UNITED STATES PATENT AND TRADEMARK OFFICE

CERTIFICATE OF CORRECTION

PATENT NO. : 10,389,568 B1
APPLICATION NO. : 15/786270
DATED : August 20, 2019
INVENTOR(S) : Steve Shattil

It is certified that error appears in the above-identified patent and that said Letters Patent is hereby corrected as shown below:

In the Drawings

Please replace Drawing Sheet 7 of 17 with Drawing Sheet 7 of 17 as shown on the attached page

In the Specification

Column 14, Line 50-51:

Please amend -- $f(\phi) = \{e^{j\theta 1}, e^{j\theta 2},\ldots,e^{j\theta N}\} = \{e^{j0}, e^{j2\pi k/N},\ldots, e^{j(N-1)\cdot 2\pi k/N}\}$ --

To read -- $f(\phi) = \{e^{j\phi 1}, e^{j\phi 2},\ldots,e^{j\phi N}\} = \{e^{j0}, e^{j2\pi k/N},\ldots, e^{j(N-1)\cdot 2\pi k/N}\}$ --

Column 14, Line 60:

Please amend -- $\{t_1, t_2,\ldots,t_{N-1}\} = \{1/f_s, 2/f_s,\ldots,(N-1)/ /f_s\}$. --

To read -- $\{t_1, t_2,\ldots,t_{N-1}\} = \{1/f_s, 2/f_s,\ldots,(N-1)/f_s\}$. --

Column 14, Line 64:

Please amend -- $\{t_1, t_2,\ldots,t_{N-1}\} = \{1/f_s, 2/f_s,\ldots,(N-1)/ /f_s\}$. --

To read -- $\{t'_1, t'_2,\ldots,t'_{N-1}\} = 1/(2Nf_s) + \{1/f_s, 2/f_s,\ldots,(N-1)/f_s\}$. --

Column 15, Line 6-7:

Please amend -- $f_1(\phi) = \{e^{j\theta 1}, e^{j\theta 2},\ldots,e^{j\theta N}\} = \{e^{j0}, e^{j2\pi k/N},\ldots, e^{j(N-1)\cdot 2\pi k/N}\}$ --

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Column 15, Line 10-11:

Please amend -- $f_2(\phi) = \{e^{j\theta' 1}, e^{j\theta' 2},\ldots,e^{j\theta N}\} = \{e^{j(0+\Delta\phi)}, e^{j(2\pi k/N+\Delta\phi)},\ldots, e^{j((N-1)\cdot 2\pi k/N+\Delta\phi)}\}$ --

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Column 16, Line 19:

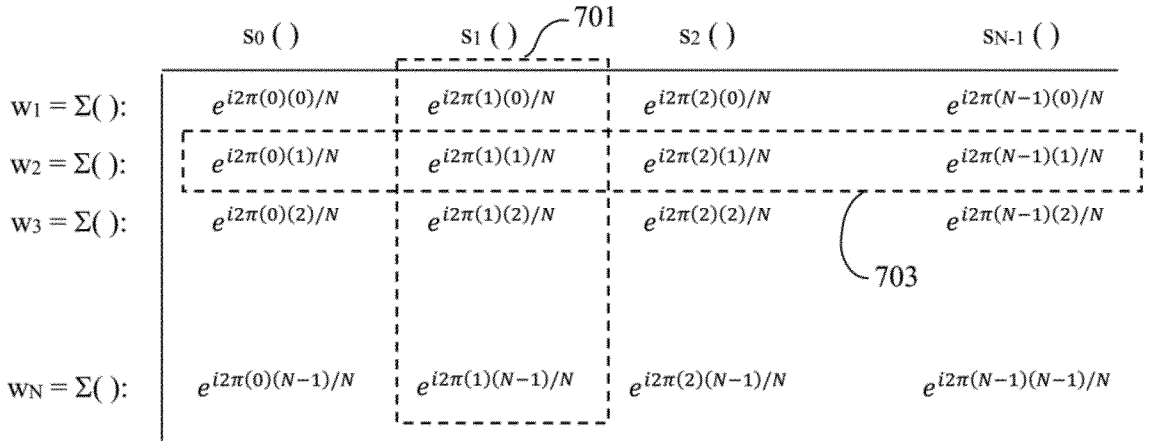
Please amend -- offsets ϕ_k used --

To read -- offsets ϕ_{kn} used --

Signed and Sealed this
Twenty-fourth Day of August, 2021

Drew Hirshfeld
Performing the Functions and Duties of the
Under Secretary of Commerce for Intellectual Property and
Director of the United States Patent and Trademark Office

Column 18, Line 28:
Please amend -- $\phi' = 2\phi f_o/f_s M$ --
To read -- $\phi' = 2\pi f_o/f_s M$ --


S0 ( )
S1 ( )
701
S2 ( )
SN-1 ( )
W1 = Σ( ):
W2 = Σ( ):
W3 = Σ( ):
WN = Σ( ):
$e^{i2\pi(0)(0)/N}$
$e^{i2\pi(1)(0)/N}$
$e^{i2\pi(2)(0)/N}$
$e^{i2\pi(N-1)(0)/N}$
$e^{i2\pi(0)(1)/N}$
$e^{i2\pi(1)(1)/N}$
$e^{i2\pi(2)(1)/N}$
$e^{i2\pi(N-1)(1)/N}$
$e^{i2\pi(0)(2)/N}$
$e^{i2\pi(1)(2)/N}$
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$e^{i2\pi(N-1)(2)/N}$
703
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$e^{i2\pi(1)(N-1)/N}$
$e^{i2\pi(2)(N-1)/N}$
$e^{i2\pi(N-1)(N-1)/N}$

