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APPLICATION NO.	ISSUE DATE	PATENT NO.	ATTORNEY DOCKET NO.	CONFIRMATION NO.
15/898,404	11/05/2019	RE47720	USTAP030D.RI	8522

92045 7590 10/16/2019

The Caldwell Firm, LLC
PO Box 59655
Dept. SVIPGP
Dallas, TX 75229

ISSUE NOTIFICATION

The projected patent number and issue date are specified above.

Determination of Patent Term Extension or Adjustment under 35 U.S.C. 154 (b)

A reissue patent is for "the unexpired part of the term of the original patent." See 35 U.S.C. 251. Accordingly, the above-identified reissue application is not eligible for Patent Term Extension or Adjustment under 35 U.S.C. 154(b).

Any questions regarding the Patent Term Extension or Adjustment determination should be directed to the Office of Patent Legal Administration at (571)-272-7702. Questions relating to issue and publication fee payments should be directed to the Application Assistance Unit (AAU) of the Office of Data Management (ODM) at (571)-272-4200.

APPLICANT(s) (Please see PAIR WEB site http://pair.uspto.gov for additional applicants):

Jerry D. Burchfiel, Waltham, MA;
Usta Technology, LLC, Longview, TX, Assignee (with 37 CFR 1.172 Interest);

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IN THE UNITED STATES PATENT AND TRADEMARK OFFICE

In re Application of:	Confirmation No.: 8522
Jerry D. Burchfiel	Examiner: Minh Dieu T NGUYEN
Application No.: 15/898,404	Art Unit: 3992
File Date: 2018-02-16	Docket No.: USTAP030D.RI
Title: SPECTRUM-ADAPTIVE NETWORKING	Date: Aug 29, 2019

COMMENTS ON STATEMENT OF REASONS FOR ALLOWANCE UNDER 37 C.F.R. § 1.104(e)

Commissioner for Patents
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Examiner:

In response to the Notice of Allowance dated 07/08/2019, please enter the following remarks.

Remarks:

The Examiner has stated the following in the Examiner's Statement of Reasons for Allowance:

> The prior art of record alone or in combination does not disclose the limitation:
>
> a) As to claim 1, the prior art of record does not anticipate or render obvious the limitation of "subtracting the power level for each the frequency from a power limit to produce a power differential for the each frequency"; and "instructing a second node in the radio communications network to avoid using a transmission frequency corresponding to a non-positive power differential in the plurality of power differentials to transmit to the first node".
>
> b) Claims 2-18 depend on claim 1 and are allowable based on the same rationale applied against claim 1.
>
> c) As to claim 20, the prior art of record does not anticipate or render obvious the limitation of "receiving an optimal waveform profile from the second node, the optimal waveform profile being based on a plurality of power measurements for the plurality of frequencies and a power limit". Claim 21 depends on claim 20 and is allowable based on the same rationale applied against claim 20.
>
> d) As to claim 19, the prior art of record does not anticipate or render obvious the limitation of "wherein the transmission signal is a first transmission signal that is transmitted using a first frequency and an 802.11-based orthogonal frequency-division multiplexing (OFDM) protocol via at least one directional antenna of a plurality of directional antennas, using a first power that is based on at least one of the one or more data structures; and further comprising: transmitting, using a second frequency and the 802.11-based OFDM protocol, a second transmission signal, simultaneously with the first transmission signal, to the third node, using a second power that is based on at

least one of the one or more data structures" and "the at least one of the one or more data structures" as recited in the claim.

e) Claims 23-37, 84-98 depend on claim 19 and are allowable based on the same rationale applied against claim 19.

f) As to claim 39, the prior art of record does not anticipate or render obvious the limitation of "transmitting, using a second power via the 802.11 based OFDM protocol and simultaneously with the first transmission signal, the second transmission signal to the third node".

g) As to claim 40, the prior art of record does not anticipate or render obvious the limitation of "wherein the transmission signal is a first transmission signal that is transmitted using a first frequency and an 802.11-based orthogonal frequency-division multiplexing (OFDM) protocol via at least one directional antenna of a plurality of directional antennas, using a first power that is based on at least one of the one or more data structures; and further comprising: transmitting, using a second frequency and the 802.11-based OFDM protocol, a second transmission signal, simultaneously with the first transmission signal, to the third node, using a second power that is based on at least one of the one or more data structures" and "the at least one of the one or more data structures" as recited in the claim.

h) Claims 42-83 depend on claim 40 and are allowable based on the same rationale applied against claim 40.

i) As to claim 41, the prior art of record does not anticipate or render obvious the limitation of "wherein an update of the compressed feedback is repeatedly

generated, compressed, and transmitted at time periods of less than one second; so that the transmit power is repeatedly updated based thereupon at time periods of less than one second".

j) Claim 42 depends on claim 41 and is allowable based on the same rationale applied against claim 41.

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."

In response, applicant respectfully points out that features of at least some of the independent claims (e.g., 1, 19, 20, 39, 40, and 41) are not necessarily the same as those the Examiner has highlighted above. For example, Claim 19 is directed to "wherein the filtered transmission signal is a filtered first transmission signal that is transmitted using a first frequency and an 802.11-based orthogonal frequency-division multiplexing (OFDM) protocol via at least one antenna of a plurality of antennas, using a first power that is based on at least one of the one or more data structures," in the context claimed.

As additional, non-exhaustive examples, Claims 1, 19, 20, 39, 40, and 41 recite the following, respectively:

1. A method for managing interference in a radio communications network, comprising the steps of:

receiving an aggregated radio signal at a first node in the radio communications network on a plurality of frequencies;

determining a power level for the aggregated radio signal for each frequency in the plurality frequencies;

subtracting the power level for each the frequency from a power limit to produce a power differential for the each frequency; and

instructing a second node in the radio communications network to avoid using a transmission frequency corresponding to a non-positive power differential in the plurality of power differentials to transmit to the first node.

19. A method for managing interference in a radio communications network, comprising the steps of:

receiving at a first node in the radio communications network an instruction transmitted from a second node in the radio communications network to avoid using a plurality of frequencies to transmit to the second node;

filtering a transmission signal to remove power from the transmission signal at each frequency in the plurality of frequencies to be avoided;

transmitting the filtered transmission signal to the second node;

separately from the receipt of the instruction, receiving a compressed first feedback from the second node that is based on a received power and one or more frequencies of a first signal transmitted from the first node to the second node;

separately from the receipt of the instruction, receiving a compressed second feedback from a third node that is based on a received power and one or more frequencies of a second signal transmitted from the first node to the third node;

decompressing the compressed first feedback resulting in a decompressed first feedback;

decompressing the compressed second feedback resulting in a decompressed second feedback;

generating one or more data structures based on the decompressed first feedback and the decompressed second feedback;

wherein the filtered transmission signal is a filtered first transmission signal that is transmitted using a first frequency and an 802.11-based orthogonal frequency-division multiplexing (OFDM) protocol via at least one antenna of a plurality of antennas, using a first power that is based on at least one of the one or more data structures; and further comprising:

transmitting, using a second frequency and the 802.11-based OFDM protocol, a filtered second transmission signal, simultaneously with the filtered first transmission signal, to the third node, using a second power that is based on at least one of the one or more data structures.

20. A method for managing interference in a radio communications network, comprising the steps of:

receiving at a first node in the radio communications network an instruction transmitted from a second node in the radio communications network to avoid using a plurality of frequencies to transmit to the second node;

filtering a transmission signal to remove power from the transmission signal at each frequency in the plurality of frequencies to be avoided;

transmitting the filtered transmission signal to the second node;

receiving an optimal waveform profile from the second node, the optimal waveform profile being based on a plurality of power measurements for the plurality of frequencies and a power limit; and

conforming the transmission signal to the optimal waveform profile prior to performing the transmitting step.

39. A method for managing interference in a radio communications network, comprising the steps of:

receiving at a first node in the radio communications network an instruction transmitted from a second node in the radio communications network to avoid using a plurality of frequencies to transmit to the second node;

filtering a transmission signal to remove power from the transmission signal at each frequency in the plurality of frequencies to be avoided;

transmitting the filtered transmission signal to the second node;

wherein the instruction includes a first instruction and the filtered transmission signal includes a filtered first transmission signal that is transmitted to the second node using a first power via an 802.11-based orthogonal frequency-division multiplexing (OFDM) protocol, and further comprising:

receiving at the first node in the radio communications network a second instruction transmitted from a third node in the radio communications network to avoid using a different plurality of frequencies to transmit to the third node;

filtering a second transmission signal to remove power from the second transmission signal at each frequency in the different plurality of frequencies to be avoided; and

transmitting, using a second power via the 802.11-based OFDM protocol and simultaneously with the filtered first transmission signal, the filtered second transmission signal to the third node.

40. A method for managing interference in a radio communications network, comprising the steps of:

receiving at a first node in the radio communications network an instruction transmitted from a second node in the radio communications network to avoid using a plurality of frequencies to transmit to the second node;

filtering a transmission signal to remove power from the transmission signal at each frequency in the plurality of frequencies to be avoided;

transmitting the filtered transmission signal to the second node;

receiving a compressed first feedback from the second node that characterizes receipt of a first signal sent from the first node to the second node;

receiving a compressed second feedback from a third node that characterizes receipt of a second signal sent from the first node to the third node;

decompressing the compressed first feedback resulting in a decompressed first feedback; and

decompressing the compressed second feedback resulting in a decompressed second feedback;

wherein the filtered transmission signal is a filtered first transmission signal that is transmitted to the second node using an 802.11-based orthogonal frequency-division multiplexing (OFDM) protocol via at least one antenna of a plurality of antennas, using a first power that is based on the decompressed first feedback; and further comprising:

transmitting, using the 802.11-based OFDM protocol, a filtered second transmission signal, simultaneously with the filtered first transmission signal, to the third node using a second power that is based on the decompressed second feedback.

41. A method for managing interference in a radio communications network, comprising the steps of:

receiving at a first node in the radio communications network an instruction transmitted from a second node in the radio communications network to avoid using a plurality of frequencies to transmit to the second node;

filtering a transmission signal to remove power from the transmission signal at each frequency in the plurality of frequencies to be avoided;

transmitting the filtered transmission signal to the second node;

separately from the receipt of the instruction, receiving a particular signal at the first node that is transmitted from the second node;

generating a feedback based on a received power and one or more frequencies via which the particular signal is received;

compressing the feedback; and

transmitting the compressed feedback from the first node to the second node, for use by the second node in determining a transmit power with which the second node transmits to the first node via at least one [directional] antenna of a plurality of [directional] antennas, while simultaneously transmitting to one or more other nodes;

wherein the filtered transmission signal is transmitted to the second node using an 802.11-based orthogonal frequency-division multiplexing (OFDM) protocol;

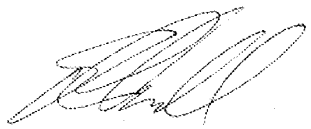
wherein an update of the compressed feedback is repeatedly generated, compressed, and transmitted at time periods of less than one second; so that the transmit power is repeatedly updated based thereupon at time periods of less than one second.

Clearly, at least some of the independent claims are not necessarily limited to the features that the Examiner has noted in the Examiner's Statement of Reasons for Allowance, as noted above (by way of example only). Instead, each of the claims should only be limited by the language existing therein.

Further, although Applicant agrees with the Examiner's conclusion that these claims are allowable, Applicant notes that the claims may be allowable for reasons other than those identified by the Examiner and does not concede that the Examiner's characterizations of the terms of the claims and the prior art are correct. Each of the claims stands on its own merits and is patentable because of the combination it recites and not because of the presence or absence of any one particular element.

The Examiner's Statement was not prepared by Applicant and only contains the Examiner's possible positions in one or more reasons for allowability. Thus, any interpretation with respect to the Examiner's Statement of Reasons for Allowance should not be imputed to the Applicant.

Respectfully submitted,



Dated: 29 Aug 2019

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Reg. No. 44,580

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92045 7590 07/08/2019

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Dallas, TX 75229

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

APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
15/898,404	02/16/2018	Jerry D. Burchfiel	USTAP030D.RI	8522

TITLE OF INVENTION: SPECTRUM-ADAPTIVE NETWORKING

APPLN. TYPE	ENTITY STATUS	ISSUE FEE DUE	PUBLICATION FEE DUE	PREV. PAID ISSUE FEE	TOTAL FEE(S) DUE	DATE DUE
nonprovisional	UNDISCOUNTED	$1000	$0.00	$0.00	$1000	10/08/2019

EXAMINER	ART UNIT	CLASS-SUBCLASS
NGUYEN, MINH DIEU T	3992	455-067100

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

☐ Change of correspondence address (or Change of Correspondence Address form PTO/SB/122) attached.

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

2. For printing on the patent front page, list
(1) The names of up to 3 registered patent attorneys or agents OR, alternatively,
(2) The name of a single firm (having as a member a registered attorney or agent) and the names of up to 2 registered patent attorneys or agents. If no name is listed, no name will be printed.

1 Patrick E. Caldwell, Esq.
2 The Caldwell Firm, LLC
3

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

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

(A) NAME OF ASSIGNEE	(B) RESIDENCE: (CITY and STATE OR COUNTRY)
USTA Technology, LLC	Longview, TX

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

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

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

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

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

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

☐ Applicant certifying micro entity status. See 37 CFR 1.29

☐ Applicant asserting small entity status. See 37 CFR 1.27

☐ Applicant changing to regular undiscounted fee status.

NOTE: Absent a valid certification of Micro Entity Status (see forms PTO/SB/15A and 15B), issue fee payment in the micro entity amount will not be accepted at the risk of application abandonment.
NOTE: If the application was previously under micro entity status, checking this box will be taken to be a notification of loss of entitlement to micro entity status.
NOTE: Checking this box will be taken to be a notification of loss of entitlement to small or micro entity status, as applicable.

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

Authorized Signature /Patrick Caldwell/ Date 29 Aug 2019

Typed or printed name Patrick Caldwell Registration No. 44580

PTOL-85 Part B (08-18) Approved for use through 01/31/2020 OMB 0651-0033 U.S. Patent and Trademark Office; U.S. DEPARTMENT OF COMMERCE

Electronic Patent Application Fee Transmittal

Application Number:	15898404
Filing Date:	16-Feb-2018
Title of Invention:	SPECTRUM-ADAPTIVE NETWORKING
First Named Inventor/Applicant Name:	Jerry D. Burchfiel
Filer:	Patrick Edgar Caldwell
Attorney Docket Number:	USTAP030D.RI

Filed as Large Entity

Filing Fees for Utility under 35 USC 111(a)

Description	Fee Code	Quantity	Amount	Sub-Total in USD($)
Basic Filing:				
Pages:				
Claims:				
REISSUE CLAIMS IN EXCESS OF 20	1205	55	100	5500
INDEPENDENT CLAIMS REISSUE	1204	4	460	1840
Miscellaneous-Filing:				
Petition:				
Patent-Appeals-and-Interference:				

Description	Fee Code	Quantity	Amount	Sub-Total in USD($)
Post-Allowance-and-Post-Issuance:				
REISSUE ISSUE FEE	1511	1	1000	1000
Extension-of-Time:				
Miscellaneous:				
		Total in USD ($)		**8340**

Electronic Acknowledgement Receipt	
EFS ID:	37025873
Application Number:	15898404
International Application Number:	
Confirmation Number:	8522
Title of Invention:	SPECTRUM-ADAPTIVE NETWORKING
First Named Inventor/Applicant Name:	Jerry D. Burchfiel
Customer Number:	92045
Filer:	Patrick Edgar Caldwell
Filer Authorized By:	
Attorney Docket Number:	USTAP030D.RI
Receipt Date:	29-AUG-2019
Filing Date:	16-FEB-2018
Time Stamp:	22:24:33
Application Type:	Utility under 35 USC 111(a)

Payment information:

Submitted with Payment	yes
Payment Type	CARD
Payment was successfully received in RAM	$8340
RAM confirmation Number	E20198SM24529988
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File Listing:

Document Number	Document Description	File Name	File Size(Bytes)/ Message Digest	Multi Part /.zip	Pages (if appl.)
1	Post Allowance Communication - Incoming	USTAP030D-RI_Comments_vF_29-Aug-2019.pdf	320534 08e9f647b700cb852f1b9ff9a75abfc5e717c630	no	10
Warnings:					
Information:					
2	Issue Fee Payment (PTO-85B)	USTAP030D-RI_fee-transmittal_vF_29-Aug-2019.pdf	220297 f3c77fb3f96159095efeb5ed6d11820ab1b2c4c3	no	1
Warnings:					
Information:					
3	Fee Worksheet (SB06)	fee-info.pdf	33996 f45ee83d17482727d82b4d4f20b6eb84b3fe181c	no	2
Warnings:					
Information:					
		Total Files Size (in bytes):	574827		

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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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Courtesy Reminder for
Application Serial No: 15/898,404

Attorney Docket No: USTAP030D.RI
Customer Number: 92045
Date of Electronic Notification: 07/08/2019

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.

An email notification regarding the correspondence was sent to the following email address(es) associated with your customer number:
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NOTICE OF ALLOWANCE AND FEE(S) DUE

92045 7590 07/08/2019

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EXAMINER	
NGUYEN, MINH DIEU T	
ART UNIT	PAPER NUMBER
3992	

DATE MAILED: 07/08/2019

APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
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nonprovisional	UNDISCOUNTED	$1000	$0.00	$0.00	$1000	10/08/2019

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

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

HOW TO REPLY TO THIS NOTICE:

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

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

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

PTOL-85 (Rev. 02/11)

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(Signature)
(Date)

APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
15/898,404	02/16/2018	Jerry D. Burchfiel	USTAP030D.RI	8522

TITLE OF INVENTION: SPECTRUM-ADAPTIVE NETWORKING

APPLN. TYPE	ENTITY STATUS	ISSUE FEE DUE	PUBLICATION FEE DUE	PREV. PAID ISSUE FEE	TOTAL FEE(S) DUE	DATE DUE
nonprovisional	UNDISCOUNTED	$1000	$0.00	$0.00	$1000	10/08/2019

EXAMINER	ART UNIT	CLASS-SUBCLASS
NGUYEN, MINH DIEU T	3992	455-067100

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

❑ Change of correspondence address (or Change of Correspondence Address form PTO/SB/122) attached.

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

2. For printing on the patent front page, list
(1) The names of up to 3 registered patent attorneys or agents OR, alternatively,
(2) The name of a single firm (having as a member a registered attorney or agent) and the names of up to 2 registered patent attorneys or agents. If no name is listed, no name will be printed.

1 _____
2 _____
3 _____

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

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

(A) NAME OF ASSIGNEE (B) RESIDENCE: (CITY and STATE OR COUNTRY)

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

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

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

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

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

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

❑ Applicant certifying micro entity status. See 37 CFR 1.29

❑ Applicant asserting small entity status. See 37 CFR 1.27

❑ Applicant changing to regular undiscounted fee status.

NOTE: Absent a valid certification of Micro Entity Status (see forms PTO/SB/15A and 15B), issue fee payment in the micro entity amount will not be accepted at the risk of application abandonment.
NOTE: If the application was previously under micro entity status, checking this box will be taken to be a notification of loss of entitlement to micro entity status.
NOTE: Checking this box will be taken to be a notification of loss of entitlement to small or micro entity status, as applicable.

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

Authorized Signature _____ Date _____

Typed or printed name _____ Registration No. _____

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92045 7590 07/08/2019

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EXAMINER	
NGUYEN, MINH DIEU T	
ART UNIT	**PAPER NUMBER**
3992	

DATE MAILED: 07/08/2019

Determination of Patent Term Extension or Adjustment under 35 U.S.C. 154 (b)

A reissue patent is for "the unexpired part of the term of the original patent." See 35 U.S.C. 251. Accordingly, the above-identified reissue application is not eligible for Patent Term Extension or Adjustment under 35 U.S.C. 154(b).

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

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

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

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

Privacy Act Statement

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

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

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

Notice of Allowability	Application No. 15/898,404	Applicant(s) Burchfiel, Jerry D.	
	Examiner MINH DIEU T NGUYEN	Art Unit 3992	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 6/12/2019.
   ☐ 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 See Continuation Sheet . 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 _____.

/MINH DIEU NGUYEN/
Primary Examiner, Art Unit 3992

Continuation of 3. The allowed claim(s) is/are: 1-21,23-37 and 39-98

Notice of Pre-AIA or AIA Status

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

DETAILED ACTION

1. This action is in response to the communication dated 6/12/2019.

Claims 1-21, 23-37, 39-98 have been examined.

Claims 22 and 38 are cancelled.

2. The present application is being examined under the pre-AIA first to invent provisions with respect to 35 U.S.C. 102, 35 U.S.C. 103, and 35 U.S.C. 112. Because the instant application is a reissue application filed on or after September 16, 2012, all references to 35 U.S.C. 251 and 37 CFR 1.172, 1.175, and 3.73 are to the current provisions.

Response to Amendment

3. a) The claims objection have been withdrawn based on the amendment filed 6/12/2019.

b) The 112, 2nd and 4th rejections have been withdrawn based on the claims amendment filed 6/12/2019.

Allowable Subject Matter

4. Claims 1-21, 23-37, 39-98 are allowed.

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

The prior art of record alone or in combination does not disclose the limitation:

a) As to claim 1, the prior art of record does not anticipate or render obvious the limitation of "subtracting the power level for each the frequency from a power limit to produce a power differential for the each frequency"; and "instructing a second node in the radio communications network to avoid using a transmission frequency corresponding to a non-positive power differential in the plurality of power differentials to transmit to the first node".

b) Claims 2-18 depend on claim 1 and are allowable based on the same rationale applied against claim 1.

c) As to claim 20, the prior art of record does not anticipate or render obvious the limitation of "receiving an optimal waveform profile from the second node, the optimal waveform profile being based on a plurality of power measurements for the plurality of frequencies and a power limit". Claim 21 depends on claim 20 and is allowable based on the same rationale applied against claim 20.

d) As to claim 19, the prior art of record does not anticipate or render obvious the limitation of "wherein the transmission signal is a first transmission signal that is transmitted using a first frequency and an 802.11-based orthogonal frequency-division multiplexing (OFDM) protocol via at least one directional antenna of a plurality of directional antennas, using a first power that is based on at least one of the one or more data structures; and further comprising: transmitting, using a second frequency and the 802.11-based OFDM protocol, a second transmission signal, simultaneously with the first transmission signal, to the third node, using a second power that is based on at

least one of the one or more data structures" and "the at least one of the one or more data structures" as recited in the claim.

e) Claims 23-37, 84-98 depend on claim 19 and are allowable based on the same rationale applied against claim 19.

f) As to claim 39, the prior art of record does not anticipate or render obvious the limitation of "transmitting, using a second power via the 802.11 based OFDM protocol and simultaneously with the first transmission signal, the second transmission signal to the third node".

g) As to claim 40, the prior art of record does not anticipate or render obvious the limitation of "wherein the transmission signal is a first transmission signal that is transmitted using a first frequency and an 802.11-based orthogonal frequency-division multiplexing (OFDM) protocol via at least one directional antenna of a plurality of directional antennas, using a first power that is based on at least one of the one or more data structures; and further comprising: transmitting, using a second frequency and the 802.11-based OFDM protocol, a second transmission signal, simultaneously with the first transmission signal, to the third node, using a second power that is based on at least one of the one or more data structures" and "the at least one of the one or more data structures" as recited in the claim.

h) Claims 42-83 depend on claim 40 and are allowable based on the same rationale applied against claim 40.

i) As to claim 41, the prior art of record does not anticipate or render obvious the limitation of "wherein an update of the compressed feedback is repeatedly

generated, compressed, and transmitted at time periods of less than one second; so that the transmit power is repeatedly updated based thereupon at time periods of less than one second".

j) Claim 42 depends on claim 41 and is allowable based on the same rationale applied against claim 41.

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

5. Applicant is reminded of the continuing obligation under 37 CFR 1.178(b), to timely apprise the Office of any prior or concurrent proceeding in which Patent No. 7,483,711 is or was involved. These proceedings would include interferences, reissues, reexaminations, and litigation.

Applicant is further reminded of the continuing obligation under 37 CFR 1.56, to timely apprise the Office of any information which is material to patentability of the claims under consideration in this reissue application.

These obligations rest with each individual associated with the filing and prosecution of this application for reissue. See also MPEP §§ 1404, 1442.01 and 1442.04.

6. Applicant is notified that any subsequent amendment to the specification and/or claims must comply with 37 CFR 1.173(b).

7. Applicant is reminded that the maximum term of the original patent is fixed at the time the patent is granted. While the term may be subsequently shortened, e.g., through the filing of a terminal disclaimer, it cannot be extended through the filing of a reissue. Accordingly, a deletion in a reissue application of an earlier-obtained benefit claim under 35 U.S.C. 120 will not operate to lengthen the term of the patent to be reissued (see MPEP 1405).

8. Any inquiry concerning this communication or earlier communications from the examiner should be directed to Minh Dieu Nguyen whose telephone number is (571) 272-3873. The examiner can normally be reached on 8:30am-5:00pm, M-F.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Mike Fuelling can be reached on (571) 270-1367. The fax phone number for the organization where this application or proceeding is assigned is (571) 273-8300.

9. 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.

Signed:

/MINH DIEU NGUYEN/
Primary Examiner, Art Unit 3992
Conferees:

/MATTHEW E HENEGHAN/
Primary Examiner, Art Unit 3992

/M.F/
Supervisory Patent Examiner, Art Unit 3992

EXAMINER'S AMENDMENT

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

The application has been amended as follows:

83. (New, Amended) The method of claim 40, wherein at least one of:

the first signal includes a data signal; the first signal includes an aggregate signal;

the first signal includes a first data signal, and the second signal includes a second data signal;

the first and second signals are reflected in an aggregate signal;

the compressed first feedback is combined with the instruction;

the compressed first feedback is received with the instruction;

the compressed first feedback is configured to ensure that transmissions from all neighbors of the first node are received at a same power level;

the compressed first feedback is configured to at least one of: minimize a transmit power on reliable links, maximize an ability to achieve spatial separation

among transmissions on a same frequency, minimize network self-interference, improve low probability of intercept (LPI), or lower probability of detection (LPD);

the compressed first feedback and the compressed second feedback are received simultaneously;

at least one of the compressed first feedback or the compressed second feedback is received before the instruction is received;

at least one of the compressed first feedback or the compressed second feedback is received after the instruction is received;

the steps are performed in the order listed;

the radio communications network includes an 802.11 network;

the radio communications network includes an 802.11a network;

the radio communications network includes an 802.11g network;

the at least one antenna includes multiple antennas;

the at least one antenna includes at least one omnidirectional antenna;

the at least one antenna includes at least one directional antenna;

interference in the radio communications network is managed;

the first node is a mobile node and the second node is a non-mobile node;

the second node is a mobile node and the first node is a non-mobile node;

the instruction sets forth the plurality of frequencies to avoid using;

the instruction specifies the plurality of frequencies to avoid using;

a purpose of the instruction is to avoid using the plurality of frequencies;

a purpose of the instruction is to avoid using the plurality of frequencies, where the purpose is accomplished by specifying the plurality of frequencies to avoid using;

a purpose of the instruction is to avoid using the plurality of frequencies, where the purpose is accomplished by specifying one or more frequencies to use;

a purpose of the instruction is to avoid using the plurality of frequencies, where the purpose is accomplished by specifying one or more frequencies to use, the one or more frequencies not including the plurality of frequencies;

the instruction to avoid the plurality of frequencies sets forth one or more frequencies to use;

the instruction to avoid the plurality of frequencies specifies one or more frequencies to use;

the instruction to avoid the plurality of frequencies assigns one or more frequencies to use;

the instruction to avoid the plurality of frequencies does not specify the plurality of frequencies;

the instruction to avoid the plurality of frequencies sets forth one or more frequencies to use, thereby resulting in the avoidance of using the plurality of frequencies;

a purpose of the filtering is to remove the power from the transmission signal at each frequency in the plurality of frequencies to be avoided, where the purpose is accomplished by specifying one or more frequencies to which the power is to be applied;

a purpose of the filtering is to remove the power from the transmission signal at each frequency in the plurality of frequencies to be avoided, where the purpose is accomplished by specifying the plurality of frequencies to be avoided;

the filtering suppresses or otherwise minimizes waves or oscillations at each frequency in the plurality of frequencies to be avoided;

the filtering suppresses or otherwise minimizes waves or oscillations at each frequency in the plurality of frequencies to be avoided, thereby resulting in the removal of the power from the transmission signal at each frequency in the plurality of frequencies to be avoided;

the filtering removes all power from the transmission signal;

the filtering removes some power from the transmission signal;

the filtering discards one or more portions of the transmission signal at each of the plurality of frequencies;

the filtering utilizes transmit excision;

the filtering utilizes compression;

the filtering identifies certain one or more frequencies in connection with which power is applied, thereby resulting in the removal of the power from the transmission signal at each frequency in the plurality of frequencies to be avoided;

the removal of power from the transmission signal at each frequency in the plurality of frequencies to be avoided is accomplished by an adjustment in relation to power previously used in connection with the transmission signal;

the removal of power from the transmission signal at each frequency in the plurality of frequencies is accomplished by adjusting a processing of the transmission signal so that power that was previously used in connection with the transmission signal at each frequency in the plurality of frequencies to be avoided, is no longer used in connection with the transmission signal at each frequency in the plurality of frequencies to be avoided;

the removal of power from the transmission signal at each frequency in the plurality of frequencies to be avoided is accomplished by setting a waveform profile that results in no power being applied in connection with the transmission signal at each frequency in the plurality of frequencies to be avoided;

the removal of power from the transmission signal at each frequency in the plurality of frequencies to be avoided is accomplished by pre-processing the transmission signal, before any power is applied, so that power, which would otherwise be applied in connection with the transmission signal at each frequency in the plurality of frequencies, is not applied in connection with the transmission signal at each frequency in the plurality of frequencies to be avoided;

the removal of power from the transmission signal at each frequency in the plurality of frequencies to be avoided is accomplished by pre-processing the transmission signal, before any power is applied, so that no power is applied in connection with the transmission signal at each frequency in the plurality of frequencies to be avoided;

the transmission signal includes a plurality of packets;

the transmission signal includes a plurality of different transmissions;

the transmission signal includes a plurality of transmissions to the second node;

the transmission signal includes a plurality of differently-timed transmissions to the second node;

the transmission signal includes a plurality of transmission components to the second node, each with different power levels;

the transmission signal includes a plurality of transmission components to the second node, each with different power levels as a result of different instances of the filtering;

the transmission signal is generated so as to not include power at each frequency in the plurality of frequencies to be avoided;

the transmission signal is generated so as to not include power at each frequency in the plurality of frequencies to be avoided, thereby resulting in the removal of the power from the transmission signal at each frequency in the plurality of frequencies to be avoided;

the transmission signal is pre-processed so as to not include power at each frequency in the plurality of frequencies to be avoided, thereby resulting in the removal

of the power from the transmission signal at each frequency in the plurality of frequencies to be avoided;

the filtering is performed using an output filter;

the filtering is performed using an optimal matched filter;

the filtering is performed using a band selection filter;

the filtering is performed using a median filter; or

the filtering is performed using a nonlinear filter.

84. (New, Amended) The method of claim 19, wherein the instruction is received prior to the receipt of the compressed first feedback.

85. (New, Amended) The method of claim 19, wherein the filtered second transmission signal is transmitted simultaneously with the filtered first transmission signal via the same plurality of antennas.

86. (New, Amended) The method of claim 19, wherein the first frequency is selected as a function of the compressed first feedback, and the second frequency is selected as a function of the compressed second feedback.

87. (New, Amended) The method of claim 19, wherein the instruction includes a 802.11 clear to send (CTS) instruction.

88. (New, Amended) The method of claim 19, wherein the instruction includes a 802.11 request to send (RTS) instruction.

89. (New, Amended) The method of claim 19, wherein the filtered second transmission signal is transmitted simultaneously with the filtered first transmission signal via at least one different antenna of the plurality of antennas.

90. (New, Amended) The method of claim 19, wherein the filtered second transmission signal is transmitted simultaneously with the filtered first transmission signal using the at least one antenna of the plurality of antennas.

91. (New, Amended) The method of claim 19, wherein at least one of:

the first signal includes a data signal; the first signal includes an aggregate signal;

the compressed first feedback is configured to ensure that transmissions from all neighbors of the first node are received at a same power level;

the compressed first feedback is configured to at least one of: minimize a transmit power on reliable links, maximize an ability to achieve spatial separation

among transmissions on a same frequency, minimize network self-interference, improve low probability of intercept (LPI), or lower probability of detection (LPD);

the compressed first feedback and the compressed second feedback are received simultaneously;

at least one of the compressed first feedback or the compressed second feedback is received separately from the receipt of the instruction, by being received before the instruction is received;

at least one of the compressed first feedback or the compressed second feedback is received separately from the receipt of the instruction, by being received after the instruction is received;

the one or more frequencies of the first signal includes a frequency band;

the one or more frequencies of the second signal includes a frequency band;

the one or more frequencies of the first signal includes a first frequency band, and the one or more frequencies of the second signal includes a second frequency band;

a single data structure is generated based on the decompressed first feedback and the decompressed second feedback;

a first data structure is generated based on the decompressed first feedback, and a second data structure is generated based on the decompressed second feedback;

a first data structure is generated based on the decompressed first feedback, where the first power is based on the first data structure, and a second data structure is generated based on the decompressed second feedback, where the second power is based on the second data structure;

the first power and the second power differ in terms of power level;

the steps are performed in the order listed;

the radio communications network includes an 802.11 network;

the radio communications network includes an 802.11a network;

the radio communications network includes an 802.11g network;

the at least one antenna includes multiple antennas;

the at least one antenna includes at least one omnidirectional antenna;

the at least one antenna includes at least one directional antenna;

the first frequency includes a first frequency band; the second frequency includes a second frequency band;

the first frequency is part of a first frequency band;

the second frequency is part of a second frequency band;

the first frequency includes a first frequency band, and the second frequency includes a second frequency band, where the first frequency band and the second frequency band do not overlap;

interference in the radio communications network is managed;

the first node is a mobile node and the second node is a non-mobile node;

the second node is a mobile node and the first node is a non-mobile node;

the instruction sets forth the plurality of frequencies to avoid using;

the instruction specifies the plurality of frequencies to avoid using;

a purpose of the instruction is to avoid using the plurality of frequencies; a purpose of the instruction is to avoid using the plurality of frequencies, where the purpose is accomplished by specifying the plurality of frequencies to avoid using;

a purpose of the instruction is to avoid using the plurality of frequencies, where the purpose is accomplished by specifying one or more frequencies to use;

a purpose of the instruction is to avoid using the plurality of frequencies, where the purpose is accomplished by specifying one or more frequencies to use, the one or more frequencies not including the plurality of frequencies;

the instruction to avoid the plurality of frequencies sets forth one or more frequencies to use;

the instruction to avoid the plurality of frequencies specifies one or more frequencies to use;

the instruction to avoid the plurality of frequencies assigns one or more frequencies to use;

the instruction to avoid the plurality of frequencies does not specify the plurality of frequencies;

the instruction to avoid the plurality of frequencies sets forth one or more frequencies to use, thereby resulting in the avoidance of using the plurality of frequencies;

a purpose of the filtering is to remove the power from the transmission signal at each frequency in the plurality of frequencies to be avoided, where the purpose is accomplished by specifying one or more frequencies to which the power is to be applied;

a purpose of the filtering is to remove the power from the transmission signal at each frequency in the plurality of frequencies to be avoided, where the purpose is accomplished by specifying the plurality of frequencies to be avoided;

the filtering suppresses or otherwise minimizes waves or oscillations at each frequency in the plurality of frequencies to be avoided;

the filtering suppresses or otherwise minimizes waves or oscillations at each frequency in the plurality of frequencies to be avoided, thereby resulting in the removal of the power from the transmission signal at each frequency in the plurality of frequencies to be avoided;

the filtering removes all power from the transmission signal;

the filtering removes some power from the transmission signal;

the filtering discards one or more portions of the transmission signal at each of the plurality of frequencies;

the filtering utilizes transmit excision;

the filtering utilizes compression;

the filtering identifies certain one or more frequencies in connection with which power is applied, thereby resulting in the removal of the power from the transmission signal at each frequency in the plurality of frequencies to be avoided;

the removal of power from the transmission signal at each frequency in the plurality of frequencies to be avoided is accomplished by an adjustment in relation to power previously used in connection with the transmission signal;

the removal of power from the transmission signal at each frequency in the plurality of frequencies is accomplished by adjusting a processing of the transmission signal so that power that was previously used in connection with the transmission signal at each frequency in the plurality of frequencies to be avoided, is no longer used in connection with the transmission signal at each frequency in the plurality of frequencies to be avoided;

the removal of power from the transmission signal at each frequency in the plurality of frequencies to be avoided is accomplished by setting a waveform profile that results in no power being applied in connection with the transmission signal at each frequency in the plurality of frequencies to be avoided;

the removal of power from the transmission signal at each frequency in the plurality of frequencies to be avoided is accomplished by pre-processing the transmission signal, before any power is applied, so that power, which would otherwise be applied in connection with the transmission signal at each frequency in the plurality of frequencies, is not applied in connection with the transmission signal at each frequency in the plurality of frequencies to be avoided;

the removal of power from the transmission signal at each frequency in the plurality of frequencies to be avoided is accomplished by pre-processing the transmission signal, before any power is applied, so that no power is applied in connection with the transmission signal at each frequency in the plurality of frequencies to be avoided;

the transmission signal is generated so as to not include power at each frequency in the plurality of frequencies to be avoided;

the transmission signal is generated so as to not include power at each frequency in the plurality of frequencies to be avoided, thereby resulting in the removal of the power from the transmission signal at each frequency in the plurality of frequencies to be avoided;

the transmission signal is pre-processed so as to not include power at each frequency in the plurality of frequencies to be avoided, thereby resulting in the removal of the power from the transmission signal at each frequency in the plurality of frequencies to be avoided;

the filtering is performed using an output filter;

the filtering is performed using an optimal matched filter;

the filtering is performed using a band selection filter;

the filtering is performed using a median filter; or

the filtering is performed using a nonlinear filter.

92. (New, Amended) The method of claim 19, wherein the removal of power from the transmission signal at each frequency in the plurality of frequencies to be avoided is accomplished by adjusting a processing of the transmission signal so that certain power that was previously used in connection with the transmission signal at each frequency in the plurality of frequencies to be avoided before the instruction is received, is no longer used in connection with the transmission signal at each frequency in the plurality of frequencies to be avoided in accordance with the instruction.

93. (New, Amended) The method of claim 19, wherein the removal of power from the transmission signal at each frequency in the plurality of frequencies to be avoided is accomplished by adjusting a processing of the transmission signal so that certain power that was previously used in connection with the transmission signal at each frequency in the plurality of frequencies to be avoided before the instruction is received, is no longer used in connection with the transmission signal at each frequency in the plurality of frequencies to be avoided in accordance with the instruction, which specifies at least

one frequency to use so as to avoid using the plurality of frequencies to be avoided in order to transmit to the second node.

94. (New, Amended) The method of claim 19, wherein network forwarding decisions are guided using instantaneous information from a media access control (MAC) layer.

95. (New) The method of claim 94, wherein the network forwarding decisions are guided to eliminate a dominant end-to-end latency effect of channel access delay at at least one hop.

96. (New, Amended) The method of claim 19, wherein frequency channels are reused in order to increase spatial reuse across multiple basic service sets.

97. (New, Amended) The method of claim 19, wherein RTS/CTS signaling is extended such that frequency channels are reused in order to increase spatial reuse across multiple basic service sets.

98. (New, Amended) The method of claim 19, wherein RTS/CTS signaling is extended such that frequency channels are reused in order to increase spatial reuse across multiple basic service sets, to accommodate legacy access points.

Issue Classification	Application/Control No.	Applicant(s)/Patent Under Reexamination
	15/898,404	Burchfiel, Jerry D.
	Examiner	**Art Unit**
	MINH DIEU T NGUYEN	3992

CPC							
Symbol						**Type**	**Version**
H04W	/	52	/	343		F	2013-01-01
H04B	/	7	/	0408		I	2013-01-01
H04B	/	7	/	12		A	2013-01-01
H04W	/	52	/	42		A	2013-01-01
H04W	/	52	/	225		A	2013-01-01

CPC Combination Sets								
Symbol						**Type**	**Set**	**Ranking**	**Version**
	/		/						

NONE		**Total Claims Allowed:**	
(Assistant Examiner)	(Date)	96	
/MINH DIEU NGUYEN/ Primary Examiner, Art Unit 3992	18 June 2019	O.G. Print Claim(s)	O.G. Print Figure
(Primary Examiner)	(Date)	1	14

U.S. Patent and Trademark Office — Part of Paper No.: 20190617

Issue Classification	Application/Control No.	Applicant(s)/Patent Under Reexamination
	15/898,404	Burchfiel, Jerry D.
	Examiner	**Art Unit**
	MINH DIEU T NGUYEN	3992

INTERNATIONAL CLASSIFICATION				
CLAIMED				
	/		/	

NON-CLAIMED				
	/		/	

US ORIGINAL CLASSIFICATION	
CLASS	**SUBCLASS**
455	522

CROSS REFERENCES(S)						
CLASS	**SUBCLASS (ONE SUBCLASS PER BLOCK)**					
455	68	69	70			

NONE		**Total Claims Allowed:**	
(Assistant Examiner)	(Date)	96	
/MINH DIEU NGUYEN/ Primary Examiner, Art Unit 3992	18 June 2019	O.G. Print Claim(s)	O.G. Print Figure
(Primary Examiner)	(Date)	1	14

U.S. Patent and Trademark Office — Part of Paper No.: 20190617

Issue Classification	Application/Control No.	Applicant(s)/Patent Under Reexamination
	15/898,404	Burchfiel, Jerry D.
	Examiner	**Art Unit**
	MINH DIEU T NGUYEN	3992

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

CLAIMS

Final	Original	Final	Original	Final	Original	Final	Original	Final	Original	Final	Original	Final	Original	Final	Original
1	1	14	14	26	27	53	40	64	53	77	66	90	79	45	92
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6	6	19	19	31	32	56	45	69	58	82	71	37	84	50	97
7	7	20	20	32	33	57	46	70	59	83	72	38	85	51	98
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9	9		22	34	35	59	48	72	61	85	74	40	87		
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NONE		**Total Claims Allowed:**	
(Assistant Examiner)	(Date)	96	
/MINH DIEU NGUYEN/ Primary Examiner, Art Unit 3992	18 June 2019	O.G. Print Claim(s)	O.G. Print Figure
(Primary Examiner)	(Date)	1	14

U.S. Patent and Trademark Office — Part of Paper No.: 20190617

Search Notes	Application/Control No.	Applicant(s)/Patent Under Reexamination
	15/898,404	Burchfiel, Jerry D.
	Examiner	Art Unit
	MINH DIEU T NGUYEN	3992

CPC - Searched*		
Symbol	**Date**	**Examiner**
H04W52/04 H04W52/06 H04W52/08 H04W52/10 H04W52/12 H04W52/125 H04W52/14 H04W52/143 H04W52/146 H04W52/16 H04W52/18 H04W52/20 H04W52/22 H04W52/221 H04W52/223 H04W52/225 H04W52/226 H04W52/228 H04W52/24 H04W52/241 H04W52/242 H04W52/243 H04W52/244 H04W52/245 H04W52/246 H04W52/247 H04W52/248 H04W52/26 H04W52/262 H04W52/265	12/17/2018	MDN
H04W52/267 H04W52/28 H04W52/281 H04W52/282 H04W52/283 H04W52/285 H04W52/286 H04W52/287 H04W52/288 H04W52/30 H04W52/32 H04W52/322 H04W52/325 H04W52/327 H04W52/34 H04W52/343 H04W52/346 H04W52/36 H04W52/362 H04W52/365 H04W52/367 H04W52/38 H04W52/383 H04W52/386 H04W52/40 H04W52/42 H04W52/44 H04W52/46 H04W52/48 H04W52/50 H04W52/52 H04W52/54 H04W52/545 H04W52/56 H04W52/58 H04W52/60	12/17/2018	MDN

CPC Combination Sets - Searched*		
Symbol	**Date**	**Examiner**

US Classification - Searched*			
Class	**Subclass**	**Date**	**Examiner**
455	522	12/07/2018	MDN

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

Search Notes		
Search Notes	**Date**	**Examiner**
Review litigation search report	12/07/2018	MDN
Text and class search on EAST	12/07/2018	MDN
Updated search on EAST	05/13/2019	MDN
Updated search on EAST	06/18/2019	MDN

Search Notes	Application/Control No.	Applicant(s)/Patent Under Reexamination
	15/898,404	Burchfiel, Jerry D.
	Examiner	Art Unit
	MINH DIEU T NGUYEN	3992

Interference Search			
US Class/CPC Symbol	US Subclass/CPC Group	Date	Examiner
455 || H04W	522 || 52/243; 52/244	06/18/2019	MDN

Index of Claims	Application/Control No.	Applicant(s)/Patent Under Reexamination
	15/898,404	Burchfiel, Jerry D.
	Examiner	**Art Unit**
	MINH DIEU T NGUYEN	3992

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

CLAIMS

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

CLAIM		DATE								
Final	Original	12/04/2018	05/13/2019	06/18/2019						
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95	41	✓	✓	=						
96	42	✓	=	=						

Index of Claims	Application/Control No.	Applicant(s)/Patent Under Reexamination
	15/898,404	Burchfiel, Jerry D.
	Examiner	Art Unit
	MINH DIEU T NGUYEN	3992

CLAIM		DATE								
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Index of Claims	Application/Control No.	Applicant(s)/Patent Under Reexamination
	15/898,404	Burchfiel, Jerry D.
	Examiner	Art Unit
	MINH DIEU T NGUYEN	3992

CLAIM		DATE								
Final	Original	12/04/2018	05/13/2019	06/18/2019						
48	95		✓	=						
49	96		✓	=						
50	97		✓	=						
51	98		✓	=						

United States Patent And Trademark Office	**Application No.** 15/898,404	**Art Unit** 3992
Reissue Terminal Disclaimer Review Form	**Examiner** MINH DIEU T NGUYEN	**AIA Status** No

Original Patent Number of Patent to be Reissued is: 7,483,711	**The Maintenance fee status is:** ◉ up to date ○ not up to date (Consult with SPRS)

Is there a terminal disclaimer filed and accepted during the prosecution of (i) the current reissue application, (ii) the underlying patent, and/or (iii) reexamination proceeding(s) of the underlying patent?

◉ NO
○ YES (Complete the rest of the form)

The reissue patent is subject to Terminal Disclaimer(s) that was/were:

☐ filed and accepted (DISQ or DISQ.E.FILE) during the prosecution of the current reissue application. (Enter terminal disclaimer(s) filing date(s) below).

1. _____ 2. _____ 3. _____

The underlying patent of the current reissue application is subject to Terminal DIsclaimer(s) that was/were:

☐ accepted (DISQ or DISQ.E.FILE) and of record in the prosecution of the underlying patent and/or reexamination procceeding(s) of the underlying patent. (Enter application/control no(s) and terminal disclaimer(s) filing date(s) below).

1. _____ _____ 2. _____ _____ 3. _____ _____

EAST Search History

EAST Search History (Prior Art)

Ref #	Hits	Search Query	DBs	Default Operator	Plurals	Time Stamp
L2	175411	(455/$.ccls 375/$.ccls.)	US-PGPUB; USPAT; EPO; JPO	OR	ON	2019/06/18 13:07
L3	276	L2 and (receiv$3 with ((second next) near (instruction signal)) with (plurality near3 frequenc$3))	US-PGPUB; USPAT; EPO; JPO	OR	ON	2019/06/18 13:07
L4	4	3 and (remov$3 with power with (plurality near3 frequenc$3))	US-PGPUB; USPAT; EPO; JPO	OR	ON	2019/06/18 13:07
L5	30660	(H04W52/04 or H04W52/06 or H04W52/08 or H04W52/10 or H04W52/12 or H04W52/125 or H04W52/14 or H04W52/143 or H04W52/146 or H04W52/16 or H04W52/18 or H04W52/20 or H04W52/22 or H04W52/221 or H04W52/223 or H04W52/225 or H04W52/226 or H04W52/228 or H04W52/24 or H04W52/241 or H04W52/242 or H04W52/243 or H04W52/244 or H04W52/245 or H04W52/246 or H04W52/247 or H04W52/248 or H04W52/26 or H04W52/262 or H04W52/265 or H04W52/267 or H04W52/28 or H04W52/281 or H04W52/282 or H04W52/283 or H04W52/285 or H04W52/286 or H04W52/287 or H04W52/288 or H04W52/30 or H04W52/32 or H04W52/322 or H04W52/325 or H04W52/327 or H04W52/34 or H04W52/343 or H04W52/346 or H04W52/36 or H04W52/362 or H04W52/365 or H04W52/367 or H04W52/38 or H04W52/383 or H04W52/386 or H04W52/40 or H04W52/42 or H04W52/44 or H04W52/46 or H04W52/48 or H04W52/50 or H04W52/52 or H04W52/54 or H04W52/545 or H04W52/56 or H04W52/58 or H04W52/60).cpc.	US-PGPUB; USPAT; EPO; JPO	OR	ON	2019/06/18 13:08
L6	44	L5 and (receiv$3 with ((second next) near (instruction signal)) with (plurality near3 frequenc$3))	US-PGPUB; USPAT; EPO; JPO	OR	ON	2019/06/18 13:08
L7	8	6 and (remov$3 with power with (plurality near3 frequenc$3))	US-PGPUB; USPAT; EPO;	OR	ON	2019/06/18 13:09

			JPO				

6/ 18/ 2019 1:22:28 PM
C:\ Users\ mnguyen16\ Documents\ EAST\ Workspaces\ 15898404.wsp

Electronic Acknowledgement Receipt

EFS ID:	36284961
Application Number:	15898404
International Application Number:	
Confirmation Number:	8522
Title of Invention:	SPECTRUM-ADAPTIVE NETWORKING
First Named Inventor/Applicant Name:	Jerry D. Burchfiel
Customer Number:	92045
Filer:	Patrick Edgar Caldwell
Filer Authorized By:	
Attorney Docket Number:	USTAP030D.RI
Receipt Date:	12-JUN-2019
Filing Date:	16-FEB-2018
Time Stamp:	23:27:06
Application Type:	Utility under 35 USC 111(a)

Payment information:

Submitted with Payment	no

File Listing:

Document Number	Document Description	File Name	File Size(Bytes)/ Message Digest	Multi Part /.zip	Pages (if appl.)
1	Amendment/Req. Reconsideration-After Non-Final Reject	USTAP030D_RI_AmendmentB_vF_12-Jun-2019.pdf	281063 39f370c6288c3d0f703bf9cfcfb06ea471995383	no	65
Warnings:					

Information:	
Total Files Size (in bytes):	281063

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.

PATENT

IN THE UNITED STATES PATENT AND TRADEMARK OFFICE

In re *reissue* application: of U.S. patent 7,483,711 15/898,404 Filed: 2/16/2018 For: SPECTRUM-ADAPTIVE NETWORKING	Confirmation No.: 8522 Examiner: NGUYEN, MINH DIEU T Art Unit: 3992 Atty. Docket No.: USTAP030D.RI Date: 6/12/2019

AMENDMENT B

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

Examiner:

In response to the Office Action dated 5/20/2019, please enter the following.

AMENDMENTS TO THE CLAIMS

Amended claims follow:

1. (Original) A method for managing interference in a radio communications network, comprising the steps of:

receiving an aggregated radio signal at a first node in the radio communications network on a plurality of frequencies;

determining a power level for the aggregated radio signal for each frequency in the plurality frequencies;

subtracting the power level for each the frequency from a power limit to produce a power differential for the each frequency; and

instructing a second node in the radio communications network to avoid using a transmission frequency corresponding to a non-positive power differential in the plurality of power differentials to transmit to the first node.

2. (Original) The method of claim 1, further comprising the steps of: receiving a transmission from the second node in the radio communications network; and discarding any portion of the transmission carried on the transmission frequency.

3. (Original) The method of claim 2, wherein the discarding step comprises applying a filter to the transmission.

4. (Original) The method of claim 1, wherein the step of determining a power level is carried out by:

acquiring a plurality of instantaneous power level measurements for each the frequency; and

calculating an average power level based on the plurality of instantaneous power level measurements.

5. (Original) The method of claim 1, wherein the step of determining a power level is carried out by:

acquiring a plurality of instantaneous power level measurements for the each frequency; and

calculating a median power level based on the plurality of instantaneous power level measurements.

6. (Original) The method of claim 1, further comprising the step of: sending to the second node a request to adjust a transmission power level on a frequency corresponding to a positive power differential in the plurality of power differentials.

7. (Original) The method of claim 1, further comprising the step of: instructing a plurality of other nodes in the radio communications network to avoid using the transmission frequency to transmit information to the first node.

8. (Original) The method of claim 7, further comprising the steps of:

receiving a transmission from one of the plurality of other nodes; and

discarding any portion of the second transmission carried on a frequency corresponding to a non-positive power differential in the plurality of power differentials.

9. (Original) The method of claim 8, further comprising the step of: sending to the one of the plurality of other nodes a request to adjust a transmit power level on a frequency corresponding to a positive power differential in the plurality of power differentials.

10. (Original) The method of claim 1, further comprising the steps of:

determining an updated power level for the aggregated radio signal for each frequency in the plurality frequencies;

subtracting the updated power level for each the frequency from the power limit to produce a plurality of updated power differentials; and

instructing the second node to avoid transmitting to the first node on a frequency corresponding to a non-positive updated power differential in the plurality of updated power differentials.

11. (Original) The method of claim 1, further comprising the steps of:
generating an optimal waveform profile based on the plurality of power differentials; and
reporting the optimal waveform profile to the second node.

12. (Original) The method of claim 11, wherein the reporting step is carried out using a common network configuration channel.

13. (Original) The method of claim 11, further comprising the step of compressing the optimal waveform profile prior to performing the reporting step.

14. (Original) The method of claim 11, wherein the optimal waveform profile specifies a waveform pattern.

15. (Original) The method of claim 14, wherein the waveform pattern defines a transmission signal having a power spectral density that varies over time.

16. (Original) The method of claim 14, further comprising the steps of:
generating a second optimal waveform profile based on the plurality of power differentials; and
reporting the second optimal waveform profile to a third node in the radio communications network; wherein the second optimal waveform profile specifies a second waveform pattern that is orthogonal to the waveform pattern.

17. (Original) The method of claim 1, wherein the plurality of frequencies comprises all of the frequencies in a radio frequency band.

18. (Original) The method of claim 1, further comprising the steps of: associating a unique pattern with the second node; and determining whether the transmission contains the unique pattern.

19. (Twice Amended) A method for managing interference in a radio communications network, comprising the steps of:

receiving at a first node in the radio communications network an instruction transmitted from a second node in the radio communications network to avoid using a plurality of frequencies to transmit to the second node;

filtering a transmission signal to remove power from the transmission signal at each frequency in the plurality of frequencies to be avoided; [and]

transmitting the filtered transmission signal to the second node;

separately from the receipt of the instruction, receiving a compressed first feedback from the second node that is based on a received power and one or more frequencies of a first signal transmitted from the first node to the second node;

separately from the receipt of the instruction, receiving a compressed second feedback from a third node that is based on a received power and one or more frequencies of a second signal transmitted from the first node to the third node;

decompressing the compressed first feedback resulting in a decompressed first feedback;

decompressing the compressed second feedback resulting in a decompressed second feedback;

generating one or more data structures based on the decompressed first feedback and the decompressed second feedback;

wherein the filtered transmission signal is a filtered first transmission signal that is transmitted using a first frequency and an 802.11-based orthogonal frequency-division multiplexing (OFDM) protocol via at least one antenna of a plurality of antennas, using a first power that is based on at least one of the one or more data structures; and further comprising:

transmitting, using a second frequency and the 802.11-based OFDM protocol, a filtered second transmission signal, simultaneously with the filtered first transmission

signal, to the third node, using a second power that is based on at least one of the one or more data structures.

20. (Amended) [The method of claim 19, further comprising the steps of:] A method for managing interference in a radio communications network, comprising the steps of:

receiving at a first node in the radio communications network an instruction transmitted from a second node in the radio communications network to avoid using a plurality of frequencies to transmit to the second node;

filtering a transmission signal to remove power from the transmission signal at each frequency in the plurality of frequencies to be avoided;

transmitting the filtered transmission signal to the second node;

receiving an optimal waveform profile from the second node, the optimal waveform profile being based on a plurality of power measurements for the plurality of frequencies and a power limit; and

conforming the transmission signal to the optimal waveform profile prior to performing the transmitting step.

21. (Original) The method of claim 20, further comprising the step of decompressing the optimal waveform profile prior to performing the conforming step.

22. (Cancelled)

23. (New, Twice Amended) The method of claim [22]19, wherein the instruction includes a first instruction, and further comprising:

receiving at the first node in the radio communications network a second instruction transmitted from [a] the third node [in the radio communication network] to avoid using a different plurality of frequencies to transmit to the third node; and

filtering [the] a second transmission signal to remove power from the second transmission signal at each frequency in the different plurality of frequencies to be avoided, resulting in the filtered second transmission signal.

24. (New, Amended) The method of claim [22]19, wherein the first power and the second power are the same.

25. (New, Amended) The method of claim [22]19, wherein the first power and the second power are different.

26. (New, Amended) The method of claim [22]19, wherein an update of the compressed first feedback is repeatedly received at time periods of less than one second, and the first power is repeatedly updated based on an updated decompressed first feedback at time periods of less than one second; and an update of the compressed second feedback is repeatedly received at time periods of less than one second, and the second power is repeatedly updated based on an updated decompressed second feedback at time periods of less than one second.

27. (New, Twice Amended) The method of claim [22]19, wherein the filtered first transmission signal and the filtered second transmission signal are [sent] transmitted via the same transceiver.

28. (New, Twice Amended) The method of claim [22]19, wherein the filtered first transmission signal and the filtered second transmission signal are [sent] transmitted via different transceivers.

29. (New, Amended) The method of claim [22]19, wherein the instruction is received utilizing a dedicated channel.

30. (New, Amended) The method of claim [22]19, wherein the instruction is received via an antenna configured for omnidirectional communication.

31. (New, Amended) The method of claim [22]19, wherein the compressed first feedback and the compressed second feedback are received utilizing a dedicated channel.

32. (New, Amended) The method of claim [22]19, wherein the compressed first feedback and the compressed second feedback are received via an antenna configured for omnidirectional communication.

33. (New, Amended) The method of claim [22]19, wherein the decompressed first feedback and the decompressed second feedback are used to increase spatial separation among transmissions.

34. (New, Amended) The method of claim [22]19, wherein the decompressed first feedback and the decompressed second feedback are used to increase spatial separation among transmissions at the same frequency.

35. (New, Twice Amended) The method of claim [22]19, and further comprising:

receiving a compressed third feedback from a fourth node that characterizes receipt of a third signal sent from the first node to the fourth node, the fourth node being a legacy node;

decompressing the compressed third feedback resulting in a decompressed third feedback;

transmitting, using a third frequency and [the] another 802.11-based OFDM protocol, the third transmission signal to the fourth node using a transceiver separate from one or more other transceivers used to transmit the filtered first transmission signal and the filtered second transmission signal, and further using a third power that is based on the decompressed third feedback.

36. (New, Twice Amended) The method of claim 35, wherein the third transmission signal is transmitted simultaneously with the filtered first transmission signal and the filtered second transmission signal via at least one different [directional] antenna of the plurality of [directional] antennas.

37. (New, Amended) The method of claim [22]19, wherein the compressed first feedback is based on a received power at a plurality of frequencies via which the first signal is received.

38. (Cancelled)

39. (New, Twice Amended) [The method of claim 19] A method for managing interference in a radio communications network, comprising the steps of:

receiving at a first node in the radio communications network an instruction transmitted from a second node in the radio communications network to avoid using a plurality of frequencies to transmit to the second node;

filtering a transmission signal to remove power from the transmission signal at each frequency in the plurality of frequencies to be avoided;

transmitting the filtered transmission signal to the second node;

wherein the instruction includes a first instruction and the filtered transmission signal includes a filtered first transmission signal that is transmitted to the second node using a first power via an 802.11-based orthogonal frequency-division multiplexing (OFDM) protocol, and further comprising:

receiving at the first node in the radio communications network a second instruction transmitted from a third node in the radio communications network to avoid using a different plurality of frequencies to transmit to the third node;

filtering a second transmission signal to remove power from the second transmission signal at each frequency in the different plurality of frequencies to be avoided; and

transmitting, using a second power via the 802.11-based OFDM protocol and simultaneously with the filtered first transmission signal, the filtered second transmission signal to the third node.

40. (New, Twice Amended) [The method of claim 19, and further comprising:] A method for managing interference in a radio communications network, comprising the steps of:

receiving at a first node in the radio communications network an instruction transmitted from a second node in the radio communications network to avoid using a plurality of frequencies to transmit to the second node;

filtering a transmission signal to remove power from the transmission signal at each frequency in the plurality of frequencies to be avoided;

transmitting the filtered transmission signal to the second node;

receiving a compressed first feedback from the second node that characterizes receipt of a first signal sent from the first node to the second node;

receiving a compressed second feedback from a third node that characterizes receipt of a second signal sent from the first node to the third node;

decompressing the compressed first feedback resulting in a decompressed first feedback; and

decompressing the compressed second feedback resulting in a decompressed second feedback;

wherein the filtered transmission signal is a filtered first transmission signal that is transmitted to the second node using an 802.11-based orthogonal frequency-division multiplexing (OFDM) protocol via at least one antenna of a plurality of antennas, using a first power that is based on the decompressed first feedback; and further comprising:

transmitting, using the 802.11-based OFDM protocol, a filtered second transmission signal, simultaneously with the filtered first transmission signal, to the third node using a second power that is based on the decompressed second feedback.

41. (New, Amended) [The method of claim 19, and further comprising:] A method for managing interference in a radio communications network, comprising the steps of:

receiving at a first node in the radio communications network an instruction transmitted from a second node in the radio communications network to avoid using a plurality of frequencies to transmit to the second node;

filtering a transmission signal to remove power from the transmission signal at each frequency in the plurality of frequencies to be avoided;

transmitting the filtered transmission signal to the second node;

separately from the receipt of the instruction, receiving a particular signal at the first node that is transmitted from the second node;

generating a feedback based on a received power and one or more frequencies via which the particular signal is received;

compressing the feedback; and

transmitting the compressed feedback from the first node to the second node, for use by the second node in determining a transmit power with which the second node transmits to the

first node via at least one [directional] antenna of a plurality of [directional] antennas, while simultaneously transmitting to one or more other nodes;

wherein the filtered transmission signal is transmitted to the second node using an 802.11-based orthogonal frequency-division multiplexing (OFDM) protocol;

wherein an update of the compressed feedback is repeatedly generated, compressed, and transmitted at time periods of less than one second; so that the transmit power is repeatedly updated based thereupon at time periods of less than one second.

42. (New, Twice Amended) The method of claim 41, wherein the instruction includes a first instruction and the filtered transmission signal includes a filtered first transmission signal, and further comprising:

receiving at the first node in the radio communications network a second instruction transmitted from a third node in the radio communications network to avoid using a different plurality of frequencies to transmit to the third node;

filtering a second transmission signal to remove power from the second transmission signal at each frequency in the different plurality of frequencies to be avoided; and

transmitting the filtered second transmission signal to the third node.

43. (New, Amended) The method of claim 40, wherein the instruction includes a first instruction, and further comprising:

receiving at the first node in the radio communications network a second instruction transmitted from the third node to avoid using a different plurality of frequencies to transmit to the third node; and

filtering a second transmission signal to remove power from the second transmission signal at each frequency in the different plurality of frequencies to be avoided, resulting in the filtered second transmission signal.

44. (New) The method of claim 40, wherein the first power and the second power are the same.

45. (New) The method of claim 40, wherein the first power and the second power are different.

46. (New) The method of claim 40, and further comprising:

generating a first data structure based on the decompressed first feedback, where the first power is based on the first data structure; and

generating a second data structure based on the decompressed second feedback, where the second power is based on the second data structure.

47. (New) The method of claim 46, wherein the first data structure and the second data structure are different.

48. (New) The method of claim 46, wherein the first data structure and the second data structure are orthogonal.

49. (New) The method of claim 46, wherein the first data structure is unique to the second node, and the second data structure is unique to the third node.

50. (New) The method of claim 46, wherein the first data structure is a first profile, and the second data structure is a second profile.

51. (New) The method of claim 46, wherein the first data structure is a first optimal waveform profile.

52. (New) The method of claim 40, and further comprising:

generating a single data structure based on the decompressed first feedback and the decompressed second feedback, where both the first power and the second power are based on the single data structure.

53. (New, Amended) The method of claim 40, wherein the filtered second transmission signal is transmitted simultaneously with the filtered first transmission signal via the same plurality of antennas.

54. (New, Amended) The method of claim 40, wherein the filtered second transmission signal is transmitted simultaneously with the filtered first transmission signal via at least one different antenna of the plurality of antennas.

55. (New, Amended) The method of claim 40, wherein the filtered second transmission signal is transmitted simultaneously with the filtered first transmission signal via the at least one antenna of the plurality of antennas.

56. (New) The method of claim 40, wherein an update of the compressed first feedback is repeatedly received, and the first power is repeatedly updated based on an updated decompressed first feedback; and an update of the compressed second feedback is repeatedly received, and the second power is repeatedly updated based on an updated decompressed second feedback.

57. (New) The method of claim 40, wherein an update of the compressed first feedback is repeatedly received in real-time, and the first power is repeatedly updated in real-time based on an updated decompressed first feedback; and an update of the compressed second feedback is repeatedly received in real-time, and the second power is repeatedly updated in real-time based on an updated decompressed second feedback.

58. (New) The method of claim 40, wherein an update of the compressed first feedback is repeatedly received at time periods of less than one second, and the first power is repeatedly updated based on an updated decompressed first feedback at time periods of less than one second; and an update of the compressed second feedback is repeatedly received at time periods of less than one second, and the second power is repeatedly updated based on an updated decompressed second feedback at time periods of less than one second.

59. (New, Amended) The method of claim 40, wherein the filtered first transmission signal and the filtered second transmission signal are sent via the same transceiver.

60. (New, Amended) The method of claim 40, wherein the filtered first transmission signal and the filtered second transmission signal are sent via different transceivers.

61. (New) The method of claim 40, wherein the compressed first feedback and the compressed second feedback are received utilizing a dedicated channel.

62. (New) The method of claim 40, wherein the compressed first feedback and the compressed second feedback are received via an antenna configured for omnidirectional communication.

63. (New) The method of claim 40, wherein the decompressed first feedback and the decompressed second feedback are used to increase spatial separation among transmissions.

64. (New) The method of claim 40, wherein the decompressed first feedback and the decompressed second feedback are used to increase spatial separation among transmissions at the same frequency.

65. (New) The method of claim 40, and further comprising:

receiving a compressed third feedback from a fourth node that characterizes receipt of a third signal sent from the first node to the fourth node, the fourth node being a legacy node;

decompressing the compressed third feedback resulting in a decompressed third feedback;

transmitting, using a third frequency and another 802.11-based OFDM protocol, the third transmission signal to the fourth node using a third power that is based on the decompressed third feedback.

66. (New) The method of claim 40, wherein the compressed first feedback is based on a received power and one or more frequencies via which the first signal is communicated.

67. (New) The method of claim 40, wherein the compressed first feedback is based on a received power at a plurality of frequencies via which the first signal is communicated.

68. (New) The method of claim 40, wherein the compressed first feedback is based on a series of power values as a function of frequency.

69. (New) The method of claim 40, wherein the compressed first feedback includes a data structure that is based on a series of power values as a function of frequency.

70. (New) The method of claim 40, wherein the instruction is received prior to the receipt of the compressed first feedback.

71. (New) The method of claim 40, wherein the instruction is received separately with respect to the receipt of the compressed first feedback.

72. (New) The method of claim 40, wherein at least three transmission signals are capable of being simultaneously transmitted to at least three different devices, using the same multiple antennas.

73. (New) The method of claim 40, wherein at least three transmission signals are capable of being simultaneously transmitted to at least three different devices, using at least one different antenna.

74. (New) The method of claim 40, wherein the instruction includes a request to send (RTS) instruction.

75. (New) The method of claim 40, wherein the instruction includes a 802.11 clear to send (CTS) instruction.

76. (New, Amended) The method of claim 40, wherein the filtered first transmission signal is transmitted using a frequency band that is selected based on the instruction and the filtered second transmission signal is transmitted using the frequency band that is selected based on another instruction received from the third node, where the filtered first transmission signal is transmitted using a first frequency in the frequency band and the filtered second transmission signal is transmitted using a second frequency in the frequency band.

77. (New, Amended) The method of claim 40, wherein the filtered first transmission signal is transmitted using a first frequency and the filtered second transmission signal is transmitted using a second frequency.

78. (New, Amended) The method of claim 40, wherein the filtered first transmission signal and the filtered second transmission signal are transmitted using the same one or more frequencies.

79. (New, Amended) The method of claim 40, wherein the filtered first transmission signal and the filtered second transmission signal are transmitted using the same frequency band.

80. (New, Amended) The method of claim 40, wherein the filtered first transmission signal is transmitted using a first frequency that is based on the instruction and the filtered second transmission signal is transmitted using a second frequency that is based on another instruction received from the third node.

81. (New, Amended) The method of claim 40, wherein the filtered first transmission signal is transmitted using a frequency that is based on the instruction and the filtered second transmission signal is transmitted using the frequency that is based on another instruction received from the third node.

82. (New, Amended) The method of claim 40, wherein the filtered first transmission signal is transmitted using a frequency band that is selected based on the instruction and the filtered

second transmission signal is transmitted using the frequency band that is selected based on another instruction received from the third node.

83. (New, Amended) The method of claim 40, wherein at least one of:

the first signal includes a data signal;

the first signal includes an aggregate signal;

the first signal includes a first data signal, and the second signal includes a second data signal;

the first and second signals are reflected in an aggregate signal;

the compressed first feedback is combined with the instruction;

the compressed first feedback is received with the instruction;

the compressed first feedback is configured to ensure that transmissions from all neighbors of the first node are received at a same power level;

the compressed first feedback is configured to at least one of: minimize a transmit power on reliable links, maximize an ability to achieve spatial separation among transmissions on a same frequency, minimize network self-interference, improve low probability of intercept (LPI), or lower probability of detection (LPD);

the compressed first feedback and the compressed second feedback are received simultaneously;

at least one of the compressed first feedback or the compressed second feedback is received before the instruction is received;

at least one of the compressed first feedback or the compressed second feedback is received after the instruction is received;

the steps are performed in the order listed;

the radio communications network includes an 802.11 network;

[the 802.11 includes 802.11a/g;]

the radio communications network includes an 802.11a network;

the radio communications network includes an 802.11g network;

the at least one antenna includes multiple antennas;

the at least one antenna includes at least one omnidirectional antenna;

the at least one antenna includes at least one directional antenna;

interference in the radio communications network is managed;

the first node is a mobile node and the second node is a non-mobile node;

the second node is a mobile node and the first node is a non-mobile node;

the instruction sets forth the plurality of frequencies to avoid using;

the instruction specifies the plurality of frequencies to avoid using;

a purpose of the instruction is to avoid using the plurality of frequencies;

a purpose of the instruction is to avoid using the plurality of frequencies, where the purpose is accomplished by specifying the plurality of frequencies to avoid using;

a purpose of the instruction is to avoid using the plurality of frequencies, where the purpose is accomplished by specifying one or more frequencies to use;

a purpose of the instruction is to avoid using the plurality of frequencies, where the purpose is accomplished by specifying one or more frequencies to use, the one or more frequencies not including the plurality of frequencies;

the instruction to avoid the plurality of frequencies sets forth one or more frequencies to use;

the instruction to avoid the plurality of frequencies specifies one or more frequencies to use;

the instruction to avoid the plurality of frequencies assigns one or more frequencies to use;

the instruction to avoid the plurality of frequencies does not specify the plurality of frequencies;

the instruction to avoid the plurality of frequencies sets forth one or more frequencies to use, thereby resulting in the avoidance of using the plurality of frequencies;

a purpose of the filtering is to remove the power from the transmission signal at each frequency in the plurality of frequencies to be avoided, where the purpose is accomplished by specifying one or more frequencies to which the power is to be applied;

a purpose of the filtering is to remove the power from the transmission signal at each frequency in the plurality of frequencies to be avoided, where the purpose is accomplished by specifying the plurality of frequencies to be avoided;

the filtering suppresses or otherwise minimizes waves or oscillations at each frequency in the plurality of frequencies to be avoided;

the filtering suppresses or otherwise minimizes waves or oscillations at each frequency in the plurality of frequencies to be avoided, thereby resulting in the removal of the power from the transmission signal at each frequency in the plurality of frequencies to be avoided;

the filtering removes all power from the transmission signal;

the filtering removes some power from the transmission signal;

the filtering discards one or more portions of the transmission signal at each of the plurality of frequencies;

the filtering utilizes transmit excision;

the filtering utilizes compression;

the filtering identifies certain one or more frequencies in connection with which power is applied, thereby resulting in the removal of the power from the transmission signal at each frequency in the plurality of frequencies to be avoided;

the removal of power from the transmission signal at each frequency in the plurality of frequencies to be avoided is accomplished by an adjustment in relation to power previously used in connection with the transmission signal;

the removal of power from the transmission signal at each frequency in the plurality of frequencies is accomplished by adjusting a processing of the transmission signal so that power that was previously used in connection with the transmission signal at each frequency in the plurality of frequencies to be avoided, is no longer used in connection with the transmission signal at each frequency in the plurality of frequencies to be avoided;

the removal of power from the transmission signal at each frequency in the plurality of frequencies to be avoided is accomplished by setting a waveform profile that results in no power being applied in connection with the transmission signal at each frequency in the plurality of frequencies to be avoided;

the removal of power from the transmission signal at each frequency in the plurality of frequencies to be avoided is accomplished by pre-processing the transmission signal, before any power is applied, so that power, which would otherwise be applied in

connection with the transmission signal at each frequency in the plurality of frequencies, is not applied in connection with the transmission signal at each frequency in the plurality of frequencies to be avoided;

the removal of power from the transmission signal at each frequency in the plurality of frequencies to be avoided is accomplished by pre-processing the transmission signal, before any power is applied, so that no power is applied in connection with the transmission signal at each frequency in the plurality of frequencies to be avoided;

the transmission signal includes a plurality of packets;

the transmission signal includes a plurality of different transmissions;

the transmission signal includes a plurality of transmissions to the second node;

the transmission signal includes a plurality of differently-timed transmissions to the second node;

the transmission signal includes a plurality of transmission components to the second node, each with different power levels;

the transmission signal includes a plurality of transmission components to the second node, each with different power levels as a result of different instances of the filtering;

the transmission signal is generated so as to not include power at each frequency in the plurality of frequencies to be avoided;

the transmission signal is generated so as to not include power at each frequency in the plurality of frequencies to be avoided, thereby resulting in the removal of the power from the transmission signal at each frequency in the plurality of frequencies to be avoided;

the transmission signal is pre-processed so as to not include power at each frequency in the plurality of frequencies to be avoided, thereby resulting in the removal of the power from the transmission signal at each frequency in the plurality of frequencies to be avoided;

the filtering is performed using an output filter;

the filtering is performed using an optimal matched filter;

the filtering is performed using a band selection filter;

the filtering is performed using a median filter; or

the filtering is performed using a nonlinear filter.

84. (New, Amended) The method of claim [19]22, wherein the instruction is received prior to the receipt of the compressed first feedback.

85. (New, Amended) The method of claim [19]22, wherein the filtered second transmission signal is transmitted simultaneously with the filtered first transmission signal via the same plurality of antennas.

86. (New, Amended) The method of claim [19]22, wherein the first frequency is selected as a function of the compressed first feedback, and the second frequency is selected as a function of the compressed second feedback.

87. (New, Amended) The method of claim [19]22, wherein the instruction includes a 802.11 clear to send (CTS) instruction.

88. (New, Amended) The method of claim [19]22, wherein the instruction includes a 802.11 request to send (RTS) instruction.

89. (New, Amended) The method of claim [19]22, wherein the filtered second transmission signal is transmitted simultaneously with the filtered first transmission signal via at least one different antenna of the plurality of antennas.

90. (New, Amended) The method of claim [19]22, wherein the filtered second transmission signal is transmitted simultaneously with the filtered first transmission signal using the at least one antenna of the plurality of antennas.

