

EIGHT KHZ, LLC
v.
META PLATFORMS, INC.; META PLATFORMS TECHNOLOGIES, LLC

Case No. 6:22-cv-00575-ADA

Asserted U.S. Patent No. 11,290,836
“Providing binaural sound behind an image being displayed with
an electronic device”

Plaintiff’s Amended Infringement Contentions

This claim chart is based on publicly available literature regarding Defendants' products. Plaintiff will be seeking Defendants' internal documentation, including technical documentation such as schematics and datasheets, in discovery and therefore Plaintiff reserves the right to amend or further supplement this claim chart.

The term "Accused Products" herein refers to all products manufactured, used, tested, imported, or sold by or on behalf of Defendants practicing the Asserted Claims of the '836 Patent, and all processes employed by Defendants that practice the Asserted Claims of the '836 Patent, consisting of at least Defendants' products that support Oculus, including by way of example and without limitation the Oculus Quest product lines. On information and belief, such Accused Products include without limitation the following: Oculus Quest, Oculus Quest 2, and Quest Pro. To the extent Defendants have substituted the name "Meta" or "Reality Labs" for "Oculus" in any of the above products, such products are also included in the Accused Products.

This claim chart specifically addresses infringement of Claims 8 and 10 ("Asserted Claims") of the '836 Patent by Defendants' Oculus Quest product. Defendants' Oculus Quest product is representative of Defendants' infringement of the Asserted Claim. While this chart specifically addresses the functionality of the Oculus Quest, these infringement contentions are illustrative rather than exhaustive and they are representative of, and apply to, all Accused Products based on the fact that all the Accused Products infringe in the same general way. 2

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Claim: 8 – Preamble¹

An electronic device,
comprising:

- The Accused Products include one or more electronic devices capable of performing the patented method.
- By way of example, the Quest provides all-in-one virtual reality (VR) through its headset and hand-held controllers. These electronic devices practice the patented method.



Source: <https://www.meta.com/blog/quest/why-im-excited-for-vr-in-2019/>



Source: <https://www.youtube.com/watch?v=ryvsAjCaKkk&t=80s> at 1:20

¹By charting the preamble, we do not concede that the preamble is a limitation and reserve the right to contend that the preamble is not a limitation of the claim.

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Claim: 8 – Element (A)

a display that displays an image that occurs within a near-field distance from a head of a user

- The device (an Oculus Quest) contains a display with 1440 x 1600 pixel resolution.
- The image displayed on the display is perceived to occur within one meter of the head of a user.



Source: <https://www.youtube.com/watch?v=pVFcseWskE>

Oculus Quest VR Headset Specs

SoC	Qualcomm Snapdragon 835
Display	Dual 1440x1600 72Hz OLED panels
IPD Setting	Mechanical IPD adjustment (range undisclosed)
Storage	64GB or 128GB of internal flash storage
Audio	Integrated speakers and microphone, dual 3.5 mm audio jack (one on each side), in-ear headphone accessory available

Source: <https://www.tomshardware.com/reviews/oculus-quest-standalone-vr-system,6110.html>

Claim 8, Element (A) - The Accused Products literally infringe this claim element. Alternatively, the limitations of this claim element are present under the Doctrine of Equivalents because to the extent there are any differences between the Accused Product and this claim element, such differences are insubstantial. Further, equivalency may be shown by the fact that the Accused Product performs substantially the same function in substantially the same way to achieve substantially the same result as recited in this claim element.

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Claim: 8 – Element (A)

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- The device (an Oculus Quest) contains a display with 1440 x 1600 pixel resolution.
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Source: <https://www.youtube.com/watch?v=sKDXksI7S6o> at 13:53

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Claim: 8 – Element (B)

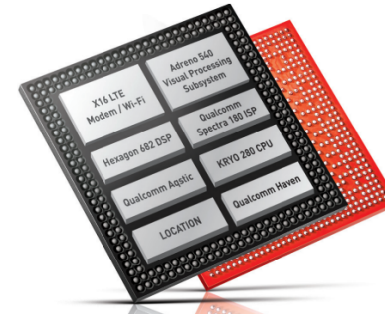
one or more processors that process sound for the image to generate binaural sound

- The Accused Products process sound using a Snapdragon 835 Platform.
- By way of example, the screenshot on the right shows a what processors are included on the Snapdragon 835 chip set as a component within the Quest.
- Public literature describes the Snapdragon 835 as capable of producing 3D sounds.