FIG. 7

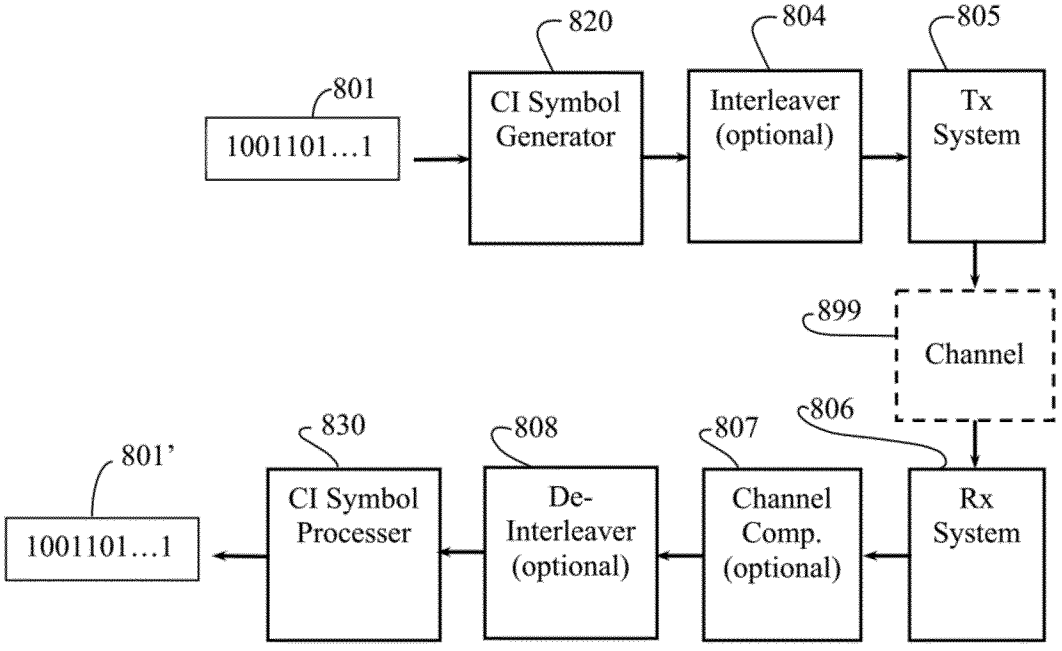
801
1001101…1
820
CI Symbol Generator
804
Interleaver (optional)
805
Tx System
899
Channel
806
807
Channel Comp. (optional)
808
De-Interleaver (optional)
830
CI Symbol Processer
801'
1001101…1
Rx System

FIG. 8A

UNITED STATES PATENT AND TRADEMARK OFFICE

CERTIFICATE OF CORRECTION

PATENT NO. : 10,389,568 B1
APPLICATION NO. : 15/786270
DATED : August 20, 2019
INVENTOR(S) : Steve Shattil

It is certified that error appears in the above-identified patent and that said Letters Patent is hereby corrected as shown below:

In the Specification

Column 1, Line 14:
-- 9,042,333 --
Should be changed to:
-- 8,750,264 --

Signed and Sealed this
Seventeenth Day of August, 2021

Drew Hirshfeld
Performing the Functions and Duties of the
Under Secretary of Commerce for Intellectual Property and
Director of the United States Patent and Trademark Office

PTO/SB/44 (09-07)
Approved for use through 03/31/2023. OMB 0651-0033
U.S. Patent and Trademark Office; U.S. DEPARTMENT OF COMMERCE

(Also Form PTO-1050)

UNITED STATES PATENT AND TRADEMARK OFFICE
CERTIFICATE OF CORRECTION

PATENT NO. : 10,389,568

APPLICATION NO.: 15/786,270

ISSUE DATE : August 20, 2019

INVENTOR(S) : Steve Shattil

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Please amend -- $f(\phi) = \{e^{j\phi 1}, e^{j\phi 2}, \ldots, e^{j\phi N}\} = \{e^{j0}, e^{j2\pi k/N}, \ldots, e^{j(N-1)\cdot 2\pi k/N}\}$ --

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Col. 14, line 64:

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to read -- $\{t'_1, t'_2, \ldots, t'_{N-1}\} = 1/(2Nf_s) + \{1/f_s, 2/f_s, \ldots, (N-1)/f_s\}$. --

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Col. 15, line 10-11:

Please amend -- $f_2(\phi) = \{e^{j\phi 1}, e^{j\phi 2}, \ldots, e^{j\phi N}\} = \{e^{j(\phi_0+\Delta\phi)}, e^{j(2\pi k/N+\Delta\phi)}, \ldots, e^{j((N-1)\cdot 2\pi k/N+\Delta\phi)}\}$ --

to read -- $f_2(\phi) = \{e^{j\phi 1}, e^{j\phi 2}, \ldots, e^{j\phi N}\} = \{e^{j(\phi_0+\Delta\phi)}, e^{j(2\pi k/N+\Delta\phi)}, \ldots, e^{j((N-1)\cdot 2\pi k/N+\Delta\phi)}\}$ --

MAILING ADDRESS OF SENDER (Please do not use Customer Number below):

Steven J Shattil
PO Box 17355, Boulder, CO 80308

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.
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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.

PTO/SB/44 (09-07)
Approved for use through 03/31/2023. OMB 0651-0033
U.S. Patent and Trademark Office; U.S. DEPARTMENT OF COMMERCE

(Also Form PTO-1050)

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CERTIFICATE OF CORRECTION

PATENT NO. : 10,389,568

APPLICATION NO.: 15/786,270

ISSUE DATE : August 20, 2019

INVENTOR(S) : Steve Shattil

It is certified that an error appears or errors appear in the above-identified patent and that said Letters Patent is hereby corrected as shown below:

Col. 16, line 19:

Please amend -- offsets ϕ_n used --

to read -- offsets ϕ_{nn} used --

Col. 18, line 28:

Please amend -- $\phi' = 2\phi f_o/f_s M$ --

to read -- $\phi' = 2\pi f_o/f_s M$ --

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PTO/SB/44 (09-07)
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CERTIFICATE OF CORRECTION

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APPLICATION NO.: 15/786,270

ISSUE DATE : August 20, 2019

INVENTOR(S) : Steve Shattil

It is certified that an error appears or errors appear in the above-identified patent and that said Letters Patent is hereby corrected as shown below:

Drawings:

Please amend FIG. 7 as indicated in the attached clean and marked-up versions of Drawing Sheet 7.

MAILING ADDRESS OF SENDER (Please do not use Customer Number below):

Steven J Shattil
PO Box 17355, Boulder, CO 80308

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IN THE UNITED STATES PATENT AND TRADEMARK OFFICE

In re Letters Patent of: Steve Shattil
Appl. No. 15/786,270
Patent No. 10,389,568
Issued 8/20/2019
For: SINGLE CARRIER FREQUENCY DIVISION MULTIPLE ACCESS BASEBAND SIGNAL GENERATION

REQUEST FOR CERTIFICATE OF CORRECTION PURSUANT TO 37 CFR 1.323

Attention: Certificate of Corrections Branch
Commissioner for Patents
P.O. Box 1450
Alexandria, VA 22313-1450

Dear Sir:

Upon reviewing the above-identified patent, Patentee noted typographical errors which should be corrected.

In the Drawings:

In FIG. 7, in the exponential of each matrix element, please amend the denominator "(N-1)" to read "N", as shown in the attached Replacement Drawing sheet 7 (clean and marked-up versions).

In the Specification:

Col. 14, line 50-51: Please amend -- $f(\phi) = \{e^{j\theta 1}, e^{j\theta 2},\ldots,e^{j\theta N}\} = \{e^{j0}, e^{j2\pi k/N},\ldots, e^{j(N-1)\cdot 2\pi k/N}\}$ -- to read -- $f(\phi) = \{e^{j\phi 1}, e^{j\phi 2},\ldots,e^{j\phi N}\} = \{e^{j0}, e^{j2\pi k/N},\ldots, e^{j(N-1)\cdot 2\pi k/N}\}$ --

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Col. 18, line 28: Please amend -- $\phi' = 2\phi f_o/f_s M$ --
to read -- $\phi' = 2\pi f_o/f_s M$ --

The errors were found in the application as filed by applicant. The fee set forth in 37 CFR 1.20(a) accompanies this letter.