91. (New, Amended) The method of claim [19]22, wherein at least one of:

the first signal includes a data signal;

the first signal includes an aggregate signal;

the compressed first feedback is configured to ensure that transmissions from all neighbors of the first node are received at a same power level;

the compressed first feedback is configured to at least one of: minimize a transmit power on reliable links, maximize an ability to achieve spatial separation among transmissions on a same frequency, minimize network self-interference, improve low probability of intercept (LPI), or lower probability of detection (LPD);

the compressed first feedback and the compressed second feedback are received simultaneously;

at least one of the compressed first feedback or the compressed second feedback is received separately from the receipt of the instruction, by being received before the instruction is received;

at least one of the compressed first feedback or the compressed second feedback is received separately from the receipt of the instruction, by being received after the instruction is received;

the one or more frequencies of the first signal includes a frequency band;

the one or more frequencies of the second signal includes a frequency band;

the one or more frequencies of the first signal includes a first frequency band, and the one or more frequencies of the second signal includes a second frequency band;

a single data structure is generated based on the decompressed first feedback and the decompressed second feedback;

a first data structure is generated based on the decompressed first feedback, and a second data structure is generated based on the decompressed second feedback;

a first data structure is generated based on the decompressed first feedback, where the first power is based on the first data structure, and a second data structure is generated based on the decompressed second feedback, where the second power is based on the second data structure;

the first power and the second power differ in terms of power level;

the steps are performed in the order listed;

[the steps are not performed in the order listed;]

the radio communications network includes an 802.11 network;

[the radio communications network includes an 802.11a/g network;]

the radio communications network includes an 802.11a network;

the radio communications network includes an 802.11g network;

the at least one antenna includes multiple antennas;

the at least one antenna includes at least one omnidirectional antenna;

the at least one antenna includes at least one directional antenna;

[the one or more]

the first frequency includes a first frequency band;

the second frequency includes a second frequency band;

the first frequency is part of a first frequency band;

the second frequency is part of a second frequency band;

the first frequency includes a first frequency band, and the second frequency includes a second frequency band, where the first frequency band and the second frequency band do not overlap;

interference in the radio communications network is managed;

the first node is a mobile node and the second node is a non-mobile node;

the second node is a mobile node and the first node is a non-mobile node;

the instruction sets forth the plurality of frequencies to avoid using;

the instruction specifies the plurality of frequencies to avoid using;

a purpose of the instruction is to avoid using the plurality of frequencies;

a purpose of the instruction is to avoid using the plurality of frequencies, where the purpose is accomplished by specifying the plurality of frequencies to avoid using;

a purpose of the instruction is to avoid using the plurality of frequencies, where the purpose is accomplished by specifying one or more frequencies to use;

a purpose of the instruction is to avoid using the plurality of frequencies, where the purpose is accomplished by specifying one or more frequencies to use, the one or more frequencies not including the plurality of frequencies;

the instruction to avoid the plurality of frequencies sets forth one or more frequencies to use;

the instruction to avoid the plurality of frequencies specifies one or more frequencies to use;

the instruction to avoid the plurality of frequencies assigns one or more frequencies to use;

the instruction to avoid the plurality of frequencies does not specify the plurality of frequencies;

the instruction to avoid the plurality of frequencies sets forth one or more frequencies to use, thereby resulting in the avoidance of using the plurality of frequencies;

a purpose of the filtering is to remove the power from the transmission signal at each frequency in the plurality of frequencies to be avoided, where the purpose is accomplished by specifying one or more frequencies to which the power is to be applied;

a purpose of the filtering is to remove the power from the transmission signal at each frequency in the plurality of frequencies to be avoided, where the purpose is accomplished by specifying the plurality of frequencies to be avoided;

the filtering suppresses or otherwise minimizes waves or oscillations at each frequency in the plurality of frequencies to be avoided;

the filtering suppresses or otherwise minimizes waves or oscillations at each frequency in the plurality of frequencies to be avoided, thereby resulting in the removal of the power from the transmission signal at each frequency in the plurality of frequencies to be avoided;

the filtering removes all power from the transmission signal;

the filtering removes some power from the transmission signal;

the filtering discards one or more portions of the transmission signal at each of the plurality of frequencies;

the filtering utilizes transmit excision;

the filtering utilizes compression;

the filtering identifies certain one or more frequencies in connection with which power is applied, thereby resulting in the removal of the power from the transmission signal at each frequency in the plurality of frequencies to be avoided;

the removal of power from the transmission signal at each frequency in the plurality of frequencies to be avoided is accomplished by an adjustment in relation to power previously used in connection with the transmission signal;

the removal of power from the transmission signal at each frequency in the plurality of frequencies is accomplished by adjusting a processing of the transmission signal so that power that was previously used in connection with the transmission signal at each frequency in the plurality of frequencies to be avoided, is no longer used in connection with the transmission signal at each frequency in the plurality of frequencies to be avoided;

the removal of power from the transmission signal at each frequency in the plurality of frequencies to be avoided is accomplished by setting a waveform profile that results in no power being applied in connection with the transmission signal at each frequency in the plurality of frequencies to be avoided;

the removal of power from the transmission signal at each frequency in the plurality of frequencies to be avoided is accomplished by pre-processing the transmission signal, before any power is applied, so that power, which would otherwise be applied in connection with the transmission signal at each frequency in the plurality of frequencies, is not applied in connection with the transmission signal at each frequency in the plurality of frequencies to be avoided;

the removal of power from the transmission signal at each frequency in the plurality of frequencies to be avoided is accomplished by pre-processing the transmission signal, before any power is applied, so that no power is applied in connection with the transmission signal at each frequency in the plurality of frequencies to be avoided;

the transmission signal is generated so as to not include power at each frequency in the plurality of frequencies to be avoided;

the transmission signal is generated so as to not include power at each frequency in the plurality of frequencies to be avoided, thereby resulting in the removal of the power from the transmission signal at each frequency in the plurality of frequencies to be avoided;

the transmission signal is pre-processed so as to not include power at each frequency in the plurality of frequencies to be avoided, thereby resulting in the removal of the power from the transmission signal at each frequency in the plurality of frequencies to be avoided;

the filtering is performed using an output filter;

the filtering is performed using an optimal matched filter;
the filtering is performed using a band selection filter;
the filtering is performed using a median filter; or
the filtering is performed using a nonlinear filter.

92. (New, Amended) The method of claim [19]22, wherein the removal of power from the transmission signal at each frequency in the plurality of frequencies to be avoided is accomplished by adjusting a processing of the transmission signal so that certain power that was previously used in connection with the transmission signal at each frequency in the plurality of frequencies to be avoided before the instruction is received, is no longer used in connection with the transmission signal at each frequency in the plurality of frequencies to be avoided in accordance with the instruction.

93. (New, Amended) The method of claim [19]22, wherein the removal of power from the transmission signal at each frequency in the plurality of frequencies to be avoided is accomplished by adjusting a processing of the transmission signal so that certain power that was previously used in connection with the transmission signal at each frequency in the plurality of frequencies to be avoided before the instruction is received, is no longer used in connection with the transmission signal at each frequency in the plurality of frequencies to be avoided in accordance with the instruction, which specifies at least one frequency to use so as to avoid using the plurality of frequencies to be avoided in order to transmit to the second node.

94. (New, Amended) The method of claim [19]22, wherein network forwarding decisions are guided using instantaneous information from a media access control (MAC) layer.

95. (New) The method of claim 94, wherein the network forwarding decisions are guided to eliminate a dominant end-to-end latency effect of channel access delay at at least one hop.

96. (New, Amended) The method of claim [19]22, wherein frequency channels are reused in order to increase spatial reuse across multiple basic service sets.

97. (New, Amended) The method of claim [19]22, wherein RTS/CTS signaling is extended such that frequency channels are reused in order to increase spatial reuse across multiple basic service sets.

98. (New, Amended) The method of claim [19]22, wherein RTS/CTS signaling is extended such that frequency channels are reused in order to increase spatial reuse across multiple basic service sets, to accommodate legacy access points.

REMARKS

The Examiner is thanked for the allowable subject matter. The claims in the present application have been amended to clarify the claimed invention. No new matter has been added.

The Examiner has objected to the claims. Specifically, the Examiner argues that "[t]he amendment to the claims dated 1/17/2019 is objected to because it is not compliant." In the present response, Patent Owner has assumed that the previous amendments to the claims dated 1/17/2019 have been entered. To this end, such amendments are re-iterated in this response with clarifications made to address the informalities identified by the Examiner.

First, the Examiner argues that "[t]he amendment to the claims dated 1/17/2019 is objected to because it is not compliant … **the added matter to the claims has to be underlined, the omitted matter must be enclosed in brackets, no[t] strikethrough**" (emphasis added). Such objection is deemed avoided by virtue of the clarifications made to the claims hereinabove.

Second, the Examiner argues that "[a]ll new claims 22-37, 39-98 are required to be underlined in their entirety, including claim number and claim identifier ("New"), as these amendments are made relative to the patent claims." Such objection is deemed avoided by virtue of the clarifications made to the claims hereinabove.

Third, the Examiner argues that "[p]ursuant to 37 CFR 1.173(c), each claim amendment must be accompanied by an explanation of the support in the disclosure of the patent for the amendment (i.e., support for all changes made in the claim(s), whether insertions or deletions). For example, the amendment dated 1/17/2019 does not provide support in the disclosure for the amended limitations (i.e., 'transmitting, using a second power via the 802.11-based OFDM protocol and simultaneously with the first transmission signal, the second transmission signal to the third node') in claim 39. The support is also required for other amended claims." Such objection is addressed hereinbelow, with a listing of support for all new and amended claims.

Fourth, the Examiner argues that "Claim 19 is objected to under 37 CFR 1.75 as being a substantial duplicate of claim 22. The only difference is claim 19 recites 'at least one antenna of a plurality of antennas' (lines 23-24), whereas claim 22 recites 'at least one directional antenna of a plurality of directional antennas' (lines 12-13). There is no definition of directional antenna in the specification. It is broadly interpreted that the antenna and directional antenna are the same." Patent Owner respectfully disagrees with such rejection, and further disagrees that the phrase "directional antenna" and the term "antenna" are "the same," as purported by the Examiner. Nevertheless, in the interest of expediting prosecution of the present application, Patent Owner has cancelled Claim 22 hereinabove.

The Examiner goes on to allege that "Claims 19, 22-37, 39, 42, 84-98 are rejected under 35 U.S.C. 112(b) or 35 U.S.C. 112 (pre-AlA), second paragraph, as being indefinite for failing to particularly point out and distinctly claim the subject matter which the inventor or a joint inventor, or for pre-AlA the applicant regards as the invention." As noted below, Patent Owner respectfully disagrees with this rejection.

Specifically, the Examiner argues that "Claim 19 recites 'receiving a compressed first feedback from the second node that is based on a received power ... , receiving a compressed second feedback from a third node that is based on a received power'. Is this the same received power?" In response, Patent Owner emphasizes that it is clear, from the claim language itself, that what is claimed is:

> .. receiving a compressed first feedback from the second node that is based on a ***received power*** **... <u>of</u> a <u>FIRST signal</u> transmitted from the first node <u>to the SECOND node</u>**;
>
> .... receiving a compressed second feedback from a third node that is based on a ***received power*** **...<u>of</u> a <u>SECOND signal</u> transmitted from the first node <u>to the THIRD node</u>**," in the specific context claimed (emphasis added).

Still yet, the Examiner argues that "Claim 39 recites 'filtering a second transmission signal'; however in the transmitting step, 'the second transmission signal' is transmitted to the

third node. What the point of filtering a second transmission signal? It is not clear if the filtered transmission signal is the first filtered transmission signal as we have the second filtered transmission signal in the claim. In the last transmitting step, both the first filtered transmission signal and second filtered transmission signal should be transmitted to the third node, not the first transmission signal and second transmission signal are transmitted as claimed. Please clarify." Regarding, "the point of filtering a second transmission signal," Patent Owner emphasizes that the point of such filtering is "to remove power from the second transmission signal at each frequency in the different plurality of frequencies to be avoided," as claimed, such that the filtered second transmission signal is transmitted to the third node, and the filtered first transmission signal is transmitted to the second node. In response to the Examiner's request for clarifications, Patent Owner has clarified the previous amendments to emphasize that is the filtered first/second transmission signals that are transmitted, in the specific context claimed (emphasis added). The Examiner has similar objections to Claims 19, 22, and 42. Such objections are deemed avoided by virtue of the clarifications made hereinabove to the claims.

The Patent Owner further makes note of the objections to Claims 83 and 91. Such objections are deemed avoided by virtue of the clarifications made hereinabove to the claims.

The Examiner goes on to allege that "Claims 83, 91 are rejected under 35 U.S.C. 112(d) or pre-AIA 35 U.S.C. 112, 4th paragraph, as being of improper dependent form for failing to further limit the subject matter of the claim upon which it depends, or for failing to include all the limitations of the claim upon which it depends." Such rejections are deemed avoided by virtue of the clarifications made hereinabove to the claims.

Claim Status: The present application includes pending claims 1-21, 23-37 and 39-98, with claims 1, 19, 20, 39, 40 and 41 being independent. Support for all claim amendments and new claims are listed below.

Using brackets and underlining, following is a summary of amendments made to any previously entered claims. Further, it should be noted that the amended and newly added claims find support throughout the patent specification and the claims as originally filed. Specific

examples of support for each of the newly added claims are mentioned below, although the totality of support for each claim is not necessarily limited to any such specific support. An explanation of the support in the disclosure of the patent for the newly added claims is provided with an indication of locations in the specification as follows. With that said, it should be noted that such discussion of support including but not limited to the cited specification excerpts is set forth for illustrative purposes only and should not be construed as limiting in any way to the claims.

Claim 19 is amended to add "filtered" as follows: "transmitting, using a second frequency and the 802.11-based OFDM protocol, a filtered second transmission signal, simultaneously with the filtered first transmission signal, to the third node, using a second power that is based on at least one of the one or more data structures." Support for such amendment is found below.

19. (Twice Amended) A method for managing interference in a radio communications network, comprising the steps of:

receiving at a first node in the radio communications network an instruction transmitted from a second node in the radio communications network to avoid using a plurality of frequencies to transmit to the second node;

filtering a transmission signal to remove power from the transmission signal at each frequency in the plurality of frequencies to be avoided; [and]

transmitting the filtered transmission signal to the second node;

separately from the receipt of the instruction, receiving a compressed first feedback from the second node that is based on a received power and one or more frequencies of a first signal transmitted from the first node to the second node; (e.g. col. 3 lns. 31-45, col. 3 ln. 62-col. 4 ln. 16, col. 10 lns. 11-27, col. 22 lns 7-34, Fig. 14 and description thereof in addition to other related/pertinent descriptions.)

separately from the receipt of the instruction, receiving a compressed second feedback from a third node that is based on a received power and one or more frequencies of a second signal transmitted from the first node to the third node; (e.g. col. 3 lns. 31-45, col. 3 ln. 62-col. 4 ln. 16, col. 10 lns. 11-27, col. 22 lns 7-34, Fig. 14 and description thereof in addition to other related/pertinent descriptions.)

decompressing the compressed first feedback resulting in a decompressed first feedback; (e.g. col. 3 lns. 31-45, col. 3 ln. 62-col. 4 ln. 16, col. 10 lns. 11-27, col. 22 lns 7-34, Fig. 14 and description thereof in addition to other related/pertinent descriptions.)

decompressing the compressed second feedback resulting in a decompressed second feedback; (e.g. col. 3 lns. 31-45, col. 3 ln. 62-col. 4 ln. 16, col. 10 lns. 11-27, col. 22 lns 7-34, Fig. 14 and description thereof in addition to other related/pertinent descriptions.)

generating one or more data structures based on the decompressed first feedback and the decompressed second feedback; (e.g. col. 3 lns. 31-45, col. 3 ln. 62-col. 4 ln. 16, col. 10 lns. 11-27, col. 22 lns 7-34, Fig. 14 and description thereof in addition to other related/pertinent descriptions.)

wherein the filtered transmission signal is a filtered first transmission signal that is transmitted using a first frequency and an 802.11-based orthogonal frequency-division multiplexing (OFDM) protocol via at least one antenna of a plurality of antennas, using a first power that is based on at least one of the one or more data structures; and further comprising: (e.g. col. 3 lns. 31-45, col. 3 ln. 62-col. 4 ln. 16, col. 10 lns. 11-27, col. 11 lns. 25-30, col. 19 lns 34-37, col. 22 lns 7-34, col. 25 lns. 33-44, Fig. 14 and description thereof in addition to other related/pertinent descriptions.)

transmitting, using a second frequency and the 802.11-based OFDM protocol, a filtered second transmission signal, simultaneously with the filtered first transmission signal, to the third node, using a second power that is based on at least one of the one or more data structures. (e.g. col. 3 lns. 31-45, col. 3 ln. 62-col. 4 ln. 16, col. 10 lns. 11-27, col. 11 lns. 25-30, col. 19 lns 34-37, col. 22 lns 7-34, col. 25 lns. 33-44, Fig. 14 and description thereof in addition to other related/pertinent descriptions.)

20. (Amended) [The method of claim 19, further comprising the steps of:] A method for managing interference in a radio communications network, comprising the steps of:

receiving at a first node in the radio communications network an instruction transmitted from a second node in the radio communications network to avoid using a plurality of frequencies to transmit to the second node; (e.g. col. 11 ln. 39 – col. 12 ln. 30, Figs. 16-18 and description thereof in addition to other related/pertinent descriptions.)

filtering a transmission signal to remove power from the transmission signal at each frequency in the plurality of frequencies to be avoided; (e.g. col. 11 ln. 39 – col. 12 ln. 30, Figs. 16-18 and description thereof in addition to other related/pertinent descriptions.)

transmitting the filtered transmission signal to the second node; (e.g. col. 3 lns. 31-45, col. 3 ln. 62-col. 4 ln. 16, col. 10 lns. 11-27, col. 11 lns. 25-30, col. 19 lns 34-37, col. 22 lns 7-34, col. 25 lns. 33-44, Fig. 14 and description thereof in addition to other related/pertinent descriptions.)

receiving an optimal waveform profile from the second node, the optimal waveform profile being based on a plurality of power measurements for the plurality of frequencies and a power limit; and

conforming the transmission signal to the optimal waveform profile prior to performing the transmitting step.

Claim 22 is cancelled with this amendment.

22. (Cancelled)

Claim 23 is amended to add "resulting in the filtered second transmission signal" to the last claim element. Support for such amendment is found below.

23. (New, Twice Amended) The method of claim [22]19, wherein the instruction includes a first instruction, and further comprising:

receiving at the first node in the radio communications network a second instruction transmitted from [a] the third node [in the radio communications network] to avoid using a different plurality of frequencies to transmit to the third node; and (e.g. col. 11 ln. 39 – col. 12 ln. 30, Figs. 16-18 and description thereof in addition to other related/pertinent descriptions.)

filtering [the]a second transmission signal to remove power from the second transmission signal at each frequency in the different plurality of frequencies to be avoided, resulting in the filtered second transmission signal. (e.g. col. 11 ln. 39 – col. 12 ln. 30, Figs. 16-18 and description thereof in addition to other related/pertinent descriptions.)

24. (New, Amended) The method of claim [22]19, wherein the first power and the second power are the same. (e.g. col. 3 lns. 31-45, col. 3 ln. 62-col. 4 ln. 16, col. 10 lns. 11-27, col. 11 lns. 25-30, col. 19 lns 34-37, col. 22 lns 7-34, col. 25 lns. 33-44, Fig. 14 and description thereof in addition to other related/pertinent descriptions.)

25. (New, Amended) The method of claim [22]19, wherein the first power and the second power are different. (e.g. col. 3 lns. 31-45, col. 3 ln. 62-col. 4 ln. 16, col. 10 lns. 11-27, col. 11 lns. 25-30, col. 19 lns 34-37, col. 22 lns 7-34, col. 25 lns. 33-44, Fig. 14 and description thereof in addition to other related/pertinent descriptions.)

26. (New, Amended) The method of claim [22]19, wherein an update of the compressed first feedback is repeatedly received at time periods of less than one second, and the first power is repeatedly updated based on an updated decompressed first feedback at time periods of less than one second; and an update of the compressed second feedback is repeatedly received at time periods of less than one second, and the second power is repeatedly updated based on an updated decompressed second feedback at time periods of less than one second. (e.g. col. 2 lns. 10-33, col. 3 lns. 31-45, col. 3 ln. 62-col. 4 ln. 16, col. 10 lns. 11-27, col. 11 lns. 25-30, col. 19 lns 34-37, col. 22 lns 7-34, col. 25 lns. 33-44, Fig. 14 and description thereof in addition to other related/pertinent descriptions.)

Claim 27 is amended to add "filtered" before both "first transmission signal" and "second transmission signal." Support for such amendment is found below.

27. (New, Twice Amended) The method of claim [22]19, wherein the filtered first transmission signal and the filtered second transmission signal are [sent]transmitted via

the same transceiver. (e.g. col. 6 lns. 51-59, col. 7 lns. 5-14, Fig. 11 and description thereof in addition to other related/pertinent descriptions.)

Claim 28 is amended to add "filtered" before both "first transmission signal" and "second transmission signal." Support for such amendment is found below.

28. (New, Twice Amended) The method of claim [22]19, wherein the filtered first transmission signal and the filtered second transmission signal are [sent]transmitted via different transceivers. (e.g. col. 6 lns. 51-59, col. 7 lns. 5-14, Fig. 11 and description thereof in addition to other related/pertinent descriptions.)

29. (New, Amended) The method of claim [22]19, wherein the instruction is received utilizing a dedicated channel. (e.g. col. 11 lns. 1-10, Fig. 2 and description thereof in addition to other related/pertinent descriptions.)

30. (New, Amended) The method of claim [22]19, wherein the instruction is received via an antenna configured for omnidirectional communication. (e.g. col. 8 lns. 60-65 in addition to other related/pertinent descriptions.)

31. (New, Amended) The method of claim [22]19, wherein the compressed first feedback and the compressed second feedback are received utilizing a dedicated channel. (e.g. col. 11 lns. 1-10, Fig. 2 and description thereof in addition to other related/pertinent descriptions.)

32. (New, Amended) The method of claim [22]19, wherein the compressed first feedback and the compressed second feedback are received via an antenna configured for omnidirectional communication. (e.g. col. 8 lns. 60-65 in addition to other related/pertinent descriptions.)

33. (New, Amended) The method of claim [22]19, wherein the decompressed first feedback and the decompressed second feedback are used to increase spatial separation among transmissions. (e.g. col. 3 lns. 30-45 in addition to other related/pertinent descriptions.)

34. (New, Amended) The method of claim [22]19, wherein the decompressed first feedback and the decompressed second feedback are used to increase spatial separation among transmissions at the same frequency. (e.g. col. 3 lns. 30-45 in addition to other related/pertinent descriptions.)

Claim 35 is amended to add "filtered" before both "first transmission signal" and "second transmission signal." Support for such amendment is found below.

35. (New, Twice Amended) The method of claim [22]19, and further comprising:

receiving a compressed third feedback from a fourth node that characterizes receipt of a third signal sent from the first node to the fourth node, the fourth node being a legacy node; (e.g. col. 3 lns. 31-45, col. 3 ln. 62-col. 4 ln. 16, col. 10 lns. 11-27, col. 22 lns 7-34, Fig. 14 and description thereof in addition to other related/pertinent descriptions.)

decompressing the compressed third feedback resulting in a decompressed third feedback; (e.g. col. 3 lns. 31-45, col. 3 ln. 62-col. 4 ln. 16, col. 10 lns. 11-27, col. 22 lns 7-34, Fig. 14 and description thereof in addition to other related/pertinent descriptions)

transmitting, using a third frequency and [the]another 802.11-based OFDM protocol, the third transmission signal to the fourth node using a transceiver separate from one or more other transceivers used to transmit the filtered first transmission signal and the filtered second transmission signal, and further using a third power that is based on the decompressed third feedback. (e.g. col. 3 lns. 31-45, col. 3 ln. 62-col. 4 ln. 16, col. 10 lns. 11-27, col. 11 lns. 25-30, col. 19 lns 34-37, col. 22 lns 7-34, col. 25 lns. 33-44, Fig. 14 and description thereof in addition to other related/pertinent descriptions.)

Claim 36 is amended to add "filtered" before both "first transmission signal" and "second transmission signal." Support for such amendment is found below.

36. (New, Twice Amended) The method of claim 35, wherein the third transmission signal is transmitted simultaneously with the filtered first transmission signal and the filtered second transmission signal via at least one different [directional] antenna of the plurality of [directional] antennas. (e.g. col. 3 lns. 31-45, col. 3 ln. 62-col. 4 ln. 16, col. 10 lns. 11-27, col. 11 lns. 25-30, col. 19 lns 34-37, col. 22 lns 7-34, col. 25 lns. 33-44, Fig. 14 and description thereof in addition to other related/pertinent descriptions.)

37. (New, Amended) The method of claim [22]19, wherein the compressed first feedback is based on a received power at a plurality of frequencies via which the first signal is received. (e.g. col. 3 lns. 31-45, col. 3 ln. 62-col. 4 ln. 16, col. 10 lns. 11-27, col. 11 lns. 25-30, col. 19 lns 34-37, col. 22 lns 7-34, col. 25 lns. 33-44, Fig. 14 and description thereof in addition to other related/pertinent descriptions.)

Claim 39 is amended to add "filtered" before both "first transmission signal" and "second transmission signal." Support for such amendment is found below.

39. (New, Twice Amended) [The method of claim 19,] A method for managing interference in a radio communications network, comprising the steps of:

receiving at a first node in the radio communications network an instruction transmitted from a second node in the radio communications network to avoid using a plurality of frequencies to transmit to the second node; (e.g. col. 3 lns. 31-45, col. 3 ln. 62-col. 4 ln. 16, col. 10 lns. 11-27, col. 22 lns 7-34, Fig. 14 and description thereof in addition to other related/pertinent descriptions.)

filtering a transmission signal to remove power from the transmission signal at each frequency in the plurality of frequencies to be avoided; (e.g. col. 3 lns. 31-45, col. 3

ln. 62-col. 4 ln. 16, col. 10 lns. 11-27, col. 22 lns 7-34, Fig. 14 and description thereof in addition to other related/pertinent descriptions.)

transmitting the filtered transmission signal to the second node; (e.g. col. 3 lns. 31-45, col. 3 ln. 62-col. 4 ln. 16, col. 10 lns. 11-27, col. 11 lns. 25-30, col. 19 lns 34-37, col. 22 lns 7-34, col. 25 lns. 33-44, Fig. 14 and description thereof in addition to other related/pertinent descriptions.)

wherein the instruction includes a first instruction and the filtered transmission signal includes a filtered first transmission signal that is transmitted to the second node using a first power via an 802.11-based orthogonal frequency-division multiplexing (OFDM) protocol, and further comprising: (e.g. col. 3 lns. 31-45, col. 3 ln. 62-col. 4 ln. 16, col. 10 lns. 11-27, col. 11 lns. 25-30, col. 19 lns 34-37, col. 22 lns 7-34, col. 25 lns. 33-44, Fig. 14 and description thereof in addition to other related/pertinent descriptions.)

receiving at the first node in the radio communications network a second instruction transmitted from a third node in the radio communications network to avoid using a different plurality of frequencies to transmit to the third node; (e.g. col. 3 lns. 31-45, col. 3 ln. 62-col. 4 ln. 16, col. 10 lns. 11-27, col. 22 lns 7-34, Fig. 14 and description thereof in addition to other related/pertinent descriptions.)

filtering a second transmission signal to remove power from the second transmission signal at each frequency in the different plurality of frequencies to be avoided; and (e.g. col. 3 lns. 31-45, col. 3 ln. 62-col. 4 ln. 16, col. 10 lns. 11-27, col. 22 lns 7-34, Fig. 14 and description thereof in addition to other related/pertinent descriptions.)

transmitting, using a second power via the 802.11-based OFDM protocol and simultaneously with the filtered first transmission signal, the filtered second transmission signal to the third node. (e.g. col. 3 lns. 31-45, col. 3 ln. 62-col. 4 ln. 16, col. 10 lns. 11-27, col. 11 lns. 25-30, col. 19 lns 34-37, col. 22 lns 7-34, col. 25 lns. 33-44, Fig. 14 and description thereof in addition to other related/pertinent descriptions.)

Claim 40 is amended to add "filtered" before both "first transmission signal" and "second transmission signal." Support for such amendment is found below.

40. (New, Twice Amended) [The method of claim 19, and further comprising:] A method for managing interference in a radio communications network, comprising the steps of:

receiving at a first node in the radio communications network an instruction transmitted from a second node in the radio communications network to avoid using a plurality of frequencies to transmit to the second node; (e.g. col. 3 lns. 31-45, col. 3 ln. 62-col. 4 ln. 16, col. 10 lns. 11-27, col. 22 lns 7-34, Fig. 14 and description thereof in addition to other related/pertinent descriptions.)

filtering a transmission signal to remove power from the transmission signal at each frequency in the plurality of frequencies to be avoided; (e.g. col. 3 lns. 31-45, col. 3 ln. 62-col. 4 ln. 16, col. 10 lns. 11-27, col. 22 lns 7-34, Fig. 14 and description thereof in addition to other related/pertinent descriptions.)

transmitting the filtered transmission signal to the second node; (e.g. col. 3 lns. 31-45, col. 3 ln. 62-col. 4 ln. 16, col. 10 lns. 11-27, col. 11 lns. 25-30, col. 19 lns 34-37,

col. 22 lns 7-34, col. 25 lns. 33-44, Fig. 14 and description thereof in addition to other related/pertinent descriptions.)

receiving a compressed first feedback from the second node that characterizes receipt of a first signal sent from the first node to the second node; (e.g. col. 3 lns. 31-45, col. 3 ln. 62-col. 4 ln. 16, col. 10 lns. 11-27, col. 22 lns 7-34, Fig. 14 and description thereof in addition to other related/pertinent descriptions.)

receiving a compressed second feedback from a third node that characterizes receipt of a second signal sent from the first node to the third node; (e.g. col. 3 lns. 31-45, col. 3 ln. 62-col. 4 ln. 16, col. 10 lns. 11-27, col. 22 lns 7-34, Fig. 14 and description thereof in addition to other related/pertinent descriptions.)

decompressing the compressed first feedback resulting in a decompressed first feedback; and (e.g. col. 3 lns. 31-45, col. 3 ln. 62-col. 4 ln. 16, col. 10 lns. 11-27, col. 22 lns 7-34, Fig. 14 and description thereof in addition to other related/pertinent descriptions.)

decompressing the compressed second feedback resulting in a decompressed second feedback; (e.g. col. 3 lns. 31-45, col. 3 ln. 62-col. 4 ln. 16, col. 10 lns. 11-27, col. 22 lns 7-34, Fig. 14 and description thereof in addition to other related/pertinent descriptions.)

wherein the filtered transmission signal is a filtered first transmission signal that is transmitted to the second node using an 802.11-based orthogonal frequency-division multiplexing (OFDM) protocol via at least one antenna of a plurality of antennas, using a first power that is based on the decompressed first feedback; and further comprising: (e.g. col. 3 lns. 31-45, col. 3 ln. 62-col. 4 ln. 16, col. 10 lns. 11-27, col. 11 lns. 25-30, col. 19 lns 34-37, col. 22 lns 7-34, col. 25 lns. 33-44, Fig. 14 and description thereof in addition to other related/pertinent descriptions.)

transmitting, using the 802.11-based OFDM protocol, a filtered second transmission signal, simultaneously with the filtered first transmission signal, to the third node using a second power that is based on the decompressed second feedback. (e.g. col. 3 lns. 31-45, col. 3 ln. 62-col. 4 ln. 16, col. 10 lns. 11-27, col. 11 lns. 25-30, col. 19 lns 34-37, col. 22 lns 7-34, col. 25 lns. 33-44, Fig. 14 and description thereof in addition to other related/pertinent descriptions.)

41. (New, Amended) [The method of claim 19, and further comprising:] A method for managing interference in a radio communications network, comprising the steps of:

receiving at a first node in the radio communications network an instruction transmitted from a second node in the radio communications network to avoid using a plurality of frequencies to transmit to the second node; (e.g. col. 3 lns. 31-45, col. 3 ln. 62-col. 4 ln. 16, col. 10 lns. 11-27, col. 22 lns 7-34, Fig. 14 and description thereof in addition to other related/pertinent descriptions.)

filtering a transmission signal to remove power from the transmission signal at each frequency in the plurality of frequencies to be avoided; (e.g. col. 3 lns. 31-45, col. 3 ln. 62-col. 4 ln. 16, col. 10 lns. 11-27, col. 22 lns 7-34, Fig. 14 and description thereof in addition to other related/pertinent descriptions.)

transmitting the filtered transmission signal to the second node; (e.g. col. 3 lns. 31-45, col. 3 ln. 62-col. 4 ln. 16, col. 10 lns. 11-27, col. 11 lns. 25-30, col. 19 lns 34-37,

col. 22 lns 7-34, col. 25 lns. 33-44, Fig. 14 and description thereof in addition to other related/pertinent descriptions.)

separately from the receipt of the instruction, receiving a particular signal at the first node that is transmitted from the second node; (e.g. col. 3 lns. 31-45, col. 3 ln. 62-col. 4 ln. 16, col. 10 lns. 11-27, col. 22 lns 7-34, Fig. 14 and description thereof in addition to other related/pertinent descriptions.)

generating a feedback based on a received power and one or more frequencies via which the particular signal is received; (e.g. col. 3 lns. 31-45, col. 3 ln. 62-col. 4 ln. 16, col. 10 lns. 11-27, col. 22 lns 7-34, Fig. 14 and description thereof in addition to other related/pertinent descriptions.)

compressing the feedback; and (e.g. col. 3 lns. 31-45, col. 3 ln. 62-col. 4 ln. 16, col. 10 lns. 11-27, col. 22 lns 7-34, Fig. 14 and description thereof in addition to other related/pertinent descriptions.)

transmitting the compressed feedback from the first node to the second node, for use by the second node in determining a transmit power with which the second node transmits to the first node via at least one [directional] antenna of a plurality of [directional] antennas, while simultaneously transmitting to one or more other nodes; (e.g. col. 3 lns. 31-45, col. 3 ln. 62-col. 4 ln. 16, col. 10 lns. 11-27, col. 11 lns. 25-30, col. 19 lns 34-37, col. 22 lns 7-34, col. 25 lns. 33-44, Fig. 14 and description thereof in addition to other related/pertinent descriptions.)

wherein the filtered transmission signal is transmitted to the second node using an 802.11-based orthogonal frequency-division multiplexing (OFDM) protocol; (e.g. col. 3 lns. 31-45, col. 3 ln. 62-col. 4 ln. 16, col. 10 lns. 11-27, col. 11 lns. 25-30, col. 19 lns 34-37, col. 22 lns 7-34, col. 25 lns. 33-44, Fig. 14 and description thereof in addition to other related/pertinent descriptions.)

wherein an update of the compressed feedback is repeatedly generated, compressed, and transmitted at time periods of less than one second; so that the transmit power is repeatedly updated based thereupon at time periods of less than one second. (e.g. col. 2 lns. 10-33, col. 3 lns. 31-45, col. 3 ln. 62-col. 4 ln. 16, col. 10 lns. 11-27, col. 11 lns. 25-30, col. 19 lns 34-37, col. 22 lns 7-34, col. 25 lns. 33-44, Fig. 14 and description thereof in addition to other related/pertinent descriptions.)

Claim 42 is amended to add "filtered" before both "first transmission signal" and "second transmission signal." Support for such amendment is found below.

42. (New, Twice Amended) The method of claim 41, wherein the instruction includes a first instruction and the filtered transmission signal includes a filtered first transmission signal, and further comprising:

receiving at the first node in the radio communications network a second instruction transmitted from a third node in the radio communications network to avoid using a different plurality of frequencies to transmit to the third node; (e.g. col. 3 lns. 31-45, col. 3 ln. 62-col. 4 ln. 16, col. 10 lns. 11-27, col. 22 lns 7-34, Fig. 14 and description thereof in addition to other related/pertinent descriptions.)

filtering a second transmission signal to remove power from the second transmission signal at each frequency in the different plurality of frequencies to be

avoided; and (e.g. col. 3 lns. 31-45, col. 3 ln. 62-col. 4 ln. 16, col. 10 lns. 11-27, col. 22 lns 7-34, Fig. 14 and description thereof in addition to other related/pertinent descriptions.)

transmitting the filtered second transmission signal to the third node. (e.g. col. 3 lns. 31-45, col. 3 ln. 62-col. 4 ln. 16, col. 10 lns. 11-27, col. 11 lns. 25-30, col. 19 lns 34-37, col. 22 lns 7-34, col. 25 lns. 33-44, Fig. 14 and description thereof in addition to other related/pertinent descriptions.)

Claim 43 is amended to add "resulting in the filtered second transmission signal" to the last claim element. Support for such amendment is found below.

43. (New, Amended) The method of claim 40, wherein the instruction includes a first instruction, and further comprising:

receiving at the first node in the radio communications network a second instruction transmitted from the third node to avoid using a different plurality of frequencies to transmit to the third node; and (e.g. col. 11 ln. 39 – col. 12 ln. 30, Figs. 16-18 and description thereof in addition to other related/pertinent descriptions.)

filtering the second transmission signal to remove power from the second transmission signal at each frequency in the different plurality of frequencies to be avoided, resulting in the filtered second transmission signal. (e.g. col. 11 ln. 39 – col. 12 ln. 30, Figs. 16-18 and description thereof in addition to other related/pertinent descriptions.)

44. (New) The method of claim 40, wherein the first power and the second power are the same. (e.g. col. 3 lns. 31-45, col. 3 ln. 62-col. 4 ln. 16, col. 10 lns. 11-27, col. 11 lns. 25-30, col. 19 lns 34-37, col. 22 lns 7-34, col. 25 lns. 33-44, Fig. 14 and description thereof in addition to other related/pertinent descriptions.)

45. (New) The method of claim 40, wherein the first power and the second power are different. (e.g. col. 3 lns. 31-45, col. 3 ln. 62-col. 4 ln. 16, col. 10 lns. 11-27, col. 11 lns. 25-30, col. 19 lns 34-37, col. 22 lns 7-34, col. 25 lns. 33-44, Fig. 14 and description thereof in addition to other related/pertinent descriptions.)

46. (New) The method of claim 40, and further comprising:

generating a first data structure based on the decompressed first feedback, where the first power is based on the first data structure; and (e.g. col. 3 lns. 31-45, col. 3 ln. 62-col. 4 ln. 16, col. 10 lns. 11-27, col. 22 lns 7-34, Fig. 14 and description thereof in addition to other related/pertinent descriptions.)

generating a second data structure based on the decompressed second feedback, where the second power is based on the second data structure. (e.g. col. 3 lns. 31-45, col. 3 ln. 62-col. 4 ln. 16, col. 10 lns. 11-27, col. 22 lns 7-34, Fig. 14 and description thereof in addition to other related/pertinent descriptions.)

47. (New) The method of claim 46, wherein the first data structure and the second data structure are different. (e.g. col. 3 lns. 31-45, col. 3 ln. 62-col. 4 ln. 16, col. 10 lns. 11-27, col. 22 lns 7-34, Fig. 14 and description thereof in addition to other related/pertinent descriptions.)

48. (New) The method of claim 46, wherein the first data structure and the second data structure are orthogonal. (e.g. col. 3 lns. 31-45, col. 3 ln. 62-col. 4 ln. 16, col. 10 lns. 11-27, col. 22 lns 7-34, Fig. 14 and description thereof in addition to other related/pertinent descriptions.)

49. (New) The method of claim 46, wherein the first data structure is unique to the second node, and the second data structure is unique to the third node. (e.g. col. 3 lns. 31-45, col. 3 ln. 62-col. 4 ln. 16, col. 10 lns. 11-27, col. 22 lns 7-34, Fig. 14 and description thereof in addition to other related/pertinent descriptions.)

50. (New) The method of claim 46, wherein the first data structure is a first profile, and the second data structure is a second profile. (e.g. col. 3 lns. 31-45, col. 3 ln. 62-col. 4 ln. 16, col. 10 lns. 11-27, col. 22 lns 7-34, Fig. 14 and description thereof in addition to other related/pertinent descriptions.)

51. (New) The method of claim 46, wherein the first data structure is a first optimal waveform profile. (e.g. col. 3 lns. 31-45, col. 3 ln. 62-col. 4 ln. 16, col. 10 lns. 11-27, col. 22 lns 7-34, Fig. 14 and description thereof in addition to other related/pertinent descriptions.)

52. (New) The method of claim 40, and further comprising:

generating a single data structure based on the decompressed first feedback and the decompressed second feedback, where both the first power and the second power are based on the single data structure. (e.g. col. 3 lns. 31-45, col. 3 ln. 62-col. 4 ln. 16, col. 10 lns. 11-27, col. 22 lns 7-34, Fig. 14 and description thereof in addition to other related/pertinent descriptions.)

Claim 53 is amended to add "filtered" before both "first transmission signal" and "second transmission signal." Support for such amendment is found below.

53. (New, Amended) The method of claim 40, wherein the filtered second transmission signal is transmitted simultaneously with the filtered first transmission signal via the same plurality of antennas. (e.g. col. 3 lns. 31-45, col. 3 ln. 62-col. 4 ln. 16, col. 10 lns. 11-27, col. 11 lns. 25-30, col. 19 lns 34-37, col. 22 lns 7-34, col. 25 lns. 33-44, Fig. 14 and description thereof in addition to other related/pertinent descriptions.)

Claim 54 is amended to add "filtered" before both "first transmission signal" and "second transmission signal." Support for such amendment is found below.

54. (New, Amended) The method of claim 40, wherein the filtered second transmission signal is transmitted simultaneously with the filtered first transmission signal via at least one different antenna of the plurality of antennas. (e.g. col. 3 lns. 31-45, col. 3 ln. 62-col. 4 ln. 16, col. 10 lns. 11-27, col. 11 lns. 25-30, col. 19 lns 34-37, col. 22

lns 7-34, col. 25 lns. 33-44, Fig. 14 and description thereof in addition to other related/pertinent descriptions.)

Claim 55 is amended to add "filtered" before both "first transmission signal" and "second transmission signal." Support for such amendment is found below.

55. (New, Amended) The method of claim 40, wherein the filtered second transmission signal is transmitted simultaneously with the filtered first transmission signal via the at least one antenna of the plurality of antennas. (e.g. col. 3 lns. 31-45, col. 3 ln. 62-col. 4 ln. 16, col. 10 lns. 11-27, col. 11 lns. 25-30, col. 19 lns 34-37, col. 22 lns 7-34, col. 25 lns. 33-44, Fig. 14 and description thereof in addition to other related/pertinent descriptions.)

56. (New) The method of claim 40, wherein an update of the compressed first feedback is repeatedly received, and the first power is repeatedly updated based on an updated decompressed first feedback; and an update of the compressed second feedback is repeatedly received, and the second power is repeatedly updated based on an updated decompressed second feedback. (e.g. col. 2 lns. 10-33, col. 3 lns. 31-45, col. 3 ln. 62-col. 4 ln. 16, col. 10 lns. 11-27, col. 11 lns. 25-30, col. 19 lns 34-37, col. 22 lns 7-34, col. 25 lns. 33-44, Fig. 14 and description thereof in addition to other related/pertinent descriptions.)

57. (New) The method of claim 40, wherein an update of the compressed first feedback is repeatedly received in real-time, and the first power is repeatedly updated in real-time based on an updated decompressed first feedback; and an update of the compressed second feedback is repeatedly received in real-time, and the second power is repeatedly updated in real-time based on an updated decompressed second feedback. (e.g. col. 2 lns. 10-33, col. 3 lns. 31-45, col. 3 ln. 62-col. 4 ln. 16, col. 10 lns. 11-27, col. 11 lns. 25-30, col. 19 lns 34-37, col. 22 lns 7-34, col. 25 lns. 33-44, Fig. 14 and description thereof in addition to other related/pertinent descriptions.)

58. (New) The method of claim 40, wherein an update of the compressed first feedback is repeatedly received at time periods of less than one second, and the first power is repeatedly updated based on an updated decompressed first feedback at time periods of less than one second; and an update of the compressed second feedback is repeatedly received at time periods of less than one second, and the second power is repeatedly updated based on an updated decompressed second feedback at time periods of less than one second. (e.g. col. 2 lns. 10-33, col. 3 lns. 31-45, col. 3 ln. 62-col. 4 ln. 16, col. 10 lns. 11-27, col. 11 lns. 25-30, col. 19 lns 34-37, col. 22 lns 7-34, col. 25 lns. 33-44, Fig. 14 and description thereof in addition to other related/pertinent descriptions.)

Claim 59 is amended to add "filtered" before both "first transmission signal" and "second transmission signal." Support for such amendment is found below.

59. (New, Amended) The method of claim 40, wherein the filtered first transmission signal and the filtered second transmission signal are sent via the same transceiver. (e.g. col. 6 lns. 51-59, col. 7 lns. 5-14, Fig. 11 and description thereof in addition to other related/pertinent descriptions.)

Claim 60 is amended to add "filtered" before both "first transmission signal" and "second transmission signal." Support for such amendment is found below.

60. (New, Amended) The method of claim 40, wherein the filtered first transmission signal and the filtered second transmission signal are sent via different transceivers. (e.g. col. 6 lns. 51-59, col. 7 lns. 5-14, Fig. 11 and description thereof in addition to other related/pertinent descriptions.)

61. (New) The method of claim 40, wherein the compressed first feedback and the compressed second feedback are received utilizing a dedicated channel. (e.g. col. 11 lns. 1-10, Fig. 2 and description thereof in addition to other related/pertinent descriptions.)

62. (New) The method of claim 40, wherein the compressed first feedback and the compressed second feedback are received via an antenna configured for omnidirectional communication. (e.g. col. 8 lns. 60-65 in addition to other related/pertinent descriptions.)

63. (New) The method of claim 40, wherein the decompressed first feedback and the decompressed second feedback are used to increase spatial separation among transmissions. (e.g. col. 3 lns. 30-45 in addition to other related/pertinent descriptions.)

64. (New) The method of claim 40, wherein the decompressed first feedback and the decompressed second feedback are used to increase spatial separation among transmissions at the same frequency. (e.g. col. 3 lns. 30-45 in addition to other related/pertinent descriptions.)

65. (New) The method of claim 40, and further comprising:

receiving a compressed third feedback from a fourth node that characterizes receipt of a third signal sent from the first node to the fourth node, the fourth node being a legacy node; (e.g. col. 3 lns. 31-45, col. 3 ln. 62-col. 4 ln. 16, col. 10 lns. 11-27, col. 22 lns 7-34, Fig. 14 and description thereof in addition to other related/pertinent descriptions.)

decompressing the compressed third feedback resulting in a decompressed third feedback; (e.g. col. 3 lns. 31-45, col. 3 ln. 62-col. 4 ln. 16, col. 10 lns. 11-27, col. 22 lns 7-34, Fig. 14 and description thereof in addition to other related/pertinent descriptions.)

transmitting, using a third frequency and another 802.11-based OFDM protocol, the third transmission signal to the fourth node using a third power that is based on the decompressed third feedback. (e.g. col. 3 lns. 31-45, col. 3 ln. 62-col. 4 ln. 16, col. 10 lns. 11-27, col. 11 lns. 25-30, col. 19 lns 34-37, col. 22 lns 7-34, col. 25 lns. 33-44, Fig. 14 and description thereof in addition to other related/pertinent descriptions.)

66. (New) The method of claim 40, wherein the compressed first feedback is based on a received power and one or more frequencies via which the first signal is communicated. (e.g. col. 3 lns. 31-45, col. 3 ln. 62-col. 4 ln. 16, col. 10 lns. 11-27, col. 22 lns 7-34, Fig. 14 and description thereof in addition to other related/pertinent descriptions.)

67. (New) The method of claim 40, wherein the compressed first feedback is based on a received power at a plurality of frequencies via which the first signal is communicated. (e.g. col. 3 lns. 31-45, col. 3 ln. 62-col. 4 ln. 16, col. 10 lns. 11-27, col. 22 lns 7-34, Fig. 14 and description thereof in addition to other related/pertinent descriptions.)

68. (New) The method of claim 40, wherein the compressed first feedback is based on a series of power values as a function of frequency. (e.g. col. 3 lns. 31-45, col. 3 ln. 62-col. 4 ln. 16, col. 10 lns. 11-27, col. 22 lns 7-34, Fig. 14 and description thereof in addition to other related/pertinent descriptions.)

69. (New) The method of claim 40, wherein the compressed first feedback includes a data structure that is based on a series of power values as a function of frequency. (e.g. col. 3 lns. 31-45, col. 3 ln. 62-col. 4 ln. 16, col. 10 lns. 11-27, col. 22 lns 7-34, Fig. 14 and description thereof in addition to other related/pertinent descriptions.)

70. (New) The method of claim 40, wherein the instruction is received prior to the receipt of the compressed first feedback. (e.g. col. 3 lns. 31-45, col. 3 ln. 62-col. 4 ln. 16, col. 10 lns. 11-27, col. 22 lns 7-34, Fig. 14 and description thereof in addition to other related/pertinent descriptions.)

71. (New) The method of claim 40, wherein the instruction is received separately with respect to the receipt of the compressed first feedback. (e.g. col. 3 lns. 31-45, col. 3 ln. 62-col. 4 ln. 16, col. 10 lns. 11-27, col. 22 lns 7-34, Fig. 14 and description thereof in addition to other related/pertinent descriptions.)

72. (New) The method of claim 40, wherein at least three transmission signals are capable of being simultaneously transmitted to at least three different devices, using the same multiple antennas. (e.g. col. 3 lns. 31-45, col. 3 ln. 62-col. 4 ln. 16, col. 10 lns. 11-27, col. 11 lns. 25-30, col. 19 lns 34-37, col. 22 lns 7-34, col. 25 lns. 33-44, Fig. 14 and description thereof in addition to other related/pertinent descriptions.)

73. (New) The method of claim 40, wherein at least three transmission signals are capable of being simultaneously transmitted to at least three different devices, using at least one different antenna. (e.g. col. 3 lns. 31-45, col. 3 ln. 62-col. 4 ln. 16, col. 10 lns. 11-27, col. 11 lns. 25-30, col. 19 lns 34-37, col. 22 lns 7-34, col. 25 lns. 33-44, Fig. 14 and description thereof in addition to other related/pertinent descriptions.)

74. (New) The method of claim 40, wherein the instruction includes a request to send (RTS) instruction. (e.g. col. 3 lns. 31-45, col. 3 ln. 62-col. 4 ln. 16, col. 10 lns. 11-27, col. 11 lns. 25-30, col. 19 lns 34-37, col. 20 lns 11-14, col. 22 lns 7-34, col. 25 lns. 33-44, Fig. 14 and description thereof in addition to other related/pertinent descriptions.)

75. (New) The method of claim 40, wherein the instruction includes a 802.11 clear to send (CTS) instruction. (e.g. col. 3 lns. 31-45, col. 3 ln. 62-col. 4 ln. 16, col. 10 lns. 11-27, col. 11 lns. 25-30, col. 19 lns 34-37, col. 20 lns 11-14, col. 22 lns 7-34, col. 25 lns. 33-44, Fig. 14 and description thereof in addition to other related/pertinent descriptions.)

Claim 76 is amended to add "filtered" before both "first transmission signal" and "second transmission signal." Support for such amendment is found below.

76. (New, Amended) The method of claim 40, wherein the filtered first transmission signal is transmitted using a frequency band that is selected based on the instruction and the filtered second transmission signal is transmitted using the frequency band that is selected based on another instruction received from the third node, where the filtered first transmission signal is transmitted using a first frequency in the frequency band and the filtered second transmission signal is transmitted using a second frequency in the frequency band. (e.g. col. 3 lns. 31-45, col. 3 ln. 62-col. 4 ln. 16, col. 10 lns. 11-27, col. 22 lns 7-34, Fig. 1-19 and description thereof in addition to other related/pertinent descriptions.)

Claim 77 is amended to add "filtered" before both "first transmission signal" and "second transmission signal." Support for such amendment is found below.

77. (New, Amended) The method of claim 40, wherein the filtered first transmission signal is transmitted using a first frequency and the filtered second transmission signal is transmitted using a second frequency. (e.g. col. 3 lns. 31-45, col. 3 ln. 62-col. 4 ln. 16, col. 10 lns. 11-27, col. 11 lns. 25-30, col. 19 lns 34-37, col. 22 lns 7-34, col. 25 lns. 33-44, Fig. 14 and description thereof in addition to other related/pertinent descriptions.)

Claim 78 is amended to add "filtered" before both "first transmission signal" and "second transmission signal." Support for such amendment is found below.

78. (New, Amended) The method of claim 40, wherein the filtered first transmission signal and the filtered second transmission signal are transmitted using the same one or more frequencies. (e.g. col. 3 lns. 31-45, col. 3 ln. 62-col. 4 ln. 16, col. 10 lns. 11-27, col. 11 lns. 25-30, col. 19 lns 34-37, col. 22 lns 7-34, col. 25 lns. 33-44, Fig. 14 and description thereof in addition to other related/pertinent descriptions.)

Claim 79 is amended to add "filtered" before both "first transmission signal" and "second transmission signal." Support for such amendment is found below.

79. (New, Amended) The method of claim 40, wherein the filtered first transmission signal and the filtered second transmission signal are transmitted using the same frequency band. (e.g. col. 3 lns. 31-45, col. 3 ln. 62-col. 4 ln. 16, col. 10 lns. 11-27, col.

11 lns. 25-30, col. 19 lns 34-37, col. 22 lns 7-34, col. 25 lns. 33-44, Fig. 14 and description thereof in addition to other related/pertinent descriptions.)

Claim 80 is amended to add "filtered" before both "first transmission signal" and "second transmission signal." Support for such amendment is found below.

80. (New, Amended) The method of claim 40, wherein the filtered first transmission signal is transmitted using a first frequency that is based on the instruction and the filtered second transmission signal is transmitted using a second frequency that is based on another instruction received from the third node. (e.g. col. 3 lns. 31-45, col. 3 ln. 62-col. 4 ln. 16, col. 10 lns. 11-27, col. 11 lns. 25-30, col. 19 lns 34-37, col. 22 lns 7-34, col. 25 lns. 33-44, Fig. 14 and description thereof in addition to other related/pertinent descriptions.)

Claim 81 is amended to add "filtered" before both "first transmission signal" and "second transmission signal." Support for such amendment is found below.

81. (New, Amended) The method of claim 40, wherein the filtered first transmission signal is transmitted using a frequency that is based on the instruction and the second transmission filtered signal is transmitted using the frequency that is based on another instruction received from the third node. (e.g. col. 3 lns. 31-45, col. 3 ln. 62-col. 4 ln. 16, col. 10 lns. 11-27, col. 22 lns 7-34, Fig. 14 and description thereof in addition to other related/pertinent descriptions.)

Claim 82 is amended to add "filtered" before both "first transmission signal" and "second transmission signal." Support for such amendment is found below.

82. (New, Amended) The method of claim 40, wherein the filtered first transmission signal is transmitted using a frequency band that is selected based on the instruction and the filtered second transmission signal is transmitted using the frequency band that is selected based on another instruction received from the third node. (e.g. col. 3 lns. 31-45, col. 3 ln. 62-col. 4 ln. 16, col. 10 lns. 11-27, col. 22 lns 7-34, Fig. 14 and description thereof in addition to other related/pertinent descriptions.)

Claim 83 is amended to removed "[the 802.11 includes 802.11a/g;]" and add "the radio communications network includes an 802.11a network; the radio communications network includes an 802.11g network; the transmission signal includes a plurality of packets; the transmission signal includes a plurality of different transmissions; the transmission signal includes a plurality of transmissions to the second node; the transmission signal includes a plurality of differently-timed transmissions to the second node; the transmission signal includes a

plurality of transmission components to the second node, each with different power levels; the transmission signal includes a plurality of transmission components to the second node, each with different power levels as a result of different instances of the filtering;" Support for such amendment is found below.

83. (New, Amended) The method of claim 40, wherein at least one of:

the first signal includes a data signal; (e.g. col. 3 lns. 31-45, col. 3 ln. 62-col. 4 ln. 16, col. 10 lns. 11-27, col. 11 lns. 25-30, col. 19 lns 34-37, col. 22 lns 7-34, col. 25 lns. 33-44, Fig. 1-19 and description thereof in addition to other related/pertinent descriptions.)

the first signal includes an aggregate signal; (e.g. col. 3 lns. 31-45, col. 3 ln. 62-col. 4 ln. 16, col. 10 lns. 11-27, col. 11 lns. 25-30, col. 19 lns 34-37, col. 22 lns 7-34, col. 25 lns. 33-44, Fig. 1-19 and description thereof in addition to other related/pertinent descriptions.)

the first signal includes a first data signal, and the second signal includes a second data signal; (e.g. col. 3 lns. 31-45, col. 3 ln. 62-col. 4 ln. 16, col. 10 lns. 11-27, col. 11 lns. 25-30, col. 19 lns 34-37, col. 22 lns 7-34, col. 25 lns. 33-44, Fig. 1-19 and description thereof in addition to other related/pertinent descriptions.)

the first and second signals are reflected in an aggregate signal; (e.g. col. 3 lns. 31-45, col. 3 ln. 62-col. 4 ln. 16, col. 10 lns. 11-27, col. 11 lns. 25-30, col. 19 lns 34-37, col. 22 lns 7-34, col. 25 lns. 33-44, Fig. 1-19 and description thereof in addition to other related/pertinent descriptions.)

the compressed first feedback is combined with the instruction; (e.g. col. 3 lns. 31-45, col. 3 ln. 62-col. 4 ln. 16, col. 10 lns. 11-27, col. 11 lns. 25-30, col. 19 lns 34-37, col. 22 lns 7-34, col. 25 lns. 33-44, Fig. 1-19 and description thereof in addition to other related/pertinent descriptions.)

the compressed first feedback is received with the instruction; (e.g. col. 3 lns. 31-45, col. 3 ln. 62-col. 4 ln. 16, col. 10 lns. 11-27, col. 11 lns. 25-30, col. 19 lns 34-37, col. 22 lns 7-34, col. 25 lns. 33-44, Fig. 1-19 and description thereof in addition to other related/pertinent descriptions.)

the compressed first feedback is configured to ensure that transmissions from all neighbors of the first node are received at a same power level; (e.g. col. 3 lns. 31-45, col. 3 ln. 62-col. 4 ln. 16, col. 10 lns. 11-27, col. 11 lns. 25-30, col. 19 lns 34-37, col. 22 lns 7-34, col. 25 lns. 33-44, Fig. 1-19 and description thereof in addition to other related/pertinent descriptions.)

the compressed first feedback is configured to at least one of: minimize a transmit power on reliable links, maximize an ability to achieve spatial separation among transmissions on a same frequency, minimize network self-interference, improve low probability of intercept (LPI), or lower probability of detection (LPD); (e.g. col. 3 lns. 31-45, col. 3 ln. 62-col. 4 ln. 16, col. 10 lns. 11-27, col. 11 lns. 25-30, col. 19 lns 34-37, col. 22 lns 7-34, col. 25 lns. 33-44, Fig. 1-19 and description thereof in addition to other related/pertinent descriptions.)

the compressed first feedback and the compressed second feedback are received simultaneously; (e.g. col. 3 lns. 31-45, col. 3 ln. 62-col. 4 ln. 16, col. 10 lns. 11-27, col. 11 lns. 25-30, col. 19 lns 34-37, col. 22 lns 7-34, col. 25 lns. 33-44, Fig. 1-19 and description thereof in addition to other related/pertinent descriptions.)

at least one of the compressed first feedback or the compressed second feedback is received before the instruction is received; (e.g. col. 3 lns. 31-45, col. 3 ln. 62-col. 4 ln. 16, col. 10 lns. 11-27, col. 11 lns. 25-30, col. 19 lns 34-37, col. 22 lns 7-34, col. 25 lns. 33-44, Fig. 1-19 and description thereof in addition to other related/pertinent descriptions.)

at least one of the compressed first feedback or the compressed second feedback is received after the instruction is received; (e.g. col. 3 lns. 31-45, col. 3 ln. 62-col. 4 ln. 16, col. 10 lns. 11-27, col. 11 lns. 25-30, col. 19 lns 34-37, col. 22 lns 7-34, col. 25 lns. 33-44, Fig. 1-19 and description thereof in addition to other related/pertinent descriptions.)

the steps are performed in the order listed; (e.g. col. 3 lns. 31-45, col. 3 ln. 62-col. 4 ln. 16, col. 10 lns. 11-27, col. 11 lns. 25-30, col. 19 lns 34-37, col. 22 lns 7-34, col. 25 lns. 33-44, Fig. 1-19 and description thereof in addition to other related/pertinent descriptions.)

the radio communications network includes an 802.11 network; (e.g. col. 3 lns. 31-45, col. 3 ln. 62-col. 4 ln. 16, col. 10 lns. 11-27, col. 11 lns. 25-30, col. 19 lns 34-37, col. 22 lns 7-34, col. 25 lns. 33-44, Fig. 1-19 and description thereof in addition to other related/pertinent descriptions.)

[the 802.11 includes 802.11a/g];

the radio communications network includes an 802.11a network; (e.g. col. 3 lns. 31-45, col. 3 ln. 62-col. 4 ln. 16, col. 10 lns. 11-27, col. 11 lns. 25-30, col. 19 lns 34-37, col. 22 lns 7-34, col. 25 lns. 33-44, Fig. 1-19 and description thereof in addition to other related/pertinent descriptions.)

the radio communications network includes an 802.11g network; (e.g. col. 3 lns. 31-45, col. 3 ln. 62-col. 4 ln. 16, col. 10 lns. 11-27, col. 11 lns. 25-30, col. 19 lns 34-37, col. 22 lns 7-34, col. 25 lns. 33-44, Fig. 1-19 and description thereof in addition to other related/pertinent descriptions.)

interference in the radio communications network is managed; (e.g. col. 3 lns. 31-45, col. 3 ln. 62-col. 4 ln. 16, col. 10 lns. 11-27, col. 11 lns. 25-30, col. 19 lns 34-37, col. 22 lns 7-34, col. 25 lns. 33-44, Fig. 1-19 and description thereof in addition to other related/pertinent descriptions.)

the at least one antenna includes multiple antennas; (e.g. col. 3 lns. 31-45, col. 3 ln. 62-col. 4 ln. 16, col. 10 lns. 11-27, col. 11 lns. 25-30, col. 19 lns 34-37, col. 22 lns 7-34, col. 25 lns. 33-44, Fig. 14 and description thereof in addition to other related/pertinent descriptions.)

the at least one antenna includes at least one omnidirectional antenna; (e.g. col. 8 lns. 60-65 in addition to other related/pertinent descriptions.)

the at least one antenna includes at least one directional antenna; (e.g. col. 3 lns. 31-45, col. 3 ln. 62-col. 4 ln. 16, col. 10 lns. 11-27, col. 11 lns. 25-30, col. 19 lns 34-37, col. 22 lns 7-34, col. 25 lns. 33-44, Fig. 14 and description thereof in addition to other related/pertinent descriptions.)

interference in the radio communications network is managed; (e.g. col. 3 lns. 31-45, col. 3 ln. 62-col. 4 ln. 16, col. 10 lns. 11-27, col. 11 lns. 25-30, col. 19 lns 34-37, col. 22 lns 7-34, col. 25 lns. 33-44, Fig. 1-19 and description thereof in addition to other related/pertinent descriptions.)

the first node is a mobile node and the second node is a non-mobile node; (e.g. col. 3 lns. 31-45, col. 3 ln. 62-col. 4 ln. 16, col. 10 lns. 11-27, col. 11 lns. 25-30, col. 19 lns 34-37, col. 22 lns 7-34, col. 25 lns. 33-44, Fig. 1-19 and description thereof in addition to other related/pertinent descriptions.)

the second node is a mobile node and the first node is a non-mobile node; (e.g. col. 3 lns. 31-45, col. 3 ln. 62-col. 4 ln. 16, col. 10 lns. 11-27, col. 11 lns. 25-30, col. 19 lns 34-37, col. 22 lns 7-34, col. 25 lns. 33-44, Fig. 1-19 and description thereof in addition to other related/pertinent descriptions.)

the instruction sets forth the plurality of frequencies to avoid using; (e.g. col. 3 lns. 31-45, col. 3 ln. 62-col. 4 ln. 16, col. 10 lns. 11-27, col. 11 lns. 25-30, col. 19 lns 34-37, col. 22 lns 7-34, col. 25 lns. 33-44, Fig. 1-19 and description thereof in addition to other related/pertinent descriptions.)

the instruction specifies the plurality of frequencies to avoid using; (e.g. col. 3 lns. 31-45, col. 3 ln. 62-col. 4 ln. 16, col. 10 lns. 11-27, col. 11 lns. 25-30, col. 19 lns 34-37, col. 22 lns 7-34, col. 25 lns. 33-44, Fig. 1-19 and description thereof in addition to other related/pertinent descriptions.)

a purpose of the instruction is to avoid using the plurality of frequencies; (e.g. col. 3 lns. 31-45, col. 3 ln. 62-col. 4 ln. 16, col. 10 lns. 11-27, col. 11 lns. 25-30, col. 19 lns 34-37, col. 22 lns 7-34, col. 25 lns. 33-44, Fig. 1-19 and description thereof in addition to other related/pertinent descriptions.)

a purpose of the instruction is to avoid using the plurality of frequencies, where the purpose is accomplished by specifying the plurality of frequencies to avoid using; (e.g. col. 3 lns. 31-45, col. 3 ln. 62-col. 4 ln. 16, col. 10 lns. 11-27, col. 11 lns. 25-30, col. 19 lns 34-37, col. 22 lns 7-34, col. 25 lns. 33-44, Fig. 1-19 and description thereof in addition to other related/pertinent descriptions.)

a purpose of the instruction is to avoid using the plurality of frequencies, where the purpose is accomplished by specifying one or more frequencies to use; (e.g. col. 3 lns. 31-45, col. 3 ln. 62-col. 4 ln. 16, col. 10 lns. 11-27, col. 11 lns. 25-30, col. 19 lns 34-37, col. 22 lns 7-34, col. 25 lns. 33-44, Fig. 1-19 and description thereof in addition to other related/pertinent descriptions.)

a purpose of the instruction is to avoid using the plurality of frequencies, where the purpose is accomplished by specifying one or more frequencies to use, the one or more frequencies not including the plurality of frequencies; (e.g. col. 3 lns. 31-45, col. 3 ln. 62-col. 4 ln. 16, col. 10 lns. 11-27, col. 11 lns. 25-30, col. 19 lns 34-37, col. 22 lns 7-34, col. 25 lns. 33-44, Fig. 1-19 and description thereof in addition to other related/pertinent descriptions.)

the instruction to avoid the plurality of frequencies sets forth one or more frequencies to use; (e.g. col. 3 lns. 31-45, col. 3 ln. 62-col. 4 ln. 16, col. 10 lns. 11-27, col. 11 lns. 25-30, col. 19 lns 34-37, col. 22 lns 7-34, col. 25 lns. 33-44, Fig. 1-19 and description thereof in addition to other related/pertinent descriptions.)

the instruction to avoid the plurality of frequencies specifies one or more frequencies to use; (e.g. col. 3 lns. 31-45, col. 3 ln. 62-col. 4 ln. 16, col. 10 lns. 11-27, col. 11 lns. 25-30, col. 19 lns 34-37, col. 22 lns 7-34, col. 25 lns. 33-44, Fig. 1-19 and description thereof in addition to other related/pertinent descriptions.)

the instruction to avoid the plurality of frequencies assigns one or more frequencies to use; (e.g. col. 3 lns. 31-45, col. 3 ln. 62-col. 4 ln. 16, col. 10 lns. 11-27, col. 11 lns. 25-30, col. 19 lns 34-37, col. 22 lns 7-34, col. 25 lns. 33-44, Fig. 1-19 and description thereof in addition to other related/pertinent descriptions.)

the instruction to avoid the plurality of frequencies does not specify the plurality of frequencies; (e.g. col. 3 lns. 31-45, col. 3 ln. 62-col. 4 ln. 16, col. 10 lns. 11-27, col. 11 lns. 25-30, col. 19 lns 34-37, col. 22 lns 7-34, col. 25 lns. 33-44, Fig. 1-19 and description thereof in addition to other related/pertinent descriptions.)

the instruction to avoid the plurality of frequencies sets forth one or more frequencies to use, thereby resulting in the avoidance of using the plurality of frequencies; (e.g. col. 3 lns. 31-45, col. 3 ln. 62-col. 4 ln. 16, col. 10 lns. 11-27, col. 11 lns. 25-30, col. 19 lns 34-37, col. 22 lns 7-34, col. 25 lns. 33-44, Fig. 1-19 and description thereof in addition to other related/pertinent descriptions.)

a purpose of the filtering is to remove the power from the transmission signal at each frequency in the plurality of frequencies to be avoided, where the purpose is accomplished by specifying one or more frequencies to which the power is to be applied; (e.g. col. 3 lns. 31-45, col. 3 ln. 62-col. 4 ln. 16, col. 10 lns. 11-27, col. 11 lns. 25-30, col. 19 lns 34-37, col. 22 lns 7-34, col. 25 lns. 33-44, Fig. 1-19 and description thereof in addition to other related/pertinent descriptions.)

a purpose of the filtering is to remove the power from the transmission signal at each frequency in the plurality of frequencies to be avoided, where the purpose is accomplished by specifying the plurality of frequencies to be avoided; (e.g. col. 3 lns. 31-45, col. 3 ln. 62-col. 4 ln. 16, col. 10 lns. 11-27, col. 11 lns. 25-30, col. 19 lns 34-37, col. 22 lns 7-34, col. 25 lns. 33-44, Fig. 1-19 and description thereof in addition to other related/pertinent descriptions.)

the filtering suppresses or otherwise minimizes waves or oscillations at each frequency in the plurality of frequencies to be avoided; (e.g. col. 3 lns. 31-45, col. 3 ln. 62-col. 4 ln. 16, col. 10 lns. 11-27, col. 11 lns. 25-30, col. 19 lns 34-37, col. 22 lns 7-34, col. 25 lns. 33-44, Fig. 1-19 and description thereof in addition to other related/pertinent descriptions.)

the filtering suppresses or otherwise minimizes waves or oscillations at each frequency in the plurality of frequencies to be avoided, thereby resulting in the removal of the power from the transmission signal at each frequency in the plurality of frequencies to be avoided; (e.g. col. 3 lns. 31-45, col. 3 ln. 62-col. 4 ln. 16, col. 10 lns. 11-27, col. 11 lns. 25-30, col. 19 lns 34-37, col. 22 lns 7-34, col. 25 lns. 33-44, Fig. 1-19 and description thereof in addition to other related/pertinent descriptions.)

the filtering removes all power from the transmission signal; (e.g. col. 3 lns. 31-45, col. 3 ln. 62-col. 4 ln. 16, col. 10 lns. 11-27, col. 11 lns. 25-30, col. 19 lns 34-37, col. 22 lns 7-34, col. 25 lns. 33-44, Fig. 1-19 and description thereof in addition to other related/pertinent descriptions.)

the filtering removes some power from the transmission signal; (e.g. col. 3 lns. 31-45, col. 3 ln. 62-col. 4 ln. 16, col. 10 lns. 11-27, col. 11 lns. 25-30, col. 19 lns 34-37, col. 22 lns 7-34, col. 25 lns. 33-44, Fig. 1-19 and description thereof in addition to other related/pertinent descriptions.)

the filtering discards one or more portions of the transmission signal at each of the plurality of frequencies; (e.g. col. 3 lns. 31-45, col. 3 ln. 62-col. 4 ln. 16, col. 10 lns. 11-27, col. 11 lns. 25-30, col. 19 lns 34-37, col. 22 lns 7-34, col. 25 lns. 33-44, Fig. 1-19 and description thereof in addition to other related/pertinent descriptions.)

the filtering utilizes transmit excision; (e.g. col. 3 lns. 31-45, col. 3 ln. 62-col. 4 ln. 16, col. 10 lns. 11-27, col. 11 lns. 25-30, col. 19 lns 34-37, col. 22 lns 7-34, col. 25 lns. 33-44, Fig. 1-19 and description thereof in addition to other related/pertinent descriptions.)

the filtering utilizes compression; (e.g. col. 3 lns. 31-45, col. 3 ln. 62-col. 4 ln. 16, col. 10 lns. 11-27, col. 11 lns. 25-30, col. 19 lns 34-37, col. 22 lns 7-34, col. 25 lns. 33-44, Fig. 1-19 and description thereof in addition to other related/pertinent descriptions.)

the filtering identifies certain one or more frequencies in connection with which power is applied, thereby resulting in the removal of the power from the transmission signal at each frequency in the plurality of frequencies to be avoided; (e.g. col. 3 lns. 31-45, col. 3 ln. 62-col. 4 ln. 16, col. 10 lns. 11-27, col. 11 lns. 25-30, col. 19 lns 34-37, col. 22 lns 7-34, col. 25 lns. 33-44, Fig. 1-19 and description thereof in addition to other related/pertinent descriptions.)

the removal of power from the transmission signal at each frequency in the plurality of frequencies to be avoided is accomplished by an adjustment in relation to power previously used in connection with the transmission signal; (e.g. col. 3 lns. 31-45, col. 3 ln. 62-col. 4 ln. 16, col. 10 lns. 11-27, col. 11 lns. 25-30, col. 19 lns 34-37, col. 22 lns 7-34, col. 25 lns. 33-44, Fig. 1-19 and description thereof in addition to other related/pertinent descriptions.)

the removal of power from the transmission signal at each frequency in the plurality of frequencies is accomplished by adjusting a processing of the transmission signal so that power that was previously used in connection with the transmission signal at each frequency in the plurality of frequencies to be avoided, is no longer used in connection with the transmission signal at each frequency in the plurality of frequencies to be avoided; (e.g. col. 3 lns. 31-45, col. 3 ln. 62-col. 4 ln. 16, col. 10 lns. 11-27, col. 11 lns. 25-30, col. 19 lns 34-37, col. 22 lns 7-34, col. 25 lns. 33-44, Fig. 1-19 and description thereof in addition to other related/pertinent descriptions.)

the removal of power from the transmission signal at each frequency in the plurality of frequencies to be avoided is accomplished by setting a waveform profile that results in no power being applied in connection with the transmission signal at each frequency in the plurality of frequencies to be avoided; (e.g. col. 3

lns. 31-45, col. 3 ln. 62-col. 4 ln. 16, col. 10 lns. 11-27, col. 11 lns. 25-30, col. 19 lns 34-37, col. 22 lns 7-34, col. 25 lns. 33-44, Fig. 1-19 and description thereof in addition to other related/pertinent descriptions.)

the removal of power from the transmission signal at each frequency in the plurality of frequencies to be avoided is accomplished by pre-processing the transmission signal, before any power is applied, so that power, which would otherwise be applied in connection with the transmission signal at each frequency in the plurality of frequencies, is not applied in connection with the transmission signal at each frequency in the plurality of frequencies to be avoided; (e.g. col. 3 lns. 31-45, col. 3 ln. 62-col. 4 ln. 16, col. 10 lns. 11-27, col. 11 lns. 25-30, col. 19 lns 34-37, col. 22 lns 7-34, col. 25 lns. 33-44, Fig. 1-19 and description thereof in addition to other related/pertinent descriptions.)

the removal of power from the transmission signal at each frequency in the plurality of frequencies to be avoided is accomplished by pre-processing the transmission signal, before any power is applied, so that no power is applied in connection with the transmission signal at each frequency in the plurality of frequencies to be avoided; (e.g. col. 3 lns. 31-45, col. 3 ln. 62-col. 4 ln. 16, col. 10 lns. 11-27, col. 11 lns. 25-30, col. 19 lns 34-37, col. 22 lns 7-34, col. 25 lns. 33-44, Fig. 1-19 and description thereof in addition to other related/pertinent descriptions.)

the transmission signal includes a plurality of packets; (e.g. col. 3 lns. 31-45, col. 3 ln. 62-col. 4 ln. 16, col. 10 lns. 11-27, col. 11 lns. 25-30, col. 19 lns 34-37, col. 22 lns 7-34, col. 25 lns. 33-44, Summary, Fig. 1-19, and description thereof in addition to other related/pertinent descriptions.)

the transmission signal includes a plurality of different transmissions; (e.g. col. 3 lns. 31-45, col. 3 ln. 62-col. 4 ln. 16, col. 10 lns. 11-27, col. 11 lns. 25-30, col. 19 lns 34-37, col. 22 lns 7-34, col. 25 lns. 33-44, Summary, Fig. 1-19, and description thereof in addition to other related/pertinent descriptions.)

the transmission signal includes a plurality of transmissions to the second node; (e.g. col. 3 lns. 31-45, col. 3 ln. 62-col. 4 ln. 16, col. 10 lns. 11-27, col. 11 lns. 25-30, col. 19 lns 34-37, col. 22 lns 7-34, col. 25 lns. 33-44, Summary, Fig. 1-19, and description thereof in addition to other related/pertinent descriptions.)

the transmission signal includes a plurality of differently-timed transmissions to the second node; (e.g. col. 3 lns. 31-45, col. 3 ln. 62-col. 4 ln. 16, col. 10 lns. 11-27, col. 11 lns. 25-30, col. 19 lns 34-37, col. 22 lns 7-34, col. 25 lns. 33-44, Summary, Fig. 1-19, and description thereof in addition to other related/pertinent descriptions.)

the transmission signal includes a plurality of transmission components to the second node, each with different power levels; (e.g. col. 3 lns. 31-45, col. 3 ln. 62-col. 4 ln. 16, col. 10 lns. 11-27, col. 11 lns. 25-30, col. 19 lns 34-37, col. 22 lns 7-34, col. 25 lns. 33-44, Summary, Fig. 1-19, and description thereof in addition to other related/pertinent descriptions.)

the transmission signal includes a plurality of transmission components to the second node, each with different power levels as a result of different instances of the filtering; (e.g. col. 3 lns. 31-45, col. 3 ln. 62-col. 4 ln. 16, col. 10 lns. 11-27, col. 11 lns. 25-30, col. 19 lns 34-37, col. 22 lns 7-34, col. 25 lns. 33-44,

Summary, Fig. 1-19, and description thereof in addition to other related/pertinent descriptions.)

the transmission signal is generated so as to not include power at each frequency in the plurality of frequencies to be avoided; (e.g. col. 3 lns. 31-45, col. 3 ln. 62-col. 4 ln. 16, col. 10 lns. 11-27, col. 11 lns. 25-30, col. 19 lns 34-37, col. 22 lns 7-34, col. 25 lns. 33-44, Fig. 1-19 and description thereof in addition to other related/pertinent descriptions.)

the transmission signal is generated so as to not include power at each frequency in the plurality of frequencies to be avoided, thereby resulting in the removal of the power from the transmission signal at each frequency in the plurality of frequencies to be avoided; (e.g. col. 3 lns. 31-45, col. 3 ln. 62-col. 4 ln. 16, col. 10 lns. 11-27, col. 11 lns. 25-30, col. 19 lns 34-37, col. 22 lns 7-34, col. 25 lns. 33-44, Fig. 1-19 and description thereof in addition to other related/pertinent descriptions.)

the transmission signal is pre-processed so as to not include power at each frequency in the plurality of frequencies to be avoided, thereby resulting in the removal of the power from the transmission signal at each frequency in the plurality of frequencies to be avoided; (e.g. col. 3 lns. 31-45, col. 3 ln. 62-col. 4 ln. 16, col. 10 lns. 11-27, col. 11 lns. 25-30, col. 19 lns 34-37, col. 22 lns 7-34, col. 25 lns. 33-44, Fig. 1-19 and description thereof in addition to other related/pertinent descriptions.)

the filtering is performed using an output filter; (e.g. col. 3 lns. 31-45, col. 3 ln. 62-col. 4 ln. 16, col. 10 lns. 11-27, col. 11 lns. 25-30, col. 19 lns 34-37, col. 22 lns 7-34, col. 25 lns. 33-44, Fig. 1-19 and description thereof in addition to other related/pertinent descriptions.)

the filtering is performed using an optimal matched filter; (e.g. col. 3 lns. 31-45, col. 3 ln. 62-col. 4 ln. 16, col. 10 lns. 11-27, col. 11 lns. 25-30, col. 19 lns 34-37, col. 22 lns 7-34, col. 25 lns. 33-44, Fig. 1-19 and description thereof in addition to other related/pertinent descriptions.)

the filtering is performed using a band selection filter; (e.g. col. 3 lns. 31-45, col. 3 ln. 62-col. 4 ln. 16, col. 10 lns. 11-27, col. 11 lns. 25-30, col. 19 lns 34-37, col. 22 lns 7-34, col. 25 lns. 33-44, Fig. 1-19 and description thereof in addition to other related/pertinent descriptions.)

the filtering is performed using a median filter; or (e.g. col. 3 lns. 31-45, col. 3 ln. 62-col. 4 ln. 16, col. 10 lns. 11-27, col. 11 lns. 25-30, col. 19 lns 34-37, col. 22 lns 7-34, col. 25 lns. 33-44, Fig. 1-19 and description thereof in addition to other related/pertinent descriptions.)

the filtering is performed using a nonlinear filter. (e.g. col. 3 lns. 31-45, col. 3 ln. 62-col. 4 ln. 16, col. 10 lns. 11-27, col. 11 lns. 25-30, col. 19 lns 34-37, col. 22 lns 7-34, col. 25 lns. 33-44, Fig. 1-19 and description thereof in addition to other related/pertinent descriptions.)

