PTO/SB/81 (01-09)
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POWER OF ATTORNEY OR REVOCATION OF POWER OF ATTORNEY WITH A NEW POWER OF ATTORNEY AND CHANGE OF CORRESPONDENCE ADDRESS

Application Number	
Filing Date	01/18/2012
First Named Inventor	C. Earl Woolfork
Title	Wireless Digital Audio Music System
Art Unit	2614
Examiner Name	Andrew Flanders
Attorney Docket Number	1028.8

I hereby revoke all previous powers of attorney given in the above-identified application.

☐ A Power of Attorney is submitted herewith.

OR

☒ I hereby appoint Practitioner(s) associated with the following Customer Number as my/our attorney(s) or agent(s) to prosecute the application identified above, and to transact all business in the United States Patent and Trademark Office connected therewith:

68533

OR

☐ I hereby appoint Practitioner(s) named below as my/our attorney(s) or agent(s) to prosecute the application identified above, and to transact all business in the United States Patent and Trademark Office connected therewith:

Practitioner(s) Name	Registration Number

Please recognize or change the correspondence address for the above-identified application to:

☒ The address associated with the above-mentioned Customer Number.

OR

☐ The address associated with Customer Number:

OR

☐ Firm or Individual Name					
Address					
City		State		Zip	
Country					
Telephone		Email			

I am the:

☐ Applicant/inventor.

OR

☒ Assignee of record of the entire interest. See 37 CFR 3.71.
Statement under 37 CFR 3.73(b) (Form PTO/SB/96) submitted herewith or filed on _____

SIGNATURE of Applicant or Assignee of Record

Signature	C. Earl Woolfork	Date	1-12-2012
Name	C. Earl Woolfork	Telephone	818-625-4966
Title and Company	President / One-E-Way, Inc.		

NOTE: Signatures of all the inventors or assignees of record of the entire interest or their representative(s) are required. Submit multiple forms if more than one signature is required, see below*.

☐ *Total of _____ forms are submitted.

This collection of information is required by 37 CFR 1.31, 1.32 and 1.33. The information is required to obtain or retain a benefit by the public which is to file (and by the USPTO to process) an application. Confidentiality is governed by 35 U.S.C. 122 and 37 CFR 1.11 and 1.14. This collection is estimated to take 3 minutes to complete, including gathering, preparing, and submitting the completed application form to the USPTO. Time will vary depending upon the individual case. Any comments on the amount of time you require to complete this form and/or suggestions for reducing this burden, should be sent to the Chief Information Officer, U.S. Patent and Trademark Office, U.S. Department of Commerce, P.O. Box 1450, Alexandria, VA 22313-1450. DO NOT SEND FEES OR COMPLETED FORMS TO THIS ADDRESS. **SEND TO: Commissioner for Patents, P.O. Box 1450, Alexandria, VA 22313-1450.**

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

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.

PTO/SB/96 (07-09)
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STATEMENT UNDER 37 CFR 3.73(b)

Applicant/Patent Owner: C. Earl Woolfork

Application No./Patent No.: Continuation of 12/970,747 Filed/Issue Date: 01/18/2012

Titled: Wireless Digital Audio Music System

One-E-Way, a Corporation

(Name of Assignee) (Type of Assignee, e.g., corporation, partnership, university, government agency, etc.

states that it is:

1. [X] the assignee of the entire right, title, and interest in;

2. [ ] an assignee of less than the entire right, title, and interest in
(The extent (by percentage) of its ownership interest is _____ %); or

3. [ ] the assignee of an undivided interest in the entirety of (a complete assignment from one of the joint inventors was made)

the patent application/patent identified above, by virtue of either:

A. [X] An assignment from the inventor(s) of the patent application/patent identified above. The assignment was recorded in the United States Patent and Trademark Office at Reel 026542, Frame 0331, or for which a copy therefore is attached.

OR

B. [ ] A chain of title from the inventor(s), of the patent application/patent identified above, to the current assignee as follows:

1. From: _____ To: _____
The document was recorded in the United States Patent and Trademark Office at
Reel _____, Frame _____, or for which a copy thereof is attached.

2. From: _____ To: _____
The document was recorded in the United States Patent and Trademark Office at
Reel _____, Frame _____, or for which a copy thereof is attached.

3. From: _____ To: _____
The document was recorded in the United States Patent and Trademark Office at
Reel _____, Frame _____, or for which a copy thereof is attached.

[ ] Additional documents in the chain of title are listed on a supplemental sheet(s).

[ ] As required by 37 CFR 3.73(b)(1)(i), the documentary evidence of the chain of title from the original owner to the assignee was, or concurrently is being, submitted for recordation pursuant to 37 CFR 3.11.

[NOTE: A separate copy (*i.e.*, a true copy of the original assignment document(s)) must be submitted to Assignment Division in accordance with 37 CFR Part 3, to record the assignment in the records of the USPTO. See MPEP 302.08]

The undersigned (whose title is supplied below) is authorized to act on behalf of the assignee.

/C. Earl Woolfork/ 1-18-2012

Signature Date

C. Earl Woolfork President

Printed or Typed Name Title

This collection of information is required by 37 CFR 3.73(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.**

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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).
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7. A record from this system of records may be disclosed, as a routine use, to the Administrator, General Services, or his/her designee, during an inspection of records conducted by GSA as part of that agency's responsibility to recommend improvements in records management practices and programs, under authority of 44 U.S.C. 2904 and 2906. Such disclosure shall be made in accordance with the GSA regulations governing inspection of records for this purpose, and any other relevant (*i.e.*, GSA or Commerce) directive. Such disclosure shall not be used to make determinations about individuals.
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9. A record from this system of records may be disclosed, as a routine use, to a Federal, State, or local law enforcement agency, if the USPTO becomes aware of a violation or potential violation of law or regulation.

INTELLECTUAL PROPERTY TRANSFER AGREEMENT

THIS INTELLECTUAL PROPERTY TRANSFER AGREEMENT (hereinafter "Agreement") is made on the Effective Date between the following parties:

C. Earl Woolfork, an individual, located in Pasadena, CA (US) 91107, and is the inventor of the technology described in U.S. Patent No. 7,412,294 (hereinafter "Inventor").

One-E-Way, Inc., is a corporation organized under the laws of Delaware, and located at P.O. Box 70848, Pasadena, CA (US) 91107-9998 (hereinafter, "Corporation").

WHEREAS:

A. Inventor owns all rights, title, and interesting certain Intellectual Property and Transferred Know-how (as defined below).
B. Inventor has agreed to sell and/or transfer any and all of his and any and all of its affiliates' or agents' right, title, and/or interest in the Intellectual Property and Transferred Know-how (as defined below) to Corporation, and
C. The Corporation has agreed to purchase and accept the same for the Consideration (as defined below).

NOW, IT IS AGREED as follows:

1. Definitions and Interpretation

1.1 Intellectual Property means any and all technologies described and pertaining to U.S. Patent No. 7,412,294, and any other foreign or domestic (U.S.) Patent Applications filed in the past (including U.S. Patent Application No. 12/144,729, currently pending) or in the future, relating to U.S. Patent No. 7,412,294 and U.S. Patent Application No. 12/144,729 and/or the wireless digital audio system described therein.

1.2 Transferred Know-how means any and all reports, processes, formulae, drawings, designs, technical information, forms, diagrams, demonstrations, presentations, and any and all communication related materials related to the Intellectual Property as defined in Section 1.1.

1.3 Effective Date means the date in which this Agreement is affixed with both parties' signatures.

1.4 Person means any natural person, partnership, corporation, trust, association, limited liability company, or other legally recognized entity.

2. In this Agreement:

2.1 The headings are inserted for convenience only and shall not affect the construction of this Agreement;

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2.2 A reference to sell or purchase includes a reference to procure the sale of or procure the purchase of or procure the transfer of, as the case may be; and

2.3 General words introduced by the word "other" shall not be given a restrictive meaning by reason of the fact that they are preceded by words indicating a particular class of act, matter, or thing, nor by the fact that they are followed by particular examples intended to be embraced by the general words.

3. THE TRANSFER

3.1 Effective as of the date signed, Inventor hereby sells and/or transfers and the Corporation hereby purchases and/or accepts any and all of Inventor's and any of all of his affiliates' or agents' right, title, and/or interest in the Intellectual Property and Transferred Know-how, but for the reservations made in the Section 3.2.

3.2 The Consideration for the sale and/or transfer in the paragraph above shall include:

3.2.1 One dollar ($1.00) and other good and valuable consideration.

3.2.2 The Corporation shall provide Inventor and his affiliates or agents a perpetual non-exclusive license for the use an enjoyment for internal application of products, derivative products, and/or support services related to the Intellectual Property and Transferred Know-how.

3.2.3 The Corporation reserves for Inventor and his affiliates and agents the power and authority to conduct research and publish documents relating to the Intellectual Property, and otherwise conduct related activity that does not negatively affect, to a reasonable person standard, the Corporation's or its affiliates' or agents' interests or objectives.

3.2.4 The Corporation acknowledges and will perpetually continue to acknowledge and publicize Inventor as the creator of the Intellectual Property.

3.2.5 The Corporation reserves for Inventor a right of first refusal concerning any resale of the Intellectual Property.

3.2.6 Neither Inventor nor any of his current or future affiliates or agents will compete with the Corporation in any manner detrimental to the Corporation's or its affiliates' or agents' interests or objectives concerning the development, expansion, and/or sale of products or services related to the Intellectual Property.

3.2.7 If any sales tax, value added tax, or other transfer tax is property chargeable in respect of the sale and purchase, the Corporation shall pay to the Inventor the amount of such tax in addition to and at the same time as the Consideration. The Inventor will issue to the Corporation a proper tax invoice in respect thereof.

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3.2.8 The Corporation hereby acknowledges that the Inventor makes no representation or warranty to the Corporation under this Agreement, either express or implied or otherwise, with respect to the Intellectual Property and any confidential information delivered, including but not limited to matters of accuracy, completeness, performance, non-infringement of third party rights, merchantability, or fitness for a particular purpose, as that the above sale and/or transfer, the delivery of said Intellectual Property or Transferred Know-how, and any and all delivery of confidential information is made to the company on an "as is" basis.

4. REPRESENTATIONS AND WARRANTIES

4.1 Inventor and the Corporation each represents and warrants to the other that:

4.1.1 Corporation is organized, validly existing, and in good standing under the laws of the country or state in which it is incorporated;

4.1.2 Corporation's execution and delivery of this Agreement, and the performance of its obligations under this Agreement, have been duly authorized by all necessary corporate action on Corporation's part, and Corporation has full corporate power, right, and authority to enter into this Agreement, to conduct the purchase pursuant to this Agreement, and to perform its obligations hereunder, and Inventor also has all power, right and authority to enter into this Agreement and to conduct the sale pursuant to this agreement and perform the obligations hereunder;

4.1.3 Neither the execution nor delivery of this Agreement by it, nor the performance by it of any of its obligations under this Agreement, violates any applicable law or regulation of any country, state, or other governmental unit, or Corporation's Articles or Certificates of Incorporation or Bylaws or other charter documents, or constitutes a violation of, or a breach or default under, any agreement or instrument or judgment or order of any court or governmental authority, to which it is a party or to which it is subject or to which any of the Intellectual Property or Transferred Know-how is subject;

4.1.4 This Agreement is a valid and binding obligation of Corporation and Inventor, enforceable against either in accordance with its terms, except as such enforceability may be limited by equitable principles or by bankruptcy or other laws affecting creditors' rights generally; and

4.1.5 No consent, approval, order, or authorization of any person, entity, court, or governmental authority is required on its part in connection with the execution and delivery of this Agreement or the performance by it of its obligations hereunder.

4.2 Inventor represents and warrants to the Corporation that:

4.2.1 He has title to the Intellectual Property and Transferred Know-how in the form in which it is delivered to the Corporation;

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4.2.2 The Intellectual Property and Transferred Know-how is valid and existing in full force and effect;

4.2.3 The Intellectual Property and Transferred Know-how is not subject to any proceeding or outstanding decree, order, judgment, settlement, or other similar agreement or stipulation that restricts in any manner the use, transfer, or licensing thereof by the Corporation or that affect the validity, use, or enforceability of the Intellectual Property;

4.2.4 No claim or allegation has been made by any person that the Intellectual Property infringes upon any United States issued patent, trade secret, or copyright of such person; and

4.2.5 Inventor knows of no claim by any person that the Intellectual Property and/or Transferred Know-how infringes upon any person's patent, copyright, trademark, trade secret, or any other intellectual property of such person, or of any applicable law or regulation.

5. COMPLETION

5.1 The sale and/or purchase of the Intellectual Property and Transferred Know-how shall be completed, and legal title and ownership in respect of the Intellectual Property and Transferred Know-how shall be deemed to pass to the Corporation, in each case, as of the Effective Date.

5.2 Inventor shall:

5.2.1 Cause to be delivered or made available to the Corporation such additional documents as the Corporation may reasonably require to complete the sale and/or purchase of the Intellectual Property and Transferred Know-how; and

5.2.2 Do such other things reasonably necessary to give full effect to this Agreement.

5.3 Corporation shall:

5.3.1 Timely pay or cause to be paid the Consideration in cash to the Inventor in the manner as Inventor may direct;

5.3.2 Cause to be delivered to made available to Inventor such additional documents as Inventor may reasonably require to complete the sale and/or purchase of the Intellectual Property; and

5.3.3 Do such other things reasonably necessary to give full effect to this Agreement.

6. LICENSE

6.1 The Corporation grants to Inventor and his affiliates or agents a perpetual, royalty-free, non-exclusive license to use all Intellectual Property and

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Transferred Know-how that has a relation or application to the business of the Inventor and that does not negatively affect, to a reasonable person standard, the Corporation's or its affiliates' or agents' interests or objectives.

7. ENTIRE AGREEMENT

7.1 This agreement sets for the entire understanding and agreement among the parties as to matters covered herein and therein and supersedes any prior understanding, agreement, or statement, written or oral, of intent among the parties with respect to the subject matter hereof.

8. COUNTERPARTS

8.1 This Agreement may be executed in any number of counterparts, each of which shall be deemed to be an original and all of which together shall be deemed to be one and the same instrument.

9. VARIATION

9.1 No waiver shall be deemed to have been made by any party of any of its rights under this Agreement unless the same is in writing and is signed on its behalf by an authorized signatory. Any such waiver shall constitute a waiver only with respect to the specific matter described in such writing and shall in no way impair the rights of the party granting such waiver in any other respect or at any other time. To be binding, any amendment of this Agreement must be effected by an instrument in writing signed by the parties.

10. NOTICES

10.1 All notices, demands, instructions, waivers, consents, or other communications to be provided pursuant to this Agreement shall be in writing, shall be effective upon receipt, and shall be sent by hand, facsimile, air courier, or certified or registered mail, return receipt requested, as follows, or as to such other address as a party may specify by notice from time to time in writing to the other party in the manner specified in this section.

If to the Corporation:

One-E-Way, Inc.
P.O. Box 70848
Pasadena, CA 91107-9998

If to the Inventor:

C. Earl Woolfork
500 Santa Paula Ave.
Pasadena, CA 91107

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11. COSTS

11.1 Inventor and the Corporation shall each pay its own costs, charges, and expenses incurred in connection with the preparation and implementation of this Agreement and the transactions contemplated by it.

12. GOVERNING LAW; SUBMISSION TO JURISDICTION; APPOINTEMN OF AGENT FOR SERVICE OF PROCESS

12.1 THE AGREEMENT SHALL BE GOVERENED BY, AND CONSTRUED IN ACCORDANCE WITH, THE LAWS OF THE STATE OF CALIFORNIA. Each party hereby irrevocably agrees that any legal action or proceeding against it arising out of this Agreement or the transactions contemplated hereby shall be brought only in the State of California, in Los Angeles County. Neither party appoints, acknowledges, or empowers any third party or agent, other than that listed above, to receive for and on its own behalf service of process in the State of California in any such action or proceeding and irrevocably consents to the service of process outside the territorial jurisdiction of said courts in any such action or proceeding by mailing copies thereof by registered United States mail, postage prepaid, to its address as specified in or pursuant to that enumerated above. Any service made on any such agent or its successor shall be effective when delivered regardless of whether notice thereof is given to the affected party. If any person or firm designated as agent hereunder shall no longer serve as agent of such party to receive service of process in the State of California, the party so affected shall be obligated promptly to appoint a successor to so serve; and unless and until such successor is appointed and the other parties notified of the same in writing, service upon the last designated agent shall be good and effective. Inventor and the Corporation both hereby agree to at all times maintain an agent to receive service of process in the State of California pursuant to this Section.

12.2 The foregoing provisions of this Section shall not affect, limit, or prevent the parties from serving process in any other manner permitted by law.

12.3 Each party irrevocably waives any objection to the venue of the courts designated in Section 11.1, whether on the basis of forum non conveniens or otherwise, and accepts and submits to the jurisdiction of such courts in connection with any legal action or proceeding against it arising out of or concerning this Agreement of the transactions contemplated hereby.

13. TAXES

13.1 Each party represents that it will provide the other party, upon reasonable request, any and all properly executed IRS forms or any similar form under the laws of the United States or the State of California that relates to the transaction and/or business contemplated hereby.

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14. U.S. BANKRUPTCY CODE

14.1 The parties acknowledge that this Agreement is an "executory contract" as provided in Section 365(n) of Title 11, United States Code (the "U.S. Bankruptcy Code") and may contain licenses to "intellectual property," as provided in Section 365(n) thereof. Each party acknowledges that if it rejects this Agreement as a debtor in possession or a trustee in bankruptcy in a case under the Bankruptcy Code, the other party may elect to retain rights under this Agreement as provided in Section 365(n) of the U.S. Bankruptcy Code to the fullest extent permitted by law, subject to all of such party's obligations and restrictions hereunder. Upon written request of one party to the other party or to an applicable bankruptcy trustee, the other party or such bankruptcy trustee shall not interfere with the rights of the requesting party as provided in this Agreement, except as otherwise provided by law or equity.

AS WITNESS, this Agreement has been signed by or on behalf of the parties the day and year first above written.

SIGNED:

C. Earl Woolfork, Inventor — 10-22-08 date

Tina Woolfork, Vice President of Operations
of One-E-Way, Inc. for and on behalf of the Corporation — 10.22.08 date

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CLAIMS

I claim:

1. A mobile wireless digital audio receiver, configured to receive a unique user code and a original audio signal representation in the form of packets, said unique user code configured to spread the spectrum of said signal and further configured for independent communication operation, the wireless digital audio receiver further configured to be directly communicable with a mobile digital audio transmitter, said mobile wireless digital audio receiver comprising:

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

a decoder operative to decode reduced intersymbol interference coding of said original audio signal representation, said audio having been wirelessly transmitted and reproduced virtually free from interference from device transmitted signals operating in the wireless digital audio receiver spectrum.

2. A wireless digital audio headphone for receipt of a unique user code and a digital audio representation signal in the form of a packet, said unique user code configured to spread the spectrum of said signal and further configured for independent communication operation, the wireless digital audio headphone further configured to be directly communicable with a mobile digital audio transmitter, said wireless digital audio headphone comprising:

a direct conversion module configured to capture packets and the correct bit sequence within the packets aided by lowering signal detection error through reduced intersymbol interference coding of said audio representation signal respective to said headphone and said mobile digital audio transmitter, said packets

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embedded in the received spread spectrum signal, the captured packets corresponding to the unique user code;

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

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

a module adapted to reproduce said generated audio output, said audio having been wirelessly transmitted from an audio player and reproduced virtually free from interference from device transmitted signals operating in the wireless headphone spectrum.

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PTO/SB/01A (01-09)
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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(s), I/we declare that:

This declaration is directed to:
- [x] The attached application, or
- [ ] United States application or PCT international application number _____
  filed on _____
  - [ ] As amended on _____ (if applicable);

I/we believe that I/we am/are the original and first inventor(s) of the subject matter which is claimed and for which a patent is sought;

I/we have reviewed and understand the contents of the above-identified application, including the claims, as amended by any amendment specifically referred to above;

I/we acknowledge the duty to disclose to the United States Patent and Trademark Office all information known to me/us to be material to patentability as defined in 37 CFR 1.56, including for continuation-in-part applications, material information which became available between the filing date of the prior application and the national or PCT international filing date of the continuation-in-part application.

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FULL NAME OF INVENTOR(S)

Inventor one: C. Earl Woolfork Date: 1-24-2012

Signature: _____ Citizen of: US

Inventor two: _____ Date: _____

Signature: _____ Citizen of: _____

- [ ] Additional inventors or a legal representative are being named on _____ additional form(s) attached herein.

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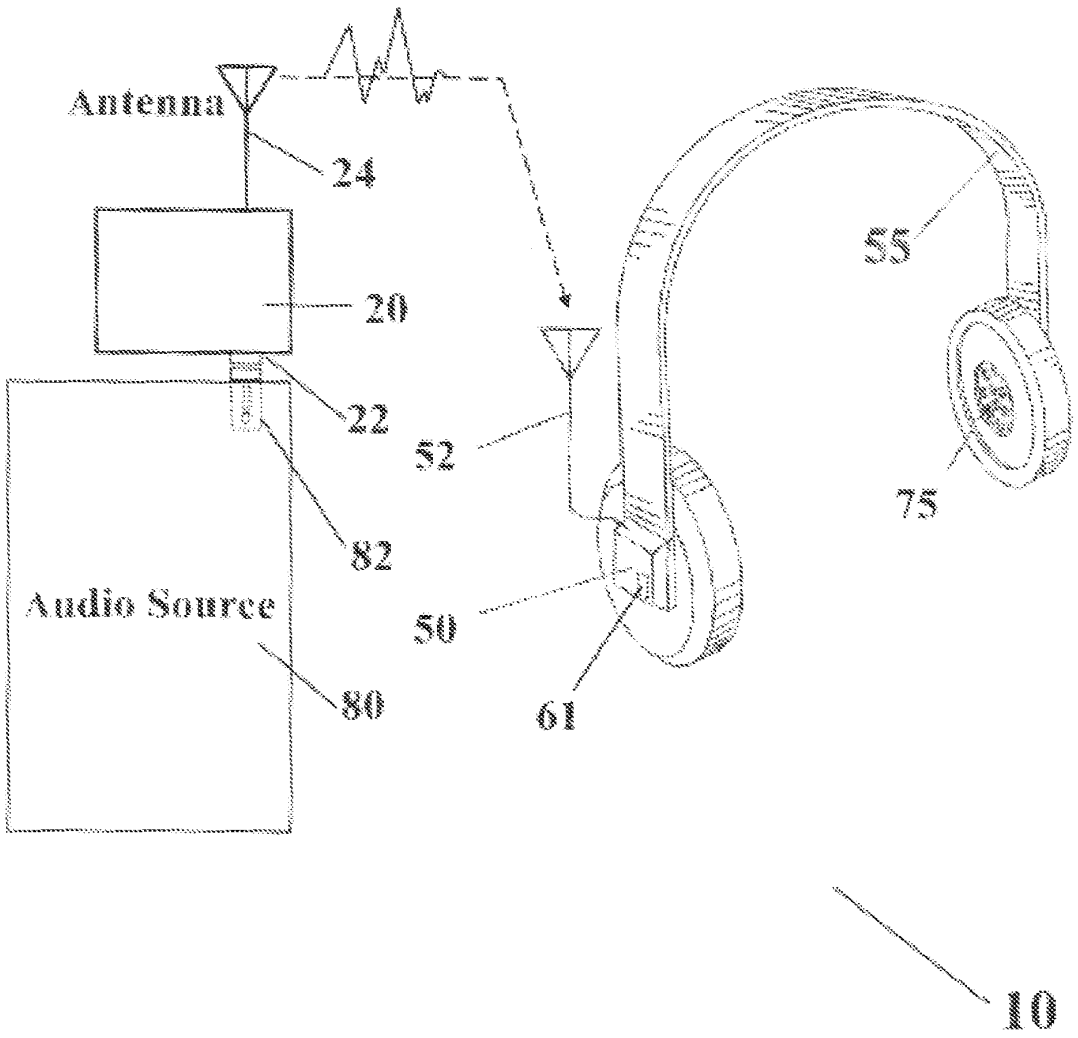


FIG.1

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

Code Generator
60
Direct Conversion Receiver
Fuzzy Logic Detection Sub-System
61
Bandpass Filter
54
32
38
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

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

Fig. 4

WIRELESS DIGITAL AUDIO MUSIC SYSTEM

This continuation application claims the benefit of U.S. Patent Application No. 12/940,747, 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 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.

ABSTRACT

[0018] 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.

Electronic Patent Application Fee Transmittal

Application Number:	
Filing Date:	
Title of Invention:	Wireless Digital Audio Music System
First Named Inventor/Applicant Name:	C. Earl Woolfork
Filer:	Megan Elizabeth Lyman
Attorney Docket Number:	1028.6

Filed as Small Entity

Utility under 35 USC 111(a) Filing Fees

Description	Fee Code	Quantity	Amount	Sub-Total in USD($)
Basic Filing:				
Utility filing Fee (Electronic filing)	4011	1	95	95
Utility Search Fee	2111	1	310	310
Utility Examination Fee	2311	1	125	125
Pages:				
Claims:				
Miscellaneous-Filing:				
Petition:				
Patent-Appeals-and-Interference:				

Description	Fee Code	Quantity	Amount	Sub-Total in USD($)
Post-Allowance-and-Post-Issuance:				
Extension-of-Time:				
Miscellaneous:				
		Total in USD ($)		**530**

Electronic Acknowledgement Receipt	
EFS ID:	11906638
Application Number:	13356949
International Application Number:	
Confirmation Number:	2299
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:	1028.6
Receipt Date:	24-JAN-2012
Filing Date:	
Time Stamp:	14:22:30
Application Type:	Utility under 35 USC 111(a)

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File Listing:

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1	Application Data Sheet	ADS.pdf	1089518 9a6379dd8b7f106942f121078f3c1cdb6da7988a	no	4
Warnings:					
Information:					
2	Power of Attorney	POAwithAssignmentData.pdf	8654255 20c20f5e285b7b14f9836895b2b999daeb9c0056	no	11
Warnings:					
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4	Oath or Declaration filed	DeclarationSigned.pdf	834536 5f333358cc017aa3333c91f59f8993396e1e204b	no	2
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Application Data Sheet 37 CFR 1.76	Attorney Docket Number	1028.5
	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.
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Applicant 1 Remove

Applicant Authority ◉ Inventor ○ Legal Representative under 35 U.S.C. 117 ○ Party of Interest under 35 U.S.C. 118

Prefix	Given Name	Middle Name	Family Name	Suffix
Mr.	C.	Earl	Woolfork	

Residence Information (Select One) ◉ US Residency ○ Non US Residency ○ Active US Military Service

City	Pasadena	State/Province	CA	Country of Residence [i]	US

Citizenship under 37 CFR 1.41(b) [i] US

Mailing Address of Applicant:

Address 1	PO Box 70848		
Address 2			
City	Pasadena	State/Province	CA
Postal Code	91107	Country [i]	US

All Inventors Must Be Listed - Additional Inventor Information blocks may be generated within this form by selecting the **Add** button. Add

Correspondence Information:

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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	1028.5	Small Entity Status Claimed	☒
Application Type	Nonprovisional		
Subject Matter	Utility		
Suggested Class (if any)		Sub Class (if any)	
Suggested Technology Center (if any)	2614		
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	1028.5
	Application Number	
Title of Invention	Wireless Digital Audio Music System	

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

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

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This section allows for the applicant to either claim benefit under 35 U.S.C. 119(e), 120, 121, or 365(c) or indicate National Stage entry from a PCT application. Providing this 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(a)(2) or CFR 1.78(a)(4), and need not otherwise be made part of the specification.

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	2010-11-05		
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	10648012	2008-07-12	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)
10648012	Continuation of	10027391	2003-08-26	7412294	2008-08-12
Prior Application Status	Abandoned			Remove	
Application Number	Continuity Type		Prior Application Number	Filing Date (YYYY-MM-DD)	
10027391				2001-12-21	

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Foreign Priority Information:

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Application Data Sheet 37 CFR 1.76	Attorney Docket Number	1028.5
	Application Number	
Title of Invention	Wireless Digital Audio Music System	

This section allows for the applicant to claim benefit of foreign priority and to identify any prior foreign application for which priority is not claimed. 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(a).

Remove

Application Number	Country [i]	Parent Filing Date (YYYY-MM-DD)	Priority Claimed
			◯ Yes ◉ No

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

Assignee Information:

Providing this information in the application data sheet does not substitute for compliance with any requirement of part 3 of Title 37 of the CFR to have an assignment recorded in the Office.

Remove

Assignee 1

If the Assignee is an Organization check here. ☒

Organization Name	One-E-Way, Inc.		
Mailing Address Information:			
Address 1	PO Box 70848		
Address 2			
City	Pasadena	**State/Province**	CA
Country [i] US		Postal Code	91107
Phone Number	818 625-4966	Fax Number	
Email Address	cwoolfork@sbcglobal.net		

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

Signature:

A signature of the applicant or representative is required in accordance with 37 CFR 1.33 and 10.18. Please see 37 CFR 1.4(d) for the form of the signature.

Signature	/Megan Lyman/			Date (YYYY-MM-DD)	2012-01-24
First Name	Megan Lyman	Last Name	Lyman	Registration Number	57054

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 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 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.

Samsung Exhibit 1002, Page 34 of 880
Samsung Electronics Co., Ltd. et al. v. One-E-Way, Inc.
IPR2025-01541

PATENT APPLICATION FEE DETERMINATION RECORD

Substitute for Form PTO-875

Application or Docket Number: 13/356,949

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	95		N/A	
SEARCH FEE (37 CFR 1.16(k), (i), or (m))	N/A	N/A	N/A	310		N/A	
EXAMINATION FEE (37 CFR 1.16(o), (p), or (q))	N/A	N/A	N/A	125		N/A	
TOTAL CLAIMS (37 CFR 1.16(i))	2 minus 20 =	*	x 30 =	0.00	OR		
INDEPENDENT CLAIMS (37 CFR 1.16(h))	2 minus 3 =	*	x 125 =	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	530		TOTAL	

APPLICATION AS AMENDED - PART II

		(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($)	OTHER THAN SMALL ENTITY ADDITIONAL FEE($)
AMENDMENT A	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	

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

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UNITED STATES DEPARTMENT OF COMMERCE
United States Patent and Trademark Office
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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
13/356,949	01/24/2012	2614	530	1028.5	2	2

CONFIRMATION NO. 2299

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

FILING RECEIPT

OC000000052394520

Date Mailed: 02/07/2012

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**

Applicant(s)

C. Earl Woolfork, Pasadena, CA;

Assignment For Published Patent Application

ONE-E-WAY, INC., Pasadena, CA

Power of Attorney: The patent practitioners associated with Customer Number 68533

Domestic Priority data as claimed by applicant

This application is a CON of 12/940,747 11/05/2010
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 (You may be eligible to benefit from the **Patent Prosecution Highway** program at the USPTO. Please see http://www.uspto.gov for more information.)

If Required, Foreign Filing License Granted: 02/02/2012

The country code and number of your priority application, to be used for filing abroad under the Paris Convention, is **US 13/356,949**

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

Non-Publication Request: No

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

Samsung Exhibit 1002, Page 36 of 880
Samsung Electronics Co., Ltd. et al. v. One-E-Way, Inc.
IPR2025-01541

Title

Wireless Digital Audio Music System

Preliminary Class

381

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 (1-866-999-4158).

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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UNITED STATES DEPARTMENT OF COMMERCE
United States Patent and Trademark Office
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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
13/356,949	01/24/2012	C. Earl Woolfork	1028.5

CONFIRMATION NO. 2299

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

FORMALITIES LETTER

OC000000052394521

Date Mailed: 02/07/2012

NOTICE TO FILE CORRECTED APPLICATION PAPERS

Filing Date Granted

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

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

- A replacement abstract commencing on a separate sheet in compliance with 37 CFR 1.72(b) and 37 CFR 1.121 is required.

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

Replies should be mailed to:

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

Registered users of EFS-Web may alternatively submit their reply to this notice via EFS-Web.
https://sportal.uspto.gov/authenticate/AuthenticateUserLocalEPF.html

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

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

/ygizaw/

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

Samsung Exhibit 1002, Page 39 of 880
Samsung Electronics Co., Ltd. et al. v. One-E-Way, Inc.
IPR2025-01541

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UNITED STATES DEPARTMENT OF COMMERCE
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APPLICATION NUMBER	FILING OR 371(C) DATE	FIRST NAMED APPLICANT	ATTY. DOCKET NO./TITLE
13/356,949	01/24/2012	C. Earl Woolfork	1028.5

CONFIRMATION NO. 2299

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

POA ACCEPTANCE LETTER

OC000000052394550

Date Mailed: 02/07/2012

NOTICE OF ACCEPTANCE OF POWER OF ATTORNEY

This is in response to the Power of Attorney filed 01/24/2012.

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.

/ttu/

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

Cont. of U.S. Patent Application No.: 12/940,747

Attorney Docket No.: 1028.6

IN THE UNITED STATES PATENT AND TRADEMARK OFFICE

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

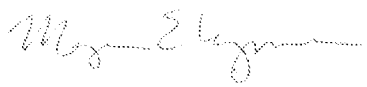
COVER LETTER FOR RESPONSE TO NOTICE TO FILE CORRECTED APPLICATION PAPERS OF 02/07/2012

Dear Sir:

The Applicant respectfully submits this notice to file corrected papers. An abstract commencing on a separate sheet in compliance with 37 CFR 1.72(b) and 37 CFR 1.121 is transmitted herewith. If there are any questions please do not hesitate to contact the Applicants attorney, listed below. Any overpayment or underpayment of fees associated with this filing are authorized to be charged to Deposit Acct. No. 50-4576.

February 7, 2012

Best Regards,



Megan Lyman, Reg. No. 57,054

Electronic Acknowledgement Receipt

EFS ID:	12018991
Application Number:	13356949
International Application Number:	
Confirmation Number:	2299
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:	1028.5
Receipt Date:	07-FEB-2012
Filing Date:	24-JAN-2012
Time Stamp:	15:37:23
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	Abstract	ABSTRACT.pdf	40718 809d43d2dd27b238a8cb1e4b70e274c705299506	no	1

Warnings:	
Information:	

2	Transmittal Letter	CoverSheetForAbstract.pdf	77292 0e1b665ff8c469feee891d19d636126c8674b6ed	no	1
Warnings:					
Information:					
			Total Files Size (in bytes):	118010	

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.

PATENT APPLICATION FEE DETERMINATION RECORD

Substitute for Form PTO-875

Application or Docket Number: 13/356,949

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	95		N/A	
SEARCH FEE (37 CFR 1.16(k), (i), or (m))	N/A	N/A	N/A	310		N/A	
EXAMINATION FEE (37 CFR 1.16(o), (p), or (q))	N/A	N/A	N/A	125		N/A	
TOTAL CLAIMS (37 CFR 1.16(i))	2 minus 20 =	*	x 30 =	0.00	OR		
INDEPENDENT CLAIMS (37 CFR 1.16(h))	2 minus 3 =	*	x 125 =	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	530		TOTAL	

APPLICATION AS AMENDED - PART II

		(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($)	OTHER THAN SMALL ENTITY ADDITIONAL FEE($)
AMENDMENT A	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	

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

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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
13/356,949	01/24/2012	2614	530	1028.6	2	2

CONFIRMATION NO. 2299

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

UPDATED FILING RECEIPT

OC000000052589890

Date Mailed: 02/16/2012

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**

Applicant(s)

C. Earl Woolfork, Pasadena, CA;

Assignment For Published Patent Application

ONE-E-WAY, INC., Pasadena, CA

Power of Attorney: The patent practitioners associated with Customer Number 68533

Domestic Priority data as claimed by applicant

This application 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

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If Required, Foreign Filing License Granted: 02/02/2012

The country code and number of your priority application, to be used for filing abroad under the Paris Convention, is **US 13/356,949**

Projected Publication Date: 05/24/2012

Non-Publication Request: No

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

Samsung Exhibit 1002, Page 46 of 880
Samsung Electronics Co., Ltd. et al. v. One-E-Way, Inc.
IPR2025-01541

Title

Wireless Digital Audio Music System

Preliminary Class

381

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PTO/SB/08a (01-10)
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INFORMATION DISCLOSURE STATEMENT BY APPLICANT
(Not for submission under 37 CFR 1.99)

Application Number	13356949
Filing Date	2012-01-24
First Named Inventor	C. Earl Woolfork
Art Unit	
Examiner Name	Andrew Flanders
Attorney Docket Number	1028.6

U.S.PATENTS Remove

Examiner Initial*	Cite No	Patent Number	Kind Code[1]	Issue Date	Name of Patentee or Applicant of cited Document	Pages,Columns,Lines where Relevant Passages or Relevant Figures Appear
	1	5668880	A	1997-09-16	Alajajian, Philip	
	2	5721783	A	1998-02-24	Anderson, James	
	3	6115478	A	2000-09-05	dspfactory Ltd.	
	4	6236862	B1	2001-05-22	Intersignal LLC	
	5	7505823	B1	2009-03-17	Intrasonics Limited	
	6	5781542	A	1998-07-14	Tanaka	
	7	6678892	A	2004-08-13	Lavelle	
	8	5491839	A	1996-02-13	Schotz	

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	Examiner Name	Andrew Flanders
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	9	5539769	A	1996-07-23	Kosko	
	10	5963583	A	1999-10-05	Davidovici	
	11	6028764	A	2000-02-22	Richardson	
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	19	7187948	B2	2007-03-06	Alden	

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	Filing Date	2012-01-24
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	Art Unit	
	Examiner Name	Andrew Flanders
	Attorney Docket Number	1028.6

	20	7215269	B2	2007-05-08	Lee	
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	Filing Date	2012-01-24
	First Named Inventor	C. Earl Woolfork
	Art Unit	
	Examiner Name	Andrew Flanders
	Attorney Docket Number	1028.6

	1	20020039424	A1	2002-04-04	Watanuki	
	2	20020068610	A1	2002-06-06	Anvekar	
	3	20020080288	A1	2002-06-27	Davies	
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	Art Unit	
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	1	Bluetooth Specification version 1.1, Bluetooth SIG, www.bluetooth.com, Feb. 22, 2001	☐
	2	Bluetooth Specification Version 1.0b, www.bluetooth.com, Dec.1, 1999	☐
	3	Mettala, Riku, Bluetooth Protocol Architecture version 1.0 White Paper, www.bluetooth.com	☐
	4	Haartsen, Jaap, Bluetooth - The universal radio interface for ad hoc wireless connectivity, Ericsson Review No.3, 1998	☐
	5	Haartsen, Jaap, Bluetooth Radio System, Ericsson Radio Systems, B.V. February 2000	☐
	6		☐
	7		☐

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

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	Application Number	13356949
	Filing Date	2012-01-24
	First Named Inventor	C. Earl Woolfork
	Art Unit	
	Examiner Name	Andrew Flanders
	Attorney Docket Number	1028.6

CERTIFICATION STATEMENT

Please see 37 CFR 1.97 and 1.98 to make the appropriate selection(s):

☐ That each item of information contained in the information disclosure statement was first cited in any communication from a foreign patent office in a counterpart foreign application not more than three months prior to the filing of the information disclosure statement. See 37 CFR 1.97(e)(1).

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☐ See attached certification statement.

☐ Fee set forth in 37 CFR 1.17 (p) has been submitted herewith.

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A signature of the applicant or representative is required in accordance with CFR 1.33, 10.18. Please see CFR 1.4(d) for the form of the signature.

Signature	/Megan Lyman/	Date (YYYY-MM-DD)	2012-04-25
Name/Print	Megan Lyman	Registration Number	57054

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Electronic Acknowledgement Receipt	
EFS ID:	12748886
Application Number:	13356949
International Application Number:	
Confirmation Number:	2299
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:	1028.6
Receipt Date:	10-MAY-2012
Filing Date:	24-JAN-2012
Time Stamp:	14:40:49
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	Non Patent Literature	1point0bcombinedfromconvertREduced.pdf	17098315 2afeaf0a473ef71402f0c4981b9e9fe66b9f1c1f	no	1442
Warnings:					
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2	Non Patent Literature	IEEEreferencesmall.pdf	2305507 939aabdfc0fe28fbe32de7c0ce0f194373412d0b	no	9
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3	Non Patent Literature	UniversalRadioSmall.pdf	2138783 37e9402a341ae38bc6bf270442088b2a3a6d7aec	no	8
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4	Information Disclosure Statement (IDS) Form (SB08)	Megan_IDS_for_USPTO_App13356949_RevA.pdf	613481 cb2a9a350e0c30bd42c1127335c812876bc128fd	no	8
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APPLICATION NUMBER	FILING OR 371(C) DATE	FIRST NAMED APPLICANT	ATTY. DOCKET NO./TITLE
13/356,949	01/24/2012	C. Earl Woolfork	1028.6

CONFIRMATION NO. 2299

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

PUBLICATION NOTICE

OC00000054458182

Title: Wireless Digital Audio Music System

Publication No.US-2012-0128171-A1
Publication Date:05/24/2012

NOTICE OF PUBLICATION OF APPLICATION

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Samsung Exhibit 1002, Page 59 of 880
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IPR2025-01541

3. (New) A wireless digital audio headphone comprising:

a portable digital audio headphone receiver configured to receive a unique user code bit sequence and a original audio signal representation in the form of packets, said digital audio headphone receiver, capable of mobile operation and configured for direct digital coded wireless spread spectrum communication with a mobile digital audio transmitter;

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

a digital demodulator configured for independent CDMA communication operation;

a decoder operative to decode reduced intersymbol interference coding of original 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 in response to the unique user code bit sequence being recognized, said audio having been wirelessly transmitted from a portable audio player and reproduced virtually free from interference from device transmitted signals operating in the wireless headphone spectrum.

4. (New) The wireless digital audio headphone of claim 3, wherein the audio output is music.

5. (New) A mobile wireless digital audio receiver, configured to receive a unique user code and a original audio signal representation in the form of packets, said unique user code configured to spread the spectrum of said signal and further configured for independent communication operation, the wireless digital audio receiver further configured to be directly communicable with a mobile digital coded audio transmitter, said mobile wireless digital audio receiver comprising:

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

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

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

a module adapted to reproduce said generated audio output, said audio having been wirelessly transmitted from an audio player and reproduced virtually free from interference from device transmitted signals operating in the wireless digital audio receiver spectrum.

6. (New) A mobile wireless digital audio receiver, configured to receive a unique user code and a original audio signal representation in the form of packets, said unique user code configured to spread the spectrum of said signal and further configured for independent communication operation, the wireless digital audio receiver further configured to be communicable with a digital audio transmitter, said mobile wireless digital audio receiver comprising:

fuzzy set membership functionality to enhance detection of said unique user code;

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

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

a digital-to-analog converter generating an audio output of said original audio signal

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IPR2025-01541

representation; and

a module adapted to reproduce said generated audio output, said audio having been wirelessly transmitted from an audio player and reproduced virtually free from interference from device transmitted signals operating in the wireless digital audio receiver spectrum.

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Samsung Electronics Co., Ltd. et al. v. One-E-Way, Inc.
IPR2025-01541

Preliminary Amendment Adding Claims 3-6 in Application No. 13/356,949

The Claims submitted herewith contain no new matter. It is respectfully requested that Claims 3-6 be entered into this application for review.

If there are any questions, concerns, or actions that can be taken to expedite the processing of this application, please do not hesitate to contact the Applicant's representative.

June 12, 2012

Respectfully Submitted,



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Samsung Exhibit 1002, Page 63 of 880
Samsung Electronics Co., Ltd. et al. v. One-E-Way, Inc.
IPR2025-01541

Electronic Patent Application Fee Transmittal

Application Number:	13356949
Filing Date:	24-Jan-2012
Title of Invention:	Wireless Digital Audio Music System
First Named Inventor/Applicant Name:	C. Earl Woolfork
Filer:	Megan Elizabeth Lyman
Attorney Docket Number:	1028.6

Filed as Small Entity

Utility under 35 USC 111(a) Filing Fees

Description	Fee Code	Quantity	Amount	Sub-Total in USD($)
Basic Filing:				
Pages:				
Claims:				
Independent claims in excess of 3	2201	2	125	250
Miscellaneous-Filing:				
Petition:				
Patent-Appeals-and-Interference:				
Post-Allowance-and-Post-Issuance:				
Extension-of-Time:				

Description	Fee Code	Quantity	Amount	Sub-Total in USD($)
Miscellaneous:				
		Total in USD ($)		**250**

Electronic Acknowledgement Receipt

EFS ID:	12991007
Application Number:	13356949
International Application Number:	
Confirmation Number:	2299
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:	1028.6
Receipt Date:	12-JUN-2012
Filing Date:	24-JAN-2012
Time Stamp:	13:29:03
Application Type:	Utility under 35 USC 111(a)

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Payment Type	Credit Card
Payment was successfully received in RAM	$250
RAM confirmation Number	10189
Deposit Account	
Authorized User	

File Listing:

Document Number	Document Description	File Name	File Size(Bytes)/ Message Digest	Multi Part /.zip	Pages (if appl.)

1	Preliminary Amendment	NewPreliminaryClaimsFinal.pdf	53829 529be6e797c1981180ebb83029ac8023bf2ea74d	no	3
Warnings:					
Information:					
2	Applicant Arguments/Remarks Made in an Amendment	NewPreliminaryClaimsFinalCoverLetter.pdf	96733 9a12f3824eadc02da5b1dab9de39d7fd2808f15d	no	1
Warnings:					
Information:					
3	Fee Worksheet (SB06)	fee-info.pdf	30023 7983c3dc3eae283410914188a51c46855875dc7c	no	2
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7. (New) A wireless digital audio receiver, configured to receive a unique user code and a original audio signal representation, said unique user code configured to spread the spectrum of said signal and further configured for independent communication operation, the wireless digital audio receiver further configured to be directly communicable with a digital audio transmitter, said wireless digital audio receiver comprising:

fuzzy set membership functionality to enhance detection of said unique user code;

a direct conversion module configured to capture the correct bit sequence embedded in the received spread spectrum signal;

a module adapted to reproduce said original audio signal representation, said audio having been wirelessly transmitted from an audio player and reproduced virtually free from interference from other device transmitted signals.

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

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

a digital modulator module configured for independent code division multiple access communication operation, said transmitter configured to wirelessly transmit said audio to be reproduced virtually free from interference from device transmitted signals operating in the wireless digital audio transmitter spectrum.

PRELIMINARY AMENDMENT

Please find submitted herewith new Claims 7 & 8. Neither claim contains new matter, and support is found throughout the specification for each. If there are any questions or concerns regarding the addition of these claims, do not hesitate to contact the Applicant's representative, whose information is below.

February 20, 2013

Respectfully Submitted,



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Raleigh, NC 27613
(919) 341-4023

Samsung Exhibit 1002, Page 69 of 880
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Description	Fee Code	Quantity	Amount	Sub-Total in USD($)
Miscellaneous:				
		Total in USD ($)		**250**

Electronic Acknowledgement Receipt

EFS ID:	15004537
Application Number:	13356949
International Application Number:	
Confirmation Number:	2299
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First Named Inventor/Applicant Name:	C. Earl Woolfork
Customer Number:	68533
Filer:	Megan Elizabeth Lyman
Filer Authorized By:	
Attorney Docket Number:	1028.6
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Deposit Account	
Authorized User	

File Listing:

Document Number	Document Description	File Name	File Size(Bytes)/ Message Digest	Multi Part /.zip	Pages (if appl.)

1	Preliminary Amendment	PreliminaryAmendClaims.pdf	39746 33f2df56eb803a476fa1604e0d08ed4cf99a75e3	no	1
Warnings:					
Information:					
2	Applicant Arguments/Remarks Made in an Amendment	TransmissionwithCLaims.pdf	90042 16cbf7b6f3babf778bbee8710aaf80e39eb44a85	no	1
Warnings:					
Information:					
3	Fee Worksheet (SB06)	fee-info.pdf	30023 48273f4e0b01a9ea6415d0ef883cbd2792ce592e	no	2
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<u>New International Application Filed with the USPTO as a Receiving Office</u>
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(Not for submission under 37 CFR 1.99)

Application Number	13356949
Filing Date	2012-24-01
First Named Inventor	C. Earl Woolfork
Art Unit	2656
Examiner Name	Andrew Flanders
Attorney Docket Number	1028.5

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	1	5048057		1991-09-10	Holmdel, Saleh	
	2	6381053		2002-04-30	Ste-foy, Fathallah	
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	1	GB2261347	GB	A	1993-05-12	Livneh,Noam		☐

INFORMATION DISCLOSURE STATEMENT BY APPLICANT (**Not for submission under 37 CFR 1.99)**		
	Application Number	13356949
	Filing Date	2012-24-01
	First Named Inventor	C. Earl Woolfork
	Art Unit	2656
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	Application Number	13356949
	Filing Date	2012-24-01
	First Named Inventor	C. Earl Woolfork
	Art Unit	2656
	Examiner Name	Andrew Flanders
	Attorney Docket Number	1028.5

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Please see 37 CFR 1.97 and 1.98 to make the appropriate selection(s):

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☒ That no item of information contained in the information disclosure statement was cited in a communication from a foreign patent office in a counterpart foreign application, and, to the knowledge of the person signing the certification after making reasonable inquiry, no item of information contained in the information disclosure statement was known to any individual designated in 37 CFR 1.56(c) more than three months prior to the filing of the information disclosure statement. See 37 CFR 1.97(e)(2).

☐ See attached certification statement.

☐ Fee set forth in 37 CFR 1.17 (p) has been submitted herewith.

☐ None

SIGNATURE

A signature of the applicant or representative is required in accordance with CFR 1.33, 10.18. Please see CFR 1.4(d) for the form of the signature.

Signature	/Megan Lyman/	Date (YYYY-MM-DD)	2013-02-04
Name/Print	Megan Lyman	Registration Number	57054

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

(12) UK Patent Application (19) GB (11) 2 261 347 (13) A

(43) Date of A publication 12.05.1993

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(30) Priority data
(31) 100029 (32) 11.11.1991 (33) IL
794104 18.11.1991 US

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H03M 13/12, H04B 7/08, H04L 25/497

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H4P PRV
H4L LDDRCW L1H10 L27H4 L27H7A L27H9
U1S S2204 S2213

(56) Documents cited
GB 2191912 A GB 2185367 A

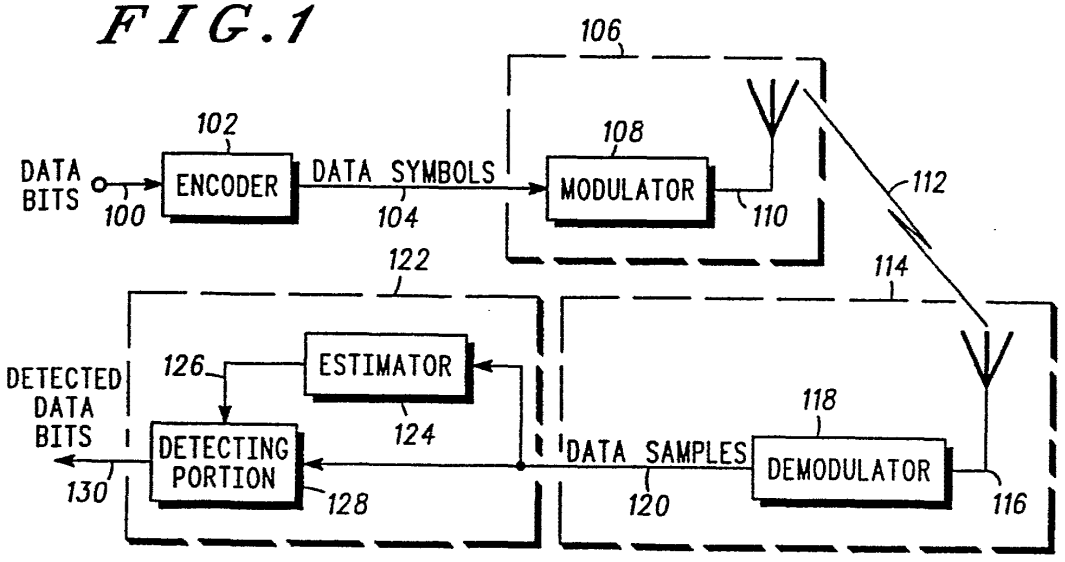
(58) Field of search
UK CL (Edition K) H4L LDDRCP LDDRCW LDDRCX LDDRQ LDDRX, H4P PDCSL PR
INT CL[5] H03M 13/12, H04L 25/49 25/497
Online databases: WPI

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Hugh Christopher Dunlop
Motorola, European Intellectual Property Operation, Jays Close, Viables Industrial Estate, Basingstoke, Hampshire, RG22 4PD, United Kingdom

(54) **Detection of data bits in a slow frequency hopping communication system**

(57) In the detecting process, the carrier to interference (C/I) power ratio of the hop of a slow frequency hopping spread spectrum signal (112), is estimated (124) by using the data samples (120) of the hop. Subsequently, a data bit (130) is detected by using the estimated C/I power ratio (126). The detection process (128) may include utilizing maximum likelihood decoding techniques to derive a data bit (130) from decision metrics and the estimated C/I power ratio (126). The decision metrics correspond to a measurement of the distance of data samples (120) from constellation points within a constellation space representating data samples (120) previously used to generate decision metrics. The detection process (128) also may include utilizing the estimated C/I power ratio (126) in combining data samples (120) of the hop as received from two or more diversity receiver branches.

FIG.1



GB 2 261 347 A

FIG. 1

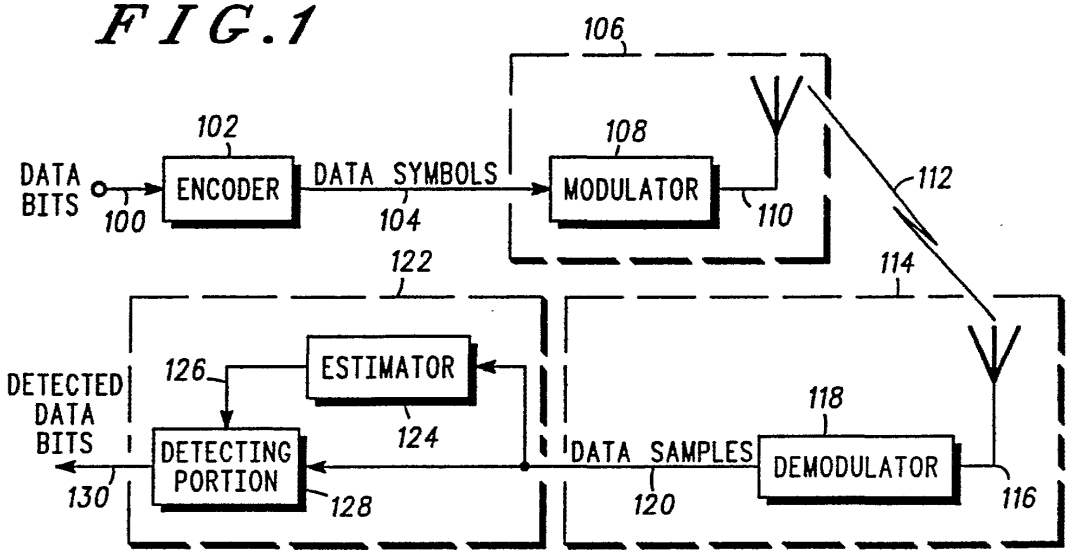
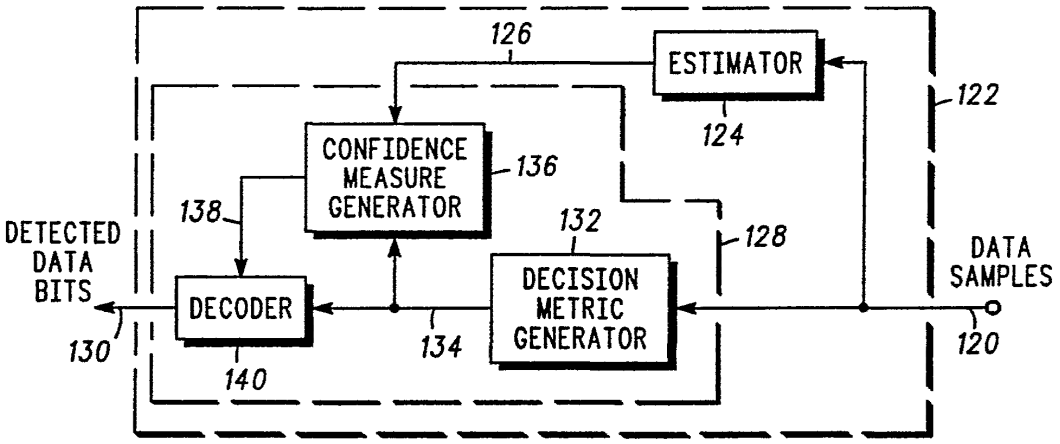

106
102
108
DATA BITS
100
ENCODER
DATA SYMBOLS
104
MODULATOR
110
112
122
114
126
ESTIMATOR
124
DETECTED DATA BITS
DETECTING PORTION
128
130
118
DATA SAMPLES
DEMODULATOR
120
116

FIG. 2


126
ESTIMATOR
124
122
CONFIDENCE MEASURE GENERATOR
136
138
132
128
DETECTED DATA BITS
DECODER
DECISION METRIC GENERATOR
DATA SAMPLES
130
134
120
140

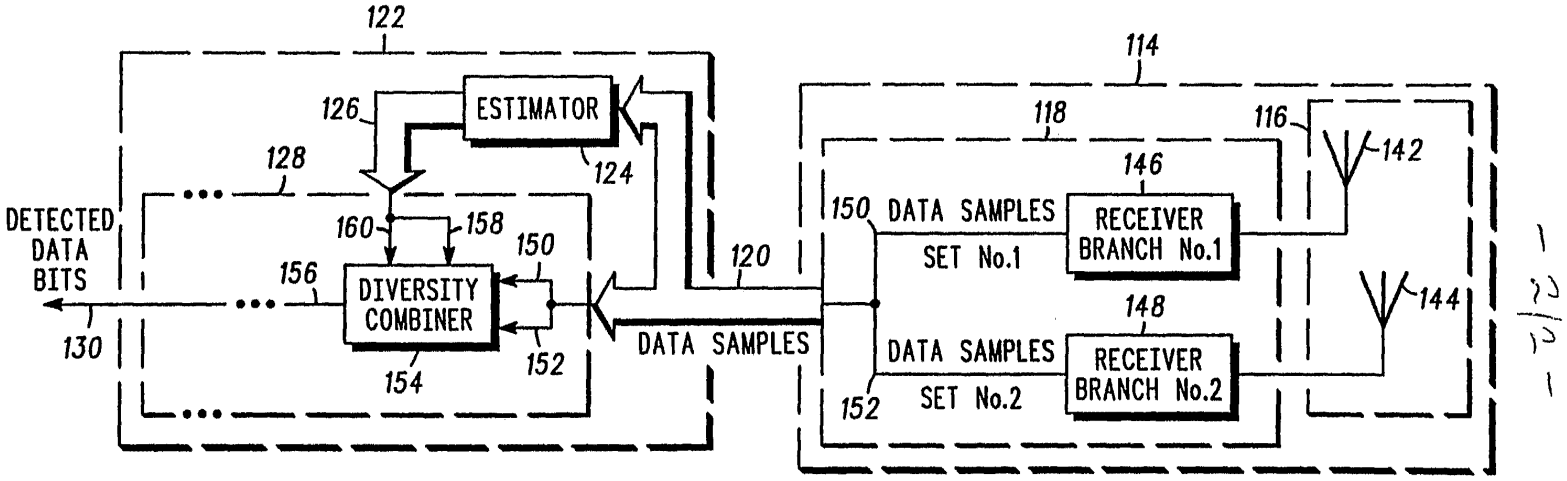

122
114
126
ESTIMATOR
124
118
116
142
128
146
150
DATA SAMPLES
SET No.1
RECEIVER
BRANCH No.1
DETECTED
DATA
BITS
160
158
150
120
156
DIVERSITY
COMBINER
148
144
130
DATA SAMPLES
DATA SAMPLES
SET No.2
RECEIVER
BRANCH No.2
154
152
152

FIG. 3

METHOD AND APPARATUS FOR IMPROVING DETECTION OF DATA BITS IN A SLOW FREQUENCY HOPPING COMMUNICATION SYSTEM

Field of the Invention

The present invention relates to communication systems which employ spread-spectrum signals and, more particularly, to a method and apparatus for improving a soft decision algorithm in a slow frequency hopping spread spectrum communication system.

Background of the Invention

Communication systems take many forms. In general, the purpose of a communication system is to transmit information-bearing signals from a source, located at one point, to a user destination, located at another point some distance away. A communication system generally consists of three basic components: transmitter, channel, and receiver. The transmitter has the function of processing the message signal into a form suitable for transmission over the channel. This processing of the message signal is typically referred to as modulation. The function of the channel is to provide a physical connection between the transmitter output and the receiver input. The function of the receiver is to process the received signal so as to produce an estimate of the original message signal. This processing of the received signal is referred to as demodulation.

Two types of two-way communication channels exist, namely, point-to point channels and point-to-multipoint channels. Examples of point-to-point channels include wirelines (e.g., local telephone transmission), microwave links, and optical fibers. In contrast, point-to-multipoint channels provide a capability where many receiving stations may be reached simultaneously from a single transmitter (e.g. cellular radio telephone communication systems). These point-to-multipoint systems are also termed Multiple Access Systems (MAS).

Analog and digital transmission methods are used to transmit a message signal over a communication channel. The use of digital methods offers several operational advantages over analog methods, including but not limited to: increased immunity to channel noise and interference, flexible operation of the system, common format for the transmission of different kinds of message signals, improved security of communication through the use of encryption, and increased capacity.

These advantages are attained at the cost of increased system complexity. However, through the use of very large-scale integration (VLSI) technology, a cost-effective way of building the hardware has been developed.

To transmit a message signal (either analog or digital) over a band-pass communication channel, the message signal must be manipulated into a form suitable for efficient transmission over the channel. Modification of the message signal is achieved by means of a process termed modulation. This process involves varying some parameter of a carrier wave in accordance with the message signal in such a way that the spectrum of the modulated wave matches the assigned channel bandwidth. Correspondingly, the receiver is required to recreate the original message signal from a degraded version of the transmitted signal after propagation through the channel. The re-creation is accomplished by using a process known as demodulation, which is the inverse of the modulation process used in the transmitter.

In addition to providing efficient transmission, there are other reasons for performing modulation. In particular, the use of modulation permits multiplexing, that is, the simultaneous transmission of signals from several message sources over a common channel. Also, modulation may be used to convert the message signal into a form less susceptible to noise and interference.

For multiplexed communication systems, the system typically consists of many remote units (i.e. subscriber units) which require active service over a communication channel for a short or discrete portion of the communication channel resource rather than continuous use of the resources on a communication channel. Therefore, communication systems have been designed to incorporate the characteristic of communicating with many remote units for brief intervals on the same communication channel. These systems are termed multiple access communication systems.

One type of communication system which can be a multiple access system is a spread spectrum system. In a spread spectrum system, a modulation technique is utilized in which a transmitted signal is spread over a wide frequency band within the communication channel. The frequency band is much wider than the minimum bandwidth required to transmit the information being sent. A voice signal, for example, can be sent with amplitude modulation (AM) in a bandwidth only twice that of the information itself. Other forms of modulation, such as low deviation frequency modulation (FM) or single sideband AM , also permit information to be transmitted in a bandwidth comparable to the bandwidth of the information itself. However, in a spread spectrum system, the modulation of a signal to be transmitted often includes taking a baseband signal (e.g., a voice channel) with a bandwidth of only a few kilohertz, and distributing the signal to be transmitted over a frequency band that may be many megahertz wide. This is accomplished by modulating the signal to be transmitted with the information to be sent and with a wideband encoding signal.

Three general types of spread spectrum communication techniques exist, including:

Direct Sequence

The modulation of a carrier by a digital code sequence whose bit rate is much higher than the information signal bandwidth. Such systems are referred to as "direct sequence" modulated systems.

Hopping

Carrier frequency shifting in discrete increments in a pattern dictated by a code sequence. These systems are called "frequency hoppers." The transmitter jumps from frequency to frequency within some predetermined set; the order of frequency usage is determined

by a code sequence. Similarly "time hopping" and "time-frequency hopping" have times of transmission which are regulated by a code sequence.

Chirp

Pulse-FM or "chirp" modulation in which a carrier is swept over a wide band during a given pulse interval.

Information (i.e. the message signal) can be embedded in the spread spectrum signal by several methods. One method is to add the information to the spreading code before it is used for spreading modulation. This technique can be used in direct sequence and frequency hopping systems. It will be noted that the information being sent must be in a digital form prior to adding it to the spreading code, because the combination of the spreading code and the information typically a binary code involves module-2 addition. Alternatively, the information or message signal may be used to modulate a carrier before spreading it.

Thus, a spread spectrum system must have two properties: (1) the transmitted bandwidth should be much greater than the bandwidth or rate of the information being sent and (2) some function other than the information being sent is employed to determine the resulting modulated channel bandwidth.

Spread spectrum communication systems can be implemented as multiple access systems in a number of different ways. One type of multiple access spread spectrum system is a code division multiple access (CDMA) system. CDMA spread spectrum systems may use direct sequence (DS-CDMA) or frequency hopping (FH-CDMA) spectrum spreading techniques. FH-CDMA systems can further be divided into slow frequency hopping (SFH-CDMA) and fast frequency hopping (FFH-CDMA) systems. In SFH-CDMA systems several data symbols, representing a sequence of data bits which are to be transmitted, modulate the carrier wave within a single hop. Whereas, in FFH-CDMA systems the carrier wave hops several times per data symbol.

In a SFH-CDMA system, multiple communication channels are accommodated by the assignment of portions of a broad frequency and or time band to each particular channel. For example, communication between two communication units in a particular communication channel is

accomplished by using a frequency synthesizer to generate a carrier wave in a particular portion of a predetermined broad frequency band for a brief period of time. The frequency synthesizer uses an input spreading code to determine the particular frequency from within the set of frequencies in the broad frequency band at which to generate the carrier wave. Spreading codes are input to the frequency synthesizer by a spreading code generator. The spreading code generator is periodically clocked or stepped through different transitions which causes different or shifted spreading codes to be output to the frequency synthesizer. Therefore, as the spreading code generator is periodically clocked, then so too is the carrier wave frequency hopped or reassigned to different portions of the frequency band. In addition to hopping, the carrier wave is modulated by data symbols representing a sequence of data bits which are to be transmitted. A common type of carrier wave modulation used in SFH-CDMA systems is M-ary frequency shift keying (MFSK), where $k = \log_2 M$ data symbols are used to determined which one of the M frequencies is to be transmitted.

