NENA Hearing Standards for Public Safety Telecommunicators

Abstract: This document is provided to assist public safety answering points (PSAPs) in establishing Americans with Disabilities Act (ADA)-compliant hearing standards for public safety telecommunicators.

NENA Hearing Standards for Public Safety Telecommunicators

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1 Executive Overview

This document is provided to assist public safety answering points (PSAPs) in establishing Americans with Disabilities Act (ADA)-compliant hearing standards for public safety telecommunicators. It is a function of the public safety telecommunicator to receive and process audible information from various telecommunications devices as well as differentiate and process numerous non-verbal audible alarms and indicators. Therefore, the following standard has been created to assist managers in developing minimum hearing standards required to perform this basic and essential function of the public safety telecommunicator role.

This standard includes information including:

- Telecommunicator role requirements
- Audiometric testing of candidates and employees
- Audiology
- Americans with Disabilities Act as it relates to employment

Purpose and Scope

This Hearing Standards for Public Safety Telecommunicators standards document is a tool for PSAP managers to use in the development of minimum hearing standards for public safety telecommunicators. It defines standard hearing requirements and audiology necessary to perform the basic functions of the telecommunicator position.

Reason to Implement

This standard will be helpful to PSAP managers by providing reasonable and defensible industry accepted minimum hearing standards for public safety telecommunicators.

Benefits

Use of this "Hearing Standards for Public Safety Telecommunicators" standards document provides PSAP centers with:

- A nationally accepted minimum hearing standard for the public safety telecommunicator role;
- Means by which to assess the hearing of potential candidates or current employees in the public safety telecommunicator role;
- Recommended audiometric testing policies.

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STANDARD DOCUMENT
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3. SHOULD: This word, or the adjective "RECOMMENDED", means that there may exist valid reasons in particular circumstances to ignore a particular item, but the full implications must be understood and carefully weighed before choosing a different course.
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5. MAY: This word, or the adjective "OPTIONAL", means that an item is truly optional. One vendor may choose to include the item because a particular marketplace requires it or because the vendor feels that it enhances the product while another vendor may omit the same item. An implementation which does not include a particular option "must" be prepared to interoperate with another implementation which does include the option, though perhaps with reduced functionality. In the same vein an implementation which does include a particular option "must" be prepared to interoperate with another implementation which does not include the option (except, of course, for the feature the option provides.)

These definitions are based on IETF RFC 2119.

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Reason for Issue/Reissue

NENA reserves the right to modify this document. Upon revision, the reason(s) will be provided in the table below.

Document Number	Approval Date	Reason For Issue/Reissue
NENA 54-002	06/10/2006	Initial Document
NENA-STA-007.2-2014	06/14/2014	Update to adhere to OSHA standards and industry best practices.
NENA-STA-007.3-2020	01/19/2020	Non-substantive and scrivener edits made for clarity, and substantive changes made to Reasonable Accommodations, section 2.4.1, during periodic review.

2 Hearing Standards for Public Safety Telecommunicators

2.1 Role Requirements

The public safety telecommunicator role requires the ability to receive auditory information from citizens and other public safety entities requesting public safety services or assistance as well as to provide telephone support. This requires both active and passive listening to process phone or radio requests, recognize incoming calls, intercoms, alarms, interactions with other employees and general happenings in the communications center. Examples of some of these activities are as follows:

- Receive and process, from multiple sources, information requiring public safety services including other telecommunicators, field units or electronic devices.
- Transmit emergency and administrative messages over communications systems.
- Dispatch emergency services by radio and electronics and coordinate response activities.
- Receive and transmit orders and instructions.
- Monitor security, fire, medical and emergency management alarms and warning systems.
- Monitor multiple radio frequencies for coordination and information.
- Receive and process non-verbal alarms, beeps and other audible indicators from various equipment.
- Monitor teletype system.

2.2 Medical Evaluation

Medical evaluation SHALL only be conducted in order to determine a candidate or current employee's fitness to perform essential job tasks and SHALL NOT be conducted in an attempt to identify disabilities which do not affect job performance, regardless of need for reasonable accommodation.

2.2.1 Evaluator Credentials

Any person conducting audiometric evaluations MUST hold the appropriate qualifications of one of the following: a state licensed, and/or certified audiologist, state licensed physician, or a trained technician supervised by one of the former.

Commentary:
Hearing conservation programs and follow-up evaluations for hearing loss should be conducted by a qualified audiologist or physician (preferably an otolaryngologist).

2.2.2 Candidates for Employment

Audiometric testing shall be performed on each candidate in order to detect any physical or medical condition that could adversely affect the candidate's ability to safely perform all essential job tasks. Audiometric testing shall be performed on all candidates for employment along with any other required medical examinations, after an offer of employment has been made and prior to the commencement duties of applicants, regardless of disability [8]. Any medical evaluation, including audiometric testing, required of candidates SHOULD be provided at no cost to the candidate.

