

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: IPR2025-01516
U.S. Patent No. 10,468,047

**PETITION FOR *INTER PARTES* REVIEW OF CLAIMS 1-20 OF
U.S. PATENT NO. 10,468,047**

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PETITIONER’S EXHIBIT LIST

Exhibit No.	Description
1001	U.S. Patent No. 10,468,047 to Woolfork (“’047 patent”)
1002	File history of U.S. Application No. 16/185,786, filed November 9, 2018 (“the 2018 application”)
1003	File history of U.S. Application No. 10/027,391, filed December 21, 2001 (“the 2001 application”), as originally filed in <i>Sony Corp. v. One-E-Way, Inc.</i> , IPR2016-01638 as Exhibit 1003
1004	U.S. Publication No. 2003/0118196 (“the ’196-Publication”), as originally filed in <i>Sony Corp. v. One-E-Way, Inc.</i> , IPR2016-01638 as Exhibit 1004
1005	File history of U.S. Application No. 10/648,012, filed August 26, 2003 (“the 2003 application”), as originally filed in <i>Sony Corp. v. One-E-Way, Inc.</i> , IPR2016-01638 as Exhibit 1005
1006	U.S. Patent No. 7,412,294, as originally filed in <i>Sony Corp. v. One-E-Way, Inc.</i> , IPR2016-01638 as Exhibit 1006
1007	Excerpts from file history of U.S. Application No. 12/144,729, filed July 12, 2008 (“the 2008 application”), as originally filed in <i>Sony Corp. v. One-E-Way, Inc.</i> , IPR2016-01638 as Exhibit 1007
1008	Comparison of the 2003 application as-filed with the 2001 application as-filed, as originally filed in <i>Sony Corp. v. One-E-Way, Inc.</i> , IPR2016-01638 as Exhibit 1008
1009	Comparison of figures from the 2003 and 2001 applications as-filed, as originally filed in <i>Sony Corp. v. One-E-Way, Inc.</i> , IPR2016-01638 as Exhibit 1009
1010	Comparison of the ’294 patent with the as-filed 2003 application, as originally filed in <i>Sony Corp. v. One-E-Way, Inc.</i> , IPR2016-01638 as Exhibit 1010
1011	Comparison of the 2008 application as-filed with the 2018

Exhibit No.	Description
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1012	Declaration of Michael Davies
1013	<i>One-E-Way, Inc. v. Apple Inc.</i> , No. 2:20-cv-06339, Dkt. 86 (C.D. Cal. Mar. 9, 2022) (“Apple Markman order”)
1014	<i>In the Matter of Certain Consumer Elecs. And Display Devices with Graphics Processing and Graphics Processing Units Therein</i> , 337-TA-943, Order 12 (ITC July 24, 2015) (“ITC Markman order”)
1015	U.S. Patent No. 6,744,808 (“Walley”)
1016	U.S. Patent No. 5,546,424 (“Miyake”)
1017	Reserved
1018	“Wireless Communications: Principles & Practice” by Theodore S. Rappaport (1996) (“Rappaport”)
1019	Reserved
1020	Reserved
1021	U.S. Patent No. 6,256,303 (“Drakoulis”)
1022	“The Communications Handbook” (1997) by Jerry D. Gibson (“Gibson”)
1023	One-E-Way’s Opening Claim Construction Brief <i>One-E-Way, Inc. v. Apple Inc.</i> , 2:20-cv-6339-JSK-PD (D.I. 65) (C.D. Cal. Dec. 6, 2021)
1024	Order Re Motion For Summary Judgment of Non-Infringement (“Apple Summary Judgment Order”) <i>One-E-Way, Inc. v. Apple Inc.</i> , 2:20-cv-6339-JSK-PD (D.I. 102) (C.D. Cal. June 15, 2022)
1025	Library of Congress Record for “Wireless Communications:

Exhibit No.	Description
	Principles & Practice” by Theodore S. Rappaport (1996)
1026	U.S. Patent No. 5,933,421
1027	Library of Congress Record for “The Communications Handbook” (1997)
1028	U.S. Patent No. 5,953,669
1029	Opinion Affirming <i>Apple</i> Summary Judgment Order <i>One-E-Way, Inc. v. Apple Inc.</i> , 2022-2020 (D.I. 32) (Aug. 14, 2023)
1030	<i>Curriculum Vitae</i> , Michael Allan Martin Davies

CLAIM LISTING

Claim or Element #	Claim Language
[1P]	A portable spread spectrum audio receiver configured to receive and store a unique user code, said portable spread spectrum receiver configured to receive wireless modulation transmissions from a spread spectrum transmitter coupled to a music audio source, said wireless modulation transmissions representative of an audio signal representation, said portable spread spectrum audio receiver comprising:
[1A]	a direct conversion module configured to receive wireless modulation transmissions representative of said audio signal representation and which have been processed to reduce intersymbol interference, and wherein said portable spread spectrum audio receiver further processes said received wireless modulation transmissions for reduction of intersymbol interference;
[1B]	a digital-to-analog converter (DAC) configured to provide an analog audio output signal corresponding to said audio signal representation;
[1C]	a speaker configured to generate an audio signal corresponding to said analog audio output signal, wherein said generated audio signal does not include audible audio content originating from any audio signals transmitted in a spectrum used by said spread spectrum transmitter that do not originate from said spread spectrum transmitter;
[1D]	wherein said portable spread spectrum audio receiver is configured to use independent code division multiple access communication and to use said unique user code to communicate with only said spread spectrum transmitter during a wireless connection;
[1E]	wherein said portable spread spectrum audio receiver is further configured to perform at least one of a plurality of demodulations on at least one of said received wireless modulation transmissions, wherein said plurality of demodulations includes a differential phase shift keying (DPSK) demodulation and a non-DPSK demodulation; and

Claim or Element #	Claim Language
[1F]	wherein said further processing for reduction of intersymbol interference is separate from said performance of at least one of said plurality of demodulations.
[2]	The portable spread spectrum audio receiver of claim 1, wherein the portable spread spectrum audio receiver is further configured to perform said plurality of demodulations on the at least one of said received wireless modulation transmissions.
[3]	The portable spread spectrum audio receiver of claim 1, wherein the audio signal representation represents music.
[4]	The portable spread spectrum audio receiver of claim 1, wherein said analog audio output signal is capable of representing audio signals below 40 Hz and also capable of representing audio signals above 5 kHz.
[5]	The portable spread spectrum audio receiver of claim 1, wherein the portable spread spectrum audio receiver includes a power supply.
[6]	The portable spread spectrum radio receiver of claim 1, further comprising a headphone unit, wherein the headphone unit is configured to integrate the speaker and wherein the headphone unit enables a user to secure the speaker on to a head of the user.
[7]	The portable spread spectrum radio receiving of claim 6, wherein the headphone unit comprises a headphone strap that connects the speaker with another speaker for opposite ear.
[8P]	A portable spread spectrum audio receiver configured to receive and store a unique user code, said portable spread spectrum receiver configured to receive wireless modulation transmissions from a spread spectrum transmitter coupled to a music audio source, said wireless modulation transmissions representative of an audio signal representation, said portable spread spectrum audio receiver configured to:
[8A]	use independent code division multiple access communication and said unique user code to communicate with only said spread spectrum transmitter during a wireless connection;
[8B]	receive wireless modulation transmissions representative of said audio signal representation;
[8C]	process said received wireless modulation transmissions for

Claim or Element #	Claim Language
	reduction of intersymbol interference;
[8D]	perform at least one of a plurality of demodulations on at least one of said received wireless modulation transmissions, wherein said plurality of demodulations includes a differential phase shift keying (DPSK) demodulation and a non-DPSK demodulation;
[8E]	generate an analog audio output signal corresponding to said audio signal representation; and
[8F]	output an audio signal corresponding to said analog audio output signal.
[9]	The portable spread spectrum audio receiver of claim 8, wherein the portable spread spectrum audio receiver is further configured to perform said plurality of demodulations on the at least one of said received wireless modulation transmissions.
[10]	The portable spread spectrum audio receiver of claim 8, wherein, prior to being received by the portable spread spectrum audio receiver, the wireless modulation transmissions have been processed to reduce intersymbol interference.
[11]	The portable spread spectrum audio receiver of claim 8, wherein said analog audio output signal is capable of representing audio signals below 40 Hz and also capable of representing audio signals above 5 kHz.
[12]	The portable spread spectrum audio receiver of claim 8, wherein said generated audio signal does not include audible audio content originating from any audio signals transmitted in a spectrum used by said spread spectrum transmitter that do not originate from said spread spectrum transmitter.
[13]	The portable spread spectrum audio receiver of claim 8, wherein said processing for reduction of intersymbol interference performed by the portable spread spectrum audio receiver is separate from said performance of at least one of said plurality of demodulations.
[14]	The portable spread spectrum audio receiver of claim 8, wherein the portable spread spectrum audio receiver includes a power supply.
[15]	The portable spread spectrum radio receiver of claim 8, further comprising a headphone unit, wherein the headphone unit is

Claim or Element #	Claim Language
	configured to integrate the speaker and wherein the headphone unit enables a user to secure the speaker on to a head of the user.
[16]	The portable spread spectrum radio receiving of claim 15, wherein the headphone unit comprises a headphone strap that connects the speaker with another speaker for opposite ear.
[17P]	A portable spread spectrum audio transmitter coupled to a music audio source, said transmitter configured to transmit a unique user code and wireless modulation transmissions representative of an audio signal representation, said portable spread spectrum audio transmitter configured to:
[17A]	encode a first representation of an audio signal to reduce intersymbol interference associated with a transmitted representation of the audio signal;
[17B]	perform at least one of a plurality of modulations on the first representation of the audio signal;
[17C]	generate a modulated signal based on the performance of at least one of the plurality of modulations, wherein the plurality of modulations includes a differential phase shift keying (DPSK) modulation and a non-DPSK modulation; and
[17D]	use the modulated signal and independent code division multiple access communication to wirelessly transmit a transmitted representation of the audio signal.
[18]	The portable spread spectrum audio transmitter of claim 17, wherein said plurality of modulations are separate from the encoding and processing by the encoder.
[19]	The portable spread spectrum audio transmitter of claim 17, wherein the transmitted unique user code distinguishes the transmitted representation of the audio signal from other transmitted audio signals in the spread spectrum transmitter spectrum, said other transmitted audio signals not originating from said wireless digital coded audio spread spectrum transmitter.
[20]	The portable spread spectrum audio transmitter of claim 17, wherein the portable spread spectrum audio transmitter includes a power supply.

Samsung Electronics Co., Ltd. (“Petitioner”) petitions for *inter partes* review of claims 1-20 of U.S. Patent No. 10,468,047 (“the ’047 patent”).

I. OVERVIEW

A. The ’047 Patent

The ’047 patent generally relates to a wireless digital audio system having a portable audio source with a transmitter and a receiver configured for communication with the transmitter.

Figure 1 depicts music audio source 80 connected to a battery powered wireless transmitter 20, which transmits audio wirelessly using an antenna 24 to a receiving antenna 52 of a headphone receiver 50. The speakers 75 in headphones 55 are used for listening to the spread spectrum-demodulated and decoded communication signal. EX1001, 2:36-3:2.

