

IN THE UNITED STATES PATENT AND TRADEMARK OFFICE

Appl. No.: 12/168,855 Confirmation No.: 8234
Applicant(s): Yan-Xiu Zheng
Filed: July 7, 2008
Art Unit: 2473
Examiner: Jeffrey M. Rutkowski
Title: METHOD FOR CONSTRUCTING FRAME STRUCTURES

Docket No.: 054788/347709
Customer No.: 00826

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

Reply to Office Action

Sir:

In response to the Office Action dated November 23, 2011, please enter the following:

Amendments to the Claims are reflected in the listing of claims beginning on page 2 of this paper; and

Remarks begin on page 14 of this paper.

Amendments to the Claims:

1. (Currently Amended) A method of constructing a frame structure for data transmission, the method comprising:
generating a first section comprising data configured in a first format compatible with a first communication system using symbols;
generating a second section following the first section, the second section comprising data configured in a second format compatible with a second communication system using symbols, wherein the first communication system and the second communication system co-exist in one transmission scheme and wherein:
the second format is compatible with the second communication system configured to support higher mobility than the first communication system, wherein each symbol in the second communication system has a shorter symbol period than that in the first communication system;
generating at least one non-data section containing information describing an aspect of data in at least one of the first section and the second section; and
combining the first section, the second section and the at least one non-data section to form the frame structure.
2. (Original) The method of claim 1, wherein the non-data section comprises mapping information for at least one of the first section and the second section.
3. (Original) The method of claim 1, wherein the non-data section comprises at least one of a preamble, a frame control header (FCH), a burst, and a map of at least one of the first section and the second section.
4. (Original) The method of claim 3, wherein the second section follows the first section in at least one of time sequence and frequency spectrum.

5. (Canceled)

6. (Currently Amended) A method of constructing a frame structure for data transmission, the method comprising:

generating a first section comprising data configured in a first format compatible with a first communication system;

generating a second section following the first section, the second section comprising data configured in a second format compatible with a second communication system, wherein the first communication system and the second communication system co-exist in one transmission scheme and wherein the second communication system has pilot symbols that are denser than those in the first communication system;

generating at least one non-data section containing information describing an aspect of data in at least one of the first section and the second section; and

combining the first section, the second section and the at least one non-data section to form the frame structure.

7. (Canceled)

8. (Previously presented) The method of claim 1, wherein a portion of the first section may be in guard band or non-communicational region of the first system.

9. (Original) The method of claim 1, wherein each of the first section and the second section carries at least one of uplink and downlink data.

10. (Original) The method of claim 1, wherein the second section carries mapping information for data in the second section.

11. (Currently Amended) A method of generating a frame for a communication system having a first communication system and a second communication system, the method comprising:

generating a first sub-frame for downlink transmission, wherein the first sub-frame comprises:

a first region comprising first mapping information;

a second region comprising second mapping information; and

a third region carrying data to be transferred in the downlink transmission, the third region comprising a first sub-region and a second sub-region, wherein the first sub-region and second sub-region are defined by the first mapping information, the first sub-region being configured to carry first data of the first communication system and the second sub-region being configured to carry second data of the second communication system in the downlink transmission, wherein the third region further comprises a fifth sub-region, the fifth sub-region being configured to carry fifth data of the first communication system or the second communication system under high mobility in the downlink transmission and each symbol in the fifth sub-region has a shorter symbol period than that in at least one of the first or second communication system, and generating a second sub-frame for uplink transmission, wherein the second sub-frame comprises:

a fourth region configured to carry data to be transferred in the uplink transmission, the fourth region comprising a third sub-region and a fourth sub-region, wherein the third sub-region and the fourth sub-region are defined by the second mapping information, the third sub-region being configured to carry third data of the first communication system and the fourth sub-region being configured to carry fourth data of the second communication system in the uplink transmission, wherein the first communication system and the second communication system co-exist in one transmission scheme.

12. (Original) The method of claim 11, wherein the second sub-region further comprises third mapping information for data placement in the second sub-region.

