UNITED STATES PATENT AND TRADEMARK OFFICE

BEFORE THE PATENT TRIAL AND APPEAL BOARD

SAMSUNG ELECTRONICS CO., LTD.,
Petitioner,

v.

ONE-E-WAY, INC.,
Patent Owner.

Case: IPR2025-01541
U.S. Patent No. 9,107,000

PETITION FOR *INTER PARTES* REVIEW OF CLAIMS 1-5, 8-12 OF U.S. PATENT NO. 9,107,000

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CLAIM LISTING

Claim or Element #	Claim Language
[1P]	A mobile wireless digital audio receiver, configured to receive a unique user code and an original audio signal representation in the form of packets, said unique user code used to spread a spectrum of said signal and further configured for independent CDMA communication operation, said receiver independent of the operation of another receiver, said mobile wireless digital audio receiver comprising:
[1A]	a direct conversion module configured to capture packets and a correct bit sequence within the packets aided by lowering signal detection error through reduced intersymbol interference coding of said original audio signal representation, said packets embedded in the received spread spectrum signal, the captured packets corresponding to the unique user code;
[1B]	a decoder operative to decode the reduced intersymbol interference coding of said original audio signal representation wherein each user has their audio receiver configured to communicate with their own separate audio transmitter, and said receiver virtually free from interference from transmission and reception device signals operating in the shared spectrum.
[2P]	A wireless digital audio headphone for receipt of a unique user code and a digital audio signal representation in the form of a packet, said unique user code used to spread a spectrum of said signal and further configured for independent CDMA communication operation, said headphone independent of the operation of another headphone, said wireless digital audio headphone comprising:
[2A]	a direct conversion module configured to capture packets and the correct bit sequence within the packets aided by lowering signal detection error through reduced intersymbol interference coding of said digital audio signal representation, said packets embedded in the received spread spectrum signal, the captured packets corresponding to the unique user code;
[2B]	a decoder operative to decode the reduced intersymbol interference coding of said original audio signal representation;

Claim or Element #	Claim Language
[2C]	a digital-to-analog converter generating an audio output of said original audio signal representation; and
[2D]	a module adapted to produce said generated audio output, wherein each user has their audio headphone configured to communicate with their own separate audio transmitter, and said audio virtually free from interference from transmission and reception device signals operating in a shared wireless headphone spectrum.
[3P]	A wireless digital audio headphone comprising:
[3A]	a digital audio headphone receiver configured to receive an unique user code bit sequence and a original audio signal representation in the form of packets, said digital audio headphone receiver, capable of mobile operation and configured for direct digital coded wireless spread spectrum communication with a mobile digital audio transmitter, and said user has their headphone configured to communicate with their own transmitter;
[3B]	a direct conversion module configured to capture packets and the correct bit sequence within the packets aided by lowering signal detection error through reduced intersymbol interference coding of said original audio signal representation said packets embedded in the received spread spectrum signal, the captured packets corresponding to the unique user code;
[3C]	a digital demodulator configured for independent CDMA communication operation wherein a user has their own transmitter and receiver;
[3D]	a decoder operative to decode the reduced intersymbol interference coding of original audio signal representation;
[3E]	a digital-to-analog converter (DAC) generating an audio output of said original audio signal representation; and
[3F]	a module responsive to the unique user code bit sequence to produce said generated audio output wherein each user has their audio headphone configured to communicate with their own separate audio transmitter, said output virtually free from interference from transmission and reception device signals operating in the shared wireless headphone spectrum.
4	The wireless digital audio headphone of claim 3, wherein the

Claim or Element #	Claim Language
	audio output is music.
[5P]	A mobile wireless digital audio receiver, configured to receive a unique user code and an original audio signal representation in the form of packets, said unique user code used to spread the spectrum of said signal and further configured for independent CDMA communication operation, said receiver independent of the operation of another receiver, said mobile wireless digital audio receiver comprising:
[5A]	a direct conversion module configured to capture packets and the correct bit sequence within the packets aided by lowering signal detection error through reduced intersymbol interference coding of said original audio signal representation respective to said mobile digital audio receiver, said packets embedded in the received spread spectrum signal, the captured packets corresponding to the unique user code;
[5B]	a decoder operative to decode the reduced intersymbol interference coding of said original audio signal representation;
[5C]	a digital-to-analog converter generating an audio output of said original audio signal representation; and
[5D]	a module adapted to produce said generated audio output, wherein each user has their audio receiver configured to communicate with their own separate audio transmitter, and said audio virtually free from interference from transmission and reception device signals operating in the shared spectrum.
[8P]	A wireless digital coded music audio spread spectrum transmitter operatively coupled to a music audio source and configured to transmit a unique user code and an original audio signal representation in the form of packets, wherein said digital coded music audio transmitter coupled to said music audio source, and configured to be directly communicable with a mobile digital audio spread spectrum receiver, is capable of being moved in any direction during operation, said wireless digital coded audio transmitter comprising:
[8A]	encoding operative to encode said original audio signal representation to reduce intersymbol interference and aid in lowering signal detection error of said audio representation signal respective to said receiver and mobile said transmitter

Claim or Element #	Claim Language
	coupled to said music audio source;
[8B]	a digital modulator module configured for independent code division multiple access communication operation, wherein each user has their own separate transmitter configured to communicate with their receiver, said transmitter configured to wirelessly transmit said audio to be reproduced virtually free from interference from transmission and reception device signals operating in the wireless digital audio transmitter shared spectrum.
[9P]	A mobile wireless digital audio receiver capable of being moved in any direction during operation and configured to receive a unique user code and an original audio signal representation in the form of packets, said unique user code used to spread a spectrum of said signal and further configured for independent CDMA communication operation, said receiver independent of the operation of another receiver, said wireless digital audio receiver comprising:
[9A]	a spread spectrum receiver module configured to capture packets and a correct bit sequence within the packets aided by lowering signal detection error through reduced intersymbol interference coding of said original audio signal representation, said packets embedded in the received spread spectrum signal, the captured packets corresponding to the unique user code;
[9B]	a decoder operative to decode the reduced intersymbol interference coding of said original audio signal representation, wherein each user has their audio receiver configured to communicate with their own separate audio transmitter, and said audio virtually free from interference from transmission and reception device signals operating in the shared spectrum.
[10P]	A wireless digital coded audio spread spectrum transmitter operatively coupled to a audio source and configured to transmit a unique user code and an original audio signal representation in the form of packets, wherein said digital coded audio transmitter coupled to said audio source, and configured to be directly communicable with a mobile digital audio spread spectrum receiver, is capable of being moved in any direction during operation, said wireless digital coded

Claim or Element #	Claim Language
	audio transmitter comprising:
[10A]	an encoding module operative to encode said original audio signal representation to reduce intersymbol interference and aid in lowering signal detection error of said audio signal representation, said transmitter coupled to said audio source;
[10B]	a digital modulator module configured for independent code division multiple access communication operation, each user has their own separate transmitter configured to communicate with their receiver, said transmitter configured to wirelessly transmit said audio to be reproduced virtually free from interference from transmission and reception device signals operating in the wireless digital audio transmitter shared spectrum.
11	The wireless digital audio receiver of claim 8, wherein the spread spectrum receiver module is further configured to utilize differential phase shift keying (DPSK) to demodulate said audio signal representation.
12	The wireless digital audio receiver of claim 10, wherein the spread spectrum receiver module is further configured to utilize differential phase shift keying (DPSK) to demodulate said audio signal representation.

Samsung Electronics Co., Ltd. ("Petitioner") petitions for *inter partes* review of claims 1-5, 8-12 ("Challenged Claims") of U.S. Patent No. 9,107,000.

I. OVERVIEW

The '000 patent relates to a wireless digital audio system.

Figure 1 depicts music audio source 80 connected to a battery powered wireless transmitter 20. EX1001, 2:32-65.

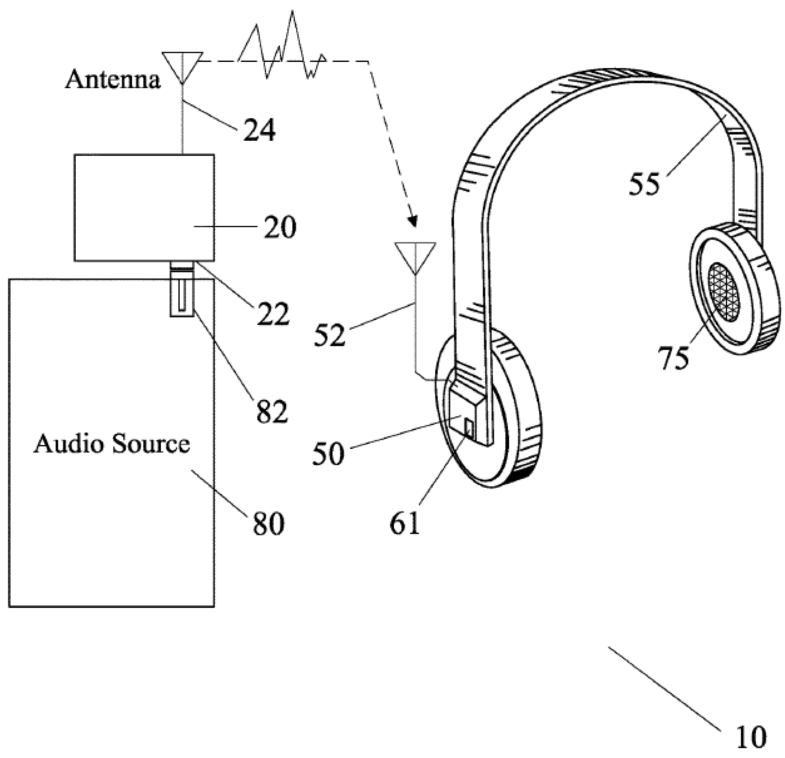


FIG. 1

"The battery powered transmitter 20 sends the audio music information to the battery powered receiver 50 in digital packet format." EX1001, 3:42-44. Code generator 44 generates a unique user code associated with one wireless user.

EX1001, 2:47-65.

A spread spectrum modulated signal is received by the antenna 52 and processed by direct conversion module 56 with a receiver code generator 60 that contains the same unique code. EX1001, 2:66-33, 4:19-30.

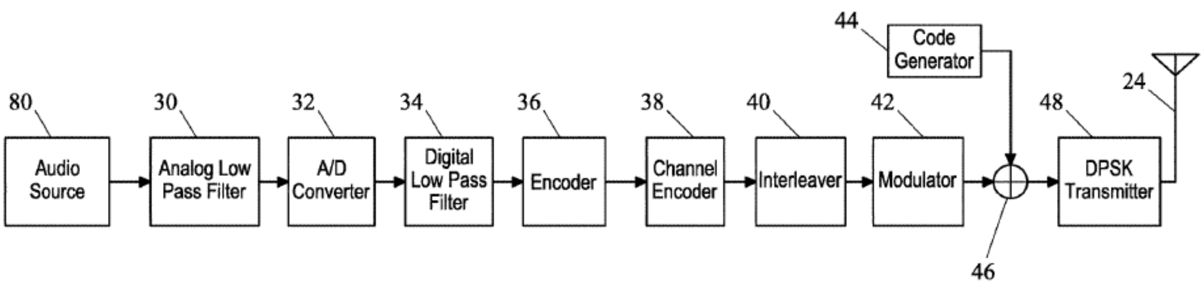


FIG. 2

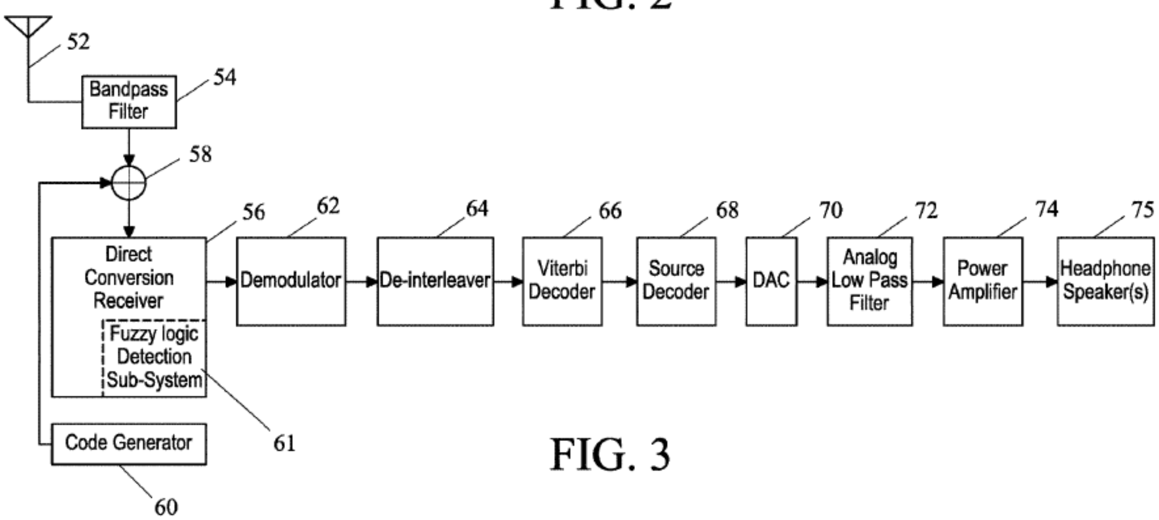


FIG. 3

II. Requirements for IPR

A. Standing

Petitioner certifies that the petition is filed within one year of service of a Complaint asserting the ’000 patent. Estoppel does not bar this Petition.

B. Challenge and Relief Requested

The Grounds for the Challenged Claims are as follows:

Ground	Claims	Basis
1	1-5, 8-12	Rendered obvious by ’196-Publication (EX1004) in view of Gibson (EX1022)
2	1-5, 8-10	Rendered obvious by Walley (EX1015) in view of Miyake (EX1016) and Gibson (EX1022)
3	11-12	Rendered obvious by Walley (EX1015) in view of Miyake (EX1016), Gibson (EX1022), and Rappaport (EX1018)
4	1-5, 8-12	Rendered obvious by Walley (EX1015) in view of Miyake (EX1016), Gibson (EX1022), Rappaport (EX1018), and Drakoulis (EX1021)

C. Claim Construction

Petitioner submits that terms should be construed according to the *Phillips* standard. *Phillips v. AWH Corp.*, 415 F.3d 1303 (Fed. Cir. 2005). In a related proceeding involving two related patents (the ’047 and ’627 patents), *One-E-Way, Inc. v. Apple Inc.*, No. 2:20-cv-06339 (C.D. Cal.) (“the *Apple* Action”), the District Court for the Central District of California construed certain terms as set forth in the table below:

Term	Construction
“reduced intersymbol interference coding”	“coding that reduces intersymbol (inter-symbol) interference”
The term “independent” in the context of “independent” CDMA	“performed independent of any central control”

communication	
"unique user code"	"fixed code (bit sequence) specifically associated with one user of a device(s)"
"direct conversion module"	"module for converting radio frequency to baseband or very near baseband in a single frequency conversion without an intermediate frequency."
"audio source"	"a device for providing audio that has an analog headphone jack"
"transmitter"	"a device that can be connected into an analog headphone jack to wirelessly transmit an audio signal"

EX1013, pp.8, 20. Petitioner requests that these terms be construed as provided in the *Apple* Action. *Id.*; *SightSound Techs., LLC v. Apple Inc.*, 809 F.3d 1307, 1316 (Fed. Cir. 2015) ("Where multiple patents 'derive from the same parent application and share many common terms, we must interpret the claims consistently across all asserted patents.'"). The remaining claim terms should be construed in accordance with their plain and ordinary meaning.