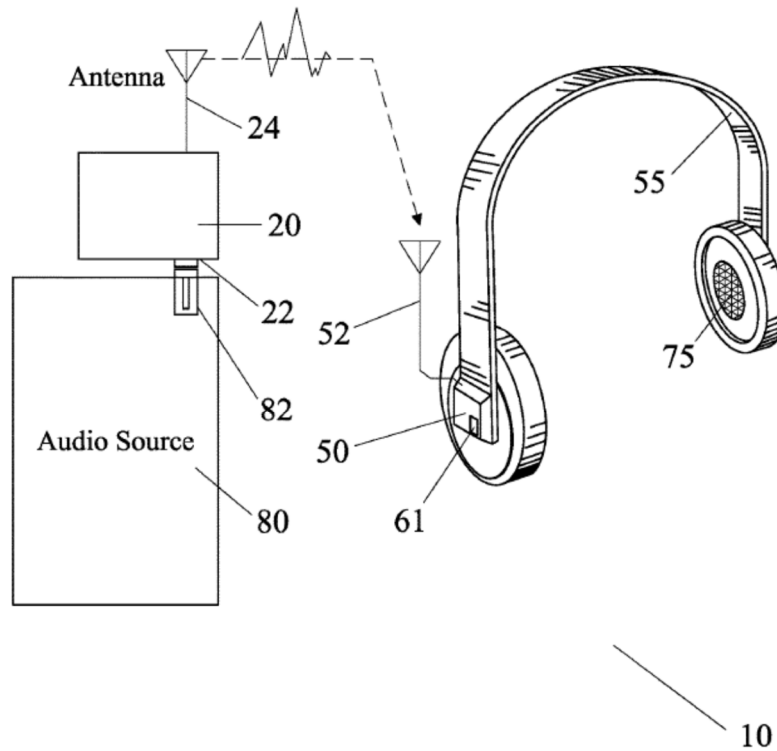


FIG. 1

Figures 2 and 3 depict block diagrams of the wireless digital audio system. The transmitter in Figure 2 digitizes the audio signal from the audio source 80 using an analog to digital converter (ADC) 32. The unique user code generated by code generator 44 is associated with one wireless digital audio system user. EX1001, 2:51-3:2.

The spread spectrum modulated signal is received by the antenna 52 and processed by spread spectrum direct conversion receiver or module 56 with a receiver code generator 60 that contains the same unique code. A digital-to-analog converter (DAC) 70 is used to transform the digital signal to an analog audio signal. EX1001, 3:3-37, 4:24-35.

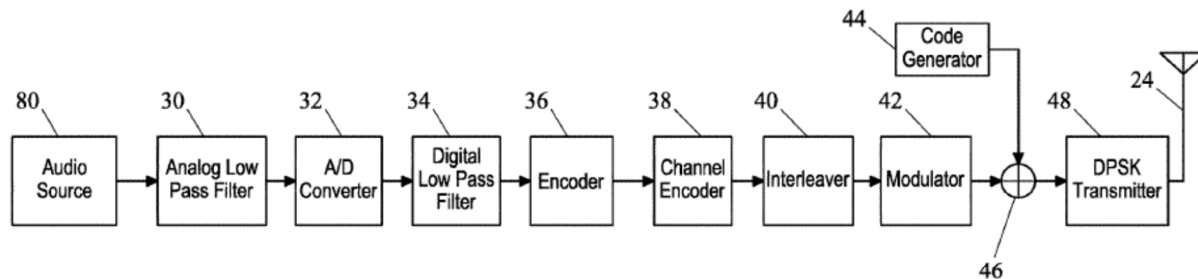


FIG. 2

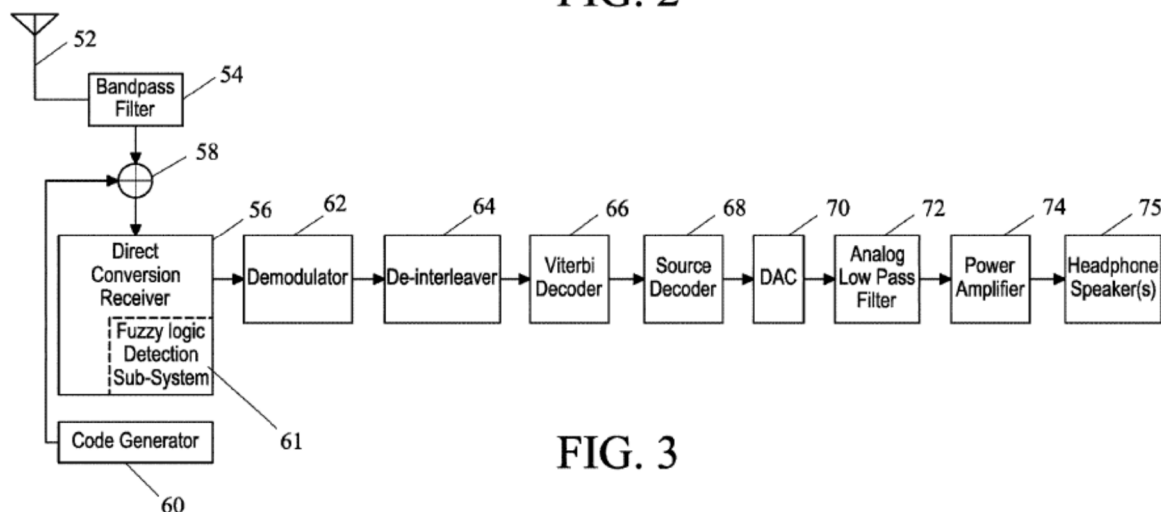


FIG. 3

B. Prosecution History

The relevant portions of the prosecution history are addressed in Section III.B below with respect to the Effective Filing Date of the Challenged Claims.

II. REQUIREMENTS FOR IPR

A. Standing

Petitioner certifies that the petition is filed within one year of service of a Complaint asserting the '047 patent.

B. Challenge and Relief Requested

Petitioner requests institution of IPR and cancelation of claims 1-20 ("Challenged Claims") of the '047 patent based on the following grounds:

Ground	Claims	Basis
1	1-4, 6-13, 15-19	Rendered obvious by '196-Publication (EX1004)
2	5, 14, 20	Rendered obvious by '196-Publication (EX1004) in view of Rappaport (EX1018)
3	1-5, 8-14, 17-20	Rendered obvious by Walley (EX1015) in view of Miyake (EX1016), Gibson (EX1022), and Rappaport (EX1018)
4	6-7, 15-16	Rendered obvious by Walley (EX1015) in view of Miyake (EX1016), Gibson (EX1022), Rappaport (EX1018), and Drakoulis (EX1021)
5	1-20	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 the '047 patent, *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 of the '047 patent as set forth in the table below:

Term	Construction
“[reduce/reduction of] intersymbol interference coding”	“coding that reduces intersymbol (inter-symbol) interference”
The term “independent” in the context of “independent” CDMA communication	“performed independent of any central control”
“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.* 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 ’047 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

¹ This is the level of skill adopted by the Administrative Law Judge (“ALJ”) in *In the Matter of Certain Consumer Elecs. And Display Devices with Graphics Processing and Graphics Processing Units Therein*, 337-TA-943 (ITC) with respect to two related patents, U.S. Patent Nos. 7,865,258 and 8,131,391. EX1014, pp.1,7-

B. Effective Filing Date of the Challenged Claims

Each application in the '047 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 '047 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 '047 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 '047 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 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 after the oral hearing but before a final written decision issued. *Sony IPR*, Papers 38, 39.

The patent owner 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) (citations omitted) (reversing district court’s finding that the patent-in-suit was entitled to the priority date of an earlier filed patent because an intervening application did not meet the written description requirement, and holding the patent-in-suit anticipated by the earlier patent); *see also Lockwood v. Am. Airlines*, 107 F.3d 1565, 1571 (Fed. Cir. 1997).

The patent owner must show that the claimed invention was disclosed in the

earlier applications as originally filed. 35 U.S.C. §120 (2012); *see Anascope, Ltd. v. Nintendo of Am., Inc.*, 601 F.3d 1333, 1337 (Fed. Cir. 2010) (finding a parent application failed to provide written description support to entitle later claims to the benefit of the specification's filing date because the later claims included text not present in the specification as originally filed). Regardless of whether the claim limitations of the later invention may be obvious from the prior disclosure, they must appear in the specification of the earlier application to get the earlier priority date. *See Lockwood*, 107 F.3d at 1571-72 ("Entitlement to a filing date does not extend to subject matter which is not disclosed, but would be obvious over what is expressly disclosed. It extends only to that which is disclosed. While the meaning of terms, phrases, or diagrams in a disclosure is to be explained or interpreted from the vantage point of one skilled in the art, all the limitations must appear in the specification.").

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 (citing *Cook Biotech Inc. v. Acell, Inc.*, 460 F.3d 1365, 1376 (Fed. Cir. 2006)). 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); *In re De Seversky*, 474 F.2d 671, 674 (C.C.P.A. 1973); MPEP 201.06(c)(IV).

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 '047 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.

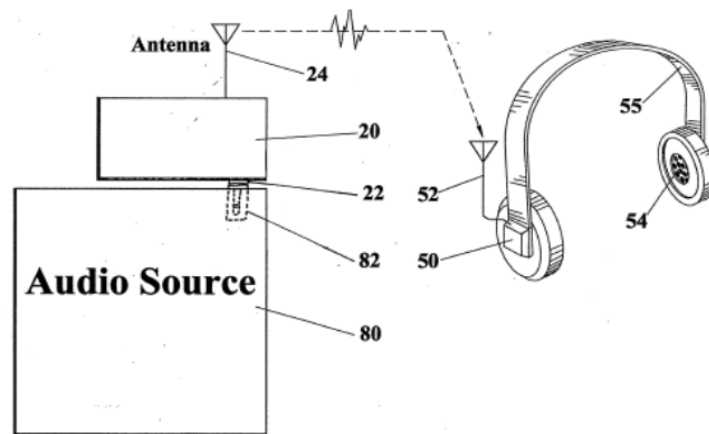


FIG.1

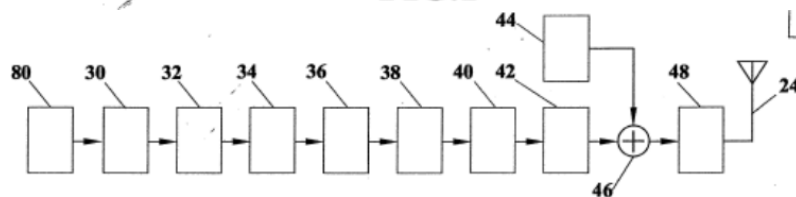


FIG.2

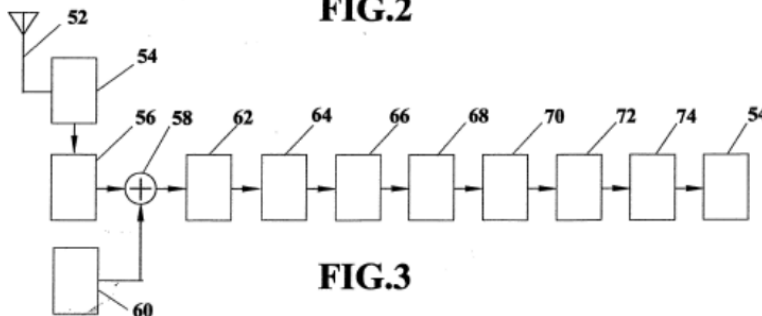


FIG.3

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 a 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 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 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, 0001-0015.

