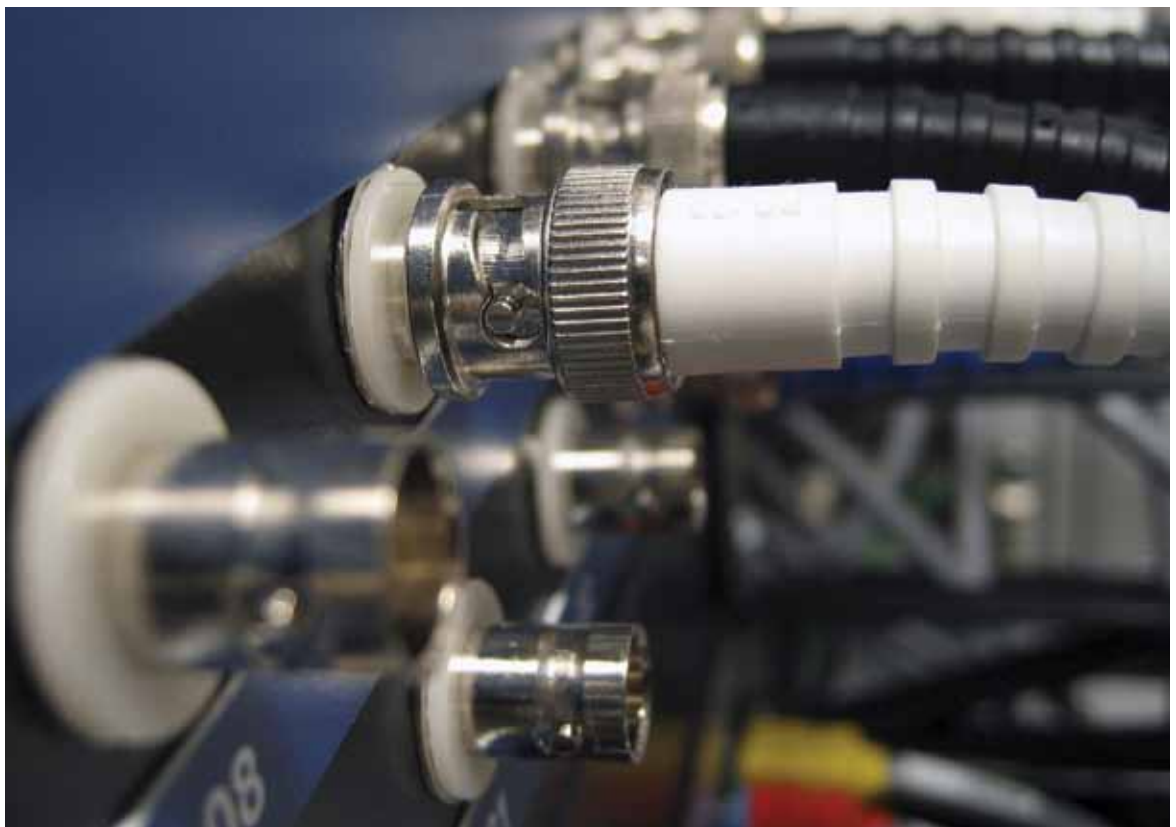
- ▶ To complete the revision of the generic specification for coaxial cables, IEC 61196-1-x and its different test procedures
- ▶ To complete the revision of Guide to the Design of Detail Specifications – Coaxial Cables (IEC 60096-0-1)
- ▶ To establish sectional specification standards for coaxial cables for ICT and multimedia distribution networks and systems
- ▶ To evaluate and establish, as appropriate, detail specification standards for microwave coaxial cables
- ▶ To develop standards for coaxial cables with PTFE insulation and with tin-soaked braids up to 18 GHz
- ▶ To introduce phase dispersion problems testing into the IEC 61196-1-108 standard

IEC SC 46C, Wires and Symmetric Cables, focuses on establishing and maintaining

standards for wires and symmetric cable pairs and quads for analog and digital transmission systems and equipment for communication and signaling. These standards may include the following: general cable construction, electrical characteristics, transmission characteristics, mechanical characteristics, environmental characteristics, related test methods and requirements and quality assessment procedures. The subcommittee has one active Working Group SC46C/WG 7 Premises Cables for Digital Communication. The main task of WG 7 is to revise the IEC 61156 series of specifications for multicore and symmetrical pair/quad cables for digital communications and to coordinate with ISO/IEC JTC 1 SC 25/WG 3 regarding the amendments to ISO/IEC 11801: Information technology — Generic cabling for customer premises.

SC 46C Key Projects:

- ▶ To develop standards for balanced cables and appropriate test methods for the emerging (40-100) Gbps Ethernet market.
- ▶ To complete the revision of fire performance of communications cables installed in buildings



— Update new methods of fire retardancy (IEC/TR 62222).

- To develop electrical transmission parameters for modeling cable assemblies (IEC/TS 61156-1-3).
- To develop measuring the temperature behavior of cables in bundles when fed with DC. IEC/TS 61156-1-4.

IEC-SC46 F, R.F. and Microwave Passive Components, develops standardization of RF and microwave passive components used in networks and cabling, including test methods

for electrical, mechanical and environmental characteristics, as well as product standards. The committee is comprised of 17 countries, “P” member participants, and 14 countries, “O” member participants.

In the past 12 months, two standards and three PAS (Publicly Available Specifications) have been approved. Also, over the past 12 months four NPs were issued. One hundred two current publications have been issued by SC 46F, and 34 of these are due for maintenance over the next three years.