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Audio	Integrated speakers and microphone, dual 3.5 mm audio jack (one on each side), in-ear headphone accessory available

Source: <https://www.tomshardware.com/reviews/oculus-quest-standalone-vr-system,6110.html>



Source: https://www.qualcomm.com/content/dam/qcomm-martech/dm-assets/documents/snapdragon_product_brief_835_0.pdf



Putting the “real” in virtual reality

Experience superior virtual and augmented reality with immersive visuals, heightened 3D sounds, and intuitive interactions—with less of the lag or latency that causes motion sickness.

Source: https://www.qualcomm.com/content/dam/qcomm-martech/dm-assets/documents/snapdragon_product_brief_835_0.pdf

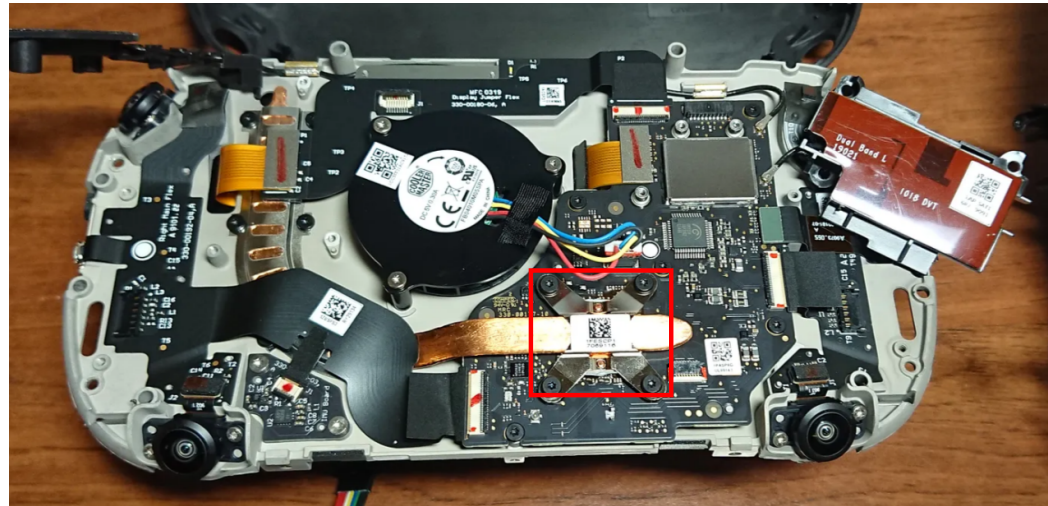
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'836 Patent

Claim: 8 – Element (B)

one or more processors that process sound for the image to generate binaural sound

- The Oculus Quest has a control board with the Qualcomm Snapdragon 835 platform chipset that processes binaural sound.



Source: <https://medium.com/badvr/oculus-quest-headset-disassembly-2f404b004a3c>

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Source: <https://www.tomshardware.com/reviews/oculus-quest-standalone-vr-system,6110.html>

Claim 8, Element (B) - The Accused Products literally infringe this claim element. Alternatively, the limitations of this claim element are present under the Doctrine of Equivalents because to the extent there are any differences between the Accused Product and this claim element, such differences are insubstantial. Further, equivalency may be shown by the fact that the Accused Product performs substantially the same function in substantially the same way to achieve substantially the same result as recited in this claim element.

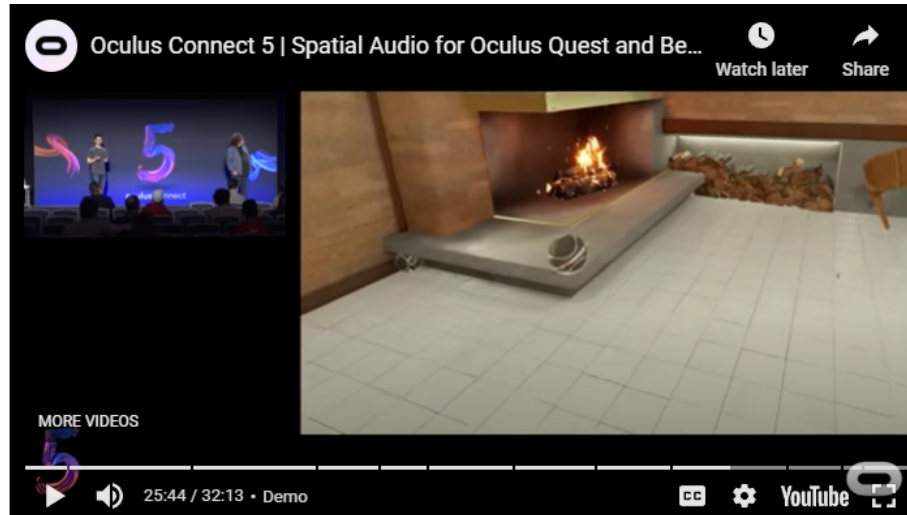
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Claim: 8 – Element (C)

that has a sound localization point (SLP) with a coordinate location that occurs at a far-field distance located behind the image and along a line-of-sight from the user to the image while the display displays the image to the user at the near-field distance

