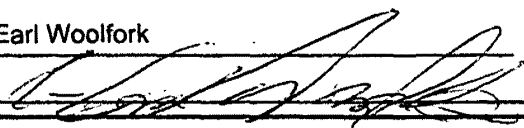


**DECLARATION (37 CFR 1.63) FOR UTILITY OR DESIGN APPLICATION USING AN
APPLICATION DATA SHEET (37 CFR 1.76)**

Title of Invention	WIRELESS DIGITAL AUDIO MUSIC SYSTEM
As the below named inventor, I hereby declare that: This declaration is directed to: ☐ The attached application, or ☒ United States application or PCT international application number <u>15/003242</u> filed on <u>January 21, 2016</u> The above-identified application was made or authorized to be made by me. I believe that I am the original inventor or an original joint inventor of a claimed invention in the application. I hereby acknowledge that any willful false statement made in this declaration is punishable under 18 U.S.C. 1001 by fine or imprisonment of not more than five (5) years, or both. WARNING: Petitioner/applicant is cautioned to avoid submitting personal information in documents filed in a patent application that may contribute to identity theft. Personal information such as social security numbers, bank account numbers, or credit card numbers (other than a check or credit card authorization form PTO-2038 submitted for payment purposes) is never required by the USPTO to support a petition or an application. If this type of personal information is included in documents submitted to the USPTO, petitioners/applicants should consider redacting such personal information from the documents before submitting them to the USPTO. Petitioner/applicant is advised that the record of a patent application is available to the public after publication of the application (unless a non-publication request in compliance with 37 CFR 1.213(a) is made in the application) or issuance of a patent. Furthermore, the record from an abandoned application may also be available to the public if the application is referenced in a published application or an issued patent (see 37 CFR 1.14). Checks and credit card authorization forms PTO-2038 submitted for payment purposes are not retained in the application file and therefore are not publicly available. LEGAL NAME OF INVENTOR Inventor: <u>C. Earl Woolfork</u> Date (Optional): <u>3-28-2018</u> Signature:  Note: An application data sheet (PTO/SB/14 or equivalent), including naming the entire inventive entity, must accompany this form or must have been previously filed. Use an additional PTO/AIA/01 form for each additional inventor.	

This collection of information is required by 35 U.S.C. 115 and 37 CFR 1.63. The information is required to obtain or retain a benefit by the public which is to file (and by the USPTO to process) an application. Confidentiality is governed by 35 U.S.C. 122 and 37 CFR 1.11 and 1.14. This collection is estimated to take 1 minute to complete, including gathering, preparing, and submitting the completed application form to the USPTO. Time will vary depending upon the individual case. Any comments on the amount of time you require to complete this form and/or suggestions for reducing this burden, should be sent to the Chief Information Officer, U.S. Patent and Trademark Office, U.S. Department of Commerce, P.O. Box 1450, Alexandria, VA 22313-1450. DO NOT SEND FEES OR COMPLETED FORMS TO THIS ADDRESS. SEND TO: Commissioner for Patents, P.O. Box 1450, Alexandria, VA 22313-1450.

If you need assistance in completing the form, call 1-800-PTO-9199 and select option 2.

Privacy Act Statement

The Privacy Act of 1974 (P.L. 93-579) requires that you be given certain information in connection with your submission of the attached form related to a patent application or patent. Accordingly, pursuant to the requirements of the Act, please be advised that: (1) the general authority for the collection of this information is 35 U.S.C. 2(b)(2); (2) furnishing of the information solicited is voluntary; and (3) the principal purpose for which the information is used by the U.S. Patent and Trademark Office is to process and/or examine your submission related to a patent application or patent. If you do not furnish the requested information, the U.S. Patent and Trademark Office may not be able to process and/or examine your submission, which may result in termination of proceedings or abandonment of the application or expiration of the patent.

The information provided by you in this form will be subject to the following routine uses:

1. The information on this form will be treated confidentially to the extent allowed under the Freedom of Information Act (5 U.S.C. 552) and the Privacy Act (5 U.S.C. 552a). Records from this system of records may be disclosed to the Department of Justice to determine whether disclosure of these records is required by the Freedom of Information Act.
2. A record from this system of records may be disclosed, as a routine use, in the course of presenting evidence to a court, magistrate, or administrative tribunal, including disclosures to opposing counsel in the course of settlement negotiations.
3. A record in this system of records may be disclosed, as a routine use, to a Member of Congress submitting a request involving an individual, to whom the record pertains, when the individual has requested assistance from the Member with respect to the subject matter of the record.
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5. A record related to an International Application filed under the Patent Cooperation Treaty in this system of records may be disclosed, as a routine use, to the International Bureau of the World Intellectual Property Organization, pursuant to the Patent Cooperation Treaty.
6. A record in this system of records may be disclosed, as a routine use, to another federal agency for purposes of National Security review (35 U.S.C. 181) and for review pursuant to the Atomic Energy Act (42 U.S.C. 218(c)).
7. A record from this system of records may be disclosed, as a routine use, to the Administrator, General Services, or his/her designee, during an inspection of records conducted by GSA as part of that agency's responsibility to recommend improvements in records management practices and programs, under authority of 44 U.S.C. 2904 and 2906. Such disclosure shall be made in accordance with the GSA regulations governing inspection of records for this purpose, and any other relevant (i.e., GSA or Commerce) directive. Such disclosure shall not be used to make determinations about individuals.
8. A record from this system of records may be disclosed, as a routine use, to the public after either publication of the application pursuant to 35 U.S.C. 122(b) or issuance of a patent pursuant to 35 U.S.C. 151. Further, a record may be disclosed, subject to the limitations of 37 CFR 1.14, as a routine use, to the public if the record was filed in an application which became abandoned or in which the proceedings were terminated and which application is referenced by either a published application, an application open to public inspection or an issued patent.
9. A record from this system of records may be disclosed, as a routine use, to a Federal, State, or local law enforcement agency, if the USPTO becomes aware of a violation or potential violation of law or regulation.

**CERTIFICATION AND REQUEST FOR PRIORITIZED EXAMINATION
UNDER 37 CFR 1.102(e)** (Page 1 of 1)

First Named Inventor:	C. Earl Woolfork	Nonprovisional Application Number (if known):	Unknown
Title of Invention:	WIRELESS DIGITAL AUDIO MUSIC SYSTEM		

APPLICANT HEREBY CERTIFIES THE FOLLOWING AND REQUESTS PRIORITIZED EXAMINATION FOR THE ABOVE-IDENTIFIED APPLICATION.

1. The processing fee set forth in 37 CFR 1.17(i)(1) and the prioritized examination fee set forth in 37 CFR 1.17(c) have been filed with the request. The publication fee requirement is met because that fee, set forth in 37 CFR 1.18(d), is currently \$0. The basic filing fee, search fee, and examination fee are filed with the request or have been already been paid. I understand that any required excess claims fees or application size fee must be paid for the application.
2. I understand that the application may not contain, or be amended to contain, more than four independent claims, more than thirty total claims, or any multiple dependent claims, and that any request for an extension of time will cause an outstanding Track I request to be dismissed.
3. The applicable box is checked below:

I. ☒ Original Application (Track One) - Prioritized Examination under § 1.102(e)(1)

- i. (a) The application is an original nonprovisional utility application filed under 35 U.S.C. 111(a). This certification and request is being filed with the utility application via EFS-Web.
---OR---
- (b) The application is an original nonprovisional plant application filed under 35 U.S.C. 111(a). This certification and request is being filed with the plant application in paper.
- ii. An executed inventor's oath or declaration under 37 CFR 1.63 or 37 CFR 1.64 for each inventor, or the application data sheet meeting the conditions specified in 37 CFR 1.53(f)(3)(i) is filed with the application.

II. ☐ Request for Continued Examination - Prioritized Examination under § 1.102(e)(2)

- i. A request for continued examination has been filed with, or prior to, this form.
- ii. If the application is a utility application, this certification and request is being filed via EFS-Web.
- iii. The application is an original nonprovisional utility application filed under 35 U.S.C. 111(a), or is a national stage entry under 35 U.S.C. 371.
- iv. This certification and request is being filed prior to the mailing of a first Office action responsive to the request for continued examination.
- v. No prior request for continued examination has been granted prioritized examination status under 37 CFR 1.102(e)(2).

Signature <u>/Harnik Shukla/</u>	Date <u>November 9, 2018</u>
Name (Print/Typed) <u>Harnik Shukla</u>	Practitioner Registration Number <u>73,097</u>
Note: This form must be signed in accordance with 37 CFR 1.33. See 37 CFR 1.4(d) for signature requirements and certifications. Submit multiple forms if more than one signature is required.*	
☒ *Total of <u>1</u> forms are submitted.	

Privacy Act Statement

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9. A record from this system of records may be disclosed, as a routine use, to a Federal, State, or local law enforcement agency, if the USPTO becomes aware of a violation or potential violation of law or regulation.

Doc Code: FAI.REQ

Document Description: Request First Action Interview

PTO/SB/413C (05-11)

Approved for use through 01/31/2013. OMB 0651-0031

U.S. Patent and Trademark Office; U. S. DEPARTMENT OF COMMERCE

Under the Paperwork Reduction Act of 1995, no persons are required to respond to a collection of information unless it displays a valid OMB control number.

REQUEST FOR FIRST ACTION INTERVIEW (FULL PILOT PROGRAM)

Attorney Docket Number: 1EWAY.009P1C7	Application Number (if known): Unknown	Filing date: Herewith
First Named Inventor: C. Earl Woolfork	Title: WIRELESS DIGITAL AUDIO MUSIC SYSTEM	

APPLICANT HEREBY REQUESTS A FIRST ACTION INTERVIEW IN THE ABOVE-IDENTIFIED APPLICATION. See Instruction Sheet on page 2.

1. The application must contain three (3) or fewer independent claims and twenty (20) or fewer total claims.
2. The application must not contain any multiple dependent claims.
3. By filing this request:

Applicant is agreeing to make an election without traverse if the Office determines that the claims are not obviously directed to a single invention; and

Applicant is agreeing not to request for a refund of the search fee and any excess claims fee paid in the application after the mailing or notification of the pre-interview communication prepared by the examiner.

4. Other attachments: _____

Signature /Harnik Shukla/	Date November 9, 2018
Name (Print/Typed) Harnik Shukla	Registration Number 73,097
Note: This form must be signed in accordance with 37 CFR 1.33. See 37 CFR 1.4(d) for signature requirements and certifications. Submit multiple forms if more than one signature is required, see below*.	
☐ *Total of <u>1</u> forms are submitted.	

The information is required to obtain or retain a benefit by the public which is to file (and by the USPTO to process) an application. Confidentiality is governed by 35 U.S.C. 122 and 37 CFR 1.11 and 1.14. This collection is estimated to take 12 hours to complete, including gathering, preparing, and submitting the completed application form to the USPTO. Time will vary depending upon the individual case. Any comments on the amount of time you require to complete this form and/or suggestions for reducing this burden, should be sent to the Chief Information Officer, U.S. Patent and Trademark Office, U.S. Department of Commerce, P.O. Box 1450, Alexandria, VA 22313-1450. DO NOT SEND FEES OR COMPLETED FORMS TO THIS ADDRESS. **SEND TO: Commissioner for Patents, P.O. Box 1450, Alexandria, VA 22313-1450.**

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Instruction Sheet for Request for First Action Interview (Full Pilot Program)
(Not to be Submitted to the USPTO)

A grantable request must meet the following conditions:

1. The application must be a new non-reissue utility application filed under 35 U.S.C. 111(a) or an international application that has entered the national stage in compliance with 35 U.S.C. 371(c).
2. The application must contain three (3) or fewer independent claims and twenty (20) or fewer total claims. The application may not contain any multiple dependent claims.
3. The request must be filed electronically using the Office's electronic filing system, EFS-Web.
4. The claims must be directed to a single invention. If the Office determines that the claims are directed to multiple inventions (e.g., in a restriction requirement), the applicant must make an election without traverse.
5. The request must be filed at least one day before a first Office action on the merits of the application appears in the Patent Application Information Retrieval (PAIR) system (i.e., at least one day prior to the date when a first Office action on the merits, notice of allowability or allowance, or action under Ex parte Quayle, 1935 Dec. Comm'r Pat. 11 (1935) appears in the PAIR system). Applicant may check the status of the application using the PAIR system.
6. The request for a first action interview must include a statement that applicant agrees not to file a request for a refund of the search fee and any excess claims fees paid in the application after the mailing or notification of the Pre-Interview Communication. Any petition for express abandonment under 37 CFR 1.138(d), and request for a refund of the search fee and any excess claims fees, filed after the mailing or notification of the Pre-Interview Communication will not be granted.

For more information, see notice "Full First Action Interview Pilot Program" available on the USPTO web site at http://www.uspto.gov/patents/init_events/faipp_full.jsp

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Doc Code: FAI.REQ

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REQUEST FOR FIRST ACTION INTERVIEW (FULL PILOT PROGRAM)

Attorney Docket Number: 1EWAY.009P1C7	Application Number (if known): Unknown	Filing date: Herewith
First Named Inventor: C. Earl Woolfork	Title: WIRELESS DIGITAL AUDIO MUSIC SYSTEM	

APPLICANT HEREBY REQUESTS A FIRST ACTION INTERVIEW IN THE ABOVE-IDENTIFIED APPLICATION. See Instruction Sheet on page 2.

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Signature /Harnik Shukla/	Date November 9, 2018
Name (Print/Typed) Harnik Shukla	Registration Number 73,097
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Application Data Sheet 37 CFR 1.76		Attorney Docket Number	1EWAY.009P1C7
		Application Number	
Title of Invention	WIRELESS DIGITAL AUDIO MUSIC SYSTEM		
The application data sheet is part of the provisional or nonprovisional application for which it is being submitted. The following form contains the bibliographic data arranged in a format specified by the United States Patent and Trademark Office as outlined in 37 CFR 1.76. This document may be completed electronically and submitted to the Office in electronic format using the Electronic Filing System (EFS) or the document may be printed and included in a paper filed application.			

Secrecy Order 37 CFR 5.2:

☐	Portions or all of the application associated with this Application Data Sheet may fall under a Secrecy Order pursuant to 37 CFR 5.2 (Paper filers only. Applications that fall under Secrecy Order may not be filed electronically.)
--------------------------	---

Inventor Information:

Inventor	1					Remove	
Legal Name							
Prefix	Given Name	Middle Name	Family Name	Suffix			
	C.	Earl	Woolfork				
Residence Information (Select One) • US Residency Non US Residency Active US Military Service							
City	Pasadena	State/Province	CA	Country of Residence	US		
Mailing Address of Inventor:							
Address 1		P.O. Box 70848					
Address 2							
City	Pasadena	State/Province	CA				
Postal Code	91107	Country	US				
All Inventors Must Be Listed - Additional Inventor Information blocks may be generated within this form by selecting the Add button.							

Correspondence Information:

Enter either Customer Number or complete the Correspondence Information section below. For further information see 37 CFR 1.33(a).			
☐ An Address is being provided for the correspondence information of this application.			
Customer Number	20995		
Email Address	efiling@knobbe.com	Add Email	Remove Email

Application Information:

Title of the Invention	WIRELESS DIGITAL AUDIO MUSIC SYSTEM		
Attorney Docket Number	1EWAY.009P1C7	Small Entity Status Claimed	☐
Application Type	Nonprovisional		
Subject Matter	Utility		
Total Number of Drawing Sheets (if any)	3	Suggested Figure for Publication (if any)	

Application Data Sheet 37 CFR 1.76		Attorney Docket Number	1EWAY.009P1C7
		Application Number	
Title of Invention	WIRELESS DIGITAL AUDIO MUSIC SYSTEM		

Filing By Reference:

Only complete this section when filing an application by reference under 35 U.S.C. 111(c) and 37 CFR 1.57(a). Do not complete this section if application papers including a specification and any drawings are being filed. Any domestic benefit or foreign priority information must be provided in the appropriate section(s) below (i.e., "Domestic Benefit/National Stage Information" and "Foreign Priority Information").

For the purposes of a filing date under 37 CFR 1.53(b), the description and any drawings of the present application are replaced by this reference to the previously filed application, subject to conditions and requirements of 37 CFR 1.57(a).

Application number of the previously filed application	Filing date (YYYY-MM-DD)	Intellectual Property Authority or Country

Publication Information:

☐ Request Early Publication (Fee required at time of Request 37 CFR 1.219)

☐ **Request Not to Publish.** I hereby request that the attached application not be published under 35 U.S.C. 122(b) and certify that the invention disclosed in the attached application **has not and will not** be the subject of an application filed in another country, or under a multilateral international agreement, that requires publication at eighteen months after filing.

Representative Information:

Representative information should be provided for all practitioners having a power of attorney in the application. Providing this information in the Application Data Sheet does not constitute a power of attorney in the application (see 37 CFR 1.32). Either enter Customer Number or complete the Representative Name section below. If both sections are completed the customer Number will be used for the Representative Information during processing.

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Domestic Benefit/National Stage Information:

This section allows for the applicant to either claim benefit under 35 U.S.C. 119(e), 120, 121, 365(c), or 386(c) or indicate National Stage entry from a PCT application. Providing benefit claim information in the Application Data Sheet constitutes the specific reference required by 35 U.S.C. 119(e) or 120, and 37 CFR 1.78.

When referring to the current application, please leave the "Application Number" field blank.

Prior Application Status	Pending	Remove	
Application Number	Continuity Type	Prior Application Number	Filing or 371(c) Date (YYYY-MM-DD)
	Continuation of	15/003242	2016-01-21

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Application Data Sheet 37 CFR 1.76		Attorney Docket Number		1EWAY.009P1C7	
		Application Number			
Title of Invention		WIRELESS DIGITAL AUDIO MUSIC SYSTEM			

Prior Application Status		Patented		Remove	
Application Number	Continuity Type	Prior Application Number	Filing Date (YYYY-MM-DD)	Patent Number	Issue Date (YYYY-MM-DD)
15/003242	Continuation of	13/775754	2013-02-25	9282396	2016-03-08
Prior Application Status		Patented		Remove	
Application Number	Continuity Type	Prior Application Number	Filing Date (YYYY-MM-DD)	Patent Number	Issue Date (YYYY-MM-DD)
13/775754	Continuation of	13/356949	2012-01-24	9107000	2015-08-11
Prior Application Status		Patented		Remove	
Application Number	Continuity Type	Prior Application Number	Filing Date (YYYY-MM-DD)	Patent Number	Issue Date (YYYY-MM-DD)
13/356949	Continuation of	12/940747	2010-11-05	8131391	2012-03-06
Prior Application Status		Patented		Remove	
Application Number	Continuity Type	Prior Application Number	Filing Date (YYYY-MM-DD)	Patent Number	Issue Date (YYYY-MM-DD)
12/940747	Continuation of	12/570343	2009-09-30	7865258	2011-01-04
Prior Application Status		Patented		Remove	
Application Number	Continuity Type	Prior Application Number	Filing Date (YYYY-MM-DD)	Patent Number	Issue Date (YYYY-MM-DD)
12/570343	Continuation of	12/144729	2008-07-12	7684885	2010-03-23
Prior Application Status		Patented		Remove	
Application Number	Continuity Type	Prior Application Number	Filing Date (YYYY-MM-DD)	Patent Number	Issue Date (YYYY-MM-DD)
12/144729	Continuation of	10/648012	2003-08-26	7412294	2008-08-12
Prior Application Status		Abandoned		Remove	
Application Number	Continuity Type	Prior Application Number	Filing or 371(c) Date (YYYY-MM-DD)		
10/648012	Continuation in part of	10/027391	2001-12-21		
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This section allows for the applicant to claim priority to a foreign application. Providing this information in the application data sheet constitutes the claim for priority as required by 35 U.S.C. 119(b) and 37 CFR 1.55. When priority is claimed to a foreign application that is eligible for retrieval under the priority document exchange program (PDX)¹ the information will be used by the Office to automatically attempt retrieval pursuant to 37 CFR 1.55(i)(1) and (2). Under the PDX program, applicant bears the ultimate responsibility for ensuring that a copy of the foreign application is received by the Office from the participating foreign intellectual property office, or a certified copy of the foreign priority application is filed, within the time period specified in 37 CFR 1.55(g)(1).

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Application Number	Country ⁱ	Filing Date (YYYY-MM-DD)	Access Code ^j (if applicable)	Remove
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Statement under 37 CFR 1.55 or 1.78 for AIA (First Inventor to File) Transition Applications

☐ This application (1) claims priority to or the benefit of an application filed before March 16, 2013 and (2) also contains, or contained at any time, a claim to a claimed invention that has an effective filing date on or after March 16, 2013. NOTE: By providing this statement under 37 CFR 1.55 or 1.78, this application, with a filing date on or after March 16, 2013, will be examined under the first inventor to file provisions of the AIA.

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Authorization or Opt-Out of Authorization to Permit Access:

When this Application Data Sheet is properly signed and filed with the application, applicant has provided written authority to permit a participating foreign intellectual property (IP) office access to the instant application-as-filed (see paragraph A in subsection 1 below) and the European Patent Office (EPO) access to any search results from the instant application (see paragraph B in subsection 1 below).

Should applicant choose not to provide an authorization identified in subsection 1 below, applicant **must opt-out** of the authorization by checking the corresponding box A or B or both in subsection 2 below.

NOTE: This section of the Application Data Sheet is **ONLY** reviewed and processed with the **INITIAL** filing of an application. After the initial filing of an application, an Application Data Sheet cannot be used to provide or rescind authorization for access by a foreign IP office(s). Instead, Form PTO/SB/39 or PTO/SB/69 must be used as appropriate.

1. Authorization to Permit Access by a Foreign Intellectual Property Office(s)

A. Priority Document Exchange (PDX) - Unless box A in subsection 2 (opt-out of authorization) is checked, the undersigned hereby **grants the USPTO authority** to provide the European Patent Office (EPO), the Japan Patent Office (JPO), the Korean Intellectual Property Office (KIPO), the State Intellectual Property Office of the People's Republic of China (SIPO), the World Intellectual Property Organization (WIPO), and any other foreign intellectual property office participating with the USPTO in a bilateral or multilateral priority document exchange agreement in which a foreign application claiming priority to the instant patent application is filed, access to: (1) the instant patent application-as-filed and its related bibliographic data, (2) any foreign or domestic application to which priority or benefit is claimed by the instant application and its related bibliographic data, and (3) the date of filing of this Authorization. See 37 CFR 1.14(h)(1).

B. Search Results from U.S. Application to EPO - Unless box B in subsection 2 (opt-out of authorization) is checked, the undersigned hereby **grants the USPTO authority** to provide the EPO access to the bibliographic data and search results from the instant patent application when a European patent application claiming priority to the instant patent application is filed. See 37 CFR 1.14(h)(2).

The applicant is reminded that the EPO's Rule 141(1) EPC (European Patent Convention) requires applicants to submit a copy of search results from the instant application without delay in a European patent application that claims priority to the instant application.

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B. Applicant **DOES NOT** authorize the USPTO to transmit to the EPO any search results from the instant patent application. If this box is checked, the USPTO will not be providing the EPO with search results from the instant application.

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NOTE: Once the application has published or is otherwise publicly available, the USPTO may provide access to the application in accordance with 37 CFR 1.14.

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Applicant Information:

Providing assignment information in this section does not substitute for compliance with any requirement of part 3 of Title 37 of CFR to have an assignment recorded by the Office.				
Applicant	1			Remove
If the applicant is the inventor (or the remaining joint inventor or inventors under 37 CFR 1.45), this section should not be completed. The information to be provided in this section is the name and address of the legal representative who is the applicant under 37 CFR 1.43; or the name and address of the assignee, person to whom the inventor is under an obligation to assign the invention, or person who otherwise shows sufficient proprietary interest in the matter who is the applicant under 37 CFR 1.46. If the applicant is an applicant under 37 CFR 1.46 (assignee, person to whom the inventor is obligated to assign, or person who otherwise shows sufficient proprietary interest) together with one or more joint inventors, then the joint inventor or inventors who are also the applicant should be identified in this section.				
Clear				
Assignee	Legal Representative under 35 U.S.C. 117		Joint Inventor	
Person to whom the inventor is obligated to assign.		Person who shows sufficient proprietary interest		
If applicant is the legal representative, indicate the authority to file the patent application, the inventor is:				
Name of the Deceased or Legally Incapacitated Inventor:				
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Prefix	Given Name	Middle Name	Family Name	Suffix
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Assignee	1			
Complete this section if assignee information, including non-applicant assignee information, is desired to be included on the patent application publication. An assignee-applicant identified in the "Applicant Information" section will appear on the patent application publication as an applicant. For an assignee-applicant, complete this section only if identification as an assignee is also desired on the patent application publication.				
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See 37 CFR 1.4(d) for the manner of making signatures and certifications.

Signature	/Harnik Shukla/		Date (YYYY-MM-DD)	2018-11-09
First Name	Harnik	Last Name	Shukla	Registration Number
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Application Data Sheet 37 CFR 1.76		Attorney Docket Number	1EWAY.009P1C7
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This collection of information is required by 37 CFR 1.76. The information is required to obtain or retain a benefit by the public which is to file (and by the USPTO to process) an application. Confidentiality is governed by 35 U.S.C. 122 and 37 CFR 1.14. This collection is estimated to take 23 minutes to complete, including gathering, preparing, and submitting the completed application data sheet form to the USPTO. Time will vary depending upon the individual case. Any comments on the amount of time you require to complete this form and/or suggestions for reducing this burden, should be sent to the Chief Information Officer, U.S. Patent and Trademark Office, U.S. Department of Commerce, P.O. Box 1450, Alexandria, VA 22313-1450. DO NOT SEND FEES OR COMPLETED FORMS TO THIS ADDRESS. **SEND TO: Commissioner for Patents, P.O. Box 1450, Alexandria, VA 22313-1450.**

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2. A record from this system of records may be disclosed, as a routine use, in the course of presenting evidence to a court, magistrate, or administrative tribunal, including disclosures to opposing counsel in the course of settlement negotiations.
- 3 A record in this system of records may be disclosed, as a routine use, to a Member of Congress submitting a request involving an individual, to whom the record pertains, when the individual has requested assistance from the Member with respect to the subject matter of the record.
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6. A record in this system of records may be disclosed, as a routine use, to another federal agency for purposes of National Security review (35 U.S.C. 181) and for review pursuant to the Atomic Energy Act (42 U.S.C. 218(c)).
7. A record from this system of records may be disclosed, as a routine use, to the Administrator, General Services, or his/her designee, during an inspection of records conducted by GSA as part of that agency's responsibility to recommend improvements in records management practices and programs, under authority of 44 U.S.C. 2904 and 2906. Such disclosure shall be made in accordance with the GSA regulations governing inspection of records for this purpose, and any other relevant (i.e., GSA or Commerce) directive. Such disclosure shall not be used to make determinations about individuals.
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9. A record from this system of records may be disclosed, as a routine use, to a Federal, State, or local law enforcement agency, if the USPTO becomes aware of a violation or potential violation of law or regulation.

WIRELESS DIGITAL AUDIO MUSIC SYSTEMINCORPORATION BY REFERENCE TO ANY PRIORITY APPLICATIONS

[0001] This application is a continuation of U.S. Application No. 15/003,242, filed January 21, 2016, which is a continuation of U.S. Application No. 13/775,754, filed February 25, 2013, now U.S. Patent No. 9,282,396, which is a continuation of U.S. Application No. 13/356,949, filed January 24, 2012, now U.S. Patent No. 9,107,000, which is a continuation of U.S. Application No. 12/940,747, filed November 5, 2010, now U.S. Patent No. 8,131,391, which is a continuation of U.S. Application No. 12/570,343, filed September 30, 2009, now U.S. Patent No. 7,865,258, which is a continuation of U.S. Application No. 12/144,729, filed July 12, 2008, now U.S. Patent No. 7,684,885, which is a continuation of U.S. Application No. 10/648,012, filed August 26, 2003, now U.S. Patent No. 7,412,294, which is a continuation of U.S. Application No. 10/027391, filed December 21, 2001, published under US 2003/0118196 A1 on June 26, 2003, now abandoned, the entireties of which are incorporated herein by reference.

BACKGROUND OF THE INVENTION

[0002] This invention relates to audio player devices and more particularly to systems that include headphone listening devices. The new audio system uses an existing headphone jack (i.e., this is the standard analog headphone jack that connects to wired headphones) of a music audio player (i.e., portable CD player, portable cassette player, portable A.M./F.M. radio, laptop/desktop computer, portable MP3 player, and the like) to connect a battery powered transmitter for wireless transmission of a signal to a set of battery powered receiving headphones.

[0003] There are also known wireless headphones that may receive A.M. and F.M. radio transmissions. However, they do not allow use of a simple plug in (i.e., plug in to the existing analog audio headphone jack) battery powered transmitter for connection to any music audio player device jack, such as the above mentioned music audio player devices, for coded wireless transmission and reception by headphones of audio music for private listening without interference where multiple users occupying the same space are operating wireless transmission devices. Existing audio systems make use of electrical wire connections

between the audio source and the headphones to accomplish private listening to multiple users.

[0004] There is a need for a battery powered simple connection system for existing music audio player devices (i.e., the previously mentioned music devices), to allow coded digital wireless transmission (using a battery powered transmitter) to a headphone receiver (using a battery powered receiver headphones) that accomplishes private listening to multiple users occupying the same space without the use of wires.

SUMMARY OF THE INVENTION

[0005] The present invention is generally directed to a wireless digital audio system for coded digital transmission of an audio signal from any audio player with an analog headphone jack to a receiver headphone located away from the audio player. Fuzzy logic technology may be utilized by the system to enhance bit detection. A battery-powered digital transmitter may include a headphone plug in communication with any suitable music audio source. For reception, a battery-powered headphone receiver may use embedded fuzzy logic to enhance user code bit detection. Fuzzy logic detection may be used to enhance user code bit detection during decoding of the transmitted audio signal. The wireless digital audio music system provides private listening without interference from other users or wireless devices and without the use of conventional cable connections.

[0006] These and other features, aspects and advantages of the present invention will become better understood with reference to the following drawings, description and claims.

BRIEF DESCRIPTION OF THE DRAWINGS

[0007] Some aspects of the present invention are generally shown by way of reference to the accompanying drawings in which:

Figure 1 schematically illustrates a wireless digital audio system in accordance with the present invention;

Figure 2 is a block diagram of an audio transmitter portion of the wireless digital audio system of Fig. 1;

Figure 3 is a block diagram of an audio receiver portion of the wireless digital audio system of Fig. 1; and

Figure 4 is an exemplary graph showing the utilization of an embedded fuzzy logic coding algorithm according to one embodiment of the present invention.

DETAILED DESCRIPTION

[0008] The following detailed description is the best currently contemplated modes for carrying out the invention. The description is not to be taken in a limiting sense, but is made merely for the purpose of illustrating the general principles of the invention.

[0009] Referring to Figures 1 through 3, a wireless digital audio music system 10 may include a battery powered transmitter 20 connected to a portable music audio player or music audio source 80. The battery powered wireless digital audio music transmitter 20 utilizes an analog to digital converter or ADC 32 and may be connected to the music audio source 80 analog headphone jack 82 using a headphone plug 22. The battery powered transmitter 20 may have a transmitting antenna 24 that may be omni-directional for transmitting a spread spectrum modulated signal to a receiving antenna 52 of a battery powered headphone receiver 50. The battery powered receiver 50 may have headphone speakers 75 in headphones 55 for listening to the spread spectrum demodulated and decoded communication signal. In the headphone receiver 50, fuzzy logic detection may be used to optimize reception of the received user code. The transmitter 20 may digitize the audio signal using ADC 32. The digitized signal may be processed downstream by an encoder 36. After digital conversion, the digital signal may be processed by a digital low pass filter. To reduce the effects of channel noise, the battery powered transmitter 20 may use a channel encoder 38. A modulator 42 modulates the digital signal to be transmitted. For further noise immunity, a spread spectrum DPSK (differential phase shift key) transmitter or module 48, is utilized. The battery powered transmitter 20 may contain a code generator 44 that may be used to create a unique user code. The unique user code generated is specifically associated with one wireless digital audio system user, and it is the only code recognized by the battery powered headphone receiver 50 operated by a particular user. The radio frequency (RF) spectrum utilized (as taken from the Industrial, Scientific and Medical (ISM) band) may be approximately 2.4 GHz. The power radiated by the transmitter adheres to the ISM standard.

[0010] Particularly, the received spread spectrum signal may be communicated to a 2.4 GHz direct conversion receiver or module 56. Referring to Figures 1 through 4, the spread spectrum modulated signal from transmit antenna 24 may be received by receiving antenna 52 and then processed by spread spectrum direct conversion receiver or module 56 with a receiver code generator 60 that contains the same transmitted unique code, in the battery

powered receiver 50 headphones. The transmitted signal from antenna 24 may be received by receiving antenna 52 and communicated to a wideband bandpass filter (BPF). The battery powered receiver 50 may utilize embedded fuzzy logic 61 (as graphically depicted in Figures 1, 4) to optimize the bit detection of the received user code. The down converted output signal of direct conversion receiver or module 56 may be summed by receiver summing element 58 with a receiver code generator 60 signal. The receiver code generator 60 may contain the same unique wireless transmission of a signal code word that was transmitted by audio transmitter 20 specific to a particular user. Other code words from wireless digital audio systems 10 may appear as noise to audio receiver 50. This may also be true for other device transmitted wireless signals

operating in the wireless digital audio spectrum of digital audio system 10. This code division multiple access (CDMA) may be used to provide each user independent audible enjoyment. The resulting summed digital signal from receiving summary element 58 and direct conversion receiver or module 56 may be processed by a 64-Ary demodulator 62 to demodulate the signal elements modulated in the audio transmitter 20. A block deinterleaver 64 may then decode the bits of the digital signal encoded in the block interleaver 40. Following such, a Viterbi decoder 66 may be used to decode the bits encoded by the channel encoder 38 in audio transmitter 20. A source decoder 68 may further decode the coding applied by encoder 36.

[0011] Each receiver headphone 50 user may be able to listen (privately) to high fidelity audio music, using any of the audio devices listed previously, without the use of wires, and without interference from any other receiver headphone 50 user, even when operated within a shared space. The fuzzy logic detection technique 61 used in the receiver 50 could provide greater user separation through optimizing code division in the headphone receiver.

[0012] The battery powered transmitter 20 sends the audio music information to the battery powered receiver 50 in digital packet format. These packets may flow to create a digital bit stream rate less than or equal to 1.0 Mbps.

[0013] The user code bits in each packet may be received and detected by a fuzzy logic detection sub-system 61 (as an option) embedded in the headphone receiver 50 to optimize audio receiver performance. For each consecutive packet received, the fuzzy logic detection sub-system 61 may compute a conditional density with respect to the context and fuzziness

of the user code vector, i.e., the received code bits in each packet. Fuzziness may describe the ambiguity of the high (1)/low (0 or -1) event in the received user code within the packet. The fuzzy logic detection sub-system 61 may measure the degree to which a high/low bit occurs in the user code vector, which produces a low probability of bit error in the presence of noise. The fuzzy logic detection sub-system 61 may use a set of if-then rules to map the user code bit inputs to validation outputs. These rules may be developed as if-then statements.

[0014] Fuzzy logic detection sub-system 61 in battery-powered headphone receiver 50 utilizes the if-then fuzzy set to map the received user code bits into two values: a low (0 or -1) and a high (1). Thus, as the user code bits are received, the "if" rules map the signal bit energy to the fuzzy set low value to some degree and to the fuzzy set high value to some degree. Figure 4 graphically shows that x-value -1 equals the maximum low bit energy representation and x-value 1 equals the maximum high bit energy representation. Due to additive noise, the user code bit energy may have some membership to a low and high as represented in Figure 4. The if-part fuzzy set may determine if each bit in the user code, for every received packet, has a greater membership to a high bit representation or a low bit representation. The more a user code bit energy fits into the high or low representation, the closer its subethood, i.e., a measure of the membership degree to which a set may be a subset of another set, may be to one.

[0015] The if-then rule parts that make up the fuzzy logic detection sub-system 61 must be followed by a defuzzifying operation. This operation reduces the aforementioned fuzzy set to a bit energy representation (i.e., -1 or 1) that is received by the transmitted packet. Fuzzy logic detection sub-system 61 may be used in battery-powered headphone receiver 50 to enhance overall system performance.

[0016] The next step may process the digital signal to return the signal to analog or base band format for use in powering speaker(s) 75. A digital-to-analog converter 70 (DAC) may be used to transform the digital signal to an analog audio signal. An analog low pass filter 72 may be used to filter the analog audio music signal to pass a signal in the approximate 20 Hz to 20 kHz frequency range and filter other frequencies. The analog audio music signal may then be processed by a power amplifier 74 that may be optimized for powering headphone speakers 75 to provide a high quality, low distortion audio music for audible enjoyment by a

user wearing headphones 55. A person skilled in the art would appreciate that some of the embodiments described hereinabove are merely illustrative of the general principles of the present invention. Other modifications or variations may be employed that are within the scope of the invention. Thus, by way of example, but not of limitation, alternative configurations may be utilized in accordance with the teachings herein. Accordingly, the drawings and description are illustrative and not meant to be a limitation thereof.

[0017] Moreover, all terms should be interpreted in the broadest possible manner consistent with the context. In particular, the terms "comprises" and "comprising" should be interpreted as referring to elements, components, or steps in a non-exclusive manner, indicating that the referenced elements, components, or steps may be present, or utilized, or combined with other elements, components, or steps that are not expressly referenced. Thus, it is intended that the invention cover all embodiments and variations thereof as long as such embodiments and variations come within the scope of the appended claims and their equivalents.

WHAT IS CLAIMED IS:

1. 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, said wireless modulation transmissions representative of an audio signal representation, said portable spread spectrum audio receiver comprising:

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;

a digital-to-analog converter (DAC) configured to provide an analog audio output signal corresponding to said audio signal representation;

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;

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;

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 and generate a demodulation signal based on said performance of at least one of said plurality of demodulations, wherein said plurality of demodulations includes a differential phase shift keying (DPSK) demodulation and a non-DPSK demodulation; and

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 40Hz and also capable of representing audio signals above 5kHz.

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 mounting unit, wherein the mounting unit is configured to integrate the speaker and wherein the mounting 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 mounting unit comprises a head mounting strap that connects the speaker with another speaker for opposite ear.

8. 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, said wireless modulation transmissions representative of an audio signal representation, said portable spread spectrum audio receiver configured to:

use independent code division multiple access communication and said unique user code to communicate with only said spread spectrum transmitter during a wireless connection;

receive wireless modulation transmissions representative of said audio signal representation;

process said received wireless modulation transmissions for reduction of intersymbol interference;

perform at least one of a plurality of demodulations on at least one of said received wireless modulation transmissions and generate a demodulation signal based on said performance of at least one of said plurality of demodulations, wherein said plurality of demodulations includes a differential phase shift keying (DPSK) demodulation and a non-DPSK demodulation;

generate an analog audio output signal corresponding to said audio signal representation; and

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 40Hz and also capable of representing audio signals above 5kHz.

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 mounting unit, wherein the mounting unit is configured to integrate the speaker and wherein the mounting 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 mounting unit comprises a head mounting strap that connects the speaker with another speaker for opposite ear.

17. A portable spread spectrum audio 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:

- encode a first representation of an audio signal to reduce intersymbol interference associated with a transmitted representation of the audio signal;

- perform at least one of a plurality of modulations on the first representation of the audio signal;

- generate a modulated signal based on the performance of the plurality of modulations, wherein the plurality of modulations includes a differential phase shift keying (DPSK) modulation and a non-DPSK modulation; and

- 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.

WIRELESS DIGITAL AUDIO MUSIC SYSTEM

ABSTRACT OF THE DISCLOSURE

A wireless digital audio system includes a portable audio source with a digital audio transmitter operatively coupled thereto and an audio receiver operatively coupled to a headphone set. The audio receiver is configured for digital wireless communication with the audio transmitter. The digital audio receiver utilizes fuzzy logic to optimize digital signal processing. Each of the digital audio transmitter and receiver is configured for code division multiple access (CDMA) communication. The wireless digital audio system allows private audio enjoyment without interference from other users of independent wireless digital transmitters and receivers sharing the same space.

29396376

TRANSMITTAL FOR POWER OF ATTORNEY TO ONE OR MORE REGISTERED PRACTITIONERS

NOTE: This form is to be submitted with the Power of Attorney by Applicant form (PTO/AIA/82B) to identify the application to which the Power of Attorney is directed, in accordance with 37 CFR 1.5, unless the application number and filing date are identified in the Power of Attorney by Applicant form. If neither form PTO/AIA/82A nor form PTO/AIA/82B identifies the application to which the Power of Attorney is directed, the Power of Attorney will not be recognized in the application.

Application Number	Unknown
Filing Date	Herewith
First Named Inventor	C. Earl Woolfork
Title	WIRELESS DIGITAL AUDIO MUSIC SYSTEM
Art Unit	Unassigned
Examiner Name	Unassigned
Attorney Docket Number	1EWAY.009P1C7

SIGNATURE of Applicant or Patent Practitioner

Signature	/Harnik Shukla/	Date (Optional)	
Name	Harnik Shukla	Registration Number	73,097
Title (if Applicant is a juristic entity)			
Applicant Name (if Applicant is a juristic entity)			
NOTE: This form must be signed in accordance with 37 CFR 1.33. See 37 CFR 1.4(d) for signature requirements and certifications. If more than one applicant, use multiple forms.			
☒ *Total of <u>1</u> forms are submitted.			

This collection of information is required by 37 CFR 1.131, 1.32, and 1.33. The information is required to obtain or retain a benefit by the public which is to file (and by the USPTO to process) an application. Confidentiality is governed by 35 U.S.C. 122 and 37 CFR 1.11 and 1.14. This collection is estimated to take 3 minutes to complete, including gathering, preparing, and submitting the completed application form to the USPTO. Time will vary depending upon the individual case. Any comments on the amount of time you require to complete this form and/or suggestions for reducing this burden, should be sent to the Chief Information Officer, U.S. Patent and Trademark Office, U.S. Department of Commerce, P.O. Box 1450, Alexandria, VA 22313-1450. DO NOT SEND FEES OR COMPLETED FORMS TO THIS ADDRESS. **SEND TO: Commissioner for Patents, P.O. Box 1450, Alexandria, VA 22313-1450.**

If you need assistance in completing the form, call 1-800-PTO-9199 and select option 2.

Doc Code: PA..
Document Description: Power of Attorney

PTO/AIA/82B (07-15)
Approved for use through 01/31/2018. OMB 0551-0035
U.S. Patent and Trademark Office, U.S. DEPARTMENT OF COMMERCE
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POWER OF ATTORNEY BY APPLICANT

I hereby revoke all previous powers of attorney given in the application identified in either the attached transmittal letter or the boxes below.

Application Number	Filing Date

(Note: The boxes above may be left blank if information is provided on form PTO/AIA/82A.)

☒ I hereby appoint the Patent Practitioner(s) associated with the following Customer Number as my/our attorney(s) or agent(s), and to transact all business in the United States Patent and Trademark Office connected therewith for the application referenced in the attached transmittal letter (form PTO/AIA/82A) or identified above:

20995

OR

☐ I hereby appoint Practitioner(s) named in the attached list (form PTO/AIA/82C) as my/our attorney(s) or agent(s), and to transact all business in the United States Patent and Trademark Office connected therewith for the patent application referenced in the attached transmittal letter (form PTO/AIA/82A) or identified above. (Note: Complete form PTO/AIA/82C.)

Please recognize or change the correspondence address for the application identified in the attached transmittal letter or the boxes above to:

☒ The address associated with the above-mentioned Customer Number

OR

☐ The address associated with Customer Number:

OR

☐ Firm or
Individual Name

Address

City

State

Zip

Country

Telephone

Email

I am the Applicant (if the Applicant is a juristic entity, list the Applicant name in the box).

C. Earl Woolfork

☒ Inventor or Joint Inventor (title not required below)

☐ Legal Representative of a Deceased or Legally Incapacitated Inventor (title not required below)

☐ Assignee or Person to Whom the Inventor is Under an Obligation to Assign (provide signer's title if applicant is a juristic entity)

☐ Person Who Otherwise Shows Sufficient Proprietary Interest (e.g., a petition under 37 CFR 1.46(b)(2) was granted in the application or is concurrently being filed with this document) (provide signer's title if applicant is a juristic entity)

SIGNATURE of Applicant for Patent

The undersigned (whose title is supplied below) is authorized to act on behalf of the applicant (e.g., where the applicant is a juristic entity).

Signature

Date (Optional)

Name

C. Earl Woolfork

Title

NOTE: Signature - This form must be signed by the applicant in accordance with 37 CFR 1.33. See 37 CFR 1.4 for signature requirements and certifications. If more than one applicant, use multiple forms.

☐ Total of _____ forms are submitted.

This collection of information is required by 37 CFR 1.131, 1.32, and 1.33. The information is required to obtain or retain a benefit by the public which is to file (and by the USPTO to process) an application. Confidentiality is governed by 35 U.S.C. 122 and 37 CFR 1.11 and 1.14. This collection is estimated to take 3 minutes to complete, including gathering, preparing, and submitting the completed application form to the USPTO. Time will vary depending upon the individual case. Any comments on the amount of time you require to complete this form and/or suggestions for reducing this burden, should be sent to the Chief Information Officer, U.S. Patent and Trademark Office, U.S. Department of Commerce, P.O. Box 1460, Alexandria, VA 22313-1460. DO NOT SEND FEES OR COMPLETED FORMS TO THIS ADDRESS. SEND TO: Commissioner for Patents, P.O. Box 1460, Alexandria, VA 22313-1460.

If you need assistance in completing the form, call 1-800-PTO-9199 and select option 2.

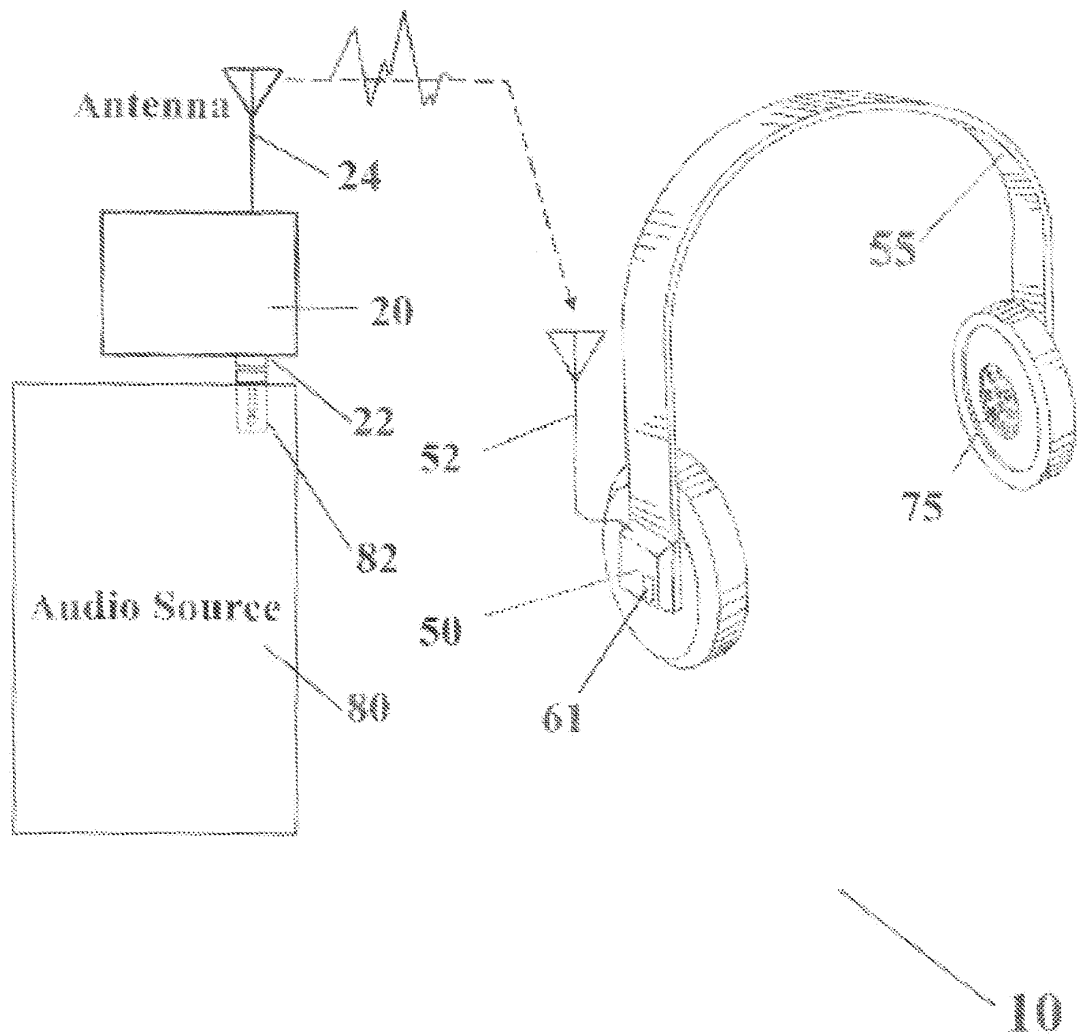


FIG.1

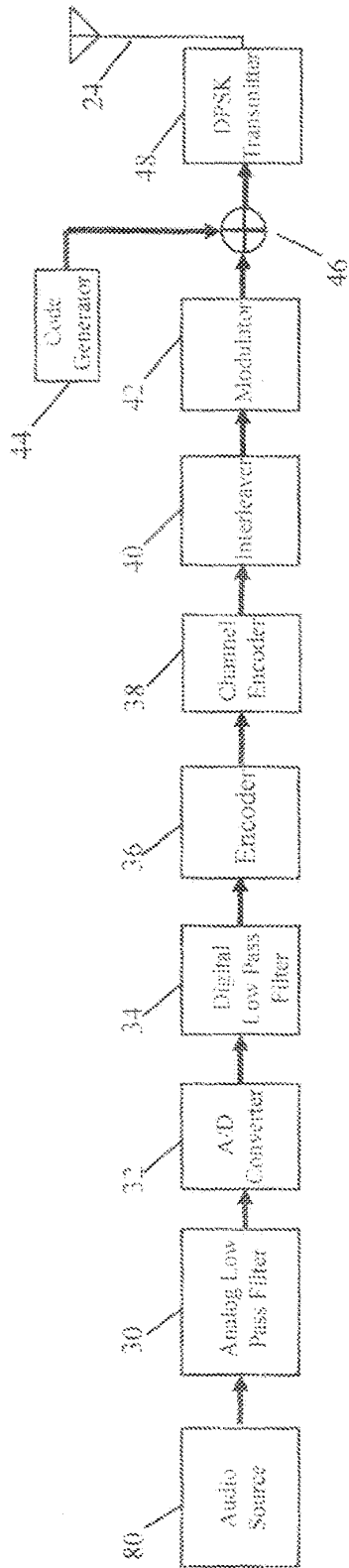


FIG. 2

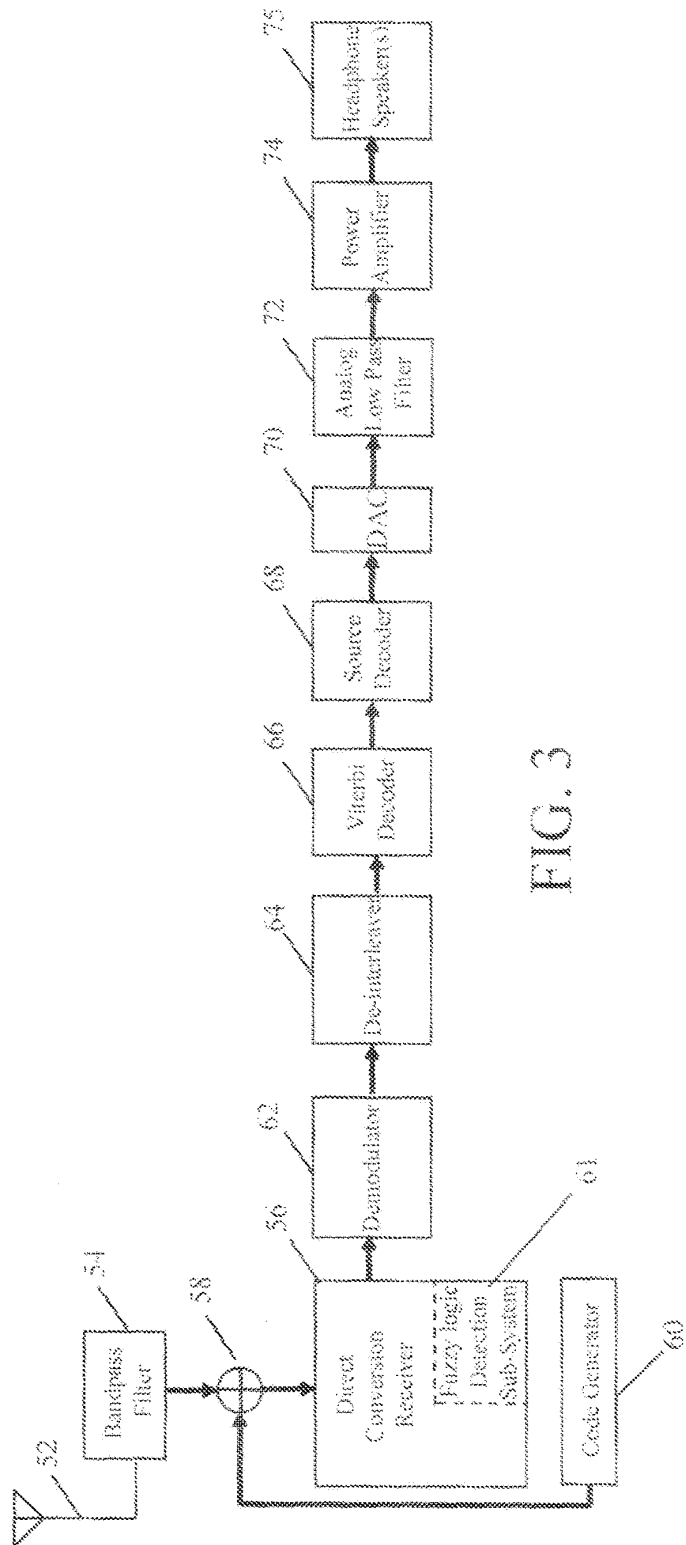


FIG. 3

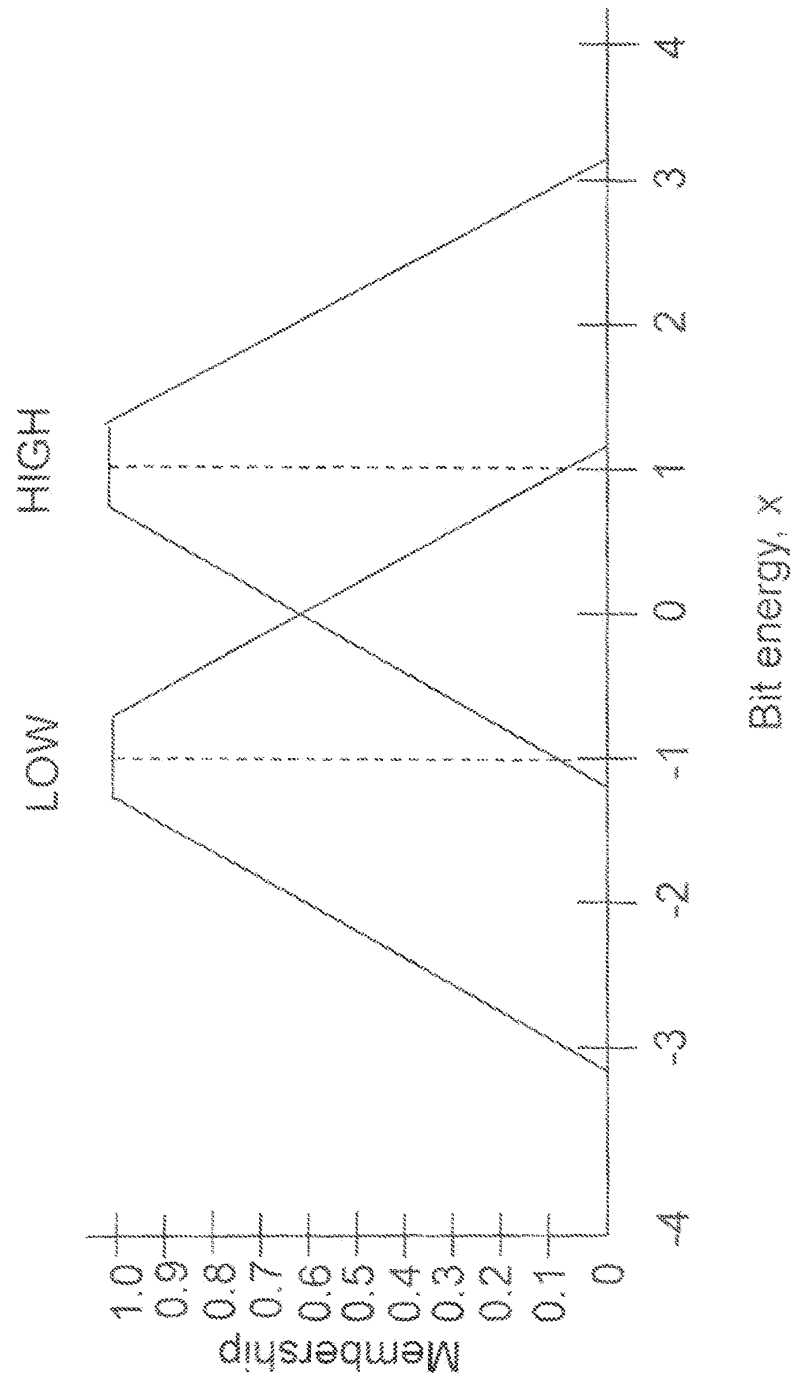


Fig. 4

Electronic Patent Application Fee Transmittal				
Application Number:				
Filing Date:				
Title of Invention:		WIRELESS DIGITAL AUDIO MUSIC SYSTEM		
First Named Inventor/Applicant Name:		C. Earl Woolfork		
Filer:		Harnik Shukla/Jenny Kim		
Attorney Docket Number:		1EWAY.009P1C7		
Filed as Large Entity				
Filing Fees for Track I Prioritized Examination - Nonprovisional Application under 35 USC 111(a)				
Description	Fee Code	Quantity	Amount	Sub-Total in USD(\$)
Basic Filing:				
UTILITY APPLICATION FILING	1011	1	300	300
UTILITY SEARCH FEE	1111	1	660	660
UTILITY EXAMINATION FEE	1311	1	760	760
REQUEST FOR PRIORITIZED EXAMINATION	1817	1	4000	4000
Pages:				
Claims:				
Miscellaneous-Filing:				

Description	Fee Code	Quantity	Amount	Sub-Total in USD(\$)
PUBL. FEE- EARLY, VOLUNTARY, OR NORMAL	1504	1	0	0
PROCESSING FEE, EXCEPT PROV. APPLS.	1830	1	140	140
Petition:				
Patent-Appeals-and-Interference:				
Post-Allowance-and-Post-Issuance:				
Extension-of-Time:				
Miscellaneous:				
Total in USD (\$)				5860

Electronic Acknowledgement Receipt	
EFS ID:	34263748
Application Number:	16185786
International Application Number:	
Confirmation Number:	1022
Title of Invention:	WIRELESS DIGITAL AUDIO MUSIC SYSTEM
First Named Inventor/Applicant Name:	C. Earl Woolfork
Customer Number:	20995
Filer:	Harnik Shukla/Chelsea Veinot
Filer Authorized By:	Harnik Shukla
Attorney Docket Number:	1EWAY.009P1C7
Receipt Date:	09-NOV-2018
Filing Date:	
Time Stamp:	15:37:26
Application Type:	Utility under 35 USC 111(a)

Payment information:

Submitted with Payment	yes
Payment Type	CARD
Payment was successfully received in RAM	\$5860
RAM confirmation Number	111318INTEFSW15384400
Deposit Account	111410
Authorized User	Chelsea Veinot
The Director of the USPTO is hereby authorized to charge indicated fees and credit any overpayment as follows: 37 CFR 1.16 (National application filing, search, and examination fees) 37 CFR 1.17 (Patent application and reexamination processing fees)	

File Listing:					
Document Number	Document Description	File Name	File Size(Bytes)/ Message Digest	Multi Part /.zip	Pages (if appl.)
1	TrackOne Request	1EWAY_Track1.pdf	113958	no	2
			86fe1c515fadcd8a322481c26da61d07541aaf76		
Warnings:					
Information:					
2	First Action Interview - Enrollment Request	1EWAY_FAI.pdf	621894	no	3
			25476etv45a8d9e8598d5cf5308abee0a4eae293e9		
Warnings:					
Information:					
3	Application Data Sheet	1EWAY_ADS.pdf	1256402	no	9
			28af203b95b4919d3740b2c85c5d94228dcf9767		
Warnings:					
Information:					
4		1EWAY_Spec.pdf	134981	yes	12
			74ea817be36d7804b24c9895bb7e53cae7fe9fd5		
	Multipart Description/PDF files in .zip description				
	Document Description		Start	End	
	Specification		1	6	
	Claims		7	11	
	Abstract		12	12	
Warnings:					
Information:					
5	Oath or Declaration filed	1EWAY_Declaration.pdf	779890	no	2
			e21532024d978fb0fb461f1c9ef691a6d55dfa0d		

Warnings:					
Information:					
6	Power of Attorney	1EWAY_POA.pdf	742264	no	2
			e872b1f04fe75ff43f9431bcb22d4e54c3c700d		
Warnings:					
Information:					
7	Drawings-only black and white line drawings	1EWAY_Drawings.pdf	1383073	no	3
			821ed9c6bb8c240cb48b17a62712036eba685c3b		
Warnings:					
Information:					
8	Fee Worksheet (SB06)	fee-info.pdf	40452	no	2
			d4091963fbbe92dbf702d44d82824bbe13f680ac		
Warnings:					
Information:					
Total Files Size (in bytes):			5072914		
This Acknowledgement Receipt evidences receipt on the noted date by the USPTO of the indicated documents, characterized by the applicant, and including page counts, where applicable. It serves as evidence of receipt similar to a Post Card, as described in MPEP 503. <u>New Applications Under 35 U.S.C. 111</u> If a new application is being filed and the application includes the necessary components for a filing date (see 37 CFR 1.53(b)-(d) and MPEP 506), a Filing Receipt (37 CFR 1.54) will be issued in due course and the date shown on this Acknowledgement Receipt will establish the filing date of the application. <u>National Stage of an International Application under 35 U.S.C. 371</u> If a timely submission to enter the national stage of an international application is compliant with the conditions of 35 U.S.C. 371 and other applicable requirements a Form PCT/DO/EO/903 indicating acceptance of the application as a national stage submission under 35 U.S.C. 371 will be issued in addition to the Filing Receipt, in due course. <u>New International Application Filed with the USPTO as a Receiving Office</u> If a new international application is being filed and the international application includes the necessary components for an international filing date (see PCT Article 11 and MPEP 1810), a Notification of the International Application Number and of the International Filing Date (Form PCT/RO/105) will be issued in due course, subject to prescriptions concerning national security, and the date shown on this Acknowledgement Receipt will establish the international filing date of the application.					



