

Standards Committee T1

March 21, 2002

Carrier Liaison Committee

Telecommunications  
Industry Forum

VIA ELECTRONIC FILING

Ordering and Billing  
Forum

William F. Caton  
Acting Secretary  
Office of the Secretary  
Federal Communications Commission  
445 12<sup>th</sup> Street, SW  
Washington, DC 20554

Network Interconnection  
Interoperability Forum

Industry Numbering  
Committee

Re: **Ex Parte Presentation in CC Docket No. 94-102**  
Revision of the Commission's Rules to Ensure  
Compatibility with Enhanced 911 Emergency Calling Systems

Protection Engineers  
Group

Standards Committee 05

Dear Mr. Caton:

Network Reliability  
Steering Committee

On March 12, 2002, representatives from the TTY Technical Standards Implementation ("TTSI") Incubator Program, sponsored by the Alliance for Telecommunications Industry Solutions ("ATIS"), met with representatives from the Federal Communications Commission ("FCC" or "Commission") to discuss issues regarding digital wireless TTY call completion to Public Safety Answering Points ("PSAP").

Internetwork  
Interoperability Test  
Coordination Committee

Telecommunications  
Fraud Prevention  
Committee

Generic Requirements  
Users Group

International Forum on  
ANSI-41 Standards  
Technology

Interactive Voice  
Response Forum

TTY Forum

Administrative Council for  
Terminal Attachments

IMSI Oversight Council

In attendance, representing the Commission, were Kris Monteith, Chief, Policy Division, WTB; Mindy Littell, Attorney, Policy Division, WTB; Patrick Forster, Senior Engineer, Policy Division, WTB; Greg Hlibok, Attorney Advisor, Disabilities Rights Office Division, CIB; and Jerome Stanshine, Telecommunications Systems Specialist, Network Technology Division, OET (via conference call). The individuals representing the TTSI were Lori Buerger, Director, External Affairs, AT&T Wireless; Karen Gulick, Partner, Harris, Wiltshire & Grannis, LLP, on behalf of AT&T Wireless; Ben Almond, Vice President, Federal Regulatory Affairs, Cingular Wireless; Ken Evans, Senior Manager, Product Realization, Cingular Wireless; Susan Palmer, Associate Director, Federal Regulatory, Cingular Wireless; Andrea Williams, Assistant General Counsel, CTIA; Steven Coston, Technical Manager, Regulatory Services, Sony Ericsson; Judy Harkins, TAP Director, Gallaudet University; Alfred Lucas, Vice President and Director, Office of Access Excellence, Motorola; John Melcher, First Vice President, NENA; Richard Taylor, Second Vice President, NENA; Scott Freiermuth, Attorney, Sprint PCS;

Ed Hall, Vice President – Technology Development, ATIS; Jim Turner, Technical Coordinator – IITC, ATIS; and Megan Campbell, General Counsel, ATIS.

The purpose of the meeting was to: (i) provide background information on the industry initiated testing activities under the auspices of the TTSI Incubator Program; (ii) notify the Commission of the issues encountered during wireless TTY testing with PSAPs; (iii) explain the efforts currently underway to address the issues identified during testing and, (iv) discuss the next steps given the June 30, 2002 mandate for wireless service providers to provide TTY capability with digital handsets including the ability to transmit 911 calls using TTY devices. The discussion was consistent with the attached presentation and supporting documents, which were provided to all participants at the meeting. However, further information is included in the next few paragraphs reflecting highlights of the discussion points and, in some cases, items that were not reflected in the written materials.

The wireless TTY/PSAP issue was discovered during first office application (FOA) testing over digital wireless networks where Total Character Error Rates (TCER) of greater than one percent (1%) were recorded while conducting network interoperability testing with a PSAP. It was mentioned that this is a latent problem capable of causing errors on the wireline side as well, but only identified as the result of the exhaustive wireless TTY testing. At the time of the *ex parte* meeting, the TTSI had tested with ten (10) PSAPs. Three (3) of the PSAP TTY vendors utilized by those PSAPs had passed with a one percent (1%) or lower TCER. The failure rate ranged from four percent (4%) to thirty-five percent (35%) TCER. (See attached presentation for details.) Emphasis was placed on the fact that there are over 7000 PSAPs deployed with the potential for 7000 different configurations of TTY equipment and, further, that some of those PSAPs utilize equipment from vendors that have gone out of business. TTSI representatives explained that part of the problem, and the lack of knowledge regarding its magnitude, is due to the different configurations of PSAP equipment and the various software used at the PSAPs. This, in turn, is due to the absence of a common specification or standard for consumer and PSAP TTY equipment.