2.2.3 Current Employees

PSAPs SHOULD develop policies and procedures for audiometric testing of employees in order to determine continued fitness to perform job tasks. These policies and procedures SHOULD ensure that employees undergo audiometric testing, at least, on an as needed basis; when a potential hearing related problem is noted by the employer or employee. Any medical evaluation, including audiometric testing, required of employees SHALL be provided at no cost to the employee.

Commentary:
Although not required, it is recommended that employees undergo annual audiometric testing to identify any deterioration in hearing ability as early as possible and determine continued fitness to perform job related tasks.

2.2.4 Medical Records

Agencies SHALL maintain in personnel records only that information which is needed or required for personnel administration purposes. Information obtained regarding the medical condition or history of an applicant that is collected by the agency MUST be maintained in a separate file in compliance with the provisions of the Americans With Disabilities Act (ADA), Health Insurance Portability and Accountability Act (HIPAA) and any state or local medical privacy laws. Audiometric testing records of all employees SHALL be kept according to the local record retention schedule.

2.3 Audiology

Public safety telecommunicators must quickly and accurately receive and process auditory information in an environment that includes various background noises such as telephones ringing, multiple frequency radio traffic, and general conversation. Generally, the noise level in PSAPs is moderate, but requires that telecommunicators be able to differentiate various verbal and non-verbal auditory cues at variable intensities.

2.3.1 Sound

Sound is composed of three variables: frequency, intensity, and duration. The frequency of sound, measured in Hertz (Hz) corresponds with the perceived pitch. Normal conversational speech ranges from 250 Hz through 6000 Hz. Sound intensity, measured in decibels (dB), relates to perceived loudness. The decibel scale has been standardized to represent the range of normal hearing in adults denoted as the unit "dB HL." Average conversational speech ranges from 40-60 dB HL. For adults, normal hearing thresholds can range from -10 through 25 dB HL for all test frequencies. When a threshold of hearing sensitivity exceeds 25 dB HL, for any frequency in an adult, this is considered a hearing loss.[2]

2.3.2 Hearing Thresholds

Audiometric hearing threshold testing SHALL be assessed using an audiometer that meets the specifications of, and is maintained and used in accordance with, the most recent edition of American National Standard/Acoustical Society of America Specifications for Audiometers, ANSI/ASA S3.6. Audiometric examinations SHALL be administered in a room meeting the requirements listed in Appendix D of OSHA regulation 29 CFR 1910.95 (h)(4).

Hearing thresholds SHALL be determined using pure tone stimuli via air conduction with test frequencies including 500, 1000, 2000, 3000, 4000, and 6000 Hz per OSHA standard 1910.95(h)(1).[2] Thresholds at each frequency SHALL be evaluated separately for each ear using either insert earphones or headphones. Other frequencies MAY be included at the discretion of the qualified evaluator.

Hearing thresholds at any evaluated frequency SHALL NOT exceed 25 dB HL in either ear. If hearing thresholds exceed 25 dB HL at any evaluated frequency, continued speech discrimination testing SHALL be completed as described in section 2.3.3.[2]

2.3.3 Audiometric Speech Discrimination

A speech discrimination evaluation is used to determine an individual's ability to understand speech in quiet and noisy listening environments. If audiometric testing revealed hearing thresholds that did not meet the standards in 2.3.2 (any threshold exceeding 25 dB HL), binaural speech discrimination testing in quiet and noise SHALL be completed in the sound field.[7]

Sound field testing SHALL be performed in a sound treated environment meeting the most recent American National Standard Specifications ANSI/ASA S3.6. CID W-22 word lists[7] SHALL be presented via a calibrated speech audiometer through a single speaker stationed at 0 degrees azimuth with the candidate seated one (1) meter (39 inches) from the speaker. One 50-word list of pre-recorded CID W-22 speech stimuli SHALL be presented in quiet at 50 dB HL. The minimum acceptable standard of speech discrimination in quiet SHALL be a score no poorer than 90% correct.[7]

A second 50-word list of pre-recorded CID W-22 speech stimuli[7] SHALL be presented at 50 dB HL in a background of broad-band noise (white-noise or speech-noise acceptable) at 40 dB HL (S/N = + 10). Noise MAY be directed through the same speaker as speech stimuli at 0 degrees azimuth or through a separate speaker located at 180 degrees azimuth. The minimum acceptable standard of speech discrimination in noise SHALL be a score no poorer than 70% correct. An open-set response format SHALL be utilized with the candidate responding in writing.[7]

Use of hearing aids, cochlear implants or enhanced listening devices to achieve the above speech discrimination standards SHALL be permitted. [5][6]

2.3.4 Hearing Conservation

Once a public safety telecommunicator is determined to have some hearing loss there are steps that can be taken to slow and/or help protect against further hearing loss. PSAPs SHOULD obtain specific advice on hearing conservation from trained professionals (i.e. Medical Doctor). Assistance may be available from local physicians, employee assistance programs, and the Occupational Health and Safety Administration.[4] General suggestions include:

- Avoid, as much as possible, exposure to noise levels higher than 90 dB at any frequency, especially any exposure that occurs daily.
- Utilization of noise reduction headsets.
- Noise canceling engineering including consoles and wall and floor coverings.`

2.4 Americans with Disability Act (ADA): Employment

The ADA prohibits discrimination on the basis of disability in employment. It prohibits discrimination in recruiting, hiring, promotions, training, pay, social activities, and other privileges of employment.