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United States Patent and Trademark Office
Address: COMMISSIONER FOR PATENTS
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APPLICATION NUMBER	FILING OR 371(C) DATE	FIRST NAMED APPLICANT	ATTY. DOCKET NO./TITLE
16/185,786	11/09/2018	C. Earl Woolfork	1EWAY.009P1C7

CONFIRMATION NO. 1022

FORMALITIES LETTER



20995
KNOBBE MARTENS OLSON & BEAR LLP
2040 MAIN STREET
FOURTEENTH FLOOR
IRVINE, CA 92614

Date Mailed: 12/03/2018

NOTICE TO FILE CORRECTED APPLICATION PAPERS

Filing Date Granted

An application number and filing date have been accorded to this application. The application is informal since it does not comply with the regulations for the reason(s) indicated below. Applicant is given TWO MONTHS from the date of this Notice within which to correct the informalities indicated below. Extensions of time may be obtained by filing a petition accompanied by the extension fee under the provisions of 37 CFR 1.136(a).

The required item(s) identified below must be timely submitted to avoid abandonment:

- Replacement drawings in compliance with 37 CFR 1.84 and 37 CFR 1.121(d) are required. The drawings submitted are not acceptable because:
 - The drawings submitted to the Office are not electronically reproducible because portions of figures 1-3 are missing and/or blurry.

Applicant is cautioned that correction of the above items may cause the specification and drawings page count to exceed 100 pages. If the specification and drawings exceed 100 pages, applicant will need to submit the required application size fee.

Replies must be received in the USPTO within the set time period or must include a proper Certificate of Mailing or Transmission under 37 CFR 1.8 with a mailing or transmission date within the set time period. For more information and a suggested format, see Form PTO/SB/92 and MPEP 512.

Replies should be mailed to:

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If you are not using EFS-Web to submit your reply, you must include a copy of this notice.

Questions about the contents of this notice and the requirements it sets forth should be directed to the Office of Data Management, Application Assistance Unit, at
(571) 272-4000 or (571) 272-4200 or 1-888-786-0101.

/ewondimu/

PATENT APPLICATION FEE DETERMINATION RECORD Substitute for Form PTO-875						Application or Docket Number 16/185,786				
APPLICATION AS FILED - PART I										
(Column 1)		(Column 2)		SMALL ENTITY		OR OTHER THAN SMALL ENTITY				
FOR	NUMBER FILED	NUMBER EXTRA	RATE(\$)	FEE(\$)		RATE(\$)	FEE(\$)			
BASIC FEE (37 CFR 1.16(a), (b), or (c))	N/A	N/A	N/A			N/A	300			
SEARCH FEE (37 CFR 1.16(k), (l), or (m))	N/A	N/A	N/A			N/A	660			
EXAMINATION FEE (37 CFR 1.16(o), (p), or (q))	N/A	N/A	N/A			N/A	760			
TOTAL CLAIMS (37 CFR 1.16(i))	20	minus 20 = *				x 100 =	0.00			
INDEPENDENT CLAIMS (37 CFR 1.16(h))	3	minus 3 = *				x 460 =	0.00			
APPLICATION SIZE FEE (37 CFR 1.16(s))	If the specification and drawings exceed 100 sheets of paper, the application size fee due is \$310 (\$155 for small entity) for each additional 50 sheets or fraction thereof. See 35 U.S.C. 41(a)(1)(G) and 37 CFR 1.16(s).						0.00			
MULTIPLE DEPENDENT CLAIM PRESENT (37 CFR 1.16(j))							0.00			
* If the difference in column 1 is less than zero, enter "0" in column 2.			TOTAL			TOTAL	1720			
APPLICATION AS AMENDED - PART II										
AMENDMENT A	(Column 1)		(Column 2)		(Column 3)		SMALL ENTITY		OR OTHER THAN SMALL ENTITY	
	CLAIMS REMAINING AFTER AMENDMENT	HIGHEST NUMBER PREVIOUSLY PAID FOR	PRESENT EXTRA	RATE(\$)	ADDITIONAL FEE(\$)		RATE(\$)	ADDITIONAL FEE(\$)		
	Total (37 CFR 1.16(i))	*	Minus **	x	=		x	=		
	Independent (37 CFR 1.16(h))	*	Minus ***	x	=		x	=		
	Application Size Fee (37 CFR 1.16(s))									
	FIRST PRESENTATION OF MULTIPLE DEPENDENT CLAIM (37 CFR 1.16(j))									
TOTAL ADD'L FEE						TOTAL ADD'L FEE				
AMENDMENT B	(Column 1)		(Column 2)		(Column 3)		SMALL ENTITY		OR OTHER THAN SMALL ENTITY	
	CLAIMS REMAINING AFTER AMENDMENT	HIGHEST NUMBER PREVIOUSLY PAID FOR	PRESENT EXTRA	RATE(\$)	ADDITIONAL FEE(\$)		RATE(\$)	ADDITIONAL FEE(\$)		
	Total (37 CFR 1.16(i))	*	Minus **	x	=		x	=		
	Independent (37 CFR 1.16(h))	*	Minus ***	x	=		x	=		
	Application Size Fee (37 CFR 1.16(s))									
	FIRST PRESENTATION OF MULTIPLE DEPENDENT CLAIM (37 CFR 1.16(j))									
TOTAL ADD'L FEE						TOTAL ADD'L FEE				
* If the entry in column 1 is less than the entry in column 2, write "0" in column 3. ** If the "Highest Number Previously Paid For" IN THIS SPACE is less than 20, enter "20". *** If the "Highest Number Previously Paid For" IN THIS SPACE is less than 3, enter "3". The "Highest Number Previously Paid For" (Total or Independent) is the highest found in the appropriate box in column 1.										



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www.uspto.gov

APPLICATION NUMBER	FILING or 371(c) DATE	GRP ART UNIT	FIL FEE REC'D	ATTY. DOCKET NO.	TOT CLAIMS	IND CLAIMS
16/185,786	11/09/2018	2654	1720	1EWAY.009P1C7	20	3

CONFIRMATION NO. 1022

FILING RECEIPT



0000000104135221

20995
KNOBBE MARTENS OLSON & BEAR LLP
2040 MAIN STREET
FOURTEENTH FLOOR
IRVINE, CA 92614

Date Mailed: 12/03/2018

Receipt is acknowledged of this non-provisional patent application. The application will be taken up for examination in due course. Applicant will be notified as to the results of the examination. Any correspondence concerning the application must include the following identification information: the U.S. APPLICATION NUMBER, FILING DATE, NAME OF APPLICANT, and TITLE OF INVENTION. Fees transmitted by check or draft are subject to collection. Please verify the accuracy of the data presented on this receipt. **If an error is noted on this Filing Receipt, please submit a written request for a Filing Receipt Correction. Please provide a copy of this Filing Receipt with the changes noted thereon. If you received a "Notice to File Missing Parts" for this application, please submit any corrections to this Filing Receipt with your reply to the Notice. When the USPTO processes the reply to the Notice, the USPTO will generate another Filing Receipt incorporating the requested corrections**

Inventor(s)

C. Earl Woolfork, Pasadena, CA;

Applicant(s)

C. Earl Woolfork, Pasadena, CA;

Power of Attorney: The patent practitioners associated with Customer Number 20995

Domestic Priority data as claimed by applicant

This application is a CON of 15/003,242 01/21/2016 PAT 10129627
which is a CON of 13/775,754 02/25/2013 PAT 9282396
which is a CON of 13/356,949 01/24/2012 PAT 9107000
which is a CON of 12/940,747 11/05/2010 PAT 8131391
which is a CON of 12/570,343 09/30/2009 PAT 7865258
which is a CON of 12/144,729 07/12/2008 PAT 7684885
which is a CON of 10/648,012 08/26/2003 PAT 7412294
which is a CIP of 10/027,391 12/21/2001 ABN

Foreign Applications for which priority is claimed (You may be eligible to benefit from the **Patent Prosecution Highway** program at the USPTO. Please see <http://www.uspto.gov> for more information.) - None.

Foreign application information must be provided in an Application Data Sheet in order to constitute a claim to foreign priority. See 37 CFR 1.55 and 1.76.

Permission to Access Application via Priority Document Exchange: Yes

Permission to Access Search Results: Yes

Applicant may provide or rescind an authorization for access using Form PTO/SB/39 or Form PTO/SB/69 as appropriate.

If Required, Foreign Filing License Granted: 11/29/2018

The country code and number of your priority application, to be used for filing abroad under the Paris Convention, is **US 16/185,786**

Projected Publication Date: To Be Determined - pending completion of Corrected Papers

Non-Publication Request: No

Early Publication Request: No
Title

WIRELESS DIGITAL AUDIO MUSIC SYSTEM

Preliminary Class

381

Statement under 37 CFR 1.55 or 1.78 for AIA (First Inventor to File) Transition Applications: No

PROTECTING YOUR INVENTION OUTSIDE THE UNITED STATES

Since the rights granted by a U.S. patent extend only throughout the territory of the United States and have no effect in a foreign country, an inventor who wishes patent protection in another country must apply for a patent in a specific country or in regional patent offices. Applicants may wish to consider the filing of an international application under the Patent Cooperation Treaty (PCT). An international (PCT) application generally has the same effect as a regular national patent application in each PCT-member country. The PCT process **simplifies** the filing of patent applications on the same invention in member countries, but **does not result** in a grant of "an international patent" and does not eliminate the need of applicants to file additional documents and fees in countries where patent protection is desired.

Almost every country has its own patent law, and a person desiring a patent in a particular country must make an application for patent in that country in accordance with its particular laws. Since the laws of many countries differ in various respects from the patent law of the United States, applicants are advised to seek guidance from specific foreign countries to ensure that patent rights are not lost prematurely.

Applicants also are advised that in the case of inventions made in the United States, the Director of the USPTO must issue a license before applicants can apply for a patent in a foreign country. The filing of a U.S. patent application serves as a request for a foreign filing license. The application's filing receipt contains further information and guidance as to the status of applicant's license for foreign filing.

Applicants may wish to consult the USPTO booklet, "General Information Concerning Patents" (specifically, the section entitled "Treaties and Foreign Patents") for more information on timeframes and deadlines for filing foreign patent applications. The guide is available either by contacting the USPTO Contact Center at 800-786-9199, or it can be viewed on the USPTO website at <http://www.uspto.gov/web/offices/pac/doc/general/index.html>.

For information on preventing theft of your intellectual property (patents, trademarks and copyrights), you may wish to consult the U.S. Government website, <http://www.stopfakes.gov>. Part of a Department of Commerce initiative, this website includes self-help "toolkits" giving innovators guidance on how to protect intellectual property in specific

page 2 of 4

countries such as China, Korea and Mexico. For questions regarding patent enforcement issues, applicants may call the U.S. Government hotline at 1-866-999-HALT (1-866-999-4258).

LICENSE FOR FOREIGN FILING UNDER
Title 35, United States Code, Section 184
Title 37, Code of Federal Regulations, 5.11 & 5.15

GRANTED

The applicant has been granted a license under 35 U.S.C. 184, if the phrase "IF REQUIRED, FOREIGN FILING LICENSE GRANTED" followed by a date appears on this form. Such licenses are issued in all applications where the conditions for issuance of a license have been met, regardless of whether or not a license may be required as set forth in 37 CFR 5.15. The scope and limitations of this license are set forth in 37 CFR 5.15(a) unless an earlier license has been issued under 37 CFR 5.15(b). The license is subject to revocation upon written notification. The date indicated is the effective date of the license, unless an earlier license of similar scope has been granted under 37 CFR 5.13 or 5.14.

This license is to be retained by the licensee and may be used at any time on or after the effective date thereof unless it is revoked. This license is automatically transferred to any related applications(s) filed under 37 CFR 1.53(d). This license is not retroactive.

The grant of a license does not in any way lessen the responsibility of a licensee for the security of the subject matter as imposed by any Government contract or the provisions of existing laws relating to espionage and the national security or the export of technical data. Licensees should apprise themselves of current regulations especially with respect to certain countries, of other agencies, particularly the Office of Defense Trade Controls, Department of State (with respect to Arms, Munitions and Implements of War (22 CFR 121-128)); the Bureau of Industry and Security, Department of Commerce (15 CFR parts 730-774); the Office of Foreign Assets Control, Department of Treasury (31 CFR Parts 500+) and the Department of Energy.

NOT GRANTED

No license under 35 U.S.C. 184 has been granted at this time, if the phrase "IF REQUIRED, FOREIGN FILING LICENSE GRANTED" DOES NOT appear on this form. Applicant may still petition for a license under 37 CFR 5.12, if a license is desired before the expiration of 6 months from the filing date of the application. If 6 months has lapsed from the filing date of this application and the licensee has not received any indication of a secrecy order under 35 U.S.C. 181, the licensee may foreign file the application pursuant to 37 CFR 5.15(b).

SelectUSA

The United States represents the largest, most dynamic marketplace in the world and is an unparalleled location for business investment, innovation, and commercialization of new technologies. The U.S. offers tremendous resources and advantages for those who invest and manufacture goods here. Through SelectUSA, our nation works to promote and facilitate business investment. SelectUSA provides information assistance to the international investor community; serves as an ombudsman for existing and potential investors; advocates on behalf of U.S. cities, states, and regions competing for global investment; and counsels U.S. economic development organizations on investment attraction best practices. To learn more about why the United States is the best country in the world to develop

technology, manufacture products, deliver services, and grow your business, visit <http://www.SelectUSA.gov> or call +1-202-482-6800.

INFORMATION DISCLOSURE STATEMENT BY APPLICANT	Application No.	16/185786
	Filing Date	November 9, 2018
	First Named Inventor	C. Earl Woolfork
	Art Unit	2654
(Multiple sheets used when necessary)	Examiner	Unassigned
SHEET 1 OF 1	Attorney Docket No.	IEWAY.009PIC7

U.S. PATENT DOCUMENTS					
Examiner Initials	Cite No.	Document Number <i>Number - Kind Code (if known)</i> Example: 1,234,567 B1	Publication Date MM-DD-YYYY	Name	Pages, Columns, Lines Where Relevant Passages or Relevant Figures Appear
	1	5,530,929	06-25-1996	Lindqvist et al.	
	2	5,970,058	10-19-1999	DeClerk et al.	
	3	6,212,282	04-03-2001	Mershon	

FOREIGN PATENT DOCUMENTS						
Examiner Initials	Cite No.	Foreign Patent Document <i>Country Code-Number-Kind Code</i> Example: JP 1234567 A1	Publication Date MM-DD-YYYY	Name	Pages, Columns, Lines Where Relevant Passages or Relevant Figures Appear	T ¹

NON PATENT LITERATURE DOCUMENTS			
Examiner Initials	Cite No.	Include name of the author (in CAPITAL LETTERS), title of the article (when appropriate), title of the item (book, magazine, journal, serial, symposium, catalog, etc.), date, page(s), volume-issue number(s), publisher, city and/or country where published.	T ¹
	4	MASHHOUR et al., "On the Direct Conversion Receiver – A Tutorial", Microwave J., June 1, 2001, http://www.microwavejournal.com/articles/print/3226-on-the-direct-conversion-receiver-a-tutorial , accessed on December 3, 2018, in 12 pages.	

29527241

Examiner Signature	Date Considered
*Examiner: Initial if reference considered, whether or not citation is in conformance with MPEP 609. Draw line through citation if not in conformance and not considered. Include copy of this form with next communication to applicant.	

T¹ - Place a check mark in this area when an English language Translation is attached.

Electronic Acknowledgement Receipt	
EFS ID:	34472041
Application Number:	16185786
International Application Number:	
Confirmation Number:	1022
Title of Invention:	WIRELESS DIGITAL AUDIO MUSIC SYSTEM
First Named Inventor/Applicant Name:	C. Earl Woolfork
Customer Number:	20995
Filer:	Harnik Shukla/Jenny Kim
Filer Authorized By:	Harnik Shukla
Attorney Docket Number:	1EWAY.009P1C7
Receipt Date:	03-DEC-2018
Filing Date:	09-NOV-2018
Time Stamp:	20:32:10
Application Type:	Utility under 35 USC 111(a)

Payment information:

Submitted with Payment		no			
File Listing:					
Document Number	Document Description	File Name	File Size(Bytes)/ Message Digest	Multi Part /.zip	Pages (if appl.)
1	Non Patent Literature	Mashhour_Microwave_J_2001.pdf	4658845 077ca2e10fba06b6ca5bb8e31fd177b3d0c ba58e	no	12
Warnings:					

Information:					
2		1EWAY_IDS.pdf	135030	yes	3
			4f0d0d0173c9864234fcbeae3829ddcd7550f98		
	Multipart Description/PDF files in .zip description				
	Document Description		Start	End	
	Transmittal Letter		1	2	
	Information Disclosure Statement (IDS) Form (SB08)		3	3	
Warnings:					
Information:					
Total Files Size (in bytes):			4793875		
This Acknowledgement Receipt evidences receipt on the noted date by the USPTO of the indicated documents, characterized by the applicant, and including page counts, where applicable. It serves as evidence of receipt similar to a Post Card, as described in MPEP 503. <u>New Applications Under 35 U.S.C. 111</u> If a new application is being filed and the application includes the necessary components for a filing date (see 37 CFR 1.53(b)-(d) and MPEP 506), a Filing Receipt (37 CFR 1.54) will be issued in due course and the date shown on this Acknowledgement Receipt will establish the filing date of the application. <u>National Stage of an International Application under 35 U.S.C. 371</u> If a timely submission to enter the national stage of an international application is compliant with the conditions of 35 U.S.C. 371 and other applicable requirements a Form PCT/DO/EO/903 indicating acceptance of the application as a national stage submission under 35 U.S.C. 371 will be issued in addition to the Filing Receipt, in due course. <u>New International Application Filed with the USPTO as a Receiving Office</u> If a new international application is being filed and the international application includes the necessary components for an international filing date (see PCT Article 11 and MPEP 1810), a Notification of the International Application Number and of the International Filing Date (Form PCT/RO/105) will be issued in due course, subject to prescriptions concerning national security, and the date shown on this Acknowledgement Receipt will establish the international filing date of the application.					

INFORMATION DISCLOSURE STATEMENT

First Inventor	: C. Earl Woolfork
App. No.	: 16/185786
Filed	: November 9, 2018
For	: WIRELESS DIGITAL AUDIO MUSIC SYSTEM
Examiner	: Unassigned
Art Unit	: 2654
Conf. No.	: 1022

Commissioner for Patents
P.O. Box 1450
Alexandria, VA 22313-1450

References and Listing

Pursuant to 37 CFR 1.56, an Information Disclosure Statement listing references is provided herewith. Copies of any listed foreign and non-patent literature references are being submitted.

No Disclaimers

To the extent that anything in the Information Disclosure Statement or the listed references could be construed as a disclaimer of any subject matter supported by the present application, Applicant hereby rescinds and retracts such disclaimer.

Timing of Disclosure

This Information Disclosure Statement is being filed within three months of the filing date or date of national phase entry, with an RCE or before receipt of a First Office Action after an RCE, and no fee is believed to be required.

The Commissioner is hereby authorized to charge any additional fees which may be required, or credit any overpayment, to Account No. 11-1410.

Application No.: 16/185786
Filing Date: November 9, 2018

Respectfully submitted,
KNOBBE, MARTENS, OLSON & BEAR, LLP

Dated: December 3, 2018

By: /Harnik Shukla/ _____
Harnik Shukla
Registration No. 73,097
Registered Practitioner
Customer No. 20995
(949) 721-5278

29527323

Docket No.: 1EWAY.009P1C7

December 7, 2018

App. No.: 16/185786

Page 1 of 1

Please Direct All Correspondence to Customer Number 20995

RESCISSION OF ANY PRIOR DISCLAIMERS AND REQUEST TO REVISIT ART

Inventor	: C. Earl Woolfork
App. No	: 16/185786
Filed	: November 9, 2018
For	: WIRELESS DIGITAL AUDIO MUSIC SYSTEM
Examiner	: Unassigned
Art Unit	: 2654
Conf #	: 1022

Commissioner for Patents
P.O. Box 1450
Alexandria, VA 22313-1450

Dear Commissioner:

The claims of the present application are different and possibly broader in scope than the claims pursued in the parent application(s). To the extent any prior amendments or characterizations of the scope of any claim or referenced art could be construed as a disclaimer of any subject matter supported by the present disclosure, Applicant hereby rescinds and retracts such disclaimer. Accordingly, the references previously considered in the parent application(s) may need to be re-visited.

Please charge any additional fees, including any fees for additional extension of time, or credit overpayment to Deposit Account No. 11-1410.

Knobbe, Martens, Olson & Bear, LLP

Respectfully submitted,

Dated: December 7, 2018

By: /Harnik Shukla/ _____
Harnik Shukla
Registration No. 73,097
Registered Practitioner
Customer No. 20995
(949) 721-5278

29557814

Electronic Acknowledgement Receipt	
EFS ID:	34522387
Application Number:	16185786
International Application Number:	
Confirmation Number:	1022
Title of Invention:	WIRELESS DIGITAL AUDIO MUSIC SYSTEM
First Named Inventor/Applicant Name:	C. Earl Woolfork
Customer Number:	20995
Filer:	Harnik Shukla/Christina Gaul
Filer Authorized By:	Harnik Shukla
Attorney Docket Number:	1EWAY.009P1C7
Receipt Date:	07-DEC-2018
Filing Date:	09-NOV-2018
Time Stamp:	16:04:45
Application Type:	Utility under 35 USC 111(a)

Payment information:

Submitted with Payment		no			
File Listing:					
Document Number	Document Description	File Name	File Size(Bytes)/ Message Digest	Multi Part /.zip	Pages (if appl.)
1	Miscellaneous Incoming Letter	009p1c7.pdf	78970	no	1
			6d378222a995be66ce39865afb10u9c6f59a9ebf		
Warnings:					

Information:	
Total Files Size (in bytes):	78970
This Acknowledgement Receipt evidences receipt on the noted date by the USPTO of the indicated documents, characterized by the applicant, and including page counts, where applicable. It serves as evidence of receipt similar to a Post Card, as described in MPEP 503. <u>New Applications Under 35 U.S.C. 111</u> If a new application is being filed and the application includes the necessary components for a filing date (see 37 CFR 1.53(b)-(d) and MPEP 506), a Filing Receipt (37 CFR 1.54) will be issued in due course and the date shown on this Acknowledgement Receipt will establish the filing date of the application. <u>National Stage of an International Application under 35 U.S.C. 371</u> If a timely submission to enter the national stage of an international application is compliant with the conditions of 35 U.S.C. 371 and other applicable requirements a Form PCT/DO/EO/903 indicating acceptance of the application as a national stage submission under 35 U.S.C. 371 will be issued in addition to the Filing Receipt, in due course. <u>New International Application Filed with the USPTO as a Receiving Office</u> If a new international application is being filed and the international application includes the necessary components for an international filing date (see PCT Article 11 and MPEP 1810), a Notification of the International Application Number and of the International Filing Date (Form PCT/RO/105) will be issued in due course, subject to prescriptions concerning national security, and the date shown on this Acknowledgement Receipt will establish the international filing date of the application.	

PATENT APPLICATION FEE DETERMINATION RECORD Substitute for Form PTO-875						Application or Docket Number 16/185,786				
APPLICATION AS FILED - PART I										
(Column 1)		(Column 2)		SMALL ENTITY		OR OTHER THAN SMALL ENTITY				
FOR	NUMBER FILED	NUMBER EXTRA	RATE(\$)	FEE(\$)		RATE(\$)	FEE(\$)			
BASIC FEE (37 CFR 1.16(a), (b), or (c))	N/A	N/A	N/A			N/A	300			
SEARCH FEE (37 CFR 1.16(k), (l), or (m))	N/A	N/A	N/A			N/A	660			
EXAMINATION FEE (37 CFR 1.16(o), (p), or (q))	N/A	N/A	N/A			N/A	760			
TOTAL CLAIMS (37 CFR 1.16(i))	20	minus 20 = *				x 100 =	0.00			
INDEPENDENT CLAIMS (37 CFR 1.16(h))	3	minus 3 = *				x 460 =	0.00			
APPLICATION SIZE FEE (37 CFR 1.16(s))	If the specification and drawings exceed 100 sheets of paper, the application size fee due is \$310 (\$155 for small entity) for each additional 50 sheets or fraction thereof. See 35 U.S.C. 41(a)(1)(G) and 37 CFR 1.16(s).						0.00			
MULTIPLE DEPENDENT CLAIM PRESENT (37 CFR 1.16(j))							0.00			
* If the difference in column 1 is less than zero, enter "0" in column 2.				TOTAL		TOTAL	1720			
APPLICATION AS AMENDED - PART II										
AMENDMENT A	(Column 1)		(Column 2)		(Column 3)		SMALL ENTITY		OR OTHER THAN SMALL ENTITY	
	CLAIMS REMAINING AFTER AMENDMENT	HIGHEST NUMBER PREVIOUSLY PAID FOR	PRESENT EXTRA	RATE(\$)	ADDITIONAL FEE(\$)		RATE(\$)	ADDITIONAL FEE(\$)		
	Total (37 CFR 1.16(i))	*	Minus **	=	x =		x =			
	Independent (37 CFR 1.16(h))	*	Minus ***	=	x =		x =			
	Application Size Fee (37 CFR 1.16(s))						Application Size Fee (37 CFR 1.16(s))			
	FIRST PRESENTATION OF MULTIPLE DEPENDENT CLAIM (37 CFR 1.16(j))						FIRST PRESENTATION OF MULTIPLE DEPENDENT CLAIM (37 CFR 1.16(j))			
			TOTAL ADD'L FEE			TOTAL ADD'L FEE				
AMENDMENT B	(Column 1)		(Column 2)		(Column 3)		SMALL ENTITY		OR OTHER THAN SMALL ENTITY	
	CLAIMS REMAINING AFTER AMENDMENT	HIGHEST NUMBER PREVIOUSLY PAID FOR	PRESENT EXTRA	RATE(\$)	ADDITIONAL FEE(\$)		RATE(\$)	ADDITIONAL FEE(\$)		
	Total (37 CFR 1.16(i))	*	Minus **	=	x =		x =			
	Independent (37 CFR 1.16(h))	*	Minus ***	=	x =		x =			
	Application Size Fee (37 CFR 1.16(s))						Application Size Fee (37 CFR 1.16(s))			
	FIRST PRESENTATION OF MULTIPLE DEPENDENT CLAIM (37 CFR 1.16(j))						FIRST PRESENTATION OF MULTIPLE DEPENDENT CLAIM (37 CFR 1.16(j))			
			TOTAL ADD'L FEE			TOTAL ADD'L FEE				
* If the entry in column 1 is less than the entry in column 2, write "0" in column 3. ** If the "Highest Number Previously Paid For" IN THIS SPACE is less than 20, enter "20". *** If the "Highest Number Previously Paid For" IN THIS SPACE is less than 3, enter "3". The "Highest Number Previously Paid For" (Total or Independent) is the highest found in the appropriate box in column 1.										



UNITED STATES PATENT AND TRADEMARK OFFICE

UNITED STATES DEPARTMENT OF COMMERCE
United States Patent and Trademark Office
Address: COMMISSIONER FOR PATENTS
P.O. Box 1450
Alexandria, Virginia 22313-1450
www.uspto.gov

APPLICATION NUMBER	FILING OR 371(C) DATE	FIRST NAMED APPLICANT	ATTY. DOCKET NO./TITLE
16/185,786	11/09/2018	C. Earl Woolfork	1EWAY.009P1C7

CONFIRMATION NO. 1022

FORMALITIES LETTER



20995
KNOBBE MARTENS OLSON & BEAR LLP
2040 MAIN STREET
FOURTEENTH FLOOR
IRVINE, CA 92614

Date Mailed: 12/11/2018

NOTICE OF INCOMPLETE REPLY (NONPROVISIONAL)

Filing Date Granted

The U.S. Patent and Trademark Office has received your reply on 12/07/2018 to the Notice to File Missing Parts (Notice) mailed 12/03/2018 and it has been entered into the nonprovisional application. The reply, however, does not include the following items required in the Notice. A complete reply must be timely filed to prevent ABANDONMENT of the above-identified application. Replies should be mailed to: Mail Stop Missing Parts, Commissioner for Patents, P.O. Box 1450, Alexandria VA 22313-1450.

Applicant is given **TWO MONTHS** from the date of the Notice to File Missing Parts (Notice) mailed 12/03/2018 within which to file all required items and pay any fees required below to avoid abandonment. Extensions of time may be obtained by filing a petition accompanied by the extension fee under the provisions of 37 CFR 1.136(a).

Items Required to Avoid Abandonment:

The required items noted below SHOULD be filed along with any items required above. The filing date of this nonprovisional application will be the date of receipt of the items required above.

The application is informal since it does not comply with the regulations for the reason(s) indicated below.

The required item(s) identified below must be timely submitted to avoid abandonment:

- Replacement drawings in compliance with 37 CFR 1.84 and 37 CFR 1.121(d) are required. The drawings submitted are not acceptable because:
 - The drawings submitted to the Office are not electronically reproducible because portions of figures 1-3 are missing and/or blurry.

Applicant is cautioned that correction of the above items may cause the specification and drawings page count to exceed 100 pages. If the specification and drawings exceed 100 pages, applicant will need to submit the required application size fee.

Replies must be received in the USPTO within the set time period or must include a proper Certificate of Mailing or Transmission under 37 CFR 1.8 with a mailing or transmission date within the set time period. For more information and a suggested format, see Form PTO/SB/92 and MPEP 512.

Replies should be mailed to:

Mail Stop Missing Parts
Commissioner for Patents
P.O. Box 1450
Alexandria VA 22313-1450

Registered users of EFS-Web may alternatively submit their reply to this notice via EFS-Web, including a copy of this Notice and selecting the document description "Applicant response to Pre-Exam Formalities Notice".
<https://sportal.uspto.gov/authenticate/AuthenticateUserLocalEPF.html>

For more information about EFS-Web please call the USPTO Electronic Business Center at 1-866-217-9197 or visit our website at <http://www.uspto.gov/ebc>.

If you are not using EFS-Web to submit your reply, you must include a copy of this notice.

Questions about the contents of this notice and the requirements it sets forth should be directed to the Office of Data Management, Application Assistance Unit, at
(571) 272-4000 or (571) 272-4200 or 1-888-786-0101.

/mtekle michael/

Docket No.: 1EWAY.009P1C7
App. No.: November 9, 2018

December 19, 2018
Page 1 of 2

Please Direct All Correspondence to Customer Number C. Earl Woolfork

SUBMISSION OF REPLACEMENT DRAWINGS

Inventor	: C. Earl Woolfork
App. No.	: 16/185786
Filed	: November 9, 2018
For	: WIRELESS DIGITAL AUDIO MUSIC SYSTEM
Art Unit	: 2654
Conf No.	: 1022

**Commissioner for Patents
P.O. Box 1450
Alexandria, VA 22313-1450**

Dear Commissioner:

Enclosed for filing in the above-referenced application are the following:

- (X) 2 sheets of Replacement Drawings.
- (X) Copy of the Notice to File Corrected Application Papers dated December 3, 2018

Applicant believes that the replacement sheet addresses the drawing deficiencies identified in the Notice to File Corrected Application Papers of December 3, 2018. No new matter has been added. Please charge any additional fees, including any fees for additional extension of time, or credit overpayment to Deposit Account No. 11-1410.

Respectfully submitted,
KNOBBE MARTENS OLSON & BEAR LLP

Dated: December 19, 2018

/Harnik Shukla/
Harnik Shukla
Registration No. 73,097
Registered Practitioner
Customer No. 20995
(949) 721-5278



UNITED STATES PATENT AND TRADEMARK OFFICE

UNITED STATES DEPARTMENT OF COMMERCE
United States Patent and Trademark Office
Address: COMMISSIONER FOR PATENTS
P.O. Box 1450
Alexandria, Virginia 22313-1450
www.uspto.gov

APPLICATION NUMBER	FILING OR 371(C) DATE	FIRST NAMED APPLICANT	ATTY. DOCKET NO./TITLE
16/185,786	11/09/2018	C. Earl Woolfork	1EWAY.009P1C7

CONFIRMATION NO. 1022

FORMALITIES LETTER



20995
KNOBBE MARTENS OLSON & BEAR LLP
2040 MAIN STREET
FOURTEENTH FLOOR
IRVINE, CA 92614

Date Mailed: 12/03/2018

NOTICE TO FILE CORRECTED APPLICATION PAPERS

Filing Date Granted

An application number and filing date have been accorded to this application. The application is informal since it does not comply with the regulations for the reason(s) indicated below. Applicant is given TWO MONTHS from the date of this Notice within which to correct the informalities indicated below. Extensions of time may be obtained by filing a petition accompanied by the extension fee under the provisions of 37 CFR 1.136(a).

The required item(s) identified below must be timely submitted to avoid abandonment:

- Replacement drawings in compliance with 37 CFR 1.84 and 37 CFR 1.121(d) are required. The drawings submitted are not acceptable because:
 - The drawings submitted to the Office are not electronically reproducible because portions of figures 1-3 are missing and/or blurry.

Applicant is cautioned that correction of the above items may cause the specification and drawings page count to exceed 100 pages. If the specification and drawings exceed 100 pages, applicant will need to submit the required application size fee.

Replies must be received in the USPTO within the set time period or must include a proper Certificate of Mailing or Transmission under 37 CFR 1.8 with a mailing or transmission date within the set time period. For more information and a suggested format, see Form PTO/SB/92 and MPEP 512.

Replies should be mailed to:

Mail Stop Missing Parts
Commissioner for Patents
P.O. Box 1450
Alexandria VA 22313-1450

Registered users of EFS-Web may alternatively submit their reply to this notice via EFS-Web, including a copy of this Notice and selecting the document description "Applicant response to Pre-Exam Formalities Notice".
<https://sportal.uspto.gov/authenticate/AuthenticateUserLocalEPF.html>

For more information about EFS-Web please call the USPTO Electronic Business Center at 1-866-217-9197 or visit our website at <http://www.uspto.gov/ebc>.

If you are not using EFS-Web to submit your reply, you must include a copy of this notice.

Questions about the contents of this notice and the requirements it sets forth should be directed to the Office of Data Management, Application Assistance Unit, at
(571) 272-4000 or (571) 272-4200 or 1-888-786-0101.

/ewondimu/

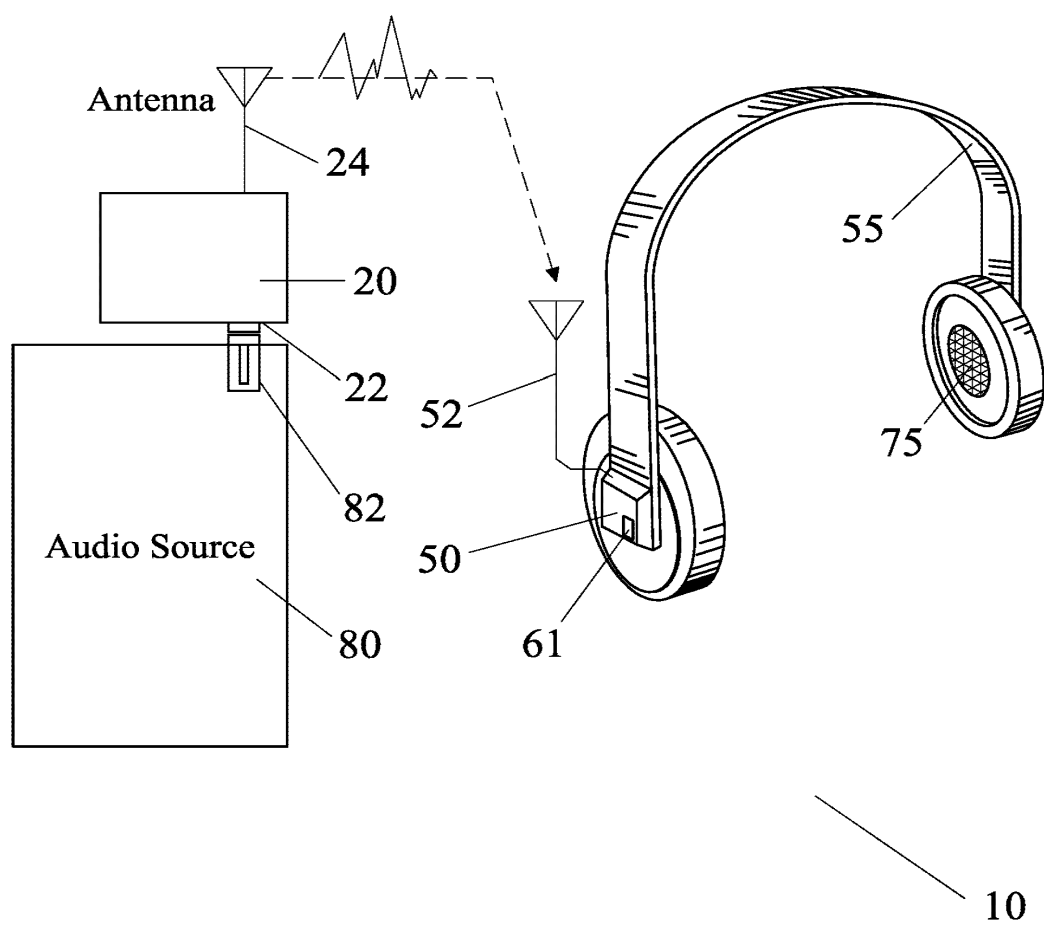


FIG. 1

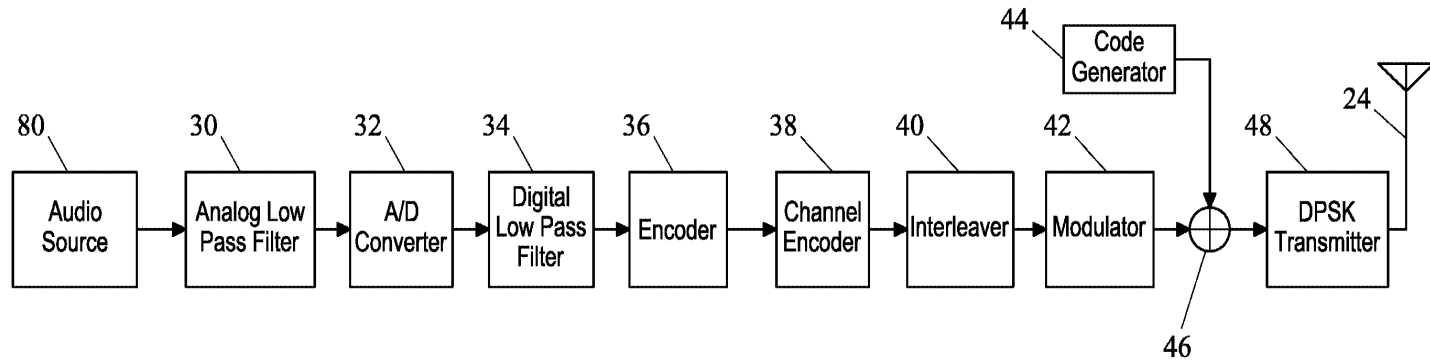


FIG. 2

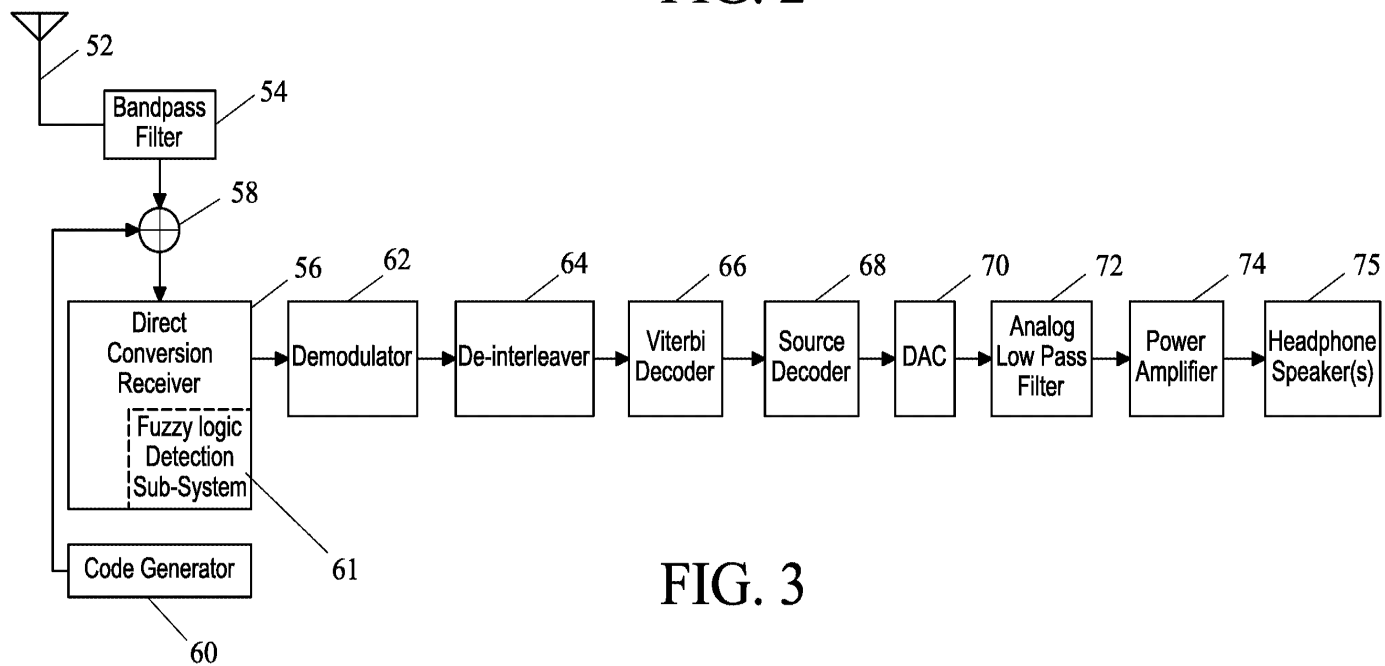


FIG. 3

Electronic Acknowledgement Receipt	
EFS ID:	34640145
Application Number:	16185786
International Application Number:	
Confirmation Number:	1022
Title of Invention:	WIRELESS DIGITAL AUDIO MUSIC SYSTEM
First Named Inventor/Applicant Name:	C. Earl Woolfork
Customer Number:	20995
Filer:	Harnik Shukla/Daniela Lopez
Filer Authorized By:	Harnik Shukla
Attorney Docket Number:	1EWAY.009P1C7
Receipt Date:	19-DEC-2018
Filing Date:	09-NOV-2018
Time Stamp:	17:23:49
Application Type:	Utility under 35 USC 111(a)

Payment information:

Submitted with Payment		no			
File Listing:					
Document Number	Document Description	File Name	File Size(Bytes)/ Message Digest	Multi Part /.zip	Pages (if appl.)
1	Applicant Response to Pre-Exam Formalities Notice	1eway_ReplDrawingsTransmittal_rev.pdf	774689 f3113b92987bbd067ae4c834fc29164bb55ea52a	no	3
Warnings:					

Information:					
2	Drawings-only black and white line drawings	1eway_ReplDrawings_rev.PDF	735754	no	2
			b11c90756b11ec514a089f535abd31a2fd285ab3		
Warnings:					
Information:					
Total Files Size (in bytes):			1510443		
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APPLICATION NUMBER	FILING or 371(c) DATE	GRP ART UNIT	FIL FEE REC'D	ATTY. DOCKET NO	TOT CLAIMS	IND CLAIMS
16/185,786	11/09/2018	2654	1720	1EWAY.009P1C7	20	3

CONFIRMATION NO. 1022

UPDATED FILING RECEIPT



00000000104639589

20995
KNOBBE MARTENS OLSON & BEAR LLP
2040 MAIN STREET
FOURTEENTH FLOOR
IRVINE, CA 92614

Date Mailed: 12/21/2018

Receipt is acknowledged of this non-provisional patent application. The application will be taken up for examination in due course. Applicant will be notified as to the results of the examination. Any correspondence concerning the application must include the following identification information: the U.S. APPLICATION NUMBER, FILING DATE, NAME OF APPLICANT, and TITLE OF INVENTION. Fees transmitted by check or draft are subject to collection. Please verify the accuracy of the data presented on this receipt. **If an error is noted on this Filing Receipt, please submit a written request for a Filing Receipt Correction. Please provide a copy of this Filing Receipt with the changes noted thereon. If you received a "Notice to File Missing Parts" for this application, please submit any corrections to this Filing Receipt with your reply to the Notice. When the USPTO processes the reply to the Notice, the USPTO will generate another Filing Receipt incorporating the requested corrections**

Inventor(s)

C. Earl Woolfork, Pasadena, CA;

Applicant(s)

C. Earl Woolfork, Pasadena, CA;

Power of Attorney: The patent practitioners associated with Customer Number 20995

Domestic Priority data as claimed by applicant

This application is a CON of 15/003,242 01/21/2016 PAT 10129627
which is a CON of 13/775,754 02/25/2013 PAT 9282396
which is a CON of 13/356,949 01/24/2012 PAT 9107000
which is a CON of 12/940,747 11/05/2010 PAT 8131391
which is a CON of 12/570,343 09/30/2009 PAT 7865258
which is a CON of 12/144,729 07/12/2008 PAT 7684885
which is a CON of 10/648,012 08/26/2003 PAT 7412294
which is a CIP of 10/027,391 12/21/2001 ABN

Foreign Applications for which priority is claimed (You may be eligible to benefit from the **Patent Prosecution Highway** program at the USPTO. Please see <http://www.uspto.gov> for more information.) - None.

Foreign application information must be provided in an Application Data Sheet in order to constitute a claim to foreign priority. See 37 CFR 1.55 and 1.76.

Permission to Access Application via Priority Document Exchange: Yes

Permission to Access Search Results: Yes

Applicant may provide or rescind an authorization for access using Form PTO/SB/39 or Form PTO/SB/69 as appropriate.

If Required, Foreign Filing License Granted: 11/29/2018

The country code and number of your priority application, to be used for filing abroad under the Paris Convention, is **US 16/185,786**

Projected Publication Date: 03/28/2019

Non-Publication Request: No

Early Publication Request: No
Title

WIRELESS DIGITAL AUDIO MUSIC SYSTEM

Preliminary Class

381

Statement under 37 CFR 1.55 or 1.78 for AIA (First Inventor to File) Transition Applications: No

PROTECTING YOUR INVENTION OUTSIDE THE UNITED STATES

Since the rights granted by a U.S. patent extend only throughout the territory of the United States and have no effect in a foreign country, an inventor who wishes patent protection in another country must apply for a patent in a specific country or in regional patent offices. Applicants may wish to consider the filing of an international application under the Patent Cooperation Treaty (PCT). An international (PCT) application generally has the same effect as a regular national patent application in each PCT-member country. The PCT process **simplifies** the filing of patent applications on the same invention in member countries, but **does not result** in a grant of "an international patent" and does not eliminate the need of applicants to file additional documents and fees in countries where patent protection is desired.

Almost every country has its own patent law, and a person desiring a patent in a particular country must make an application for patent in that country in accordance with its particular laws. Since the laws of many countries differ in various respects from the patent law of the United States, applicants are advised to seek guidance from specific foreign countries to ensure that patent rights are not lost prematurely.

Applicants also are advised that in the case of inventions made in the United States, the Director of the USPTO must issue a license before applicants can apply for a patent in a foreign country. The filing of a U.S. patent application serves as a request for a foreign filing license. The application's filing receipt contains further information and guidance as to the status of applicant's license for foreign filing.

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page 2 of 4

countries such as China, Korea and Mexico. For questions regarding patent enforcement issues, applicants may call the U.S. Government hotline at 1-866-999-HALT (1-866-999-4258).

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Title 37, Code of Federal Regulations, 5.11 & 5.15

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No license under 35 U.S.C. 184 has been granted at this time, if the phrase "IF REQUIRED, FOREIGN FILING LICENSE GRANTED" DOES NOT appear on this form. Applicant may still petition for a license under 37 CFR 5.12, if a license is desired before the expiration of 6 months from the filing date of the application. If 6 months has lapsed from the filing date of this application and the licensee has not received any indication of a secrecy order under 35 U.S.C. 181, the licensee may foreign file the application pursuant to 37 CFR 5.15(b).

