

Calibrating the ABR clinician's eye: an online image-based benchmarking suite for ABR residual-noise, signal-to-noise and amplitude judgement

Judging whether an auditory brainstem response (ABR) recording meets published criteria is a skilled visual task. Testers and reviewers often disagree on whether overlaid waveforms meet British Society of Audiology (BSA) Response Absent/Clear Response criteria. Training and quality assurance have lacked an accessible objective benchmark against which clinicians can calibrate their clinical judgement.



<https://mask.audiolo.gy/noise>

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01 / WHAT IT IS

Upload an ABR screenshot, fill with yellow, estimate is derived

Aim: A free-to-use browser-based suite that quantifies residual noise, signal-to-noise ratio (SNR), and response amplitude directly from ABR trace images to support benchmarking, training, and quality assurance.

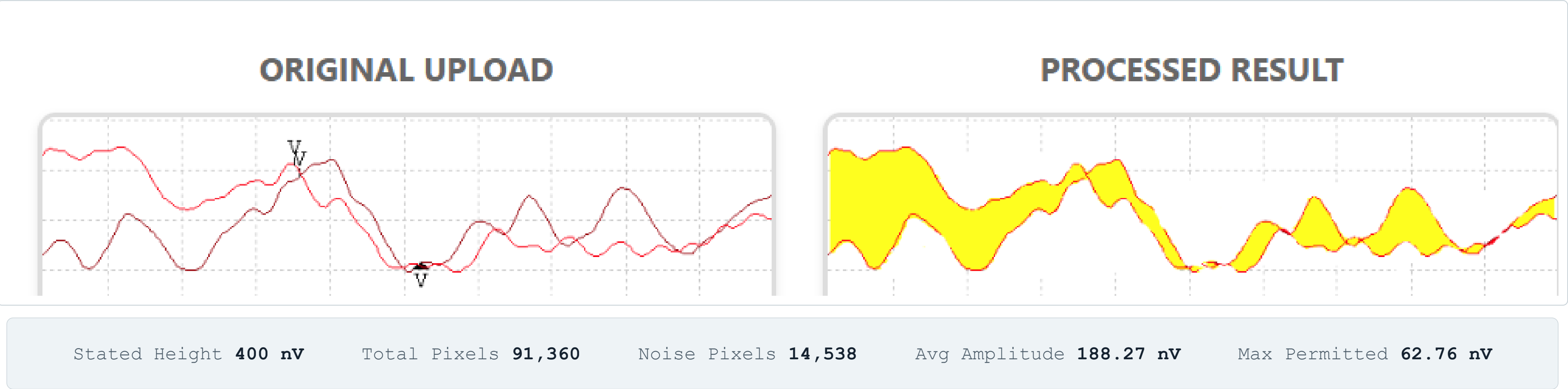
Method: Users upload an anonymised, cropped and scaled image of two superimposed ABR traces. Across three online tools, the software quantifies the area between traces by filling it with yellow pixels and applies conventional BSA ABR criteria (25 nV residual-noise floor or 3:1 SNR). Additional functions include Wave V–SN10 peak-to-peak amplitude estimation and baseline-drift correction visualisation.

02 / THE THREE TOOLS

- SNR Residual Noise (CR):** Signal-to-noise ratio from a stated amplitude scale (against 3:1 criterion).
- Waveform Amplitude:** Wave V–SN10 estimation tool, with rotate-to-flat for drift correction.
- RA Residual Noise:** Residual noise between replications (against 25 nV limit)

Tool 1 · SNR Residual Noise (CR)

Does the replicated response amplitude exceed the average noise by at least 3:1?



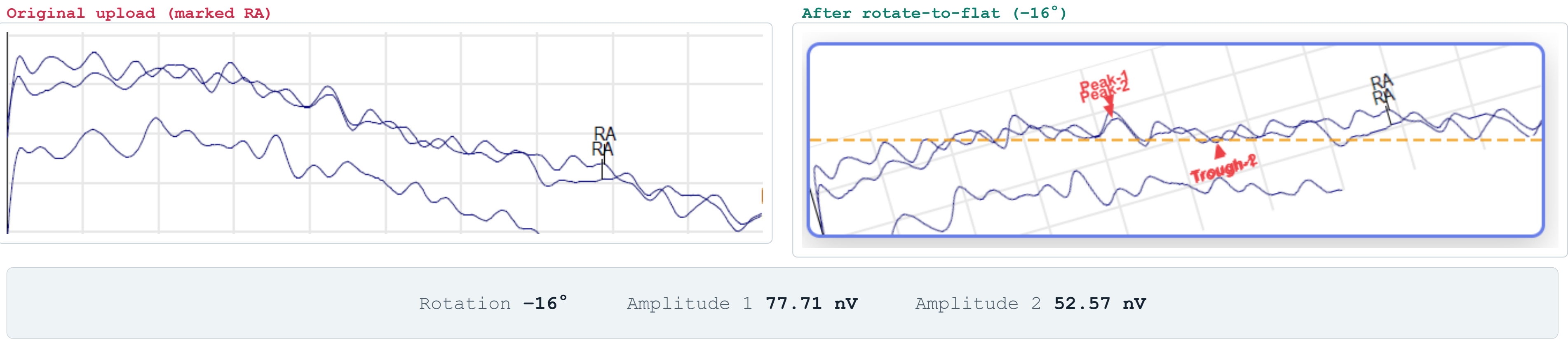
Is a present response clear of the noise?