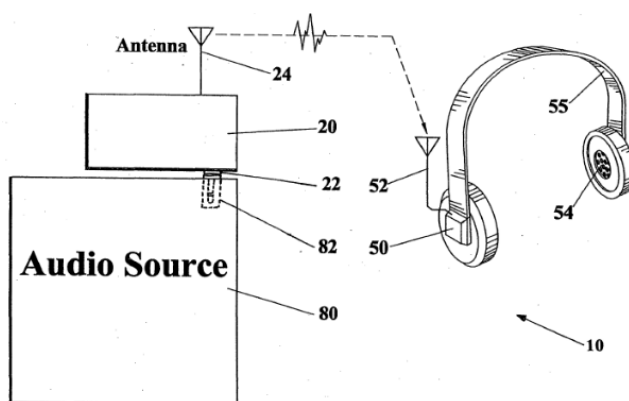


FIG 1

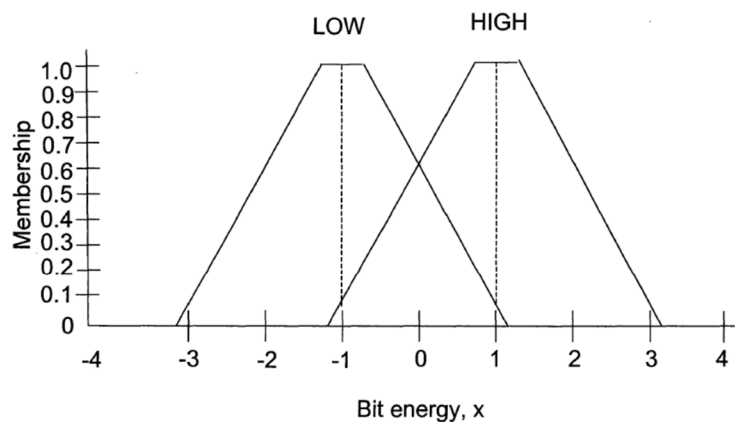


Figure 2

Critically, the 2003 application claimed priority to the 2001 application as a CIP,² *but did not* incorporate by reference the 2001 application. The 2003 application as filed also differs substantially from the 2001 application. While 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, 0004. 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.*, 0005-0008 (detailing the fuzzy logic operations 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 2003 application figures also contain no functional block diagrams showing the

² The priority claim in the 2003 specification as originally filed contains a typographical error in the parent application number that was later corrected.

components or operation of the fuzzy audio wireless music system of the invention. *Id.*, 0014-0015.

3. *The 2003 Application As Filed Does Not Support the '047 Patent Claims.*

For the '047 patent claims to be entitled to the 2001 application's filing date, the patent owner 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 as originally filed describes the invention with sufficient detail. *See Anascape*, 601 F.3d at 1337; MPEP §2163.05 (“To comply with the written description requirement...or to be entitled to an earlier priority date or filing date under 35 U.S.C. 119, 120, or 365(c), each claim limitation must be expressly, implicitly, or inherently supported in the originally filed disclosure.”); *Purdue Pharma L.P. v. Faulding Inc.*, 230 F.3d 1320, 1323 (Fed. Cir. 2000) (“Put another way, one skilled in the art, reading the original disclosure, must immediately discern the limitation at issue in the claims.”).

The originally filed 2003 application does not support the claims of the '047 patent. The '047 patent claims recite, *inter alia*, reduced “intersymbol interference” (cls. 1-20) and “a direct conversion module” (cls. 1-8). EX1001. In addition, independent claims 1, 8, and 17 recite “differential phase shift keying (DPSK).” *Id.* Yet the 2003 application fails to disclose “intersymbol interference,” “a direct

conversion module,” or “differential phase shift keying (DPSK).” EX1012, ¶81. None of these limitations are even inherently described in the 2003 application as originally filed. *See* EX1012, ¶¶81,82. As a result, the ’047 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 amended the 2003 application on August 15, 2006 to incorporate by reference of the 2001 application. EX1005, 0375.

An incorporation by reference statement added nearly three years after filing of 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) (“An incorporation by reference statement added after an application’s filing date is not effective because no new matter can be added to an application after its filing date”).³ December 21, 2001 cannot be the priority date of the ’047 patent claims.

In fact, no matter added after the original disclosure is filed may be used to

³ 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 (C.C.P.A. 1973).

provide written description support. *Anascape*, 601 F.3d at 1337; MPEP §2163.05.

In October 2004, more than a year after filing the 2003 application,⁴ 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 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).

⁴ And more than a year after the 2001 application published in June 2003.

The examiner objected to many of these amendments under 35 U.S.C. §132 as introducing new matter, but allowed others.⁵ 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, which does not support the '047 claims. Thus, August 26, 2003 cannot be the priority date of the '047 patent claims.

5. *July 12, 2008 is the Earliest Priority Date to Which the '047 Claims Are Entitled.*

As discussed above in Sections III.B.1-4, the '047 patent claims are not entitled to the benefit of the filing date of the 2001 application or of the 2003 application because the 2003 application broke the chain of disclosure, and the 2003 application fails to support the '047 claims. *See Lockwood*, 107 F.3d at 1571-72; *Ex Parte MacLeod*, 2003 WL 25277951, at *7-8. No other applications in the family were ever co-pending with the 2001 application. The earliest priority date to which the '047 claims are entitled is thus July 12, 2008, the filing date of the 2008 application, because the as-filed specification of the '047 patent is substantially the

⁵ 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, and it was a material error by the examiner to accept this support. All new matter amendments, including additions from the 2001 application's specification and figures, should have been rejected.

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 '047 patent. EX1012, ¶¶88, 91, 92-93, 94-95, 97-98, 99.

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[,]” which is a “a dedicated code that is used 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.” EX1016, 5:49-56; *see also id.*, 8:12-60.

5. *Gibson (EX1022)*

Gibson is a book 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 an apparatus with 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 Renders Obvious Claims 1-4, 6-13 and 15-19.

1. *Claim 1*

- a. [1P] A portable spread spectrum audio receiver configured to receive and store a unique user code, said portable spread spectrum receiver configured to receive wireless modulation transmissions from a spread

spectrum transmitter coupled to a music audio source, said wireless modulation transmissions representative of an audio signal representation, said portable spread spectrum audio receiver comprising:

The '196-Publication renders obvious this limitation. EX1012, ¶¶106-121.

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 *portable ... 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 connected to the audio source 80 headphone jack 82 using a headphone plug 22.” EX1004, ¶[0011], FIG. 1. Thus, the '196-Publication teaches a *transmitter* (“audio transmitter 20”) and an *audio source* (“audio source 80”). EX1012, ¶115.

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.” A POSA would thus have understood that the '196-Publication teaches or suggests that “audio source 80” is a *music audio source*. EX1012, ¶117.

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]. 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]. Audio receiver 50 further comprises “demodulator 62 to demodulate the **signal elements modulated in the audio transmitter 20.**” *Id.*, ¶[0017].

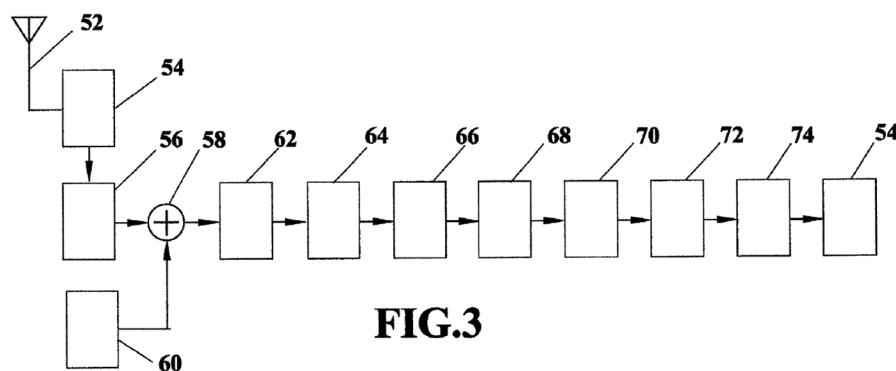
Accordingly, the '196-Publication renders obvious a *portable spread spectrum audio receiver* (“audio receiver 50”) *configured to receive and store a unique user code* (“unique codeword”). Furthermore, the '196-Publication teaches *portable spread spectrum audio receiver* (“audio receiver 50”) *configured to receive wireless modulation transmissions from a spread spectrum transmitter* (modulated transmissions from “audio transmitter 20”) *coupled to a music audio source* (“audio source 80,” which can be a “radio, tape players, [or] CD players”). EX1012, ¶121; EX1004, Abstract, ¶¶[0002], [0004], [0014]-[0017].

- b. [1A] a direct conversion module configured to receive wireless modulation transmissions representative of said audio signal representation and which have been processed to reduce intersymbol interference, and wherein said portable spread spectrum audio receiver further processes said received wireless modulation

transmissions for reduction of intersymbol interference;

The '196-Publication renders obvious this limitation. EX1012, ¶¶122-129.

As explained in Section II.C above, 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.” The '196-Publication discloses that “direct conversion receiver 56” receives a “spread spectrum signal” transmitted from “audio transmitter 20.” EX1004, ¶[0015]. In a parallel proceeding, One-E-Way Inc. (“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. Thus, the '196-Publication teaches a *direct conversion module* (“direct conversion receiver 56”). As depicted below “audio receiver 50” includes “direct conversion receiver 56”:



EX1004, FIG. 3, ¶[0009] (“FIG. 3 illustrates a functional block diagram of the audio receiver”). The received signal was “modulated in the audio transmitter 20.” *Id.*, ¶[0017], [0014]. Thus, the ’196-Publication teaches *a direct conversion module (direct conversion receiver 56) configured to receive wireless modulation transmissions representative of said audio signal representation (the received modulated signal).*

The ’196-Publication discloses that audio transmitter 20 includes “encoder 36...to reduce intersymbol interference (ISI) by using a transform code to encode the digital signal” (i.e., *coding that reduces intersymbol (inter-symbol) interference*) and thus *provides transmissions representative of an audio signal representation that have been processed to reduce intersymbol interference.* EX1004, ¶[0013], FIG. 2. 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].

Accordingly, the ’196-Publication discloses that its “audio receiver 50” (“*portable spread spectrum audio receiver*”) processes the “received spread spectrum signal” (“*wireless modulation transmissions*”) to “reduce intersymbol interference (ISI)” (“*reduction of intersymbol interference*”). EX1004, ¶[0013]-[0015]; EX1012, ¶129.

- c. [1B] a digital-to-analog converter (DAC) configured to provide an analog audio output signal corresponding to

said audio signal representation;

The '196-Publication renders obvious this limitation. EX1012, ¶¶130-132.

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].

- d. [1C] a speaker configured to generate an audio signal corresponding to said analog audio output signal, wherein said generated audio signal does not include audible audio content originating from any audio signals transmitted in a spectrum used by said spread spectrum transmitter that do not originate from said spread spectrum transmitter;

The '196-Publication renders obvious this limitation. EX1012, ¶¶133-135.

The '196-Publication indicates that the use of “code division multiple access (CDMA) may be used to provide each user independent operation.” EX1004, ¶[0016]. The '196-Publication explains that the unique user code allows a receiver to identify transmissions intended for “a particular...user” while “[o]ther code words from wireless digital audio systems 10 may appear as noise.” *Id.*

A POSA would thus have understood that audio receiver 50 would selectively receive transmissions from transmitter 20 (*said spread spectrum transmitter*) and *do[] not include audible audio content originating from any audio signals transmitted in a spectrum used by said spread spectrum transmitter that do not originate from said spread spectrum transmitter.* EX1012, ¶135. The '196-

Publication explains that these transmissions are then demodulated and processed to “return the signal to analog or base band format for use in powering a speaker 54” (*speaker configured to genera an audio signal corresponding to said analog audio output signal*). EX1004, ¶¶[0017]-[0018]; EX1012, ¶135.

- e. [1D] wherein said portable spread spectrum audio receiver is configured to use independent code division multiple access communication and to use said unique user code to communicate with only said spread spectrum transmitter during a wireless connection;

The '196-Publication renders obvious *wherein said portable spread spectrum audio receiver is configured to use independent code division multiple access communication and to use said unique user code to communicate with only said spread spectrum transmitter during a wireless connection*. EX1012, ¶¶136-138.

