PTO/AIA/15 (03-13)
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UTILITY PATENT APPLICATION TRANSMITTAL

(Only for new nonprovisional applications under 37 CFR 1.53(b))

Attorney Docket No.	1028.10
First Named Inventor	C. Earl Woolfork
Title	Wireless Digital Audio Syster
Express Mail Label No.	

APPLICATION ELEMENTS

See MPEP chapter 600 concerning utility patent application contents.

1. [✓] **Fee Transmittal Form** (PTO/SB/17 or equivalent)
2. [✓] **Applicant asserts small entity status.** See 37 CFR 1.27
3. [ ] **Applicant certifies micro entity status.** See 37 CFR 1.29. Applicant must attach form PTO/SB/15A or B or equivalent.
4. [✓] **Specification** [*Total Pages* 7] Both the claims and abstract must start on a new page. *(See MPEP § 608.01(a) for information on the preferred arrangement)*
5. [✓] **Drawing(s)** (35 U.S.C. 113) [*Total Sheets* 3]
6. **Inventor's Oath or Declaration** [*Total Pages* ____] *(including substitute statements under 37 CFR 1.64 and assignments serving as an oath or declaration under 37 CFR 1.63(e))*
   a. [ ] Newly executed (original or copy)
   b. [✓] A copy from a prior application (37 CFR 1.63(d))
7. [✓] **Application Data Sheet** ** See note below.* See 37 CFR 1.76 (PTO/AIA/14 or equivalent)
8. **CD-ROM or CD-R** in duplicate, large table, or Computer Program (*Appendix*)
   [ ] Landscape Table on CD
9. **Nucleotide and/or Amino Acid Sequence Submission** (*if applicable, items a. – c. are required*)
   a. [ ] Computer Readable Form (CRF)
   b. [ ] Specification Sequence Listing on:
      i. [ ] CD-ROM or CD-R (2 copies); or
      ii. [ ] Paper
   c. [ ] Statements verifying identity of above copies

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

ACCOMPANYING APPLICATION PAPERS

10. [ ] **Assignment Papers** (cover sheet & document(s)) Name of Assignee ____
11. [ ] **37 CFR 3.73(c) Statement** (*when there is an assignee*) [ ] **Power of Attorney**
12. [ ] **English Translation Document** (*if applicable*)
13. [ ] **Information Disclosure Statement** (PTO/SB/08 or PTO-1449) [ ] Copies of citations attached
14. [ ] **Preliminary Amendment**
15. [ ] **Return Receipt Postcard** (*MPEP § 503*) (*Should be specifically itemized*)
16. [ ] **Certified Copy of Priority Document(s)** (*if foreign priority is claimed*)
17. [ ] **Nonpublication Request** Under 35 U.S.C. 122(b)(2)(B)(i). Applicant must attach form PTO/SB/35 or equivalent.
18. [ ] **Other:** ____

*Note: (1) Benefit claims under 37 CFR 1.78 and foreign priority claims under 1.55 **must** be included in an Application Data Sheet (ADS).
(2) For applications filed under 35 U.S.C. 111, the application must contain an ADS specifying the applicant if the applicant is an assignee, person to whom the inventor is under an obligation to assign, or person who otherwise shows sufficient proprietary interest in the matter. See 37 CFR 1.46(b).

19. CORRESPONDENCE ADDRESS

[✓] The address associated with Customer Number: 68533 **OR** [ ] Correspondence address below

Name					
Address					
City		State		Zip Code	
Country		Telephone		Email	

Signature	/Megan Lyman/	Date	1/21/2016
Name (Print/Type)	Megan Lyman	Registration No. (Attorney/Agent)	57054

This collection of information is required by 37 CFR 1.53(b). 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 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.

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.

Electronic Patent Application Fee Transmittal

Application Number:	
Filing Date:	
Title of Invention:	Wireless Digital Audio System
First Named Inventor/Applicant Name:	C. Earl Woolfork
Filer:	Megan Elizabeth Lyman
Attorney Docket Number:	1028.10

Filed as Small Entity

Filing Fees for Utility under 35 USC 111(a)

Description	Fee Code	Quantity	Amount	Sub-Total in USD($)
Basic Filing:				
Utility filing Fee (Electronic filing)	4011	1	70	70
Utility Search Fee	2111	1	300	300
Utility Examination Fee	2311	1	360	360
Pages:				
Claims:				
Miscellaneous-Filing:				
Petition:				
Patent-Appeals-and-Interference:				

Description	Fee Code	Quantity	Amount	Sub-Total in USD($)
Post-Allowance-and-Post-Issuance:				
Extension-of-Time:				
Miscellaneous:				
		Total in USD ($)		**730**

Electronic Acknowledgement Receipt	
EFS ID:	24689574
Application Number:	15003242
International Application Number:	
Confirmation Number:	8992
Title of Invention:	Wireless Digital Audio System
First Named Inventor/Applicant Name:	C. Earl Woolfork
Customer Number:	68533
Filer:	Megan Elizabeth Lyman
Filer Authorized By:	
Attorney Docket Number:	1028.10
Receipt Date:	21-JAN-2016
Filing Date:	
Time Stamp:	16:12:13
Application Type:	Utility under 35 USC 111(a)

Payment information:

Submitted with Payment	yes
Payment Type	Credit Card
Payment was successfully received in RAM	$730
RAM confirmation Number	3086
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	Abstract	ABSTRACT.pdf	40960 47b27be5a8b667f99a555a0e93591a0975ce4b7f	no	1
Warnings:					
Information:					
2	Application Data Sheet	ADSfilled.pdf	1823436 3071b71b2e020f15e5d8343bf01144d4471d434d	no	9
Warnings:					
Information:					
3	Claims	Claims.pdf	50650 561c27188360725e37f4961d8ed675af677e3541	no	3
Warnings:					
Information:					
4	Drawings-only black and white line drawings	Drawings.pdf	3282322 f05bec01d957cb6c26adbf2533357a98f0d4d78f	no	3
Warnings:					
Information:					
5	Oath or Declaration filed	Declaration.pdf	549175 f13cb35d23e78ca1104bc38444833757fa7a6105	no	1
Warnings:					
Information:					
6	Specification	Spec.pdf	76595 a30ce15b57086ae7ce3cd385b2eeedc51f0c9e96	no	7
Warnings:					
Information:					
7	Oath or Declaration filed	CoverSheetForDeclaration.pdf	77928 98503c13d25cbee4c1eb1d3213cee27f8674e625	no	1
Warnings:					
Information:					

8	Transmittal of New Application	transmittalsheet.pdf	208136 c8414e915f4b0b200cc35ce73e9595a783dc7a19	no	2
Warnings:					
Information:					
9	Fee Worksheet (SB06)	fee-info.pdf	34594 b34674f694c040463daa60dbb123156dff67aaab	no	2
Warnings:					
Information:					
		Total Files Size (in bytes):	6143796		

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.

ABSTRACT

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.

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Application Data Sheet 37 CFR 1.76	Attorney Docket Number	1028.10
	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
Mrs.	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. — Add

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	68533		
Email Address	melyman@lymanpatents.com	Add Email	Remove Email

Application Information:

Title of the Invention	Wireless Digital Audio Music System		
Attorney Docket Number	1028.10	Small Entity Status Claimed	☒
Application Type	Nonprovisional		
Subject Matter	Utility		
Total Number of Drawing Sheets (if any)	3	Suggested Figure for Publication (if any)	1

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Application Data Sheet 37 CFR 1.76	Attorney Docket Number	1028.10
	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.

Please Select One:	● Customer Number	US Patent Practitioner	○ Limited Recognition (37 CFR 11.9)
Customer Number	68533		

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	17775754	2013-02-25

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Application Data Sheet 37 CFR 1.76	Attorney Docket Number	1028.10
	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)
17754753	Continuation of	13356949	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)
13356949	Continuation of	12940747	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)
12940747	Continuation of	12570343	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)
12570343	Continuation of	12144729	2008-07-12	7684885	2010-03-03
Prior Application Status	Patented			Remove
Application Number	Continuity Type	Prior Application Number	Filing Date (YYYY-MM-DD)	Patent Number	Issue Date (YYYY-MM-DD)
12144729	Continuation of	10648012	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)	
10648012	Continuation in part of	10027391	2001-12-21	

Additional Domestic Benefit/National Stage Data may be generated within this form by selecting the **Add** button. Add

Foreign Priority Information:

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)[i] 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).

Remove

Application Number	Country[i]	Filing Date (YYYY-MM-DD)	Access Code[i] (if applicable)

Additional Foreign Priority Data may be generated within this form by selecting the **Add** button. Add

EFS Web 2.2.12

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Application Data Sheet 37 CFR 1.76	Attorney Docket Number	1028.10
	Application Number	
Title of Invention	Wireless Digital Audio Music System	

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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Application Data Sheet 37 CFR 1.76	Attorney Docket Number	1028.10
	Application Number	
Title of Invention	Wireless Digital Audio Music System	

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.

2. Opt-Out of Authorizations to Permit Access by a Foreign Intellectual Property Office(s)

☐ A. Applicant **DOES NOT** authorize the USPTO to permit a participating foreign IP office access to the instant application-as-filed. If this box is checked, the USPTO will not be providing a participating foreign IP office with any documents and information identified in subsection 1A above.

☐ 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.

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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Application Data Sheet 37 CFR 1.76	Attorney Docket Number	1028.10
	Application Number	
Title of Invention	Wireless Digital Audio Music System	

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:

If the Applicant is an Organization check here. ☐

Prefix	**Given Name**	Middle Name	**Family Name**	Suffix

Mailing Address Information For Applicant:

Address 1			
Address 2			
City		**State/Province**	
Country		Postal Code	
Phone Number		Fax Number	
Email Address			

Additional Applicant Data may be generated within this form by selecting the Add button. Add

Assignee Information including Non-Applicant Assignee 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.

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Application Data Sheet 37 CFR 1.76	Attorney Docket Number	1028.10
	Application Number	
Title of Invention	Wireless Digital Audio Music System	

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.

Remove

If the Assignee or Non-Applicant Assignee is an Organization check here. ☐

Prefix	**Given Name**	Middle Name	**Family Name**	Suffix

Mailing Address Information For Assignee including Non-Applicant Assignee:

Address 1			
Address 2			
City		**State/Province**	
Country i		Postal Code	
Phone Number		Fax Number	
Email Address			

Additional Assignee or Non-Applicant Assignee Data may be generated within this form by selecting the Add button. Add

Signature:

Remove

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This Application Data Sheet **must** be signed by a patent practitioner if one or more of the applicants is a **juristic entity** (e.g., corporation or association). If the applicant is two or more joint inventors, this form must be signed by a patent practitioner, **all** joint inventors who are the applicant, or one or more joint inventor-applicants who have been given power of attorney (e.g., see USPTO Form PTO/AIA/81) on behalf of **all** joint inventor-applicants.

See 37 CFR 1.4(d) for the manner of making signatures and certifications.

Signature	/Megan Lyman/			Date (YYYY-MM-DD)	2016-01-21
First Name	Megan Lyman	Last Name	Lyman	Registration Number	57054

Additional Signature may be generated within this form by selecting the Add button. Add

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Application Data Sheet 37 CFR 1.76	Attorney Docket Number	1028.10
	Application Number	
Title of Invention	Wireless Digital Audio Music System	

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.**

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 the Freedom of Information Act requires disclosure of these records.

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 CooperationTreaty.

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 inspections 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.

1. A wireless digital audio spread spectrum receiver, capable of mobile operation, configured to receive a unique user code and an audio signal representation from a digital audio spread spectrum transmitter in the form of packets, said audio signal representation representative of audio from an audio source, said digital audio spread spectrum receiver directly communicable with said digital audio transmitter, said digital audio spread spectrum receiver comprising;

a direct conversion module configured to capture packets and the correct bit sequence within the packets, lowering signal detection error through reduced intersymbol interference coding of said audio representation signal respective to mobile said digital audio spread spectrum receiver and said digital audio spread spectrum transmitter, said packets embedded in a received spread spectrum signal, the captured packets corresponding to the unique user code;

a digital demodulator configured for independent code division multiple access communication operation;

a decoder operative to decode reduced intersymbol interference coding of said audio signal representation;

a digital-to-analog converter (DAC) generating an audio output of said original audio signal representation; and

a module adapted to reproduce said generated audio output, wherein each user has their spread spectrum receiver configured to communicate with said digital audio spread spectrum transmitter, said audio having been wirelessly transmitted from said audio source such that signals not originating from said digital audio spread spectrum transmitter are inaudible while operating in the wireless digital audio spread spectrum transmitter spectrum.

2. The wireless digital audio spread spectrum receiver of Claim 1, wherein the wireless digital audio spread spectrum receiver having a differential phase shift keying (DPSK) implementation and a digital demodulator implementation for spread spectrum reception.

3. A wireless digital audio spread spectrum receiver configured to receive a unique user code and an audio signal representation from a mobile digital audio spread spectrum transmitter in the form of packets, said audio signal representation representative of audio from a mobile audio source, said digital audio spread spectrum receiver directly communicable with said mobile digital audio transmitter, said digital audio spread spectrum receiver comprising;

a direct conversion module configured to capture packets and the correct bit sequence within the packets, lowering signal detection error through reduced intersymbol interference coding of said audio representation signal respective to said digital audio spread spectrum receiver and said mobile digital audio spread spectrum transmitter, said packets embedded in a received spread spectrum signal, the captured packets corresponding to the unique user code;

a digital demodulator configured for independent code division multiple access communication operation;

a decoder operative to decode reduced intersymbol interference coding of said audio signal representation;

a digital-to-analog converter (DAC) generating an audio output of said original audio signal representation; and

a module adapted to reproduce said generated audio output, wherein each user has their spread spectrum receiver configured to communicate with their own separate spread spectrum transmitter, said audio having been wirelessly transmitted from said mobile audio source such that signals not originating from said mobile digital audio spread spectrum transmitter are inaudible while operating in the wireless digital audio spread spectrum transmitter spectrum.

4. The wireless digital audio spread spectrum receiver of Claim 3, wherein the wireless digital audio spread spectrum receiver having a differential phase shift keying (DPSK) implementation and a digital demodulator implementation for spread spectrum reception.

5. A portable wireless digital audio transmission system for digital transmission of an audio signal representation from a portable audio source, said audio signal representation representative of audio from said portable audio source, said portable wireless digital audio transmission system comprising:

a mobile digital audio spread spectrum transmitter configured to couple to said portable audio source and transmitting a unique user code bit sequence with said audio signal representation in packet format, and configured for independent code division multiple access (CDMA) communication operation, said mobile digital audio spread spectrum transmitter comprising:

an encoder operative to encode said original audio signal representation to reduce intersymbol interference, lowering signal detection error of said audio signal representation respective to said mobile digital audio spread spectrum transmitter.

6. The portable wireless digital audio transmission system of Claim 5, wherein said mobile digital audio spread spectrum transmitter having a differential phase shift keying (DPSK) implementation and a digital modulator implementation for spread spectrum transmission.

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IPR2025-01540

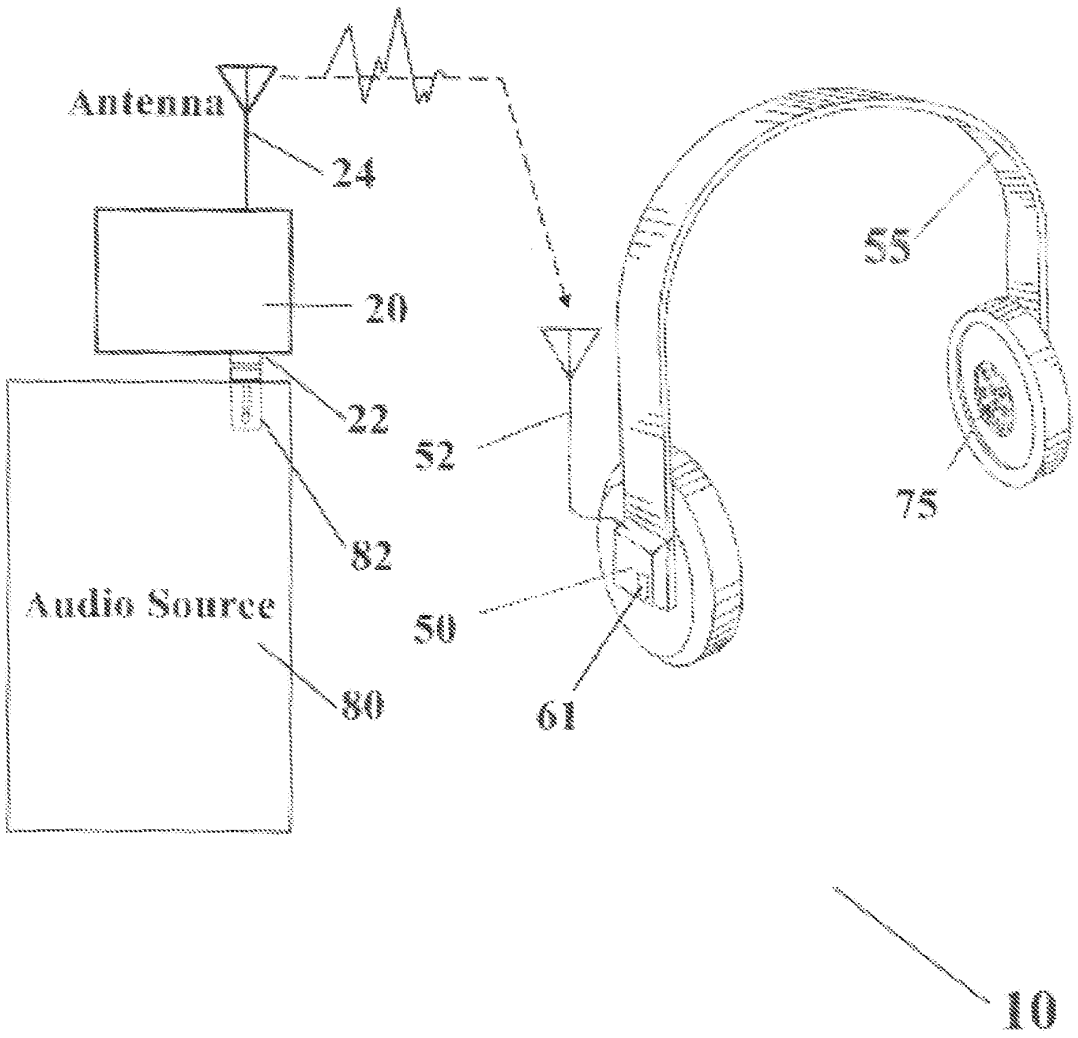


FIG.1

Audio Source
80
Analog Low Pass Filter
30
A-D Converter
32
Digital Low Pass Filter
34
Encoder
36
Channel Encoder
38
Interleaver
40
Modulator
42
Code Generator
44
46
DPSK Transmitter
48
24

FIG. 2

52
Bandpass Filter
54
58
Direct Conversion Receiver
Fuzzy logic Detection Sub-System
Code Generator
60
61
56
Demodulator
62
De-interleaver
64
Viterbi Decoder
66
Source Decoder
68
DAC
70
Analog Low Pass Filter
72
Power Amplifier
74
Headphone Speaker(s)
75

FIG. 3

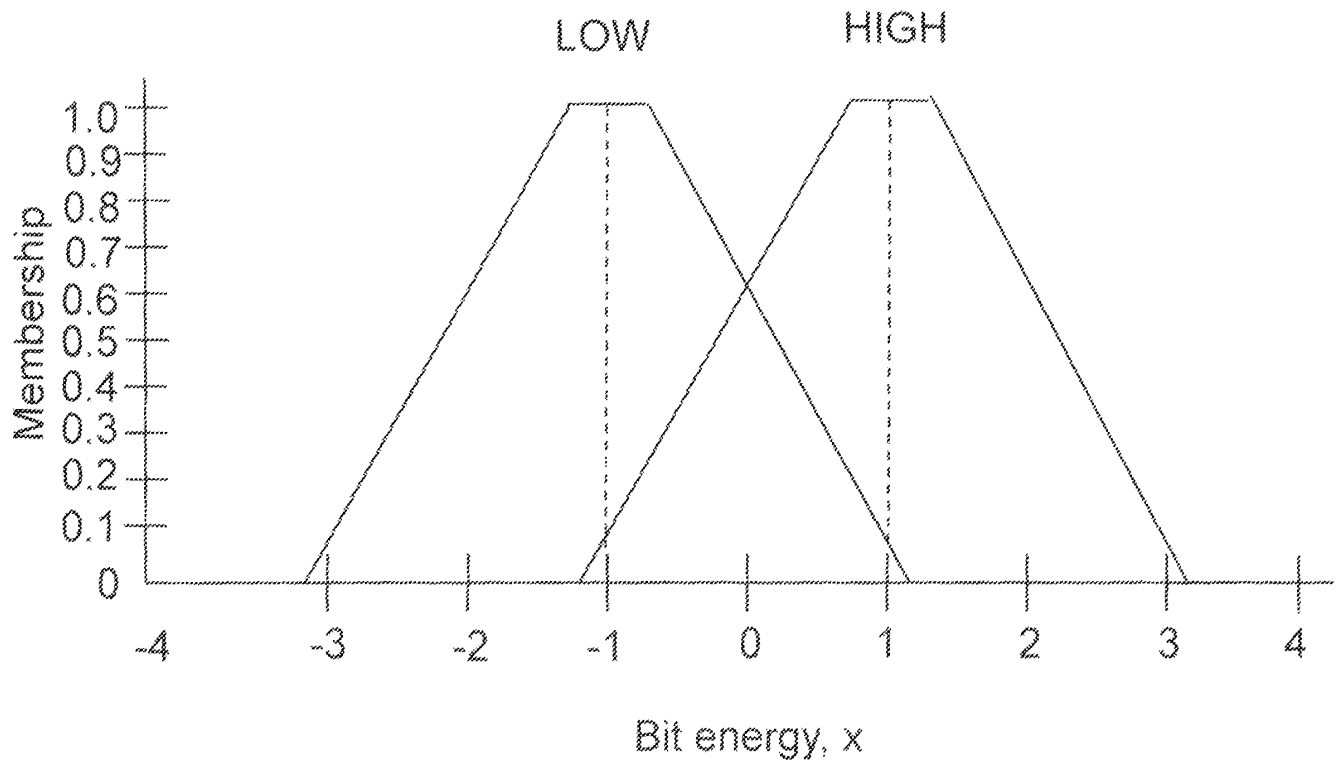

LOW
HIGH
Membership
1.0
0.9
0.8
0.7
0.6
0.5
0.4
0.3
0.2
0.1
0
-4
-3
-2
-1
0
1
2
3
4
Bit energy, x

Fig. 4

COMBINATION DECLARATION AND POWER OF ATTORNEY

As the below named inventor, I hereby declare that this declaration is an original.

INVENTORSHIP IDENTIFICATION

My residence, post office address and citizenship are as stated below next to my name, I believe I am the original, first and sole inventor of the subject matter which is claimed and for which a patent is sought on the invention entitled: **FUZZY AUDIO WIRELESS MUSIC SYSTEM**.

SPECIFICATION IDENTIFICATION

The specification is attached hereto.

ACKNOWLEDGEMENT OF REVIEW OF PAPERS AND DUTY OF CANDOR

I hereby state that I have reviewed and understand the contents of the above identified specification, including the claims, as amended by any amendment referred to above. I acknowledge the duty to disclose information which is material to the examination of this application in accordance with Title 37, Code of Federal Regulations, Section 1.56(a), including information that occurred between the filing date of the prior application and the national filing date of the continuation-in-part application.

PRIORITY CLAIM

I hereby claim foreign priority benefits under Title 35, United States Code, Section 119 of any foreign applications(s) for patent or inventor's certificate or of any PCT international application(s) designating at least one country other than the United States of America listed below and have also identified below any foreign application(s) for patent or inventor's certificate or any PCT international application(s) designating at least one country other than the United States of America filed by me on the same subject matter having a filing date before that of the application(s) of which priority is claimed.

No such applications have been filed.

Dated: 8/20/03

C. EARL WOOLFORK

WIRELESS DIGITAL AUDIO MUSIC SYSTEM

This continuation application claims the benefit of U.S. Patent Application No. 13/775,754 filed February 25, 2013, which is a continuation application claiming benefit of U.S. Patent Application No. 13/356,949 filed January 24, 2012, which was a continuation application claiming the benefit of U.S. Patent Application Serial No. 12/940,747 filed November 5, 2010, now U.S. Patent No. 8,131,391, which was a continuation application claiming the benefit of U.S. Patent Application Serial No. 12/570,343 filed September 30, 2009, now U.S. Patent No. 7,865,258, which was a continuation claiming the benefit of U.S. Patent Application Serial No. 12/144,729 filed July 12, 2008, now U.S. Patent No. 7,684,885, which was a continuation claiming benefit of U.S. Patent Application Serial No. 10/648,012 filed August 26, 2003, now U.S. Patent No. 7,412,294, which was a continuation-in-part claiming benefit from U.S. Patent Application Serial No. 10/027,391, filed December 21, 2001, for "Wireless Digital Audio System," published under US 2003/0118196 A1 on June 26, 2003, now abandoned, the disclosures of which are incorporated herein in their entireties by reference.

BACKGROUND OF THE INVENTION

[0001] 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.

[0002] Use of audio headphones with audio player devices such as portable CD players, portable cassette players, portable A.M./F.M. radios, laptop/desktop computers, portable MP3 players and the like have been in use for many years. These systems incorporate an audio source having an analog headphone jack to which headphones may be connected by wire.

[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

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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 de-interleaver 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 subsethood, 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.

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Continuation from U.S. Patent Application No.: 13/775,754

Attorney Docket No.: 1028.10

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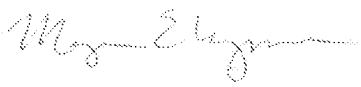
In re Application of:	Art Unit: 2615
C. Earl Woolfork	
For: WIRELESS DIGITAL AUDIO SYSTEM	Customer No.: 68533

COVER LETTER FOR TRANSMITTAL OF CONTINUATION APPLICATION

Dear Sir:

The Applicant respectfully submits this continuation application that claims benefit back to U.S. Patent Application No.: 10/648,012, filed August 26, 2003 which claimed benefit of U.S. Patent Application No. 10/027,391, filed December 21, 2001, now abandoned. Transmitted herewith please find the specification; claims; drawings; application data sheet; a copy of the previously filed declaration in Application No. 10/648,012; and the required fees. Any overpayment or underpayment of fees associated with this filing are authorized to be charged to Deposit Acct. No. 50-4576.

Best Regards,



Megan Lyman, Reg. No. 57,054

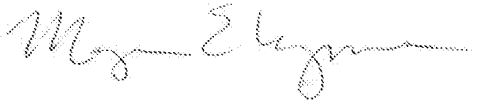
Submission of Supplemental Application Data Sheet

To Whom It May Concern:

The above application was filed January 21, 2015. The Application Data Sheet submitted therewith contained a typographical error. In the Domestic Benefit Section: application number 17/775,754 that application number should read: 13/775,754. A supplemental Application Data Sheet containing this correction is submitted herewith. Please do not hesitate to contact me with any questions or concerns.

February 1, 2016

Respectfully Submitted,



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melyman@lymanpatents.com
(919) 341-4023 (phone)
(919) 341-0271 (fax)

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Electronic Acknowledgement Receipt

EFS ID:	24781273
Application Number:	15003242
International Application Number:	
Confirmation Number:	8992
Title of Invention:	Wireless Digital Audio Music System
First Named Inventor/Applicant Name:	
Customer Number:	68533
Filer:	Megan Elizabeth Lyman
Filer Authorized By:	
Attorney Docket Number:	1028.10
Receipt Date:	01-FEB-2016
Filing Date:	
Time Stamp:	14:43:16
Application Type:	Utility under 35 USC 111(a)

Payment information:

Submitted with Payment	no

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Document Number	Document Description	File Name	File Size(Bytes)/ Message Digest	Multi Part /.zip	Pages (if appl.)
1	Application Data Sheet	ADSfilledCorrected.pdf	1823544 63353cf73a88a589ce992ff6f0498e4523a2e904	no	9
Warnings:					
Information:					

2	Transmittal Letter	TransmittalLetterforNewADS.pdf	68258 b4e06c13d039ad645857b3cebcadcc1e17480df4	no	1
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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.

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Application Data Sheet 37 CFR 1.76	Attorney Docket Number	1028.10
	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
Mrs.	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. Add

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	68533		
Email Address	melyman@lymanpatents.com	Add Email	Remove Email

Application Information:

Title of the Invention	Wireless Digital Audio Music System		
Attorney Docket Number	1028.10	Small Entity Status Claimed	☒
Application Type	Nonprovisional		
Subject Matter	Utility		
Total Number of Drawing Sheets (if any)	3	Suggested Figure for Publication (if any)	1

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Application Data Sheet 37 CFR 1.76	Attorney Docket Number	1028.10
	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.

Please Select One:	● Customer Number	US Patent Practitioner	○ Limited Recognition (37 CFR 11.9)
Customer Number	68533		

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	17775754	2013-02-25

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Application Data Sheet 37 CFR 1.76	Attorney Docket Number	1028.10
	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)
13754753	Continuation of	13356949	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)
13356949	Continuation of	12940747	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)
12940747	Continuation of	12570343	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)
12570343	Continuation of	12144729	2008-07-12	7684885	2010-03-03
Prior Application Status	Patented			Remove
Application Number	Continuity Type	Prior Application Number	Filing Date (YYYY-MM-DD)	Patent Number	Issue Date (YYYY-MM-DD)
12144729	Continuation of	10648012	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)	
10648012	Continuation in part of	10027391	2001-12-21	

Additional Domestic Benefit/National Stage Data may be generated within this form by selecting the **Add** button. Add

Foreign Priority Information:

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)[i] 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).

Remove

Application Number	Country[i]	Filing Date (YYYY-MM-DD)	Access Code[i] (if applicable)

Additional Foreign Priority Data may be generated within this form by selecting the **Add** button. Add

EFS Web 2.2.12

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Application Data Sheet 37 CFR 1.76	Attorney Docket Number	1028.10
	Application Number	
Title of Invention	Wireless Digital Audio Music System	

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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Application Data Sheet 37 CFR 1.76	Attorney Docket Number	1028.10
	Application Number	
Title of Invention	Wireless Digital Audio Music System	

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.

2. Opt-Out of Authorizations to Permit Access by a Foreign Intellectual Property Office(s)

☐ A. Applicant **DOES NOT** authorize the USPTO to permit a participating foreign IP office access to the instant application-as-filed. If this box is checked, the USPTO will not be providing a participating foreign IP office with any documents and information identified in subsection 1A above.

☐ 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.

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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Application Data Sheet 37 CFR 1.76	Attorney Docket Number	1028.10
	Application Number	
Title of Invention	Wireless Digital Audio Music System	

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:

If the Applicant is an Organization check here. ☐

Prefix	**Given Name**	Middle Name	**Family Name**	Suffix

Mailing Address Information For Applicant:

Address 1			
Address 2			
City		**State/Province**	
Country		Postal Code	
Phone Number		Fax Number	
Email Address			

Additional Applicant Data may be generated within this form by selecting the Add button. Add

Assignee Information including Non-Applicant Assignee 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.

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Approved for use through 04/30/2017. OMB 0651-0032
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Application Data Sheet 37 CFR 1.76	Attorney Docket Number	1028.10
	Application Number	
Title of Invention	Wireless Digital Audio Music System	

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.

Remove

If the Assignee or Non-Applicant Assignee is an Organization check here. ☐

Prefix	**Given Name**	Middle Name	**Family Name**	Suffix

Mailing Address Information For Assignee including Non-Applicant Assignee:

Address 1			
Address 2			
City		**State/Province**	
Country i		Postal Code	
Phone Number		Fax Number	
Email Address			

Additional Assignee or Non-Applicant Assignee Data may be generated within this form by selecting the Add button. Add

Signature:

Remove

NOTE: This Application Data Sheet must be signed in accordance with 37 CFR 1.33(b). **However, if this Application Data Sheet is submitted with the INITIAL filing of the application and either box A or B is not checked in subsection 2 of the "Authorization or Opt-Out of Authorization to Permit Access" section, then this form must also be signed in accordance with 37 CFR 1.14(c).**

This Application Data Sheet **must** be signed by a patent practitioner if one or more of the applicants is a **juristic entity** (e.g., corporation or association). If the applicant is two or more joint inventors, this form must be signed by a patent practitioner, **all** joint inventors who are the applicant, or one or more joint inventor-applicants who have been given power of attorney (e.g., see USPTO Form PTO/AIA/81) on behalf of **all** joint inventor-applicants.

See 37 CFR 1.4(d) for the manner of making signatures and certifications.

Signature	/Megan Lyman/			Date (YYYY-MM-DD)	2016-01-21
First Name	Megan Lyman	Last Name	Lyman	Registration Number	57054

Additional Signature may be generated within this form by selecting the Add button. Add

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U.S. Patent and Trademark Office; U.S. DEPARTMENT OF COMMERCE
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Application Data Sheet 37 CFR 1.76	Attorney Docket Number	1028.10
	Application Number	
Title of Invention	Wireless Digital Audio Music System	

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.**

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 the Freedom of Information Act requires disclosure of these records.

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 CooperationTreaty.

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 inspections 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.

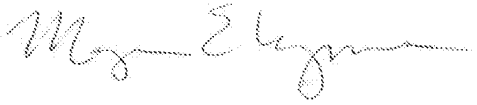
Submission of Supplemental Application Data Sheet

To Whom It May Concern:

The above application was filed January 21, 2015. The Application Data Sheet submitted therewith contained a typographical error. In the Domestic Benefit Section: application number 17/775,754 that application number should read: 13/775,754. A supplemental Application Data Sheet containing this correction is submitted herewith. Please do not hesitate to contact me with any questions or concerns.

February 3, 2016

Respectfully Submitted,



Megan E. Lyman, Registration No. 57,054
1816 Silver Mist Ct.
Raleigh, NC 27613
melyman@lymanpatents.com
(919) 341-4023 (phone)
(919) 341-0271 (fax)

Samsung Exhibit 1002, Page 45 of 370
Samsung Electronics Co., Ltd. et al. v. One-E-Way, Inc.
IPR2025-01540

Electronic Acknowledgement Receipt

EFS ID:	24832412
Application Number:	15003242
International Application Number:	
Confirmation Number:	8992
Title of Invention:	Wireless Digital Audio Music System
First Named Inventor/Applicant Name:	C. Earl Woolfork
Customer Number:	68533
Filer:	Megan Elizabeth Lyman
Filer Authorized By:	
Attorney Docket Number:	1028.10
Receipt Date:	05-FEB-2016
Filing Date:	21-JAN-2016
Time Stamp:	11:01:49
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	Application Data Sheet	ADSfilledCorrected2.pdf	1823441 dfde69f1f5c789de94a717491b54a370fe5c41d1	no	9
Warnings:					
Information:					

2	Transmittal Letter	TransmittalLetterforNewADS2.pdf	68263 3bb3fc7ed30dcb4da54c42aca2063c318db654cb	no	1

Warnings:	
Information:	
Total Files Size (in bytes):	1891704

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.

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Application Data Sheet 37 CFR 1.76	Attorney Docket Number	1028.10
	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
Mrs.	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. Add

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	68533		
Email Address	melyman@lymanpatents.com	Add Email	Remove Email

Application Information:

Title of the Invention	Wireless Digital Audio Music System		
Attorney Docket Number	1028.10	Small Entity Status Claimed	☒
Application Type	Nonprovisional		
Subject Matter	Utility		
Total Number of Drawing Sheets (if any)	3	Suggested Figure for Publication (if any)	1

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Application Data Sheet 37 CFR 1.76	Attorney Docket Number	1028.10
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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.

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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.

Please Select One:	● Customer Number	US Patent Practitioner	○ Limited Recognition (37 CFR 11.9)
Customer Number	68533		

Domestic Benefit/National Stage Information:

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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	13774754	2013-02-25

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U.S. Patent and Trademark Office; U.S. DEPARTMENT OF COMMERCE
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Application Data Sheet 37 CFR 1.76	Attorney Docket Number	1028.10
	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)
13775754	Continuation of	13356949	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)
13356949	Continuation of	12940747	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)
12940747	Continuation of	12570343	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)
12570343	Continuation of	12144729	2008-07-12	7684885	2010-03-03
Prior Application Status	Patented			Remove
Application Number	Continuity Type	Prior Application Number	Filing Date (YYYY-MM-DD)	Patent Number	Issue Date (YYYY-MM-DD)
12144729	Continuation of	10648012	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)	
10648012	Continuation in part of	10027391	2001-12-21	

Additional Domestic Benefit/National Stage Data may be generated within this form by selecting the **Add** button. Add

Foreign Priority Information:

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)[i] 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).

Remove

Application Number	Country[i]	Filing Date (YYYY-MM-DD)	Access Code[i] (if applicable)

Additional Foreign Priority Data may be generated within this form by selecting the **Add** button. Add

EFS Web 2.2.12

PTO/AIA/14 (11-15)
Approved for use through 04/30/2017. OMB 0651-0032
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 contains a valid OMB control number.

Application Data Sheet 37 CFR 1.76	Attorney Docket Number	1028.10
	Application Number	
Title of Invention	Wireless Digital Audio Music System	

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.

PTO/AIA/14 (11-15)
Approved for use through 04/30/2017. OMB 0651-0032
U.S. Patent and Trademark Office; U.S. DEPARTMENT OF COMMERCE
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Application Data Sheet 37 CFR 1.76	Attorney Docket Number	1028.10
	Application Number	
Title of Invention	Wireless Digital Audio Music System	

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.

2. Opt-Out of Authorizations to Permit Access by a Foreign Intellectual Property Office(s)

☐ A. Applicant **DOES NOT** authorize the USPTO to permit a participating foreign IP office access to the instant application-as-filed. If this box is checked, the USPTO will not be providing a participating foreign IP office with any documents and information identified in subsection 1A above.

☐ 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.

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.

PTO/AIA/14 (11-15)
Approved for use through 04/30/2017. OMB 0651-0032
U.S. Patent and Trademark Office; U.S. DEPARTMENT OF COMMERCE
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Application Data Sheet 37 CFR 1.76	Attorney Docket Number	1028.10
	Application Number	
Title of Invention	Wireless Digital Audio Music System	

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:

If the Applicant is an Organization check here. ☐

Prefix	**Given Name**	Middle Name	**Family Name**	Suffix

Mailing Address Information For Applicant:

Address 1			
Address 2			
City		**State/Province**	
Country		Postal Code	
Phone Number		Fax Number	
Email Address			

Additional Applicant Data may be generated within this form by selecting the Add button. Add

Assignee Information including Non-Applicant Assignee 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.

PTO/AIA/14 (11-15)
Approved for use through 04/30/2017. OMB 0651-0032
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 contains a valid OMB control number.

Application Data Sheet 37 CFR 1.76	Attorney Docket Number	1028.10
	Application Number	
Title of Invention	Wireless Digital Audio Music System	

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.

Remove

If the Assignee or Non-Applicant Assignee is an Organization check here. ☐

Prefix	**Given Name**	Middle Name	**Family Name**	Suffix

Mailing Address Information For Assignee including Non-Applicant Assignee:

Address 1			
Address 2			
City		**State/Province**	
Country i		Postal Code	
Phone Number		Fax Number	
Email Address			

Additional Assignee or Non-Applicant Assignee Data may be generated within this form by selecting the Add button. Add

Signature:

Remove

NOTE: This Application Data Sheet must be signed in accordance with 37 CFR 1.33(b). **However, if this Application Data Sheet is submitted with the INITIAL filing of the application and either box A or B is not checked in subsection 2 of the "Authorization or Opt-Out of Authorization to Permit Access" section, then this form must also be signed in accordance with 37 CFR 1.14(c).**

This Application Data Sheet **must** be signed by a patent practitioner if one or more of the applicants is a **juristic entity** (e.g., corporation or association). If the applicant is two or more joint inventors, this form must be signed by a patent practitioner, **all** joint inventors who are the applicant, or one or more joint inventor-applicants who have been given power of attorney (e.g., see USPTO Form PTO/AIA/81) on behalf of **all** joint inventor-applicants.

See 37 CFR 1.4(d) for the manner of making signatures and certifications.

Signature	/Megan Lyman/			Date (YYYY-MM-DD)	2016-01-21
First Name	Megan Lyman	Last Name	Lyman	Registration Number	57054

Additional Signature may be generated within this form by selecting the Add button. Add

PTO/AIA/14 (11-15)
Approved for use through 04/30/2017. OMB 0651-0032
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 contains a valid OMB control number.

Application Data Sheet 37 CFR 1.76	Attorney Docket Number	1028.10
	Application Number	
Title of Invention	Wireless Digital Audio Music System	

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.**

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 the Freedom of Information Act requires disclosure of these records.

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 CooperationTreaty.

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 inspections 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.

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
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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
15/003,242	01/21/2016	2654	730	1028.10	6	3

CONFIRMATION NO. 8992

68533
MEGAN LYMAN
1816 SILVER MIST CT.
RALEIGH, NC 27613

FILING RECEIPT



Date Mailed: 02/09/2016

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: None

Domestic Applications for which benefit is claimed - None.
A proper domestic benefit claim must be provided in an Application Data Sheet in order to constitute a claim for domestic benefit. See 37 CFR 1.76 and 1.78.

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: 02/05/2016
The country code and number of your priority application, to be used for filing abroad under the Paris Convention, is **US 15/003,242**

Projected Publication Date: 07/27/2017

Non-Publication Request: No

Early Publication Request: No
**** SMALL ENTITY ****
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 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).

Samsung Exhibit 1002, Page 58 of 370
Samsung Electronics Co., Ltd. et al. v. One-E-Way, Inc.
IPR2025-01540

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 AssetsControl, 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.