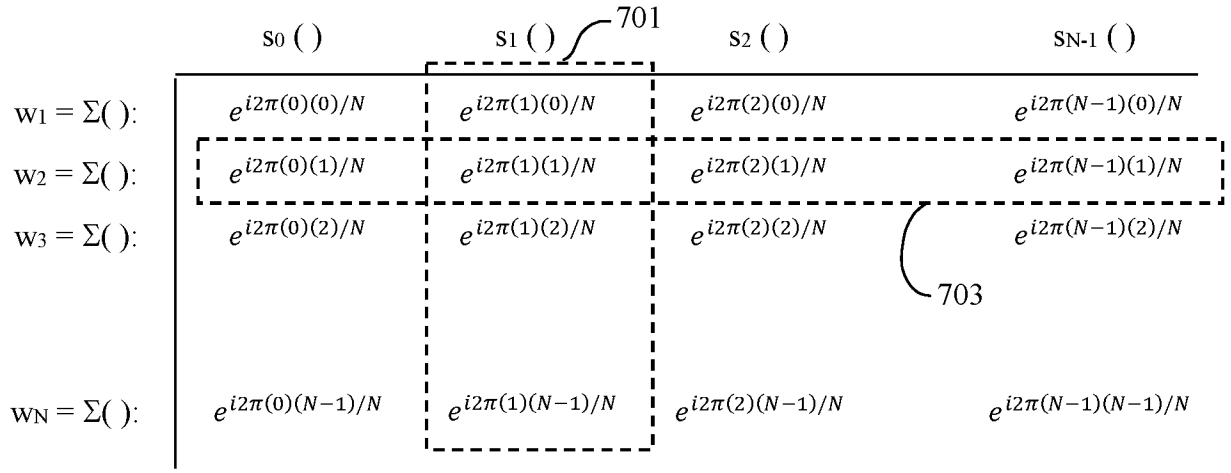
The errors now sought to be corrected are inadvertent typographical errors of which does not involve new matter or require reexamination.

Transmitted herewith is a proposed Certificate of Correction effecting such amendment. Patentee respectfully solicits the granting of the requested Certificate of Correction.

Respectfully submitted,

/Steven J Shattil/

Steven J. Shattil, Reg. No. 40,170
P.O. Box 17355
Boulder, CO 80308-0355
(720) 234-4351


s0 ( )
s1 ( )
701
s2 ( )
sN-1 ( )
w1 = Σ( ):
w2 = Σ( ):
w3 = Σ( ):
wN = Σ( ):
$e^{i2\pi(0)(0)/N}$
$e^{i2\pi(1)(0)/N}$
$e^{i2\pi(2)(0)/N}$
$e^{i2\pi(N-1)(0)/N}$
$e^{i2\pi(0)(1)/N}$
$e^{i2\pi(1)(1)/N}$
$e^{i2\pi(2)(1)/N}$
$e^{i2\pi(N-1)(1)/N}$
$e^{i2\pi(0)(2)/N}$
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$e^{i2\pi(2)(2)/N}$
$e^{i2\pi(N-1)(2)/N}$
703
$e^{i2\pi(0)(N-1)/N}$
$e^{i2\pi(1)(N-1)/N}$
$e^{i2\pi(2)(N-1)/N}$
$e^{i2\pi(N-1)(N-1)/N}$

FIG. 7

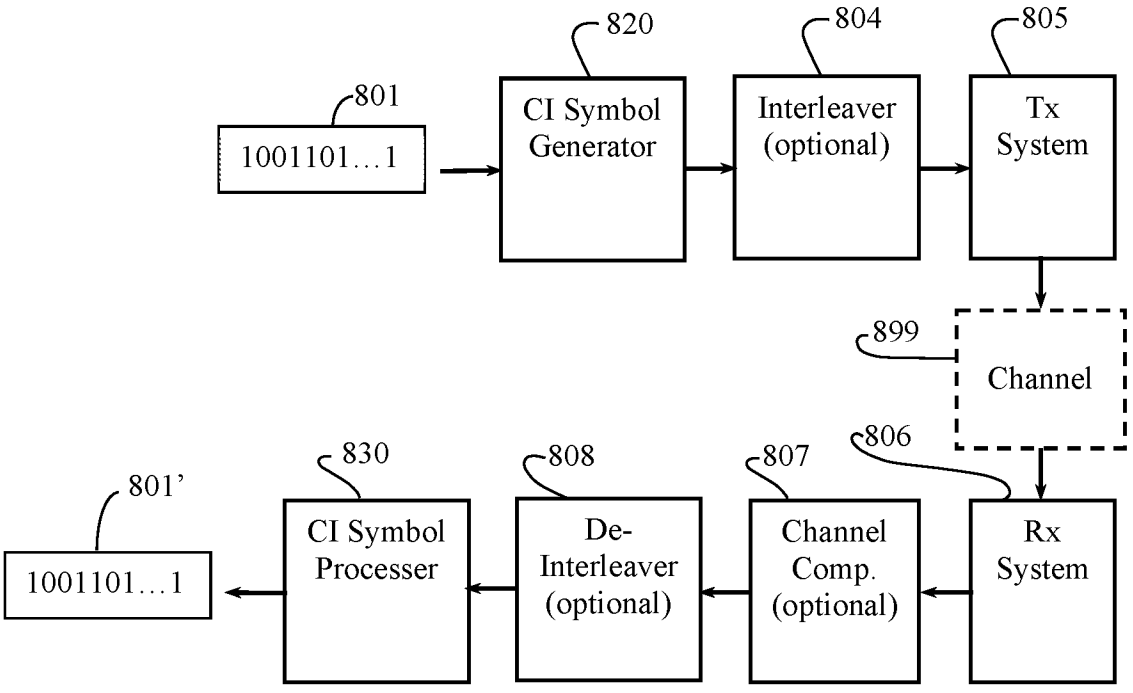
801
1001101…1
820
CI Symbol Generator
804
Interleaver (optional)
805
Tx System
899
Channel
806
Rx System
807
Channel Comp. (optional)
808
De-Interleaver (optional)
830
CI Symbol Processer
801'
1001101…1