As explained in Section II.C above, the term “Independent CDMA” should be construed to mean “performed independent of any central control.” The '196-Publication teaches *independent CDMA*, including the *use* of a *unique user code*, so that the receiver is configured to only communicate with a particular transmitter:

The receiver code generator 60 may contain the same unique code word that was transmitted by the audio transmitter 20 specific to a particular a user. 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. This code

division multiple access (CDMA) 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 "Independent CDMA" as it does not require any centralized control. EX1012, ¶138.

- f. [1E] wherein said portable spread spectrum audio receiver is further configured to perform at least one of a plurality of demodulations on at least one of said received wireless modulation transmissions, wherein said plurality of demodulations includes a differential phase shift keying (DPSK) demodulation and a non-DPSK demodulation; and

The '196-Publication renders obvious this limitation. EX1012, ¶¶139-142.

The '196-Publication teaches that the transmitter can modulate the transmission in at least two ways: by using a "64-Ary modulator 42"—a non-DPSK modulation—and by using a "differential phase shift key (DPSK) transmitter 48 that modulates the digital signal to be transmitted." EX1004, ¶[0014].

While the '196-Publication does not expressly recite the use of a DPSK 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]. The ’196-Publication further teaches that the receiver can process the received transmission “to represent the original signal processed and transmitted by the audio transmitter.” *Id.* A POSA would have understood that to restore “the original signal,” the modulations performed prior to transmission (64-Ary and DPSK) by the transmitter must be demodulated by the audio receiver. EX1012, ¶141.

Accordingly, the ’196-Publication teaches that the receiver performs a plurality of demodulations (64-Ary and DPSK) on the received wireless modulation transmissions. EX1012, ¶¶139-142; EX1004, ¶¶[0014]- [0017].

- g. [1F] wherein said further processing for reduction of intersymbol interference is separate from said performance of at least one of said plurality of demodulations.

The ’196-Publication renders obvious this limitation. EX1012, ¶¶143-145.

The ’196-Publication teaches separate components for decoding the received signal after demodulation, including a source decoder 68 which “may further decode the coding applied by the encoder 36.” EX1004, ¶[0017], Fig. 3. As discussed above, the coding applied by encoder 36 is used to “reduce intersymbol interference.” *Id.*, ¶[0013].

- 2. *Claim 2. The portable spread spectrum audio receiver of claim 1, wherein the portable spread spectrum audio receiver is further configured to perform said plurality of demodulations*

on the at least one of said received wireless modulation transmissions.

The '196-Publication renders obvious this claim. EX1012, ¶¶146-148.

As explained in [1E], the '196-Publication teaches a transmitter which first modulates a signal a “64-Ary modulator” and then modulates the resulting signal with a “differential phase shift key (DPSK) transmitter 48 that modulates the digital signal to be transmitted.” EX1004, ¶[0014]. A POSA would have understood that to restore “the original signal,” 64-Ary and DPSK demodulations must be performed by the audio receiver. EX1012, ¶147; *see* [1E].

Accordingly, the '196-Publication teaches that the receiver performs a plurality of demodulations on the received wireless modulation transmissions. EX1012, ¶148.

3. *Claim 3. The portable spread spectrum audio receiver of claim 1, wherein the audio signal representation represents music.*

The '196-Publication renders obvious this claim. EX1012, ¶¶149-150.

The '196-Publication states the “invention relates to audio player devices and more particularly to systems that include headphone listening devices.” EX1004, ¶[0001]. It further teaches that the headphones are used “with audio player devices such as radio, tape players, CD players, computers, television audio and the like” and provides an example of “cassette tape players that may be used during exercising as for example running. *Id.*, ¶[0002]. A POSA would have understood that radio,

tape players, and CD players provide audio signal representations that represent music. EX1012, ¶150.

4. *Claim 4. The portable spread spectrum audio receiver of claim 1, wherein said analog audio output signal is capable of representing audio signals below 40 Hz and also capable of representing audio signals above 5 kHz.*

The '196-Publication renders obvious this claim. EX1012, ¶¶151-152.

The '196-Publication teaches “[a]n analog low pass filter 72 may be used to filter the analog audio signal to pass a signal in the approximate 20 Hz to 20 kHz frequency range and filter other frequencies.” EX1004, ¶[0018]. Because 20 Hz is below 40 Hz and 20 kHz is above 5 kHz, the '196-Publication teaches this limitation. EX1012, ¶152.

5. *Claim 6. The portable spread spectrum radio receiver of claim 1, further comprising a headphone unit, wherein the headphone unit is configured to integrate the speaker and wherein the headphone unit enables a user to secure the speaker on to a head of the user.*

The '196-Publication renders obvious this claim. EX1012, ¶¶153-154.

The '196-Publication states “[t]he audio receiver 50 may have headphone speakers 54 in headphones 55 for listening to the audio signal” and illustrates a headphone unit that enables a user to secure the speaker on to the head of a user in Figure 1:

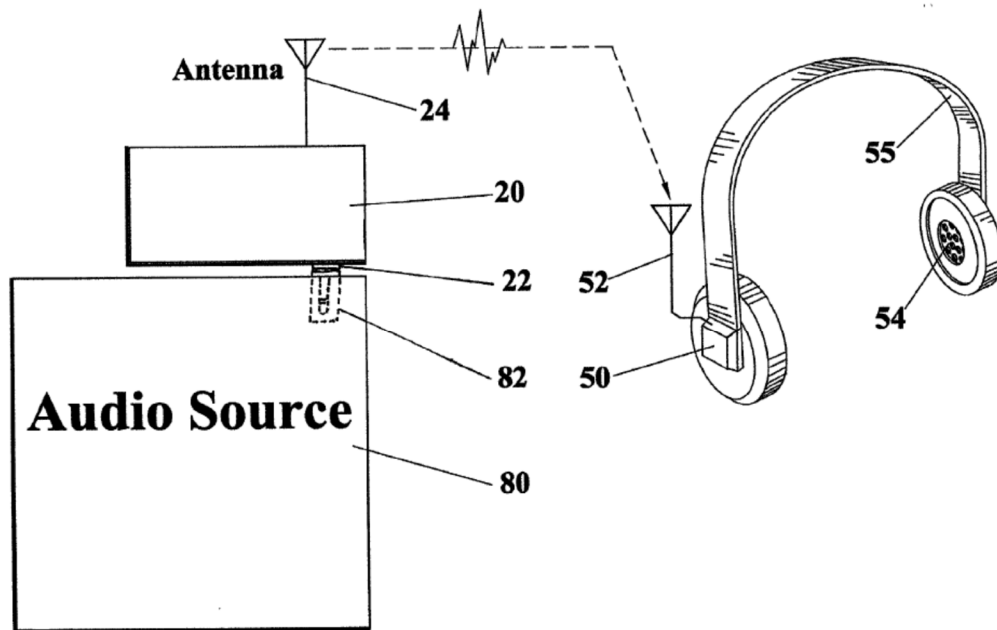


FIG.1

EX1004, ¶[0011], Fig. 1.

6. *Claim 7. The portable spread spectrum radio receiving of claim 6, wherein the headphone unit comprises a headphone strap that connects the speaker with another speaker for opposite ear.*

The '196-Publication discloses and renders obvious this claim. EX1012, ¶¶155-156.

The '196-Publication states “[t]he audio receiver 50 may have headphone speakers 54 in headphones 55 for listening to the audio signal” and illustrates a headphone strap that connects the speaker with another speaker for the opposite ear in Figure 1:

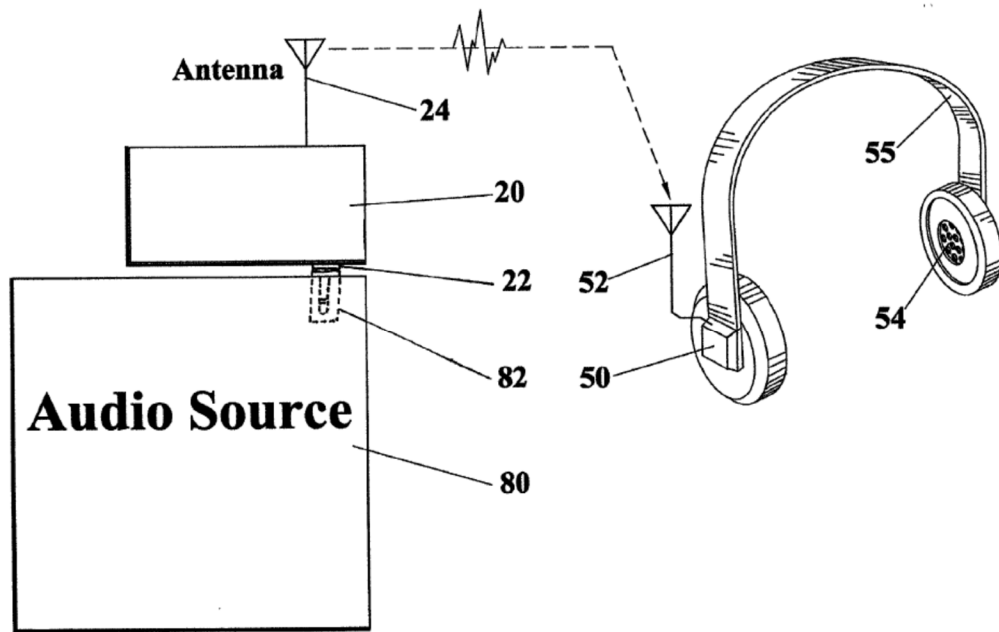


FIG.1

EX1004, ¶[0011], Fig. 1.

7. *Claims 8-13, 15-16*

Claim 8 and its dependent claims, 9-13 and 15-16, correspond to Claim 1 and its dependent claims as indicated in the below table, and claims 8-13 and 15-16 are rendered obvious for the same reasons provided above in Ground 1 for their matching claims or claim limitations.

Limitation	Corresponding Limitation
[8P]	[1P]
[8A]	[1D]
[8B]	[1A]
[8C]	[1A]

[8D]	[1E]
[8E]	[1B]
[8F]	[1C]
[9]	Claim 2
[10]	[1A]
[11]	Claim 4
[12]	[1C]
[13]	[1F]
[15]	Claim 6
[16]	Claim 7

8. *Claim 17*

- a. [17P] A portable spread spectrum audio transmitter coupled to a music audio source, said transmitter configured to transmit a unique user code and wireless modulation transmissions representative of an audio signal representation, said portable spread spectrum audio transmitter configured to:

The '196-Publication discloses and renders obvious this limitation. EX1012, ¶¶158-161.

The '196-Publication teaches a *spread spectrum transmitter coupled to a music audio source*. See §III.D.1.a. The '196-Publication states “audio transmitter 20 may be a compact device that may be connected to the audio source 80 to remain therewith for transmitting a signal to an audio receiver.” EX1004, ¶[0012]. A POSA

would have understood that the transmitter is *portable* since it is “compact” and configured for “wireless transmission of a signal to a receiving headphone.” EX1004, ¶¶[0001], [0012]; EX1012, ¶159.

The '196-Publication further teaches a *spread spectrum spread spectrum audio transmitter...configured to transmit a unique user code and wireless modulation transmissions representative of an audio signal representation*. It states “[m]odulation of the digital signal may be performed using direct sequence *spread spectrum* communication technology.” EX1004, ¶[0014]. In particular, the transmitter includes “a transmitter code generator 44 signal to produce a high symbol rate, and a unique codeword that spreads the signal spectrum.” *Id.* The *transmitter [is] configured to transmit a unique user code*: “The receiver code generator 60 may contain the same **unique code word that was transmitted by the audio transmitter 20 specific to a particular a user.**” *Id.*, ¶[0016].

Additionally, “audio transmitter 20” is *configured to transmit...wireless modulation transmissions representative of an audio signal representation* as it includes “a differential phase shift key (DPSK) transmitter 48 that modulates the digital signal to be transmitted by an omni-directional transmitting antenna 24 at approximately 2.4 GHz.” *Id.*, ¶[0014].

