EUHA Guideline

Weekly routine check of the test box

Guideline 04-04

EUHA

Europäische Union der
Hörgeräteakustiker e.V.

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Contents

Weekly routine check of the test box

1. Introduction/Aims

This test procedure is aimed at checking the frequency response and dynamic range of the test box.

2. Positioning of reference and measuring microphones

After removing the coupler from the measuring microphone (also called coupler microphone), the reference and measuring microphones are set up at a 90-degree angle to one another such that the microphones are positioned inside the centre marking of the speaker and approx. 5 mm (± 3 mm) apart from each other (cf. fig. 1 a, b, c, e). When sound is presented from the side (cf. fig. 1 d, f), the measuring and reference microphones should be aligned, i.e. positioned at a 0-degree angle. Fig. 1 illustrates the positioning of reference and measuring microphones in different test boxes.

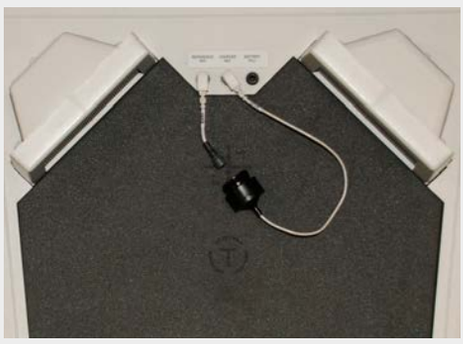
a) ACAM 5

b) Affinity

c) Aurical (before 2012)

d) Aurical (from 2012)

e) Unity 2



f) Verifit

Fig. 2: Positioning of reference and measuring microphones in different test boxes

3. Output levels with sinusoids at different levels

The output level of the measuring microphone is recorded for sinusoids (ranging between 200 Hz and 5 kHz) at 50, 60, 70, 80, and 90 dB SPL (at least for 60 and 90 dB SPL). The following features are to be checked (cf. fig. 2):

- All characteristics run horizontally in the output level frequency diagram.
- 10-dB spacing of curves.
- Deviations in the 50 dB curve caused by noise are permissible, in particular in the low-frequency range.
- Should the 90 dB curve deviate from the 80 dB curve by less than 10 dB due to saturation effects of the speaker, measurements above 80 dB input SPL will be incorrect.
- Horizontal curves should be represented with ± 2 dB maximum error.

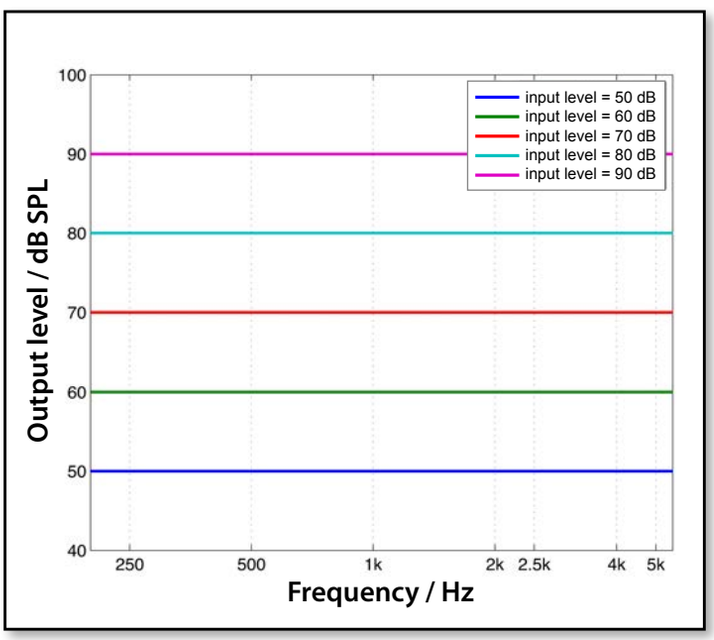


Fig. 2: Curves for sinusoids with 10-dB spacing

4. Input-output diagram at 1.6 kHz

The input-output diagram at 1.6 kHz is preferably recorded across the whole dynamic range of the measuring equipment (at least for 50 to 90 dB SPL, cf. fig. 3).

