

Exhibit A-17: Invalidity Based on the Oculus DK1 System

U.S. Patent No. 9,282,196

Claims 1, 4, 15, and 19 (the “Asserted Claims”) of the ’196 Patent are anticipated under 35 U.S.C. § 102 and/or obvious under 35 U.S.C. § 103 in view of the Oculus Rift DK1 system¹ (“Oculus DK1 System”), as embodied in the Oculus DK1 products themselves and other prior art references that describe them. To the extent Plaintiff argues that the Oculus DK1 System does not disclose any limitation, either expressly, implicitly, and/or by inherency, a person of ordinary skill in the art would have determined that the limitation would have been obvious in light of the Oculus DK1 System alone or in combination with applicant admitted prior art, the knowledge of one of ordinary skill in the art, or any one or more of the references identified in Defendants’ invalidity contentions for at least the reasons stated in the cover pleading for Defendants’ invalidity contentions and/or in the accompanying claim charts.

The contentions provided below address the Asserted Claims that Plaintiff identified in its infringement contentions. Defendants reserve the right to supplement or modify these contentions in accordance with and to address orders of the Court (e.g., any claim construction order(s)), Local Rules, other applicable rules, and/or in response to any supplementation, amendment, or modification of Plaintiff’s infringement contentions.

The following disclosures are for prior art purposes only. The following chart may include positions in the alternative and does not constitute any concession by Defendants for purposes of infringement. Defendants’ contentions herein are not, and should in no way be seen as, admissions or adoptions regarding any particular claim scope or construction or alleged infringement, either literally or under

¹ The Oculus DK1 System referred to herein includes, but is not limited to, the various physical prototypes, commercial products, and systems created and publicly presented by Oculus prior to any date to which the ’196 Patent can claim priority. The Oculus Rift DK1 System (also referred to as “Oculus Rift Development Kit” or “Oculus Rift Developer Kit” in press releases) was announced in August 2012 through a Kickstarter campaign, and began shipping to developers as of March 2013. See Oculus Rift Kickstarts Campaign to Make Virtual Reality a Reality (August 1, 2012), <https://www.nbcnews.com/tech/tech-news/oculus-rift-kickstarts-campaign-make-virtual-reality-reality-flna918527>; Oculus Rift: Step into the Game (October 6, 2012), <https://www.youtube.com/watch?v=DhcOMOWRMnA>; Update of Developer Kit Technology, Shipping Details (November 28, 2012), https://www.meta.com/blog/quest/update-on-developer-kit-technology-shipping-details/?utm_source=www.google.com&utm_medium=oculusredirect; Oculus Rift Development Kit Unboxing (March 21, 2013), <https://www.youtube.com/watch?v=xxlI6xDNdKg>; Development Kits are Shipping! (March 29, 2013), <https://www.kickstarter.com/projects/1523379957/oculus-rift-step-into-the-game/posts/440293>.

the doctrine of equivalents. Defendants do not agree with Plaintiff's application of the claims, or that the claims satisfy other statutory requirements, e.g., under 35 U.S.C. § 112. Furthermore, to the extent any Asserted Claim is subject to 35 U.S.C. § 112(6), Defendants' invalidity contentions are in no way an admission that the '196 Patent specification sufficiently discloses or describes corresponding structure for performing the claimed function. Defendants' contentions also are based, at least in part, on Plaintiff's Infringement Contentions to date and Plaintiff's overly broad interpretation and application of the Asserted Claims.

The citations to portions of any reference in this chart are exemplary only and are not exhaustive of the disclosures of the limitations in the art. Furthermore, citations to any figure, table, chart, component, or embodiment are meant to encompass the language describing the respective figure, table, chart, component, or embodiment and vice versa. Defendants will rely on the entirety of the references cited in this chart to show that the Asserted Claims are invalid, as will Defendants' experts. Defendants also reserve the right to rely on additional citations or sources of evidence that may be or may become applicable during discovery as this case progresses, e.g., through third-party discovery.

Claim	Oculus DK1 System's Exemplary Disclosures
CLAIM 1	
1[pre]. A method executed by one or more electronic devices in an electronic system that move a sound localization point (SLP) of a voice of a computer program during a voice exchange between the computer program and a user, the method comprising:	To the extent the preamble is limiting, the Oculus DK1 System discloses and/or renders obvious, alone or in combination with other prior art, “[a] method executed by one or more electronic devices in an electronic system that move a sound localization point (SLP) of a voice of a computer program during a voice exchange between the computer program and a user, the method comprising” as embodied in the product itself and as reflected in other prior art references that describe it. For example: The Oculus DK1 System discloses and/or renders obvious, alone or in combination with other prior art, “one or more electronic devices in an electronic system”:

Claim	Oculus DK1 System's Exemplary Disclosures
	The Oculus DK1 System includes a computer ² (indicated with a (1) in the image below), along with electronic devices including an Oculus Rift DK1 headset (indicated with a (2)), earphones ³

² For example, a computer can be an exemplary Dell Inspiron 7720. *See* META-8KHZ_00047873. A computer can also be an exemplary HP ENVY DV4-5213cl Notebook computer. *See* META-8KHZ_00047987. An HP ENVY DV4-5213cl Notebook computer works in the same way as a Dell Inspiron 7720 computer, as described herein.

³ Earphones may be wireless and can connect to, for example, a computer via, for example, Bluetooth. *See, e.g.*, LG Tone+ HBS-730: Where Have You Been All My Life (February 18, 2013), <https://www.wired.com/2013/02/lg-tone-plus-hbs-730/> (describing wireless LG Tone+ HBS-730 earphones with Bluetooth); BackBeat GO 2 Earbuds Tutorial (November 5, 2013), <https://www.youtube.com/watch?v=EOwxkSW1UbM> (describing wireless BackBeat GO 2 Earbuds with Bluetooth); Denon AH-W150 Exercise Freak Review: Wireless Headphones for Workouts (April 19, 2013), <https://www.cnet.com/reviews/denon-exercise-freak-ah-w150-headphone-review/> (“The []Denon AH-W150 Exercise Freak[] in-ear Bluetooth headphones support wireless audio from Bluetooth-enabled devices.”); *see also, e.g.*, META-8KHZ_00046189; META-8KHZ_00047873 at 31, 33 (supports “Bluetooth combo card”); META-8KHZ_00047806; META-8KHZ_00047987 at 9, 15.

Claim	Oculus DK1 System's Exemplary Disclosures
	(like the earphones shown in (3) below), controller ⁴ and/or mouse ⁵ and/or keyboard ⁶ (like the controller shown in (4) below), and a microphone(s) ⁷ (like the microphone shown in (5) below that is embedded into the display of the Dell Inspiron 7720 computer):

⁴ A controller may be wireless and can connect to a computer. *See, e.g.*, How To: Use Your Xbox 360 or PS3 Controller on a PC (April 11, 2013), https://www.youtube.com/watch?v=7nLnrtleR_c (explaining how to use Xbox 360 and/or PS3 controllers wirelessly with computer); Classic Game Room – XBOX 360 CONTROLLER for WINDOWS Review (January 21, 2013), <https://www.youtube.com/watch?v=-GEZIp66Po> at 1:03 (showing wireless Xbox 360 controller connected to computer using a wireless adapter); META-8KHZ_00047859; *see also, e.g.*, META-8KHZ_00046189; META-8KHZ_00047873 at 31, 33 (supports “Bluetooth combo card”); META-8KHZ_00047806; META-8KHZ_00047987 at 9, 15.

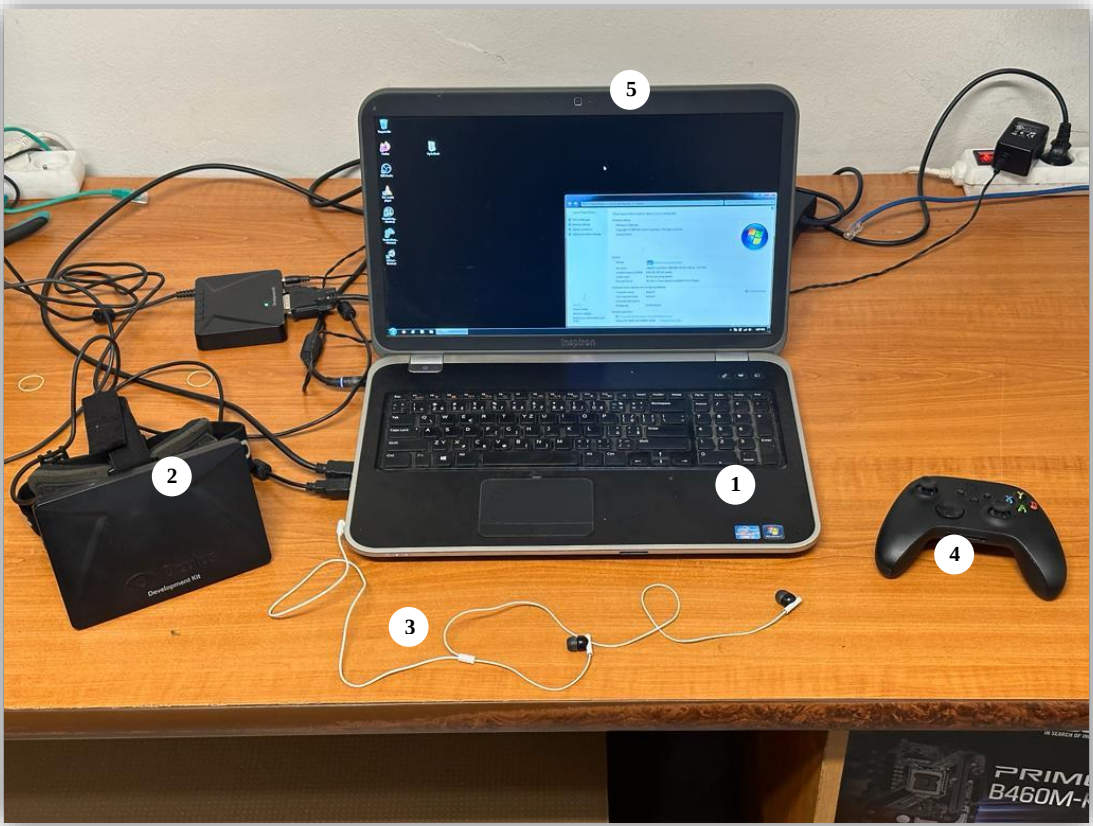
⁵ A mouse may be wireless and can connect to a computer. *See, e.g.*, SteelSeries Sensei Wireless Gaming Mouse Review (May 1, 2014), <https://www.anandtech.com/show/7971/steelseries-sensei-wireless-gaming-mouse-review/2> (describing SteelSeries Sensei Wireless mouse that can be used with a computer); SteelSeries Sensei Wireless Laser Mouse Review (May 19, 2014), <https://www.youtube.com/watch?v=MCVBi5Lub04> (showing SteelSeries Wireless mouse in use with computer that connects to computer via base station); Logitech M325 Wireless Mouse – Review (January 22, 2014), <https://cafelilium.wordpress.com/2014/01/22/logitech-m325-wireless-mouse-review/> (describing Logitech M325 Wireless Mouse that connects to computer USB adapter plugged into computer); META-8KHZ_00047798; META-8KHZ_00047844; <https://blog.logitech.com/2010/06/07/new-logitech-wireless-mouse-m510-delivers-all-day-comfort-and-advanced-control/> (describing M510 mouse); *see also, e.g.*, META-8KHZ_00046189; META-8KHZ_00047873 at 31, 33 (supports “Bluetooth combo card”); META-8KHZ_00047806; META-8KHZ_00047987 at 9, 15.

⁶ A keyboard may be wireless and can connect to a computer. *See, e.g.*, Review: Logitech K830 Wireless HTPC Keyboard with TouchPad (May 15, 2014), <https://www.smarthomebeginner.com/logitech-k830-wireless-backlit-htpc-keyboard/> (describing wireless keyboard that was tested on “Windows PC”); Apple Wireless Keyboard 2 Battery Version (August 7, 2011), <https://www.youtube.com/watch?v=Zd44VTeggPI> (showing wireless Apple keyboard); META-8KHZ_00047843; <https://blog.logitech.com/2010/08/12/new-logitech-wireless-combo-mk520-puts-convenience-and-control-at-your-fingertips/> (describing K520 keyboard); *see also, e.g.*, META-8KHZ_00046189; META-8KHZ_00047873 at 31, 33 (supports “Bluetooth combo card”); META-8KHZ_00047806; META-8KHZ_00047987 at 9, 15.

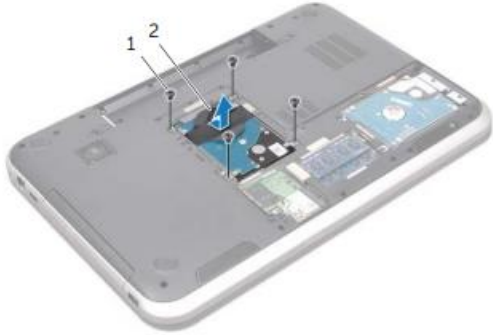
⁷ Microphone may be included in a computer. *See, e.g.*, META-8KHZ_00045115 at 3 (“Internal microphone support”); META-8KHZ_00047987 at 7 (“Internal microphones (2)). Microphone may also connect to, for example, a computer and may be wired or wireless. Wired microphone can connect to a computer via, for example, an auxiliary port or USB port. *See, e.g.*, META-

Claim	Oculus DK1 System's Exemplary Disclosures

8KHZ_00045115 at 3 (“one microphone-in port”); META-8KHZ_00047987 at 22 (“[C]onnect a microphone to the microphone jack on the computer.”); Blue Yeti on PS3 (June 1, 2011), <https://www.youtube.com/watch?v=oulJ4eJODUs>. Wireless microphone can connect to a computer via, for example, Bluetooth. *See, e.g.*, Denon AH-W150 Exercise Freak Review: Wireless Headphones for Workouts (April 19, 2013), <https://www.cnet.com/reviews/denon-exercise-freak-ah-w150-headphone-review/> (“The []Denon AH-W150 Exercise Freak[] in-ear Bluetooth headphones support wireless audio from Bluetooth-enabled devices . . . They have a built-in microphone.”); *see also, e.g.*, META-8KHZ_00046189; META-8KHZ_00047873 at 31, 33 (supports “Bluetooth combo card”); META-8KHZ_00047806; META-8KHZ_00047987 at 9, 15.

Claim	Oculus DK1 System's Exemplary Disclosures
	 See photograph of an exemplary Oculus DK1 System.⁸ Computer (1), in this example, is a Dell Inspiron 7720. The Dell Inspiron 7720 (1) comprises parts that make up traditional PCs, such as processor (CPU) and graphics card (GPU), and memory

⁸ META-8KHZ_00047800; *see also* META-8KHZ_00047801; META-8KHZ_00047802; META-8KHZ_00047799; META-8KHZ_00047805; META-8KHZ_00047804; META-8KHZ_00047803.

Claim	Oculus DK1 System's Exemplary Disclosures
	(RAM). The Dell Inspiron 7720 also includes a hard drive. The exemplary Dell Inspiron 7720 also includes memory (RAM) and includes a hard drive: Inspiron 17R-7720  1 screws (4) 2 hard-drive assembly Inspiron 17R-5720/Inspiron 17R-7720  1 screws (4) 2 hard-drive assembly

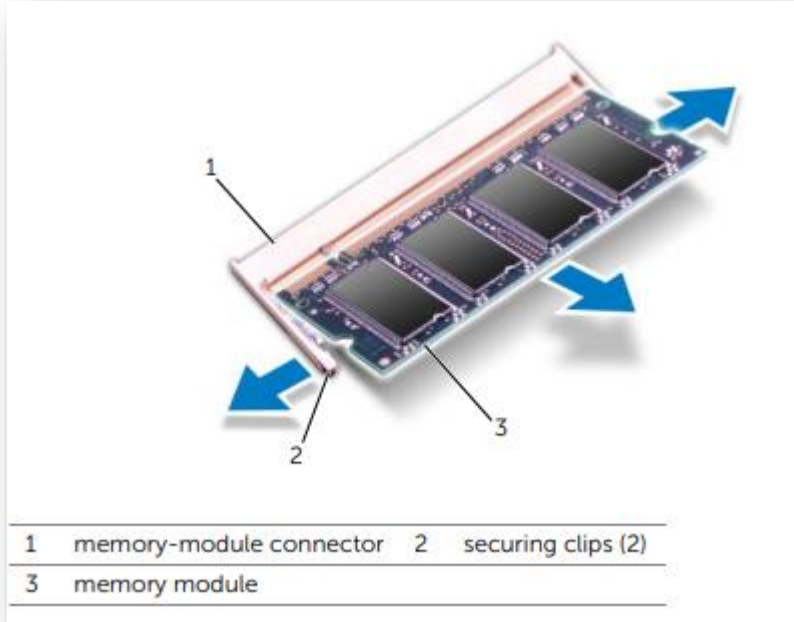
Claim	Oculus DK1 System's Exemplary Disclosures
	See Owner's Manual for Dell Inspiron 7720 (2012).⁹  See photograph of an exemplary Oculus DK1 System.¹⁰

⁹ META-8KHZ_00047873

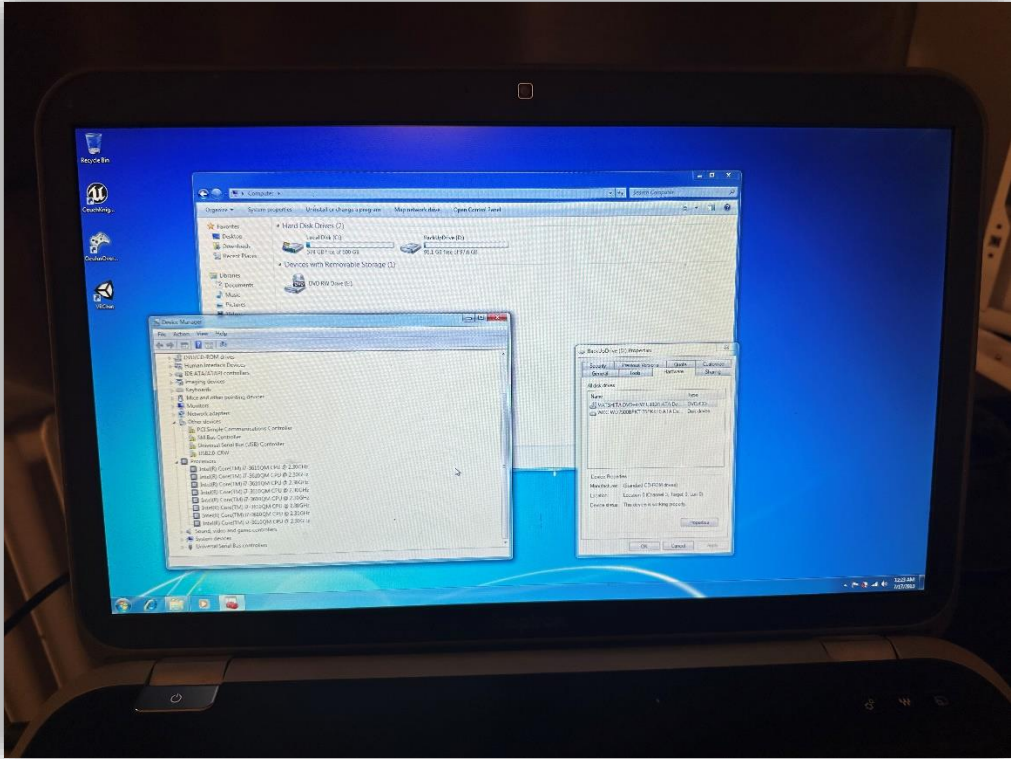
¹⁰ META-8KHZ_00047842

Claim	Oculus DK1 System's Exemplary Disclosures												
	Memory <table> <tr> <td>Connectors</td><td>two internally-accessible DDR3 SODIMM sockets</td></tr> <tr> <td>Capacities</td><td>2 GB and 4 GB</td></tr> <tr> <td>Minimum memory</td><td>2 GB</td></tr> <tr> <td>Maximum memory</td><td>4 GB</td></tr> <tr> <td>Memory type</td><td>1333/1600 MHz DDR3 SODIMM</td></tr> <tr> <td>Memory configurations supported</td><td>2 GB, 4 GB, 6 GB, and 8 GB</td></tr> </table> See Specification Sheet for Dell Inspiron 7720 (2013) (showing 1333/1600 MHz DDR3 SODIMM RAM memory).¹¹	Connectors	two internally-accessible DDR3 SODIMM sockets	Capacities	2 GB and 4 GB	Minimum memory	2 GB	Maximum memory	4 GB	Memory type	1333/1600 MHz DDR3 SODIMM	Memory configurations supported	2 GB, 4 GB, 6 GB, and 8 GB
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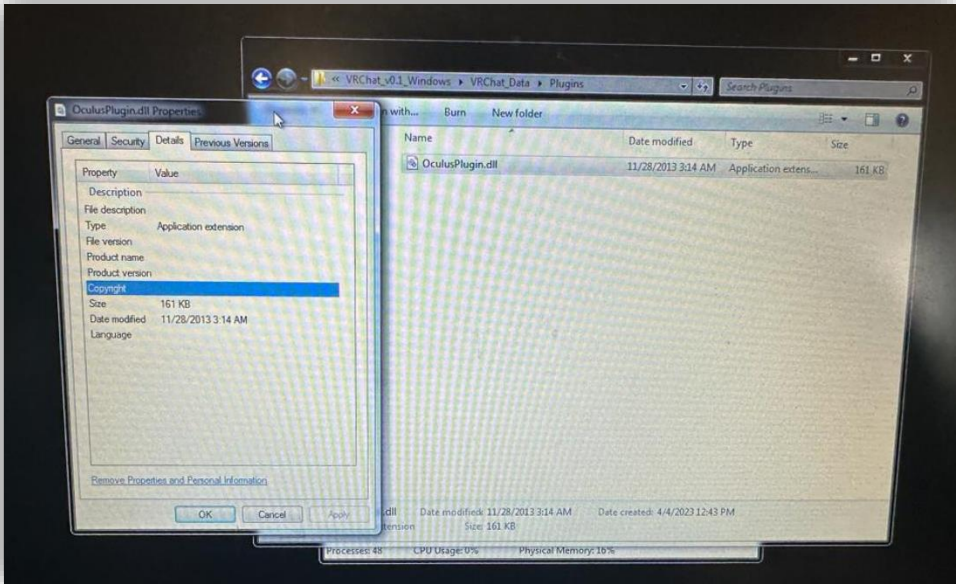
¹¹ META-8KHZ_00045115

Claim	Oculus DK1 System's Exemplary Disclosures
	 1 memory-module connector 2 securing clips (2) 3 memory module See Owner's Manual for Dell Inspiron 7720 (2012).¹² The Oculus DK1 System discloses and/or renders obvious, alone or in combination with other prior art, "one or more devices in an electronic system" that "execute[]" "[a] method" that "move[s] a sound localization point (SLP) of a voice of a computer program during a voice exchange between the computer program and a user": The hard drive on the Dell Inspiron 7720 includes instructions that allows the computer to operate, for example, the Windows 7 operating system.

¹² META-8KHZ_00047873

Claim	Oculus DK1 System's Exemplary Disclosures
	 See photograph of an exemplary Oculus DK1 System.¹³

¹³ META-8KHZ_00047841

Claim	Oculus DK1 System's Exemplary Disclosures
	 See photograph of an exemplary Oculus DK1 System (storing VRChat application).¹⁴

¹⁴ META-8KHZ_00046193

Claim	Oculus DK1 System's Exemplary Disclosures
	The Windows 7 Operating System can execute applications, such as Couch Knights, ¹⁵ Oculus Overlay, ¹⁶ SecondLife, ¹⁷ VRChat, ¹⁸ and others, that are compatible with the operating system. ¹⁹ A POSA would understand that any application which is capable of operating with the Windows operating system is capable of being displayed on the Oculus DK1 headset (2), which is connected to the same computer on which Windows operates, using either Oculus libraries or other software

¹⁵ Couch Knights was publicly demonstrated at the Games Developer Conference in March 2014. *See, e.g.*, GDC 2014: Oculus Rift DK2 'Couch Knights' Gameplay, <https://www.youtube.com/watch?v=CoyjO-etC30>; *see also* Oculus Rift DK2 Hands-On Impressions! Couch Knights, Valkyrie, and How It Compares to the DK1, https://www.youtube.com/watch?v=d_9nSA7thEc; Couch Knights at Oculus Rift DK2 @ GDC 2014, https://www.youtube.com/watch?v=J3Y_Qe1-Qvk. Couch Knights was also publicly demonstrated at PAX East 2014 in April 2014. *See, e.g.*, Pax East 2014 Oculus Rift HD Couch Knights Impressions, <https://www.youtube.com/watch?v=Up56qLOGIqY>; <https://blog.hansoninc.com/en-guarde-couch-knights-oculus-rift-pax-east/>.

¹⁶ Oculus Overlay was available prior to any date to which the '196 Patent can claim priority. *See, e.g.*, <https://web.archive.org/web/20131226064044/http://holophone3d.com/oculus/> (December 26, 2013); DayZ (Arma 2) Oculus Rift DK1 (June 1, 2013), <https://www.youtube.com/watch?v=5HBMHGymfbo> (showing DayZ application using "Oculus Overlay"); Prepar3D / Oculus Rift Using Oculus Overlay (January 13, 2014), <https://www.youtube.com/watch?v=x1pkG4zTlhQ> (showing Prepar3D application displayed with Oculus Overlay).

¹⁷ SecondLife (through the SecondLife Oculus Rift Beta) for the Oculus DK1 was available at least as early as March 2014. *See, e.g.*, SLOculusRiftBeta (March 26, 2014), <https://www.youtube.com/watch?v=YaROmSCpa2o>; *see also, e.g.*, Second Life on a Oculus Rift (January 21, 2014), <https://www.youtube.com/watch?v=MFh3buY8KFA>; How to Use Oculus Rift with Second Life (May 22, 2014), <https://www.youtube.com/watch?v=TLL5JVwG118>; Release Notes/Second Life Project OculusRift (May 21, 2014), https://wiki.secondlife.com/wiki/Release_Notes/Second_Life_Project_OculusRift/3.7.8.289834.

¹⁸ VRChat v0.1, for example, was released on January 16, 2014. *See* https://www.reddit.com/r/oculus/comments/1vcbwk/vrchat_v01_released/; <https://en.wikipedia.org/wiki/VRChat>.

¹⁹ *See, e.g.*, VRChat v0.1 Released, https://www.reddit.com/r/oculus/comments/1vcbwk/vrchat_v01_released/ (showing Windows download for VRChat v0.1); <https://www.unrealengine.com/marketplace/en-US/product/couch-knights> (showing Windows as a supported platform); https://wiki.secondlife.com/wiki/Release_Notes/Second_Life_Project_OculusRift/3.7.8.289834 ("Oculus Rift is supported in Windows Vista (or newer)"); *see also* https://en.wikipedia.org/wiki/List_of_Microsoft_Windows_versions (showing that Windows Vista was released prior to Windows 7).

Claim	Oculus DK1 System's Exemplary Disclosures
	such as Oculus Overlay.²⁰ In the below example, a web browser (Firefox) is rendering on the Oculus Rift DK1 headset (the lenses were removed to capture the photo) using the Oculus Overlay software:  See photograph of an exemplary Oculus DK1 System.²¹

²⁰ See <https://web.archive.org/web/20131226064044/http://holophone3d.com/oculus/> (“‘OculusOverlay’ provides is a high performance way to pipe any content from your desktop into your Oculus Rift. It works for any 3D and 2D content and now has tons of great features.”).

²¹ META-8KHZ_00046194; *see also* META-8KHZ_00046203

Claim	Oculus DK1 System's Exemplary Disclosures
	Other software, such as Couch Knights, SecondLife, and VRChat, can also be displayed on the Oculus Rift DK1 headset: ²²

²² Other compatible applications include Minecraft and Half-Life 2. *See, e.g.*, Oculus Rift DK1 + Razer Hydra – Riftmax Theater, Minecraft, Sixense Tuscany (1080p) (February 2, 2014) at 17:48, <https://www.youtube.com/watch?v=pKnZMdRbHKk&t=1097s>; Oculus Rift DK1 + Razer Hydra - Half-Life 2 - Part 10 (1080p), <https://www.youtube.com/watch?v=hloKHP1SLKE> (same); Minecraft | VIRTUAL REALITY MOD! (Razer Hydra & Oculus Rift!) | Mod Showcase (March 13, 2014), <https://www.youtube.com/watch?v=4GRL0M4MKww>.

Claim	Oculus DK1 System's Exemplary Disclosures
	 See photograph of an exemplary Oculus DK1 System (showing Couch Knights).²³

²³ META-8KHZ_00047801; *see also* META-8KHZ_00047804

Claim	Oculus DK1 System's Exemplary Disclosures
	 See photograph of an exemplary Oculus DK1 System (showing a knight character displayed on headset).²⁴

²⁴ META-8KHZ_00046201; *see also* META-8KHZ_00046190

Claim	Oculus DK1 System's Exemplary Disclosures
	See SLOculusRiftBeta Video (March 26, 2014) (showing SecondLife Oculus Rift Beta on the Oculus Rift DK1 headset).

Claim	Oculus DK1 System's Exemplary Disclosures
	 See How to Use Oculus Rift with Second Life (May 22, 2014).²⁵

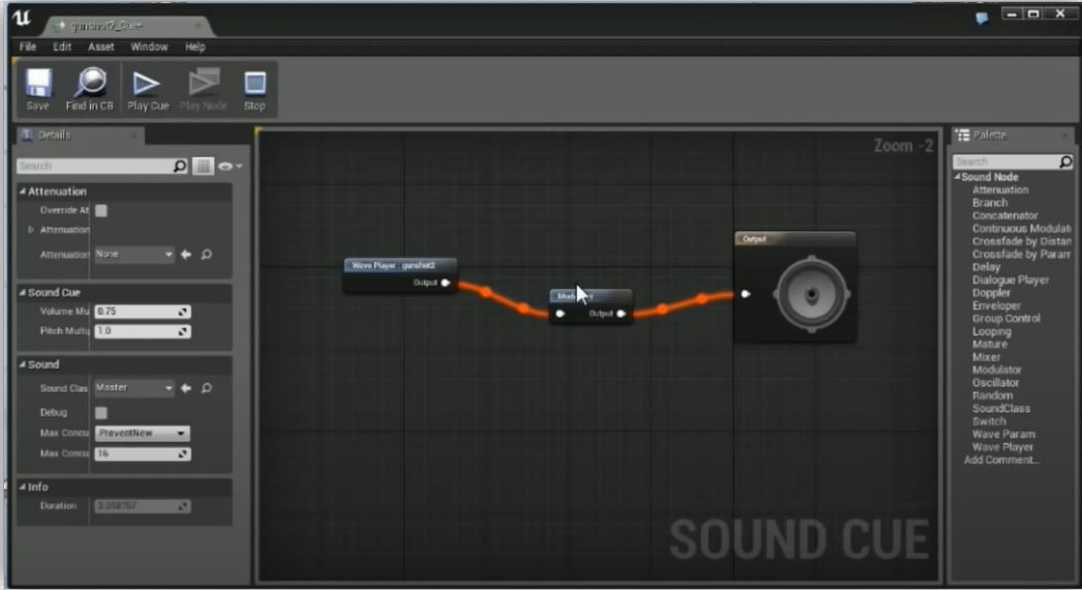
²⁵ <https://www.youtube.com/watch?v=TLL5JVwG118>; see also <https://community.secondlife.com/blogs/entry/1199-second-life%E2%80%99s-oculus-rift-integration-is-ready-for-beta-testers/>; <https://community.secondlife.com/blogs/entry/1275-using-the-oculus-rift-with-second-life/>.

Claim	Oculus DK1 System's Exemplary Disclosures
	 See photograph of an exemplary Oculus DK1 System (showing VRChat).²⁶

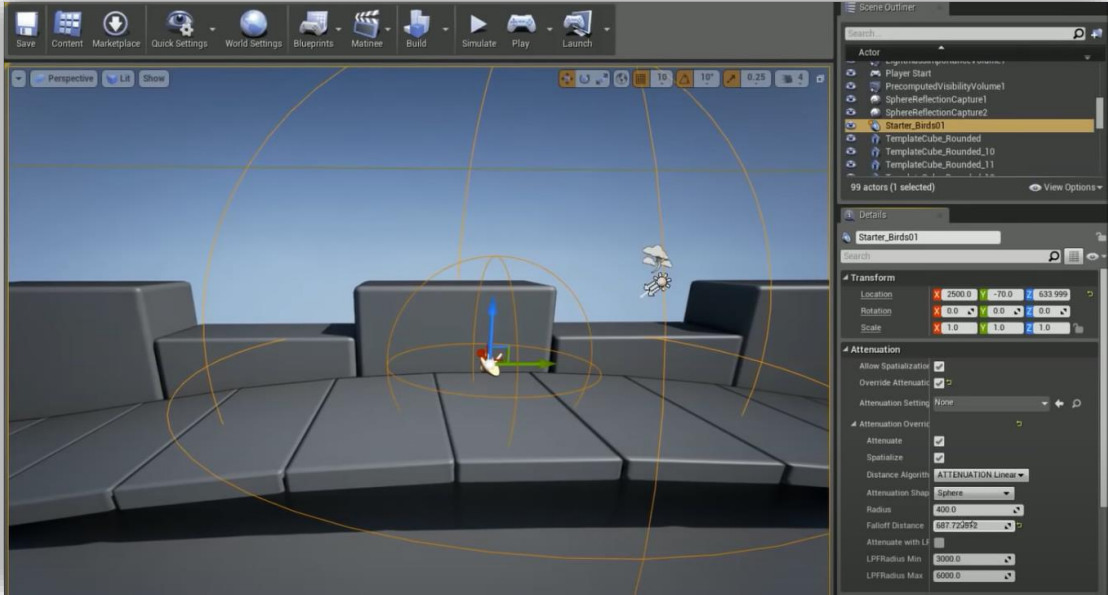
²⁶ META-8KHZ_00047802; *see also* META-8KHZ_00047805

Claim	Oculus DK1 System's Exemplary Disclosures
	 See photograph of an exemplary DK1 System (showing VRChat displayed on the headset).²⁷ The Oculus DK1 System discloses and/or renders obvious, alone or in combination with other prior art, “mov[ing] a sound localization point (SLP) of a voice of a computer program during a voice exchange between the computer program and a user.” For example, under at least Plaintiff’s theory of infringement, the Oculus DK1 System using applications like Couch Knights includes “a voice exchange between the computer program and a user.” In applications like Couch Knights, the user

²⁷ META-8KHZ_00046202; *see also* META-8KHZ_00046235

Claim	Oculus DK1 System's Exemplary Disclosures
	controls a knight character that produces sound, including footsteps, sword swings, and other sounds (i.e., a “voice” of the computer program). The knight character’s “voice” (for example, footsteps or sword swings) is produced in response to the user’s commands that the user inputs via, for example, a controller (such as an Xbox controller) and/or keyboard. Thus, under at least Plaintiff’s theory of infringement, there is a “voice exchange between the computer program and a user.” The knight character’s sounds originate to the user from an SLP located at the knight character itself. For example, Couch Knights was created using the Unreal Engine 4 game engine.²⁸ Unreal Engine includes “Sound Node[s]” for game objects that allowed for spatialization of the object’s audio. 

²⁸ <https://www.unrealengine.com/marketplace/en-US/product/couch-knights>.

Claim	Oculus DK1 System's Exemplary Disclosures
	See, e.g., Unreal Engine 4 Tutorial - Sound Cues at 1:39.²⁹  The screenshot shows the Unreal Engine 4 editor interface. The main viewport displays a 3D scene with a knight character on a stone platform. The character is surrounded by a yellow sphere representing its sound localization point (SLP). The right-hand side of the interface shows the 'Details' panel for the 'Starter_Birds01' actor. The 'Attenuation' section is expanded, showing various settings including 'Allow Spatialization' (checked), 'Override Attenuation' (checked), 'Attenuation Setting' (None), 'Attenuation Overrid' (unchecked), 'Attenuate' (checked), 'Spatialize' (checked), 'Distance Algorithm' (ATTENUATION_LINEAR), 'Attenuation Shape' (Sphere), 'Radius' (400.0), 'Falloff Distance' (987.722652), 'Attenuate with LI' (unchecked), 'LPI Radius Min' (9000.0), and 'LPI Radius Max' (9000.0). See also, e.g., Unreal Engine 4 Tutorial - Ambient Audio (Basic!) at 1:06.³⁰ When the user inputs commands via controller and/or keyboard, for example, the knight character and its SLP moves.³¹ Thus, in applications like Couch Knights, the “sound localization point (SLP) of a voice of a computer program” moves. When the knight character moves, sound (e.g., footsteps) is produced such that the knight character moves “during a voice exchange between the

²⁹ https://www.youtube.com/watch?v=rZhrjHSN_II (showing attenuation option for “Sound Node” in Unreal Engine 4).

³⁰ <https://www.youtube.com/watch?v=qtgY7esjB6I> (showing attenuation and "Allow Spatialization" options).

³¹ See GDC 2014: Oculus Rift DK2 ‘Couch Knights’ Gameplay (March 21, 2014), <https://www.youtube.com/watch?v=CoyjO-etC30> (showing a user moving a knight character via a handheld controller).

Claim	Oculus DK1 System's Exemplary Disclosures
	computer program and a user.”³² The user is able to localize the knight character's sounds to the knight character itself (or SLP located at the knight character).  See picture of an exemplary Couch Knights application (showing knight character that produces sound, such as footsteps and sword swings).³³

³² See Couch Knights on Oculus Rift DK1 (July 17, 2014), <https://www.youtube.com/watch?v=HcreLAfiqUs> (showing knight character making sounds, including footsteps, sword swings, and fireball noises, in response to user input); see also Couch Knights | Oculus Rift DK2 (August 24, 2014), <https://www.youtube.com/watch?v=bMQwLGRXyE8> (same).

³³ <https://www.unrealengine.com/marketplace/en-US/product/couch-knights>

Claim	Oculus DK1 System's Exemplary Disclosures
	As another example, applications like SecondLife designate a sound localization point at virtual objects and/or other users' virtual avatars.³⁴ For example, the documentation for the SecondLife application explains that “sound clips” can be “attached” to virtual objects. As shown below, under at least Plaintiff's theory of infringement, virtual objects in applications like SecondLife “move[,]” and sounds (i.e., “a voice of the computer program”) “follow the object they are in if it moves.” Scripting comments Sound clips • llTriggerSound() • Unattached - sounds occur where they're triggered. • Cannot be stopped with llStopSound(). • llPlaySound() • Attached - sounds follow the object they are in if it moves. • Only one at a time per prim. Playing another will stop the current sound. • llLoopSound() • Attached - sounds follow the object they are in if it moves. • This continuously loops the sound. • Only one at a time per prim. Playing another will stop the current sound. See SecondLife Wiki – Environment Sounds (Revision as of 20:11, July 15, 2012).³⁵

³⁴ SecondLife uses “fmod” as an “[a]udio engine.” See https://web.archive.org/web/20131231020628/https://wiki.secondlife.com/wiki/Third_Party_Libraries. SecondLife also uses “openal.” See *id.* “OpenAL is a cross-platform 3D audio API appropriate for use with gaming applications and many other types of applications.” See <https://web.archive.org/web/20130729040534/http://connect.creativelabs.com/openal/default.aspx>.
³⁵ https://wiki.secondlife.com/w/index.php?title=Environment_Sounds&direction=prev&oldid=1195319.

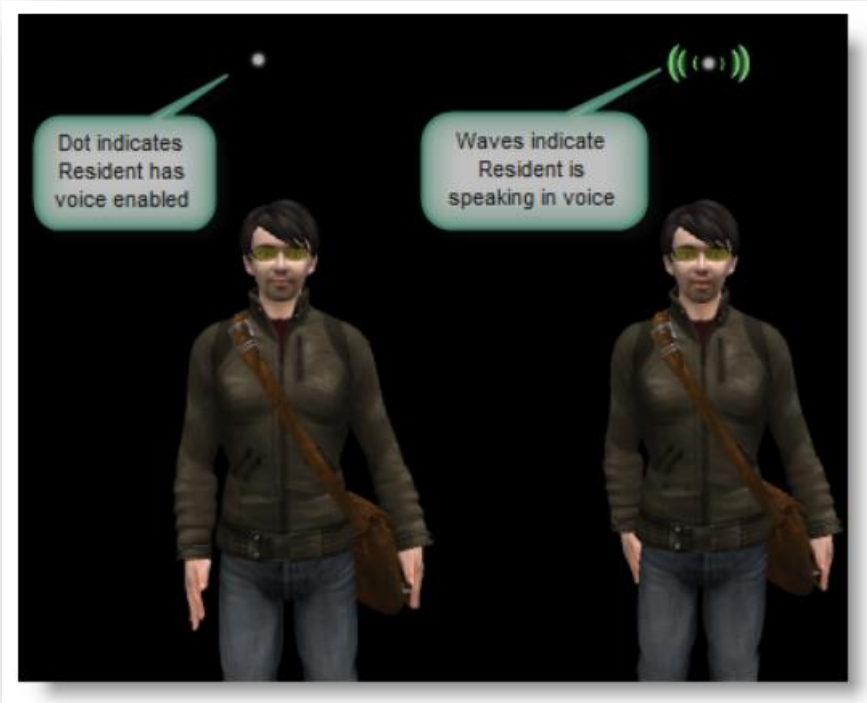
Claim	Oculus DK1 System's Exemplary Disclosures
	In addition, a user can move a virtual object's SLP in applications like SecondLife. For example, the user can move a virtual object "when [the] user clicks and holds the mouse button down on an object, then drags the mouse."³⁶ Thus, SLPs are located at virtual objects in applications like SecondLife. Sound clips originate from the SLPs at virtual objects, and the SLP moves "during a voice exchange between the computer program and a user." Furthermore, as explained above, applications like SecondLife includes other users, and "[y]ou can talk to the people around you through text-based Local Chat. If you have a microphone, you can also speak out loud using inworld voice."³⁷ An example of another user in the form of a SecondLife "resident" is shown below. The other user's avatar has "a voice chat feature that lets avatars speak,"³⁸ i.e, a "voice" of a computer program. Users can move their respective avatars.³⁹

³⁶ https://wiki.secondlife.com/wiki/Category:LSL_Grab (lasted edited July 24, 2011).

³⁷ See Viewer 2 Quick Start Guide/Local chat and voice (February 23, 2010) at https://wiki.secondlife.com/wiki/Viewer_2_Quick_Start_Guide/Local_chat_and_voice.

³⁸ See SecondLife Wiki – Lip Sync (last edited on October 13, 2009) at https://wiki.secondlife.com/wiki/Lip_sync.

³⁹ See, e.g., <https://www.youtube.com/watch?v=YaROmSCpa2o> at 2:32.