IEC/TC 46: CABLES, WIRES, WAVEGUIDES, R.F. CONNECTORS, R.F. AND MICROWAVE PASSIVE COMPONENTS AND ACCESSORIES



**TECHNICAL ADVISOR, SC 46C & SECRETARY:
JOHN KINCAID**
Independent Consultant



**TECHNICAL ADVISOR, SC 46A & CONVENER:
DAVID WILSON**
CommScope

TECHNICAL ADVISOR, SC 46F: JOHN SCHIMELFANICK
Applied Engineering Products



DEPUTY TECHNICAL ADVISOR: ROGER MATTHEWS
PPC

IEC TAG TC 46 COMMITTEE PARTICIPANTS

ADC, Agilent Technologies, Inc., Amphenol R.F., Andrew Corporation, Applied Engineering Products, Inc., Berk-Tek, CommScope Network Solutions, Copperweld Bimetallic Product Business, Defense Logistics Agency, Fluke Networks, IW-Microwave, Nexans/Berk-Tek, PPC, Rosenberger of North America, LLC, Summitek Instruments, Tensolite Company, TFC/Amphenol, The Siemon Company, Tyco Electronics

TC 76: Optical Radiation Safety and Laser Equipment

TIA SERVES AS THE ADMINISTRATOR OF THE U.S. TECHNICAL ADVISORY GROUP (US TAG) of Technical Committee 76, operating under the auspices of the International Electrotechnical Commission (IEC).

IEC TC 76 develops and maintains safety standards for products that generate laser and other optical radiation. The products covered range from fiber-optic and free-space telecommunications systems and other information technology equipment to industrial, medical and entertainment products.

2009 OVERVIEW

Standards relating to the safety of products are vital to achieving market acceptance. The standards need to not only assure safety but also to be practical, so they do not impose an undue burden on the manufacturers and users of the products. Because of the wide diversity of product applications and the overlap of interest, TC 76 is made up of relatively permanent working groups according to application and supporting functions.

IEC TC 76 maintains liaisons with the following IEC committees:

IEC/TC 66 — Safety of measuring, control and laboratory equipment. Equipment under the purview of TC 66 often incorporates lasers or other optical radiation sources. TC 76 monitors TC 66 documents and provides comments or consultation as needed.

IEC/TC 86 — Standards for fiber-optic systems, modules, devices and components intended primarily for use with communications equipment. TC 76 monitors TC 86 documents and provides comments or consultation as needed or requested.

IEC/TC 92 — is now merged into TC 108, responsible for audio, video and other consumer electronic equipment, which often incorporates lasers or other optical radiation sources. TC 76 monitors TC 92 documents and provides comments or consultation as needed.

IEC/TC 100 — Consumer Electronic Products. This committee is responsible for audio-visual equipment in people's homes, including optical disc entertainment products.

IEC/TC108 — IT Equipment. This committee is responsible for computer equipment and accessory products.

IEC/TC 110 — Flat Panel Display Devices. This equipment generates optical radiation. Therefore, their documents reference TC 76 documents for radiation safety issues.

ISO/TC 172 — ISO/TC 172/SC 9 Liaison. This is a joint working group with TC 76/WG 10, which is responsible for the development and maintenance of the ISO 11553 series of standards for laser-based machine tools.

CIE – ICNIRP — ICNIRP establishes safe exposure limits for non-ionizing, including optical, radiation. Liaison is maintained by joint membership. TC 76 develops hazard classifications based on the ICNIRP exposure limits. CIE and IEC TC 34A are responsible for lamps



and lamp systems. IEC 62471 is a joint IEC/CIE standard for the photobiological safety of lamps and lamp systems.

2009 ACTIVITIES

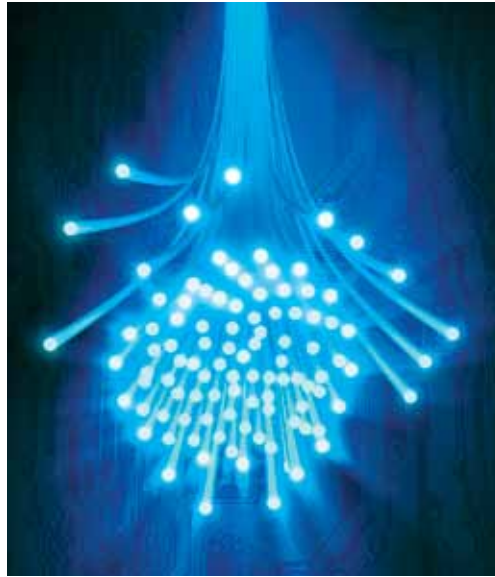
Among the most significant accomplishments in 2009 were the unanimous international approval of amendments to the IEC 60825-2 standard for fiber optic communications systems and the decision to move to removal of LED transmitters from the scope of IEC 60825 for free space optical communications systems. The amendments to 60825-2 became necessary as a result of the 2007 amendments to the horizontal 60825-1 general safety standard for laser equipment. The new 60825-2 retains the hazard classification scheme for LED fibers. The plan to remove LEDs from 60825-12 is to be accomplished by the issuance of an interpretation notice (ISH) of policy.

There are seven working groups in TC 76. These working groups develop and maintain their respective specialty interests in the IEC 60825, Safety of Laser Products Part 1: Equipment classification and requirements 62471, 60601 — Medical electrical equipment) and ISO 11553 series as follows:

WG 1, Optical Radiation Safety, reviews biological and physical data and makes recommendations/revisions of maximum permissible exposure (MPE), acceptable exposure limit (AEL) and measurement conditions. This WG is now addressing the question of whether the use of magnifying optics results in an increased hazard for viewing, with the possible result of elimination of one of the measurement conditions for classification of laser products. This has particular application for optical fibers in communications equipment.

WG 3, Laser Radiation Measurement, develops and maintains, as necessary, technical reports to be used as guides in making radiometric measurements of laser radiation levels for comparison with the AEL and MPE and performing hazard evaluations pursuant to IEC 60825-1. This WG is developing an amendment to the current technical report, IEC 60825-13, addressing more complex measurement questions in hazard determination. A new draft was issued in 2008.

WG 4, Safety of Medical Laser Equipment, is developing the second edition of IEC 601-2-22, as



well as a guide for the safe use of medical laser equipment. This WG is developing a standard that will be IEC 60601-2-57 and a technical report addressing the hazards of intense light equipment in medical and cosmetic applications, which is causing injuries throughout the world.

WG 5, Safety of Fiber Optics Communications Systems, deals with the safety of fiber optics communications systems. The WG develops international standards on the safety of fiber optics consistent with IEC 60825, in coordination with other relevant technical committees. This includes enclosed transmission systems and semiconductor lasers. An ISH was issued stating that edition 1.2 of IEC 60825-1 should be used with fiber optic communications systems pending the revision of IEC 60825-2.