Claim 84 is amended to update dependency of claim. Support for such amendment is found below.

84. (New, Amended) The method of claim 19, wherein the instruction is received prior to the receipt of the compressed first feedback. (e.g. col. 3 lns. 31-45, col. 3 ln. 62-col. 4 ln. 16, col. 10 lns. 11-27, col. 22 lns 7-34, Fig. 14 and description thereof in addition to other related/pertinent descriptions.)

Claim 85 is amended to update dependency of claim and add "filtered" before both "first transmission signal" and "second transmission signal." Support for such amendment is found below.

85. (New, Amended) The method of claim [19]22, wherein the filtered second transmission signal is transmitted simultaneously with the filtered first transmission signal via the same plurality of antennas. (e.g. col. 3 lns. 31-45, col. 3 ln. 62-col. 4 ln. 16, col. 10 lns. 11-27, col. 11 lns. 25-30, col. 19 lns 34-37, col. 22 lns 7-34, col. 25 lns. 33-44, Fig. 14 and description thereof in addition to other related/pertinent descriptions.)

Claim 86 is amended to update dependency of claim. Support for such amendment is found below.

86. (New, Amended) The method of claim [19]22, wherein the first frequency is selected as a function of the compressed first feedback, and the second frequency is selected as a function of the compressed second feedback. (e.g. col. 3 lns. 31-45, col. 3 ln. 62-col. 4 ln. 16, col. 10 lns. 11-27, col. 11 lns. 25-30, col. 19 lns 34-37, col. 22 lns 7-34, col. 25 lns. 33-44, Fig. 14 and description thereof in addition to other related/pertinent descriptions.)

Claim 87 is amended to update dependency of claim. Support for such amendment is found below.

87. (New, Amended) The method of claim [19]22, wherein the instruction includes a 802.11 clear to send (CTS) instruction. (e.g. col. 3 lns. 31-45, col. 3 ln. 62-col. 4 ln. 16, col. 10 lns. 11-27, col. 22 lns 7-34, Fig. 14 and description thereof in addition to other related/pertinent descriptions.)

Claim 88 is amended to update dependency of claim. Support for such amendment is found below.

88. (New, Amended) The method of claim [19]22, wherein the instruction includes a 802.11 request to send (RTS) instruction. (e.g. col. 3 lns. 31-45, col. 3 ln. 62-col. 4 ln. 16, col. 10 lns. 11-27, col. 22 lns 7-34, Fig. 14 and description thereof in addition to other related/pertinent descriptions.)

Claim 89 is amended to update dependency of claim and add "filtered" before both "first transmission signal" and "second transmission signal." Support for such amendment is found below.

89. (New, Amended) The method of claim [19]22, wherein the filtered second transmission signal is transmitted simultaneously with the filtered first transmission signal via at least one different antenna of the plurality of antennas. (e.g. col. 3 lns. 31-45, col. 3 ln. 62-col. 4 ln. 16, col. 10 lns. 11-27, col. 11 lns. 25-30, col. 19 lns 34-37, col. 22 lns 7-34, col. 25 lns. 33-44, Fig. 14 and description thereof in addition to other related/pertinent descriptions.)

Claim 90 is amended to update dependency of claim and add "filtered" before both "first transmission signal" and "second transmission signal." Support for such amendment is found below.

90. (New, Amended) The method of claim [19]22, wherein the filtered second transmission signal is transmitted simultaneously with the filtered first transmission signal using the at least one antenna of the plurality of antennas. (e.g. col. 3 lns. 31-45, col. 3 ln. 62-col. 4 ln. 16, col. 10 lns. 11-27, col. 11 lns. 25-30, col. 19 lns 34-37, col. 22 lns 7-34, col. 25 lns. 33-44, Fig. 14 and description thereof in addition to other related/pertinent descriptions.)

Claim 91 is amended to update dependency of claim, remove "[the steps are not performed in the order listed;]," remove"[the radio communications network includes an 802.11a/g network;]," add "the radio communications network includes an 802.11a network;
the radio communications network includes an 802.11g network;" and remove "[the one or more]." Support for such amendment is found below.

91. (New, Amended) The method of claim [19]22, wherein at least one of:
the first signal includes a data signal; (e.g. col. 3 lns. 31-45, col. 3 ln. 62-col. 4 ln. 16, col. 10 lns. 11-27, col. 11 lns. 25-30, col. 19 lns 34-37, col. 22 lns 7-34, col. 25 lns. 33-44, Fig. 1-19 and description thereof in addition to other related/pertinent descriptions.)
the first signal includes an aggregate signal; (e.g. col. 3 lns. 31-45, col. 3 ln. 62-col. 4 ln. 16, col. 10 lns. 11-27, col. 11 lns. 25-30, col. 19 lns 34-37, col. 22 lns 7-34, col. 25 lns. 33-44, Fig. 1-19 and description thereof in addition to other related/pertinent descriptions.)
the compressed first feedback is configured to ensure that transmissions from all neighbors of the first node are received at a same power level; (e.g. col. 3 lns. 31-45, col. 3 ln. 62-col. 4 ln. 16, col. 10 lns. 11-27, col. 11 lns. 25-30, col. 19

lns 34-37, col. 22 lns 7-34, col. 25 lns. 33-44, Fig. 1-19 and description thereof in addition to other related/pertinent descriptions.)

the compressed first feedback is configured to at least one of: minimize a transmit power on reliable links, maximize an ability to achieve spatial separation among transmissions on a same frequency, minimize network self-interference, improve low probability of intercept (LPI), or lower probability of detection (LPD); (e.g. col. 3 lns. 31-45, col. 3 ln. 62-col. 4 ln. 16, col. 10 lns. 11-27, col. 11 lns. 25-30, col. 19 lns 34-37, col. 22 lns 7-34, col. 25 lns. 33-44, Fig. 1-19 and description thereof in addition to other related/pertinent descriptions.)

the compressed first feedback and the compressed second feedback are received simultaneously; (e.g. col. 3 lns. 31-45, col. 3 ln. 62-col. 4 ln. 16, col. 10 lns. 11-27, col. 11 lns. 25-30, col. 19 lns 34-37, col. 22 lns 7-34, col. 25 lns. 33-44, Fig. 1-19 and description thereof in addition to other related/pertinent descriptions.)

at least one of the compressed first feedback or the compressed second feedback is received separately from the receipt of the instruction, by being received before the instruction is received; (e.g. col. 3 lns. 31-45, col. 3 ln. 62-col. 4 ln. 16, col. 10 lns. 11-27, col. 11 lns. 25-30, col. 19 lns 34-37, col. 22 lns 7-34, col. 25 lns. 33-44, Fig. 1-19 and description thereof in addition to other related/pertinent descriptions.)

at least one of the compressed first feedback or the compressed second feedback is received separately from the receipt of the instruction, by being received after the instruction is received; (e.g. col. 3 lns. 31-45, col. 3 ln. 62-col. 4 ln. 16, col. 10 lns. 11-27, col. 11 lns. 25-30, col. 19 lns 34-37, col. 22 lns 7-34, col. 25 lns. 33-44, Fig. 1-19 and description thereof in addition to other related/pertinent descriptions.)

the one or more frequencies of the first signal includes a frequency band; (e.g. col. 3 lns. 31-45, col. 3 ln. 62-col. 4 ln. 16, col. 10 lns. 11-27, col. 11 lns. 25-30, col. 19 lns 34-37, col. 22 lns 7-34, col. 25 lns. 33-44, claim 17, Fig. 1-19 and description thereof in addition to other related/pertinent descriptions.)

the one or more frequencies of the second signal includes a frequency band; (e.g. col. 3 lns. 31-45, col. 3 ln. 62-col. 4 ln. 16, col. 10 lns. 11-27, col. 11 lns. 25-30, col. 19 lns 34-37, col. 22 lns 7-34, col. 25 lns. 33-44, claim 17, Fig. 1-19 and description thereof in addition to other related/pertinent descriptions.)

the one or more frequencies of the first signal includes a first frequency band, and the one or more frequencies of the second signal includes a second frequency band; (e.g. col. 3 lns. 31-45, col. 3 ln. 62-col. 4 ln. 16, col. 10 lns. 11-27, col. 11 lns. 25-30, col. 19 lns 34-37, col. 22 lns 7-34, col. 25 lns. 33-44, claim 17, Fig. 1-19 and description thereof in addition to other related/pertinent descriptions.)

a single data structure is generated based on the decompressed first feedback and the decompressed second feedback; (e.g. col. 3 lns. 31-45, col. 3 ln. 62-col. 4 ln. 16, col. 10 lns. 11-27, col. 22 lns 7-34, Fig. 14 and description thereof in addition to other related/pertinent descriptions.)

a first data structure is generated based on the decompressed first feedback, and a second data structure is generated based on the decompressed

second feedback; (e.g. col. 3 lns. 31-45, col. 3 ln. 62-col. 4 ln. 16, col. 10 lns. 11-27, col. 22 lns 7-34, Fig. 14 and description thereof in addition to other related/pertinent descriptions.)

a first data structure is generated based on the decompressed first feedback, where the first power is based on the first data structure, and a second data structure is generated based on the decompressed second feedback, where the second power is based on the second data structure; (e.g. col. 3 lns. 31-45, col. 3 ln. 62-col. 4 ln. 16, col. 10 lns. 11-27, col. 22 lns 7-34, Fig. 14 and description thereof in addition to other related/pertinent descriptions.)

the first power and the second power differ in terms of power level; (e.g. col. 3 lns. 31-45, col. 3 ln. 62-col. 4 ln. 16, col. 10 lns. 11-27, col. 22 lns 7-34, Fig. 14 and description thereof in addition to other related/pertinent descriptions.)

the steps are performed in the order listed; (e.g. col. 3 lns. 31-45, col. 3 ln. 62-col. 4 ln. 16, col. 10 lns. 11-27, col. 11 lns. 25-30, col. 19 lns 34-37, col. 22 lns 7-34, col. 25 lns. 33-44, Fig. 1-19 and description thereof in addition to other related/pertinent descriptions.)

[the steps are not performed in the order listed;]

the radio communications network includes an 802.11 network; (e.g. col. 3 lns. 31-45, col. 3 ln. 62-col. 4 ln. 16, col. 10 lns. 11-27, col. 11 lns. 25-30, col. 19 lns 34-37, col. 22 lns 7-34, col. 25 lns. 33-44, Fig. 1-19 and description thereof in addition to other related/pertinent descriptions.)

[the radio communications network includes an 802.11a/g network;]

the radio communications network includes an 802.11a network; (e.g. col. 3 lns. 31-45, col. 3 ln. 62-col. 4 ln. 16, col. 10 lns. 11-27, col. 11 lns. 25-30, col. 19 lns 34-37, col. 22 lns 7-34, col. 25 lns. 33-44, Fig. 1-19 and description thereof in addition to other related/pertinent descriptions.)

the radio communications network includes an 802.11g network; (e.g. col. 3 lns. 31-45, col. 3 ln. 62-col. 4 ln. 16, col. 10 lns. 11-27, col. 11 lns. 25-30, col. 19 lns 34-37, col. 22 lns 7-34, col. 25 lns. 33-44, Fig. 1-19 and description thereof in addition to other related/pertinent descriptions.)

interference in the radio communications network is managed; (e.g. col. 3 lns. 31-45, col. 3 ln. 62-col. 4 ln. 16, col. 10 lns. 11-27, col. 11 lns. 25-30, col. 19 lns 34-37, col. 22 lns 7-34, col. 25 lns. 33-44, Fig. 1-19 and description thereof in addition to other related/pertinent descriptions.)

the at least one antenna includes multiple antennas; (e.g. col. 3 lns. 31-45, col. 3 ln. 62-col. 4 ln. 16, col. 10 lns. 11-27, col. 11 lns. 25-30, col. 19 lns 34-37, col. 22 lns 7-34, col. 25 lns. 33-44, Fig. 14 and description thereof in addition to other related/pertinent descriptions.)

the at least one antenna includes at least one omnidirectional antenna; (e.g. col. 8 lns. 60-65 in addition to other related/pertinent descriptions.)

the at least one antenna includes at least one directional antenna; (e.g. col. 3 lns. 31-45, col. 3 ln. 62-col. 4 ln. 16, col. 10 lns. 11-27, col. 11 lns. 25-30, col. 19 lns 34-37, col. 22 lns 7-34, col. 25 lns. 33-44, Fig. 14 and description thereof in addition to other related/pertinent descriptions.)

[the one or more]

the first frequency includes a first frequency band; (e.g. col. 3 lns. 31-45, col. 3 ln. 62-col. 4 ln. 16, col. 10 lns. 11-27, col. 11 lns. 25-30, col. 19 lns 34-37, col. 22 lns 7-34, col. 25 lns. 33-44, claim 17, Fig. 1-19 and description thereof in addition to other related/pertinent descriptions.)

the second frequency includes a second frequency band; (e.g. col. 3 lns. 31-45, col. 3 ln. 62-col. 4 ln. 16, col. 10 lns. 11-27, col. 11 lns. 25-30, col. 19 lns 34-37, col. 22 lns 7-34, col. 25 lns. 33-44, claim 17, Fig. 1-19 and description thereof in addition to other related/pertinent descriptions.)

the first frequency is part of a first frequency band; (e.g. col. 3 lns. 31-45, col. 3 ln. 62-col. 4 ln. 16, col. 10 lns. 11-27, col. 11 lns. 25-30, col. 19 lns 34-37, col. 22 lns 7-34, col. 25 lns. 33-44, claim 17, Fig. 1-19 and description thereof in addition to other related/pertinent descriptions.)

the second frequency is part of a second frequency band; (e.g. col. 3 lns. 31-45, col. 3 ln. 62-col. 4 ln. 16, col. 10 lns. 11-27, col. 11 lns. 25-30, col. 19 lns 34-37, col. 22 lns 7-34, col. 25 lns. 33-44, claim 17, Fig. 1-19 and description thereof in addition to other related/pertinent descriptions.)

the first frequency includes a first frequency band, and the second frequency includes a second frequency band, where the first frequency band and the second frequency band do not overlap; (e.g. col. 3 lns. 31-45, col. 3 ln. 62-col. 4 ln. 16, col. 10 lns. 11-27, col. 11 lns. 25-30, col. 19 lns 34-37, col. 22 lns 7-34, col. 25 lns. 33-44, claim 17, Fig. 1-19 and description thereof in addition to other related/pertinent descriptions.)

interference in the radio communications network is managed; (e.g. col. 3 lns. 31-45, col. 3 ln. 62-col. 4 ln. 16, col. 10 lns. 11-27, col. 11 lns. 25-30, col. 19 lns 34-37, col. 22 lns 7-34, col. 25 lns. 33-44, Fig. 1-19 and description thereof in addition to other related/pertinent descriptions.)

the first node is a mobile node and the second node is a non-mobile node; (e.g. col. 3 lns. 31-45, col. 3 ln. 62-col. 4 ln. 16, col. 10 lns. 11-27, col. 11 lns. 25-30, col. 19 lns 34-37, col. 22 lns 7-34, col. 25 lns. 33-44, Fig. 1-19 and description thereof in addition to other related/pertinent descriptions.)

the second node is a mobile node and the first node is a non-mobile node; (e.g. col. 3 lns. 31-45, col. 3 ln. 62-col. 4 ln. 16, col. 10 lns. 11-27, col. 11 lns. 25-30, col. 19 lns 34-37, col. 22 lns 7-34, col. 25 lns. 33-44, Fig. 1-19 and description thereof in addition to other related/pertinent descriptions.)

the instruction sets forth the plurality of frequencies to avoid using; (e.g. col. 3 lns. 31-45, col. 3 ln. 62-col. 4 ln. 16, col. 10 lns. 11-27, col. 11 lns. 25-30, col. 19 lns 34-37, col. 22 lns 7-34, col. 25 lns. 33-44, Fig. 1-19 and description thereof in addition to other related/pertinent descriptions.)

the instruction specifies the plurality of frequencies to avoid using; (e.g. col. 3 lns. 31-45, col. 3 ln. 62-col. 4 ln. 16, col. 10 lns. 11-27, col. 11 lns. 25-30, col. 19 lns 34-37, col. 22 lns 7-34, col. 25 lns. 33-44, Fig. 1-19 and description thereof in addition to other related/pertinent descriptions.)

a purpose of the instruction is to avoid using the plurality of frequencies; (e.g. col. 3 lns. 31-45, col. 3 ln. 62-col. 4 ln. 16, col. 10 lns. 11-27, col. 11 lns. 25-30, col. 19 lns 34-37, col. 22 lns 7-34, col. 25 lns. 33-44, Fig. 1-19 and description thereof in addition to other related/pertinent descriptions.)

a purpose of the instruction is to avoid using the plurality of frequencies, where the purpose is accomplished by specifying the plurality of frequencies to avoid using; (e.g. col. 3 lns. 31-45, col. 3 ln. 62-col. 4 ln. 16, col. 10 lns. 11-27, col. 11 lns. 25-30, col. 19 lns 34-37, col. 22 lns 7-34, col. 25 lns. 33-44, Fig. 1-19 and description thereof in addition to other related/pertinent descriptions.)

a purpose of the instruction is to avoid using the plurality of frequencies, where the purpose is accomplished by specifying one or more frequencies to use; (e.g. col. 3 lns. 31-45, col. 3 ln. 62-col. 4 ln. 16, col. 10 lns. 11-27, col. 11 lns. 25-30, col. 19 lns 34-37, col. 22 lns 7-34, col. 25 lns. 33-44, Fig. 1-19 and description thereof in addition to other related/pertinent descriptions.)

a purpose of the instruction is to avoid using the plurality of frequencies, where the purpose is accomplished by specifying one or more frequencies to use, the one or more frequencies not including the plurality of frequencies; (e.g. col. 3 lns. 31-45, col. 3 ln. 62-col. 4 ln. 16, col. 10 lns. 11-27, col. 11 lns. 25-30, col. 19 lns 34-37, col. 22 lns 7-34, col. 25 lns. 33-44, Fig. 1-19 and description thereof in addition to other related/pertinent descriptions.)

the instruction to avoid the plurality of frequencies sets forth one or more frequencies to use; (e.g. col. 3 lns. 31-45, col. 3 ln. 62-col. 4 ln. 16, col. 10 lns. 11-27, col. 11 lns. 25-30, col. 19 lns 34-37, col. 22 lns 7-34, col. 25 lns. 33-44, Fig. 1-19 and description thereof in addition to other related/pertinent descriptions.)

the instruction to avoid the plurality of frequencies specifies one or more frequencies to use; (e.g. col. 3 lns. 31-45, col. 3 ln. 62-col. 4 ln. 16, col. 10 lns. 11-27, col. 11 lns. 25-30, col. 19 lns 34-37, col. 22 lns 7-34, col. 25 lns. 33-44, Fig. 1-19 and description thereof in addition to other related/pertinent descriptions.)

the instruction to avoid the plurality of frequencies assigns one or more frequencies to use; (e.g. col. 3 lns. 31-45, col. 3 ln. 62-col. 4 ln. 16, col. 10 lns. 11-27, col. 11 lns. 25-30, col. 19 lns 34-37, col. 22 lns 7-34, col. 25 lns. 33-44, Fig. 1-19 and description thereof in addition to other related/pertinent descriptions.)

the instruction to avoid the plurality of frequencies does not specify the plurality of frequencies; (e.g. col. 3 lns. 31-45, col. 3 ln. 62-col. 4 ln. 16, col. 10 lns. 11-27, col. 11 lns. 25-30, col. 19 lns 34-37, col. 22 lns 7-34, col. 25 lns. 33-44, Fig. 1-19 and description thereof in addition to other related/pertinent descriptions.)

the instruction to avoid the plurality of frequencies sets forth one or more frequencies to use, thereby resulting in the avoidance of using the plurality of frequencies; (e.g. col. 3 lns. 31-45, col. 3 ln. 62-col. 4 ln. 16, col. 10 lns. 11-27, col. 11 lns. 25-30, col. 19 lns 34-37, col. 22 lns 7-34, col. 25 lns. 33-44, Fig. 1-19 and description thereof in addition to other related/pertinent descriptions.)

a purpose of the filtering is to remove the power from the transmission signal at each frequency in the plurality of frequencies to be avoided, where the purpose is accomplished by specifying one or more frequencies to which the power is to be applied; (e.g. col. 3 lns. 31-45, col. 3 ln. 62-col. 4 ln. 16, col. 10 lns. 11-27, col. 11 lns. 25-30, col. 19 lns 34-37, col. 22 lns 7-34, col. 25 lns. 33-

44, Fig. 1-19 and description thereof in addition to other related/pertinent descriptions.)

a purpose of the filtering is to remove the power from the transmission signal at each frequency in the plurality of frequencies to be avoided, where the purpose is accomplished by specifying the plurality of frequencies to be avoided; (e.g. col. 3 lns. 31-45, col. 3 ln. 62-col. 4 ln. 16, col. 10 lns. 11-27, col. 11 lns. 25-30, col. 19 lns 34-37, col. 22 lns 7-34, col. 25 lns. 33-44, Fig. 1-19 and description thereof in addition to other related/pertinent descriptions.)

the filtering suppresses or otherwise minimizes waves or oscillations at each frequency in the plurality of frequencies to be avoided; (e.g. col. 3 lns. 31-45, col. 3 ln. 62-col. 4 ln. 16, col. 10 lns. 11-27, col. 11 lns. 25-30, col. 19 lns 34-37, col. 22 lns 7-34, col. 25 lns. 33-44, Fig. 1-19 and description thereof in addition to other related/pertinent descriptions.)

the filtering suppresses or otherwise minimizes waves or oscillations at each frequency in the plurality of frequencies to be avoided, thereby resulting in the removal of the power from the transmission signal at each frequency in the plurality of frequencies to be avoided; (e.g. col. 3 lns. 31-45, col. 3 ln. 62-col. 4 ln. 16, col. 10 lns. 11-27, col. 11 lns. 25-30, col. 19 lns 34-37, col. 22 lns 7-34, col. 25 lns. 33-44, Fig. 1-19 and description thereof in addition to other related/pertinent descriptions.)

the filtering removes all power from the transmission signal; (e.g. col. 3 lns. 31-45, col. 3 ln. 62-col. 4 ln. 16, col. 10 lns. 11-27, col. 11 lns. 25-30, col. 19 lns 34-37, col. 22 lns 7-34, col. 25 lns. 33-44, Fig. 1-19 and description thereof in addition to other related/pertinent descriptions.)

the filtering removes some power from the transmission signal; (e.g. col. 3 lns. 31-45, col. 3 ln. 62-col. 4 ln. 16, col. 10 lns. 11-27, col. 11 lns. 25-30, col. 19 lns 34-37, col. 22 lns 7-34, col. 25 lns. 33-44, Fig. 1-19 and description thereof in addition to other related/pertinent descriptions.)

the filtering discards one or more portions of the transmission signal at each of the plurality of frequencies; (e.g. col. 3 lns. 31-45, col. 3 ln. 62-col. 4 ln. 16, col. 10 lns. 11-27, col. 11 lns. 25-30, col. 19 lns 34-37, col. 22 lns 7-34, col. 25 lns. 33-44, Fig. 1-19 and description thereof in addition to other related/pertinent descriptions.)

the filtering utilizes transmit excision; (e.g. col. 3 lns. 31-45, col. 3 ln. 62-col. 4 ln. 16, col. 10 lns. 11-27, col. 11 lns. 25-30, col. 19 lns 34-37, col. 22 lns 7-34, col. 25 lns. 33-44, Fig. 1-19 and description thereof in addition to other related/pertinent descriptions.)

the filtering utilizes compression; (e.g. col. 3 lns. 31-45, col. 3 ln. 62-col. 4 ln. 16, col. 10 lns. 11-27, col. 11 lns. 25-30, col. 19 lns 34-37, col. 22 lns 7-34, col. 25 lns. 33-44, Fig. 1-19 and description thereof in addition to other related/pertinent descriptions.)

the filtering identifies certain one or more frequencies in connection with which power is applied, thereby resulting in the removal of the power from the transmission signal at each frequency in the plurality of frequencies to be avoided; (e.g. col. 3 lns. 31-45, col. 3 ln. 62-col. 4 ln. 16, col. 10 lns. 11-27, col. 11 lns. 25-

30, col. 19 lns 34-37, col. 22 lns 7-34, col. 25 lns. 33-44, Fig. 1-19 and description thereof in addition to other related/pertinent descriptions.)

the removal of power from the transmission signal at each frequency in the plurality of frequencies to be avoided is accomplished by an adjustment in relation to power previously used in connection with the transmission signal; (e.g. col. 3 lns. 31-45, col. 3 ln. 62-col. 4 ln. 16, col. 10 lns. 11-27, col. 11 lns. 25-30, col. 19 lns 34-37, col. 22 lns 7-34, col. 25 lns. 33-44, Fig. 1-19 and description thereof in addition to other related/pertinent descriptions.)

the removal of power from the transmission signal at each frequency in the plurality of frequencies is accomplished by adjusting a processing of the transmission signal so that power that was previously used in connection with the transmission signal at each frequency in the plurality of frequencies to be avoided, is no longer used in connection with the transmission signal at each frequency in the plurality of frequencies to be avoided; (e.g. col. 3 lns. 31-45, col. 3 ln. 62-col. 4 ln. 16, col. 10 lns. 11-27, col. 11 lns. 25-30, col. 19 lns 34-37, col. 22 lns 7-34, col. 25 lns. 33-44, Fig. 1-19 and description thereof in addition to other related/pertinent descriptions.)

the removal of power from the transmission signal at each frequency in the plurality of frequencies to be avoided is accomplished by setting a waveform profile that results in no power being applied in connection with the transmission signal at each frequency in the plurality of frequencies to be avoided; (e.g. col. 3 lns. 31-45, col. 3 ln. 62-col. 4 ln. 16, col. 10 lns. 11-27, col. 11 lns. 25-30, col. 19 lns 34-37, col. 22 lns 7-34, col. 25 lns. 33-44, Fig. 1-19 and description thereof in addition to other related/pertinent descriptions.)

the removal of power from the transmission signal at each frequency in the plurality of frequencies to be avoided is accomplished by pre-processing the transmission signal, before any power is applied, so that power, which would otherwise be applied in connection with the transmission signal at each frequency in the plurality of frequencies, is not applied in connection with the transmission signal at each frequency in the plurality of frequencies to be avoided; (e.g. col. 3 lns. 31-45, col. 3 ln. 62-col. 4 ln. 16, col. 10 lns. 11-27, col. 11 lns. 25-30, col. 19 lns 34-37, col. 22 lns 7-34, col. 25 lns. 33-44, Fig. 1-19 and description thereof in addition to other related/pertinent descriptions.)

the removal of power from the transmission signal at each frequency in the plurality of frequencies to be avoided is accomplished by pre-processing the transmission signal, before any power is applied, so that no power is applied in connection with the transmission signal at each frequency in the plurality of frequencies to be avoided; (e.g. col. 3 lns. 31-45, col. 3 ln. 62-col. 4 ln. 16, col. 10 lns. 11-27, col. 11 lns. 25-30, col. 19 lns 34-37, col. 22 lns 7-34, col. 25 lns. 33-44, Fig. 1-19 and description thereof in addition to other related/pertinent descriptions.)

the transmission signal is generated so as to not include power at each frequency in the plurality of frequencies to be avoided; (e.g. col. 3 lns. 31-45, col. 3 ln. 62-col. 4 ln. 16, col. 10 lns. 11-27, col. 11 lns. 25-30, col. 19 lns 34-37, col. 22 lns 7-34, col. 25 lns. 33-44, Fig. 1-19 and description thereof in addition to other related/pertinent descriptions.)

the transmission signal is generated so as to not include power at each frequency in the plurality of frequencies to be avoided, thereby resulting in the removal of the power from the transmission signal at each frequency in the plurality of frequencies to be avoided; (e.g. col. 3 lns. 31-45, col. 3 ln. 62-col. 4 ln. 16, col. 10 lns. 11-27, col. 11 lns. 25-30, col. 19 lns 34-37, col. 22 lns 7-34, col. 25 lns. 33-44, Fig. 1-19 and description thereof in addition to other related/pertinent descriptions.)

the transmission signal is pre-processed so as to not include power at each frequency in the plurality of frequencies to be avoided, thereby resulting in the removal of the power from the transmission signal at each frequency in the plurality of frequencies to be avoided; (e.g. col. 3 lns. 31-45, col. 3 ln. 62-col. 4 ln. 16, col. 10 lns. 11-27, col. 11 lns. 25-30, col. 19 lns 34-37, col. 22 lns 7-34, col. 25 lns. 33-44, Fig. 1-19 and description thereof in addition to other related/pertinent descriptions.)

the filtering is performed using an output filter; (e.g. col. 3 lns. 31-45, col. 3 ln. 62-col. 4 ln. 16, col. 10 lns. 11-27, col. 11 lns. 25-30, col. 19 lns 34-37, col. 22 lns 7-34, col. 25 lns. 33-44, Fig. 1-19 and description thereof in addition to other related/pertinent descriptions.)

the filtering is performed using an optimal matched filter; (e.g. col. 3 lns. 31-45, col. 3 ln. 62-col. 4 ln. 16, col. 10 lns. 11-27, col. 11 lns. 25-30, col. 19 lns 34-37, col. 22 lns 7-34, col. 25 lns. 33-44, Fig. 1-19 and description thereof in addition to other related/pertinent descriptions.)

the filtering is performed using a band selection filter; (e.g. col. 3 lns. 31-45, col. 3 ln. 62-col. 4 ln. 16, col. 10 lns. 11-27, col. 11 lns. 25-30, col. 19 lns 34-37, col. 22 lns 7-34, col. 25 lns. 33-44, Fig. 1-19 and description thereof in addition to other related/pertinent descriptions.)

the filtering is performed using a median filter; or (e.g. col. 3 lns. 31-45, col. 3 ln. 62-col. 4 ln. 16, col. 10 lns. 11-27, col. 11 lns. 25-30, col. 19 lns 34-37, col. 22 lns 7-34, col. 25 lns. 33-44, Fig. 1-19 and description thereof in addition to other related/pertinent descriptions.)

the filtering is performed using a nonlinear filter. (e.g. col. 3 lns. 31-45, col. 3 ln. 62-col. 4 ln. 16, col. 10 lns. 11-27, col. 11 lns. 25-30, col. 19 lns 34-37, col. 22 lns 7-34, col. 25 lns. 33-44, Fig. 1-19 and description thereof in addition to other related/pertinent descriptions.)

Claim 92 is amended to update dependency of claim. Support for such amendment is found below.

92. (New, Amended) The method of claim [19]22, wherein the removal of power from the transmission signal at each frequency in the plurality of frequencies to be avoided is accomplished by adjusting a processing of the transmission signal so that certain power that was previously used in connection with the transmission signal at each frequency in the plurality of frequencies to be avoided before the instruction is received, is no longer used in connection with the transmission signal at each frequency in the plurality of frequencies to be avoided in accordance with the instruction. (e.g. col. 3 lns.

31-45, col. 3 ln. 62-col. 4 ln. 16, col. 10 lns. 11-27, col. 11 lns. 25-30, col. 19 lns 34-37, col. 21, lines 41-65, col. 22 lns 7-34, col. 25 lns. 33-44, Fig. 1-19 and description thereof in addition to other related/pertinent descriptions.)

Claim 93 is amended to update dependency of claim. Support for such amendment is found below.

93. (New, Amended) The method of claim [19]22, wherein the removal of power from the transmission signal at each frequency in the plurality of frequencies to be avoided is accomplished by adjusting a processing of the transmission signal so that certain power that was previously used in connection with the transmission signal at each frequency in the plurality of frequencies to be avoided before the instruction is received, is no longer used in connection with the transmission signal at each frequency in the plurality of frequencies to be avoided in accordance with the instruction, which specifies at least one frequency to use so as to avoid using the plurality of frequencies to be avoided in order to transmit to the second node. (e.g. col. 3 lns. 31-45, col. 3 ln. 62-col. 4 ln. 16, col. 10 lns. 11-27, col. 11 lns. 25-30, col. 19 lns 34-37, col. 21, lines 41-65, col. 22 lns 7-34, col. 25 lns. 33-44, Fig. 1-19 and description thereof in addition to other related/pertinent descriptions.)

Claim 94 is amended to update dependency of claim. Support for such amendment is found below.

94. (New, Amended) The method of claim [19]22, wherein network forwarding decisions are guided using instantaneous information from a media access control (MAC) layer. (e.g. col. 9, line 61-col. 10, line 11, Fig. 1 and description thereof in addition to other related/pertinent descriptions.)

95. (New) The method of claim 94, wherein the network forwarding decisions are guided to eliminate a dominant end-to-end latency effect of channel access delay at at least one hop. (e.g. col. 9, line 61-col. 10, line 11, Fig. 1 and description thereof in addition to other related/pertinent descriptions.)

Claim 96 is amended to update dependency of claim. Support for such amendment is found below.

96. (New, Amended) The method of claim [19]22, wherein frequency channels are reused in order to increase spatial reuse across multiple basic service sets. (e.g. col. 25, Figs. 16-19 and description thereof in addition to other related/pertinent descriptions.)

Claim 97 is amended to update dependency of claim. Support for such amendment is found below.

97. (New, Amended) The method of claim [19]22, wherein RTS/CTS signaling is extended such that frequency channels are reused in order to increase spatial reuse across multiple basic service sets. (e.g. col. 25, Figs. 16-19 and description thereof in addition to other related/pertinent descriptions.)

Claim 98 is amended to update dependency of claim. Support for such amendment is found below.

98. (New, Amended) The method of claim [19]22, wherein RTS/CTS signaling is extended such that frequency channels are reused in order to increase spatial reuse across multiple basic service sets, to accommodate legacy access points. (e.g. col. 25, Figs. 16-19 and description thereof in addition to other related/pertinent descriptions.)

It should be noted that foregoing excerpts are set for illustrative purposes only and should not be construed as exhaustive and further should not be considered limiting to the claims in any manner whatsoever.

The Examiner is thanked for the allowable subject matter. In the statement of reasons for the indication of allowable subject matter, the Examiner notes that '[a]s to claims 19, 22, the prior art of record does not anticipate or render obvious the limitation of "wherein the transmission signal is a first transmission signal that is transmitted using a first frequency and an 802.11-based orthogonal frequency division multiplexing (OFDM) protocol via at least one directional antenna of a plurality of directional antennas, using a first power that is based on at least one of the one or more data structures; and further comprising: transmitting, using a second frequency and the 802.11-based OFDM protocol, a second transmission signal, simultaneously with the first transmission signal, to the third node, using a second power that is based on at least one of the one or more data structures" and "the at least one of the one or more data structures" as recited in the claim.' In response, Patent Owner respectfully points out that features of at least some of the independent claims (e.g. 19) are not necessarily the same as those the Examiner has highlighted above. For example, Claim 19 is not limited to a "directional" antenna.

Also in the statement of reasons for the indication of allowable subject matter, the Examiner notes that '[a]s to claim 40, the prior art of record does not anticipate or render obvious the limitation of "wherein the transmission signal is a first transmission signal that is transmitted

using a first frequency and an 802.11-based orthogonal frequency-division multiplexing (OFDM) protocol via at least one directional antenna of a plurality of directional antennas, using a first power that is based on at least one of the one or more data structures; and further comprising: transmitting, using a second frequency and the 802.11-based OFDM protocol, a second transmission signal, simultaneously with the first transmission signal, to the third node, using a second power that is based on at least one of the one or more data structures" and "the at least one of the one or more data structures" as recited in the claim. In response, Patent Owner respectfully points out that features of at least some of the independent claims (e.g. 40, etc.) are not necessarily the same as those the Examiner has highlighted above. For example, Claim 40 is not limited to a "directional" antenna, is not limited to "using a first frequency", is not limited to "using a second frequency," and is not limited to "one or more data structures".

Thus, Patent Owner respectfully points out that features of at least some of the independent claims are thus not necessarily the same as those the Examiner has highlighted. Clearly, at least some of the independent claims are not necessarily limited to the features (and/or the exact language) that the Examiner has noted in the statement of reasons for allowance. Instead, each of the claims should only be limited by the language existing therein. Further, although applicant agrees with the Examiner's conclusion that these claims are allowable, Patent Owner notes that the claims may be allowable for reasons other than those identified by the Examiner and does not necessarily concede that the Examiner's characterizations of the terms of the claims and the prior art are correct. Each of the claims stands on its own merits and is patentable because of the combination it recites and not because of the presence or absence of any one particular element. The Examiner's statement was not prepared by Patent Owner and only contains the Examiner's possible positions in one or more reasons for allowability. Thus, any interpretation with respect to the Examiner's statement of reasons for allowance should not be imputed to the Patent Owner.

It is believed that all of the pending issues have been addressed. It should be noted that the absence of a reply to a specific rejection, issue, or comment does not signify agreement with or concession of that rejection, issue, or comment. In addition, because the arguments made above may not be exhaustive, there may be reasons for patentability of any or all pending claims

(or other claims) that have not been expressed. Still yet, nothing in this reply should be construed as intention to concede any issue with regard to any claim, except as specifically stated in this reply. Finally, it should be noted that no claim is intended to be construed under 35 U.S.C. 112, paragraph 6.

Respectfully submitted,



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Office Action Summary	**Application No.** 15/898,404	**Applicant(s)** Burchfiel, Jerry D.	
	Examiner MINH DIEU T NGUYEN	**Art Unit** 3992	**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 1/17/2019.

☐ 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) 1-37 and 39-98 is/are pending in the application.

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

6) ☑ Claim(s) 1-18,20-21,40 and 42-82 is/are allowed.

7) ☑ Claim(s) 19,22-37,39,41 and 83-98 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 _____ 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: _____.

Notice of Pre-AIA or AIA Status

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

DETAILED ACTION

1. This office action is in response to the communication dated 1/17/2019.

Claims 1-37, 39-98 are pending, claim 38 is cancelled.

2. The present application is being examined under the pre-AIA first to invent provisions with respect to 35 U.S.C. 102, 35 U.S.C. 103, and 35 U.S.C. 112. Because the instant application is a reissue application filed on or after September 16, 2012, all references to 35 U.S.C. 251 and 37 CFR 1.172, 1.175, and 3.73 are to the current provisions.

3. Applicant is reminded of the continuing obligation under 37 CFR 1.178(b), to timely apprise the Office of any prior or concurrent proceeding in which Patent No. 7,483,711 is or was involved. These proceedings would include interferences, reissues, reexaminations, and litigation.

Applicant is further reminded of the continuing obligation under 37 CFR 1.56, to timely apprise the Office of any information which is material to patentability of the claims under consideration in this reissue application.

These obligations rest with each individual associated with the filing and prosecution of this application for reissue. See also MPEP §§ 1404, 1442.01 and 1442.04.

4. Applicant is notified that any subsequent amendment to the specification and/or claims must comply with 37 CFR 1.173(b).

5. Applicant is reminded that the maximum term of the original patent is fixed at the time the patent is granted. While the term may be subsequently shortened, e.g., through the filing of a terminal disclaimer, it cannot be extended through the filing of a reissue. Accordingly, a deletion in a reissue application of an earlier-obtained benefit claim under 35 U.S.C. 120 will not operate to lengthen the term of the patent to be reissued (see MPEP 1405).

Response to Amendment/Arguments

6. a) The 112, 2nd rejection to claim 19 raised in the office action dated 12/26/2018 have been withdrawn based on the amendment dated 1/17/2019.

b) The reissue oath/declaration filed on 1/17/2019 has been considered and entered. It is proper and therefore the 251 rejection based on a defective reissue declaration has been withdrawn.

c) The 102 rejection to claim 19 has been withdrawn based on the amendment dated 1/17/2019 reciting allowable subject matter in claim 19.

Claim Objections

7. a) The amendment to the claims dated 1/17/2019 is objected to because it is not compliant with 37 CFR 1.173(b)(c)(d) (g) (i.e. the added matter to the claims has to be underlined, the omitted matter must be enclosed in brackets, no strikethrough. All amendments must be made relative to the patent specification, including the claims, and drawings, which are in effect as of the date of filing of the reissue application).

For example, claim 23 contains double brackets and strikethrough on its limitation. Correction is required for claims 19-20, 22-37, 39-41.

All new claims 22-37, 39-98 are required to be underlined in their entirety, including claim number and claim identifier ("New"), as these amendments are made relative to the patent claims. Correction is required for claims 22-37, 39-98. See MPEP § 1453.

b) Pursuant to 37 CFR 1.173(c), each claim amendment must be accompanied by an explanation of the support in the disclosure of the patent for the amendment (i.e., support for all changes made in the claim(s), whether insertions or

deletions). For example, the amendment dated 1/17/2019 does not provide support in the disclosure for the amended limitations (i.e., "transmitting, using a second power via the 802.11-based OFDM protocol and simultaneously with the first transmission signal, the second transmission signal to the third node") in claim 39. The support is also required for other amended claims.

c) Claim 19 is objected to under 37 CFR 1.75 as being a substantial duplicate of claim 22. The only difference is claim 19 recites "at least one antenna of a plurality of antennas" (lines 23-24), whereas claim 22 recites "at least one directional antenna of a plurality of directional antennas (lines 12-13). There is no definition of directional antenna in the specification. It is broadly interpreted that the antenna and directional antenna are the same. When two claims in an application are duplicates or else are so close in content that they both cover the same thing, despite a slight difference in wording, it is proper after allowing one claim to object to the other as being a substantial duplicate of the allowed claim. See MPEP § 706.03(k).

Claim Rejections - 35 USC § 112

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

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

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

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

8. Claims 19, 22-37, 39, 42, 84-98 are rejected under 35 U.S.C. 112(b) or 35 U.S.C. 112 (pre-AIA), second paragraph, as being indefinite for failing to particularly point out and distinctly claim the subject matter which the inventor or a joint inventor, or for pre-AIA the applicant regards as the invention.

a) Claim 19 recites "receiving a compressed first feedback from the second node that is based on a received power ..., receiving a compressed second feedback from a third node that is based on a received power". Is this the same received power?

b) Claim 39 recites "filtering a second transmission signal", however in the transmitting step, "the second transmission signal" is transmitted to the third node. What the point of filtering a second transmission signal? It is not clear if the filtered transmission signal is the first filtered transmission signal as we have the second filtered transmission signal in the claim. In the last transmitting step, both the first filtered transmission signal and second filtered transmission signal should be transmitted to the third node, not the first transmission signal and second transmission signal are transmitted as claimed. Please clarify.

c) Claims 19 and 22, it is not clear if the filtered transmission signal is the first filtered transmission signal as we have the second filtered transmission signal in the claim. In the last transmitting step, both the first filtered transmission signal and second filtered transmission signal should be transmitted to the third node, not the first transmission signal and second transmission signal are transmitted as claimed. Please clarify.

d) Claim 42 recites "transmitting the second transmission signal to the third node". What happens to the step of filtering a second transmission signal? It serves no purpose if the second transmission signal is transmitted to the third node. It should be amended to recite --transmitting the second filtered transmission signal to the third node--. Please correct and provide specification support.

e) Claims 83 and 91 recite the language of "wherein at least one of:...", any one of recited limitations stand by itself, so it is indefinite "the steps are not performed in the order listed" because there is indefinite orders the steps are not performed; "the 802.11 includes 802.11a/g" lacks antecedent basis".

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

> (d) REFERENCE IN DEPENDENT FORMS.—Subject to subsection (e), a claim in dependent form shall contain a reference to a claim previously set forth and then specify a further limitation of the subject matter claimed. A claim in dependent form shall be construed to incorporate by reference all the limitations of the claim to which it refers.

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

> Subject to the following paragraph [i.e., the fifth paragraph of pre-AIA 35 U.S.C. 112], a claim in dependent form shall contain a reference to a claim previously set forth and then specify a further limitation of the subject matter claimed. A claim in dependent form shall be construed to incorporate by reference all the limitations of the claim to which it refers.

9) Claims 83, 91 are rejected under 35 U.S.C. 112(d) or pre-AIA 35 U.S.C. 112, 4th paragraph, as being of improper dependent form for failing to further limit the subject matter of the claim upon which it depends, or for failing to include all the limitations of the claim upon which it depends. Claims 83, 91 recite "the steps are not performed in the order listed", at least this limitation does not further limit the subject matter of the claim. Also the limitation "the steps are performed in the order listed". It is rejected under 112, 4th because it is impossible for both of the "steps performed" conditions to be

false, so the Markush group becomes 100% true and therefore it has the same scope as the base claim. Applicant may cancel the claim(s), amend the claim(s) to place the claim(s) in proper dependent form, rewrite the claim(s) in independent form, or present a sufficient showing that the dependent claim(s) complies with the statutory requirements.

Allowable Subject Matter

10. The following is a statement of reasons for the indication of allowable subject matter:

a) As to claim 1, the prior art of record does not anticipate or render obvious the limitation of "subtracting the power level for each the frequency from a power limit to produce a power differential for the each frequency"; and "instructing a second node in the radio communications network to avoid using a transmission frequency corresponding to a non-positive power differential in the plurality of power differentials to transmit to the first node".

b) Claims 2-18 depend on claim 1 and are allowable based on the same rationale applied against claim 1.

c) As to claim 20, the prior art of record does not anticipate or render obvious the limitation of "receiving an optimal waveform profile from the second node, the optimal waveform profile being based on a plurality of power measurements for the plurality of frequencies and a power limit". Claim 21 depends on claim 20 and is allowable based on the same rationale applied against claim 20.

d) As to claims 19, 22, the prior art of record does not anticipate or render obvious the limitation of "wherein the transmission signal is a first transmission signal that is transmitted using a first frequency and an 802.11-based orthogonal frequency-division multiplexing (OFDM) protocol via at least one directional antenna of a plurality of directional antennas, using a first power that is based on at least one of the one or more data structures; and further comprising: transmitting, using a second frequency and the 802.11-based OFDM protocol, a second transmission signal, simultaneously with the first transmission signal, to the third node, using a second power that is based on at least one of the one or more data structures" and "the at least one of the one or more data structures" as recited in the claim. Claims 19, 22-37, 84-98 are allowed if the raised above objection/rejections are overcome.

e) As to claim 40, the prior art of record does not anticipate or render obvious the limitation of "wherein the transmission signal is a first transmission signal that is transmitted using a first frequency and an 802.11-based orthogonal frequency-division multiplexing (OFDM) protocol via at least one directional antenna of a plurality of directional antennas, using a first power that is based on at least one of the one or more data structures; and further comprising: transmitting, using a second frequency and the 802.11-based OFDM protocol, a second transmission signal, simultaneously with the first transmission signal, to the third node, using a second power that is based on at least one of the one or more data structures" and "the at least one of the one or more data structures" as recited in the claim.

f) Claims 42-82 depend on claim 40 and are allowable based on the same rationale applied against claim 40. Claim 83 is allowable when overcoming the raised above rejection.

g) As to claim 39, the prior art of record does not anticipate or render obvious the limitation of "transmitting, using a second power via the 802.11 based OFDM protocol and simultaneously with the first transmission signal, the second transmission signal to the third node". Claim 39 is allowable if the raised above objection/rejection are overcome.

h) As to claim 41, the prior art of record does not anticipate or render obvious the limitation of "wherein an update of the compressed feedback is repeatedly generated, compressed, and transmitted at time periods of less than one second; so that the transmit power is repeatedly updated based thereupon at time periods of less than one second". Claim 41 is allowable if the raised above objection/rejection are overcome.

Conclusion

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

A shortened statutory period for reply to this final action is set to expire THREE MONTHS from the mailing date of this action. In the event a first reply is filed within

TWO MONTHS of the mailing date of this final action and the advisory action is not mailed until after the end of the THREE-MONTH shortened statutory period, then the shortened statutory period will expire on the date the advisory action is mailed, and any extension fee pursuant to 37 CFR 1.136(a) will be calculated from the mailing date of the advisory action. In no event, however, will the statutory period for reply expire later than SIX MONTHS from the date of this final action.

Any inquiry concerning this communication or earlier communications from the examiner should be directed to Minh Dieu Nguyen whose telephone number is (571) 272-3873. The examiner can normally be reached on 8:30am-5:00pm, M-F.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Mike Fuelling can be reached at (571) 270-1367. 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.

Signed:

/MINH DIEU NGUYEN/

Primary Examiner, Art Unit 3992

Conferees:

/MATTHEW E HENEGHAN/
Primary Examiner, Art Unit 3992

/M.F/
Supervisory Patent Examiner, Art Unit 3992

Search Notes	Application/Control No.	Applicant(s)/Patent Under Reexamination
	15/898,404	Burchfiel, Jerry D.
	Examiner	Art Unit
	MINH DIEU T NGUYEN	3992

CPC - Searched*		
Symbol	**Date**	**Examiner**
H04W52/04 H04W52/06 H04W52/08 H04W52/10 H04W52/12 H04W52/125 H04W52/14 H04W52/143 H04W52/146 H04W52/16 H04W52/18 H04W52/20 H04W52/22 H04W52/221 H04W52/223 H04W52/225 H04W52/226 H04W52/228 H04W52/24 H04W52/241 H04W52/242 H04W52/243 H04W52/244 H04W52/245 H04W52/246 H04W52/247 H04W52/248 H04W52/26 H04W52/262 H04W52/265	12/17/2018	MDN
H04W52/267 H04W52/28 H04W52/281 H04W52/282 H04W52/283 H04W52/285 H04W52/286 H04W52/287 H04W52/288 H04W52/30 H04W52/32 H04W52/322 H04W52/325 H04W52/327 H04W52/34 H04W52/343 H04W52/346 H04W52/36 H04W52/362 H04W52/365 H04W52/367 H04W52/38 H04W52/383 H04W52/386 H04W52/40 H04W52/42 H04W52/44 H04W52/46 H04W52/48 H04W52/50 H04W52/52 H04W52/54 H04W52/545 H04W52/56 H04W52/58 H04W52/60	12/17/2018	MDN

CPC Combination Sets - Searched*		
Symbol	**Date**	**Examiner**

US Classification - Searched*			
Class	**Subclass**	**Date**	**Examiner**
455	522	12/07/2018	MDN

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

Search Notes		
Search Notes	**Date**	**Examiner**
Review litigation search report	12/07/2018	MDN
Text and class search on EAST	12/07/2018	MDN
Updated search on EAST	05/13/2019	MDN

Search Notes	Application/Control No.	Applicant(s)/Patent Under Reexamination
	15/898,404	Burchfiel, Jerry D.
	Examiner	Art Unit
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Interference Search			
US Class/CPC Symbol	US Subclass/CPC Group	Date	Examiner

Index of Claims	Application/Control No.	Applicant(s)/Patent Under Reexamination
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✓	Rejected	-	Cancelled	N	Non-Elected	A	Appeal
=	Allowed	÷	Restricted	I	Interference	O	Objected

CLAIMS

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

CLAIM		DATE								
Final	Original	12/04/2018	05/13/2019							
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	42	✓	=							

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CLAIM		DATE								
Final	Original	12/04/2018	05/13/2019							
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CLAIM		DATE								
Final	Original	12/04/2018	05/13/2019							
	95		✓							
	96		✓							
	97		✓							
	98		✓							

EAST Search History

EAST Search History (Prior Art)

Ref #	Hits	Search Query	DBs	Default Operator	Plurals	Time Stamp
S86	30383	(H04W52/04 or H04W52/06 or H04W52/08 or H04W52/10 or H04W52/12 or H04W52/125 or H04W52/14 or H04W52/143 or H04W52/146 or H04W52/16 or H04W52/18 or H04W52/20 or H04W52/22 or H04W52/221 or H04W52/223 or H04W52/225 or H04W52/226 or H04W52/228 or H04W52/24 or H04W52/241 or H04W52/242 or H04W52/243 or H04W52/244 or H04W52/245 or H04W52/246 or H04W52/247 or H04W52/248 or H04W52/26 or H04W52/262 or H04W52/265 or H04W52/267 or H04W52/28 or H04W52/281 or H04W52/282 or H04W52/283 or H04W52/285 or H04W52/286 or H04W52/287 or H04W52/288 or H04W52/30 or H04W52/32 or H04W52/322 or H04W52/325 or H04W52/327 or H04W52/34 or H04W52/343 or H04W52/346 or H04W52/36 or H04W52/362 or H04W52/365 or H04W52/367 or H04W52/38 or H04W52/383 or H04W52/386 or H04W52/40 or H04W52/42 or H04W52/44 or H04W52/46 or H04W52/48 or H04W52/50 or H04W52/52 or H04W52/54 or H04W52/545 or H04W52/56 or H04W52/58 or H04W52/60).cpc.	US-PGPUB; USPAT; EPO; JPO	OR	ON	2019/05/13 09:02
S88	175382	(455/$.ccls 375/$.ccls.)	US-PGPUB; USPAT; EPO; JPO	OR	ON	2019/05/13 09:03
S90	43	S86 and (receiv$3 with ((second next) near (instruction signal)) with (plurality near3 frequenc$3))	US-PGPUB; USPAT; EPO; JPO	OR	ON	2019/05/13 09:04
S91	8	S90 and (remov$3 with power with (plurality near3 frequenc$3))	US-PGPUB; USPAT; EPO; JPO	OR	ON	2019/05/13 09:04
S92	276	S88 and (receiv$3 with ((second next) near (instruction signal)) with (plurality near3 frequenc$3))	US-PGPUB; USPAT; EPO; JPO	OR	ON	2019/05/13 09:06
S93	4	S92 and (remov$3 with power with (plurality near3 frequenc$3))	US-PGPUB; USPAT;	OR	ON	2019/05/13 09:09

			EPO; JPO			
S94	0	S86 and (updat$3 with (compress$3 near3 feedback) with second)	US-PGPUB; USPAT; EPO; JPO	OR	ON	2019/05/13 09:15
S95	0	S88 and (updat$3 with (compress$3 near3 feedback) with second)	US-PGPUB; USPAT; EPO; JPO	OR	ON	2019/05/13 09:15

5/13/2019 3:41:04 PM
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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 15/898,404	Filing Date 02/16/2018	☐ 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	01/17/2019	(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))	* 97	Minus	** 42	= 55	X $100 =	5500
	Independent (37 CFR 1.16(h))	* 7	Minus	***3	= 4	X $460 =	1840
	☐ Application Size Fee (37 CFR 1.16(s))						
	☐ FIRST PRESENTATION OF MULTIPLE DEPENDENT CLAIM (37 CFR 1.16(j))						
						TOTAL ADD'L FEE	**7340**

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
TYWANA LOVELACE

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Doc Code: REIS.DECL
Document Description: Reissue Declaration Filed In Accordance With MPEP 1414

PTO/AIA/06 (02-17)
Approved for use through 01/31/2020. OMB 0651-0033
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REISSUE APPLICATION DECLARATION BY THE ASSIGNEE	Docket Number (optional) USTAP030D.RI

I hereby declare that:

The residence and mailing address of the inventor or joint inventors are stated below.

Name of the Assignee:

Usta Technology, LLC

I am authorized to act on behalf of the assignee (if the assignee is a juristic entity).

The entire title to the patent identified below is vested in said assignee, or if there are multiple assignees/owners, all assignees/owners have executed a Reissue Application Declaration to account for the entire title of the patent identified below.

Inventor Jerry D. Burchfiel

Residence: City	State	Country
Waltham	MA	US

Mailing Address

211 W Tyler St., Suite C

City	State	Zip	Country
Longview	TX	75601	US

☑ Additional Inventors are named on separately numbered sheets attached hereto.

Patent Number 7,483,711	Patent Issue Date 01-27-2009

I believe said inventor(s) to be the original inventor or original joint inventors of the subject matter which is described and claimed in said patent, for which a reissue patent is sought on the invention titled:

SPECTRUM-ADAPTIVE NETWORKING

the specification of which

☐ is attached hereto.

☑ was filed on 2/16/2018 as reissue application number 15/898,404 .

The above-identified application was made or authorized to be made by me.

I hereby acknowledge that any willful false statement made in this declaration is punishable under 18 U.S.C. 1001 by fine or imprisonment of not more than five (5) years, or both.

I believe the original patent to be wholly or partly inoperative or invalid, for the reasons described below.
(Check all boxes that apply.)

☐ by reason of a defective specification or drawing.

☑ by reason of the patentee claiming more or less than he had the right to claim in the patent.

☐ by reason of other errors.

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REISSUE APPLICATION DECLARATION BY THE ASSIGNEE	Docket Number (Optional)

At least one error upon which reissue is based is described below. If the reissue is a broadening reissue, a claim that the application seeks to broaden must be identified and the box below must be checked:

Claim 22 is added to claim more than what was being claimed in the patent.

[Attach additional sheets, if needed.]

☐ **The application for the original patent was filed under 37 CFR 1.46 by the assignee of the entire interest.**

I hereby appoint:

☑ Practitioners associated with Customer Number: 92045

OR

☐ Practitioner(s) named below:

Name	Registration 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.

Correspondence Address: Direct all communications about the application to:

☑ The address associated with Customer Number: 92045

OR

☐ Firm or Individual Name					
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Signature /Andrew Gordon/	Date (Optional)
Legal name of person signing: Andrew Gordon	
Address of Assignee: 211 W Tyler St., Suite C Longview, TX 75601	

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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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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.

Electronic Patent Application Fee Transmittal

Application Number:	15898404
Filing Date:	16-Feb-2018
Title of Invention:	SPECTRUM-ADAPTIVE NETWORKING
First Named Inventor/Applicant Name:	Jerry D. Burchfiel
Filer:	Patrick Edgar Caldwell
Attorney Docket Number:	USTAP030D.RI

Filed as Large Entity

Filing Fees for Utility under 35 USC 111(a)

Description	Fee Code	Quantity	Amount	Sub-Total in USD($)
Basic Filing:				
Pages:				
Claims:				
CLAIMS IN EXCESS OF 20	1202	55	100	5500
INDEPENDENT CLAIMS IN EXCESS OF 3	1201	4	460	1840
Miscellaneous-Filing:				
LATE FILING FEE FOR OATH OR DECLARATION	1051	1	160	160
Petition:				
Patent-Appeals-and-Interference:				

Description	Fee Code	Quantity	Amount	Sub-Total in USD($)
Post-Allowance-and-Post-Issuance:				
Extension-of-Time:				
Miscellaneous:				
		Total in USD ($)		**7500**

Electronic Acknowledgement Receipt	
EFS ID:	34893123
Application Number:	15898404
International Application Number:	
Confirmation Number:	8522
Title of Invention:	SPECTRUM-ADAPTIVE NETWORKING
First Named Inventor/Applicant Name:	Jerry D. Burchfiel
Customer Number:	92045
Filer:	Patrick Edgar Caldwell
Filer Authorized By:	
Attorney Docket Number:	USTAP030D.RI
Receipt Date:	17-JAN-2019
Filing Date:	16-FEB-2018
Time Stamp:	22:17:14
Application Type:	Utility under 35 USC 111(a)

Payment information:

Submitted with Payment	yes
Payment Type	CARD
Payment was successfully received in RAM	$7500
RAM confirmation Number	011819INTEFSW22174100
Deposit Account	
Authorized User	
The Director of the USPTO is hereby authorized to charge indicated fees and credit any overpayment as follows:	

File Listing:

Document Number	Document Description	File Name	File Size(Bytes)/ Message Digest	Multi Part /.zip	Pages (if appl.)
1	Amendment/Req. Reconsideration-After Non-Final Reject	USTAP030DRI_Amndt_A_vF_17-Jan-2019.pdf	216968 d3bbe17945e6b8af2a5b83358196a02a0d2a8583	no	57
Warnings:					
Information:					
2	Oath or Declaration filed	USTAP030DRI_Declaration_Burchfiel_updated.pdf	366365 d1504ed0d8bb09488a77280f78f661270868c06c	no	3
Warnings:					
Information:					
3	Fee Worksheet (SB06)	fee-info.pdf	35759 e3697c9d6dbf41862b256ff890b9050d6095f37a	no	2
Warnings:					
Information:					
		Total Files Size (in bytes):	619092		

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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.

PATENT

IN THE UNITED STATES PATENT AND TRADEMARK OFFICE

In re *reissue* application: of U.S. patent 7,483,711 15/898,404 Filed: 2/16/2018 For: SPECTRUM-ADAPTIVE NETWORKING	Confirmation No.: 8522 Examiner: NGUYEN, MINH DIEU T Art Unit: 3992 Atty. Docket No.: USTAP030D.RI Date: 1/17/2019

AMENDMENT

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

Examiner:

In response to the Office Action dated 12/26/2018, please enter the following.

AMENDMENTS TO THE CLAIMS

Amended claims follow:

1. (Original) A method for managing interference in a radio communications network, comprising the steps of:

receiving an aggregated radio signal at a first node in the radio communications network on a plurality of frequencies;

determining a power level for the aggregated radio signal for each frequency in the plurality frequencies;

subtracting the power level for each the frequency from a power limit to produce a power differential for the each frequency; and

instructing a second node in the radio communications network to avoid using a transmission frequency corresponding to a non-positive power differential in the plurality of power differentials to transmit to the first node.

2. (Original) The method of claim 1, further comprising the steps of: receiving a transmission from the second node in the radio communications network; and discarding any portion of the transmission carried on the transmission frequency.

3. (Original) The method of claim 2, wherein the discarding step comprises applying a filter to the transmission.

4. (Original) The method of claim 1, wherein the step of determining a power level is carried out by:

acquiring a plurality of instantaneous power level measurements for each the frequency; and

calculating an average power level based on the plurality of instantaneous power level measurements.

5. (Original) The method of claim 1, wherein the step of determining a power level is carried out by:

acquiring a plurality of instantaneous power level measurements for the each frequency; and

calculating a median power level based on the plurality of instantaneous power level measurements.

6. (Original) The method of claim 1, further comprising the step of: sending to the second node a request to adjust a transmission power level on a frequency corresponding to a positive power differential in the plurality of power differentials.

7. (Original) The method of claim 1, further comprising the step of: instructing a plurality of other nodes in the radio communications network to avoid using the transmission frequency to transmit information to the first node.

8. (Original) The method of claim 7, further comprising the steps of:

receiving a transmission from one of the plurality of other nodes; and

discarding any portion of the second transmission carried on a frequency corresponding to a non-positive power differential in the plurality of power differentials.

9. (Original) The method of claim 8, further comprising the step of: sending to the one of the plurality of other nodes a request to adjust a transmit power level on a frequency corresponding to a positive power differential in the plurality of power differentials.

10. (Original) The method of claim 1, further comprising the steps of:

determining an updated power level for the aggregated radio signal for each frequency in the plurality frequencies;

subtracting the updated power level for each the frequency from the power limit to produce a plurality of updated power differentials; and

instructing the second node to avoid transmitting to the first node on a frequency corresponding to a non-positive updated power differential in the plurality of updated power differentials.

11. (Original) The method of claim 1, further comprising the steps of:
generating an optimal waveform profile based on the plurality of power differentials; and
reporting the optimal waveform profile to the second node.

12. (Original) The method of claim 11, wherein the reporting step is carried out using a common network configuration channel.

13. (Original) The method of claim 11, further comprising the step of compressing the optimal waveform profile prior to performing the reporting step.

14. (Original) The method of claim 11, wherein the optimal waveform profile specifies a waveform pattern.

15. (Original) The method of claim 14, wherein the waveform pattern defines a transmission signal having a power spectral density that varies over time.

16. (Original) The method of claim 14, further comprising the steps of:

generating a second optimal waveform profile based on the plurality of power differentials; and

reporting the second optimal waveform profile to a third node in the radio communications network; wherein the second optimal waveform profile specifies a second waveform pattern that is orthogonal to the waveform pattern.

17. (Original) The method of claim 1, wherein the plurality of frequencies comprises all of the frequencies in a radio frequency band.

18. (Original) The method of claim 1, further comprising the steps of: associating a unique pattern with the second node; and determining whether the transmission contains the unique pattern.

19. (Currently Amended) A method for managing interference in a radio communications network, comprising the steps of:

receiving at a first node in the radio communications network an instruction transmitted from a second node in the radio communications network to avoid using a plurality of frequencies to transmit to the second node;

filtering a transmission signal to remove power from the transmission signal at each frequency in the plurality of frequencies to be avoided; [[and]]

transmitting the filtered transmission signal to the second node;

separately from the receipt of the instruction, receiving a compressed first feedback from the second node that is based on a received power and one or more frequencies of a first signal transmitted from the first node to the second node;

separately from the receipt of the instruction, receiving a compressed second feedback from a third node that is based on a received power and one or more frequencies of a second signal transmitted from the first node to the third node;

decompressing the compressed first feedback resulting in a decompressed first feedback;

decompressing the compressed second feedback resulting in a decompressed second feedback;

generating one or more data structures based on the decompressed first feedback and the decompressed second feedback;

wherein the filtered transmission signal is a first transmission signal that is transmitted using a first frequency and an 802.11-based orthogonal frequency-division multiplexing (OFDM) protocol via at least one antenna of a plurality of antennas, using a first power that is based on at least one of the one or more data structures; and further comprising:

transmitting, using a second frequency and the 802.11-based OFDM protocol, a second transmission signal, simultaneously with the first transmission signal, to the third

node, using a second power that is based on at least one of the one or more data structures.

20. (Currently Amended) ~~The method of claim 19, further comprising the steps of:~~ A method for managing interference in a radio communications network, comprising the steps of:

receiving at a first node in the radio communications network an instruction transmitted from a second node in the radio communications network to avoid using a plurality of frequencies to transmit to the second node;

filtering a transmission signal to remove power from the transmission signal at each frequency in the plurality of frequencies to be avoided;

transmitting the filtered transmission signal to the second node;

receiving an optimal waveform profile from the second node, the optimal waveform profile being based on a plurality of power measurements for the plurality of frequencies and a power limit; and

conforming the transmission signal to the optimal waveform profile prior to performing the transmitting step.

21. (Original) The method of claim 20, further comprising the step of decompressing the optimal waveform profile prior to performing the conforming step.

22. (Currently Amended) ~~The method of claim 19, and further comprising:~~ A method for managing interference in a radio communications network, comprising the steps of:

receiving at a first node in the radio communications network an instruction transmitted from a second node in the radio communications network to avoid using a plurality of frequencies to transmit to the second node;

filtering a transmission signal to remove power from the transmission signal at each frequency in the plurality of frequencies to be avoided;

transmitting the filtered transmission signal to the second node;

separately from the receipt of the instruction, receiving a compressed first feedback from the second node that is based on a received power and one or more frequencies of a first signal transmitted from the first node to the second node;

separately from the receipt of the instruction, receiving a compressed second feedback from a third node that is based on a received power and one or more frequencies of a second signal transmitted from the first node to the third node;

decompressing the compressed first feedback resulting in a decompressed first feedback;

decompressing the compressed second feedback resulting in a decompressed second feedback;

generating one or more of data structures based on the decompressed first feedback and the decompressed second feedback;

wherein the filtered transmission signal is a first transmission signal that is transmitted using a first frequency and an 802.11-based orthogonal frequency-division multiplexing (OFDM) protocol via at least one directional antenna of a plurality of directional antennas, using a first power that is based on at least one of the one or more data structures; and further comprising:

transmitting, using a second frequency and the 802.11-based OFDM protocol, a second transmission signal, simultaneously with the first transmission signal, to the third node, using a second power that is based on at least one of the one or more data structures.

23. (Currently Amended) The method of claim [[22]]19, wherein the instruction includes a first instruction, and further comprising:

receiving at the first node in the radio communications network a second instruction transmitted from [[a]]the third node ~~in the radio communications network~~ to avoid using a different plurality of frequencies to transmit to the third node; and

filtering the second transmission signal to remove power from the second transmission signal at each frequency in the different plurality of frequencies to be avoided.

24. (Currently Amended) The method of claim [[22]]19, wherein the first power and the second power are the same.

25. (Currently Amended) The method of claim [[22]]19, wherein the first power and the second power are different.

26. (Currently Amended) The method of claim [[22]]19, wherein an update of the compressed first feedback is repeatedly received at time periods of less than one second, and the first power is repeatedly updated based on an updated decompressed first feedback at time periods of less than one second; and an update of the compressed second feedback is repeatedly received at time periods of less than one second, and the second power is repeatedly updated based on an updated decompressed second feedback at time periods of less than one second.

27. (Currently Amended) The method of claim [[22]]19, wherein the first transmission signal and the second transmission signal are [[sent]]transmitted via the same transceiver.

28. (Currently Amended) The method of claim [[22]]19, wherein the first transmission signal and the second transmission signal are [[sent]]transmitted via different transceivers.

29. (Currently Amended) The method of claim [[22]]19, wherein the instruction is received utilizing a dedicated channel.

30. (Currently Amended) The method of claim [[22]]19, wherein the instruction is received via an antenna configured for omnidirectional communication.

31. (Currently Amended) The method of claim [[22]]19, wherein the compressed first feedback and the compressed second feedback are received utilizing a dedicated channel.

32. (Currently Amended) The method of claim [[22]]19, wherein the compressed first feedback and the compressed second feedback are received via an antenna configured for omnidirectional communication.

33. (Currently Amended) The method of claim [[22]]19, wherein the decompressed first feedback and the decompressed second feedback are used to increase spatial separation among transmissions.

34. (Currently Amended) The method of claim [[22]]19, wherein the decompressed first feedback and the decompressed second feedback are used to increase spatial separation among transmissions at the same frequency.

35. (Currently Amended) The method of claim [[22]]19, and further comprising:

receiving a compressed third feedback from a fourth node that characterizes receipt of a third signal sent from the first node to the fourth node, the fourth node being a legacy node;

decompressing the compressed third feedback resulting in a decompressed third feedback;

transmitting, using a third frequency and [[the]]another 802.11-based OFDM protocol, the third transmission signal to the fourth node using a transceiver separate from one or more other transceivers used to transmit the first transmission signal and the second transmission signal, and further using a third power that is based on the decompressed third feedback.

36. (Currently Amended) The method of claim 35, wherein the third transmission signal is transmitted simultaneously with the first transmission signal and the second transmission signal via at least one different [[directional]] antenna of the plurality of [[directional]] antennas.

37. (Currently Amended) The method of claim [[22]]19, wherein the compressed first feedback is based on a received power at a plurality of frequencies via which the first signal is received.

38. (Cancelled)

39. (Currently Amended) ~~The method of claim 19,~~ A method for managing interference in a radio communications network, comprising the steps of:

receiving at a first node in the radio communications network an instruction transmitted from a second node in the radio communications network to avoid using a plurality of frequencies to transmit to the second node;

filtering a transmission signal to remove power from the transmission signal at each frequency in the plurality of frequencies to be avoided;

transmitting the filtered transmission signal to the second node;

wherein the instruction includes a first instruction and the filtered transmission signal includes a first transmission signal that is transmitted to the second node using a first power via an 802.11-based orthogonal frequency-division multiplexing (OFDM) protocol, and further comprising:

receiving at the first node in the radio communications network a second instruction transmitted from a third node in the radio communications network to avoid using a different plurality of frequencies to transmit to the third node;

filtering a second transmission signal to remove power from the second transmission signal at each frequency in the different plurality of frequencies to be avoided; and

transmitting, using a second power via the 802.11-based OFDM protocol and simultaneously with the first transmission signal, the second transmission signal to the third node.

40. (Currently Amended) ~~The method of claim 19, and further comprising:~~ A method for managing interference in a radio communications network, comprising the steps of:

receiving at a first node in the radio communications network an instruction transmitted from a second node in the radio communications network to avoid using a plurality of frequencies to transmit to the second node;

filtering a transmission signal to remove power from the transmission signal at each frequency in the plurality of frequencies to be avoided;

transmitting the filtered transmission signal to the second node;

receiving a compressed first feedback from the second node that characterizes receipt of a first signal sent from the first node to the second node;

receiving a compressed second feedback from a third node that characterizes receipt of a second signal sent from the first node to the third node;

decompressing the compressed first feedback resulting in a decompressed first feedback; and

decompressing the compressed second feedback resulting in a decompressed second feedback;

wherein the filtered transmission signal is a first transmission signal that is transmitted to the second node using an 802.11-based orthogonal frequency-division multiplexing (OFDM) protocol via at least one antenna of a plurality of antennas, using a first power that is based on the decompressed first feedback; and further comprising:

transmitting, using the 802.11-based OFDM protocol, a second transmission signal, simultaneously with the first transmission signal, to the third node using a second power that is based on the decompressed second feedback.

41. (Currently Amended) ~~The method of claim 19, and further comprising:~~ A method for managing interference in a radio communications network, comprising the steps of:

receiving at a first node in the radio communications network an instruction transmitted from a second node in the radio communications network to avoid using a plurality of frequencies to transmit to the second node;

filtering a transmission signal to remove power from the transmission signal at each frequency in the plurality of frequencies to be avoided;

transmitting the filtered transmission signal to the second node;

separately from the receipt of the instruction, receiving a particular signal at the first node that is transmitted from the second node;

generating a feedback based on a received power and one or more frequencies via which the particular signal is received;

compressing the feedback; and

transmitting the compressed feedback from the first node to the second node, for use by the second node in determining a transmit power with which the second node transmits to the first node via at least one [[directional]] antenna of a plurality of [[directional]] antennas, while simultaneously transmitting to one or more other nodes;

wherein the filtered transmission signal is transmitted to the second node using an 802.11-based orthogonal frequency-division multiplexing (OFDM) protocol;

wherein an update of the compressed feedback is repeatedly generated, compressed, and transmitted at time periods of less than one second; so that the transmit power is repeatedly updated based thereupon at time periods of less than one second.

42. (Currently Amended) The method of claim 41, wherein the instruction includes a first instruction and the filtered transmission signal includes a first transmission signal, and further comprising:

receiving at the first node in the radio communications network a second instruction transmitted from a third node in the radio communications network to avoid using a different plurality of frequencies to transmit to the third node;

filtering a second transmission signal to remove power from the second transmission signal at each frequency in the different plurality of frequencies to be avoided; and

transmitting the second transmission signal to the third node.

43. (New) The method of claim 40, wherein the instruction includes a first instruction, and further comprising:

receiving at the first node in the radio communications network a second instruction transmitted from the third node to avoid using a different plurality of frequencies to transmit to the third node; and

filtering the second transmission signal to remove power from the second transmission signal at each frequency in the different plurality of frequencies to be avoided.

44. (New) The method of claim 40, wherein the first power and the second power are the same.

45. (New) The method of claim 40, wherein the first power and the second power are different.

46. (New) The method of claim 40, and further comprising:

generating a first data structure based on the decompressed first feedback, where the first power is based on the first data structure; and

generating a second data structure based on the decompressed second feedback, where the second power is based on the second data structure.

47. (New) The method of claim 46, wherein the first data structure and the second data structure are different.

48. (New) The method of claim 46, wherein the first data structure and the second data structure are orthogonal.

49. (New) The method of claim 46, wherein the first data structure is unique to the second node, and the second data structure is unique to the third node.

50. (New) The method of claim 46, wherein the first data structure is a first profile, and the second data structure is a second profile.

51. (New) The method of claim 46, wherein the first data structure is a first optimal waveform profile.

52. (New) The method of claim 40, and further comprising:

generating a single data structure based on the decompressed first feedback and the decompressed second feedback, where both the first power and the second power are based on the single data structure.

53. (New) The method of claim 40, wherein the second transmission signal is transmitted simultaneously with the first transmission signal via the same plurality of antennas.

54. (New) The method of claim 40, wherein the second transmission signal is transmitted simultaneously with the first transmission signal via at least one different antenna of the plurality of antennas.

55. (New) The method of claim 40, wherein the second transmission signal is transmitted simultaneously with the first transmission signal via the at least one antenna of the plurality of antennas.

56. (New) The method of claim 40, wherein an update of the compressed first feedback is repeatedly received, and the first power is repeatedly updated based on an updated decompressed first feedback; and an update of the compressed second feedback is repeatedly received, and the second power is repeatedly updated based on an updated decompressed second feedback.

57. (New) The method of claim 40, wherein an update of the compressed first feedback is repeatedly received in real-time, and the first power is repeatedly updated in real-time based on an updated decompressed first feedback; and an update of the compressed second feedback is repeatedly received in real-time, and the second power is repeatedly updated in real-time based on an updated decompressed second feedback.

58. (New) The method of claim 40, wherein an update of the compressed first feedback is repeatedly received at time periods of less than one second, and the first power is repeatedly updated based on an updated decompressed first feedback at time periods of less than one second; and an update of the compressed second feedback is repeatedly received at time periods of less than one second, and the second power is repeatedly updated based on an updated decompressed second feedback at time periods of less than one second.

59. (New) The method of claim 40, wherein the first transmission signal and the second transmission signal are sent via the same transceiver.

60. (New) The method of claim 40, wherein the first transmission signal and the second transmission signal are sent via different transceivers.

61. (New) The method of claim 40, wherein the compressed first feedback and the compressed second feedback are received utilizing a dedicated channel.