Claim	Oculus DK1 System's Exemplary Disclosures
	 The image shows two avatars in a virtual environment. Above the left avatar is a single white dot, and a callout box points to it with the text: "Dot indicates Resident has voice enabled". Above the right avatar are three white dots with radiating lines, and a callout box points to them with the text: "Waves indicate Resident is speaking in voice". See Viewer 2 Quick Start Guide/Local chat and voice (February 23, 2010).⁴⁰

⁴⁰ https://wiki.secondlife.com/wiki/Viewer_2_Quick_Start_Guide/Local_chat_and_voice.

Claim	Oculus DK1 System's Exemplary Disclosures
	 See SecondLife Tutorial Video – Voice Chat Getting Started (November 14, 2008).⁴¹ In addition, non-player characters (or “bots” in SecondLife) “can be created in the same way as a human-controlled avatar.”⁴² A bot “is being controlled by a program” and “can be used in various ways,” including for “user interaction” and as a “[r]oleplaying NPC (non-player characters) for

⁴¹ https://wiki.secondlife.com/wiki/Video_Tutorials/More; see also <http://vidtuts.s3.amazonaws.com/VOICE-CHAT-Getting-started.mp4>.

⁴² <https://wiki.secondlife.com/wiki/Bot#:~:text=Second%20Life%20bot%20account%20can,choose%20it%20from%20available%20alternatives>

Claim	Oculus DK1 System's Exemplary Disclosures
	gaming and interactive areas.”⁴³ A bot can also “[s]erve as a secretary or support robot by using autoresponder AI or remote chat assistant or “[b]e a non-personal character (NPC) in a roleplaying game.”⁴⁴ The audio for other residents in applications like SecondLife is spatialized. For example, the SecondLife documentation describes a “Voice Test” where “5 testers” “Edit > Preferences > Voice Chat > [x] Enable voice chat, Hear voice at: Avatar position, camera direction.” Then arrange themselves so that “4 testers [are] around one tester at north, south, east and west.” This test is used to “verify [that] each tester sounds like their voice is coming from their position inworld” and that “everyone sound like they are in the right place spatially.”

⁴³

<https://wiki.secondlife.com/wiki/Bot#:~:text=Second%20Life%20bot%20account%20can,choose%20it%20from%20available%20alternatives>

⁴⁴ https://web.archive.org/web/20130723023800/https://wiki.secondlife.com/wiki/Second_Life_bot_software_comparison

Claim	Oculus DK1 System's Exemplary Disclosures
	Voice Test VERSION 0.1 LENGTH 00:00 TESTERS 5 OVERVIEW Coming SETUP Up to 5 normal users, (can be done with 2) Spatial sound testing with gathered groups • Setup: Have each of 5 testers do the following: Edit > Preferences > Voice Chat > [x] Enable voice chat, Hear voice at: Avatar position, camera direction. • Arrange 4 testers around one tester at north, south, east and west, like this: <pre><tab> . Tester N . Tester W Tester C Tester E . </tab></pre> • Tester C: Face Tester N. • Cardinal Testers: Speak one at a time starting with Tester N and going clockwise around Tester C (N followed by E followed by S followed by W). • Tester C: Without moving, verify each tester sounds like their voice is coming from their position inworld. • Tester C: Rotate your avatar to face Tester S. • Cardinal Testers, repeat the round robin above, starting with Tester S. • Tester C: Without moving, verify each tester sounds like their voice is coming from their position inworld. • Tester C: Alt-Zoom on something out of range of the testers. * ... • Group in a circle • Does everyone sound like they are in the right place spatially? • If someone moves away, do they get quieter? • Group with members behind you • Can you hear all members, including those behind you? See SecondLife Wiki – Voice Test (November 26, 2007).⁴⁵

⁴⁵ https://wiki.secondlife.com/wiki/Voice_Test.

Claim	Oculus DK1 System's Exemplary Disclosures
	The SecondLife documentation also explains that “3D position” is used by the <i>Session.Set3Dposition.1</i> method for both the “speaker and listener” and that <i>Session.Set3Dposition.1</i> “describes the speaking position and the listening position for this avatar.”

Session.Set3DPosition.1

When sending a 3D position for speaker and listener, the "listener" is either the avatar position or the camera position. That is, it describes the speaking position and the listening position for this avatar.

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      <X>261451</X>
      <Y>26.9568</Y>
      <Z>-283000</Z>
    </Position>
    <Velocity>
      <X>0</X>
      <Y>0</Y>
      <Z>0</Z>
    </Velocity>
    <AtOrientation>
      <X>0.816965</X>
      <Y>0</Y>
      <Z>-0.576688</Z>
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    <UpOrientation>
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      <Y>1</Y>
      <Z>0</Z>
    </UpOrientation>
    <LeftOrientation>
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      <Y>0</Y>
      <Z>-0.816965</Z>
    </LeftOrientation>
  </SpeakerPosition>
  <ListenerPosition>
    <Position>
      <X>261448</X>
      <Y>27.9639</Y>
      <Z>-283001</Z>
    </Position>
    <Velocity>
      <X>0</X>
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    </Velocity>
    <AtOrientation>
      <X>0.795791</X>
      <Y>0</Y>
      <Z>-0.559283</Z>
    </AtOrientation>
    <UpOrientation>
      <X>0</X>
      <Y>1</Y>
      <Z>0</Z>
    </UpOrientation>
    <LeftOrientation>
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      <Y>0</Y>
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    </LeftOrientation>
  </ListenerPosition>
</Request>
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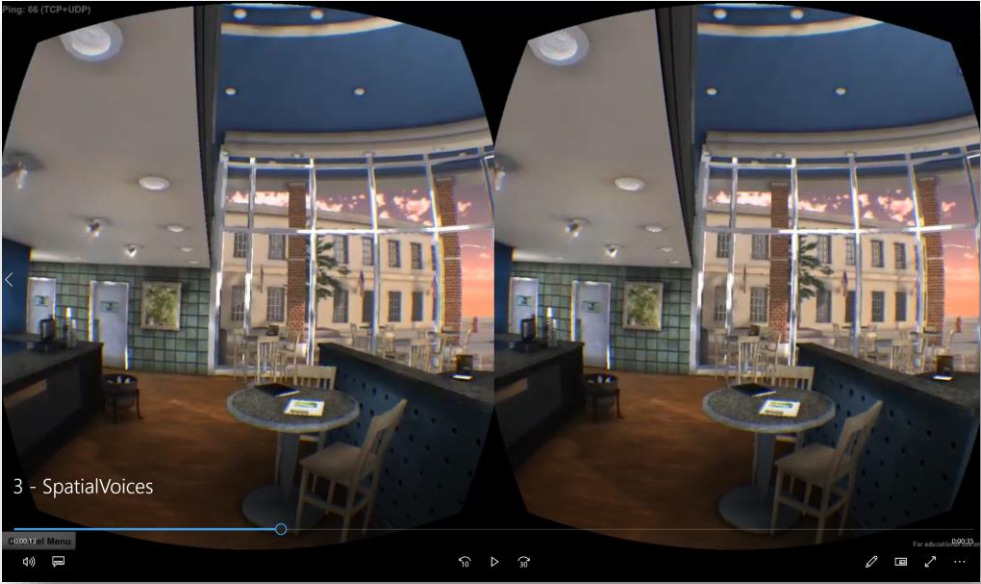
The viewer doesn't get a response

Claim	Oculus DK1 System's Exemplary Disclosures
	See SecondLife Wiki – Voice/Technical (November 18, 2009).⁴⁶ Therefore, in applications like SecondLife, under at least Plaintiff's theory of infringement, an SLP "of a voice of a computer program" (another player's avatar that speaks or a bot that speaks or a virtual object that makes sounds) "move[s]" "during a voice exchange between the computer program and a user." As another example, under at least Plaintiff's theory of infringement, applications like VRChat include "a sound localization point (SLP) of a voice of a computer program." Applications like VRChat designate a location at another user's avatar as an SLP. When the other user speaks, as shown below by the user's nametag turning red, a voice emits from the other user's avatar, i.e. "a voice exchange between the computer program and a user."

⁴⁶ <https://wiki.secondlife.com/wiki/Voice/Technical#Session.Set3DPosition.1.>

Claim	Oculus DK1 System's Exemplary Disclosures
	 See photograph of an exemplary Oculus DK1 System (showing nametag in red).⁴⁷ Both users can move their own avatars and corresponding SLPs via, for example, controller and/or mouse and/or keyboard (i.e., “move a sound localization point (SLP) of a voice of a computer program”). The user is able to localize the voice to the other user’s avatar (and corresponding SLP). For example, when the user turns to the left, the sound is now originating to the right for the user, where the original unchanged location of the other user’s avatar is located and producing “a voice” of the computer program.

⁴⁷ See also Oculus Rift DK1 - VRChat 0.1 (1080p) <https://www.youtube.com/watch?v=z9PgdbYLbLU>.

Claim	Oculus DK1 System's Exemplary Disclosures
	 See photograph of an exemplary Oculus DK1 System (showing VRChat).⁴⁸ For example, the VRChat development diary from 2014 explains that the developer used “two libraries” in addition to Unity3D: “Tnet (for networking) and Uspeak (for voicechat),” which were used with “a sweet CoffeeShop environment on the Unity Asset Store.”⁴⁹ Uspeak includes

⁴⁸ META-8KHZ_00046187; *see also* META-8KHZ_00046233; META-8KHZ_00046188; Oculus Rift DK1 - VRChat 0.1 (1080p) (January 16, 2014) <https://www.youtube.com/watch?v=z9PgdbYlLU>

⁴⁹ VRChat v0.1 Development, <https://web.archive.org/web/20140121030858/http://grahamgaylor.com/2014/01/>; *see also* <https://web.archive.org/web/20140121030107/http://grahamgaylor.com/2013/06/> (“Now I’ll explain the code implementation using Unity3D using C#.”); <https://web.archive.org/web/20140121030112/http://grahamgaylor.com/2013/09/> (“I decided to go with Unity3D as my game engine for two reasons. First off, I have the most experience with Unity, I’ve played around with the UDK, but I

Claim	Oculus DK1 System's Exemplary Disclosures
	“[s]patial audio support” for voice chat that provided “directional audio for a truly immersive experience.”⁵⁰ Furthermore, the Unity Developers Manual from 2014 explains that Unity supported 3D audio. For example, audio clips from sound clip files are “played back so as to simulate its position in the game world’s 3D space” if the “audio clip is marked as a 3D Sound.”⁵¹ “3D sounds emulate the distance and location of sounds by attenuating volume and panning across speakers.”⁵²

came crawling back to Unity. My second and more important reason is that there are Unity plugins for most of the hardware I’m using.”); <https://web.archive.org/web/20140121030858/http://grahamgaylor.com/2014/01/> (“I used Unity3D for both projects, but used better networking and voice chat libraries in the second iteration.”); <https://web.archive.org/web/20140120214705/http://grahamgaylor.com/category/unity3d/>; <https://web.archive.org/web/20140121030102/http://grahamgaylor.com/2013/01/>; <https://web.archive.org/web/20140121093515/http://grahamgaylor.com/2013/04/> (“To start, the Oculus Developer Center is now open and ready for devs to download the Rift SDK. What this means is that developers will now be able to integrate the Rift into their games and/or start building games from scratch with an actual test unit to build it around. As of now (April 1), it seems the only SDK downloads are the Windows SDK and the Unity 4 Pro integration package.”); <https://web.archive.org/web/20140121030847/http://grahamgaylor.com/2013/05/>.

⁵⁰ See [RELEASED] USpeak Voice Chat – Voice Chat For All Your Multiplayer Games, <https://forum.unity.com/threads/released-uspeak-voice-chat-voice-chat-for-all-your-multiplayer-games.154609/> (last edited November 17, 2013).

⁵¹ See <https://web.archive.org/web/20140601033451/http://docs.unity3d.com/Manual/class-AudioClip.html>.

⁵² See <https://web.archive.org/web/20140601033451/http://docs.unity3d.com/Manual/class-AudioClip.html>.

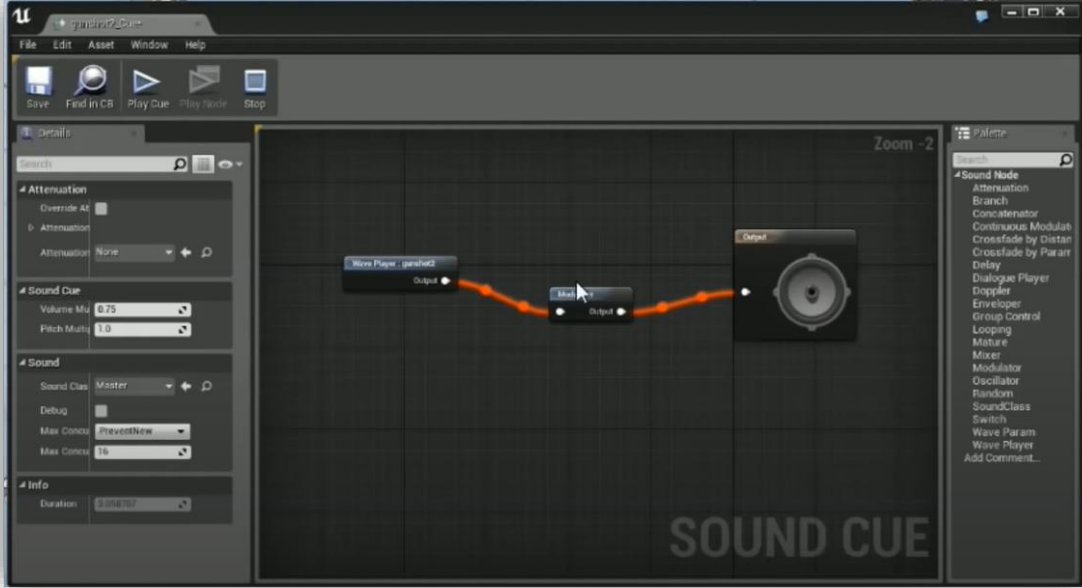
Claim	Oculus DK1 System's Exemplary Disclosures
	Basic Theory In real life, sounds are emitted by objects and heard by listeners. The way a sound is perceived depends on a number of factors. A listener can tell roughly which direction a sound is coming from and may also get some sense of its distance from its loudness and quality. A fast-moving sound source (like a falling bomb or a passing police car) will change in pitch as it moves as a result of the Doppler Effect. Also, the surroundings will affect the way sound is reflected, so a voice inside a cave will have an echo but the same voice in the open air will not.  Audio Sources and Listener Audio Overview – Unity Documentation (June 3, 2014).⁵³ To the extent Plaintiff contends that the Oculus DK1 System with applications like Couch Knights, SecondLife, and/or VRChat does not include “a voice exchange between a computer program and a user,” a person of ordinary skill in the art would have found it obvious to implement a user speaking to a computer program and a computer program speaking back based on other applications that included such functionality prior to any date to which the '196 Patent can claim priority. For example, in applications like Lifeline, a user speaks to the computer program and the computer program responds.⁵⁴

⁵³ <https://web.archive.org/web/20140603055903/http://docs.unity3d.com/Manual/AudioOverview.html>.

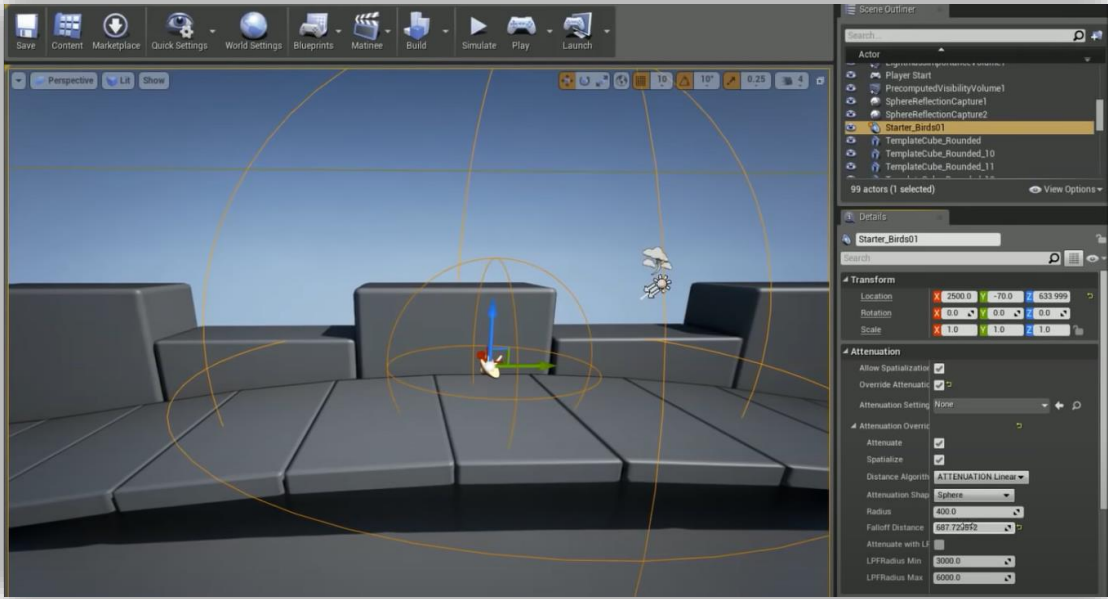
⁵⁴ See, e.g. LIFELINE: The Game Controlled ENTIRELY By Your Voice (September 11, 2018) at 2:02, <https://www.youtube.com/watch?v=XzmHrMqrKyo>; Lifeline: Voice Action Adventure [Part 2] The Room (September 10, 2013), <https://www.youtube.com/watch?v=TzXr1qD05ZM>; <https://www.ign.com/articles/2004/03/03/lifeline> (Lifeline review posted March 3, 2004); [https://en.wikipedia.org/wiki/Lifeline_\(video_game\)](https://en.wikipedia.org/wiki/Lifeline_(video_game)) (Lifeline released in 2003); see also, e.g., Kinectimals – XBOX360 with KINECT Part 1 TRUE HD – QUALITY 1080 (September 5, 2013) at 8:47, https://www.youtube.com/watch?v=BrCXV9_cQYw (showing voice exchange between user and computer tiger in Kinectimals application); How to Name Ur Nintendog (October 2, 2011) at 2:05, <https://www.youtube.com/watch?v=XnyPZshtiII> (showing voice exchange between user and computer dog in Nintendogs application).

Claim	Oculus DK1 System's Exemplary Disclosures
1[a]. providing, through an electronic earphone being located at a head of the user and being in communication with a handheld portable electronic device (HPED), binaural sound to the user during the voice exchange between the computer program and the user such that an origin of the voice of the computer program occurs at the SLP at a first location in empty space that is away from and proximate to the user;	The Oculus DK1 System discloses and/or renders obvious, alone or in combination with other prior art, “providing, through an electronic earphone being located at a head of the user and being in communication with a handheld portable electronic device (HPED), binaural sound to the user during the voice exchange between the computer program and the user such that an origin of the voice of the computer program occurs at the SLP at a first location in empty space that is away from and proximate to the user” as embodied in the product itself and as reflected in other prior art references that describe it. <i>See</i> disclosures and cited evidence for limitation 1[pre]. For example: The Oculus DK1 System discloses and/or renders obvious, alone or in combination with other prior art, “providing . . . binaural sound to the user during the voice exchange between the computer program and the user such that an origin of the voice of the computer program occurs at the SLP”: For example, under at least Plaintiff’s theory of infringement, applications like Couch Knights provide “binaural sound to the user during the voice exchange between the computer program and the user such that an origin of the voice of the computer program occurs at the SLP.” As explained above for claim limitation 1[pre], in applications like Couch Knights, the sounds (e.g., footsteps and sword swings) produced at the knight character (or the “voice of the computer program”) originate from the knight character (“origin of the voice of the computer program occurs at the SLP”). For example, Couch Knights was created using the Unreal Engine 4 game engine.⁵⁵ Unreal Engine includes “Sound Node[s]” for game objects that allowed for spatialization of the object’s audio.

⁵⁵ <https://www.unrealengine.com/marketplace/en-US/product/couch-knights>.

Claim	Oculus DK1 System's Exemplary Disclosures
	 See, e.g., Unreal Engine 4 Tutorial – Sound Cues at 1:39.⁵⁶

⁵⁶ https://www.youtube.com/watch?v=rZhrjHSN_II (showing attenuation option for “Sound Node” in Unreal Engine 4).

Claim	Oculus DK1 System's Exemplary Disclosures
	 The screenshot shows the Unreal Engine 4 interface. The main viewport displays a knight character in a virtual environment with stone walls and a blue sky. The knight is positioned in the center, and a small, glowing, spherical object is visible in the air. The Details panel on the right shows the 'Starter_Birds01' actor selected, with the 'Attenuation' section expanded. The 'Attenuation' section includes options for 'Allow Spatialization' (checked), 'Override Attenuation' (checked), 'Attenuation Setting' (None), 'Attenuation Override' (checked), 'Distance Algorithm' (ATTENUATION Linear), 'Radius' (400.0), 'Falloff Distance' (587.72552), 'Attenuate with LPF' (checked), 'LPFRadii Min' (3000.0), and 'LPFRadii Max' (6000.0). See also, e.g., Unreal Engine 4 Tutorial – Ambient Audio (Basic!) at 1:06.⁵⁷ When the knight character moves, “binaural sound,” such as spatialized and/or attenuated footstep sound, is produced from the knight character (and its corresponding SLP).⁵⁸ The user is able to localize the knight character’s sounds to the knight character itself (and its corresponding SLP).

⁵⁷ <https://www.youtube.com/watch?v=qtgY7esjB6I> (showing attenuation and “Allow Spatialization” options).

⁵⁸ See Couch Knights on Oculus Rift DK1 (July 17, 2014), <https://www.youtube.com/watch?v=HcreLAfiqUs> (showing knight character making sounds, including footsteps, sword swings, and fireball noises, in response to user input); see also Couch Knights | Oculus Rift DK2 (August 24, 2014), <https://www.youtube.com/watch?v=bMQwLGRXyE8> (same).

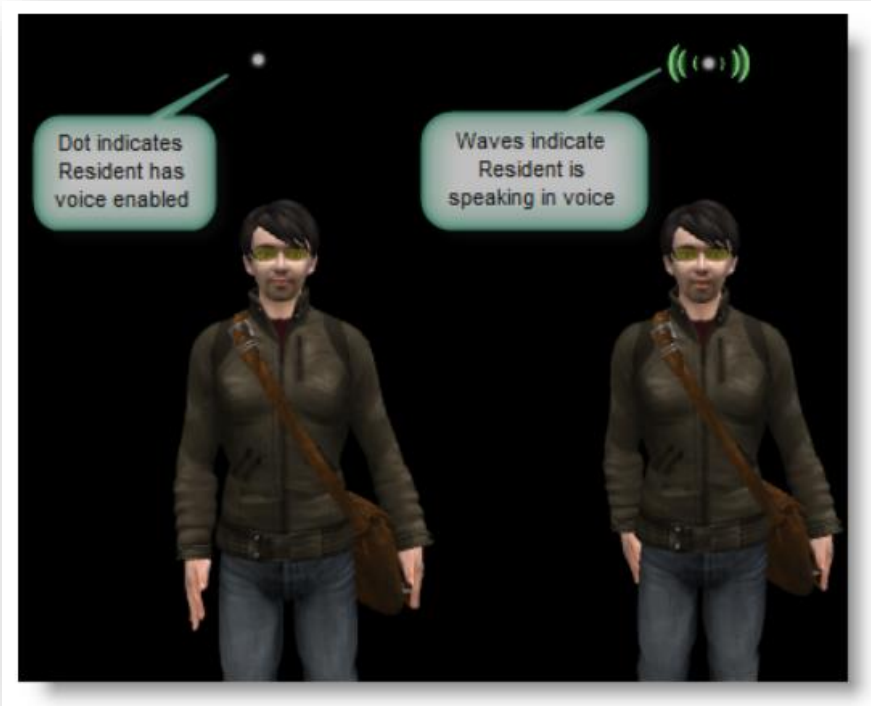
Claim	Oculus DK1 System's Exemplary Disclosures
	See picture of an exemplary Couch Knights application (showing knight character that produces sound, such as footsteps and sword swings).⁵⁹ As another example, under at least Plaintiff's theory of infringement, the applications like SecondLife provide "binaural sound to the user during the voice exchange between the computer program and the user such that an origin of the voice of the computer program occurs at the SLP." As explained above for claim limitation 1[pre], in applications like SecondLife, sound clips ("voice of the computer program") originate from virtual objects (or their corresponding SLPs).

⁵⁹ <https://www.unrealengine.com/marketplace/en-US/product/couch-knights>

Claim	Oculus DK1 System's Exemplary Disclosures
	Scripting comments <i>Sound clips</i> • <code>llTriggerSound()</code> • Unattached - sounds occur where they're triggered. • Cannot be stopped with <code>llStopSound()</code>. • <code>llPlaySound()</code> • Attached - sounds follow the object they are in if it moves. • Only one at a time per prim. Playing another will stop the current sound. • <code>llLoopSound()</code> • Attached - sounds follow the object they are in if it moves. • This continuously loops the sound. • Only one at a time per prim. Playing another will stop the current sound. See SecondLife Wiki – Environment Sounds (Revision as of 20:11, July 15, 2012).⁶⁰ Voices of other users (“voice of the computer program”) also originate from other users’ virtual avatars (or their corresponding SLPs). For example, the other user’s avatar has “a voice chat feature that lets avatars speak.”⁶¹

⁶⁰ https://wiki.secondlife.com/w/index.php?title=Environment_Sounds&direction=prev&oldid=1195319.

⁶¹ See SecondLife Wiki – Lip Sync (last edited on October 13, 2009) at https://wiki.secondlife.com/wiki/Lip_sync.

Claim	Oculus DK1 System's Exemplary Disclosures
	 See Viewer 2 Quick Start Guide/Local chat and voice (February 23, 2010).⁶²

⁶² https://wiki.secondlife.com/wiki/Viewer_2_Quick_Start_Guide/Local_chat_and_voice.

Claim	Oculus DK1 System's Exemplary Disclosures
	 See SecondLife Tutorial Video – Voice Chat Getting Started (November 14, 2008).⁶³ In addition, non-player characters (or “bots” in SecondLife) “can be created in the same way as a human-controlled avatar.”⁶⁴ A bot “is being controlled by a program” and “can be used in various ways,” including for “user interaction” and as a “[r]oleplaying NPC (non-player characters) for

⁶³ https://wiki.secondlife.com/wiki/Video_Tutorials/More; see also <http://vidtuts.s3.amazonaws.com/VOICE-CHAT-Getting-started.mp4>.

⁶⁴ <https://wiki.secondlife.com/wiki/Bot#:~:text=Second%20Life%20bot%20account%20can,choose%20it%20from%20available%20alternatives>

Claim	Oculus DK1 System's Exemplary Disclosures
	gaming and interactive areas.”⁶⁵ A bot can also “[s]erve as a secretary or support robot by using autoresponder AI or remote chat assistant or “[b]e a non-personal character (NPC) in a roleplaying game.”⁶⁶ The audio for other residents in applications like SecondLife is spatialized. For example, the SecondLife documentation describes a “Voice Test” where “5 testers” “Edit > Preferences > Voice Chat > [x] Enable voice chat, Hear voice at: Avatar position, camera direction.” Then arrange themselves so that “4 testers [are] around one tester at north, south, east and west.” This test is used to “verify [that] each tester sounds like their voice is coming from their position inworld” and that “everyone sound like they are in the right place spatially.”

⁶⁵

<https://wiki.secondlife.com/wiki/Bot#:~:text=Second%20Life%20bot%20account%20can,choose%20it%20from%20available%20alternatives>

⁶⁶ https://web.archive.org/web/20130723023800/https://wiki.secondlife.com/wiki/Second_Life_bot_software_comparison

Claim	Oculus DK1 System's Exemplary Disclosures
	Voice Test VERSION 0.1 LENGTH 00:00 TESTERS 5 OVERVIEW Coming SETUP Up to 5 normal users, (can be done with 2) Spatial sound testing with gathered groups • Setup: Have each of 5 testers do the following: Edit > Preferences > Voice Chat > [x] Enable voice chat, Hear voice at: Avatar position, camera direction. • Arrange 4 testers around one tester at north, south, east and west, like this: <pre><tab> . Tester N . Tester W Tester C Tester E . </tab></pre> • Tester C: Face Tester N. • Cardinal Testers: Speak one at a time starting with Tester N and going clockwise around Tester C (N followed by E followed by S followed by W). • Tester C: Without moving, verify each tester sounds like their voice is coming from their position inworld. • Tester C: Rotate your avatar to face Tester S. • Cardinal Testers, repeat the round robin above, starting with Tester S. • Tester C: Without moving, verify each tester sounds like their voice is coming from their position inworld. • Tester C: Alt-Zoom on something out of range of the testers. * ... • Group in a circle • Does everyone sound like they are in the right place spatially? • If someone moves away, do they get quieter? • Group with members behind you • Can you hear all members, including those behind you? See SecondLife Wiki – Voice Test (November 26, 2007).⁶⁷

⁶⁷ https://wiki.secondlife.com/wiki/Voice_Test.

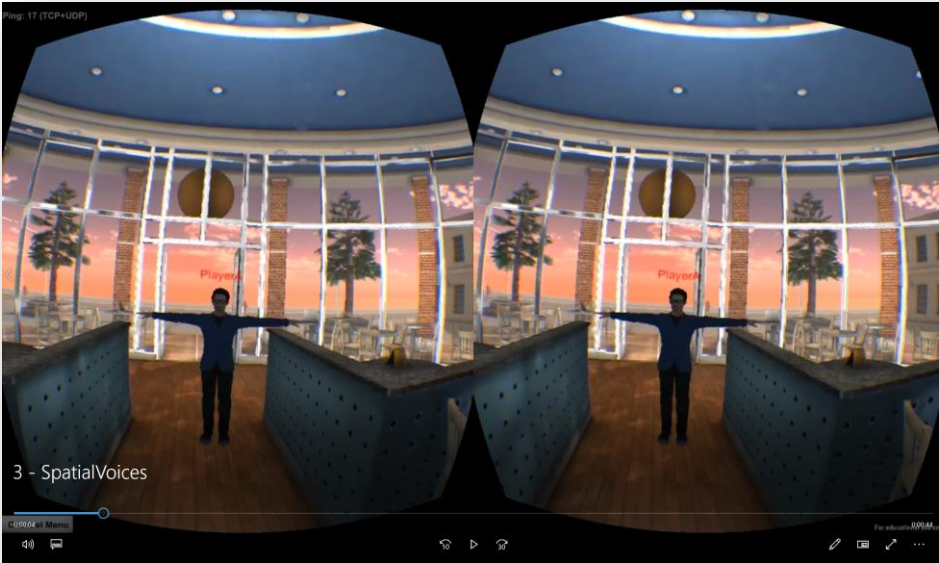
Claim	Oculus DK1 System's Exemplary Disclosures
	The SecondLife documentation also explains that “3D position” is used by the <i>Session.Set3DPosition.1</i> method for both the “speaker and listener” and that <i>Session.Set3Dposition.1</i> “describes the speaking position and the listening position for this avatar.”

Session.Set3DPosition.1

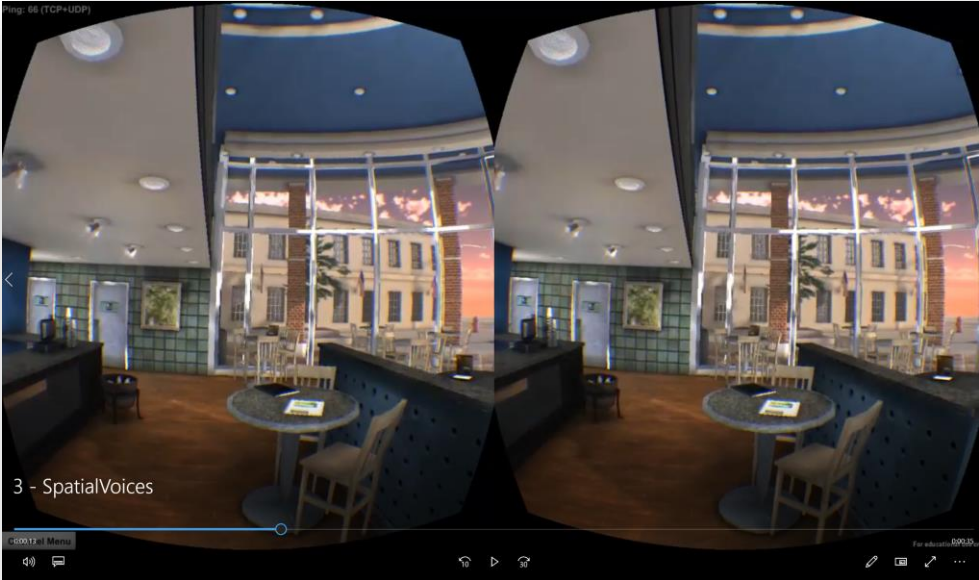
When sending a 3D position for speaker and listener, the "listener" is either the avatar position or the camera position. That is, it describes the speaking position and the listening position for this avatar.

```
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  <SessionHandle>c1_m1000abcdefghijklmnopqrstuvwxy1</SessionHandle>
  <OrientationType>legacy</OrientationType>
  <SpeakerPosition>
    <Position>
      <X>261451</X>
      <Y>26.9568</Y>
      <Z>-283000</Z>
    </Position>
    <Velocity>
      <X>0</X>
      <Y>0</Y>
      <Z>0</Z>
    </Velocity>
    <AtOrientation>
      <X>0.816965</X>
      <Y>0</Y>
      <Z>-0.576688</Z>
    </AtOrientation>
    <UpOrientation>
      <X>0</X>
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      <Z>0</Z>
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  <ListenerPosition>
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      <Y>0</Y>
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    <LeftOrientation>
      <X>-0.574999</X>
      <Y>0</Y>
      <Z>-0.818154</Z>
    </LeftOrientation>
  </ListenerPosition>
</Request>
```

The viewer doesn't get a response

Claim	Oculus DK1 System's Exemplary Disclosures
	See SecondLife Wiki – Voice/Technical (November 18, 2009).⁶⁸ As another example, under at least Plaintiff's theory of infringement, applications like VRChat provide "binaural sound to the user during the voice exchange between the computer program and the user such that an origin of the voice of the computer program occurs at the SLP." As explained above for claim limitation 1[pre], in applications like VRChat, another user's voice ("voice of the computer program") originates from that user's virtual avatar that has a corresponding SLP ("origin of the voice of the computer program occurs at the SLP").  See photograph of an exemplary Oculus DK1 System (showing another avatar in front of the user's own avatar (point of view) where the "voice of the computer program" is localized to the other

⁶⁸ <https://wiki.secondlife.com/wiki/Voice/Technical#Session.Set3DPosition.1.>

Claim	Oculus DK1 System's Exemplary Disclosures
	avatar (or corresponding SLP)).⁶⁹ When the user turns to the left, the sound is now originating to the right for the user, localizing to the other avatar as “binaural sound.”  See photograph of an exemplary Oculus DK1 System (showing VRChat).⁷⁰ For example, the VRChat development diary from 2014 explains that the developer used “two libraries” in addition to Unity3D: “Tnet (for networking) and Uspeak (for voicechat),” which were

⁶⁹ META-8KHZ_00046187; see also META-8KHZ_00046233; META-8KHZ_00046188; Oculus Rift DK1 - VRChat 0.1 (1080p) (January 16, 2014) <https://www.youtube.com/watch?v=z9PgdbYLbLU>

⁷⁰ See *id.*

Claim	Oculus DK1 System's Exemplary Disclosures
	used with “a sweet CoffeeShop environment on the Unity Asset Store.”⁷¹ Uspeak includes “[s]patial audio support” for voice chat that provided “directional audio for a truly immersive experience.”⁷² Furthermore, the Unity Developers Manual from 2014 explains that Unity supported 3D audio. For example, audio clips from sound clip files are “played back so as to simulate its position in the game world’s 3D space” if the “audio clip is marked as a 3D Sound.”⁷³ 3D sounds emulate the distance and location of sounds by attenuating volume and panning across speakers.”⁷⁴

⁷¹ VRChat v0.1 Development, <https://web.archive.org/web/20140121030858/http://grahamgaylor.com/2014/01/>; see also <https://web.archive.org/web/20140121030107/http://grahamgaylor.com/2013/06/> (“Now I’ll explain the code implementation using Unity3D using C#.”); <https://web.archive.org/web/20140121030112/http://grahamgaylor.com/2013/09/> (“I decided to go with Unity3D as my game engine for two reasons. First off, I have the most experience with Unity, I’ve played around with the UDK, but I came crawling back to Unity. My second and more important reason is that there are Unity plugins for most of the hardware I’m using.”); <https://web.archive.org/web/20140121030858/http://grahamgaylor.com/2014/01/> (“I used Unity3D for both projects, but used better networking and voice chat libraries in the second iteration.”); <https://web.archive.org/web/20140120214705/http://grahamgaylor.com/category/unity3d/>; <https://web.archive.org/web/20140121030102/http://grahamgaylor.com/2013/01/>; <https://web.archive.org/web/20140121093515/http://grahamgaylor.com/2013/04/> (“To start, the Oculus Developer Center is now open and ready for devs to download the Rift SDK. What this means is that developers will now be able to integrate the Rift into their games and/or start building games from scratch with an actual test unit to build it around. As of now (April 1), it seems the only SDK downloads are the Windows SDK and the Unity 4 Pro integration package.”); <https://web.archive.org/web/20140121030847/http://grahamgaylor.com/2013/05/>.

⁷² See [RELEASED] USpeak Voice Chat – Voice Chat For All Your Multiplayer Games, <https://forum.unity.com/threads/released-uspeak-voice-chat-voice-chat-for-all-your-multiplayer-games.154609/> (last edited November 17, 2013).

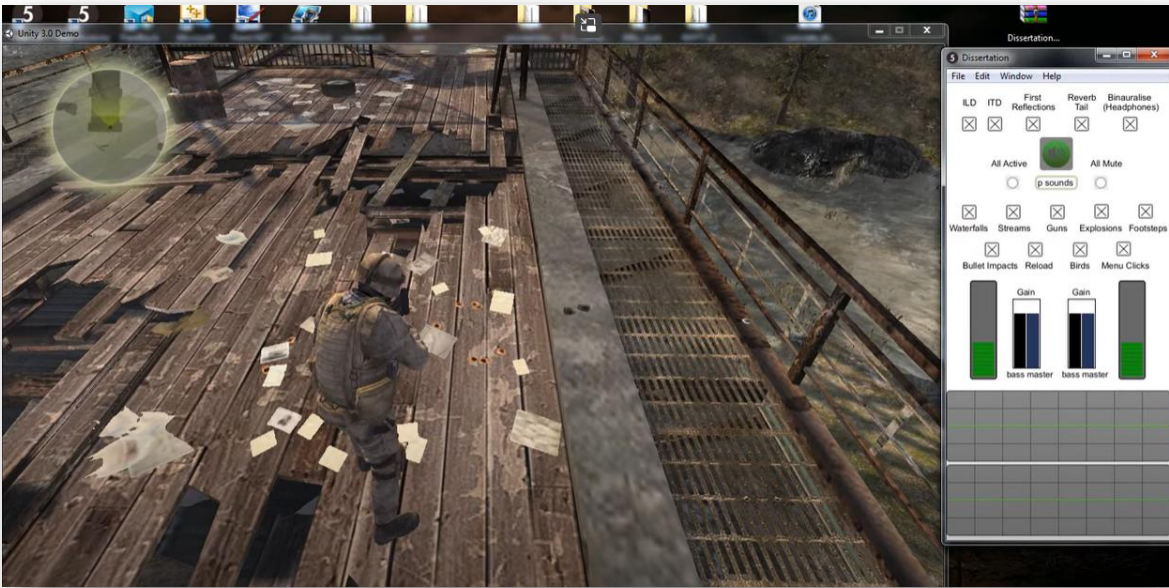
⁷³ See <https://web.archive.org/web/20140601033451/http://docs.unity3d.com/Manual/class-AudioClip.html>.

⁷⁴ See <https://web.archive.org/web/20140601033451/http://docs.unity3d.com/Manual/class-AudioClip.html>.

Claim	Oculus DK1 System's Exemplary Disclosures
	Basic Theory In real life, sounds are emitted by objects and heard by listeners. The way a sound is perceived depends on a number of factors. A listener can tell roughly which direction a sound is coming from and may also get some sense of its distance from its loudness and quality. A fast-moving sound source (like a falling bomb or a passing police car) will change in pitch as it moves as a result of the Doppler Effect. Also, the surroundings will affect the way sound is reflected, so a voice inside a cave will have an echo but the same voice in the open air will not.  Audio Sources and Listener Audio Overview – Unity Documentation (June 3, 2014).⁷⁵ As another example, VRChat was “created by using the Unity 3D engine and is a platform for users to meet online and chat with each other in environments they have made themselves. The software has made it easy for developers to add more than one user to any video game or other application, provided they are of the Unity-developed environments. The software used by the developers takes its cues from an amalgamation of different things: head gaze direction, body gestures and 3D positional audio to do its best to develop an immersive, fun social experience for all users involved.” See VR Chat Releasing for Oculus Rift (December 2, 2014).⁷⁶ As early as 2011, Unity includes binauralization, for example as shown in the “Procedural Audio and Binauralisation in Unity’s Bootcamp Demo (v 1.0)” as shown below:

⁷⁵ <https://web.archive.org/web/20140603055903/http://docs.unity3d.com/Manual/AudioOverview.html>.

⁷⁶ <https://virtualrealitytimes.com/2014/12/02/vr-chat-releasing-for-oculus-rift/>; see also VRChat now in Oculus Rift app store (December 3, 2014) <https://www.hypergridbusiness.com/2014/12/vrchat-now-in-oculus-rift-app-store/>; Oculus Rift DK1 – VRChat 0.1 (1080p) (January 16, 2014) <https://www.youtube.com/watch?v=z9PgdbYLbLU>; VRChat v0.1 Released https://www.reddit.com/r/oculus/comments/1vcbwk/vrchat_v01_released/.

Claim	Oculus DK1 System's Exemplary Disclosures
	 The image is a screenshot from a Unity 3.0 Demo. It shows a first-person perspective of a character in a virtual environment. The character is standing on a wooden platform or bridge over a body of water. The environment is dark and atmospheric, with some floating papers or debris. In the top right corner, there is a window titled 'Dissertation...' which contains a binaural audio control panel. This panel has various checkboxes for audio settings, including 'ILD', 'ITD', 'First Reflections', 'Reverb Tail', and 'Binauralise (Headphones)'. It also has a 'p sounds' button and several sliders for 'Gain' and 'bass master'. The panel is designed to allow users to adjust the binaural audio experience. See Procedural Audio and Binauralisation in Unity's Bootcamp Demo (v 1.0) (Aug. 15, 2011).⁷⁷ The Oculus DK1 System discloses and/or renders obvious, alone or in combination with other prior art, that the SLP is “at a first location in empty space that is away from and proximate to the user”: For example, under at least Plaintiff's theory of infringement, in applications like Couch Knights, the knight character (or corresponding SLP) is located “in empty space.” The knight character is also “away from and proximate to the user,” as shown below.