- Enter the stated grid height of the image (400 nV).
- Yellow shading marks the area between the two traces.
- Modify the yellow fill if the autofill needs adjustment.
- Amplitude 188 nV vs measured noise 63.6 nV (max permitted 62.8 nV).
- Measured noise gives the SNR — here 2.96 : 1

X Response NOT > 3:1 — SNR 2.96 : 1

Tool 2 · Waveform Amplitude + Drift

Correcting baseline drift before measuring amplitude



Measuring amplitude on a tilted baseline

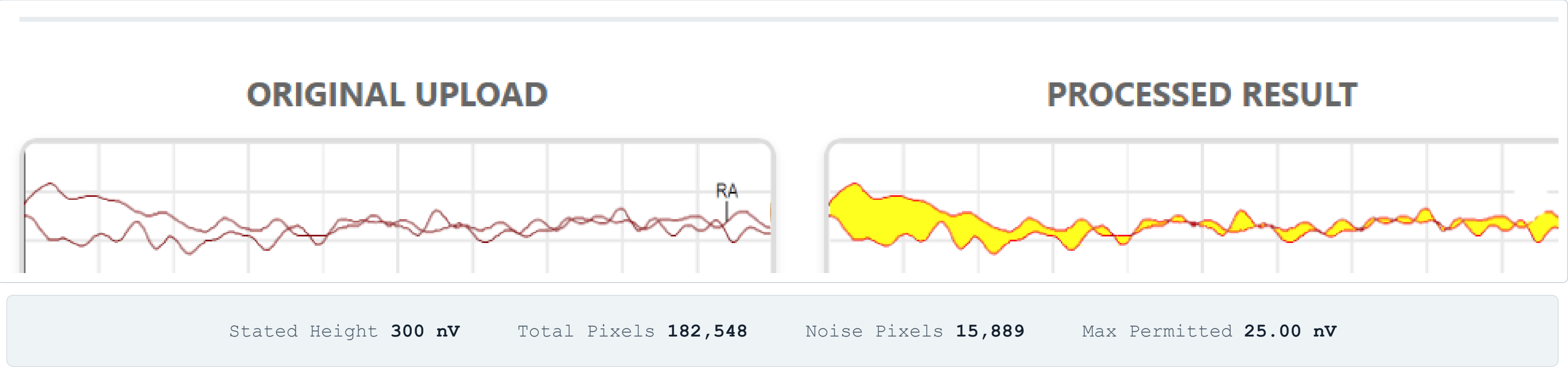
- Rotate Left / Right until the baseline sits flat (here −16°).
- Mark Peak & Trough (Wave V–SN10) on each waveform.
- Live amplitudes update as you rotate (77.71 and 52.57 nV).

Not logged, so it has no pass/fail count of its own unless the user moves on to the next tool.

U Rotate-to-flat, in this case RA likely becomes inconclusive

Tool 3 · RA Residual Noise

Is there <25 nV of noise between RA superimposed traces?



Is there less than 25 nV of noise between two RA waveforms?

- Upload an image of the two superimposed waveforms; state the scale (300 nV).
- Residual noise between them is represented by the yellow fill.
- Modify the yellow fill if the autofill needs adjustment.
- Tested against a fixed 25 nV floor.
- Here 26.11 nV — just over — floor not yet quiet enough.

X Noise exceeds 25 nV — 26.11 nV

03 / HOW IT WORKS

Pixel Count, Filling, Estimating

The tool isolates trace pixels based on colour and fills the gap between replicates with yellow, counts total vs noise pixels, and scales to nanovolts. Two traces marked 200 and 500 nV can share the same pixels yet carry very different noise, so the stated scale must match the source display exactly.

04 / LIMITATIONS

Read it for what it is

- Every figure depends on the stated scale and a correct gridline-to-gridline scale and a good crop.
- Drift correction is a manual rotate, judged by eye, and removes only a straight tilt; a genuine response may be in the tilt.
- Pixel-based noise approximates residual noise, but is more consistent than visual estimation, which varies widely between observers.
- A benchmarking and training aid for consistency — not ground truth, and not a certified medical device.

05 / PARTIAL RESULTS OF USER RUNS JAN 2026 TO END OF JULY 2026

895

analyses logged · Jan–Jul 2026

59% BSA Criteria Met · 41% BSA Criteria Not Met

Note: the Waveform Amplitude tool is not logged — users often continue to the CR tool from there, so it is excluded from these counts.

Tool usage · to 31 Jul

CR (3:1) tool 452 · RA (25 nV) tool 443



Outcomes · to 31 Jul

Accept 528 · Exceed 367