PATENT APPLICATION FEE DETERMINATION RECORD

Substitute for Form PTO-875

Application or Docket Number: 15/003,242

APPLICATION AS FILED - PART I

FOR	(Column 1) NUMBER FILED	(Column 2) NUMBER EXTRA	SMALL ENTITY RATE($)	SMALL ENTITY FEE($)	OR	OTHER THAN SMALL ENTITY RATE($)	OTHER THAN SMALL ENTITY FEE($)
BASIC FEE (37 CFR 1.16(a), (b), or (c))	N/A	N/A	N/A	70		N/A	
SEARCH FEE (37 CFR 1.16(k), (i), or (m))	N/A	N/A	N/A	300		N/A	
EXAMINATION FEE (37 CFR 1.16(o), (p), or (q))	N/A	N/A	N/A	360		N/A	
TOTAL CLAIMS (37 CFR 1.16(i))	6 minus 20 =	*	x 40 =	0.00	OR		
INDEPENDENT CLAIMS (37 CFR 1.16(h))	3 minus 3 =	*	x 210 =	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	730		TOTAL	

APPLICATION AS AMENDED - PART II

AMENDMENT A

	(Column 1) CLAIMS REMAINING AFTER AMENDMENT		(Column 2) HIGHEST NUMBER PREVIOUSLY PAID FOR	(Column 3) PRESENT EXTRA	SMALL ENTITY RATE($)	SMALL ENTITY ADDITIONAL FEE($)	OR	OTHER THAN SMALL ENTITY RATE($)	OTHER THAN SMALL ENTITY ADDITIONAL FEE($)
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))									
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) CLAIMS REMAINING AFTER AMENDMENT		(Column 2) HIGHEST NUMBER PREVIOUSLY PAID FOR	(Column 3) PRESENT EXTRA	RATE($)	ADDITIONAL FEE($)		RATE($)	ADDITIONAL FEE($)
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))									
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.

UNITED STATES PATENT AND TRADEMARK OFFICE

UNITED STATES DEPARTMENT OF COMMERCE
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www.uspto.gov

APPLICATION NUMBER	FILING OR 371(C) DATE	FIRST NAMED APPLICANT	ATTY. DOCKET NO./TITLE
15/003,242	01/21/2016	C. Earl Woolfork	1028.10

CONFIRMATION NO. 8992

68533
MEGAN LYMAN
1816 SILVER MIST CT.
RALEIGH, NC 27613

INFORMAL NOTICE

OC000000080388368

Date Mailed: 02/09/2016

INFORMATIONAL NOTICE TO APPLICANT

Applicant is notified that the above-identified application contains the deficiencies noted below. No period for reply is set forth in this notice for correction of these deficiencies. However, if a deficiency relates to the inventor's oath or declaration, the applicant must file an oath or declaration in compliance with 37 CFR 1.63, or a substitute statement in compliance with 37 CFR 1.64, executed by or with respect to each actual inventor no later than the expiration of the time period set in the "Notice of Allowability" to avoid abandonment. See 37 CFR 1.53(f).

The item(s) indicated below are also required and should be submitted with any reply to this notice to avoid further processing delays.

A new inventor's oath or declaration that identifies this application (e.g., by Application Number and filing date) is required. The inventor's oath or declaration does not comply with 37 CFR 1.63 in that it:

- does not state that the above-identified application was made or authorized to be made by the person executing the oath or declaration.

C. Earl Woolfork

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**.

/kgebremichael/

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
15/003,242	01/21/2016	C. Earl Woolfork	1028.10

CONFIRMATION NO. 8992

68533
MEGAN LYMAN
1816 SILVER MIST CT.
RALEIGH, NC 27613

IMPROPER CFR REQUEST

OC000000080387865

Date Mailed: 02/09/2016

RESPONSE TO REQUEST FOR CORRECTED FILING RECEIPT

Power of Attorney, Claims, Fees, System Limitations, and Miscellaneous

In response to your request for a corrected Filing Receipt, the Office is unable to comply with your request because:

- The ADS submitted on 02/01/2016 was not properly marked up to show the desired changes. For information being changed relative to the information already of record, additions must be shown with underlining, and deletions must be shown with strike-through or brackets. See 37 CFR 1.76(c)(2)

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**.

/asahle/

1. (Currently Amended) ~~A wireless digital audio spread spectrum receiver, capable of mobile operation, configured to receive a unique user code and an audio signal representation from a digital audio spread spectrum transmitter in the form of packets, said audio signal representation representative of audio from an audio source, said digital audio spread spectrum receiver directly communicable with said digital audio transmitter, said digital audio spread spectrum receiver comprising;~~

~~a direct conversion module configured to capture packets and the correct bit sequence within the packets, lowering signal detection error through reduced intersymbol interference coding of said audio representation signal respective to mobile said digital audio spread spectrum receiver and said digital audio spread spectrum transmitter, said packets embedded in a received spread spectrum signal, the captured packets corresponding to the unique user code;~~

~~a digital demodulator configured for independent code division multiple access communication operation;~~

~~a decoder operative to decode reduced intersymbol interference coding of said audio signal representation;~~

~~a digital-to-analog converter (DAC) generating an audio output of said original audio signal representation; and~~

~~a module adapted to reproduce said generated audio output, wherein each user has their spread spectrum receiver configured to communicate with said digital audio spread spectrum transmitter, said audio having been wirelessly transmitted from said audio source such that signals not originating from said digital audio spread spectrum~~

~~transmitter are inaudible while operating in the wireless digital audio spread spectrum transmitter spectrum.~~

A wireless digital audio spread spectrum receiver, capable of mobile operation, configured to receive a unique user code and an audio signal representation from a digital audio spread spectrum transmitter, said audio signal representation representative of audio from a portable audio source, said digital audio spread spectrum receiver operative to communicate wirelessly with said digital audio spread spectrum transmitter, said digital audio spread spectrum receiver comprising:

a direct conversion module configured to receive wireless spread spectrum signal transmissions representative of the unique user code and the audio signal representation, wherein the received transmissions are encoded to reduce intersymbol interference;

a digital demodulator configured to demodulate a received transmission and to generate a demodulated transmission, the digital demodulator configured to perform first demodulation and second demodulation, wherein said second demodulation is differential phase shift keying (DPSK) demodulation;

a decoder operative to decode the demodulated transmission and to generate a receiver audio signal representation, the decoder configured to decode reduced intersymbol interference coding and to decode representations of audio in the frequency range of 20Hz to 20kHz, said decoding being separate from said first and second demodulation;

a digital-to-analog converter (DAC) configured to generate an audio output from said receiver audio signal representation; and

a speaker configured to reproduce said generated audio output, wherein said reproduction does not include audible audio content originating from any transmitted audio signals in the wireless digital audio spread spectrum transmitter spectrum that do not originate from said digital audio spread spectrum transmitter;

wherein the wireless digital audio spread spectrum receiver is configured to use independent code division multiple access communication and to use the received unique user code to communicate only with said wireless digital audio spread spectrum transmitter for the duration of a wireless connection.

2. (Currently Amended) ~~The wireless digital audio spread spectrum receiver of Claim 1, wherein the wireless digital audio spread spectrum receiver having a differential phase shift keying (DPSK) implementation and a digital demodulator implementation for spread spectrum reception.~~ The wireless digital audio spread spectrum receiver of Claim 1, wherein said audio from said portable audio source is music.

3. (Currently Amended) ~~A wireless digital audio spread spectrum receiver configured to receive a unique user code and an audio signal representation from a mobile digital audio spread spectrum transmitter in the form of packets, said audio signal representation~~

~~representative of audio from a mobile audio source, said digital audio spread spectrum receiver directly communicable with said mobile digital audio transmitter, said digital audio spread spectrum receiver comprising;~~

~~a direct conversion module configured to capture packets and the correct bit sequence within the packets, lowering signal detection error through reduced intersymbol interference coding of said audio representation signal respective to said digital audio spread spectrum receiver and said mobile digital audio spread spectrum transmitter, said packets embedded in a received spread spectrum signal, the captured packets corresponding to the unique user code;~~

~~a digital demodulator configured for independent code division multiple access communication operation;~~

~~a decoder operative to decode reduced intersymbol interference coding of said audio signal representation;~~

~~a digital-to-analog converter (DAC) generating an audio output of said original audio signal representation; and~~

~~a module adapted to reproduce said generated audio output, wherein each user has their spread spectrum receiver configured to communicate with their own separate spread spectrum transmitter, said audio having been wirelessly transmitted from said mobile audio source such that signals not originating from said mobile digital audio spread spectrum transmitter are inaudible while operating in the wireless digital audio spread spectrum transmitter spectrum.~~

A portable spread spectrum audio receiver, configured to receive and store a unique user code, said portable spread spectrum receiver configured to receive wireless transmissions from a

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

a direct conversion module configured to receive wireless transmissions representative of the audio signal representation, wherein the received wireless transmissions are encoded to reduce intersymbol interference;

a digital demodulator configured to demodulate a received transmission and to generate a demodulated transmission, the digital demodulator configured to perform first demodulation and second demodulation, wherein said second demodulation is differential phase shift keying (DPSK) demodulation;

a decoder operative to decode the demodulated transmission and to generate a receiver audio signal representation, the decoder configured to decode reduced intersymbol interference coding and to decode representations of audio in the frequency range of 20Hz to 20kHz, said decoding being separate from said first and second demodulation;

a digital-to-analog converter (DAC) configured to generate an audio output from said receiver audio signal representation; and

a speaker configured to reproduce said generated audio output, wherein said reproduction does not include audible audio content originating from any transmitted

audio signals in the spread spectrum transmitter spectrum that do not originate from said spread spectrum transmitter;

wherein the portable spread spectrum audio receiver is configured to use independent code division multiple access communication and to use the received unique user code to communicate only with said spread spectrum transmitter for the duration of a wireless connection.

4. (Currently Amended) ~~The wireless digital audio spread spectrum receiver of Claim 3, wherein the wireless digital audio spread spectrum receiver having a differential phase shift keying (DPSK) implementation and a digital demodulator implementation for spread spectrum reception.~~ The portable spread spectrum receiver of Claim 3, wherein the audio signal representation represents music.

5. (Currently Amended) ~~A portable wireless digital audio transmission system for digital transmission of an audio signal representation from a portable audio source, said audio signal representation representative of audio from said portable audio source, said portable wireless digital audio transmission system comprising:~~

~~a mobile digital audio spread spectrum transmitter configured to couple to said portable audio source and transmitting a unique user code bit sequence with said audio signal representation in packet format, and configured for independent code division~~

~~multiple access (CDMA) communication operation, said mobile digital audio spread spectrum transmitter comprising:~~

~~an encoder operative to encode said original audio signal representation to reduce intersymbol interference, lowering signal detection error of said audio signal representation respective to said mobile digital audio spread spectrum transmitter.~~

A wireless digital coded audio spread spectrum transmitter operatively coupled to a portable audio player and configured to transmit a unique user code and a representation of an audio signal, wherein said digital coded audio spread spectrum transmitter is configured to wirelessly communicate with a digital audio spread spectrum receiver and is configured to be moved in any direction during operation, said wireless digital coded audio spread spectrum transmitter comprising:

an encoder operative to encode a first representation of an audio signal to reduce intersymbol interference associated with a transmitted representation of the audio signal, said encoder configured to process signals in the frequency range of 20Hz to 20kHz for representation in said first representation of an audio signal;

a digital modulator configured to modulate the first representation of the audio signal, said digital modulator configured to perform a first modulation and a second modulation, said digital modulator configured to generate a second representation of the audio signal, wherein said second modulation is differential phase shift keying (DPSK) modulation, and wherein said first modulation and said second modulation are separate from encoding and processing by the encoder; and

wherein the wireless digital coded audio spread spectrum transmitter is configured to use the second representation of the audio signal and to use independent code division multiple access communication to wirelessly transmit a transmitted representation of the audio signal, and 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.

6. (Currently Amended) ~~The portable wireless digital audio transmission system of Claim 5, wherein said mobile digital audio spread spectrum transmitter having a differential phase shift keying (DPSK) implementation and a digital modulator implementation for spread spectrum transmission.~~ The wireless digital coded audio spread spectrum transmitter of Claim 5, wherein the first representation of an audio signal is representative of music.

7. (New) The wireless digital audio spread spectrum receiver of Claim 1, wherein said first demodulation is 64-ary demodulation.

8. (New) The portable spread spectrum receiver of Claim 3, wherein said first demodulation is 64-ary demodulation.

9. (New) The wireless digital coded audio spread spectrum transmitter of Claim 5, wherein the first modulation is 64-ary modulation.

Samsung Exhibit 1002, Page 71 of 370
Samsung Electronics Co., Ltd. et al. v. One-E-Way, Inc.
IPR2025-01540

Submission of Amended Claims

To Mr. Flanders:

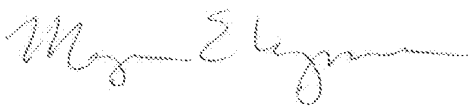
The above application was filed January 21, 2015. The amended claims submitted herewith contain no new matter. Support for the frequency range disclosed (20Hz to 20kHz) is found in paragraph 16 of the original specification.

Moreover, it is requested that the IDS originally submitted on 6/19/15 in Application No. 13/356,949 be incorporated by reference in the instant application.

If there are any questions or concerns, please contact me at any time.

December 21, 2016

Respectfully Submitted,



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Samsung Exhibit 1002, Page 72 of 370
Samsung Electronics Co., Ltd. et al. v. One-E-Way, Inc.
IPR2025-01540

Electronic Acknowledgement Receipt	
EFS ID:	27867815
Application Number:	15003242
International Application Number:	
Confirmation Number:	8992
Title of Invention:	Wireless Digital Audio Music System
First Named Inventor/Applicant Name:	C. Earl Woolfork
Customer Number:	68533
Filer:	Megan Elizabeth Lyman
Filer Authorized By:	
Attorney Docket Number:	1028.10
Receipt Date:	21-DEC-2016
Filing Date:	21-JAN-2016
Time Stamp:	16:13:55
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	Claims	AmendedClaims15003242.pdf	82327 d54cccf14bcb1aabc0bc8359c2144216348599af	no	9
Warnings:					

Information:					
2	Applicant Arguments/Remarks Made in an Amendment	TransmittalLetterforAmendedClaims.pdf	68251 c36b1455ac28d2f44e66946c58fece66c500d172	no	1
Warnings:					
Information:					
			Total Files Size (in bytes):	150578	

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.

UNITED STATES PATENT AND TRADEMARK OFFICE

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APPLICATION NUMBER	FILING OR 371(C) DATE	FIRST NAMED APPLICANT	ATTY. DOCKET NO./TITLE
15/003,242	01/21/2016	C. Earl Woolfork	1028.10

CONFIRMATION NO. 8992

68533
MEGAN LYMAN
1816 SILVER MIST CT.
RALEIGH, NC 27613

PUBLICATION NOTICE

OC000000093068451

Title: Wireless Digital Audio Music System

Publication No.US-2017-0214995-A1
Publication Date:07/27/2017

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 publically available Searchable Databases via the Internet at www.uspto.gov. The direct link to access the publication is currently http://www.uspto.gov/patft/.

The publication process established by the Office does not provide for mailing a copy of the publication to applicant. A copy of the publication may be obtained from the Office upon payment of the appropriate fee set forth in 37 CFR 1.19(a)(1). Orders for copies of patent application publications are handled by the USPTO's Public Records Division. The Public Records Division can be reached by telephone at (571) 272-3150 or (800) 972-6382, by facsimile at (571) 273-3250, by mail addressed to the United States Patent and Trademark Office, Public Records Division, Alexandria, VA 22313-1450 or via the Internet.

In addition, information on the status of the application, including the mailing date of Office actions and the dates of receipt of correspondence filed in the Office, may also be accessed via the Internet through the Patent Electronic Business Center at www.uspto.gov using the public side of the Patent Application Information and Retrieval (PAIR) system. The direct link to access this status information is currently https://portal.uspto.gov/pair/PublicPair. Prior to publication, such status information is confidential and may only be obtained by applicant using the private side of PAIR.

Further assistance in electronically accessing the publication, or about PAIR, is available by calling the Patent Electronic Business Center at 1-866-217-9197.

Office of Data Managment, Application Assistance Unit (571) 272-4000, or (571) 272-4200, or 1-888-786-0101

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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
15/003,242	01/21/2016	C. Earl Woolfork	1028.10	8992

68533 7590 12/14/2017

MEGAN LYMAN
1816 SILVER MIST CT.
RALEIGH, NC 27613

EXAMINER
FLANDERS, ANDREW C

ART UNIT	PAPER NUMBER
2656	

NOTIFICATION DATE	DELIVERY MODE
12/14/2017	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):

MELYMAN@LYMANPATENTS.COM

Office Action Summary	Application No. 15/003,242	Applicant(s) WOOLFORK, C. EARL	
	Examiner Andrew C. Flanders	Art Unit 2656	AIA (First Inventor to File) Status Yes

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

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE *3* MONTHS FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

1)☒ Responsive to communication(s) filed on *21 January 2016*.

☐ A declaration(s)/affidavit(s) under **37 CFR 1.130(b)** was/were filed on _____.

2a)☐ This action is **FINAL**. 2b)☒ This action is non-final.

3)☐ 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.

4)☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims*

5)☒ Claim(s) *1-9* is/are pending in the application.

5a) Of the above claim(s) _____ is/are withdrawn from consideration.

6)☐ Claim(s) _____ is/are allowed.

7)☒ Claim(s) *1-9* is/are rejected.

8)☐ Claim(s) _____ is/are objected to.

9)☐ Claim(s) _____ are subject to restriction and/or election requirement.

* If any claims have been determined allowable, 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.

Application Papers

10)☐ The specification is objected to by the Examiner.

11)☒ The drawing(s) filed on *21 January 2016* is/are: a)☒ accepted or b)☐ objected to by the Examiner.

Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).

Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).

Priority under 35 U.S.C. § 119

12)☐ 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)).

** See the attached detailed Office action for a list of the certified copies not received.

Attachment(s)

1) ☒ Notice of References Cited (PTO-892)

2) ☐ Information Disclosure Statement(s) (PTO/SB/08a and/or PTO/SB/08b) Paper No(s)/Mail Date _____.

3) ☐ Interview Summary (PTO-413) Paper No(s)/Mail Date. _____ .

4) ☐ Other: _____.

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.

Claims 1 – 9 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.

Claims 1 – 9 recite [a] digital demodulator configured to perform first demodulation and second demodulation, wherein the second demodulation is differential phase shift keying (DPSK) demodulation. So far as examiner can ascertain, the claimed demodulator is the disclosed demodulator 62. However, demodulator 62 is not disclosed as including a first and second demodulation, nor is it disclosed as providing for DPSK demodulation. In fact, the specification provides no teachings as to the first and second demodulation or the DPSK demodulation. The specification teaches demodulator 62 as 64-Ary demodulator to demodulate the signal elements modulated in transmitter 20; para 15.

In sum, the specification does not provide any teachings and/or details as to the claimed first demodulation and/or a second demodulation nor any DPSK demodulation.

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 claims at issue 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); and *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 a nonstatutory double patenting ground provided the reference application or patent either is shown to be commonly owned with this application, or claims an invention made as a result of activities undertaken within the scope of a joint research agreement. A terminal disclaimer must be signed in compliance with 37 CFR 1.321(b).

The USPTO internet Web site contains terminal disclaimer forms which may be used. Please visit http://www.uspto.gov/forms/. The filing date of the application will determine what form 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 http://www.uspto.gov/patents/process/file/efs/guidance/eTD-info-I.jsp.

Claims 1 – 9 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 – 9 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 – 9 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 – 9 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 – 9 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 – 9 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. 15/003,242	Applicant(s)/Patent Under Reexamination WOOLFORK, C. EARL	
	Examiner Andrew C. Flanders	Art Unit 2656	Page 1 of 1

U.S. PATENT DOCUMENTS

*		Document Number Country Code-Number-Kind Code	Date MM-YYYY	Name	CPC Classification	US Classification
*	A	US-6,130,643 A	10-2000	Trippett; John M.	G01S7/36	342/380
*	B	US-6,982,132 B1	01-2006	Goldner; Ronald B.	E06B9/24	204/192.11
*	C	US-2001/0025358 A1	09-2001	Eidson, Donald Brian	H03M13/09	714/752
*	D	US-7,099,413 B2	08-2006	Chuang; Justin C.	H04L25/0204	370/210
*	E	US-2004/0223622 A1	11-2004	Lindemann, Eric Lee	H04R5/04	381/79
*	F	US-7,047,474 B2	05-2006	Rhee; Do-Jun	H03M13/1515	714/755
*	G	US-6,418,558 B1	07-2002	Roberts; Harold A.	G06F17/14	348/E7.07
*	H	US-5,175,558 A	12-1992	DuPree; James E.	G01S7/36	342/378
*	I	US-5,946,343 A	08-1999	Schotz; Larry	H04B1/04	375/141
*	J	US-6,342,844 B1	01-2002	Rozin; Alexander	G07B15/063	340/928
*	K	US-5,771,441 A	06-1998	Altstatt; John E.	H01Q1/24	343/718
*	L	US-6,678,892 B1	01-2004	Lavelle; Patrick M.	G06F3/1423	348/837
	M	US-				

FOREIGN PATENT DOCUMENTS

*		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.

Bibliographic Data

Application No: 15003242

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.
01/21/2016	700	2656	1028.10
RULE			

APPLICANTS

INVENTORS

C. Earl Woolfork, Pasadena, CA, UNITED STATES

CONTINUING DATA

FOREIGN APPLICATIONS

IF REQUIRED, FOREIGN LICENSE GRANTED**

02/05/2016

STATE OR COUNTRY

UNITED STATES

ADDRESS

MEGAN LYMAN
1816 SILVER MIST CT.
RALEIGH, NC 27613
UNITED STATES

FILING FEE RECEIVED

$730

Index of Claims	Application/Control No.	Applicant(s)/Patent Under Reexamination
	15003242	WOOLFORK, C. EARL
	Examiner	**Art Unit**
	ANDREW C FLANDERS	2656

✓	Rejected	-	Cancelled	N	Non-Elected	A	Appeal
=	Allowed	÷	Restricted	I	Interference	O	Objected

☐ Claims renumbered in the same order as presented by applicant ☐ CPA ☐ T.D. ☐ R.1.47

CLAIM		DATE								
Final	Original	12/10/2017								
	1	✓								
	2	✓								
	3	✓								
	4	✓								
	5	✓								
	6	✓								
	7	✓								
	8	✓								
	9	✓								

EAST Search History

EAST Search History (Prior Art)

Ref #	Hits	Search Query	DBs	Default Operator	Plurals	Time Stamp
L1	1	"15003242"	US-PGPUB; USPAT; USOCR	OR	OFF	2017/12/10 19:45
L2	9	"10648012"	US-PGPUB; USPAT; USOCR	OR	OFF	2017/12/10 19:48
L3	1481	H04R1/1083.cpc.	US-PGPUB; USPAT; USOCR	OR	OFF	2017/12/10 20:08
L4	3586	H04R2420/07.cpc.	US-PGPUB; USPAT; USOCR	OR	OFF	2017/12/10 20:09
L5	2054	H04R5/033.cpc.	US-PGPUB; USPAT; USOCR	OR	OFF	2017/12/10 20:09
L6	0	H04R1/6066.cpc.	US-PGPUB; USPAT; USOCR	OR	OFF	2017/12/10 20:09
L7	2100	H04M1/6066.cpc.	US-PGPUB; USPAT; USOCR	OR	OFF	2017/12/10 20:10
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;	OR	OFF	2006/05/02 17:47

			USPAT			
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; USPAT	OR	OFF	2006/05/02 17:50
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;	OR	OFF	2006/08/28 15:57

			USPAT			
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; USPAT	OR	OFF	2006/08/31 12:17
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;	OR	OFF	2007/03/28 13:46

Samsung Exhibit 1002, Page 90 of 370
Samsung Electronics Co., Ltd. et al. v. One-E-Way, Inc.
IPR2025-01540

			USPAT			
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" | "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-	OR	OFF	2007/07/16

			PGPUB; USPAT; USOCR			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

12/ 10/ 2017 8:18:08 PM
C:\ Users\ aflanders\ Documents\ EAST\ Workspaces\ 10648012.wsp

Search Notes	Application/Control No.	Applicant(s)/Patent Under Reexamination
	15003242	WOOLFORK, C. EARL
	Examiner	Art Unit
	ANDREW C FLANDERS	2656

CPC- SEARCHED		
Symbol	Date	Examiner
H04R1/1083	12/10/17	acf
H04R2420/07	12/10/17	acf
H04R5/033	12/10/17	acf
H04M1/6066	12/10/17	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	12/10/17	acf
PE2E, EAST and PALM inventor search for double patenting	12/10/17	acf
google.com patents search	12/10/17	acf
reviewed search strategy for applications in patent family	12/10/17	acf

INTERFERENCE SEARCH			
US Class/ CPC Symbol	US Subclass / CPC Group	Date	Examiner

	/ANDREW C FLANDERS/ Primary Examiner.Art Unit 2656

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MEGAN LYMAN
1816 SILVER MIST CT.
RALEIGH, NC 27613

Courtesy Reminder for
Application Serial No: 15/003,242

Attorney Docket No: 1028.10
Customer Number: 68533
Date of Electronic Notification: 12/14/2017

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An email notification regarding the correspondence was sent to the following email address(es) associated with your customer number:
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Doc Code: PA..
Document Description: Power of Attorney

PTO/AIA/82A (07-13)
Approved for use through 01/31/2018. OMB 0651-0035
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Application Number	15/003242
Filing Date	21 January 2016
First Named Inventor	C. Earl Woolfork
Title	WIRELESS DIGITAL AUDIO MUSIC SYSTEM
Art Unit	2656
Examiner Name	Flanders, Andrew C.
Attorney Docket Number	1EWAY.009P1C6

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 1 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.**

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

PTO/AIA/82B (07-13)
Approved for use through 01/31/2018. OMB 0651-0035
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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:

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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 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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Electronic Acknowledgement Receipt

EFS ID:	32005053
Application Number:	15003242
International Application Number:	
Confirmation Number:	8992
Title of Invention:	Wireless Digital Audio Music System
First Named Inventor/Applicant Name:	C. Earl Woolfork
Customer Number:	68533
Filer:	Harnik Shukla/Danika Gregory
Filer Authorized By:	Harnik Shukla
Attorney Docket Number:	1028.10
Receipt Date:	09-MAR-2018
Filing Date:	21-JAN-2016
Time Stamp:	10:50:13
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	Power of Attorney	2018-03-09_Power_of_Attorney_1EWAY_009P1C6.pdf	721959 b9513caf21dbfd36f3853af29e5ce365d9976c7c	no	2
Warnings:					

Information:	
Total Files Size (in bytes):	721959

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New Applications Under 35 U.S.C. 111

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National Stage of an International Application under 35 U.S.C. 371

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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.

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APPLICATION NUMBER	FILING OR 371(C) DATE	FIRST NAMED APPLICANT	ATTY. DOCKET NO./TITLE
15/003,242	01/21/2016	C. Earl Woolfork	1EWAY.009P1C6

CONFIRMATION NO. 8992

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

POA ACCEPTANCE LETTER

OC000000098018501

Date Mailed: 03/14/2018

NOTICE OF ACCEPTANCE OF POWER OF ATTORNEY

This is in response to the Power of Attorney filed 03/09/2018.

The Power of Attorney in this application is accepted. Correspondence in this application will be mailed to the above address as provided by 37 CFR 1.33.

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**.

/qnguyen/

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 OBVIATE A DOUBLE PATENTING REJECTION OVER A "PRIOR" PATENT**
Application Number	15003242
Filing Date	21-Jan-2016
First Named Inventor	C. Woolfork
Attorney Docket Number	1EWAY.009P1C6
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
C. Earl Woolfork	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)

9285396

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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:	15003242
Filing Date:	21-Jan-2016
Title of Invention:	Wireless Digital Audio Music System
First Named Inventor/Applicant Name:	C. Earl Woolfork
Filer:	Harnik Shukla/Anthony Bonilla
Attorney Docket Number:	1EWAY.009P1C6

Filed as Small 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	2814	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.: 15003242

Filing Date: 21-Jan-2016

Applicant/Patent under Reexamination: Woolfork

Electronic Terminal Disclaimer filed on March 14, 2018

☒ 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:	32054864
Application Number:	15003242
International Application Number:	
Confirmation Number:	8992
Title of Invention:	Wireless Digital Audio Music System
First Named Inventor/Applicant Name:	C. Earl Woolfork
Customer Number:	20995
Filer:	Harnik Shukla/Anthony Bonilla
Filer Authorized By:	Harnik Shukla
Attorney Docket Number:	1EWAY.009P1C6
Receipt Date:	14-MAR-2018
Filing Date:	21-JAN-2016
Time Stamp:	18:39:41
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	031518INTEFSW18393800
Deposit Account	111410
Authorized User	Anthony Bonilla
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	35574 db0a579595550c37123f24426f5a7c2890105664	no	3
Warnings:					
Information:					
2	Fee Worksheet (SB06)	fee-info.pdf	30653 e1083890a62940b5dc711c1cff66be965df52f47	no	2
Warnings:					
Information:					
		Total Files Size (in bytes):	66227		

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.

IN THE UNITED STATES PATENT AND TRADEMARK OFFICE

First Inventor	:	C. Earl Woolfork
App. No.	:	15/003,242
Filed	:	January 21, 2016
For	:	WIRELESS DIGITAL AUDIO MUSIC SYSTEM
Examiner	:	Flanders, Andrew C.
Art Unit	:	2656
Conf. No.	:	8992

RESPONSE TO NON-FINAL OFFICE ACTION DATED DECEMBER 14, 2017

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

Dear Commissioner:

In response to the Office Action mailed December 14, 2017, the Applicants respectfully request the above-identified application be amended as follows:

Samsung Exhibit 1002, Page 108 of 370
Samsung Electronics Co., Ltd. et al. v. One-E-Way, Inc.
IPR2025-01540

AMENDMENTS TO THE CLAIMS

1. (Currently Amended) A wireless digital audio spread spectrum receiver, capable of mobile operation, configured to receive a unique user code and an audio signal representation from a digital audio spread spectrum transmitter, said audio signal representation representative of audio from a portable audio source, said digital audio spread spectrum receiver operative to communicate wirelessly with said digital audio spread spectrum transmitter, said digital audio spread spectrum receiver comprising:

a direct conversion module configured to receive wireless spread spectrum signal transmissions representative of the unique user code and the audio signal representation, wherein the received transmissions are encoded to reduce intersymbol interference;

~~a digital demodulator configured to demodulate a received transmission and to generate a demodulated transmission, the digital demodulator configured to perform first demodulation and second demodulation, wherein said second demodulation is differential phase shift keying (DPSK) demodulation;~~

a digital-to-analog converter (DAC) configured to generate an audio output from said receiver audio signal representation; and

a speaker configured to reproduce said generated audio output, wherein said reproduction does not include audible audio content originating from any transmitted audio signals in the wireless digital audio spread spectrum transmitter spectrum that do not originate from said digital audio spread spectrum transmitter;

wherein the wireless digital audio spread spectrum receiver is configured to use independent code division multiple access communication and to use the received unique user code to communicate with only [[with]] said wireless digital audio spread spectrum transmitter for the duration of a wireless connection; and

wherein the wireless digital audio spread spectrum receiver is further configured to:

demodulate a received modulated transmission, and

generate a demodulated signal based on the received modulated transmission by performing at least one of a plurality of demodulations, wherein

the plurality of demodulations includes a differential phase shift keying (DPSK) demodulation and also includes a non-DPSK demodulation.

2. (Previously Presented) The wireless digital audio spread spectrum receiver of Claim 1, wherein said audio from said portable audio source is music.

3. (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 transmission from a spread spectrum transmitter, said wireless transmissions representative of an audio signal representation, said portable spread spectrum audio receiver comprising:

a direct conversion module configured to receive wireless transmissions representative of the audio signal representation, wherein the received wireless transmissions are encoded to reduce intersymbol interference;

~~a digital demodulator configured to demodulate a received transmission and to generate a demodulated transmission, the digital demodulator configured to perform first demodulation and second demodulation, wherein said second demodulation is differential phase shift keying (DPSK) demodulation;~~

a decoder operative to decode the demodulated transmission and to generate a receiver audio signal representation, the decoder configured to decode reduced intersymbol interference coding and to decode representations of audio in the frequency range of 20Hz to 20kHz, said decoding being separate from said first and second demodulation;

a digital-to-analog converter (DAC) configured to generate an audio output from said receiver audio signal representation; and

a speaker configured to reproduce said generated audio output, wherein said reproduction does not include audible audio content originating from any transmitted audio signals in the spread spectrum transmitter spectrum that do not originate from said spread spectrum transmitter;

wherein the portable spread spectrum audio receiver is configured to use independent code division multiple access communication and to use the received unique user code to communicate with only [[with]] said spread spectrum transmitter for the duration of a wireless connection; and

wherein the wireless digital audio spread spectrum receiver is further configured to perform at least one of a plurality of demodulations on a received modulation transmission and generate a demodulation signal based on the performance of the plurality of demodulations, wherein the plurality of demodulations includes a differential phase shift keying (DPSK) demodulation and a non-DPSK demodulation.

4. (Previously Presented) The portable spread spectrum receiver of Claim 3, wherein the audio signal representation represents music.

5. (Currently Amended) A wireless digital coded audio spread spectrum transmitter operatively coupled to a portable audio player and configured to transmit a unique user code and a representation of an audio signal, wherein said digital coded audio spread spectrum transmitter is configured to wirelessly communicate with a digital audio spread spectrum receiver and is configured to be moved in any direction during operation, said wireless digital coded audio spread spectrum transmitter comprising:

an encoder operative to encode a first representation of an audio signal to reduce intersymbol interference associated with a transmitted representation of the audio signal, said encoder configured to process signals in the frequency range of 20Hz to 20kHz for representation in said first representation of an audio signal;

~~a digital modulator configured to modulate the first representation of the audio signal, said digital modulator configured to perform a first modulation and a second modulation, said digital modulator configured to generate a second representation of the audio signal, wherein said second modulation is differential phase shift keying (DPSK) modulation, and wherein said first modulation and said second modulation are separate from encoding and processing by the encoder; and~~

wherein the wireless digital coded audio spread spectrum transmitter is further configured to perform at least one of a plurality of modulations on the first representation of the audio signal and 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;

wherein said plurality of modulations are separate from the encoding and processing by the encoder; and

wherein the wireless digital coded audio spread spectrum transmitter is further configured to use the ~~second representation of the audio signal~~ modulated signal and to use independent code division multiple access communication to wirelessly transmit a transmitted representation of the audio signal, and 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.

6. (Previously Presented) The wireless digital coded audio spread spectrum transmitter of Claim 5, wherein the first representation of an audio signal is representative of music.

7. (Currently Amended) The wireless digital audio spread spectrum receiver of Claim 1, wherein said ~~first~~ non-DPSK demodulation is 64-ary demodulation.

8. (Currently Amended) The portable spread spectrum receiver of Claim 3, wherein said non-DPSK ~~first~~ demodulation is 64-ary demodulation.

9. (Currently Amended) The wireless digital coded audio spread spectrum transmitter of Claim 5, wherein [[the]] said non-DPSK ~~first~~ modulation is 64-ary modulation.

10. (New) The wireless digital audio spread spectrum receiver of Claim 1, wherein the digital audio spread spectrum receiver is further configured to receive the receive wireless spread spectrum signal transmissions where the receive wireless spread spectrum signal transmissions are in the Industrial Scientific and Medical 2.4 GHz band, ranging from 2.4 GHz to 2.5 GHz.

11. (New) The portable spread spectrum receiver of Claim 3, wherein the portable spread spectrum receiver is further configured to receive the received wireless

transmissions where the received wireless transmissions are in the Industrial Scientific and Medical 2.4 GHz band, ranging from 2.4 GHz to 2.5 GHz.

12. (New) The wireless digital coded audio spread spectrum transmitter of Claim 5, wherein wireless digital coded audio spread spectrum transmitter is further configured to transmit the transmitted representation of the audio signal where the transmitted representation of the audio signal are in the Industrial Scientific and Medical 2.4 GHz band, ranging from 2.4 GHz to 2.5 GHz.

Samsung Exhibit 1002, Page 113 of 370
Samsung Electronics Co., Ltd. et al. v. One-E-Way, Inc.
IPR2025-01540

SUMMARY OF THE INTERVIEW

Applicant's representative, Harnik Shukla, conducted a telephonic interview with Examiner Flanders on March 13, 2018. Applicant's representative discussed the § 112 rejection with respect to Claim 1. No agreement was reached.

Samsung Exhibit 1002, Page 114 of 370
Samsung Electronics Co., Ltd. et al. v. One-E-Way, Inc.
IPR2025-01540

REMARKS

By way of summary, Claims 1-9 were pending in this application. In the present amendment, Applicant has amended claims 1, 3, 5, 7-9 without prejudice or disclaimer to previously pending versions thereof and added new claims 10 - 12. Support for the new claims can be found at least in paragraphs [0014] and [0015] of the publication. Accordingly, Claims 1-12 remain pending.

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

The Office Action rejected Claims 1-9 under 35 USC § 112, first paragraph, as failing to comply with the written description requirement. *Office Action*, 2-3. Applicant respectfully disagrees with the rejection. However, in the interest of expediting prosecution, Applicant has amended the claims as shown above. Support for the amendments can be found at least in paragraphs [0014] and [0015] of the Publication and Figures 2 and 3.

Thus, at least based on the amendments and the discussion during the Interview, Applicant respectfully requests withdrawal of the rejection. Applicant's representative invites the Examiner to call at the direct dial listed below should further clarification be required.

Rejection Of Claims Under Obviousness-Type Double Patenting

The Office Action rejected Claims 1-9 under the non-statutory, obviousness-type double patenting. While the Applicant may not agree with the foregoing rejection, in order to progress the prosecution of the present application, the Applicant has attached an appropriate Terminal Disclaimer. Accordingly, the Applicant respectfully requests withdrawal of the non-statutory, obviousness-type double patenting rejection of the claims.

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 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.

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

Dated: March 14, 2018

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

27765441

Electronic Acknowledgement Receipt

EFS ID:	32054979
Application Number:	15003242
International Application Number:	
Confirmation Number:	8992
Title of Invention:	Wireless Digital Audio Music System
First Named Inventor/Applicant Name:	C. Earl Woolfork
Customer Number:	20995
Filer:	Harnik Shukla/Anthony Bonilla
Filer Authorized By:	Harnik Shukla
Attorney Docket Number:	1EWAY.009P1C6
Receipt Date:	14-MAR-2018
Filing Date:	21-JAN-2016
Time Stamp:	18:48:43
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		1Response.pdf	123988 11e97e49820539a69c1e308b5f01ceca98cd a41b	yes	9

	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	9
Warnings:			
Information:			
	Total Files Size (in bytes):	123988	

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.

PTO/SB/06 (09-11)
Approved for use through 1/31/2014. OMB 0651-0032
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.

PATENT APPLICATION FEE DETERMINATION RECORD Substitute for Form PTO-875	Application or Docket Number 15/003,242	Filing Date 01/21/2016	☐ To be Mailed

ENTITY: ☐ LARGE ☒ SMALL ☐ MICRO

APPLICATION AS FILED – PART I

FOR	(Column 1) NUMBER FILED	(Column 2) 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), (i), 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 $ =	
INDEPENDENT CLAIMS (37 CFR 1.16(h))	minus 3 =	*	X $ =	
☐ 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

AMENDMENT 03/14/2018	(Column 1) CLAIMS REMAINING AFTER AMENDMENT		(Column 2) HIGHEST NUMBER PREVIOUSLY PAID FOR	(Column 3) PRESENT EXTRA	RATE ($)	ADDITIONAL FEE ($)
Total (37 CFR 1.16(i))	* 12	Minus	** 20	= 0	X $50 =	0
Independent (37 CFR 1.16(h))	* 3	Minus	***3	= 0	X $230 =	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

AMENDMENT	(Column 1) CLAIMS REMAINING AFTER AMENDMENT		(Column 2) HIGHEST NUMBER PREVIOUSLY PAID FOR	(Column 3) PRESENT EXTRA	RATE ($)	ADDITIONAL FEE ($)
Total (37 CFR 1.16(i))	*	Minus	**	=	X $ =	
Independent (37 CFR 1.16(h))	*	Minus	***	=	X $ =	
☐ 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.
** 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 number found in the appropriate box in column 1.

LIE
ANTHONY WILLIAMS

This collection of information is required by 37 CFR 1.16. 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 12 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.

PTO/SB/08 Equivalent

INFORMATION DISCLOSURE STATEMENT BY APPLICANT	Application No.	15/003242
	Filing Date	January 21, 2016
	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.	1EWAY.009P1C6

U.S. PATENT DOCUMENTS					
Examiner Initials	Cite No.	Document Number *Number - Kind Code (if known)* 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 *Country Code-Number-Kind Code* 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.	

T[1] - Place a check mark in this area when an English language Translation is attached.

INFORMATION DISCLOSURE STATEMENT BY APPLICANT	Application No.	15/003242
	Filing Date	January 21, 2016
	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.	1EWAY.009P1C6

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.	
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	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.	
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	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	Application No.	15/003242
	Filing Date	January 21, 2016
	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.	1EWAY.009P1C6

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.	
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	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
***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

First Inventor	:	C. Earl Woolfork
App. No.	:	15/003242
Filed	:	January 21, 2016
For	:	WIRELESS DIGITAL AUDIO MUSIC SYSTEM
Examiner	:	Flanders, Andrew C.
Art Unit	:	2656
Conf. No.	:	8992

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.

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 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 receipt of a First Office Action, but before the mailing date of a Final Action and before the mailing date of a Notice of Allowance. This Statement is accompanied by the fees set forth in 37 CFR 1.17(p).

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

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

Dated: March 26, 2018

By:/Harnik Shukla/_____
Harnik Shukla
Registration No. 73,097
Registered Practitioner
Customer No. 20995
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27825518

Electronic Patent Application Fee Transmittal	
Application Number:	15003242
Filing Date:	21-Jan-2016
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.009P1C6
Filed as Small 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($)
Miscellaneous:				
SUBMISSION- INFORMATION DISCLOSURE STMT	2806	1	120	120
		Total in USD ($)		**120**

Electronic Acknowledgement Receipt	
EFS ID:	32162538
Application Number:	15003242
International Application Number:	
Confirmation Number:	8992
Title of Invention:	Wireless Digital Audio Music System
First Named Inventor/Applicant Name:	C. Earl Woolfork
Customer Number:	20995
Filer:	Harnik Shukla/Anthony Bonilla
Filer Authorized By:	Harnik Shukla
Attorney Docket Number:	1EWAY.009P1C6
Receipt Date:	26-MAR-2018
Filing Date:	21-JAN-2016
Time Stamp:	20:18:58
Application Type:	Utility under 35 USC 111(a)

Payment information:

Submitted with Payment	yes
Payment Type	CARD
Payment was successfully received in RAM	$120
RAM confirmation Number	032718INTEFSW20195000
Deposit Account	111410
Authorized User	Anthony Bonilla
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)	

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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.