⁷⁷ <https://www.youtube.com/watch?v=sQIKPaKNCPY>

Claim	Oculus DK1 System's Exemplary Disclosures
	 See picture of an exemplary Couch Knights application (showing knight characters that produces sound, such as footsteps and sword swings, apart from the user).⁷⁸ As another example, under at least Plaintiff's theory of infringement, in applications like SecondLife, virtual game objects and/or the other user's avatar is located "in empty space." The

⁷⁸ <https://www.unrealengine.com/marketplace/en-US/product/couch-knights>. See also, e.g., Couch Knights on Oculus Rift DK1 (July 17, 2014), <https://www.youtube.com/watch?v=HcreLAfIqUs> (showing knight character making sounds, including footsteps, sword swings, and fireball noises, in response to user input); GDC 2014: Oculus Rift DK2 'Couch Knights' Gameplay (March 21, 2014), <https://www.youtube.com/watch?v=CoyjO-etC30> (showing a user moving a knight character "in empty space that is away from and proximate to" the user).

Claim	Oculus DK1 System's Exemplary Disclosures
	virtual game objects and/or the other user's avatar is also "away from and proximate to the user," as shown below. The image shows two avatars in a virtual environment. Above the left avatar is a small white dot, and a callout box points to it with the text: "Dot indicates Resident has voice enabled". Above the right avatar are green sound waves, and a callout box points to them with the text: "Waves indicate Resident is speaking in voice". Both avatars are wearing dark jackets and blue jeans. See Viewer 2 Quick Start Guide/Local chat and voice (February 23, 2010) (showing other user's avatar "in empty space that is away from and proximate to the user").⁷⁹

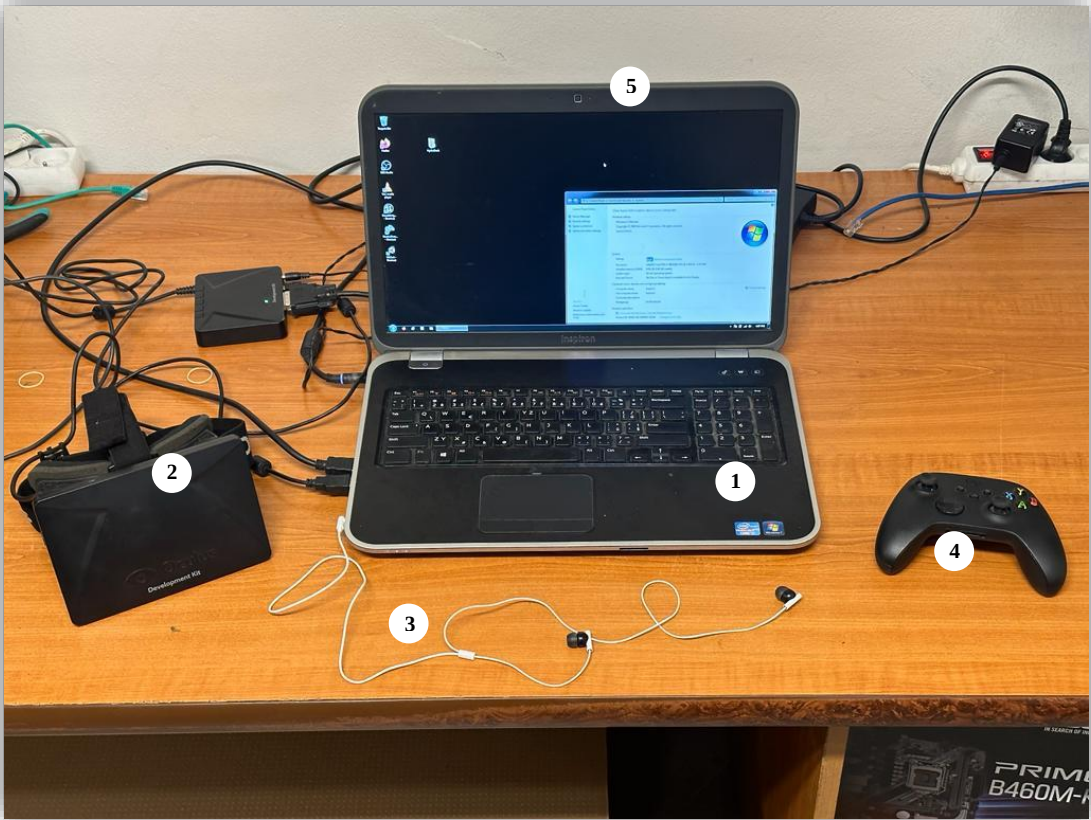
⁷⁹ https://wiki.secondlife.com/wiki/Viewer_2_Quick_Start_Guide/Local_chat_and_voice; see also Second Life on a Oculus Rift (January 21, 2014), <https://www.youtube.com/watch?v=MFh3buY8KFA>.

Claim	Oculus DK1 System's Exemplary Disclosures
	 See How to Use Oculus Rift with Second Life at 1:05.⁸⁰ As another example, under at least Plaintiff's theory of infringement, in applications like VRChat, the other user's avatar is located "in empty space." The other user's avatar is also "away from and proximate to the user," as shown below.

⁸⁰ <https://www.youtube.com/watch?v=TLL5JVwG118> (showing virtual objects (or their corresponding SLPs) "in empty space that is away from and proximate to the user").

Claim	Oculus DK1 System's Exemplary Disclosures
	See photograph of an exemplary Oculus DK1 System (showing other user's avatar (or corresponding SLP) "in empty space that is away from and proximate to the user").⁸¹ The Oculus DK1 System discloses and/or renders obvious, alone or in combination with other prior art, "providing . . . binaural sound to the user" "through an electronic earphone being located at a head of the user and being in communication with a handheld portable electronic device (HPED)": Any application, including applications like Couch Knights, SecondLife, and VRChat, can use electronic earphones, such as those shown below at (3), through the audio jack interface on the Dell Inspiron 7720. Thus, the earphones (3) are in communication with an exemplary Oculus DK1 System, including the Oculus Rift DK1 headset (2) and controller (4) (HPED). An exemplary

⁸¹ See also Oculus Rift DK1 – VRChat 0.1 (1080p) <https://www.youtube.com/watch?v=z9PgdbYLbLU>.

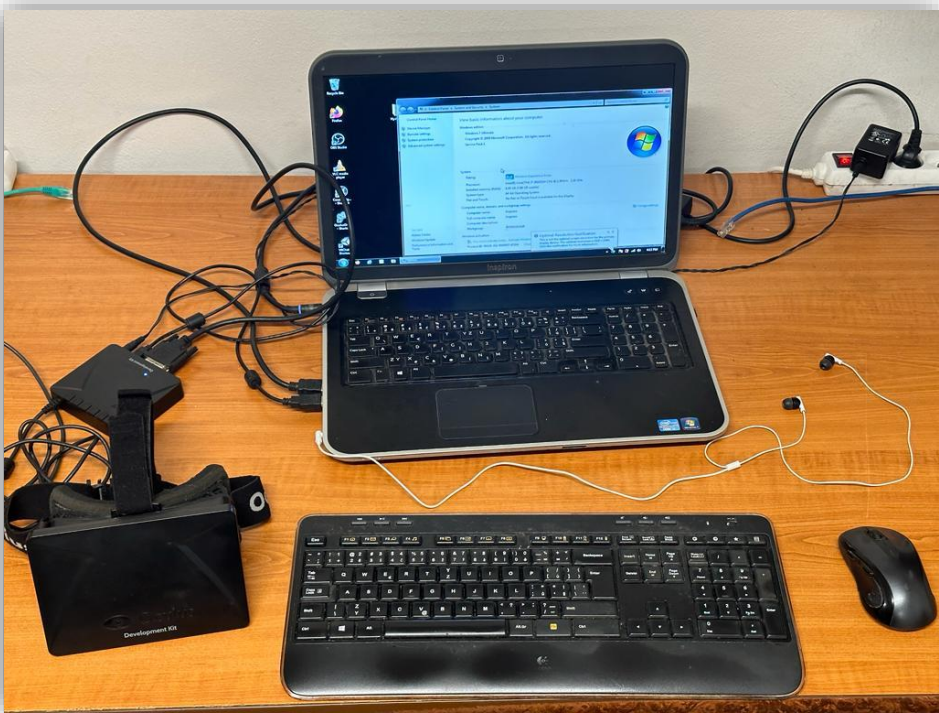
Claim	Oculus DK1 System's Exemplary Disclosures
	Oculus Rift System can also be used with a handheld portable mouse and other handheld portable electronic devices.⁸² 

⁸² See, e.g., Oculus Rift DK1 + Razer Hydra – Oculus Maxiumus (1080p) (February 3, 2014), https://youtu.be/1R--5oi69_4?si=QsvhRY1xQY-ZBToB (showing DK1 being used with handheld Razer Hydra controllers).

Claim	Oculus DK1 System's Exemplary Disclosures
	See photograph of an exemplary Oculus DK1 System.⁸³ Mouse, Keyboard, Gamepad It's important to realize that once users put on the Oculus Rift, they are effectively blind to the outside world. They can't see their keyboard, their mouse, their gamepad, or their monitor. Once they're inside, interacting with these devices will be done by touch alone. Of course, this isn't so unusual; we're used to operating our input devices by touch, but we use sight to perform our initial orientation and corrections (such as changing hand position on a keyboard). This has important ramifications for interaction design. For instance, any use of the keyboard as a means of input is bound to be awkward, since the user will be unable to find individual keys or home position except by touch. A mouse will be a bit easier to use, as long as the user has a clear idea of where their mouse is before they put on the headset. Although still perhaps not the ultimate solution, gamepads are the most popular traditional controller at this time. The user can grip the gamepad with both hands and isn't bound to ergonomic factors of using a more complicated control device on a desktop. The more intuitive and simple the controller, the more comfortable a user will be when using it without visual reference. Given the constraints of VR and the Rift, we believe gamepads are preferable over keyboard and mouse input. However, we must emphasize that neither input method is ideal for VR, and research is underway at Oculus to find innovative and intuitive ways of interacting with a wide breadth of VR content. The Oculus VR Best Practices Guide (April 30, 2014) at 31 (showing that the Oculus DK1 can be used with a controller and/or mouse and/or keyboard).⁸⁴

⁸³ META-8KHZ_00047800; *see also* META-8KHZ_00047801; META-8KHZ_00047802; META-8KHZ_00047799; META-8KHZ_00047805; META-8KHZ_00047804; META-8KHZ_00047803.

⁸⁴ META-8KHZ_00048116.

Claim	Oculus DK1 System's Exemplary Disclosures
	Any application can use electronic earphones through the audio jack interface (shown below) on the Dell Inspiron 7720.⁸⁵ 

⁸⁵ The electronic earphones may be wireless and can connect to a computer via, for example, Bluetooth. *See, e.g.*, LG Tone+ HBS-730: Where Have You Been All My Life (February 18, 2013), <https://www.wired.com/2013/02/lg-tone-plus-hbs-730/> (describing wireless LG Tone+ HBS-730 earphones with Bluetooth); BackBeat GO 2 Earbuds Tutorial (November 5, 2013), <https://www.youtube.com/watch?v=EOwxkSW1UbM> (describing wireless BackBeat GO 2 Earbuds with Bluetooth); *see also, e.g.*, META-8KHZ_00047873 at 31, 33 (supports “Bluetooth combo card”).

Claim	Oculus DK1 System's Exemplary Disclosures						
	See photograph of an exemplary Oculus DK1 System (showing earphones).⁸⁶ Ports and connectors <table> <tr> <td>Audio</td><td>one microphone-in port</td></tr> <tr> <td></td><td>one stereo headphone/speaker/microphone combo port</td></tr> <tr> <td></td><td>one digital microphone</td></tr> </table> See Specification Sheet for Dell Inspiron 7720 (2013).⁸⁷ To the extent Plaintiff contends that the Oculus DK1 System with applications like Couch Knights, SecondLife, and/or VRChat does not include “a voice exchange between the computer program and the user,” a person of ordinary skill in the art would have found it obvious to implement a user speaking to a computer program and a computer program speaking back based on other applications that included such functionality prior to any date to which the '196 Patent can claim priority. For example, in applications like Lifeline, a user speaks to the computer program and the computer program responds.⁸⁸	Audio	one microphone-in port		one stereo headphone/speaker/microphone combo port		one digital microphone
Audio	one microphone-in port						
	one stereo headphone/speaker/microphone combo port						
	one digital microphone						

⁸⁶ META-8KHZ_00047799; META-8KHZ_00047800

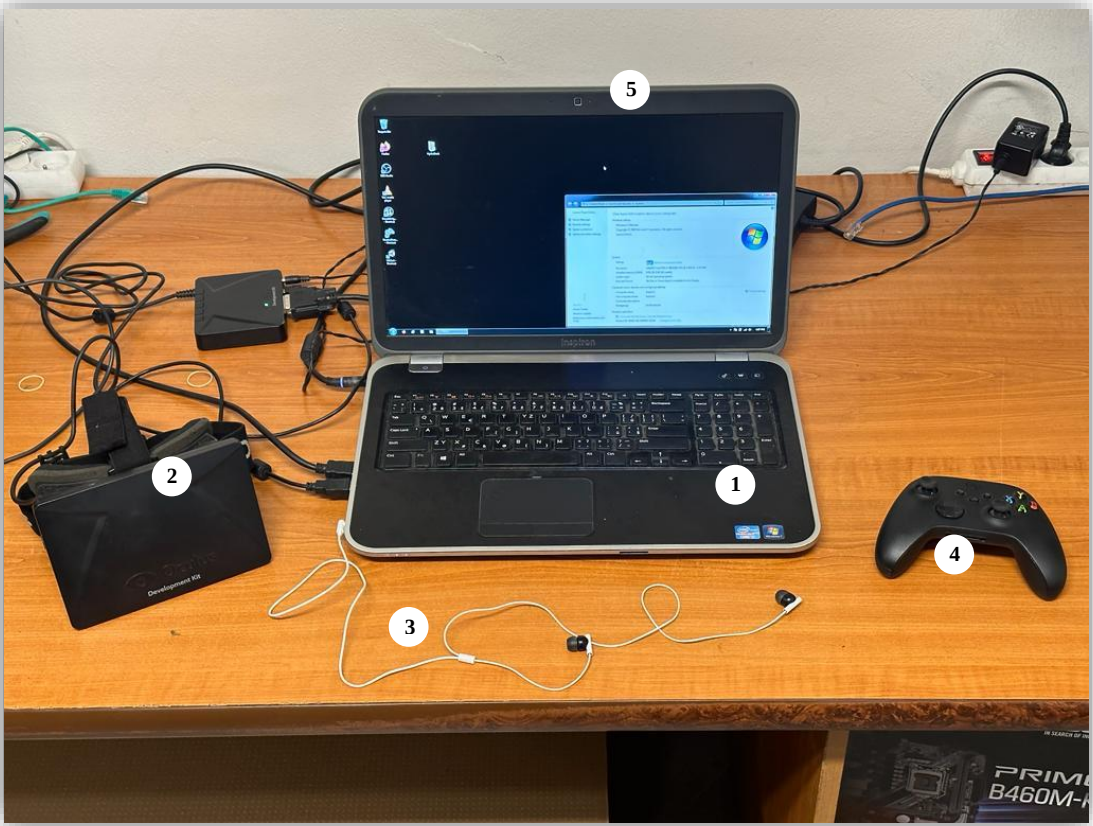
⁸⁷ META-8KHZ_00045115

⁸⁸ See, e.g. LIFELINE: The Game Controlled ENTIRELY By Your Voice (September 11, 2018) at 2:02, <https://www.youtube.com/watch?v=XzmHrMqrKyo>; Lifeline: Voice Action Adventure [Part 2] The Room (September 10, 2013), <https://www.youtube.com/watch?v=TzXr1qD05ZM>; <https://www.ign.com/articles/2004/03/03/lifeline> (Lifeline review posted March 3, 2004); [https://en.wikipedia.org/wiki/Lifeline_\(video_game\)](https://en.wikipedia.org/wiki/Lifeline_(video_game)) (Lifeline released in 2003); see also, e.g., Kinectimals – XBOX360 with KINECT Part 1 TRUE HD – QUALITY 1080 (September 5, 2013) at 8:47, https://www.youtube.com/watch?v=BrcXV9_cQYw (showing voice exchange between user and computer tiger in Kinectimals application); How to Name Ur Nintendog (October 2, 2011)

Claim	Oculus DK1 System's Exemplary Disclosures
1[b]. receiving, from the user and at the HPED, a command to move the SLP of the voice of the computer program from the first location in empty space to a second location in empty space that is proximate to the first location and away from and proximate to the user;	The Oculus DK1 System discloses and/or renders obvious, alone or in combination with other prior art, “receiving, from the user and at the HPED, a command to move the SLP of the voice of the computer program from the first location in empty space to a second location in empty space that is proximate to the first location and away from and proximate to the user” as embodied in the product itself and as reflected in other prior art references that describe it. <i>See</i> disclosures and cited evidence for limitations 1[pre] and 1[a]. For example: The Oculus DK1 System discloses and/or renders obvious, alone or in combination with other prior art, “receiving, from the user and at the HPED, a command to move the SLP of the voice of the computer program from the first location in empty space to a second location in empty space that is proximate to the first location and away from and proximate to the user”: As explained above, an exemplary Oculus DK1 System includes the computer (1), and controller (4). An exemplary Oculus DK1 System can also be used with a handheld portable mouse and other handheld portable electronic devices.⁸⁹

at 2:05, <https://www.youtube.com/watch?v=XnyPZshtiII> (showing voice exchange between user and computer dog in Nintendogs application).

⁸⁹ *See, e.g.*, Oculus Rift DK1 + Razer Hydra – Oculus Maxiumus (1080p) (February 3, 2014), https://youtu.be/1R--5oi69_4?si=QsvhRY1xQY-ZBToB (showing DK1 being used with handheld Razer Hydra controllers); The Oculus VR Best Practices Guide (April 30, 2014) at 31, META-8KHZ_00048116 (DK1 works with “Mouse, Keyboard, Gamepad”).

Claim	Oculus DK1 System's Exemplary Disclosures
	 See photograph of an exemplary Oculus DK1 System.⁹⁰ For example, under at least Plaintiff's theory of infringement, applications like Couch Knights "receive[], from the user and at the HPED, a command to move the SLP of the voice of the

⁹⁰ META-8KHZ_00047800; *see also* META-8KHZ_00047801; META-8KHZ_00047802; META-8KHZ_00047799; META-8KHZ_00047805; META-8KHZ_00047804; META-8KHZ_00047803.

Claim	Oculus DK1 System's Exemplary Disclosures
	computer program.” In applications like Couch Knights, users control a virtual miniature figurine of a knight in a room. The knight character (and its corresponding SLP) can be controlled by using a controller and/or keyboard to issue “a command,” and the Oculus DK1 System, including the Oculus Rift DK1 headset, receives the user’s command. As the user commands the knight character to move and the knight character moves, the knight character produces sounds, such as footsteps or smashing sounds (“voice of the computer program”), as explained above for claim limitation 1[pre]. These sounds correspond to the knight character’s location as the user moves the knight character in the virtual world.⁹¹ When controlling the knight character, the user moves the knight character (and corresponding SLP), under at least Plaintiff’s theory of infringement, from its initial “first location in empty space to a second location in empty space,” wherein the “second location in empty space” “is proximate to the first location and away from and proximate to the user,” i.e. away from the user’s point of view.⁹² As another example, under at least Plaintiff’s theory of infringement, applications like SecondLife “receive[], from the user and at the HPED, a command to move the SLP of the voice of the computer program.” In applications like SecondLife, as explained above for claim limitation 1[pre], the user can use a controller and/or mouse and/or keyboard to issue “a command” to move virtual objects that have sound clips attached (“voice of the computer program”), and the Oculus DK1 System, including the Oculus Rift DK1 headset, receives the user’s command.

⁹¹ See, e.g., Couch Knights on Oculus Rift DK1 (July 17, 2014), <https://www.youtube.com/watch?v=HcreLAfIqUs> (showing knight character making sounds, including footsteps, sword swings, and fireball noises, in response to user input); GDC 2014: Oculus Rift DK2 ‘Couch Knights’ Gameplay, <https://www.youtube.com/watch?v=CoyjO-etC30> (showing user controlling knight character using a handheld controller); Couch Knights on Oculus Rift DK1, <https://www.youtube.com/watch?v=HcreLAfIqUs> (showing knight character making sounds, including footsteps, sword swings, and fireball noises, in response to user input).

⁹² See, e.g., Couch Knights on Oculus Rift DK1 (July 17, 2014), <https://www.youtube.com/watch?v=HcreLAfIqUs> (showing knight character making sounds, including footsteps, sword swings, and fireball noises, in response to user input); GDC 2014: Oculus Rift DK2 ‘Couch Knights’ Gameplay, <https://www.youtube.com/watch?v=CoyjO-etC30>; Couch Knights on Oculus Rift DK1, <https://www.youtube.com/watch?v=HcreLAfIqUs>.

Claim	Oculus DK1 System's Exemplary Disclosures
	For example, the documentation for the SecondLife application explains that “sound clips” can be “attached” to virtual objects. As shown below, virtual objects in applications like SecondLife “move[],” and sounds (i.e., “a voice of the computer program”) “follow the object they are in if it moves.” The image is a screenshot of a webpage titled "Scripting comments" with a sub-header "Sound clips". It contains a bulleted list of functions and their behaviors: • <code>llTriggerSound()</code> • Unattached - sounds occur where they're triggered. • Cannot be stopped with <code>llStopSound()</code>. • <code>llPlaySound()</code> • Attached - sounds follow the object they are in if it moves. • Only one at a time per prim. Playing another will stop the current sound. • <code>llLoopSound()</code> • Attached - sounds follow the object they are in if it moves. • This continuously loops the sound. • Only one at a time per prim. Playing another will stop the current sound. See SecondLife Wiki – Environment Sounds (Revision as of 20:11, July 15, 2012).⁹³ A user can move a virtual object (and its corresponding SLP) in applications like SecondLife. For example, the user can move a virtual object “when [the] user clicks and holds the mouse button

⁹³ https://wiki.secondlife.com/w/index.php?title=Environment_Sounds&direction=prev&oldid=1195319.

Claim	Oculus DK1 System's Exemplary Disclosures
	down on an object, then drags the mouse.”⁹⁴ In addition, a user can move their avatar (and corresponding SLP) that can “speak” (“voice of the computer program”).⁹⁵ The SecondLife documentation also explains that “3D position” is used by the <i>Session.Set3DPosition.1</i> method for both the “speaker and listener” and that <i>Session.Set3DPosition.1</i> “describes the speaking position and the listening position for this avatar.”

⁹⁴ https://wiki.secondlife.com/wiki/Category:LSL_Grab (lasted edited July 24, 2011).

⁹⁵ See SecondLife Wiki – Lip Sync (last edited on October 13, 2009) at https://wiki.secondlife.com/wiki/Lip_sync; see also <https://www.youtube.com/watch?v=YaROmSCpa2o> at 2:32; How to Use Oculus Rift with Second Life (May 22, 2014) at 1:26, <https://www.youtube.com/watch?v=TLL5JVwG118> (“If you want to move in the same direction you are looking, tap the Q key to align to look.”); https://wiki.secondlife.com/wiki/Viewerhelp:Preferences_-_Move_%26_View (January 11, 2012) (describing ways to move an avatar including “arrow key” and “click[ing]”).

Session.Set3DPosition.1

When sending a 3D position for speaker and listener, the "listener" is either the avatar position or the camera position. That is, it describes the speaking position and the listening position for this avatar.

```
<Request requestId="114" action="Session.Set3DPosition.1">
  <SessionHandle>c1_m1000abcdefghijklmnopqrstuvwxy1</SessionHandle>
  <OrientationType>legacy</OrientationType>
  <SpeakerPosition>
    <Position>
      <X>261451</X>
      <Y>26.9568</Y>
      <Z>-283000</Z>
    </Position>
    <Velocity>
      <X>0</X>
      <Y>0</Y>
      <Z>0</Z>
    </Velocity>
    <AtOrientation>
      <X>0.816965</X>
      <Y>0</Y>
      <Z>-0.576688</Z>
    </AtOrientation>
    <UpOrientation>
      <X>0</X>
      <Y>1</Y>
      <Z>0</Z>
    </UpOrientation>
    <LeftOrientation>
      <X>-0.576688</X>
      <Y>0</Y>
      <Z>-0.816965</Z>
    </LeftOrientation>
  </SpeakerPosition>
  <ListenerPosition>
    <Position>
      <X>261448</X>
      <Y>27.9639</Y>
      <Z>-283001</Z>
    </Position>
    <Velocity>
      <X>0</X>
      <Y>0</Y>
      <Z>0</Z>
    </Velocity>
    <AtOrientation>
      <X>0.795791</X>
      <Y>0</Y>
      <Z>-0.559283</Z>
    </AtOrientation>
    <UpOrientation>
      <X>0</X>
      <Y>1</Y>
      <Z>0</Z>
    </UpOrientation>
    <LeftOrientation>
      <X>-0.574999</X>
      <Y>0</Y>
      <Z>-0.818154</Z>
    </LeftOrientation>
  </ListenerPosition>
</Request>
```

The viewer doesn't get a response

Claim	Oculus DK1 System's Exemplary Disclosures
	See SecondLife Wiki - Voice/Technical (November 18, 2009).⁹⁶ When a virtual object and/or avatar (and corresponding SLP) is moved by a user's command, the virtual object and/or avatar move, under at least Plaintiff's theory of infringement, from "the first location in empty space to a second location in empty space," wherein the "second location" "is proximate to the first location and away from and proximate to the user."⁹⁷ As another example, under at least Plaintiff's theory of infringement, applications like VRChat "receive[], from the user and at the HPED, a command to move the SLP of the voice of the computer program." In applications like VRChat, the first individual can use the controller and/or mouse and/or keyboard to issue "a command" to move or reposition their avatar (and corresponding SLP) within the virtual environment ("command to move the SLP of the voice of the computer program"), and the Oculus DK1 System, including the Oculus Rift DK1 headset, receives the user's command. For example, under at least Plaintiff's theory of infringement, the second individual avatar is in front of the first individual avatar in empty space (point of view) and the voice sound is originating in front of the user, as explained above for claim limitation 1[pre]. When an object or avatar is moved from a first location to a second location, it is moved from its initial "first location in empty space to a second location in empty space," wherein the "second location in empty space" "is proximate to the first location and away from and proximate to the user," i.e. away from the user's point of view.

⁹⁶ <https://wiki.secondlife.com/wiki/Voice/Technical#Session.Set3DPosition.1.>

⁹⁷ See, e.g., Second Life on a Oculus Rift, <https://www.youtube.com/watch?v=MFh3buY8KFA> (showing avatars in "empty space"); How to Use Oculus Rift with Second Life at 1:06, <https://www.youtube.com/watch?v=TLL5JVwG118> (showing virtual objects in "empty space").

Claim	Oculus DK1 System's Exemplary Disclosures
	 See photograph of an exemplary Oculus DK1 System (showing VRChat).⁹⁸ To the extent Plaintiff contends that the Oculus DK1 System with applications like Couch Knights, SecondLife, and/or VRChat does not include a “voice exchange between the computer program and the user,” a person of ordinary skill in the art would have found it obvious to implement a user speaking to a computer program and a computer program speaking back based on other applications that included such functionality prior to any date to which the '196 Patent can claim

⁹⁸ META-8KHZ_00046187; *see also* META-8KHZ_00046233; META-8KHZ_00046188; Oculus Rift DK1 - VRChat 0.1 (1080p) (January 16, 2014) <https://www.youtube.com/watch?v=z9PgdbYLbLU>

Claim	Oculus DK1 System's Exemplary Disclosures
	priority. For example, in applications like Lifeline, a user speaks to the computer program and the computer program responds.⁹⁹ To the extent Plaintiff argues that the Oculus DK1 System does not disclose this limitation, either expressly, implicitly, and/or by inherency, a person of ordinary skill in the art would have determined that the limitation would have been obvious in light of the Oculus DK1 System alone or in combination with any applicant admitted prior art, the knowledge of one of ordinary skill in the art, or any one or more of the references identified in Meta's Invalidity Contentions under Section IV.J.3 for at least the reasons stated in Meta's Invalidity Contentions cover pleading. <i>See, e.g., Chou</i> at 7:62-8:30 ("Referring again to FIG. 2, the standalone environment sensing device 200 can optionally include a set of user controls 232. The visually impaired person can utilize the user controls 232 to customize various aspects of the operation of the sensing device 200 including, but not limited to, the following. The visually impaired person can utilize the user controls to adjust various properties of the virtual sound sources such as the type of sound that emanates from each of the virtual sound sources, the volume of the sound that emanates from each of the virtual sound sources, and the frequency of the sound that emanates from each of the virtual sound sources, among other things. The visually impaired person can also utilize the user controls to choose different modes of operation such as a walk mode, a read mode, an analyze environment mode, and a manipulate object mode, among others. The visually impaired person can also utilize the user controls to adjust the field of view of the object sensor 202. It will be appreciated that the visually impaired person can make these adjustments both on-the-fly (i.e., when he is actively using the sensing device to determine the spatial geometry of his current physical environment) and offline

⁹⁹ *See, e.g.* LIFELINE: The Game Controlled ENTIRELY By Your Voice (September 11, 2018) at 2:02, <https://www.youtube.com/watch?v=XzmHrMqrKyo>; Lifeline: Voice Action Adventure [Part 2] The Room (September 10, 2013), <https://www.youtube.com/watch?v=TzXr1qD05ZM>; <https://www.ign.com/articles/2004/03/03/lifeline> (Lifeline review posted March 3, 2004); [https://en.wikipedia.org/wiki/Lifeline_\(video_game\)](https://en.wikipedia.org/wiki/Lifeline_(video_game)) (Lifeline released in 2003); *see also, e.g.*, Kinectimals – XBOX360 with KINECT Part 1 TRUE HD – QUALITY 1080 (September 5, 2013) at 8:47, https://www.youtube.com/watch?v=BrCXV9_cQYw (showing voice exchange between user and computer tiger in Kinectimals application); How to Name Ur Nintendog (October 2, 2011) at 2:05, <https://www.youtube.com/watch?v=XnyPZshtiI> (showing voice exchange between user and computer dog in Nintendogs application).

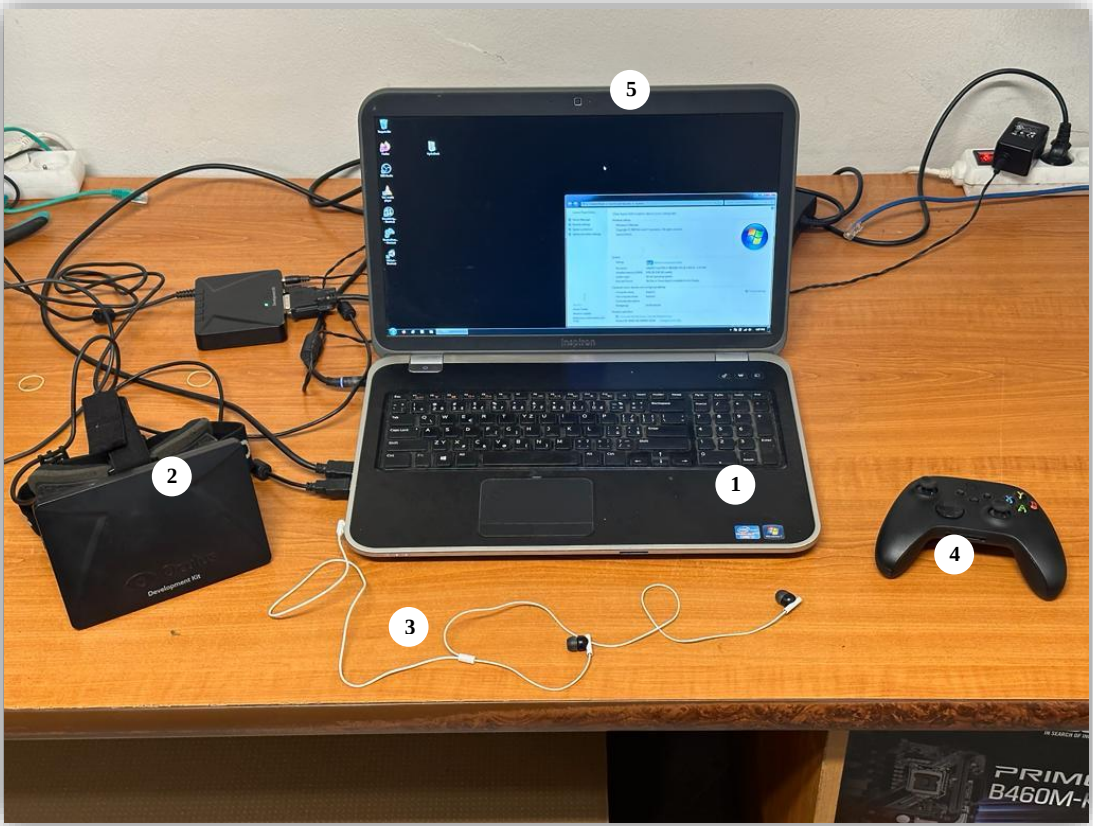
Claim	Oculus DK1 System's Exemplary Disclosures
	(e.g., when he is not actively using the sensing device to determine the spatial geometry of his physical environment). The user controls 232 can be implemented in various ways including, but not limited to, the following. In an exemplary embodiment of the augmented auditory perception technique described herein the user controls 232 include one or more physical control elements (not shown) such as buttons, or sliders, or any combination thereof. The sensing device 200 can optionally also include a location sensor 208 which is also coupled to the first computing device 210 and operates in conjunction therewith to determine the location coordinates (such as latitude and longitude, among others) of the sensing device 200. Various types of devices can be employed for the location sensor 208 such as a global positioning system (GPS) sensor, among others.”), Fig. 2; Jarvinen at 17:37-48 (“Referring now to FIG. 5, a flow diagram an example embodiment is provided. In FIG. 5, a device such as, for example, communication device 90 may detect one or more hand gestures to manipulate one or more selected audio objects. The hand gestures may be gestures of a bare hand of a user that may not necessarily be currently holding an apparatus (e.g., apparatus 50). As described above, the communication device 90 may be embodied in a wrist band, bracelet (e.g., a wrist bracelet), game controller, ring, glove, pen, or any other device that is worn by a user or is otherwise attached to the user and which detects hand gestures of the user.”), 12:39-42 (“The gesture module 78 may analyze this information to modify an audio object(s) (e.g., an audio signal (e.g., a spatial audio signal)) based in part on the movements of the hand(s), as described more fully below.”), Fig. 5; Cohen 1991 II at 39 (“With a device like a DataGlove, a user can point and gesticulate using a 3D workspace envelope.”), 39 (“Pointing at a source indicates it, as a prelude for selection by grasping”), 57 (“The standard pointing device in a window/icon/menu/pointing device (wimp) system is a mouse. A mouse, trackball (a mouse on its back), or joystick would suffice for positioning objects in 2-space. One can imagine direct control of position (with a mouse, trackball, or DataGlove, say), steering control (with a return-to-center joystick, perhaps), or programmed control (automatic circulation),” “for instance, used joysticks to manipulate crudely spatialized sources. As long as visual tokens for the spatial sound objects are accessible through the workstation, they can be manipulated through the operations described above. For example, a mouse-based system finds analogs to indicating, highlighting, and relocating in pointing, clicking, and dragging. A speaker might be singled out for special attention by clicking her token, which would throw a spotlight on her voice.”), 90 (“In a gestural interface (like Handy Sound’s), pointing and grasping are natural postures for indicating and securing.”); Li

Claim	Oculus DK1 System's Exemplary Disclosures
	305 at 14:5-18 (“FIG. 7 illustrates a method for simultaneously generating configurable three-dimensional (3D) sounds using a microphone array system. Three-dimensional (3D) sound comprises 3D surround sound, 3D binaural sound, and 3D stereo sound. 3D sound comprises, for example, music, speech, any audio signal, etc., and is used with or without 3D images, 3D movies, and 3D videos. 3D sound allows a user to experience sound in a 3D space. As used herein, the term “user” refers to a listener of a sound recording, or a person receiving an audio signal on audio media. The 3D sound is represented as a 3D binaural sound when used with a headset or as a 3D surround sound when used with multiple loudspeakers, for example, in a home theater speaker system. The 3D stereo sound is considered as a special case of the 3D sound.”); Billinghurst 1998 at 5 (“A hand held Logitech wireless trackball with three buttons is used as the primary input device.”), 167-68 (6DoF “wand type pointing devices” and “joysticks” allow users to “point at or manipulate virtual objects”); Pedersen at 9:6-21 (“The user may move the symbols into desired positions on the display using the user interface of the control device. For example, the display may be a touch sensitive display allowing the user to move the symbols by touching and dragging the symbols as is well-known in the art of smartphones. When the symbols have been moved into their desired positions on the display, the processor controls the corresponding binaural filters connected to respective input signals from sound sources represented by the symbols, for selection of directional transfer function corresponding to the positions on the display of the symbols representing the sound sources with relation to the symbol representing the user, whereby the user perceives the Sound sources to be positioned in the directions, or at the positions, indicated by the respective symbols positions on the display.”), 16:55-61 (“In addition, the microphones of binaural hearing aid 10A, 10B may be used for reception of spoken commands by the user transmitted (not shown) to the Smartphone 110 for speech recognition in a processor 130 of the smartphone 110, for decoding of the spoken commands and for controlling the hearing device system 10 to perform actions defined by respective spoken commands.”); Boustead at 13:5-44 (“FIG. 2 illustrates a Graphical User Interface (GUI) 200 of a conference scene which may be provided at the conference server 100 and/or at the terminals 120. If provided at a terminal 120, the GUI 200 may enable a participant to modify the conference scene as perceived at the terminal 120. In an embodiment, the GUI 200 enables a chairperson of an audio conference to place the conference participants within a conference scene. The GUI 200 may indicate the participants 201 of the audio conference. The participants 201 may correspond to the originators of the audio signals comprised within a set of

Claim	Oculus DK1 System's Exemplary Disclosures
	downstream audio signals. As such, the GUI 200 may indicate up to (M-1) participants 201,” Fig. 2; Bedingfield at 6:27-51 (“From the decision block 304, the listener may select the mode for modifying individual participants via route B at the block 308. At a selection block 322, the listener may select a setting, such as to place the focus at a block 324, to change a participant's volume at a block 326, or to change a participant's location at a block 328. If the listener selects to place the focus at the block 324, the listener then selects a participant for the focus (the focus object). The focus object's volume may then be amplified above the volume level of the other participants. For example, when multiple participants are speaking during a conference, the listener may desire to place the focus on the participant the listener desires to hear above the other speaking participants. If the listener selects to change the volume at the block 326, the listener may select a participant and adjust the volume, or other aspects of the participants sound such as the aspects adjustable by the block 316. If the listener selects to change the location at the block 328, the listener selects a participant and then selects a new location for the participant within the sound field. The listener may also relocate his position within the sound field at the block 328. After the setting is selected at the selection block 322 and a setting is selected and implemented at the blocks 324, 326 or 328, the method 300 advances to the decision block 318 and then to either the decision block 304 or the block 320 as described above.”); Knappe at 9:43-67 (“GUI 100 can allow a user to manually partition the sound field. One possible GUI ‘look and feel’, illustrated in FIGS. 7A and 7B, shows a method of manual partitioning. FIG. 7A shows a GUI screen 110 at the start of a conference call. The presentation sound field is represented in GUI screen 110 by annular half-circle 112. Endpoints B, C, and D are portrayed respectively in blocks 114, 116, and 118 (endpoint D's block 118 is shown smaller than the others because D represents a monophonic sound source). The blocks initially appear to the inside of the half-circle 112, signaling that no sound field mapping is currently being done on any of these sources. FIG. 7B shows GUI screen 110 after manipulation by a listener. The listener has created a presentation sound field sector for each endpoint, e.g., by dragging and dropping blocks 114, 116, and 118 onto half-circle 112. Endpoint B now occupies sector 122, i.e., approximately the leftmost 75 degrees of the sound field. Endpoint C now occupies, sector 124, i.e., the 75 degree sector from about 15 degrees left of center to about 60 degrees right of center. Endpoint D now occupies sector 126, i.e., approximately the rightmost 30 degrees of the sound field. Note that the listener has replaced the generic labels of each endpoint with icons containing the names of the conference participants at each location. The listener can

Claim	Oculus DK1 System's Exemplary Disclosures
	also manipulate the widths of sectors 122, 124, and 126 by moving the sector dividers.”), Figs. 7A and 7B; Begault 2000 at 173 173 (“[A]udio in any virtual reality configuration can provide an important source of feedback. For instance, the VPL Data Glove works by analyzing a combination of detected finger positions and then using the software to match them to sets of predefined gestures (e.g., a peace sign, pointing with the index finger, squeezing hand as a fist).”).
1[c]. moving, based on the command and during the voice exchange between the computer program and the user, the SLP of the voice of the computer program from the first location in empty space to the second location in empty space that is proximate to the first location and away from and proximate to the user; and	The Oculus DK1 System discloses and/or renders obvious, alone or in combination with other prior art, “moving, based on the command and during the voice exchange between the computer program and the user, the SLP of the voice of the computer program from the first location in empty space to the second location in empty space that is proximate to the first location and away from and proximate to the user” as embodied in the product itself and as reflected in other prior art references that describe it. See disclosures and cited evidence for limitations 1[pre], 1[a], and 1[b]. For example: The Oculus DK1 System discloses and/or renders obvious, alone or in combination with other prior art, “moving, based on the command and during the voice exchange between the computer program and the user, the SLP of the voice of the computer program from the first location in empty space to the second location in empty space that is proximate to the first location and away from and proximate to the user”: As explained above, an exemplary Oculus DK1 System includes the computer (1) and controller (4). An exemplary Oculus DK1 System can also be used with a handheld portable mouse and other handheld electronic devices.¹⁰⁰

¹⁰⁰ See, e.g., Oculus Rift DK1 + Razer Hydra – Oculus Maxiumus (1080p) (February 3, 2014), https://youtu.be/1R--5oi69_4?si=QsvhRY1xQY-ZBToB (showing DK1 being used with handheld Razer Hydra controllers); The Oculus VR Best Practices Guide (April 30, 2014) at 31, META-8KHZ_00048116 (DK1 works with “Mouse, Keyboard, Gamepad”).

Claim	Oculus DK1 System's Exemplary Disclosures
	 See photograph of an exemplary Oculus DK1 System.¹⁰¹ For example, under at least Plaintiff's theory of infringement, applications like Couch Knights "receive[], from the user and at the HPED, a command to move the SLP of the voice of the

¹⁰¹ META-8KHZ_00047800; *see also* META-8KHZ_00047801; META-8KHZ_00047802; META-8KHZ_00047799; META-8KHZ_00047805; META-8KHZ_00047804; META-8KHZ_00047803.