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PATENT APPLICATION FEE DETERMINATION RECORD Substitute for Form PTO-875						Application or Docket Number 16/185,786	
APPLICATION AS FILED - PART I							
(Column 1)		(Column 2)		SMALL ENTITY		OTHER THAN SMALL ENTITY	
FOR	NUMBER FILED	NUMBER EXTRA	RATE(\$)	FEE(\$)	OR	RATE(\$)	FEE(\$)
BASIC FEE (37 CFR 1.16(a), (b), or (c))	N/A	N/A	N/A			N/A	300
SEARCH FEE (37 CFR 1.16(k), (l), or (m))	N/A	N/A	N/A			N/A	660
EXAMINATION FEE (37 CFR 1.16(o), (p), or (q))	N/A	N/A	N/A			N/A	760
TOTAL CLAIMS (37 CFR 1.16(i))	20	minus 20 = *			OR	x 100 =	0.00
INDEPENDENT CLAIMS (37 CFR 1.16(h))	3	minus 3 = *				x 460 =	0.00
APPLICATION SIZE FEE (37 CFR 1.16(s))	If the specification and drawings exceed 100 sheets of paper, the application size fee due is \$310 (\$155 for small entity) for each additional 50 sheets or fraction thereof. See 35 U.S.C. 41(a)(1)(G) and 37 CFR 1.16(s).						0.00
MULTIPLE DEPENDENT CLAIM PRESENT (37 CFR 1.16(j))							0.00
			TOTAL			TOTAL	1720
* If the difference in column 1 is less than zero, enter "0" in column 2.							
APPLICATION AS AMENDED - PART II							
AMENDMENT A	(Column 1)		(Column 2)		(Column 3)		SMALL ENTITY
	CLAIMS REMAINING AFTER AMENDMENT	HIGHEST NUMBER PREVIOUSLY PAID FOR	PRESENT EXTRA	RATE(\$)	ADDITIONAL FEE(\$)	OR	RATE(\$)
	Total (37 CFR 1.16(i))	*	Minus **	=	x =	OR	x =
	Independent (37 CFR 1.16(h))	*	Minus ***	=	x =	OR	x =
	Application Size Fee (37 CFR 1.16(s))					OR	
	FIRST PRESENTATION OF MULTIPLE DEPENDENT CLAIM (37 CFR 1.16(j))					OR	
			TOTAL ADD'L FEE		OR	TOTAL ADD'L FEE	
AMENDMENT B	(Column 1)		(Column 2)		(Column 3)		SMALL ENTITY
	CLAIMS REMAINING AFTER AMENDMENT	HIGHEST NUMBER PREVIOUSLY PAID FOR	PRESENT EXTRA	RATE(\$)	ADDITIONAL FEE(\$)	OR	RATE(\$)
	Total (37 CFR 1.16(i))	*	Minus **	=	x =	OR	x =
	Independent (37 CFR 1.16(h))	*	Minus ***	=	x =	OR	x =
	Application Size Fee (37 CFR 1.16(s))					OR	
	FIRST PRESENTATION OF MULTIPLE DEPENDENT CLAIM (37 CFR 1.16(j))					OR	
			TOTAL ADD'L FEE		OR	TOTAL ADD'L FEE	
* If the entry in column 1 is less than the entry in column 2, write "0" in column 3. ** If the "Highest Number Previously Paid For" IN THIS SPACE is less than 20, enter "20". *** If the "Highest Number Previously Paid For" IN THIS SPACE is less than 3, enter "3". The "Highest Number Previously Paid For" (Total or Independent) is the highest found in the appropriate box in column 1.							



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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
16/185,786	11/09/2018	C. Earl Woolfork	1EWAY.009PIC7	1022
20995	7590	01/02/2019	EXAMINER	
KNOBBE MARTENS OLSON & BEAR LLP 2040 MAIN STREET FOURTEENTH FLOOR IRVINE, CA 92614			ART UNIT	PAPER NUMBER
			2654	
			NOTIFICATION DATE	DELIVERY MODE
			01/02/2019	ELECTRONIC

Please find below and/or attached an Office communication concerning this application or proceeding.

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efiling@knobbe.com
jayna.cartee@knobbe.com

<i>Decision Granting Request for Prioritized Examination (Track I)</i>	Application No. 16/185,786	Applicant(s) Woolfork, C. Earl	
	Examiner BRIAN W BROWN	Art Unit OPET	AIA (First Inventor to File) Status Yes

1. THE REQUEST FILED 09 November 2018 IS **GRANTED** .

The above-identified application has met the requirements for prioritized examination

A. ☒ for an original nonprovisional application (Track I).

B. ☐ for an application undergoing continued examination (RCE).

2. **The above-identified application will undergo prioritized examination.** The application will be accorded special status throughout its entire course of prosecution until one of the following occurs:

A. filing a **petition for extension of time** to extend the time period for filing a reply;

B. filing an **amendment to amend the application to contain more than four independent claims, more than thirty total claims**, or a multiple dependent claim;

C. filing a **request for continued examination** ;

D. filing a notice of appeal;

E. filing a request for suspension of action;

F. mailing of a notice of allowance;

G. mailing of a final Office action;

H. completion of examination as defined in 37 CFR 41.102; or

I. abandonment of the application.

Telephone inquiries with regard to this decision should be directed to BRIAN BROWN at (571)272-5338. In his/her absence, calls may be directed to Petition Help Desk at (571) 272-3282.

/BRIAN W BROWN/ Petitions Examiner, OPET	
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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
16/185,786	11/09/2018	C. Earl Woolfork	1EWAY.009PIC7	1022
20995 7590 02/27/2019 KNOBBE MARTENS OLSON & BEAR LLP 2040 MAIN STREET FOURTEENTH FLOOR IRVINE, CA 92614			EXAMINER FLANDERS, ANDREW C	
			ART UNIT 2656	PAPER NUMBER
			NOTIFICATION DATE 02/27/2019	DELIVERY MODE ELECTRONIC

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Notice of the Office communication was sent electronically on above-indicated "Notification Date" to the following e-mail address(es):

efiling@knobbe.com
jayna.cartee@knobbe.com

DETAILED ACTION

Notice of Pre-AIA or AIA Status

The present application, filed on or after March 16, 2013, is being examined under the first inventor to file provisions of the AIA.

Claim Rejections - 35 USC § 112

The following is a quotation of the first paragraph of 35 U.S.C. 112(a):

(a) IN GENERAL.—The specification shall contain a written description of the invention, and of the manner and process of making and using it, in such full, clear, concise, and exact terms as to enable any person skilled in the art to which it pertains, or with which it is most nearly connected, to make and use the same, and shall set forth the best mode contemplated by the inventor or joint inventor of carrying out the invention.

The following is a quotation of the first paragraph of pre-AIA 35 U.S.C. 112:

The specification shall contain a written description of the invention, and of the manner and process of making and using it, in such full, clear, concise, and exact terms as to enable any person skilled in the art to which it pertains, or with which it is most nearly connected, to make and use the same, and shall set forth the best mode contemplated by the inventor of carrying out his invention.

The following is a quotation of 35 U.S.C. 112(b):

(b) CONCLUSION.—The specification shall conclude with one or more claims particularly pointing out and distinctly claiming the subject matter which the inventor or a joint inventor regards as the invention.

The following is a quotation of 35 U.S.C. 112 (pre-AIA), second paragraph:

The specification shall conclude with one or more claims particularly pointing out and distinctly claiming the subject matter which the applicant regards as his invention.

Claims 1 – 20 are rejected under 35 U.S.C. 112(a) or 35 U.S.C. 112 (pre-AIA), first paragraph, as failing to comply with the written description requirement. The claim(s) contains subject matter which was not described in the specification in such a way as to reasonably convey to one skilled in the relevant art that the inventor or a joint

inventor, or for pre-AIA the inventor(s), at the time the application was filed, had possession of the claimed invention.

Claim 1 further recites “generate a demodulation signal based on said performance of at least one of said plurality of demodulations.” The specification as originally filed in the parent/family applications, and in the instant application provide does not provide detail as to a generation of a demodulation signal on the basis of the performance of one of a plurality of modulators. Paragraphs [0013] and [0015] mention optimizing audio receiver performance, and overall system performance, but not in terms of gen of a demodulation signal, nor in terms of said performance of the plurality of demodulators.

Claims 8 and 17 recite similar limitations directed to generation of a demodulation signal and are rejected under the same grounds.

Claim 6 is further directed “comprising a mounting unit, wherein the mounting unit is configured to integrate the speaker and wherein the mounting unit enables a user to secure the speaker on to a head of the user.”

Applicant's specification makes no mention of a mounting unit, the mounting unit integrating the speaker, and the mounting unit enabling a user to secure the speaker on to a head of the user. At best, the specification teaches of a headphone, but this falls short of the specific details provided for by claim 6.

Claim 7 is further directed “wherein the mounting unit comprises a head mounting strap that connects the speaker with another speaker for opposite ear.”

Applicant’s specification makes no mention of the mounting unit, a head mounting strap, or the head mounting strap connecting the speaker with another speaker for the opposite ear.”

At best, the specification teaches of a headphone, but this falls short of the specific details provided for by claim 7.

Claims 12, 15, 16 and 17 are rejected under the same grounds stated above.

Claims 2 – 7, 9 – 16 and 18 – 20 are dependent upon claims 1, 8 and 17, thereby incorporating the limitations at issue, and thus are rejected under the same grounds.

Claims 1 – 20 are rejected under 35 U.S.C. 112(b) or 35 U.S.C. 112 (pre-AIA), second paragraph, as being indefinite for failing to particularly point out and distinctly claim the subject matter which the inventor or a joint inventor, or for pre-AIA the applicant regards as the invention.

Claims 1, 8, and 17 recite the limitation “said performance” or “the performance.” There is insufficient antecedent basis for these limitations in the claims.

Claims 2 – 7, 9 – 18 and 18 – 20 are dependent upon claims 1, 8 and 17, thereby incorporating the limitations at issue, and thus are rejected under the same grounds.

Claim Rejections - 35 USC § 103

In the event the determination of the status of the application as subject to AIA 35 U.S.C. 102 and 103 (or as subject to pre-AIA 35 U.S.C. 102 and 103) is incorrect, any correction of the statutory basis for the rejection will not be considered a new ground of rejection if the prior art relied upon, and the rationale supporting the rejection, would be the same under either status.

The following is a quotation of 35 U.S.C. 103 which forms the basis for all obviousness rejections set forth in this Office action:

A patent for a claimed invention may not be obtained, notwithstanding that the claimed invention is not identically disclosed as set forth in section 102, if the differences between the claimed invention and the prior art are such that the claimed invention as a whole would have been obvious before the effective filing date of the claimed invention to a person having ordinary skill in the art to which the claimed invention pertains. Patentability shall not be negated by the manner in which the invention was made.

The factual inquiries set forth in *Graham v. John Deere Co.*, 383 U.S. 1, 148 USPQ 459 (1966), that are applied for establishing a background for determining obviousness under 35 U.S.C. 103 are summarized as follows:

1. Determining the scope and contents of the prior art.
2. Ascertaining the differences between the prior art and the claims at issue.
3. Resolving the level of ordinary skill in the pertinent art.

4. Considering objective evidence present in the application indicating obviousness or nonobviousness.

Claims 1 – 20 is/are rejected under 35 U.S.C. 103 as being unpatentable over Hamada (hereinafter Ham, U.S. Patent Application Publication 2002/0065043) in view of Khayrallah (hereinafter Kha, U.S. Patent Application Publication 2001/0033621) and Haartsen (hereinafter Haart 1, U.S. Patent 6,563,892) and incorporating in its entirety (see Haart 1 col. 2 lines 20 - 30), Hartsen (hereinafter Haart 2, BLUETOOTH—The universal radio interface for ad hoc, wireless connectivity, 1998).

Regarding **Claim 1**, Ham discloses:

A portable spectrum audio receiver (Fig. 1)

Ham discloses the transmission as a Bluetooth transmission (see 14 and 21), but is generation silent in regards to the specific details of the technique of the transmission, in particular as to the details as claimed.

In a related field of endeavor, e.g. Bluetooth transmissions, Kah discloses techniques for the transmission and reception of wireless audio data (Figs. 1, 2) applicable to a wide range of communication protocols and technologies including the Bluetooth standard, and Haart discloses techniques in a radio communication system useful in systems employing Bluetooth technology (col. 4 lines 13 – 22).

Modifying the Bluetooth communication of Ham using the features and techniques disclosed by Kah and Haart would have been obvious to one of ordinary skill in the art. Given that both Kah and Haart explicitly disclose their techniques are

applicable to transmissions using Bluetooth, it would have been predictable to adapt Ham's Bluetooth in a similar manner using the various teachings of Kah and Haart. Further, adding the features of Kah would have enabled Ham to improve performance (paras 4 -5 of Kah) and adding the features of Haart would have enabled Ham to include a performance improvement as well (col. 5 lines 55 – 67 of Haart).

The modification of Ham by Kah and Haart further discloses or makes obvious:

The portable audio receiver as a 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 (e.g. Ham's Bluetooth transmission using frequency-hop (FH) spread spectrum, since this technology better supports low-cost, low power radio implementations." ; Haart 2 page 11), said wireless modulation transmissions representative of an audio signal representation (e.g. high fidelity audio; para 7 of Ham), said portable spread spectrum audio receiver comprising:

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 (Ham's Bluetooth transmission as modified by Haart 1 disclosing a solution (using differential modulation) to the DC offset problem caused by a homodyne receiver, which is another name for a direct conversion receiver; col. 2 lines 39-41, col. 4 lines 54-58 and col. 5 lines 43-44; In disclosing a solution to enable the use of direct conversion receivers, Haart 1 thus

discloses the use of such receivers in its system. Haart 1 and 2 disclose the use of packets that have a fixed format and include a unique 72-bit access code, Haart page 113, figure 4. Haart 1);

a digital-to-analog converter (DAC) configured to provide an analog audio output signal corresponding to said audio signal representation (e.g. D/A convertor; Fig. 1 of Ham);

a speaker configured to generate an audio signal corresponding to said analog audio output signal (e.g. speaker Fig. 1 of Ham, also note audio output through speaker in para 83 of Ham), 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 (e.g. Ham's Bluetooth communication, now modified by Haart 2 disclosing how a user can "connect a headset to your mobile PC" i.e. "their own separate digital audio spread spectrum transmitter"; page 112; further "Signals not originating from said portable digital audio spread spectrum transmitter" would be perceived as interference by a receiver. Haart 1 and 2 describe sources of interference and the ways to render them inaudible: "radio systems operating in this band must cope with several unpredictable sources of interference, such as baby monitors, garage door openers, cordless phones and microwave ovens (the strongest source of interference). interference can be avoided using an adaptive scheme that finds an unused part of the spectrum, or it can be suppressed by means of spectrum spreading." Haart 2 pages 112, 114);

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 (e.g. . Ham's Bluetooth transmission now adapted to use radio communication system as "useful in systems employing the Bluetooth technology, e.g., having operating characteristics such as frequency hopped CDMA, low transmit power, etc." col. 4 lines 12-15 of Haart);

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 and generate a demodulation signal based on said performance of at least one of said plurality of demodulations (e.g. Ham's Bluetooth communication, now including the demodulation 204 of Fig. 1 of Kah; note multiple modulation schemes in para 18), wherein said plurality of demodulations includes a differential phase shift keying (DPSK) demodulation and a non-DPSK demodulation (e.g. phase shift keying and differential phase shift keying; paras 24, 25 of Kah); and

wherein said further processing for reduction of intersymbol interference is separate from said performance of at least one of said plurality of demodulations (e.g. performed by the Viterbi encoder/decoder in Haart as implemented in Ham's bluetooth communication).

Regarding **Claim 2**, in addition to the elements stated above regarding claim 1, the combination further discloses:

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 (e.g. transmissions over the bluetooth channel of Ham, as described using the modulation/demodulation of Kah, Fig. 1, in particular 108 and 204).

Regarding **Claim 3**, in addition to the elements stated above regarding claim 1, the combination further discloses:

wherein the audio signal representation represents music.

Regarding **Claim 4**, in addition to the elements stated above regarding claim 1, the combination further discloses:

wherein said analog audio output signal is capable of representing audio signals below 40Hz and also capable of representing audio signals above 5kHz.

Regarding **Claim 5**, in addition to the elements stated above regarding claim 1, the combination further discloses:

wherein the portable spread spectrum audio receiver includes a power supply.

Regarding **Claim 6**, in addition to the elements stated above regarding claim 1, the combination further discloses:

further comprising a mounting unit, wherein the mounting unit is configured to integrate the speaker and wherein the mounting unit enables a user to secure the speaker on to a head of the user (e.g. headset/headphone of Ham; paras 4,72)

Regarding **Claim 7**, in addition to the elements stated above regarding claim 6, the combination further discloses:

wherein the mounting unit comprises a head mounting strap that connects the speaker with another speaker for opposite ear (e.g. headset/headphone of Ham; paras 4,72)

Regarding **Claim 8**, Ham discloses:

A portable audio receiver (e.g. data exchange between portable information equipment; para 4).

Ham discloses the transmission as a Bluetooth transmission (see 14 and 21), but is generation silent in regards to the specific details of the technique of the transmission, in particular as to the details as claimed.

In a related field of endeavor, e.g. Bluetooth transmissions, Kah discloses techniques for the transmission and reception of wireless audio data (Figs. 1, 2) applicable to a wide range of communication protocols and technologies including the Bluetooth standard, and Haart discloses techniques in a radio communication system useful in systems employing Bluetooth technology (col. 4 lines 13 – 22).

Modifying the Bluetooth communication of Ham using the features and techniques disclosed by Kah and Haart would have been obvious to one of ordinary skill in the art. Given that both Kah and Haart explicitly disclose their techniques are applicable to transmissions using Bluetooth, it would have been predictable to adapt Ham's Bluetooth in a similar manner using the various teachings of Kah and Haart. Further, adding the features of Kah would have enabled Ham to improve performance (paras 4 -5 of Kah) and adding the features of Haart would have enabled Ham to include a performance improvement as well (col. 5 lines 55 – 67 of Haart).

The modification of Ham by Kah and Haart further discloses or makes obvious:

The portable audio receiver as a 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 (e.g. Ham's bluetooth transmission using frequency-hop (FH) spread spectrum, since this technology better supports low-cost, low power radio implementations." ; Haart 2 page 11), said wireless modulation transmissions representative of an audio signal representation (e.g. high fidelity audio; para 7 of Ham), said portable spread spectrum audio receiver configured to:

use independent code division multiple access communication and said unique user code to communicate with only said spread spectrum transmitter during a wireless connection (e.g. . Ham's bluetooth transmission now adapted to use radio communication system as "useful in systems employing the Bluetooth technology, e.g., having operating characteristics such as frequency hopped CDMA, low transmit power, etc." col. 4 lines 12-15 of Haart)

receive wireless modulation transmissions representative of said audio signal representation (e.g. Ham's Bluetooth receiving unit, now modified to include modulation, as taught in Bluetooth transmitter/receiver of Fig. 1 of Kah, note also modulation schemes of Haart, in particular that they can be used in conjunction iwht other types of modulation; col. 1 lines 5 – 17)

process said received wireless modulation transmissions for reduction of intersymbol interference (e.g. Ham's Bluetooth, now modified to include the teachings of

Haart, in particular undoing intersymbol interference; col. 1 lines 5 – 17; also see col. 7 lines 60+)

perform at least one of a plurality of demodulations on at least one of said received wireless modulation transmissions and generate a demodulation signal based on said performance of at least one of said plurality of demodulations (e.g. Ham's Bluetooth communication, now including the demodulation 204 of Fig. 1 of Kah; note multiple modulation schemes in para 18), wherein said plurality of demodulations includes a differential phase shift keying (DPSK) demodulation and a non-DPSK demodulation (e.g. phase shift keying and differential phase shift keying; paras 24, 25 of Kah);

generate an analog audio output signal corresponding to said audio signal representation (e.g. output of D/A converter Fig. 1 of Ham); and

output an audio signal corresponding to said analog audio output signal (e.g. audio output through speaker of Ham; para 83, Fig. 1).

Claims 9 – 16 are rejected under the same grounds stated above, and **claims 17 – 20** are directed to the transmission side of the reception side presented in claims 1 – 16 above, and are rejected under the same grounds, as being directed to the respective transmission elements corresponding to the reception elements as claimed above, and taught by the transmission side of Ham, Kah and Haart above.

Double Patenting

The nonstatutory double patenting rejection is based on a judicially created doctrine grounded in public policy (a policy reflected in the statute) so as to prevent the unjustified or improper timewise extension of the “right to exclude” granted by a patent and to prevent possible harassment by multiple assignees. A nonstatutory double patenting rejection is appropriate where the conflicting claims are not identical, but at least one examined application claim is not patentably distinct from the reference claim(s) because the examined application claim is either anticipated by, or would have been obvious over, the reference claim(s). See, e.g., *In re Berg*, 140 F.3d 1428, 46 USPQ2d 1226 (Fed. Cir. 1998); *In re Goodman*, 11 F.3d 1046, 29 USPQ2d 2010 (Fed. Cir. 1993); *In re Longi*, 759 F.2d 887, 225 USPQ 645 (Fed. Cir. 1985); *In re Van Ornum*, 686 F.2d 937, 214 USPQ 761 (CCPA 1982); *In re Vogel*, 422 F.2d 438, 164 USPQ 619 (CCPA 1970); *In re Thorington*, 418 F.2d 528, 163 USPQ 644 (CCPA 1969).

A timely filed terminal disclaimer in compliance with 37 CFR 1.321(c) or 1.321(d) may be used to overcome an actual or provisional rejection based on nonstatutory double patenting provided the reference application or patent either is shown to be commonly owned with the examined application, or claims an invention made as a result of activities undertaken within the scope of a joint research agreement. See MPEP § 717.02 for applications subject to examination under the first inventor to file provisions of the AIA as explained in MPEP § 2159. See MPEP §§ 706.02(I)(1) - 706.02(I)(3) for applications not subject to examination under the first inventor to file provisions of the AIA. A terminal disclaimer must be signed in compliance with 37 CFR 1.321(b).

The USPTO Internet website contains terminal disclaimer forms which may be used. Please visit www.uspto.gov/patent/patents-forms. The filing date of the application in which the form is filed determines what form (e.g., PTO/SB/25, PTO/SB/26, PTO/AIA/25, or PTO/AIA/26) should be used. A web-based eTerminal Disclaimer may be filled out completely online using web-screens. An eTerminal Disclaimer that meets all requirements is auto-processed and approved immediately upon submission. For more information about eTerminal Disclaimers, refer to www.uspto.gov/patents/process/file/efs/guidance/eTD-info-1.jsp.

Claims 1 – 20 are rejected on the ground of nonstatutory double patenting as being unpatentable over claims 1 – 12 of U.S. Patent No. 10,129,627. Although the claims at issue are not identical, they are broader than the claims of the '627 patent, and are made obvious by the limitations presented.

Claims 1 – 20 are rejected on the ground of nonstatutory double patenting as being unpatentable over claims 1 – 17 of U.S. Patent No. 9,285,396. Although the claims at issue are not identical, they are broader than the claims of the '396 patent, and are made obvious by the limitations presented.

Claims 1 – 20 are rejected on the ground of nonstatutory double patenting as being unpatentable over claims 1 – 12 of U.S. Patent No. 9,107,000. Although the claims at issue are not identical, they are broader than the claims of the '000 patent, and are made obvious by the limitations presented.

Claims 1 – 20 are rejected on the ground of nonstatutory double patenting as being unpatentable over claims 1 – 10 of U.S. Patent No. 8,131,391. Although the claims at issue are not identical, they are broader than the claims of the '391 patent, and are made obvious by the limitations presented.

Claims 1 – 20 are rejected on the ground of nonstatutory double patenting as being unpatentable over claims 1 – 13 of U.S. Patent No. 7,865,258. Although the claims at issue are not identical, they are broader than the claims of the '258 patent, and are made obvious by the limitations presented.

Claims 1 – 20 are rejected on the ground of nonstatutory double patenting as being unpatentable over claims 1 – 20 of U.S. Patent No. 7,684,885. Although the claims at issue are not identical, they are broader than the claims of the '885 patent, and are made obvious by the limitations presented.

Claims 1 – 20 are rejected on the ground of nonstatutory double patenting as being unpatentable over claims 1 – 19 of U.S. Patent No. 7,412,294. Although the claims at issue are not identical, they are broader than the claims of the '294 patent, and are made obvious by the limitations presented.

Conclusion

Any inquiry concerning this communication or earlier communications from the examiner should be directed to Andrew C Flanders whose telephone number is (571)272-7516. The examiner can normally be reached on M-F 8:30-5:00.

Examiner interviews are available via telephone, in-person, and video conferencing using a USPTO supplied web-based collaboration tool. To schedule an interview, applicant is encouraged to use the USPTO Automated Interview Request (AIR) at <http://www.uspto.gov/interviewpractice>.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Curtis Kuntz can be reached on (571) 272-7499. The fax phone number for the organization where this application or proceeding is assigned is 571-273-8300.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see <http://pair-direct.uspto.gov>. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free). If you would like assistance from a USPTO Customer Service Representative or access to the automated information system, call 800-786-9199 (IN USA OR CANADA) or 571-272-1000.

/ANDREW C FLANDERS/
Primary Examiner, Art Unit 2656

Notice of References Cited	Application/Control No. 16/185,786		Applicant(s)/Patent Under Reexamination Woolfork, C. Earl	
	Examiner Andrew C Flanders		Art Unit 2656	Page 1 of 2

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*	B	US-6678892-B1	01-2004	Lavelle; Patrick M.	G06F3/1423	348/837
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	O					
	P					
	Q					
	R					
	S					
	T					

NON-PATENT DOCUMENTS

*		Include as applicable: Author, Title Date, Publisher, Edition or Volume, Pertinent Pages)
	U	BLUETOOTH—The universal radio interface for ad hoc, wireless connectivity; Jaap Haartsen, Ericsson Review No. 2, 1998 (Year: 1998)
	V	
	W	
	X	

*A copy of this reference is not being furnished with this Office action. (See MPEP § 707.05(a).)
Dates in MM-YYYY format are publication dates. Classifications may be US or foreign.

U.S. Patent and Trademark Office
PTO-892 (Rev. 01-2001)

Notice of References Cited

Part of Paper No. 20190221

<i>Notice of References Cited</i>	Application/Control No. 16/185,786		Applicant(s)/Patent Under Reexamination Woolfork, C. Earl	
	Examiner Andrew C Flanders		Art Unit 2656	Page 2 of 2

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*	A	US-5771441-A	06-1998	Altstatt; John E.	H01Q1/24	343/718
*	B	US-5491839-A	02-1996	Schotz; Larry	H04B1/04	381/79
	C					
	D					
	E					
	F					
	G					
	H					
	I					
	J					
	K					
	L					
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*		Document Number Country Code-Number-Kind Code	Date MM-YYYY	Country	Name	CPC Classification
	N					
	O					
	P					
	Q					
	R					
	S					
	T					

NON-PATENT DOCUMENTS

*		Include as applicable: Author, Title Date, Publisher, Edition or Volume, Pertinent Pages)
	U	
	V	
	W	
	X	

*A copy of this reference is not being furnished with this Office action. (See MPEP § 707.05(a).)
Dates in MM-YYYY format are publication dates. Classifications may be US or foreign.

U.S. Patent and Trademark Office
PTO-892 (Rev. 01-2001)

Notice of References Cited

Part of Paper No. 20190221

Search Notes 	Application/Control No. 16/185,786	Applicant(s)/Patent Under Reexamination Woolfork, C. Earl
	Examiner Andrew C Flanders	Art Unit 2656

CPC - Searched*		
Symbol	Date	Examiner
H04R1/083	2/21/19	acf
H04R2420/07	2/21/19	acf
H04R5/003	2/21/19	acf
H04M1/6066	2/21/19	acf
H04N21/4363, 43637	2/21/19	acf
H04W84/18	2/21/19	acf
H04W88/06	2/21/19	acf
H04H20/95	2/21/19	acf

CPC Combination Sets - Searched*		
Symbol	Date	Examiner

US Classification - Searched*			
Class	Subclass	Date	Examiner

* See search history printout included with this form or the SEARCH NOTES box below to determine the scope of the search.

Search Notes		
Search Notes	Date	Examiner
see history attached	2/21/19	acf
PE2E, EAST and PALM inventor search for double patenting	2/21/19	acf
google.com patents search	2/21/19	acf
reviewed search strategies for parent applications	2/21/19	acf

/ANDREW C FLANDERS/ Primary Examiner, Art Unit 2656	
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<i>Search Notes</i> 	Application/Control No. 16/185,786	Applicant(s)/Patent Under Reexamination Woolfork, C. Earl
	Examiner Andrew C Flanders	Art Unit 2656

Interference Search			
US Class/CPC Symbol	US Subclass/CPC Group	Date	Examiner

/ANDREW C FLANDERS/ Primary Examiner, Art Unit 2656	
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<i>Index of Claims</i> 	Application/Control No. 16/185,786	Applicant(s)/Patent Under Reexamination Woolfork, C. Earl
	Examiner Andrew C Flanders	Art Unit 2656

✓	Rejected
=	Allowed

-	Cancelled
÷	Restricted

N	Non-Elected
I	Interference

A	Appeal
O	Objected

CLAIMS										
☐ Claims renumbered in the same order as presented by applicant ☐ CPA ☐ T.D. ☐ R.1.47										
CLAIM		DATE								
Final	Original	02/21/2019								
	1	✓								
	2	✓								
	3	✓								
	4	✓								
	5	✓								
	6	✓								
	7	✓								
	8	✓								
	9	✓								
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	15	✓								
	16	✓								
	17	✓								
	18	✓								
	19	✓								
	20	✓								

PTO/SB/08 Equivalent

INFORMATION DISCLOSURE STATEMENT BY APPLICANT	Application No.	16/185786
	Filing Date	November 9, 2018
	First Named Inventor	C. Earl Woolfork
	Art Unit	~~2654~~
(Multiple sheets used when necessary)	Examiner	~~Unassigned~~ /ANDREW C FLANDERS/
SHEET 1 OF 1	Attorney Docket No.	IEWAY.009PIC7

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Examiner Initials	Cite No.	Document Number <i>Number - Kind Code (if known)</i> Example: 1,234,567 B1	Publication Date MM-DD-YYYY	Name	Pages, Columns, Lines Where Relevant Passages or Relevant Figures Appear
	1	5,530,929	06-25-1996	Lindqvist et al.	
	2	5,970,058	10-19-1999	DeClerk et al.	
	3	6,212,282	04-03-2001	Mershon	

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Examiner Initials	Cite No.	Foreign Patent Document <i>Country Code-Number-Kind Code</i> Example: JP 1234567 A1	Publication Date MM-DD-YYYY	Name	Pages, Columns, Lines Where Relevant Passages or Relevant Figures Appear	T ¹

NON PATENT LITERATURE DOCUMENTS			
Examiner Initials	Cite No.	Include name of the author (in CAPITAL LETTERS), title of the article (when appropriate), title of the item (book, magazine, journal, serial, symposium, catalog, etc.), date, page(s), volume-issue number(s), publisher, city and/or country where published.	T ¹
	4	MASHHOUR et al., "On the Direct Conversion Receiver – A Tutorial", Microwave J., June 1, 2001, http://www.microwavejournal.com/articles/print/3226-on-the-direct-conversion-receiver-a-tutorial , accessed on December 3, 2018, in 12 pages.	

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Examiner Signature	/ANDREW C FLANDERS/	Date Considered	02/21/2019
*Examiner: Initial if reference considered, whether or not citation is in conformance with MPEP 609. Draw line through citation if not in conformance and not considered. Include copy of this form with next communication to applicant.			

T¹ - Place a check mark in this area when an English language Translation is attached.

EAST Search History

EAST Search History (Prior Art)

Ref #	Hits	Search Query	DBs	Default Operator	Plurals	Time Stamp
L1	16	(US-20010025358-\$ or US-20040223622-\$).did. or (US-6130643-\$ or US-6982132-\$ or US-7099413-\$ or US-7047474-\$ or US-6418558-\$ or US-5175558-\$ or US-6317039-\$ or US-5771441-\$ or US-5946343-\$ or US-5491839-\$ or US-6424820-\$ or US-6898585-\$ or US-6781977-\$ or US-5781542-\$).did.	US-PGPUB; USPAT; USOCR	OR	OFF	2019/02/21 16:22
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L4	1	("6,563,892").PN.	US-PGPUB; USPAT; USOCR	OR	OFF	2019/02/21 16:25
L8	1	("20020181415").PN.	US-PGPUB; USPAT; USOCR	OR	OFF	2019/02/21 16:50
L9	1	l8 and ((dpsk) (cdma) (bluetooth) (audio))	US-PGPUB; USPAT; USOCR	OR	OFF	2019/02/21 16:50
L10	9	09/612,464	US-PGPUB; USPAT; USOCR	OR	OFF	2019/02/21 16:55
L11	4	cockayne.in. and commerce.ti.	US-PGPUB; USPAT; USOCR	OR	OFF	2019/02/21 16:56
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L26	2	((("9282396") or ("10129627"))).PN.	US- PGPUB; USPAT; USOCR	OR	OFF	2019/02/21 18:45
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S3	0	FHSS with unique adj hop	US- PGPUB; USPAT	OR	OFF	2006/05/02 17:46
S4	0	FHSS with each adj user	US- PGPUB; USPAT	OR	OFF	2006/05/02 17:46

S5	0	FHSS with individual adj user	US-PGPUB; USPAT	OR	OFF	2006/05/02 17:47
S6	0	(FHSS or "frequency hopping spread spectrum") with individual adj user	US-PGPUB; USPAT	OR	OFF	2006/05/02 17:47
S7	0	(FHSS or "frequency hopping spread spectrum") near user same unique	US-PGPUB; USPAT	OR	OFF	2006/05/02 17:47
S8	9	(FHSS or "frequency hopping spread spectrum") with user same unique	US-PGPUB; USPAT	OR	OFF	2006/05/02 17:48
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S18	10725	"rechargeable battery" and @ad<"20011220"	US-PGPUB; USPAT	OR	OFF	2006/08/28 15:55
S19	376	"rechargeable battery".ti. and @ad<"20011220"	US-PGPUB; USPAT	OR	OFF	2006/08/28 15:55
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S26	640693	("rechargeable battery" and portable) with milliamp hours and @ad< "20011220"	US-PGPUB; USPAT	OR	OFF	2006/08/28 15:57
S27	18	("rechargeable battery" and portable) and "milliamp hours" and @ad< "20011220"	US-PGPUB; USPAT	OR	OFF	2006/08/31 12:17
S28	29	"5491839"	US-PGPUB; USPAT	OR	OFF	2006/08/30 12:56
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S30	1	("5771441").PN.	US-PGPUB; USPAT	OR	OFF	2006/08/30 12:56
S31	1	("6,107,147").PN.	US-PGPUB; USPAT	OR	OFF	2006/08/31 12:17
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S33	1	("5946343").PN.	US-PGPUB; USPAT	OR	OFF	2006/09/25 09:50
S34	422	(455/564.1,412,413).CCLS.	US-PGPUB; USPAT	OR	OFF	2006/09/25 09:50
S35	5294	(375/219,295-297,346,348).CCLS.	US-PGPUB; USPAT	OR	OFF	2006/09/25 10:02
S36	1	("20040223622").PN.	US-PGPUB; USPAT	OR	OFF	2006/09/25 10:04
S37	1	("5946343").PN.	US-PGPUB; USPAT	OR	OFF	2006/09/25 10:05
S38	1	("7,050,419").PN.	US-PGPUB; USPAT	OR	OFF	2007/03/20 09:32
S39	1	("20010025358").PN.	US-PGPUB; USPAT	OR	OFF	2007/03/20 09:37
S40	2618	(375/341,140,147).CCLS.	US-PGPUB; USPAT	OR	OFF	2007/03/20 09:37
S41	1807	S40 and @ad< "20011220"	US-PGPUB; USPAT	OR	OFF	2007/03/20 09:38
S42	8	("2001/0025358").URPN.	USPAT	OR	OFF	2007/03/20 09:51
S43	0	("2002/0025009").URPN.	USPAT	OR	OFF	2007/03/20

						09:59
S44	0	("2002/0025009").URPN.	USPAT	OR	OFF	2007/03/20 10:01
S45	12	("20020159543" "5434623" "5867532" "5973642" "6243423" "6327314" "6339612" "6459728" "6477210" "6480554" "6654429" "6671338").PN. OR ("7099413").URPN.	US- PGPUB; USPAT; USOCR	OR	OFF	2007/03/20 10:08
S46	74	"band pass" and demodulator and interleaver and "viterbi decoder"	US- PGPUB; USPAT; USOCR	OR	OFF	2007/03/20 10:08
S47	59	S46 and @ad< "20011220"	US- PGPUB; USPAT; USOCR	OR	OFF	2007/03/20 10:08
S48	17	("4278978" "4635063" "5175558" "5493307").PN. OR ("6130643").URPN.	US- PGPUB; USPAT; USOCR	OR	OFF	2007/03/20 10:15
S49	1	("5175558").PN.	US- PGPUB; USPAT	OR	OFF	2007/03/20 10:16
S50	13	("4651155" "4931977").PN. OR ("5175558").URPN.	US- PGPUB; USPAT; USOCR	OR	OFF	2007/03/20 10:34
S51	1	("5946343").PN.	US- PGPUB; USPAT	OR	OFF	2007/03/20 11:40
S52	7186	(375/295,146,130,340,316,148).CCLS.	US- PGPUB; USPAT	OR	OFF	2007/03/20 11:41
S53	4473	S52 and @ad< "20011220"	US- PGPUB; USPAT	OR	OFF	2007/03/20 11:41
S54	1	("20040223622").PN.	US- PGPUB; USPAT	OR	OFF	2007/03/21 12:11
S55	5	"reed solomon" with "intersymbol interference"	US- PGPUB; USPAT	OR	OFF	2007/03/21 12:13
S56	30	"reed solomon" same "intersymbol interference"	US- PGPUB; USPAT	OR	OFF	2007/03/21 12:13
S57	21	S56 and @ad< "20011220"	US- PGPUB; USPAT	OR	OFF	2007/03/21 12:27
S58	1	("20030045235").PN.	US- PGPUB; USPAT	OR	OFF	2007/03/21 12:37
S59	1	("5790595").PN.	US- PGPUB; USPAT	OR	OFF	2007/03/21 12:37
S60	2435	((375/262,265,341) or (714/794,795)).CCLS.	US- PGPUB; USPAT	OR	OFF	2007/03/24 09:15

S62	56	"375".clas. and "fuzzy logic"	US-PGPUB; USPAT	OR	OFF	2007/03/26 11:04
S64	1	("4970637").PN.	US-PGPUB; USPAT	OR	OFF	2007/03/28 13:46
S65	755	(audio sound music voice) same (a/d "analog to digital") same (lpf "low pass")	US-PGPUB; USPAT	OR	OFF	2007/03/28 13:46
S66	282	(audio sound music voice) with (a/d "analog to digital") with ((lpf "low pass") and "digital")	US-PGPUB; USPAT	OR	OFF	2007/03/28 13:47
S67	227	(audio sound music voice) with (a/d "analog to digital") with ((lpf "low pass") and "digital") and @ad< "20011221"	US-PGPUB; USPAT	OR	OFF	2007/03/28 15:33
S68	34712	"band pass filter" bpf with "direct conversion receiver"	US-PGPUB; USPAT	OR	OFF	2007/03/28 15:33
S69	35	("band pass filter" bpf) with "direct conversion receiver"	US-PGPUB; USPAT	OR	OFF	2007/03/28 15:33
S70	8	S69 and @ad< "20011221"	US-PGPUB; USPAT	OR	OFF	2007/03/28 15:55
S71	1	("20030045235").PN.	US-PGPUB; USPAT	OR	OFF	2007/03/28 16:16
S72	1	("20040223622").PN.	US-PGPUB; USPAT	OR	OFF	2007/03/28 16:20
S73	1	("5946343").PN.	US-PGPUB; USPAT	OR	OFF	2007/03/28 16:27
S74	364	"64-ary"	US-PGPUB; USPAT	OR	OFF	2007/03/28 16:27
S75	74	"64-ary" near modulat\$4	US-PGPUB; USPAT	OR	OFF	2007/03/28 16:27
S76	46	S75 and @ad< "20011120"	US-PGPUB; USPAT	OR	OFF	2007/03/28 16:27
S77	2	((("4970637") or ("5790595")).PN.	US-PGPUB; USPAT	OR	OFF	2007/07/16 09:58
S78	3	((("4970637") or ("5790595") or ("20040223622")).PN.	US-PGPUB; USPAT	OR	OFF	2007/07/16 09:58
S79	3	("2004/0223622").URPN.	USPAT	OR	OFF	2007/07/16 11:25
S80	1	("5771441").PN.	US-PGPUB; USPAT	OR	OFF	2007/07/16 11:25
S81	60	("2236946" "2828413" "2840694" "3080785" "3085460" "3087117" "3296916" "3579211" "3743751" "3781451" "3825666" "3863157"	US-PGPUB; USPAT; USOCR	OR	OFF	2007/07/16 11:26

		"3901118" "3906160" "4004228" "4229826" "4335930" "4344184" "4369521" "4430757" "4453269" "4464792" "4471493" "4612688" "4647135" "4721926" "4794622" "4845751" "4899388" "4988957" "5025704" "5214568").PN. OR ("5771441").URPN.				
S82	2	S81 and cdma	US- PGPUB; USPAT; USOCR	OR	OFF	2007/07/16 11:26
S83	1	("6678892").PN.	US- PGPUB; USPAT	OR	OFF	2008/05/20 11:41
S84	1	("20020072816").PN.	US- PGPUB; USPAT	OR	OFF	2008/05/20 14:24
S85	22	"fuzzy logic" and modulat\$5 and filter and (dpsk "phase shift key")	US- PGPUB; USPAT	OR	OFF	2008/06/06 09:20
S86	0	"455".clas. and "375".clas. and S85	US- PGPUB; USPAT	OR	OFF	2008/06/06 09:21
S87	1	"10100351"	US- PGPUB; USPAT	OR	OFF	2008/06/06 11:49
S88	1	("6,678,892").PN.	US- PGPUB; USPAT	OR	OFF	2008/06/06 12:38
S89	3	("20030021429" "20030076346" "6867820").PN.	US- PGPUB; USPAT	OR	OFF	2008/06/06 12:42
S90	13	("4589134" "4626892" "5042070" "5541638" "5581621" "5631850" "5775939" "6100936" "6195438").PN. OR ("6867820").URPN.	US- PGPUB; USPAT; USOCR	OR	OFF	2008/06/06 12:43
S91	1	"15003242"	US- PGPUB; USPAT; USOCR	OR	OFF	2017/12/10 19:45
S92	9	"10648012"	US- PGPUB; USPAT; USOCR	OR	OFF	2017/12/10 19:48
S93	1481	H04R1/1083.cpc.	US- PGPUB; USPAT; USOCR	OR	OFF	2017/12/10 20:08
S94	3586	H04R2420/07.cpc.	US- PGPUB; USPAT; USOCR	OR	OFF	2017/12/10 20:09
S95	2054	H04R5/033.cpc.	US- PGPUB; USPAT; USOCR	OR	OFF	2017/12/10 20:09
S96	0	H04R1/6066.cpc.	US-	OR	OFF	2017/12/10

			PGPUB; USPAT; USOCR			20:09
S97	2100	H04M1/6066.cpc.	US- PGPUB; USPAT; USOCR	OR	OFF	2017/12/10 20:10
S98	2	(("6563892") or ("5530929")).PN.	US- PGPUB; USPAT; USOCR	OR	OFF	2018/06/25 12:32
S99	1	("20030118196").PN.	US- PGPUB; USPAT; USOCR	OR	OFF	2018/06/25 12:37
S100	2	"13775754"	US- PGPUB; USPAT; USOCR	OR	OFF	2018/06/25 12:51
S101	1	("7865258").PN.	US- PGPUB; USPAT; USOCR	OR	OFF	2018/06/25 13:31
S102	5	(("7412294") or ("7684885") or ("7865258") or ("8131391") or ("9107000")).PN.	US- PGPUB; USPAT; USOCR	OR	OFF	2018/06/25 13:32
S103	6	(("7412294") or ("7684885") or ("7865258") or ("8131391") or ("9107000") or ("9282396")).PN.	US- PGPUB; USPAT; USOCR	OR	OFF	2018/06/25 13:48
S104	2	S103 and ("20 hz" "20hz" "20 khz" "20khz").clm.	US- PGPUB; USPAT; USOCR	OR	OFF	2018/06/25 13:49
S105	1	"15003242"	US- PGPUB; USPAT; USOCR	OR	OFF	2018/06/25 16:47
S106	1	S105 and (modulate modulation modulator modulating modulates modulated demodulate demodulation demodulator demodulating demodulates demodulated)	US- PGPUB; USPAT; USOCR	OR	OFF	2018/06/25 16:48
S107	1	("9282396").PN.	US- PGPUB; USPAT; USOCR	OR	OFF	2018/08/08 10:22
S108	5	"12940747"	US- PGPUB; USPAT; USOCR	OR	OFF	2018/08/08 10:23
S109	1	"15003424"	US- PGPUB; USPAT; USOCR	OR	OFF	2018/08/08 10:24
S110	1	"15003242"	US- PGPUB; USPAT;	OR	OFF	2018/08/08 10:24

			USOCR			
S111	8	"10027391"	US-PGPUB; USPAT	OR	OFF	2018/09/11 15:05
S112	38	("20khz" "20 khz") and (bluetooth "blue tooth") and @ad< "20011220"	US-PGPUB; USPAT	OR	OFF	2018/09/11 15:57
S113	3	("20030054827" "20040120341" "6839325").PN.	US-PGPUB; USPAT; USOCR	OR	OFF	2018/09/11 16:05
S114	19	("44.1") and (bluetooth "blue tooth") and @ad< "20011220"	US-PGPUB; USPAT	OR	OFF	2018/09/11 16:10
S115	0	(09/732044).APP.	USPAT; USOCR	OR	OFF	2018/09/11 16:14
S116	1	("7260221").PN.	US-PGPUB; USPAT; USOCR	OR	OFF	2018/09/11 16:20
S117	1	("20030114109").PN.	US-PGPUB; USPAT; USOCR	OR	OFF	2018/09/11 16:22
S118	1	"15003242"	US-PGPUB; USPAT	OR	OFF	2018/09/11 17:08
S119	6	("20010041056" "20020000831" "20040169665" "5864678" "6021198" "6798447").PN.	US-PGPUB; USPAT; USOCR	OR	OFF	2018/09/11 20:36
S120	12	("20010025358" "20040223622" "5175558" "5771441" "5946343" "6130643" "6342844" "6418558" "6678892" "6982132" "7047474" "7099413").PN.	US-PGPUB; USPAT; USOCR	OR	OFF	2018/09/12 15:57
S121	453	bluetooth and dpsk	US-PGPUB; USPAT; USOCR	OR	OFF	2018/09/12 16:00
S122	13	S121 and @ad< "20011220"	US-PGPUB; USPAT; USOCR	OR	OFF	2018/09/12 16:00
S123	30	bluetooth and dpsk and intersymbol	US-PGPUB; USPAT; USOCR	OR	OFF	2018/09/12 16:03
S124	2	S123 and @ad< "20011220"	US-PGPUB; USPAT; USOCR	OR	OFF	2018/09/12 16:03
S125	3	((("5530929") or ("5970058") or ("6212282")).PN.	US-PGPUB; USPAT; USOCR	OR	OFF	2019/02/21 14:08
S126	0	"16185786"	US-PGPUB;	OR	OFF	2019/02/21 14:17

EAST Search History

			USPAT; USOCR			
S127	3	"15003242"	US- PGPUB; USPAT; USOCR	OR	OFF	2019/02/21 14:17
S128	11	"10648012"	US- PGPUB; USPAT; USOCR	OR	OFF	2019/02/21 14:18
S129	10	S128 and intersymbol	US- PGPUB; USPAT; USOCR	OR	OFF	2019/02/21 14:18
S130	10	"10027391"	US- PGPUB; USPAT; USOCR	OR	OFF	2019/02/21 14:20

2/ 21/ 2019 6:52:32 PM

C:\Users\aflanders\Documents\EAST\Workspaces\10648012.wsp

Bibliographic Data

Application No: 16/185,786

Foreign Priority claimed: ☐ Yes ☒ No

35 USC 119 (a-d) conditions met: ☐ Yes ☒ No ☐ Met After Allowance

Verified and Acknowledged: /ANDREW C FLANDERS/

Examiner's Signature

Initials

Title:

WIRELESS DIGITAL AUDIO MUSIC SYSTEM

FILING or 371(c) DATE	CLASS	GROUP ART UNIT	ATTORNEY DOCKET NO.
11/09/2018	381	2656	1EWAY.009P1C7
RULE			

APPLICANTS

INVENTORS

C. Earl Woolfork Pasadena, CA, UNITED STATES

CONTINUING DATA

This application is a CON of 15003242 01/21/2016 PAT 10129627

15003242 is a CON of 13775754 02/25/2013 PAT 9282396

13775754 is a CON of 13356949 01/24/2012 PAT 9107000

13356949 is a CON of 12940747 11/05/2010 PAT 8131391

12940747 is a CON of 12570343 09/30/2009 PAT 7865258

12570343 is a CON of 12144729 07/12/2008 PAT 7684885

12144729 is a CON of 10648012 08/26/2003 PAT 7412294

10648012 is a CIP of 10027391 12/21/2001ABN

FOREIGN APPLICATIONS

IF REQUIRED, FOREIGN LICENSE GRANTED**

11/29/2018

STATE OR COUNTRY

UNITED STATES

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UNITED STATES PATENT AND TRADEMARK OFFICE

USPTO Automated Interview Request (AIR)

Mar 14 2019

This paper requesting to schedule and/or conduct an interview is appropriate because:

This submission is requested to be accepted as an authorization for this interview to communicate via the internet. Recognizing that Internet communications are not secure, I hereby authorize the USPTO to communicate with the undersigned concerning scheduling of the interview via video conference, instant messaging, or electronic mail, and to conduct the interview in accordance with office practice including video conferencing.

Name(s):
Harnik Shukla

S-signature:
/Harnik Shukla/

Registration Number:
73097

U.S. Application Number:
16185786

Confirmation Number:
1022

E-mail Address:
2hzs@knobbe.com

Phone Number:
+1 9497215278

Proposed Time of Interview:
3-22-2019 12:00 PM ET

Preferred Interview Type:
Telephonic

I am the applicant or applicant's representative for this application.

Topic for Discussion:



UNITED STATES
PATENT AND TRADEMARK OFFICE



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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
16/185,786	11/09/2018	C. Earl Woolfork	1EWAY.009PIC7	1022
20995 7590 03/28/2019 KNOBBE MARTENS OLSON & BEAR LLP 2040 MAIN STREET FOURTEENTH FLOOR IRVINE, CA 92614			EXAMINER FLANDERS, ANDREW C	
			ART UNIT 2656	PAPER NUMBER
			NOTIFICATION DATE 03/28/2019	DELIVERY MODE ELECTRONIC

Please find below and/or attached an Office communication concerning this application or proceeding.

The time period for reply, if any, is set in the attached communication.

Notice of the Office communication was sent electronically on above-indicated "Notification Date" to the following e-mail address(es):

efiling@knobbe.com
jayna.cartee@knobbe.com

<i>Applicant-Initiated Interview Summary</i>	Application No. 16/185,786		Applicant(s) Woolfork, C. Earl	
	Examiner Andrew C Flanders		Art Unit 2656	AIA (FITF) Status Yes

All participants (applicant, applicants representative, PTO personnel):

(1) Andrew C. Flanders. (3) C. Earl Woolfork.

(2) Harnik Shukla. (4) _____.

Date of Interview: 22 March 2019.

Type: ☒ Telephonic ☐ Video Conference
 ☐ Personal [copy given to: ☐ applicant ☐ applicant's representative]

Exhibit shown or demonstration conducted: ☐ Yes ☒ No.
 If Yes, brief description: _____.

Issues Discussed ☐101 ☒112 ☐102 ☒103 ☐Others
 (For each of the checked box(es) above, please describe below the issue and detailed description of the discussion)

Claim(s) discussed: 1 and 6.

Identification of prior art discussed: See Continuation Sheet.

Substance of Interview
 (For each issue discussed, provide a detailed description and indicate if agreement was reached. Some topics may include: identification or clarification of a reference or a portion thereof, claim interpretation, proposed amendments, arguments of any applied references etc...)

Discussed application of prior art to claimed invention and issues under 35 U.S.C. 112. Examiner noted that generating the demodulation signal on a basis of the performance of the demodulators does not appear to be sufficiently disclosed. Examiner also noted to applicant that removal of this limitation would overcome the rejection under 112. Examiner also noted the claimed mounting unit did not appear to be sufficiently disclosed. Applicant inquired if "headphone unit" would be acceptable. It appears to the Examiner that this would be acceptable and overcome the rejections under 112. Examiner and Applicant also discussed the rejections under 103, specifically to the point of unrecoverable ISI being introduced at a bitrate as high as that disclosed by Hamada. Examiner noted further evidence would be required to be persuasive. Applicant noted further reasoning and evidence will be provided in the next response. No agreement was reached and no indication of allowable subject matter was given. Further search and/or consideration will be required..

Applicant recordation instructions: The formal written reply to the last Office action must include the substance of the interview. (See MPEP section 713.04). If a reply to the last Office action has already been filed, applicant is given a non-extendable period of the longer of one month or thirty days from this interview date, or the mailing date of this interview summary form, whichever is later, to file a statement of the substance of the interview

Examiner recordation instructions: Examiners must summarize the substance of any interview of record. A complete and proper recordation of the substance of an interview should include the items listed in MPEP 713.04 for complete and proper recordation including the identification of the general thrust of each argument or issue discussed, a general indication of any other pertinent matters discussed regarding patentability and the general results or outcome of the interview, to include an indication as to whether or not agreement was reached on the issues raised.

☒ Attachment

/ANDREW C FLANDERS/ Primary Examiner, Art Unit 2656	
--	--

Summary of Record of Interview Requirements

Manual of Patent Examining Procedure (MPEP), Section 713.04, Substance of Interview Must be Made of Record

A complete written statement as to the substance of any face-to-face, video conference, or telephone interview with regard to an application must be made of record in the application whether or not an agreement with the examiner was reached at the interview.

Title 37 Code of Federal Regulations (CFR) 1.133 Interviews

Paragraph (b)

In every instance where reconsideration is requested in view of an interview with an examiner, a complete written statement of the reasons presented at the interview as warranting favorable action must be filed by the applicant. An interview does not remove the necessity for reply to Office action as specified in §§ 1.111, 1.135. (35 U.S.C. 132)

37 CFR §1.2 Business to be transacted in writing.

All business with the Patent or Trademark Office should be transacted in writing. The personal attendance of applicants or their attorneys or agents at the Patent and Trademark Office is unnecessary. The action of the Patent and Trademark Office will be based exclusively on the written record in the Office. No attention will be paid to any alleged oral promise, stipulation, or understanding in relation to which there is disagreement or doubt.

The action of the Patent and Trademark Office cannot be based exclusively on the written record in the Office if that record is itself incomplete through the failure to record the substance of interviews.

It is the responsibility of the applicant or the attorney or agent to make the substance of an interview of record in the application file, unless the examiner indicates he or she will do so. It is the examiners responsibility to see that such a record is made and to correct material inaccuracies which bear directly on the question of patentability.