FIG. 8A

Amended Marked Up

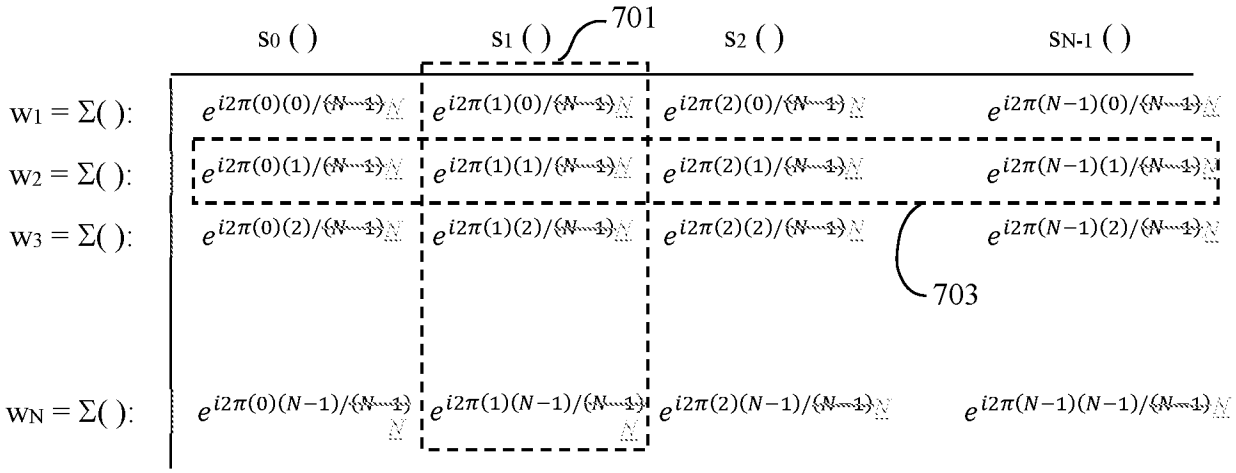

FIG. 7 (Amended)

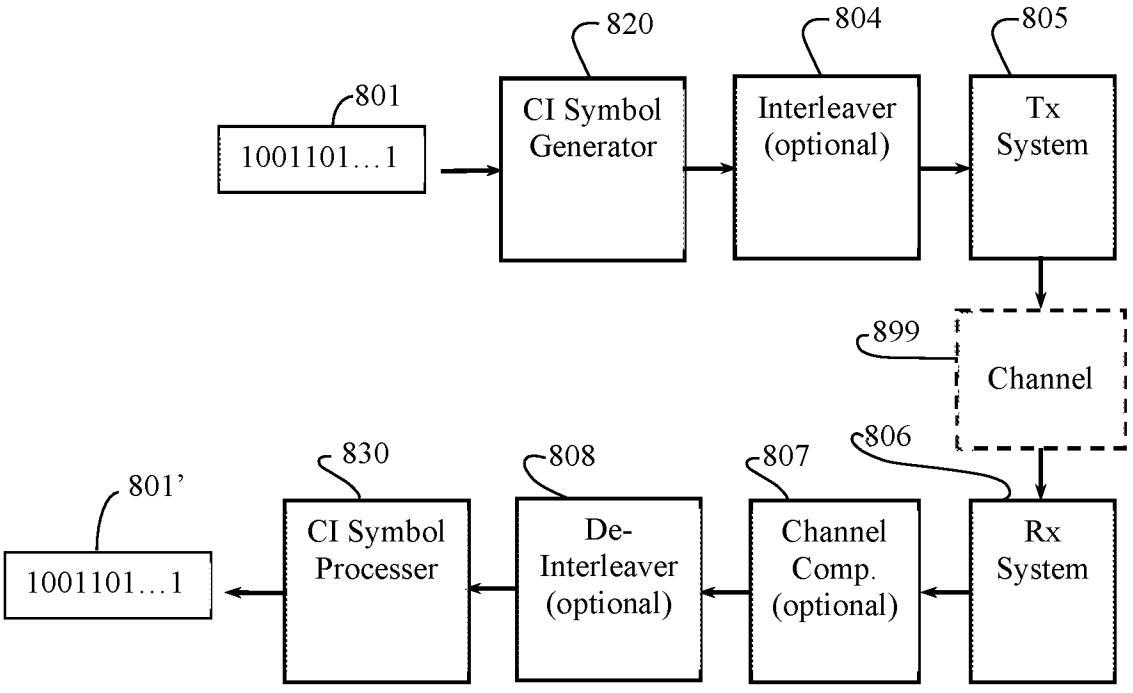

FIG. 8A

Notice of Allowability	Application No. 15/786,270	Applicant(s) Shattil, Steve	
	Examiner DIANE L LO	Art Unit 2466	AIA (FITF) Status No

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

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

1. ☑ This communication is responsive to amendment received 05/29/2019.
   ☐ A declaration(s)/affidavit(s) under **37 CFR 1.130(b)** was/were filed on _____.

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

3. ☑ The allowed claim(s) is/are 58-63,65-87 and 89-106 . As a result of the allowed claim(s), you may be eligible to benefit from the **Patent Prosecution Highway** program at a participating intellectual property office for the corresponding application. For more information, please see **http://www.uspto.gov/patents/init_events/pph/index.jsp** or send an inquiry to **PPHfeedback@uspto.gov.**

4. ☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).

   Certified copies:

   a) ☐ All b) ☐ Some *c) ☐ None of the:

   1. ☐ Certified copies of the priority documents have been received.
   2. ☐ Certified copies of the priority documents have been received in Application No. _____ .
   3. ☐ Copies of the certified copies of the priority documents have been received in this national stage application from the International Bureau (PCT Rule 17.2(a)).

   * Certified copies not received: _____ .

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

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

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

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

Attachment(s)

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

/DIANE L LO/
Primary Examiner, Art Unit 2466

REASONS FOR ALLOWANCE

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

Applicant has rewritten the allowable subject matter of claims 64 and 88 into independent form.

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

Conclusion

Any inquiry concerning this communication or earlier communications from the examiner should be directed to DIANE LEE LO whose telephone number is (571)270-1952. The examiner can normally be reached on Monday - Friday 8 am - 5 pm.

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

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Faruk Hamza can be reached on (571)272-7969. 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.

/DIANE L LO/
Primary Examiner, Art Unit 2466

IN THE UNITED STATES PATENT AND TRADEMARK OFFICE

In re Patent Application of:	Docket No.: CBF-000.C4
Steve Shattil	Confirmation No.: 5080
Application No.: 15/786,270	Group Art Unit: 2466
Filed: 10/17/2017	Examiner: LO, DIANE LEE

For: **SINGLE CARRIER FREQUENCY DIVISION MULTIPLE ACCESS BASEBAND SIGNAL GENERATION**

Commissioner for Patents
P.O. BOX 1700
Alexandria, VA 22313-1700

AMENDMENT

Sir:

This letter is responsive to the non-final office action mailed on 05-13-2019.

Amendments to the Claims are reflected in the listing of claims which begins on page 2.

Remarks begin on page 15.