Claim	Oculus DK1 System's Exemplary Disclosures
	computer program.” In applications like Couch Knights, users control a virtual miniature figurine of a knight in a room. The knight character (and corresponding SLP) can be controlled by using a controller and/or keyboard and/or mouse to issue “a command,” and the Oculus DK1 System, including the Oculus Rift DK1 headset, receives the user’s command. As the user commands the knight character to move and the knight character moves, the knight character produces sounds, such as footsteps or smashing sounds (“voice of the computer program”), as explained above for claim limitation 1[pre]. These sounds correspond to the knight character’s location as the user moves the knight character in the virtual world.¹⁰² When controlling the knight character, under at least Plaintiff’s theory of infringement, the use moves the knight character from its initial “first location in empty space to a second location in empty space,” wherein the “second location in empty space” “is proximate to the first location and away from and proximate to the user,” i.e. away from the user’s point of view.¹⁰³ The knight character produces, for example, footstep sounds when it moves based on the user’s command (i.e., “during the voice exchange between the computer program and the user”). As another example, under at least Plaintiff’s theory of infringement, applications like SecondLife “receive[], from the user and at the HPED, a command to move the SLP of the voice of the computer program.” In applications like SecondLife, as explained above for claim limitation 1[pre], the user can use a controller and/or mouse and/or keyboard to issue “a command” to move virtual objects that have sound clips attached (“voice of the computer program”), and the Oculus DK1 System, including the Oculus Rift DK1 headset, receives the user’s command.

¹⁰² See, e.g., GDC 2014: Oculus Rift DK2 ‘Couch Knights’ Gameplay, <https://www.youtube.com/watch?v=CoyjO-etC30> (showing user controlling knight character using a handheld controller); Couch Knights on Oculus Rift DK1, <https://www.youtube.com/watch?v=HcreLAflqUs> (showing knight character making sounds, including footsteps, sword swings, and fireball noises, in response to user input).

¹⁰³ See, e.g., Couch Knights on Oculus Rift DK1 (July 17, 2014), <https://www.youtube.com/watch?v=HcreLAflqUs> (showing knight character making sounds, including footsteps, sword swings, and fireball noises, in response to user input); GDC 2014: Oculus Rift DK2 ‘Couch Knights’ Gameplay, <https://www.youtube.com/watch?v=CoyjO-etC30>; Couch Knights on Oculus Rift DK1, <https://www.youtube.com/watch?v=HcreLAflqUs>.

Claim	Oculus DK1 System's Exemplary Disclosures
	Scripting comments <i>Sound clips</i> • <code>llTriggerSound()</code> • Unattached - sounds occur where they're triggered. • Cannot be stopped with <code>llStopSound()</code>. • <code>llPlaySound()</code> • Attached - sounds follow the object they are in if it moves. • Only one at a time per prim. Playing another will stop the current sound. • <code>llLoopSound()</code> • Attached - sounds follow the object they are in if it moves. • This continuously loops the sound. • Only one at a time per prim. Playing another will stop the current sound. See SecondLife Wiki – Environment Sounds (Revision as of 20:11, July 15, 2012).¹⁰⁴ For example, the documentation for the SecondLife application explains that “sound clips” can be “attached” to virtual objects. As shown below, virtual objects in applications like SecondLife “move[,]” and sounds (i.e., “a voice of the computer program”) “follow the object they are in if it moves (i.e., “during the voice exchange between the computer program and the user”).

¹⁰⁴ https://wiki.secondlife.com/w/index.php?title=Environment_Sounds&direction=prev&oldid=1195319.

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	Scripting comments <i>Sound clips</i> • <code>llTriggerSound()</code> • Unattached - sounds occur where they're triggered. • Cannot be stopped with <code>llStopSound()</code>. • <code>llPlaySound()</code> • Attached - sounds follow the object they are in if it moves. • Only one at a time per prim. Playing another will stop the current sound. • <code>llLoopSound()</code> • Attached - sounds follow the object they are in if it moves. • This continuously loops the sound. • Only one at a time per prim. Playing another will stop the current sound. See SecondLife Wiki – Environment Sounds (Revision as of 20:11, July 15, 2012).¹⁰⁵ A user can move a virtual object (and its corresponding SLP) in applications like SecondLife. For example, the user can move a virtual object “when [the] user clicks and holds the mouse button down on an object, then drags the mouse.”¹⁰⁶ In addition, a user can move their avatar that can “speak” (“voice of the computer program”).¹⁰⁷

¹⁰⁵ https://wiki.secondlife.com/w/index.php?title=Environment_Sounds&direction=prev&oldid=1195319.

¹⁰⁶ https://wiki.secondlife.com/wiki/Category:LSL_Grab (lasted edited July 24, 2011).

¹⁰⁷ See SecondLife Wiki – Lip Sync (last edited on October 13, 2009) at https://wiki.secondlife.com/wiki/Lip_sync; see also <https://www.youtube.com/watch?v=YaROmSCpa2o> at 2:32; How to Use Oculus Rift with Second Life (May 22, 2014) at 1:26, <https://www.youtube.com/watch?v=TLL5JVwG118> (“If you want to move in the same direction you are looking, tap the Q key to

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	The SecondLife documentation also explains that “3D position” is used by the <i>Session.Set3DPosition.1</i> method for both the “speaker and listener” and that <i>Session.Set3DPosition.1</i> “describes the speaking position and the listening position for this avatar.”

align to look.”); https://wiki.secondlife.com/wiki/Viewerhelp:Preferences_-_Move_%26_View (January 11, 2012) (describing ways to move an avatar including “arrow key” and “click[ing]”).

Session.Set3DPosition.1

When sending a 3D position for speaker and listener, the "listener" is either the avatar position or the camera position. That is, it describes the speaking position and the listening position for this avatar.

```
<Request requestId="114" action="Session.Set3DPosition.1">
  <SessionHandle>c1_m1000abcdefghijklmnopqrstuvwxy1</SessionHandle>
  <OrientationType>legacy</OrientationType>
  <SpeakerPosition>
    <Position>
      <X>261451</X>
      <Y>26.9568</Y>
      <Z>-283000</Z>
    </Position>
    <Velocity>
      <X>0</X>
      <Y>0</Y>
      <Z>0</Z>
    </Velocity>
    <AtOrientation>
      <X>0.816965</X>
      <Y>0</Y>
      <Z>-0.576688</Z>
    </AtOrientation>
    <UpOrientation>
      <X>0</X>
      <Y>1</Y>
      <Z>0</Z>
    </UpOrientation>
    <LeftOrientation>
      <X>-0.576688</X>
      <Y>0</Y>
      <Z>-0.816965</Z>
    </LeftOrientation>
  </SpeakerPosition>
  <ListenerPosition>
    <Position>
      <X>261448</X>
      <Y>27.9639</Y>
      <Z>-283001</Z>
    </Position>
    <Velocity>
      <X>0</X>
      <Y>0</Y>
      <Z>0</Z>
    </Velocity>
    <AtOrientation>
      <X>0.795791</X>
      <Y>0</Y>
      <Z>-0.559283</Z>
    </AtOrientation>
    <UpOrientation>
      <X>0</X>
      <Y>1</Y>
      <Z>0</Z>
    </UpOrientation>
    <LeftOrientation>
      <X>-0.574999</X>
      <Y>0</Y>
      <Z>-0.818154</Z>
    </LeftOrientation>
  </ListenerPosition>
</Request>
```

The viewer doesn't get a response

Claim	Oculus DK1 System's Exemplary Disclosures
	See SecondLife Wiki - Voice/Technical (November 18, 2009).¹⁰⁸ When a virtual object and/or avatar (and its corresponding SLP) is moved by a user's command, under at least Plaintiff's theory of infringement, the virtual object and/or avatar move from "the first location in empty space to a second location in empty space." The "second location" "is proximate to the first location and away from and proximate to the user."¹⁰⁹ As another example, under at least Plaintiff's theory of infringement, applications like VRChat "receive[], from the user and at the HPED, a command to move the SLP of the voice of the computer program." In applications like VRChat, the first individual can use the controller and/or mouse and/or keyboard (HPED) to issue "a command" to move or reposition their avatar within the virtual environment ("command to move the SLP of the voice of the computer program"), and the Oculus DK1 System, including the Oculus Rift DK1 headset, receives the user's command. For example, under at least Plaintiff's theory of infringement, the second individual avatar is in front of the first individual avatar in empty space (point of view), and the voice sound is originating in front of the user, as explained above for claim limitation 1[pre]. When an object or avatar is moved from a first location to a second location, it is moved from its initial "first location in empty space to a second location in empty space," wherein the "second location in empty space" "is proximate to the first location and away from and proximate to the user," i.e. away from the user's point of view. The avatar can be moved along with its voice.

¹⁰⁸ <https://wiki.secondlife.com/wiki/Voice/Technical#Session.Set3DPosition.1>.

¹⁰⁹ See, e.g., Second Life on a Oculus Rift, <https://www.youtube.com/watch?v=MFh3buY8KFA> (showing avatars in "empty space"); How to Use Oculus Rift with Second Life at 1:06, <https://www.youtube.com/watch?v=TLL5JVwG118> (showing virtual objects in "empty space").

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	 See photograph of an exemplary Oculus DK1 System (showing VRChat).¹¹⁰ To the extent Plaintiff contends that the Oculus DK1 System with applications like Couch Knights, SecondLife, and/or VRChat does not include a “voice exchange between the computer program and the user,” a person of ordinary skill in the art would have found it obvious to implement a user speaking to a computer program and a computer program speaking back based on other applications that included such functionality prior to any date to which the '196 Patent can claim

¹¹⁰ META-8KHZ_00046187; *see also* META-8KHZ_00046233; META-8KHZ_00046188; Oculus Rift DK1 - VRChat 0.1 (1080p) (January 16, 2014) <https://www.youtube.com/watch?v=z9PgdbYLbLU>

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	priority. For example, in applications like Lifeline, a user speaks to the computer program and the computer program responds.¹¹¹ To the extent Plaintiff argues that the Oculus DK1 System does not disclose this limitation, either expressly, implicitly, and/or by inherency, a person of ordinary skill in the art would have determined that the limitation would have been obvious in light of the Oculus DK1 System alone or in combination with any applicant admitted prior art, the knowledge of one of ordinary skill in the art, or any one or more of the references identified in Meta's Invalidity Contentions under Section IV.J.3 for at least the reasons stated in Meta's Invalidity Contentions cover pleading. <i>See, e.g., Chou</i> at 7:62-8:30 ("Referring again to FIG. 2, the standalone environment sensing device 200 can optionally include a set of user controls 232. The visually impaired person can utilize the user controls 232 to customize various aspects of the operation of the sensing device 200 including, but not limited to, the following. The visually impaired person can utilize the user controls to adjust various properties of the virtual sound sources such as the type of sound that emanates from each of the virtual sound sources, the volume of the sound that emanates from each of the virtual sound sources, and the frequency of the sound that emanates from each of the virtual sound sources, among other things. The visually impaired person can also utilize the user controls to choose different modes of operation such as a walk mode, a read mode, an analyze environment mode, and a manipulate object mode, among others. The visually impaired person can also utilize the user controls to adjust the field of view of the object sensor 202. It will be appreciated that the visually impaired person can make these adjustments both on-the-fly (i.e., when he is actively using the sensing device to determine the spatial geometry of his current physical environment) and offline

¹¹¹ *See, e.g.* LIFELINE: The Game Controlled ENTIRELY By Your Voice (September 11, 2018) at 2:02, <https://www.youtube.com/watch?v=XzmHrMqrKyo>; Lifeline: Voice Action Adventure [Part 2] The Room (September 10, 2013), <https://www.youtube.com/watch?v=TzXr1qD05ZM>; <https://www.ign.com/articles/2004/03/03/lifeline> (Lifeline review posted March 3, 2004); [https://en.wikipedia.org/wiki/Lifeline_\(video_game\)](https://en.wikipedia.org/wiki/Lifeline_(video_game)) (Lifeline released in 2003); *see also, e.g.*, Kinectimals – XBOX360 with KINECT Part 1 TRUE HD – QUALITY 1080 (September 5, 2013) at 8:47, https://www.youtube.com/watch?v=BrCXV9_cQYw (showing voice exchange between user and computer tiger in Kinectimals application); How to Name Ur Nintendog (October 2, 2011) at 2:05, <https://www.youtube.com/watch?v=XnyPZshtiI> (showing voice exchange between user and computer dog in Nintendogs application).

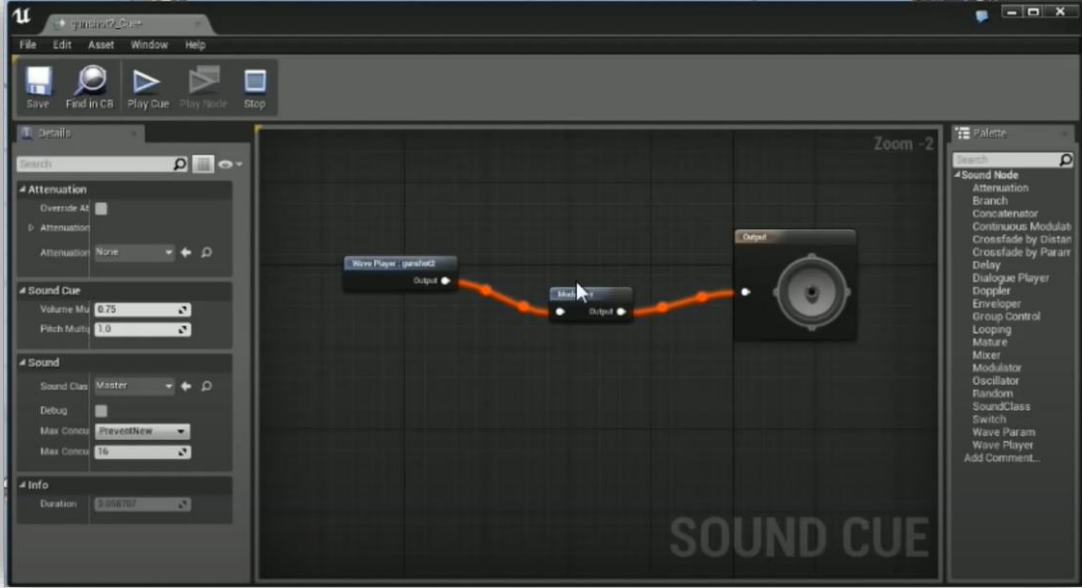
Claim	Oculus DK1 System's Exemplary Disclosures
	(e.g., when he is not actively using the sensing device to determine the spatial geometry of his physical environment). The user controls 232 can be implemented in various ways including, but not limited to, the following. In an exemplary embodiment of the augmented auditory perception technique described herein the user controls 232 include one or more physical control elements (not shown) such as buttons, or sliders, or any combination thereof. The sensing device 200 can optionally also include a location sensor 208 which is also coupled to the first computing device 210 and operates in conjunction therewith to determine the location coordinates (such as latitude and longitude, among others) of the sensing device 200. Various types of devices can be employed for the location sensor 208 such as a global positioning system (GPS) sensor, among others.”), Fig. 2; Jarvinen at 17:37-48 (“Referring now to FIG. 5, a flow diagram an example embodiment is provided. In FIG. 5, a device such as, for example, communication device 90 may detect one or more hand gestures to manipulate one or more selected audio objects. The hand gestures may be gestures of a bare hand of a user that may not necessarily be currently holding an apparatus (e.g., apparatus 50). As described above, the communication device 90 may be embodied in a wrist band, bracelet (e.g., a wrist bracelet), game controller, ring, glove, pen, or any other device that is worn by a user or is otherwise attached to the user and which detects hand gestures of the user.”), 12:39-42 (“The gesture module 78 may analyze this information to modify an audio object(s) (e.g., an audio signal (e.g., a spatial audio signal)) based in part on the movements of the hand(s), as described more fully below.”), Fig. 5; Cohen 1991 II at 39 (“With a device like a DataGlove, a user can point and gesticulate using a 3D workspace envelope.”), 39 (“Pointing at a source indicates it, as a prelude for selection by grasping”), 57 (“The standard pointing device in a window/icon/menu/pointing device (wimp) system is a mouse. A mouse, trackball (a mouse on its back), or joystick would suffice for positioning objects in 2-space. One can imagine direct control of position (with a mouse, trackball, or DataGlove, say), steering control (with a return-to-center joystick, perhaps), or programmed control (automatic circulation),” “for instance, used joysticks to manipulate crudely spatialized sources. As long as visual tokens for the spatial sound objects are accessible through the workstation, they can be manipulated through the operations described above. For example, a mouse-based system finds analogs to indicating, highlighting, and relocating in pointing, clicking, and dragging. A speaker might be singled out for special attention by clicking her token, which would throw a spotlight on her voice.”), 90 (“In a gestural interface (like Handy Sound’s), pointing and grasping are natural postures for indicating and securing.”); Li

Claim	Oculus DK1 System's Exemplary Disclosures
	305 at 14:5-18 (“FIG. 7 illustrates a method for simultaneously generating configurable three-dimensional (3D) sounds using a microphone array system. Three-dimensional (3D) sound comprises 3D surround sound, 3D binaural sound, and 3D stereo sound. 3D sound comprises, for example, music, speech, any audio signal, etc., and is used with or without 3D images, 3D movies, and 3D videos. 3D sound allows a user to experience sound in a 3D space. As used herein, the term “user” refers to a listener of a sound recording, or a person receiving an audio signal on audio media. The 3D sound is represented as a 3D binaural sound when used with a headset or as a 3D surround sound when used with multiple loudspeakers, for example, in a home theater speaker system. The 3D stereo sound is considered as a special case of the 3D sound.”); Billinghurst 1998 at 5 (“A hand held Logitech wireless trackball with three buttons is used as the primary input device.”), 167-68 (6DoF “wand type pointing devices” and “joysticks” allow users to “point at or manipulate virtual objects”); Pedersen at 9:6-21 (“The user may move the symbols into desired positions on the display using the user interface of the control device. For example, the display may be a touch sensitive display allowing the user to move the symbols by touching and dragging the symbols as is well-known in the art of smartphones. When the symbols have been moved into their desired positions on the display, the processor controls the corresponding binaural filters connected to respective input signals from sound sources represented by the symbols, for selection of directional transfer function corresponding to the positions on the display of the symbols representing the sound sources with relation to the symbol representing the user, whereby the user perceives the Sound sources to be positioned in the directions, or at the positions, indicated by the respective symbols positions on the display.”), 16:55-61 (“In addition, the microphones of binaural hearing aid 10A, 10B may be used for reception of spoken commands by the user transmitted (not shown) to the Smartphone 110 for speech recognition in a processor 130 of the smartphone 110, for decoding of the spoken commands and for controlling the hearing device system 10 to perform actions defined by respective spoken commands.”); Boustead at 13:5-44 (“FIG. 2 illustrates a Graphical User Interface (GUI) 200 of a conference scene which may be provided at the conference server 100 and/or at the terminals 120. If provided at a terminal 120, the GUI 200 may enable a participant to modify the conference scene as perceived at the terminal 120. In an embodiment, the GUI 200 enables a chairperson of an audio conference to place the conference participants within a conference scene. The GUI 200 may indicate the participants 201 of the audio conference. The participants 201 may correspond to the originators of the audio signals comprised within a set of

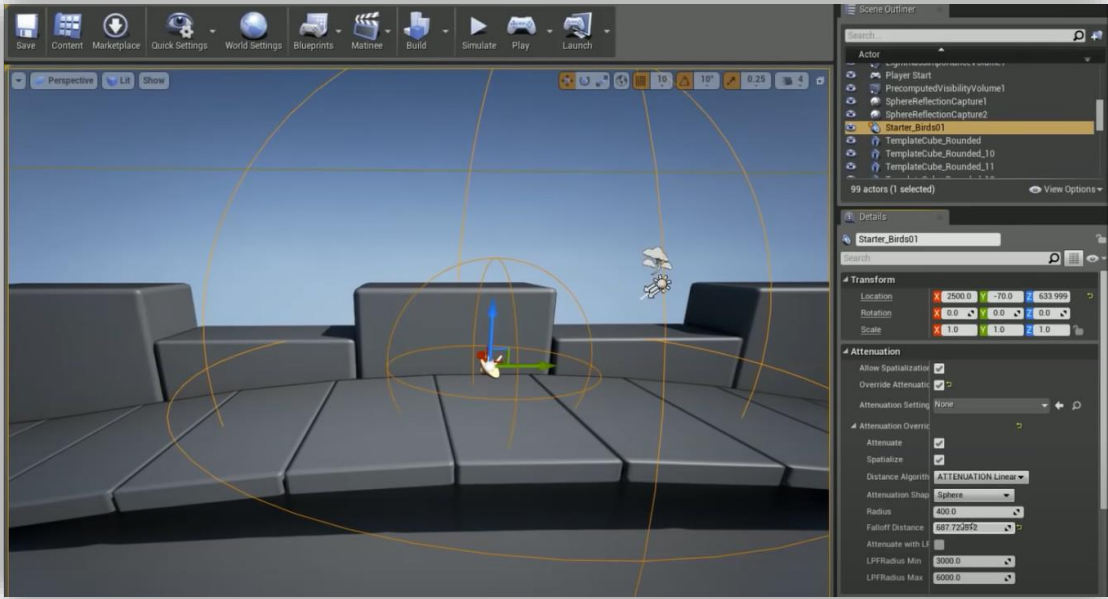
Claim	Oculus DK1 System's Exemplary Disclosures
	downstream audio signals. As such, the GUI 200 may indicate up to (M-1) participants 201,” Fig. 2; Bedingfield at 6:27-51 (“From the decision block 304, the listener may select the mode for modifying individual participants via route B at the block 308. At a selection block 322, the listener may select a setting, such as to place the focus at a block 324, to change a participant's volume at a block 326, or to change a participant's location at a block 328. If the listener selects to place the focus at the block 324, the listener then selects a participant for the focus (the focus object). The focus object's volume may then be amplified above the volume level of the other participants. For example, when multiple participants are speaking during a conference, the listener may desire to place the focus on the participant the listener desires to hear above the other speaking participants. If the listener selects to change the volume at the block 326, the listener may select a participant and adjust the volume, or other aspects of the participants sound such as the aspects adjustable by the block 316. If the listener selects to change the location at the block 328, the listener selects a participant and then selects a new location for the participant within the sound field. The listener may also relocate his position within the sound field at the block 328. After the setting is selected at the selection block 322 and a setting is selected and implemented at the blocks 324, 326 or 328, the method 300 advances to the decision block 318 and then to either the decision block 304 or the block 320 as described above.”); Knappe at 9:43-67 (“GUI 100 can allow a user to manually partition the sound field. One possible GUI ‘look and feel’, illustrated in FIGS. 7A and 7B, shows a method of manual partitioning. FIG. 7A shows a GUI screen 110 at the start of a conference call. The presentation sound field is represented in GUI screen 110 by annular half-circle 112. Endpoints B, C, and D are portrayed respectively in blocks 114, 116, and 118 (endpoint D's block 118 is shown smaller than the others because D represents a monophonic sound source). The blocks initially appear to the inside of the half-circle 112, signaling that no sound field mapping is currently being done on any of these sources. FIG. 7B shows GUI screen 110 after manipulation by a listener. The listener has created a presentation sound field sector for each endpoint, e.g., by dragging and dropping blocks 114, 116, and 118 onto half-circle 112. Endpoint B now occupies sector 122, i.e., approximately the leftmost 75 degrees of the sound field. Endpoint C now occupies, sector 124, i.e., the 75 degree sector from about 15 degrees left of center to about 60 degrees right of center. Endpoint D now occupies sector 126, i.e., approximately the rightmost 30 degrees of the sound field. Note that the listener has replaced the generic labels of each endpoint with icons containing the names of the conference participants at each location. The listener can

Claim	Oculus DK1 System's Exemplary Disclosures
	also manipulate the widths of sectors 122, 124, and 126 by moving the sector dividers.”), Figs. 7A and 7B; Begault 2000 at 173 173 (“[A]udio in any virtual reality configuration can provide an important source of feedback. For instance, the VPL Data Glove works by analyzing a combination of detected finger positions and then using the software to match them to sets of predefined gestures (e.g., a peace sign, pointing with the index finger, squeezing hand as a fist).”).
1[d]. providing, through the electronic earphone being located at the head of the user and being in communication with the HPED, the binaural sound to the user during the voice exchange between the computer program and the user such that the origin of the voice of the computer program occurs at the SLP at the second location in empty space that is proximate to the first location and away from and proximate to the user.	The Oculus DK1 System discloses and/or renders obvious, alone or in combination with other prior art, “providing, through the electronic earphone being located at the head of the user and being in communication with the HPED, the binaural sound to the user during the voice exchange between the computer program and the user such that the origin of the voice of the computer program occurs at the SLP at the second location in empty space that is proximate to the first location and away from and proximate to the user” as embodied in the product itself and as reflected in other prior art references that describe it. See disclosures and cited evidence for limitations 1[pre], 1[a], and 1[c]. For example: The Oculus DK1 System discloses and/or renders obvious, alone or in combination with other prior art, “providing . . . the binaural sound to the user during the voice exchange between the computer program and the user such that the origin of the voice of the computer program occurs at the SLP”: For example, under at least Plaintiff’s theory of infringement, applications like Couch Knights provide “binaural sound to the user during the voice exchange between the computer program and the user such that an origin of the voice of the computer program occurs at the SLP.” As explained above for claim limitation 1[pre], in applications like Couch Knights, the sounds (e.g., footsteps and sword swings) produced at the knight character (or the “voice of the computer program”) originate from the knight character (“origin of the voice of the computer program occurs at the SLP”). For example, Couch Knights was created using the Unreal Engine 4 game engine.¹¹² Unreal Engine includes “Sound Node[s]” for game objects that allowed for spatialization of the object’s audio.

¹¹² <https://www.unrealengine.com/marketplace/en-US/product/couch-knights>.

Claim	Oculus DK1 System's Exemplary Disclosures
	 See, e.g., Unreal Engine 4 Tutorial – Sound Cues at 1:39.¹¹³

¹¹³ https://www.youtube.com/watch?v=rZhrjHSN_U (showing attenuation option for “Sound Node” in Unreal Engine 4).

Claim	Oculus DK1 System's Exemplary Disclosures
	 The screenshot shows the Unreal Engine 4 interface. The main viewport displays a 3D scene with a knight character in the center, surrounded by a wireframe sphere representing sound attenuation. The right-hand side of the interface shows the 'Scene Outliner' and 'Details' panels. The 'Details' panel for 'Starter_Birds01' is expanded, showing the 'Attenuation' section with various settings like 'Allow Spatialization', 'Distance Algorithm', and 'Radius'. See also, e.g., Unreal Engine 4 Tutorial – Ambient Audio (Basic!) at 1:06.¹¹⁴ When the knight character moves, “binaural sound,” such as spatialized and/or attenuated footstep sound, is produced from the knight character (or its corresponding SLP).¹¹⁵ The user is able to localize the knight character’s sounds to the knight character itself (and its corresponding SLP).

¹¹⁴ <https://www.youtube.com/watch?v=qtgY7esjB6I> (showing attenuation and “Allow Spatialization” options).

¹¹⁵ See Couch Knights on Oculus Rift DK1 (July 17, 2014), <https://www.youtube.com/watch?v=HcreLAfIqUs> (showing knight character making sounds, including footsteps, sword swings, and fireball noises, in response to user input); see also Couch Knights | Oculus Rift DK2 (August 24, 2014), <https://www.youtube.com/watch?v=bMQwLGRXyE8> (same).

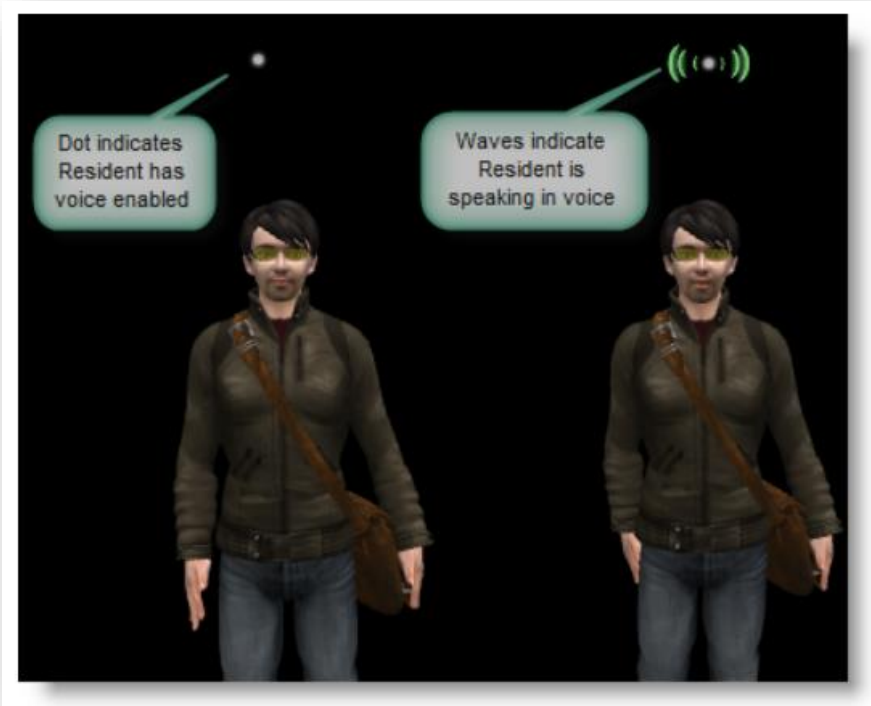
Claim	Oculus DK1 System's Exemplary Disclosures
	 See picture of an exemplary Couch Knights application (showing knight character that produces sound, such as footsteps and sword swings).¹¹⁶ As another example, under at least Plaintiff's theory of infringement, applications like SecondLife provide "binaural sound to the user during the voice exchange between the computer program and the user such that an origin of the voice of the computer program occurs at the SLP." As explained above for claim limitation 1[pre], in applications like SecondLife, sound clips ("voice of the computer program") originate from virtual objects (or SLPs).

¹¹⁶ <https://www.unrealengine.com/marketplace/en-US/product/couch-knights>

Claim	Oculus DK1 System's Exemplary Disclosures
	Scripting comments <i>Sound clips</i> • <code>llTriggerSound()</code> • Unattached - sounds occur where they're triggered. • Cannot be stopped with <code>llStopSound()</code>. • <code>llPlaySound()</code> • Attached - sounds follow the object they are in if it moves. • Only one at a time per prim. Playing another will stop the current sound. • <code>llLoopSound()</code> • Attached - sounds follow the object they are in if it moves. • This continuously loops the sound. • Only one at a time per prim. Playing another will stop the current sound. See SecondLife Wiki – Environment Sounds (Revision as of 20:11, July 15, 2012).¹¹⁷ Voices of other users (“voice of the computer program”) also originate from other users’ virtual avatars (or their corresponding SLPs). For example, the other user’s avatar has “a voice chat feature that lets avatars speak.”¹¹⁸

¹¹⁷ https://wiki.secondlife.com/w/index.php?title=Environment_Sounds&direction=prev&oldid=1195319.

¹¹⁸ See SecondLife Wiki – Lip Sync (last edited on October 13, 2009) at https://wiki.secondlife.com/wiki/Lip_sync.

Claim	Oculus DK1 System's Exemplary Disclosures
	 See Viewer 2 Quick Start Guide/Local chat and voice (February 23, 2010).¹¹⁹

¹¹⁹ https://wiki.secondlife.com/wiki/Viewer_2_Quick_Start_Guide/Local_chat_and_voice.

Claim	Oculus DK1 System's Exemplary Disclosures
	 See SecondLife Tutorial Video – Voice Chat Getting Started (November 14, 2008).¹²⁰ In addition, non-player characters (or “bots” in SecondLife) “can be created in the same way as a human-controlled avatar.”¹²¹ A bot “is being controlled by a program” and “can be used in various ways,” including for “user interaction” and as a “[r]oleplaying NPC (non-player characters) for

¹²⁰ https://wiki.secondlife.com/wiki/Video_Tutorials/More; see also <http://vidtuts.s3.amazonaws.com/VOICE-CHAT-Getting-started.mp4>.

¹²¹ <https://wiki.secondlife.com/wiki/Bot#:~:text=Second%20Life%20bot%20account%20can,choose%20it%20from%20available%20alternatives>

Claim	Oculus DK1 System's Exemplary Disclosures
	gaming and interactive areas.”¹²² A bot can also “[s]erve as a secretary or support robot by using autoresponder AI or remote chat assistant or “[b]e a non-personal character (NPC) in a roleplaying game.”¹²³ The audio for other residents in applications like SecondLife is spatialized. For example, the SecondLife documentation describes a “Voice Test” where “5 testers” “Edit > Preferences > Voice Chat > [x] Enable voice chat, Hear voice at: Avatar position, camera direction.” Then arrange themselves so that “4 testers [are] around one tester at north, south, east and west.” This test is used to “verify [that] each tester sounds like their voice is coming from their position inworld” and that “everyone sound like they are in the right place spatially.”

¹²²

<https://wiki.secondlife.com/wiki/Bot#:~:text=Second%20Life%20bot%20account%20can,choose%20it%20from%20available%20alternatives>

¹²³ https://web.archive.org/web/20130723023800/https://wiki.secondlife.com/wiki/Second_Life_bot_software_comparison

Claim	Oculus DK1 System's Exemplary Disclosures
	Voice Test VERSION 0.1 LENGTH 00:00 TESTERS 5 OVERVIEW Coming SETUP Up to 5 normal users, (can be done with 2) Spatial sound testing with gathered groups • Setup: Have each of 5 testers do the following: Edit > Preferences > Voice Chat > [x] Enable voice chat, Hear voice at: Avatar position, camera direction. • Arrange 4 testers around one tester at north, south, east and west, like this: <pre><tab> . Tester N . Tester W Tester C Tester E . </tab></pre> • Tester C: Face Tester N. • Cardinal Testers: Speak one at a time starting with Tester N and going clockwise around Tester C (N followed by E followed by S followed by W). • Tester C: Without moving, verify each tester sounds like their voice is coming from their position inworld. • Tester C: Rotate your avatar to face Tester S. • Cardinal Testers, repeat the round robin above, starting with Tester S. • Tester C: Without moving, verify each tester sounds like their voice is coming from their position inworld. • Tester C: Alt-Zoom on something out of range of the testers. * ... • Group in a circle • Does everyone sound like they are in the right place spatially? • If someone moves away, do they get quieter? • Group with members behind you • Can you hear all members, including those behind you? See SecondLife Wiki – Voice Test (November 26, 2007).¹²⁴

¹²⁴ https://wiki.secondlife.com/wiki/Voice_Test.

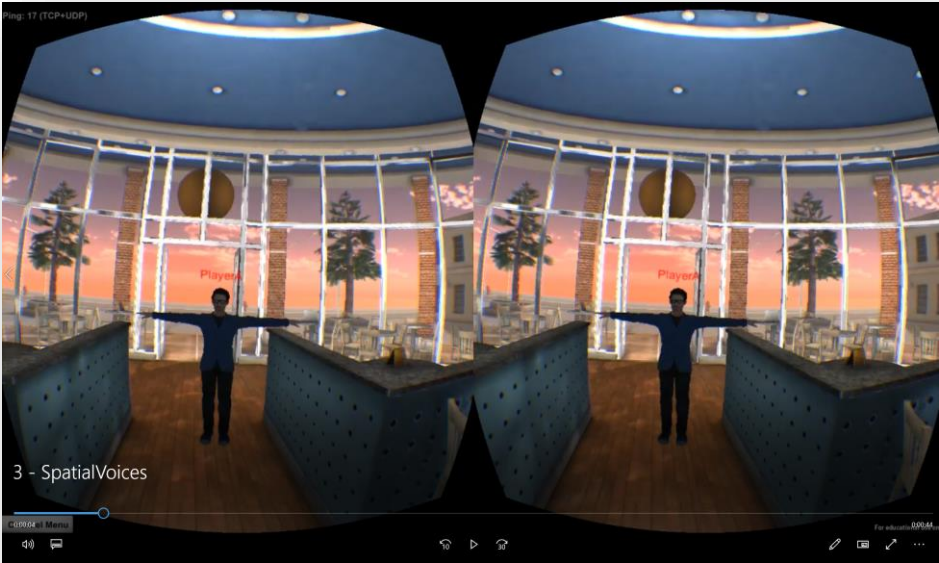
Claim	Oculus DK1 System's Exemplary Disclosures
	The SecondLife documentation also explains that “3D position” is used by the <i>Session.Set3Dposition.1</i> method for both the “speaker and listener” and that <i>Session.Set3Dposition.1</i> “describes the speaking position and the listening position for this avatar.”

Session.Set3DPosition.1

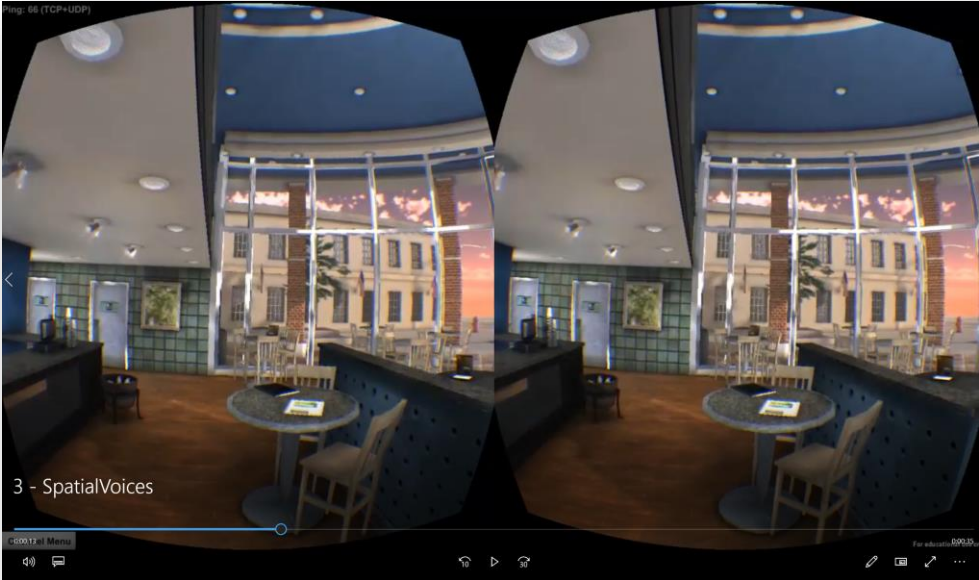
When sending a 3D position for speaker and listener, the "listener" is either the avatar position or the camera position. That is, it describes the speaking position and the listening position for this avatar.

```
<Request requestId="114" action="Session.Set3DPosition.1">
  <SessionHandle>c1_m1000abcdefghijklmnopqrstuvwxy1</SessionHandle>
  <OrientationType>legacy</OrientationType>
  <SpeakerPosition>
    <Position>
      <X>261451</X>
      <Y>26.9568</Y>
      <Z>-283000</Z>
    </Position>
    <Velocity>
      <X>0</X>
      <Y>0</Y>
      <Z>0</Z>
    </Velocity>
    <AtOrientation>
      <X>0.816965</X>
      <Y>0</Y>
      <Z>-0.576688</Z>
    </AtOrientation>
    <UpOrientation>
      <X>0</X>
      <Y>1</Y>
      <Z>0</Z>
    </UpOrientation>
    <LeftOrientation>
      <X>-0.576688</X>
      <Y>0</Y>
      <Z>-0.816965</Z>
    </LeftOrientation>
  </SpeakerPosition>
  <ListenerPosition>
    <Position>
      <X>261448</X>
      <Y>27.9639</Y>
      <Z>-283001</Z>
    </Position>
    <Velocity>
      <X>0</X>
      <Y>0</Y>
      <Z>0</Z>
    </Velocity>
    <AtOrientation>
      <X>0.795791</X>
      <Y>0</Y>
      <Z>-0.559283</Z>
    </AtOrientation>
    <UpOrientation>
      <X>0</X>
      <Y>1</Y>
      <Z>0</Z>
    </UpOrientation>
    <LeftOrientation>
      <X>-0.574999</X>
      <Y>0</Y>
      <Z>-0.818154</Z>
    </LeftOrientation>
  </ListenerPosition>
</Request>
```

The viewer doesn't get a response

Claim	Oculus DK1 System's Exemplary Disclosures
	See SecondLife Wiki – Voice/Technical (November 18, 2009).¹²⁵ As another example, under at least Plaintiff's theory of infringement, applications like VRChat provide "binaural sound to the user during the voice exchange between the computer program and the user such that an origin of the voice of the computer program occurs at the SLP." As explained above for claim limitation 1[pre], in applications like VRChat, another user's voice ("voice of the computer program") originates from that user's virtual avatar which is associated with an SLP ("origin of the voice of the computer program occurs at the SLP").  See photograph of an exemplary Oculus DK1 System (showing another avatar in front of the user's own avatar (point of view) where the "voice of the computer program" is localized to the other

¹²⁵ <https://wiki.secondlife.com/wiki/Voice/Technical#Session.Set3DPosition.1>.

Claim	Oculus DK1 System's Exemplary Disclosures
	avatar).¹²⁶ When the user turns to the left, the sound is now originating to the right for the user, localizing to the other avatar as “binaural sound.”  See photograph of an exemplary Oculus DK1 System (showing VRChat). For example, the VRChat development diary from 2014 explains that the developer used “two libraries” in addition to Unity3D: “Tnet (for networking) and Uspeak (for voicechat),” which were used with “a sweet CoffeeShop environment on the Unity Asset Store.”¹²⁷ Uspeak includes

¹²⁶ META-8KHZ_00046187; *see also* META-8KHZ_00046233; META-8KHZ_00046188; Oculus Rift DK1 - VRChat 0.1 (1080p) (January 16, 2014) <https://www.youtube.com/watch?v=z9PgdbYlLU>

¹²⁷ VRChat v0.1 Development, <https://web.archive.org/web/20140121030858/http://grahamgaylor.com/2014/01/>; *see also* <https://web.archive.org/web/20140121030107/http://grahamgaylor.com/2013/06/> (“Now I’ll explain the code implementation using

Claim	Oculus DK1 System's Exemplary Disclosures
	“[s]patial audio support” for voice chat that provided “directional audio for a truly immersive experience.”¹²⁸ Furthermore, the Unity Developers Manual from 2014 explains that Unity supported 3D audio. For example, audio clips from sound clip files are “played back so as to simulate its position in the game world’s 3D space” if the “audio clip is marked as a 3D Sound.”¹²⁹ “3D sounds emulate the distance and location of sounds by attenuating volume and panning across speakers.”¹³⁰

Unity3D using C#.”); <https://web.archive.org/web/20140121030112/http://grahamgaylor.com/2013/09/> (“I decided to go with Unity3D as my game engine for two reasons. First off, I have the most experience with Unity, I’ve played around with the UDK, but I came crawling back to Unity. My second and more important reason is that there are Unity plugins for most of the hardware I’m using.”); <https://web.archive.org/web/20140121030858/http://grahamgaylor.com/2014/01/> (“I used Unity3D for both projects, but used better networking and voice chat libraries in the second iteration.”); <https://web.archive.org/web/20140120214705/http://grahamgaylor.com/category/unity3d/>; <https://web.archive.org/web/20140121030102/http://grahamgaylor.com/2013/01/>; <https://web.archive.org/web/20140121093515/http://grahamgaylor.com/2013/04/> (“To start, the Oculus Developer Center is now open and ready for devs to download the Rift SDK. What this means is that developers will now be able to integrate the Rift into their games and/or start building games from scratch with an actual test unit to build it around. As of now (April 1), it seems the only SDK downloads are the Windows SDK and the Unity 4 Pro integration package.”); <https://web.archive.org/web/20140121030847/http://grahamgaylor.com/2013/05/>.

