Developing Standards for Accessibility
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http://www.tiaonline.org/policy/accessibility

http://tiaonline.org/all-standards/committees/tr-41
• Introductions / Background on TIA
• Wireline Telephone Handset HAC Magnetic Coupling
  • FCC Rules
  • ANSI/TIA-1083-A: *How this voluntary performance standard affects you*
• Wireline Telephone Handset Volume Control
  • FCC Rules (and status of TIA petition for rulemaking with FCC)
  • ANSI/TIA-4965: *How this standard affects you*
• High-Gain Amplified Telephones with Tone Control
  • Addressing hearing loss and use of the telephone
  • ANSI/TIA-4953: *How this voluntary performance standard affects you*
• Questions?
• Represents ~400 information and communication technology (ICT) companies
• Technology and standards development
• Policy and advocacy leadership
• American National Standards (ANSI) accredited standards development organization
  • 12 engineering committees
  • 12 international advisory groups
TIA’s Accessibility Mission

- Encourage collaboration among stakeholders
- Development of voluntary, consensus-based, standards
- Increase the accessibility of technology for those with disabilities
- Encourage innovation
  - Harness technology to open new communications opportunities
- Proactive consultation with the disability community
  - Understand the needs related to ICT products
  - Encourage accessibility solutions into member companies’ product development process
- Work with government regulatory agencies
  - Encourage the use of voluntary, consensus-based, industry standards to address accessibility needs
  - Example: TIA-1083-A standard specifying reduced magnetic noise by telephones for users with T-coil equipped hearing aids
• TIA’s TR-41 Committee
  “Performance and Accessibility for Communications Products”
  • Voluntary standards for telecommunications equipment and systems performance
  • Strong focus on equipment used for voice services, integrated voice and data services, and Internet protocol (IP) applications

• TR-41.3.14 (Accessibility Working Group)
  • Performance standards for equipment features addressing hearing impairments and other disabilities
  • Telephone devices including handsets, headsets, and speakerphones
  • Participants from across the industry including accessibility consumer interests (such as Gallaudet University)
HAC Magnetic Coupling and Volume Control Requirements and Performance for Wireline Telephones

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What is FCC Telephone Hearing Aid Compatibility?
• The Hearing Aid Compatibility Act of 1988 (the HAC Act)
  • All wireline (including cordless) telephones in the U.S. are required to be hearing aid compatible (HAC).
  • The FCC established the technical requirements in CFR part-68.316

• Improved performance for hearing aid users
  • The telephone handset couples magnetically to a hearing aid’s telecoil (“t-coil”).
  • T-coil use reduces background noise heard by the hearing aid user.

• The FCC rules do not address magnetically coupled noise (more on this later…)
The FCC expanded the requirements for Hearing Aid Compatibility

- Became effective January 1, 2000.
- All wireline (including cordless) telephones in the U.S. are required to have “12 dB” volume control gain over the nominal volume control setting.

Addresses the acoustic output from the telephone handset coupled to the microphone of a hearing aid, or directly to the ear.

The FCC rules reference outdated TIA standards for the methods used to measure the handset’s acoustic output level. (more on this later…)
Enhanced HAC Magnetic Coupling Performance

• FCC’s HAC Magnetic Coupling Requirements
  • FCC 47 C.F.R. § 68.316
  • TIA developed the 68.316 rules which are published in the TIA-504 standard.

• The Problems
  • Technical requirements do not address impacts of magnetically coupled noise.
  • Biggest problems are for cordless telephones (including DECT).

• The Solution: ANSI/TIA-1083
  • Voluntary standard developed by TIA TR41.3 (published in March, 2007).
  • Addresses complaints of “buzz” noise often caused by cordless telephones.
  • Revised to include telephones with digital interfaces (including VoIP telephones) (published as ANSI/TIA-1083-A, November, 2010).
What’s New for ANSI/TIA-1083-A?

TIA TR41.3 is revising ANSI/TIA-1083-A

• Adding wideband audio requirements
  • For telephones that support wideband audio.
  • Wideband audio improves intelligibility when listening to speech.

• Allow using speech as a test signal
  • Some telephones do not support using sine waves (tones) for test signals.
  • Will “future-proof” the standard for use with testing new product designs.
How ANSI/TIA-1083 Affects You

Look for the logo to ensure HAC magnetic compatibility performance

Compatible with Hearing Aid T-Coil

TIA-1083

Compatible with Hearing Aid T-Coil

TIA-1083
Look for the TIA-1083 Logo
Improving the FCC’s Volume Control Rules for Regular Wireline Telephones (ANSI/TIA-4965) and Voluntary Performance Standard for Specialty Amplified Telephones (ANSI/TIA-4953)

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Improving The FCC’s Telephone Volume Control Rules

- **FCC’s Volume Control requirements**
  - FCC 47 C.F.R. § 68.317
  - References outdated TIA standards for measuring handset acoustic output level. (using “ROLR”: Receiver Objective Loudness Rating).

- **The Problems**
  - Outdated testing methods using ROLR may lead to incorrect measurements.
  - Outdated testing methods may cause a poor design to meet the requirements.

- **The Solution:** **ANSI/TIA-4965**
  - “Receive Volume Control Requirements for Digital and Analog Wireline Terminals”
  - Developed by TIA TR41.3 (published October 24, 2012).
Conversational Gain

• A more rational and intuitive way to measure volume control

• **Conversational Gain =**
  How loud a voice is compared to a typical face-to-face conversation
  (two people talking face-to-face, 1 meter apart)

• 0dB conversational gain means the speech heard from the telephone is the same level that would be heard if speaking face-to-face 1 meter apart
How is Conversational Gain Measured?