62. (New) The method of claim 40, wherein the compressed first feedback and the compressed second feedback are received via an antenna configured for omnidirectional communication.

63. (New) The method of claim 40, wherein the decompressed first feedback and the decompressed second feedback are used to increase spatial separation among transmissions.

64. (New) The method of claim 40, wherein the decompressed first feedback and the decompressed second feedback are used to increase spatial separation among transmissions at the same frequency.

65. (New) The method of claim 40, and further comprising:

receiving a compressed third feedback from a fourth node that characterizes receipt of a third signal sent from the first node to the fourth node, the fourth node being a legacy node;

decompressing the compressed third feedback resulting in a decompressed third feedback;

transmitting, using a third frequency and another 802.11-based OFDM protocol, the third transmission signal to the fourth node using a third power that is based on the decompressed third feedback.

66. (New) The method of claim 40, wherein the compressed first feedback is based on a received power and one or more frequencies via which the first signal is communicated.

67. (New) The method of claim 40, wherein the compressed first feedback is based on a received power at a plurality of frequencies via which the first signal is communicated.

68. (New) The method of claim 40, wherein the compressed first feedback is based on a series of power values as a function of frequency.

69. (New) The method of claim 40, wherein the compressed first feedback includes a data structure that is based on a series of power values as a function of frequency.

70. (New) The method of claim 40, wherein the instruction is received prior to the receipt of the compressed first feedback.

71. (New) The method of claim 40, wherein the instruction is received separately with respect to the receipt of the compressed first feedback.

72. (New) The method of claim 40, wherein at least three transmission signals are capable of being simultaneously transmitted to at least three different devices, using the same multiple antennas.

73. (New) The method of claim 40, wherein at least three transmission signals are capable of being simultaneously transmitted to at least three different devices, using at least one different antenna.

74. (New) The method of claim 40, wherein the instruction includes a request to send (RTS) instruction.

75. (New) The method of claim 40, wherein the instruction includes a 802.11 clear to send (CTS) instruction.

76. (New) The method of claim 40, wherein the first transmission signal is transmitted using a frequency band that is selected based on the instruction and the second transmission signal is transmitted using the frequency band that is selected based on another instruction received from the third node, where the first transmission signal is transmitted using a first frequency in the frequency band and the second transmission signal is transmitted using a second frequency in the frequency band.

77. (New) The method of claim 40, wherein the first transmission signal is transmitted using a first frequency and the second transmission signal is transmitted using a second frequency.

78. (New) The method of claim 40, wherein the first transmission signal and the second transmission signal are transmitted using the same one or more frequencies.

79. (New) The method of claim 40, wherein the first transmission signal and the second transmission signal are transmitted using the same frequency band.

80. (New) The method of claim 40, wherein the first transmission signal is transmitted using a first frequency that is based on the instruction and the second transmission signal is transmitted using a second frequency that is based on another instruction received from the third node.

81. (New) The method of claim 40, wherein the first transmission signal is transmitted using a frequency that is based on the instruction and the second transmission signal is transmitted using the frequency that is based on another instruction received from the third node.

82. (New) The method of claim 40, wherein the first transmission signal is transmitted using a frequency band that is selected based on the instruction and the second transmission signal is transmitted using the frequency band that is selected based on another instruction received from the third node.

83. (New) The method of claim 40, wherein at least one of:

the first signal includes a data signal;

the first signal includes an aggregate signal;

the first signal includes a first data signal, and the second signal includes a second data signal;

the first and second signals are reflected in an aggregate signal;

the compressed first feedback is combined with the instruction;

the compressed first feedback is received with the instruction;

the compressed first feedback is configured to ensure that transmissions from all neighbors of the first node are received at a same power level;

the compressed first feedback is configured to at least one of: minimize a transmit power on reliable links, maximize an ability to achieve spatial separation among

transmissions on a same frequency, minimize network self-interference, improve low probability of intercept (LPI), or lower probability of detection (LPD);

the compressed first feedback and the compressed second feedback are received simultaneously;

at least one of the compressed first feedback or the compressed second feedback is received before the instruction is received;

at least one of the compressed first feedback or the compressed second feedback is received after the instruction is received;

the steps are performed in the order listed;

the steps are not performed in the order listed;

the radio communications network includes an 802.11 network;

the 802.11 includes 802.11a/g;

the at least one antenna includes multiple antennas;

the at least one antenna includes at least one omnidirectional antenna;

the at least one antenna includes at least one directional antenna;

interference in the radio communications network is managed;

the first node is a mobile node and the second node is a non-mobile node;

the second node is a mobile node and the first node is a non-mobile node;

the instruction sets forth the plurality of frequencies to avoid using;

the instruction specifies the plurality of frequencies to avoid using;

a purpose of the instruction is to avoid using the plurality of frequencies;

a purpose of the instruction is to avoid using the plurality of frequencies, where the purpose is accomplished by specifying the plurality of frequencies to avoid using;

a purpose of the instruction is to avoid using the plurality of frequencies, where the purpose is accomplished by specifying one or more frequencies to use;

a purpose of the instruction is to avoid using the plurality of frequencies, where the purpose is accomplished by specifying one or more frequencies to use, the one or more frequencies not including the plurality of frequencies;

the instruction to avoid the plurality of frequencies sets forth one or more frequencies to use;

the instruction to avoid the plurality of frequencies specifies one or more frequencies to use;

the instruction to avoid the plurality of frequencies assigns one or more frequencies to use;

the instruction to avoid the plurality of frequencies does not specify the plurality of frequencies;

the instruction to avoid the plurality of frequencies sets forth one or more frequencies to use, thereby resulting in the avoidance of using the plurality of frequencies;

a purpose of the filtering is to remove the power from the transmission signal at each frequency in the plurality of frequencies to be avoided, where the purpose is accomplished by specifying one or more frequencies to which the power is to be applied;

a purpose of the filtering is to remove the power from the transmission signal at each frequency in the plurality of frequencies to be avoided, where the purpose is accomplished by specifying the plurality of frequencies to be avoided;

the filtering suppresses or otherwise minimizes waves or oscillations at each frequency in the plurality of frequencies to be avoided;

the filtering suppresses or otherwise minimizes waves or oscillations at each frequency in the plurality of frequencies to be avoided, thereby resulting in the removal of the power from the transmission signal at each frequency in the plurality of frequencies to be avoided;

the filtering removes all power from the transmission signal;

the filtering removes some power from the transmission signal;

the filtering discards one or more portions of the transmission signal at each of the plurality of frequencies;

the filtering utilizes transmit excision;

the filtering utilizes compression;

the filtering identifies certain one or more frequencies in connection with which power is applied, thereby resulting in the removal of the power from the transmission signal at each frequency in the plurality of frequencies to be avoided;

the removal of power from the transmission signal at each frequency in the plurality of frequencies to be avoided is accomplished by an adjustment in relation to power previously used in connection with the transmission signal;

the removal of power from the transmission signal at each frequency in the plurality of frequencies is accomplished by adjusting a processing of the transmission signal so that power that was previously used in connection with the transmission signal at each frequency in the plurality of frequencies to be avoided, is no longer used in connection with the transmission signal at each frequency in the plurality of frequencies to be avoided;

the removal of power from the transmission signal at each frequency in the plurality of frequencies to be avoided is accomplished by setting a waveform profile that results in no power being applied in connection with the transmission signal at each frequency in the plurality of frequencies to be avoided;

the removal of power from the transmission signal at each frequency in the plurality of frequencies to be avoided is accomplished by pre-processing the transmission signal, before any power is applied, so that power, which would otherwise be applied in connection with the transmission signal at each frequency in the plurality of frequencies, is not applied in connection with the transmission signal at each frequency in the plurality of frequencies to be avoided;

the removal of power from the transmission signal at each frequency in the plurality of frequencies to be avoided is accomplished by pre-processing the transmission signal, before any power is applied, so that no power is applied in connection with the transmission signal at each frequency in the plurality of frequencies to be avoided;

the transmission signal is generated so as to not include power at each frequency in the plurality of frequencies to be avoided;

the transmission signal is generated so as to not include power at each frequency in the plurality of frequencies to be avoided, thereby resulting in the removal of the power from the transmission signal at each frequency in the plurality of frequencies to be avoided;

the transmission signal is pre-processed so as to not include power at each frequency in the plurality of frequencies to be avoided, thereby resulting in the removal

of the power from the transmission signal at each frequency in the plurality of frequencies to be avoided;

the filtering is performed using an output filter;

the filtering is performed using an optimal matched filter;

the filtering is performed using a band selection filter;

the filtering is performed using a median filter; or

the filtering is performed using a nonlinear filter.

84. (New) The method of claim 19, wherein the instruction is received prior to the receipt of the compressed first feedback.

85. (New) The method of claim 19, wherein the second transmission signal is transmitted simultaneously with the first transmission signal via the same plurality of antennas.

86. (New) The method of claim 19, wherein the first frequency is selected as a function of the compressed first feedback, and the second frequency is selected as a function of the compressed second feedback.

87. (New) The method of claim 19, wherein the instruction includes a 802.11 clear to send (CTS) instruction.

88. (New) The method of claim 19, wherein the instruction includes a 802.11 request to send (RTS) instruction.

89. (New) The method of claim 19, wherein the second transmission signal is transmitted simultaneously with the first transmission signal via at least one different antenna of the plurality of antennas.

90. (New) The method of claim 19, wherein the second transmission signal is transmitted simultaneously with the first transmission signal using the at least one antenna of the plurality of antennas.

91. (New) The method of claim 19, wherein at least one of:

the first signal includes a data signal;

the first signal includes an aggregate signal;

the compressed first feedback is configured to ensure that transmissions from all neighbors of the first node are received at a same power level;

the compressed first feedback is configured to at least one of: minimize a transmit power on reliable links, maximize an ability to achieve spatial separation among transmissions on a same frequency, minimize network self-interference, improve low probability of intercept (LPI), or lower probability of detection (LPD);

the compressed first feedback and the compressed second feedback are received simultaneously;

at least one of the compressed first feedback or the compressed second feedback is received separately from the receipt of the instruction, by being received before the instruction is received;

at least one of the compressed first feedback or the compressed second feedback is received separately from the receipt of the instruction, by being received after the instruction is received;

the one or more frequencies of the first signal includes a frequency band;

the one or more frequencies of the second signal includes a frequency band;

the one or more frequencies of the first signal includes a first frequency band, and the one or more frequencies of the second signal includes a second frequency band;

a single data structure is generated based on the decompressed first feedback and the decompressed second feedback;

a first data structure is generated based on the decompressed first feedback, and a second data structure is generated based on the decompressed second feedback;

a first data structure is generated based on the decompressed first feedback, where the first power is based on the first data structure, and a second data structure is generated based on the decompressed second feedback, where the second power is based on the second data structure;

the first power and the second power differ in terms of power level;

the steps are performed in the order listed;

the steps are not performed in the order listed;

the radio communications network includes an 802.11 network;

the 802.11 includes 802.11a/g;

the at least one antenna includes multiple antennas;

the at least one antenna includes at least one omnidirectional antenna;

the at least one antenna includes at least one directional antenna;

the one or more

the first frequency includes a first frequency band;

the second frequency includes a second frequency band;

the first frequency is part of a first frequency band;

the second frequency is part of a second frequency band;

the first frequency includes a first frequency band, and the second frequency includes a second frequency band, where the first frequency band and the second frequency band do not overlap;

interference in the radio communications network is managed;

the first node is a mobile node and the second node is a non-mobile node;

the second node is a mobile node and the first node is a non-mobile node;

the instruction sets forth the plurality of frequencies to avoid using;

the instruction specifies the plurality of frequencies to avoid using;

a purpose of the instruction is to avoid using the plurality of frequencies;

a purpose of the instruction is to avoid using the plurality of frequencies, where the purpose is accomplished by specifying the plurality of frequencies to avoid using;

a purpose of the instruction is to avoid using the plurality of frequencies, where the purpose is accomplished by specifying one or more frequencies to use;

a purpose of the instruction is to avoid using the plurality of frequencies, where the purpose is accomplished by specifying one or more frequencies to use, the one or more frequencies not including the plurality of frequencies;

the instruction to avoid the plurality of frequencies sets forth one or more frequencies to use;

the instruction to avoid the plurality of frequencies specifies one or more frequencies to use;

the instruction to avoid the plurality of frequencies assigns one or more frequencies to use;

the instruction to avoid the plurality of frequencies does not specify the plurality of frequencies;

the instruction to avoid the plurality of frequencies sets forth one or more frequencies to use, thereby resulting in the avoidance of using the plurality of frequencies;

a purpose of the filtering is to remove the power from the transmission signal at each frequency in the plurality of frequencies to be avoided, where the purpose is accomplished by specifying one or more frequencies to which the power is to be applied;

a purpose of the filtering is to remove the power from the transmission signal at each frequency in the plurality of frequencies to be avoided, where the purpose is accomplished by specifying the plurality of frequencies to be avoided;

the filtering suppresses or otherwise minimizes waves or oscillations at each frequency in the plurality of frequencies to be avoided;

the filtering suppresses or otherwise minimizes waves or oscillations at each frequency in the plurality of frequencies to be avoided, thereby resulting in the removal of the power from the transmission signal at each frequency in the plurality of frequencies to be avoided;

the filtering removes all power from the transmission signal;

the filtering removes some power from the transmission signal;

the filtering discards one or more portions of the transmission signal at each of the plurality of frequencies;

the filtering utilizes transmit excision;

the filtering utilizes compression;

the filtering identifies certain one or more frequencies in connection with which power is applied, thereby resulting in the removal of the power from the transmission signal at each frequency in the plurality of frequencies to be avoided;

the removal of power from the transmission signal at each frequency in the plurality of frequencies to be avoided is accomplished by an adjustment in relation to power previously used in connection with the transmission signal;

the removal of power from the transmission signal at each frequency in the plurality of frequencies is accomplished by adjusting a processing of the transmission signal so that power that was previously used in connection with the transmission signal at each frequency in the plurality of frequencies to be avoided, is no longer used in connection with the transmission signal at each frequency in the plurality of frequencies to be avoided;

the removal of power from the transmission signal at each frequency in the plurality of frequencies to be avoided is accomplished by setting a waveform profile that results in no power being applied in connection with the transmission signal at each frequency in the plurality of frequencies to be avoided;

the removal of power from the transmission signal at each frequency in the plurality of frequencies to be avoided is accomplished by pre-processing the transmission signal, before any power is applied, so that power, which would otherwise be applied in connection with the transmission signal at each frequency in the plurality of frequencies, is not applied in connection with the transmission signal at each frequency in the plurality of frequencies to be avoided;

the removal of power from the transmission signal at each frequency in the plurality of frequencies to be avoided is accomplished by pre-processing the transmission signal, before any power is applied, so that no power is applied in connection with the transmission signal at each frequency in the plurality of frequencies to be avoided;

the transmission signal is generated so as to not include power at each frequency in the plurality of frequencies to be avoided;

the transmission signal is generated so as to not include power at each frequency in the plurality of frequencies to be avoided, thereby resulting in the removal of the power from the transmission signal at each frequency in the plurality of frequencies to be avoided;

the transmission signal is pre-processed so as to not include power at each frequency in the plurality of frequencies to be avoided, thereby resulting in the removal

of the power from the transmission signal at each frequency in the plurality of frequencies to be avoided;

the filtering is performed using an output filter;

the filtering is performed using an optimal matched filter;

the filtering is performed using a band selection filter;

the filtering is performed using a median filter; or

the filtering is performed using a nonlinear filter.

92. (New) The method of claim 19, wherein the removal of power from the transmission signal at each frequency in the plurality of frequencies to be avoided is accomplished by adjusting a processing of the transmission signal so that certain power that was previously used in connection with the transmission signal at each frequency in the plurality of frequencies to be avoided before the instruction is received, is no longer used in connection with the transmission signal at each frequency in the plurality of frequencies to be avoided in accordance with the instruction.

93. (New) The method of claim 19, wherein the removal of power from the transmission signal at each frequency in the plurality of frequencies to be avoided is accomplished by adjusting a processing of the transmission signal so that certain power that was previously used in connection with the transmission signal at each frequency in the plurality of frequencies to be avoided before the instruction is received, is no longer used in connection with the transmission signal at each frequency in the plurality of frequencies to be avoided in accordance with the instruction, which specifies at least one frequency to use so as to avoid using the plurality of frequencies to be avoided in order to transmit to the second node.

94. (New) The method of claim 19, wherein network forwarding decisions are guided using instantaneous information from a media access control (MAC) layer.

95. (New) The method of claim 94, wherein the network forwarding decisions are guided to eliminate a dominant end-to-end latency effect of channel access delay at at least one hop.

96. (New) The method of claim 19, wherein frequency channels are reused in order to increase spatial reuse across multiple basic service sets.

97. (New) The method of claim 19, wherein RTS/CTS signaling is extended such that frequency channels are reused in order to increase spatial reuse across multiple basic service sets.

98. (New) The method of claim 19, wherein RTS/CTS signaling is extended such that frequency channels are reused in order to increase spatial reuse across multiple basic service sets, to accommodate legacy access points.

REMARKS

The Examiner is thanked for the allowable subject matter. The claims in the present application have been amended to clarify the claimed invention. No new matter has been added.

Claims 19-42 are rejected under 35 U.S.C.112(b) or 35 U.S.C.112 (pre-AIA), second paragraph, as allegedly being indefinite for failing to particularly point out and distinctly claim the subject matter which the inventor or a joint inventor, or for pre-AIA the applicant regards as the invention. Applicant respectfully disagrees. In any case, such rejection is avoided by virtue of the clarifications made hereinabove.

Claims 1-42 are rejected as being allegedly based upon a defective reissue declaration under 35 U.S.C. 251. Applicant respectfully disagrees. In any case, such rejection is avoided by virtue of the updated reissue oath/declaration filed herewith.

Claim 19 is rejected under pre-AIA 35 U.S.C. 102(b) as being allegedly anticipated by Gendel et al. (US Patent 6,115,408). Such rejection is rendered moot in view of the incorporation of at least a portion of the allowable subject matter in such claim.

The newly added claims find support throughout the patent specification and the claims as originally filed. Specific examples of support for each of the newly added claims are mentioned below, although the totality of support for each claim is not necessarily limited to any such specific support. An explanation of the support in the disclosure of the patent for the newly added claims is provided with an indication of locations in the specification as follows. With that said, it should be noted that such discussion of support including but not limited to the cited specification excerpts is set forth for illustrative purposes only and should not be construed as limiting in any way to the claims.

43. (New) The method of claim 40, wherein the instruction includes a first instruction, and further comprising:

receiving at the first node in the radio communications network a second instruction transmitted from the third node to avoid using a different plurality of frequencies to transmit to the third node; and (e.g. col. 11 ln. 39 – col. 12 ln. 30, Figs. 16-18 and description thereof in addition to other related/pertinent descriptions)

filtering the second transmission signal to remove power from the second transmission signal at each frequency in the different plurality of frequencies to be avoided. (e.g. col. 11 ln. 39 – col. 12 ln. 30, Figs. 16-18 and description thereof in addition to other related/pertinent descriptions)

44. (New) The method of claim 40, wherein the first power and the second power are the same. (e.g. col. 3 lns. 31-45, col. 3 ln. 62-col. 4 ln. 16, col. 10 lns. 11-27, col. 11 lns. 25-30, col. 19 lns 34-37, col. 22 lns 7-34, col. 25 lns. 33-44, Fig. 14 and description thereof in addition to other related/pertinent descriptions)

45. (New) The method of claim 40, wherein the first power and the second power are different. (e.g. col. 3 lns. 31-45, col. 3 ln. 62-col. 4 ln. 16, col. 10 lns. 11-27, col. 11 lns. 25-30, col. 19 lns 34-37, col. 22 lns 7-34, col. 25 lns. 33-44, Fig. 14 and description thereof in addition to other related/pertinent descriptions)

46. (New) The method of claim 40, and further comprising:

generating a first data structure based on the decompressed first feedback, where the first power is based on the first data structure; and (e.g. col. 3 lns. 31-45, col. 3 ln. 62-col. 4 ln. 16, col. 10 lns. 11-27, col. 22 lns 7-34, Fig. 14 and description thereof in addition to other related/pertinent descriptions)

generating a second data structure based on the decompressed second feedback, where the second power is based on the second data structure. (e.g. col. 3 lns. 31-45, col. 3 ln. 62-col. 4 ln. 16, col. 10 lns. 11-27, col. 22 lns 7-34, Fig. 14 and description thereof in addition to other related/pertinent descriptions)

47. (New) The method of claim 46, wherein the first data structure and the second data structure are different. (e.g. col. 3 lns. 31-45, col. 3 ln. 62-col. 4 ln. 16, col. 10 lns. 11-27, col. 22 lns 7-34, Fig. 14 and description thereof in addition to other related/pertinent descriptions)

48. (New) The method of claim 46, wherein the first data structure and the second data structure are orthogonal. (e.g. col. 3 lns. 31-45, col. 3 ln. 62-col. 4 ln. 16, col. 10 lns.

11-27, col. 22 lns 7-34, Fig. 14 and description thereof in addition to other related/pertinent descriptions)

49. (New) The method of claim 46, wherein the first data structure is unique to the second node, and the second data structure is unique to the third node. (e.g. col. 3 lns. 31-45, col. 3 ln. 62-col. 4 ln. 16, col. 10 lns. 11-27, col. 22 lns 7-34, Fig. 14 and description thereof in addition to other related/pertinent descriptions)

50. (New) The method of claim 46, wherein the first data structure is a first profile, and the second data structure is a second profile. (e.g. col. 3 lns. 31-45, col. 3 ln. 62-col. 4 ln. 16, col. 10 lns. 11-27, col. 22 lns 7-34, Fig. 14 and description thereof in addition to other related/pertinent descriptions)

51. (New) The method of claim 46, wherein the first data structure is a first optimal waveform profile. (e.g. col. 3 lns. 31-45, col. 3 ln. 62-col. 4 ln. 16, col. 10 lns. 11-27, col. 22 lns 7-34, Fig. 14 and description thereof in addition to other related/pertinent descriptions)

52. (New) The method of claim 40, and further comprising:

generating a single data structure based on the decompressed first feedback and the decompressed second feedback, where both the first power and the second power are based on the single data structure. (e.g. col. 3 lns. 31-45, col. 3 ln. 62-col. 4 ln. 16, col. 10 lns. 11-27, col. 22 lns 7-34, Fig. 14 and description thereof in addition to other related/pertinent descriptions)

53. (New) The method of claim 40, wherein the second transmission signal is transmitted simultaneously with the first transmission signal via the same plurality of antennas. (e.g. col. 3 lns. 31-45, col. 3 ln. 62-col. 4 ln. 16, col. 10 lns. 11-27, col. 11 lns. 25-30, col. 19 lns 34-37, col. 22 lns 7-34, col. 25 lns. 33-44, Fig. 14 and description thereof in addition to other related/pertinent descriptions)

54. (New) The method of claim 40, wherein the second transmission signal is transmitted simultaneously with the first transmission signal via at least one different antenna of the plurality of antennas. (e.g. col. 3 lns. 31-45, col. 3 ln. 62-col. 4 ln. 16, col. 10 lns. 11-27, col. 11 lns. 25-30, col. 19 lns 34-37, col. 22 lns 7-34, col. 25 lns. 33-44, Fig. 14 and description thereof in addition to other related/pertinent descriptions)

55. (New) The method of claim 40, wherein the second transmission signal is transmitted simultaneously with the first transmission signal via the at least one antenna of the plurality of antennas. (e.g. col. 3 lns. 31-45, col. 3 ln. 62-col. 4 ln. 16, col. 10 lns. 11-27, col. 11 lns. 25-30, col. 19 lns 34-37, col. 22 lns 7-34, col. 25 lns. 33-44, Fig. 14 and description thereof in addition to other related/pertinent descriptions)

56. (New) The method of claim 40, wherein an update of the compressed first feedback is repeatedly received, and the first power is repeatedly updated based on an updated decompressed first feedback; and an update of the compressed second feedback is repeatedly received, and the second power is repeatedly updated based on an updated decompressed second feedback. (e.g. col. 2 lns. 10-33, col. 3 lns. 31-45, col. 3 ln. 62-col. 4 ln. 16, col. 10 lns. 11-27, col. 11 lns. 25-30, col. 19 lns 34-37, col. 22 lns 7-34, col. 25 lns. 33-44, Fig. 14 and description thereof in addition to other related/pertinent descriptions)

57. (New) The method of claim 40, wherein an update of the compressed first feedback is repeatedly received in real-time, and the first power is repeatedly updated in real-time based on an updated decompressed first feedback; and an update of the compressed second feedback is repeatedly received in real-time, and the second power is repeatedly updated in real-time based on an updated decompressed second feedback. (e.g. col. 2 lns. 10-33, col. 3 lns. 31-45, col. 3 ln. 62-col. 4 ln. 16, col. 10 lns. 11-27, col. 11 lns. 25-30, col. 19 lns 34-37, col. 22 lns 7-34, col. 25 lns. 33-44, Fig. 14 and description thereof in addition to other related/pertinent descriptions)

58. (New) The method of claim 40, wherein an update of the compressed first feedback is repeatedly received at time periods of less than one second, and the first power is repeatedly updated based on an updated decompressed first feedback at time periods of less than one second; and an update of the compressed second feedback is repeatedly received at time periods of less than one second, and the second power is repeatedly updated based on an updated decompressed second feedback at time periods of less than one second. (e.g. col. 2 lns. 10-33, col. 3 lns. 31-45, col. 3 ln. 62-col. 4 ln. 16, col. 10 lns. 11-27, col. 11 lns. 25-30, col. 19 lns 34-37, col. 22 lns 7-34, col. 25 lns. 33-44, Fig. 14 and description thereof in addition to other related/pertinent descriptions)

59. (New) The method of claim 40, wherein the first transmission signal and the second transmission signal are sent via the same transceiver. (e.g. col. 6 lns. 51-59, col. 7 lns. 5-14, Fig. 11 and description thereof in addition to other related/pertinent descriptions)

60. (New) The method of claim 40, wherein the first transmission signal and the second transmission signal are sent via different transceivers. (e.g. col. 6 lns. 51-59, col. 7 lns. 5-14, Fig. 11 and description thereof in addition to other related/pertinent descriptions)

61. (New) The method of claim 40, wherein the compressed first feedback and the compressed second feedback are received utilizing a dedicated channel. (e.g. col. 11 lns. 1-10, Fig. 2 and description thereof in addition to other related/pertinent descriptions)

62. (New) The method of claim 40, wherein the compressed first feedback and the compressed second feedback are received via an antenna configured for omnidirectional communication. (e.g. col. 8 lns. 60-65 in addition to other related/pertinent descriptions)

63. (New) The method of claim 40, wherein the decompressed first feedback and the decompressed second feedback are used to increase spatial separation among transmissions. (e.g. col. 3 lns. 30-45 in addition to other related/pertinent descriptions)

64. (New) The method of claim 40, wherein the decompressed first feedback and the decompressed second feedback are used to increase spatial separation among transmissions at the same frequency. (e.g. col. 3 lns. 30-45 in addition to other related/pertinent descriptions)

65. (New) The method of claim 40, and further comprising:

receiving a compressed third feedback from a fourth node that characterizes receipt of a third signal sent from the first node to the fourth node, the fourth node being a legacy node; (e.g. col. 3 lns. 31-45, col. 3 ln. 62-col. 4 ln. 16, col. 10 lns. 11-27, col. 22 lns 7-34, Fig. 14 and description thereof in addition to other related/pertinent descriptions)

decompressing the compressed third feedback resulting in a decompressed third feedback; (e.g. col. 3 lns. 31-45, col. 3 ln. 62-col. 4 ln. 16, col. 10 lns. 11-27, col. 22 lns 7-34, Fig. 14 and description thereof in addition to other related/pertinent descriptions)

transmitting, using a third frequency and another 802.11-based OFDM protocol, the third transmission signal to the fourth node using a third power that is based on the decompressed third feedback. (e.g. col. 3 lns. 31-45, col. 3 ln. 62-col. 4 ln. 16, col. 10 lns. 11-27, col. 11 lns. 25-30, col. 19 lns 34-37, col. 22 lns 7-34, col. 25 lns. 33-44, Fig. 14 and description thereof in addition to other related/pertinent descriptions)

66. (New) The method of claim 40, wherein the compressed first feedback is based on a received power and one or more frequencies via which the first signal is communicated. (e.g. col. 3 lns. 31-45, col. 3 ln. 62-col. 4 ln. 16, col. 10 lns. 11-27, col. 22 lns 7-34, Fig. 14 and description thereof in addition to other related/pertinent descriptions)

67. (New) The method of claim 40, wherein the compressed first feedback is based on a received power at a plurality of frequencies via which the first signal is communicated. (e.g. col. 3 lns. 31-45, col. 3 ln. 62-col. 4 ln. 16, col. 10 lns. 11-27, col. 22 lns 7-34, Fig. 14 and description thereof in addition to other related/pertinent descriptions)

68. (New) The method of claim 40, wherein the compressed first feedback is based on a series of power values as a function of frequency. (e.g. col. 3 lns. 31-45, col. 3 ln. 62-col. 4 ln. 16, col. 10 lns. 11-27, col. 22 lns 7-34, Fig. 14 and description thereof in addition to other related/pertinent descriptions)

69. (New) The method of claim 40, wherein the compressed first feedback includes a data structure that is based on a series of power values as a function of frequency. (e.g. col. 3 lns. 31-45, col. 3 ln. 62-col. 4 ln. 16, col. 10 lns. 11-27, col. 22 lns 7-34, Fig. 14 and description thereof in addition to other related/pertinent descriptions)

70. (New) The method of claim 40, wherein the instruction is received prior to the receipt of the compressed first feedback. (e.g. col. 3 lns. 31-45, col. 3 ln. 62-col. 4 ln. 16, col. 10 lns. 11-27, col. 22 lns 7-34, Fig. 14 and description thereof in addition to other related/pertinent descriptions)

71. (New) The method of claim 40, wherein the instruction is received separately with respect to the receipt of the compressed first feedback. (e.g. col. 3 lns. 31-45, col. 3 ln. 62-col. 4 ln. 16, col. 10 lns. 11-27, col. 22 lns 7-34, Fig. 14 and description thereof in addition to other related/pertinent descriptions)

72. (New) The method of claim 40, wherein at least three transmission signals are capable of being simultaneously transmitted to at least three different devices, using the same multiple antennas. (e.g. col. 3 lns. 31-45, col. 3 ln. 62-col. 4 ln. 16, col. 10 lns. 11-27, col. 11 lns. 25-30, col. 19 lns 34-37, col. 22 lns 7-34, col. 25 lns. 33-44, Fig. 14 and description thereof in addition to other related/pertinent descriptions)

73. (New) The method of claim 40, wherein at least three transmission signals are capable of being simultaneously transmitted to at least three different devices, using at least one different antenna. (e.g. col. 3 lns. 31-45, col. 3 ln. 62-col. 4 ln. 16, col. 10 lns. 11-27, col. 11 lns. 25-30, col. 19 lns 34-37, col. 22 lns 7-34, col. 25 lns. 33-44, Fig. 14 and description thereof in addition to other related/pertinent descriptions)

74. (New) The method of claim 40, wherein the instruction includes a request to send (RTS) instruction. (e.g. col. 3 lns. 31-45, col. 3 ln. 62-col. 4 ln. 16, col. 10 lns. 11-27, col. 11 lns. 25-30, col. 19 lns 34-37, col. 20 lns 11-14, col. 22 lns 7-34, col. 25 lns. 33-44, Fig. 14 and description thereof in addition to other related/pertinent descriptions)

75. (New) The method of claim 40, wherein the instruction includes a 802.11 clear to send (CTS) instruction. (e.g. col. 3 lns. 31-45, col. 3 ln. 62-col. 4 ln. 16, col. 10 lns. 11-27, col. 11 lns. 25-30, col. 19 lns 34-37, col. 20 lns 11-14, col. 22 lns 7-34, col. 25 lns. 33-44, Fig. 14 and description thereof in addition to other related/pertinent descriptions)

76. (New) The method of claim 40, wherein the first transmission signal is transmitted using a frequency band that is selected based on the instruction and the second transmission signal is transmitted using the frequency band that is selected based on another instruction received from the third node, where the first transmission signal is transmitted using a first frequency in the frequency band and the second transmission signal is transmitted using a second frequency in the frequency band. (e.g. col. 3 lns. 31-45, col. 3 ln. 62-col. 4 ln. 16, col. 10 lns. 11-27, col. 22 lns 7-34, Fig. 1-19 and description thereof in addition to other related/pertinent descriptions)

77. (New) The method of claim 40, wherein the first transmission signal is transmitted using a first frequency and the second transmission signal is transmitted using a second frequency. (e.g. col. 3 lns. 31-45, col. 3 ln. 62-col. 4 ln. 16, col. 10 lns. 11-27, col. 11 lns. 25-30, col. 19 lns 34-37, col. 22 lns 7-34, col. 25 lns. 33-44, Fig. 14 and description thereof in addition to other related/pertinent descriptions)

78. (New) The method of claim 40, wherein the first transmission signal and the second transmission signal are transmitted using the same one or more frequencies. (e.g. col. 3 lns. 31-45, col. 3 ln. 62-col. 4 ln. 16, col. 10 lns. 11-27, col. 11 lns. 25-30, col. 19 lns 34-37, col. 22 lns 7-34, col. 25 lns. 33-44, Fig. 14 and description thereof in addition to other related/pertinent descriptions)

79. (New) The method of claim 40, wherein the first transmission signal and the second transmission signal are transmitted using the same frequency band. (e.g. col. 3 lns. 31-45, col. 3 ln. 62-col. 4 ln. 16, col. 10 lns. 11-27, col. 11 lns. 25-30, col. 19 lns 34-37, col. 22 lns 7-34, col. 25 lns. 33-44, Fig. 14 and description thereof in addition to other related/pertinent descriptions)

80. (New) The method of claim 40, wherein the first transmission signal is transmitted using a first frequency that is based on the instruction and the second transmission signal is transmitted using a second frequency that is based on another instruction received from the third node. (e.g. col. 3 lns. 31-45, col. 3 ln. 62-col. 4 ln. 16, col. 10 lns. 11-27, col. 11 lns. 25-30, col. 19 lns 34-37, col. 22 lns 7-34, col. 25 lns. 33-44, Fig. 14 and description thereof in addition to other related/pertinent descriptions)

81. (New) The method of claim 40, wherein the first transmission signal is transmitted using a frequency that is based on the instruction and the second transmission signal is transmitted using the frequency that is based on another instruction received from the third node. (e.g. col. 3 lns. 31-45, col. 3 ln. 62-col. 4 ln. 16, col. 10 lns. 11-27, col. 22 lns 7-34, Fig. 14 and description thereof in addition to other related/pertinent descriptions)

82. (New) The method of claim 40, wherein the first transmission signal is transmitted using a frequency band that is selected based on the instruction and the second transmission signal is transmitted using the frequency band that is selected based on another instruction received from the third node. (e.g. col. 3 lns. 31-45, col. 3 ln. 62-col. 4 ln. 16, col. 10 lns. 11-27, col. 22 lns 7-34, Fig. 14 and description thereof in addition to other related/pertinent descriptions)

83. (New) The method of claim 40, wherein at least one of:

the first signal includes a data signal; (e.g. col. 3 lns. 31-45, col. 3 ln. 62-col. 4 ln. 16, col. 10 lns. 11-27, col. 11 lns. 25-30, col. 19 lns 34-37, col. 22 lns 7-34, col. 25 lns. 33-44, Fig. 1-19 and description thereof in addition to other related/pertinent descriptions)

the first signal includes an aggregate signal; (e.g. col. 3 lns. 31-45, col. 3 ln. 62-col. 4 ln. 16, col. 10 lns. 11-27, col. 11 lns. 25-30, col. 19 lns 34-37, col. 22 lns 7-34, col. 25 lns. 33-44, Fig. 1-19 and description thereof in addition to other related/pertinent descriptions)

the first signal includes a first data signal, and the second signal includes a second data signal; (e.g. col. 3 lns. 31-45, col. 3 ln. 62-col. 4 ln. 16, col. 10 lns. 11-27, col. 11 lns. 25-30, col. 19 lns 34-37, col. 22 lns 7-34, col. 25 lns. 33-44, Fig. 1-19 and description thereof in addition to other related/pertinent descriptions)

the first and second signals are reflected in an aggregate signal; (e.g. col. 3 lns. 31-45, col. 3 ln. 62-col. 4 ln. 16, col. 10 lns. 11-27, col. 11 lns. 25-30, col. 19 lns 34-37, col. 22 lns 7-34, col. 25 lns. 33-44, Fig. 1-19 and description thereof in addition to other related/pertinent descriptions)

the compressed first feedback is combined with the instruction; (e.g. col. 3 lns. 31-45, col. 3 ln. 62-col. 4 ln. 16, col. 10 lns. 11-27, col. 11 lns. 25-30, col. 19 lns 34-37, col. 22 lns 7-34, col. 25 lns. 33-44, Fig. 1-19 and description thereof in addition to other related/pertinent descriptions)

the compressed first feedback is received with the instruction; (e.g. col. 3 lns. 31-45, col. 3 ln. 62-col. 4 ln. 16, col. 10 lns. 11-27, col. 11 lns. 25-30, col. 19 lns 34-37, col. 22 lns 7-34, col. 25 lns. 33-44, Fig. 1-19 and description thereof in addition to other related/pertinent descriptions)

the compressed first feedback is configured to ensure that transmissions from all neighbors of the first node are received at a same power level; (e.g. col. 3 lns. 31-45, col. 3 ln. 62-col. 4 ln. 16, col. 10 lns. 11-27, col. 11 lns. 25-30, col. 19 lns 34-37, col. 22 lns 7-34, col. 25 lns. 33-44, Fig. 1-19 and description thereof in addition to other related/pertinent descriptions)

the compressed first feedback is configured to at least one of: minimize a transmit power on reliable links, maximize an ability to achieve spatial separation among transmissions on a same frequency, minimize network self-interference, improve low probability of intercept (LPI), or lower probability of detection (LPD); (e.g. col. 3 lns. 31-45, col. 3 ln. 62-col. 4 ln. 16, col. 10 lns. 11-27, col. 11

lns. 25-30, col. 19 lns 34-37, col. 22 lns 7-34, col. 25 lns. 33-44, Fig. 1-19 and description thereof in addition to other related/pertinent descriptions)

the compressed first feedback and the compressed second feedback are received simultaneously; (e.g. col. 3 lns. 31-45, col. 3 ln. 62-col. 4 ln. 16, col. 10 lns. 11-27, col. 11 lns. 25-30, col. 19 lns 34-37, col. 22 lns 7-34, col. 25 lns. 33-44, Fig. 1-19 and description thereof in addition to other related/pertinent descriptions)

at least one of the compressed first feedback or the compressed second feedback is received before the instruction is received; (e.g. col. 3 lns. 31-45, col. 3 ln. 62-col. 4 ln. 16, col. 10 lns. 11-27, col. 11 lns. 25-30, col. 19 lns 34-37, col. 22 lns 7-34, col. 25 lns. 33-44, Fig. 1-19 and description thereof in addition to other related/pertinent descriptions)

at least one of the compressed first feedback or the compressed second feedback is received after the instruction is received; (e.g. col. 3 lns. 31-45, col. 3 ln. 62-col. 4 ln. 16, col. 10 lns. 11-27, col. 11 lns. 25-30, col. 19 lns 34-37, col. 22 lns 7-34, col. 25 lns. 33-44, Fig. 1-19 and description thereof in addition to other related/pertinent descriptions)

the steps are performed in the order listed; (e.g. col. 3 lns. 31-45, col. 3 ln. 62-col. 4 ln. 16, col. 10 lns. 11-27, col. 11 lns. 25-30, col. 19 lns 34-37, col. 22 lns 7-34, col. 25 lns. 33-44, Fig. 1-19 and description thereof in addition to other related/pertinent descriptions)

the steps are not performed in the order listed; (e.g. col. 3 lns. 31-45, col. 3 ln. 62-col. 4 ln. 16, col. 10 lns. 11-27, col. 11 lns. 25-30, col. 19 lns 34-37, col. 22 lns 7-34, col. 25 lns. 33-44, Fig. 1-19 and description thereof in addition to other related/pertinent descriptions)

the radio communications network includes an 802.11 network; (e.g. col. 3 lns. 31-45, col. 3 ln. 62-col. 4 ln. 16, col. 10 lns. 11-27, col. 11 lns. 25-30, col. 19 lns 34-37, col. 22 lns 7-34, col. 25 lns. 33-44, Fig. 1-19 and description thereof in addition to other related/pertinent descriptions)

the 802.11 includes 802.11a/g; (e.g. col. 3 lns. 31-45, col. 3 ln. 62-col. 4 ln. 16, col. 10 lns. 11-27, col. 11 lns. 25-30, col. 19 lns 34-37, col. 22 lns 7-34, col. 25 lns. 33-44, Fig. 1-19 and description thereof in addition to other related/pertinent descriptions)

interference in the radio communications network is managed; (e.g. col. 3 lns. 31-45, col. 3 ln. 62-col. 4 ln. 16, col. 10 lns. 11-27, col. 11 lns. 25-30, col. 19

lns 34-37, col. 22 lns 7-34, col. 25 lns. 33-44, Fig. 1-19 and description thereof in addition to other related/pertinent descriptions)

the at least one antenna includes multiple antennas; (e.g. col. 3 lns. 31-45, col. 3 ln. 62-col. 4 ln. 16, col. 10 lns. 11-27, col. 11 lns. 25-30, col. 19 lns 34-37, col. 22 lns 7-34, col. 25 lns. 33-44, Fig. 14 and description thereof in addition to other related/pertinent descriptions)

the at least one antenna includes at least one omnidirectional antenna; (e.g. col. 8 lns. 60-65 in addition to other related/pertinent descriptions)

the at least one antenna includes at least one directional antenna; (e.g. col. 3 lns. 31-45, col. 3 ln. 62-col. 4 ln. 16, col. 10 lns. 11-27, col. 11 lns. 25-30, col. 19 lns 34-37, col. 22 lns 7-34, col. 25 lns. 33-44, Fig. 14 and description thereof in addition to other related/pertinent descriptions)

interference in the radio communications network is managed; (e.g. col. 3 lns. 31-45, col. 3 ln. 62-col. 4 ln. 16, col. 10 lns. 11-27, col. 11 lns. 25-30, col. 19 lns 34-37, col. 22 lns 7-34, col. 25 lns. 33-44, Fig. 1-19 and description thereof in addition to other related/pertinent descriptions)

the first node is a mobile node and the second node is a non-mobile node; (e.g. col. 3 lns. 31-45, col. 3 ln. 62-col. 4 ln. 16, col. 10 lns. 11-27, col. 11 lns. 25-30, col. 19 lns 34-37, col. 22 lns 7-34, col. 25 lns. 33-44, Fig. 1-19 and description thereof in addition to other related/pertinent descriptions)

the second node is a mobile node and the first node is a non-mobile node; (e.g. col. 3 lns. 31-45, col. 3 ln. 62-col. 4 ln. 16, col. 10 lns. 11-27, col. 11 lns. 25-30, col. 19 lns 34-37, col. 22 lns 7-34, col. 25 lns. 33-44, Fig. 1-19 and description thereof in addition to other related/pertinent descriptions)

the instruction sets forth the plurality of frequencies to avoid using; (e.g. col. 3 lns. 31-45, col. 3 ln. 62-col. 4 ln. 16, col. 10 lns. 11-27, col. 11 lns. 25-30, col. 19 lns 34-37, col. 22 lns 7-34, col. 25 lns. 33-44, Fig. 1-19 and description thereof in addition to other related/pertinent descriptions)

the instruction specifies the plurality of frequencies to avoid using; (e.g. col. 3 lns. 31-45, col. 3 ln. 62-col. 4 ln. 16, col. 10 lns. 11-27, col. 11 lns. 25-30, col. 19 lns 34-37, col. 22 lns 7-34, col. 25 lns. 33-44, Fig. 1-19 and description thereof in addition to other related/pertinent descriptions)

a purpose of the instruction is to avoid using the plurality of frequencies; (e.g. col. 3 lns. 31-45, col. 3 ln. 62-col. 4 ln. 16, col. 10 lns. 11-27, col. 11 lns. 25-30, col. 19 lns 34-37, col. 22 lns 7-34, col. 25 lns. 33-44, Fig. 1-19 and description thereof in addition to other related/pertinent descriptions)

a purpose of the instruction is to avoid using the plurality of frequencies, where the purpose is accomplished by specifying the plurality of frequencies to avoid using; (e.g. col. 3 lns. 31-45, col. 3 ln. 62-col. 4 ln. 16, col. 10 lns. 11-27, col. 11 lns. 25-30, col. 19 lns 34-37, col. 22 lns 7-34, col. 25 lns. 33-44, Fig. 1-19 and description thereof in addition to other related/pertinent descriptions)

a purpose of the instruction is to avoid using the plurality of frequencies, where the purpose is accomplished by specifying one or more frequencies to use; (e.g. col. 3 lns. 31-45, col. 3 ln. 62-col. 4 ln. 16, col. 10 lns. 11-27, col. 11 lns. 25-30, col. 19 lns 34-37, col. 22 lns 7-34, col. 25 lns. 33-44, Fig. 1-19 and description thereof in addition to other related/pertinent descriptions)

a purpose of the instruction is to avoid using the plurality of frequencies, where the purpose is accomplished by specifying one or more frequencies to use, the one or more frequencies not including the plurality of frequencies; (e.g. col. 3 lns. 31-45, col. 3 ln. 62-col. 4 ln. 16, col. 10 lns. 11-27, col. 11 lns. 25-30, col. 19 lns 34-37, col. 22 lns 7-34, col. 25 lns. 33-44, Fig. 1-19 and description thereof in addition to other related/pertinent descriptions)

the instruction to avoid the plurality of frequencies sets forth one or more frequencies to use; (e.g. col. 3 lns. 31-45, col. 3 ln. 62-col. 4 ln. 16, col. 10 lns. 11-27, col. 11 lns. 25-30, col. 19 lns 34-37, col. 22 lns 7-34, col. 25 lns. 33-44, Fig. 1-19 and description thereof in addition to other related/pertinent descriptions)

the instruction to avoid the plurality of frequencies specifies one or more frequencies to use; (e.g. col. 3 lns. 31-45, col. 3 ln. 62-col. 4 ln. 16, col. 10 lns. 11-27, col. 11 lns. 25-30, col. 19 lns 34-37, col. 22 lns 7-34, col. 25 lns. 33-44, Fig. 1-19 and description thereof in addition to other related/pertinent descriptions)

the instruction to avoid the plurality of frequencies assigns one or more frequencies to use; (e.g. col. 3 lns. 31-45, col. 3 ln. 62-col. 4 ln. 16, col. 10 lns. 11-27, col. 11 lns. 25-30, col. 19 lns 34-37, col. 22 lns 7-34, col. 25 lns. 33-44, Fig. 1-19 and description thereof in addition to other related/pertinent descriptions)

the instruction to avoid the plurality of frequencies does not specify the plurality of frequencies; (e.g. col. 3 lns. 31-45, col. 3 ln. 62-col. 4 ln. 16, col. 10 lns. 11-27, col. 11 lns. 25-30, col. 19 lns 34-37, col. 22 lns 7-34, col. 25 lns. 33-44, Fig. 1-19 and description thereof in addition to other related/pertinent descriptions)

the instruction to avoid the plurality of frequencies sets forth one or more frequencies to use, thereby resulting in the avoidance of using the plurality of frequencies; (e.g. col. 3 lns. 31-45, col. 3 ln. 62-col. 4 ln. 16, col. 10 lns. 11-27, col. 11 lns. 25-30, col. 19 lns 34-37, col. 22 lns 7-34, col. 25 lns. 33-44, Fig. 1-19 and description thereof in addition to other related/pertinent descriptions)

a purpose of the filtering is to remove the power from the transmission signal at each frequency in the plurality of frequencies to be avoided, where the purpose is accomplished by specifying one or more frequencies to which the power is to be applied; (e.g. col. 3 lns. 31-45, col. 3 ln. 62-col. 4 ln. 16, col. 10 lns. 11-27, col. 11 lns. 25-30, col. 19 lns 34-37, col. 22 lns 7-34, col. 25 lns. 33-44, Fig. 1-19 and description thereof in addition to other related/pertinent descriptions)

a purpose of the filtering is to remove the power from the transmission signal at each frequency in the plurality of frequencies to be avoided, where the purpose is accomplished by specifying the plurality of frequencies to be avoided; (e.g. col. 3 lns. 31-45, col. 3 ln. 62-col. 4 ln. 16, col. 10 lns. 11-27, col. 11 lns. 25-30, col. 19 lns 34-37, col. 22 lns 7-34, col. 25 lns. 33-44, Fig. 1-19 and description thereof in addition to other related/pertinent descriptions)

the filtering suppresses or otherwise minimizes waves or oscillations at each frequency in the plurality of frequencies to be avoided; (e.g. col. 3 lns. 31-45, col. 3 ln. 62-col. 4 ln. 16, col. 10 lns. 11-27, col. 11 lns. 25-30, col. 19 lns 34-37, col. 22 lns 7-34, col. 25 lns. 33-44, Fig. 1-19 and description thereof in addition to other related/pertinent descriptions)

the filtering suppresses or otherwise minimizes waves or oscillations at each frequency in the plurality of frequencies to be avoided, thereby resulting in the removal of the power from the transmission signal at each frequency in the plurality of frequencies to be avoided; (e.g. col. 3 lns. 31-45, col. 3 ln. 62-col. 4 ln. 16, col. 10 lns. 11-27, col. 11 lns. 25-30, col. 19 lns 34-37, col. 22 lns 7-34, col. 25 lns. 33-44, Fig. 1-19 and description thereof in addition to other related/pertinent descriptions)

the filtering removes all power from the transmission signal; (e.g. col. 3 lns. 31-45, col. 3 ln. 62-col. 4 ln. 16, col. 10 lns. 11-27, col. 11 lns. 25-30, col. 19 lns 34-37, col. 22 lns 7-34, col. 25 lns. 33-44, Fig. 1-19 and description thereof in addition to other related/pertinent descriptions)

the filtering removes some power from the transmission signal; (e.g. col. 3 lns. 31-45, col. 3 ln. 62-col. 4 ln. 16, col. 10 lns. 11-27, col. 11 lns. 25-30, col. 19

lns 34-37, col. 22 lns 7-34, col. 25 lns. 33-44, Fig. 1-19 and description thereof in addition to other related/pertinent descriptions)

the filtering discards one or more portions of the transmission signal at each of the plurality of frequencies; (e.g. col. 3 lns. 31-45, col. 3 ln. 62-col. 4 ln. 16, col. 10 lns. 11-27, col. 11 lns. 25-30, col. 19 lns 34-37, col. 22 lns 7-34, col. 25 lns. 33-44, Fig. 1-19 and description thereof in addition to other related/pertinent descriptions)

the filtering utilizes transmit excision; (e.g. col. 3 lns. 31-45, col. 3 ln. 62-col. 4 ln. 16, col. 10 lns. 11-27, col. 11 lns. 25-30, col. 19 lns 34-37, col. 22 lns 7-34, col. 25 lns. 33-44, Fig. 1-19 and description thereof in addition to other related/pertinent descriptions)

the filtering utilizes compression; (e.g. col. 3 lns. 31-45, col. 3 ln. 62-col. 4 ln. 16, col. 10 lns. 11-27, col. 11 lns. 25-30, col. 19 lns 34-37, col. 22 lns 7-34, col. 25 lns. 33-44, Fig. 1-19 and description thereof in addition to other related/pertinent descriptions)

the filtering identifies certain one or more frequencies in connection with which power is applied, thereby resulting in the removal of the power from the transmission signal at each frequency in the plurality of frequencies to be avoided; (e.g. col. 3 lns. 31-45, col. 3 ln. 62-col. 4 ln. 16, col. 10 lns. 11-27, col. 11 lns. 25-30, col. 19 lns 34-37, col. 22 lns 7-34, col. 25 lns. 33-44, Fig. 1-19 and description thereof in addition to other related/pertinent descriptions)

the removal of power from the transmission signal at each frequency in the plurality of frequencies to be avoided is accomplished by an adjustment in relation to power previously used in connection with the transmission signal; (e.g. col. 3 lns. 31-45, col. 3 ln. 62-col. 4 ln. 16, col. 10 lns. 11-27, col. 11 lns. 25-30, col. 19 lns 34-37, col. 22 lns 7-34, col. 25 lns. 33-44, Fig. 1-19 and description thereof in addition to other related/pertinent descriptions)

the removal of power from the transmission signal at each frequency in the plurality of frequencies is accomplished by adjusting a processing of the transmission signal so that power that was previously used in connection with the transmission signal at each frequency in the plurality of frequencies to be avoided, is no longer used in connection with the transmission signal at each frequency in the plurality of frequencies to be avoided; (e.g. col. 3 lns. 31-45, col. 3 ln. 62-col. 4 ln. 16, col. 10 lns. 11-27, col. 11 lns. 25-30, col. 19 lns 34-37, col. 22 lns 7-34, col. 25 lns. 33-44, Fig. 1-19 and description thereof in addition to other related/pertinent descriptions)

the removal of power from the transmission signal at each frequency in the plurality of frequencies to be avoided is accomplished by setting a waveform profile that results in no power being applied in connection with the transmission signal at each frequency in the plurality of frequencies to be avoided; (e.g. col. 3 lns. 31-45, col. 3 ln. 62-col. 4 ln. 16, col. 10 lns. 11-27, col. 11 lns. 25-30, col. 19 lns 34-37, col. 22 lns 7-34, col. 25 lns. 33-44, Fig. 1-19 and description thereof in addition to other related/pertinent descriptions)

the removal of power from the transmission signal at each frequency in the plurality of frequencies to be avoided is accomplished by pre-processing the transmission signal, before any power is applied, so that power, which would otherwise be applied in connection with the transmission signal at each frequency in the plurality of frequencies, is not applied in connection with the transmission signal at each frequency in the plurality of frequencies to be avoided; (e.g. col. 3 lns. 31-45, col. 3 ln. 62-col. 4 ln. 16, col. 10 lns. 11-27, col. 11 lns. 25-30, col. 19 lns 34-37, col. 22 lns 7-34, col. 25 lns. 33-44, Fig. 1-19 and description thereof in addition to other related/pertinent descriptions)

the removal of power from the transmission signal at each frequency in the plurality of frequencies to be avoided is accomplished by pre-processing the transmission signal, before any power is applied, so that no power is applied in connection with the transmission signal at each frequency in the plurality of frequencies to be avoided; (e.g. col. 3 lns. 31-45, col. 3 ln. 62-col. 4 ln. 16, col. 10 lns. 11-27, col. 11 lns. 25-30, col. 19 lns 34-37, col. 22 lns 7-34, col. 25 lns. 33-44, Fig. 1-19 and description thereof in addition to other related/pertinent descriptions)

the transmission signal is generated so as to not include power at each frequency in the plurality of frequencies to be avoided; (e.g. col. 3 lns. 31-45, col. 3 ln. 62-col. 4 ln. 16, col. 10 lns. 11-27, col. 11 lns. 25-30, col. 19 lns 34-37, col. 22 lns 7-34, col. 25 lns. 33-44, Fig. 1-19 and description thereof in addition to other related/pertinent descriptions)

the transmission signal is generated so as to not include power at each frequency in the plurality of frequencies to be avoided, thereby resulting in the removal of the power from the transmission signal at each frequency in the plurality of frequencies to be avoided; (e.g. col. 3 lns. 31-45, col. 3 ln. 62-col. 4 ln. 16, col. 10 lns. 11-27, col. 11 lns. 25-30, col. 19 lns 34-37, col. 22 lns 7-34, col. 25 lns. 33-44, Fig. 1-19 and description thereof in addition to other related/pertinent descriptions)

the transmission signal is pre-processed so as to not include power at each frequency in the plurality of frequencies to be avoided, thereby resulting in the removal of the power from the transmission signal at each frequency in the plurality of frequencies to be avoided; (e.g. col. 3 lns. 31-45, col. 3 ln. 62-col. 4 ln. 16, col. 10 lns. 11-27, col. 11 lns. 25-30, col. 19 lns 34-37, col. 22 lns 7-34, col. 25 lns. 33-44, Fig. 1-19 and description thereof in addition to other related/pertinent descriptions)

the filtering is performed using an output filter; (e.g. col. 3 lns. 31-45, col. 3 ln. 62-col. 4 ln. 16, col. 10 lns. 11-27, col. 11 lns. 25-30, col. 19 lns 34-37, col. 22 lns 7-34, col. 25 lns. 33-44, Fig. 1-19 and description thereof in addition to other related/pertinent descriptions)

the filtering is performed using an optimal matched filter; (e.g. col. 3 lns. 31-45, col. 3 ln. 62-col. 4 ln. 16, col. 10 lns. 11-27, col. 11 lns. 25-30, col. 19 lns 34-37, col. 22 lns 7-34, col. 25 lns. 33-44, Fig. 1-19 and description thereof in addition to other related/pertinent descriptions)

the filtering is performed using a band selection filter; (e.g. col. 3 lns. 31-45, col. 3 ln. 62-col. 4 ln. 16, col. 10 lns. 11-27, col. 11 lns. 25-30, col. 19 lns 34-37, col. 22 lns 7-34, col. 25 lns. 33-44, Fig. 1-19 and description thereof in addition to other related/pertinent descriptions)

the filtering is performed using a median filter; or (e.g. col. 3 lns. 31-45, col. 3 ln. 62-col. 4 ln. 16, col. 10 lns. 11-27, col. 11 lns. 25-30, col. 19 lns 34-37, col. 22 lns 7-34, col. 25 lns. 33-44, Fig. 1-19 and description thereof in addition to other related/pertinent descriptions)

the filtering is performed using a nonlinear filter. (e.g. col. 3 lns. 31-45, col. 3 ln. 62-col. 4 ln. 16, col. 10 lns. 11-27, col. 11 lns. 25-30, col. 19 lns 34-37, col. 22 lns 7-34, col. 25 lns. 33-44, Fig. 1-19 and description thereof in addition to other related/pertinent descriptions)

84. (New) The method of claim 19, wherein the instruction is received prior to the receipt of the compressed first feedback. (e.g. col. 3 lns. 31-45, col. 3 ln. 62-col. 4 ln. 16, col. 10 lns. 11-27, col. 22 lns 7-34, Fig. 14 and description thereof in addition to other related/pertinent descriptions)

85. (New) The method of claim 19, wherein the second transmission signal is transmitted simultaneously with the first transmission signal via the same plurality of antennas. (e.g. col. 3 lns. 31-45, col. 3 ln. 62-col. 4 ln. 16, col. 10 lns. 11-27, col. 11 lns.

25-30, col. 19 lns 34-37, col. 22 lns 7-34, col. 25 lns. 33-44, Fig. 14 and description thereof in addition to other related/pertinent descriptions)

86. (New) The method of claim 19, wherein the first frequency is selected as a function of the compressed first feedback, and the second frequency is selected as a function of the compressed second feedback. (e.g. col. 3 lns. 31-45, col. 3 ln. 62-col. 4 ln. 16, col. 10 lns. 11-27, col. 11 lns. 25-30, col. 19 lns 34-37, col. 22 lns 7-34, col. 25 lns. 33-44, Fig. 14 and description thereof in addition to other related/pertinent descriptions)

87. (New) The method of claim 19, wherein the instruction includes a 802.11 clear to send (CTS) instruction. (e.g. col. 3 lns. 31-45, col. 3 ln. 62-col. 4 ln. 16, col. 10 lns. 11-27, col. 22 lns 7-34, Fig. 14 and description thereof in addition to other related/pertinent descriptions)

88. (New) The method of claim 19, wherein the instruction includes a 802.11 request to send (RTS) instruction. (e.g. col. 3 lns. 31-45, col. 3 ln. 62-col. 4 ln. 16, col. 10 lns. 11-27, col. 22 lns 7-34, Fig. 14 and description thereof in addition to other related/pertinent descriptions)

89. (New) The method of claim 19, wherein the second transmission signal is transmitted simultaneously with the first transmission signal via at least one different antenna of the plurality of antennas. (e.g. col. 3 lns. 31-45, col. 3 ln. 62-col. 4 ln. 16, col. 10 lns. 11-27, col. 11 lns. 25-30, col. 19 lns 34-37, col. 22 lns 7-34, col. 25 lns. 33-44, Fig. 14 and description thereof in addition to other related/pertinent descriptions)

90. (New) The method of claim 19, wherein the second transmission signal is transmitted simultaneously with the first transmission signal using the at least one antenna of the plurality of antennas. (e.g. col. 3 lns. 31-45, col. 3 ln. 62-col. 4 ln. 16, col. 10 lns. 11-27, col. 11 lns. 25-30, col. 19 lns 34-37, col. 22 lns 7-34, col. 25 lns. 33-44, Fig. 14 and description thereof in addition to other related/pertinent descriptions)

91. (New) The method of claim 19, wherein at least one of:

the first signal includes a data signal; (e.g. col. 3 lns. 31-45, col. 3 ln. 62-col. 4 ln. 16, col. 10 lns. 11-27, col. 11 lns. 25-30, col. 19 lns 34-37, col. 22 lns 7-

34, col. 25 lns. 33-44, Fig. 1-19 and description thereof in addition to other related/pertinent descriptions)

the first signal includes an aggregate signal; (e.g. col. 3 lns. 31-45, col. 3 ln. 62-col. 4 ln. 16, col. 10 lns. 11-27, col. 11 lns. 25-30, col. 19 lns 34-37, col. 22 lns 7-34, col. 25 lns. 33-44, Fig. 1-19 and description thereof in addition to other related/pertinent descriptions)

the compressed first feedback is configured to ensure that transmissions from all neighbors of the first node are received at a same power level; (e.g. col. 3 lns. 31-45, col. 3 ln. 62-col. 4 ln. 16, col. 10 lns. 11-27, col. 11 lns. 25-30, col. 19 lns 34-37, col. 22 lns 7-34, col. 25 lns. 33-44, Fig. 1-19 and description thereof in addition to other related/pertinent descriptions)

the compressed first feedback is configured to at least one of: minimize a transmit power on reliable links, maximize an ability to achieve spatial separation among transmissions on a same frequency, minimize network self-interference, improve low probability of intercept (LPI), or lower probability of detection (LPD); (e.g. col. 3 lns. 31-45, col. 3 ln. 62-col. 4 ln. 16, col. 10 lns. 11-27, col. 11 lns. 25-30, col. 19 lns 34-37, col. 22 lns 7-34, col. 25 lns. 33-44, Fig. 1-19 and description thereof in addition to other related/pertinent descriptions)

the compressed first feedback and the compressed second feedback are received simultaneously; (e.g. col. 3 lns. 31-45, col. 3 ln. 62-col. 4 ln. 16, col. 10 lns. 11-27, col. 11 lns. 25-30, col. 19 lns 34-37, col. 22 lns 7-34, col. 25 lns. 33-44, Fig. 1-19 and description thereof in addition to other related/pertinent descriptions)

at least one of the compressed first feedback or the compressed second feedback is received separately from the receipt of the instruction, by being received before the instruction is received; (e.g. col. 3 lns. 31-45, col. 3 ln. 62-col. 4 ln. 16, col. 10 lns. 11-27, col. 11 lns. 25-30, col. 19 lns 34-37, col. 22 lns 7-34, col. 25 lns. 33-44, Fig. 1-19 and description thereof in addition to other related/pertinent descriptions)

at least one of the compressed first feedback or the compressed second feedback is received separately from the receipt of the instruction, by being received after the instruction is received; (e.g. col. 3 lns. 31-45, col. 3 ln. 62-col. 4 ln. 16, col. 10 lns. 11-27, col. 11 lns. 25-30, col. 19 lns 34-37, col. 22 lns 7-34, col. 25 lns. 33-44, Fig. 1-19 and description thereof in addition to other related/pertinent descriptions)

the one or more frequencies of the first signal includes a frequency band; (e.g. col. 3 lns. 31-45, col. 3 ln. 62-col. 4 ln. 16, col. 10 lns. 11-27, col. 11 lns. 25-30, col. 19 lns 34-37, col. 22 lns 7-34, col. 25 lns. 33-44, claim 17, Fig. 1-19 and description thereof in addition to other related/pertinent descriptions)

the one or more frequencies of the second signal includes a frequency band; (e.g. col. 3 lns. 31-45, col. 3 ln. 62-col. 4 ln. 16, col. 10 lns. 11-27, col. 11 lns. 25-30, col. 19 lns 34-37, col. 22 lns 7-34, col. 25 lns. 33-44, claim 17, Fig. 1-19 and description thereof in addition to other related/pertinent descriptions)

the one or more frequencies of the first signal includes a first frequency band, and the one or more frequencies of the second signal includes a second frequency band; (e.g. col. 3 lns. 31-45, col. 3 ln. 62-col. 4 ln. 16, col. 10 lns. 11-27, col. 11 lns. 25-30, col. 19 lns 34-37, col. 22 lns 7-34, col. 25 lns. 33-44, claim 17, Fig. 1-19 and description thereof in addition to other related/pertinent descriptions)

a single data structure is generated based on the decompressed first feedback and the decompressed second feedback; (e.g. col. 3 lns. 31-45, col. 3 ln. 62-col. 4 ln. 16, col. 10 lns. 11-27, col. 22 lns 7-34, Fig. 14 and description thereof in addition to other related/pertinent descriptions)

a first data structure is generated based on the decompressed first feedback, and a second data structure is generated based on the decompressed second feedback; (e.g. col. 3 lns. 31-45, col. 3 ln. 62-col. 4 ln. 16, col. 10 lns. 11-27, col. 22 lns 7-34, Fig. 14 and description thereof in addition to other related/pertinent descriptions)

a first data structure is generated based on the decompressed first feedback, where the first power is based on the first data structure, and a second data structure is generated based on the decompressed second feedback, where the second power is based on the second data structure; (e.g. col. 3 lns. 31-45, col. 3 ln. 62-col. 4 ln. 16, col. 10 lns. 11-27, col. 22 lns 7-34, Fig. 14 and description thereof in addition to other related/pertinent descriptions)

the first power and the second power differ in terms of power level; (e.g. col. 3 lns. 31-45, col. 3 ln. 62-col. 4 ln. 16, col. 10 lns. 11-27, col. 22 lns 7-34, Fig. 14 and description thereof in addition to other related/pertinent descriptions)

the steps are performed in the order listed; (e.g. col. 3 lns. 31-45, col. 3 ln. 62-col. 4 ln. 16, col. 10 lns. 11-27, col. 11 lns. 25-30, col. 19 lns 34-37, col. 22 lns 7-34, col. 25 lns. 33-44, Fig. 1-19 and description thereof in addition to other related/pertinent descriptions)

the steps are not performed in the order listed; (e.g. col. 3 lns. 31-45, col. 3 ln. 62-col. 4 ln. 16, col. 10 lns. 11-27, col. 11 lns. 25-30, col. 19 lns 34-37, col. 22 lns 7-34, col. 25 lns. 33-44, Fig. 1-19 and description thereof in addition to other related/pertinent descriptions)

the radio communications network includes an 802.11 network; (e.g. col. 3 lns. 31-45, col. 3 ln. 62-col. 4 ln. 16, col. 10 lns. 11-27, col. 11 lns. 25-30, col. 19 lns 34-37, col. 22 lns 7-34, col. 25 lns. 33-44, Fig. 1-19 and description thereof in addition to other related/pertinent descriptions)

the 802.11 includes 802.11a/g; (e.g. col. 3 lns. 31-45, col. 3 ln. 62-col. 4 ln. 16, col. 10 lns. 11-27, col. 11 lns. 25-30, col. 19 lns 34-37, col. 22 lns 7-34, col. 25 lns. 33-44, Fig. 1-19 and description thereof in addition to other related/pertinent descriptions)

interference in the radio communications network is managed; (e.g. col. 3 lns. 31-45, col. 3 ln. 62-col. 4 ln. 16, col. 10 lns. 11-27, col. 11 lns. 25-30, col. 19 lns 34-37, col. 22 lns 7-34, col. 25 lns. 33-44, Fig. 1-19 and description thereof in addition to other related/pertinent descriptions)

the at least one antenna includes multiple antennas; (e.g. col. 3 lns. 31-45, col. 3 ln. 62-col. 4 ln. 16, col. 10 lns. 11-27, col. 11 lns. 25-30, col. 19 lns 34-37, col. 22 lns 7-34, col. 25 lns. 33-44, Fig. 14 and description thereof in addition to other related/pertinent descriptions)

the at least one antenna includes at least one omnidirectional antenna; (e.g. col. 8 lns. 60-65 in addition to other related/pertinent descriptions)

the at least one antenna includes at least one directional antenna; (e.g. col. 3 lns. 31-45, col. 3 ln. 62-col. 4 ln. 16, col. 10 lns. 11-27, col. 11 lns. 25-30, col. 19 lns 34-37, col. 22 lns 7-34, col. 25 lns. 33-44, Fig. 14 and description thereof in addition to other related/pertinent descriptions)

the first frequency includes a first frequency band; (e.g. col. 3 lns. 31-45, col. 3 ln. 62-col. 4 ln. 16, col. 10 lns. 11-27, col. 11 lns. 25-30, col. 19 lns 34-37, col. 22 lns 7-34, col. 25 lns. 33-44, claim 17, Fig. 1-19 and description thereof in addition to other related/pertinent descriptions)

the second frequency includes a second frequency band; (e.g. col. 3 lns. 31-45, col. 3 ln. 62-col. 4 ln. 16, col. 10 lns. 11-27, col. 11 lns. 25-30, col. 19 lns 34-37, col. 22 lns 7-34, col. 25 lns. 33-44, claim 17, Fig. 1-19 and description thereof in addition to other related/pertinent descriptions)

the first frequency is part of a first frequency band; (e.g. col. 3 lns. 31-45, col. 3 ln. 62-col. 4 ln. 16, col. 10 lns. 11-27, col. 11 lns. 25-30, col. 19 lns 34-37,

col. 22 lns 7-34, col. 25 lns. 33-44, claim 17, Fig. 1-19 and description thereof in addition to other related/pertinent descriptions)

the second frequency is part of a second frequency band; (e.g. col. 3 lns. 31-45, col. 3 ln. 62-col. 4 ln. 16, col. 10 lns. 11-27, col. 11 lns. 25-30, col. 19 lns 34-37, col. 22 lns 7-34, col. 25 lns. 33-44, claim 17, Fig. 1-19 and description thereof in addition to other related/pertinent descriptions)

the first frequency includes a first frequency band, and the second frequency includes a second frequency band, where the first frequency band and the second frequency band do not overlap; (e.g. col. 3 lns. 31-45, col. 3 ln. 62-col. 4 ln. 16, col. 10 lns. 11-27, col. 11 lns. 25-30, col. 19 lns 34-37, col. 22 lns 7-34, col. 25 lns. 33-44, claim 17, Fig. 1-19 and description thereof in addition to other related/pertinent descriptions)

interference in the radio communications network is managed; (e.g. col. 3 lns. 31-45, col. 3 ln. 62-col. 4 ln. 16, col. 10 lns. 11-27, col. 11 lns. 25-30, col. 19 lns 34-37, col. 22 lns 7-34, col. 25 lns. 33-44, Fig. 1-19 and description thereof in addition to other related/pertinent descriptions)

the first node is a mobile node and the second node is a non-mobile node; (e.g. col. 3 lns. 31-45, col. 3 ln. 62-col. 4 ln. 16, col. 10 lns. 11-27, col. 11 lns. 25-30, col. 19 lns 34-37, col. 22 lns 7-34, col. 25 lns. 33-44, Fig. 1-19 and description thereof in addition to other related/pertinent descriptions)

the second node is a mobile node and the first node is a non-mobile node; (e.g. col. 3 lns. 31-45, col. 3 ln. 62-col. 4 ln. 16, col. 10 lns. 11-27, col. 11 lns. 25-30, col. 19 lns 34-37, col. 22 lns 7-34, col. 25 lns. 33-44, Fig. 1-19 and description thereof in addition to other related/pertinent descriptions)

the instruction sets forth the plurality of frequencies to avoid using; (e.g. col. 3 lns. 31-45, col. 3 ln. 62-col. 4 ln. 16, col. 10 lns. 11-27, col. 11 lns. 25-30, col. 19 lns 34-37, col. 22 lns 7-34, col. 25 lns. 33-44, Fig. 1-19 and description thereof in addition to other related/pertinent descriptions)

the instruction specifies the plurality of frequencies to avoid using; (e.g. col. 3 lns. 31-45, col. 3 ln. 62-col. 4 ln. 16, col. 10 lns. 11-27, col. 11 lns. 25-30, col. 19 lns 34-37, col. 22 lns 7-34, col. 25 lns. 33-44, Fig. 1-19 and description thereof in addition to other related/pertinent descriptions)

a purpose of the instruction is to avoid using the plurality of frequencies; (e.g. col. 3 lns. 31-45, col. 3 ln. 62-col. 4 ln. 16, col. 10 lns. 11-27, col. 11 lns. 25-30, col. 19 lns 34-37, col. 22 lns 7-34, col. 25 lns. 33-44, Fig. 1-19 and description thereof in addition to other related/pertinent descriptions)

a purpose of the instruction is to avoid using the plurality of frequencies, where the purpose is accomplished by specifying the plurality of frequencies to avoid using; (e.g. col. 3 lns. 31-45, col. 3 ln. 62-col. 4 ln. 16, col. 10 lns. 11-27, col. 11 lns. 25-30, col. 19 lns 34-37, col. 22 lns 7-34, col. 25 lns. 33-44, Fig. 1-19 and description thereof in addition to other related/pertinent descriptions)

a purpose of the instruction is to avoid using the plurality of frequencies, where the purpose is accomplished by specifying one or more frequencies to use; (e.g. col. 3 lns. 31-45, col. 3 ln. 62-col. 4 ln. 16, col. 10 lns. 11-27, col. 11 lns. 25-30, col. 19 lns 34-37, col. 22 lns 7-34, col. 25 lns. 33-44, Fig. 1-19 and description thereof in addition to other related/pertinent descriptions)

a purpose of the instruction is to avoid using the plurality of frequencies, where the purpose is accomplished by specifying one or more frequencies to use, the one or more frequencies not including the plurality of frequencies; (e.g. col. 3 lns. 31-45, col. 3 ln. 62-col. 4 ln. 16, col. 10 lns. 11-27, col. 11 lns. 25-30, col. 19 lns 34-37, col. 22 lns 7-34, col. 25 lns. 33-44, Fig. 1-19 and description thereof in addition to other related/pertinent descriptions)

the instruction to avoid the plurality of frequencies sets forth one or more frequencies to use; (e.g. col. 3 lns. 31-45, col. 3 ln. 62-col. 4 ln. 16, col. 10 lns. 11-27, col. 11 lns. 25-30, col. 19 lns 34-37, col. 22 lns 7-34, col. 25 lns. 33-44, Fig. 1-19 and description thereof in addition to other related/pertinent descriptions)

the instruction to avoid the plurality of frequencies specifies one or more frequencies to use; (e.g. col. 3 lns. 31-45, col. 3 ln. 62-col. 4 ln. 16, col. 10 lns. 11-27, col. 11 lns. 25-30, col. 19 lns 34-37, col. 22 lns 7-34, col. 25 lns. 33-44, Fig. 1-19 and description thereof in addition to other related/pertinent descriptions)

the instruction to avoid the plurality of frequencies assigns one or more frequencies to use; (e.g. col. 3 lns. 31-45, col. 3 ln. 62-col. 4 ln. 16, col. 10 lns. 11-27, col. 11 lns. 25-30, col. 19 lns 34-37, col. 22 lns 7-34, col. 25 lns. 33-44, Fig. 1-19 and description thereof in addition to other related/pertinent descriptions)

the instruction to avoid the plurality of frequencies does not specify the plurality of frequencies; (e.g. col. 3 lns. 31-45, col. 3 ln. 62-col. 4 ln. 16, col. 10 lns. 11-27, col. 11 lns. 25-30, col. 19 lns 34-37, col. 22 lns 7-34, col. 25 lns. 33-44, Fig. 1-19 and description thereof in addition to other related/pertinent descriptions)

the instruction to avoid the plurality of frequencies sets forth one or more frequencies to use, thereby resulting in the avoidance of using the plurality of frequencies; (e.g. col. 3 lns. 31-45, col. 3 ln. 62-col. 4 ln. 16, col. 10 lns. 11-27, col. 11 lns. 25-30, col. 19 lns 34-37, col. 22 lns 7-34, col. 25 lns. 33-44, Fig. 1-19 and description thereof in addition to other related/pertinent descriptions)

a purpose of the filtering is to remove the power from the transmission signal at each frequency in the plurality of frequencies to be avoided, where the purpose is accomplished by specifying one or more frequencies to which the power is to be applied; (e.g. col. 3 lns. 31-45, col. 3 ln. 62-col. 4 ln. 16, col. 10 lns. 11-27, col. 11 lns. 25-30, col. 19 lns 34-37, col. 22 lns 7-34, col. 25 lns. 33-44, Fig. 1-19 and description thereof in addition to other related/pertinent descriptions)

a purpose of the filtering is to remove the power from the transmission signal at each frequency in the plurality of frequencies to be avoided, where the purpose is accomplished by specifying the plurality of frequencies to be avoided; (e.g. col. 3 lns. 31-45, col. 3 ln. 62-col. 4 ln. 16, col. 10 lns. 11-27, col. 11 lns. 25-30, col. 19 lns 34-37, col. 22 lns 7-34, col. 25 lns. 33-44, Fig. 1-19 and description thereof in addition to other related/pertinent descriptions)

the filtering suppresses or otherwise minimizes waves or oscillations at each frequency in the plurality of frequencies to be avoided; (e.g. col. 3 lns. 31-45, col. 3 ln. 62-col. 4 ln. 16, col. 10 lns. 11-27, col. 11 lns. 25-30, col. 19 lns 34-37, col. 22 lns 7-34, col. 25 lns. 33-44, Fig. 1-19 and description thereof in addition to other related/pertinent descriptions)

the filtering suppresses or otherwise minimizes waves or oscillations at each frequency in the plurality of frequencies to be avoided, thereby resulting in the removal of the power from the transmission signal at each frequency in the plurality of frequencies to be avoided; (e.g. col. 3 lns. 31-45, col. 3 ln. 62-col. 4 ln. 16, col. 10 lns. 11-27, col. 11 lns. 25-30, col. 19 lns 34-37, col. 22 lns 7-34, col. 25 lns. 33-44, Fig. 1-19 and description thereof in addition to other related/pertinent descriptions)

the filtering removes all power from the transmission signal; (e.g. col. 3 lns. 31-45, col. 3 ln. 62-col. 4 ln. 16, col. 10 lns. 11-27, col. 11 lns. 25-30, col. 19 lns 34-37, col. 22 lns 7-34, col. 25 lns. 33-44, Fig. 1-19 and description thereof in addition to other related/pertinent descriptions)

the filtering removes some power from the transmission signal; (e.g. col. 3 lns. 31-45, col. 3 ln. 62-col. 4 ln. 16, col. 10 lns. 11-27, col. 11 lns. 25-30, col. 19

lns 34-37, col. 22 lns 7-34, col. 25 lns. 33-44, Fig. 1-19 and description thereof in addition to other related/pertinent descriptions)

the filtering discards one or more portions of the transmission signal at each of the plurality of frequencies; (e.g. col. 3 lns. 31-45, col. 3 ln. 62-col. 4 ln. 16, col. 10 lns. 11-27, col. 11 lns. 25-30, col. 19 lns 34-37, col. 22 lns 7-34, col. 25 lns. 33-44, Fig. 1-19 and description thereof in addition to other related/pertinent descriptions)

the filtering utilizes transmit excision; (e.g. col. 3 lns. 31-45, col. 3 ln. 62-col. 4 ln. 16, col. 10 lns. 11-27, col. 11 lns. 25-30, col. 19 lns 34-37, col. 22 lns 7-34, col. 25 lns. 33-44, Fig. 1-19 and description thereof in addition to other related/pertinent descriptions)

the filtering utilizes compression; (e.g. col. 3 lns. 31-45, col. 3 ln. 62-col. 4 ln. 16, col. 10 lns. 11-27, col. 11 lns. 25-30, col. 19 lns 34-37, col. 22 lns 7-34, col. 25 lns. 33-44, Fig. 1-19 and description thereof in addition to other related/pertinent descriptions)

the filtering identifies certain one or more frequencies in connection with which power is applied, thereby resulting in the removal of the power from the transmission signal at each frequency in the plurality of frequencies to be avoided; (e.g. col. 3 lns. 31-45, col. 3 ln. 62-col. 4 ln. 16, col. 10 lns. 11-27, col. 11 lns. 25-30, col. 19 lns 34-37, col. 22 lns 7-34, col. 25 lns. 33-44, Fig. 1-19 and description thereof in addition to other related/pertinent descriptions)

the removal of power from the transmission signal at each frequency in the plurality of frequencies to be avoided is accomplished by an adjustment in relation to power previously used in connection with the transmission signal; (e.g. col. 3 lns. 31-45, col. 3 ln. 62-col. 4 ln. 16, col. 10 lns. 11-27, col. 11 lns. 25-30, col. 19 lns 34-37, col. 22 lns 7-34, col. 25 lns. 33-44, Fig. 1-19 and description thereof in addition to other related/pertinent descriptions)

the removal of power from the transmission signal at each frequency in the plurality of frequencies is accomplished by adjusting a processing of the transmission signal so that power that was previously used in connection with the transmission signal at each frequency in the plurality of frequencies to be avoided, is no longer used in connection with the transmission signal at each frequency in the plurality of frequencies to be avoided; (e.g. col. 3 lns. 31-45, col. 3 ln. 62-col. 4 ln. 16, col. 10 lns. 11-27, col. 11 lns. 25-30, col. 19 lns 34-37, col. 22 lns 7-34, col. 25 lns. 33-44, Fig. 1-19 and description thereof in addition to other related/pertinent descriptions)

the removal of power from the transmission signal at each frequency in the plurality of frequencies to be avoided is accomplished by setting a waveform profile that results in no power being applied in connection with the transmission signal at each frequency in the plurality of frequencies to be avoided; (e.g. col. 3 lns. 31-45, col. 3 ln. 62-col. 4 ln. 16, col. 10 lns. 11-27, col. 11 lns. 25-30, col. 19 lns 34-37, col. 22 lns 7-34, col. 25 lns. 33-44, Fig. 1-19 and description thereof in addition to other related/pertinent descriptions)

the removal of power from the transmission signal at each frequency in the plurality of frequencies to be avoided is accomplished by pre-processing the transmission signal, before any power is applied, so that power, which would otherwise be applied in connection with the transmission signal at each frequency in the plurality of frequencies, is not applied in connection with the transmission signal at each frequency in the plurality of frequencies to be avoided; (e.g. col. 3 lns. 31-45, col. 3 ln. 62-col. 4 ln. 16, col. 10 lns. 11-27, col. 11 lns. 25-30, col. 19 lns 34-37, col. 22 lns 7-34, col. 25 lns. 33-44, Fig. 1-19 and description thereof in addition to other related/pertinent descriptions)

the removal of power from the transmission signal at each frequency in the plurality of frequencies to be avoided is accomplished by pre-processing the transmission signal, before any power is applied, so that no power is applied in connection with the transmission signal at each frequency in the plurality of frequencies to be avoided; (e.g. col. 3 lns. 31-45, col. 3 ln. 62-col. 4 ln. 16, col. 10 lns. 11-27, col. 11 lns. 25-30, col. 19 lns 34-37, col. 22 lns 7-34, col. 25 lns. 33-44, Fig. 1-19 and description thereof in addition to other related/pertinent descriptions)

the transmission signal is generated so as to not include power at each frequency in the plurality of frequencies to be avoided; (e.g. col. 3 lns. 31-45, col. 3 ln. 62-col. 4 ln. 16, col. 10 lns. 11-27, col. 11 lns. 25-30, col. 19 lns 34-37, col. 22 lns 7-34, col. 25 lns. 33-44, Fig. 1-19 and description thereof in addition to other related/pertinent descriptions)

the transmission signal is generated so as to not include power at each frequency in the plurality of frequencies to be avoided, thereby resulting in the removal of the power from the transmission signal at each frequency in the plurality of frequencies to be avoided; (e.g. col. 3 lns. 31-45, col. 3 ln. 62-col. 4 ln. 16, col. 10 lns. 11-27, col. 11 lns. 25-30, col. 19 lns 34-37, col. 22 lns 7-34, col. 25 lns. 33-44, Fig. 1-19 and description thereof in addition to other related/pertinent descriptions)

the transmission signal is pre-processed so as to not include power at each frequency in the plurality of frequencies to be avoided, thereby resulting in the removal of the power from the transmission signal at each frequency in the plurality of frequencies to be avoided; (e.g. col. 3 lns. 31-45, col. 3 ln. 62-col. 4 ln. 16, col. 10 lns. 11-27, col. 11 lns. 25-30, col. 19 lns 34-37, col. 22 lns 7-34, col. 25 lns. 33-44, Fig. 1-19 and description thereof in addition to other related/pertinent descriptions)

the filtering is performed using an output filter; (e.g. col. 3 lns. 31-45, col. 3 ln. 62-col. 4 ln. 16, col. 10 lns. 11-27, col. 11 lns. 25-30, col. 19 lns 34-37, col. 22 lns 7-34, col. 25 lns. 33-44, Fig. 1-19 and description thereof in addition to other related/pertinent descriptions)

the filtering is performed using an optimal matched filter; (e.g. col. 3 lns. 31-45, col. 3 ln. 62-col. 4 ln. 16, col. 10 lns. 11-27, col. 11 lns. 25-30, col. 19 lns 34-37, col. 22 lns 7-34, col. 25 lns. 33-44, Fig. 1-19 and description thereof in addition to other related/pertinent descriptions)

the filtering is performed using a band selection filter; (e.g. col. 3 lns. 31-45, col. 3 ln. 62-col. 4 ln. 16, col. 10 lns. 11-27, col. 11 lns. 25-30, col. 19 lns 34-37, col. 22 lns 7-34, col. 25 lns. 33-44, Fig. 1-19 and description thereof in addition to other related/pertinent descriptions)

the filtering is performed using a median filter; or (e.g. col. 3 lns. 31-45, col. 3 ln. 62-col. 4 ln. 16, col. 10 lns. 11-27, col. 11 lns. 25-30, col. 19 lns 34-37, col. 22 lns 7-34, col. 25 lns. 33-44, Fig. 1-19 and description thereof in addition to other related/pertinent descriptions)

the filtering is performed using a nonlinear filter. (e.g. col. 3 lns. 31-45, col. 3 ln. 62-col. 4 ln. 16, col. 10 lns. 11-27, col. 11 lns. 25-30, col. 19 lns 34-37, col. 22 lns 7-34, col. 25 lns. 33-44, Fig. 1-19 and description thereof in addition to other related/pertinent descriptions)

92. (New) The method of claim 19, wherein the removal of power from the transmission signal at each frequency in the plurality of frequencies to be avoided is accomplished by adjusting a processing of the transmission signal so that certain power that was previously used in connection with the transmission signal at each frequency in the plurality of frequencies to be avoided before the instruction is received, is no longer used in connection with the transmission signal at each frequency in the plurality of frequencies to be avoided in accordance with the instruction. (e.g. col. 3 lns. 31-45, col. 3

ln. 62-col. 4 ln. 16, col. 10 lns. 11-27, col. 11 lns. 25-30, col. 19 lns 34-37, col. 21, lines 41-65, col. 22 lns 7-34, col. 25 lns. 33-44, Fig. 1-19 and description thereof in addition to other related/pertinent descriptions)

93. (New) The method of claim 19, wherein the removal of power from the transmission signal at each frequency in the plurality of frequencies to be avoided is accomplished by adjusting a processing of the transmission signal so that certain power that was previously used in connection with the transmission signal at each frequency in the plurality of frequencies to be avoided before the instruction is received, is no longer used in connection with the transmission signal at each frequency in the plurality of frequencies to be avoided in accordance with the instruction, which specifies at least one frequency to use so as to avoid using the plurality of frequencies to be avoided in order to transmit to the second node. (e.g. col. 3 lns. 31-45, col. 3 ln. 62-col. 4 ln. 16, col. 10 lns. 11-27, col. 11 lns. 25-30, col. 19 lns 34-37, col. 21, lines 41-65, col. 22 lns 7-34, col. 25 lns. 33-44, Fig. 1-19 and description thereof in addition to other related/pertinent descriptions)

94. (New) The method of claim 19, wherein network forwarding decisions are guided using instantaneous information from a media access control (MAC) layer. (e.g. col. 9, line 61-col. 10, line 11, Fig. 1 and description thereof in addition to other related/pertinent descriptions)

95. (New) The method of claim 94, wherein the network forwarding decisions are guided to eliminate a dominant end-to-end latency effect of channel access delay at at least one hop. (e.g. col. 9, line 61-col. 10, line 11, Fig. 1 and description thereof in addition to other related/pertinent descriptions)

96. (New) The method of claim 19, wherein frequency channels are reused in order to increase spatial reuse across multiple basic service sets. (e.g. col. 25, Figs. 16-19 and description thereof in addition to other related/pertinent descriptions)

97. (New) The method of claim 19, wherein RTS/CTS signaling is extended such that frequency channels are reused in order to increase spatial reuse across multiple basic service sets. (e.g. col. 25, Figs. 16-19 and description thereof in addition to other related/pertinent descriptions)

98. (New) The method of claim 19, wherein RTS/CTS signaling is extended such that frequency channels are reused in order to increase spatial reuse across multiple basic service sets, to accommodate legacy access points. (e.g. col. 25, Figs. 16-19 and description thereof in addition to other related/pertinent descriptions)

It should be noted that foregoing excerpts are set for illustrative purposes only and should not be construed as exhaustive and further should not be considered limiting to the claims in any manner whatsoever.

