

CONTENTS

FOREWORD.....5

1 Scope.....7

2 Normative references.....7

3 Terms and definitions8

4 General conditions.....12

4.1 Acoustic test method12

4.2 Acoustic coupler.....13

4.3 Measurement frequency range13

4.4 Reporting of data13

5 Test enclosure and test equipment.....13

5.1 General.....13

5.2 Unwanted stimuli in the test enclosure.....13

5.3 Sound source.....13

5.4 Measurement system for the measurement of the sound pressure level and harmonic distortion produced by a hearing aid14

5.5 Direct-current measuring system14

5.6 Magnetic field source for ETLS and MASL measurements.....15

6 Test conditions15

6.1 General.....15

6.2 Control of the sound field16

6.3 Measurement configuration for directional hearing aids17

6.4 Normal operating conditions for a hearing aid18

6.4.1 General18

6.4.2 Battery or supply voltage.....18

6.4.3 Settings of controls19

6.4.4 Ambient conditions.....19

6.4.5 Sound outlet system.....19

6.4.6 Accessories20

7 Test procedures20

7.1 Frequency response curves.....20

7.2 OSPL90 frequency response curve.....20

7.3 Full-on gain response curve21

7.4 Basic frequency response curve21

7.4.1 Test procedure.....21

7.4.2 Frequency range.....22

7.4.3 Reference test gain (RTG)23

7.5 Total harmonic distortion23

7.6 Equivalent input noise23

7.7 Battery current.....23

7.8 Measurements for hearing aids having induction pick-up coil.....24

7.8.1 General24

7.8.2 Equivalent test loop sensitivity (ETLS).....24

7.8.3 Maximum HFA magneto-acoustical sensitivity level (HFA MASL) of induction pick-up coil.....24

8 Characteristics of electrical input circuits for hearing aids.....24

8.1 Electrical characteristics.....24

8.1.1 General24

8.1.2	Input impedance	25
8.1.3	Input sensitivity	25
8.2	Mechanical characteristics and electrical function of connector system for electrical input.....	25
9	Additional optional test procedures	25
9.1	General.....	25
9.2	Effects of tone control and gain control	25
9.2.1	Basic frequency response: effect of tone control	25
9.2.2	Frequency response: effect of gain control position.....	25
9.2.3	Characteristics of the gain control	26
9.3	Intermodulation distortion	26
9.4	Effects of variation of battery or supply voltage and internal resistance	26
9.4.1	Full-on gain.....	26
9.4.2	OSPL90	27
9.4.3	Total harmonic distortion	27
9.4.4	Total intermodulation distortion	27
9.5	Equivalent input noise in one-third-octave bands	27
9.6	Additional measurements for hearing aids having induction pick-up coil.....	30
9.6.1	General	30
9.6.2	Basic frequency response	30
9.6.3	Frequency response with full-on gain control setting	30
9.6.4	Effect of gain control position on frequency response.....	30
9.6.5	Harmonic distortion	31
9.7	Additional measurements for hearing aids having induction pick-up coil for use with a telephone	31
9.7.1	General	31
9.7.2	SPLITS response curve.....	32
9.7.3	HFA-SPLITS	32
9.7.4	Relative simulated equivalent telephone sensitivity (RSETS).....	32
9.8	Additional measurements applying to AGC hearing aids.....	33
9.8.1	General	33
9.8.2	Steady-state input-output characteristics	33
9.8.3	Dynamic AGC characteristics (attack and release time)	34
9.9	Additional optional measurements with ear simulator, according to IEC 60318-4.....	34
9.9.1	General	34
9.9.2	Output sound pressure level frequency response curve for an input sound pressure level of 90 dB	34
9.9.3	Full-on gain response curve	34
9.9.4	Basic frequency response curve	34
9.9.5	Presentation of data	34
10	Maximum permitted expanded uncertainty of measurements.....	34
	Bibliography	36
	Figure 1 – Example of test arrangement for behind-the-ear hearing aid.....	16
	Figure 2 – Example of test arrangement for in-the-ear hearing aid	17
	Figure 3 – Example of test arrangement for directional hearing aid	18
	Figure 4 – Example of OSPL90 curve and basic frequency response curve	21

Figure 5 – Example of determination of frequency range from basic frequency response curve22

Figure 6 – Example of hearing aid acoustic gain28

Figure 7 – Example of hearing aid output noise and test equipment noise29

Figure 8 – Hearing aid equivalent input noise and ambient noise29

Figure 9 – Telephone magnetic field simulator (TMFS)31

Figure 10 – Example of hearing aids on TMFS for SPLITS test32

Figure 11 – Example of a steady-state input-output characteristic33

Table 1 – Resistors and open circuit voltages for zinc-air battery simulators.....19

Table 2 – Distortion test frequencies and input sound pressure levels23

Table 3 – Values of U_{max} for basic measurements.....35