Multiple communication channels are allocated by using a plurality of spreading codes to assign portions of the frequency band to different channels during the same time period. As a result, transmitted signals are in the same broad frequency band of the communication channel, but within unique portions of the broad frequency band assigned by the unique spreading codes. These unique spreading codes preferably are orthogonal to one another such that the cross-correlation between the spreading codes is approximately zero. Particular transmitted signals can be retrieved from the communication channel by despreading a signal representative of the sum of signals in the communication channel with a spreading code related to the particular transmitted signal which is to be retrieved from the communication channel. Further, when the spreading codes are orthogonal to one another, the received signal can be correlated with a particular spreading code such that only the desired signal related to the particular spreading code is enhanced while the other signals are not enhanced.

It will be appreciated by those skilled in the art that several different spreading codes exist which can be used to separate data signals from one another in a CDMA communication system. These spreading codes include but are not limited to pseudonoise (PN) codes and Walsh codes. A Walsh code corresponds to a single row or column of the Hadamard matrix. For example, in a 64 channel CDMA spread spectrum system, particular

mutually orthogonal Walsh codes can be selected from the set of 64 Walsh codes within a 64 by 64 Hadamard matrix.

Further it will be appreciated by those skilled in the art that the data signals are typically channel coded to improve performance of the communication system by enabling transmitted signals to better withstand the effects of various channel impairments, such as noise, fading, and jamming. Typically, channel coding reduces the probability of bit error, and/or reduces the required signal to noise ratio usually expressed as bit energy per noise density (E_b/N_0), to recover the signal at the cost of expending more bandwidth than would otherwise be necessary to transmit the data signal.

A typical spread spectrum transmission involves expanding the bandwidth of an information signal, transmitting the expanded signal and recovering the desired information signal by remapping the received spread spectrum into the original information signals bandwidth. This series of bandwidth trades used in spread spectrum signalling techniques allows a communication system to deliver a relatively error-free information signal in a noisy environment or communication channel. The quality of recovery of the transmitted information signal from the communication channel is measured by the error rate (i.e., the number of errors in the recovery of the transmitted signal over a particular time span or received bit span) for some E_b/N_0. As the error rate increases the quality of the signal received by the receiving party decreases. As a result, communication systems typically are designed to limit the error rate to an upper bound or maximum so that the degradation in the quality of the received signal is limited. In CDMA spread spectrum communication systems, the error rate is related to the noise interference level in the communication channel which is directly related to number of simultaneous but code divided users within the communication channel. Thus, in order to limit the maximum error rate, the number of simultaneous code divided users in the communication channel is limited. However, the error rate can be reduced by using channel coding schemes. The error rate can also be reduced by using diversity combining. Therefore, by using channel coding and/or diversity combining schemes the number of simultaneous users in a communication channel can be increased while still maintaining the same maximum error rate limit.

As discussed in Digital Communications: Fundamentals and Applications by Bernard Sklar, published by Prentice Hall, Englewood

Cliffs, New Jersey in 1988, especially chapters 5 and 6 entitled "Channel Coding" found on pages 245-380, several of these channel coding and decoding schemes have been developed for use in communication systems. Among the decoding schemes discussed is using a maximum-likelihood (ML) decoding algorithm. In addition to the discussion found in Sklar's book above-mentioned, Gottfried Ungerboeck described in general MLSE decoding algorithms in "Adaptive Maximum-Likelihood Receiver for Carrier-Modulated Data-Transmission Systems", IEEE Transactions on Communications, vol. com-22, no. 5, May 1974, p.p. 624-636. However, a need exists for ML decoding schemes to be specifically optimized for use in frequency hopping spread spectrum communication systems. In optimizing the communication system with respect to the ML decoding algorithm, one starting point is analyzing the implementation of the ML decoding algorithm to the particular environment to which it is to be used. For the purposes of this discussion, the environment will include convolutional encoders and ML decoding algorithms similar to the Viterbi decoding algorithm. It will be appreciated by those skilled in the art that these principles can be applied to other encoding techniques such as block encoding and ML decoding algorithms other than Viterbi-like algorithms. Through the use of these optimized decoding schemes, the number of simultaneous users in a communication system can be increased over the number of simultaneous users in a communication system using non-optimized decoding algorithms while maintaining the same maximum error rate limit.

Several of diversity combining schemes have been developed for use in communication systems. Among the diversity combining schemes is the diversity reception technique described in U.S. Pat. No. 5,031,193 entitled "Method and Apparatus for Diversity Reception of Time-Dispersed Signals". This patent describes diversity combining stages which perform either bit by bit selection of or maximal ratio combining of signals received from several receiver branches. The diversity combined signal may optionally be subsequently used in estimating the received sequence. Another diversity reception scheme is described in U. S. Pat. No. 4,271,525 entitled " Adaptive Diversity Receiver For Digital Communications". This patent describes an adaptive diversity receiver using an adaptive transversal filter for each receiver branch, followed by a decision feedback equalizer. The tap gains of the transversal filters are

updated via feedback from the output of the equalizer, and other points in the receiver. However, a need exists for diversity combining schemes to be specifically optimized for use in frequency hopping spread spectrum communication systems. In optimizing the communication system with respect to diversity combining, one starting point is analyzing the implementation of diversity combining to the particular environment to which it is to be used. For the purposes of this discussion, the environment will include at least two receiver branches and a signal combining technique of either bit by bit selection or maximal ratio combining. It will be appreciated by those skilled in the art that these principles can be applied to other diversity combining techniques. Through the use of these optimized diversity combining schemes, the number of simultaneous users in a communication system can be increased over the number of simultaneous users in a communication system using non-optimized diversity combining techniques while maintaining the same maximum error rate limit.

Summary of the Invention

A method and apparatus is provided for improving detection of data bits in data samples of a hop of a slow frequency hopping spread spectrum signal. In the detecting process, the carrier to interference (C/I) power ratio of the hop is estimated by using the data samples of the hop. Subsequently, a data bit is detected by using the estimated C/I power ratio. The detection process may include utilizing maximum likelihood decoding techniques to derive a data bit from decision metrics and the estimated C/I power ratio. The decision metrics correspond to a measurement of the distance of data samples from constellation points within a constellation space representing data samples previously used to generate decision metrics. The detection process also may include utilizing the estimated C/I power ratio in combining data samples of the hop as received from two or more diversity receiver branches.

Brief Description of the Drawings

FIG. 1 is a block diagram showing a preferred embodiment slow frequency hopping communication system.

FIG. 2 is a block diagram showing a preferred embodiment data bit detection portion which utilize maximum likelihood decoding techniques.

FIG. 3 is a block diagram showing preferred embodiment receiving and data bit detection portions which utilize diversity combining techniques.

Detailed Description

Referring now to FIG. 1, a preferred embodiment slow frequency hopping (SFH) communication system is shown. In optimizing the communication system, one starting point is analyzing the implementation of the ML decoding algorithm and diversity combining techniques to the particular environment to which it is to be used. For the purposes of this discussion, the environment will include convolutional encoding of data bits prior to transmission and slow frequency hopping signaling. It will be appreciated by those skilled in the art that these principles can be applied to other encoding techniques such as block encoding as well as other signalling techniques having properties similar to slow frequency hopping signalling such as time hopping signalling.

In order to design either a convolutional decoder to perform optimal ML decoding or a diversity combiner to perform optimal diversity combining, obtaining knowledge about the received carrier signal power to interference signal power ratio (i.e., C/I power ratio) is desirable. Measurement of the actual C/I power ratio in SFH communication systems can be difficult since the carrier signal hops at discrete time intervals over a broad frequency band. The C/I power ratio may change with each hop, since the interference in different portions of the broad frequency band may vary by the frequency. This variance of the interference at different frequencies may be due to signals other than the desired signal being transmitted at or near the same frequency as the desired frequency as well as from spurious noise bursts from electrical power generators and transmission lines, solar flares, atmospheric disturbances and the like. Therefore, since actual measurement is difficult, an approximation of the C/I power ratio in SFH communication systems is desirable.

In accordance with a preferred embodiment of the present invention one such approximation of the the C/I power ratio is proposed. In this preferred embodiment an assumption concerning the communication channel conditions has been made. This assumption is that the C/I power ratio

remains constant over the duration of a single hop. Such an assumption is valid so long as the duration of the hop is short enough to be able to reasonably assume that the magnitude of the power interference sources in the communication channel would be constant over the hop. The preferred embodiment approximation or estimate of the C/I power ratio of a hop of a SFH spread spectrum signal is measured according to the following equation for Ψ:

$$\Psi = \frac{Ave^2\{Re\{z\}\}}{Ave\{|z|^2\} - Ave^2\{Re\{z\}\}} \qquad \text{(eq. 1)}$$

In the equation (eq. 1), z represents the phase modulation cancelled forms of the data samples of a hop of the SFH signal. The data samples are samples of the complex envelope of the hop where the hop has been modulated by nth phase shift keying. Cancellation of nth phase shift keying modulation of the hop of the slow frequency hopping spread spectrum signal can be accomplished by raising the complex envelope of the hop to the nth power. As a result, z represents the phase modulation cancelled forms of the data samples which comprise samples of the complex envelope of the hop raised to the nth power for the nth phase shift keying modulated hop of the slow frequency hopping spread spectrum signal. For example, a complex envelope of a bi-phase shift key modulated (BPSK) hop of a SFH signal is raised to the second power (i.e., squared) in order to generate a phase modulation cancelled form of the hop. Similarly, a complex envelope of a quadrature phase shift key modulated (QPSK) hop of a SFH signal is raised to the fourth power in order to generate a phase modulation cancelled form of the hop.

In addition, in the equation (eq. 1), $Ave^2\{Re\{z\}\}$ is the square of the average of the real portion of z over the hop. More precisely, z_k represents a single phase modulation cancelled data sample where the data sample is represented as a complex number having a real and an imaginary portion. In addition, N is the number of data samples of the complex envelope of the hop. Thus, $Ave^2\{Re\{z\}\}$ may be computed by squaring the result of the following equation:

$$\frac{1}{N}\sum_{k=1}^{N} Re\{z_k\} \qquad \text{(eq. 2)}$$

in which the real portions of each data sample z_i of the hop are summed together and subsequently divided by the number of data samples of the hop.

In addition, in the equation (eq. 1), Ave$\{|z|^2\}$ is the average of the square of the magnitude of the complex valued z (i.e. where z has a real and imaginary portion) over the hop. More precisely, as noted above, z_k represents a single phase modulation cancelled data sample where the data sample is represented as a complex number having a real and an imaginary portion. In addition, N is the number of data samples of the complex envelope of the hop. Thus, Ave$\{|z|^2\}$ may be computed according to the following equation:

$$\frac{1}{N}\sum_{k=1}^{N}|z_k|^2 \qquad \text{(eq. 3)}$$

in which the square of the absolute value of each data sample z_k is summed together and subsequently divided by the number of data samples of the hop.

It will be appreciated by those skilled in the art that any monotonically related form of the estimate of the C/I power ratio (Ψ) may be used without departing from the scope of the present invention. For example, an estimate maybe formed using Ψ in which Ψ is raised to a power greater or less than one, Ψ is multiplied or divided by a constant value or variable, and/or Ψ is added to or subtracted from a constant value or variable. Further, it will be appreciated by those skilled in the art that this preferred embodiment C/I power ratio estimate (Ψ) has several advantages. These advantages include the ease of calculation of the estimate (Ψ) due to simple arithmetic operations being performed on digital values which represent data samples. Another advantage is the lack of need for measurements other than those already being done in the data bit detecting process. The sampling of the complex envelope of the hop is already being done in conjunction with the data bit detecting process. Further, measurement of the actual C/I power ratio would involve the additional steps of measuring the power of the carrier and interference signals over the hop. Yet another advantage is that this estimate (Ψ) does not require any prior knowledge

concerning the data bits being transmitted within of the hop of the SFH signal.

This estimate of the C/I ratio (Ψ) of a hop is a monotonous function of the actual C/I power ratio. A derivation of a proof this statement follows. Each data sample (x_k) of the complex envelope of the received hop of the SFH signal is described by the following equation:

$$x_k = P + n_r + jn_i \qquad \text{(eq. 4)}$$

where P is the average amplitude of the received data sample and n_r ,n_i are the real and imaginary components of the interference. Both n_r ,n_i are independent, zero mean normal variables, with equal variance σ_n^2 (i.e. they can be modeled as white, Gaussian noise). However, these following derivations can be easily extended by one skilled in the art to non-Gaussian noise. The actual C/I power ratio can be described as:

$$\frac{C}{I} = \frac{2 \cdot Ave^2\{Re\{x_k\}}{Var[Re\{x_k\}] + Var[Im\{x_k\}]} = \frac{P^2}{\sigma_n^2} \qquad \text{(eq. 5)}$$

When a BPSK modulated SFH signal is used in the communication system, the derivation of the proof that the estimated C/I power ratio (Ψ) of (eq. 1) is a monotonous function of the actual C/I power ratio continues as follows.

$$z_k = x_k^2 = (P + n_r + jn_i)^2 = (P + n_r)^2 - n_i^2 + j2(P + n_r)n_i \qquad \text{(eq. 6)}$$

where z_k represents a single phase modulation cancelled data sample where the data sample (x_k) is represented as a complex number having a real and an imaginary portion and (eq. 4) was substituted into (eq. 6) for x_k.

In addition, in the equation (eq. 1), Ave{Re{z}} is the average of the real portion of z over the hop. More precisely,

$$\begin{aligned} Ave\{Re\{z\}\} &= \overline{(P + n_r)^2} - \overline{n_i^2} \\ &= \overline{P^2} + \overline{2Pn_r} + \overline{n_r^2} - \overline{n_i^2} \\ &= P^2 + 0 + \sigma_n^2 - \sigma_n^2 = P^2 \end{aligned} \qquad \text{(eq. 7)}$$

where the real portion of z_k as defined in (eq. 6) was substituted in (eq. 7) and, in accordance with the definition of Gaussian noise model given above and the definition of the nth central moment of a Gaussian random variable, the average of n_r and n_i (i.e., $\overline{n_r}$ and $\overline{n_i}$) each go to zero over the hop and average of n_r^2 and n_i^2 (i.e., $\overline{n_r^2}$ and $\overline{n_i^2}$) each go to σ_n^2.

In addition, in the equation (eq. 1), $|z_k|^2$ is the square of the absolute value of z_k. More precisely,

$$\begin{aligned}|z_k|^2 &= \left[(P + n_r)^2 - n_i^2\right]^2 + \left[2(P + n_r)n_i\right]^2 \\ &= (P + n_r)^4 - 2(P + n_r)^2 n_i^2 + n_i^4 + 4(P + n_r)^2 n_i^2 \\ &= (P + n_r)^4 + 2(P + n_r)^2 n_i^2 + n_i^4 \\ &= (P^4 + 4P^3 n_r + 6P^2 n_r^2 + 4P n_r^3 + n_r^4) \\ &\quad + (2P^2 n_i^2 + 2P n_r n_i^2 + 2n_r^2 n_i^2) + n_i^4 \end{aligned} \qquad \text{(eq. 8)}$$

where the definition of z_k from (eq. 6) was substituted in (eq. 8).

In addition, in the equation (eq. 1), Ave$\{|z|^2\}$ is the average of the square of the magnitude of the real and imaginary portions of z over the hop. More precisely,

$$\begin{aligned}\text{Ave}\{|z|^2\} &= \overline{P^4} + \overline{4P^3 n_r} + \overline{6P^2 n_r^2} + \overline{4P n_r^3 + n_r^4} \\ &\quad + \overline{2P^2 n_i^2} + \overline{2P n_r n_i^2} + \overline{2n_r^2 n_i^2} + \overline{n_i^4} \\ &= P^4 + 0 + 6P^2\sigma_n^2 + 0 + 3\sigma_n^4 + 2P^2\sigma_n^2 + 0 + 2\sigma_n^4 + 3\sigma_n^4 \\ &= P^4 + 8P^2\sigma_n^2 + 8\sigma_n^4 \end{aligned} \qquad \text{(eq. 9)}$$

where the square of the absolute value of z_k as defined in (eq. 8) was substituted in (eq. 9). In addition, in accordance with the definition of Gaussian noise model given above and the definition of the nth central moment of a Gaussian random variable, the average of an odd power of n_r and n_i (i.e., $\overline{n_r}$ and $\overline{n_i}$) each go to zero over the hop and average of an even power n of n_r and n_i (i.e., $\overline{n_r}$ and $\overline{n_i}$) each go to a factor defined as:

$$\overline{n_r^n} = \overline{n_i^n} = 1 \cdot 3 \cdot 5 \cdot (n-1) \cdot \sigma_n^n \qquad \text{(eq. 10)}$$

such that $\overline{n_r^2} = \overline{n_i^2} = \sigma_n^2$ and $\overline{n_r^4} = \overline{n_i^4} = 3\sigma_n^4$.

Thus, (eq. 5), (eq. 7) and (eq. 9) can be substituted into (eq. 1) as follows to derive an expression of the estimate of the power ratio (Ψ) in terms of actual C/I power ratio:

$$\Psi = \frac{Ave^2\{Re\{z\}\}}{Ave\{|z|^2\} - Ave^2\{Re\{z\}\}}$$
$$= \frac{P^4}{P^4 + 8P^2\sigma_n^2 + 8\sigma_n^4 - P^4} = \frac{P^4}{8P^2\sigma_n^2 + 8\sigma_n^4}$$
$$= \frac{(C/I)^2}{8(C/I) + 8} \qquad \text{(eq. 11)}$$

which is a monotonic function of C/I since the derivative of the estimate (Ψ) with respect to the actual C/I is greater than zero for all real and positive values of C/I. More precisely,

$$\frac{\delta\Psi}{\delta(C/I)} = \frac{\delta}{\delta(C/I)}\frac{(C/I)^2}{8(C/I) + 8} = \frac{8(C/I)^2 + 16(C/I)}{[8(C/I) + 8]^2} > 0 \qquad \text{(eq. 12)}$$

Thus, for a BPSK modulated SFH signal the estimated C/I power ratio (Ψ) of (eq. 1) is a monotonous function of the actual C/I power ratio.

When a QPSK modulated SFH signal is used in the communication system, the derivation of the proof that the estimated C/I power ratio (Ψ) of (eq. 1) is a monotonous function of the actual C/I power ratio continues as follows.

$$z_k = x_k^4 = (P + n_r + jn_i)^4$$
$$= (P + n_r)^4 - 6(P + n_r)^2 n_i^2 + n_i^4 + j4(P + n_r)n_i[(P + n_r)^2 - n_i^2] \qquad \text{(eq. 13)}$$

where z_i represents a single phase modulation cancelled data sample where the data sample (x_k) is represented as a complex number having a real and an imaginary portion and (eq. 4) was substituted into (eq. 13) for x_k.

In addition, in the equation (eq. 1), Ave{Re{z}} is the average of the real portion of z over the hop. More precisely,

$$Ave\{Re\{z\}\} = \overline{(P + n_r)^4} - \overline{6(P + n_r)^2 n_i^2} + \overline{n_i^4}$$
$$= \left(\overline{P^4} + \overline{4P^3 n_r} + \overline{6P^2 n_r^2} + \overline{4P n_r^3} + \overline{n_r^4}\right)$$
$$- \left(\overline{6P^2 n_i^2} + \overline{12 n_r n_i^2} + \overline{6 n_r^2 n_i^2}\right) + \overline{n_i^4}$$
$$= P^4 + 0 + 6P^2\sigma_n^2) + 0 + 3\sigma_n^2 - 6P^2\sigma_n^2 - 0 - 6\sigma_n^4 + 3\sigma_n^4$$
$$= P^4 \qquad \text{(eq. 14)}$$

where the real portion of z_k as defined in (eq. 13) was substituted in (eq. 14) and, in accordance with the definition of Gaussian noise model given above and the definition of the nth central moment of a Gaussian random variable, the average of an odd power of n_r and n_i (i.e., $\overline{n_r}$ and $\overline{n_i}$) each go to zero over the hop and average of an even power n of n_r and n_i (i.e., $\overline{n_r}$ and $\overline{n_i}$) each go to a factor defined in (eq. 10) such that $\overline{n_r^2} = \overline{n_i^2} = \sigma_n^2$ and $\overline{n_r^4} = \overline{n_i^4} = 3\sigma_n^4$.

In addition, in the equation (eq. 1), $|z_k|^2$ is the square of the absolute value of z_k. More precisely,

$$
\begin{aligned}
|z_k|^2 &= \left[(P + n_r)^4 - 6(P + n_r)^2 n_i^2 + n_i^4\right]^2 \\
&\quad + \left[4(P + n_r)n_i[(P + n_r)^2 - n_i^2]\right]^2 \\
&= (P + n_r)^8 - 12(P + n_r)^6 n_i^2 + 38(P + n_r)^4 n_i^4 - 12(P + n_r)^2 n_i^6 + n_i^8 \\
&\quad + 16(P + n_r)^2 n_i^2[(P + n_r)^4 - 2(P + n_r)^2 n_i^2 + n_i^4] \\
&= (P + n_r)^8 - 12(P + n_r)^6 n_i^2 + 38(P + n_r)^4 n_i^4 - 12(P + n_r)^2 n_i^6 + n_i^8 \\
&\quad + 16(P + n_r)^6 n_i^2 - 32(P + n_r)^4 n_i^4 + 16(P + n_r)^2 n_i^6 \\
&= (P + n_r)^8 + 4(P + n_r)^6 n_i^2 + 6(P + n_r)^4 n_i^4 + 4(P + n_r)^2 n_i^6 + n_i^8 \\
&= (P^8 + 8P^7 n_r + 28P^6 n_r^2 + 56P^5 n_r^3 + 70P^4 n_r^4 + 56P^3 n_r^5 \\
&\quad + 28P^2 n_r^6 + 8P n_r^7 + n_r^8) \\
&\quad + 4(P^6 + 6P^5 n_r + 15P^4 n_r^2 + 20P^3 n_r^3 + 15P^2 n_r^4 \\
&\quad + 6P n_r^5 + n_r^6) n_i^2 \\
&\quad + 6(P^4 + 4P^3 n_r + 6P^2 n_r^2 + 4P n_r^3 + n_r^4) n_i^4 \\
&\quad + 4(P^2 + 2P n_r + n_r^2) n_i^6 + n_i^8
\end{aligned}
\qquad \text{(eq. 15)}
$$

where the definition of z_k from (eq. 13) was substituted in (eq. 15).

In addition, in the equation (eq. 1), Ave$\{|z|^2\}$ is the average of the square of the magnitude of the real and imaginary portions of z over the hop. More precisely,

$$
\begin{aligned}
\text{Ave}\{|z|^2\} &= \Big(\overline{P^8 + 8P^7 n_r + 28P^6 n_r^2 + 56P^5 n_r^3 + 70P^4 n_r^4} \\
&\quad \overline{+ 56P^3 n_r^5 + 28P^2 n_r^6 + 8P n_r^7 + n_r^8} \Big) \\
&\quad + \Big[\overline{4\left(P^6 + 6P^5 n_r + 15P^4 n_r^2 + 20P^3 n_r^3 + 15P^2 n_r^4\right.} \\
&\quad \overline{\left. + 6P n_r^5 + n_r^6\right) n_i^2} \Big] \\
&\quad + \Big(\overline{6(P^4 + 4P^3 n_r + 6P^2 n_r^2 + 4P n_r^3 + n_r^4) n_i^4} \Big) \\
&\quad + \Big(\overline{4(P^2 + 2P n_r + n_r^2) n_i^6} \Big) + \overline{n_i^8}
\end{aligned}
$$

The above expression can be simplified by eliminating the terms which go to zero (i.e. those terms having n_r or n_i raised to an odd power) results in the following expression:

$$
\begin{aligned}
&= \left(\overline{P^8 + 28P^6n_r^2 + 70P^4n_r^4 + 28P^2n_r^6 + n_r^8}\right) \\
&\quad + \left[\overline{4\left(P^6 + 15P^4n_r^2 + 15P^2n_r^4 + n_r^6\right)n_i^2}\right] \\
&\quad + \left(\overline{6(P^4 + 6P^2n_r^2 + n_r^4)n_i^4}\right) \\
&\quad + \left(\overline{4(P^2 + n_r^2)n_i^6}\right) + \overline{n_i^8} \\
&= \left(\overline{P^8 + 28P^6n_r^2 + 70P^4n_r^4 + 28P^2n_r^6 + n_r^8}\right) \\
&\quad + \left(\overline{4P^6n_i^2 + 60P^4n_r^2n_i^2 + 60P^2n_r^4n_i^2 + 4n_r^6n_i^2}\right) \\
&\quad + \left(\overline{6P^4n_i^4 + 36P^2n_r^2n_i^4 + 6n_r^4n_i^4}\right) \\
&\quad + \left(\overline{4P^2n_i^6 + 4n_r^2n_i^6}\right) + \overline{n_i^8} \\
&= \overline{P^8} + \overline{28P^6n_r^2} + \overline{70P^4n_r^4} + \overline{28P^2n_r^6} + \overline{n_r^8} \\
&\quad + \overline{4P^6n_i^2} + \overline{60P^4n_r^2n_i^2} + \overline{60P^2n_r^4n_i^2} + \overline{4n_r^6n_i^2} \\
&\quad + \overline{6P^4n_i^4} + \overline{36P^2n_r^2n_i^4} + \overline{6n_r^4n_i^4} \\
&\quad + \overline{4P^2n_i^6} + \overline{4n_r^2n_i^6} + \overline{n_i^8} \\
&= P^8 + 28P^6\sigma_n^2 + 210P^4\sigma_n^4 + 420P^2\sigma_n^6 + 105\sigma_n^8 \\
&\quad + 4P^6\sigma_n^2 + 60P^4\sigma_n^4 + 180P^2\sigma_n^6 + 60\sigma_n^8 \\
&\quad + 18P^4\sigma_n^4 + 108P^2\sigma_n^6 + 54\sigma_n^8 \\
&\quad + 60P^2\sigma_n^6 + 60\sigma_n^8 + 105\sigma_n^8 \\
&= P^8 + 32P^6\sigma_n^2 + 288P^4\sigma_n^4 + 768P^2\sigma_n^6 + 384\sigma_n^8 \qquad \text{(eq. 16)}
\end{aligned}
$$

where the square of the absolute value of z_k as defined in (eq. 8) was substituted in (eq. 9). In addition, , in accordance with the definition of Gaussian noise model given above and the definition of the nth central moment of a Gaussian random variable, the average of an odd power of n_r and n_i (i.e., $\overline{n_r^n}$ and $\overline{n_i^n}$) each go to zero over the hop and average of an even power n of n_r and n_i (i.e., $\overline{n_r^n}$ and $\overline{n_i^n}$) each go to a factor defined in (eq. 10) such that $\overline{n_r^2} = \overline{n_i^2} = \sigma_n^2$, $\overline{n_r^4} = \overline{n_i^4} = 3\sigma_n^4$, $\overline{n_r^6} = \overline{n_i^6} = 15\sigma_n^6$, and $\overline{n_r^8} = \overline{n_i^8} = 105\sigma_n^8$.

Thus, (eq. 5), (eq. 14) and (eq. 16) can be substituted into (eq. 1) as follows to derive an expression of the estimate of the power ratio (Ψ) in terms of actual C/I power ratio:

$$\Psi = \frac{Ave^2\{Re\{z\}\}}{Ave\{|z|^2\} - Ave^2\{Re\{z\}\}}$$
$$= \frac{P^8}{P^8 + 32P^6\sigma_n^2 + 288P^4\sigma_n^4 + 768P^2\sigma_n^6 + 384\sigma_n^8 - P^8}$$
$$= \frac{P^8}{32P^6\sigma_n^2 + 288P^4\sigma_n^4 + 768P^2\sigma_n^6 + 384\sigma_n^8}$$
$$= \frac{(C/I)^4}{32(C/I)^3 + 288(C/I)^2 + 768(C/I) + 384} \qquad \text{(eq. 17)}$$

which is a monotonic function of C/I since the derivative of the estimate (Ψ) with respect to the actual C/I is greater than zero for all real and positive values of C/I. More precisely,

$$\frac{\delta\Psi}{\delta(C/I)} = \frac{\delta}{\delta(C/I)} \frac{(C/I)^4}{32(C/I)^3 + 288(C/I)^2 + 768(C/I) + 384}$$
$$= \frac{288(C/I)^5 + 1536(C/I)^4 + 1152(C/I)^3}{\left(32(C/I)^3 + 288(C/I)^2 + 768(C/I) + 384\right)^2} > 0 \qquad \text{(eq. 18)}$$

Thus, for a QPSK modulated SFH signal the estimated C/I power ratio (Ψ) of (eq. 1) is a monotonous function of the actual C/I power ratio.

It will be appreciated by those skilled in the art that the above derivations can be extended to any nth phase shift keying modulated SFH signal to prove that the estimated C/I power ratio (Ψ) of (eq. 1) is a monotonous function of the actual C/I power ratio for any nth phase shift keying modulated SFH signal.

Since this estimate of each hop's C/I power ratio (Ψ) of (eq. 1) is a monotonous function of the actual C/I power ratio, this estimate of each hop's C/I power ratio (Ψ) may preferably be used to determine a level of confidence that a particular hop was detected properly by a receiving station. The number of levels of confidence which may be determined can be varied depending on the particular use for the level of confidence. For example, two levels of confidence may be determined for use in a hard decision environment. The two levels of confidence include: (1) full confidence which corresponds to the estimated C/I power ratio being at or above a particular threshold and (2) no confidence which corresponds to the estimated C/I

power ratio being below the particular threshold. In another example, several levels of confidence may be determined for use in a soft decision environment. These several levels of confidence correspond to increasing confidence as the estimated C/I power ratio increases in value.

A description of a preferred embodiment communication system, shown in FIG. 1, which incorporates the above mentioned optimizing principles for a data bit detection in a SFH signal follows. In the encoding portion 102 of the communication system, traffic channel data bits 100 are input to an encoder 102 at a particular bit rate. The input traffic channel data bits can include either voice converted to data by a vocoder, pure data, or a combination of the two types of data. Encoder 102 preferrably encodes the input data bits 100 into data symbols 104 at a fixed encoding rate with an encoding algorithm which facilitates subsequent maximum likelihood decoding of the data symbols into data bits (e.g. convolutional or block coding algorithms).

The data symbols 104 may optionally then be interleaved by the encoding portion 102. Typically, interleaving increases the output distance between the consecutively input non-interleaved data symbols. This interleaving of data symbols causes burst of errors to be spread out in time and thus to be handled by the data bit detector as if they were random errors. This interleaving thereby allows random-error-correcting coding (e.g. convolutional coding) to be useful in a bursty noise communication channel (e.g. radio frequency communication channels). The interleaving preferably is limited to a predetermined size of the block of data symbols. The block size preferably is derived from the maximum number of data symbols, representing input data bits 100, which can be transmitted at a predetermined chip rate within a predetermined length transmission block. Subsequently, the interleaved data symbols 104 are output from the encoding portion 102. It will be appreciated by those skilled in the art that several different variations of interleaving could be implemented without departing from the scope of the present invention. For example, several different techniques can be used to interleave the data symbols (e.g., convolutional or block interleaving). In addition, the size of the interleaving block could be altered to accommodate different transmission lengths or rates. Also, the dimensions of the matrix could be altered to increase or decrease the interleaved distance between consecutively input groups of data symbols.

The interleaved data symbols 104 are then input to a transmitting portion 106 of the communication system. It will be appreciated by those skilled in the art that additional coding of the data symbols 104 may be done in the transmitting portion 106 to enable multiple access by several users to the same communication channel. Such encoding may include coding which ensures orthogonality of an individual users encoded traffic channel bits from other users encoded traffic channel bits. However, this additional coding typically depends upon the specific implementation of the SFH communication system. Further, this additional coding typically will not interfere with the implementation of the teachings of the present invention as described herein as long as the additional encoding is done after the initial encoding and the additional decoding is done prior to the preferred embodiment data bit detection process. The interleaved data symbols 104 are prepared for transmission over a communication channel as a SFH signal by a modulator 106. Subsequently, the modulated sequence is provided to an antenna 110 for transmission over the communication channel 112.

A receiving portion 114 of the communication system receives the transmitted SFH spread spectrum signal from over the communication channel 112 through antenna 116. Each hop of the received SFH signal preferably is sampled into data samples 120 by demodulator 118. Subsequently, the data samples 120 are output to the detector 122 of the communication system.

If the encoder 102 of the communication has interleaved the data symbols, then the detector 122 deinterleaves the data samples by using a technique which is substantially inverse to the interleaving technique used in the encoder 102. After, if necessary, such deinterleaving, the detector 122 of the communication system inputs the data samples 120 into a an estimator 124 which preferrably generates an estimate of the C/I power ratio (Ψ) 126 for each hop in accordance with the algorithm described above as (eq. 1) and reproduced below:

$$\Psi = \frac{\text{Ave}^2\{\text{Re}\{z\}\}}{\text{Ave}\{|z|^2\} - \text{Ave}^2\{\text{Re}\{z\}\}} \qquad \text{(eq. 1)}$$

The symbol z preferrably represents the phase modulation cancelled forms of the data samples of a hop of the SFH signal. The data samples preferrably are samples of the complex envelope of the hop where the

hop has been modulated by nth phase shift keying. Cancellation of nth phase shift keying modulation of the hop of the slow frequency hopping spread spectrum signal preferrably is accomplished by raising the complex envelope of the hop to the nth power. As a result, z represents the phase modulation cancelled forms of the data samples which comprise samples of the complex envelope of the hop raised to the nth power for the nth phase shift keying modulated hop of the slow frequency hopping spread spectrum signal. It will be appreciated by those skilled in the art that any monotonically related form of the estimate of the C/I power ratio (Ψ) may be used without departing from the scope of the present invention.

The detector 122 of the communication system also inputs the data samples 120 into the detecting portion 128 which detects data bits 130 in the data samples 128 of each particular hop by using the estimated C/I power ratio 126 for that particular hop which was generated by the estimator 124.

The preferred embodiment described in reference to FIG. 1 may be further extended into a more specific use in the detection process of the C/I power ratio estimate 126 to the decoding process as shown in FIG. 2. In FIG. 2, the detector 122 input the data samples 120 associated with each hop into a decision metric generator 132 of the detecting portion 128. The decision metric generator 132 uses the input data samples 120 to generate decision metrics 134 associated with each hop which correspond to a distance of an input data sample from a constellation point within a constellation space representing previously input data samples 120. These decision metrics 134 correspond to possible transitions within a maximum likelihood decoding trellis which decoder 140 will subsequently be determining.

The estimator 124 inputs the estimate of the C/I power ratio (Ψ) 126 associated with each hop into the detecting portion 128. The detecting portion 128 provides the C/I power ratio estimates (Ψ) 126 to a confidence measure generator 136. The confidence measure generator 136 also receives the decision metrics 134 associated with each hop from the decision metric generator. The confidence measure generator 136 uses the C/I power ratio estimate (Ψ) 126 associated with a particular hop to determine a level of confidence 138 in the accuracy of the decision metrics 134 associated with the particular hop (i.e., accurately or actually relate to the transmitted encoded data bits 100). For example, if the C/I power ratio

estimate (Ψ) 126 for the hop is below a predetermined threshold, then the probability that the data samples 120 of that hop actually represent the transmitted encoded data bits 100 is low. As a result the decision metrics 134 are probably not actually related to the transmitted encoded data bits 100, because the data samples 120 of the hop probably do not correspond to the transmitted encoded data bits 100.

The number of different levels of confidence 138 which may be determined for a particular hop can be varied depending on the particular use for the level of confidence 138. For example, two levels of confidence in the decision metrics 134 of each hop may be determined for use in a hard decision environment. The two levels of confidence include: (1) full confidence which corresponds to the estimated C/I power ratio being at or above a particular threshold and (2) no confidence which corresponds to the estimated C/I power ratio being below the particular threshold. In response to a full confidence measure 138, the associated decision metrics 134 for the hop would be used by the decoder 140. However, in response to a no confidence measure 138, the associated decision metrics 134 for the hop would not be used by the decoder 140. In another example, several levels of confidence in the decision metrics 134 of each hop may be determined for use in a soft decision environment. These several levels of confidence correspond to increasing confidence as the estimated C/I power ratio 138 increases in value. In response to the increasing level of confidence measure 138, the associated decision metrics 134 for the hop would be given greater weight by decoder 140. Such a weighting system of the decision metrics 134 by a decoder 140 is often termed using side information about the decision metrics 134.

The decoder 140 preferably generates estimated data bits 130 by utilizing maximum likelihood decoding techniques to derive the estimated traffic channel data bits 130 from the decision metrics 134 of each hop and the associated confidence measures 138 which are input to the decoder 140. When the traffic channel data bits 100 have been convolutionally encoded, the maximum likelihood decoding techniques which are used may based upon the Viterbi decoding algorithm.

The preferred embodiment described in reference to FIG. 1 may be further extended into a more specific use in the detection process of the C/I power ratio estimate 126 to the diversity combining process as shown in FIG. 3. In FIG. 3, the receiving portion 114 of the communication system.

receives the transmitted SFH spread spectrum signal from over the communication channel 112 through antenna structure 116. The antenna structure 116 preferrably includes at least a first receiving antenna 142 and a second receiving antenna 144. The first receiving antenna 142 is preferrably geographically displaced from the second receiving antenna 144 such that a diversity antenna structure is formed. Each hop of the SFH signal as received by the first and second antennae 142 and 144 is preferrably input to the demodulator 118. Demodulator 118 includes a first and second receiver branch 146 and 148, respectively. The first receiver branch 146 is coupled to the first antenna 142 in order to demodulate and sample each hop of the SFH signal 122 received by the first antenna 142 into a first data sample set 150. Similarly, the second receiver branch 148 is coupled to the second antenna 144 in order to demodulate and sample each hop of the SFH signal 122 received by the second antenna 144 into a second data sample set 152. Subsequently, the sets of data samples 150 and 152 (collectively described as data samples 120) are output to the detector 122 of the communication system. The data samples 120 may preferrably be coupled to detector 122 on a data bus having each of the data sample sets 150 and 152 thereon or by a set of individual data signal couplers for each data samples set 150 and 152.

The detector 122 of the communication system inputs the sets of data samples 120 into an estimator 124 which preferrably generates a first and a second estimate of the C/I power ratio (Ψ) 158 and 160 (collectively described as C/I power ratio estimate 126) for each hop corresponding to the first and second set of data samples 150 and 152, respectively, in accordance with the algorithm described above as (eq. 1). These C/I power ratio estimates 126 are output to the detecting portion 128.

Similarly, the detector 122 of the communication system inputs the sets of data samples 120 (i.e. first and second sets 150 and 152, respectively) into the detecting portion 128. The detecting portion provides the first and second data sample sets 150 and 152 to a diversity combiner 154. The diversity combiner 154 combines the first and second sets of data samples 150 and 152, respectively, into a single combined set of data samples 156. The diversity combining is accomplished by using weighting coefficients for the first and second sets of input data samples 150 and 152 of each hop which are derived from the associated first and second C/I power ratio estimate 158 and 160 input .

The diversity combiner 154 uses the first and second C/I power ratio estimate (Ψ) 158 and 160, respectively, associated with a particular hop to determine a level of confidence in the accuracy of the reception of the first and second set of data samples 150 and 152, respectively associated with the particular hop by the receiving portion 114. For example, if the first C/I power ratio estimate (Ψ) 158 for the hop is below a predetermined threshold, then the probability that the first set of data samples 150 of that hop actually represent the transmitted encoded data bits 100 is nominal.

The number of different levels of confidence in the accuracy of reception which may be determined for a particular hop can be varied depending on the particular use for the level of confidence. For example, two levels of confidence of each hop may be determined for use in a hard decision environment. The two levels of confidence include: (1) full confidence which corresponds to the estimated C/I power ratio being at or above a particular threshold and (2) no confidence which corresponds to the estimated C/I power ratio being below the particular threshold. In response to a full confidence measure, the associated set of data samples for the hop would be used by the diversity combiner 154 in generating the single combined set of data samples 156 for the hop. However, in response to a no confidence measure, the associated set of data samples for the hop would not be used by the diversity combiner 154 in generating the single combined set of data samples 156 for the hop. In another example, several levels of confidence in the accuracy of reception of each hop may be determined for use in a soft decision environment. These several levels of confidence correspond to increasing confidence as the estimated C/I power ratio 126 increases in value. In response to the increasing level of confidence, the associated set of data samples for the hop would be assigned greater weighting coefficients by the diversity combiner 154. It will be appreciated by those skilled in the art that these diversity combining techniques can be extended to combining a plurality of sets of data samples received on a corresponding plurality of receiver branches.

Subsequently, single combined set of data samples 156 preferrably is used by the detecting portion 128 to detect data bits 130 in the data samples. Such detection may be accomplished by using a decoding technique similar to the one described above in reference to FIG. 2. However, other types of detection of data bits in the combined set of data

samples 156 could be used without departing from the spirit and scope of preferred embodiment diversity combining invention as claimed.

Although the invention has been described and illustrated with a certain degree of particularity, it is understood that the present disclosure of embodiments has been made by way of example only and that numerous changes in the arrangement and combination of parts as well as steps may be resorted to by those skilled in the art without departing from the spirit and scope of the invention as claimed. For example, the modulator, antennas and demodulator portions of the preferred embodiment communication system as described were directed to CDMA spread spectrum signals transmitted over a radio communication channel. However, as will be understood by those skilled in the art, the communication channel could alternatively be an electronic data bus, wireline, optical fiber link, or any other type of communication channel.

Claims

What is claimed is:

1. An apparatus comprising a detector, the detector having detecting means for detecting data bits in input data samples of a hop of a slow frequency hopping spead spectrum signal, the improvement is characterized by:
   (a) the detector having estimator means, operatively coupled to the detector means, for estimating the carrier to interference power ratio of the hop of the slow frequency hopping signal by using the input data samples of the hop; and
   (b) the detecting means using the estimated carrier to interference power ratio to detect data bits in the input data samples of the hop of the slow frequency hopping signal.

2. The apparatus of claim 1 wherein the detector estimator means comprises means for computing the estimated carrier to interference power ratio with a metric at least comprising a monotonically related function (ψ) defined as follows:

$$\Psi = \frac{Ave^2\{Re\{z\}\}}{Ave\{|z|^2\} - Ave^2\{Re\{z\}\}}$$

where,

z = phase cancelled forms of the input data samples wherein the input data samples represent the complex envelope of an nth phase shift keying modulated hop of the slow frequency hopping spread spectrum signal

$Ave^2\{Re\{z\}\}$ = the square of the average of the real portion of z over the hop

$Ave\{|z|^2\}$ = the average of the square of the magnitude of the complex valued z over the hop.

3. The apparatus of claim 2 wherein cancellation of nth phase shift keying modulation of the hop of the slow frequency hopping spread spectrum signal includes raising the complex envelope of the hop to the nth power whereby z represents the phase cancelled forms of the input data samples which comprise data samples of the complex envelope of the hop raised to the nth power for the nth phase shift keying modulated hop of the slow frequency hopping spread spectrum signal.

4. The apparatus of claim 1 wherein the detector detecting means comprises:

(a) means for generating decision metrics from the input data samples of the hop, each decision metric corresponding to a distance of an input data sample from a constellation point within a constellation space representing previously input data samples;

(b) means for generating a measure of confidence of the accuracy of the decision metrics based upon the estimated carrier to interference power ratio of the hop; and

(c) decoding means for generating an estimated data bit by utilizing maximum likelihood decoding techniques to derive a data bit from the decision metrics and the accuracy measure of confidence of the decision metrics.

5. The apparatus of claim 1 wherein:

(a) the input data samples of the hop of the slow frequency hopping spread spectrum signal comprise a plurality of sets of input data samples of the hop, each set corresponding to input data samples of the hop as received from one of a plurality of diversity receiver branches;

(b) the estimator means comprises means for estimating a carrier to interference power ratio of the hop of the slow frequency hopping signal associated with each particular set of input data samples by using the particular set of input data samples of the hop; and

(c) the detector detecting means comprises diversity combining means for combining the plurality of sets of input data samples into a set of input data samples in accordance with weighting coefficients for each particular set of input data samples derived from the estimated carrier to interference power ratio associated with the particular set of input data samples.

6. The apparatus of claim 1 further comprising:

(a) receiving means for receiving a slow frequency hopping spread spectrum signal from over a communication channel; and

(b) sampling means, operatively coupled to the receiving means and the detector, for sampling a hop of the received slow frequency hopping spread spectrum signal into data samples and inputting the data samples of the hop of the received slow frequency hopping spread spectrum signal to the detector.

7. The apparatus of claim 1 further comprising:

(a) encoding means for encoding input data bits into data symbols with an encoding algorithm which facilitates subsequent detection of data bits in samples of the data symbols;

(b) a transmitting means, operatively coupled to the encoding means, for transmitting the data symbols over a communication channel as a slow frequency hopping spread spectrum signal;

(c) receiving means for receiving the slow frequency hopping spread spectrum signal from over the communication channel; and

(d) sampling means, operatively coupled to the receiving means and the detector, for sampling a hop of the received slow frequency hopping spread spectrum signal into data samples and inputting the data samples of the hop of the received slow frequency hopping spread spectrum signal to the detector.

8. A method of communicating with slow frequency hopping spread spectrum signals including recovering data bits from data samples of a hop of a slow frequency hopping spread spectrum signal, the recovering steps comprising detecting data bits in the data samples of the hop of the slow frequency hopping signal, the improvement is characterized by:

(a) estimating the carrier to interference power ratio of the hop of the slow frequency hopping signal by using the data samples of the hop; and

(b) the detecting step using the estimated carrier to interference power ratio to detect data bits in the data samples of the hop of the slow frequency hopping signal.

9. The method of claim 8 wherein the recovering step of estimating comprises computing the estimated carrier to interference power ratio with a metric at least comprising a monotonically related function (ψ) defined as follows:

$$\Psi = \frac{\text{Ave}^2\{\text{Re}\{z\}\}}{\text{Ave}\{|z|^2\} - \text{Ave}^2\{\text{Re}\{z\}\}}$$

where,

z = phase cancelled forms of the input data samples wherein the phase cancelled forms of the input data samples are derived by raising the complex envelope of the hop to the nth power whereby z represents the phase cancelled forms of the input data samples which comprise data samples of the complex envelope of the hop raised to the nth power for the nth phase shift keying modulated hop of the slow frequency hopping spread spectrum signal

$\text{Ave}^2\{\text{Re}\{z\}\}$ = the square of the average of the real portion of z over the hop

$\text{Ave}\{|z|^2\}$ = the average of the square of the magnitude of the complex valued z over the hop.

10. The method of claim 8 wherein:

(a) the data samples of the hop of the slow frequency hopping spread spectrum signal comprise a plurality of sets of data samples of the hop, each set corresponding to data samples of the hop as received from one of a plurality of diversity receiver branches;

(b) the recovering step of estimating comprises estimating a carrier to interference power ratio of the hop of the slow frequency hopping signal associated with each particular set of data samples by using the particular set of data samples of the hop; and

(c) the recovering step of detecting comprises diversity combining the plurality of sets of data samples into a set of data samples in accordance with weighting coefficients for each particular set of data samples derived from the estimated carrier to interference power ratio associated with the particular set of data samples.

Patents Act 1977
Examiner's report to the Comptroller under Section 17 (The Search Report)

Application number
GB 9222170.4

Relevant Technical fields

(i) UK Cl (Edition K) H4P (PR, PDCSL); H4L (LDDRCP, LDDRCW, LDDRCX, LDDRQ, LDDRX)

(ii) Int Cl (Edition 5) H04L 25/49, 25/497; H03M 13/12

Search Examiner
K WILLIAMS

Databases (see over)

(i) UK Patent Office

(ii) ONLINE DATABASE: WPI

Date of Search
4 DECEMBER 1992

Documents considered relevant following a search in respect of claims 1-10

Category (see over)	Identity of document and relevant passages	Relevant to claim(s)
A	GB 2191912 A (SIGNAL PROCESSORS) See whole specification	1, 8
A	GB 2185367 A (NIPPON TELEGRAPH) See page 3, lines 18-27	1, 8

Samsung Exhibit 1002, Page 111 of 880
Samsung Electronics Co., Ltd. et al. v. One-E-Way, Inc.
IPR2025-01541

Category	Identity of document and relevant passages	Relevant to claim(s)

Categories of documents

X: Document indicating lack of novelty or of inventive step.

Y: Document indicating lack of inventive step if combined with one or more other documents of the same category.

A: Document indicating technological background and/or state of the art.

P: Document published on or after the declared priority date but before the filing date of the present application.

E: Patent document published on or after, but with priority date earlier than, the filing date of the present application.

&: Member of the same patent family, corresponding document.

Databases: The UK Patent Office database comprises classified collections of GB, EP, WO and US patent specifications as outlined periodically in the Official Journal (Patents). The on-line databases considered for search are also listed periodically in the Official Journal (Patents).

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First Named Inventor/Applicant Name:	C. Earl Woolfork
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Document Number	Document Description	File Name	File Size(Bytes)/ Message Digest	Multi Part /.zip	Pages (if appl.)
1	Information Disclosure Statement (IDS) Form (SB08)	IDSForm.pdf	611842 0a705ae4ae2c35fa67f60b3b98b351b613c28f7e	no	4

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2	Foreign Reference	GB2261347A.pdf	1578492 2f71e5677b6bb7ea7996d9aabc1708702fd758a6	no	35

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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.

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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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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):

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Office Action Summary	Application No. 13/356,949	Applicant(s) WOOLFORK, C. EARL	
	Examiner Andrew C. Flanders	Art Unit 2656	AIA (First Inventor to File) Status No

-- 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 MONTH(S) OR THIRTY (30) DAYS, WHICHEVER IS LONGER, 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 *24 January 2013*.

☐ 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) *1-8* 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) *1-8* 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 *24 January 2012* 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/08) Paper No(s)/Mail Date _____.

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

4) ☐ Other: _____.

Samsung Exhibit 1002, Page 116 of 880
Samsung Electronics Co., Ltd. et al. v. One-E-Way, Inc.
IPR2025-01541

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 § 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 of this title, 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.

Claims 1 – 8 are rejected under pre-AIA 35 U.S.C. 103(a) as being unpatentable over Altstatt (U.S. Patent 5,771,441) in view of Li (U.S. Patent 6,781,977) in further view of Kurrat (U.S. Patent 6,456,645) and in further view of Lindemann (U.S. Patent Application Publication 2004/0223622)

Regarding **Claim 1**, Altstatt discloses:

A mobile wireless audio receiver (Fig. 1)

However, digital wireless communication was notoriously wedll known in the art.

For Example, Li teaches a system providing CDMA communication of digital audio to headphone devices; col. 3 lines 20 – 33.

Replacing the FM transmitter/receiver implementation of Alstatt to use the digital CDMA communication discloses:

the system as a digital system (i.e. digital audio; col. 2 lines 48 – 51); also A/D conversion; col. 3 line 7).

It would have been obvious to one of ordinary skill in the art at the time the invention was made to apply the digital CDMA wireless communication of Li to replace the FM modulation communication as taught by Alstatt. Li clearly teaches the device for use in portable implementations such as music and headphone audio reproductions. Li

also teaches the outputs/inputs as standard audio jacks. Furthermore, doing so would be simple substitution of one known element (i.e. digital CDMA transmitter/receiver) for another (i.e. analog FM transmitter) to obtain predictable results (i.e. Alstatt w/ a digital transmitter). Additionally, Li discloses a number of advantages of using digital communication in col. 6.

The combination further discloses:

configured to receive a unique user code and a original audio signal representation in the form of packets (packet form met by the G.729 encoding implementation, see col. 4 lines 25 – 33; also see the discussion of sending the entire signal using frames; col 3 lines 9 – 11), said unique user code configured to spread the spectrum of said signal and further configured for independent communication operation (matching the inherent code in CDMA to initiate de-spreading, i.e. each channel in CDMA corresponds to a different random sequence, this sequence must be received and recognized by receiving unit 200 in order for the device to operate), the wireless digital audio receiver further configured to be directly communicable with a mobile digital audio transmitter (Altstatt Figs 1 and 2),

The combination fails to explicitly disclose:

said mobile wireless digital audio receiver comprising:

a direct conversion module configured to capture packets

In a related field of endeavor (i.e. wireless music transmission), Kurrat discloses a transmission device that includes a direct conversion module. Using a direct

conversion receiver as the radio frequency receiver provides a low cost and low current consumption implementation (col. 2).

Applying this direct conversion module to the transmission of Burdick discloses:

a direct conversion module configured to capture packets (Kurrat's Direct conversion module now implemented in the combination's wireless transmission/reception configuration).

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 Kurrat to the combination. One would have been motivated to do so to provide a low cost low current the combination conversion receiver in the wireless communication device of Budrick; see col. 2 of Kurrat.

The combination also fails to explicitly disclose:

However, reducing intersymbol interference in audio coding for CDMA transmission is notoriously well known in the art.

Lindemann discloses a device that transmits digital audio between a stereo system and a speaker using CDMA. Lindemann also includes that the transmission stream is created using a Reed-Solomon encoding and interleaver and a corresponding decoder in the decoder; Figs. 6 and 8.

Applying these teachings to the encoding of the combination discloses:

and a correct bit sequence within the packets aided by lowering signal detection error through reduced intersymbol interference coding of said audio representation signal respective to said mobile wireless digital audio receiver and said mobile digital

audio transmitter (Fig. 8 element 802 which is a Reed Solomon decoder and Interleaver; it is known in the art to configure Reed Solomon decoding/interleaving to reduce ISI as is shown by Roberts 6,418,558. Reducing ISI is a desirable feature to any digital transmission).

It would have been obvious to one of ordinary skill in the art at the time the invention was made to include the reed Solomon encoder/decoder in the combinations channel encoding. Doing so would have been nothing more than applying a known technique to a known device ready for improvement to yield predictable results as:

1) the prior art contained a base device in the combination's wireless CDMA headphone set that, when including intersymbol interference reduction, can be seen as in improvement;

2) the prior art contained a known technique (i.e. Reed Solomon encoding/decoding to reduce ISI) in a comparable device in Lindemann (i.e. wireless audio transmission); And

3) applying the teachings of Lindemann to the combination of Altstatt in view of Li would have been predictable as both operate on wireless CDMA communications of audio.

The combination further discloses:

said packets embedded in the received spread spectrum signal, the captured packets corresponding to the unique user code (CDMA communication shown in Li);

a decoder operative to decode reduced intersymbol interference coding of said original audio signal representation, said audio having been wirelessly transmitted and

reproduced virtually free from interference from device transmitted signals operating in the wireless digital audio receiver spectrum (decoders of Li, now implemented in Altstatt to reproduce the digital audio signals).

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

a digital to analog converter generating an audio output of said original signal representation (portion of Li that converts the digital audio to analog for reproduction by the speaker 206); and

a module adapted to reproduce said generated audio output, said audio having been wirelessly transmitted from an audio player and reproduced virtually free from interference from device transmitted signals operating in the wireless headphone spectrum (206 of Li)

Regarding **Claim 3**, in addition to the elements stated above in the rejections of claims 1 and 2, the combination made in claim 1 further discloses:

a digital demodulator configured for independent CDMA communication operation (CDMA demodulator in receiver end of Li).

Regarding **Claim 4**, in addition to the elements stated above in the rejections of claims 1 - 3, the combination made in claim 1 further discloses:

where in the audio output is music (music; Li Abstract, also implied in Altstatt)

Regarding **Claim 6**, in addition to the elements stated above in the rejections of claims 1 - 3, the combination made in claim 1 further discloses:

fuzzy set membership functionality to enhance detection of said unique user code (soft decision making by the receiver to despread; col. 4 line 63 - col. 5 line 25 of Li).

Claims 5, 7 and 8 are rejected under the same grounds stated above.

Double Patenting

The nonstatutory double patenting rejection is based on a judicially created doctrine grounded in public policy (a policy reflected in the statute) so as to prevent the unjustified or improper timewise extension of the “right to exclude” granted by a patent and to prevent possible harassment by multiple assignees. A nonstatutory double patenting rejection is appropriate where the 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 – 8 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 not patentably distinct from each other because the claims of the ‘391 patent anticipate the claims of the instant application.

Claims 1 – 8 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 not patentably distinct from each other because the claims of the ‘258 patent anticipate the claims of the instant application.

Claims 1 – 8 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 not patentably distinct from each other because the claims of the ‘885 patent anticipate the claims of the instant application.

Claims 1 – 8 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 not patentably distinct from each other because the claims of the ‘294 patent anticipate the claims of the instant application.

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.

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. 13/356,949	Applicant(s)/Patent Under Reexamination WOOLFORK, C. EARL	
	Examiner Andrew C. Flanders	Art Unit 2656	Page 1 of 2

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*	B	US-6,982,132	01-2006	Goldner et al.	429/162
*	C	US-2001/0025358	09-2001	Eidson et al.	714/752
*	D	US-7,099,413	08-2006	Chuang et al.	375/347
*	E	US-2004/0223622	11-2004	Lindemann et al.	381/079
*	F	US-7,047,474	05-2006	Rhee et al.	714/755
*	G	US-6,418,558	07-2002	Roberts et al.	725/129
*	H	US-5,175,558	12-1992	DuPree, James E.	342/378
*	I	US-6,317,039	11-2001	Thomason, John A.	340/505
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Dates in MM-YYYY format are publication dates. Classifications may be US or foreign.

Samsung Exhibit 1002, Page 127 of 880
Samsung Electronics Co., Ltd. et al. v. One-E-Way, Inc.
IPR2025-01541

Notice of References Cited	Application/Control No. 13/356,949	Applicant(s)/Patent Under Reexamination WOOLFORK, C. EARL	
	Examiner Andrew C. Flanders	Art Unit 2656	Page 2 of 2

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	F	US-			
	G	US-			
	H	US-			
	I	US-			
	J	US-			
	K	US-			
	L	US-			
	M	US-			

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Dates in MM-YYYY format are publication dates. Classifications may be US or foreign.

PTO/SB/08a (01-10)
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INFORMATION DISCLOSURE STATEMENT BY APPLICANT
(Not for submission under 37 CFR 1.99)

Application Number	13356949
Filing Date	2012-01-24
First Named Inventor	C. Earl Woolfork
Art Unit	
Examiner Name	Andrew Flanders
Attorney Docket Number	1028.6

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Examiner Initial*	Cite No	Patent Number	Kind Code[1]	Issue Date	Name of Patentee or Applicant of cited Document	Pages,Columns,Lines where Relevant Passages or Relevant Figures Appear
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	First Named Inventor	C. Earl Woolfork
	Art Unit	
	Examiner Name	Andrew Flanders
	Attorney Docket Number	1028.6

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	Examiner Name	Andrew Flanders
	Attorney Docket Number	1028.6

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	Examiner Name	Andrew Flanders
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	1	Bluetooth Specification version 1.1, Bluetooth SIG, www.bluetooth.com, Feb. 22, 2001	☐
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EXAMINER SIGNATURE

Examiner Signature	/Andrew Flanders/	Date Considered	10/02/2013

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	First Named Inventor	C. Earl Woolfork
	Art Unit	
	Examiner Name	Andrew Flanders
	Attorney Docket Number	1028.6

CERTIFICATION STATEMENT

Please see 37 CFR 1.97 and 1.98 to make the appropriate selection(s):

☐ That each item of information contained in the information disclosure statement was first cited in any communication from a foreign patent office in a counterpart foreign application not more than three months prior to the filing of the information disclosure statement. See 37 CFR 1.97(e)(1).

OR

☒ That no item of information contained in the information disclosure statement was cited in a communication from a foreign patent office in a counterpart foreign application, and, to the knowledge of the person signing the certification after making reasonable inquiry, no item of information contained in the information disclosure statement was known to any individual designated in 37 CFR 1.56(c) more than three months prior to the filing of the information disclosure statement. See 37 CFR 1.97(e)(2).

☐ See attached certification statement.

☐ Fee set forth in 37 CFR 1.17 (p) has been submitted herewith.

☐ None

SIGNATURE

A signature of the applicant or representative is required in accordance with CFR 1.33, 10.18. Please see CFR 1.4(d) for the form of the signature.

Signature	/Megan Lyman/	Date (YYYY-MM-DD)	2012-04-25
Name/Print	Megan Lyman	Registration Number	57054

This collection of information is required by 37 CFR 1.97 and 1.98. 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 1 hour 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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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:

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2. A record from this system of records may be disclosed, as a routine use, in the course of presenting evidence to a court, magistrate, or administrative tribunal, including disclosures to opposing counsel in the course of settlement negotiations.

3. A record in this system of records may be disclosed, as a routine use, to a Member of Congress submitting a request involving an individual, to whom the record pertains, when the individual has requested assistance from the Member with respect to the subject matter of the record.

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 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.

ALL REFERENCES CONSIDERED EXCEPT WHERE LINED THROUGH. /ACF/

PTO/SB/08a (01-10)
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INFORMATION DISCLOSURE STATEMENT BY APPLICANT
(Not for submission under 37 CFR 1.99)

Application Number	13356949
Filing Date	2012-24-01
First Named Inventor	C. Earl Woolfork
Art Unit	2656
Examiner Name	Andrew Flanders
Attorney Docket Number	1028.5

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Examiner Initial*	Cite No	Patent Number	Kind Code[1]	Issue Date	Name of Patentee or Applicant of cited Document	Pages,Columns,Lines where Relevant Passages or Relevant Figures Appear
	1	5048057		1991-09-10	Holmdel, Saleh	
	2	6381053		2002-04-30	Ste-foy, Fathallah	
	3	5420585		1995-05-30	Adams, W.B.	

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	1	GB2261347	GB	A	1993-05-12	Livneh,Noam		☐

EFS Web 2.1.17

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INFORMATION DISCLOSURE STATEMENT BY APPLICANT (Not for submission under 37 CFR 1.99)		
	Application Number	13356949
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	First Named Inventor	C. Earl Woolfork
	Art Unit	2656
	Examiner Name	Andrew Flanders
	Attorney Docket Number	1028.5

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	1		☐
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EXAMINER SIGNATURE			
Examiner Signature	/Andrew Flanders/	Date Considered	10/02/2013

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

[1] See Kind Codes of USPTO Patent Documents at www.USPTO.GOV or MPEP 901.04. [2] Enter office that issued the document, by the two-letter code (WIPO Standard ST.3). [3] For Japanese patent documents, the indication of the year of the reign of the Emperor must precede the serial number of the patent document. [4] Kind of document by the appropriate symbols as indicated on the document under WIPO Standard ST.16 if possible. [5] Applicant is to place a check mark here if English language translation is attached.

ALL REFERENCES CONSIDERED EXCEPT WHERE LINED THROUGH. /ACF/

INFORMATION DISCLOSURE STATEMENT BY APPLICANT (Not for submission under 37 CFR 1.99)		
	Application Number	13356949
	Filing Date	2012-24-01
	First Named Inventor	C. Earl Woolfork
	Art Unit	2656
	Examiner Name	Andrew Flanders
	Attorney Docket Number	1028.5

CERTIFICATION STATEMENT

Please see 37 CFR 1.97 and 1.98 to make the appropriate selection(s):

☐ That each item of information contained in the information disclosure statement was first cited in any communication from a foreign patent office in a counterpart foreign application not more than three months prior to the filing of the information disclosure statement. See 37 CFR 1.97(e)(1).

OR

☒ That no item of information contained in the information disclosure statement was cited in a communication from a foreign patent office in a counterpart foreign application, and, to the knowledge of the person signing the certification after making reasonable inquiry, no item of information contained in the information disclosure statement was known to any individual designated in 37 CFR 1.56(c) more than three months prior to the filing of the information disclosure statement. See 37 CFR 1.97(e)(2).

☐ See attached certification statement.

☐ Fee set forth in 37 CFR 1.17 (p) has been submitted herewith.

☐ None

SIGNATURE

A signature of the applicant or representative is required in accordance with CFR 1.33, 10.18. Please see CFR 1.4(d) for the form of the signature.

Signature	/Megan Lyman/	Date (YYYY-MM-DD)	2013-02-04
Name/Print	Megan Lyman	Registration Number	57054

This collection of information is required by 37 CFR 1.97 and 1.98. 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 1 hour 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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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 record s.

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)).

