US012395864B2

(12) **United States Patent**
Elsherif et al.

(10) **Patent No.: US 12,395,864 B2**
(45) **Date of Patent: Aug. 19, 2025**

(54) **CONFIGURATION SWITCH TRIGGERS FOR AUDIO DEVICE COMMUNICATIONS**

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(*) Notice: Subject to any disclaimer, the term of this patent is extended or adjusted under 35 U.S.C. 154(b) by 361 days.

(21) Appl. No.: **18/309,690**

(22) Filed: **Apr. 28, 2023**

(65) **Prior Publication Data**

US 2024/0114357 A1 Apr. 4, 2024

Related U.S. Application Data

(60) Provisional application No. 63/378,340, filed on Oct. 4, 2022.

(51) **Int. Cl.**
H04W 24/10 (2009.01)
H04W 24/02 (2009.01)

(52) **U.S. Cl.**
CPC ***H04W 24/02*** (2013.01); ***H04W 24/10*** (2013.01)

(58) **Field of Classification Search**
CPC H04W 24/02; H04W 24/10
See application file for complete search history.

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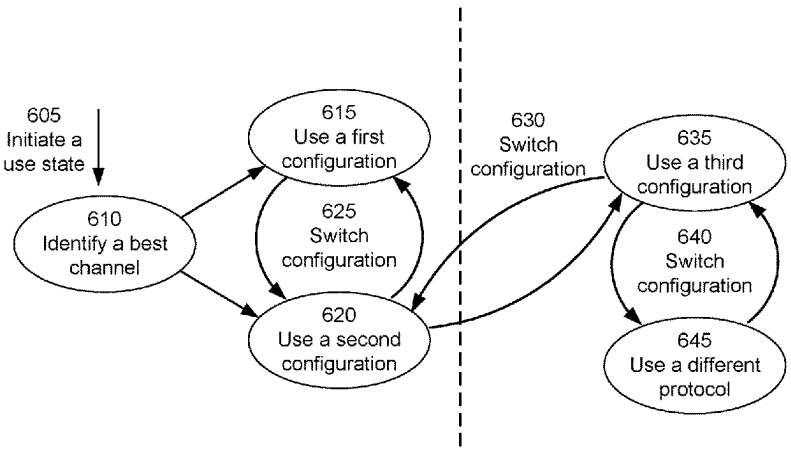
(57) **ABSTRACT**

Various aspects of the present disclosure generally relate to wireless communication. In some aspects, a wireless communication device (WCD) may communicate, via a wireless link, with an audio device using a first configuration having first values for communication parameters. The WCD may transmit an indication to switch to a second configuration based at least in part on a configuration switch trigger, the configuration switch trigger being based at least in part on one or more of a link quality metric associated with the wireless link or a change of a use state of the WCD, and the second configuration having second values for the communication parameters associated with a reduction in voltage-induced interference in an audio output of the audio device. Numerous other aspects are described.

30 Claims, 10 Drawing Sheets



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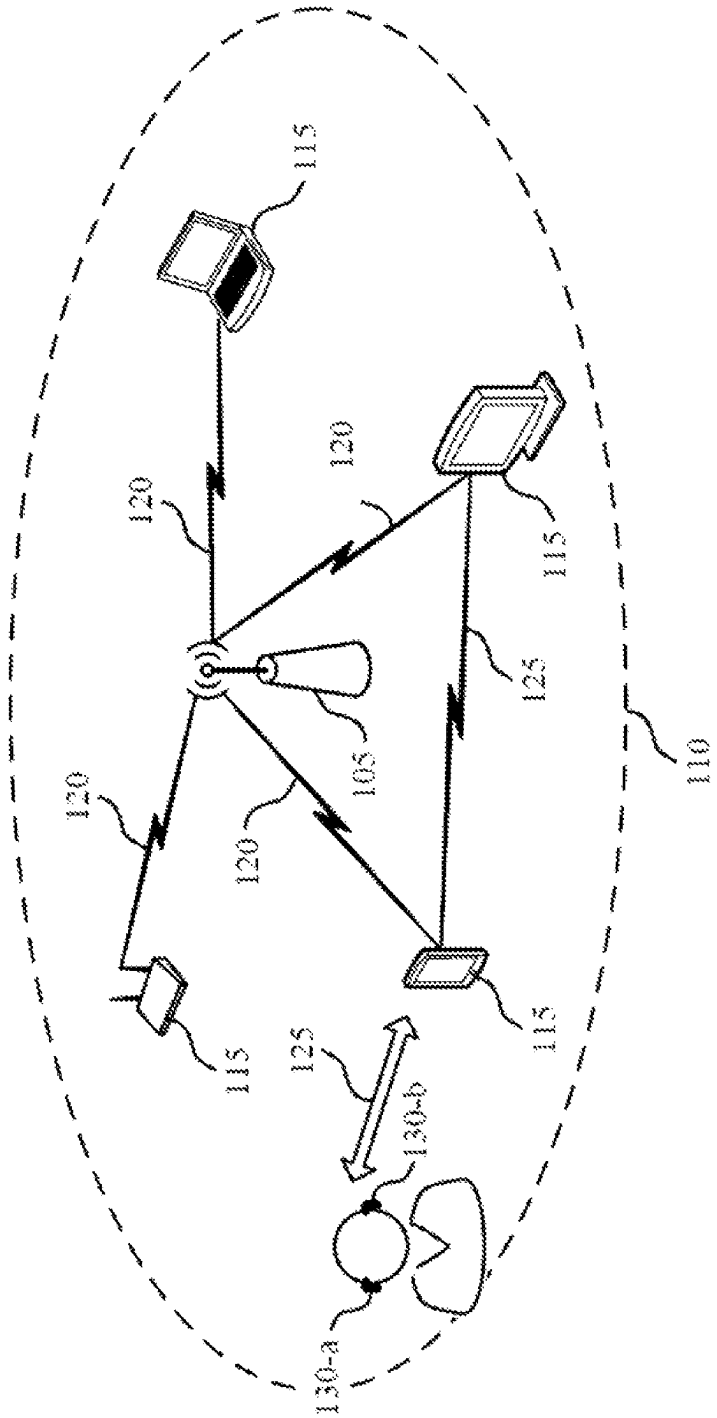

FIG. 1

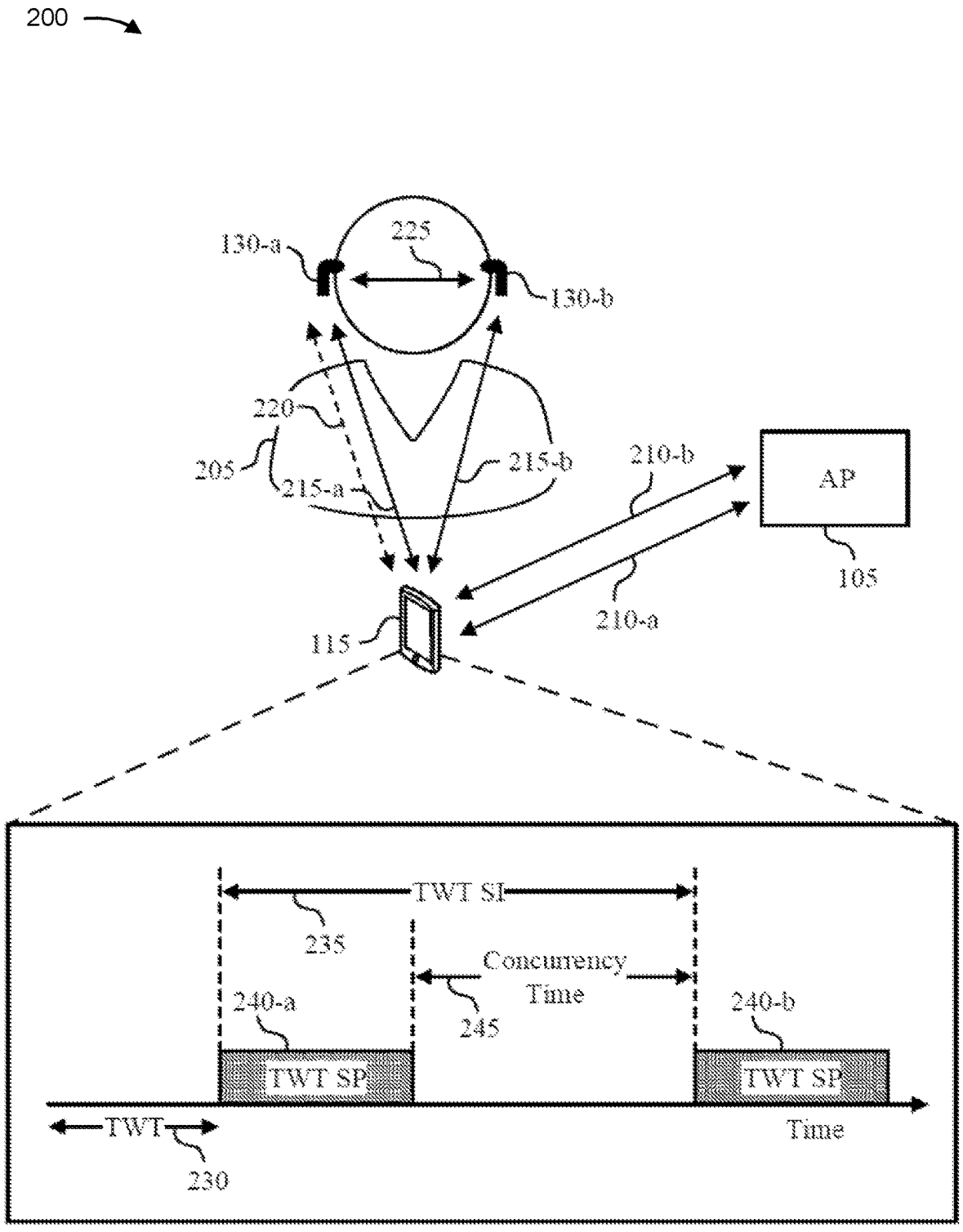
200
130-a
225
130-b
220
205
215-a
215-b
210-b
AP
105
210-a
115
TWT SI
235
Concurrency Time
240-a
245
240-b
TWT SP
TWT SP
TWT
Time
230

FIG. 2

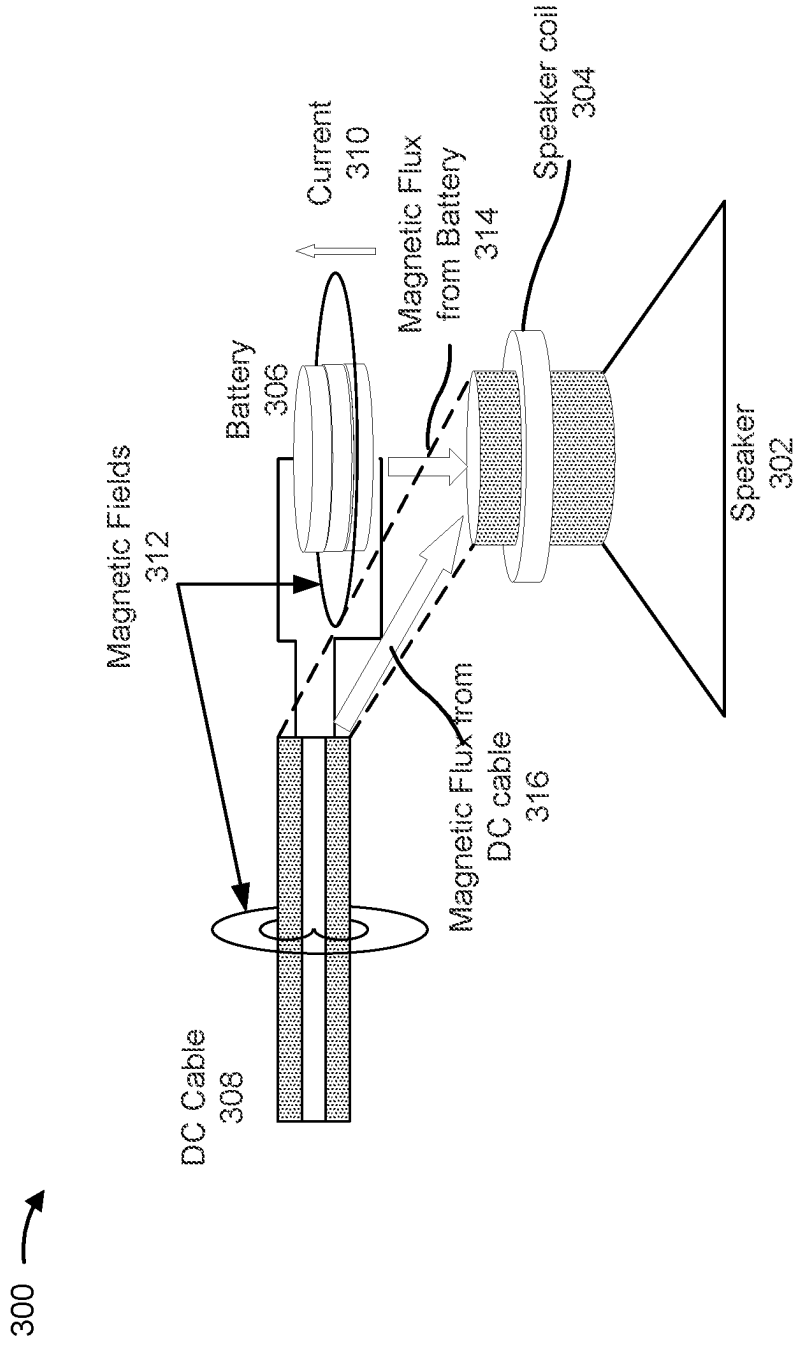
300
DC Cable
308
Magnetic Fields
312
Battery
306
Current
310
Magnetic Flux
from Battery
314
Speaker coil
304
Speaker
302
Magnetic Flux from
DC cable
316

FIG. 3

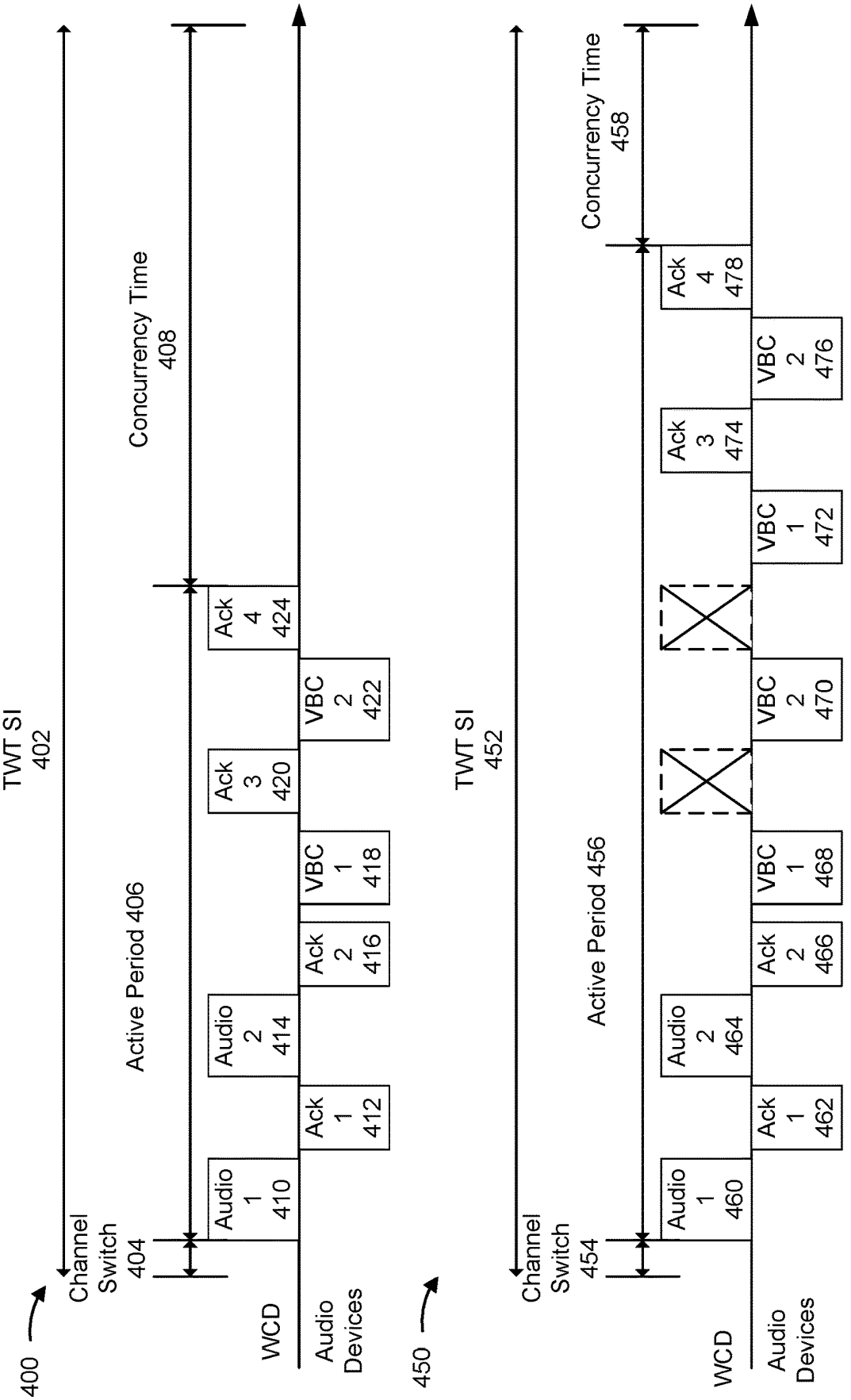
400
TWT SI
402
Channel Switch
404
Active Period 406
Concurrency Time
408
WCD
Audio Devices
Audio 1 410
Ack 1 412
Audio 2 414
Ack 2 416
VBC 1 418
Ack 3 420
VBC 2 422
Ack 4 424
450
TWT SI
452
Channel Switch
454
Active Period 456
Concurrency Time
458
WCD
Audio Devices
Audio 1 460
Ack 1 462
Audio 2 464
Ack 2 466
VBC 1 468
VBC 2 470
VBC 1 472
Ack 3 474
VBC 2 476
Ack 4 478