The Examiner is thanked for the allowable subject matter. While the Examiner has stated reasons for allowance for some of the independent claims, he did not do so for others. In response, applicant respectfully points out that features of at least some of the independent claims are not necessarily the same as those the Examiner has highlighted. Clearly, at least some of the independent claims are not necessarily limited to the features (and/or the exact language) that the Examiner has noted in the statement of reasons for allowance. Instead, each of the claims should only be limited by the language existing therein. Further, although applicant agrees with the Examiner's conclusion that these claims are allowable, applicant notes that the claims may be allowable for reasons other than those identified by the Examiner and does not necessarily concede that the Examiner's characterizations of the terms of the claims and the prior art are correct. Each of the claims stands on its own merits and is patentable because of the combination it recites and not because of the presence or absence of any one particular element. The Examiner's statement was not prepared by applicant and only contains the Examiner's possible positions in one or more reasons for allowability. Thus, any interpretation with respect to the Examiner's statement of reasons for allowance should not be imputed to the applicant.

It is believed that all of the pending issues have been addressed. It should be noted that the absence of a reply to a specific rejection, issue, or comment does not signify agreement with or concession of that rejection, issue, or comment. In addition, because the arguments made above may not be exhaustive, there may be reasons for patentability of any or all pending claims (or other claims) that have not been expressed. Still yet, nothing in this reply should be construed as intention to concede any issue with regard to any claim, except as specifically stated in this reply. Finally, it should be noted that no claim is intended to be construed under 35 U.S.C. 112, paragraph 6.

Respectfully submitted,



Dated: 17 Jan 2019

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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
15/898,404	02/16/2018	Jerry D. Burchfiel	USTAP030D.RI	8522

92045 7590 12/26/2018

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EXAMINER	
NGUYEN, MINH DIEU T	

ART UNIT	PAPER NUMBER
3992	

NOTIFICATION DATE	DELIVERY MODE
12/26/2018	ELECTRONIC

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

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

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

eofficeaction@appcoll.com
pcaldwell@thecaldwellfirm.com

Office Action Summary	Application No. 15/898,404	Applicant(s) Burchfiel, Jerry D.	
	Examiner MINH DIEU T NGUYEN	Art Unit 3992	AIA 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 2/16/2018.

☐ 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) 1-42 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) 1-42 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 _____ 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 7/31/2018.

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

4) ☐ Other: _____.

Notice of Pre-AIA or AIA Status

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

DETAILED ACTION

1. The instant application, Application No. 15/898,404 (hereinafter the '404 application), is a reissue of U.S. Application No. 10/689,763, issued on January 27, 2009 as U.S. 7,483,711 (hereinafter the '711 patent), which claims benefit under 35 U.S.C. §119(e) of Provisional U.S. Patent Application No. 60/420,930 filed on October 24, 2002.

2. Claims 1-42 are pending, where claims 22-42 are newly added claims.

3. The present application is being examined under the pre-AIA first to invent provisions with respect to 35 U.S.C. 102, 35 U.S.C. 103, and 35 U.S.C. 112. Because the instant application is a reissue application filed on or after September 16, 2012, all references to 35 U.S.C. 251 and 37 CFR 1.172, 1.175, and 3.73 are to the current provisions.

4. Applicant is reminded of the continuing obligation under 37 CFR 1.178(b), to timely apprise the Office of any prior or concurrent proceeding in which Patent No. 7,483,711 is or was involved. These proceedings would include interferences, reissues, reexaminations, and litigation.

Applicant is further reminded of the continuing obligation under 37 CFR 1.56, to timely apprise the Office of any information which is material to patentability of the claims under consideration in this reissue application.

These obligations rest with each individual associated with the filing and prosecution of this application for reissue. See also MPEP §§ 1404, 1442.01 and 1442.04.

5. Applicant is notified that any subsequent amendment to the specification and/or claims must comply with 37 CFR 1.173(b).

Applicant is reminded that the maximum term of the original patent is fixed at the time the patent is granted. While the term may be subsequently shortened, e.g., through the filing of a terminal disclaimer, it cannot be extended through the filing of a reissue. Accordingly, a deletion in a reissue application of an earlier-obtained benefit claim under 35 U.S.C. 120 will not operate to lengthen the term of the patent to be reissued (see MPEP 1405).

Information Disclosure Statement

6. The information disclosure statement (IDS) submitted on July 31, 2018 has been considered by the examiner.

Claim Rejections - 35 USC § 112

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

> (b) CONCLUSION.—The specification shall conclude with one or more claims particularly pointing out and distinctly claiming the subject matter which the inventor or a joint inventor regards as the invention.
>
> The following is a quotation of 35 U.S.C. 112 (pre-AIA), second paragraph:
>
> The specification shall conclude with one or more claims particularly pointing out and distinctly claiming the subject matter which the applicant regards as his invention.

8. Claims 19-42 are rejected under 35 U.S.C. 112(b) or 35 U.S.C. 112 (pre-AIA), second paragraph, as being indefinite for failing to particularly point out and distinctly claim the subject matter which the inventor or a joint inventor, or for pre-AIA the applicant regards as the invention.

Claim 19 recites "filtering a transmission signal to remove power from the transmission signal at each frequency in the plurality of frequencies". It is unclear whether "each frequency in the plurality of frequencies" are the frequencies to be avoided to transmit to the second node or not. If they are the same, as the specification discloses ('711 Patent: 4:6-8), then it is suggested to amend as --filtering a transmission signal to remove power from the transmission signal at each avoided frequency in the plurality of frequencies--.

Claim 19 further recites "transmitting the transmission signal to the second node". It is unclear whether "the transmission signal" to be transmitted to the second node is the one before being filtered or after it is being filtered. At least from the specification ('711 Patent, 4: 8-9), it should be amended to recite --transmitting the filtered transmission signal to the second node--.

The appropriate correction is required for every occurrence of "transmission signal" in all dependent claims that depend on claim 19.

Oath/Declaration

9. The reissue oath/declaration filed with this application is defective (see 37 CFR 1.175 and MPEP § 1414) because of the following:

The declaration does not only indicate the claim number having an error, but also fails to indicate what the error is.

It is suggested that the declaration should at least indicate claim 22 being added to claim more than what was being claimed in the patent.

Claim Rejections - 35 USC § 251

10. 35 U.S.C. 251(a) reads as follows:

> Whenever any patent is, through error, deemed wholly or partly inoperative or invalid, by reason of a defective specification or drawing, or by reason of the patentee claiming more or less than he had a right to claim in the patent, the Director shall, on the surrender of such patent and the payment of the fee required by law, reissue the patent for the invention disclosed in the original patent, and in accordance with a new and amended application, for the unexpired part of the term of the original patent. No new matter shall be introduced into the application for reissue.

11. Claims 1-42 are rejected as being based upon a defective reissue declaration under 35 U.S.C. 251 as set forth above. See 37 CFR 1.175.

The nature of the defect(s) in the declaration is set forth in the discussion above in paragraph 9.

Claim Rejections - 35 USC § 102

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

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

13. Claim 19 is rejected under pre-AIA 35 U.S.C. 102(b) as being anticipated by Gendel et al. (US Patent 6,115,408).

Gendel discloses a method for managing interference in a radio communications network *(i.e., an apparatus and method that is capable of controlling the transmission power levels to optimize power consumption, minimize communication interference with neighboring devices and increase data security, Gendel: 3: 15-19),* comprising the steps of:

receiving at a first node in the radio communications network an instruction transmitted from a second node in the radio communications network to avoid using a plurality of frequencies to transmit to the second node *(i.e., primary system 102 with plurality of communication subsystems 122, 124 communicates with secondary systems 104, 106, each includes communication subsystems 132, 134, Gendel: Fig. 1; 6:65-7:37. Each subsystem detects the occurrence or non-occurrence of a reception error from received data, identifies a used segment in which the reception error occurred, replaces the particular used segment (e.g., an erred segment) and all of its hopping frequencies with an unused segment, Gendel: Fig. 2A and 2B; 7:14-8:12)*

filtering a transmission signal to remove power from the transmission signal at each frequency in the plurality of frequencies *(i.e., receive circuit 311 selectively amplifies filtered signal, Gendel: 8:29-49; Fig. 3)*; and

transmitting the transmission signal to the second node *(i.e., spreading code control unit transmits data, Gendel: 8:50-9:7).*

Allowable Subject Matter

14. The following is a statement of reasons for the indication of allowable subject matter:

a) As to claim 1, the prior art of record does not anticipate or render obvious the limitation of "subtracting the power level for each the frequency from a power limit to produce a power differential for the each frequency"; and "instructing a second node in the radio communications network to avoid using a transmission frequency corresponding to a non-positive power differential in the plurality of power differentials to transmit to the first node".

b) Claims 2-18 depend on claim 1 and are allowable based on the same rationale applied against claim 1.

c) Claims 20, 22 would be allowable if rewritten to overcome the rejection(s) under 35 U.S.C. 112(b) or 35 U.S.C. 112 (pre-AIA), 2nd paragraph, set forth in this Office action and to include all of the limitations of the base claim and any intervening claims.

As to claim 20, the prior art of record does not anticipate or render obvious the limitation of "receiving an optimal waveform profile from the second node, the optimal waveform profile being based on a plurality of power measurements for the plurality of frequencies and a power limit".

As to claim 22, the prior art of record does not anticipate or render obvious the limitation of "wherein the transmission signal is a first transmission signal that is transmitted using a first frequency and an 802.11-based orthogonal frequency-division multiplexing (OFDM) protocol via at least one directional antenna of a plurality of directional antennas, using a first power that is based on at least one of the one or more data structures; and further comprising: transmitting, using a second frequency and the 802.11-based OFDM protocol, a second transmission signal, simultaneously with the first transmission signal, to the third node, using a second power that is based on at least one of the one or more data structures" and "the at least one of the one or more data structures" as recited in the claim.

Conclusion

Any inquiry concerning this communication or earlier communications from the examiner should be directed to Minh Dieu Nguyen whose telephone number is (571) 272-3873. The examiner can normally be reached on 8:30am-5:00pm, M-F.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Mike Fuelling can be reached at (571) 270-1367. 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.

Signed:
/MINH DIEU NGUYEN/
Primary Examiner, Art Unit 3992

Conferees:

/MATTHEW E HENEGHAN/
Primary Examiner, Art Unit 3992

/M.F/
Supervisory Patent Examiner, Art Unit 3992

Notice of References Cited	Application/Control No. 15/898,404	Applicant(s)/Patent Under Reexamination Burchfiel, Jerry D.	
	Examiner MINH DIEU T NGUYEN	Art Unit 3992	Page 1 of 1

U.S. PATENT DOCUMENTS

*		Document Number Country Code-Number-Kind Code	Date MM-YYYY	Name	CPC Classification	US Classification
*	A	US-6115408-A	09-2000	Gendel; Alon	H04B1/713	370/343
	B					
	C					
	D					
	E					
	F					
	G					
	H					
	I					
	J					
	K					
	L					
	M					

FOREIGN PATENT DOCUMENTS

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

Index of Claims	Application/Control No.	Applicant(s)/Patent Under Reexamination
	15/898,404	Burchfiel, Jerry D.
	Examiner	**Art Unit**
	MINH DIEU T NGUYEN	3992

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

CLAIMS

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

CLAIM		DATE								
Final	Original	12/04/2018								
	1	✓								
	2	✓								
	3	✓								
	4	✓								
	5	✓								
	6	✓								
	7	✓								
	8	✓								
	9	✓								
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	33	✓								
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	35	✓								
	36	✓								
	37	✓								
	38	✓								
	39	✓								
	40	✓								
	41	✓								
	42	✓								

Search Notes	Application/Control No.	Applicant(s)/Patent Under Reexamination
	15/898,404	Burchfiel, Jerry D.
	Examiner	Art Unit
	MINH DIEU T NGUYEN	3992

CPC - Searched*		
Symbol	**Date**	**Examiner**
H04W52/04 H04W52/06 H04W52/08 H04W52/10 H04W52/12 H04W52/125 H04W52/14 H04W52/143 H04W52/146 H04W52/16 H04W52/18 H04W52/20 H04W52/22 H04W52/221 H04W52/223 H04W52/225 H04W52/226 H04W52/228 H04W52/24 H04W52/241 H04W52/242 H04W52/243 H04W52/244 H04W52/245 H04W52/246 H04W52/247 H04W52/248 H04W52/26 H04W52/262 H04W52/265	12/17/2018	MDN
H04W52/267 H04W52/28 H04W52/281 H04W52/282 H04W52/283 H04W52/285 H04W52/286 H04W52/287 H04W52/288 H04W52/30 H04W52/32 H04W52/322 H04W52/325 H04W52/327 H04W52/34 H04W52/343 H04W52/346 H04W52/36 H04W52/362 H04W52/365 H04W52/367 H04W52/38 H04W52/383 H04W52/386 H04W52/40 H04W52/42 H04W52/44 H04W52/46 H04W52/48 H04W52/50 H04W52/52 H04W52/54 H04W52/545 H04W52/56 H04W52/58 H04W52/60	12/17/2018	MDN

CPC Combination Sets - Searched*		
Symbol	**Date**	**Examiner**

US Classification - Searched*			
Class	**Subclass**	**Date**	**Examiner**
455	522	12/07/2018	MDN

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

Search Notes		
Search Notes	**Date**	**Examiner**
Review litigation search report	12/07/2018	MDN
Text and class search on EAST	12/07/2018	MDN

Search Notes	Application/Control No.	Applicant(s)/Patent Under Reexamination
	15/898,404	Burchfiel, Jerry D.
	Examiner	Art Unit
	MINH DIEU T NGUYEN	3992

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

Doc code: IDS
Doc description: Information Disclosure Statement (IDS) Filed

PTO/SB/08a (02-18)
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INFORMATION DISCLOSURE STATEMENT BY APPLICANT
(Not for submission under 37 CFR 1.99)

Application Number	15898404
Filing Date	2018-02-16
First Named Inventor	Jerry D. Burchfiel
Art Unit	3992
Examiner Name	Minh Dieu T NGUYEN
Attorney Docket Number	USTAP030D.RI

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	4328581	A	1982-05-04	Harmon et al.	Entire Document
	2	6052594	A	2000-04-18	Chuang et al.	Entire Document
	3	6115408	A	2000-09-05	Gendel et al.	Entire Document

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	1							

ALL REFERENCES CONSIDERED EXCEPT WHERE LINED THROUGH. /MD.N/

INFORMATION DISCLOSURE STATEMENT BY APPLICANT (Not for submission under 37 CFR 1.99)		
	Application Number	15898404
	Filing Date	2018-02-16
	First Named Inventor	Jerry D. Burchfiel
	Art Unit	3992
	Examiner Name	Minh Dieu T NGUYEN
	Attorney Docket Number	USTAP030D.RI

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NON-PATENT LITERATURE DOCUMENTS [Remove]

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]
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EXAMINER SIGNATURE

Examiner Signature	/MINH DIEU NGUYEN/	Date Considered	12/03/2018

*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.

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INFORMATION DISCLOSURE STATEMENT BY APPLICANT

(Not for submission under 37 CFR 1.99)

Application Number	15898404
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First Named Inventor	Jerry D. Burchfiel
Art Unit	3992
Examiner Name	Minh Dieu T NGUYEN
Attorney Docket Number	USTAP030D.RI

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.

The fee set forth in 37 CFR 1.17 (p) has been submitted herewith.

☒ A certification statement is not submitted herewith.

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	/Patrick Caldwell/	Date (YYYY-MM-DD)	2018-07-31
Name/Print	Patrick Caldwell	Registration Number	44580

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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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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EAST Search History

EAST Search History (Prior Art)

Ref #	Hits	Search Query	DBs	Default Operator	Plurals	Time Stamp
L2	29459	(H04W52/04 or H04W52/06 or H04W52/08 or H04W52/10 or H04W52/12 or H04W52/125 or H04W52/14 or H04W52/143 or H04W52/146 or H04W52/16 or H04W52/18 or H04W52/20 or H04W52/22 or H04W52/221 or H04W52/223 or H04W52/225 or H04W52/226 or H04W52/228 or H04W52/24 or H04W52/241 or H04W52/242 or H04W52/243 or H04W52/244 or H04W52/245 or H04W52/246 or H04W52/247 or H04W52/248 or H04W52/26 or H04W52/262 or H04W52/265 or H04W52/267 or H04W52/28 or H04W52/281 or H04W52/282 or H04W52/283 or H04W52/285 or H04W52/286 or H04W52/287 or H04W52/288 or H04W52/30 or H04W52/32 or H04W52/322 or H04W52/325 or H04W52/327 or H04W52/34 or H04W52/343 or H04W52/346 or H04W52/36 or H04W52/362 or H04W52/365 or H04W52/367 or H04W52/38 or H04W52/383 or H04W52/386 or H04W52/40 or H04W52/42 or H04W52/44 or H04W52/46 or H04W52/48 or H04W52/50 or H04W52/52 or H04W52/54 or H04W52/545 or H04W52/56 or H04W52/58 or H04W52/60).cpc. (H04W52/04 or H04W52/06 or H04W52/08 or H04W52/10 or H04W52/12 or H04W52/125 or H04W52/14 or H04W52/143 or H04W52/146 or H04W52/16 or H04W52/18 or H04W52/20 or H04W52/22 or H04W52/221 or H04W52/223 or H04W52/225 or H04W52/226 or H04W52/228 or H04W52/24 or H04W52/241 or H04W52/242 or H04W52/243 or H04W52/244 or H04W52/245 or H04W52/246 or H04W52/247 or H04W52/248 or H04W52/26 or H04W52/262 or H04W52/265 or H04W52/267 or H04W52/28 or H04W52/281 or H04W52/282 or H04W52/283 or H04W52/285 or H04W52/286 or H04W52/287 or H04W52/288 or H04W52/30 or H04W52/32 or H04W52/322 or H04W52/325 or H04W52/327 or H04W52/34 or H04W52/343 or H04W52/346 or H04W52/36 or H04W52/362 or H04W52/365 or H04W52/367 or H04W52/38 or H04W52/383 or H04W52/386 or H04W52/40 or H04W52/42 or H04W52/44 or H04W52/46 or H04W52/48 or H04W52/50 or H04W52/52 or H04W52/54 or	US-PGPUB; USPAT; EPO; JPO	OR	ON	2018/12/12 12:06

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L4	175445	(455/$.ccls 375/$.ccls.)	US-PGPUB; USPAT; EPO; JPO	OR	ON	2018/12/12 12:06
L5	3	L4 and ((optimal near3 waveform) with (power near3 measur$6))	US-PGPUB; USPAT; EPO; JPO	OR	ON	2018/12/12 12:06
S1	1	"7483711".pn.	US-PGPUB; USPAT; EPO; JPO	OR	ON	2018/12/03 15:12
S2	29421	(H04W52/04 or H04W52/06 or H04W52/08 or H04W52/10 or H04W52/12 or H04W52/125 or H04W52/14 or H04W52/143 or H04W52/146 or H04W52/16 or H04W52/18 or H04W52/20 or H04W52/22 or H04W52/221 or H04W52/223 or H04W52/225 or H04W52/226 or H04W52/228 or H04W52/24 or H04W52/241 or H04W52/242 or H04W52/243 or H04W52/244 or H04W52/245 or H04W52/246 or H04W52/247 or H04W52/248 or H04W52/26 or H04W52/262 or H04W52/265 or H04W52/267 or H04W52/28 or H04W52/281 or H04W52/282 or H04W52/283 or H04W52/285 or H04W52/286 or H04W52/287 or H04W52/288 or H04W52/30 or H04W52/32 or H04W52/322 or H04W52/325 or H04W52/327 or H04W52/34 or H04W52/343 or H04W52/346 or H04W52/36 or H04W52/362 or H04W52/365 or H04W52/367 or H04W52/38 or H04W52/383 or H04W52/386 or H04W52/40 or H04W52/42 or H04W52/44 or H04W52/46 or H04W52/48 or H04W52/50 or H04W52/52 or H04W52/54 or H04W52/545 or H04W52/56 or H04W52/58 or H04W52/60).cpc. (H04W52/04 or H04W52/06 or H04W52/08 or H04W52/10 or H04W52/12 or H04W52/125 or H04W52/14 or H04W52/143 or H04W52/146 or H04W52/16 or H04W52/18 or H04W52/20 or H04W52/22 or H04W52/221 or H04W52/223 or H04W52/225 or H04W52/226 or H04W52/228 or H04W52/24 or H04W52/241 or H04W52/242 or H04W52/243 or H04W52/244 or H04W52/245 or H04W52/246 or H04W52/247 or H04W52/248 or H04W52/26 or H04W52/262 or H04W52/265 or	US-PGPUB; USPAT; EPO; JPO	OR	ON	2018/12/04 13:41

		H04W52/267 or H04W52/28 or H04W52/281 or H04W52/282 or H04W52/283 or H04W52/285 or H04W52/286 or H04W52/287 or H04W52/288 or H04W52/30 or H04W52/32 or H04W52/322 or H04W52/325 or H04W52/327 or H04W52/34 or H04W52/343 or H04W52/346 or H04W52/36 or H04W52/362 or H04W52/365 or H04W52/367 or H04W52/38 or H04W52/383 or H04W52/386 or H04W52/40 or H04W52/42 or H04W52/44 or H04W52/46 or H04W52/48 or H04W52/50 or H04W52/52 or H04W52/54 or H04W52/545 or H04W52/56 or H04W52/58 or H04W52/60).cpc.				
S3	3	("4328581", "6052594", "6115408").pn.	US-PGPUB; USPAT; EPO; JPO	OR	ON	2018/12/04 13:42
S4	2	("20020022484", "20020022495").pn.	US-PGPUB; USPAT; EPO; JPO	OR	ON	2018/12/04 14:22
S5	587	S2 and (receiv$3 with (instruction signal) with (plurality near3 frequenc$3))	US-PGPUB; USPAT; EPO; JPO	OR	ON	2018/12/04 14:25
S6	8	S5 and (remov$3 with power with (plurality near3 frequenc$3))	US-PGPUB; USPAT; EPO; JPO	OR	ON	2018/12/04 14:26
S7	0	S3 and (receiv$3 with (instruction signal) with (plurality near3 frequenc$3))	US-PGPUB; USPAT; EPO; JPO	OR	ON	2018/12/04 14:52
S8	0	S3 and (remov$3 with power with (plurality near3 frequenc$3))	US-PGPUB; USPAT; EPO; JPO	OR	ON	2018/12/04 14:52
S9	0	S4 and (receiv$3 with (instruction signal) with (plurality near3 frequenc$3))	US-PGPUB; USPAT; EPO; JPO	OR	ON	2018/12/04 14:53
S10	0	S4 and (remov$3 with power with (plurality near3 frequenc$3))	US-PGPUB; USPAT; EPO; JPO	OR	ON	2018/12/04 14:53
S11	3540	(455/$.ccls 375/$.ccls.) and (receiv$3 with (instruction signal) with (plurality near3 frequenc$3))	US-PGPUB; USPAT; EPO; JPO	OR	ON	2018/12/04 14:53

S12	3540	S11 and (receiv$3 with (instruction signal) with (plurality near3 frequenc$3))	US-PGPUB; USPAT; EPO; JPO	OR	ON	2018/12/04 15:08
S13	10	S12 and (remov$3 with power with (plurality near3 frequenc$3))	US-PGPUB; USPAT; EPO; JPO	OR	ON	2018/12/04 15:08
S16	0	("4328581", "6052594", "6115408").pn. and (remov$3 with power with frequenc$3)	US-PGPUB; USPAT; EPO; JPO	OR	ON	2018/12/06 13:55
S17	0	("4328581", "6052594", "6115408").pn. and ((remov$3 delet$3)with power with frequenc$3)	US-PGPUB; USPAT; EPO; JPO	OR	ON	2018/12/06 13:56
S18	0	("4328581", "6052594", "6115408").pn. and ((remov$3 delet$3) with power with frequenc$3)	US-PGPUB; USPAT; EPO; JPO	OR	ON	2018/12/06 13:56
S19	0	("4328581", "6052594", "6115408").pn. and ((eliminat$3 discard$3 remov$3 delet$3) with power with frequenc$3)	US-PGPUB; USPAT; EPO; JPO	OR	ON	2018/12/06 13:57
S20	175445	(455/$.ccls 375/$.ccls.)	US-PGPUB; USPAT; EPO; JPO	OR	ON	2018/12/06 13:57
S21	1362	S20 and ((eliminat$3 discard$3 remov$3 delet$3) with power with frequenc$3)	US-PGPUB; USPAT; EPO; JPO	OR	ON	2018/12/06 13:58
S22	580	S20 and (((eliminat$3 discard$3 remov$3 delet$3) with power with frequenc$3) same filter$3)	US-PGPUB; USPAT; EPO; JPO	OR	ON	2018/12/06 13:59
S23	199	S22 and @ad<"20021024"	US-PGPUB; USPAT; EPO; JPO	OR	ON	2018/12/06 14:00
S24	2	S23 and (receiv$3 with (instruction signal) with us$3 with (plurality near3 frequenc$3))	US-PGPUB; USPAT; EPO; JPO	OR	ON	2018/12/06 14:02
S25	0	S23 and (receiv$3 with (instruction signal) with frequenc$3 with (primary priority))	US-PGPUB; USPAT; EPO; JPO	OR	ON	2018/12/06 14:10

S26	669	S20 and (receiv$3 with (instruction signal) with frequenc$3 with (primary priority))	US-PGPUB; USPAT; EPO; JPO	OR	ON	2018/12/06 14:11
S27	224	S26 and @ad<"20021024"	US-PGPUB; USPAT; EPO; JPO	OR	ON	2018/12/06 14:11
S28	0	S23 and S27	US-PGPUB; USPAT; EPO; JPO	OR	ON	2018/12/06 14:11
S29	165	S20 and (receiv$3 with (instruction signal) with us$3 with frequenc$3 with (primary priority))	US-PGPUB; USPAT; EPO; JPO	OR	ON	2018/12/06 14:12
S30	58	S29 and @ad<"20021024"	US-PGPUB; USPAT; EPO; JPO	OR	ON	2018/12/06 14:13
S31	14	S20 and (receiv$3 with (instruction signal) with frequenc$3 with ((primary priority) near3 user))	US-PGPUB; USPAT; EPO; JPO	OR	ON	2018/12/06 14:15
S32	2	S31 and @ad<"20021024"	US-PGPUB; USPAT; EPO; JPO	OR	ON	2018/12/06 14:15
S34	0	S17 and (receiv$3 with (instruction signal) with frequenc$3 with ((primary priority) near3 user))	US-PGPUB; USPAT; EPO; JPO	OR	ON	2018/12/06 14:18
S35	0	S16 and (receiv$3 with (instruction signal) with frequenc$3 with ((primary priority) near3 user))	US-PGPUB; USPAT; EPO; JPO	OR	ON	2018/12/06 14:18
S36	29433	(H04W52/04 or H04W52/06 or H04W52/08 or H04W52/10 or H04W52/12 or H04W52/125 or H04W52/14 or H04W52/143 or H04W52/146 or H04W52/16 or H04W52/18 or H04W52/20 or H04W52/22 or H04W52/221 or H04W52/223 or H04W52/225 or H04W52/226 or H04W52/228 or H04W52/24 or H04W52/241 or H04W52/242 or H04W52/243 or H04W52/244 or H04W52/245 or H04W52/246 or H04W52/247 or H04W52/248 or H04W52/26 or H04W52/262 or H04W52/265 or H04W52/267 or H04W52/28 or H04W52/281 or H04W52/282 or H04W52/283 or H04W52/285 or H04W52/286 or H04W52/287 or	US-PGPUB; USPAT; EPO; JPO	OR	ON	2018/12/06 15:04

		H04W52/288 or H04W52/30 or H04W52/32 or H04W52/322 or H04W52/325 or H04W52/327 or H04W52/34 or H04W52/343 or H04W52/346 or H04W52/36 or H04W52/362 or H04W52/365 or H04W52/367 or H04W52/38 or H04W52/383 or H04W52/386 or H04W52/40 or H04W52/42 or H04W52/44 or H04W52/46 or H04W52/48 or H04W52/50 or H04W52/52 or H04W52/54 or H04W52/545 or H04W52/56 or H04W52/58 or H04W52/60).cpc. (H04W52/04 or H04W52/06 or H04W52/08 or H04W52/10 or H04W52/12 or H04W52/125 or H04W52/14 or H04W52/143 or H04W52/146 or H04W52/16 or H04W52/18 or H04W52/20 or H04W52/22 or H04W52/221 or H04W52/223 or H04W52/225 or H04W52/226 or H04W52/228 or H04W52/24 or H04W52/241 or H04W52/242 or H04W52/243 or H04W52/244 or H04W52/245 or H04W52/246 or H04W52/247 or H04W52/248 or H04W52/26 or H04W52/262 or H04W52/265 or H04W52/267 or H04W52/28 or H04W52/281 or H04W52/282 or H04W52/283 or H04W52/285 or H04W52/286 or H04W52/287 or H04W52/288 or H04W52/30 or H04W52/32 or H04W52/322 or H04W52/325 or H04W52/327 or H04W52/34 or H04W52/343 or H04W52/346 or H04W52/36 or H04W52/362 or H04W52/365 or H04W52/367 or H04W52/38 or H04W52/383 or H04W52/386 or H04W52/40 or H04W52/42 or H04W52/44 or H04W52/46 or H04W52/48 or H04W52/50 or H04W52/52 or H04W52/54 or H04W52/545 or H04W52/56 or H04W52/58 or H04W52/60).cpc.				
S37	16	S36 and (receiv$3 with (instruction signal) with frequenc$3 with ((primary priority) near3 user))	US-PGPUB; USPAT; EPO; JPO	OR	ON	2018/12/06 15:04
S38	29433	(H04W52/04 or H04W52/06 or H04W52/08 or H04W52/10 or H04W52/12 or H04W52/125 or H04W52/14 or H04W52/143 or H04W52/146 or H04W52/16 or H04W52/18 or H04W52/20 or H04W52/22 or H04W52/221 or H04W52/223 or H04W52/225 or H04W52/226 or H04W52/228 or H04W52/24 or H04W52/241 or H04W52/242 or H04W52/243 or H04W52/244 or H04W52/245 or H04W52/246 or H04W52/247 or H04W52/248 or H04W52/26 or H04W52/262 or H04W52/265 or H04W52/267 or H04W52/28 or H04W52/281 or H04W52/282 or H04W52/283 or H04W52/285 or H04W52/286 or H04W52/287 or H04W52/288 or H04W52/30 or H04W52/32 or H04W52/322 or H04W52/325 or H04W52/327 or H04W52/34 or H04W52/343 or H04W52/346 or H04W52/36 or	US-PGPUB; USPAT; EPO; JPO	OR	ON	2018/12/06 16:31

		H04W52/362 or H04W52/365 or H04W52/367 or H04W52/38 or H04W52/383 or H04W52/386 or H04W52/40 or H04W52/42 or H04W52/44 or H04W52/46 or H04W52/48 or H04W52/50 or H04W52/52 or H04W52/54 or H04W52/545 or H04W52/56 or H04W52/58 or H04W52/60).cpc. (H04W52/04 or H04W52/06 or H04W52/08 or H04W52/10 or H04W52/12 or H04W52/125 or H04W52/14 or H04W52/143 or H04W52/146 or H04W52/16 or H04W52/18 or H04W52/20 or H04W52/22 or H04W52/221 or H04W52/223 or H04W52/225 or H04W52/226 or H04W52/228 or H04W52/24 or H04W52/241 or H04W52/242 or H04W52/243 or H04W52/244 or H04W52/245 or H04W52/246 or H04W52/247 or H04W52/248 or H04W52/26 or H04W52/262 or H04W52/265 or H04W52/267 or H04W52/28 or H04W52/281 or H04W52/282 or H04W52/283 or H04W52/285 or H04W52/286 or H04W52/287 or H04W52/288 or H04W52/30 or H04W52/32 or H04W52/322 or H04W52/325 or H04W52/327 or H04W52/34 or H04W52/343 or H04W52/346 or H04W52/36 or H04W52/362 or H04W52/365 or H04W52/367 or H04W52/38 or H04W52/383 or H04W52/386 or H04W52/40 or H04W52/42 or H04W52/44 or H04W52/46 or H04W52/48 or H04W52/50 or H04W52/52 or H04W52/54 or H04W52/545 or H04W52/56 or H04W52/58 or H04W52/60).cpc.				
S39	16	S38 and (receiv$3 with (instruction signal) with frequenc$3 with ((primary priority) near3 user))	US-PGPUB; USPAT; EPO; JPO	OR	ON	2018/12/06 16:31
S40	0	S39 and @ad<"20021024"	US-PGPUB; USPAT; EPO; JPO	OR	ON	2018/12/06 16:31
S41	85	S38 and (((eliminat$3 discard$3 remov$3 delet$3) with power with frequenc$3) same filter$3)	US-PGPUB; USPAT; EPO; JPO	OR	ON	2018/12/06 17:17
S42	19	S41 and @ad<"20021024"	US-PGPUB; USPAT; EPO; JPO	OR	ON	2018/12/06 17:17
S43	3	("4328581", "6052594", "6115408").pn.	US-PGPUB; USPAT; EPO; JPO	OR	ON	2018/12/06 18:24
S44	0	S43 and (((eliminat$3 discard$3 remov$3 delet$3) with power with frequenc$3) same	US-PGPUB;	OR	ON	2018/12/06 18:24

		filter$3)	USPAT; EPO; JPO			
S47	29433	(H04W52/04 or H04W52/06 or H04W52/08 or H04W52/10 or H04W52/12 or H04W52/125 or H04W52/14 or H04W52/143 or H04W52/146 or H04W52/16 or H04W52/18 or H04W52/20 or H04W52/22 or H04W52/221 or H04W52/223 or H04W52/225 or H04W52/226 or H04W52/228 or H04W52/24 or H04W52/241 or H04W52/242 or H04W52/243 or H04W52/244 or H04W52/245 or H04W52/246 or H04W52/247 or H04W52/248 or H04W52/26 or H04W52/262 or H04W52/265 or H04W52/267 or H04W52/28 or H04W52/281 or H04W52/282 or H04W52/283 or H04W52/285 or H04W52/286 or H04W52/287 or H04W52/288 or H04W52/30 or H04W52/32 or H04W52/322 or H04W52/325 or H04W52/327 or H04W52/34 or H04W52/343 or H04W52/346 or H04W52/36 or H04W52/362 or H04W52/365 or H04W52/367 or H04W52/38 or H04W52/383 or H04W52/386 or H04W52/40 or H04W52/42 or H04W52/44 or H04W52/46 or H04W52/48 or H04W52/50 or H04W52/52 or H04W52/54 or H04W52/545 or H04W52/56 or H04W52/58 or H04W52/60).cpc. (H04W52/04 or H04W52/06 or H04W52/08 or H04W52/10 or H04W52/12 or H04W52/125 or H04W52/14 or H04W52/143 or H04W52/146 or H04W52/16 or H04W52/18 or H04W52/20 or H04W52/22 or H04W52/221 or H04W52/223 or H04W52/225 or H04W52/226 or H04W52/228 or H04W52/24 or H04W52/241 or H04W52/242 or H04W52/243 or H04W52/244 or H04W52/245 or H04W52/246 or H04W52/247 or H04W52/248 or H04W52/26 or H04W52/262 or H04W52/265 or H04W52/267 or H04W52/28 or H04W52/281 or H04W52/282 or H04W52/283 or H04W52/285 or H04W52/286 or H04W52/287 or H04W52/288 or H04W52/30 or H04W52/32 or H04W52/322 or H04W52/325 or H04W52/327 or H04W52/34 or H04W52/343 or H04W52/346 or H04W52/36 or H04W52/362 or H04W52/365 or H04W52/367 or H04W52/38 or H04W52/383 or H04W52/386 or H04W52/40 or H04W52/42 or H04W52/44 or H04W52/46 or H04W52/48 or H04W52/50 or H04W52/52 or H04W52/54 or H04W52/545 or H04W52/56 or H04W52/58 or H04W52/60).cpc.	US-PGPUB; USPAT; EPO; JPO	OR	ON	2018/12/06 20:53
S48	0	S47 and (substract$3 with (power near3 level) with (power near3 limit))	US-PGPUB; USPAT; EPO; JPO	OR	ON	2018/12/06 20:53

S49	3	("4328581", "6052594", "6115408").pn.	US-PGPUB; USPAT; EPO; JPO	OR	ON	2018/12/06 20:54
S50	0	S49 and (substract$3 with (power near3 level) with (power near3 limit))	US-PGPUB; USPAT; EPO; JPO	OR	ON	2018/12/06 20:54
S51	175445	(455/$.ccls 375/$.ccls.)	US-PGPUB; USPAT; EPO; JPO	OR	ON	2018/12/06 20:54
S52	0	S51 and (substract$3 with (power near3 level) with (power near3 limit))	US-PGPUB; USPAT; EPO; JPO	OR	ON	2018/12/06 20:54
S63	28311	(H04W52/04 or H04W52/06 or H04W52/08 or H04W52/10 or H04W52/12 or H04W52/125 or H04W52/14 or H04W52/143 or H04W52/146 or H04W52/16 or H04W52/18 or H04W52/20 or H04W52/22 or H04W52/221 or H04W52/223 or H04W52/225 or H04W52/226 or H04W52/228 or H04W52/24 or H04W52/241 or H04W52/242 or H04W52/243 or H04W52/244 or H04W52/245 or H04W52/246 or H04W52/247 or H04W52/248 or H04W52/26 or H04W52/262 or H04W52/265 or H04W52/267 or H04W52/28 or H04W52/281 or H04W52/282 or H04W52/283 or H04W52/285 or H04W52/286 or H04W52/287 or H04W52/288 or H04W52/30 or H04W52/32 or H04W52/322 or H04W52/325 or H04W52/327 or H04W52/34 or H04W52/343 or H04W52/346 or H04W52/36 or H04W52/362 or H04W52/365 or H04W52/367 or H04W52/38 or H04W52/383 or H04W52/386 or H04W52/40 or H04W52/42 or H04W52/44 or H04W52/46 or H04W52/48 or H04W52/50 or H04W52/52 or H04W52/54 or H04W52/545 or H04W52/56 or H04W52/58 or H04W52/60).cpc.	US-PGPUB; USPAT; EPO; JPO	OR	ON	2018/12/07 09:46
S64	3	("4328581", "6052594", "6115408").pn.	US-PGPUB; USPAT; EPO; JPO	OR	ON	2018/12/07 13:48
S65	3	S64 and (receiv$3 with (instruction signal))	US-PGPUB; USPAT; EPO; JPO	OR	ON	2018/12/07 13:48
S67	2	S65 and ((filter$3 mask$3))	USPAT	OR	OFF	2018/12/07 13:49
S68	2	S67 and transmit$6	USPAT	OR	OFF	2018/12/07

						13:50
S70	2	S64 and ((filter$3 mask$3))	USPAT	OR	OFF	2018/12/07 13:51

12/12/2018 12:30:10 PM
C:\Users\mnguyen16\Documents\EAST\Workspaces\15898404.wsp

Bibliographic Data

Application No: 15/898,404

Foreign Priority claimed: ○ Yes ◉ No

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

Verified and Acknowledged: /MINH DIEU NGUYEN/ (Examiner's Signature) | (Initials)

Title: SPECTRUM-ADAPTIVE NETWORKING

FILING or 371(c) DATE	CLASS	GROUP ART UNIT	ATTORNEY DOCKET NO.
02/16/2018	455	3992	USTAP030D.RI
RULE			

APPLICANTS

Usta Technology, LLC, Longview, TX, UNITED STATES

INVENTORS

Jerry D. Burchfiel Waltham, MA, UNITED STATES

CONTINUING DATA

This application is a REI of 10689763 10/22/2003 PAT 7483711

10689763 has PRO of 60420930 10/24/2002

FOREIGN APPLICATIONS

IF REQUIRED, FOREIGN LICENSE GRANTED**

03/07/2018

STATE OR COUNTRY

UNITED STATES

ADDRESS

The Caldwell Firm, LLC
PO Box 59655
Dept. SVIPGP
Dallas, TX 75229
UNITED STATES

FILING FEE RECEIVED

$5,360

Doc code: IDS
Doc description: Information Disclosure Statement (IDS) Filed

PTO/SB/08a (02-18)
Approved for use through 11/30/2020. OMB 0651-0031
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INFORMATION DISCLOSURE STATEMENT BY APPLICANT
(Not for submission under 37 CFR 1.99)

Application Number	15898404
Filing Date	2018-02-16
First Named Inventor	Jerry D. Burchfiel
Art Unit	3992
Examiner Name	Minh Dieu T NGUYEN
Attorney Docket Number	USTAP030D.RI

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	4328581	A	1982-05-04	Harmon et al.	Entire Document
	2	6052594	A	2000-04-18	Chuang et al.	Entire Document
	3	6115408	A	2000-09-05	Gendel et al.	Entire Document

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	1							

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INFORMATION DISCLOSURE STATEMENT BY APPLICANT (Not for submission under 37 CFR 1.99)		
	Application Number	15898404
	Filing Date	2018-02-16
	First Named Inventor	Jerry D. Burchfiel
	Art Unit	3992
	Examiner Name	Minh Dieu T NGUYEN
	Attorney Docket Number	USTAP030D.RI

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NON-PATENT LITERATURE DOCUMENTS [Remove]

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		

If you wish to add additional non-patent literature document citation information please click the Add button [Add]

EXAMINER SIGNATURE

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	15898404
	Filing Date	2018-02-16
	First Named Inventor	Jerry D. Burchfiel
	Art Unit	3992
	Examiner Name	Minh Dieu T NGUYEN
	Attorney Docket Number	USTAP030D.RI

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.

The fee set forth in 37 CFR 1.17 (p) has been submitted herewith.

☒ A certification statement is not submitted herewith.

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	/Patrick Caldwell/	Date (YYYY-MM-DD)	2018-07-31
Name/Print	Patrick Caldwell	Registration Number	44580

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.

Electronic Acknowledgement Receipt

EFS ID:	33332082
Application Number:	15898404
International Application Number:	
Confirmation Number:	8522
Title of Invention:	SPECTRUM-ADAPTIVE NETWORKING
First Named Inventor/Applicant Name:	Jerry D. Burchfiel
Customer Number:	92045
Filer:	Patrick Edgar Caldwell
Filer Authorized By:	
Attorney Docket Number:	USTAP030D.RI
Receipt Date:	31-JUL-2018
Filing Date:	16-FEB-2018
Time Stamp:	14:59:20
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)	USTAP030DRI_IDS_vF_31-Jul-2018.pdf	1052917 fca45cd7bf45d196746eff8a70347bbc44582bf9	no	4

Warnings:

Information:	
Total Files Size (in bytes):	1052917

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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.

Litigation Search Report CRU 3999

Reissue Application No: 15/898404

TO: Minh Dieu Nguyen **Location: CRU** **Art Unit: 3992** **Date: 06/19/2018**	**From: KAREN L. WARD** **Location: CRU 3999** **MDE 4B19** **Phone: (571) 272-7932** **KAREN.WARD@uspto.gov**

Search Notes

Litigation was not found for US Patent Number: 7,483,711.

1) I performed a KeyCite Search in Westlaw, which retrieves all history on the patent including any litigation.

2) I performed a search on the patent in Lexis CourtLink for any open dockets or closed cases.

3) I performed a search in Lexis in the Federal Courts and Administrative Materials databases for any cases found.

4) I performed a search in Lexis in the IP Journal and Periodicals database for any articles on the patent.

5) I performed a search in Lexis in the news databases for any articles about the patent or any articles about litigation on this patent.

Citing References (20)

Treatment	Title	Date	Type	Depth	Headnote(s)
—	**1. RADIO COMMUNICATIONS NETWORK INTERFERENCE MANAGING METHOD, INVOLVES SUBTRACTING POWER LEVEL FOR AGGREGATED SIGNAL FROM POWER LIMIT TO FORM DIFFERENTIALS AND INSTRUCTING USERS NOT TO USE NON-POSITIVE DIFFERENTIAL FREQUENCY** Out Of Plan DWPI 2004-389968+	Oct. 24, 2002	DWPI	—	—
—	**2. OPTICAL FIBER-BASED DISTRIBUTED ANTENNA SYSTEMS, COMPONENTS, AND RELATED METHODS FOR CALIBRATION THEREOF** Out Of Plan US PAT 8532492 , U.S. PTO Utility Optical fiber-based wireless systems and related components and methods are disclosed. The systems support radio frequency (RF) communications with clients over optical fiber,...	Sep. 10, 2013	Patents	—	—
—	**3. SYSTEM AND METHOD FOR WIDEBAND INTERFERENCE SUPPRESSION** Out Of Plan US PAT 8526550+ , U.S. PTO Utility A wideband interference suppression system comprises at least one signal conditioning device receiving at least one input signal having a signal of interest portion and an...	Sep. 03, 2013	Patents	—	—
—	**4. SPECTRUM-ADAPTIVE NETWORKING** Out Of Plan US PAT 8494534+ , U.S. PTO Utility The present invention increases the available spectrum in a wireless network by sharing existing allocated (and in-use) portions of the RF spectrum in a manner that minimizes the...	July 23, 2013	Patents	—	—
—	**5. FEEDBACK CONTROL FOR MULTICAST OR BROADCAST SERVICES** Out Of Plan US PAT 8478327 , U.S. PTO Utility The invention relates to a method for controlling feedback of mobile terminals receiving via an air interface of a mobile communication system a multicast or broadcast service...	July 02, 2013	Patents	—	—
—	**6. RF 044933/0544** Out Of Plan	Feb. 14, 2018	Assignments	—	—
—	**7. RF 042347/0371** Out Of Plan	May 11, 2017	Assignments	—	—
—	**8. RF 024456/0537** Out Of Plan	May 28, 2010	Assignments	—	—
—	**9. RF 023427/0436** Out Of Plan	Oct. 27, 2009	Assignments	—	—
—	**10. RF 017274/0318** Out Of Plan	Mar. 02, 2006	Assignments	—	—
—	**11. RF 014624/0196** Out Of Plan	May 12, 2004	Assignments	—	—
—	**12. RF 014638/0084** Out Of Plan	Oct. 22, 2003	Assignments	—	—

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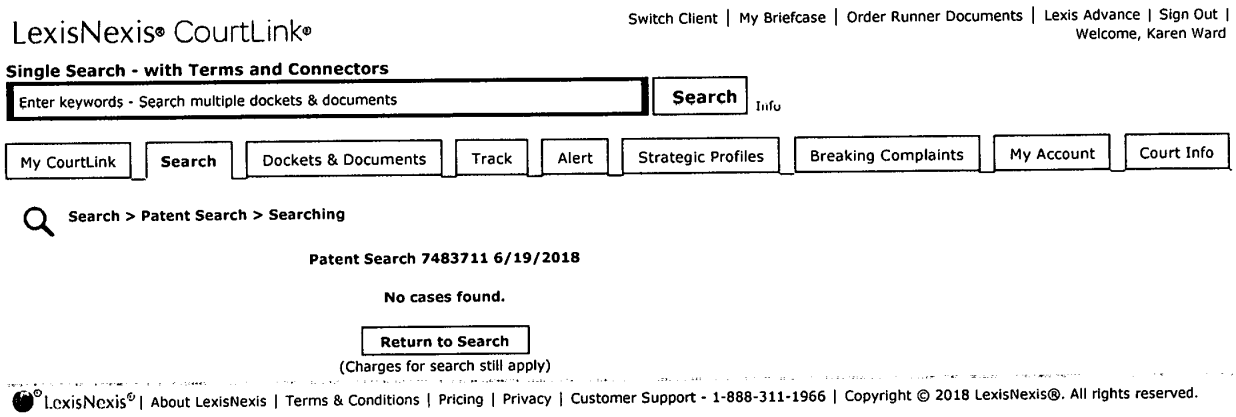
Treatment	Title	Date	Type	Depth	Headnote(s)
—	**13. PatStat 7483711**	Apr. 17, 2018	Patent Status Files	—	—
—	**14. DISTRIBUTION OF TIME-DIVISION MULTIPLEXED (TDM) MANAGEMENT SERVICES IN A DISTRIBUTED ANTENNA SYSTEM, AND RELATED COMPONENTS, SYSTEMS, AND METHODS** Out Of Plan US PAT 9973968 , U.S. PTO Utility Distribution of management services in distributed antenna systems having a central unit and remote units configured to time-division multiplex (TDM) downlink and/or uplink...	May 15, 2018	Patents	—	—
—	**15. TIME-DIVISION DUPLEXING (TDD) IN DISTRIBUTED COMMUNICATIONS SYSTEMS, INCLUDING DISTRIBUTED ANTENNA SYSTEMS (DASS)** Out Of Plan US PAT 9974074 , U.S. PTO Utility Time-division duplexing (TDD) in distributed communications systems, including distributed antenna systems (DASs) is disclosed. In one embodiment, a control circuit is provided and...	May 15, 2018	Patents	—	—
—	**16. LOCALIZATION SERVICES IN OPTICAL FIBER- BASED DISTRIBUTED COMMUNICATIONS COMPONENTS AND SYSTEMS, AND RELATED METHODS** Out Of Plan US PAT 9967032 , U.S. PTO Utility Optical fiber-based distributed communications components and systems, and related methods to provide localization services for client devices are disclosed. The localization...	May 08, 2018	Patents	—	—
—	**17. MONITORING NON-SUPPORTED WIRELESS SPECTRUM WITHIN COVERAGE AREAS OF DISTRIBUTED ANTENNA SYSTEMS (DASS)** Out Of Plan US PAT 9967754 , U.S. PTO Utility Monitoring non-supported wireless spectrum within a coverage area of a distributed antenna system (DAS) in which a listening module connected to a remote unit of the DAS monitors...	May 08, 2018	Patents	—	—
—	**18. IOT AUTOMATION AND DATA COLLECTION SYSTEM** Out Of Plan US PAT 9948349 , U.S. PTO Utility A system and method for automating a deployment site served by a distributed antenna system (DAS) is disclosed. The deployment site is configured with a plurality of remote antenna...	Apr. 17, 2018	Patents	—	—

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Treatment	Title	Date	Type	Depth	Headnote(s)
—	**19. REDUCING LOCATION-DEPENDENT DESTRUCTIVE INTERFERENCE IN DISTRIBUTED ANTENNA SYSTEMS (DASS) OPERATING IN MULTIPLE- INPUT, MULTIPLE-OUTPUT (MIMO) CONFIGURATION, AND RELATED COMPONENTS, SYSTEMS, AND METHODS** Out Of Plan US PAT 9929786 , U.S. PTO Utility Components, systems, and methods for reducing location-dependent destructive interference in distributed antenna systems operating in multiple-input, multiple-output (MIMO)...	Mar. 27, 2018	Patents	—	—
—	**20. FLEXIBLE HEAD-END CHASSIS SUPPORTING AUTOMATIC IDENTIFICATION AND INTERCONNECTION OF RADIO INTERFACE MODULES AND OPTICAL INTERFACE MODULES IN AN OPTICAL FIBER-BASED DISTRIBUTED ANTENNA SYSTEM (DAS)** Out Of Plan US PAT 9929810 , U.S. PTO Utility Flexible head-end chassis supporting automatic identification and interconnection of radio interface modules (RIMs) and optical interface modules (OIMs) in an optical fiber-based...	Mar. 27, 2018	Patents	—	—

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Patent Search 7483711 6/19/2018
No cases found.
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PATENT EXAMINER *REISSUE APPLICATION CHECKLIST* *(For applications filed on or after September 16,2012)*	Application No. 15898404	Date 06/19/2018	
	Examiner Nguyen	Art Unit 3992	SPE

DO NOT SCAN THIS DOCUMENT INTO IFW

This document should be presented to the POC for reissues based on the particular TC review policy.

THIS CHECKLIST IS PROVIDED AS AN AID TO THE REISSUE EXAMINATION PROCESS. IT SHOULD BE USED THROUGHOUT PROSECUTION AND MUST NOT BE PART OF THE PUBLICLY VIEWABLE CONTENT. THE CHECKLIST MUST BE REMOVED FROM THE FILE AT THE TIME OF ALLOWANCE AFTER SUPERVISORY APPROVAL.

Although reissue applications are considered **"SPECIAL LAWS CASES"** (MPEP § 1442), reissue application appearing on an examiner's docket report should be taken up for action as directed by your CRU management.

Prior to examining a reissue application, the examiner should review the original patent file (MPEP § 1440). If the original patent file (or any necessary parent applications) is not available in eDAN then the examiner should obtain the paper file and either review the paper file or give it to the CRU TSS for scanning into eDAN. Examination of the reissue application is directly linked to the prosecution history of the original application for the patent to be reissued.

ALL CLAIMS DIRECTED TO THE PATENTED INVENTION(S) IN THE REISSUE APPLICATION ARE SUBJECT TO A FULL EXAMINATION ON THE MERITS, INCLUDING THE RE-PRESENTED ORIGINAL CLAIMS OF THE PATENT.

I. Non-Allowance actions: Review Sections I and II (items 1-24) prior to completing a first Office action. **DO NOT** send the Reissue Application Checklist for scanning into the file wrapper or mail to applicant. All non-allowance actions are posted for counting in the same manner as in a non-provisional application. Consult your supervisor or reissue specialist for CRU specific review requirements prior to mailing all non-allowance Office actions.

II. Allowance: Complete Sections I-III (items 1-25) when preparing the reissue application for allowance. Attach the completed Reissue Application Checklist with the allowance documents in OACS. A supervisor, reissue specialist, or TSS member will remove the Checklist prior to mailing the allowance. Consult your supervisor or reissue specialist for CRU specific review requirements prior to mailing an allowance.

A "Reissue Application Guide" containing further explanations of most of the items on this checklist and is available in paper form or electronically (by e-mail or SharePoint) from your supervisor.

Answer YES or NO to the questions below, and add comments as necessary. See a CRU supervisor or reissue specialist for further assistance, if needed.

SECTION I: PRIOR TO EXAMINATION

1. **Is the reissue application under examination filed on or after 9/16/2012?**

☑ *Yes* ☐ *No* *Comments:*
If NO,DO NOT use this checklist. Contact a CRU supervisor or reissue specialist to obtain a PRE-AIA reissue checklist and guide.

2. **Is the original patent still in force, i.e., it has not expired due to the conclusion of its patent term or lapsed due to non-payment of the scheduled maintenance fees?** *A reissue application must actually issue as a reissue patent before expiration of the original patent. Accordingly, always make sure the patent has not expired; this should be monitored throughout the prosecution of the reissue application. See "Reissue Application Guideline" for methods of checking patent term, and MPEP § 1415.01.*

☑ *Yes* ☐ *No* *Comments:*
If NO, contact a CRU supervisor or reissue specialist

3. **Has the notice of the filing of the reissue application been published in the *Official Gazette* (O.G.)?** *See MPEP § 1430 and the "Reissue Application Guide" for additional information. Check PALM contents for code NRE.*

☑ *Yes* OG date ____ ☐ *No* *Comments:*
If NO, STOP examination and have your supervisor request OPAP to effect publication. Reissue RCEs are not announced in the O.G.

4. **Is the current date more than two months after the O.G. publication date?** *See MPEP 1441 and the "Reissue Application Guide" for additional information.*

☐ *Yes* ☑ *No* *Comments:*
If NO, wait until the two-month period has expired before preparing and issuing an Office action, unless directed otherwise by a written decision by Office of Patent Legal Administration (OPLA) or Office of Petitions contained in the file wrapper .

5. **Is the original patent involved in litigation?** *Information (a litigation search) should be requested from the STIC, if not found in the file. If YES, a shortened reply period of one month may have to be set by the Examiner, or prosecution may have to be suspended. See "Reissue Application Guide" and consult a CRU supervisor or reissue specialist.*

☑ *Yes* ☐ *No* *Comments:*
If NO, proceed with examination.

6. **Is the original patent currently involved in a post issuance proceeding, such as: reexamination proceeding, post grant review, inter-partes review, or covered business method review?** *To determine if the patent is undergoing reexamination, check "Continuity" information in PALM using the original patent number or the Continuity Data Map in eDAN. If YES, see a CRU supervisor or reissue specialist who will e-mail the Office of Patent Legal Administration (OPLA) for consideration of a merger of the reexam and reissue proceedings. For the post grant review the applicant is required to inform the examiner or you can interface with the PTAB webpage:*

https://ptabtrials.uspto.gov/prweb/PRWebLDAP2/HcI5xOSeX_yQRYZAnTXXCg%5B%5B/!STANDARD?UserIdentifier=searchuser*

☑ *Yes* ☐ *No* *Comments:*
If YES, contact a CRU supervisor or reissue specialist.

7. **Is there a signed reissue oath or declaration or substitute statement in lieu of a declaration? Is there a signed consent of assignee or a statement of non-assignment?**

(a) Oath/Declaration/Substitute Statement in lieu of declaration
☑ *Yes* ☐ *No* *Comments:*
If NO, contact a CRU supervisor or reissue specialist to return the application to OPAP.

(b) Consent of Assignee
☑ *Yes* ☐ *No* *Comments:*
If NO, contact a CRU supervisor or reissue specialist to return the application to OPAP.

SECTION II: EXAMINATION

8. **Is this a reissue of a patent that was issued from an application with an effective filing date on or after March 16, 2013?**

☐ Yes ☑ No *Comments:*
If YES, then follow the AIA-FITF (First Inventor To File) rules for examination of the reissue application. Note: This does not mean that the claims are necessarily subject to the new prior art regime. See guide and consult CRU supervisor or reissue specialist if there is any question as to the effective filing date of the claims in reissue.

9. **Are the original patent file wrapper and any relevant related patent applications available through eDAN, MADRAS, or PE2E?**

☑ Yes ☐ No *Comments:*
If NO, order the paper file wrapper(s) through PALM. **NOTE:** *the original patent file wrapper must be reviewed regardless of whether the answer is "Yes" or "No". This review includes: any prior art references, restriction requirements, surrendered subject matter/recapture, rejections (including double patenting), priority claims, and determining perfection of foreign priority. See MPEP § 1440. If file is unavailable, consult a CRU supervisor or reissue specialist.*

10. **Has the original patent or the reissue application been assigned?** *The Assignee in the reissue is the applicant (37 C.F.R. 1.172) and* ***must*** *be indicated as the Applicant on the ADS and all inventors must be named in the inventor section by their legal names.*

☑ *Yes* ☐ *No* *Comments:*
If YES, check a), b), and c) below; if NO proceed to item 11.

(a) Did the applicant file an Application Data Sheet (ADS) identifying the assignee as the applicant and listing the named inventors in the inventors section by their legal names?

☑ *Yes* ☐ *No* *Comments:*
If NO, object to the ADS or lack thereof.

(b) Did the applicant establish ownership of the patent by filing a Statement under 37 CFR 3.73(c) (or form PTO/AIA/96) signed by, or on behalf of, the assignee(s) pursuant to 37 CFR 3.73(c)(2)-(d)(3)? *See MPEP § 1410.02 and the "Reissue Application Guide" for additional information.*

☑ *Yes* ☐ *No* *Comments:*
If NO, object to the application under 37 CFR 1.172(a), using form paragraph 14.16-14.16.06.

(c) Did the applicant file a Consent of Assignee that is signed by all of the assignees (37 CFR 1.172(a) (or PTO form PTO/AIA/53)? *See MPEP § 1410.02 and the "Reissue Application Guide" for additional information.*

☑ *Yes* ☐ *No* *Comments:*

If NO, object to the application under 37 CFR 1.172(a), using form paragraph 14.15.
NOTE: Consent of Assignee and the Statement under 37 CFR 3.73(c) must be signed by: *i) a person having apparent authority in the organization (e.g., president, vice-president, CEO), ii) a person who establishes he/she is authorized to act on behalf of the assignee, or iii) attorney of record (must be given a power of attorney).*

11. **Is the signed AIA oath/declaration or substitute statement in lieu of a declaration (PTO/AIA/05, PTO/AIA/06, PTO/AIA/07, or its equivalent) compliant with the requirements of 37 CFR 1.63 and 1.175 for an AIA application?** *See reissue guide for the list of requirements. If NO, then reject all claims under 35 U.S.C 251 (citing all the relevant reasons).*

☑ *Yes* ☐ *No* *Comments:*
If YES, then proceed to item 12.

12. **Is there is an oath/declaration signed by Assignee (PTO/AIA/06 or its equivalent) which indicates that the original patent (i.e. patent that is being reissued) was filed under 37 CFR 1.46?** *If YES then the original patent application must have been filed on or* ***after*** *September 16, 2012. If (a) filed before 9/16/12 or (b) if the original patent application was filed after September 16, 2012 and a review of the original file wrapper does not indicate that the patent was filed under 37 CFR 1.46, then object to the oath/declaration for being defective using Form Paragraph. 14.01.06 (in OACS) followed by rejection of all the claims for being based on a defective oath/declaration Form Paragraph 14.14.*

☑ *Yes* ☐ *No* *Comments:*

13. **Does the reissue application contain a foreign priority or domestic benefit claim to an earlier filed application?**

☐ *Yes* ☑ *No* *Comments:*
If YES, an Application Data Sheet (ADS) must be filed to claim foreign priority or domestic benefit. Correction of foreign priority benefit or correction of continuing application data may need a petition for unintentional delay. See "Reissue Application Guide" for additional information.

14. **Is the reissue application a divisional or a continuation of another pending reissue application, or is there a child reissue application that is a divisional or continuation of this reissue application?** *To determine this, check the "Continuity" in eDAN or PALM, and verify that the applicant has claimed domestic benefit on the ADS. See MPEP § 1451.*

☑ *Yes* ☐ *No* *Comments:*
If YES, see "Reissue Application Guide" for special instructions. See item #15 below for restriction practice in reissue applications.

15. **Does the reissue application contain claims to more than one separate and distinct invention(s)? 37 CFR 1.176.** *Restriction among original patent claims is not permitted. See MPEP § 1450 and "Reissue Application Checklist Guideline" for additional information.*

☐ *Yes* ☐ *No* *Comments:*
If YES, a restriction requirement is permitted between the subject matter of original patent claims and newly added claims that are separate and distinct inventions (in such case, the subject matter of original patent claims is constructively elected and must be examined on the merit in the first Office action).

16. **Is there any claim that is broader in scope (in ANY respect) than the original patent claims?** *A broadened reissue claim is a claim which enlarges the scope of the claim of a patent. A reissue claim is a broadened claim if it is broader than an original claim, in any one respect. A claim containing both broadened and narrowed limitations is a broadened claim. See MPEP § 1412.03 and the "Reissue Application Guide" for additional information.*

☐ *Yes* ☐ *No* *Comments:*
If YES, proceed to item 16a-16c. If NO, proceed to item 18.

(a) **Is the oath/declaration signed by the all of the inventors or has a substitute statement in lieu of a declaration under 37 CFR 1.64 been submitted for any inventor who did not sign the declaration? Note: if the original application for patent was filed by the assignee under 37 CFR 1.46 (on or after 9/16/2012) then the assignee may make the declaration for a broadened reissue.**

☐ *Yes* ☐ *No* *Comments:*
If NO, reject all of the claims under 35 USC 251, using form paragraph 14.13.

(b) **Is there a clear intent to broaden the patent claims present within two years of the grant of the original patent?**
☐ *Yes* ☐ *No* *Comments:*
If NO, reject all claims under 35 USC 251, using form paragraph 14.12.

(c) **Does the oath/declaration identify at least one broadened claim?**
☐ *Yes* ☐ *No* *Comments:*

If NO, object to the declaration as being defective and reject all the claims under 35 USC 251, as required by 37 CFR 1.175(b), use form paragraph 14.01.06 and 14.14.

17. **Is the broadening (from Item 16 above) an attempt to "recapture" claimed subject matter which was deliberately added, or argued, to overcome a rejection in the original application or an application in the family?** *See "Reissue Application Guide" for the three-step test for impermissible recapture. Recapture is the removal of subject matter added or argued during original prosecution to successfully obtain allowability. If any claim in the reissue application deletes a claim limitation that was added or argued to obtain the original patent, the three-step recapture test should be followed to determine whether the claims must be rejected due to impermissible recapture. See MPEP § 1412.02 and the "Reissue Application Guide" for additional information.*

☐ *Yes* ☐ *No* *Comments:*
If YES, all the relevant claims to the impermissible recapture must be rejected under 35 USC 251, use form paragraph 14.17.

18. **Does the reissue application contain a protest(s) under 37 CFR 1.291(a)?**

☐ *Yes* ☑ *No* *Comments:*

If YES, the protest must be considered. Protests may be filed during the two-month period following the O.G. notice, or anytime up until the Notice of Allowance, and should be considered in the next Office Action. Check with a CRU supervisor or reissue specialist to see whether the protest is compliant. If the protest was filed after close of prosecution, check whether a petition under 1.182 was filed and granted. For handling protests, See "Reissue Application Guide" and MPEP § 1441.01 and 1901.

19. **Were there any changes made to the original patent by a Certificate of Correction dated prior to the filing of the reissue?** *See MPEP § 1411.01* and the *"Reissue Application Guide" for additional information.*

☐ *Yes* ☑ *No* *Comments:*

If YES, check to see if the changes were properly presented as a part of the original patent without any markings (i.e., no brackets or underlining). If the changes were not properly presented, the examiner must require correction by the applicant in the form of a replacement paragraph (or paragraphs).

20. **Does the reissue application include at least one error that is correctable by reissue?** *The error that supports the reissue must be an error that causes the patent to be wholly or partly inoperative or invalid. See MPEP § 1402 for examples of errors correctable by reissue (e.g., claims are too narrow or too broad, disclosure inaccuracies, correcting foreign or domestic priority claims, or solely adding dependent claims) and the "Reissue Application Guide" for additional information.*

☐ *Yes* ☐ *No* *Comments:*

If NO, reject all of the claims under 35 USC 251, see form paragraph 14.01.01-14.01.03 and 14.14.

21. **Does the reissue application include an error(s) that may NOT be corrected by reissue?** *Reissue is not a vehicle to cure all patent ills.* See *MPEP § 1402 for examples of errors not correctable by reissue (e.g., recapture of surrendered subject matter, broadening the claims after two years from the grant of the original patent, or claims directed to a non-elected invention/species after failure to timely file a divisional application in the original application in response to a restriction requirement) and the "Reissue Application Guide" for additional information.*

☐ *Yes* ☐ *No* *Comments:*

If YES, reject appropriate claims under 35 USC 251.

22. **Does the reissue application seek to provoke an interference with another patent?** *See MPEP § 1449.02 and the "Reissue Application Guide" for additional information.*

☐ *Yes* ☐ *No* *Comments:*

If YES, see a CRU supervisor or reissue specialist.