US006563892B1

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

(10) **Patent No.: US 6,563,892 B1**
(45) **Date of Patent: May 13, 2003**

(54) **METHOD AND SYSTEM FOR DETECTION OF BINARY INFORMATION IN THE PRESENCE OF SLOWLY VARYING DISTURBANCES**

(75) Inventors: **Jacobus Haartsen**, Borne (NL); **Paul Dent**, Pittsboro, NC (US)

(73) Assignee: **Telefonaktiebolaget LM Ericsson**, Stockholm (SE)

(*) Notice: Subject to any disclaimer, the term of this patent is extended or adjusted under 35 U.S.C. 154(b) by 0 days.

(21) Appl. No.: **09/332,955**

(22) Filed: **Jun. 15, 1999**

(51) **Int. Cl.**[7] **H04B 1/10**
(52) **U.S. Cl.** **375/350**; 375/346; 375/348
(58) **Field of Search** 375/350, 348, 375/346, 341, 229, 230, 231, 232, 233, 234; 708/301, 319, 320, 322, 323

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Haartsen, J., "Bluetooth—The Universal Radio Interface for Ad Hoc, Wireless Connectivity", Ericsson Review, Telecommunications Technology Journal No. 3, 1998, pp. 110–117.

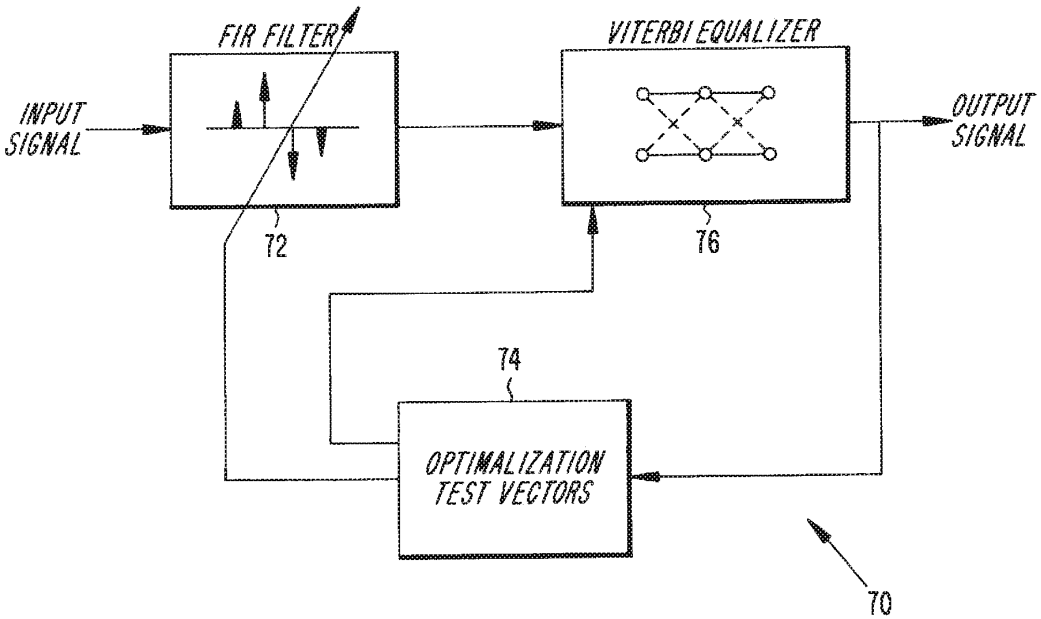
* cited by examiner

Primary Examiner—Mohammad H. Ghayour
(74) *Attorney, Agent, or Firm*—Burns, Doane, Swecker & Matthis

(57) **ABSTRACT**

A radiocommunication system is described in which DC offset and other slowly varying disturbances which that may impact a signal are suppressed. Exemplary embodiments of the present invention combine a difference circuit, e.g., a FIR filter, with a maximum likelihood sequence estimator, e.g., a Viterbi detector, to implement suppression techniques on binary signals.

31 Claims, 11 Drawing Sheets



SONY Exhibit 1006 - 0001

Samsung Exhibit 1002, Page 136 of 370
Samsung Electronics Co., Ltd. et al. v. One-E-Way, Inc.
IPR2025-01540

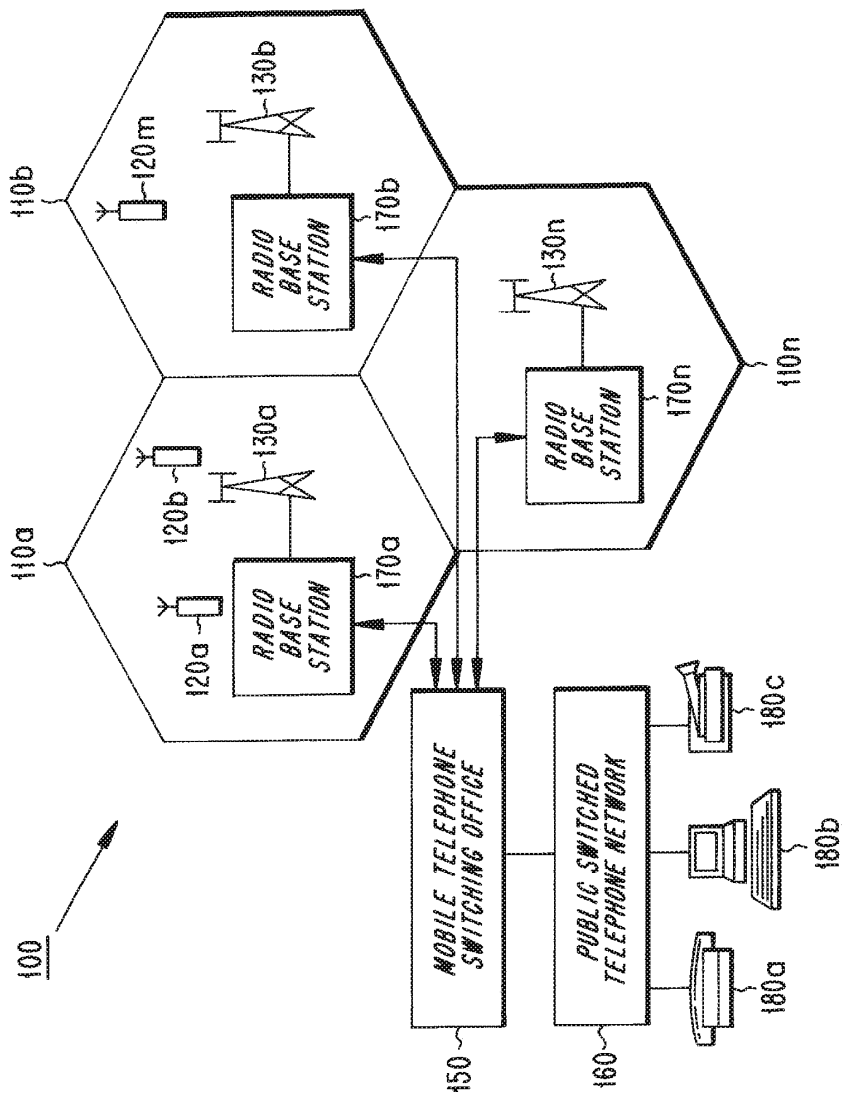


Fig. 1(a)
(PRIOR ART)

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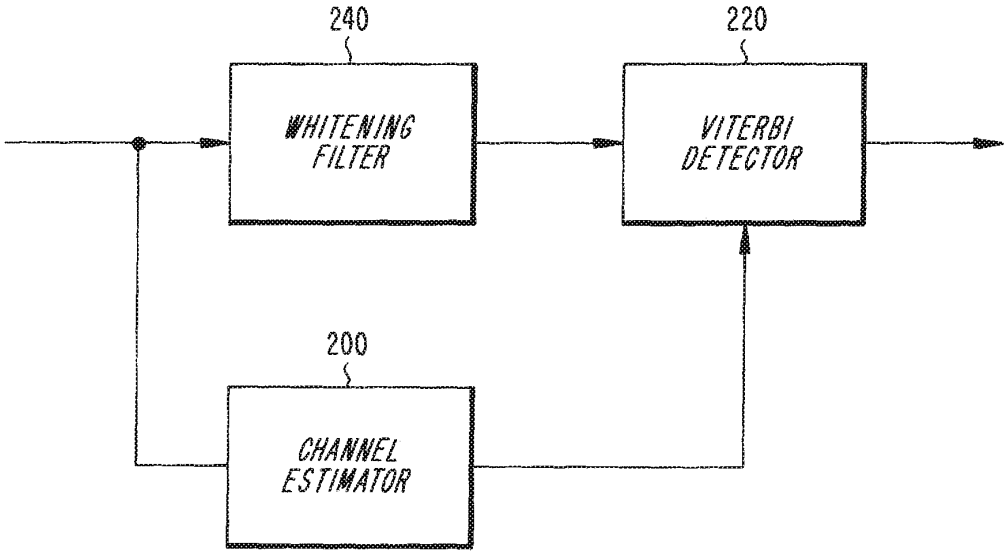
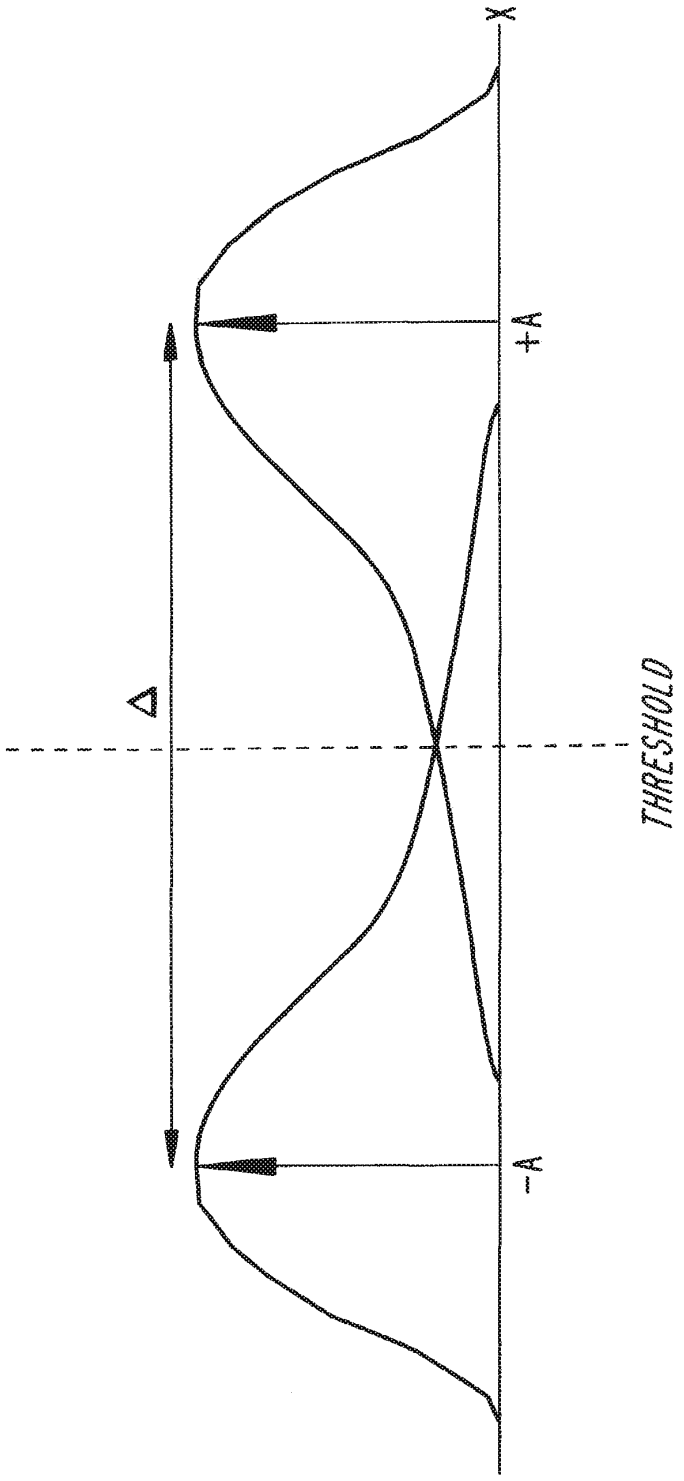


Fig. 1(b)
(PRIOR ART)

Fig. 2



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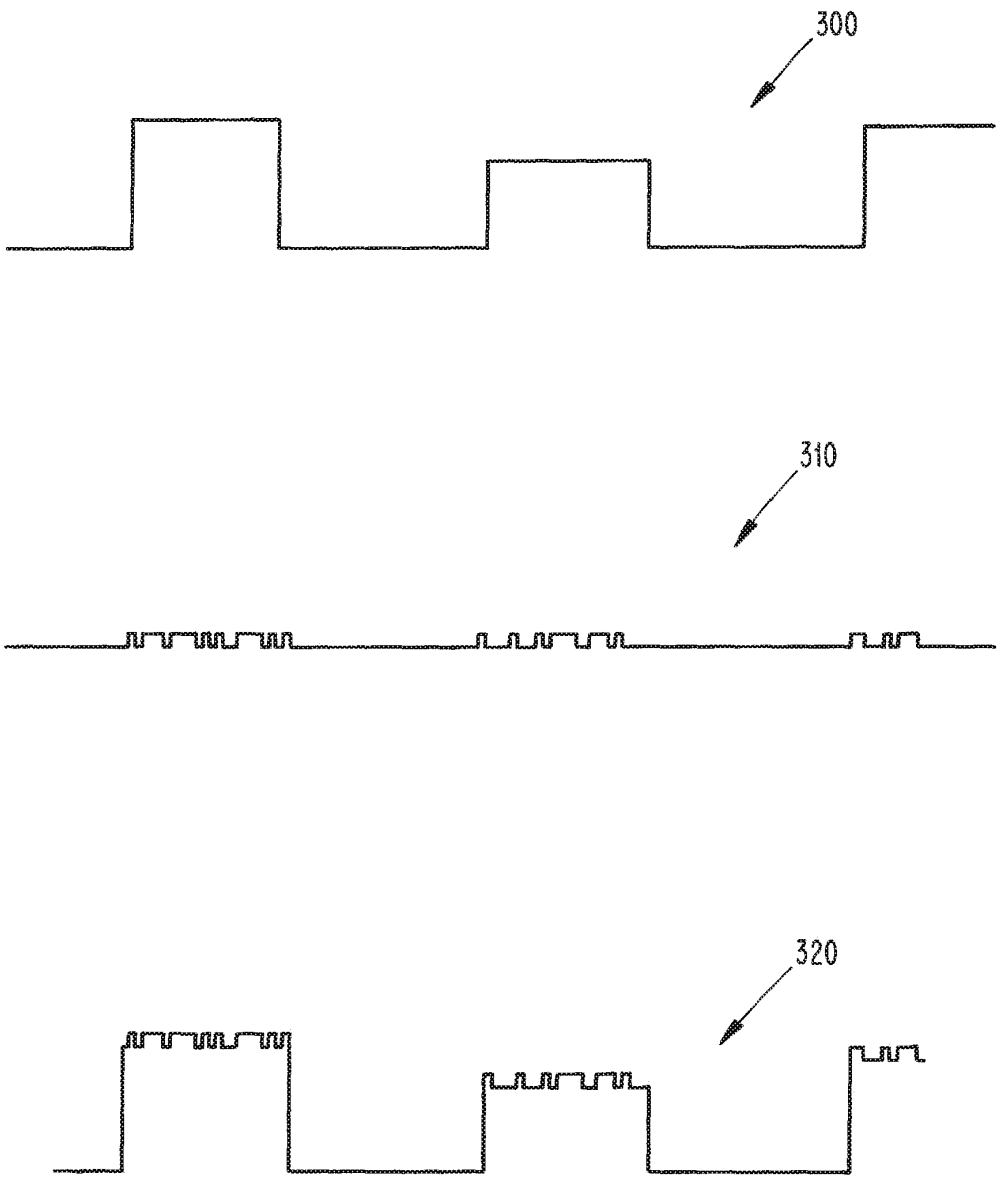


Fig. 3(a)

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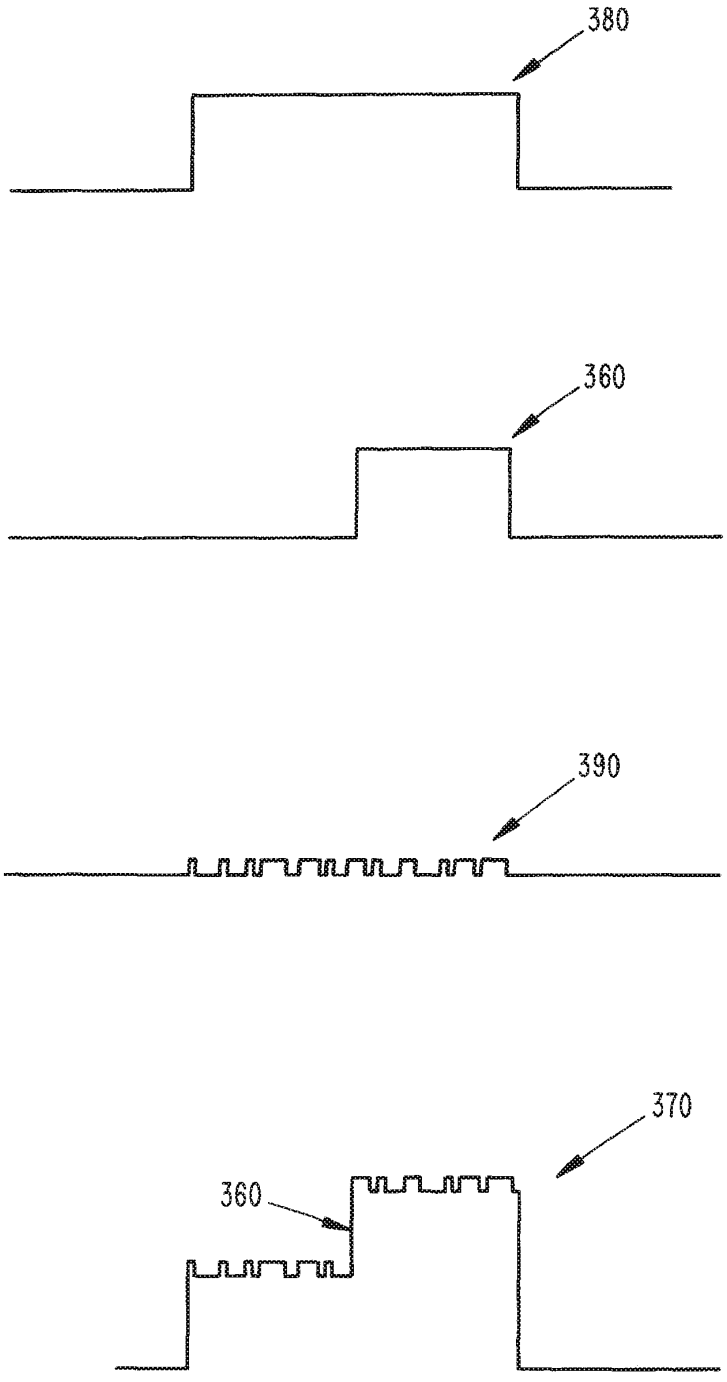


Fig. 3(b)

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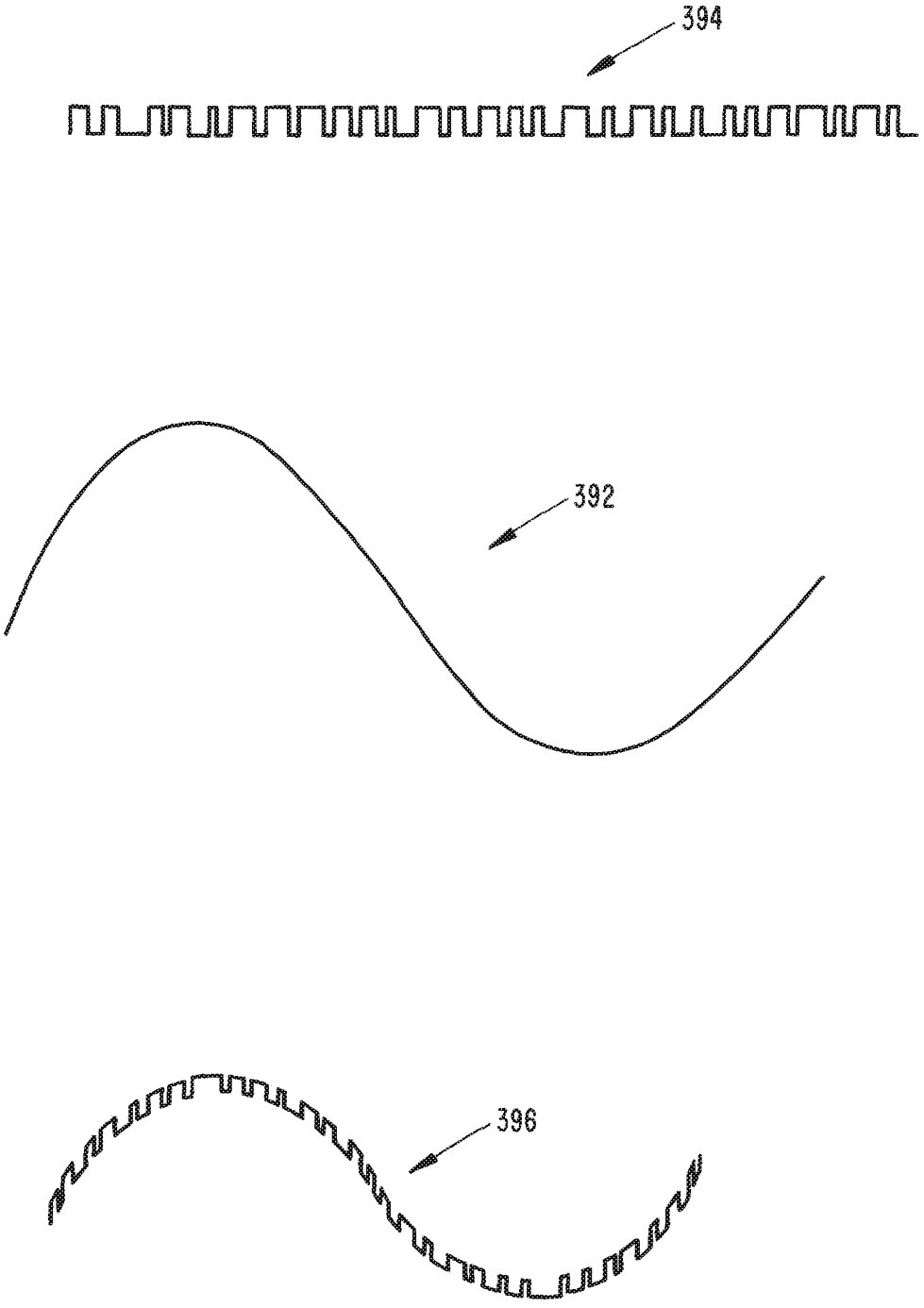


Fig. 3(c)

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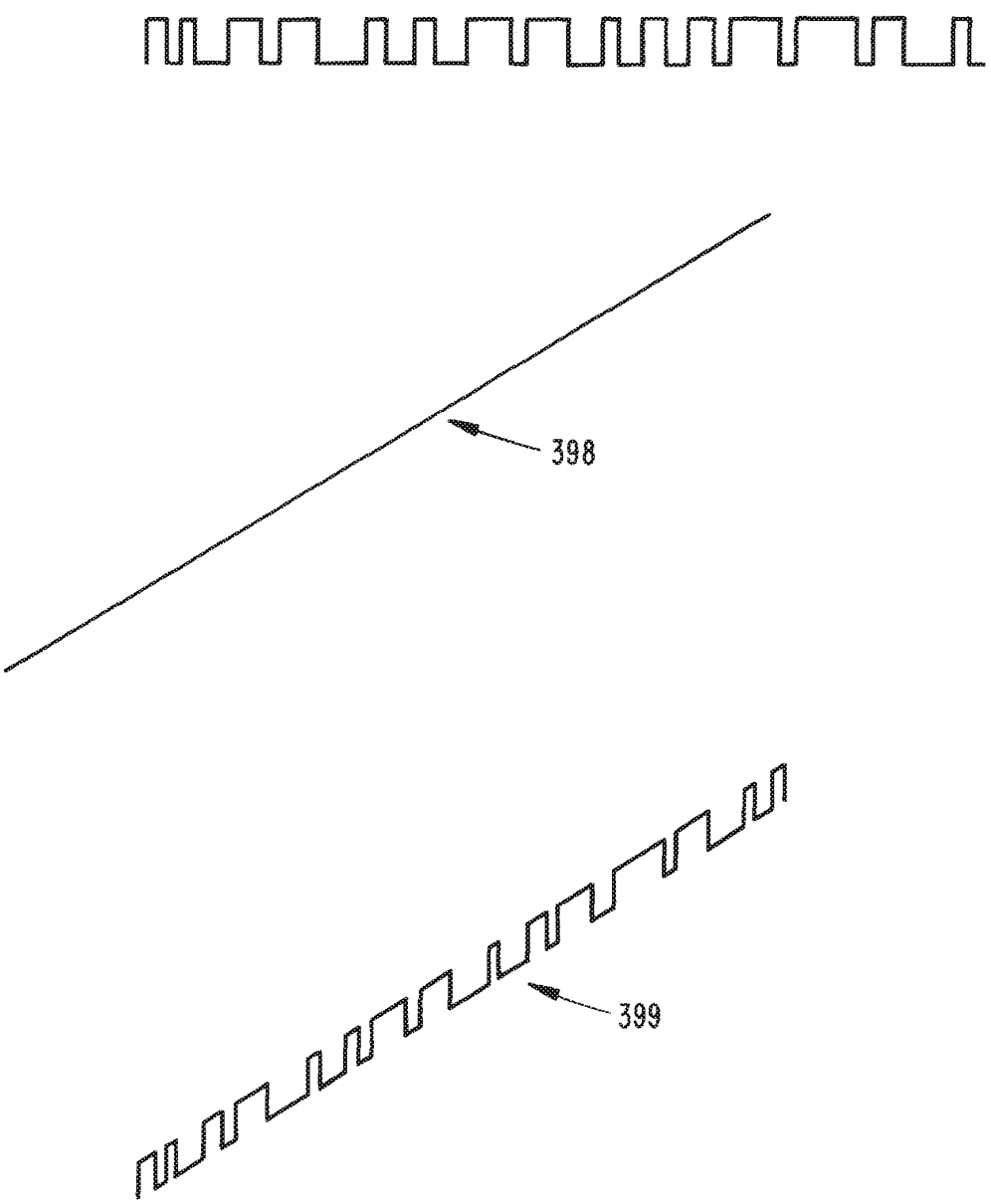


Fig. 3(d)

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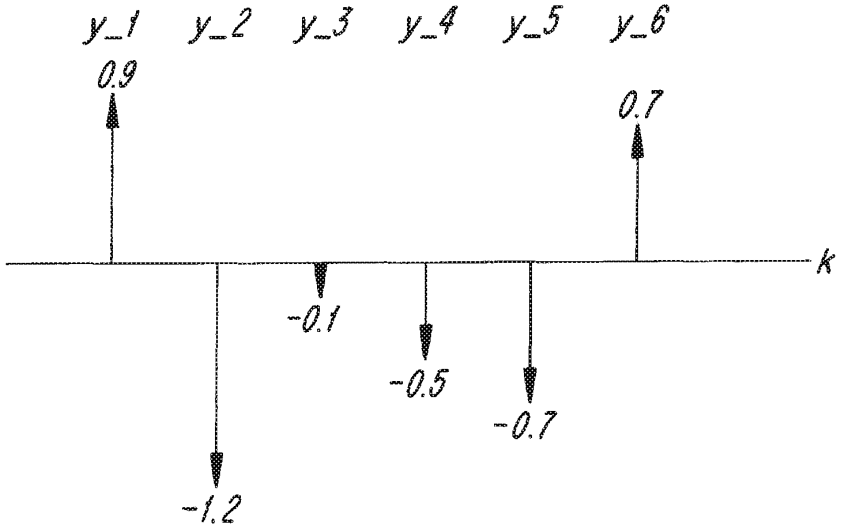


Fig. 4

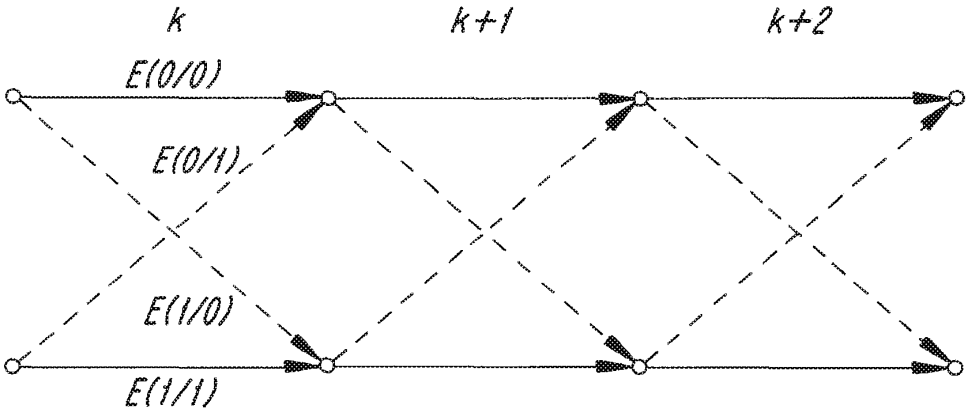


Fig. 5

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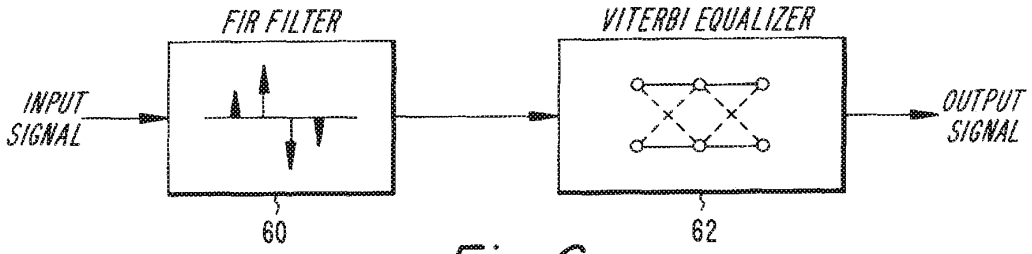


Fig. 6

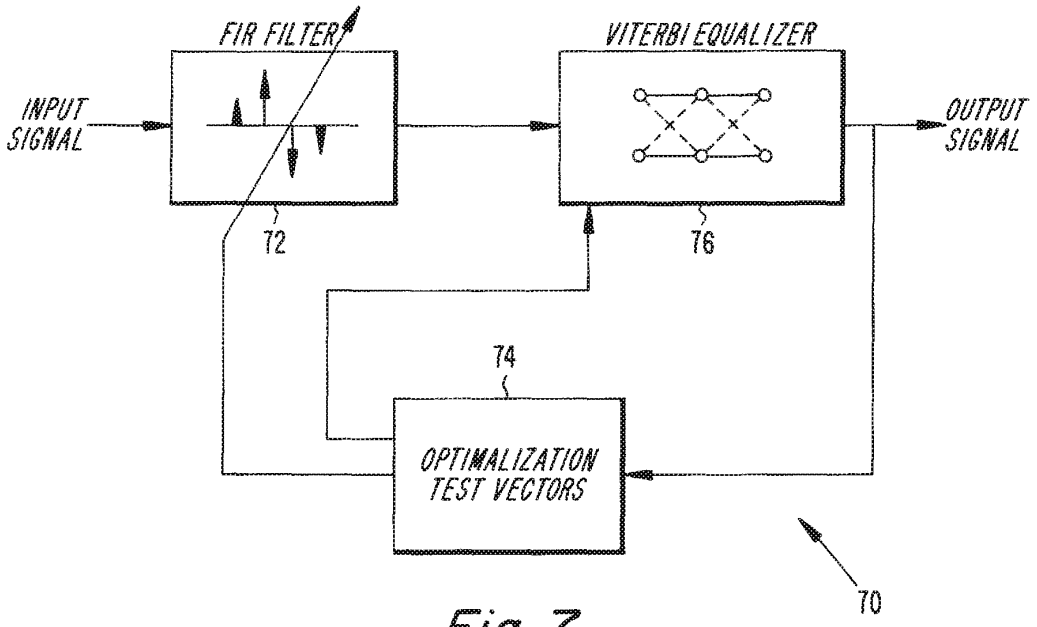


Fig. 7

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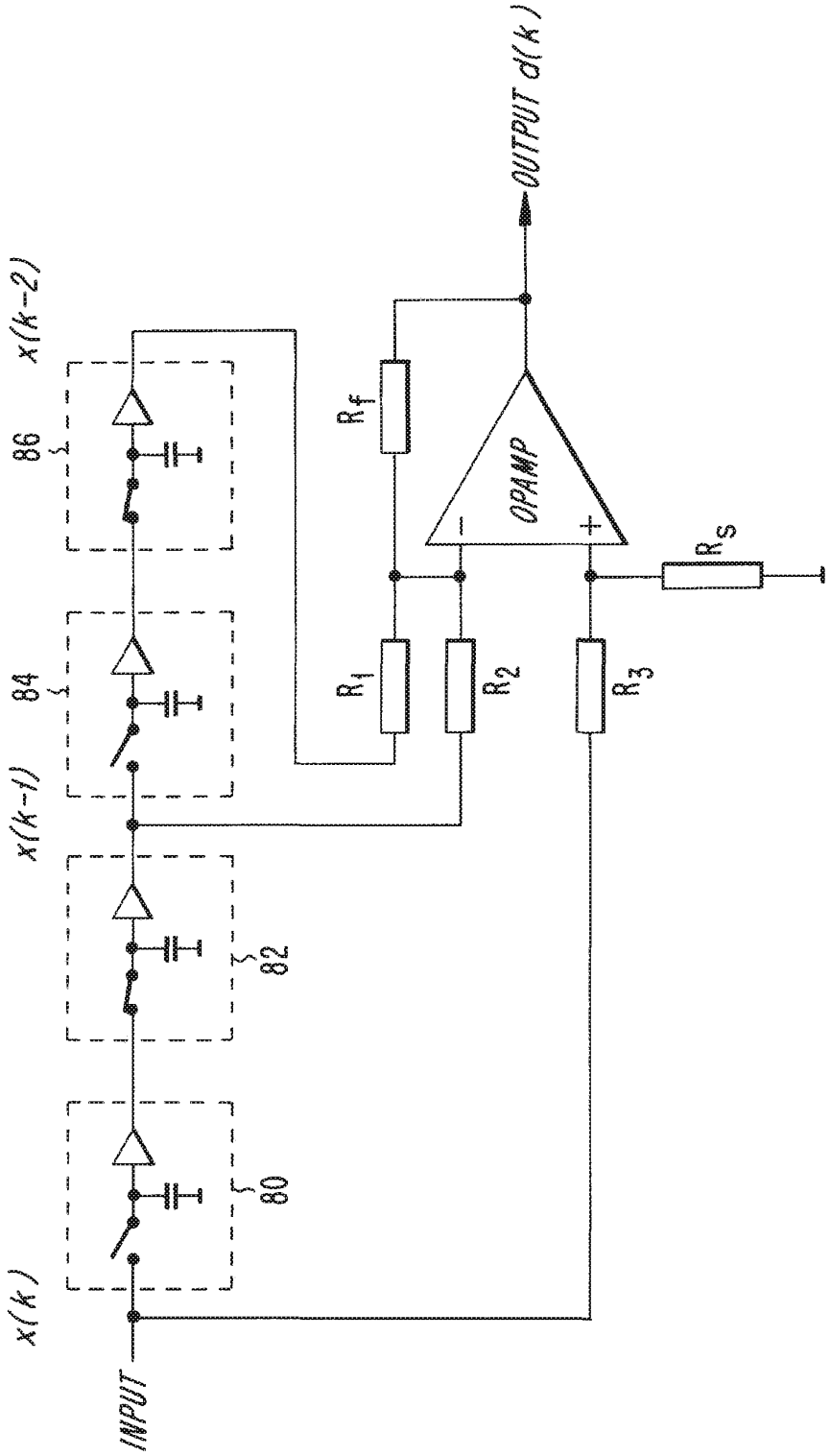


Fig. 8

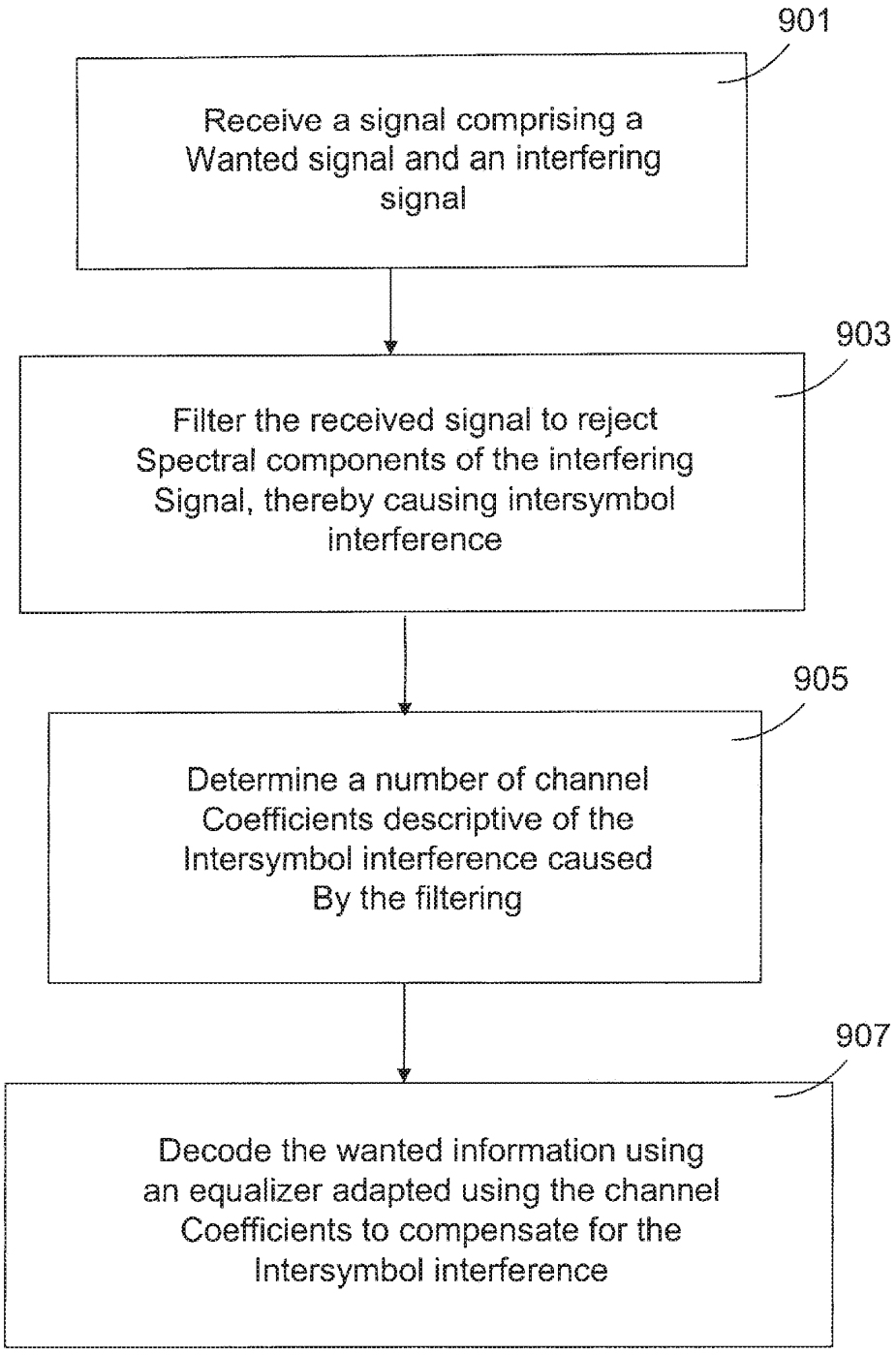


FIG. 9

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METHOD AND SYSTEM FOR DETECTION OF BINARY INFORMATION IN THE PRESENCE OF SLOWLY VARYING DISTURBANCES

BACKGROUND

The present invention pertains to systems and methods involved in radiocommunication systems and, more particularly, to systems that employ binary signal streams of known amplitude which are disturbed by, for example, DC offsets, drifts, and other slowly changing disturbances superimposed on the desired binary signal. The techniques described herein are particularly well-suited for the detection of binary FM or binary FSK modulated signals in the presence of such disturbing signals, but can also be used in conjunction with other types of modulation.

The cellular telephone industry has made phenomenal strides in commercial operations in the United States as well as the rest of the world. Growth in major metropolitan areas has far exceeded expectations and is rapidly outstripping system capacity. If this trend continues, the effects of this industry's growth will soon reach even the smallest markets. Innovative solutions are required to meet these increasing capacity needs as well as to maintain high quality service and avoid rising prices.

FIG. **1** illustrates an example of a conventional cellular radio communication system **100** in which the present invention can be implemented. The radio communication system **100** includes a plurality of radio base stations **170***a–n* connected to a plurality of corresponding antennas **130***a–n*. The radio base stations **170***a–n* in conjunction with the antennas **130***a–n* communicate with a plurality of mobile terminals (e.g. terminals **120***a*, **120***b* and **120***m*) within a plurality of cells **110***a–n*. Communication from a base station to a mobile terminal is referred to as the downlink, whereas communication from a mobile terminal to the base station is referred to as the uplink.

The base stations are connected to a mobile telephone switching office (MSC) **150**. Among other tasks, the MSC coordinates the activities of the base stations, such as during the handoff of a mobile terminal from one cell to another. The MSC, in turn, can be connected to a public switched telephone network **160**, which services various communication devices **180***a*, **180***b* and **180***c*.

In conventional cellular radiocommunication systems such as that illustrated in FIG. **1**, the signal transmitted over the air interface does not travel along a single, straight path. Instead, the radiated energy reflects and travels in many directions so that different portions of the radiated energy arrive at the receiver (i.e., either that of terminals **120** or base stations **170**) at different times. As a result, the receiver receives a distorted signal that is very different from the original signal. This distortion problem, which is commonly referred to as multipath fading, can be viewed as a smearing of the transmitted pulses.

In such conventional systems, the effects of the radio channel are measured and taken into account in the receiver when attempting to correctly determine the originally transmitted information. Channel estimates are calculated based upon known information which is periodically transmitted over the radio channel to the receiver. Since radio channels may change rapidly, e.g., due to movement of the terminals **120**, the channel estimate can be regularly updated.