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ALL REFERENCES CONSIDERED EXCEPT WHERE LINED THROUGH. /ACF/

EAST Search History

EAST Search History (Prior Art)

Ref #	Hits	Search Query	DBs	Default Operator	Plurals	Time Stamp
L1	1	("8131391").PN.	US-PGPUB; USPAT; USOCR	OR	OFF	2013/10/02 10:23
L7	1	("8131391").PN.	US-PGPUB; USPAT; USOCR	OR	OFF	2013/10/02 10:27
L22	1765	wireless and (audio music) and "direct conversion"	US-PGPUB; USPAT; USOCR	OR	OFF	2013/10/02 10:30
L23	177	l22 and @ad<"20011221"	US-PGPUB; USPAT	OR	OFF	2013/10/02 10:30
L24	6	l23 and (headphone "head phone" earphone "ear phone")	US-PGPUB; USPAT	OR	OFF	2013/10/02 10:31
L25	18	(US-20010025358-$ or US-20040223622-$).did. or (US-6130643-$ or US-6982132-$ or US-7099413-$ or US-7047474-$ or US-6418558-$ or US-5175558-$ or US-6317039-$ or US-5771441-$ or US-5946343-$ or US-5491839-$ or US-6424820-$ or US-6898585-$ or US-6781977-$ or US-5781542-$ or US-6678892-$ or US-6456645-$).did.	US-PGPUB; USPAT	OR	OFF	2013/10/02 10:34
L26	6	l25 and packet	US-PGPUB; USPAT; USOCR	OR	OFF	2013/10/02 10:34
L27	6	l25 and cdma	US-PGPUB; USPAT; USOCR	OR	OFF	2013/10/02 10:44
L28	1	l25 and "direct conversion"	US-PGPUB; USPAT; USOCR	OR	OFF	2013/10/02 10:52
L29	4	(("8131391") or ("7865258") or ("7684885") or ("7412294")).PN.	US-PGPUB; USPAT; USOCR	OR	OFF	2013/10/02 12:00
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

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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; 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	(10/648012).APP.	US-PGPUB;	OR	OFF	2006/09/25

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Samsung Electronics Co., Ltd. et al. v. One-E-Way, Inc.
IPR2025-01541

			USPAT			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

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Samsung Electronics Co., Ltd. et al. v. One-E-Way, Inc.
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S56	30	"reed solomon" same "intersymbol interference"	US-PGPUB; USPAT	OR	OFF	2007/03/21 12:13
S57	21	S56 and @ad<"20011220"	US-PGPUB; USPAT	OR	OFF	2007/03/21 12:27
S58	1	("20030045235").PN.	US-PGPUB; USPAT	OR	OFF	2007/03/21 12:37
S59	1	("5790595").PN.	US-PGPUB; USPAT	OR	OFF	2007/03/21 12:37
S60	2435	((375/262,265,341) or (714/794,795)).CCLS.	US-PGPUB; USPAT	OR	OFF	2007/03/24 09:15
S62	56	"375".clas. and "fuzzy logic"	US-PGPUB; USPAT	OR	OFF	2007/03/26 11:04
S64	1	("4970637").PN.	US-PGPUB; USPAT	OR	OFF	2007/03/28 13:46
S65	755	(audio sound music voice) same (a/d "analog to digital") same (lpf "low pass")	US-PGPUB; USPAT	OR	OFF	2007/03/28 13:46
S66	282	(audio sound music voice) with (a/d "analog to digital") with ((lpf "low pass") and "digital")	US-PGPUB; USPAT	OR	OFF	2007/03/28 13:47
S67	227	(audio sound music voice) with (a/d "analog to digital") with ((lpf "low pass") and "digital") and @ad<"20011221"	US-PGPUB; USPAT	OR	OFF	2007/03/28 15:33
S68	34712	"band pass filter" bpf with "direct conversion receiver"	US-PGPUB; USPAT	OR	OFF	2007/03/28 15:33
S69	35	("band pass filter" bpf) with "direct conversion receiver"	US-PGPUB; USPAT	OR	OFF	2007/03/28 15:33
S70	8	S69 and @ad<"20011221"	US-PGPUB; USPAT	OR	OFF	2007/03/28 15:55
S71	1	("20030045235").PN.	US-PGPUB; USPAT	OR	OFF	2007/03/28 16:16
S72	1	("20040223622").PN.	US-PGPUB; USPAT	OR	OFF	2007/03/28 16:20
S73	1	("5946343").PN.	US-PGPUB; USPAT	OR	OFF	2007/03/28 16:27
S74	364	"64-ary"	US-PGPUB; USPAT	OR	OFF	2007/03/28 16:27
S75	74	"64-ary" near modulat$4	US-PGPUB; USPAT	OR	OFF	2007/03/28 16:27
S76	46	S75 and @ad<"20011120"	US-PGPUB; USPAT	OR	OFF	2007/03/28 16:27
S77	2	(("4970637") or ("5790595")).PN.	US-PGPUB; USPAT	OR	OFF	2007/07/16 09:58
S78	3	(("4970637") or ("5790595") or ("20040223622")).PN.	US-PGPUB; USPAT	OR	OFF	2007/07/16 09:58
S79	3	("2004/0223622").URPN.	USPAT	OR	OFF	2007/07/16 11:25
S80	1	("5771441").PN.	US-PGPUB; USPAT	OR	OFF	2007/07/16 11:25
S81	60	("2236946" | "2828413" | "2840694" | "3080785" | "3085460" | "3087117" | "3296916" | "3579211" | "3743751" | "3781451" | "3825666" | "3863157" | "3901118" | "3906160" | "4004228" |	US-PGPUB; USPAT; USOCR	OR	OFF	2007/07/16 11:26

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		"4229826" | "4335930" | "4344184" | "4369521" | "4430757" | "4453269" | "4464792" | "4471493" | "4612688" | "4647135" | "4721926" | "4794622" | "4845751" | "4899388" | "4988957" | "5025704" | "5214568").PN. OR ("5771441").URPN.				
S82	2	S81 and cdma	US-PGPUB; USPAT; USOCR	OR	OFF	2007/07/16 11:26
S83	1	("6678892").PN.	US-PGPUB; USPAT	OR	OFF	2008/05/20 11:41
S84	1	("20020072816").PN.	US-PGPUB; USPAT	OR	OFF	2008/05/20 14:24
S85	22	"fuzzy logic" and modulat$5 and filter and (dpsk "phase shift key")	US-PGPUB; USPAT	OR	OFF	2008/06/06 09:20
S86	0	"455".clas. and "375".clas. and S85	US-PGPUB; USPAT	OR	OFF	2008/06/06 09:21
S87	1	"10100351"	US-PGPUB; USPAT	OR	OFF	2008/06/06 11:49
S88	1	("6,678,892").PN.	US-PGPUB; USPAT	OR	OFF	2008/06/06 12:38
S89	3	("20030021429" | "20030076346" | "6867820").PN.	US-PGPUB; USPAT	OR	OFF	2008/06/06 12:42
S90	13	("4589134" | "4626892" | "5042070" | "5541638" | "5581621" | "5631850" | "5775939" | "6100936" | "6195438").PN. OR ("6867820").URPN.	US-PGPUB; USPAT; USOCR	OR	OFF	2008/06/06 12:43
S91	2	"10648012"	US-PGPUB; USPAT	OR	OFF	2009/02/14 10:23
S92	1	"12144729"	US-PGPUB; USPAT	OR	OFF	2009/02/14 10:31
S93	1	("5790595").PN.	US-PGPUB; USPAT	OR	OFF	2009/02/14 12:36
S94	1	("6678892").PN.	US-PGPUB; USPAT	OR	OFF	2009/02/14 12:37
S95	1	("6678892").PN.	US-PGPUB; USPAT	OR	OFF	2009/05/26 07:51
S96	1680	portable and music and CDMA and transmitter and receiver	US-PGPUB; USPAT	OR	OFF	2009/09/01 11:35
S97	527	portable and music and CDMA and transmitter and receiver and private	US-PGPUB; USPAT	OR	OFF	2009/09/01 11:35
S98	57	portable and music and CDMA and transmitter and receiver and private and "fuzzy logic"	US-PGPUB; USPAT	OR	OFF	2009/09/01 11:35
S99	0	S98 and @ad<"20011221"	US-PGPUB; USPAT	OR	OFF	2009/09/01 11:36
S100	41	S97 and @ad<"20011221"	US-PGPUB; USPAT	OR	OFF	2009/09/01 11:36
S101	1	("6678692").PN.	US-PGPUB; USPAT	OR	OFF	2009/09/01 11:39
S102	1	("6678892").PN.	US-PGPUB; USPAT	OR	OFF	2009/09/01 11:39
S103	25	("5555466" | "5771441" | "6058288" | "6243645" | "6266815" | "6300880" |	US-PGPUB; USPAT;	OR	OFF	2009/09/01 11:39

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		"6317039").PN. OR ("6678892").URPN.	USOCR			
S104	63	("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	2009/09/01 11:42
S105	10	("20030045235" | "20040223622" | "5491839" | "5771441" | "5790595" | "5946343" | "6342844" | "6418558" | "6678892" | "6982132").PN.	US-PGPUB; USPAT; USOCR	OR	OFF	2009/09/01 11:42
S106	4453	"fuzzy logic" and @ad<"20011221"	US-PGPUB; USPAT; USOCR	OR	OFF	2009/09/01 11:48
S107	659	S106 and transmitter	US-PGPUB; USPAT; USOCR	OR	OFF	2009/09/01 11:48
S108	591	S106 and portable	US-PGPUB; USPAT; USOCR	OR	OFF	2009/09/01 11:48
S109	4	S106 and portable adj player	US-PGPUB; USPAT; USOCR	OR	OFF	2009/09/01 11:49
S110	0	"fuzzy logic" with reciever	US-PGPUB; USPAT; USOCR	OR	OFF	2009/09/01 11:50
S111	49	"fuzzy logic" with receiver	US-PGPUB; USPAT; USOCR	OR	OFF	2009/09/01 11:50
S112	27	S111 and @ad<"20011221"	US-PGPUB; USPAT	OR	OFF	2009/09/01 11:50
S113	192	"fuzzy logic" same receiver	US-PGPUB; USPAT; USOCR	OR	OFF	2009/09/01 11:51
S114	72	S113 and @ad<"20011221"	US-PGPUB; USPAT	OR	OFF	2009/09/01 11:52
S115	71	("4019141" | "4229829" | "5264795" | "5404577" | "5437057" | "5568516" | "5694467" | "5771438" | "5771441" | "5867223" | "5978689" | "6006115").PN. OR ("6424820").URPN.	US-PGPUB; USPAT; USOCR	OR	OFF	2009/09/02 11:27
S116	34	S115 and @ad<"20011221"	US-PGPUB; USPAT	OR	OFF	2009/09/02 11:28
S117	31	bluetooth with (headphone headset earphone "head phone" "head set" "ear phone") with cdma	US-PGPUB; USPAT	OR	OFF	2009/09/02 11:32
S118	2	S117 and @ad<"20011221"	US-PGPUB; USPAT	OR	OFF	2009/09/02 11:32
S119	32	wireless with (headphone headset earphone "head phone" "head set"	US-PGPUB; USPAT	OR	OFF	2009/09/02 11:33

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		"ear phone") with cdma				
S120	3	S119 and @ad<"20011221"	US-PGPUB; USPAT	OR	OFF	2009/09/02 11:33
S121	57	(headphone headset earphone "head phone" "head set" "ear phone") with cdma	US-PGPUB; USPAT	OR	OFF	2009/09/02 11:34
S122	10	S121 and @ad<"20011221"	US-PGPUB; USPAT	OR	OFF	2009/09/02 11:34
S123	0	WO0056093	US-PGPUB; USPAT	OR	OFF	2009/09/02 11:36
S124	0	WO0056093	US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO; DERWENT; IBM_TDB	OR	OFF	2009/09/02 11:37
S125	0	WO/0056093	US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO; DERWENT; IBM_TDB	OR	OFF	2009/09/02 11:37
S126	2	(("5781542") or ("5799005")).PN.	US-PGPUB; USPAT	OR	OFF	2009/09/02 11:42
S127	1	("6199076").PN.	US-PGPUB; USPAT	OR	OFF	2009/09/02 13:51
S128	0	woolfork-earl.in.	US-PGPUB; USPAT	OR	OFF	2009/11/23 11:44
S129	3	woolfork-c-$.in.	US-PGPUB; USPAT	OR	OFF	2009/11/23 11:44
S139	1	("7412294").PN.	US-PGPUB; USPAT	OR	OFF	2010/01/11 12:21
S140	1	("7412294").PN.	US-PGPUB; USPAT	OR	OFF	2010/06/01 09:29
S141	3	"12144729"	US-PGPUB; USPAT	OR	OFF	2010/06/01 09:34
S142	843	cdma and "fuzzy logic"	US-PGPUB; USPAT	OR	OFF	2010/10/18 09:46
S143	66	S142 and @ad<"20011221"	US-PGPUB; USPAT	OR	OFF	2010/10/18 09:46
S144	14	cdma same "fuzzy logic"	US-PGPUB; USPAT	OR	OFF	2010/10/18 09:46
S145	5	S144 and @ad<"20011221"	US-PGPUB; USPAT	OR	OFF	2010/10/18 09:46
S146	11	code same wireless same "fuzzy logic"	US-PGPUB; USPAT	OR	OFF	2010/10/18 09:49
S147	2	S146 and @ad<"20011221"	US-PGPUB; USPAT	OR	OFF	2010/10/18 09:49
S148	2704	(700/94).CCLS.	US-PGPUB; USPAT	OR	OFF	2010/10/21 12:51
S149	3	(("7412294") or ("7865258") or ("7684885")).PN.	US-PGPUB; USPAT	OR	OFF	2011/05/02 14:06
S150	1	("6418558").PN.	US-PGPUB; USPAT;	OR	OFF	2011/11/03 09:41

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			USOCR			
S151	1	("6678892").PN.	US-PGPUB; USPAT; USOCR	OR	OFF	2011/11/03 09:42
S152	1	S150 and reed same intersymbol	US-PGPUB; USPAT; USOCR	OR	OFF	2011/11/03 10:03

EAST Search History (Interference)

Ref #	Hits	Search Query	DBs	Default Operator	Plurals	Time Stamp
S130	0	woolfork-earl.in.	USPAT; UPAD	OR	OFF	2009/11/23 11:44
S131	1	woolfork-c-$.in.	USPAT; UPAD	OR	OFF	2009/11/23 11:44
S132	195	(700/94).CCLS.	UPAD	OR	OFF	2009/11/23 11:59
S133	225	((700/94) or (455/3.06)).CCLS.	UPAD	OR	OFF	2010/01/11 11:18
S153	31	(700/94).CCLS.	UPAD	OR	OFF	2012/01/09 11:39

10/2/2013 12:16:03 PM
C:\Users\aflanders\Documents\EAST\Workspaces\12940747.wsp

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BIB DATA SHEET

CONFIRMATION NO. 2299

SERIAL NUMBER	FILING or 371(c) DATE RULE	CLASS	GROUP ART UNIT	ATTORNEY DOCKET NO.
13/356,949	01/24/2012	700	2656	1028.6

APPLICANTS

C. Earl Woolfork, Pasadena, CA;

**** CONTINUING DATA **************************

This application 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 **************************

**** IF REQUIRED, FOREIGN FILING LICENSE GRANTED **** ** SMALL ENTITY **
02/02/2012

Foreign Priority claimed ☐ Yes ☑ No 35 USC 119(a-d) conditions met ☐ Yes ☑ No Verified and Acknowledged /ANDREW C FLANDERS/ Examiner's Signature	☐ Met after Allowance Initials	STATE OR COUNTRY	SHEETS DRAWINGS	TOTAL CLAIMS	INDEPENDENT CLAIMS
		CA	3	2	2

ADDRESS

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

TITLE

Wireless Digital Audio Music System

FILING FEE RECEIVED		
1030	FEES: Authority has been given in Paper No._____ to charge/credit DEPOSIT ACCOUNT No._____ for following:	☐ All Fees ☐ 1.16 Fees (Filing) ☐ 1.17 Fees (Processing Ext. of time) ☐ 1.18 Fees (Issue) ☐ Other _____ ☐ Credit

Index of Claims	Application/Control No.	Applicant(s)/Patent Under Reexamination
	13356949	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	10/02/2013								
	1	✓								
	2	✓								
	3	✓								
	4	✓								
	5	✓								
	6	✓								
	7	✓								
	8	✓								

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Search Notes	Application/Control No.	Applicant(s)/Patent Under Reexamination
	13356949	WOOLFORK, C. EARL
	Examiner	Art Unit
	ANDREW C FLANDERS	2656

CPC- SEARCHED		
Symbol	Date	Examiner

CPC COMBINATION SETS - SEARCHED		
Symbol	Date	Examiner

US CLASSIFICATION SEARCHED			
Class	Subclass	Date	Examiner

SEARCH NOTES		
Search Notes	Date	Examiner
see history attached	10/2/13	acf
reviewed and repeatedsearch history of entire family; 10/027,391 10/648,012 12/144,729 12/570,343 12/940,747	10/2/13	acf
eDan, EAST and PALM inventor search for double patenting	10/2/13	acf
google.com patents search	10/2/13	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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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
13/356,949	01/24/2012	C. Earl Woolfork	1028.6	2299

68533 7590 12/11/2013

MEGAN LYMAN
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RALEIGH, NC 27613

EXAMINER	
FLANDERS, ANDREW C	
ART UNIT	PAPER NUMBER
2656	

NOTIFICATION DATE	DELIVERY MODE
12/11/2013	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

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Applicant-Initiated Interview Summary	**Application No.** 13/356,949	**Applicant(s)** WOOLFORK, C. EARL	
	Examiner Andrew C. Flanders	**Art Unit** 2656	

All participants (applicant, applicant's representative, PTO personnel):

(1) *Andrew C. Flanders*. (3) *Megan Lyman*.

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

Date of Interview: *05 December 2013*.

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: *1-8*.

Identification of prior art discussed: *Altstatt, Li, Kurrat and Lindemann of record*.

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

Discussed differences in the invention and the prior art. Namely, the multiple transmitters and multiple receivers moving dynamically. Examiner and Applicant were unable to reach any agreement as to the validity of the combination. Examiner maintains that the combination makes sense in light of all of the prior art while Applicant disagrees and states the combination does not make sense. No agreement was reached and no indication of allowable subject matter was given..

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

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

☐ Attachment

/Andrew C Flanders/ Primary Examiner, Art Unit 2656	

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Summary of Record of Interview Requirements

Manual of Patent Examining Procedure (MPEP), Section 713.04, Substance of Interview Must be Made of Record
A complete written statement as to the substance of any face-to-face, video conference, or telephone interview with regard to an application must be made of record in the application whether or not an agreement with the examiner was reached at the interview.

Title 37 Code of Federal Regulations (CFR) § 1.133 Interviews
Paragraph (b)

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

37 CFR §1.2 Business to be transacted in writing.
All business with the Patent or Trademark Office should be transacted in writing. The personal attendance of applicants or their attorneys or agents at the Patent and Trademark Office is unnecessary. The action of the Patent and Trademark Office will be based exclusively on the written record in the Office. No attention will be paid to any alleged oral promise, stipulation, or understanding in relation to which there is disagreement or doubt.

———

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

It is the responsibility of the applicant or the attorney or agent to make the substance of an interview of record in the application file, unless the examiner indicates he or she will do so. It is the examiner's 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 applicant's 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 applicant's 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 examiner's 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 examiner's initials.

CLAIMS

I claim:

1. (Previously Presented) A mobile wireless digital audio receiver, configured to receive a unique user code and a original audio signal representation in the form of packets, said unique user code configured to spread the spectrum of said signal and further configured for independent communication operation, the wireless digital audio receiver further configured to be directly communicable with a mobile digital audio transmitter, said mobile wireless digital audio receiver comprising:

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

a decoder operative to decode reduced intersymbol interference coding of said original audio signal representation, said audio having been wirelessly transmitted and reproduced virtually free from interference from device transmitted signals operating in the wireless digital audio receiver spectrum.

2. (Previously Presented) A wireless digital audio headphone for receipt of a unique user code and a digital audio representation signal in the form of a packet, said unique user code configured to spread the spectrum of said signal and further configured for independent communication operation, the wireless digital audio headphone further configured to be directly communicable with a mobile digital audio transmitter, said wireless digital audio headphone comprising:

a direct conversion module configured to capture packets and the correct bit sequence within the packets aided by lowering signal detection error through reduced intersymbol interference coding of said audio representation signal respective to said

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headphone and said mobile digital audio transmitter, said packets embedded in the received spread spectrum signal, the captured packets corresponding to the unique user code;

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

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

a module adapted to reproduce said generated audio output, said audio having been wirelessly transmitted from an audio player and reproduced virtually free from interference from device transmitted signals operating in the wireless headphone spectrum.

3. (Previously Presented) A wireless digital audio headphone comprising:

a portable digital audio headphone receiver configured to receive a unique user code bit sequence and a original audio signal representation in the form of packets, said digital audio headphone receiver, capable of mobile operation and configured for direct digital coded wireless spread spectrum communication with a mobile digital audio transmitter;

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

a digital demodulator configured for independent CDMA communication operation;

a decoder operative to decode reduced intersymbol interference coding of original 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 in response to the unique user code bit sequence being recognized, said audio having been wirelessly transmitted from a portable audio player and reproduced virtually free from interference from device

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transmitted signals operating in the wireless headphone spectrum.

4. (Previously Presented) The wireless digital audio headphone of claim 3, wherein the audio output is music.

5. (Previously Presented) A mobile wireless digital audio receiver, configured to receive a unique user code and a original audio signal representation in the form of packets, said unique user code configured to spread the spectrum of said signal and further configured for independent communication operation, the wireless digital audio receiver further configured to be directly communicable with a mobile digital coded audio transmitter, said mobile wireless digital audio receiver comprising:

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

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

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

a module adapted to reproduce said generated audio output, said audio having been wirelessly transmitted from an audio player and reproduced virtually free from interference from device transmitted signals operating in the wireless digital audio receiver spectrum.

6. (Previously Presented) A mobile wireless digital audio receiver, configured to receive a unique user code and a original audio signal representation in the form of packets, said unique user code configured to spread the spectrum of said signal and further configured for independent communication operation, the wireless digital audio receiver further configured to be communicable with a digital audio transmitter, said mobile

wireless digital audio receiver comprising:

fuzzy set membership functionality to enhance detection of said unique user code;

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

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

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

a module adapted to reproduce said generated audio output, said audio having been wirelessly transmitted from an audio player and reproduced virtually free from interference from device transmitted signals operating in the wireless digital audio receiver spectrum.

7. (Previously Presented) A wireless digital audio receiver, configured to receive a unique user code and a original audio signal representation, said unique user code configured to spread the spectrum of said signal and further configured for independent communication operation, the wireless digital audio receiver further configured to be directly communicable with a digital audio transmitter, said wireless digital audio receiver comprising:

fuzzy set membership functionality to enhance detection of said unique user code;

a direct conversion module configured to capture the correct bit sequence embedded in the received spread spectrum signal;

a module adapted to reproduce said original audio signal representation, said audio having been wirelessly transmitted from an audio player and reproduced virtually free from interference from other device transmitted signals.

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8. (Previously Presented) A wireless digital coded music audio transmitter operatively coupled to a music audio source and configured to transmit a unique user code and an original audio signal representation, wherein said digital coded music audio transmitter coupled to said music audio source, and configured to be directly communicable with a mobile digital audio receiver, is capable of being moved in any direction during operation, said wireless digital coded audio transmitter comprising:

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

a digital modulator module configured for independent code division multiple access communication operation, said transmitter configured to wirelessly transmit said audio to be reproduced virtually free from interference from device transmitted signals operating in the wireless digital audio transmitter spectrum.

9. (New) A wireless digital audio receiver capable of being moved in any direction during operation and configured to receive a unique user code and a original audio signal representation in the form of packets, said unique user code configured to spread the spectrum of said signal and further configured for independent communication operation, said wireless digital audio receiver further configured to be directly communicable with a digital audio transmitter capable of being moved in any direction during operation, said wireless digital audio receiver comprising:

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

a decoder operative to decode reduced intersymbol interference coding of said original audio signal representation, said audio having been wirelessly transmitted and

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reproduced virtually free from interference from device transmitted signals operating in the wireless digital audio receiver spectrum.

10. (New) A wireless digital coded audio transmitter operatively coupled to a audio source and configured to transmit a unique user code and an original audio signal representation, wherein said digital coded audio transmitter coupled to said audio source, and configured to be directly communicable with a mobile digital audio receiver, is capable of being moved in any direction during operation, said wireless digital coded audio transmitter comprising:

encoding operative to encode said original audio signal representation to reduce intersymbol interference and aid in lowering signal detection error of said audio representation signal respective to said receiver and mobile said transmitter coupled to said audio source;

a digital modulator module configured for independent code division multiple access communication operation, said transmitter configured to wirelessly transmit said audio to be reproduced virtually free from interference from device transmitted signals operating in the wireless digital audio transmitter spectrum.

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RESPONSE TO THE OFFICE ACTION DATED 10/11/2013

Examiner Interview on December 5, 2013

The applicant would like to thank Examiner Flanders for the interview telephonically conducted on December 5, 2013. The summary submitted by the Examiner on December 11th is noted. The substance of the interview centered around the prior art and their teachings and possible ways of creating the present invention. The discussion included the prior art Lavelle, which has been directly cited in past Office Actions in this prosecution history, but is currently not directly cited. Thus, the interjection of that prior art forms a different rejection altogether.

Response to the Rejection of Claims 1-8 Under 35 U.S.C. 103

1. Legal Standard

A finding of obviousness requires that "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 the subject matter pertain." 35 U.S.C. §103(a). In *KSR Int'l Co. v. Teleflex, Inc.*, 127 S. Ct. 1727, 82 USPQ2d 1385 (2007), the Supreme Court stated that the following factors set forth in *Graham v. John Deere Co.*, 383 U.S. 1, 148 USPQ 459 (1966) control an obviousness inquiry: (1) the scope and content of the prior art; (2) the differences between the prior art and the claimed invention; (3) the level of ordinary skill in the art; and (4) objective evidence of nonboviousness. *KSR*, 127 S. Ct. at 1734, 82 USPQ2d at 1388 (quoting *Graham*, 383 U.S. at 17-18, 14 USPQ at 467).

The *KSR* Court affirmed that it is "important to identify a reason that would have prompted a person of ordinary skill in the relevant field to combine the elements in the way the claimed new invention does . . . because inventions in most, if not all, instances rely upon building blocks long since uncovered, and claimed discoveries

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almost of necessity will be combinations of what, in some sense, is already known." *KSR,* 127 S. Ct. at 1741, 82 USPQ2d at 1396. Once the *Graham* factors have been addressed, the Examiner may apply the TSM test, asking whether (l) a teaching, suggestion or motivation exists in the prior art to combine the references cited, and (2) one skilled in the art would have a reasonable expectation of success. *See* USPTO Guidelines at 57534.

Further, in order to establish *prima facie* obviousness of a claimed invention, all the claim limitations must be taught or suggested by the prior art. *In re Royka,* 490 F.2d 981, 180 USPQ 580 (CCPA 1974). Additionally, in considering a prior art reference, the reference must be considered in its entirety, *i.e.,* as a whole, including portions that would lead away from the claimed invention. *WL. Gore & Associates, Inc.* v. *Garlock. Inc., 721* F.2d 1540,220 USPQ 303 (Fed. Cir. 1983), cert. denied, 469 U.S. 851 (1984). A prior art reference is only appropriate where the "invention as a whole would be obvious to a person of ordinary skill in the field." In re Kumar, 418 F.3d 1361, 76 USPQ2d 1048, 1053 (Fed. Cir. 2005). Moreover, it is improper to combine references where the references teach away from their combination. *In re Grasselli,* 713 F.2d 731,743,218 USPQ 769, 779 (Fed. Cir. 1983). Indeed, "an applicant may rebut a prima facie case of obviousness by showing that the prior art teaches away from the claimed invention *in any material respect." In re Peterson*, 315 F.3d 1325, 1331 (Fed. Cir. 2003) (Emphasis added). In making an obviousness rejection, Examiners must provide evidence and clear argument as to how the prior art suggests the invention. *Sud-Chemie v. Multisorb Techs.*, 554 F. 3d 1001 (Fed. Cir. 2009).

2. Summary

The applicant is well aware that the prior art is taken as a whole in the rejections posed. It is in this light that the Applicant respectfully urges the Examiner to review this invention. Additionally, the prosecution history of this application is long. However, in the application's review, it is tantamount to view the invention as of its date of priority (at least), December 21, **2001**. As outlined in detail below, the prior

art in combination do not teach or suggest the present invention and provide no motivation for one of ordinary skill to combine and solve the novel problems posed by a mobile system working with a single mobile transmitter and a single mobile receiver in a space containing other transmissions in the digital wireless spectrum where both the transmitter and receiver may be in motion independent from one another. Since it is apparent from prior communications that the removal of some of the prior art would remove the obvious rejection, prior art is discussed singularly below, followed by specific solutions provided by the present invention. Combination of the prior art is also discussed, as is the proper legal standard.

3. Altstatt

a. General

The shortcomings of Altstatt cannot be alleviated any combination of the prior art. In particular, in the rejection of Claim 1 there are many shortcomings of Altstatt, namely that it does not disclose a: (1) digital system, (2) a receiver that can receive unique user code bit sequence and an original audio signal representation in the form of packets, (3) a direct conversion module configured to capture packets and the correct bit sequence within the packets aided by lowering signal detection error through reduced intersymbol interference coding of said audio representation signal respective to said mobile digital audio receiver and said mobile digital coded audio transmitter, (4) a digital demodulator configured for independent CDMA communication, (5) a decoder operative to decode reduced intersymbol interference coding or original audio signal representation, (6) a digital-to-analog converter generating an audio output of said original audio signal representation, and (7) a module adapted to-reproduce said generated audio output in response to unique user code bit sequence being recognized.[1] An eighth missing characteristic could be added, namely, that Altstatt uses a knob for the user to adjust (during

[1] Claim 3.

device operation) to minimize interference in a channel. Altstatt alone cannot suggest the present invention.

At least seven essential elements of the present invention are identified by the Examiner as not taught or suggested by Altstatt. The rejection relies on the interjection of Li to teach CDMA digital transmission, and on Lindemann to reduce intersymbol interference. Similar arguments can be applied to claims 2-10. Altstatt can only be arguably applied to teach (1) a wireless audio headphone (subject to interference) for the receipt of an audio music representation signal, (2) an audio receiver, capable of mobile operation, configured for direct wireless communication (subject to interference) with a mobile audio transmitter. In contrast to the present invention, Altstatt requires the user to manually suppress unintended interference during device operation (Altstatt column 7 lines 6-8).

The present invention necessitates a great deal of added complexity in its additional elements to achieve the novel wireless digital audio system as is described in each of the claims. For each claim, the OA rejections are based on Altstatt in combination with Li, Lindemann and Kurrat.

b. Interference in Altstatt

Moreover, the OA states that Altstatt discloses the invention in analog (OA page 3 "A mobile wireless audio receiver (Fig.1). However, digital wireless communication was notoriously well known in the art"). This statement is in error. As opposed to Altstatt, the claimed invention *is in operation* without interference from other transmitters in the spectrum. During operation, Altstatt encounters interference from other transmitters in the spectrum. Altstatt states: "This allows the user to move the frequency of his or her transmitter in case a strong local station is causing interference" (Col. 7 Lines 6-8).

Altstatt fails to provide an initialized assignment to wirelessly connect a transmitter/receiver pair that is free of interference from a similar transmitter.[2] Altstatt teaches user interaction, *during operation*, to constantly find a new assignment (frequency) when interference is encountered. Instead, the claimed invention utilizes a unique initialized assignment (unique user code) that wirelessly connects a transmitter/receiver pair *without the need for user interaction during operation*. Altstatt does not teach or suggest *device operation* free from interference from other transmitters in the spectrum. By contrast, the claimed invention initializes a *unique user code* (Claims 1-10) to uniquely match a transmitter with a receiver to aid in preventing interference from another similar transmitter *during operation* (*free from interference from device transmitted signals* ***operating*** *in the wireless digital audio spectrum*; Claims 1-10).

4. Alstatt and Li

The combination of Altstatt and Li does not teach or suggest the present invention. As previously discussed on page 2 of the August 4, 2010 of the Applicant's response to the Final Rejection dated 06/07/2010: "The Examiner understands that Altstatt does not disclose a direct one-to-one digital transmitter-to-headphone communication link, thus, it should also be understood that Altstatt cannot realize the benefits of such a digital link as asserted."[3] Moreover, Li clearly discloses a

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[2] Alstatt states "the frequency is set before shipment . . . the capacitance . . . or the inductance . . . may be varied, or both may be varied by the user in the field to set the frequency of transmission of the transmitter. This allows the user to move the frequency of his or her transmitter in case a strong local station is causing interference" (Col. 7 Lines 3-8).

[3] The Examiner's understanding is evidenced in the Office Action Mailed 08-09-2005, page 6: "However the system of Altstatt is an analog transmission system that, in operation, lacks the benefits of a digitally encoded and transmitted audio signal" and Office Action Mailed 05-17-2006, page 6 and Office Action Mailed 10-02-2006,

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cellular communication system.[4] A CDMA cellular network is a time-synchronous system that requires intermediate links (not a one-to-one direct link), for example, a cell phone tower between end-to-end transmission and reception to suppress interference.

The instant OA asserts: "It would be obvious to one of ordinary skill in the art at the time the invention was made to apply the digital CDMA wireless communication of Li to replace the FM modulation communication as taught by Altstatt." (see pg. 3). Claims 1-10 of the present invention specifically disclose a direct one-to-one transmitter/receiver communication link[5] that the Altstatt/Li combination cannot teach or suggest. A close review of Altstatt/Li combination reveals that intermediate equipment (or steps) is required for the transmitter and headphone receiver to communicate. For example, the Altstatt/Li system must wirelessly transmit audio (Altstatt) to, at least, a base station and/or a cell phone tower (Li) prior to the receiver headphone receiving the audio.

Any attempt to eliminate the intermediate base station and/or cell phone tower would cause interference resulting from unintended transmission sources. In contrast, claim language in the present invention states: "said audio having been

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page 10: "However, the system of Altstatt an analog transmission system that, operation lacks the benefits digitally encoded and transmitted audio signal."

[4] Li column 1 lines 57 – 63 "CDMA digital cellular communications system . . . ," See also Li column 6 lines 55 – 62 "IMT 2000 . . . IS95 . . . CDMA 2000. IMT 2000, IS95 and CDMA 2000 are all cellular (i.e., cell phone) standards and each requires the centralized control of a base station for operation. Li's centralized control base station system does not disclose a direct one-to-one transmitter-to-headphone communication link."

[5] For example, the in-motion transmitter/in-motion receiver embodiment language of Claim 8: "digital coded music audio transmitter coupled to said music audio source, and configured to be directly communicable with a mobile digital audio receiver, is capable of being moved in any direction during operation."

wirelessly transmitted and reproduced virtually free from interference from device transmitted signals operating in the . . . spectrum." The Examiner has approved this language in the past. Item 3 of the Advisory Action dated 07/27/2011 submits that the language of "direct communication" (or "directly communicable") adheres to a one-to-one architecture embodiment.[6]

Figure 9.1 "Block diagram of a cellular system" of Exhibit I, previously submitted as a visual aid, exemplifies the architecture required to "apply the communication of Li to replace the FM modulation communication as taught by Altstatt" (without interference from unintended transmission sources). Moreover, the present invention is, among other things, related to a time-asynchronous (decentralized) system. Some differences between a CDMA cellular time-synchronous system and a time-asynchronous system are detailed in section 2.1 "Imperfect Orthogonality of CDMA Codes" on page 155 of Exhibit II, previously submitted. The reference clearly discloses the problems that exist when attempting to substitute the CDMA cellular time-synchronous centralized system equipment for time-asynchronous decentralized system equipment (as stated on page 4 of the OA "simple substitution of one known element . . . for another . . . to obtain predictable results").

Because Altstatt and Li cannot be combined to produce a useable and functioning device to transmit audio wirelessly virtually free of interference, Altstatt/Li combination fails to teach or suggest the present invention. As this combination is relied upon to reject all claims in the present invention, it is respectfully requested that the rejections be removed and the application be allowed. The current amendments to the claims do not change the scope or the analysis of the Altstatt/Li combination.

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[6] Item 3 of the Advisory Action states: "Previous they were only communicable, no direct requirement was present. The previous interpretation allowed for intermittent steps during communication while the new limitations preclude this interpretation."

5. Li, Lindeman, and Lavelle

The shortcomings of other cited prior art in combination and singularly are vast. Li and Lindemann (and Lavelle whom the Examiner referenced frequently during the Examiner Interview on December 5, 2013), teach centralized base station control where all CDMA signals within the system originate from the same transmitter. Li column 1 lines 57 – 63: "CDMA digital cellular communications system . . . ," See also Li column 6 lines 55 – 62: "IMT 2000 . . . IS95 . . . CDMA 2000. IMT 2000, IS95 and CDMA 2000 are all cellular (i.e., cell phone) standards and each requires the centralized control of a base station for operation", Lindemann paragraph 0011: "For a typical surround sound home theater system there are six loudspeakers. Each loudspeaker contains an RF receive antenna and an RF receiver, and performs acquisition and tracking on the *RF signal generated by the single RF transmitter* in the audio transmission device" (emphasis added) and Lavelle US Patent 6,678,892 column 7 lines 4-10: ". . . the first and second wireless transmitters . . . have been replaced by the wireless transmitter of FIG. 1B, the latter for wirelessly transmitting signals based upon Code–Division Multiple Access (CDMA) technology."

Consequently, neither Li, Lindemann, nor Lavelle in combination with Altstatt teach *independent communication operation; Claims 1-10* (decentralized communications where each device accesses the medium individually and transmits the data without central control) for *direct mobile transmitter-to-mobile receiver communication* (*Claims 1-10)* and *free from interference from device transmitted signals operating in the wireless digital audio spectrum (Claims 1-10).*

It is erroneous to find the combination of a *centralized system (e.g., Li, Lindemann, Lavelle)* with Altstatt to obviate, at least, the claimed *decentralized system invention*. In fact, Exhibit II (which is referenced later) clearly substantiates this misinterpretation within the OA. For example, Exhibit II, previously submitted, states: "In fact, codes that are orthogonal in synchronous systems *(i.e., centralized system)* exhibit high cross-correlation *(i.e., interference)* when *not perfectly synchronized (i.e., decentralized system)"* (emphasis added). Thus, at the time the

present invention was made, a decentralized system without interference was entirely unknown and not though possible. The invention is novel and patentable and it is respectfully requested that the rejection be removed and the application be put into allowance

Moreover, Li, Lindemann and Lavelle do not produce wireless audio transmission and reproduction anytime, as accomplished by the present invention.[7] Clearly, exercise and/or running can be done anytime, and the present invention allows for this. Li is inoperable without cell phone connectivity (e.g., coverage holes or physical obstacles blocking cell tower signal, such as buildings, tunnels, etc) and Lindemann (home theater) along with Lavelle (in-vehicle) are inoperable out of their specific and respective environments. Even Alstatt would not be enabled to operate while a user constantly changes position, music reproduction would be dependent on the user constantly adjusting the dials of Altstatt to hear anything.

It is evident that Altstatt, Li, Lindemann and Lavelle, alone or in combination, do not teach or suggest, at least, the novel wireless invention of 1) *device operation* free from interference from device transmitted signals in the wireless spectrum 2) within a decentralized system using a code uniquely designed for a transmitter/receiver pair and 3) mobile transmission/mobile reception of audio (e.g., music) anytime. It is respectfully requested that the rejections be removed.

[7] Parent application 10/027,391 to the present invention states: "Such use includes the portable player systems such as cassette tape players that may be used during exercising as for example running."

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6. Inter-symbol Interference

a. Reducing Inter-symbol Interference was not well known at the time of the present invention

As to the argument (both Lindemann in the OA and Lavelle during the Examiner Interview on December 5, 2013) pertaining to the inter-symbol interference (ISI), the examiner asserts that "reducing intersymbol interference in audio coding for CDMA transmission is notoriously well known in the art" (page 5 of the OA).

The applicant would like to point out that Lavelle is silent as to ISI. Furthermore, Lavelle does not teach wireless digital communication between an in-motion digital audio transmitter and in-motion digital audio receiver (e.g., a headset) as is claimed in the present invention.[8] Lavelle teaches a vehicle in-motion and within that vehicle exists a headset and transmitter mounted to the vehicle's body.[9]

Bluetooth may be considered a decentralized system. In 2001, Motorola stated: "In the Bluetooth channel environment, however, the received signal has *unrecoverable* ISI." (Exhibit III "Motorola's Bluetooth Solution to Interference Rejection and Coexistence with 802.11," page 4, and provided in and IDS during the prosecution of U.S. Patent No. 8,131,391 (emphasis added)). Note, that ISI was well known to the applicant prior to 2001, and the solution is provided in the present invention (Paragraph 0013 of parent application 10/027,391 states: "An encoder 36 may be used to reduce intersymbol interference (ISI) . . . The reduction of ISI may lower the probability of a signal detection error in the audio receiver."). Thus, reducing

[8] Parent application 10/027,391 to the present invention states: "Such use includes the portable player systems such as cassette tape players that may be used during exercising as for example running."

[9] See column 10, lines 11-15 of Lavelle, which state: "the entertainment unit being mounted against the interior roof of the vehicle, the entertainment unit may also be mounted against the front portion of the vehicle."

intersymbol interference in audio coding for CDMA transmission is *not* notoriously well known in the art as posited by the examiner.

Both Lavelle and Lindemann are silent about ISI. The present invention provides a novel solution to a well known problem in 2001. It is novel and patentable.

Lindemann applies Reed-Solomon encoding/decoding for the purpose of *detecting and correcting errors after a signal has been received* (i.e., after the presence of a signal is detected, the signal is then analyzed for errors within the signal and then the errors are corrected).[10] In stark contrast, the present invention reduces ISI for, among other things, lowering the error in *detecting the presence of the signal in the receiver*.[11]

The whole process of signal authentication in the present invention may be viewed as a three-step procedure:

(1) detect the presence of the correct signal (present invention),

(2) determine if any anomalies exist within the captured signal i.e., error detection (Reed-Solomon) and

(3) correct the anomalies within the signal that have been identified i.e., error correction (Reed-Solomon).

Reed-Solomon does not teach or suggest the novel way of reducing ISI as utilized in the present invention.

The prior art corrects errors after reception because it has to; the solution provided by the present invention was unknown. The occurrence of errors is going to

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[10] Lindemann paragraph 0061 states: "Each transmission frame is Reed Solomon decoded to generate fully error corrected Transmission Frames."

[11] Paragraph 0013 of parent application 10/027,391 states: "An encoder 36 may be used to reduce intersymbol interference (ISI) . . . The reduction of ISI may lower the probability of a signal detection error in the audio receiver.").

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happen, and errors are well known, but where and how they are corrected between the prior art and present invention is completely disparate. The combination of Altstatt , Lindemann or Lavelle cannot teach reduction of ISI as utilized in the present invention, given that, at least, (1) Altstatt, Lindeman and Lavelle are all silent about ISI and (2) Exhibit III, referenced above, discredits the OA statement "reducing intersymbol interference in audio coding for CDMA transmission is notoriously well known in the art." Reducing intersymbol interference was not well known in the art and the present invention teaches a new and novel way of doing so.

b. The prior art in combination does not teach reduction in ISI as solved by the present invention

Li teaches the necessity of intermediate links, such as, a base station to transmit wireless digital audio, thus removing the Li/Altstatt combination that is cited for teaching a base device in the combination's wireless CDMA headphone set. The Reed-Solomon technique of reducing interference is inapplicable and founded on a disparate approach to reducing interference, removing Lindemann as prior art for teaching the reduction of intersymbol interference in a comparable device.

Further, Kurrat does not disclose "a direct conversion module configured to capture packets and the correct bit sequence within the packets aided by lowering signal detection error through reduced intersymbol interference coding of said audio representation signal respective to said mobile digital audio receiver and said mobile digital coded audio transmitter," as claimed in the present invention. Kurrat simply discloses the use of a direct conversion receiver. Thus, there is nothing predictable about the present invention's functioning of high fidelity transmission and reception of digital audio directly between one transmitter and one receiver in the presence of other users, and the rejections should be removed (see pages 3 - 8 of the OA).

Additionally, the Examiner asserts: "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 Kurrat to

the combination. One would have been motivated to do so to provide a low cost low current the combination conversion receiver in the wireless communication device of Budrick; see col. 2 of Kurrat." Although, Kurrat does not disclose a direct conversion module configured to capture packets and the correct bit sequence within the packets aided by lowering signal detection error through reduced intersymbol interference coding of said audio representation signal respective to said mobile digital audio receiver and said mobile digital coded audio transmitter as claimed. Kurrat is silent about a direct conversion receiver configured in such a manner.

7. Conclusion as to ISI

Simply, the combination of Altstatt, Li and Lindemann, does not teach or suggest the present invention. The combination provides no motivation to one skilled in the art to create the present invention as disclosed. As previously stated, claims 1- 10 include language of direct communication, whereas Altstatt with Li necessarily rely on an intermediate cellular communication architecture to wirelessly link (end-to-end) a transmitter with a receiver for the purpose of communicating audio without interference from unintended transmitter devices. Moreover, Altstatt, Li, Kurrat and Lindemann do not teach or suggest the reduction of ISI for, among other things, lowering the error in *detecting the presence of the signal in the receiver* (as pointed out previously). None of the cited prior art contemplates ISI. And as previously discussed, Lindemann utilizes Reed-Solomon for the purpose of *detecting and correcting errors within a received signal,* not for *detecting the presence of the signal* (as stated in the specification and claims).

The Applicant is not arguing that Lindemann is not solving a particular problem through use of Reed-Solomon. The Applicant is merely attempting to provide an understanding that Lindemann approaches his particular problem in such a disparate fashion to the present invention that Lindemann could not teach or suggest to one of ordinary skill how to solve interference in the unique and superior fashion presented in the claims of the instant application. It is clear that the prior

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art in combination cannot obviate the present inventions, the rejections should be removed and the application placed into allowance.

8. Li and G.729

Finally, Li teaches G.729 for audio bit framing to transfer (by form that includes a wired link) the audio data to the channel encoder. Li column 3 lines 5 – 11 "Signals from each sound source … sent to the multichannel sound signal encoder . . . by frame, which will be sent to the channel encoder" and this is stated again in "col. 4 lines 25 – 33" referenced in the OA. The claimed invention (Claim 1) states "*configured to receive a unique user code and a original audio signal representation in the form of packet*" and "*packets embedded in the received spread spectrum signal.*" This is a transmission over the air (wireless) that includes, at least, a unique user code and audio signal representation. Clearly, the combination of Altstatt and Li for G.729 audio frame transfer does not teach wireless spread spectrum packets.

9. New Claims

Claims 9 and 10 have been added. The Applicant respectfully requests that the new claims be entered at this time.

10. Conclusion

All of the explanations above remove the obviousness arguments for all remaining Claims 1- 10. Thus, it is respectfully requested that for at least the reasons provided above, the prior art references are deficient in providing the present invention solution, and the remaining Claims should be in allowance.

Moreover, the Applicant would like to state that any other arguments made by the Examiner and not explicitly addressed in this response are not agreed to by the Applicant (e.g., the rejection for obviousness fuzzy logic, etc). Silence as to any arguments made by the Examiner is not an assent to those arguments; the Applicant respectfully asserts that all claims in their present condition are allowable and patentable. For example, the language "fuzzy set membership functionality to

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enhance detection of said unique user code" (as supported by Patent 7,865,258 column 3 lines 56 – 67 and column 4 lines 1 – 5), has already been allowed (See Claims 7 – 9 of Patent 8,131,391).

If there are any questions, concerns, or actions that can be taken to expedite the processing of this application, please do not hesitate to contact the Applicant's representative.

December 17, 2013

Respectfully Submitted,



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Exhibit III

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

Application Note

by
Weizhong Chen, Ph.D.

AN2211/D
Rev. 0, 12/2001

MOTOROLA intelligence everywhere | digital dna

Exhibit III

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Abstract and Contents

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

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

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1 Introduction

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

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

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

2 Motorola's Bluetooth Solution

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

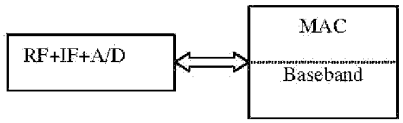


Figure 1. Motorola's Two-Chip Bluetooth Solution

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

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

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

2.1 Joint Detection of Access Code, Timing, and Carrier

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

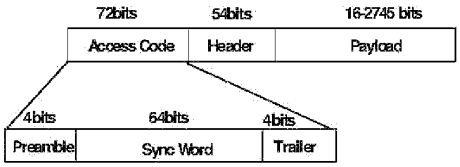


Figure 2. Bluetooth Packet Structure

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

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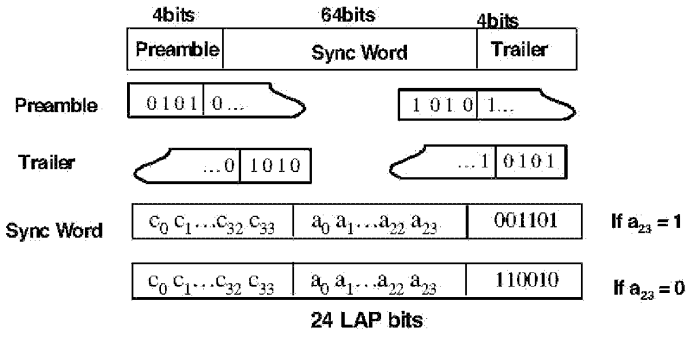


Figure 3. Access Code Structure

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

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

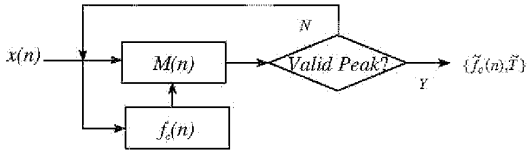


Figure 4. Motorola's Joint Detection

2.2 MLSE Symbol Recovery with Carrier Tracking

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

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Exhibit III

Motorola's Bluetooth Solution

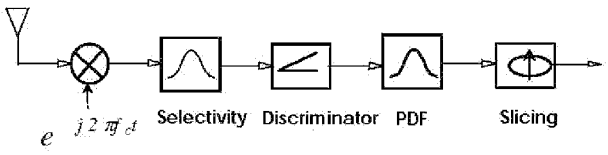


Figure 5. Conventional Receiver Architecture

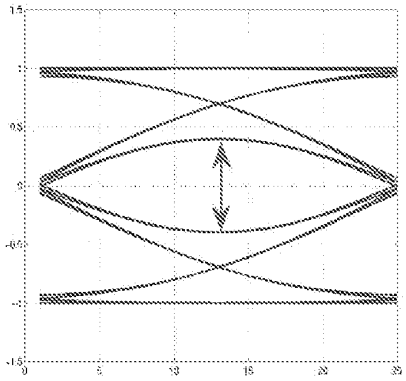


Figure 6. Slicing Detector Performance Determined by the Channel's Eye-Opening or ISI

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

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

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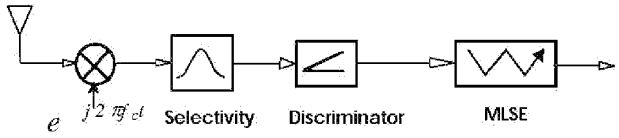


Figure 7. MLSE-Based Receiver Architecture

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

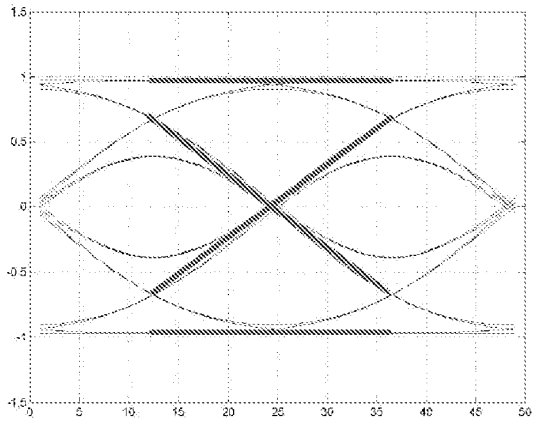


Figure 8. Signal Transition Used in MLSE

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

3 Performance of Motorola's Bluetooth Solution

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

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Exhibit III

Performance of Motorola's Bluetooth Solution

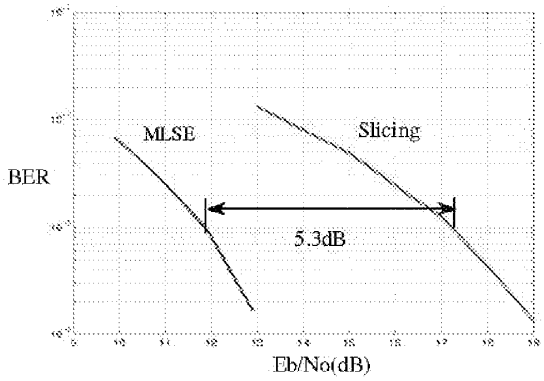
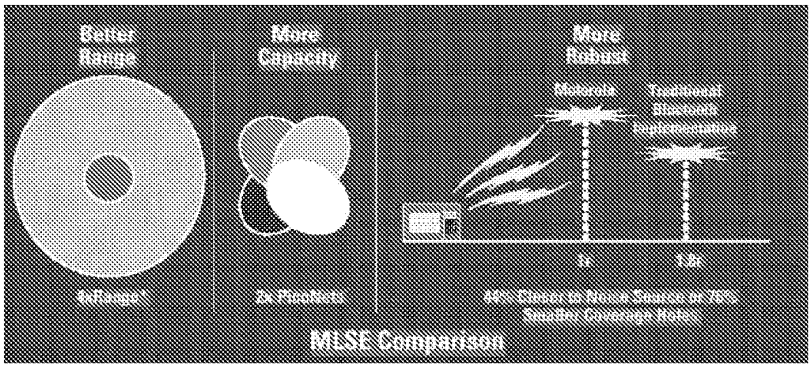


Figure 9. Performance Gain of MLSE Symbol Recovery

Table 1. Summary of Interference Rejection Performance

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

( ) = measured
= specification sheet



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

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

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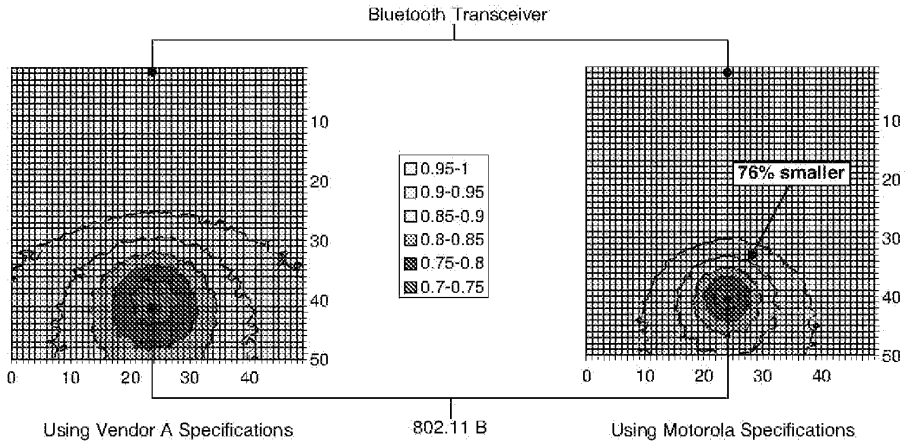


Figure 11. Coverage Map Showing Bluetooth Performance in the Presence of an 802.11 Interferer

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

Summary

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

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

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

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

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Exhibit III

Summary

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IPR2025-01541

Electronic Acknowledgement Receipt

EFS ID:	17690939
Application Number:	13356949
International Application Number:	
Confirmation Number:	2299
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:	1028.6
Receipt Date:	18-DEC-2013
Filing Date:	24-JAN-2012
Time Stamp:	10:08:01
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	ClaimsResponseFOA.pdf	79607 e0307aa8a0d5a19b10a0a83895760275bff386a1	no	6

Warnings:	
Information:	

2	Applicant Arguments/Remarks Made in an Amendment	ResponseExhibit.pdf	2959471 69156d06f6ea5d42417cb3141fa27aa2c1ba5a0e	no	27
Warnings:					
Information:					
			Total Files Size (in bytes):	3039078	

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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
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68533 e 2014-03-07

MEGAN LYMAN
1816 SILVER MIST CT.
RALEIGH, NC 27613

Paper No.

Application No.:	**13/356,949**	**Date Mailed:**	**2014-03-07**
First Named Inventor:	Woolfork, C., Earl	Examiner:	FLANDERS, ANDREW C
Attorney Docket No.:	1028.6	Art Unit:	2656
Confirmation No.:	2299	Filing Date:	2012-01-24

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

Commissioner for Patents

PTO-90c (Rev.08-06)

NOTICE REQUIRING EXCESS CLAIMS FEES	Application No.	Applicant(s)
	13/356,949	WOOLFORK, C. EARL
		Art Unit
		2600

The excess claim(s) filed on 18 December, 2013 is/are not accompanied by the appropriate payment of excess claims fees set forth in 37 CFR 1.16(h)-(j) or 1.492(d)-(f). Excess claims fees are required for each claim in independent form in excess of three (§ 1.16(h)), each claim (whether dependent or independent) in excess of twenty (note that § 1.75(c) indicates how multiple dependent claims are considered for fee calculation purposes) (§ 1.16(i)), and each application that contains a multiple dependent claim (§ 1.16(j)).

Since the application is not under a final rejection, applicant is given a time period of **TWO (2) MONTHS** from the mailing date of this notice to submit either: (1) the fee payment of $ 210.00, or (2) an amendment in compliance with 37 CFR 1.121 that cancels the excess claim(s), in order to avoid ABANDONMENT. Extensions of this time period may be granted under 37 CFR 1.136, unless the excess claim(s) was/were presented in a preliminary amendment.

☐ 1 The funds in Deposit Account No. are insufficient to cover the entire fee due. The balance is due within the time period set forth in this notice. See note below regarding the appropriate service charge.

☐ 2. The Credit Card payment to cover the entire fee due to Account (**Card type + last 4 digits ONLY**) was refused. The balance is due within the time period set forth in this notice. See note below regarding the appropriate service charge.

☒ 3. The amendment that includes the excess claim(s) has not been entered, since applicant has failed to remit (or authorize charge to a Deposit Account or Credit Card) the fee as indicated on the attached Patent Application Fee Determination Record (PTO/SB/06). Remittance or authorization is due within the time period set forth in this notice.

☐ 4. The fee submitted in this application is insufficient. A balance of $ is due for presentation of excess claims (37 CFR 1.16(h)-(j) or 1.492(d)-(f)).

☐ 5. Other.

Explanation (*Provide specific details of the required correction in order to assist the applicant. Indicate whether a service charge has been added to the fee due*):

THE AMOUNT OF THE FEE(S) DUE IS SUBJECT TO CHANGE, GENERALLY ON OCTOBER 1 OF EACH YEAR (37 CFR 1.16, 1.21 & 1.492). THE **AMOUNT OF THE FEE(S) DUE IS DETERMINED AS OF THE DATE A COMPLETE REPLY WITH THE APPROPRIATE FEE(S) IS RECEIVED BY THE OFFICE** (37 CFR 1.8 & 1.10). BECAUSE THE AMOUNT DUE IS SUBJECT TO CHANGE, IT IS RECOMMENDED THAT APPLICANT CHECK THE CURRENT FEE SCHEDULE WHICH IS AVAILABLE ON THE USPTO'S WEBSITE AT: ***http://www.uspto.gov/web/offices/ac/qs/ope/fees.htm***

Service Charges: There is a $50 service charge for processing each payment refused (including a check returned "unpaid") or charged back by a financial institution (37 CFR 1.21(m)). There is a $25.00 service charge for each month when the balance of a deposit account is below $1000 at the end of the month (37 CFR 1.21(b)(2)).

Technical Support Staff (TSS): /NICHELE PETERSON/ Phone Number: (571)272-7273

Note to TSS: Please do NOT use this notice if the application is under a final rejection.

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Samsung Electronics Co., Ltd. et al. v. One-E-Way, Inc.
IPR2025-01541

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
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PATENT APPLICATION FEE DETERMINATION RECORD Substitute for Form PTO-875	Application or Docket Number 13/356,949	Filing Date 01/24/2012	☒ 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	12/18/2013	(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))	* 10	Minus	** 20	= 0	X $40 =	0
	Independent (37 CFR 1.16(h))	* 9	Minus	***8	= 1	X $210 =	210
	☐ Application Size Fee (37 CFR 1.16(s))						
	☐ FIRST PRESENTATION OF MULTIPLE DEPENDENT CLAIM (37 CFR 1.16(j))						
						TOTAL ADD'L FEE	**210**

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
/NICHELE PETERSON/

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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MEGAN LYMAN
1816 SILVER MIST CT.
RALEIGH, NC 27613

Courtesy Reminder for
Application Serial No: 13/356,949

Attorney Docket No: 1028.6
Customer Number: 68533
Date of Electronic Notification: 03/07/2014

This is a courtesy reminder that new correspondence is available for this application. If you have not done so already, please review the correspondence. The official date of notification of the outgoing correspondence will be indicated on the form PTOL-90 accompanying the correspondence.

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Electronic Patent Application Fee Transmittal

Application Number:	13356949
Filing Date:	24-Jan-2012
Title of Invention:	Wireless Digital Audio Music System
First Named Inventor/Applicant Name:	C. Earl Woolfork
Filer:	Megan Elizabeth Lyman
Attorney Docket Number:	1028.6

Filed as Small Entity

Utility under 35 USC 111(a) Filing Fees

Description	Fee Code	Quantity	Amount	Sub-Total in USD($)
Basic Filing:				
Pages:				
Claims:				
Independent Claims in Excess of 3	2201	2	210	420
Miscellaneous-Filing:				
Petition:				
Patent-Appeals-and-Interference:				
Post-Allowance-and-Post-Issuance:				
Extension-of-Time:				

Description	Fee Code	Quantity	Amount	Sub-Total in USD($)
Miscellaneous:				
		Total in USD ($)		**420**

Electronic Acknowledgement Receipt	
EFS ID:	18525246
Application Number:	13356949
International Application Number:	
Confirmation Number:	2299
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:	1028.6
Receipt Date:	19-MAR-2014
Filing Date:	24-JAN-2012
Time Stamp:	15:57:30
Application Type:	Utility under 35 USC 111(a)

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File Listing:

Document Number	Document Description	File Name	File Size(Bytes)/ Message Digest	Multi Part /.zip	Pages (if appl.)

1	Fee Worksheet (SB06)	fee-info.pdf	30089 782dfc2ae1cf81a6fa9a921395091260fe7dc946	no	2
Warnings:					
Information:					
			Total Files Size (in bytes):	30089	

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 NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
13/356,949	01/24/2012	C. Earl Woolfork	1028.6	2299

68533 7590 05/05/2014

MEGAN LYMAN
1816 SILVER MIST CT.
RALEIGH, NC 27613

EXAMINER	
FLANDERS, ANDREW C	
ART UNIT	PAPER NUMBER
2656	

NOTIFICATION DATE	DELIVERY MODE
05/05/2014	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

Samsung Exhibit 1002, Page 198 of 880
Samsung Electronics Co., Ltd. et al. v. One-E-Way, Inc.
IPR2025-01541

Office Action Summary	Application No. 13/356,949	Applicant(s) WOOLFORK, C. EARL	
	Examiner Andrew C. Flanders	Art Unit 2656	AIA (First Inventor to File) Status No

-- 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 *18 December 2013*.

☐ 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) *1-10* 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) *1-10* 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 *24 January 2012* 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: _____.

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DETAILED ACTION

Notice of Pre-AIA or AIA Status

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

Response to Arguments

Applicant's arguments filed 18 December 2013 have been fully considered but they are not persuasive.

In section 3. a. Applicant generally discusses the shortcomings of Altstatt. Examiner agrees that such shortcomings exist, to wit, the requirement of the rejection under 35. U.S.C. 103a. It is noted that simply because one reference fails to teach many (to which the examiner does not necessarily agree) does not preclude obviousness.

In section 3. b. Applicant generally discusses the differences between the interference correction of Altstatt and the claimed "virtually free from interference." Examiner notes that simply tuning Altstatt to an unused frequency will allow reproduction that is "virtually free from interference." Furthermore, the CDMA implementation of the combination requires a device be paired to a particular "code," which is the entire basis of CDMA. This code enables transmission and reception separate from other CDMA transmissions, i.e. "virtually free from interference."

Applicant's allegation that Altstatt does not meet "device operation free from interference from other transmitters in the spectrum," is not persuasive. Examiner disagrees for the reasons stated above, generally, tuning to a particular frequency separates the device from the interference on the rest of the FM band (Spectrum), also the CDMA spectrum to which the code belongs also frees the device from the interference from other CMDA communications.

In section 4, Applicant alleges:

> A CDMA cellular network is a time-synchronous system that requires intermediate links (not a one-to-one direct link), for example, a cell phone tower between end-to-end transmission and reception to suppress interference.

Examiner disagrees. A cell phone tower is not required for CDMA communication to suppress interference. Take for example, Lindemann, which is a wireless stereo system for use in a consumer home. No intermediate links or towers are present in this invention. Furthermore, one to one CDMA communications in wireless headphone devices are notoriously well known in the art. Lavell (U.S. 6,678,892) teaches of a CDMA communication to independent headphone users.

In section 4, Applicant further alleges:

> Any attempt to eliminate the intermediate base station and]or cell phone tower would cause interference resulting from unintended transmission sources, In contrast, claim language in the present invention states: "said audio having been wirelessly transmitted and reproduced virtually free from interference from device transmitted signals operating in the.., spectrum." The Examiner has approved this language in the past. Item 3 of the Advisory Action dated 07/27/2011 submits that the language

> of"direct communication" (or "directly communicable") adheres to a one-to-one architecture embodiment.

Examiner disagrees. As noted above, both Lindemann and Lavell show that an intermediate base station is not required. The transmission between Lindemann/Lavell is directly between the receiver and transmitter.

In section 5, Applicant further alleges:

> Consequently, neither Li, Lindemann, nor Lavelle in combination with Altstatt teach independent communication operation; Claims 1-10 (decentralized communications where each device accesses the medium individually and transmits the data without central control) for direct mobile transmitter-to-mobile receiver communication (Claims 1-10) and free from interference from device transmitted signals operating in the wireless digital audio spectrum (Claims 1-10).

Examiner disagrees. When considering everything known in the art at the time the invention was made, it is clear that private, one to one CDMA communications in audio systems were known as evidenced, for example, by Lavelle. Further, In response to applicant's argument that the references fail to show certain features of applicant's invention, it is noted that the features upon which applicant relies (i.e., decentralized communications where each device accesses the medium individually and transmits the data without central control) are not recited in the rejected claim(s). Although the claims are interpreted in light of the specification, limitations from the specification are not read into the claims. See *In re Van Geuns*, 988 F.2d 1181, 26 USPQ2d 1057 (Fed. Cir. 1993).

In section 5, Applicant further alleges:

> Thus, at the time the present invention was made, a decentralized system without interference was entirely unknown and not though possible.

Examiner respectfully disagrees. 1.) the claims are not explicitly drawn to " a decentralized system without interference." 2.) these decentralized systems were known, as evidenced by Lavelle and Lindemann.

In section 5, Applicant further alleges:

> Clearly, exercise and/or running can be done anytime, and the present invention allows for this. Li is inoperable without cell phone connectivity (e.g., coverage holes or physical obstacles blocking cell tower signal, such as buildings, tunnels, etc) and Lindemann (home theater) along with Lavelle (in-vehicle) are inoperable out of their specific and respective environments.

Examiner disagrees and notes Applicants misinterpretation of the rejection. Li is shown for a typical CDMA communication. This does not restrict it only to large scale implementations such as a typical mobile phone/tower implementation. Again, small scale CDMA communications are known as evidenced by Lindemann and Lavelle, and these implementations are what the nature of the combination relies upon.

In section 6. a. Applicant further alleges:

> The applicant would like to point out that Lavelle is silent as to ISI. Furthermore, Lavelle does not teach wireless digital communication between an in-motion digital audio transmitter and in-motion digital audio receiver (e.g., a headset) as is claimed in the present invention.8 Lavelle

> teaches a vehicle in-motion and within that vehicle exists a headset and transmitter mounted to the vehicle's body.9

Examiner agrees that Lavelle does not explicitly teach ISI, however Lavelle discloses Reed-Solomon encoding, of which application of reduction of ISI is known and desirable in such encoding as evidenced (and noted by) Roberts, 6,418,558.