Attempting to better understand the scope of the problem, the TTSI representatives informed the Commission staff that the development of a standard test process for PSAPs and PSAP TTY vendors is currently underway. The goal is to develop a minimum performance validation tool, based on TIA/EIA 840 specifications (Minimum Performance Standards for Text Telephone Signal Detector and Text Telephone Signal Regenerator), to address all wireless technologies and make that tool available for web site dial-in use by PSAPs and PSAP TTY vendors. In order to ensure compatibility and interoperability, a registry would be established for PSAP vendors to list equipment meeting the set threshold of a TCER of one percent (1%) or less. While all TTSI representatives strongly endorsed such testing, it was noted that communication to and cooperation of the PSAPs and PSAP TTY vendors are essential for resolution of the identified problem. In this context, the TTSI representatives requested assistance from the Commission in encouraging the appropriate participation through the available means.

Notwithstanding the problem identified and the continuing efforts to resolve it, the TTSI representatives made it clear that the group was recommending that service providers launch a general consumer oriented TTY capability over digital wireless networks on June 30, 2002. It was explained that the launch would provide several other benefits to TTY users. However, the recommendation was premised on the proactive education of TTY users and consumers in general regarding the potential for errors rendering TTY messages unintelligible at the PSAP. It was strongly recommended that the Commission issue a Public Notice encouraging TTY users and consumers to consider other means of communications for emergency calls, including Telecommunications Relay Service (TRS), analog cellular, and landline telecommunications.

As efforts continue to resolve the wireless TTY PSAP issues, the TTSI Incubator Program and ATIS have committed to keeping the Commission apprised. Should the Commission require any further information regarding the issues discussed during the March 12, 2002 *ex parte* meeting or the status of activities going forward, please contact Ed Hall at (202) 434-8836 or me at (202) 434-8847.

Pursuant to Section 1.1206(b)(2) of the Commission's rules, one copy of this letter is being filed electronically for inclusion in the public record of the above-referenced proceeding.

Sincerely,

*Megan L. Campbell*  
General Counsel

#### Attachments

cc: Kris Monteith, Chief, Policy Division, WTB (kmonteit@fcc.gov)  
Mindy Littell, Attorney, Policy Division, WTB (mlittell@fcc.gov)  
Patrick Forster, Senior Engineer, Policy Division, WTB (pforster@fcc.gov)  
Greg Hlibok, Attorney Advisor, Disabilities Rights Office Division, CIB (ghlibok@fcc.gov)  
Jerome Stanshine, Telecommunications Systems Specialist, Network Technology Division,  
OET (jstanshi@fcc.gov)  
Lori Buerger, Director, External Affairs, AT&T Wireless (lori.buerger@attws.com)  
Karen Gulick, Partner, Harris, Wiltshire & Grannis, LLP (KGulick@harriswiltshire.com)  
Ben Almond, Vice President, Federal Regulatory Affairs, Cingular Wireless  
(ben.almond@cingular.com)  
Ken Evans, Senior Manager, Product Realization, Cingular Wireless  
(ken.evans@cingular.com)  
Susan Palmer, Associate Director, Federal Regulatory, Cingular Wireless  
(susan.k.palmer@cingular.com)  
Andrea Williams, Assistant General Counsel, CTIA (awilliams@ctia.org)

Steven Coston, Technical Manager, Regulatory Services, Sony Ericsson  
([steve.coston@ericsson.com](mailto:steve.coston@ericsson.com))

Judy Harkins, TAP Director, Gallaudet University ([judy.harkins@gallaudet.edu](mailto:judy.harkins@gallaudet.edu))

Alfred Lucas, Vice President and Director, Office of Access Excellence, Motorola  
([al.lucas@motorola.com](mailto:al.lucas@motorola.com))

John Melcher, First Vice President, NENA ([jmelcher@911.org](mailto:jmelcher@911.org))

Richard Taylor, Second Vice President, NENA ([richard.taylor@ncmail.net](mailto:richard.taylor@ncmail.net))

Scott Freiermuth, Attorney, Sprint PCS ([SFreie02@sprintspectrum.com](mailto:SFreie02@sprintspectrum.com))

Ed Hall, Vice President – Technology Development, ATIS ([ehall@atis.org](mailto:ehall@atis.org))