Channel estimation can be used in conjunction with an application of the Viterbi algorithm to determine the originally transmitted information as shown in FIG. **1**(*b*). Therein, the received signal is used to produce channel estimates at block **200**. The channel estimates are provided to the Viterbi detector **220**, wherein they are employed to determine metrics associated with the likelihood of various state transitions. Those skilled in the art will readily understand the operation of Viterbi detector **220** and, therefore, a fuller discussion of this device is not provided here. A filter **240** may also be provided upstream of the Viterbi detector **220** to whiten the noise associated with the earlier processing (not shown) on the received signal, since it has been shown that Viterbi detectors provide optimal results in the presence of white, rather than colored, noise.

Although channel effects are a dominant disturbance in conventional cellular systems, in other types of systems the dominant disturbance to transmitted signals may arise from other sources. For example, a new relatively low cost, low range wireless transmission system (defined by the recently developed "Bluetooth" technology) has been proposed for localized two-way data transmissions. Bluetooth systems are envisioned as a universal radio interface in the 2.45 GHz frequency band that enable portable electronic devices to connect and communicate wirelessly via short-range, ad hoc networks. Readers interested in various details regarding the Bluetooth technology are referred to the article entitled "BLUETOOTH—The universal radio interface for ad hoc, wireless connectivity" authored by Jaap Haartsen and found in the Ericsson Review, Telecommunications Technology Journal No. 3, 1998, the disclosure of which is incorporated here by reference. Of particular interest for this discussion is the fact that channel effects associated with the Bluetooth air interface may not be the dominant disturbance to transmitted signals in such systems, due to the short-range nature of the air interface links. Accordingly, other slowly varying disturbances may be more problematic than channel effects in such systems.

Such disturbances can have several origins. In many instances, the disturbance cannot be filtered out when the desired signal itself has low-frequency components. Examples of such disturbances include DC offset in homodyne receivers, offset in FM discriminators due to inaccuracies in the local oscillator frequency, drift (in otherwise presumably constant signal levels) due to temperature and aging, all of which represent situations where special attention has to be given to obtain error-free recovery of the desired signal.

There are several methods for performing DC offset suppression. The simplest methods use DC blocking capacitors to high-pass filter the signal. However, these filters have long response times which result in long settling times after turning on the receiver. Such long settling times are unacceptable in TDMA receivers where the receiver is switched on and off repetitively. Another technique for performing DC offset suppression is differentiation followed by integration. The differentiation removes all DC components since it has a zero at DC. Integration inverse filters the differentiated signal. The differentiation and integration can conveniently be carried out using adaptive delta modulation (ADM) techniques, e.g., as described in U.S. patent application Ser. No. 07/578,251, entitled "DC Offset Compensation", filed in September of 1990 to Paul W. Dent. However, this technique requires considerable oversampling and can only be used to suppress DC offset. Drifts and other slowly varying, unwanted signals cannot be suppressed. Other suppression techniques are carried out in the digital domain, but require a high dynamic range of the A-to-D converter since no suppression has taken place prior to the digital processing.

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Accordingly, it would be desirable to provide a solution to address the problems associated with slowly varying disturbances, such as DC offset, drift, etc.

SUMMARY

These, and other, drawbacks, limitations and problems associated with conventional techniques for compensating for slowly varying disturbances are overcome by the present invention which removes slowly varying disturbances superimposed on streams of binary symbols with known separation. According to one exemplary method, the signal is first sampled at the symbol rate. The symbols are then fed into a discrete, finite-impulse-response (FIR) filter that removes the disturbance. The effects of the filter on the desired binary signal (e.g., intersymbol interference) are undone in a decoder that applies a Viterbi algorithm and acts like an equalizer. The Viterbi algorithm uses the knowledge of the constant amplitude separation of the binary signals, and forms estimates of the filter response for different possible desired input sequences.

The complexity of the exemplary systems according to the present invention depends on the length of the FIR filter. The longer the FIR filter, the more states are required in the Viterbi algorithm. The performance of the system depends on the coefficients of the FIR filter. Exemplary embodiments of the present invention describe how to tailor the trade-off that can be made between the noise performance and the suppression performance of the FIR filter.

BRIEF DESCRIPTION OF THE DRAWINGS

The foregoing objects, features and advantages of the present invention, as well as other features, will be more readily understood upon reading the following detailed description in conjunction with the drawings in which:

FIG. **1**(*a*) shows a conventional radio communication system including plural base stations and a mobile telephone switching office;

FIG. **1**(*b*) depicts a portion of a conventional receiver including a channel estimator, Viterbi detector and filter;

FIG. **2** shows a signal representation of binary signals in an arbitrary noisy environment;

FIGS. **3**(*a*)–(*d*) show various types of disturbed information signals which can be found in communications receivers, more specifically;

FIG. **3**(*a*) illustrates step responses in an information signal caused by on-off events;

FIG. **3**(*b*) illustrates an additional step due to an adjacent interferer in a homodyne detector;

FIG. **3**(*c*) depicts the effects caused by a continuous wave interferer on an information signal;

FIG. **3**(*d*) illustrates the effects caused by a drifting local oscillator on an information signal;

FIG. **4** is an example of sampled, binary sequence in presence of noise;

FIG. **5** is a trellis diagram for a two-state Viterbi decoder employing a 2-tap FIR filter;

FIG. **6** is an exemplary embodiment of a receiver according to the present invention;

FIG. **7** depicts an exemplary embodiment of the present invention in which an adaptive arrangement is provided to suppress disturbances;

FIG. **8** is an example of a discrete FIR filter in the analog domain; and

FIG. **9** is a flow diagram of a method of decoding wanted information symbols from a wanted signal according to a exemplary edmbodiment of a the invention.

DETAILED DESCRIPTION

In the following description, for purposes of explanation and not limitation, specific details are set forth, such as particular circuits, circuit components, techniques, etc. in order to provide a thorough understanding of the present invention. However, it will be apparent to one skilled in the art that the present invention may be practiced in other embodiments that depart from these specific details. In other instances, detailed descriptions of well-known methods, devices, and circuits are omitted so as not to obscure the description of the present invention.

The exemplary radio communication systems discussed herein are described as useful in systems employing the Bluetooth technology, e.g., having operating characteristics such as frequency hopped CDMA, low transmit power, etc. However, those skilled in the art will appreciate that the concepts disclosed herein find use in other protocols and systems, including, but not limited to, frequency division multiple access (FDMA), time division multiple access (TDMA), code division multiple access (CDMA), or some hybrid of any of the above protocols.

In particular, exemplary embodiments of the present invention provide techniques for handling disturbances associated with binary signals. A general binary signal representation is shown in FIG. **2**. Therein, there are two possible symbols, +A and −A. Due to noise, there is a signal probability distribution around the noise-free values +A and −A. A bit decision can be made by providing a threshold between the two possible values, and then making a bit decision according to the location of the detected sample with respect to the threshold. The optimal threshold location is at the intersection of the two probability distribution functions as shown in FIG. **2**. Often, there is mirror symmetry in the functions between +A and −A, and then the threshold can be placed halfway between the two signal values.

If a disturbance is superimposed on the binary signal, the signal values +A and −A are translated in the X-direction according to the disturbance. FIGS. **3**(*a*)–**3**(*d*) show some examples of signals disturbed by DC offset or other slowly varying signals. Each of these figures depicts the original signal as the top function, followed by one or more disturbing signals, with the resultant combination of the original signal plus the disturbing signal illustrated at the bottom of each figure. For example, in FIG. **3**(*a*), an original signal **300** is disturbed by DC offsets **310** resulting in the composite signal **320**. These DC offsets are generated as soon as the electronic circuitry of the receiver is switched on. Thus, DC blocking is not possible for this condition, since a fast receiver response is needed so that the receiver can detect, e.g., the beginning of a signal burst associated with that receiver's channel.

In FIG. **3**(*b*), an additional DC step response **360** in the middle of the burst is seen in the composite signal **370**, which additional DC step response can be experienced, for example, in homodyne receivers due to intermodulation in the receive chain. As in FIG. **3**(*a*), the original signal **380** in FIG. **3**(*b*) is also disturbed by DC offset **390**. FIG. **3**(*c*) shows a continuous wave interference signal **392** superimposed on the desired signal **394** to result in a composite signal **396**. Additionally, FIG. **3**(*d*) shows a drift **398** in the detected signal **399**, which drift can result from temperature variations, aging or imbalance problems.

Despite these types of variations and disturbances experienced by the signal, the threshold for the bit value determination has conventionally remained fixed (assuming no a

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 final 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 $f_o+\Delta f$ and $f_o-\Delta f$, whereas for a binary zero, the symbols use both $f_o+\Delta f$ or both $f_o-\Delta f$. 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 removed as long as the difference in the disturbance level between adjacent samples is less than Δ/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 embodimerits 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 future 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 0 1}. However, due to noise, the sampled values y_1 to y_6 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_1 was a 1, a conventional DFSK detector would give an output sequence of {1 0 1 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_6 must be 1 and x_5 must be 0. Taking into account the relatively small differences between the sampled values associated with x_5, x_4, x_3, and x_2, it can be recognized that all these bits should have the same value as bit x_5, i.e., 0. Between x_2 and x_1, the difference shows that the transition from 1 to 0 is highly probable. Since x_1 was assumed to be 1, x_2 must then be zero which matches with the derivation of the value of x_2 described above based on its similarity to bits x_5, x_4 and x_3. Therefore, the decoded sequence according to this empirical detection technique is {1 0 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 future 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 paths 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., in 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 retrieves 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 feed.

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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hypothesized bit and p is the previous, hypothesized bit. For a binary signal with distance Δ, the error signals at instant k are:

$$E_k(0/0)=d(k)^2$$

$$E_k(1/0)=(d(k)-\Delta)^2$$

$$E_k(0/1)=(d(k)+\Delta)^2$$

$$E_k(1/1)=d(k)^2$$

where d(k)=x(k)−x(k−1) is the difference between the current sample and the previous sample. This instantaneous error is added to the path metric. The hypothesized bits in the path form the path history. When sufficient bits are incorporated in the path history, i.e., when the decision depth is reached), a decision on the first bit is made by comparing the cumulative metrics of all paths and selecting the path with the lowest metric. The oldest bit in the path history of this path is selected as the decision bit.

Using a Viterbi decoder **62** after the difference circuit **60** instead of just a threshold detection (i.e., as in conventional DFSK detection) improves the SNR performance by about 1 dB. In addition, the performance in the presence of disturbance signals is much better than in case of conventional DFSK, since the step in the disturbance between adjacent samples can be much bigger than Δ/2. However, the SNR performance is not yet as good as the conventional FSK detector, as will be apparent to those skilled in the art from the following discussion.

The difference circuit can be regarded as a discrete high-pass filter with a frequency response G(ω):

$$G(\omega)=\sin(\omega)-\pi<\omega<\pi$$

where ω is the normalized frequency. This is not an ideal high-pass filter, since an ideal high pass filter would have a flat spectrum with only a zero at ω=0. Since G(ω) is not an ideal filter, the noise out of this filter is not white but colored which means that there is a correlation between the noise in adjacent difference samples. This degrades the Viterbi detection, which is optimized for white noise.

The high-pass filter characteristics can be improved by increasing the order of the difference equation. Consider that the difference circuit can be regarded as a FIR filter with coefficients a(m), such that:

$$d(k)=a(0)\cdot x(k)+a(1)\cdot x(k-1)+a(2)\cdot x(k-2)\ldots$$

The first-order filter discussed above for implementation of equation (1) has only two taps with values a(0)=1 and a(1)=−1, i.e., it provides a difference only between adjacent samples. The rest of the coefficients of the FIR filter are zero. For a higher order filter, more taps are used, i.e., information regarding other samples is employed. To maintain the DC offset suppression qualities of this filter, the sum of the FIR coefficients should be zero:

$$\sum_{m=0}^{N-1} a(m) = 0 \qquad (2)$$

In order to correct for the intersymbol interference (ISI) introduced in higher order FIR filters, the number of states employed by the Viterbi decoder **62** has to increase. For an N-tap FIR filter, the number of required states in the Viterbi decoder is $2^{(N-1)}$. The instantaneous error in the Viterbi decoder can be derived from the filter response as follows:

$$E_k(c|p_1p_2p_3p_4p_5\ldots pN)=(d(k)-[a(0)c+a(1)p_1+a(2)p_2+\ldots+a(N)p_N]-\Delta/2)^2 \qquad (3)$$

where c is the current hypothesized bit, $p_1p_2\ldots p_N$ is the path history (p_N is the oldest bit) and d(k) is the current output of the FIR filter. E_k can be determined for all 2^N possible paths. Then at each Viterbi state, the worst path (i.e., the path with highest path metric) is rejected and eliminated from the scheme.

To suppress DC offsets and other low frequency disturbances according to exemplary embodiments of the present invention, the FIR filter coefficients of filter **60** should be chosen to provide a high-pass filter characteristic having a predetermined order, which characteristic will represent a trade-off between the SNR performance (under disturbance-free conditions), and the disturbance suppression capabilities. The better the SNR performance, the worse the suppression of low-frequency disturbances. If only DC offset suppression is required in a particular implementation of the present invention, as compared with other types of slowly varying disturbances, then apart from the requirement on the sum of the coefficients as given in equation (2), an additional requirement is to have a filter impulse response whose autocorrelation approaches a Dirac pulse as closely as possible.

The combination of a FIR filter **60** and a Viterbi detector **62** shown in FIG. **6** is an example of what more generally can be considered as a prefilter to remove unwanted signal components followed by an equalizer to retrieve the desired signal. Thus, other types of filters (e.g., infinite impulse filters) and other types of equalizers (e.g., linear, non-linear, decision feedback, etc.) can also be used in conjunction with the present invention. However, introduction of the FIR filter **60**, having filter coefficients which are set to suppress inband interference (e.g., as opposed to adjacent channel interference), colors the noise included in the output from the filter and also introduces intersymbol interference in the desired signal. Thus, the coefficients of the equalizer (or the metrics used in the Viterbi detector **62**) should be determined taking into account the filter coefficients employed in filter **60** to optimize the detection of symbols in the desired signal.

Since the FIR filter **60** of FIG. **6** has fixed coefficients, the Viterbi equalizer parameters are fixed as well. The foregoing exemplary embodiments have focused on suppression of DC offsets and low-frequency disturbances. However, the FIR filter **60** can also be configured to suppress other kind of disturbances, e.g., using equation (3), to recalculate the metrics used in the VA and provide adaptive suppression as illustrated in FIG. **7**. In this example, the detector **70** is periodically provided with a test sequence, e.g., a sequence of known symbols. The filter **72** is adaptive and the coefficients are adjusted by an optimizing function **74** such that the test sequence is optimally detected, i.e., that the disturbances are rejected as much as possible. Those skilled in the art will appreciate that this can be accomplished by identifying the parameters of the disturbances and minimizing them using, for example, a least mean square error approach. From the FIR filter coefficients calculated by optimizing function **74**, the metric used in the Viterbi equalizer **76** can be derived using equation (3) and an optimal detection chain results.

To reduce the dynamic range of the A-to-D converters in systems with large offsets at the input, the FIR filtering performed by filters **60** or **72** can be performed in the analog domain. In this way, the disturbance is removed before A-to-D conversion. An example of a circuit that performs differencing in the analog domain, and which can be used to implement either FIR filter **60** or **72**, is shown in FIG. **8**. The sampled data provided at the input is delayed in a switched analog delay line constructed with buffered sample-and-hold circuits **80**, **82**, **84** and **86**. The buffer outputs feed to an operational amplifier (OPAMP) **88** which is configured to

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operate like an adder and subtracter. The filter coefficients can be implemented by the proper values of the resistors R1, R2, R3, R_f and R_s in a manner which will be apparent to those skilled in the art. If the filter is adaptive, one or more of these resistors can be made to have variable values. The signals leading to the inverting input of OPAMP **88** are multiplied by negative coefficients, while those signals leading to the non-inverting input of OPAMP **88** are multiplied by positive coefficients. The OPAMP output is the filtered signal and has a much smaller dynamic range than the original signal. This output signal is now sampled at the symbol rate, converted to digital format and fed into the Viterbi equalizer **62** or **76**.

The above-described exemplary embodiments are intended to be illustrative in all respects, rather than restrictive, of the present invention. Thus the present invention is capable of many variations in detailed implementation that can be derived from the description contained herein by a person skilled in the art. All such variations and modifications are considered to be within the scope and spirit of the present invention as defined by the following claims.

What is claimed is:

1. A method for suppressing inband interference in binary signals comprising the steps of:

receiving a signal;

processing said signal using a filter to suppress said inband interference; and

determining values associated with said signal by processing an output of said filter using an equalizer, wherein said equalizer is configured to compensate for the distortion introduced by said filter.

2. The method of claim **1** wherein the filter is a FIR filter.

3. The method of claim **2** wherein the FIR filter is a time-discrete analog filter.

4. The method of claim **2** wherein coefficients of the FIR filter are programmable to provide adaptive interference suppression.

5. The method of claim **2**, wherein a sum of coefficients of said FIR filter equals zero.

6. The method of claim **5**, wherein said FIR filter has a filter impulse response having an autocorrelation value approaching a Dirac pulse.

7. The method of claim **1**, wherein an output of said filter contains colored noise.

8. The method of claim **1**, wherein said step of determining values further comprises:

determining said values using a maximum likelihood sequence estimator employing the Viterbi algorithm.

9. The method of claim **1**, wherein said inband interference includes DC offset.

10. A receiver for processing a received signal comprising:

a filter having coefficients which are set to suppress inband interference to generate a distorted output; and

an equalizer for receiving said distorted output and determining values associated with said received signal samples, wherein said equalizer is configured to compensate for the distortion introduced by said filter.

11. The receiver of claim **10** wherein the filter is a FIR filter.

12. The receiver of claim **11** wherein the FIR filter is a time-discrete analog filter.

13. The receiver of claim **11** wherein coefficients of the FIR filter are programmable to provide adaptive interference suppression.

14. The receiver of claim **10**, wherein said equalizer is a maximum likelihood sequence estimator.

15. The receiver of claim **11**, wherein a sum of coefficients of said FIR filter equals zero.

16. The receiver of claim **15**, wherein said FIR filter has a filter impulse response having an autocorrelation value approaching a Dirac pulse.

17. The receiver of claim **11**, wherein an output of said FIR filter contains colored noise.

18. A receiver which suppresses DC offset in binary signals comprising:

means for receiving a signal;

means for processing said signal using a difference circuit to generate differences between samples in said signal; and

means for determining values associated with said signal using said differences wherein said DC offset is suppressed.

19. The receiver of claim **18** wherein means for processing includes a FIR filter.

20. The receiver of claim **19** wherein the FIR filter is a time-discrete analog filter.

21. The receiver of claim **19** wherein coefficients of the FIR filter are programmable to provide adaptive interference suppression.

22. The receiver of claim **18**, wherein means for determining values is a maximum likelihood sequence estimator employing the Viterbi algorithm.

23. The receiver of claim **19**, wherein a sum of coefficients of said FIR filter equals zero.

24. The receiver of claim **23**, wherein said FIR filter has a filter impulse response having an autocorrelation value approaching a Dirac pulse.

25. The receiver of claim **19**, wherein an output of said FIR filter contains colored noise.

26. A method for decoding wanted information symbols from a wanted signal while suppressing a systematic unwanted interfering signal having a frequency spectrum lying within the frequency spectrum of the wanted signal comprising the steps of:

receiving a signal including said wanted signal plus said interfering signal and noise;

filtering the received signal using a filter having first coefficients set to reject spectral components of said interfering signal, thereby also rejecting wanted spectral components of the wanted signal and causing intersymbol interference;

determining a number of channel coefficients descriptive of said intersymbol interference caused by said interference-suppression filter; and

decoding said wanted information using an equalizer adapted using said channel coefficients to compensate for said intersymbol interference.

27. The method of claim **26** in which said filter is a digital filter.

28. The method of claim **26** in which said filter is a Finite Impulse Response filter employing a number of FIR coefficients as said first coefficients.

29. The method of claim **28** in which said channel coefficients are substantially the same as said FIR coefficients.

30. The method of claim **26** in which said step of determining said channel coefficients further comprises the step of:

correlating the filtered signal with a sequence of known symbols contained in the wanted signal.

31. The method of claim **26** in which said equalizer is a Viterbi Maximum Likelihood Sequence Estimator.

* * * * *

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US005530929A

United States Patent [19]

Lindqvist et al.

[11] Patent Number: 5,530,929

[45] Date of Patent: Jun. 25, 1996

[54] **HOMODYNE RECEIVER MINIMIZING OSCILLATOR LEAKAGE**

[75] Inventors: **Björn Lindqvist**, Bjärred; **Martin Isberg**, Lund, both of Sweden

[73] Assignee: **Ericsson GE Mobile Communications Inc.**, Research Triangle Park, N.C.

[21] Appl. No.: **303,183**

[22] Filed: **Sep. 8, 1994**

[30] **Foreign Application Priority Data**

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[51] **Int. Cl.**[6] **H04B 1/26**

[52] **U.S. Cl.** **455/324**; 455/310; 455/318

[58] **Field of Search** 455/300, 310, 455/301, 313, 314, 317, 318, 323, 324, 255, 258, 260, 315, 296; 331/51, 53

[56] **References Cited**

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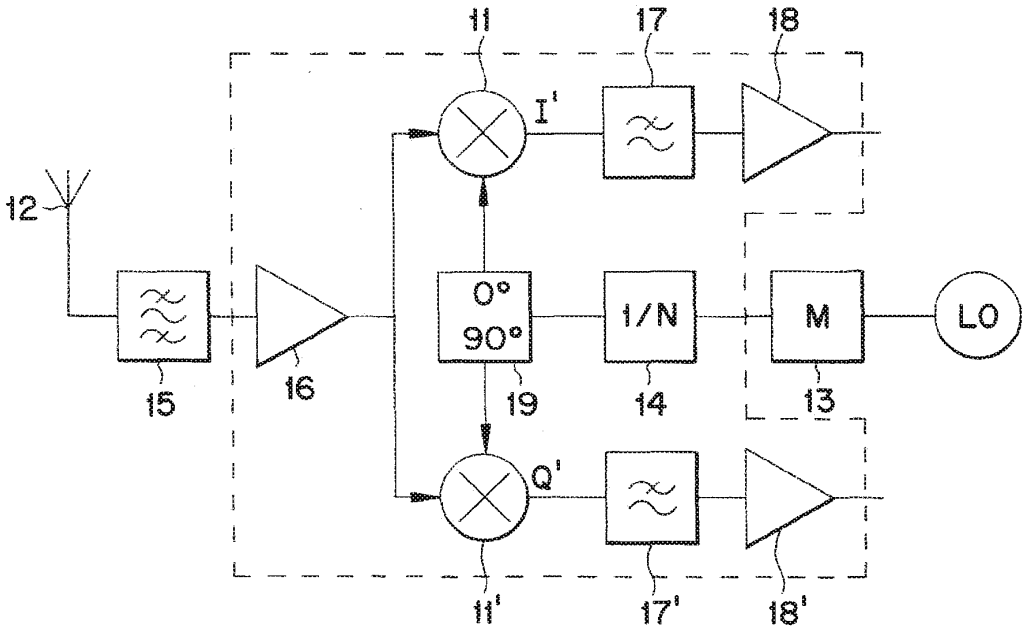
Primary Examiner—Andrew I. Faile

Attorney, Agent, or Firm—Burns, Doane, Swecker & Mathis

[57] **ABSTRACT**

A method and a device in a homodyne receiver including a local oscillator generating an oscillator signal at a frequency of f_{LO}, a mixer, and a reception device for receiving an input signal having a frequency of f_{RF}, the oscillator signal and the input signal being supplied to the mixer. The oscillator signal is supplied to a first processing unit to produce a first output signal having a frequency of $M*f_{LO}$, where M is an integer value. The first output signal is supplied to a second processing unit to produce a second output signal having a frequency of $M*f_{LO}/N=f_{LO}$, where N is an integer number and $M \neq N$, and the mixer and the second processing unit are integrated to minimize leakage of signals being supplied to the mixer from the second processing unit.

5 Claims, 1 Drawing Sheet



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FIG. 1
PRIOR ART

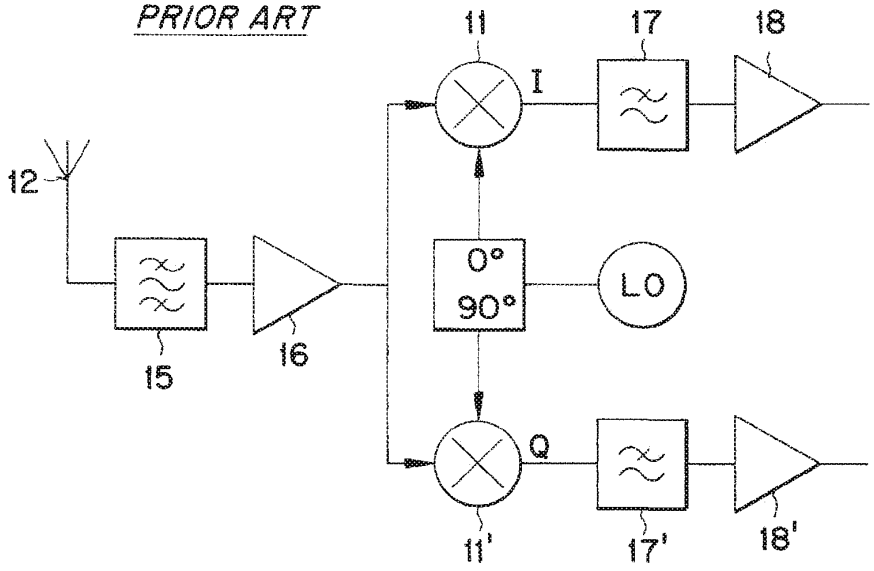
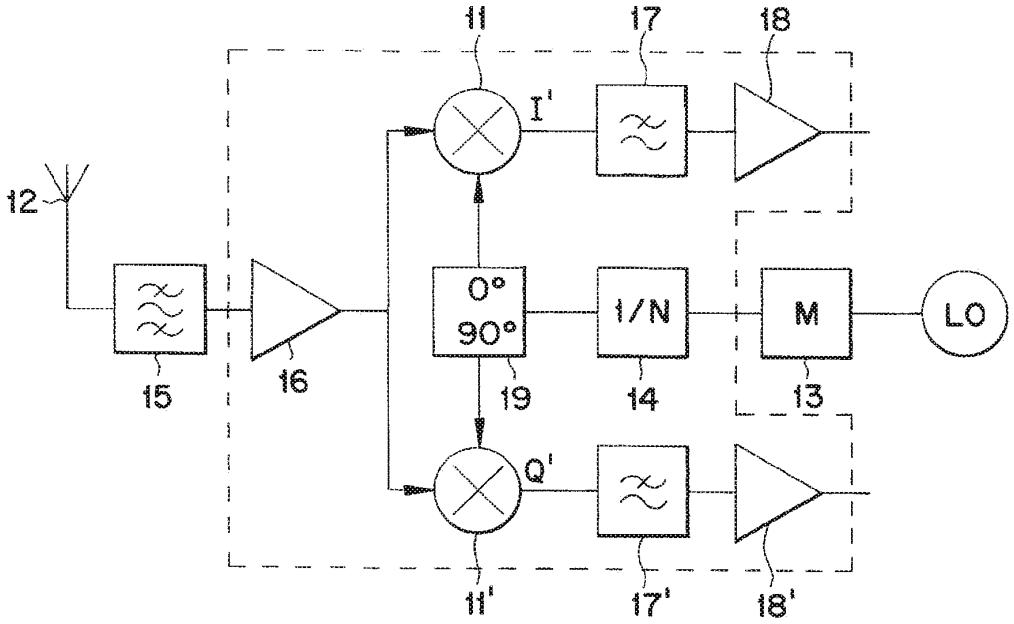


FIG. 2



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HOMODYNE RECEIVER MINIMIZING OSCILLATOR LEAKAGE

BACKGROUND

The invention relates to a method and a device in a homodyne receiver to be used in radio, tele, and data communication systems such as portable cellular phones, cordless phones, pagers, carrier frequency systems, TV cable systems, etc. Receivers in this technical field should preferably be small, lightweight and inexpensive.

The first generation of cellular systems relied on analogue frequency modulation for speech transmission, and several standards have been developed, such as NMT450, NMT900, AMPS, and ETACS.

The second generation of cellular systems follows three different standards: in Europe and some countries in Asia and Australia—Global System For Mobile Communications (GSM), in north America—American Digital Cellular (ADC), and in Japan—Pacific Digital Cellular (PDC). These systems all employ digital voice transmission and some digital services such as facsimile transmission and short messages.

To make the portables smaller and less expensive much research has been done to increase the level of integration of different parts in the phone.

Prior art receivers that have been used in this technical field were of the conventional heterodyne type. For applications in small low cost mobile communication systems these receivers suffer from high production costs caused by expensive and non-integrable RF and IF components such as band pass filters. To overcome such drawbacks alternative receivers have been developed. These receivers are based on the direct conversion principle. The local oscillator frequency is equal to the received carrier frequency and, consequently, the received signal is converted to the base band in one single step. This concept was first introduced for SSB-receivers but can be used in many different types of modulation, particularly for digital quadrature modulation schemes.

In a homodyne receiver or a zero-IF-receiver the received signal and the local oscillator operate at exactly the same frequency. Since there are no intermediate frequencies (IF) many filters can be omitted or simplified. The operation of the homodyne receiver can be described as follows. The RF signal of center frequency f_c and bandwith BW_{rf} is amplified with a low noise amplifier to improve the total noise figure of the receiver. The signal is then split and down converted to DC by mixers in both channels. The down converted spectrum is folded over itself and spans from DC to ½ BW_{rf}. The low frequency signals I and Q provided by the mixers are then filtered to remove any adjacent channel and amplified to set the noise floor. The I and Q signals or the quadrature signals will allow basically any type of modulation when an appropriate signal processing is utilized.

A major drawback of direct conversion receivers is spurious emission. The main source of spurious emission in a direct conversion receiver is local oscillator leakage. In an ordinary super heterodyne receiver the local oscillator leakage to the antenna is attenuated by the first receiver bandpass filter. In a direct conversion receiver this is not the case since the local oscillator frequency lies within the passband of this bandpass filter. At least two types of leakage are present in a direct conversion receiver. The first type is wire bound leakage, and a second type is radiated leakage caused by parasitic coupling between leads and/or bonding wires.

Different methods have been suggested to overcome the problems with spurious emissions. W092/01337 discloses a direct conversion receiver comprising an antenna, a RF-filter, an amplifier and a mixer. A local oscillator, operating at a subharmonic of the received frequency, provides a signal to the mixer. A standard type mixer is used and a normal drawback of such a mixer, is that harmonics will be generated in the mixer when a signal of a frequency lower than the received signal is fed to the mixer from the LO is utilized to obtain the wanted signal in the mixer. Even though the local oscillator operates at a subharmonic of the received signal also harmonics will be generated. Some of these harmonics will in fact correspond to the received signal, and spurious emission will occur at some level.

In DE 3240565 another type of homodyne receiver is disclosed. The LO of this receiver is a controllable oscillator that generates a signal with a frequency forming a multiple of the receiver frequency. The generated signal is then phase shifted 180° and divided to the frequency of the RF-signal. A major drawback in a receiver having a LO operating at a multiple of the received frequency is the difficulties to obtain the required characteristics of the LO. For instance the power consumption of such an oscillator will be difficult to match to the demands of a low total power consumption of the receiver.

SUMMARY

According to the present invention the problems and drawbacks of direct conversion receivers mentioned above are overcome by the use of a local oscillator, the frequency output thereof being processed in two steps before it is fed to the mixer. Preferably the frequency is both multiplied and divided before being supplied to the mixer. The final processing of the oscillator frequency to obtain the frequency of the received signal is not made until immediately before the mixer, preferably on the same chip as the mixer.

BRIEF DESCRIPTION OF DRAWINGS

Further features, advantages and details of the invention are set forth in the following description, drawings and claims.

FIG. **1** is a functional block diagram of a prior art homodyne receiver, and

FIG. **2** is a block diagram of a preferred embodiment of a homodyne receiver according to the invention.

DETAILED DESCRIPTION

In FIG. **1** a prior art homodyne received is shown. In the receiver of FIG. **1** quadrature modulation is utilized. An antenna **12** receives electromagnetic energy transmitted from a transmitter not shown in the drawings. The received signal is fed to a first band pass filter **15**, which is provided to select the correct communication band to improve the blocking characteristics of the receiver. Strong signals outside of the received band are attenuated and therefore do not degrade the receiver performance.

An output of said bandpass filter **15** is connected to a low noise amplifier **16** which improves the sensitivity of the receiver. The amplifier gain of said low noise amplifier **16** is selected in view of actual requirements. A high gain results in good sensitivity, and low gain is desirable to achieve a good dynamic range and proper intermodulation character-

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istics. An output of said low noise amplifier **16** is divided into two different parts, namely an I-channel and a Q-channel.

Each of the I-channel and Q-channel is connected to a mixer **11**, **11'**. The mixer forms an essential part of the direct conversion receiver. It converts the high frequency input signal to base band where it is easier to amplify and filter the signal with low-pass filters **17**, **17'** and amplifiers **18**, **18'**. The mixer, **11**, **11'** can be passive or active, and the choice between the two depends mostly on the intended application. Passive mixers have good large signal performance and a high third order intercept point but suffer from high conversion losses and the need of a strong local oscillator signal. Therefore, such mixers are avoided in battery powered equipment. An active mixer has a high conversion gain, can be driven by a low power local oscillator but instead has a lower third order intercept point and a slightly poorer noise figure than the passive mixer. In a preferred embodiment an active mixer is used because of the demands for lower power consumption.

As mentioned above a quadrature modulation scheme is preferred according to the present invention. To achieve a quadrature signal mainly two different ways to do it are available. The first is to simply shift the phase of one or both of the I and Q oscillator signals, that is to shift one signal 90° or one +45° and the other −45°. The second method is to use an oscillator that outputs a balanced signal, that is two signals one of which is 180° shifted in phase from the other. These signals are then divided by two in the chain between the local oscillator and the mixers. A half wave length at twice the frequency equals a quarter of a wave length or 90° at the desired frequency, and thus the quadrature signal is generated automatically. According to the present invention the local oscillator operates at a frequency different from the wanted signal or the received signal. Referring to FIG. **2**, the LO is connected to a first processing unit **13** which multiplies the frequency of the local oscillator by a factor M. M should be an integer, and preferably is M=3. An output of said first processing unit **13** is operatively connected to a second processing unit **14** in which an input signal is divided by a factor N. M and N are both integer numbers, and furthermore M≠N. Preferably is N=2. FIG. **2** shows that two mixers **11** and **11'** are provided, and a phase shift network **19** is operatively connected to said mixers. A first mixer **11** receives the input signal amplified in said amplifier **16** and the output signal of said second processing unit **14**, and produces a signal I. The second mixer **11'** receives also the output signal of said amplifier **16** and the output signal from said second processing unit **14** phase shifted 90°, and produces a signal Q. However, when N=2 it could be more appropriate to phase shift the output signal within said second processing unit **14**.

Output signals I and Q from mixers **11** and **11'** are supplied to low pass filters **17**, **17'** of conventional type and then further amplified in conventional amplifiers **18** and **18'**. According to the invention it is not necessary to utilize quadrature signals or the quadrature modulation scheme. In such embodiments the phase shift network **19** is omitted and so are all units denoted by a prime sign.

A main feature of the invention is that signals having a frequency that could cause spurious emissions are not fed through wires such as bonding wires, microstrip, strip lines, coax lines, etc. Therefore, at least said second processing unit **14** should be integrated with said mixers **11**, **11'**. The integration can be made as an integration in one chip (indicated by the dotted lines in FIG. **2**) but also other types of integration having the same characteristics of low emission of electromagnetic signals can be used. In some applications it would be appropriate to integrate also said first processing unit **13** together with said mixers **11**, **11'** and said first processing unit **14**.

Different combinations of M and N are possible. Preferably, N and M are chosen so as to keep the operating frequency of said LO as low as possible to avoid unnecessary power losses. As stated above N is preferably **2**, and M is preferably **3** but also the opposite could be an appropriate choice.

The receiver according to the invention obviously can be used also in wired systems and is not restricted to radio communication systems. In a wired system the antenna **12** is replaced by an input circuit or other reception means applicable in such a system.

What is claimed is:

1. A method in a homodyne receiver including a local oscillator generating an oscillator signal at a frequency of f_{LO}, a mixer, and reception means for receiving an input signal having a frequency of f_{RF}, the oscillator signal and the input signal being supplied to the mixer, comprising the steps of:

(a) supplying the oscillator signal to a first processing unit to produce a first output signal having a frequency of $M*f_{LO}$, where M is an integer value,

(b) supplying the first output signal to a second processing unit to produce a second output signal having a frequency of $M*f_{LO}/N=f_{RF}$, where N is an integer number and M≠N, and

(c) integrating the mixer and the second processing unit to minimize leakage of signals being supplied to the mixer from the second processing unit.

2. The method of claim **1**, wherein the oscillator signal is a balanced output signal, including a first oscillator signal and a second oscillator signal, the second oscillator signal being shifted 180° from the first oscillator signal.

3. The method of claim **1**, further comprising the steps of:

phase shifting the second output signal by substantially 90° to produce a phase shifted signal, and

supplying the second output signal to the mixer and the phase shifted signal to a second mixer to obtain quadrature signals.

4. A device in a homodyne receiver including a local oscillator for generating an oscillator signal at a frequency of f_{LO}, a mixer, and reception means for receiving an input signal having a frequency of f_{RF}, the oscillator and the reception means being operatively connected to the mixer, comprising:

a first processing unit operatively connected to the local oscillator for producing a first output signal having a frequency of $M*f_{LO}$, where M is an integer value, and

a second processing unit operatively connected to the first processing unit for producing a second output signal having a frequency of $M*f_{LO}/N=f_{RF}$, where N is an integer number and M≠N,

wherein the mixer and the second processing unit are integrated to minimize leakage of signals supplied to the mixer from the second processing unit.

5. The device of claim **4**, wherein the first processing unit is a multiplier and the second processing unit is a divider circuit.

* * * * *

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Please Direct All Correspondence to Customer Number 20995

REQUEST FOR CORRECTED FILING RECEIPT

Inventor	:	C. Earl Woolfork
App. No	:	15/003242
Filed	:	January 21, 2016
For	:	WIRELESS DIGITAL AUDIO MUSIC SYSTEM
Examiner	:	Flanders, Andrew C.
Art Unit	:	2656
Conf No.	:	8992

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

Dear Commissioner:

Applicant hereby requests that the Official Filing Receipt, a copy of which is enclosed, be corrected to reflect the priority data as listed in the Corrected Application Data Sheet filed concurrently.

This priority data was outlined in the Specification as filed on January 21, 2016. Also, this priority data was originally listed on the Application Data Sheet filed on January 21, 2016, however the submitted Application Data Sheet contained a *typographical error in the Application Number* of the parent application. A Submission of Supplemental Application Data Sheet was submitted on February 1, 2016 to correct the application number of the parent application. However, the supplemental ADS had a typographical error listing the parent application number as 13/754,753. A subsequent Submission of Supplemental Application Data Sheet was submitted on February 5, 2016 to correct the application number of the parent to the correct number of 13/775,754.

The filing receipt mailed February 9, 2016 does not reflect any priority data. Please find attached a Corrected Application Data Sheet which reflects the priority claim data as it is currently known.

Respectfully submitted,

Dated:4/11/2018_____ By:/Harnik Shukla/_____
Harnik Shukla
Registration No. 73,097
Registered Practitioner
Customer No. 20995
(949) 721-5278

27781761

APPLICATION DATA SHEET

Application Information

Application Number:	15/003,242
Filing Date:	January 21, 2016
Application Type:	Nonprovisional
Subject Matter:	Utility
Title:	WIRELESS DIGITAL AUDIO MUSIC SYSTEM
Attorney Docket Number:	1EWAY.009P1C6
Total Drawing Sheets:	3
Small Entity?:	Yes

Correspondence Information

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Representative Information

Representative Customer Number: 20995

Domestic Priority Information

Application:	Continuity Type:	Parent Application:	Parent Filing Date:
This Application	Continuation of	13/775,754	February 25, 2013
13/775,754	Continuation of	13/356,949	January 24, 2012
13/356,949	Continuation of	12/940,747	November 5, 2010
12/940,747	Continuation of	12/570,343	September 30, 2009
12/570,343	Continuation of	12/144,729	July 12, 2008

Application:	Continuity Type:	Parent Application:	Parent Filing Date:
12/144,729	Continuation of	10/648,012	August 26, 2003
10/648,012	Continuation-in-part of	10/027,391	December 21, 2001

Dated: April 11, 2018

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IPR2025-01540

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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
15/003,242	01/21/2016	2654	730	1028.10	6	3

CONFIRMATION NO. 8992

FILING RECEIPT

68533
MEGAN LYMAN
1816 SILVER MIST CT.
RALEIGH, NC 27613

OC000000080388367

Date Mailed: 02/09/2016

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: None

This application is a CON of 13/775754 02/25/2013 PAT 9282386
which is a CON of 13/356949 01/24/2012 PAT 8107900
which is a CON of 12/940747 11/05/2010 PAT 8131291
which is a CON of 12/579243 09/30/2009 PAT 7865208
which is a CON of 12/144729 07/12/2008 PAT 7684885
which is a CON of 10/646012 08/26/2003 PAT 7412294
which is a CIP of 10/027391 12/21/2001 ABA

Domestic Applications for which benefit is claimed - None.

A proper domestic benefit claim must be provided in an Application Data Sheet in order to constitute a claim for domestic benefit. See 37 CFR 1.76 and 1.78.

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: 02/05/2016

The country code and number of your priority application, to be used for filing abroad under the Paris Convention, is **US 15/003,242**

Projected Publication Date: 07/27/2017

Non-Publication Request: No

Early Publication Request: No
**** SMALL ENTITY ****
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.

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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 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).

Samsung Exhibit 1002, Page 162 of 370
Samsung Electronics Co., Ltd. et al. v. One-E-Way, Inc.
IPR2025-01540

LICENSE FOR FOREIGN FILING UNDER

Title 35, United States Code, Section 184

Title 37, Code of Federal Regulations, 5.11 & 5.15

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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 AssetsControl, 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).