Applicants remaining arguments in section 6. a. are not persuasive for the reasons stated above, namely that it was known prior to Applicant's invention to remove ISI in a reed solomon encoder, as shown by Roberts.

In section 6. b. Applicant alleges:

“The prior art in combination does not teach reduction in ISI as solved by the present invention.”

Examienr notes, while this statement may be true (to which the Examiner does not necessarily agree), the actual claim only requires actual reduction of intersymbol interference. It is not explicitly limited to a particular way or method of doing so. To be sure, the claim explicitly recites "lowering signal detection error through reduced intersymbol interference coding." Thus, while it may not be the exact solution provided by Applicant, any type of coding that will reduce intersymbol interference will meet this limitation, e.g. Reed-solomon as shown.

Applicants remaining arguments in sections 7 and 8 are not persuasive for the same reasons above.

Examiner notes that many of Applicants arguments contain interpretations of the claims which are not expressly supported either by 1.) the explicit claim language itself and/or 2.) Applicant's disclosure. Additionally, the exhibits that Applicant refer, are moot given the teachings in the prior art. While Applicants submission weight in favor of Applicant, they are not the only teachings known at the time the invention was made.

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 of this title, 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.

Claims 1 – 10 are rejected under pre-AIA 35 U.S.C. 103(a) as being unpatentable over Altstatt (U.S. Patent 5,771,441) in view of Li (U.S. Patent 6,781,977) in further view of Kurrat (U.S. Patent 6,456,645) and in further view of Lindemann (U.S. Patent Application Publication 2004/0223622)

Regarding **Claim 1**, Altstatt discloses:

A mobile wireless audio receiver (Fig. 1).

Alstatt fails to disclose the device as “digital.”

However, digital wireless communication was notoriously well known in the art.

For Example, Li teaches a system providing CDMA communication of digital audio to headphone devices; col. 3 lines 20 – 33.

Replacing the FM transmitter/receiver implementation of Alstatt to use the digital CDMA communication discloses:

the system as a digital system (i.e. digital audio; col. 2 lines 48 – 51); also A/D conversion; col. 3 line 7).

It would have been obvious to one of ordinary skill in the art at the time the invention was made to apply the digital CDMA wireless communication of Li to replace the FM modulation communication as taught by Alstatt. Li clearly teaches the device for use in portable implementations such as music and headphone audio reproductions. Li also teaches the outputs/inputs as standard audio jacks. Furthermore, doing so would be simple substitution of one known element (i.e. digital CDMA transmitter/receiver) for another (i.e. analog FM transmitter) to obtain predictable results (i.e. Alstatt w/ a digital transmitter). Additionally, Li discloses a number of advantages of using digital communication in col. 6.

The combination further discloses:

configured to receive a unique user code and a original audio signal representation in the form of packets (packet form met by the G.729 encoding implementation, see col. 4 lines 25 – 33; also see the discussion of sending the entire signal using frames; col 3 lines 9 – 11), said unique user code configured to spread the spectrum of said signal and further configured for independent communication operation (matching the inherent code in CDMA to initiate de-spreading, i.e. each channel in CDMA corresponds to a different random sequence, this sequence must be received and recognized by receiving unit 200 in order for the device to operate), the wireless digital audio receiver further configured to be directly communicable with a mobile digital audio transmitter (Altstatt Figs 1 and 2),

The combination fails to explicitly disclose:

said mobile wireless digital audio receiver comprising:

a direct conversion module configured to capture packets

In a related field of endeavor (i.e. wireless music transmission), Kurrat discloses a transmission device that includes a direct conversion module. Using a direct conversion receiver as the radio frequency receiver provides a low cost and low current consumption implementation (col. 2).

Applying this direct conversion module to the transmission of the combination discloses:

a direct conversion module configured to capture packets (Kurrat's Direct conversion module now implemented in the combination's wireless transmission/reception configuration).

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 Kurrat to the combination. One would have been motivated to do so to provide a low cost low current the combination conversion receiver in the wireless communication device of the combination; see col. 2 of Kurrat.

The combination also fails to explicitly disclose:

However, reducing intersymbol interference in audio coding for CDMA transmission is notoriously well known in the art.

Lindemann discloses a device that transmits digital audio between a stereo system and a speaker using CDMA. Lindemann also includes that the transmission

stream is created using a Reed-Solomon encoding and interleaver and a corresponding decoder in the decoder; Figs. 6 and 8.

Applying these teachings to the encoding of the combination discloses:

and a correct bit sequence within the packets aided by lowering signal detection error through reduced intersymbol interference coding of said audio representation signal respective to said mobile wireless digital audio receiver and said mobile digital audio transmitter (Fig. 8 element 802 which is a Reed Solomon decoder and Interleaver; it is known in the art to configure Reed Solomon decoding/interleaving to reduce ISI as is shown by Roberts 6,418,558. Reducing ISI is a desirable feature to any digital transmission).

It would have been obvious to one of ordinary skill in the art at the time the invention was made to include the reed Solomon encoder/decoder in the combinations channel encoding. Doing so would have been nothing more than applying a known technique to a known device ready for improvement to yield predictable results as:

1) the prior art contained a base device in the combination's wireless CDMA headphone set that, when including intersymbol interference reduction, can be seen as in improvement;

2) the prior art contained a known technique (i.e. Reed Solomon encoding/decoding to reduce ISI) in a comparable device in Lindemann (i.e. wireless audio transmission); And

3) applying the teachings of Lindemann to the combination of Altstatt in view of Li would have been predictable as both operate on wireless CDMA communications of audio.

The combination further discloses:

said packets embedded in the received spread spectrum signal, the captured packets corresponding to the unique user code (CDMA communication shown in Li);

a decoder operative to decode reduced intersymbol interference coding of said original audio signal representation, said audio having been wirelessly transmitted and reproduced virtually free from interference from device transmitted signals operating in the wireless digital audio receiver spectrum (decoders of Li, now implemented in Altstatt to reproduce the digital audio signals).

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

a digital to analog converter generating an audio output of said original signal representation (portion of Li that converts the digital audio to analog for reproduction by the speaker 206); and

a module adapted to reproduce said generated audio output, said audio having been wirelessly transmitted from an audio player and reproduced virtually free from interference from device transmitted signals operating in the wireless headphone spectrum (206 of Li)

Regarding **Claim 3**, in addition to the elements stated above in the rejections of claims 1 and 2, the combination made in claim 1 further discloses:

a digital demodulator configured for independent CDMA communication operation (CDMA demodulator in receiver end of Li).

Regarding **Claim 4**, in addition to the elements stated above in the rejections of claims 1 - 3, the combination made in claim 1 further discloses:

where in the audio output is music (music; Li Abstract, also implied in Altstatt)

Regarding **Claim 6**, in addition to the elements stated above in the rejections of claims 1 - 3, the combination made in claim 1 further discloses:

fuzzy set membership functionality to enhance detection of said unique user code (soft decision making by the receiver to despread; col. 4 line 63 - col. 5 line 25 of Li).

Claims 5, 7, 8, 9 and 10 are rejected under the same grounds stated above (e.g. receiver/transmitter work in unison, the receiver will contain the decoding components, the transmitter will contain the corresponding encoding compnents).

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 – 10 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 not patentably distinct from each other because the claims of the ‘391 patent anticipate the claims of the instant application.

Claims 1 – 10 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 not patentably distinct from each other because the claims of the ‘258 patent anticipate the claims of the instant application.

Claims 1 – 10 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 not patentably distinct from each other because the claims of the ‘885 patent anticipate the claims of the instant application.

Claims 1 – 10 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 not patentably distinct from each other because the claims of the ‘294 patent anticipate the claims of the instant application.

Conclusion

THIS ACTION IS MADE FINAL. 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.

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

Search Notes	Application/Control No.	Applicant(s)/Patent Under Reexamination
	13356949	WOOLFORK, C. EARL
	Examiner	Art Unit
	ANDREW C FLANDERS	2656

CPC- SEARCHED		
Symbol	Date	Examiner

CPC COMBINATION SETS - SEARCHED		
Symbol	Date	Examiner

US CLASSIFICATION SEARCHED			
Class	Subclass	Date	Examiner

SEARCH NOTES		
Search Notes	Date	Examiner
see history attached	10/2/13	acf
reviewed and repeatedsearch history of entire family; 10/027,391 10/648,012 12/144,729 12/570,343 12/940,747	10/2/13	acf
eDan, EAST and PALM inventor search for double patenting	10/2/13	acf
google.com patents search	10/2/13	acf
updated	5/1/14	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
	13356949	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	10/02/2013	05/01/2014							
	1	✓	✓							
	2	✓	✓							
	3	✓	✓							
	4	✓	✓							
	5	✓	✓							
	6	✓	✓							
	7	✓	✓							
	8	✓	✓							
	9		✓							
	10		✓							

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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; 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

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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	(10/648012).APP.	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

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S47	59	S46 and @ad<"20011220"	US-PGPUB; USPAT; USOCR	OR	OFF	2007/03/20 10:08
S48	17	("4278978" | "4635063" | "5175558" | "5493307").PN. OR ("6130643").URPN.	US-PGPUB; USPAT; USOCR	OR	OFF	2007/03/20 10:15
S49	1	("5175558").PN.	US-PGPUB; USPAT	OR	OFF	2007/03/20 10:16
S50	13	("4651155" | "4931977").PN. OR ("5175558").URPN.	US-PGPUB; USPAT; USOCR	OR	OFF	2007/03/20 10:34
S51	1	("5946343").PN.	US-PGPUB; USPAT	OR	OFF	2007/03/20 11:40
S52	7186	(375/295,146,130,340,316,148).CCLS.	US-PGPUB; USPAT	OR	OFF	2007/03/20 11:41
S53	4473	S52 and @ad<"20011220"	US-PGPUB; USPAT	OR	OFF	2007/03/20 11:41
S54	1	("20040223622").PN.	US-PGPUB; USPAT	OR	OFF	2007/03/21 12:11
S55	5	"reed solomon" with "intersymbol interference"	US-PGPUB; USPAT	OR	OFF	2007/03/21 12:13
S56	30	"reed solomon" same "intersymbol interference"	US-PGPUB; USPAT	OR	OFF	2007/03/21 12:13
S57	21	S56 and @ad<"20011220"	US-PGPUB; USPAT	OR	OFF	2007/03/21 12:27
S58	1	("20030045235").PN.	US-PGPUB; USPAT	OR	OFF	2007/03/21 12:37
S59	1	("5790595").PN.	US-PGPUB; USPAT	OR	OFF	2007/03/21 12:37
S60	2435	((375/262,265,341) or (714/794,795)).CCLS.	US-PGPUB; USPAT	OR	OFF	2007/03/24 09:15
S62	56	"375".clas. and "fuzzy logic"	US-PGPUB; USPAT	OR	OFF	2007/03/26 11:04
S64	1	("4970637").PN.	US-PGPUB; USPAT	OR	OFF	2007/03/28 13:46
S65	755	(audio sound music voice) same (a/d "analog to digital") same (lpf "low pass")	US-PGPUB; USPAT	OR	OFF	2007/03/28 13:46
S66	282	(audio sound music voice) with (a/d "analog to digital") with ((lpf "low pass") and "digital")	US-PGPUB; USPAT	OR	OFF	2007/03/28 13:47
S67	227	(audio sound music voice) with (a/d "analog to digital") with ((lpf "low pass") and "digital") and @ad<"20011221"	US-PGPUB; USPAT	OR	OFF	2007/03/28 15:33
S68	34712	"band pass filter" bpf with "direct conversion receiver"	US-PGPUB; USPAT	OR	OFF	2007/03/28 15:33
S69	35	("band pass filter" bpf) with "direct conversion receiver"	US-PGPUB; USPAT	OR	OFF	2007/03/28 15:33
S70	8	S69 and @ad<"20011221"	US-PGPUB; USPAT	OR	OFF	2007/03/28 15:55
S71	1	("20030045235").PN.	US-PGPUB; USPAT	OR	OFF	2007/03/28 16:16
S72	1	("20040223622").PN.	US-PGPUB; USPAT	OR	OFF	2007/03/28 16:20

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S73	1	("5946343").PN.	US-PGPUB; USPAT	OR	OFF	2007/03/28 16:27
S74	364	"64-ary"	US-PGPUB; USPAT	OR	OFF	2007/03/28 16:27
S75	74	"64-ary" near modulat$4	US-PGPUB; USPAT	OR	OFF	2007/03/28 16:27
S76	46	S75 and @ad<"20011120"	US-PGPUB; USPAT	OR	OFF	2007/03/28 16:27
S77	2	(("4970637") or ("5790595")).PN.	US-PGPUB; USPAT	OR	OFF	2007/07/16 09:58
S78	3	(("4970637") or ("5790595") or ("20040223622")).PN.	US-PGPUB; USPAT	OR	OFF	2007/07/16 09:58
S79	3	("2004/0223622").URPN.	USPAT	OR	OFF	2007/07/16 11:25
S80	1	("5771441").PN.	US-PGPUB; USPAT	OR	OFF	2007/07/16 11:25
S81	60	("2236946" | "2828413" | "2840694" | "3080785" | "3085460" | "3087117" | "3296916" | "3579211" | "3743751" | "3781451" | "3825666" | "3863157" | "3901118" | "3906160" | "4004228" | "4229826" | "4335930" | "4344184" | "4369521" | "4430757" | "4453269" | "4464792" | "4471493" | "4612688" | "4647135" | "4721926" | "4794622" | "4845751" | "4899388" | "4988957" | "5025704" | "5214568").PN. OR ("5771441").URPN.	US-PGPUB; USPAT; USOCR	OR	OFF	2007/07/16 11:26
S82	2	S81 and cdma	US-PGPUB; USPAT; USOCR	OR	OFF	2007/07/16 11:26
S83	1	("6678892").PN.	US-PGPUB; USPAT	OR	OFF	2008/05/20 11:41
S84	1	("20020072816").PN.	US-PGPUB; USPAT	OR	OFF	2008/05/20 14:24
S85	22	"fuzzy logic" and modulat$5 and filter and (dpsk "phase shift key")	US-PGPUB; USPAT	OR	OFF	2008/06/06 09:20
S86	0	"455".clas. and "375".clas. and S85	US-PGPUB; USPAT	OR	OFF	2008/06/06 09:21
S87	1	"10100351"	US-PGPUB; USPAT	OR	OFF	2008/06/06 11:49
S88	1	("6,678,892").PN.	US-PGPUB; USPAT	OR	OFF	2008/06/06 12:38
S89	3	("20030021429" | "20030076346" | "6867820").PN.	US-PGPUB; USPAT	OR	OFF	2008/06/06 12:42
S90	13	("4589134" | "4626892" | "5042070" | "5541638" | "5581621" | "5631850" | "5775939" | "6100936" | "6195438").PN. OR ("6867820").URPN.	US-PGPUB; USPAT; USOCR	OR	OFF	2008/06/06 12:43
S91	2	"10648012"	US-PGPUB; USPAT	OR	OFF	2009/02/14 10:23
S92	1	"12144729"	US-PGPUB; USPAT	OR	OFF	2009/02/14 10:31
S93	1	("5790595").PN.	US-PGPUB; USPAT	OR	OFF	2009/02/14 12:36

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S94	1	("6678892").PN.	US-PGPUB; USPAT	OR	OFF	2009/02/14 12:37
S95	1	("6678892").PN.	US-PGPUB; USPAT	OR	OFF	2009/05/26 07:51
S96	1680	portable and music and CDMA and transmitter and receiver	US-PGPUB; USPAT	OR	OFF	2009/09/01 11:35
S97	527	portable and music and CDMA and transmitter and receiver and private	US-PGPUB; USPAT	OR	OFF	2009/09/01 11:35
S98	57	portable and music and CDMA and transmitter and receiver and private and "fuzzy logic"	US-PGPUB; USPAT	OR	OFF	2009/09/01 11:35
S99	0	S98 and @ad<"20011221"	US-PGPUB; USPAT	OR	OFF	2009/09/01 11:36
S100	41	S97 and @ad<"20011221"	US-PGPUB; USPAT	OR	OFF	2009/09/01 11:36
S101	1	("6678692").PN.	US-PGPUB; USPAT	OR	OFF	2009/09/01 11:39
S102	1	("6678892").PN.	US-PGPUB; USPAT	OR	OFF	2009/09/01 11:39
S103	25	("5555466" | "5771441" | "6058288" | "6243645" | "6266815" | "6300880" | "6317039").PN. OR ("6678892").URPN.	US-PGPUB; USPAT; USOCR	OR	OFF	2009/09/01 11:39
S104	63	("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	2009/09/01 11:42
S105	10	("20030045235" | "20040223622" | "5491839" | "5771441" | "5790595" | "5946343" | "6342844" | "6418558" | "6678892" | "6982132").PN.	US-PGPUB; USPAT; USOCR	OR	OFF	2009/09/01 11:42
S106	4453	"fuzzy logic" and @ad<"20011221"	US-PGPUB; USPAT; USOCR	OR	OFF	2009/09/01 11:48
S107	659	S106 and transmitter	US-PGPUB; USPAT; USOCR	OR	OFF	2009/09/01 11:48
S108	591	S106 and portable	US-PGPUB; USPAT; USOCR	OR	OFF	2009/09/01 11:48
S109	4	S106 and portable adj player	US-PGPUB; USPAT; USOCR	OR	OFF	2009/09/01 11:49
S110	0	"fuzzy logic" with reciever	US-PGPUB; USPAT; USOCR	OR	OFF	2009/09/01 11:50
S111	49	"fuzzy logic" with receiver	US-PGPUB; USPAT; USOCR	OR	OFF	2009/09/01 11:50

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S112	27	S111 and @ad<"20011221"	US-PGPUB; USPAT	OR	OFF	2009/09/01 11:50
S113	192	"fuzzy logic" same receiver	US-PGPUB; USPAT; USOCR	OR	OFF	2009/09/01 11:51
S114	72	S113 and @ad<"20011221"	US-PGPUB; USPAT	OR	OFF	2009/09/01 11:52
S115	71	("4019141" | "4229829" | "5264795" | "5404577" | "5437057" | "5568516" | "5694467" | "5771438" | "5771441" | "5867223" | "5978689" | "6006115").PN. OR ("6424820").URPN.	US-PGPUB; USPAT; USOCR	OR	OFF	2009/09/02 11:27
S116	34	S115 and @ad<"20011221"	US-PGPUB; USPAT	OR	OFF	2009/09/02 11:28
S117	31	bluetooth with (headphone headset earphone "head phone" "head set" "ear phone") with cdma	US-PGPUB; USPAT	OR	OFF	2009/09/02 11:32
S118	2	S117 and @ad<"20011221"	US-PGPUB; USPAT	OR	OFF	2009/09/02 11:32
S119	32	wireless with (headphone headset earphone "head phone" "head set" "ear phone") with cdma	US-PGPUB; USPAT	OR	OFF	2009/09/02 11:33
S120	3	S119 and @ad<"20011221"	US-PGPUB; USPAT	OR	OFF	2009/09/02 11:33
S121	57	(headphone headset earphone "head phone" "head set" "ear phone") with cdma	US-PGPUB; USPAT	OR	OFF	2009/09/02 11:34
S122	10	S121 and @ad<"20011221"	US-PGPUB; USPAT	OR	OFF	2009/09/02 11:34
S123	0	WO0056093	US-PGPUB; USPAT	OR	OFF	2009/09/02 11:36
S124	0	WO0056093	US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO; DERWENT; IBM_TDB	OR	OFF	2009/09/02 11:37
S125	0	WO/0056093	US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO; DERWENT; IBM_TDB	OR	OFF	2009/09/02 11:37
S126	2	(("5781542") or ("5799005")).PN.	US-PGPUB; USPAT	OR	OFF	2009/09/02 11:42
S127	1	("6199076").PN.	US-PGPUB; USPAT	OR	OFF	2009/09/02 13:51
S128	0	woolfork-earl.in.	US-PGPUB; USPAT	OR	OFF	2009/11/23 11:44
S129	3	woolfork-c-$.in.	US-PGPUB; USPAT	OR	OFF	2009/11/23 11:44
S139	1	("7412294").PN.	US-PGPUB; USPAT	OR	OFF	2010/01/11 12:21
S140	1	("7412294").PN.	US-PGPUB;	OR	OFF	2010/06/01

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			USPAT			09:29
S141	3	"12144729"	US-PGPUB; USPAT	OR	OFF	2010/06/01 09:34
S142	843	cdma and "fuzzy logic"	US-PGPUB; USPAT	OR	OFF	2010/10/18 09:46
S143	66	S142 and @ad<"20011221"	US-PGPUB; USPAT	OR	OFF	2010/10/18 09:46
S144	14	cdma same "fuzzy logic"	US-PGPUB; USPAT	OR	OFF	2010/10/18 09:46
S145	5	S144 and @ad<"20011221"	US-PGPUB; USPAT	OR	OFF	2010/10/18 09:46
S146	11	code same wireless same "fuzzy logic"	US-PGPUB; USPAT	OR	OFF	2010/10/18 09:49
S147	2	S146 and @ad<"20011221"	US-PGPUB; USPAT	OR	OFF	2010/10/18 09:49
S148	2704	(700/94).CCLS.	US-PGPUB; USPAT	OR	OFF	2010/10/21 12:51
S149	3	(("7412294") or ("7865258") or ("7684885")).PN.	US-PGPUB; USPAT	OR	OFF	2011/05/02 14:06
S150	1	("6418558").PN.	US-PGPUB; USPAT; USOCR	OR	OFF	2011/11/03 09:41
S151	1	("6678892").PN.	US-PGPUB; USPAT; USOCR	OR	OFF	2011/11/03 09:42
S152	1	S150 and reed same intersymbol	US-PGPUB; USPAT; USOCR	OR	OFF	2011/11/03 10:03
S154	1	("8131391").PN.	US-PGPUB; USPAT; USOCR	OR	OFF	2013/10/02 10:23
S155	1	("8131391").PN.	US-PGPUB; USPAT; USOCR	OR	OFF	2013/10/02 10:27
S156	1765	wireless and (audio music) and "direct conversion"	US-PGPUB; USPAT; USOCR	OR	OFF	2013/10/02 10:30
S157	177	S156 and @ad<"20011221"	US-PGPUB; USPAT	OR	OFF	2013/10/02 10:30
S158	6	S157 and (headphone "head phone" earphone "ear phone")	US-PGPUB; USPAT	OR	OFF	2013/10/02 10:31
S159	18	(US-20010025358-$ or US-20040223622-$).did. or (US-6130643-$ or US-6982132-$ or US-7099413-$ or US-7047474-$ or US-6418558-$ or US-5175558-$ or US-6317039-$ or US-5771441-$ or US-5946343-$ or US-5491839-$ or US-6424820-$ or US-6898585-$ or US-6781977-$ or US-5781542-$ or US-6678892-$ or US-6456645-$).did.	US-PGPUB; USPAT	OR	OFF	2013/10/02 10:34
S160	6	S159 and packet	US-PGPUB; USPAT; USOCR	OR	OFF	2013/10/02 10:34
S161	6	S159 and cdma	US-PGPUB; USPAT;	OR	OFF	2013/10/02 10:44

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			USOCR			
S162	1	S159 and "direct conversion"	US-PGPUB; USPAT; USOCR	OR	OFF	2013/10/02 10:52
S163	4	(("8131391") or ("7865258") or ("7684885") or ("7412294")).PN.	US-PGPUB; USPAT; USOCR	OR	OFF	2013/10/02 12:00
S164	18	(US-20010025358-$ or US-20040223622-$).did. or (US-6130643-$ or US-6982132-$ or US-7099413-$ or US-7047474-$ or US-6418558-$ or US-5175558-$ or US-6317039-$ or US-5771441-$ or US-5946343-$ or US-5491839-$ or US-6424820-$ or US-6898585-$ or US-6781977-$ or US-5781542-$ or US-6678892-$ or US-6456645-$).did.	US-PGPUB; USPAT	OR	OFF	2013/12/05 09:59
S165	1	S164 and intersymbol	US-PGPUB; USPAT; USOCR	OR	OFF	2013/12/05 09:59
S166	1	S164 and intersymbol and reed	US-PGPUB; USPAT; USOCR	OR	OFF	2013/12/05 09:59

EAST Search History (Interference)

Ref #	Hits	Search Query	DBs	Default Operator	Plurals	Time Stamp
S130	0	woolfork-earl.in.	USPAT; UPAD	OR	OFF	2009/11/23 11:44
S131	1	woolfork-c-$.in.	USPAT; UPAD	OR	OFF	2009/11/23 11:44
S132	195	(700/94).CCLS.	UPAD	OR	OFF	2009/11/23 11:59
S133	225	((700/94) or (455/3.06)).CCLS.	UPAD	OR	OFF	2010/01/11 11:18
S153	31	(700/94).CCLS.	UPAD	OR	OFF	2012/01/09 11:39

5/1/2014 11:22:28 AM
C:\Users\aflanders\Documents\EAST\Workspaces\12940747.wsp

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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:
1028.6	13/356,949	01/24/2012
First Named Inventor:	**Title:**	
C. Earl Woolfork	Wireless Digital Audio 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
/Megan Lyman/	06/17/2014
Name (Print/Typed) Megan Lyman	**Practitioner Registration No.** 57054

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.

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.

CLAIMS

I claim:

1. (Currently Amended) A mobile wireless digital audio receiver, configured to receive a unique user code and an original audio signal representation in the form of packets, said unique user code configured to spread ~~the~~ a spectrum of said signal and further configured for independent CDMA communication operation, said receiver independent of the operation of another receiver, ~~the wireless digital audio receiver further configured to be directly communicable with a mobile digital audio transmitter,~~ said mobile wireless digital audio receiver comprising:

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

a decoder operative to decode reduced intersymbol interference coding of said original audio signal representation, said audio having been wirelessly transmitted and reproduced virtually free from interference from device transmitted signals operating in the ~~wireless digital audio receiver~~ spectrum.

2. (Currently Amended) A wireless digital audio headphone for receipt of a unique user code and a digital audio representation signal in the form of a packet, said unique user code configured to spread ~~the~~ a spectrum of said signal and further configured for independent CDMA communication operation, said headphone independent of the operation of another headphone, ~~the wireless digital audio headphone further configured to be directly communicable with a mobile digital audio transmitter,~~ said wireless digital audio headphone comprising:

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

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

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

a module adapted to reproduce said generated audio output, said audio having been wirelessly transmitted from an audio player and reproduced virtually free from interference from device transmitted signals operating in ~~the~~ a wireless headphone spectrum.

3. (Currently Amended) A wireless digital audio headphone comprising:

a ~~portable~~ digital audio headphone receiver configured to receive an unique user code bit sequence and a original audio signal representation in the form of packets, said digital audio headphone receiver, capable of mobile operation and configured for direct digital coded wireless spread spectrum communication with a mobile digital audio transmitter;

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

a digital demodulator configured for independent CDMA communication operation wherein a user has their own transmitter and receiver;

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

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

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a module adapted to reproduce said generated audio output in response to the unique user code bit sequence being recognized, said audio having been wirelessly transmitted from a portable audio player and reproduced virtually free from interference from device transmitted signals operating in the wireless headphone spectrum.

4. (Previously Presented) The wireless digital audio headphone of claim 3, wherein the audio output is music.

5. (Currently Amended) A mobile wireless digital audio receiver, configured to receive a unique user code and an original audio signal representation in the form of packets, said unique user code configured to spread the spectrum of said signal and further configured for independent CDMA communication operation, said receiver independent of the operation of another receiver, ~~the wireless digital audio receiver further configured to be directly communicable with a mobile digital coded audio transmitter,~~ said mobile wireless digital audio receiver comprising:

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

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

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

a module adapted to reproduce said generated audio output, said audio having been wirelessly transmitted from an audio player and reproduced virtually free from interference from device transmitted signals operating in the ~~wireless digital audio receiver~~ spectrum.

6. (Currently Amended) A mobile wireless digital audio receiver, configured to receive

a unique user code and an original audio signal representation in the form of packets, said unique user code configured to spread the spectrum of said signal and further configured for independent CDMA communication operation, said receiver independent of the operation of another receiver, ~~the wireless digital audio receiver further configured to be communicable with a digital audio transmitter,~~ said mobile wireless digital audio receiver comprising:

fuzzy set membership functionality to enhance detection of said unique user code;

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

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

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

a module adapted to reproduce said generated audio output, said audio having been wirelessly transmitted from an audio player and reproduced virtually free from interference from device transmitted signals operating in the ~~wireless digital audio receiver~~ spectrum.

7. (Currently Amended) A wireless digital audio receiver, configured to receive an unique user code and a original audio signal representation, said unique user code configured to spread the spectrum of said signal and further configured for independent CDMA communication operation, wherein a user has their own transmitter and receiver, ~~the wireless digital audio receiver further configured to be directly communicable with a digital audio transmitter,~~ said wireless digital audio receiver comprising:

fuzzy set membership functionality to enhance detection of said unique user code;

a direct conversion module configured to capture the correct bit sequence embedded in the received spread spectrum signal;

a module adapted to reproduce said original audio signal representation, said audio having been wirelessly transmitted from an audio player and reproduced virtually free from interference from other device transmitted signals.

8. (Currently Amended) A wireless digital coded music audio transmitter operatively coupled to a music audio source and configured to transmit a unique user code and an original audio signal representation, wherein said digital coded music audio transmitter coupled to said music audio source, and configured to be directly communicable with a mobile digital audio receiver, is capable of being moved in any direction during operation, said wireless digital coded audio transmitter comprising:

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

a digital modulator module configured for independent code division multiple access communication, wherein a user has their own transmitter and receiver, said transmitter configured to wirelessly transmit said audio to be reproduced virtually free from interference from device transmitted signals operating in the wireless digital audio transmitter spectrum.

9. (Currently Amended) A mobile wireless digital audio receiver ~~capable of being moved in any direction during operation and~~ configured to receive a unique user code and an original audio signal representation in the form of packets, said unique user code configured to spread ~~the~~ a spectrum of said signal and further configured for independent CDMA communication operation, said receiver independent of the operation of another receiver, ~~said wireless digital audio receiver further configured to be directly communicable with a digital audio transmitter capable of being moved in any direction during operation,~~ said wireless digital audio receiver comprising:

a spread spectrum receiver module configured to capture packets and a correct bit sequence within the packets aided by lowering signal detection error through reduced intersymbol interference coding of said audio ~~representation signal~~ signal representation

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~~respective to said mobile wireless digital audio receiver and said mobile digital audio transmitter,~~ said packets embedded in the received spread spectrum signal, the captured packets corresponding to the unique user code;

a decoder operative to decode reduced intersymbol interference coding of said original audio signal representation, said audio having been wirelessly transmitted and reproduced virtually free from interference from device transmitted signals operating in the ~~wireless digital audio receiver~~ spectrum.

10. (Currently Amended) A wireless digital coded audio transmitter operatively coupled to a audio source and configured to transmit a unique user code and an original audio signal representation, wherein said digital coded audio transmitter coupled to said audio source, and configured to be directly communicable with a mobile digital audio receiver, is capable of being moved in any direction during operation, said wireless digital coded audio transmitter comprising:

an encoding module operative to encode said original audio signal representation to reduce intersymbol interference and aid in lowering signal detection error of said audio representation signal respective to said receiver and mobile said transmitter coupled to said audio source;

a digital modulator module configured for independent code division multiple access communication, wherein each user has their own transmitter and receiver, said transmitter configured to wirelessly transmit said audio to be reproduced virtually free from interference from device transmitted signals operating in the wireless digital audio transmitter spectrum.

11. (New) The wireless digital audio receiver of Claim 9, wherein the spread spectrum receiver module is further configured to utilize differential phase shift keying (DPSK) to demodulate said audio signal representation.

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RESPONSE TO THE FINAL REJECTION DATED 05/05/2014: AFTER FINAL CONSIDERATION PILOT 2.0

AMENDMENTS TO CLAIMS 1, 2, 3, 5, 6, 7, 8, 9 AND 10

The current amendments allow for a review of the present action under the After Final Consideration Pilot. The current amendments do not broaden the scope of the claims. The amendments further clarify the use of CDMA and that the system may include users that each have their own transmitter and receiver. Moreover, the deletion of references to the digital audio receiver and digital audio transmitter as to intersymbol interference because by stating that there was intersymbol interference, it is understood that it is used at both the mobile receiver and transmitter.

If there are any questions, concerns, or actions that can be taken to expedite the processing of this application, please do not hesitate to contact the Applicant's representative.

June 16, 2014

Respectfully Submitted,



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Electronic Acknowledgement Receipt

EFS ID:	19326956
Application Number:	13356949
International Application Number:	
Confirmation Number:	2299
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:	1028.6
Receipt Date:	17-JUN-2014
Filing Date:	24-JAN-2012
Time Stamp:	14:05:52
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	sb0434AfterFinalForm.pdf	226285 e8cbc150625aea8778348cd70b65d461bde72c48	no	2

Warnings:	
Information:	

2	Amendment/Req. Reconsideration-After Non-Final Reject	ClaimsResponseFRJ.pdf	85405 2af2e15ae9d62c448418f3755b3b5df7ec30ea69	no	6
Warnings:					
Information:					
3	Applicant Arguments/Remarks Made in an Amendment	ResponseFinalRej.pdf	75202 4639f234bc9e817fcb1a3c848fd13be5773c3332	no	1
Warnings:					
Information:					
		Total Files Size (in bytes):	386892		

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
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PATENT APPLICATION FEE DETERMINATION RECORD Substitute for Form PTO-875	Application or Docket Number 13/356,949	Filing Date 01/24/2012	☐ 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 **06/17/2014**

	(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))	* 11	Minus	** 20	= 0	X $40 =	0
Independent (37 CFR 1.16(h))	* 4	Minus	***9	= 0	X $210 =	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
/KAREN VESTAL/

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.

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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
13/356,949	01/24/2012	C. Earl Woolfork	1028.6	2299

68533 7590 06/26/2014

MEGAN LYMAN
1816 SILVER MIST CT.
RALEIGH, NC 27613

EXAMINER	
FLANDERS, ANDREW C	
ART UNIT	PAPER NUMBER
2656	

NOTIFICATION DATE	DELIVERY MODE
06/26/2014	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

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Advisory Action Before the Filing of an Appeal Brief	**Application No.** 13/356,949	**Applicant(s)** WOOLFORK, C. EARL	
	Examiner Andrew C. Flanders	**Art Unit** 2656	**AIA (First Inventor to File) Status** No

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

THE REPLY FILED _____ FAILS TO PLACE THIS APPLICATION IN CONDITION FOR ALLOWANCE.

NO NOTICE OF APPEAL FILED

1. ☐ The reply was filed after a final rejection. No Notice of Appeal has been filed. To avoid abandonment of this application, applicant must timely file one of the following replies: (1) an amendment, affidavit, or other evidence, which places the application in condition for allowance; (2) a Notice of Appeal (with appeal fee) in compliance with 37 CFR 41.31; or (3) a Request for Continued Examination (RCE) in compliance with 37 CFR 1.114 if this is a utility or plant application. Note that RCEs are not permitted in design applications. The reply must be filed within one of the following time periods:
   a) ☐ The period for reply expires _____months from the mailing date of the final rejection.
   b) ☐ The period for reply expires on: (1) the mailing date of this Advisory Action; or (2) the date set forth in the final rejection, whichever is later. In no event, however, will the statutory period for reply expire later than SIX MONTHS from the mailing date of the final rejection.
   c) ☐ A prior Advisory Action was mailed more than 3 months after the mailing date of the final rejection in response to a first after-final reply filed within 2 months of the mailing date of the final rejection. The current period for reply expires months from the mailing date of *the prior Advisory Action* or SIX MONTHS from the mailing date of the final rejection, whichever is earlier.
   Examiner Note: If box 1 is checked, check either box (a), (b) or (c). ONLY CHECK BOX (b) WHEN THIS ADVISORY ACTION IS THE FIRST RESPONSE TO APPLICANT'S FIRST AFTER-FINAL REPLY WHICH WAS FILED WITHIN TWO MONTHS OF THE FINAL REJECTION. ONLY CHECK BOX (c) IN THE LIMITED SITUATION SET FORTH UNDER BOX (c). See MPEP 706.07(f).

Extensions of time may be obtained under 37 CFR 1.136(a). The date on which the petition under 37 CFR 1.136(a) and the appropriate extension fee have been filed is the date for purposes of determining the period of extension and the corresponding amount of the fee. The appropriate extension fee under 37 CFR 1.17(a) is calculated from: (1) the expiration date of the shortened statutory period for reply originally set in the final Office action; or (2) as set forth in (b) or (c) above, if checked. Any reply received by the Office later than three months after the mailing date of the final rejection, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

NOTICE OF APPEAL

2. ☐ The Notice of Appeal was filed on _____. A brief in compliance with 37 CFR 41.37 must be filed within two months of the date of filing the Notice of Appeal (37 CFR 41.37(a)), or any extension thereof (37 CFR 41.37(e)), to avoid dismissal of the appeal. Since a Notice of Appeal has been filed, any reply must be filed within the time period set forth in 37 CFR 41.37(a).

AMENDMENTS

3. ☒ The proposed amendments filed after a final rejection, but prior to the date of filing a brief, will not be entered because
   a) ☒ They raise new issues that would require further consideration and/or search (see NOTE below);
   b) ☐ They raise the issue of new matter (see NOTE below);
   c) ☒ They are not deemed to place the application in better form for appeal by materially reducing or simplifying the issues for appeal; and/or
   d) ☐ They present additional claims without canceling a corresponding number of finally rejected claims.
   NOTE: *the proposed amendements do not appear to place the application in condition for allowance and cannot be fully considered in the time permitted for AFCP 2.0. As such, the amendment will be considered under pre-AFCP practice.*. (See 37 CFR 1.116 and 41.33(a)).
4. ☐ The amendments are not in compliance with 37 CFR 1.121. See attached Notice of Non-Compliant Amendment (PTOL-324).
5. ☐ Applicant's reply has overcome the following rejection(s): _____.
6. ☐ Newly proposed or amended claim(s) _____ would be allowable if submitted in a separate, timely filed amendment canceling the non-allowable claim(s).
7. ☒ For purposes of appeal, the proposed amendment(s): (a) ☒ will not be entered, or (b) ☐ will be entered, and an explanation of how the new or amended claims would be rejected is provided below or appended.

AFFIDAVIT OR OTHER EVIDENCE

8. ☐ A declaration(s)/affidavit(s) under **37 CFR 1.130(b)** was/were filed on _____.
9. ☐ The affidavit or other evidence filed after final action, but before or on the date of filing a Notice of Appeal will not be entered because applicant failed to provide a showing of good and sufficient reasons why the affidavit or other evidence is necessary and was not earlier presented. See 37 CFR 1.116(e).
10. ☐ The affidavit or other evidence filed after the date of filing the Notice of Appeal, but prior to the date of filing a brief, will not be entered because the affidavit or other evidence failed to overcome all rejections under appeal and/or appellant fails to provide a showing of good and sufficient reasons why it is necessary and was not earlier presented. See 37 CFR 41.33(d)(1).
11. ☐ The affidavit or other evidence is entered. An explanation of the status of the claims after entry is below or attached.

REQUEST FOR RECONSIDERATION/OTHER

12. ☐ The request for reconsideration has been considered but does NOT place the application in condition for allowance because: _____.
13. ☐ Note the attached Information *Disclosure Statement*(s). (PTO/SB/08) Paper No(s). _____
14. ☐ Other: _____.

STATUS OF CLAIMS

15. The status of the claim(s) is (or will be) as follows:
    Claim(s) allowed: .
    Claim(s) objected to: .
    Claim(s) rejected: 1-10.

/CURTIS KUNTZ/ Supervisory Patent Examiner, Art Unit 2656	/Andrew C Flanders/ Primary Examiner, Art Unit 2656

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IPR2025-01541

Do not enter
/ACF/
6/19/14

RESPONSE TO THE FINAL REJECTION DATED 05/05/2014: AFTER FINAL CONSIDERATION PILOT 2.0

AMENDMENTS TO CLAIMS 1, 2, 3, 5, 6, 7, 8, 9 AND 10

The current amendments allow for a review of the present action under the After Final Consideration Pilot. The current amendments do not broaden the scope of the claims. The amendments further clarify the use of CDMA and that the system may include users that each have their own transmitter and receiver. Moreover, the deletion of references to the digital audio receiver and digital audio transmitter as to intersymbol interference because by stating that there was intersymbol interference, it is understood that it is used at both the mobile receiver and transmitter.

If there are any questions, concerns, or actions that can be taken to expedite the processing of this application, please do not hesitate to contact the Applicant's representative.

June 16, 2014

Respectfully Submitted,



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Samsung Exhibit 1002, Page 240 of 880
Samsung Electronics Co., Ltd. et al. v. One-E-Way, Inc.
IPR2025-01541

Doc code: RCEX
Doc description: Request for Continued Examination (RCE)

PTO/SB/30EFS (07-09)
Approved for use through 07/31/2012. OMB 0651-0031
U.S. Patent and Trademark Office; U.S. DEPARTMENT OF COMMERCE
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REQUEST FOR CONTINUED EXAMINATION(RCE)TRANSMITTAL
(Submitted Only via EFS-Web)

Application Number	13/356,949	Filing Date	2012-01-24	Docket Number (if applicable)	1028.6	Art Unit	2656
First Named Inventor	C. Earl Woolfork			Examiner Name	Andrew Flanders		

This is a Request for Continued Examination (RCE) under 37 CFR 1.114 of the above-identified application.
Request for Continued Examination (RCE) practice under 37 CFR 1.114 does not apply to any utility or plant application filed prior to June 8, 1995, or to any design application. The Instruction Sheet for this form is located at WWW.USPTO.GOV

SUBMISSION REQUIRED UNDER 37 CFR 1.114

Note: If the RCE is proper, any previously filed unentered amendments and amendments enclosed with the RCE will be entered in the order in which they were filed unless applicant instructs otherwise. If applicant does not wish to have any previously filed unentered amendment(s) entered, applicant must request non-entry of such amendment(s).

☐ Previously submitted. If a final Office action is outstanding, any amendments filed after the final Office action may be considered as a submission even if this box is not checked.

- ☐ Consider the arguments in the Appeal Brief or Reply Brief previously filed on _____
- ☐ Other _____

☒ Enclosed

- ☒ Amendment/Reply
- ☐ Information Disclosure Statement (IDS)
- ☐ Affidavit(s)/ Declaration(s)
- ☐ Other _____

MISCELLANEOUS

☐ Suspension of action on the above-identified application is requested under 37 CFR 1.103(c) for a period of months _____
(Period of suspension shall not exceed 3 months; Fee under 37 CFR 1.17(i) required)

☐ Other _____

FEES

☐ **The RCE fee under 37 CFR 1.17(e) is required by 37 CFR 1.114 when the RCE is filed.**
The Director is hereby authorized to charge any underpayment of fees, or credit any overpayments, to Deposit Account No _____

SIGNATURE OF APPLICANT, ATTORNEY, OR AGENT REQUIRED

☒ Patent Practitioner Signature

☐ Applicant Signature

PTO/SB/30EFS (07-09)
Approved for use through 07/31/2012. OMB 0651-0031
U.S. Patent and Trademark Office; U.S. DEPARTMENT OF COMMERCE
Under the Paperwork Reduction Act of 1995, no persons are required to respond to a collection of information unless it contains a valid OMB control number.

Signature of Registered U.S. Patent Practitioner			
Signature	/Megan Lyman/	Date (YYYY-MM-DD)	2014-07-22
Name	Megan Lyman	Registration Number	57054

This collection of information is required by 37 CFR 1.114. 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.

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 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 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 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.

CLAIMS

I claim:

1. (Currently Amended) A mobile wireless digital audio receiver, configured to receive a unique user code and an original audio signal representation in the form of packets, said unique user code configured to spread ~~the~~ a spectrum of said signal and further configured for independent CDMA communication operation, said receiver independent of the operation of another receiver, ~~the wireless digital audio receiver further configured to be directly communicable with a mobile digital audio transmitter,~~ said mobile wireless digital audio receiver comprising:

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

a decoder operative to decode the reduced intersymbol interference coding of said original audio signal representation ~~, said audio having been wirelessly transmitted and reproduced~~ virtually free from interference from device transmitted signals operating in the ~~wireless digital audio receiver~~ spectrum.

2. (Currently Amended) A wireless digital audio headphone for receipt of a unique user code and a digital audio ~~representation~~ signal representation in the form of a packet, said unique user code configured to spread ~~the~~ a spectrum of said signal and further configured for independent CDMA communication operation, said headphone independent of the operation of another headphone, ~~the wireless digital audio headphone further configured to be directly communicable with a mobile digital audio transmitter,~~ said wireless digital audio headphone comprising:

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

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

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

a module adapted to ~~reproduce~~ produce said generated audio output, said audio ~~having been wirelessly transmitted~~ ~~from an audio player~~ ~~and reproduced~~ virtually free from interference from device transmitted signals operating in ~~the~~ a wireless headphone spectrum.

3. (Currently Amended) A wireless digital audio headphone comprising:

a ~~portable~~ digital audio headphone receiver configured to receive an unique user code bit sequence and a original audio signal representation in the form of packets, said digital audio headphone receiver, capable of mobile operation and configured for direct digital coded wireless spread spectrum communication with a mobile digital audio transmitter;

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

a digital demodulator configured for independent CDMA communication operation wherein a user has their own transmitter and receiver;

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

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

a module responsive to the unique user code bit sequence to ~~adapted to reproduce~~ produce said generated audio output ~~in response to the unique user code bit sequence being recognized, said audio having been wirelessly transmitted from a portable audio player and reproduced~~ virtually free from interference from device transmitted signals operating in the wireless headphone spectrum.

4. (Previously Presented) The wireless digital audio headphone of claim 3, wherein the audio output is music.

5. (Currently Amended) A mobile wireless digital audio receiver, configured to receive a unique user code and an original audio signal representation in the form of packets, said unique user code configured to spread the spectrum of said signal and further configured for independent CDMA communication operation, said receiver independent of the operation of another receiver, ~~the wireless digital audio receiver further configured to be directly communicable with a mobile digital coded audio transmitter,~~ said mobile wireless digital audio receiver comprising:

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

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

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

a module adapted to ~~reproduce~~ produce said generated audio output, said audio ~~having been wirelessly transmitted from an audio player, and reproduced~~ virtually free from interference from device transmitted signals operating in the ~~wireless digital audio~~

~~receiver~~ spectrum.

6. (Currently Amended) A mobile wireless digital audio receiver, configured to receive a unique user code and an original audio signal representation in the form of packets, said unique user code configured to spread the spectrum of said signal and further configured for independent CDMA communication operation, said receiver independent of the operation of another receiver, ~~the wireless digital audio receiver further configured to be communicable with a digital audio transmitter,~~ said mobile wireless digital audio receiver comprising:

fuzzy set membership functionality to enhance detection of said unique user code;

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

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

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

a module adapted to ~~reproduce~~ produce said generated audio output, said ~~audio having been wirelessly transmitted from an audio player, and reproduced~~ virtually free from interference from device transmitted signals operating in the ~~wireless digital audio receiver~~ spectrum.

7. (Currently Amended) A wireless digital audio receiver, configured to receive an unique user code and a original audio signal representation, said unique user code configured to spread ~~the~~ a spectrum of said signal and further configured for independent CDMA communication operation, ~~wherein a user has their own transmitter and receiver,~~ said receiver independent of the operation of another receiver, ~~the wireless digital audio receiver further configured to be directly communicable with a digital audio transmitter,~~

said wireless digital audio receiver comprising:

fuzzy set membership functionality to enhance detection of said unique user code;

a direct conversion module configured to capture the correct bit sequence embedded in the received spread spectrum signal;

a module adapted to ~~reproduce~~ produce said original audio signal representation, said audio~~ having been wirelessly transmitted from an audio player, and reproduced~~ virtually free from interference from other device transmitted signals.

8. (Currently Amended) A wireless digital coded music audio transmitter operatively coupled to a music audio source and configured to transmit a unique user code and an original audio signal representation, wherein said digital coded music audio transmitter coupled to said music audio source, and configured to be directly communicable with a mobile digital audio receiver, is capable of being moved in any direction during operation, said wireless digital coded audio transmitter comprising:

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

a digital modulator module configured for independent code division multiple access communication, wherein a user has their own transmitter, said transmitter configured to wirelessly transmit said audio to be reproduced virtually free from interference from device transmitted signals operating in the wireless digital audio transmitter spectrum.

9. (Currently Amended) A mobile wireless digital audio receiver capable of being moved in any direction during operation and configured to receive a unique user code and an original audio signal representation in the form of packets, said unique user code configured to spread ~~the~~ a spectrum of said signal and further configured for independent CDMA communication operation, said receiver independent of the operation of another receiver, ~~said wireless digital audio receiver further configured to be directly~~

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~~communicable with a digital audio transmitter capable of being moved in any direction during operation,~~ said wireless digital audio receiver comprising:

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

a decoder operative to decode the reduced intersymbol interference coding of said original audio signal representation, said audio ~~having been wirelessly transmitted and reproduced~~ virtually free from interference from device transmitted signals operating in the ~~wireless digital audio receiver~~ spectrum.

10. (Currently Amended) A wireless digital coded audio transmitter operatively coupled to a audio source and configured to transmit a unique user code and an original audio signal representation, wherein said digital coded audio transmitter coupled to said audio source, and configured to be directly communicable with a mobile digital audio receiver, is capable of being moved in any direction during operation, said wireless digital coded audio transmitter comprising:

an encoding module operative to encode said original audio signal representation to reduce intersymbol interference and aid in lowering signal detection error of said audio ~~representation~~ signal representation, ~~respective to said receiver and mobile~~ said transmitter coupled to said audio source;

a digital modulator module configured for independent code division multiple access communication, wherein ~~each~~ a user has their own transmitter, ~~and receiver,~~ said transmitter configured to wirelessly transmit said original audio signal representation ~~to be reproduced~~ virtually free from interference from device transmitted signals operating in the ~~wireless digital audio transmitter~~ spectrum.

11. (New) The wireless digital audio receiver of Claim 9, wherein the spread spectrum receiver module is further configured to utilize differential phase shift keying (DPSK) to demodulate said audio signal representation.

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REMARKS IN CONJUNCTION WITH REQUEST FOR REEXAMINATION

Amendments to Claims 1, 2, 3, 5, 6, 7, 8, 9 and 10

The current amendments allow for a review of the present action under the After Final Consideration Pilot. The current amendments do not broaden the scope of the claims. The amendments further clarify the use of CDMA and that the system may include users that each have their own transmitter and receiver. Moreover, the deletion of references to the digital audio receiver and digital audio transmitter as to intersymbol interference because by stating that there was intersymbol interference, it is understood that it is used at both the mobile receiver and transmitter.

Remarks Regarding Rejection on Page 4 of the Final Action Dated 05/05/14

As stated on page 4 of the Final Rejection:

> In section 5, Appellant further alleges: Consequently, neither Li, Lindemann, nor Lavelle in combination with Altstatt teach independent communication operation; Claims 1-10 (decentralized communications where each device access the medium individually and transmits the data without central control) for direct mobile transmitter-to-mobile receiver communication (Claims 1-10) and free from interference from device transmitted signals operating in the wireless digital audio spectrum (Claims 1-10).
>
> Examiner disagrees… Further, In response to applicant's argument that the references fail to show certain features of applicant's invention, it is noted that the features upon which applicant relies (i.e., decentralized communication where each device

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accesses the medium individually and transmits the data without central control) are not recited in the rejected claim(s).

Applicant respectfully disagrees. Decentralized communication *is* recited in the rejected claims. The claims state: "unique user code configured to spread the spectrum of said signal and further configured for independent communication operation … virtually free from interference." In contrast, "a centralized network architecture features a specialized node, i.e., the base station, that coordinates and controls all transmissions within the coverage area, or cell," (Reference: Exhibit I, page 120 of "Handbook Of Wireless Networks And Mobile Computing," and Figure 6.2 on page 121) (Emphasis added). This centralized network architecture is applied in Li, Lindemann and Lavelle as pointed out in the first paragraph of page 8, section 5 of the "Response To The Office Action Dated 10/11/2013" (Reference Exhibit II).

The decentralized architecture (also known as distributed or ad hoc) as recited in the claims, has already been clearly defined in Exhibit I of the "Request For Reexamination And Response To The Final Rejection Dated 06/07/10" and referenced herein as Exhibit III. Further clarity regarding decentralized communication is found in attached Exhibit I, wherein page 121 of "Handbook Of Wireless Networks And Mobile Computing," states: "Ad hoc nodes communicate directly with one another in a peer-to-peer fashion." This is further exemplified in Exhibit I, Figure 6.3, page 122 of "Handbook Of Wireless Networks And Mobile Computing," and in Exhibit IV, Figure 2.11, page 43 of "Handbook Of RF & Wireless Technologies."

The given definitions, illustrations, and references of a centralized and decentralized network cited above, confirm that the centralized method of Li, Lindemann and Lavelle do not combine Altstatt to teach, suggest or motivate a decentralized communication system as taught by the current application. These references

simply cannot obviate the decentralized digital peer-to-peer functionality of the invention. Moreover, "Replacing the FM transmitter/receiver implementation of Alstatt to use the digital CDMA communication" (as the FOA suggests on page 8) of Li, Lindemann or Lavelle does not obviate the invention because "codes that are orthogonal in synchronous systems (i.e., centralized system) exhibit high cross-correlation (i.e., interference) when not perfectly synchronized (i.e., the asynchronous decentralized system)," emphasis added. This fact has been presented many times in the past prosecution history (for example, Exhibit II "CDMA-Based MAC Protocol For Wireless Ad Hoc Networks" of the "Response To The Office Action Dated 10/11/2013").

The claim language of the present invention clearly describes and discloses a decentralized architecture ("unique user code configured to spread the spectrum of said signal and further configured for independent communication operation ... virtually free from interference"). Nevertheless, in the interest of moving forward, the claim language "independent CDMA communication operation, said receiver independent of the operation of another receiver" has been added for further clarification (multiple audio receivers sharing a single audio transmitter - synchronous system - is not mandatory). The claim language aids in clarifying a decentralized architecture. In stark contrast, Li, Lindemann or Lavelle in combination with Altstatt produces the following digital centralized network: "Communication from a base station (i.e., the single audio transmitter) to a node takes place on a downlink channel. Only the base station has access to a downlink channel, whereas the nodes (i.e., multiple audio receivers) share the uplink channels," emphasis added (Reference: Exhibit I, page 121 of "Handbook Of Wireless Networks And Mobile Computing). Thus, page 5 of the FOA is erroneous in stating that "these decentralized systems were known, as evidenced by Lavelle and Lindemann."

Furthermore, the claim language "unique user code configured to spread the spectrum of said signal and further configured for independent CDMA

communication operation, said receiver independent of the operation of another receiver . . . virtually free from interference" is well supported in paragraph 0016 of the parent specification. (paragraph 0016 states: "The receiver code generator 60 may contain the same unique code word that was transmitted by the audio transmitter 20 specific to a particular a user. Other code words from wireless digital audio systems 10 may appear as noise to a particular audio receiver 50 … This code division multiple access (CDMA) may be used to provide each user independent operation.").

The rejection is respectfully requested to be removed. Even within the "Examiner's Answer" dated 03/13/2008, it was stated that "Appellant's invention is disclosed as providing private listening to multiple individuals sharing the same space." This admission, at least, demonstrates that each of the receivers within the - transmitter/receiver pair - "wireless digital audio systems 10" peer-to-peer apparatus (referenced above in paragraph 0016 of the parent specification), are operable independent of centralized control in the present invention. The combination of Altstatt with the centralized digital networks of Li, Lindemann or Lavelle do not obviate the invention. Appellant respectfully requests the allowance of claims 1- 10.

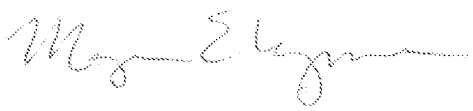
The remarks presented herein demonstrate that the claims of this application should be allowed. Any outstanding rejections that have not been specifically addressed in this document are not assented to. The other rejections of this application under 35 U.S.C. 103 have been argued by the applicant a multitude of times in this application's prosecution history. Applicant maintains that any other rejections should be removed at this time and the application be placed into allowance.

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IPR2025-01541

If there are any questions, concerns, or actions that can be taken to expedite the processing of this application, please do not hesitate to contact the Applicant's representative.

July 22, 2014

Respectfully Submitted,



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Samsung Exhibit 1002, Page 255 of 880
Samsung Electronics Co., Ltd. et al. v. One-E-Way, Inc.
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Electronic Patent Application Fee Transmittal

Application Number:	13356949
Filing Date:	24-Jan-2012
Title of Invention:	Wireless Digital Audio Music System
First Named Inventor/Applicant Name:	C. Earl Woolfork
Filer:	Megan Elizabeth Lyman
Attorney Docket Number:	1028.6

Filed as Small Entity

Utility under 35 USC 111(a) Filing Fees

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($)
Miscellaneous:				
Request for Continued Examination	2801	1	600	600
		Total in USD ($)		**600**

Electronic Acknowledgement Receipt

EFS ID:	19649717
Application Number:	13356949
International Application Number:	
Confirmation Number:	2299
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:	1028.6
Receipt Date:	22-JUL-2014
Filing Date:	24-JAN-2012
Time Stamp:	16:17:17
Application Type:	Utility under 35 USC 111(a)

Payment information:

Submitted with Payment	yes
Payment Type	Credit Card
Payment was successfully received in RAM	$600
RAM confirmation Number	2710
Deposit Account	
Authorized User	

File Listing:

Document Number	Document Description	File Name	File Size(Bytes)/ Message Digest	Multi Part /.zip	Pages (if appl.)

1	Request for Continued Examination (RCE)	sb0030e_fill.pdf	797702 51224b0ef02ed88975eb9fa29e0eac575752e270	no	3
Warnings:					
Information:					
2	Amendment Submitted/Entered with Filing of CPA/RCE	ClaimsRCE.pdf	81391 52437fd98dd4d3bfc1b54f4f00a3a7be727e572b	no	7
Warnings:					
Information:					
3	Applicant Arguments/Remarks Made in an Amendment	RemarksRCE.pdf	101003 5303f9d3925f01bddfbc5537b5072841eaf7fe1b	no	5
Warnings:					
Information:					
4	Fee Worksheet (SB06)	fee-info.pdf	30144 17f380c20b03246fcf50e6362543e5afa8b13bb5	no	2
Warnings:					
Information:					
		Total Files Size (in bytes):	1010240		

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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 NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
13/356,949	01/24/2012	C. Earl Woolfork	1028.6	2299

68533 7590 12/22/2014

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EXAMINER	
FLANDERS, ANDREW C	

ART UNIT	PAPER NUMBER
2656	

NOTIFICATION DATE	DELIVERY MODE
12/22/2014	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. 13/356,949	Applicant(s) WOOLFORK, C. EARL	
	Examiner Andrew C. Flanders	Art Unit 2656	AIA (First Inventor to File) Status No

-- 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 *22 July 2014*.

☐ 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) *1-11* 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) *1-11* 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 *24 January 2012* 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: _____.

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DETAILED ACTION

Notice of Pre-AIA or AIA Status

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

Continued Examination Under 37 CFR 1.114

A request for continued examination under 37 CFR 1.114, including the fee set forth in 37 CFR 1.17(e), was filed in this application after final rejection. Since this application is eligible for continued examination under 37 CFR 1.114, and the fee set forth in 37 CFR 1.17(e) has been timely paid, the finality of the previous Office action has been withdrawn pursuant to 37 CFR 1.114. Applicant's submission filed on 22 July 2014 has been entered.

Response to Arguments

Applicant's arguments filed 22 July 2014 have been fully considered but they are not persuasive.

> Applicant respectfully disagrees. Decentralized communication is recited in the rejected claims. The claims state: "unique user code configured to spread the spectrum of said signal and further configured for independent communication operation ... virtually free from interference." In contrast, "a centralized network architecture features a specialized node, i.e., the base station, that coordinates and controls all transmissions within the coverage area, or cell," (Reference: Exhibit I, page 120 of "Handbook Of Wireless Networks And Mobile Computing," and Figure 6.2

on page 121) (Emphasis added). This centralized network architecture is applied in Li, Lindemann and Lavelle as pointed out in the first paragraph of page 8, section 5 of the "Response To The Office Action Dated 10/11/2013" (Reference Exhibit II).

The decentralized architecture (also known as distributed or ad hoc) as recited in the claims, has already been clearly defined in Exhibit I of the "Request For Reexamination And Response To The Final Rejection Dated 06/07/10" and referenced herein as Exhibit III. Further clarity regarding decentralized communication is found in attached Exhibit I, wherein page 121 of"Handbook Of Wireless Networks And Mobile Computing," states: "Ad hoc nodes communicate directly with one another in a peer-to-peer fashion." This is further exemplified in Exhibit I, Figure 6.3, page 122 of "Handbook Of Wireless Networks And Mobile Computing," and in Exhibit IV, Figure 2.11, page 43 of "Handbook Of RF & Wireless Technologies." The given definitions, illustrations, and references of a centralized and decentralized network cited above, confirm that the centralized method of Li, Lindemann and Lavelle do not combine Mtstatt to teach, suggest or motivate a decentralized communication system as taught by the current application. These references simply cannot obviate the decentralized digital peer-to-peer functionality of the invention. Moreover, "Replacing the FM transmitter/receiver implementation of Alstatt to use the digital CDMA communication" (as the FOA suggests on page 8) of Li, Lindemann or Lavelle does not obviate the invention because "codes that are orthogonal in synchronous systems (i.e., centralized system) exhibit high cross- correlation (i.e., interference) when not perfectly synchronized (i.e., the asynchronous decentralized system)," emphasis added. This fact has been presented many times in the past prosecution history (for example, Exhibit II "CDMA-Based MAC Protocol For Wireless Ad Hoc Networks" of the "Response To The Office Action Dated 10/11/2013").

The claim language of the present invention clearly describes and discloses a decentralized architecture ("unique user code configured to spread the spectrum of said signal and further configured for independent communication operation ... virtually free from interference"). Nevertheless, in the interest of moving forward, the claim language "independent CDMA communication operation, said receiver independent of the operation of another receiver" has been added for further clarification (multiple audio receivers sharing a single audio transmitter - synchronous system - is not mandatory). The claim language aids in clarifying a decentralized architecture. In stark contrast, Li, Lindemann or Lavelle in combination with Altstatt produces the following digital centralized network: "Communication from a base station (i.e., the single audio transmitter) to a node takes place on a downlink channel. Only the base station has access to a downlink channel, whereas the nodes (i.e.,

> multiple audio receivers) share the uplink channels," emphasis added (Reference: Exhibit I, page 121 of"Handbook Of Wireless Networks And Mobile Computing). Thus, page 5 of the FOA is erroneous in stating that "these decentralized systems were known, as evidenced by Lavelle and Lindemann."

Examiner respectfully disagrees. Even if the decentralized operation were clearly noted in the claims, these features are made obvious given the knowledge in the prior art. Altstatt, Li and Lavelle make obvious independent use of transmitters and receivers (Altstatt) in shared spaces/decentralized (Li and Lavelle) as shown below

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 of this title, 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.

Claims 1 – 11 are rejected under pre-AIA 35 U.S.C. 103(a) as being unpatentable over Altstatt (U.S. Patent 5,771,441) in view of Li (U.S. Patent 6,781,977) in further view of Kurrat (U.S. Patent 6,456,645) and in further view of Lavelle (U.S. Patent 6,678,892) and in further view of Lindemann (U.S. Patent Application Publication 2004/0223622)

Regarding **Claim 1**, Altstatt discloses:

A mobile wireless audio receiver (Fig. 1).

Alstatt fails to disclose the device as “digital.”

However, digital wireless communication was notoriously well known in the art.

For Example, Li teaches a system providing CDMA communication of digital audio to headphone devices; col. 3 lines 20 – 33.

Replacing the FM transmitter/receiver implementation of Alstatt to use the digital CDMA communication discloses:

the system as a digital system (i.e. digital audio; col. 2 lines 48 – 51); also A/D conversion; col. 3 line 7).

It would have been obvious to one of ordinary skill in the art at the time the invention was made to apply the digital CDMA wireless communication of Li to replace the FM modulation communication as taught by Alstatt. Li clearly teaches the device for use in portable implementations such as music and headphone audio reproductions. Li also teaches the outputs/inputs as standard audio jacks. Furthermore, doing so would be simple substitution of one known element (i.e. digital CDMA transmitter/receiver) for another (i.e. analog FM transmitter) to obtain predictable results (i.e. Alstatt w/ a digital transmitter). Additionally, Li discloses a number of advantages of using digital communication in col. 6.

The combination further discloses:

configured to receive a unique user code and an original audio signal representation in the form of packets (packet form met by the G.729 encoding implementation, see col. 4 lines 25 – 33; also see the discussion of sending the entire signal using frames; col 3 lines 9 – 11), said unique user code configured to spread the spectrum of said signal and further configured for independent CDMA communication operation (matching the inherent code in CDMA to initiate de-spreading, i.e. each channel in CDMA corresponds to a different random sequence, this sequence must be received and recognized by receiving unit 200 in order for the device to operate)

The combination fails to explicitly disclose:

said receiver independent of the operation of another receiver.

Alstatt generally hints to these features by allowing a user to tune to a particular frequency to avoid interference from other signals. In general, independent operation in a shared space using CDMA communication is well known. Lavelle teaches of a transmitter/headphone system that is capable of transmission in a shared space (e.g. car) providing operation of multiple headphones independent of one another. Applying these features to the system of the combination discloses:

said receiver independent of the operation of another receiver.

It would have been obvious to one of ordinary skill in the art to apply the teachings of Lavelle to the combination. Doing so would have allowed all of the available frequency bandwidth to be used while simultaneously minimizing interference, as well as being an obvious application in wireless headphone systems; see Lavelle col. 5 line 42 - cool. 6 line 8.

The combination fails to explicitly disclose:

said mobile wireless digital audio receiver comprising:

a direct conversion module configured to capture packets

In a related field of endeavor (i.e. wireless music transmission), Kurrat discloses a transmission device that includes a direct conversion module. Using a direct conversion receiver as the radio frequency receiver provides a low cost and low current consumption implementation (col. 2).

Applying this direct conversion module to the transmission of the combination discloses:

a direct conversion module configured to capture packets (Kurrat's Direct conversion module now implemented in the combination's wireless transmission/reception configuration).

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 Kurrat to the combination. One would have been motivated to do so to provide a low cost low current the combination conversion receiver in the wireless communication device of the combination; see col. 2 of Kurrat.

