

Comparison of 1994 and 1999 ASHA Guidelines for Fitting and Monitoring FM Systems

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In the previous issue a summary was provided of rehabilitation-related guidelines, position papers, and technical reports approved by the National Institute of Deafness and Other Communication Disorders; American Speech, Language, and Hearing Association (ASHA); the American Academy of Audiology; and the Educational Audiology Association. Included in that list were Guidelines for Fitting and Monitoring FM Systems (ASHA, 1994). The only addition to this summary this year is the revised Guidelines for Fitting and Monitoring FM Systems approved by ASHA in November, 1999. These guidelines are similar to those developed in 1994 in scope and general content, but specific measurement techniques differ. Therefore, a comparison is provided below in Tables 1, 2, and 3 of the electroacoustic, real ear, and behavioral techniques, respectively, to highlight the main changes in these guidelines.

GUIDELINE REFERENCES

Guidelines for Fitting and Monitoring FM Systems

American Speech-Language-Hearing Association. (1994, March). *Asha*, 36 (Suppl. 12), 1-9. – Practice Guideline

Introduction to the uses of FM systems, preselection considerations, performance measurements, and device management. Includes specific methods and diagrams for use of 2cc coupler, real ear, and speech recognition testing to evaluate FM systems.

Guidelines for Fitting and Monitoring FM Systems

American Speech-Language-Hearing Association. (1999, in press).

A revision of the 1994 Guidelines with major changes in the procedures for setting the FM gain relative to the environmental microphone and in behavioral testing.

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Table 1

Comparison of 1994 and 1999 ASHA Guidelines: 1.00 Electroacoustic Measures

1994 ASHA guidelines	1999 ASHA guidelines
1.00 Electroacoustic Measures	
Equipment setup:	
Test hearing aid (HA) alone by attaching HA to 2cc coupler and placing in the calibrated location in the test box. Test HA + FM by placing the FM microphone in the test box and attach the FM receiver to the 2cc coupler. Distance between transmitter and receiver should be at least 2 ft. If a neckloop is used, the HA should be placed in relation to the neckloop to simulate typical use positions.	Same as for 1994
1.10 Setting frequency response:	
Match the OUTPUT of the FM system obtained with an 80-dB SPL input to the OUTPUT of the HA alone obtained with a 65-dB SPL input.	<p>1.11) If hearing loss is less than 80 dB HL and student uses FM only – Same as 1994</p> <p>1.12) If hearing loss is greater than 80 dB HL or student uses FM + environmental mode Match the GAIN of the FM system obtained with a 65-dB SPL, 1000-Hz tone to the GAIN of the HA alone obtained with a 65-dB SPL, 1000-Hz tone. Then increase the input to 80 dB SPL. If the output . . .</p> <p>1.121) increases by at least 10 dB, the setting is correct</p> <p>1.122) increases by 15 dB, reduce the FM volume so that output falls by 5 dB</p> <p>1.123) increases by only 5 dB, increase the FM volume to provide an additional 2 or 3 dB of output</p> <p>1.124) stays the same, increase the FM volume to provide an additional 5 dB of output</p>
1.20 Setting SSPL90:	
Match the OUTPUT of the FM system obtained with a 90-dB SPL pure-tone sweep input to the OUTPUT of the HA alone obtained with the same 90-dB SPL pure-tone sweep input.	Same as 1994

Table 2
 Comparison of 1994 and 1999 ASHA Guidelines: 2.00 Real Ear Measures

1994 ASHA guidelines	1999 ASHA guidelines
2.00 Real Ear Measures	
Equipment setup:	
<p>Test HA alone by setting up the reference and probe microphones as recommended by the manufacturer. To test HA + FM place the FM microphone according to the type of reference microphone.</p> <p>2.01) Off-line (stored) equalization method: The FM and reference microphones are placed near the loudspeaker during the leveling procedure. During testing the reference microphone is disabled.</p> <p>2.02) On-line (active) equalization method: The FM and reference microphones are placed above the pinna. During testing the reference microphone is active.</p>	<p>The FM microphone should be placed as close as possible to the location of the reference microphone.</p>
2.10 Setting frequency response:	
<p>Match the OUTPUT of the FM system obtained with an 80-dB SPL input to the OUTPUT of the HA alone obtained with a 65-dB SPL input.</p>	<p>2.11) If hearing loss is less than 80 dB HL and student uses FM only – Same as 1994</p> <p>2.12) If hearing loss is greater than 80 dB HL or student uses FM + environmental mode Match the GAIN of the FM system obtained with a 65-dB SPL complex signal to the GAIN of the HA alone obtained with a 65-dB SPL complex signal. Then increase the input to 80 dB SPL and follow steps outlined in 1.12.</p>
2.20 Setting SSPL90:	
<p>Match the OUTPUT of the FM system obtained with a 90-dB SPL pure-tone sweep input to the OUTPUT of the HA alone obtained with the same 90-dB SPL pure-tone sweep input.</p>	<p>Same as 1994</p>

Table 3

Comparison of 1994 and 1999 ASHA Guidelines: 3.00 Behavioral Measures

1994 ASHA guidelines	1999 ASHA guidelines
3.00 Behavioral Measures	
Patient setup:	
For HA measures, student is seated in the soundbooth. For FM measures, student is seated in the control room by the examiner.	For HA and FM measures, student is seated in the soundbooth.
3.10 Speech recognition hearing aid alone:	
With the student wearing the aid(s) seated at 45° azimuth in the calibrated location in the test booth, speech recognition is tested with speech presented at 55 dB HL and speech noise at 50 dB HL.	3.11) Quiet: With the student seated as stated in 3.10 of 1994, speech recognition is tested with speech presented at 55 dB HL. 3.12) Noise: With the same arrangement, speech recognition is tested with the addition of speech noise at 50 dB HL.
3.20 Speech recognition with FM alone:	
With the student wearing the FM receiver seated outside the test booth near the examiner and the FM microphone in the calibrated location in the test booth, speech recognition is tested with speech presented at 70 dB HL and speech noise at 50 dB HL.	Not addressed specifically in the 1999 guidelines but procedures for FM + HA described below in 3.30 can be followed with environmental microphones turned off.
3.30 Speech recognition with FM + HA:	
With the student wearing the FM receiver seated at 45° azimuth in the calibrated location in the test booth and the FM microphone placed so that speech from the speaker arrives at 83 dB SPL (i.e., close to the speaker), speech recognition is tested with speech presented at 55 dB HL and speech noise at 50 dB HL.	3.32) Noise: With the student seated as for testing with the HA alone but now wearing the FM receiver and the examiner wearing the FM microphone seated at the test controls, speech recognition is measured via monitored live voice while the 50 dB HL speech noise continues. 3.33) Quiet: With the same arrangement, speech recognition is tested with the speech noise turned off.