- b. [17A] encode a first representation of an audio signal to reduce intersymbol interference associated with a

transmitted representation of the audio signal;

The '196-Publication discloses and renders obvious this limitation. EX1012, ¶¶162-163.

The '196-Publication teaches that 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*) and thus teaches *encode a first representation of an audio signal to reduce intersymbol interference associated with a transmitted representation of the audio signal*. EX1004, ¶[0013].

- c. [17B] perform at least one of a plurality of modulations on the first representation of the audio signal;

The '196-Publication renders obvious the claimed *perform at least one of a plurality of modulations on the first representation of the audio signal*. EX1012, ¶¶164-165.

The '196-Publication teaches that the transmitter can modulate the transmission in at least two ways by using a “64-Ary modulator 42”—a non-DPSK modulation—and by using a “differential phase shift key (DPSK) transmitter 48 that modulates the digital signal to be transmitted.” EX1004, ¶[0014].

- d. [17C] generate a modulated signal based on the performance of at least one of the plurality of modulations, wherein the plurality of modulations includes a differential phase shift keying (DPSK)

modulation and a non-DPSK modulation; and

The '196-Publication renders obvious the claimed *generate a modulated signal based on the performance of at least one of the plurality of modulations, wherein the plurality of modulations includes a differential phase shift keying (DPSK) modulation and a non-DPSK modulation*. EX1012, ¶¶166-167.

The '196-Publication teaches that the transmitter can modulate the transmission in at least two ways by using a “64-Ary modulator 42”—a non-DPSK modulation—and by using a “differential phase shift key (DPSK) transmitter 48 that modulates the digital signal to be transmitted.” EX1004, ¶[0014].

- e. [17D] use the modulated signal and independent code division multiple access communication to wirelessly transmit a transmitted representation of the audio signal.

The '196-Publication renders obvious the claimed *use the modulated signal and independent code division multiple access communication to wirelessly transmit a transmitted representation of the audio signal*. EX1012, ¶¶168-170.

The '196-Publication teaches the use of independent CDMA, including the use of a unique user code, so that the receiver is configured to only communicate with a particular transmitter. Specifically, the transmitter includes “a transmitter code generator 44 signal to produce a high symbol rate, and a unique codeword that spreads the signal spectrum” and a “differential phase shift key (DPSK) transmitter 48 that modulates the digital signal to be transmitted by an omni-directional

transmitting antenna 24.” EX1004, ¶[0014].

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.” *Id.*, ¶[0016]. The ’196-Publication states “[t]his code division multiple access (CDMA) may be used to provide each user independent operation.” *Id.*

9. *Claim 18. The portable spread spectrum audio transmitter of claim 17, wherein said plurality of modulations are separate from the encoding and processing by the encoder.*

The ’196-Publication renders obvious this claim. EX1012, ¶¶171-173.

The ’196-Publication discloses separate components for modulation and encoding the audio signal. Specifically, “encoder 36 may be used to reduce intersymbol interference (ISI) by using a transform code to encode the digital signal.” EX1004, ¶[0013], Fig. 2. Following encoding, a “64-Ary modulator 42 may be used for summation at summation element 46” and 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.” *Id.*, ¶[0014].

10. *Claim 19. The portable spread spectrum audio transmitter of claim 17, wherein the transmitted unique user code distinguishes the transmitted representation of the audio signal from other transmitted audio signals in the spread spectrum transmitter spectrum, said other transmitted audio signals not originating from said wireless digital coded audio*

spread spectrum transmitter.

The '196-Publication discloses and renders obvious this claim. EX1012, ¶¶174-175.

The '196-Publication teaches “a transmitter code generator 44 signal to produce a high symbol rate, and a unique codeword that spreads the signal spectrum.” *Id.*, ¶[0014]. It further teaches that the “receiver code generator 60 may contain the same unique code word that was transmitted by the audio transmitter 20 specific to a particular a user.” *Id.*, ¶[0016]. Because the transmitter and receiver use the same unique user code, “[o]ther 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. This code division multiple access (CDMA) may be used to provide each user independent operation.” Thus, the '196-Publication indicates the headphones provide “a high quality, low distortion signal for hearing by a user wearing the headphones 55.” EX1004, ¶[0018].

E. Ground 2: The '196-Publication In View of Rappaport Renders Obvious Claims 5, 14 and 20.

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

Ground 2 relies on the '196-Publication in view of Rappaport. The '196-Publication is directed to “wireless digital audio systems for transmission of a signal from an audio player device to a headphone.” The '196-Publication does not

explicitly state how the audio player device or headphone receives power. EX1012, ¶178. Nevertheless, a POSA would have understood that the audio player device and headphones of the '196-Publication would have needed to receive power from a power supply, such as a battery. EX1012, ¶179.

For example, Rappaport is a textbook whose purpose “to initiate the newcomer to cellular radio and wireless personal communications.” EX1018, xiii. Rappaport explains that the “power supply requirements” would vary for different devices, and teaches and suggests that portable wireless communication devices include a battery to supply power to the device. EX1018, 22-23, 43, 199, 317. A POSA would have thus understood that the '196-Publication's audio player device and headphones would include a power supply, such as a battery. EX1012, ¶182.

A POSA would have had a reasonable expectation of success in including a *power supply* with the *portable spread spectrum audio receiver* because it was well known in the art that an electronic device requires a power supply, and it was well known to use a battery as a power supply for a portable device. EX1018, 22-23, 43, 199, 317; EX1021, 5:63-6:2; EX1012, ¶183.

2. *Claim 5. The portable spread spectrum audio receiver of claim 1, wherein the portable spread spectrum audio receiver includes a power supply.*

The '196-Publication in view of Rappaport renders obvious this claim. EX1012, ¶¶184-188.

The '196-Publication renders obvious the portable spread spectrum audio receiver of claim 1. *See* §III.D.1.

The '196-Publication teaches the use of a power amplifier that powers the headphone speaker: “[t]he analog audio signal may then be processed by a **power amplifier 74** that may be optimized **for powering a headphone speaker 54** to optimize a high quality, low distortion signal for hearing by a user wearing the headphones 55.” EX1004, ¶[0018]. Furthermore, a POSA would have understood that: (1) portable devices have “power supply requirements” (EX1018, 22); and (2) a “power amplifier” requires a *power supply* to ... “power[] a headphone speaker.” EX1012, ¶187. A POSA would have been motivated to include a power supply, such as a battery, as disclosed in Rappaport, in order to provide power to the wireless component. EX1012, ¶188.

3. *Claim 14. The portable spread spectrum audio receiver of claim 8, wherein the portable spread spectrum audio receiver includes a power supply.*

The '196-Publication in view of Rapport renders obvious this claim. EX1012, ¶189; *see* claim 5.

4. *Claim 20. The portable spread spectrum audio transmitter of claim 17, wherein the portable spread spectrum audio transmitter includes a power supply.*

The '196-Publication in view of Rappaport renders obvious this claim. EX1012, ¶¶190-192.

The '196-Publication renders obvious the portable spread spectrum audio transmitter of claim 17. *See* §III.D.8.

The '196-Publication teaches that the portable transmitter includes a power supply by indicating it “may transmit an electromagnetic signal...using approximately 100 milliwatts or less of power.” EX1004, ¶[0011]; *see also id.*, ¶[0014] (“transmit power may be limited to 100 milliwatts.”). A POSA would have understood that the portable transmitter must require a power supply to transmit the signal with 100 milliwatts or less of power. EX1012, ¶192.

F. Ground 3: Walley In View of Miyake, Gibson, and Rappaport Renders Obvious Claims 1-5, 8-14, and 17-20.

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

Ground 3 relies on Walley in view of Miyake, Gibson and Rappaport.

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 3 and 4 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 5, 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 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 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, ¶195 (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, ¶196.

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, ¶197. “[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 known spreading process to improve Walley’s similar spread spectrum system to provide user-specific

spreading codes to tailor transmissions based on user preferences. EX1012, ¶198. 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, ¶198. 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, ¶198. A POSA would have reasonably expected to succeed in using Miyake’s user-specific spreading code in Walley’s system because Miyake describes using such 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, ¶199; 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 or modulated prior to transmission, how the received signal is decoded or demodulated, and whether a received signal is directly converted from a carrier frequency to baseband without the use of an intermediate frequency. EX1012, ¶¶234-35. Rappaport is a textbook whose purpose “to initiate the newcomer to cellular radio and wireless personal communications.” EX1018, xiii. Similarly, 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 Rappaport textbook and 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 Rappaport’s and Gibson’s teachings to Walley would be successful. EX1012, ¶202. A POSA would have reasonably expected to succeed in implementing Gibson’s and Rappaport’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) and 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 1*

- a. [1P] A portable spread spectrum audio receiver configured to receive and store a unique user code, said portable spread spectrum receiver configured to receive wireless modulation transmissions from a spread spectrum transmitter coupled to a music audio source, said wireless modulation transmissions representative of an audio signal representation, said portable spread spectrum audio receiver comprising:

Assuming claim 1’s preamble is limiting, Walley in view of Miyake, Gibson and Rappaport renders obvious this limitation. EX1012, ¶¶203-224.

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. Walley discloses a “representative example of a portable telephone,” which includes “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.

A POSA would have understood that transmitting music to speakers, headphones, or a portable phone’s “hand unit” would require the music transmitter (“wireless units” or a “base unit”) to be coupled to a music audio source to provide

music input signal. EX1012, ¶210 (citing EX1015, 6:52-56 (“instead of a continuous speech input...any manner of data could be substituted and the method described would be equally viable.”), 11:49-51 (“The fidelity of the audio signal will decrease as the sampling rate of the input signal decreases.”).)

As explained in Section II.C above, the term “unique user code” should be construed to mean a “fixed code (bit sequence) specifically associated with one user of a device(s).” Walley discloses a spread spectrum system (e.g., a CDMA system) that uses a “spreading code[,]” which Walley discloses as a “a dedicated code that is used to separate that system’s transmissions from all others.” EX1015, 1:27-59. Walley also discloses that the “spreading codes” are “commonly referred to as Pseudo Noise (PN) codes.” EX1015, 1:34-35. 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. Yet, Miyake discloses “spreading codes specific to individual users,” which is consistent with the ’047 patent’s explanation that a “unique user code is specifically associated with one wireless digital audio system user.” EX1001, 2:60-66. 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 discloses 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..” *Id.*, 7:12-21.

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 would 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, ¶¶220-22.

Walley in view of Miyake, Gibson and Rappaport thus renders obvious a

portable spread spectrum audio receiver (Walley's phone, speaker, or headphones) *configured to receive and store a unique user code* (Walley's spreading code combined with Miyake's user-specific code), *said portable spread spectrum receiver configured to receive wireless modulation transmissions from a spread spectrum transmitter* (Walley's music-transmitting wireless unit or base unit) *coupled to a music audio source, said wireless modulation transmissions representative of an audio signal representation.* EX1012, ¶224.

- b. [1A] a direct conversion module configured to receive wireless modulation transmissions representative of said audio signal representation and which have been processed to reduce intersymbol interference, and wherein said portable spread spectrum audio receiver further processes said received wireless modulation transmissions for reduction of intersymbol interference;

Walley in view of Miyake, Gibson and Rappaport renders obvious this limitation. EX1012, ¶¶225-235.

Walley describes a system in which an audio signal (such as “continuous speech” or “any manner of data”) is “digitized and compressed,” and then “provided to 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 *wireless modulation transmissions representative of said audio signal representation and which have been processed to reduce intersymbol interference* and a receiver which *processes said received wireless modulation transmissions for reduction of intersymbol interference*. 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, ¶229.