The combination also fails to explicitly disclose:

correct bit sequence within the packets aided by lowering signal detection error through reduced intersymbol interference coding of said original audio signal representation.

However, reducing intersymbol interference in audio coding for CDMA transmission is notoriously well known in the art.

Lindemann discloses a device that transmits digital audio between a stereo system and a speaker using CDMA. Lindemann also includes that the transmission stream is created using a Reed-Solomon encoding and interleaver and a corresponding decoder in the decoder; Figs. 6 and 8.

Applying these teachings to the encoding of the combination discloses:

and a correct bit sequence within the packets aided by lowering signal detection error through reduced intersymbol interference coding of said audio representation signal respective to said mobile wireless digital audio receiver and said mobile digital audio transmitter (Fig. 8 element 802 which is a Reed Solomon decoder and Interleaver; it is known in the art to configure Reed Solomon decoding/interleaving to reduce ISI as is shown by Roberts 6,418,558. Reducing ISI is a desirable feature to any digital transmission).

It would have been obvious to one of ordinary skill in the art at the time the invention was made to include the reed Solomon encoder/decoder in the combinations channel encoding. Doing so would have been nothing more than applying a known technique to a known device ready for improvement to yield predictable results as:

1) the prior art contained a base device in the combination's wireless CDMA headphone set that, when including intersymbol interference reduction, can be seen as in improvement;

2) the prior art contained a known technique (i.e. Reed Solomon encoding/decoding to reduce ISI) in a comparable device in Lindemann (i.e. wireless audio transmission); And

3) applying the teachings of Lindemann to the combination of Altstatt in view of Li would have been predictable as both operate on wireless CDMA communications of audio.

The combination further discloses:

said packets embedded in the received spread spectrum signal, the captured packets corresponding to the unique user code (CDMA communication shown in Li);

a decoder operative to decode the reduced intersymbol interference coding of said original audio signal representation, virtually free from interference from device transmitted signals operating in the wireless digital audio receiver spectrum (decoders of Li, now implemented in Altstatt to reproduce the digital audio signals, see the multiple discussions of reducing interference throughout the cited references above).

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

a digital to analog converter generating an audio output of said original signal representation (portion of Li that converts the digital audio to analog for reproduction by the speaker 206); and

a module adapted to reproduce said generated audio output, said audio having been wirelessly transmitted from an audio player and reproduced virtually free from interference from device transmitted signals operating in the wireless headphone spectrum (206 of Li)

Regarding **Claim 3**, in addition to the elements stated above in the rejections of claims 1 and 2, the combination made in claim 1 further discloses:

a digital demodulator configured for independent CDMA communication operation wherein a user has their own transmitter and receiver (CDMA communication now replacing the FM transmission of Altstatt).

Regarding **Claim 4**, in addition to the elements stated above in the rejections of claims 1 - 3, the combination made in claim 1 further discloses:

where in the audio output is music (music; Li Abstract, also implied in Altstatt)

Regarding **Claim 6**, in addition to the elements stated above in the rejections of claims 1 - 3, the combination made in claim 1 further discloses:

fuzzy set membership functionality to enhance detection of said unique user code (soft decision making by the receiver to despread; col. 4 line 63 - col. 5 line 25 of Li).

Regarding **Claim 11**, in addition to the elements stated above in the rejections of claims 9, the combination made in claim 1 fails to explicitly disclose:

wherein the spread spectrum receiver module is further configured to utilize differential phase shift keying (DPSK) to demodulate said audio signal representation.

Tthe combination fails to disclose using differential phase shift keying (DPSK). However, DPSK modulation is notoriously well known to be used in CDMA communication. It would have been obvious to one of ordinary skill in the art at the time of the invention to apply the DPSK modulation to the CDMA implementation of the

combination. One would have been motivated to do so to apply a known technique (i.e. DPSK) to a known device (CDMA transmitter) to yield predictable results (i.e. DPSK in CDMA, Li is silent as to the type of modulation used and it would provided predictable results to use any number of known and obvious techniques).

Claims 5, 7, 8, 9 and 10 are rejected under the same grounds stated above (e.g. receiver/transmitter work in unison, the receiver will contain the decoding components, the transmitter will contain the corresponding encoding components).

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 – 11 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 not patentably distinct from each other because the claims of the ‘391 patent anticipate the claims of the instant application.

Claims 1 – 11 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 not patentably distinct from each other because the claims of the ‘258 patent anticipate the claims of the instant application.

Claims 1 – 11 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 not patentably distinct from each other because the claims of the ‘885 patent anticipate the claims of the instant application.

Claims 1 – 11 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 not patentably distinct from each other because the claims of the ‘294 patent anticipate the claims of the instant application.

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.

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

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; 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

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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	(10/648012).APP.	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

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S47	59	S46 and @ad<"20011220"	US-PGPUB; USPAT; USOCR	OR	OFF	2007/03/20 10:08
S48	17	("4278978" | "4635063" | "5175558" | "5493307").PN. OR ("6130643").URPN.	US-PGPUB; USPAT; USOCR	OR	OFF	2007/03/20 10:15
S49	1	("5175558").PN.	US-PGPUB; USPAT	OR	OFF	2007/03/20 10:16
S50	13	("4651155" | "4931977").PN. OR ("5175558").URPN.	US-PGPUB; USPAT; USOCR	OR	OFF	2007/03/20 10:34
S51	1	("5946343").PN.	US-PGPUB; USPAT	OR	OFF	2007/03/20 11:40
S52	7186	(375/295,146,130,340,316,148).CCLS.	US-PGPUB; USPAT	OR	OFF	2007/03/20 11:41
S53	4473	S52 and @ad<"20011220"	US-PGPUB; USPAT	OR	OFF	2007/03/20 11:41
S54	1	("20040223622").PN.	US-PGPUB; USPAT	OR	OFF	2007/03/21 12:11
S55	5	"reed solomon" with "intersymbol interference"	US-PGPUB; USPAT	OR	OFF	2007/03/21 12:13
S56	30	"reed solomon" same "intersymbol interference"	US-PGPUB; USPAT	OR	OFF	2007/03/21 12:13
S57	21	S56 and @ad<"20011220"	US-PGPUB; USPAT	OR	OFF	2007/03/21 12:27
S58	1	("20030045235").PN.	US-PGPUB; USPAT	OR	OFF	2007/03/21 12:37
S59	1	("5790595").PN.	US-PGPUB; USPAT	OR	OFF	2007/03/21 12:37
S60	2435	((375/262,265,341) or (714/794,795)).CCLS.	US-PGPUB; USPAT	OR	OFF	2007/03/24 09:15
S62	56	"375".clas. and "fuzzy logic"	US-PGPUB; USPAT	OR	OFF	2007/03/26 11:04
S64	1	("4970637").PN.	US-PGPUB; USPAT	OR	OFF	2007/03/28 13:46
S65	755	(audio sound music voice) same (a/d "analog to digital") same (lpf "low pass")	US-PGPUB; USPAT	OR	OFF	2007/03/28 13:46
S66	282	(audio sound music voice) with (a/d "analog to digital") with ((lpf "low pass") and "digital")	US-PGPUB; USPAT	OR	OFF	2007/03/28 13:47
S67	227	(audio sound music voice) with (a/d "analog to digital") with ((lpf "low pass") and "digital") and @ad<"20011221"	US-PGPUB; USPAT	OR	OFF	2007/03/28 15:33
S68	34712	"band pass filter" bpf with "direct conversion receiver"	US-PGPUB; USPAT	OR	OFF	2007/03/28 15:33
S69	35	("band pass filter" bpf) with "direct conversion receiver"	US-PGPUB; USPAT	OR	OFF	2007/03/28 15:33
S70	8	S69 and @ad<"20011221"	US-PGPUB; USPAT	OR	OFF	2007/03/28 15:55
S71	1	("20030045235").PN.	US-PGPUB; USPAT	OR	OFF	2007/03/28 16:16
S72	1	("20040223622").PN.	US-PGPUB; USPAT	OR	OFF	2007/03/28 16:20

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S73	1	("5946343").PN.	US-PGPUB; USPAT	OR	OFF	2007/03/28 16:27
S74	364	"64-ary"	US-PGPUB; USPAT	OR	OFF	2007/03/28 16:27
S75	74	"64-ary" near modulat$4	US-PGPUB; USPAT	OR	OFF	2007/03/28 16:27
S76	46	S75 and @ad<"20011120"	US-PGPUB; USPAT	OR	OFF	2007/03/28 16:27
S77	2	(("4970637") or ("5790595")).PN.	US-PGPUB; USPAT	OR	OFF	2007/07/16 09:58
S78	3	(("4970637") or ("5790595") or ("20040223622")).PN.	US-PGPUB; USPAT	OR	OFF	2007/07/16 09:58
S79	3	("2004/0223622").URPN.	USPAT	OR	OFF	2007/07/16 11:25
S80	1	("5771441").PN.	US-PGPUB; USPAT	OR	OFF	2007/07/16 11:25
S81	60	("2236946" | "2828413" | "2840694" | "3080785" | "3085460" | "3087117" | "3296916" | "3579211" | "3743751" | "3781451" | "3825666" | "3863157" | "3901118" | "3906160" | "4004228" | "4229826" | "4335930" | "4344184" | "4369521" | "4430757" | "4453269" | "4464792" | "4471493" | "4612688" | "4647135" | "4721926" | "4794622" | "4845751" | "4899388" | "4988957" | "5025704" | "5214568").PN. OR ("5771441").URPN.	US-PGPUB; USPAT; USOCR	OR	OFF	2007/07/16 11:26
S82	2	S81 and cdma	US-PGPUB; USPAT; USOCR	OR	OFF	2007/07/16 11:26
S83	1	("6678892").PN.	US-PGPUB; USPAT	OR	OFF	2008/05/20 11:41
S84	1	("20020072816").PN.	US-PGPUB; USPAT	OR	OFF	2008/05/20 14:24
S85	22	"fuzzy logic" and modulat$5 and filter and (dpsk "phase shift key")	US-PGPUB; USPAT	OR	OFF	2008/06/06 09:20
S86	0	"455".clas. and "375".clas. and S85	US-PGPUB; USPAT	OR	OFF	2008/06/06 09:21
S87	1	"10100351"	US-PGPUB; USPAT	OR	OFF	2008/06/06 11:49
S88	1	("6,678,892").PN.	US-PGPUB; USPAT	OR	OFF	2008/06/06 12:38
S89	3	("20030021429" | "20030076346" | "6867820").PN.	US-PGPUB; USPAT	OR	OFF	2008/06/06 12:42
S90	13	("4589134" | "4626892" | "5042070" | "5541638" | "5581621" | "5631850" | "5775939" | "6100936" | "6195438").PN. OR ("6867820").URPN.	US-PGPUB; USPAT; USOCR	OR	OFF	2008/06/06 12:43
S91	2	"10648012"	US-PGPUB; USPAT	OR	OFF	2009/02/14 10:23
S92	1	"12144729"	US-PGPUB; USPAT	OR	OFF	2009/02/14 10:31
S93	1	("5790595").PN.	US-PGPUB; USPAT	OR	OFF	2009/02/14 12:36

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S94	1	("6678892").PN.	US-PGPUB; USPAT	OR	OFF	2009/02/14 12:37
S95	1	("6678892").PN.	US-PGPUB; USPAT	OR	OFF	2009/05/26 07:51
S96	1680	portable and music and CDMA and transmitter and receiver	US-PGPUB; USPAT	OR	OFF	2009/09/01 11:35
S97	527	portable and music and CDMA and transmitter and receiver and private	US-PGPUB; USPAT	OR	OFF	2009/09/01 11:35
S98	57	portable and music and CDMA and transmitter and receiver and private and "fuzzy logic"	US-PGPUB; USPAT	OR	OFF	2009/09/01 11:35
S99	0	S98 and @ad<"20011221"	US-PGPUB; USPAT	OR	OFF	2009/09/01 11:36
S100	41	S97 and @ad<"20011221"	US-PGPUB; USPAT	OR	OFF	2009/09/01 11:36
S101	1	("6678692").PN.	US-PGPUB; USPAT	OR	OFF	2009/09/01 11:39
S102	1	("6678892").PN.	US-PGPUB; USPAT	OR	OFF	2009/09/01 11:39
S103	25	("5555466" | "5771441" | "6058288" | "6243645" | "6266815" | "6300880" | "6317039").PN. OR ("6678892").URPN.	US-PGPUB; USPAT; USOCR	OR	OFF	2009/09/01 11:39
S104	63	("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	2009/09/01 11:42
S105	10	("20030045235" | "20040223622" | "5491839" | "5771441" | "5790595" | "5946343" | "6342844" | "6418558" | "6678892" | "6982132").PN.	US-PGPUB; USPAT; USOCR	OR	OFF	2009/09/01 11:42
S106	4453	"fuzzy logic" and @ad<"20011221"	US-PGPUB; USPAT; USOCR	OR	OFF	2009/09/01 11:48
S107	659	S106 and transmitter	US-PGPUB; USPAT; USOCR	OR	OFF	2009/09/01 11:48
S108	591	S106 and portable	US-PGPUB; USPAT; USOCR	OR	OFF	2009/09/01 11:48
S109	4	S106 and portable adj player	US-PGPUB; USPAT; USOCR	OR	OFF	2009/09/01 11:49
S110	0	"fuzzy logic" with reciever	US-PGPUB; USPAT; USOCR	OR	OFF	2009/09/01 11:50
S111	49	"fuzzy logic" with receiver	US-PGPUB; USPAT; USOCR	OR	OFF	2009/09/01 11:50

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S112	27	S111 and @ad<"20011221"	US-PGPUB; USPAT	OR	OFF	2009/09/01 11:50
S113	192	"fuzzy logic" same receiver	US-PGPUB; USPAT; USOCR	OR	OFF	2009/09/01 11:51
S114	72	S113 and @ad<"20011221"	US-PGPUB; USPAT	OR	OFF	2009/09/01 11:52
S115	71	("4019141" | "4229829" | "5264795" | "5404577" | "5437057" | "5568516" | "5694467" | "5771438" | "5771441" | "5867223" | "5978689" | "6006115").PN. OR ("6424820").URPN.	US-PGPUB; USPAT; USOCR	OR	OFF	2009/09/02 11:27
S116	34	S115 and @ad<"20011221"	US-PGPUB; USPAT	OR	OFF	2009/09/02 11:28
S117	31	bluetooth with (headphone headset earphone "head phone" "head set" "ear phone") with cdma	US-PGPUB; USPAT	OR	OFF	2009/09/02 11:32
S118	2	S117 and @ad<"20011221"	US-PGPUB; USPAT	OR	OFF	2009/09/02 11:32
S119	32	wireless with (headphone headset earphone "head phone" "head set" "ear phone") with cdma	US-PGPUB; USPAT	OR	OFF	2009/09/02 11:33
S120	3	S119 and @ad<"20011221"	US-PGPUB; USPAT	OR	OFF	2009/09/02 11:33
S121	57	(headphone headset earphone "head phone" "head set" "ear phone") with cdma	US-PGPUB; USPAT	OR	OFF	2009/09/02 11:34
S122	10	S121 and @ad<"20011221"	US-PGPUB; USPAT	OR	OFF	2009/09/02 11:34
S123	0	WO0056093	US-PGPUB; USPAT	OR	OFF	2009/09/02 11:36
S124	0	WO0056093	US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO; DERWENT; IBM_TDB	OR	OFF	2009/09/02 11:37
S125	0	WO/0056093	US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO; DERWENT; IBM_TDB	OR	OFF	2009/09/02 11:37
S126	2	(("5781542") or ("5799005")).PN.	US-PGPUB; USPAT	OR	OFF	2009/09/02 11:42
S127	1	("6199076").PN.	US-PGPUB; USPAT	OR	OFF	2009/09/02 13:51
S128	0	woolfork-earl.in.	US-PGPUB; USPAT	OR	OFF	2009/11/23 11:44
S129	3	woolfork-c-$.in.	US-PGPUB; USPAT	OR	OFF	2009/11/23 11:44
S139	1	("7412294").PN.	US-PGPUB; USPAT	OR	OFF	2010/01/11 12:21
S140	1	("7412294").PN.	US-PGPUB;	OR	OFF	2010/06/01

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			USPAT			09:29
S141	3	"12144729"	US-PGPUB; USPAT	OR	OFF	2010/06/01 09:34
S142	843	cdma and "fuzzy logic"	US-PGPUB; USPAT	OR	OFF	2010/10/18 09:46
S143	66	S142 and @ad<"20011221"	US-PGPUB; USPAT	OR	OFF	2010/10/18 09:46
S144	14	cdma same "fuzzy logic"	US-PGPUB; USPAT	OR	OFF	2010/10/18 09:46
S145	5	S144 and @ad<"20011221"	US-PGPUB; USPAT	OR	OFF	2010/10/18 09:46
S146	11	code same wireless same "fuzzy logic"	US-PGPUB; USPAT	OR	OFF	2010/10/18 09:49
S147	2	S146 and @ad<"20011221"	US-PGPUB; USPAT	OR	OFF	2010/10/18 09:49
S148	2704	(700/94).CCLS.	US-PGPUB; USPAT	OR	OFF	2010/10/21 12:51
S149	3	(("7412294") or ("7865258") or ("7684885")).PN.	US-PGPUB; USPAT	OR	OFF	2011/05/02 14:06
S150	1	("6418558").PN.	US-PGPUB; USPAT; USOCR	OR	OFF	2011/11/03 09:41
S151	1	("6678892").PN.	US-PGPUB; USPAT; USOCR	OR	OFF	2011/11/03 09:42
S152	1	S150 and reed same intersymbol	US-PGPUB; USPAT; USOCR	OR	OFF	2011/11/03 10:03
S154	1	("8131391").PN.	US-PGPUB; USPAT; USOCR	OR	OFF	2013/10/02 10:23
S155	1	("8131391").PN.	US-PGPUB; USPAT; USOCR	OR	OFF	2013/10/02 10:27
S156	1765	wireless and (audio music) and "direct conversion"	US-PGPUB; USPAT; USOCR	OR	OFF	2013/10/02 10:30
S157	177	S156 and @ad<"20011221"	US-PGPUB; USPAT	OR	OFF	2013/10/02 10:30
S158	6	S157 and (headphone "head phone" earphone "ear phone")	US-PGPUB; USPAT	OR	OFF	2013/10/02 10:31
S159	18	(US-20010025358-$ or US-20040223622-$).did. or (US-6130643-$ or US-6982132-$ or US-7099413-$ or US-7047474-$ or US-6418558-$ or US-5175558-$ or US-6317039-$ or US-5771441-$ or US-5946343-$ or US-5491839-$ or US-6424820-$ or US-6898585-$ or US-6781977-$ or US-5781542-$ or US-6678892-$ or US-6456645-$).did.	US-PGPUB; USPAT	OR	OFF	2013/10/02 10:34
S160	6	S159 and packet	US-PGPUB; USPAT; USOCR	OR	OFF	2013/10/02 10:34
S161	6	S159 and cdma	US-PGPUB; USPAT;	OR	OFF	2013/10/02 10:44

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			USOCR			
S162	1	S159 and "direct conversion"	US-PGPUB; USPAT; USOCR	OR	OFF	2013/10/02 10:52
S163	4	(("8131391") or ("7865258") or ("7684885") or ("7412294")).PN.	US-PGPUB; USPAT; USOCR	OR	OFF	2013/10/02 12:00
S164	18	(US-20010025358-$ or US-20040223622-$).did. or (US-6130643-$ or US-6982132-$ or US-7099413-$ or US-7047474-$ or US-6418558-$ or US-5175558-$ or US-6317039-$ or US-5771441-$ or US-5946343-$ or US-5491839-$ or US-6424820-$ or US-6898585-$ or US-6781977-$ or US-5781542-$ or US-6678892-$ or US-6456645-$).did.	US-PGPUB; USPAT	OR	OFF	2013/12/05 09:59
S165	1	S164 and intersymbol	US-PGPUB; USPAT; USOCR	OR	OFF	2013/12/05 09:59
S166	1	S164 and intersymbol and reed	US-PGPUB; USPAT; USOCR	OR	OFF	2013/12/05 09:59

EAST Search History (Interference)

Ref #	Hits	Search Query	DBs	Default Operator	Plurals	Time Stamp
S130	0	woolfork-earl.in.	USPAT; UPAD	OR	OFF	2009/11/23 11:44
S131	1	woolfork-c-$.in.	USPAT; UPAD	OR	OFF	2009/11/23 11:44
S132	195	(700/94).CCLS.	UPAD	OR	OFF	2009/11/23 11:59
S133	225	((700/94) or (455/3.06)).CCLS.	UPAD	OR	OFF	2010/01/11 11:18
S153	31	(700/94).CCLS.	UPAD	OR	OFF	2012/01/09 11:39

12/16/2014 9:55:49 AM
C:\Users\aflanders\Documents\EAST\Workspaces\12940747.wsp

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Index of Claims	Application/Control No.	Applicant(s)/Patent Under Reexamination
	13356949	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	10/02/2013	05/01/2014	12/16/2014						
	1	✓	✓	✓						
	2	✓	✓	✓						
	3	✓	✓	✓						
	4	✓	✓	✓						
	5	✓	✓	✓						
	6	✓	✓	✓						
	7	✓	✓	✓						
	8	✓	✓	✓						
	9		✓	✓						
	10		✓	✓						
	11			✓						

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Search Notes	Application/Control No.	Applicant(s)/Patent Under Reexamination
	13356949	WOOLFORK, C. EARL
	Examiner	Art Unit
	ANDREW C FLANDERS	2656

CPC- SEARCHED		
Symbol	Date	Examiner

CPC COMBINATION SETS - SEARCHED		
Symbol	Date	Examiner

US CLASSIFICATION SEARCHED			
Class	Subclass	Date	Examiner
700	94	12/16/14	acf

SEARCH NOTES		
Search Notes	Date	Examiner
see history attached	10/2/13	acf
reviewed and repeatedsearch history of entire family; 10/027,391 10/648,012 12/144,729 12/570,343 12/940,747	10/2/13	acf
eDan, EAST and PALM inventor search for double patenting	10/2/13	acf
google.com patents search	10/2/13	acf
updated	5/1/14	acf
updated	12/16/14	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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Courtesy Reminder for
Application Serial No: 13/356,949

Attorney Docket No: 1028.6
Customer Number: 68533
Date of Electronic Notification: 12/22/2014

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PTO/SB/08a (01-10)
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INFORMATION DISCLOSURE STATEMENT BY APPLICANT (**Not for submission under 37 CFR 1.99)**		
	Application Number	13356949
	Filing Date	2012-24-01
	First Named Inventor	C. Earl Woolfork
	Art Unit	2656
	Examiner Name	Andrew Flanders
	Attorney Docket Number	

U.S.PATENTS						Remove
Examiner Initial*	Cite No	Patent Number	Kind Code[1]	Issue Date	Name of Patentee or Applicant of cited Document	Pages,Columns,Lines where Relevant Passages or Relevant Figures Appear
	1	6982132		2006-03-01	Goldner,Ronald	
	2	7505823		2009-17-03	Bartlett,David	
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INFORMATION DISCLOSURE STATEMENT BY APPLICANT (**Not for submission under 37 CFR 1.99)**		
	Application Number	13356949
	Filing Date	2012-24-01
	First Named Inventor	C. Earl Woolfork
	Art Unit	2656
	Examiner Name	Andrew Flanders
	Attorney Docket Number	

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, pages(s), volume-issue number(s), publisher, city and/or country where published.	T[5]
	1		☐

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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 a citation if not in conformance and not considered. Include copy of this form with next communication to applicant.

[1] See Kind Codes of USPTO Patent Documents at www.USPTO.GOV or MPEP 901.04. [2] Enter office that issued the document, by the two-letter code (WIPO Standard ST.3). [3] For Japanese patent documents, the indication of the year of the reign of the Emperor must precede the serial number of the patent document. [4] Kind of document by the appropriate symbols as indicated on the document under WIPO Standard ST.16 if possible. [5] Applicant is to place a check mark here if English language translation is attached.

INFORMATION DISCLOSURE STATEMENT BY APPLICANT (**Not for submission under 37 CFR 1.99)**		
	Application Number	13356949
	Filing Date	2012-24-01
	First Named Inventor	C. Earl Woolfork
	Art Unit	2656
	Examiner Name	Andrew Flanders
	Attorney Docket Number	

CERTIFICATION STATEMENT

Please see 37 CFR 1.97 and 1.98 to make the appropriate selection(s):

☐ That each item of information contained in the information disclosure statement was first cited in any communication from a foreign patent office in a counterpart foreign application not more than three months prior to the filing of the information disclosure statement. See 37 CFR 1.97(e)(1).

OR

☐ That no item of information contained in the information disclosure statement was cited in a communication from a foreign patent office in a counterpart foreign application, and, to the knowledge of the person signing the certification after making reasonable inquiry, no item of information contained in the information disclosure statement was known to any individual designated in 37 CFR 1.56(c) more than three months prior to the filing of the information disclosure statement. See 37 CFR 1.97(e)(2).

☐ See attached certification statement.

☐ Fee set forth in 37 CFR 1.17 (p) has been submitted herewith.

☐ None

SIGNATURE

A signature of the applicant or representative is required in accordance with CFR 1.33, 10.18. Please see CFR 1.4(d) for the form of the signature.

Signature		Date (YYYY-MM-DD)	
Name/Print		Registration Number	

This collection of information is required by 37 CFR 1.97 and 1.98. 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 1 hour 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:	21559877
Application Number:	13356949
International Application Number:	
Confirmation Number:	2299
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:	1028.6
Receipt Date:	20-FEB-2015
Filing Date:	24-JAN-2012
Time Stamp:	16:57:34
Application Type:	Utility under 35 USC 111(a)

Payment information:

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File Listing:

Document Number	Document Description	File Name	File Size(Bytes)/ Message Digest	Multi Part /.zip	Pages (if appl.)
1	Claims	ClaimsAmendedFInalFOARCE.pdf	77517 f31cec9db0e42bbc31f98feea7b9051c6fa58a90	no	6

Warnings:
Information:

2	Applicant Arguments/Remarks Made in an Amendment	Response.pdf	2498331 89f97bded2a39123fbbdb1acdbe768b1d5a85a85	no	15
Warnings:					
Information:					
3	Information Disclosure Statement (IDS) Form (SB08)	IDSsubmittedwithResponse.pdf	611547 717241b5a39ecbbbb5bf3b979a70aa6d8219da24	no	4
Warnings:					
Information:					
		Total Files Size (in bytes):	3187395		

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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.

CLAIMS

I claim:

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

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

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

2. (Currently Amended) A wireless digital audio headphone for receipt of a unique user code and a digital audio signal representation in the form of a packet, said unique user code configured to spread a spectrum of said signal and further configured for independent CDMA communication operation, said headphone independent of the operation of another headphone, said wireless digital audio headphone comprising:

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

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

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

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

3. (Currently Amended) A wireless digital audio headphone comprising:

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

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

a digital demodulator configured for independent CDMA communication operation wherein a user has their own transmitter and receiver;

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

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

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

4. (Previously Presented) The wireless digital audio headphone of claim 3, wherein the audio output is music.

5. (Currently Amended) A mobile wireless digital audio receiver, configured to receive a unique user code and an original audio signal representation in the form of packets, said unique user code configured to spread the spectrum of said signal and further configured for independent CDMA communication operation, said receiver independent of the operation of another receiver, said mobile wireless digital audio receiver comprising:

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

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

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

a module adapted to produce said generated audio output, wherein each user has their audio receiver configured to communicate with their own separate audio transmitter, and said audio virtually free from interference from transmission and reception device ~~transmitted~~ signals operating in the shared spectrum.

6. (Currently Amended) A mobile wireless digital audio receiver, configured to receive a unique user code and an original audio signal representation in the form of packets, said unique user code configured to spread the spectrum of said signal and further configured for independent CDMA communication operation, said receiver independent of the operation of another receiver, said mobile wireless digital audio receiver comprising:

fuzzy set membership functionality to enhance detection of said unique user code;

a direct conversion module configured to capture packets and the correct bit sequence within the packets aided by lowering signal detection error through reduced

intersymbol interference coding of said audio signal representation, said packets embedded in the received spread spectrum signal, the captured packets corresponding to the unique user code;

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

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

a module adapted to produce said generated audio output, wherein each user has their audio receiver configured to communicate with their own separate audio transmitter, and said audio virtually free from interference from transmission and reception device ~~transmitted~~ signals operating in a shared spectrum.

7. (Currently Amended) A wireless digital audio receiver, configured to receive an unique user code and a original audio signal representation, said unique user code configured to spread a spectrum of said signal and further configured for independent CDMA communication operation, said receiver independent of the operation of another receiver, said wireless digital audio receiver comprising:

fuzzy set membership functionality to enhance detection of said unique user code;

a direct conversion module configured to capture the correct bit sequence embedded in the received spread spectrum signal;

a module adapted to produce said original audio signal representation, wherein each user has their audio receiver configured to communicate with their own separate audio transmitter, and said audio virtually free from interference from transmission and reception device ~~transmitted~~ signals.

8. (Currently Amended) A wireless digital coded music audio spread spectrum transmitter operatively coupled to a music audio source and configured to transmit a unique user code and an original audio signal representation in the form of packets, wherein said digital coded music audio transmitter coupled to said music audio source, and configured to be directly communicable with a mobile digital audio spread spectrum

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receiver, is capable of being moved in any direction during operation, said wireless digital coded audio transmitter comprising:

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

a digital modulator module configured for independent code division multiple

access communication operation, wherein [[a]] each user has their own separate transmitter configured to communicate with their receiver, said transmitter configured to wirelessly transmit said audio to be reproduced virtually free from interference from transmission and reception device ~~transmitted~~ signals operating in the wireless digital audio transmitter shared spectrum.

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

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

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

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

an encoding module operative to encode said original audio signal representation to reduce intersymbol interference and aid in lowering signal detection error of said audio signal representation, said transmitter coupled to said audio source;

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

11. (Currently Amended) The wireless digital audio receiver of Claim ~~9~~ 8, wherein the spread spectrum receiver module is further configured to utilize differential phase shift keying (DPSK) to demodulate said audio signal representation.

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

RESPONSE TO THE OFFICE ACTION DATED 12/22/14

Examiner interview on 2/11/15

The applicant would like to thank the Examiner for his time and attention to the application and the telephonic interview that took place on February 11, 2015. The participants of the interview were C. Earl Woolfork, Megan Lyman, and Examiner Flanders. The content of the interview were a detailed discussion of the role and placement of differential encoding in the present invention, as well as the system architecture of the present invention. It was discussed that CDMA and differential encoding are used in different steps of the wireless headphone system, and different from the teachings of the prior art.

Claims

Claims 1-3, and 5-11 have been amended to recite the one to one relationship between each transmitter and its own receiver as is taught by the invention. Claim 12 is new and does not present any new matter. The amendments to the claims do not present new matter and are well supported by the disclosure, it is respectfully requested that they be entered at this time.

Rejection of Claims 1-11 under 35 USC § 103

The legal standards for obviousness are well known, and well documented, in this case. Those standards, as previously outlined and discussed in the prosecution history, are incorporated by reference so as to streamline the remarks presented at this time.

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It is well known that DPSK is a differential encoding scheme[1] (pages 11 and 12 of the Action). The invention utilizes differential encoding[2] for, among other things, noise immunity[3] (e.g., inter-symbol interference noise reduction) as claimed (" … capture packets and a correct bit sequence within the packets aided by lowering signal detection error through reduced intersymbol interference coding … ").

The use of differential encoding in a mobile spread spectrum transmitter that communicates audio (e.g., music) directly (i.e., point-to-point) to a mobile spread spectrum receiver –for, in one embodiment, "lowering signal detection error through reduced intersymbol interference coding (i.e., differential encoding/decoding) of said original audio signal representation" – while utilizing CDMA in a particular distributed network architecture (i.e., mobile transmitter-to-mobile receiver) and suppressing interference from other device transmitted signals in the network (all of which is claimed), is not disclosed in the combination (as the above language from OA states) and is not obvious.

Reed-Solomon, as referenced by Lindemann and Roberts, is directed toward *detecting and correcting the errors within a received signal*. The Reed-Solomon reference in Lindemann and Roberts is not directed toward differential encoding/decoding (DPSK). Reed-Solomon is a Block Code, where *extra bits are added to the data* for detecting and correcting errors within the received signal[4]. Whereas differential encoding/decoding (in the present invention) *applies a known phase relationship to the audio representation data at the encoder*, then during decoding, a received piece of audio representation data is

---

[1] Ref: Exhibit I, Introduction to Spread Spectrum Communications, "In the case of DPSK, it is only necessary that the phase be the same from one signaling interval to the next to allow the comparison of signals in adjacent bit intervals."

[2] Ref: Specification Column 2, Lines 52-53 "For further noise immunity, a spread spectrum DPSK (differential phase shift key) transmitter or module is utilized.

[3] Ref: Exhibit II, Wireless Communications Systems, "…differentially encoded MPSK … is used to eliminate phase ambiguity in the carrier recovery process."

[4] Ref: Exhibit III Wireless Communications, pg. 340 "In block codes, parity bits are added to blocks or message bits to make code blocks" and pg. 345 "BCH cyclic codes are among the most important block codes … common class of nonbinary BCH codes is the family of codes known as Reed-Solomon codes."

used as a reference for the following piece of audio representation data[5] to aid in suppressing intersymbol interference (ISI).

It is argued on page 7 of the Action that Li, Lindemann and Lavelle present a centralized system, and that Altstatt can be used to teach a decentralized system to obviate the present invention. As discussed in the interview, one of skill could not replace the FM transmitter of Altstatt to use CDMA codes because codes in a centralized system (Li, Lindemann, and Lavelle) exhibit high interference in a decentralized system (as discussed previously in the Response to Office Action dated 10/11/13).[6] Thus, one of skill would have to develop new coding. The claimed unique user code is related to the spread spectrum code division multiple access portion of the invention. It aids in suppressing user-to-user interference as opposed to suppressing intersymbol interference within the audio representation data. The combination does not suggest the present invention's use of CDMA and differential encoding to create a wireless headphone receiver with an associated transmitter. The rejection should not stand.

As to the use of Reed-Solomon as referenced by the prior art of Lindemann and Roberts. It is important to note that Reed-Solomon, as taught in the prior art, is directed towards detecting and correcting the errors within a *received* signal. In the present invention the transmitter encodes and the receiver decodes the differential

---

[5] Ref: Exhibit I, Introduction to Spread Spectrum Communications, "In the case of DPSK, it is only necessary that the phase be the same from one signaling interval to the next to allow the comparison of signals in adjacent bit intervals."

[6] Ref: CDMA-Based MAC Protocol for Wireless Ad Hoc Networks, pg. 155 "A system is called time-synchronous (i.e. Centralized) if all signals originate from the same transmitter,..., a system is called time-asynchronous (i.e. Decentralized) if signals originate from multiple transmitters...In this case, the cross-correlation (i.e. interference) between codes cannot be neglected. In fact, codes that are orthogonal in synchronous systems exhibit high cross-correlation when not properly synchronized." Emphasis added.

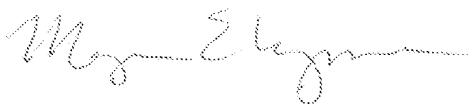
coding to correct for interference created by phase issues presented by the potentially mobile environment of the present invention. This phase issue has also been presented previously in the prosecution history of this application. Lindemann and Roberts to not disclose or suggest Reed-Solomon for the remediation of intersymbol interference as taught by the present invention. The rejection should be removed.

The remarks presented herein demonstrate the novelty of the present invention separate from the teachings of the prior art. The applicant does not acquiesce to any rejections that have not been specifically addressed in this Response. Previous remarks regarding the novelty of the present invention are incorporated by reference. Applicant respectfully requests that the rejections be removed at this time, and the application be placed into allowance.

If there are any questions, concerns, or actions that can be taken to expedite the processing of this application, please do not hesitate to contact the Applicant's representative.

February 20, 2015

Respectfully Submitted,



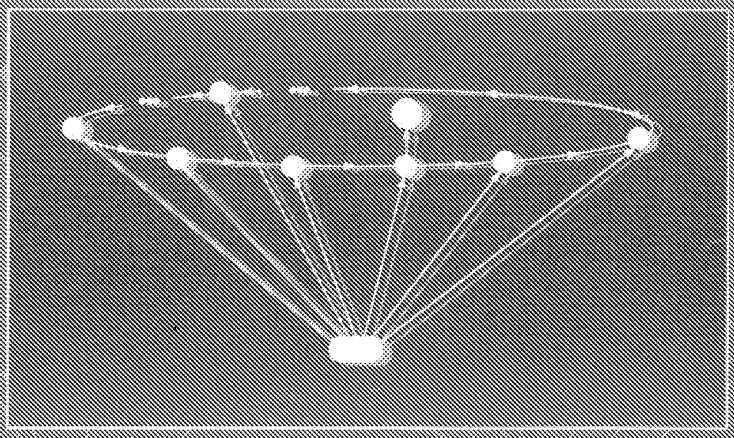
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EXHIBIT I

Introduction to Spread Spectrum Communications



ROGER L. PETERSON
RODGER E. ZIEMER
DAVID E. BORTH

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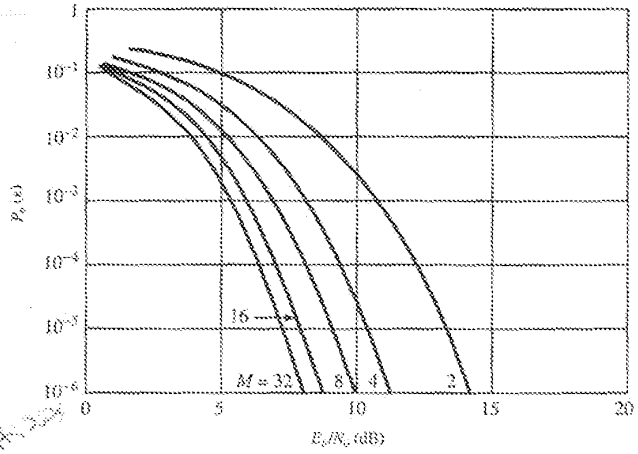


FIGURE 1-20. Bit error probability versus E_b/N_0 for noncoherent M-ary FSK.

for the case of several diffuse signal components of approximately the same powers being received, possibly due to multiple reflectors in the channel. The sum totals of the in-phase and quadrature signal components at the receiver are then approximately Gaussian by the central limit theorem, which means that the envelope, R, is Rayleigh and the phase, ϕ, is uniformly distributed in $(0,2\pi)$. The Rician model is appropriate if the received signal consists of a direct, or specular, component plus several diffuse components of approximately equal powers. The Rayleigh model is the easiest one to analyze if it is assumed that for any coherent communication system the random phase is tracked exactly, an assumption that may not always be easily implemented. In the case of DPSK, it is only necessary that the phase be the same from one signaling interval to the next to allow the comparison of signals in adjacent bit intervals.

If these conditions are met, the probability of error expressions given previously are conditional on the received signal envelope, R, through the signal-to-noise ratio, z, which is

$$z = \frac{E_b}{N_0} = \frac{R^2 T}{2N_0} \tag{1-83}$$

Since R is assumed to be Rayleigh, it follows that z, being proportional to the square of R, is exponential with probability density function

$$f(z) = \frac{1}{\bar{z}} e^{-z/\bar{z}} \qquad z \geq 0 \tag{1-84}$$

where $\bar{z}$ is the average signal-to-noise ratio. The average probability of error for BPSK is then

$$\bar{P}_E = \int_0^\infty Q(\sqrt{2z}) \frac{1}{\bar{z}} e^{-z/\bar{z}}\, dz \tag{1-85}$$

This can be integrated exactly to give

$$\bar{P}_E = \frac{1}{2}\left(1 - \sqrt{\right.$$

A similar analysis for coherent FSK

$$\bar{P}_E = \frac{1}{2}\left(1 - \sqrt{\frac{}{2 +}\right.$$

Finally, for DPSK and noncoherent FS

$$\bar{P}_E = \frac{1}{2(1 +}$$

and

$$\bar{P}_E = \frac{1}{2 +}$$

respectively. These probability of erro compared with the corresponding nonf by fading is severe.

For Rayleigh flat fading, the receiv components, which were Gaussian ran received signal is then Rayleigh. A m the received signal being composed o Gaussian in-phase and quadrature com variables techniques, the probability lope in this case can be shown to be

$$p(r) = \frac{r}{\sigma^2} \exp\left(\frac{r^2}{}\right.$$

where a is the amplitude of the sinuso sian in-phase and quadrature compon order zero. The sinusoidal component ponent, in analogy with a signal comp the quadrature Gaussian components called the diffuse component in analo large number of contributions scattere objects.

The effect of Rician fading on a analyzed with the result [7]

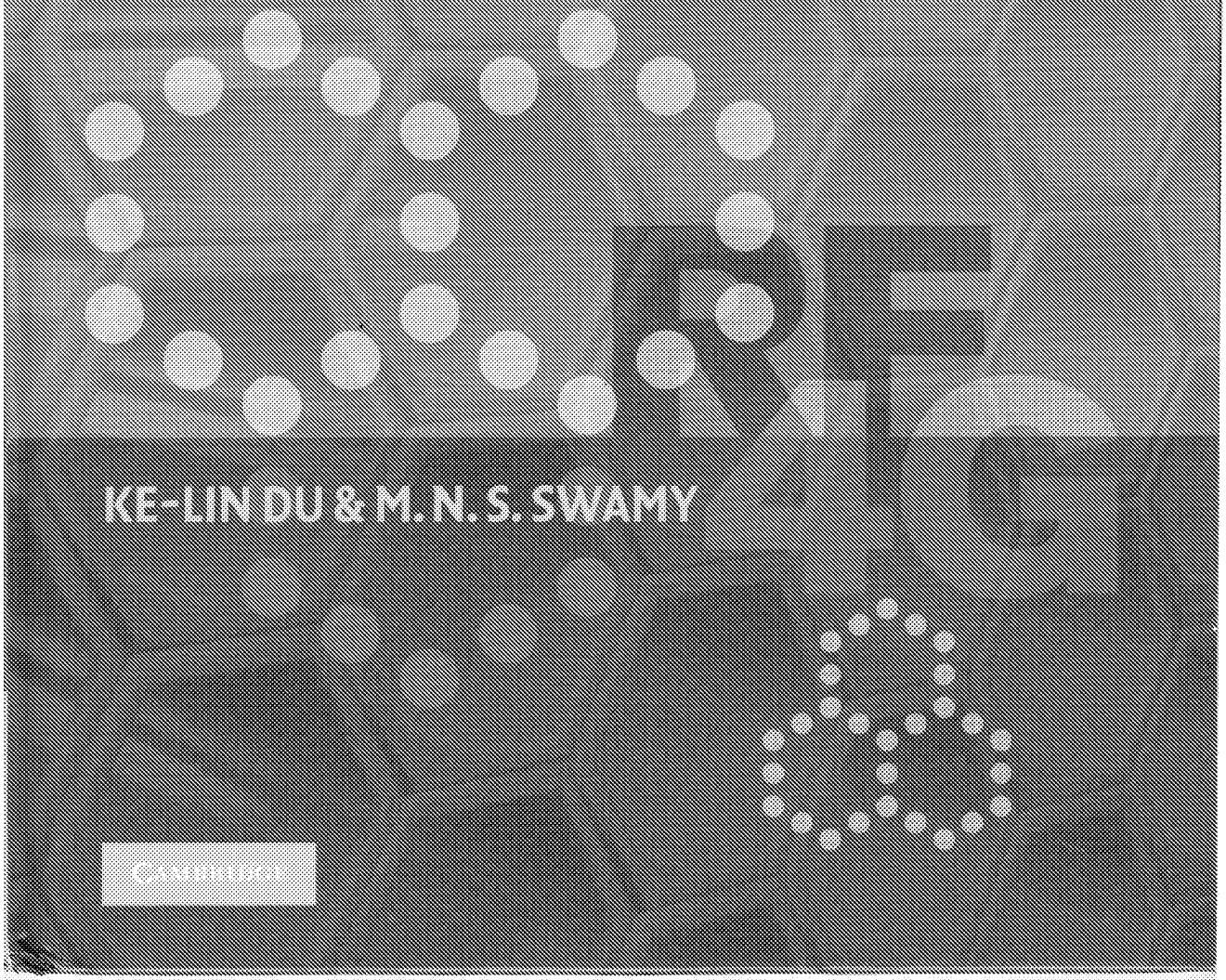
$$\bar{P}_E = \left(2 + \frac{\gamma\sqrt{}}{1 + \gamma^2}\right.$$

where γ^2 is the ratio of powers in the components. The error probability is

EXHIBIT II

WIRELESS COMMUNICATION SYSTEMS

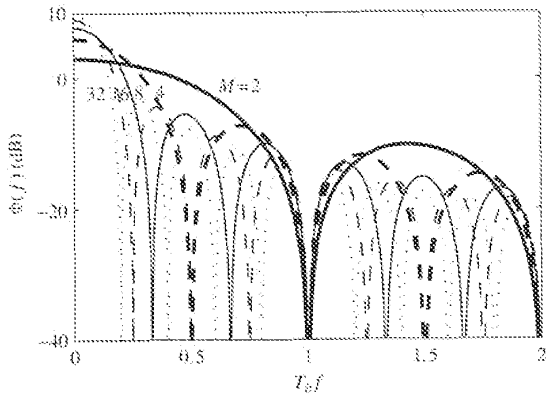
From RF Subsystems to 4G Enabling Technologies



KE-LIN DU & M. N. S. SWAMY

CAMBRIDGE

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PSD of MPSK.

Differential MPSK

Differential MPSK (DMPSK) is referred to as differentially encoded and differentially coherently demodulated MPSK. The differentially coherent demodulation is a noncoherent scheme, since phase coherent reference signals are not needed. This scheme is used in case of random phase in the received signal. Like DEBPSK, when the differentially encoded MPSK signal is coherently demodulated, we get differentially encoded MPSK (DEMPSK), which is used to eliminate phase ambiguity in the carrier recovery process. The modulator uses the MPSK modulator, preceded by two differential encoders, one on each channel, before the carrier multiplier. The DMPSK and DEMPSK demodulators are given in [39]. The DEMPSK demodulator is in fact the coherent MPSK, followed by a differential decoder. The PSD for differentially encoded MPSK signals is the same as that of MPSK for an equally likely original bitstream.

The SEP for DMPSK is in an integral form [39]

$$P_s = \frac{\sin\frac{\pi}{M}}{2\pi}\int_{-\pi/2}^{\pi/2}\frac{e^{-\gamma_s\left(1-\cos\frac{\pi}{M}\cos x\right)}}{1-\cos\frac{\pi}{M}\cos x}dx. \tag{7.70}$$

For $M = 2$, it reduces to (7.57). For other M values, it has to be numerically evaluated. For large SNR, it can be approximated by

$$P_s \approx 2Q\left(\sqrt{2\gamma_s}\sin\frac{\pi}{\sqrt{2}M}\right) \quad \text{(optimum DMPSK)}. \tag{7.71}$$

This result is asymptotically 3 dB inferior in SNR to the SEP of the MPSK, which is given by (7.66) for $M \geq 4$.

The SEP for DEMPSK is also given in integral form [39]. For $M = 2$, it reduces to (7.59). For $M = 4$, it reduces to [39]

$$P_s = 4Q\left(\sqrt{\gamma_s}\right) - 8\left[Q\left(\sqrt{\gamma_s}\right)\right]^2 + 8\left[Q\left(\sqrt{\gamma_s}\right)\right]^3 - 4\left[Q\left(\sqrt{\gamma_s}\right)\right]^4 \quad \text{(DEQPSK)}. \tag{7.72}$$

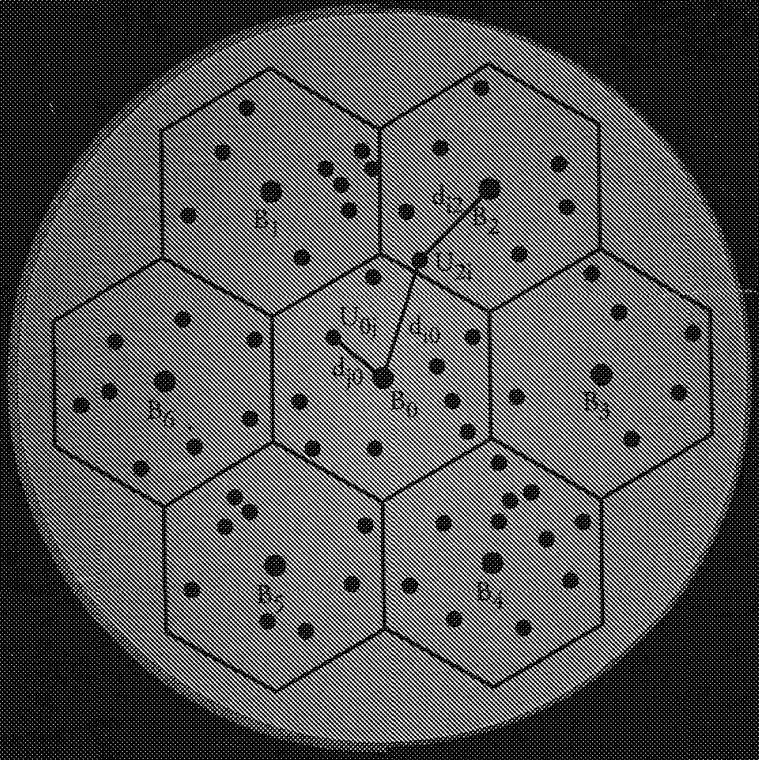
Samsung Exhibit 1002, Page 309 of 880
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IPR2025-01541

EXHIBIT III

WIRELESS

communications

Principles & Practice



Theodore S. Rappaport

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$$\frac{C}{B} = \log_2\left(1 + \frac{E_b R_b}{N_0 B}\right) \tag{6.83}$$

where C/B denotes *bandwidth efficiency*.

The basic purpose of error detection and error correction techniques is to introduce redundancies in the data to improve wireless link performance. The introduction of redundant bits increases the raw data rate used in the link, hence increases the bandwidth requirement for a fixed source data rate. This reduces the bandwidth efficiency of the link in high SNR conditions, but provides excellent BER performance at low SNR values.

It is well known that the use of orthogonal signaling allows the probability of error to become arbitrarily small by expanding the signal set, i.e., by making the number of waveforms $M \to \infty$, provided that the SNR per bit exceeds the Shannon limit of $SNR_b \geq -1.6$ dB [Vit79]. In the limit, Shannon's result indicates that extremely wideband signals could be used to achieve error free communications, as long as sufficient SNR exists. Error control coding waveforms, on the other hand, have bandwidth expansion factors that grow only linearly with the code block length. Error correction coding thus offers advantages in bandwidth limited applications, and also provides link protection in power limited applications.

A channel coder operates on digital message (or source) data by encoding the source information into a code sequence for transmission through the channel. There are two basic types of error correction and detection codes: *block codes* and *convolutional codes*.

6.14 Block Codes

Block codes are *forward error correction* (FEC) codes that enable a limited number of errors to be detected and corrected without retransmission. Block codes can be used to improve the performance of a communications system when other means of improvement (such as increasing transmitter power or using a more sophisticated demodulator) are impractical.

In block codes, parity bits are added to blocks of message bits to make *codewords* or *code blocks*. In a block encoder, k information bits are encoded into n code bits. A total of $n - k$ redundant bits are added to the k information bits for the purpose of detecting and correcting errors [Lin83]. The block code is referred to as an (n, k) code, and the rate of the code is defined as $R_c = k/n$ and is equal to the rate of information divided by the raw channel rate.

The ability of a block code to correct errors is a function of the *code distance*. Many families of codes exist that provide varying degrees of error protection [Cou93], [Hay94], [Lin83], [Skl93], and [Vit79].

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lies within distance 3 of any codeword, thus making maximum likelihood decoding possible.

Cyclic Codes

Cyclic codes are a subset of the class of linear codes which satisfy the cyclic property as discussed before. As a result of this property, these codes possess a considerable amount of structure which can be exploited.

A cyclic code can be generated by using a generator polynomial $g(p)$ of degree $(n-k)$. The generator polynomial of an (n,k) cyclic code is a factor of p^n+1 and has the general form

$$g(p) = p^{n-k} + g_{n-k-1}p^{n-k-1} + \ldots + g_1 p + 1 \tag{6.96}$$

A message polynomial $x(p)$ can also be defined as

$$x(p) = x_{k-1}p^{k-1} + \ldots + x_1 p + x_0 \tag{6.97}$$

where $(x_{k-1}, \ldots, x_0)$ represents the k information bits. The resultant codeword $c(p)$ can be written as

$$c(p) = x(p)g(p) \tag{6.98}$$

where $c(p)$ is a polynomial of degree less than n.

Encoding for a cyclic code is usually performed by a linear feedback shift register based on either the generator or parity polynomial.

BCH Codes

BCH cyclic codes are among the most important block codes since they exist for a wide range of rates, achieve significant coding gains, and can be implemented even at high speeds [Bos60]. The block length of the codes is $n = 2^m - 1$ for $m \geq 3$, and the number of errors that they can correct is bounded by $t < (2^m - 1)/2$. The binary BCH codes can be generalized to create classes of nonbinary codes which use m bits per code symbol. The most important and common class of nonbinary BCH codes is the family of codes known as Reed-Solomon codes. The (63,47) Reed-Solomon code in U.S. *Cellular Digital Packet Data* (CDPD) uses $m = 6$ bits per code symbol.

Reed-Solomon Codes

Reed-Solomon (RS) are nonbinary codes which are capable of correcting errors which appear in bursts and are commonly used in concatenated coding systems [Ree60]. The block length of these codes is $n = 2^m - 1$. These can be extended to 2^m or $2^m + 1$. The number of parity symbols that must be used to correct e errors is $n - k = 2e$. The minimum distance $d_{min} = 2e + 1$. RS codes achieve the largest possible d_{min} of any linear code.

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PATENT APPLICATION FEE DETERMINATION RECORD Substitute for Form PTO-875	Application or Docket Number 13/356,949	Filing Date 01/24/2012	☐ 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 **02/20/2015**

	(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 $40 =	0
Independent (37 CFR 1.16(h))	* 9	Minus	***9	= 0	X $210 =	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.
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LIE
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TERMINAL DISCLAIMER TO OBVIATE A PROVISIONAL DOUBLE PATENTING REJECTION OVER A PENDING "REFERENCE" APPLICATION	Docket Number (Optional) 1028.4

In re Application of:

Application No.:

Filed:

For:

The owner*, C. Earl Woolfork, of 100 percent interest 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 any patent granted on pending **reference** Application Number 12/144,729, filed on 7/12/2009, as such term is defined in 35 U.S.C. 154 and 173, and as the term of any patent granted on said **reference** application may be shortened by any terminal disclaimer filed prior to the grant of any patent on the pending **reference** application. 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 any patent granted on the **reference** application are commonly owned. This agreement runs with any patent granted on the instant application and is binding upon the grantee, its successors or assigns.

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1. ☐ For submissions on behalf of a business/organization (e.g., corporation, partnership, university, government agency, etc.), the undersigned is empowered to act on behalf of the business/organization.

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2. ☑ The undersigned is an attorney or agent of record. Reg. No. 57,054

/Megan Lyman/ — Signature
2/23/2015 — Date

Megan Lyman — Typed or printed name

(919) 341-4023 — Telephone Number

☑ Terminal disclaimer fee under 37 CFR 1.20(d) is included.

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Electronic Patent Application Fee Transmittal

Application Number:	13356949
Filing Date:	24-Jan-2012
Title of Invention:	Wireless Digital Audio Music System
First Named Inventor/Applicant Name:	C. Earl Woolfork
Filer:	Megan Elizabeth Lyman
Attorney Docket Number:	1028.6
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($)
Miscellaneous:				
Statutory or Terminal Disclaimer	1814	1	160	160
		Total in USD ($)		**160**

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EFS ID:	21602272
Application Number:	13356949
International Application Number:	
Confirmation Number:	2299
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:	1028.6
Receipt Date:	25-FEB-2015
Filing Date:	24-JAN-2012
Time Stamp:	18:53:24
Application Type:	Utility under 35 USC 111(a)

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Warnings:					
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	Application Number	13356949
	Filing Date	2012-24-01
	First Named Inventor	C. Earl Woolfork
	Art Unit	2656
	Examiner Name	Andrew Flanders
	Attorney Docket Number	

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	2	6104913		2000-08-15	McAllister,Alexander	
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	Filing Date	2012-24-01
	First Named Inventor	C. Earl Woolfork
	Art Unit	2656
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	1	EP 0840465 A2			1998-05-06	Kivela,Seppo		☐
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	1	ANTHONY EPHREMIDES, WTEC Study on Wireless Technologies and Information Systems, July 2000						☐
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	Application Number	13356949
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	First Named Inventor	C. Earl Woolfork
	Art Unit	2656
	Examiner Name	Andrew Flanders
	Attorney Docket Number	

CERTIFICATION STATEMENT

Please see 37 CFR 1.97 and 1.98 to make the appropriate selection(s):

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☐ See attached certification statement.

☒ Fee set forth in 37 CFR 1.17 (p) has been submitted herewith.

☐ None

SIGNATURE

A signature of the applicant or representative is required in accordance with CFR 1.33, 10.18. Please see CFR 1.4(d) for the form of the signature.

Signature	/Megan Lyman/	Date (YYYY-MM-DD)	2015-03-02
Name/Print	Megan Lyman	Registration Number	57054

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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 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.

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(54) User interface for mobile telephone

(57) A radio telephone (1) in accordance with the invention comprises at least a power supply (65), radio part (4), antenna (5) of the radio part, and a user interface having at least one microphone (9, 14), at least one earpiece (8, 13), means (6) for making a call and means (15) for answering a call. The radio telephone (1) is divided at least into a first part (2) and a second part (3). The first part (2) comprises at least the power supply (65), radio part (4), antenna (5) of the radio part, and means (21, 28) for communicating on the first link communication (LINK1) with the second part (3). The second part (3) comprises at least the means (15) for answering the call, and means (33, 39) for communicating with the first part (2).

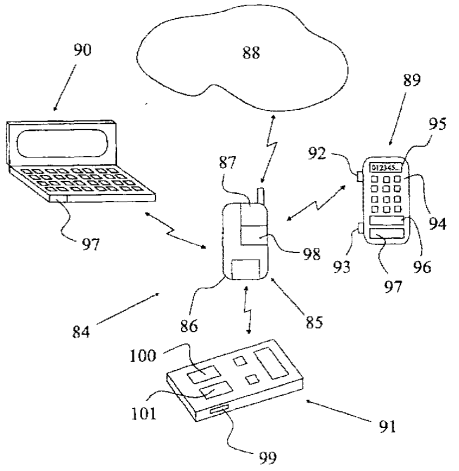


Fig. 8

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Description

The present invention relates to a radio telephone in accordance with the preamble of the accompanying claim 1.

A radio telephone relates in this context to a wireless telephone whereby a radio communication can be arranged with a telecommunication network or another radio telephone. Hand phone relates to a portable radio telephone, such as a mobile phone having a size and design suited for hand. The above definitions are based on publication No. TSK 19, "Matkaviestinsanasto - Vocabulary of Mobile Communications", published by Tekniikan sanastokeskus ry, Helsinki 1993.

The user interface of the radio telephone comprises at least a microphone, earpiece and keys for making a call and answering an incoming call. Additionally, particularly mobile phones comprise a display, whereby the user of the telephone can be given information e.g. of an incoming call.

To use a hand phone often involves the problem that the telephone starts ringing in situations where the phone is beyond the reach of hands, for example in a pocket of a jacket lying on the car seat, in a bag, inside the breast pocket or in a place otherwise unhandy. Also, the telephone may start ringing in a situation when the answering is difficult in other respect, such as in bus, at a meeting or in church.

Attempts have been made to overcome the drawback by placing the entire radio telephone on a wrist strap, wherein the wrist telephone would be easy to carry along and, when the phone starts ringing, it would be close to the user and therefore easy to answer. For instance European patent application EP-602828 introduces a solution where the radio telephone is placed to a wrist-watch type case. Most parts, including the microphone, of the radio telephone are positioned in the body of the case, mainly an earpiece being placed in the cover part. When a call is initiated, the cover part is opened, wherein the distance between the microphone and the earpiece can be increased, which facilitates the use of the wrist telephone. The above mentioned publication mainly attempts to describe the mechanical implementation of a wrist telephone. Also US-patent 5,260,915 introduces a solution for mechanical realization of a wrist telephone. In practice, the prior art provides no means for packing the radio telephone to be compact in a manner that it would be sensible to place it on wrist, inasmuch as reasonable operation times are desired for the phone. Batteries for known radio telephones are still considerably larger and heavier than the entire wrist strap, wherein adapting the radio telephone on the wrist strap would require that a very small battery was used, which, however, would mean that the operation time of the wrist telephone would be very short at a single charge.

A further problem of the wrist telephone is how to implement the antenna. To place the antenna too close to the user's body, e.g. wound around the wrist strap, will deteriorate the properties of the antenna. This sets limitations on the operation distance of the wrist telephone from the base station or another radio telephone.

Yet another drawback of known wrist telephones is the fact that the efficiencies of the transmitters are so low that thermal problems are caused when the entire radio telephone is compactly packed on a wrist strap. The thermal load directed to the wrist telephone is further increased by the wrist of the user.

An object of the present invention is to provide an improvement to the use of radio telephone, in particularly in view of answering the radio telephone. The invention is based on the idea that at least a part of the user interface of the radio telephone is constituted in a manner that it is easy to carry along by the user, and to be kept within the reach of hands. To achieve this object, the radio telephone is divided at least into a first part and a second part, wherein the first part comprises at least a power supply, a radio part (transceiver) to communicate within the radio telephone system, e.g. with a base station or another radio phone, an antenna and data transfer means for communicating with the second part. The second part comprises at least keys and data transfer means for communicating with the first part. When applying the invention to a digital phone, such as a GSM mobile phone, the digital signal processing functions are advantageously placed to the first part. The present invention is characterized by what is described in the characterizing portion of the accompanying claim 1.

The present invention provides considerable advantages over solutions of prior art. When the second part of the radio telephone of the invention is close to the user, e.g. on wrist, the telephone can easily be answered by keys or the like of the second part. Further, the whole call can be carried out by utilizing the second part only. Thus, the first part can under normal use circumstances be kept on a belt, in a pocket, bag or even in glove locker of a car during the whole call.

A link communication in accordance with the invention can be implemented in a manner that the frequencies used in the connection depend on the frequencies used by the radio part, wherein several radio telephones of the invention can be adjacent to each other and used simultaneously, without disturbing each other.

In the solution of the invention, the parts that cause problems in wrist telephones, such parts as the transmitter of the radio part and the battery, are positioned to the first part, wherein the wrist part can be formed to have a low power consumption. Thus, the wrist part can also be non-chargeable battery operated.

In the radio telephone of the invention the antenna of the radio part is, in the first part, further from the user's body, wherein the positioning problems of antennas of known wrist phones can be eliminated.

In the following, the invention will be described in more detail with reference made to the accompanying drawings. In the drawings

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Fig. 1a shows a radio telephone in accordance with the first advantageous embodiment of the invention,

Fig. 1b shows a reduced block diagram of an advantageous alternative implementation of the first part of the radio telephone in accordance with the first advantageous embodiment of the invention,

Fig. 1c shows a reduced block diagram of an advantageous alternative implementation of the second part of the radio telephone in accordance with the first advantageous embodiment of the invention,

Fig. 2 shows a radio telephone in accordance with the second advantageous embodiment of the invention,

Fig. 3a shows a radio telephone in accordance with the third advantageous embodiment of the invention,

Fig. 3b shows a reduced block diagram of an advantageous alternative implementation of the data transfer means of the first part of the radio telephone in accordance with the third advantageous embodiment of the invention,

Fig. 3c shows a reduced block diagram of an advantageous alternative implementation of the data transfer means of the second part of the radio telephone in accordance with the third advantageous embodiment of the invention,

Fig. 3d shows a reduced block diagram of an advantageous alternative implementation of the data transfer means of the third part of the radio telephone in accordance with the third advantageous embodiment of the invention,

Fig. 4a shows a radio telephone in accordance with the fourth advantageous embodiment of the invention,

Fig. 4b shows a reduced block diagram of an advantageous alternative implementation of the data transfer means of the second part of the radio telephone in accordance with the fourth advantageous embodiment of the invention,

Fig. 5 shows a reduced block diagram of the second advantageous alternative implementation of the control of link frequencies,

Fig. 6 shows a reduced block diagram of the third advantageous alternative implementation of the control of link frequencies,

Figs. 7a and 7b show still another construction for the second part 3 of the radio telephone according to the invention in a skeleton diagram, and

Fig. 8 shows a modular radio telephone apparatus.

A radio telephone 1 of the first advantageous embodiment of the invention in accordance with Fig. 1a is composed of a first part, i.e., a telephone part 2, and a second part, i.e., a wrist part 3 in data transfer communication with the first part. The telephone part 2 used is preferably a radio telephone, such as a GSM mobile telephone. The telephone part 2 comprises a radio part 4, having among other things a transmitter/receiver 49 of the radio telephone, antenna 5 of the radio part, keypad 6 and display means 7, earpiece 8 and microphone 9. Furthermore, the telephone part 2 comprises a link module 10 for creating a data transfer communication between the wrist part 3 and the telephone part 2. The link module 10 is mounted advantageously to a system connector 12 or the like of the telephone part 2, via which system connector the signalling between the link module 10 and the telephone part 2, which is necessary in the data transfer communication, can be arranged.

The wrist part 3 in accordance with the first embodiment of the invention comprises at least a supplementary earpiece 13, supplementary microphone 14, handset keys, i.e., key for answering the call 15, and key for terminating the call 16, as well as means 36 for creating an alarm signal. In addition, in the wrist part 3 in accordance with the first embodiment of the invention, a supplementary display device 11 is arranged for showing information corresponding to those shown on the display means 7 of the telephone part, e.g. the calling telephone number or the name of the person who calls. Furthermore, the wrist part 3 preferably comprises a wrist strap 17, wherein the wrist part 3 can easily be attached to the wrist so that, if necessary, it is carried along

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with the user. In Fig. 1a, the wrist part 3 is shown in a functional position, wherein a supplementary earpiece 13, attached at a second end of an attachment arm 18, is drawn out of a first wrist case 19a. Thus, the distance between the supplementary earpiece 13 and the supplementary microphone 14 nearly corresponds to the distance between the ear and the mouth of the user. When the wrist part 3 is mounted on the wrist, the supplementary earpiece 13 is situated at the hollow of the hand. The palm is placed against the ear, wherein the supplementary earpiece 13 is very close to the ear and the supplementary microphone is close to the mouth. The hollow of the hand is around the ear, which attenuates the influence of external noises and thus improves the understandability of the speech. After the call is terminated, the supplementary earpiece 13 is pushed back to the first wrist case 19a and the call terminating key 16 is pushed.

