Filed on behalf of: Meta Platforms, Inc.

Entered: April 12, 2024

UNITED STATES PATENT AND TRADEMARK OFFICE

BEFORE THE PATENT TRIAL AND APPEAL BOARD

META PLATFORMS, INC.,
Petitioner,

v.

EIGHT KHZ, LLC,
Patent Owner.

Case IPR2023-01024
Patent 11,290,836 B2

PETITIONERS' UPDATED EXHIBIT LIST

Pursuant to 37 C.F.R. § 42.63(e), Petitioners Meta Platforms, Inc., Meta Platforms Technologies, LLC, and Twisted Pixel Games, LLC respectfully submits the following updated exhibit list:

Exhibit	Description
1001	U.S. Patent No. 11,290,836 ("'836 patent")
1002	U.S. Patent No. 11,290,836 File History ("'836 FH")
1003	Declaration of Dr. Agnieszka Roginska in Support of Petition for *Inter Partes* Review of the '836 Patent
1004	Curriculum Vitae of Dr. Agnieszka Roginska
1005	Daniel J. Finnegan et al., *Compensating for Distance Compression in Audiovisual Virtual Environments Using Incongruence*, Chi' 16: Proc. of the 2016 CHI Conf. on Hum. Factors in Computing Sys. (2016) ("Finnegan")
1006	Durand R. Begault, *3-D Sound for Virtual Reality and Multimedia*, NASA/TM—2000-209606 (Aug. 2000) ("Begault")
1007	U.S. Patent No. 9,226,090 ("Norris")
1008	V.R. Algazi et al., The *CIPIC HRTF Database*, IEEE Workshop on Applications of Signal Processing to Audio and Acoustics (2001) ("Algazi")
1009	U.S. Patent No 7,876,903 ("Sauk")
1010	U.S. Patent No. 10,979,843 ("Shivappa")
1011	Zhiying Zhou et al., *An Experimental Study on the Role of Software Synthesized 3D Sound in Augmented Reality Environments*, 16 Interacting with Computs. 989 (2004) ("Zhou")
1012	Declaration of Ingrid Hsieh-Yee in Support of Petition for *Inter Partes* Review of the '836 Patent ("Hsieh-Yee")
1013	Curriculum Vitae of Ingrid Hsieh-Yee
1014	U.S. Patent No. 4,774,515 ("Gehring")
1015	U.S. Patent No. 2,955,156 ("Heilig")

Exhibit	Description
1016	U.S. Patent No. 9,041,622 ("McCulloch")
1017	U.S. Patent No. 10,509,466 ("Miller")
1018	U.S. Patent No. 9,767,618 ("Najaf-Zadeh")
1019	U.S. Patent No. 9,232,336 ("Nishio")
1020	U.S. Patent No. 9,578,440 ("Otto")
1021	U.S. Patent No. 1,624,486 ("Fletcher")
1022	U.S. Patent No. 1,855,149 ("Jones")
1023	U.S. Patent No. 8,873,761 ("Fukui")
1024	U.S. Patent No. 9,787,846 ("Srinivasan")
1025	U.S. Patent Application Publication No. US 2012/0183161 A1
1026	U.S. Patent No. 9,530,426 ("Wright")
1027	U.S. Patent Application Publication No. US 2017/0115488 A1 ("Ambrus")
1028	U.S. Patent No. 7,710,654 ("Ashkenazi")
1029	Matthias Geier et al., *The SoundScape Renderer: A Unified Spatial Audio Reproduction Framework for Arbitrary Rendering Methods* (Convention Paper 7330), Audio Eng'g Soc'y 124th Convention (2008)
1030	V. Ralph Algazi & Richard O. Duda, *Headphone-Based Spatial Sound*, 28 IEEE Signal Processing Mag. 33 (2011) ("Algazi 2011")
1031	S.S. Fisher et al., *Virtual Interface Environment Workstations*, Procs. of the Hum. Factors Soc'y, 32nd Annual Meeting 91 (1988)
1032	Wolfgang Fohl et al., *A System-On-Chip Platform for HRTF-Based Realtime Spatial Audio Rendering With an Improved Realtime Filter Interpolation*, 4 Int'l J. Advances Intelligent Sys. 309 (2011)
1033	Jason Jerald, *The VR Book – Perception and Interaction Design for Virtual Reality* (M. Tamer Özsu ed., 2015) ("The VR Book")

