Title:	**DIRECTIONAL NOISE**
Ref Number:	**13**
Location:	**NATIONAL COLLEGE ACOUSTIC LAB**
Supervisor:	**SALIH HASSAN**
Academic:	**SALIH HASSAN**
Team Size:	**~4**
Environment:	**INDOORS**

OBJECTIVE

To understand how the directivity of sound changes with source position in a room and with frequency.

APPARATUS

- A room
- Sound Level Meter (CEL or B&K),
- Loudspeaker
- Random Noise Generator
- Filter Set
- Tripod
- Measuring Tape

PROCEDURE

1. Turn on SLM- check battery level- calibrate the meter by applying a calibrator (approximately 94dB at 1kHz, read the instructions on the calibrator) Set the meter to 80, F, F(Lin) and SPL.

2. Connect the generator to filter set, connect output of generator (through amplifier – if provided) to loudspeaker

1. Set CEL328 to on, F, FL (you must calibrate first, then switch to Frequency Linear, FL, in this experiment- Don't use Frequency + A weighting FA)

2. Set the filter control to 63 Hz.

3. Place the SLM on the tripod some 4m from the loudspeaker, at a height of 1.2m

4. Measure the octave band Sound Pressure Levels, SPL, in the range 63 Hz to 4 kHz in each of the following positions

    a) 8m from the loudspeaker
    b) 4m from the loudspeaker
    c) 2m from the loudspeaker
    d) 1m from the loudspeaker

5. Investigate the change in SPL at 63 Hz and 4 kHz when the SLM is moved towards a surface, leave the loudspeaker where it is.

6. Investigate the change in SPL at 63 Hz and 4 kHz when the loudspeaker is moved from

   a) the middle of the room
   b) the centre of a wall/floor
   c) the corner of a room

Please Note: a modern SLM will measure L_{eq} as well a bar chart of each octave band SPL. Record the Leq provided the measurement does not include any significant unwanted noise. If there is unwanted noise, press the reset button.

DISCUSSION

- Why does the meter needle (on digital displays the bar chart) fluctuate more at low frequencies than at high?
- Why does the octave band level at low frequency (125 Hz) change whilst at high frequency (4 kHz) it does not?
- Is it correct in (8) to refer to L_{eq} or should it be L_{AeqT}?

NOTE: Do not change the output level on Generator or Amplifier during the experiment
APPARATUS

RESULTS

1. Plot the Sound Pressure Levels for the frequency 63 Hz to 4 kHz on separate graphs.
2. Plot the 125 Hz and 4 kHz measurement on the same graph and comment on the result for the various loudspeaker positions
3. Answer the discussion questions