

Exhibit 9

8,582,789

1. A hearing enhancement system for a user, comprising:

The Galaxy Buds 2 Pro together with an audio system, such as a Samsung mobile phone, is a hearing enhancement system.

<https://www.samsung.com/global/galaxy/galaxy-buds2-pro/>:



Galaxy Buds2 Pro

<https://www.samsung.com/us/support/answer/ANS10001319/>:

How to connect your Samsung Galaxy earbuds

Galaxy Buds are versatile, wireless earbuds that can connect to several devices so you can get your audio your way. Whether you want to connect them to a phone, tablet, PC, TV, or even a smart watch, they have you covered. They can be used for streaming music and podcasts as well as making and managing phone calls. You can also switch the connection between other devices in your home using the Galaxy Wearable app or your device's Bluetooth settings.

an audio system configured to receive input signals for broadcasting, and

An audio system, such as in a Samsung mobile phone, receives inputs signals for broadcasting.

<https://www.samsung.com/global/galaxy/galaxy-buds2-pro/>:

**24-bit
Hi-Fi audio**



Every note sounds like the real thing because clear audio starts at the source with your favorite Samsung Galaxy device. The updated Samsung Seamless Codec encodes the full 24-bit audio to decode on the Galaxy Buds2 Pro, maintaining that same 24-bit high-quality sound. ^{1, 2}

configured to up-convert the received input signals into up-converted signals to be wirelessly transmitted;	On information and belief, the Samsung mobile phone up-converts the received input signal into an up-converted signals to be wirelessly transmitted. https://archive.org/details/electroniccommun0000toma/mode/1up (Tomasi, W. (2001). Electronic communications systems: fundamentals through advanced (4th edition). Prentice Hall. P. 4):
--	--

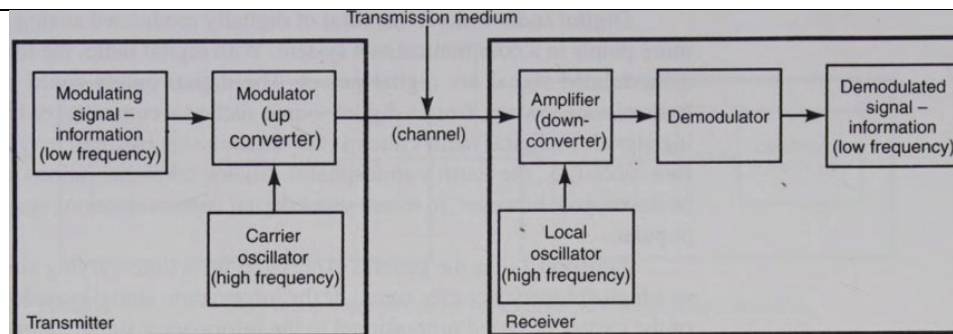


FIGURE 1-2 Communications system block diagram

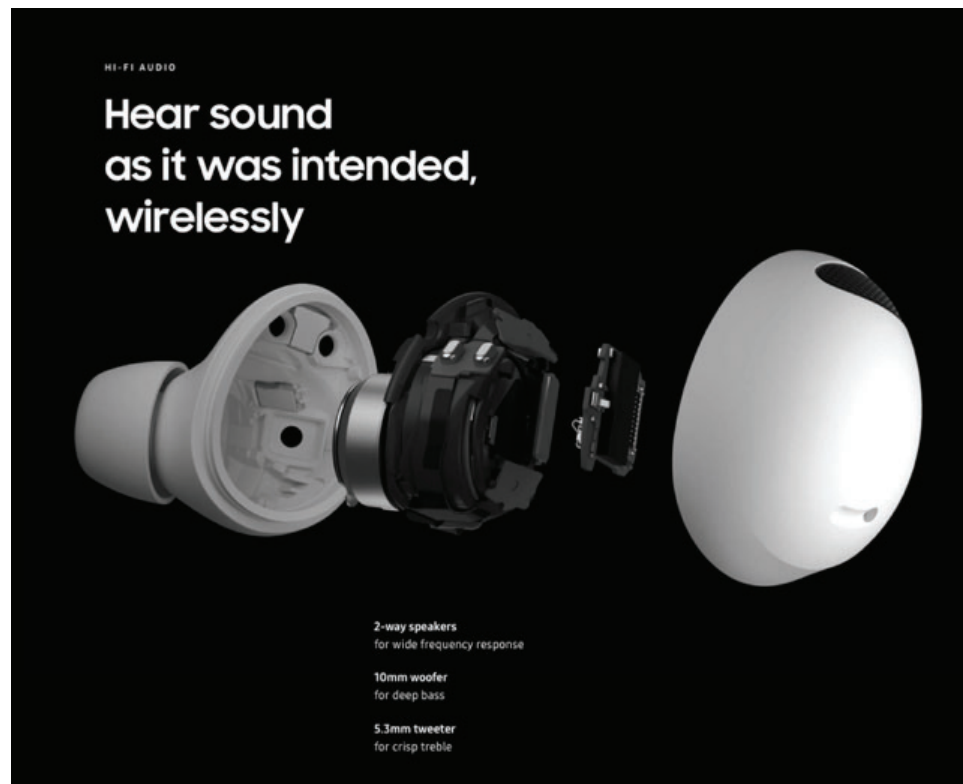
interfere with each other. For example, all commercial FM stations broadcast voice and music signals that occupy the audio-frequency band from approximately 300 Hz to 15 kHz. To avoid interfering with each other, each station converts its information to a different frequency band or channel. The term *channel* is often used to refer to a specific band of frequencies allocated a particular service. A standard voice-band channel occupies approximately a 3-kHz bandwidth and is used for transmission of voice-quality signals; commercial AM broadcast channels occupy approximately a 10-kHz frequency band, and 30 MHz or more of bandwidth is required for microwave and satellite radio channels.