¹²⁸ See [RELEASED] USpeak Voice Chat – Voice Chat For All Your Multiplayer Games, <https://forum.unity.com/threads/released-uspeak-voice-chat-voice-chat-for-all-your-multiplayer-games.154609/> (last edited November 17, 2013).

¹²⁹ See <https://web.archive.org/web/20140601033451/http://docs.unity3d.com/Manual/class-AudioClip.html>.

¹³⁰ See <https://web.archive.org/web/20140601033451/http://docs.unity3d.com/Manual/class-AudioClip.html>.

Claim	Oculus DK1 System's Exemplary Disclosures
	Basic Theory In real life, sounds are emitted by objects and heard by listeners. The way a sound is perceived depends on a number of factors. A listener can tell roughly which direction a sound is coming from and may also get some sense of its distance from its loudness and quality. A fast-moving sound source (like a falling bomb or a passing police car) will change in pitch as it moves as a result of the Doppler Effect. Also, the surroundings will affect the way sound is reflected, so a voice inside a cave will have an echo but the same voice in the open air will not.  Audio Sources and Listener Audio Overview – Unity Documentation (June 3, 2014).¹³¹ As another example, VRChat was “created by using the Unity 3D engine and is a platform for users to meet online and chat with each other in environments they have made themselves. The software has made it easy for developers to add more than one user to any video game or other application, provided they are of the Unity-developed environments. The software used by the developers takes its cues from an amalgamation of different things: head gaze direction, body gestures and 3D positional audio to do its best to develop an immersive, fun social experience for all users involved.” See VR Chat Releasing for Oculus Rift (December 2, 2014).¹³² As early as 2011, Unity includes binauralization, for example as shown in the “Procedural Audio and Binauralisation in Unity’s Bootcamp Demo (v 1.0)” as shown below:

¹³¹ <https://web.archive.org/web/20140603055903/http://docs.unity3d.com/Manual/AudioOverview.html>.

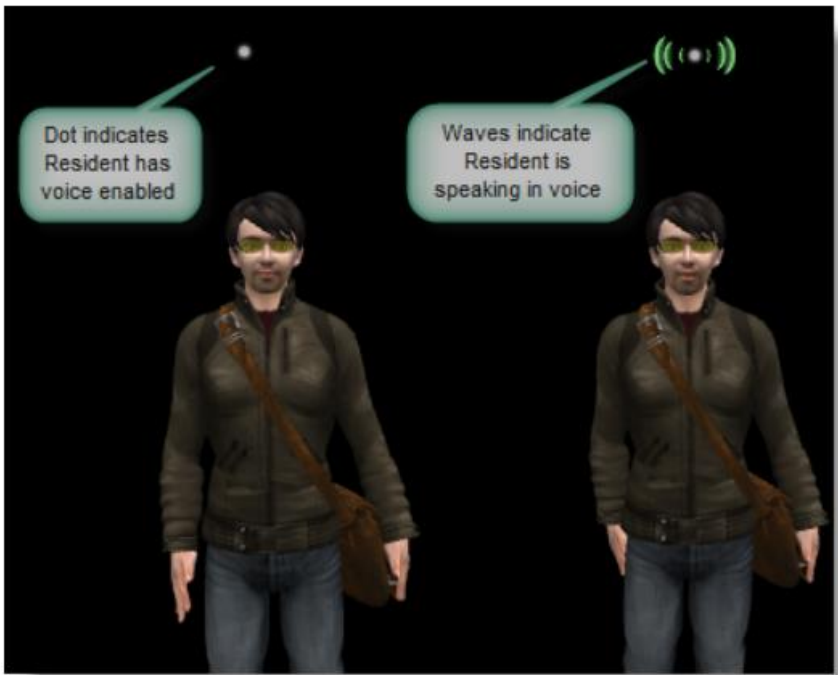
¹³² <https://virtualrealitytimes.com/2014/12/02/vr-chat-releasing-for-oculus-rift/>; see also VRChat now in Oculus Rift app store (December 3, 2014) <https://www.hypergridbusiness.com/2014/12/vrchat-now-in-oculus-rift-app-store/>; Oculus Rift DK1 – VRChat 0.1 (1080p) (January 16, 2014) <https://www.youtube.com/watch?v=z9PgdbYLbLU>; VRChat v0.1 Released https://www.reddit.com/r/oculus/comments/1vcbwk/vrchat_v01_released/.

Claim	Oculus DK1 System's Exemplary Disclosures
	 The image is a screenshot from a Unity 3.0 Demo. It shows a first-person perspective of a character standing on a wooden walkway or bridge. The environment is a dark, industrial-looking area with wooden planks and metal railings. On the right side of the screen, there is a semi-transparent overlay of a binaural audio control panel. This panel has various checkboxes for audio settings, including 'ILD', 'ITD', 'First Reflections', 'Reverb Tail', and 'Binauralise (Headphones)'. It also has a 'p sounds' button and several sliders for 'Gain' and 'bass master'. The panel is titled 'Dissertation...' and has a menu bar with 'File', 'Edit', 'Window', and 'Help'. See Procedural Audio and Binauralisation in Unity's Bootcamp Demo (v 1.0) (Aug. 15, 2011).¹³³ The Oculus DK1 System discloses and/or renders obvious, alone or in combination with other prior art, an SLP “at the second location in empty space that is proximate to the first location and away from and proximate to the user”: For example, under at least Plaintiff’s theory of infringement, in applications like Couch Knights, the knight character (and its corresponding SLP) is located “at the second location in empty space” after the knight character is moved. The knight character “at the second location” is also

¹³³ <https://www.youtube.com/watch?v=sQlKPaKNCPY>

Claim	Oculus DK1 System's Exemplary Disclosures
	“proximate to the first location and away from and proximate to the user” after the knight character is moved, as shown below.  See picture of an exemplary Couch Knights application (showing knight characters that produces sound, such as footsteps and sword swings, apart from the user).¹³⁴

¹³⁴ <https://www.unrealengine.com/marketplace/en-US/product/couch-knights>. See also, e.g., Couch Knights on Oculus Rift DK1 (July 17, 2014), <https://www.youtube.com/watch?v=HcreLAfIqUs> (showing knight character moving from a first location to a second location “in empty space”); GDC 2014: Oculus Rift DK2 ‘Couch Knights’ Gameplay (March 21, 2014), <https://www.youtube.com/watch?v=CoyjO-etC30> (showing a user moving a knight character from a first location to a second location “in empty space”).

Claim	Oculus DK1 System's Exemplary Disclosures
	As another example, under at least Plaintiff's theory of infringement, in applications like SecondLife, virtual game objects and/or the other user's avatar is located "at the second location in empty space" after the virtual game objects and/or avatar are moved by a user. The virtual game objects and/or avatar is also "proximate to the first location and away from and proximate to the user" after the virtual game objects and/or avatar are moved by a user, as shown below. 

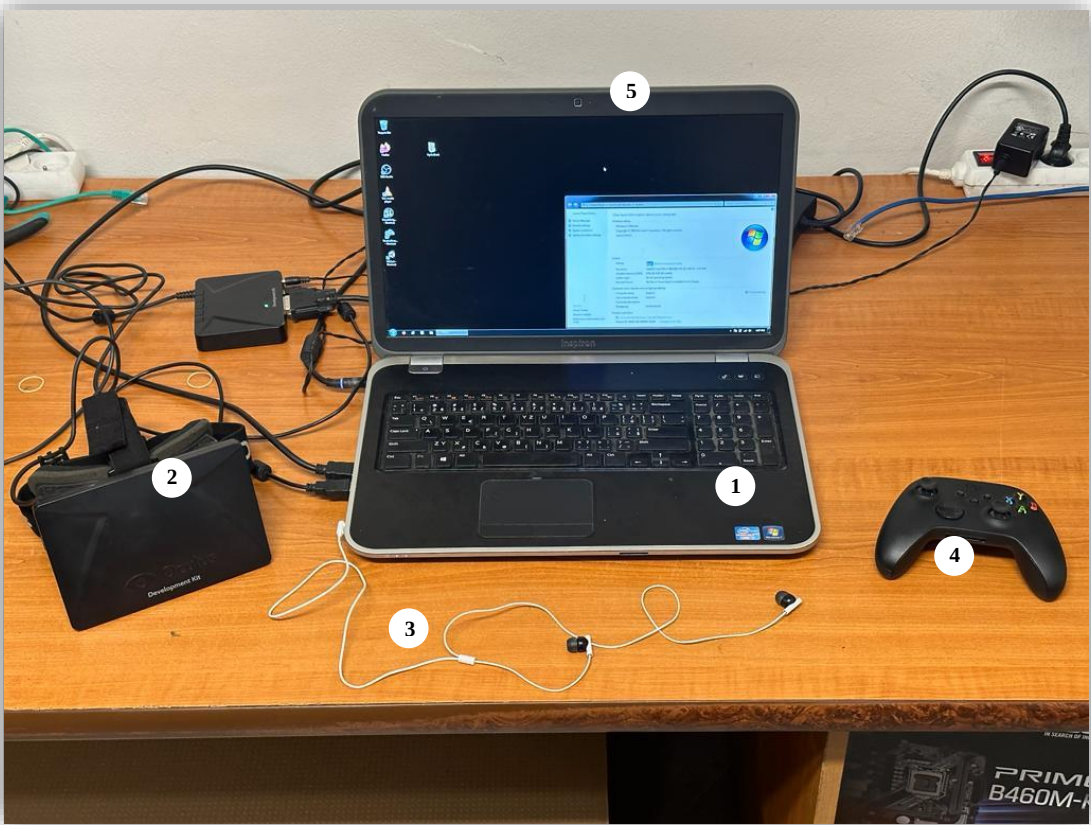
Claim	Oculus DK1 System's Exemplary Disclosures
	See Viewer 2 Quick Start Guide/Local chat and voice (February 23, 2010) (showing other user's avatar "in empty space").¹³⁵  See How to Use Oculus Rift with Second Life at 1:05.¹³⁶ As another example, under at least Plaintiff's theory of infringement, in applications like VRChat, the other user's avatar (and corresponding SLP) is located "at the second location in empty space" after the other user moves the avatar. The other user's avatar is also "proximate to the first location and away from and proximate to the user" after the other user moves the avatar, as shown below.

¹³⁵ https://wiki.secondlife.com/wiki/Viewer_2_Quick_Start_Guide/Local_chat_and_voice; see also Second Life on a Oculus Rift (January 21, 2014), <https://www.youtube.com/watch?v=MFh3buY8KFA>.

¹³⁶ <https://www.youtube.com/watch?v=TLL5JVwG118> (showing virtual objects (and corresponding SLPs) "in empty space").

Claim	Oculus DK1 System's Exemplary Disclosures
	 See photograph of an exemplary Oculus DK1 System (showing other user's avatar "in empty space").¹³⁷ The Oculus DK1 System discloses and/or renders obvious, alone or in combination with other prior art, "providing . . . the binaural sound to the user" "through the electronic earphone being located at the head of the user and being in communication with the HPED": Any application, including applications like Couch Knights, SecondLife, and VRChat, can use the exemplary electronic earphones (3) through the audio jack interface on the exemplary Dell Inspiron 7720. Thus, the exemplary earphones are in communication with an exemplary Oculus DK1 System, including the Oculus Rift DK1 headset (2) and controller (4) (HPED). An exemplary

¹³⁷ See also Oculus Rift DK1 – VRChat 0.1 (1080p) <https://www.youtube.com/watch?v=z9PgdbYLbLU>.

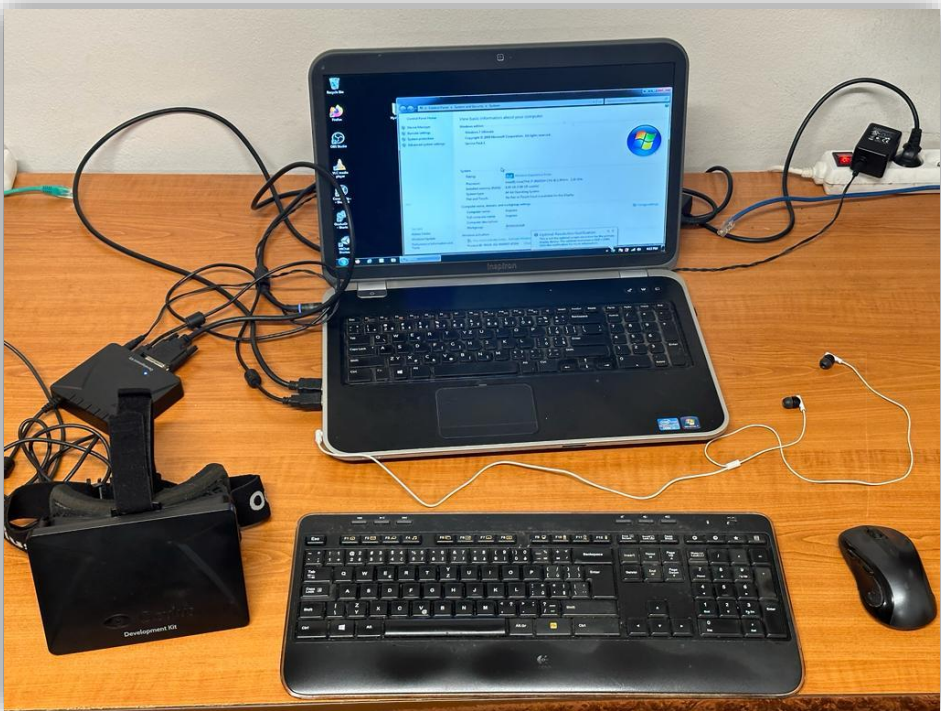
Claim	Oculus DK1 System's Exemplary Disclosures
	Oculus Rift System can also be used with a handheld portable mouse and other handheld portable electronic devices.¹³⁸ 

¹³⁸ See, e.g., Oculus Rift DK1 + Razer Hydra – Oculus Maxiumus (1080p) (February 3, 2014), https://youtu.be/1R--5oi69_4?si=QsvhRY1xQY-ZBToB (showing DK1 being used with handheld Razer Hydra controllers); The Oculus VR Best Practices Guide (April 30, 2014) at 31, META-8KHZ_00048116 (DK1 works with “Mouse, Keyboard, Gamepad”).

Claim	Oculus DK1 System's Exemplary Disclosures
	See photograph of an exemplary Oculus DK1 System.¹³⁹ Any application can use electronic earphones through the audio jack interface (shown below) on the Dell Inspiron 7720.¹⁴⁰

¹³⁹ META-8KHZ_00047800; *see also* META-8KHZ_00047801; META-8KHZ_00047802; META-8KHZ_00047799; META-8KHZ_00047805; META-8KHZ_00047804; META-8KHZ_00047803.

¹⁴⁰ The electronic earphones may be wireless and can connect to a computer via, for example, Bluetooth. *See, e.g.*, LG Tone+ HBS-730: Where Have You Been All My Life (February 18, 2013), <https://www.wired.com/2013/02/lg-tone-plus-hbs-730/> (describing wireless LG Tone+ HBS-730 earphones with Bluetooth); BackBeat GO 2 Earbuds Tutorial (November 5, 2013), <https://www.youtube.com/watch?v=EOwxkSW1UbM> (describing wireless BackBeat GO 2 Earbuds with Bluetooth); *see also, e.g.*, META-8KHZ_00047873 at 31, 33 (supports “Bluetooth combo card”).

Claim	Oculus DK1 System's Exemplary Disclosures
	 See photograph of an exemplary Oculus DK1 System (showing earphones).¹⁴¹

¹⁴¹ META-8KHZ_00047799; META-8KHZ_00047800

Claim	Oculus DK1 System's Exemplary Disclosures
	Ports and connectors Audio - one microphone-in port - one stereo headphone/speaker/microphone combo port - one digital microphone See Specification Sheet for Dell Inspiron 7720 (2013).¹⁴² To the extent Plaintiff contends that the Oculus DK1 System with applications like Couch Knights, SecondLife, and/or VRChat does not include a “voice exchange between the computer program and the user,” a person of ordinary skill in the art would have found it obvious to implement a user speaking to a computer program and a computer program speaking back based on other applications that included such functionality prior to any date to which the '196 Patent can claim priority. For example, in applications like Lifeline, a user speaks to the computer program and the computer program responds.¹⁴³
CLAIM 4	

¹⁴² META-8KHZ_00045115

¹⁴³ See, e.g. LIFELINE: The Game Controlled ENTIRELY By Your Voice (September 11, 2018) at 2:02, <https://www.youtube.com/watch?v=XzmHrMqrKyo>; Lifeline: Voice Action Adventure [Part 2] The Room (September 10, 2013), <https://www.youtube.com/watch?v=TzXr1qD05ZM>; <https://www.ign.com/articles/2004/03/03/lifeline> (Lifeline review posted March 3, 2004); [https://en.wikipedia.org/wiki/Lifeline_\(video_game\)](https://en.wikipedia.org/wiki/Lifeline_(video_game)) (Lifeline released in 2003); see also, e.g., Kinectimals – XBOX360 with KINECT Part 1 TRUE HD – QUALITY 1080 (September 5, 2013) at 8:47, https://www.youtube.com/watch?v=BrC XV9_cQYw (showing voice exchange between user and computer tiger in Kinectimals application); How to Name Ur Nintendog (October 2, 2011) at 2:05, <https://www.youtube.com/watch?v=XnyPZshtiI> (showing voice exchange between user and computer dog in Nintendogs application).

Claim	Oculus DK1 System's Exemplary Disclosures
4[pre][a]. The method of claim 1 further comprising: tracking a head orientation of the user as the user moves with respect to the SLP at the second location; and	The Oculus DK1 System discloses and/or renders obvious, alone or in combination with other prior art, “[t]he method of claim 1 further comprising: tracking a head orientation of the user as the user moves with respect to the SLP at the second location” as embodied in the product itself and as reflected in other prior art references that describe it. <i>See</i> disclosures and cited evidence for claim 1. For example: The Oculus DK1 System discloses and/or renders obvious, alone or in combination with other prior art, “tracking a head orientation of the user as the user moves with respect to the SLP at the second location”: The Oculus DK1 System tracks the user’s head orientation. The Oculus Rift DK1 headset includes an orientation sensor inside the headset casing (shown below) that includes IMU tracking in 9 dimension (9 DoF) – acceleration sensor (xyz), gyroscope (xyz) and magnetometer (xyz).¹⁴⁴

¹⁴⁴ See Oculus Rift DK1 Teardown (April 9, 2013), <https://www.ifixit.com/Teardown/Oculus+Rift+DK1+Teardown/13682> (“Head tracking accomplished with 1000 Hz absolute 9DOF orientation sensor (includes gyroscope, accelerometer, and magnetometer).”).

Claim	Oculus DK1 System's Exemplary Disclosures
	See photograph of an exemplary Oculus DK1 System.¹⁴⁵ Orientation Tracking The Oculus Rift hardware includes a gyroscope, accelerometer, and magnetometer. We combine the information from these sensors through a process known as <i>sensor fusion</i> to determine the orientation of the user's head in the real world, and to synchronize the user's virtual perspective in real-time. These sensors provide data to accurately track and portray yaw, pitch, and roll movements. The Oculus VR Best Practices Guide (April 30, 2014) at 18.¹⁴⁶

¹⁴⁵ META-8KHZ_00046195

¹⁴⁶ META-8KHZ_00048116.

Claim	Oculus DK1 System's Exemplary Disclosures
	In addition, the Oculus DK1 System can be used with a Razer Hydra device to track the user as the user moves in the real world such that the user's movement also occurs in the virtual world.¹⁴⁷ To the extent applications like Couch Knights, SecondLife, and/or VRChat do not natively support the Razer Hydra device, it would have been obvious to a person of ordinary skill in the art to modify the applications to support the Razer Hydra device like other games at the time.¹⁴⁸ For example, under at least Plaintiff's theory of infringement, in applications like Couch Knights, the user's head orientation is tracked with respect to the knight character (and its corresponding SLP) "at the second location."¹⁴⁹ As another example, under at least Plaintiff's theory of infringement, in applications like SecondLife, the user's head orientation is tracked with respect to the virtual objects and/or other users' avatars (and its corresponding SLP) "at the second location."¹⁵⁰

¹⁴⁷ See, e.g., Oculus Rift DK1 + Razer Hydra – Riftmax Theater, Minecrist, Sixense Tuscany (1080p) (February 2, 2014) at 17:48, <https://www.youtube.com/watch?v=pKnZMdRbHKk&t=1097s> (showing use of Razer Hydra with DK1 for movement tracking); Oculus Rift DK1 + Razer Hydra – Half-Life 2 – Part 10 (1080p), <https://www.youtube.com/watch?v=hloKHP1SLKE> (same); Minecraft | VIRTUAL REALITY MOD! (Razer Hydra & Oculus Rift!) | Mod Showcase (March 13, 2014), <https://www.youtube.com/watch?v=4GRL0M4MKww> (same).

¹⁴⁸ See, e.g., Oculus Rift DK1 + Razer Hydra – Riftmax Theater, Minecrist, Sixense Tuscany (1080p) (February 2, 2014) at 17:48, <https://www.youtube.com/watch?v=pKnZMdRbHKk&t=1097s>; Oculus Rift DK1 + Razer Hydra – Half-Life 2 – Part 10 (1080p), <https://www.youtube.com/watch?v=hloKHP1SLKE>; Minecraft | VIRTUAL REALITY MOD! (Razer Hydra & Oculus Rift!) | Mod Showcase (March 13, 2014), <https://www.youtube.com/watch?v=4GRL0M4MKww>.

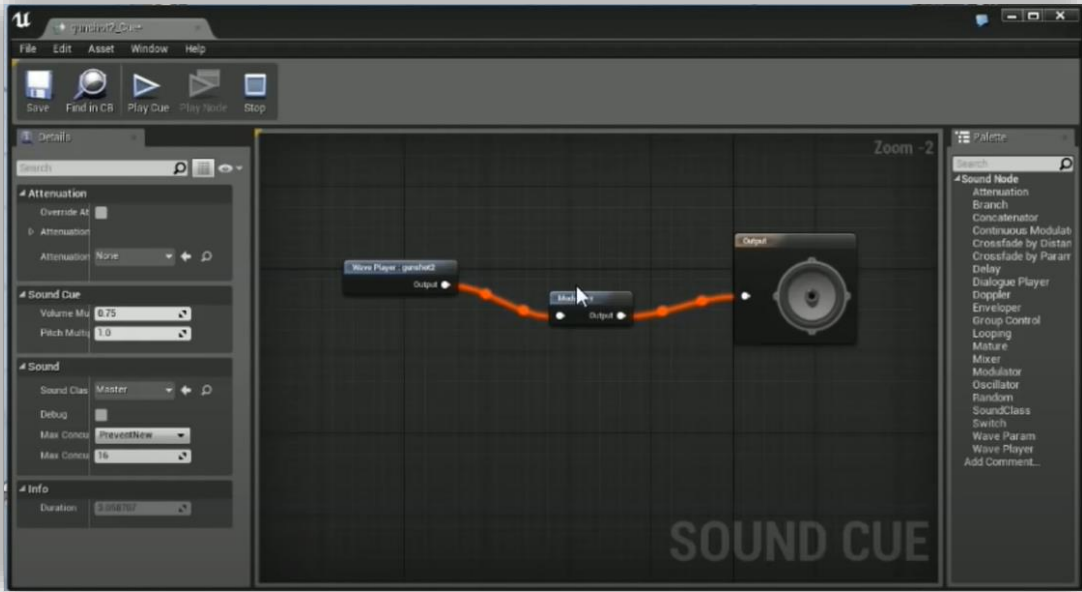
¹⁴⁹ See, e.g., GDC 2014: Oculus Rift DK2 'Couch Knights Gameplay, <https://www.youtube.com/watch?v=CoyjO-etC30> (showing the user's point of view change "with respect to" the knight character); Couch Knights on Oculus Rift DK1, <https://www.youtube.com/watch?v=HcreLAflqUs> (same).

¹⁵⁰ See, e.g., Second Life On a Oculus Rift, <https://www.youtube.com/watch?v=MFh3buY8KFA> (showing the user's point of view change "with respect to" other users' avatars); How to Use Oculus Rift with Second Life, <https://www.youtube.com/watch?v=TLL5JVwG118> (showing the user's point of view change "as the user moves").

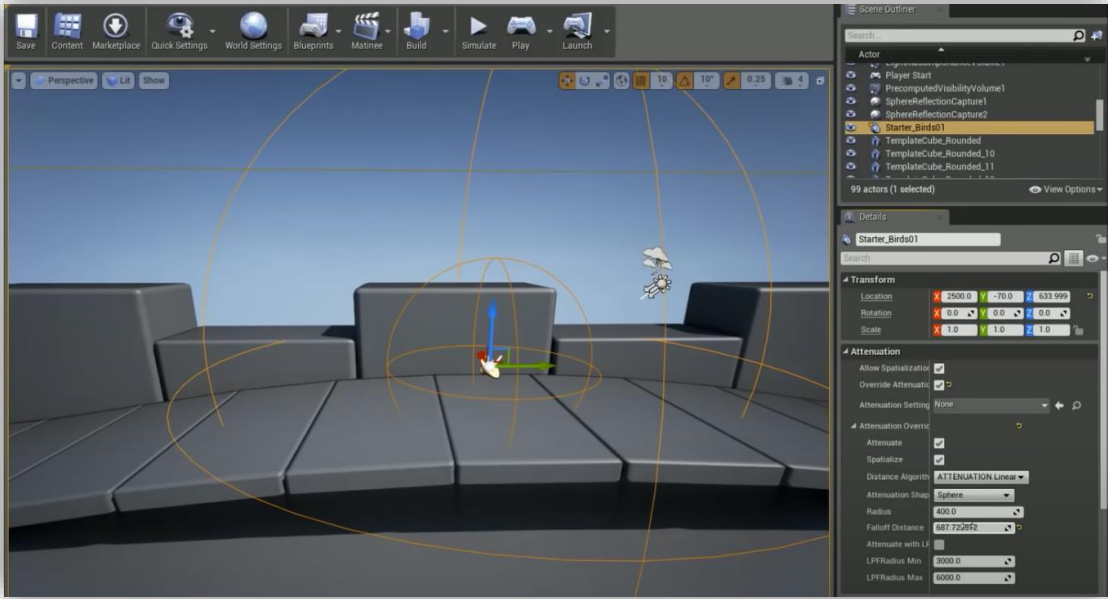
Claim	Oculus DK1 System’s Exemplary Disclosures
	As another example, under at least Plaintiff’s theory of infringement, in applications like VRChat, the user’s head orientation is tracked with respect to the users’ avatars (and their SLPs) “at the second location.” ¹⁵¹
4[b]. adjusting a sound of the voice of the computer program that the user hears through the electronic earphone so the sound of the voice of the computer program continues to appear to originate from the SLP at the second location even as the user moves with respect to the second location.	The Oculus DK1 System discloses and/or renders obvious, alone or in combination with other prior art, “adjusting a sound of the voice of the computer program that the user hears through the electronic earphone so the sound of the voice of the computer program continues to appear to originate from the SLP at the second location even as the user moves with respect to the second location” as embodied in the product itself and as reflected in other prior art references that describe it. <i>See</i> disclosures and cited evidence for claim 1 and limitations 4[pre][a]. For example: The Oculus DK1 System discloses and/or renders obvious, alone or in combination with other prior art, “adjusting a sound of the voice of the computer program that the user hears through the electronic earphone so the sound of the voice of the computer program continues to appear to originate from the SLP at the second location even as the user moves with respect to the second location.” Under at least Plaintiff’s theory of infringement, applications like Couch Knights “adjust[]” the sounds produced by the knight character (SLP), such as footsteps or sword swings (“voice of the computer program”), that the user hears through the electronic earphone (3) so the sounds “continue[] to appear to originate from” the knight character at the second location “even as the user moves,” for example by moving their head, “with respect to the second location.” The knight character’s sounds originate to the user from an SLP located at the knight character itself such that the knight character is associated with an SLP. For example, Couch Knights was created using the Unreal Engine 4 game engine.¹⁵² Unreal Engine includes “Sound Node[s]” for game objects that allowed for spatialization of the object’s audio.

¹⁵¹ *See, e.g.*, META-8KHZ_00046187 (showing user’s point of view change “with respect to” another user’s avatar); Oculus Rift DK1 – VRChat 0.1 (1080p) at 3:30, <https://www.youtube.com/watch?v=z9PgdbYLBLU> (same).

¹⁵² <https://www.unrealengine.com/marketplace/en-US/product/couch-knights>.

Claim	Oculus DK1 System's Exemplary Disclosures
	 See, e.g., Unreal Engine 4 Tutorial - Sound Cues at 1:39.¹⁵³

¹⁵³ https://www.youtube.com/watch?v=rZhrjHSN_U (showing attenuation option for “Sound Node” in Unreal Engine 4).

Claim	Oculus DK1 System's Exemplary Disclosures
	 The screenshot shows the Unreal Engine 4 interface. The main viewport displays a 3D scene with a knight character in the center, surrounded by a wireframe sphere and a grid. The right-hand side of the interface features a 'Details' panel for the selected actor, 'Starter_Bird01'. This panel includes sections for 'Transform' (Location, Rotation, Scale), 'Attenuation' (Allow Spatialization, Override Attenuation, Attenuation Setting), and 'Attenuation Override' (Attenuate, Spatialize, Distance Algorithm, Attenuation Shape, Radius, Falloff Distance, Attenuate with L1, LPFRadius Min, LPFRadius Max). The 'Attenuation' section is expanded, showing various settings for sound attenuation. See also, e.g., Unreal Engine 4 Tutorial - Ambient Audio (Basic!) at 1:06.¹⁵⁴ When the user moves their head, the sound produced by the knight character (“the sound of the voice of the computer program”) continues to originate from the knight character (and corresponding SLP) at the knight character’s second location.¹⁵⁵

¹⁵⁴ <https://www.youtube.com/watch?v=qtgY7esjB6I> (showing attenuation and “Allow Spatialization” options).

¹⁵⁵ See, e.g., Couch Knights on Oculus Rift DK1, <https://www.youtube.com/watch?v=HcreLAflqUs> (showing sound originating from knight character as user moves their head); see also <https://forums.unrealengine.com/t/hmd-inputs-vr-pitch-yaw-roll/6523/5> (posted in June 2014) (showing discussion about head mounted display support in Unreal Engine); <https://forums.unrealengine.com/t/hmd-oculus-rift-always-starting-oriented-in-x-why/279640> (posted in April 2014) (showing discussion about head mounted display and orientation

Claim	Oculus DK1 System's Exemplary Disclosures
	As another example, under at least Plaintiff's theory of infringement, applications like SecondLife "adjust" the sounds produced by virtual objects and/or other users' avatars ("sound of the voice of the computer program") that the user hears through the electronic earphone (3) so the sounds "continue[] to appear to originate from" the virtual objects and/or other users' avatars at the second location "even as the user moves," for example by moving their head or own virtual avatar, "with respect to the second location." For example, the user can "hear voice chat" either from the camera position or from the avatar position. 

support in Unreal Engine); <https://forums.unrealengine.com/t/oculus-rift-support/277109> (posted in March 2014) (discussing Oculus Rift support in Unreal Engine).

Claim	Oculus DK1 System's Exemplary Disclosures
	See SecondLife Tutorial Video – Voice Chat Getting Started (November 14, 2008).¹⁵⁶ In addition, non-player characters (or “bots” in SecondLife) “can be created in the same way as a human-controlled avatar.”¹⁵⁷ A bot “is being controlled by a program” and “can be used in various ways,” including for “user interaction” and as a “[r]oleplaying NPC (non-player characters) for gaming and interactive areas.”¹⁵⁸ A bot can also “[s]erve as a secretary or support robot by using autoresponder AI or remote chat assistant or “[b]e a non-personal character (NPC) in a roleplaying game.”¹⁵⁹ The audio for other residents in applications like SecondLife is spatialized such that the calling party's avatar image is associated with an SLP. For example, the SecondLife documentation describes a “Voice Test” where “5 testers” “Edit > Preferences > Voice Chat > [x] Enable voice chat, Hear voice at: Avatar position, camera direction.” Then arrange themselves so that “4 testers [are] around one tester at north, south, east and west.” This test is used to “verify [that] each tester sounds like their voice is coming from their position inworld” and that “everyone sound like they are in the right place spatially.”

¹⁵⁶ https://wiki.secondlife.com/wiki/Video_Tutorials/More; see also <http://vidtuts.s3.amazonaws.com/VOICE-CHAT-Getting-started.mp4>.

¹⁵⁷

<https://wiki.secondlife.com/wiki/Bot#:~:text=Second%20Life%20bot%20account%20can,choose%20it%20from%20available%20alternatives>

¹⁵⁸

<https://wiki.secondlife.com/wiki/Bot#:~:text=Second%20Life%20bot%20account%20can,choose%20it%20from%20available%20alternatives>

¹⁵⁹ https://web.archive.org/web/20130723023800/https://wiki.secondlife.com/wiki/Second_Life_bot_software_comparison

Claim	Oculus DK1 System's Exemplary Disclosures
	Voice Test VERSION 0.1 LENGTH 00:00 TESTERS 5 OVERVIEW Coming SETUP Up to 5 normal users, (can be done with 2) Spatial sound testing with gathered groups • Setup: Have each of 5 testers do the following: Edit > Preferences > Voice Chat > [x] Enable voice chat, Hear voice at: Avatar position, camera direction. • Arrange 4 testers around one tester at north, south, east and west, like this: <pre><tab> . Tester N . Tester W Tester C Tester E . </tab></pre> • Tester C: Face Tester N. • Cardinal Testers: Speak one at a time starting with Tester N and going clockwise around Tester C (N followed by E followed by S followed by W). • Tester C: Without moving, verify each tester sounds like their voice is coming from their position inworld. • Tester C: Rotate your avatar to face Tester S. • Cardinal Testers, repeat the round robin above, starting with Tester S. • Tester C: Without moving, verify each tester sounds like their voice is coming from their position inworld. • Tester C: Alt-Zoom on something out of range of the testers. * ... • Group in a circle • Does everyone sound like they are in the right place spatially? • If someone moves away, do they get quieter? • Group with members behind you • Can you hear all members, including those behind you? See SecondLife Wiki – Voice Test (November 26, 2007).¹⁶⁰ The documentation for the SecondLife application also explains that “sound clips” can be “attached” to virtual objects.

¹⁶⁰ https://wiki.secondlife.com/wiki/Voice_Test.

Claim	Oculus DK1 System's Exemplary Disclosures
	Scripting comments <i>Sound clips</i> • <code>llTriggerSound()</code> • Unattached - sounds occur where they're triggered. • Cannot be stopped with <code>llStopSound()</code>. • <code>llPlaySound()</code> • Attached - sounds follow the object they are in if it moves. • Only one at a time per prim. Playing another will stop the current sound. • <code>llLoopSound()</code> • Attached - sounds follow the object they are in if it moves. • This continuously loops the sound. • Only one at a time per prim. Playing another will stop the current sound. See SecondLife Wiki – Environment Sounds (Revision as of 20:11, July 15, 2012).¹⁶¹ The SecondLife documentation also explains that “3D position” is used by the <code>Session.Set3Dposition.1</code> method for both the “speaker and listener” and that <code>Session.Set3Dposition.1</code> “describes the speaking position and the listening position for this avatar.”

¹⁶¹ https://wiki.secondlife.com/w/index.php?title=Environment_Sounds&direction=prev&oldid=1195319.

Session.Set3DPosition.1

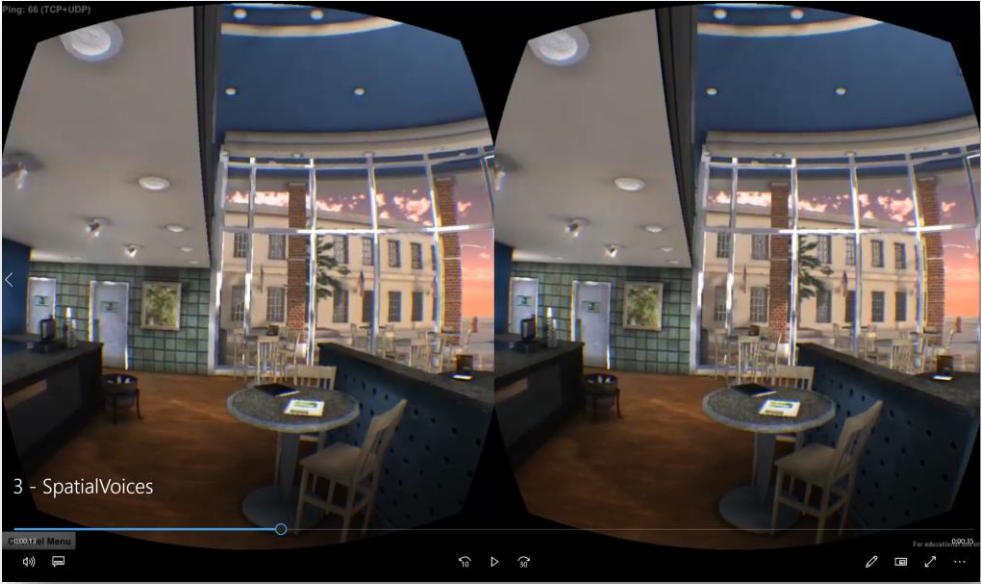
When sending a 3D position for speaker and listener, the "listener" is either the avatar position or the camera position. That is, it describes the speaking position and the listening position for this avatar.

```
<Request requestId="114" action="Session.Set3DPosition.1">
  <SessionHandle>c1_m1000abcdefghijklmnopqrstuvwxyz1</SessionHandle>
  <OrientationType>legacy</OrientationType>
  <SpeakerPosition>
    <Position>
      <X>261451</X>
      <Y>26.9568</Y>
      <Z>-283000</Z>
    </Position>
    <Velocity>
      <X>0</X>
      <Y>0</Y>
      <Z>0</Z>
    </Velocity>
    <AtOrientation>
      <X>0.816965</X>
      <Y>0</Y>
      <Z>-0.576688</Z>
    </AtOrientation>
    <UpOrientation>
      <X>0</X>
      <Y>1</Y>
      <Z>0</Z>
    </UpOrientation>
    <LeftOrientation>
      <X>-0.576688</X>
      <Y>0</Y>
      <Z>-0.816965</Z>
    </LeftOrientation>
  </SpeakerPosition>
  <ListenerPosition>
    <Position>
      <X>261448</X>
      <Y>27.9639</Y>
      <Z>-283001</Z>
    </Position>
    <Velocity>
      <X>0</X>
      <Y>0</Y>
      <Z>0</Z>
    </Velocity>
    <AtOrientation>
      <X>0.795791</X>
      <Y>0</Y>
      <Z>-0.559283</Z>
    </AtOrientation>
    <UpOrientation>
      <X>0</X>
      <Y>1</Y>
      <Z>0</Z>
    </UpOrientation>
    <LeftOrientation>
      <X>-0.574999</X>
      <Y>0</Y>
      <Z>-0.818154</Z>
    </LeftOrientation>
  </ListenerPosition>
</Request>
```

The viewer doesn't get a response

Claim	Oculus DK1 System's Exemplary Disclosures
	See SecondLife Wiki – Voice/Technical (November 18, 2009).¹⁶² Sounds of virtual objects and/or avatars will appear to originate from the SLP of the virtual objects and/or avatars at a second location as the user moves their head with respect to the SLP, which has a “3D Position.” As shown above, the “ListenerPosition” takes into account position and orientation. Thus, under at least Plaintiff’s theory of infringement, as the user moves their head or own virtual avatar “with respect to the second location,” applications like SecondLife “adjust[] a sound of the voice of the computer program” “so the sound of the voice of the computer program continues to appear to originate from the SLP at the second location.” As another example, under at least Plaintiff’s theory of infringement, applications like VRChat “adjust[]” the sounds produced by other users’ avatars (“sound of the voice of the computer program”) that the user hears through the electronic earphone (3) so the sounds “continue[] to appear to originate from” the other users’ avatars at the second location “even as the user moves,” for example by moving their head or own virtual avatar, “with respect to the second location.” When the user turns to the left so that another user’s avatar is to the right (i.e. moves their head), the sound is now originating to the right for the user at the other user’s avatar (and corresponding SLP).

¹⁶² <https://wiki.secondlife.com/wiki/Voice/Technical#Session.Set3DPosition.1>.

Claim	Oculus DK1 System's Exemplary Disclosures
	 See photograph of an exemplary Oculus DK1 System (showing VRChat).¹⁶³ For example, the VRChat development diary from 2014 explains that the developer used “two libraries” in addition to Unity3D: “TNet (for networking) and USpeak (for voicechat),” which were used with “a sweet CoffeeShop environment on the Unity Asset Store.”¹⁶⁴ USpeak includes

¹⁶³ META-8KHZ_00046187; *see also* META-8KHZ_00046233; META-8KHZ_00046188; Oculus Rift DK1 - VRChat 0.1 (1080p) (January 16, 2014) <https://www.youtube.com/watch?v=z9PgdbYLBu>

¹⁶⁴ VRChat v0.1 Development, <https://web.archive.org/web/20140121030858/http://grahamgaylor.com/2014/01/>; *see also* <https://web.archive.org/web/20140121030107/http://grahamgaylor.com/2013/06/> (“Now I’ll explain the code implementation using Unity3D using C#.”); <https://web.archive.org/web/20140121030112/http://grahamgaylor.com/2013/09/> (“I decided to go with Unity3D as my game engine for two reasons. First off, I have the most experience with Unity, I’ve played around with the UDK, but I

Claim	Oculus DK1 System's Exemplary Disclosures
	“[s]patial audio support” for voice chat that provided “directional audio for a truly immersive experience.”¹⁶⁵ Furthermore, the Unity Developers Manual from 2014 explains that Unity supported 3D audio. For example, audio clips from sound clip files are “played back so as to simulate its position in the game world’s 3D space” if the “audio clip is marked as a 3D Sound.”¹⁶⁶ “3D sounds emulate the distance and location of sounds by attenuating volume and panning across speakers.”¹⁶⁷

came crawling back to Unity. My second and more important reason is that there are Unity plugins for most of the hardware I’m using.”); <https://web.archive.org/web/20140121030858/http://grahamgaylor.com/2014/01/> (“I used Unity3D for both projects, but used better networking and voice chat libraries in the second iteration.”); <https://web.archive.org/web/20140120214705/http://grahamgaylor.com/category/unity3d/>; <https://web.archive.org/web/20140121030102/http://grahamgaylor.com/2013/01/>; <https://web.archive.org/web/20140121093515/http://grahamgaylor.com/2013/04/> (“To start, the Oculus Developer Center is now open and ready for devs to download the Rift SDK. What this means is that developers will now be able to integrate the Rift into their games and/or start building games from scratch with an actual test unit to build it around. As of now (April 1), it seems the only SDK downloads are the Windows SDK and the Unity 4 Pro integration package.”); <https://web.archive.org/web/20140121030847/http://grahamgaylor.com/2013/05/>.

