

Calibration of Acoustic Stimuli for NZ Auditory Brainstem Response Testing

NZAS Paediatric Technical Advisory Group Report

The Paediatric Technical Advisory group would like to thank the Ontario Ministry of Children, Community and Social Services for permission to adopt and modify as required their Ontario Infant Hearing Program Protocol for Auditory Brainstem Response based Audiological Assessment (ABRA) Version 2018.01 and Provision of Amplification Version 2019.01 for use in New Zealand.

NZ applies the calibration values for acoustic stimuli for Auditory Brainstem response testing used in the Ontario and British Columbia newborn hearing screening programmes. Both programmes currently use the same values.

The Vivosonic transducers are calibrated in Canada and the Biologic NavPro and Eclipse are calibrated in NZ. All systems must be calibrated according to the values in the table below which are the SPL to HL offsets.

Tone Burst	ER3-A	TDH 49	B71/81	Duration Linear Window (2-1-2 Cycles)
500 Hz	22 ppe SPL	25 ppe SPL	67 dB ppe re 1 μ N RMS	4-2-4 ms
1 kHz	25 ppe SPL	23 ppe SPL	54 dB ppe re 1 μ N RMS	2-1-2 ms
2 kHz	20 ppe SPL	26 ppe SPL	49 dB ppe re 1 μ N RMS	0.5-1.0-.5 ms
4 kHz	26 ppe SPL	29 ppe SPL	46 dB ppe re 1 μ N RMS	0.25-1-0.25 ms
Click				
	31 pe SPL	36 pe SPL	51 dB pe re 1 μ N RMS	100 μ s

Calibration values from Small & Stapells (2003) unoccluded RETFLs for 500, 1000 and 2000 Hz. However, for 4000 Hz, we use the both-ears occluded RETFL. The occluded RETFL is used because the 4000-Hz unoccluded level is likely contaminated (too low) due to acoustic radiation. Personal Communication D.R. Stapells, 2024

Notes

1. Insert earphones calibrated using occluded ear simulator B & K 4157 conforming to IEC 60318-4.
2. The occluded ear coupler is preferred over the original 2cc coupler as it is a better comparison to the human ear (Champlin and Letowski, 2014).
3. Background to the development of the New Zealand protocol. When the Universal Newborn Hearing Screening and Early Intervention Programme (UNHSEIP) was established in 2010, PTAG created the NZ Audiology diagnostic and amplification protocol, in conjunction with the introduction of universal newborn hearing screening, recognising the need for reliable objective measures. After reviewing international protocols the Ontario and British Columbia Canadian protocols were used as the basis for the NZ protocol as they were based on the research from acknowledged experts in the field, David Stapells, Professor Emeritus, School of Audiology and Speech Sciences, University of British Columbia and Martyn Hyde, Professor Emeritus at University of

Toronto, Dept of Otolaryngology/Head&Neck Surgery. This was reflected in the teaching of the University of Auckland Master of Audiology programme. This is acknowledged in the introduction of the Diagnostic and Amplification Protocol (DAP) first published in 2010 by the National Screening Unit and revised in 2015 (Ministry of Health, 2016).

References

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