III. THE CHALLENGED CLAIMS ARE UNPATENTABLE

A. Person of Ordinary Skill in the Art

A person of ordinary skill in the art ("POSA") of the '000 patent has a Bachelor of Science degree in electrical engineering or a related field, and approximately two years of experience in the design or implementation of wireless communications systems, or the equivalent. Alternatively, a POSA has approximately six years of experience in the design or implementation of wireless communications systems, or the equivalent.[1]

B. Effective Filing Date of the Challenged Claims

Each application in the ’000 patent family claims priority to the prior applications in the chain. Merely claiming priority, however, is not sufficient for a claim to obtain the benefit of an earlier filing date. For the ’000 patent claims to be entitled to the priority date of the earliest application in the chain, *i.e.*, the 2001 application, every application between the ’000 patent and that application must maintain disclosure that supports the claims.

Here, the applicant broke the chain of disclosure in 2003 by filing a continuation-in-part (“CIP”) application, EX1005, directed to a different invention than that of the ’000 claims. The 2003 application did not include or incorporate by reference the disclosure of the earlier 2001 application, and the applicant’s subsequent amendments to the 2003 application’s specification and figures cannot cure the break in the chain because the amendments were not supported by the 2003 application’s disclosure as filed, and thus improperly introduced new matter.

Notably, Sony Corporation filed an IPR petition with respect to a related patent, U.S. Patent No. 9,282,396, and argued that the challenged claims were

[1] This is the level of skill proposed by Petitioner and adopted by the Administrative Law Judge (“ALJ”) in the ITC action. EX1014, pp.7-9.

invalid in view of the '196-Publication due to the break in the chain of disclosure in the 2003 application. *Sony Corp. v. One-E-Way, Inc., IPR2016-01638 ("Sony IPR")*, Paper 12 at 5-13. The PTAB concluded that Sony had "shown sufficiently that the [2003] application failed to maintain continuity of disclosure with the [2001] application, and, as a result, the [later, related] patent is not entitled to the benefit of the filing date of the [2003] application or the [2001] application" and instituted review. *Id.*, 12-13, 17. The parties settled before a final written decision. *Sony IPR*, Papers 38, 39.

PO bears the ultimate burden of demonstrating entitlement to an earlier application's filing date. *See In re NTP, Inc.*, 654 F.3d 1268, 1276-77 (Fed. Cir. 2011). This burden is not satisfied simply because the later application is a "continuation" or a "continuation-in-part" of the earlier one. *See Rsch. Corp. Techs., Inc. v. Microsoft Corp.*, 627 F.3d 859, 865, 869-70 (Fed. Cir. 2010). If the earlier application is not an immediate parent, "in order to gain the benefit of the filing date of an earlier application under 35 U.S.C. §120, each application in the chain leading back to the earlier application must comply with the written description requirement of 35 U.S.C. §112," maintaining continuity of disclosure throughout the chain. *Zenon Env't, Inc. v. U.S. Filter Corp.*, 506 F.3d 1370, 1378–82 (Fed. Cir. 2007).

PO must show that the claimed invention was disclosed in the earlier applications as <u>originally filed</u>. 35 U.S.C. §120 (2012); *see Anascape, Ltd. v.*

Nintendo of Am., Inc., 601 F.3d 1333, 1337 (Fed. Cir. 2010).

Incorporation by reference can maintain continuity of disclosure. It "provides a method for integrating material from various documents into a host document … by citing such material in a manner that makes clear that the material is effectively part of the host document as if it were explicitly contained therein." *Zenon*, 506 F.3d at 1378. However, claiming priority as a CIP (or continuation or divisional) of a parent application is not an incorporation by reference of a prior application. *See Ex Parte MacLeod*, 2003 WL 25277951, at *7-8 (No. 2001-1651, B.P.A.I. Sept. 4, 2003). Further, an incorporation-by-reference statement cannot be added after the application's filing date. 35 U.S.C. §132; MPEP 201.06(c)(IV).

1. The 2001 Application

On December 21, 2001, the earliest application to which the '000 patent claims priority, entitled "Wireless Digital Audio System," was filed and assigned U.S. Application No. 10/027,391 ("the 2001 application"). EX1003, p.3. As filed, the 2001 application included a 5-page specification, 7 claims, an abstract, and 3 figures (shown below). *Id.*, pp.4-22.

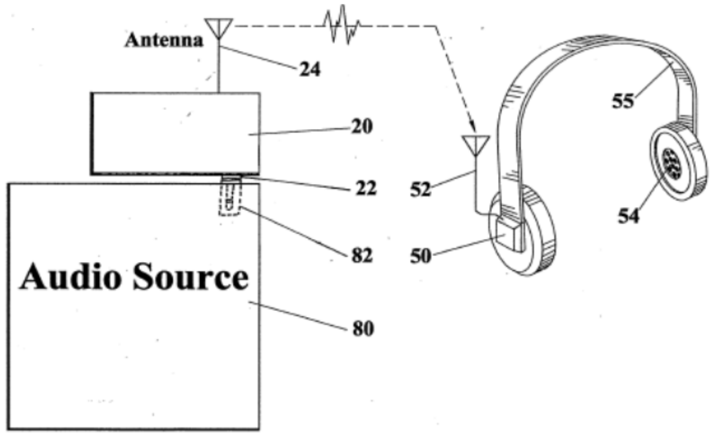


FIG.1

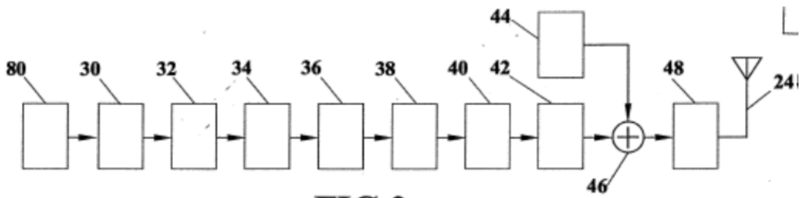


FIG.2

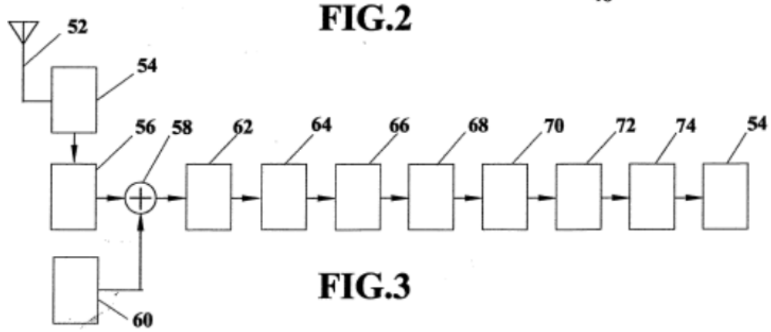


FIG.3

The 2001 application states that "[t]he present invention is directed to wireless digital audio systems for transmission of a signal from an audio player device to a headphone." *Id*., p.6. The 2001 application describes various details of the wireless digital audio system, including that "encoder 36 may be used to reduce intersymbol interference (ISI) by using a transform code to encode the digital signal"; "differential phase shift key (DPSK) transmitter 48 [] modulates the digital signal to be transmitted"; and "direct conversion receiver 56 may provide a method for down converting the received signal." *Id*., pp.8-9. Figures 2 and 3 include functional block diagrams showing the components, including the encoder 36, DPSK transmitter 48, and direct conversion receiver 56, and operational flow of the audio transmitter and audio receiver, respectively. *Id*., p.22.

The examiner rejected all claims in the 2001 application on September 6, 2002 as obvious under 35 U.S.C. § 103 in view of certain prior art. *Id*., pp.26-36. Following the applicant canceling claims 1 and 2 and attempting to argue over the rejection, the examiner again rejected the remaining claims on February 26, 2003 as obvious in view of the prior art. *Id*., pp.49-57. Rather than respond to this rejection, on August 27, 2003 the applicant expressly abandoned the 2001 application in favor of a CIP application. *Id*., p.60.

On June 26, 2003, shortly before abandonment, the 2001 application published as U.S. Publication 2003/0118196 ("the '196-Publication"). EX1004.

2. The 2003 Application

On August 26, 2003, the applicant filed a CIP application directed to a different invention, entitled "Fuzzy Audio Wireless Music System," assigned U.S. Application No. 10/648,012 ("the 2003 application"). EX1005. As filed, the 2003 application included a 6-page specification, 5 claims, an abstract, and 2 figures (shown below). EX1005, pp.1-20.

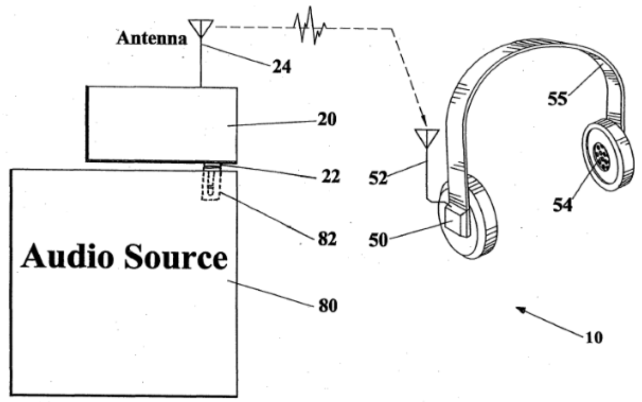


FIG 1

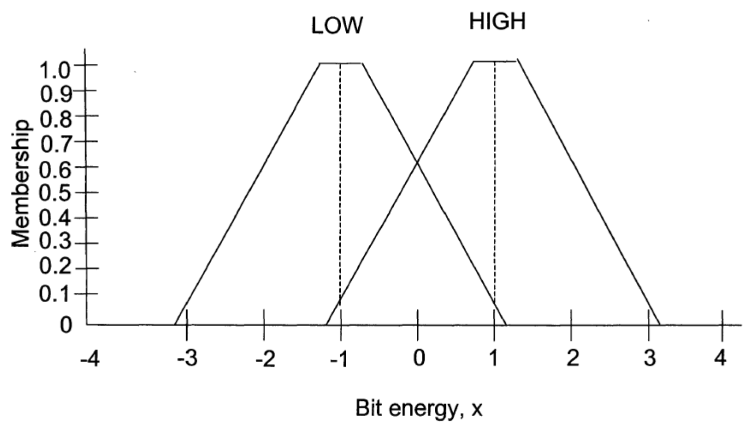


Figure 2

Critically, the 2003 application claimed priority to the 2001 application as a CIP, *but did not* incorporate by reference the 2001 application. The 2003 application as filed also differs substantially from the 2001 application. Although figures 1 of both applications are nearly identical, figure 2 of the 2003 application differs from figures 2 and 3 of the 2001 application, which are not included in the 2003 application. *See* EX1009. In addition, the wireless audio system described in the 2003 application specification differs significantly from that described in the 2001 application. *See* EX1008.

For example, the 2003 application's "Summary of the Invention" states, "[t]he present invention is directed to FAWM (Fuzzy Audio Wireless Music) systems for coded digital transmission of an audio signal from any audio player device with a headphone jack to a receiver headphone using fuzzy logic technology." EX1005, p.2. Unlike the 2001 application, the 2003 application does not disclose or describe a direct conversion receiver, differential phase shift keying, intersymbol interference, or an encoder to reduce it. *Id.*, pp.3-6 (describing the fuzzy logic operations in detail and stating that "[t]he fuzzy logic detector is the key component to the FAWM system 10," but not describing any of the aforementioned components). The figures of the 2003 application also contain no functional block diagrams showing the components or operation of the fuzzy audio wireless music system of the invention. *Id.*, pp.16-17.

3. The 2003 Application As Filed Does Not Support the '000 Patent Claims.

For the '000 patent claims to be entitled to the 2001 application's filing date, PO must show that each application in the chain leading back to December 2001—including the 2003 application—complies with the written description requirement of 35 U.S.C. § 112. *See Lockwood*, 107 F.3d at 1571-72. An earlier application supports a claim if the application <u>as originally filed</u> describes the invention with sufficient detail. *See Anascape*, 601 F.3d at 1337.

The originally filed 2003 application does not support the claims of the '000 patent. The '000 patent claims recite, *inter alia*, "lowering signal detection error through reduced intersymbol interference coding" (cls. 1-6, 8-12) and "a direct conversion module" (cls. 1-7). EX1001. In addition, dependent claims 11 and 12 recite "differential phase shift keying (DPSK)." *Id*. None of these limitations are expressly described in the 2003 application as originally filed. *See* EX1012, ¶¶83-84. Nor are any of these limitations inherently disclosed in the 2003 application as originally filed. *Id*. As a result, the '000 patent claims are not entitled to the 2001 application filing date; the 2003 application, as filed, broke the chain of disclosure.

4. Applicant's Amendments to the 2003 Application Cannot Establish a 2001 or 2003 Priority Date.

As noted above, the applicant failed to incorporate by reference the 2001 application in the originally filed 2003 application. Instead, the applicant added an incorporation by reference of the 2001 application by amendment on August 15, 2006. EX1005, 0375.

An incorporation by reference statement added nearly three years after filing the 2003 application constitutes improper new matter and is, therefore, ineffective in establishing continuity of disclosure back to the 2001 application. MPEP

201.06(c)(IV).[2] December 21, 2001 cannot be the priority date of the ’000 patent claims.

In fact, no matter added after the original disclosure is filed may be used to provide written description support. *Anascape,* 601 F.3d at 1337. In October 2004, more than a year after filing the 2003 application,[3] the applicant began extensively amending the specification and figures of the 2003 application, both to add and remove material. Over the next two years, in addition to the August 2006 incorporation by reference of the 2001 application, amendments included:

- Adding description that the FAWM system utilized Bluetooth technology, including that the transmitter and the receiver are a Bluetooth compliant transmitter and receiver (EX1005, 0025-34);
- Broadening the disclosure by removing specifics, including removing the statement that “[t]he fuzzy logic detector is the key component to the FAWM system 10.” (EX1005, 0029);
- Changing the application title from “Fuzzy Audio Wireless Music System” to “Wireless Digital Audio Music System” (EX1005, 0076);
- Removing all references to “FAWM” and replacing them with “wireless digital audio music” (EX1005, 0076-84);
- Adding new figures 2 and 3 and heavily editing the original figure 2 from the 2003 application into new figure 4 (EX1005, 0086, 0093-95);
- Adding a description of a “direct conversion receiver 56” to the

[2] The CIP priority claim in the 2003 application is not an incorporation by reference of the 2001 application. In re De Seversky, 474 F.2d 671, 674 (CCPA 1973).
[3] And more than a year after the 2001 application published in June 2003.

specification (EX1005, 0287);

- Adding a "direct conversion receiver 56" to figure 3 (EX1005, 0296, 0307); and
- Adding a description of a "DPSK (differential phase shift key) transmitter" to the specification (EX1005, 0377).