As explained in Section II.C above, 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.” Walley’s exemplary spread spectrum transmitter includes a “modulator 213, for modulating the carrier frequency 215” which respect to FIG. 2, depicted below:

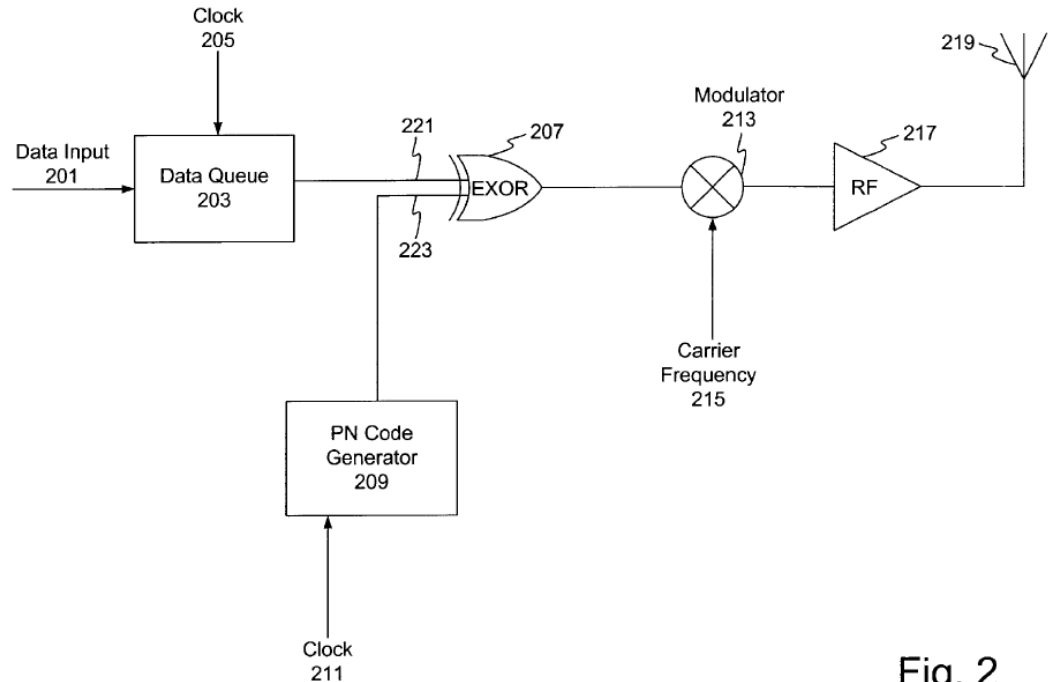


Fig. 2

EX1015, FIG. 2.

Walley does not explicitly disclose whether the receiver converts the received signal to baseband; however, 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, ¶233.

Walley also does not explicitly disclose whether its receivers directly convert the received signal to baseband without using an intermediate frequency. EX1012, ¶234-35. 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, 1323, FIG. 92.13; EX1012, ¶234.

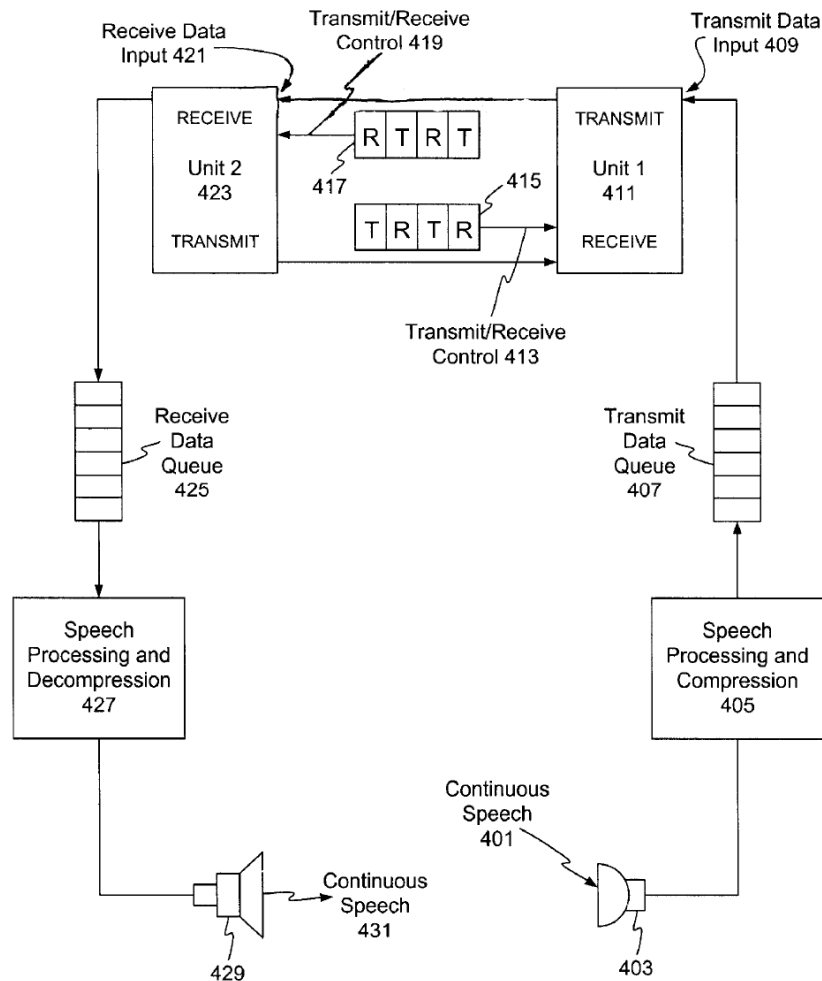
It would have been obvious to combine Gibson's direct conversion receiver with the teachings of Walley to provide a receiver including a *direct conversion module configured to receive wireless spread spectrum signal transmissions* in view of Walley's teaching of a "modulator 213, for modulating the 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, ¶235). 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, ¶235. 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, ¶235. 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, ¶235.

- c. [1B] a digital-to-analog converter (DAC) configured to provide an analog audio output signal corresponding to

said audio signal representation;

Walley in view of Miyake, Gibson and Rappaport renders obvious this limitation. EX1012, ¶236.

Walley describes a system with a speech processing and compression block 405 (which “digitizes” an audio signal before transmission) and a corresponding speech processing and decompression block 427 to reverse that process 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....the 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, 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 to convert the received digital audio signal back to analog form for output through a speaker. EX1012, ¶238.

- d. [1C] a speaker configured to generate an audio signal corresponding to said analog audio output signal, wherein said generated audio signal does not include audible audio content originating from any audio signals transmitted in a spectrum used by said spread spectrum transmitter that do not originate from said spread spectrum transmitter;

Walley in view of Miyake, Gibson and Rappaport renders obvious this

limitation. EX1012, ¶¶239-242.

Walley discloses a receiver (portable phone, headphones, or a speaker) which includes *a speaker configured to generate an audio signal corresponding to said analog audio output signal*. 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’s receiver 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.

A POSA would have understood that a speaker which uses a transmitter’s unique spreading code to receive the transmitter’s audio transmission would generate audio which does not include audible audio content from other transmitters. EX1012, ¶242.

- e. [1D] wherein said portable spread spectrum audio receiver is configured to use independent code division multiple access communication and to use said unique user code to communicate with only said spread spectrum transmitter during a wireless connection;

Walley in view of Miyake, Gibson and Rappaport renders obvious this limitation. EX1012, ¶¶243-249.

As explained in Section II.C above, the term “Independent CDMA” should be construed to mean “performed independent of any central control”.

Walley discloses 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.

Walley does not teach whether a receiver uses *said unique...code to communicate with only said spread spectrum transmitter*.

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, ¶249. 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, ¶249. Thus, Miyake alone and in view of Walley teach a *receiver...configured to use independent code division multiple access communication*.

A POSA would have been motivated to combine the spreading process of Walley with Miyake to provide a spreading process which creates user-specific spreading codes whose code lengths are adjusted to reduce noise/interference in

order to allow each user's respective receiver to operate independent of the operation of another user's receiver during a wireless connection. *See* §III.F.1.

- f. [1E] wherein said portable spread spectrum audio receiver is further configured to perform at least one of a plurality of demodulations on at least one of said received wireless modulation transmissions, wherein said plurality of demodulations includes a differential phase shift keying (DPSK) demodulation and a non-DPSK demodulation; and

Walley in view of Miyake, Gibson and Rappaport renders obvious this limitation. EX1012, ¶¶250-256.

Walley discloses modulating a signal for transmission and then demodulate the signal by a receiver using “CDMA” (*non-DPSK demodulation*).

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, 1:41-51; EX1012, ¶251.

A POSA would have understood that despreading a spread spectrum transmission to recover the original data would teach or suggest the use of a *non-DPSK demodulator* on the receiving end to demodulate the modulated signal. EX1012, ¶252.

Walley discloses a spread spectrum transmitter which 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, for example a DPSK modulator or an M-ary Quadrature Amplitude Modulation (QAM). For example, Rappaport explains 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.

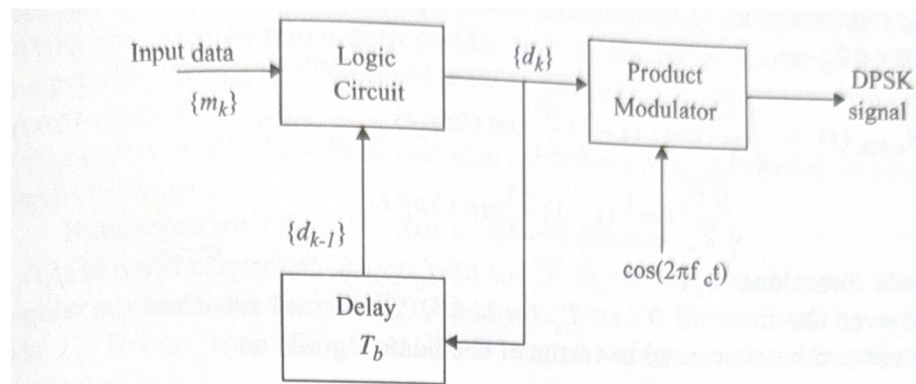


Figure 5.24
Block diagram of a DPSK transmitter.

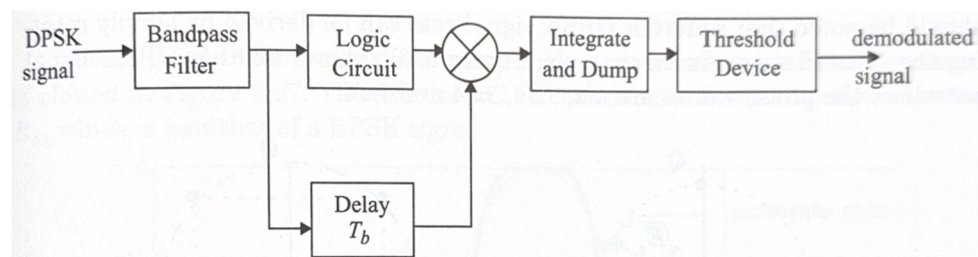


Figure 5.25
Block diagram of DPSK receiver.

EX1018, FIG. 5.24, 5.25.

Rappaport additionally discloses M-ary QAM, which is a non-DPSK modulation that has “superior” “power efficiency” over M-ary PSK. EX1018, 270-72.

A POSA would have understood that the use of Rappaport's DPSK and M-ary QAM modulators/demodulators to perform the modulation/demodulation in Walley's system is the use of a known technique (DPSK and/or 64-ary QAM) to improve a similar wireless system in the same way (to modulate/demodulate a signal).