WG 7, High Power Lasers, develops requirements for the radiation safety of high power lasers. This WG has amended IEC 60825-4 with a new annex addressing laser guards.

WG 8, Development and Maintenance of Basic Standards, develops and maintains basic standards and annexes for the safe use of lasers, except those with specific application tasks, including, complete editing of IEC 60825-1, complete development of a laser light show document, a complete labels and symbols standard, and a manufacturer's checklist standard. This WG is responsible for the new edition of IEC 60825-3, a technical report addressing the safety of laser light shows and displays. The

WG is also working on simplified labeling and the withdrawal of TR 60825-10.

WG 9, Non-Coherent Sources, develops MPEs and measurement conditions for these MPEs for broadband sources. This WG is preparing a new TR 62471-2 providing guidance on the use of IEC 60825-1 or 62471-1 to determine the hazard classification of non-laser equipment.

WG 10 (jointly with ISO TC 172/SC9), Laser Machine Tools, develops and maintains the ISO 11553 series of standards. Recent work has been focused on new standards to address hand-held delivery systems and the noise directive in the European Union.

U.S. Votes and Comments were submitted on the following Standards Documents:

- ▶ Guidelines on manufacturing requirements relating to non-laser optical radiation safety
- ▶ TR 62471-2, passive components and cables in high power fiber optic communications systems
- ▶ 60825-17, testing of laser guards
- ▶ 60825-4, A2, Ed 2, standard for intense lights for medical and cosmetic use
- ▶ IEC 60601-2-57, convenorship of TC 76/WG 5 for optical communications systems
- ▶ Amendments to 60825-2 for fiber optic communications systems
- ▶ Interpretation sheet for 60825-1, testing of proprietary laser guards.

To find out more about participating in IEC TC 76, please contact Florence Otieno: fotieno@tiaonline.org, +1.703.907.7556

TC 76: OPTICAL RADIATION SAFETY AND LASER EQUIPMENT



CHAIRMAN AND TECHNICAL ADVISOR:
JEROME E. (JERRY) DENNIS
Independent Consultant



SECRETARY: WILLIAM ERTLE
Rockwell Laser Industries



DEPUTY TECHNICAL ADVISOR: ROBERT WEINER
Weiner Associates

IEC TAG TC 76 COMMITTEE PARTICIPANTS

Laser Product Safety LLC, Microvision Inc., Naval Surface Warfare Center, NIST, PSC Scanning, Inc., Rockwell Laser Industries, Texas Instruments, Inc., TÜV Rheinland of N.A., Inc., US Army Center for Health, Weiner Associates

IEC TC 86: Fibre Optics

TIA SERVES AS THE INTERNATIONAL SECRETARIAT FOR TC 86 AND SC 86C AND

administrator of the U.S. Technical Advisory Groups (US TAGs) of IEC Technical Committee 86: Fibre Optics and its subcommittees through the U.S. National Committee of the International Electrotechnical Commission (IEC).

The goal of the committee is to prepare standards for fiber optic systems, modules, devices and components intended primarily for use with communications equipment. This activity covers terminology, characteristics, related tests, calibration and measurement methods, functional interfaces, and optical, environmental and mechanical requirements to ensure reliable system performance.

2009 OVERVIEW

IEC has three subcommittees, the details of which are given below. In addition, two working groups, WG 1: Terminology and symbology, and WG 4: Fibre optic test equipment calibration, report directly to TC 86. The committee has developed liaisons with IEC TC 100 – Audio, Video and Multimedia Systems and Equipment and with the International Telecommunication Union. Joint Working Group 9 works on optical functionality for electronic assemblies.

The IEC TC 86 US TAG collocates its meetings with those of TIA TR-42, Telecommunications Cabling Systems, to capitalize on the synergies between the two groups. The international committee and its subcommittees and working groups are due to meet next in Seattle, Wash., in October 2010 as part of the 74th IEC General Meeting. TIA is a sponsor of this event.

In 2009, TC 86 processed 23 documents and published 10 documents.

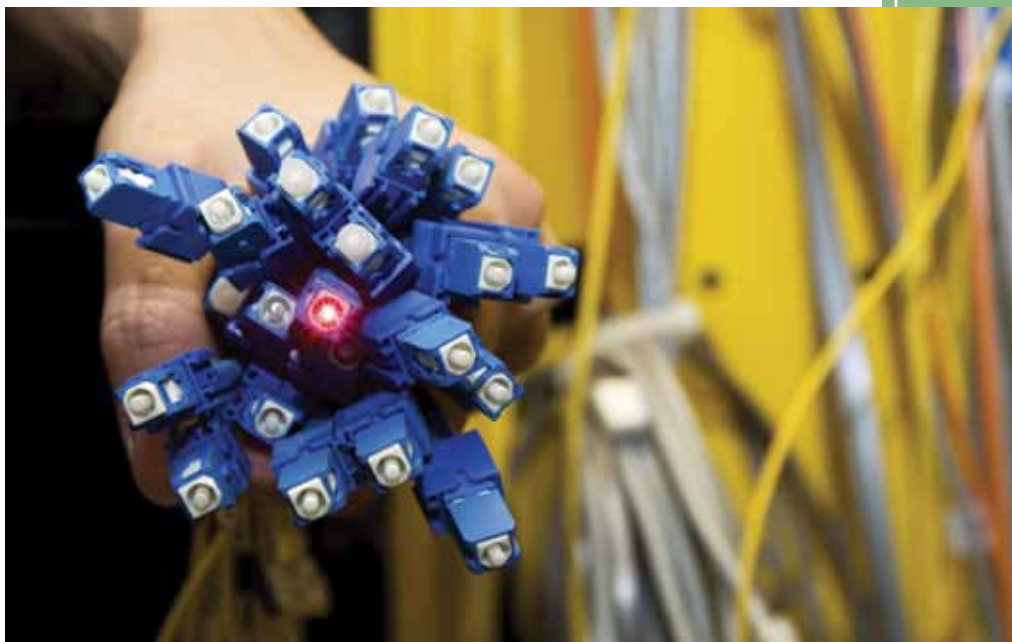
IEC SC 86A , Fibres and Cables, focuses on international standards for optical fibers and cables embracing all types of communications applications. This activity covers terminology, generic characteristics, test and measurement methods, and specifications for all types of single-mode and multimode optical fibers and all types of optical fiber indoor and outdoor cables to ensure reliable system performance and operation.