FIG. 4

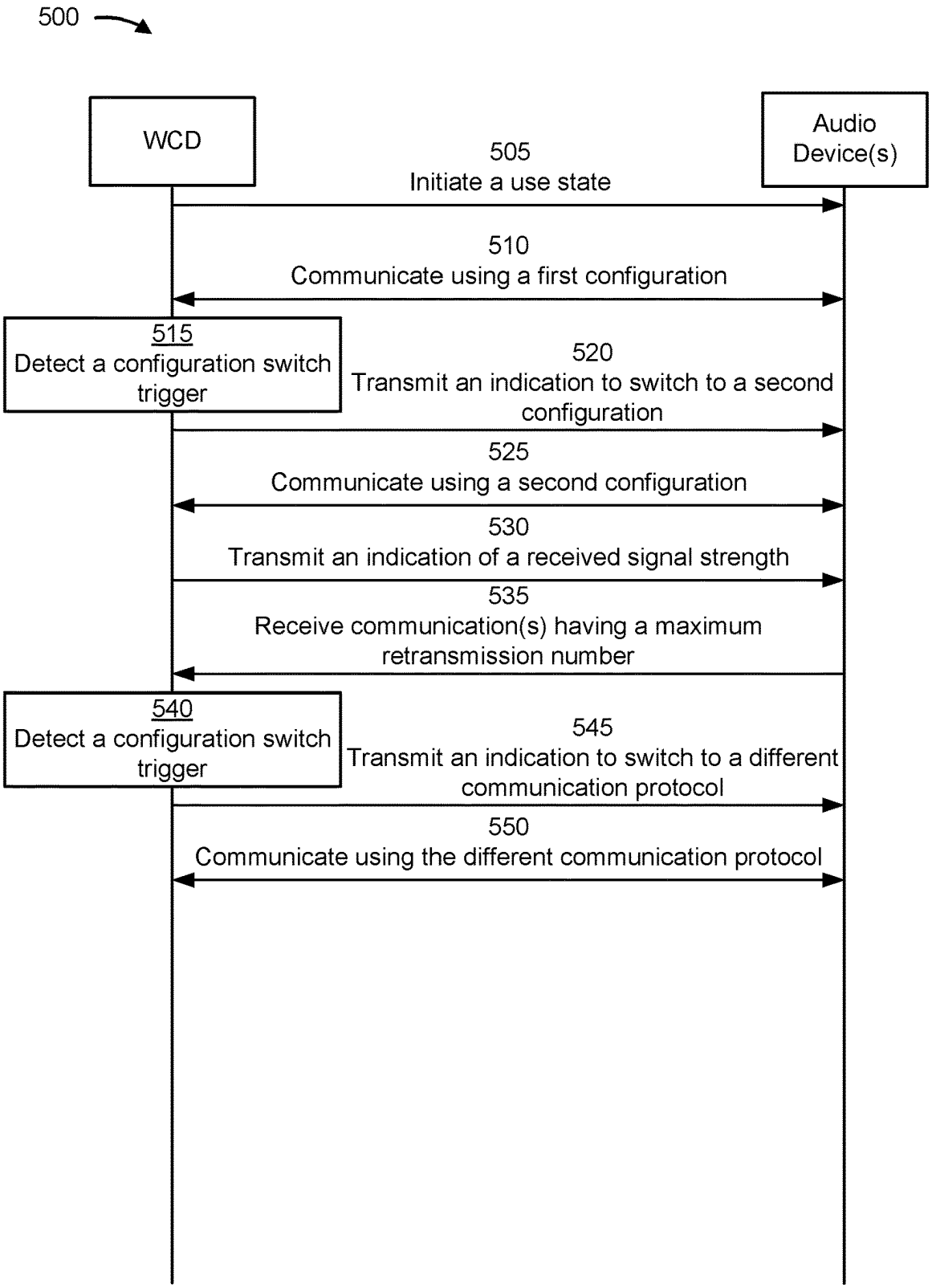
500
WCD
Audio Device(s)
505
Initiate a use state
510
Communicate using a first configuration
515
Detect a configuration switch trigger
520
Transmit an indication to switch to a second configuration
525
Communicate using a second configuration
530
Transmit an indication of a received signal strength
535
Receive communication(s) having a maximum retransmission number
540
Detect a configuration switch trigger
545
Transmit an indication to switch to a different communication protocol
550
Communicate using the different communication protocol

FIG. 5

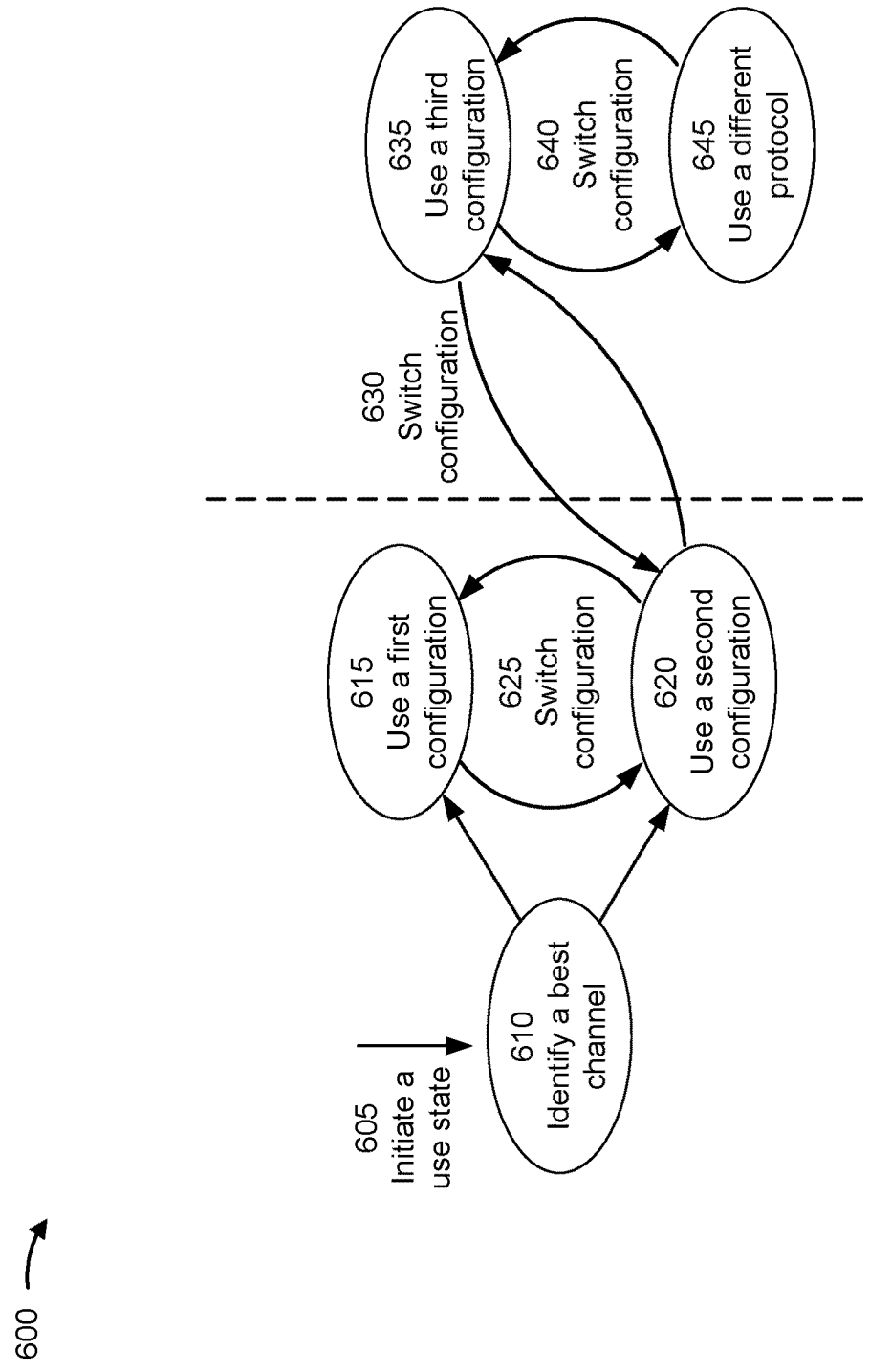
600
605 Initiate a use state
610 Identify a best channel
615 Use a first configuration
620 Use a second configuration
625 Switch configuration
630 Switch configuration
635 Use a third configuration
640 Switch configuration
645 Use a different protocol

FIG. 6

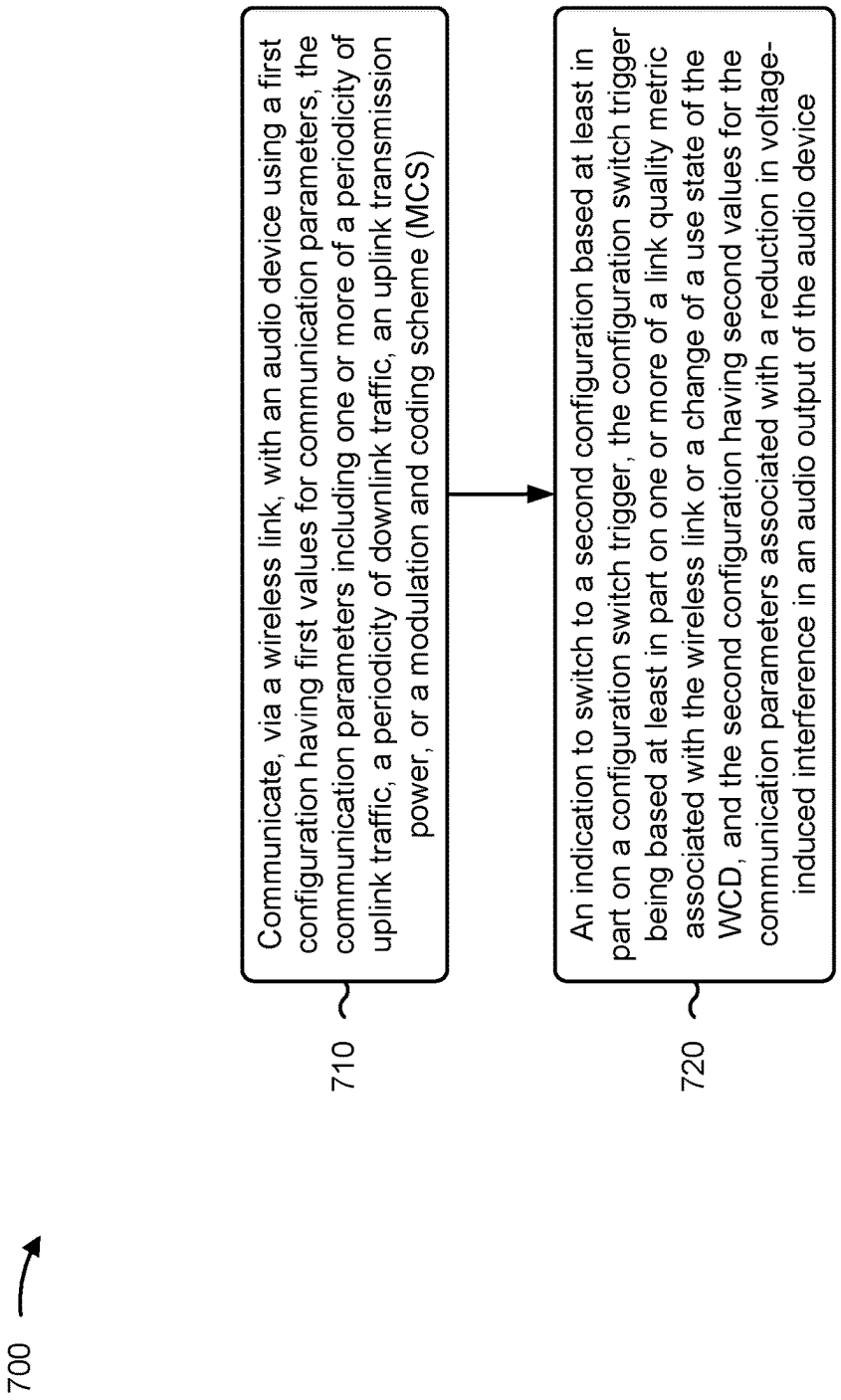
700
710
Communicate, via a wireless link, with an audio device using a first configuration having first values for communication parameters, the communication parameters including one or more of a periodicity of uplink traffic, a periodicity of downlink traffic, an uplink transmission power, or a modulation and coding scheme (MCS)
720
An indication to switch to a second configuration based at least in part on a configuration switch trigger, the configuration switch trigger being based at least in part on one or more of a link quality metric associated with the wireless link or a change of a use state of the WCD, and the second configuration having second values for the communication parameters associated with a reduction in voltage-induced interference in an audio output of the audio device

FIG. 7

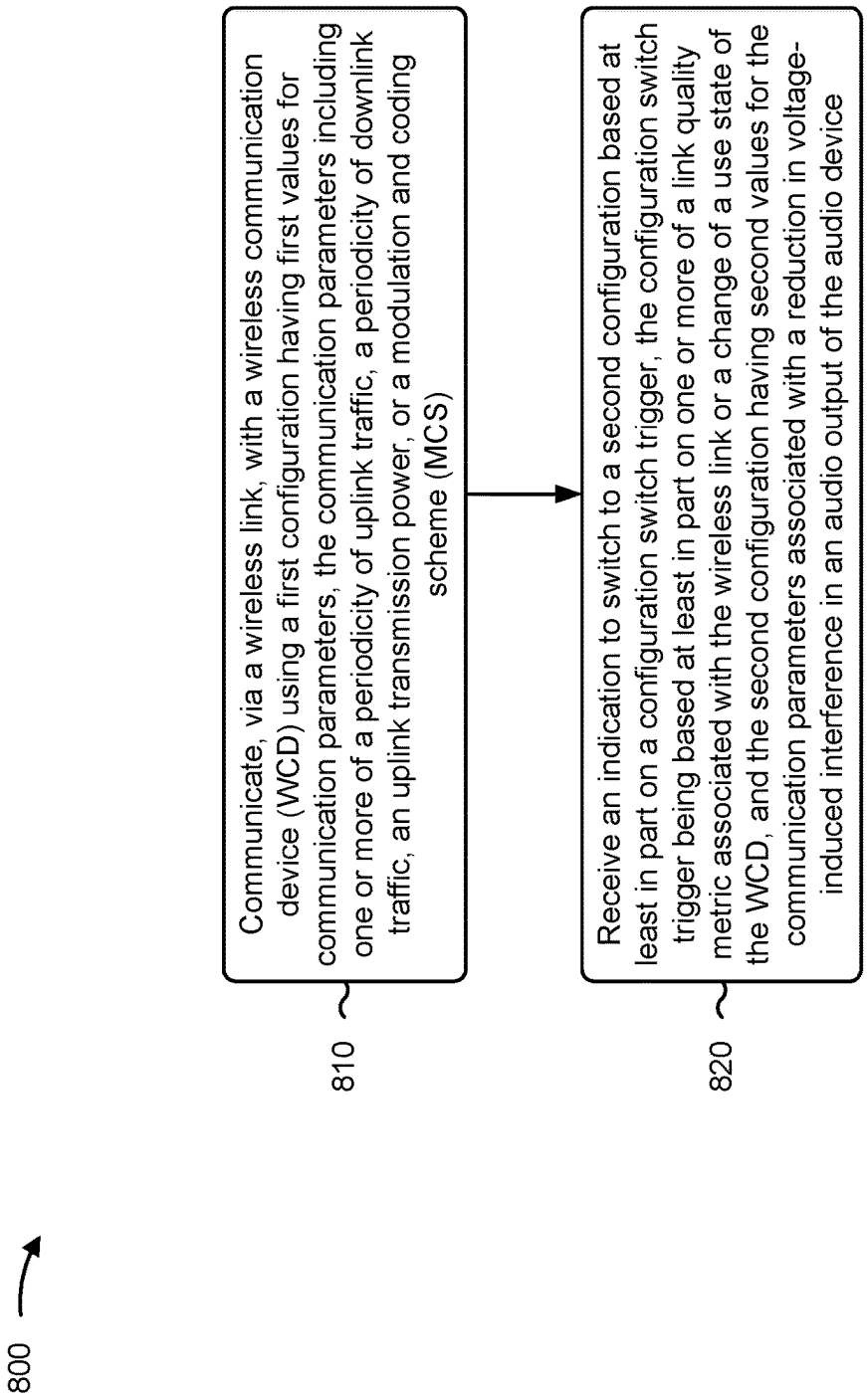
800
Communicate, via a wireless link, with a wireless communication device (WCD) using a first configuration having first values for communication parameters, the communication parameters including one or more of a periodicity of uplink traffic, a periodicity of downlink traffic, an uplink transmission power, or a modulation and coding scheme (MCS)
810
Receive an indication to switch to a second configuration based at least in part on a configuration switch trigger, the configuration switch trigger being based at least in part on one or more of a link quality metric associated with the wireless link or a change of a use state of the WCD, and the second configuration having second values for the communication parameters associated with a reduction in voltage-induced interference in an audio output of the audio device
820