2.4.1 Reasonable Accommodations

Public entities are required `to make reasonable modifications to policies, practices, procedures, and equipment where necessary to avoid discrimination, unless they can demonstrate that doing so would fundamentally alter the nature of the service, program, or activity being provided. Examples of reasonable accommodation include:

- Employer provided headsets with built in amplification.
- Employee's hearing aids.
- Employee's cochlear implants.[4]

Commentary:
Individual or issue specific measures of accommodation should be sought in consultation with affected persons and a trained professional (i.e. audiologist, Medical Doctor).

2.4.2 Job Task Necessity

It is essential to the life and safety of the community and Public Safety Responders for Public Safety Telecommunicators to meet the hearing standards set forth in this document.

3 NENA Registry System (NRS) Considerations

Not Applicable

4 Documentation Required for the Development of a NENA XML Schema

Not Applicable

5 Impacts, Considerations, Abbreviations, Terms, and Definitions

5.1 Operations Impacts Summary

This "Hearing Standards for Public Safety Telecommunicators" standards document does have operational impacts on the PSAP. Primarily from a budgetary perspective, in that audiometric testing SHOULD be provided at no cost to the employee or employment candidate. Also, depending on the solution implemented in each may increase the duration of pre-employment interviews and testing. These impacts SHOULD be carefully considered by PSAP managers and mitigated as much as possible.

5.2 Technical Impacts Summary

Not applicable

5.3 Security Impacts Summary

Not applicable

5.4 Recommendation for Additional Development Work

No additional development work needed.

5.5 Anticipated Timeline

None.

5.6 Cost Factors

Cost factors affecting PSAPs will include the costs associated with audiometric testing and any reasonable accommodations necessary for persons with hearing impairment.

5.7 Cost Recovery Considerations

Local funding sources will generally be utilized for cost factors associated with audiometric testing and/or reasonable accommodations. PSAPs may have access to local government occupational health centers or be able to partner with neighboring PSAPs/agencies to help reduce costs associated with audiometric testing.

5.8 Additional Impacts (non-cost related)

The information or requirements contained in this NENA document are not expected to have 9-1-1 Center operational impacts, based on the analysis of the authoring group.

5.9 Abbreviations, Terms, and Definitions

See NENA Master Glossary of 9-1-1 Terminology, NENA-ADM-000 [1], for a complete listing of terms used in NENA documents. All abbreviations used in this document are listed below, along with any new or updated terms and definitions.

Term or Abbreviation (Expansion)	Definition / Description
Decibel	A unit for expressing the relative intensity of sounds on a scale from zero for the average least perceptible sound (near total silence) to about 130 for the average pain level. A sound 10 times more powerful than 0dB is 10 dB. A sound 100 times more powerful than near total silence is 20 dB. A sound 1,000 times more powerful than near total silence is 30 dB. In normal, non-laboratory situations an average human ear can only detect a changes of at least 3 dB.
Hertz	Hertz (abbreviated Hz) is a unit of frequency (of change in state or cycle in a sound wave, alternating current, or other cyclical waveform) of one cycle per second. It replaces the earlier term; cycle per second (cps). In acoustic sound, the range of average human hearing is from 20 Hz to roughly 20 kHz (20 thousand Hertz). The pitch of middle C on a piano is 263 Hz.
Otolaryngologist	A physician specialized in diagnosing diseases of the head and neck especially those involving the ears, nose, and throat (ENT).

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6 Recommended Reading and References

187 [1] National Emergency Number Association. *Master Glossary of 9-1-1 Terminology*.
188 NENA-ADM-000.22-2018, approved April 13, 2018.
189 [2] Speaks, C.E. (1999). *Introduction to sound: Acoustics for the hearing and speech*
190 *sciences* (3rd Ed.). Clifton Park, NY: Delmar Learning.
191 [3] OSHA regulations 1910.95 (29 CFR 1910.95(h0(1)-(4)). Web. www.osha.gov. 16
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194 2013.
195 [5] Cochlear Implants. Web. http://www.cochlear.com/wps/wcm/connect/us/home.
196 [6] Advanced Bionics. Web. http://www.advancedbionics.com.
197 [7] ***Journal of Speech and Hearing Research*** Vol.21 507-518 September 1978.
198 [8] Americans With Disabilities Act of 1990, Pub. L. No. 101-336, 104 Stat.328 (1990)

7 Exhibits

200 Not Applicable

8 Appendix

202 Not Applicable

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