- The diagram must exhibit linear behaviour (1:1 slope)
- The measured output level must equal the input level (input = output).
- The diagram should be represented with ± 2 dB maximum error.

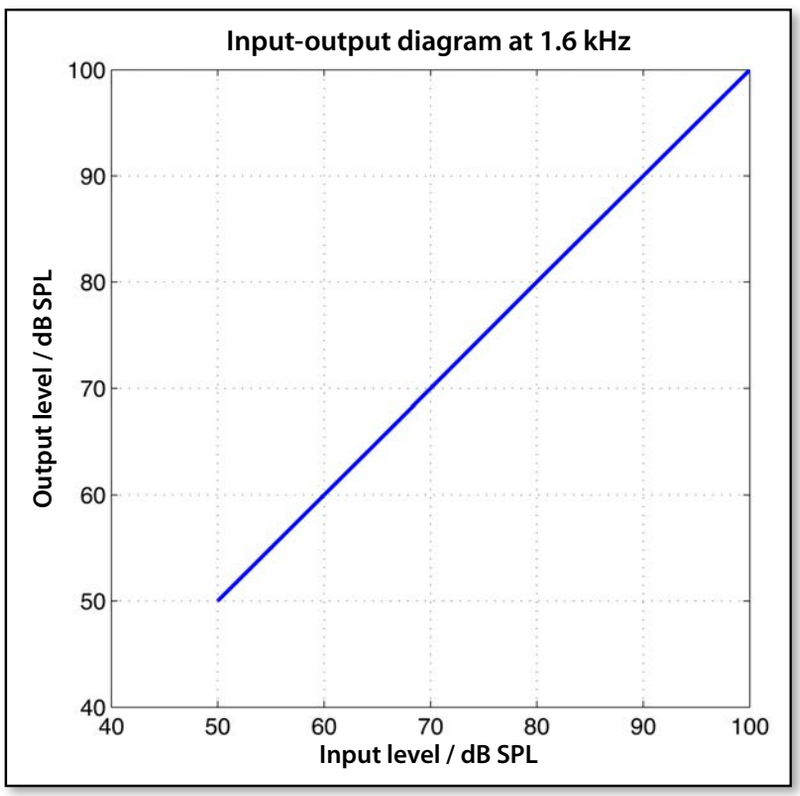


Fig. 3: Input-output diagram at 1.6 kHz

5. Coupler curve without hearing aid

The coupler curve is recorded without hearing aid using a pure tone (200 Hz to 5 kHz) at 80 dB SPL (cf. fig. 4).

- The 2cc coupler for BTEs (HA2 coupler) is used with the tube, but without hearing aid.
- At approx. 320 Hz, resonance should be +14.5 dB (cf. fig. 4). The resonance position depends on the tube length. Should the maximum be above 320 Hz, the tube is too short; should the maximum be below 320 Hz, the tube is too long.
- The curve depicted in fig. 4 should be represented with ± 2 dB maximum error for frequencies ranging between 200 Hz and 2 kHz, and with ± 3 dB maximum error for frequencies ranging between 2 kHz and 5 kHz. The frequency of the maximum (320 Hz) should be achieved within ± 5%.

