

Sound quality index

聲壓位準(SPL)

1. 麥克風所收到的聲音訊號和人耳能夠接收到的最小值的相對值

$$SPL = 20 \log_{10} \left(\frac{P_{rms}}{P_{ref}} \right)$$

P_{rms} : $P(t)$ 的方均根植，也稱為有效聲壓(effective sound pressure)

P_{ref} : 人耳能感知的最小壓力值($20\mu Pa$)

Standard sensitivity of microphone: 46.44mv/Pa

Unit: dB or dBA

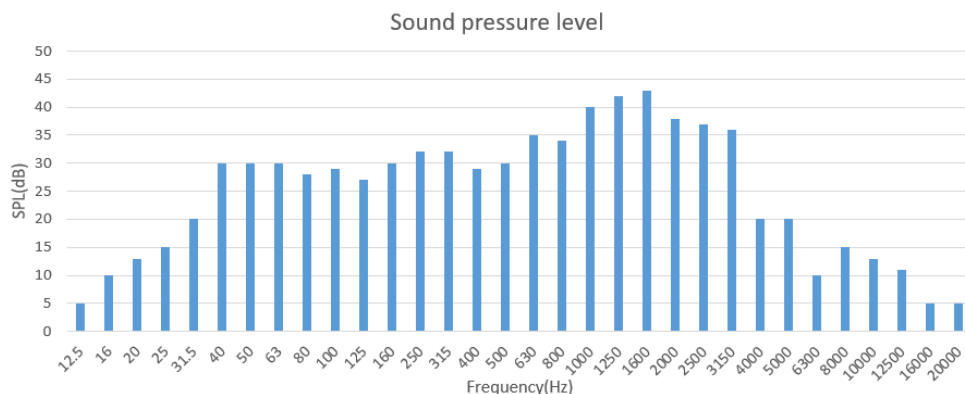
2. 不同音源的SPL疊加

$$SPL_s = 10 \log_{10} \left(\sum 10^{\frac{SPL_i}{10}} \right)$$

3. 三分之一八音頻帶(1/3 Octave band)

在0~20k Hz間，切分不同頻帶，每個頻帶的上限頻率/下限頻率為2的立方根， $\frac{f_u}{f_l} = 2^{1/3}$

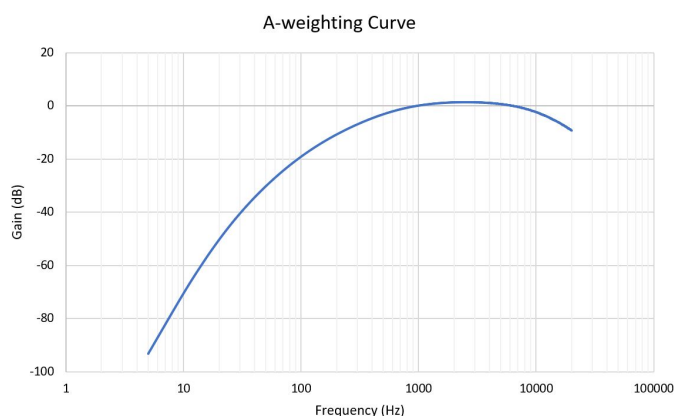
中心頻帶為上限頻率和下限頻率成績的平方根， $f_c = \sqrt{f_u f_l}$



4. dB to dBA

將原本所有的 SPL_i 做總和前，先用以A-Weight權重增益其值，再做加總。

$$SPL_s = 10 \log_{10} \left(\sum_{i=1}^n 10^{\frac{SPL_i + weight}{10}} \right)$$



source: <https://acousticalengineer.com/a-weighting-table/>

Prominence Ratio (dB)

Modulation(%):

Reference:

1. <https://acousticalengineer.com/a-weighting-table/>
2. <http://aitanh.blogspot.com/2017/05/blog-post.html>
3. http://aitanh.blogspot.com/2018/01/blog-post_22.html?m=0
4. <https://www.linuxdataacquisition.com/docs/tn257.pdf>
5. <http://www.pal-acoustics.com/index.php?a=services&id=109&lang=cn>
6. <https://dsp.stackexchange.com/questions/1059/how-do-you-plot-an-spl-vs-frequency-curve-for-a-given-set-of-pressure-data>