The examiner did object to many of these amendments under 35 U.S.C. § 132 as introducing new matter in the disclosure, but allowed others.[4] By the time the 2003 application issued as U.S. Patent No. 7,412,294 (EX1006) on August 12, 2008, the specification and figures were completely different from the as-filed 2003 application. EX1010.

Regardless of the amendments, the priority-date analysis is properly conducted based on the 2003 application as filed. The original 2003 application does not support the '000 claims and thus August 26, 2003 cannot be the priority date of the '000 patent claims.

5. *July 12, 2008 is the Earliest Priority Date to Which the '000 Claims Are Entitled.*

As discussed above in Sections III.B.1-4, the '000 patent claims are not entitled to the benefit of the filing date of the 2001 application because the 2003

[4] The applicant cited the 2001 application as support for amendments to the 2003 application even though no incorporation by reference had been made. *See*, *e.g.*, EX1005, 0076, 0263. This was improper. All new matter amendments, including additions from the 2001 application's specification and figures, should have been rejected.

application broke the chain of disclosure; nor are the ’000 patent claims entitled to the benefit of the filing date of the 2003 application. *See Lockwood*, 107 F.3d at 1571-72; *Ex Parte MacLeod*, 2003 WL 25277951, *7-8. No other applications in the family were ever co-pending with the 2001 application. The earliest priority date to which the ’000 patent claims are entitled is thus July 12, 2008, the filing date of the 2008 application, because the as-filed specification of the ’000 patent is substantially the same as the as-filed specification of the 2008 application. EX1011.

C. Prior Art Overview

Each prior art reference relied upon below is in the same field of endeavor as the ’000 patent. EX1012, ¶¶90-101.

1. ’196-Publication (EX1004)

The ’196-Publication is U.S. Patent Appl. Pub. 2003/0118196, published June 26, 2003. The ’196-Publication is at least pre-AIA §102(b) prior art.

The ’196-Publication is directed to “wireless digital audio systems for transmission of a signal from an audio player device to a headphone.” EX1004, Abstract.

2. Rappaport (EX1018)

Rappaport is a book titled “Wireless Communications: Principles & Practice” by Theodore S. Rappaport, which published in 1996. EX1012, ¶90. Rappaport is at least pre-AIA §102(b) prior art. Rappaport “provides extensive coverage of the most common analog and digital modulation techniques used in mobile communications." *Id.*, xiv.

3. Walley (EX1015)

Walley is U.S. Patent No. 6,744,808, which was filed June 3, 1999 and issued June 1, 2004. Walley is at least pre-AIA §102(e) prior art. Walley discloses a CDMA system that uses a "spreading code[]" "to separate that system's transmissions from all others." EX1015, 1:27-59.

4. Miyake (EX1016)

Miyake is U.S. Patent No. 5,546,424, which was filed June 27, 1994 and issued August 13, 1996. Miyake is at least pre-AIA §102(b) prior art. Miyake describes a "spreading code" based on a code "specific to [an] individual user" and a code "assigned according to … attributes." EX1016, 5:49-56; *see also id.*, 8:12-60.

5. Gibson (EX1022)

Gibson is titled "The Communications Handbook" by Jerry D. Gibson, which published in 1997. EX1012, ¶96. Gibson is at least pre-AIA §102(b) prior art. Gibson is a handbook that outlines the "Basic Principles" of a communication system.

6. Drakoulis (EX1021)

Drakoulis is U.S. Patent No. 6,256,303, which was filed October 15, 1999 and issued July 3, 2001. Drakoulis is at least pre-AIA §102(a) prior art.

Drakoulis is directed to a "base unit 22" coupled "via jacks or connectors and electrical conductors to the signal source 10," which may include "a CD player, AM/FM tuner, tape deck, turntable, etc." EX1021, 5:21-25, 5:34-37.

D. Ground 1: The '196-Publication in View of Gibson Renders Obvious Claims 1-5 and 8-12.

1. Overview of the combination; motivation to combine; expectation of success.

Ground 1 relies on the '196-Publication in view of Gibson.

The '196-Publication is directed to "wireless digital audio systems for transmission of a signal from an audio player device to a headphone." EX1004, Abstract. Although the '196-Publication teaches "a method for down converting the received signal while utilizing timing and synchronization to capture the correct bit sequence" (EX1004, ¶[0015]), it does not expressly disclose how the signal is organized for transmission. EX1012, ¶110. Gibson is a communications handbook which includes "articles or chapters" that are "written as tutorials or overviews, so that once the reader locates the broader topic, it is easy to find an answer to a specific question." EX1022, iii, title. Gibson teaches "the seven-layer open system interconnection (OSI) model," including the use of "packets" to break down a long communication message. EX1022, 182, 567-576.

A POSA would have been motivated to use the teachings of the Gibson handbook to provide the implementation details required to create a signal organized for transmission and reception based on the '196-Publication's teachings, and would have had a reasonable expectation that applying Gibson's teachings to the '196-Publication would be successful. EX1012, ¶¶108-112. A POSA would have reasonably expected to succeed in implementing Gibson's teachings in '196-Publication's system because Gibson is a handbook which includes "articles or chapters" that are "written as tutorials or overviews, so that once the reader locates the broader topic, it is easy to find an answer to a specific question." EX1022, iii.

2. *Claim 1*

a. [1p] A mobile wireless digital audio receiver, configured to receive a unique user code and an original audio signal representation in the form of packets, said unique user code used to spread a spectrum of said signal and further configured for independent CDMA communication operation, said receiver independent of the operation of another receiver, said mobile wireless digital audio receiver comprising:

The '196-Publication in view of Gibson renders obvious this limitation. EX1012, ¶¶113-128.

The '196-Publication teaches "wireless digital audio systems for transmission of a signal from an audio player to a headphone." EX1004, Abstract. "[A]udio receiver 50…may be a headphone receiver" and is a *mobile wireless digital audio receiver. Id.*, ¶[0011]; *see also id.*, Fig. 1.

The term "unique user code" should be construed to mean a "fixed code (bit sequence) specifically associated with one user of a device(s)." *See* §II.C.

Audio transmitter includes "a transmitter code generator 44 signal to produce…a unique codeword that spreads the signal spectrum" of the transmission to audio receiver. EX1004, ¶[0014]. Furthermore, audio receiver 50 receives the transmission and includes "receiver code generator 60 [that] may contain the same unique code word that was transmitted by the audio transmitter 20 specific to a particular a user" to demodulate the transmission. *Id.*, ¶[0016]. The demodulated signal is decoded and "conditioned to represent the original signal processed and transmitted by the audio transmitter 20." *Id.*, ¶[0017]. Thus, audio receiver 50 is *configured to receive a unique user code and an original audio signal representation…said unique user code used to further spread a spectrum of said signal*.

The term "independent" should be construed to mean "performed independent of any central control." §II.C. The '196-Publication teaches that "receiver 50" uses "code division multiple access (CDMA) [which] may be used to provide each user independent operation." EX1004, ¶[0016]. The one-to-one relationship between the '196-Publication's receiver and transmitter teaches a *receiver…further configured for independent CDMA communication operation, said receiver independent of the operation of another receiver* as it does not require any centralized control. EX1012,

¶¶121-123; EX1004, ¶[0016].

The ’196-Publication does not expressly disclose the characteristics of the bit sequence, such as how it is organized for transmission. EX1012, ¶124. However, it would have been obvious to a POSA to implement the system described in the ’196-Publication to organize the transmitted bit sequence into blocks of data, such as by portioning the data into packets. EX1012, ¶¶124-127. First, a POSA would have been familiar with the use of packets in wireless digital communications and the advantages of such use. EX1012, ¶¶125-126. For example, Gibson teaches “the seven-layer open system interconnection (OSI) model” including a “data link layer, which transforms packets received from the network layer into *frames* by adding address, control and error check fields prior to their transmission.” EX1022, 182. Gibson further teaches the use of “parity check bits” which “allow the receiver to detect and possibly correct errors in the received frames.” *Id.* Gibson depicts an exemplary frame including a “data packet” and “Error Check (CRC)” fields:

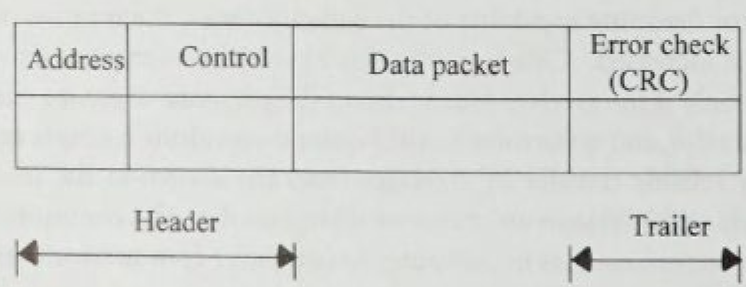


FIGURE 15.1 Structure of a frame.

EX1022, 182(FIG. 15.1). Second, the ’196-Publication describes “utilizing timing and synchronization to capture the correct bit sequence embedded in the received spread spectrum signal," and using a block interleaver 40 and block de-interleaver 46 to reduce errors. EX1004, ¶¶[0015], [0013], [0017]. Both timing and synchronization, as well as interleaving/de-interleaving, are typically accomplished using packets, and a POSA would find it obvious to use packets to implement the system described in the '196-Publication. EX1012, ¶¶124-127. A POSA would have been motivated to use "packets" and "frames" to partition the '196-Publication's transmitted audio bit stream as it would allow the receiver to determine whether there was a transmission error, and potentially correct the error. EX1012, ¶¶124-127.

b. <u>[1A] a direct conversion module configured to capture packets and a correct bit sequence within the packets aided by lowering signal detection error through reduced intersymbol interference coding of said original audio signal representation, said packets embedded in the received spread spectrum signal, the captured packets corresponding to the unique user code;</u>

The '196-Publication in view of Gibson renders obvious this limitation. EX1012, ¶¶129-136.

The term "direct conversion module" should be construed to mean a "module for converting radio frequency to baseband or very near baseband in a single frequency conversion without an intermediate frequency" and "[reduce/reduction of] intersymbol interference coding" should be construed to mean "coding that reduces intersymbol (inter-symbol) interference." §II.C.

The '196-Publication teaches "a transmitter code generator 44 signal to produce…a unique codeword that spreads the signal spectrum" of the transmission to audio receiver. EX1004, ¶[0014]. The '196-Publication teaches a "direct conversion receiver 56 [that] may provide a method for down converting the received signal while utilizing timing and synchronization to capture the correct bit sequence embedded in the received spread spectrum signal." EX1004, ¶[0015]. In a parallel proceeding, PO argued that "a POSITA would understand that a 'direct conversion' receiver includes near-zero intermediate frequency (NZIF) receivers that convert to very near baseband in a single frequency conversion without an intermediate frequency." EX1023, 18. As depicted below "audio receiver 50" includes "direct conversion receiver 56":

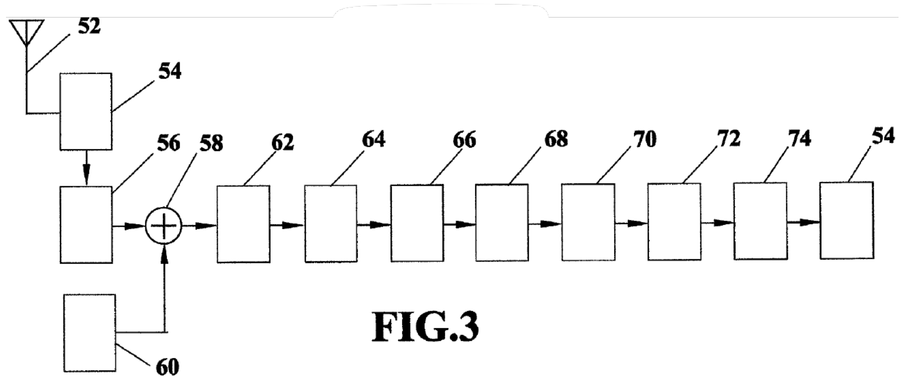


FIG.3

EX1004, FIG. 3, ¶[0009] ("FIG. 3 illustrates a functional block diagram of the audio receiver"). Thus, the '196-Publication teaches a *direct conversion module* ("direct conversion receiver 56") *configured to capture…a correct bit sequence* within a *received spread spectrum signal…corresponding to the unique user code*. EX1012,

¶¶129-136.

Also, as discussed above, a POSA would find it obvious to use packets in implementing the system of the ’196-Publication. See [1P]; EX1012 ¶¶129-136. Thus, ’196-Publication in view of Gibson renders obvious a *direct conversion module* (“direct conversion receiver 56”) *configured to capture packets and a correct bit sequence within the packets…said packets embedded in the received spread spectrum signal, the captured packets corresponding to the unique user code*.

Audio transmitter includes “encoder 36…to reduce intersymbol interference (ISI) by using a transform code to encode the digital signal.” EX1004, ¶[0013]. “The reduction of ISI may lower the probability of signal detection error.” *Id.*

Thus, the ’196-Publication in view of Gibson teaches a *direct conversion module configured to capture…a correct bit sequence within the packets aided by lowering signal detection error through reduced intersymbol interference coding of said original audio signal representation.* EX1012, ¶¶137-138.

c. [1B] a decoder operative to decode the reduced intersymbol interference coding of said original audio signal representation wherein each user has their audio receiver configured to communicate with their own separate audio transmitter, and said receiver virtually free from interference from transmission and reception device signals operating in the shared spectrum.

The ’196-Publication in view of Gibson renders obvious this limitation. EX1012, ¶¶139-146.

Audio transmitter includes “encoder 36…to reduce intersymbol interference (ISI) by using a transform code to encode the digital signal” (*coding that reduces intersymbol (inter-symbol) interference*). EX1004, ¶[0013].