Jim Turner, Technical Coordinator – IITC, ATIS ([jturner@atis.org](mailto:jturner@atis.org))

## Federal Communications Commission

Ex Parte Meeting  
March 12, 1:00 PM to 2:00 PM  
445 12<sup>th</sup> St., S.W.  
Washington, DC 20554

Topic: Wireless TTY Call Completion to a PSAP

### Industry Representatives:

- |                      |                   |
|----------------------|-------------------|
| 1. Megan Campbell,   | ATIS              |
| 2. Ed Hall,          | ATIS              |
| 3. Jim Turner        | ATIS              |
| 4. Lori Buerger      | AWS               |
| 5. Karen Gulick      | AWS               |
| 6. Ben Almond        | Cingular Wireless |
| 7. Ken Evans         | Cingular Wireless |
| 8. Susan Palmer      | Cingular Wireless |
| 9. Andrea Williams   | CTIA              |
| 10. Steve Coston     | Ericsson          |
| 11. Judy Harkins     | Gallaudet Univ.   |
| 12. Al Lucas         | Motorola          |
| 13. John Melcher     | NENA              |
| 14. Richard Taylor   | NENA              |
| 15. Scott Freiermuth | Sprint PCS        |

## **TTY Call Completion to a PSAP**

### **Prepared for FCC Meeting**

**March 12, 2002**

**by**

**ATIS**

**TTY Technical Standards Implementation (TTSI)**

**Contact:**

**Ed Hall**

**Ehall@atis.org**

**202.628.6380**



## **Background: TTY Forum**

- TTY Forum Established in 1997 by CTIA
- Now sponsored by ATIS  
<http://www.atis.org/atis/tty/ttyforum.htm>
- **Mission**: Enable a TTY user to access digital wireless networks including calls to 9-1-1 (PSAP)
- **Members**: Open Industry Forum-Open to all  
FCC; Consumer Organizations; Public Safety;  
TTY Manufacturers; Handset Manufacturers;  
Infrastructure Manufacturers; Service Providers



## Background: TTY Forum

### Accomplishments to date:

- Over 70 Agreements  
(e.g., Solve for 45.45 baudot/not E-Protocols)
- “User Requirements”
- “TTY Mode Switch” Design Considerations
- Impetus for a suite of Technical Standards:
  - TDMA • CDMA
  - GSM • 2.5-mm Jack
- Glossary of Terms
- Complex Technical Issues



## TTY Forum: Current Status

- ANSI-41 technologies (TDMA, CDMA) have standardized Lucent's, “No Gain Solution”
- GSM based carriers have standardized Ericsson's Cellular TTY Modem (CTM) solution
- Handsets are being manufactured and infrastructure is being deployed
- **Industry is working in unison, sharing technology issues and solutions.**
- **Cooperation**
- **Due Diligence on a complex technical issue!!**



## **TTY Technical Standard Implementation (TTSI)**

- **Technical Complexity**
  - TTY Code Development
    - Releases, Validation
  - Product Development
    - Simulations, Test failures
  - System Integration
    - Assumptions
- **TTY Forum (non-technical)**
- **Ericsson sparked the establishment of TTSI**



## **TTSI**

- **Issues and Resolutions**
  - Standardized TTY Test Process: Gállaudet SW
  - White-paper:
    - Dynamic Echo Control, Output levels, VCO/HCO: TSB-121
  - Interoperability between Wireless and PSAPs
- **Final Test Stages & Interoperability**
  - Critical Test failure analysis
    - Standards issue, equipment and configuration, test coord.
- **Issues being escalated and actions assigned**





## The Wireless TTY PSAP Issue

- PSAP Interoperability
  - Testing has uncovered unacceptable TCER (greater than 1%) between Wireless TTY and some PSAPs rendering conversations unintelligible
    - 37 PSAP/CAD vendors identified
    - 10 PSAP/CAD locations tested to date
    - 41 failures out of 82 test cases
    - 3 PSAP vendors pass



## The Wireless TTY PSAP Issue

### High Character Error Rates

- Until PSAP equipment is standardized and ADA compliant, some digital wireless TTY users are at risk of not being able to communicate with a PSAP in an emergency
- This raises concerns that some PSAPs may not be able to handle wireline, as well as, wireless TTY calls



## PSAP Problem

- Over 7,000 PSAPs deployed nationwide subject to varying state and local oversight. NENA coordinates, but has no regulatory authority
- There is no commonly accepted TTY specification, certification process, or requirements for PSAPs and other call centers
- Some vendors have exited the PSAP CPE business, but their products are still in network
- There are 9 PSAP and wireless technical standards that must work together for TTY access