23. **Does the issue of interference estoppel (lost count doctrine) apply?** *See MPEP § 2308.03. Interference Estoppel applies to the losing party of an interference. See "Reissue Application Guide".*

☐ *Yes* ☐ *No* *Comments:*
If YES, see CRU supervisor or reissue specialist.

24. **Are all amendments to the specification, drawings and claims compliant with 37 CFR 1.173(b)-(g)?** *All amendment markings (i.e., brackets and underlining, no strikethrough) are made relative to the original patent text, and not relative to the prior amendment. A full listing of the claims is not required with each amendment in a reissue application. See amendment practice described in "Reissue Application Checklist Guideline" for proper markings. See MPEP § 1453 for additional information.*

☑ *Yes* ☐ *No* *Comments:*
If NO, object to the claims, drawings, and/or specification under 37 CFR 1.173(b).

PATENT APPLICATION FEE DETERMINATION RECORD

Substitute for Form PTO-875

Application or Docket Number: 15/898,404

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			N/A	300
SEARCH FEE (37 CFR 1.16(k), (i), or (m))	N/A	N/A	N/A			N/A	660
EXAMINATION FEE (37 CFR 1.16(o), (p), or (q))	N/A	N/A	N/A			N/A	2200
TOTAL CLAIMS (37 CFR 1.16(i))	42 minus 20 =	* 22			OR	x 100 =	2200
INDEPENDENT CLAIMS (37 CFR 1.16(h))	2 minus 3 =	*				x 460 =	0.00
APPLICATION SIZE FEE (37 CFR 1.16(s))	If the specification and drawings exceed 100 sheets of paper, the application size fee due is $310 ($155 for small entity) for each additional 50 sheets or fraction thereof. See 35 U.S.C. 41(a)(1)(G) and 37 CFR 1.16(s).						0.00
MULTIPLE DEPENDENT CLAIM PRESENT (37 CFR 1.16(j))							0.00
* If the difference in column 1 is less than zero, enter "0" in column 2.			TOTAL			TOTAL	5360

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
15/898,404	02/16/2018	2649	5520	USTAP030D.RI	42	2

CONFIRMATION NO. 8522

UPDATED FILING RECEIPT

92045
The Caldwell Firm, LLC
PO Box 59655
Dept. SVIPGP
Dallas, TX 75229

OC000000098219122

Date Mailed: 03/22/2018

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

Inventor(s)

Jerry D. Burchfiel, Waltham, MA;

Applicant(s)

Usta Technology, LLC, Longview, TX, Assignee (with 37 CFR 1.172 Interest);

Assignment For Published Patent Application

Usta Technology, LLC, Longview, TX

Power of Attorney: None

Domestic Priority data as claimed by applicant

This application is a REI of 10/689,763 10/22/2003 PAT 7483711
which claims benefit of 60/420,930 10/24/2002

Foreign Applications for which priority is claimed (You may be eligible to benefit from the **Patent Prosecution Highway** program at the USPTO. Please see http://www.uspto.gov for more information.) - None.
Foreign application information must be provided in an Application Data Sheet in order to constitute a claim to foreign priority. See 37 CFR 1.55 and 1.76.

Permission to Access Application via Priority Document Exchange: Yes

Permission to Access Search Results: Yes

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

If Required, Foreign Filing License Granted: 03/07/2018

The country code and number of your priority application, to be used for filing abroad under the Paris Convention, is **US 15/898,404**

Projected Publication Date: None, application is not eligible for pre-grant publication

Non-Publication Request: No

Early Publication Request: No

Title

SPECTRUM-ADAPTIVE NETWORKING

Preliminary Class

455

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

PROTECTING YOUR INVENTION OUTSIDE THE UNITED STATES

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

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

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

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For information on preventing theft of your intellectual property (patents, trademarks and copyrights), you may wish to consult the U.S. Government website, http://www.stopfakes.gov. Part of a Department of Commerce initiative, this website includes self-help "toolkits" giving innovators guidance on how to protect intellectual property in specific countries such as China, Korea and Mexico. For questions regarding patent enforcement issues, applicants may call the U.S. Government hotline at 1-866-999-HALT (1-866-999-4258).

LICENSE FOR FOREIGN FILING UNDER

Title 35, United States Code, Section 184

Title 37, Code of Federal Regulations, 5.11 & 5.15

GRANTED

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

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

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

NOT GRANTED

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

SelectUSA

The United States represents the largest, most dynamic marketplace in the world and is an unparalleled location for business investment, innovation, and commercialization of new technologies. The U.S. offers tremendous resources and advantages for those who invest and manufacture goods here. Through SelectUSA, our nation works to promote and facilitate business investment. SelectUSA provides information assistance to the international investor community; serves as an ombudsman for existing and potential investors; advocates on behalf of U.S. cities, states, and regions competing for global investment; and counsels U.S. economic development organizations on investment attraction best practices. To learn more about why the United States is the best country in the world to develop technology, manufacture products, deliver services, and grow your business, visit http://www.SelectUSA.gov or call +1-202-482-6800.

PATENT

IN THE UNITED STATES PATENT AND TRADEMARK OFFICE

In re application of:	Confirmation No.: 8522
Jerry D. Burchfiel	Examiner:
Application No.: 15/898,404	Art Unit: 2649
Filed: 02-16-2018	Atty. Docket No.: USTAP030D.RI
For: SPECTRUM-ADAPTIVE NETWORKING	Date: 3/15/2018

RESPONSE TO NOTICE TO FILE MISSING PARTS OF REISSUE APPLICATION

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

Examiner:

In response to the Notice to File Missing Parts of Reissue Application dated 3/8/18, applicant includes attached Consent of Assignee and includes the appropriate fee. Applicant does not believe that any additional fees are due. However, in the event that any other fees are due, the Director is hereby authorized to charge any required fees due (other than issue fees), and to credit any overpayment made, in connection with the filing of this paper to Deposit Account No. 50-4964 (Order No. USTA030D.RI).

Respectfully submitted,



Dated: 15 Mar 2018

The Caldwell Firm, LLC
PO Box 59655
Dallas, Texas 75229-0655
Telephone: (214) 734-2313
pcaldwell@thecaldwellfirm.com

Patrick E. Caldwell, Esq.
Reg. No. 44,580

PTO/AIA/53 (09-12)
Approved for use through 01/31/2020. OMB 0651-0033
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.

REISSUE APPLICATION: CONSENT OF ASSIGNEE; STATEMENT OF NON-ASSIGNMENT	Docket Number (Optional) USTAP030D.RI

This is part of the application for a reissue patent based on the original patent identified below.

Name of Patentee(s)
Jerry D. Burchfiel

Patent Number	Date Patent Issued
7,483,711	01-27-2009

Title of Invention
SPECTRUM-ADAPTIVE NETWORKING

1. [X] Filed herein is a statement under 37 CFR 3.73(c). (Form PTO/AIA/96)

2. [ ] Ownership of the patent is in the inventor(s), and no assignment of the patent is in effect.

One of boxes 1 or 2 above must be checked. If multiple assignees, complete this form for each assignee. If box 2 is checked, skip the next entry and go directly to "Name of Assignee."

The written consent of all assignees and inventors owning an undivided interest in the original patent is included in this application for reissue.

The assignee(s) owning an undivided interest in said original patent is/are Usta Technology, LLC, and the assignee(s) consents to the accompanying application for reissue.

Name of assignee/inventor (if not assigned)
Usta Technology, LLC

Signature	Date
/Andrew Gordon/	2/10/2018

Typed or printed name and title of person signing for assignee (if assigned)

Andrew Gordon, Manager

This collection of information is required by 37 CFR 1.172. 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 6 minutes to complete, including gathering, preparing, and submitting the completed application form to the USPTO. Time will vary depending upon the individual case. Any comments on the amount of time you require to complete this form and/or suggestions for reducing this burden, should be sent to the Chief Information Officer, U.S. Patent and Trademark Office, U.S. Department of Commerce, P.O. Box 1450, Alexandria, VA 22313-1450. DO NOT SEND FEES OR COMPLETED FORMS TO THIS ADDRESS. **SEND TO: Commissioner for Patents, P.O. Box 1450, Alexandria, VA 22313-1450.**

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

Privacy Act Statement

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

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

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

Electronic Patent Application Fee Transmittal

Application Number:	15898404
Filing Date:	16-Feb-2018
Title of Invention:	SPECTRUM-ADAPTIVE NETWORKING
First Named Inventor/Applicant Name:	Jerry D. Burchfiel
Filer:	Patrick Edgar Caldwell
Attorney Docket Number:	USTAP030D.RI

Filed as Large Entity

Filing Fees for Utility under 35 USC 111(a)

Description	Fee Code	Quantity	Amount	Sub-Total in USD($)
Basic Filing:				
Pages:				
Claims:				
Miscellaneous-Filing:				
LATE FILING FEE FOR OATH OR DECLARATION	1051	1	160	160
Petition:				
Patent-Appeals-and-Interference:				
Post-Allowance-and-Post-Issuance:				

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

Electronic Acknowledgement Receipt	
EFS ID:	32083039
Application Number:	15898404
International Application Number:	
Confirmation Number:	8522
Title of Invention:	SPECTRUM-ADAPTIVE NETWORKING
First Named Inventor/Applicant Name:	Jerry D. Burchfiel
Customer Number:	92045
Filer:	Patrick Edgar Caldwell
Filer Authorized By:	
Attorney Docket Number:	USTAP030D.RI
Receipt Date:	16-MAR-2018
Filing Date:	16-FEB-2018
Time Stamp:	23:49:24
Application Type:	Utility under 35 USC 111(a)

Payment information:

Submitted with Payment	yes
Payment Type	CARD
Payment was successfully received in RAM	$160
RAM confirmation Number	031918INTEFSW23510200
Deposit Account	
Authorized User	
The Director of the USPTO is hereby authorized to charge indicated fees and credit any overpayment as follows:	

File Listing:

Document Number	Document Description	File Name	File Size(Bytes)/ Message Digest	Multi Part /.zip	Pages (if appl.)
1	Transmittal Letter	USTAP030D-RI_ResponseToMissingParts_vF_15-Mar-2018.pdf	28471 9ae1ef90e9078d95e1d657f09cb41ddf65ae8eef	no	1
Warnings:					
Information:					
2	Consent of Assignee accompanying the declaration	USTAP030D-RI_Consent_of_all_assignees.pdf	309040 7a667f76a6e1bb77d8c1dab1295782ca492b2532	no	2
Warnings:					
Information:					
3	Fee Worksheet (SB06)	fee-info.pdf	30793 a05720ae44b12377d7f11a92e277894dbedd7b7d	no	2
Warnings:					
Information:					
		Total Files Size (in bytes):	368304		

This Acknowledgement Receipt evidences receipt on the noted date by the USPTO of the indicated documents, characterized by the applicant, and including page counts, where applicable. It serves as evidence of receipt similar to a Post Card, as described in MPEP 503.

New Applications Under 35 U.S.C. 111

If a new application is being filed and the application includes the necessary components for a filing date (see 37 CFR 1.53(b)-(d) and MPEP 506), a Filing Receipt (37 CFR 1.54) will be issued in due course and the date shown on this Acknowledgement Receipt will establish the filing date of the application.

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

If a timely submission to enter the national stage of an international application is compliant with the conditions of 35 U.S.C. 371 and other applicable requirements a Form PCT/DO/EO/903 indicating acceptance of the application as a national stage submission under 35 U.S.C. 371 will be issued in addition to the Filing Receipt, in due course.

New International Application Filed with the USPTO as a Receiving Office

If a new international application is being filed and the international application includes the necessary components for an international filing date (see PCT Article 11 and MPEP 1810), a Notification of the International Application Number and of the International Filing Date (Form PCT/RO/105) will be issued in due course, subject to prescriptions concerning national security, and the date shown on this Acknowledgement Receipt will establish the international filing date of the application.

UNITED STATES PATENT AND TRADEMARK OFFICE

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

APPLICATION NUMBER	FILING or 371(c) DATE	GRP ART UNIT	FIL FEE REC'D	ATTY.DOCKET.NO	TOT CLAIMS	IND CLAIMS
15/898,404	02/16/2018	2649	5360	USTAP030D.RI	42	2

CONFIRMATION NO. 8522

92045
The Caldwell Firm, LLC
PO Box 59655
Dept. SVIPGP
Dallas, TX 75229

FILING RECEIPT

OC000000097894584

Date Mailed: 03/08/2018

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

Inventor(s)

Jerry D. Burchfiel, Waltham, MA;

Applicant(s)

Usta Technology, LLC, Longview, TX, Assignee (with 37 CFR 1.172 Interest);

Assignment For Published Patent Application

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Early Publication Request: No

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UNITED STATES PATENT AND TRADEMARK OFFICE

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

APPLICATION NUMBER	FILING OR 371(C) DATE	FIRST NAMED APPLICANT	ATTY. DOCKET NO./TITLE
15/898,404	02/16/2018	Jerry D. Burchfiel	USTAP030D.RI

CONFIRMATION NO. 8522

92045
The Caldwell Firm, LLC
PO Box 59655
Dept. SVIPGP
Dallas, TX 75229

FORMALITIES LETTER

OC000000097894585

Date Mailed: 03/08/2018

NOTICE TO FILE MISSING PARTS OF REISSUE APPLICATION

Filing Date Granted

An application number and filing date have been accorded to this reissue application. The item(s) indicated below, however, are missing. Applicant is given **TWO MONTHS** from the date of this Notice within which to file all required items and pay any fees required below to avoid abandonment. Extensions of time may be obtained by filing a petition accompanied by the extension fee under the provisions of 37 CFR 1.136(a).

- Consent of the assignee is present, but is unsigned. A statement of consent bearing the signature of an official authorized to act on behalf of the assignee(s) must be provided, to comply with 37 CFR 1.172.
- Surcharge as set forth in 37 CFR 1.16(f) must be submitted.
  The surcharge is due for any one of:
  - late submission of the basic filing fee, search fee, or examination fee,
  - late submission of inventor's oath or declaration,
  - filing an application that does not contain at least one claim on filing, or
  - submission of an application filed by reference to a previously filed application.

SUMMARY OF FEES DUE:

The fee(s) required within **TWO MONTHS** from the date of this Notice to avoid abandonment is/are itemized below. No entity status discount is in effect. If applicant is qualified for small entity status, a written assertion of small entity status must be submitted to establish small entity status. (See 37 CFR 1.27). If applicant is qualified for micro entity status, an acceptable Certification of Micro Entity Status must be submitted to establish micro entity status. (See 37 CFR 1.29 and forms PTO/SB/15A and 15B.)

- $ **160** surcharge.
- $(**0**) previous unapplied payment amount.
- $ **160** TOTAL FEE BALANCE DUE.

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

Replies should be mailed to:

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

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

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

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

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

/ddfelix/

PATENT APPLICATION FEE DETERMINATION RECORD

Substitute for Form PTO-875

Application or Docket Number: 15/898,404

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			N/A	300
SEARCH FEE (37 CFR 1.16(k), (i), or (m))	N/A	N/A	N/A			N/A	660
EXAMINATION FEE (37 CFR 1.16(o), (p), or (q))	N/A	N/A	N/A			N/A	2200
TOTAL CLAIMS (37 CFR 1.16(i))	42 minus 20 =	* 22			OR	x 100 =	2200
INDEPENDENT CLAIMS (37 CFR 1.16(h))	2 minus 3 =	*				x 460 =	0.00
APPLICATION SIZE FEE (37 CFR 1.16(s))	If the specification and drawings exceed 100 sheets of paper, the application size fee due is $310 ($155 for small entity) for each additional 50 sheets or fraction thereof. See 35 U.S.C. 41(a)(1)(G) and 37 CFR 1.16(s).						0.00
MULTIPLE DEPENDENT CLAIM PRESENT (37 CFR 1.16(j))							0.00
* If the difference in column 1 is less than zero, enter "0" in column 2.			TOTAL			TOTAL	5360

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.

US007483711B2

(12) **United States Patent**
Burchfiel

(10) **Patent No.: US 7,483,711 B2**
(45) **Date of Patent: Jan. 27, 2009**

(54) **SPECTRUM-ADAPTIVE NETWORKING**

(75) Inventor: **Jerry D. Burchfiel**, Waltham, MA (US)

(73) Assignee: **BBN Technologies Corp**, Cambridge, MA (US)

(*) Notice: Subject to any disclaimer, the term of this patent is extended or adjusted under 35 U.S.C. 154(b) by 1019 days.

(21) Appl. No.: **10/689,763**

(22) Filed: **Oct. 22, 2003**

(65) **Prior Publication Data**

US 2004/0092281 A1 May 13, 2004

Related U.S. Application Data

(60) Provisional application No. 60/420,930, filed on Oct. 24, 2002.

(51) **Int. Cl.**
H04B 7/00 (2006.01)
H04Q 7/20 (2006.01)

(52) **U.S. Cl.** **455/522**; 455/68; 455/69; 455/70; 455/63.1; 455/114.2; 455/127.1; 455/452.1; 455/452.2

(58) **Field of Classification Search** 455/450–451, 455/452.1–2, 67.11–67.16, 68–70, 522, 127.1–127.5, 455/63.1, 114.2, 114.3, 296, 226.1–226.4
See application file for complete search history.

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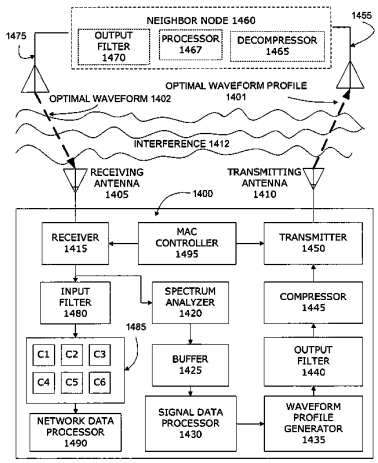
* cited by examiner

Primary Examiner—Tuan A Tran
(74) *Attorney, Agent, or Firm*—Ropes & Gray LLP

(57) **ABSTRACT**

The present invention increases the available spectrum in a wireless network by sharing existing allocated (and in-use) portions of the RF spectrum in a manner that will minimize the probability of interfering with existing legacy users. The invention provides interference temperature-adaptive waveforms, and a variety of physical and media access control protocols for generating waveforms based on measurement and characterization of the local spectrum. The invention measures the local spectrum at a receiving node, generates an optimal waveform profile specifying transmission parameters that will water-fill unused spectrum up to an interference limit without causing harmful interference to primary and legacy transmitters using the same frequency bands, and enables simultaneous transmit and receive modes at a multiplicity of transceivers in a wireless network. The invention also provides closed loop feedback control between nodes, co-site interference management, intersymbol interference mitigation, wide sense stationary baseband signaling and modulation, and power limited signaling for avoiding detection and interception.

21 Claims, 19 Drawing Sheets



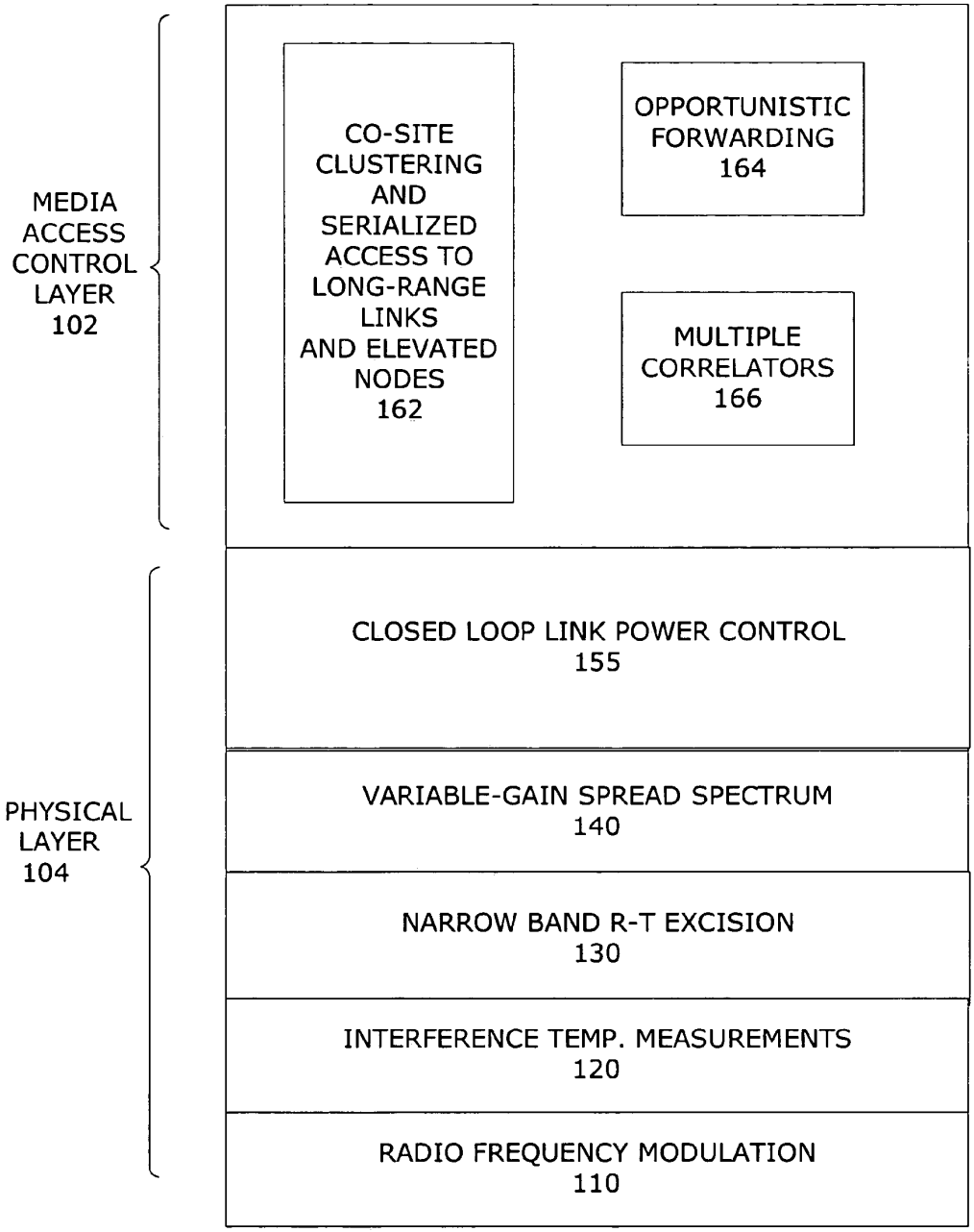

MEDIA ACCESS CONTROL LAYER 102
CO-SITE CLUSTERING AND SERIALIZED ACCESS TO LONG-RANGE LINKS AND ELEVATED NODES 162
OPPORTUNISTIC FORWARDING 164
MULTIPLE CORRELATORS 166
PHYSICAL LAYER 104
CLOSED LOOP LINK POWER CONTROL 155
VARIABLE-GAIN SPREAD SPECTRUM 140
NARROW BAND R-T EXCISION 130
INTERFERENCE TEMP. MEASUREMENTS 120
RADIO FREQUENCY MODULATION 110

FIG. 1

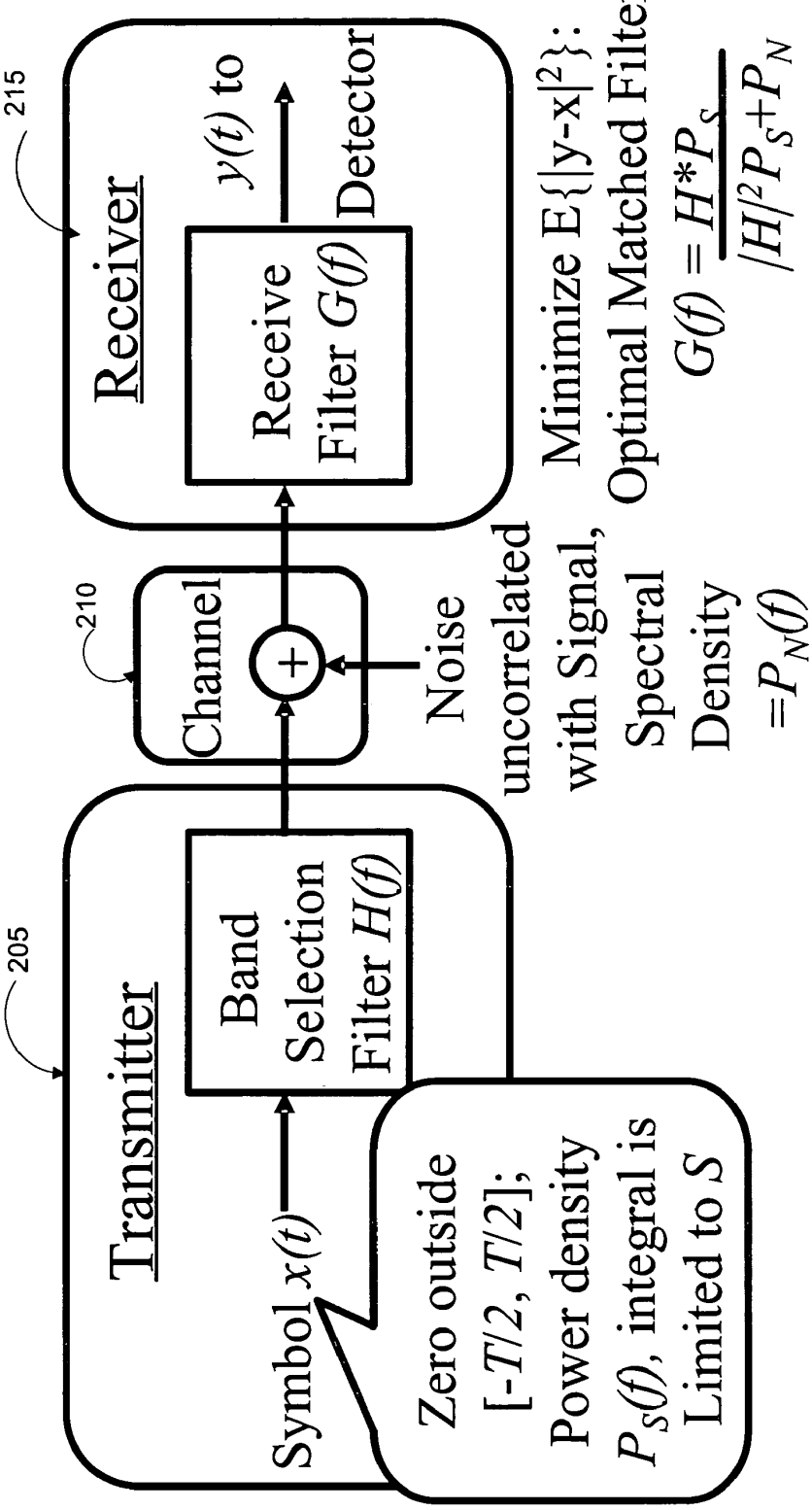

205
Transmitter
Band Selection Filter H(f)
Symbol x(t)
Zero outside [-T/2, T/2]; Power density $P_S(f)$, integral is Limited to S
210
Channel
Noise uncorrelated with Signal, Spectral Density $=P_N(f)$
215
Receiver
Receive Filter G(f)
y(t) to Detector
Minimize $E\{|y-x|^2\}$: Optimal Matched Filter
$G(f) = \frac{H^* P_S}{|H|^2 P_S + P_N}$

FIG. 2

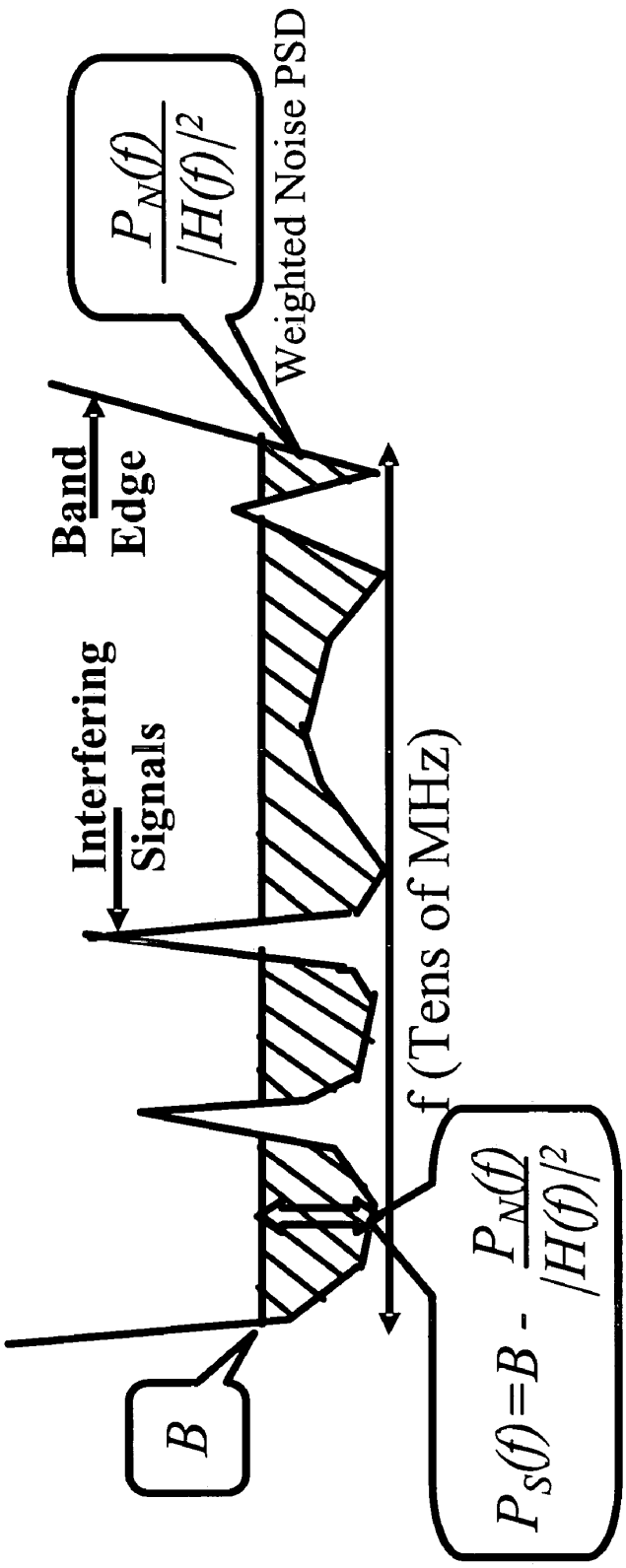

Weighted Noise PSD
$\frac{P_N(f)}{|H(f)|^2}$
Band Edge
Interfering Signals
f (Tens of MHz)
B
$P_S(f)=B-\frac{P_N(f)}{|H(f)|^2}$

FIG. 3

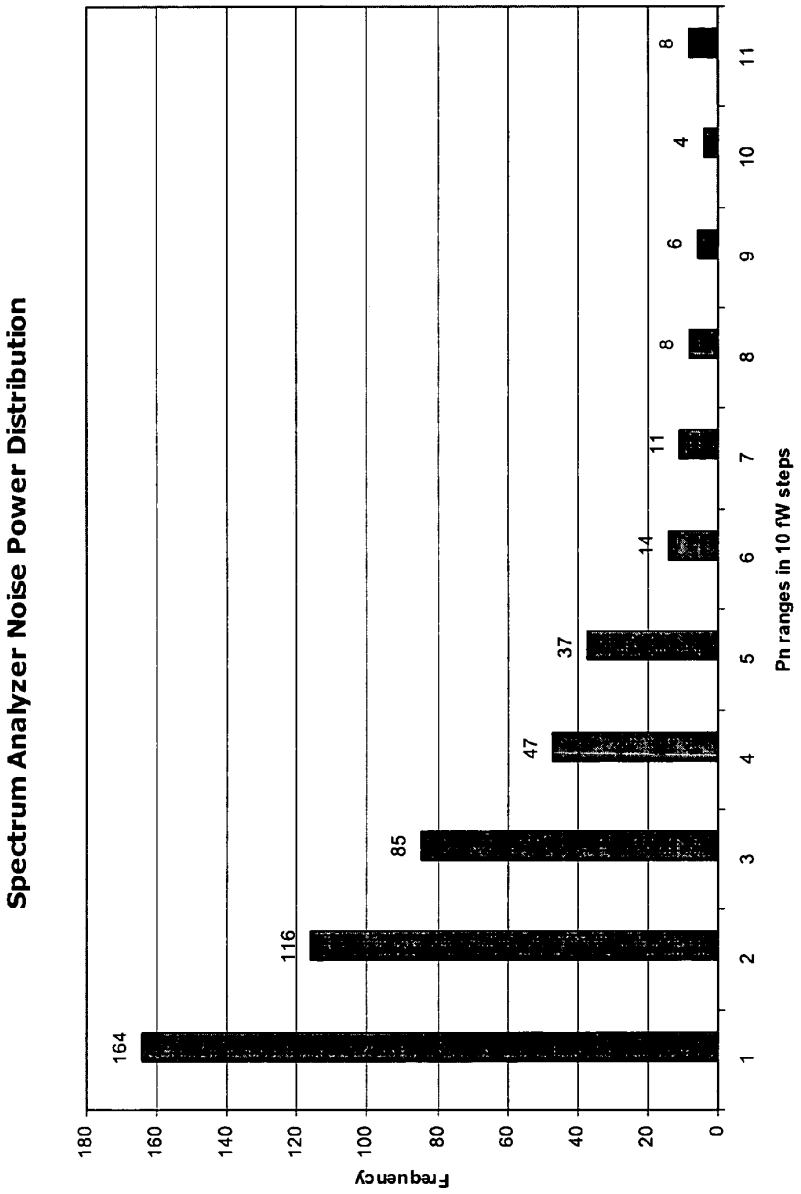

Spectrum Analyzer Noise Power Distribution
Frequency
Pn ranges in 10 fW steps
164
116
85
47
37
14
11
8
6
4
8
0
20
40
60
80
100
120
140
160
180
1
2
3
4
5
6
7
8
9
10
11

FIG. 4

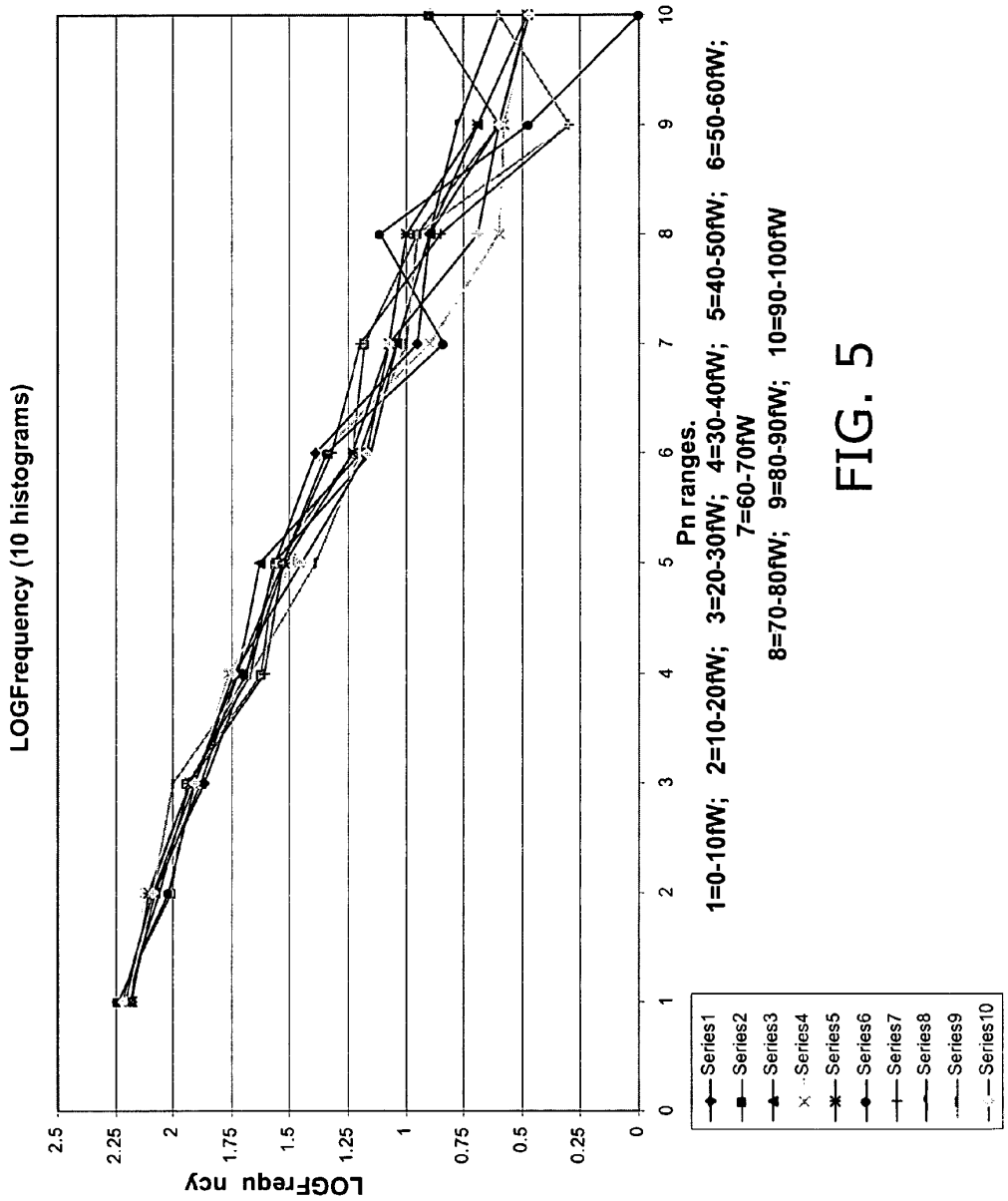

LOGFrequency (10 histograms)
LOGFrequ ncy
2.5
2.25
2
1.75
1.5
1.25
1
0.75
0.5
0.25
0
0
1
2
3
4
5
6
7
8
9
10
Pn ranges.
1=0-10fW; 2=10-20fW; 3=20-30fW; 4=30-40fW; 5=40-50fW; 6=50-60fW;
7=60-70fW
8=70-80fW; 9=80-90fW; 10=90-100fW
Series1
Series2
Series3
Series4
Series5
Series6
Series7
Series8
Series9
Series10

FIG. 5

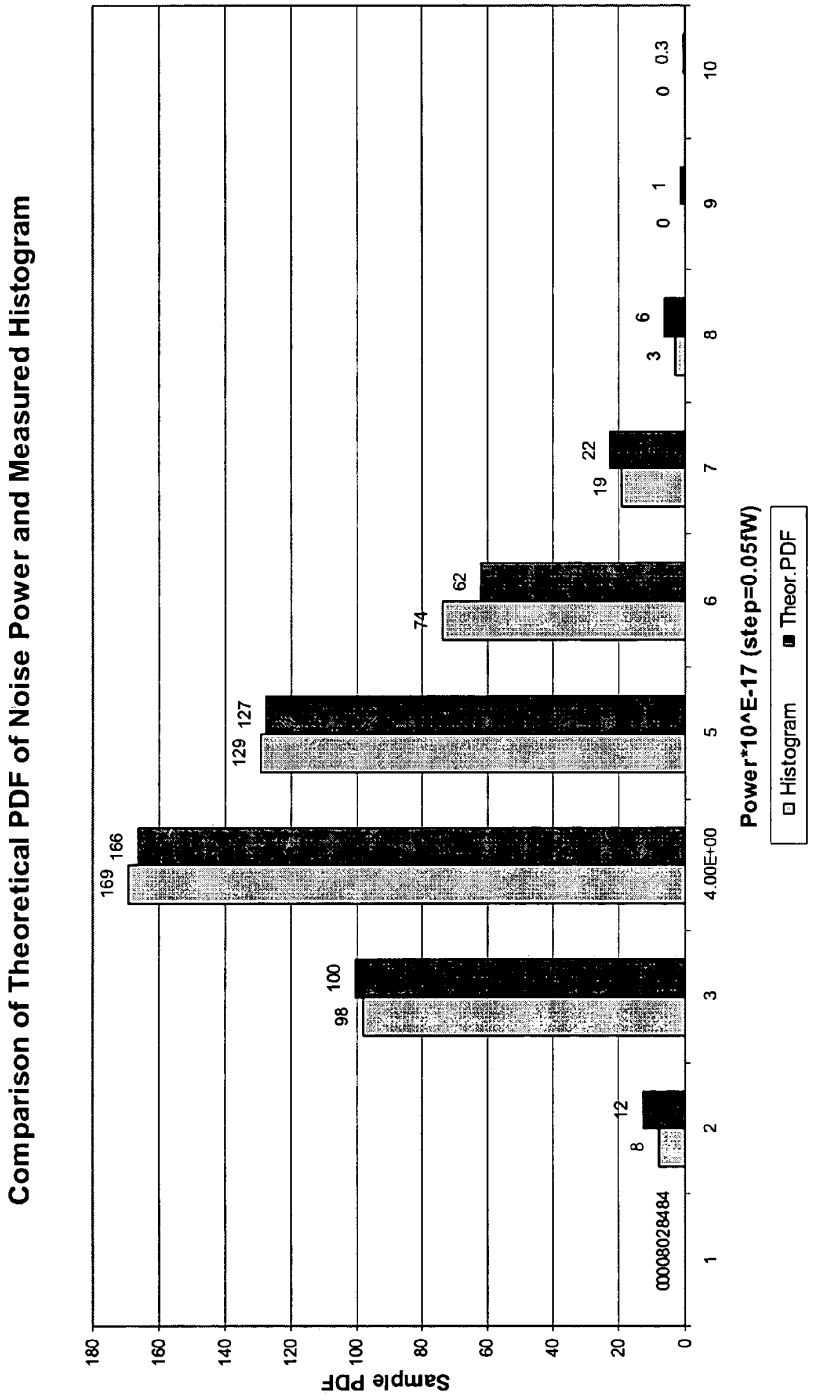

Comparison of Theoretical PDF of Noise Power and Measured Histogram
Sample PDF
Power*10^E-17 (step=0.05fW)
Histogram
Theor.PDF
4.00E+00
169
166
129
127
74
62
19
22
3
6
0
1
0
0.3
98
100
8
12
0
0
0
8
0
2
8
4
8
4

FIG. 6

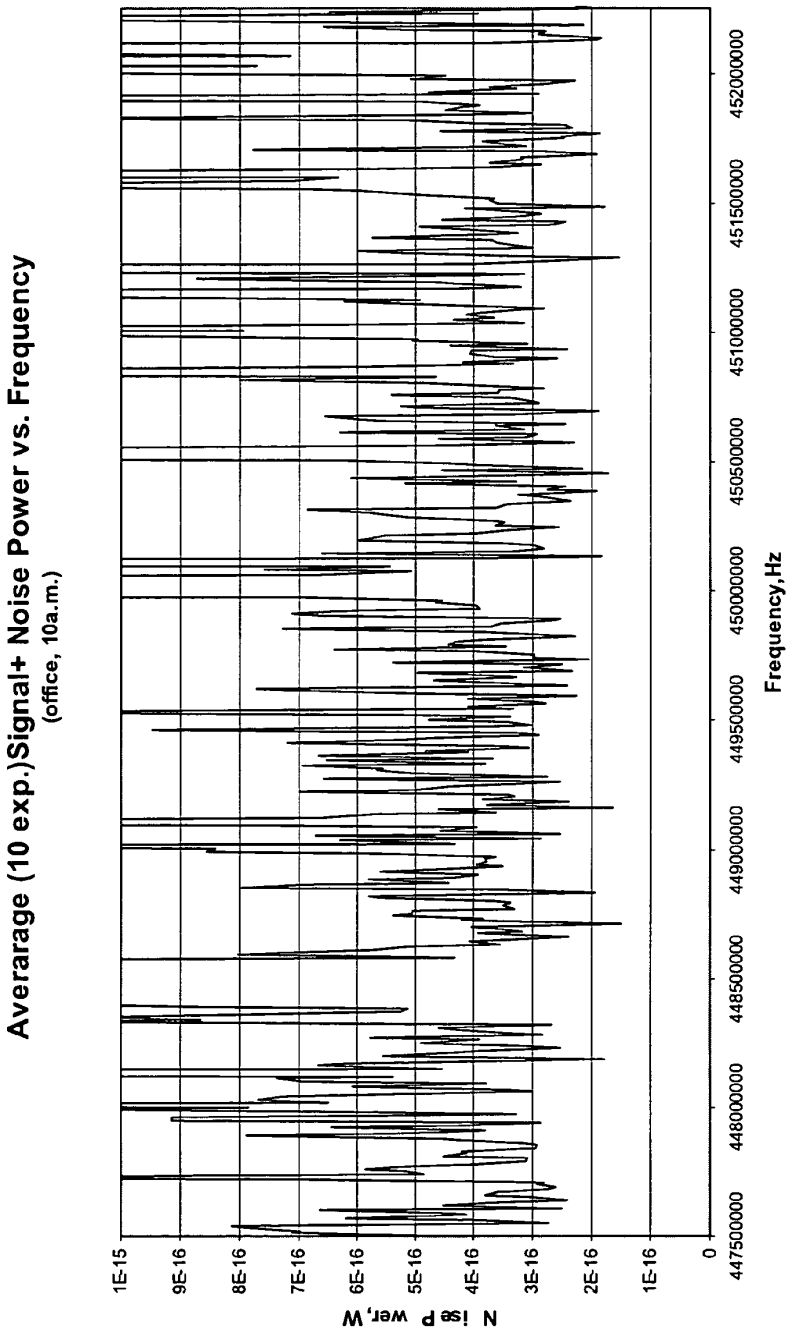

Averarage (10 exp.)Signal+ Noise Power vs. Frequency
(office, 10a.m.)
N ise P wer,W
1E-15
9E-16
8E-16
7E-16
6E-16
5E-16
4E-16
3E-16
2E-16
1E-16
0
447500000
448000000
448500000
449000000
449500000
450000000
450500000
451000000
451500000
452000000
Frequency,Hz

FIG. 7

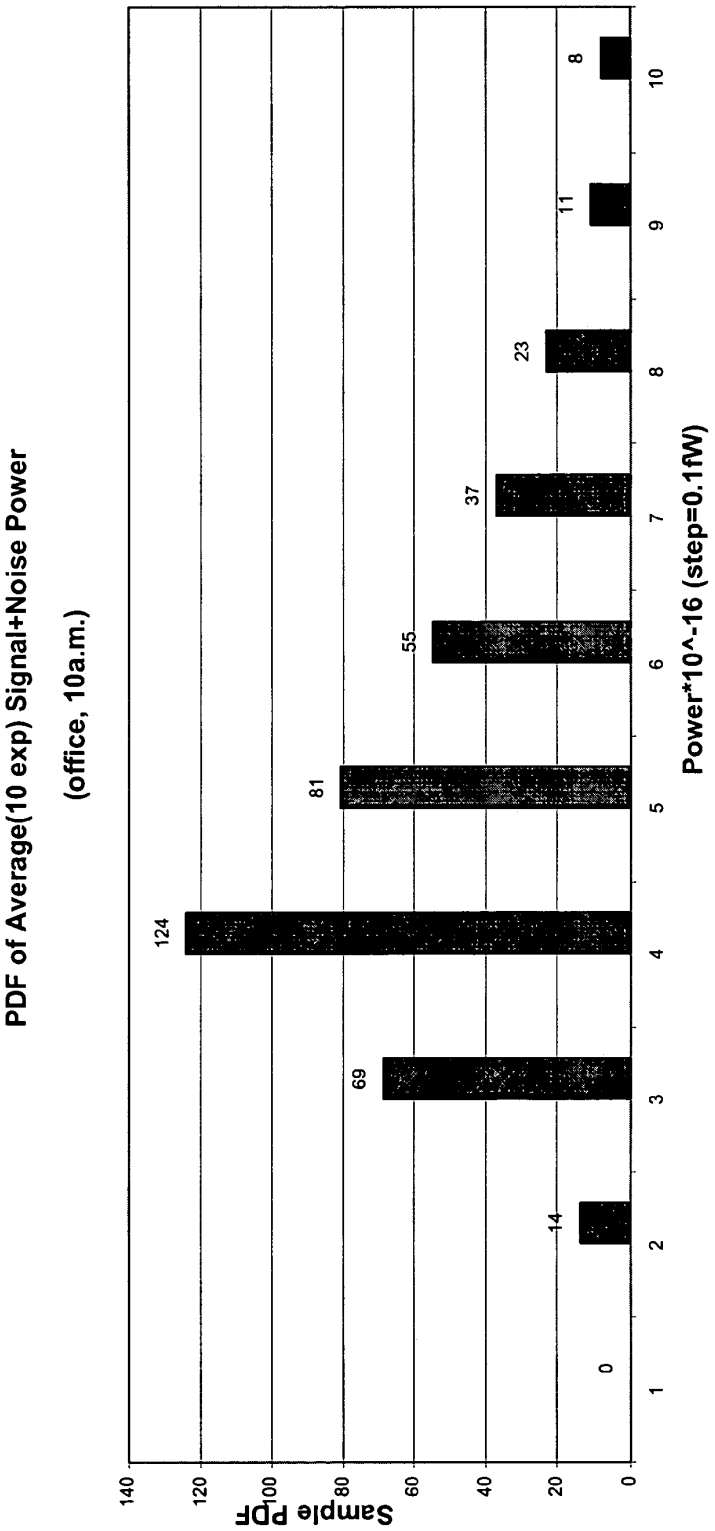

PDF of Average(10 exp) Signal+Noise Power
(office, 10a.m.)
Sample PDF
Power*10^-16 (step=0.1fW)
0
20
40
60
80
100
120
140
1
2
3
4
5
6
7
8
9
10
0
14
69
124
81
55
37
23
11
8

FIG. 8

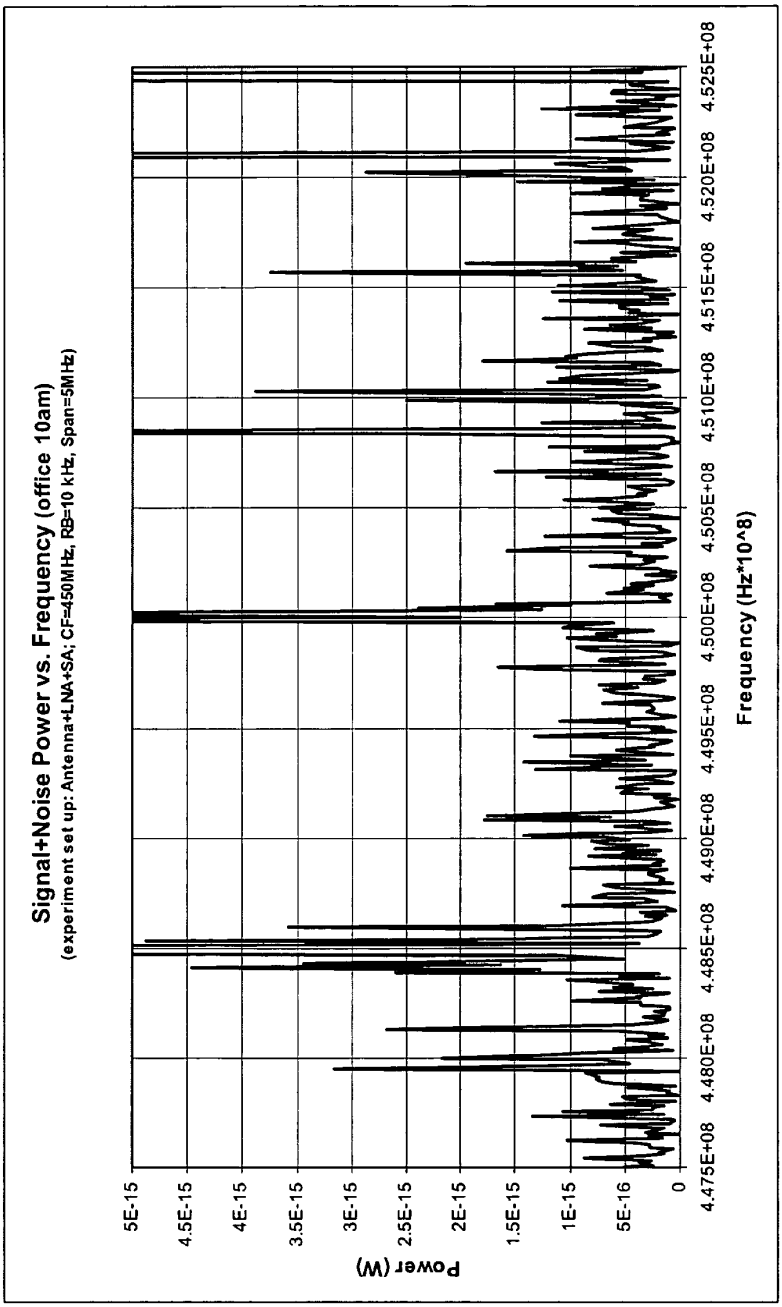

Signal+Noise Power vs. Frequency (office 10am)
(experiment set up: Antenna+LNA+SA; CF=450MHz, RB=10 kHz, Span=5MHz)
Power (W)
5E-15
4.5E-15
4E-15
3.5E-15
3E-15
2.5E-15
2E-15
1.5E-15
1E-15
5E-16
0
Frequency (Hz*10^8)
4.475E+08
4.480E+08
4.485E+08
4.490E+08
4.495E+08
4.500E+08
4.505E+08
4.510E+08
4.515E+08
4.520E+08
4.525E+08

FIG. 9

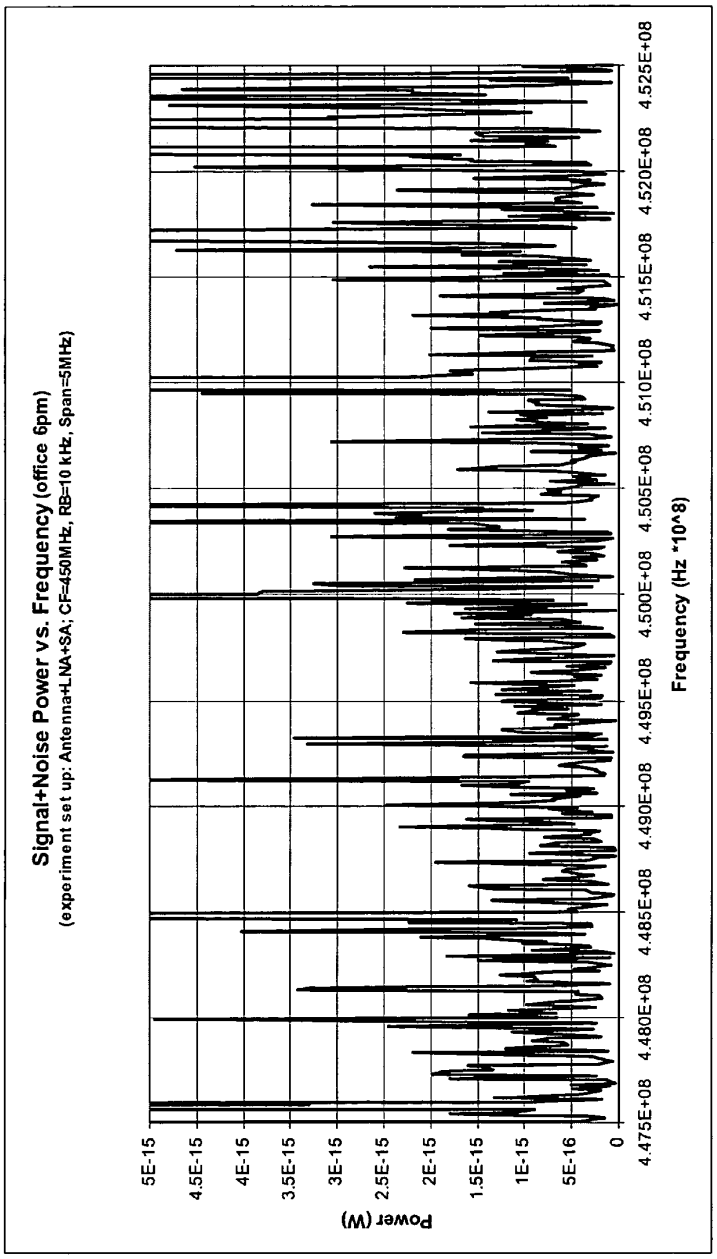

Signal+Noise Power vs. Frequency (office 6pm)
(experiment set up: Antenna+LNA+SA; CF=450MHz, RB=10 kHz, Span=5MHz)
Power (W)
5E-15
4.5E-15
4E-15
3.5E-15
3E-15
2.5E-15
2E-15
1.5E-15
1E-15
5E-16
0
Frequency (Hz *10^8)
4.475E+08
4.480E+08
4.485E+08
4.490E+08
4.495E+08
4.500E+08
4.505E+08
4.510E+08
4.515E+08
4.520E+08
4.525E+08

FIG. 10

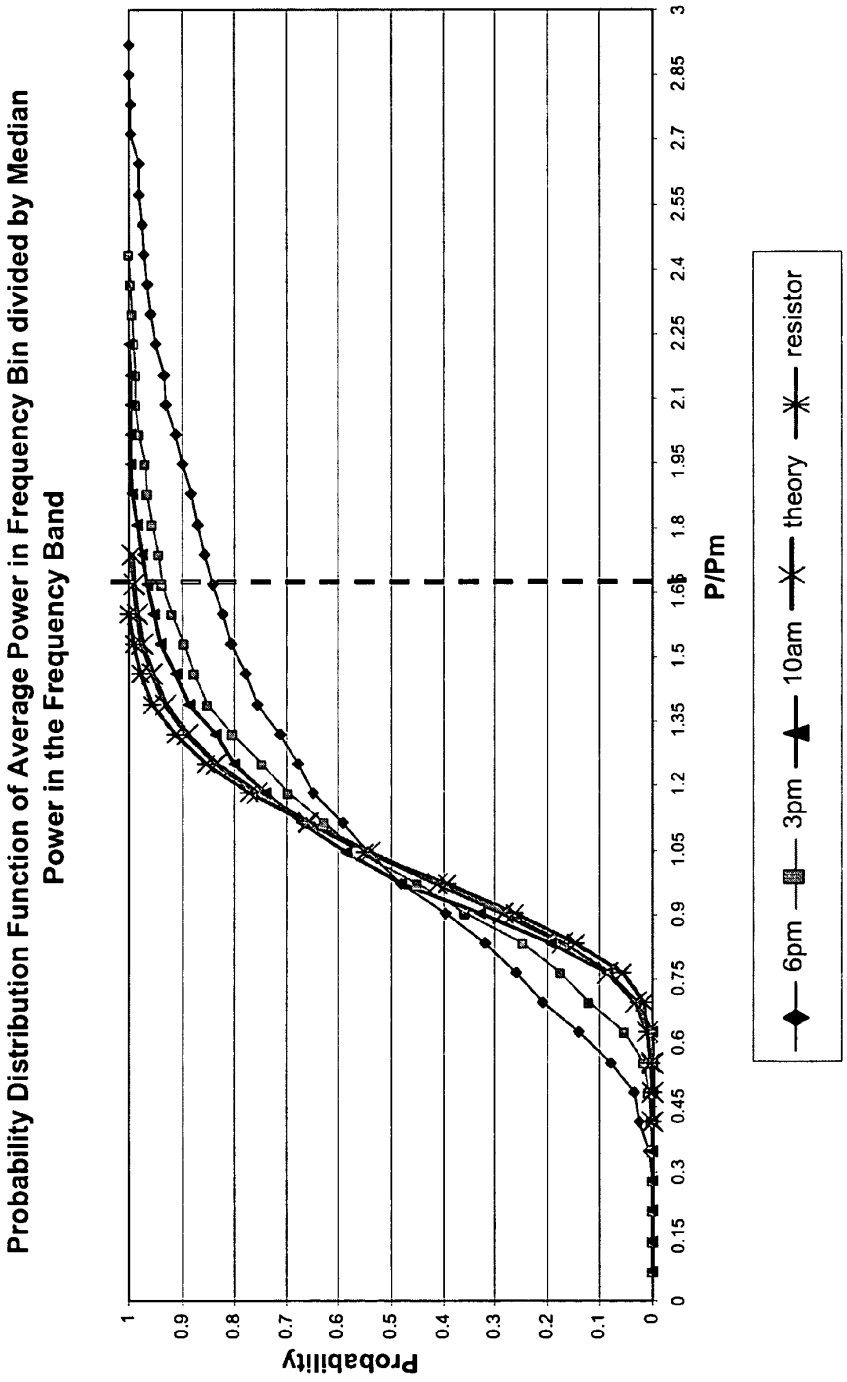

Probability Distribution Function of Average Power in Frequency Bin divided by Median Power in the Frequency Band
Probability
P/Pm
6pm
3pm
10am
theory
resistor

FIG. 11

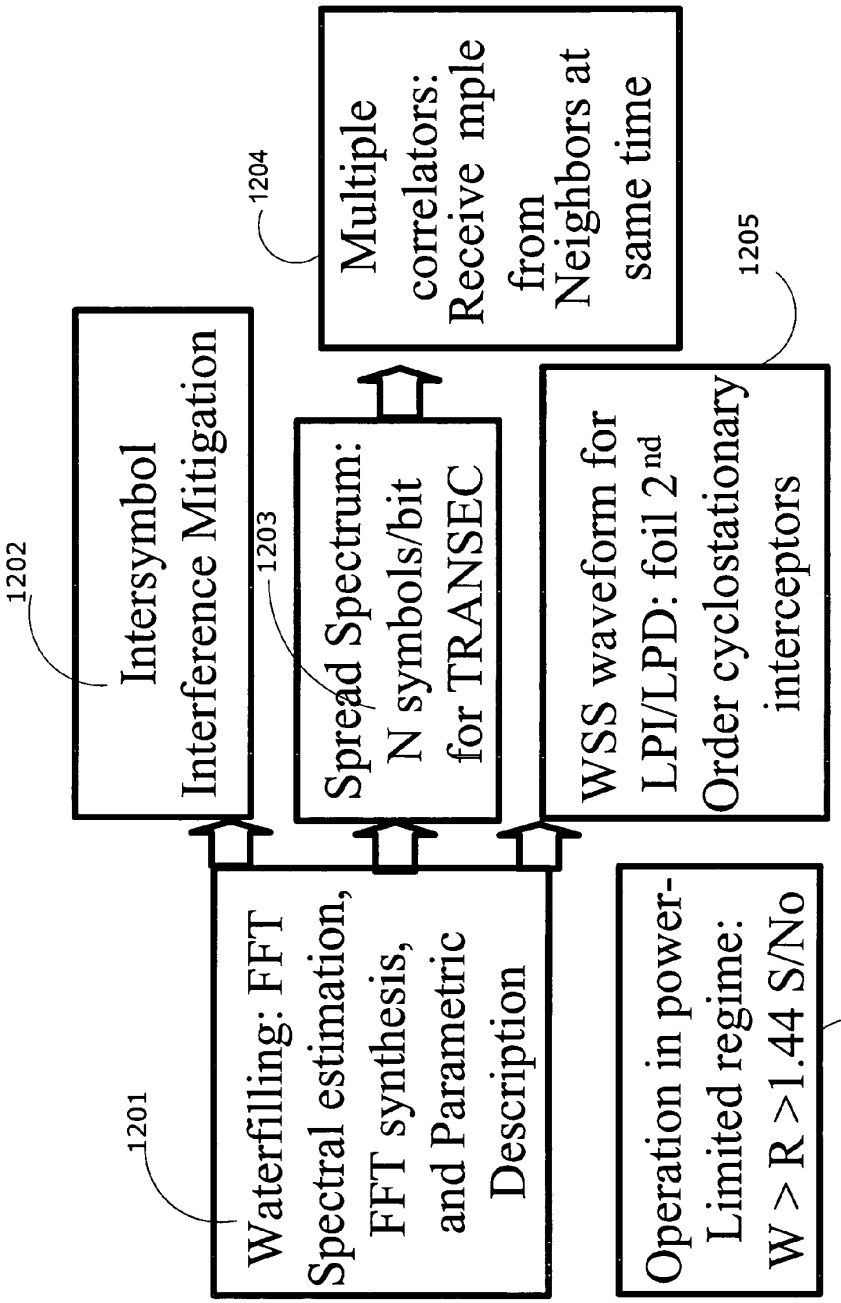

Waterfilling: FFT Spectral estimation, FFT synthesis, and Parametric Description
1201
Intersymbol Interference Mitigation
1202
Spread Spectrum: N symbols/bit for TRANSEC
1203
Multiple correlators: Receive mple from Neighbors at same time
1204
WSS waveform for LPI/LPD: foil 2nd Order cyclostationary interceptors
1205
Operation in power-Limited regime: W > R >1.44 S/No
1206

FIG. 12

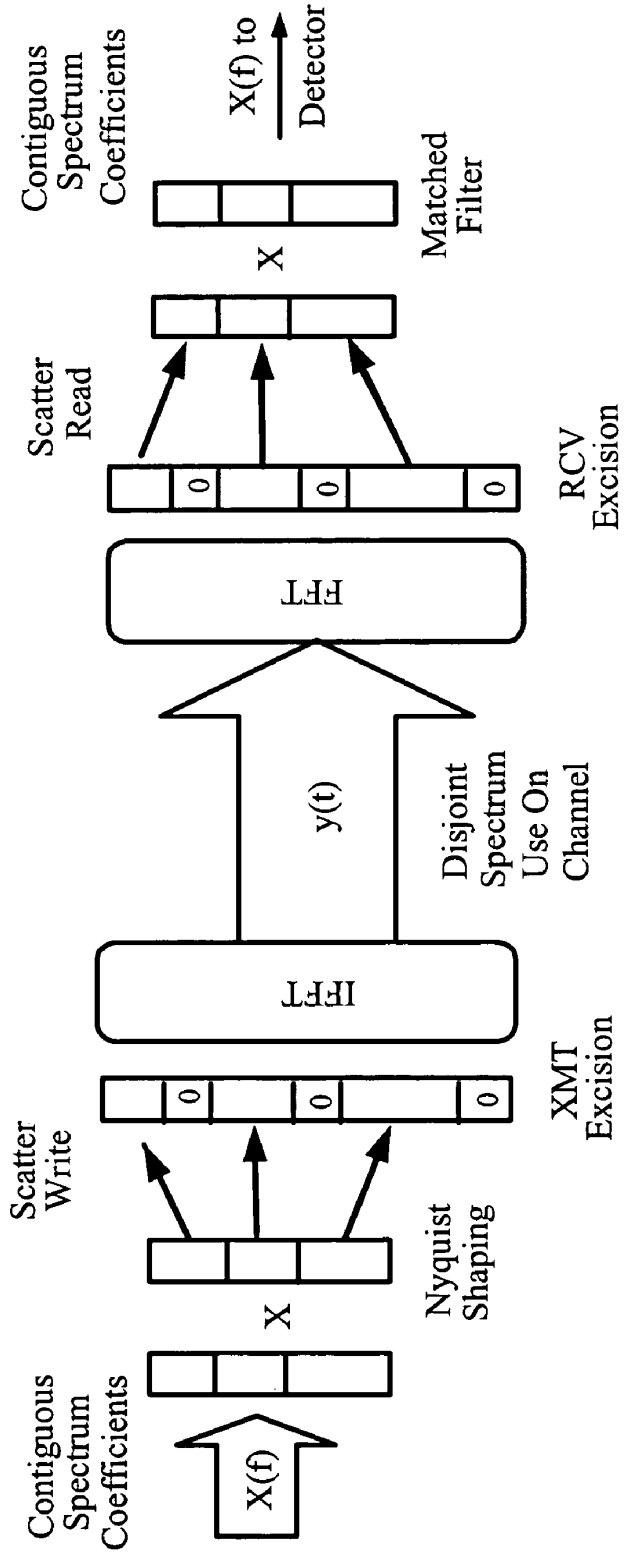

Contiguous Spectrum Coefficients
X(f)
X
Nyquist Shaping
Scatter Write
XMT Excision
IFFT
y(t)
Disjoint Spectrum Use On Channel
FFT
RCV Excision
Scatter Read
X
Matched Filter
X(f) to Detector
Contiguous Spectrum Coefficients
0
0
0
0
0
0

FIG. 13

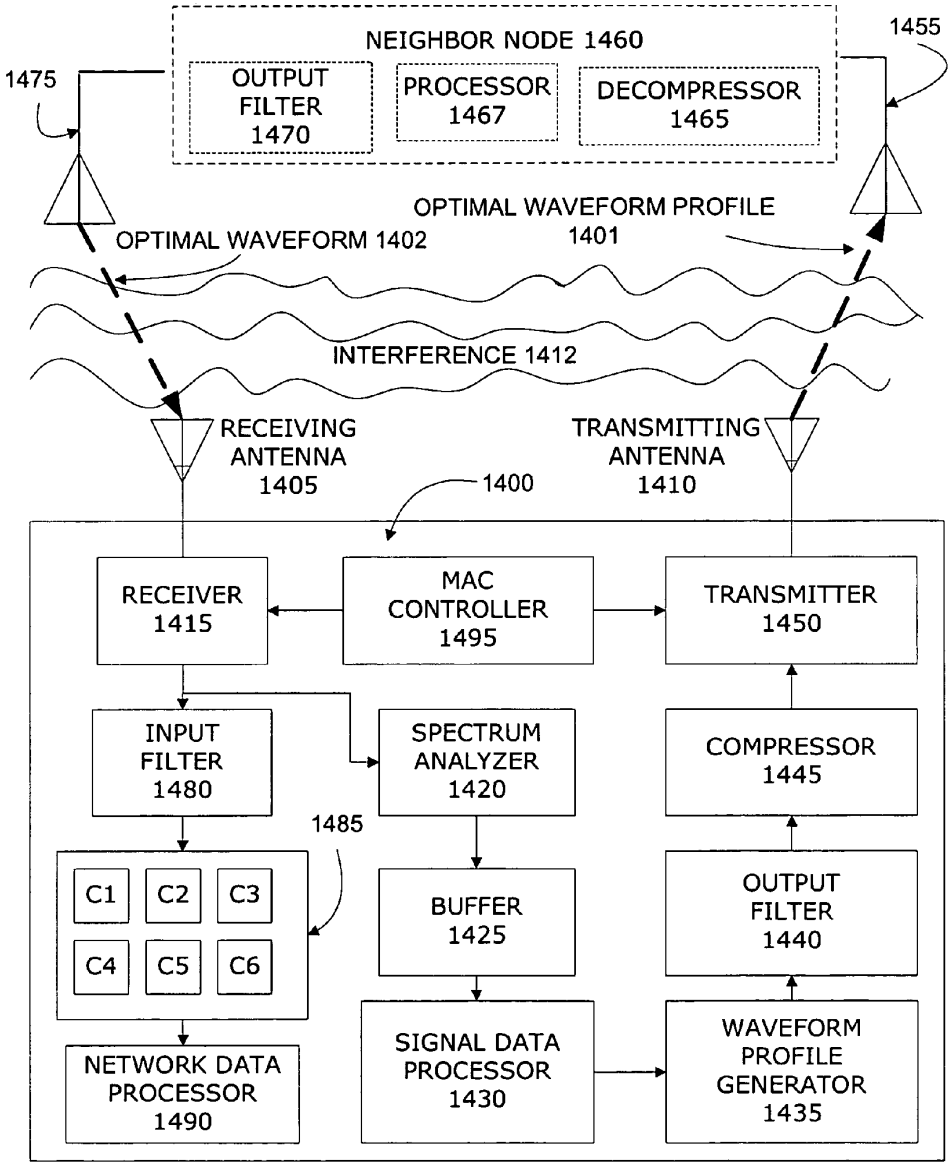

NEIGHBOR NODE 1460
OUTPUT FILTER 1470
PROCESSOR 1467
DECOMPRESSOR 1465
1455
1475
OPTIMAL WAVEFORM PROFILE 1401
OPTIMAL WAVEFORM 1402
INTERFERENCE 1412
RECEIVING ANTENNA 1405
TRANSMITTING ANTENNA 1410
1400
RECEIVER 1415
MAC CONTROLLER 1495
TRANSMITTER 1450
INPUT FILTER 1480
SPECTRUM ANALYZER 1420
COMPRESSOR 1445
1485
C1
C2
C3
C4
C5
C6
BUFFER 1425
OUTPUT FILTER 1440
NETWORK DATA PROCESSOR 1490
SIGNAL DATA PROCESSOR 1430
WAVEFORM PROFILE GENERATOR 1435

FIG. 14

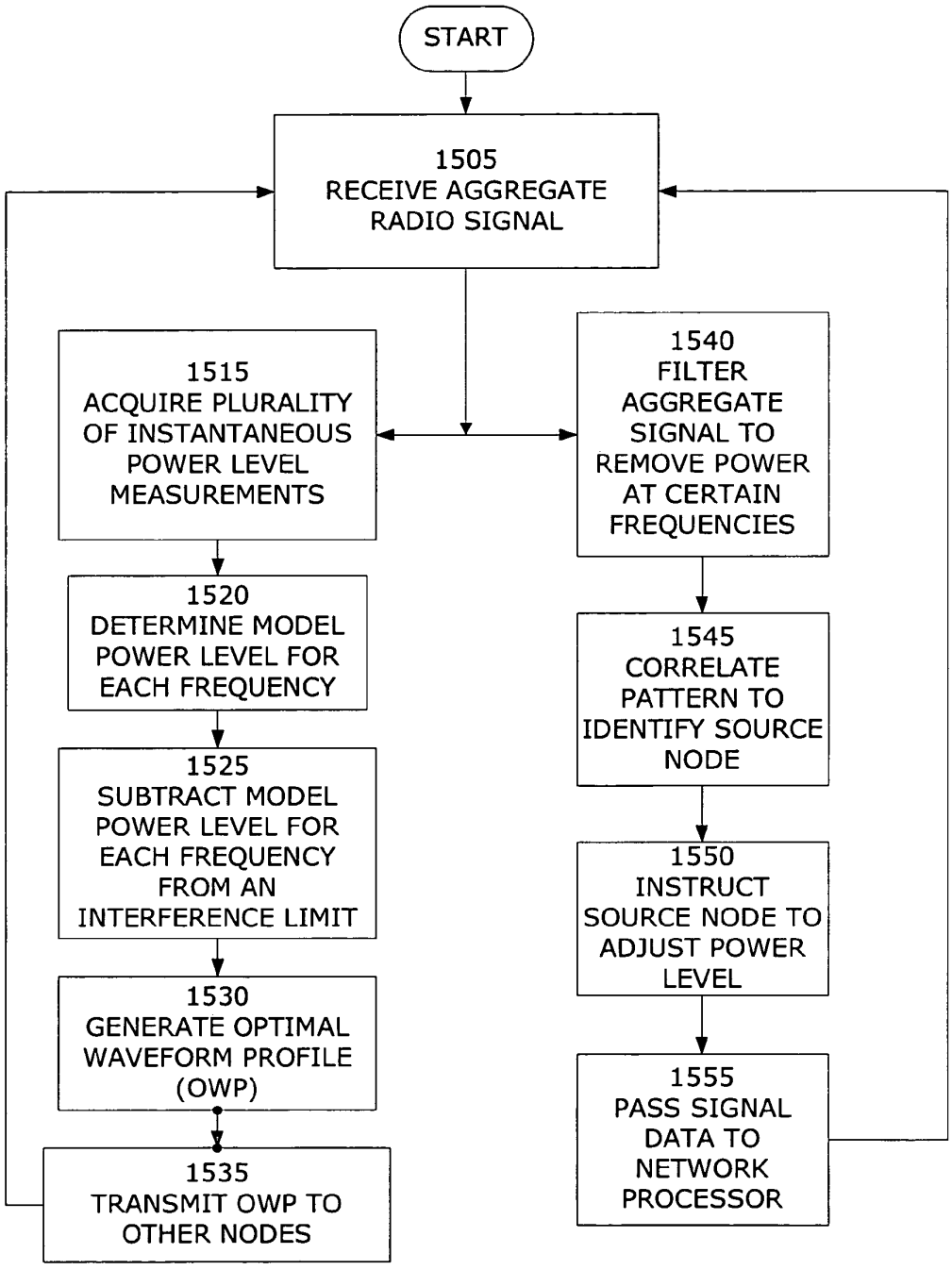

START
1505
RECEIVE AGGREGATE RADIO SIGNAL
1515
ACQUIRE PLURALITY OF INSTANTANEOUS POWER LEVEL MEASUREMENTS
1520
DETERMINE MODEL POWER LEVEL FOR EACH FREQUENCY
1525
SUBTRACT MODEL POWER LEVEL FOR EACH FREQUENCY FROM AN INTERFERENCE LIMIT
1530
GENERATE OPTIMAL WAVEFORM PROFILE (OWP)
1535
TRANSMIT OWP TO OTHER NODES
1540
FILTER AGGREGATE SIGNAL TO REMOVE POWER AT CERTAIN FREQUENCIES
1545
CORRELATE PATTERN TO IDENTIFY SOURCE NODE
1550
INSTRUCT SOURCE NODE TO ADJUST POWER LEVEL
1555
PASS SIGNAL DATA TO NETWORK PROCESSOR

