UNITED STATES PATENT AND TRADEMARK OFFICE

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BEFORE THE PATENT TRIAL AND APPEAL BOARD

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VERANCE CORP.,
Petitioner,

v.

MZ AUDIO SCIENCES, LLC,
Patent Owner.

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IPR2022-01544
Patent 7,289,961 B2

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Before KARL D. EASTHOM, DAVID C. McKONE, and
IFTIKHAR AHMED, *Administrative Patent Judges*.

EASTHOM, *Administrative Patent Judge.*

JUDGMENT
Final Written Decision
Determining No Challenged Claims Unpatentable
35 U.S.C. § 318(a)

I. INTRODUCTION

The Board instituted *inter partes* review of claims 1–10 of U.S. Patent No. 7,289,961 B2 (Ex. 1001, "the '961 patent") based on a Petition filed by Sony Group Corp. (Japan), Sony Corp. of America, Sony Interactive Entertainment LLC, Sony Pictures Entertainment Inc., Sony Electronics Inc. (now terminated as petitioner, (Paper 17)), and Verance Corp. (sole remaining "Petitioner"). Paper 7 ("Pet.").

After the Institution Decision (Paper 12), MZ Audio Sciences, LLC ("Patent Owner") filed a Response to the Petition (Paper 27, "PO Resp."), Petitioner filed a Reply (Paper 28, "Reply"), and Patent Owner filed a Sur-reply (Paper 29, "Sur-reply"). The parties participated in an oral hearing and a copy of the transcript is in the record. Paper 36.

We have jurisdiction under 35 U.S.C. § 6 to enter this Final Written Decision under 35 U.S.C. § 318(a). Petitioner has the burden of proving unpatentability of the challenged claims by a preponderance of the evidence. 35 U.S.C. § 316(e). Having reviewed the parties' arguments and cited evidence based on the full record, for the reasons discussed below, we determine that Petitioner has not demonstrated by a preponderance of the evidence that claims 1–10 of the '961 patent are unpatentable. To the extent this Final Written Decision may conflict with the Institution Decision, "the Board has an obligation to assess the [validity] question anew after trial based on the totality of the record." *In re Magnum Oil Tools Int'l, Ltd.*, 829 F.3d 1364, 1377 (Fed. Cir. 2016); *see also Trivascular, Inc. v. Samuels*, 812 F.3d 1056, 1068 (Fed. Cir. 2016) ("The Board is free to change its view of the merits after further development of the record, and should do so if convinced its initial inclinations were wrong.").

A. Related Matters

The parties indicate that Patent Owner asserted the '961 patent in district court lawsuits, including *MZ Audio Sciences, LLC v. Sony Group Corp. (Japan)*, No. 1:21-cv-0166 (D. Del.), and *MZ Audio Sciences, LLC v. Sony Group Corp. (Japan)*, No. 2:22-cv-00866 (C.D. Cal.). Pet. xi; Paper 9, 1. The parties identify no other related proceedings.

B. The Asserted Grounds

Petitioner asserts the following grounds of unpatentability (Pet. 2):

Claim(s) Challenged	35 U.S.C.[1] §	Reference(s)/Basis
1–10	103(a)	Srinivasan[2], Cabot[3], Kudumakis[4]
2, 3, 5, 7, 8, 10	103(a)	Srinivasan, Cabot, Kudumakis, Hobson[5]
1–10	103(a)	Kudumakis, Tilki[6], Cabot

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[1] The Leahy-Smith America Invents Act, Pub. L. No. 112-29, 125 Stat. 284 (2011) ("AIA"), amended 35 U.S.C. § 103 (effective Mar. 16, 2013). Petitioner points out that "[t]he application from which U.S. Patent No. 7,289,961 issued claims priority to U.S. Provisional Application No. 60/479,438, filed June 19, 2003." Pet. xi. Because the earliest possible effective filing date for the '961 patent precedes the effective date of the applicable AIA amendment, the pre-AIA version of § 103 applies.

[2] Srinivasan, US 6,272,176 B1, issued Aug. 7, 2001. Ex. 1005.

[3] R. C. Cabot et al., *Detection of Phase Shifts in Harmonically Related Tones*, J. AUDIO ENG. SOC., VOL. 24, NO. 7 (Sept. 1976). Ex. 1006.

[4] Kudumakis et al., Int. Pub. WO 01/58063, published Aug. 9, 2001. Ex. 1007.

[5] Hobson et al., US 6,633,653 B1, issued Oct. 14, 2003, filed Feb. 4, 2000. Ex. 1042.

[6] J.F. Tilki et al., *Encoding a Hidden Auxiliary Channel onto a Digital Audio Signal Using Psychoacoustic Masking*, PROCEEDINGS IEEE

In support, Petitioner relies on the testimony of Dr. Michael Scordilis (Ex. 1003).0

C. The '961 Patent

The '961 patent relates to embedding data in an audio signal for watermarking, steganography, or other purposes. Ex. 1001, code (57). "The present invention is directed to a system and method for insertion of hidden data into audio signals and retrieval of such data from audio signals and is more particularly directed to such a system and method using a phase encoding method." *Id.* at 1:20–24. The process divides the audio signal into time frames that contain frequency bands representing the audio signal. *Id.* at code (57). Then, "the relative phases of one or more frequency bands are shifted to represent the data to be embedded." *Id.* at code (57).

The invention exploits the randomness of the relative phases of frequency components in typical audio speech or music. Ex. 1001, 3:47–53 ("So far, however, the apparent randomness of the phase has not been exploited for data hiding purposes.").

The method involves dividing an audio signal into time frames, sampling the time frames, and transforming the representation of the signal into its frequency components. *See* Ex. 1001, 5:30–67. Then, the method involves selecting at least two frequency components, the first of which is a fundamental tone, and the other(s) of which is/are an overtone or harmonic of the fundamental tone, obtaining the relative phase difference(s) between

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SOUTHEASTCON '97, "Engineering the New Century," Apr. 12–14, 1997. Ex. 1008; *see also* Pet. 52–53 (arguing that Tilki is prior art under §§ 102(a)–(b)) (citing Ex. 1025, 1–8; Ex. 1026, 1–2; Ex. 1027, 2; Ex. 1030, 1–2; Ex. 1032, 48; Ex. 1033, 2719).

the at least two frequency components, altering the phase of at least one of the overtones or harmonics to embed the desired hidden data into the signal, and inverse transforming the frequency components back into a digital representation of the time varying signal. *Id.* at 5:30–6:28.

The specification states that "in addition to steganography and watermarking, any suitable use for hidden data falls within the present invention." Ex. 1001, 8:66–67.

D. Challenged Claims

Petitioner challenges all ten claims of the '961 patent. Of these, claims 1, 4, 6, and 9 are independent. For purposes of this Final Written Decision, claim 1 is representative. Claim 1 follows (information added to conform to Petitioner's nomenclature):

> 1.   [1PRE] A method for embedding data in an audio signal, the method comprising:
>   [1A] (a) dividing the audio signal into a plurality of time frames and, in each time frame, a plurality of frequency components;
>   [1B] (b) in each of at least some of the plurality of time frames, selecting at least two of the plurality of frequency components; and
>   [1C] (c) altering a phase of at least one of the plurality of frequency components in accordance with the data to be embedded, wherein:
>   [1C-1] step (b) comprises selecting a fundamental tone and at least one overtone; and
>   [1C-2] step (c) comprises quantizing a phase difference of the at least one overtone relative to the fundamental tone to embed at least one bit of the data to be embedded.

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