FIG. 8

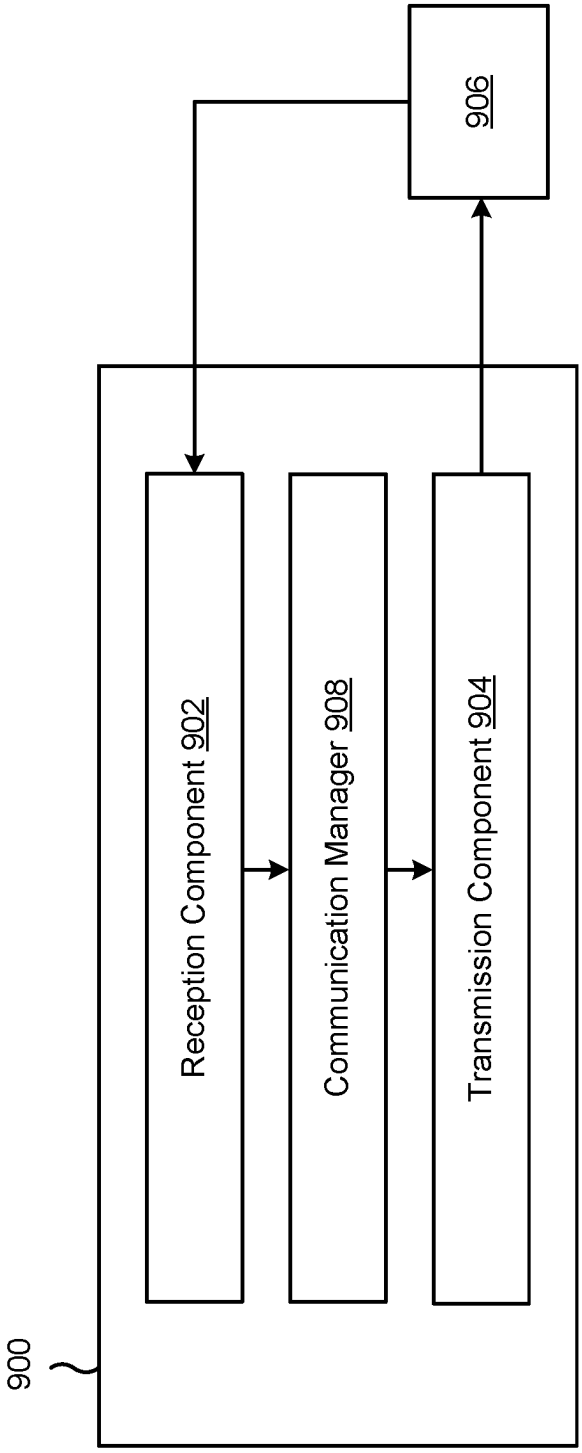
906
Reception Component 902
Communication Manager 908
Transmission Component 904
900

FIG. 9

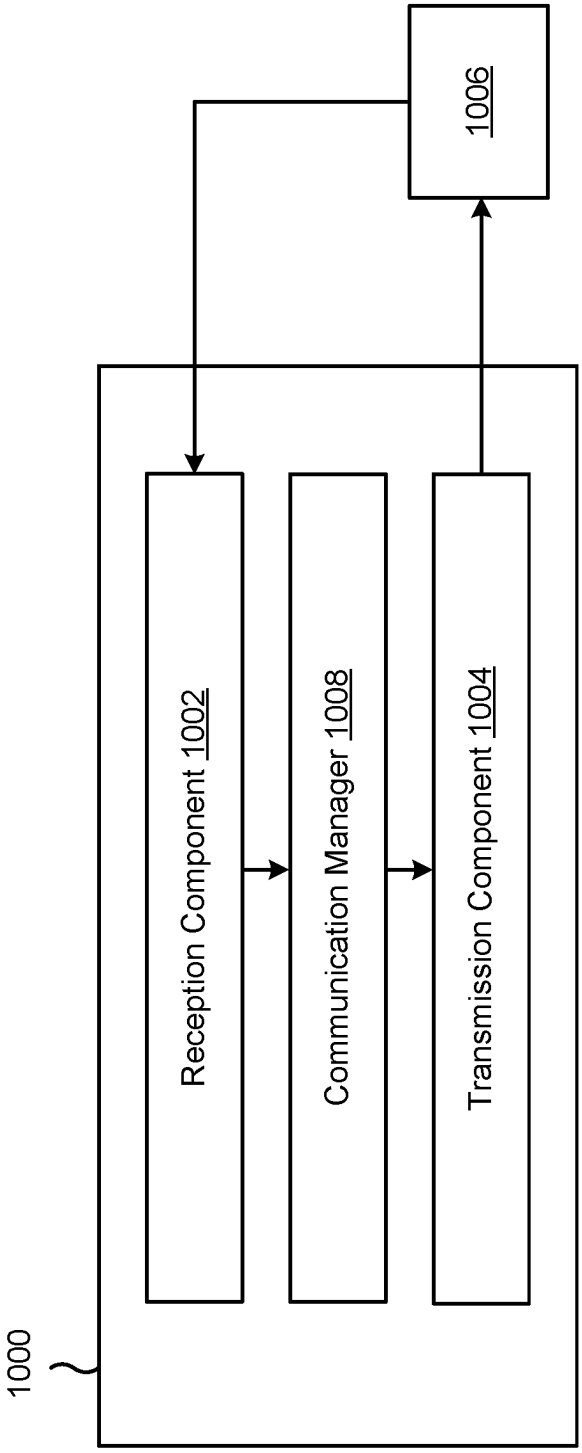
1006
Reception Component 1002
Communication Manager 1008
Transmission Component 1004
1000

FIG. 10

CONFIGURATION SWITCH TRIGGERS FOR AUDIO DEVICE COMMUNICATIONS

CROSS-REFERENCE TO RELATED APPLICATION

This patent application claims priority to Provisional Patent Application No. 63/378,340, filed on Oct. 4, 2022 entitled "CONFIGURATION SWITCH TRIGGERS FOR AUDIO DEVICE COMMUNICATIONS," and assigned to the assignee hereof. The disclosure of the prior application is considered part of and is incorporated by reference into this patent application.

FIELD OF THE DISCLOSURE

Aspects of the present disclosure generally relate to wireless communication and to techniques and apparatuses for configuration switch triggers for audio device communications.

BACKGROUND

Wireless communication systems are widely deployed to provide various types of communication content such as voice, video, packet data, messaging, broadcast, and so on. These systems may be multiple-access systems capable of supporting communication with multiple users by sharing the available system resources (e.g., time, frequency, and power). A wireless network, for example a wireless local area network (WLAN), such as a Wi-Fi (i.e., Institute of Electrical and Electronics Engineers (IEEE) 802.11) network, may include an access point (AP) that may communicate with one or more stations (STAs) or mobile devices. The AP may be coupled to a network, such as the Internet, and may enable a mobile device to communicate via the network (or communicate with other devices coupled to the access point). A wireless device may communicate with a network device bi-directionally. For example, in a WLAN, a STA may communicate with an associated AP via downlink and uplink. "Downlink" may refer to the communication link from the AP to the station, and "uplink" may refer to the communication link from the station to the AP.

The AP may be coupled to a network, such as the Internet, and may enable a mobile device to communicate via the network (or communicate with other devices coupled to the access point). A wireless device may communicate with a network device bi-directionally. For example, in a WLAN, a device may communicate with an associated AP via downlink (e.g., the communication link from the AP to the device) and uplink (e.g., the communication link from the device to the AP). A wireless personal area network (WPAN), which may include a Bluetooth connection, may provide for short range wireless connections between two or more paired wireless devices. For example, wireless devices such as cellular phones may utilize WPAN communications to exchange information such as audio signals with wireless headsets.

SUMMARY

Some aspects described herein relate to a method of wireless communication performed by a wireless communication device (WCD). The method may include communicating, via a wireless link, with an audio device using a first configuration having first values for communication parameters, the communication parameters including one or more of: a periodicity of uplink traffic, a periodicity of downlink traffic, an uplink transmission power, or a modulation and coding scheme (MCS). The method may include transmitting an indication to switch to a second configuration based at least in part on a configuration switch trigger, the configuration switch trigger being based at least in part on one or more of a link quality metric associated with the wireless link or a change of a use state of the WCD, and the second configuration having second values for the communication parameters (e.g., where at least one of the second values for a communication parameter being different from the first value for the corresponding communication parameter).

Some aspects described herein relate to a method of wireless communication performed by an audio device. The method may include communicating, via a wireless link, with a WCD using a first configuration having first values for communication parameters, the communication parameters including one or more of: a periodicity of uplink traffic, a periodicity of downlink traffic, an uplink transmission power, or an MCS. The method may include receiving an indication to switch to a second configuration based at least in part on a configuration switch trigger, the configuration switch trigger being based at least in part on one or more of a link quality metric associated with the wireless link or a change of a use state of the WCD, and the second configuration having second values for the communication parameters (e.g., where at least one of the second values for a communication parameter being different from the first value for the corresponding communication parameter).

Some aspects described herein relate to a WCD for wireless communication. The wireless communication device may include a memory and one or more processors coupled to the memory. The one or more processors may be configured to communicate, via a wireless link, with an audio device using a first configuration having first values for communication parameters, the communication parameters including one or more of: a periodicity of uplink traffic, a periodicity of downlink traffic, an uplink transmission power, or an MCS. The one or more processors may be configured to transmit an indication to switch to a second configuration based at least in part on a configuration switch trigger, the configuration switch trigger being based at least in part on one or more of a link quality metric associated with the wireless link or a change of a use state of the WCD, and the second configuration having second values for the communication parameters (e.g., where at least one of the second values for a communication parameter being different from the first value for the corresponding communication parameter).

Some aspects described herein relate to an audio device for wireless communication. The audio device may include a memory and one or more processors coupled to the memory. The one or more processors may be configured to communicate, via a wireless link, with a WCD using a first configuration having first values for communication parameters, the communication parameters including one or more of: a periodicity of uplink traffic, a periodicity of downlink traffic, an uplink transmission power, or an MCS. The one or more processors may be configured to receive an indication to switch to a second configuration based at least in part on a configuration switch trigger, the configuration switch trigger being based at least in part on one or more of a link quality metric associated with the wireless link or a change of a use state of the WCD, and the second configuration having second values for the communication parameters (e.g., where at least one of the second values for a commu-

nication parameter being different from the first value for the corresponding communication parameter).

Some aspects described herein relate to a non-transitory computer-readable medium that stores a set of instructions for wireless communication by a WCD. The set of instructions, when executed by one or more processors of the WCD, may cause the WCD to communicate, via a wireless link, with an audio device using a first configuration having first values for communication parameters, the communication parameters including one or more of: a periodicity of uplink traffic, a periodicity of downlink traffic, an uplink transmission power, or an MCS. The set of instructions, when executed by one or more processors of the WCD, may cause the WCD to transmit an indication to switch to a second configuration based at least in part on a configuration switch trigger, the configuration switch trigger being based at least in part on one or more of a link quality metric associated with the wireless link or a change of a use state of the WCD, and the second configuration having second values for the communication parameters (e.g., where at least one of the second values for a communication parameter being different from the first value for the corresponding communication parameter).

Some aspects described herein relate to a non-transitory computer-readable medium that stores a set of instructions for wireless communication by an audio device. The set of instructions, when executed by one or more processors of the audio device, may cause the audio device to communicate, via a wireless link, with a WCD using a first configuration having first values for communication parameters, the communication parameters including one or more of: a periodicity of uplink traffic, a periodicity of downlink traffic, an uplink transmission power, or an MCS. The set of instructions, when executed by one or more processors of the audio device, may cause the audio device to receive an indication to switch to a second configuration based at least in part on a configuration switch trigger, the configuration switch trigger being based at least in part on one or more of a link quality metric associated with the wireless link or a change of a use state of the WCD, and the second configuration having second values for the communication parameters (e.g., where at least one of the second values for a communication parameter being different from the first value for the corresponding communication parameter).

Some aspects described herein relate to an apparatus for wireless communication. The apparatus may include means for communicating, via a wireless link, with an audio device using a first configuration having first values for communication parameters, the communication parameters including one or more of: a periodicity of uplink traffic, a periodicity of downlink traffic, an uplink transmission power, or an MCS. The apparatus may include means for transmitting an indication to switch to a second configuration based at least in part on a configuration switch trigger, the configuration switch trigger being based at least in part on one or more of a link quality metric associated with the wireless link or a change of a use state of the apparatus, and the second configuration having second values for the communication parameters (e.g., where at least one of the second values for a communication parameter being different from the first value for the corresponding communication parameter).

Some aspects described herein relate to an apparatus for wireless communication. The apparatus may include means for communicating, via a wireless link, with a WCD using a first configuration having first values for communication parameters, the communication parameters including one or more of: a periodicity of uplink traffic, a periodicity of downlink traffic, an uplink transmission power, or an MCS. The apparatus may include means for receiving an indication to switch to a second configuration based at least in part on a configuration switch trigger, the configuration switch trigger being based at least in part on one or more of a link quality metric associated with the wireless link or a change of a use state of the WCD, and the second configuration having second values for the communication parameters (e.g., where at least one of the second values for a communication parameter being different from the first value for the corresponding communication parameter).

Aspects generally include a method, apparatus, system, computer program product, non-transitory computer-readable medium, user equipment, base station, network entity, network node, wireless communication device, and/or processing system as substantially described herein with reference to and as illustrated by the drawings, specification, and appendix.

The foregoing has outlined rather broadly the features and technical advantages of examples according to the disclosure in order that the detailed description that follows may be better understood. Additional features and advantages will be described hereinafter. The conception and specific examples disclosed may be readily utilized as a basis for modifying or designing other structures for carrying out the same purposes of the present disclosure. Such equivalent constructions do not depart from the scope of the appended claims. Characteristics of the concepts disclosed herein, both their organization and method of operation, together with associated advantages, will be better understood from the following description when considered in connection with the accompanying figures. Each of the figures is provided for the purposes of illustration and description, and not as a definition of the limits of the claims.

While aspects are described in the present disclosure by illustration to some examples, those skilled in the art will understand that such aspects may be implemented in many different arrangements and scenarios. Techniques described herein may be implemented using different platform types, devices, systems, shapes, sizes, and/or packaging arrangements. For example, some aspects may be implemented via integrated chip embodiments or other non-module-component based devices (e.g., end-user devices, vehicles, communication devices, computing devices, industrial equipment, retail/purchasing devices, medical devices, and/or artificial intelligence devices). Aspects may be implemented in chip-level components, modular components, non-modular components, non-chip-level components, device-level components, and/or system-level components. Devices incorporating described aspects and features may include additional components and features for implementation and practice of claimed and described aspects. For example, transmission and reception of wireless signals may include one or more components for analog and digital purposes (e.g., hardware components including antennas, radio frequency chains, power amplifiers, modulators, buffers, processors, interleavers, adders, and/or summers). It is intended that aspects described herein may be practiced in a wide variety of devices, components, systems, distributed arrangements, and/or end-user devices of varying size, shape, and constitution.

BRIEF DESCRIPTION OF THE DRAWINGS

So that the above-recited features of the present disclosure can be understood in detail, a more particular description, briefly summarized above, may be had by reference to

aspects, some of which are illustrated in the appended drawings. It is to be noted, however, that the appended drawings illustrate only certain typical aspects of this disclosure and are therefore not to be considered limiting of its scope, for the description may admit to other equally effective aspects. The same reference numbers in different drawings may identify the same or similar elements.

FIG. **1** illustrates a wireless communication system (also known as a wireless local area network (WLAN) or a Wi-Fi network) configured, in accordance with the present disclosure.

FIG. **2** illustrates an example of a wireless communication system that supports low-latency parameter updates for extended personal audio networks, in accordance with the present disclosure.

FIG. **3** illustrates an example of an audio device, in accordance with the present disclosure.

FIG. **4** illustrates examples of target wake time (TWT) packet sequences, in accordance with the present disclosure.

FIG. **5** is a diagram of an example associated with configuration switch triggers for audio device communications, in accordance with the present disclosure.

FIG. **6** is a diagram of an example associated with configuration switch triggers for audio device communications, in accordance with the present disclosure.

FIG. **7** is a diagram illustrating an example process performed, for example, by a WCD, in accordance with the present disclosure.

FIG. **8** is a diagram illustrating an example process performed, for example, by an audio device, in accordance with the present disclosure.

FIG. **9** is a diagram of an example apparatus for wireless communication, in accordance with the present disclosure.

FIG. **10** is a diagram of an example apparatus for wireless communication, in accordance with the present disclosure.

DETAILED DESCRIPTION

Various aspects of the disclosure are described more fully hereinafter with reference to the accompanying drawings. This disclosure may, however, be embodied in many different forms and should not be construed as limited to any specific structure or function presented throughout this disclosure. Rather, these aspects are provided so that this disclosure will be thorough and complete, and will fully convey the scope of the disclosure to those skilled in the art. One skilled in the art should appreciate that the scope of the disclosure is intended to cover any aspect of the disclosure disclosed herein, whether implemented independently of or combined with any other aspect of the disclosure. For example, an apparatus may be implemented or a method may be practiced using any number of the aspects set forth herein. In addition, the scope of the disclosure is intended to cover such an apparatus or method which is practiced using other structure, functionality, or structure and functionality in addition to or other than the various aspects of the disclosure set forth herein. It should be understood that any aspect of the disclosure disclosed herein may be embodied by one or more elements of a claim.

Several aspects of telecommunication systems will now be presented with reference to various apparatuses and techniques. These apparatuses and techniques will be described in the following detailed description and illustrated in the accompanying drawings by various blocks, modules, components, circuits, steps, processes, algorithms, or the like (collectively referred to as "elements"). These elements may be implemented using hardware, software, or combinations thereof. Whether such elements are implemented as hardware or software depends upon the particular application and design constraints imposed on the overall system.

In some networks, a wireless communication device (WCD) may support applications associated with low-latency or lossless audio to one or more other devices, such as one or more personal audio devices. For example, a wireless communication device may support applications and use cases associated with ultra-low-latency (ULL), such as ULL gaming, or streaming lossless audio to one or more personal audio devices (e.g., peripheral devices) of a user. In scenarios in which a user uses two peripheral devices, the wireless communication device may support an extended personal audio network (XPAN) via which the wireless communication device may communicate with the two peripheral devices. To meet latency or lossless criteria associated with an application or use case, XPAN devices may employ a target wake time (TWT) technique for communication between the wireless communication device and the peripheral devices. In some systems, the peripheral devices and the wireless communication device may exchange one or more Bluetooth messages and implement a complete TWT teardown between the wireless communication device and each of the peripheral devices. Such an exchange of Bluetooth messages and TWT teardown may introduce too much latency for some applications, such as ULL gaming or streaming lossless audio applications.