Figure 1-2 is the simplified block diagram for an electronic communications system showing the relationship among the modulating signal, the high-frequency carrier, and the modulated wave. The information signal (sometimes called the intelligence signal) combines with the carrier in the modulator to produce the modulated wave. The information can be in analog or digital form and the modulator can perform either analog or digital modulation. Information signals are *up-converted* from low frequencies to high frequencies in the transmitter and *down-converted* from high frequencies to low frequencies in the receiver. The process of converting a frequency or band of frequencies to another location in the total frequency spectrum is called *frequency translation*. Frequency translation is an intricate part of electronic communications because information signals may be up- and down-converted many times as they are transported through the system called a channel. The modulated signal is transported to the receiver over a transmission system. In the receiver the modulated signal is amplified, down-converted in frequency, then demodulated to reproduce the original source information.

a wireless receiver configured to wirelessly receive the up-converted signals;

The Galaxy Buds 2 Pro includes a wireless receiver to wirelessly receive the up-converted signals.

<https://www.samsung.com/us/mobile-audio/galaxy-buds2-pro/>:



Every note sounds like the real thing because clear audio starts at the source with your favorite Samsung Galaxy device. The updated Samsung Seamless Codec encodes the full 24-bit audio to decode on the Galaxy Buds2 Pro, maintaining that same 24-bit high-quality sound.^{1,2}

; <https://www.sammobile.com/wp-content/uploads/2022/08/Samsung-Galaxy-Buds-2-Pro-User-Manual.pdf>:

Using the earbuds

Connecting to a mobile device

Before the connection

- Charge the charging case sufficiently.
- The Galaxy Wearable app must be installed on your mobile device. If the app is not installed on your mobile device, download the app from **Galaxy Store** or **Play Store**.
 - ✓ You can download the Galaxy Wearable app only on mobile devices running Android OS version **8.0** (API **26**), or later, and with 1.5 GB of RAM or more.
 - You can change the language of the Galaxy Wearable app on your mobile device. Launch the **Settings** app on your mobile device and tap **General management** → **Language**. English may appear by default if the selected language on the Settings app is not supported on the Galaxy Wearable app.

Connecting the earbuds to a Samsung mobile device for the first time

- 1 Check the direction of each earbud and correctly insert them into their corresponding slots in the charging case.
If the earbud battery indicator light does not flash, connect the charging case to the charger and charge them for more than 10 minutes.
- 2 Close the charging case.

3 Open the charging case.

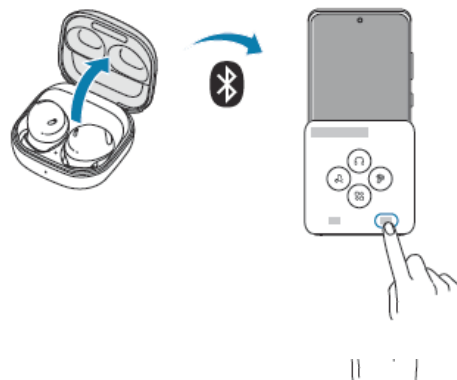
The earbuds will enter Bluetooth pairing mode automatically and a pop-up window will appear on your mobile device.

If the pop-up window does not appear or if you want to connect to a non-Samsung mobile device that also uses the Android OS, refer to [Connecting to a non-Samsung mobile device that also uses the Android OS](#) (or, the connection pop-up window does not appear).