¹⁶⁵ See [RELEASED] USpeak Voice Chat – Voice Chat For All Your Multiplayer Games, <https://forum.unity.com/threads/released-uspeak-voice-chat-voice-chat-for-all-your-multiplayer-games.154609/> (last edited November 17, 2013).

¹⁶⁶ See <https://web.archive.org/web/20140601033451/http://docs.unity3d.com/Manual/class-AudioClip.html>.

¹⁶⁷ See <https://web.archive.org/web/20140601033451/http://docs.unity3d.com/Manual/class-AudioClip.html>.

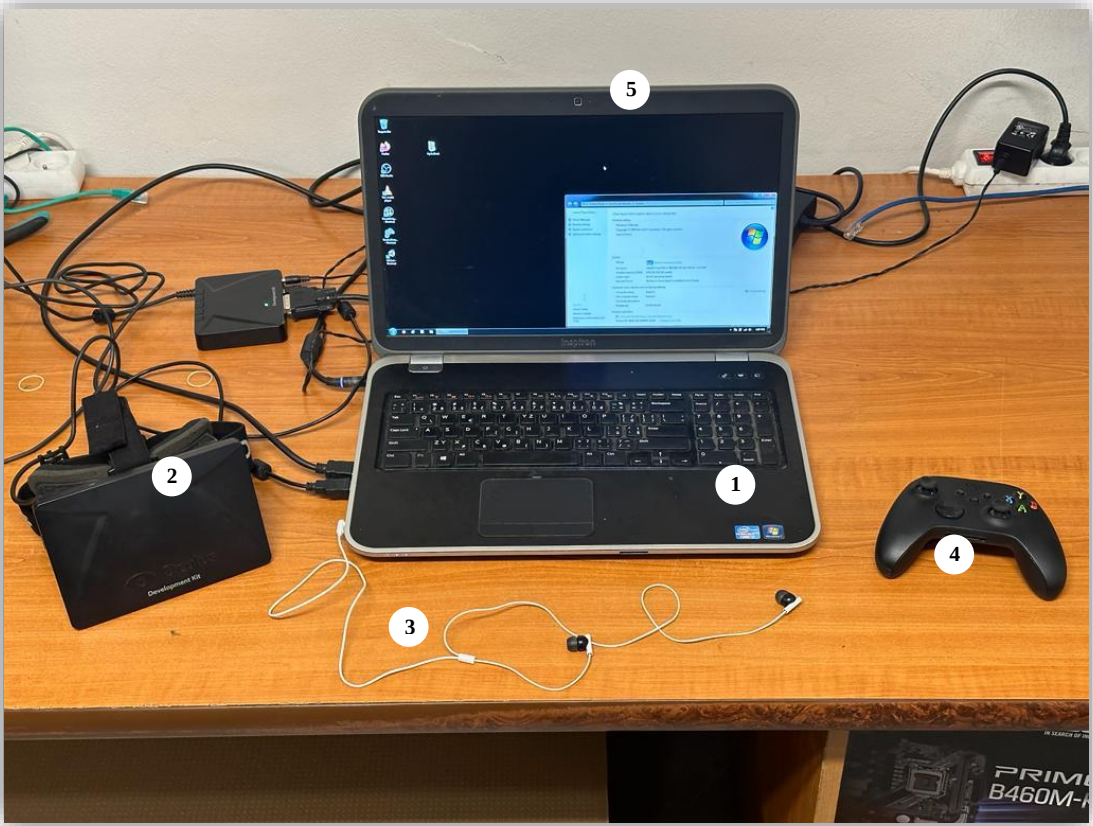
Claim	Oculus DK1 System's Exemplary Disclosures
	Basic Theory In real life, sounds are emitted by objects and heard by listeners. The way a sound is perceived depends on a number of factors. A listener can tell roughly which direction a sound is coming from and may also get some sense of its distance from its loudness and quality. A fast-moving sound source (like a falling bomb or a passing police car) will change in pitch as it moves as a result of the Doppler Effect. Also, the surroundings will affect the way sound is reflected, so a voice inside a cave will have an echo but the same voice in the open air will not.  Audio Sources and Listener Audio Overview – Unity Documentation (June 3, 2014).¹⁶⁸ As another example, VRChat “created by using the Unity 3D engine and is a platform for users to meet online and chat with each other in environments they have made themselves. The software has made it easy for developers to add more than one user to any video game or other application, provided they are of the Unity-developed environments. The software used by the developers takes its cues from an amalgamation of different things: head gaze direction, body gestures and 3D positional audio to do its best to develop an immersive, fun social experience for all users involved.” See VR Chat Releasing for Oculus Rift (December 2, 2014).¹⁶⁹ As shown above, applications like VRChat take into account, for example, “head gaze direction.” Thus, as the user moves their head or own virtual avatar “with respect to the second location,” applications like VRChat “adjust[] a sound of the voice of the computer program” “so the sound of

¹⁶⁸ <https://web.archive.org/web/20140603055903/http://docs.unity3d.com/Manual/AudioOverview.html>.

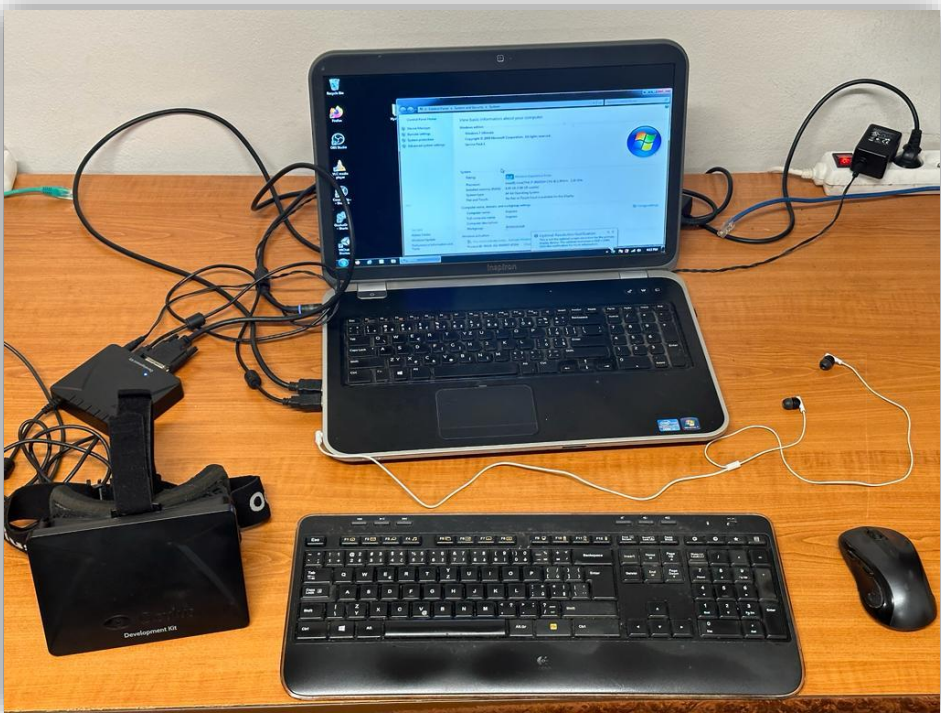
¹⁶⁹ <https://virtualrealitytimes.com/2014/12/02/vr-chat-releasing-for-oculus-rift/>; see also VRChat now in Oculus Rift app store (December 3, 2014) <https://www.hypergridbusiness.com/2014/12/vrchat-now-in-oculus-rift-app-store/>; Oculus Rift DK1 - VRChat 0.1 (1080p) (January 16, 2014) <https://www.youtube.com/watch?v=z9PgdbYLbLU>; VRChat v0.1 Released https://www.reddit.com/r/oculus/comments/1vcbwk/vrchat_v01_released/.

Claim	Oculus DK1 System's Exemplary Disclosures
	the voice of the computer program continues to appear to originate from the SLP at the second location.” The Oculus DK1 System discloses and/or renders obvious, alone or in combination with other prior art, that “that the user hears” “the voice of the computer program” “through the electronic earphone”: Any application, including applications like Couch Knights, SecondLife, and VRChat, can use electronic earphones, like those shown in (3) below, through the audio jack interface on the Dell Inspiron 7720, which is an analog signal that goes directly into speakers. Thus, the earphones (3) are in communication with an exemplary Oculus DK1 System, including the Oculus Rift DK1 headset (2) and controller (4) (HPED). An exemplary Oculus Rift System can also be used with a handheld portable mouse or other handheld portable electronic devices.¹⁷⁰

¹⁷⁰ See, e.g., Oculus Rift DK1 + Razer Hydra – Oculus Maxiumus (1080p) (February 3, 2014), https://youtu.be/1R--5oi69_4?si=QsvhRY1xQY-ZBToB (showing DK1 being used with handheld Razer Hydra controllers); The Oculus VR Best Practices Guide (April 30, 2014) at 31, META-8KHZ_00048116 (DK1 works with “Mouse, Keyboard, Gamepad”).

Claim	Oculus DK1 System's Exemplary Disclosures
	 See photograph of an exemplary Oculus DK1 System.¹⁷¹

¹⁷¹ META-8KHZ_00047800; *see also* META-8KHZ_00047801; META-8KHZ_00047802; META-8KHZ_00047799; META-8KHZ_00047805; META-8KHZ_00047804; META-8KHZ_00047803.

Claim	Oculus DK1 System's Exemplary Disclosures
	Any application can use electronic earphones through the audio jack interface (shown below) on the Dell Inspiron 7720.¹⁷² 

¹⁷² Electronic earphones may be wireless and can connect to a computer via, for example, Bluetooth. *See, e.g.*, LG Tone+ HBS-730: Where Have You Been All My Life (February 18, 2013), <https://www.wired.com/2013/02/lg-tone-plus-hbs-730/> (describing wireless LG Tone+ HBS-730 earphones with Bluetooth); BackBeat GO 2 Earbuds Tutorial (November 5, 2013), <https://www.youtube.com/watch?v=EOwxkSW1UbM> (describing wireless BackBeat GO 2 Earbuds with Bluetooth); *see also, e.g.*, META-8KHZ_00047873 at 31, 33 (supports “Bluetooth combo card”).

Claim	Oculus DK1 System's Exemplary Disclosures
	See photograph of an exemplary Oculus DK1 System (showing earphones). ¹⁷³
CLAIM 15	
15[pre]. An electronic system with one or more electronic devices that move a sound localization point (SLP) of a voice of a computer program during a voice exchange between the computer program and a person, the electronic system comprising:	To the extent the preamble is limiting, the Oculus DK1 System discloses and/or renders obvious, alone or in combination with other prior art, “[a]n electronic system with one or more electronic devices that move a sound localization point (SLP) of a voice of a computer program during a voice exchange between the computer program and a person, the electronic system comprising” as embodied in the product itself and as reflected in other prior art references that describe it. See disclosures and cited evidence for limitations 1[pre], 1[b], and 1[c]. For example: The Oculus DK1 System discloses and/or renders obvious, alone or in combination with other prior art, “[a]n electronic system with one or more electronic devices”: The Oculus DK1 System includes a computer¹⁷⁴ (indicated with a (1) in the image below), along with electronic devices including an Oculus Rift DK1 headset (indicated with a (2)), earphones¹⁷⁵

¹⁷³ META-8KHZ_00047799; META-8KHZ_00047800

¹⁷⁴ For example, a computer can be an exemplary Dell Inspiron 7720. See META-8KHZ_00047873. A computer can also be an exemplary HP ENVY DV4-5213cl Notebook computer. See META-8KHZ_00047987. An HP ENVY DV4-5213cl Notebook computer works in the same way as a Dell Inspiron 7720 computer, as described herein.

¹⁷⁵ Earphones may be wireless and can connect to, for example, a computer via, for example, Bluetooth. See, e.g., LG Tone+ HBS-730: Where Have You Been All My Life (February 18, 2013), <https://www.wired.com/2013/02/lg-tone-plus-hbs-730/> (describing wireless LG Tone+ HBS-730 earphones with Bluetooth); BackBeat GO 2 Earbuds Tutorial (November 5, 2013), <https://www.youtube.com/watch?v=EOwxkSW1UbM> (describing wireless BackBeat GO 2 Earbuds with Bluetooth); Denon AH-W150 Exercise Freak Review: Wireless Headphones for Workouts (April 19, 2013), <https://www.cnet.com/reviews/denon-exercise-freak-ah-w150-headphone-review/> (“The []Denon AH-W150 Exercise Freak[] in-ear Bluetooth headphones support wireless audio from Bluetooth-enabled devices.”); see also, e.g., META-8KHZ_00047806; META-8KHZ_00047987 at 9, 15; META-8KHZ_00046189; META-8KHZ_00047873 at 31, 33 (supports “Bluetooth combo card”); <https://web.archive.org/web/20081104021724/https://manuals.playstation.net/document/en/ps3/current/settings/bluetooth.html>.

Claim	Oculus DK1 System's Exemplary Disclosures
	(like the earphones shown in (3) below), controller ¹⁷⁶ and/or mouse ¹⁷⁷ and/or keyboard ¹⁷⁸ (like the controller shown in (4) below), and a microphone(s) ¹⁷⁹ (like the microphone shown in (5) below that is embedded into the display of the Dell Inspiron 7720 computer):

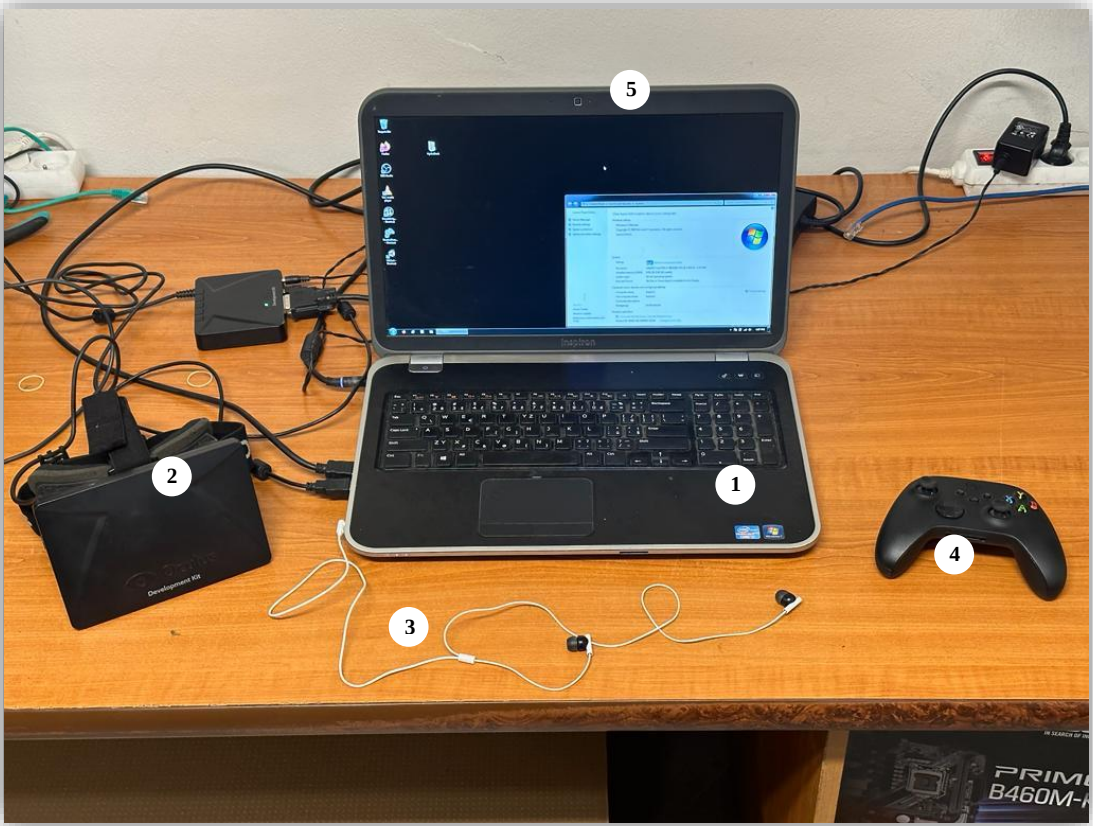
¹⁷⁶ A controller may be wireless and can connect to a computer. *See, e.g.*, How To: Use Your Xbox 360 or PS3 Controller on a PC (April 11, 2013), https://www.youtube.com/watch?v=7nLnRkleR_c (explaining how to use Xbox 360 and/or PS3 controllers wirelessly with computer); Classic Game Room – XBOX 360 CONTROLLER for WINDOWS Review (January 21, 2013), <https://www.youtube.com/watch?v=-GEZIp66Po> at 1:03 (showing wireless Xbox 360 controller connected to computer using a wireless adapter); META-8KHZ_00047859; *see also, e.g.*, META-8KHZ_00046189; META-8KHZ_00047873 at 31, 33 (supports “Bluetooth combo card”); META-8KHZ_00047806; META-8KHZ_00047987 at 9, 15.

¹⁷⁷ A mouse may be wireless and can connect to a computer. *See, e.g.*, SteelSeries Sensei Wireless Gaming Mouse Review (May 1, 2014), <https://www.anandtech.com/show/7971/steelseries-sensei-wireless-gaming-mouse-review/2> (describing SteelSeries Sensei Wireless mouse that can be used with a computer); SteelSeries Sensei Wireless Laser Mouse Review (May 19, 2014), <https://www.youtube.com/watch?v=MCVBi5Lub04> (showing SteelSeries Wireless mouse in use with computer that connects to computer via base station); Logitech M325 Wireless Mouse – Review (January 22, 2014), <https://cafelilium.wordpress.com/2014/01/22/logitech-m325-wireless-mouse-review/> (describing Logitech M325 Wireless Mouse that connects to computer USB adapter plugged into computer); META-8KHZ_00047798; META-8KHZ_00047844; <https://blog.logitech.com/2010/06/07/new-logitech-wireless-mouse-m510-delivers-all-day-comfort-and-advanced-control/> (describing M510 mouse); *see also, e.g.*, META-8KHZ_00046189; META-8KHZ_00047873 at 31, 33 (supports “Bluetooth combo card”); META-8KHZ_00047806; META-8KHZ_00047987 at 9, 15.

¹⁷⁸ A keyboard may be wireless and can connect to a computer. *See, e.g.*, Review: Logitech K830 Wireless HTPC Keyboard with TouchPad (May 15, 2014), <https://www.smarthomebeginner.com/logitech-k830-wireless-backlit-htpc-keyboard/> (describing wireless keyboard that was tested on “Windows PC”); Apple Wireless Keyboard 2 Battery Version (August 7, 2011), <https://www.youtube.com/watch?v=Zd44VTeggPI> (showing wireless Apple keyboard); META-8KHZ_00047843; <https://blog.logitech.com/2010/08/12/new-logitech-wireless-combo-mk520-puts-convenience-and-control-at-your-fingertips/> (describing K520 keyboard); *see also, e.g.*, META-8KHZ_00046189; META-8KHZ_00047873 at 31, 33 (supports “Bluetooth combo card”); META-8KHZ_00047806; META-8KHZ_00047987 at 9, 15.

¹⁷⁹ Microphone may be included in a computer. *See, e.g.*, META-8KHZ_00045115 at 3 (“Internal microphone support”); META-8KHZ_00047987 at 7 (“Internal microphones (2)). Microphone may also connect to, for example, a computer and may be wired or wireless. Wired microphone can connect to a computer via, for example, an auxiliary port or USB port. *See, e.g.*, META-

8KHZ_00045115 at 3 (“one microphone-in port”); META-8KHZ_00047987 at 22 (“[C]onnect a microphone to the microphone jack on the computer.”); Blue Yeti on PS3 (June 1, 2011), <https://www.youtube.com/watch?v=oulJ4eJODUs>. Wireless microphone can connect to a computer via, for example, Bluetooth. *See, e.g.*, Denon AH-W150 Exercise Freak Review: Wireless Headphones for Workouts (April 19, 2013), <https://www.cnet.com/reviews/denon-exercise-freak-ah-w150-headphone-review/> (“The []Denon AH-W150 Exercise Freak[] in-ear Bluetooth headphones support wireless audio from Bluetooth-enabled devices . . . They have a built-in microphone.”); *see also, e.g.*, META-8KHZ_00046189; META-8KHZ_00047873 at 31, 33 (supports “Bluetooth combo card”); META-8KHZ_00047806; META-8KHZ_00047987 at 9, 15.

Claim	Oculus DK1 System's Exemplary Disclosures
	 See photograph of an exemplary Oculus DK1 System.¹⁸⁰

¹⁸⁰ META-8KHZ_00047800; *see also* META-8KHZ_00047801; META-8KHZ_00047802; META-8KHZ_00047799; META-8KHZ_00047805; META-8KHZ_00047804; META-8KHZ_00047803.

Claim	Oculus DK1 System's Exemplary Disclosures
	Computer (1), in this example, is a Dell Inspiron 7720. The Dell Inspiron 7720 (1) comprises parts that make up traditional PCs, such as processor (CPU), graphics card (GPU). The exemplary Dell Inspiron 7720 also includes memory (RAM) and includes a hard drive: Inspiron 17R-7720  1 screws (4) 2 hard-drive assembly Inspiron 17R-5720/Inspiron 17R-7720  1 screws (4) 2 hard-drive assembly

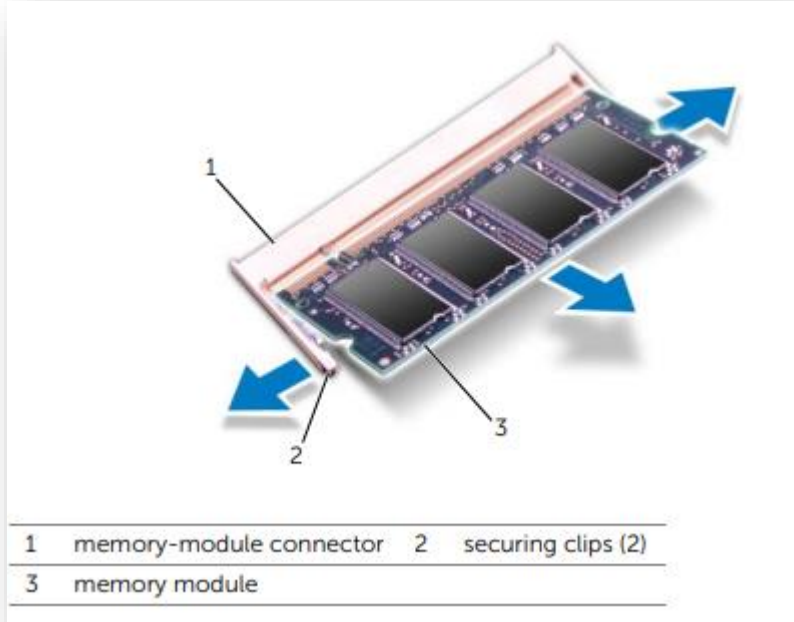
Claim	Oculus DK1 System's Exemplary Disclosures
	See Owner's Manual for Dell Inspiron 7720 (2012).¹⁸¹  See photograph of an exemplary Oculus DK1 System.¹⁸²

¹⁸¹ META-8KHZ_00047873

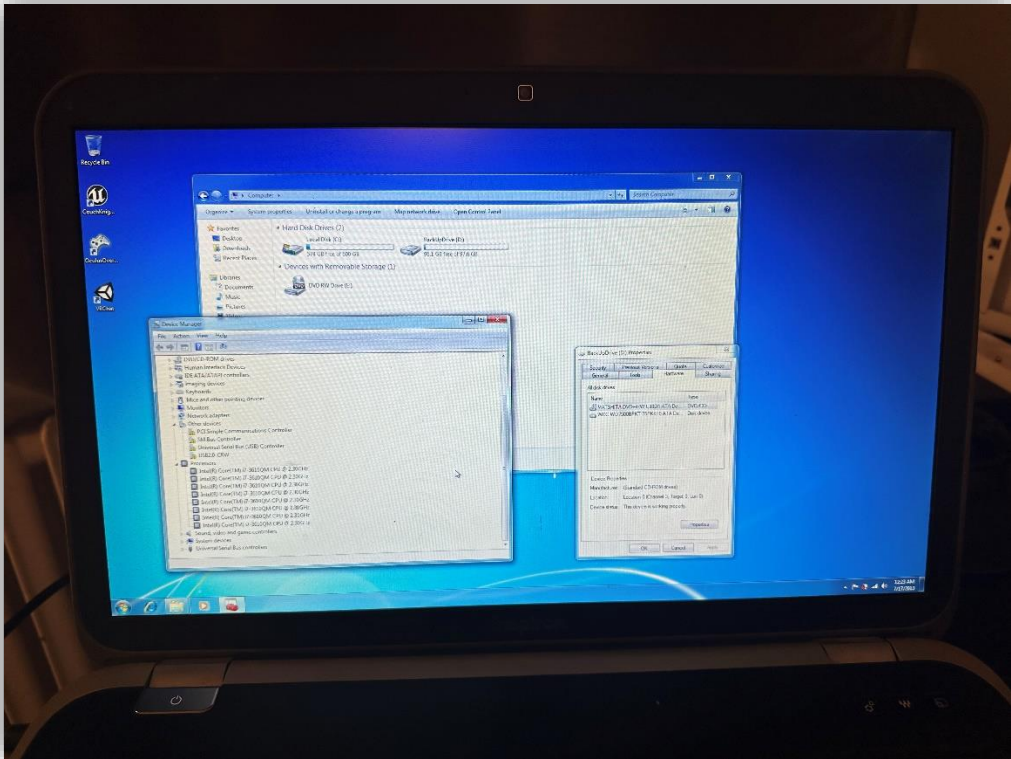
¹⁸² META-8KHZ_00047842

Claim	Oculus DK1 System's Exemplary Disclosures												
	Memory <table> <tr> <td>Connectors</td><td>two internally-accessible DDR3 SODIMM sockets</td></tr> <tr> <td>Capacities</td><td>2 GB and 4 GB</td></tr> <tr> <td>Minimum memory</td><td>2 GB</td></tr> <tr> <td>Maximum memory</td><td>4 GB</td></tr> <tr> <td>Memory type</td><td>1333/1600 MHz DDR3 SODIMM</td></tr> <tr> <td>Memory configurations supported</td><td>2 GB, 4 GB, 6 GB, and 8 GB</td></tr> </table> See Specification Sheet for Dell Inspiron 7720 (2013) (showing 1333/1600 MHz DDR3 SODIMM RAM memory).¹⁸³	Connectors	two internally-accessible DDR3 SODIMM sockets	Capacities	2 GB and 4 GB	Minimum memory	2 GB	Maximum memory	4 GB	Memory type	1333/1600 MHz DDR3 SODIMM	Memory configurations supported	2 GB, 4 GB, 6 GB, and 8 GB
Connectors	two internally-accessible DDR3 SODIMM sockets												
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Memory type	1333/1600 MHz DDR3 SODIMM												
Memory configurations supported	2 GB, 4 GB, 6 GB, and 8 GB												

¹⁸³ META-8KHZ_00045115

Claim	Oculus DK1 System's Exemplary Disclosures
	 1 memory-module connector 2 securing clips (2) 3 memory module See Owner's Manual for Dell Inspiron 7720 (2012).¹⁸⁴ The Oculus DK1 system discloses and/or renders obvious, alone or in combination with other prior art, "one or more electronic devices" that "move a sound localization point (SLP) of a voice of a computer program during a voice exchange between the computer program and a person": The hard drive on an exemplary Dell Inspiron 7720 includes instructions that allows the computer to operate, for example, the Windows 7 operating system.

¹⁸⁴ META-8KHZ_00047873

Claim	Oculus DK1 System's Exemplary Disclosures
	 See photograph of an exemplary Oculus DK1 System.¹⁸⁵

¹⁸⁵ META-8KHZ_00047841

Claim	Oculus DK1 System's Exemplary Disclosures
	The Windows 7 Operating System can execute applications, such as Couch Knights,¹⁸⁶ Oculus Overlay,¹⁸⁷ SecondLife,¹⁸⁸ VRChat,¹⁸⁹, and others, that are compatible with the operating system.¹⁹⁰ A POSA would understand that any application which is capable of operating with the Windows operating system is capable of being displayed on the Oculus DK1 headset (2), which is connected to the same computer on which Windows operates, using either Oculus libraries or other software

¹⁸⁶ Couch Knights was publicly demonstrated at the Games Developer Conference in March 2014. *See, e.g.*, GDC 2014: Oculus Rift DK2 'Couch Knights' Gameplay, <https://www.youtube.com/watch?v=CoyjO-etC30>; *see also* Oculus Rift DK2 Hands-On Impressions! Couch Knights, Valkyrie, and How It Compares to the DK1, https://www.youtube.com/watch?v=d_9nSA7thEc; Couch Knights at Oculus Rift DK2 @ GDC 2014, https://www.youtube.com/watch?v=J3Y_Qe1-Qvk. Couch Knights was also publicly demonstrated at PAX East 2014 in April 2014. *See, e.g.*, Pax East 2014 Oculus Rift HD Couch Knights Impressions, <https://www.youtube.com/watch?v=Up56qLOGIqY>; <https://blog.hansoninc.com/en-guarde-couch-knights-oculus-rift-pax-east/>.

¹⁸⁷ Oculus Overlay was available prior to any date to which the '196 Patent can claim priority. *See, e.g.*, <https://web.archive.org/web/20131226064044/http://holophone3d.com/oculus/> (December 26, 2013); DayZ (Arma 2) Oculus Rift DK1 (June 1, 2013), <https://www.youtube.com/watch?v=5HBMHGymfbo> (showing DayZ application using "Oculus Overlay"); Prepar3D / Oculus Rift Using Oculus Overlay (January 13, 2014), <https://www.youtube.com/watch?v=x1pkG4zTIhQ> (showing Prepar3D application displayed with Oculus Overlay).

¹⁸⁸ SecondLife (through the SecondLife Oculus Rift Beta) for the Oculus DK1 was available at least as early as March 2014. *See, e.g.*, SLOculusRiftBeta (March 26, 2014), <https://www.youtube.com/watch?v=YaROmSCpa2o>; *see also, e.g.*, Second Life on a Oculus Rift (January 21, 2014), <https://www.youtube.com/watch?v=MFh3buY8KFA>; How to Use Oculus Rift with Second Life (May 22, 2014), <https://www.youtube.com/watch?v=TLL5JVwG118>; Release Notes/Second Life Project OculusRift (May 21, 2014), https://wiki.secondlife.com/wiki/Release_Notes/Second_Life_Project_OculusRift/3.7.8.289834.

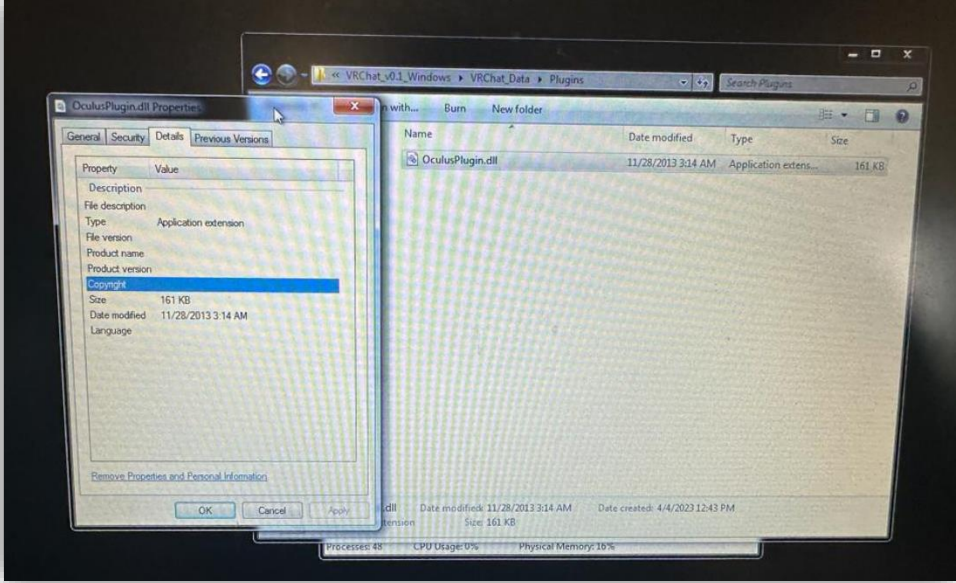
¹⁸⁹ VRChat v0.1, for example, was released on January 16, 2014. *See* https://www.reddit.com/r/oculus/comments/1vcbwk/vrchat_v01_released/; <https://en.wikipedia.org/wiki/VRChat>.

¹⁹⁰ *See, e.g.*, VRChat v0.1 Released, https://www.reddit.com/r/oculus/comments/1vcbwk/vrchat_v01_released/ (showing Windows download for VRChat v0.1); <https://www.unrealengine.com/marketplace/en-US/product/couch-knights> (showing Windows as a supported platform); https://wiki.secondlife.com/wiki/Release_Notes/Second_Life_Project_OculusRift/3.7.8.289834 ("Oculus Rift is supported in Windows Vista (or newer)"); *see also* https://en.wikipedia.org/wiki/List_of_Microsoft_Windows_versions (showing that Windows Vista was released prior to Windows 7).

Claim	Oculus DK1 System's Exemplary Disclosures
	such as Oculus Overlay.¹⁹¹ In the below example, a web browser (Firefox) is rendering on the Oculus Rift DK1 headset (the lenses were removed to capture the photo) using the Oculus Overlay software:  See photograph of an exemplary Oculus DK1 System.¹⁹²

¹⁹¹ See <https://web.archive.org/web/20131226064044/http://holophone3d.com/oculus/> (“OculusOverlay’ provides is a high performance way to pipe any content from your desktop into your Oculus Rift. It works for any 3D and 2D content and now has tons of great features.”).

¹⁹² META-8KHZ_00046194; *see also* META-8KHZ_00046203

Claim	Oculus DK1 System's Exemplary Disclosures
	 See photograph of an exemplary Oculus DK1 System (showing VRChat application).¹⁹³ Other software, such as Couch Knights, SecondLife, and VRChat, can also be displayed on the Oculus Rift DK1 headset:¹⁹⁴

¹⁹³ META-8KHZ_00046193

¹⁹⁴ Other compatible applications include Minecraft and Half-Life 2. See, e.g., Oculus Rift DK1 + Razer Hydra – Riftmax Theater, Minecraft, Sixsense Tuscany (1080p) (February 2, 2014) at 17:48, <https://www.youtube.com/watch?v=pKnZMdRbHKk&t=1097s>; Oculus Rift DK1 + Razer Hydra - Half-Life 2 - Part 10 (1080p), <https://www.youtube.com/watch?v=hloKHP1SLKE> (same); Minecraft | VIRTUAL REALITY MOD! (Razer Hydra & Oculus Rift!) | Mod Showcase (March 13, 2014), <https://www.youtube.com/watch?v=4GRL0M4MKww> (same).

Claim	Oculus DK1 System's Exemplary Disclosures
	 See photograph of an exemplary Oculus DK1 System (showing Couch Knights).¹⁹⁵

¹⁹⁵ META-8KHZ_00047801; *see also* META-8KHZ_00047804

Claim	Oculus DK1 System's Exemplary Disclosures
	 See photograph of an exemplary Oculus DK1 System (showing a knight character displayed on headset).¹⁹⁶

¹⁹⁶ META-8KHZ_00046201; *see also* META-8KHZ_00046190

Claim	Oculus DK1 System's Exemplary Disclosures
	 See SLOculusRiftBeta Video (March 26, 2014) (showing SecondLife Oculus Rift Beta on the Oculus Rift DK1 headset).¹⁹⁷

¹⁹⁷ <https://www.youtube.com/watch?v=YaROmSCpa2o>.

Claim	Oculus DK1 System's Exemplary Disclosures
	 See How to Use Oculus Rift with Second Life (May 22, 2014).¹⁹⁸

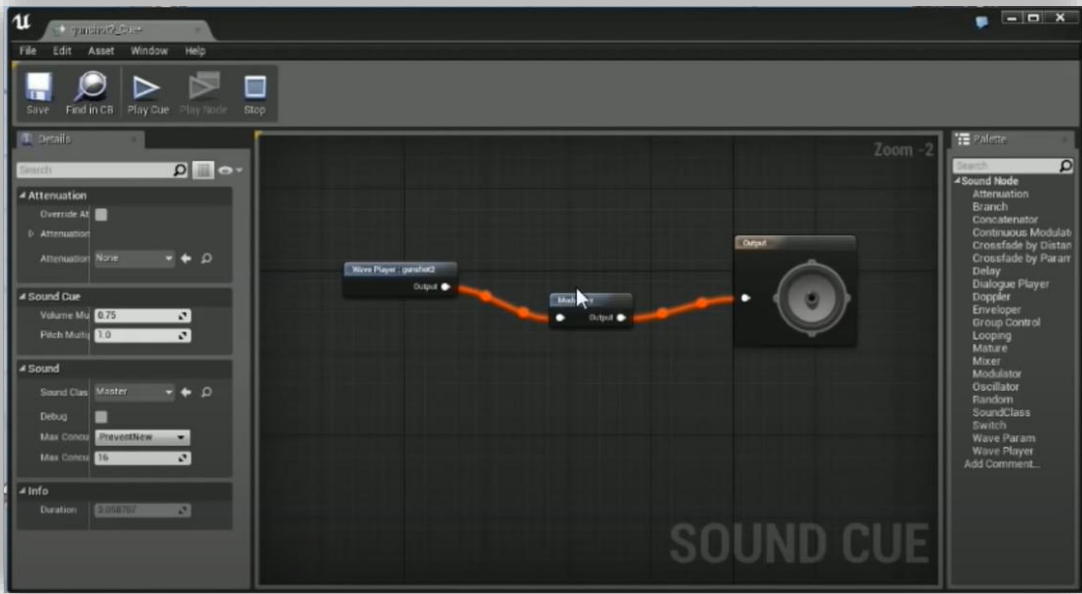
¹⁹⁸ <https://www.youtube.com/watch?v=TLL5JVwG118>; see also <https://community.secondlife.com/blogs/entry/1199-second-life%E2%80%99s-oculus-rift-integration-is-ready-for-beta-testers/>; <https://community.secondlife.com/blogs/entry/1275-using-the-oculus-rift-with-second-life/>.

Claim	Oculus DK1 System's Exemplary Disclosures
	 See photograph of an exemplary Oculus DK1 System (showing VRChat).¹⁹⁹

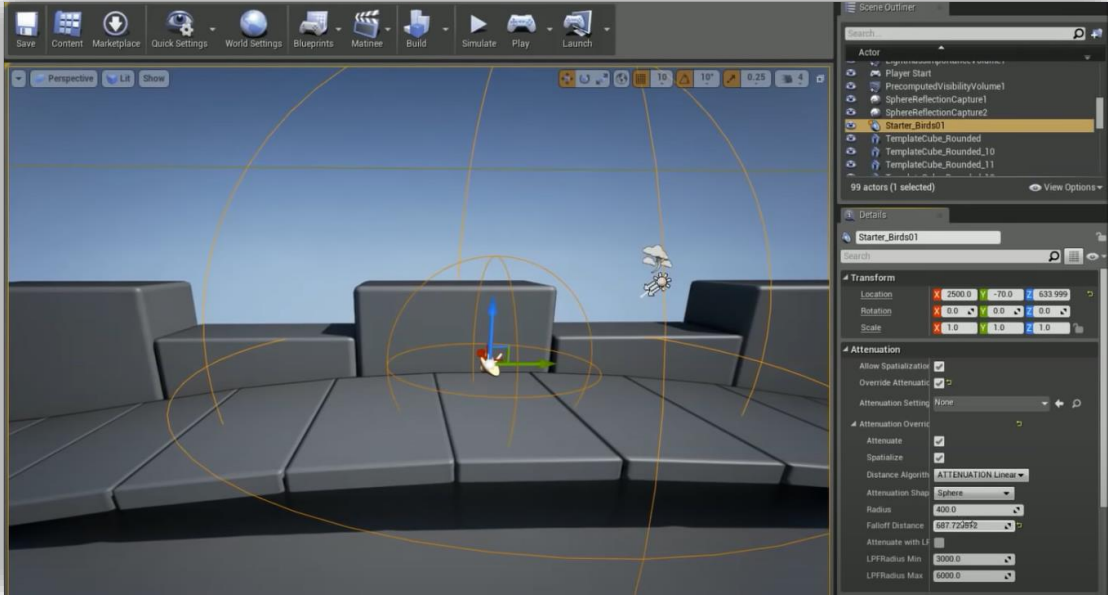
¹⁹⁹ META-8KHZ_00047802; *see also* META-8KHZ_00047805

Claim	Oculus DK1 System's Exemplary Disclosures
	 See photograph of an exemplary DK1 System (showing VRChat displayed on the headset).²⁰⁰ The Oculus DK1 System discloses and/or renders obvious, alone or in combination with other prior art, “mov[ing] a sound localization point (SLP) of a voice of a computer program during a voice exchange between the computer program and a person.” For example, under at least Plaintiff’s theory of infringement, the Oculus DK1 System using applications like Couch Knights include “a voice exchange between the computer program and a person.” In applications like Couch Knights,

²⁰⁰ META-8KHZ_00046202; *see also* META-8KHZ_00046235

Claim	Oculus DK1 System's Exemplary Disclosures
	the person controls a knight character that produces sound, including footsteps, sword swings, and other sounds (i.e., a “voice” of the computer program). The knight character’s “voice” (for example, footsteps or sword swings) is produced in response to the person’s commands that the person inputs via, for example, a controller and/or keyboard. Thus, under at least Plaintiff’s theory of infringement, there is a “voice exchange between the computer program and a person.” The knight character’s sounds originate to the person from an SLP located at the knight character itself such that the knight character is associated with an SLP. For example, Couch Knights was created using the Unreal Engine 4 game engine.²⁰¹ Unreal Engine includes “Sound Node[s]” for game objects that allowed for spatialization of the object’s audio. 

²⁰¹ <https://www.unrealengine.com/marketplace/en-US/product/couch-knights>.

Claim	Oculus DK1 System's Exemplary Disclosures
	See, e.g., Unreal Engine 4 Tutorial – Sound Cues at 1:39.²⁰²  See also, e.g., Unreal Engine 4 Tutorial – Ambient Audio (Basic!) at 1:06.²⁰³ When the person inputs commands via a controller and/or keyboard, for example, the knight character and its SLP moves.²⁰⁴ Thus, in applications like Couch Knights, the “sound localization

²⁰² https://www.youtube.com/watch?v=rZhrjHSN_II (showing attenuation option for “Sound Node” in Unreal Engine 4).