AMENDMENTS TO THE CLAIMS

The following is a complete list of all claims in this application.

Claims 1 – 57 (Cancelled).

58. (Currently Amended) A method comprising:

dividing a block of complex-valued symbols into a plurality of sets of complex-valued symbols;

transform precoding each of the plurality of sets of complex-valued symbols into a block of transform-precoded complex-valued symbols; and

generating an Orthogonal Frequency Division Multiplex (OFDM) signal comprising a plurality of OFDM subcarriers modulated by the transform-precoded complex-valued symbols, wherein the transform precoding generates a plurality of orthogonal spreading codes to provide a superposition of the plurality of OFDM subcarriers with a reduced peak-to-average-power ratio.

59. (Previously Presented) The method of claim 58, wherein the transform precoding spreads the block of complex-valued symbols with a plurality of orthogonal spreading codes comprising complex-valued coefficients of a discrete Fourier transform (DFT) to produce the block of transform-precoded complex-valued symbols.

60. (Previously Presented) The method of claim 59, wherein the DFT is a fast Fourier transform (FFT).

61. (Previously Presented) The method of claim 58, comprising:

mapping the block of transform-precoded complex-valued symbols to physical resource blocks assigned for transmission of a physical uplink shared channel.

62. (Previously Presented) The method of claim 61, wherein the mapping is responsive to an assignment of spectrum resources for selecting a plurality of OFDM subcarriers corresponding to at least one OFDM symbol interval.

63. (Previously Presented) The method of claim 58, comprising:

scrambling a block of bits of one subframe of a physical uplink shared channel resulting in a block of scrambled bits; and

modulating the block of scrambled bits resulting in the block of complex-valued symbols.

64. (Canceled).

65. (Previously Presented) The method of claim 61, wherein at least one of the transform precoding and the mapping is configured to weight each of the plurality of OFDM subcarriers with an amplitude scaling factor to adjust gain of the superposition.

66. (Previously Presented) The method of claim 61, wherein the mapping is configured to select the plurality of OFDM subcarriers according to at least one of a

frequency division multiple access scheme, a time division multiple access scheme, a space division multiple access scheme, a code division multiple access scheme, and a frequency-hoping scheme.

67. (Previously Presented) The method of claim 63, wherein the scrambling is configured to scramble the block of bits into a block of scrambled bits with at least one pseudo-noise code.

68. (Previously Presented) The method of claim 58, wherein the transform precoding is applied according to

$$z(l \cdot M_{sc}^{PUSCH} + k) = \frac{1}{\sqrt{M_{sc}^{PUSCH}}} \sum_{i=0}^{M_{sc}^{PUSCH}-1} d(l \cdot M_{sc}^{PUSCH} + i) e^{-j\frac{2\pi ik}{M_{sc}^{PUSCH}}},$$

wherein:

the block of complex-valued symbols and the block of transform-precoded complex-valued symbol comprises a plurality of resource elements;

l represents a time-domain index of each of the plurality of resource elements;

k represents a frequency-domain index of each of the plurality of resource elements;

M_{sc}^{PUSCH} is a scheduled bandwidth for uplink transmission expressed as a number of subcarriers;

$d(l \cdot M_{sc}^{PUSCH} + i)$ represents resource elements of the block of complex-valued symbols; and

$z(l \cdot M_{sc}^{PUSCH} + k)$ represents resource elements of the block of transform precoded complex-valued symbols.

69. (Previously Presented) The method of claim 68, wherein:

the transform precoding spreads the block of complex-valued symbols with a plurality of orthogonal spreading codes comprising complex-valued coefficients of a discrete Fourier transform (DFT) to produce the block of transform precoded complex-valued symbols; and

M_{sc}^{PUSCH} is a length of the DFT corresponding to the plurality of orthogonal spreading codes.

70. (Previously Presented) The method of claim 69, wherein:

each transform-precoded set of complex-valued symbols of the block of transform-precoded complex-valued symbols is a single-carrier frequency division multiple access symbol; and

said each transform precoded set of complex-valued symbols is processed by the DFT.

71. (Previously Presented) The method of claim 59, wherein:

$M_{sc}^{PUSCH} = M_{RB}^{PUSCH} * N_{sc}^{RB}$;

M_{RB}^{PUSCH} is a scheduled bandwidth for uplink transmission expressed as a number of resource blocks; and

N_{sc}^{RB} is a resource block size in the frequency domain expressed as a number of subcarriers.

72. (Previously Presented) The method of claim 71, wherein:

$M_{RB}^{PUSCH} \leq N_{RB}^{UL}$; and

N_{RB}^{UL} is an uplink bandwidth configuration expressed in multiples of N_{sc}^{RB}.

73. (Previously Presented) The method of claim 68, wherein:

the block of transform-precoded complex-valued symbols comprises carrier interferometry symbol values (w_n); and

the block of complex-valued symbols comprises data symbols (s_n).

74. (Previously Presented) The method of claim 73, wherein carrier interferometry code chip values are arranged with respect to a plurality of phase spaces.

75. (Previously Presented) The method of claim 74, wherein the plurality of phase spaces comprises orthogonal phase spaces.

76. (Previously Presented) The method of claim 74, wherein each of the data symbol values is impressed upon one of the plurality of phase spaces.

77. (Previously Presented) The method of claim 73, wherein the number of carrier interferometry symbol values is different than the number of data symbols.

78. (Previously Presented) The method of claim 58, wherein each of the plurality of sets of complex-valued symbols is a single carrier frequency division multiple access (SC-FDMA) symbol.

79. (Previously Presented) The method of claim 58, comprising generating a time-continuous signal defined by:

$s_l(t) = \sum_{k=-\lfloor N_{RB}^{UL} N_{sc}^{RB}/2 \rfloor}^{\lfloor N_{RB}^{UL} N_{sc}^{RB}/2 \rfloor - 1} a_{k^{(-)},l} e^{j2\pi(k+1/2)\Delta f\left(t - N_{CP,l} T_s\right)}$, wherein:

N_{sc}^{RB} is a resource block size in a frequency domain express as a number of subcarriers;

N_{RB}^{UL} is an uplink bandwidth configuration express in multiples of N_{sc}^{RB};

$a_{k^{(-)},l}$ is a value of a resource element;

Δf is subcarrier spacing;

$N_{CP,l}$ is a downlink cyclic prefix length for OFDM symbol l in a slot; and

T_s is a basic time unit.

80. (Previously Presented) The method of claim 79, wherein the time-continuous signal is generated in a single carrier frequency division multiple access (SC-FDMA) symbol.

81. (Previously Presented) The method of claim 58, wherein the transform precoding generates a plurality of quasi-orthogonal complex-valued spreading codes to

provide a superposition of the plurality of OFDM subcarriers with a reduced peak-to-average-power ratio.