In some implementations, a WCD, which may be a handset or an access point (AP) (e.g., a soft AP (SAP)), and a set of peripheral devices (e.g., earbuds or audio devices) may use downlink audio data packets to carry updated TWT parameters or any other XPAN-related parameters that the wireless communication device and the peripheral devices may indicate via wireless signaling. Additionally, or alternatively, the wireless communication device may embed a set of updated parameters in a padding section of an audio data packet and may transmit the audio data packet to the peripheral devices. The peripheral devices may each acknowledge the audio data packet transmitted by the wireless communication device, and the wireless communication device may communicate in accordance with the updated parameters based on receiving acknowledgements from each of the peripheral devices.

FIG. **1** illustrates a wireless communication system **100** (also known as a wireless local area network (WLAN) or a Wi-Fi network) configured in accordance with the present disclosure. The wireless communication system **100** may include an AP **105** and multiple associated devices **115** (such as stations (STAs) or SAPs), which may represent devices such as mobile stations, personal digital assistants (PDAs), other handheld devices, netbooks, notebook computers, tablet computers, laptops, display devices (e.g., TVs, computer monitors, etc.), printers, etc. The AP **105** and the associated devices **115** (e.g., associated STAs) may represent a basic service set (BSS) or an extended service set (ESS). The various devices **115** in the network are able to communicate with one another through the AP **105**. Also shown is a coverage area **110** of the AP **105**, which may represent a basic service area (BSA) of the wireless communication system **100**. An extended network station (not shown) associated with the wireless communication system **100** may be connected to a wired or wireless distribution system that may allow multiple APs **105** to be connected in an ESS.

Although not shown in FIG. **1**, a device **115** may be located in the intersection of more than one coverage area **110** and may associate with more than one AP **105**. A single

AP **105** and an associated set of devices **115** may be referred to as a BSS. An ESS is a set of connected BSSs. A distribution system (not shown) may be used to connect APs **105** in an ESS. In some cases, the coverage area **110** of an AP **105** may be divided into sectors (also not shown). The wireless communication system **100** may include APs **105** of different types (e.g., metropolitan area, home network, etc.), with varying and overlapping coverage areas **110**. Two devices **115** may also communicate directly via a direct wireless communication link **125** regardless of whether both devices **115** are in the same coverage area **110**. Examples of direct wireless communication links **120** may include Wi-Fi Direct connections, Wi-Fi Tunneled Direct Link Setup (TDLS) links, and other group connections. Devices **115** and APs **105** may communicate according to the WLAN radio and baseband protocol for physical and MAC layers from IEEE 802.11 and versions including, but not limited to, 802.11b, 802.11g, 802.11a, 802.11n, 802.11ac, 802.11ad, 802.11ah, 802.11ax, etc. In other implementations, peer-to-peer connections or ad hoc networks may be implemented within wireless communication system **100**.

In some cases, a device **115** (or an AP **105**) may be detectable by a central AP **105**, but not by other devices **115** in the coverage area **110** of the central AP **105**. For example, one device **115** may be at one end of the coverage area **110** of the central AP **105** while another device **115** may be at the other end. Thus, both devices **115** may communicate with the AP **105**, but may not receive the transmissions of the other. This may result in colliding transmissions for the two devices **115** in a contention-based environment (e.g., carrier sense multiple access with collision avoidance (CSMA/CA)) because the devices **115** may not refrain from transmitting on top of each other. A device **115** whose transmissions are not identifiable, but that is within the same coverage area **110** may be known as a hidden node. CSMA/CA may be supplemented by the exchange of a request-to-send (RTS) packet transmitted by a sending device **115** (or AP **105**) and a clear-to-send (CTS) packet transmitted by the receiving device **115** (or AP **105**). This may alert other devices within range of the sender and receiver not to transmit for the duration of the primary transmission. Thus, RTS and/or CTS may help mitigate a hidden node problem.

The wireless communication system **100** may include an AP **105**, devices **115** (e.g., which may be referred to as source devices or central devices), and paired devices **115** (e.g., which may be referred to as sink devices or peripheral devices) implementing WLAN communications (e.g., Wi-Fi communications) and/or Bluetooth communications. For example, devices **115** may include cell phones, user equipment (UEs), STAB, mobile stations, PDAs, other handheld devices, netbooks, notebook computers, tablet computers, laptops, or some other suitable terminology. Paired devices **115** may include Bluetooth-enabled devices capable of pairing with other Bluetooth-enabled devices (e.g., such as devices **115**), which may include wireless audio devices (e.g., headsets, earbuds, speakers, earpieces, headphones), display devices (e.g., TVs, computer monitors), microphones, meters, valves, etc.

"Bluetooth communications" may refer to a short-range communication protocol and may be used to connect and exchange information between devices **115** and paired devices **115** (e.g., between mobile phones, computers, digital cameras, wireless headsets, speakers, keyboards, mice or other input peripherals, and similar devices). Bluetooth systems (e.g., aspects of wireless communication system **100**) may be organized using a central-peripheral relationship employing a time-division duplex protocol having, for example, defined time slots of 625 microseconds, in which transmission alternates between the central device (e.g., a device **115**) and one or more peripheral devices (e.g., paired devices **115**). In some examples, "device **115**" may generally refer to a central device, and "paired device **115**" may refer to a peripheral device in the wireless communication system **100**. Therefore, in some examples, a device may be referred to as either a device **115** or a paired device **115** based on the Bluetooth role configuration of the device. That is, designation of a device as either a device **115** or a paired device **115** may not necessarily indicate a distinction in device capability, but rather may refer to or indicate roles held by the device in the wireless communication system **100**. Generally, "device **115**" may refer to a wireless communication device capable of wirelessly exchanging data signals with another device (e.g., a paired device **115**), and "paired device **115**" may refer to a device operating in a peripheral role, or to a short-range wireless communication device capable of exchanging data signals with the device **115** (e.g., using Bluetooth communication protocols).

A communication link **125** may be established between two Bluetooth-enabled devices (e.g., between a device **115** and a paired device **115**) and may provide for communications or services (e.g., according to some Bluetooth profiles). The controller stack may be responsible for setting up communication links **125**, such as asynchronous connection-oriented links (or asynchronous connection-oriented connections), synchronous connection-orientated (SCO) links (or SCO connections), extended synchronous connection-oriented (eSCO) links (or eSCO connections), other logical transport channel links, etc. For example, a Bluetooth connection may be an eSCO connection for voice calls (e.g., which may allow for retransmission), an asynchronous connection-less (ACL) connection for music streaming (e.g., advanced audio distribution profile (A2DP)), etc. eSCO packets may be transmitted in predetermined time slots (e.g., 6 Bluetooth slots each for eSCO). The regular interval between the eSCO packets may be specified when the Bluetooth link is established. The eSCO packets to/from a specific device (e.g., paired device **115**) are acknowledged and may be retransmitted if not acknowledged during a retransmission window. In addition, audio may be streamed between a device **115** and a paired device **115** using an ACL connection (e.g., an A2DP profile). In some cases, the ACL connection may occupy 1, 3, or 5 Bluetooth slots for data or voice. Other Bluetooth profiles supported by Bluetooth-enabled devices may include Bluetooth Low Energy (BLE) (e.g., providing considerably reduced power consumption and cost while maintaining a similar communication range), human interface device (HID) profile (e.g., providing low latency links with low power requirements), etc.

A device may, in some examples, be capable of both Bluetooth and WLAN communications. For example, WLAN and Bluetooth components may be co-located within a device, such that the device may be capable of communicating according to both Bluetooth and WLAN communication protocols, as each technology may offer different benefits or may improve user experience in different conditions. In some examples, Bluetooth and WLAN communications may share a same medium, such as the same unlicensed frequency medium. In such examples, a device **115** may support WLAN communications via AP **105** (e.g., over communication links **120**). The AP **105** and the associated devices **115** may represent a BSS or an ESS. The various devices **115** in the network may be able to commu-

nicate with one another through the AP **105**. In some cases the AP **105** may be associated with a coverage area, which may represent a BSA.

Devices **115** and APs **105** may communicate according to the WLAN radio and baseband protocol for physical and MAC layers from IEEE 802.11 and versions including, but not limited to, 802.11b, 802.11g, 802.11a, 802.11n, 802.11ac, 802.11ad, 802.11ah, 802.11ax, etc. In other implementations, peer-to-peer connections or ad hoc networks may be implemented within system **100**, and devices may communicate with each other via communication links **120** (e.g., Wi-Fi Direct connections, Wi-Fi TDLS links, peer-to-peer communication links, or other peer or group connections). AP **105** may be coupled to a network (such as the Internet) and may enable a device **115** to communicate via the network (or communicate with other devices **115** coupled to the AP **105**). A device **115** may communicate with a network device bi-directionally. For example, in a WLAN, a device **115** may communicate with an associated AP **105** via downlink (e.g., the communication link from the AP **105** to the device **115**) and uplink (e.g., the communication link from the device **115** to the AP **105**).

In some examples, content, media, audio, etc. exchanged between a device **115** and a paired device **115** may originate from a WLAN. For example, in some examples, device **115** may receive audio from an AP **105** (e.g., via WLAN communications), and the device **115** may then relay or pass the audio to the paired device **115** (e.g., via Bluetooth communications). In some examples, certain types of Bluetooth communications (e.g., such as high quality or high definition (HD) Bluetooth) may require enhanced quality of service. For example, in some examples, delay-sensitive Bluetooth traffic may have a higher priority than WLAN traffic.

In some deployments, a wireless communication device may support applications associated with low-latency or lossless audio to one or more other devices, such as one or more personal audio devices. For example, a wireless communication device may support applications and use cases associated with ULL, such as ULL gaming, or streaming lossless audio to one or more personal audio devices (e.g., peripheral devices) of a user. In scenarios in which a user uses two peripheral devices (e.g., a wireless earbud **130**-*a* and a wireless earbud **130**-*b*), the wireless communication device may support an XPAN via which the wireless communication device may communicate with the two peripheral devices.

To meet latency or lossless criteria associated with an application or use case, XPAN devices may employ a TWT technique for communication between the wireless communication device and the peripheral devices. Initial or default TWT parameters may be set under an expectation for ideal (e.g., interference-free or approximately interference-free) conditions and may be updated in response to changing channel conditions or a changing concurrency situation at the wireless communication device. In some systems, the peripheral devices and the wireless communication device may exchange one or more Bluetooth messages and implement a complete TWT teardown between the wireless communication device and each of the peripheral devices. Such an exchange of Bluetooth messages and TWT teardown may introduce too much latency for some applications, such as ULL gaming or streaming lossless audio applications.

In some implementations, a wireless communication device, which may be a device **115** (e.g., a handset) or an AP **105**, and a set of peripheral devices may use downlink audio data packets to carry updated TWT parameters or any other XPAN-related parameters that the wireless communication device and the peripheral devices may indicate via wireless signaling.

FIG. **2** illustrates an example of a wireless communication system **200** that supports low-latency parameter updates for extended personal audio networks in accordance with the present disclosure. The wireless communication system **200** may implement or be implemented to realize aspects of the wireless communication system **100**. For example, the wireless communication system **200** illustrates communication between an AP **105**, a device **115** (e.g., a handset or handheld device), and a wireless earbud **130**-*a* and a wireless earbud **130**-*b* of a user **205** (e.g., examples of audio devices and/or peripheral devices), which may be examples of corresponding devices as illustrated by and described with reference to FIG. **1**. In some implementations, the device **115**, the wireless earbud **130**-*a*, and the wireless earbud **130**-*b* may support a signaling-based mechanism according to which the device **115** may transmit an indication of a set of updated parameters to each of the wireless earbud **130**-*a* and the wireless earbud **130**-*b* via one or audio data packets.

In some deployments, the device **115** may communicate with the AP **105** via one or both of a link **210**-*a* and a link **210**-*b*, which may be examples of infrastructure links between the AP **105** and the device **115**. The link **210**-*a* may be an example of a 2.4 GHz link between the AP **105** and the device **115**, and the link **210**-*b* may be an example of a 5 GHz link or a 6 GHz link between the AP **105** and the device **115**. Further, the device **115** may communicate wirelessly with each of the wireless earbud **130**-*a* and the wireless earbud **130**-*b*, where each of the wireless earbud **130**-*a* and the wireless earbud **130**-*b* may be associated with an XPAN of the device **115**. For example, the device **115** may communicate with the wireless earbud **130**-*a* via a link **215**-*a* and may communicate with the wireless earbud **130**-*b* via a link **215**-*b*, where the link **215**-*a* and the link **215**-*b* may be referred to or understood as XPAN links. The link **215**-*a* may be an example of a 5 GHz link or a 6 GHz link and the link **215**-*b* may be an example of a 5 GHz link or a 6 GHz link. Additionally, in some examples, the device **115** may communicate with the wireless earbud **130**-*a*, which may be an example of a primary earbud, via a communication link **220**. The communication link **220** may be an example of a Bluetooth link between the device **115** and the wireless earbud **130**-*a*. The wireless earbud **130**-*a* and the wireless earbud **130**-*b*, which may be an example of a secondary earbud, may communicate with each other via a link **225**, which may be an example of a Bluetooth link between the wireless earbud **130**-*a* and the wireless earbud **130**-*b*.

In some cases, the device **115**, the wireless earbud **130**-*a*, and the wireless earbud **130**-*b* may support or belong to an XPAN and may use the XPAN to support one or more applications or use cases, such as applications or use cases associated with latency or lossless audio constraints or criteria. For example, the device **115** may support one or more use cases of ULL gaming and streaming lossless audio to the wireless earbud **130**-*a* and the wireless earbud **130**-*b* (e.g., personal devices of the device **115**). For such applications, the device **115** may be expected to keep end-to-end latency below a relatively stringent latency target (e.g., 40 ms for ULL gaming). Further, the device **115** may also be tasked with handling (e.g., gracefully handling) a coexistence of XPAN traffic (e.g., traffic to or from one or both of the wireless earbud **130**-*a* and the wireless earbud **130**-*b*) with other concurrency scenarios the user **205** or the system may initiate. Such other concurrency scenarios may include a scan concurrency for channel selection, STA infrastructure

link concurrency for online gaming or other traffic to or from the AP **105**, or neighbor aware networking (NAN) discovery and NAN data transfer, or any combination thereof.

The device **115** may be expected to meet a latency constraint for various applications or use cases (e.g., an ultra-low-latency constraint for a ULL gaming use case) and also facilitate coexistence between XPAN and other concurrency scenarios on the device **115**. To meet the latency constraints associated with, for example, ULL gaming, a power constraint of the wireless earbud **130**-*a* and the wireless earbud **130**-*b*, and/or power and concurrency constraints at the device **115**, the device **115** may employ a TWT technique for the communication between the device **115** (which may act or function as an SAP) and each of the wireless earbud **130**-*a* and wireless earbud **130**-*b* (which may act or function as STAs).

Example TWT parameters include a TWT **230**, a TWT SI **235**, and a TWT service period (SP) **240**. A TWT **230** may indicate or be associated with a timing synchronization function (TSF) time indicating a start or beginning of a first TWT session. A TWT SI **235** may indicate a TWT interval, which may refer to a time difference between a start or beginning of two consecutive TWT sessions. A TWT SP **240** may indicate a duration during which one or both of the wireless earbud **130**-*a* and the wireless earbud **130**-*b* are awake during a TWT SI **235**. In some aspects, a TWT SP **240** may be referred to or understood as a TWT session. As illustrated by FIG. **2**, the TWT SI **235** may indicate a time difference between a TWT SP **240**-*a* and a TWT **240**-*b*. A remainder of time within a TWT SI **235** excluding a TWT SP **240** may be referred to or understood as a concurrency time **245** during which the device **115** may perform any operations (e.g., transmission or reception) associated with a concurrency scenario at the device **115**. In other words, the difference between XPAN TWT SI **235** and XPAN TWT SP **240** may be the time left for the device **115** to support other concurrencies (e.g., outside of any channel switching or software overheads).

For XPAN, each of the wireless earbud **130**-*a* and the wireless earbud **130**-*b* (which may be examples of TWT requesting STAs) may initiate a TWT session with the device **115** (which may be an example of a TWT responding STA). Further, for low-latency use cases (e.g., ULL gaming use cases), a target end-to-end latency may be relatively stringent (e.g., less than or equal to approximately 40 ms), which may be tied to, associated with, or expect a Wi-Fi latency in a specific range (e.g., in the sub-10 ms range). To achieve such a Wi-Fi latency, a TWT SI **235** and a TWT SP **240** may be selected or set to specific values (e.g., a TWT SI **235** may be set to 4 ms with a TWT SP **240** of 2 ms). Further, for a lossless audio use case, for example, a TWT SI **235** may be set to approximately 70 ms with a TWT SP **240** of approximately 23 ms.

In some cases, a default or initial set of TWT parameters for XPAN may be configured or set expecting ideal (e.g., interference-free or approximately interference-free) conditions (e.g., link conditions, channel conditions, or environmental conditions). In some deployments, Wi-Fi channel conditions, a concurrency situation of the device **115**, or XPAN constraints may change over time. Such changes may trigger, be associated with, or mandate a TWT parameter update. Further, in applications or use cases associated with low latency (e.g., ULL gaming and streaming lossless audio), the TWT parameter update may be expected to be performed with low latency to continue to meet XPAN constraints without compromising a user experience. As an example, for XPAN gaming use cases, a TWT SP **240** may be approximately 2 ms. A communication overhead of the updated TWT parameters, or other information communicated from the device **115** to the wireless earbud **130**-*a* and the wireless earbud **130**-*b*, may also be expected to be relatively small.

In some systems, however, a TWT parameter update procedure may be associated with a relatively high latency. Further, because TWT sessions may be initiated by the wireless earbud **130**-*a* and the wireless earbud **130**-*b* (with default or initial parameters), any update for TWT parameters triggered by a condition change on the device **115** may involve the device **115** transmitting the updated parameters to the wireless earbud **130**-*a* and the wireless earbud **130**-*b* followed by a TWT parameter change at the wireless earbud **130**-*a* and the wireless earbud **130**-*b*.