In this specification, the data transfer communication between the telephone part 2 and the wrist part 3 is designated a first link communication LINK1. Several various alternatives exist for providing link communications. One solution is to implement the link connection in a galvanic manner, i.e., by conductors or a cable. Thus, the distance between the telephone part 2 and the wrist part 3 is restricted by the length of the conductors or the cable. The advantage of this solution is the fact that the connection functions certainly in spite of strong external disturbances. This solution is applicable in cases when the telephone part 2 is close to the user, e.g. in a jacket pocket, and the wrist part 3 is attached to the wrist.

The link connection can also be implemented as ultrasonic data transfer, which has been utilized for example in remote controls for televisions. Thus, in this case an ultrasonic signal modulated by information to be transmitted is created in the ultrasonic transmitter which is demodulated in an ultrasonic receiver. By using ultrasound, no visual connection is necessary between the telephone part 2 and the wrist part 3. However, the ultrasound attenuates very quickly, wherein it may be that the communication is not possible when the telephone part 2 is covered, e.g. inside the clothes.

A link communication can also be implemented by infrared data transfer, wherein both the telephone part 2 and the wrist part 3 comprise an infrared transmitter and infrared receiver. The infrared data transfer requires an unhindered passage for the infrared light beams, either directly or via reflecting surfaces, such as windows and other shining surfaces from the infrared transmitter to the infrared receiver, which restricts the utility of this data transfer method.

The most advantageous alternative implementation to create a link communication is the radio communication, wherein no visual communication is required, and neither does the attenuating of the signal cause any problems during normal use. Fig. 1b shows, in the telephone part 2, the implementation of the first link communication LINK1 used in the radio telephone 1 in accordance with the first advantageous embodiment of the invention. The modulation method used in the link is e. g. frequency modulation (FM) or a digital modulation method. In the link communication, the frequency range used is not relevant for applying the invention as such. The frequency range is advantageously divided into channels, wherein a specific portion of the frequency range is reserved for each channel. The width of the channel is based on e.g. the modulation method used. For instance in frequency modulation, the carrier frequency is set to the medium frequency of the channel (channel frequency), wherein the frequency of the frequency modulated signal changes according to the modulating signal on both sides of the channel frequency. The maximum frequency deviation is no more than a half of the width of the frequency range reserved for the channel.

The link communications are bi-directional, preferably in the manner that in analog telephone systems, simultaneous transmission is possible to both directions of the link: in the first link communication LINK1 from the telephone part 2 to the wrist part 3 and from the wrist part 3 to the telephone part 2. Thus, the transmitter of the link module in the telephone part transmits on the free channel frequency of the first transmission band (uplink band), and the transmitter of the wrist part transmits on the respective channel frequency of the first reception band (downlink band). In practical embodiments the difference between the transmission channel frequency and the reception channel frequency is set to constant (duplex separation).

In connection with digital telephone systems utilizing the time-division multiple access (TDMA), it is also to be noted that within the same geographical area several telephones can be operating at the same frequency so that for each telephone a time slot is reserved for communication. In such systems, also time division can be used in the link of the invention and the time slot used by the link can be linked up with the time slot used by the telephone.

The analog radio phone 1 in accordance with the first advantageous embodiment of the invention operates as follows. By means of its menu functions (not shown) the radio phone 1 is set to UAI operation mode (User Air Interface), wherein the link module 10 is in use. When a call arrives to the telephone part 2, the creation of the first link communication LINK1 is initiated. The receiver 21 of the link module of the telephone part 2 is set to scan the reception band selected for the first link communication, e.g. by switching a voltage in a form of a triangular wave to a scan line and by closing the switch S1. The triangular wave is created e.g. by digital/analog converter (D/A) of a controller 27. The triangular wave is directed via the switch S1 and the resistance R1 to a capacitance diode D1. A change in the voltage between the conductors of the capacitance diode D1 causes a change in the capacitance of the capacitance diode D1.

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The capacitance diode D1 is coupled to the frequency control circuit of a local oscillator 20 of the link module, wherein the frequency of the local oscillator 20 of the link module changes in relation to the change in the voltage of the scan line. The frequency created by the local oscillator 20 of the link module is directed to a mixer 22 of the receiver of the link module. A reception antenna circuit of the link module is connected to the mixer 22, receiving circuit comprising a reception antenna 23 of the link module, first band-pass filter 24 and high-frequency amplifier 58 of the receiver of the link module. The pass band set to the first band-pass filter 24 is the frequency range of the reception band selected for the first link communication, wherein such radio frequency signals which are situated within said frequency range are directed to the mixer. From the output of the mixer 22, a mixing result is obtained which is the difference between signals of the local oscillator frequency and the radio frequency to be received, said difference being directed to the detector 26 via a second band-pass filter 25. The width of the pass band of the second band-pass filter 25 corresponds substantially to the width of the channel, wherein the signals situated possibly in adjacent channels cause no disturbance to the demodulation. From the output of the detector, a demodulated signal 42 is obtained. The demodulated signal is further directed to a low-pass filter 75, the low-pass filtered signal is passed to a AFC-line, the voltage level of which is monitored during the scanning by a link module controller 27. In the apparatus of Fig. 1b monitoring is performed by analog/digital converter (AID) of the controller 27, said converter converting the voltage value to a digital value which is processed in the application software of the controller 27. The voltage level of the AFC line is relative to the DC level of the output of the detector 26. When the signal transmitted by the wrist part is being received, the AFC line can be used for keeping the local oscillator frequency of the receiver locked to the carrier frequency of the signal transmitted by the wrist part.

The controller 27 concludes on the basis of the voltage level of the AFC line whether the reception band has other communication. If no other communication exists, any channel frequency of the reception band can be tuned in. In case other communication is found, a vacant channel has to be selected on the reception band. In case there is no vacancy, no communication with the wrist part can be created on the selected reception band. In case a vacant space is found, the receiver is tuned to the respective channel frequency, i.e., a control voltage corresponding to the selected channel frequency is set to the capacitance diode D1. Thus, the capacitance of the capacitance diode D1 sets the frequency of the local oscillator 20 of the link module to correspond to the selected channel frequency. At the same time when the receiver of the link module is tuned to the correct channel frequency, also the transmitter of the link module is tuned to the frequency of the duplex separation, because in the present embodiment the local oscillator 20 of the link module is common to both the receiver 21 of the link module and to the transmitter 28 of the link module.

The received demodulated signal can be obtained from the audio output line 42 of the link module. When the data signal is being received, the signal is directed to the controller 27 of the link module which examines the received data by closing a switch S13. The audio signal, however, is directed to the telephone part 2 by closing a switch S9. When the transmission of the wrist part is being received, the AFC line can be switched to the capacitance diode D1 by closing a switch S11, wherein the receiver 21 has been locked to the frequency of transmission.

After a free reception channel has been found the formation of a data transfer communication between the telephone part 2 and the wrist part 3 can be initiated. The controller 27 of the link module switches on the receiver 28, closes the switch S2 and supplies to the data input of the modulator of the link module a password which is common to the link module 10 and the wrist part 3.

The password can be advantageously the international mobile equipment identification (IMEI) of the radio telephone 1. The password is also stored in the wrist part 3. Thus, upon an incoming call, *e.g.* the controller 27 of the link module reads the equipment identification IMEI and possibly also other information stored in the radio telephone 1, and sends the information to the wrist part 3. In the wrist part 3, it is examined if the equipment identification is stored in the wrist part, and in the positive case, the received equipment identification IMEI is compared with the equipment identification stored in the wrist part 3. If an equipment identification is stored in the wrist part 3 and it is the same as the equipment identification received, an alarm of the incoming call is generated. In other cases, no alarm will be generated, and the link connection will be closed. By this arrangement it can be secured that the wrist part 3 is the wrist part 3 of the radio telephone 1 in question. This identification may be necessary in situations in which there are several radio telephones 1 according to the invention within the range of action of the link connection LINK1.

Fig. 1b shows the transmitter 28 of the link module, which transmitter operates in the following manner. The modulating signal is directed to a capacitance diode D2 having a capacitance which varies according to the modulation signal. The data signal is directed via a switch S2 and a separating means R7, and the analog signal via a switch S6 and a separating means R8. The separating means R7, R8 mainly operate as impedance matching means. The basic frequency of the oscillator 29 to be modulated is thus selected that between the radio-frequency signal to be transmitted and the radio-frequency signal to be received a frequency difference is formed, this difference corresponding to the value of the desired duplex separation. By using a common local oscillator it is possible to tune both the receiver and the

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transmitter in a manner that the duplex separation remains constant regardless of the channel in use. As a modulation result a frequency modulated signal is obtained, this signal being directed to the first input of the mixer 30 of the link module transmitter. The frequency of the local oscillator 20 of the link module is directed to the second input of the mixer 30, said frequency being set in a manner that the receiver tunes to a desired reception frequency. Thus, a modulated transmission channel frequency signal is obtained from the output of the mixer, said signal being further amplified in a high-frequency amplifier 59 of the link module and low-pass filtered in the low-pass filter 31, e.g. to attenuate spurious responses. From the low-pass filter the modulated radio-frequency signal is passed to the transmission antenna 32 of the link module.

The receiver of the wrist part is switched on at predetermined intervals, for example every five seconds, and the reception band of the wrist part, i.e., the transmission band of the link module 10, is scanned. The controller 34 of the wrist part simultaneously controls the output of the detector 35 of the wrist part to search for possible transmissions created by the link module of the radio part. In case transmissions are found, the receiver is locked to the transmission and the information included in the transmission is read. In case the password of the wrist part is found, the receiver of the wrist part is locked to the respective frequency. If the own password of the wrist part is found, an alarm is generated in the means 36 for creating an alarm signal to inform the user of an incoming call, e.g. by means of a sound or light signal, vibration or tickling.

The meaning of this periodical switching on is to decrease the power consumption of the wrist part 3. The operating voltages has to be switched on in the wrist part only during the call. Otherwise the operating voltages can be switched off, only at certain intervals it is checked whether the radio part has received a call.

The receiver 21 of the link module of the radio part can save power by operating in a corresponding manner, i.e., it controls only at certain intervals whether there exists any transmissions on its reception band, i.e., on the transmission band of the wrist part, otherwise the operating voltages are switched off.

The operating voltages for the transmission parts of the link module 10 and transmission parts of the wrist part 3 are switched on only during a call.

The control signals for the operating voltages of the receiver and the transmitter of the radio part 2 of the radio phone itself are not preferred for the switching signals of the operating voltages of the transmitter and the receiver of the link, because they would cause higher power consumption in the link part due to e.g. the fact that the operating voltage of the receiver of the telephone cannot be switched off for such a long period of time as in the link module 10.

The operation of the transmitter/receiver of the wrist part 3 corresponds, at its substantial parts, to the operation of the transmitter/receiver of the link module 10. The receiver 33 of the wrist part is set to scan the transmission band selected for the first link communication through e.g. by switching on a triangular-wave formed voltage to the scan line and by closing the switch S3. The triangular wave is directed via the switch S3 and the resistance R4 to the capacitance diode D3. By the capacitance diode D3, it is controlled the frequency of the local oscillator 37 of the wrist part in relation to the change of the voltage in the scan line. The frequency formed by the local oscillator 37 of the wrist part is directed to the mixer 56 of the receiver of the wrist part. The radio-frequency signals received from the reception antenna 57 of the wrist part are directed via a third band-pass filter 54 to be amplified in the high-frequency amplifier 60 of the receiver of wrist part and further to the mixer 56 of the receiver of the wrist part. From the output of the mixer the difference signal between the local oscillator and the radio frequency signal to be received is directed via a fourth band-pass filter 63 to the detector 35 of the wrist part. Also the width of the pass band of the fourth band-pass filter 63 is substantially the same as the width of the channel. The output signal of the detector 35 is directed to the low-pass filter 76 of the detector of the wrist part in order to form an AFC signal. A demodulated signal is obtained from the audio line of the wrist part. When the data signal is being received, the signal is directed to the controller 34 of the wrist part which examines the received data by switching on the switch S14. The audio signal, however, is directed to the supplementary earpiece 13 by switching on the switch S12. Furthermore, the demodulated signal is further directed via a resistance R6 to the AFC line, the voltage level of which is controlled by the controller 34 of the wrist part. The locking to the frequency of the transmission is advantageously carried out by switching on the voltage of the AFC line to the capacitance diode D3 of the local oscillator of the wrist part by switching on the switch S11.

The data signal or audio signal modulated in the transmitter 39 of the wrist part is directed to the capacitance diode D4 which is in the oscillator circuit of the modulator 38. The basic frequency of this oscillator circuit is selected so that a frequency difference is provided between the radio frequency signal to be transmitted and the radio frequency signal to be received, said frequency difference corresponding to the value of the desired duplex separation. The controller 34 switches on the switch S4 as long as the data is being transferred, wherein a switch S5 is switched off. Correspondingly, as long as the analog signal is being transmitted, the controller 34 closes the switch S5 and opens the switch S4. Separating means R9, R10, which are connected in series with the switches S4, S5 operate as matching means. As the result of the modulation, a frequency modulated signal is provided, this being passed to the first input of the mixer 55 of the transmitter. The frequency of the local oscillator 37 of the wrist part is directed

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to the second input of the mixer 55. Thus, a frequency modulated transmission channel frequency signal of the wrist is obtained from the output of the mixer, said signal being further amplified in the high frequency amplifier 61 of the wrist part and low-pass filtered in the low-pass filter 40, e.g. in order to attenuate spurious emissions. From the low-pass filter the modulated radio-frequency signal is directed to the transmission antenna 53.

After the alarm has been generated, the controller 34 of the wrist part enters the modulator 38 of the wrist part with a command which is transmitted to the link module and whereby the link module 10 of the telephone is controlled to transmit the data of the incoming call to the wrist part 3. In the receiver 21 of the link module, the signal transmitted by the transmitter of the wrist part is demodulated and passed to the controller 27 of the link module, which interprets the command. On the basis of this the controller 27 of the link module fetches the data e.g. from the system connector 12 of the radio telephone 1, the link module 10 being connected to said system connector 12. In the link module, the data is modified, if this is necessary, and the modulator 29 of the link modulator is modulated by this data. The receiver of the wrist part receives the data which is modified by the controller 34 of the wrist part, and feeds the data to the display driver to be shown on the supplementary display means 11. Thus, the user can see on the supplementary display means 11 e.g. the telephone number or the name of the caller. In case the user wishes to answer the call he or she pushes the answering key 15, which is usually designated with a green handset. Based on the fact that the key has been pushed, the controller 34 of the wrist part transmits a message to the link module to open the call. Subsequently, the data transfer is terminated and the switch S2 in the modulator of the link module is opened. Correspondingly, the audio line is switched on, i.e., the switch S6 is closed. In the wrist part 3, the output of the detector is connected to the supplementary earpiece 13 of the wrist part by switching on the switch S12, and the input of the modulator to the supplementary microphone 14 of the wrist part by closing the switch S5. The audio lines 41, 42 are coupled in the link module 10 correspondingly to the external audio lines (EXT. AUDIO) of the system connector by switching on the switches S6 and S9. It is not necessary to switch on the earpiece 8 and the microphone 9 of the telephone part 2 itself. The telephone communication is now accomplished, wherein the supplementary earpiece 13 is pulled out, hand is taken to the ear and speech can be started. In case the quality of the communication between the telephone part 2 and the wrist part 3 is good, it is possible to make the entire call through the link. In case the quality is not sufficient, the other speaker is asked to hold until the telephone part 2 is reached, whereafter the call is continued. If the microphone 9 and the earpiece 8 of the telephone part have not been switched on in the beginning of the call, they are switched on at this point. The telephone part in accordance with Fig. 1b comprises switches S7, S8, which are switched on by the processor unit 50 of the radio part, wherein the call can be continued by using the telephone part 2.

Updating of the data on the supplementary display means 11 can be carried out at suitable intervals by transmitting the display data to the wrist part. However, the updating and the transmission of other data is not performed during the call in this embodiment. When using e.g. a digital link, it is possible to transmit speech and data at the same time.

One mechanical implementation principle of the wrist part 3 is shown in Fig. 1a. The transmitter/receiver 33, 39, controller 34, earpiece 13 and the microphone 14 of the wrist part are placed in the first wrist case 19a. The display means 11 and handset keys 15, 16 are placed in the second wrist case 19b. The transmission and reception antennas 53, 57 of the wrist part can be attached to the wrist strap 17, as well as the signal wires (not shown) between the first and second wrist case.

The link module 10 connected to the system connector 12 of the telephone part can also advantageously be of a so called Loop Through type, i.e., the other edge of the link module 10 has a similar system connector as the system connector 12 of the telephone part. At least charge contacts have advantageously been passed through the link module 10, wherein it is not necessary to remove the link module during the battery charge.

Thus, the wrist part 3 in accordance with the first embodiment of the invention is parallel with the user interface of the telephone itself, wherein the telephone part 2 can be used as a normal telephone, e.g. when the wrist part communication does not work due to external disturbances or other reasons. Although in the accompanying Figs. 1a, 2, 3a and 4, the link module 10 is shown as a separate module connected to a telephone, it is possible to place the operations of the link module also into the telephone.

In practical embodiments of the transmitter/receivers of the wrist part and the link module, it is possible to use intermediate frequency circuits 43, 43' (IF) used e.g. in analog radio telephones, said intermediate frequency circuits comprising among other things a mixer, high-frequency and low-frequency amplifiers, limiter, and detector. The sensitivity of the circuits is sufficient for this purpose. The circuits are economical and they have a low power consumption. Further, for the implementation of the transmitter there exist ready-made FM modulators 44, 44'. The wrist part in accordance with the invention can also be non-chargeable battery operated because its power consumption can be made very low.

The controllers 27, 34 can be e.g. known micro controllers having, in addition to a processor, random access memory (RAM), input/output lines, analog/digital converter, digital/analog converter and read only memory (ROM). In particular, in such embodiments in which the link module 10 is implemented as a part of the telephone part 2, the functions of the link module controller

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can be implemented at least partially also in the application software of the controller of the telephone part 2.

The switches S1 to S14 are advantageously semiconductor switches, wherein the control of the switches is carried out by switching a voltage to the control line of the switch, said voltage having an off-mode at the first value, and an on-mode at the second value. The first voltage value is e.g. about 0V and the second value is close to the value of the operating voltage V_{CC}. Thus, the control line can be coupled to the binary I/O line (input/output) of the controller 27, 34, 50, e.g. two voltage values by the application software of the controller being possible to be set to said binary I/O line on the application software of the controller.

The invention can be applied also in a manner that the entire user interface is moved to the wrist part 3, and the telephone part 2 has no user interface: keypad 6, display device 7, earpiece 8 and microphone 9. Thus, the telephone part 2 mainly comprises the transmitter/receiver 49 of the radio part, antenna 5, power supply 65, operating switch 64, and data transfer means 10 for communication with the wrist part 3. Thus, The keypad 66 of the wrist part has all the keys required for call making, such as the number keys and the handset keys 15, 16. One exemplifying solution of this second advantageous embodiment of the invention is shown in Fig. 2.

A radio telephone 1 in accordance with the third advantageous embodiment of the invention, shown in Figs. 3a to 3d, is divided into three parts. The data transfer communication between the second and third part is in this context referred to as a second link communication LINK2, and the data transfer communication between the first and the second part is referred to as a third link communication LINK3. The first part, i.e., the telephone part, corresponds, in view of its substantial portions, to the telephone part 2 of the first embodiment. The second part, i.e., the wrist part 3, comprises a display device 11 and handset keys 15, 16 as well as data transfer means for the first link communication LINK1 for communication with the telephone part 2 and data transfer means for the second link communication LINK2 for communication with the third part, i.e., with the headset part 45. In this embodiment, the wrist part 3 functions as a repeater for the audio signals in data transfer between the telephone part 2 and the headset part 45. The headset part 45 comprises primarily audio parts, such as a supplementary earpiece 13 and a supplementary microphone 14, as well as communication means for the second link communication LINK2 for communication with the wrist part 3. In the wrist part 3, no detection is performed to audio signals travelling to either directions. Data signals transmitted from the link module are transferred between the telephone part 2 and the wrist part 3, but these are not directed to the headset part 45. However, between the wrist part 3 and the headset part 45 also data signals, such as a password, can be transferred to ensure that the handset part communicates with the right wrist part. The circuit diagram of Fig. 3d shows the communication means of the headset part for the second link communication LINK2 which comprises a transmitter 70, receiver 73, transmission and reception antennas 71, 72 and a local oscillator 69, whose frequency is controlled by capacitance diode D5. In view of the function of the communication means, reference is here made to an earlier illustration in this description of the operation of the transmitter/receivers 39, 33 of the wrist part.

In Fig. 3c, the block diagram of the wrist part 3 comprises a transmitter/receiver in accordance with the first embodiment of the invention, the transmitter/receiver being supplemented with converters 46, 47 and a local oscillator 48 of the converter. The high-frequency signals modulated with an audio signal and transmitted from the telephone part 2 are directed from a reception antenna 57 of the wrist part via a band-pass filter 54 and a high-frequency amplifier 60 to the transmission converter 46 where the frequency of the local oscillator 48 of the converter is mixed to the signal. The resulted mixing is directed via a low-pass filter 77 to a transmission antenna 67 of the converter. The high-frequency signal modulated with audio signal transmitted from a headset 45 are received by a reception antenna 68 of the converter and directed to the reception converter 47 where the frequency of the local oscillator 48 of the converter is mixed to the signal. The mixing result is directed via a low-pass filter 40 and a high-frequency amplifier 61 to the reception antenna 57.

The frequency of the local oscillator 48 of the converter is so selected that the channels of the second link communication LINK2 do not overlap with the channels of the first link communication LINK1.

Also the radio telephone 1 in accordance with the fourth advantageous embodiment of the invention is divided into three parts (Fig. 4). The first part 2, i.e., the telephone part corresponds at its substantial portions to the telephone part 2 of the second embodiment, which telephone part comprises no user interface. The second part 3, i.e., the wrist part comprises a display device 11, a keypad 66 having all the keys required in making a call, such as number keys and handset keys 15, 16. A display means and a keypad are advantageously connected to the I/O lines of the controller 34 of the wrist part. The wrist part comprises also data transfer means 33, 39 for the first link communication LINK1 for communication with the telephone part 2 and data transfer means 46, 47, 48, 67, 68 for the second link communication LINK2 for communication with the third part, i.e., the headset part 45. The headset part 45 mainly comprises audio parts, such as a supplementary earpiece 13 and supplementary microphone 14, as well as communication means for a second link communication LINK2 to communicate with the wrist part 3. Since the telephone part 2 does not comprise a user interface in this embodiment, the call being made by using the keypad of the wrist part. In view of other respects, the operation according to the fourth embodiment of the inven-

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tion corresponds substantially to the operation of the third embodiment of the invention.

A mobile station in accordance with the third and fourth embodiment of the invention can also be implemented in a manner that between the telephone part 2 and the wrist part 3 only data signals are transferred and audio signals are transferred directly between the telephone part 2 and the headset part 45 by using a third link communication. Thus, the telephone part 2 further comprises data transfer means for a third link communication LINK3 (not shown). The frequency band of the third link communication is advantageously selected in a manner that the difference of the channel frequencies of the third link communication and the channel frequencies of the first link communication is constant, wherein a local oscillator of the link module and a supplementary oscillator tuned to a stable frequency can be used in creating a local oscillator frequency in the data transfer means of the third link communication. Transmission of audio and data signals can be implemented by means of above mentioned data transfer methods, advantageously as a frequency modulated high-frequency signals.

The distance between the wrist part 3 and the headset part 45 is short, about 1 m, wherein a relatively low transmission power is sufficient.

In the telephone which is divided into three parts, the communication between the telephone part 2, the wrist part 3 and the headset part 45 can take place also in a manner that only the links LINK1 and LINK3 are used in a fashion that the links are identical. The data signal contained in the link communication is indicated in the wrist part and the wrist part correspondingly transmits only the data. In the headset part, the audio signal contained in the link communication is detected to the earpiece 13 and the headset modulates the link signal by a audio signal obtained from the microphone 14. If necessary, it is possible to detect in the headset part also a part of the data signal e.g. to control the signal strength levels of the earpiece and the microphone.

The headset of the radio telephone in accordance with the third and fourth embodiment of the invention can be e.g. a known headphone-microphone combination set on the user's head, wherein the headphone (headphones) and the microphone can be immediately used and both hands are free during the call.

Figures 7a and 7b show still another construction for the second part 3 of the radio telephone according to the invention in a skeleton diagram. The second part 3 is arranged in connection with spectacles 79, sunglasses or the like. A supplementary earphone 13 is arranged advantageously in the earpiece 81 of the first arm 80 of the spectacles, for example inside the earpiece 81. A supplementary microphone 14 is placed in this embodiment at the first end 82a of an auxiliary arm 82. The auxiliary arm is fixed with hinges from the second end 82b of the auxiliary arm to the first arm 80 of the spectacles. The second part 3 comprises advantageously also means for answering a call, arranged e.g. with a switch (not shown) placed at the second end 82b of the auxiliary arm so that when the second part is in standby (Fig. 7a), the switch is in the first state, for example open. When answering to an incoming call, the auxiliary arm 82 is turned downwards, as shown in Fig. 7b. The switch is then in the second state (closed), whereby the controller 34 of the second part detects the change in the state of the switch and starts setting up a link connection, as described above in this description. Upon terminating the call, the auxiliary arm 82 is turned back substantially parallel to the arm 80, whereby the switch changes its state and the link connection can be closed. In this advantageous embodiment, it is possible to use solutions presented above in this description for implementation of the transceiver of the second part, the controller *etc.* In Figs. 7a and 7b, the reference numeral 84 indicates a housing where these can be advantageously accommodated. The wirings between the auxiliary earphone 13, the auxiliary microphone 14, the transceiver, etc. are arranged e.g. inside or on the outer surface of the arms 80, 83.

On the basis of what was presented above, it is obvious that this spectacle solution can also be applied in a radio telephone according to the third and fourth embodiments of the invention, consisting of three parts, whereby the headset part 45 is arranged in connection with the spectacles 79 and comprises *e.g.* an auxiliary earphone 13, an auxiliary microphone 14, and communication means for the second link connection LINK2. The means for answering a call are thus preferably integrated in the second part 3 of the radio telephone.

The mechanical implementation of the second part 3 can be of a different type than the above-presented part placed in wrist. It can be for example a thin, card-like unit, which can be placed for example in a breast pocket, or the second part 3 can be for example a pen-like unit.

Earlier in this description, an alternative implementation was introduced for selecting a frequency (channel) used in the link communication LINK1, LINK2, LINK3 by scanning through the reception band used and by searching the vacant channels. Fig. 5 shows an alternative method for selecting the frequency used in the link communication.

Radio telephone cellular network controls the frequencies of the radio telephones in the network in a manner that in the same cell, i.e., in the same geographical area the simultaneously active radio telephones use different transmission/reception frequency and/or different time slots, i.e., each radio telephone has its own individual traffic channel. This information is utilized in a manner that the link frequency is tied to the frequency and/or time slot used by the radio part of the radio telephone, by which frequency and/or time slot the radio telephone communicates with the base station. When the frequency of the link is, in all analog radio telephones, at a fixed frequency difference, e.g. from the frequency

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of the transmitter of the telephone, and the transmitters of the radio part 4 of all the radio telephones operating in the same cell are in different frequencies, this means that also the link frequencies of the radio telephones in the cell are different. In a radio telephone 1 in accordance with Fig. 5 the local oscillator 51 of the transmitter/receiver 49 of the radio part creates a transmission and reception frequency to the transmitter/receiver 49. The same frequency of the local oscillator 51 of the transmitter/receiver of the radio part is utilized by mixing it or a radio part frequency related thereto to the frequency of the local oscillator of the module of the mixer 78 of the link module to create a link frequency, i.e., the link frequency follows the frequency of the local oscillator 51 of the radio part, however, remaining at a constant frequency difference thereof. In this manner, the link frequencies of the radio telephones in the same cell are prevented from being set to the same frequency. A mixing can be an up mixing or down mixing depending on the link frequency used.

The third advantageous embodiment of the control of link frequencies, as shown in Fig. 6, comprises a synthesizer 52 for creating a link frequency. In this embodiment, the synthesizer comprises a phase locked loop (PLL) and a voltage controlled oscillator (VCO). The control voltage of the voltage controlled oscillator is changed by changing the division ratio in the phase locked loop, wherein the frequency of the voltage controlled oscillator is changed. The controller 50 of the radio part has the information of the frequencies/time slots used by the transmitter/receiver 49 of the radio part, i. e., the traffic channel. By utilizing this information, the processor unit 50 of the radio part controls the synthesizer 52 of the link in order to set the link frequency. The processor unit simultaneously attends to that the link frequency has predetermined frequency difference to the transmission and reception frequency of the transmitter/receiver 49 of the radio part.

In digital phones, such as e.g. TDMA (GSM, PCN) and CDMA, several telephones can simultaneously be active in the same cell and operate in the same frequency. In the TDMA system, telephones communicating in the same frequency use different time slots, by which the telephones are prevented from disturbing each other.

In the CDMA (code division multiple access) system telephones communicate simultaneously in the same frequency. CDMA is based on spread spectrum communication technique. Each channel has an individual pseudorandom binary sequence by which the carrier wave is modulated and the spectrum is spread. Signals are separated in the reception by using a correlator which accepts the signal energy of only the selected binary sequence and despreads its spectrum.

The embodiment in accordance with Fig. 6 can also be used in telephone systems where several telephones of the same cell communicate simultaneously in the same frequency.

Each telephone present in the same cell has an individual traffic channel (channel number) by which it communicates with the base station. When the link channels LINK1, LINK2, LINK3 are tied to the channel number in a manner that each traffic channel of the telephone, telephone↔base station, has a respective individual link channel, it is possible to eliminate disturbances between the telephone links.

Further, it is possible to use time division on the link channels LINK1, LINK2, LINK3 of digital telephones, in a manner that traffic channels, telephone↔base station in the same frequency transfer the data of the time slot they had used to the link LINK. This data is present in the processor unit 50 of the radio part, the processor unit being capable of controlling the PLL unit 52 and the control unit 27 of the link module. Thus, the link of each telephone operates only within the time slot reserved therefor and disturbances between the telephones are prevented. Since the link LINK frequency is different from the frequency of the traffic channel, it may be that the time slots used by the link are different than the time slots of the traffic channel as long as each traffic channel or group of channels has its respective individual link channel. Also, frequency hopping can be used in the link, so that each link channel has its own individual hopping sequence, which prevents disturbances between the telephones.

In the link, it is also possible to use spread spectrum communication of the CDMA system, wherein each link channel has a different pseudorandom binary sequence, wherein disturbances between telephones which are close to each other is prevented. Here as well, it is substantial that each traffic channel or group of channels, telephone↔base station, has a respective different pseudorandom binary sequence in the link.

The use of the TDMA or CDMA technique also make it possible for the transmitter and receiver of the link to operate in the same frequency, i.e., the link for example transmits and receives in the same frequency, but at different time slots or by using different pseudorandom binary sequences.

The same principle of creating link channels can be used in communication between the telephone and its accessories.

In the embodiments in accordance with the invention only the substantial properties of the invention are described. For example the link receivers and the transmitters can be implemented in a manner that several intermediate frequencies are used, which is known to an expert in the field.

Although it is advantageous to apply the invention in such radio telephones which are regarded to operate as portable telecommunication terminals, the invention can also be applied in radio telephones in which the communication is created between two radio telephones, possibly via one or several base stations.

Figure 8 shows a modular radio telephone apparatus indicated generally by the reference numeral 84. The

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apparatus comprises a core module unit 85 consisting of a housing 86 and, contained within the housing, a radio transceiver (transmitter/receiver) 87. The transceiver 87 functions in the manner described above, with reference to the embodiments of Figures 1 to 7, to communicate with a cellular radio telephone network 88, e. g. a GSM network. The core module 85 does not have a conventional telephone user interface and a user cannot make or receive a telephone call using the core module 85 alone.

The core module 85 communicates with one of a number of 'peripheral' modules 89, 90 91, each of which contains an independent power supply (not shown). Shown in figure 8, by way of example, are three peripheral modules which each provide a different user function. A first module 89 is a credit card sized module comprising a microphone 92, an earpiece 93, a numeric keypad 94, and an LCD display 95. Each of these components is coupled to a data processor 96 within the module which is in turn coupled to a low power radio transceiver 97. This transceiver 97 is able to communicate wirelessly with a corresponding low power transceiver 98 in the core module 85. The peripheral module 89 therefore provides a first user interface for the apparatus 84 allowing a user to make and receive voice calls via the core module 85.

A second module 90 illustrated in Figure 8 has the form of a palm-top computer or personal digital assistant (PDA) containing a microprocessor (not shown). The module 90 again contains a low power transceiver 97 for communicating with the core module 85. The second module may be used to make and receive data calls, e. g. short message service (SMS), facsimile, and e-mail.

The third peripheral module 91 comprises a blood glucose measuring device including a slot 99 for the insertion of a blood glucose test strip. A measuring device for communicating with a radio telephone network is described, for example, in WO 97/28736 and WO 97/28737. Data processing means 100 within the module communicates measured blood glucose levels to a low power radio transceiver 101. As will be understood, this transceiver 100 transmits the data to the low power receiver 99 of the core module 85. The third module 91 is also able to receive data from the network 88, via the core module 85. This data may relate to a patient treatment regime determined in accordance with the measured blood glucose levels.

From the detailed description given above with reference to Figures 1 to 7, it will be understood how the 'link' connection between the core module 85 and the peripheral modules 89, 90, 91 may be implemented. It will also be apparent how the peripheral modules may be operated interchangeably with the core module.

Advantageously, interference between two or more peripheral modules is avoided by assigning different local radio traffic channels (uplink and downlink) to different peripheral modules. For example, channels may be spaced apart, in the frequency domain, by a fixed amount. Moreover, in order to avoid interference between local communications performed by different radio systems within an overlapping transmission area, the frequencies assigned to the local communications of a given core module are fixed relative to the frequencies on which the core module communicates with the telephone network. Alternatively, separation may be achieved by separating the various channels, by fixed amounts, in the time domain. In yet another alternative, local traffic channels may be assigned to individual modules by the network, these channels being identified in messages sent over the network traffic channels.

The invention is not districted merely to the above described embodiments, instead it can be modified within the scope of the accompanying claims.

Claims

1. Apparatus for wirelessly communicating with a mobile telephone network, the apparatus comprising;

   a first unit having a power supply, a radio transceiver with an antenna for communicating with the mobile telephone network over a network traffic channel, and first local wireless communication means; and
   a second unit having data processing means and second local wireless communication means arranged to communicate over a local traffic channel with said first local wireless communication means to transfer data between the data processing means and said radio transceiver,

   wherein in use said local traffic channel is determined by said network traffic channel.

2. Apparatus according to claim 1, wherein said local traffic channel is tied to said network traffic channel.

3. Apparatus according to claim 1, wherein in use said local traffic channel is identified to the apparatus by a message transmitted via said network traffic channel.

4. Apparatus according to any one of the preceding claims, and comprising a plurality of said second units which provide respective different user functions.

5. Apparatus according to claim 4, wherein in use the local traffic channels of the second units are different from one another, but are all tied to said network traffic channel.

6. Apparatus according to any one of the preceding claims, wherein said network traffic channel and

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said local traffic channel(s) differ in the time and/or the frequency domain.

7. Apparatus according to any one of the preceding claims, wherein said first unit does not have a radio telephone user interface.

8. Apparatus according to any one of the preceding claims, wherein said first unit has a radio telephone user interface.

9. Apparatus according to claim 4, wherein at least one of said second units comprises means for answering a telephone call received by said first unit and a second of said units comprises an earphone and a microphone coupled to the data processing means thereof.

10. Apparatus according to any one of the preceding claims, wherein the second unit, or one of the second units, comprises a measuring device for measuring a physical parameter, said measuring device being coupled to the data processing means thereof whereby a measured parameter can be transmitted to the radio transceiver of the first unit.

11. Apparatus according to claim 10, wherein said measuring device is arranged to measure the glucose level in a blood sample.

12. Apparatus according to any one of the preceding claims, wherein said local traffic channel is a radio traffic channel.

13. A radio telephone (1) comprising at least a power supply (65), radio part (4), antenna (5) of the radio part, and a user interface having at least one microphone (9, 14), at least one earpiece (8, 13), means (6, 66) for making a call and means (15) for answering a call, characterized in that the radio telephone (1) is divided at least into a first part (2) and a second part (3), the first part (2) comprising at least the power supply (65), radio part (4), antenna (5) of the radio part, and means (21, 28) for communicating on a first link communication (LINK1) with the second part (3), the second part (3) comprising at least the means (15) for answering a call, and means (33, 39) for communicating with the first part (2).

14. A radio telephone (1) as set forth in claim 13, **characterized** in that it is divided into a first part (2), a second part (3) and a third part (45), that a user interface (6, 8, 9, 15) is positioned to the first part (2), that the second part (3) further comprises means (46, 47) for communicating with the third part (45), and that a supplementary earpiece (13) and a supplementary microphone (14) are positioned to the third part (45) which further comprises means (70, 73) for communicating with the second part (3).

15. A radio telephone (1) as set forth in claim 13, **characterized** in that it is divided into a first part (2), a second part (3) and a third part (45), and that means (66) for making a call and means (15) for answering a call are positioned to the second part (3), which further comprises means (46, 47) for communicating with the third part, and that a supplementary earpiece (13) and a supplementary microphone (14) are placed to the third part (45) which further comprises means (70, 73) for communicating with the second part (3).

16. A radio telephone (1) as set forth in any of the claims 13 to 15, **characterized** in that at least means (21, 28) of the first part for communicating on the first link communication (LINK1) with the second part (3), and means (33, 39) of the second part for communicating with the first part (2) are arranged to be occasionally switched on in order to lower power consumption.

17. A radio telephone (1) as set forth in any of the claims 13 to 16, **characterized** in that the first link communication (LINK1) between the first (2) and second (3) part is a bi-directional radio communication, wherein the signals transferred from the first part (2) to the second part (3) are arranged to be transmitted on a transmission frequency band (uplink), and the signals transferred from the second part (3) to the first part (2) are arranged to be transmitted on a reception frequency band (downlink), wherein each transmission frequency and reception frequency used are preferably situated at a constant distance from each other (duplex separation).

18. A radio telephone (1) as set forth in claim 17, **characterized** in that data transfer in the first link communication (LINK1) is arranged to be performed as frequency modulated signals, wherein the first part (2) comprises a link module (10) having a transmitter (28) for transmission of signals transferred from the first part (2) to the second part (3), and a receiver (21) for reception of signals transferred from the second part (3) to the first part (2), and the second part (3) comprising a transmitter (39) for transmission of signals transferred from the second part (3) to the first part (2), and a receiver (33) for reception of signals transferred from the first part (2) to the second part (3).

19. A radio telephone (1) as set forth in claims 17 or 18, **characterized** in that

- a transmitter (28) of the link module and a transmitter (39) of the second part are arranged to be switched on only during the call, and

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- a receiver (21) of the link module and a receiver (33) of the second part are arranged to be switched on periodically in order to check whether there exists messages in the first link communication (LINK1), and during a call.

20. A radio telephone (1) as set forth in claim 18, **characterized** in that the link module (10) comprises means (20, 21, 27, 28, D1) for selecting the transmission and reception frequency used in each separate case in the first link communication (LINK1).

21. A radio telephone (1) as set forth in claim 20, **characterized** in that the selection of the carrier frequency used in each separate case in the first link communication (LINK1) is arranged to be carried out by scanning the reception frequency band selected for the first link communication in the receiver of the link module, and by examining the output signal of the receiver during the scan in order to clarify the message-free carrier frequency.

22. A radio telephone (1) as set forth in claim 20, **characterized** in that the selection of transmission and reception frequency used in each separate case in the first link communication (LINK1) is arranged to be carried out by adjusting a local oscillator (20) of the link module according to the frequency set to a local oscillator (51) of the radio part.

23. A radio telephone (1) as set forth in claim 22, **characterized** in that the difference of the frequency of the local oscillator (20) of the link module and the frequency of the local oscillator (51) of the radio part is constant.

24. A radio telephone (1) as set forth in claim 20, wherein one or several traffic channels are arranged to be used in the communication, **characterized** in that a link channel corresponding to each traffic channel or specific channel group is arranged to the link communications (LINK1, LINK2, LINK3).

25. A radio telephone (1) as set forth in claim 22, **characterized** in that it is a digital telephone in which, in communication in traffic channel, a time division (TDMA) is arranged to be used, wherein in each traffic channel different time slots are arranged to be used, and that time division is arranged to be used in link channels, wherein different time slot is arranged to be used in each link channel.

26. A radio telephone (1) as set forth in claim 24, **characterized** in that spread spectrum communication is arranged to be used on link channels, wherein an individual pseudorandom binary sequence is arranged for each link channel.

27. A radio telephone (1) as set forth in claim 24, **characterized** in that frequency hopping is arranged to be used in the link channels, wherein an individual hopping sequence is arranged for each link channel.

28. A radio telephone (1) as set forth in claims 14 or 15, **characterized** in that the difference of the transmission frequencies (uplink) used in the first (LINK1) and second (LINK2) link communications at a time is constant.

29. A radio telephone (1) as set forth in claim 14 or 15, **characterized** in that audio signals are arranged to be transferred directly between the first (2) and third (45) part, wherein the first part further comprises a transmitter/receiver for communication with the third part, and the third part further comprises a transmitter/receiver for communication with the first part.

30. A radio telephone (1) as set forth in any of the preceding claims, **characterized** in that at least an auxiliary earphone (13) and an auxiliary microphone (14) are placed in connection with spectacles (79).

31. A radio telephone (1) as set forth in any of the preceding claims, **characterized** in that identification of the second part (3) of the radio telephone is arranged to take place by transmitting a password from the first part (2) to the second part (3) with means (34) for examining the password, and that the password is the equipment identification (IMEI) of the radio telephone.

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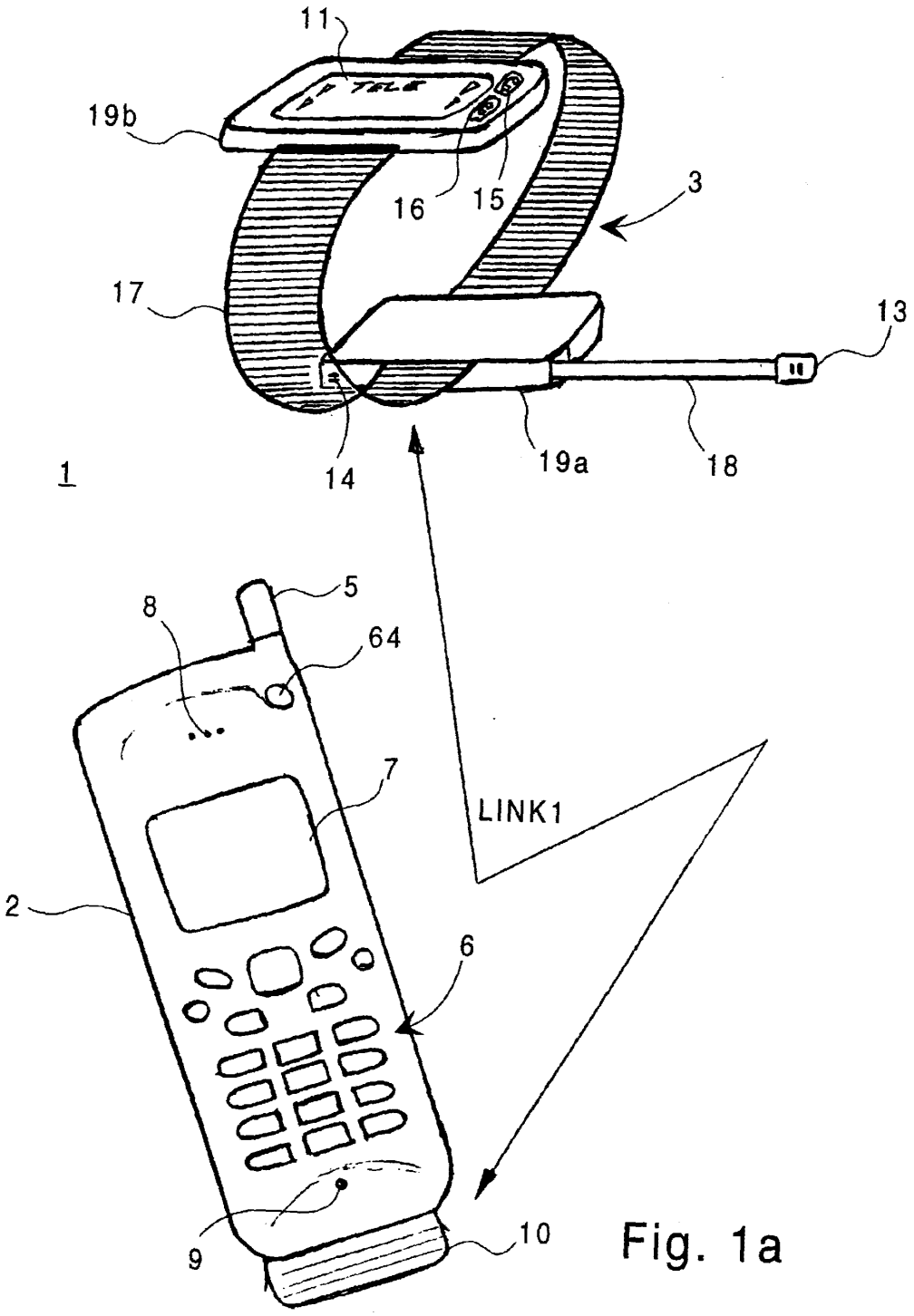


Fig. 1a

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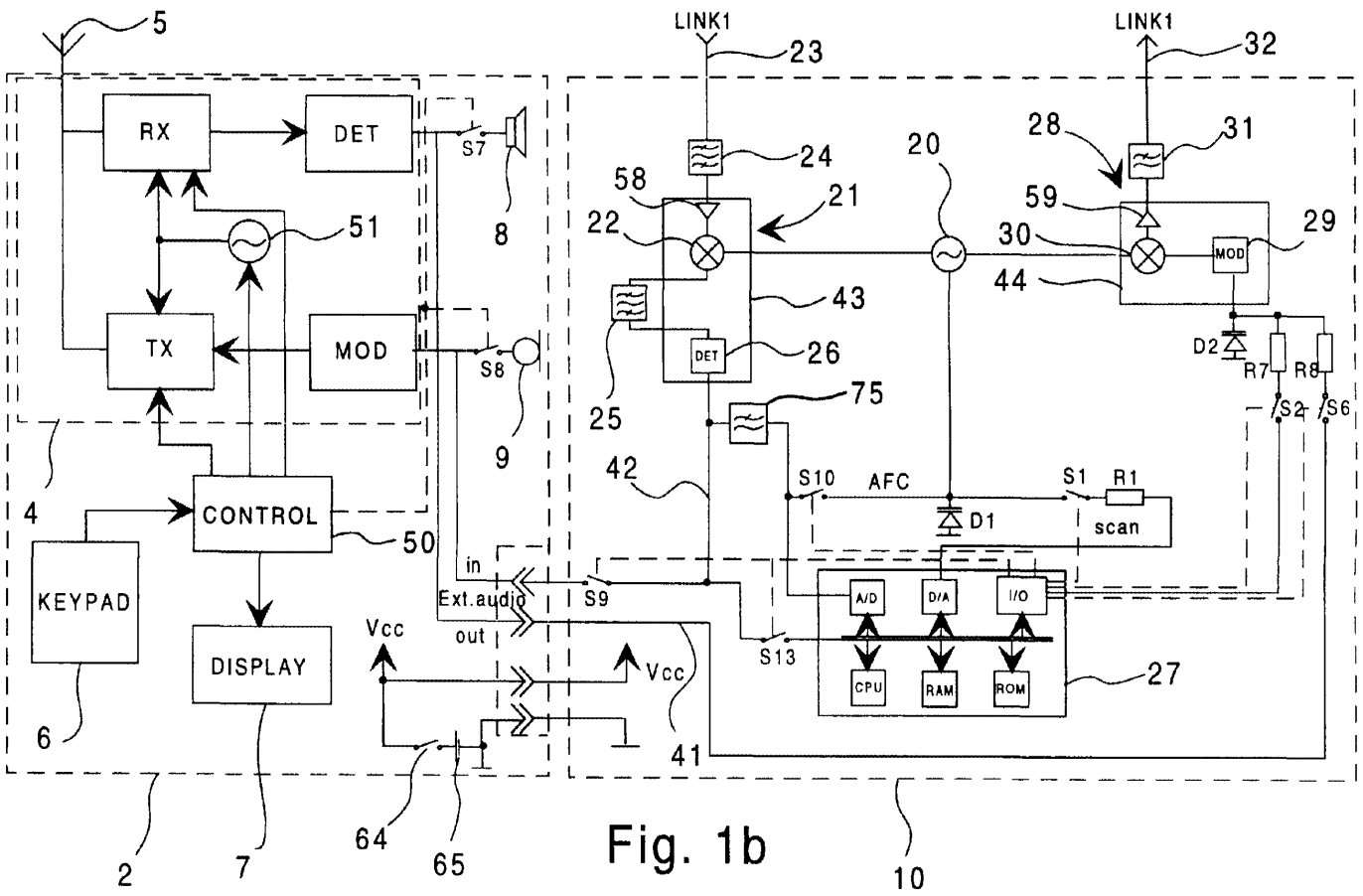


Fig. 1b

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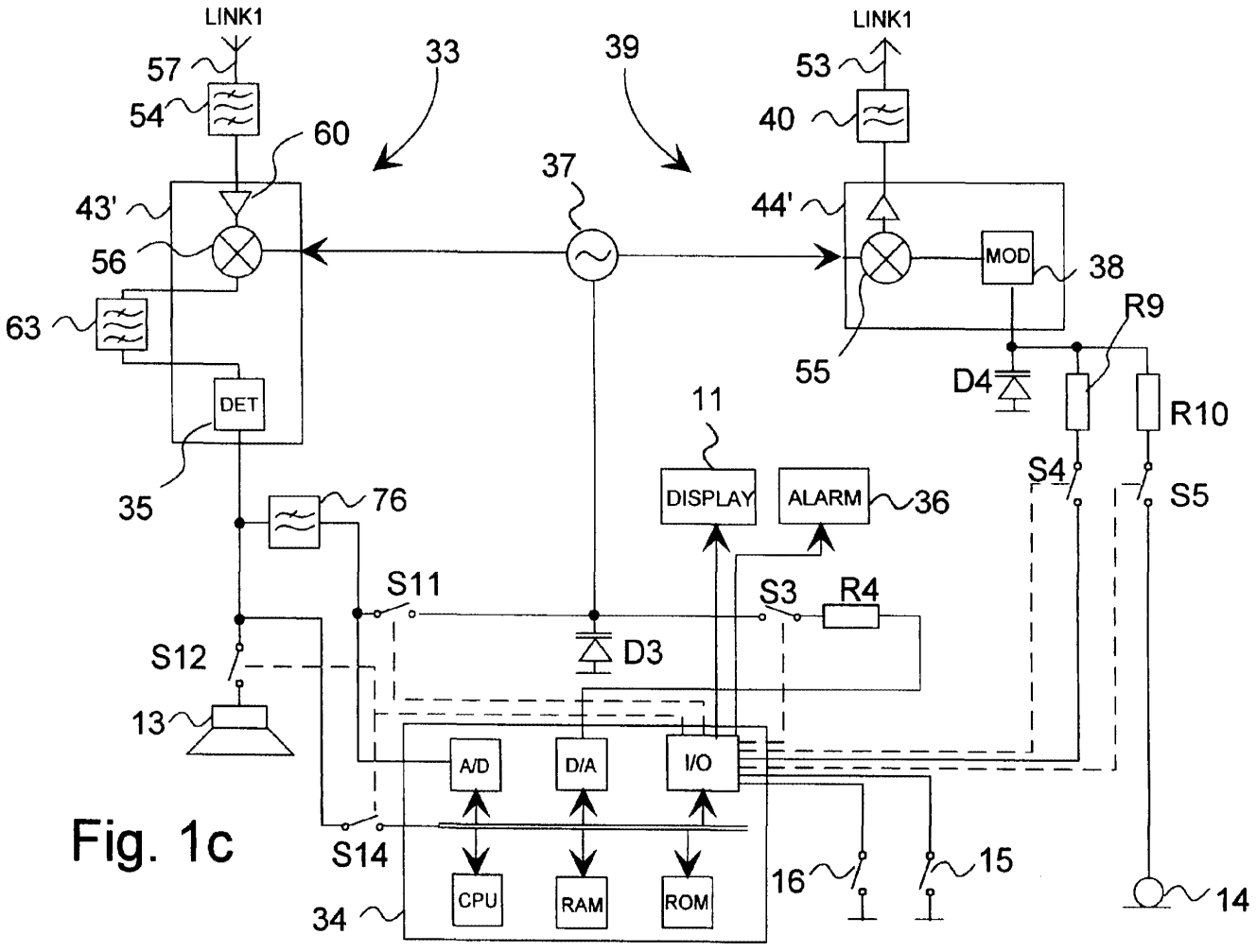

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Fig. 1c

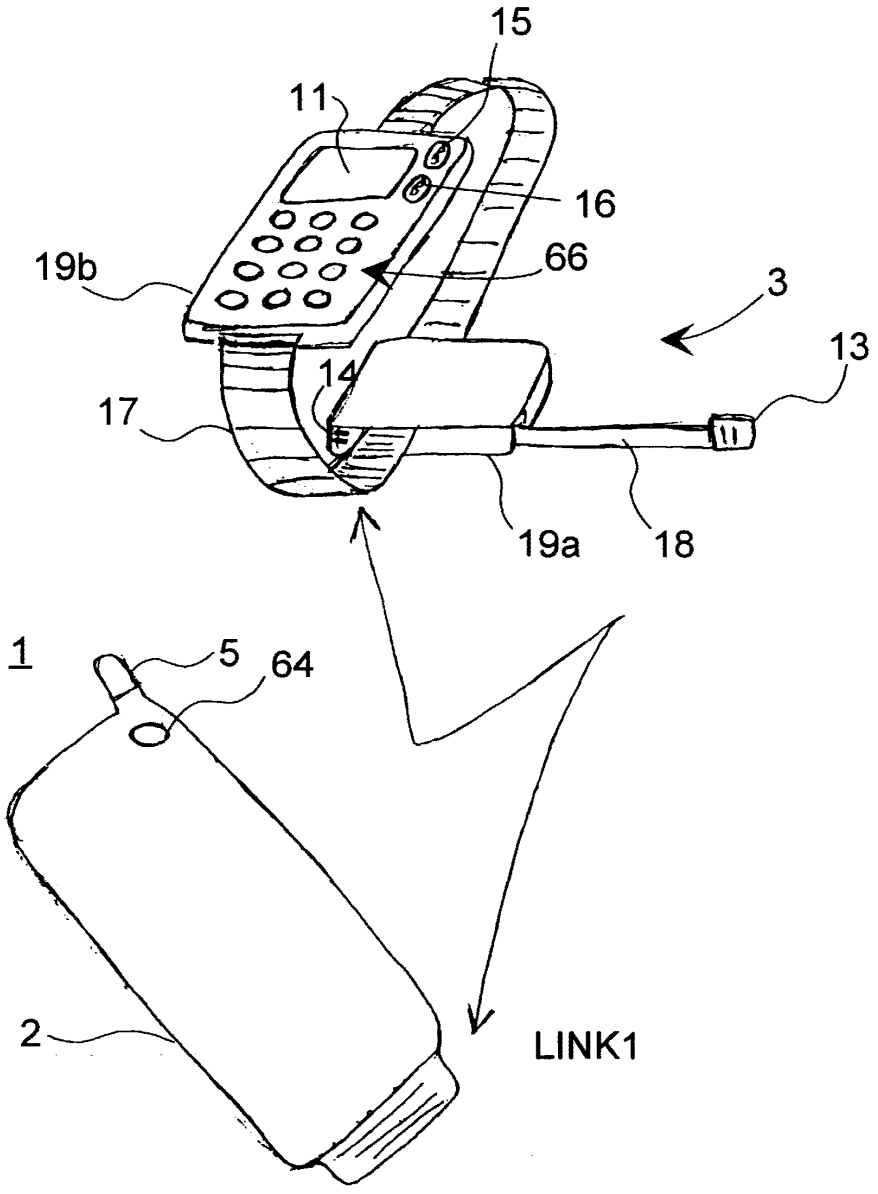


Fig. 2

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Samsung Electronics Co., Ltd. et al. v. One-E-Way, Inc.
IPR2025-01541

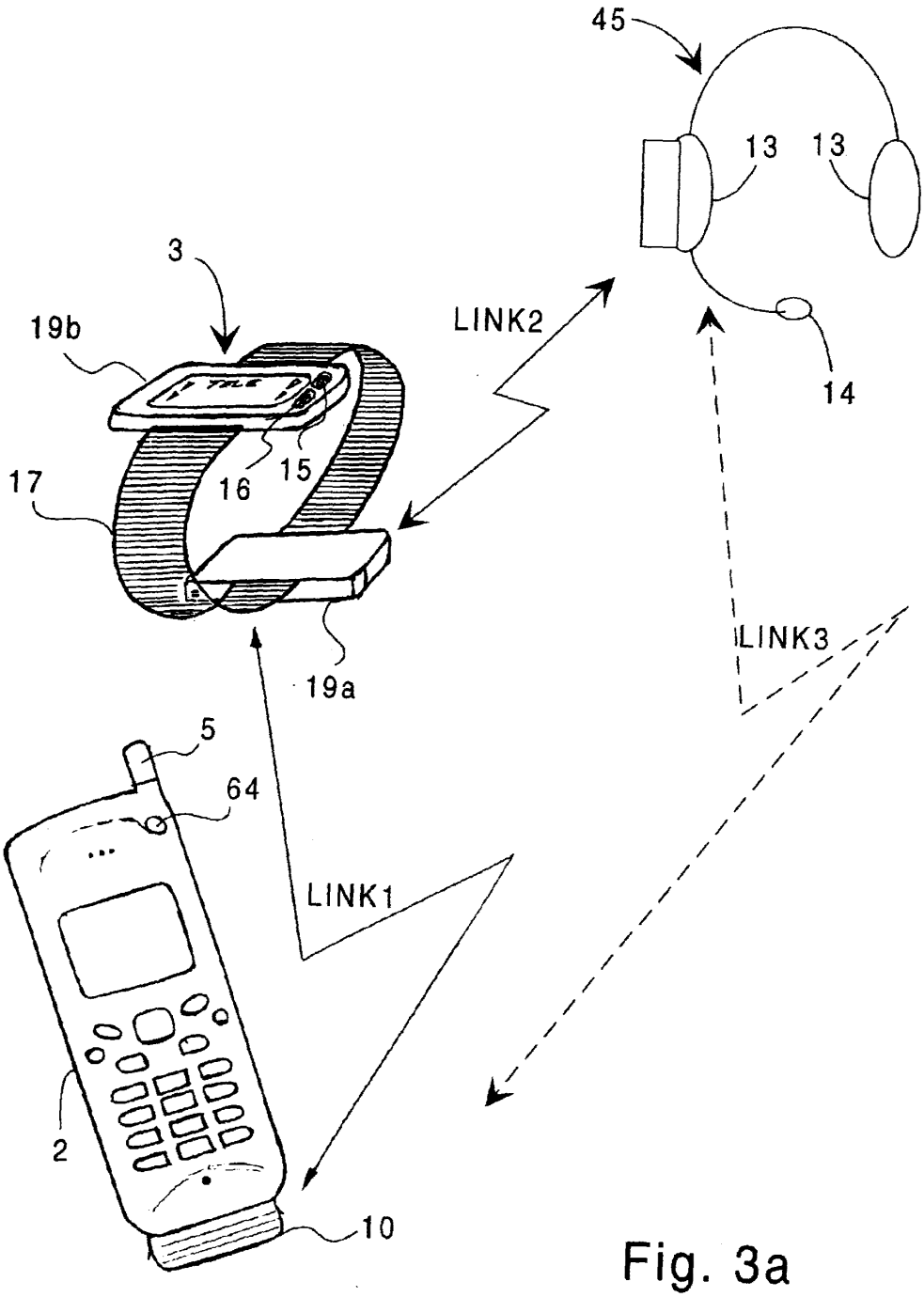


Fig. 3a

Samsung Exhibit 1002, Page 342 of 880
Samsung Electronics Co., Ltd. et al. v. One-E-Way, Inc.
IPR2025-01541

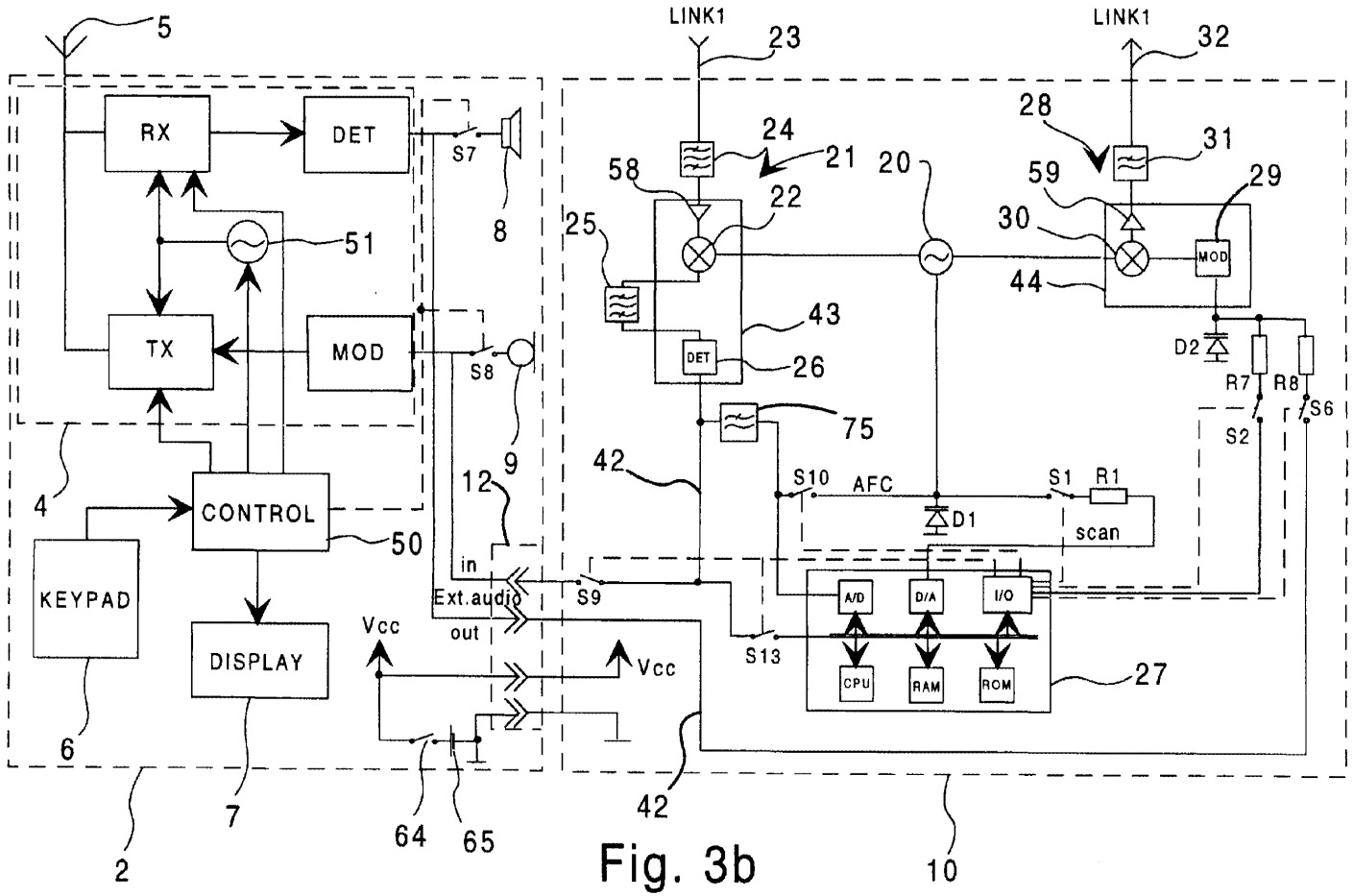


Fig. 3b

Samsung Exhibit 1002, Page 343 of 880
Samsung Electronics Co., Ltd. et al. v. One-E-Way, Inc.
IPR2025-01541