Audio receiver 50 comprises “source decoder 68” to “decode the coding applied by the encoder 36” and thus processes the received signal for reduction of ISI. *Id.*, ¶[0017]. Thus, the ’196-Publication in view of Gibson renders obvious *a decoder* (source decoder 68) *operative to decode the reduced intersymbol interference coding of said original audio signal representation.*

The ’196-Publication teaches a *receiver* which uses a “unique code word that was transmitted by the audio transmitter 20 specific to a particular a user.” EX1004, ¶[0016]; [1P]. “This code division multiple access (CDMA) may be used to provide each user independent operation.” *Id.* Thus, the ’196-Publication in view of Gibson renders obvious *wherein each user has their audio receiver configured to communicate with their own separate audio transmitter.*

The ’196-Publication teaches that the “unique codeword…spreads the signal spectrum.” EX1004, ¶[0014]. “Other code words from wireless digital audio systems 10 may appear as noise to a particular audio receiver 50. This may also be true for other device transmitted signals operating in the wireless digital audio system 10 spectrum.” EX1004, ¶[0016]. Thus, the ’196-Publication in view of Gibson renders obvious *said receiver virtually free from interference from transmission and* *reception device signals operating in the shared spectrum.*

Accordingly, the '196-Publication in view of Gibson renders obvious claim 1.

3. *Claim 2*

Claim 2 largely corresponds to Claim 1 as indicated below.

Limitation	Corresponding Limitation
[2P]	[1P]
[2A]	[1A]
[2B]	[1B]

a. [2C] a digital-to-analog converter generating an audio output of said original audio signal representation; and;

The '196-Publication in view of Gibson renders obvious this limitation. EX1012, ¶¶148-150.

Audio receiver 50 includes "[a] digital-to-analog converter 70 (DAC) [that] may be used to transform the digital signal to an analog audio signal." EX1004, ¶[0018]. "The analog audio signal may then be processed…for powering a headphone speaker 54." *Id.*

b. [2D] a module adapted to produce said generated audio output, wherein each user has their audio headphone configured to communicate with their own separate audio transmitter, and said audio virtually free from interference from transmission and reception device signals operating in a shared wireless headphone spectrum.

The ’196-Publication in view of Gibson renders obvious this limitation. EX1012, ¶¶151-156.

The ’196-Publication teaches that the analog audio output signal from the DAC 70 is provided to an “analog low pass filter 72” and then “power amplifier 74 that may be optimized for powering a headphone speaker 54.” EX1004, ¶[0018]. Thus, the ’196-Publication in view of Gibson renders obvious *a module adapted to produce said generated audio output*.

The ’196-Publication in view of Gibson renders obvious *wherein each user has their audio headphone configured to communicate with their own separate audio transmitter, and said audio virtually free from interference from transmission and reception device signals operating in a shared…spectrum*. *See* [1B].

The ’196-Publication teaches that the “received spread spectrum signal may then be communicated to a 2.4 GHz direct conversion receiver.” EX1004, ¶[0015].

Since the ’196-Publication teaches wireless headphone receivers ([1P]) using the same 2.4 GHz spectrum, the ’196-Publication in view of Gibson renders obvious *a shared wireless headphone spectrum*.

4. Claim 3

a. [3P] A wireless digital audio headphone comprising:

See [1P].

b. [3A] a digital audio headphone receiver configured to receive an unique user code bit sequence and a original audio signal representation in the form of packets, said digital audio headphone receiver, capable of mobile operation and configured for direct digital coded wireless spread spectrum communication with a mobile digital audio transmitter, and said user has their headphone configured to communicate with their own transmitter;

The '196-Publication in view of Gibson renders obvious this limitation. EX1012, ¶¶159-167.

The '196-Publication in view of Gibson renders obvious *a digital audio headphone receiver* (headphone receiver 50) *configured to receive an unique user code bit sequence* (unique codeword) *and a original audio signal representation in the form of packets* (as disclosed in Gibson)*, said digital audio headphone receiver, capable of mobile operation*. *See* [1P].

The '196-Publication in view of Gibson teaches an "audio transmitter 20…for transmitting an electromagnetic signal to…an audio receiver 50 that may be a headphone receiver." EX1004, ¶[0011]. "The audio transmitter 20 may be a compact device that may be connected to the audio source 80." EX1004, ¶[0012]. The transmitter includes "a transmitter code generator 44 signal to produce…a unique codeword that spreads the signal spectrum" of the transmission to audio receiver. EX1004, ¶[0014]. The receiver includes "direct conversion receiver 56" which receives the "spread spectrum signal" transmitted from "audio transmitter 20."

EX1004, ¶¶[0015]-[0016]. Thus, the ’196-Publication in view of Gibson renders obvious *configured for direct digital coded wireless spread spectrum communication with a mobile digital audio transmitter* (the “compact” audio transmitter 20).

The ’196-Publication teaches a *headphone receiver* which uses a “unique code word that was transmitted by the audio transmitter 20 specific to a particular a user.” EX1004, ¶[0016]; [1P]. “This code division multiple access (CDMA) may be used to provide each user independent operation.” *Id.* Thus, the ’196-Publication in view of Gibson renders obvious *said user has their headphone configured to communicate with their own transmitter.*

c. [3B] a direct conversion module configured to capture packets and the correct bit sequence within the packets aided by lowering signal detection error through reduced intersymbol interference coding of said original audio signal representation said packets embedded in the received spread spectrum signal, the captured packets corresponding to the unique user code;

See [1A].

d. [3C] a digital demodulator configured for independent CDMA communication operation wherein a user has their own transmitter and receiver;

The ’196-Publication in view of Gibson renders obvious this limitation. EX1012, ¶¶169-173.

The term “independent” should be construed to mean “performed independent of any central control." §II.C.

"The down converted output signal of the direct conversion receiver 56 may be summed in receiver summing element 58 with a receiver code generator 60 signal." EX1004, ¶[0016]. To demodulate the signal, "receiver code generator 60" uses the "same unique code word that was transmitted by the audio transmitter 20 specific to a particular a user." *Id.*; EX1012, ¶171. "This code division multiple access (CDMA) may be used to provide each user independent operation." *Id.* "The resulting summed digital signal from receiving summary element 58 may be processed by a 64-Ary demodulator 62 to demodulate the signal elements modulated in the audio transmitter 20." EX1004, ¶[0017]. Thus, the '196-Publication in view of Gibson renders obvious *a digital demodulator* (summing element 58, receiver code generating 60 and/or demodulator 62) *configured for…CDMA communication operation wherein a user has their own transmitter and receiver.* The one-to-one relationship between the '196-Publication's receiver and transmitter teaches *independent CDMA communication operation* as it does not require any centralized control. EX1012, ¶¶169-173; EX1004, ¶[0016].

e. <u>[3D] a decoder operative to decode the reduced intersymbol interference coding of original audio signal representation;</u>

See [1B].

f. <u>[3E] a digital-to-analog converter (DAC) generating an</u>

audio output of said original audio signal representation; and

See [2C].

g. [3F] a module responsive to the unique user code bit sequence to produce said generated audio output wherein each user has their audio headphone configured to communicate with their own separate audio transmitter, said output virtually free from interference from transmission and reception device signals operating in the shared wireless headphone spectrum.

The ’196-Publication in view of Gibson renders obvious *a module responsive to the unique user code bit sequence to produce said generated audio output*. EX1012, ¶¶176-182.

The ’196-Publication teaches the use of a “unique code word” (*unique user code bit sequence*) to demodulate a received spread spectrum signal. *See* [3C]. The demodulated signal is decoded “to represent the original signal” (EX1004, ¶[0017]) and then converted to an analog signal by “digital-to-analog converter 70” (*see* [2C]). The analog signal is provided to an “analog low pass filter 72” and then “power amplifier 74 that may be optimized for powering a headphone speaker 54.” EX1004, ¶[0018]. Thus, the ’196-Publication in view of Gibson renders obvious *module responsive to the unique user code bit sequence to produce said generated audio output*. EX1012, ¶¶176-181.

The ’196-Publication in view of Gibson renders obvious *wherein each user* *has their audio headphone configured to communicate with their own separate audio transmitter, said output virtually free from interference from transmission and reception device signals operating in the shared wireless headphone spectrum. See* [1B].

5. *Claim 4. The wireless digital audio headphone of claim 3, wherein the audio output is music.*

The ’196-Publication in view of Gibson renders obvious this limitation. EX1012, ¶¶183-185.

The ’196-Publication in view of Gibson describes a “connection system for existing audio player devices,” “such as radio, tape players, [and] CD players.” EX1004, ¶¶[0002], [0004]. “[C]assette tape players…may be used during exercising.” *Id.*, ¶[0002]. A POSA would have understood that radio, tape players, and CD players provide audio signal representations that represent music. EX1012, ¶¶183-185.

6. *Claim 5*

Claim 5 corresponds to the following limitations of Claims 1 and 2 as indicated below.

Limitation	Corresponding Limitation
[5P]	[1P]
[5A]	[1A]

[5B]	[1B]
[5C]	[2C]
[5D]	[2D]

7. *Claim 8*

a. [8P] A wireless digital coded music audio spread spectrum transmitter operatively coupled to a music audio source and configured to transmit a unique user code and an original audio signal representation in the form of packets, wherein said digital coded music audio transmitter coupled to said music audio source, and configured to be directly communicable with a mobile digital audio spread spectrum receiver, is capable of being moved in any direction during operation, said wireless digital coded audio transmitter comprising:

The '196-Publication in view of Gibson renders obvious this limitation. EX1012, ¶¶187-199.

The '196-Publication teaches "wireless digital audio systems for transmission of a signal from an audio player to a headphone." EX1004, Abstract. "[A]udio receiver 50…may be a headphone receiver" and is thus a *mobile digital audio…receiver*. *Id.*, ¶[0011]; *see also id.*, Fig. 1.

As described above, the term "transmitter" should be construed to mean "a device that can be connected into an analog headphone jack to wirelessly transmit an audio signal" and the term "audio source" should be construed to mean "a device for providing audio that has an analog headphone jack." §II.C. The '196-Publication discloses that an "audio transmitter 20 may be a compact device that may be connected to the audio source 80 headphone jack 82 using a headphone plug 22." EX1004, ¶[0012], FIG. 2. Thus, the '196-Publication teaches a *wireless digital coded…audio transmitter* ("audio transmitter 20") *operatively coupled to [an] audio source* ("audio source 80"). EX1012, ¶¶187-193. A POSA would have understood that the transmitter is *capable of being moved in any direction during operation* since it is "compact" and configured for "wireless transmission of a signal to a receiving headphone." EX1004, ¶¶[0001]-[0002], [0012]; EX1012, ¶¶187-194.

The '196-Publication describes a "connection system for existing audio player devices," "such as radio, tape players, [and] CD players." EX1004, ¶¶[0002]-[0004]. "[C]assette tape players…may be used during exercising." *Id.* A POSA would thus have understood that the '196-Publication teaches or suggests that "audio source 80" is a *<u>music</u> audio source* and "audio transmitter 20" is a *music audio transmitter*. EX1012, ¶¶187-195.

Audio transmitter includes "a transmitter code generator 44 signal to produce…a unique codeword that spreads the signal spectrum" of the transmission to audio receiver, and the receiver includes "receiver code generator 60 [that] may contain the same unique code word that was transmitted by the audio transmitter 20 specific to a particular a user" to demodulate the transmission. EX1004, ¶¶[0014]-[0015]. Thus, the '196-Publication teaches a *spread spectrum transmitter* (audio transmitter 20)…*configured to transmit a unique user code* (unique code word) *and an original audio signal representation* (music audio).

The ’196-Publication teaches that "audio transmitter 20 may have a transmitting antenna 24 that may be omni-directional for transmitting an electromagnetic signal to a receiving antenna 52 of an audio receiver 50." EX1004, ¶[0011]. Thus, ’196-Publication teaches that "audio transmitter 20" is *configured to be directly communicable with a mobile digital audio spread spectrum receiver*. EX1012, ¶197.

b. [8A] encoding operative to encode said original audio signal representation to reduce intersymbol interference and aid in lowering signal detection error of said audio representation signal respective to said receiver and mobile said transmitter coupled to said music audio source;

The ’196-Publication in view of Gibson renders obvious this limitation. EX1012, ¶¶200-203.

The "[reduce/reduction of] intersymbol interference coding" should be construed to mean "coding that reduces intersymbol (inter-symbol) interference." §II.C.

The ’196-Publication teaches the audio transmitter includes "encoder 36…to reduce intersymbol interference (ISI) by using a transform code to encode the digital signal" (*coding that reduces intersymbol (inter-symbol) interference*). EX1004,

¶[0013]. "The reduction of ISI may lower the probability of signal detection error." *Id.* Thus, the '196-Publication in view of Gibson renders *encoding operative to encode said original audio signal representation to reduce intersymbol interference and aid in lowering signal detection error of said audio representation signal respective to said receiver and mobile said transmitter coupled to said music audio source*.

c. <u>[8B] a digital modulator module configured for independent code division multiple access communication operation, wherein each user has their own separate transmitter configured to communicate with their receiver, said transmitter configured to wirelessly transmit said audio to be reproduced virtually free from interference from transmission and reception device signals operating in the wireless digital audio transmitter shared spectrum.</u>

The '196-Publication in view of Gibson renders obvious this limitation. EX1012, ¶¶204-210.

The '196-Publication teaches that the "[m]odulation of the digital signal may be performed using direct sequence spread spectrum communication technology." EX1004, ¶[0014]. "A 64-Ary modulator 42 may be used for summation at summation element 46 with a transmitter code generator 44 signal to produce a high symbol rate, and a unique codeword that spreads the signal spectrum." *Id.* "The output of the summation element 46 may then be communicated to a differential phase shift key (DPSK) transmitter 48 that modulates the digital signal to be transmitted." *Id*. Thus, the '196-Publication teaches *a digital modulator module* (modulators 42 and/or 48).

The term "independent" should be construed to mean "performed independent of any central control." §II.C. The '196-Publication teaches that a system which uses "code division multiple access (CDMA) [which] may be used to provide each user independent operation." EX1004, ¶[0016]. The one-to-one relationship between the '196-Publication's receiver and transmitter teaches a *modulator module configured for independent code division multiple access communication operation* as it does not require any centralized control. EX1012, ¶¶204-209; EX1004, ¶[0016].

The '196-Publication in view of Gibson renders obvious *each user has their audio receiver configured to communicate with their own separate audio transmitter, and said receiver virtually free from interference from transmission and reception device signals operating in the shared spectrum*. *See* [1B]. As reflected with corresponding annotations (red, green, blue) above and below, [8B] recites materially the same limitations, and thus, the '196-Publication in view of Gibson renders obvious *each user has their own separate transmitter configured to communicate with their receiver, said transmitter configured to wirelessly transmit said audio to be reproduced virtually free from interference from transmission and reception device signals operating in the wireless digital audio transmitter shared spectrum*. EX1012, ¶¶210.

8. Claim 9

Claim 9 corresponds to the limitations of Claim 1 as indicated below.