[1E] does not require that the receiver be capable of performing more than one of either the DPSK or non-DPSK demodulation. Walley in view of Miyake, Gibson and Rappaport thus renders obvious *a portable spread spectrum audio receiver* (Walley's telephone, speaker or headphones) *is further configured to perform at least one of a plurality of demodulations on at least one of said received wireless modulation transmissions, wherein said plurality of demodulations includes a differential phase shift keying (DPSK) demodulation and a non-DPSK demodulation* (either Rappaport's DSPK or M-Ary QAM demodulation).

In the event PO asserts that [1E] requires a receiver capable of performing *more than one* type of demodulation, any such requirement would still have been obvious. A POSA would have appreciated that DPSK and non-DPSK modulation/demodulation methods each provided different benefits and challenges, and that no single method would always be best for all transmissions and environments. EX1012, ¶256. Walley's "generic type spread spectrum controllers which can be used in a variety of applications" (EX1015, Abstract) would thus

benefit from being able to select between a DPSK and a non-DPSK modulation/demodulation to optimize quality/performance for a given wireless application. EX1012, ¶256.

- g. [1F] wherein said further processing for reduction of intersymbol interference is separate from said performance of at least one of said plurality of demodulations.

Walley in view of Miyake, Gibson and Rappaport renders obvious this limitation. EX1012, ¶¶257-258. *See* [1A].

3. *Claim 2*

Walley in view of Miyake, Gibson and Rappaport renders obvious this claim. EX1012, ¶¶259-261. *See* [1E].

4. *Claim 3*

Walley in view of Miyake, Gibson and Rappaport renders obvious this claim. EX1012, ¶¶262-263.

Walley describes “wireless units to transmit music to speakers or headphones” and “a base unit” which can “broadcast a high fidelity music signal to the hand unit.” EX1015, 2:33-39, 7:36-40, 12:15-24, 2:67-3:25.

5. *Claim 4*

Walley in view of Miyake, Gibson and Rappaport renders obvious this claim. EX1012, ¶¶264-265.

Walley describes a system in which the receiver is capable of processing audio

having a frequency range of 20 Hz to 20 kHz:

The type of operations that the data input controller can perform are dependent on the data which is input. ... if the chipping rate of the transmit signal were adequate to **support a sampling rate which would yield a 20 Hz to 20 kHz audio bandwidth,** then the transmit controller 805 might instruct the data input controller to sample at a rate of X samples per second that would yield **a 20 Hz to 20 kHz audio bandwidth.**

EX1015, 8:67-9:35; 2:33-39, 7:36-40, 12:15-24, 2:67-3:25.

6. *Claim 5*

Walley in view of Miyake, Gibson and Rappaport renders obvious this claim.

EX1012, ¶¶266-270.

Walley discloses a system which is directed to “wireless communications electronics, such as cordless and cellular telephones, [and] wireless units to transmit music to speakers or headphones.” EX1015, 2:33-39; 2:67-3:25, 11:15-18, 4:48-62, 8:43-47, 8:62-65, 9:13-31, 9:57-60, 10:23-29, 11:23-35. However, Walley does not expressly disclose how these electronic devices receive power.

Gibson teaches that “information on the temperature range and **power supply**” of a system should be collected “to select a [D/A] converter that is accurate over the operating range.” EX1022, 114-15. Gibson further teaches that “low power” devices which include “D/A...circuits” may be “battery-operated.” EX1022, 107.

Thus, Gibson teaches or suggests that devices, such as those including a D/A converter, include a “power supply” such as a battery. EX1022, 107, 114-15. A POSA would have been motivated to combine Walley’s receiver with a “power supply” (such as a “battery”) to provide power to the receiver because

- a. Spread spectrum devices require “power” to communicate (EX1015, ¶[0018]); and
- b. Gibson teaches or suggests that devices which include a D/A converter (such as Walley’s receiver (*see* §III.F.2.c)) use a “power supply” such as a “battery” to provide “power” to the device. EX1022, 114-15.

Accordingly, Walley in view of Gibson renders obvious *wherein the portable spread spectrum audio receiver* (Walley’s telephones, speaker or headphones) *includes a power supply* (Gibson’s “power supply,” such as a “battery”). EX1012, ¶270.

7. Claims 8-14

Claim 8 and its dependent claims, 9-14, correspond to Claim 1 and its dependent claims as indicated in the below table, and claims 8-14 are rendered obvious for the same reasons provided above in Sections III.F.2-5 for their matching claims or claim limitations.

Limitation	Corresponding Limitation
[8P]	[1P]

[8A]	[1D]
[8B]	[1A]
[8C]	[1A]
[8D]	[1E]
[8E]	[1B]
[8F]	[1C]
[9]	Claim 2
[10]	[1A]
[11]	Claim 4
[12]	[1C]
[13]	[1F]
[14]	Claim 5

8. *Claim 17*

a. [17P]

Assuming claim 17's preamble is limiting, Walley in view of Miyake, Gibson and Rappaport renders obvious this limitation. EX1012, ¶¶272-274.

As explained in [1P], Walley in view of Miyake, Gibson and Rappaport renders obvious *wireless modulation transmissions from a spread spectrum transmitter coupled to a music audio source and wireless modulation transmissions representative of an audio signal representation*. Walley in view of Miyake further renders obvious a transmitter which transmits using a *unique user code*. [1P]

b. [17A]

Walley in view of Miyake, Gibson and Rappaport renders obvious this limitation. EX1012, ¶¶275-276.

As explained in [1F]: (1) Walley discloses a system in which an audio input signal is digitized and processed prior to transmission, and then processed by the receiver to restore the signal for output; and (2) Gibson precoding methods encode/decode a transmission for reduced intersymbol interference in digital communication systems (i.e. *coding that reduces intersymbol (inter-symbol) interference*).

A POSA would have been motivated to combine Gibson's precoding techniques with Walley to mitigate the "common problem" of intersymbol interference in digital data communication systems by encoding a digitized audio signal using Gibson's precoding techniques to *encode a first representation of an audio signal to reduce intersymbol interference associated with a transmitted representation of the audio signal*. 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, ¶276.

c. [17B]

Walley in view of Miyake, Gibson and Rappaport renders obvious the claimed

perform at least one of a plurality of modulations on the first representation of the audio signal. EX1012, ¶¶277-278.

Walley discloses the use of a PN code to modulate a signal. *See* [1E] (citing EX1015, 5:13-44). Walley discloses a spread spectrum transmitter which includes a “modulator 213, for modulating the carrier frequency 215.” *See* [1E] (citing 6:10-34). As explained in [1E], a POSA would have understood that Walley’s modulator 213 could include a DPSK modulator or an M-ary QAM, as disclosed in Rappaport. *See* [1E] (citing EX1018, 270-72, FIG. 5.24).

d. [17C]

Walley in view of Miyake, Gibson and Rappaport renders obvious the claimed *generate a modulated signal based on the performance of at least one of the plurality of modulations, wherein the plurality of modulations includes a differential phase shift keying (DPSK) modulation and a non-DPSK modulation.* EX1012, ¶¶279-280. *See* [17B].

e. [17D]

Walley in view of Miyake, Gibson and Rappaport renders obvious the claimed *use the modulated signal and independent code division multiple access communication to wirelessly transmit a transmitted representation of the audio signal.* EX1012, ¶¶281-285.

Walley discloses a receiver which uses a transmitter’s unique spreading code

to separate the transmitter's transmission from other transmissions. *See* [1D] (citing EX1015, 1:27-59, 5:33-44). Miyake discloses a transmitter which *use[s] the modulated signal and independent code division multiple access communication to wirelessly transmit a transmitted representation of the audio signal* as Miyake teaches that each receiver uses the same spreading code as the transmitter it communicates with, and this spreading code is different from that used by other users. *See* [1D] (citing EX1016, 6:63-7:18).

A POSA would have been motivated to combine the spreading process of Walley with Miyake to provide a spreading process which creates user-specific spreading codes whose code lengths are adjusted to reduce noise/interference in order to allow each user's respective receiver to operate independent of the operation of another user's receiver. *See* §III.F.1.

9. *Claim 18*

Walley in view of Miyake, Gibson and Rappaport renders obvious this claim. EX1012, ¶286.

See [1F].

10. *Claim 19*

Walley in view of Miyake, Gibson and Rappaport renders obvious this claim. EX1012, ¶¶287-291.

As explained in [1D]: (1) Walley discloses a receiver which uses a

transmitter's unique spreading code to separate the transmitter's transmission from other transmissions; and (2) Miyake discloses a *receiver is configured to use independent code division multiple access communication* as Miyake teaches that each receiver uses the same spreading code as the transmitter it communicates with, and this spreading code is different from that used by other users.

A POSA would have been motivated to combine the spreading process of Walley with Miyake to provide a spreading process which creates user-specific spreading codes whose code lengths are adjusted to reduce noise/interference in order to allow each user's respective receiver to operate independent of the operation of another user's receiver. See §III.F.1.

11. Claim 20

Walley in view of Miyake, Gibson and Rappaport renders obvious this claim. EX1012, ¶¶292-295.

Gibson teaches that “information on the temperature range and **power supply**” of a system should be collected “to select [an A/D] converter that is accurate over the operating range.” EX1022, 114-15. Gibson further teaches that “low power” devices which include “A/D...circuits” may be “battery-operated.” EX1022, 107.

Thus, Gibson teaches or suggests that devices, such as those including an A/D converter, include a “power supply” such as a battery. EX1022, 107, 114-15. A POSA would have been motivated to combine Walley's transmitter with a “power

supply” (such as a “battery”) to provide power to the transmitter because:

- a. Spread spectrum devices require “power” to communicate (EX1015, ¶[0018]); and
- b. Gibson teaches or suggests that devices which include an A/D converter (such as Walley’s transmitter (*see* §III.F.2.c)) use a “power supply” such as a “battery” to provide “power” to the device. EX1022, 114-15.

G. Ground 4: Walley In View of Miyake, Gibson, Rappaport, and Drakoulis Renders Obvious Claims 6-7 and 15-16.

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

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. As explained in Sections III.C.3 and III.F.2.a, Walley teaches a CDMA spread spectrum controller which addresses the “different requirement” of “wireless communication electronics” such as “headphones.” However, Walley does not disclose details regarding the structure of the headphones. Drakoulis discloses a wireless headphones design which depicts the physical structure of the headphones, including a headphone strap which physically connects two ear speakers and secures the ear speakers to a user’s head. EX1021, Abstract, FIGS. 1, 6, 10:22-30. A POSA

would have been motivated to combine Drakoulis's wireless headphone design with Walley's CDMA/spread spectrum receiver to provide headphones which *integrate[s] the speaker and enables a user to secure the speaker on to a head of the user and which provide a headphone strap that connects the speaker with another speaker for opposite ear* because the use of a headphone strap to secure headphone ear speakers to a user's head would have been obvious to a POSITA, as illustrated by Drakoulis teaches the use of this design for wireless headphones. EX1012, ¶298. A POSA would have had a reasonable expectation of success at combining Drakoulis's wireless headphone design with Walley's CDMA/spread spectrum receiver because their teachings are complementary since Walley teaches the internal design for wireless headphones, and Drakoulis depicts an exemplary physical/external structure for wireless headphones. EX1012, ¶298.