- There is an SLP located at the virtual image of the ball that is out in space.
- The SLPs occur at a far-field distance for the user, behind the image that is displayed mere inches from the eyes of users.



Source: https://www.meta.com/blog/quest/simulating-dynamic-soundscapes-at-facebook-reality-labs/?utm_source=www.bing.com&utm_medium=oculusredirect

Shown is an image of a virtual ball thrown in a room, while using the Accused Product. While the ball appears out in the room or bouncing off the walls and sound coming from the ball at the same distance, the projected image is only inches away from the user, projected in the headset.

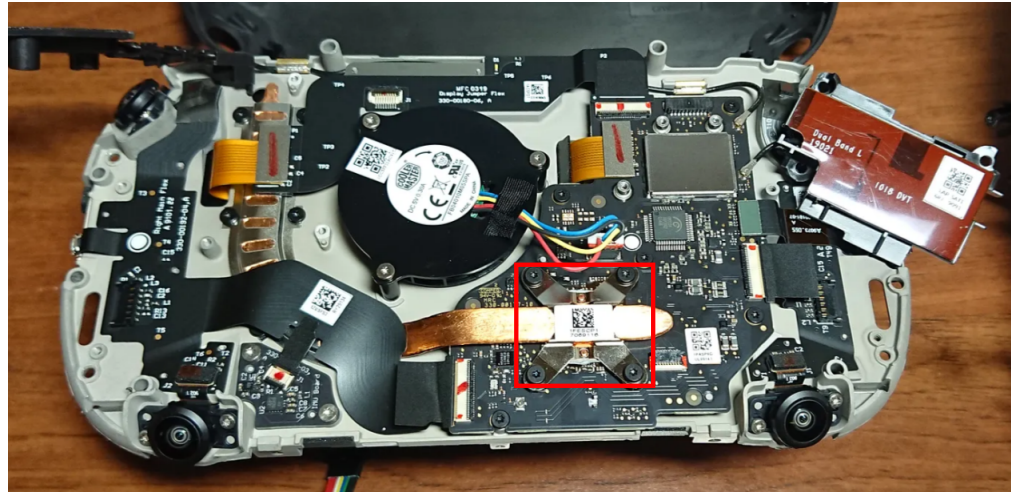
Claim 8, Element (C) - The Accused Products literally infringe this claim element. Alternatively, the limitations of this claim element are present under the Doctrine of Equivalents because to the extent there are any differences between the Accused Product and this claim element, such differences are insubstantial. Further, equivalency may be shown by the fact that the Accused Product performs substantially the same function in substantially the same way to achieve substantially the same result as recited in this claim element.

'836 Patent

Claim: 8 – Element (D)

wherein the one or more processors include a digital signal processor (DSP) that processes the sound for the image with far-field head-related transfer functions (HRTFs)

- The Accused Products process sound using a DSP inside a chipset.
- By way of example, the screenshot on the right shows the Qualcomm Snapdragon 835 platform chipset.
- Public literature describes the Snapdragon 835 as capable of producing 3D sounds.



Source: <https://medium.com/badvr/oculus-quest-headset-disassembly-2f404b004a3c>

Oculus Quest VR Headset Specs

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Source: <https://www.tomshardware.com/reviews/oculus-quest-standalone-vr-system,6110.html>

FEATURES & SPECIFICATIONS³

GPU

- + Adreno 540 GPU
- + OpenGL ES 3.2, OpenCL 2.0 full, Vulkan, DX12

DSP

- + Hexagon 682 DSP with:
 - Hexagon Vector eExtensions
 - Qualcomm All-Ways Aware
 - TensorFlow and Halide support
 - Qualcomm® Neural Processing Engine (NPE) SDK

Display

- + UltraHD Premium-ready
- + 4K Ultra HD, 60 FPS
- + 10-bit color depth
- + DisplayPort, HDMI, and USB Type-C support

Audio

- + Qualcomm Aqstic™ audio codec and speaker amplifier
- + High 123dB SNR, Native DSD support
- + Qualcomm® aptX™ audio playback with support for aptX Classic and HD

Claim 8, Element (D) - The Accused Products literally infringe this claim element. Alternatively, the limitations of this claim element are present under the Doctrine of Equivalents because to the extent there are any differences between the Accused Product and this claim element, such differences are insubstantial. Further, equivalency may be shown by the fact that the Accused Product performs substantially the same function in substantially the same way to achieve substantially the same result as recited in this claim element.