Limitation	Corresponding Limitation
[9A]	[1A]
[9B]	[1B]

a. [9P] A mobile wireless digital audio receiver capable of being moved in any direction during operation and configured to receive a unique user code and an original audio signal representation in the form of packets, said unique user code used to spread a spectrum of said signal and further configured for independent CDMA communication operation, said receiver independent of the operation of another receiver, said wireless digital audio receiver comprising;

The ’196-Publication in view of Gibson renders obvious the preamble. [9P] is materially the same as [1P], except [9P] additionally requires the *receiver…capable of being moved in any direction during operation,* and thus the common portions of [9P] are rendered obvious for the same reasons.. *See* [1P]; *see also* EX1012, ¶¶212-215.

“[A]udio receiver 50…may be a headphone receiver” and thus is *capable of being moved in any direction during operation*. EX1004, ¶[0011], Fig. 1; EX1012, ¶¶212-215.

9. Claim 10.

Claim 10 corresponds to the limitations of Claim 8 as indicated below.

Limitation	Corresponding Limitation
[10P]	[8P]
[10A]	[8A]
[10B]	[8B]

While claim 8 requires a "music audio source," claim 10 more broadly requires an "audio source." EX1012, ¶¶216-217.

10. Claim 11. The wireless digital audio receiver of claim 8, wherein the spread spectrum receiver module is further configured to utilize differential phase shift keying (DPSK) to demodulate said audio signal representation.

To the extent the *spread spectrum receiver module* refers to the *mobile digital audio spread spectrum receiver* of claim 8,[5] the '196-Publication in view of Gibson renders obvious this limitation. EX1012, ¶¶218-222.

The transmitter include "a differential phase shift key (DPSK) transmitter 48 that modulates the digital signal to be transmitted." EX1004, ¶[0014]; [8B].

While the '196-Publication does not expressly recite the use of a DPSK

[5] Petitioner's challenges to this claim are based on PO's implicit positions taken in its infringement contentions in co-pending litigation against Petitioners. While claim 8 is directed to a "spread spectrum transmitter…configured to be directly communicable with a mobile digital audio spread spectrum receiver" (*see* [8P]), dependent claim 11 is directed to "[t]he wireless digital audio receiver of claim 8." PO has contended that claim 8 is infringed by the "Accused Transmitter Products" and that claim 11 is infringed by the "Accused Receiver Products." EX1031, pp.2, 24.

demodulator in the audio receiver, the ’196-Publication teaches an audio receiver which receives and processes the transmitted signal through a wideband band pass filter 54, direct conversion receiver 56, and a receiver summing element 58. *Id.*, ¶¶[0015]-[0016]. The ’196-Publication then explains that “[t]he resulting summed digital signal from receiving summary element 58 may be processed by a 64-Ary demodulator 62 to demodulate the signal elements modulated in the audio transmitter.” *Id.*, ¶[0017]. A POSA would have understood that the DPSK demodulation would have been performed prior to the 64-Ary demodulation (i.e., by wideband band pass filter 54, direct conversion receiver 56, and/or a receiver summing element 58). Thus, the ’196-Publication in view of Gibson renders obvious *spread spectrum receiver module is further configured to utilize differential phase shift keying (DPSK) to demodulate said audio signal representation.* EX1012, ¶¶218-222.

11. Claim 12

See claim 11.

E. Ground 2: Walley in view of Miyake and Gibson Renders Obvious Claims 1-5, 8-10.

1. Overview of the combination; motivation to combine; expectation of success.

Ground 2 relies on Walley in view of Miyake and Gibson.

In a parallel proceeding, PO proposed that the terms “transmitter” and “audio source" should have their plain and ordinary meaning, and Petitioner disagrees with those proposed constructions. EX1023, 4-9. However, for purposes of Grounds 2 and 3 herein, Petitioner adopts PO's constructions for these terms to illustrate that, even under PO's proposed constructions, the challenged claims are obvious in view of the cited prior art. In Ground 4, Petitioner applies the proper constructions for these terms, as set forth in Section II.C.

Walley is directed to "generic type spread spectrum controllers" which address "Problems With the Current Art" relating to the "different requirements" of "wireless communications electronics, such as <u>cordless and cellular telephones, [and] wireless units to transmit music to speakers or headphones</u>." EX1015, Abstract, 2:33-39, 2:66-3:1, 12:15-25. Walley teaches a variable length PN code controller which can increase the PN code to "increase the transmit range or to overcome interference or jamming." EX1012, ¶226 (citing EX1015, 8:39-43, 9:4-9)). Walley does not expressly disclose the claimed "*unique user code*." However, Miyake teaches a "spread spectrum communication system which can simplify the management of users and services" by assigning user-specific spreading codes. EX1016, 2:23-26, 5:49-56, 8:12-60; EX1012, ¶227.

A POSA would have been motivated to combine the spreading process of Walley with Miyake's spreading process because it would combine Walley's adjustable system PN code (which can be lengthened to reduce interference) with

Miyake's user-specific spreading code, to provide a spreading process which creates user-specific spreading codes that can be lengthened to reduce interference. EX1012, ¶¶224-228. "[I]f a technique has been used to improve one device, and a person of ordinary skill in the art would recognize that it would improve similar devices in the same way, using the technique is obvious." *KSR Int'l Co. v. Teleflex Inc.*, 550 U.S. 398, 417 (2007). Such a combination would involve the use of Miyake's spreading process to improve Walley's similar spread spectrum system to provide user-specific spreading codes to tailor transmissions based on user preferences. EX1012, ¶¶224-229. For example, Walley explains that "the clarity and fidelity of sound in a portable phone may be an important consideration but, as the signal starts to fade, a user may willingly accept a somewhat lower fidelity in order to have an increased range." EX1015, 3:22-26. A POSA would have understood that user-specific spreading codes would allow the system to identify users that are willing to accept a lower fidelity in exchange for an increased range (or vice versa). EX1012, ¶¶224-229. Moreover, it would have been a simple substitution of one known element (Walley's system-based spreading code) for another (Miyaki's user-specific spreading code) to obtain predictable results (a user-specific spreading code). EX1012, ¶¶224-229. A POSA would have reasonably expected to succeed in using Miyake's user-specific spreading code in Walley's system because Miyake describes using spreading codes in the context of a spread spectrum system like Walley's and a POSA would have understood that implementing spreading codes on a user-basis (Miyake) instead of on a system-basis (Walley) would have only required routine knowledge as user accounts and user-specific systems were well-known, and Miyake describes its spread spectrum system as something "which can be designed easily." EX1012, ¶¶224-230; EX1016, 2:23-26.

Although Walley describes a CDMA spread spectrum controller suitable for a range of devices, Walley does not expressly disclose certain implementation details for the receiver and transmitter, including how its audio signal is encoded prior to transmission, how the received signal is decoded, and whether a received signal is directly converted from a carrier frequency to baseband without the use of an intermediate frequency. EX1012, ¶231. Gibson is a communications handbook which includes "articles or chapters" that are "written as tutorials or overviews, so that once the reader locates the broader topic, it is easy to find an answer to a specific question." EX1022, iii, title. A POSA would have been motivated to use the teachings of the Gibson handbook to provide the implementation details required to create a transmitter and receiver based on Walley's teachings, and would have had a reasonable expectation that applying Gibson's teachings to Walley would be successful. EX1012, ¶¶224-233. A POSA would have reasonably expected to succeed in implementing Gibson's teachings in Walley's system because Gibson is a handbook which includes "articles or chapters" that are "written as tutorials or overviews, so that once the reader locates the broader topic, it is easy to find an answer to a specific question" (EX1022, iii).

2. Claim 1

a. [1P] A mobile wireless digital audio receiver, configured to receive a unique user code and an original audio signal representation in the form of packets, said unique user code used to spread a spectrum of said signal and further configured for independent CDMA communication operation, said receiver independent of the operation of another receiver, said mobile wireless digital audio receiver comprising:

Assuming the preamble is limiting, Walley in view of Miyake and Gibson renders obvious this limitation. EX1012, ¶¶234-256.

Walley teaches "generic type spread spectrum controllers which can be used in a variety of applications." EX1015, Abstract. These controllers address "Problems With the Current Art" relating to the "different requirements" of "wireless communications electronics, such as cordless and cellular telephones, [and] wireless units to transmit music to speakers or headphones." EX1015, 2:33-39, 2:66-3:1, 12:15-25. Thus, Walley teaches *a mobile wireless digital audio receiver* (phones, speakers, or headphones).

The term "unique user code" should be construed to mean a "fixed code (bit sequence) specifically associated with one user of a device(s)" and "independent" in "independent CDMA" should be construed to mean "performed independent of any central control." *See* §II.C.

Walley discloses a spread spectrum system that uses a "spreading code[]" ("commonly referred to as Pseudo Noise (PN) codes") which Walley discloses as a "a dedicated code that is used to separate that system's transmissions from all others." EX1015, 1:27-59. "In a CDMA transmission, each bit of data to be transmitted is replaced by a spreading code if the data to be transmitted is a '1', and is replaced by the inverse of the spreading code if the data to be transmitted is '0'." EX1015, 1:38:41. Walley teaches that this code can be lengthened to "increase the noise immunity and the transmission range of the signal." *Id.*, 4:23-25.

Although Walley discloses that its "spreading codes" are "dedicated code[s]" used to separate transmissions, it does not expressly disclose that the "spreading codes" are unique to a particular user. Miyake discloses "spreading codes specific to individual users," which is consistent with the '000 patent's explanation that a "unique user code is specifically associated with one wireless digital audio system user." EX1001, 2:57-61. Specifically, Miyake teaches a "spread spectrum communication system which can simplify the management of users and services." EX1016, 2:23-26. Miyake describes a "spreading code" based on the output of a "first spreading code generator 32, which produces spreading codes specific to individual users" and the "output from the second spreading code generator 33, which produces spreading codes assigned according to the attributes." EX1016, 5:49-56; *see also id.*, 8:12-60.

A POSA would have understood this "spreading code" is a *unique user code* because Miyake discloses that the "spreading codes [are] specific to individual users." *Id.*, 5:49-56. Further, Miyake teaches that the spreading code is "set on the transmitter side [and] should coincide with the spreading code set on the receiver side" (and thus, is a "fixed code") and "those spreading codes should differ from those for the other channel users who also use this communication system." EX1016, 6:63-7:18.

A POSA would have been motivated to combine the spreading process of Walley with Miyake's spreading process because it would combine Walley's dedicated, system PN code with Miyake's spreading code to provide a spreading process which creates user-specific spreading codes that allow each user's respective receiver to operate independent of the operation of another user's receiver and allow the system to identify users that are willing to accept a lower fidelity in exchange for an increased range (or vice versa) and can be lengthened to reduce interference. §III.F.1; EX1012, ¶¶234-245.

Walley in view of Miyake and Gibson thus render obvious a *mobile wireless digital audio receiver* (Walley's phone, speaker or headphones)*, configured to receive a unique user code* (Walley's spreading code combined with Miyake's user-specific code) *and an original audio signal representation* (Walley's audio/music)...*said unique user code used to spread a spectrum of said signal.* EX1012, ¶¶234-249.

Walley teaches a receiver which uses a transmitter's unique spreading code ("a dedicated code") "to separate that system's transmission from all others." EX1015, 1:27-40; *see also id.*, 1:41-59, 5:33-44.

Miyake teaches a *receiver is configured to use independent code division multiple access communication* as Miyake teaches that "the spreading code set on the transmitter side should coincide with the spreading code set on the receiver side" and "those spreading codes should differ from those for the other channel users who also use this communication system." EX1016, 6:63-7:18. The one-to-one relationship between Miyake's receiver and transmitter teaches this definition as it does not require any centralized control. EX1012, ¶¶250-255. Additionally, Walley teaches that an orthogonal code is used to separate the transmissions of interest from the rest, so that the receiver only communicates with the transmitter of interest. EX1012, ¶¶250-255. Thus, Miyake alone and in view of Walley teach a *receiver… further configured for independent CDMA communication operation.*

Walley teaches the use of "data queues," such as "transmit data queue 407," where data "is maintained prior to transmission" and a "receive data [q]ueue 425, where it is held until the speech processing and decompression module 427 is ready to receive it." EX1015, 7:5-12; EX1015, 9:36-37, 6-12-13 ("data transmit queue, 803,…acts as a buffer"), ("data is then stored in a data queue 203 until it is ready to be transmitted"). "When the next bit of data is ready to be transmitted, it is clocked out of the data queue." EX1015, 6:13-14. A POSA would have understand that a "data queue" is a buffer which maintains the order of data received, and thus would have understood that Walley teaches or suggests an audio signal with an ordered sequence of bits. EX1012, ¶256.

Walley does not expressly disclose the characteristics of the bit sequence, such as how it is organized for transmission. EX1012, ¶257. However, it would have been obvious to a POSA to implement the system described in Walley to organize the transmitted bit sequence into blocks of data, such as by portioning the data into packets. EX1012, ¶¶256-257. First, a POSA would have been familiar with the use of packets in wireless digital communications and the advantages of such use. EX1012, ¶¶256-257. For example, Gibson teaches "the seven-layer open system interconnection (OSI) model" including a "data link layer, which transforms packets received from the network layer into *frames* by adding address, control and error check fields prior to their transmission." EX1022, 182. Gibson further teaches the use of "parity check bits" which "allow the receiver to detect and possibly correct errors in the received frames." *Id.* Gibson depicts an exemplary frame including a "data packet" and "Error Check (CRC)" fields:

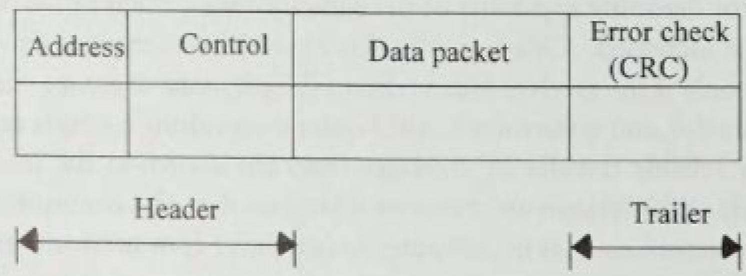


FIGURE 15.1 Structure of a frame.

EX1022, 182 (FIG. 15.1). Walley teaches a system which contemplates errors created based on "interference or jamming. EX1015, 8:40-43. A POSA would have been motivated to use Gibson's "packets" and parity check bits, such as the "Error check (CRC)" field to partition Walley's transmitted audio bit stream as it would allow the receiver to determine whether there was a transmission error, and potentially correct the error. EX1012, ¶¶256-258.

