

# BI Test

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## Bl Test

The purpose for the Bl test function is to check the offset of the placement of the coil in the magnetic gap. The force factor the  $Bl(x)$  of a speaker depends of the coil position in the magnetic field. Normally the coil has to be placed in the magnetic field so the movement in and out is equal. See figure 1.

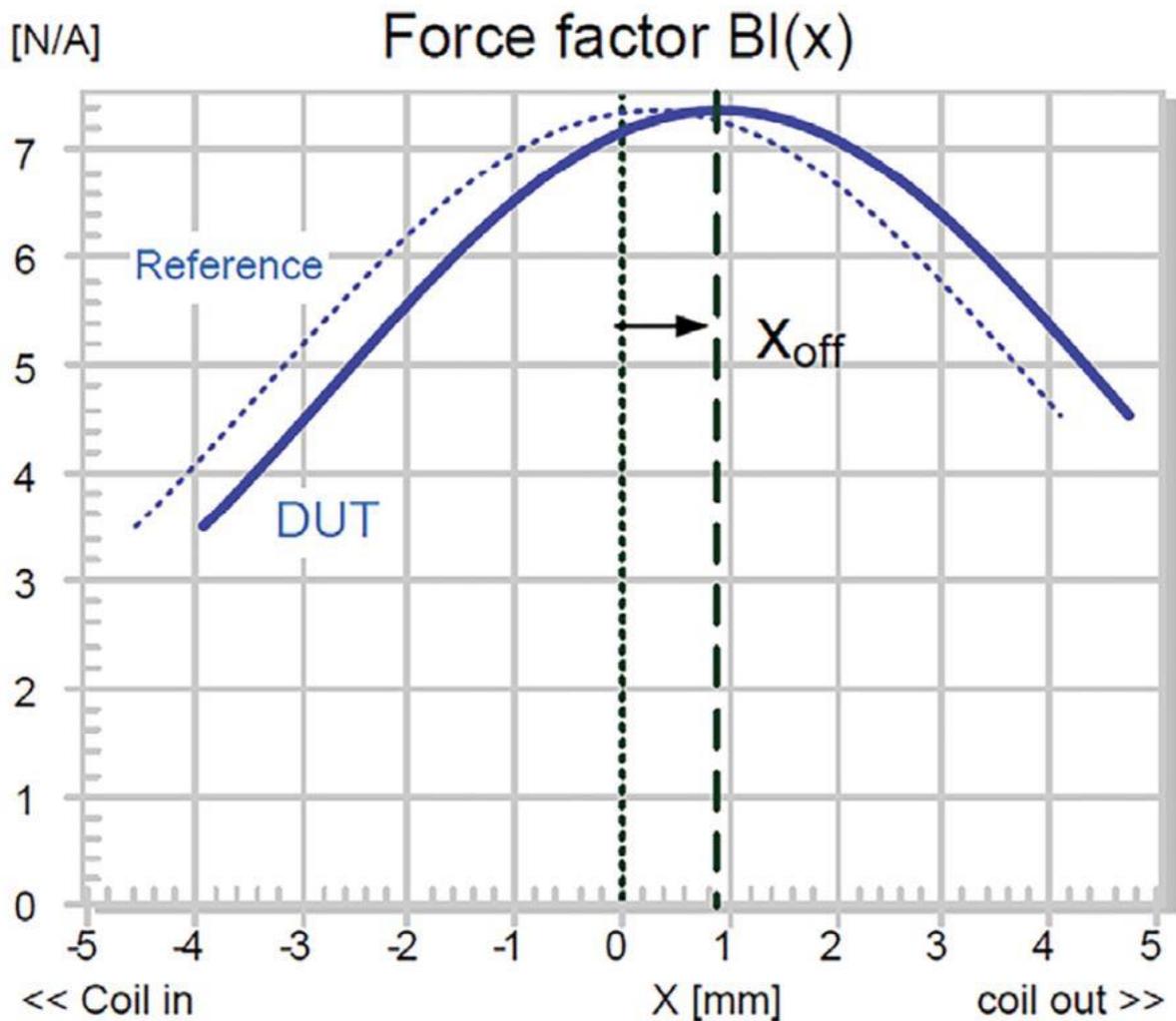


Figure 1: The force factor for a coil placed in the middle of magnetic field the reference and a coil the DUT placed with an offset.

