

Fast Frequency Response Measurements

WITH THE XL2 ANALYZER

Thanks to this feature, the XL2 Analyzer is able to measure a stable frequency response within 1 to 4 seconds. This comes in handy when a rapid test of a loudspeaker, amplifier or mixer channel is required.



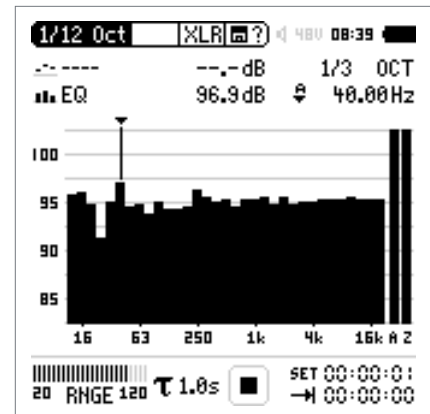
XL2 Analyzer

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TRADITIONAL METHOD

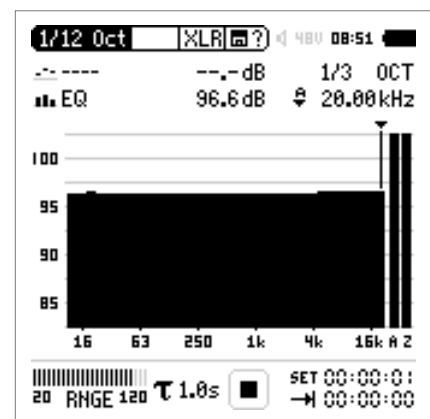
Spectral analysis of a pink noise signal is often used to measure frequency response. In order to get an exact result, long averaging (settling) times are necessary due to the random nature of conventional Pink Noise.



Snapshot of a Pink Noise Spectrum

NEW SOLUTION

To reduce the long averaging period, a specially-synthesized Pink Noise signal is used which produces an flat spectrum within a short cycle time.



Stable Spectrum after 1 second

TEST SIGNAL GENERATION

Due to the cyclic repetition of this test signal, its frequency resolution is limited to $1/T$ (T = cycle time). Therefore, depending on the measurement resolution required, at least the following cycle times are required:

Resolution	Cycle Time	Wav File Name MR-PRO
1/1 Octave	1 s	SIGNALS -> Fastpink1
1/3 Octave	1 s	SIGNALS -> Fastpink1
1/6 Octave	4 s	SIGNALS -> Fastpink4
1/12 Octave	4 s	SIGNALS -> Fastpink4

Minirator MR-PRO



EXAMPLE 1: TESTING LOUDSPEAKERS

Electro-acoustic installations often involve a large number of loudspeakers, all of which should be verified; during commissioning and also later regularly during maintenance. The measurement of the frequency response is traditionally time-consuming. For a quick pass/fail check, the XL2, together with the “Spectral Limits” option, is ideally suited to get a meaningful result within a very short time.

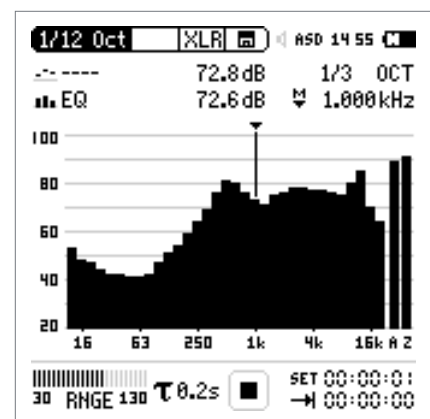
In practice, you need:

- a Minirator MR-PRO Signal Generator
- an XL2 Acoustic Analyzer with the “Spectral Limits” Option
- a Measurement Microphone (e.g. M4261)

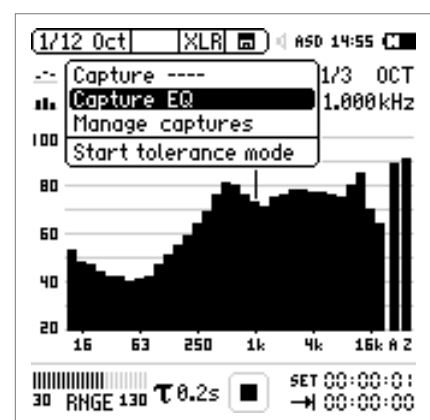
STEP 1

Connect the MR-PRO to a reference loudspeaker and play the “Fastpnk1” test signal.

