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# PATENT OWNER'S DEMONSTRATION EXHIBITS

JANUARY 25, 2024

ORAL ARGUMENT

VERANCE CORP.

V.

MZ AUDIO SCIENCES, LLC

U.S. PATENT NO. 7,289,961

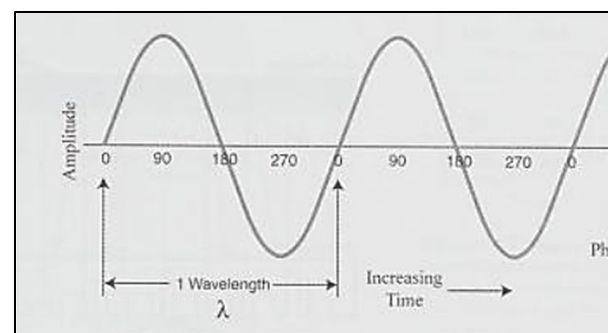
CASE NO. IPR2022-01544

SARAH E. SPIRES, COUNSEL FOR PATENT OWNER

# TECHNOLOGY BACKGROUND

# General Principles of Sound Waves

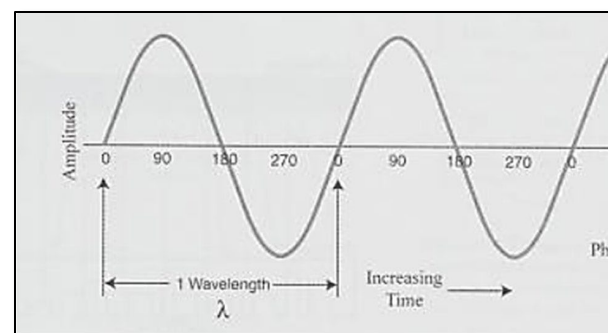
- Sound wave = energy released by vibrating objects
- Amplitude = relative strength/intensity; measured in decibels (dB)
- Frequency = oscillations per second; measured in Hertz (Hz)



Example of pure-pitch sine wave

# General Principles of Sound Wa

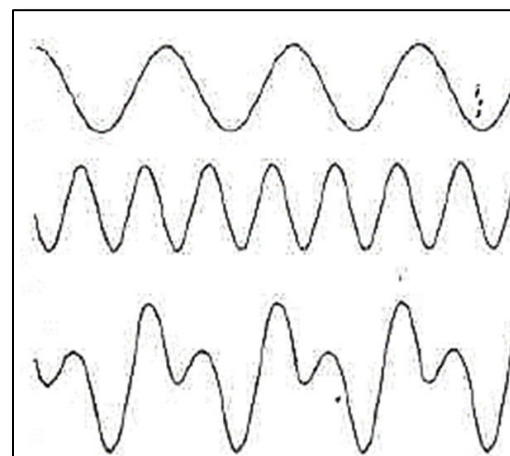
- Phase = the fractional part of a period through which the time variable of a periodic quantity has moved, as measured at any point in time from an arbitrary time origin
- Usually expressed in terms of angular measure
- One period =  $360^\circ$  or  $2\pi$  radians



Example of pure-pitch sin

# General Principles of Sound Wa

- Music = collection of multiple instruments/voices playing and/or singing different notes concurrently
- Individual components of a sound are combined and represented as a composite or complex waveform
- In the example shown at right, the top and middle sine waves are added to produce the bottom waveform



Example of complex wa

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