FIG. 15

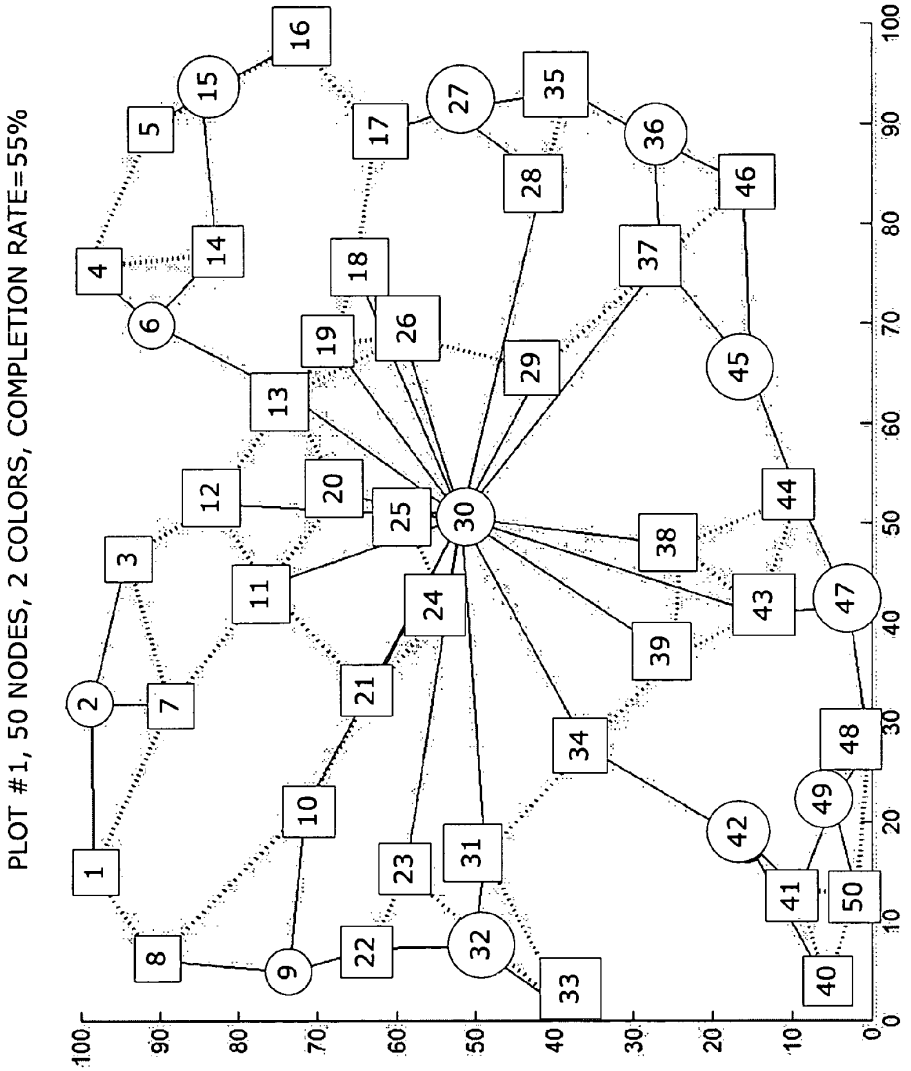

PLOT #1, 50 NODES, 2 COLORS, COMPLETION RATE=55%
1
2
3
4
5
6
7
8
9
10
11
12
13
14
15
16
17
18
19
20
21
22
23
24
25
26
27
28
29
30
31
32
33
34
35
36
37
38
39
40
41
42
43
44
45
46
47
48
49
50
0
10
20
30
40
50
60
70
80
90
100

FIG. 16

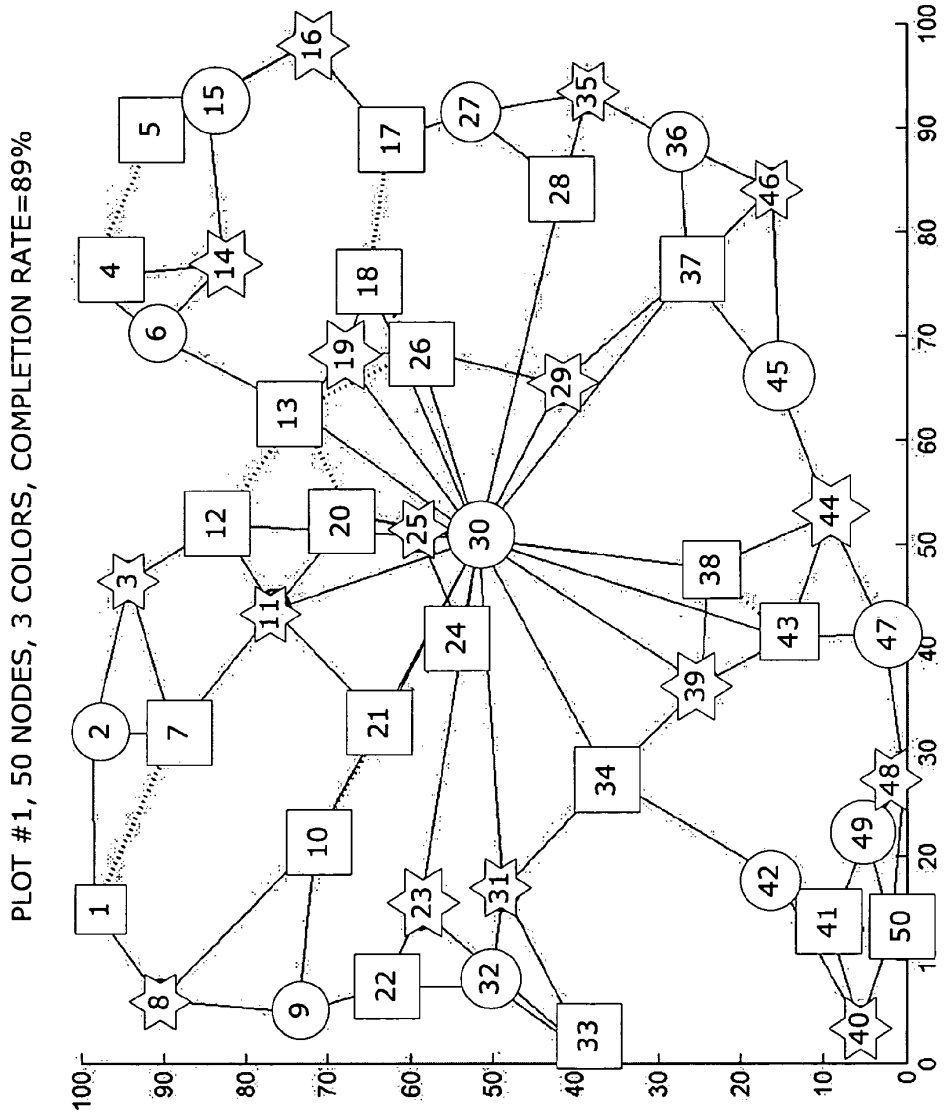

PLOT #1, 50 NODES, 3 COLORS, COMPLETION RATE=89%
0
10
20
30
40
50
60
70
80
90
100

FIG. 17

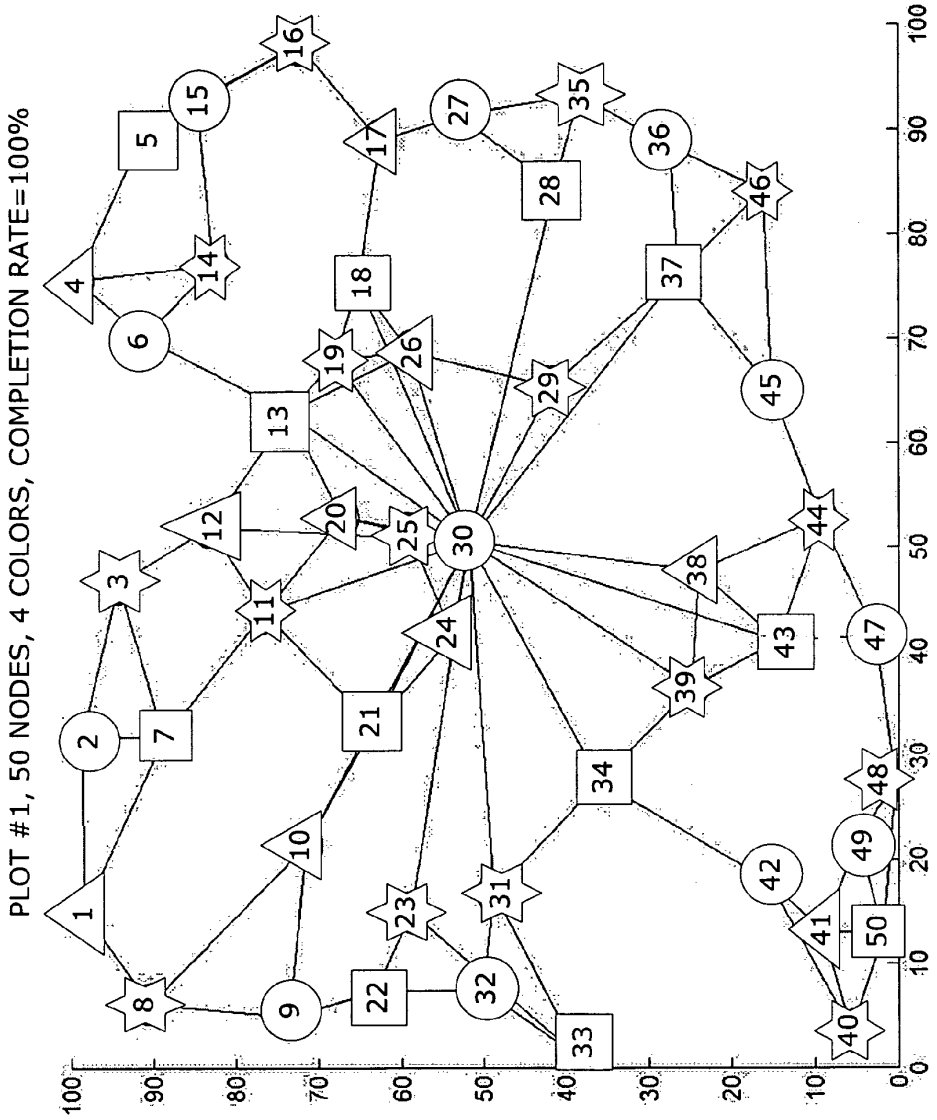

PLOT #1, 50 NODES, 4 COLORS, COMPLETION RATE=100%
0
10
20
30
40
50
60
70
80
90
100

FIG. 18

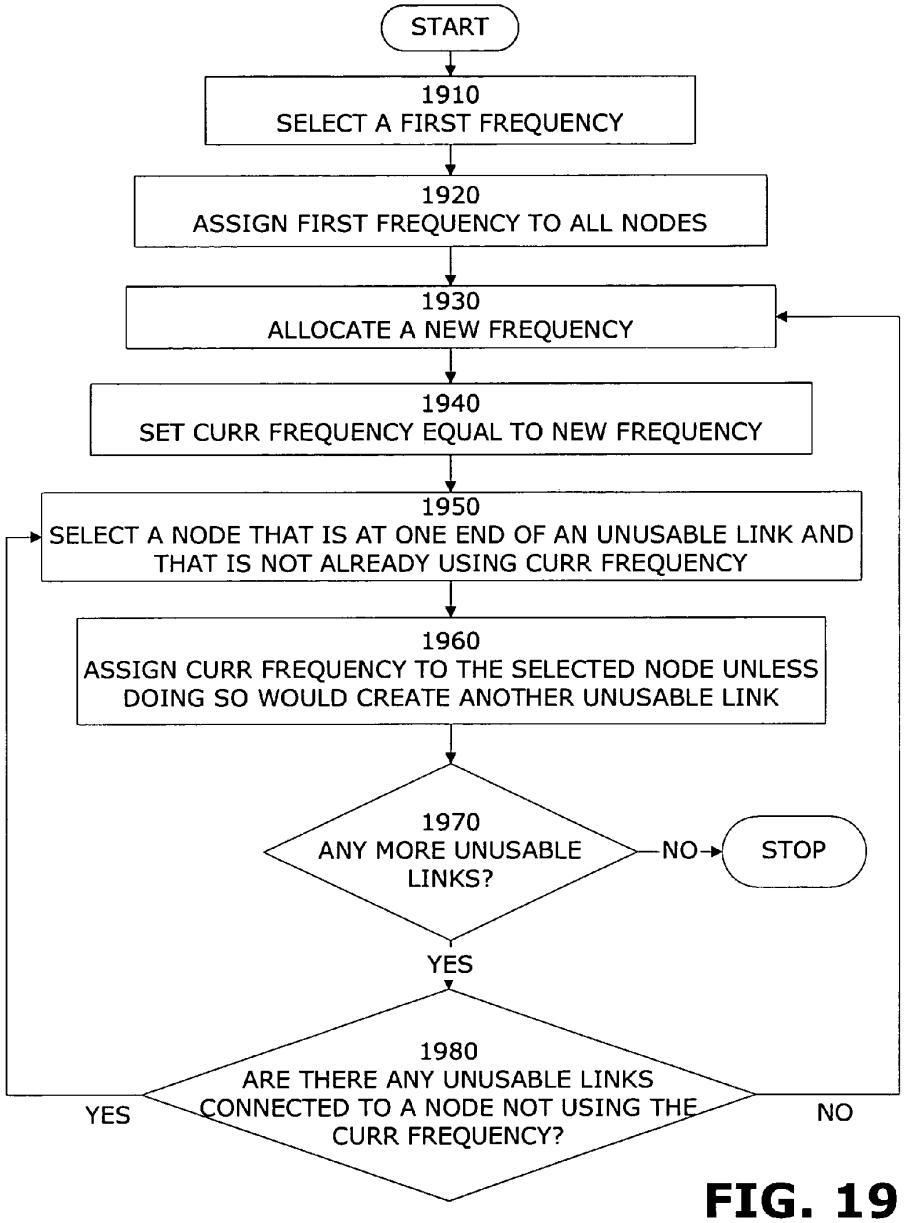

START
1910
SELECT A FIRST FREQUENCY
1920
ASSIGN FIRST FREQUENCY TO ALL NODES
1930
ALLOCATE A NEW FREQUENCY
1940
SET CURR FREQUENCY EQUAL TO NEW FREQUENCY
1950
SELECT A NODE THAT IS AT ONE END OF AN UNUSABLE LINK AND THAT IS NOT ALREADY USING CURR FREQUENCY
1960
ASSIGN CURR FREQUENCY TO THE SELECTED NODE UNLESS DOING SO WOULD CREATE ANOTHER UNUSABLE LINK
1970
ANY MORE UNUSABLE LINKS?
NO
STOP
YES
1980
ARE THERE ANY UNUSABLE LINKS CONNECTED TO A NODE NOT USING THE CURR FREQUENCY?
YES
NO

FIG. 19

SPECTRUM-ADAPTIVE NETWORKING

RELATED APPLICATIONS

This application claims priority under 35 U.S.C. § 119 to provisional Application No. 60/420,930, filed Oct. 24, 2002, the entirety of which is incorporated herein by reference.

BACKGROUND OF THE INVENTION

1. Field of the Invention

The present invention relates generally to radio frequency spectrum management systems, and, more particularly, to systems and methods for recovering and/or sharing radio frequency spectrum in radio frequency bands already populated by legacy users (such as cell phone users) and high-priority users (such as public safety, military and government entities) without exposing those legacy and high-priority users to harmful interference.

2. Description of the Related Art

Wireless communications network bandwidth continues to shrink at an alarming rate. Increasing demand for spectrum-based services and devices is putting a strain on long-standing and out-moded spectrum allocation and use policies. Managing interference levels among the rapidly increasing number of users has become extremely difficult because of the greater density, mobility and variability of "next generation" (XG) radio frequency emitters.

Current spectrum management policy seeks to assign locally unoccupied portions of the RF spectrum to XG users. The Federal Communications Commission ("FCC") Spectrum Management Policy Task Force has recommended adoption of a policy of "Interference Protection," which defines an acceptable level of interference to primary users from secondary users in terms of this interference temperature. Under the recommended policy, secondary users of a band are required to accept interference from primary users, and must cause no "harmful" interference to the primary users. Thus, the policy permits secondary (e.g., unlicensed) users to radiate only enough power in an area of interest to raise the interference temperature in the band to a specified threshold T_0 for the band, service, and locality. The receivers of the primary (e.g., licensed) users are then expected to tolerate this specified level of interference. This proposed arrangement, if it is widely adopted, will create an opportunity to "underlay" existing primary applications with low-power, low-impact opportunistic applications that operate below the threshold.

While the Spectrum Policy Task Force Report recommends a new set of rules for spectrum use that in turn will provide a sound framework for using the available spectrum more efficiently, the report does not address many important and heretofore unanswered questions about how to build and configure networks and devices that comply with the new set of rules. Accordingly, what is needed are tools, devices and applications XG users can build, configure and deploy in order to take advantage of the proposed spectrum policies.

SUMMARY OF THE INVENTION

The present invention provides key enabling technology to implement the FCC's new flexible spectrum use policy. The invention addresses both individual spectrum management devices and provides an integrated system concept for dynamic, adaptive, radio frequency spectrum assignment and use. The result is far greater spectrum efficiency, providing megabit/sec rate communications networks that can extend far beyond the capabilities of existing wireless networking systems and devices. The invention provides a way to underlay new services on existing bandwidth allocations with minimal or no interference to, and from, existing: legacy users, while providing up to 30 times greater throughput than the current systems.

To accomplish these goals, a node of a network communications system configured to operate in accordance with the present invention is configured to:

- Continuously carry out real-time sensing and characterization of the local spectrum usage by (potentially interfering) narrowband and-wideband emitters;
- Dynamically and autonomously adapt (on a time scale of milliseconds) to the local spectrum environment by selecting and controlling the waveforms (power spectral density (PSD) and Media Access Control (MAC) protocols) that its network neighbors use when transmitting to this node;
- Automatically carry out a closed loop power control algorithm with each neighbor to throttle back on unnecessarily high power levels, thereby enhancing Low Probability of Detection (LPD);
- Apply transmission security ("TRANSEC") parameters to the spread spectrum modulation process in order to enhance Low Probability of Intercept (LPI); and
- Carry out packet forwarding (routing) in a way that balances aggregate network throughput against average end-to-end delay. (This results in real time traffic, e.g., voice, being sent with higher power, minimizing latency due to channel access delays at multiple hops, and bulk traffic being sent with lower power, minimizing network self-interference, maximizing spatial reuse of frequencies and enhancing LPI/LPD).

As described in detail below, the present invention also provides a highly advanced networking communications architecture for implementing the policies recommended by the FCC Task Force. The design of the architecture combines dynamic spectrum management techniques with matching adaptive networking and full exploitation of multiple transceivers per communications node. The invention also provides the flexibility and scalability, and may be easily adapted for use with other forward-looking wireless communications systems and technologies.

The present invention solves the "spectrum crisis" currently plaguing commercial, military, government and private users by providing a way to underlay spectrum-efficient megabit rate networking onto bands allocated for other purposes. The invention can thus be used, for example, to underlay military networking below any narrowband-channelized spectrum where individual channels have less than 100% duty cycle, such as in commercial cellular, without interfering with existing legacy users of these bands. Initial use of existing frequency allocations ensures that the invention may be implemented domestically without displacing or upsetting existing users. In overseas locations and in wartime, however, the invention is not restricted to these particular bands, and the flexible hardware and software made possible by the invention will also operate in other frequencies without hardware modification.

In general, the present invention provides a method for managing interference in a radio communications network, comprising the steps of: (1) receiving an aggregated radio signal at a first node in the radio communications network on a plurality of frequencies; (2) determining a power level for the aggregated radio signal for each frequency in the plurality frequencies; (3) subtracting the power level at each frequency from a power limit to produce a power differential for each

frequency; and (4) instructing other nodes in the radio communications network to avoid using a transmission frequency corresponding to a non-positive power differential in the plurality of power differentials to transmit to the first node. A government agency, such as the FCC, an industry standards group, or other rule-making body may specify the power limit.

In preferred embodiments, the method further comprises the steps of: (5) receiving a transmission from a second node in the radio communications network; and (6) discarding any portion of the transmission carried on the transmission frequency the second node was instructed to avoid. Typically, although not necessarily, the discarding step is accomplished by applying an optimal matched filter to the transmission, said optimal matched filter being keyed to the instruction sent to the second node. By discarding a portion of the received transmission in this manner (the, process is called receiver excision); interference produced by other emitters (e.g., legacy primary users) in the wireless environment is filtered out of the transmission.

The power level may be determined by acquiring a plurality of instantaneous power level measurements for each frequency and calculating an average power level based on the plurality of instantaneous power level measurements. This creates a "model" power level, of sorts, that may reflect a more accurate measure of the power levels present at the plurality of frequencies over a given period of time. Alternatively, the model power level also may be determined by calculating a median power level based on the plurality of instantaneous power level measurements.

In preferred embodiments, the method also includes closed loop power control. Each receiver sends to other nodes in the network a request to adjust (or limit) its transmission power level on frequencies corresponding to positive power differentials so that the receiver receives transmissions from all of its neighbors at the same power level. This feedback from each receiver in the network minimizes the transmit power on reliable links, maximizes the ability to achieve spatial separation among transmissions on the same frequency, and thereby minimizes network self-interference. Closed loop power control functionality also improves low probability of intercept (LPI) and low probability of detection (LPD), and minimizes battery drain for mobile and/or portable transmitting nodes.

In preferred embodiments of the invention, the aggregated signal is continuously monitored and the measured power level is continuously updated to account for the fact that some or all of the nodes may be mobile, and therefore constantly moving around, and new emitters (causing increased levels of interference) may come on line. Accordingly, each receiver in the network is preferably configured to provide constant, or at least fairly constant, updated instructions to its neighbors setting forth the optimal transmission parameters to use to transmit data to that receiver.

The optimal transmission parameters sent out to neighboring nodes by a receiver node may be embodied in an optimal waveform profile, which itself may contain information and instructions beyond power spectral density values. Such profile might also contain, for example, a schedule of optimal times to transmit information to the receiving node.

In some embodiments, it may be advantageous, desirable or necessary to compress the optimal waveform profile prior to transmitting it to a neighboring node. It may also be advantageous to specify a particular waveform pattern so that the receiving node will be able to determine from which node the waveform came.

In another aspect of the invention, another method for managing interference in a radio communications network, is provided, comprising the steps of: (1) receiving at a first node in the radio communications network an instruction transmitted from a second node to avoid using a plurality of frequencies to transmit to the second node; (2) filtering a transmission signal to remove power at frequencies that should be avoided; and (3) transmitting, the filtered transmission signal to the second node. As before, the instruction may be embodied in or combined with an optimal waveform profile from the second node, the optimal waveform profile being based on a plurality of power measurements for a plurality of frequencies, as measured from the second node, and the power limit. In this aspect of the invention, the method may also, include the step of decompressing the optimal waveform profile prior to generating a transmission signal conforming to the profile.

In still another aspect, the invention provides a method of managing interference in a radio communications network having a multiplicity of nodes, each node in the multiplicity having attached thereto a set of antennas oriented to face directions relative to other antennas, attached to the node. This method comprises the steps of (1) dividing the multiplicity of nodes into a plurality of node clusters; (2) assigning a unique receiving frequency to each node in a node cluster; and (3) assigning a unique transmission frequency to each antenna in the set of antennas attached to a first node in the node cluster; wherein the unique transmission frequency assigned to each antenna is equivalent to the unique receiving frequency assigned to a neighboring node in the node cluster.

In this aspect, the invention may further comprise transmitting outgoing messages from the first node to the neighboring nodes using unique receiving frequencies assigned to the neighboring nodes. The first node is also capable of transmitting the outgoing message to the neighboring node and receiving an incoming message from another neighboring node simultaneously.

In yet another aspect of the present invention, there is provided a radio communications device, comprising a receiver configured to receive an aggregated radio signal existing at the radio communications device, a spectrum analyzer, coupled to the receiver, configured to produce a series of power readings for the aggregated radio signal for each frequency in a plurality of frequencies, a waveform profile generator configured to produce a waveform profile based on the series of power readings and a power limit, and a filter, coupled to the receiver, configured to detect in the aggregate radio signal a transmission signal addressed to the radio communications device, and to discard any portion of the transmission signal carried on a frequency corresponding to an unacceptable transmission frequency. The waveform profile defines the set of unacceptable transmission frequencies. A radio communications device operating in accordance with this aspect of the invention may also include a signal data processor configured to generate a model power level (e.g, an average or median power level) for the aggregated radio signal for each frequency in the plurality frequencies based on the series of power readings. The radio communications device typically would also include a transmitter configured to transmit the waveform profile to a second radio communications device or to multiple radio communication devices in the network.

Preferably, the radio communications device in this embodiment of the invention also includes a correlator, or a plurality of correlators, coupled to the filter, configured to determine whether the detected transmission signal contains a pattern uniquely associated with one or more other radio communications devices in the network. Each pattern in a

multiplicity of patterns is orthogonal to each other pattern so that the correlators may be used to identify discrete patterns being carried by a single frequency or group of frequencies. The radio communications device may further include a media access controller ("MAC controller") configured to toggle the radio communications device back and forth between a transmit mode and a receive mode.

In still another aspect of the invention, there is provided a method for managing co-site interference in a wireless network, comprising the steps of: (1) identifying a subset of nodes within a multiplicity of nodes, each node in the subset being capable of transmitting data to each other node in the subset in accordance with a defined connectivity threshold and using a power setting that falls within a low power range; (2) defining a collection of transmission frequencies to be used by nodes of the subset only when transmitting to a node outside of the subset; and (3) permitting only one node of the subset at a time to transmit using any transmission frequency within the collection. In this embodiment, access to certain frequencies for data transmissions are serially allocated to the members of the subset so that only one node may use those frequencies at a time. Since nodes in a mobile network may be moving continuously, the method may further include the step of updating the subset of nodes in short (i.e., low power) range of each other according to a schedule, at regular intervals, when it is determined that a significant amount of node movement has occurred, or upon a determination that some combination of any one or all of the foregoing situations has occurred.

In preferred embodiments, the step of identifying a subset of nodes in short range of each other is carried out using a K-Means vector quantization algorithm. The step of serially allocating permission to use the long-range links is carried out using a point coordination function.

In this embodiment, all nodes in the subset are configured to receive transmissions on the any transmission frequency in the collection while no node in the subset is transmitting on that transmission frequency. Preferably, a unique spread-spectrum code is associated with the subset of nodes, so that transmissions from the subset may be identified as such.

To better manage interference, another layer of clustering may be implemented, which involves identifying a second subset of nodes within the multiplicity of nodes, wherein each node in the second subset is capable of transmitting data to each other node in the second subset in accordance with the defined connectivity threshold using a power setting that falls within a medium power range. A second collection of transmission frequencies is generated, this collection to be used by the nodes of the second subset to transmit using a power setting that falls outside the medium power range. Here again, only one node of the second subset at a time is allowed to transmit using any transmission frequency within the second collection.

Also provided is a method for managing congestion at an elevated node in a wireless network, comprising the steps of: (1) identifying a subset of nodes within a multiplicity of nodes, each node in the subset being capable of transmitting data to each other node in the subset in accordance with a defined connectivity threshold and using a power setting that falls within a low power range; (2) defining a collection of transmission frequencies to be used by nodes of the subset only when transmitting to the elevated node; and (3) permitting only one node of the subset at a time to transmit to the elevated node using any transmission frequency within the collection. This process manages the network communications in such way as to avoid high fan-in congestion. In this embodiment, nodes of the subset are serially allocated permission to use certain frequencies to transmit to the elevated node. All nodes in the subset are configured to receive transmissions on the any transmission frequency in the collection while no node in the subset is transmitting on the transmission frequency.

A wireless network configured to operate in accordance with the present invention comprises a plurality of short-range links, a multiplicity of nodes configured to automatically identify a cluster of nodes within the multiplicity capable of transmitting data to each other node in the cluster via the plurality of short-range links using a power setting that falls within a low power range. The multiplicity of nodes is also configured to self-select a node in the cluster to act as a long-range transmission manager, which permits only one member of the cluster at a time to transmit using any power setting that falls outside the low power range.

A radio communications device in accordance with this embodiment may comprise a transmitter configured to send data to any other media access controller in the multiplicity using a power setting that falls within a low power range, and a media access controller configured to receive a plurality of requests from the multiplicity of other radio communications devices to transmit using a power setting that falls within a high-power range. Here again, the media access controller is configured to grant only one request in the plurality of requests at a time. The radio communications device may be further configured to receive any transmission having a power level that falls within the high-power range while no radio communications device in the multiplicity of other radio communications devices is transmitting using the power level. Preferably, the radio communications device also includes a correlator, or multiple correlators, configured to determine whether the transmission contains a pattern associated with a particular radio communications device in the multiplicity of radio communication devices.

Finally, a method of managing real-time data traffic in a wireless communications network is provided. The network has a multiplicity of nodes and is configured to transmit a data stream along a route from a source node in the network to a destination node in the network according to a routing protocol. This method comprises the steps of receiving at an intermediate node in the route a data packet from the data stream and a request to transmit the data packet to the next node in the route and determining whether the next node is operating in a receiving mode. If the next node is operating in the receiving mode, the data packet is transmitted to thee next node. However, if the next node is not operating in the receiving mode, then the data packet is forwarded to any other node in the multiplicity of nodes that is both in the receiving mode and nearer to the destination node than the intermediate node.

Aspects of the present invention may be implemented using software radio technology, which provides flexibility to make dynamic adaptive use of spectrum under rapidly changing interference conditions. Software radios also support advanced adaptive Media Access Control (MAC) protocols. Vanu, Inc. (www.vanu.com) of Cambridge, Mass., for example, makes software radios suitable for using as a transceiver in a network configured to operate in accordance with the present invention.

Software radio technology also enables implementing embodiments of the present invention using COTS (commercial-off-the-shelf) processor-based radios that will improve over time, incorporating new signaling protocols as they become available, and incorporating ever more efficient components in terms of size, weight, and power. Software radios may be built around Intel Pentium 4 processors, for example, which currently operate at clock speeds of about 3.2 GHz, are

projected to operate at clock rates beyond 10 GHz by 2005. Because the software used in a software radio is portable, networks and networking devices designed according to embodiments of the present invention can be upgraded over time to feature the latest and fastest COTS processors. In addition, the invention can easily be configured to use RF-to-digital front-end technology, which can provide all the necessary analog functions on a compact card. Rapid technology improvements in this area make these front ends quite affordable, so there is no impediment to operating each network node with multiple independent transceivers. This rapid evolution in transceiver technology is evident, for example, in today's two-chip CMOS implementations of IEEE 802.11a 54 Mb/s OFDM transceivers.

BRIEF DESCRIPTION OF THE DRAWINGS

The foregoing summary, as well as the following detailed description, will be best understood in conjunction with the attached drawings, which are incorporated in and constitute part of the specification. The drawings illustrate preferred embodiments of the invention, and, together with the description, serve to explain the principles of the present inventions.

FIG. **1** depicts a high-level block diagram illustrating an arrangement of some of the physical components in a transceiver configured to operate according to an embodiment of the present invention.

FIG. **2** shows a reference model defining the characteristics of a channel between a transmitter and a receiver configured to operate in accordance with principles of the present invention.

FIG. **3**, graphically illustrates a method of calculating the power spectral density (PSD) of an optimal waveform according to embodiments of the invention.

FIGS. **4** through **11** contain plots and graphs illustrating the results of spectrum measuring experiments supporting the need for and the benefits of the present invention.

FIG. **12** depicts a model illustrating an integrated system concept according to an embodiment of the present invention.

FIG. **13** illustrates one approach, in accordance with the principles of the present invention, to mitigating intersymbol interference.

FIG. **14** shows a high-level block diagram of a network node **1400** (such as a software radio, a router, etc.) configured to operate according to embodiments of the present invention.

FIG. **15** contains a high-level flow diagram illustrating the steps performed in an embodiment of the present invention in order to process signals and manage interference received at a node, such as the node shown in FIG. **14**.

FIGS. **16**, **17** and **18** show the results of simulation experiments for coloring (assigning different frequencies) a random layout of fifty nodes in a network.

FIG. **19** shows a high-level flow diagram illustrating the steps that may be performed by a processor configured to assign receive frequencies to a multiplicity of nodes, in accordance with the present invention, to ensure that there are no adjacent nodes that use the same receive frequency.

DESCRIPTION OF THE PREFERRED EMBODIMENTS

Reference will now be made in detail to preferred embodiments of the invention, examples of which are illustrated in the drawings. Notably, the present invention may be implemented using software, hardware, or any combination thereof, as would be apparent to those of ordinary skill in the art. Therefore, the figures and examples below are not meant to limit the scope of the present invention or its embodiments or equivalents.

The invention provides dramatic improvements in assured wireless communications by dynamic redistribution of allocated spectrum and advanced Media Access Control (MAC) protocols. FIG. **1** shows an architecture that can be used to achieve these improvements according to an embodiment of the present invention. FIG. **1** shows the various functions of the architecture as they are arranged in their appropriate protocol layers. What follows is a description of each layer of the design.

General Architecture Description

The invention provides a system for using local, metropolitan, and wide-area network (LAN, MAN, and WAN) bands for high-speed (megabit-rate) networking and seamless interoperability with current systems. Taking advantage of military L-Band, UHF and VHF, allocations (cross-banding within a single network), for example, as shown in Table 1 below, different links are created for these different purposes.

Band	Use	Per-Hop Range	Path Loss	Data Rate	Analogy
Mil - 3: 1710-1850 MHz	W-LANs (Squad)	0.2 Km	60-90 dB	~10 Mb/s	Star Trek "Comm Badge"
Mil - UHF: 225-400 MHz	W-CANs (Company)	5 Km	90-120 dB	~2 Mb/s	Star Trek "Communicator"
Mil - VHF: 30-88 MHz	W-MANs (Bde)	30 Km	120-150 dB	~0.5 Mb/s	30 times faster than SINCGARS

This approach, namely providing a range of different link types, all integrated into a single network with automatic cross-banding in nodes with multiple independent transceivers, provides all the benefits needed for successful megabit-rate wireless networking.

Path loss (PL) is the ratio of the signal power coming down the receive feedline from an isotropic receive antenna, to the signal power going up the transmit feedline to an isotropic transmit antenna. In the example of 90 dB path loss, every Watt transmitted turns into a nanoWatt received. Assuming the use of isotropic antennas (gain=1=0 dB), the path loss (PL) that can be tolerated on a link (link budget) is the ratio of the available transmit power, to the receiver sensitivity (required receiver power). The Mil-VHF band provides much better propagation (longer range) for modest power, as the effective area of an omni-directional antenna may be represented by the equation $\lambda^2/4\pi$, where λ is the wavelength. This results in almost a 30 dB improvement in path loss (P.L.), for 30 times the line of sight (LOS) range compared to the Mil-3

band. Diffraction around wavelength-sized obstacles (e.g., 10 meter hills or buildings) can make an even greater difference beyond LOS.

In contrast, the Mil-3 band provides much higher available bandwidth, permitting far higher data rates over short ranges. In fact, the short range here results in both high spatial reuse of the frequency allocation, and a low power, LPI/LPD signal with wide spectrum spreading. Having an unobtrusive signal eliminates the need to contest spectrum "ownership".

The Mil-UHF band is intermediate between these two in both range and available bandwidth, satisfying the need for medium range links.

As shown in FIG. **1**, an architecture structured according to an embodiment of the present invention compromises both physical layer **104** and media access control (MAC) layer **102** components. At the physical layer **104** the functional components of the architecture may include components for radio frequency modulation **110**, interference temperature measurements **120**, narrow-band receive-transmit R-T excision **130**, variable-gain spread spectrum **140** and closed loop link power control **155**. The MAC layer **102** comprises components for implementing co-site clustering and serialized access to long-range links and elevated nodes **162**, opportunistic forwarding **164** and multiple correlators **166** for detecting specific waveform patterns. Each of these components are described in more detail below.

Co-Site Clustering and Multiple Correlators

A significant problem encountered when using the spectrum for wireless communication is co-site interference, which occurs when transmissions to distant nodes overwhelm reception by local nodes. The present invention addresses the co-site interference problem by using multiple independent transceivers of different frequencies (bands) to establish short links (e.g., 60-90 dB PL), medium links (e.g., 90-120 dB PL), and long links (e.g., 120-150 dB PL), as shown in Table 1, above.

Co-site clustering and serialized access component **162** comprises MAC protocols that automatically define W-LAN groups (good internal connectivity with short-range links), in which use of any medium-range link is serialized. W-MAN groups (nodes with good internal connectivity using medium-range links) are defined, in which use of any long-range link is serialized.

A K-Means vector quantization algorithm may be used to define co-site clusters and dynamically update them. Within each cluster (e.g., squad W-LAN), a point, coordination function (PCF) is used to serialize access to a medium-range link. Each cluster alternates between receiving over multiple medium-range links, and transmitting over one medium-range link. Using multiple correlators **166** and a different spread spectrum code for each W-LAN permits simultaneous use of medium-range links by different squads without interference.

In a preferred embodiment, a number of nodes have elevated antennas to provide long-range links for "Small World" latency reduction and low-latency quality of service (QoS) traffic. As described below, a specialized MAC protocol to handle the very high fan-in usually associated with using elevated nodes may be used to avoid congestion at the elevated node.

For extremely low delay traffic, packets are forwarded to any node in the direction of the destination (lower hop count) that is not currently transmitting (like a soccer player passing to an open teammate downfield). Although this violates the customary practice of strict protocol layering, by using instantaneous information from the MAC layer to guide network forwarding decisions, it eliminates the dominant end-to-end latency effect of channel access delay at each hop. Opportunistic forwarding component **164** carries out this function. The opportunistic forwarding component **164** carries out forwarding of packets based on their indicated (differential services, or diffserv) quality of service. Bulk traffic is forwarded via low-power multi-hop routing, to maximize spatial reuse of frequencies and enhance LPI/LPD. Real-time voice traffic traverses the network in fewer hops at higher power in order to minimize end-to-end latency.

Closed Loop Link Power Control

Closed loop link power control component **155** provides feedback from each receiver to a neighboring transmitter to minimize transmit power for a reliable link. This maximizes spatial reuse of frequencies, minimizes network self-interference, improves LPI/LPD, and minimizes battery drain for portable nodes.

This may be accomplished by keeping transmit power density low (e.g., <50 mW/MHz or 1 W per 20 MHz) in any frequency or time interval, subject to topology control to maintain a connected network. This also enhances spectrum compatibility with other friendly narrowband and wideband (NB and WB) systems. This limit on power density also helps achieve LPI by thwarting linear (spectrum analyzer) interceptors. Wideband waveforms may be used to achieve: the desired ranges.

Variable-Gain Spread Spectrum

Variable gain spread spectrum component **140** controls the processing gain (spectrum spreading factor) associated with a node in the network. In preferred embodiments, different levels of security may be implemented by varying the processing gain (PG). In the military battle context, for example, very high PG (e.g., 30 dB) may be used during covert insertion and special operations; medium PG (e.g., 20 dB, higher data rate) may be used for entry and positioning of major forces; and modest PG (e.g., 10 dB, highest data rates) be used during actual battles. Flexible software radio technology enables the use of variable PG.

Multiple receive correlators **166** in the MAC layer **102** may be used to receive simultaneously from multiple neighbors. Spread spectrum signaling increases bandwidth by a factor of the PG. Using multiple correlators recoups spectrum efficiency by a factor of the number of neighbors, up to the square root of the PG.

Narrowband R&T Excision

Narrow band R-T Excision component **130** controls the process for using zero power at certain frequencies during transmission and ignoring information (power) existing at those frequencies on the receiving end. In preferred embodiments, orthogonal frequency division, multiplexing (OFDM) waveforms with 25 KHz channels that support transmit and receive narrow band excision may be used to eliminate interference with legacy systems. The OFDM signal (which is the sum of many complex exponentials, each with an independent phase) approximates a Gaussian envelope featureless waveform for LPI/LPD. R&T excision may be adjusted on a very dynamic basis (milliseconds) to underlay spectrum allocated for a legacy channelized narrow band system.

In preferred embodiments, short-term power spectrum measurements (<<1 sec) may betaken at the receiver, and narrow band (25 KHz) excision of spectral spikes are used to minimize interference produced by legacy systems. Matching narrow band excision of the same spikes at neighboring transmitters eliminates interference experienced by narrow band legacy systems.

Interference Temperature Measurements

Interference temperature measurements component **120** monitors aggregate signals present at the receiver in the wireless network. In preferred embodiments, each receiver does its own spectral analysis of local interference, assigns its own receive frequencies automatically, and reports them to its neighbors over a common, low data rate, configuration channel. Selecting low-interference frequency ranges minimizes transmit power requirements and avoids congested spectrum.

Radio Frequency (RF)-To-Baseband, Using Multiple Transceivers

As described in more detail below, a wireless networking architecture according to the present invention may also include radio frequency modulation component **110** in order to increase throughput capacity and provide more secure transmissions. For example, and as described in more detail below, multiple transceivers may be used at each node to support simultaneous operation in multiple bands, simultaneous spectral analysis and communications, and other functions. Wide-sense stationary waveforms may also be used to thwart 2nd order cyclo-stationary interceptors. Zero mean, equal power, uncorrelated I and Q signals conceal the carrier frequency. Nyquist filtered symbols may also be used conceal the symbol clock.

In multi-antenna nodes, a separate time division duplex (TDD) transceiver may be assigned to each directional antenna. This provides far more throughput than a single-transceiver architecture that switches one transceiver among multiple antennas.

And finally, a distinct receive frequency may be assigned to each node for multiple, non-interfering transmissions in a network having a multiplicity of nodes.

A more detailed discussion of the characteristics of each node in a wireless network configured to operate according to a preferred embodiment of the present invention will now be provided. Each node in the preferred embodiment is configured to perform the following three receiver-centric activities.

1. Each node continuously carries out real-time sensing and characterization of the local spectrum at the receiver of each node due to (potentially interfering) narrowband and wideband emitters. For example, this analysis could use a 2K complex FFT every 100 usec to achieve 10 KHz resolution over a 20 MHz bandwidth of interest. These measurements will be different at each network node, since each node has a different interference environment. Any other information about the types of transmissions occurring in band with potential for sharing should be gathered at this time. The underlying principle here is that different "applications" can tolerate differing degrees of interference (i.e. A TV broadcast may not tolerate much interference but a wireless packet switched network may tolerate a small percentage of packet loss).
2. . Based on the characterization performed as described above, each node further determines a waveform with optimal Power Spectral Density (PSD) to be used by neighboring nodes to transmit to this node. This process consists of "inverting" the various spectral spaces of opportunity into a realizable waveform that will approach the optimal performance predicted by pure water filling (to be described in detail below).
3. . Each node reports its optimal receive waveform (an economical parametric characterization of the optimal PSD) to each of its (e.g., handful of) network neighbors for the neighbor's use in talking to this node, preferably along with an optimal transmit schedule and an expiration time after which the information should be considered stale. The waveform reporting function may be performed in conjunction with executing other functions provided by an optional XG transceiver application programming interface (API). Such APIs typically include extensions of the Future Combat Systems Communications primitives. These primitives currently support the receiving node's power control feedback loop with each of its neighbors. The feedback loop ensures that the XG signal arrives at this node's receiver with the same power from every neighbor, minimizing problems of near-far receiver masking).

This architecture is called receiver-centric, because it focuses largely on eliminating interference, which only occurs in the nonlinear circuits of a receiver, not at a transmitter. Each receiver is responsible for minimizing its own interference by designing a minimal-interference waveform, and directing all its neighbors to use this waveform to transmit to it. Different receivers will design different waveforms, depending on their local interference.

In preferred embodiments, the present invention may be characterized ass having two different temporal metabolisms. At a low level, the local noise interference may be estimated on a msec-by-msec time scale, making very short term predictions that the next msec will resemble the previous one. On a longer time scale of tens or hundreds of msec, time-varying models of the interference may be developed based on recognition of the type of application (e.g.; video stream) causing the interference. On this time scale, a temporal model may be used to predict which short term waveform should be used at which time.

Methods for Time-Frequency Water Filling

A description of the methods used to derive an optimal power spectrum density for static (short term) waveform generation based on short term (e.g., 1 msec) spectral measurements will now be provided. This method permits each transceiver to determine, based on measurements in its receiver, the power spectrum density its neighboring transceivers should use transmit to it to maximize its detected signal to noise ratio (SNR) under the constraint of limited transmit power. In the embodiment described below, we assume that the interference spectrum over the next msec (or multiple msec) will be the same as it was in a previous measurement. It should be apparent to those skilled in the art, however, that when the measured spectrum changes significantly, the node must notify its neighbors of the updated optimal waveform.

Optimal Stationary (Short Term) Waveform Selection

The water-filling approach has long been known as the optimal way to minimize the mean squared error of a channel with colored background noise. This optimality is based on minimizing the mean squared error between the signal at the detector and the originated signal (maximizing the received SNR), subject to the constraint that the transmitted signal has a limited total power S.

FIG. **2** shows a reference model defining the characteristics of a channel **210** between a transmitter **205** and a receiver **215**. In FIG. **2**, $P_s(f)$ is the signal power spectrum density (Watts/Hz) at the source. H(f) represents the value of a band selection filter, which is equal to 1 inside the system's desired band of operations, and 0 outside the desired band of operations. Thus, band selection filter H(f) rejects undesired out-of-band signals. G(f) represents the value of the optimal matched filter. When optimal match filter G(f) is applied to the input signal spectrum (which includes noise) at the detector, the filtered signal has the maximum signal to noise ratio. T is the time interval (sec) for signaling one symbol. A T of 1 usec means a signaling rate of 1 Msamples/sec. $P_n(f)$ is the noise power spectrum density (Watts/Hz) arriving at the receiver

along with the desired signal. The optimal PSD results from the "water filling" approach, where the sum of the interference level (weighted by the band selection filter) and the additional received signal power from neighbors is not more than a constant (the water level).

In a static world, the following optimal water filling would occur:

- At frequencies where local interference exceeds the water level, no power should be transmitted. This automatic transmit excision minimizes the interference from XG signaling to legacy users.
- At these same frequencies, the optimal matched filter in the receiver has zero gain. This automatic receive excision minimizes the interference from legacy users to XG users.
- As a result, the XG network is an underlay network service that meets the requirements for secondary use of the band, namely, accepting any interference from existing users and agreeing to cause no harmful interference.

In actuality, there are many reasons why this cannot happen in a real system. For example, there is always power leakage in the spectra because signals have finite bandwidth. The question is, how much is allowable, and whether the signal contained in that leakage is missed when it is reconstructed erroneously.

FIG. **3** graphically illustrates a method of calculating the power spectral density (PSD) of an optimal waveform according to embodiments of the invention. As can be seen in FIG. **3**, the PSD (represented by the variable $P_s(f)$ in FIG. **3**) is equal to the interference limit B minus the measured noise floor $P_N(f)$ within the band of interest. The optimality of the waveform is based on minimizing the mean squared error between the signal at the detector and the originated signal, subject to the constraint that the transmitted signal has a limited total power S. Receive excision suffers from finite front end dynamic range, limiting how large the peaks in FIG. **3** can be before they swamp the front end of the receiver. In this case, the spectrum cannot be inverted in one fell swoop, and may need to be passed through selective analog filtering before digitization.

Characterizing Background Interference

Techniques for defining the stationary waveform best tailored to the short-term noise/interference spectrum received at a node will now be described. These techniques may be: used, in embodiments of the invention, to maximize the received SNR subject to limited transmit power. Noise in a specified bandwidth, W, appears as a bivariant Gaussian signal in the in-phase (I) and Quadrature-phase (Q) channels, both measured in RMS Volts across the impedance of the measuring device, typically R=50 ohms. The total power measured in this bandwidth is then $P=(I^2+Q^2)/R$, with a Gaussian probability density function (PDF) for both I and Q. A change of independent variable to measured power P shows that it has an exponential PDF equal to $1/P_0\exp(-P/P_0)$, with mean=standard deviation=P_0 and median $P_0\ln 2 \sim 0.693\ P_0$.

Noise appears when coupling the measuring device to a resistive load or an antenna operating in a thermal environment with absolute temperature T Kelvins. The noise power resulting from thermal excitation is k T W, where k is Boltzmann's constant $1.38*10^{-23}$ Watts/Hertz/Kelvin. This results from Einstein's equipartition of energy theorem, where each mode of a system in thermal equilibrium receives an excitation of kT/2 joules. However, any measuring device has implementation defects characterized by a noise figure F, which is the ratio of its actual measured noise power referred to the input of the device, to the ideal value of k T W for the thermal noise above. Here the reference value of T is conventionally taken as 290 K (room temperature), and F is normally a few dB for low noise amplifiers. The net equivalent input noise is thus k T F W.

Attaching antennas to a node also brings in signals from intentional radiators. When there are large numbers of uncorrelated faint signals (e.g., from many distant radiators) in the bandwidth being measured, the Central Limit Theorem (CLT) says that the resulting summed signal again approaches a bivariant Gaussian. Therefore, this particular background interference can also be characterized as thermal noise in a still hotter environment, namely a higher value of T. The FCC Spectrum Policy Task Force defines this equivalent as the interference temperature T_i.

Today's Spectrum: Narrowband (NB) Interferers

In addition to the noise signals described above, an antenna on a node will pick up strong signals from other (friendly and hostile) users. Many of these signals are narrowband (e.g., 25 KHz channels allocated for voice and low rate data in the UHF band), and may be non-Gaussian, since data signals often have constant envelopes for efficient power amplification. They can appear and disappear on time scales corresponding to users activating push-to-talk, switches (i.e., a time scale of seconds). In the case of frequency hopping radios, the dwell time in a particular 25 KHz channel may only be on the order of milliseconds, while a cellular phone call can last minutes. In any case, these narrow band signals appear on a spectrum analyzer as narrow "fingers" sticking up above the noise floor in the band of interest (which is normally MHz to tens of MHz wide).

The spectrum analyzer measures the power in each of a large number of adjacent frequency bins over a short time. The shortest time interval for independent measurements corresponds to calculation of a discrete Fourier transform (DFT), where the measurement interval is the-reciprocal of the frequency bin resolution (e.g., 100 μsec measurements for 10 KHz resolution). The measurements described and plotted below were made using a Rhode & Schwartz lab quality spectrum analyzer, exporting digital data to EXCEL and MATLAB for analysis and plotting.

Probability Distribution and Statistical Analysis for "Noise Floor" Estimation

Experiments were conducted to carry out statistical characterization of the "noise floor" in a band of interest. The initial calibration experiments used a room temperature resistor (290 K) feeding a lab-quality Rhode & Schwartz Model FSEM spectrum analyzer examining a 5 MHz span centered on 450 MHz with 10 KHz resolution. (The spectrum analyzer was preceded by a 24 dB (5 dB N.F.) wide band preamp). The noise power measured in adjacent bins was uncorrelated.

FIG. **4** shows typical sample data plotted as a histogram (relative frequency of noise power occurrence~PDF, versus power) resulting from 500 independent power samples.

FIG. **5** shows the results of ten identical but independent measurement runs with histogram plotted on a log scale, as a function of the power measured. The straight line of log probability versus measured power demonstrates the predicted exponential probability density function $1/P_0\exp(-P/P_0)$, with P_0=0.198 fW (−127 dBm). This measured power is 7 dB above k T W (−134 dBm), so the experimental setup has a 7 dB noise figure. The plot shows that the statistical fluctuation in the measurements is far greater at higher power levels, where the small number of samples results in relatively greater sampling fluctuations.

In order to estimate the "noise floor", i.e., the interference temperature, N power samples were averaged for each fre-

quency bin in order to get a stable, unbiased estimate of average power. The PDF for this sample mean is the N-fold convolution of the exponential PDF scaled by a factor of N, namely:

$$Prob(P) = \frac{N^N}{(N-1)!}\frac{P^{N-1}}{P_O^N}\exp(-NP/P_O) \quad \text{(Equation 1)}$$

with mean P_0 (as expected) and mode (most probable power) of P_0 (N-1)/N. For N=10, the median is 0.95 P_0. The standard deviation is P_0/sqrt(N). The sqrt(N) factor in this denominator can substantially reduce the variations (statistical fluctuations) in our estimate of the mean power in the noise floor. If the spectrum analyzer does a DFT every 100 μsec (10 KHz resolution), averaging ten samples per bin would take 1 msec to develop this estimate of mean power in all bins.

FIG. **6** shows a comparison of a histogram derived by averaging the results of the 10 experiments of FIG. **5** (relative frequency of occurrence of a given mean power in a bin), compared with the theoretical PDF of Equation 1 above. The agreement between the two histograms is excellent, showing that a 10-sample power estimate in each bin provides a good characterization of the noise floor P_0.

As described above, some frequency bins will reflect strong narrowband signals by measuring relatively large power. The goal is to determine which bins contain only noise power corresponding to the measured noise floor (interference temperature), and which contain strong signals. The XG signal PSD will then fill up each noise-only bin to a "water filling" temperature below the FCC-specified maximum interference temperature, and transmit zero in bins where strong signals already exceed the water level. However, since all measures are probabilistic, any decision must be characterized by its confidence level, as described below.

The null hypothesis is that there is only noise in bin M. If the power measurement for this bin is statistically significant (e.g., 0.01), then the null hypothesis for this bin is rejected, and the conclusion is that there is a strong signal present. Such a large mean power measurement would happen only in one run out of 100 if only random noise is present. This permits rejection of the null hypothesis with a fair degree of confidence. The significance level is the area under the tail of the PDF of the sample mean. Bins with a sample mean that exceeds the corresponding significance threshold are judged likely (e.g., with the corresponding 99% confidence) to contain a strong signal, and a system according to the present invention transmits no power in those bins. This provides transmit excision at the transmitter to minimize interference to narrow band users, and receive excision in the receiver's matched filter to minimize narrow band interference to wide band users. The remaining bins are judged likely to contain only noise, and the system transmits power in those bins up to water filling temperature, below the FCC-specified maximum permissible interference temperature.

Since the sample mean is the sum of N independent identically distributed variables, its distribution approaches Gaussian (CLT). The 99% probability distribution threshold is P_0 (1+2.33/sqrt(N)).

FIG. **7** shows a spectrum analysis of received signals when strong narrow band signals are present. The plot in FIG. **7** was made in linear power rather than dB in order to focus on the structure of the noise floor, and to provide an absolute reference of zero Watts. The strong signals reach far off the top of the plot (one signal is 50 dB above the noise floor). It is the noise floor, however, that we want to investigate.

FIG. **8** shows a histogram of received power corresponding to FIG. **7**. The histogram (422 samples) shows the typical power distribution "bump" due to the noise floor. Histogram samples far to the right in FIG. **8** correspond to strong signals. If FIG. **8** contained all of the samples for the received power in FIG. **7**, one could observe another 78 samples (not shown in FIG. **8**) located many chart widths far off to the right of the chart shown in FIG. **8** representing the strong signals. However, these strong signals are not of particular interest because it is the noise floor that is being measured. Matching the low-power histogram bump with a theoretical curve corresponding to average noise power P_0 permits us to estimate the underlying noise floor P_0, in spite of the presence of strong signals. This will also determine the threshold at 99% confidence (at P_0(1+2.33/sqrt(N)) to separate the bins containing the narrow band signals from those containing only noise. The waveform synthesized as a result of this measurement will have support over disjoint frequencies, namely those judged to contain only noise.

Table 2 below shows measured results in characterizing a 5 MHz wide noise floor centered at 450 MHz at different times of the day (10 AM, 3 PM and 6 PM). The table shows average power per 10 KHz bin.

TABLE 2

	Noise floor measured as a function of time of day.				
Source	290 K Resistor	Inside lab antenna	Window antenna @ 10 AM	Window antenna @ 3 PM	Window antenna @ 6 PM
P_O = Avg. Pwr.	$2.0 * 10^{-16}$ W	$3.5 * 10^{-16}$ W	$3.5 * 10^{-16}$ W	$6 * 10^{-16}$ W	$7 * 10^{-16}$ W

FIGS. **9** and **10** show the spectrum at 10 AM and 6 PM respectively. The later spectrum obviously has many more high power narrowband signals, and the effects of some of their "skirts" (unintended radiation at nearby frequencies) can be seen in the elevated noise floor. At other frequencies, the noise floor is elevated for unknown reasons, perhaps because of large numbers of additional faint signals.

Analysis of a single "noise only" bin in the time domain showed no discernible features. Each scan has nonrepeating wiggles (like Gaussian noise), and successive values (at 100 used sampling interval for the 10 KHz analysis bandwidth) are uncorrelated.

The results of these tests provide a strong indication that the elevated (and varying) noise floor is the sum of a large number of weak narrowband signals (or a smaller number of wideband signals) from unknown sources outside the building, and some skirts from strong signals.

The results were at 450 MHz, where the noise floor was flat over the 5 MHz analysis range. Examination of an equal

bandwidth at center frequencies of 300 MHz and 39 MHz again showed a flat noise floor, although the noise floor was further elevated by a few dB.

The experiments described above with reference to FIGS. **4-10** illustrate only one approach for characterizing the "noise floor" for water-filling spectrum uses, based on statistical analysis of power measurements as a function of frequency and time, and based on hypothesis testing. After reading the above discussion it should be apparent to those skilled in the art that numerous other approaches may be used without departing from the scope of the present invention. Such experiments form the basis for algorithms, such as the one described below with reference to FIG. **15**, which may be used in transceivers configured to operate in accordance with embodiments of the present invention.

Alternative Analysis Tool: Median Filters

Instead of using the sample mean as a power estimate for each bin, a sample median (nonlinear filter) may be used instead. A median filter outputs the 50% percentile value (the median) from a vector of N samples. These filters are often used in image processing to eliminate "outlier" samples due to impulsive noise, while preserving sharp edges.

FIG. **11** demonstrates the use of the median power across a band at a particular time as a normalizing factor for the power measured in each bin. Here, for each sample spectrum, a trial median was generated across the entire band. A number of the bins reflected very strong signals (far above the band median), so bins with power more than 2.5 times the median were discarded when calculating, the, final band median. For the 10 AM, 3 PM, and 6 PM data, discarding these bins eliminated 71, 82, and 97 of the 500 frequency bins, respectively. After rejecting consideration of these very strong signals, the band median power in remaining bands was recalculated to characterize the noise floor by normalizing bin power with the band median power.

The theory curve gives the theoretical probability density function obtained from integrating Equation 1. The quite similar resistor curve shows the results of measured noise from a resistor source. The other three curves (10 AM, 3 PM, and 6 PM) show increasing deviations from the theoretical curve and the resistor (noise only) curve. The vertical dotted line shows the 99th percentile value (P=1.6 *Pmedian) for the theoretical curve. If this value is applied as the threshold to determine whether only noise is present in a bin or a signal is present, we will reject 1% of the bins in the noise-only case. Therefore, 99% of the noise only bins in the band will be targeted for reuse.

Using the same threshold algorithm at 10 AM, we would reject about 4% of the surviving 429 bins as containing signal. At 3 PM, we would eliminate use of 6% of the surviving 418 bins, and at 6 PM we would eliminate 15% of the surviving 413 bins for spectrum use. The overall result is that respectively 82%, 79%, and 70% of the band is still available for reuse at these times.

By using the above-described method, each receiver in a network operating in accordance with the present invention may characterize the noise floor of a band in terms of a median power across it, and normalize all bin powers in terms of this measured band median. Establishing a threshold (e.g., the 99th percentile for theoretical or measured "pure" noise) for signal presence determines the spectrum waveform for all neighbors to use to transmit to this node.

Representing the Waveform PSD (Quantified Bits)

The procedure above will mark a subset of the (hundreds to a few thousand) frequency bins as available for water-filled transmissions. Since each strong signal typically covers a number of contiguous bins, run length coding is a compact and efficient representation of this subset. If we have, for example, 12 strong signals appearing in a 4096-bin spectrum analysis, this representation might appear as 12 pairs of 12-bit, integers (18 bytes total). The first number of each pair is the number of contiguous available frequency bins, and the second is the number of following contiguous unavailable bins. This representation of the desired PSD is sufficiently compact that it can easily be added to the power control feedback loop to each neighbor node in the network, specifying both the neighbor's desired transmit power and its desired PSD.

Tomorrow's Spectrum: Interference Temperature with Added WB Interferers

Once the FCC begins to succeed in its quest for more flexible and dynamic spectrum use, more wideband adaptive (XG-like) emitters will appear. They will use wideband signals to provide good spectrum compatibility among independent users, and high data rates in spite of limited transmit PSD. The resulting interference temperature will be the result of a number of uncorrelated low power wideband signals, again summing in the limit to a bivariant Gaussian signal. In this case, it isn't possible to identify individual emitters, just their composite power effect. The same statistical estimation techniques described above may be used to estimate the interference power in each bin, and send enough power in each bin to "fill it up" to the water-filling temperature below the FCC's maximum permissible interference temperature.

When the FCC's spectrum management revolution is complete and everyone is using XG technology, we can expect to see white Gaussian "noise" at all frequencies everywhere, equal to the FCC's permissible interference temperature in each band.

Representing The XG Waveform PSD (Quantified Bits)

A compact representation of the XG PSD for this case would again be a sequence of pairs of integers. The first number specifies the permissible power to be transmitted, and the second the number of contiguous bins to which the value applies. For six different measured noise floors in a band, 18 bytes can represent the desired XG PSD in the power-and-spectrum-control feedback loop messages to neighbors. When strong narrowband signals are also present, the permissible power will be zero for that interval of bins.

Trade Studies for Design of the Short-Term Waveform

FIG. **12** depicts a model illustrating an integrated system concept according to an embodiment of the present invention. As shown in FIG. **12**, the present invention uses water-filling (represented by the component designated **1201**) for each node to create its optimal short-term receiving waveform for use by all of its neighbors to communicate with it. The resulting spectrum is nonuniform and covers disjoint frequencies. As a result, the time domain version of this waveform (a basic symbol on the channel) will be far more complicated than the sin(t)/t pulse generated by a brick wall frequency domain specification. In the following, a number of techniques for achieving very desirable waveform characteristics are presented. These techniques which will be described in more detail below, include using: Intersymbol Interference Mitigation (component **1202**); Spread Spectrum Transmissions (component **1203**); Multiple Correlators (component **1204**); and Wide Sense Stationary (WSS) Baseband Signals and Modulation (component **1205**). When used in conjunction with operating nodes, in a Power-Limited Regime (component **1206**), these techniques provide a comprehensive spectrum reuse system that is far more efficient than any of the existing or proposed systems.

Intersymbol Interference Mitigation

The power spectrum derived from the statistical noise floor characterization described above is a crenelated structure with fragmented frequency support. The first challenge was to transmit a sequence of basic symbols with this power spectrum (modulated to carry user data) in a way that intersymbol interference is tolerable. Obviously, spacing the symbols far apart in time will reduce the intersymbol interference, at the cost of greatly reducing the data rate.

An alternative approach is shown in FIG. **13**. Here, the desired waveform is specified as a contiguous vector of complex Fourier coefficients X(f), with constant amplitude and some phase structure. X(f) is the set of the coefficients to be transmitted over the channel, expressed as the complex value of each frequency bin of a complex waveform (as would result from a fast Fourier transform (FFT)). This frequency vector is then expanded to a wider bandwidth that has zeroes in the ranges where the spectrum estimator has judged that interfering signals are present. This wider band frequency vector is then inverse-FFT'ed into a time waveform for transmission across the channel. The symbol rate on the channel is higher, corresponding to the expanded bandwidth of this vector. Y(t) is the signal sent over the channel, which has the wider bandwidth. The undesired frequencies have been removed from y(t) by the transmit excision.

On the receive side (toward the right-most side of FIG. **13**), the receiver does a matching FFT, "squeezes out" the undesirable frequencies (accomplishing receive excision), and then multiplies the frequency vector by the characteristic matched filter (with phases opposite to the original signal in each frequency bin) to produce the signal to be detected at the original symbol rate. The core structure (IFFT, channel, FFT) corresponds to OFDM modulation recently commercialized in IEEE 802.11a and 802.11 g wireless LANs. Of course, the remaining structure (a spectrum shaping appliqué) is unique to XG. A Nyquist shaper (satisfying the Nyquist criterion for zero intersymbol interference) algorithm permits finite length symbols with no intersymbol interference, in spite of the use of noncontiguous spectrum. Thus, X(f) on the receiver side is a reconstruction of the original set of frequency coefficients with the same name at the sender. The user symbol rate matches the bandwidth of this frequency domain specification X(f).

CDMA w/Multiple Correlators—White Signals

Some throughput may be lost due to spreading (processing gain). By using multiple code division multiple access (CDMA) correlators at each receiver to permit multiple neighbors to send to the node at the same time, some of the throughput lost to spreading can be recovered. Examples of multi-correlator systems that exchange information with multiple nodes simultaneously include GPS (receiving from up to 12 satellites) and IS-95 CDMA downlink (sending to up to 64 cell phones). The present invention uses multiple waveforms (e.g., with differing phase structure) that all have the optimal PSD and have a small, tolerable level of mutual interference. For typical mobile ad hoc networks, nodes usually have 4 to 6 neighbors, so that is a reasonable estimate of the number of correlators needed, and thus the throughput factor that can be recovered from the spreading loss.

To achieve high performance CDMA, the present invention uses white waveforms (those having constant power spectrum density at the detector) with pseudorandom phase structure. A waveform of this type can be used to provide a signal that approximates a Gaussian envelope to improve LPI/LPD, while providing orthogonal CDMA for minimal interference among multiple simultaneous transmissions to the destination node.

Unlike the CDMA cell towers, the present invention uses small, light transceivers with small antenna structures, so the transceivers will only be able to operate in wideband half duplex, not full duplex, mode. This means that each node will alternate between a state of receiving from N neighbors simultaneously, and a state of transmitting either to one neighbor, or to N neighbors simultaneously when this doesn't require an impractical dynamic range. This requires MAC protocol that is quite different from conventional carrier sense multiple access/collision detect (CSMA/CD) protocols, such as IEEE 802.11, which uses RTS/CTS exchanges. The basic rule in the multi-correlator architecture of the present invention is to transmit traffic to any neighbors that aren't currently transmitting. This approach provides another opportunity to use "Opportunistic Forwarding", as described above. For extremely low delay traffic, packets are forwarded to any node in the direction of the destination (lower hop count) that is not currently transmitting (like a soccer player looking for an open team mate downfield). This violates the customary practice of strict protocol layering, by using instantaneous information from the MAC layer to guide network forwarding decisions. It minimizes the dominant end-to-end latency effect of channel access delay at each hop, providing far lower network latency for critical real time traffic.

The invention also uses orthogonal CDMA waveforms, as well as that of the multi-correlator MAC protocol, described above, to achieve optimal performance.

LPI/LPD: Wide Sense Stationary Baseband Signal and Modulation

The present invention generates a waveform with the optimal PSD that enhances LPI/LPD capability. In some applications, it is important to generate a wide sense stationary (WSS) water-filling waveform that minimizes features susceptible to intercept by a second order cyclo-stationary interceptor. Wide sense stationarity requires that all second order statistics of the signal are constant functions of time, meaning that the expected value of the signal (mean) is constant (chosen to be zero), and the expected variance (mean power) and the autocorrelation function are also constant functions of time. Specialized filtering and linear modulation architecture may be used to eliminate any spectral redundancy (nonlinear constant envelope and continuous phase modulations are easily susceptible to second order cyclostationary intercept). This symbol generation and modulation structure involves Nyquist filtering of the symbols (limiting symbol frequencies to 1/(2T), where T is the symbol period on the channel), to produce constant mean power signaling, and to prevent exposure of the symbol clock by a magnitude-square operation.

In addition, the symbols are modulated onto a carrier using uncorrelated I and Q channels with equal mean power to prevent exposure of the doubled carrier frequency by a squaring operator. Making I and Q uncorrelated may be accomplished either by sending uncorrelated data on each channel, or by making Q the Hilbert transform of I, resulting in single sideband modulation of the carrier. Hilbert transforms are described in A. Papoulis, Probability, Random Variables, and Stochastic Processes, McGraw Hill 1991, which is incorporated herein by reference in its entirety.

Use of Power Limited Signals for Spectrum Compatibility and LPI/LPD: (Data Rate<<Bandwidth, Eb~No)

In preferred embodiments of the present invention, network links are operated in the, power limited regime (transmitting far less than one bps per Hz), rather than the conven-

tional bandwidth limited regime (with more than one bps per Hz), which requires high SNR (e.g. >10 dB for 10-5 BER with QPSK). At the cost of lower data rates, this capability, along with closed loop power control on each link, will permit an entire network to operate in LPI/LPD mode. Using wide bandwidths and low power also greatly enhances the spectrum compatibility among multiple XG users and legacy users.

Preferably, the optimal water-filling waveforms produced by the above-described methods are used in a spread spectrum mode, where the user bit rate is roughly an order of magnitude less than the basic symbol rate. Spectrum spreading improves LPI/LPD and interference performance by a factor of the processing gain, at the cost of a reduced user data rate. The recently introduced Turbo-Hadamard codes, which provide very low rate (e.g. rate 1/8 or 1/16) forward error correction (FEC) coding, may be used to address this problem. A rate of 1/8 or 1/16 means that one user bit turns into 8 or 16 bits with forward error correction on the channel. These codes have been demonstrated to operate with 10-5 BER down to Eb/No ratios below 0 dB at the detector, which is close to the ultimate Shannon bound of Eb/No=−1.6 dB. With this approach, spectrum spreading and FEC are combined into a single operation. Operation at such low Eb/No ratios provides LPI/LPD and excellent spectrum compatibility with other users. The spread spectrum (e.g., an order of magnitude greater bandwidth than the data rate) permits resolving multipath components in the time domain, perhaps even power combining the energy of the different multipath components in a rake receiver.

FIG. **14** shows a high-level block diagram of a network node **1400** (such as a software radio, a router, etc.) configured to operate according to embodiments of the present invention. As shown in FIG. **14**, node **1400** comprises a receiving antenna **1405**, a transmitting antenna **1410**, a receiver **1415**, an input filter **1480**, multiple correlators **1485**, a network data processor **1490**, a MAC controller **1495**, a spectrum analyzer **1420**, a buffer **1425**, a signal data processor **1430**, a transmitter **1450**, a compressor **1445**, an output filter **1440** and a waveform profile generator **1435**.

Receiver **1415** continuously monitors and receives aggregate signals from the networking environment. When a signal is received, receiver **1415** passes the signal to spectrum analyzer **1420**, which is configured to continuously measure power in all the frequencies contained in a frequency band of interest. The output from spectrum analyzer **1420** is a series of power values as a function of frequency. Typically, although not necessarily, spectrum analyzer **1420** would store multiple power functions in a buffer **1425**, which is coupled to a signal data processor **1430** configured to create a model or "normalized" power function, such as by computing the average or median power reading at each frequency in the band of interest over a given period of time. Signal data processor **1430** conveys the model power function to waveform profile generator **1435**, which, in preferred embodiments, is configured to subtract the model power function from a specified interference temperature, limit or threshold, in order generate an optimal waveform profile that specifies which frequency neighboring nodes should use to communicate with node **1400**. More particularly, waveform profile generator **1435** produces an optimal waveform profile **1401** that requires neighboring nodes communicating with node **1400** to use zero power at frequencies node **1400** has determined are already populated with signals generated by legacy communication devices in the network.

Output filter **1440** conforms the optimal waveform profile created by waveform profile generator **1435** to a format that will be understood by neighboring node **1460**. In other words, output filter **1440** performs transmit excision to remove power from certain frequencies that neighboring node **1460** has determined should not be used because those frequencies are carrying data signals from primary users (e.g. legacy and high-priority users, such as police, governmental or military entities). Optionally, node **1400** includes a compressor **1445**, which may be implemented in hardware, software, or both, which compresses the optimal waveform profile **1401** prior to sending it to neighboring node **1460** via transmitter **1450** and antenna **1410**. In a preferred embodiment, node **1400** would also provide feedback information to neighboring node **1460** to assure that the signal neighboring node **1460** sends back to node **1400** arrives with the same power level as that of every other neighbor, minimizing problems of near-far receiver masking.

Neighboring node **1460** typically comprises substantially the same components as node **1400**. For simplicity's sake, however, neighboring node **1460** is shown in FIG. **14** as being comprised of a processor **1467**, decompressor **1465**, output filter **1470**, receiving antenna **1455** and transmitting antenna **1475**. Neighboring node **1460** receives the signal containing the optimal waveform profile **1401** from node **1400** via antenna **1455**. If the signal containing optimal waveform profile **1401** is compressed, decompressor **1465** of neighboring node **1460** decompresses the signal before passing it along to processor **1467**. Processor **1467** is configured, in conjunction with output filter **1470**, to use the optimal waveform profile **1401** to generate and send a new signal (optimal waveform **1402**) conforming to the optimal waveform profile **1401** when transmitting data to node **1400**. In other words, the signal has been filtered such that there is no power transmitted at the frequencies waveform profile generator **1435** determined carried signals from legacy transmission devices.

Neighboring node **1460** transmits information back to node **1400** in the form of the optimal waveform **1402** via transmitting antenna **1475**. Notably, nodes **1400** and neighboring node **1460** may or may not use a single antenna to perform both the transmit and receive functions. During this transmission, optimal waveform **1402** may be influenced and/or partially contaminated by interference **1412** produced by other emitters (e.g., legacy transmitting devices) existing in the wireless networking environment.

When the signal carrying optimal waveform **1402** (combined with noise and interference produced from interference **1412**) is received at node **1400** via antenna **1405** and receiver **1415**, it will again be passed to spectrum analyzer **1420** for analysis and generation of an "updated" optimal waveform profile that takes into account changes in the wireless communication environment that may have occurred since the last optimal waveform profile was generated. Such changes in the wireless communication environment might occur, for example, due to a change in the physical location of node **1400** or other mobile nodes in the network, or by new emitters coming online in the vicinity of node **1400**.

Receivers **1415** also passes the incoming signal to input filter **1480** (preferably, an optimal matched filter), which is configured to zero out (or ignore) any power carried at frequencies node **1400** previously determined were occupied by signals produced by legacy systems. In other words, input filter **1480**, performs receiver excision because it is configured to be most sensitive where the optimal waveform profile **1401** requires there to be power, and completely insensitive to power signals carried on frequencies where the optimal waveform profile **1401** for node **1400** requires there to be no signal. In this way, input filter **1480** removes the noise and interference caused by interference **1412**.

Input filter **1480** passes the filtered signal to a set of multiple correlators **1485** (containing correlators C**1** through CN), each of which is configured to respond to unique patterns associated with one or more neighboring nodes in the vicinity of node **1400**. Using multiple correlators in this manner allows node **1400** to receive from multiple neighboring nodes simultaneously. Once the incoming signal has been filtered by input filter, **1480** and its source has been identified by multiple correlators **1485**, it is then passed on to network data processor **1490** for processing of the data carried by the signal, according to the specific requirements, applications and/or networking, protocols associated with node **1400** and the wireless communications network in general.

As discussed above, node **1400** is configured to operate in half-duplex mode, meaning that it is always in either transmit mode or receive mode, but not both at the same time. Accordingly, node **1400** also includes a media access controller (designated MAC controller **1495** in FIG. **14**), which is responsible for switching node **1400** back and forth between receive mode and transmit mode. When node **1400** is operating in receive mode, it is capable of receiving multiple signals from multiple neighboring nodes, each of which uses the optimal waveform **1402**, as defined by node **1400** and transmitted to those neighboring nodes. Node **1400** identifies the source of those signals using correlators C**1** through CN (designated **1485** in FIG. **14**).

In alternative embodiments, node **1400** may be configured to use a common, low data rate configuration channel to transmit waveform profile **1401** to neighboring node **1460**.

Although the example node shown in FIG. **14** and discussed in detail above shows components, such as processors, controllers, generators, antennas, filters and buffers, as separate physical components residing at node **1400**, those skilled in the art would recognize and appreciate the fact that the invention may be advantageously combined or divided, depending on the needs of the particular implementation, into more or fewer processors controllers, generators, antennas, filters and buffers than the number shown in the embodiment of FIG. **14**, and that such components do not necessarily have to reside at each of the nodes in the network. It should be apparent, for example, that, although the example node in FIG. **14** shows two separate antennas for clarity, network-nodes typically use only a single antenna for both transmit and receive modes. Accordingly, such alternative configurations are not meant to fall outside the scope of the claimed invention.

FIG. **15** contains a high-level flow diagram illustrating the steps performed in an embodiment of the present invention in order to process signals and manage, interference received at a node, such as node **1400** described above with reference to FIG. **14**. Beginning at step **1505**, the node receives an aggregate radio signal available at the receiving node. When a signal is received, the system passes the signal through two parallel processing chains.

The first processing chain, depicted on the left side of FIG. **15**, comprises steps **1515**, **1520**, **1525**, **1530** and **1535**. In step **1515**, a plurality of instantaneous power measurements over a given length of time are acquired for each frequency in a band of interest and, in some embodiments, stored in a buffer as shown in FIG. **14**. Next, at step **1520**, the system determines a model power level based on the plurality of power levels acquired in step **1515**. Such model power level may be determined, for example, by calculating the average or median power level at each frequency during the period of time. The model power level at each frequency is then subtracted from an interference limit, step **1525**. The interference limit may be specified by a government agency, a rule-making body an industry standard and/or some combination of all of them.

The difference between the interference limit and the model power level, which represents the amount of power spectrum available for use by next generation systems, is used, at step **1530**, to generate an optimal waveform profile (OWP) for the receiving node to receive transmissions from a neighboring node. The optimal waveform profile requires that certain frequencies will not be used to communicate with this node because using those frequencies will interfere with legacy and primary users communicating in the band of interest. At step **1535**, the optimal waveform profile (OWP) is transmitted to other nodes in the network. At this point, control returns to step **1505** where the system again receives the aggregate signal available at the receiving node.

While the optimal waveform profile (OWP) is being calculated, generated and reported to other nodes in steps **1525**, **1530** and **1535**, the received aggregate signal is also examined in a parallel chain of steps (steps **1540**, **1545**, **1550** and **1555** in FIG. **15**) to determine whether the signal contains data sent specifically to this node from another specific node in the network. At step **1540**, for instance, the aggregate signal is filtered, such as by an optimal matched filter, to remove all power carried on frequencies corresponding to transmissions, by legacy and primary users. These frequencies are the same frequencies specified for avoidance by the optimal waveform profile (OWP) generated in step **1530**. Next, at step **1545**, the filtered signal is correlated to identify a source for the transmission by determining whether it contains a unique pattern associated with a particular node in the network.

If a particular node is identified as the source of the transmitted and received signal, the system may optionally instruct that node to adjust the power level on its transmission (step **1550**) so as not to overwhelm other nodes in the immediate vicinity. At step **1555**, the signal data is passed to a network processor for further processing in accordance with the requirements of various applications and protocols, and control passes, once again, back to step **1505**, where the system continues to receive an aggregate signal.

Clustering of Nodes to Manage the Large Dynamic Range of RF Links in a Mobile Wireless Network.

Typical mobile networks have RF links that have a path loss (PL) range of 60-120 dB. This corresponds to a line-of-sight range variation (with r^2 loss) of 1000 to 1, or ground mobile range variations (with r^4 loss) of about 30 to 1. Co-site interference limits overall network performance because (high power) transmission to a distant receiver "deafens" all nearby receivers. This 60 dB dynamic range of path loss is beyond the normal power control and spurious-free dynamic range (SFDR) capabilities of typical RF transceivers.