The movement in and out of the magnetic field makes the membrane to move in and out. Ideal the force factor curve should be flat so no distortion is generated when the membrane moving. For small signals small distortion will be generated. For large signals due to large movements distortion will be generated. If the coil is placed in the middle of the magnetic field and a sine is added to the speaker as a

large signal the top and the bottom of the sine will be compressed and distortion generated. The top and the bottom of the sine compressed at same displacement. If the coil is placed with an offset the compression will begin on one of sine top than the other.

To measure the top and the bottom of a sine via the impedance it is possible to measure if the coil is having an offset in the magnetic field. To make a proper measurement the coil must move so much so the coil go in the nonlinear range of the magnetic field. The best conditions are a large signal on the speaker to force the coil in the nonlinear range and measure the speaker in free field. The free field measurement gives the most movements around the resonance of a speaker.

## Bl setup

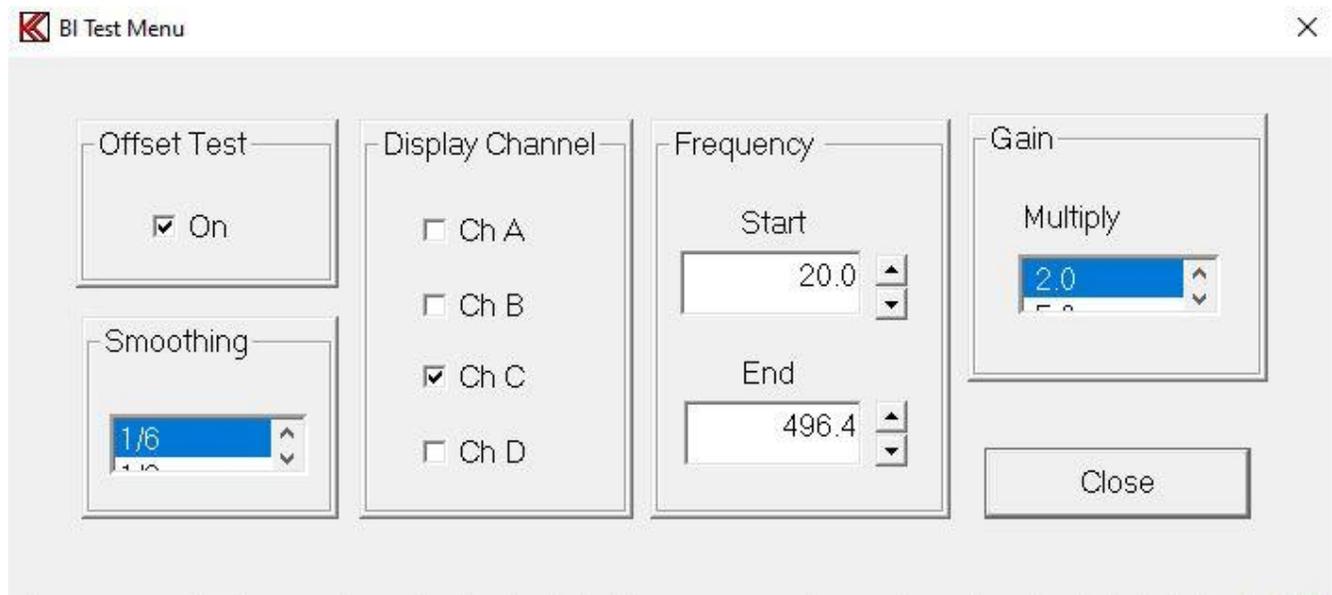


Figure 2: The Bl test on with a smoothing of 1/6 octave from 20 to 496.4 Hz.