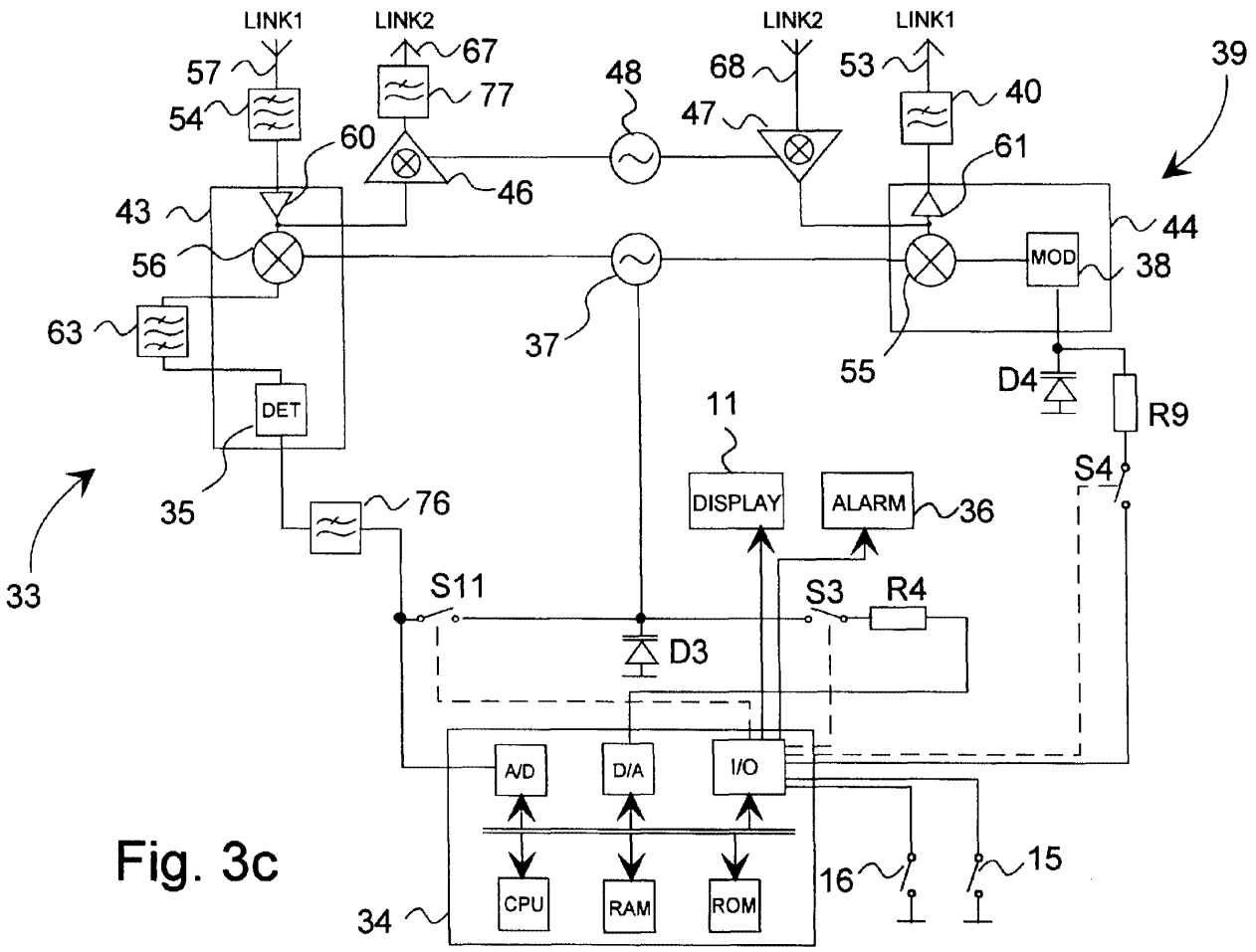


Fig. 3c

Samsung Exhibit 1002, Page 344 of 880
Samsung Electronics Co., Ltd. et al. v. One-E-Way, Inc.
IPR2025-01541

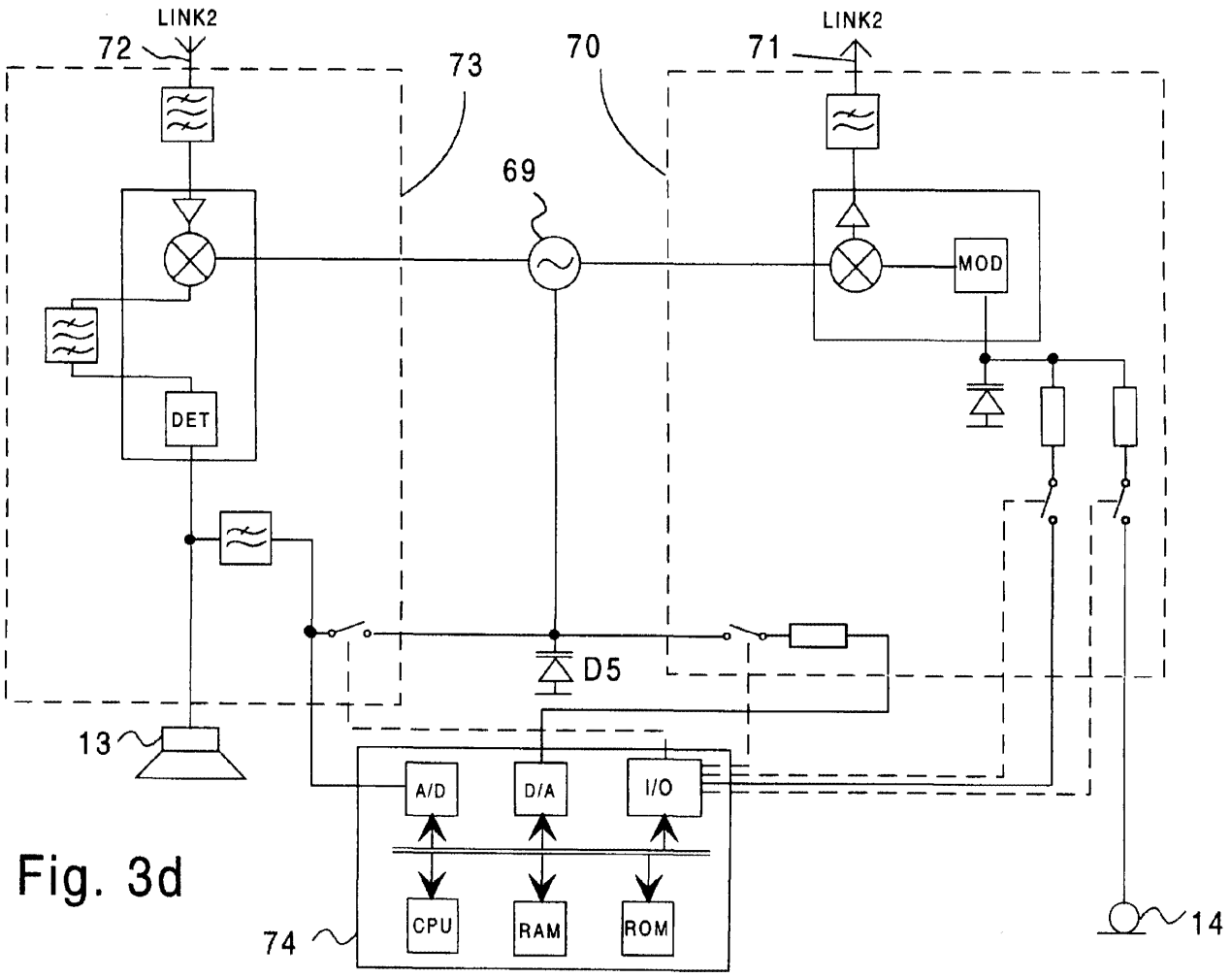


Fig. 3d

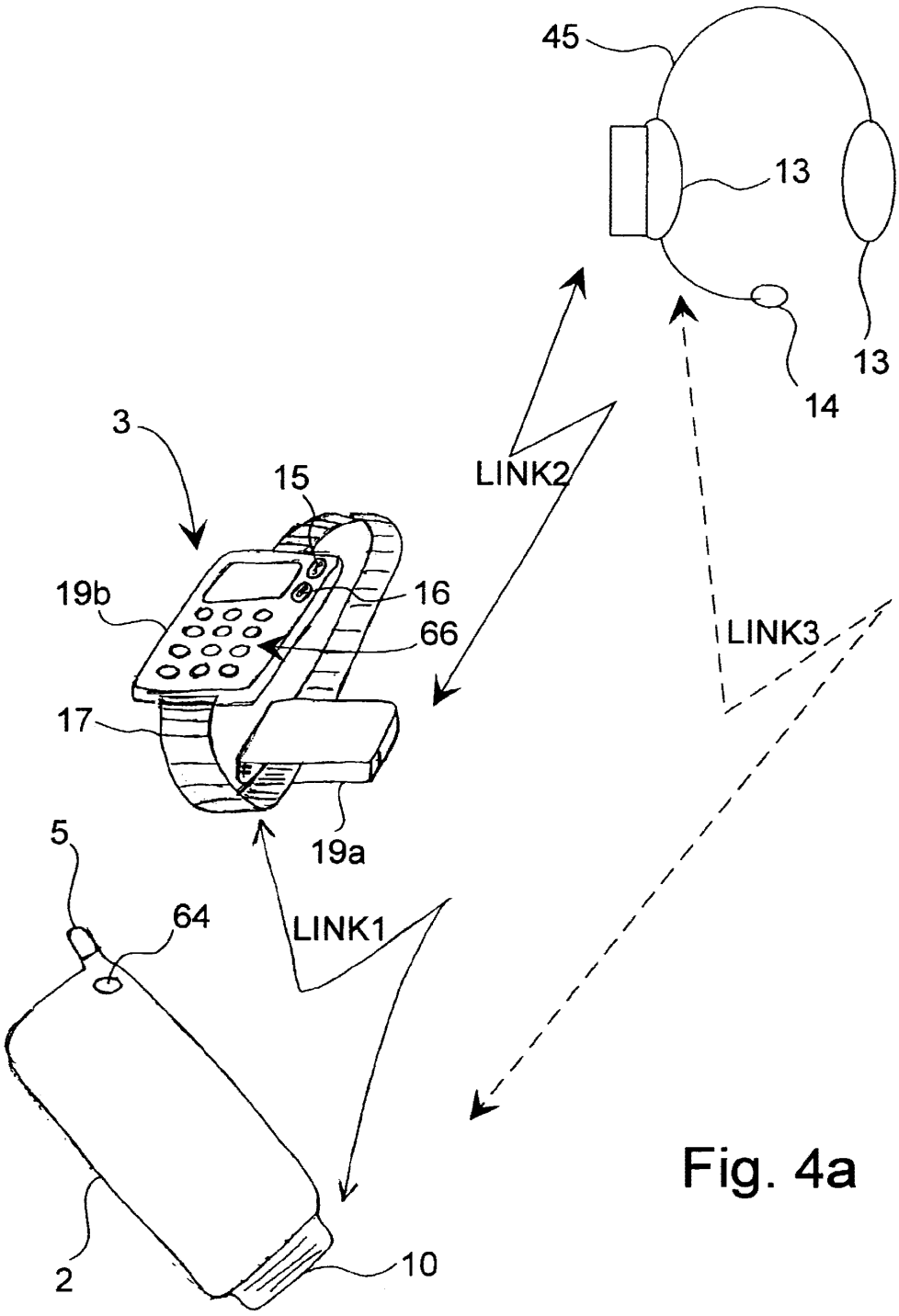


Fig. 4a

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Samsung Electronics Co., Ltd. et al. v. One-E-Way, Inc.
IPR2025-01541

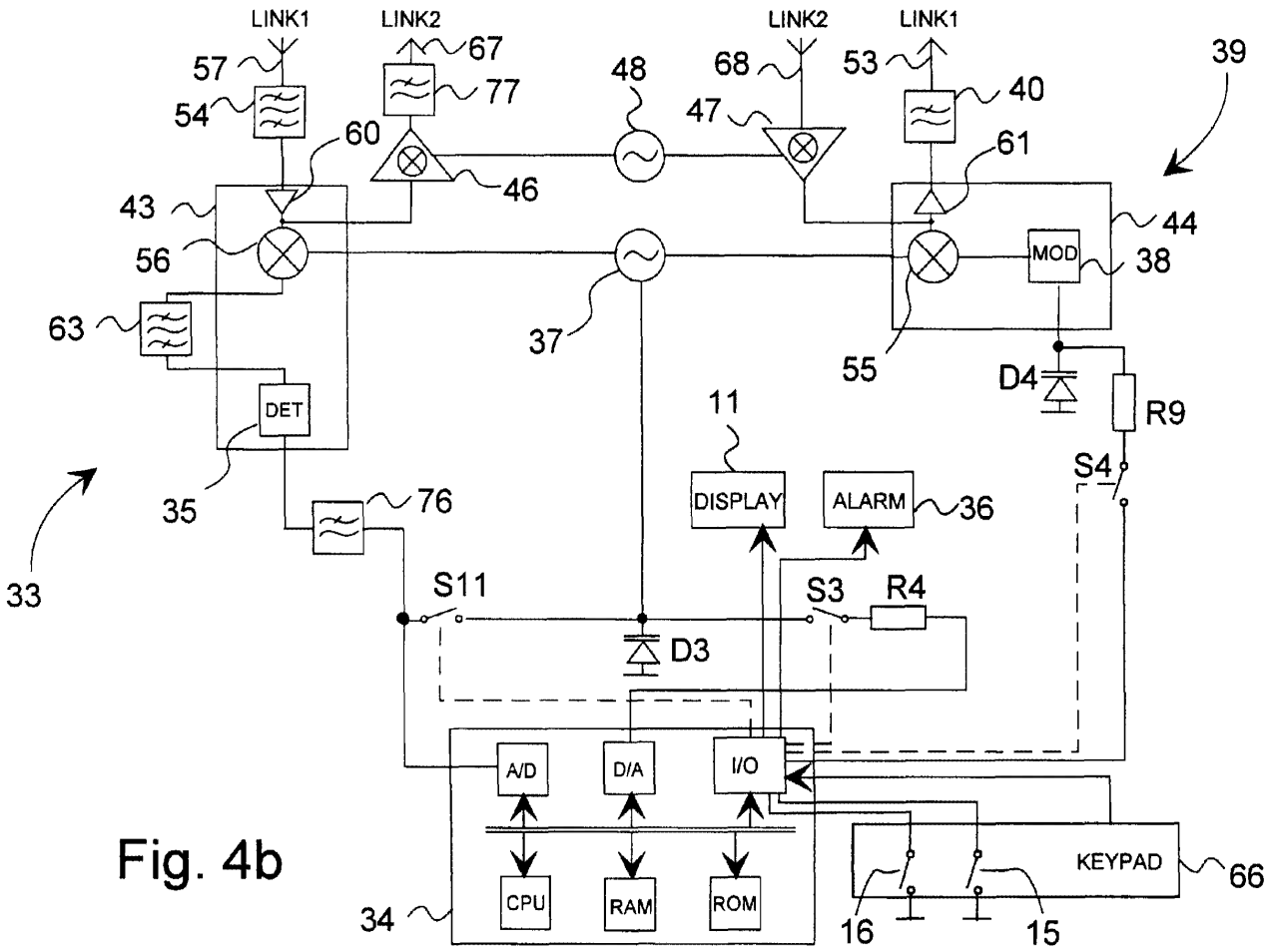


Fig. 4b

EP 0 840 465 A2

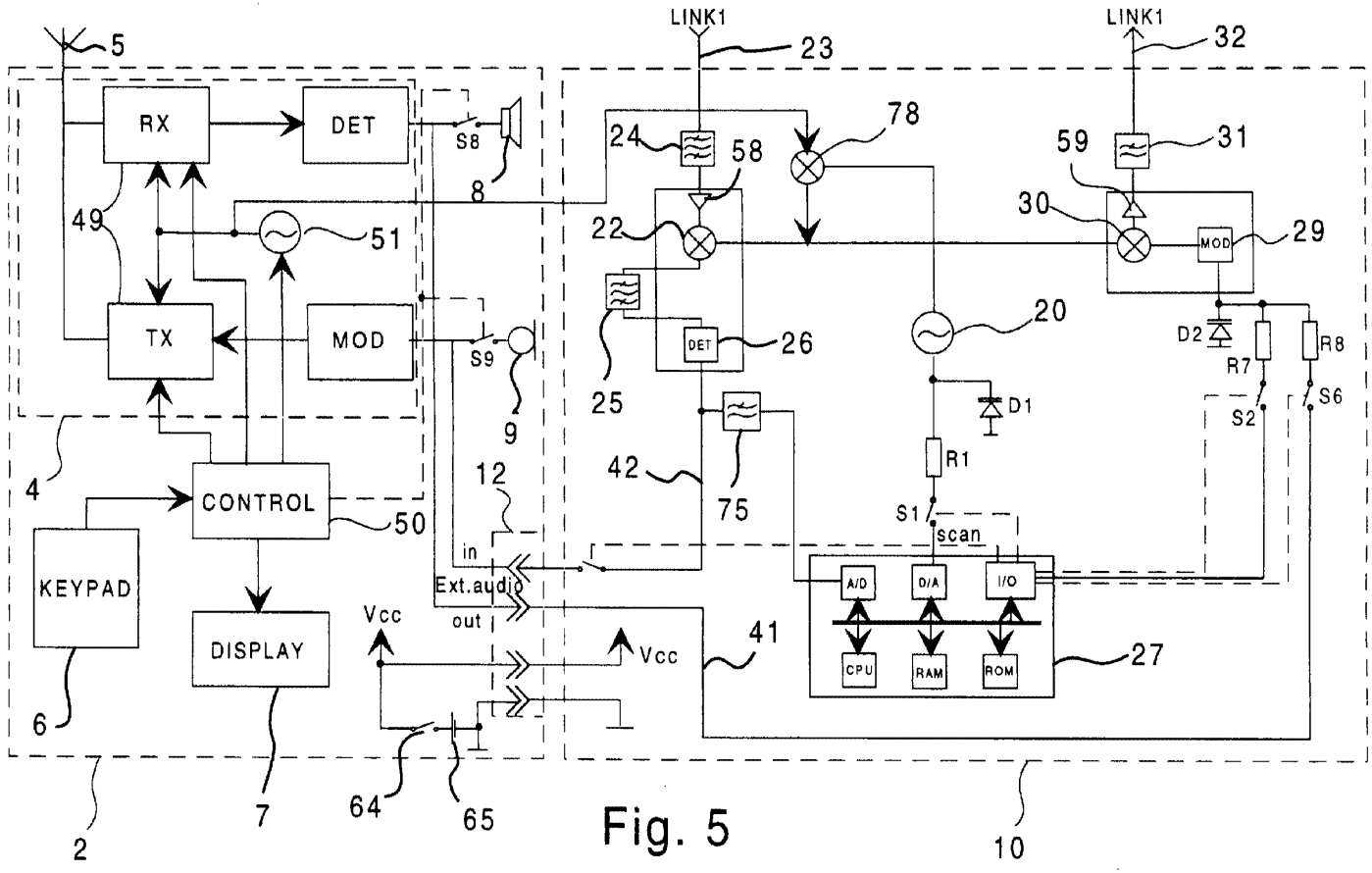


Fig. 5

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Samsung Electronics Co., Ltd. et al. v. One-E-Way, Inc.
IPR2025-01541

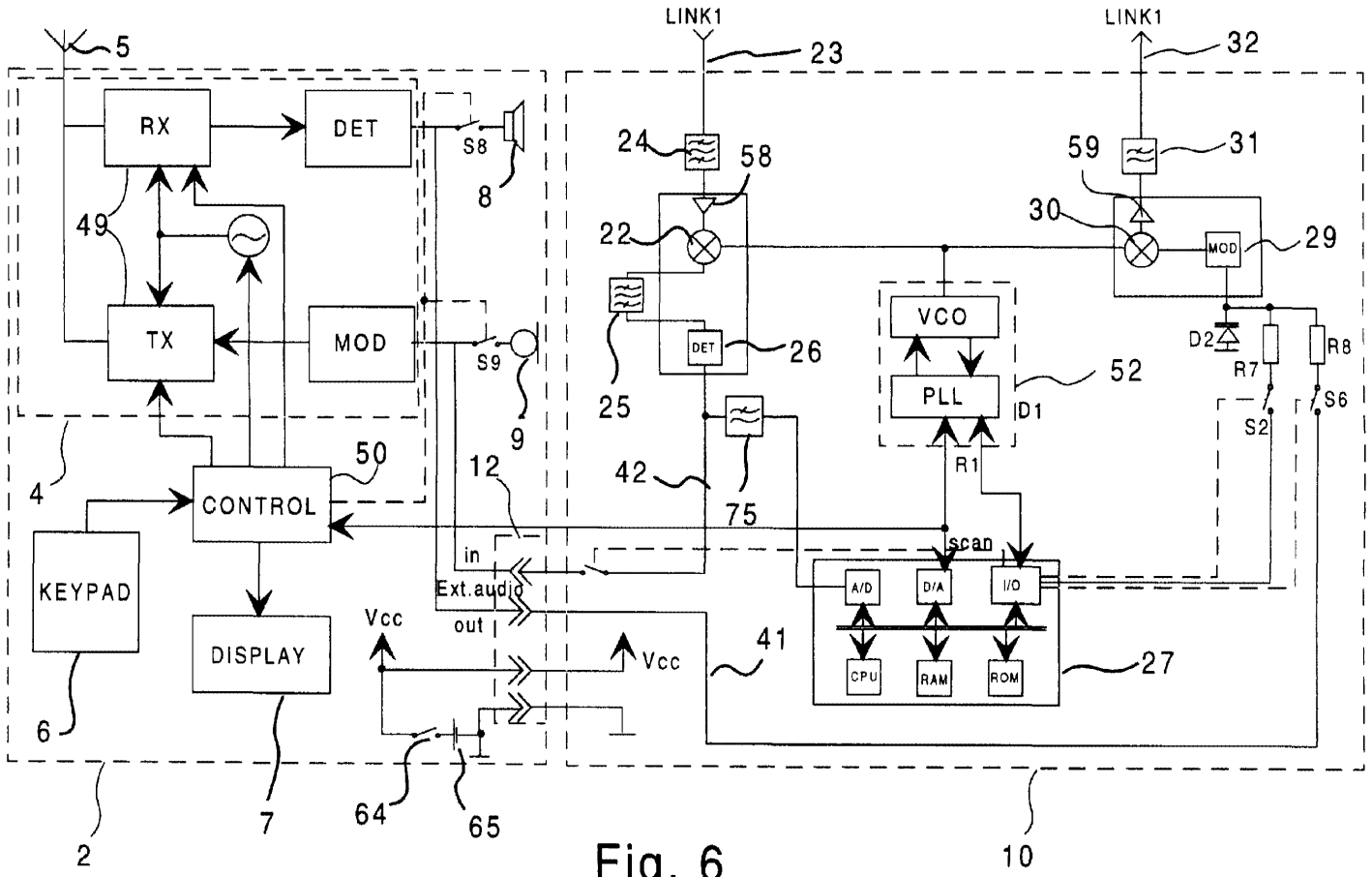

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KEYPAD
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out
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Fig. 6

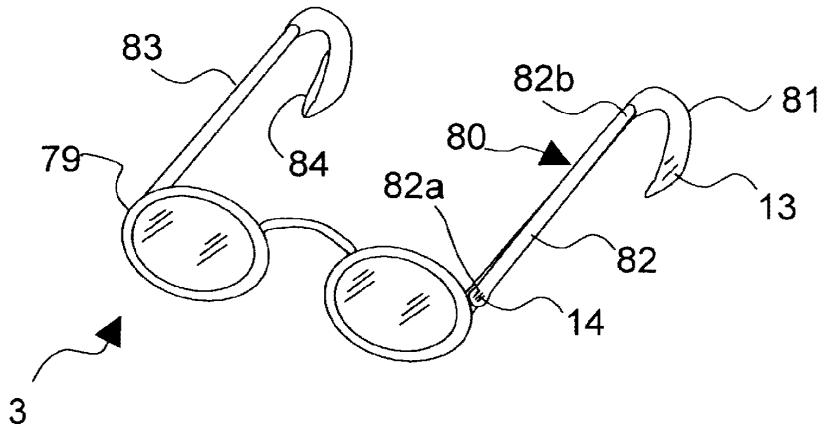


Fig. 7a

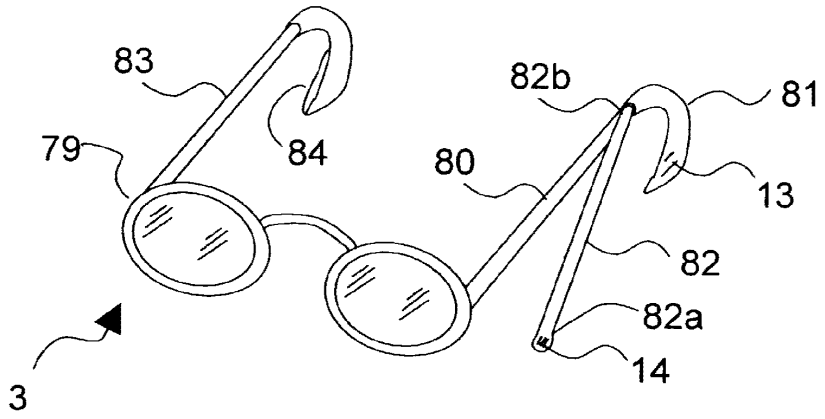


Fig. 7b

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IPR2025-01541

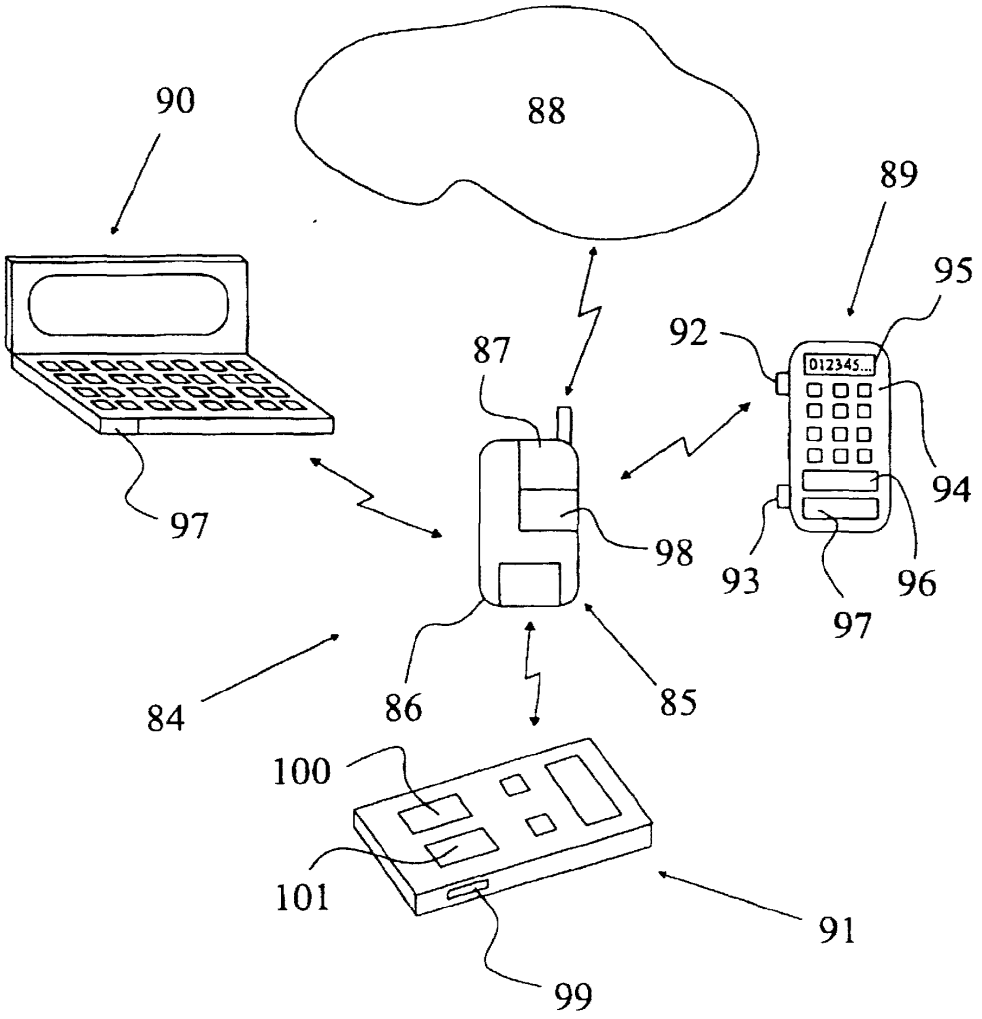


Fig. 8

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Samsung Electronics Co., Ltd. et al. v. One-E-Way, Inc.
IPR2025-01541

Electronic Acknowledgement Receipt

EFS ID:	21633821
Application Number:	13356949
International Application Number:	
Confirmation Number:	2299
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:	1028.6
Receipt Date:	02-MAR-2015
Filing Date:	24-JAN-2012
Time Stamp:	11:24:21
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	Information Disclosure Statement (IDS) Form (SB08)	IDSSecond.pdf	611900 afc2bcff435dde74166941c2302ecaf6a3bca33e	no	4

Warnings:	
Information:	

2	Foreign Reference	EP0840465A2.pdf	591643 56b62ce44d1ff993a8175e961ce6dab7fc658a08	no	27
Warnings:					
Information:					
3	Non Patent Literature	NPlitop2.pdf	6557978 d1dd4ce5faf9f1422d64927323f66dd24b4ae89b	no	171
Warnings:					
Information:					
			Total Files Size (in bytes):	7761521	

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.

Statement under MPEP 2001.06(c)

To Whom It May Concern:

The above application is involved in an ITC investigation. The applicant notifies the Patent Office of this matter in accordance with MPEP 2001.06(c), which states "[w]here the subject matter of patent is being sought is or has been involved in litigation, the existence of such litigation and any other material information arising therefrom must be brought to the attention of the U.S. Patent and Trademark Office." It is with candor and good faith that this information is provided. Please do not hesitate to contact me with any questions or concerns.

March 8, 2015

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 354 of 880
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IPR2025-01541

Electronic Acknowledgement Receipt

EFS ID:	21708119
Application Number:	13356949
International Application Number:	
Confirmation Number:	2299
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:	1028.6
Receipt Date:	09-MAR-2015
Filing Date:	24-JAN-2012
Time Stamp:	12:22:43
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	Notice of concurrent proceedings / decisions	SatementforCFR.pdf	68650 220bed848c94e76826252190ba822a665bf3adfe	no	1

Warnings:	
Information:	

Total Files Size (in bytes):	68650

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.

Application Number	Application/Control No.	Applicant(s)/Patent under Reexamination	
	13/356,949	WOOLFORK, C. EARL	

Document Code - DISQ	Internal Document – DO NOT MAIL

TERMINAL DISCLAIMER	☐ APPROVED	☒ DISAPPROVED
Date Filed : 25 FEB 2015	This patent is subject to a Terminal Disclaimer	

Approved/Disapproved by:

The filing date of the serial number that forms the basis for the double patenting rejection is incorrect.

Please complete the heading portion of the TD including the instant serial number.

JAB

PTO/SB/25 (07-09)
Approved for use through 07/31/2012. OMB 0651-0031
U.S. Patent and Trademark Office; U.S. DEPARTMENT OF COMMERCE
Under the Paperwork Reduction Act of 1995, no persons are required to respond to a collection of information unless it displays a valid OMB control number.

TERMINAL DISCLAIMER TO OBVIATE A PROVISIONAL DOUBLE PATENTING REJECTION OVER A PENDING "REFERENCE" APPLICATION	Docket Number (Optional) 1028.4

In re Application of:

Application No.:

Filed:

For:

The owner*, C. Earl Woolfork, of 100 percent interest 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 any patent granted on pending **reference** Application Number 13/356,949, filed on 2/24/2012, as such term is defined in 35 U.S.C. 154 and 173, and as the term of any patent granted on said **reference** application may be shortened by any terminal disclaimer filed prior to the grant of any patent on the pending **reference** application. 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 any patent granted on the **reference** application 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 any patent granted on the instant application that would extend to the expiration date of the full statutory term as defined in 35 U.S.C. 154 and 173 of any patent granted on said **reference** application, "as the term of any patent granted on said **reference** application may be shortened by any terminal disclaimer filed prior to the grant of any patent on the pending **reference** application," in the event that: any such patent: granted on the pending **reference** application: 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 shortened by any terminal disclaimer filed prior to its grant.

Check either box 1 or 2 below, if appropriate.

1. ☐ For submissions on behalf of a business/organization (e.g., corporation, partnership, university, government agency, etc.), the undersigned is empowered to act on behalf of the business/organization.

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.

2. ☑ The undersigned is an attorney or agent of record. Reg. No. 57,054

/Megan Lyman/ — Signature
3/16/2015 — Date

Megan Lyman — Typed or printed name

(919) 341-4023 — Telephone Number

☑ Terminal disclaimer fee under 37 CFR 1.20(d) is included.

WARNING: Information on this form may become public. Credit card information should not be included on this form. Provide credit card information and authorization on PTO-2038.

*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 statement. See MPEP § 324.

This collection of information is required by 37 CFR 1.321. 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.

Transmission of Opposing Arguments in Litigation

To Whom It May Concern:

The above application is involved in an ITC investigation. The applicant notifies the Patent Office of this and has attached the opposing arguments that have been made. Please find attached: Response of Beats Electronics, etc to the Complaint and Notice of Investigation; AlphCom's Answer to Complaint and Notice of Investigation; Sony's Answer to Complaint and Notice of Investigation; GN Netcom's Answer to Complaint and Notice of Investigation; Creative's Answer to Complaint and Notice of Investigation; Sennheiser's Answer to Complaint and Notice of Investigation; and BlueAnt's Answer to Complaint and Notice of Investigation. It is with candor and good faith that this information is provided. Please do not hesitate to contact me with any questions or concerns.

March 16, 2015

Respectfully Submitted,



Megan E. Lyman, Registration No. 57,054
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Raleigh, NC 27613
melyman@lymanpatents.com
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Samsung Electronics Co., Ltd. et al. v. One-E-Way, Inc.
IPR2025-01541

(919) 341-0271 (fax)

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IPR2025-01541

UNITED STATES INTERNATIONAL TRADE COMMISSION
WASHINGTON, D.C. 20436

Before the Honorable Thomas B. Pender

In the Matter of **CERTAIN WIRELESS HEADSETS**	**Investigation No. 337-TA-943**

RESPONSE OF BEATS ELECTRONICS, LLC AND BEATS ELECTRONICS INTERNATIONAL TO THE COMPLAINT AND NOTICE OF INVESTIGATION

Pursuant to 19 C.F.R. § 210.13, Respondents Beats Electronics, LLC and Beats Electronics International (collectively, the "Beats Respondents") hereby respond to the Complaint and Notice of Investigation in the above-captioned matter.

The Beats Respondents deny that they have engaged in any unfair acts which violate 19 U.S.C. § 1337 ("Section 337") under any asserted theory. The Beats Respondents deny importing, selling for importation, and/or selling within the United States after importation any products that infringe any claim of Complainant's asserted patents. The Beats Respondents also deny that Complainant's asserted patents are valid or enforceable. Except as specifically admitted herein, the Beats Respondents deny all allegations of the Complaint.

For ease of reference, the Beats Respondents have adopted the headings found in the Complaint. However, to the extent that such headings themselves contain factual and/or legal characterizations, the Beats Respondents deny all such characterizations.

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RESPONSE TO THE COMPLAINT

I. INTRODUCTION

1. The Beats Respondents admit that Complainant One-E-Way ("Complainant" or "One-E-Way") has filed a Complaint requesting that the United States International Trade Commission commence an investigation pursuant to Section 337. The Beats Respondents deny the merits of the Complaint, and deny that they have engaged in any unlawful acts under Section 337. The Beats Respondents deny infringement of any asserted claim of U.S. Patent Nos. 7,865,258 ("the '258 patent") or 8,131391 ("the '391 patent) (collectively, the "patents-in-suit"), and deny that the patents-in-suit are valid or enforceable. To the extent that the allegations in Paragraph 1 are directed to the Beats Respondents, the Beats Respondents deny all remaining allegations in Paragraph 1. The Beats Respondents lack sufficient information or knowledge to form a belief as to the truth of the remaining allegations in Paragraph 1, and therefore deny the allegations.

2. The Beats Respondents admit that documents purporting to be certified copies of the '258 and '391 patents accompany the Complaint as Exhibits 1 and 2, respectively. The Beats Respondents admit that documents entitled "Intellectual Property Transfer Agreement" accompany the Complaint as Exhibits 3 and 4. To the extent that the allegations in Paragraph 2 are directed to the Beats Respondents, the Beats Respondents deny all remaining allegations in Paragraph 2. The Beats Respondents lack sufficient information or knowledge to form a belief as to the truth of the remaining allegations in Paragraph 2, and therefore deny the allegations.

3. The Beats Respondents admit that the named Respondents are Sony Corporation, Sony Corporation of America, Sony Electronics, Inc., Sennheiser Electronic GmbH & Co. KG, Sennheiser Electronic Corporation, BlueAnt Wireless Pty, Ltd., BlueAnt Wireless, Inc., Creative

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Technology Ltd., Creative Labs, Inc., Beats Electronics, LLC, Beats Electronics International, Jawbone, Inc., and GN Netcom A/S which is alleged to do business as Jabra (collectively "Respondents"). The Beats Respondents, however, deny that they should be Respondents in this Investigation, and deny that they have engaged in any unfair acts which violate Section 337 under any asserted theory. To the extent that the allegations in Paragraph 3 are directed to the Beats Respondents, the Beats Respondents deny all remaining allegations in Paragraph 3. The Beats Respondents lack sufficient information or knowledge to form a belief as to the truth of the remaining allegations in Paragraph 3, and therefore deny the allegations.

4. The Beats Respondents lack sufficient information or knowledge to form a belief as to the truth of the allegations in Paragraph 4, and therefore deny the allegations.

5. The Beats Respondents admit that Complainant purports to seek, as relief from the Commission, limited exclusion orders excluding from entry into the United States certain wireless headset devices of Respondents that Complainant alleges to infringe the asserted claims of the patents-in-suit. The Beats Respondents admit that Complainant also purports to seek as relief cease and desist orders directed to Respondents to halt the importation, marketing, advertising, demonstration, warehousing of inventory for distribution, sale and use of such devices in the United States. The Beats Respondents deny infringement of any asserted claim of any patent-in-suit, and deny that Complainant is entitled to any of the relief sought against them. To the extent that the allegations in Paragraph 5 are directed to the Beats Respondents, the Beats Respondents deny all remaining allegations in Paragraph 5. The Beats Respondents lack sufficient information or knowledge to form a belief as to the truth of the remaining allegations in Paragraph 5, and therefore deny the allegations.

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II. COMPLAINANT

6. The Beats Respondents lack sufficient information or knowledge to form a belief as to the truth of the allegations in Paragraph 6, and therefore deny the allegations.

III. RESPONDENTS

Sony, Sony America, and Sony Electronics

7. The Beats Respondents lack sufficient information or knowledge to form a belief as to the truth of the allegations in Paragraph 7, and therefore deny the allegations.

8. The Beats Respondents lack sufficient information or knowledge to form a belief as to the truth of the allegations in Paragraph 8, and therefore deny the allegations.

9. The Beats Respondents lack sufficient information or knowledge to form a belief as to the truth of the allegations in Paragraph 9, and therefore deny the allegations.

10. The Beats Respondents lack sufficient information or knowledge to form a belief as to the truth of the allegations in Paragraph 10, and therefore deny the allegations.

Sennheiser and Sennheiser America

11. The Beats Respondents lack sufficient information or knowledge to form a belief as to the truth of the allegations in Paragraph 11, and therefore deny the allegations.

12. The Beats Respondents lack sufficient information or knowledge to form a belief as to the truth of the allegations in Paragraph 12, and therefore deny the allegations.

13. The Beats Respondents lack sufficient information or knowledge to form a belief as to the truth of the allegations in Paragraph 13, and therefore deny the allegations.

BlueAnt and BlueAnt-US

14. The Beats Respondents lack sufficient information or knowledge to form a belief as to the truth of the allegations in Paragraph 14, and therefore deny the allegations.

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15. The Beats Respondents lack sufficient information or knowledge to form a belief as to the truth of the allegations in Paragraph 15, and therefore deny the allegations.

Creative and Creative Labs

16. The Beats Respondents lack sufficient information or knowledge to form a belief as to the truth of the allegations in Paragraph 16, and therefore deny the allegations.

17. The Beats Respondents lack sufficient information or knowledge to form a belief as to the truth of the allegations in Paragraph 17, and therefore deny the allegations.

18. The Beats Respondents lack sufficient information or knowledge to form a belief as to the truth of the allegations in Paragraph 18, and therefore deny the allegations.

Beats and Beats Ireland

19. The Beats Respondents admit that Beats Electronics, LLC ("Beats") is a corporation organized under the laws of the State of Delaware with its principal place of business in Culver City, California 90232. Except as so admitted, the Beats Respondents deny the allegations in Paragraph 19.

20. The Beats Respondents admit that Beats Electronics International ("Beats Ireland") was formerly registered as Beats Electronics International Limited. The Beats Respondents admit that Beats Electronics International is an Irish corporation, which formerly had its registered office at The Malt House South, Grand Canal Quay, Dublin 2, Ireland. Except as so admitted, the Beats Respondents deny the allegations in Paragraph 20.

21. The Beats Respondents admit that Beats Ireland was formerly an indirect subsidiary of Beats. Except as so admitted, the Beats Respondents deny the allegations in Paragraph 21.

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Jawbone

22. The Beats Respondents lack sufficient information or knowledge to form a belief as to the truth of the allegations in Paragraph 22, and therefore deny the allegations.

Jabra

23. The Beats Respondents lack sufficient information or knowledge to form a belief as to the truth of the allegations in Paragraph 23, and therefore deny the allegations.

IV. THE TECHNOLOGIES AND PRODUCTS AT ISSUE

24. The Beats Respondents deny that any Beats product practices the '258 and/or '391 patents. The Beats Respondents lack sufficient information or knowledge to form a belief as to the truth of the remaining allegations in Paragraph 24, and therefore deny the allegations.

V. THE PATENTS-IN-SUIT

25. The Beats Respondents admit that the '391 patent states that it issued from U.S. Patent Application No. 12/940,747, which, the '391 patent states, is a continuation application of U.S. Patent Application No. 12/570,343, which, the '391 patent states, issued as the '258 patent. The Beats Respondents admit that the '391 patent lists U.S. Patent Application No. 10/027,391, filed on December 21, 2001, as a "Related U.S. Application." The Beats Respondents lack sufficient information or knowledge to form a belief as to the truth of the remaining allegations in Paragraph 25, and therefore deny the allegations.

A. The '258 Patent

Identification of the Patent and Ownership

26. The Beats Respondents admit that the '258 patent is entitled "Wireless Digital Audio System," and that the '258 patent states that it issued on January 4, 2011. The Beats Respondents admit that the '258 patent states that C. Earl Woolfork is the sole named inventor.

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The Beats Respondents lack sufficient information or knowledge to form a belief as to the truth of the remaining allegations in Paragraph 26, and therefore deny the allegations.

27. The Beats Respondents admit that a document purporting to be a copy of the prosecution history for the '258 patent accompanies the Complaint as Appendix A, and that documents purporting to be copies of the references mentioned in the prosecution history of the '258 patent accompany the Complaint as Appendix B. The Beats Respondents lack sufficient information or knowledge to form a belief as to the truth of the remaining allegations in Paragraph 27, and therefore deny the allegations.

Non-Technical Description of the Patented Invention

28. The Beats Respondents deny the allegations in Paragraph 28 insofar as they relate in any way to a proposed construction of the specification or claims of the '258 patent. The Beats Respondents deny that the '258 patent discloses "inventions." The Beats Respondents lack sufficient information or knowledge to form a belief as to the truth of the remaining allegations in Paragraph 28, and therefore deny the allegations.

29. The Beats Respondents deny the allegations in Paragraph 29 insofar as they relate in any way to a proposed construction of the specification or claims of the '258 patent. The Beats Respondents deny that the '258 patent discloses "inventions." The Beats Respondents lack sufficient information or knowledge to form a belief as to the truth of the remaining allegations in Paragraph 29, and therefore deny the allegations.

B. The '391 Patent

Identification of the Patent and Ownership

30. The Beats Respondents admit that the '391 patent states that it issued on March 6, 2012. The Beats Respondents admit that the '391 patent states that it is a continuation of the

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patent application that issued as the '258 patent. The Beats Respondents admit that the '391 patent states that C. Earl Woolfork is the sole named inventor. The Beats Respondents deny that the '391 patent is entitled "Wireless Digital Audio System." The Beats Respondents lack sufficient information or knowledge to form a belief as to the truth of the remaining allegations in Paragraph 30, and therefore deny the allegations.

31. The Beats Respondents admit that a document purporting to be a copy of the prosecution history for the '391 patent accompanies the Complaint as Appendix C, and that documents purporting to be copies of the references mentioned in the prosecution history of the '391 patent accompany the Complaint as Appendix D. The Beats Respondents lack sufficient information or knowledge to form a belief as to the truth of the remaining allegations in Paragraph 31, and therefore deny the allegations.

Non-Technical Description of the Patented Invention

32. The Beats Respondents deny the allegations in Paragraph 32 insofar as they relate in any way to a proposed construction of the specification or claims of the '391 patent. The Beats Respondents deny that the '391 patent discloses "inventions." The Beats Respondents lack sufficient information or knowledge to form a belief as to the truth of the remaining allegations in Paragraph 32, and therefore deny the allegations.

33. The Beats Respondents deny the allegations in Paragraph 33 insofar as they relate in any way to a proposed construction of the specification or claims of the '391 patent. The Beats Respondents deny that the '391 patent discloses "inventions." The Beats Respondents lack sufficient information or knowledge to form a belief as to the truth of the remaining allegations in Paragraph 33, and therefore deny the allegations.

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VI. ALLEGED UNFAIR ACTS OF THE RESPONDENTS

A. Sony, Sony America, and Sony Electronics

34. The Beats Respondents lack sufficient information or knowledge to form a belief as to the truth of the allegations in Paragraph 34, and therefore deny the allegations.

35. The Beats Respondents lack sufficient information or knowledge to form a belief as to the truth of the allegations in Paragraph 35, and therefore deny the allegations.

36. The Beats Respondents lack sufficient information or knowledge to form a belief as to the truth of the allegations in Paragraph 36, and therefore deny the allegations.

37. The Beats Respondents lack sufficient information or knowledge to form a belief as to the truth of the allegations in Paragraph 37, and therefore deny the allegations.

38. The Beats Respondents lack sufficient information or knowledge to form a belief as to the truth of the allegations in Paragraph 38, and therefore deny the allegations.

39. The Beats Respondents lack sufficient information or knowledge to form a belief as to the truth of the allegations in Paragraph 39, and therefore deny the allegations.

40. The Beats Respondents lack sufficient information or knowledge to form a belief as to the truth of the allegations in Paragraph 40, and therefore deny the allegations.

B. Sennheiser and Sennheiser America

41. The Beats Respondents lack sufficient information or knowledge to form a belief as to the truth of the allegations in Paragraph 41, and therefore deny the allegations.

42. The Beats Respondents lack sufficient information or knowledge to form a belief as to the truth of the allegations in Paragraph 42, and therefore deny the allegations.

43. The Beats Respondents lack sufficient information or knowledge to form a belief as to the truth of the allegations in Paragraph 43, and therefore deny the allegations.

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44. The Beats Respondents lack sufficient information or knowledge to form a belief as to the truth of the allegations in Paragraph 44, and therefore deny the allegations.

45. The Beats Respondents lack sufficient information or knowledge to form a belief as to the truth of the allegations in Paragraph 45, and therefore deny the allegations.

46. The Beats Respondents lack sufficient information or knowledge to form a belief as to the truth of the allegations in Paragraph 46, and therefore deny the allegations.

47. The Beats Respondents lack sufficient information or knowledge to form a belief as to the truth of the allegations in Paragraph 47, and therefore deny the allegations.

C. **BlueAnt and BlueAnt-US**

48. The Beats Respondents lack sufficient information or knowledge to form a belief as to the truth of the allegations in Paragraph 48, and therefore deny the allegations.

49. The Beats Respondents lack sufficient information or knowledge to form a belief as to the truth of the allegations in Paragraph 49, and therefore deny the allegations.

50. The Beats Respondents lack sufficient information or knowledge to form a belief as to the truth of the allegations in Paragraph 50, and therefore deny the allegations.

51. The Beats Respondents lack sufficient information or knowledge to form a belief as to the truth of the allegations in Paragraph 51, and therefore deny the allegations.

52. The Beats Respondents lack sufficient information or knowledge to form a belief as to the truth of the allegations in Paragraph 52, and therefore deny the allegations.

53. The Beats Respondents lack sufficient information or knowledge to form a belief as to the truth of the allegations in Paragraph 53, and therefore deny the allegations.

54. The Beats Respondents lack sufficient information or knowledge to form a belief as to the truth of the allegations in Paragraph 54, and therefore deny the allegations.

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D. Creative and Creative Labs

55. The Beats Respondents lack sufficient information or knowledge to form a belief as to the truth of the allegations in Paragraph 55, and therefore deny the allegations.

56. The Beats Respondents lack sufficient information or knowledge to form a belief as to the truth of the allegations in Paragraph 56, and therefore deny the allegations.

57. The Beats Respondents lack sufficient information or knowledge to form a belief as to the truth of the allegations in Paragraph 57, and therefore deny the allegations.

58. The Beats Respondents lack sufficient information or knowledge to form a belief as to the truth of the allegations in Paragraph 58, and therefore deny the allegations.

59. The Beats Respondents lack sufficient information or knowledge to form a belief as to the truth of the allegations in Paragraph 59, and therefore deny the allegations.

60. The Beats Respondents lack sufficient information or knowledge to form a belief as to the truth of the allegations in Paragraph 60, and therefore deny the allegations.

61. The Beats Respondents lack sufficient information or knowledge to form a belief as to the truth of the allegations in Paragraph 61, and therefore deny the allegations.

E. Beats and Beats Ireland

62. The Beats Respondents deny the allegations in Paragraph 62.

63. The Beats Respondents admit that headsets have been sold under the following names: Studio Wireless, Solo^2 Wireless, and Powerbeats2 Wireless ("Accused Beats Products"). The Beats Respondents deny that these headsets infringe any asserted claim of any patent-in-suit. The Beats Respondents lack sufficient information or knowledge to form a belief as to the truth of the remaining allegations in Paragraph 63, and therefore deny the allegations.

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64. The Beats Respondents admit that the Accused Beats Products have been manufactured, assembled, and/or packaged outside of the United States. Except as so admitted, the Beats Respondents deny the allegations in Paragraph 64.

65. The Beats Respondents deny the allegations in Paragraph 65.

66. The Beats Respondents deny the allegations in Paragraph 66.

67. The Beats Respondents deny the allegations in Paragraph 67.

68. The Beats Respondents deny the allegations in Paragraph 68.

F. Jawbone

69. The Beats Respondents lack sufficient information or knowledge to form a belief as to the truth of the allegations in Paragraph 69, and therefore deny the allegations.

70. The Beats Respondents lack sufficient information or knowledge to form a belief as to the truth of the allegations in Paragraph 70, and therefore deny the allegations.

71. The Beats Respondents lack sufficient information or knowledge to form a belief as to the truth of the allegations in Paragraph 71, and therefore deny the allegations.

72. The Beats Respondents lack sufficient information or knowledge to form a belief as to the truth of the allegations in Paragraph 72, and therefore deny the allegations.

73. The Beats Respondents lack sufficient information or knowledge to form a belief as to the truth of the allegations in Paragraph 73, and therefore deny the allegations.

74. The Beats Respondents lack sufficient information or knowledge to form a belief as to the truth of the allegations in Paragraph 74, and therefore deny the allegations.

75. The Beats Respondents lack sufficient information or knowledge to form a belief as to the truth of the allegations in Paragraph 75, and therefore deny the allegations.

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G. Jabra

76. The Beats Respondents lack sufficient information or knowledge to form a belief as to the truth of the allegations in Paragraph 76, and therefore deny the allegations.

77. The Beats Respondents lack sufficient information or knowledge to form a belief as to the truth of the allegations in Paragraph 77, and therefore deny the allegations.

78. The Beats Respondents lack sufficient information or knowledge to form a belief as to the truth of the allegations in Paragraph 78, and therefore deny the allegations.

79. The Beats Respondents lack sufficient information or knowledge to form a belief as to the truth of the allegations in Paragraph 79, and therefore deny the allegations.

80. The Beats Respondents lack sufficient information or knowledge to form a belief as to the truth of the allegations in Paragraph 80, and therefore deny the allegations.

81. The Beats Respondents lack sufficient information or knowledge to form a belief as to the truth of the allegations in Paragraph 81, and therefore deny the allegations.

82. The Beats Respondents lack sufficient information or knowledge to form a belief as to the truth of the allegations in Paragraph 82, and therefore deny the allegations.

VII. SPECIFIC INSTANCES OF ALLEGED UNFAIR IMPORTATION AND SALE

83. The Beats Respondents lack sufficient information or knowledge to form a belief as to the truth of the allegations in Paragraph 83, and therefore deny the allegations.

84. The Beats Respondents lack sufficient information or knowledge to form a belief as to the truth of the allegations in Paragraph 84, and therefore deny the allegations.

85. The Beats Respondents lack sufficient information or knowledge to form a belief as to the truth of the allegations in Paragraph 85, and therefore deny the allegations.

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86. The Beats Respondents lack sufficient information or knowledge to form a belief as to the truth of the allegations in Paragraph 86, and therefore deny the allegations.

87. The Beats Respondents admit that the Accused Beats Products have been manufactured outside of the United States. The Beats Respondents lack sufficient information or knowledge to form a belief as to the truth of the remaining allegations in Paragraph 87, and therefore deny the allegations.

88. The Beats Respondents lack sufficient information or knowledge to form a belief as to the truth of the allegations in Paragraph 88, and therefore deny the allegations.

89. The Beats Respondents lack sufficient information or knowledge to form a belief as to the truth of the allegations in Paragraph 89, and therefore deny the allegations.

VIII. CLASSIFICATION OF THE ACCUSED PRODUCTS UNDER THE HARMONIZED TARIFF SCHEDULE OF THE UNITED STATES

90. The Beats Respondents deny the allegations in Paragraph 90.

IX. RELATED LITIGATION

91. The Beats Respondents lack sufficient information or knowledge to form a belief as to the truth of the allegations in Paragraph 91, and therefore deny the allegations.

X. DOMESTIC INDUSTRY

92. The Beats Respondents lack sufficient information or knowledge to form a belief as to the truth of the allegations in Paragraph 92, and therefore deny the allegations.

A. One-E-Way's Alleged Development of the Domestic Industry

93. The Beats Respondents lack sufficient information or knowledge to form a belief as to the truth of the allegations in Paragraph 93, and therefore deny the allegations.

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B. One-E-Way Licensees' Alleged Development of the Domestic Industry

94. The Beats Respondents lack sufficient information or knowledge to form a belief as to the truth of the allegations in Paragraph 94, and therefore deny the allegations.

95. The Beats Respondents lack sufficient information or knowledge to form a belief as to the truth of the allegations in Paragraph 95, and therefore deny the allegations.

96. The Beats Respondents lack sufficient information or knowledge to form a belief as to the truth of the allegations in Paragraph 96, and therefore deny the allegations.

97. The Beats Respondents lack sufficient information or knowledge to form a belief as to the truth of the allegations in Paragraph 97, and therefore deny the allegations.

98. The Beats Respondents lack sufficient information or knowledge to form a belief as to the truth of the allegations in Paragraph 98, and therefore deny the allegations.

99. The Beats Respondents lack sufficient information or knowledge to form a belief as to the truth of the allegations in Paragraph 99, and therefore deny the allegations.

100. The Beats Respondents lack sufficient information or knowledge to form a belief as to the truth of the allegations in Paragraph 100, and therefore deny the allegations.

XI. RELIEF REQUESTED

101. To the extent that the allegations in Paragraph 101 are directed to the Beats Respondents, the Beats Respondents deny all allegations in Paragraph 101, deny the merits of the Complaint, and deny that Complainant is entitled to any of the relief it seeks or any other and further relief. The Beats Respondents lack sufficient information or knowledge to form a belief as to the truth of the remaining allegations in Paragraph 101, and therefore deny the allegations.

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RESPONSE TO NOTICE OF INVESTIGATION

Responding to the Notice of Investigation dated January 8, 2015, the Beats Respondents acknowledge that the Commission has initiated an Investigation under Section 337 and that the Beats Respondents are named in that Notice.

The Beats Respondents deny that there has been any violation of Section 337 by them in the importation into the United States, the sale for importation, or the sale within the United States after importation of certain wireless headsets. The Beats Respondents deny infringement of any asserted claim of any asserted patent, and deny that the asserted patents are valid or enforceable. The Beats Respondents lack sufficient information or knowledge to form a belief as to the truth of the allegations that a domestic industry exists under subsection (a)(2) of Section 337 with respect to any of the asserted patents, and therefore deny each and every such allegation. The Beats Respondents deny that Complainant is entitled to any relief in this Investigation, including, but not limited to, any exclusion order or cease and desist order.

AFFIRMATIVE DEFENSES

The Beats Respondents assert the following affirmative and other defenses, reserving the right to modify, amend, or otherwise expand upon these defenses as discovery proceeds in this Investigation.

FIRST AFFIRMATIVE DEFENSE
(Non-Infringement of the '258 Patent)

1. Although the Beats Respondents do not bear the burden of proof on this issue, no valid asserted claims of the '258 patent are infringed directly, contributorily, or by inducement by the Accused Beats Products.

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SECOND AFFIRMATIVE DEFENSE
(Non-Infringement of the '391 Patent)

2. Although the Beats Respondents do not bear the burden of proof on this issue, no valid asserted claims of the '391 patent are infringed directly, contributorily, or by inducement by the Accused Beats Products.

THIRD AFFIRMATIVE DEFENSE
(Lack of Importation)

3. Although the Beats Respondents do not bear the burden of proof on this issue, no Accused Beats Product infringes or is able to infringe the asserted claims of the asserted patents at the time of importation.

FOURTH AFFIRMATIVE DEFENSE
(Lack of Unfair Acts by the Beats Respondents)

4. Although the Beats Respondents do not bear the burden of proof on this issue, the Beats Respondents do not presently, and did not at the time of the filing of the Complaint, sell for importation into the United States, import into the United States, or sell after importation into the United States any of the Accused Beats Products.

FIFTH AFFIRMATIVE DEFENSE
(Invalidity of the '258 Patent)

5. The '258 patent is invalid by reason of having been issued in violation of one or more provisions of the patent laws of the United States, including but not limited to such provisions in 35 U.S.C. §§ 101, 102, 103, 112, 115, and/or 116, or the Rules and Regulations of the United States Patent and Trademark Office relating thereto.

6. The audio coding, digital encoding, modulation and transmission techniques (and corresponding decoding, demodulation and reception techniques) claimed in the '258 patent were known to persons of ordinary skill in the art long before the claimed priority date. In many

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cases, these techniques pre-dated the '258 patent by several decades or were otherwise related to development of the prior art Bluetooth standard. There is nothing novel or nonobvious about the combination of known elements as claimed in the '258 patent.

7. For example, the asserted claims of the '258 patent are invalid under 35 U.S.C. §§ 102 and/or 103 as anticipated by, or obvious in light of, the prior art references cited by the Examiner during the prosecution of the '258 patent and related applications, and other references. Such references include but are not limited to U.S. 6,781,977 to Li, Specification of the Bluetooth System Version 1.0B (issued Dec. 1, 1999), Specification of the Bluetooth System Version 1.1 (issued Feb. 22, 2001), the documents submitted and proposals presented by participants in the development of the IEEE 802.15 standard, U.S. Patent No. 6,473,449 to Cafarella et al., U.S. Patent No. 7,154,958 to Dabak et al., U.S. Patent No. 6,731,706 to Acharya et al., Samuel C. Yang, *CDMA RF System Engineering* (1998), Andrew R. Cohen, et al., *A New Coding Technique for Asynchronous Multiple Access Communication*, IEEE Trans. On Commc'ns Tech., Vol. Com-19, pp. 849-855 (Oct. 1971), Andrew J. Viterbi, *Error Bounds for Convolutional Codes and an Asymptotically Optimum Decoding Algorithm*, IEEE Trans. On Information Theory, Vol. IT-13, pp. 260-269 (Apr. 1967). The Beats Respondents incorporate by reference all prior art references identified by all the other Respondents in this Investigation in each of their respective Responses to the Complaint. The Beats Respondents are in the process of identifying additional relevant prior art, including through discovery, which is in its early stages at the time of this Response.

8. The asserted claims of the '258 patent are also invalid for failure to meet the requirements of 35 U.S.C. § 112 as a result of the specification lacking sufficient written description, failing to particularly point out and distinctly claim the subject matter which the

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inventor regarded as the alleged invention, and/or failing to set forth a written description sufficient to enable any person skilled in the art to make and use the alleged invention.

9. The Beats Respondents will set forth further invalidity allegations upon obtaining relevant prior art and consistent with the forthcoming schedule in this Investigation.

SIXTH AFFIRMATIVE DEFENSE
(Invalidity of the '391 Patent)

10. The '391 patent is invalid by reason of having been issued in violation of one or more provisions of the patent laws of the United States, including but not limited to such provisions in 35 U.S.C. §§ 101, 102, 103, 112, 115, and/or 116, or the Rules and Regulations of the United States Patent and Trademark Office relating thereto.

11. The audio coding, digital encoding, modulation and transmission techniques (and corresponding decoding, demodulation and reception techniques) claimed in the '391 patent were known to persons of ordinary skill in the art long before the claimed priority date. In many cases, these techniques pre-dated the '391 patent by several decades or were otherwise related to development of the prior art Bluetooth standard. There is nothing novel or nonobvious about the combination of known elements as claimed in the '391 patent.

12. For example, the asserted claims of the '391 patent are invalid under 35 U.S.C. §§ 102 and/or 103 as anticipated by, or obvious in light of, the prior art references cited by the Examiner during the prosecution of the '391 patent and related applications, and other references. Such references include but are not limited to U.S. 6,781,977 to Li, Specification of the Bluetooth System Version 1.0B (issued Dec. 1, 1999), Specification of the Bluetooth System Version 1.1 (issued Feb. 22, 2001), the documents submitted and proposals presented by participants in the development of the IEEE 802.15 standard, U.S. Patent No. 6,473,449 to Cafarella et al., U.S. Patent No. 7,154,958 to Dabak et al., U.S. Patent No. 6,731,706 to Acharya

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et al., Samuel C. Yang, *CDMA RF System Engineering* (1998), Andrew R. Cohen, et al., *A New Coding Technique for Asynchronous Multiple Access Communication*, IEEE Trans. On Commc'ns Tech., Vol. Com-19, pp. 849-855 (Oct. 1971), Andrew J. Viterbi, *Error Bounds for Convolutional Codes and an Asymptotically Optimum Decoding Algorithm*, IEEE Trans. On Information Theory, Vol. IT-13, pp. 260-269 (Apr. 1967). The Beats Respondents incorporate by reference all prior art references identified by all the other Respondents in this Investigation in each of their respective Responses to the Complaint. The Beats Respondents are in the process of identifying additional relevant prior art, including through discovery, which is in its early stages at the time of this Response.

13. The asserted claims of the '391 patent are also invalid for failure to meet the requirements of 35 U.S.C. § 112 as a result of the specification lacking sufficient written description, failing to particularly point out and distinctly claim the subject matter which the inventor regarded as the alleged invention, and/or failing to set forth a written description sufficient to enable any person skilled in the art to make and use the alleged invention.

14. The Beats Respondents will set forth further invalidity allegations upon obtaining relevant prior art and consistent with the forthcoming schedule in this Investigation.

SEVENTH AFFIRMATIVE DEFENSE
(Lack of Domestic Industry)

15. Although the Beats Respondents do not bear the burden of proof on this issue, the Commission lacks jurisdiction over Respondents in this investigation because Complainant has not established any basis for finding that a domestic industry exists or is in the process of being formed with respect to any of the claims of the '258 patent, and/or '391 patent. Specifically, on information and belief prior to discovery, Complainant has failed to show that it or its licensees are practicing the claims of the asserted patents in the United States or that it or its licensees have

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made a significant investment in U.S. plant and equipment related to the asserted patents, a significant employment of U.S. labor and capital related to the asserted patents, or a substantial investment in U.S. exploitation of the asserted patents, including engineering, research, development, and/or licensing in the United States.

EIGHTH AFFIRMATIVE DEFENSE
(Lack of Standing)

16. Although the Beats Respondents do not bear the burden of proof on this issue, on information and belief prior to discovery, Complainant lacks standing to pursue the relief sought by virtue of it having less than all necessary rights in the asserted patents.

NINTH AFFIRMATIVE DEFENSE
(Waiver, Acquiescence)

17. Complainant's requested relief is barred, in whole or in part, by the doctrines of waiver and/or acquiescence because it has long known the basis for the allegations it now asserts against the Beats Respondents, but it unreasonably delayed in seeking relief.

TENTH AFFIRMATIVE DEFENSE
(Public Interest)

18. The relief requested by Complainant would not further the public interest, but would adversely affect the public welfare, competitive conditions, and the U.S. consumer.

ELEVENTH AFFIRMATIVE DEFENSE
(Additional Defenses)

19. The Beats Respondents reserve the right to assert additional defenses based on further discovery and investigation. The Beats Respondents further adopt any relevant defenses that may be raised by any other Respondent in this Investigation.

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ADDITIONAL INFORMATION REQUIRED BY 19 C.F.R. § 210.13(b)

See CONFIDENTIAL Exhibit 1, attached hereto, for the statistical and other data required by Commission Rule 210.13 relating to the accused Studio Wireless, Solo^2 Wireless, and Powerbeats2 Wireless headsets.

REQUEST FOR RELIEF

WHEREFORE, the Beats Respondents respectfully request that the Commission:

1. Find that that there has been no violation by the Beats Respondents of Section 337 of the Tariff Act of 1930, as amended;
2. Deny all relief requested by Complainant as to the Beats Respondents;
3. Find that the Beats Respondents have not infringed any asserted claim of any asserted patent;
4. Find that the asserted claims of the asserted patents are invalid and/or unenforceable;
5. Find that a public interest exists that precludes any remedy, even if a violation is found;
6. Issue an Order terminating the instant investigation as to the Beats Respondents; and
7. Award the Beats Respondents such other and further relief as the Commission deems appropriate.

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Dated: February 2, 2015

Respectfully submitted,



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Counsel for Respondents Beats Electronics, LLC, and Beats Electronics International

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VERIFICATION OF BEATS ELECTRONICS, LLC'S RESPONSE TO COMPLAINT AND NOTICE OF INVESTIGATION

I, Gene Daniel Levoff, declare, in accordance with 19 C.F.R. § 210.4, under penalty of perjury under the laws of the United States of America, that the following statements are true:

1. I am Manager of Beats Electronics, LLC and am duly authorized to sign this verification on its behalf.

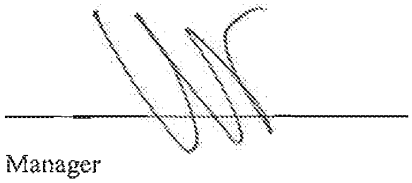
2. I have read the Response of Beats Electronics, LLC and Beats Electronics International to the Complaint and Notice of Investigation (the "Response"), and am familiar with the allegations and statements attributable to Beats Electronics, LLC that are contained therein.

3. The Response is not being presented for any improper purpose, such as to harass or to cause unnecessary delay or needless increase in the cost of the Investigation.

4. To the best of my knowledge, information, and belief, based upon reasonable inquiry, the Response is well-founded in fact and is warranted by existing law or by non-frivolous argument for the extension, modification, or reversal of existing law of the establishment of new law.

5. The allegations and other factual contentions contained in the Response that are attributable to Beats Electronics, LLC have evidentiary support or are likely to have evidentiary support after a reasonable opportunity for further investigation and discovery.