Examiners must complete an Interview Summary Form for each interview held where a matter of substance has been discussed during the interview by checking the appropriate boxes and filling in the blanks. Discussions regarding only procedural matters, directed solely to restriction requirements for which interview recordation is otherwise provided for in Section 812.01 of the Manual of Patent Examining Procedure, or pointing out typographical errors or unreadable script in Office actions or the like, are excluded from the interview recordation procedures below. Where the substance of an interview is completely recorded in an Examiners Amendment, no separate Interview Summary Record is required.

The Interview Summary Form shall be given an appropriate Paper No., placed in the right hand portion of the file, and listed on the "Contents" section of the file wrapper. In a personal interview, a duplicate of the Form is given to the applicant (or attorney or agent) at the conclusion of the interview. In the case of a telephone or video-conference interview, the copy is mailed to the applicants correspondence address either with or prior to the next official communication. If additional correspondence from the examiner is not likely before an allowance or if other circumstances dictate, the Form should be mailed promptly after the interview rather than with the next official communication.

The Form provides for recordation of the following information:

- Application Number (Series Code and Serial Number)
- Name of applicant
- Name of examiner
- Date of interview
- Type of interview (telephonic, video-conference, or personal)
- Name of participant(s) (applicant, attorney or agent, examiner, other PTO personnel, etc.)
- An indication whether or not an exhibit was shown or a demonstration conducted
- An identification of the specific prior art discussed
- An indication whether an agreement was reached and if so, a description of the general nature of the agreement (may be by attachment of a copy of amendments or claims agreed as being allowable). Note: Agreement as to allowability is tentative and does not restrict further action by the examiner to the contrary.
- The signature of the examiner who conducted the interview (if Form is not an attachment to a signed Office action)

It is desirable that the examiner orally remind the applicant of his or her obligation to record the substance of the interview of each case. It should be noted, however, that the Interview Summary Form will not normally be considered a complete and proper recordation of the interview unless it includes, or is supplemented by the applicant or the examiner to include, all of the applicable items required below concerning the substance of the interview.

A complete and proper recordation of the substance of any interview should include at least the following applicable items:

- 1) A brief description of the nature of any exhibit shown or any demonstration conducted,-
- 2) an identification of the claims discussed,
- 3) an identification of the specific prior art discussed,
- 4) an identification of the principal proposed amendments of a substantive nature discussed, unless these are already described on the Interview Summary Form completed by the Examiner,
- 5) a brief identification of the general thrust of the principal arguments presented to the examiner,
(The identification of arguments need not be lengthy or elaborate. A verbatim or highly detailed description of the arguments is not required. The identification of the arguments is sufficient if the general nature or thrust of the principal arguments made to the examiner can be understood in the context of the application file. Of course, the applicant may desire to emphasize and fully describe those arguments which he or she feels were or might be persuasive to the examiner.)
- 6) a general indication of any other pertinent matters discussed, and
- 7) if appropriate, the general results or outcome of the interview unless already described in the Interview Summary Form completed by the examiner.

Examiners are expected to carefully review the applicants record of the substance of an interview. If the record is not complete and accurate, the examiner will give the applicant an extendable one month time period to correct the record.

Examiner to Check for Accuracy

If the claims are allowable for other reasons of record, the examiner should send a letter setting forth the examiners version of the statement attributed to him or her. If the record is complete and accurate, the examiner should place the indication, Interview Record OK on the paper recording the substance of the interview along with the date and the examiners initials.

Continuation of Identification of prior art discussed: Hamada (US 2002/0065043), Kah (US 2001/0033621), Haartsen (US 6,563,892)

12.3 ERROR HANDLING

In the DV and HV3 packet, the voice is not protected by FEC. The quality of the voice in an error-prone environment then depends on the robustness of the voice coding scheme. CVSD, in particular, is rather insensitive to random bit errors, which are experienced as white background noise. However, when a packet is rejected because either the channel access code or the HEC test was unsuccessful, measures have to be taken to "fill" in the lost speech segment.

The voice payload in the HV2 packet is protected by a 2/3 rate FEC. For errors that are detected but cannot be corrected, the receiver should try to minimize the audible effects. For instance, from the 15-bit FEC segment with uncorrected errors, the 10-bit information part as found before the FEC decoder should be used. The HV1 packet is protected by a 3 bit repetition FEC. For this code, the decoding scheme will always assume zero or one-bit errors. Thus, there exist no detectable but uncorrectable error events for HV1 packets.

12.4 GENERAL AUDIO REQUIREMENTS

These specifications are tentative and will be fixed within 18 months after the release of the Bluetooth Specification version 1.0 Draft Foundation.

12.4.1 Signal levels

For A-law and μ -law log-PCM encoded signals the requirements on signal levels follows ITU-T G.711.

Full swing at the 16 bit linear PCM interface to the CVSD encoder is defined to be 3 dBm0. A digital CVSD encoded test signal is provided in a Test Signal file available on the website. This signal is generated by a software implementation of a reference CVSD encoder. The digital encoder input signal (1020 Hz, sine-wave) generating the test signal has a nominal power of -15 dBm0. When the CVSD encoded test signal is fed through the CVSD receiver chain, the nominal output power should be -15 ± 1.0 dBm0.

12.4.2 CVSD audio quality

For Bluetooth audio quality the requirements are put on the transmitter side. The 64 ksamples/s linear PCM input signal must have negligible spectral power density above 4 kHz. A set of reference input signals are encoded by the transmitter and sent through a reference decoder (available on the website). The power spectral density in the 4-32 kHz band of the decoded signal at the 64 ksamples/s linear PCM output, should be more than 20 dB below the maximum in the 0-4 kHz range.



"Kah"

US 2001/0033621 A1

3

Oct. 25, 2001

insignificantly over that time period. Unfortunately, changing from coherent to differential modulation increases the number of certain error events and results in a loss of about 3 dB for all three bits.

[0026] One way to improve receiver performance is to combine demodulation and channel decoding using feedback from the channel decoder to the demodulator. This technique is referred to as multi-pass demodulation. In a multi-pass demodulation receiver, the received signal is initially demodulated and decoded in conventional fashion. The decoded bits are then re-encoded and selected ones of the re-encoded bits are fed back to the demodulator. The received signal is demodulated a second time. During the second pass through the demodulator, the re-encoded bits are treated as known bits or pilot bits by the demodulator. This process can be repeated multiple times, at the cost of increased complexity. Typically, the largest benefit occurs with the first few passes.

[0027] FIG. 2 is a block diagram of a multi-pass demodulation receiver 300. Multi-pass demodulation receiver 300 comprises a demodulator 302, de-interleaver 304, channel decoder 306, and re-encoder 308. The received signal is converted to the baseband frequency and input to demodulator 302. During the first pass through the demodulator 302, the received signal is demodulated in a conventional fashion. The received sequence output from demodulator 302 is fed to de-interleaver 304, which reorders the bits of the received sequence. The output from de-interleaver 304 is fed to channel decoder 306, which detects and corrects errors that may have occurred during transmission. The output from channel decoder 306 is an estimate of the original information sequence transmitted from the transmitter 100. The output from channel decoder 306 is then re-encoded in re-encoder 308 and selected ones of the re-encoded bits are fed back to the demodulator 302 to use as pilot bits in second pass demodulation. During second pass demodulation, the re-encoded bits fed back from channel decoder 306 are treated as known bits by the demodulator 302. Thus, during second pass demodulation, the demodulator 302 is constrained to output symbols that meet the known bit pattern. The re-encoded bits output by channel decoder 306 may be "hard bits" or may be "soft bits" reflecting the level of confidence in the decision. In either case, well-known methods exist for exploiting the decisions in the demodulator 302.

[0028] Multi-pass demodulation may be particularly useful when the bits of a transmitted symbol have unequal error protection. The bits with the greatest error protection are decoded after the first pass through the demodulator 302 with a relatively high degree of certainty. The strongly coded bits may be treated as known bits in a second pass through the demodulator 302 to assist the demodulation of more weakly coded bits or uncoded bits. Demodulation in a multi-pass demodulation receiver 300 may involve two or more passes through the demodulator 302 with more bits treated as known bits after each pass through the demodulator 302. An example of a multi-pass receiver 300 is described in U.S. Pat. No. 5,673,251 to Dent, which is incorporated herein by reference.

[0029] The present invention employs a technique referred to as differential coding in combination with higher order modulation to improve receiver performance. Error coding

and interleaving may also be used. According to the present invention, a differential relation is established at the bit level between successive transmit symbols. The present invention is particularly suited to communication systems 100 with multiple error protection and diagonal interleaving, which are typically used for protecting speech. The invention is applicable to a wide range of communication protocols and technologies, including standards published by the Telecommunications Industry Association (TIA) and Electronics Industry Association (EIA) known as TIA/EIA-136, and the Bluetooth standard. Numerous variations of the differential coding scheme are possible, a few of which are described below to illustrate the flexibility afforded by differential coding.

[0030] FIG. 3 is a functional block diagram of a transmitter 400 according to the present invention that employs differential coding. The transmitter 400 is similar to a conventional transmitter 100 but includes a differential coder 408 to establish a differential relation between transmit symbols spaced in time. The transmitter 400 of the present invention comprises a source coder 402, channel coder 404, interleaver 406, differential coder 408, and modulator 410. Source coder 402, channel coder 404, and interleaver 406 perform the same functions as their counterparts in the conventional transmitter 100. It is to be noted that source coder 402, channel coder 404, and interleaver 406 are not essential elements of the inventive receiver 400 but one or more of these elements will typically be present.

[0031] In the illustrated embodiment of the invention, differential coder 408 receives the output from interleaver 406. Differential coder 408 could also receive output directly from channel coder 404 or source coder 402. In any case, differential coder 408 receives a bit sequence at its input, referred to herein as the input sequence, which is divided into successive symbols, referred to herein as input symbols. The function of the differential coder 408 is to produce a transmit sequence comprising a plurality of transmit symbols based on the input sequence by differentially encoding selected bits of the input sequence. Differential coding may be performed, for example, by coding a selected bit of each input symbol with respect to one or more bits from one or more previous input symbols. In this example, the transmit sequence will comprise some bits which are differentially coded and others which are not differentially coded. It is not necessary that every transmit symbol include differentially coded bits. Some transmit symbols may be comprised entirely of differentially coded bits, while others contain no differentially encoded bits. Furthermore, some transmit symbols may comprise a mixture of differentially coded bits and non-differentially coded bits.

[0032] Modulator 410 receives the transmit sequence from differential coder 408 and modulates the transmit sequence onto a carrier. Modulator 410 may, for example, comprise a coherent Q-PSK modulator or a coherent 16-QAM modulator. However, those skilled in the art will recognize that the differential coding scheme may also be used with other higher order modulation schemes.

[0033] Referring now to FIG. 4, a receiver 500, according to the present invention, is shown. Receiver 500 comprises an equalizer 502, de-interleaver 504, channel decoder 506, source decoder 508, and re-encoder 510. The de-interleaver 504, channel decoder 506, and source decoder 508 perform

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controlled manner, a receiver 200 can detect and correct bit errors that may occur during transmission by making use of the redundant information and it's a priori knowledge of the codes used at the transmitter 100. Channel coder 104 may apply error coding to selected bits, referred to herein as protected bits, 106 not protected by error coding are referred to herein as unprotected bits. Further, protected bits may fall into two or more classes, with certain classes of bits receiving greater error protection than other classes.

[0017] Interleaver 106 permutes the ordering of the coded bits output from the channel coder 104 in a deterministic manner. It takes coded bits as an input and produces a sequence of identical bits as an output, but in a different order. Thus, the interleaver spreads bits in time. In many communication systems, some source bits are more important than other source bits. For example, a speech coder typically outputs several important bits, referred to as "core bits," in succession. If the duration of one interleaver 106 to spread the important bits in time to protect against a deep fade, where an entire block of bits may be lost or corrupted, interleaving effectively spreads the important bits in time so that even in a deep fade, a sufficient number of the important bits will be successfully transmitted to the receiver 200 to maintain a desired signal quality threshold.

[0018] Modulator 108 receives the interleaved output from the interleaver 106 and generates waveforms that bear out the physical nature of the channel 12 and can be efficiently transmitted over the channel 12. The set of possible signal waveforms output from the modulator 108 is referred to as the signal constellation. The bits output from interleaver 106 are grouped to form symbols, which are then mapped to points on the signal constellation. For example, the input bits to the demodulator 106 may be grouped into a sequence of symbols comprising three bits each, with each bit having two possible values. In this example, the signal constellation would have eight points corresponding to the eight possible combinations of three bits. The signal constellation or modulation scheme is typically selected with regard to other specifications of the communication system, original detection performance, power requirements, or bandwidth availability. Typical signal constellations used in digital communication systems include 16-QAM, 8-PSK, 4-PSK, and QPSK. The output of modulator 108 is a transmit signal that is amplified and transmitted over the communication channel 12 to the receiver 200.

[0019] The basic function of the receiver 200 is to reconstruct the information sequence transmitted from the transmitter 100 from a received signal, which may have been corrupted by the communication channel 12. Receiver 200 comprises a front end circuit 202, demodulator 204, decoder/interleaver 206, channel decoder 208, and source decoder 210.

[0020] Front end circuit 202 is coupled to a receive antenna 203. Front end circuit 202 converts the received signal to the baseband frequency to generate a baseband signal, which is then sampled and digitized. The sampled and digitized baseband signal is passed to the demodulator 204. The function of the demodulator 204 is to process the received signal to determine which of the possible symbols in the signal constellation were transmitted by the transmitter 100. For example, when binary modulation is used, the demodulator 204 processes the received signal and decides

at each symbol interval whether a transmitted symbol is a "0" or a "1". The output of demodulator 204 is referred to herein as the received sequence, which is essentially an estimate of the transmit sequence. The received sequence will typically contain some bit errors.

[0021] The interleaver 206 reorders the bits of the received sequence to undo the effects of interleaver 106, which are then input to the channel decoder 208. Channel decoder 208 attempts to detect and correct bit errors that may have occurred during transmission from the received sequence and it's a priori knowledge of the code used by the channel coder 104. A measure of how well the demodulator 204 and channel decoder 208 perform is the frequency with which bit errors occur in the detected sequence.

[0022] As a final step, a source decoder 210 accepts the decoded output from the channel decoder 208 and, from knowledge of the source encoding method, attempts to reconstruct the original source data stream. The difference between the reconstructed source data stream and the original source data stream is a measure of the distortion introduced by the digital communication system 10.

[0023] In conventional digital communication systems 10, coding and modulation are performed separately at the transmitter 100. Likewise, demodulation and decoding are performed in separate operations at the receiver 200. The demodulator 204 decides what symbols were transmitted based on the received signal. The decisions by the demodulator 204 may be based on estimates of soft decisions that include reliability information. The channel decoder 208 then processes the decisions by the demodulator 204 using bit reliability information when available to detect and correct errors that may have occurred during transmission.

[0024] One commonly used modulation scheme is coherent phase shift keying (PSK). In coherent B-PSK, each transmitted symbol $V(t)$ comprises three bits, denoted $x(t)$, $y(t)$, and $z(t)$. Each transmit symbol $V(t)$ maps to one point on the signal constellation. For example, each transmit symbol $V(t)$ may be mapped to the signal constellation using Gray coding, which means that all adjacent points on the signal constellation vary at only a single bit position. Coherent B-PSK provides good performance in flat fading channels with an adequate signal-to-noise ratio. However, receiver performance can suffer at low signal-to-noise ratios. This performance arises in time-varying channels where the phase of the signal is corrupted by, for example, Doppler effects and multipath propagation. In such cases, it may be desirable to employ a technique known as differential modulation.

[0025] Differential PSK (DPSK) is a non-coherent form of phase shift keying which avoids the need for a coherent reference signal at the receiver 200. Non-coherent receivers are relatively easy and inexpensive to build and, hence, are widely used in wireless communications. In DPSK systems, each symbol (grouping of bits) maps to a differential phase $\Delta\phi$. The differential phase $\Delta\phi$ is then used to determine the phase of the transmitted signal at symbol interval i according to the relation $\phi_i = \phi_{i-1} + \Delta\phi_i$. Thus, in DPSK, the phase of each transmitted symbol $y_i(t)$ is determined by the phase of the previously-transmitted symbol $y_{i-1}(t)$ and the differential phase $\Delta\phi$. Thus, the received signal can be demodulated by comparing symbols only one symbol period apart, a sufficiently short time span so that channel phase changes

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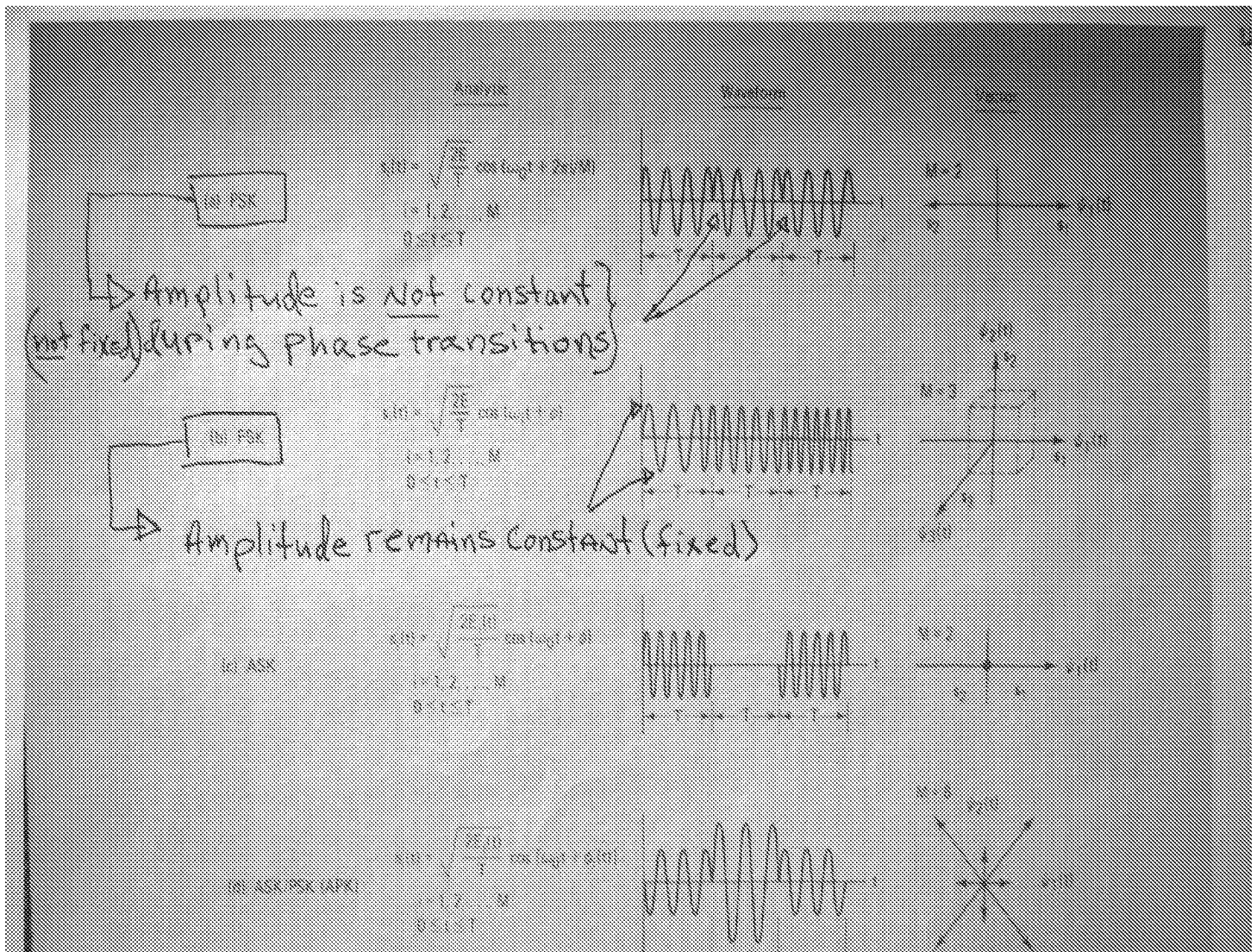
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"Haart"

priori knowledge about the interference present, which would allow an adaptation of the threshold). As a result, bit errors are introduced since the fixed threshold does not remain located at the optimal position midway between the signal values. However, since the amplitude of the binary signal is fixed (e.g., as in binary FM signals, wherein the modulation index represents the amplitude of the first detection signal at the output of the FM detector and is fixed), the separation Δ between the signal symbols remains fixed regardless of the disturbance superimposed on the signal.

Therefore, a better detection technique for binary signals disturbed by slowly varying signals is to abandon the threshold technique, and instead use the difference Δ between the two possible symbols. To be able to use this technique, the signal separation between the two symbols must be fixed. Therefore, this difference technique can only be used in systems where this separation is constant and is not affected by propagation effects. Such difference techniques include, for example, binary phase or frequency modulation schemes (e.g. continuous phase frequency shift keying, CPFSK) which are widely used in wireless communication because of the property that the signal variation is hardly affected by propagation effects.

A known technique that uses the difference between two adjacent symbols is differential keying. In differential keying, a one is represented by a change between two adjacent symbols, whereas a zero is represented by no change between adjacent symbols (or the other way around). Differential keying is primarily found in phase modulation schemes (DPSK) but can be used in other modulation schemes as well. For example, frequency modulation could also be implemented in this manner, e.g., a DFSK scheme (Differential Frequency Shift Keying) wherein for a binary one, two adjacent symbols use $f_0 + \Delta f$ and $f_1 - \Delta f$, whereas for a binary zero, the symbols use both $f_0 + \Delta f$ or both $f_1 - \Delta f$. The original signal $d(k)$ at time instant k is retrieved in the detector by sampling the input signal at the symbol rate and comparing two adjacent samples. This can be achieved by subtracting the previous symbol $x(k-1)$ from the current symbol $x(k)$:

$$d(k) = x(k) - x(k-1) \quad (1)$$

It will be appreciated by those skilled in the art that this type of differential modulation scheme removes all DC offset. In addition, some low-frequency signals can be recovered as long as the difference in the disturbance level between adjacent samples is less than $\Delta/2$. DFSK modulation is, however, not used much in practice since its signal-to-noise (SNR) performance is degraded compared to FSK. This degradation occurs because, for the determination of a single bit, the noise of two samples is taken into account in the differential process. Therefore, the performance in white Gaussian noise of DFSK modulation is more than 3 dB worse than that of FSK modulation.

According to exemplary embodiments of the present invention, a performance improvement can be obtained by taking into account the difference signals from more than two adjacent samples. That is, whereas conventional DFSK modulation only uses the information from two samples which are adjacent to determine a bit's value, exemplary embodiments of the present invention use the information from more than two adjacent samples to make a bit decision. To perform this technique, the decision of a bit is delayed and the difference information of three bits is used to make a more accurate decision. An example will serve to better illustrate an exemplary method according to the present invention.

Consider the binary symbols with noise as shown in FIG. 4. For those readers more familiar with the binary alphabet being $\{+1, -1\}$, a 0 corresponds to a -1 value whereas a 1 corresponds to a $+1$ value. The signal separation Δ is 2 in this example and the desired sequence is $x = \{1, 0, 0, 0, 1\}$. However, due to noise, the sampled values y_1 to y_5 are, in this example, $\{0.9, -1.2, -0.1, -0.5, -0.7, 0.7\}$ as shown in FIG. 4.

If the detector only takes the difference between adjacent samples, the difference signal is then $\{-2.1, 1.1, -0.4, -0.2, 1.4\}$ for this example. Assuming that the first bit x_{n-1} was a 1, a conventional DFSK detector would give an output sequence of $\{1, 0, 1, 1, 1\}$, using the framework that a 1 is decided when the difference is bigger than 1.0, a 0 is decided when the difference is smaller than -1.0 , and no change from the previous bit is decided when the difference is between -1.0 and 1.0 .

However, Applicants have recognized that a more intelligent scheme would recognize other characteristics within the sampled values to more correctly detect the received bits. For example, noting the magnitude of the last difference in the difference sequence, i.e., 1.4, makes it highly probable that a transition from 0 to 1 took place. Therefore, x_{n-5} must be 1 and x_{n-4} must be 0. Taking into account the relatively small differences between the sampled values associated with x_{n-5} , x_{n-4} , x_{n-3} , and x_{n-2} , it can be recognized that all these bits should have the same value as bit x_{n-5} , i.e., 0. Between x_{n-2} and x_{n-1} , the difference shows that the transition from 1 to 0 is highly probable. Since x_{n-3} was assumed to be 1, x_{n-2} must then be zero which matches with the derivation of the value of x_{n-2} described above based on its similarity to bits x_{n-5} , x_{n-4} and x_{n-3} . Therefore, the decoded sequence according to this empirical detection technique is $\{1, 0, 0, 0, 1\}$, which is identical with the original signal.

To implement the evaluation of such characteristics, one exemplary embodiment employs algorithms which incorporate information associated with frame bits or symbols, e.g., the well known Viterbi algorithm (VA). In the VA, all possible transitions are investigated, and a record is kept from the error between the hypothesized transitions and the actual transitions experienced. One realization of possible transitions form a path through the trellis tree of the Viterbi decoder. The error signals are accumulated and represent the metric of the path. At each node, the path with the lowest metric survives, the other is eliminated. When sufficient future symbols are investigated, a bit decision of the symbol at the start of the path can be performed. The number of future symbols tested is called the decision depth. Those skilled in the art will understand the operation of the Viterbi algorithm per se and, therefore, additional details regarding this algorithm are not described herein.

Exemplary embodiments of the present invention feed an input signal received by a communications device, e.g., at a mobile phone or base station, through a prefilter which removes the DC offset and low-frequency components. This prefilter applies the difference equation given in equation (1), above. The output of the prefilter is then passed to a Viterbi decoder (see FIG. 6). From the difference signals, the Viterbi decoder recovers the original signals but with the disturbances removed. For the prefilter of equation (1), wherein only the difference between two adjacent symbols is taken into account, the corresponding Viterbi trellis is shown in FIG. 5. Each state in the Viterbi trellis of FIG. 5 is represented by a circle into which the state transition arrows lead.

In the trellis, the instantaneous error associated with state transitions is represented by $E(c|p)$ where c is the current,



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NOTICE OF PUBLICATION OF APPLICATION

The above-identified application will be electronically published as a patent application publication pursuant to 37 CFR 1.211, et seq. The patent application publication number and publication date are set forth above.

The publication may be accessed through the USPTO's publicly available Searchable Databases via the Internet at www.uspto.gov. The direct link to access the publication is currently <http://www.uspto.gov/patft/>.

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RESPONSE TO OFFICE ACTION DATED FEBRUARY 27, 2019**Mail Stop Amendment**

Commissioner for Patents
P.O. Box 1450
Alexandria, VA 22313-1450

Dear Commissioner:

In response to the Office Action mailed February 27, 2019, the Applicant respectfully requests the above-identified application be amended as follows:

AMENDMENTS TO THE CLAIMS

The following listing of claims replaces all prior versions thereof. Changes are shown below in highlighted form, where insertions appear as underlined text (e.g., insertions) while deletions appear as strikethrough text (e.g., ~~deletions~~) or double brackets (e.g., [[deletions]]).

1. (Currently Amended) 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, said wireless modulation transmissions representative of an audio signal representation, said portable spread spectrum audio receiver comprising:

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;

a digital-to-analog converter (DAC) configured to provide an analog audio output signal corresponding to said audio signal representation;

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;

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;

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 ~~and generate a demodulation signal based on said performance of at least one of said plurality of demodulations,~~

wherein said plurality of demodulations includes a differential phase shift keying (DPSK) demodulation and a non-DPSK demodulation; and

wherein said further processing for reduction of intersymbol interference is separate from said performance of at least one of said plurality of demodulations.

2. (Original) 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. (Original) The portable spread spectrum audio receiver of Claim 1, wherein the audio signal representation represents music.

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

5. (Original) The portable spread spectrum audio receiver of Claim 1, wherein the portable spread spectrum audio receiver includes a power supply.

6. (Currently Amended) The portable spread spectrum radio receiver of Claim 1, further comprising a headphone mounting unit, wherein the mounting headphone unit is configured to integrate the speaker and wherein the mounting unit enables a user to secure the speaker on to a head of the user.

7. (Currently Amended) The portable spread spectrum radio receiving of Claim 6, wherein the mounting-headphone unit comprises a head mounting strap that connects the speaker with another speaker for opposite ear.

8. (Currently Amended) 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, said wireless modulation transmissions representative of an audio signal representation, said portable spread spectrum audio receiver configured to:

use independent code division multiple access communication and said unique user code to communicate with only said spread spectrum transmitter during a wireless connection;

receive wireless modulation transmissions representative of said audio signal representation;

process said received wireless modulation transmissions for reduction of intersymbol interference;

perform at least one of a plurality of demodulations on at least one of said received wireless modulation transmissions ~~and generate a demodulation signal based on said performance of at least one of said plurality of demodulations,~~ wherein said plurality of demodulations includes a differential phase shift keying (DPSK) demodulation and a non-DPSK demodulation;

generate an analog audio output signal corresponding to said audio signal representation; and

output an audio signal corresponding to said analog audio output signal.

9. (Original) 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. (Original) 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. (Original) The portable spread spectrum audio receiver of Claim 8, wherein said analog audio output signal is capable of representing audio signals below 40Hz and also capable of representing audio signals above 5kHz.

12. (Original) 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. (Original) 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. (Original) The portable spread spectrum audio receiver of Claim 8, wherein the portable spread spectrum audio receiver includes a power supply.

15. (Currently Amended) The portable spread spectrum radio receiver of Claim 8, further comprising a ~~mounting~~headphone unit, wherein the ~~mounting~~headphone unit is configured to integrate the speaker and wherein the mounting unit enables a user to secure the speaker on to a head of the user.

16. (Currently Amended) The portable spread spectrum radio receiving of Claim 15, wherein the ~~mounting~~headphone unit comprises a head mounting strap that connects the speaker with another speaker for opposite ear.

17. (Original) A portable spread spectrum audio 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:

encode a first representation of an audio signal to reduce intersymbol interference associated with a transmitted representation of the audio signal;

perform at least one of a plurality of modulations on the first representation of the audio signal;

generate a modulated signal based on the performance of the plurality of modulations, wherein the plurality of modulations includes a differential phase shift keying (DPSK) modulation and a non-DPSK modulation; and

use the modulated signal and independent code division multiple access communication to wirelessly transmit a transmitted representation of the audio signal.

18. (Original) 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. (Original) 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

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20. (Original) The portable spread spectrum audio transmitter of Claim 17, wherein the portable spread spectrum audio transmitter includes a power supply.

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SUMMARY OF INTERVIEW

Applicant's representative, Harnik Shukla and Inventor, C. Earl Woolfork, conducted a telephonic interview with Examiner Flanders on March 22, 2019. The Applicant's representative discussed proposed amendments to overcome the rejections under Section 112. Furthermore, Applicant's representative discussed the cited references (Hamada, Haart, and Kharyallah) in view of Section 103 rejection. No agreement was reached as to allowance.

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REMARKS

By way of summary, Claims 1-20 were pending in this application. In the present amendment, Applicant has amended the claims without prejudice or disclaimer to previously pending versions thereof as shown above. Accordingly, Claims 1-20 remain pending.

Rejections Under 35 U.S.C. § 112, First Paragraph

The Office Action rejected Claims 1 – 20 under 35 U.S.C. § 112, first paragraph. *Office Action*, 2 – 4.

Specifically, the Office Action rejected the limitation “generate a demodulation signal based on said performance of at least one of said plurality of demodulations.” Applicant disagrees with the Office Action and any characterization of the claim language. Solely in the interest of expediting prosecution, Applicant has removed the limitation from the claims at issue based on the suggestion from the Examiner in the Interview.

Furthermore, the Office Action rejected “mounting unit” as recited in the claims. Without acquiescing to the rejection, Applicant has amended the claims to recite a “headphone unit,” which the Examiner agreed during the Interview was acceptable.

Based at least on the amendments and the discussions in the Interview, Applicant respectfully requests withdrawal of the rejections.

Rejections Under 35 U.S.C. § 112, Second Paragraph

The Office Action rejected Claims 1 – 20 under 35 U.S.C. § 112, second paragraph. *Office Action*, 4. The Office Action objected to “said performance” for lack of antecedent basis. Applicant respectfully disagrees and request reconsideration as the claims recite “perform at least one of a plurality of demodulations.”

Art Based Rejections

The Office Action rejected independent Claims 1, 8, and 17 under 35 U.S.C. § 103 as being unpatentable over U.S. Pub. No 2002/0065043 to Hamada (hereinafter “Ham”) in view of U.S. Pub. No. 2001/0033621 to Kharyallah (hereinafter “Kha”) and

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Haartsen (hereinafter “Haart 1”, U.S. Patent 6,563,892) and incorporating in its entirety (see Haart 1 col. 2 lines 20 - 30), Hartsen (hereinafter Haart 2, BLUETOOTH-The universal radio interface for ad hoc, wireless connectivity, 1998).” *Office Action*, 6. The Office Action rejected the dependent claims based at least on these same references as applied to their corresponding independent claims. Applicant respectfully traverses these rejections, the characterizations of the pending claims and the cited references and each and every implicit and explicit potential for reliance on Official Notice.

Independent Claim 1

Applicant respectfully disagrees with the Office Action because the cited references fail to teach or suggest all the limitations of Claim 1. Furthermore, the cited references are not properly combinable. Finally, there is no motivation to combine all the cited references.

Deficiencies of Haart 1 Reference

For example, Claim 1 recites, among other things, “wherein said portable spread spectrum audio receiver further processes said received wireless modulation transmissions for reduction of intersymbol interference.” Ham and Kha are silent about reducing intersymbol interference (ISI). The Office Action appears to cite the “Viterbi encoder/decoder” of Haart for the “reduction of interference.” *Office Action*, 9. Applicant respectfully disagrees with the Office Action for the following reasons.

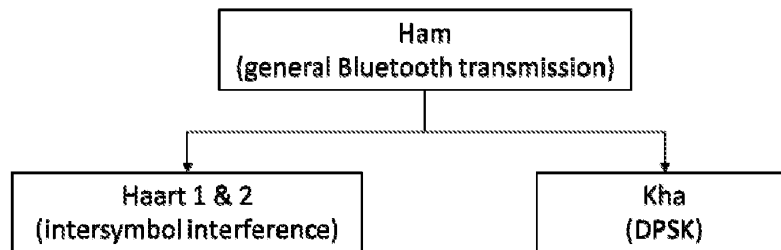
Haart states that the “binary signal (e.g., intersymbol interference) are undone in a decoder that applies a Viterbi algorithm. . . . The Viterbi algorithm uses the knowledge of the constant amplitude separation of the binary signals. . . .” *Haart*, 3:15-18. Haart is incompatible with the system as described in Claim 1. For example, Claim 1 recites use of differential phase shift keying (DPSK) modulation. This modulation is incompatible with the requirement of “constant amplitude” of Haart’s system. In fact, Haart specifically moves away from DPSK in its own disclosure and uses DFSK instead because of the constant amplitude requirement. *Haart*, 5:24-40.

Deficiencies of Kha Reference

The Office Action cites to Kha for teaching “plurality of demodulations” including “DPSK.” *Office Action*, 9. However, Kha is also incompatible with the system corresponding to a non-limited embodiment of Claim 1. Kha teaches that “[u]nfortunately, changing from coherent to differential modulation increases the number certain events and results in a loss of about 3 dB for all three bits. One way to improve receiver performance is to **combine** demodulation and channel decoding using feedback from the channel decoder to the demodulator.” *Kha*, [0024]-[0025]. This directly teaches away from “wherein said further processing for reduction of intersymbol interference is separate from said performance of at least one of said plurality of demodulations” as recited in Claim 1. Kha is also silent on reduction of ISI interference.

Deficiencies in the Combination

The Office Action started with Ham and added Haart 1 & 2 in parallel with Kha as illustrated below:



First, the combination fails because Haart 1 is incompatible with Claim 1 and Kha. Haart discloses fixed or constant amplitude, which is incompatible with DPSK.

Second, Ham’s teachings of using a high bitrate and Bluetooth would result in unrecoverable ISI. See e.g. Motorola Application Note, 4 (attached as Appendix A). However, Ham fails to mention ISI or use of any filters. Ham is mostly concerned with managing a buffer (“24”) and using this buffer to account for any losses. *Ham*, [0137]. A person skilled in the art would have no motivation to combine Ham with either Haart 1/2 or Kha.

Third, the combination fails because even if they were improperly combined (which the Applicant clearly states is not possible), the combination would fail to teach

or suggest all the limitations of Claim 1. As discussed above, Haart 1 does not teach that the demodulation is separate from DPSK. Accordingly, Haart 1 does not teach two separate processes. Furthermore, as discussed above, Kha also teaches combining demodulation and channel decoding. Thus, Kha also does not teach two separate processes. Therefore, even if they were improperly combined, the combination would still result in a single process and not “wherein said further processing for reduction of intersymbol interference is separate from said performance of at least one of said plurality of demodulations” as recited in Claim 1.

Finally, there is no motivation to combine Ham with Haart (1 & 2) and Kha as stated in the Office Action. As illustrated above, the Office Action first combines Ham with Haart to “improve performance” of Ham’s bluetooth. *Office Action*, 7. Similarly, the Office Action combines Ham with Kha to also “improve performance.” *Id.* However, assuming that Ham/Haart(1 & 2) and Ham/Kha combination is possible (which the Applicant does not concede), the Office Action fails to provide any motivation for combining the third reference. In fact, as discussed above, Haart(1 & 2) and Kha are not combinable at all. Therefore, a person skilled in the art starting from Ham will not be motivated to combine both Haart and Kha.

Thus, for at least all of the reasons discussed above, Claim 1 is patentable over the cited references.

Independent Claim 8

In contrast to the teachings of the cited references discussed above, amended Claim 8 recites the following:

- use independent code division multiple access communication and said unique user code to communicate with only said spread spectrum transmitter during a wireless connection;
- receive wireless modulation transmissions representative of said audio signal representation;
- process said received wireless modulation transmissions for reduction of intersymbol interference;
- 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;

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generate an analog audio output signal corresponding to said audio signal representation; and
output an audio signal corresponding to said analog audio output signal

Thus, for at least these reasons, amended Claim 8 is patentable over the cited references.

Independent Claim 17

In contrast to the teachings of the cited references discussed above, amended Claim 17 recites the following:

encode a first representation of an audio signal to reduce intersymbol interference associated with a transmitted representation of the audio signal;
perform at least one of a plurality of modulations on the first representation of the audio signal;
generate a modulated signal based on the performance of the plurality of modulations, wherein the plurality of modulations includes a differential phase shift keying (DPSK) modulation and a non-DPSK modulation; and
use the modulated signal and independent code division multiple access communication to wirelessly transmit a transmitted representation of the audio signal.

Thus, for at least these reasons, amended Claim 17 is patentable over the cited references.

Dependent Claims

The dependent claims are patentable for the same reasons articulated above with respect to their independent claims. The dependent claims are also patentable because of the additional features recited therein.

No Disclaimers or Disavowals

Although the present communication may include alterations to the application or claims, or characterizations of claim scope or referenced art, Applicant is not conceding in this application that previously pending claims are not patentable over the cited references. Rather, any alterations or characterizations are being made to facilitate expeditious prosecution of this application. Applicant reserves the right to pursue at a

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later date any previously pending or other broader or narrower claims that capture any subject matter supported by the present disclosure, including subject matter found to be specifically disclaimed herein or by any prior prosecution. Accordingly, reviewers of this or any parent, child or related prosecution history shall not reasonably infer that Applicant has made any disclaimers or disavowals of any subject matter supported by the present application. Further, Applicant's arguments in favor of one independent claim should not be imputed to any other independent claim.

Conclusion

In view of the foregoing amendments and remarks, Applicant respectfully requests that the Examiner withdraw the outstanding rejections and allow the present application. If any issues arise during examination, the Examiner is invited to call the undersigned representative at his direct dial number listed below.

By focusing on specific claims and claim recitations in the discussion above, Applicant does not intend to imply that other claim recitations are disclosed or rendered obvious by the art of record.

Please charge any additional fees, including any fees for additional extension of time, or credit overpayment to Deposit Account No. 11-1410.

Respectfully submitted,

KNOBBE, MARTENS, OLSON & BEAR, LLP

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Filing Date: November 9, 2018

APPENDIX A

Motorola's Bluetooth Solution to Interference Rejection and Coexistence with 802.11

Application Note

by
Weizhong Chen, Ph.D.

AN2211/D
Rev. 0, 12/2001



digital dna 

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Abstract and Contents

Bluetooth™ is a low-cost and low-power wireless connectivity technology operating in the 2.4 GHz unlicensed ISM band. One of the important challenges to Bluetooth™ adopters is interference rejection and coexistence with other WLAN standards such as 802.11. This document describes Motorola's Bluetooth solution that addresses these challenges.

Motorola's interference rejection solution is achieved via high-performance signal detection algorithms. High-performance signal detection algorithms not only increase Bluetooth™ performance, but also reduce its interference to 802.11 due to the reduction of re-transmissions. The high-performance signal detection in baseband includes joint detection of the access code, timing, and carrier frequency. The maximum likelihood sequence estimation (MLSE) is used for symbol recovery and carrier tracking. Motorola's interference rejection performance is not at the price of extensive processing that increases silicon cost and power consumption. The joint detection gate count is comparable with a conventional solution for the access code detection and timing sync and the MLSE gate count is negligible in current silicon technology. Motorola's solution relies on its unique, powerful, and efficient algorithms.

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2.2	MLSE Symbol Recovery with Carrier Tracking	3
3	Performance of Motorola's Bluetooth Solution	5
4	Summary	7

1 Introduction

Bluetooth™ is a low-cost and low-power short-range radio link that operates in the worldwide 2.4 GHz unlicensed ISM band. It may be used as a cable replacement technology or as an advanced personal wireless local area network. Because of the unrestricted access to the ISM band, Bluetooth devices are exposed to a high level of interference from unknown proprietary products, such as microwave ovens, cordless phones, and so on. Interference is also possible from WLAN products, such as 802.11, which coexist with Bluetooth products.

A frequency-hopping scheme is used to overcome interference and fading. Bluetooth uses Gaussian Frequency Shift Keying (GFSK) modulation on each hop with a 1 Mbit/s raw data rate. This frequency hopping technology helps mitigate interference to some extent. However, due to the fact that Bluetooth channels are spread over the entire ISM band and have a narrow channel spacing, interference from adjacent Bluetooth channels also presents a problem.

Motorola believes that the solution to interference rejection can be achieved via high-performance signal detection algorithms. High-performance signal detection not only increases Bluetooth's ability to survive in an interference environment, it also reduces interference to 802.11 by reducing the need for re-transmissions. This in turn not only enhances the user's experience, it also reduces the battery drain of the device. However, Motorola's interference rejection performance does not come at the price of extensive processing that would increase power consumption and silicon cost. Instead, it relies on its unique, powerful, and efficient algorithms.

2 Motorola's Bluetooth Solution

The Motorola Bluetooth solution is a two-chip solution as shown in Figure 1, where the baseband portion provides high-performance detection.

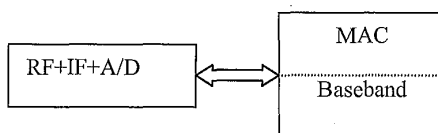


Figure 1. Motorola's Two-Chip Bluetooth Solution

The high-performance signal detection in baseband includes joint detection of the access code, timing, and carrier frequency. The maximum likelihood sequence estimation (MLSE) is used for symbol recovery and carrier tracking. The joint detection uses the 64 bits of the entire sync word to estimate the carrier digitally, instead of the 4 bits of the preamble in the conventional analog approach. Thus, the joint detection significantly improves the carrier estimation in the presence of interference, thereby enhancing the message recovery performance. The Bluetooth channel has unrecoverable Inter Symbol Interference (ISI) due to its GFSK modulation and narrow channel spacing. Conventional slicing detection is optimal only

Motorola's Bluetooth Solution

for zero-ISI channels and is a non-optimal solution for Bluetooth. The MLSE symbol recovery, however, can be an optimal solution for channels with ISI. MLSE detection is a packet waveform matching detector that tries all possible bit patterns. ISI has been included into its optimization. Thus, MLSE is expected to provide a significant performance gain over the conventional slicing detection in the Bluetooth channel environment. In addition, MLSE allows the use of an exceptionally narrow selectivity filter, thus providing additional interference and Additive White Gaussian Noise (AWGN) rejection.

Traditionally, sophisticated joint detection and MLSE symbol recovery require more processing power than other approaches, resulting in sub-optimal cost and operational power. However, the Motorola Bluetooth solution achieves a cost-effective and power-efficient solution. The joint detection gate count is comparable with a conventional solution for the access code detection and timing sync. The MLSE gate count is negligible in current silicon technology.

2.1 Joint Detection of Access Code, Timing, and Carrier

The Bluetooth packet structure is shown in Figure 2. Different from other communication protocols, the access code in Bluetooth serves not only for synchronization purposes, but also for user detection purposes. The access code changes from connection to connection and only the intended receiver knows the access code precisely. The access code is used by the intended receiver to derive the arrival timing and carrier. Non-intended receivers treat the access code as noise and switch to sleep mode at the end of the access code.

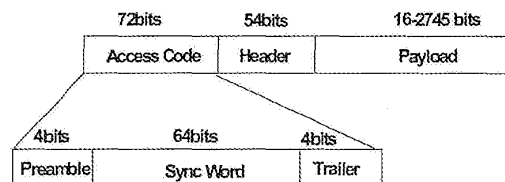


Figure 2. Bluetooth Packet Structure

The access code is constructed as shown in Figure 3 where the 24 LAP bits are the lower address portion (LAP) of the sending device's ID. The 34 parity bits are generated in such a way that any access code has a minimum distance of 14 bits from any other access codes with a different LAP. This ensures that a sufficient correlation magnitude difference exists between the intended receiver and non-intended receivers, allowing the intended receiver to reliably detect the message arrival while unintended receivers quickly fall into a power-saving sleep mode. Another important feature of the access code is its non-cyclic nature. This means that a time-shifted version of any access code will not be similar to another access code, thus avoiding potential false alarms for non-intended receivers.

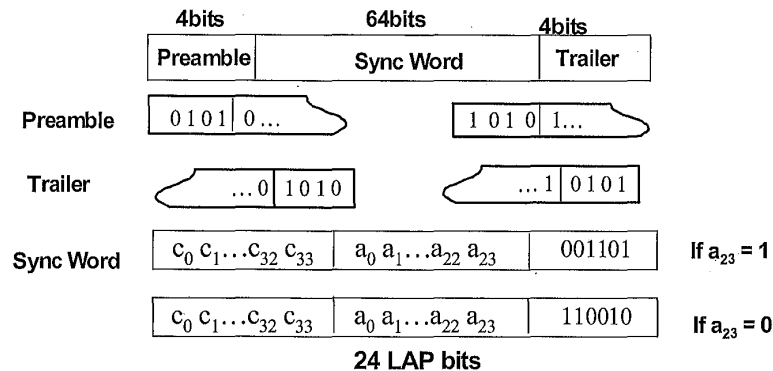


Figure 3. Access Code Structure

In a conventional approach, the 4 bits of preamble are used for carrier estimation. The estimated carrier is corrected for the following signal for the access code detection, timing synchronization, and symbol recovery. In the presence of interference, the 4 bits of preamble are not enough to estimate a reliable carrier, thus the performance of the access code detection and timing sync is affected, and so is the following symbol recovery.

With Motorola's joint detection, the baseband signal of the 64 bits of the entire sync word is used for simultaneous carrier estimation, timing synchronization, and access code detection. The unique joint detection metric is designed so that it has a global peak for the intended receiver at the arrival time and correct carrier estimation, which is also achieved only at the arrival time. This joint detection is shown in Figure 4. Measurements indicate that this joint detection not only gives us improved carrier estimation accuracy, it also reduces the false alarm rate and increases the reliability of the access code detection, thus reducing the re-transmission. The reduced re-transmission and lower false alarm rate improves the battery life. The reduced re-transmission also lowers the interference to other devices operating in the ISM band, such as 802.11 devices.

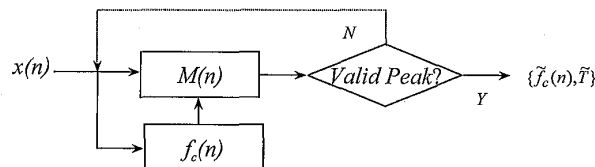


Figure 4. Motorola's Joint Detection

2.2 MLSE Symbol Recovery with Carrier Tracking

The conventional approach to symbol recovery uses a slicing detector after the discriminator and Post-Detection Filter (PDF), as shown in Figure 5. With a slicing detector, a symbol is detected based on its signal value at its symbol center. The symbol recovery performance is controlled by the eye-opening of the channel or Inter Symbol Interference (ISI) of the channel, as shown in Figure 6. A slicing detector is optimal only if the channel has zero-ISI.

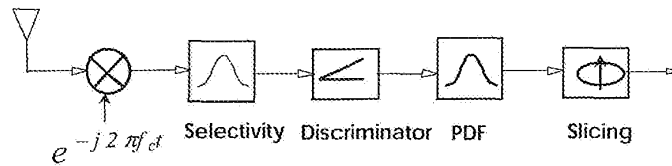


Figure 5. Conventional Receiver Architecture

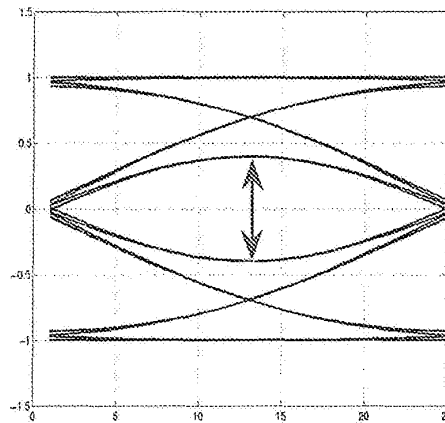


Figure 6. Slicing Detector Performance Determined by the Channel's Eye-Opening or ISI

In the Bluetooth channel environment, however, the received signal has unrecoverable ISI. Channel equalization cannot remove this ISI because of the Gaussian pulse shaping and the congestive Bluetooth channel structure. The congestive channel structure requires a selectivity filter that causes additional ISI and non-linear distortion.

To achieve a significant performance improvement for symbol recovery over the conventional slicing detector, Motorola uses the maximum likelihood sequence estimation (MLSE) for the symbol recovery. MLSE is a packet waveform matching detector that tries all bit patterns of the packet and selects the best bit pattern as the detected packet bits. With MLSE, the ISI is included into its optimization, which makes MLSE an optimal solution for channels with ISI. Because of this key feature, MLSE symbol recovery allows the use of an exceptionally narrow selectivity filter to reject interference and AWGN. The receiver architecture with MLSE is shown in Figure 7.

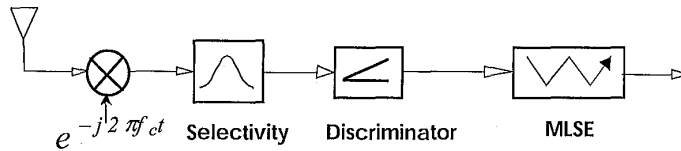


Figure 7. MLSE-Based Receiver Architecture

An intuitive explanation for the MLSE symbol recovery is shown in Figure 8. MLSE symbol recovery looks at the signal transition between two symbols. With Viterbi searching, as each new symbol is received, two surviving paths or two possible packets always remain. As the last symbol is processed, a final packet is chosen from the two.

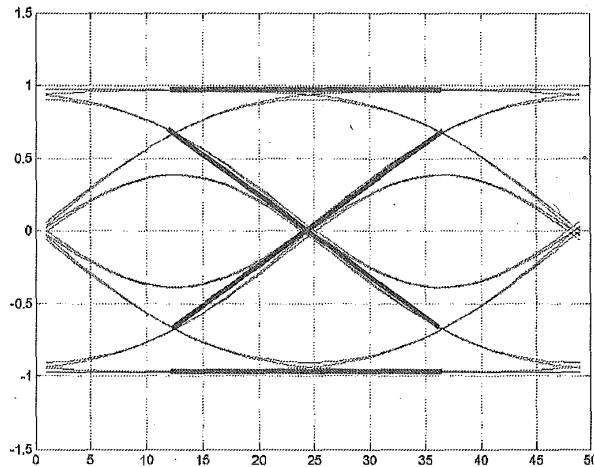


Figure 8. Signal Transition Used in MLSE

The Motorola Bluetooth solution is based on MLSE symbol recovery and includes carrier tracking to compensate for carrier drift over the message transmission.

3 Performance of Motorola's Bluetooth Solution

Figure 9 gives the performance comparison between the MLSE symbol recovery and the conventional slicing symbol recovery in AWGN. It is shown that the MLSE approach gives us at least 5 dB gain in AWGN. Table 1 summarizes the interference rejection performance and comparison with the performance specification of other vendors. It shows that the Motorola Bluetooth solution gives the best interference rejection performance on the market. In terms of user experience, the AGWN performance gain and interference rejection performance can be translated as coverage expansion, capacity increase, and quality improvement of service, as shown in Figure 10.

