Threshold of Hearing

The measured threshold of hearing curve shows that the sound intensity required to be heard is quite different for different frequencies. The standard threshold of hearing at 1000 Hz is nominally taken to be 0 dB, but the actual curves show the measured threshold at 1000 Hz to be about 4 dB. There is marked discrimination against low frequencies so that about 60 dB is required to be heard at 30 Hz.

Psychoacoustics

1. The frequency range of the voice is typically only from about **500 Hz to 4 kHz**
2. The normal range of frequencies audible to humans is **20 to 20,000 Hz.**

Threshold of hearing range chart

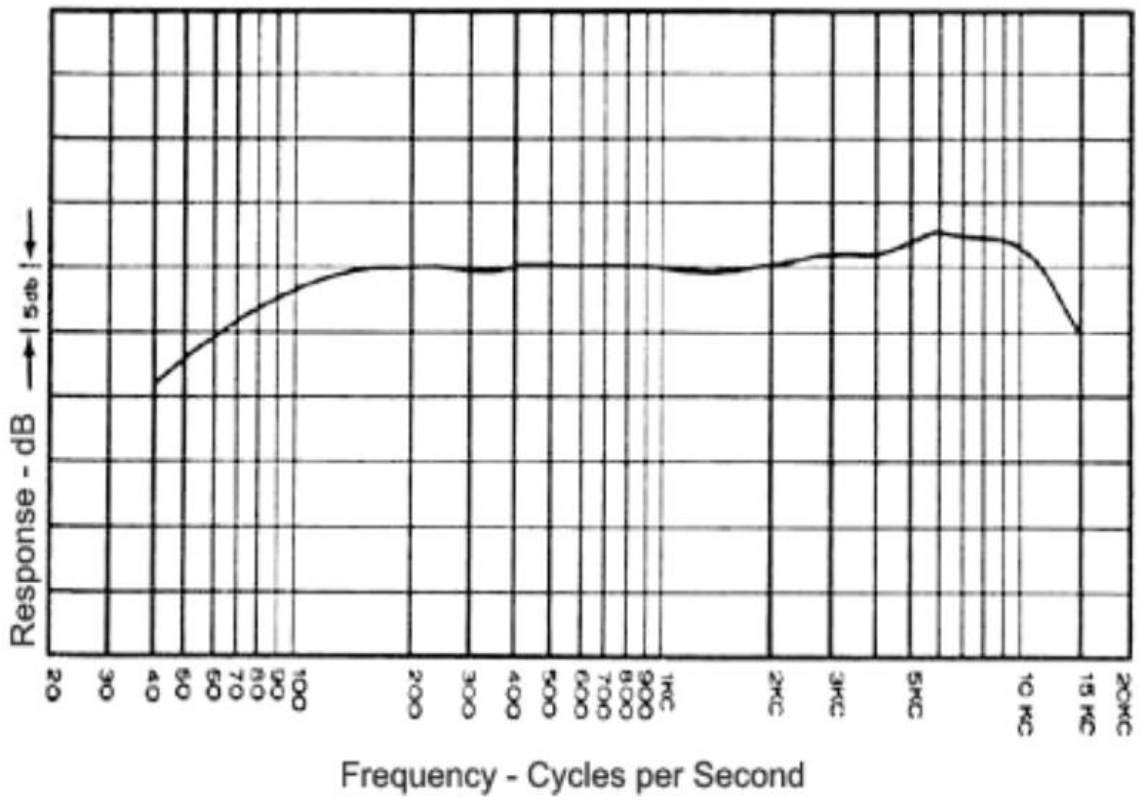
Source	Intensity	Intensity Level	# of Times Greater Than TOH
Threshold of Hearing (TOH)	$1*10^{-12}$ W/m^2	0 dB	10^0
Rustling Leaves	$1*10^{-11}$ W/m^2	10 dB	10^1
Whisper	$1*10^{-10}$ W/m^2	20 dB	10^2
Normal Conversation	$1*10^{-6}$ W/m^2	60 dB	10^6
Busy Street Traffic	$1*10^{-5}$ W/m^2	70 dB	10^7
Vacuum Cleaner	$1*10^{-4}$ W/m^2	80 dB	10^8
Large Orchestra	$6.3*10^{-3}$ W/m^2	98 dB	$10^{9.8}$
Walkman at Maximum Level	$1*10^{-2}$ W/m^2	100 dB	10^{10}
Front Rows of Rock Concert	$1*10^{-1}$ W/m^2	110 dB	10^{11}
Threshold of Pain	$1*10^{1}$ W/m^2	130 dB	10^{13}
Military Jet Takeoff	$1*10^{2}$ W/m^2	140 dB	10^{14}
Instant Perforation of Eardrum	$1*10^{4}$ W/m^2	160 dB	10^{16}