On the XL2, choose the 1/12 Oct menu item, then select the EQ parameter with timer mode set to ‘single shot’ (SET 00:00:01). Start a 1-second frequency response measurement by pressing the ► button.



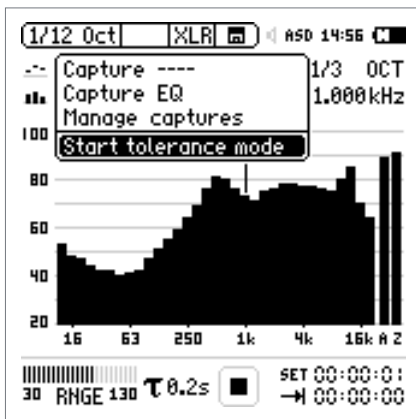
Stable Spectrum after 1 second



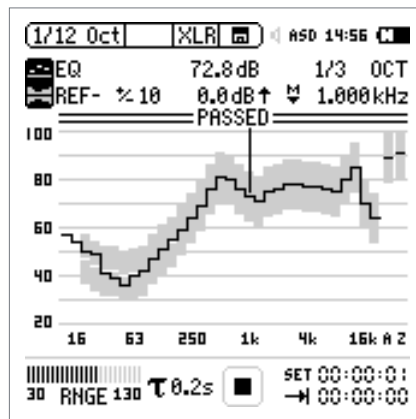
Save the XL2 Measurement Results

STEP 2

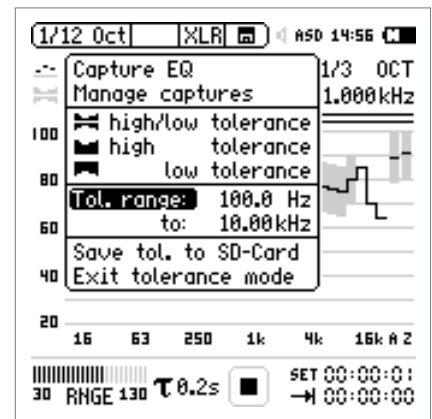
Switch to tolerance mode and reduce the measurement bandwidth on the XL2 if necessary.



Tolerance Mode activated



Tolerance band

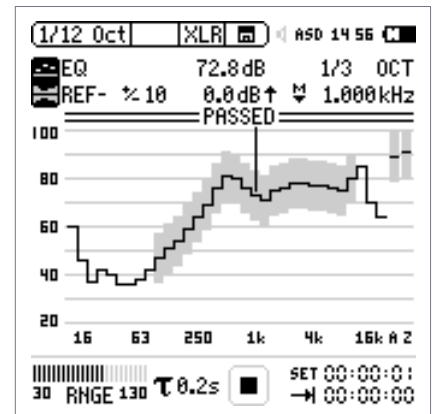


Reduce measurement bandwidth (optional)

STEP 3

Connect the MR-PRO to the loudspeaker under test and play the "Fastpnk1" test signal.

On the XL2, verify the frequency response by pressing the ► button.

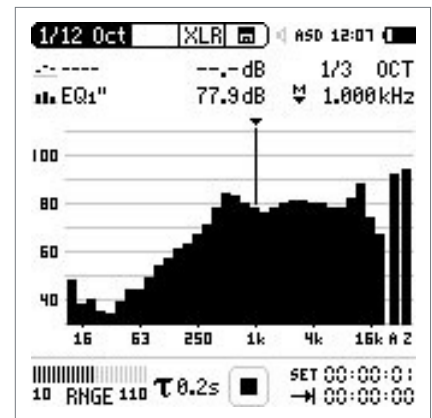


Measurement with reduced bandwidth

EXAMPLE 2: TEST AND COMPARE

There are applications where the frequency response is displayed continuously, but no report needs to be generated. For example, when you want to optimize the frequency response of loudspeakers using an equalizer. To do this, proceed as follows:

- Connect the MR-PRO to the desired component and play the “Fastpnk1” test signal.
- Now select the EQ1” parameter on the XL2. The frequency response is displayed immediately and updated every 100 ms.



Frequency Response