Performance of Motorola's Bluetooth Solution

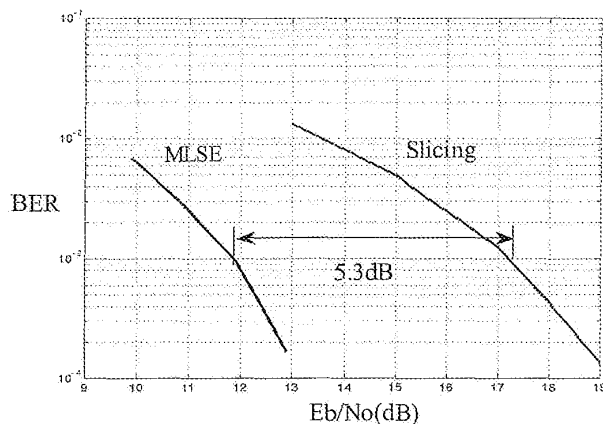
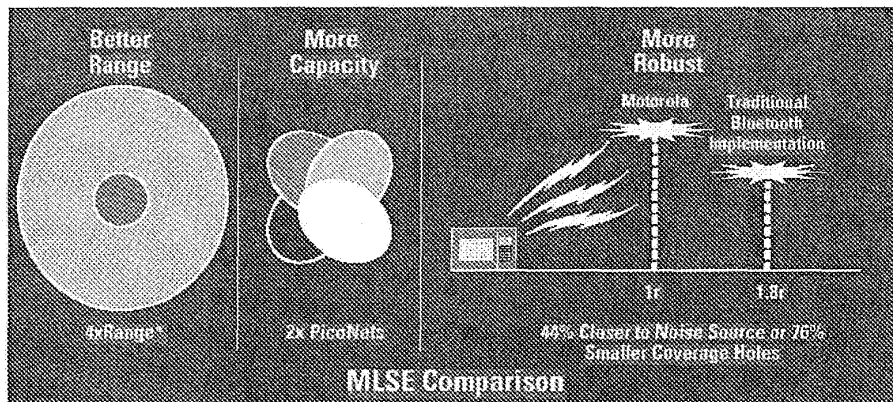


Figure 9. Performance Gain of MLSE Symbol Recovery

Table 1. Summary of Interference Rejection Performance

	Motorola	Vendor A	Vendor B	Vendor C
Co-channel	(7.5 dB)	12 dB	9 dB (10.6 dB)	9 dB
Adjacent Channel	(-10 dB)	4 dB	-6 dB (-4.5 dB)	-2 dB
Sensitivity	(-84 dBm)	-80 dBm	-85 dBm	-72 dBm

() = measured
= specification sheet



* Compared to a Bluetooth Specification V1.1 compliant bit slicing radio

Figure 10. User Experience of the Performance Gain from MLSE versus Traditional Slicing Detector

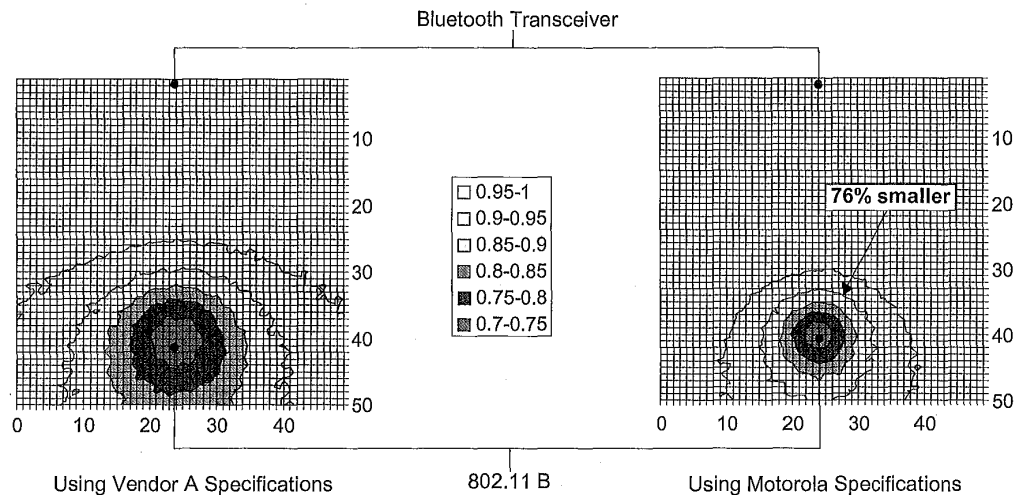


Figure 11. Coverage Map Showing Bluetooth Performance in the Presence of an 802.11 Interferer

Figure 11 shows how the interference rejection numbers in Table 1 impact the link performance of Bluetooth devices under 802.11 interference. The two graphs show Bluetooth packet reliability at various locations using Vendor A and Motorola devices respectively under identical 802.11 interference. It is shown that the Motorola solution provides a significant improvement in reception quality (76% smaller coverage hole). This improvement reveals itself in the form of increased throughput (for data applications) and better voice quality (for audio applications). Meanwhile, the improved Bluetooth performance also reduces the re-transmission for Bluetooth devices, thus further reducing interference to 802.11 devices.

4 Summary

The Motorola Bluetooth solution delivers to the Bluetooth market not only low-cost and low-power devices but also the best interference rejection performance as well.

Motorola has been involved with Bluetooth development since its beginning. Motorola is aware of the challenging issues of interference rejection and coexistence with 802.11. The engineers at Motorola put a heavy emphasis on interference rejection performance into the design of its platform solution.

The joint detection for access code, timing, and carrier provides high reliability and low false-alarm rate for the access code detection. It also provides robust carrier and timing synchronization in the presence of interference. The MLSE symbol recovery with carrier tracking is an optimal solution to message recovery in a Bluetooth channel environment that has unrecoverable ISI. In addition, MLSE symbol recovery also allows using exceptionally narrow selectivity that gives the Motorola solution additional interference rejection.

These sophisticated detection algorithms extend the battery life since they reduce the need for re-transmission. The sensitivity gain can be directly translated into better user experiences including coverage expansion, capacity increase, and quality of service. The reduced re-transmission can also improve the condition of coexistence with 802.11.

Summary

Electronic Acknowledgement Receipt	
EFS ID:	36101937
Application Number:	16185786
International Application Number:	
Confirmation Number:	1022
Title of Invention:	WIRELESS DIGITAL AUDIO MUSIC SYSTEM
First Named Inventor/Applicant Name:	C. Earl Woolfork
Customer Number:	20995
Filer:	Harnik Shukla/Evelyn Salcido
Filer Authorized By:	Harnik Shukla
Attorney Docket Number:	1EWAY.009P1C7
Receipt Date:	23-MAY-2019
Filing Date:	09-NOV-2018
Time Stamp:	17:55:07
Application Type:	Utility under 35 USC 111(a)

Payment information:

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File Listing:					
Document Number	Document Description	File Name	File Size(Bytes)/ Message Digest	Multi Part /.zip	Pages (if appl.)
1		1EWAY_Resp.pdf	3928360	yes	26
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	Multipart Description/PDF files in .zip description		
	Document Description	Start	End
	Amendment/Req. Reconsideration-After Non-Final Reject	1	1
	Claims	2	6
	Applicant summary of interview with examiner	7	7
	Applicant Arguments/Remarks Made in an Amendment	8	26
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PATENT APPLICATION FEE DETERMINATION RECORD Substitute for Form PTO-875				Application or Docket Number 16/185,786		Filing Date 11/09/2018		☐ To be Mailed	
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APPLICATION AS FILED - PART I									
		(Column 1)	(Column 2)						
FOR		NUMBER FILED	NUMBER EXTRA	RATE (\$)		FEE (\$)			
☐ BASIC FEE (37 CFR 1.16(a), (b), or (c))		N/A	N/A	N/A					
☐ SEARCH FEE (37 CFR 1.16(k), (j), or (m))		N/A	N/A	N/A					
☐ EXAMINATION FEE (37 CFR 1.16(o), (p), or (q))		N/A	N/A	N/A					
TOTAL CLAIMS (37 CFR 1.16(i))		minus 20 =	*	x \$100 =					
INDEPENDENT CLAIMS (37 CFR 1.16(h))		minus 3 =	*	x \$460 =					
☐ APPLICATION SIZE FEE (37 CFR 1.16(s))		If the specification and drawings exceed 100 sheets of paper, the application size fee due is \$310 (\$155 for small entity) for each additional 50 sheets or fraction thereof. See 35 U.S.C. 41(a)(1)(G) and 37 CFR 1.16(s).							
☐ MULTIPLE DEPENDENT CLAIM PRESENT (37 CFR 1.16(j))									
* If the difference in column 1 is less than zero, enter "0" in column 2.				TOTAL					
APPLICATION AS AMENDED - PART II									
		(Column 1)		(Column 2)	(Column 3)				
AMENDMENT	05/23/2019	CLAIMS REMAINING AFTER AMENDMENT		HIGHEST NUMBER PREVIOUSLY PAID FOR	PRESENT EXTRA	RATE (\$)		ADDITIONAL FEE (\$)	
	Total (37 CFR 1.16(i))	* 20	Minus	** 20	= 0	x \$100 =		0	
	Independent (37 CFR 1.16(h))	* 3	Minus	*** 3	= 0	x \$460 =		0	
	☐ Application Size Fee (37 CFR 1.16(s))								
	☐ FIRST PRESENTATION OF MULTIPLE DEPENDENT CLAIM (37 CFR 1.16(j))								
						TOTAL ADD'L FEE		0	
		(Column 1)		(Column 2)	(Column 3)				
AMENDMENT		CLAIMS REMAINING AFTER AMENDMENT		HIGHEST NUMBER PREVIOUSLY PAID FOR	PRESENT EXTRA	RATE (\$)		ADDITIONAL FEE (\$)	
	Total (37 CFR 1.16(i))	*	Minus	**	=	x \$0 =			
	Independent (37 CFR 1.16(h))	*	Minus	***	=	x \$0 =			
	☐ Application Size Fee (37 CFR 1.16(s))								
	☐ FIRST PRESENTATION OF MULTIPLE DEPENDENT CLAIM (37 CFR 1.16(j))								
						TOTAL ADD'L FEE			
* If the entry in column 1 is less than the entry in column 2, write "0" in column 3.						LIE			
** If the "Highest Number Previously Paid For" IN THIS SPACE is less than 20, enter "20".						/VINCENT S BUTLER/			
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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
16/185,786	11/09/2018	C. Earl Woolfork	1EWAY.009PIC7	1022
20995	7590	08/09/2019		
KNOBBE MARTENS OLSON & BEAR LLP			EXAMINER	
2040 MAIN STREET			FLANDERS, ANDREW C	
FOURTEENTH FLOOR				
IRVINE, CA 92614			ART UNIT	PAPER NUMBER
			2656	
			NOTIFICATION DATE	DELIVERY MODE
			08/09/2019	ELECTRONIC

Please find below and/or attached an Office communication concerning this application or proceeding.

The time period for reply, if any, is set in the attached communication.

Notice of the Office communication was sent electronically on above-indicated "Notification Date" to the following e-mail address(es):

efiling@knobbe.com
jayna.cartee@knobbe.com

DETAILED ACTION

Notice of Pre-AIA or AIA Status

The present application, filed on or after March 16, 2013, is being examined under the first inventor to file provisions of the AIA.

Response to Arguments

Applicant's arguments filed 23 May 2019 have been fully considered but they are not persuasive.

Applicant's arguments as to the rejections under 35 U.S.C. 112, First and Second paragraph are not persuasive. Applicant has noted that the claimed "mounting unit," has been removed, however it still remains in claims 6 and 15, and is similarly recited in claims 7 and 16. Applicant has further noted that the "said performance" is now directed to "perform at least one of a plurality of demodulations," however, claim 17 still recites "generate a modulated signal based on the performance of the plurality of modulations..."

Applicant's arguments, filed 23 May 2019, with respect to the rejections under 35 U.S.C. 103 have been fully considered and are persuasive. The rejection of the claims under 35 U.S.C. 103 has been withdrawn.

Claim Rejections - 35 USC § 112

The following is a quotation of the first paragraph of 35 U.S.C. 112(a):

(a) IN GENERAL.—The specification shall contain a written description of the invention, and of the manner and process of making and using it, in such full, clear, concise, and exact terms as to enable any person skilled in the art to which it pertains, or with which it

is most nearly connected, to make and use the same, and shall set forth the best mode contemplated by the inventor or joint inventor of carrying out the invention.

The following is a quotation of the first paragraph of pre-AIA 35 U.S.C. 112:

The specification shall contain a written description of the invention, and of the manner and process of making and using it, in such full, clear, concise, and exact terms as to enable any person skilled in the art to which it pertains, or with which it is most nearly connected, to make and use the same, and shall set forth the best mode contemplated by the inventor of carrying out his invention.

The following is a quotation of 35 U.S.C. 112(b):

(b) CONCLUSION.—The specification shall conclude with one or more claims particularly pointing out and distinctly claiming the subject matter which the inventor or a joint inventor regards as the invention.

The following is a quotation of 35 U.S.C. 112 (pre-AIA), second paragraph:

The specification shall conclude with one or more claims particularly pointing out and distinctly claiming the subject matter which the applicant regards as his invention.

Claims 6, 7, and 15 – 20 are rejected under 35 U.S.C. 112(a) or 35 U.S.C. 112 (pre-AIA), first paragraph, as failing to comply with the written description requirement.

The claim(s) contains subject matter which was not described in the specification in such a way as to reasonably convey to one skilled in the relevant art that the inventor or a joint inventor, or for pre-AIA the inventor(s), at the time the application was filed, had possession of the claimed invention.

Claim 6 is further directed “...wherein the mounting unit...”

Applicant’s specification makes no mention of a mounting unit, the mounting unit integrating the speaker, and the mounting unit enabling a user to secure the speaker on to a head of the user. At best, the specification teaches of a headphone, but this falls short of the specific details provided for by claim 6.

Claim 7 is further directed "...a head mounting strap...."

Applicant's specification makes no mention of the mounting unit, a head mounting strap, or the head mounting strap connecting the speaker with another speaker for the opposite ear."

At best, the specification teaches of a headphone, but this falls short of the specific details provided for by claim 7.

Claim 17 further recites "generate a modulated signal based on the performance of the plurality of modulations." The specification as originally filed in the parent/family applications, and in the instant application provide does not provide detail as to a generation of a demodulation signal on the basis of the performance of one of a plurality of modulators. Paragraphs [0013] and [0015] mention optimizing audio receiver performance, and overall system performance, but not in terms of gen of a demodulation signal, nor in terms of said performance of the plurality of demodulators.

Claims 15 and 16 are rejected under the same grounds stated above.

Claims 18 – 20 are dependent upon claim 17, thereby incorporating the limitations at issue, and thus are rejected under the same grounds.

Claims 6, 7, 15 – 20 are rejected under 35 U.S.C. 112(b) or 35 U.S.C. 112 (pre-AIA), second paragraph, as being indefinite for failing to particularly point out and distinctly claim the subject matter which the inventor or a joint inventor, or for pre-AIA the applicant regards as the invention.

Claim 17 recites the limitation “the performance.” There is insufficient antecedent basis for these limitations in the claims.

Claims 6 and 15 recite the limitation “the mounting unit.” There is insufficient antecedent basis for these limitations in the claims.

Claims 7, 16 and 18 – 20 are dependent upon claims 6, 15 and 17, thereby incorporating the limitations at issue, and thus are rejected under the same grounds.

Double Patenting

The nonstatutory double patenting rejection is based on a judicially created doctrine grounded in public policy (a policy reflected in the statute) so as to prevent the unjustified or improper timewise extension of the “right to exclude” granted by a patent and to prevent possible harassment by multiple assignees. A nonstatutory double patenting rejection is appropriate where the conflicting claims are not identical, but at least one examined application claim is not patentably distinct from the reference claim(s) because the examined application claim is either anticipated by, or would have been obvious over, the reference claim(s). See, e.g., *In re Berg*, 140 F.3d 1428, 46

USPQ2d 1226 (Fed. Cir. 1998); *In re Goodman*, 11 F.3d 1046, 29 USPQ2d 2010 (Fed. Cir. 1993); *In re Longi*, 759 F.2d 887, 225 USPQ 645 (Fed. Cir. 1985); *In re Van Ornum*, 686 F.2d 937, 214 USPQ 761 (CCPA 1982); *In re Vogel*, 422 F.2d 438, 164 USPQ 619 (CCPA 1970); *In re Thorington*, 418 F.2d 528, 163 USPQ 644 (CCPA 1969).

A timely filed terminal disclaimer in compliance with 37 CFR 1.321(c) or 1.321(d) may be used to overcome an actual or provisional rejection based on nonstatutory double patenting provided the reference application or patent either is shown to be commonly owned with the examined application, or claims an invention made as a result of activities undertaken within the scope of a joint research agreement. See MPEP § 717.02 for applications subject to examination under the first inventor to file provisions of the AIA as explained in MPEP § 2159. See MPEP §§ 706.02(I)(1) - 706.02(I)(3) for applications not subject to examination under the first inventor to file provisions of the AIA. A terminal disclaimer must be signed in compliance with 37 CFR 1.321(b).

The USPTO Internet website contains terminal disclaimer forms which may be used. Please visit www.uspto.gov/patent/patents-forms. The filing date of the application in which the form is filed determines what form (e.g., PTO/SB/25, PTO/SB/26, PTO/AIA/25, or PTO/AIA/26) should be used. A web-based eTerminal Disclaimer may be filled out completely online using web-screens. An eTerminal Disclaimer that meets all requirements is auto-processed and approved immediately upon submission. For more information about eTerminal Disclaimers, refer to www.uspto.gov/patents/process/file/efs/guidance/eTD-info-I.jsp.

Claims 1 – 20 are rejected on the ground of nonstatutory double patenting as being unpatentable over claims 1 – 12 of U.S. Patent No. 10,129,627. Although the claims at issue are not identical, they are broader than the claims of the '627 patent, and are made obvious by the limitations presented.

Claims 1 – 20 are rejected on the ground of nonstatutory double patenting as being unpatentable over claims 1 – 17 of U.S. Patent No. 9,285,396. Although the claims at issue are not identical, they are broader than the claims of the '396 patent, and are made obvious by the limitations presented.

Claims 1 – 20 are rejected on the ground of nonstatutory double patenting as being unpatentable over claims 1 – 12 of U.S. Patent No. 9,107,000. Although the claims at issue are not identical, they are broader than the claims of the '000 patent, and are made obvious by the limitations presented.

Claims 1 – 20 are rejected on the ground of nonstatutory double patenting as being unpatentable over claims 1 – 10 of U.S. Patent No. 8,131,391. Although the claims at issue are not identical, they are broader than the claims of the '391 patent, and are made obvious by the limitations presented.

Claims 1 – 20 are rejected on the ground of nonstatutory double patenting as being unpatentable over claims 1 – 13 of U.S. Patent No. 7,865,258. Although the

claims at issue are not identical, they are broader than the claims of the '258 patent, and are made obvious by the limitations presented.

Claims 1 – 20 are rejected on the ground of nonstatutory double patenting as being unpatentable over claims 1 – 20 of U.S. Patent No. 7,684,885. Although the claims at issue are not identical, they are broader than the claims of the '885 patent, and are made obvious by the limitations presented.

Claims 1 – 20 are rejected on the ground of nonstatutory double patenting as being unpatentable over claims 1 – 19 of U.S. Patent No. 7,412,294. Although the claims at issue are not identical, they are broader than the claims of the '294 patent, and are made obvious by the limitations presented.

Conclusion

Applicant's amendment necessitated the new ground(s) of rejection presented in this Office action. Accordingly, **THIS ACTION IS MADE FINAL**. See MPEP § 706.07(a). Applicant is reminded of the extension of time policy as set forth in 37 CFR 1.136(a).

A shortened statutory period for reply to this final action is set to expire THREE MONTHS from the mailing date of this action. In the event a first reply is filed within TWO MONTHS of the mailing date of this final action and the advisory action is not mailed until after the end of the THREE-MONTH shortened statutory period, then the shortened statutory period will expire on the date the advisory action is mailed, and any

extension fee pursuant to 37 CFR 1.136(a) will be calculated from the mailing date of the advisory action. In no event, however, will the statutory period for reply expire later than SIX MONTHS from the date of this final action.

Any inquiry concerning this communication or earlier communications from the examiner should be directed to Andrew C Flanders whose telephone number is (571)272-7516. The examiner can normally be reached on M-F 8:30-5:00.

Examiner interviews are available via telephone, in-person, and video conferencing using a USPTO supplied web-based collaboration tool. To schedule an interview, applicant is encouraged to use the USPTO Automated Interview Request (AIR) at <http://www.uspto.gov/interviewpractice>.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Curtis Kuntz can be reached on (571) 272-7499. The fax phone number for the organization where this application or proceeding is assigned is 571-273-8300.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see <http://pair-direct.uspto.gov>. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free). If you would like assistance from a USPTO Customer Service Representative or access to the automated information system, call 800-786-9199 (IN USA OR CANADA) or 571-272-1000.

Application/Control Number: 16/185,786
Art Unit: 2656

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/ANDREW C FLANDERS/
Primary Examiner, Art Unit 2656

Search Notes 	Application/Control No. 16/185,786	Applicant(s)/Patent Under Reexamination Woolfork, C. Earl
	Examiner Andrew C Flanders	Art Unit 2656

CPC - Searched*		
Symbol	Date	Examiner
H04R1/083	2/21/19	acf
H04R2420/07	2/21/19	acf
H04R5/003	2/21/19	acf
H04M1/6066	2/21/19	acf
H04N21/4363, 43637	2/21/19	acf
H04W84/18	2/21/19	acf
H04W88/06	2/21/19	acf
H04H20/95	2/21/19	acf

CPC Combination Sets - Searched*		
Symbol	Date	Examiner

US Classification - Searched*			
Class	Subclass	Date	Examiner

* See search history printout included with this form or the SEARCH NOTES box below to determine the scope of the search.

Search Notes		
Search Notes	Date	Examiner
see history attached	2/21/19	acf
PE2E, EAST and PALM inventor search for double patenting	2/21/19	acf
google.com patents search	2/21/19	acf
reviewed search strategies for parent applications	2/21/19	acf
updated	8/6/19	acf

/ANDREW C FLANDERS/ Primary Examiner, Art Unit 2656	
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<i>Search Notes</i> 	Application/Control No. 16/185,786	Applicant(s)/Patent Under Reexamination Woolfork, C. Earl
	Examiner Andrew C Flanders	Art Unit 2656

Interference Search			
US Class/CPC Symbol	US Subclass/CPC Group	Date	Examiner

/ANDREW C FLANDERS/ Primary Examiner, Art Unit 2656	
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<i>Index of Claims</i> 	Application/Control No. 16/185,786	Applicant(s)/Patent Under Reexamination Woolfork, C. Earl
	Examiner Andrew C Flanders	Art Unit 2656

✓	Rejected
=	Allowed

-	Cancelled
÷	Restricted

N	Non-Elected
I	Interference

A	Appeal
O	Objected

CLAIMS										
☐ Claims renumbered in the same order as presented by applicant ☐ CPA ☐ T.D. ☐ R.1.47										
CLAIM		DATE								
Final	Original	02/21/2019	08/06/2019							
	1	✓	✓							
	2	✓	✓							
	3	✓	✓							
	4	✓	✓							
	5	✓	✓							
	6	✓	✓							
	7	✓	✓							
	8	✓	✓							
	9	✓	✓							
	10	✓	✓							
	11	✓	✓							
	12	✓	✓							
	13	✓	✓							
	14	✓	✓							
	15	✓	✓							
	16	✓	✓							
	17	✓	✓							
	18	✓	✓							
	19	✓	✓							
	20	✓	✓							

EAST Search History

EAST Search History (Prior Art)

Ref #	Hits	Search Query	DBs	Default Operator	Plurals	Time Stamp
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S2	6	S1 and @ad<"20011221"	US-PGPUB; USPAT	OR	OFF	2006/05/02 17:45
S3	0	FHSS with unique adj hop	US-PGPUB; USPAT	OR	OFF	2006/05/02 17:46
S4	0	FHSS with each adj user	US-PGPUB; USPAT	OR	OFF	2006/05/02 17:46
S5	0	FHSS with individual adj user	US-PGPUB; USPAT	OR	OFF	2006/05/02 17:47
S6	0	(FHSS or "frequency hopping spread spectrum") with individual adj user	US-PGPUB; USPAT	OR	OFF	2006/05/02 17:47
S7	0	(FHSS or "frequency hopping spread spectrum") near user same unique	US-PGPUB; USPAT	OR	OFF	2006/05/02 17:47
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S16	1	("6342844").PN.	US- PGPUB; USPAT	OR	OFF	2006/05/03 11:46
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S19	376	"rechargeable battery".ti. and @ad<"20011220"	US- PGPUB; USPAT	OR	OFF	2006/08/28 15:55
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S33	1	("5946343").PN.	US- PGPUB; USPAT	OR	OFF	2006/09/25 09:50
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S38	1	("7,050,419").PN.	US- PGPUB; USPAT	OR	OFF	2007/03/20 09:32
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S76	46	S75 and @ad< "20011120"	US- PGPUB; USPAT	OR	OFF	2007/03/28 16:27
S77	2	(("4970637") or ("5790595")).PN.	US- PGPUB; USPAT	OR	OFF	2007/07/16 09:58
S78	3	(("4970637") or ("5790595") or ("20040223622")).PN.	US- PGPUB; USPAT	OR	OFF	2007/07/16 09:58
S79	3	("2004/0223622").URPN.	USPAT	OR	OFF	2007/07/16 11:25
S80	1	("5771441").PN.	US- PGPUB; USPAT	OR	OFF	2007/07/16 11:25
S81	60	("2236946" "2828413" "2840694" "3080785" "3085460" "3087117" "3296916" "3579211" "3743751" "3781451" "3825666" "3863157" "3901118" "3906160" "4004228" "4229826" "4335930" "4344184" "4369521" "4430757" "4453269" "4464792" "4471493" "4612688" "4647135" "4721926" "4794622" "4845751" "4899388" "4988957" "5025704" "5214568").PN. OR ("5771441").URPN.	US- PGPUB; USPAT; USOCR	OR	OFF	2007/07/16 11:26
S82	2	S81 and cdma	US- PGPUB; USPAT; USOCR	OR	OFF	2007/07/16 11:26
S83	1	("6678892").PN.	US- PGPUB; USPAT	OR	OFF	2008/05/20 11:41
S84	1	("20020072816").PN.	US- PGPUB; USPAT	OR	OFF	2008/05/20 14:24
S85	22	"fuzzy logic" and modulat\$5 and filter and (dpsk "phase shift key")	US- PGPUB; USPAT	OR	OFF	2008/06/06 09:20
S86	0	"455".clas. and "375".clas. and S85	US- PGPUB; USPAT	OR	OFF	2008/06/06 09:21
S87	1	"10100351"	US- PGPUB; USPAT	OR	OFF	2008/06/06 11:49
S88	1	("6,678,892").PN.	US- PGPUB; USPAT	OR	OFF	2008/06/06 12:38
S89	3	("20030021429" "20030076346" "6867820").PN.	US- PGPUB;	OR	OFF	2008/06/06 12:42

			USPAT			
S90	13	("4589134" "4626892" "5042070" "5541638" "5581621" "5631850" "5775939" "6100936" "6195438").PN. OR ("6867820").URPN.	US- PGPUB; USPAT; USOCR	OR	OFF	2008/06/06 12:43
S91	1	"15003242"	US- PGPUB; USPAT; USOCR	OR	OFF	2017/12/10 19:45
S92	9	"10648012"	US- PGPUB; USPAT; USOCR	OR	OFF	2017/12/10 19:48
S93	1481	H04R1/1083.cpc.	US- PGPUB; USPAT; USOCR	OR	OFF	2017/12/10 20:08
S94	3586	H04R2420/07.cpc.	US- PGPUB; USPAT; USOCR	OR	OFF	2017/12/10 20:09
S95	2054	H04R5/033.cpc.	US- PGPUB; USPAT; USOCR	OR	OFF	2017/12/10 20:09
S96	0	H04R1/6066.cpc.	US- PGPUB; USPAT; USOCR	OR	OFF	2017/12/10 20:09
S97	2100	H04M1/6066.cpc.	US- PGPUB; USPAT; USOCR	OR	OFF	2017/12/10 20:10
S98	2	((("6563892") or ("5530929")).PN.	US- PGPUB; USPAT; USOCR	OR	OFF	2018/06/25 12:32
S99	1	("20030118196").PN.	US- PGPUB; USPAT; USOCR	OR	OFF	2018/06/25 12:37
S100	2	"13775754"	US- PGPUB; USPAT; USOCR	OR	OFF	2018/06/25 12:51
S101	1	("7865258").PN.	US- PGPUB; USPAT; USOCR	OR	OFF	2018/06/25 13:31
S102	5	((("7412294") or ("7684885") or ("7865258") or ("8131391") or ("9107000")).PN.	US- PGPUB; USPAT; USOCR	OR	OFF	2018/06/25 13:32
S103	6	((("7412294") or ("7684885") or ("7865258") or ("8131391") or ("9107000") or ("9282396")).PN.	US- PGPUB; USPAT; USOCR	OR	OFF	2018/06/25 13:48
S104	2	S103 and ("20 hz" "20hz" "20 khz"	US-	OR	OFF	2018/06/25

		"20khz").clm.	PGPUB; USPAT; USOCR			13:49
S105	1	"15003242"	US- PGPUB; USPAT; USOCR	OR	OFF	2018/06/25 16:47
S106	1	S105 and (modulate modulation modulator modulating modulates modulated demodulate demodulation demodulator demodulating demodulates demodulated)	US- PGPUB; USPAT; USOCR	OR	OFF	2018/06/25 16:48
S107	1	("9282396").PN.	US- PGPUB; USPAT; USOCR	OR	OFF	2018/08/08 10:22
S108	5	"12940747"	US- PGPUB; USPAT; USOCR	OR	OFF	2018/08/08 10:23
S109	1	"15003424"	US- PGPUB; USPAT; USOCR	OR	OFF	2018/08/08 10:24
S110	1	"15003242"	US- PGPUB; USPAT; USOCR	OR	OFF	2018/08/08 10:24
S111	8	"10027391"	US- PGPUB; USPAT	OR	OFF	2018/09/11 15:05
S112	38	("20khz" "20 khz") and (bluetooth "blue tooth") and @ad<"20011220"	US- PGPUB; USPAT	OR	OFF	2018/09/11 15:57
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S114	19	("44.1") and (bluetooth "blue tooth") and @ad<"20011220"	US- PGPUB; USPAT	OR	OFF	2018/09/11 16:10
S115	0	(09/732044).APP.	USPAT; USOCR	OR	OFF	2018/09/11 16:14
S116	1	("7260221").PN.	US- PGPUB; USPAT; USOCR	OR	OFF	2018/09/11 16:20
S117	1	("20030114109").PN.	US- PGPUB; USPAT; USOCR	OR	OFF	2018/09/11 16:22
S118	1	"15003242"	US- PGPUB; USPAT	OR	OFF	2018/09/11 17:08
S119	6	("20010041056" "20020000831" "20040169665" "5864678" "6021198" "6798447").PN.	US- PGPUB; USPAT; USOCR	OR	OFF	2018/09/11 20:36

S120	12	("20010025358" "20040223622" "5175558" "5771441" "5946343" "6130643" "6342844" "6418558" "6678892" "6982132" "7047474" "7099413").PN.	US-PGPUB; USPAT; USOCR	OR	OFF	2018/09/12 15:57
S121	453	bluetooth and dpsk	US-PGPUB; USPAT; USOCR	OR	OFF	2018/09/12 16:00
S122	13	S121 and @ad< "20011220"	US-PGPUB; USPAT; USOCR	OR	OFF	2018/09/12 16:00
S123	30	bluetooth and dpsk and intersymbol	US-PGPUB; USPAT; USOCR	OR	OFF	2018/09/12 16:03
S124	2	S123 and @ad< "20011220"	US-PGPUB; USPAT; USOCR	OR	OFF	2018/09/12 16:03
S125	3	((("5530929") or ("5970058") or ("6212282")).PN.	US-PGPUB; USPAT; USOCR	OR	OFF	2019/02/21 14:08
S126	0	"16185786"	US-PGPUB; USPAT; USOCR	OR	OFF	2019/02/21 14:17
S127	3	"15003242"	US-PGPUB; USPAT; USOCR	OR	OFF	2019/02/21 14:17
S128	11	"10648012"	US-PGPUB; USPAT; USOCR	OR	OFF	2019/02/21 14:18
S129	10	S128 and intersymbol	US-PGPUB; USPAT; USOCR	OR	OFF	2019/02/21 14:18
S130	10	"10027391"	US-PGPUB; USPAT; USOCR	OR	OFF	2019/02/21 14:20
S131	16	(US-20010025358-\$ or US-20040223622-\$).did. or (US-6130643-\$ or US-6982132-\$ or US-7099413-\$ or US-7047474-\$ or US-6418558-\$ or US-5175558-\$ or US-6317039-\$ or US-5771441-\$ or US-5946343-\$ or US-5491839-\$ or US-6424820-\$ or US-6898585-\$ or US-6781977-\$ or US-5781542-\$).did.	US-PGPUB; USPAT; USOCR	OR	OFF	2019/02/21 16:22
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S136	1	S135 and ((dpsk) (cdma) (bluetooth) (audio))	US- PGPUB; USPAT; USOCR	OR	OFF	2019/02/21 16:50
S137	9	09/612,464	US- PGPUB; USPAT; USOCR	OR	OFF	2019/02/21 16:55
S138	4	cockayne.in. and commerce.ti.	US- PGPUB; USPAT; USOCR	OR	OFF	2019/02/21 16:56
S139	1	(09/842198).APP.	USPAT; USOCR	OR	OFF	2019/02/21 16:56
S140	33	("4926187" "5066957" "5191326" "5451958" "5457808" "5513248" "5548532" "5566022" "5585952" "5606444" "5677909" "5696912" "5734965" "5768683" "5815200" "5892900" "5903548" "5929779" "5948040" "6058106" "6067076" "6118320" "6154298" "6243577" "6259405" "6292651" "6311308" "6324392" "6373399" "6377608" "6405049" "6414635" "6484260").PN.	US- PGPUB; USPAT; USOCR	OR	OFF	2019/02/21 16:56
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S145	1	S144 and ((bluetooth) (spread spectrum) (intersymbol) (keying) (audio) (portable) (cdma))	US- PGPUB; USPAT; USOCR	OR	OFF	2019/02/21 17:20
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S148	1	("20010033621").PN.	US-	OR	OFF	2019/02/21

			PGPUB; USPAT; USOCR			17:22
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S150	1	S148 and ((bluetooth) (spread spectrum) (intersymbol) (keying) (audio) (portable) (cdma) dpsk)	US- PGPUB; USPAT; USOCR	OR	OFF	2019/02/21 17:22
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S153	2	((("9282396") or ("10129627"))).PN.	US- PGPUB; USPAT; USOCR	OR	OFF	2019/02/21 18:45
S154	20	H04B2201/71346.cpc.	US- PGPUB; USPAT; USOCR	OR	OFF	2019/02/21 18:55
S155	4685	H04N21/43637.cpc.	US- PGPUB; USPAT; USOCR	OR	OFF	2019/02/21 18:55
S156	1227	H04N21/4363.cpc.	US- PGPUB; USPAT; USOCR	OR	OFF	2019/02/21 18:55
S157	17440	H04W84/18.cpc.	US- PGPUB; USPAT; USOCR	OR	OFF	2019/02/21 18:55
S158	19830	H04W88/06.cpc.	US- PGPUB; USPAT; USOCR	OR	OFF	2019/02/21 18:56
S159	484	H04H20/95.cpc.	US- PGPUB; USPAT; USOCR	OR	OFF	2019/02/21 18:57

8/ 6/ 2019 3:49:50 PM

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UNITED STATES PATENT AND TRADEMARK OFFICE

USPTO Automated Interview Request (AIR)

Aug 16 2019

This paper requesting to schedule and/or conduct an interview is appropriate because:

This submission is requested to be accepted as an authorization for this interview to communicate via the internet. Recognizing that Internet communications are not secure, I hereby authorize the USPTO to communicate with the undersigned concerning scheduling of the interview via video conference, instant messaging, or electronic mail, and to conduct the interview in accordance with office practice including video conferencing.

Name(s):
Harnik Shukla

S-signature:
/Harnik Shukla/

Registration Number:
73097

U.S. Application Number:
16185786

Confirmation Number:
1022

E-mail Address:
2hzs@knobbe.com

Phone Number:
+1 9497215278

Proposed Time of Interview:
8-27-2019 1:00 PM ET

Preferred Interview Type:
Telephonic

I am the applicant or applicant's representative for this application.

Topic for Discussion:



UNITED STATES
PATENT AND TRADEMARK OFFICE

INFORMATION DISCLOSURE STATEMENT BY APPLICANT <i>(Multiple sheets used when necessary)</i> SHEET 1 OF 3	Application No.	16/185786
	Filing Date	November 9, 2018
	First Named Inventor	C. Earl Woolfork
	Art Unit	2656
	Examiner	Flanders, Andrew C.
	Attorney Docket No.	IEWAY.009PIC7

U.S. PATENT DOCUMENTS						
Examiner Initials	Cite No.	Document Number <i>Number - Kind Code (if known)</i> Example: 1,234,567 B1	Publication Date MM-DD-YYYY	Name	Pages, Columns, Lines Where Relevant Passages or Relevant Figures Appear	
	1	6,563,892 B1	05-13-2003	Haartsen et al.		
	2	5,530,929	05-25-1996	Lindqvist et al.		

FOREIGN PATENT DOCUMENTS						
Examiner Initials	Cite No.	Foreign Patent Document <i>Country Code-Number-Kind Code</i> Example: JP 1234567 A1	Publication Date MM-DD-YYYY	Name	Pages, Columns, Lines Where Relevant Passages or Relevant Figures Appear	T ¹

NON PATENT LITERATURE DOCUMENTS						
Examiner Initials	Cite No.	Include name of the author (in CAPITAL LETTERS), title of the article (when appropriate), title of the item (book, magazine, journal, serial, symposium, catalog, etc.), date, page(s), volume-issue number(s), publisher, city and/or country where published.				T ¹
	3	Petition for Inter Partes Review of U.S. Patent 9,282,396, Sony Corporation v. One-E-Way, Inc., Case No. IPR2016-01638, as filed August 19, 2016, 59 pages.				
	4	Patent Owner One-E-Way's Preliminary Response to Petition for Inter Partes Review of U.S. Patent 9,282,396, Sony Corporation v. One-E-Way, Inc., Case No. IPR2016-01638, as filed November 25, 2016, 20 pages.				
	5	Petitioner's Reply to Patent Owner's Preliminary Response to Petition for Inter Partes Review of U.S. Patent 9,282,396, Sony Corporation v. One-E-Way, Inc., Case No. IPR2016-01638, as filed February 8, 2017, 11 pages.				
	6	Decision Instituting Inter Partes Review of U.S. Patent 9,282,396, Sony Corporation v. One-E-Way, Inc., Case No. IPR2016-01638, as filed February 22, 2017, 19 pages.				
	7	Index to Exhibits, Sony Corporation v. One-E-Way, Inc., Case No. IPR2016-01638, as filed May 22, 2017, 2 pages.				
	8	Patent Owner Response to Petition for Inter Partes Review of U.S. Patent 9,282,396, Sony Corporation v. One-E-Way, Inc., Case No. IPR2016-01638, as filed June 2, 2017, 55 pages.				
	9	Reply in Support of Petition for Inter Partes Review of U.S. Patent 9,282,396, Sony Corporation v. One-E-Way, Inc., Case No. IPR2016-01638, as filed August 25, 2017, 23 pages.				
	10	Record of Oral Hearing Held November 6, 2017, Sony Corporation v. One-E-Way, Inc., Case No. IPR2016-01638 and Case No. IPR2016-01639, November 6, 2017, 71 pages.				
	11	Exhibit 1008 Comparison of 2001 Application Specification and 2003 Application Specification as Originally Filed, Sony Corporation v. One-E-Way, Inc., Case No. IPR2016-01638, 9 pages.				
	12	Exhibit 1009 Comparison of Figures from 2001 Application and 2003 Application as Originally Filed, Sony Corporation v. One-E-Way, Inc., Case No. IPR2016-01638, 3 pages.				
	13	Exhibit 1010 Comparison of 2003 Application Specification as Originally Filed and Issued U.S. Patent No. 7,412,294, Sony Corporation v. One-E-Way, Inc., Case No. IPR2016-01638, 19 pages.				

Examiner Signature	Date Considered
*Examiner: Initial if reference considered, whether or not citation is in conformance with MPEP 609. Draw line through citation if not in conformance and not considered. Include copy of this form with next communication to applicant.	

T¹ - Place a check mark in this area when an English language Translation is attached.

INFORMATION DISCLOSURE STATEMENT BY APPLICANT	Application No.	16/185786
	Filing Date	November 9, 2018
	First Named Inventor	C. Earl Woolfork
	Art Unit	2656
(Multiple sheets used when necessary)	Examiner	Flanders, Andrew C.
SHEET 2 OF 3	Attorney Docket No.	IEWAY.009PIC7

NON PATENT LITERATURE DOCUMENTS			
Examiner Initials	Cite No.	Include name of the author (in CAPITAL LETTERS), title of the article (when appropriate), title of the item (book, magazine, journal, serial, symposium, catalog, etc.), date, page(s), volume-issue number(s), publisher, city and/or country where published.	T ¹
	14	Exhibit 1011 Comparison of 2008 Application Specification and Specification of Patent No. 9,282,396 as Originally Filed, Sony Corporation v. One-E-Way, Inc., Case No. IPR2016-01638, 9 pages.	
	15	Exhibit 1012 John T. Moring August 18, 2016 Signed Declaration, Sony Corporation v. One-E-Way, Inc., Case No. IPR2016-01638, 29 pages.	
	16	Exhibit 1013 Order No. 12: Construing Terms of the Asserted Patents in the matter of CERTAIN CONSUMER ELECTRONICS AND DISPLAY DEVICES WITH GRAPHICS PROCESSING AND GRAPHICS PROCESSING UNITS THEREIN, Sony Corporation v. One-E-Way, Inc., Case No. IPR2016-01638, 49 pages.	
	17	Petitioner's Presentation for Case No. IPR2016-01638 and Case No. IPR2016-01638, Sony Corporation v. One-E-Way, Inc., dated November 6, 2017, 62 pages.	
	18	Patent Owner's Oral Hearing Presentation for Case No. IPR2016-01638, Sony Corporation v. One-E-Way, Inc., dated November 6, 2017, 24 pages.	
	19	Patent Owner's Oral Hearing Presentation for Case No. IPR2016-01639, Sony Corporation v. One-E-Way, Inc., dated November 6, 2017, 18 pages.	
	20	Petition for Inter Partes Review of U.S. Patent 9,282,396, Sony Corporation v. One-E-Way, Inc., Case No. IPR2016-01639, as filed August 19, 2016, 85 pages.	
	21	Patent Owner One-E-Way's Preliminary Response to Petition for Inter Partes Review, Sony Corporation v. One-E-Way, Inc., Case No. IPR2016-01639, as filed November 25, 2016, 70 pages.	
	22	Decision Instituting Inter Partes Review of U.S. Patent 9,282,396, Sony Corporation v. One-E-Way, Inc., Case No. IPR2016-01639, as filed February 22, 2017, 26 pages.	
	23	Index to Exhibits, Sony Corporation v. One-E-Way, Inc., Case No. IPR2016-01639, as filed May 22, 2017, 3 pages.	
	24	Patent Owner's Response to Petition for Inter Partes Review of U.S. Patent 9,282,396, Sony Corporation v. One-E-Way, Inc., Case No. IPR2016-01639, as filed June 2, 2017, 62 pages.	
	25	Reply in Support of Petition for Inter Partes Review of U.S. Patent 9,282,396, Sony Corporation v. One-E-Way, Inc., Case No. IPR2016-01639, as filed August 25, 2017, 24 pages.	
	26	Exhibit 1006 U.S. Patent No. 6,563,892, Sony Corporation v. One-E-Way, Inc., Case No. IPR2016-01639, 17 pages.	
	27	Exhibit 1007 Haartsen Article regarding Bluetooth – The Universal Radio (1998), Sony Corporation v. One-E-Way, Inc., Case No. IPR2016-01639, 10 pages.	
	28	Exhibit 1008 Haartsen, The Bluetooth Radio System (2000), Sony Corporation v. One-E-Way, Inc., Case No. IPR2016-01639, 12 pages.	
	29	Exhibit 1009 Giannakis Article regarding Load-Adaptive MUI ISI-Resilient, Sony Corporation v. One-E-Way, Inc., Case No. IPR2016-01639, 14 pages.	
	30	Exhibit 1013 John Moring August 18, 2016 Signed Declaration, Sony Corporation v. One-E-Way, Inc., Case No. IPR2016-01639, 67 pages.	
	31	Exhibit 1015 Sony Direct Infringement Claim Charts, Sony Corporation v. One-E-Way, Inc., Case No. IPR2016-01639, 140 pages.	

Examiner Signature	Date Considered
*Examiner: Initial if reference considered, whether or not citation is in conformance with MPEP 609. Draw line through citation if not in conformance and not considered. Include copy of this form with next communication to applicant.	

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INFORMATION DISCLOSURE STATEMENT BY APPLICANT <i>(Multiple sheets used when necessary)</i>	Application No.	16/185786
	Filing Date	November 9, 2018
	First Named Inventor	C. Earl Woolfork
	Art Unit	2656
	Examiner	Flanders, Andrew C.
SHEET 3 OF 3	Attorney Docket No.	IEWAY.009PIC7

NON PATENT LITERATURE DOCUMENTS			
Examiner Initials	Cite No.	Include name of the author (in CAPITAL LETTERS), title of the article (when appropriate), title of the item (book, magazine, journal, serial, symposium, catalog, etc.), date, page(s), volume-issue number(s), publisher, city and/or country where published.	T ¹
	32	Exhibit 1017 U.S. Patent No. 5,530,929, Sony Corporation v. One-E-Way, Inc., Case No. IPR2016-01639, 4 pages.	
	33	Exhibit 2001 Joseph C. McAlexander III, P.E., Signed Declaration and CV, Sony Corporation v. One-E-Way, Inc., Case No. IPR2016-01639, 34 pages.	
	34	Exhibit 2002 Zhou Frequency-Hopped Paper, Sony Corporation v. One-E-Way, Inc., Case No. IPR2016-01639, 5 pages.	
	35	Exhibit 2003 Fredman Paper, Sony Corporation v. One-E-Way, Inc., Case No. IPR2016-01639, 6 pages.	
	36	Exhibit 2004 Lee Paper, Sony Corporation v. One-E-Way, Inc., Case No. IPR2016-01639, 7 pages.	
	37	Exhibit 2006 Transcript of Deposition Held May 24, 2017, Sony Corporation v. One-E-Way, Inc., Case No. IPR2016-01639, 98 pages.	
	38	Exhibit 2007 Supplemental Declaration by Joseph C. McAlexander, P.E., Sony Corporation v. One-E-Way, Inc., Case No. IPR2016-01639, 9 pages.	
	39	Petition for Inter Partes Review of U.S. Patent 7,865,258, Sony Corporation v. One-E-Way, Inc., Case No. IPR2018-00216, as filed November 22, 2017, 59 pages.	
	40	Petitioner's Exhibit List, Sony Corporation v. One-E-Way, Inc., Case No. IPR2018-00216, as filed November 22, 2017, 1 page.	
	41	Exhibit 1012 Moring Declaration dated November 21, 2017, Sony Corporation v. One-E-Way, Inc., Case No. IPR2018-00216, 30 pages.	
	42	Petition for Inter Partes Review of U.S. Patent 7,865,258, Sony Corporation v. One-E-Way, Inc., Case No. IPR2018-00217, as filed November 22, 2017, 70 pages.	
	43	Petitioner's Exhibit List, Sony Corporation v. One-E-Way, Inc., Case No. IPR2018-00217, as filed November 22, 2017, 1 page.	
	44	Exhibit 1012 Moring Declaration dated November 17, 2017, Sony Corporation v. One-E-Way, Inc., Case No. IPR2018-00217, 63 pages.	
	45	Petition for Inter Partes Review of U.S. Patent 8,131,391, Sony Corporation v. One-E-Way, Inc., Case No. IPR2018-00218, as filed November 22, 2017, 61 pages.	
	46	Petitioner's Exhibit List, Sony Corporation v. One-E-Way, Inc., Case No. IPR2018-00218, as filed November 22, 2017, 1 page.	
	47	Exhibit 1012 Moring Declaration dated November 21, 2017, Sony Corporation v. One-E-Way, Inc., Case No. IPR2018-00218, 32 pages.	
	48	Petition for Inter Partes Review of U.S. Patent 8,131,391, Sony Corporation v. One-E-Way, Inc., Case No. IPR2018-00219, as filed November 22, 2017, 74 pages.	
	49	Petitioner's Exhibit List, Sony Corporation v. One-E-Way, Inc., Case No. IPR2018-00219, as filed November 22, 2017, 1 page.	
	50	Exhibit 1012 Moring Declaration dated November 17, 2017, Sony Corporation v. One-E-Way, Inc., Case No. IPR2018-00219, 67 pages.	

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Examiner Signature	Date Considered
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Electronic Patent Application Fee Transmittal				
Application Number:		16185786		
Filing Date:		09-Nov-2018		
Title of Invention:		WIRELESS DIGITAL AUDIO MUSIC SYSTEM		
First Named Inventor/Applicant Name:		C. Earl Woolfork		
Filer:		Harnik Shukla/Jenny Kim		
Attorney Docket Number:		1EWAY.009P1C7		
Filed as Large Entity				
Filing Fees for Utility under 35 USC 111(a)				
Description	Fee Code	Quantity	Amount	Sub-Total in USD(\$)
Basic Filing:				
Pages:				
Claims:				
Miscellaneous-Filing:				
Petition:				
Patent-Appeals-and-Interference:				
Post-Allowance-and-Post-Issuance:				
Extension-of-Time:				

Description	Fee Code	Quantity	Amount	Sub-Total in USD(\$)
Miscellaneous:				
SUBMISSION- INFORMATION DISCLOSURE STMT	1806	1	240	240
Total in USD (\$)				240

Electronic Acknowledgement Receipt	
EFS ID:	37092423
Application Number:	16185786
International Application Number:	
Confirmation Number:	1022
Title of Invention:	WIRELESS DIGITAL AUDIO MUSIC SYSTEM
First Named Inventor/Applicant Name:	C. Earl Woolfork
Customer Number:	20995
Filer:	Harnik Shukla/Jenny Kim
Filer Authorized By:	Harnik Shukla
Attorney Docket Number:	1EWAY.009P1C7
Receipt Date:	06-SEP-2019
Filing Date:	09-NOV-2018
Time Stamp:	17:49:11
Application Type:	Utility under 35 USC 111(a)

Payment information:

Submitted with Payment	yes
Payment Type	CARD
Payment was successfully received in RAM	\$ 240
RAM confirmation Number	E201996H53245829
Deposit Account	
Authorized User	
The Director of the USPTO is hereby authorized to charge indicated fees and credit any overpayment as follows:	

File Listing:					
Document Number	Document Description	File Name	File Size(Bytes)/ Message Digest	Multi Part /.zip	Pages (if appl.)
1		1EWAY_IDS.pdf	250113	yes	5
			6d04ddcf1508a2a65c5804c4a90cca1a2a03f396		
	Multipart Description/PDF files in .zip description				
	Document Description		Start	End	
	Transmittal Letter		1	2	
	Information Disclosure Statement (IDS) Form (SB08)		3	5	
Warnings:					
Information:					
2	Fee Worksheet (SB06)	fee-info.pdf	30732	no	2
			c8f85cd7ec23170c8097bae1aef877ce57ac0d56		
Warnings:					
Information:					
Total Files Size (in bytes):			280845		
This Acknowledgement Receipt evidences receipt on the noted date by the USPTO of the indicated documents, characterized by the applicant, and including page counts, where applicable. It serves as evidence of receipt similar to a Post Card, as described in MPEP 503. <u>New Applications Under 35 U.S.C. 111</u> If a new application is being filed and the application includes the necessary components for a filing date (see 37 CFR 1.53(b)-(d) and MPEP 506), a Filing Receipt (37 CFR 1.54) will be issued in due course and the date shown on this Acknowledgement Receipt will establish the filing date of the application. <u>National Stage of an International Application under 35 U.S.C. 371</u> If a timely submission to enter the national stage of an international application is compliant with the conditions of 35 U.S.C. 371 and other applicable requirements a Form PCT/DO/EO/903 indicating acceptance of the application as a national stage submission under 35 U.S.C. 371 will be issued in addition to the Filing Receipt, in due course. <u>New International Application Filed with the USPTO as a Receiving Office</u> If a new international application is being filed and the international application includes the necessary components for an international filing date (see PCT Article 11 and MPEP 1810), a Notification of the International Application Number and of the International Filing Date (Form PCT/RO/105) will be issued in due course, subject to prescriptions concerning national security, and the date shown on this Acknowledgement Receipt will establish the international filing date of the application.					

INFORMATION DISCLOSURE STATEMENT

First Inventor	: C. Earl Woolfork
App. No.	: 16/185786
Filed	: November 9, 2018
For	: WIRELESS DIGITAL AUDIO MUSIC SYSTEM
Examiner	: Flanders, Andrew C.
Art Unit	: 2656
Conf. No.	: 1022

Commissioner for Patents
P.O. Box 1450
Alexandria, VA 22313-1450

References and Listing

Pursuant to 37 CFR 1.56, an Information Disclosure Statement listing references is provided herewith. Listed references are of record in U.S. patent application No. 15/003242, filed January 21, 2016, which is the parent of this Continuation application, and is relied upon for an earlier filing date under 35 USC 120. Copies of the references are not submitted pursuant to 37 CFR 1.98(d).

No Disclaimers

To the extent that anything in the Information Disclosure Statement or the listed references could be construed as a disclaimer of any subject matter supported by the present application, Applicant hereby rescinds and retracts such disclaimer.

Notification of Related Litigation Filing

Submitted herewith in the above-identified application is an Information Disclosure Statement listing references for consideration. These references are being submitted pursuant to MPEP § 2001.06(c) in that U.S. Patent Nos. 9,282,396, 7,865,258, 8,131,391, are currently involved in litigation, namely, *Sony Corporation v. One-E-Way, Inc.*, (IPR2016-01638, IPR2016-01639, IPR2018-00216, IPR2018-00217, IPR2018-00218, and IPR2018-00219). One or more of these patents may be related, or

Application No.: 16/185786
Filing Date: November 9, 2018

claimed as part of the priority claim of the present application, or may claim a priority benefit of applications and patents that are part of the present application's claim for priority under 35 U.S.C. § 120.

To the best of the undersigned's understanding, the references submitted herewith represent documents or document portions that are non-confidential as defined by any protective order governing information exchanged between the parties to the litigation mentioned above.

Timing of Disclosure

This Information Disclosure Statement is being filed after the mailing date of a final action or after the mailing date of a Notice of Allowance. Please place these references in the file in accordance with 37 CFR 1.97(i).

Respectfully submitted,
KNOBBE, MARTENS, OLSON & BEAR, LLP

Dated: September 6, 2019

By: /Harnik Shukla/ _____
Harnik Shukla
Registration No. 73,097
Registered Practitioner
Customer No. 20995
(949) 721-5278

31272549

Doc Code: DIST.E.FILE Document Description: Electronic Terminal Disclaimer - Filed		PTO/SB/26 U.S. Patent and Trademark Office Department of Commerce
Electronic Petition Request	TERMINAL DISCLAIMER TO OBIATE A DOUBLE PATENTING REJECTION OVER A "PRIOR" PATENT	
Application Number	16185786	
Filing Date	09-Nov-2018	
First Named Inventor	C. Woolfork	
Attorney Docket Number	1EWAY.009P1C7	
Title of Invention	WIRELESS DIGITAL AUDIO MUSIC SYSTEM	
☒ Filing of terminal disclaimer does not obviate requirement for response under 37 CFR 1.111 to outstanding Office Action ☒ This electronic Terminal Disclaimer is not being used for a Joint Research Agreement.		
Owner	Percent Interest	
ONE-E-WAY, INC.	100%	
The owner(s) with percent interest listed above in the instant application hereby disclaims, except as provided below, the terminal part of the statutory term of any patent granted on the instant application which would extend beyond the expiration date of the full statutory term of prior patent number(s) 8131391 9107000 9282396 10129627 7412294 7684885 7865258		

as the term of said prior patent is presently shortened by any terminal disclaimer. The owner hereby agrees that any patent so granted on the instant application shall be enforceable only for and during such period that it and the prior patent are commonly owned. This agreement runs with any patent granted on the instant application and is binding upon the grantee, its successors or assigns.

In making the above disclaimer, the owner does not disclaim the terminal part of the term of any patent granted on the instant application that would extend to the expiration date of the full statutory term of the prior patent, "as the term of said prior patent is presently shortened by any terminal disclaimer," in the event that said prior patent later:

- expires for failure to pay a maintenance fee;
- is held unenforceable;
- is found invalid by a court of competent jurisdiction;
- is statutorily disclaimed in whole or terminally disclaimed under 37 CFR 1.321;
- has all claims canceled by a reexamination certificate;
- is reissued; or
- is in any manner terminated prior to the expiration of its full statutory term as presently shortened by any terminal disclaimer.

☒ Terminal disclaimer fee under 37 CFR 1.20(d) is included with Electronic Terminal Disclaimer request.

☐ I certify, in accordance with 37 CFR 1.4(d)(4), that the terminal disclaimer fee under 37 CFR 1.20(d) required for this terminal disclaimer has already been paid in the above-identified application.