13. (Canceled)

14. (Currently Amended) A method of generating a frame for a communication system having a first communication system and a second communication system, the method comprising:

generating a first sub-frame for downlink transmission, wherein the first sub-frame comprises:

a first region comprising first mapping information;

a second region comprising second mapping information; and

a third region carrying data to be transferred in the downlink transmission, the third region comprising a first sub-region and a second sub-region, wherein the first sub-region and second sub-region are defined by the first mapping information, the first sub-region being configured to carry first data of the first communication system and the second sub-region being configured to carry second data of the second communication system in the downlink transmission, wherein the third region further comprises a fifth sub-region having pilot symbols that are denser than those in at least one of the first or second sub-region, and

generating a second sub-frame for uplink transmission, wherein the second sub-frame comprises:

a fourth region configured to carry data to be transferred in the uplink transmission, the fourth region comprising a third sub-region and a fourth sub-region, wherein the third sub-region and the fourth sub-region are defined by the second mapping information, the third sub-region being configured to carry third data of the first communication system and the fourth sub-region being configured to carry fourth data of the second communication system in the uplink transmission, wherein the first communication system and the second communication system co-exist in one transmission scheme.

15. (Canceled)

16. (Previously presented) The method of claim 11, wherein the fifth sub-region is defined by the first mapping information.

17. (Previously presented) The method of claim 11, wherein the fifth sub-region further comprises fourth mapping information for defining data placement in the fifth sub-region.

18. (Currently Amended) The method of claim 11, wherein the fourth region further comprises a sixth sub-region, the sixth sub-region being configured to carry sixth data of the first communication system or the second communication system under high mobility in the uplink transmission.

19. (Currently Amended) The method of claim 18, wherein pilot symbols in the sixth sub-region are denser than those in at least one of the first or second communication system.

20. (Currently Amended) The method of claim 18, wherein each symbol in the sixth sub-region has a shorter symbol period than that in at least one of the first or second communication system.

21. (Original) The method of claim 18, wherein the sixth sub-region is defined by the second mapping information.

22. (Original) The method of claim 18, wherein the sixth sub-region further comprises fifth mapping information for defining data placement in the sixth sub-region.

23. (Previously presented) A method of generating a frame for transferring data in a communication system, the communication system comprising a first system and a second system, the method comprising:

generating a first frame comprising a first sub-frame for downlink transmission and a second sub-frame for uplink transmission in a first frequency band;

generating a second frame comprising a third sub-frame for downlink transmission and a fourth sub-frame for uplink transmission in a second frequency band;

identifying a guard band between the first frequency band and the second frequency

band; and

generating a third frame comprising a fifth sub-frame for downlink transmission and a sixth sub-frame for uplink transmission in the guard band.

wherein the first frame is configured to carry data of the first system and data of the second system in parallel with the second frame being configured to carry data of the first system and data of the second system, and wherein the third frame is configured to carry data of the second system but not data of the first system.

24. (Previously presented) The method of claim 23, wherein at least one of the first sub-frame or the third sub-frame comprises:

a first region comprising first mapping information;

a second region comprising second mapping information; and

a third region carrying data to be transferred in the downlink transmission, the third region comprising a first sub-region and a second sub-region, wherein the first sub-region and second sub-region are defined by the first mapping information, the first sub-region being configured to carry first data of the first system and the second sub-region being configured to carry second data of the second system in the downlink transmission.

25. (Previously presented) The method of claim 23, wherein at least one of the second sub-frame or the fourth sub-frame comprises:

a fourth region carrying data to be transferred in the uplink transmission, the fourth region comprising a third sub-region and a fourth sub-region, wherein the third sub-region and the fourth sub-region are defined by second mapping information, the third sub-region being configured to carry third data of the first system and the fourth sub-region being configured to carry fourth data of the second system in the uplink transmission.

26. (Original) The method of claim 24, wherein the second sub-region further comprises third mapping information for data placement in the second sub-region.

27. (Previously presented) The method of claim 24, wherein the third region further

comprises a fifth sub-region, the fifth sub-region being configured to carry fifth data of the first system or the second system under high mobility in the downlink transmission.