An example TWT parameter update procedure may include a sequence of signaling steps that involve one or more transmissions using a Bluetooth link, which may introduce relatively large delays. For example, a Wi-Fi sub-system (SS) of the device **115** may send, to a Bluetooth host (BT host) of the device **115**, a request (e.g., a TWT parameter update request) to update one or more TWT parameters after one or more conditions are detected that trigger one or more TWT parameter changes. The BT host of the device **115** may communicate an updated set of TWT parameters to a BT host of a primary earbud (e.g., the wireless earbud **130**-*a*) using a Bluetooth link. Such an updated TWT configuration sent via a Bluetooth link may add approximately 80 ms of delay. The BT host of the primary earbud may signal the new TWT parameters internally to a Wi-Fi SS of the primary earbud, and the BT host of the primary earbud may communicate the new TWT parameters to a BT host of a secondary earbud (e.g., the wireless earbud **130**-*b*) using a Bluetooth link. Such an indication of a TWT configuration via a Bluetooth link between the primary earbud and the secondary earbud may add approximately 120 ms of delay. The BT host of the secondary earbud may signal the new TWT parameters internally to a Wi-Fi SS of the secondary earbud.

The Wi-Fi SS of the primary earbud may start a TWT session teardown and parameter update process. The TWT session teardown and parameter update process may involve a transmission, from the Wi-Fi SS of the primary earbud to the Wi-Fi SS of the device **115** via an XPAN Wi-Fi link, of a TWT Teardown message and a TWT Request message that carries the new TWT parameters and a transmission, from the Wi-Fi SS of the device **115** to the Wi-Fi SS of the primary earbud via the XPAN Wi-Fi link, of an acknowledgement (ACK) of the new TWT parameters with a TWT Response message. The Wi-Fi SS of the device **115** may update the BT host of the device **115** that a new TWT session with the primary earbud has been established (e.g., the Wi-Fi SS may indicate a TWT session update to the BT host). Such a TWT session teardown and parameter update process may additionally be performed between the device **115** and the secondary earbud.

In accordance with such a TWT parameter update procedure, the device **115** may incur a relatively large delay between the time that a condition is triggered on the device **115** associated with a TWT parameter update and the time that the updated parameters take effect. For example, some components of the delay may include a delay of approximately 80 ms associated with the updated TWT configuration sent via the Bluetooth link between the device **115** and the primary earbud, a delay of approximately 100 ms associated with a sniff exit delay if the Bluetooth link between the two earbuds is in sniff mode, a delay of

approximately 20 ms associated with the updated TWT configuration sent via the Bluetooth link between the two earbuds, and a delay of approximately 5 ms associated with the teardown of the TWT sessions and the re-establishment of new TWT sessions from both earbuds. Accordingly, such a TWT parameter update procedure may be associated with a total end-to-end delay of approximately 205 ms for a one-time TWT parameter update, which may be too much for some applications or use cases (e.g., ULL gaming and streaming lossless audio use cases).

In some implementations, the device **115**, the wireless earbud **130**-*a*, and the wireless earbud **130**-*b* may support a data-packet-generation-based and signaling-based mechanism according to which the device **115** may embed an indication of one or more updated parameters in one or more audio data packets that the device **115** may transmit to the wireless earbud **130**-*a* and the wireless earbud **130**-*b*. For example, if the device **115** detects a change that triggers a parameter update, or if the device **115** otherwise determines to transmit a set of parameters to the wireless earbud **130**-*a* and the wireless earbud **130**-*b* with low latency, the device **115** may embed the parameters in one or more downlink audio data packets and may transmit the one or more downlink audio data packets to the wireless earbud **130**-*a* and the wireless earbud **130**-*b*. In some implementations, the device **115** may transmit an indication of the parameters to the wireless earbud **130**-*a* via a first audio data packet transmitted using a first Wi-Fi link (e.g., a first XPAN Wi-Fi link) and may transmit an indication of the parameters to the wireless earbud **130**-*b* via a second audio data packet transmitted using a second Wi-Fi link (e.g., a second XPAN Wi-Fi link). The first audio data packet and the second audio data packet may include the same information or may include different information, and each may be examples of physical layer convergence protocol (PLCP) protocol data units (PPDUs).

The device **115** may convey a set of one or more parameters to both of the wireless earbud **130**-*a* and the wireless earbud **130**-*b* in the course of expected downlink data transmissions or traffic (e.g., without using any additional or dedicated signaling). In accordance with such a lack of additional over-the-air Bluetooth or Wi-Fi signaling between the device **115** and each of the wireless earbud **130**-*a* and the wireless earbud **130**-*b*, and between the wireless earbud **130**-*a* and the wireless earbud **130**-*b*, a total end-to-end delay may be one or a relatively small quantity of TWT SIs **235**, which may correspond to a delay of approximately 4 or 8 ms for some applications or use cases (e.g., ULL gaming). Such a delay of approximately 4 or 8 ms may represent a significant cut down in end-to-end delay of TWT parameter renegotiation compared to other example parameter update procedures (which may incur delays of approximately 205 ms).

The device **115**, the wireless earbud **130**-*a*, and the wireless earbud **130**-*b* may achieve up to approximately 50× faster response time to any condition change on an XPAN or infrastructure link associated with the device **115**. In other words, the described techniques may allow or facilitate an agile XPAN system that can adapt to changing wireless conditions associated with an XPAN or infrastructure link at the device **115**. Accordingly, the described techniques may be applicable to any latency-sensitive applications or use cases using TWT as the communication protocol between potentially power-constrained devices or any other use cases that are associated with or expect low-latency XPAN parameter updates from a default or initial set of programmed values.

Further, the described techniques may allow or facilitate an updating of one or more TWT parameters at the same time and may additionally, or alternatively, be used for communicating any other information (XPAN-related or otherwise) between the device **115**, the wireless earbud **130**-*a*, and the wireless earbud **130**-*b* in a fast and efficient way. For examples, the parameters that may be communicated between the device **115** and each of the wireless earbud **130**-*a* and the wireless earbud **130**-*b* may include a set of one or more TWT parameters, a received signal strength indicator (RSSI) measured at either the device **115** or one or both of the wireless earbud **130**-*a* and the wireless earbud **130**-*b* that is expected to be communicated to the device **115** or one or both of the wireless earbud **130**-*a* and the wireless earbud **130**-*b*, a channel switch indication or request, or a bearer switch indication or request. Such one or more TWT parameters may include any one or more of a TWT SI **235**, a TWT SP **240**, or a TWT start time (e.g., a TWT **230**). Further, such a bearer switch indication or request may be a request for a switch from an XPAN bearer to a Bluetooth bearer, or vice versa.

In some networks using XPAN communications, the networks may support ULL gaming with end-to-end latency parameters along with coexistence with concurrency scenarios in which a WCD has wireless links to an audio device and additional devices. To meet the latency requirements for ULL gaming, power requirements of the audio device and power and concurrency requirements on the WCD, a TWT technique may be is used for communication between the WCD (e.g., acting as an SAP) and the audio device (e.g., acting as an STA). The TWT may be a TSF time indicating a start of a first TWT session. An SI indicates the TWT interval (e.g., a time difference between a start of two consecutive TWT sessions). An SP indicates a duration the audio device will be awake during an SI. A concurrency time is a difference between the SP and the SI and is a time remaining for the WCD to support the additional concurrencies (e.g., communications via additional wireless links). The faster gaming traffic is successfully delivered between the WCD and the audio device, the more concurrency time that can be achieved on an infra link of the WCD. For XPAN, each audio device (e.g., a TWT-requesting STA) may initiate a TWT session with the WCD (e.g., a TWT responding STA).

FIG. **3** illustrates an example **300** of an audio device, in accordance with the present disclosure. As shown, FIG. **3**, an audio device may include a speaker **302**, a speaker coil **304** (e.g., to convert an electrical signal into audio signals), a battery **306**, and a direct current (DC) cable that connects the battery **306** to the speaker **302**.

In some audio devices (e.g., wireless-communication-enabled audio devices), the DC cable **308** and the battery **306** may produce magnetic fields **312** based at least in part on (e.g., proportional to) a DC current (e.g., current **310**). The magnetic fields **312** may produce magnetic flux **316** from the DC cable **308** and magnetic flux **314** from the battery **306**. The magnetic flux (e.g., a total of the magnetic flux **314** and **316**) into the speaker coil **304**, which may be shunted by an audio power amplifier (PA) output resistance, which may provide 0.1 ohms along with associated wires. When the DC current changes, the magnetic flux through the speaker coil **304** changes as well. A change of the magnetic flux through the speaker coil **304** may induce a voltage in the speaker coil **304**. The voltage in the speaker coil **304** may cause a rising current in coils of the speaker coil **304**. The rising current may cause the speaker **302** to release energy of the coils and produce a sound of one or more clicks.

In some audio devices, a manufacturer may use a hardware-based solution, such as a magnetic shielding and/or power supply unit coupling, among other examples. However, hardware-based solutions may increase a cost of the audio devices and/or may consume limited space within the audio devices.

As indicated above, FIG. **3** is provided as an example. Other examples may differ from what is described with regard to FIG. **3**.

FIG. **4** illustrates examples **400** and **450** of TWT packet sequences, in accordance with the present disclosure. In the context of FIG. **4**, a WCD may communicate with one or more audio devices. For example, the WCD may communicate with a first audio device and a second audio device.

As shown in example **400**, the WCD may communicate with the one or more audio devices using a TWT technique. The TWT may include a TWT SI **402** associated with a periodicity of TWT communication occasions. The TWT SI **402** may include a channel switch time **404** during which the WCD and/or the one or more audio devices may tune to a channel associated with communicating together. The TWT SI **402** may include an active period **406** during which the WCD and the one or more audio devices exchange communications. After the active period, the TWT SI **402** may include a concurrency time **408** during which the WCD and the audio devices are not schedule communicate with each other via a TWT-based communication.

In the example **400**, the WCD may transmit a first audio communication (audio 1) **410** to a first audio device. The first audio device may respond with an acknowledgement (ACK 1) **412** to indicate reception of the first audio communication **410**. Similarly, the WCD may transmit a second audio communication **414** (audio 2) to a second audio device. The second audio device may respond with an acknowledgment (ACK 2) **416** to indicate reception of the second audio communication **410**.

The first audio device may transmit an uplink communication (VBC 1) **418** to the WCD. The WCD may respond with an acknowledgment (ACK 3) **420** to indicate reception of the uplink communication **418**. Similarly, the second audio device may transmit an uplink communication (VBC 2) **422** to the WCD. The WCD may respond with an acknowledgment (ACK 4) **416** to indicate reception of the uplink communication **422**.

In the example **450**, the one or more audio devices may retransmit one or more communications based at least in part on the WCD failing to respond with an ACK to an uplink communication. In example **450**, the TWT may include a TWT SI **452** associated with a periodicity of TWT communication occasions. The TWT SI **452** may include a channel switch time **454** during which the WCD and/or the one or more audio devices may tune to a channel associated with communicating together. The TWT SI **452** may include an active period **456** during which the WCD and the one or more audio devices exchange communications. After the active period, the TWT SI **452** may include a concurrency time **458** during which the WCD and the audio devices are not schedule communicate with each other via a TWT-based communication.

In the example **450**, the WCD may transmit a first audio communication (audio 1) **460** to a first audio device. The first audio device may respond with an acknowledgement (ACK 1) **462** to indicate reception of the first audio communication **460**. Similarly, the WCD may transmit a second audio communication **464** (audio 2) to a second audio device. The second audio device may respond with an acknowledgment (ACK 2) **466** to indicate reception of the second audio communication **460**.

The first audio device may transmit an uplink communication (VBC 1) **468** (audio 1) to the WCD. The first audio device may fail to receive an acknowledgment to indicate reception of the uplink communication **468**. Similarly, the second audio device may transmit an uplink communication (VBC 2) **470** to the WCD. The second audio device may fail to receive an acknowledgment to indicate reception of the uplink communication **470**.

Based at least in part on failing to receive an ACK from the WCD, the first audio device and the second audio device may retransmit the first uplink communication **468** and the second uplink communication **468** to the WCD. For example, the first audio device may transmit a retransmission of uplink communication (VBC 1) **472** to the WCD. The WCD may respond with an acknowledgment (ACK 3) **734** to indicate reception of the retransmission of uplink communication **468**. Similarly, the second audio device may transmit an retransmission of uplink communication (VBC 2) **476** to the WCD. The WCD may respond with an acknowledgment (ACK 4) **478** to indicate reception of the retransmission of the uplink communication **476**.

As shown in FIG. **4**, a TWT active period may be longer, and a concurrency time may be shorter, when retransmissions occur.

As indicated above, FIG. **4** is provided as an example. Other examples may differ from what is described with regard to FIG. **4**.

In some audio devices (e.g., wireless-communication-enabled audio devices), a direct current (DC) cable and battery may produce a magnetic field proportional to the DC current. The magnetic field may provide magnetic flux into a speaker coil, which may be shunted by an audio power amplifier (PA) output resistance, which may provide 0.1 ohms along with associated wires. When the DC current changes, the magnetic flux through speaker coil changes as well. A change of magnetic flux through the speaker coil may induce a voltage in the speaker coil. The voltage in the speaker coil may cause a rising current in the coils. The rising current may cause the speaker to release energy of the coils and produce a sound of one or more clicks.

In some audio devices, a manufacturer may use a hardware-based solution, such as a magnetic shielding and/or power supply unit coupling, among other examples. However, hardware-based solutions may increase a cost of the audio devices and/or may consume limited space within the audio devices.

In some aspects described herein, a WCD and an audio device may use intelligent packet scheduling and/or traffic shaping on the WCD and/or the audio device to mitigate clicking from magnetic coupling on the audio device (e.g., earbuds). In some aspects, the WCD and the audio device may communicate in one of a set of candidate communication states (configurations). For example, each candidate communication state may be associated with values of communication parameters, such as a periodicity of uplink traffic, a periodicity of downlink traffic, an uplink transmission power, or an MCS. Each candidate communication state may differ from each other candidate communication state with at least one value of the communication parameters.

The WCD and the audio device may transition between candidate communication states based at least in part on a configuration switch trigger. The configuration switch trigger may be based at least in part on a link quality metric or a change in a use state of the WCD. For example, the configuration switch trigger may be based at least in part on

an increase or decrease in a signal strength (e.g., received signal strength indication (RSSI)), a screen state detection (e.g., locked screen, always on display, or active display, among other examples), and/or an operating mode detection (e.g., based at least in part on operating system information).

Based at least in part on selecting a communication state using configuration switch triggers, the WCD may reduce clicks and/or other noise caused by voltage induced in a speaker coil by DC current changes.

In some aspects, the WCD may include a communication manager. As described in more detail elsewhere herein, the communication manager may communicate, via a wireless link, with an audio device using a first configuration having first values for communication parameters, the communication parameters including one or more of: a periodicity of uplink traffic, a periodicity of downlink traffic, an uplink transmission power, or an MCS; and transmit an indication to switch to a second configuration based at least in part on a configuration switch trigger, the configuration switch trigger being based at least in part on one or more of a link quality metric associated with the wireless link or a change of a use state of the WCD, and the second configuration having second values for the communication parameters. Additionally, or alternatively, the communication manager may perform one or more other operations described herein.

In some aspects, the audio device may include a communication manager. As described in more detail elsewhere herein, the communication manager may communicate, via a wireless link, with a WCD using a first configuration having first values for communication parameters, the communication parameters including one or more of: a periodicity of uplink traffic, a periodicity of downlink traffic, an uplink transmission power, or an MCS; and receive an indication to switch to a second configuration based at least in part on a configuration switch trigger, the configuration switch trigger being based at least in part on one or more of a link quality metric associated with the wireless link or a change of a use state of the WCD, and the second configuration having second values for the communication parameters. Additionally, or alternatively, the communication manager may perform one or more other operations described herein.

In some aspects, the WCD includes means for communicating, via a wireless link, with an audio device using a first configuration having first values for communication parameters, the communication parameters including one or more of: a periodicity of uplink traffic, a periodicity of downlink traffic, an uplink transmission power, or an MCS; and/or means for transmitting an indication to switch to a second configuration based at least in part on a configuration switch trigger, the configuration switch trigger being based at least in part on one or more of a link quality metric associated with the wireless link or a change of a use state of the WCD, and the second configuration having second values for the communication parameters. In some aspects, the means for the WCD to perform operations described herein may include, for example, one or more of a communication manager, a transmit processor, a TX MIMO processor, a modem, an antenna, a MIMO detector, a receive processor, a controller/processor, a memory, or a scheduler.

In some aspects, the audio device includes means for communicating, via a wireless link, with a WCD using a first configuration having first values for communication parameters, the communication parameters including one or more of: a periodicity of uplink traffic, a periodicity of downlink traffic, an uplink transmission power, or an MCS; and/or means for receiving an indication to switch to a second configuration based at least in part on a configuration switch trigger, the configuration switch trigger being based at least in part on one or more of a link quality metric associated with the wireless link or a change of a use state of the WCD, and the second configuration having second values for the communication parameters. In some aspects, the means for the audio device to perform operations described herein may include, for example, one or more of a communication manager, a transmit processor, a TX MIMO processor, a modem, an antenna, a MIMO detector, a receive processor, a controller/processor, a memory, or a scheduler.

FIG. **5** is a diagram of an example **500** associated with configuration switch triggers for audio device communications, in accordance with the present disclosure. As shown in FIG. **5**, WCD (e.g., a STA, a UE, or host device, among other examples) may communicate with one or more audio devices (e.g., earbuds). In some aspects, the WCD and the one or more audio devices may have established a wireless connection prior to operations shown in FIG. **5**.

As shown by reference number **505**, the WCD may initiate a use state for wireless communication with the one or more audio devices. In some aspects, the use state may be associated with use for gaming, use for lossless audio, and/or other uses.