## PSAP / Wireless Standards

- NENA -04-001 PN 1663 - PSAP Standard
- TIA/EIA 825 - FSK Modem - PSAP / TTY Vendor's guide
- TIA/EIA 840 A - Minimum performance standards for Text Telephone Signal Detector & Regenerator - Wireless TTY
- IS 823 B - TDMA TTY Extension
- TIA IS 127-3 EVRC CDMA TTY Extension
- TIA IS 733-2 13K CDMA TTY Extension
- TIA IS 889 CDMA TTY/TDD Minimum Performance Standard
- T1-718 PCS 1900 CTM Bit Exact Code
- ITU -T V.18 Text Telephone Telephony Automodring and modem

All Standards *MUST* inter-operate with each other



## TTSI Efforts to Resolve

- Wireless Network modification to maximize interoperability with existing PSAPs
- Availability of a minimum performance validation tool based on TIA/EIA 840 to define the scope of the PSAP interoperability issue (potential to be modified for use by wireline)
  - PSAP/PSAP vendors will be encouraged to dial-in and record this file using their baudot method
  - PSAP/Vendors will mail resultant text file to ATIS for scoring.
- ATIS/NENA will keep a register of PSAPs tested, passed, and failed to define scope of problem



## TTY Call to PSAP

### **NENA plays a critical Role:**

- Is a member of the TTY Forum
- Has been engaged on this issue
- Has volunteered to coordinate testing with PSAP TTY suites
- Industry currently working with NENA to resolve TTY/PSAP issue
  - NENA has appointed an Official Representative to assist TTSI



## Mobile TTY – Next Steps

- TTSI recommends launch on 6/30/02
  - TTY users will benefit
    - Wireless access to digital phones, friends/family, TRS & some PSAPs
    - Provides easy access to other digital services
      - SMS, Wireless Web, Messaging
- Continue TTY Forum/TTSI for Resolution
  - NENA, PSAP CPE & TTY Manufacturers' participation essential



## Mobile TTY – Next Steps

- TTSI
  - Work with NENA to identify the scope of the problem by 9/30/02
  - Develop a standardized acceptance test
    - Utilize current TTSI process
    - Registry established to track progress
- Mandatory Testing & Compliance
  - Carriers, Wireless Infrastructure & Handset, TTY Terminals & PSAPs all testing to the standard acceptance test



## **Mobile TTY – Next Steps**

- FCC Action regarding Mandate Issues
  - Public Notice
  - Need to address lack of TTY specifications
  - Consider ADA implications of PSAP readiness
- Notification to Consumers



## **Comments and Questions**



# Report 34 TCER By PSAP Device

Destination Device 100

Test Configuration	Uplink Error Rate	Downlink Error Rate
Landline to PSAP	0	7.4
Landline to PSAP	0.23	1.06
Landline to PSAP	0	1.04
Landline to PSAP	7.4	0
Landline to PSAP	0.9	0.09
Landline to PSAP	0	0
Mobile to PSAP	7	0
Mobile to PSAP	0	0
Mobile to PSAP	9.3	0
Mobile to PSAP	0	0
Mobile to PSAP	7.2	0
Mobile to PSAP	0	5.5
Mobile to PSAP	0	6.7
Mobile to PSAP	0	2.7
Mobile to PSAP	3.7	0
<b>Summary for 'Destination Device Under Test' = 100 (15 detail records)</b>		
<b>Overall Avg</b>	<b>2.38</b>	<b>1.63</b>
<b>(Landline Avg &lt;6 Records&gt;</b>	<b>1.42</b>	<b>1.59)</b>
<b>(Mobile Avg &lt;9 Records&gt;</b>	<b>1.81</b>	<b>1.65)</b>

Destination Device 101

Test Configuration	Uplink Error Rate	Downlink Error Rate
Landline to PSAP	0.08	0
Landline to PSAP	1.9	0
Landline to PSAP	0	0
Mobile to PSAP	32.7	2.2
Mobile to PSAP	15.53	18.03
Mobile to PSAP	24	0
Mobile to PSAP	8.19	0.83
Mobile to PSAP	27.7	0
Mobile to PSAP	25.8	0
Mobile to PSAP	18.9	0

Summary for 'Destination Device Under Test' = 101 (10 detail records)  
 Overall Avg **15.48**  
 (Land Line Avg <3 Records> **0.66**)  
 (Mobile Avg <7 Records> **21.83**)