- ✓ When the charging case battery indicator light flashes in red, take out the earbuds from the charging case and insert them into the case again.

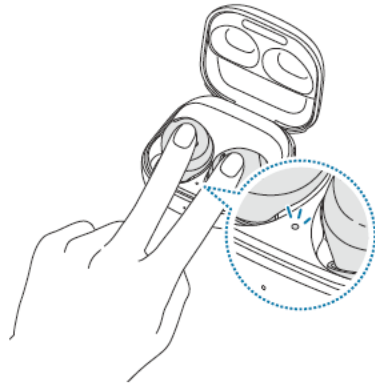
4 On your mobile device, tap **Connect** on the pop-up window and follow the on-screen instructions to complete the connection.

Once the connection has been established, the earbuds will be automatically connected to your mobile device whenever you open the charging case while the earbuds are inside it.



- ✓
- You can download the Galaxy Wearable app only on mobile devices running Android OS version **8.0** (API **26**), or later, and with 1.5 GB of RAM or more.
 - Connection methods may vary depending on your device and software version.
 - The connection pop-up window will appear only on Samsung mobile devices running Android OS version **8.0** or later that have the SmartThings app installed. If the pop-up window does not appear, update the SmartThings app to the latest version.
 - The appearance of the pop-up window may vary depending on your connected mobile device.

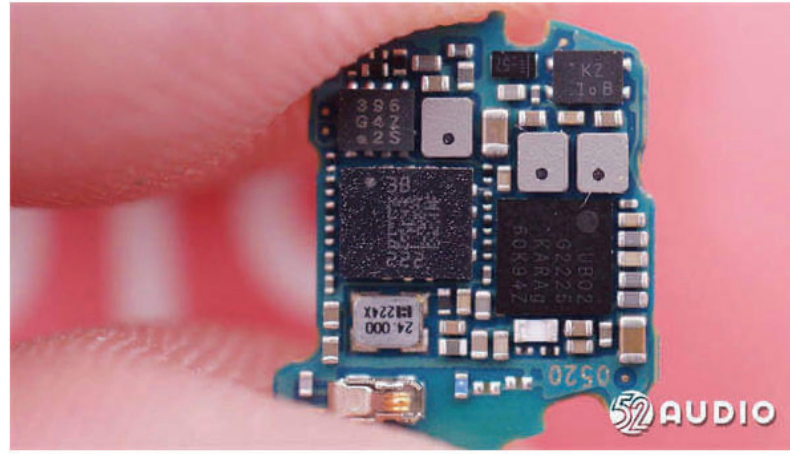
- If the earbuds do not connect to a mobile device within three minutes, Bluetooth pairing mode will be deactivated. Close the charging case again and open it. The earbuds will enter Bluetooth pairing mode.
- If you want to connect to another mobile device after a connection has been established, refer to [Connecting with other devices after disconnecting from the previous mobile device](#).
- When connecting earbuds with a mobile device that has been signed in to a Samsung account, the earbuds pairing information will be synced on the other mobile devices that use the same Samsung account and you do not need to pair them at the beginning again. To connect the other devices that use the same Samsung account with the earbuds, on the mobile devices that you want to connect, launch the **Settings** app, tap **Connections** → **Bluetooth**, and then select the earbuds synced through the Samsung account.
- If only a single earbud is connected to your mobile device, you will hear the sound in mono. It will automatically switch to stereo mode when both earbuds are connected to your mobile device.
- If the earbuds do not connect to a mobile device, the connection pop-up window does not appear, or your mobile device cannot find the earbuds, store them in the charging case and touch and hold both earbuds for more than three seconds to enter Bluetooth pairing mode manually. When Bluetooth pairing mode has been entered, the earbud battery indicator light will flash red, green, and blue.



a down-converter configured to down-convert the received up-converted signals into down-converted signals;

On information and belief, the Galaxy Buds 2 Pro includes a down-converter that converts the received up-converted signals into down converted signals.

; <https://www.qucox.com/samsung-galaxy-buds2-pro-teardown/>:



ST LSM6DSV16BX 6-axis IMU, bone conduction two-in-one chip. The 6-axis IMU is used for the 360 audio function, and the bone conduction is used for the noise cancellation of the uplink call. At the same time, the software can support head tracking and VAD algorithm.

a modifier configured to modify the down-converted signals into modified signals based on at least one hearing characteristic of the user to enhance the hearing of the user; and

The Galaxy Buds 2 Pro includes a modifier that modifies the down-converted signals into modified signals based on at least one hearing characteristic of the user to enhance the hearing of the user.