As shown by reference number **510**, the WCD and the one or more audio devices may communicate using a first configuration. The first configuration may be associated with a set of communication parameters. For example, the communication parameters may include a periodicity of uplink traffic, a periodicity of downlink traffic, an uplink transmission power, and/or a MCS, among other examples.

In some aspects, the first configuration may be associated with communication parameters, such as a first maximum number of uplink data retransmissions, a first maximum number of uplink acknowledgment (ACK) retransmissions, a first delayed block ACK transmission policy, a first quality of service (QoS) configuration, and/or a first configuration for transmission of traffic of an additional communication protocol that is different from a communication protocol associated with the wireless link, among other examples. These parameters may be used to reduce voltage-induced interference in an audio output of the audio device.

As shown by reference number **515**, the WCD may detect a configuration switch trigger. In some aspects, the configuration switch trigger may be based at least in part on a link quality metric associated with the wireless link or a change of a use state of the WCD. In some aspects, the link quality metric may include a received RSSI value, a number of dropped packets, a number of retransmissions, and/or a packet error rate, among other examples.

In some aspects, the RSSI value used to detect the configuration switch trigger may be an average of a set of RSSI values (e.g., most recent RSSI values). The set of RSSI values may be based at least in part on measurements by the WCD or an indication of measurements by the one or more audio devices, among other examples.

In some aspects, the change of the use state of the WCD may include stopping of a low-latency data stream, deactivation of a screen, and/or exiting of an application associated with the downlink traffic or the uplink traffic, among other examples.

As shown by reference number **520**, the WCD may transmit, and the one or more audio devices may receive, an indication to switch to a second configuration. In some aspects, the WCD may transmit the indication via an index associated with the second configuration, a proper subset of the second values, and/or all of the second values, among

other examples. For example, the WCD may indicate, using the index, to use the second configuration, including communication parameters associated with the second configuration. In some aspects, the WCD may indicate one or more of the communication parameters (e.g., explicit values or related to values of the first configuration) that should be changed to switch from the first configuration to the second configuration. In some aspects, the WCD may indicate values (e.g., explicit or related to values of the first configuration) of the communication parameters to use. The communication parameters may constitute the second configuration.

In some aspects, the WCD may transmit a first message that indicates to switch to a second value for the uplink transmission power and then transmit a second message to switch to one or more of a second value for the periodicity of the uplink traffic or a second value for the periodicity of the downlink traffic. In some aspects, the WCD may transmit a single message that indicates to switch to the second value for the uplink transmission power and to switch to one or more of the second value for the periodicity of the uplink traffic or the second value for the periodicity of the downlink traffic.

In some aspects, a first subset of the communication parameters is dependent on a second subset of communication parameters. For example, a transmission power may be based at least in part on an MCS and/or a maximum repetition number. Additionally, or alternatively, a maximum repetition number may be based at least in part on a transmission power and/or an MCS. Based at least in part on dependency, the indication to switch to the second configuration may indicate the second subset of communication parameters (and omit an indication of one or more of the first subset of communication parameters). In this way, a payload of the indication to switch to the second configuration may be reduced and the one or more audio devices may derive the first subset of the communication parameters from the first subset of communication parameters.

As shown by reference number **525**, the WCD and the one or more audio devices may communicate using a second configuration. The second configuration may be associated with a set of communication parameters. For example, the communication parameters may include a periodicity of uplink traffic, a periodicity of downlink traffic, an uplink transmission power, and/or a MCS, among other examples. In some aspects, the second configuration may have values for the communication parameters associated with a reduction in voltage-induced interference in an audio output of the audio device.

In some aspects, the second configuration is associated with communication parameters, such as a second maximum number of uplink data retransmissions that is different from the first maximum number of uplink data retransmissions, a second maximum number of uplink ACK retransmissions that is different from the first maximum number of uplink ACK retransmissions. In some aspects, the second configuration is associated with a second delayed block ACK transmission policy that is different from the first delayed block ACK transmission policy, a second QoS configuration that is different from the first QoS configuration, and/or a second configuration for transmission of traffic of the additional communication protocol that is different from the first configuration for transmission of traffic of the additional communication protocol, among other examples. In some aspects, the second configuration may be used to reduce voltage-induced interference in an audio output of the audio device relative to the first configuration. Alternatively the first configuration may be used to reduce voltage-induced interference in the audio output of the audio device relative to the second configuration. For example, the communication parameters of the second configuration may reduce voltage-induced interference based at least in part on reducing a density of transmissions from the audio device and/or a power density of transmissions over time.

As shown by reference number **530**, the WCD may transmit and the one or more audio devices may receive, an indication of a received signal strength. For example, the received signal strength may be associated with an uplink communication during communication using the second configuration.

As shown by reference number **535**, the WCD may receive, and the one or more audio devices may transmit, one or more communications having a maximum retransmission number. For example, the one or more communications may have a maximum retransmission number based at least in part on the received signal strength of the uplink communication.

In some aspects, the WCD may transmit, before receiving the one or more communications having the maximum retransmission number, an indication of a mapping of MCS values and downlink transmission powers. The WCD may have transmitted an indication of the MCS value for downlink communication and/or uplink communications (e.g., as part of the first configuration or the second configuration). The WCD may transmit a downlink communication while communicating using the second configuration and the one or more audio devices may transmit an uplink communication with a maximum retransmission number that is based at least in part on the uplink transmission power.

In some aspects, an audio device may measure RSSI of a received DL packet from the WCD. The audio device may calculate a path loss given knowledge of the MCS-TxPower mapping and the actual MCS used in the received DL packet. audio device may estimate the RSSI at the WCD using the calculated path loss and the uplink transmission power from the audio device. The audio device may then determine a maximum number of retries for the WCD RSSI, as estimated.

As shown by reference number **540**, the WCD may detect a configuration switch trigger. In some aspects, the configuration switch trigger may be based at least in part on a link quality metric associated with the wireless link or a change of a use state of the WCD. In some aspects, the link quality metric may include a received RSSI value, a number of dropped packets, a number of retransmissions, and/or a packet error rate, among other examples.

In some aspects, the RSSI value used to detect the configuration switch trigger may be an average of a set of RSSI values (e.g., most recent RSSI values). The set of RSSI values may be based at least in part on measurements by the WCD or an indication of measurements by the one or more audio devices, among other examples.

In some aspects, the change of the use state of the WCD may include stopping of a low-latency data stream, deactivation of a screen, and/or exiting of an application associated with the downlink traffic or the uplink traffic, among other examples.

In some aspects, the WCD may detect that a link quality has degraded (e.g., based at least in part on one or more link quality metrics) and/or that the WCD has changed a use state of the WCD to a relaxed latency state.

As shown by reference number **545**, the WCD may transmit, and the one or more audio devices may receive, an indication to switch to a different communication protocol.

For example, the WCD may indicate to switch to a Bluetooth communication protocol. In some aspects, the different communication protocol may be associated with an increased latency and/or an increased range relative to a communication protocol associated with the first configuration.

As shown by reference number **550**, the WCD and the one or more audio devices may communication using the different communication protocol.

Based at least in part on the WCD indicating to switch between configurations and/or communication protocols, the WCD may reduce or avoid clicks and/or other noise caused by voltage induced in a speaker coil by DC current changes.

As indicated above, FIG. **5** is provided as an example. Other examples may differ from what is described with respect to FIG. **5**.

FIG. **6** is a diagram of an example **600** associated with configuration switch triggers for audio device communications, in accordance with the present disclosure. In context of FIG. **6**, a WCD (e.g., a STA, a UE, or host device, among other examples) may communicate with one or more audio devices (e.g., earbuds). In some aspects, the WCD and the one or more audio devices may have established a wireless connection prior to operations shown in FIG. **6**.

As shown by reference number **605**, the WCD may initiate a use state. For example, the WCD may initiate a use state such as ULL gaming or streaming lossless audio.

As shown by reference number **610**, the WCD may identify a best channel for communicating with the one or more audio devices. For example, the WCD and the one or more audio devices may measure reference signals to identify a best channel, having characteristics such as frequency band and/or directional beams. The best channel may be a channel with a strongest received power, a highest signal-to-noise ratio (SNR), and/or low interference, among other examples.

As shown by reference number **615**, WCD may use a first configuration. The first configuration may be associated with ULL communications having a lowest latency and/or a lowest error rate. In some aspects, the first configuration may be associated with a first TWT SI for uplink communications and a second TWT SI for downlink communications. For example, the first configuration may be associated with a 4 ms downlink SI and a 16 ms uplink SI. In this way downlink SI has a smaller period between communication occasions and can provide downlink information with reduced latency. With a longer uplink SI, the WCD and the one or more audio devices may conserve network resources based at least in part on uplink communications being less often and/or with a relaxed latency requirement compared with downlink communications.

In some aspects, the first configuration may have a lowest power limit for uplink communications by the one or more audio devices. Additionally, or alternatively, the first configuration may have a highest MCS.

As shown by reference number **620**, WCD may use a second configuration. The second configuration may be associated with ULL communications having a second lowest latency and/or a second lowest error rate. In some aspects, the second configuration may be associated with a third TWT SI for uplink communications and a fourth TWT SI for downlink communications. For example, the second configuration may be associated with an 8 ms downlink SI and a 16 ms uplink SI. In this way downlink SI has a smaller period between communication occasions and can provide downlink information with reduced latency, but with more latency than the first configuration.

In some aspects, the second configuration may have a second lowest power limit for uplink communications by the one or more audio devices. Additionally, or alternatively, the second configuration may have a second-highest MCS or an MCS equal to the MCS of the first configuration).

In some aspects, the WCD may initiate the use state by selecting the first configuration. In this case, the WCD may start in a lowest-latency configuration and switch out of the first configuration to the second configuration upon detection of a configuration switch trigger, as shown by reference number **625**.

Alternatively, the WCD may initiate the use state by selecting the second configuration. In this case, the WCD may start in a second lowest-latency configuration and switch out of the second configuration upon detection of a configuration switch trigger. In this case the configuration switch trigger may indicate support for switching up to the first configuration or switching to a third configuration that has higher latency than the second configuration.

As shown by reference number **630**, the WCD may switch a configuration from the second configuration to a use a third configuration shown by reference number **635**. In some aspects, the third configuration may be associated with a latency that is higher than the second configuration. For example, the third configuration may be associated with a 16+ms SI for downlink communication and a 16-32+ms SI for uplink communications. Additionally, or alternatively, the third configuration may be associated with a power limit that is higher than configurations 1 and/or 2, and/or may be configured with an MCS that is lower (e.g., with less spectral efficiency) than configurations 1 and/or 2.

In some aspects, the third configuration may be associated with a change in a use state of the WCD and/or the one or more audio devices. For example, the WCD may have stopped presenting audio from a stream, such as a game. This change in the use state may be detected based at least in part on an RSSI drop, detection of a change in a screen state detection (e.g., screen locked and/or off), or detection of an operating mode detection using OS stats (e.g., gaming or lossless operation and/or high quality (HQ) or 3D-audio), among other examples.

As shown by reference number **635**, the WCD may switch a configuration from the third configuration to using a different protocol, as shown by reference number **645**. In some aspects, the WCD may switch to the different protocol (e.g., a Bluetooth protocol) based at least in part on the different protocol having a larger range and/or reduced power consumption.

In some aspects, the WCD may switch configurations to improved latency configurations based at least in part on improved link quality metrics, such as RSSI measurement values, a number of dropped packets, a number of retransmissions, and/or a packet error rate, among other examples. The improved link quality metrics may be associated with a reduced number of retransmissions or other actions that cause the speaker coils to accumulate and discharge energy that converts to unwanted sounds from the speakers.

In some aspects, the WCD may switch configurations to more relaxed latency configurations based at least in part on degraded link quality metrics, such as RSSI measurement values, a number of dropped packets, a number of retransmissions, and/or a packet error rate, among other examples. The degraded link quality metrics may be associated with an increased number of retransmissions or other actions that cause the speaker coils to accumulate and discharge energy

that converts to unwanted sounds from the speakers. For this reason, transmission power may be reduced, MCS may be reduced (e.g., to reduce retransmissions) and/or SI may be increased for downlink communications to reduce an average amount of power used to communicate over time. In this way, the configurations may balance performance and the unwanted sounds from the speakers.

As indicated above, FIG. **6** is provided as an example. Other examples may differ from what is described with respect to FIG. **6**.

FIG. **7** is a diagram illustrating an example process **700** performed, for example, by a WCD, in accordance with the present disclosure. Example process **700** is an example where the WCD (e.g., a STA, a host device, or a UE) performs operations associated with configuration switch triggers for audio device communications.

As shown in FIG. **7**, in some aspects, process **700** may include communicating, via a wireless link, with an audio device using a first configuration having first values for communication parameters, the communication parameters including one or more of: a periodicity of uplink traffic, a periodicity of downlink traffic, an uplink transmission power, or a MCS (block **710**). For example, the WCD (e.g., using communication manager **906**, depicted in FIG. **9**) may communicate, via a wireless link, with an audio device using a first configuration having first values for communication parameters, the communication parameters including one or more of: a periodicity of uplink traffic, a periodicity of downlink traffic, an uplink transmission power, or a MCS, as described above.

As further shown in FIG. **7**, in some aspects, process **700** may include an indication to switch to a second configuration based at least in part on a configuration switch trigger, the configuration switch trigger being based at least in part on one or more of a link quality metric associated with the wireless link or a change of a use state of the WCD, and the second configuration having second values for the communication parameters associated with a reduction in voltage-induced interference in an audio output of the audio device (block **720**). For example, the WCD (e.g., using communication manager **906**, depicted in FIG. **9**) may an indication to switch to a second configuration based at least in part on a configuration switch trigger, the configuration switch trigger being based at least in part on one or more of a link quality metric associated with the wireless link or a change of a use state of the WCD, and the second configuration having second values for the communication parameters associated with a reduction in voltage-induced interference in an audio output of the audio device, as described above.

Process **700** may include additional aspects, such as any single aspect or any combination of aspects described below and/or in connection with one or more other processes described elsewhere herein.

In a first aspect, the indication to switch to the second configuration comprises an indication of an index associated with the second configuration, a proper subset of the second values, or all of the second values.

In a second aspect, alone or in combination with the first aspect, at least one of the first values is different from at least one of the second values.

In a third aspect, alone or in combination with one or more of the first and second aspects, process **700** includes transmitting an indication to switch from a first communication protocol to a second communication protocol based at least in part on an additional configuration switch trigger.

In a fourth aspect, alone or in combination with one or more of the first through third aspects, the additional configuration switch trigger is based at least in part on a degradation of a link quality or a change of a use state of the WCD to a relaxed latency state, and wherein the second communication protocol is associated with an increased latency or an increased range relative to the first communication protocol.

In a fifth aspect, alone or in combination with one or more of the first through fourth aspects, the link quality metric is based at least in part on one or more of a received RSSI value, a number of dropped packets, a number of retransmissions, or a packet error rate.

In a sixth aspect, alone or in combination with one or more of the first through fifth aspects, the RSSI value comprises an average of a set of most recent RSSI values.

In a seventh aspect, alone or in combination with one or more of the first through sixth aspects, the change of use state of the WCD comprises stopping of a low-latency data stream, deactivation of a screen, or exiting of an application associated with the downlink traffic or the uplink traffic.

In an eighth aspect, alone or in combination with one or more of the first through seventh aspects, the first configuration is associated with one or more of a first maximum number of uplink data retransmissions, a first maximum number of uplink ACK retransmissions, a first delayed block ACK transmission policy, a first QoS configuration, or a first configuration for transmission of traffic of an additional communication protocol that is different from a communication protocol associated with the wireless link, and wherein the second configuration is associated with one or more of a second maximum number of uplink data retransmissions that is different from the first maximum number of uplink data retransmissions, a second maximum number of uplink ACK retransmissions that is different from the first maximum number of uplink ACK retransmissions, a second delayed block ACK transmission policy that is different from the first delayed block ACK transmission policy, a second QoS configuration that is different from the first QoS configuration, or a second configuration for transmission of traffic of the additional communication protocol that is different from the first configuration for transmission of traffic of the additional communication protocol.

In a ninth aspect, alone or in combination with one or more of the first through eighth aspects, transmitting the indication to switch to the second configuration comprises transmitting a first message that indicates to switch to a second value for the uplink transmission power, and a second message, after the first message, to switch to one or more of a second value for the periodicity of the uplink traffic or a second value for the periodicity of the downlink traffic, or transmitting a single message that indicates to switch to the second value for the uplink transmission power and to switch to one or more of the second value for the periodicity of the uplink traffic or the second value for the periodicity of the downlink traffic.

In a tenth aspect, alone or in combination with one or more of the first through ninth aspects, one or more values of the second values are based at least in part on one or more additional values of the second values, and wherein the indication to switch to the second configuration includes an indication of the one or more additional values of the second values.

In an eleventh aspect, alone or in combination with one or more of the first through tenth aspects, process **700** includes transmitting an indication of a received signal strength of an uplink communication, and receiving one or more commu-

nications having a maximum retransmission number based at least in part on the received signal strength of the uplink communication.

In a twelfth aspect, alone or in combination with one or more of the first through eleventh aspects, process **700** includes transmitting an indication of a mapping of MCS values and downlink transmission powers, transmitting an indication of an MCS value for a downlink communication, transmitting the downlink communication, and receiving an uplink communication having a maximum retransmission number that is based at least in part on the uplink transmission power.

In a thirteenth aspect, alone or in combination with one or more of the first through twelfth aspects, the indication is carried in the communication with the audio device via the wireless link.

Although FIG. **7** shows example blocks of process **700**, in some aspects, process **700** may include additional blocks, fewer blocks, different blocks, or differently arranged blocks than those depicted in FIG. **7**. Additionally, or alternatively, two or more of the blocks of process **700** may be performed in parallel.

FIG. **8** is a diagram illustrating an example process **800** performed, for example, by an audio device, in accordance with the present disclosure. Example process **800** is an example where the audio device (e.g., an earbud) performs operations associated with configuration switch triggers for audio device communications.

