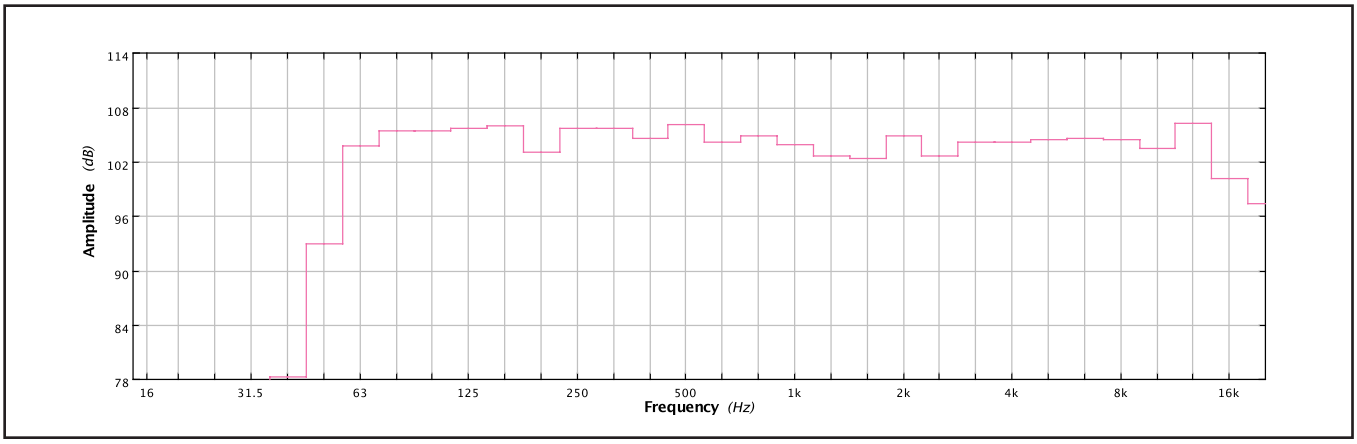
Headroom Predictions Using B-Noise in MAPP XT



UPQ Pink Noise at 1m: 1/3 Octave Spectrum

A Weighted Average = 116 dB Z Peak = 131 dB

MAPP Predictions using Pink Noise

The equal energy per octave nature of pink noise makes it an accepted reference source to predict the SPL and headroom of a loudspeaker or loudspeaker array. Pink noise is also an excellent, albeit conservative, means of estimating the SPL a system would linearly reproduce when driven with other types of inputs that have broad spectral content.

When pink noise is applied to a Meyer Sound UPQ, the resulting headroom curve shows the amplitude the speaker can achieve over the range of audible frequencies before limiting at any given frequency.

These pink noise-based predictions are extremely accurate and independently verifiable. When pink noise is applied to a system in the field, the results will track extremely closely to those predicted in MAPP.

The Relationship of Headroom to Frequency

Because the linear SPL capability of a loudspeaker is dependent on the spectral content of the input signal, measured SPL values for the same speaker will be different for each type of input. For example, the limited frequency content of speech presents different headroom demands on a loudspeaker than the broader frequency content of electronic dance music. Therefore, using only full-bandwidth pink noise to predict the SPL capability of a system would not expose that system's higher potential for linear reproduction of a band-limited input signal. For speech-only systems, decisions based on a headroom curve derived from a pink noise input could lead to over-specification of the loudspeaker system design.

