

Unitron frequency compression 2 verification guide

We tend to focus a lot on advanced signal processing features and functions, which help clients hear and understand speech better in a multitude of listening situations. However, a fundamental concept in audiology that we should not lose sight of is that audibility precedes intelligibility¹. That's where frequency lowering through Unitron's frequency compression 2 comes in.

Frequency compression 2 provides access to speech sounds that may occur outside of a hearing instrument user's audible range.

Here is a step-by-step guide for the verification of frequency compression 2.

Step 1: Set up

- First, complete your hearing instrument verification procedure as normal.
- For Ultra Power hearing instruments, frequency compression 2 is on by default for audiograms with a PTA >70dB, so it is important to ensure frequency compression 2 is disabled before running any initial Real Ear Measures. Without doing so, the response may appear to not meet target.
- The default is a symmetrical approach based on the better ear audiogram. If the client is experiencing a significant asymmetry, then frequency compression 2 can be calculated independently for each ear.

Important definitions

LTASS – Long Term Average Speech Spectrum

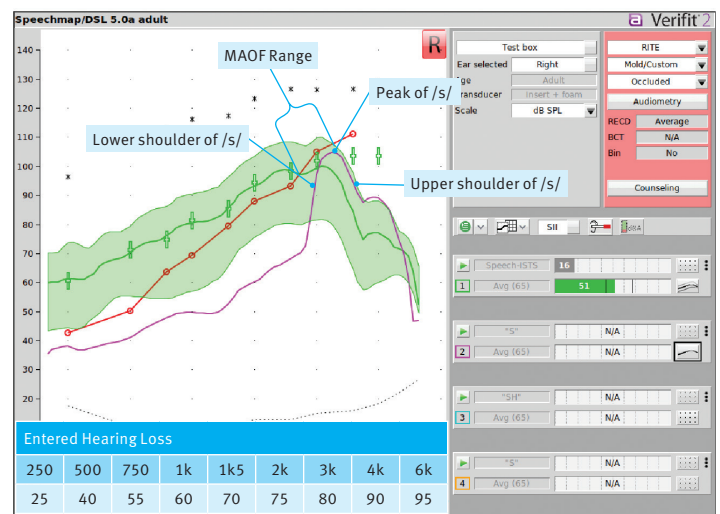
This provides information on the spectral distribution of the speech signal over time.²

MAOF – Maximum Audible Output Frequency

This is the range in which the frequencies between the average and the peak of the LTASS intersect with the audiogram in the high frequencies.³

Step 2: Determine the audibility of /s/

- With frequency compression 2 disabled, run your /s/ stimulus and see where it falls – if it is outside the MAOF range, as it appears in this example, that sound is not audible.



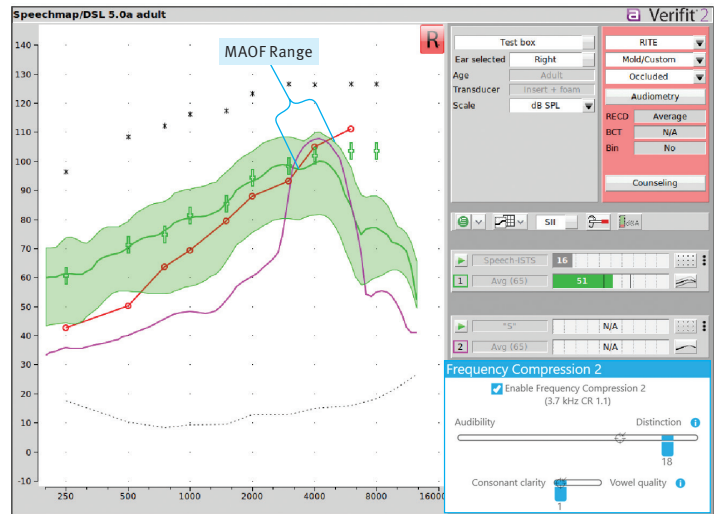
1. Erber, N.P. (1982). Auditory Training. [Lecture on auditory training sponsored by the Alexander Graham Bell Association for the Deaf.] Washington, DC.

2. Lofqvist, A. (1986). The long-time-average spectrum as a tool in voice research. Journal of Phonetics. Vol. 4, pp. 471-475. Accessed from: <https://www.sciencedirect.com/science/article/pii/S0095447019306928>

3. McCreery, R.W., Bentler, R.A. and Roush, P.A. (2013). Characteristics of hearing aid fittings in infants and young children. Ear and Hearing. 34(6), pp. 701-10. Accessed from: <https://pubmed.ncbi.nlm.nih.gov/23575463/>

Step 3: Enable frequency compression 2

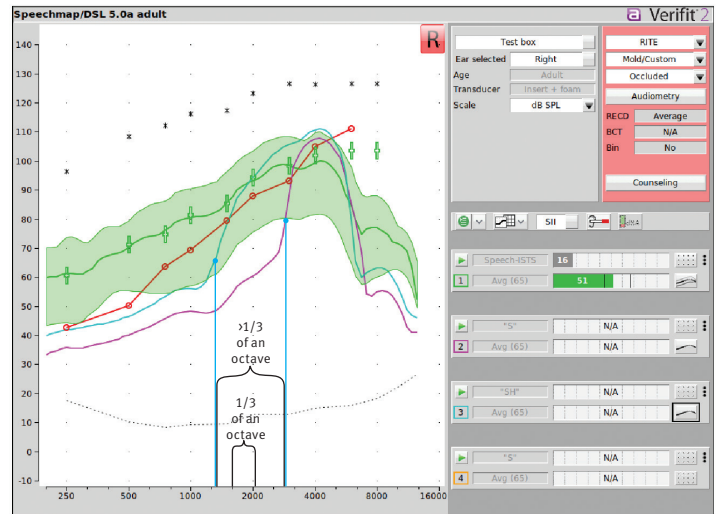
- Now, enable frequency compression 2, and subsequently run the /s/ stimulus again.
- Using the sliders in TrueFit, set the hearing instruments to the weakest setting where the client will get benefit. On the screen, this will present as the upper shoulder of the /s/ being as close as possible to the upper limit of the MAOF range. We can adjust this with the Audibility/Distinction slider. The goal is to move the slider so that the upper shoulder of /s/ crosses over at the upper limit of the MAOF.



Step 4: Discrimination of phonemes

- Finally, run your /sh/ stimulus. This is illustrated by the light blue line.
- You should see greater than a third of an octave of separation between the lower shoulders of /sh/ (light blue line) and /s/ (magenta line) cross the blue threshold line.
- Now we can see objectively that the hearing instrument provides audibility and distinction to /s/ and /sh/.

Note: the speech stimuli used are specific to the phonemes /s/ and /sh/ and do not have sound in the lower frequencies, so the frequency response in that region is not relevant.



Things to keep in mind...

- Is the client reporting that they are hearing well without the use of frequency lowering?
- If the client isn't liking the sound quality with frequency compression 2 enabled, consider using a weaker setting and slowly moving the client to target gradually over time – think of this in the same way as we think of acclimatization for first fits!
- Always use the weakest setting where the client is getting benefit. This will help to maintain a more natural sound quality.

About Unitron

At Unitron, we empower people with life-enhancing hearing experiences that fit seamlessly into their world. Our sound performance technology, Experience Innovations, and intuitive design work perfectly together to provide personalization and optimization. Because everyone deserves to **Love the experience.**

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