The subcommittee has formal liaisons with IEC committees covering a range of related technical areas such as overhead electrical

conductors (IEC TC 7), R.F. Connectors, R.F. and microwave passive components and accessories (IEC TC 48) and interconnection of information technology equipment (ISO/IEC JTC 1 SC 25).

The subcommittee has two working groups: WG 1 – Fibres and associated measuring methods and WG 3 – Cables.

IEC SC 86B, Fibre Optic Interconnecting Devices and Passive Components, focuses on international standards for fiber optic interconnecting devices and passive components, embracing all types of communications applications. This activity covers terminology,



characteristics, related test and measurement methods and functional interfaces, including all mechanical, environmental and optical requirements, to ensure interoperability and reliable performance of fiber optic interconnecting devices and passive components.

SC 86B has three working groups: WG 4 –

To find out more about participating in IEC TC 86, please contact Florence Otieno: fotieno@tiaonline.org, +1.703.907.7556

IEC TC 86: FIBRE OPTICS

TECHNICAL ADVISOR, TC 86: JAMES E. MATTHEWS III (U.S.)
Corning, Inc.



TECHNICAL ADVISOR, SC 86A:
MIKE KINARD (U.S.)
OFS



TECHNICAL ADVISOR SC 86B:
STEVE SWANSON
Corning, Inc.



TECHNICAL ADVISOR, SC 86C:
ATUL SRIVASTAVA
One Terabit

ASSISTANT SECRETARY: ELAINA FINGER (U.S.)
Corning, Inc.

IEC TAG TC 86 COMMITTEE PARTICIPANTS

ADC, ADC Telecommunications, Aegis Lightwave, Agilent Technologies, Inc., Alcatel-Lucent, Amphenol Fiber Optic Products, Berk-Tek, Chromis Fibreoptics, Cisco Systems, Inc., CommScope Network Solutions, Corning Cable Systems, Corning Inc., Defense Supply Center, Diamond USA, Inc., Direct Optical Research Co., Draka Comteq Optical Fibre, EXFO E.O. Engineering, Inc., FiberSource Inc., Fluke Networks, Greenlee Textron Inc., JDSU, Leviton Network Solutions, Noyes Fiber Systems, OCLARO, OFS, One Terabit, Panduit Corporation, Photon Kinetics, Inc., Sumitomo Electric Lightwave Corp, Telcordia Technologies, The Siemon Company, TIA, Tyco Electronics, US Conec, US Conec LTD, Xtellus Dynamic Optics, Yazaki NA Inc., Y-Connect Oper.

Standard tests and measurement methods for fiber optic interconnecting devices and passive components, WG 6 – Standards and specifications for fibre optic interconnecting devices and related components, and WG 7 – Standards and specifications for fiber optic passive components.

In 2009, SC 86B processed a total of 83 documents and published 17 standards. During this busy year, IEC SC 86B agreed to accept the proposed EF targets proposed by IEC SC 86C in the “Installed cable plant – multimode attenuation measurement” document; a revision to the end face visual inspection document, 61300-3-35, was completed; and progress was made on the Maintenance Team optical interface standards for rectangular ferrules. In addition, a technical report on cleaning methods is scheduled to be developed emphasizing the need for cleaning fiber optic connections as well as describing some examples of current tools and methods available for proper cleaning. A connector reliability ad hoc group comprised of members from SC 86B and iNEMI is focusing its initial work on single-mode connectors. Two failure modes have been examined so far – fiber withdrawal and breaking at the rear of the ferrule.

IEC SC 86C, Fibre Optic Systems and Active Devices, focuses on international standards for fiber optic systems and active devices embracing all types of communications applications. This activity covers terminology, characteristics, test and measurement methods, and functional interfaces, including all mechanical, environmental, optical and electrical requirements to ensure interoperability and reliable system performance.

SC 86C has liaisons with, among others, IEC TC 76 – Optical radiation safety and laser equipment, IEC TC 100 – Audio, video and multimedia systems and equipment, and ISO/IEC JTC 1 SC 25 – Interconnection of information technology equipment.

There are four working groups: WG 1 – Fibre optic communications systems and sub-systems, WG 3 – Optical amplifiers, WG 4 – Fibre optic active components and devices, and WG 5 – Dynamic Modules and devices.

ISO/TC 204: Intelligent Transport Systems

THE U.S. TECHNICAL ADVISORY GROUP (US TAG) TO ISO/TC204 APPOINTS THE

U.S. delegation to ISO/TC204. Both the structure and scope of the US TAG shadow those of ISO/TC204. The domestic shadow group for each ISO/TC204 Working Group is called a Working Advisory Group (WAG) in the US TAG.

The work program of the U.S. TAG tracks that of ISO/TC204. All work items in ISO/TC204 are circulated to and, in some cases, originated by the US TAG prior to their approval at the international level.

ISO/TC204 SCOPE

ISO/TC204 encompasses standardization of information, communications and control systems in the field of urban and rural surface transportation, including intermodal and multimodal aspects, traveler information, traffic management, public transport, commercial transport, emergency services and commercial services, generally referred to as Intelligent Transport Systems (ITS).

The following aspects of intercity rail are included in the work of ISO/TC204: intermodal movement of passengers and freight, informa-

tion systems relating to passenger and freight rail transport, and the use of ITS technology at the intersection of roads and rails (“grade crossings” or “level crossings”). Other aspects of intercity rail are not included in the work of ISO/TC204.

ISO/TC204’s work does not include ITS systems that are completely self-contained in the vehicle and that do not interact with other vehicles or the infrastructure. This is the responsibility of ISO/TC22.

ISO/TC204 is responsible for the overall system and infrastructure aspects of ITS, as well as the coordination of the overall ISO work program in this field, including the schedule for standards development, taking into account the work of existing international standardization bodies.

2009 ACTIVITIES

ISO/TC204 meets twice a year. The first meeting in 2009 took place May 11-15, 2009, in Chiang Mai, Thailand.