In a preferred embodiment of the present invention, co-site interference may be addressed by dividing the available spectrum into two bands, with simultaneously operating, non-interfering half duplex transceivers on each. One set of transceivers is used within automatically formed short-range clusters, e.g., nodes with 60-90 dB PL to their neighbors within a cluster (intra-cluster communications). The other set of transceivers are configured to operate over considerably longer paths (PLs in the 90-120 dB range), using far greater transmitter power, to provide inter-cluster communications. Factoring the spectrum into two bands with greatly differing path loss capabilities is one way of reducing the dynamic range required of any single transceiver to a range that is much easier to manage (e.g., 30 dB).

A manager for each cluster is automatically selected, e.g., by using a K-means (position vector quantization) algorithm. The manager provides a point coordination function that controls use of any inter-cluster link. The manager is accessed over the intra-cluster links, and grants only serialized access to use an inter-cluster link. Traffic need not flow through the manager, only the channel access permission for use of the inter-cluster links. This eliminates co-site interference within each cluster, by assuring that, at most, one long range transceiver is transmitting at a time within each cluster.

Multiple CDMA correlators may be used in each short-range transceiver, and a different CDMA transmission code assigned for each neighbor. Thus, a node can receive from multiple neighbors at the same time, as long as it is not transmitting. The ability to receive from multiple neighbors simultaneously on each band recovers some of the bandwidth lost to the CDMA code's spectrum spreading. Simultaneous CDMA reception from multiple neighbors is enhanced by using closed loop power control from each neighbor (e.g., over a 30 dB dynamic range) to assure that equal power arrives at the receiver from each neighbor.

In preferred embodiments, each correlator provides "carrier sense" to indicate when a particular neighbor is transmitting. The node alternates between modes of transmitting to a single neighbor, or receiving from multiple neighbors. When no outgoing traffic is queued to a neighbor that is not currently transmitting, the node switches to receiving mode. When outgoing traffic is queued and no neighbor is transmitting to this node, the node switches to transmit mode. The same type of multi-correlator operation may be used for the long-range transceivers to improve their aggregate reception data rates as well.

Co-site interference may also be minimized by giving each node its own receive frequency. Under this scheme, transmit frequency is changed on a packet-by-packet basis to send each packet to the appropriate neighbor node on the neighboring node's own receive frequency. This permits a node to transmit out of one directional antenna (on the appropriate transmit frequency, i.e., the neighbor's receive frequency), while simultaneously receiving through multiple other directional antennas, pointed in other directions, on this node's own receive frequency. The benefits of simultaneous transmit and receive include both higher network throughput, and lower end-to-end latency for real time traffic.

A problem arises, however, when there are a multiplicity of nodes in a network and each node uses directional antennas to transmit, and receive at the same time. Suppose, for example, the node comprises a moving vehicle equipped with multiple directional antennas; one on each side of the vehicle. The directional antennas usually do not provide enough signal separation to use the same frequency to broadcast on one side of the vehicle while receiving on the opposite side. The transmitting antenna will simply overwhelm the receiving antenna. For this reason, the transceivers on each node (or, in this case, each vehicle) in the network may be configured to have its own unique receive frequency and alternate between transmit and receive modes. While the node is in receive mode, and not transmitting, it will pick up any signal ton its assigned frequency.

In some networks, there is simply not enough spectrum available to allocate a unique receive frequency to every node in the network. The present invention addresses this problem by assigning a small number of receive frequencies to nodes in such a way that nodes using the same receive frequency are far enough apart so that they do not pick up each other's transmissions. In other words, adjacent nodes are never assigned the same frequency.

FIGS. **16**, **17** and **18** show the results of simulation experiments for assigning different frequencies (sometimes referred to as "coloring") a random layout of fifty nodes in a network. First, as shown in FIG. **16**, an attempt was made to assign frequencies to all 50 nodes using only two frequencies. In FIG. **16**, the first frequency is represented by the squares and the second frequency is represented by the circles. If a link connects two nodes having the same frequency (shape), then that link is deemed to be unusable because it means those two nodes are sharing the same receive frequency. As FIG. **16** shows, it is not possible to assign one-of the two frequencies (i.e., one of the two shapes) to all 50 nodes in such a way that there are no links connecting the same shape. Links connecting the same shape are shown as dotted lines in FIG. **16**. So, for example, as shown in FIG. **16**, the links between nodes **1** and **7**, nodes **7** and **11**, nodes **11**, and **21**, nodes **11** and **12**, nodes **13** and **3**, etc.; are all unusable links. In this case, only 55% of the links in FIG. **16** are usable.

FIG. **17** shows the results of attempting to assign receive frequencies to the same set of nodes using three different frequencies (shapes) instead of two. Thus, a new frequency (represented by the star shape in FIG. **17**) is available to use at different nodes as assigned receive frequencies. As can be seen in FIG. **17**, after all of the nodes have been assigned one of the three available receive frequencies (shape), more of the links (89%) are usable than occurred with two frequencies (shapes). However, there are still a number of unusable links between nodes having the same frequencies (e.g., links connecting nodes **1** and **7**, nodes **4** and **5**, nodes **12** and **13**, etc).

FIG. **18** shows the results of attempting to assign receive frequencies (shapes) to the same set of 50 nodes using four frequencies (shapes) instead of three. Thus, a fourth frequency (represented in FIG. **18** by the triangle shape) is now available to assign to nodes. Having four different frequencies (i.e., four different shapes) to assign to the fifty nodes makes it possible to have no adjacent nodes with the same frequency (or same shape). Thus, 100% of the nodes are connected by usable links. This being the case, there should be enough physical separation between nodes using the same receive frequency to transmit and receive simultaneously without experiencing harmful interference.

FIG. **19** shows a high-level flow diagram illustrating the steps that may be performed by a processor configured to assign receive frequencies to a multiplicity of nodes in accordance with the present invention, to ensure that there are no adjacent nodes that use the same receive frequency. Links that are connected to nodes having the same receive frequency are unusable. As shown in FIG. **19**, the first steps, step **1910** and **1920**, are to select a first receive frequency and assign it to all of the nodes in the network. Next, a new frequency (receive frequency number two) is allocated, step **1930**, and made the current frequency (using the variable "curr_frequency") at step **1940**.

Next, in step **1950**, a node that is at one end of an unusable link and that is not already using the, current frequency is selected. The current frequency is assigned as the receive frequency for the selected node unless doing so would create another unusable link in the network. See step **1960**. In the next step, step **1970**, the system checks to see if there are any more unusable links. If the answer is no, processing stops because all links are now usable and there is no need to proceed any further. However, if it is determined at step **1970** that unusable links still exist, then the next step, step **1980**, is to determine whether any of the unusable links are connected to a node not already, using the current color. If the answer is yes, then processing returns to steps **1950** and then **1960**, wherein that node is selected and assigned the current fre-

quency unless doing so would create another unusable link. If, on the other hand, it is determined at step **1980** that none of the unusable links are connected to a node not using the current frequency, then processing returns again to step **1930**, where another frequency must be allocated and then assigned to nodes connected to unusable links until either all links become usable or no other nodes can be assigned the newly allocated frequency.

The above-described embodiments are by no means meant to limit the scope of the invention. Though the invention has been described with respect to preferred embodiments thereof, many variations and modifications will become apparent to those skilled in the art upon reading this disclosure and the following claims, as well as practicing the claimed invention. It is therefore the intention that the claims be interpreted as broadly as possible in view of the prior art, to include all such variations and modifications.

What is claimed is:

1. A method for managing interference in a radio communications network, comprising the steps of:

receiving an aggregated radio signal at a first node in the radio communications network on a plurality of frequencies;

determining a power level for the aggregated radio signal for each frequency in the plurality frequencies;

subtracting the power level for each the frequency from a power limit to produce a power differential for the each frequency; and

instructing a second node in the radio communications network to avoid using a transmission frequency corresponding to a non-positive power differential in the plurality of power differentials to transmit to the first node.

2. The method of claim **1**, further comprising the steps of: receiving a transmission from the second node in the radio communications network; and discarding any portion of the transmission carried on the transmission frequency.

3. The method of claim **2**, wherein the discarding step comprises applying a filter to the transmission.

4. The method of claim **1**, wherein the step of determining a power level is carried out by:

acquiring a plurality of instantaneous power level measurements for each the frequency; and

calculating an average power level based on the plurality of instantaneous power level measurements.

5. The method of claim **1**, wherein the step of determining a power level is carried out by:

acquiring a plurality of instantaneous power level measurements for the each frequency; and

calculating a median power level based on the plurality of instantaneous power level measurements.

6. The method of claim **1**, further comprising the step of: sending to the second node a request to adjust a transmission power level on a frequency corresponding to a positive power differential in the plurality of power differentials.

7. The method of claim **1**, further comprising the step of: instructing a plurality of other nodes in the radio communications network to avoid using the transmission frequency to transmit information to the first node.

8. The method of claim **7**, further comprising the steps of:

receiving a transmission from one of the plurality of other nodes; and

discarding any portion of the second transmission carried on a frequency corresponding to a non-positive power differential in the plurality of power differentials.

9. The method of claim **8**, further comprising the step of: sending to the one of the plurality of other nodes a request to adjust a transmit power level on a frequency corresponding to a positive power differential in the plurality of power differentials.

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

determining an updated power level for the aggregated radio signal for each frequency in the plurality frequencies;

subtracting the updated power level for each the frequency from the power limit to produce a plurality of updated power differentials; and

instructing the second node to avoid transmitting to the first node on a frequency corresponding to a non-positive updated power differential in the plurality of updated power differentials.

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

generating an optimal waveform profile based on the plurality of power differentials; and

reporting the optimal waveform profile to the second node.

12. The method of claim **11**, wherein the reporting step is carried out using a common network configuration channel.

13. The method of claim **11**, further comprising the step of compressing the optimal waveform profile prior to performing the reporting step.

14. The method of claim **11**, wherein the optimal waveform profile specifies a waveform pattern.

15. The method of claim **14**, wherein the waveform pattern defines a transmission signal having a power spectral density that varies over time.

16. The method of claim **14**, further comprising the steps of:

generating a second optimal waveform profile based on the plurality of power differentials; and

reporting the second optimal waveform profile to a third node in the radio communications network; wherein the second optimal waveform profile specifies a second waveform pattern that is orthogonal to the waveform pattern.

17. The method of claim **1**, wherein the plurality of frequencies comprises all of the frequencies in a radio frequency band.

18. The method of claim **1**, further comprising the steps of: associating a unique pattern with the second node; and determining whether the transmission contains the unique pattern.

19. A method for managing interference in a radio communications network, comprising the steps of:

receiving at a first node in the radio communications network an instruction transmitted from a second node in the radio communications network to avoid using a plurality of frequencies to transmit to the second node;

filtering a transmission signal to remove power from the transmission signal at each frequency in the plurality of frequencies; and

transmitting the transmission signal to the second node.

20. The method of claim **19**, further comprising the steps of:

receiving an optimal waveform profile from the second node, the optimal waveform profile being based on a plurality of power measurements for the plurality of frequencies and a power limit; and

conforming the transmission signal to the optimal waveform profile prior to performing the transmitting step.

21. The method of claim **20**, further comprising the step of decompressing the optimal waveform profile prior to performing the conforming step.

* * * * *

PATENT

IN THE UNITED STATES PATENT AND TRADEMARK OFFICE

In re *reissue* application:	Confirmation No.: Unassigned
of U.S. patent 7,483,711	Examiner: Unassigned
Filed: 2/16/2018	Art Unit: Unassigned
For: SPECTRUM-ADAPTIVE NETWORKING	Atty. Docket No.: USTAP030D.RI
	Date: 2/16/2018

PRELIMINARY AMENDMENT
AND
NOTICE OF PRIOR/CONCURRENT PROCEEDINGS AND DECISIONS THEREON

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

Examiner:

Prior to substantive examination, please enter the following amendments in the above application.

The Status of Claims is listed on page 2.

Notice of Prior/Concurrent Proceedings and Decisions Thereon is listed on page 3.

Remarks, including support for all changes to the claims, begin on page 13.

STATUS OF CLAIMS

Claims 1-21 are original patented claims. Claims 22-42 are newly added.

NOTICE OF PRIOR/CONCURRENT PROCEEDINGS AND DECISIONS THEREON

With respect to other prior or concurrent proceedings, interferences or trials before the Patent Trial and Appeal Board, reissues, reexaminations, litigations and decisions thereon, there are no other such proceedings or decisions thereon.

AMENDMENTS TO THE CLAIMS

Amended claims follow:

1. (Original) A method for managing interference in a radio communications network, comprising the steps of:

receiving an aggregated radio signal at a first node in the radio communications network on a plurality of frequencies;

determining a power level for the aggregated radio signal for each frequency in the plurality frequencies;

subtracting the power level for each the frequency from a power limit to produce a power differential for the each frequency; and

instructing a second node in the radio communications network to avoid using a transmission frequency corresponding to a non-positive power differential in the plurality of power differentials to transmit to the first node.

2. (Original) The method of claim 1, further comprising the steps of: receiving a transmission from the second node in the radio communications network; and discarding any portion of the transmission carried on the transmission frequency.

3. (Original) The method of claim 2, wherein the discarding step comprises applying a filter to the transmission.

4. (Original) The method of claim 1, wherein the step of determining a power level is carried out by:

acquiring a plurality of instantaneous power level measurements for each the frequency; and

calculating an average power level based on the plurality of instantaneous power level measurements.

5. (Original) The method of claim 1, wherein the step of determining a power level is carried out by:

acquiring a plurality of instantaneous power level measurements for the each frequency; and

calculating a median power level based on the plurality of instantaneous power level measurements.

6. (Original) The method of claim 1, further comprising the step of: sending to the second node a request to adjust a transmission power level on a frequency corresponding to a positive power differential in the plurality of power differentials.

7. (Original) The method of claim 1, further comprising the step of: instructing a plurality of other nodes in the radio communications network to avoid using the transmission frequency to transmit information to the first node.

8. (Original) The method of claim 7, further comprising the steps of:

receiving a transmission from one of the plurality of other nodes; and

discarding any portion of the second transmission carried on a frequency corresponding to a non-positive power differential in the plurality of power differentials.

9. (Original) The method of claim 8, further comprising the step of: sending to the one of the plurality of other nodes a request to adjust a transmit power level on a frequency corresponding to a positive power differential in the plurality of power differentials.

10. (Original) The method of claim 1, further comprising the steps of:

determining an updated power level for the aggregated radio signal for each frequency in the plurality frequencies;

subtracting the updated power level for each the frequency from the power limit to produce a plurality of updated power differentials; and

instructing the second node to avoid transmitting to the first node on a frequency corresponding to a non-positive updated power differential in the plurality of updated power differentials.

11. (Original) The method of claim 1, further comprising the steps of:
generating an optimal waveform profile based on the plurality of power differentials; and
reporting the optimal waveform profile to the second node.

12. (Original) The method of claim 11, wherein the reporting step is carried out using a common network configuration channel.

13. (Original) The method of claim 11, further comprising the step of compressing the optimal waveform profile prior to performing the reporting step.

14. (Original) The method of claim 11, wherein the optimal waveform profile specifies a waveform pattern.

15. (Original) The method of claim 14, wherein the waveform pattern defines a transmission signal having a power spectral density that varies over time.

16. (Original) The method of claim 14, further comprising the steps of:
generating a second optimal waveform profile based on the plurality of power differentials; and
reporting the second optimal waveform profile to a third node in the radio communications network; wherein the second optimal waveform profile specifies a second waveform pattern that is orthogonal to the waveform pattern.

17. (Original) The method of claim 1, wherein the plurality of frequencies comprises all of the frequencies in a radio frequency band.

18. (Original) The method of claim 1, further comprising the steps of: associating a unique pattern with the second node; and determining whether the transmission contains the unique pattern.

19. (Original) A method for managing interference in a radio communications network, comprising the steps of:

receiving at a first node in the radio communications network an instruction transmitted from a second node in the radio communications network to avoid using a plurality of frequencies to transmit to the second node;

filtering a transmission signal to remove power from the transmission signal at each frequency in the plurality of frequencies; and

transmitting the transmission signal to the second node.

20. (Original) The method of claim 19, further comprising the steps of:

receiving an optimal waveform profile from the second node, the optimal waveform profile being based on a plurality of power measurements for the plurality of frequencies and a power limit; and

conforming the transmission signal to the optimal waveform profile prior to performing the transmitting step.

21. (Original) The method of claim 20, further comprising the step of decompressing the optimal waveform profile prior to performing the conforming step.

22. (New) The method of claim 19, and further comprising:

separately from the receipt of the instruction, receiving a compressed first feedback from the second node that is based on a received power and one or more frequencies of a first signal transmitted from the first node to the second node;

separately from the receipt of the instruction, receiving a compressed second feedback from a third node that is based on a received power and one or more frequencies of a second signal transmitted from the first node to the third node;

decompressing the compressed first feedback resulting in a decompressed first feedback;

decompressing the compressed second feedback resulting in a decompressed second feedback;

generating one or more of data structures based on the decompressed first feedback and the decompressed second feedback;

wherein the transmission signal is a first transmission signal that is transmitted using a first frequency and an 802.11-based orthogonal frequency-division multiplexing (OFDM) protocol via at least one directional antenna of a plurality of directional antennas, using a first power that is based on at least one of the one or more data structures; and further comprising:

transmitting, using a second frequency and the 802.11-based OFDM protocol, a second transmission signal, simultaneously with the first transmission signal, to the third node, using a second power that is based on at least one of the one or more data structures.

23. (New) The method of claim 22, wherein the instruction includes a first instruction, and further comprising:

receiving at the first node in the radio communications network a second instruction transmitted from a third node in the radio communications network to avoid using a different plurality of frequencies to transmit to the third node; and

filtering the second transmission signal to remove power from the second transmission signal at each frequency in the different plurality of frequencies.

24. (New) The method of claim 22, wherein the first power and the second power are the same.

25. (New) The method of claim 22, wherein the first power and the second power are different.

26. (New) The method of claim 22, wherein an update of the compressed first feedback is repeatedly received at time periods of less than one second, and the first power is repeatedly updated based on an updated decompressed first feedback at time periods of less than one second; and an update of the compressed second feedback is repeatedly received at time periods

of less than one second, and the second power is repeatedly updated based on an updated decompressed second feedback at time periods of less than one second.

27. (New) The method of claim 22, wherein the first transmission signal and the second transmission signal are sent via the same transceiver.

28. (New) The method of claim 22, wherein the first transmission signal and the second transmission signal are sent via different transceivers.

29. (New) The method of claim 22, wherein the instruction is received utilizing a dedicated channel.

30. (New) The method of claim 22, wherein the instruction is received via an antenna configured for omnidirectional communication.

31. (New) The method of claim 22, wherein the compressed first feedback and the compressed second feedback are received utilizing a dedicated channel.

32. (New) The method of claim 22, wherein the compressed first feedback and the compressed second feedback are received via an antenna configured for omnidirectional communication.

33. (New) The method of claim 22, wherein the decompressed first feedback and the decompressed second feedback are used to increase spatial separation among transmissions.

34. (New) The method of claim 22, wherein the decompressed first feedback and the decompressed second feedback are used to increase spatial separation among transmissions at the same frequency.

35. (New) The method of claim 22, and further comprising:

receiving a compressed third feedback from a fourth node that characterizes receipt of a third signal sent from the first node to the fourth node, the fourth node being a legacy node;

decompressing the compressed third feedback resulting in a decompressed third feedback;

transmitting, using a third frequency and the 802.11-based OFDM protocol, the third transmission signal to the fourth node using a transceiver separate from one or more other transceivers used to transmit the first transmission signal and the second transmission signal, and further using a third power that is based on the decompressed third feedback.

36. (New) The method of claim 35, wherein the third transmission signal is transmitted simultaneously with the first transmission signal and the second transmission signal via at least one different directional antenna of the plurality of directional antennas.

37. (New) The method of claim 22, wherein the compressed first feedback is based on a received power at a plurality of frequencies via which the first signal is received.

38. (New) The method of claim 22, wherein at least one of:

the first signal includes a data signal;

the first signal includes an aggregate signal;

the compressed first feedback is combined with the instruction;

the compressed first feedback is received with the instruction;

the compressed first feedback is configured to ensure that transmissions from all neighbors of the first node are received at a same power level;

the compressed first feedback is configured to at least one of: minimize a transmit power on reliable links, maximize an ability to achieve spatial separation among transmissions on a same frequency, minimize network self-interference, improves low probability of intercept (LPI), or low probability of detection (LPD);

the compressed first feedback and the compressed second feedback are received simultaneously;

the radio communications network includes an 802.11 network;

the 802.11 network includes an 802.11a/g network;

interference in the radio communications network is managed;

the first node is a mobile node and the second node is a non-mobile node;

the second node is a mobile node and the first node is a non-mobile node;

the instruction sets forth the plurality of frequencies to avoid using;

the instruction specifies the plurality of frequencies to avoid using;

the instruction to avoid the plurality of frequencies sets forth one or more frequencies to use;

the instruction to avoid the plurality of frequencies specifies one or more frequencies to use;

the instruction to avoid the plurality of frequencies assigns one or more frequencies to use;

the instruction to avoid the plurality of frequencies does not specify the plurality of frequencies;

the instruction to avoid the plurality of frequencies sets forth one or more frequencies to use, thereby resulting in the avoidance of using the plurality of frequencies;

the filtering removes all power from the transmission signal;

the filtering removes some power from the transmission signal;

the filtering discards one or more portions of the transmission signal at each of the plurality of frequencies;

the filtering is performed using an optimal matched filter;

the filtering is performed using a band selection filter;

the filtering is performed using a median filter; or

the filtering is performed using a nonlinear filter.

39. (New) The method of claim 19, wherein the instruction includes a first instruction and the transmission signal includes a first transmission signal, and further comprising:

receiving at the first node in the radio communications network a second instruction transmitted from a third node in the radio communications network to avoid using a different plurality of frequencies to transmit to the third node;

filtering a second transmission signal to remove power from the second transmission signal at each frequency in the different plurality of frequencies; and

transmitting the second transmission signal to the third node.

40. (New) The method of claim 19, wherein the transmission signal is transmitted to the second node using an 802.11-based orthogonal frequency-division multiplexing (OFDM) protocol.

41. (New) The method of claim 19, and further comprising:

separately from the receipt of the instruction, receiving a particular signal at the first node that is transmitted from the second node;

generating a feedback based on a received power and one or more frequencies via which the particular signal is received;

compressing the feedback; and

transmitting the compressed feedback from the first node to the second node, for use by the second node in determining a power with which the second node transmits to the first node via at least one directional antenna of a plurality of directional antennas, while simultaneously transmitting to one or more other nodes;

wherein the transmission signal is transmitted to the second node using an 802.11-based orthogonal frequency-division multiplexing (OFDM) protocol;

wherein an update of the compressed feedback is repeatedly generated, compressed, and transmitted at time periods of less than one second; so that the power is repeatedly updated based thereupon at time periods of less than one second.

42. (New) The method of claim 41, wherein the instruction includes a first instruction and the transmission signal includes a first transmission signal, and further comprising:

receiving at the first node in the radio communications network a second instruction transmitted from a third node in the radio communications network to avoid using a different plurality of frequencies to transmit to the third node;

filtering a second transmission signal to remove power from the second transmission signal at each frequency in the different plurality of frequencies; and

transmitting the second transmission signal to the third node.

REMARKS

The claims in the present application have been amended to clarify the claimed invention. No new matter has been added.

The newly added Claims find support throughout the patent specification and Claims as originally filed. Specific examples of support for each of the newly added Claims are mentioned below, although the totality of support for each claim is not necessarily limited to any such specific support. An explanation of the support in the disclosure of the patent for the newly added claims is provided with an indication of locations in the specification as follows. With that said, it should be noted that such discussion of support including but not limited to the cited specification excerpts is set forth for illustrative purposes only and should not be construed as limiting in any way.

22. (New) The method of claim 19, and further comprising:

separately from the receipt of the instruction, receiving a compressed first feedback from the second node that is based on a received power and one or more frequencies of a first signal transmitted from the first node to the second node; (e.g. col. 3 lns. 31-45, col. 3 ln. 62-col. 4 ln. 16, col. 10 lns. 11-27, col. 22 lns 7-34, Fig. 14 and description thereof in addition to other related/pertinent descriptions)

separately from the receipt of the instruction, receiving a compressed second feedback from a third node that is based on a received power and one or more frequencies of a second signal transmitted from the first node to the third node; (e.g. col. 3 lns. 31-45, col. 3 ln. 62-col. 4 ln. 16, col. 10 lns. 11-27, col. 22 lns 7-34, Fig. 14 and description thereof in addition to other related/pertinent descriptions)

decompressing the compressed first feedback resulting in a decompressed first feedback; (e.g. col. 3 lns. 31-45, col. 3 ln. 62-col. 4 ln. 16, col. 10 lns. 11-27, col. 22 lns 7-34, Fig. 14 and description thereof in addition to other related/pertinent descriptions)

decompressing the compressed second feedback resulting in a decompressed second feedback; (e.g. col. 3 lns. 31-45, col. 3 ln. 62-col. 4 ln. 16, col. 10 lns. 11-27, col. 22 lns 7-34, Fig. 14 and description thereof in addition to other related/pertinent descriptions)

generating one or more of data structures based on the decompressed first feedback and the decompressed second feedback; (e.g. col. 3 lns. 31-45, col. 3 ln. 62-col. 4 ln. 16, col. 10 lns. 11-27, col. 22 lns 7-34, Fig. 14 and description thereof in addition to other related/pertinent descriptions)

wherein the transmission signal is a first transmission signal that is transmitted using a first frequency and an 802.11-based orthogonal frequency-division multiplexing (OFDM) protocol via at least one directional antenna of a plurality of directional antennas, using a first power that is based on at least one of the one or more data structures; and further comprising: (e.g. col. 3 lns. 31-45, col. 3 ln. 62-col. 4 ln. 16, col. 10 lns. 11-27, col. 11 lns. 25-30, col. 19 lns 34-37, col. 22 lns 7-34, col. 25 lns. 33-44, Fig. 14 and description thereof in addition to other related/pertinent descriptions)

transmitting, using a second frequency and the 802.11-based OFDM protocol, a second transmission signal, simultaneously with the first transmission signal, to the third node, using a second power that is based on at least one of the one or more data structures. (e.g. col. 3 lns. 31-45, col. 3 ln. 62-col. 4 ln. 16, col. 10 lns. 11-27, col. 11 lns. 25-30, col. 19 lns 34-37, col. 22 lns 7-34, col. 25 lns. 33-44, Fig. 14 and description thereof in addition to other related/pertinent descriptions)

23. (New) The method of claim 22, wherein the instruction includes a first instruction, and further comprising:

receiving at the first node in the radio communications network a second instruction transmitted from a third node in the radio communications network to avoid using a different plurality of frequencies to transmit to the third node; and (e.g. col. 11 ln. 39 – col. 12 ln. 30, Figs. 16-18 and description thereof in addition to other related/pertinent descriptions)

filtering the second transmission signal to remove power from the second transmission signal at each frequency in the different plurality of frequencies. (e.g. col. 11 ln. 39 – col. 12 ln. 30, Figs. 16-18 and description thereof in addition to other related/pertinent descriptions)

24. (New) The method of claim 22, wherein the first power and the second power are the same. (e.g. col. 3 lns. 31-45, col. 3 ln. 62-col. 4 ln. 16, col. 10 lns. 11-27, col. 11 lns. 25-30, col. 19 lns

34-37, col. 22 lns 7-34, col. 25 lns. 33-44, Fig. 14 and description thereof in addition to other related/pertinent descriptions)

25. (New) The method of claim 22, wherein the first power and the second power are different. (e.g. col. 3 lns. 31-45, col. 3 ln. 62-col. 4 ln. 16, col. 10 lns. 11-27, col. 11 lns. 25-30, col. 19 lns 34-37, col. 22 lns 7-34, col. 25 lns. 33-44, Fig. 14 and description thereof in addition to other related/pertinent descriptions)

26. (New) The method of claim 22, wherein an update of the compressed first feedback is repeatedly received at time periods of less than one second, and the first power is repeatedly updated based on an updated decompressed first feedback at time periods of less than one second; and an update of the compressed second feedback is repeatedly received at time periods of less than one second, and the second power is repeatedly updated based on an updated decompressed second feedback at time periods of less than one second. (e.g. col. 2 lns. 10-33, col. 3 lns. 31-45, col. 3 ln. 62-col. 4 ln. 16, col. 10 lns. 11-27, col. 11 lns. 25-30, col. 19 lns 34-37, col. 22 lns 7-34, col. 25 lns. 33-44, Fig. 14 and description thereof in addition to other related/pertinent descriptions)

27. (New) The method of claim 22, wherein the first transmission signal and the second transmission signal are sent via the same transceiver. (e.g. col. 6 lns. 51-59, col. 7 lns. 5-14, Fig. 11 and description thereof in addition to other related/pertinent descriptions)

28. (New) The method of claim 22, wherein the first transmission signal and the second transmission signal are sent via different transceivers. (e.g. col. 6 lns. 51-59, col. 7 lns. 5-14, Fig. 11 and description thereof in addition to other related/pertinent descriptions)

29. (New) The method of claim 22, wherein the instruction is received utilizing a dedicated channel. (e.g. col. 11 lns. 1-10, Fig. 2 and description thereof in addition to other related/pertinent descriptions)

30. (New) The method of claim 22, wherein the instruction is received via an antenna configured for omnidirectional communication. (e.g. col. 8 lns. 60-65 in addition to other related/pertinent descriptions)

31. (New) The method of claim 22, wherein the compressed first feedback and the compressed second feedback are received utilizing a dedicated channel. (e.g. col. 11 lns. 1-10, Fig. 2 and description thereof in addition to other related/pertinent descriptions)

32. (New) The method of claim 22, wherein the compressed first feedback and the compressed second feedback are received via an antenna configured for omnidirectional communication. (e.g. col. 8 lns. 60-65 in addition to other related/pertinent descriptions)

33. (New) The method of claim 22, wherein the decompressed first feedback and the decompressed second feedback are used to increase spatial separation among transmissions. (e.g. col. 3 lns. 30-45 in addition to other related/pertinent descriptions)

34. (New) The method of claim 22, wherein the decompressed first feedback and the decompressed second feedback are used to increase spatial separation among transmissions at the same frequency. (e.g. col. 3 lns. 30-45 in addition to other related/pertinent descriptions)

35. (New) The method of claim 22, and further comprising:

receiving a compressed third feedback from a fourth node that characterizes receipt of a third signal sent from the first node to the fourth node, the fourth node being a legacy node; (e.g. col. 3 lns. 31-45, col. 3 ln. 62-col. 4 ln. 16, col. 10 lns. 11-27, col. 22 lns 7-34, Fig. 14 and description thereof in addition to other related/pertinent descriptions)

decompressing the compressed third feedback resulting in a decompressed third feedback; (e.g. col. 3 lns. 31-45, col. 3 ln. 62-col. 4 ln. 16, col. 10 lns. 11-27, col. 22 lns 7-34, Fig. 14 and description thereof in addition to other related/pertinent descriptions)

transmitting, using a third frequency and the 802.11-based OFDM protocol, the third transmission signal to the fourth node using a transceiver separate from one or more other transceivers used to transmit the first transmission signal and the second transmission signal, and

further using a third power that is based on the decompressed third feedback. (e.g. col. 3 lns. 31-45, col. 3 ln. 62-col. 4 ln. 16, col. 10 lns. 11-27, col. 11 lns. 25-30, col. 19 lns 34-37, col. 22 lns 7-34, col. 25 lns. 33-44, Fig. 14 and description thereof in addition to other related/pertinent descriptions)

36. (New) The method of claim 35, wherein the third transmission signal is transmitted simultaneously with the first transmission signal and the second transmission signal via at least one different directional antenna of the plurality of directional antennas. (e.g. col. 3 lns. 31-45, col. 3 ln. 62-col. 4 ln. 16, col. 10 lns. 11-27, col. 11 lns. 25-30, col. 19 lns 34-37, col. 22 lns 7-34, col. 25 lns. 33-44, Fig. 14 and description thereof in addition to other related/pertinent descriptions)

37. (New) The method of claim 22, wherein the compressed first feedback is based on a received power at a plurality of frequencies via which the first signal is received. (e.g. col. 3 lns. 31-45, col. 3 ln. 62-col. 4 ln. 16, col. 10 lns. 11-27, col. 11 lns. 25-30, col. 19 lns 34-37, col. 22 lns 7-34, col. 25 lns. 33-44, Fig. 14 and description thereof in addition to other related/pertinent descriptions)

38. (New) The method of claim 22, wherein at least one of:

the first signal includes a data signal; (e.g. col. 3 lns. 31-45, col. 3 ln. 62-col. 4 ln. 16, col. 10 lns. 11-27, col. 11 lns. 25-30, col. 19 lns 34-37, col. 22 lns 7-34, col. 25 lns. 33-44, Fig. 1-19 and description thereof in addition to other related/pertinent descriptions)

the first signal includes an aggregate signal; (e.g. col. 3 lns. 31-45, col. 3 ln. 62-col. 4 ln. 16, col. 10 lns. 11-27, col. 11 lns. 25-30, col. 19 lns 34-37, col. 22 lns 7-34, col. 25 lns. 33-44, Fig. 1-19 and description thereof in addition to other related/pertinent descriptions)

the compressed first feedback is combined with the instruction; (e.g. col. 3 lns. 31-45, col. 3 ln. 62-col. 4 ln. 16, col. 10 lns. 11-27, col. 11 lns. 25-30, col. 19 lns 34-37, col. 22 lns 7-34, col. 25 lns. 33-44, Fig. 1-19 and description thereof in addition to other related/pertinent descriptions)

the compressed first feedback is received with the instruction; (e.g. col. 3 lns. 31-45, col. 3 ln. 62-col. 4 ln. 16, col. 10 lns. 11-27, col. 11 lns. 25-30, col. 19 lns 34-37, col. 22 lns 7-34,

col. 25 lns. 33-44, Fig. 1-19 and description thereof in addition to other related/pertinent descriptions)

the compressed first feedback is configured to ensure that transmissions from all neighbors of the first node are received at a same power level; (e.g. col. 3 lns. 31-45, col. 3 ln. 62-col. 4 ln. 16, col. 10 lns. 11-27, col. 11 lns. 25-30, col. 19 lns 34-37, col. 22 lns 7-34, col. 25 lns. 33-44, Fig. 1-19 and description thereof in addition to other related/pertinent descriptions)

the compressed first feedback is configured to at least one of: minimize a transmit power on reliable links, maximize an ability to achieve spatial separation among transmissions on a same frequency, minimize network self-interference, improves low probability of intercept (LPI), or low probability of detection (LPD); (e.g. col. 3 lns. 31-45, col. 3 ln. 62-col. 4 ln. 16, col. 10 lns. 11-27, col. 11 lns. 25-30, col. 19 lns 34-37, col. 22 lns 7-34, col. 25 lns. 33-44, Fig. 1-19 and description thereof in addition to other related/pertinent descriptions)

the compressed first feedback and the compressed second feedback are received simultaneously; (e.g. col. 3 lns. 31-45, col. 3 ln. 62-col. 4 ln. 16, col. 10 lns. 11-27, col. 11 lns. 25-30, col. 19 lns 34-37, col. 22 lns 7-34, col. 25 lns. 33-44, Fig. 1-19 and description thereof in addition to other related/pertinent descriptions)

the radio communications network includes an 802.11 network; (e.g. col. 3 lns. 31-45, col. 3 ln. 62-col. 4 ln. 16, col. 10 lns. 11-27, col. 11 lns. 25-30, col. 19 lns 34-37, col. 22 lns 7-34, col. 25 lns. 33-44, Fig. 1-19 and description thereof in addition to other related/pertinent descriptions)

the 802.11 network includes an 802.11a/g network; (e.g. col. 3 lns. 31-45, col. 3 ln. 62-col. 4 ln. 16, col. 10 lns. 11-27, col. 11 lns. 25-30, col. 19 lns 34-37, col. 22 lns 7-34, col. 25 lns. 33-44, Fig. 1-19 and description thereof in addition to other related/pertinent descriptions)
interference in the radio communications network is managed; (e.g. col. 3 lns. 31-45, col. 3 ln. 62-col. 4 ln. 16, col. 10 lns. 11-27, col. 11 lns. 25-30, col. 19 lns 34-37, col. 22 lns 7-34, col. 25 lns. 33-44, Fig. 1-19 and description thereof in addition to other related/pertinent descriptions)

the first node is a mobile node and the second node is a non-mobile node; (e.g. col. 3 lns. 31-45, col. 3 ln. 62-col. 4 ln. 16, col. 10 lns. 11-27, col. 11 lns. 25-30, col. 19 lns 34-37, col. 22 lns 7-34, col. 25 lns. 33-44, Fig. 1-19 and description thereof in addition to other related/pertinent descriptions)

the second node is a mobile node and the first node is a non-mobile node; (e.g. col. 3 lns. 31-45, col. 3 ln. 62-col. 4 ln. 16, col. 10 lns. 11-27, col. 11 lns. 25-30, col. 19 lns 34-37, col. 22 lns 7-34, col. 25 lns. 33-44, Fig. 1-19 and description thereof in addition to other related/pertinent descriptions)

the instruction sets forth the plurality of frequencies to avoid using; (e.g. col. 3 lns. 31-45, col. 3 ln. 62-col. 4 ln. 16, col. 10 lns. 11-27, col. 11 lns. 25-30, col. 19 lns 34-37, col. 22 lns 7-34, col. 25 lns. 33-44, Fig. 1-19 and description thereof in addition to other related/pertinent descriptions)

the instruction specifies the plurality of frequencies to avoid using; (e.g. col. 3 lns. 31-45, col. 3 ln. 62-col. 4 ln. 16, col. 10 lns. 11-27, col. 11 lns. 25-30, col. 19 lns 34-37, col. 22 lns 7-34, col. 25 lns. 33-44, Fig. 1-19 and description thereof in addition to other related/pertinent descriptions)

the instruction to avoid the plurality of frequencies sets forth one or more frequencies to use; (e.g. col. 3 lns. 31-45, col. 3 ln. 62-col. 4 ln. 16, col. 10 lns. 11-27, col. 11 lns. 25-30, col. 19 lns 34-37, col. 22 lns 7-34, col. 25 lns. 33-44, Fig. 1-19 and description thereof in addition to other related/pertinent descriptions)

the instruction to avoid the plurality of frequencies specifies one or more frequencies to use; (e.g. col. 3 lns. 31-45, col. 3 ln. 62-col. 4 ln. 16, col. 10 lns. 11-27, col. 11 lns. 25-30, col. 19 lns 34-37, col. 22 lns 7-34, col. 25 lns. 33-44, Fig. 1-19 and description thereof in addition to other related/pertinent descriptions)

the instruction to avoid the plurality of frequencies assigns one or more frequencies to use; (e.g. col. 3 lns. 31-45, col. 3 ln. 62-col. 4 ln. 16, col. 10 lns. 11-27, col. 11 lns. 25-30, col. 19 lns 34-37, col. 22 lns 7-34, col. 25 lns. 33-44, Fig. 1-19 and description thereof in addition to other related/pertinent descriptions)

the instruction to avoid the plurality of frequencies does not specify the plurality of frequencies; (e.g. col. 3 lns. 31-45, col. 3 ln. 62-col. 4 ln. 16, col. 10 lns. 11-27, col. 11 lns. 25-30, col. 19 lns 34-37, col. 22 lns 7-34, col. 25 lns. 33-44, Fig. 1-19 and description thereof in addition to other related/pertinent descriptions)

the instruction to avoid the plurality of frequencies sets forth one or more frequencies to use, thereby resulting in the avoidance of using the plurality of frequencies; (e.g. col. 3 lns. 31-45, col. 3 ln. 62-col. 4 ln. 16, col. 10 lns. 11-27, col. 11 lns. 25-30, col. 19 lns 34-37, col. 22 lns

7-34, col. 25 lns. 33-44, Fig. 1-19 and description thereof in addition to other related/pertinent descriptions)

the filtering removes all power from the transmission signal; (e.g. col. 3 lns. 31-45, col. 3 ln. 62-col. 4 ln. 16, col. 10 lns. 11-27, col. 11 lns. 25-30, col. 19 lns 34-37, col. 22 lns 7-34, col. 25 lns. 33-44, Fig. 1-19 and description thereof in addition to other related/pertinent descriptions)

the filtering removes some power from the transmission signal; (e.g. col. 3 lns. 31-45, col. 3 ln. 62-col. 4 ln. 16, col. 10 lns. 11-27, col. 11 lns. 25-30, col. 19 lns 34-37, col. 22 lns 7-34, col. 25 lns. 33-44, Fig. 1-19 and description thereof in addition to other related/pertinent descriptions)

the filtering discards one or more portions of the transmission signal at each of the plurality of frequencies; (e.g. col. 3 lns. 31-45, col. 3 ln. 62-col. 4 ln. 16, col. 10 lns. 11-27, col. 11 lns. 25-30, col. 19 lns 34-37, col. 22 lns 7-34, col. 25 lns. 33-44, Fig. 1-19 and description thereof in addition to other related/pertinent descriptions)

the filtering is performed using an optimal matched filter; (e.g. col. 3 lns. 31-45, col. 3 ln. 62-col. 4 ln. 16, col. 10 lns. 11-27, col. 11 lns. 25-30, col. 19 lns 34-37, col. 22 lns 7-34, col. 25 lns. 33-44, Fig. 1-19 and description thereof in addition to other related/pertinent descriptions)

the filtering is performed using a band selection filter; (e.g. col. 3 lns. 31-45, col. 3 ln. 62-col. 4 ln. 16, col. 10 lns. 11-27, col. 11 lns. 25-30, col. 19 lns 34-37, col. 22 lns 7-34, col. 25 lns. 33-44, Fig. 1-19 and description thereof in addition to other related/pertinent descriptions)

the filtering is performed using a median filter; or (e.g. col. 3 lns. 31-45, col. 3 ln. 62-col. 4 ln. 16, col. 10 lns. 11-27, col. 11 lns. 25-30, col. 19 lns 34-37, col. 22 lns 7-34, col. 25 lns. 33-44, Fig. 1-19 and description thereof in addition to other related/pertinent descriptions)

the filtering is performed using a nonlinear filter. (e.g. col. 3 lns. 31-45, col. 3 ln. 62-col. 4 ln. 16, col. 10 lns. 11-27, col. 11 lns. 25-30, col. 19 lns 34-37, col. 22 lns 7-34, col. 25 lns. 33-44, Fig. 1-19 and description thereof in addition to other related/pertinent descriptions)

39. (New) The method of claim 19, wherein the instruction includes a first instruction and the transmission signal includes a first transmission signal, and further comprising:

receiving at the first node in the radio communications network a second instruction transmitted from a third node in the radio communications network to avoid using a different

plurality of frequencies to transmit to the third node; (e.g. col. 3 lns. 31-45, col. 3 ln. 62-col. 4 ln. 16, col. 10 lns. 11-27, col. 22 lns 7-34, Fig. 14 and description thereof in addition to other related/pertinent descriptions)

filtering a second transmission signal to remove power from the second transmission signal at each frequency in the different plurality of frequencies; and (e.g. col. 3 lns. 31-45, col. 3 ln. 62-col. 4 ln. 16, col. 10 lns. 11-27, col. 22 lns 7-34, Fig. 14 and description thereof in addition to other related/pertinent descriptions)

transmitting the second transmission signal to the third node. (e.g. col. 3 lns. 31-45, col. 3 ln. 62-col. 4 ln. 16, col. 10 lns. 11-27, col. 11 lns. 25-30, col. 19 lns 34-37, col. 22 lns 7-34, col. 25 lns. 33-44, Fig. 14 and description thereof in addition to other related/pertinent descriptions)

40. (New) The method of claim 19, wherein the transmission signal is transmitted to the second node using an 802.11-based orthogonal frequency-division multiplexing (OFDM) protocol. (e.g. col. 3 lns. 31-45, col. 3 ln. 62-col. 4 ln. 16, col. 10 lns. 11-27, col. 11 lns. 25-30, col. 19 lns 34-37, col. 22 lns 7-34, col. 25 lns. 33-44, Fig. 14 and description thereof in addition to other related/pertinent descriptions)

41. (New) The method of claim 19, and further comprising:

separately from the receipt of the instruction, receiving a particular signal at the first node that is transmitted from the second node; (e.g. col. 3 lns. 31-45, col. 3 ln. 62-col. 4 ln. 16, col. 10 lns. 11-27, col. 22 lns 7-34, Fig. 14 and description thereof in addition to other related/pertinent descriptions)

generating a feedback based on a received power and one or more frequencies via which the particular signal is received; (e.g. col. 3 lns. 31-45, col. 3 ln. 62-col. 4 ln. 16, col. 10 lns. 11-27, col. 22 lns 7-34, Fig. 14 and description thereof in addition to other related/pertinent descriptions)

compressing the feedback; and (e.g. col. 3 lns. 31-45, col. 3 ln. 62-col. 4 ln. 16, col. 10 lns. 11-27, col. 22 lns 7-34, Fig. 14 and description thereof in addition to other related/pertinent descriptions)

transmitting the compressed feedback from the first node to the second node, for use by the second node in determining a power with which the second node transmits to the first node

via at least one directional antenna of a plurality of directional antennas, while simultaneously transmitting to one or more other nodes; (e.g. col. 3 lns. 31-45, col. 3 ln. 62-col. 4 ln. 16, col. 10 lns. 11-27, col. 11 lns. 25-30, col. 19 lns 34-37, col. 22 lns 7-34, col. 25 lns. 33-44, Fig. 14 and description thereof in addition to other related/pertinent descriptions)

wherein the transmission signal is transmitted to the second node using an 802.11-based orthogonal frequency-division multiplexing (OFDM) protocol; (e.g. col. 3 lns. 31-45, col. 3 ln. 62-col. 4 ln. 16, col. 10 lns. 11-27, col. 11 lns. 25-30, col. 19 lns 34-37, col. 22 lns 7-34, col. 25 lns. 33-44, Fig. 14 and description thereof in addition to other related/pertinent descriptions)

wherein an update of the compressed feedback is repeatedly generated, compressed, and transmitted at time periods of less than one second; so that the power is repeatedly updated based thereupon at time periods of less than one second. (e.g. col. 2 lns. 10-33, col. 3 lns. 31-45, col. 3 ln. 62-col. 4 ln. 16, col. 10 lns. 11-27, col. 11 lns. 25-30, col. 19 lns 34-37, col. 22 lns 7-34, col. 25 lns. 33-44, Fig. 14 and description thereof in addition to other related/pertinent descriptions)

42. (New) The method of claim 41, wherein the instruction includes a first instruction and the transmission signal includes a first transmission signal, and further comprising:

receiving at the first node in the radio communications network a second instruction transmitted from a third node in the radio communications network to avoid using a different plurality of frequencies to transmit to the third node; (e.g. col. 3 lns. 31-45, col. 3 ln. 62-col. 4 ln. 16, col. 10 lns. 11-27, col. 22 lns 7-34, Fig. 14 and description thereof in addition to other related/pertinent descriptions)

filtering a second transmission signal to remove power from the second transmission signal at each frequency in the different plurality of frequencies; and (e.g. col. 3 lns. 31-45, col. 3 ln. 62-col. 4 ln. 16, col. 10 lns. 11-27, col. 22 lns 7-34, Fig. 14 and description thereof in addition to other related/pertinent descriptions)

transmitting the second transmission signal to the third node. (e.g. col. 3 lns. 31-45, col. 3 ln. 62-col. 4 ln. 16, col. 10 lns. 11-27, col. 11 lns. 25-30, col. 19 lns 34-37, col. 22 lns 7-34, col. 25 lns. 33-44, Fig. 14 and description thereof in addition to other related/pertinent descriptions)

It should be noted that foregoing excerpts are set for illustrative purposes only and should not be construed as exhaustive and further should not be considered limiting to the claims in any manner whatsoever.

Should the Examiner deem that any further amendment is desirable to place this application in condition for allowance, applicant invites the Examiner to telephone the undersigned attorney at the number listed below.

Respectfully submitted,



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Electronic Patent Application Fee Transmittal

Application Number:	
Filing Date:	
Title of Invention:	SPECTRUM-ADAPTIVE NETWORKING
First Named Inventor/Applicant Name:	Jerry D. Burchfiel
Filer:	Patrick Edgar Caldwell
Attorney Docket Number:	USTAP030D.RI

Filed as Large Entity

Filing Fees for Reissue (Utility)

Description	Fee Code	Quantity	Amount	Sub-Total in USD($)
Basic Filing:				
UTILITY REISSUE BASIC	1014	1	300	300
DESIGN AND UTILITY REISSUE BASIC	1114	1	660	660
DESIGN AND UTILITY REISSUE BASIC	1314	1	2200	2200
Pages:				
Claims:				
REISSUE CLAIMS IN EXCESS OF 20	1205	22	100	2200
Miscellaneous-Filing:				
Petition:				

Description	Fee Code	Quantity	Amount	Sub-Total in USD($)
Patent-Appeals-and-Interference:				
Post-Allowance-and-Post-Issuance:				
Extension-of-Time:				
Miscellaneous:				
			Total in USD ($)	5360

Electronic Acknowledgement Receipt	
EFS ID:	31815025
Application Number:	15898404
International Application Number:	
Confirmation Number:	8522
Title of Invention:	SPECTRUM-ADAPTIVE NETWORKING
First Named Inventor/Applicant Name:	Jerry D. Burchfiel
Customer Number:	92045
Filer:	Patrick Edgar Caldwell
Filer Authorized By:	
Attorney Docket Number:	USTAP030D.RI
Receipt Date:	16-FEB-2018
Filing Date:	
Time Stamp:	23:32:14
Application Type:	Reissue (Utility)

Payment information:

Submitted with Payment	yes
Payment Type	CARD
Payment was successfully received in RAM	$5360
RAM confirmation Number	022018INTEFSW23331900
Deposit Account	
Authorized User	
The Director of the USPTO is hereby authorized to charge indicated fees and credit any overpayment as follows:	

File Listing:

Document Number	Document Description	File Name	File Size(Bytes)/ Message Digest	Multi Part /.zip	Pages (if appl.)
1	Transmittal Letter	USTAP030DRI_XMTL_vF_16-Feb-2018.pdf	136084 21b320ebb80427efa796c86bb67189bfbb934142	no	2
Warnings:					
Information:					
2	Fee Worksheet (SB06)	USTAP030DRI_FeeXMTL_vF_16-Feb-2018.pdf	110825 5d2eb14f31544df60f245b42a3feb875e9cb04f4	no	2
Warnings:					
Information:					
3	Application Data Sheet	USTAP030DRI_ADS_vF_16-Feb-2018.pdf	81364 365d2e7da97f962f85b429fff1c1de4f669cec73	no	8
Warnings:					
Information:					
This is not an USPTO supplied ADS fillable form					
4	Power of Attorney	USTA_POA.pdf	208322 289cec69eac39d029fc83cd85f7160ff549bf6ef	no	1
Warnings:					
Information:					
5	Assignee showing of ownership per 37 CFR 3.73	USTAP030DRI_373c_vF_16-Feb-2018.pdf	107198 e1a4c14d4243c7698973e93703871d56993a64eb	no	3
Warnings:					
Information:					
6	Reissue dec filed in accordance with MPEP 1414	USTAP030DRI_Declaration_Burchfiel.pdf	355724 a7af9795b29cb205e0c98a2d92dc0178b541c307	no	3
Warnings:					

Information:					
7	Consent of Assignee accompanying the declaration	USTAP030DRI_Consent_of_all_assignees.pdf	309001 c0e8c59f125e441eeb9d396234ab63a5cc029649	no	2
Warnings:					
Information:					
8	Transmittal Reissue Application	USTAP030DRI_Spec_US748371 1.pdf	3000207 1c6b601a2ec6b1a94d5785fbe5b6b2ecc43e21df	no	34
Warnings:					
Information:					
9	Preliminary Amendment	USTAP030DRI_Prelim_Amndt_vF_16-Feb-2018.pdf	97016 2ad0144b4fb6fc574d014ad940e0316114a9c7da	no	23
Warnings:					
Information:					
10	Fee Worksheet (SB06)	fee-info.pdf	36835 ecce5eddc256dbbbd7e41b84611ce9fd6beaedc1	no	2
Warnings:					
Information:					
		Total Files Size (in bytes):	4442576		

This Acknowledgement Receipt evidences receipt on the noted date by the USPTO of the indicated documents, characterized by the applicant, and including page counts, where applicable. It serves as evidence of receipt similar to a Post Card, as described in MPEP 503.

New Applications Under 35 U.S.C. 111

If a new application is being filed and the application includes the necessary components for a filing date (see 37 CFR 1.53(b)-(d) and MPEP 506), a Filing Receipt (37 CFR 1.54) will be issued in due course and the date shown on this Acknowledgement Receipt will establish the filing date of the application.

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

If a timely submission to enter the national stage of an international application is compliant with the conditions of 35 U.S.C. 371 and other applicable requirements a Form PCT/DO/EO/903 indicating acceptance of the application as a national stage submission under 35 U.S.C. 371 will be issued in addition to the Filing Receipt, in due course.

New International Application Filed with the USPTO as a Receiving Office

If a new international application is being filed and the international application includes the necessary components for an international filing date (see PCT Article 11 and MPEP 1810), a Notification of the International Application Number and of the International Filing Date (Form PCT/RO/105) will be issued in due course, subject to prescriptions concerning national security, and the date shown on this Acknowledgement Receipt will establish the international filing date of the application.

PTO/AIA/50 (10-17)
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REISSUE PATENT APPLICATION TRANSMITTAL

Address to:		
Mail Stop Reissue Commissioner for Patents P.O. Box 1450 Alexandria, VA 22313-1450	Attorney Docket No.	USTAP030D.RI
	First Named Inventor	Jerry D. Burchfiel
	Original Patent Number	7,483,711
	Original Patent Issue Date (Month/Day/Year)	01-27-2009
	Priority Mail Express® Label No.	

APPLICATION FOR REISSUE OF: (*Check applicable box*) ☑ Utility Patent ☐ Design Patent ☐ Plant Patent

APPLICATION ELEMENTS (37 CFR 1.173)

1. ☑ **Fee Transmittal Form** (PTO/SB/56)
2. ☐ **Applicant asserts small entity status.** See 37 CFR 1.27
3. ☐ **Applicant certifies micro entity status.** See 37 CFR 1.29. Applicant must attach form PTO/SB/15A or B or equivalent.
4. ☑ **Specification and Claims** in double column copy of patent format (*amended, if appropriate*)
5. ☑ **Drawing(s)** (*proposed amendments, if appropriate*)
6. ☑ **Reissue Oath/Declaration or Substitute Statement** (37 CFR 1.175) (PTO/AIA/05, 06, or 07)
7. ☑ **Application Data Sheet** **NOTE:** Benefit claims under 37 CFR 1.78 and foreign priority claims under 37 CFR 1.55 MUST be set forth in an Application Data Sheet (ADS).
8. ☑ **Original U.S. Patent currently assigned?** ☑ Yes ☐ No (*If Yes, check applicable box(es)*)
   - ☑ Written Consent of all Assignees (PTO/AIA/53)
   - ☑ 37 CFR 3.73(c) Statement (PTO/AIA/96)
9. ☐ **CD-ROM or CD-R** in duplicate, Computer Program (*Appendix*) or large table
   - ☐ Landscape Table on CD
10. **Nucleotide and/or Amino Acid Sequence Submission** (*if applicable, items a. – c. are required*)
    - a. ☐ Computer Readable Form (CRF)
    - b. ☐ Specification Sequence Listing on:
      - i. ☐ CD-ROM (2 copies) or CD-R (2 copies); **or**
      - ii. ☐ Paper
    - c. ☐ Statements verifying identity of above copies

ACCOMPANYING APPLICATION PARTS

11. ☑ **Statement of status and support for all changes to the claims.** See 37 CFR 1.173(c).
12. ☑ **Power of Attorney**
13. ☐ **Information Disclosure Statement (IDS)** PTOSB/08 or PTO-1449
    - ☐ Copies of citations attached
14. ☐ **English translation of Reissue Oath/Declaration** (*if applicable*)
15. ☐ **Return Receipt Postcard** (MPEP § 503) (Should be specifically itemized)
16. ☑ **Preliminary Amendment** (37 CFR 1.173; MPEP § 1453)
17. ☐ **Other:** _____

☐ This is a continuation reissue or divisional reissue application (*i.e.*, a second or subsequent reissue application for the same issued patent). (*Check box if applicable.*)

18. CORRESPONDENCE ADDRESS

☑ The address associated with Customer Number: 92045 **OR** ☐ Correspondence address below

Name					
Address					
City		State		Zip Code	
Country		Telephone			
Email					

Signature	/Patrick Caldwell/	Date	2/16/2018
Name (Print/Type)	Patrick Caldwell	Registration No.	44,580

This collection of information is required by 37 CFR 1.173. 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: Mail Stop Reissue, 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/56 (03-13)
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REISSUE APPLICATION FEE TRANSMITTAL FORM

Docket Number (Optional): USTA030D.RI

Application as Filed -- Part 1

	(1) Claims in Patent	(2) Claims Filed in Reissue Application	(3) Number Extra	Micro Entity Rate ($)	Micro Entity Fee ($)	Small Entity Rate ($)	Small Entity Fee ($)	Undiscounted Rate ($)	Undiscounted Fee ($)
Total Claims (37 CFR 1.16(i))	(A) 21	(B) 42	* 22 =	x =		x =		x 100 =	2200
Ind. Claims (37 CFR 1.16(h))	(C) 2	(D) 2	** 0 =	x =		x =		x 460 =	
Application Size Fee (37 CFR 1.16(s))	If the specification and drawings exceed 100 sheets of paper, the application size fee due is $400 ($200 for small entity, $100 for micro entity) for each additional 50 sheets or fraction thereof. See 35 U.S.C. 41(a)(1)(G) and 37 CFR 1.16(s).								
	Filing Fee (37 CFR 1.16(e))								300
	Search Fee (37 CFR 1.16(n))								660
	Examination Fee (37 CFR 1.16(r))								2200
	Total Filing Fee								5360

Application as Amended – Part 2

	(1) Claims Remaining After Amendment	(2) Highest Number Previously Paid For	(3) Extra Claims Present	Micro Entity Rate ($)	Micro Entity Fee ($)	Small Entity Rate ($)	Small Entity Fee ($)	Undiscounted Rate ($)	Undiscounted Fee ($)
Total Claims (37 CFR 1.16(i))	*** -	****	=	x =		x =		x =	
Ind. Claims (37 CFR 1.16(h))	*** -	*****	=	x =		x =		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 $400 ($200 for small entity, $100 for micro entity) for each additional 50 sheets or fraction thereof. See 35 U.S.C. 41(a)(1)(G) and 37 CFR 1.16(s).								
			Total Additional Fee						

* Enter (B) -- 20, or enter "0" if (B) is less than 20.
** Enter (D) -- minus 3, or enter "0" if (D) is less than 3.
*** After any cancellation of claims.
**** If the "Highest Number of Total Claims Previously Paid For" is less than 20, enter "20" in this space.
***** If the "Highest Number of Independent Claims Previously Paid For" is less than 3, enter "3" in this space.

☐ Applicant asserts small entity status. See 37 CFR 1.27.

☐ Applicant certifies micro entity status. See 37 CFR 1.29.
Form PTO/SB/15A or B or equivalent must either be enclosed or have been submitted previously.

☐ The Director is hereby authorized to charge any additional fees under 37 CFR 1.16 or 1.17 which may be required, or credit any overpayment to Deposit Account No. _____.

☐ A check in the amount of $ _____ to cover the filing/additional fee is enclosed.

☑ Payment made via EFS-Web.

☐ Payment by credit card. Form PTO-2038 is attached. 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.

/Patrick Caldwell/ — Signature
2/16/2018 — Date
Patrick Caldwell — Typed or Printed Name
44,580 — Registration Number, if applicable
214-734-2313 — Telephone Number

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 1.11, 1.14 and 41.6. 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.

PTO/AIA/14 (11-15)
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Application Data Sheet 37 CFR 1.76	Attorney Docket Number	USTAP030D.RI
	Application Number	
Title of Invention	SPECTRUM-ADAPTIVE NETWORKING	

The application data sheet is part of the provisional or nonprovisional application for which it is being submitted. The following form contains the bibliographic data arranged in a format specified by the United States Patent and Trademark Office as outlined in 37 CFR 1.76.
This document may be completed electronically and submitted to the Office in electronic format using the Electronic Filing System (EFS) or the document may be printed and included in a paper filed application.

Secrecy Order 37 CFR 5.2:

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

Inventor Information:

Inventor 1 Remove

Legal Name

Prefix	Given Name	Middle Name	Family Name	Suffix
	Jerry	D.	Burchfiel	

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

City	Waltham	State/Province	MA	Country of Residence	US

Mailing Address of Inventor:

Address 1	211 W Tyler St., Suite C		
Address 2			
City	Longview	State/Province	TX
Postal Code	75601	Country	US

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

Correspondence Information:

Enter either Customer Number or complete the Correspondence Information section below.
For further information see 37 CFR 1.33(a).

☐ **An Address is being provided for the correspondence Information of this application.**

Customer Number	92045		
Email Address	pcaldwell@thecaldwellfirm.com	Add Email	Remove Email

Application Information:

Title of the Invention	SPECTRUM-ADAPTIVE NETWORKING		
Attorney Docket Number	USTAP030D.RI	Small Entity Status Claimed	☐
Application Type	Nonprovisional		
Subject Matter	Utility		
Total Number of Drawing Sheets (if any)		Suggested Figure for Publication (if any)	

PTO/AIA/14 (11-15)
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U.S. Patent and Trademark Office; U.S. DEPARTMENT OF COMMERCE
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Application Data Sheet 37 CFR 1.76	Attorney Docket Number	USTAP030D.RI
	Application Number	
Title of Invention	SPECTRUM-ADAPTIVE NETWORKING	

Filing By Reference:

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

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

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

Publication Information:

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

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

Representative Information:

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

Please Select One:	◉ Customer Number	○ US Patent Practitioner	○ Limited Recognition (37 CFR 11.9)
Customer Number	92045		

Domestic Benefit/National Stage Information:

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

Prior Application Status	Patented	Remove

Application Number	Continuity Type	Prior Application Number	Filing Date (YYYY-MM-DD)	Patent Number	Issue Date (YYYY-MM-DD)
	reissued of	10689763	2003-10-22	7483711	2009-01-27

Application Data Sheet 37 CFR 1.76	Attorney Docket Number	USTAP030D.RI
	Application Number	
Title of Invention	SPECTRUM-ADAPTIVE NETWORKING	

Prior Application Status	Expired		Remove
Application Number	Continuity Type	Prior Application Number	Filing or 371(c) Date (YYYY-MM-DD)
10689763	Claims benefit of provisional	60420930	2002-10-24
Additional Domestic Benefit/National Stage Data may be generated within this form by selecting the **Add** button.			

Foreign Priority Information:

This section allows for the applicant to claim priority to a foreign application. Providing this information in the application data sheet constitutes the claim for priority as required by 35 U.S.C. 119(b) and 37 CFR 1.55. When priority is claimed to a foreign application that is eligible for retrieval under the priority document exchange program (PDX)[i] the information will be used by the Office to automatically attempt retrieval pursuant to 37 CFR 1.55(i)(1) and (2). Under the PDX program, applicant bears the ultimate responsibility for ensuring that a copy of the foreign application is received by the Office from the participating foreign intellectual property office, or a certified copy of the foreign priority application is filed, within the time period specified in 37 CFR 1.55(g)(1).

			Remove
Application Number	Country[i]	Filing Date (YYYY-MM-DD)	Access Code[i] (if applicable)
Additional Foreign Priority Data may be generated within this form by selecting the **Add** button.			

Statement under 37 CFR 1.55 or 1.78 for AIA (First Inventor to File) Transition Applications

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

PTO/AIA/14 (11-15)
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U.S. Patent and Trademark Office; U.S. DEPARTMENT OF COMMERCE
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Application Data Sheet 37 CFR 1.76	Attorney Docket Number	USTAP030D.RI
	Application Number	
Title of Invention	SPECTRUM-ADAPTIVE NETWORKING	

Authorization or Opt-Out of Authorization to Permit Access:

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

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

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

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

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

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

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

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

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

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

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

PTO/AIA/14 (11-15)
Approved for use through 04/30/2017. OMB 0651-0032
U.S. Patent and Trademark Office; U.S. DEPARTMENT OF COMMERCE
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Application Data Sheet 37 CFR 1.76	Attorney Docket Number	USTAP030D.RI
	Application Number	
Title of Invention	SPECTRUM-ADAPTIVE NETWORKING	

Applicant Information:

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

Applicant 1

If the applicant is the inventor (or the remaining joint inventor or inventors under 37 CFR 1.45), this section should not be completed. The information to be provided in this section is the name and address of the legal representative who is the applicant under 37 CFR 1.43; or the name and address of the assignee, person to whom the inventor is under an obligation to assign the invention, or person who otherwise shows sufficient proprietary interest in the matter who is the applicant under 37 CFR 1.46. If the applicant is an applicant under 37 CFR 1.46 (assignee, person to whom the inventor is obligated to assign, or person who otherwise shows sufficient proprietary interest) together with one or more joint inventors, then the joint inventor or inventors who are also the applicant should be identified in this section.

Clear

◉ Assignee	○ Legal Representative under 35 U.S.C. 117	○ Joint Inventor
○ Person to whom the inventor is obligated to assign.	○ Person who shows sufficient proprietary interest	

If applicant is the legal representative, indicate the authority to file the patent application, the inventor is:

Name of the Deceased or Legally Incapacitated Inventor:

If the Applicant is an Organization check here. ☒

Organization Name	Usta Technology, LLC

Mailing Address Information For Applicant:

Address 1	211 W Tyler St., Suite C		
Address 2			
City	Longview	**State/Province**	TX
Country	US	Postal Code	75601
Phone Number		Fax Number	
Email Address			

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

Assignee Information including Non-Applicant Assignee Information:

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

PTO/AIA/14 (11-15)
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Application Data Sheet 37 CFR 1.76	Attorney Docket Number	USTAP030D.RI
	Application Number	
Title of Invention	SPECTRUM-ADAPTIVE NETWORKING	

Assignee 1

Complete this section if assignee information, including non-applicant assignee information, is desired to be included on the patent application publication. An assignee-applicant identified in the "Applicant Information" section will appear on the patent application publication as an applicant. For an assignee-applicant, complete this section only if identification as an assignee is also desired on the patent application publication.

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

Organization Name	Usta Technology, LLC

Mailing Address Information For Assignee including Non-Applicant Assignee:

Address 1	211 W Tyler St., Suite C		
Address 2			
City	Longview	**State/Province**	TX
Country	US	Postal Code	75601
Phone Number		Fax Number	
Email Address			

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

Signature:

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

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

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

Signature	/Patrick Caldwell/			Date (YYYY-MM-DD)	2018-02-16
First Name	Patrick	Last Name	Caldwell	Registration Number	44580

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

PTO/AIA/14 (11-15)
Approved for use through 04/30/2017. OMB 0651-0032
U.S. Patent and Trademark Office; U.S. DEPARTMENT OF COMMERCE
Under the Paperwork Reduction Act of 1995, no persons are required to respond to a collection of information unless it contains a valid OMB control number.

Application Data Sheet 37 CFR 1.76	Attorney Docket Number	USTAP030D.RI
	Application Number	
Title of Invention	SPECTRUM-ADAPTIVE NETWORKING	

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

Privacy Act Statement

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

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

1 The information on this form will be treated confidentially to the extent allowed under the Freedom of Information Act (5 U.S.C. 552) and the Privacy Act (5 U.S.C. 552a). Records from this system of records may be disclosed to the Department of Justice to determine whether the Freedom of Information Act requires disclosure of these records.

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

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

4. A record in this system of records may be disclosed, as a routine use, to a contractor of the Agency having need for the information in order to perform a contract. Recipients of information shall be required to comply with the requirements of the Privacy Act of 1974, as amended, pursuant to 5 U.S.C. 552a(m).

5. A record related to an International Application filed under the Patent Cooperation Treaty in this system of records may be disclosed, as a routine use, to the International Bureau of the World Intellectual Property Organization, pursuant to the Patent CooperationTreaty.

6. A record in this system of records may be disclosed, as a routine use, to another federal agency for purposes of National Security review (35 U.S.C. 181) and for review pursuant to the Atomic Energy Act (42 U.S.C. 218(c)).

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

8. A record from this system of records may be disclosed, as a routine use, to the public after either publication of the application pursuant to 35 U.S.C. 122(b) or issuance of a patent pursuant to 35 U.S.C. 151. Further, a record may be disclosed, subject to the limitations of 37 CFR 1.14, as a routine use, to the public if the record was filed in an application which became abandoned or in which the proceedings were terminated and which application is referenced by either a published application, an application open to public inspections or an issued patent.

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

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

PTO/AIA/82B (07-13)
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POWER OF ATTORNEY BY APPLICANT

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

Application Number	Filing Date

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

☑ I hereby appoint the Patent Practitioner(s) associated with the following Customer Number as my/our attorney(s) or agent(s), and to transact all business in the United States Patent and Trademark Office connected therewith for the application referenced in the attached transmittal letter (form PTO/AIA/82A) or identified above: 92045

OR

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

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

☑ The address associated with the above-mentioned Customer Number

OR

☐ The address associated with Customer Number:

OR

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

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

Usta Technology, LLC

☐ Inventor or Joint Inventor (title not required below)

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

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

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

SIGNATURE of Applicant for Patent

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

Signature	Andrew Gordon	Date (Optional)	
Name	Andrew Gordon		
Title	Manager		

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

☐ Total of forms are submitted.

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

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

PTO/AIA/96 (08-12)
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STATEMENT UNDER 37 CFR 3.73(c)

Applicant/Patent Owner: Usta Technology, LLC

Application No./Patent No.: 7,483,711 Filed/Issue Date: 01-27-2009

Titled: SPECTRUM-ADAPTIVE NETWORKING

Usta Technology, LLC, a Limited Liability Company

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

states that, for the patent application/patent identified above, it is (choose **one** of options 1, 2, 3 or 4 below):

1. ☑ The assignee of the entire right, title, and interest.

2. ☐ An assignee of less than the entire right, title, and interest (check applicable box):

   ☐ The extent (by percentage) of its ownership interest is _____%. Additional Statement(s) by the owners holding the balance of the interest must be submitted to account for 100% of the ownership interest.

   ☐ There are unspecified percentages of ownership. The other parties, including inventors, who together own the entire right, title and interest are:

   Additional Statement(s) by the owner(s) holding the balance of the interest must be submitted to account for the entire right, title, and interest.

3. ☐ The assignee of an undivided interest in the entirety (a complete assignment from one of the joint inventors was made). The other parties, including inventors, who together own the entire right, title, and interest are:

   Additional Statement(s) by the owner(s) holding the balance of the interest must be submitted to account for the entire right, title, and interest.

4. ☐ The recipient, via a court proceeding or the like (*e.g.*, bankruptcy, probate), of an undivided interest in the entirety (a complete transfer of ownership interest was made). The certified document(s) showing the transfer is attached.

The interest identified in option 1, 2 or 3 above (not option 4) is evidenced by either (choose **one** of options A or B below):

A. ☐ 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 _____, Frame _____, or for which a copy thereof is attached.

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

1. From: BURCHFIEL, JERRY D. To: BBNT SOLUTIONS LLC

   The document was recorded in the United States Patent and Trademark Office at

   Reel 014638, Frame 0084, or for which a copy thereof is attached.

2. From: BBNT SOLUTIONS LLC To: BBN TECHNOLOGIES CORP.

   The document was recorded in the United States Patent and Trademark Office at

   Reel 017274, Frame 0318, or for which a copy thereof is attached.

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**.

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

PTO/AIA/96 (08-12)
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STATEMENT UNDER 37 CFR 3.73(c)

3. From: BBN TECHNOLOGIES CORP. To: RAYTHEON BBN TECHNOLOGIES CORP.

The document was recorded in the United States Patent and Trademark Office at
Reel 024456, Frame 0537, or for which a copy thereof is attached.

4. From: RAYTHEON BBN TECHNOLOGIES CORP To: MIRAI VENTURES LLC

The document was recorded in the United States Patent and Trademark Office at
Reel 042347, Frame 0371, or for which a copy thereof is attached.

5. From: MIRAI VENTURES LLC To: USTA TECHNOLOGY LLC

The document was recorded in the United States Patent and Trademark Office at
Reel 044933, Frame 0544, or for which a copy thereof is attached.

6. 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(c)(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.

/Patrick E. Caldwell/	2/16/2018
Signature	Date
Patrick E. Caldwell	44,580
Printed or Typed Name	Title or Registration Number

Privacy Act Statement

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

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

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

Doc Code: REIS.DECL
Document Description: Reissue Declaration Filed In Accordance With MPEP 1414

PTO/AIA/06 (02-17)
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U.S. Patent and Trademark Office; U.S. DEPARTMENT OF COMMERCE
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REISSUE APPLICATION DECLARATION BY THE ASSIGNEE	Docket Number (optional) USTAP030D.RI

I hereby declare that:

The residence and mailing address of the inventor or joint inventors are stated below.

Name of the Assignee:

Usta Technology, LLC

I am authorized to act on behalf of the assignee (if the assignee is a juristic entity).

The entire title to the patent identified below is vested in said assignee, or if there are multiple assignees/owners, all assignees/owners have executed a Reissue Application Declaration to account for the entire title of the patent identified below.

Inventor Jerry D. Burchfiel

Residence: City	State	Country
Waltham	MA	US

Mailing Address

211 W Tyler St., Suite C

City	State	Zip	Country
Longview	TX	75601	US

☑ Additional Inventors are named on separately numbered sheets attached hereto.

Patent Number 7,483,711	Patent Issue Date 01-27-2009

I believe said inventor(s) to be the original inventor or original joint inventors of the subject matter which is described and claimed in said patent, for which a reissue patent is sought on the invention titled:

SPECTRUM-ADAPTIVE NETWORKING

the specification of which

☑ is attached hereto.

☐ was filed on _____ as reissue application number _____.

The above-identified application was made or authorized to be made by me.

I hereby acknowledge that any willful false statement made in this declaration is punishable under 18 U.S.C. 1001 by fine or imprisonment of not more than five (5) years, or both.

I believe the original patent to be wholly or partly inoperative or invalid, for the reasons described below.
(Check all boxes that apply.)

☐ by reason of a defective specification or drawing.

☑ by reason of the patentee claiming more or less than he had the right to claim in the patent.

☐ by reason of other errors.

This collection of information is required by 37 CFR 1.175. 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 30 minutes to complete, including gathering, preparing, and submitting the completed application form to the USPTO. Time will vary depending upon the individual case. Any comments on the amount of time you require to complete this form and/or suggestions for reducing this burden, should be sent to the Chief Information Officer, U.S. Patent and Trademark Office, U.S. Department of Commerce, P.O. Box 1450, Alexandria, VA 22313-1450. DO NOT SEND FEES OR COMPLETED FORMS TO THIS ADDRESS. **SEND TO: Commissioner for Patents, P.O. Box 1450, Alexandria, VA 22313-1450.**

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

PTO/AIA/06 (02-17)
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REISSUE APPLICATION DECLARATION BY THE ASSIGNEE	Docket Number (Optional)

At least one error upon which reissue is based is described below. If the reissue is a broadening reissue, a claim that the application seeks to broaden must be identified and the box below must be checked:

[Attach additional sheets, if needed.]

☐ **The application for the original patent was filed under 37 CFR 1.46 by the assignee of the entire interest.**

I hereby appoint:

☑ Practitioners associated with Customer Number: 92045

OR

☐ Practitioner(s) named below:

Name	Registration 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.

Correspondence Address: Direct all communications about the application to:

☑ The address associated with Customer Number: 92045

OR

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

WARNING:

Petitioner/applicant is cautioned to avoid submitting personal information in documents filed in a patent application that may contribute to identity theft. Personal information such as social security numbers, bank account numbers, or credit card numbers (other than a check or credit card authorization form PTO-2038 submitted for payment purposes) is never required by the USPTO to support a petition or an application. If this type of personal information is included in documents submitted to the USPTO, petitioners/applicants should consider redacting such personal information from the documents before submitting them to the USPTO. Petitioner/applicant is advised that the record of a patent application is available to the public after publication of the application (unless a non-publication request in compliance with 37 CFR 1.213(a) is made in the application) or issuance of a patent. Furthermore, the record from an abandoned application may also be available to the public if the application is referenced in a published application or an issued patent (see 37 CFR 1.14). Checks and credit card authorization forms PTO-2038 submitted for payment purposes are not retained in the application file and therefore are not publicly available.

Signature /Andrew Gordon/	Date (Optional)
Legal name of person signing: Andrew Gordon	
Address of Assignee: 211 W Tyler St., Suite C Longview, TX 75601	

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/AIA/53 (09-12)
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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.

REISSUE APPLICATION: CONSENT OF ASSIGNEE; STATEMENT OF NON-ASSIGNMENT	Docket Number (Optional) USTAP030D.RI

This is part of the application for a reissue patent based on the original patent identified below.

Name of Patentee(s)
Jerry D. Burchfiel

Patent Number	Date Patent Issued
7,483,711	01-27-2009

Title of Invention
SPECTRUM-ADAPTIVE NETWORKING

1. [X] Filed herein is a statement under 37 CFR 3.73(c). (Form PTO/AIA/96)

2. [ ] Ownership of the patent is in the inventor(s), and no assignment of the patent is in effect.

One of boxes 1 or 2 above must be checked. If multiple assignees, complete this form for each assignee. If box 2 is checked, skip the next entry and go directly to "Name of Assignee."

The written consent of all assignees and inventors owning an undivided interest in the original patent is included in this application for reissue.

The assignee(s) owning an undivided interest in said original patent is/are Usta Technology, LLC, and the assignee(s) consents to the accompanying application for reissue.

Name of assignee/inventor (if not assigned)
Usta Technology, LLC

Signature	Date
/Andrew Gordon/	2/10/2018

Typed or printed name and title of person signing for assignee (if assigned)

Andrew Gordon

This collection of information is required by 37 CFR 1.172. 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 6 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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