82. (Currently Amended) An apparatus, comprising:

a processor; and

a non-transitory computer-readable memory communicatively coupled to the processor, the memory including a set of instructions stored thereon and executable by the processor for:

dividing a block of complex-valued symbols into a plurality of sets of complex-valued symbols;

transform precoding each of the plurality of sets of complex-valued symbols into a block of transform precoded complex-valued symbols; and

generating an Orthogonal Frequency Division Multiplex (OFDM) signal comprising a plurality of OFDM subcarriers modulated with the transform-precoded complex-valued symbols, wherein the transform precoding generates a plurality of orthogonal spreading codes to provide a superposition of the plurality of OFDM subcarriers with a reduced peak-to-average-power ratio.

83. (Previously Presented) The apparatus of claim 82, wherein the transform precoding spreads the block of complex-valued symbols with a plurality of orthogonal spreading codes comprising complex-valued coefficients of a discrete Fourier transform (DFT) to produce the block of transform-precoded complex-valued symbols.

84. (Previously Presented) The apparatus of claim 83, wherein the DFT is a fast Fourier transform (FFT).

85. (Previously Presented) The apparatus of claim 82, comprising instructions for:

mapping the block of transform-precoded complex-valued symbols to physical resource blocks assigned for transmission of a physical uplink shared channel.

86. (Previously Presented) The apparatus of claim 85, wherein the mapping is responsive to an assignment of spectrum resources for selecting a plurality of OFDM subcarriers corresponding to at least one OFDM symbol interval.

87. (Previously Presented) The apparatus of claim 82, comprising instructions for:

scrambling a block of bits of one subframe of a physical uplink shared channel resulting in a block of scrambled bits; and

modulating the block of scrambled bits resulting in the block of complex-valued symbols.

88. (Canceled).

89. (Previously Presented) The apparatus of claim 85, wherein at least one of the transform precoding and the mapping is configured to weight each of the plurality of OFDM subcarriers with an amplitude scaling factor to adjust gain of the superposition.

90. (Previously Presented) The apparatus of claim 85, wherein the mapping is configured to select the plurality of OFDM subcarriers according to at least one of a frequency division multiple access scheme, a time division multiple access scheme, a space division multiple access scheme, a code division multiple access scheme, and a frequency-hoping scheme.

91. (Previously Presented) The apparatus of claim 87, wherein the scrambling is configured to scramble the block of bits into a block of scrambled bits with at least one pseudo-noise code.

92. (Previously Presented) The apparatus of claim 82, wherein the transform precoding is applied according to

$$z(l \cdot M_{sc}^{PUSCH} + k) = \frac{1}{\sqrt{M_{sc}^{PUSCH}}} \sum_{i=0}^{M_{sc}^{PUSCH}-1} d(l \cdot M_{sc}^{PUSCH} + i) e^{-j\frac{2\pi ik}{M_{sc}^{PUSCH}}},$$

wherein:

the block of complex-valued symbols and the block of transform-precoded complex-valued symbol comprises a plurality of resource elements;

l represents a time-domain index of each of the plurality of resource elements;

k represents a frequency-domain index of each of the plurality of resource elements;

M_{sc}^{PUSCH} is a scheduled bandwidth for uplink transmission expressed as a number of subcarriers;

$d(l \cdot M_{sc}^{PUSCH} + i)$ represents resource elements of the block of complex-valued symbols; and

$z(l \cdot M_{sc}^{PUSCH} + k)$ represents resource elements of the block of transform precoded complex-valued symbols.

93. (Previously Presented) The apparatus of claim 92, wherein:

the transform precoding spreads the block of complex-valued symbols with a plurality of orthogonal spreading codes comprising complex-valued coefficients of a discrete Fourier transform (DFT) to produce the block of transform precoded complex-valued symbols; and

M_{sc}^{PUSCH} is a length of the DFT corresponding to the plurality of orthogonal spreading codes.

94. (Previously Presented) The apparatus of claim 93, wherein:

each transform-precoded set of complex-valued symbols of the block of transform-precoded complex-valued symbols is a single-carrier frequency division multiple access symbol; and

said each transform precoded set of complex-valued symbols is processed by the DFT.

95. (Previously Presented) The apparatus of claim 83, wherein:

$M_{sc}^{PUSCH} = M_{RB}^{PUSCH} * N_{sc}^{RB}$;

M_{RB}^{PUSCH} is a scheduled bandwidth for uplink transmission expressed as a number of resource blocks; and

N_{sc}^{RB} is a resource block size in the frequency domain expressed as a number of subcarriers.

96. (Previously Presented) The method of claim 95, wherein:

$M_{RB}^{PUSCH} \leq N_{RB}^{UL}$; and

N_{RB}^{UL} is an uplink bandwidth configuration expressed in multiples of N_{sc}^{RB}.

97. (Previously Presented) The method of claim 92, wherein:

the block of transform-precoded complex-valued symbols comprises carrier interferometry symbol values (w_n); and

the block of complex-valued symbols comprises data symbols (s_n).

98. (Previously Presented) The method of claim 97, wherein carrier interferometry code chip values are arranged with respect to a plurality of phase spaces.

99. (Previously Presented) The method of claim 98, wherein the plurality of phase spaces comprises orthogonal phase spaces.

100. (Previously Presented) The method of claim 98, wherein each of the data symbol values is impressed upon one of the plurality of phase spaces.

101. (Previously Presented) The method of claim 97, wherein the number of carrier interferometry symbol values is different than the number of data symbols.

102. (Previously Presented) The method of claim 82, wherein each of the plurality of sets of complex-valued symbols is a single carrier frequency division multiple access (SC-FDMA) symbol.

103. (Previously Presented) The method of claim 82, comprising generating a time-continuous signal defined by:

$s_l(t) = \sum_{k=-[N_{RB}^{UL}N_{sc}^{RB}/2]}^{[N_{RB}^{UL}N_{sc}^{RB}/2]-1} a_{k^{(-)},l} e^{j2\pi(k+1/2)\Delta f\left(t-N_{CP,l}T_s\right)}$, wherein:

N_{sc}^{RB} is a resource block size in a frequency domain express as a number of subcarriers;

N_{RB}^{UL} is an uplink bandwidth configuration express in multiples of N_{sc}^{RB};

$a_{k^{(-)},l}$ is a value of a resource element;

Δf is subcarrier spacing;

$N_{CP,l}$ is a downlink cyclic prefix length for OFDM symbol l in a slot; and

T_s is a basic time unit.

104. (Previously Presented) The apparatus of claim 93, wherein the time-continuous signal is generated in a single carrier frequency division multiple access (SC-FDMA) symbol.

105. (Previously Presented) The apparatus of claim 82, wherein the transform precoding generates a plurality of quasi-orthogonal complex-valued spreading codes to provide a superposition of the plurality of OFDM subcarriers with a reduced peak-to-average-power ratio.