'836 Patent

Claim: 8 – Element (D)

wherein the one or more processors include a digital signal processor (DSP) that processes the sound for the image with far-field head-related transfer functions (HRTFs)

- The Oculus Quest uses a Qualcomm Snapdragon 835 processor. This processor uses HRTFs to process sound for far-field images.
- Defendants' public literature confirms the Accused Products utilize HRTFs to localize sound and create 3D Audio spatialization.



Putting the “real” in virtual reality

Experience superior virtual and augmented reality with immersive visuals, heightened 3D sounds, and intuitive interactions—with less of the lag or latency that causes motion sickness.

Source: https://www.qualcomm.com/content/dam/qcomm-martech/dm-assets/documents/snapdragon_product_brief_835_0.pdf

FEATURES & SPECIFICATIONS³

GPU

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- + Qualcomm® aptX™ audio playback with support for aptX Classic and HD

While video games and conventional film present audio on a plane, VR uses head-related transfer function (HRTF) to simulate how sound would reach the ears, which allows for a full 3D audio experience. The Rift headset is designed so that the sound you hear comes from the same direction as a given visual stimulus. Thanks to built in headphones, that means designers can place sounds behind you as a prompt to turn toward something beyond your field of view.

Source: <https://www.oculus.com/blog/beyond-surround-sound-audio-advances-in-vr/>

Claim 8, Element (D) - The Accused Products literally infringe this claim element. Alternatively, the limitations of this claim element are present under the Doctrine of Equivalents because to the extent there are any differences between the Accused Product and this claim element, such differences are insubstantial. Further, equivalency may be shown by the fact that the Accused Product performs substantially the same function in substantially the same way to achieve substantially the same result as recited in this claim element.

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Claim: 8 – Element (E)

while the electronic device is located at the near-field distance from the head of the user.

- As illustrated by Defendants' public marketing of the Accused Products, when the Oculus Quest is in use, it is worn on the head of a user, and is thus located within a few inches of the head of the user.



Source: <https://www.youtube.com/watch?v=pVFcsedWsKE>

Claim 8, Element (E) - The Accused Products literally infringe this claim element. Alternatively, the limitations of this claim element are present under the Doctrine of Equivalents because to the extent there are any differences between the Accused Product and this claim element, such differences are insubstantial. Further, equivalency may be shown by the fact that the Accused Product performs substantially the same function in substantially the same way to achieve substantially the same result as recited in this claim element.

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Claim: 10 – Element (A)

The electronic device of claim 8,

wherein the image is a virtual reality (VR) image

- As evidenced by Defendants' public demonstration of the Accused Products, users perceive the virtual images of a fictional pet "Bogo", while in a virtual environment.
- This image, as seen by a user of the device of claim 8, is a virtual image.



Source: <https://www.youtube.com/watch?v=sKDXksl7S6o> at 7:04 and 7:37

Claim 10, Element (A) - The Accused Products literally infringe this claim element. Alternatively, the limitations of this claim element are present under the Doctrine of Equivalents because to the extent there are any differences between the Accused Product and this claim element, such differences are insubstantial. Further, equivalency may be shown by the fact that the Accused Product performs substantially the same function in substantially the same way to achieve substantially the same result as recited in this claim element.

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Claim: 10 – Element (B)

the display is included with a head mounted display worn on the head of the user.

- The device (an Oculus Quest) contains displays with 1440 x 1600 pixel resolution.



Source: <https://www.youtube.com/watch?v=pVFcsedWsKE>

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Source: <https://www.tomshardware.com/reviews/oculus-quest-standalone-vr-system,6110.html>

Claim 10, Element (B) - The Accused Products literally infringe this claim element. Alternatively, the limitations of this claim element are present under the Doctrine of Equivalents because to the extent there are any differences between the Accused Product and this claim element, such differences are insubstantial. Further, equivalency may be shown by the fact that the Accused Product performs substantially the same function in substantially the same way to achieve substantially the same result as recited in this claim element.

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