UNITED STATES PATENT AND TRADEMARK OFFICE

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BEFORE THE PATENT TRIAL AND APPEAL BOARD

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GOOGLE LLC,

Petitioner,

v.

JAWBONE INNOVATIONS, LLC,

Patent Owner.

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Case IPR2022-01124

U.S. Patent No. 11,122,357

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**DECLARATION OF JEFFREY S. VIPPERMAN, PH.D.**

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IPR2022-01321
Exhibit 1003

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A. Kanamori, Elko, and McCowan Render Obvious Claims 1-20 ..... 35

1. Independent Claim 1 ..... 35

a. [1P] "A device, comprising:" ..... 35

b. [1A]: "a first virtual microphone comprising a first combination of a first microphone signal and a second microphone signal, wherein the first microphone signal is generated by a first physical microphone and the second microphone signal is generated by a second physical microphone;" ..... 35

c. [1B]: "a second virtual microphone comprising a second combination of the first microphone signal and the second microphone signal," ..... 40

d. [1C]: "wherein the second combination is different from the first combination," ..... 42

e. [1D]: "wherein the first virtual microphone and the second virtual microphone are distinct virtual directional microphones with substantially similar responses to noise and substantially dissimilar responses to speech; and" ..... 43

f. [1E]: "a signal processor coupled with the first and second microphone signals and operative to combine the first and second microphone signals by filtering and summing in the time domain, to apply a varying linear transfer function between the first and second microphone signals, and to generate an output signal having noise content that is attenuated with respect to speech content." ..... 65

2. Dependent Claims 2-14 ..... 79

a. Claim 2: "The device of claim 1, wherein the signal processor comprises one or more digital signal processors (DSPs)." ..... 79

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b. Claim 3: "The device of claim 1, wherein the noise content comprises acoustic noise and the speech content comprises human speech."....80

c. Claim 4: "The device of claim 1, wherein the signal processor is operative to add a delay to the first microphone signals."....81

d. Claim 5: "The device of claim 4, wherein the signal processor is operative to raise the delay to a power that is proportional to a time difference between arrival of the speech at the first virtual microphone and arrival of the speech at the second virtual microphone."....81

e. Claim 6: "The device of claim 4, wherein the signal processor is operative to raise the delay to a power that is proportional to a sampling frequency multiplied by a quantity equal to a third distance subtracted from a fourth distance, the third distance being between the first physical microphone and a speech source of the speech and the fourth distance being between the second physical microphone and the speech source."....84

f. Claim 7: "The device of claim 1, wherein the first and second physical microphones comprise omnidirectional microphones."....86

g. Claim 8: "The device of claim 1, wherein the first and second physical microphones are included in a microphone array."....86

h. Claim 9: "The device of claim 1, wherein the first physical microphone and the second physical microphones are disposed along an axis and are separated from each other by a first distance."....86

i. Claim 10: "The device of claim 9, wherein a midpoint of the axis is a second distance from a speech source that generates the speech, wherein

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the speech source is located in a direction defined by an angle relative to the midpoint." .....87

j. Claim 11: "The device of claim 10, wherein the first virtual microphone is formed by subtracting the second microphone signal from the first microphone signal." .....90

k. Claim 12: "The device of claim 10, wherein the second virtual microphone is formed by subtracting the first microphone signal from the second microphone signal." .....91

l. Claim 13: "The device of claim 1, wherein the first virtual microphone is formed by subtracting the second microphone signal from a delayed version of the first microphone signal." .....93

m. Claim 14: "The device of claim 1, wherein the second virtual microphone is formed by subtracting the first microphone signal from a delayed version of the second microphone signal." .....94

3. Independent Claim 15 .....96

a. [15P]: "A device, comprising:" .....96

b. [15A]: "a first virtual microphone comprising a first combination of a first microphone signal and a second microphone signal, wherein the first microphone signal is generated by a first physical microphone and the second microphone signal is generated by a second physical microphone;" .....96

c. [15B]: "a second virtual microphone comprising a second combination of the first microphone signal and the second microphone signal," .....96

d. [15C]: "wherein the second combination is different from the first combination," .....96

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