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PATENT APPLICATION FEE DETERMINATION RECORD

Substitute for Form PTO-875

Application or Docket Number: 15/003,242

APPLICATION AS FILED - PART I

FOR	(Column 1) NUMBER FILED	(Column 2) NUMBER EXTRA	SMALL ENTITY RATE($)	SMALL ENTITY FEE($)	OR	OTHER THAN SMALL ENTITY RATE($)	OTHER THAN SMALL ENTITY FEE($)
BASIC FEE (37 CFR 1.16(a), (b), or (c))	N/A	N/A	N/A	70		N/A	
SEARCH FEE (37 CFR 1.16(k), (i), or (m))	N/A	N/A	N/A	300		N/A	
EXAMINATION FEE (37 CFR 1.16(o), (p), or (q))	N/A	N/A	N/A	360		N/A	
TOTAL CLAIMS (37 CFR 1.16(i))	6 minus 20 =	*	x 40 =	0.00	OR		
INDEPENDENT CLAIMS (37 CFR 1.16(h))	3 minus 3 =	*	x 210 =	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	730		TOTAL	

APPLICATION AS AMENDED - PART II

AMENDMENT A

	(Column 1) CLAIMS REMAINING AFTER AMENDMENT		(Column 2) HIGHEST NUMBER PREVIOUSLY PAID FOR	(Column 3) PRESENT EXTRA	SMALL ENTITY RATE($)	SMALL ENTITY ADDITIONAL FEE($)	OR	OTHER THAN SMALL ENTITY RATE($)	OTHER THAN SMALL ENTITY ADDITIONAL FEE($)
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))									
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) CLAIMS REMAINING AFTER AMENDMENT		(Column 2) HIGHEST NUMBER PREVIOUSLY PAID FOR	(Column 3) PRESENT EXTRA	RATE($)	ADDITIONAL FEE($)		RATE($)	ADDITIONAL FEE($)
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))									
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.

Electronic Acknowledgement Receipt

EFS ID:	32314181
Application Number:	15003242
International Application Number:	
Confirmation Number:	8992
Title of Invention:	Wireless Digital Audio Music System
First Named Inventor/Applicant Name:	C. Earl Woolfork
Customer Number:	20995
Filer:	Harnik Shukla/Heide Young
Filer Authorized By:	Harnik Shukla
Attorney Docket Number:	1EWAY.009P1C6
Receipt Date:	11-APR-2018
Filing Date:	21-JAN-2016
Time Stamp:	18:36:07
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	Request for Corrected Filing Receipt	1EWAY_ReqCorrFR.pdf	484526 938705a3c6b24ccf28d88b4b49646e3aea8cec40	no	8

Warnings:

Information:	
Total Files Size (in bytes):	484526

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.

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
15/003,242	01/21/2016	C. Earl Woolfork	1EWAY.009P1C6

CONFIRMATION NO. 8992

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

IMPROPER CFR REQUEST



Date Mailed: 04/16/2018

RESPONSE TO REQUEST FOR CORRECTED FILING RECEIPT

Continuity, Priority Claims, Petitions, and Non-Publication Requests

In response to your request for a corrected Filing Receipt, the Office is unable to comply with your request because:

- The priority or continuity claim has not been entered because it was not filed during the required time period. Applicant may wish to consider filing a petition to accept an unintentionally delayed claim for priority. See 37 CFR 1.55 or 1.78.

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**.

/hsarwari/

Please Direct All Correspondence to Customer Number 20995

IN THE UNITED STATES PATENT AND TRADEMARK OFFICE

Inventor	:	C. Earl Woolfork
App. No	:	15/003242
Filed	:	January 21, 2016
For	:	WIRELESS DIGITAL AUDIO MUSIC SYSTEM
Examiner	:	Flanders, Andrew C.
Art Unit	:	2656
Conf No.	:	8992

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

We, the applicant's new attorney of record, have recently discovered an error in claiming priority of prior applications in the above-identified application which is published as U.S. Publication No. 2017/0214995.

Pursuant to 37 C.F.R. § 1.55(f), Applicant hereby submits a petition to accept delayed priority claim and submits that the entire delay in claiming priority was unintentional.

An Application Data Sheet was submitted when the application was originally filed on January 21, 2016. There was a typographical error in the ADS in which the application number of the parent is listed as 17/754,753 as opposed to the correct application number of 13/775,754. However, page 1, paragraph 1 of the Specification filed at the same time listed related applications:

> "This continuation application claims the benefit of U.S. Patent Application No. 13/775,754 filed February 25, 2013, which is a continuation application claiming benefit of U.S. Patent Application No.

13/356,949 filed January 24, 2012, which was a continuation application claiming the benefit of U.S. Patent Application Serial No. 12/940,747 filed November 5, 2010, now U.S. Patent No. 8,131,391, which was a continuation application claiming the benefit of U.S. Patent Application Serial No. 12/570,343 filed September 30, 2009, now U.S. Patent No. 7,865, 258, which was a continuation claiming the benefit of U.S. Patent Application Serial No. 12/144,729 filed July 12, 2008, now U.S. Patent NO. 7,685,885, which was a continuation claiming benefit of U.S. Patent Application Serial No. 10/648,012 filed August 26, 2003, now U.S. Patent Application Serial No. 10/027,391, filed December 21, 2001, for "Wireless Digital Audio System," published under US 2003/0118196 A1 on June 26, 2003, now abandoned, the disclosures of which are incorporated herein in their entireties by reference."

The filing receipt mailed February 9, 2016 does not reflect any priority data. Please find attached a Corrected Application Data Sheet and marked-up Filing Receipt which reflects the priority claim data as it is currently known.

Surcharge under 37 C.F.R. § 1.17(m) paid via EFS Web. Please charge any additional fees, including any fees for additional extension of time, or credit overpayment to Deposit Account No. 11-1410.

Respectfully submitted,

Dated: May 9, 2018

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

27887482

Please Direct All Correspondence to Customer Number 20995

REQUEST FOR CORRECTED FILING RECEIPT

Inventor	:	C. Earl Woolfork
App. No	:	15/003242
Filed	:	January 21, 2016
For	:	WIRELESS DIGITAL AUDIO MUSIC SYSTEM
Examiner	:	Flanders, Andrew C.
Art Unit	:	2656
Conf No.	:	8992

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

Dear Commissioner:

Applicant hereby requests that the Official Filing Receipt, a copy of which is enclosed, be corrected to reflect the priority data as listed in the Corrected Application Data Sheet filed concurrently.

This priority data was outlined in the Specification as filed on January 21, 2016. Also, this priority data was originally listed on the Application Data Sheet filed on January 21, 2016, however the submitted Application Data Sheet contained a *typographical error in the Application Number* of the parent application. A Submission of Supplemental Application Data Sheet was submitted on February 1, 2016 to correct the application number of the parent application. However, the supplemental ADS had a typographical error listing the parent application number as 13/754,753. A subsequent Submission of Supplemental Application Data Sheet was submitted on February 5, 2016 to correct the application number of the parent to the correct number of 13/775,754.

The filing receipt mailed February 9, 2016 does not reflect any priority data. Please find attached a Corrected Application Data Sheet which reflects the priority claim data as it is currently known.

Respectfully submitted,

Dated:5/9/2018_____ By:/Harnik Shukla/_____
Harnik Shukla
Registration No. 73,097
Registered Practitioner
Customer No. 20995
(949) 721-5278

27781761

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	GRP ART UNIT	FIL FEE REC'D	ATTY.DOCKET.NO	TOT CLAIMS	IND CLAIMS
15/003,242	01/21/2016	2654	730	1028.10	6	3

CONFIRMATION NO. 8992

FILING RECEIPT



OC000000080388367

68533
MEGAN LYMAN
1816 SILVER MIST CT.
RALEIGH, NC 27613

Date Mailed: 02/09/2016

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: None

This application is a CON of 13/775754 02/25/2013 PAT 9282386
which is a CON of 13/356949 01/24/2012 PAT 8107900
which is a CON of 12/940747 11/05/2010 PAT 8131291
which is a CON of 12/579243 09/30/2009 PAT 7865208
which is a CON of 12/144729 07/12/2008 PAT 7684885
which is a CON of 10/646012 08/26/2003 PAT 7412294
which is a CIP of 10/027391 12/21/2001 ABA

Domestic Applications for which benefit is claimed - None.
A proper domestic benefit claim must be provided in an Application Data Sheet in order to constitute a claim for domestic benefit. See 37 CFR 1.76 and 1.78.

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: 02/05/2016
The country code and number of your priority application, to be used for filing abroad under the Paris Convention, is **US 15/003,242**

Projected Publication Date: 07/27/2017

Non-Publication Request: No

Early Publication Request: No
**** SMALL ENTITY ****
Title

Wireless Digital Audio Music System

Preliminary Class

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

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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 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).

Samsung Exhibit 1002, Page 173 of 370
Samsung Electronics Co., Ltd. et al. v. One-E-Way, Inc.
IPR2025-01540

LICENSE FOR FOREIGN FILING UNDER

Title 35, United States Code, Section 184

Title 37, Code of Federal Regulations, 5.11 & 5.15

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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 AssetsControl, 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).

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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.

APPLICATION DATA SHEET

Application Information

Application Number:	15/003,242
Filing Date:	January 21, 2016
Application Type:	Nonprovisional
Subject Matter:	Utility
Title:	WIRELESS DIGITAL AUDIO MUSIC SYSTEM
Attorney Docket Number:	1EWAY.009P1C6
Total Drawing Sheets:	3
Small Entity?:	Yes

Correspondence Information

Correspondence Customer Number: 20995

Phone Number:	(949) 760-0404
Fax Number:	(949) 760-9502
E-Mail Address:	efiling@knobbe.com

Representative Information

Representative Customer Number: 20995

Domestic Priority Information

Application:	Continuity Type:	Parent Application:	Parent Filing Date:	Parent Status:	Parent Patent No.:	Parent Issue Date:
This Application	Continuation of	13/775,754	February 25, 2013	Issued	9,282,396	March 8, 2016

Application:	Continuity Type:	Parent Application:	Parent Filing Date:	Parent Status:	Parent Patent No.:	Parent Issue Date:
13/775,754	Continuation of	13/356,949	January 24, 2012	Issued	9,107,000	August 11, 2015
13/356,949	Continuation of	12/940,747	November 5, 2010	Issued	8,131,391	March 6, 2012
12/940,747	Continuation of	12/570,343	September 30, 2009	Issued	7,865,258	January 4, 2011
12/570,343	Continuation of	12/144,729	July 12, 2008	Issued	7,684,885	March 23, 2010
12/144,729	Continuation of	10/648,012	August 26, 2003	Issued	7,412,294	August 12, 2008
10/648,012	Continuation -in-part of	10/027,391	December 21, 2001	Abandoned		

Dated: May 9, 2018

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

27767462

Electronic Patent Application Fee Transmittal

Application Number:	15003242
Filing Date:	21-Jan-2016
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.009P1C6

Filed as Small 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:				
PET. DELAY SUB OR RESTORE PRIORITY-CLAIM	2454	1	1000	1000
Patent-Appeals-and-Interference:				
Post-Allowance-and-Post-Issuance:				

Description	Fee Code	Quantity	Amount	Sub-Total in USD($)
Extension-of-Time:				
Miscellaneous:				
		Total in USD ($)		**1000**

Electronic Acknowledgement Receipt	
EFS ID:	32581795
Application Number:	15003242
International Application Number:	
Confirmation Number:	8992
Title of Invention:	Wireless Digital Audio Music System
First Named Inventor/Applicant Name:	C. Earl Woolfork
Customer Number:	20995
Filer:	Harnik Shukla/Jennifer Neat
Filer Authorized By:	Harnik Shukla
Attorney Docket Number:	1EWAY.009P1C6
Receipt Date:	09-MAY-2018
Filing Date:	21-JAN-2016
Time Stamp:	20:31:55
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	051018INTEFSW20325600
Deposit Account	111410
Authorized User	Jennifer Neat
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	Petition for review by the Office of Petitions	009p1c6_Petition.pdf	98387 27169c5cf69638c5b52233b2113a5c62456e810e	no	2
Warnings:					
Information:					
2	Request for Corrected Filing Receipt	009p1c6_ReqCorrFR.pdf	329534 424e0c87feaf0f7b842f9b30be842ab170fe70c9	no	5
Warnings:					
Information:					
3	Application Data Sheet	009p1c6_CorrADS.pdf	112051 e06294ed2f57d3f02f64813b75ba323dc5cae6c8	no	2
Warnings:					
Information:					
This is not an USPTO supplied ADS fillable form					
4	Fee Worksheet (SB06)	fee-info.pdf	30376 511c77fd2cbce57c640d03af2af88e7efebb900d	no	2
Warnings:					
Information:					
		Total Files Size (in bytes):	570348		

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.

UNITED STATES PATENT AND TRADEMARK OFFICE

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United States Patent and Trademark Office
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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
15/003,242	01/21/2016	2656	730	1EWAY.009P1C6	6	3

CONFIRMATION NO. 8992

CORRECTED FILING RECEIPT

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



Date Mailed: 06/12/2018

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 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: 02/05/2016

The country code and number of your priority application, to be used for filing abroad under the Paris Convention, is **US 15/003,242**

Projected Publication Date: Not Applicable

Non-Publication Request: No

Early Publication Request: No
**** SMALL ENTITY ****
Title

Wireless Digital Audio Music System

Preliminary Class

700

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

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 AssetsControl, 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.

Samsung Exhibit 1002, Page 185 of 370
Samsung Electronics Co., Ltd. et al. v. One-E-Way, Inc.
IPR2025-01540

Office of Petitions: Routing Sheet



Application No. 15003242

This application is being forwarded to your office for further processing. A decision has been rendered on a petition filed in this application, as indicated below. For details of this decision, please see the document PET.OP.DEC filed on the same date as this document.

- [x] **GRANTED**
- [ ] **DISMISSED**
- [ ] **DENIED**

Office of Petitions: Decision Count Sheet

Mailing Month: 6

Application No.: 15003242

1 5 0 0 3 2 4 2

For US serial numbers: enter number only, no slashes or commas. Ex: 10123456
For PCT: enter "51+single digit of year of filing+last 5 numbers", Ex. for PCT/US05/12345, enter 51512345

Deciding Official: Thornton McLaughlin, Kenya

Count (1) - Palm Credit 15003242

Decision: GRANT

FINANCE WORK NEEDED
☐ Select Check Box for YES

* G R A N T *

Decision Type: 535 - 37 CFR 1.78(a)(3) & (a)(6) UNINTENTIONAL DELAY

* 5 3 5 *

Notes:

Count (2)

Decision: n/a

FINANCE WORK NEEDED
☐ Select Check Box for YES

Decision Type: NONE

Notes:

Count (3)

Decision: n/a

FINANCE WORK NEEDED
☐ Select Check Box for YES

Decision Type: NONE

Notes:

Initials of Approving Official (if required)

If more than 3 decisions, attach 2nd count sheet & mark this box ☐

Printed on: 6/11/2018

Office of Petitions Internal Document - Ver. 5.0

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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
15/003,242	01/21/2016	C. Earl Woolfork	1EWAY.009P1C6	8992

20995 7590 06/14/2018

KNOBBE MARTENS OLSON & BEAR LLP
2040 MAIN STREET
FOURTEENTH FLOOR
IRVINE, CA 92614
UNITED STATES OF AMERICA

EXAMINER	
FLANDERS, ANDREW C	

ART UNIT	PAPER NUMBER
2656	

NOTIFICATION DATE	DELIVERY MODE
06/14/2018	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):

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

UNITED STATES PATENT AND TRADEMARK OFFICE

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In re Application of	:	
Woolfork	:	
Application No. 15/003,242	:	DECISION ON PETITION
Filed: January 21, 2016	:	UNDER 37 CFR 1.78
Attorney Docket No. 1EWAY.009P1C6	:	

This is a decision on the petition under 37 CFR 1.78(e) filed on May 9, 2018, to accept an unintentionally delayed claim for the benefit of priority to the prior-filed non-provisional applications set forth in the corrected Application Data Sheet filed on May 9, 2018.

The petition under 37 CFR 1.78(e) is **GRANTED**.

A petition for acceptance of a claim for late priority under 37 CFR 1.78(d) is only applicable to those applications filed on, or after, November 29, 2000. Further, the petition is appropriate only after the expiration of the period specified in 37 CFR 1.78(d). In addition, the petition under 37 CFR 1.78(e) must be accompanied by:

1. the reference required by 35 U.S.C § 120 and paragraph (d)(2) to the prior-filed application, unless previously submitted;

2. the surcharge set forth in § 1.17(m), and

3. a statement that the entire delay between the date the claim was due under 37 CFR 1.78(d)(3) and the date the benefit claim was filed was unintentional. The Director may require additional information where there is a question whether the delay was unintentional.

The instant nonprovisional application was filed after November 29, 2000, and the claim herein for the benefit of priority to the prior-filed applications, is submitted after the expiration of the period specified in 37 CFR 1.78(d). Accordingly, having found that the instant petition for acceptance of an unintentionally delayed claim for benefit of priority under 35 U.S.C. § 120 to the prior-filed non-provisional applications satisfies the conditions of 37 CFR 1.78(e), the petition is granted.

Petitioner is advised that this decision grants the petition to accept the unintentionally delayed domestic benefit claim to the prior filed application(s) because the petition requirements of 37 CFR 1.78(c) and the formal requirements for claiming domestic benefit (see MPEP 211.01 et. seq.) have been met. This acceptance should not be construed as meaning that this application is entitled to the benefit of the prior-filed application(s). Whether a claimed invention in a nonprovisional application is entitled to the benefit of the filing date of a prior-filed application on the basis of the disclosure thereof is determined during examination if it becomes necessary to do so (e.g., intervening reference and interference proceeding). See MPEP 211.05.

A corrected Filing Receipt, which includes the priority claim to the prior-filed nonprovisional application is enclosed.

Any inquiries concerning this decision may be directed to Kenya A. McLaughlin, Attorney Advisor, at (571) 272-3222.

This matter is being referred to Technology Center GAU 2656 for further processing.

/Kenya A. McLaughlin/

Kenya A. McLaughlin
Attorney Advisor
Office of Petitions

Enclosure: Corrected Filing Receipt

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UNITED STATES DEPARTMENT OF COMMERCE
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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
15/003,242	01/21/2016	2656	730	1EWAY.009P1C6	6	3

CONFIRMATION NO. 8992

CORRECTED FILING RECEIPT

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

Date Mailed: 06/12/2018

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

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This application 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
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which is a CON of 12/144,729 07/12/2008 PAT 7684885
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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

Samsung Exhibit 1002, Page 191 of 370
Samsung Electronics Co., Ltd. et al. v. One-E-Way, Inc.
IPR2025-01540

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: 02/05/2016

The country code and number of your priority application, to be used for filing abroad under the Paris Convention, is **US 15/003,242**

Projected Publication Date: Not Applicable

Non-Publication Request: No

Early Publication Request: No
** **SMALL ENTITY** **
Title

Wireless Digital Audio Music System

Preliminary Class

700

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.

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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

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 AssetsControl, 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.

Samsung Exhibit 1002, Page 194 of 370
Samsung Electronics Co., Ltd. et al. v. One-E-Way, Inc.
IPR2025-01540

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APPLICATION NUMBER	FILING OR 371(C) DATE	FIRST NAMED APPLICANT	ATTY. DOCKET NO./TITLE
15/003,242	01/21/2016	C. Earl Woolfork	1EWAY.009P1C6

CONFIRMATION NO. 8992

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

PUB REQUEST ACCEPTANCE LETTER

OC000000100280002

Date Mailed: 06/14/2018

NOTICE OF ACCEPTANCE OF PUBLICATION REQUEST

The request for voluntary publication, amended publication, early publication, redacted publication, republication, corrected publication or revised publication has been received for this application. The request, including payment of any necessary fee(s), is in compliance with 37 CFR 1.215, 1.217, 1.219 or 1.221.

The projected publication date is 09/20/2018.

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**.

/npfarmer/

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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
15/003,242	01/21/2016	C. Earl Woolfork	1EWAY.009P1C6	8992

20995 7590 06/29/2018

KNOBBE MARTENS OLSON & BEAR LLP
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IRVINE, CA 92614
UNITED STATES OF AMERICA

EXAMINER	
FLANDERS, ANDREW C	

ART UNIT	PAPER NUMBER
2656	

NOTIFICATION DATE	DELIVERY MODE
06/29/2018	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):

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

Office Action Summary	Application No. 15/003,242	Applicant(s) WOOLFORK, C. EARL	
	Examiner Andrew C. Flanders	Art Unit 2656	AIA (First Inventor to File) Status Yes

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

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE *3* MONTHS FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

1)☒ Responsive to communication(s) filed on _____.

☐ A declaration(s)/affidavit(s) under **37 CFR 1.130(b)** was/were filed on _____.

2a)☒ This action is **FINAL**. 2b)☐ This action is non-final.

3)☐ 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.

4)☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims*

5)☒ Claim(s) *1-12* is/are pending in the application.

5a) Of the above claim(s) _____ is/are withdrawn from consideration.

6)☐ Claim(s) _____ is/are allowed.

7)☒ Claim(s) *1-12* is/are rejected.

8)☐ Claim(s) _____ is/are objected to.

9)☐ Claim(s) _____ are subject to restriction and/or election requirement.

* If any claims have been determined allowable, 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.

Application Papers

10)☐ The specification is objected to by the Examiner.

11)☒ The drawing(s) filed on *21 January 2016* is/are: a)☒ accepted or b)☐ objected to by the Examiner.

Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).

Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).

Priority under 35 U.S.C. § 119

12)☐ 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)).

** See the attached detailed Office action for a list of the certified copies not received.

Attachment(s)

1) ☒ Notice of References Cited (PTO-892)

2) ☒ Information Disclosure Statement(s) (PTO/SB/08a and/or PTO/SB/08b) Paper No(s)/Mail Date _____.

3) ☐ Interview Summary (PTO-413) Paper No(s)/Mail Date. _____ .

4) ☐ Other: _____.

DETAILED ACTION

Notice of Pre-AIA or AIA Status

The present application is being examined under the pre-AIA first to invent provisions.

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 – 12 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.

Claims 1, 3 and 5 have been amended to include “generate a demodulated signal based on the received modulated transmission by performing at least one of a plurality of demodulations, wherein the plurality of demodulations includes a differential phase shift keying (DPSK) demodulation and also includes a non-DPSK demodulation.”

The claim as written appears to require a plurality of demodulators. The disclosure, particularly Figs. 2 and 3, only depict one modulation step being used in the transmitter and receiver, elements 42 and 62. The manner in which the claim is presented appears to cover multiple demodulations are used simultaneously in the transmitter/receiver. However, this is not presented in the specification. This is further compounded in claims 6 – 8 which require both the DPSK demodulation, and now a 64-ary demodulation.

Claims 2, 4 and 6 – 12 are rejected as incorporating the elements of 1, 3 and 5 as above.

Claims 1 -12 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, 3 and 5 have been amended to include “generate a demodulated signal based on the received modulated transmission by performing at least one of a plurality of demodulations, wherein the plurality of demodulations includes a differential phase shift keying (DPSK) demodulation and also includes a non-DPSK demodulation.”

The limitation as amended, first appears to indicate “at least one” modulation/demodulation is used. The claim then recites demodulations include a DPSK demodulation, and then also includes a non-DPSK demodulation. The manner in which the claim is presented does not make clear whether one of a plurality of demodulations is used in the transmitter/receiver, as is presented in the specification, or multiple demodulations are used simultaneously in the transmitter/receiver, as is not presented in the specification. This is further compounded in claims 6 – 8 which require both the DPSK demodulation, and now a 64-ary demodulation.

For the purpose of expediting prosecution, the claimed demodulation will be interpreted in the alternative.

Claims 2, 4 and 6 – 12 are rejected as incorporating the elements of 1, 3 and 5 as above.

Claim Rejections - 35 USC § 102

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 the appropriate paragraphs of pre-AIA 35 U.S.C. 102 that form the basis for the rejections under this section made in this Office action:

> A person shall be entitled to a patent unless –
>
> (b) the invention was patented or described in a printed publication in this or a foreign country or in public use or on sale in this country, more than one year prior to the date of application for patent in the United States.

Claim(s) 1, 2, 3, 5 and 10 – 12 is/are rejected under pre-AIA 35 U.S.C. 102b as being anticipated by 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**, Haart 1 and Haart 2 disclose:

A wireless digital audio spread spectrum receiver, capable of mobile operation, configured to receive a unique user code and an audio signal representation from a digital audio spread spectrum transmitter, said audio signal representation representative of audio from a portable audio source, said digital audio spread spectrum receiver operative to communicate wirelessly with said digital audio spread spectrum transmitter (e.g. a new relatively low cost, low range wireless transmission system, defined by the recently developed Bluetooth technology for localized two-way data transmissions; Haart 1 col. 2 lines 17 – 29; This system can be embodied as the “ultimate headset—a cordless headset keeps your hands free. Connect a headset to

your mobile PC or to any wired connection and free your hands for more important tasks at the office or in your car," and Bluetooth radios use frequency-hop (FH) spread spectrum, since this technology better supports low-cost, low power radio implementations." ; Haart 2 page 112) said digital audio spread spectrum receiver comprising:

a direct conversion module configured to receive wireless spread spectrum signal transmissions representative of the unique user code and the audio signal representation, wherein the received transmissions are encoded to reduce intersymbol interference (Haart 1 discloses 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 further discloses DPSK encoding as "a known technique" to lower signal detection error. col. 3 lines 11-20, col. 5 lines 24-44; note that DPSK encoding meets the "lowering signal detection error through reduced intersymbol interference coding" as noted by Applicant's own admission; i.e. According to the inventor's own admission during prosecution of the 2012 application, DPSK encoding meets "the applied reduced intersymbol interference coding of said original audio signal representation" limitation.);

a digital-to-analog converter (DAC) configured to generate an audio output from said receiver audio signal representation (Haart 2 discloses using the system to

implement an audio headset; page 112; further to generate an audio output from the headset, a digital-to-analog converter is inherently required); and

a speaker configured to reproduce said generated audio output (e.g. “headset”, note use cases; page 112 of Haart 2), wherein said reproduction does not include audible audio content originating from any transmitted audio signals in the wireless digital audio spread spectrum transmitter spectrum that do not originate from said digital audio spread spectrum transmitter (Haart 2 discloses 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 the wireless digital audio spread spectrum receiver is configured to use independent code division multiple access communication and to use the received unique user code (e.g. access code above) to communicate with only said wireless digital audio spread spectrum transmitter for the duration of a wireless connection (Haart 1 states that its techniques “are particularly well-suited for the detection of binary FiVl or binary FSK modulated signals in the presence of such disturbing signals, but can

also be used in conjunction with other types of modulation." Col. 1 lines 13-17; further describes its 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); and

wherein the wireless digital audio spread spectrum receiver is further configured to:

demodulate a received modulated transmission (Haart 1's techniques "are particularly well-suited for the detection of binary FM or binary FSK modulated signals in the presence of such disturbing signals, but can also be used in conjunction with other types of modulation." Col. 1 lines 13-17; note A digital demodulator is inherently required to demodulate modulated signals), and

generate a demodulated signal based on the received modulated transmission by performing at least one of a plurality of demodulations, wherein the plurality of demodulations includes a differential phase shift keying (DPSK) demodulation and also includes a non-DPSK demodulation (Haart 1 describes the use of differential modulation, including DPSK, as a solution to the DC offset problem; col. 5 lines 24-44. For DPSK modulation to be used, the receiver and demodulator implementation must also utilize DPSK technology; therefore, it is inherent, in the Haart 1 disclosure.).

Regarding **Claim 2**, in addition to the elements stated above regarding claim 1, Haart 1 and Haart 2 further disclose:

wherein said audio from said portable audio source is music.

Regarding **Claim 3**, in addition to the elements stated above regarding claim 1, Haart 1 and Haart 2 further disclose:

a decoder operative to decode the demodulated transmission and to generate a receiver audio signal representation, the decoder configured to decode reduced intersymbol interference coding and to decode representations of audio in the frequency range of 20Hz to 20kHz, said decoding being separate from said first and second demodulation (Haart 1 discloses an exemplary method, in which the "effects of the filter on the desired binary signal (e.g., intersymbol interference) are undone in a decoder that applies a Viterhi algorithm and acts like an equalizer." Col. 3 lines 11-20. Haart 1 further describes DPSK encoding as "a known technique" to lower signal detection error, col. 5 lines 24-44. According to the inventor's own admission during prosecution of the 2012 application, DPSK encoding meets "the applied reduced intersymbol interference coding of said original audio signal representation" limitation. Futher note, audio signals [intended to be heard] are inherently in the range of 20Hz-20Khz).

Regarding **Claim 10**, in addition to the elements stated above regarding claim 1, Haart 1 and Haart 2 further disclose:

wherein the digital audio spread spectrum receiver is further configured to receive the receive wireless spread spectrum signal transmissions where the receive wireless spread spectrum signal transmissions are in the Industrial Scientific and Medical 2.4 GHz band, ranging from 2.4 GHz to 2.5 GHz (e.g. Haart 2 describes

Bluetooth as “a universal radio interface in the 2.45 GHz frequency band that enables portable electronic devices to connect and communicate wirelessly via short-range, ad hoc networks.”page 110).

Claim 11 is rejected under the same grounds as stated above.

Claims 5 and 12 are rejected under the same grounds as stated above, covering the transmission side of the reception side as mapped above.

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 pre-AIA 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

> (a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negatived 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 pre-AIA 35 U.S.C. 103(a) 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.

This application currently names joint inventors. In considering patentability of the claims under pre-AIA 35 U.S.C. 103(a), the examiner presumes that the subject matter of the various claims was commonly owned at the time any inventions covered therein were made absent any evidence to the contrary. Applicant is advised of the obligation under 37 CFR 1.56 to point out the inventor and invention dates of each claim that was not commonly owned at the time a later invention was made in order for the examiner to consider the applicability of pre-AIA 35 U.S.C. 103(c) and potential pre-AIA 35 U.S.C. 102(e), (f) or (g) prior art under pre-AIA 35 U.S.C. 103(a).

Claims 4 and 6 is/are rejected under pre-AIA 35 U.S.C. 103(a) as being unpatentable over 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) in view of Schotz et al. (hereinafter Sch, U.S. patent 5,946,343).

Regarding **Claim 4**, in addition to the elements stated above regarding claim 3, Haart 1 and Haart 2 fail to explicitly disclose:

wherein the audio signal representation represents music.

In a related field of endeavor (e.g. wireless transmission of digital audio using frequency hopping spread spectrum modulation [for use in CDMA]), schotz discloses a wireless transmission akin to that of Haart for the transmission and reception of audio signals, e.g. music (approximately 20Hz to 20Khz); col. 2 lines 55 - 67.

It would have been obvious to one of ordinary skill in the art at the time the invention was made to apply the teachings of Shotz to Haart 1 and 2. Doing so would have been nothing more than simple substitution of one know element for another to yield predictable results as:

1) the prior art contained a device in Haart 1 and 2 which differed from the claimed device by substitution of the type of audio used, as while Haart 1 and 2 disclose “audio,” they are not explicit as to music;

2) the prior art in Schotz teaches of a wireless transmission of digital audio in a manner like Haart (e.g. Frequency hopping spread spectrum), and is explicit in the transmission of music; and

3) given that both devices use wireless transmission, use similar transmission technique, and given that Haart transmits audio, but is silent as to music, whereas Schotz is explicit as to transmitting music over a similar wireless transmission, it would have been predictable to substitute the music transmission in place of the generic audio of Haart.

Claim 6 is rejected under the same grounds as stated above.

Claims 7 – 9 is/are rejected under pre-AIA 35 U.S.C. 103(a) as being unpatentable over 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) in view of Kim et al. (hereinafter Kim, A Coherent Dual-Channel QPSK Modulation for CDMA Systems; copyright 1996).

Regarding **Claim 7**, in addition to the elements stated above regarding claim 3, Haart 1 and Haart 2 fail to explicitly disclose:

wherein said first-non-DPSK demodulation is 64-ary demodulation.

In a related field of endeavor (e.g. CDMA transmissions and receptions), Kim discloses 64-ary orthogonal quadrature phase shift keying modulation has been studied extensively [i.e. “well known"] as employed in CDMA systems; abstract.

It would have been obvious to one of ordinary skill in the art at the time the invention was made to apply the teachings of Kim to Haart 1 and 2. Doing so would have been nothing more than simple substitution of one know element for another to yield predictable results as:

1) the prior art contained a device in Haart 1 and 2 which differed from the claimed device by substitution of the type of modulation, namely 64-ary modulation;

2) the prior art in Kim teaches that wireless transmission in CDMA using 64-ary modulation is well known, and has been studied extensively; and

3) given that both devices use wireless transmission, use similar transmission technique, and given that Kim notes that 64-ary modulation has been studied extensively in CDMA implementations, it would have been predictable to use this well known modulation scheme in a CDMA communication device such as that of Haart.

Claims 8 and 9 are rejected under the same grounds as stated above.

Conclusion

Applicant's submission of an information disclosure statement under 37 CFR 1.97(c) with the fee set forth in 37 CFR 1.17(p) on 26 March 2018 prompted the new ground(s) of rejection presented in this Office action. Accordingly, **THIS ACTION IS MADE FINAL**. See MPEP § 609.04(b). 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 mailing 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.

/Andrew C Flanders/
Primary Examiner, Art Unit 2656

Notice of References Cited	Application/Control No. 15/003,242	Applicant(s)/Patent Under Reexamination WOOLFORK, C. EARL	
	Examiner Andrew C. Flanders	Art Unit 2656	Page 1 of 1

U.S. PATENT DOCUMENTS

*		Document Number Country Code-Number-Kind Code	Date MM-YYYY	Name	CPC Classification	US Classification
	A	US-				
	B	US-				
	C	US-				
	D	US-				
	E	US-				
	F	US-				
	G	US-				
	H	US-				
	I	US-				
	J	US-				
	K	US-				
	L	US-				
	M	US-				

FOREIGN PATENT DOCUMENTS

*		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	"A Coherent Dual-Channel QPSK Modulation for CDMA Systems," Kim et al. Copyright 1996
	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.

EAST Search History

EAST Search History (Prior Art)

Ref #	Hits	Search Query	DBs	Default Operator	Plurals	Time Stamp
L1	1	"15003242"	US-PGPUB; USPAT; USOCR	OR	OFF	2018/06/25 16:47
L2	1	l1 and (modulate modulation modulator modulating modulates modulated demodulate demodulation demodulator demodulating demodulates demodulated)	US-PGPUB; USPAT; USOCR	OR	OFF	2018/06/25 16:48
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; USPAT	OR	OFF	2006/05/02 17:50
S13	13	(FHSS or "frequency hopping spread spectrum") with ("hopping code")	US-PGPUB; USPAT	OR	OFF	2006/05/02 17:50

Samsung Exhibit 1002, Page 213 of 370
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IPR2025-01540

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; USPAT	OR	OFF	2006/08/31 12:17
S32	0	("10648012").PN.	US-PGPUB; USPAT	OR	OFF	2006/09/25 09:26

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Samsung Electronics Co., Ltd. et al. v. One-E-Way, Inc.
IPR2025-01540

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
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S43	0	("2002/0025009").URPN.	USPAT	OR	OFF	2007/03/20 09:59
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S50	13	("4651155" | "4931977").PN. OR ("5175558").URPN.	US-PGPUB; USPAT; USOCR	OR	OFF	2007/03/20 10:34

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S51	1	("5946343").PN.	US-PGPUB; USPAT	OR	OFF	2007/03/20 11:40
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S56	30	"reed solomon" same "intersymbol interference"	US-PGPUB; USPAT	OR	OFF	2007/03/21 12:13
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S59	1	("5790595").PN.	US-PGPUB; USPAT	OR	OFF	2007/03/21 12:37
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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
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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
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S85	22	"fuzzy logic" and modulat$5 and filter and (dpsk "phase shift key")	US-PGPUB; USPAT	OR	OFF	2008/06/06 09:20
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S87	1	"10100351"	US-PGPUB; USPAT	OR	OFF	2008/06/06 11:49
S88	1	("6,678,892").PN.	US-	OR	OFF	2008/06/06

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			PGPUB; USPAT			12:38
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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
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Samsung Exhibit 1002, Page 219 of 370
Samsung Electronics Co., Ltd. et al. v. One-E-Way, Inc.
IPR2025-01540

Bibliographic Data

Application No: 15/003,242

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.
01/21/2016	700	2656	1EWAY.009P1C6
RULE			

APPLICANTS

INVENTORS

C. Earl Woolfork Pasadena, CA, UNITED STATES

CONTINUING DATA

This application 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 12/21/2001

FOREIGN APPLICATIONS

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UNITED STATES

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INFORMATION DISCLOSURE STATEMENT BY APPLICANT	Application No.	15/003242
	Filing Date	January 21, 2016
	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.	1EWAY.009P1C6

U.S. PATENT DOCUMENTS					
Examiner Initials	Cite No.	Document Number *Number - Kind Code (if known)* 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 *Country Code-Number-Kind Code* 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	06/25/2018

***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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PTO/SB/08 Equivalent

INFORMATION DISCLOSURE STATEMENT BY APPLICANT	Application No.	15/003242
	Filing Date	January 21, 2016
	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.	1EWAY.009P1C6

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	06/25/2018

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INFORMATION DISCLOSURE STATEMENT BY APPLICANT	Application No.	15/003242
	Filing Date	January 21, 2016
	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.	1EWAY.009P1C6

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 06/25/2018
***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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ALL REFERENCES CONSIDERED EXCEPT WHERE LINED THROUGH. /A.C.F/

Search Notes	Application/Control No.	Applicant(s)/Patent Under Reexamination
	15003242	WOOLFORK, C. EARL
	Examiner	Art Unit
	ANDREW C FLANDERS	2656

CPC- SEARCHED		
Symbol	Date	Examiner
H04R1/1083	12/10/17	acf
H04R2420/07	12/10/17	acf
H04R5/033	12/10/17	acf
H04M1/6066	12/10/17	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	12/10/17	acf
PE2E, EAST and PALM inventor search for double patenting	12/10/17	acf
google.com patents search	12/10/17	acf
reviewed search strategy for applications in patent family	12/10/17	acf
updated	6/25/18	acf

INTERFERENCE SEARCH			
US Class/ CPC Symbol	US Subclass / CPC Group	Date	Examiner

	/ANDREW C FLANDERS/ Primary Examiner.Art Unit 2656

Index of Claims	Application/Control No.	Applicant(s)/Patent Under Reexamination
	15003242	WOOLFORK, C. EARL
	Examiner	**Art Unit**
	ANDREW C FLANDERS	2656

✓	Rejected	-	Cancelled	N	Non-Elected	A	Appeal
=	Allowed	÷	Restricted	I	Interference	O	Objected

☐ Claims renumbered in the same order as presented by applicant ☐ CPA ☐ T.D. ☐ R.1.47

CLAIM		DATE								
Final	Original	12/10/2017	06/25/2018							
	1	✓	✓							
	2	✓	✓							
	3	✓	✓							
	4	✓	✓							
	5	✓	✓							
	6	✓	✓							
	7	✓	✓							
	8	✓	✓							
	9	✓	✓							
	10		✓							
	11		✓							
	12		✓							

UNITED STATES PATENT AND TRADEMARK OFFICE

USPTO Automated Interview Request (AIR)

Jul 10 2018

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:
15003242

Confirmation Number:
8992

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9497215278

Proposed Time of Interview:
7-24-2018 1:00 PM ET

Alternative Proposed Time(s) of Interview:
ET
Alternative Proposed Time(s) of Interview:
ET
Prefered Interview Type:
Telephonic

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

uspto UNITED STATES PATENT AND TRADEMARK OFFICE
PALM-SILVER

Doc Code: A.NE.AFCP
Document Description: After Final Consideration Pilot Program Request

PTO/SB/434 (05-13)

CERTIFICATION AND REQUEST FOR CONSIDERATION UNDER THE AFTER FINAL CONSIDERATION PILOT PROGRAM 2.0

Practitioner Docket No.:	Application No.:	Filing Date:
1EWAY.009P1C6	15/003242	JANUARY 21, 2016
First Named Inventor:	**Title:**	
C. Earl Woolfork	WIRELESS DIGITAL AUDIO MUSIC SYSTEM	

APPLICANT HEREBY CERTIFIES THE FOLLOWING AND REQUESTS CONSIDERATION UNDER THE AFTER FINAL CONSIDERATION PILOT PROGRAM 2.0 (AFCP 2.0) OF THE ACCOMPANYING RESPONSE UNDER 37 CFR 1.116.

1. The above-identified application is (i) an original utility, plant, or design nonprovisional application filed under 35 U.S.C. 111(a) [a continuing application (*e.g.*, a continuation or divisional application) is filed under 35 U.S.C. 111(a) and is eligible under (i)], or (ii) an international application that has entered the national stage in compliance with 35 U.S.C. 371(c).
2. The above-identified application contains an outstanding final rejection.
3. Submitted herewith is a response under 37 CFR 1.116 to the outstanding final rejection. The response includes an amendment to at least one independent claim, and the amendment does not broaden the scope of the independent claim in any aspect.
4. This certification and request for consideration under AFCP 2.0 is the only AFCP 2.0 certification and request filed in response to the outstanding final rejection.
5. Applicant is willing and available to participate in any interview requested by the examiner concerning the present response.
6. This certification and request is being filed electronically using the Office's electronic filing system (EFS-Web).
7. Any fees that would be necessary consistent with current practice concerning responses after final rejection under 37 CFR 1.116, *e.g.*, extension of time fees, are being concurrently filed herewith. [There is no additional fee required to request consideration under AFCP 2.0.]
8. By filing this certification and request, applicant acknowledges the following:
    - Reissue applications and reexamination proceedings are not eligible to participate in AFCP 2.0.
    - The examiner will verify that the AFCP 2.0 submission is compliant, *i.e.*, that the requirements of the program have been met (see items 1 to 7 above). For compliant submissions:
        - The examiner will review the response under 37 CFR 1.116 to determine if additional search and/or consideration (i) is necessitated by the amendment and (ii) could be completed within the time allotted under AFCP 2.0. If additional search and/or consideration is required but cannot be completed within the allotted time, the examiner will process the submission consistent with current practice concerning responses after final rejection under 37 CFR 1.116, *e.g.*, by mailing an advisory action.
        - If the examiner determines that the amendment does not necessitate additional search and/or consideration, or if the examiner determines that additional search and/or consideration is required and could be completed within the allotted time, then the examiner will consider whether the amendment places the application in condition for allowance (after completing the additional search and/or consideration, if required). If the examiner determines that the amendment does not place the application in condition for allowance, then the examiner will contact the applicant and request an interview.
            - The interview will be conducted by the examiner, and if the examiner does not have negotiation authority, a primary examiner and/or supervisory patent examiner will also participate.
            - If the applicant declines the interview, or if the interview cannot be scheduled within ten (10) calendar days from the date that the examiner first contacts the applicant, then the examiner will proceed consistent with current practice concerning responses after final rejection under 37 CFR 1.116.