Exhibit	Description
1034	Masayuki Morimoto & Yoichi Ando, *On the Simulation of Sound Localization*, 1 J. of Acoustical Soc'y Japan (E) 167 (1980)
1035	C. Phillip Brown & Richard O. Duda, *A Structural Model for Binaural Sound Synthesis*, 6 IEEE Transactions on Speech and Audio Processing 476 (1998)
1036	Douglas S. Brungart & William M. Rabinowitz, *Auditory Localization of Nearby Sources. Head-related transfer Functions*, 106 J. Acoustical Soc'y of Am. 1465 (1999)
1037	Kai-Uwe Doerr et al., *Evaluation of a Low-Cost 3D Sound System for Immersive Virtual Reality Training Systems*, 13 IEEE Transactions on Visualization and Comput. Graphics 204 (2007)
1038	*Virtual Reality*, Cryptologic Quarterly 21 (Dec. 1, 2011)
1039	Stephan Paul, *Binaural Recording Technology: A Historical Review and Possible Future Developments*, 95 Acta Acustica United with Acustica 767 (2009)
1040	David Romblom & Bryan Cook, *Near-Field Compensation for HRTF Processing* (Convention Paper 7611), Audio Eng'g Soc'y 125th Convention (2008)
1041	Amy Turner et al., *Can the Perception of Depth in Stereoscopic Images Be Influenced by 3D Sound?*, 7863 Stereoscopic Displays & Applications (2011)
1042	Elizabeth M. Wenzel et al., *Development of a Three-Dimensional Auditory Display System*, 20 SIGCHI Bull. 52 (1988)
1043	Elizabeth M. Wenzel et al., *Localization with Non-Individualized Virtual Acoustic Display Cues*, Chi' 91: Proceedings of the SIGCHI Conf. on Hum. Factors in Comput. Sys. 351 (1991)
1044	Frederic L. Wightman & Doris J. Kistler, *Headphone Simulation of Free-Field Listening. II: Psychophysical Validation*, 85 J. Acoustical Soc'y of Am. 868 (1989)
1045	Steven M. Kaplan, Wiley Electrical and Electronics Engineering Dictionary 335 (2004)
1046	Dmitry N. Zotkin et al., *Customizable Auditory Displays*, Proc. of the Inte'l Conf. on Auditory Display (July 2002)

Exhibit	Description
1047	*Asserted U.S. Patent No. 11,290,836 "Providing Binaural Sound Behind an Image Being Displayed with an Electronic Device*, Plaintiff's Infringement Contentions Exhibit 27, *Eight KHZ, LLC v. Meta Platforms, Inc*., No. 6:22-cv-00575 (W.D. Tex. Mar. 3, 2023)
1048	*Asserted U.S. Patent No. 11,290,836 "Providing Binaural Sound Behind an Image Being Displayed with an Electronic Device*, Plaintiff's Infringement Contentions Exhibit 18, *Eight KHZ, LLC v. Meta Platforms, Inc*., No. 6:22-cv-00575 (W.D. Tex. Mar. 3, 2022)
1049	*Asserted U.S. Patent No. 11,290,836 "Providing Binaural Sound Behind an Image Being Displayed with an Electronic Device*, Plaintiff's Infringement Contentions Exhibit 36, *Eight KHZ, LLC v. Meta Platforms, Inc*., No. 6:22-cv-00575 (W.D. Tex. Mar. 3, 2023)
1050	Rasmus Konig Sorenson, *Review: Oculus Rift DK2 – Next-Level Virtual Reality*, flatpanelshd (Aug. 13, 2014), https://www.flatpanelshd.com/review.php?subaction=showfull&id=1407909173
1051	U.S. Patent No. 9,392,212 ("Ross")
1052	Mark Wherry, *Audio Add-ons For Macbook Pro, Apple Notes*, SoundonSound (Mar. 2007), https://www.soundonsound.com/techniques/audio-add-ons-macbook-pro
1053	Defendants Opening Claim Construction Brief, *Eight kHz, LLC v. Meta Platforms, Inc*., No. 6:22-cv-00575 (W.D. Tex. Apr. 12, 2023), ECF No. 83
1054	Plaintiff's Claim Construction Reply Brief, *Eight kHz, LLC v. Meta Platforms, Inc*., No. 6:22-cv-00575 (W.D. Tex. May 3, 2023), ECF No. 92
1055	Plaintiff's Claim Construction Reply Brief, Exhibit 7, *Eight kHz, LLC v. Meta Platforms, Inc*., No. 6:22-cv-00575 (W.D. Tex. May 3, 2023), ECF No. 92-7
1056	U.S. Patent No. 5,173,944 ("Begault '944")

