

Sound on Display

Metacog Patent Research

Issue: 6

1. Advancements Galore

The major consumer device makers are competitively devising new and revolutionary advancements - be it a bezel-free phone, in-display fingerprint scanners, 5G support, foldable phones, multiple camera lenses, smartwatches with cameras, AI support, etc.

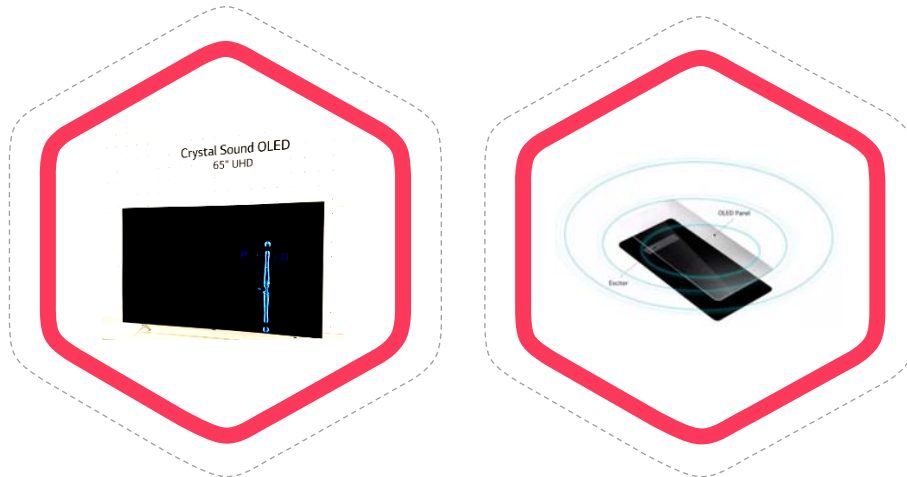
In this edition, we'll focus on a new technology called "sound on display", wherein the sound is generated by the vibrations on a screen.

2. Sound on Display Technologies

2.1. LG's Crystal Sound

At CES 2017, LG Display displayed an 88-inch 8K Crystal Sound OLED display, wherein a 3.2.2-channel sound system was embedded into the display. There were two exciters up top, one in the middle and two towards the bottom. These exciters produced sounds by vibrating the display, thereby making the sound bar (or speakers) redundant.

LG advanced this technology and launched G8 ThinQ with built-in Crystal Sound technology on an OLED screen. The phone's vibrating surface acts as a diaphragm to amplify sound and its top part acts as a loudspeaker. It has one bottom speaker that is paired with the top part of the screen forming a two-channel audio setup.



LG's Display Speaker

In early 2019, LG Electronics filed a trademark for the "Display Speaker" with the EPO.

Noteworthy Patents

➤ **US 10,349,181 B2** (LG Display Co Ltd)

Title: Actuator fixing device and panel vibration type sound-generating display device including the same

Abstract: Provided are an actuator fixing device and a panel vibration type sound-generating display device including the same. A display device includes: a display panel configured to display an image, a cover bottom configured to cover the display panel, and a plurality of sound-generating actuators supported by the cover bottom, the sound-generating actuators being configured to vibrate the display panel to generate sound, at least two of the sound-generating actuators being adjacent to each other.

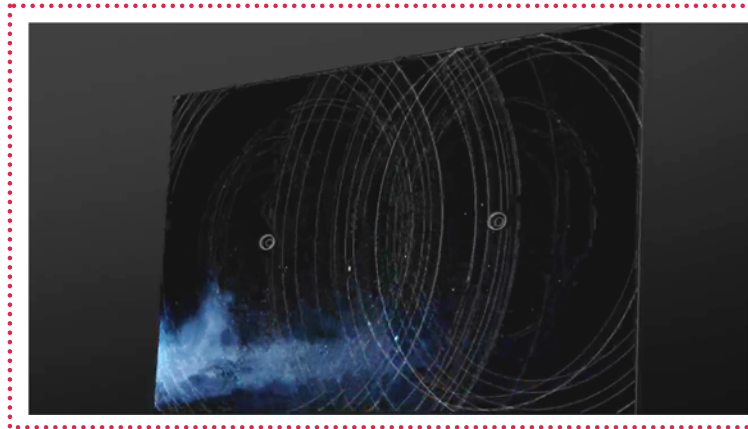
➤ **US 10,091,585 B2** (LG Display Co Ltd)