Signature	Date
/Harnik Shukla/	8/29/2018
Name (Print/Typed) HARNIK SHUKLA	**Practitioner Registration No.** 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 1 forms are submitted.

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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.
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.

IN THE UNITED STATES PATENT AND TRADEMARK OFFICE

First Inventor	:	C. Earl Woolfork
App. No.	:	15/003242
Filed	:	January 21, 2016
For	:	WIRELESS DIGITAL AUDIO MUSIC SYSTEM
Examiner	:	Flanders, Andrew C.
Art Unit	:	2656
Conf. No.	:	8992

AMENDMENT SUBMITTED WITH AFTER FINAL CONSIDERATION PILOT PROGRAM REQUEST

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

Dear Commissioner:

In response to the Office Action mailed June 29, 2018, the Applicants respectfully request the above-identified application be amended as follows:

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IPR2025-01540

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 wireless digital audio spread spectrum receiver, capable of mobile operation, configured to receive a unique user code and [[an]] a high quality audio signal representation with a frequency range of 20Hz to 20kHz from a digital audio spread spectrum transmitter, said audio signal representation representative of audio from a portable audio source, said digital audio spread spectrum receiver operative to communicate wirelessly with said digital audio spread spectrum transmitter, said digital audio spread spectrum receiver comprising:

a direct conversion module configured to receive wireless spread spectrum signal transmissions representative of the unique user code and the high quality audio signal representation, wherein the received transmissions are encoded to reduce intersymbol interference, wherein the wireless digital audio spread spectrum receiver is capable of processing the high quality audio signal having a frequency range of 20Hz to 20kHz;

a digital-to-analog converter (DAC) configured to generate an audio output from said receiver audio signal representation; and

a speaker configured to reproduce said generated audio output, wherein said reproduction does not include audible audio content originating from any transmitted audio signals in the wireless digital audio spread spectrum transmitter spectrum that do not originate from said digital audio spread spectrum transmitter;

wherein the wireless digital audio spread spectrum receiver is configured to use independent code division multiple access communication and to use the received unique user code to communicate with only said wireless digital audio spread spectrum transmitter for the duration of a wireless connection; and

wherein the wireless digital audio spread spectrum receiver is further configured to:

demodulate a received modulated transmission, and

generate a demodulated signal based on the received modulated transmission by performing at least one of a plurality of demodulations, wherein the plurality of demodulations includes a differential phase shift keying (DPSK) demodulation and also includes a non-DPSK demodulation.

2. (Previously Presented) The wireless digital audio spread spectrum receiver of Claim 1, wherein said audio from said portable audio source is music.

3. (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 transmission from a spread spectrum transmitter, said wireless transmissions representative of [[an]]a high quality audio signal representation with a frequency range of 20Hz to 20kHz, said portable spread spectrum audio receiver comprising:

a direct conversion module configured to receive wireless transmissions representative of the high quality audio signal representation, wherein the received wireless transmissions are encoded to reduce intersymbol interference;

a decoder operative to decode the demodulated transmission and to generate a receiver audio signal representation, the decoder configured to decode reduced intersymbol interference coding and to decode representations of audio in the frequency range of 20Hz to 20kHz~~, said decoding being separate from said first and second demodulation~~;

a digital-to-analog converter (DAC) configured to generate an audio output from said receiver audio signal representation; and

a speaker configured to reproduce said generated audio output, wherein said reproduction does not include audible audio content originating from any transmitted audio signals in the spread spectrum transmitter spectrum that do not originate from said spread spectrum transmitter;

wherein the portable spread spectrum audio receiver is configured to use independent code division multiple access communication and to use the received unique user code to communicate with only said spread spectrum transmitter for the duration of a wireless connection; [[and]]

wherein the wireless digital audio spread spectrum receiver is further configured to perform at least one of a plurality of demodulations on a received modulation transmission and generate a demodulation signal based on the performance of the plurality of demodulations, wherein the plurality of demodulations includes a differential phase shift keying (DPSK) demodulation and a non-DPSK demodulation; and

wherein said decoding is separate from said plurality of demodulations.

4. (Previously Presented) The portable spread spectrum receiver of Claim 3, wherein the audio signal representation represents music.

5. (Currently Amended) A wireless digital coded audio spread spectrum transmitter operatively coupled to a portable audio player and configured to transmit a unique user code and a representation of an audio signal with a frequency range of 20Hz to 20Khz, wherein said digital coded audio spread spectrum transmitter is configured to wirelessly communicate with a digital audio spread spectrum receiver and is configured to be moved in any direction during operation, said wireless digital coded audio spread spectrum transmitter comprising:

an encoder operative to encode a first representation of an audio signal to reduce intersymbol interference associated with a transmitted representation of the audio signal, said encoder configured to process signals in the frequency range of 20Hz to 20kHz for representation in said first representation of an audio signal;

wherein the wireless digital coded audio spread spectrum transmitter is further configured to perform at least one of a plurality of modulations on the first representation of the audio signal and 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;

wherein said plurality of modulations are separate from the encoding and processing by the encoder; and

wherein the wireless digital coded audio spread spectrum transmitter is further configured to use the modulated signal and to use independent code

division multiple access communication to wirelessly transmit a transmitted representation of the audio signal, and 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.

6. (Previously Presented) The wireless digital coded audio spread spectrum transmitter of Claim 5, wherein the first representation of an audio signal is representative of music.

7. (Previously Presented) The wireless digital audio spread spectrum receiver of Claim 1, wherein said non-DPSK demodulation is 64-ary demodulation.

8. (Previously Presented) The portable spread spectrum receiver of Claim 3, wherein said non-DPSK demodulation is 64-ary demodulation.

9. (Previously Presented) The wireless digital coded audio spread spectrum transmitter of Claim 5, wherein [[the]] said non-DPSK modulation is 64-ary modulation.

10. (Previously Presented) The wireless digital audio spread spectrum receiver of Claim 1, wherein the digital audio spread spectrum receiver is further configured to receive the receive wireless spread spectrum signal transmissions where the receive wireless spread spectrum signal transmissions are in the Industrial Scientific and Medical 2.4 GHz band, ranging from 2.4 GHz to 2.5 GHz.

11. (Previously Presented) The portable spread spectrum receiver of Claim 3, wherein the portable spread spectrum receiver is further configured to receive the received wireless transmissions where the received wireless transmissions are in the Industrial Scientific and Medical 2.4 GHz band, ranging from 2.4 GHz to 2.5 GHz.

12. (Previously Presented) The wireless digital coded audio spread spectrum transmitter of Claim 5, wherein wireless digital coded audio spread spectrum transmitter is further configured to transmit the transmitted representation of the audio signal where the transmitted representation of the audio signal are in the Industrial Scientific and Medical 2.4 GHz band, ranging from 2.4 GHz to 2.5 GHz.

SUMMARY OF THE INTERVIEW

Applicant's representatives, Harnik Shukla and C. Earl Woolfork, conducted a telephonic interview with Examiner Flanders on August 8, 2018. Applicant's representatives discussed the §112 rejections with respect to Claim 1 and the attached Exhibit 1. The Examiner agreed that the § 112 rejections against Claim 1 are likely overcome in view of the discussions and Exhibit 1. Applicant's representatives further discussed the §102 rejection against Claim 1 in view of the cited references, Haartsen (U.S. Patent 6,563,892) and Haartsen (BLUETOOTH-The universal radio interface for ad hoc, wireless connectivity, 1998). The Examiner agreed that the proposed amendment to Claim 1 likely overcomes the § 102 rejection. Finally, Applicant's representative discussed the petition to correct priority filed on May 9, 2018 and granted on June 14, 2018. The Examiner confirmed the chain of priority of the pending Application dating back to Application No. 10/027,391, which was filed on December 21, 2001. The Examiner agreed to review the response filed along with an AFCP request.

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REMARKS

By way of summary, Claims 1-12 were pending in this application. In the present amendment, Applicant has amended Claims 1, 3, and 5 without prejudice or disclaimer to previously pending versions thereof. Accordingly, Claims 1-12 remain pending.

Priority

Applicant filed a petition to correct priority on May 9, 2018. The petition was granted on June 14, 2018. During the Interview, the Examiner confirmed the chain of priority of the pending Application dating back to Application No. 10/027,391, which was filed on December 21, 2001. Applicant respectfully submits that the current claims as amended are supported by the chain of applications dating back to and including the disclosure of Application No. 10/027,391.

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

The Office Action rejected Claims 1 – 12 under 35 U.S.C. § 112, first paragraph. *Office Action*, 2-3. More specifically, the Office Action rejected the claim limitation, "generate a demodulated signal based on the received modulated transmission by performing at least one of a plurality of demodulations, wherein the plurality of demodulations includes a differential phase shift keying (DPSK) demodulation and also includes a non-DPSK demodulation." Applicant respectfully disagrees with the rejection and the characterization of the claims.

The first paragraph of 35 U.S.C. § 112 states: "[t]he specification shall contain a written description of the invention." "To satisfy the written description requirement, a patent specification must describe the claimed invention in sufficient detail that ***one skilled in the art can reasonably conclude that the inventor had possession of the claimed invention***." M.P.E.P. § 2163(I). The adequacy of written description support is a factual issue and is to be determined on a case-by-case basis. *See e.g., Vas-Cath, Inc. v. Mahurkar*, 935 F.2d at 1563, 19 USPQ2d at 1116 (Fed. Cir. 1991). *The factual determination in a written description analysis depends on the nature of the invention and the amount of knowledge imparted to those skilled in the art by the disclosure. Union Oil v. Atlantic Richfield Co.*, 208 F.3d 989, 996 (Fed. Cir. 2000).

As discussed during the Interview with respect to attached *Exhibit 1*, a person skilled in the art can reasonably conclude that the inventor has possession of the claimed invention based at least on Figures 2 and 3 of the pending application, in view of Figure 5.24 of *Exhibit 1*. The Examiner agreed during the Interview that the support provided likely overcomes the § 112, first paragraph rejection.

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

The Office Action rejected Claims 1 – 12 under 35 U.S.C. § 112, second paragraph. *Office Action*, 3-4. More specifically, the Office Action rejected the claim limitation, "generate a demodulated signal based on the received modulated transmission by performing at least one of a plurality of demodulations, wherein the plurality of demodulations includes a differential phase shift keying (DPSK) demodulation and also includes a non-DPSK demodulation." Applicant respectfully disagrees with the rejection and the characterization of the claims.

"A decision on whether a claim is indefinite under 35 U.S.C. 112(b) or pre-AIA 35 U.S.C. 112, second paragraph requires a determination of whether those skilled in the art would understand what is claimed when the claim is read in light of the specification." *MPEP* 2173.02. As discussed during the Interview and agreed by the Examiner in view of Exhibit 1, a person skilled in the art would understand the scope of the claims based at least of Figures 2 and 3 and the corresponding disclosure. Accordingly, Applicant respectfully requests reconsideration and withdrawal of the rejection.

Art Based Rejections

The Office Action rejected independent Claim 1 under 35 U.S.C. § 102 as being anticipated by "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*, 5 - 8. 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. Particularly, Applicant does

not acquiesce to the incorporation of Haart 2 as proper for the § 102 rejection. The Office Action also mischaracterizes the claim limitations and previous prosecution history. Particularly, the Office Action states that "[a]ccording to the inventor's own admission during prosecution of the 2012 application, DPSK encoding meets 'the applied reduced intersymbol interference coding of said original audio signal presentation' limitation." *Office Action*, 6. Applicant respectfully disagrees to the extent that Applicant's statement during prosecution is interpreted to mean that all DPSK encoding satisfies the reduced intersymbol interference coding limitation. Applicant respectfully submits that a person of ordinary skill in the art would understand the statement made during prosecution to be limited to non-binary forms of DPSK, which may reduce intersymbol interference.

Nevertheless, solely in the interest of expediting prosecution, Applicant has amended Claim 1 as proposed during the Interview. The Examiner agreed that the proposed amendment overcomes the art based rejection on the record. Thus, at least based on the amendment, Applicant respectfully requests reconsideration and withdrawal of the rejection against Claim 1.

Independent Claim 3

The Office Action rejected Claim 3 under 35 U.S.C. § 102 as anticipated by Haart 1 in view of Haart 2. The Office Action states that "audio signals [intended to be heard] are inherently in the range of 20Hz-20KHz." *Office Action*, 9. Applicant respectfully disagrees with the rejection and the characterization of claims in the Office Action. As discussed during the Interview, there is a difference in frequency ranges of audio signals corresponding to voice versus high quality music. Based on the discussion of Haart 1 and Haart 2 during the Interview and the amendment to Claim 3 as shown above, Applicant respectfully requests withdrawal and reconsideration of the art based rejections against Claim 3.

Independent Claim 5

The Office Action rejected Claim 5 under 35 U.S.C. § 102 as anticipated by Haart 1 in view of Haart 2. Applicant respectfully disagrees with the rejection and the characterization of claims in the Office Action. Based on the discussion of Haart 1 and

Haart 2 during the Interview and the amendment to Claim 5 as shown above, Applicant respectfully requests withdrawal and reconsideration of the art based rejections against Claim 5.

Dependent Claims

The Office Action rejected the dependent claims based at least on the same rejections as their corresponding independent 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 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.

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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

Dated: August 29, 2018

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

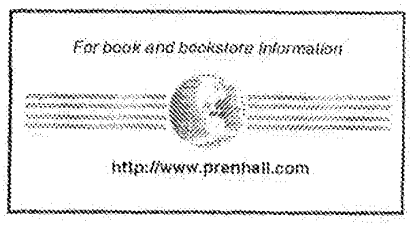
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EXHIBIT 1

Wireless Communications

Principles and Practice

Theodore S. Rappaport





Prentice Hall PTR
Upper Saddle River, New Jersey 07458

E1

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bit period. At the end of each bit period, the switch at the output of the integrator closes to dump the output signal to the decision circuit. Depending on whether the integrator output is above or below a certain threshold, the decision circuit decides that the received signal corresponds to a binary 1 or 0. The threshold is set at an optimum level such that the probability of error is minimized. If it is equally likely that a binary 1 or 0 is transmitted, then the voltage level corresponding to the midpoint between the detector output voltage levels of binary 1 and 0 is used as the optimum threshold.

As seen in Section 5.6, the probability of bit error for *many* modulation schemes in an AWGN channel is found using the Q-function of the distance between the signal points. From the constellation diagram of a BPSK signal shown in Figure 5.21, it can be seen that the distance between adjacent points in the constellation is $2\sqrt{E_b}$. Substituting this in equation (5.62), the probability of bit error is obtained as

$$P_{e,\text{BPSK}} = Q\left(\sqrt{\frac{2E_b}{N_0}}\right) \tag{5.74}$$

5.7.2 Differential Phase Shift Keying (DPSK)

Differential PSK is a noncoherent form of phase shift keying which avoids the need for a coherent reference signal at the receiver. Noncoherent receivers are easy and cheap to build, and hence are widely used in wireless communications. In DPSK systems, the input binary sequence is first differentially encoded and then modulated using a BPSK modulator. The differentially encoded sequence $\{d_k\}$ is generated from the input binary sequence $\{m_k\}$ by complementing the modulo-2 sum of m_k and d_{k-1}. The effect is to leave the symbol d_k unchanged from the previous symbol if the incoming binary symbol m_k is 1, and to toggle d_k if m_k is 0. Table 5.1 illustrates the generation of a DPSK signal for a sample sequence m_k which follows the relationship $d_k = \overline{m_k \oplus d_{k-1}}$.

Table 5.1 Illustration of the Differential Encoding Process

$\{m_k\}$		1	0	0	1	0	1	1	0
$\{d_{k-1}\}$		1	1	0	1	1	0	0	0
$\{d_k\}$	1	1	0	1	1	0	0	0	1

A block diagram of a DPSK transmitter is shown in Figure 5.24. It consists of a one bit delay element and a logic circuit interconnected so as to generate the differentially encoded sequence from the input binary sequence. The output is passed through a product modulator to obtain the DPSK signal. At the receiver, the original sequence is recovered from the demodulated differentially encoded signal through a complementary process, as shown in Figure 5.25.

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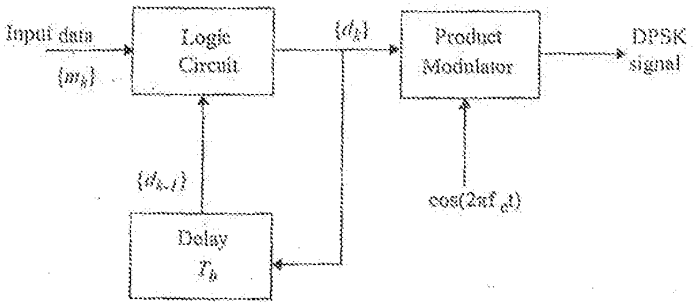


Figure 5.24
Block diagram of a DPSK transmitter.

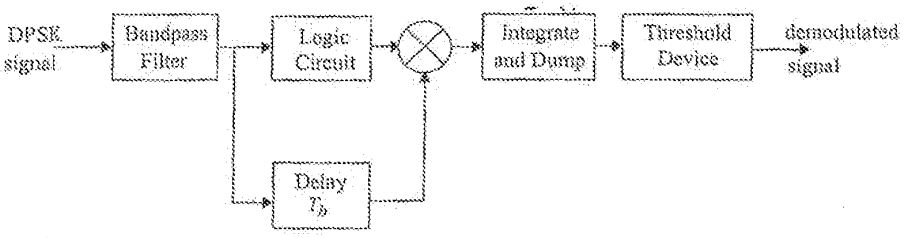


Figure 5.25
Block diagram of DPSK receiver.

While DPSK signaling has the advantage of reduced receiver complexity, its energy efficiency is inferior to that of coherent PSK by about 3 dB. The average probability of error for DPSK in additive white Gaussian noise is given by

$$P_{e,\,\mathrm{DPSK}} = \frac{1}{2}\exp\left(-\frac{E_b}{N_0}\right) \tag{5.75}$$

5.7.3 Quadrature Phase Shift Keying (QPSK)

Quadrature phase shift keying (QPSK) has twice the bandwidth efficiency of BPSK, since 2 bits are transmitted in a single modulation symbol. The phase of the carrier takes on 1 of 4 equally spaced values, such as 0, $\pi/2$, π, and $3\pi/2$, where each value of phase corresponds to a unique pair of message bits. The QPSK signal for this set of symbol states may be defined as

$$S_{\mathrm{QPSK}}(t) = \sqrt{\frac{2E_s}{T_s}}\cos\left[2\pi f_c t + (i-1)\frac{\pi}{2}\right] \quad 0 \le t \le T_s, \quad i = 1, 2, 3, 4. \tag{5.76}$$

where T_s is the symbol duration and is equal to twice the bit period.

Samsung Exhibit 1002, Page 245 of 370
Samsung Electronics Co., Ltd. et al. v. One-E-Way, Inc.
IPR2025-01540

Electronic Acknowledgement Receipt

EFS ID:	33579172
Application Number:	15003242
International Application Number:	
Confirmation Number:	8992
Title of Invention:	Wireless Digital Audio Music System
First Named Inventor/Applicant Name:	C. Earl Woolfork
Customer Number:	20995
Filer:	Harnik Shukla/Aimee Kazan
Filer Authorized By:	Harnik Shukla
Attorney Docket Number:	1EWAY.009P1C6
Receipt Date:	29-AUG-2018
Filing Date:	21-JAN-2016
Time Stamp:	18:29:06
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	After Final Consideration Program Request	009P1C6_AFCP.pdf	226939 464c7893a1aa06b1cef51664d17d8ccb536b6bb0	no	2
Warnings:					

Information:					
2		009P1C6_Amendment.pdf	803016 d09eb5855e1469e584cb52e7a7b0830968526899	yes	16

Multipart Description/PDF files in .zip description		
Document Description	**Start**	**End**
Response After Final Action	1	1
Claims	2	5
Applicant summary of interview with examiner	6	6
Applicant Arguments/Remarks Made in an Amendment	7	16

Warnings:	
Information:	
Total Files Size (in bytes):	1029955

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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
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PATENT APPLICATION FEE DETERMINATION RECORD Substitute for Form PTO-875	Application or Docket Number 15/003,242	Filing Date 01/21/2016	☐ To be Mailed

ENTITY: ☐ LARGE ☑ SMALL ☐ MICRO

APPLICATION AS FILED - PART I

FOR	(Column 1) NUMBER FILED	(Column 2) 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), (i), 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 $40 =	
INDEPENDENT CLAIMS (37 CFR 1.16(h))	minus 3 =	*		x $210 =	
☐ 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

AMENDMENT	08/29/2018	(Column 1) CLAIMS REMAINING AFTER AMENDMENT		(Column 2) HIGHEST NUMBER PREVIOUSLY PAID FOR	(Column 3) PRESENT EXTRA		RATE ($)	ADDITIONAL FEE ($)
	Total (37 CFR 1.16(i))	* 12	Minus	** 20	= 0		x $50 =	0
	Independent (37 CFR 1.16(h))	* 3	Minus	*** 3	= 0		x $230 =	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

AMENDMENT		(Column 1) CLAIMS REMAINING AFTER AMENDMENT		(Column 2) HIGHEST NUMBER PREVIOUSLY PAID FOR	(Column 3) 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.	SLIE
** If the "Highest Number Previously Paid For" IN THIS SPACE is less than 20, enter "20".	shanda E ross
*** 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 number found in the appropriate box in column 1.	

This collection of information is required by 37 CFR 1.16. 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 12 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.**

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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
15/003,242	01/21/2016	C. Earl Woolfork	1EWAY.009P1C6	8992

20995 7590 09/04/2018

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2040 MAIN STREET
FOURTEENTH FLOOR
IRVINE, CA 92614

EXAMINER	
FLANDERS, ANDREW C	

ART UNIT	PAPER NUMBER
2656	

NOTIFICATION DATE	DELIVERY MODE
09/04/2018	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

Applicant-Initiated Interview Summary	**Application No.** 15/003,242	**Applicant(s)** Woolfork, C. Earl	
	Examiner Andrew C Flanders	**Art Unit** 2656	**AIA Status** Yes

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

(1) Andrew C. Flanders. (3) Harnik Shukla.

(2) C. Earl Woolfork. (4) _____.

Date of Interview: 08 August 2018.

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.

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...)

See Continuation Sheet.

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: Haartsen (U.S. 6,563,892) and Hartsen 2 (BLUETOOTH - The universal radio interface for ad hoc, wireless connectivity; 1998)

Continuation of Substance of Interview including description of the general nature of what was agreed to if an agreement was reached, or any other comments: Discussed 112 rejections, in particular the limitation of “generate a demodulated signal based on the received modulated transmission by performing at least one of a plurality of demodulations, wherein the plurality of demodulations includes a differential phase shift keying (DPSK) demodulation and also includes a non-DPSK demodulation.” Applicant's interview request, Exhibit 2 details a block diagram, as known by one of ordinary skill in the art, of a DPSK transmitter/receiver. Applicant's claim covers a plurality of demodulators, which, when viewed in light of the exhibit, shows another modulator/demodulator in applicants bocks 48 and 56 of Fig. 3. Given the modulators 42 and 62 as well as the above, Applicant's argument is persuasive and the 112 rejections will be removed. Applicant further disclosed Hartsen 1 and 2. Applicant's proposed amendments to the claims are now directed to an audio signal in the frequency range of 20hz-20khz. Applicant notes, and Examiner agrees, that Hartsen 1 and 2 only discuss bluetooth in terms of speaker phone communication, and do not discuss this particular range. Examiner noted that a review of bluetooth at the time of the invention will be necessary to determine if this would have been anticipated or obvious.

Please Direct All Correspondence to Customer Number 20995

IN THE UNITED STATES PATENT AND TRADEMARK OFFICE

Inventor	:	C. Earl Woolfork
App. No	:	15/003242
Filed	:	January 21, 2016
For	:	WIRELESS DIGITAL AUDIO MUSIC SYSTEM
Examiner	:	Flanders, Andrew C.
Art Unit	:	2656
Conf No.	:	8992

INTERVIEW AGENDA

Dear Examiner Flanders:

Thank you for granting an interview on Wednesday, August 8, 2018 at 10:30 AM Eastern. During the Interview, the inventor (Earl) and I would like to discuss the following:

1. § 102 Rejection
    a. Discuss proposed amendment to Claim 1 shown below
    b. Discuss Col 5., lines 11 to 54 of U.S. 6,563,892 (Haartsen)
    c. "The identical invention must be shown in as complete detail as is contained in the ... claim. . . . The elements ***must be arranged as required*** by the claim." MPEP 2131.
    d. Discuss Exhibit 1 (if necessary)

2. § 112, First Paragraph
    a. Discuss "plurality of demodulations"
    b. The first paragraph of 35 U.S.C. § 112 states: "[t]he specification shall contain a written description of the invention." "To satisfy the written description requirement, a patent specification must describe the claimed invention in sufficient detail that ***one skilled in the art can reasonably conclude that the inventor had possession of the claimed invention.***" M.P.E.P. § 2163(I). The well-established test for sufficiency of support under the written description requirement of 35 U.S.C. §112 , first paragraph is *whether the disclosure "reasonably conveys to artisan that the inventor had possession at that time of the later claimed subject matter." In re Kaslow*, 707 F.2d 1366, 1375, 2121 USPQ 1089, 1096

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(Fed. Cir. 1983); *see also Vas-Cath, Inc. v. Mahurkar*, 935 F.2d at 1563, 19 USPQ2d at 1116 (Fed. Cir. 1991). The adequacy of written description support is a factual issue and is to be determined on a case-by-case basis. *See e.g., Vas-Cath, Inc. v. Mahurkar*, 935 F.2d at 1563, 19 USPQ2d at 1116 (Fed. Cir. 1991). *The factual determination in a written description analysis depends on the nature of the invention and the amount of knowledge imparted to those skilled in the art by the disclosure. Union Oil v. Atlantic Richfield Co.*, 208 F.3d 989, 996 (Fed. Cir. 2000).

c. Discuss Exhibit 2 (if necessary)

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CLAIMS

1. (Proposed Amendment) A wireless digital audio spread spectrum receiver, capable of mobile operation, configured to receive a unique user code and ~~an~~ a high quality audio signal representation with a frequency range of 20Hz to 20kHz from a digital audio spread spectrum transmitter, said audio signal representation representative of audio from a portable audio source, said digital audio spread spectrum receiver operative to communicate wirelessly with said digital audio spread spectrum transmitter, said digital audio spread spectrum receiver comprising:

a direct conversion module configured to receive wireless spread spectrum signal transmissions representative of the unique user code and the high quality audio signal representation, wherein the received transmissions are encoded to reduce intersymbol interference, wherein the wireless digital audio spread spectrum receiver is capable of processing the high quality audio signal having a frequency range of 20Hz to 20kHz;

a digital-to-analog converter (DAC) configured to generate an audio output from said receiver audio signal representation; and

a speaker configured to reproduce said generated audio output, wherein said reproduction does not include audible audio content originating from any transmitted audio signals in the wireless digital audio spread spectrum transmitter spectrum that do not originate from said digital audio spread spectrum transmitter;

wherein the wireless digital audio spread spectrum receiver is configured to use independent code division multiple access communication and to use the received unique user code to communicate with only said wireless digital audio spread spectrum transmitter for the duration of a wireless connection; and

wherein the wireless digital audio spread spectrum receiver is further configured to:

demodulate a received modulated transmission, and

generate a demodulated signal based on the received modulated transmission by performing at least one of a plurality of demodulations, wherein

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the plurality of demodulations includes a differential phase shift keying (DPSK) demodulation and also includes a non-DPSK demodulation.

Respectfully submitted,

KNOBBE, MARTENS, OLSON & BEAR, LLP

Dated:8/6/2018

By:/Harnik Shukla/

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

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EXHIBIT 1

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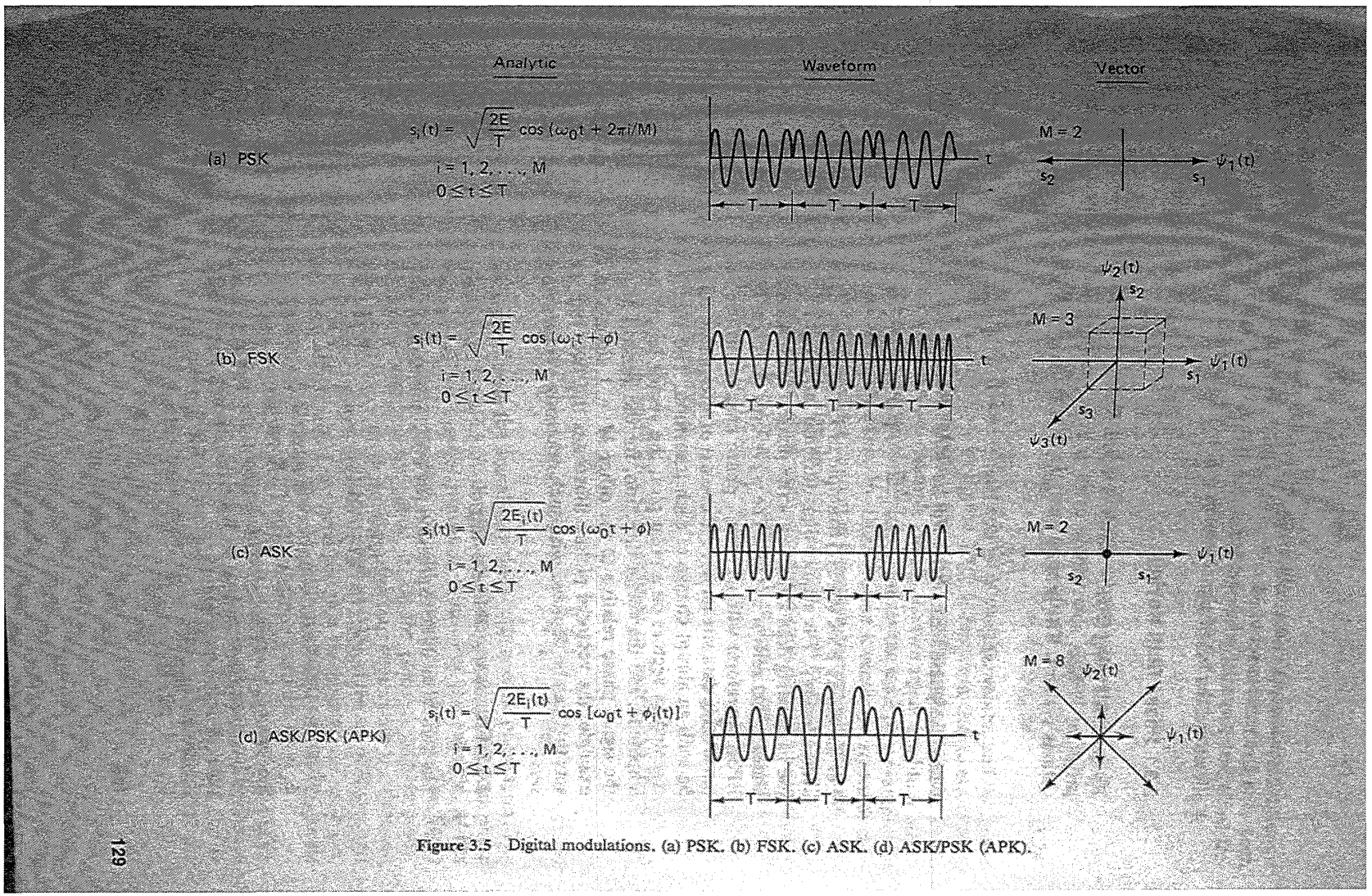


Figure 3.5 Digital modulations. (a) PSK. (b) FSK. (c) ASK. (d) ASK/PSK (APK).

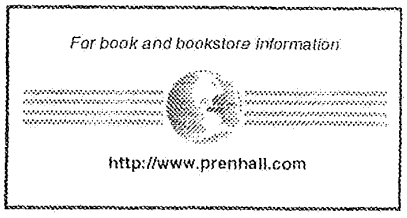
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Samsung Electronics Co., Ltd. et al. v. One-E-Way, Inc.
IPR2025-01540

Exhibit 2

Wireless Communications

Principles and Practice

Theodore S. Rappaport





Prentice Hall PTR
Upper Saddle River, New Jersey 07458

E1

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ER

bit period. At the end of each bit period, the switch at the output of the integrator closes to dump the output signal to the decision circuit. Depending on whether the integrator output is above or below a certain threshold, the decision circuit decides that the received signal corresponds to a binary 1 or 0. The threshold is set at an optimum level such that the probability of error is minimized. If it is equally likely that a binary 1 or 0 is transmitted, then the voltage level corresponding to the midpoint between the detector output voltage levels of binary 1 and 0 is used as the optimum threshold.

As seen in Section 5.6, the probability of bit error for *many* modulation schemes in an AWGN channel is found using the Q-function of the distance between the signal points. From the constellation diagram of a BPSK signal shown in Figure 5.21, it can be seen that the distance between adjacent points in the constellation is $2\sqrt{E_b}$. Substituting this in equation (5.62), the probability of bit error is obtained as

$$P_{e,\,\text{BPSK}} = Q\left(\sqrt{\frac{2E_b}{N_0}}\right) \tag{5.74}$$

5.7.2 Differential Phase Shift Keying (DPSK)

Differential PSK is a noncoherent form of phase shift keying which avoids the need for a coherent reference signal at the receiver. Noncoherent receivers are easy and cheap to build, and hence are widely used in wireless communications. In DPSK systems, the input binary sequence is first differentially encoded and then modulated using a BPSK modulator. The differentially encoded sequence $\{d_k\}$ is generated from the input binary sequence $\{m_k\}$ by complementing the modulo-2 sum of m_k and d_{k-1}. The effect is to leave the symbol d_k unchanged from the previous symbol if the incoming binary symbol m_k is 1, and to toggle d_k if m_k is 0. Table 5.1 illustrates the generation of a DPSK signal for a sample sequence m_k which follows the relationship $d_k = \overline{m_k \oplus d_{k-1}}$.

Table 5.1 Illustration of the Differential Encoding Process

$\{m_k\}$		1	0	0	1	0	1	1	0
$\{d_{k-1}\}$		1	1	0	1	1	0	0	0
$\{d_k\}$	1	1	0	1	1	0	0	0	1

A block diagram of a DPSK transmitter is shown in Figure 5.24. It consists of a one bit delay element and a logic circuit interconnected so as to generate the differentially encoded sequence from the input binary sequence. The output is passed through a product modulator to obtain the DPSK signal. At the receiver, the original sequence is recovered from the demodulated differentially encoded signal through a complementary process, as shown in Figure 5.25.

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Samsung Electronics Co., Ltd. et al. v. One-E-Way, Inc.
IPR2025-01540

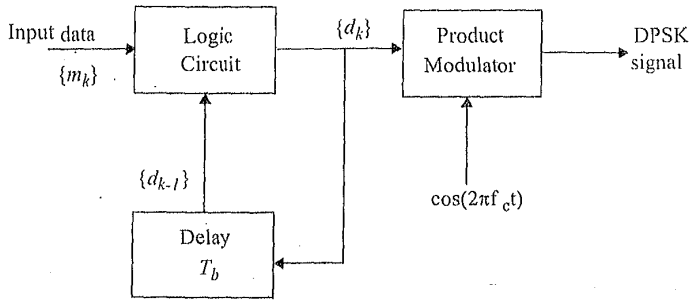


Figure 5.24
Block diagram of a DPSK transmitter.

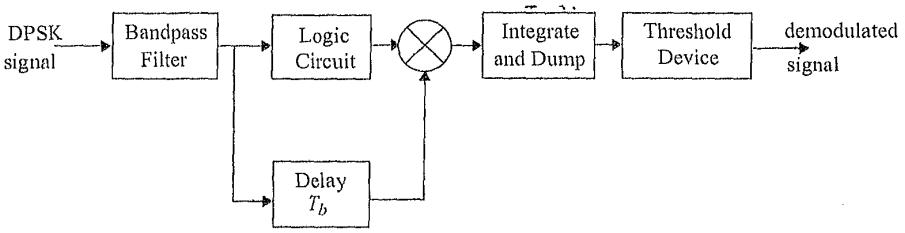


Figure 5.25
Block diagram of DPSK receiver.

While DPSK signaling has the advantage of reduced receiver complexity, its energy efficiency is inferior to that of coherent PSK by about 3 dB. The average probability of error for DPSK in additive white Gaussian noise is given by

$$P_{e,\,\mathrm{DPSK}} = \frac{1}{2}\exp\left(-\frac{E_b}{N_0}\right) \tag{5.75}$$

5.7.3 Quadrature Phase Shift Keying (QPSK)

Quadrature phase shift keying (QPSK) has twice the bandwidth efficiency of BPSK, since 2 bits are transmitted in a single modulation symbol. The phase of the carrier takes on 1 of 4 equally spaced values, such as 0, $\pi/2$, π, and $3\pi/2$, where each value of phase corresponds to a unique pair of message bits. The QPSK signal for this set of symbol states may be defined as

$$S_{\mathrm{QPSK}}(t) = \sqrt{\frac{2E_s}{T_s}}\cos\left[2\pi f_c t + (i-1)\frac{\pi}{2}\right] \quad 0 \le t \le T_s \quad i = 1, 2, 3, 4. \tag{5.76}$$

where T_s is the symbol duration and is equal to twice the bit period.

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Samsung Electronics Co., Ltd. et al. v. One-E-Way, Inc.
IPR2025-01540

****
*** TX REPORT ***
****

TRANSMISSION OK

TX/RX NO	3517
CONNECTION TEL	915712737516
SUBADDRESS	
CONNECTION ID	
ST. TIME	08/06 14:49
USAGE T	03'09
PGS. SENT	10
RESULT	OK

Docket No.: 1EWAY.009P1C6

August 6, 2018

Please Direct All Correspondence to Customer Number 20995

IN THE UNITED STATES PATENT AND TRADEMARK OFFICE

Inventor	:	C. Earl Woolfork
App. No	:	15/003242
Filed	:	January 21, 2016
For	:	WIRELESS DIGITAL AUDIO MUSIC SYSTEM
Examiner	:	Flanders, Andrew C.
Art Unit	:	2656
Conf No.	:	8992

INTERVIEW AGENDA

Dear Examiner Flanders:

Thank you for granting an interview on Wednesday, August 8, 2018 at 10:30 AM Eastern. During the Interview, the inventor (Earl) and I would like to discuss the following:

1. § 102 Rejection
   a. Discuss proposed amendment to Claim 1 shown below
   b. Discuss Col 5., lines 11 to 54 of U.S. 6,563,892 (Haartsen)
   c. "The identical invention must be shown in as complete detail as is contained in the ... claim. . . . The elements ***must be arranged as required*** by the claim." MPEP 2131.
   d. Discuss Exhibit 1 (if necessary)

2. § 112 First Paragraph

UNITED STATES PATENT AND TRADEMARK OFFICE

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

APPLICATION NUMBER	FILING OR 371(C) DATE	FIRST NAMED APPLICANT	ATTY. DOCKET NO./TITLE
15/003,242	01/21/2016	C. Earl Woolfork	1EWAY.009P1C6

CONFIRMATION NO. 8992

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

PUBLICATION NOTICE

OC000000102473230

Title: Wireless Digital Audio Music System

Publication No.US-2018-0270561-A9
Publication Date:09/20/2018

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 publically available Searchable Databases via the Internet at www.uspto.gov. The direct link to access the publication is currently http://www.uspto.gov/patft/.

The publication process established by the Office does not provide for mailing a copy of the publication to applicant. A copy of the publication may be obtained from the Office upon payment of the appropriate fee set forth in 37 CFR 1.19(a)(1). Orders for copies of patent application publications are handled by the USPTO's Public Records Division. The Public Records Division can be reached by telephone at (571) 272-3150 or (800) 972-6382, by facsimile at (571) 273-3250, by mail addressed to the United States Patent and Trademark Office, Public Records Division, Alexandria, VA 22313-1450 or via the Internet.

In addition, information on the status of the application, including the mailing date of Office actions and the dates of receipt of correspondence filed in the Office, may also be accessed via the Internet through the Patent Electronic Business Center at www.uspto.gov using the public side of the Patent Application Information and Retrieval (PAIR) system. The direct link to access this status information is currently https://portal.uspto.gov/pair/PublicPair. Prior to publication, such status information is confidential and may only be obtained by applicant using the private side of PAIR.

Further assistance in electronically accessing the publication, or about PAIR, is available by calling the Patent Electronic Business Center at 1-866-217-9197.

Office of Data Managment, Application Assistance Unit (571) 272-4000, or (571) 272-4200, or 1-888-786-0101

UNITED STATES PATENT AND TRADEMARK OFFICE

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NOTICE OF ALLOWANCE AND FEE(S) DUE

20995 7590 09/25/2018

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

EXAMINER	
FLANDERS, ANDREW C	
ART UNIT	**PAPER NUMBER**
2656	

DATE MAILED: 09/25/2018

APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
15/003,242	01/21/2016	C. Earl Woolfork	1EWAY.009P1C6	8992

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	SMALL	$500	$0.00	$0.00	$500	12/26/2018

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: Utility patents issuing on applications filed on or after Dec. 12, 1980 may require payment of maintenance fees. It is patentee's responsibility to ensure timely payment of maintenance fees when due.

PTOL-85 (Rev. 02/11)

Samsung Exhibit 1002, Page 265 of 370
Samsung Electronics Co., Ltd. et al. v. One-E-Way, Inc.
IPR2025-01540

PART B - FEE(S) TRANSMITTAL

Complete and send this form, together with applicable fee(s), to: Mail **Mail Stop ISSUE FEE**
Commissioner for Patents
P.O. Box 1450
Alexandria, Virginia 22313-1450
or Fax (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 09/25/2018
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 facsimile transmitted to the USPTO (571) 273-2885, on the date indicated below.