As shown in FIG. **8**, in some aspects, process **800** may include communicating, via a wireless link, with a WCD using a first configuration having first values for communication parameters, the communication parameters including one or more of: a periodicity of uplink traffic, a periodicity of downlink traffic, an uplink transmission power, or a MCS (block **810**). For example, the audio device (e.g., using reception component **1002**, transmission component **1004**, and/or communication manager **1006**, depicted in FIG. **10**) may communicate, via a wireless link, with a WCD using a first configuration having first values for communication parameters, the communication parameters including one or more of: a periodicity of uplink traffic, a periodicity of downlink traffic, an uplink transmission power, or a MCS, as described above.

As further shown in FIG. **8**, in some aspects, process **800** may include receiving an indication to switch to a second configuration based at least in part on a configuration switch trigger, the configuration switch trigger being based at least in part on one or more of a link quality metric associated with the wireless link or a change of a use state of the WCD, and the second configuration having second values for the communication parameters associated with a reduction in voltage-induced interference in an audio output of the audio device (block **820**). For example, the audio device (e.g., using reception component **1002** and/or communication manager **1006**, depicted in FIG. **10**) may receive an indication to switch to a second configuration based at least in part on a configuration switch trigger, the configuration switch trigger being based at least in part on one or more of a link quality metric associated with the wireless link or a change of a use state of the WCD, and the second configuration having second values for the communication parameters associated with a reduction in voltage-induced interference in an audio output of the audio device, as described above.

Process **800** may include additional aspects, such as any single aspect or any combination of aspects described below and/or in connection with one or more other processes described elsewhere herein.

In a first aspect, the indication to switch to the second configuration comprises an indication of an index associated with the second configuration, a proper subset of the second values, or all of the second values.

In a second aspect, alone or in combination with the first aspect, at least one of the first values is different from at least one of the second values.

In a third aspect, alone or in combination with one or more of the first and second aspects, process **800** includes receiving an indication to switch from a first communication protocol to a second communication protocol based at least in part on an additional configuration switch trigger.

In a fourth aspect, alone or in combination with one or more of the first through third aspects, the additional configuration switch trigger is based at least in part on a degradation of a link quality or a change of a use state of the WCD to a relaxed latency state, and wherein the second communication protocol is associated with an increased latency or an increased range relative to the first communication protocol.

In a fifth aspect, alone or in combination with one or more of the first through fourth aspects, the link quality metric is based at least in part on one or more of a received RSSI value, a number of dropped packets, a number of retransmissions, or a packet error rate.

In a sixth aspect, alone or in combination with one or more of the first through fifth aspects, the RSSI value comprises an average of a set of most recent RSSI values.

In a seventh aspect, alone or in combination with one or more of the first through sixth aspects, the change of use state of the WCD comprises stopping of a low-latency data stream, deactivation of a screen, or exiting of an application associated with the downlink traffic or the uplink traffic.

In an eighth aspect, alone or in combination with one or more of the first through seventh aspects, the first configuration is associated with one or more of a first maximum number of uplink data retransmissions, a first maximum number of uplink ACK retransmissions, a first delayed block ACK transmission policy, a first QoS configuration, or a first configuration for transmission of traffic of an additional communication protocol that is different from a communication protocol associated with the wireless link, and wherein the second configuration is associated with one or more of a second maximum number of uplink data retransmissions that is different from the first maximum number of uplink data retransmissions, a second maximum number of uplink ACK retransmissions that is different from the first maximum number of uplink ACK retransmissions, a second delayed block ACK transmission policy that is different from the first delayed block ACK transmission policy, a second QoS configuration that is different from the first QoS configuration, or a second configuration for transmission of traffic of the additional communication protocol that is different from the first configuration for transmission of traffic of the additional communication protocol.

In a ninth aspect, alone or in combination with one or more of the first through eighth aspects, receiving the indication to switch to the second configuration comprises receiving a first message that indicates to switch to a second value for the uplink transmission power, and a second message, after the first message, to switch to one or more of a second value for the periodicity of the uplink traffic or a second value for the periodicity of the downlink traffic, or receiving a single message that indicates to switch to the second value for the uplink transmission power and to

switch to one or more of the second value for the periodicity of the uplink traffic or the second value for the periodicity of the downlink traffic.

In a tenth aspect, alone or in combination with one or more of the first through ninth aspects, one or more values of the second values are based at least in part on one or more additional values of the second values, and wherein the indication to switch to the second configuration includes an indication of the one or more additional values of the second values.

In an eleventh aspect, alone or in combination with one or more of the first through tenth aspects, process **800** includes estimating a received signal strength of an uplink communication, and transmitting one or more communications having a maximum retransmission number based at least in part on the received signal strength of the uplink communication.

In a twelfth aspect, alone or in combination with one or more of the first through eleventh aspects, process **800** includes receiving an indication of a mapping of MCS values and downlink transmission powers, receiving an indication of an MCS value for a first downlink communication, receiving the first downlink communication, measuring a received signal strength of the first downlink communication, estimating a pathloss of the first downlink communication, configuring an uplink transmission power based at least in part on the pathloss of the first downlink communication, and configuring a maximum retransmission number based at least in part on the uplink transmission power.

In a thirteenth aspect, alone or in combination with one or more of the first through twelfth aspects, the indication is carried in the communication with the audio device via the wireless link.

Although FIG. **8** shows example blocks of process **800**, in some aspects, process **800** may include additional blocks, fewer blocks, different blocks, or differently arranged blocks than those depicted in FIG. **8**. Additionally, or alternatively, two or more of the blocks of process **800** may be performed in parallel.

FIG. **9** is a diagram of an example apparatus **900** for wireless communication, in accordance with the present disclosure. The apparatus **900** may be a WCD, or a WCD may include the apparatus **900**. In some aspects, the apparatus **900** includes a reception component **902** and a transmission component **904**, which may be in communication with one another (for example, via one or more buses and/or one or more other components). As shown, the apparatus **900** may communicate with another apparatus **906** (such as a peripheral device, an earbud, an audio device, and/or another wireless communication device) using the reception component **902** and the transmission component **904**. As further shown, the apparatus **900** may include the communication manager **908**.

In some aspects, the apparatus **900** may be configured to perform one or more operations described herein. Additionally, or alternatively, the apparatus **900** may be configured to perform one or more processes described herein, such as process **300** of FIG. **3**. In some aspects, the apparatus **900** and/or one or more components shown in FIG. **9** may include one or more components of the WCD described in connection with FIG. **2**. Additionally, or alternatively, one or more components shown in FIG. **9** may be implemented within one or more components described in connection with FIG. **2**. Additionally, or alternatively, one or more components of the set of components may be implemented at least in part as software stored in a memory. For example, a component (or a portion of a component) may be implemented as instructions or code stored in a non-transitory computer-readable medium and executable by a controller or a processor to perform the functions or operations of the component.

The reception component **902** may receive communications, such as reference signals, control information, data communications, or a combination thereof, from the apparatus **906**. The reception component **902** may provide received communications to one or more other components of the apparatus **900**. In some aspects, the reception component **902** may perform signal processing on the received communications (such as filtering, amplification, demodulation, analog-to-digital conversion, demultiplexing, deinterleaving, de-mapping, equalization, interference cancellation, or decoding, among other examples), and may provide the processed signals to the one or more other components of the apparatus **900**. In some aspects, the reception component **902** may include one or more antennas, a modem, a demodulator, a MIMO detector, a receive processor, a controller/processor, a memory, or a combination thereof, of the WCD described in connection with FIG. **2**.

The transmission component **904** may transmit communications, such as reference signals, control information, data communications, or a combination thereof, to the apparatus **906**. In some aspects, one or more other components of the apparatus **900** may generate communications and may provide the generated communications to the transmission component **904** for transmission to the apparatus **906**. In some aspects, the transmission component **904** may perform signal processing on the generated communications (such as filtering, amplification, modulation, digital-to-analog conversion, multiplexing, interleaving, mapping, or encoding, among other examples), and may transmit the processed signals to the apparatus **906**. In some aspects, the transmission component **904** may include one or more antennas, a modem, a modulator, a transmit MIMO processor, a transmit processor, a controller/processor, a memory, or a combination thereof, of the WCD described in connection with FIG. **2**. In some aspects, the transmission component **904** may be co-located with the reception component **902** in a transceiver.

The communication manager **908**, reception component **902**, and/or transmission component **904** may communicate, via a wireless link, with an audio device using a first configuration having first values for communication parameters, the communication parameters including one or more of: a periodicity of uplink traffic, a periodicity of downlink traffic, an uplink transmission power, or an MCS. The transmission component **904** may transmit an indication to switch to a second configuration based at least in part on a configuration switch trigger, the configuration switch trigger being based at least in part on one or more of a link quality metric associated with the wireless link or a change of a use state of the WCD, and the second configuration having second values for the communication parameters.

The transmission component **904** may transmit an indication to switch from a first communication protocol to a second communication protocol based at least in part on an additional configuration switch trigger.

The transmission component **904** may transmit an indication of a received signal strength of an uplink communication.

The reception component **902** may receive one or more communications having a maximum retransmission number based at least in part on the received signal strength of the uplink communication.

The transmission component **904** may transmit an indication of a mapping of MCS values and downlink transmission powers.

The transmission component **904** may transmit an indication of an MCS value for a downlink communication.

The transmission component **904** may transmit the downlink communication.

The reception component **902** may receive an uplink communication having a maximum retransmission number that is based at least in part on the uplink transmission power.

The number and arrangement of components shown in FIG. **9** are provided as an example. In practice, there may be additional components, fewer components, different components, or differently arranged components than those shown in FIG. **9**. Furthermore, two or more components shown in FIG. **9** may be implemented within a single component, or a single component shown in FIG. **9** may be implemented as multiple, distributed components. Additionally, or alternatively, a set of (one or more) components shown in FIG. **9** may perform one or more functions described as being performed by another set of components shown in FIG. **9**.

FIG. **10** is a diagram of an example apparatus **1000** for wireless communication, in accordance with the present disclosure. The apparatus **1000** may be an audio device, or an audio device may include the apparatus **1000**. In some aspects, the apparatus **1000** includes a reception component **1002** and a transmission component **1004**, which may be in communication with one another (for example, via one or more buses and/or one or more other components). As shown, the apparatus **1000** may communicate with another apparatus **1006** (such as a UE, a base station, or another wireless communication device) using the reception component **1002** and the transmission component **1004**. As further shown, the apparatus **1000** may include the communication manager **1008**.

In some aspects, the apparatus **1000** may be configured to perform one or more operations described herein. Additionally, or alternatively, the apparatus **1000** may be configured to perform one or more processes described herein, such as process **400** of FIG. **4**. In some aspects, the apparatus **1000** and/or one or more components shown in FIG. **10** may include one or more components of the audio device described in connection with FIG. **2**. Additionally, or alternatively, one or more components shown in FIG. **10** may be implemented within one or more components described in connection with FIG. **2**. Additionally, or alternatively, one or more components of the set of components may be implemented at least in part as software stored in a memory. For example, a component (or a portion of a component) may be implemented as instructions or code stored in a non-transitory computer-readable medium and executable by a controller or a processor to perform the functions or operations of the component.

The reception component **1002** may receive communications, such as reference signals, control information, data communications, or a combination thereof, from the apparatus **1006**. The reception component **1002** may provide received communications to one or more other components of the apparatus **1000**. In some aspects, the reception component **1002** may perform signal processing on the received communications (such as filtering, amplification, demodulation, analog-to-digital conversion, demultiplexing, deinterleaving, de-mapping, equalization, interference cancellation, or decoding, among other examples), and may provide the processed signals to the one or more other components of the apparatus **1000**. In some aspects, the reception component **1002** may include one or more antennas, a modem, a demodulator, a MIMO detector, a receive processor, a controller/processor, a memory, or a combination thereof, of the audio device described in connection with FIG. **2**.

The transmission component **1004** may transmit communications, such as reference signals, control information, data communications, or a combination thereof, to the apparatus **1006**. In some aspects, one or more other components of the apparatus **1000** may generate communications and may provide the generated communications to the transmission component **1004** for transmission to the apparatus **1006**. In some aspects, the transmission component **1004** may perform signal processing on the generated communications (such as filtering, amplification, modulation, digital-to-analog conversion, multiplexing, interleaving, mapping, or encoding, among other examples), and may transmit the processed signals to the apparatus **1006**. In some aspects, the transmission component **1004** may include one or more antennas, a modem, a modulator, a transmit MIMO processor, a transmit processor, a controller/processor, a memory, or a combination thereof, of the audio device described in connection with FIG. **2**. In some aspects, the transmission component **1004** may be co-located with the reception component **1002** in a transceiver.

The communication manager **1008**, reception component **1002**, and/or transmission component **1004** may communicate, via a wireless link, with a WCD using a first configuration having first values for communication parameters, the communication parameters including one or more of: a periodicity of uplink traffic, a periodicity of downlink traffic, an uplink transmission power, or an MCS. The reception component **1002** may receive an indication to switch to a second configuration based at least in part on a configuration switch trigger, the configuration switch trigger being based at least in part on one or more of a link quality metric associated with the wireless link or a change of a use state of the WCD, and the second configuration having second values for the communication parameters.

The reception component **1002** may receive an indication to switch from a first communication protocol to a second communication protocol based at least in part on an additional configuration switch trigger.

The reception component **1002** may estimate a received signal strength of an uplink communication.

The transmission component **1004** may transmit one or more communications having a maximum retransmission number based at least in part on the received signal strength of the uplink communication.

The reception component **1002** may receive an indication of a mapping of MCS values and downlink transmission powers.

The reception component **1002** may receive an indication of an MCS value for a first downlink communication.

The reception component **1002** may receive the first downlink communication.

The communication manager **1008**, reception component **1002**, and/or transmission component **1004** may measure a received signal strength of the first downlink communication.

The communication manager **1008** may estimate a pathloss of the first downlink communication.

The communication manager **1008** and/or the transmission component **1004** may configure an uplink transmission power based at least in part on the pathloss of the first downlink communication.

The communication manager **1008** may configure a maximum retransmission number based at least in part on the uplink transmission power.

The number and arrangement of components shown in FIG. **10** are provided as an example. In practice, there may be additional components, fewer components, different components, or differently arranged components than those shown in FIG. **10**. Furthermore, two or more components shown in FIG. **10** may be implemented within a single component, or a single component shown in FIG. **10** may be implemented as multiple, distributed components. Additionally, or alternatively, a set of (one or more) components shown in FIG. **10** may perform one or more functions described as being performed by another set of components shown in FIG. **10**.

The following provides an overview of some Aspects of the present disclosure:

Aspect 1: A method of wireless communication performed by a wireless communication device (WCD), comprising: communicating, via a wireless link, with an audio device using a first configuration having first values for communication parameters, the communication parameters including one or more of: a periodicity of uplink traffic, a periodicity of downlink traffic, an uplink transmission power, or a modulation and coding scheme (MCS); and transmitting an indication to switch to a second configuration based at least in part on a configuration switch trigger, the configuration switch trigger being based at least in part on one or more of a link quality metric associated with the wireless link or a change of a use state of the WCD, and the second configuration having second values for the communication parameters.

Aspect 2: The method of Aspect 1, wherein the indication to switch to the second configuration comprises an indication of: an index associated with the second configuration, a proper subset of the second values, or all of the second values.

Aspect 3: The method of any of Aspects 1-2, wherein at least one of the first values is different from at least one of the second values.

Aspect 4: The method of any of Aspects 1-3, further comprising: transmitting an indication to switch from a first communication protocol to a second communication protocol based at least in part on an additional configuration switch trigger.

Aspect 5: The method of Aspect 4, wherein the additional configuration switch trigger is based at least in part on a degradation of a link quality or a change of a use state of the WCD to a relaxed latency state, and wherein the second communication protocol is associated with an increased latency or an increased range relative to the first communication protocol.

Aspect 6: The method of any of Aspects 1-5, wherein the link quality metric is based at least in part on one or more of: a received signal strength indication (RSSI) value, a number of dropped packets, a number of retransmissions, or a packet error rate.

Aspect 7: The method of Aspect 6, wherein the RSSI value comprises an average of a set of most recent RSSI values.

Aspect 8: The method of any of Aspects 1-7, wherein the change of use state of the WCD comprises: stopping of a low-latency data stream, deactivation of a screen, or exiting of an application associated with the downlink traffic or the uplink traffic.

Aspect 9: The method of any of Aspects 1-8, wherein the first configuration is associated with one or more of: a first maximum number of uplink data retransmissions, a first maximum number of uplink acknowledgment (ACK) retransmissions, a first delayed block ACK transmission policy, a first quality of service (QoS) configuration, or a first configuration for transmission of traffic of an additional communication protocol that is different from a communication protocol associated with the wireless link, and wherein the second configuration is associated with one or more of: a second maximum number of uplink data retransmissions that is different from the first maximum number of uplink data retransmissions, a second maximum number of uplink ACK retransmissions that is different from the first maximum number of uplink ACK retransmissions, a second delayed block ACK transmission policy that is different from the first delayed block ACK transmission policy, a second QoS configuration that is different from the first QoS configuration, or a second configuration for transmission of traffic of the additional communication protocol that is different from the first configuration for transmission of traffic of the additional communication protocol.

Aspect 10: The method of any of Aspects 1-9, wherein transmitting the indication to switch to the second configuration comprises: transmitting: a first message that indicates to switch to a second value for the uplink transmission power, and a second message, after the first message, to switch to one or more of a second value for the periodicity of the uplink traffic or a second value for the periodicity of the downlink traffic; or transmitting a single message that indicates to switch to the second value for the uplink transmission power and to switch to one or more of the second value for the periodicity of the uplink traffic or the second value for the periodicity of the downlink traffic.

Aspect 11: The method of any of Aspects 1-10, wherein one or more values of the second values are based at least in part on one or more additional values of the second values, and wherein the indication to switch to the second configuration includes an indication of the one or more additional values of the second values.