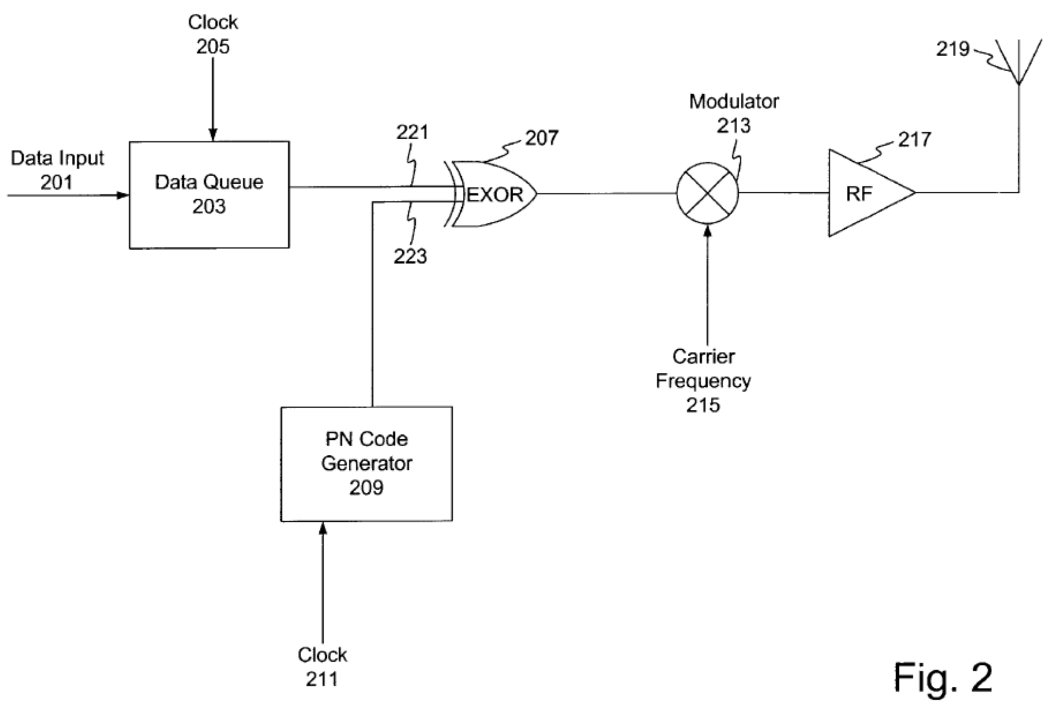
Thus, Walley in view of Miyake and Gibson renders obvious *an original audio signal representation in the form of packets.*

b. [1A] a direct conversion module configured to capture packets and a correct bit sequence within the packets aided by lowering signal detection error through reduced intersymbol interference coding of said original audio signal representation, said packets embedded in the received spread spectrum signal, the captured packets corresponding to the unique user code;

Walley in view of Miyake and Gibson renders obvious this limitation. EX1012, ¶¶259-270.

The term "direct conversion module" should be construed to mean a "module for converting radio frequency to baseband or very near baseband in a single frequency conversion without an intermediate frequency" and "[reduce/reduction of] intersymbol interference coding" should be construed to mean "coding that reduces intersymbol (inter-symbol) interference." §II.C.

Walley's exemplary spread spectrum transmitter includes a "modulator 213, for modulating the carrier frequency 215" with respect to FIG. 2, depicted below:



EX1015, FIG. 2.

A POSA would have understood that the disclosure of a transmitter which modulates a signal with a carrier frequency would teach or suggest a receiver which receives this transmission and performs the reciprocal steps. EX1012, ¶¶259-263.

Walley also does not explicitly disclose whether its receivers directly convert the received signal to baseband without using an intermediate frequency. EX1012, ¶264. However, Gibson teaches a "single conversion receiver"/"direct conversion receiver" which converts a received signal to baseband with "zero IF" (i.e., without using an intermediate frequency). EX1022, 1322-1323, FIG. 92.13; EX1012, ¶264.

It would have been obvious to combine Gibson's direct conversion receiver with the teachings of Walley to provide a receiver including a *direct conversion module configured to receive wireless spread spectrum signal transmissions* in view of Walley's teaching of a "modulator 213, for modulating the carrier frequency 215," in the transmitter. Gibson explains a "direct conversion receiver" is suitable for the "low power consumption and low cost" needs of portable electronic devices (e.g., "telephones") (EX1022, 1322-23) and "possesses several advantages over the normal superheterodyne approach" (*id.*, 1323-24) which a POSA would understand uses an intermediate frequency (EX1012, ¶¶259-265). A POSA would have understood that a receiver, such as wireless headphones, would benefit from a component suitable for "low power consumption and low cost" designs. EX1012, ¶¶259-265. A POSA would have understood that the use of Gibson's direct conversion receiver as part of the demodulator suggested by Walley is a simple substitution of one known frequency conversion/demodulation technique for another to achieve the predictable result of a conversion from a carrier frequency to baseband without the use of an intermediate frequency. EX1012, ¶¶259-265. Additionally, a

POSA would have understood that the inclusion of Gibson's direct conversion receiver in Walley's receiver is the combination of prior art elements according to known methods to yield predictable results. EX1012, ¶¶259-265.

As explained in [1P], (1) Walley in view of Miyaki renders obvious audio which is *received* in a *spread spectrum signal* based on a *unique user code*, and (2) Walley in view of Gibson renders obvious an *audio signal representation* *<u>in the form of packets</u>* (Walley's audio bit stream partitioned based on Gibson). It would have been obvious to combine these teachings to implement Walley's system to transmit packets within a spread spectrum signal and then configure the receiver to *capture…a correct bit sequence within the packets… said packets embedded in the received spread spectrum signal, the captured packets corresponding to the unique user code*. EX1012, ¶267.

Walley describes an audio signal ("continuous speech" or "any manner of data") which is "digitized and compressed," and then "provided to the transmit data queue 407, where it is maintained prior to transmission." EX1015, 6:51-7:26; *see also id.* at 12:15-24, 1:27-59, FIG. 4. Walley, however, does not expressly disclose how the audio signal is "encoded" prior to transmission. Gibson teaches that a signal can be encoded by introducing a "controlled amount of intersymbol" inference "at the transmitter, which can be removed at the receiver" using "partial-response (PR) signaling" (EX1022, 329) and then "precod[ing]" the signal "in such a way as to compensate for…intersymbol interference." (i.e. *coding that reduces intersymbol (inter-symbol) interference*). (EX1022, 333).

A POSA would have been motivated to combine Gibson with Walley to compensate for intersymbol interference in digital communication systems by encoding/decoding a digitized audio signal using Gibson's precoding techniques to provide a transmitter which creates *a correct bit sequence within the packets aided by lowering signal detection error through reduced intersymbol interference coding*. A POSA would have understood that the addition of Gibson's precoding techniques to Walley's system is the use of a known technique (precoding) to improve a similar digital data communication system in the same way (to reduce intersymbol interference). EX1012, ¶¶266-270.

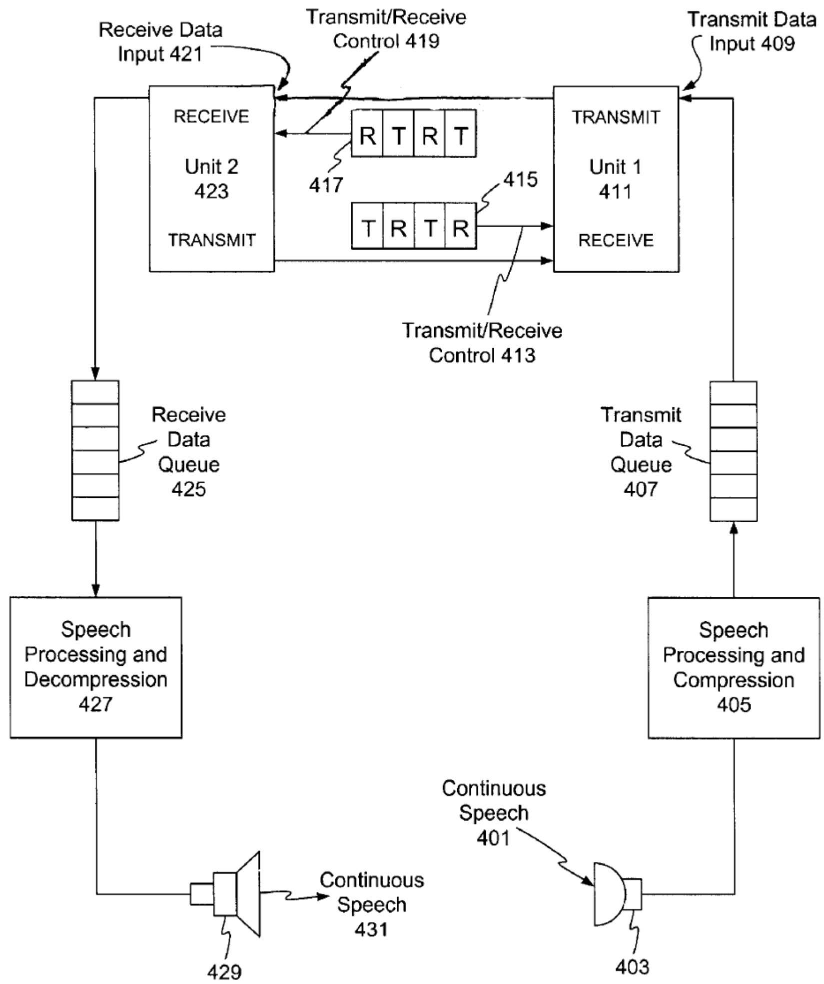
Gibson teaches that the "precoder compensates for the intersymbol interference introduced by the channel, allowing the receiver to detect the data by a simple threshold operation." EX1022, 336. Thus, a POSA would have understood that Gibson's precoding would additionally *aid in lowering signal detection error of said audio representation signal respective to said receiver and mobile said transmitter coupled to said music audio source.* EX1012, ¶¶269-271.

c. <u>[1B] a decoder operative to decode the reduced intersymbol interference coding of said original audio signal representation wherein each user has their audio receiver configured to communicate with their own separate audio transmitter, and said receiver virtually free</u>

from interference from transmission and reception device signals operating in the shared spectrum.

Walley in view of Miyake and Gibson renders obvious this limitation. EX1012, ¶¶272-278.

Walley describes a system which includes a speech processing and compression block 405 (which processes an audio signal before transmission) and a corresponding speech processing and decompression block 427 (*decoder operative to decode the demodulated transmission*) to process a received transmission to provide an audio signal to speaker 429:



EX1015, FIG. 4.

> The Microphone 403 is coupled to a speech processing and compression block 405 where the continuous speech is **digitized and compressed**. The resulting data is provided to the transmit data queue 407, where it is maintained prior to transmission….[T]he data is provided from the receive data queue 425 to the **speech processing and decompression module 427 for processing and decompression. The decompressed, processed speech is**

> **then provided to an output device, such as the speaker 429,** for reproducing it as continuous speech 431.

EX1015, 6:57-7:26.

A POSA would have been motivated to combine Gibson with Walley to compensate for intersymbol interference in digital communication systems by encoding Walley's audio signal using Gibson's precoding techniques (*reduced intersymbol interference coding*). *See* [1A]. A POSA would have understood that a precoded audio transmission would have required *a decoder operative to decode the reduced intersymbol interference coding of said original audio signal representation.* EX1012, ¶¶272-274.

Walley discloses a receiver which uses a transmitter's unique spreading code ("a dedicated code") "to separate that system's transmission from all others" "on the same frequency band." EX1015, 1:27-40; *see also id.*, 1:41-59, 5:33-44. A POSA would have understood that a *receiver* which uses the transmitter's unique spreading code "to separate that system's transmissions from all others" "on the same frequency band" would be *virtually free from interference from transmission and reception device signals operating in the shared spectrum*. EX1012, ¶¶275-276.

Walley does not teach whether a user has their own receiver or their own transmitter. Miyake teaches "spreading codes specific to individual users." EX1016, 5:49-58. Miyake teaches that "the spreading code set on the transmitter side should coincide with the spreading code set on the receiver side" and "those spreading codes should differ from those for the other channel users who also use this communication system." EX1016, 6:63-7:18. The one-to-one relationship between Miyake's receiver and transmitter teaches that *each user has their audio receiver configured to communicate with their own separate audio transmitter*. EX1012, ¶¶272-277. A POSA would have been motivated to implement Walley's system such that *each user has their audio receiver configured to communicate with their own separate audio transmitter* in view of Miyake because Walley does not discuss who owns/controls what device, and Miyake teaches a user-specific system which envisions a one-to-one relationship between a user's receiver and a corresponding transmitter.

Accordingly, Walley in view of Miyake and Gibson renders obvious claim 1.

3. Claim 2

Claim 2 largely corresponds to Claim 1 as indicated below.

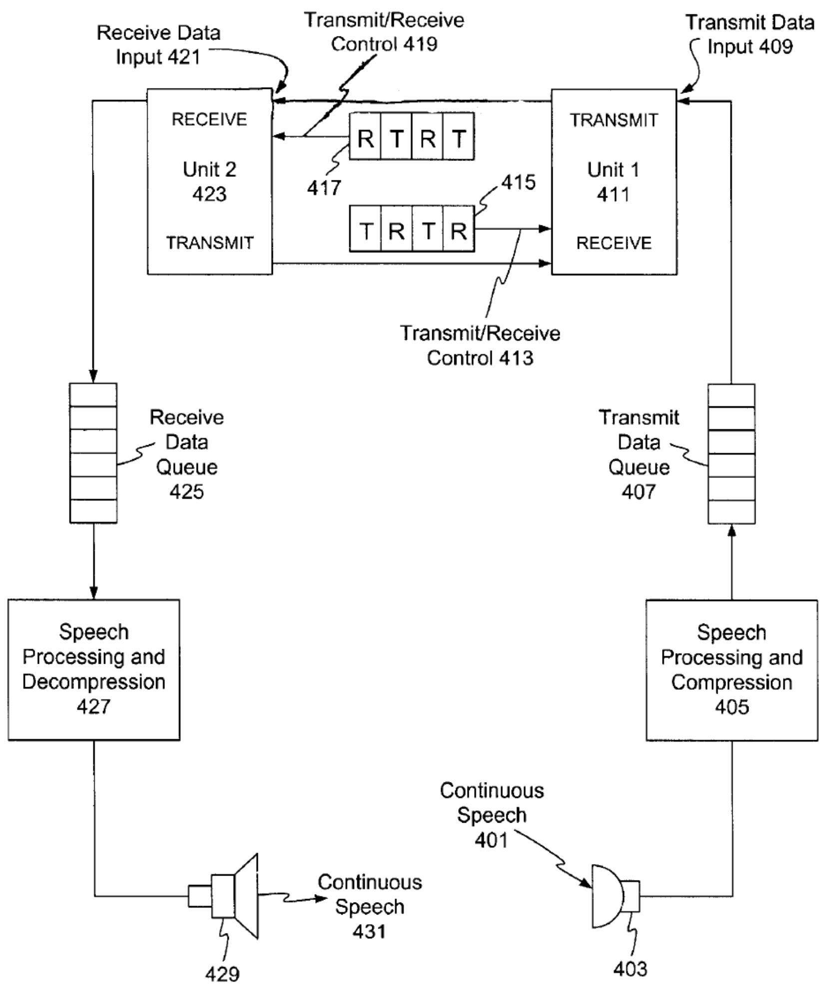
Limitation	Corresponding Limitation
[2P]	[1P]
[2A]	[1A]
[2B]	[1B]

a. [2C]

Walley in view of Miyake and Gibson renders obvious this limitation.