Destination Device 122

Test Configuration	Uplink Error Rate	Downlink Error Rate
Mobile to PSAP	11.11	0
Mobile to PSAP	10.03	0
Mobile to PSAP	3.2	0

Summary for 'Destination Device Under Test' = 122 (3 detail records)  
 Avg **8.11**

Destination Device 123

Test Configuration	Uplink Error Rate	Downlink Error Rate
Mobile to PSAP	1.51	0.1
Mobile to PSAP	0	0
Mobile to PSAP	3.03	0.8
<b>Summary for 'Destination Device Under Test' = 123 (3 detail records)</b>	<b>1.51</b>	<b>0.3</b>
<b>AVG</b>		

Destination Device 124

Test Configuration	Uplink Error Rate	Downlink Error Rate
Mobile to PSAP	0	0.62
<b>Summary for 'Destination Device Under Test' = 124 (1 detail record)</b>	<b>0</b>	<b>0.62</b>
<b>AVG</b>		

Destination Device 125

Test Configuration	Uplink Error Rate	Downlink Error Rate
Mobile to PSAP	6.34	2.9
Mobile to PSAP	6.66	0.93
Mobile to PSAP	6.66	0
<b>Summary for 'Destination Device Under Test' = 125 (3 detail records)</b>	<b>6.55</b>	<b>1.28</b>
<b>AVG</b>		



Destination Device 126

Test Configuration	Uplink Error Rate	Downlink Error Rate
Mobile to PSAP	0	7.67
Mobile to PSAP	0	6.66
Mobile to PSAP	0	7.5

Summary for 'Destination Device Under Test' = 126 (3 detail records)  
AVG 0 7.28

Destination Device 127

Test Configuration	Uplink Error Rate	Downlink Error Rate
Mobile to PSAP	0	0.69
Mobile to PSAP	0	1.38
Mobile to PSAP	7.28	1.26

Summary for 'Destination Device Under Test' = 127 (3 detail records)  
AVG 2.43 1.11

Destination Device 21

Test Configuration	Uplink Error Rate	Downlink Error Rate
Landline to PSAP	2.66	0
Landline to PSAP	2.66	1.33
Landline to PSAP	8	1.3
Landline to PSAP	0	0
Landline to PSAP	0	0
Landline to PSAP	2.6	0
Landline to PSAP	2.6	0
Mobile to PSAP	0	0
Mobile to PSAP	0	0
Mobile to PSAP	0	0
Mobile to PSAP	0	0
Mobile to PSAP	0	0
Mobile to PSAP	0	0
Mobile to PSAP	70(phone Issue)	0
Mobile to PSAP	0	0
Mobile to PSAP	0	0
Mobile to PSAP	0	0
Mobile to PSAP	0	0
Mobile to PSAP	0	0
Mobile to PSAP	0	0
Mobile to PSAP	2.58	0
Mobile to PSAP	0	0
Mobile to PSAP	0	0
Mobile to PSAP	0	0

Mobile to PSAP	0	0	0
Mobile to PSAP	0	0	0
Mobile to PSAP	0	0	0
Mobile to PSAP	0	0	0
Mobile to PSAP	0	0	0
Mobile to PSAP	0	0	0
Mobile to PSAP	0	0	0
Mobile to PSAP	0	0	0
Mobile to PSAP	40(Phone Issue)	0	2
Mobile to PSAP	70(Phone Issue)	0	2
Mobile to PSAP	0	0	0
Mobile to PSAP	1.27	0	0
Mobile to PSAP	0	0	0
Mobile to PSAP	0	0	0

**Summary for 'Destination Device Under Test' = 21 (36 detail records)**

<b>Overall Avg</b>	<b>5.62</b>	<b>0.184</b>
<b>(Avg Landline &lt;7 detail records&gt;</b>	<b>2.64</b>	<b>0.37)</b>
<b>(Avg Mobile only &lt;29 detail Records&gt;</b>	<b>6.33</b>	<b>0.13)</b>
<b>(Avg Mobile with out defective phone &lt;26 DR&gt;</b>	<b>0.14</b>	<b>0.0)</b>

Destination Device 99

Test Configuration	Uplink Error Rate	Downlink Error Rate
Mobile to PSAP	0	0
Mobile to PSAP	0	0
Mobile to PSAP	0	0
Mobile to PSAP	0	0

Summary for 'Destination Device Under Test' = 99 (4 detail records)  
Avg 0