Executed this 24 day of January 2015.



Manager
Beats Electronics, LLC

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VERIFICATION OF BEATS ELECTRONICS INTERNATIONAL'S RESPONSE TO COMPLAINT AND NOTICE OF INVESTIGATION

I, Cathy Kearney, declare, in accordance with 19 C.F.R. § 210.4, under penalty of perjury under the laws of the United States of America, that the following statements are true:

1. I am a Director of Beats Electronics International and am duly authorized to sign this verification on its behalf.

2. I have read the Response of Beats Electronics, LLC and Beats Electronics International to the Complaint and Notice of Investigation (the "Response"), and am familiar with the allegations and statements attributable to Beats Electronics International that are contained therein.

3. The Response is not being presented for any improper purpose, such as to harass or to cause unnecessary delay or needless increase in the cost of the Investigation.

4. To the best of my knowledge, information, and belief, based upon reasonable inquiry, the Response is well-founded in fact and is warranted by existing law or by non-frivolous argument for the extension, modification, or reversal of existing law of the establishment of new law.

5. The allegations and other factual contentions contained in the Response that are attributable to Beats Electronics International have evidentiary support or are likely to have evidentiary support after a reasonable opportunity for further investigation and discovery.

Executed this 29th day of January 2015.

Director
Beats Electronics International

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EXHIBIT 1

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EXHIBIT 1

Pursuant to 19 C.F.R. § 210.13(b), Respondent Beats Electronics, LLC ("Beats") provides the following information. By providing such information, Beats only intends to supply the required data. Beats denies that any of the supplied data refers or relates to any unlawful act under Section 337 (19 U.S.C. § 1337) or otherwise.

1. The following reflects the approximate quantity and value of sales in the United States of the accused Studio Wireless, Solo^2 Wireless, and Powerbeats2 Wireless products ("Accused Beats Products") for the year 2014:

a. Studio Wireless

	2014
Total Quantity of U.S. Units Sold	**[REDACTED]**
(U.S.) Retail Price	$379.95

b. Solo^2 Wireless

	2014
Total Quantity of U.S. Units Sold	**[REDACTED]**
(U.S.) Retail Price	$299.95

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c. Powerbeats2 Wireless

	2014
Total Quantity of U.S. Units Sold	**[REDACTED]**
(U.S.) Retail Price	$199.95

2. The relative significance of the U.S. market for the Accused Beats Products is as follows: The U.S. market constitutes approximately **[REDACTED]** of worldwide sales.

3. The Accused Beats Products fall within the following classification of the Harmonized Tariff Schedule of the United States: HTSUS 8517.62.0050.

4. The Beats Respondents do not manufacture or have any capacity to produce the Accused Beats Products. The foreign manufacturers of the Accused Beats Products are: Fugang Electronic (Dong Guan) Co., Ltd. (Studio Wireless and Powerbeats2 Wireless) and Innovation Sound Technology, Co. Ltd. (Solo^2 Wireless). Fugang's and Innovation's capacity to produce the Accused Beats Products is determined by the forecasts and purchase orders they receive for the products.

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CERTIFICATE OF SERVICE

I hereby certify that a copy of the foregoing RESPONSE TO THE COMPLAINT AND NOTICE OF INVESTIGATION was served in the manner indicated below on February 2, 2015:

The Honorable Lisa R. Barton
Secretary
U.S. INTERNATIONAL TRADE COMMISSION
500 E St., SW
Washington, DC 20436

- ☐ VIA FIRST CLASS MAIL
- ☒ VIA ELECTRONIC FILING (EDIS)
- ☐ VIA OVERNIGHT COURIER
- ☒ VIA HAND DELIVERY
- ☐ VIA EMAIL (PDF File)

The Honorable Thomas B. Pender
Administrative Law Judge
U.S. INTERNATIONAL TRADE COMMISSION
500 E St., SW
Washington, DC 20436

- ☐ VIA FIRST CLASS MAIL
- ☐ VIA ELECTRONIC FILING (EDIS)
- ☐ VIA OVERNIGHT COURIER
- ☒ VIA HAND DELIVERY (2 Copies)
- ☒ VIA EMAIL (Word format to Gregory.Moldafsky@usitc.gov)

Vu Bui
Office of Unfair Import Investigations
U.S. International Trade Commission
500 E Street, SW
Washington, DC 20436

- ☐ VIA FIRST CLASS MAIL
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- ☒ VIA HAND DELIVERY (2 Copies)
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IPR2025-01541

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/s/ DS
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Senior Paralegal
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UNITED STATES INTERNATIONAL TRADE COMMISSION
WASHINGTON, D.C.

Before the Honorable Thomas B. Pender
Administrative Law Judge

IN THE MATTER OF:	)	
CERTAIN WIRELESS HANDSETS	)	Inv. No. 337-TA-943

RESPONDENT ALIPHCOM D/B/A JAWBONE'S RESPONSE TO COMPLAINANT'S STATEMENT OF PUBLIC INTEREST, COMPLAINT UNDER SECTION 337 OF THE TARIFF ACT OF 1930, AND NOTICE OF INVESTIGATION

RESPONDENTS:

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February 2, 2015

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PRELIMINARY STATEMENT

Pursuant to Commission Rule 210.13 (19 C.F.R. § 210.13), Respondent AliphCom d/b/a Jawbone ("Jawbone" or "Respondent") submits the following Response to the Statement of Public Interest and Complaint filed by Complainant One-E-Way ("One-E-Way" or "Complainant") on December 4, 2014, as well as to the U.S. International Trade Commission's ("Commission") Notice of Institution issued on January 8, 2015 and published in the Federal Register on January 13, 2015 (80 Fed. Reg. 1663-1664).

Jawbone denies that it has directly, or through its affiliates or third parties, engaged in acts of unfair competition or otherwise violated section 337 by importing, selling for importation, and/or selling within the United States after importation any product that infringes literally and/or under the doctrine of equivalents, either directly, contributorily, and/or by inducement, any valid and enforceable claim of United States Patent No. 7,865,258 (the "'258 Patent"), and/or United States Patent No. 8,131,391 (the "'391 Patent"), (collectively, the "Asserted Patents"). Jawbone further denies that any claim of the Asserted Patent is valid and/or enforceable. Except as specifically admitted herein, Jawbone denies all allegations of the Complaint and Notice of Investigation.

Given the recency of this investigation, Jawbone has not had sufficient time and opportunity to collect and review all of the information that may be relevant and necessary to respond to the matters raised in the Complaint. To the extent that any allegations of the Complaint refer to or rely upon such information, Jawbone is without information sufficient to admit or deny such allegations, and therefore denies the same. Moreover, Jawbone reserves the right to take such further positions and raise additional defenses based on further information that may be discovered subsequent to the filing of this Response.

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RESPONSE TO STATEMENT OF PUBLIC INTEREST

To the extent that Complainant's Statement of Public Interest contains factual allegations regarding Jawbone or Jawbone products, Jawbone denies that such factual allegations are entirely accurate or complete. To the extent Complainant's Statement of Public Interest contains factual allegations that do not pertain to Jawbone or Jawbone products, Jawbone lacks sufficient information to form a belief as to the truth of such allegations and therefore denies them. Jawbone disputes Complainant's contention that an exclusion order banning importation of the accused Jawbone products would not implicate significant public health, safety, or welfare concerns in the United States. Jawbone reserves the right to take discovery, introduce evidence, and make arguments regarding public interest issues throughout the course of this Investigation.

RESPONSE TO COMPLAINT

In the following sections, each heading and paragraph number refers to the respective heading and paragraph number used in the Complaint. Reproducing the headings and paragraph numbers of the Complaint is done only for convenience, and does not indicate any agreement or other endorsement by Jawbone of such headings and any text of the Complaint. Jawbone denies any and all allegations made in the Complaint that are not specifically and expressly admitted below.

I. INTRODUCTION

1. Jawbone admits that Complainant One-E-Way, Inc. ("One-E-Way" or "Complainant") filed their Complaint requesting that the U.S. International Trade Commission institute an investigation pursuant to section 337 of the Tariff Act of 1930, as amended, regarding alleged importation, sale for importation, and/or sale within the United States after importation of certain wireless headsets. Jawbone also admits that it is listed as a Respondent on the Complaint, as alleged in paragraph 1 of the Complaint. Jawbone denies that it has engaged

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in violations of section 337 and denies the remaining allegations of paragraph 1 of the Complaint made with respect to Jawbone or Jawbone products. Jawbone lacks knowledge or information sufficient to form a belief as to the truth of the remaining allegations in paragraph 1 of the Complaint and therefore denies them.

2. Jawbone admits that Exhibit 1 to the Complaint purports to be a copy of the '258 Patent. Jawbone admits that Exhibit 2 to the Complaint purports to be a copy of the '391 Patent. Jawbone also admits that Exhibit 3 to the Complaint purports to include various documents regarding alleged assignment of the '258. Jawbone also admits that Exhibit 4 to the Complaint purports to include various document regarding alleged assignment of the '391 Patent. Jawbone lacks knowledge or information sufficient to form a belief as to the truth of the remaining allegations in paragraph 2 of the Complaint, and, on that basis, denies them.

3. Jawbone denies that it has engaged in unfair acts in violation of Section 337 through the unlawful importation, sale for importation, and/or sale after importation of wireless audio devices. Jawbone lacks knowledge or information sufficient to form a belief as to the truth of the remaining allegations in paragraph 3 of the Complaint, and, on that basis, denies them.

4. Jawbone lacks knowledge or information sufficient to form a belief as to the truth of the allegations in paragraph 4 of the Complaint, and, on that basis, denies them.

5. Jawbone admits that Complainant seeks a limited exclusion order and cease and desist orders. Jawbone denies that Complainant is entitled to the relief described in paragraph 5of the Complaint or to any other or different relief and denies any and all remaining allegations contained in paragraph 5 of the Complaint.

II. COMPLAINANTS

6. Jawbone lacks knowledge or information sufficient to form a belief as to the truth of the allegations in paragraph 6 of the Complaint, and, on that basis, denies them.

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III. RESPONDENTS

Sony, Sony America and Sony Electronics

7. Jawbone lacks knowledge or information sufficient to form a belief as to the truth of the allegations in paragraph 7 of the Complaint, and, on that basis, denies them.

8. Jawbone lacks knowledge or information sufficient to form a belief as to the truth of the allegations in paragraph 8 of the Complaint, and, on that basis, denies them.

9. Jawbone lacks knowledge or information sufficient to form a belief as to the truth of the allegations in paragraph 9 of the Complaint, and, on that basis, denies them.

10. Jawbone lacks knowledge or information sufficient to form a belief as to the truth of the allegations in paragraph 10 of the Complaint, and, on that basis, denies them.

Sennheiser and Sennheiser America

11. Jawbone lacks knowledge or information sufficient to form a belief as to the truth of the allegations in paragraph 11 of the Complaint, and, on that basis, denies them.

12. Jawbone lacks knowledge or information sufficient to form a belief as to the truth of the allegations in paragraph 12 of the Complaint, and, on that basis, denies them.

13. Jawbone lacks knowledge or information sufficient to form a belief as to the truth of the allegations in paragraph 13 of the Complaint, and, on that basis, denies them.

BlueAnt and BlueAnt-US

14. Jawbone lacks knowledge or information sufficient to form a belief as to the truth of the allegations in paragraph 14 of the Complaint, and, on that basis, denies them.

15. Jawbone lacks knowledge or information sufficient to form a belief as to the truth of the allegations in paragraph 15 of the Complaint, and, on that basis, denies them.

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Creative and Creative Labs

16. Jawbone lacks knowledge or information sufficient to form a belief as to the truth of the allegations in paragraph 16 of the Complaint, and, on that basis, denies them.

17. Jawbone lacks knowledge or information sufficient to form a belief as to the truth of the allegations in paragraph 17 of the Complaint, and, on that basis, denies them.

18. Jawbone lacks knowledge or information sufficient to form a belief as to the truth of the allegations in paragraph 18 of the Complaint, and, on that basis, denies them.

Beats and Beats Ireland

19. Jawbone lacks knowledge or information sufficient to form a belief as to the truth of the allegations in paragraph 19 of the Complaint, and, on that basis, denies them.

20. Jawbone lacks knowledge or information sufficient to form a belief as to the truth of the allegations in paragraph 20 of the Complaint, and, on that basis, denies them.

21. Jawbone lacks knowledge or information sufficient to form a belief as to the truth of the allegations in paragraph 21 of the Complaint, and, on that basis, denies them.

Jawbone

22. Jawbone admits that AliphCom d/b/a Jawbone is a California Corporation and that Jawbone has its principal place of business at 99 Rhode Island Street, 3rd Floor, San Francisco, California 94103. Jawbone denies the remaining allegations in paragraph 22 of the Complaint.

Jabra

23. Jawbone lacks knowledge or information sufficient to form a belief as to the truth of the allegations in paragraph 23 of the Complaint, and, on that basis, denies them.

IV. THE TECHNOLOGIES AND PRODUCTS AT ISSUE

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24. Jawbone lacks knowledge or information sufficient to form a belief as to the truth of the allegations in paragraph 24 of the Complaint, and, on that basis, denies them.

V. THE PATENTS-IN-SUIT

25. Jawbone admits that the '391 Patent purports to be the result of U.S. Application No. 12/940,747, which on its face, claims to be a continuation-in-part of Application No. 12/570,343, which issued as the '258 Patent. The '391 Patent and the '258 Patent appear to share an identical specification and both claim priority to U.S. Patent Application No. 10/027,391, filed on December 21, 2001. Jawbone lacks knowledge or information sufficient to form a belief as to the truth of the remaining allegations in paragraph 25 of the Complaint, and, on that basis, denies them.

A. The '258 Patent

Identification of the Patent and Ownership by One-E-Way

26. Jawbone admits that the '258 Patent is entitled "Wireless Digital Audio System," that it issued on January 4, 2011, and that it names C. Earl Woolfork as the sole inventor. Jawbone admits that Exhibit 1 to the Complaint purports to be a copy of the '258 Patent. Jawbone also admits Exhibit 3 to the Complaint purports to include various documents regarding alleged assignment of the '258 patent. Jawbone lacks knowledge or information sufficient to form a belief as to the truth of the remaining allegations in paragraph 26 of the Complaint, and, on that basis, denies them.

27. Jawbone admits that Appendix A and B to the Complaint purports to be a copy of the '258 Patent prosecution history and cited references. Jawbone lacks knowledge or information sufficient to form a belief as to the truth of the remaining allegations in paragraph 27 of the Complaint, and, on that basis, denies them.

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Non-Technical Description of the Patented Invention

28. Jawbone denies any and all allegations of paragraph 28 to the extent they purport to apply to Jawbone. Jawbone lacks knowledge or information sufficient to form a belief as to the truth of all other allegations in paragraph 28 of the Complaint, and on that basis, denies them.

29. Jawbone denies any and all allegations of paragraph 28 to the extent they purport to apply to Jawbone. Jawbone lacks knowledge or information sufficient to form a belief as to the truth of all other allegations in paragraph 28 of the Complaint, and on that basis, denies them.

B. The '391 Patent

Identification of the Patent and Ownership by One-E-Way

30. Jawbone admits that the '391 Patent is entitled "Wireless Digital Audio System," that it issued on March 6, 2012, and that it names C. Earl Woolfork as the sole inventor. Jawbone admits that Exhibit 2 to the Complaint purports to be a copy of the '391 Patent. Jawbone also admits Exhibit 4 to the Complaint purports to include various documents regarding alleged assignment of the '391 patent. Jawbone lacks knowledge or information sufficient to form a belief as to the truth of the remaining allegations in paragraph 30 of the Complaint, and, on that basis, denies them.

31. Jawbone admits that Appendix C and D to the Complaint purports to be respectively a copy of the '391 Patent prosecution history and cited references. Jawbone lacks knowledge or information sufficient to form a belief as to the truth of the remaining allegations in paragraph 31 of the Complaint, and, on that basis, denies them.

Non-Technical Description of the Patented Invention

32. Jawbone denies any and all allegations of paragraph 32 to the extent they purport to apply to Jawbone. Jawbone lacks knowledge or information sufficient to form a belief as to the truth of all other allegations in paragraph 32 of the Complaint, and on that basis, denies them.

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33. Jawbone denies any and all allegations of paragraph 33 to the extent they purport to apply to Jawbone. Jawbone lacks knowledge or information sufficient to form a belief as to the truth of all other allegations in paragraph 33 of the Complaint, and on that basis, denies them.

VI. UNFAIR ACTS OF THE RESPONDENTS

A. Sony, Sony America, and Sony Electronics

34. Jawbone lacks knowledge or information sufficient to form a belief as to the truth of the allegations in paragraph 34 of the Complaint, and on that basis, denies them.

35. Jawbone lacks knowledge or information sufficient to form a belief as to the truth of the allegations in paragraph 35 of the Complaint, and on that basis, denies them.

36. Jawbone lacks knowledge or information sufficient to form a belief as to the truth of the allegations in paragraph 36 of the Complaint, and on that basis, denies them.

37. Jawbone lacks knowledge or information sufficient to form a belief as to the truth of the allegations in paragraph 37 of the Complaint, and on that basis, denies them.

38. Jawbone lacks knowledge or information sufficient to form a belief as to the truth of the allegations in paragraph 38 of the Complaint, and on that basis, denies them.

39. Jawbone lacks knowledge or information sufficient to form a belief as to the truth of the allegations in paragraph 39 of the Complaint, and on that basis, denies them.

40. Jawbone lacks knowledge or information sufficient to form a belief as to the truth of the allegations in paragraph 40 of the Complaint, and on that basis, denies them.

B. Sennheiser and Sennheiser America

41. Jawbone lacks knowledge or information sufficient to form a belief as to the truth of the allegations in paragraph 41 of the Complaint, and on that basis, denies them.

42. Jawbone lacks knowledge or information sufficient to form a belief as to the truth of the allegations in paragraph 42 of the Complaint, and on that basis, denies them.

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43. Jawbone lacks knowledge or information sufficient to form a belief as to the truth of the allegations in paragraph 43 of the Complaint, and on that basis, denies them.

44. Jawbone lacks knowledge or information sufficient to form a belief as to the truth of the allegations in paragraph 44 of the Complaint, and on that basis, denies them.

45. Jawbone lacks knowledge or information sufficient to form a belief as to the truth of the allegations in paragraph 45 of the Complaint, and on that basis, denies them.

46. Jawbone lacks knowledge or information sufficient to form a belief as to the truth of the allegations in paragraph 46 of the Complaint, and on that basis, denies them.

47. Jawbone lacks knowledge or information sufficient to form a belief as to the truth of the allegations in paragraph 47 of the Complaint, and on that basis, denies them.

C. BlueAnt and BlueAnt-US

48. Jawbone lacks knowledge or information sufficient to form a belief as to the truth of the allegations in paragraph 48 of the Complaint, and on that basis, denies them.

49. Jawbone lacks knowledge or information sufficient to form a belief as to the truth of the allegations in paragraph 49 of the Complaint, and on that basis, denies them.

50. Jawbone lacks knowledge or information sufficient to form a belief as to the truth of the allegations in paragraph 50 of the Complaint, and on that basis, denies them.

51. Jawbone lacks knowledge or information sufficient to form a belief as to the truth of the allegations in paragraph 51 of the Complaint, and on that basis, denies them.

52. Jawbone lacks knowledge or information sufficient to form a belief as to the truth of the allegations in paragraph 52 of the Complaint, and on that basis, denies them.

53. Jawbone lacks knowledge or information sufficient to form a belief as to the truth of the allegations in paragraph 53 of the Complaint, and on that basis, denies them.

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54. Jawbone lacks knowledge or information sufficient to form a belief as to the truth of the allegations in paragraph 54 of the Complaint, and on that basis, denies them.

D. Creative and Creative Labs

55. Jawbone lacks knowledge or information sufficient to form a belief as to the truth of the allegations in paragraph 55 of the Complaint, and on that basis, denies them.

56. Jawbone lacks knowledge or information sufficient to form a belief as to the truth of the allegations in paragraph 56 of the Complaint, and on that basis, denies them.

57. Jawbone lacks knowledge or information sufficient to form a belief as to the truth of the allegations in paragraph 57 of the Complaint, and on that basis, denies them.

58. Jawbone lacks knowledge or information sufficient to form a belief as to the truth of the allegations in paragraph 58 of the Complaint, and on that basis, denies them.

59. Jawbone lacks knowledge or information sufficient to form a belief as to the truth of the allegations in paragraph 59 of the Complaint, and on that basis, denies them.

60. Jawbone lacks knowledge or information sufficient to form a belief as to the truth of the allegations in paragraph 60 of the Complaint, and on that basis, denies them.

61. Jawbone lacks knowledge or information sufficient to form a belief as to the truth of the allegations in paragraph 61 of the Complaint, and on that basis, denies them.

E. Beats and Beats Ireland

62. Jawbone lacks knowledge or information sufficient to form a belief as to the truth of the allegations in paragraph 62 of the Complaint, and on that basis, denies them.

63. Jawbone lacks knowledge or information sufficient to form a belief as to the truth of the allegations in paragraph 63 of the Complaint, and on that basis, denies them.

64. Jawbone lacks knowledge or information sufficient to form a belief as to the truth of the allegations in paragraph 64 of the Complaint, and on that basis, denies them.

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65. Jawbone lacks knowledge or information sufficient to form a belief as to the truth of the allegations in paragraph 65 of the Complaint, and on that basis, denies them.

66. Jawbone lacks knowledge or information sufficient to form a belief as to the truth of the allegations in paragraph 66 of the Complaint, and on that basis, denies them.

67. Jawbone lacks knowledge or information sufficient to form a belief as to the truth of the allegations in paragraph 67 of the Complaint, and on that basis, denies them.

68. Jawbone lacks knowledge or information sufficient to form a belief as to the truth of the allegations in paragraph 68 of the Complaint, and on that basis, denies them.

F. Jawbone

69. Jawbone denies that it makes or has made products that infringe any claim of any Patents-in-Suit. Jawbone lacks knowledge or information sufficient to form a belief as to the truth of the remaining allegations in paragraph 69 of the Complaint, and on that basis, denies them.

70. Jawbone admits that Exhibit 20 purports to be an image of ERA headsets with images of the physical product contained in Exhibit 48. Jawbone lacks knowledge or information sufficient to form a belief as to the truth of the remaining allegations in paragraph 69 of the Complaint, and on that basis, denies them.

71. Jawbone admits that it imports, sells, and offers for sale wireless headsets. To the extent paragraph 71 contains allegations regarding certain third-party activities, Jawbone lacks knowledge or information sufficient to form a belief as to the truth of such allegations, and on that basis, denies them.

72. Jawbone admits that Exhibit 21 purports to be a claim chart alleging infringement. Jawbone denies that it directly infringes the '391 Patent. Jawbone lacks knowledge or

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information sufficient to form a belief as to the truth of the remaining allegations in paragraph 72 of the Complaint, and on that basis, denies them.

73. Jawbone admits that Exhibit 22 purports to be a claim chart alleging indirect infringement of the '258 and '391 Patents. Jawbone denies that it indirectly infringes the '258 and '391 Patents. Jawbone lacks knowledge or information sufficient to form a belief as to the truth of the remaining allegations in paragraph 73 of the Complaint, and on that basis, denies them.

74. Jawbone denies that it received a written notice on August 8, 2014 from Complainants regarding infringement. Jawbone lacks knowledge or information sufficient to form a belief as to the truth of the remaining allegations in paragraph 74 of the Complaint, and on that basis, denies them.

75. Jawbone denies that it actively induced others to directly infringe the Patents-in-Suit. Jawbone lacks knowledge or information sufficient to form a belief as to the truth of the remaining allegations in paragraph 75 of the Complaint, and on that basis, denies them.

G. Jabra

76. Jawbone lacks knowledge or information sufficient to form a belief as to the truth of the allegations in paragraph 76 of the Complaint, and on that basis, denies them.

77. Jawbone lacks knowledge or information sufficient to form a belief as to the truth of the allegations in paragraph 77 of the Complaint, and on that basis, denies them.

78. Jawbone lacks knowledge or information sufficient to form a belief as to the truth of the allegations in paragraph 78 of the Complaint, and on that basis, denies them.

79. Jawbone lacks knowledge or information sufficient to form a belief as to the truth of the allegations in paragraph 79 of the Complaint, and on that basis, denies them.

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80. Jawbone lacks knowledge or information sufficient to form a belief as to the truth of the allegations in paragraph 80 of the Complaint, and on that basis, denies them.

81. Jawbone lacks knowledge or information sufficient to form a belief as to the truth of the allegations in paragraph 81 of the Complaint, and on that basis, denies them.

82. Jawbone lacks knowledge or information sufficient to form a belief as to the truth of the allegations in paragraph 82 of the Complaint, and on that basis, denies them.

VII. SPECIFIC INSTANCES OF UNFAIR IMPORTATION AND SALE

83. Jawbone lacks knowledge or information sufficient to form a belief as to the truth of the allegations in paragraph 83 of the Complaint, and on that basis, denies them.

84. Jawbone lacks knowledge or information sufficient to form a belief as to the truth of the allegations in paragraph 84 of the Complaint, and on that basis, denies them.

85. Jawbone lacks knowledge or information sufficient to form a belief as to the truth of the allegations in paragraph 85 of the Complaint, and on that basis, denies them.

86. Jawbone lacks knowledge or information sufficient to form a belief as to the truth of the allegations in paragraph 86 of the Complaint, and on that basis, denies them.

87. Jawbone lacks knowledge or information sufficient to form a belief as to the truth of the allegations in paragraph 87 of the Complaint, and on that basis, denies them.

88. Jawbone admits that Exhibit 31 purports to be a copy of a receipt from a purchase of a Jawbone product. Jawbone lacks knowledge or information sufficient to form a belief as to the truth of the remaining allegations in paragraph 88 of the Complaint, and on that basis, denies them.

89. Jawbone lacks knowledge or information sufficient to form a belief as to the truth of the allegations in paragraph 89 of the Complaint, and on that basis, denies them.

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VIII. CLASSIFICATION OF THE INFRINGING PRODUCTS UNDER THE HARMONIZED TARIFF SCHEDULE OF THE UNITES STATES

90. Jawbone admits that certain of its wireless headset products and specifically, the "ERA Headset" identified in paragraph 90 of the Complaint, are imported into the United States under Harmonized Tariff Schedule number 8517.62.0050. Jawbone denies all remaining allegations of paragraph 90 of the Complaint with respect to Jawbone. Jawbone lacks knowledge or information sufficient to form a belief as to the truth of the remaining allegations in paragraph 90 of the Complaint, and on that basis, denies them.

IX. RELATED LITIGATION

91. Jawbone lacks knowledge or information sufficient to form a belief as to the truth of the remaining allegations in paragraph 91 of the Complaint and therefore denies them.

X. DOMESTIC INDUSTRY

92. Paragraph 92 of the Complaint contains legal assertions and conclusions to which no response is required. To the extent paragraph 92 of the Complaint contains factual allegations, Jawbone lacks knowledge or information sufficient to form a belief as to the truth of such allegations and on that basis, denies them.

A. One-E-Way's Development of the Domestic Industry

93. Paragraph 93 of the Complaint contains legal assertions and conclusions to which no response is required. Jawbone admits that Complainants attached purported images of the Patented Products to the Complaint in Exhibit33. Jawbone admits that Complainants attached purported claim charts to the Complaint as Exhibits 34-35. Jawbone also admits that attached to the Complaint as Exhibit 36 is a purported declaration providing details regarding One-E-Way's business. Paragraph 93 of the Complaint contains legal assertions and conclusions to which no response is required. To the extent paragraph 93 of the Complaint contains factual allegations,

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Jawbone lacks knowledge or information sufficient to form a belief as to the truth of such allegations and on that basis, denies them.

B. One-E-Way Licensees' Development of the Domestic Industry

94. Paragraph 94 of the Complaint contains legal assertions and conclusions to which no response is required. To the extent paragraph 94 of the Complaint contains factual allegations, Jawbone lacks knowledge or information sufficient to form a belief as to the truth of such allegations and on that basis, denies them.

95. Jawbone admits that Exhibit 37 attached to the Complaint is a purported image of Plantronics Licensed Products and Exhibits 38-39 are purported claim charts to the Complaint. Paragraph 95 of the Complaint contains legal assertions and conclusions to which no response is required. To the extent paragraph 95 of the Complaint contains factual allegations, Jawbone lacks knowledge or information sufficient to form a belief as to the truth of such allegations and on that basis, denies them.

96. Paragraph 96 of the Complaint contains legal assertions and conclusions to which no response is required. To the extent paragraph 96 of the Complaint contains factual allegations, Jawbone lacks knowledge or information sufficient to form a belief as to the truth of such allegations and on that basis, denies them.

97. Paragraph 97 of the Complaint contains legal assertions and conclusions to which no response is required. To the extent paragraph 97 of the Complaint contains factual allegations, Jawbone lacks knowledge or information sufficient to form a belief as to the truth of such allegations and on that basis, denies them.

98. Jawbone admits that Exhibit 40 attached to the Complaint is a purported image of Jaybird Licensed Products and Exhibits 41-42 are purported claim charts to the Complaint. Paragraph 98 of the Complaint contains legal assertions and conclusions to which no response is

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required. To the extent paragraph 98 of the Complaint contains factual allegations, Jawbone lacks knowledge or information sufficient to form a belief as to the truth of such allegations and on that basis, denies them.

99. Paragraph 99 of the Complaint contains legal assertions and conclusions to which no response is required. To the extent paragraph 99 of the Complaint contains factual allegations, Jawbone lacks knowledge or information sufficient to form a belief as to the truth of such allegations and on that basis, denies them.

100. Paragraph 100 of the Complaint contains legal assertions and conclusions to which no response is required. To the extent paragraph 100 of the Complaint contains factual allegations, Jawbone lacks knowledge or information sufficient to form a belief as to the truth of such allegations and on that basis, denies them.

XI. RELIEF REQUESTED

101. Jawbone denies that Complainants are entitled to the requested relief in section XI a) through e) of the Complaint or any other different relief.

RESPONSE TO THE NOTICE OF INVESTIGATION

Pursuant to Commission Rule 210.13, Jawbone responds to the Notice of Investigation issued by the U.S. International Trade Commission on January 8, 2015, and published in the Federal Register on January 13, 2015 (80 Fed. Reg. 1663-1664).

Jawbone admits that the Commission issued an original Notice of Investigation, based on the Complaint filed by Complainants on December 4, 2014, which published in the Federal Register on January 13, 2015 (80 Fed. Reg. 1663-1664). Jawbone admits that the Complaint generally sets forth the allegations summarized in the Notice of Investigation, but denies those allegations with respect to Jawbone. Jawbone admits that, as set forth in the Notice of Investigation, Complainants requested that an investigation be instituted and that, after the

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investigation, a limited exclusion order, or cease and desist orders be issued, but denies that Complainants are entitled to any such relief.

Jawbone denies that there has been any violation of Section 337 by Jawbone. In addition, Jawbone contends that one or more asserted claims of the Asserted Patents are invalid and cannot support any remedy for alleged infringement. Jawbone further contends that it has performed no unfair act, that Complainants have no domestic industry, and that the requested relief is not in the public interest.

ADDITIONAL INFORMATION REQUIRED UNDER COMMISSION RULE 210.13(b)

By providing the following information, Jawbone intends only to supply data required by 19 C.F.R. § 210.13(b). Jawbone specifically denies that any of the information or data supplied below, or in the exhibits accompanying this Response, relates to or supports any allegation of infringement against Jawbone or any violation of 19 U.S.C. § 1337 by Jawbone.

The quantity and estimated value of Jawbone's imports of the accused Jawbone product identified in the Complaint, Jawbone ERA Headset ("Accused Jawbone Product") are provided in Confidential Exhibit A to this Response.

The manufacturer of the Accused Jawbone Product is identified in Confidential Exhibit A to this Response.

Purchases in the United States account for a significant percentage of Jawbone wireless headsets that Jawbone sells worldwide.

AFFIRMATIVE DEFENSES

Jawbone alleges and asserts the following defenses in response to the allegations in the Complaint, and undertakes the burden of proof only as to those defenses that are deemed by law to be affirmative defenses. Jawbone has not had sufficient opportunity to collect and review

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information in connection with this Investigation that is relevant to potentially available defenses against the allegations in the Complaint. Jawbone reserves the right to supplement and/or amend its defenses as the Investigation progresses and based on discovery. Jawbone also reserves the right to rely upon any defense(s) raised by any other party to this Investigation.

First Affirmative Defense
(Non-Infringement)

1. Although Jawbone does not bear the burden of proof on this issue, has not directly infringed, indirectly infringed, contributed to, or induced infringement of any valid and enforceable claim of the '258 and '391 patents, including asserted claims 3, 4, 8, 10 and 11 of the '258 Patent; asserted claims 1, 2, 3, 4, 5, 6 and 10 of the '391 Patent (collectively, the "Asserted Claims").

Second Affirmative Defense
(Invalidity)

2. Upon information and belief, one or more Asserted Claims of the Asserted Patents are invalid for failure to comply with one or more of the requirements of patentability set forth in the Patent Act, including, but not limited to 35 U.S.C. §§ 101, 102, 103, 112, 115, and/or 116.

3. Upon information and belief, one or more Asserted Claims are invalid under 35 U.S.C. § 101 for failing to claim patent eligible subject matter and for lacking utility.

4. Upon information and belief, one or more Asserted Claims are invalid under 35 U.S.C. §§ 102 and/or 103 as anticipated by, or obvious in light of, at least the prior art references cited by the examiner during prosecution of asserted patents and related applications; prior art references disclosed during prosecution of those applications; prior art references disclosed during reexamination of those applications; prior art identified in Exhibit B to this response; and/or additional prior art to be produced in discovery. Jawbone incorporates by reference all

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prior art references identified by all the other Respondents in this Investigation in each of their respective Responses to the Complaint. Jawbone is in the process of identifying additional relevant prior art, including through discovery, which is in its early stages at the time of this Response. Jawbone will set forth further invalidity allegations and contentions upon obtaining relevant prior art and consistent with the forthcoming schedule in this Investigation.

5. Upon information and belief, one or more Asserted Claims are also invalid for failure to meet the requirements of 35 U.S.C. § 112 as a result of the specification lacking sufficient written description, failing to particularly point out and distinctly claim the subject matter which the inventors regarded as the alleged invention, and/or failing to set forth a written description sufficient to enable any person skilled in the art to make and use the alleged invention.

Third Affirmative Defense
(Prosecution History Estoppel)

6. Upon information and belief, Complainants are precluded by the doctrine of prosecution history estoppel and/or by prior art from asserting any construction of some or all of the claims of the Asserted Patents, or from asserting infringement under the doctrine of equivalents, that could cover any products used, imported, sold, or offered for sale by Jawbone due to certain arguments, cancellations, representations, admissions and statements made to the USPTO during the prosecution of the applications that resulted in the asserted patents and applications related thereto.

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Fourth Affirmative Defense
(Lack of Domestic Industry)

7. On information and belief, Complainants cannot establish a domestic industry for the Asserted Patents exists or is in the process of being established as required under Section 337(a)(2) and as defined in part by Section 337(a)(3) of the Tariff Act of 1930, as amended.

Fifth Affirmative Defense
(Standing)

8. To the extent that Complainants do not have substantially all rights to the asserted '258 and/or '391 Patents or the purported assignments are defective for any reason, Complainants lack standing to bring this action.

Sixth Affirmative Defense
(No Unfair Act)

9. Jawbone has not committed an unfair act in violation of Section 337.

Seventh Affirmative Defense
(Equitable Defenses)

10. Upon information and belief, Complainants claims for relief are barred, in whole or in part, by defenses of license (either express or implied), waiver, estoppel, patent exhaustion, and/or unclean hands.

Eighth Affirmative Defense
(Lack of Importation)

11. Although Jawbone does not bear the burden of proof on this issue, no Accused Jawbone Product infringes or is able to infringe the Asserted Claims of the Asserted Patents at the time of importation.

Ninth Affirmative Defense
(Public Interest)

12. The relief request by Complainant would not further the public interest, but would adversely affect the public welfare, competitive conditions and the U.S. consumer.

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Tenth Affirmative Defense
(Unenforceability of All Asserted Patents Based on Patent Misuse)

12. Complainant knows and has known that the asserted patents are invalid and/or unenforceable based on the prior art disclosed by the patent office and defendants in the prior litigation.

13. By knowingly raising claims of infringement of invalid and/or unenforceable patents, Complainant has attempted to impermissibly broaden the temporal and physical scope of their patents with an anticompetitive effect.

14. Complainant's asserted patents are unenforceable based on patent misuse.

Eleventh Affirmative Defense
(Additional Defenses)

15. Jawbone reserves the right to assert additional defenses based on further discovery and investigation. Jawbone further adopts any relevant defenses that may be raised by any other Respondent in this Investigation.

CONCLUSION

WHEREFORE, by reason of the foregoing, Jawbone respectfully requests that the Commission issue an order:

A. determining that no violation of Section 337 of the Tariff Act of 1930, as amended, exists by reason of any manufacture, importation, offer for sale, or sale by Jawbone of any Certain Wireless Headsets as described in the Complaint and Notice of Investigation, and terminate the Investigation;

B. determining that Jawbone has not imported, sold for importation, or sold within the United States after importation any product covered by a valid and enforceable claim of the Asserted Patents;

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C. determining that Complainant's demands for relief are barred under 19 U.S.C. § 1337(d)(1), (f)(1), and (g)(1) because of the relief's effect upon the public health and welfare, competitive conditions in the United States economy, the production of like or directly competitive articles in the United States, and United States consumers;

D. denying Complainant's request for a limited exclusion order, cease and desist order, and all other relief requested as to Jawbone and/or its respective accused products;

E. awarding Jawbone its attorneys' fees and costs incurred in responding to the Complaint and defending this Investigation;

F. dismissing the Complaint and terminating the present Investigation; and

G granting such other relief as the Commission deems just and proper.

Dated: February 2, 2015

Respectfully submitted,

/s/ Stephen R. Smith

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EXHIBIT A

Will Be Filed Separately

EXHIBIT B

U.S. Patents Cited

U.S. No. 6,781,977
U.S. No. 6,473,449
U.S. No. 7,154,958
U.S. No. 6,731,706

Other References

Specification of the Bluetooth System Version 1.0B (issued Dec. 1, 1999).

Specification of the Bluetooth System Version 1.1 (issued Feb. 22, 2001).

Documents submitted and proposals presented by participants in the development of the IEEE 802.15 standard.

Samuel C. Yang, *CDMA RF System Engineering* (1998).

Andrew R. Cohen, et al., *A New Coding Technique for Asynchronous Multiple Access Communication,* IEEE Trans. On Commc'ns Tech., Vol. Com-19, pp. 849-855 (Oct. 1971).

Andrew J. Viterbi, *Error Bounds for Convolutional Codes and an Asymptotically Optimum Decoding Algorithm*, IEEE Trans. On Information Theory, Vol. IT-13, pp. 260-269 (Apr. 1967).

Haartsen, *The Bluetooth Radio System*, IEEE Personal Communications, Feb. 2000, pgs. 28 *et seq*.

Rappaport, *Wireless Communications: Principles and Practice*, 1996.

In the Matter of Certain Wireless Headsets
Investigation No. 337-TA-943

CERTIFICATE OF SERVICE

I hereby certify that on February 2, 2015, copies of **RESPONDENT ALIPHCOM D/B/A JAWBONE'S RESPONSE TO COMPLAINANTS' STATEMENT OF PUBLIC INTEREST, COMPLAINT UNDER SECTION 337 OF THE TARIFF ACT OF 1930, AND NOTICE OF INVESTIGATION** were filed and served upon the following parties as indicated:

The Honorable Lisa R. Barton
Secretary
U.S. International Trade Commission
500 E Street, SW
Washington, DC 20436

☒ Via EDIS
☒ Via Hand Delivery
☐ Via Overnight Delivery
☐ Not Served

The Honorable Thomas B. Pender
Administrative Law Judge
U.S. International Trade Commission
500 E Street, S.W., Room 317
Washington, DC 20436

☒ Via Hand Delivery (2 Copies)
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Dated: February 2, 2015

/s/ *Laura Williams*
Laura Williams
COOLEY LLP

UNITED STATES INTERNATIONAL TRADE COMMISSION
WASHINGTON, D.C. 20436

Before The Honorable Thomas B. Pender
Administrative Law Judge

In the Matter of CERTAIN WIRELESS HEADSETS	Investigation No. 337-TA-943

RESPONSE OF SONY CORPORATION, SONY CORPORATION OF AMERICA, AND SONY ELECTRONICS INC. TO THE COMPLAINT OF ONE-E-WAY UNDER SECTION 337 OF THE TARIFF ACT OF 1930, AS AMENDED, AND NOTICE OF INVESTIGATION

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Counsel for Respondents Sony Corporation, Sony Corporation of America, and Sony Electronics Inc.

February 2, 2015

Pursuant to 19 C.F.R. § 210.13, Respondents Sony Corporation ("SC"), Sony Corporation of America ("SCA"), and Sony Electronics Inc. ("SEL") (collectively, the "Sony Respondents") hereby respond to the Complaint filed pursuant to Section 337 of the Tariff Act of 1930, as amended, 19 U.S.C. § 1337 ("Section 337") by One-E-Way, Inc. ("One-E-Way" or "Complainant") on December 8, 2014 and to the Notice of Investigation issued by the United States International Trade Commission ("the Commission") on January 13, 2015. *See* 80 Fed. Reg. 1663 (Jan. 13, 2015).

Because discovery has just begun, the Sony Respondents have not had sufficient time and opportunity to collect and review all of the information that may be relevant to the issues raised in this Response. The Sony Respondents therefore reserve the right to amend or supplement this Response, including raising any additional defenses, based on any additional facts or developments that become available or that arise after the filing of this Response. In this light, the Sony Respondents deny each and every allegation averred in the Complaint that is not expressly admitted below. Any admission below is not an admission to any purported conclusions, characterizations, implications, or speculations that might follow from the admitted facts.

The Sony Respondents have adopted the headings in the Complaint for ease of reference. However, to the extent that such headings themselves contain factual and legal characterizations, the Sony Respondents deny such characterizations.

RESPONSE TO THE COMPLAINT

I. INTRODUCTION

1. The Sony Respondents admit that One-E-Way has requested that the United States International Trade Commission ("I.T.C") commence an investigation pursuant to Section

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337. The Sony Respondents admit that One-E-Way is asserting U.S. Patent Nos. 7,865,258 ("the '258 Patent") and 8,131,391 ("the '391 Patent") (collectively, "the Patents-in-Suit"). The Sony Respondents deny the remaining allegations contained in paragraph 1.

2. The Sony Respondents admit what purports to be certified copies of the Patents-in-Suit are attached to the Complaint as Exhibits 1 and 2. The Sony Respondents admit that what purports to be patent assignment records of the Patents-in-Suit are attached to the Complaint as Exhibits 3 and 4 of the Complaint. The Sony Respondents admit that One-E-Way is asserting claims 3-4, 8, and 10-11 of the '258 Patent and claims 1-6 and 10 of the '391 Patent. The Sony Respondents deny the remaining allegations contained in paragraph 2.

3. The Sony Respondents admit that One-E-Way has named as the Sony Respondents, Sennheiser Electronic GmbH & Co. KG, Sennheiser Electronic Corporation, BlueAnt Wireless Pty, Ltd., BlueAnt Wireless, Inc., Creative Technology Ltd., Creative Labs, Inc., Beats Electronics, LLC, Beats Electronics International Ltd., Jawbone, Inc., and GN Netcom A/S which does business as Jabra (collectively "Respondents"). The Sony Respondents deny the remaining allegations contained in paragraph 3.

4. The Sony Respondents are without knowledge or information sufficient to form a belief as to the truth of the allegations of paragraph 4, and therefore deny the same.

5. The Sony Respondents admit that One-E-Way is seeking relief, including a limited exclusion order pursuant to Section 337, and cease and desist orders directed to the Sony Respondents, but deny that One-E-Way is entitled to such relief.

II. COMPLAINANT

6. The Sony Respondents are without knowledge or information sufficient to form a belief as to the truth of the allegations of paragraph 6, and therefore deny the same.

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III. RESPONDENTS

Sony, Sony America and Sony Electronics

7. The Sony Respondents admit that SC is a corporation organized under the laws of Japan with its principal place of business at 1-7-1 Konan, Minato-ku, Tokyo 108-0075, Japan. The Sony Respondents deny the remaining allegations contained in paragraph 7.

8. The Sony Respondents admit that SCA is a corporation organized under the laws of the State of New York with its principal place of business at 550 Madison Avenue, New York, New York 10022. The Sony Respondents deny the remaining allegations contained in paragraph 8.

9. The Sony Respondents deny that SEL is a corporation organized under the laws of the State of California. The Sony Respondents admit that SEL has its principal place of business at 16530 Via Esprillo, San Diego, CA 92127. The Sony Respondents deny the remaining allegations contained in paragraph 9.

10. The Sony Respondents admit that SC is the direct or indirect corporate parent of a number of Sony-branded entities. The Sony Respondents admit that SC has certain responsibilities with respect to the business planning and manufacturing of Sony-branded products. The Sony Respondents admit that SCA is an indirect subsidiary of SC and SEL is a subsidiary of SCA. The Sony Respondents admit that SCA and SEL have certain responsibilities with respect to business planning, marketing, and sales of Sony-branded products within the United States. The Sony Respondents deny the remaining allegations of paragraph 10.

Sennheiser and Sennheiser America

11. The Sony Respondents are without knowledge or information sufficient to form a belief as to the truth of the allegations of paragraph 11, and therefore deny the same.

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12. The Sony Respondents are without knowledge or information sufficient to form a belief as to the truth of the allegations of paragraph 12, and therefore deny the same.

13. The Sony Respondents are without knowledge or information sufficient to form a belief as to the truth of the allegations of paragraph 13, and therefore deny the same.

BlueAnt and BlueAnt-US

14. The Sony Respondents are without knowledge or information sufficient to form a belief as to the truth of the allegations of paragraph 14, and therefore deny the same.

15. The Sony Respondents are without knowledge or information sufficient to form a belief as to the truth of the allegations of paragraph 15, and therefore deny the same.

Creative and Creative Labs

16. The Sony Respondents are without knowledge or information sufficient to form a belief as to the truth of the allegations of paragraph 16, and therefore deny the same.

17. The Sony Respondents are without knowledge or information sufficient to form a belief as to the truth of the allegations of paragraph 17, and therefore deny the same.

18. The Sony Respondents are without knowledge or information sufficient to form a belief as to the truth of the allegations of paragraph 18, and therefore deny the same.

Beats and Beats Ireland

19. The Sony Respondents are without knowledge or information sufficient to form a belief as to the truth of the allegations of paragraph 19, and therefore deny the same.

20. The Sony Respondents are without knowledge or information sufficient to form a belief as to the truth of the allegations of paragraph 20, and therefore deny the same.

21. The Sony Respondents are without knowledge or information sufficient to form a belief as to the truth of the allegations of paragraph 21, and therefore deny the same.

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Jawbone

22. The Sony Respondents are without knowledge or information sufficient to form a belief as to the truth of the allegations of paragraph 22, and therefore deny the same.

Jabra

23. The Sony Respondents are without knowledge or information sufficient to form a belief as to the truth of the allegations of paragraph 23, and therefore deny the same.

IV. THE TECHNOLOGIES AND PRODUCTS AT ISSUE

24. The Sony Respondents deny the allegations contained in paragraph 24.

V. THE PATENTS-IN-SUIT

25. The Sony Respondents admit that the face of the '391 Patent states that it issued from U.S. Patent Application No. 12/940,747 and purports to be a continuation of U.S. Patent Application No.12/570,343 which issued as the '258 Patent. The Sony Respondents admit that the '391 Patent and the '258 Patent purport to claim priority to U.S. Patent Application No. 10/027,391. The Sony Respondents are without knowledge or information sufficient to form a belief as to the truth of the remaining allegations of paragraph 25, and therefore deny the same.

A. The '258 Patent

26. The Sony Respondents admit the face of the '258 Patent states that it is entitled "Wireless Digital Audio System," issued on January 4, 2011, C. Earl Woolfork is the sole named inventor, and One-E-Way is the sole assignee. The Sony Respondents are without knowledge or information sufficient to form a belief as to the truth of the remaining allegations of paragraph 26, and therefore deny the same.

27. The Sony Respondents admit that what appears to be a certified copy of the prosecution history of the '258 Patent and reference documents mentioned in the prosecution

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history are attached to the Complaint in Appendices A and B. The Sony Respondents are without knowledge or information sufficient to form a belief as to the truth of the remaining allegations of paragraph 27, and therefore deny the same.

28. The Sony Respondents are without knowledge or information sufficient to form a belief as to the truth of the allegations of paragraph 28, and therefore deny the same.

29. The Sony Respondents are without knowledge or information sufficient to form a belief as to the truth of the allegations of paragraph 29, and therefore deny the same.

B. The '391 Patent

30. The Sony Respondents admit that the face of the '391 Patent states that it is entitled "Wireless Digital Audio System," issued on March 6, 2012, C. Earl Woolfork is the sole named inventor, and One-E-Way is the sole assignee. The '391 Patent purports to be a continuation of U.S. Patent Application No.12/570,343 which issued as the '258 Patent. The Sony Respondents are without knowledge or information sufficient to form a belief as to the truth of the allegations of paragraph 30, and therefore deny the same.

31. The Sony Respondents admit that what appears to be a certified copy of the prosecution history of the '391 Patent and reference documents mentioned in the prosecution history are attached to the Complaint in Appendices C and D. The Sony Respondents are without knowledge or information sufficient to form a belief as to the truth of the remaining allegations of paragraph 31, and therefore deny the same.

32. The Sony Respondents are without knowledge or information sufficient to form a belief as to the truth of the allegations of paragraph 32, and therefore deny the same.

33. The Sony Respondents are without knowledge or information sufficient to form a belief as to the truth of the allegations of paragraph 33, and therefore deny the same.

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VI. [PURPORTED] UNFAIR ACTS OF THE RESPONDENTS

A. Sony, Sony America and Sony Electronics

34. The Sony Respondents deny the allegations contained in paragraph 34.

35. The Sony Respondents admit that One-E-Way has accused the following products of patent infringement: Premium Bluetooth headsets (MDR-1RBT), Bluetooth and Noise Cancelling Headset (MDR-ZX750BN), Premium Bluetooth Wireless headsets (MDR-10RBT), Bluetooth headsets (DR-BTN200), and Stereo Bluetooth headset (SBH80) ("the Accused Products"). The Sony Respondents are without knowledge or information sufficient to form a belief as to the truth of the remaining allegations of paragraph 35, and therefore deny the same.

36. The Sony Respondents admit that the products listed in paragraph 35 are manufactured, assembled and/or packaged outside of the United States. The Sony Respondents further admit that the products listed in paragraph 35 are imported into the United States, sold for importation into the United States and/or sold after importation by the Sony Respondents. The Sony Respondents deny the remaining allegations contained in paragraph 36.

37. The Sony Respondents admit that what purports to be claim charts are attached to the Complaint as Exhibit 6. The Sony Respondents deny the remaining allegations contained in paragraph 37.

38. The Sony Respondents admit that what purports to be claim charts are attached to the Complaint as Exhibit 7. The Sony Respondents deny the remaining allegations contained in paragraph 38.

39. The Sony Respondents deny the allegations contained in paragraph 39.

40. The Sony Respondents deny the allegations contained in paragraph 40.

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B. Sennheiser and Sennheiser America

41. The Sony Respondents are without knowledge or information sufficient to form a belief as to the truth of the allegations of paragraph 41, and therefore deny the same.

42. The Sony Respondents are without knowledge or information sufficient to form a belief as to the truth of the allegations of paragraph 42, and therefore deny the same.

43. The Sony Respondents are without knowledge or information sufficient to form a belief as to the truth of the allegations of paragraph 43, and therefore deny the same.

44. The Sony Respondents are without knowledge or information sufficient to form a belief as to the truth of the allegations of paragraph 44, and therefore deny the same.

45. The Sony Respondents are without knowledge or information sufficient to form a belief as to the truth of the allegations of paragraph 45, and therefore deny the same.

46. The Sony Respondents are without knowledge or information sufficient to form a belief as to the truth of the allegations of paragraph 46, and therefore deny the same.

C. BlueAnt and BlueAnt-US

47. The Sony Respondents are without knowledge or information sufficient to form a belief as to the truth of the allegations of paragraph 47, and therefore deny the same.

48. The Sony Respondents are without knowledge or information sufficient to form a belief as to the truth of the allegations of paragraph 48, and therefore deny the same.

49. The Sony Respondents are without knowledge or information sufficient to form a belief as to the truth of the allegations of paragraph 49, and therefore deny the same.

50. The Sony Respondents are without knowledge or information sufficient to form a belief as to the truth of the allegations of paragraph 50, and therefore deny the same.

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51. The Sony Respondents are without knowledge or information sufficient to form a belief as to the truth of the allegations of paragraph 51, and therefore deny the same.

52. The Sony Respondents are without knowledge or information sufficient to form a belief as to the truth of the allegations of paragraph 52, and therefore deny the same.

53. The Sony Respondents are without knowledge or information sufficient to form a belief as to the truth of the allegations of paragraph 53, and therefore deny the same.

54. The Sony Respondents are without knowledge or information sufficient to form a belief as to the truth of the allegations of paragraph 54, and therefore deny the same.

D. Creative and Creative Labs

55. The Sony Respondents are without knowledge or information sufficient to form a belief as to the truth of the allegations of paragraph 55, and therefore deny the same.

56. The Sony Respondents are without knowledge or information sufficient to form a belief as to the truth of the allegations of paragraph 56, and therefore deny the same.

57. The Sony Respondents are without knowledge or information sufficient to form a belief as to the truth of the allegations of paragraph 57, and therefore deny the same.

58. The Sony Respondents are without knowledge or information sufficient to form a belief as to the truth of the allegations of paragraph 58, and therefore deny the same.

59. The Sony Respondents are without knowledge or information sufficient to form a belief as to the truth of the allegations of paragraph 59, and therefore deny the same.

60. The Sony Respondents are without knowledge or information sufficient to form a belief as to the truth of the allegations of paragraph 60, and therefore deny the same.

61. The Sony Respondents are without knowledge or information sufficient to form a belief as to the truth of the allegations of paragraph 61, and therefore deny the same.

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E. Beats and Beats Ireland

62. The Sony Respondents are without knowledge or information sufficient to form a belief as to the truth of the allegations of paragraph 62, and therefore deny the same.

63. The Sony Respondents are without knowledge or information sufficient to form a belief as to the truth of the allegations of paragraph 63, and therefore deny the same.

64. The Sony Respondents are without knowledge or information sufficient to form a belief as to the truth of the allegations of paragraph 64, and therefore deny the same.

65. The Sony Respondents are without knowledge or information sufficient to form a belief as to the truth of the allegations of paragraph 65, and therefore deny the same.

66. The Sony Respondents are without knowledge or information sufficient to form a belief as to the truth of the allegations of paragraph 66, and therefore deny the same.

67. The Sony Respondents are without knowledge or information sufficient to form a belief as to the truth of the allegations of paragraph 67, and therefore deny the same.

68. The Sony Respondents are without knowledge or information sufficient to form a belief as to the truth of the allegations of paragraph 68, and therefore deny the same.

F. Jawbone

69. The Sony Respondents are without knowledge or information sufficient to form a belief as to the truth of the allegations of paragraph 69, and therefore deny the same.

70. The Sony Respondents are without knowledge or information sufficient to form a belief as to the truth of the allegations of paragraph 70, and therefore deny the same.

71. The Sony Respondents are without knowledge or information sufficient to form a belief as to the truth of the allegations of paragraph 71, and therefore deny the same.

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72. The Sony Respondents are without knowledge or information sufficient to form a belief as to the truth of the allegations of paragraph 72, and therefore deny the same.

73. The Sony Respondents are without knowledge or information sufficient to form a belief as to the truth of the allegations of paragraph 73, and therefore deny the same.

74. The Sony Respondents are without knowledge or information sufficient to form a belief as to the truth of the allegations of paragraph 74, and therefore deny the same.

75. The Sony Respondents are without knowledge or information sufficient to form a belief as to the truth of the allegations of paragraph 75, and therefore deny the same.

G. Jabra

76. The Sony Respondents are without knowledge or information sufficient to form a belief as to the truth of the allegations of paragraph 76, and therefore deny the same.

77. The Sony Respondents are without knowledge or information sufficient to form a belief as to the truth of the allegations of paragraph 77, and therefore deny the same.

78. The Sony Respondents are without knowledge or information sufficient to form a belief as to the truth of the allegations of paragraph 78, and therefore deny the same.

79. The Sony Respondents are without knowledge or information sufficient to form a belief as to the truth of the allegations of paragraph 79, and therefore deny the same.

80. The Sony Respondents are without knowledge or information sufficient to form a belief as to the truth of the allegations of paragraph 80, and therefore deny the same.

81. The Sony Respondents are without knowledge or information sufficient to form a belief as to the truth of the allegations of paragraph 81, and therefore deny the same.

82. The Sony Respondents are without knowledge or information sufficient to form a belief as to the truth of the allegations of paragraph 82, and therefore deny the same.

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VII. [PURPORTED] SPECIFIC INSTANCES OF UNFAIR IMPORTATION AND SALE

83. The Sony Respondents are without knowledge or information sufficient to form a belief as to the truth of the allegations of paragraph 83, and therefore deny the same.

84. The Sony Respondents are without knowledge or information sufficient to form a belief as to the truth of the allegations of paragraph 84, and therefore deny the same.

85. The Sony Respondents are without knowledge or information sufficient to form a belief as to the truth of the allegations of paragraph 85, and therefore deny the same.

86. The Sony Respondents are without knowledge or information sufficient to form a belief as to the truth of the allegations of paragraph 86, and therefore deny the same.

87. The Sony Respondents are without knowledge or information sufficient to form a belief as to the truth of the allegations of paragraph 87, and therefore deny the same.

88. The Sony Respondents are without knowledge or information sufficient to form a belief as to the truth of the allegations of paragraph 88, and therefore deny the same.

89. The Sony Respondents are without knowledge or information sufficient to form a belief as to the truth of the allegations of paragraph 89, and therefore deny the same.

VIII. CLASSIFICATION OF THE [ALLEGEDLY] INFRINGING PRODUCTS UNDER THE HARMONIZED TARIFF SCHEDULE OF THE UNITED STATES

90. The Sony Respondents admit that the Sony products identified in the Complaint are classifiable under the Harmonized Tariff Schedule ("HTS") of the United States. The Sony Respondents admit that the following Accused Products may be classified under HTS No. 8517.62.0050: Premium Bluetooth headsets (MDR-1RBT), Bluetooth (DR-BTN200) headsets, and Stereo Bluetooth headset (SBH80). The Sony Respondents further admit that the following Accused Products may be classified under HTS No. 8518.30.2000: the Bluetooth and Noise Cancelling (MDR-ZX750BN), Premium Bluetooth headsets (MDR-1RBT), Premium Bluetooth

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Wireless headsets (MDR-10RBT), and Bluetooth (DR-BTN200) headsets. The Sony Respondents are without knowledge or information sufficient to form a belief as to the truth of the remaining allegations of paragraph 90, and therefore deny the same.

IX. RELATED LITIGATION

91. The Sony Respondents are without knowledge or information sufficient to form a belief as to the truth of the allegations of paragraph 91, and therefore deny the same.

X. DOMESTIC INDUSTRY

92. The Sony Respondents are without knowledge or information sufficient to form a belief as to the truth of the allegations of paragraph 92, and therefore deny the same.

93. The Sony Respondents are without knowledge or information sufficient to form a belief as to the truth of the allegations of paragraph 93, and therefore deny the same.

94. The Sony Respondents are without knowledge or information sufficient to form a belief as to the truth of the allegations of paragraph 94, and therefore deny the same.

95. The Sony Respondents are without knowledge or information sufficient to form a belief as to the truth of the allegations of paragraph 95, and therefore deny the same.

96. The Sony Respondents are without knowledge or information sufficient to form a belief as to the truth of the allegations of paragraph 96, and therefore deny the same.

97. The Sony Respondents are without knowledge or information sufficient to form a belief as to the truth of the allegations of paragraph 97, and therefore deny the same.

98. The Sony Respondents are without knowledge or information sufficient to form a belief as to the truth of the allegations of paragraph 98, and therefore deny the same.

99. The Sony Respondents are without knowledge or information sufficient to form a belief as to the truth of the allegations of paragraph 99, and therefore deny the same.

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100. The Sony Respondents are without knowledge or information sufficient to form a belief as to the truth of the allegations of paragraph 100, and therefore deny the same.

XI. RELIEF REQUESTED

101. The Sony Respondents deny the statements in One-E-Way's "Relief Requested" section to the extent that they purport to allege the existence of any factual or legal predicates for the relief requested. Further, the Sony Respondents deny that One-E-Way is entitled to any of the relief requested, including the relief outlined in subparagraphs (a) through (e).

RESPONSE TO THE NOTICE OF INVESTIGATION

Pursuant to Commission Rule 210.13, Sony responds to the Notice of Investigation issued by the U.S. International Trade Commission on January 8, 2015 and published in the Federal Register on January 13, 2015 (80 Fed. Reg. 1663), as follows:

The Sony Respondents admit that the Complaint generally sets forth the allegations summarized in the Notice of Investigation, but deny those allegations with respect to the Sony Respondents.

The Sony Respondents admit that One-E-Way has requested that an investigation be instituted and that, after the investigation, a limited exclusion order and a cease and desist order be issued, as set forth in the Notice of Investigation, but deny that One-E-Way is entitled to any such relief.

Specifically, the Sony Respondents deny that it has engaged in any action that would constitute unlawful importation into the United States, sale for importation, or sale within the United States after importation, of Certain Wireless Headsets that infringe the Patents-in-Suit. The Sony Respondents contend that the asserted claims of the Patents-in-Suit are invalid and cannot support any remedy for alleged infringement.

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The Sony Respondents deny that One-E-Way is entitled to any relief in this proceeding.

STATEMENT UNDER COMMISSION RULE 210.13(b)

By providing the following information, the Sony Respondents intend only to supply data required by 19 C.F.R. § 210.13(b). The Sony Respondents specifically deny that any of the information or data supplied relates to or supports any allegation of infringement against the Sony Respondents or any violation of Section 337.

The Sony Respondents or their subsidiaries import the accused Premium Bluetooth headsets (MDR-1RBT), Bluetooth and Noise Cancelling Headset (MDR-ZX750BN), Premium Bluetooth Wireless headsets (MDR-10RBT), Bluetooth headsets (DR-BTN200), and Stereo Bluetooth headset (SBH80) into the United States under the following HTS item numbers: 8518.30.2000 and 8517.62.0050.

Confidential Exhibit A to this Response provides statistical data on the quantity and value of imports of the accused Premium Bluetooth headsets (MDR-1RBT), Bluetooth and Noise Cancelling Headset (MDR-ZX750BN), Premium Bluetooth Wireless headsets (MDR-10RBT), Bluetooth headsets (DR-BTN200) , and Stereo Bluetooth headset (SBH80), a statement concerning the Sony Respondents capacity to produce the accused article, and the relative significance of the U.S. market to the Sony Respondents' operations.

DEFENSES

The Sony Respondents specifically allege and assert the following defenses, undertaking the burden of proof only as to those defenses that are deemed by law to be affirmative defenses. The Sony Respondents further state that they have not had sufficient opportunity to collect and review information relevant to potentially available defenses against the allegations of the Complaint, and thus reserve the right to modify defenses or to raise additional defenses as

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discovery proceeds in this Investigation. The Sony Respondents further reserve the right to rely upon any defenses raised by any other party to this Investigation.

First Defense: Non-Infringement

1. The Sony Respondents do not infringe any valid and enforceable claim of the '258 Patent, including asserted claims 3-4, 8, and 10-11.

2. The Sony Respondents do not infringe any valid and enforceable claim of the '391 Patent, including asserted claims 1-6 and 10. Also, even if direct infringement of the claims of the '391 Patent by a user of a Sony device is found, there can be no contributory infringement by Sony because the accused devices are capable of substantial noninfringing uses.

Second Defense: Invalidity

3. Upon information and belief, the asserted claims of the Patents-in-Suit are each invalid because they fail to comply with the requirements of at least 35 U.S.C. §§ 102, 103, 112 and/or 132.

4. Upon information and belief, the asserted claims of the '258 Patent are invalid under 35 U.S.C. §§ 102 and/or 103 as anticipated by or obvious in light of one or more of the prior art references cited by the examiner during prosecution of the Patents-in-Suit and related applications; one or more of the prior art references disclosed by the applicants during prosecution of those applications; and/or one or more of the prior art references identified in Exhibit B to this response, taken alone or in combination.

5. Upon information and belief, the asserted claims of the '391 Patent are invalid under 35 U.S.C. §§ 102 and/or 103 as anticipated by or obvious in light of one or more of the prior art references cited by the examiner during prosecution of the Patents-in-Suit and related applications; one or more of the prior art references disclosed by the applicants during

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prosecution of those applications; and/or one or more of the prior art references identified in Exhibit B to this response, taken alone or in combination

6. Upon information and belief, the asserted claims of the Patents-in-Suit are also invalid for failure to meet the requirements of 35 U.S.C. § 112 as a result of their specifications lacking sufficient written description, failing to particularly point out and distinctly claim the subject matter which the inventors regarded as the alleged invention, and/or failing to set forth written descriptions sufficient to enable any person skilled in the art to make and use the alleged inventions.

7. Upon information and belief, the asserted claims of the Patents-in-Suit are also invalid for failure to meet the requirements of 35 U.S.C. § 132 as a result of the introduction of new matter into the specification of the Patents-in-Suit and/or their parent applications during prosecution before the United States Patent and Trademark Office.

Third Defense: Lack of Domestic Industry

8. Upon information and belief, One-E-Way has not adequately established the existence of a domestic industry for the Patents-in-Suit as required by Section 337(a)(2) and defined by Section 337(a)(3). Specifically, One-E-Way has not established that it (and/or a licensee) has made a "significant investment" in plant, equipment, labor, or capital relating to articles protected by at least one claim of each of the Patents-in-Suit, sufficient to satisfy the economic prong of the domestic industry requirement. Further, One-E-Way has not established that it (and/or a licensee) has made a "substantial investment" in licensing, research and development, or other qualifying activities relating to each of the Patents-in-Suit and/or to articles protected by at least once claim of each of the Patents-in-Suit, sufficient to satisfy the

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