EX1012, ¶¶280-282.

Walley describes a speech processing and compression block 405 (which "digitizes" an audio signal before transmission) and a corresponding block 427 to reverse that process to provide an audio signal to speaker 429:



EX1015, FIG. 4; EX1015, 6:57-7:26 (explaining audio is "digitized and compressed" in block 405 and "decompressed" and "processed" in block 427), 9:13-17 ("If for instance the data is an analog voice waveform…the data input controller may perform an analog to digital conversion function.”).

A POSA would have understood that a system which converts an input from analog-to-digital before transmission would teach or suggest a digital-to-analog converter for *generating an audio output* (an analog signal) *of said original audio signal representation* (received digital audio signal). EX1012, ¶¶280-282.

b. [2D]

Walley in view of Miyake and Gibson renders obvious this limitation. EX1012, ¶¶283-286.

Walley discloses a receiver (portable phone, headphones, or a speaker) which includes a speaker to output the converted analog signal (*a module adapted to produce said generated audio output*). EX1015, 6:57-7:26 (“The decompressed, processed speech is then provided to an output device, such as the speaker 429”); *see also id.*, 6:51-56, 12:15-24 (“Another embodiment…comprises a set of wireless speakers”).

Walley in view of Miyake and Gibson renders obvious *wherein each user has their audio headphone configured to communicate with their own separate audio transmitter, and said audio virtually free from interference from transmission and reception device signals operating in a shared…spectrum*. *See* [1B].

Walley teaches a receiver such as wireless headphones. EX1015, 2:33-39, 2:66-3:1. Thus, Walley in view of Miyake and Gibson renders obvious renders obvious *a shared wireless headphone spectrum*.

4. Claim 3

a. [3P]

See [1P].

b. [3A]

Walley in view of Miyake and Gibson renders obvious this limitation. EX1012, ¶¶289-294.

Walley in view of Miyake and Gibson renders obvious *a digital audio headphone receiver* (Walley's headphones) *configured to receive an unique user code bit sequence* (Walley's spreading code combined with Miyake's user-specific code) *and an original audio signal representation in the form of packets* (Walley's audio, partitioned into packets as disclosed in Gibson)*, said digital audio headphone receiver, capable of mobile operation*. *See* [1P].

Walley teaches "generic type spread spectrum controllers" which address the "different requirements" of "wireless communications electronics, such as cordless and cellular telephones, [and] wireless units to transmit music to speakers or headphones." EX1015, Abstract, 2:33-39, 2:66-3:1, 12:15-25. Walley discloses "a portable telephone," which includes a "mobile hand unit" and "a base unit." *Id.*, 6:48-66.

Thus, Walley teaches a *receiver* (headphone)…*configured for direct digital* *coded wireless spread spectrum communication with a mobile digital audio transmitter* (“base unit” or a “wireless unit” such as a phone’s hand unit).

Walley in view of Miyake renders obvious *each user has their audio receiver configured to communicate with their own separate audio transmitter. See* [1B]. Since Walley teaches a headphone receiver, Walley in view of Miyake renders obvious *said user has their headphone configured to communicate with their own transmitter. Id*.

Thus, Walley in view of Miyake and Gibson render obvious *said user has their headphone configured to communicate with their own transmitter.*

c. [3B]

See [1A].

d. [3C]

Walley in view of Miyake and Gibson renders obvious this limitation. EX1012, ¶¶296-301.

Walley discloses modulating a signal for transmission and then demodulating the signal by a receiver using “CDMA”:

> Spread spectrum, also known as **CDMA, is a method of signal modulation** which distributes the data contained in a signal over a wide bandwidth.

EX1015, 5:13-15; *see also id.*, 5:16-44, FIG. 2, 6:10-26 (describing CDMA modulation in FIG. 2), 1:41-51 (despreading); EX1012, ¶297.

Walley's spread spectrum transmitter also includes a "modulator 213, for modulating the carrier frequency 215." EX1015, 6:10-34. While Walley does not expressly recite the use of a demodulator in the audio receiver, a POSA would have understood that modulations performed prior to transmission by the transmitter must be demodulated by the audio receiver. EX1012, ¶¶296-298.

Thus, Walley teaches a *digital demodulator* (receiver's counterpart of modulator 213 and CDMA demodulator).

Miyake alone and in view of Walley teaches *configured for independent CDMA communication operation. See* [1P]. Walley in view of Miyake render obvious *each user has their audio receiver configured to communicate with their own separate audio transmitter. See* [1B]. Thus, Walley in view of Miyake and Gibson render obvious *configured for independent CDMA communication operation wherein a user has their own transmitter and receiver.*

e. [3D]

See [1B].

f. [3E]

See [2C].

g. [3F]

Walley in view of Miyake and Gibson renders obvious this limitation. EX1012, ¶¶304-309.

Walley teaches the use of a "spreading code" "to separate that system's transmissions from all others." EX1015, 1:30-34. "To decode a spread spectrum transmission at the receiver, it is necessary to 'despread' the code." EX1015, 1:41-43.

A POSA would have been motivated to combine Walley and Miyake to create a *unique user code bit sequence* to modulate an audio signal for transmission and then demodulate/despread the signal at the receiver. *See* [1P]. Walley teaches that the received signal is processed and "provided to an output device, such as the speaker 429." EX1015, 7:8-19. Thus, Walley in view of Miyake and Gibson render obvious a receiver including *a module responsive to the unique user code bit sequence to produce said generated audio output.*

Walley in view of Miyake and Gibson renders obvious *wherein each user has their audio headphone configured to communicate with their own separate audio transmitter, said output virtually free from interference from transmission and reception device signals operating in the shared wireless headphone spectrum. See* [1B].

5. Claim 4

Walley in view of Miyake and Gibson renders obvious this limitation. EX1012, ¶¶310-311.

Walley teaches "generic type spread spectrum controllers" for "cordless and cellular telephones, [and] wireless units to transmit **music** to speakers or headphones." EX1015, Abstract, 2:33-39, 12:15-25. Walley discloses a "base unit" that can "broadcast a high fidelity **music** signal to the hand unit" when a person "was placed on hold." *Id.*, 7:36-40.

6. Claim 5

Claim 5 corresponds to the following limitations of Claims 1 and 2 as indicated below.

Limitation	Corresponding Limitation
[5P]	[1P]
[5A]	[1A]
[5B]	[1B]
[5C]	[2C]
[5D]	[2D]

7. Claim 8

a. [8P]

Walley in view of Miyake and Gibson renders obvious this limitation. EX1012, ¶¶313-325.

Walley teaches "generic type spread spectrum controllers" suitable for "cordless and cellular telephones, [and] wireless units to transmit music to speakers or headphones." EX1015, Abstract, 2:33-39, 2:66-3:1, 12:15-25. Walley discloses "a portable telephone," which includes a "mobile hand unit" and "a base unit." *Id.*, 6:48-66. The "base unit" can "broadcast a high fidelity music signal to the hand unit" when a person "was placed on hold." *Id.*, 7:36-40. Thus, Walley teaches a *wireless digital coded music audio spread spectrum transmitter* ("base unit" or a "wireless unit" such as a phone's hand unit) that *is capable of being moved in any direction during operation.*

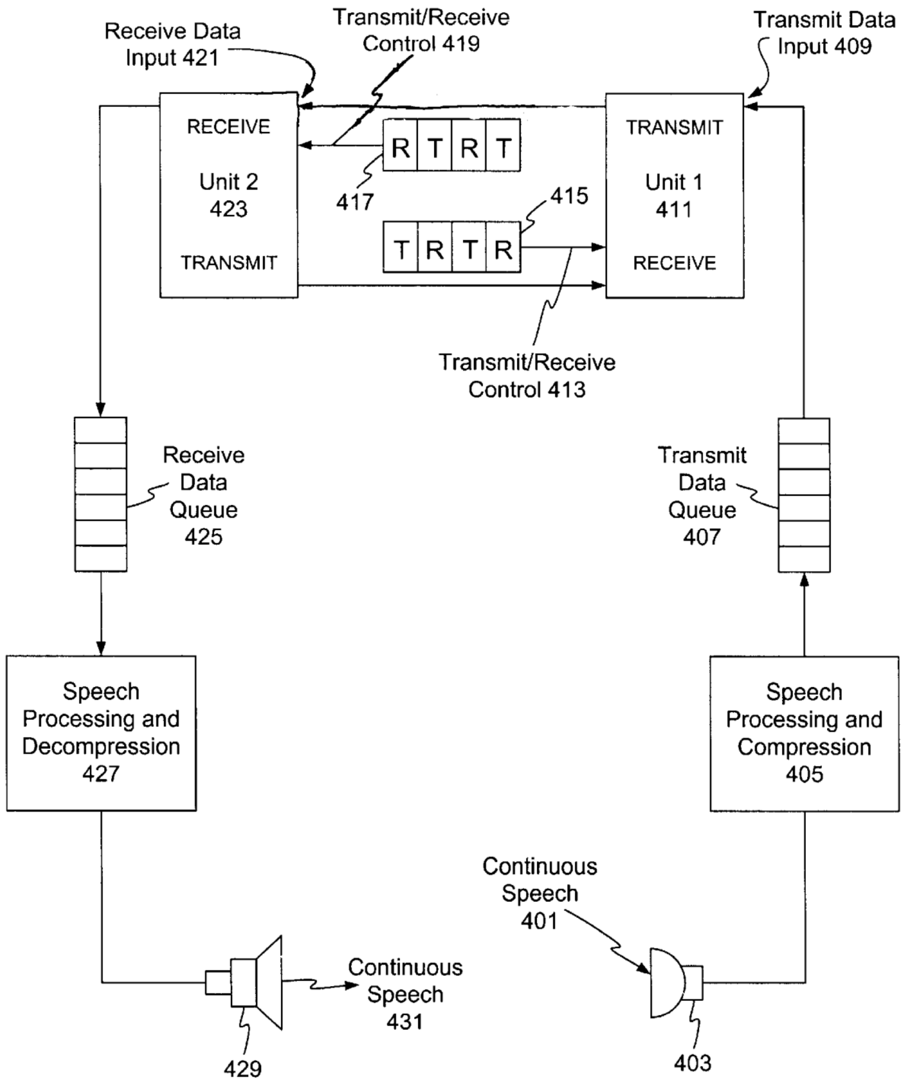
A POSA would have understood that transmitting music to speakers, headphones, or a portable phone's "hand unit" would require the *transmitter* to include or be connected to (and thus would be *operatively coupled to*) *a music audio source.* EX1012, ¶¶313-318.

The term "unique user code" should be construed to mean a "fixed code (bit sequence) specifically associated with one user of a device(s)." §II.C. Walley discloses a spread spectrum system that uses a "spreading code[]" ("commonly referred to as Pseudo Noise (PN) codes") which Walley discloses as a "a dedicated code that is used to separate that system's transmissions from all others." EX1015, 1:27-59. "In a CDMA transmission, each bit of data to be transmitted is replaced by a spreading code if the data to be transmitted is a '1', and is replaced by the inverse of the spreading code if the data to be transmitted is '0'." EX1015, 1:38:41. Walley teaches that this code can be lengthened to "increase the noise immunity and the transmission range of the signal." *Id.*, 4:23-25.

As explained in [1P] and [3F], a POSA would have been motivated to combine Walley and Miyake to provide a *unique user code bit sequence* to modulate an audio signal for transmission. Thus, Walley in view of Miyake renders obvious a *transmitter…configured to transmit a unique user code and an original audio signal representation.* EX1012, ¶¶313-323.

Walley in view of Miyake and Gibson renders obvious *an original audio signal representation in the form of packets. See* [1P].

Walley depicts a transmitting unit (411) directly communicating with a receiving unit (423):



EX1015, FIG. 4. Thus, Walley teaches a *transmitter configured to be directly communicable with a mobile digital audio spread spectrum receiver.*

b. [8A]

Walley in view of Miyake and Gibson renders obvious this limitation. EX1012, ¶¶326-330.

The "[reduce/reduction of] intersymbol interference coding" should be construed to mean "coding that reduces intersymbol (inter-symbol) interference."

§II.C.

Walley teaches an audio input signal that is digitized and processed (by speech processing and compression block 405) prior to transmission. *See* [3B]. Thus, Walley teaches an *encoder* (speech processing and compression block 405).

Gibson teaches precoding methods to encode/decode a transmission for reduced intersymbol interference in digital communication systems (i.e., *coding that reduces intersymbol (inter-symbol) interference*). *See* [1A].

A POSA would have been motivated to combine Gibson's precoding techniques with Walley's speech processing and compression block 405 (*encoder*) to mitigate intersymbol interference in digital data communication systems by encoding a digitized audio signal using Gibson's precoding techniques to perform *encoding operative to encode said original audio signal representation to reduce intersymbol interference*. EX1012, ¶¶326-330; *see* [1A]. Gibson teaches that the "precoder compensates for the intersymbol interference introduced by the channel, allowing the receiver to detect the data by a simple threshold operation." EX1022, 336. Thus, a POSA would have understood that Gibson's precoding would *aid in lowering signal detection error of said audio representation signal respective to said receiver and mobile said transmitter coupled to said music audio source.* EX1012, ¶¶326-330.

c. [8B]

Walley in view of Miyake and Gibson renders obvious this limitation. EX1012, ¶¶331-333.

Walley teaches modulating a signal for transmission using CDMA. EX1015, 5:13-44, FIG. 2, 6:10-26 (describing CDMA modulation in FIG. 2). EX1012, ¶332; *see* [3C]. Walley's spread spectrum transmitter also includes a "modulator 213, for modulating the carrier frequency 215." EX1015, 6:10-34. Thus, Walley teaches *a digital modulator module* (CDMA modulator and/or modulator 213).

Walley in view of Miyake and Gibson renders obvious *independent code division multiple access communication operation. See* [3C].

Walley in view of Miyake and Gibson renders obvious *each user has their audio receiver configured to communicate with their own separate audio transmitter, and said receiver virtually free from interference from transmission and reception device signals operating in the shared spectrum*. *See* [1B]. As reflected with corresponding annotations (red, green, blue), [8B] recites materially the same limitations, and thus, Walley in view of Miyake and Gibson renders obvious renders obvious *each user has their own separate transmitter configured to communicate with their receiver, said transmitter configured to wirelessly transmit said audio to be reproduced virtually free from interference from transmission and reception device signals operating in the wireless digital audio transmitter shared spectrum*.

8. *Claim 9*

Claim 9 corresponds to the limitations of Claim 1 as indicated below.