(Depositor's name)
(Signature)
(Date)

APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
15/003,242	01/21/2016	C. Earl Woolfork	1EWAY.009P1C6	8992

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	SMALL	$500	$0.00	$0.00	$500	12/26/2018

EXAMINER	ART UNIT	CLASS-SUBCLASS
FLANDERS, ANDREW C	2656	700-094000

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 03-02 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 _____
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 has been filed for recordation as set forth in 37 CFR 3.11. 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. The following fee(s) are submitted:

❑ Issue Fee

❑ Publication Fee (No small entity discount permitted)

❑ Advance Order - # of Copies _____

4b. Payment of Fee(s): **(Please first reapply any previously paid issue fee shown above)**

❑ A check is enclosed.

❑ Payment by credit card. Form PTO-2038 is attached.

❑ The director is hereby authorized to charge the required fee(s), any deficiency, or credits any overpayment, to Deposit Account Number _____ (enclose an extra copy of this form).

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. _____

PTOL-85 Part B (10-13) Approved for use through 10/31/2013. OMB 0651-0033 U.S. Patent and Trademark Office; U.S. DEPARTMENT OF COMMERCE

Samsung Exhibit 1002, Page 266 of 370
Samsung Electronics Co., Ltd. et al. v. One-E-Way, Inc.
IPR2025-01540

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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
15/003,242	01/21/2016	C. Earl Woolfork	1EWAY.009P1C6	8992

20995 7590 09/25/2018

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

EXAMINER	
FLANDERS, ANDREW C	

ART UNIT	PAPER NUMBER
2656	

DATE MAILED: 09/25/2018

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.

PTOL-85 (Rev. 02/11)

Samsung Exhibit 1002, Page 267 of 370
Samsung Electronics Co., Ltd. et al. v. One-E-Way, Inc.
IPR2025-01540

Notice Requiring Inventor's Oath or Declaration	Application No. 15/003,242	Applicant(s) C. Earl Woolfork	
	Examiner FLANDERS, ANDREW C	Art Unit 2656	

This notice is an attachment to the Notice of Allowability (PTOL-37), or the Notice of Allowability For A Design Application (PTOL-37D).

An inventor's oath or declaration in compliance with 37 CFR 1.63 or 1.64 executed by or with respect to each inventor has not yet been submitted.

An oath or declaration in compliance with 37 CFR 1.63, or a substitute statement in compliance with 37 CFR 1.64, executed by or with respect to each inventor (for any inventor for which a compliant oath, declaration, or substitute statement has not yet been submitted) MUST be filed no later than the date on which the issue fee is paid. See 35 U.S.C. 115(f). Failure to timely comply will result in ABANDONMENT of this application.

A properly executed inventor's oath to declaration has not been received for the following inventor(s):

If applicant previously filed one or more oaths, declarations, or substitute statements, applicant may have received an informational notice regarding deficiencies therein.

The following deficiencies are noted:

INFORMAL ACTION PROBLEMS

A new inventor's oath or declaration that identifies this application (e.g., by Application Number and filing date) is required. The inventor's oath or declaration does not comply with 37 CFR 1.63 in that it:

- does not state that the above-identified application was made or authorized to be made by the person executing the oath or declaration: **C. Earl Woolfork**.
- does not include an acknowledgement that any willful false statement made in such declaration or statement is punishable under section 1001 of title 18 by fine or imprisonment of not more than five (5) years, or both: **C. Earl Woolfork**.

Questions relating to this Notice should be directed to the Application Assistance Unit at 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 12 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.** 15/003,242	**Applicant(s)** Woolfork, C. Earl	
	Examiner Andrew C Flanders	**Art Unit** 2656	**AIA 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 amendment filed 29 August 2018.
   ☐ 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 1-12 . 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 areply 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)
2. ☐ Information Disclosure Statements (PTO/SB/08), Paper No./Mail Date _____.
3. ☐ Examiner's Comment Regarding Requirement for Deposit of Biological Material _____.
4. ☑ Interview Summary (PTO-413), Paper No./Mail Date. _____.
5. ☐ Examiner's Amendment/Comment
6. ☑ Examiner's Statement of Reasons for Allowance
7. ☑ Other PTOL-2323.

/ANDREW C FLANDERS/
Primary Examiner, Art Unit 2656

Samsung Exhibit 1002, Page 270 of 370
Samsung Electronics Co., Ltd. et al. v. One-E-Way, Inc.
IPR2025-01540

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.

Allowable Subject Matter

Claims 1 – 12 are allowed.

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

Applicant's arguments regarding the rejections under 35. U.S.C. 112, First paragraph are persuasive. In particular, the disclosed DPSK transmitter/receiver would have to have included a DPSK modulation/demodulation as evidenced by Exhibit 1. Figures 5.24 and 5.25 teach a standard DPSK transmitter/receiver configuration at the time of the invention include a DPSK modulation and demodulation. Thus, it would have been reasonable to one of ordinary skill in the art to recognize the use of these elements as claimed.

Regarding the rejections under 35 U.S.C. 102b and 103a in view of Haartsen (hereinafter Haart 1, U.S. Patent 6,563,892) and (see Haart 1 col. 2 lines 20 - 30), Hartsen (hereinafter Haart 2, BLUETOOTH—The universal radio interface for ad hoc, wireless connectivity, 1998), the amendments to the claims overcome the rejections set forth in the prior action.

In particular, the claims are now directed to a receiver/transmitter that processes an audio signal having a frequency range of 20Hz to 20kHz. Haart 1 and Haart 2 do not explicitly disclose the frequency range of the audio signal, but discuss the audio in terms of a phone or speakerphone. Further, Haart 1 and 2 in terms of a Bluetooth transmitter as implementing the radio transmission.

An updated search has revealed Hamada (U.S. 2002/0065043), which discloses a way for high quality audio transmission over a Bluetooth channel (see Figs. 1, 14 and 21, as well as paras 75, (e.g. realizing CD quality) and para 189 (data transmission of a high quality sound can be achieved), using compression, such as MP3 and AAC, para 75.

Given that Hamada discloses transmission over Bluetooth (Fig. 1) and Haart 1 explicitly states "the exemplary radio communications discussed herein are described as useful in systems employing the Bluetooth technology"; col. 4 lines 13 – 15. Since Haart 1's disclosed techniques would be useful in systems employing Bluetooth technology's, and since Hamada's system employs Bluetooth technology, it would have been predictable to one of ordinary skill in the art to modify the system of Hamada to use the techniques of Haart. Further, modification would have been desirable since Haart discloses the techniques in terms of being "useful" in Bluetooth systems.

In view of the above, the amendments to the claims, in particular the range of 20hz – 20khz would have been met by the combination of Hamada and Haart 1 and 2. (e.g. CD quality, MP3, AAC).

However, a further discussion with Applicant on 14 September 2018, focusing on the claim limitations of the DPSK modulation/demodulation, shows that this particular

modulation scheme for use in Bluetooth would not have been obvious, nor anticipated (known) at the time of the invention. In particular, Applicant points out that in col. 5 of Haart 1, the amplitude of the binary signal is fixed; col. 5 lines 5-6. Continuing, in order to use this technique, and detect signal separation, the separation must be fixed; col 5 lines 11 – 23. Haart goes on to then discuss DPSK, and the benefits of differential keying, and how it can be used in other modulation schemes as well, for example DFSK. Haart discusses DPSK in order to explain how the differential keying of DPSK is useable in FSK modulation, providing for a DFSK modulation. As noted by Applicant, this is due to the fact that the amplitude must remain constant, which is not possible in DPSK. DPSK modulation does not have a fixed amplitude as would be required, see further Fig. 3.5 (a) PSK and (b) and FSK modulation graphs detailing this fact as provided in Exhibit 2 and discussed in the interview 08 August 2018

Given the above, Claims 1 – 12 are allowable in view of the prior art.

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

Examiner-Initiated Interview Summary	**Application No.** 15/003,242	**Applicant(s)** Woolfork, C. Earl	
	Examiner Andrew C Flanders	**Art Unit** 2656	**AIA Status** Yes

All participants (applicant, applicant's representative, PTO personnel):

(1) Andrew C. Flanders.

(3) Harnik Shukla.

(2) C. Earl Woolfork.

(4) _____.

Date of Interview: 14 September 2018.

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.

Identification of prior art discussed: Haartsen (U.S. 6,563,892), Hamada (U.S. 2002/0065043), and Kharyralla (U.S. 2001/003621).

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...)

See Continuation Sheet.

Applicant recordation instructions: It is not necessary for applicant to provide a separate record of the substance of 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	

Continuation of Substance of Interview including description of the general nature of what was agreed to if an agreement was reached, or any other comments: Discussed applicability of new references to the claimed invention and rationale for combination. Examiner noted Hamada discloses a bluetooth system, Haartsen discloses techniques for use in Bluetooth systems and Kharyalla discloses differential coding in bluetooth systems. As an initial finding, Applicant points out that Kharyalla does not discloses DPSK for use in the invention explicitly, and further, does not solve the issues associated with DPSK in bluetooth. Examiner agrees, at best, Kharyalla discloses differential modulation in bluetooth, but not DPSK. Examiner also points to Hamada in view of Haartsen given their use in bluetooth. However, Applicant notes that the proposed combination fails to adequately anticipate or make obvious DPSK encoding for various reasons. Applicant notes that the disclosure of Haartsen (col. 5) shows that the amplitude of the signal must be fixed. Applicant then notes that Haartsen further discusses DPSK in terms of differential keying, to be applied to the FSK modulation, thereby implementing a DFSK modulation. Applicant notes that DPSK is not usable in this configuration due to the fixed amplitude requirement and that PSK modulation techniques have varying amplitudes. Examiner agrees.

Notice of References Cited	Application/Control No. 15/003,242	Applicant(s)/Patent Under Reexamination Woolfork, C. Earl	
	Examiner Andrew C Flanders	Art Unit 2656	Page 1 of 1

U.S. PATENT DOCUMENTS

*		Document Number Country Code-Number-Kind Code	Date MM-YYYY	Name	CPC Classification	US Classification
*	A	US-20010033621-A1	10-2001	Khayrallah, Ali S.	H03M7/3002	375/244
*	B	US-20020065043-A1	05-2002	Hamada, Osamu	H04W28/06	455/41.3
	C					
	D					
	E					
	F					
	G					
	H					
	I					
	J					
	K					
	L					
	M					

FOREIGN PATENT DOCUMENTS

*		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.

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AFCP 2.0 Decision	Application No.	Applicant(s)	
	15/003,242	Woolfork, C. Earl	
	Examiner	Art Unit	AIA Status
	Andrew C Flanders	2656	Yes

This is in response to the After Final Consideration Pilot request filed 29 August 2018.

1. **Improper Request** – The AFCP 2.0 request is improper for the following reason(s) and the after final amendment submitted with the request will be treated under pre-pilot procedure.

   ☐ An AFCP 2.0 request form PTO/SB/434 (or equivalent document) was not submitted.

   ☐ A non-broadening amendment to at least one independent claim was not submitted.

   ☐ A proper AFCP 2.0 request was submitted in response to the most recent final rejection.

   ☐ Other: _____

2. **Proper Request**

   A. After final amendment submitted with the request will not be treated under AFCP 2.0.
   The after final amendment cannot be reviewed and a search conducted within the guidelines of the pilot program.

   ☐ The after final amendment will be treated under pre-pilot procedure.

   B. Updated search and/or completed additional consideration.
   The examiner performed an updated search and/or completed additional consideration of the after final amendment within the time authorized for the pilot program. The result(s) of the updated search and/or completed additional consideration are:

   ☑ 1. All of the rejections in the most recent final Office action are overcome and a Notice of Allowance is issued herewith.

   ☐ 2. The after final amendment would not overcome all of the rejections in the most recent final Office action .
   See attached interview summary for further details.

   ☐ 3. The after final amendment was reviewed, and it raises a new issue(s). See attached interview summary for
   further details.

   ☐ 4. The after final amendment raises new issues, but would overcome all of the rejections in the most recent final Office action. A decision on determining allowability could not be made within the guidelines of the pilot. See attached interview summary for further details, including any newly discovered prior art.

   ☑ 5. Other: see attached interview summary

   Examiner Note: Please attach an interview summary when necessary as described above.

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Issue Classification	Application/Control No.	Applicant(s)/Patent Under Reexamination
	15/003,242	Woolfork, C. Earl
	Examiner	**Art Unit**
	Andrew C Flanders	2656

CPC						
Symbol					**Type**	**Version**
H04R	/	1	/	1041	F	2013-01-01
G10L	/	19	/	005	I	2013-01-01
G10L	/	19	/	167	I	2013-01-01
G10L	/	25	/	33	I	2013-01-01
H04R	/	3	/	04	I	2013-01-01
H04B	/	1	/	707	I	2013-01-01
H04R	/	2420	/	07	A	2013-01-01

CPC Combination Sets							
Symbol					**Type**	**Set**	**Ranking**	**Version**
	/		/					

NONE		Total Claims Allowed:	
(Assistant Examiner)	(Date)	12	
/ANDREW C FLANDERS/ Primary Examiner, Art Unit 2656	14 September 2018	O.G. Print Claim(s)	O.G. Print Figure
(Primary Examiner)	(Date)	1	1

U.S. Patent and Trademark Office — Part of Paper No.: 20180911

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Issue Classification	Application/Control No.	Applicant(s)/Patent Under Reexamination
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	Examiner	**Art Unit**
	Andrew C Flanders	2656

INTERNATIONAL CLASSIFICATION				
CLAIMED				
G06F	/	17	/	00

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)	12	
/ANDREW C FLANDERS/ Primary Examiner, Art Unit 2656	14 September 2018	O.G. Print Claim(s)	O.G. Print Figure
(Primary Examiner)	(Date)	1	1

U.S. Patent and Trademark Office — Part of Paper No.: 20180911

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Issue Classification	Application/Control No.	Applicant(s)/Patent Under Reexamination
	15/003,242	Woolfork, C. Earl
	Examiner	**Art Unit**
	Andrew C Flanders	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												
2	2	11	11												
3	3	12	12												
4	4														
5	5														
6	6														
7	7														
8	8														
9	9														

NONE		**Total Claims Allowed:**	
(Assistant Examiner)	(Date)	12	
/ANDREW C FLANDERS/ Primary Examiner, Art Unit 2656	14 September 2018	O.G. Print Claim(s)	O.G. Print Figure
(Primary Examiner)	(Date)	1	1

U.S. Patent and Trademark Office Part of Paper No.: 20180911

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Search Notes	Application/Control No.	Applicant(s)/Patent Under Reexamination
	15/003,242	Woolfork, C. Earl
	Examiner	**Art Unit**
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CPC - Searched*		
Symbol	**Date**	**Examiner**
H04R1/1083	12/10/17	acf
H04R2420/07	12/10/17	acf
H04R5/033	12/10/17	acf
H04M1/6066	12/10/17	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	12/10/17	acf
PE2E, EAST and PALM inventor search for double patenting	12/10/17	acf
google.com patents search	12/10/17	acf
reviewed search strategy for applications in patent family	12/10/17	acf
updated	6/25/18	acf
updated	9/14/18	acf

/ANDREW C FLANDERS/ Primary Examiner.Art Unit 2656	

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Search Notes	Application/Control No.	Applicant(s)/Patent Under Reexamination
	15/003,242	Woolfork, C. Earl
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Interference Search			
US Class/CPC Symbol	**US Subclass/CPC Group**	**Date**	**Examiner**
H04M1	6066	9/14/18	acf
H04R1	1083	9/14/18	acf
H04R5	033	9/14/18	acf
H04R2420	07	9/14/18	acf

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Index of Claims	Application/Control No.	Applicant(s)/Patent Under Reexamination
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	Examiner	**Art Unit**
	Andrew C Flanders	2656

✓	Rejected	-	Cancelled	N	Non-Elected	A	Appeal
=	Allowed	÷	Restricted	I	Interference	O	Objected

CLAIMS

☑ Claims renumbered in the same order as presented by applicant ☐ CPA ☑ T.D. ☐ R.1.47

CLAIM		DATE								
Final	Original	12/10/2017	06/25/2018	09/14/2018						
1	1	✓	✓	=						
2	2	✓	✓	=						
3	3	✓	✓	=						
4	4	✓	✓	=						
5	5	✓	✓	=						
6	6	✓	✓	=						
7	7	✓	✓	=						
8	8	✓	✓	=						
9	9	✓	✓	=						
10	10		✓	=						
11	11		✓	=						
12	12		✓	=						

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EAST Search History

EAST Search History (Prior Art)

Ref #	Hits	Search Query	DBs	Default Operator	Plurals	Time Stamp
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; USPAT	OR	OFF	2006/05/02 17:50
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;	OR	OFF	2006/05/03 11:46

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			USPAT			
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; USPAT	OR	OFF	2006/08/31 12:17
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;	OR	OFF	2006/09/25 10:02

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			USPAT			
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;	OR	OFF	2007/03/20 11:41

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			USPAT			
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;	OR	OFF	2007/03/28 16:27

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			USPAT			
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.	US-PGPUB; USPAT;	OR	OFF	2008/06/06 12:43

Samsung Exhibit 1002, Page 289 of 370
Samsung Electronics Co., Ltd. et al. v. One-E-Way, Inc.
IPR2025-01540

		OR ("6867820").URPN.	USOCR			
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
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S100	2	"13775754"	US-PGPUB; USPAT; USOCR	OR	OFF	2018/06/25 12:51
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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-	OR	OFF	2018/06/25

Samsung Exhibit 1002, Page 290 of 370
Samsung Electronics Co., Ltd. et al. v. One-E-Way, Inc.
IPR2025-01540

			PGPUB; USPAT; USOCR			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
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S115	0	(09/732044).APP.	USPAT; USOCR	OR	OFF	2018/09/11 16:14
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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" |	US-PGPUB; USPAT; USOCR	OR	OFF	2018/09/12 15:57

Samsung Exhibit 1002, Page 291 of 370
Samsung Electronics Co., Ltd. et al. v. One-E-Way, Inc.
IPR2025-01540

		"7099413").PN.				
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9/14/2018 2:20:55 PM
C:\Users\aflanders\Documents\EAST\Workspaces\10648012.wsp

Samsung Exhibit 1002, Page 292 of 370
Samsung Electronics Co., Ltd. et al. v. One-E-Way, Inc.
IPR2025-01540

Please enter amendment
/acf/
9/14/18

1EWAY.009P1C6 PATENT

IN THE UNITED STATES PATENT AND TRADEMARK OFFICE

First Inventor	:	C. Earl Woolfork
App. No.	:	15/003242
Filed	:	January 21, 2016
For	:	WIRELESS DIGITAL AUDIO MUSIC SYSTEM
Examiner	:	Flanders, Andrew C.
Art Unit	:	2656
Conf. No.	:	8992

AMENDMENT SUBMITTED WITH AFTER FINAL CONSIDERATION PILOT PROGRAM REQUEST

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

Dear Commissioner:

In response to the Office Action mailed June 29, 2018, the Applicants respectfully request the above-identified application be amended as follows:

Samsung Exhibit 1002, Page 293 of 370
Samsung Electronics Co., Ltd. et al. v. One-E-Way, Inc.
IPR2025-01540

Please Direct All Correspondence to Customer Number 20995

IN THE UNITED STATES PATENT AND TRADEMARK OFFICE

Inventor	:	C. Earl Woolfork
App. No.	:	15/003242
Filed	:	January 21, 2016
For	:	WIRELESS DIGITAL AUDIO MUSIC SYSTEM
Art Unit	:	2656
Conf No.	:	8992

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

Dear Commissioner:

The above-captioned application was filed without a Declaration and/or Substitute Statement. Enclosed in compliance with 37 CFR 1.53(f) are the following:

(X) A Declaration for:

C. Earl Woolfork

Respectfully submitted,

KNOBBE, MARTENS, OLSON & BEAR, LLP

Dated: September 25, 2018

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

29114682

Electronic Acknowledgement Receipt

EFS ID:	33822182
Application Number:	15003242
International Application Number:	
Confirmation Number:	8992
Title of Invention:	Wireless Digital Audio Music System
First Named Inventor/Applicant Name:	C. Earl Woolfork
Customer Number:	20995
Filer:	Harnik Shukla/Melissa Ramirez
Filer Authorized By:	Harnik Shukla
Attorney Docket Number:	1EWAY.009P1C6
Receipt Date:	25-SEP-2018
Filing Date:	21-JAN-2016
Time Stamp:	18:17:43
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		009P1C6_Declaration.pdf	462271 5eba28169a2af04806e69c490eef96dd41626522	yes	2

	Multipart Description/PDF files in .zip description		
	Document Description	**Start**	**End**
	Oath or Declaration filed	2	2
	Transmittal Letter	1	1
Warnings:			
Information:			
	Total Files Size (in bytes):	462271	

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.

PTO/AIA/01 (06-12)
Approved for use through 11/30/2020. OMB 0651-0032
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.

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 15/003242 filed on January 21, 2016.

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.

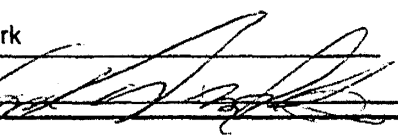
I hereby acknowledge that any willful false statement made in this declaration is punishable under 18 U.S.C. 1001 by fine or imprisonment of not more than five (5) years, or both.

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: C. Earl Woolfork Date (Optional): 3-28-2018

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.

PTO/AIA/01 (06-12)
Approved for use through 11/30/2020. OMB 0651-0032
U.S. Patent and Trademark Office; U.S. DEPARTMENT OF COMMERCE
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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 15/003242 filed on January 21, 2016.

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.

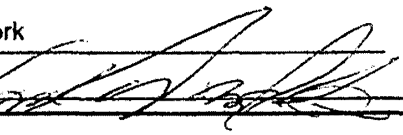
I hereby acknowledge that any willful false statement made in this declaration is punishable under 18 U.S.C. 1001 by fine or imprisonment of not more than five (5) years, or both.

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: C. Earl Woolfork Date (Optional): 3-28-2018

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.

Please Direct All Correspondence to Customer Number 20995

IN THE UNITED STATES PATENT AND TRADEMARK OFFICE

Inventor	:	C. Earl Woolfork
App. No.	:	15/003242
Filed	:	January 21, 2016
For	:	WIRELESS DIGITAL AUDIO MUSIC SYSTEM
Art Unit	:	2656
Conf No.	:	8992

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

Dear Commissioner:

The above-captioned application was filed without a Declaration and/or Substitute Statement. Enclosed in compliance with 37 CFR 1.53(f) are the following:

(X) A Declaration for:

C. Earl Woolfork

Respectfully submitted,

KNOBBE, MARTENS, OLSON & BEAR, LLP

Dated: October 2, 2018

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

29114682

PTO/AIA/01 (06-12)
Approved for use through 11/30/2020. OMB 0651-0032
U.S. Patent and Trademark Office; U.S. DEPARTMENT OF COMMERCE
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DECLARATION (37 CFR 1.63) FOR UTILITY OR DESIGN APPLICATION USING AN APPLICATION DATA SHEET (37 CFR 1.76)

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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 15/003242

filed on January 21, 2016

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.

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LEGAL NAME OF INVENTOR

Inventor: C. Earl Woolfork Date (Optional): 3-25-2018

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.

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

Electronic Acknowledgement Receipt	
EFS ID:	33899523
Application Number:	15003242
International Application Number:	
Confirmation Number:	8992
Title of Invention:	Wireless Digital Audio Music System
First Named Inventor/Applicant Name:	C. Earl Woolfork
Customer Number:	20995
Filer:	Harnik Shukla/Leonardo Quintana
Filer Authorized By:	Harnik Shukla
Attorney Docket Number:	1EWAY.009P1C6
Receipt Date:	02-OCT-2018
Filing Date:	21-JAN-2016
Time Stamp:	18:45:54
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.)
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	Multipart Description/PDF files in .zip description		
	Document Description	**Start**	**End**
	Miscellaneous Incoming Letter	1	1
	Oath or Declaration filed	2	2
Warnings:			
Information:			
	Total Files Size (in bytes):	569265	

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.

Please Direct All Correspondence to Customer Number 20995

IN THE UNITED STATES PATENT AND TRADEMARK OFFICE

Inventor	:	C. Earl Woolfork
App. No	:	15/003242
Filed	:	January 21, 2016
For	:	WIRELESS DIGITAL AUDIO MUSIC SYSTEM
Examiner	:	Flanders, Andrew C.
Art Unit	:	2656
Conf No.	:	8992

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 25, 2018.

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*, 3 - 4. Applicant does not concede that patentability rests fully on these or any particular aspect that has been specifically

acknowledged as persuasive. For example, the Examiner emphasizes a particular argument by Applicant on pages 3-4 of the Notice of Allowance. 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.

To the extent that there is any attempt to identify the closest prior art or to characterize the contents or teachings of any of the art of record, Applicant disagrees and traverses such an attempt. For example, Applicant disagrees that Hamada (U.S. Pub No 2002/0065043) "discloses a way for high quality audio transmission over a Bluetooth channel." *Notice of Allowance*, 3. Furthermore, Applicant disagrees that a person skilled in the art would have been motivated to combine Hamada with Haart 1.

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: October 3, 2018

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

29123447

SUMMARY OF INTERVIEW

Inventor	:	C. Earl Woolfork
App. No	:	15/003242
Filed	:	January 21, 2016
For	:	WIRELESS DIGITAL AUDIO MUSIC SYSTEM
Examiner	:	Flanders, Andrew C.
Art Unit	:	2656
Conf No.	:	8992

Dear Commissioner:

Applicant submits this Summary of Interview for recording in the official file.

Attendees, Date and Type of Interview

The interview was conducted telephonically and attended by Examiner Andrew C. Flanders, Applicant's representative, Harnik Shukla and the inventor, C. Earl Woolfork.

Exhibits and/or Demonstrations

N/A

Identification of Claims Discussed

1

Identification of Cited/Disclosed Art Discussed

Haartsen (U.S. 6,563,892), Hamada (U.S. 2002/0065043), and Kharyralla (U.S. 2001/003621).

Principal Arguments and Other Matters

Applicant's representative discussed the applicability of new references, Hamada and Kharyralla, with respect to Claim 1. Applicant's representative argued that Hamada and Kharyralla fail to teach or suggest, alone or in combination, all the limitations of

Claim 1. Applicant's representative further argued that there is no motivation to combine Hamada with Haartsen or Kharyalla. Applicant's representative and the Inventor further distinguished the references for their failure to teach or suggest DPSK in combination with the rest of the claimed limitations.

Results of Interview

The Examiner agreed that the claims are allowable over the previously cited art and the new art, Hamada and Kharyralla.

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: October 3, 2018

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

29131535

Samsung Exhibit 1002, Page 307 of 370
Samsung Electronics Co., Ltd. et al. v. One-E-Way, Inc.
IPR2025-01540

Electronic Patent Application Fee Transmittal

Application Number:	15003242
Filing Date:	21-Jan-2016
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.009P1C6

Filed as Small 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	2501	1	500	500

Description	Fee Code	Quantity	Amount	Sub-Total in USD($)
Extension-of-Time:				
Miscellaneous:				
		Total in USD ($)		**500**

Electronic Acknowledgement Receipt	
EFS ID:	33904429
Application Number:	15003242
International Application Number:	
Confirmation Number:	8992
Title of Invention:	Wireless Digital Audio Music System
First Named Inventor/Applicant Name:	C. Earl Woolfork
Customer Number:	20995
Filer:	Harnik Shukla/ThuyQuyen Nguyen
Filer Authorized By:	Harnik Shukla
Attorney Docket Number:	1EWAY.009P1C6
Receipt Date:	03-OCT-2018
Filing Date:	21-JAN-2016
Time Stamp:	13:22:23
Application Type:	Utility under 35 USC 111(a)

Payment information:

Submitted with Payment	yes
Payment Type	CARD
Payment was successfully received in RAM	$500
RAM confirmation Number	100318INTEFSW13231900
Deposit Account	111410
Authorized User	ThuyQuyen Nguyen
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)	009p1c6_Ifee.pdf	1599011 09b323d688ab3156974603667e34c7eea6342b34	no	1
Warnings:					
Information:					
2	Miscellaneous Incoming Letter	009p1c6_Comments.pdf	88904 6644a010ce7554b176cf34f2890196ac98c51744	no	3
Warnings:					
Information:					
3	Applicant summary of interview with examiner	009p1c6_IntSumm.pdf	85380 6fd76b1df2fdab720af4e5397252024d3aa66d21	no	2
Warnings:					
Information:					
4	Fee Worksheet (SB06)	fee-info.pdf	30064 7b1b525a86af65def17050ecbcb24fba1498959e	no	2
Warnings:					
Information:					
		Total Files Size (in bytes):	1803359		

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), to: Mail **Mail Stop ISSUE FEE**
Commissioner for Patents
P.O. Box 1450
Alexandria, Virginia 22313-1450
or Fax (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 09/25/2018
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 facsimile transmitted to the USPTO (571) 273-2885, on the date indicated below.

(Depositor's name)
(Signature)
(Date)

APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
15/003,242	01/21/2016	C. Earl Woolfork	1EWAY.009P1C6	8992

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	SMALL	$500	$0.00	$0.00	$500	12/26/2018

EXAMINER	ART UNIT	CLASS-SUBCLASS
FLANDERS, ANDREW C	2656	700-094000

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 03-02 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,
2 Olson & Bear, LLP
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 has been filed for recordation as set forth in 37 CFR 3.11. 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. The following fee(s) are submitted:

☒ Issue Fee

☐ Publication Fee (No small entity discount permitted)

☐ Advance Order - # of Copies _____

4b. Payment of Fee(s): **(Please first reapply any previously paid issue fee shown above)**

☐ A check is enclosed.

☒ Payment by credit card. ~~Form PTO-2038 is attached.~~ via EFS web.

☒ The director is hereby authorized to charge the required fee(s), any deficiency, or credits any overpayment, to Deposit Account Number 11-1410 (enclose an extra copy of this form).

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 /Hamik Shukla/ Date October 3, 2018

Typed or printed name Hamik Shukla Registration No. 73,097

PTOL-85 Part B (10-13) Approved for use through 10/31/2013. OMB 0651-0033 U.S. Patent and Trademark Office; U.S. DEPARTMENT OF COMMERCE

Samsung Exhibit 1002, Page 313 of 370
Samsung Electronics Co., Ltd. et al. v. One-E-Way, Inc.
IPR2025-01540

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.
15/003,242	01/21/2016	C. Earl Woolfork	1EWAY.009P1C6	8992

7590 10/05/2018

KNOBBE MARTENS OLSON & BEAR LLP
2040 MAIN STREET
FOURTEENTH FLOOR
IRVINE, CA 92614
UNITED STATES OF AMERICA

EXAMINER	
FLANDERS, ANDREW C	
ART UNIT	PAPER NUMBER
2656	
NOTIFICATION DATE	DELIVERY MODE
10/05/2018	ELECTRONIC

Letter Withdrawing a Notice Requiring Inventor's Oath or Declaration

The Notice Requiring Inventor's Oath or Declaration mailed on 9/25/18 was sent in error, and is hereby withdrawn. The time period set forth in the Notice of Allowance and Fee(s) Due to file a reply and pay the required fees continues to run from the mailing date of the Notice of Allowance and Fee(s) Due. Any time period set forth in the Notice of Allowability continues to run from the mailing date of the Notice of Allowability.

Questions relating to this Notice should be directed to the Application Assistance Unit at 571-272-4200.

M. Brown

(571)-272-4200 or 1(888)-786-0101
Patent Publication Branch
Office of Data Management

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.	ISSUE DATE	PATENT NO.	ATTORNEY DOCKET NO.	CONFIRMATION NO.
15/003,242	11/13/2018	10129627	1EWAY.009P1C6	8992

20995 7590 10/24/2018

KNOBBE MARTENS OLSON & BEAR LLP
2040 MAIN STREET
FOURTEENTH FLOOR
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 256 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.

Applicant will be able to obtain more detailed information by accessing the Patent Application Information Retrieval (PAIR) WEB site (http://pair.uspto.gov).

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 Application Assistance Unit (AAU) of the Office of Data Management (ODM) at (571)-272-4200.

APPLICANT(s) (Please see PAIR WEB site http://pair.uspto.gov for additional applicants):

C. Earl Woolfork, Pasadena, CA;

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 USA offers tremendous resources and advantages for those who invest and manufacture goods here. Through SelectUSA, our nation works to encourage and facilitate business investment. To learn more about why the USA is the best country in the world to develop technology, manufacture products, and grow your business, visit SelectUSA.gov.

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	REQUEST ID
15/003,242	01/21/2016	C. Earl Woolfork	1EWAY.009P1C6	75519

Acknowledgement of Loss of Entitlement to Entity Status Discount

The entity status change request below filed through Private PAIR on 11/09/2018 has been accepted.

CERTIFICATIONS:

Change of Entity Status:

X Applicant changing to regular undiscounted fee status.

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

This portion must be completed by the signatory or signatories making the entity status change in accordance with 37 CFR 1.4(d)(4).

Signature:	/Harnik Shukla/
Name:	Harnik Shukla
Registration Number:	73097

IN THE UNITED STATES PATENT AND TRADEMARK OFFICE

First Inventor	:	C. Earl Woolfork
App. No.	:	15/003242
Filed	:	January 21, 2016
For	:	WIRELESS DIGITAL AUDIO MUSIC SYSTEM
Examiner	:	Flanders, Andrew C.
Art Unit	:	2656
Conf. No.	:	8992

REMOVAL OF SMALL ENTITY STATUS; PAYMENT OF DEFICIENCY OWED

Mail Stop Issue Fee
Commissioner for Patents
P.O. Box 1450
Alexandria, VA 22313-1450

Applicant files this Request to make payments under Large Entity Status under 37 CFR § 1.28(C)(2) in the above-mentioned application.

Beginning at the time of the January 2016 filing, small entity status as claimed in good faith and small entity fees were paid in error. It has been recently discovered that large entity status applies to this application. Applicant has since updated Private PAIR to claim large entity status.

For payment of deficiency owed, MPEP § 509.03(X) provides the following guidance for calculating the deficiency owed:

(1) Itemize of the deficiency payment

(2) List each particular fee along with current fee amount for non-small entity status

(3) List small entity fee actually paid.

(4) List deficiency owed for each fee.

(5) Provide total deficiency owed.

Accordingly, Applicant requests to pay fees of **$2,610.00** as follows:

Description of Fee	Date of Payment	Amount Paid as Small Entity	Amount Due for Current Large Entity Fee	Deficiency
Utility Application Issue Fee code 2501	10/3/2018	$500.00	$1,000.00	$500.00
Petition for Delayed Submission 2454	5/10/2018	$1,000.00	$2,000.00	$1,000.00
Submission of Information Disclosure Statement code 2806	3/27/2018	$120.00	$240.00	$120.00
Terminal Disclaimer code 2814	3/15/2017	$160.00	$160.00	----
Utility Search Fee code 2111	1/22/2016	$300.00	$660.00	$360.00
Basic Filing Dee code 4011	1/22/2016	$70.00	$300.00	$230.00
Utility Examination Fee code 2311	1/22/2016	$360.00	$760.00	$400.00
TOTAL		**$2,510.00**	**5,120.00**	**$2,610.00**

Applicant hereby authorizes the Director to 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: November 9, 2018

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

Electronic Acknowledgement Receipt

EFS ID:	34266891
Application Number:	15003242
International Application Number:	
Confirmation Number:	8992
Title of Invention:	Wireless Digital Audio Music System
First Named Inventor/Applicant Name:	C. Earl Woolfork
Customer Number:	20995
Filer:	Harnik Shukla/Christina Graul
Filer Authorized By:	Harnik Shukla
Attorney Docket Number:	1EWAY.009P1C6
Receipt Date:	09-NOV-2018
Filing Date:	21-JAN-2016
Time Stamp:	16:29:23
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	1EWAY_Entity.pdf	92753 ab01a0e155794511da4fdb1aa471326ac9183fa7	no	2
Warnings:					

Information:	
Total Files Size (in bytes):	92753

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.

Trials@uspto.gov
571-272-7822

Paper 7
Date: June 11, 2021

UNITED STATES PATENT AND TRADEMARK OFFICE

BEFORE THE PATENT TRIAL AND APPEAL BOARD

APPLE INC,
Petitioner,

v.

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

IPR2021-00287
Patent 10,129,627 B2

Before GEORGIANNA W. BRADEN, ROBERT J. WEINSCHENK, and RUSSELL E. CASS, *Administrative Patent Judges.*

CASS, *Administrative Patent Judge.*

DECISION
Denying Institution of *Inter Partes* Review
35 U.S.C. § 314

I. INTRODUCTION

A. Background

Apple Inc. ("Petitioner") filed a Petition requesting an *inter partes* review of claims 5–6 and 12 (the "challenged claims") of U.S. Patent No. 10,192,627 B2 (Ex. 1001, "the '627 patent"). Paper 3 ("Pet."). One-E-Way, Inc. ("Patent Owner") filed a Preliminary Response. Paper 6 ("Prelim. Resp.").

We have authority to determine whether to institute an *inter partes* review under 35 U.S.C. § 314 and 37 C.F.R. § 42.4. An *inter partes* review may not be instituted unless it is determined that "the information presented in the petition filed under section 311 and any response filed under section 313 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 (2018); *see also* 37 C.F.R § 42.4(a) (2020) ("The Board institutes the trial on behalf of the Director."). The reasonable likelihood standard is "a higher standard than mere notice pleading," but "lower than the 'preponderance' standard to prevail in a final written decision." *Hulu, LLC v. Sound View Innovations, LLC*, IPR2018-01039, Paper 29 at 13 (PTAB Dec. 20, 2019) (precedential).

For the reasons provided below and based on the record before us, we determine Petitioner has not demonstrated a reasonable likelihood that it would prevail in showing the unpatentability of at least one of the challenged claims. Accordingly, we do not institute an *inter partes* review.

B. Real Parties in Interest

Petitioner states that "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 Proceedings

The parties identify the following district court case involving the '627 patent: *One-E-Way, Inc. v. Apple Inc.*, Case No. 2:20-cv-06339 (C.D. Cal. Filed July 16, 2020). Pet. 1 (citing Ex. 1022; Ex. 1023); Paper 5, 1.

Petitioner also identifies a prior ITC investigation in which One-E-Way alleged infringement of related patents against a number of respondents: *In re Certain Wireless Headsets*, Investigation No. 337-TA-943 (the "ITC investigation"). Pet. 1–2. According to Petitioner, One-E-Way's original complaint named Beats as one of the respondents, but One-E-Way subsequently moved to withdraw its allegations against Beats, and the ITC investigation was terminated as to Beats. *Id.* Petitioner further states that, during the course of the investigation, the ITC issued a claim construction ruling (the "ITC Claim Construction Order"). *Id.* at 2.

Patent Owner additionally identifies four IPRs against patents related to the '627 patent: IPR2021-00283, IPR2021-00284, IPR2021-00285, and IPR2021-00286. Paper 5, 1.

D. The '627 Patent (Ex. 1001)

The '627 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:

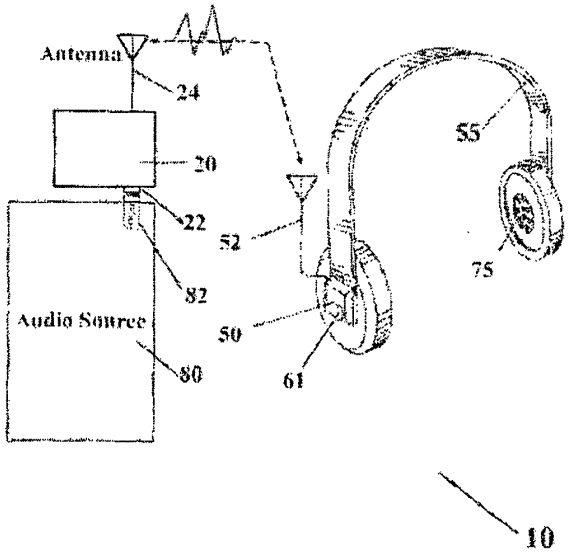


FIG.1

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. Ex. 1001, 2:40–43. Transmitter 20 is connected to music audio source 80 via analog headphone jack 82 using headphone plug 22. *Id.* at 2:43–46. 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 2:46–53.

The audio transmitter portion of the wireless digital audio system is shown in more detail in Figure 2, reproduced below:

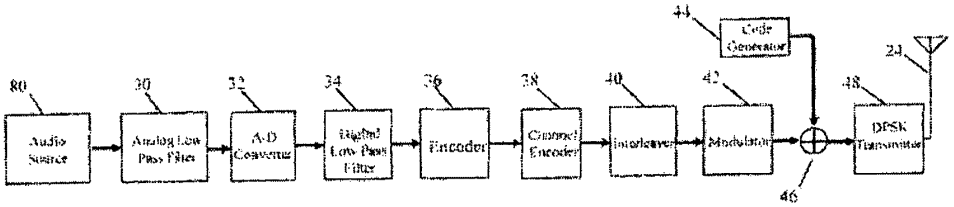


FIG. 2

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. Ex. 1001, 2:55–59. 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 2:59–62. 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 2:64–3:3. The signal is then passed to spread spectrum DPSK (differential phase shift key) transmitter 48, which provides further noise immunity, and to antenna 24 for transmission. *Id.* at 2:62–64.

The audio receiver portion coupled to the wireless headphones is shown in more detail in Figure 3, reproduced below:

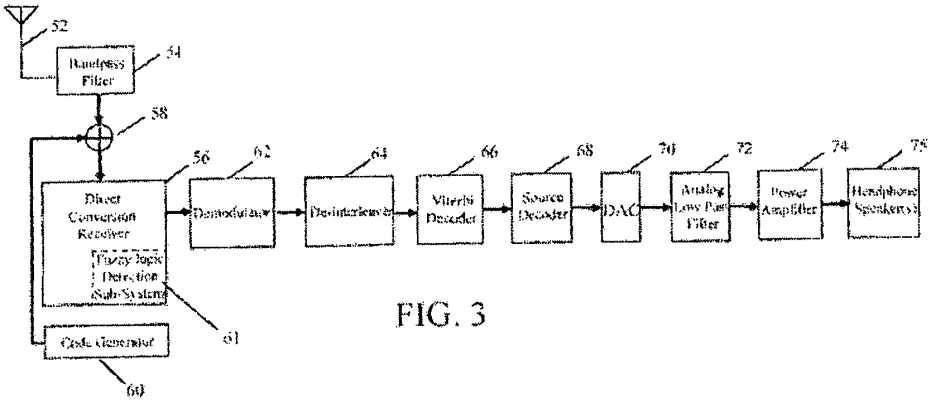


FIG. 3

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. Ex. 1001, 3:9–11. 3:15–17. 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 3:11–14, 3:20–26.

The '627 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 3:23–30. According to the '627 patent, "[t]his code division multiple access (CDMA) may be used to provide each user independent audio enjoyment." *Id.* at 3:30–32.