Aspect 12: The method of any of Aspects 1-11, further comprising: transmitting an indication of a received signal strength of an uplink communication; and receiving one or more communications having a maximum retransmission number based at least in part on the received signal strength of the uplink communication.

Aspect 13: The method of any of Aspects 1-12, further comprising: transmitting an indication of a mapping of MCS values and downlink transmission powers; transmitting an indication of an MCS value for a downlink communication; transmitting the downlink communication; and receiving an uplink communication having a maximum retransmission number that is based at least in part on the uplink transmission power.

Aspect 14: A method of wireless communication performed by an audio device, comprising: communicating, via a wireless link, with a wireless communication device (WCD) using a first configuration having first values for communication parameters, the communication parameters including one or more of: a periodicity of uplink traffic, a periodicity of downlink traffic, an uplink transmission power, or a modulation and coding scheme (MCS); and receiving an indication to switch to a second configuration based at least in part on a configuration switch trigger, the

configuration switch trigger being based at least in part on one or more of a link quality metric associated with the wireless link or a change of a use state of the WCD, and the second configuration having second values for the communication parameters.

Aspect 15: The method of Aspect 14, wherein the indication to switch to the second configuration comprises an indication of: an index associated with the second configuration, a proper subset of the second values, or all of the second values.

Aspect 16: The method of any of Aspects 14-15, wherein at least one of the first values is different from at least one of the second values.

Aspect 17: The method of any of Aspects 14-16, further comprising: receiving an indication to switch from a first communication protocol to a second communication protocol based at least in part on an additional configuration switch trigger.

Aspect 18: The method of Aspect 17, wherein the additional configuration switch trigger is based at least in part on a degradation of a link quality or a change of a use state of the WCD to a relaxed latency state, and wherein the second communication protocol is associated with an increased latency or an increased range relative to the first communication protocol.

Aspect 19: The method of any of Aspects 14-18, wherein the link quality metric is based at least in part on one or more of: a received signal strength indication (RSSI) value, a number of dropped packets, a number of retransmissions, or a packet error rate.

Aspect 20: The method of Aspect 19, wherein the RSSI value comprises an average of a set of most recent RSSI values.

Aspect 21: The method of any of Aspects 14-20, wherein the change of use state of the WCD comprises: stopping of a low-latency data stream, deactivation of a screen, or exiting of an application associated with the downlink traffic or the uplink traffic.

Aspect 22: The method of any of Aspects 14-21, wherein the first configuration is associated with one or more of: a first maximum number of uplink data retransmissions, a first maximum number of uplink acknowledgment (ACK) retransmissions, a first delayed block ACK transmission policy, a first quality of service (QoS) configuration, or a first configuration for transmission of traffic of an additional communication protocol that is different from a communication protocol associated with the wireless link, and wherein the second configuration is associated with one or more of: a second maximum number of uplink data retransmissions that is different from the first maximum number of uplink data retransmissions, a second maximum number of uplink ACK retransmissions that is different from the first maximum number of uplink ACK retransmissions, a second delayed block ACK transmission policy that is different from the first delayed block ACK transmission policy, a second QoS configuration that is different from the first QoS configuration, or a second configuration for transmission of traffic of the additional communication protocol that is different from the first configuration for transmission of traffic of the additional communication protocol.

Aspect 23: The method of any of Aspects 14-22, wherein receiving the indication to switch to the second configuration comprises: receiving: a first message that indicates to switch to a second value for the uplink transmission power, and a second message, after the first message, to switch to one or more of a second value for the periodicity of the uplink traffic or a second value for the periodicity of the downlink traffic; or receiving a single message that indicates to switch to the second value for the uplink transmission power and to switch to one or more of the second value for the periodicity of the uplink traffic or the second value for the periodicity of the downlink traffic.

Aspect 24: The method of any of Aspects 14-23, wherein one or more values of the second values are based at least in part on one or more additional values of the second values, and wherein the indication to switch to the second configuration includes an indication of the one or more additional values of the second values.

Aspect 25: The method of any of Aspects 14-24, further comprising: estimating a received signal strength of an uplink communication; and transmitting one or more communications having a maximum retransmission number based at least in part on the received signal strength of the uplink communication.

Aspect 26: The method of any of Aspects 14-25, further comprising: receiving an indication of a mapping of MCS values and downlink transmission powers; receiving an indication of an MCS value for a first downlink communication; receiving the first downlink communication; measuring a received signal strength of the first downlink communication; estimating a pathloss of the first downlink communication; configuring an uplink transmission power based at least in part on the pathloss of the first downlink communication; and configuring a maximum retransmission number based at least in part on the uplink transmission power.

Aspect 27: An apparatus for wireless communication at a device, comprising a processor; memory coupled with the processor; and instructions stored in the memory and executable by the processor to cause the apparatus to perform the method of one or more of Aspects 1-26.

Aspect 28: A device for wireless communication, comprising a memory and one or more processors coupled to the memory, the one or more processors configured to perform the method of one or more of Aspects 1-26.

Aspect 29: An apparatus for wireless communication, comprising at least one means for performing the method of one or more of Aspects 1-26.

Aspect 30: A non-transitory computer-readable medium storing code for wireless communication, the code comprising instructions executable by a processor to perform the method of one or more of Aspects 1-26.

Aspect 31: A non-transitory computer-readable medium storing a set of instructions for wireless communication, the set of instructions comprising one or more instructions that, when executed by one or more processors of a device, cause the device to perform the method of one or more of Aspects 1-26.

The foregoing disclosure provides illustration and description but is not intended to be exhaustive or to limit the aspects to the precise forms disclosed. Modifications and variations may be made in light of the above disclosure or may be acquired from practice of the aspects.

Further disclosure is included in the appendix. The appendix is provided as an example only and is to be considered part of the specification. A definition, illustration, or other description in the appendix does not supersede or override similar information included in the detailed description or figures. Furthermore, a definition, illustration, or other description in the detailed description or figures does not supersede or override similar information included in the appendix. Furthermore, the appendix is not intended to limit the disclosure of possible aspects.

As used herein, the term "component" is intended to be broadly construed as hardware and/or a combination of hardware and software. "Software" shall be construed broadly to mean instructions, instruction sets, code, code segments, program code, programs, subprograms, software modules, applications, software applications, software packages, routines, subroutines, objects, executables, threads of execution, procedures, and/or functions, among other examples, whether referred to as software, firmware, middleware, microcode, hardware description language, or otherwise. As used herein, a "processor" is implemented in hardware and/or a combination of hardware and software. It will be apparent that systems and/or methods described herein may be implemented in different forms of hardware and/or a combination of hardware and software. The actual specialized control hardware or software code used to implement these systems and/or methods is not limiting of the aspects. Thus, the operation and behavior of the systems and/or methods are described herein without reference to specific software code, since those skilled in the art will understand that software and hardware can be designed to implement the systems and/or methods based, at least in part, on the description herein.

As used herein, "satisfying a threshold" may, depending on the context, refer to a value being greater than the threshold, greater than or equal to the threshold, less than the threshold, less than or equal to the threshold, equal to the threshold, not equal to the threshold, or the like.

Even though particular combinations of features are recited in the claims and/or disclosed in the specification, these combinations are not intended to limit the disclosure of various aspects. Many of these features may be combined in ways not specifically recited in the claims and/or disclosed in the specification. The disclosure of various aspects includes each dependent claim in combination with every other claim in the claim set. As used herein, a phrase referring to "at least one of" a list of items refers to any combination of those items, including single members. As an example, "at least one of: a, b, or c" is intended to cover a, b, c, a+b, a+c, b+c, and a+b+c, as well as any combination with multiples of the same element (e.g., a+a, a+a+a, a+a+b, a+a+c, a+b+b, a+c+c, b+b, b+b+b, b+b+c, c+c, and c+c+c, or any other ordering of a, b, and c).

No element, act, or instruction used herein should be construed as critical or essential unless explicitly described as such. Also, as used herein, the articles "a" and "an" are intended to include one or more items and may be used interchangeably with "one or more." Further, as used herein, the article "the" is intended to include one or more items referenced in connection with the article "the" and may be used interchangeably with "the one or more." Furthermore, as used herein, the terms "set" and "group" are intended to include one or more items and may be used interchangeably with "one or more." Where only one item is intended, the phrase "only one" or similar language is used. Also, as used herein, the terms "has," "have," "having," or the like are intended to be open-ended terms that do not limit an element that they modify (e.g., an element "having" A may also have B). Further, the phrase "based on" is intended to mean "based, at least in part, on" unless explicitly stated otherwise. Also, as used herein, the term "or" is intended to be inclusive when used in a series and may be used interchangeably with "and/or," unless explicitly stated otherwise (e.g., if used in combination with "either" or "only one of").

What is claimed is:

1. A wireless communication device (WCD) for wireless communication, comprising:

a memory; and

one or more processors, coupled to the memory, configured to:

communicate, via a wireless link, with an audio device using a first configuration having first values for communication parameters, the communication parameters including one or more of:

a periodicity of uplink traffic,

a periodicity of downlink traffic,

an uplink transmission power, or

a modulation and coding scheme (MCS); and

transmit an indication to switch to a second configuration based at least in part on a configuration switch trigger, the configuration switch trigger being based at least in part on one or more of a link quality metric associated with the wireless link or a change of a use state of the WCD, and the second configuration having second values for the communication parameters.

2. The WCD of claim **1**, wherein the indication to switch to the second configuration comprises an indication of:

an index associated with the second configuration,

a proper subset of the second values, or

all of the second values.

3. The WCD of claim **1**, wherein at least one of the first values is different from at least one of the second values.

4. The WCD of claim **1**, wherein the one or more processors are further configured to:

transmit an indication to switch from a first communication protocol to a second communication protocol based at least in part on an additional configuration switch trigger.

5. The WCD of claim **4**, wherein the additional configuration switch trigger is based at least in part on a degradation of a link quality or a change of a use state of the WCD to a relaxed latency state, and

wherein the second communication protocol is associated with an increased latency or an increased range relative to the first communication protocol.

6. The WCD of claim **1**, wherein the link quality metric is based at least in part on one or more of:

a received signal strength indication (RSSI) value,

a number of dropped packets,

a number of retransmissions, or

a packet error rate.

7. The WCD of claim **6**, wherein the RSSI value comprises an average of a set of most recent RSSI values.

8. The WCD of claim **1**, wherein the change of use state of the WCD comprises:

stop of a low-latency data stream,

deactivation of a screen, or

exiting of an application associated with the downlink traffic or the uplink traffic.

9. The WCD of claim **1**, wherein the first configuration is associated with one or more of:

a first maximum number of uplink data retransmissions,

a first maximum number of uplink acknowledgment (ACK) retransmissions,

a first delayed block ACK transmission policy,

a first quality of service (QoS) configuration, or

a first configuration for transmission of traffic of an additional communication protocol that is different from a communication protocol associated with the wireless link, and

wherein the second configuration is associated with one or more of:

a second maximum number of uplink data retransmissions that is different from the first maximum number of uplink data retransmissions,

a second maximum number of uplink ACK retransmissions that is different from the first maximum number of uplink ACK retransmissions,

a second delayed block ACK transmission policy that is different from the first delayed block ACK transmission policy,

a second QoS configuration that is different from the first QoS configuration, or

a second configuration for transmission of traffic of the additional communication protocol that is different from the first configuration for transmission of traffic of the additional communication protocol.

10. The WCD of claim **1**, wherein the one or more processors, to transmit the indication to switch to the second configuration, are configured to:

transmit:

a first message that indicates to switch to a second value for the uplink transmission power, and

a second message, after the first message, to switch to one or more of a second value for the periodicity of the uplink traffic or a second value for the periodicity of the downlink traffic; or

transmit a single message that indicates to switch to the second value for the uplink transmission power and to switch to one or more of the second value for the periodicity of the uplink traffic or the second value for the periodicity of the downlink traffic.

11. The WCD of claim **1**, wherein one or more values of the second values are based at least in part on one or more additional values of the second values, and

wherein the indication to switch to the second configuration includes an indication of the one or more additional values of the second values.

12. The WCD of claim **1**, wherein the one or more processors are further configured to:

transmit an indication of a received signal strength of an uplink communication; and

receive one or more communications having a maximum retransmission number based at least in part on the received signal strength of the uplink communication.

13. The WCD of claim **1**, wherein the one or more processors are further configured to:

transmit an indication of a mapping of MCS values and downlink transmission powers;

transmit an indication of an MCS value for a downlink communication;

transmit the downlink communication; and

receive an uplink communication having a maximum retransmission number that is based at least in part on the uplink transmission power.

14. The WCD of claim **1**, wherein the indication is carried in the communication with the audio device via the wireless link.

15. An audio device for wireless communication, comprising:

a memory; and

one or more processors, coupled to the memory, configured to:

communicate, via a wireless link, with a wireless communication device (WCD) using a first configuration having first values for communication parameters, the communication parameters including one or more of:

a periodicity of uplink traffic,

a periodicity of downlink traffic,

an uplink transmission power, or

a modulation and coding scheme (MCS); and

receive an indication to switch to a second configuration based at least in part on a configuration switch trigger, the configuration switch trigger being based at least in part on one or more of a link quality metric associated with the wireless link or a change of a use state of the WCD, and the second configuration having second values for the communication parameters.

16. The audio device of claim **15**, wherein the indication to switch to the second configuration comprises an indication of:

an index associated with the second configuration,

a proper subset of the second values, or

all of the second values.

17. The audio device of claim **15**, wherein at least one of the first values is different from at least one of the second values.

18. The audio device of claim **15**, wherein the one or more processors are further configured to:

receive an indication to switch from a first communication protocol to a second communication protocol based at least in part on an additional configuration switch trigger.

19. The audio device of claim **18**, wherein the additional configuration switch trigger is based at least in part on a degradation of a link quality or a change of a use state of the WCD to a relaxed latency state, and

wherein the second communication protocol is associated with an increased latency or an increased range relative to the first communication protocol.

20. The audio device of claim **15**, wherein the link quality metric is based at least in part on one or more of:

a received signal strength indication (RSSI) value,

a number of dropped packets,

a number of retransmissions, or

a packet error rate.

21. The audio device of claim **20**, wherein the RSSI value comprises an average of a set of most recent RSSI values.

22. The audio device of claim **15**, wherein the change of use state of the WCD comprises:

stop of a low-latency data stream,

deactivation of a screen, or

exiting of an application associated with the downlink traffic or the uplink traffic.

23. The audio device of claim **15**, wherein the first configuration is associated with one or more of:

a first maximum number of uplink data retransmissions,

a first maximum number of uplink acknowledgment (ACK) retransmissions,

a first delayed block ACK transmission policy,

a first quality of service (QoS) configuration, or

a first configuration for transmission of traffic of an additional communication protocol that is different from a communication protocol associated with the wireless link, and

wherein the second configuration is associated with one or more of:

a second maximum number of uplink data retransmissions that is different from the first maximum number of uplink data retransmissions,

a second maximum number of uplink ACK retransmissions that is different from the first maximum number of uplink ACK retransmissions,

a second delayed block ACK transmission policy that is different from the first delayed block ACK transmission policy,

a second QoS configuration that is different from the first QoS configuration, or

a second configuration for transmission of traffic of the additional communication protocol that is different from the first configuration for transmission of traffic of the additional communication protocol.

24. The audio device of claim **15**, wherein the one or more processors, to receive the indication to switch to the second configuration, are configured to:

receive:

a first message that indicates to switch to a second value for the uplink transmission power, and

a second message, after the first message, to switch to one or more of a second value for the periodicity of the uplink traffic or a second value for the periodicity of the downlink traffic; or

receive a single message that indicates to switch to the second value for the uplink transmission power and to switch to one or more of the second value for the periodicity of the uplink traffic or the second value for the periodicity of the downlink traffic.

25. The audio device of claim **15**, wherein one or more values of the second values are based at least in part on one or more additional values of the second values, and

wherein the indication to switch to the second configuration includes an indication of the one or more additional values of the second values.

26. The audio device of claim **15**, wherein the one or more processors are further configured to:

estimate a received signal strength of an uplink communication; and

transmit one or more communications having a maximum retransmission number based at least in part on the received signal strength of the uplink communication.

27. The audio device of claim **15**, wherein the one or more processors are further configured to:

receive an indication of a mapping of MCS values and downlink transmission powers;

receive an indication of an MCS value for a first downlink communication;

receive the first downlink communication;

measure a received signal strength of the first downlink communication;

estimate a pathloss of the first downlink communication;

configure an uplink transmission power based at least in part on the pathloss of the first downlink communication; and

configure a maximum retransmission number based at least in part on the uplink transmission power.

28. The audio device of claim **15**, wherein the indication is carried in the communication with the audio device via the wireless link.

29. A method of wireless communication performed by a wireless communication device (WCD), comprising:

communicating, via a wireless link, with an audio device using a first configuration having first values for communication parameters, the communication parameters including one or more of:

a periodicity of uplink traffic,

a periodicity of downlink traffic,

an uplink transmission power, or

a modulation and coding scheme (MCS); and

an indication to switch to a second configuration based at least in part on a configuration switch trigger, the configuration switch trigger being based at least in part on one or more of a link quality metric associated with the wireless link or a change of a use state of the WCD, and the second configuration having second values for the communication parameters associated with a reduction in voltage-induced interference in an audio output of the audio device.

30. A method of wireless communication performed by an audio device, comprising:

communicating, via a wireless link, with a wireless communication device (WCD) using a first configuration having first values for communication parameters, the communication parameters including one or more of:

a periodicity of uplink traffic,

a periodicity of downlink traffic,

an uplink transmission power, or

a modulation and coding scheme (MCS); and

receiving an indication to switch to a second configuration based at least in part on a configuration switch trigger, the configuration switch trigger being based at least in part on one or more of a link quality metric associated with the wireless link or a change of a use state of the WCD, and the second configuration having second values for the communication parameters associated with a reduction in voltage-induced interference in an audio output of the audio device.

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