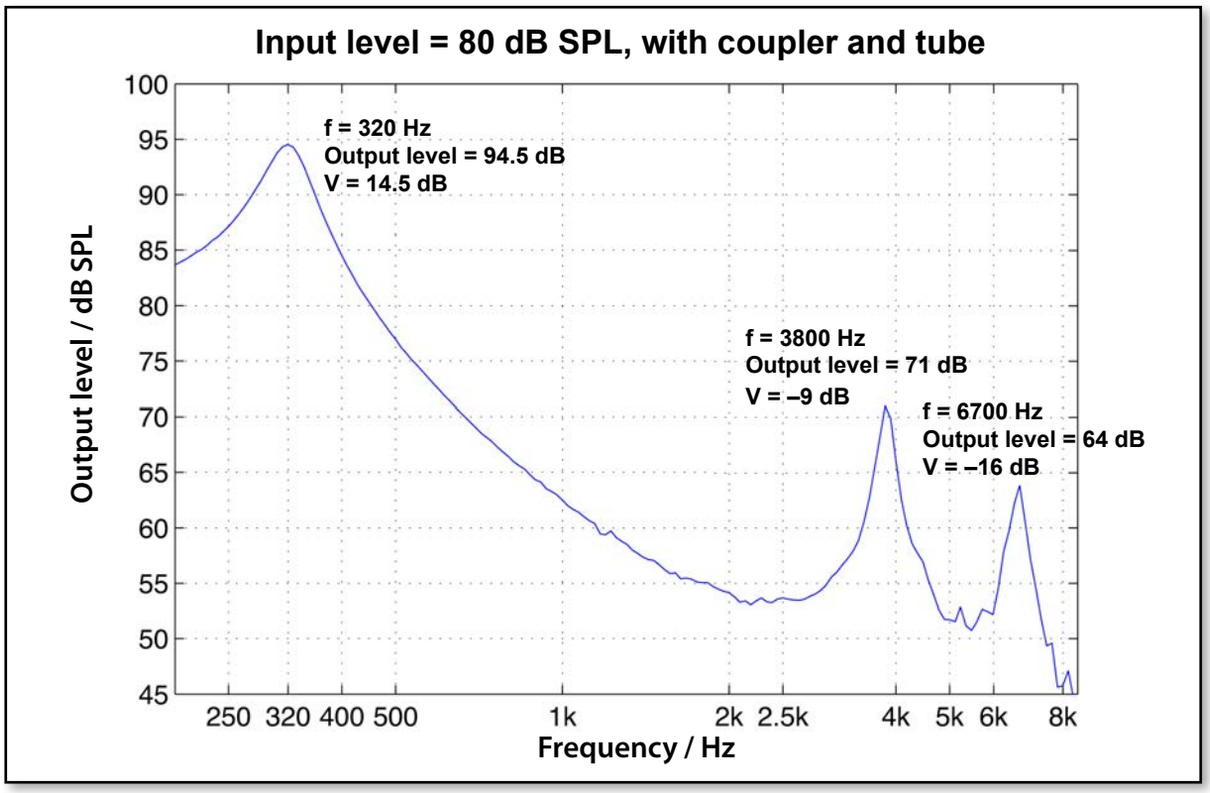


Fig. 4: Curve for a 2cc coupler without hearing aid, but with tube

6. Percentiles with ISTS

Finally, frequency-dependent calibration of the equipment is checked using the ISTS, without coupler and without hearing aid. The setup corresponds to that described in section 2.

- Measurement without coupler at 65 dB input level presented for 60 s. In the gain diagram, all curves must run along the zero line; in the output level diagram, the measured values must correspond to the values provided by IEC 60118-15 (cf. table 1).
- Errors of up to ± 3 dB (400 – 5000 Hz) are permissible.

=> Should there be errors or deviations, the equipment must be recalibrated. If results are still outside the permissible error range given, even after repeated calibration, a service provider should be commissioned.

International Speech Test Signal: Sound pressure levels in dB for third-octave bands (excerpt from IEC 60118-15, simplified)														
kHz	**0.25**	**0.315**	**0.4**	**0.5**	**0.63**	**0.8**	**1.0**	**1.25**	**1.6**	**2.0**	**2.5**	**3.15**	**4.0**	**5.0**
99th percentiles	69	66	66	68	67	64	60	59	58	56	54	54	52	51
65th percentiles	48	48	55	53	53	48	44	42	43	41	40	39	37	36
30th percentiles	35	38	41	43	37	33	31	30	30	28	30	28	28	24
LTASS	56	53	57	57	55	53	49	47	47	44	42	42	40	40

Table 1: 30th, 65th, 99th percentiles and LTASS for the ISTS in dB for third-octave bands