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 the block interleaver 40 in Figure 2. Ex, 1001 at 3:32–38. 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 3:38–41. 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 4:30–35. The signal is then passed to power amplifier 74, which powers headphone speakers to provide high quality, low distortion music to a user wearing headphones 55. *Id.* at 4:35–39.

E. Illustrative Claims

Of the challenged claims, claim 5 is independent. Claim 5 is illustrative and is reproduced below.

> 5. [(pre)] A wireless digital coded audio spread spectrum transmitter operatively coupled to a portable audio player and

configured to transmit a unique user code and a representation of an audio signal with a frequency range of 20 Hz to 20 [kH]z, wherein said digital coded audio spread spectrum transmitter is configured to wirelessly communicate with a digital audio spread spectrum receiver and is configured to be moved in any direction during operation, said wireless digital coded audio spread spectrum transmitter comprising:

[(a)] an encoder operative to encode a first representation of an audio signal to reduce intersymbol interference associated with a transmitted representation of the audio signal, said encoder configured to process signals in the frequency range of 20 Hz to 20 kHz for representation in said first representation of an audio signal;

[(b)(i)] wherein the wireless digital coded audio spread spectrum transmitter is further configured to perform at least one of a plurality of modulations on the first representation of the audio signal and

[(b)(ii)] 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;

[(c)] wherein said plurality of modulations are separate from the encoding and processing by the encoder; and

[(d)(i)] wherein the wireless digital coded audio spread spectrum transmitter is further configured to use the modulated signal and to use independent code division multiple access communication to wirelessly transmit a transmitted representation of the audio signal, and

[(d)(ii)] 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.

Ex. 1001, 6:17–52 (bracketed paragraph identifiers added).

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F. Evidence of Record

Petitioner relies upon the following references found in the record:

Bernard Sklar, *Digital Communications: Fundamentals and Applications* (1988) (Ex. 1003, "Sklar");

Jean Walrand and Pravin Varaiya, *High Performance Communication Networks* (2d ed. 2000) (Ex. 1004, "Walrand");

Jaap C. Haartsen, "The Bluetooth Radio System," *IEEE Personal Communications*, Vol. 7, Issue No. 1, Feb. 2000 (Excerpt) (Ex. 1005, "Haartsen");

John B. Groe and Lawrence E. Larson, *CDMA Mobile Radio Design* (2000) (Ex. 1009, "Groe");

KR Application No. 20-1998-0018161, published Apr. 25, 2000 (as translated) (Ex. 1010, "Ham");

Xiang-Gen Xia, "New Precoding for Intersymbol Interference Cancellation Using Nonmaximally Decimated Multirate Filterbanks with Ideal FIR Equalizers," *IEEE Transactions on Signal Processing*, Vol. 45, Issue No. 10 (Oct. 1997) (Ex. 1011, "Xia");

Dirschedl et al., U.S. Patent No. 6,262,994 B1, issued Jul. 17, 2001 (Ex. 1037, "Dirschedl");

Matero et al., WO 00/76109 A1, pub. Dec. 14, 2000 (Ex. 1038, "Matero").

Pet. iv–vii, 4.

Petitioner submits the Declaration of Regis J. Bates, Jr. ("Mr. Bates," Ex. 1002). Patent Owner submits the Declaration of Joseph C. McAlexander ("Mr. McAlexander," Ex. 2001).

G. Challenges to Patentability

Petitioner challenges the patentability of claims 5–6 and 12 of the '627 patent based on the following grounds:

Claims Challenged	35 U.S.C. §	Reference(s)/Basis
5–6	103[1]	Ham, Sklar, Xia, Groe, Dirschedl, Matero
12	103	Ham, Sklar, Xia, Groe, Dirschedl, Matero, Walrand
5–6, 12	103	Ham, Sklar, Xia, Groe, Dirschedl, Matero, Haartsen
12	103	Ham, Sklar, Xia, Groe, Dirschedl, Matero, Walrand, Haartsen

II. DISCUSSION

A. 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). Petitioner requests that the Board adopt the constructions of several claim terms from the ITC investigation.

[1] The Leahy-Smith America Invents Act, Pub. L. No. 112-29, 125 Stat. 284 (2011) ("AIA"), included revisions to 35 U.S.C. § 103 that became effective as of March 16, 2013. The application for the '627 patent was filed after March 16, 2013, but includes a priority claim to an application filed before this date. Ex. 1001, code (22), (63). Neither Petitioner nor Patent Owner takes a position on the effective filing date of the challenged claims. Pet. 8; Prelim. Resp. 7. For purposes of institution, we apply the pre-AIA versions of 35 U.S.C. § 103.

Pet. 7. Pertinent to this Decision, Petitioner requests that the Board adopt the ITC's construction of the two terms[2] listed below:

Claim Term	Reference(s)/Basis
"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)"

Pet. 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 for independent CDMA communication operation" 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

[2] 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.

terms need be construed that are in controversy, and only to the extent necessary to resolve the controversy.").

B. Principles of Law

A claim is unpatentable under 35 U.S.C. § 103 if "the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains." *KSR Int'l Co. v. Teleflex Inc.*, 550 U.S. 398, 406 (2007). The question of obviousness is resolved on the basis of underlying factual determinations, including: (1) the scope and content of the prior art; (2) any differences between the claimed subject matter and the prior art; (3) the level of skill in the art; and (4) where in evidence, objective evidence of non-obviousness.[3] *Graham v. John Deere Co.*, 383 U.S. 1, 17–18 (1966). When evaluating a combination of teachings, we must also "determine whether there was an apparent reason to combine the known elements in the fashion claimed by the patent at issue." *KSR*, 550 U.S. at 418 (citing *In re Kahn*, 441 F.3d 977, 988 (Fed. Cir. 2006)). Whether a combination of prior art elements would have produced a predictable result weighs in the ultimate determination of obviousness. *Id.* at 416–417.

In an *inter partes* review, the petitioner must show with particularity why each challenged claim is unpatentable. *Harmonic Inc. v. Avid Tech., Inc.*, 815 F.3d 1356, 1363 (Fed. Cir. 2016); 37 C.F.R. § 42.104(b). The burden of persuasion never shifts to Patent Owner. *Dynamic Drinkware, LLC v. Nat'l Graphics, Inc.*, 800 F.3d 1375, 1378 (Fed. Cir. 2015).

[3] At this stage of the proceeding, Patent Owner has not presented objective evidence of non-obviousness.

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We analyze the challenges presented in the Petition in accordance with the above-stated principles.

C. Level of Ordinary Skill in the Art

Petitioner contends that a person of ordinary skill in the art at the time of the alleged invention "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). Patent Owner states that, for purposes of its Preliminary Response, it 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 skill in the art, which is consistent with the '627 patent and the asserted prior art of record.

D. Ground 1: Alleged Obviousness of Claims 5–6 Over Ham, Sklar, Xia, Groe, Dirschedl, and Matero

Petitioner contends that claims 5–6 would have been obvious in view of Ham, Sklar, Xia, Groe, Dirschedl, and Matero. Pet. 15–65. Patent Owner disagrees, arguing, *inter alia*, that the claimed combination does not teach "independent code division multiple access communication" as required by all of the challenged claims. Prelim. Resp. 26–40. For the reasons discussed below, we determine Petitioner has not established a reasonable likelihood that the claims challenged in this ground are unpatentable.

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

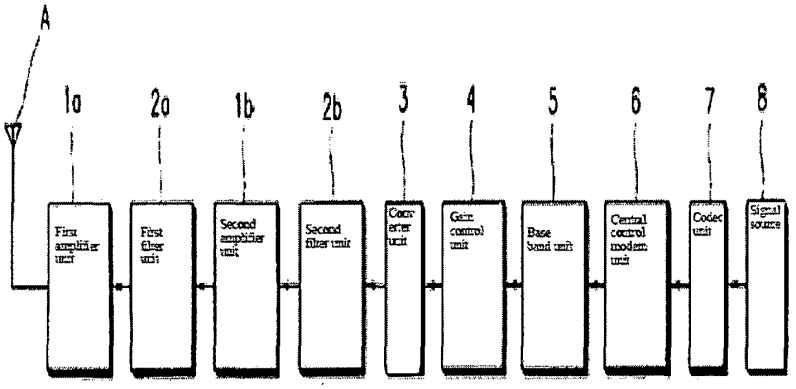
reception circuit that transmit[s] and receive[s] signals using the Code Division Multiple Access (CDMA) method." Ex. 1010, Abstract, 2. Ham explains that:

> [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 a 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.

Ex. 1010, 2.

Ham discloses a transmission circuit for wirelessly transmitting a signal in Figure 1, reproduced below:

FIG. 1

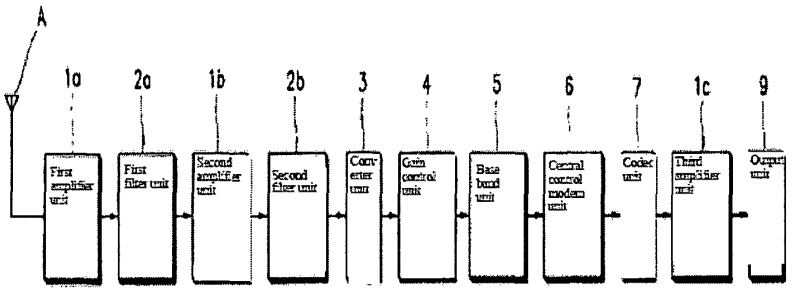


As shown in Figure 1, the transmission circuit includes antenna A, codec unit 7 for encoding a signal applied from signal source 8, central control modem unit 6 for performing error correction on the signal output from codec unit 7, base band unit 5 that receives the output of central control modem unit 6, converts it into an intermediate frequency, and outputs the

converted signal, and amplification, filtering, and gain control units 1a, 2a, 1b, 2b, 3, and 4. Ex. 1010, 2.

Ham discloses a wireless headphone receiving circuit in Figure 2, reproduced below:

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 6 for removing an error correction and pseudorandom code, codec 7 for decoding the audio signal, and amplifier 1c that amplifies the signal from codec unit 7 and passes it to output unit 9. Ex. 1010, 2, 3.

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 communications systems." Ex. 1003, 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 537. "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." Ex. 1003, 541–542. In CDMA, "each simultaneous user employs a unique spread-spectrum signaling code," which "provides communication privacy between users with different spreading signals." *Id.* at 542. Thus, "[a]n unauthorized user (a user not having access to a spreading signal) cannot easily monitor the communications of the authorized users." *Id.*

3. Analysis of Independent Claim 5

Claim 5 recites a "wireless digital coded audio spread spectrum transmitter" that is configured "to use independent code division multiple access communication to wirelessly transmit a transmitted representation of the audio signal," such that "the transmitted unique user code distinguishes the transmitted representation of the audio signal from other transmitted audio signals in the spread spectrum transmitter spectrum." Ex. 1001, 6:42–52. 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* § II.A, *supra*.

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. 62 (citing Ex. 1010, 2–3, Figs. 1–2) (emphasis omitted); Ex. 1002 ¶¶ 359–364. Petitioner also asserts that "Ham nowhere suggests any control or coordination of communications between transmission and reception circuits by a centralized facility." *Id.*

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. 1002 ¶ 360). 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 28–29 (citing Pet. 62; Ex. 1002 ¶ 360; 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 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." Pet. 7; Prelim. Resp. 6. The ITC's construction is consistent with the '627 patent's disclosure of a CDMA system that uses a code generator in the transmitter to create a unique

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spreading code, rather than receiving the spreading code from a central controller. Ex. 1001, 2:64–3:1 (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"). Thus, the '627 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. 30–31; 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 3 (which we address in

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detail below) support Mr. McAlexander's testimony. Petitioner's Ground 3 relies on a proposed combination that includes Haartsen, which, according to Petitioner, teaches a CDMA system that does not require a central controller. Pet. 67–74; *id.* at 69 ("Haartsen describes the master's *device* identity being transmitted as an access code."); *id.* at 73 ("The transmitter need not . . . be assigned a unique PN code by a third party."); Ex. 1002 ¶¶ 391, 402. 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. 73 (emphasis added); *see* Ex. 1102 ¶ 402. 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. 73–74; Ex. 1102 ¶ 402. 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. 61–62. 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 5 would have been obvious over Ham, Sklar, Xia, Groe, Dirschedl, and Matero.

4. Analysis of Dependent Claim 6

Claim 6 depends from claim 5. Petitioner's arguments and evidence regarding claim 6 do not compensate for the deficiencies discussed above for claim 5. *See* Pet. 64–65. Thus, for the same reasons discussed above for claim 5, Petitioner does not demonstrate a reasonable likelihood of prevailing in showing that claim 6 would have been obvious over Ham, Sklar, Xia, Groe, Dirschedl, and Matero.

E. Ground 2: Alleged Obviousness of Claim 12 Over Ham, Sklar, Xia, Groe, Dirschedl, Matero, and Walrand

Petitioner contends claim 12 would have been obvious in view of Ham, Sklar, Xia, Groe, Dirschedl, Matero, and Walrand. Pet. 65–67. Claim 12 depends from claim 5. Petitioner's arguments and evidence regarding claim 12 do not compensate for the deficiencies discussed above for claim 5. *See* Pet. 65–67. Thus, for the same reasons discussed above for Ground 1, Petitioner does not demonstrate a reasonable likelihood of prevailing in showing that claim 12 would have been obvious in view of Ham, Sklar, Xia, Groe, Dirschedl, Matero, and Walrand.

F. Ground 3: Alleged Obviousness of Claims 5–6 and 12 Over Ham, Sklar, Xia, Groe, Dirschedl, Matero, and Haartsen

Petitioner contends claims 5–6 and 12 would have been obvious in view of Ham, Sklar, Xia, Groe, Dirschedl, Matero, and Haartsen. Pet. 67–74. For the reasons discussed below, we determine Petitioner has not established a reasonable likelihood that the claims challenged in this ground are unpatentable.

1. Overview of Haartsen (Ex. 1105)

Haartsen is an article from *IEEE Personal Communications* entitled "The Bluetooth Radio System." Ex. 1005, 28. Haartsen describes the

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"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 29–30. 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 30. 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. Ex. 1005, 31. 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. Analysis of Independent Claim 5

Ground 3 is based on and builds upon Petitioner's alternative mapping in Ground 1 which uses Sklar's frequency hopping CDMA (FH-CDMA) to teach the "unique user code" required by claim 5. Pet. 68. 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 the claims. *Id.* at 30–31. In Ground 3, Petitioner relies on Haartsen's Bluetooth implementation of FH-CDMA in lieu of Sklar's FH-CDMA system. *Id.* at 68. More specifically, Petitioner argues in Ground 3 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 68–69.

Petitioner explains that it is including Ground 3 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. 67 (citing Ex. 1016, Ex. B 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 67–68. Petitioner states that it disputes Patent Owner's apparent construction of "unique user code" as applying to Bluetooth's device-based codes because "the ITC construed '**unique user code**' as a 'fixed code (bit sequence) **specifically associated with one user** of a device." *Id.* at 15. However, Petitioner asserts, although it "does not agree with Patent Owner's apparent interpretation," if maintained "then this same broad construction will read on the prior art" and "'the [challenged] claims would also cover [Haartsen],' which describes an earlier implementation of Bluetooth." *Id.* at 67–68; *see* Pet. 14–15.

Petitioner goes on to assert that Haartsen discloses a Bluetooth system in which the frequency hop sequence is determined from the *device* identity

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of a transmitter known as the "master." Pet. 68 (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.* at 69 (citing Ex. 1016, Ex. B; Ex. 1002 ¶ 390). 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.* (citing Ex. 1016, Ex. B at 2; Ex. 1002 ¶ 391).

As noted above, Patent Owner does not contest Petitioner's (and the ITC's) proposed construction of "unique user code." Prelim. Resp. 6; Section II.A, *supra*. 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 of the device identity of the master. *See generally* Prelim. Resp. Instead, Patent Owner argues that Petitioner fails to establish a reason 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. Prelim. Resp. 34–40.

We determine Petitioner has not shown a reasonable likelihood of unpatentability of claim 5 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." *See* § II.A, *supra*. 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 Bluctooth 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. Pet. 68. 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, 30 (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 ITC's construction of "unique user code."

Consequently, we determine Petitioner has failed to show a reasonable likelihood that independent claim 5 is unpatentable over Ham, Sklar, Xia, Groe, Dirschedl, Matero, and Haartsen.

3. Dependent Claims 6 and 12

For Ground 3, Petitioner does not set forth separate argument for dependent claims 6 and 12, but instead relies on the argument provided for Ground 1. Pet. 64–65, 65–74. For the reasons set forth previously with respect to Ground 1, we determine Petitioner has not demonstrated a reasonable likelihood that claims 6 and 12 are unpatentable over the references relied on by Petitioner.

G. Ground 4: Alleged Obviousness of Claim 12 Over Ham, Sklar, Xia, Groe, Dirschedl, Matero, Walrand, and Haartsen

For Ground 4, Petitioner relies on its arguments regarding Ham, Sklar, Xia, Groe, Dirschedl, and Matero from Ground 1, its arguments concerning Walrand from Ground 2, and its arguments concerning Haartsen for Ground 3. Pet. 75. For the reasons set forth previously with respect to Grounds 1–3, we determine Petitioner has not demonstrated a reasonable likelihood that claim 12 is unpatentable over the references relied on by Petitioner.

III. CONCLUSION

After considering the evidence and arguments presented in the current record, we determine Petitioner has not demonstrated a reasonable likelihood of prevailing with respect to at least one claim challenged in the Petition. Therefore, we do not institute an *inter partes* review in this proceeding.

IV. ORDER

In consideration of the foregoing, it is hereby:

ORDERED that the Petition is denied and no *inter partes* review is instituted in this proceeding.

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Trials@uspto.gov
571-272-7822

Paper 7
Date: June 11, 2021

UNITED STATES PATENT AND TRADEMARK OFFICE

BEFORE THE PATENT TRIAL AND APPEAL BOARD

APPLE INC,
Petitioner,

v.

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

IPR2021-00286
Patent 10,129,627 B2

Before GEORGIANNA W. BRADEN, ROBERT J. WEINSCHENK, and RUSSELL E. CASS, *Administrative Patent Judges.*

CASS, *Administrative Patent Judge.*

DECISION
Denying Institution of *Inter Partes* Review
35 U.S.C. § 314

I. INTRODUCTION

A. Background

Apple Inc. ("Petitioner") filed a Petition requesting an *inter partes* review of claims 1–4 and 10–11 (the "challenged claims") of U.S. Patent No. 10,192,627 B2 (Ex. 1101, "the '627 patent"). Paper 3 ("Pet."). One-E-Way, Inc. ("Patent Owner") filed a Preliminary Response. Paper 6 ("Prelim. Resp.").

We have authority to determine whether to institute an *inter partes* review under 35 U.S.C. § 314 and 37 C.F.R. § 42.4. An *inter partes* review may not be instituted unless it is determined that "the information presented in the petition filed under section 311 and any response filed under section 313 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 (2018); *see also* 37 C.F.R § 42.4(a) (2020) ("The Board institutes the trial on behalf of the Director."). The reasonable likelihood standard is "a higher standard than mere notice pleading," but "lower than the 'preponderance' standard to prevail in a final written decision." *Hulu, LLC v. Sound View Innovations, LLC*, IPR2018-01039, Paper 29 at 13 (PTAB Dec. 20, 2019) (precedential).

For the reasons provided below and based on the record before us, we determine Petitioner has not demonstrated a reasonable likelihood that it would prevail in showing the unpatentability of at least one of the challenged claims. Accordingly, we do not institute an *inter partes* review.

B. Real Parties in Interest

Petitioner states that "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 Proceedings

The parties identify the following district court case involving the '627 patent: *One-E-Way, Inc. v. Apple Inc.*, Case No. 2:20-cv-06339 (C.D. Cal. Filed July 16, 2020). Pet. 1 (citing Ex. 1122; Ex. 1123); Paper 5, 1.

Petitioner also identifies a prior ITC investigation in which One-E-Way alleged infringement of related patents against a number of respondents: *In re Certain Wireless Headsets*, Investigation No. 337-TA-943 (the "ITC investigation"). Pet. 1–2. According to Petitioner, One-E-Way's original complaint named Beats as one of the respondents, but One-E-Way subsequently moved to withdraw its allegations against Beats, and the ITC investigation was terminated as to Beats. *Id.* Petitioner further states that, during the course of the investigation, the ITC issued a claim construction ruling (the "ITC Claim Construction Order"). *Id.* at 2.

Patent Owner additionally identifies four IPRs against patents related to the '627 patent: IPR2021-00283, IPR2021-00284, IPR2021-00285, and IPR2021-00287. Paper 5, 1.

D. The '627 Patent (Ex. 1101)

The '627 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:

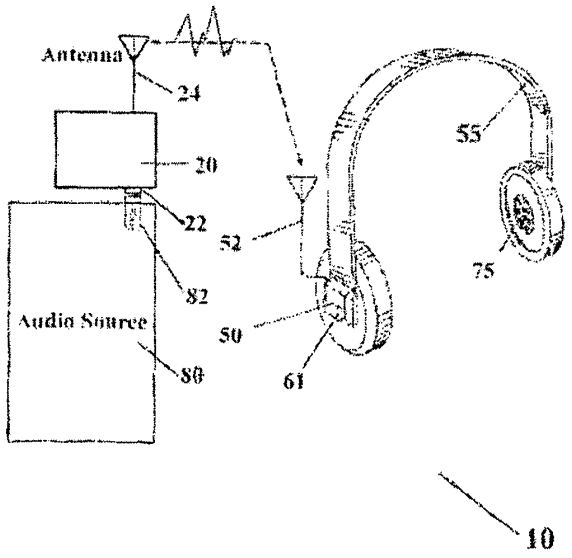


FIG.1

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. Ex. 1101, 2:40–43. Transmitter 20 is connected to music audio source 80 via analog headphone jack 82 using headphone plug 22. *Id.* at 2:43–46. 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 2:46–53.

The audio transmitter portion of the wireless digital audio system is shown in more detail in Figure 2, reproduced below:

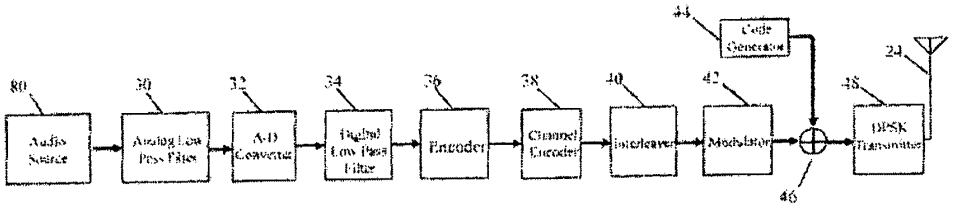


FIG. 2

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. Ex. 1101, 2:55–59. 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 2:59–62. 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 2:64–3:3. The signal is then passed to spread spectrum DPSK (differential phase shift key) transmitter 48, which provides further noise immunity, and to antenna 24 for transmission. *Id.* at 2:62–64.

The audio receiver portion coupled to the wireless headphones is shown in more detail in Figure 3, reproduced below:

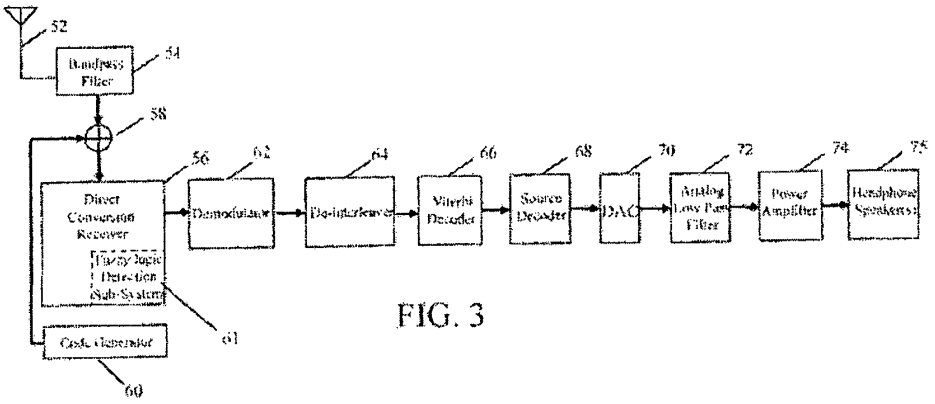


FIG. 3

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. Ex. 1101, 3:9–11. 3:15–17. 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 3:11–14, 3:20–26.

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The '627 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 3:23–30. According to the '627 patent, "[t]his code division multiple access (CDMA) may be used to provide each user independent audio enjoyment." *Id.* at 3:30–32.

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 the block interleaver 40 in Figure 2. Ex. 1101, 3:32–38. 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 3:38–41. 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 4:30–35. The signal is then passed to power amplifier 74, which powers headphone speakers to provide high quality, low distortion music to a user wearing headphones 55. *Id.* at 4:35–39.

E. Illustrative Claims

Of the challenged claims, claims 1 and 3 are independent. Claim 1 is illustrative and is reproduced below.

> 1. [(pre)] A wireless digital audio spread spectrum receiver, capable of mobile operation, configured to receive a unique

user code and a high quality audio signal representation with a frequency range of 20 Hz to 20 kHz from a digital audio spread spectrum transmitter, said audio signal representation representative of audio from a portable audio source, said digital audio spread spectrum receiver operative to communicate wirelessly with said digital audio spread spectrum transmitter, said digital audio spread spectrum receiver comprising:

[(a)(i)] a direct conversion module configured to receive wireless spread spectrum signal transmissions representative of the unique user code and the high quality audio signal representation

[(a)(ii)] wherein the received transmissions are encoded to reduce intersymbol interference, wherein the wireless digital audio spread spectrum receiver is capable of processing the high quality audio signal having a frequency range of 20 Hz to 20 kHz;

[(b)] a digital-to-analog converter (DAC) configured to generate an audio output from said receiver audio signal representation; and

[(c)] a speaker configured to reproduce said generated audio output, wherein said reproduction does not include audible audio content originating from any transmitted audio signals in the wireless digital audio spread spectrum transmitter spectrum that do not originate from said digital audio spread spectrum transmitter:

[(d)] wherein the wireless digital audio spread spectrum receiver is configured to use independent code division multiple access communication and to use the received unique user code to communicate with only said wireless digital audio spread spectrum transmitter for the duration of a wireless connection; and;

[(e)] wherein the wireless digital audio spread spectrum receiver is further configured to;

[(f)] demodulate a received modulated transmission, and

> [(g)] generate a demodulated signal based on the received modulated transmission by performing at least one of a plurality of demodulations, wherein the plurality of demodulations includes a differential phase shift keying (DPSK) demodulation and also includes a non-DPSK demodulation.

Ex. 1101, 4:61–5:35 (bracketed paragraph identifiers added).

F. Evidence of Record

Petitioner relies upon the following references found in the record:

Bernard Sklar, *Digital Communications: Fundamentals and Applications* (1988) (Ex. 1103, "Sklar");

Jean Walrand and Pravin Varaiya, *High Performance Communication Networks* (2d ed. 2000) (Ex. 1104, "Walrand");

Jaap C. Haartsen, "The Bluetooth Radio System," *IEEE Personal Communications*, Vol. 7, Issue No. 1, Feb. 2000 (Excerpt) (Ex. 1105, "Haartsen");

John B. Groe and Lawrence E. Larson, *CDMA Mobile Radio Design* (2000) (Ex. 1109, "Groe");

KR Application No. 20-1998-0018161, published Apr. 25, 2000 (as translated) (Ex. 1110, "Ham");

Xiang-Gen Xia, "New Precoding for Intersymbol Interference Cancellation Using Nonmaximally Decimated Multirate Filterbanks with Ideal FIR Equalizers," *IEEE Transactions on Signal Processing*, Vol. 45, Issue No. 10 (Oct. 1997) (Ex. 1111, "Xia");

Dirschedl et al., U.S. Patent No. 6,262,994 B1, issued Jul. 17, 2001 (Ex. 1137, "Dirschedl");

Matero et al., WO 00/76109 A1, pub. Dec. 14, 2000 (Ex. 1138, "Matero").

Pet. i–iii, 4.

Petitioner submits the Declaration of Regis J. Bates, Jr. ("Mr. Bates," Ex. 1102). Patent Owner submits the Declaration of Joseph C. McAlexander ("Mr. McAlexander," Ex. 2001).

G. Challenges to Unpatentability

Petitioner challenges the patentability of claims 1–4 and 10–11 of the '627 patent based on the following grounds:

Claims Challenged	35 U.S.C. §	Reference(s)/Basis
1–4	103[1]	Ham, Sklar, Xia, Groe, Dirschedl, Matero
10–11	103	Ham, Sklar, Xia, Groe, Dirschedl, Matero, Walrand
1–4, 10–11	103	Ham, Sklar, Xia, Groe, Dirschedl, Matero, Haartsen
10–11	103	Ham, Sklar, Xia, Groe, Dirschedl, Matero, Walrand, Haartsen

II. DISCUSSION

A. 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). Petitioner requests that the Board adopt the constructions of several claim terms from the ITC investigation.

[1] The Leahy-Smith America Invents Act, Pub. L. No. 112-29, 125 Stat. 284 (2011) ("AIA"), included revisions to 35 U.S.C. § 103 that became effective as of March 16, 2013. The application for the '627 patent was filed after March 16, 2013, but includes a priority claim to an application filed before this date. Ex. 1101, code (22), (63). Neither Petitioner nor Patent Owner takes a position on the effective filing date of the challenged claims. Pet. 9–10; Prelim. Resp. 7. For purposes of institution, we apply the pre-AIA versions of 35 U.S.C. § 103.

Pet. 7. Pertinent to this Decision, Petitioner requests that the Board adopt the ITC's construction of the two terms[2] listed below:

Claim Term	Reference(s)/Basis
"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)"

Pet. 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 for independent CDMA communication operation" 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

[2] Petitioner also requests that we adopt the ITC's constructions of two additional claim terms, "reduced intersymbol interference coding" and "direct conversion module." Pet. 7. We need not construe these claim terms, however, to resolve the issues presented in the Petition.

terms need be construed that are in controversy, and only to the extent necessary to resolve the controversy.").

B. Principles of Law

A claim is unpatentable under 35 U.S.C. § 103 if "the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains." *KSR Int'l Co. v. Teleflex Inc.*, 550 U.S. 398, 406 (2007). The question of obviousness is resolved on the basis of underlying factual determinations, including: (1) the scope and content of the prior art; (2) any differences between the claimed subject matter and the prior art; (3) the level of skill in the art; and (4) where in evidence, objective evidence of non-obviousness.[3] *Graham v. John Deere Co.*, 383 U.S. 1, 17–18 (1966). When evaluating a combination of teachings, we must also "determine whether there was an apparent reason to combine the known elements in the fashion claimed by the patent at issue." *KSR*, 550 U.S. at 418 (citing *In re Kahn*, 441 F.3d 977, 988 (Fed. Cir. 2006)). Whether a combination of prior art elements would have produced a predictable result weighs in the ultimate determination of obviousness. *Id.* at 416–417.

In an *inter partes* review, the petitioner must show with particularity why each challenged claim is unpatentable. *Harmonic Inc. v. Avid Tech., Inc.*, 815 F.3d 1356, 1363 (Fed. Cir. 2016); 37 C.F.R. § 42.104(b). The burden of persuasion never shifts to Patent Owner. *Dynamic Drinkware, LLC v. Nat'l Graphics, Inc.*, 800 F.3d 1375, 1378 (Fed. Cir. 2015).

[3] At this stage of the proceeding, Patent Owner has not presented objective evidence of non-obviousness.

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We analyze the challenges presented in the Petition in accordance with the above-stated principles.

C. Level of Ordinary Skill in the Art

Petitioner contends that a person of ordinary skill in the art at the time of the alleged invention "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. 7 (citing Ex. 1102 ¶ 11). Patent Owner states that, for purposes of its Preliminary Response, it 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 skill in the art, which is consistent with the '627 patent and the asserted prior art of record.

D. Ground 1: Alleged Obviousness of Claims 1–4 Over Ham, Sklar, Xia, Groe, Dirschedl, and Matero

Petitioner contends that claims 1–4 are obvious in view of Ham, Sklar, Xia, Groe, Dirschedl, and Matero. Pet. 16–58. Patent Owner disagrees, arguing, *inter alia*, that the claimed combination does not teach "independent code division multiple access communication" as required by all of the challenged claims. Prelim. Resp. 26–40. For the reasons discussed below, we determine Petitioner has not established a reasonable likelihood that the claims challenged in this ground are unpatentable.

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

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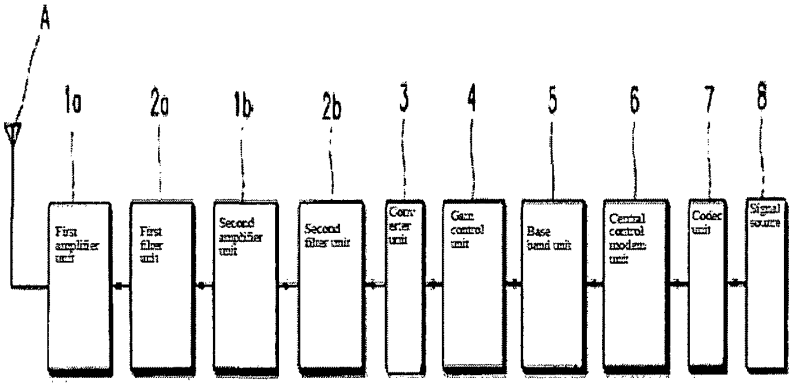
reception circuit that transmit[s] and receive[s] signals using the Code Division Multiple Access (CDMA) method." Ex. 1110, Abstract, 2. Ham explains that:

> [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 a 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.

Ex. 1110, 2.

Ham discloses a transmission circuit for wirelessly transmitting a signal in Figure 1, reproduced below:

FIG. 1

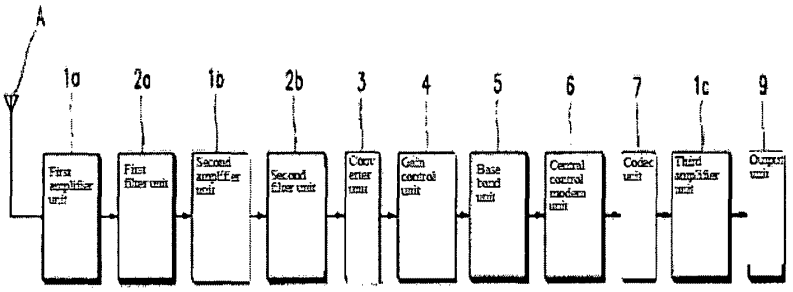


As shown in Figure 1, the transmission circuit includes antenna A, codec unit 7 for encoding a signal applied from signal source 8, central control modem unit 6 for performing error correction on the signal output from codec unit 7, base band unit 5 that receives the output of central control modem unit 6, converts it into an intermediate frequency, and outputs the

converted signal, and amplification, filtering, and gain control units 1a, 2a, 1b, 2b, 3, and 4. Ex. 1110, 2.

Ham discloses a wireless headphone receiving circuit in Figure 2, reproduced below:

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 6 for removing an error correction and pseudorandom code, codec 7 for decoding the audio signal, and amplifier 1c that amplifies the signal from codec unit 7 and passes it to output unit 9. Ex. 1110, 2, 3.

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 communications systems." Ex. 1103, 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 537. "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." Ex. 1103, 541–542. In CDMA, "each simultaneous user employs a unique spread-spectrum signaling code," which "provides communication privacy between users with different spreading signals." *Id.* at 542. Thus, "[a]n unauthorized user (a user not having access to a spreading signal) cannot easily monitor the communications of the authorized users." *Id.*

3. Analysis of Independent Claims 1 and 3

Claim 1 recites a "wireless digital audio spread spectrum receiver" that "is configured to use independent code division multiple access communication and to use the received unique user code to communicate with only said wireless digital audio spread spectrum transmitter for the duration of a wireless connection." Ex. 1101, 5:21–26. Claim 3 recites a similar limitation. *Id.* at 5:66–6:4. 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* § II.A, *supra*.

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. 50 (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.* (citing Ex. 1102 ¶¶ 218–223).

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. 27–28 (citing Ex. 1102 ¶ 218). 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 29 (citing Pet. 50; Ex. 1102 ¶ 218; 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." Pet. 7; Prelim. Resp. 6. The ITC's construction is consistent with the '627 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, 2:64–3:1 (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 ¶ 402. Thus, the '627 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. 30–31; 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 3 (which we address in detail below) support Mr. McAlexander's testimony. Petitioner's Ground 3

relies on a proposed combination that includes Haartsen, which, according to Petitioner, teaches a CDMA system that does not require a central controller. Pet. 69–75; *id.* at 71 ("Haartsen describes the master's *device* identity being transmitted as an access code."); *id.* at 74 ("The transmitter need not . . . be assigned a unique PN code by a third party."); Ex. 1102 ¶¶ 391, 402. 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. 74 (emphasis added); *see* Ex. 1102 ¶ 402. 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. 74; Ex. 1102 ¶ 402. 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. 48–50. 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 3 would have been obvious over Ham, Sklar, Xia, Groe, Dirschedl, and Matero.

4. Analysis of Dependent Claims 2 and 4

Claims 2 and 4 depend from claim 1 or 3. Petitioner's arguments and evidence regarding these dependent claims do not compensate for the deficiencies discussed above for claims 1 and 3. *See* Pet. 58, 66. Thus, for the same reasons discussed above for claims 1 and 3, Petitioner does not demonstrate a reasonable likelihood of prevailing in showing that claims 2 and 4 would have been obvious over Ham, Sklar, Xia, Groe, Dirschedl, and Matero.

E. Ground 2: Alleged Obviousness of Claims 10 and 11 Over Ham, Sklar, Xia, Groe, Dirschedl, Matero, and Walrand

Petitioner contends claims 10 and 11 would have been obvious in view of Ham, Sklar, Xia, Groe, Dirschedl, Matero, and Walrand. Pet. 67–69. Claims 10 and 11 depend from claim 1 or 3. Petitioner's arguments and evidence regarding these dependent claims do not compensate for the deficiencies discussed above for claims 1 and 3. *See* Pet. 67–69. Thus, for the same reasons discussed above for Ground 1, Petitioner does not demonstrate a reasonable likelihood of prevailing in showing that claims 10 and 11 would have been obvious in view of Ham, Sklar, Xia, Groe, Dirschedl, Matero, and Walrand.

F. Ground 3: Obviousness of Claims 1–4 and 10–11 Over Ham, Sklar, Xia, Groe, Dirschedl, Matero, and Haartsen

Petitioner contends claims 1–4 and 10–11 would have been obvious in view of Ham, Sklar, Xia, Groe, Dirschedl, Matero, and Haartsen. Pet. 69–75. For the reasons discussed below, we determine Petitioner has not established a reasonable likelihood that the claims challenged in this ground are unpatentable.

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1. Overview of Haartsen (Ex. 1105)

Haartsen is an article from *IEEE Personal Communications* entitled "The Bluetooth Radio System." Ex. 1105, 28. 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 29–30. 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 30. 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. Ex. 1105, 31. 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. Analysis of Independent Claims 1 and 3

Ground 3 is based on and builds upon Petitioner's alternative mapping in Ground 1 which uses Sklar's frequency hopping CDMA (FH-CDMA) to teach the "unique user code" required by claims 1 and 3. Pet. 70. 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 the claims. *Id.* at 29–30. In Ground 3, Petitioner relies on Haartsen's Bluetooth implementation of FH-CDMA in lieu of Sklar's FH-CDMA system. *Id.* at 70. More specifically, Petitioner argues in Ground 3 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 70.

Petitioner explains that it is including Ground 3 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. 69 (citing Ex. 1116, Ex. B at 2–3). According to Petitioner, Patent Owner "appears to interpret '**unique user code**' as 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 "the ITC construed '**unique user code**' as a 'fixed code (bit sequence) **specifically associated with one user** of a device." *Id.* at 15. However, Petitioner asserts, although it "does not agree with that apparent interpretation," if maintained "it 'will read on the prior art,'" as disclosed by Haartsen. *Id.*; *see* Pet. 15–16.

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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." Pet. 70 (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. 1116, Ex. B; Ex. 1102 ¶ 390). 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 71 (citing Ex. 1116, Ex. B at 2; Ex. 1102 ¶ 394).

As noted above, Patent Owner does not contest Petitioner's (and the ITC's) proposed construction of "unique user code." Prelim. Resp. 6; Section II.A, *supra*. 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 of 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. Prelim. Resp. 34–40. 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 40–45.

We determine Petitioner has not shown a reasonable likelihood of unpatentability of claims 1 and 3 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." *See* § II.A, *supra*. 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. 15 ("the ITC construed '**unique user code**' as a 'fixed code (bit sequence) **specifically associated with one user** of a device"). 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. Pet. 70. 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.

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Ex. 1105, 30 (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 ITC's construction of "unique user code."

Consequently, we determine Petitioner has failed to show a reasonable likelihood that independent claims 1 and 3 are unpatentable over Ham, Sklar, Xia, Groe, Dirschedl, Matero, and Haartsen.

3. Dependent Claims 2, 4, 10, and 11

For Ground 3, Petitioner does not set forth separate argument for dependent claims 2, 4, 10, and 11, but instead relies on the argument provided for Ground 1. Pet. 58, 66, 70–75. For the reasons set forth previously with respect to Ground 1, we determine Petitioner has not demonstrated a reasonable likelihood that claims 2, 4, 10, and 11 are unpatentable over the references relied on by Petitioner.

G. Ground 4: Alleged Obviousness of Claims 10–11 Over Ham, Sklar, Xia, Groe, Dirschedl, Matero, Walrand, and Haartsen

For Ground 4, Petitioner relies on its arguments regarding Ham, Sklar, Xia, Groe, Dirschedl, and Matero from Ground 1, its arguments concerning Walrand from Ground 2, and its arguments concerning Haartsen for Ground 3. Pet. 76. For the reasons set forth previously with respect to Grounds 1–3, we determine Petitioner has not demonstrated a reasonable likelihood that claims 10 and 11 are unpatentable over the references relied on by Petitioner.

III. CONCLUSION

After considering the evidence and arguments presented in the current record, we determine Petitioner has not demonstrated a reasonable

likelihood of prevailing with respect to at least one claim challenged in the Petition. Therefore, we do not institute an *inter partes* review in this proceeding.

IV. ORDER

In consideration of the foregoing, it is hereby:

ORDERED that the Petition is denied and no *inter partes* review is instituted in this proceeding.

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