Applicant claims the following fee status:

☐ Small Entity

☐ Micro Entity

☒ Regular Undiscounted

I hereby declare that all statements made herein of my own knowledge are true and that all statements made on information and belief are believed to be true; and further that these statements were made with the knowledge that willful false statements and the like so made are punishable by fine or imprisonment, or both, under Section 1001 of Title 18 of the United States Code and that such willful false statements may jeopardize the validity of the application or any patent issued thereon.

THIS PORTION MUST BE COMPLETED BY THE SIGNATORY OR SIGNATORIES

I certify, in accordance with 37 CFR 1.4(d)(4) that I am:

☒ An attorney or agent registered to practice before the Patent and Trademark Office who is of record in this application

Registration Number 73097

☐ A sole inventor

☐ A joint inventor; I certify that I am authorized to sign this submission on behalf of all of the inventors as evidenced by the power of attorney in the application

☐ A joint inventor; all of whom are signing this request

Signature	/Harnik Shukla/
Name	Harnik Shukla

*Statement under 37 CFR 3.73(b) is required if terminal disclaimer is signed by the assignee (owner).
Form PTO/SB/96 may be used for making this certification. See MPEP § 324.

Electronic Patent Application Fee Transmittal				
Application Number:		16185786		
Filing Date:		09-Nov-2018		
Title of Invention:		WIRELESS DIGITAL AUDIO MUSIC SYSTEM		
First Named Inventor/Applicant Name:		C. Earl Woolfork		
Filer:		Harnik Shukla/Wendi Manzanares		
Attorney Docket Number:		1EWAY.009P1C7		
Filed as Large Entity				
Filing Fees for Utility under 35 USC 111(a)				
Description	Fee Code	Quantity	Amount	Sub-Total in USD(\$)
Basic Filing:				
STATUTORY OR TERMINAL DISCLAIMER	1814	1	160	160
Pages:				
Claims:				
Miscellaneous-Filing:				
Petition:				
Patent-Appeals-and-Interference:				
Post-Allowance-and-Post-Issuance:				

Description	Fee Code	Quantity	Amount	Sub-Total in USD(\$)
Extension-of-Time:				
Miscellaneous:				
Total in USD (\$)				160

Doc Code: DISQ.E.FILE

Document Description: Electronic Terminal Disclaimer – Approved

Application No.: 16185786

Filing Date: 09-Nov-2018

Applicant/Patent under Reexamination: Woolfork

Electronic Terminal Disclaimer filed on September 6, 2019

☒ APPROVED

This patent is subject to a terminal disclaimer

☐ DISAPPROVED

Approved/Disapproved by: Electronic Terminal Disclaimer automatically approved by EFS-Web

U.S. Patent and Trademark Office

Electronic Acknowledgement Receipt	
EFS ID:	37094274
Application Number:	16185786
International Application Number:	
Confirmation Number:	1022
Title of Invention:	WIRELESS DIGITAL AUDIO MUSIC SYSTEM
First Named Inventor/Applicant Name:	C. Earl Woolfork
Customer Number:	20995
Filer:	Harnik Shukla/Wendi Manzanares
Filer Authorized By:	Harnik Shukla
Attorney Docket Number:	1EWAY.009P1C7
Receipt Date:	06-SEP-2019
Filing Date:	09-NOV-2018
Time Stamp:	18:52:55
Application Type:	Utility under 35 USC 111(a)

Payment information:

Submitted with Payment	yes
Payment Type	CARD
Payment was successfully received in RAM	\$ 160
RAM confirmation Number	E201996I52536228
Deposit Account	111410
Authorized User	Wendi Manzanares
The Director of the USPTO is hereby authorized to charge indicated fees and credit any overpayment as follows: 37 CFR 1.16 (National application filing, search, and examination fees) 37 CFR 1.17 (Patent application and reexamination processing fees)	

File Listing:					
Document Number	Document Description	File Name	File Size(Bytes)/ Message Digest	Multi Part /.zip	Pages (if appl.)
1	Terminal Disclaimer-Filed (Electronic)	eTerminal-Disclaimer.pdf	35929	no	3
			4a793d3245961e8dbcc1f228ffd3be946d73a924		
Warnings:					
Information:					
2	Fee Worksheet (SB06)	fee-info.pdf	30454	no	2
			023ba7821229d743e689b4c1d7f59121e9ed6cf2		
Warnings:					
Information:					
Total Files Size (in bytes):			66383		
This Acknowledgement Receipt evidences receipt on the noted date by the USPTO of the indicated documents, characterized by the applicant, and including page counts, where applicable. It serves as evidence of receipt similar to a Post Card, as described in MPEP 503. <u>New Applications Under 35 U.S.C. 111</u> If a new application is being filed and the application includes the necessary components for a filing date (see 37 CFR 1.53(b)-(d) and MPEP 506), a Filing Receipt (37 CFR 1.54) will be issued in due course and the date shown on this Acknowledgement Receipt will establish the filing date of the application. <u>National Stage of an International Application under 35 U.S.C. 371</u> If a timely submission to enter the national stage of an international application is compliant with the conditions of 35 U.S.C. 371 and other applicable requirements a Form PCT/DO/EO/903 indicating acceptance of the application as a national stage submission under 35 U.S.C. 371 will be issued in addition to the Filing Receipt, in due course. <u>New International Application Filed with the USPTO as a Receiving Office</u> If a new international application is being filed and the international application includes the necessary components for an international filing date (see PCT Article 11 and MPEP 1810), a Notification of the International Application Number and of the International Filing Date (Form PCT/RO/105) will be issued in due course, subject to prescriptions concerning national security, and the date shown on this Acknowledgement Receipt will establish the international filing date of the application.					



UNITED STATES PATENT AND TRADEMARK OFFICE

UNITED STATES DEPARTMENT OF COMMERCE
United States Patent and Trademark Office
Address: COMMISSIONER FOR PATENTS
P.O. Box 1450
Alexandria, Virginia 22313-1450
www.uspto.gov

NOTICE OF ALLOWANCE AND FEE(S) DUE

20995 7590 09/18/2019
KNOBBE MARTENS OLSON & BEAR LLP
2040 MAIN STREET
FOURTEENTH FLOOR
IRVINE, CA 92614

EXAMINER

FLANDERS, ANDREW C

ART UNIT

PAPER NUMBER

2656

DATE MAILED: 09/18/2019

APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
16/185,786	11/09/2018	C. Earl Woolfork	1EWAY.009P1C7	1022

TITLE OF INVENTION: WIRELESS DIGITAL AUDIO MUSIC SYSTEM

APPLN. TYPE	ENTITY STATUS	ISSUE FEE DUE	PUBLICATION FEE DUE	PREV. PAID ISSUE FEE	TOTAL FEE(S) DUE	DATE DUE
nonprovisional	UNDISCOUNTED	\$1000	\$0.00	\$0.00	\$1000	12/18/2019

THE APPLICATION IDENTIFIED ABOVE HAS BEEN EXAMINED AND IS ALLOWED FOR ISSUANCE AS A PATENT. PROSECUTION ON THE MERITS IS CLOSED. THIS NOTICE OF ALLOWANCE IS NOT A GRANT OF PATENT RIGHTS. THIS APPLICATION IS SUBJECT TO WITHDRAWAL FROM ISSUE AT THE INITIATIVE OF THE OFFICE OR UPON PETITION BY THE APPLICANT. SEE 37 CFR 1.313 AND MPEP 1308.

THE ISSUE FEE AND PUBLICATION FEE (IF REQUIRED) MUST BE PAID WITHIN THREE MONTHS FROM THE MAILING DATE OF THIS NOTICE OR THIS APPLICATION SHALL BE REGARDED AS ABANDONED. THIS STATUTORY PERIOD CANNOT BE EXTENDED. SEE 35 U.S.C. 151. THE ISSUE FEE DUE INDICATED ABOVE DOES NOT REFLECT A CREDIT FOR ANY PREVIOUSLY PAID ISSUE FEE IN THIS APPLICATION. IF AN ISSUE FEE HAS PREVIOUSLY BEEN PAID IN THIS APPLICATION (AS SHOWN ABOVE), THE RETURN OF PART B OF THIS FORM WILL BE CONSIDERED A REQUEST TO REAPPLY THE PREVIOUSLY PAID ISSUE FEE TOWARD THE ISSUE FEE NOW DUE.

HOW TO REPLY TO THIS NOTICE:

I. Review the ENTITY STATUS shown above. If the ENTITY STATUS is shown as SMALL or MICRO, verify whether entitlement to that entity status still applies.

If the ENTITY STATUS is the same as shown above, pay the TOTAL FEE(S) DUE shown above.

If the ENTITY STATUS is changed from that shown above, on PART B - FEE(S) TRANSMITTAL, complete section number 5 titled "Change in Entity Status (from status indicated above)".

For purposes of this notice, small entity fees are 1/2 the amount of undiscounted fees, and micro entity fees are 1/2 the amount of small entity fees.

II. PART B - FEE(S) TRANSMITTAL, or its equivalent, must be completed and returned to the United States Patent and Trademark Office (USPTO) with your ISSUE FEE and PUBLICATION FEE (if required). If you are charging the fee(s) to your deposit account, section "4b" of Part B - Fee(s) Transmittal should be completed and an extra copy of the form should be submitted. If an equivalent of Part B is filed, a request to reapply a previously paid issue fee must be clearly made, and delays in processing may occur due to the difficulty in recognizing the paper as an equivalent of Part B.

III. All communications regarding this application must give the application number. Please direct all communications prior to issuance to Mail Stop ISSUE FEE unless advised to the contrary.

IMPORTANT REMINDER: Maintenance fees are due in utility patents issuing on applications filed on or after Dec. 12, 1980. It is patentee's responsibility to ensure timely payment of maintenance fees when due. More information is available at www.uspto.gov/PatentMaintenanceFees.

PART B - FEE(S) TRANSMITTAL

Complete and send this form, together with applicable fee(s), by mail or fax, or via EFS-Web.

By mail, send to: Mail Stop ISSUE FEE
Commissioner for Patents
P.O. Box 1450
Alexandria, Virginia 22313-1450

By fax, send to: (571)-273-2885

INSTRUCTIONS: This form should be used for transmitting the ISSUE FEE and PUBLICATION FEE (if required). Blocks 1 through 5 should be completed where appropriate. All further correspondence including the Patent, advance orders and notification of maintenance fees will be mailed to the current correspondence address as indicated unless corrected below or directed otherwise in Block 1, by (a) specifying a new correspondence address; and/or (b) indicating a separate "FEE ADDRESS" for maintenance fee notifications.

CURRENT CORRESPONDENCE ADDRESS (Note: Use Block 1 for any change of address)

20995 7590 09/18/2019
KNOBBE MARTENS OLSON & BEAR LLP
2040 MAIN STREET
FOURTEENTH FLOOR
IRVINE, CA 92614

Note: A certificate of mailing can only be used for domestic mailings of the Fee(s) Transmittal. This certificate cannot be used for any other accompanying papers. Each additional paper, such as an assignment or formal drawing, must have its own certificate of mailing or transmission.

Certificate of Mailing or Transmission

I hereby certify that this Fee(s) Transmittal is being deposited with the United States Postal Service with sufficient postage for first class mail in an envelope addressed to the Mail Stop ISSUE FEE address above, or being transmitted to the USPTO via EFS-Web or by facsimile to (571) 273-2885, on the date below.

(Typed or printed name)
(Signature)
(Date)

APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
16/185,786	11/09/2018	C. Earl Woolfork	IEWAY.009P1C7	1022

TITLE OF INVENTION: WIRELESS DIGITAL AUDIO MUSIC SYSTEM

APPLN. TYPE	ENTITY STATUS	ISSUE FEE DUE	PUBLICATION FEE DUE	PREV. PAID ISSUE FEE	TOTAL FEE(S) DUE	DATE DUE
nonprovisional	UNDISCOUNTED	\$1000	\$0.00	\$0.00	\$1000	12/18/2019

EXAMINER	ART UNIT	CLASS-SUBCLASS
FLANDERS, ANDREW C	2656	381-074000

1. Change of correspondence address or indication of "Fee Address" (37 CFR 1.363).

- ☐ Change of correspondence address (or Change of Correspondence Address form PTO/SB/122) attached.
- ☐ "Fee Address" indication (or "Fee Address" Indication form PTO/SB/47; Rev 03-09 or more recent) attached. **Use of a Customer Number is required.**

2. For printing on the patent front page, list

(1) The names of up to 3 registered patent attorneys or agents OR, alternatively,

1 _____

(2) The name of a single firm (having as a member a registered attorney or agent) and the names of up to 2 registered patent attorneys or agents. If no name is listed, no name will be printed.

2 _____

3 _____

3. ASSIGNEE NAME AND RESIDENCE DATA TO BE PRINTED ON THE PATENT (print or type)

PLEASE NOTE: Unless an assignee is identified below, no assignee data will appear on the patent. If an assignee is identified below, the document must have been previously recorded, or filed for recordation, as set forth in 37 CFR 3.11 and 37 CFR 3.81(a). Completion of this form is NOT a substitute for filing an assignment.

(A) NAME OF ASSIGNEE

(B) RESIDENCE: (CITY and STATE OR COUNTRY)

Please check the appropriate assignee category or categories (will not be printed on the patent) : ☐ Individual ☐ Corporation or other private group entity ☐ Government

4a. Fees submitted: ☐ Issue Fee ☐ Publication Fee (if required) ☐ Advance Order - # of Copies _____

4b. Method of Payment: (Please first reapply any previously paid fee shown above)

☐ Electronic Payment via EFS-Web ☐ Enclosed check ☐ Non-electronic payment by credit card (Attach form PTO-2038)

☐ The Director is hereby authorized to charge the required fee(s), any deficiency, or credit any overpayment to Deposit Account No. _____

5. Change in Entity Status (from status indicated above)

- ☐ Applicant certifying micro entity status. See 37 CFR 1.29
- ☐ Applicant asserting small entity status. See 37 CFR 1.27
- ☐ Applicant changing to regular undiscounted fee status.

NOTE: Absent a valid certification of Micro Entity Status (see forms PTO/SB/15A and 15B), issue fee payment in the micro entity amount will not be accepted at the risk of application abandonment.

NOTE: If the application was previously under micro entity status, checking this box will be taken to be a notification of loss of entitlement to micro entity status.

NOTE: Checking this box will be taken to be a notification of loss of entitlement to small or micro entity status, as applicable.

NOTE: This form must be signed in accordance with 37 CFR 1.31 and 1.33. See 37 CFR 1.4 for signature requirements and certifications.

Authorized Signature _____

Date _____

Typed or printed name _____

Registration No. _____



UNITED STATES PATENT AND TRADEMARK OFFICE

UNITED STATES DEPARTMENT OF COMMERCE
United States Patent and Trademark Office
Address: COMMISSIONER FOR PATENTS
P.O. Box 1450
Alexandria, Virginia 22313-1450
www.uspto.gov

APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
16/185,786	11/09/2018	C. Earl Woolfork	1EWAY.009P1C7	1022
20995	7590	09/18/2019	EXAMINER	
KNOBBE MARTENS OLSON & BEAR LLP			FLANDERS, ANDREW C	
2040 MAIN STREET			ART UNIT	
FOURTEENTH FLOOR			PAPER NUMBER	
IRVINE, CA 92614			2656	

DATE MAILED: 09/18/2019

Determination of Patent Term Adjustment under 35 U.S.C. 154 (b) (Applications filed on or after May 29, 2000)

The Office has discontinued providing a Patent Term Adjustment (PTA) calculation with the Notice of Allowance.

Section 1(h)(2) of the AIA Technical Corrections Act amended 35 U.S.C. 154(b)(3)(B)(i) to eliminate the requirement that the Office provide a patent term adjustment determination with the notice of allowance. See Revisions to Patent Term Adjustment, 78 Fed. Reg. 19416, 19417 (Apr. 1, 2013). Therefore, the Office is no longer providing an initial patent term adjustment determination with the notice of allowance. The Office will continue to provide a patent term adjustment determination with the Issue Notification Letter that is mailed to applicant approximately three weeks prior to the issue date of the patent, and will include the patent term adjustment on the patent. Any request for reconsideration of the patent term adjustment determination (or reinstatement of patent term adjustment) should follow the process outlined in 37 CFR 1.705.

Any questions regarding the Patent Term Extension or Adjustment determination should be directed to the Office of Patent Legal Administration at (571)-272-7702. Questions relating to issue and publication fee payments should be directed to the Customer Service Center of the Office of Patent Publication at 1-(888)-786-0101 or (571)-272-4200.

OMB Clearance and PRA Burden Statement for PTOL-85 Part B

The Paperwork Reduction Act (PRA) of 1995 requires Federal agencies to obtain Office of Management and Budget approval before requesting most types of information from the public. When OMB approves an agency request to collect information from the public, OMB (i) provides a valid OMB Control Number and expiration date for the agency to display on the instrument that will be used to collect the information and (ii) requires the agency to inform the public about the OMB Control Number's legal significance in accordance with 5 CFR 1320.5(b).

The information collected by PTOL-85 Part B is required by 37 CFR 1.311. The information is required to obtain or retain a benefit by the public which is to file (and by the USPTO to process) an application. Confidentiality is governed by 35 U.S.C. 122 and 37 CFR 1.14. This collection is estimated to take 30 minutes to complete, including gathering, preparing, and submitting the completed application form to the USPTO. Time will vary depending upon the individual case. Any comments on the amount of time you require to complete this form and/or suggestions for reducing this burden, should be sent to the Chief Information Officer, U.S. Patent and Trademark Office, U.S. Department of Commerce, P.O. Box 1450, Alexandria, Virginia 22313-1450. DO NOT SEND FEES OR COMPLETED FORMS TO THIS ADDRESS. SEND TO: Commissioner for Patents, P.O. Box 1450, Alexandria, Virginia 22313-1450. Under the Paperwork Reduction Act of 1995, no persons are required to respond to a collection of information unless it displays a valid OMB control number.

Privacy Act Statement

The Privacy Act of 1974 (P.L. 93-579) requires that you be given certain information in connection with your submission of the attached form related to a patent application or patent. Accordingly, pursuant to the requirements of the Act, please be advised that: (1) the general authority for the collection of this information is 35 U.S.C. 2(b)(2); (2) furnishing of the information solicited is voluntary; and (3) the principal purpose for which the information is used by the U.S. Patent and Trademark Office is to process and/or examine your submission related to a patent application or patent. If you do not furnish the requested information, the U.S. Patent and Trademark Office may not be able to process and/or examine your submission, which may result in termination of proceedings or abandonment of the application or expiration of the patent.

The information provided by you in this form will be subject to the following routine uses:

1. The information on this form will be treated confidentially to the extent allowed under the Freedom of Information Act (5 U.S.C. 552) and the Privacy Act (5 U.S.C. 552a). Records from this system of records may be disclosed to the Department of Justice to determine whether disclosure of these records is required by the Freedom of Information Act.
2. A record from this system of records may be disclosed, as a routine use, in the course of presenting evidence to a court, magistrate, or administrative tribunal, including disclosures to opposing counsel in the course of settlement negotiations.
3. A record in this system of records may be disclosed, as a routine use, to a Member of Congress submitting a request involving an individual, to whom the record pertains, when the individual has requested assistance from the Member with respect to the subject matter of the record.
4. A record in this system of records may be disclosed, as a routine use, to a contractor of the Agency having need for the information in order to perform a contract. Recipients of information shall be required to comply with the requirements of the Privacy Act of 1974, as amended, pursuant to 5 U.S.C. 552a(m).
5. A record related to an International Application filed under the Patent Cooperation Treaty in this system of records may be disclosed, as a routine use, to the International Bureau of the World Intellectual Property Organization, pursuant to the Patent Cooperation Treaty.
6. A record in this system of records may be disclosed, as a routine use, to another federal agency for purposes of National Security review (35 U.S.C. 181) and for review pursuant to the Atomic Energy Act (42 U.S.C. 218(c)).
7. A record from this system of records may be disclosed, as a routine use, to the Administrator, General Services, or his/her designee, during an inspection of records conducted by GSA as part of that agency's responsibility to recommend improvements in records management practices and programs, under authority of 44 U.S.C. 2904 and 2906. Such disclosure shall be made in accordance with the GSA regulations governing inspection of records for this purpose, and any other relevant (i.e., GSA or Commerce) directive. Such disclosure shall not be used to make determinations about individuals.
8. A record from this system of records may be disclosed, as a routine use, to the public after either publication of the application pursuant to 35 U.S.C. 122(b) or issuance of a patent pursuant to 35 U.S.C. 151. Further, a record may be disclosed, subject to the limitations of 37 CFR 1.14, as a routine use, to the public if the record was filed in an application which became abandoned or in which the proceedings were terminated and which application is referenced by either a published application, an application open to public inspection or an issued patent.
9. A record from this system of records may be disclosed, as a routine use, to a Federal, State, or local law enforcement agency, if the USPTO becomes aware of a violation or potential violation of law or regulation.

Notice of Allowability	Application No. 16/185,786	Applicant(s) Woolfork, C. Earl	
	Examiner Andrew C Flanders	Art Unit 2656	AIA (FITF) Status Yes

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address--

All claims being allowable, PROSECUTION ON THE MERITS IS (OR REMAINS) CLOSED in this application. If not included herewith (or previously mailed), a Notice of Allowance (PTOL-85) or other appropriate communication will be mailed in due course. **THIS NOTICE OF ALLOWABILITY IS NOT A GRANT OF PATENT RIGHTS.** This application is subject to withdrawal from issue at the initiative of the Office or upon petition by the applicant. See 37 CFR 1.313 and MPEP 1308.

1. ☒ This communication is responsive to the interview conducted 03 September 2019.
☐ A declaration(s)/affidavit(s) under **37 CFR 1.130(b)** was/were filed on ____.

2. ☐ An election was made by the applicant in response to a restriction requirement set forth during the interview on ____; the restriction requirement and election have been incorporated into this action.

3. ☒ The allowed claim(s) is/are 1-20. As a result of the allowed claim(s), you may be eligible to benefit from the **Patent Prosecution Highway** program at a participating intellectual property office for the corresponding application. For more information, please see http://www.uspto.gov/patents/init_events/pph/index.jsp or send an inquiry to PPHfeedback@uspto.gov.

4. ☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
Certified copies:
a) ☐ All b) ☐ Some *c) ☐ None of the:
1. ☐ Certified copies of the priority documents have been received.
2. ☐ Certified copies of the priority documents have been received in Application No. ____.
3. ☐ Copies of the certified copies of the priority documents have been received in this national stage application from the International Bureau (PCT Rule 17.2(a)).
* Certified copies not received: ____.

Applicant has THREE MONTHS FROM THE "MAILING DATE" of this communication to file a reply complying with the requirements noted below. Failure to timely comply will result in ABANDONMENT of this application.
THIS THREE-MONTH PERIOD IS NOT EXTENDABLE.

5. ☐ CORRECTED DRAWINGS (as "replacement sheets") must be submitted.
☐ including changes required by the attached Examiner's Amendment / Comment or in the Office action of Paper No./Mail Date ____.

Identifying indicia such as the application number (see 37 CFR 1.84(c)) should be written on the drawings in the front (not the back) of each sheet. Replacement sheet(s) should be labeled as such in the header according to 37 CFR 1.121(d).

6. ☐ DEPOSIT OF and/or INFORMATION about the deposit of BIOLOGICAL MATERIAL must be submitted. Note the attached Examiner's comment regarding REQUIREMENT FOR THE DEPOSIT OF BIOLOGICAL MATERIAL.

Attachment(s)

1. ☐ Notice of References Cited (PTO-892)	5. ☒ Examiner's Amendment/Comment
2. ☒ Information Disclosure Statements (PTO/SB/08), Paper No./Mail Date ____.	6. ☒ Examiner's Statement of Reasons for Allowance
3. ☐ Examiner's Comment Regarding Requirement for Deposit of Biological Material ____.	7. ☐ Other ____.
4. ☒ Interview Summary (PTO-413), Paper No./Mail Date ____.	

/ANDREW C FLANDERS/ Primary Examiner, Art Unit 2656	
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DETAILED ACTION

Notice of Pre-AIA or AIA Status

The present application, filed on or after March 16, 2013, is being examined under the first inventor to file provisions of the AIA.

EXAMINER'S AMENDMENT

An examiner's amendment to the record appears below. Should the changes and/or additions be unacceptable to applicant, an amendment may be filed as provided by 37 CFR 1.312. To ensure consideration of such an amendment, it MUST be submitted no later than the payment of the issue fee.

Authorization for this examiner's amendment was given in an interview with Harnik Shukla on 08 September 2019.

The application has been amended as follows:

1. (Currently Amended) 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:

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;

a digital-to-analog converter (DAC) configured to provide an analog audio output signal corresponding to said audio signal representation;

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;

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;

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

wherein said further processing for reduction of intersymbol interference is separate from said performance of at least one of said plurality of demodulations.

6. (Currently Amended) 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 ~~mounting~~ headphone unit enables a user to secure the speaker on to a head of the user.

7. (Currently Amended) The portable spread spectrum radio receiving of Claim 6, wherein the headphone unit comprises a ~~head-mounting~~ headphone strap that connects the speaker with another speaker for opposite ear.

8. (Currently Amended) 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:

use independent code division multiple access communication and said unique user code to communicate with only said spread spectrum transmitter during a wireless connection;

receive wireless modulation transmissions representative of said audio signal representation;

process said received wireless modulation transmissions for reduction of intersymbol interference;

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;

generate an analog audio output signal corresponding to said audio signal representation; and

output an audio signal corresponding to said analog audio output signal.

15. (Proposed Amendment) The portable spread spectrum radio receiver of Claim 8, further comprising a headphone unit, wherein the headphone unit is configured to integrate the speaker and wherein the ~~mounting~~ headphone unit enables a user to secure the speaker on to a head of the user.

16. (Proposed Amendment) The portable spread spectrum radio receiving of Claim 15, wherein the headphone unit comprises a ~~head-mounting~~ headphone strap that connects the speaker with another speaker for opposite ear.

17. (Currently Amended) 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:

encode a first representation of an audio signal to reduce intersymbol interference associated with a transmitted representation of the audio signal;

perform at least one of a plurality of modulations on the first representation of the audio signal;

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

use the modulated signal and independent code division multiple access communication to wirelessly transmit a transmitted representation of the audio signal.

Allowable Subject Matter

Claims 1 – 20 are allowed.

The following is an examiner's statement of reasons for allowance:

The prior art of record fails to explicitly disclose or make obvious the limitations presented in Applicant's claims 1, 8 and 17. Specifically, in claims 1, 8 and 17, the claimed invention is drawn to a portable audio receiver and/or a portable transmitter wirelessly communicating audio from a music audio source (Fig. 1, 20, 80 and 55). The receiver is depicted as a set of wireless, battery powered headphones (see, for example, paras 5, Fig. 1, element 55). The transmitter is depicted as a portable battery powered transmitter operably connected to the music audio source through the user of a plug/jack configuration (see Fig. 1, elements 20 and 80). The receiver and transmitter, are depicted as being in close proximity, as noted in paras 3, 4, detailing users of the system occupying the same space and improvements over existing systems using wires (wires in headphones indicating close proximity).

Given the above construction of the claimed portable audio transmitter and portable audio receiver and music audio source, the prior art of record fails to explicitly disclose or make obvious the claimed limitations in this particular field.

Further, claim 17 recites generation of a modulated signal based on the performance of the plurality of modulations. The term performance, is intended to be drawn to the operation of the modulators, thus obviating the rejections under 35. U.S.C. 112.

Any comments considered necessary by applicant must be submitted no later than the payment of the issue fee and, to avoid processing delays, should preferably accompany the issue fee. Such submissions should be clearly labeled "Comments on Statement of Reasons for Allowance."

Conclusion

Any inquiry concerning this communication or earlier communications from the examiner should be directed to Andrew C Flanders whose telephone number is (571)272-7516. The examiner can normally be reached on M-F 8:30-5:00.

Examiner interviews are available via telephone, in-person, and video conferencing using a USPTO supplied web-based collaboration tool. To schedule an interview, applicant is encouraged to use the USPTO Automated Interview Request (AIR) at <http://www.uspto.gov/interviewpractice>.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Curtis Kuntz can be reached on (571) 272-7499. The fax phone number for the organization where this application or proceeding is assigned is 571-273-8300.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see <http://pair-direct.uspto.gov>. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free). If you would like assistance from a USPTO Customer Service Representative or access to the automated information system, call 800-786-9199 (IN USA OR CANADA) or 571-272-1000.

/ANDREW C FLANDERS/
Primary Examiner, Art Unit 2656

<i>Applicant-Initiated Interview Summary</i>	Application No. 16/185,786	Applicant(s) Woolfork, C. Earl	
	Examiner Andrew C Flanders	Art Unit 2656	AIA (FITF) Status Yes

All participants (applicant, applicants representative, PTO personnel):

(1) Andrew C. Flanders. (3) ____.

(2) Harnik Shukla. (4) ____.

Date of Interview: 03 September 2019.

Type: ☒ Telephonic ☐ Video Conference
☐ Personal [copy given to: ☐ applicant ☐ applicant's representative]

Exhibit shown or demonstration conducted: ☐ Yes ☐ No.
If Yes, brief description: ____.

Issues Discussed ☐101 ☒112 ☐102 ☐103 ☐Others
(For each of the checked box(es) above, please describe below the issue and detailed description of the discussion)

Claim(s) discussed: 1,6-8 and 15-17.

Identification of prior art discussed: n/a.

Substance of Interview
(For each issue discussed, provide a detailed description and indicate if agreement was reached. Some topics may include: identification or clarification of a reference or a portion thereof, claim interpretation, proposed amendments, arguments of any applied references etc...)

Discussed claims in terms of the rejections under 35 U.S.C. 112. It was agreed that Applicant's drawing was sufficient for the claimed limitations presented in claims 6, 7, 15 and 16. Specifically, the headphones as they are depicted in Fig. 1 show a "strap" type connection between the two side (speaker) elements. Further, it was agreed that the claimed "performance" of the modulators/demodulators should be interpreted as the "operation" of the modulators/demodulators as it was in the other applications in the patent family, and thus is sufficient under 35 U.S.C. 112. Further discussed claims 1, 8 and 17 in terms of claim breadth, in particular, the broad limitations could be construed as a simple cell phone. However, Applicant notes such an interpretation would be unreasonable, and notes that the disclosure and drawings are directed to transmission in the realm of music audio devices and should be interpreted as such. Examiner agreed..

Applicant recordation instructions: The formal written reply to the last Office action must include the substance of the interview. (See MPEP section 713.04). If a reply to the last Office action has already been filed, applicant is given a non-extendable period of the longer of one month or thirty days from this interview date, or the mailing date of this interview summary form, whichever is later, to file a statement of the substance of the interview.

Examiner recordation instructions: Examiners must summarize the substance of any interview of record. A complete and proper recordation of the substance of an interview should include the items listed in MPEP 713.04 for complete and proper recordation including the identification of the general thrust of each argument or issue discussed, a general indication of any other pertinent matters discussed regarding patentability and the general results or outcome of the interview, to include an indication as to whether or not agreement was reached on the issues raised.

☐ Attachment

/ANDREW C FLANDERS/ Primary Examiner, Art Unit 2656	
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Summary of Record of Interview Requirements

Manual of Patent Examining Procedure (MPEP), Section 713.04, Substance of Interview Must be Made of Record

A complete written statement as to the substance of any face-to-face, video conference, or telephone interview with regard to an application must be made of record in the application whether or not an agreement with the examiner was reached at the interview.

Title 37 Code of Federal Regulations (CFR) 1.133 Interviews

Paragraph (b)

In every instance where reconsideration is requested in view of an interview with an examiner, a complete written statement of the reasons presented at the interview as warranting favorable action must be filed by the applicant. An interview does not remove the necessity for reply to Office action as specified in §§ 1.111, 1.135. (35 U.S.C. 132)

37 CFR §1.2 Business to be transacted in writing.

All business with the Patent or Trademark Office should be transacted in writing. The personal attendance of applicants or their attorneys or agents at the Patent and Trademark Office is unnecessary. The action of the Patent and Trademark Office will be based exclusively on the written record in the Office. No attention will be paid to any alleged oral promise, stipulation, or understanding in relation to which there is disagreement or doubt.

The action of the Patent and Trademark Office cannot be based exclusively on the written record in the Office if that record is itself incomplete through the failure to record the substance of interviews.

It is the responsibility of the applicant or the attorney or agent to make the substance of an interview of record in the application file, unless the examiner indicates he or she will do so. It is the examiners responsibility to see that such a record is made and to correct material inaccuracies which bear directly on the question of patentability.

Examiners must complete an Interview Summary Form for each interview held where a matter of substance has been discussed during the interview by checking the appropriate boxes and filling in the blanks. Discussions regarding only procedural matters, directed solely to restriction requirements for which interview recordation is otherwise provided for in Section 812.01 of the Manual of Patent Examining Procedure, or pointing out typographical errors or unreadable script in Office actions or the like, are excluded from the interview recordation procedures below. Where the substance of an interview is completely recorded in an Examiners Amendment, no separate Interview Summary Record is required.

The Interview Summary Form shall be given an appropriate Paper No., placed in the right hand portion of the file, and listed on the "Contents" section of the file wrapper. In a personal interview, a duplicate of the Form is given to the applicant (or attorney or agent) at the conclusion of the interview. In the case of a telephone or video-conference interview, the copy is mailed to the applicants correspondence address either with or prior to the next official communication. If additional correspondence from the examiner is not likely before an allowance or if other circumstances dictate, the Form should be mailed promptly after the interview rather than with the next official communication.

The Form provides for recordation of the following information:

- Application Number (Series Code and Serial Number)
- Name of applicant
- Name of examiner
- Date of interview
- Type of interview (telephonic, video-conference, or personal)
- Name of participant(s) (applicant, attorney or agent, examiner, other PTO personnel, etc.)
- An indication whether or not an exhibit was shown or a demonstration conducted
- An identification of the specific prior art discussed
- An indication whether an agreement was reached and if so, a description of the general nature of the agreement (may be by attachment of a copy of amendments or claims agreed as being allowable). Note: Agreement as to allowability is tentative and does not restrict further action by the examiner to the contrary.
- The signature of the examiner who conducted the interview (if Form is not an attachment to a signed Office action)

It is desirable that the examiner orally remind the applicant of his or her obligation to record the substance of the interview of each case. It should be noted, however, that the Interview Summary Form will not normally be considered a complete and proper recordation of the interview unless it includes, or is supplemented by the applicant or the examiner to include, all of the applicable items required below concerning the substance of the interview.

A complete and proper recordation of the substance of any interview should include at least the following applicable items:

- 1) A brief description of the nature of any exhibit shown or any demonstration conducted,-
- 2) an identification of the claims discussed,
- 3) an identification of the specific prior art discussed,
- 4) an identification of the principal proposed amendments of a substantive nature discussed, unless these are already described on the Interview Summary Form completed by the Examiner,
- 5) a brief identification of the general thrust of the principal arguments presented to the examiner,
(The identification of arguments need not be lengthy or elaborate. A verbatim or highly detailed description of the arguments is not required. The identification of the arguments is sufficient if the general nature or thrust of the principal arguments made to the examiner can be understood in the context of the application file. Of course, the applicant may desire to emphasize and fully describe those arguments which he or she feels were or might be persuasive to the examiner.)
- 6) a general indication of any other pertinent matters discussed, and
- 7) if appropriate, the general results or outcome of the interview unless already described in the Interview Summary Form completed by the examiner.

Examiners are expected to carefully review the applicants record of the substance of an interview. If the record is not complete and accurate, the examiner will give the applicant an extendable one month time period to correct the record.

Examiner to Check for Accuracy

If the claims are allowable for other reasons of record, the examiner should send a letter setting forth the examiners version of the statement attributed to him or her. If the record is complete and accurate, the examiner should place the indication, Interview Record OK on the paper recording the substance of the interview along with the date and the examiners initials.

Search Notes 	Application/Control No. 16/185,786	Applicant(s)/Patent Under Reexamination Woolfork, C. Earl
	Examiner Andrew C Flanders	Art Unit 2656

CPC - Searched*		
Symbol	Date	Examiner
H04R1/083	2/21/19	acf
H04R2420/07	2/21/19	acf
H04R5/003	2/21/19	acf
H04M1/6066	2/21/19	acf
H04N21/4363, 43637	2/21/19	acf
H04W84/18	2/21/19	acf
H04W88/06	2/21/19	acf
H04H20/95	2/21/19	acf
G10L19/167	9/9/19	acf

CPC Combination Sets - Searched*		
Symbol	Date	Examiner

US Classification - Searched*			
Class	Subclass	Date	Examiner

* See search history printout included with this form or the SEARCH NOTES box below to determine the scope of the search.

/ANDREW C FLANDERS/ Primary Examiner, Art Unit 2656	
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<i>Search Notes</i> 	Application/Control No. 16/185,786	Applicant(s)/Patent Under Reexamination Woolfork, C. Earl
	Examiner Andrew C Flanders	Art Unit 2656

Search Notes		
Search Notes	Date	Examiner
see history attached	2/21/19	acf
PE2E, EAST and PALM inventor search for double patenting	2/21/19	acf
google.com patents search	2/21/19	acf
reviewed search strategies for parent applications	2/21/19	acf
updated	8/6/19	acf
updated	9/9/19	acf

Interference Search			
US Class/CPC Symbol	US Subclass/CPC Group	Date	Examiner
H04M1	6066	9/7/19	acf
H04R1	1083	9/7/19	acf
H04R5	033	9/7/19	acf
H04R2420	07	9/7/19	acf
G10L19	167	9/9/19	acf

/ANDREW C FLANDERS/ Primary Examiner, Art Unit 2656	
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Issue Classification 	Application/Control No. 16/185,786	Applicant(s)/Patent Under Reexamination Woolfork, C. Earl
	Examiner Andrew C Flanders	Art Unit 2656

CPC						
Symbol					Type	Version
G10L	/	19	/	167	F	2013-01-01
G10L	/	19	/	005	I	2013-01-01
H04B	/	1	/	707	I	2013-01-01
H04R	/	5	/	00	I	2013-01-01
G10L	/	25	/	33	I	2013-01-01
H04R	/	1	/	1041	I	2013-01-01
H04R	/	3	/	04	I	2013-01-01
H04R	/	2420	/	07	A	2013-01-01
H04L	/	25	/	03006	A	2013-01-01

CPC Combination Sets					
Symbol	Type	Set	Ranking	Version	
/					

NONE		Total Claims Allowed:	
(Assistant Examiner)	(Date)	20	
/ANDREW C FLANDERS/ Primary Examiner, Art Unit 2656	09 September 2019	O.G. Print Claim(s)	O.G. Print Figure
(Primary Examiner)	(Date)	1	1

U.S. Patent and Trademark Office

Part of Paper No.: 20190903

Issue Classification 	Application/Control No. 16/185,786	Applicant(s)/Patent Under Reexamination Woolfork, C. Earl
	Examiner Andrew C Flanders	Art Unit 2656

INTERNATIONAL CLASSIFICATION			
CLAIMED			
G10L19/16	/	19	/
H04R5/00	/	5	/
H04R1/10	/	1	/

NON-CLAIMED			
	/		/

US ORIGINAL CLASSIFICATION	
CLASS	SUBCLASS
700	94

CROSS REFERENCES(S)						
CLASS	SUBCLASS (ONE SUBCLASS PER BLOCK)					

NONE		Total Claims Allowed:	
(Assistant Examiner)	(Date)	20	
/ANDREW C FLANDERS/ Primary Examiner, Art Unit 2656	09 September 2019	O.G. Print Claim(s)	O.G. Print Figure
(Primary Examiner)	(Date)	1	1

Issue Classification 	Application/Control No. 16/185,786	Applicant(s)/Patent Under Reexamination Woolfork, C. Earl
	Examiner Andrew C Flanders	Art Unit 2656

☒ Claims renumbered in the same order as presented by applicant ☐ CPA ☒ T.D. ☐ R.1.47

CLAIMS															
Final	Original	Final	Original	Final	Original	Final	Original	Final	Original	Final	Original	Final	Original	Final	Original
1	1	10	10	19	19										
2	2	11	11	20	20										
3	3	12	12												
4	4	13	13												
5	5	14	14												
6	6	15	15												
7	7	16	16												
8	8	17	17												
9	9	18	18												

NONE	Total Claims Allowed:	
(Assistant Examiner)	(Date)	20
/ANDREW C FLANDERS/ Primary Examiner, Art Unit 2656	09 September 2019	
(Primary Examiner)	(Date)	
		O.G. Print Claim(s)
		O.G. Print Figure
		1
		1

U.S. Patent and Trademark Office

Part of Paper No.: 20190903

<i>Index of Claims</i> 	Application/Control No. 16/185,786	Applicant(s)/Patent Under Reexamination Woolfork, C. Earl
	Examiner Andrew C Flanders	Art Unit 2656

✓	Rejected
=	Allowed

-	Cancelled
÷	Restricted

N	Non-Elected
I	Interference

A	Appeal
O	Objected

CLAIMS										
☒ Claims renumbered in the same order as presented by applicant ☐ CPA ☒ T.D. ☐ R.1.47										
CLAIM		DATE								
Final	Original	02/21/2019	08/06/2019	09/09/2019						
1	1	✓	✓							
2	2	✓	✓	=						
3	3	✓	✓	=						
4	4	✓	✓	=						
5	5	✓	✓	=						
6	6	✓	✓	=						
7	7	✓	✓	=						
8	8	✓	✓	=						
9	9	✓	✓	=						
10	10	✓	✓	=						
11	11	✓	✓	=						
12	12	✓	✓	=						
13	13	✓	✓	=						
14	14	✓	✓	=						
15	15	✓	✓	=						
16	16	✓	✓	=						
17	17	✓	✓	=						
18	18	✓	✓	=						
19	19	✓	✓	=						
20	20	✓	✓	=						

EAST Search History**EAST Search History (Prior Art)**

Ref #	Hits	Search Query	DBs	Default Operator	Plurals	Time Stamp
L2	1	("5530959").PN.	US-PGPUB; USPAT; USOCR	OR	OFF	2019/09/09 16:50
L3	1651	G10L19/167.cpc.	US-PGPUB; USPAT; USOCR	OR	OFF	2019/09/09 17:00
L5	6	"10648012"	USPAT; USOCR	OR	OFF	2019/09/09 17:03
L6	6	"10027391"	USPAT; USOCR	OR	OFF	2019/09/09 17:03
S1	9	FHSS with unique with user	US-PGPUB; USPAT	OR	OFF	2007/03/20 09:30
S2	6	S1 and @ad<"20011221"	US-PGPUB; USPAT	OR	OFF	2006/05/02 17:45
S3	0	FHSS with unique adj hop	US-PGPUB; USPAT	OR	OFF	2006/05/02 17:46
S4	0	FHSS with each adj user	US-PGPUB; USPAT	OR	OFF	2006/05/02 17:46
S5	0	FHSS with individual adj user	US-PGPUB; USPAT	OR	OFF	2006/05/02 17:47
S6	0	(FHSS or "frequency hopping spread spectrum") with individual adj user	US-PGPUB; USPAT	OR	OFF	2006/05/02 17:47
S7	0	(FHSS or "frequency hopping spread spectrum") near user same unique	US-PGPUB; USPAT	OR	OFF	2006/05/02 17:47
S8	9	(FHSS or "frequency hopping spread spectrum") with user same unique	US-PGPUB; USPAT	OR	OFF	2006/05/02 17:48
S9	17	(FHSS or "frequency hopping spread spectrum") same unique same user	US-PGPUB; USPAT	OR	OFF	2006/05/02 17:48
S10	6	S9 and @ad<"20011221"	US-PGPUB; USPAT	OR	OFF	2006/05/02 17:48
S11	9	(FHSS or "frequency hopping spread spectrum") same multiple adj user!	US-PGPUB; USPAT	OR	OFF	2006/05/03 10:32
S12	91	(FHSS or "frequency hopping spread spectrum") same (pn or "hopping code")	US-PGPUB;	OR	OFF	2006/05/02 17:50

			USPAT			
S13	13	(FHSS or "frequency hopping spread spectrum") with ("hopping code")	US-PGPUB; USPAT	OR	OFF	2006/05/02 17:50
S14	3	S13 and @ad<"20011221"	US-PGPUB; USPAT	OR	OFF	2006/05/02 17:51
S15	1	("5946343").PN.	US-PGPUB; USPAT	OR	OFF	2006/05/03 11:46
S16	1	("6342844").PN.	US-PGPUB; USPAT	OR	OFF	2006/05/03 11:46
S17	1	("5771441").PN.	US-PGPUB; USPAT	OR	OFF	2006/08/28 15:55
S18	10725	"rechargeable battery" and @ad<"20011220"	US-PGPUB; USPAT	OR	OFF	2006/08/28 15:55
S19	376	"rechargeable battery".ti. and @ad<"20011220"	US-PGPUB; USPAT	OR	OFF	2006/08/28 15:55
S20	17	("rechargeable battery" and portable).ti. and @ad<"20011220"	US-PGPUB; USPAT	OR	OFF	2006/08/28 15:57
S21	3623043	("rechargeable battery" and portable) with mah andd @ad<"20011220"	US-PGPUB; USPAT	OR	OFF	2006/08/28 15:57
S22	0	("rechargeable battery" and portable) with mah and @ad<"20011220"	US-PGPUB; USPAT	OR	OFF	2006/08/28 15:57
S23	3623041	("rechargeable battery" and portable) with ma-h andd @ad<"20011220"	US-PGPUB; USPAT	OR	OFF	2006/08/28 15:57
S24	3623041	("rechargeable battery" and portable) with "ma-h" andd @ad<"20011220"	US-PGPUB; USPAT	OR	OFF	2006/08/28 15:57
S25	0	("rechargeable battery" and portable) with "ma-h" and @ad<"20011220"	US-PGPUB; USPAT	OR	OFF	2006/08/28 15:57
S26	640693	("rechargeable battery" and portable) with milliamp hours and @ad<"20011220"	US-PGPUB; USPAT	OR	OFF	2006/08/28 15:57
S27	18	("rechargeable battery" and portable) and "milliamp hours" and @ad<"20011220"	US-PGPUB; USPAT	OR	OFF	2006/08/31 12:17
S28	29	"5491839"	US-PGPUB; USPAT	OR	OFF	2006/08/30 12:56
S29	1	("5491839").PN.	US-PGPUB; USPAT	OR	OFF	2006/08/30 12:56
S30	1	("5771441").PN.	US-PGPUB; USPAT	OR	OFF	2006/08/30 12:56
S31	1	("6,107,147").PN.	US-PGPUB;	OR	OFF	2006/08/31 12:17

			USPAT			
S32	0	("10648012").PN.	US-PGPUB; USPAT	OR	OFF	2006/09/25 09:26
S33	1	("5946343").PN.	US-PGPUB; USPAT	OR	OFF	2006/09/25 09:50
S34	422	(455/564.1,412,413).CCLS.	US-PGPUB; USPAT	OR	OFF	2006/09/25 09:50
S35	5294	(375/219,295-297,346,348).CCLS.	US-PGPUB; USPAT	OR	OFF	2006/09/25 10:02
S36	1	("20040223622").PN.	US-PGPUB; USPAT	OR	OFF	2006/09/25 10:04
S37	1	("5946343").PN.	US-PGPUB; USPAT	OR	OFF	2006/09/25 10:05
S38	1	("7,050,419").PN.	US-PGPUB; USPAT	OR	OFF	2007/03/20 09:32
S39	1	("20010025358").PN.	US-PGPUB; USPAT	OR	OFF	2007/03/20 09:37
S40	2618	(375/341,140,147).CCLS.	US-PGPUB; USPAT	OR	OFF	2007/03/20 09:37
S41	1807	S40 and @ad<"20011220"	US-PGPUB; USPAT	OR	OFF	2007/03/20 09:38
S42	8	("2001/0025358").URPN.	USPAT	OR	OFF	2007/03/20 09:51
S43	0	("2002/0025009").URPN.	USPAT	OR	OFF	2007/03/20 09:59
S44	0	("2002/0025009").URPN.	USPAT	OR	OFF	2007/03/20 10:01
S45	12	("20020159543" "5434623" "5867532" "5973642" "6243423" "6327314" "6339612" "6459728" "6477210" "6480554" "6654429" "6671338").PN. OR ("7099413").URPN.	US-PGPUB; USPAT; USOCR	OR	OFF	2007/03/20 10:08
S46	74	"band pass" and demodulator and interleaver and "viterbi decoder"	US-PGPUB; USPAT; USOCR	OR	OFF	2007/03/20 10:08
S47	59	S46 and @ad<"20011220"	US-PGPUB; USPAT; USOCR	OR	OFF	2007/03/20 10:08
S48	17	("4278978" "4635063" "5175558" "5493307").PN. OR ("6130643").URPN.	US-PGPUB; USPAT; USOCR	OR	OFF	2007/03/20 10:15
S49	1	("5175558").PN.	US-PGPUB; USPAT	OR	OFF	2007/03/20 10:16

S50	13	("4651155" "4931977").PN. OR ("5175558").URPN.	US-PGPUB; USPAT; USOCR	OR	OFF	2007/03/20 10:34
S51	1	("5946343").PN.	US-PGPUB; USPAT	OR	OFF	2007/03/20 11:40
S52	7186	(375/295,146,130,340,316,148).CCLS.	US-PGPUB; USPAT	OR	OFF	2007/03/20 11:41
S53	4473	S52 and @ad< "20011220"	US-PGPUB; USPAT	OR	OFF	2007/03/20 11:41
S54	1	("20040223622").PN.	US-PGPUB; USPAT	OR	OFF	2007/03/21 12:11
S55	5	"reed solomon" with "intersymbol interference"	US-PGPUB; USPAT	OR	OFF	2007/03/21 12:13
S56	30	"reed solomon" same "intersymbol interference"	US-PGPUB; USPAT	OR	OFF	2007/03/21 12:13
S57	21	S56 and @ad< "20011220"	US-PGPUB; USPAT	OR	OFF	2007/03/21 12:27
S58	1	("20030045235").PN.	US-PGPUB; USPAT	OR	OFF	2007/03/21 12:37
S59	1	("5790595").PN.	US-PGPUB; USPAT	OR	OFF	2007/03/21 12:37
S60	2435	((375/262,265,341) or (714/794,795)).CCLS.	US-PGPUB; USPAT	OR	OFF	2007/03/24 09:15
S62	56	"375".clas. and "fuzzy logic"	US-PGPUB; USPAT	OR	OFF	2007/03/26 11:04
S64	1	("4970637").PN.	US-PGPUB; USPAT	OR	OFF	2007/03/28 13:46
S65	755	(audio sound music voice) same (a/d "analog to digital") same (lpf "low pass")	US-PGPUB; USPAT	OR	OFF	2007/03/28 13:46
S66	282	(audio sound music voice) with (a/d "analog to digital") with ((lpf "low pass") and "digital")	US-PGPUB; USPAT	OR	OFF	2007/03/28 13:47
S67	227	(audio sound music voice) with (a/d "analog to digital") with ((lpf "low pass") and "digital") and @ad< "20011221"	US-PGPUB; USPAT	OR	OFF	2007/03/28 15:33
S68	34712	"band pass filter" bpf with "direct conversion receiver"	US-PGPUB; USPAT	OR	OFF	2007/03/28 15:33
S69	35	("band pass filter" bpf) with "direct conversion receiver"	US-PGPUB; USPAT	OR	OFF	2007/03/28 15:33
S70	8	S69 and @ad< "20011221"	US-PGPUB;	OR	OFF	2007/03/28 15:55

			USPAT			
S71	1	("20030045235").PN.	US-PGPUB; USPAT	OR	OFF	2007/03/28 16:16
S72	1	("20040223622").PN.	US-PGPUB; USPAT	OR	OFF	2007/03/28 16:20
S73	1	("5946343").PN.	US-PGPUB; USPAT	OR	OFF	2007/03/28 16:27
S74	364	"64-ary"	US-PGPUB; USPAT	OR	OFF	2007/03/28 16:27
S75	74	"64-ary" near modulat\$4	US-PGPUB; USPAT	OR	OFF	2007/03/28 16:27
S76	46	S75 and @ad<"20011120"	US-PGPUB; USPAT	OR	OFF	2007/03/28 16:27
S77	2	((("4970637") or ("5790595")).PN.	US-PGPUB; USPAT	OR	OFF	2007/07/16 09:58
S78	3	((("4970637") or ("5790595") or ("20040223622")).PN.	US-PGPUB; USPAT	OR	OFF	2007/07/16 09:58
S79	3	("2004/0223622").URPN.	USPAT	OR	OFF	2007/07/16 11:25
S80	1	("5771441").PN.	US-PGPUB; USPAT	OR	OFF	2007/07/16 11:25
S81	60	("2236946" "2828413" "2840694" "3080785" "3085460" "3087117" "3296916" "3579211" "3743751" "3781451" "3825666" "3863157" "3901118" "3906160" "4004228" "4229826" "4335930" "4344184" "4369521" "4430757" "4453269" "4464792" "4471493" "4612688" "4647135" "4721926" "4794622" "4845751" "4899388" "4988957" "5025704" "5214568").PN. OR ("5771441").URPN.	US-PGPUB; USPAT; USOCR	OR	OFF	2007/07/16 11:26
S82	2	S81 and cdma	US-PGPUB; USPAT; USOCR	OR	OFF	2007/07/16 11:26
S83	1	("6678892").PN.	US-PGPUB; USPAT	OR	OFF	2008/05/20 11:41
S84	1	("20020072816").PN.	US-PGPUB; USPAT	OR	OFF	2008/05/20 14:24
S85	22	"fuzzy logic" and modulat\$5 and filter and (dpsk "phase shift key")	US-PGPUB; USPAT	OR	OFF	2008/06/06 09:20
S86	0	"455".clas. and "375".clas. and S85	US-PGPUB; USPAT	OR	OFF	2008/06/06 09:21

S87	1	"10100351"	US-PGPUB; USPAT	OR	OFF	2008/06/06 11:49
S88	1	("6,678,892").PN.	US-PGPUB; USPAT	OR	OFF	2008/06/06 12:38
S89	3	("20030021429" "20030076346" "6867820").PN.	US-PGPUB; USPAT	OR	OFF	2008/06/06 12:42
S90	13	("4589134" "4626892" "5042070" "5541638" "5581621" "5631850" "5775939" "6100936" "6195438").PN. OR ("6867820").URPN.	US-PGPUB; USPAT; USOCR	OR	OFF	2008/06/06 12:43
S91	1	"15003242"	US-PGPUB; USPAT; USOCR	OR	OFF	2017/12/10 19:45
S92	9	"10648012"	US-PGPUB; USPAT; USOCR	OR	OFF	2017/12/10 19:48
S93	1481	H04R1/1083.cpc.	US-PGPUB; USPAT; USOCR	OR	OFF	2017/12/10 20:08
S94	3586	H04R2420/07.cpc.	US-PGPUB; USPAT; USOCR	OR	OFF	2017/12/10 20:09
S95	2054	H04R5/033.cpc.	US-PGPUB; USPAT; USOCR	OR	OFF	2017/12/10 20:09
S96	0	H04R1/6066.cpc.	US-PGPUB; USPAT; USOCR	OR	OFF	2017/12/10 20:09
S97	2100	H04M1/6066.cpc.	US-PGPUB; USPAT; USOCR	OR	OFF	2017/12/10 20:10
S98	2	((("6563892") or ("5530929")).PN.	US-PGPUB; USPAT; USOCR	OR	OFF	2018/06/25 12:32
S99	1	("20030118196").PN.	US-PGPUB; USPAT; USOCR	OR	OFF	2018/06/25 12:37
S100	2	"13775754"	US-PGPUB; USPAT; USOCR	OR	OFF	2018/06/25 12:51
S101	1	("7865258").PN.	US-PGPUB; USPAT; USOCR	OR	OFF	2018/06/25 13:31
S102	5	((("7412294") or ("7684885") or	US-	OR	OFF	2018/06/25

