FREQUENTY ASKED QUESTIONS

M-Noise™ Test Signal

GENERAL

1. Can I create my own M-Noise wav file?

   ANSWER: No. In order for M-Noise measurements made by one person or company to be verifiable by another, the same M-Noise file must be used. We are not planning on any revisions of the file, but it is critical nevertheless to ensure the latest version of the file is used and that it is not corrupted by using the SHA-256 or MD5 procedure described in the download section.

2. Is M-Noise a better representation of music than other test signals?

   ANSWER: As we showed in “M-Noise A New Test Signal” hi-passing music (or M-Noise) at higher and higher frequencies results in a higher and higher crest factor. In “Real World SPL” we showed that the Maximum Linear SPL for music is not the same as for pink noise. When measuring a variety of loudspeakers with music, pink noise, and M-Noise, we found the M-Noise results were a far better match to music than pink noise. The related videos contain as much information as practical so that everyone can repeat and verify the results.

3. Why does pink noise not emulate music completely?

   ANSWER: The crest factor of pink noise changes very little as a function of frequency. But, the crest factor of music increases significantly at high frequencies. Our measurements show this result is strikingly consistent across a wide variety of musical styles.

4. Can I use the M-Noise wav file in place of pink noise in my current workflow to tune systems in the field?

   ANSWER: Yes, M-Noise can be used with any source independent, two-channel analyzer. M-Noise is advantageous when measuring the Maximum Linear Peak SPL but yields the same frequency response at lower SPLs as pink noise and music.

5. Can I measure linear peak SPL using M-Noise and my own tools?

   ANSWER: Yes, provided the equipment used fulfills the requirements and is connected as shown in “M-Noise Practical Use.”

6. Where can I find more documentation on how to measure Maximum Linear Peak SPL with M-Noise?

   ANSWER: All technical information regarding M-Noise is kept up-to-date on this website: m-noise.org.

7. I manufacture and/or sell loudspeakers. Am I free to use M-Noise to specify and publish linear peak SPL?

   ANSWER: Yes, we encourage everyone to use M-Noise and the Maximum Linear SPL procedure for any audio product or system.

8. What loudspeaker manufacturers use M-Noise and the appropriate procedure to specify linear peak SPL?

   ANSWER: Many manufacturers are in the early stages of updating their loudspeaker test procedure. Meyer Sound is updating all loudspeaker datasheets to include M-Noise measurements and is testing every loudspeaker on the production line using the M-Noise procedure to ensure it complies with specifications.

9. How can I trust that M-Noise linear peak SPL specified by manufacturers are reliable?

   ANSWER: Because M-Noise is freely available, and there is a clear, detailed procedure for using it, specifications that use M-Noise can be easily verified by others.

10. Is M-Noise a replacement for sine wave THD measurements?

    ANSWER: No, the purpose of M-Noise is to determine the Maximum Linear Peak SPL that is expected for music with a minimum of distortion. M-Noise and the linear peak SPL procedure do indicate the onset of distortion, but they are not intended as a sensitive measurement of the amount of distortion. While THD measurements with sine waves are a very sensitive indicator of the amount of distortion, they do not directly indicate the linear peak SPL that is expected for music.

11. Can a loudspeaker be damaged following the M-Noise Linear Peak SPL procedure?

    ANSWER: Any signal can damage a loudspeaker if played at an excessive level. The probability of damaging a loudspeaker with M-Noise is no different than with other test signals. It is the manufacturer's responsibility to correctly state signal levels that can be safely reproduced.

12. Can the linear peak SPL procedure be successfully completed in any room?

    ANSWER: Relative comparisons between two or more loudspeakers can be done in normal rooms under certain conditions:

    a) All loudspeakers and microphones should be placed in the same relative positions.

    b) Loudspeakers and microphones should be placed as far as possible from as many reflective surfaces as possible. To compare a loudspeaker against a manufacturer's specification sheet, the test will need to be completed in the same acoustic environment used by the manufacturer. This usually means measuring in an anechoic chamber or outdoors on a reflective ground plane.

TROUBLE SHOOTING

1. How can I avoid clipping the M-Noise playback device output or the analyzer reference input before finishing the procedure?