Title: Panel vibration type sound generating display device

Abstract: Disclosed is a display device that includes a display panel, sound generating actuators including a first sound generating actuator in a first area of the display panel and a second sound generating actuator in a second area of the display panel, the first and second sound generating actuators configured to vibrate the display panel to generate sound, and a partition between the first sound generating actuator and the second sound generating actuator.

2.2. Sony's Acoustic Surface Audio

Taking cue from LG, Sony has developed their own version of sound on display for TVs, and they call it "Acoustic Surface Audio". In this technology, two actuators behind the TV vibrate to create acoustics that move with the picture, and the sound comes directly from the centre of the screen. In addition, there are two sound-positioning tweeters in the back of the TV to simulate sound from the centre of the screen and precisely matching pictures with sound.

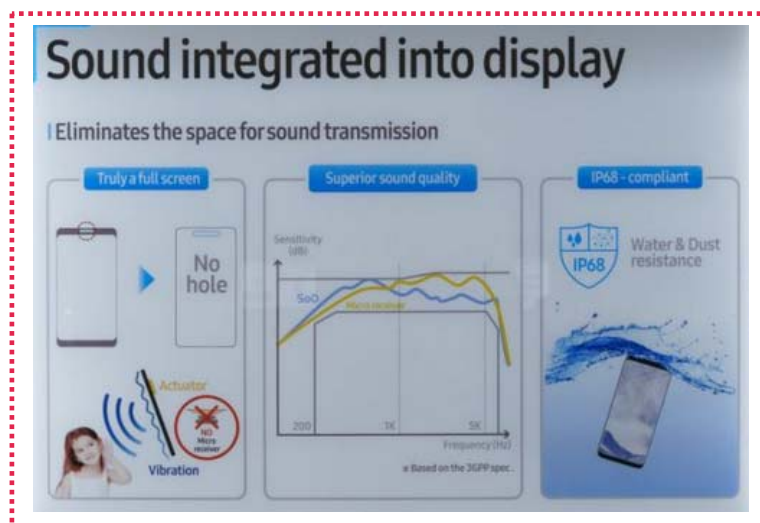


2.3. Vivo's Screen SoundCasting

Vivo unveiled the APEX, a prototype device that supports screen soundcasting (amongst other features such as in-display fingerprint scanner and a bezel-free display). Using screen soundcasting, the entire APEX display is turned into a speaker by sending vibrations through the screen. This is done by placing a piezoelectric transducer between two metal plates. These plates vibrate when sound waves strike one or both plates. This vibration is then translated into waveform and is sent to the display.

2.4. Samsung's Sound on Display

At SID 2018, Samsung unveiled an OLED display that also acts as a speaker. It is rumoured that Samsung may officially launch this technology in its upcoming flagship devices.



Noteworthy Patents

➤ **US 20190116406 A1** (Samsung SDI Co Ltd)

Title: Display Apparatus

Abstract: A display apparatus includes a display panel which displays an image and a vibration member attached to a surface of the display panel, where the vibration member receives a sound signal, generates a vibration in response to the sound signal, and transfers the vibration to the display panel to allow the display panel to output a sound

References

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Ritesh Bendre. Vivo NEX: This exciting new feature is its best kept secret. BGR. See <https://www.bgr.in/features/vivo-nex-screen-soundcasting-technology-piezoelectric-transducer-all-screen-speaker-july-21-amazon-india-vivo-e-store-rs-44990/>

Will the smartphone top bezel disappear completely? Samsung Electronics demonstrates sound built-in OLED panel CES 2019. See <http://www.enuri.com/knowcom/detail.jsp?kbno=799291>