		("7865258") or ("8131391") or ("9107000").PN.	PGPUB; USPAT; USOCR			13:32
S103	6	((("7412294") or ("7684885") or ("7865258") or ("8131391") or ("9107000") or ("9282396")).PN.	US- PGPUB; USPAT; USOCR	OR	OFF	2018/06/25 13:48
S104	2	S103 and ("20 hz" "20hz" "20 khz" "20khz").clm.	US- PGPUB; USPAT; USOCR	OR	OFF	2018/06/25 13:49
S105	1	"15003242"	US- PGPUB; USPAT; USOCR	OR	OFF	2018/06/25 16:47
S106	1	S105 and (modulate modulation modulator modulating modulates modulated demodulate demodulation demodulator demodulating demodulates demodulated)	US- PGPUB; USPAT; USOCR	OR	OFF	2018/06/25 16:48
S107	1	("9282396").PN.	US- PGPUB; USPAT; USOCR	OR	OFF	2018/08/08 10:22
S108	5	"12940747"	US- PGPUB; USPAT; USOCR	OR	OFF	2018/08/08 10:23
S109	1	"15003424"	US- PGPUB; USPAT; USOCR	OR	OFF	2018/08/08 10:24
S110	1	"15003242"	US- PGPUB; USPAT; USOCR	OR	OFF	2018/08/08 10:24
S111	8	"10027391"	US- PGPUB; USPAT	OR	OFF	2018/09/11 15:05
S112	38	("20khz" "20 khz") and (bluetooth "blue tooth") and @ad<"20011220"	US- PGPUB; USPAT	OR	OFF	2018/09/11 15:57
S113	3	("20030054827" "20040120341" "6839325").PN.	US- PGPUB; USPAT; USOCR	OR	OFF	2018/09/11 16:05
S114	19	("44.1") and (bluetooth "blue tooth") and @ad<"20011220"	US- PGPUB; USPAT	OR	OFF	2018/09/11 16:10
S115	0	(09/732044).APP.	USPAT; USOCR	OR	OFF	2018/09/11 16:14
S116	1	("7260221").PN.	US- PGPUB; USPAT; USOCR	OR	OFF	2018/09/11 16:20
S117	1	("20030114109").PN.	US- PGPUB; USPAT;	OR	OFF	2018/09/11 16:22

			USOCR			
S118	1	"15003242"	US-PGPUB; USPAT	OR	OFF	2018/09/11 17:08
S119	6	("20010041056" "20020000831" "20040169665" "5864678" "6021198" "6798447").PN.	US-PGPUB; USPAT; USOCR	OR	OFF	2018/09/11 20:36
S120	12	("20010025358" "20040223622" "5175558" "5771441" "5946343" "6130643" "6342844" "6418558" "6678892" "6982132" "7047474" "7099413").PN.	US-PGPUB; USPAT; USOCR	OR	OFF	2018/09/12 15:57
S121	453	bluetooth and dpsk	US-PGPUB; USPAT; USOCR	OR	OFF	2018/09/12 16:00
S122	13	S121 and @ad< "20011220"	US-PGPUB; USPAT; USOCR	OR	OFF	2018/09/12 16:00
S123	30	bluetooth and dpsk and intersymbol	US-PGPUB; USPAT; USOCR	OR	OFF	2018/09/12 16:03
S124	2	S123 and @ad< "20011220"	US-PGPUB; USPAT; USOCR	OR	OFF	2018/09/12 16:03
S125	3	((("5530929") or ("5970058") or ("6212282"))).PN.	US-PGPUB; USPAT; USOCR	OR	OFF	2019/02/21 14:08
S126	0	"16185786"	US-PGPUB; USPAT; USOCR	OR	OFF	2019/02/21 14:17
S127	3	"15003242"	US-PGPUB; USPAT; USOCR	OR	OFF	2019/02/21 14:17
S128	11	"10648012"	US-PGPUB; USPAT; USOCR	OR	OFF	2019/02/21 14:18
S129	10	S128 and intersymbol	US-PGPUB; USPAT; USOCR	OR	OFF	2019/02/21 14:18
S130	10	"10027391"	US-PGPUB; USPAT; USOCR	OR	OFF	2019/02/21 14:20
S131	16	(US-20010025358-\$ or US-20040223622-\$).did. or (US-6130643-\$ or US-6982132-\$ or US-7099413-\$ or US-7047474-\$ or US-6418558-\$ or US-5175558-\$ or US-6317039-\$ or US-5771441-\$ or US-5946343-\$ or US-5491839-\$ or US-	US-PGPUB; USPAT; USOCR	OR	OFF	2019/02/21 16:22

		6424820-\$ or US-6898585-\$ or US-6781977-\$ or US-5781542-\$).did.				
S133	10	("6678892" "6982132" "20040223622" "5491839" "5771441" "5771441" "6418558" "5790595" "5946343" "6342844" "20030045235" "5491839" "5946343").PN.	US-PGPUB; USPAT; USOCR	OR	OFF	2019/02/21 16:24
S134	1	("6,563,892").PN.	US-PGPUB; USPAT; USOCR	OR	OFF	2019/02/21 16:25
S135	1	("20020181415").PN.	US-PGPUB; USPAT; USOCR	OR	OFF	2019/02/21 16:50
S136	1	S135 and ((dpsk) (cdma) (bluetooth) (audio))	US-PGPUB; USPAT; USOCR	OR	OFF	2019/02/21 16:50
S137	9	09/612,464	US-PGPUB; USPAT; USOCR	OR	OFF	2019/02/21 16:55
S138	4	cockayne.in. and commerce.ti.	US-PGPUB; USPAT; USOCR	OR	OFF	2019/02/21 16:56
S139	1	(09/842198).APP.	USPAT; USOCR	OR	OFF	2019/02/21 16:56
S140	33	("4926187" "5066957" "5191326" "5451958" "5457808" "5513248" "5548532" "5566022" "5585952" "5606444" "5677909" "5696912" "5734965" "5768683" "5815200" "5892900" "5903548" "5929779" "5948040" "6058106" "6067076" "6118320" "6154298" "6243577" "6259405" "6292651" "6311308" "6324392" "6373399" "6377608" "6405049" "6414635" "6484260").PN.	US-PGPUB; USPAT; USOCR	OR	OFF	2019/02/21 16:56
S141	4	S140 and cdma	US-PGPUB; USPAT; USOCR	OR	OFF	2019/02/21 16:57
S142	1	(09/842198).APP.	USPAT; USOCR	OR	OFF	2019/02/21 17:15
S143	1	"20050147057".pn.	US-PGPUB; USPAT; USOCR	OR	OFF	2019/02/21 17:18
S144	1	S143 and ((bluetooth) (spread spectrum) (intersymbol) (keying) (audio) (portable) (cdma))	US-PGPUB; USPAT; USOCR	OR	OFF	2019/02/21 17:18
S145	1	S144 and ((bluetooth) (spread spectrum) (intersymbol) (keying) (audio) (portable) (cdma))	US-PGPUB; USPAT; USOCR	OR	OFF	2019/02/21 17:20
S146	1	"6563892".pn. and ((bluetooth) (spread	US-	OR	OFF	2019/02/21

		spectrum) (intersymbol) (keying) (audio) (portable) (cdma))	PGPUB; USPAT; USOCR			17:20
S147	0	("US20010033621A1").PN.	US-PGPUB; USPAT; USOCR	OR	OFF	2019/02/21 17:22
S148	1	("20010033621").PN.	US-PGPUB; USPAT; USOCR	OR	OFF	2019/02/21 17:22
S149	1	S148 and ((bluetooth) (spread spectrum) (intersymbol) (keying) (audio) (portable) (cdma))	US-PGPUB; USPAT; USOCR	OR	OFF	2019/02/21 17:22
S150	1	S148 and ((bluetooth) (spread spectrum) (intersymbol) (keying) (audio) (portable) (cdma) dpsk)	US-PGPUB; USPAT; USOCR	OR	OFF	2019/02/21 17:22
S151	1	("5,673,291").PN.	US-PGPUB; USPAT; USOCR	OR	OFF	2019/02/21 17:28
S152	2	((("9285396") or ("10129627"))).PN.	US-PGPUB; USPAT; USOCR	OR	OFF	2019/02/21 18:43
S153	2	((("9282396") or ("10129627"))).PN.	US-PGPUB; USPAT; USOCR	OR	OFF	2019/02/21 18:45
S154	20	H04B2201/71346.cpc.	US-PGPUB; USPAT; USOCR	OR	OFF	2019/02/21 18:55
S155	4685	H04N21/43637.cpc.	US-PGPUB; USPAT; USOCR	OR	OFF	2019/02/21 18:55
S156	1227	H04N21/4363.cpc.	US-PGPUB; USPAT; USOCR	OR	OFF	2019/02/21 18:55
S157	17440	H04W84/18.cpc.	US-PGPUB; USPAT; USOCR	OR	OFF	2019/02/21 18:55
S158	19830	H04W88/06.cpc.	US-PGPUB; USPAT; USOCR	OR	OFF	2019/02/21 18:56
S159	484	H04H20/95.cpc.	US-PGPUB; USPAT; USOCR	OR	OFF	2019/02/21 18:57
S160	1	"16185786"	US-PGPUB; USPAT; USOCR	OR	OFF	2019/08/06 15:37

S161	1	"16185786"	US-PGPUB; USPAT	OR	OFF	2019/09/03 13:48
S162	12	"10648012"	US-PGPUB; USPAT	OR	OFF	2019/09/03 13:49
S163	1	("7165998").PN.	US-PGPUB; USPAT; USOCR	OR	OFF	2019/09/03 14:44
S164	69	"6603801"	US-PGPUB; USPAT; USOCR	OR	OFF	2019/09/03 14:45
S165	3	((("6603801") or ("6678310") or ("6563858")).PN.	US-PGPUB; USPAT; USOCR	OR	OFF	2019/09/03 14:46
S166	0	(09/231228).APP.	US-PGPUB; USOCR	OR	OFF	2019/09/03 14:46
S167	0	S165 and (spread spreads spreading) and (modulate modulating modulation modulated modulates demodulate demodulating demodulation demodulated demodulates) and dpsk	US-PGPUB; USOCR	OR	OFF	2019/09/03 14:47
S168	0	S165 and (spread spreads spreading) and (modulate modulating modulation modulated modulates demodulate demodulating demodulation demodulated demodulates)	US-PGPUB; USOCR	OR	OFF	2019/09/03 14:48
S169	0	S165 and (spread spreads spreading)	US-PGPUB; USOCR	OR	OFF	2019/09/03 14:49
S170	3	S165 and (spread spreads spreading) and (modulate modulating modulation modulated modulates demodulate demodulating demodulation demodulated demodulates) and dpsk	US-PGPUB; USPAT; USOCR	OR	OFF	2019/09/03 14:49
S171	3	S170 and (intersymbol isi)	US-PGPUB; USPAT; USOCR	OR	OFF	2019/09/03 14:49
S172	533	portable and (spread spreads spreading) and (modulate modulating modulation modulated modulates demodulate demodulating demodulation demodulated demodulates) and dpsk	US-PGPUB; USPAT; USOCR	OR	OFF	2019/09/05 13:40
S173	51	S172 and (intersymbol isi)	US-PGPUB; USPAT; USOCR	OR	OFF	2019/09/05 13:41
S174	8	S173 and @ad< "20011221"	US-PGPUB; USPAT; USOCR	OR	OFF	2019/09/05 13:41
S175	13	((("5,515,396") or ("5,535,239") or ("5,416,797") or ("5,309,474") or ("5,103,459") or ("5,774,504") or	US-PGPUB; USPAT;	OR	OFF	2019/09/05 13:45

		("5,841,819") or ("5,844,741") or ("4,545,054") or ("4,346,473") or ("5,482,807") or ("5,982,807") or ("6,535,554")).PN.	USOCR			
S176	3	((("6603801") or ("6678310") or ("6563858")).PN.	US-PGPUB; USPAT; USOCR	OR	OFF	2019/09/05 13:55
S177	3	S176 and (spread spreads spreading) and (modulate modulating modulation modulated modulates demodulate demodulating demodulation demodulated demodulates) and dpsk	US-PGPUB; USPAT; USOCR	OR	OFF	2019/09/05 13:55
S178	3	S177 and (intersymbol isi)	US-PGPUB; USPAT; USOCR	OR	OFF	2019/09/05 13:55
S179	3	S178 and cdma	US-PGPUB; USPAT; USOCR	OR	OFF	2019/09/05 13:55
S180	1	S174 and cdma	US-PGPUB; USPAT; USOCR	OR	OFF	2019/09/05 14:04
S181	830020	S174 and code codes	US-PGPUB; USPAT; USOCR	OR	OFF	2019/09/05 14:05
S182	830019	S174 and 9code codes	US-PGPUB; USPAT; USOCR	OR	OFF	2019/09/05 14:05
S183	3	S174 and (code codes)	US-PGPUB; USPAT; USOCR	OR	OFF	2019/09/05 14:05
S184	3	S179 and (code codes)	US-PGPUB; USPAT; USOCR	OR	OFF	2019/09/05 14:06
S186	1	"16185786"	US-PGPUB; USPAT	OR	OFF	2019/09/06 17:16
S187	1	S186 and (headphone headphones)	US-PGPUB; USPAT	OR	OFF	2019/09/06 17:16

9/ 9/ 2019 5:06:08 PM

C:\Users\aflanders\Documents\EAST\Workspaces\10648012.wsp

PTO/SB/08 Equivalent

INFORMATION DISCLOSURE STATEMENT BY APPLICANT	Application No.	16/185786	
	Filing Date	November 9, 2018	
	First Named Inventor	C. Earl Woolfork	
	Art Unit	2656	
(Multiple sheets used when necessary)		Examiner	Flanders, Andrew C.
SHEET 1 OF 3		Attorney Docket No.	IEWAY.009PIC7

U.S. PATENT DOCUMENTS					
Examiner Initials	Cite No.	Document Number <i>Number - Kind Code (if known)</i> Example: 1,234,567 B1	Publication Date MM-DD-YYYY	Name	Pages, Columns, Lines Where Relevant Passages or Relevant Figures Appear
	1	6,563,892 B1	05-13-2003	Haartsen et al.	
	2	5,530,929	05-25-1996	Lindqvist et al.	

FOREIGN PATENT DOCUMENTS						
Examiner Initials	Cite No.	Foreign Patent Document <i>Country Code-Number-Kind Code</i> Example: JP 1234567 A1	Publication Date MM-DD-YYYY	Name	Pages, Columns, Lines Where Relevant Passages or Relevant Figures Appear	T ¹

NON PATENT LITERATURE DOCUMENTS			
Examiner Initials	Cite No.	Include name of the author (in CAPITAL LETTERS), title of the article (when appropriate), title of the item (book, magazine, journal, serial, symposium, catalog, etc.), date, page(s), volume-issue number(s), publisher, city and/or country where published.	T ¹
	3	Petition for Inter Partes Review of U.S. Patent 9,282,396, Sony Corporation v. One-E-Way, Inc., Case No. IPR2016-01638, as filed August 19, 2016, 59 pages.	
	4	Patent Owner One-E-Way's Preliminary Response to Petition for Inter Partes Review of U.S. Patent 9,282,396, Sony Corporation v. One-E-Way, Inc., Case No. IPR2016-01638, as filed November 25, 2016, 20 pages.	
	5	Petitioner's Reply to Patent Owner's Preliminary Response to Petition for Inter Partes Review of U.S. Patent 9,282,396, Sony Corporation v. One-E-Way, Inc., Case No. IPR2016-01638, as filed February 8, 2017, 11 pages.	
	6	Decision Instituting Inter Partes Review of U.S. Patent 9,282,396, Sony Corporation v. One-E-Way, Inc., Case No. IPR2016-01638, as filed February 22, 2017, 19 pages.	
	7	Index to Exhibits, Sony Corporation v. One-E-Way, Inc., Case No. IPR2016-01638, as filed May 22, 2017, 2 pages.	
	8	Patent Owner Response to Petition for Inter Partes Review of U.S. Patent 9,282,396, Sony Corporation v. One-E-Way, Inc., Case No. IPR2016-01638, as filed June 2, 2017, 55 pages.	
	9	Reply in Support of Petition for Inter Partes Review of U.S. Patent 9,282,396, Sony Corporation v. One-E-Way, Inc., Case No. IPR2016-01638, as filed August 25, 2017, 23 pages.	
	10	Record of Oral Hearing Held November 6, 2017, Sony Corporation v. One-E-Way, Inc., Case No. IPR2016-01638 and Case No. IPR2016-01639, November 6, 2017, 71 pages.	
	11	Exhibit 1008 Comparison of 2001 Application Specification and 2003 Application Specification as Originally Filed, Sony Corporation v. One-E-Way, Inc., Case No. IPR2016-01638, 9 pages.	
	12	Exhibit 1009 Comparison of Figures from 2001 Application and 2003 Application as Originally Filed, Sony Corporation v. One-E-Way, Inc., Case No. IPR2016-01638, 3 pages.	
	13	Exhibit 1010 Comparison of 2003 Application Specification as Originally Filed and Issued U.S. Patent No. 7,412,294, Sony Corporation v. One-E-Way, Inc., Case No. IPR2016-01638, 19 pages.	

Examiner Signature /ANDREW C FLANDERS/	Date Considered 09/09/2019
*Examiner: Initial if reference considered, whether or not citation is in conformance with MPEP 609. Draw line through citation if not in conformance and not considered. Include copy of this form with next communication to applicant. ~~ALL REFERENCES CONSIDERED EXCEPT WHERE LINED THROUGH. /A.C.F/~~	

T¹ - Place a check mark in this area when an English language Translation is attached.

PTO/SB/08 Equivalent

INFORMATION DISCLOSURE STATEMENT BY APPLICANT	Application No.	16/185786
	Filing Date	November 9, 2018
	First Named Inventor	C. Earl Woolfork
	Art Unit	2656
(Multiple sheets used when necessary)	Examiner	Flanders, Andrew C.
SHEET 2 OF 3	Attorney Docket No.	IEWAY.009PIC7

NON PATENT LITERATURE DOCUMENTS			
Examiner Initials	Cite No.	Include name of the author (in CAPITAL LETTERS), title of the article (when appropriate), title of the item (book, magazine, journal, serial, symposium, catalog, etc.), date, page(s), volume-issue number(s), publisher, city and/or country where published.	T ¹
	14	Exhibit 1011 Comparison of 2008 Application Specification and Specification of Patent No. 9,282,396 as Originally Filed, Sony Corporation v. One-E-Way, Inc., Case No. IPR2016-01638, 9 pages.	
	15	Exhibit 1012 John T. Moring August 18, 2016 Signed Declaration, Sony Corporation v. One-E-Way, Inc., Case No. IPR2016-01638, 29 pages.	
	16	Exhibit 1013 Order No. 12: Construing Terms of the Asserted Patents in the matter of CERTAIN CONSUMER ELECTRONICS AND DISPLAY DEVICES WITH GRAPHICS PROCESSING AND GRAPHICS PROCESSING UNITS THEREIN, Sony Corporation v. One-E-Way, Inc., Case No. IPR2016-01638, 49 pages.	
	17	Petitioner's Presentation for Case No. IPR2016-01638 and Case No. IPR2016-01638, Sony Corporation v. One-E-Way, Inc., dated November 6, 2017, 62 pages.	
	18	Patent Owner's Oral Hearing Presentation for Case No. IPR2016-01638, Sony Corporation v. One-E-Way, Inc., dated November 6, 2017, 24 pages.	
	19	Patent Owner's Oral Hearing Presentation for Case No. IPR2016-01639, Sony Corporation v. One-E-Way, Inc., dated November 6, 2017, 18 pages.	
	20	Petition for Inter Partes Review of U.S. Patent 9,282,396, Sony Corporation v. One-E-Way, Inc., Case No. IPR2016-01639, as filed August 19, 2016, 85 pages.	
	21	Patent Owner One-E-Way's Preliminary Response to Petition for Inter Partes Review, Sony Corporation v. One-E-Way, Inc., Case No. IPR2016-01639, as filed November 25, 2016, 70 pages.	
	22	Decision Instituting Inter Partes Review of U.S. Patent 9,282,396, Sony Corporation v. One-E-Way, Inc., Case No. IPR2016-01639, as filed February 22, 2017, 26 pages.	
	23	Index to Exhibits, Sony Corporation v. One-E-Way, Inc., Case No. IPR2016-01639, as filed May 22, 2017, 3 pages.	
	24	Patent Owner's Response to Petition for Inter Partes Review of U.S. Patent 9,282,396, Sony Corporation v. One-E-Way, Inc., Case No. IPR2016-01639, as filed June 2, 2017, 62 pages.	
	25	Reply in Support of Petition for Inter Partes Review of U.S. Patent 9,282,396, Sony Corporation v. One-E-Way, Inc., Case No. IPR2016-01639, as filed August 25, 2017, 24 pages.	
	26	Exhibit 1006 U.S. Patent No. 6,563,892, Sony Corporation v. One-E-Way, Inc., Case No. IPR2016-01639, 17 pages.	
	27	Exhibit 1007 Haartsen Article regarding Bluetooth – The Universal Radio (1998), Sony Corporation v. One-E-Way, Inc., Case No. IPR2016-01639, 10 pages.	
	28	Exhibit 1008 Haartsen, The Bluetooth Radio System (2000), Sony Corporation v. One-E-Way, Inc., Case No. IPR2016-01639, 12 pages.	
	29	Exhibit 1009 Giannakis Article regarding Load-Adaptive MUI ISI-Resilient, Sony Corporation v. One-E-Way, Inc., Case No. IPR2016-01639, 14 pages.	
	30	Exhibit 1013 John Moring August 18, 2016 Signed Declaration, Sony Corporation v. One-E-Way, Inc., Case No. IPR2016-01639, 67 pages.	
	31	Exhibit 1015 Sony Direct Infringement Claim Charts, Sony Corporation v. One-E-Way, Inc., Case No. IPR2016-01639, 140 pages.	

Examiner Signature	/ANDREW C FLANDERS/	Date Considered	09/09/2019
*Examiner: Initial if reference considered, whether or not citation is in conformance with MPEP 609. Draw line through citation if not in conformance and not considered. Include copy of this form with next communication to applicant. ~~ALL REFERENCES CONSIDERED EXCEPT WHERE LINED THROUGH. /A.C.F./~~			

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PTO/SB/08 Equivalent

INFORMATION DISCLOSURE STATEMENT BY APPLICANT	Application No.	16/185786
	Filing Date	November 9, 2018
	First Named Inventor	C. Earl Woolfork
	Art Unit	2656
(Multiple sheets used when necessary)	Examiner	Flanders, Andrew C.
SHEET 3 OF 3	Attorney Docket No.	IEWAY.009PIC7

NON PATENT LITERATURE DOCUMENTS			
Examiner Initials	Cite No.	Include name of the author (in CAPITAL LETTERS), title of the article (when appropriate), title of the item (book, magazine, journal, serial, symposium, catalog, etc.), date, page(s), volume-issue number(s), publisher, city and/or country where published.	T ¹
	32	Exhibit 1017 U.S. Patent No. 5,530,929, Sony Corporation v. One-E-Way, Inc., Case No. IPR2016-01639, 4 pages.	
	33	Exhibit 2001 Joseph C. McAlexander III, P.E., Signed Declaration and CV, Sony Corporation v. One-E-Way, Inc., Case No. IPR2016-01639, 34 pages.	
	34	Exhibit 2002 Zhou Frequency-Hopped Paper, Sony Corporation v. One-E-Way, Inc., Case No. IPR2016-01639, 5 pages.	
	35	Exhibit 2003 Fredman Paper, Sony Corporation v. One-E-Way, Inc., Case No. IPR2016-01639, 6 pages.	
	36	Exhibit 2004 Lee Paper, Sony Corporation v. One-E-Way, Inc., Case No. IPR2016-01639, 7 pages.	
	37	Exhibit 2006 Transcript of Deposition Held May 24, 2017, Sony Corporation v. One-E-Way, Inc., Case No. IPR2016-01639, 98 pages.	
	38	Exhibit 2007 Supplemental Declaration by Joseph C. McAlexander, P.E., Sony Corporation v. One-E-Way, Inc., Case No. IPR2016-01639, 9 pages.	
	39	Petition for Inter Partes Review of U.S. Patent 7,865,258, Sony Corporation v. One-E-Way, Inc., Case No. IPR2018-00216, as filed November 22, 2017, 59 pages.	
	40	Petitioner's Exhibit List, Sony Corporation v. One-E-Way, Inc., Case No. IPR2018-00216, as filed November 22, 2017, 1 page.	
	41	Exhibit 1012 Moring Declaration dated November 21, 2017, Sony Corporation v. One-E-Way, Inc., Case No. IPR2018-00216, 30 pages.	
	42	Petition for Inter Partes Review of U.S. Patent 7,865,258, Sony Corporation v. One-E-Way, Inc., Case No. IPR2018-00217, as filed November 22, 2017, 70 pages.	
	43	Petitioner's Exhibit List, Sony Corporation v. One-E-Way, Inc., Case No. IPR2018-00217, as filed November 22, 2017, 1 page.	
	44	Exhibit 1012 Moring Declaration dated November 17, 2017, Sony Corporation v. One-E-Way, Inc., Case No. IPR2018-00217, 63 pages.	
	45	Petition for Inter Partes Review of U.S. Patent 8,131,391, Sony Corporation v. One-E-Way, Inc., Case No. IPR2018-00218, as filed November 22, 2017, 61 pages.	
	46	Petitioner's Exhibit List, Sony Corporation v. One-E-Way, Inc., Case No. IPR2018-00218, as filed November 22, 2017, 1 page.	
	47	Exhibit 1012 Moring Declaration dated November 21, 2017, Sony Corporation v. One-E-Way, Inc., Case No. IPR2018-00218, 32 pages.	
	48	Petition for Inter Partes Review of U.S. Patent 8,131,391, Sony Corporation v. One-E-Way, Inc., Case No. IPR2018-00219, as filed November 22, 2017, 74 pages.	
	49	Petitioner's Exhibit List, Sony Corporation v. One-E-Way, Inc., Case No. IPR2018-00219, as filed November 22, 2017, 1 page.	
	50	Exhibit 1012 Moring Declaration dated November 17, 2017, Sony Corporation v. One-E-Way, Inc., Case No. IPR2018-00219, 67 pages.	

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Examiner Signature	/ANDREW C. FLANDERS/	Date Considered	09/09/2019
*Examiner: Initial if reference considered, whether or not citation is in conformance with MPEP 609. Draw line through citation if not in conformance and not considered. Include copy of this form with next communication to applicant. ~~ALL REFERENCES CONSIDERED EXCEPT WHERE LINED THROUGH. /A.C.F./~~			

T¹ - Place a check mark in this area when an English language Translation is attached.

Please Direct All Correspondence to Customer Number 20995

IN THE UNITED STATES PATENT AND TRADEMARK OFFICE

Inventor	: C. Earl Woolfork
App. No	: 16/185786
Filed	: November 9, 2018
For	: WIRELESS DIGITAL AUDIO MUSIC SYSTEM
Examiner	: Flanders, Andrew C.
Art Unit	: 2656
Conf No.	: 1022

INTERVIEW SUMMARY

Commissioner for Patents
P.O. Box 1450
Alexandria, VA 22313-1450

Dear Sir:

In response to the Interview Summary dated September 18, 2019, the Applicant respectfully submits this *Interview Summary* in the above-identified application.

Respectfully submitted,

KNOBBE, MARTENS, OLSON & BEAR, LLP

Dated: September 27, 2019

By: /Harnik Shukla/ _____
Harnik Shukla
Registration No. 73,097
Registered Practitioner
Customer No. 20995
(949) 721-5278

SUMMARY OF INTERVIEW

Applicant's representative, Harnik Shukla, conducted a telephonic interview with Examiner Andrew Flanders, on September 3, 2019.

The Applicant's representative discussed the rejections under 35 U.S.C. 112 for Claims 6, 7, 15, and 16. It was agreed that the Drawings in the Specification as filed provide sufficient support for the claimed limitations presented in claims 6, 7, 15 and 16.

The Applicant's representative further discussed that "performance" as recited in the claim should be interpreted in light of the specification as understood by a person skilled in the art. One such interpretation is operation. The Examiner agreed that the claim term "performance" is definite.

The Examiner raised a concern that the claims can be construed to cover a cell phone communicating with a cell tower. The Applicant's representative addressed the Examiner's concern by pointing to specific portions of the claim language and the specification. The Applicant's representative explained that while the transmitter as recited in the claim could be part of a cell phone, the claims cover transmission of music in close proximity, not cell towers. *See also* Reasons for Allowance on pages 6 - 7 of Notice of Allowance. The Examiner agreed.

31412883

Electronic Patent Application Fee Transmittal				
Application Number:		16185786		
Filing Date:		09-Nov-2018		
Title of Invention:		WIRELESS DIGITAL AUDIO MUSIC SYSTEM		
First Named Inventor/Applicant Name:		C. Earl Woolfork		
Filer:		Harnik Shukla/Jenny Kim		
Attorney Docket Number:		1EWAY.009P1C7		
Filed as Large Entity				
Filing Fees for Utility under 35 USC 111(a)				
Description	Fee Code	Quantity	Amount	Sub-Total in USD(\$)
Basic Filing:				
Pages:				
Claims:				
Miscellaneous-Filing:				
Petition:				
Patent-Appeals-and-Interference:				
Post-Allowance-and-Post-Issuance:				
UTILITY APPL ISSUE FEE	1501	1	1000	1000

Description	Fee Code	Quantity	Amount	Sub-Total in USD(\$)
Extension-of-Time:				
Miscellaneous:				
Total in USD (\$)				1000

Electronic Acknowledgement Receipt	
EFS ID:	37306142
Application Number:	16185786
International Application Number:	
Confirmation Number:	1022
Title of Invention:	WIRELESS DIGITAL AUDIO MUSIC SYSTEM
First Named Inventor/Applicant Name:	C. Earl Woolfork
Customer Number:	20995
Filer:	Harnik Shukla/Elizabeth Rutherford
Filer Authorized By:	Harnik Shukla
Attorney Docket Number:	1EWAY.009P1C7
Receipt Date:	27-SEP-2019
Filing Date:	09-NOV-2018
Time Stamp:	18:17:45
Application Type:	Utility under 35 USC 111(a)

Payment information:

Submitted with Payment	yes
Payment Type	CARD
Payment was successfully received in RAM	\$ 1000
RAM confirmation Number	E20199QI18089066
Deposit Account	111410
Authorized User	Elizabeth Rutherford
The Director of the USPTO is hereby authorized to charge indicated fees and credit any overpayment as follows: 37 CFR 1.16 (National application filing, search, and examination fees) 37 CFR 1.17 (Patent application and reexamination processing fees)	

File Listing:					
Document Number	Document Description	File Name	File Size(Bytes)/ Message Digest	Multi Part /.zip	Pages (if appl.)
1	Issue Fee Payment (PTO-85B)	1EWAY009P1C7_IFee.pdf	199339	no	1
			fb1cfeae68dcf57ceca021e14ca5b251f2e5773a8		
Warnings:					
Information:					
2	Post Allowance Communication - Incoming	1EWAY009P1C7_Comments.pdf	26057	no	3
			e3ec438d5e06738148a33af9ecf9308a2f4ed375		
Warnings:					
Information:					
3	Applicant summary of interview with examiner	1EWAY009P1C7_IntSummary.pdf	18948	no	2
			7b70c2f65797dbaf551b2cbc0d1b13cb4e8fa7e7		
Warnings:					
Information:					
4	Fee Worksheet (SB06)	fee-info.pdf	30402	no	2
			7eb088f7a86fe8e61b54ed249367dea02788be92		
Warnings:					
Information:					
Total Files Size (in bytes):			274746		

This Acknowledgement Receipt evidences receipt on the noted date by the USPTO of the indicated documents, characterized by the applicant, and including page counts, where applicable. It serves as evidence of receipt similar to a Post Card, as described in MPEP 503.

New Applications Under 35 U.S.C. 111

If a new application is being filed and the application includes the necessary components for a filing date (see 37 CFR 1.53(b)-(d) and MPEP 506), a Filing Receipt (37 CFR 1.54) will be issued in due course and the date shown on this Acknowledgement Receipt will establish the filing date of the application.

National Stage of an International Application under 35 U.S.C. 371

If a timely submission to enter the national stage of an international application is compliant with the conditions of 35 U.S.C. 371 and other applicable requirements a Form PCT/DO/EO/903 indicating acceptance of the application as a national stage submission under 35 U.S.C. 371 will be issued in addition to the Filing Receipt, in due course.

New International Application Filed with the USPTO as a Receiving Office

If a new international application is being filed and the international application includes the necessary components for an international filing date (see PCT Article 11 and MPEP 1810), a Notification of the International Application Number and of the International Filing Date (Form PCT/RO/105) will be issued in due course, subject to prescriptions concerning national security, and the date shown on this Acknowledgement Receipt will establish the international filing date of the application.

PART B - FEE(S) TRANSMITTAL

Complete and send this form, together with applicable fee(s), by mail or fax, or via EFS-Web.

By mail, send to: Mail Stop ISSUE FEE
Commissioner for Patents
P.O. Box 1450
Alexandria, Virginia 22313-1450

By fax, send to: (571)-273-2885

INSTRUCTIONS: This form should be used for transmitting the ISSUE FEE and PUBLICATION FEE (if required). Blocks 1 through 5 should be completed where appropriate. All further correspondence including the Patent, advance orders and notification of maintenance fees will be mailed to the current correspondence address as indicated unless corrected below or directed otherwise in Block 1, by (a) specifying a new correspondence address; and/or (b) indicating a separate "FEE ADDRESS" for maintenance fee notifications.

CURRENT CORRESPONDENCE ADDRESS (Note: Use Block 1 for any change of address)

20995 7590 09/18/2019
KNOBBE MARTENS OLSON & BEAR LLP
2040 MAIN STREET
FOURTEENTH FLOOR
IRVINE, CA 92614

Note: A certificate of mailing can only be used for domestic mailings of the Fee(s) Transmittal. This certificate cannot be used for any other accompanying papers. Each additional paper, such as an assignment or formal drawing, must have its own certificate of mailing or transmission.

Certificate of Mailing or Transmission

I hereby certify that this Fee(s) Transmittal is being deposited with the United States Postal Service with sufficient postage for first class mail in an envelope addressed to the Mail Stop ISSUE FEE address above, or being transmitted to the USPTO via EFS-Web or by facsimile to (571) 273-2885, on the date below.

(Typed or printed name)
(Signature)
(Date)

APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
16/185,786	11/09/2018	C. Earl Woolfork	IEWAY.009P1C7	1022

TITLE OF INVENTION: WIRELESS DIGITAL AUDIO MUSIC SYSTEM

APPLN. TYPE	ENTITY STATUS	ISSUE FEE DUE	PUBLICATION FEE DUE	PREV. PAID ISSUE FEE	TOTAL FEE(S) DUE	DATE DUE
nonprovisional	UNDISCOUNTED	\$1000	\$0.00	\$0.00	\$1000	12/18/2019

EXAMINER	ART UNIT	CLASS-SUBCLASS
FLANDERS, ANDREW C	2656	381-074000

1. Change of correspondence address or indication of "Fee Address" (37 CFR 1.363).

☐ Change of correspondence address (or Change of Correspondence Address form PTO/SB/122) attached.

☐ "Fee Address" indication (or "Fee Address" Indication form PTO/SB/47; Rev 03-09 or more recent) attached. **Use of a Customer Number is required.**

2. For printing on the patent front page, list

(1) The names of up to 3 registered patent attorneys or agents OR, alternatively,

(2) The name of a single firm (having as a member a registered attorney or agent) and the names of up to 2 registered patent attorneys or agents. If no name is listed, no name will be printed.

1 KNOBBE MARTENS OLSON & BEAR, LLP

2 _____

3 _____

3. ASSIGNEE NAME AND RESIDENCE DATA TO BE PRINTED ON THE PATENT (print or type)

PLEASE NOTE: Unless an assignee is identified below, no assignee data will appear on the patent. If an assignee is identified below, the document must have been previously recorded, or filed for recordation, as set forth in 37 CFR 3.11 and 37 CFR 3.81(a). Completion of this form is NOT a substitute for filing an assignment.

(A) NAME OF ASSIGNEE

ONE-E-WAY, INC.

(B) RESIDENCE: (CITY and STATE OR COUNTRY)

Pasadena, CA

Please check the appropriate assignee category or categories (will not be printed on the patent): ☐ Individual ☒ Corporation or other private group entity ☐ Government

4a. Fees submitted: ☒ Issue Fee ☐ Publication Fee (if required) ☐ Advance Order - # of Copies _____

4b. Method of Payment: (Please first reapply any previously paid fee shown above)

☒ Electronic Payment via EFS-Web ☐ Enclosed check ☐ Non-electronic payment by credit card (Attach form PTO-2038)

☒ The Director is hereby authorized to charge the required fee(s), any deficiency, or credit any overpayment to Deposit Account No. **11-1410**

5. Change in Entity Status (from status indicated above)

☐ Applicant certifying micro entity status. See 37 CFR 1.29

☐ Applicant asserting small entity status. See 37 CFR 1.27

☐ Applicant changing to regular undiscounted fee status.

NOTE: Absent a valid certification of Micro Entity Status (see forms PTO/SB/15A and 15B), issue fee payment in the micro entity amount will not be accepted at the risk of application abandonment. NOTE: If the application was previously under micro entity status, checking this box will be taken to be a notification of loss of entitlement to micro entity status.

NOTE: Checking this box will be taken to be a notification of loss of entitlement to small or micro entity status, as applicable.

NOTE: This form must be signed in accordance with 37 CFR 1.31 and 1.33. See 37 CFR 1.4 for signature requirements and certifications.

Authorized Signature /Harnik Shukla/

Date September 27, 2019

Typed or printed name HARNIK SHUKLA

Registration No. 73,097

Please Direct All Correspondence to Customer Number 20995

IN THE UNITED STATES PATENT AND TRADEMARK OFFICE

Inventor	: C. Earl Woolfork
App. No	: 16/185786
Filed	: November 9, 2018
For	: WIRELESS DIGITAL AUDIO MUSIC SYSTEM
Examiner	: Flanders, Andrew C.
Art Unit	: 2656
Conf No.	: 1022

Mail Stop Issue Fee

Commissioner for Patents
P.O. Box 1450
Alexandria, VA 22313-1450

COMMENTS ON STATEMENT OF REASONS FOR ALLOWANCE

Dear Commissioner:

Applicant makes the following comments in response to the Examiner's description of allowable subject matter in the Notice of Allowance mailed on September 18, 2019.

The independent claims recite various combinations of features, and each combination is independently patentable. Any remarks in support of patentability of one claim should not be imputed to any other claim, including claims in other applications, even if similar terminology is used.

Applicant agrees that the allowed claims are patentable, but Applicant takes no position regarding the full wording of the Reasons for Allowance and therefore respectfully traverses them. Accordingly, the Examiner's attempt to re-phrase, summarize, or highlight persuasive aspects of Applicant's arguments should not be attributed to Applicant. *See e.g. Notice of Allowance, 6 - 7.* Applicant does not concede that patentability rests fully on these or any particular aspect that has been specifically

acknowledged as persuasive. Applicant respectfully submits that there may be additional reasons for patentability of the claims that are not stated in this record and Applicant does not waive any right to any arguments that may rely, in whole or in part, on such additional reasons.

Any remarks referring to only a portion of a claim should not be understood to base patentability on that portion alone or to imply that the limitation or combination of limitations discussed is essential or critical; rather, patentability rests on each claim taken as a whole. Accordingly, to the extent that the Reasons for Allowance omit claim elements, add claim elements, or identify purportedly distinguishing features, removed from the claim context, Applicant respectfully disagrees with the Reasons for Allowance. Additionally, to the extent that the Reasons for Allowance paraphrase the subject matter of the claims and/or deviate from the full and complete language recited in each individual claim, Applicant respectfully disagrees with the Reasons for Allowance. For instance, on pages 6-7 of the Notice of Allowance, the Examiner construes claim language by pointing to portions in the Specification and paraphrasing the claimed subject matter. Applicant respectfully disagrees with such paraphrasing and further disagrees with the Examiner's attempt to limit the construction of particular claim terms to only the cited portions of the Specification in the Notice of Allowance.

To the extent that there is any implication that the patentability of dependent claims is only attributable to the limitations in the independent claim from which each depends or that the dependent claims have the same scope as the claims from which they depend, Applicant respectfully disagrees and notes that it is each claim, taken as a whole, that is patentable. Accordingly, Applicant submits that each of the allowed claims is allowable because the prior art does not teach or suggest the combination of features recited by that claim, taken as a whole.

The claims of the present application are possibly different in scope than the claims that may be pursued in other applications owned by the owner of the present application, such as continuations, divisionals, continuations-in-part, and/or other applications. To the extent that any of the claims of the present application or any previous amendments thereto or remarks relating thereto (including any characterizations of any referenced art) could be construed as a disclaimer of any

subject matter supported by the present disclosure, Applicant hereby rescinds and retracts such disclaimer. Accordingly, Applicant reserves the right to pursue claims directed to any subject matter supported by the present disclosure in any of the other applications.

Applicant also reserves the right to contest whether or not references cited or referred to in the prosecution of this application are in fact prior art references, and to contest any characterizations of what the present disclosure or the art of record discloses or teaches.

Respectfully submitted,

KNOBBE, MARTENS, OLSON & BEAR, LLP

Dated: September 27, 2019

By: /Harnik Shukla/ _____
Harnik Shukla
Registration No. 73,097
Registered Practitioner
Customer No. 20995
(949) 721-5278

31406045



UNITED STATES PATENT AND TRADEMARK OFFICE

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IRVINE, CA 92614

ISSUE NOTIFICATION

The projected patent number and issue date are specified above.

Determination of Patent Term Adjustment under 35 U.S.C. 154 (b) (application filed on or after May 29, 2000)

The Patent Term Adjustment is 0 day(s). Any patent to issue from the above-identified application will include an indication of the adjustment on the front page.

If a Continued Prosecution Application (CPA) was filed in the above-identified application, the filing date that determines Patent Term Adjustment is the filing date of the most recent CPA.

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APPLICANT(s) (Please see PAIR WEB site <http://pair.uspto.gov> for additional applicants):

C. Earl Woolfork, Pasadena, CA;

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IR103 (Rev. 10/09)

AO 120 (Rev. 08/10)

TO: Mail Stop 8 Director of the U.S. Patent and Trademark Office P.O. Box 1450 Alexandria, VA 22313-1450	REPORT ON THE FILING OR DETERMINATION OF AN ACTION REGARDING A PATENT OR TRADEMARK
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In Compliance with 35 U.S.C. § 290 and/or 15 U.S.C. § 1116 you are hereby advised that a court action has been filed in the U.S. District Court _____ for the Central District of California _____ on the following

☐ Trademarks or ☒ Patents. (☐ the patent action involves 35 U.S.C. § 292.);

DOCKET NO. 2:20-CV-06339	DATE FILED 7/16/2020	U.S. DISTRICT COURT for the Central District of California
PLAINTIFF ONE-E-WAY, INC.		DEFENDANT APPLE INC.
PATENT OR TRADEMARK NO.	DATE OF PATENT OR TRADEMARK	HOLDER OF PATENT OR TRADEMARK
1 8,131,391	3/6/2012	One-E-Way, Inc.
2 10,468,047	11/5/2019	One-E-Way, Inc.
3		
4		
5		

In the above—entitled case, the following patent(s)/ trademark(s) have been included:

DATE INCLUDED	INCLUDED BY ☐ Amendment ☐ Answer ☐ Cross Bill ☐ Other Pleading
PATENT OR TRADEMARK NO.	DATE OF PATENT OR TRADEMARK
1	
2	
3	
4	
5	

In the above—entitled case, the following decision has been rendered or judgement issued:

DECISION/JUDGEMENT

CLERK	(BY) DEPUTY CLERK	DATE
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Copy 1—Upon initiation of action, mail this copy to Director Copy 3—Upon termination of action, mail this copy to Director
 Copy 2—Upon filing document adding patent(s), mail this copy to Director Copy 4—Case file copy

UNITED STATES PATENT AND TRADEMARK OFFICE

BEFORE THE PATENT TRIAL AND APPEAL BOARD

APPLE INC.,
Petitioner,

v.

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

IPR2021-00284
Patent 10,468,047 B2

Before GEORGIANNA W. BRADEN, ROBERT J. WEINSCHENK, and
RUSSELL E. CASS, *Administrative Patent Judges*.

WEINSCHENK, *Administrative Patent Judge*.

DECISION
Denying Institution of *Inter Partes* Review
35 U.S.C. § 314

I. INTRODUCTION

A. *Background and Summary*

Apple Inc. (“Petitioner”) filed a Petition (Paper 3, “Pet.”) requesting an *inter partes* review of claims 1–16 (“the challenged claims”) of U.S. Patent No. 10,468,047 B2 (Ex. 1101, “the ’047 patent”). One-E-Way, Inc. (“Patent Owner”) filed a Preliminary Response (Paper 6, “Prelim. Resp.”) to the Petition.

An *inter partes* review may not be instituted unless “the information presented in the petition . . . and any response . . . shows that there is a reasonable likelihood that the petitioner would prevail with respect to at least 1 of the claims challenged in the petition.” 35 U.S.C. § 314(a). We determine Petitioner does not demonstrate a reasonable likelihood of prevailing in showing that at least one of the challenged claims of the ’047 patent is unpatentable. Accordingly, the Petition is denied, and no trial is instituted.

B. *Real Parties in Interest*

Petitioner states “Apple Inc. . . . and its wholly-owned subsidiary Beats Electronics, LLC (‘Beats’) are the real parties-in-interest to this *inter partes* review.” Pet. 1. Patent Owner states “[t]he real party in interest is One-E-Way, Inc.” Paper 5 (Patent Owner’s Mandatory Notices), 1.

C. *Related Matters*

The parties identify the following district court case involving the ’047 patent: *One-E-Way, Inc. v. Apple Inc.*, Case No. 2:20-cv-06339 (C.D. Cal.). Pet. 1; Paper 5, 1.

Petitioner also identifies a prior ITC investigation in which Patent Owner alleged infringement of related patents against a number of

respondents: *In re Certain Wireless Headsets*, Investigation No. 337-TA-943 (the “ITC investigation”). Pet. 1. According to Petitioner, Patent Owner’s original complaint named Beats as one of the respondents, but Patent Owner subsequently moved to withdraw its allegations against Beats, and the ITC investigation was terminated as to Beats. *Id.* at 1–2. Petitioner further states that, during the course of the ITC investigation, the ITC issued a claim construction ruling (the “ITC Claim Construction Order”). *Id.* at 2.

Patent Owner additionally identifies four petitions for *inter partes* review against patents related to the ’047 patent: IPR2021-00283, IPR2021-00285, IPR2021-00286, and IPR2021-00287. Paper 5, 1.

D. The ’047 Patent

The ’047 patent relates to a wireless digital audio system including a portable audio source operatively coupled to a digital audio transmitter, and an audio receiver coupled to a headphone set. Ex. 1101, code (57). An embodiment of the system is shown in Figure 1, reproduced below:

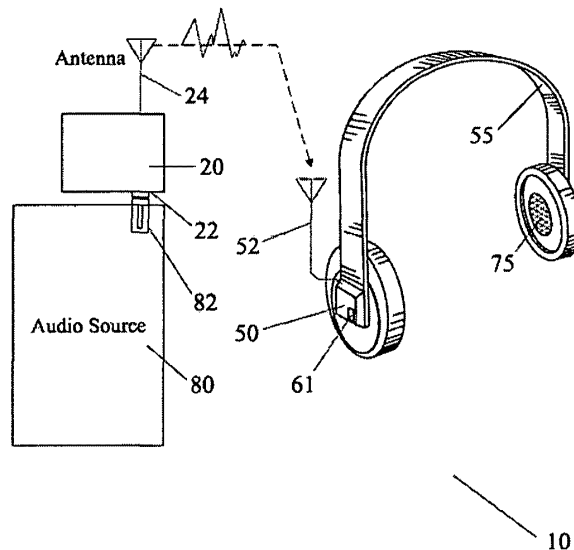


FIG. 1

Id. at Fig. 1. As shown in Figure 1, wireless digital audio music system 10 includes battery powered transmitter 20 connected to portable music player or music audio source 80. *Id.* at 2:36–39. Transmitter 20 is connected to music audio source 80 via analog headphone jack 82 using headphone plug 22. *Id.* at 2:39–42. Transmitter 20 has transmitting antenna 24 for transmitting a spread spectrum modulated signal to receiving antenna 52 of battery powered headphone receiver 50, which is coupled to headphones 55 including headphone speakers 75. *Id.* at 2:42–49.

The audio transmitter portion of the wireless digital audio system is shown in more detail in Figure 2, reproduced below:

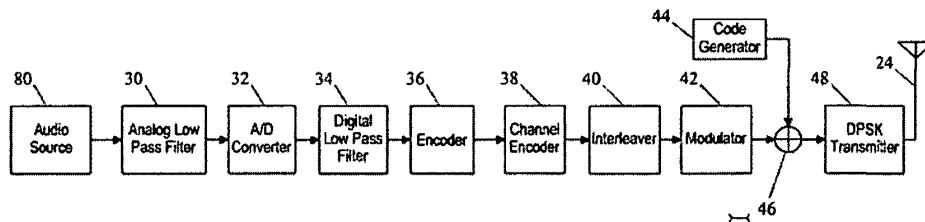


FIG. 2

Id. at Fig. 2. As shown in Figure 2, the audio transmitter digitizes the signal from audio source 80 using analog to digital converter (“ADC”) 32, and then processes the digitized signal using digital low pass filter 34 and encoder 36. *Id.* at 2:51–55. The signal is passed through channel encoder 38 to reduce the effects of channel noise, and then modulated for transmission by modulator 42. *Id.* at 2:55–58. Code generator 44 creates a “unique user code” that is “specifically associated with one wireless digital audio system user,” and “is the only code recognized by the battery powered headphone receiver 50 operated by a particular user.” *Id.* at 2:60–66. The signal is then passed to spread spectrum differential phase shift key (“DPSK”)

transmitter 48, which provides further noise immunity, and to antenna 24 for transmission. *Id.* at 2:58–60.

The audio receiver portion coupled to the wireless headphones is shown in more detail in Figure 3, reproduced below:

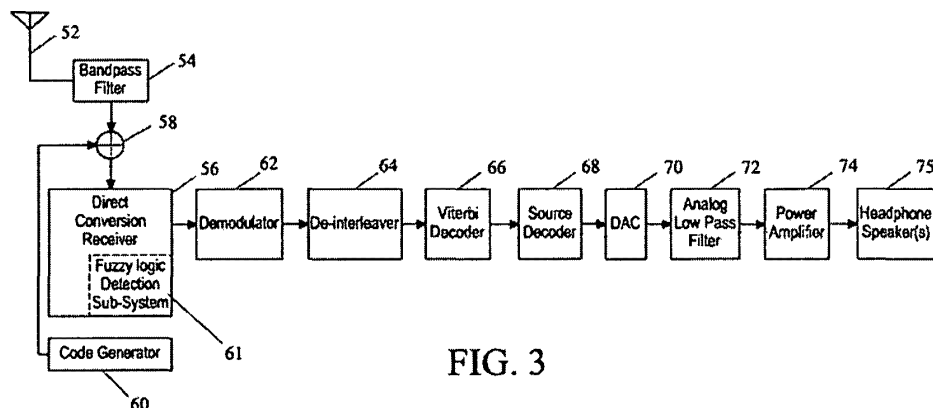


FIG. 3

Id. at Fig. 3. As shown in Figure 3, antenna 52 receives the spread spectrum modulated signal from transmit antenna 24 (Figure 2) and communicates it to wideband bandpass filter 54. *Id.* at 3:5–13. The output of bandpass filter 54 is summed with the output of receiver code generator 60, and communicated to direct conversion receiver 56. *Id.* at 3:5–11, 3:16–19. The '047 patent explains that the “receiver code generator 60 may contain the same unique wireless transmission of a signal code word that was transmitted by audio transmitter 20 specific to a particular user,” and “[o]ther code words from wireless digital audio systems 10” as well as “other device transmitted wireless signals operating in the wireless digital audio spectrum of digital audio system 10” may “appear as noise to audio receiver 50.” *Id.* at 3:19–26. According to the '047 patent, “[t]his code division multiple access (CDMA) may be used to provide each user independent audio enjoyment.” *Id.* at 3:26–28.

Returning to Figure 3, the signal from direct conversion receiver 56 is processed by demodulator 62 to demodulate the signal elements modulated in audio transmitter 20, and passed to block de-interleaver 64 which decodes the bits of the digital signal encoded in block interleaver 40 (Figure 2). *Id.* at 3:28–34. Viterbi decoder 66 decodes the bits encoded by channel encoder 38 in audio transmitter 20 (Figure 2), and source decoder 68 further decodes the coding applied by encoder 36. *Id.* at 3:34–37. Digital to analog converter (“DAC”) 70 converts the digital signal into an analog audio signal, and analog low pass filter 72 filters the analog audio signal to pass a signal in the frequency range of approximately 20 Hz to 20 KHz. *Id.* at 4:26–31. The signal is then passed to power amplifier 74, which powers headphone speakers 75 to provide high quality, low distortion music to a user wearing headphones 55. *Id.* at 4:31–35.

E. Illustrative Claim

Of the challenged claims, claims 1 and 8 are independent. Claim 1 is reproduced below.

1. 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:

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;

a digital-to-analog converter (DAC) configured to provide an analog audio output signal corresponding to said audio signal representation;

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;

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;

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

wherein said further processing for reduction of intersymbol interference is separate from said performance of at least one of said plurality of demodulations.

Ex. 1101, 4:56–5:27.

F. Evidence of Record

Petitioner submits the following evidence of record:

Evidence	Exhibit No.
Declaration of Regis J. Bates Jr. (“Bates Declaration”)	1102
Bernard Sklar, DIGITAL COMMUNICATIONS FUNDAMENTALS AND APPLICATIONS (Reynold Rieger ed., 1988) (“Sklar”)	1103
Jaap C. Haartsen, <i>The Bluetooth Radio System</i> , IEEE Personal Communications, Vol. 7, No. 1 (Feb. 2000) (“Haartsen”)	1105
John B. Groe, CDMA MOBILE RADIO DESIGN (2000) (“Groe”)	1109

Evidence	Exhibit No.
Ham Inhwa, KR 2000-0006888, published Apr. 25, 2000 (“Ham”)	1110
Xiang-Gen Xia, <i>New Precoding for Intersymbol Interference Cancellation Using Nonmaximally Decimated Multirate Filterbanks with Ideal FIR Equalizers</i> , IEEE Transactions on Signal Processing, Vol. 45, No. 10 (Oct. 1997) (“Xia”)	1111
Dirschedl, US 6,262,994 B1, issued July 17, 2001 (“Dirschedl”)	1137
Matero, WO 00/76109 A1, published Dec. 14, 2000 (“Matero”)	1138

Patent Owner submits the Declaration of Joseph C. McAlexander.

Ex. 2001 (“McAlexander Declaration”).