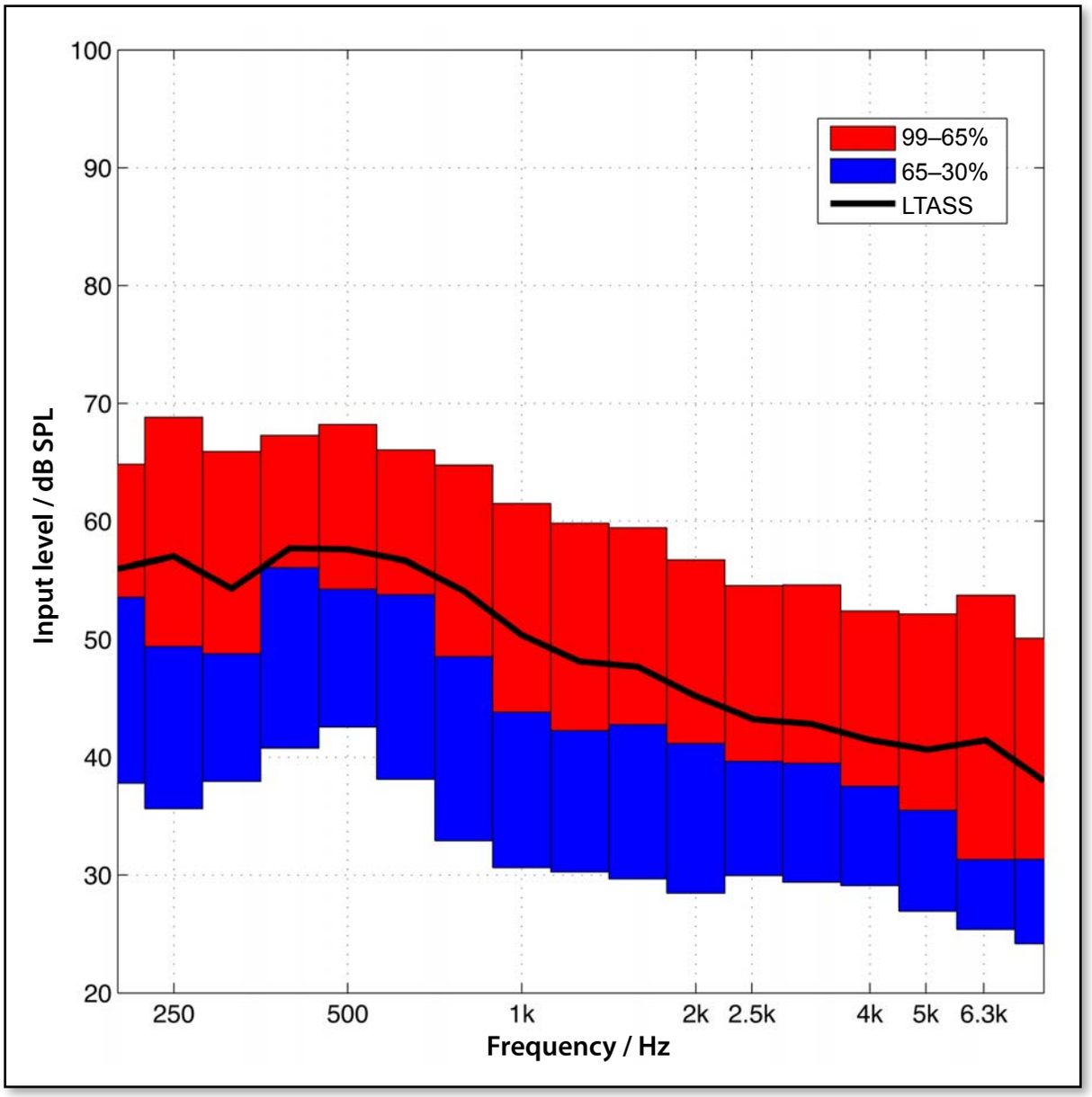


Fig. 5: Diagram of ISTS percentiles corresponding to table 1