New work items approved for adoption in Chiang Mai include

- ▶ (WG 3) 14296: Extension of Current Specification of In-vehicle Digital Map Databases
- ▶ (WG 8) 14806: Public Transport Requirements for Use of Payment Applications as Fare Media
- ▶ (WG14) 26684: Cooperative Intersection Signal Information and Violation Warning Systems (CISIVWS)

Work items approved for publication in Chiang Mai include

- ▶ (WG 3) 17267: Navigation System Application Program Interface (API)





- (WG 16) 25111: CALM (Communication for Land Mobiles) ITS Using Public Wireless Networks – General Requirements
- (WG 16) 25112: CALM Mobile Wireless Broadband Using IEEE 802.16e/IEEE 802.16g
- (WG 16) 25113: CALM Mobile Wireless Broadband Using High Capacity Spatial Division Multiple Access
- (WG 16) 11766: Lawful Interception in ITS and CALM

The second meeting of ISO/TC204 took place September 14-18, 2009, in Barcelona, Spain.

New work items adopted in Barcelona include:

- (WG 7) 15638: Framework for Collaborative ITS Applications for Heavy Vehicles
- (WG 8) 24014-3: Interoperable Fare Management System – Part 3: Interoperability Within a Multi-application Environment

Work items approved for publication in Barcelona include:

- (WG 14) 15622: Adaptive Cruise Control (ACC)
- (WG 14) 17386: Manoeuvring Aids for Low Speed Operation (MALSO)
- (WG 14) 22840: Extended Range Backing Aid (ERBA)
- (WG 16) 11769: Data Retention for Law Enforcement in ITS and CALM
- (WG 16) 25114: Probe Data Reporting Management

In 2010, ISO/TC204 will meet in April in New Orleans, La., and in November in Jeju Island, South Korea.

The US TAG to ISO/TC204 typically meets three or four times a year and maintains extensive email correspondence for the purpose of formulating U.S. positions on the technical issues of the TC. In 2010, the US TAG will meet in January, April and September.

To find out more about participating in ISO/TC 204, please contact Andy Dryden: adryden@tiaonline.org, +1.703.907.7702

ISO TECHNICAL COMMITTEE 204 (ISO/TC 204), INTELLIGENT TRANSPORT SYSTEMS

ISO/TC 204 LEADERSHIP

Committee Chair (U.S.): Michael Noblett, *Connexis LLC*

Committee Vice-Chair (Japan): Prof. Hironao Kawashima, *Center for Open Systems Management, Faculty of Science & Technology, Keio University*

Secretary (U.S.): Andrew Dryden, *Telecommunications Industry Association (TIA)*

WORKING GROUPS

WG1: Architecture

CONVENER: Vacant, *United Kingdom*

WG 3: ITS Database Technology

CONVENER: Mr. Jun Shibata, *Japan*

WG 4: AEI/AVI (Automatic Equipment Identification/ Automatic Vehicle Identification)

CONVENER: Mr. Knut Evensen, *Norway*

WG 5: Electronic Fee and Toll Collection

CONVENER: Mr. Jesper Engdahl, *Sweden*

WG 7: General Fleet, Commercial & Freight Management

CONVENER: Dr. Lewis Sabounghi, *Canada*

WG 8: Public Transport/Emergency

CONVENER: Mr. Koorosh Olyai, *USA*

WG 9: Integrated Transport Information, Management & Control

CONVENER: Mr. Dean Zabrieszch, *Australia*

WG 10: Traveler Information Systems

CONVENER: Mr. Paul Burton, *United Kingdom*

WG 14: Vehicle/Roadway Warning and Control Systems

CONVENER: Mr. Yoshimi Furukawa, *Japan*

WG 15: Dedicated Short Range Communications for ITS Applications

CONVENER: Dr. Carl Rokitansky, *Germany*

WG 16: Wide Area Communications/ Protocol and Interfaces

CONVENER: Mr. T. Russell Shields, *USA*

WG 17: Nomadic Devices

CONVENER: Dr. Young-Jun Moon, *Korea*

WG18: Cooperative Systems

CONVENER: Dr. Hans-Joachim Schade, *Germany*

US TAG ISO/TC 204 LEADERSHIP

US TAG Chair: Richard Weiland, *Weiland Consulting Co.*

WORKING ADVISORY GROUPS

WAG1: Architecture

CHAIR: Mr. Thomas Kurihara, *TKstds Management*

WAG 3: ITS Database Technology

CHAIR: Mr. Thomas Lydon, *NAVTEQ*

WAG 4: AEI/AVI (Automatic Equipment Identification/ Automatic Vehicle Identification)

CHAIR: Mr. Richard Schnacke, *Transcore*

WAG 5: Electronic Fee and Toll Collection

CHAIR: Vacant

WAG 7: General Fleet, Commercial & Freight Management

CHAIR: Mr. Michael Onder, *U.S. DOT, Federal Highway Administration*

WAG 8: Public Transport/Emergency

CHAIR: Mr. Martin Schroeder, *APTA*

WAG 9: Integrated Transport Information, Management & Control

CHAIR: Mr. Robert Rausch, *Transcore*

WAG 10: Traveler Information Systems

CHAIR: Mr. Joel Markowitz, *Metropolitan Transportation Commission (San Francisco Bay Area)*

WAG 14: Vehicle/Roadway Warning and Control Systems

CHAIR: Dr. Steven Shladover, *California PATH Program (U.C. Berkeley)*

WAG 15: Dedicated Short Range Communications for ITS Applications

CHAIR: Mr. Richard Schnacke, *Transcore*

WAG 16: Wide Area Communications/ Protocol and Interfaces

CHAIR: Mr. Steve Sprouffske, *Kapsch TrafficCom Inc.*

WAG 17: Nomadic Devices

CHAIR: Chung-Min Chen, *Telcordia*

Third Generation Partnership Project 2 (3GPP2)