G. Challenges to Patentability

Petitioner asserts that the challenged claims are unpatentable on the following grounds:

Claim(s) Challenged	35 U.S.C. §	Reference(s)/Basis
1–16	103	Ham, Sklar, Xia, Groe, Dirschedl, Matero
1–16	103	Ham, Sklar, Xia, Groe, Dirschedl, Matero, Haartsen

II. ANALYSIS

A. Level of Ordinary Skill in the Art

Petitioner contends that a person of ordinary skill in the art “would have possessed at least a bachelor’s degree in electrical engineering and two years’ experience in wireless communications systems design or implementation, or equivalent.” Pet. 6 (citing Ex. 1102 ¶ 11). For purposes of the Preliminary Response, Patent Owner does not contest Petitioner’s proposed level of ordinary skill. Prelim. Resp. 7. At this stage of the proceeding, we adopt Petitioner’s assessment of the level of ordinary skill in

the art, which is consistent with the '047 patent and the asserted prior art of record.

B. Claim Construction

A claim “shall be construed using the same claim construction standard that would be used to construe the claim in a civil action under 35 U.S.C. § 282(b).” 37 C.F.R. § 42.100(b) (2020). Petitioner requests that the Board adopt the constructions of several claim terms from the ITC investigation. Pet. 6–8. Pertinent to this Decision, Petitioner requests that the Board adopt the ITC’s construction of the two terms¹ listed below:

Claim Term	ITC’s Construction
“configured for independent CDMA communication operation”	“configured for code division multiple access (CDMA) communication operation performed independent of any central control”
“unique user code”	“fixed code (bit sequence) specifically associated with one user of a device(s)”

Id. at 7. Patent Owner states that, at this stage of the proceeding, it does not contest Petitioner’s proposed constructions of these claim terms. Prelim. Resp. 6.

For purposes of this Decision, we adopt Petitioner’s proposed constructions. We, therefore, construe “configured to use independent code division multiple access communication” to mean “configured for code division multiple access (CDMA) communication operation performed

¹ Petitioner also requests that we adopt the ITC’s constructions of two additional claim terms, “reduced intersymbol interference coding” and “direct conversion module.” Pet. 6–7. We need not construe these claim terms, however, to resolve the issues presented in the Petition.

independent of any central control,” and “unique user code” to mean “fixed code (bit sequence) specifically associated with one user of a device(s).” Based on our review of the Petition and Preliminary Response, we do not believe that any other claim terms require express construction at this stage of the proceeding. *See Nidec Motor Corp. v. Zhongshan Broad Ocean Motor Co. Ltd.*, 868 F.3d 1013, 1017 (Fed. Cir. 2017); *Vivid Techs., Inc. v. Am. Sci. & Eng’g, Inc.*, 200 F.3d 795, 803 (Fed. Cir. 1999) (“[O]nly those terms need be construed that are in controversy, and only to the extent necessary to resolve the controversy.”).

C. Ground 1: Alleged Obviousness of Claims 1–16 over Ham, Sklar, Xia, Groe, Dirschedl, and Matero

Petitioner argues that claims 1–16 would have been obvious over Ham, Sklar, Xia, Groe, Dirschedl, and Matero. Pet. 15–62, 69–74. For the reasons discussed below, Petitioner does not demonstrate a reasonable likelihood of prevailing in showing that claims 1–16 would have been obvious over Ham, Sklar, Xia, Groe, Dirschedl, and Matero.

1. Overview of Ham (Ex. 1110)

Ham is a Korean patent application publication that is directed to “a wireless head phone transmission and reception circuit,” and, in particular, “relates to a code division type transmission circuit and wireless headphone reception circuit that transmit[s] and receive[s] signals using the Code Division Multiple Access (CDMA) method.” Ex. 1110, 2. Ham explains that:

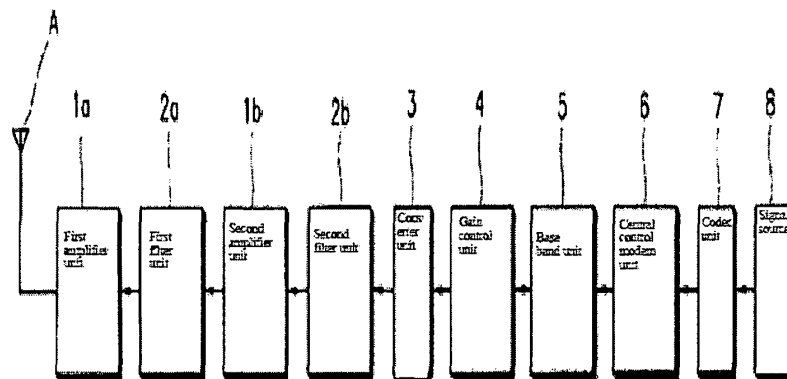
[T]he code division multiple access method (hereinafter referred to as the code division method) is a method of sharing a frequency by extending a signal into a frequency band that is much wider than the bandwidth of the required amount of information. In other words, it shares all frequency and time

and maintains orthogonality with a unique code assigned to it. In this case, in the code division method, a signal to be transmitted is extended by receiving a unique Pseudo Random (PN) code.

Id.

Ham discloses a transmission circuit for wirelessly transmitting a signal in Figure 1, reproduced below:

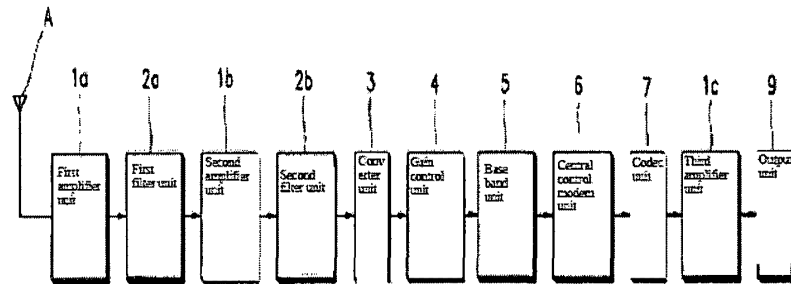
FIG. 1



Id. at Fig. 1. As shown in Figure 1, the transmission circuit includes antenna A, codec unit 7 for encoding a signal applied from signal source 8, central control modem unit 6 for performing error correction on the signal output from codec unit 7, base band unit 5 that receives the output of central control modem unit 6, converts it into an intermediate frequency, and outputs the converted signal, and amplifier, filter, converter, and gain control units 1a, 2a, 1b, 2b, 3, and 4. *Id.* at 2.

Ham discloses a wireless headphone receiving circuit in Figure 2, reproduced below:

FIG. 2



Id. at Fig. 2. As shown in Figure 2, the receiving circuit includes antenna A for receiving the wireless signal, base band unit 5 for processing the gain controlled signal, central control modem unit 6 for removing an error correction and pseudorandom code, codec unit 7 for decoding the audio signal, and amplifier unit 1c that amplifies the signal from codec unit 7 and passes it to output unit 9. *Id.* at 2.

2. Overview of Sklar (Ex. 1103)

Sklar is a textbook entitled “Digital Communications: Fundamentals and Applications,” and “presents the ideas and techniques fundamental to digital communication systems.” Ex. 1103, 22.² Specifically, Sklar discusses “spread-spectrum” systems in which “the transmission bandwidth employed is much greater than the minimum bandwidth required to transmit the information.” *Id.* at 384. “Spreading,” Sklar explains, “is accomplished by means of a *spreading signal*, often called a *code signal*, which is independent of the data.” *Id.* At the receiver, “despreading” (recovering the original data) “is accomplished by the correlation of the received spread

² We cite to the exhibit page numbers added by Petitioner.

signal with a synchronized replica of the spreading signal used to spread the information.” *Id.*

Sklar further explains that code division multiple access (CDMA) is a technique that uses spread-spectrum methods for multiple access “in order to share a communications resource among numerous users in a coordinated manner.” *Id.* at 388–389. In CDMA, “each simultaneous user employs a unique spread-spectrum signaling code,” which “provide[s] communication privacy between users with different spreading signals.” *Id.* Thus, “[a]n unauthorized user (a user not having access to a spreading signal) cannot easily monitor the communications of the authorized users.” *Id.* at 389.

3. *Independent Claims 1 and 8*

Claim 1 recites a “portable spread spectrum audio receiver” that “is configured to use independent code division multiple access communication and to use said unique user code to communication with only said spread spectrum transmitter during a wireless connection.” Ex. 1101, 5:13–17. Claim 8 recites a similar limitation. *Id.* at 5:57–61. As discussed above, Petitioner requests that we construe the phrase “configured to use independent code division multiple access communication” to mean “configured for code division multiple access (CDMA) communication operation performed independent of any central control,” and Patent Owner does not dispute this construction. Pet. 6–7; Prelim. Resp. 6; *see* Section II.B.

Petitioner asserts that “Ham’s CDMA is ‘independent of any central control’ because Ham discloses and suggests a one-to-one correspondence between a transmission circuit and reception circuit.” Pet. 46 (citing Ex. 1110, 2–3, Figs. 1–2) (emphasis omitted). Petitioner also asserts that

“Ham nowhere suggests any control or coordination of communications between transmission and reception circuits by a centralized facility.” *Id.* at 46–47 (citing Ex. 1102 ¶¶ 211–217).

Patent Owner responds that Petitioner’s “citations establish only that Ham’s transmission circuit transmits signals to the reception circuit using the CDMA method,” and “[n]othing in those citations mentions any supposed ‘one-to-one correspondence.’” Prelim. Resp. 27 (citing Ex. 1102 ¶ 212). Patent Owner also responds that Petitioner “ignores the evidence pointing to Ham’s use of centralized control, such as Ham’s express disclosure that its code division method ‘maintains orthogonality.’” *Id.* at 28 (citing Pet. 46–47; Ex. 1102 ¶ 212; Ex. 1110, 2). According to Patent Owner, “[o]ne of ordinary skill in the art would [] understand that maintaining orthogonality is an indication of centralized control.” *Id.* at 30 (citing Ex. 2001 ¶ 16).

On this record, Petitioner does not show sufficiently that Ham teaches “independent code division multiple access communication” under the claim construction agreed to by the parties and adopted for purposes of this Decision. As discussed above, at this stage of the proceeding, the parties agree to the ITC’s construction of the phrase “configured to use independent code division multiple access communication” as “configured for code division multiple access (CDMA) communication operation performed independent of any central control.” The ITC’s construction is consistent with the ’047 patent’s disclosure of a CDMA system that uses a code generator in the transmitter to create a unique spreading code, rather than receiving the spreading code from a central controller. Ex. 1101, 2:60–66 (disclosing that “[t]he battery powered transmitter 20 may contain a code

generator 44 that may be used to create a unique user code” that “is specifically associated with one wireless digital audio system user”); Ex. 1102 ¶ 263. Thus, the ’047 patent’s system performs “independent code division multiple access communication” by having the transmitter generate the CDMA spreading code, rather than by having it be assigned by a central system.

Petitioner, though, does not show sufficiently that Ham teaches CDMA performed independent of any central control. Ham teaches a CDMA system that “shares all frequency and time and *maintains orthogonality* with a unique code assigned to it.” Ex. 1110, 2 (emphasis added). Patent Owner presents evidence that Ham’s teaching that its CDMA system “maintains orthogonality” indicates that it depends on a central controller to assign the spreading codes. Prelim. Resp. 30; Ex. 2001 ¶ 16. Specifically, Patent Owner’s declarant, Mr. McAlexander, explains that “in a wireless communications system in which multiple user devices communicate wirelessly in the same frequency and time, orthogonality can only be maintained by providing each user device with a spreading code known to be orthogonal to each spreading code being used by another user device.” Ex. 2001 ¶ 16. Mr. McAlexander further explains that “[i]n Ham’s system, this would require centralized control ensuring that all Ham’s assigned PN codes have a cross-correlation value of zero.” *Id.*

Petitioner does not present contrary evidence showing that Ham’s orthogonal codes do not require assignment by a central controller. To the contrary, Petitioner’s own arguments in Ground 2 (which we address in detail below) support Mr. McAlexander’s testimony. Petitioner’s Ground 2 relies on a proposed combination that includes Haartsen, which, according to

Petitioner, teaches a CDMA system that does not require a central controller. Pet. 63–69; *id.* at 64 (“Haartsen describes the master’s *device* identity being transmitted as an access code.”); *id.* at 68 (“The transmitter need not . . . be assigned a unique PN code by a third party.”); Ex. 1102 ¶¶ 254, 263.

Petitioner asserts that one of the reasons it would have been obvious to combine Ham and Haartsen is that Haartsen’s CDMA system “can benefit Ham” by “allow[ing] a transmitter to set up a frequency hopping connection with a receiver *in the absence of* any coordination by a third party, such as a central controller.” Pet. 68 (emphasis added); *see* Ex. 1102 ¶ 263. In other words, Petitioner argues that using Haartsen’s CDMA system would have benefitted Ham by eliminating Ham’s need for coordination by a central controller. Pet. 68; Ex. 1102 ¶ 263. This appears to be an acknowledgement by Petitioner that Ham’s CDMA system involves coordination by a central controller.

As discussed above, for Ground 1, Petitioner relies solely on Ham as teaching “independent code division multiple access communication.” Pet. 46–47. But, for the foregoing reasons, the evidence of record at this stage of the proceeding indicates that Ham’s CDMA system depends on a central controller in order to assign codes in a manner that maintains orthogonality, and, thus, does not teach CDMA performed “independent of any central control,” as required by Petitioner’s proposed construction. As a result, Petitioner does not demonstrate a reasonable likelihood of prevailing in showing that claims 1 and 8 would have been obvious over Ham, Sklar, Xia, Groe, Dirschedl, and Matero.

4. *Dependent Claims 2–7 and 9–16*

Claims 2–7 and 9–16 depend from claim 1 or 8. Petitioner’s arguments and evidence regarding these dependent claims do not compensate for the deficiencies discussed above for claims 1 and 8. *See* Pet. 57–62, 71–74. Thus, for the same reasons discussed above for claims 1 and 8, Petitioner does not demonstrate a reasonable likelihood of prevailing in showing that claims 2–7 and 9–16 would have been obvious over Ham, Sklar, Xia, Groe, Dirschedl, and Matero.

5. *Summary*

For the foregoing reasons, Petitioner does not demonstrate a reasonable likelihood of prevailing in showing that claims 1–16 would have been obvious over Ham, Sklar, Xia, Groe, Dirschedl, and Matero.

D. *Ground 2: Alleged Obviousness of Claims 1–16 over Ham, Sklar, Xia, Groe, Dirschedl, Matero, and Haartsen*

Petitioner argues that claims 1–16 would have been obvious over Ham, Sklar, Xia, Groe, Dirschedl, Matero, and Haartsen. Pet. 63–69, 74. For the reasons discussed below, Petitioner does not demonstrate a reasonable likelihood of prevailing in showing that claims 1–16 would have been obvious over Ham, Sklar, Xia, Groe, Dirschedl, Matero, and Haartsen.

1. *Overview of Haartsen (Ex. 1105)*

Haartsen is an article from *IEEE Personal Communications* entitled “The Bluetooth Radio System.” Ex. 1105, 4.³ Haartsen describes the “Bluetooth technology” as “a new universal radio interface” that “has been developed enabling electronic devices to communicate wirelessly via short-range ad hoc radio connections.” *Id.* Haartsen explains that Bluetooth uses

³ We cite to the exhibit page numbers added by Petitioner.

frequency hopping CDMA (“FH-CDMA”) for its multiple access scheme. *Id.* at 5–6. The particular frequency hopping sequence is determined by the unit that controls the FH channel, which is called the “master,” and the master’s native clock also defines the phase in the hopping sequence. *Id.* at 6. The other participants in the communication are called “slaves,” and use the master identity to select the same hopping sequence and add time offsets to their respective native clocks to synchronize to the frequency hopping. *Id.*

Haartsen explains that the Bluetooth system uses packet-based transmission in which each packet starts with an access code, followed by a packet header, and ending with the user payload. *Id.* at 7. The access code “has pseudo-random properties” and “includes the identity of the piconet master.” *Id.* All packets exchanged on the channel are identified by this master identity, and the packet will only be accepted by the recipient if the access code matches the access code corresponding to the piconet master. *Id.*

2. *Independent Claims 1 and 8*

Ground 2 builds on Petitioner’s alternative mapping in Ground 1 that relies on Sklar’s FH-CDMA to teach the “unique user code” required by claims 1 and 8. Pet. 63–64. In Ground 1, Petitioner asserts that a key feature of Sklar’s FH-CDMA is that “[e]ach user employs a pseudonoise (PN) code, *orthogonal (or nearly orthogonal) to all other user codes*, that dictates the frequency hopping band assignments,” and argues that this PN code is the “unique user code” recited in claims 1 and 8. *Id.* at 26–27 (emphasis altered). In Ground 2, Petitioner relies on Haartsen’s Bluetooth implementation of FH-CDMA in lieu of Sklar’s FH-CDMA system. *Id.* at

63–64. More specifically, Petitioner argues in Ground 2 that Haartsen teaches a “unique user code” determined from the device identity of a Bluetooth transmitter that is used to define the frequency hop sequence, rather than relying on Sklar’s orthogonal PN codes to teach the “unique user code” for defining the frequency hop sequence, as in Ground 1. *Id.* at 64.

Petitioner explains that it is including Ground 2 because “Patent Owner’s Infringement Contentions appear to interpret a ‘**unique user code**’ as met by Bluetooth’s use of a *device* address associated with the transmitter.” Pet. 63 (citing Ex. 1116, Ex. C at 2–3). According to Petitioner, Patent Owner “appears to apply an interpretation of ‘**unique user code**’ that would be met by (current) Bluetooth’s use of a *device* identity associated with the transmitter (‘master’), from which the hop pattern and channel access code are derived.” *Id.* Petitioner states that it disputes Patent Owner’s apparent construction of “unique user code” as applying to Bluetooth’s device-based codes because “[t]he ITC construed ‘**unique user code**’ as a ‘fixed code (bit sequence) **specifically associated with one user** of a device(s).’” *Id.* at 14. However, Petitioner asserts, although it “does not agree with Patent Owner’s apparent interpretation,” if maintained “it ‘will read on the prior art,’” as disclosed by Haartsen. *Id.* at 63.

Petitioner goes on to assert that Haartsen discloses a Bluetooth system in which the frequency hop sequence is determined from the *device* identity of a transmitter known as the “master.” *Id.* at 64 (citing Ex. 1105, 30, 33, Fig. 7). According to Petitioner, “[t]his manner of using a specific device’s identity to determine the hop sequence is substantially similar to present-day Bluetooth’s frequency hopping functionality cited by Patent Owner for transmission of a ‘**unique user code**.’” *Id.* (citing Ex. 1102 ¶¶ 253–256).

Petitioner further argues that Haartsen describes the master's device identity being transmitted as an access code with each packet, which "is substantially similar to Patent Owner's apparent reliance on transmission of a channel access code with each packet in present-day Bluetooth." *Id.* at 64–65 (citing Ex. 1102 ¶¶ 251–257; Ex. 1105, 31, Fig. 3; Ex. 1116, Ex. C at 2).

As noted above, Patent Owner does not contest Petitioner's (and the ITC's) proposed construction of "unique user code." Prelim. Resp. 6; *see* Section II.B. Patent Owner also does not address the issue of whether the term "unique user code" is met by Haartsen's determination of the frequency hop sequence from the device identity of the master. *See generally* Prelim. Resp. Instead, Patent Owner argues that Petitioner fails to establish a motivation to substitute Sklar's FH-CDMA method for Ham's DS-CDMA method, or to substitute Ham's CDMA method with Haartsen's FH-CDMA method. *Id.* at 33–39. Patent Owner also argues, as in the case of Ground 1, that Ham does not disclose a "direct conversion module," as recited in independent claim 1. *Id.* at 40–44.

Petitioner does not show a reasonable likelihood of unpatentability of claims 1 and 8 because Petitioner has not shown sufficiently that Haartsen discloses a "unique user code" under the claim construction agreed by the parties and adopted in this Decision. As discussed above, the parties agreed to adopt the ITC's construction of "unique user code" as a "fixed code (bit sequence) specifically associated with one user of a device(s)." *See* Section II.B. In setting forth this construction, the ITC emphasized that its "construction makes clear that *the fixed code is associated with 'one user (of a device(s))' and not a 'user's device.'*" Ex. 1130, 37 (emphasis added). We agree with the ITC that this understanding flows from the ordinary

meaning of the construction adopted, and note that Petitioner appears to rely on it as well. *See* Pet. 14 (“The ITC construed ‘**unique user code**’ as a ‘fixed code (bit sequence) **specifically associated with one user** of a device(s).”). Petitioner, however, fails to show that Haartsen discloses a unique user code that is associated with *one user of a device, rather than a device itself*.

Indeed, Petitioner acknowledges that “in prior art Bluetooth as described in Haartsen, the frequency hop sequence is determined from the *device* identity of a transmitter known as the ‘master,’” rather than from a user associated with the device. *Id.* at 64. Petitioner’s assertion is supported by Haartsen’s disclosure, which states that the frequency hop sequence is determined by the device identity of the “master” transmitter. As Haartsen explains:

The particular sequence is determined by the unit that controls the FH channel, which is called the *master*. The native clock of the master unit also defines the phase in the hopping sequence. **All other participants on the hopping channel are *slaves*, they use the master identity to select the same hopping sequence** and add time offsets to their respective native clocks to synchronize to the frequency hopping.

Ex. 1105, 6 (emphasis added). Thus, Haartsen discloses that the code that determines the frequency hop sequence is based on the identity of the master device, rather than being associated with “one user of a device,” as required by the parties’ agreed construction of “unique user code.”

Consequently, Petitioner does not show a reasonable likelihood that independent claims 1 and 8 are unpatentable over Ham, Sklar, Xia, Groe, Dirschedl, Matero, and Haartsen.

3. Dependent Claims 2–7 and 9–16

Claims 2–7 and 9–16 depend from claim 1 or 8. Petitioner’s arguments and evidence regarding these dependent claims do not compensate for the deficiencies discussed above for claims 1 and 8. *See* Pet. 57–62, 71–74. Thus, for the same reasons discussed above for claims 1 and 8, Petitioner does not demonstrate a reasonable likelihood of prevailing in showing that claims 2–7 and 9–16 would have been obvious over Ham, Sklar, Xia, Groe, Dirschedl, Matero, and Haartsen.

4. Summary

For the foregoing reasons, Petitioner does not demonstrate a reasonable likelihood of prevailing in showing that claims 1–16 would have been obvious over Ham, Sklar, Xia, Groe, Dirschedl, Matero, and Haartsen.

III. CONCLUSION

Petitioner does not demonstrate a reasonable likelihood of prevailing in showing that at least one of the challenged claims of the ’047 patent is unpatentable.

IV. ORDER

It is hereby

ORDERED that the Petition is denied, and no trial is instituted.

IPR2021-00284
Patent 10,468,047 B2

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UNITED STATES PATENT AND TRADEMARK OFFICE

BEFORE THE PATENT TRIAL AND APPEAL BOARD

APPLE INC.,
Petitioner,

v.

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

IPR2021-00285
Patent 10,468,047 B2

Before GEORGIANNA W. BRADEN, ROBERT J. WEINSCHENK, and
RUSSELL E. CASS, *Administrative Patent Judges*.

WEINSCHENK, *Administrative Patent Judge*.

DECISION
Denying Institution of *Inter Partes* Review
35 U.S.C. § 314

I. INTRODUCTION

A. *Background and Summary*

Apple Inc. (“Petitioner”) filed a Petition (Paper 3, “Pet.”) requesting an *inter partes* review of claims 17–20 (“the challenged claims”) of U.S. Patent No. 10,468,047 B2 (Ex. 1001, “the ’047 patent”). One-E-Way, Inc. (“Patent Owner”) filed a Preliminary Response (Paper 6, “Prelim. Resp.”) to the Petition.

An *inter partes* review may not be instituted unless “the information presented in the petition . . . and any response . . . shows that there is a reasonable likelihood that the petitioner would prevail with respect to at least 1 of the claims challenged in the petition.” 35 U.S.C. § 314(a). We determine Petitioner does not demonstrate a reasonable likelihood of prevailing in showing that at least one of the challenged claims of the ’047 patent is unpatentable. Accordingly, the Petition is denied, and no trial is instituted.

B. *Real Parties in Interest*

Petitioner states “Apple Inc. . . . and its wholly-owned subsidiary Beats Electronics, LLC (‘Beats’) are the real parties-in-interest to this *inter partes* review.” Pet. 1. Patent Owner states “[t]he real party in interest is One-E-Way, Inc.” Paper 5 (Patent Owner’s Mandatory Notices), 1.

C. *Related Matters*

The parties identify the following district court case involving the ’047 patent: *One-E-Way, Inc. v. Apple Inc.*, Case No. 2:20-cv-06339 (C.D. Cal.). Pet. 1; Paper 5, 1.

Petitioner also identifies a prior ITC investigation in which Patent Owner alleged infringement of related patents against a number of

respondents: *In re Certain Wireless Headsets*, Investigation No. 337-TA-943 (the “ITC investigation”). Pet. 1. According to Petitioner, Patent Owner’s original complaint named Beats as one of the respondents, but Patent Owner subsequently moved to withdraw its allegations against Beats, and the ITC investigation was terminated as to Beats. *Id.* at 1–2. Petitioner further states that, during the course of the ITC investigation, the ITC issued a claim construction ruling (the “ITC Claim Construction Order”). *Id.* at 2.

Patent Owner additionally identifies four petitions for *inter partes* review against patents related to the ’047 patent: IPR2021-00283, IPR2021-00284, IPR2021-00286, and IPR2021-00287. Paper 5, 1.

D. The ’047 Patent

The ’047 patent relates to a wireless digital audio system including a portable audio source operatively coupled to a digital audio transmitter, and an audio receiver coupled to a headphone set. Ex. 1001, code (57). An embodiment of the system is shown in Figure 1, reproduced below:

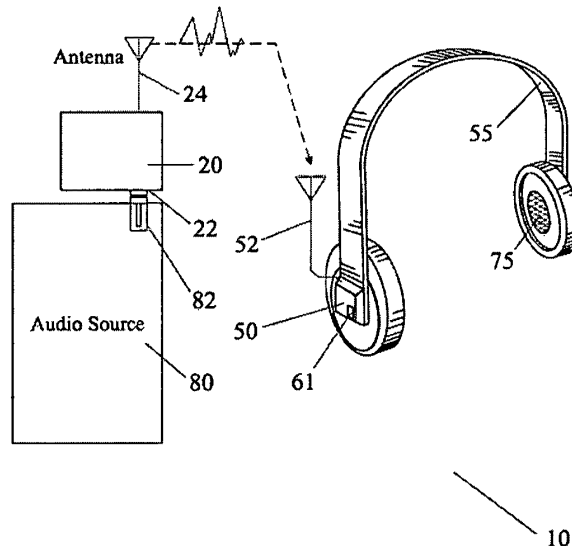


FIG. 1

Id. at Fig. 1. As shown in Figure 1, wireless digital audio music system 10 includes battery powered transmitter 20 connected to portable music player or music audio source 80. *Id.* at 2:36–39. Transmitter 20 is connected to music audio source 80 via analog headphone jack 82 using headphone plug 22. *Id.* at 2:39–42. Transmitter 20 has transmitting antenna 24 for transmitting a spread spectrum modulated signal to receiving antenna 52 of battery powered headphone receiver 50, which is coupled to headphones 55 including headphone speakers 75. *Id.* at 2:42–49.

The audio transmitter portion of the wireless digital audio system is shown in more detail in Figure 2, reproduced below:

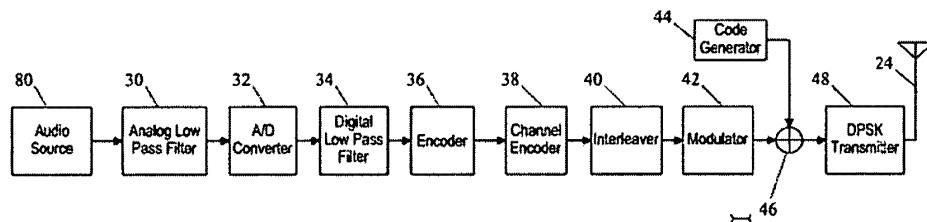


FIG. 2

Id. at Fig. 2. As shown in Figure 2, the audio transmitter digitizes the signal from audio source 80 using analog to digital converter (“ADC”) 32, and then processes the digitized signal using digital low pass filter 34 and encoder 36. *Id.* at 2:51–55. The signal is passed through channel encoder 38 to reduce the effects of channel noise, and then modulated for transmission by modulator 42. *Id.* at 2:55–58. Code generator 44 creates a “unique user code” that is “specifically associated with one wireless digital audio system user,” and “is the only code recognized by the battery powered headphone receiver 50 operated by a particular user.” *Id.* at 2:60–66. The signal is then passed to spread spectrum differential phase shift key (“DPSK”)

transmitter 48, which provides further noise immunity, and to antenna 24 for transmission. *Id.* at 2:58–60.

The audio receiver portion coupled to the wireless headphones is shown in more detail in Figure 3, reproduced below:

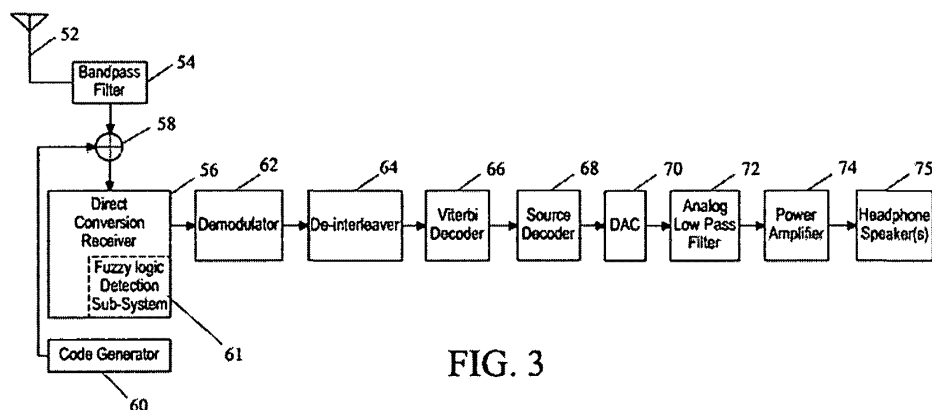


FIG. 3

Id. at Fig. 3. As shown in Figure 3, antenna 52 receives the spread spectrum modulated signal from transmit antenna 24 (Figure 2) and communicates it to wideband bandpass filter 54. *Id.* at 3:5–13. The output of bandpass filter 54 is summed with the output of receiver code generator 60, and communicated to direct conversion receiver 56. *Id.* at 3:5–11, 3:16–19. The '047 patent explains that the “receiver code generator 60 may contain the same unique wireless transmission of a signal code word that was transmitted by audio transmitter 20 specific to a particular user,” and “[o]ther code words from wireless digital audio systems 10” as well as “other device transmitted wireless signals operating in the wireless digital audio spectrum of digital audio system 10” may “appear as noise to audio receiver 50.” *Id.* at 3:19–26. According to the '047 patent, “[t]his code division multiple access (CDMA) may be used to provide each user independent audio enjoyment.” *Id.* at 3:26–28.

Returning to Figure 3, the signal from direct conversion receiver 56 is processed by demodulator 62 to demodulate the signal elements modulated in audio transmitter 20, and passed to block de-interleaver 64 which decodes the bits of the digital signal encoded in block interleaver 40 (Figure 2). *Id.* at 3:28–34. Viterbi decoder 66 decodes the bits encoded by channel encoder 38 in audio transmitter 20 (Figure 2), and source decoder 68 further decodes the coding applied by encoder 36. *Id.* at 3:34–37. Digital to analog converter (“DAC”) 70 converts the digital signal into an analog audio signal, and analog low pass filter 72 filters the analog audio signal to pass a signal in the frequency range of approximately 20 Hz to 20 KHz. *Id.* at 4:26–31. The signal is then passed to power amplifier 74, which powers headphone speakers 75 to provide high quality, low distortion music to a user wearing headphones 55. *Id.* at 4:31–35.

E. Illustrative Claim

Of the challenged claims, claim 17 is independent. Claim 17 is reproduced below.

17. 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:
 - encode a first representation of an audio signal to reduce intersymbol interference associated with a transmitted representation of the audio signal;
 - perform at least one of a plurality of modulations on the first representation of the audio signal;
 - 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

use the modulated signal and independent code division multiple access communication to wirelessly transmit a transmitted representation of the audio signal.

Ex. 1001, 6:46–64.

F. Evidence of Record

Petitioner submits the following evidence of record:

Evidence	Exhibit No.
Declaration of Regis J. Bates Jr. (“Bates Declaration”)	1002
Bernard Sklar, DIGITAL COMMUNICATIONS FUNDAMENTALS AND APPLICATIONS (Reynold Rieger ed., 1988) (“Sklar”)	1003
Jaap C. Haartsen, <i>The Bluetooth Radio System</i> , IEEE Personal Communications, Vol. 7, No. 1 (Feb. 2000) (“Haartsen”)	1005
John B. Groe, CDMA MOBILE RADIO DESIGN (2000) (“Groe”)	1009
Ham Inhwa, KR 2000-0006888, published Apr. 25, 2000 (“Ham”)	1010
Xiang-Gen Xia, <i>New Precoding for Intersymbol Interference Cancellation Using Nonmaximally Decimated Multirate Filterbanks with Ideal FIR Equalizers</i> , IEEE Transactions on Signal Processing, Vol. 45, No. 10 (Oct. 1997) (“Xia”)	1011
Dirschedl, US 6,262,994 B1, issued July 17, 2001 (“DirschedeI”)	1037
Matero, WO 00/76109 A1, published Dec. 14, 2000 (“Matero”)	1038

Patent Owner submits the Declaration of Joseph C. McAlexander.

Ex. 2001 (“McAlexander Declaration”).

G. Challenges to Patentability

Petitioner asserts that the challenged claims are unpatentable on the following grounds:

Claim(s) Challenged	35 U.S.C. §	Reference(s)/Basis
17–20	103	Ham, Sklar, Xia, Groe, Dirschedl, Matero

Claim(s) Challenged	35 U.S.C. §	Reference(s)/Basis
17–20	103	Ham, Sklar, Xia, Groe, Dirschedl, Matero, Haartsen

II. ANALYSIS

A. Level of Ordinary Skill in the Art

Petitioner contends that a person of ordinary skill in the art “would have possessed at least a bachelor’s degree in electrical engineering and two years’ experience in wireless communications systems design or implementation, or equivalent.” Pet. 6 (citing Ex. 1002 ¶ 11). For purposes of the Preliminary Response, Patent Owner does not contest Petitioner’s proposed level of ordinary skill. Prelim. Resp. 6–7. At this stage of the proceeding, we adopt Petitioner’s assessment of the level of ordinary skill in the art, which is consistent with the ’047 patent and the asserted prior art of record.

B. Claim Construction

A claim “shall be construed using the same claim construction standard that would be used to construe the claim in a civil action under 35 U.S.C. § 282(b).” 37 C.F.R. § 42.100(b) (2020). Petitioner requests that the Board adopt the constructions of several claim terms from the ITC investigation. Pet. 7. Pertinent to this Decision, Petitioner requests that the Board adopt the ITC’s construction of the two terms¹ listed below:

¹ Petitioner also requests that we adopt the ITC’s constructions of one additional claim term, “reduced intersymbol interference coding.” Pet. 7. We need not construe this claim term, however, to resolve the issues presented in the Petition.

Claim Term	ITC's Construction
"configured for independent CDMA communication operation"	"configured for code division multiple access (CDMA) communication operation performed independent of any central control"
"unique user code"	"fixed code (bit sequence) specifically associated with one user of a device(s)"

Id. Patent Owner states that, at this stage of the proceeding, it does not contest Petitioner's proposed constructions of these claim terms. Prelim. Resp. 6.

For purposes of this Decision, we adopt Petitioner's proposed constructions. We, therefore, construe "configured to . . . use . . . independent code division multiple access communication" to mean "configured for code division multiple access (CDMA) communication operation performed independent of any central control," and "unique user code" to mean "fixed code (bit sequence) specifically associated with one user of a device(s)." Based on our review of the Petition and Preliminary Response, we do not believe that any other claim terms require express construction at this stage of the proceeding. *See Nidec Motor Corp. v. Zhongshan Broad Ocean Motor Co. Ltd.*, 868 F.3d 1013, 1017 (Fed. Cir. 2017); *Vivid Techs., Inc. v. Am. Sci. & Eng'g, Inc.*, 200 F.3d 795, 803 (Fed. Cir. 1999) ("[O]nly those terms need be construed that are in controversy, and only to the extent necessary to resolve the controversy.").

C. Ground 1: Alleged Obviousness of Claims 17–20 over Ham, Sklar, Xia, Groe, Dirschedl, and Matero

Petitioner argues that claims 17–20 would have been obvious over Ham, Sklar, Xia, Groe, Dirschedl, and Matero. Pet. 15–61. For the reasons discussed below, Petitioner does not demonstrate a reasonable likelihood of

prevailing in showing that claims 17–20 would have been obvious over Ham, Sklar, Xia, Groe, Dirschedl, and Matero.

1. Overview of Ham (Ex. 1010)

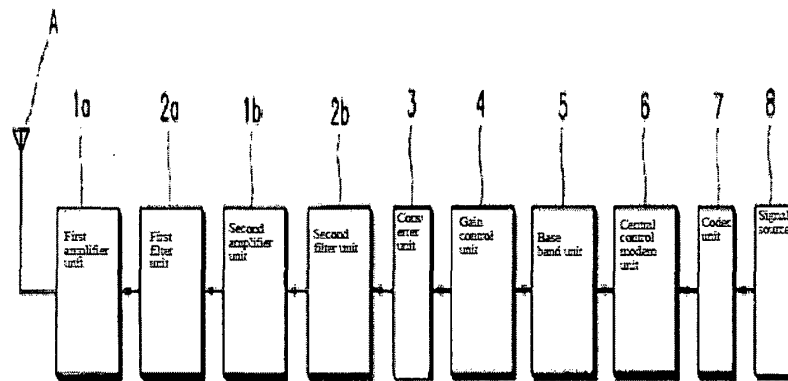
Ham is a Korean patent application publication that is directed to “a wireless head phone transmission and reception circuit,” and, in particular, “relates to a code division type transmission circuit and wireless headphone reception circuit that transmit[s] and receive[s] signals using the Code Division Multiple Access (CDMA) method.” Ex. 1010, 2. Ham explains that:

[T]he code division multiple access method (hereinafter referred to as the code division method) is a method of sharing a frequency by extending a signal into a frequency band that is much wider than the bandwidth of the required amount of information. In other words, it shares all frequency and time and maintains orthogonality with a unique code assigned to it. In this case, in the code division method, a signal to be transmitted is extended by receiving a unique Pseudo Random (PN) code.

Id.

Ham discloses a transmission circuit for wirelessly transmitting a signal in Figure 1, reproduced below:

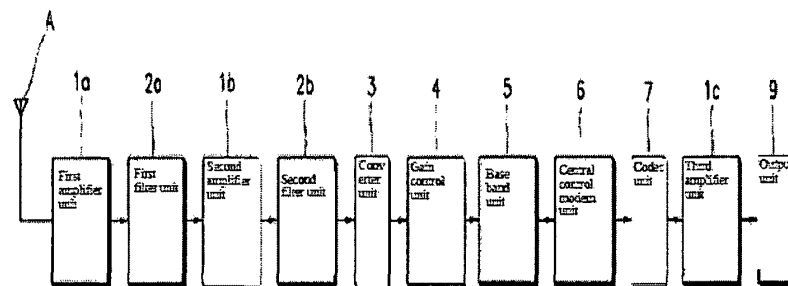
FIG. 1



Id. at Fig. 1. As shown in Figure 1, the transmission circuit includes antenna A, codec unit 7 for encoding a signal applied from signal source 8, central control modem unit 6 for performing error correction on the signal output from codec unit 7, base band unit 5 that receives the output of central control modem unit 6, converts it into an intermediate frequency, and outputs the converted signal, and amplifier, filter, converter, and gain control units 1a, 2a, 1b, 2b, 3, and 4. *Id.* at 2.

Ham discloses a wireless headphone receiving circuit in Figure 2, reproduced below:

FIG. 2



Id. at Fig. 2. As shown in Figure 2, the receiving circuit includes antenna A for receiving the wireless signal, base band unit 5 for processing the gain controlled signal, central control modem unit 6 for removing an error correction and pseudorandom code, codec unit 7 for decoding the audio signal, and amplifier unit 1c that amplifies the signal from codec unit 7 and passes it to output unit 9. *Id.* at 2.

2. *Overview of Sklar (Ex. 1003)*

Sklar is a textbook entitled “Digital Communications: Fundamentals and Applications,” and “presents the ideas and techniques fundamental to digital communication systems.” Ex. 1003, 22.² Specifically, Sklar discusses “spread-spectrum” systems in which “the transmission bandwidth employed is much greater than the minimum bandwidth required to transmit the information.” *Id.* at 384. “Spreading,” Sklar explains, “is accomplished by means of a *spreading signal*, often called a *code signal*, which is independent of the data.” *Id.* At the receiver, “despreading” (recovering the original data) “is accomplished by the correlation of the received spread signal with a synchronized replica of the spreading signal used to spread the information.” *Id.*

Sklar further explains that code division multiple access (CDMA) is a technique that uses spread-spectrum methods for multiple access “in order to share a communications resource among numerous users in a coordinated manner.” *Id.* at 388–389. In CDMA, “each simultaneous user employs a unique spread-spectrum signaling code,” which “provide[s] communication privacy between users with different spreading signals.” *Id.* at 389. Thus,

² We cite to the exhibit page numbers added by Petitioner.

“[a]n unauthorized user (a user not having access to a spreading signal) cannot easily monitor the communications of the authorized users.” *Id.*

3. *Independent Claim 17*

Claim 17 recites a “portable spread spectrum audio transmitter” that is “configured to . . . use . . . independent code division multiple access communication to wirelessly transmit a transmitted representation of the audio signal.” Ex. 1001, 6:62–64. As discussed above, Petitioner requests that we construe the phrase “configured to use independent code division multiple access communication” to mean “configured for code division multiple access (CDMA) communication operation performed independent of any central control,” and Patent Owner does not dispute this construction. Pet. 7; Prelim. Resp. 6; *see* Section II.B.

Petitioner asserts that “Ham’s CDMA is ‘independent’ because Ham discloses and suggests a one-to-one correspondence between a transmission circuit and reception circuit.” Pet. 49 (citing Ex. 1010, 2–3, Figs. 1–2) (emphasis omitted). Petitioner also asserts that “Ham nowhere suggests any control or coordination of communications between transmission and reception circuits by a centralized facility.” *Id.* (citing Ex. 1002 ¶¶ 372–379).

Patent Owner responds that Petitioner’s “citations establish only that Ham’s transmission circuit transmits signals to the reception circuit using the CDMA method,” and “[n]othing in those citations mentions any supposed ‘one-to-one correspondence.’” Prelim. Resp. 26–27 (citing Ex. 1002 ¶ 373). Patent Owner also responds that Petitioner “ignores the evidence pointing to Ham’s use of centralized control, such as Ham’s express disclosure that its code division method ‘maintains orthogonality.’”

Id. at 28 (citing Pet. 49; Ex. 1002 ¶ 373; Ex. 1010, 2). According to Patent Owner, “[o]ne of ordinary skill in the art would [] understand that maintaining orthogonality is an indication of centralized control.” *Id.* at 29 (citing Ex. 2001 ¶ 16).

On this record, Petitioner does not show sufficiently that Ham teaches “independent code division multiple access communication” under the claim construction agreed to by the parties and adopted for purposes of this Decision. As discussed above, at this stage of the proceeding, the parties agree to the ITC’s construction of the phrase “configured to . . . use . . . independent code division multiple access communication” as “configured for code division multiple access (CDMA) communication operation performed independent of any central control.” The ITC’s construction is consistent with the ’047 patent’s disclosure of a CDMA system that uses a code generator in the transmitter to create a unique spreading code, rather than receiving the spreading code from a central controller. Ex. 1001, 2:60–66 (disclosing that “[t]he battery powered transmitter 20 may contain a code generator 44 that may be used to create a unique user code” that “is specifically associated with one wireless digital audio system user”); Ex. 1002 ¶ 263. Thus, the ’047 patent’s system performs “independent code division multiple access communication” by having the transmitter generate the CDMA spreading code, rather than by having it be assigned by a central system.

Petitioner, though, does not show sufficiently that Ham teaches CDMA performed independent of any central control. Ham teaches a CDMA system that “shares all frequency and time and *maintains orthogonality* with a unique code assigned to it.” Ex. 1010, 2 (emphasis

added). Patent Owner presents evidence that Ham's teaching that its CDMA system "maintains orthogonality" indicates that it depends on a central controller to assign the spreading codes. Prelim. Resp. 29–30; Ex. 2001 ¶ 16. Specifically, Patent Owner's declarant, Mr. McAlexander, explains that "in a wireless communications system in which multiple user devices communicate wirelessly in the same frequency and time, orthogonality can only be maintained by providing each user device with a spreading code known to be orthogonal to each spreading code being used by another user device." Ex. 2001 ¶ 16. Mr. McAlexander further explains that "[i]n Ham's system, this would require centralized control ensuring that all Ham's assigned PN codes have a cross-correlation value of zero." *Id.*

Petitioner does not present contrary evidence showing that Ham's orthogonal codes do not require assignment by a central controller. To the contrary, Petitioner's own arguments in Ground 2 (which we address in detail below) support Mr. McAlexander's testimony. Petitioner's Ground 2 relies on a proposed combination that includes Haartsen, which, according to Petitioner, teaches a CDMA system that does not require a central controller. Pet. 61–68; *id.* at 64 ("Haartsen describes the master's *device* identity being transmitted as an access code."); *id.* at 67 ("The transmitter need not . . . be assigned a unique PN code by a third party."); Ex. 1002 ¶¶ 254, 263. Petitioner asserts that one of the reasons it would have been obvious to combine Ham and Haartsen is that Haartsen's CDMA system "can benefit Ham" by "allow[ing] a transmitter to set up a frequency hopping connection with a receiver *in the absence of* any coordination by a third party, such as a central controller." Pet. 67 (emphasis added); *see* Ex. 1002 ¶ 263. In other words, Petitioner argues that using Haartsen's CDMA system would have

benefitted Ham by eliminating Ham's need for coordination by a central controller. Pet. 67; Ex. 1002 ¶ 263. This appears to be an acknowledgement by Petitioner that Ham's CDMA system involves coordination by a central controller.

As discussed above, for Ground 1, Petitioner relies solely on Ham as teaching "independent code division multiple access communication." Pet. 48–49. But, for the foregoing reasons, the evidence of record at this stage of the proceeding indicates that Ham's CDMA system depends on a central controller in order to assign codes in a manner that maintains orthogonality, and, thus, does not teach CDMA performed "independent of any central control," as required by Petitioner's proposed construction. As a result, Petitioner does not demonstrate a reasonable likelihood of prevailing in showing that claim 17 would have been obvious over Ham, Sklar, Xia, Groe, Dirschedl, and Matero.

4. Dependent Claims 18–20

Claims 18–20 depend from claim 17. Petitioner's arguments and evidence regarding these dependent claims do not compensate for the deficiencies discussed above for claim 17. *See* Pet. 49–61. Thus, for the same reasons discussed above for claim 17, Petitioner does not demonstrate a reasonable likelihood of prevailing in showing that claims 18–20 would have been obvious over Ham, Sklar, Xia, Groe, Dirschedl, and Matero.

5. Summary

For the foregoing reasons, Petitioner does not demonstrate a reasonable likelihood of prevailing in showing that claims 17–20 would have been obvious over Ham, Sklar, Xia, Groe, Dirschedl, and Matero.

D. Ground 2: Alleged Obviousness of Claims 17–20 over Ham, Sklar, Xia, Groe, Dirschedl, Matero, and Haartsen

Petitioner argues that claims 17–20 would have been obvious over Ham, Sklar, Xia, Groe, Dirschedl, Matero, and Haartsen. Pet. 61–68. For the reasons discussed below, Petitioner does not demonstrate a reasonable likelihood of prevailing in showing that claims 17–20 would have been obvious over Ham, Sklar, Xia, Groe, Dirschedl, Matero, and Haartsen.

1. Overview of Haartsen (Ex. 1005)

Haartsen is an article from *IEEE Personal Communications* entitled “The Bluetooth Radio System.” Ex. 1005, 4.³ Haartsen describes the “Bluetooth technology” as “a new universal radio interface” that “has been developed enabling electronic devices to communicate wirelessly via short-range ad hoc radio connections.” *Id.* Haartsen explains that Bluetooth uses frequency hopping CDMA (“FH-CDMA”) for its multiple access scheme. *Id.* at 5–6. The particular frequency hopping sequence is determined by the unit that controls the FH channel, which is called the “master,” and the master’s native clock also defines the phase in the hopping sequence. *Id.* at 6. The other participants in the communication are called “slaves,” and use the master identity to select the same hopping sequence and add time offsets to their respective native clocks to synchronize to the frequency hopping. *Id.*

Haartsen explains that the Bluetooth system uses packet-based transmission in which each packet starts with an access code, followed by a packet header, and ending with the user payload. *Id.* at 7. The access code “has pseudo-random properties” and “includes the identity of the piconet

³ We cite to the exhibit page numbers added by Petitioner.

master.” *Id.* All packets exchanged on the channel are identified by this master identity, and the packet will only be accepted by the recipient if the access code matches the access code corresponding to the piconet master. *Id.*

2. Independent Claim 17

Ground 2 builds on Petitioner’s alternative mapping in Ground 1 that relies on Sklar’s FH-CDMA to teach the “unique user code” required by claim 17. Pet. 61–63. In Ground 1, Petitioner asserts that a key feature of Sklar’s FH-CDMA is that “[e]ach user employs a pseudonoise (PN) code, **orthogonal (or nearly orthogonal) to all other user codes**, that dictates the frequency hopping band assignments,” and argues that this PN code is the “unique user code” recited in claim 17. *Id.* at 28–29 (emphasis altered). In Ground 2, Petitioner relies on Haartsen’s Bluetooth implementation of FH-CDMA in lieu of Sklar’s FH-CDMA system. *Id.* at 61–63. More specifically, Petitioner argues in Ground 2 that Haartsen teaches a “unique user code” determined from the device identity of a Bluetooth transmitter that is used to define the frequency hop sequence, rather than relying on Sklar’s orthogonal PN codes to teach the “unique user code” for defining the frequency hop sequence, as in Ground 1. *Id.* at 63.

Petitioner explains that it is including Ground 2 because “Patent Owner’s Infringement Contentions appear to interpret the ‘**unique user code**’ as met by Bluetooth’s use of a *device* address associated with the transmitter.” Pet. 61 (citing Ex. 1016, Ex. C at 2–3). According to Petitioner, Patent Owner “appears to apply an interpretation of ‘**unique user code**’ that would be met by (current) Bluetooth’s use of a *device* identity associated with the transmitter (‘master’), from which the hop pattern and

channel access code are derived.” *Id.* at 62. Petitioner states that it disputes Patent Owner’s apparent construction of “unique user code” as applying to Bluetooth’s device-based codes because “[t]he ITC construed ‘**unique user code**’ as a ‘fixed code (bit sequence) **specifically associated with one user** of a device(s).’” *Id.* at 14. However, Petitioner asserts, although it “does not agree with Patent Owner’s apparent interpretation,” if maintained it “‘will read on the prior art,’” as disclosed by Haartsen. *Id.* at 62.

Petitioner goes on to assert that Haartsen discloses a Bluetooth system in which the frequency hop sequence is determined from the *device* identity of a transmitter known as the “master.” *Id.* at 63 (citing Ex. 1005, 30, 33, Fig. 7). According to Petitioner, “[t]his manner of using a specific device’s identity to determine the hop sequence is substantially similar to present-day Bluetooth’s frequency hopping functionality cited by Patent Owner for transmission of a ‘**unique user code**.’” *Id.* (citing Ex. 1002 ¶¶ 252–253, 397–398; Ex. 1016, Ex. C at 26–27). Petitioner further argues that Haartsen describes the master’s device identity being transmitted as an access code with each packet, which “is substantially similar to Patent Owner’s apparent reliance on transmission of a channel access code with each packet in present-day Bluetooth.” *Id.* at 64 (citing Ex. 1002 ¶ 251; Ex. 1005, 31, Fig. 3; Ex. 1016, Ex. C at 2–3).

As noted above, Patent Owner does not contest Petitioner’s (and the ITC’s) proposed construction of “unique user code.” Prelim. Resp. 6; *see* Section II.B. Patent Owner also does not address the issue of whether the term “unique user code” is met by Haartsen’s determination of the frequency hop sequence from the device identity of the master. *See generally* Prelim. Resp. Instead, Patent Owner argues that Petitioner fails to establish a

motivation to substitute Sklar's FH-CDMA method for Ham's DS-CDMA method, or to substitute Ham's CDMA method with Haartsen's FH-CDMA method. *Id.* at 33–39.

Petitioner does not show a reasonable likelihood of unpatentability of claim 17 because Petitioner has not shown sufficiently that Haartsen discloses a “unique user code” under the claim construction agreed by the parties and adopted in this Decision. As discussed above, the parties agreed to adopt the ITC's construction of “unique user code” as a “fixed code (bit sequence) specifically associated with one user of a device(s).” *See* Section II.B. In setting forth this construction, the ITC emphasized that its “construction makes clear that *the fixed code is associated with ‘one user (of a device(s))’ and not a ‘user’s device.’*” Ex. 1030, 37 (emphasis added). We agree with the ITC that this understanding flows from the ordinary meaning of the construction adopted, and note that Petitioner appears to rely on it as well. *See* Pet. 14 (“The ITC construed ‘**unique user code**’ as a ‘fixed code (bit sequence) **specifically associated with one user** of a device(s).’”). Petitioner, however, fails to show that Haartsen discloses a unique user code that is associated with *one user of a device, rather than a device itself*.

Indeed, Petitioner acknowledges that “in prior art Bluetooth as described in Haartsen, the frequency hop sequence is determined from the *device* identity of a transmitter known as the ‘master,’” rather than from a user associated with the device. *Id.* at 63. Petitioner's assertion is supported by Haartsen's disclosure, which states that the frequency hop sequence is determined by the device identity of the “master” transmitter. As Haartsen explains:

The particular sequence is determined by the unit that controls the FH channel, which is called the *master*. The native clock of the master unit also defines the phase in the hopping sequence. **All other participants on the hopping channel are *slaves*, they use the master identity to select the same hopping sequence** and add time offsets to their respective native clocks to synchronize to the frequency hopping.

Ex. 1005, 6 (emphasis added). Thus, Haartsen discloses that the code that determines the frequency hop sequence is based on the identity of the master device, rather than being associated with “one user of a device,” as required by the parties’ agreed construction of “unique user code.”

Consequently, Petitioner does not show a reasonable likelihood that independent claim 17 is unpatentable over Ham, Sklar, Xia, Groe, Dirschedl, Matero, and Haartsen.

3. Dependent Claims 18–20

Claims 18–20 depend from claim 17. Petitioner’s arguments and evidence regarding these dependent claims do not compensate for the deficiencies discussed above for claim 17. *See* Pet. 49–61, 68. Thus, for the same reasons discussed above for claim 17, Petitioner does not demonstrate a reasonable likelihood of prevailing in showing that claims 18–20 would have been obvious over Ham, Sklar, Xia, Groe, Dirschedl, Matero, and Haartsen.

4. Summary

For the foregoing reasons, Petitioner does not demonstrate a reasonable likelihood of prevailing in showing that claims 17–20 would have been obvious over Ham, Sklar, Xia, Groe, Dirschedl, Matero, and Haartsen.

III. CONCLUSION

Petitioner does not demonstrate a reasonable likelihood of prevailing in showing that at least one of the challenged claims of the '047 patent is unpatentable.

IV. ORDER

It is hereby

ORDERED that the Petition is denied, and no trial is instituted.

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