Limitation	Corresponding Limitation
[9A]	[1A]
[9B]	[1B]

a. [9P]

[9P] is materially the same as [1P], except [9P] additionally requires the *receiver…capable of being moved in any direction during operation.* Walley teaches a wireless headphone receiver, and thus, Walley in view of Miyake and Gibson renders obvious this limitation. *See* [1P]; EX1012, ¶¶335-337.

9. Claim 10.

Claim 10 corresponds to the limitations of Claim 8 as indicated below.

Limitation	Corresponding Limitation
[10P]	[8P]
[10A]	[8A]
[10B]	[8B]

While claim 8 requires a "music audio source," claim 10 more broadly requires an "audio source."

F. Ground 3: Walley in view of Miyake, Gibson, and Rappaport Renders Obvious Claims 11-12.

1. Overview of the combination; motivation to combine; expectation of success.

Ground 3 relies on Walley in view of Miyake, Gibson and Rappaport. A POSA would have been motivated to combine the teachings of Walley, Miyake and Gibson for the reasons provided in Ground 2.

A POSA would additionally have been motivated to combine these teachings with Rappaport. Walley teaches a CDMA spread spectrum controller suitable for a range of devices, but Walley does not expressly disclose certain implementation details for the receiver and transmitter, including how its audio signal is modulated prior to transmission. *See* §§ III.D.3, III.E.2.a; EX1012, ¶¶340-341. Rappaport is a textbook whose purpose "to initiate the newcomer to cellular radio and wireless personal communications." EX1018, xiii. A POSA would have been motivated to use the teachings of the Rappaport textbook to provide the implementation details required to create a transmitter and receiver based on Walley's teachings, and would have had a reasonable expectation that applying Rappaport's teachings to Walley would be successful. EX1012, ¶¶340-342. A POSA would have reasonably expected to succeed in implementing Rappaport's teachings in Walley's system because Rappaport was "designed for the student or practicing engineer" (EX1018, xiii) and "provides extensive coverage of the most common analog and digital modulation techniques used in mobile communications" (EX1018, xiv).

2. Claim 11

To the extent the *spread spectrum receiver module* refers to the *mobile digital* *audio spread spectrum receiver* of claim 8 or a component of this *receiver*,[6] Walley in view of Miyake, Gibson and Rappaport renders obvious this limitation. EX1012, ¶¶344-347.

Walley's spread spectrum transmitter includes a "modulator 213, for modulating the carrier frequency 215." EX1015, 6:10-34. Walley does not expressly disclose what modulation is performed by modulator 213. A POSA would have understood that this modulator could include a DPSK modulator. For example, Rappaport teaches that Differential PSK (DPSK) is a "widely used" modulation technique which advantageously "avoids the need for a coherent reference signal at the receiver" and whose receivers are "easy and cheap to build." EX1018, 242.

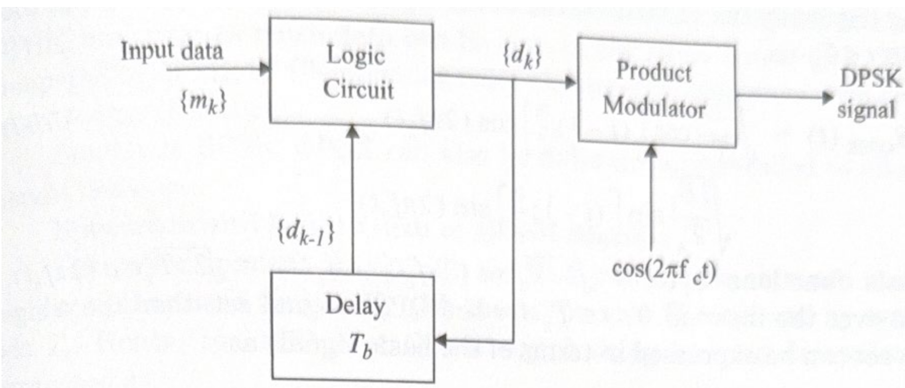


Figure 5.24
Block diagram of a DPSK transmitter.

[6] *See* footnote 5.

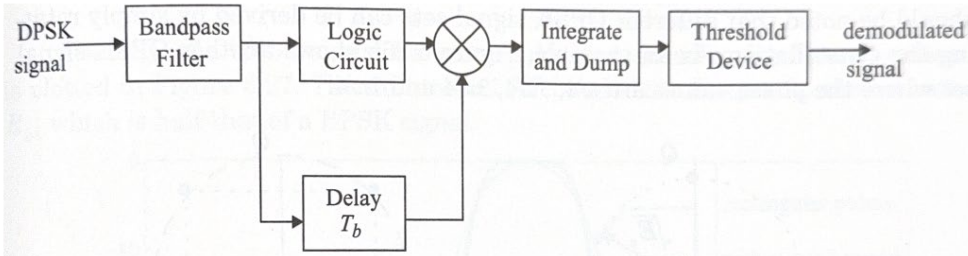


Figure 5.25
Block diagram of DPSK receiver.

EX1018, FIG. 5.24, 5.25.

A POSA would have understood that using Rappaport's DPSK modulators/demodulators to perform the modulation/demodulation in Walley's system is the use of a known technique (DSPK) to improve a similar wireless system in the same way (to modulate/demodulate a signal).

Thus, Walley in view of Miyake, Gibson, and Rappaport renders obvious *spread spectrum receiver module is further configured to utilize differential phase shift keying (DPSK) to demodulate said audio signal representation.* EX1012, ¶¶344-347.

3. *Claim 12*

See claim 11.

G. Ground 4: Walley In View of Miyake, Gibson, Rappaport and Drakoulis Renders Obvious Claims 1-5 and 8-12.

1. *Overview of the combination; motivation to combine; expectation of success.*

In contrast to Grounds 2 and 3 above, Petitioner applies the constructions set forth in Section II.C from the *Apple* Action for the terms "transmitter" and "audio source" for Ground 4. Below, Petitioner identifies how these terms are met by the combination of Walley and Drakoulis, and Petitioner otherwise adopts the arguments set forth in Grounds 2 and 3 above.

Ground 4 relies on Walley in view of Miyake, Gibson, Rappaport, and Drakoulis. A POSA would have been motivated to combine the teachings of Walley, Miyake, Gibson and Rappaport for the reasons provided in Ground 3.

A POSA would additionally have been motivated to combine these teachings with Drakoulis. Walley teaches a CDMA spread spectrum controller for wireless headphones, speakers and phones, and teaches transmitting music to these devices from "wireless units" or a "base unit." *See* §§ III.D.3, III.E.2.a.

Drakoulis describes "**a base unit 22 containing a high frequency transmitter** and a remote unit 24 which is capable of receiving the high frequency transmitted signal." EX1021, 5:27-5:33. **"**As shown in FIG. 1, the base unit 22 is adapted to be **coupled via jacks or connectors** and electrical conductors to the signal source 10." EX1021, 5:34-37.

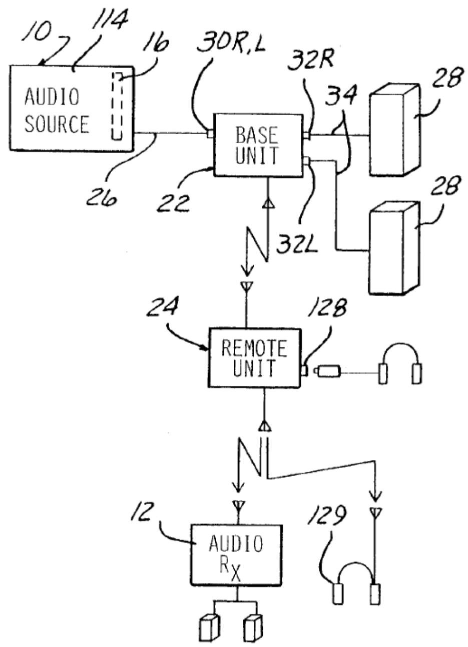


FIG. 1

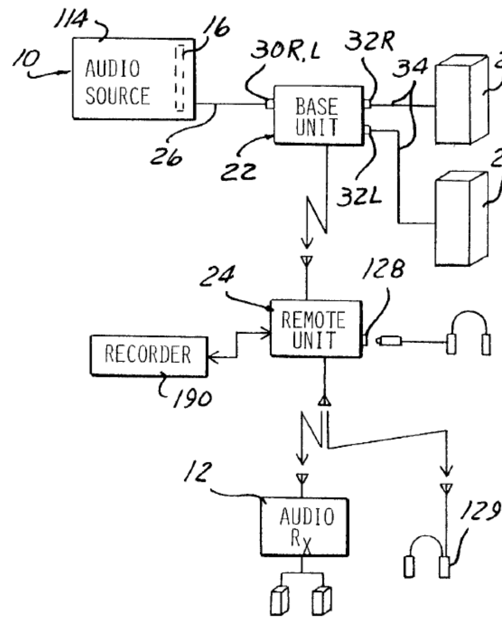


FIG. 6

EX1021, FIGS. 1, 6.

Drakoulis teaches "a **stereo mini-input jack**…may also be mounted on the housing of the base unit 22 for receiving mini plug connectors." EX1021, 5:56-62.

Drakoulis teaches that "audio sources 10" include "a CD player, AM/FM tuner, tape deck, turntable, etc." EX1021, 5:19-25. A POSA would have understood that these audio sources conventionally include an analog headphone jack.

A POSA would have been motivated to combine Drakoulis's transmitter (which includes a stereo mini-input jack to connect to an *audio source*'s headphone jack to wirelessly transmit the *audio source's* audio) with Walley because Walley teaches "generic type spread spectrum controllers which can be used in a variety of applications" and Drakoulis teaches a transmitter adds wireless capabilities to a non-wireless audio source. EX1012, ¶¶350-358.

Moreover, it would have been a simple substitution of one known element (Walley's transmitter, such as a "wireless unit" or "base unit" capable of transmitting music) for another (Drakoulis's transmitter, which is capable of transmitting music outputted from an audio source's headphone jack) to obtain predictable results (a "wireless unit" or "base unit" capable of transmitting music outputted from an audio source's headphone jack). EX1012, ¶¶350-359. A POSA would have had a reasonable expectation of success at combining Drakoulis's "stereo mini-input jack" with Walley's transmitters because Walley explains that "any manner of data could be substituted" for the exemplary "continuous speech input" disclosed by Walley, and a stereo mini-input jack is a conventional component that is routinely added to provide audio input to a device. EX1012, ¶¶350-359.

2. *Claims 1-5, 8-12*

a. [1B], [2D], [3A], [3C], [3F], [5D], [8P]-[8B], [9B], [10P]-[10B]

The term "transmitter" should be construed to mean "a device that can be connected into an analog headphone jack to wirelessly transmit an audio signal" and the term "audio source" should be construed to mean "a device for providing audio that has an analog headphone jack." §II.C.

Drakoulis teaches a *transmitter* (base unit 22) *coupled to a music audio source*

(CD player, AM/FM tuner, tape deck) under these constructions. §III.G.1.

A POSA would have been motivated to combine Drakoulis's *transmitter* and *audio source* with Walley because Walley teaches "generic type spread spectrum controllers which can be used in a variety of applications" and Drakoulis teaches a transmitter which adds wireless capabilities to a non-wireless audio source using an analog headphone jack. *See* §III.G.1.

Walley in view of Miyake, Gibson, Rappaport and Drakoulis thus renders obvious the *transmitter* (Walley's music-transmitting wireless unit or base unit modified by Drakoulis to connect to a headphone jack) recited in [1B], [2D], [3A], [3C], [3F], [5D], [8P]-[8B], [9B], [10P]-[10B] and the *audio source* recited in [8P], [8A], [10P], [10A].

Limitation [3A] recites a "mobile digital audio transmitter," limitations [8P] and [10P] recite a "transmitter…capable of being moved in any direction during operation," limitation [8A] recites a "mobile said transmitter." These elements are rendered obvious by Walley's music-transmitting wireless unit or base unit modified by Drakoulis to connect to a headphone jack because Drakoulis explains that its *transmitter* (base unit 22) "is provided with DC power from DC storage batteries 36 or by a conventional AC/DC adapter 38," and thus, Drakoulis teaches a battery-powered *mobile…transmitter…capable of being moved in any direction during operation*. EX1021, 5:63-6:2, FIGS. 2, 3B.

b. <u>The Remaining Limitations</u>

Walley in view of Miyake, Gibson, Rappaport and Drakoulis render obvious the remaining limitations of claims 1-5 and 8-12 for the same reasons provided in Grounds 2 and 3.

IV. MANDATORY NOTICES

A. Real Party-In-Interest

The real parties in interest to this petition are Samsung Electronics, Co., Ltd. and Samsung Electronics America, Inc.

B. Related Matters

The ’000 patent is involved in the following district court actions: *One-E-Way, Inc. v. Dell Techs. Inc.*, 24-cv-1558 (W.D. Tex., filed December 18, 2024); *One-E-Way, Inc. v. Anker Innovations. Ltd.*, 24-cv-1559 (W.D. Tex., filed December 18, 2024); *One-E-Way, Inc. v. Samsung Electronics Co., Ltd.*, 24-cv-1561 (W.D. Tex., filed December 18, 2024).

C. Lead and Back-Up Counsel

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D. Service

Petitioner consents to service by email on the following email address: Samsung-OEW-IPR@gtlaw.com.

V. FEES

The required fee is being paid electronically through P-TACTS.

VI. CONCLUSION

For the reasons explained herein, Petitioner requests that IPR be instituted and the Challenged Claims be canceled.

Dated: September 17, 2025

Respectfully Submitted,

/*Trenton A. Ward*/

Trenton A. Ward
Reg. No. 59,157

CERTIFICATE OF COMPLIANCE

This petition complies with the word count limits set forth in 37 C.F.R. § 42.24(a)(i), effective May 2, 2016, because this Petition contains less than 14,000 words, excluding the parts of the petition exempted by 37 C.F.R. § 42.24(a), as determined using the word count provided by Microsoft Word, which was used to prepare this Petition.

Dated: September 17, 2025

Respectfully Submitted,

/*Trenton A. Ward*/

Trenton A. Ward
Reg. No. 59,157

CERTIFICATE OF SERVICE

Pursuant to 37 C.F.R. §§ 42.6(e) and 42.105(a), the undersigned certifies that on September 17, 2025, I caused a true and correct copy of PETITION FOR INTER PARTES REVIEW OF CLAIMS 1-5 and 8-12 OF U.S. PATENT NO. 9,107,000*,* Exhibits 1001-1016, 1018, 1021-1031, and PETITIONER'S POWER OF ATTORNEY by UPS Next Day Air on the Patent Owner at the correspondence address of record for U.S. Patent No. 9,107,000 as follows:

20995 - Knobbe, Martens, Olson & Bear, LLP
2040 Main Street
Fourteenth Floor
Irvine, CA
United States

I further certify that a courtesy copy of the above-identified materials were served on litigation counsel by electronic means upon the foregoing individuals:

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