<https://www.techopedia.com/audio/best-noise-cancelling-earbuds:>

How Do Active Noise-Cancelling Earbuds Work?

Active noise-cancelling (ANC) earbuds use a digital noise-cancellation system to reduce **background noise** and optimize the listening experience. The ANC system uses several microphones that listen to the noise outside the earbuds from the surrounding environment and inside the earbuds.

An ANC chipset inverts the sound waves outside the earbuds, producing audio to counter the external noise. At the same time, the sound that leaks in through the ear tip within the earbuds is neutralized.

; <https://www.bayaudiology.co.nz/hearing-health-blog/noise-cancelling-headphones:>

Many people also wonder, are noise-cancelling headphones bad for tinnitus? The good news here is that noise-cancelling headphones are not bad for tinnitus, despite receiving some bad press in recent times. In fact, as noise-cancelling headphones reduce low-frequency background noise, people can better hear what they are playing, making them potentially less likely to turn up the volume to damaging levels – and thus may even help prevent **tinnitus** (which can be caused by constant **exposure to noise**, especially high-pitched tones).

; [https://www.soundguys.com/samsung-galaxy-buds-2-pro-review-78415/:](https://www.soundguys.com/samsung-galaxy-buds-2-pro-review-78415/)

You can adjust the channel balance using a slider of the stereo audio output of the Galaxy Buds 2 Pro, which is great for hearing-impaired folks. This way, you can listen on a single earbud or both while shifting the balance more heavily to one side. You can also turn on ANC for use with just one bud.

; [https://www.samsung.com/global/galaxy/galaxy-buds2-pro/:](https://www.samsung.com/global/galaxy/galaxy-buds2-pro/)

Active Noise Canceling (ANC) is better than ever.

With 3 high SNR (Signal-to-Noise Ratio) microphones, the Galaxy Buds2 Pro tracks and eliminates more outside sound — even soft sounds like wind.³



Battery

Get up to 5 hrs of continuous playtime with ANC on and up to 18 hrs in the cradle.^{16, 17, 18}

Earbuds provide up to 5hrs of play time with ANC on, while the case provides up to 18 hours of battery life when the case and earbuds are charged to 100%. Based on internal testing. Audio playback time tested by pairing a pre-production Galaxy Buds2 Pro to a recently released Galaxy smartphone with default settings including ANC on. Actual battery life may vary and depend on usage conditions, settings, number of times charged, Bluetooth signal strength, and other factors.

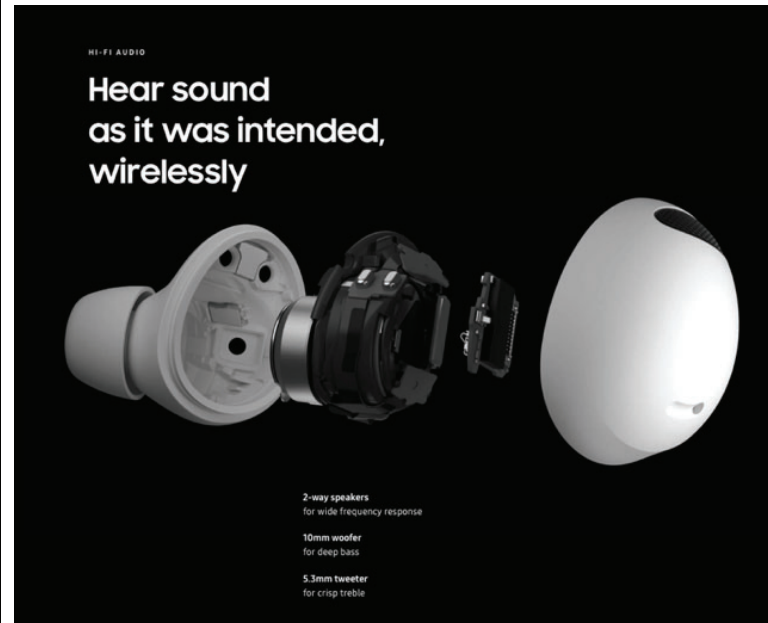
*'Default setting' refers to the original setting for the Galaxy Buds2 Pro when it was first released, simply with the power turned on.

*'Play time' refers to when the Galaxy Buds2 Pro are connected to the phone, streaming music.

a speaker configured to generate audio output signals from the modified signals for the user.

The Galaxy Buds 2 Pro includes a speaker to generate audio output signals from the modified signals for the user.

<https://www.samsung.com/us/mobile-audio/galaxy-buds2-pro/>:



Speaker

Dynamic 2-way
Woofer & tweeter