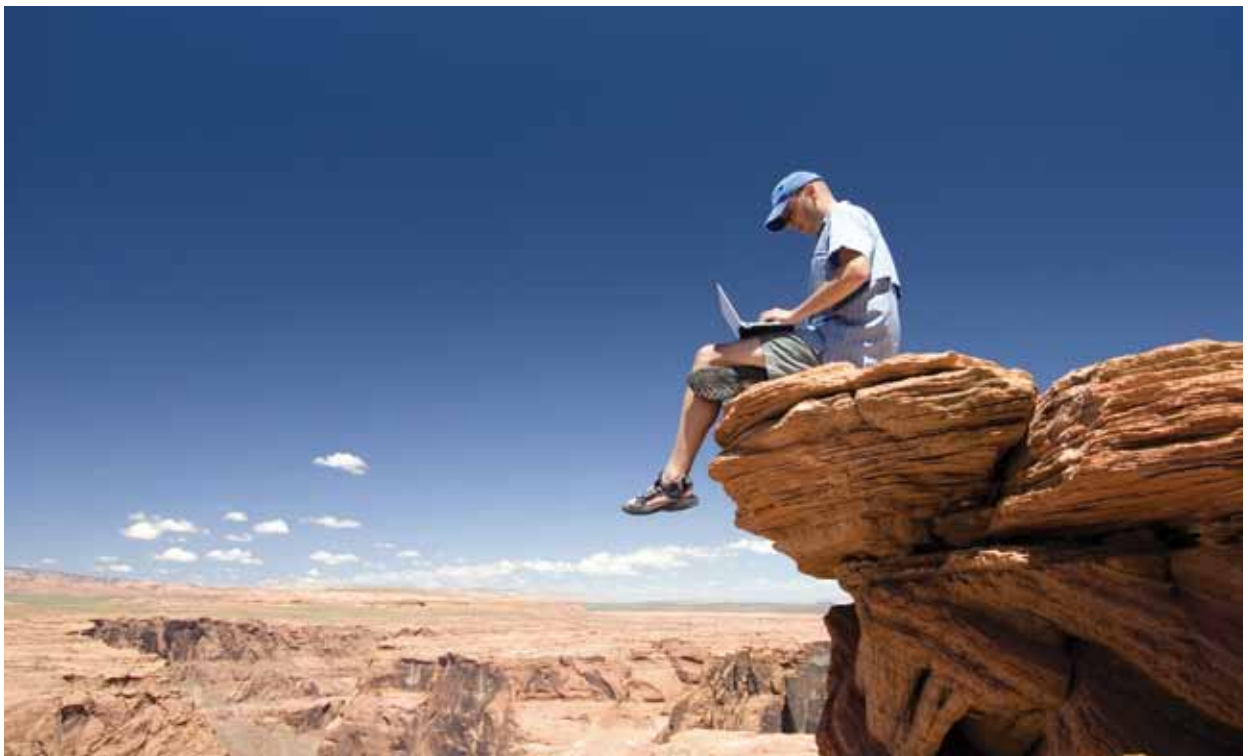
TIA is a founding partner of 3GPP2 and has served as the project's Secretariat since its inception in 1999. 3GPP2 brings more than 50 companies from five standards development organizations to create globally applicable third-generation and beyond wireless communications specifications based on cdma2000®* technology. These specifications are then submitted to the project's organizational partners for conversion into standards.

2009 OVERVIEW

3GPP2 is a collaborative 3G telecommunications specification-setting project comprised of interests from the Americas and Asia (the Association of Radio Industries and Businesses [ARIB] – Japan, the China Communications

Standards Association [CCSA] – China, TIA, the Telecommunications Technology Association [TTA] – Korea, and The Telecommunications Technology Committee [TTC] – Japan) and is focused on global specifications for the cdma2000 air interface, core network (Mobile

* cdma2000® is the trademark for the technical nomenclature for certain specifications and standards of the Organizational Partners (OPs) of 3GPP2. Geographically (and as of the date of publication), cdma2000® is a registered trademark of the Telecommunications Industry Association (TIA-USA) in the United States.



THIRD GENERATION PARTNERSHIP PROJECT 2 (3GPP2)

3GPP2 COMMITTEE PARTICIPANTS

Aeroflex , Agilent Technologies , AirCell, LLC , Airvana , AirWalk Communications, Inc., Alcatel-Lucent Shanghai Bell, Alcatel Lucent, Award Solutions, Inc., Bell Canada, Bridgewater Systems, China Telecom, Cisco Systems, Inc., COMPRION GmbH, DBSD North America, Ericsson, Inc. , ETRI , Gemalto, Inc., Hitachi, Ltd., Huawei Technologies Co., Ltd., KDDI Corp., KT Corp., Kyocera Corp., LG Electronics, Inc., LG Telecom, Ltd., Motorola, Inc., National Communications System, NEC Corp., Nokia Siemens Networks, Qualcomm Inc., Reliance-IITM Telecom Centre of Excellence, Research In Motion, Research Institute of Telecommunication Transmission, MII, Rohde&Schwarz, America, Samsung Electronics Co., Ltd., SGS Wireless US, Inc., Sierra Wireless, SK Telecom, Skyterra Communications, Sony Ericsson Mobile Communications Japan, Inc., Spirent Communications, Sprint Nextel, Tata Systems, Telcordia Technologies, Inc., TeleCommunication Systems, Inc., Telespree Communications, TerreStar Networks, Inc., Toshiba Corp., US Cellular, UTStarcom, Verizon Wireless, VIA Telecom, ZTE Corp.

Application Part), all-IP core network, Radio Access Network and other ancillary specifications. In addition, several organizations such as the CDMA Development Group (CDG), the IPv6 Forum and the Femto Forum are members of 3GPP2, representing the market interests and promotion of 3GPP2 technologies.

2009 was a year of celebration for 3GPP2, beginning with an outstanding and beautiful 10-year anniversary celebration hosted in Shanghai, China, by CCSA and culminating with a very well received and successful workshop on Serving Growth Markets, held in Mumbai, India, in November.

In addition, 3GPP2 had a very busy year of specification development, producing more than 72 specifications and reports in 2009.

2009 ACTIVITIES

Planning for its future direction and setting sights on the vision and evolution of its technology, early in 2009 3GPP2 published its Vision Document. The focus of the document was market trends and directions, taking into consideration the increasing capacity demands for voice and data. The paper addresses such capabilities as High Rate Packet Data (HRPD) enhanced features (e.g., smart networks), advanced network and services management such as Self-Organizing Networks, evolution of femtocell integration, and Machine-to-Machine (M2M) communications.