   ANSWER: The procedure tests a loudspeaker at high input levels, increasing the chance of clipping a measurement channel. Determine the maximum electrical input and output voltages of all the devices to ensure the loudspeaker can be driven to its maximum linear output, typically at least +18 dBu, and sometimes as much as +24 dBu. If needed, use an additional device capable of the necessary output voltage and add enough gain to make sure the maximum output of the loudspeaker is reached. This gain can be added after the reference point of the analyzer if it is set at the beginning and not changed during the procedure. The playback level should always be adjusted at a point in the signal path that is before the reference channel of the analyzer.

2. Why is the transfer function amplitude trace immediately moving up when the playback level is changed?

   ANSWER: Check the location in the signal path where the playback level is changed. Increasing the level after the reference point of the analyzer will make the trace move up. The playback level should be adjusted before the reference point of the analyzer so that only non-linear behavior of the speaker causes the trace to move.

3. How can I avoid clipping the analyzer microphone input before finishing the procedure?

   ANSWER: Check the microphone input gain or range by putting a calibrator on the microphone and making sure the expected maximum SPL will not clip the mic input. For instance, if the calibrator produces 94 dB and the loudspeaker is expected to produce 134 dB peak, make sure the calibrator signal is at least 40 dB down from clipping the microphone input.

4. Why is the crest factor at the microphone less than 18 dB?

   ANSWER: There could be several causes. Because the crest factor of M-Noise changes with frequency, the crest factor may change if it is passed through a loudspeaker whose frequency response is not flat. For instance, if a loudspeaker is boundary loaded or in an array, the frequency response may be boosted at low frequencies. The crest factor of M-Noise is lower at low frequencies, so If the frequency response is boosted at low frequencies the resulting crest factor may be lower. This may also happen if the microphone is off-axis and high frequencies are attenuated. Measurements always involve some uncertainty and range of repeatability. Microphones are commonly rated +/-1 dB. The occurrence of peaks of M-Noise are relatively rare events, so it's not uncommon for the repeatability of peak levels to be over a larger range. On the other hand it's also possible for compression or clipping to occur in the loudspeaker or processor, therefore a reduction in the crest factor at the microphone is worth investigating.

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5. Some loudspeakers compress at low frequencies first, and others at high frequencies, or all frequencies. Is that normal?

   ANSWER: Yes, different loudspeakers will compress at different frequencies for M-Noise. An individual loudspeaker will compress differently for M-Noise than for pink noise or B-weighted noise. The frequency dependent compression behavior of a loudspeaker is new information revealed by the Maximum Linear Peak SPL Procedure that has not been directly revealed using other test signals. Compressing at some, but not all, frequencies is sometimes desirable. When loudspeakers are arrayed, there is often significant summation at low frequencies where individual speakers are less directional. It is normal for loudspeakers to compress at low frequencies first if they are intended to be arrayed.

6. A Meyer Sound loudspeaker measured in the field has a higher Linear Peak SPL than is shown on the data sheet. Why is that?

   ANSWER: Meyer Sound strives to make unit to unit variances as small as possible. The Linear Peak SPL shown on the data sheet is conservative enough that every unit will meet or slightly exceed the specification. If the result is significantly more than the specification, check that the playback level increase is strictly stopped at the 2 dB compression point – that no point within the frequency range of the loudspeaker is compressed more than 2.0 dB. Many loudspeakers will get several dB louder when the amount of compression is increased from 2 to 3 dB. But at this level, the loudspeaker is exhibiting unmistakable non-linear behavior.

7. The frequency response of the loudspeaker doesn't look right when the microphone is placed close to the loudspeaker. Is something wrong?

   ANSWER: Probably not. At a normal listening location, the distance difference between the loudspeaker's high and low drivers is negligible. It is possible to put a microphone close enough to a loudspeaker that the distance difference between the high and low drivers is enough to make a level difference. Usually, it is best to put the microphone equidistant between the highest driver and the next lowest driver or centered between all drivers.

8. Why does the M-Noise wav file I downloaded sound different from the M-Noise excerpts in the videos?

   ANSWER: M-Noise is an uncompressed 96kHz wav file. The audio in our web videos is data compressed. To maximize the possibility that everyone uses the authentic uncompressed M-Noise, the M-Noise in the videos was additionally processed to make it easy to identify.

9. Why does M-Noise go so low in frequency? Why isn't M-Noise peak normalized?

   ANSWER: The bandwidth and RMS normalization of M-Noise was chosen to conform to SMPTE 2095-1.

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