• Using standardized telephone testing equipment
  - ITU P.58 Head And Torso Simulator (HATS)
  - ITU P.57 Type-3.3 Ear Simulator
The Transition from ROLR to Conversational Gain

• A standard unamplified telephone (the Western Electric 500-type telephone and equivalent models by other manufacturers) provides about 6 dB of Conversational Gain even though it has no volume control.

• The current FCC ROLR-based requirement for at least 12 dB of gain above the normal unamplified level thus becomes a minimum of 18 dB of Conversational Gain.

• The requirement to automatically reset if the ROLR-based gain exceeds 18 dB becomes 24 dB of Conversational Gain.
• October 25, 2012
  • TIA filed a Petition for Rulemaking with the FCC. (see http://bit.ly/10ah86B)
  • Petition is for the FCC to reference ANSI/TIA-4965 (using Conversational Gain instead of ROLR) to measure wireline handset telephones’ volume control

• March 2013
  • The FCC gave TIA’s Petition a formal rulemaking number (CG Docket No. 13-46).

• July 2013
  • FCC released a public notice and received no opposing comments.

• Awaiting FCC activity…
How Conversational Gain Affects You

- Uses a more intuitive reference
  - 12dB gain means hearing speech 12dB louder than if speaking face-to-face

- A better way to compare consumer products
  - Permits a valid comparison of the sound levels produced by different devices

- Manufacturers’ volume control claims are easier to verify
  - Brings fairness to the marketplace for equipment manufacturers
• Specialty telephone product
  • Sold in some retail channels
  • Offered for free from some state equipment programs
  • Used by people with hearing loss with or without using a hearing aid

• Much higher amplification than a standard telephone’s FCC 12 dB gain (or 18 dB of “Conversational Gain”)

• Tone Control is a major feature

• Much higher amplitude acoustic ringer / alerter
What Was the Problem?

- No standard method to measure and evaluate a telephone’s acoustic performance related to the needs of users with hearing loss.
Who Asked for a Solution?

- TEDPA (Telecommunications Equipment Distribution Programs Association)
  - State programs that buy and distribute equipment to people with disabilities
  - Collectively the largest purchasers of high-gain amplified telephones in the US

- **Amplified telephone manufacturers**
  - Managing claims of “gain” from competitors
  - Bring sanity to telephone RFP requirements

- **Amplified telephone consumers**
  - Need to know if an amplified telephone will meet the needs of their hearing loss
  - Need to know if an amplified telephone will work well when used with a hearing aid
Who Needs an Amplified Telephone?

- People with varying degrees of hearing loss
  - Mild
  - Moderate
  - Severe

- People with hearing aids
  - Telephone to hearing aid acoustic coupling issues (microphone mode)
  - Magnetic signal performance for t-coil use (HAC)
• **The Solution: ANSI/TIA-4953**
  
  • *Amplified Telephone Measurement Procedures and Performance Requirements*
  • Developed by TIA TR-41.3 (published in May 2012)

• **TIA-4953 Requirements Summary**
  
  • Volume Control (measured as “Conversational Gain”)
  • **Tone Control**
  • Acoustic ringer level and tone
  • Acoustic performance for hearing-aid users
  • Magnetic performance for hearing-aid t-coil users (TIA-1083)
  • Noise, distortion, stability (no howling), transmit levels
Why is Tone Control Important?
### ANSI/TIA-4953 Technical Details Summary

<table>
<thead>
<tr>
<th>Hearing Loss Category</th>
<th>Hearing Loss (HL) Range</th>
<th>Tone Control Type</th>
<th>Tone Control</th>
<th>Conversational Gain</th>
<th>Ringer Gain</th>
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<td>Steep Slope</td>
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</table>

- Other: (Distortion, noise, transmit, stability)
- Unamplified Mode Acoustics Performance Requirements
- Acoustic Hearing Aid Compatibility Performance Requirements
- Magnetic Hearing Aid Compatibility Performance (TIA–1083–A)
What’s New for ANSI/TIA-4953?

**TIA TR41.3 is revising ANSI/TIA-4953**

- **Add requirements for the maximum volume control**
  - Distortion requirements for the maximum volume control setting.
  - Will help reduce user confusion.
  - Should help for Analog Terminal Adapter (ATA) interoperability.

- **Add requirements for sidetone**
  - Will improve complaints of noise and howling or squealing.
  - Should help for Analog Terminal Adapter (ATA) interoperability.

- **Add requirements for digital interface telephones (e.g., VoIP)**
  - Same as for analog interface except for different test signal levels.
  - Applicable to any digital interface handset product.
How ANSI/TIA-4953 Affects You

Look for the logo to make an informed decision

Amplified For MILD Hearing Loss
Amplified For MODERATE Hearing Loss
Amplified For SEVERE Hearing Loss

TIA-4953 TIA-4953 TIA-4953
Summary and Questions

• Hearing Aid Compatibility (HAC) (handset magnetic audio output)
  • FCC rules work but more needed for some telephones (e.g., cordless DECT).
  • TIA TR41.3 developed and published the ANSI/TIA-1083-A voluntary standard.

• Volume Control (handset acoustic audio output)
  • TIA TR41.3 developed and published the ANSI/TIA-4965 standard using “Conversational Gain” as the basis to address outdated FCC testing methods.
  • TIA petitioned the FCC to change the wireline telephone volume control rules.

• Performance of Amplified Telephones with Tone Control
  • TIA TR41.3 developed and published the ANSI/TIA-4953 voluntary standard (also using “Conversational Gain” as the basis).
  • Acoustic output level of the handset (including tone control) and ringer
  • Coupling to hearing aids acoustically and magnetically (t-coil)
Thank You!