It was a very active year for the 3GPP2 technical groups, with aggressive schedules for completion of several major areas of work: Revision E of the cdma2000 air interface was completed, providing from three to four times the additional capacity for voice services and

enhancements in the performance of data systems. Interworking was developed for cdma2000 and HRPD with WLAN, LTE and WiMAX, including the development of evolved HRPD (eHRPD) supporting an interworking and co-deployment with LTE. Architectures and protocols to support femtocells was another major area of effort. Many other specifications were updated to enhance the packet data network, location services and system selection.

An extremely successful workshop focusing on Serving Growth Markets was held in Mumbai, India, in early November 2009. Response to the workshop was overwhelming, with more than 120 attendees. The focus of the workshop was the requirements and needs of the Indian market. Outstanding presentations were given, highlighting the perspectives of India's operators and vendors, input from research and academia, a report of spectrum issues specific to this market area, and experiences with system and deployment issues. 3GPP2 will be very busy in 2010 addressing the needs so aptly presented by the Indian representatives.

3GPP2 is planning for another busy year in 2010 with continued work on performance enhancements for HRPD, simultaneous voice and data (cdma2000® 1X and HRPD), femtocells and technology interworking. Additionally, the requirements technical group in 3GPP2 recently began work on technical reports for M2M communications and Green Revised Energy Efficient Network (GREEN).

As of December 2009, the cdma2000® and HRPD subscriber base has exceeded 500 million subscribers, supported by more than 500 networks, in more than 100 countries, per the CDG statistics.

TIA Standards Development Program Participants

TIA standards activities and programs are open to TIA members and non-members. TIA thanks the following companies and organizations for their 2009/2010 participation in formulating positions and preparing international standards and reports for use by industry and government.

- ▶ 4SE, Inc.
- ▶ AASKI Technology, Inc.
- ▶ ADC Telecommunications, Inc.
- ▶ ADTRAN
- ▶ Advantech Satellite Networks
- ▶ AECOM
- ▶ Aero Solutions, LLC
- ▶ Aeroflex
- ▶ Agere Systems
- ▶ Airvana, Inc.
- ▶ Alcatel-Lucent
- ▶ Allied Telephone and Data Corp.
- ▶ ALLTEL Communications, Inc.
- ▶ Aluma-Form, Inc.
- ▶ American Tower Corp.
- ▶ Anagran, Inc.
- ▶ Andrew Corp.
- ▶ Anixter Inc
- ▶ APCO Project 25
- ▶ Apple
- ▶ Aselsan Inc.
- ▶ AT&T
- ▶ AT&T Mobility
- ▶ Avaya
- ▶ B&C Contracting Company
- ▶ B&T Engineering, Inc.
- ▶ Baxter Enterprises
- ▶ Bechtel Telecom
- ▶ Bel Stewart Connectors
- ▶ Belden Networks Division
- ▶ Bell Canada
- ▶ Berk-Tek
- ▶ Black & Veatch Telecommunications
- ▶ Booz, Allen & Hamilton
- ▶ Bridgewater Systems Inc.
- ▶ Broadcast Tower Technologies, Inc.
- ▶ Broadcom Corp.
- ▶ C Faulkner Engineering
- ▶ C2 Consulting
- ▶ CDMA Development Group
- ▶ Cell Trees Inc
- ▶ Chatsworth Products, Inc.
- ▶ Cingular Wireless
- ▶ Cisco Systems, Inc.
- ▶ CML Microcircuits (USA) Inc.
- ▶ CMX
- ▶ CoCo Communications Corp
- ▶ CommFlow Resources Inc.
- ▶ CommScope Network Solutions
- ▶ Comtech EF Data
- ▶ Conexant Systems, Inc.
- ▶ Connectivity Technologies, Inc.
- ▶ Corning Inc.
- ▶ Crown Castle International Corp.
- ▶ CSI Telecommunications, Inc.
- ▶ Daniels Electronics Ltd.
- ▶ Davidson Engineering, LLC
- ▶ DaVinci Engineering Inc.
- ▶ Defense Information Systems Agency
- ▶ Defense Supply Center, Columbus
- ▶ Dielectric Communications
- ▶ Digital Voice Systems, Inc.
- ▶ Direct Optical Research Co.
- ▶ Dolby Laboratories Inc.
- ▶ Doty-Moore Tower Services
- ▶ Draka Comteq Optical Fibre
- ▶ E.F. Johnson
- ▶ EADS Public Safety Inc.
- ▶ EET, L.L.C
- ▶ Ehresmann Engineering, Inc.
- ▶ Electronics Research Inc.
- ▶ EMBARQ Corp.
- ▶ Emtelle US Inc
- ▶ Engineered Endeavors, Inc.
- ▶ ERICO Inc.
- ▶ Ericsson Inc.
- ▶ Etherstack
- ▶ EXFO E.O. Engineering, Inc.
- ▶ Exporior Photonics, Inc.
- ▶ FAL Associates
- ▶ FBI
- ▶ FDH Engineering
- ▶ FiberSource Inc.
- ▶ FLO Forum
- ▶ Fluke Networks
- ▶ Frye-Comm Consulting LLC
- ▶ FTR&D LLC
- ▶ Fujitsu Network Communications, Inc.
- ▶ Furukawa Industrial S.A.
- ▶ FWT, Inc.
- ▶ G.R.A.S. Sound & Vibration
- ▶ Gemalto Inc.
- ▶ General Cable
- ▶ General Dynamics C4 Systems
- ▶ Genesis Cable Systems
- ▶ Genivar, LP
- ▶ Gilat Satellite Networks Ltd.
- ▶ Glen Martin Engineering
- ▶ Global Tower Partners
- ▶ Globalstar
- ▶ Graybar
- ▶ Greenlee Textron Inc.
- ▶ Harris Corp.
- ▶ HARTING, Inc. of North America
- ▶ HellermannTyton
- ▶ Henkels & McCoy Inc.
- ▶ Hewlett-Packard
- ▶ Hitachi Telecom (USA) Inc.
- ▶ Homaco
- ▶ Huawei Technologies USA
- ▶ Hubbell Premise Wiring