Introducing B-Noise

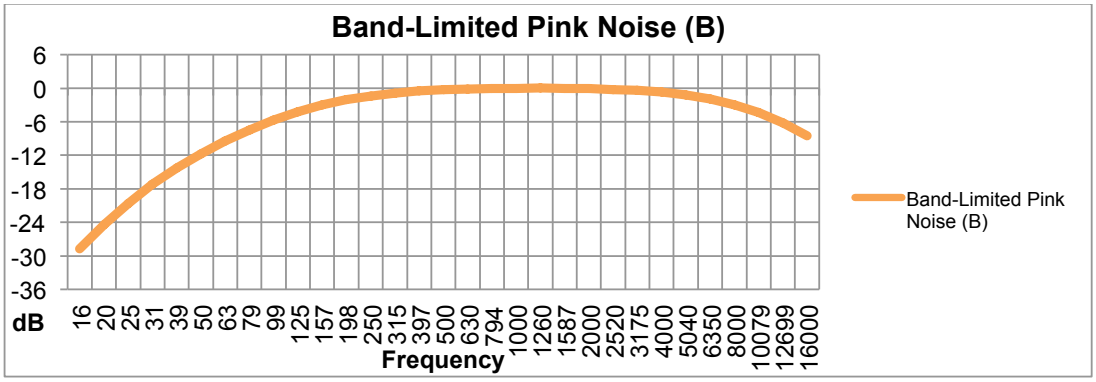
To help our users understand how loudspeakers react to different input signals, Meyer Sound has developed an additional input source for MAPP called B-Noise.

"Band-Limited Pink Noise" is pink noise that has been filtered using the following B-Contour formula:

dB Band-Limited Pink Noise at a given frequency
$f = 0.17 + 20 * \log(Rb(f))$ where:

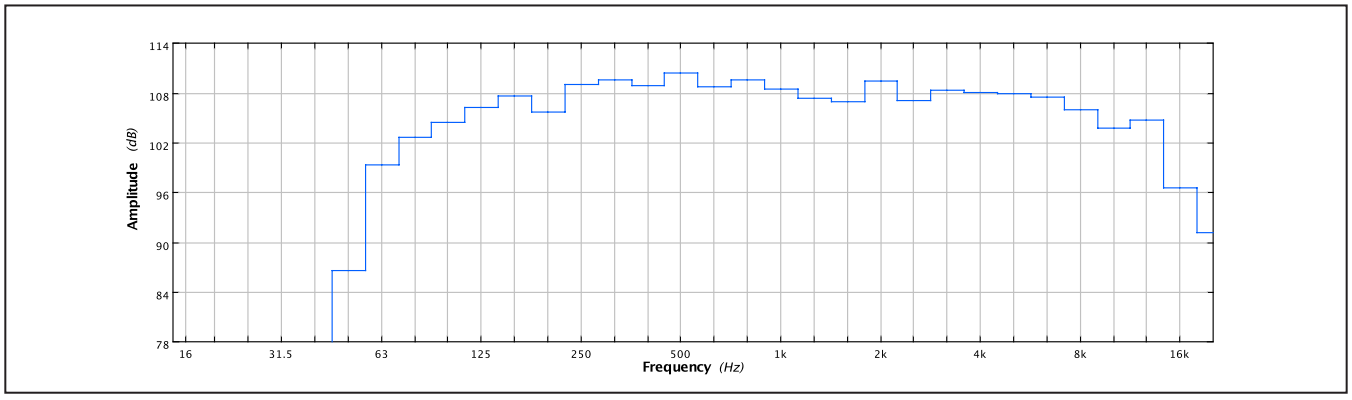
$$Rb(f) = \frac{12200^2 * f^3}{(f^2 + 20.6^2)(f^2 + 12200^2)((f^2 + 158.5^2)^{0.5})}$$

Giving the result:



The above graph indicates that B-Noise has less spectral content in the extreme high frequencies and low frequencies than in the mid band. Now Meyer Sound users will be able to view the headroom of their systems from the perspective of two different input signals.

Here is the result of a B-Noise input:



UPQ B-Noise at 1m: 1/3 Octave Spectrum

A Weighted Average = 120 dB Z Peak = 134 dB

Real-World SPL

The Pink Noise and B-Noise SPL predictions in MAPP XT are independently verifiable, and are intended to represent linear reproduction levels of real-world signals lasting hours, as opposed to test bursts lasting only a few milliseconds, which are the basis of the Max Peak SPL specification. The inclusion of B-Noise and Linear Peak SPL information in MAPP XT ensures an accurate representation of our products' capabilities. Meyer Sound makes extremely powerful loudspeakers and wishes to represent them with specifications based on repeatable, linear, real-world measurements.