In this example the Bl test is setup as shown in figure 2. The frequency range is selected around the speaker resonance. The measurement is done in free field.

The measurement is showing on figure 3. The upper and lower limits are already done in this example.

Note that the displacement is different before and after the resonance. The Bl curve is going around the middle of screen if no displacement is measured. The displacement is displayed as an average value on each test point around the middle of screen. If the speaker is connected reversed the curve is reversed. The test can be used as a polarity test.

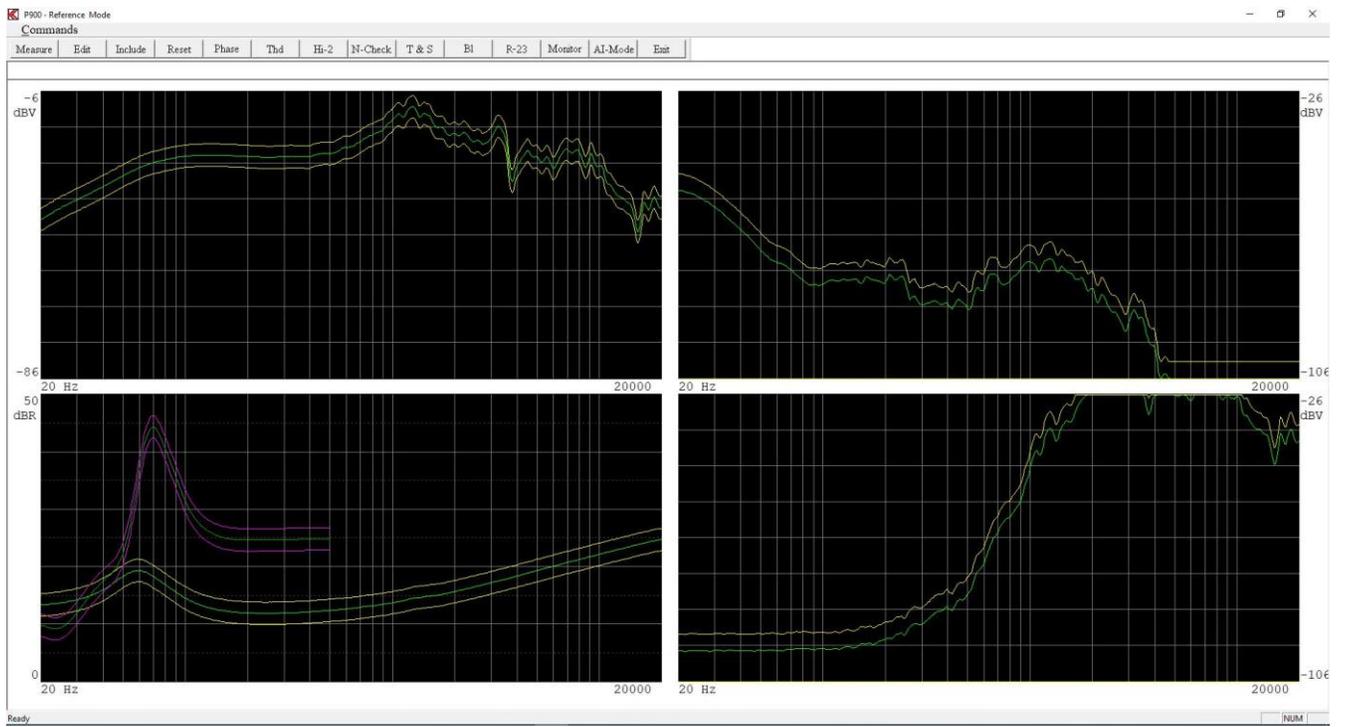


Figure 3: A measurement on a speaker with the BI test displayed in the impedance channel.