106. (Currently Amended) A computer program product, comprising a non-transitory computer readable hardware storage device having computer readable program code stored therein, said program code containing instructions executable by one or more processors of a computer system to implement a method comprising:

dividing a block of complex-valued symbols into a plurality of sets of complex-valued symbols; and

transform precoding each of the plurality of sets of complex-valued symbols into a block of transform precoded complex-valued symbols; and

generating an Orthogonal Frequency Division Multiplex (OFDM) signal comprising a plurality of OFDM subcarriers modulated with the transform-precoded complex-valued symbols, wherein the transform precoding generates a plurality of orthogonal spreading codes to provide a superposition of the plurality of OFDM subcarriers with a reduced peak-to-average-power ratio.

REMARKS

By this amendment, claim 106 was amended to recite a "non-transitory computer readable hardware storage device", as suggested in the Examination Report to avoid the 35 U.S.C. 101 rejection. Accordingly, Applicant respectfully requests reconsideration of the 35 U.S.C. 101 rejection of claim 106.

The Examination Report indicated that Claims 64, 65, 67, 73-77, 79-81, 88, 89, 91, 97-101, 103, and 105 would be allowable if rewritten in independent form including all of the limitations of the base claim and any intervening claims. Independent claim 58 was amended to include all of the limitations of claim 64, and thus constitutes claim 64 rewritten in independent form. Independent claim 82 was amended to include all of the limitations of claim 88, and thus constitutes claim 88 rewritten in independent form. Independent claim 106 was amended to include all of the limitations of claim 88, and thus should be allowable. In view of these amendments, Applicant respectfully requests reconsideration of the 35 U.S.C. 102 rejection of claims 58-63, 66, 68-72, 78, 82-87, 90, 92-96, 102, 104, and 106.

Claims 64 and 88 were canceled.

Applicant respectfully contents that no issue of new matter has been added by this amendment.

If the Examiner believes, for any reason, that personal communication will expedite prosecution of this application, the Examiner is invited to telephone the undersigned at the number provided.

Prompt and favorable consideration of this Reply is respectfully requested.

Respectfully Submitted,

/Steven J Shattil/

Steven J Shattil
Reg. No. 65,170

UNITED STATES PATENT AND TRADEMARK OFFICE

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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
15/786,270	10/17/2017	Steve Shattil	CBF-000.C4	5080

74284 7590 05/13/2019

Steven J Shattil
P.O. Box 17355
Boulder, CO 80308-0355

EXAMINER	
LO, DIANE LEE	

ART UNIT	PAPER NUMBER
2466	

MAIL DATE	DELIVERY MODE
05/13/2019	PAPER

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.

Office Action Summary	Application No. 15/786,270	Applicant(s) Shattil, Steve	
	Examiner DIANE L LO	Art Unit 2466	AIA (FITF) 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 10/17/2017.

☐ 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) 58-106 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) 58-63,66,68-72,78,82-87,90,92-96,102,104 and 106 is/are rejected.

8) ☑ Claim(s) 64-65,67,73-77,79-81,88-89,91,97-101,103 and 105 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 10/17/2017 is/are: a)☑ accepted or b)☐ objected to by the Examiner.

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

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

Priority under 35 U.S.C. § 119

12)☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).

Certified copies:

a)☐ All b)☐ Some** c)☐ None of the:

1.☐ Certified copies of the priority documents have been received.

2.☐ Certified copies of the priority documents have been received in Application No. _____.

3.☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

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

Attachment(s)

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

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

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

4) ☐ Other: _____.

DETAILED ACTION

This is response to Application 15/786,270 filed on 10/17/2017 in which claims 58-106 are presented for examination.

Allowable Subject Matter

Claims 64, 65, 67, 73-77, 79-81, 88, 89, 91, 97-101, 103, and 105 are objected to as being dependent upon a rejected base claim, but would be allowable if rewritten in independent form including all of the limitations of the base claim and any intervening claims.

Claim Rejections - 35 USC § 101

35 U.S.C. 101 reads as follows:

> Whoever invents or discovers any new and useful process, machine, manufacture, or composition of matter, or any new and useful improvement thereof, may obtain a patent therefor, subject to the conditions and requirements of this title.

Claim 106 is rejected under 35 U.S.C. 101 as being directed to non-statutory subject matter. Claim 106 define computer readable medium referring to any medium that is storing a program executable by a computer. The broadest reasonable interpretation of a claim drawn to a computer readable medium (also called machine readable medium and other such variations) typically covers forms of non-transitory tangible media and transitory propagating signals *per se* in view of the ordinary and customary meaning of computer readable media, particularly when the specification is silent. *See* MPEP

2111.01. In this case, the specification is silent. When the broadest reasonable interpretation of a claim covers a signal *per se*, the claim must be rejected under 35 U.S.C. § 101 as covering non-statutory subject matter. *See In re Nuijten*, 500 F.3d 1346, 1356-57 (Fed. Cir. 2007) (transitory embodiments are not directed to statutory subject matter) and *Interim Examination Instructions for Evaluating Subject Matter Eligibility Under 35 U.S.C. § 101*, Aug. 24, 2009; p. 2.

A claim drawn to such a computer readable medium that covers both transitory and non-transitory embodiments may be amended to narrow the claim to cover only statutory embodiments to avoid a rejection under 35 U.S.C. § 101 by adding the limitation "non-transitory" to the claim. Such an amendment would typically not raise the issue of new matter, even when the specification is silent because the broadest reasonable interpretation relies on the ordinary and customary meaning that includes signals *per se*. The limited situations in which such an amendment could raise issues of new matter occur, for example, when the specification does not support a non-transitory embodiment because a signal *per se* is the only viable embodiment such that the amended claim is impermissibly broadened beyond the supporting disclosure. *See, e.g., Gentry Gallery, Inc. v. Berkline Corp.*, 134 F.3d 1473 (Fed. Cir. 1998).

Claim Rejections - 35 USC § 102

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

> A person shall be entitled to a patent unless –
>
> (e) the invention was described in (1) an application for patent, published under section 122(b), by another filed in the United States before the

> invention by the applicant for patent or (2) a patent granted on an application for patent by another filed in the United States before the invention by the applicant for patent, except that an international application filed under the treaty defined in section 351(a) shall have the effects for purposes of this subsection of an application filed in the United States only if the international application designated the United States and was published under Article 21(2) of such treaty in the English language.

Claims 58-63, 66, 68-72, 78, 82-87, 90, 92-96, 102, 104 and 106 are rejected under pre-AIA 35 U.S.C. 102(e) as being anticipated by Zhang et al. (US 2010/0041350 A1).