Every microphone has a signature and part of that signature is its Frequency Response. Frequency response determines the basic "sound" of the microphone. It is determined by the range of the sound (from lowest to highest frequency) that a microphone can reproduce and how that sound varies at different frequencies.

The most common response curves you are likely to see are flat and tailored. When you look through catalogs or web pages, you're probably going to see icons that look something like these.

Frequency Response Charts

A microphone's frequency response pattern is shown using a chart like the one below and referred to as a frequency response curve. The *x* axis shows frequency in Hertz, the *y* axis shows response in decibels. A higher value means that frequency will be exaggerated; a lower value means the frequency is attenuated. In this example, frequencies around 5 - kHz are boosted while frequencies above 10kHz and below 100Hz are attenuated. This is a typical response curve for a vocal microphone.



Frequency range of various musical instruments

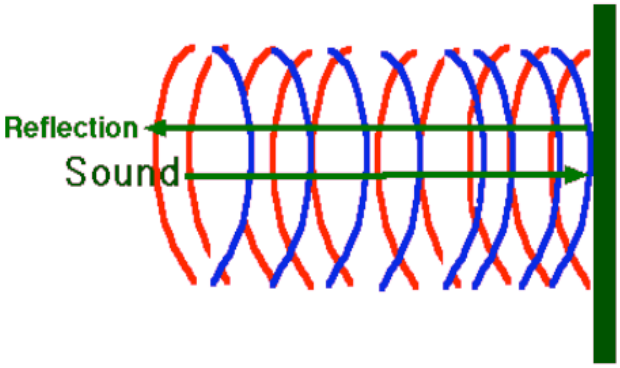
The Approximate Frequency Ranges chart below displays the frequencies generated by some familiar musical instruments (including our voices) with **BOTH** the numerical fundamental and harmonic approximate frequencies shown.
Given the often-talked-about musical range of 20hz-20khz, it is surprising to see just how low the musical fundamental frequencies actually are (almost all are under 3,500khz)

My chart above shows the approximate frequency ranges of various musical instruments and the human voice. The black boxes represent their fundamental frequencies and the yellow boxes represent their harmonic frequencies. It's much easier to understand and enhance the instruments you want to hear when you know what frequencies they cover.

Echo

(A repetition of sound)_**Echo's,** one_or a few at most repetitions of an audio signal. Not all sound that hits matter is absorbed. Some of it is reflected. That means sound bounces off the solid matter the way a tennis ball bounces off a wall. Sound reflected back to its source is an echo.

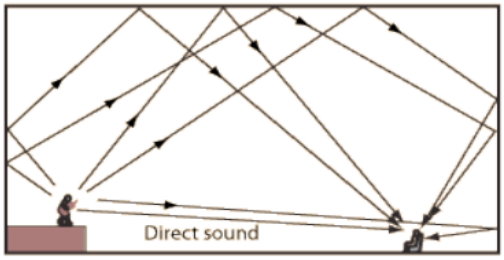
1.One repetitions of an audio signals called as echo



Reverberation

Reverberation is the collection of reflected sounds from the surfaces in an enclosure like an auditorium. It is a desirable property of auditoriums to the extent that it helps to overcome the inverse square law drop-off of sound intensity in the enclosure. However, if it is excessive, it makes the sounds run together with loss of articulation - the sound becomes muddy, garbled. To quantitatively characterize the reverberation, the parameter called the reverberation time is used.

2.Many repetitions becoming more closely speed (denser) with time



(Reverberant sound is the collection of all the reflected sounds in an auditorium)

Delay

3.The time interval between a direct signal and its echoes (to postpone to a later date)

Decay

4. The time it takes for the echoes and reverberation to die away (Progressive decline)