²⁰³ <https://www.youtube.com/watch?v=qtgY7esjB6I> (showing attenuation and “Allow Spatialization” options).

²⁰⁴ See Couch Knights on Oculus Rift DK1 (July 17, 2014), <https://www.youtube.com/watch?v=HcreLAflqUs> (showing knight character making sounds, including footsteps, sword swings, and fireball noises, in response to user input); GDC 2014: Oculus Rift DK2 ‘Couch Knights’ Gameplay (March 21, 2014), <https://www.youtube.com/watch?v=CoyjO-etC30> (showing a user moving a knight character via a handheld controller).

Claim	Oculus DK1 System's Exemplary Disclosures
	point (SLP) of a voice of a computer program” moves. When the knight character moves, sound (e.g., footsteps) is produced such that the knight character moves “during a voice exchange between the computer program and a person.”²⁰⁵ The user is able to localize the knight character’s sounds to the knight character itself (or SLP located at the knight character).  See picture of an exemplary Couch Knights application (showing knight character that produces sound, such as footsteps and sword swings).²⁰⁶

²⁰⁵ See Couch Knights on Oculus Rift DK1 (July 17, 2014), <https://www.youtube.com/watch?v=HcreLAflqUs> (showing knight character making sounds, including footsteps, sword swings, and fireball noises, in response to user input); see also Couch Knights | Oculus Rift DK2 (August 24, 2014), <https://www.youtube.com/watch?v=bMQwLGRXyE8> (same).

²⁰⁶ <https://www.unrealengine.com/marketplace/en-US/product/couch-knights>

Claim	Oculus DK1 System's Exemplary Disclosures
	As another example, applications like SecondLife designates a sound localization point at virtual objects and/or other people's virtual avatars.²⁰⁷ For example, the documentation for the SecondLife application explains that "sound clips" can be "attached" to virtual objects. As shown below, under at least Plaintiff's theory of infringement, virtual objects in applications like SecondLife "move[]," and sounds (i.e., "a voice of the computer program") "follow the object they are in if it moves." Scripting comments <i>Sound clips</i> • <code>llTriggerSound()</code> • Unattached - sounds occur where they're triggered. • Cannot be stopped with <code>llStopSound()</code>. • <code>llPlaySound()</code> • Attached - sounds follow the object they are in if it moves. • Only one at a time per prim. Playing another will stop the current sound. • <code>llLoopSound()</code> • Attached - sounds follow the object they are in if it moves. • This continuously loops the sound. • Only one at a time per prim. Playing another will stop the current sound.

²⁰⁷ SecondLife uses "fmod" as an "[a]udio engine." See https://web.archive.org/web/20131231020628/https://wiki.secondlife.com/wiki/Third_Party_Libraries. SecondLife also uses "openal." See *id.* "OpenAL is a cross-platform 3D audio API appropriate for use with gaming applications and many other types of applications." See <https://web.archive.org/web/20130729040534/http://connect.creativelabs.com/openal/default.aspx>.

Claim	Oculus DK1 System's Exemplary Disclosures
	See SecondLife Wiki – Environment Sounds (Revision as of 20:11, July 15, 2012).²⁰⁸ In addition, a user can move a virtual object's SLP in applications like SecondLife. For example, the user can move a virtual object “when [the] user clicks and holds the mouse button down on an object, then drags the mouse.”²⁰⁹ Thus, SLPs are located at virtual objects in applications like SecondLife. Sound clips originate from the SLPs at virtual objects, and the SLP moves “during a voice exchange between the computer program and a person.” Furthermore, as explained above, applications like SecondLife include other users, and “[y]ou can talk to the people around you through text-based Local Chat. If you have a microphone, you can also speak out loud using inworld voice.”²¹⁰ An example of another user in the form of a SecondLife “resident” is shown below. The other user's avatar has “a voice chat feature that lets avatars speak,”²¹¹ i.e, a “voice” of a computer program. Users can move their respective avatars.²¹²

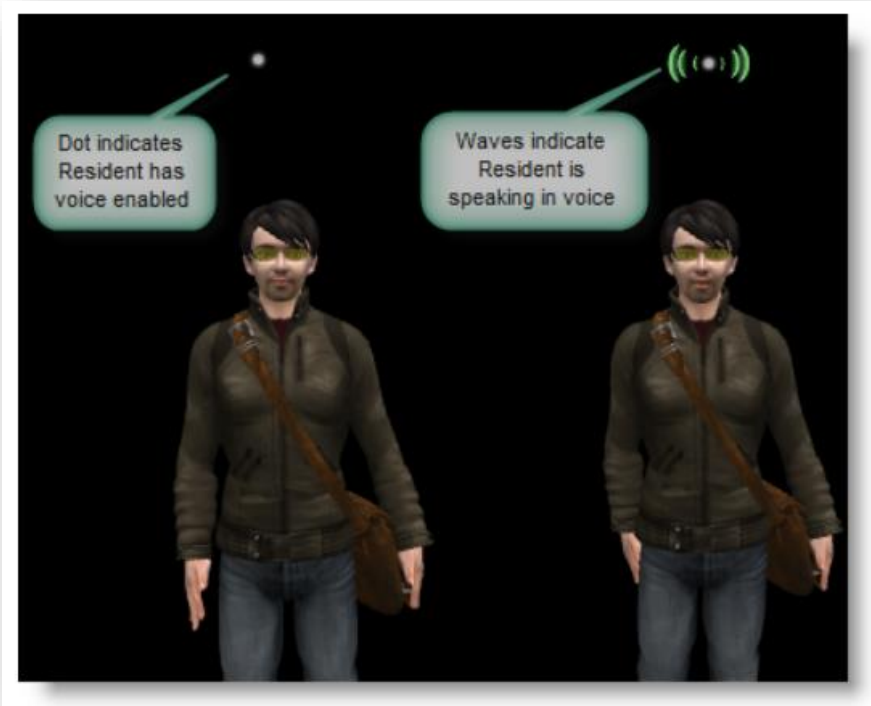
²⁰⁸ https://wiki.secondlife.com/w/index.php?title=Environment_Sounds&direction=prev&oldid=1195319.

²⁰⁹ https://wiki.secondlife.com/wiki/Category:LSL_Grab (lasted edited July 24, 2011).

²¹⁰ See Viewer 2 Quick Start Guide/Local chat and voice (February 23, 2010) at https://wiki.secondlife.com/wiki/Viewer_2_Quick_Start_Guide/Local_chat_and_voice.

²¹¹ See SecondLife Wiki – Lip Sync (last edited on October 13, 2009) at https://wiki.secondlife.com/wiki/Lip_sync.

²¹² See, e.g., <https://www.youtube.com/watch?v=YaROmSCpa2o> at 2:32; How to Use Oculus Rift with Second Life (May 22, 2014) at 1:26, <https://www.youtube.com/watch?v=TLL5JVwG118> (“If you want to move in the same direction you are looking, tap the Q key to align to look.”); https://wiki.secondlife.com/wiki/Viewerhelp:Preferences_-_Move_%26_View (January 11, 2012) (describing ways to move an avatar including “arrow key” and “click[ing]”).

Claim	Oculus DK1 System's Exemplary Disclosures
	 See Viewer 2 Quick Start Guide/Local chat and voice (February 23, 2010).²¹³

²¹³ https://wiki.secondlife.com/wiki/Viewer_2_Quick_Start_Guide/Local_chat_and_voice.

Claim	Oculus DK1 System's Exemplary Disclosures
	 See SecondLife Tutorial Video – Voice Chat Getting Started (November 14, 2008).²¹⁴ In addition, non-player characters (or “bots” in SecondLife) “can be created in the same way as a human-controlled avatar.”²¹⁵ A bot “is being controlled by a program” and “can be used in various ways,” including for “user interaction” and as a “[r]oleplaying NPC (non-player characters) for

²¹⁴ https://wiki.secondlife.com/wiki/Video_Tutorials/More; see also <http://vidtuts.s3.amazonaws.com/VOICE-CHAT-Getting-started.mp4>.

²¹⁵

<https://wiki.secondlife.com/wiki/Bot#:~:text=Second%20Life%20bot%20account%20can,choose%20it%20from%20available%20alternatives>

Claim	Oculus DK1 System's Exemplary Disclosures
	gaming and interactive areas.”²¹⁶ A bot can also “[s]erve as a secretary or support robot by using autoresponder AI or remote chat assistant or “[b]e a non-personal character (NPC) in a roleplaying game.”²¹⁷ The audio for other residents in applications like SecondLife is spatialized. For example, the SecondLife documentation describes a “Voice Test” where “5 testers” “Edit > Preferences > Voice Chat > [x] Enable voice chat, Hear voice at: Avatar position, camera direction.” Then arrange themselves so that “4 testers [are] around one tester at north, south, east and west.” This test is used to “verify [that] each tester sounds like their voice is coming from their position inworld” and that “everyone sound like they are in the right place spatially.”

²¹⁶

<https://wiki.secondlife.com/wiki/Bot#:~:text=Second%20Life%20bot%20account%20can,choose%20it%20from%20available%20alternatives>

²¹⁷ https://web.archive.org/web/20130723023800/https://wiki.secondlife.com/wiki/Second_Life_bot_software_comparison

Claim	Oculus DK1 System's Exemplary Disclosures
	Voice Test VERSION 0.1 LENGTH 00:00 TESTERS 5 OVERVIEW Coming SETUP Up to 5 normal users, (can be done with 2) Spatial sound testing with gathered groups • Setup: Have each of 5 testers do the following: Edit > Preferences > Voice Chat > [x] Enable voice chat, Hear voice at: Avatar position, camera direction. • Arrange 4 testers around one tester at north, south, east and west, like this: <pre><tab> . Tester N . Tester W Tester C Tester E . </tab></pre> • Tester C: Face Tester N. • Cardinal Testers: Speak one at a time starting with Tester N and going clockwise around Tester C (N followed by E followed by S followed by W). • Tester C: Without moving, verify each tester sounds like their voice is coming from their position inworld. • Tester C: Rotate your avatar to face Tester S. • Cardinal Testers, repeat the round robin above, starting with Tester S. • Tester C: Without moving, verify each tester sounds like their voice is coming from their position inworld. • Tester C: Alt-Zoom on something out of range of the testers. * ... • Group in a circle • Does everyone sound like they are in the right place spatially? • If someone moves away, do they get quieter? • Group with members behind you • Can you hear all members, including those behind you? See SecondLife Wiki – Voice Test (November 26, 2007).²¹⁸

²¹⁸ https://wiki.secondlife.com/wiki/Voice_Test.

Claim	Oculus DK1 System's Exemplary Disclosures
	The SecondLife documentation also explains that “3D position” is used by the <i>Session.Set3DPosition.1</i> method for both the “speaker and listener” and that <i>Session.Set3Dposition.1</i> “describes the speaking position and the listening position for this avatar.”

Session.Set3DPosition.1

When sending a 3D position for speaker and listener, the "listener" is either the avatar position or the camera position. That is, it describes the speaking position and the listening position for this avatar.

```
<Request requestId="114" action="Session.Set3DPosition.1">
  <SessionHandle>c1_m1000abcdefghijklmnopqrstuvwxy1</SessionHandle>
  <OrientationType>legacy</OrientationType>
  <SpeakerPosition>
    <Position>
      <X>261451</X>
      <Y>26.9568</Y>
      <Z>-283000</Z>
    </Position>
    <Velocity>
      <X>0</X>
      <Y>0</Y>
      <Z>0</Z>
    </Velocity>
    <AtOrientation>
      <X>0.816965</X>
      <Y>0</Y>
      <Z>-0.576688</Z>
    </AtOrientation>
    <UpOrientation>
      <X>0</X>
      <Y>1</Y>
      <Z>0</Z>
    </UpOrientation>
    <LeftOrientation>
      <X>-0.576688</X>
      <Y>0</Y>
      <Z>-0.816965</Z>
    </LeftOrientation>
  </SpeakerPosition>
  <ListenerPosition>
    <Position>
      <X>261448</X>
      <Y>27.9639</Y>
      <Z>-283001</Z>
    </Position>
    <Velocity>
      <X>0</X>
      <Y>0</Y>
      <Z>0</Z>
    </Velocity>
    <AtOrientation>
      <X>0.795791</X>
      <Y>0</Y>
      <Z>-0.559283</Z>
    </AtOrientation>
    <UpOrientation>
      <X>0</X>
      <Y>1</Y>
      <Z>0</Z>
    </UpOrientation>
    <LeftOrientation>
      <X>-0.574999</X>
      <Y>0</Y>
      <Z>-0.818154</Z>
    </LeftOrientation>
  </ListenerPosition>
</Request>
```

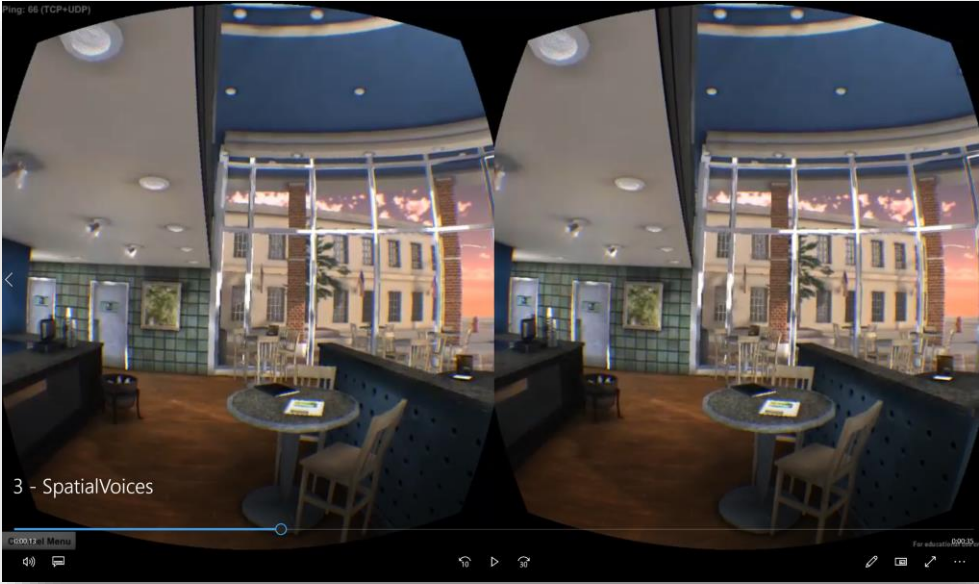
The viewer doesn't get a response

Claim	Oculus DK1 System's Exemplary Disclosures
	See SecondLife Wiki – Voice/Technical (November 18, 2009).²¹⁹ Therefore, under at least Plaintiff's theory of infringement, in applications like SecondLife, an SLP "of a voice of a computer program" (another player's avatar that speaks or a bot that speaks or a virtual object that makes sounds) "move[s]" "during a voice exchange between the computer program and a person." As another example, under at least Plaintiff's theory of infringement, applications like VRChat include "a sound localization point (SLP) of a voice of a computer program." Applications like VRChat designate a location at another user's avatar as an SLP. When the other user speaks, as shown below by the user's nametag turning red, a voice emits from the other user's avatar, i.e. "a voice exchange between the computer program and a user."

²¹⁹ <https://wiki.secondlife.com/wiki/Voice/Technical#Session.Set3DPosition.1>.

Claim	Oculus DK1 System's Exemplary Disclosures
	 See photograph of an exemplary Oculus DK1 System (showing nametag in red).²²⁰ Both users can move their own avatars and corresponding SLPs via, for example, a controller and/or mouse and/or keyboard (i.e., “move a sound localization point (SLP) of a voice of a computer program”). The user is able to localize the voice to the other user’s avatar (and corresponding SLP). For example, when the user turns to the left, the sound is now originating to the right for the user, where the original unchanged location of the other user’s avatar is located and producing “a voice” of the computer program.

²²⁰ See also Oculus Rift DK1 - VRChat 0.1 (1080p) <https://www.youtube.com/watch?v=z9PgdbYLbLU>.

Claim	Oculus DK1 System's Exemplary Disclosures
	 See photograph of an exemplary Oculus DK1 System (showing VRChat).²²¹ For example, the VRChat development diary from 2014 explains that the developer used “two libraries” in addition to Unity3D: “Tnet (for networking) and Uspeak (for voicechat),” which were used with “a sweet CoffeeShop environment on the Unity Asset Store.”²²² Uspeak includes

²²¹ META-8KHZ_00046187; *see also* META-8KHZ_00046233; META-8KHZ_00046188; Oculus Rift DK1 - VRChat 0.1 (1080p) (January 16, 2014) <https://www.youtube.com/watch?v=z9PgdbYLBu>

²²² VRChat v0.1 Development, <https://web.archive.org/web/20140121030858/http://grahamgaylor.com/2014/01/>; *see also* <https://web.archive.org/web/20140121030107/http://grahamgaylor.com/2013/06/> (“Now I’ll explain the code implementation using Unity3D using C#.”); <https://web.archive.org/web/20140121030112/http://grahamgaylor.com/2013/09/> (“I decided to go with Unity3D as my game engine for two reasons. First off, I have the most experience with Unity, I’ve played around with the UDK, but I

Claim	Oculus DK1 System's Exemplary Disclosures
	“[s]patial audio support” for voice chat that provided “directional audio for a truly immersive experience.”²²³ Furthermore, the Unity Developers Manual from 2014 explains that Unity supported 3D audio. For example, audio clips from sound clip files are “played back so as to simulate its position in the game world’s 3D space” if the “audio clip is marked as a 3D Sound.”²²⁴ “3D sounds emulate the distance and location of sounds by attenuating volume and panning across speakers.”²²⁵

came crawling back to Unity. My second and more important reason is that there are Unity plugins for most of the hardware I’m using.”); <https://web.archive.org/web/20140121030858/http://grahamgaylor.com/2014/01/> (“I used Unity3D for both projects, but used better networking and voice chat libraries in the second iteration.”); <https://web.archive.org/web/20140120214705/http://grahamgaylor.com/category/unity3d/>; <https://web.archive.org/web/20140121030102/http://grahamgaylor.com/2013/01/>; <https://web.archive.org/web/20140121093515/http://grahamgaylor.com/2013/04/> (“To start, the Oculus Developer Center is now open and ready for devs to download the Rift SDK. What this means is that developers will now be able to integrate the Rift into their games and/or start building games from scratch with an actual test unit to build it around. As of now (April 1), it seems the only SDK downloads are the Windows SDK and the Unity 4 Pro integration package.”); <https://web.archive.org/web/20140121030847/http://grahamgaylor.com/2013/05/>.

²²³ See [RELEASED] USpeak Voice Chat – Voice Chat For All Your Multiplayer Games, <https://forum.unity.com/threads/released-uspeak-voice-chat-voice-chat-for-all-your-multiplayer-games.154609/> (last edited November 17, 2013).

²²⁴ See <https://web.archive.org/web/20140601033451/http://docs.unity3d.com/Manual/class-AudioClip.html>.

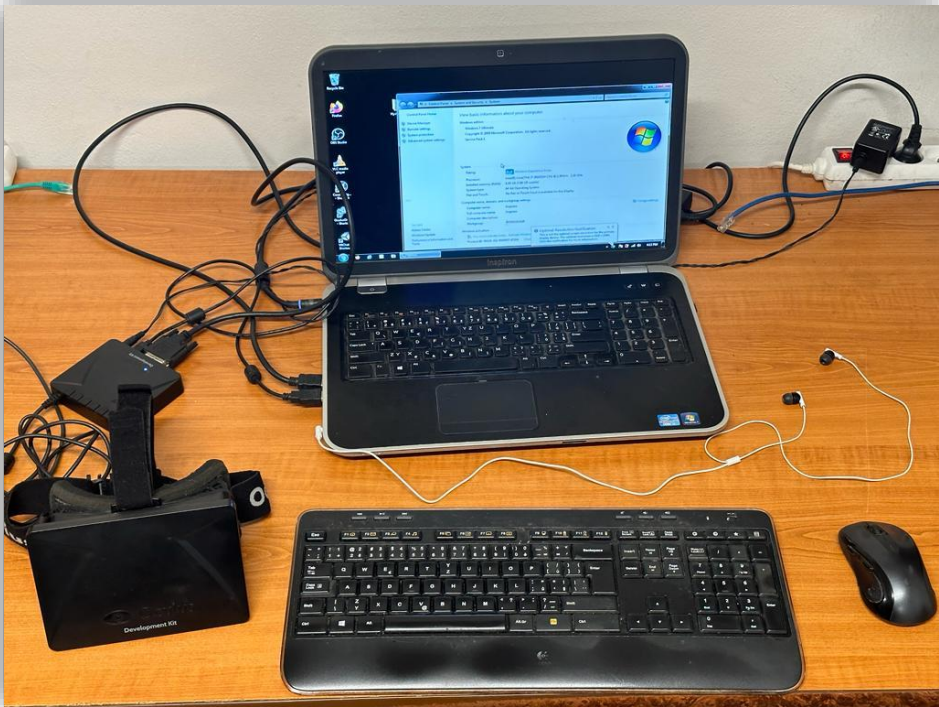
²²⁵ See <https://web.archive.org/web/20140601033451/http://docs.unity3d.com/Manual/class-AudioClip.html>.

Claim	Oculus DK1 System's Exemplary Disclosures
	Basic Theory In real life, sounds are emitted by objects and heard by listeners. The way a sound is perceived depends on a number of factors. A listener can tell roughly which direction a sound is coming from and may also get some sense of its distance from its loudness and quality. A fast-moving sound source (like a falling bomb or a passing police car) will change in pitch as it moves as a result of the Doppler Effect. Also, the surroundings will affect the way sound is reflected, so a voice inside a cave will have an echo but the same voice in the open air will not.  Audio Sources and Listener Audio Overview – Unity Documentation (June 3, 2014).²²⁶ To the extent Plaintiff contends that the Oculus DK1 System with applications like Couch Knights, SecondLife, and/or VRChat does not include a “voice exchange between the computer program and the user,” a person of ordinary skill in the art would have found it obvious to implement a user speaking to a computer program and a computer program speaking back based on other applications that included such functionality prior to any date to which the '196 Patent can claim priority. For example, in applications like Lifeline, a user speaks to the computer program and the computer program responds.²²⁷

²²⁶ <https://web.archive.org/web/20140603055903/http://docs.unity3d.com/Manual/AudioOverview.html>.

²²⁷ See, e.g. LIFELINE: The Game Controlled ENTIRELY By Your Voice (September 11, 2018) at 2:02, <https://www.youtube.com/watch?v=XzmHrMqrKyo>; Lifeline: Voice Action Adventure [Part 2] The Room (September 10, 2013), <https://www.youtube.com/watch?v=TzXr1qD05ZM>; <https://www.ign.com/articles/2004/03/03/lifeline> (Lifeline review posted March 3, 2004); [https://en.wikipedia.org/wiki/Lifeline_\(video_game\)](https://en.wikipedia.org/wiki/Lifeline_(video_game)) (Lifeline released in 2003); see also, e.g., Kinectimals – XBOX360 with KINECT Part 1 TRUE HD – QUALITY 1080 (September 5, 2013) at 8:47, https://www.youtube.com/watch?v=BrCXV9_cQYw (showing voice exchange between user and computer tiger in Kinectimals application); How to Name Ur Nintendog (October 2, 2011) at 2:05, <https://www.youtube.com/watch?v=XnyPZshtiI> (showing voice exchange between user and computer dog in Nintendogs application).

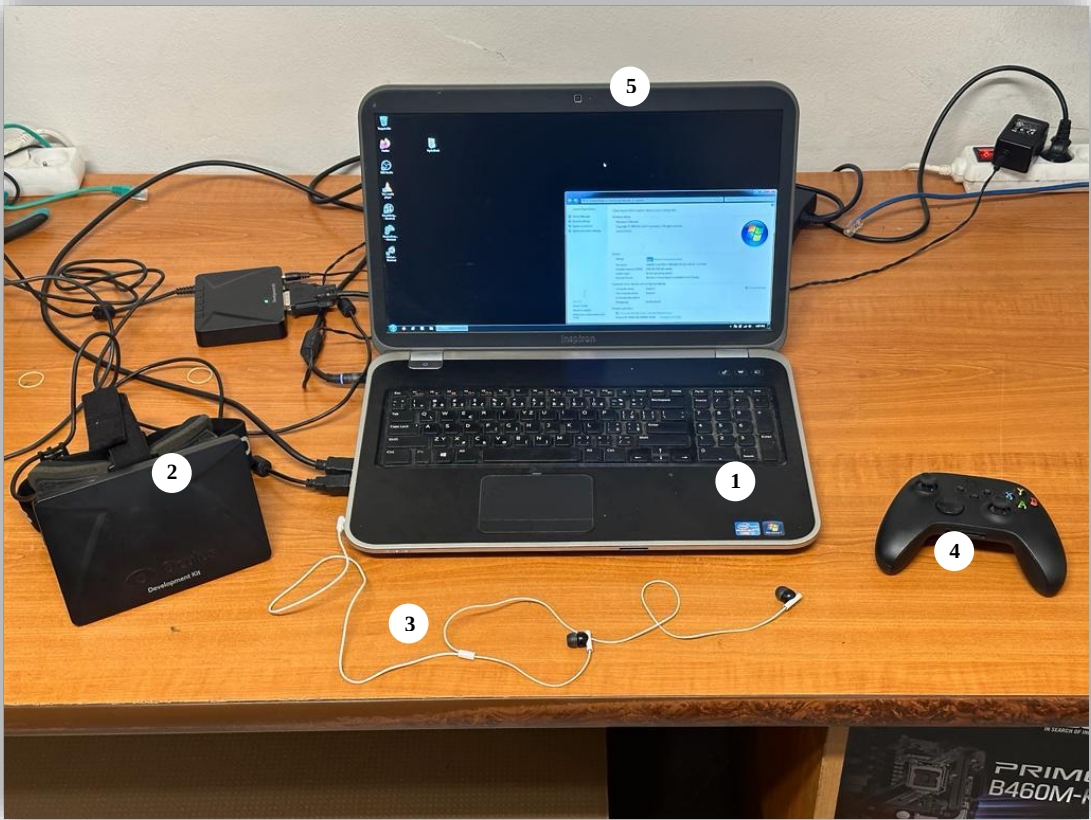
Claim	Oculus DK1 System's Exemplary Disclosures
15[a]. a wearable electronic device that the person wears and that provides the voice of the computer program to the person at the SLP at a first location in empty space that is away from and proximate to the person;	The Oculus DK1 System discloses and/or renders obvious, alone or in combination with other prior art, “a wearable electronic device that the person wears and that provides the voice of the computer program to the person at the SLP at a first location in empty space that is away from and proximate to the person” as embodied in the product itself and as reflected in other prior art references that describe it. <i>See</i> disclosures and cited evidence for limitations 1[pre], 1[a], 1[d], and 15[pre]. For example: The Oculus DK1 system discloses and/or renders obvious, alone or in combination with other prior art, “a wearable electronic device that the person wears”: For example, the “person” wears “a wearable electronic device” on their head. The person wears earphones that provide sound.

Claim	Oculus DK1 System's Exemplary Disclosures
	 See photograph of an exemplary Oculus DK1 System (showing earphones).²²⁸ The person also wears the Oculus DK1 headset using a head strap. An example of a person wearing the Oculus DK1 headset is shown below.

²²⁸ META-8KHZ_00047799; META-8KHZ_00047800

Claim	Oculus DK1 System's Exemplary Disclosures
	 See How to Use Oculus Rift with Second Life (May 22, 2014).²²⁹ The Oculus DK1 System discloses and/or renders obvious, alone or in combination with other prior art, that the “wearable electronic device” “provides the voice of the computer program to the person at the SLP at a first location in empty space that is away from and proximate to the person”: Any application, including Couch Knights, SecondLife, and VRChat, can use electronic earphones (3) through the audio jack interface on the Dell Inspiron 7720, which is an analog signal that goes directly into speakers. Thus, the earphones (3) are in communication with the Oculus DK1 System,

²²⁹ <https://www.youtube.com/watch?v=TLL5JVwG118>; see also <https://community.secondlife.com/blogs/entry/1199-second-life%E2%80%99s-oculus-rift-integration-is-ready-for-beta-testers/>; <https://community.secondlife.com/blogs/entry/1275-using-the-oculus-rift-with-second-life/>.

Claim	Oculus DK1 System's Exemplary Disclosures
	including the Oculus Rift DK1 headset (2). Thus, the “wearable electronic device” “provides the voice of the computer program to the person” via, for example, earphones (3).  See photograph of an exemplary Oculus DK1 System.²³⁰

²³⁰ META-8KHZ_00047800; *see also* META-8KHZ_00047801; META-8KHZ_00047802; META-8KHZ_00047799; META-8KHZ_00047805; META-8KHZ_00047804; META-8KHZ_00047803.

Claim	Oculus DK1 System's Exemplary Disclosures						
	Any application can use electronic earphones through the audio jack interface (shown below) on the Dell Inspiron 7720.²³¹ Ports and connectors <table> <tr> <td>Audio</td><td>one microphone-in port</td></tr> <tr> <td></td><td>one stereo headphone/speaker/microphone combo port</td></tr> <tr> <td></td><td>one digital microphone</td></tr> </table> See Specification Sheet for Dell Inspiron 7720 (2013).²³² The Oculus DK1 System discloses and/or renders obvious, alone or in combination with other prior art, “provid[ing] the voice of the computer program to the person at the SLP at a first location in empty space that is away from and proximate to the person.” See disclosures and cited evidence for 1[a]. For example, in the same way as described above for claim limitation 1[a], at least the applications like Couch Knights, SecondLife, and/or VRChat satisfies this limitation. To the extent Plaintiff argues that the Oculus DK1 System does not disclose this limitation, either expressly, implicitly, and/or by inherency, a person of ordinary skill in the art would have determined that the limitation would have been obvious in light of the Oculus DK1 System alone or	Audio	one microphone-in port		one stereo headphone/speaker/microphone combo port		one digital microphone
Audio	one microphone-in port						
	one stereo headphone/speaker/microphone combo port						
	one digital microphone						

²³¹ The electronic earphones may be wireless and can connect to a computer via, for example, Bluetooth. See, e.g., LG Tone+ HBS-730: Where Have You Been All My Life (February 18, 2013), <https://www.wired.com/2013/02/lg-tone-plus-hbs-730/> (describing wireless LG Tone+ HBS-730 earphones with Bluetooth); BackBeat GO 2 Earbuds Tutorial (November 5, 2013), <https://www.youtube.com/watch?v=EOwxkSW1UbM> (describing wireless BackBeat GO 2 Earbuds with Bluetooth); see also, e.g., META-8KHZ_00047873 at 31, 33 (supports “Bluetooth combo card”).

²³² META-8KHZ_00045115

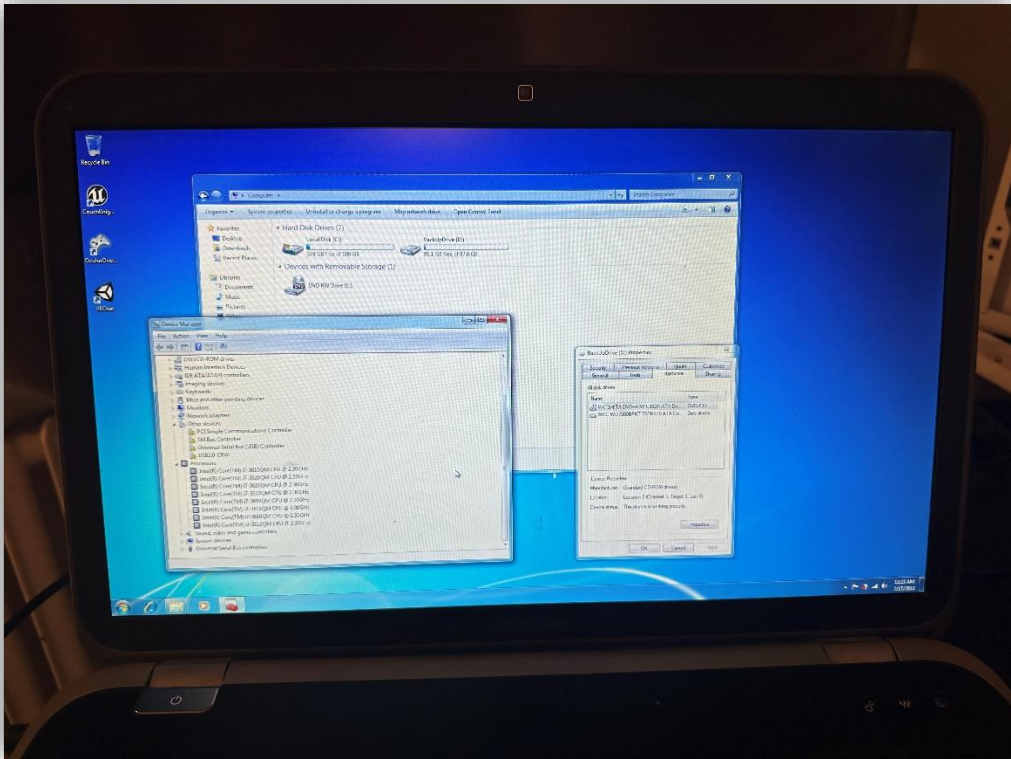
Claim	Oculus DK1 System's Exemplary Disclosures
	in combination with any applicant admitted prior art, the knowledge of one of ordinary skill in the art, or any one or more of the references identified in Defendants' Invalidity Contentions under Section IV.J.2 for at least the reasons stated in Defendants' Invalidity Contentions cover pleading. <i>See, e.g., Haddick 248</i> at [001179] ("FIG. 156 is an illustration of a head mounted display device 15600 with see-through capabilities. The head mounted display device 15600 includes see-through displays 15602, one or more cameras 15604 and electronics 15608, wherein the electronics 15608 can include one or more of the following: a processor, a battery, a global positioning sensor (GPS), a direction sensor, data storage, a wireless communication system and a user interface."); Bradski 253 at [0214] ("As shown in FIG. 4A, a user 60 of a head-mounted augmented reality system ("AR system") is depicted wearing a frame 64 structure coupled to a display system 62 positioned in front of the eyes of the user. A speaker 66 is coupled to the frame 64 in the depicted configuration and positioned adjacent the ear canal of the user 60 (in one embodiment, another speaker, not shown, is positioned adjacent the other ear canal of the user to provide for stereo/shapeable sound control). The display 62 is operatively coupled 68, such as by a wired lead or wireless connectivity, to a local processing and data module 70 which may be mounted in a variety of configurations, such as fixedly attached to the frame 64, fixedly attached to a helmet or hat 80 as shown in the embodiment of FIG. 4B, embedded in headphones, removably attached to the torso 82 of the user 60 in a configuration (e.g., placed in a backpack (not shown)) as shown in the embodiment of FIG. 4C, or removably attached to the hip 84 of the user 60 in a belt-coupling style configuration as shown in the embodiment of FIG. 4D.").
15[b]. a memory that stores instructions; and	The Oculus DK1 System discloses and/or renders obvious, alone or in combination with other prior art, "a memory that stores instructions" as embodied in the product itself and as reflected in other prior art references that describe it. <i>See</i> disclosures and cited evidence for 1[pre] and 15[pre]. For example: The Oculus DK1 System discloses and/or renders obvious, alone or in combination with other prior art, "a memory that stores instructions." For example: The Dell Inspiron 7720 also includes a hard drive:

Claim	Oculus DK1 System's Exemplary Disclosures
	Inspiron 17R-7720  1 screws (4) 2 hard-drive assembly Inspiron 17R-5720/Inspiron 17R-7720  1 screws (4) 2 hard-drive assembly See Owner's Manual for Dell Inspiron 7720 (2012).²³³

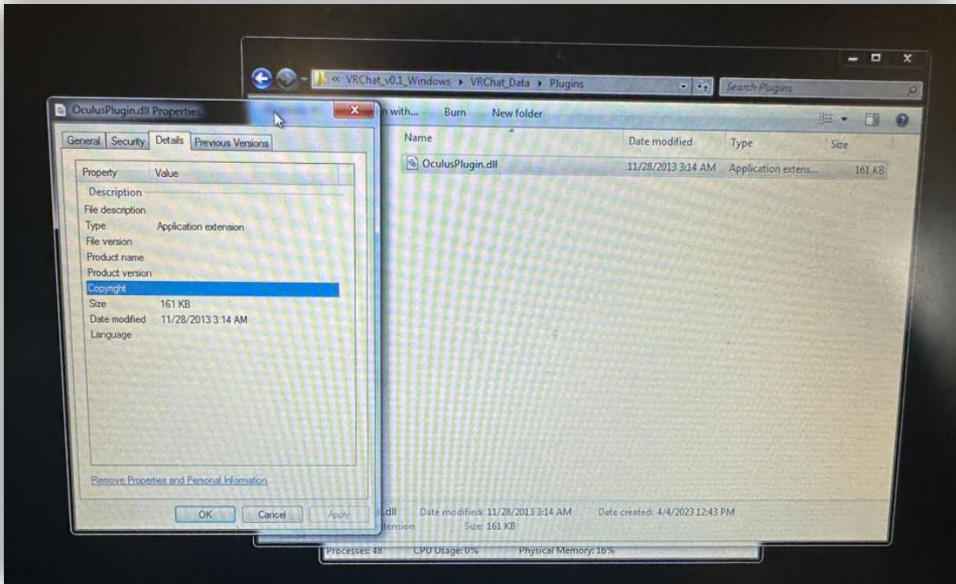
²³³ META-8KHZ_00047873

Claim	Oculus DK1 System's Exemplary Disclosures
	See photograph of an exemplary Oculus DK1 System.²³⁴ The hard drive on the Dell Inspiron 7720 includes “instructions” that allows the computer to operate, for example, the Windows 7 operating system. Applications such as Couch Knights, Oculus Overlay, SecondLife, VRChat, and others are also “instructions,” and would be stored on the hard drive of the computer, in this case a Dell Inspiron 7720.