1. **Regarding claim 58**, Zhang teaches a method comprising:

dividing a block of complex-valued symbols into a plurality of sets of complex valued symbols (*Paragraph [0073] divides the symbols into sets*);

transform precoding each of the plurality of sets of complex-valued symbols into a block of transform-precoded complex-valued symbols (*Paragraphs [0073] and [0074] produce block of complex valued symbols*); and

generating an Orthogonal Frequency Division Multiplex (OFDM) signal comprising a plurality of OFDM subcarriers modulated by the transform-precoded complex-valued symbols (*Figure 3A and 3B Paragraphs [0071] to [0073]*).

2. **Regarding claim 82**, Zhang teaches an apparatus, comprising:

a processor; and

a non-transitory computer-readable memory communicatively coupled to the processor, the memory including a set of instructions stored thereon and executable by the processor for:

dividing a block of complex-valued symbols into a plurality of sets of complex valued symbols (*Paragraph [0073] divides the symbols into sets*);

transform precoding each of the plurality of sets of complex-valued symbols into a block of transform precoded complex-valued symbols (*Paragraphs [0073] and [0074] produce block of complex valued symbols*); and

generating an Orthogonal Frequency Division Multiplex (OFDM) signal comprising a plurality of OFDM subcarriers modulated with the transform-precoded complex-valued symbols (*Figure 3A and 3B Paragraphs [0071] to [0073]*).

3. **Regarding claims 59 and 83**, Zhang teaches wherein the transform precoding spreads the block of complex-valued symbols with a plurality of orthogonal spreading codes comprising complex-valued coefficients of a discrete Fourier transform (DFT) to produce the block of transform-precoded complex-valued symbols (*Figure 3A and 3B Paragraphs [0048] and [0071] to [0073] DFT*).

4. **Regarding claims 60 and 84**, Zhang teaches wherein the DFT is a fast Fourier transform (FFT) (*Figure 3A and 3B Paragraphs [0048] and [0071] to [0073] DFT*).

5. **Regarding claims 61 and 85**, Zhang teaches comprising: mapping the block of transform-precoded complex-valued symbols to physical resource blocks assigned for

transmission of a physical uplink shared channel (*Paragraph [0073] divides the symbols into PUSCH sets*).

6. **Regarding claims 62 and 86**, Zhang teaches wherein the mapping is responsive to an assignment of spectrum resources for selecting a plurality of OFDM subcarriers corresponding to at least one OFDM symbol interval (*Paragraph [0056] and [0078] subcarriers and symbols*).

7. **Regarding claims 63 and 87**, Zhang teaches comprising:

scrambling a block of bits of one subframe of a physical uplink shared channel resulting in a block of scrambled bits; and modulating the block of scrambled bits resulting in the block of complex-valued symbols (*Paragraph [0071] to [0076] scrambler blocks*).

8. **Regarding claims 66 and 90**, Zhang teaches wherein the mapping is configured to select the plurality of OFDM subcarriers according to at least one of a frequency division multiple access scheme, a time division multiple access scheme, a space division multiple access scheme, a code division multiple access scheme, and a frequency-hoping scheme (*Paragraphs [0134] and [0149] CDM and FDM*).

9. **Regarding claims 68 and 92**, Zhang teaches wherein the transform precoding is applied according to

$z(l*M^{PUSCH}_{sc}+k) =$

wherein:

the block of complex-valued symbols and the block of transform-precoded complex-valued symbol comprises a plurality of resource elements;

l represents a time-domain index of each of the plurality of resource elements;

k represents a frequency-domain index of each of the plurality of resource elements;

MgcSCH is a scheduled bandwidth for uplink transmission expressed as a number of subcarriers;

d(l ■ MgcSCH + 0 represents resource elements of the block of complex-valued symbols; and

z(Z • MgcSCH + k) represents resource elements of the block of transform precoded complex-valued symbols (*Paragraph [0073] Equation* 7).

10. **Regarding claims 69 and 93**, Zhang teaches wherein:

the transform precoding spreads the block of complex-valued symbols with a plurality of orthogonal spreading codes comprising complex-valued coefficients of a discrete Fourier transform (DFT) to produce the block of transform precoded complex valued symbols; and MgcSCH is a length of the DFT corresponding to the plurality of orthogonal spreading codes (*Paragraph [0073] Equation 7*).

11. **Regarding claims 70 and 94**, Zhang teaches wherein:

each transform-precoded set of complex-valued symbols of the block of transform-precoded complex-valued symbols is a single-carrier frequency division multiple access symbol; and said each transform precoded set of complex-valued symbols is processed by the DFT (*Paragraphs [0073] and [0074] Equation 7*).

12. **Regarding claims 71 and 95**, Zhang teaches wherein:

MpscUSCH = Mprubsch * Nsrcb ;

M™sch is a scheduled bandwidth for uplink transmission expressed as a number of resource blocks; and

Nsrcb is a resource block size in the frequency domain expressed as a number of subcarriers *(Paragraphs [0073] and [0074] Equation 7*).

13. **Regarding claims 72 and 96**, Zhang teaches wherein:

M™sch < Nrb ; and

Nrb is an uplink bandwidth configuration expressed in multiples oi NRB (*Paragraphs [0073] and [0074] Equation* 8).

14. **Regarding claims 78 and 102**, Zhang teaches wherein each of the plurality of sets of complex-valued symbols is a single carrier frequency division multiple access (SC-FDMA) symbol (*Figure 3A and 3B Paragraphs [0071] to [0073]*).

15. **Regarding claim 104,** Zhang teaches wherein the time-continuous signal is generated in a single carrier frequency division multiple access (SC-FDMA) symbol (*Figure 3A and 3B Paragraphs [0048] and [0071] to [0073] DFT*).

16. **Regarding claim 106**, Zhang teaches a computer program product, comprising a computer readable hardware storage device having computer readable program code stored therein, said program code containing instructions executable by one or more processors of a computer system to implement a method (*Figure 3A and 3B Paragraphs [0071] to [0073]*) comprising:
dividing a block of complex-valued symbols into a plurality of sets of complexvalued symbols (*Paragraph [0073] divides the symbols into sets*); and
transform precoding each of the plurality of sets of complex-valued symbols into a block of transform precoded complex-valued symbols (*Paragraphs [0073] and [0074] produce block of complex valued symbols*) and
generating an Orthogonal Frequency Division Multiplex (OFDM) signal comprising a plurality of OFDM subcarriers modulated with the transform-precoded complex-valued symbols (*Figure 3A and 3B Paragraphs [0071] to [0073]*).

Conclusion

Any inquiry concerning this communication or earlier communications from the examiner should be directed to DIANE LEE LO whose telephone number is (571)270-1952. The examiner can normally be reached on Monday - Friday 8 am - 5 pm.

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

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Faruk Hamza can be reached on (571)272-7969. The fax phone number for the organization where this application or proceeding is assigned is 571-273-8300.

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/DIANE L LO/
Primary Examiner, Art Unit 2466