2. Claim 6

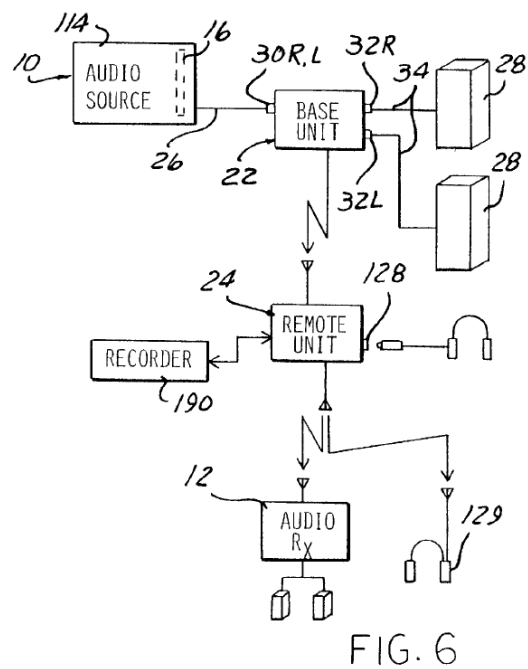
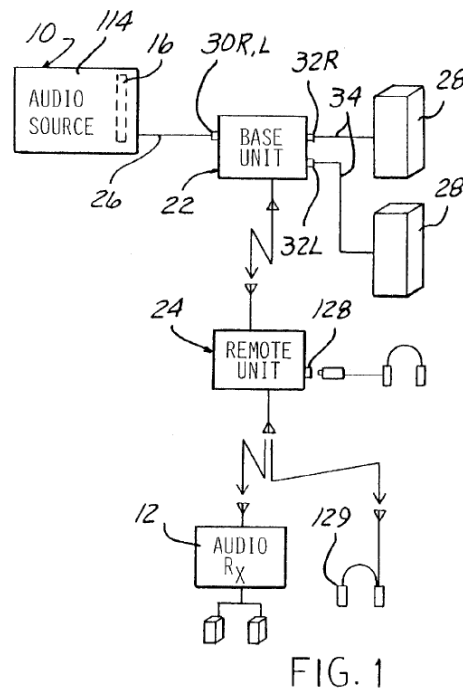
As explained above in §III.F.2 for Ground 3, Walley in view of Miyake, Gibson, and Rappaport renders claim 1 obvious. *See* EX1012, ¶¶299-303. Claim 6 depends from claim 1 and further comprises a headphone unit.

Walley describes wireless headphones:

As popularity increases for **wireless communications electronics, such as** cordless and cellular telephones, wireless units to transmit music to speakers or **headphones....**

EX1015, 2:33-39.

Walley does not expressly disclose details regarding the structure of the headphones. However, FIGS. 1 and 6 of Drakoulis, reproduced below, depict a conventional headphones design (129) wherein an strap between two speakers used to secure the speakers to a user's head:



EX1021, FIGS. 1, 6; EX1021, 10:22-30 (“the audio receiver or output device 12, shown in FIG. 1, which is capable of receiving the re-broadcasted transmit signal from the antenna 170 may be...a **wireless headphone having demodulation circuitry mounted therein**”).

A POSA would have been motivated to combine Drakoulis's headphone design with Walley's CDMA/spread spectrum receiver to provide headphones which *integrate[s] the speaker and enables a user to secure the speaker on to a head*

of the user as a headphone strap which secures headphone ear speakers to a user's head is well-known, and Drakoulis teaches the use of this design for wireless headphones. EX1012, ¶303.

3. *Claim 7*

Walley in view of Miyake, Gibson, Rappaport and Drakoulis renders this claim obvious. EX1012, ¶¶304-307.

Walley discloses a *headphone unit* which receive wireless transmissions but does not expressly disclose details regarding the structure of the headphones. EX1015, 2:33-39.

Drakoulis depicts a wireless headphones design which includes *a headphone strap that connects the speaker with another speaker for opposite ear*. See claim 6 (citing EX1021, FIGS. 1, 6, 10:22-30).

A POSA would have been motivated to use Drakoulis's headphone design as the use of a strap to connect two ear speakers is well-known, and Drakoulis teaches the use of this design for wireless headphones. EX1012, ¶307.

4. *Claim 15*

Walley in view of Miyake, Gibson, and Rappaport renders claim 8 obvious. See §III.F.7.

Claim 15 recites the same limitation as claim 6. Thus, claim 15 is rendered obvious by Walley in view of Miyake, Gibson, Rappaport and Drakoulis for the

same reasons. *See* §III.G.2.

5. *Claim 16*

Claim 16 recites the same limitation as claim 7. Thus, claim 16 is rendered obvious by Walley in view of Miyake, Gibson, Rappaport and Drakoulis for the same reasons. *See* §III.G.3.

H. Ground 5: Walley In View of Miyake, Gibson, Rappaport and Drakoulis Renders Obvious Claims 1-20.

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

In contrast to Grounds 3 and 4 above, Petitioner applies the constructions set forth in Section II.C from the *Apple* Action for the terms “transmitter” and “audio source” for Ground 5. 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 3 and 4 above.

Ground 5 relies on Walley in view of Miyake, Gibson, Rappaport, and Drakoulis. A POSA would have been motivated to combine, and would have had a reasonable expectation of success at combining, the teachings of Walley, Miyake, Gibson, Rappaport, and Drakoulis for the reasons provided in Ground 4.

2. *Claim 1*

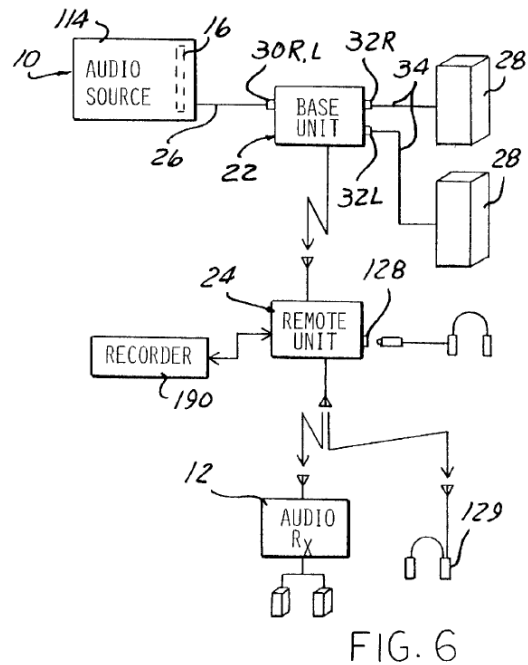
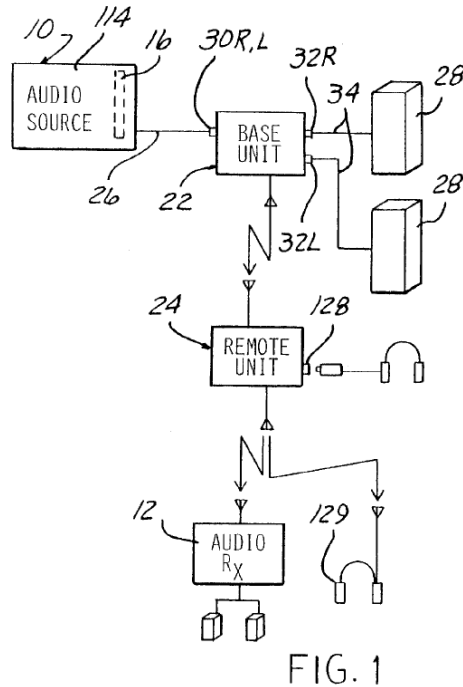
Assuming claim 1’s preamble is limiting, Walley in view of Miyake, Gibson, Rappaport and Drakoulis renders obvious this limitation. EX1012, ¶¶312-319. Elements [1A]-[1F] are obvious for the same reasons as set forth in Ground 3. *See*

§III.F.2.

As explained in Ground 3, Walley in view of Miyake, Gibson, Rappaport and Drakoulis renders obvious [1P] (*portable spread spectrum audio receiver configured to receive and store a unique user code, said portable spread spectrum receiver configured to receive wireless modulation transmissions from a spread spectrum transmitter coupled to a music audio source, said wireless modulation transmissions representative of an audio signal representation*) under the plain and ordinary meanings of “transmitter” and “audio source.” See III.F.2.a.

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 coupled to a music audio source* under these constructions.

Drakoulis is directed to an apparatus which “includes 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.



EX1021, FIGS. 1, 6.

Drakoulis teaches that “audio sources 10” include “a CD player, AM/FM tuner, tape deck, turntable, etc.” EX1021, 5:21-25. Drakoulis further teaches “a **stereo mini-input jack**...may also be mounted on the housing of the base unit 22 for receiving mini plug connectors attached to cables.” EX1021, 5:56-60. Drakoulis thus teaches *a device that can be connected into an analog headphone jack (base unit 22 through a stereo mini-input jack) to wirelessly transmit an audio signal.* EX1012, ¶316. Drakoulis further teaches *a device for providing audio that has an analog headphone jack* (a CD player, AM/FM tuner, tape deck). EX1012, ¶316.

A POSA would have been motivated to combine Drakoulis’s transmitter (which connects to an *audio source*’s headphone jack to wirelessly transmit audio from the *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 can advantageously add wireless transmission capabilities to a non-wireless audio source. EX1012, ¶317.

Moreover, it would be 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, ¶318. 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, ¶318.

Walley in view of Miyake, Gibson, Rappaport and Drakoulis thus renders obvious a *portable spread spectrum audio receiver* (Walley’s phone, speaker or headphones) *configured to receive and store a unique user code* (Walley’s spreading code combined with Miyake’s user-specific code), *said portable spread spectrum receiver configured to receive wireless modulation transmissions from a spread spectrum transmitter* (Walley’s wireless unit or base unit modified by Drakoulis to

connect to a headphone jack) *coupled to a music audio source* (e.g., Drakoulis’s cd player, radio or tape deck), *said wireless modulation transmissions representative of an audio signal representation*. EX1012, ¶319. Elements [1A]-[1F] are obvious for the same reasons as set forth in Ground 3. *See* §III.F.2.

3. Claims 8-16

As explained in Ground 3, [8P] corresponds to [1P], and [8P] is rendered obvious by the combination of Walley, Miyake, Gibson, Rappaport and Drakoulis for the same reasons set forth above. Elements [8A]-[8F] and claims 9-16 are obvious for the same reasons as set forth in Grounds 3 and 4. *See* §§III.F.7, III.G.4-5; EX1012, ¶¶312-319.

4. Claims 17-20

a. [17P]

As explained in Ground 3, Walley in view of Miyake, Gibson and Rappaport renders obvious *a portable spread spectrum audio transmitter* (Walley’s “handsets” or “wireless units”) *coupled to a music audio source, said transmitter configured to transmit a unique user code and wireless modulation transmissions representative of an audio signal representation* under the plain and ordinary meanings of “transmitter” and “audio source.” EX1012, ¶320.

As explained with respect to [1P], under the constructions for “transmitter” and “audio source” set forth in §II.C above, Walley in view of Miyake, Gibson, Rappaport and Drakoulis renders obvious *a portable spread spectrum audio*

transmitter (Walley’s “base unit” or “wireless units” modified by Drakoulis to connect to a headphone jack) *coupled to a music audio source* (e.g., Drakoulis’s cd player, radio or tape deck), *said transmitter configured to transmit a unique user code* (Walley’s spreading code combined with Miyake’s user-specific code) *and wireless modulation transmissions representative of an audio signal representation*. EX1012, ¶¶320-321.

Elements [17A]-[17D] and claims 18-20 are obvious for the same reasons as set forth in Grounds 3 and 4. *See* III.F.8-11; EX1012, ¶322.

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 ’047 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).

The ’047 patent was previously involved in the following actions: *One-E-Way, Inc. v. Apple Inc.*, 2-20-cv-06339 (C.D. CA); *One-E-Way, Inc. v. Apple Inc.*,

22-2200 (Fed. Cir.); *Apple Inc. v. One-E-Way*, IPR2021-00284, -00285.

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 8, 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 8, 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 8, 2025, I caused a true and correct copy of PETITION FOR INTER PARTES REVIEW OF CLAIMS 1-20 OF U.S. PATENT NO. 10,468,047, Exhibits 1001-1016, 1018, 1021-1030, 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. 10,468,047 as follows:

20995 - Knobbe, Martens, Olson & Bear, LLP
2040 Main Street
Fourteenth Floor
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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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