²³⁴ META-8KHZ_00047842

Claim	Oculus DK1 System's Exemplary Disclosures
	 See photograph of an exemplary Oculus DK1 System.²³⁵

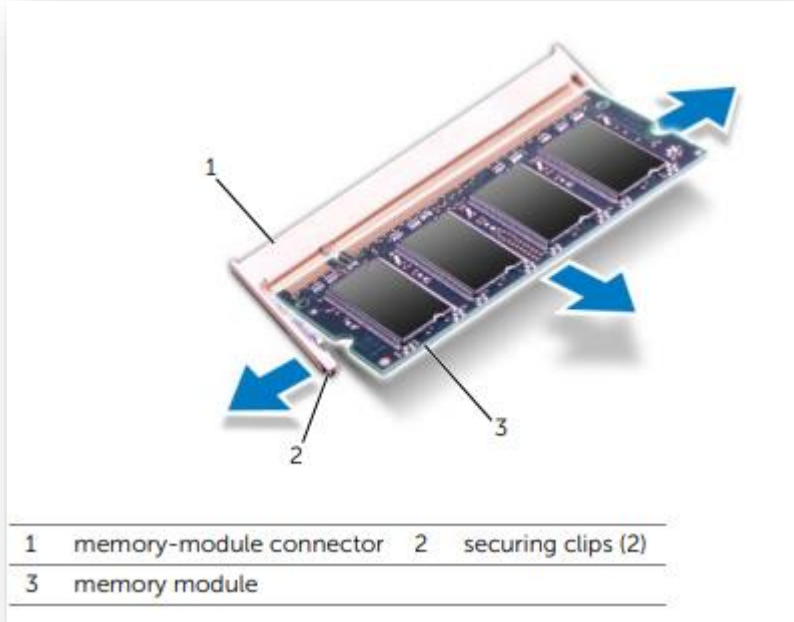
²³⁵ META-8KHZ_00047841

Claim	Oculus DK1 System's Exemplary Disclosures
	 See photograph of an exemplary Oculus DK1 System (storing VRChat application).²³⁶ The Dell Inspiron 7720 also includes RAM memory:

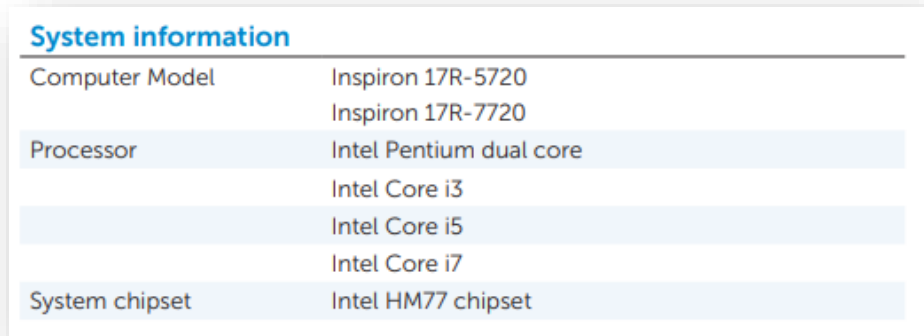
²³⁶ META-8KHZ_00046193

Claim	Oculus DK1 System's Exemplary Disclosures												
	Memory <table> <tr> <td>Connectors</td><td>two internally-accessible DDR3 SODIMM sockets</td></tr> <tr> <td>Capacities</td><td>2 GB and 4 GB</td></tr> <tr> <td>Minimum memory</td><td>2 GB</td></tr> <tr> <td>Maximum memory</td><td>4 GB</td></tr> <tr> <td>Memory type</td><td>1333/1600 MHz DDR3 SODIMM</td></tr> <tr> <td>Memory configurations supported</td><td>2 GB, 4 GB, 6 GB, and 8 GB</td></tr> </table> See Specification Sheet for Dell Inspiron 7720 (2013) (showing 1333/1600 MHz DDR3 SODIMM RAM memory).²³⁷	Connectors	two internally-accessible DDR3 SODIMM sockets	Capacities	2 GB and 4 GB	Minimum memory	2 GB	Maximum memory	4 GB	Memory type	1333/1600 MHz DDR3 SODIMM	Memory configurations supported	2 GB, 4 GB, 6 GB, and 8 GB
Connectors	two internally-accessible DDR3 SODIMM sockets												
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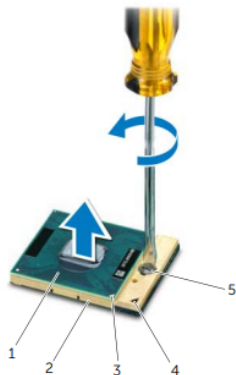
²³⁷ META-8KHZ_00045115

Claim	Oculus DK1 System's Exemplary Disclosures
	 1 memory-module connector 2 securing clips (2) 3 memory module See Owner's Manual for Dell Inspiron 7720 (2012).²³⁸
15[c]. a processor that executes the instructions to receive a command from the person to move the SLP of the voice of the computer program from the first location in empty space to a second location in empty	The Oculus DK1 System discloses and/or renders obvious, alone or in combination with other prior art, “a processor that executes the instructions to receive a command from the person to move the SLP of the voice of the computer program from the first location in empty space to a second location in empty space that is proximate to the first location and away from and proximate to the person, move the SLP of the voice of the computer program in response to the command from the first location in empty space to the second location in empty space, and provide binaural sound to the person through the wearable electronic device during the voice exchange between the computer program and the person such that an origin of the voice of the computer program occurs at the SLP

²³⁸ META-8KHZ_00047873

Claim	Oculus DK1 System's Exemplary Disclosures												
space that is proximate to the first location and away from and proximate to the person, move the SLP of the voice of the computer program in response to the command from the first location in empty space to the second location in empty space, and provide binaural sound to the person through the wearable electronic device during the voice exchange between the computer program and the person such that an origin of the voice of the computer program occurs at the SLP at the second location in empty space that is proximate to the first location and away from and proximate to the person	at the second location in empty space that is proximate to the first location and away from and proximate to the person” as embodied in the product itself and as reflected in other prior art references that describe it. <i>See</i> disclosures and cited evidence for limitations 1[b]-[d]. For example: The Oculus DK1 System discloses and/or renders obvious, alone or in combination with other prior art, “a processor that executes” instructions: A POSA would have been aware that, prior to any date to which the '196 Patent can claim priority, computers commonly include a “processor” and the “processor” would execute computer instructions. As one example, the exemplary Dell Inspiron 7720 includes a processor:  The screenshot shows a 'System information' window with a table of hardware details. The table has two columns: the component name and the specific model. The components listed are Computer Model, Processor, and System chipset. The Computer Model is listed as Inspiron 17R-5720 and Inspiron 17R-7720. The Processor is listed as Intel Pentium dual core, Intel Core i3, Intel Core i5, and Intel Core i7. The System chipset is listed as Intel HM77 chipset. <table border="1"> <thead> <tr> <th colspan="2">System information</th></tr> </thead> <tbody> <tr> <td rowspan="2">Computer Model</td><td>Inspiron 17R-5720</td></tr> <tr> <td>Inspiron 17R-7720</td></tr> <tr> <td rowspan="4">Processor</td><td>Intel Pentium dual core</td></tr> <tr> <td>Intel Core i3</td></tr> <tr> <td>Intel Core i5</td></tr> <tr> <td>Intel Core i7</td></tr> <tr> <td>System chipset</td><td>Intel HM77 chipset</td></tr> </tbody> </table> <i>See</i> Specification Sheet for Dell Inspiron 7720 (2013) (showing Intel processors).²³⁹	System information		Computer Model	Inspiron 17R-5720	Inspiron 17R-7720	Processor	Intel Pentium dual core	Intel Core i3	Intel Core i5	Intel Core i7	System chipset	Intel HM77 chipset
System information													
Computer Model	Inspiron 17R-5720												
	Inspiron 17R-7720												
Processor	Intel Pentium dual core												
	Intel Core i3												
	Intel Core i5												
	Intel Core i7												
System chipset	Intel HM77 chipset												

²³⁹ META-8KHZ_00045115

Claim	Oculus DK1 System’s Exemplary Disclosures												
	Procedure 1 To loosen the ZIF socket, use a small, flat-blade screwdriver and rotate the ZIF-socket cam screw counterclockwise until it comes to the cam stop. ⚠ CAUTION: To ensure maximum cooling for the processor, do not touch the heat transfer areas on the processor thermal cooling assembly. The oils in your skin can reduce the heat transfer capability of the thermal pads. ⚠ CAUTION: When removing the processor module, pull the module straight up. Be careful not to bend the pins on the processor module. 2 Lift the processor module from the ZIF socket.  <table><tr><td>1</td><td>processor</td><td>2</td><td>ZIF socket</td></tr><tr><td>3</td><td>processor pin-1 corner</td><td>4</td><td>ZIF-socket pin-1 corner</td></tr><tr><td>5</td><td>ZIF-socket cam screw</td><td></td><td></td></tr></table>	1	processor	2	ZIF socket	3	processor pin-1 corner	4	ZIF-socket pin-1 corner	5	ZIF-socket cam screw		
1	processor	2	ZIF socket										
3	processor pin-1 corner	4	ZIF-socket pin-1 corner										
5	ZIF-socket cam screw												
	See Owner’s Manual for Dell Inspiron 7720 (2012).²⁴⁰ The Oculus DK1 System discloses and/or renders obvious “receiv[ing] a command from the person to move the SLP of the voice of the computer program from the first location in empty space to a												

²⁴⁰ META-8KHZ_00047873

Claim	Oculus DK1 System's Exemplary Disclosures
	second location in empty space that is proximate to the first location and away from and proximate to the person.” See disclosures and cited evidence for limitation 1[b]. The Oculus DK1 System discloses and/or renders obvious, alone or in combination with other prior art, “mov[ing] the SLP of the voice of the computer program in response to the command from the first location in empty space to the second location in empty space.” See disclosures and cited evidence for limitation 1[c]. The Oculus DK1 System discloses and/or renders obvious, alone or in combination with other prior art, “provid[ing] binaural sound to the person through the wearable electronic device during the voice exchange between the computer program and the person such that an origin of the voice of the computer program occurs at the SLP at the second location in empty space that is proximate to the first location and away from and proximate to the person.” See disclosures and cited evidence for limitation 1[d]. To the extent Plaintiff contends that the Oculus DK1 System with applications like Couch Knights, SecondLife, and/or VRChat does not include a “voice exchange between the computer program and the user,” a person of ordinary skill in the art would have found it obvious to implement a user speaking to a computer program and a computer program speaking back based on other applications that included such functionality prior to any date to which the '196 Patent can claim priority. For example, in applications like Lifeline, a user speaks to the computer program and the computer program responds.²⁴¹

²⁴¹ See, e.g. LIFELINE: The Game Controlled ENTIRELY By Your Voice (September 11, 2018) at 2:02, <https://www.youtube.com/watch?v=XzmHrMqrKyo>; Lifeline: Voice Action Adventure [Part 2] The Room (September 10, 2013), <https://www.youtube.com/watch?v=TzXr1qD05ZM>; <https://www.ign.com/articles/2004/03/03/lifeline> (Lifeline review posted March 3, 2004); [https://en.wikipedia.org/wiki/Lifeline_\(video_game\)](https://en.wikipedia.org/wiki/Lifeline_(video_game)) (Lifeline released in 2003); see also, e.g., Kinectimals – XBOX360 with KINECT Part 1 TRUE HD – QUALITY 1080 (September 5, 2013) at 8:47, https://www.youtube.com/watch?v=BrCXV9_cQYw (showing voice exchange between user and computer tiger in Kinectimals application); How to Name Ur Nintendog (October 2, 2011) at 2:05, <https://www.youtube.com/watch?v=XnyPZshtiI> (showing voice exchange between user and computer dog in Nintendogs application).

Claim	Oculus DK1 System's Exemplary Disclosures
	To the extent Plaintiff argues that the Oculus DK1 System does not disclose this limitation, either expressly, implicitly, and/or by inherency, a person of ordinary skill in the art would have determined that the limitation would have been obvious in light of the Oculus DK1 System alone or in combination with any applicant admitted prior art, the knowledge of one of ordinary skill in the art, or any one or more of the references identified in Meta's Invalidity Contentions under Section IV.J.3 for at least the reasons stated in Meta's Invalidity Contentions cover pleading. <i>See, e.g., Chou</i> at 7:62-8:30 ("Referring again to FIG. 2, the standalone environment sensing device 200 can optionally include a set of user controls 232. The visually impaired person can utilize the user controls 232 to customize various aspects of the operation of the sensing device 200 including, but not limited to, the following. The visually impaired person can utilize the user controls to adjust various properties of the virtual sound sources such as the type of sound that emanates from each of the virtual sound sources, the volume of the sound that emanates from each of the virtual sound sources, and the frequency of the sound that emanates from each of the virtual sound sources, among other things. The visually impaired person can also utilize the user controls to choose different modes of operation such as a walk mode, a read mode, an analyze environment mode, and a manipulate object mode, among others. The visually impaired person can also utilize the user controls to adjust the field of view of the object sensor 202. It will be appreciated that the visually impaired person can make these adjustments both on-the-fly (i.e., when he is actively using the sensing device to determine the spatial geometry of his current physical environment) and offline (e.g., when he is not actively using the sensing device to determine the spatial geometry of his physical environment). The user controls 232 can be implemented in various ways including, but not limited to, the following. In an exemplary embodiment of the augmented auditory perception technique described herein the user controls 232 include one or more physical control elements (not shown) such as buttons, or sliders, or any combination thereof. The sensing device 200 can optionally also include a location sensor 208 which is also coupled to the first computing device 210 and operates in conjunction therewith to determine the location coordinates (such as latitude and longitude, among others) of the sensing device 200. Various types of devices can be employed for the location sensor 208 such as a global positioning system (GPS) sensor, among others."), Fig. 2; <i>Jarvinen</i> at 17:37-48 ("Referring now to FIG. 5, a flow diagram an example embodiment is provided. In FIG. 5, a device such as, for example, communication device 90 may detect one or

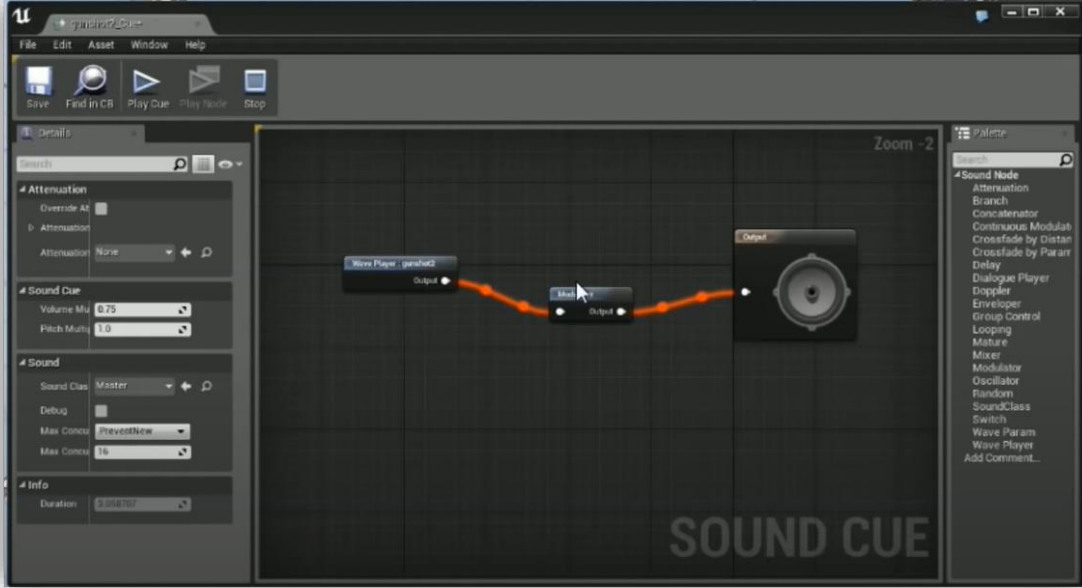
Claim	Oculus DK1 System's Exemplary Disclosures
	more hand gestures to manipulate one or more selected audio objects. The hand gestures may be gestures of a bare hand of a user that may not necessarily be currently holding an apparatus (e.g., apparatus 50). As described above, the communication device 90 may be embodied in a wrist band, bracelet (e.g., a wrist bracelet), game controller, ring, glove, pen, or any other device that is worn by a user or is otherwise attached to the user and which detects hand gestures of the user.”), 12:39-42 (“The gesture module 78 may analyze this information to modify an audio object(s) (e.g., an audio signal (e.g., a spatial audio signal)) based in part on the movements of the hand(s), as described more fully below.”), Fig. 5; Cohen 1991 II at 39 (“With a device like a DataGlove, a user can point and gesticulate using a 3D workspace envelope.”), 39 (“Pointing at a source indicates it, as a prelude for selection by grasping”), 57 (“The standard pointing device in a window/icon/menu/pointing device (wimp) system is a mouse. A mouse, trackball (a mouse on its back), or joystick would suffice for positioning objects in 2-space. One can imagine direct control of position (with a mouse, trackball, or DataGlove, say), steering control (with a return-to-center joystick, perhaps), or programmed control (automatic circulation),” “for instance, used joysticks to manipulate crudely spatialized sources. As long as visual tokens for the spatial sound objects are accessible through the workstation, they can be manipulated through the operations described above. For example, a mouse-based system finds analogs to indicating, highlighting, and relocating in pointing, clicking, and dragging. A speaker might be singled out for special attention by clicking her token, which would throw a spotlight on her voice.”), 90 (“In a gestural interface (like Handy Sound’s), pointing and grasping are natural postures for indicating and securing.”); Li 305 at 14:5-18 (“FIG. 7 illustrates a method for simultaneously generating configurable three-dimensional (3D) sounds using a microphone array system. Three-dimensional (3D) sound comprises 3D surround sound, 3D binaural sound, and 3D stereo sound. 3D sound comprises, for example, music, speech, any audio signal, etc., and is used with or without 3D images, 3D movies, and 3D videos. 3D sound allows a user to experience sound in a 3D space. As used herein, the term “user” refers to a listener of a sound recording, or a person receiving an audio signal on audio media. The 3D sound is represented as a 3D binaural sound when used with a headset or as a 3D surround sound when used with multiple loudspeakers, for example, in a home theater speaker system. The 3D stereo sound is considered as a special case of the 3D sound.”); Billinghurst 1998 at 5 (“A hand held Logitech wireless trackball with three buttons is used as the primary input device.”), 167-68 (6DoF “wand type pointing devices” and “joysticks” allow users to “point at or

Claim	Oculus DK1 System's Exemplary Disclosures
	manipulate virtual objects”); Pedersen at 9:6-21 (“The user may move the symbols into desired positions on the display using the user interface of the control device. For example, the display may be a touch sensitive display allowing the user to move the symbols by touching and dragging the symbols as is well-known in the art of smartphones. When the symbols have been moved into their desired positions on the display, the processor controls the corresponding binaural filters connected to respective input signals from sound sources represented by the symbols, for selection of directional transfer function corresponding to the positions on the display of the symbols representing the sound sources with relation to the symbol representing the user, whereby the user perceives the Sound sources to be positioned in the directions, or at the positions, indicated by the respective symbols positions on the display.”), 16:55-61 (“In addition, the microphones of binaural hearing aid 10A, 10B may be used for reception of spoken commands by the user transmitted (not shown) to the Smartphone 110 for speech recognition in a processor 130 of the smartphone 110, for decoding of the spoken commands and for controlling the hearing device system 10 to perform actions defined by respective spoken commands.”); Boustead at 13:5-44 (“FIG. 2 illustrates a Graphical User Interface (GUI) 200 of a conference scene which may be provided at the conference server 100 and/or at the terminals 120. If provided at a terminal 120, the GUI 200 may enable a participant to modify the conference scene as perceived at the terminal 120. In an embodiment, the GUI 200 enables a chairperson of an audio conference to place the conference participants within a conference scene. The GUI 200 may indicate the participants 201 of the audio conference. The participants 201 may correspond to the originators of the audio signals comprised within a set of downstream audio signals. As such, the GUI 200 may indicate up to (M-1) participants 201,” Fig. 2; Bedingfield at 6:27-51 (“From the decision block 304, the listener may select the mode for modifying individual participants via route B at the block 308. At a selection block 322, the listener may select a setting, such as to place the focus at a block 324, to change a participant’s volume at a block 326, or to change a participant’s location at a block 328. If the listener selects to place the focus at the block 324, the listener then selects a participant for the focus (the focus object). The focus object’s volume may then be amplified above the volume level of the other participants. For example, when multiple participants are speaking during a conference, the listener may desire to place the focus on the participant the listener desires to hear above the other speaking participants. If the listener selects to change the volume at the block 326, the listener may select a participant and adjust the volume, or other aspects of the participants sound such as the aspects adjustable by

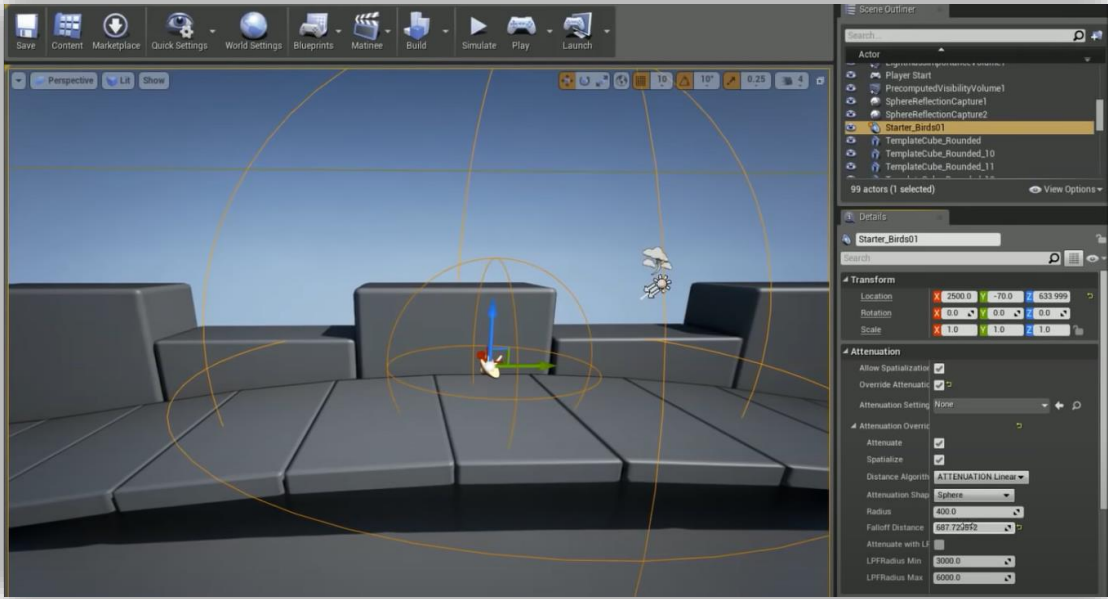
Claim	Oculus DK1 System's Exemplary Disclosures
	the block 316. If the listener selects to change the location at the block 328, the listener selects a Participant and then selects a new location for the participant within the sound field. The listener may also relocate his position within the sound field at the block 328. After the setting is selected at the selection block 322 and a setting is selected and implemented at the blocks 324, 326 or 328, the method 300 advances to the decision block 318 and then to either the decision block 304 or the block 320 as described above.”); Knappe at 9:43-67 (“GUI 100 can allow a user to manually partition the sound field. One possible GUI ‘look and feel’, illustrated in FIGS. 7A and 7B, shows a method of manual partitioning. FIG. 7A shows a GUI screen 110 at the start of a conference call. The presentation sound field is represented in GUI screen 110 by annular half-circle 112. Endpoints B, C, and D are portrayed respectively in blocks 114, 116, and 118 (endpoint D’s block 118 is shown smaller than the others because D represents a monophonic sound source). The blocks initially appear to the inside of the half-circle 112, signaling that no sound field mapping is currently being done on any of these sources. FIG. 7B shows GUI screen 110 after manipulation by a listener. The listener has created a presentation sound field sector for each endpoint, e.g., by dragging and dropping blocks 114, 116, and 118 onto half-circle 112. Endpoint B now occupies sector 122, i.e., approximately the leftmost 75 degrees of the sound field. Endpoint C now occupies, sector 124, i.e., the 75 degree sector from about 15 degrees left of center to about 60 degrees right of center. Endpoint D now occupies sector 126, i.e., approximately the rightmost 30 degrees of the sound field. Note that the listener has replaced the generic labels of each endpoint with icons containing the names of the conference participants at each location. The listener can also manipulate the widths of sectors 122, 124, and 126 by moving the sector dividers.”), Figs. 7A and 7B; Begault 2000 at 173 173 (“[A]udio in any virtual reality configuration can provide an important source of feedback. For instance, the VPL Data Glove works by analyzing a combination of detected finger positions and then using the software to match them to sets of predefined gestures (e.g., a peace sign, pointing with the index finger, squeezing hand as a fist).”).
CLAIM 19	
19. The electronic system of claim 15, wherein the processor further executes the instructions to change	The Oculus DK1 System discloses and/or renders obvious, alone or in combination with other prior art, “[t]he electronic system of claim 15, wherein the processor further executes the instructions to change attenuation and reverberation of the binaural sound in order to add artificial audial cues of virtual objects near the person, wherein the virtual objects do not actually exist near the person but

Claim	Oculus DK1 System's Exemplary Disclosures
attenuation and reverberation of the binaural sound in order to add artificial audial cues of virtual objects near the person, wherein the virtual objects do not actually exist near the person but are perceived to exist by the person from the artificial audial cues.	are perceived to exist by the person from the artificial audial cues” as embodied in the product itself and as reflected in other prior art references that describe it. <i>See</i> disclosures and cited evidence for limitations 1[pre], 1[a], 15[pre], and 15[c]. For example: The Oculus DK1 System discloses and/or renders obvious, alone or in combination with other prior art, “the processor” executing “instructions.” <i>See</i> disclosures and cited evidence for limitations 15[c]. The Oculus DK1 System discloses and/or renders obvious, alone or in combination with other prior art, “chang[ing] attenuation and reverberation of the binaural sound in order to add artificial audial cues of virtual objects near the person.” <i>See</i> disclosures and cited evidence for limitations 1[pre], 1[a], and 15[pre]. For example, as described above for claim limitations 1[pre], 1[a], and 15[pre], the applications like Couch Knights include spatialized binaural sound, such as footsteps or sword swings, localized to the SLP located at a knight character (“virtual object[] near the person”), in addition to environmental objects such as a table or books. Couch Knights was created using the Unreal Engine 4 game engine.²⁴² Prior to any date to which the '196 Patent can claim priority, Unreal Engine 4 includes “Sound Node[s]” for game objects that allowed for spatialization of the object’s audio, including “chang[ing] attenuation” and “reverberation” of sounds.

²⁴² <https://www.unrealengine.com/marketplace/en-US/product/couch-knights>.

Claim	Oculus DK1 System's Exemplary Disclosures
	 See, e.g., Unreal Engine 4 Tutorial – Sound Cues at 1:39.²⁴³

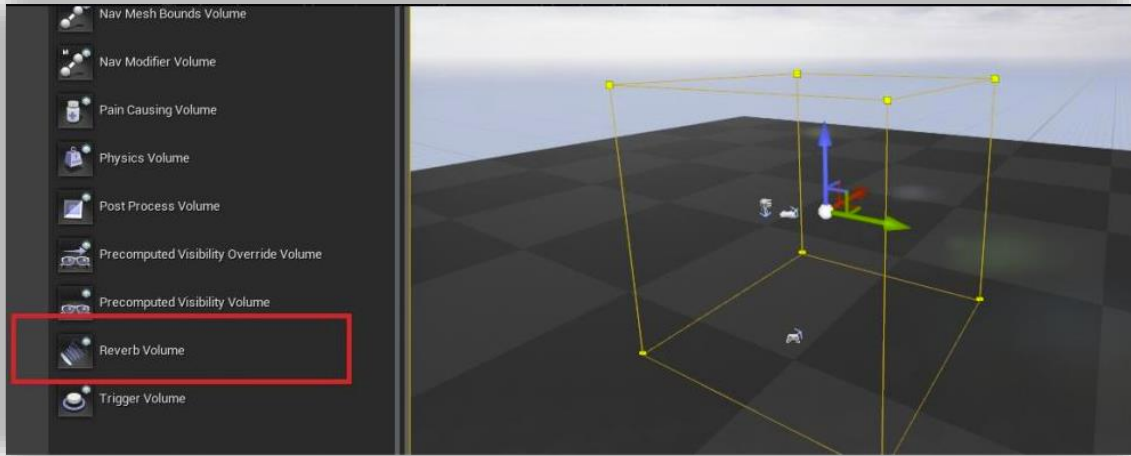
²⁴³ https://www.youtube.com/watch?v=rZhrjHSN_U (showing attenuation option for “Sound Node” in Unreal Engine 4).

Claim	Oculus DK1 System's Exemplary Disclosures
	 The screenshot displays the Unreal Engine 4 interface. The main viewport shows a 3D scene with a character (Starter_Bird01) standing on a platform. The interface includes a top toolbar with icons for Save, Content, Marketplace, Quick Settings, World Settings, Blueprints, Matinee, Build, Simulate, Play, and Launch. On the right, the 'Scene Outliner' panel lists various actors, and the 'Details' panel shows the properties for the selected actor, including Transform, Attenuation, and other settings. See also, e.g., Unreal Engine 4 Tutorial – Ambient Audio (Basic!) at 1:06.²⁴⁴

²⁴⁴ <https://www.youtube.com/watch?v=qtgY7esjB6I> (showing attenuation and "Allow Spatialization" options).

Claim	Oculus DK1 System's Exemplary Disclosures
	<i>See also, e.g., photograph of reverb parameters.</i>²⁴⁵

²⁴⁵ <https://forums.unrealengine.com/t/how-can-i-dampen-ambient-sounds-when-indoors/281924/2> (April 2014) (showing audio settings for “ReverbVolume,” including the “Apply Reverb” option).

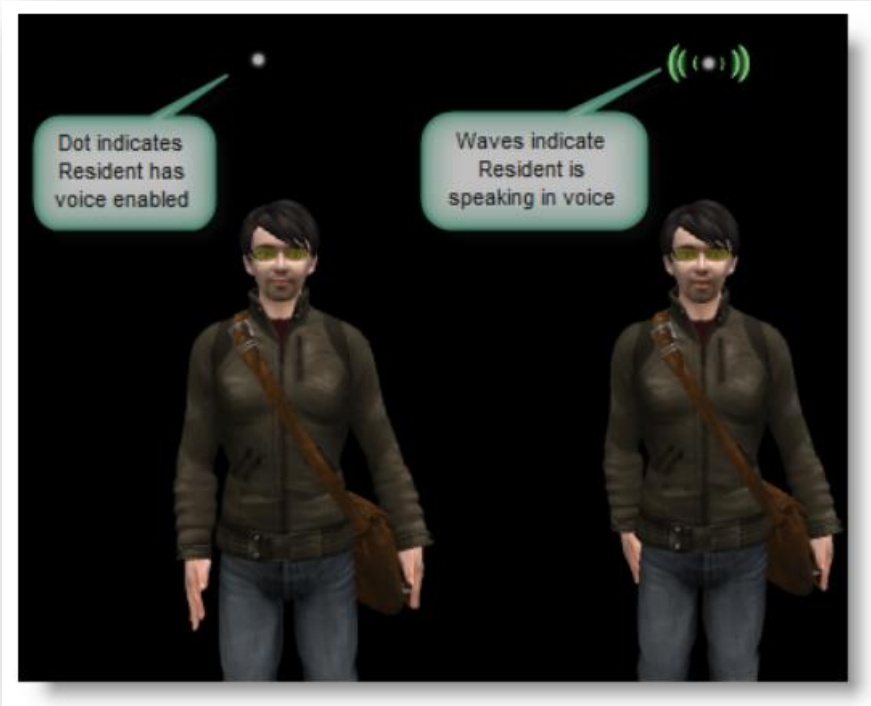
Claim	Oculus DK1 System's Exemplary Disclosures
	 See also, e.g., photograph of reverb volume.²⁴⁶ Thus, to the extent applications like Couch Knights did not include “chang[ing] attenuation and reverberation,” it would have been obvious to a person of skill in the art to implement such features in applications like Couch Knights using Unreal Engine 4. As another example, as described above for claim limitations 1[pre], 1[a], and 15[pre], the applications like SecondLife include spatialized binaural sound, such as sound clips and people’s voices, localized to the SLP located at a game object or virtual avatar (“virtual object[] near the person”).

²⁴⁶ <https://forums.unrealengine.com/t/ambient-audio-basic-tutorial/3261/4> (April 2014) (showing “Reverb Volume” that can be “[d]rag[ged] in” to the virtual environment).

Claim	Oculus DK1 System's Exemplary Disclosures
	Scripting comments <i>Sound clips</i> • <code>llTriggerSound()</code> • Unattached - sounds occur where they're triggered. • Cannot be stopped with <code>llStopSound()</code>. • <code>llPlaySound()</code> • Attached - sounds follow the object they are in if it moves. • Only one at a time per prim. Playing another will stop the current sound. • <code>llLoopSound()</code> • Attached - sounds follow the object they are in if it moves. • This continuously loops the sound. • Only one at a time per prim. Playing another will stop the current sound. See SecondLife Wiki – Environment Sounds (Revision as of 20:11, July 15, 2012).²⁴⁷ An example of another user in the form of a SecondLife “resident” is shown below. The other user’s avatar has “a voice chat feature that lets avatars speak.”²⁴⁸

²⁴⁷ https://wiki.secondlife.com/w/index.php?title=Environment_Sounds&direction=prev&oldid=1195319.

²⁴⁸ See SecondLife Wiki – Lip Sync (last edited on October 13, 2009) at https://wiki.secondlife.com/wiki/Lip_sync.

Claim	Oculus DK1 System's Exemplary Disclosures
	 See Viewer 2 Quick Start Guide/Local chat and voice (February 23, 2010).²⁴⁹

²⁴⁹ https://wiki.secondlife.com/wiki/Viewer_2_Quick_Start_Guide/Local_chat_and_voice.

Claim	Oculus DK1 System's Exemplary Disclosures
	 See SecondLife Tutorial Video – Voice Chat Getting Started (November 14, 2008).²⁵⁰ In addition, non-player characters (or “bots” in SecondLife) “can be created in the same way as a human-controlled avatar.”²⁵¹ A bot “is being controlled by a program” and “can be used in various ways,” including for “user interaction” and as a “[r]oleplaying NPC (non-player characters) for

²⁵⁰ https://wiki.secondlife.com/wiki/Video_Tutorials/More; see also <http://vidtuts.s3.amazonaws.com/VOICE-CHAT-Getting-started.mp4>.

²⁵¹ <https://wiki.secondlife.com/wiki/Bot#:~:text=Second%20Life%20bot%20account%20can,choose%20it%20from%20available%20alternatives>

Claim	Oculus DK1 System's Exemplary Disclosures
	gaming and interactive areas.”²⁵² A bot can also “[s]erve as a secretary or support robot by using autoresponder AI or remote chat assistant or “[b]e a non-personal character (NPC) in a roleplaying game.”²⁵³ The audio for other residents in applications like SecondLife is spatialized. For example, the SecondLife documentation describes a “Voice Test” where “5 testers” “Edit > Preferences > Voice Chat > [x] Enable voice chat, Hear voice at: Avatar position, camera direction.” Then arrange themselves so that “4 testers [are] around one tester at north, south, east and west.” This test is used to “verify [that] each tester sounds like their voice is coming from their position inworld” and that “everyone sound like they are in the right place spatially.”

²⁵²

<https://wiki.secondlife.com/wiki/Bot#:~:text=Second%20Life%20bot%20account%20can,choose%20it%20from%20available%20alternatives>

²⁵³ https://web.archive.org/web/20130723023800/https://wiki.secondlife.com/wiki/Second_Life_bot_software_comparison

Claim	Oculus DK1 System's Exemplary Disclosures
	Voice Test VERSION 0.1 LENGTH 00:00 TESTERS 5 OVERVIEW Coming SETUP Up to 5 normal users, (can be done with 2) Spatial sound testing with gathered groups • Setup: Have each of 5 testers do the following: Edit > Preferences > Voice Chat > [x] Enable voice chat, Hear voice at: Avatar position, camera direction. • Arrange 4 testers around one tester at north, south, east and west, like this: <pre><tab> . Tester N . Tester W Tester C Tester E . </tab></pre> • Tester C: Face Tester N. • Cardinal Testers: Speak one at a time starting with Tester N and going clockwise around Tester C (N followed by E followed by S followed by W). • Tester C: Without moving, verify each tester sounds like their voice is coming from their position inworld. • Tester C: Rotate your avatar to face Tester S. • Cardinal Testers, repeat the round robin above, starting with Tester S. • Tester C: Without moving, verify each tester sounds like their voice is coming from their position inworld. • Tester C: Alt-Zoom on something out of range of the testers. * ... • Group in a circle • Does everyone sound like they are in the right place spatially? • If someone moves away, do they get quieter? • Group with members behind you • Can you hear all members, including those behind you? See SecondLife Wiki – Voice Test (November 26, 2007).²⁵⁴

²⁵⁴ https://wiki.secondlife.com/wiki/Voice_Test.

Claim	Oculus DK1 System's Exemplary Disclosures
	The SecondLife documentation also explains that “3D position” is used by the <i>Session.Set3Dposition.1</i> method for both the “speaker and listener” and that <i>Session.Set3Dposition.1</i> “describes the speaking position and the listening position for this avatar.”

Session.Set3DPosition.1

When sending a 3D position for speaker and listener, the "listener" is either the avatar position or the camera position. That is, it describes the speaking position and the listening position for this avatar.

```
<Request requestId="114" action="Session.Set3DPosition.1">
  <SessionHandle>c1_m1000abcdefghijklmnopqrstuvwxy1</SessionHandle>
  <OrientationType>legacy</OrientationType>
  <SpeakerPosition>
    <Position>
      <X>261451</X>
      <Y>26.9568</Y>
      <Z>-283000</Z>
    </Position>
    <Velocity>
      <X>0</X>
      <Y>0</Y>
      <Z>0</Z>
    </Velocity>
    <AtOrientation>
      <X>0.816965</X>
      <Y>0</Y>
      <Z>-0.576688</Z>
    </AtOrientation>
    <UpOrientation>
      <X>0</X>
      <Y>1</Y>
      <Z>0</Z>
    </UpOrientation>
    <LeftOrientation>
      <X>-0.576688</X>
      <Y>0</Y>
      <Z>-0.816965</Z>
    </LeftOrientation>
  </SpeakerPosition>
  <ListenerPosition>
    <Position>
      <X>261448</X>
      <Y>27.9639</Y>
      <Z>-283001</Z>
    </Position>
    <Velocity>
      <X>0</X>
      <Y>0</Y>
      <Z>0</Z>
    </Velocity>
    <AtOrientation>
      <X>0.795791</X>
      <Y>0</Y>
      <Z>-0.559283</Z>
    </AtOrientation>
    <UpOrientation>
      <X>0</X>
      <Y>1</Y>
      <Z>0</Z>
    </UpOrientation>
    <LeftOrientation>
      <X>-0.574999</X>
      <Y>0</Y>
      <Z>-0.818154</Z>
    </LeftOrientation>
  </ListenerPosition>
</Request>
```

The viewer doesn't get a response

Claim	Oculus DK1 System's Exemplary Disclosures
	See SecondLife Wiki – Voice/Technical (November 18, 2009).²⁵⁵ In addition, applications like SecondLife use the FMOD audio engine.²⁵⁶ FMOD includes the ability to modify reverberation of sounds.²⁵⁷ Applications like SecondLife also use OpenAL²⁵⁸ OpenAL includes the ability to modify reverberation and attenuation.²⁵⁹ Thus, to the extent applications like SecondLife did not include “chang[ing] attenuation and reverberation,” it would have been obvious to a person of skill in the art to implement such features in applications like Couch Knights using FMOD. As another example, as described above for claim limitations 1[pre], 1[a], and 15[pre], applications like VRChat include spatialized binaural sound, such as people’s voices, localized to the SLP located at, for example, a virtual avatar (“virtual object[] near the person”). Applications like VRChat “change attenuation and reverberation” of sounds “to add artificial audial cues of virtual objects near the person,” such as virtual avatars.

²⁵⁵ <https://wiki.secondlife.com/wiki/Voice/Technical#Session.Set3DPosition.1>.

²⁵⁶ https://web.archive.org/web/20131231020628/https://wiki.secondlife.com/wiki/Third_Party_Libraries (SecondLife uses “fmod” as “[a]udio engine”).

²⁵⁷ See, e.g., FMOD Studio Tutorial 04 – Mixer Introduction (October 10, 2012) at 5:00, <https://www.youtube.com/watch?v=DUP1rPmA0DI> (showing reverb in FMOD); FMOD Studio Tutorial 05 – The 3D Panner (February 26, 2013) at 1:38, <https://www.youtube.com/watch?v=CJ3rpZGrHh0> (discussing attenuation of sound in connection with FMOD’s 3D sounds).

²⁵⁸ https://web.archive.org/web/20131231020628/https://wiki.secondlife.com/wiki/Third_Party_Libraries (SecondLife uses “openal”).

²⁵⁹ OpenAL 1.1 Specification and Reference (2005) at 8, <https://web.archive.org/web/20130327000050/http://connect.creativelabs.com/openal/Documentation/OpenAL%201.1%20Specification.pdf> (“OpenAL does include extensions compatible with the IA-SIG 3D Level 1 and Level 2 rendering guidelines to handle sound-source directivity and distance-related attenuation and Doppler effects, as well as environmental effects such as reflection, obstruction, transmission, and reverberation.”).

Claim	Oculus DK1 System's Exemplary Disclosures
	For example, VRChat was created using the Unity3D engine.²⁶⁰ The VRChat development diary from 2014 explains that the developer used “two libraries” in addition to Unity3D: “TNet (for networking) and Uspeak (for voicechat),” which were used with “a sweet CoffeeShop environment on the Unity Asset Store.”²⁶¹ Uspeak includes “[s]patial audio support” for voice chat that provided “directional audio for a truly immersive experience.”²⁶² Furthermore, the Unity Developers Manual from 2014 explains that Unity supported 3D audio. For example, audio clips from sound clip files are “played back so as to simulate its position in the

²⁶⁰ See, e.g., <https://en.wikipedia.org/wiki/VRChat>; VRChat v0.1 Development, <https://web.archive.org/web/20140121030858/http://grahamgaylor.com/2014/01/>.

²⁶¹ VRChat v0.1 Development, <https://web.archive.org/web/20140121030858/http://grahamgaylor.com/2014/01/>; see also <https://web.archive.org/web/20140121030107/http://grahamgaylor.com/2013/06/> (“Now I’ll explain the code implementation using Unity3D using C#.”); <https://web.archive.org/web/20140121030112/http://grahamgaylor.com/2013/09/> (“I decided to go with Unity3D as my game engine for two reasons. First off, I have the most experience with Unity, I’ve played around with the UDK, but I came crawling back to Unity. My second and more important reason is that there are Unity plugins for most of the hardware I’m using.”); <https://web.archive.org/web/20140121030858/http://grahamgaylor.com/2014/01/> (“I used Unity3D for both projects, but used better networking and voice chat libraries in the second iteration.”); <https://web.archive.org/web/20140120214705/http://grahamgaylor.com/category/unity3d/>; <https://web.archive.org/web/20140121030102/http://grahamgaylor.com/2013/01/>; <https://web.archive.org/web/20140121093515/http://grahamgaylor.com/2013/04/> (“To start, the Oculus Developer Center is now open and ready for devs to download the Rift SDK. What this means is that developers will now be able to integrate the Rift into their games and/or start building games from scratch with an actual test unit to build it around. As of now (April 1), it seems the only SDK downloads are the Windows SDK and the Unity 4 Pro integration package.”); <https://web.archive.org/web/20140121030847/http://grahamgaylor.com/2013/05/>.

²⁶² See [RELEASED] USpeak Voice Chat – Voice Chat For All Your Multiplayer Games, <https://forum.unity.com/threads/released-uspeak-voice-chat-voice-chat-for-all-your-multiplayer-games.154609/> (last edited November 17, 2013).

Claim	Oculus DK1 System's Exemplary Disclosures
	game world's 3D space" if the "audio clip is marked as a 3D Sound."²⁶³ "3D sounds emulate the distance and location of sounds by attenuating volume and panning across speakers."²⁶⁴ Basic Theory In real life, sounds are emitted by objects and heard by listeners. The way a sound is perceived depends on a number of factors. A listener can tell roughly which direction a sound is coming from and may also get some sense of its distance from its loudness and quality. A fast-moving sound source (like a falling bomb or a passing police car) will change in pitch as it moves as a result of the Doppler Effect. Also, the surroundings will affect the way sound is reflected, so a voice inside a cave will have an echo but the same voice in the open air will not.  Audio Sources and Listener Audio Overview – Unity Documentation (June 3, 2014).²⁶⁵ As another example, VRChat was "created by using the Unity 3D engine and is a platform for users to meet online and chat with each other in environments they have made themselves. The software has made it easy for developers to add more than one user to any video game or other application, provided they are of the Unity-developed environments. The software used by the developers takes its cues from an amalgamation of different things: head gaze direction, body gestures and 3D positional audio to do its best to develop an immersive, fun social experience for all users involved." See VR Chat Releasing for Oculus Rift (December 2, 2014).²⁶⁶

²⁶³ See <https://web.archive.org/web/20140601033451/http://docs.unity3d.com/Manual/class-AudioClip.html>.

²⁶⁴ See <https://web.archive.org/web/20140601033451/http://docs.unity3d.com/Manual/class-AudioClip.html>.

²⁶⁵ <https://web.archive.org/web/20140603055903/http://docs.unity3d.com/Manual/AudioOverview.html>.

²⁶⁶ <https://virtualrealitytimes.com/2014/12/02/vr-chat-releasing-for-oculus-rift/>; see also VRChat now in Oculus Rift app store (December 3, 2014) <https://www.hypergridbusiness.com/2014/12/vrchat-now-in-oculus-rift-app-store/>; Oculus Rift DK1 - VRChat

Claim	Oculus DK1 System's Exemplary Disclosures
	As early as 2011, Unity included binauralization, for example as shown in the “Procedural Audio and Binauralisation in Unity’s Bootcamp Demo (v 1.0)” as shown below:  See Procedural Audio and Binauralisation in Unity’s Bootcamp Demo (v 1.0) (Aug. 15, 2011) (showing “Reverb Tail” and “First Reflections” options).²⁶⁷

0.1 (1080p) (January 16, 2014) <https://www.youtube.com/watch?v=z9PgdbYLbLU>; VRChat v0.1 Released https://www.reddit.com/r/oculus/comments/1vcbwk/vrchat_v01_released/.

²⁶⁷ <https://www.youtube.com/watch?v=sQIKPaKNCPY>

Claim	Oculus DK1 System's Exemplary Disclosures
	Thus, to the extent applications like VRChat did not include “chang[ing] attenuation and reverberation,” it would have been obvious to a person of skill in the art to implement such features in applications like VRChat using Unity3D. The Oculus DK1 System discloses and/or renders obvious, alone or in combination with other prior art, “virtual objects” that “do not actually exist near the person but are perceived to exist by the person from the artificial audial cues”: For example, in applications like Couch Knights, the knight characters (“virtual objects”) are virtual and “do not actually exist near the person.” The person playing Couch Knights “perceive[s]” the knight characters based on their “artificial audial cues,” such as footsteps and sword swings. As another example, in applications like SecondLife, the game objects and/or avatars are virtual and “do not actually exist near the person.” The person playing SecondLife “perceive[s]” the game objects and/or avatars based on their “artificial audial cues,” such as sound clips or voice. As another example, in applications like VRChat, the player avatars are virtual and “do not actually exist near the person.” The person playing VRChat “perceive[s]” the game objects and/or player avatars based on their “artificial audial cues,” such as voice.