- ▶ Hughes Network Systems, LLC
- ▶ Icom America Inc.
- ▶ Ideal Industries, Inc.
- ▶ Industrial Engineering & Testing
- ▶ Industry Canada
- ▶ Institute for Telecommunication Sciences
- ▶ Intel Corp.
- ▶ Intertek Testing Services
- ▶ Intrado
- ▶ IP Fabrics
- ▶ ITW Linx
- ▶ J&M Consultants, Inc.
- ▶ J. Upton Consulting
- ▶ JPMorgan Chase & Co.
- ▶ KCI Technologies, Inc.
- ▶ Kenwood USA Corp.
- ▶ KITCO Fiber Optics
- ▶ Kpff Consulting Engineers
- ▶ Kyocera Telecomm. Research Corp.
- ▶ Leviton Network Solutions
- ▶ LG InfoComm U.S.A., Inc.
- ▶ Littelfuse Inc.
- ▶ Lockheed Martin Corp.
- ▶ LSI Corp.
- ▶ M/A-Com, Inc.
- ▶ Malouf Engineering International
- ▶ MC Communications
- ▶ Megger
- ▶ Microsoft Corp.
- ▶ Microtronix Systems Ltd.
- ▶ Mindspeed Technologies
- ▶ MITRE Corp.
- ▶ MLD Engineering Solutions, Inc
- ▶ Molex Inc.
- ▶ Motorola, Inc.
- ▶ Movius Interactive Corp.
- ▶ NATE (National Association of Tower Erectors)
- ▶ National Communications System
- ▶ National Technical Systems (NTS)
- ▶ Nello Corp.
- ▶ NetGemini, Inc.
- ▶ NeuStar Inc.
- ▶ NIES (Nexans Intel. Ent. Solutions)
- ▶ NIST-OLES
- ▶ Nokia Siemens Networks
- ▶ Nortel Networks
- ▶ Northwest Information Services
- ▶ Noyes Fiber Systems
- ▶ NTIA
- ▶ ODVA Open Devicenet Vendor Association, Inc.
- ▶ OFS
- ▶ Optical Cable Corp.
- ▶ ORCA SYSTEMS, INC.
- ▶ Oregon State Police
- ▶ Ortronics, Inc.
- ▶ PacketStorm Communications, Inc.
- ▶ Panasonic Corp. of North America
- ▶ Panasonic Electric Works Laboratory of America
- ▶ Panduit Corp.
- ▶ Paul J. Ford and Company
- ▶ Phoenix Contact
- ▶ Photon Kinetics, Inc.
- ▶ Plantronics
- ▶ Power Line Systems, Inc.
- ▶ PPC
- ▶ Quabbin Wire & Cable Co., Inc.
- ▶ Qualcomm Inc.
- ▶ Raytheon
- ▶ RELM Wireless Corp.
- ▶ Research In Motion Corp.
- ▶ RISA Technologies
- ▶ RIT Technologies Inc.
- ▶ Rogers Wireless
- ▶ Rohde & Schwarz, Inc.
- ▶ Rohn Products LLC
- ▶ RTKL Associates Inc.
- ▶ Russound
- ▶ Sabre Towers & Poles
- ▶ SAIC
- ▶ Samdale Limited
- ▶ Samsung Electronics
- ▶ Samsung Telecom America
- ▶ Shively Labs
- ▶ Sigma Delta Communications, Inc.
- ▶ Sioux Falls Tower Specialists
- ▶ SkyTerra Communications
- ▶ Soapstone Networks
- ▶ Solvay Solexis
- ▶ Sony Wireless Tech Division
- ▶ Spirent Communications
- ▶ Sprint Nextel
- ▶ SS8 Networks, Inc.
- ▶ Stainless LLC
- ▶ Starent Networks Corp.
- ▶ State of Florida
- ▶ Stealth Concealment Solutions, Inc.
- ▶ Sumitomo Electric Lightwave Corp
- ▶ Superior Essex
- ▶ Surtec America
- ▶ Tait Radio Communications
- ▶ Technical Associates
- ▶ Technisonic Industries Ltd.
- ▶ Telchemy, Inc.
- ▶ Telcordia Technologies, Inc.
- ▶ TeleCommunication Systems, Inc.
- ▶ Telex Communications, Inc.
- ▶ Tellabs, Inc.
- ▶ Teltronic S.A.U.
- ▶ Texas Instruments, Inc.
- ▶ Thales Communications, Inc.
- ▶ The Fiber Optic Association
- ▶ The Siemon Company
- ▶ The Wiremold Company
- ▶ Tower Consultants, Inc.
- ▶ Tower Engineering Professionals
- ▶ Tower Technology
- ▶ Towerkraft Engineering, P.C.
- ▶ TranSwitch Corp.
- ▶ Turris Corp.
- ▶ TX RX Systems, Inc.
- ▶ Tyco Electronics
- ▶ U.S. Department of Commerce
- ▶ U.S. Department of Homeland Security
- ▶ U.S. Department of Justice
- ▶ Underwriters Laboratories Inc.
- ▶ Uniden America Corp.
- ▶ Uniden Engineering Services
- ▶ US Cellular
- ▶ US Conec LTD
- ▶ UTStarcom, Inc.
- ▶ Valmont Communications
- ▶ Valmont-PennSummit
- ▶ Verizon Communications
- ▶ Vertical Solutions
- ▶ VIA Telecom
- ▶ ViaSat, Inc.
- ▶ VTech Communications
- ▶ Walker Engineering Inc.
- ▶ Weisman Consultants
- ▶ WesTower Communications Inc.
- ▶ Wiltec Technologies
- ▶ WK3C Wireless LLC
- ▶ Xtellus Dynamic Optics
- ▶ Yazaki NA Inc.
- ▶ Ygomi LLC
- ▶ Zetron, Inc.
- ▶ ZTE USA Inc.



ADVANCING GLOBAL COMMUNICATIONS

HEADQUARTERS

2500 Wilson Boulevard
Suite 300
Arlington, VA 22201-3834
+1.703.907.7700
+1.703.907.7727 (fax)

GOVERNMENT AFFAIRS

10 G Street, NE
Suite 550
Washington, DC 20002-4213
+1.202.346.3240
+1.202.346.3241 (fax)

tiaonline.org