Exhibit	Description
1057	U.S. Patent No. 5,438, 623 ("Begault '623")
1058	Deposition transcript of Durand Begault, Ph.D., *Eight Khz, LLC v. Meta Platforms, Inc.,* No. 6:22-cv-00575 (W.D. Tex. May 22, 2023)
1059	Areti Andreopoulou & Agnieszka Roginska, *Towards the Creation of a Standardized HRTF Repository*, Audio Eng'g Soc'y Convention Paper 8571, Oct. 20-23, 2011
1060	Chan Jun Chun et al., *Deep Neural Network Based HRTF Personalization Using Anthropometric Measurements*, Audio Eng'g Soc'y Convention Paper 9860, Oct. 18-21, 2017
1061	Karen Collins, *Game Sound: An Introduction to the History, Theory, and Practice of Video Game Music and Sound Design* (2008)
1062	Sungmok Hwang & Youngjin Park, *HRIR Customization in the Median Plane Via Principal Components Analysis*, AES 31st Int'l Conf., London, UK (2007)
1063	Donald H. Merson & John N. Bowers, *Absolute and Relative Cues for the Auditory Perception of Egocentric Distance*, 8 Perception 311-22 (1979)
1064	Matthew Fam Kai Liang, *The AweSOME 5: High-End Sound Cards Review* (Oct. 11, 1998), https://assets.hardwarezone.com/2009/reviews/sound/roundup/soundcards.htm
1065	Matthew Fam Kai Liang, *The AweSOME: 5(Part 2): Explore: Technologies Behind …* (Sept. 27, 1998), https://assets.hardwarezone.com/2009/reviews/sound/roundup/sound2.htm
1066	Pavel Zahorik, *Assessing Auditory Distance Perception Using Virtual Acoustics*, 111 J. Acoustical Soc'y. Am. 1832-46 (2002)
1067	Korean Patent Application Publication No. KR 10-2011-0022252, including English Translation and Certification ("Moon")

Exhibit	Description
1068	*Oculus: Complete Guide — History, Products, Founding, and More*, History-Computer.com (updated May 13, 2013), https://history-computer.com/oculus-history/
1069	Pat Lawler, *What's So Special About the Digital Signal Processor?*, Qualcomm: OnQ Blog (Dec. 5, 2013), https://www.qualcomm.com/news/onq/2013/12/whats-so-special-about-digital-signal-processor ("Qualcomm blog")
1070	John D. Sutter, *Microsoft's Talking Paper Clip is Back*, CNN.com (Apr. 29, 2011), http://www.cnn.com/2011/TECH/web/04/29/microsoft.paper.clip/index.html#:~:text=Well%2C%20like%20it%20or%20not,2%3A%20Clippy's%20Second%20Chance.%22
1071	*Super Mario 64 Characters*, Mario.fandom.com, https://mario.fandom.com/wiki/Category:Characters_in_Super_Mario_Galaxy (last visited June 5, 2023)
1072	Mona Lalwani, *Surrounded By Sound: How 3D Audio Hacks Your Brain*, Theverge.com (Feb. 12, 2015), https://www.theverge.com/2015/2/12/8021733/3d-audio-3dio-binaural-immersive-vr-sound-times-square-new-york
1073	*Aureal Semiconductor*, Dosdays.co.uk, https://dosdays.co.uk/topics/Manufacturers/aureal.php (last visited June 5, 2013)
1074	Mike Andrawes, Audio Report – Comdex '99, Anandtech.com (Nov. 30, 1999), https://www.anandtech.com/show/417
1075	Elizabeth M. Wenzel et al., *A Virtual Display System for Conveying Three-Dimensional Acoustic Information,* 32nd Proc. of the Hum. Factors Soc'y Annual Meeting 86 (1988) ("Wenzel 1988b")
1076	Jean-Marc Jot et al., *Digital Signal Processing Issues in the Context of Binaural and Transaural Stereophony*, 98th Proc. of the Convention of the Audio Eng'g Soc'y (1995) ("Jot")
1077	Henrik Moller et al., *Head-Related Transfer Functions of Human Subjects*, 43 J. Audio Eng'g Soc'y 300 (1995) ("Moller")

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1078	David A. Burgess, *Techniques for Low Cost Spatial Audio*, ACM Symp. on User Interface Software and Tech. 53 (1992) ("Burgess")
1079	Navarun Gupta et al., *HRTF database at FIU DSP Lab*, IEEE Int'l Conf on Acoustics, Speech, and Signal Processing (2010) ("Gupta")
1080	John C. Middlebrooks, *Individual Differences in External-Ear Transfer Functions Reduced by Scaling in Frequency*, 106 J. Acoustical Soc'y Am. 1480 (1999) ("Middlebrooks")
1081	Elizabeth M. Wenzel, *Localization in Virtual Acoustic Displays*, 1 Presence Teleoperators & Virtual Env'ts 80 (1992) ("Wenzel 1992")
1082	U.S. Patent No. 9,037,468 ("Osman")
1083	Durant R. Begault et al., *Design and Verification of HeadZap, A Semi-Automated HRIR Measurement System*, 120th Proc. of the Audio Eng'g Soc'y Convention (2006) ("HeadZap")
1084	Bill Gardner & Keith Martin, *HRTF Measurements of a KEMAR Dummy-Head Microphone*, MIT Media Lab Perceptual Computing – Tech. Rep. 280 (1994)
1085	David M. Howard & Jamie A.S. Angus, *Acoustics and Psychoacoustics* (3d ed. 2006)
1086-1140	RESERVED
1141	Defendants' Stipulation Regarding Invalidity Challenges, *Eight kHz, LLC v. Meta Platforms, Inc*., No. 6:22-cv-00575 (W.D. Tex. Oct. 17, 2023), ECF No. 149
1142	Order Resetting Markman Hearing Via Zoom, *Eight kHz, LLC v. Meta Platforms, Inc*., No. 6:22-cv-00575 (W.D. Tex. Sept. 11, 2023), ECF No. 142
1143	Order Granting Joint Motion to Amend Scheduling Order, *Eight kHz, LLC v. Meta Platforms, Inc*., No. 6:22-cv-00575 (W.D. Tex. Aug. 30, 2023), ECF No. 140

Exhibit	Description
1144	Email from Board to Counsel Authorizing Petitioners' Request to Reply to Patent Owner's Preliminary Response in IPR2023-01019, -01020, and -01024 (Oct. 12, 2023)
1145	Declaration of Razi Safi In Response to Patent Owner's Objections to Petitioners' Exhibits [*served, not filed*]
1146	Confidential Settlement Agreement [*Parties and Board Only*]

Respectfully submitted,

Dated: April 12, 2024

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CERTIFICATE OF SERVICE

Pursuant to 37 C.F.R. § 42.6(e), I certify that on this 12th day of April, 2024, a true and correct copy of the foregoing **Petitioners' Updated Exhibit List and Exhibit 1146** were served by electronic mail on Patent Owner's lead and backup counsel at the following email addresses:

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