28. (Previously presented) The method of claim 27, wherein pilot symbols in the fifth sub-region are denser than those in at least one of the first or second system.

29. (Original) The method of claim 27, wherein each symbol in the fifth sub-region has a shorter symbol period than that in at least one of the first or second system.

30. (Original) The method of claim 27, wherein the fifth sub-region is defined by the first mapping information.

31. (Original) The method of claim 27, wherein the fifth sub-region further comprises fourth mapping information for defining data placement in the fifth sub-region.

32. (Currently Amended) The method of claim 27, wherein the fourth region further comprises a sixth sub-region, the sixth sub-region being configured to carry sixth data of the first communication system or the second communication system under high mobility in the uplink transmission.

33. (Currently Amended) The method of claim 32, wherein pilot symbols in the sixth sub-region are denser than those in at least one of the first or second communication system.

34. (Currently Amended) The method of claim 32, wherein each symbol in the sixth sub-region has a shorter symbol period than that in at least one of the first or second communication system.

35. (Original) The method of claim 32, wherein the sixth sub-region is defined by the second mapping information.

36. (Original) The method of claim 32, wherein the sixth sub-region further comprises fifth mapping information for defining data placement in the sixth sub-region.

37. (Currently Amended) The method of claim 23, further comprising a band between the first frame and the third frame, wherein the band is applicable for carrying data of the first communication system or the second communication system.

38. (Original) The method of claim 35, wherein the band further comprises sixth mapping information defining first placement of the data carried by the band.

39. (Original) The method of claim 35, wherein the third mapping information defines second placement of the data carried by the band.

40. (Currently Amended) A method of allocating information in a frame of a communication system, the communication system comprising:

a first communication system and a second communication system, the frame configured for performing first data transmission of the first communication system, second data transmission of the second communication system, and third data transmission of the first communication system or the second communication system under high mobility, the method comprising:

allocating data of the first communication system and the second communication system [[in]] according to first mapping information;

dividing a data region of the frame to form a first sub-region and a second sub-region according to the first mapping information;

further dividing the data region of the frame into the first sub-region, the second sub-region and a third sub-region according to the first mapping information;

performing the first data transmission of the first communication system by using the first sub-region;

performing the second data transmission of the second communication system by using the second sub-region; and

performing the third data transmission of the first communication system or the second communication system by using the third sub-region, wherein each symbol in the third sub-region has a shorter symbol period than that in at least one of the first or second sub-region, wherein the first communication system and the second communication system co-exist in one transmission scheme.

41. (Currently Amended) The method of claim 40, further comprising:
allocating data of the second communication system carried in the second sub-region in a second mapping information.

42. (Canceled)

43. (Currently Amended) A method of allocating information in a frame of a communication system, the communication system comprising:

a first communication system and a second communication system, the frame configured for performing first data transmission of the first communication system, second data transmission of the second communication system, the method comprising:

allocating data of the first communication system and the second communication system [[in]] according to first mapping information;

dividing a data region of the frame to form a first sub-region and a second sub-region according to the first mapping information;

further dividing the data region of the frame into the first sub-region, the second sub-region and a third sub-region according to the first mapping information;

performing the first data transmission of the first communication system by using the first sub-region;

performing the second data transmission of the second communication system by using the second sub-region; and

performing the third data transmission of the first communication system or the second communication system by using the third sub-region, wherein pilot symbols in the third sub-region are denser than those in at least one of the first or second sub-region, wherein the first

communication system and the second communication system co-exist in one transmission scheme.

44. (Canceled)

45. (Currently Amended) The method of claim 40, further comprising:
allocating data of the first communication system or the second communication system
carried in the third sub-region in third mapping information.

46. (Currently Amended) A method of allocating information in a frame of a
communication system, the frame comprising:

a first frame, a second frame and a band between the first frame and the second frame,
the communication system comprising a first communication system and a second
communication system, the frame configured for performing first data transmission of the first
communication system, second data transmission of the second communication system, and third
data transmission of the first communication system or the second communication system under
high mobility, the method comprising:

allocating data of the first communication system and the second communication system
[[in]] according to first mapping information or second mapping information;

dividing a data region of the first frame or the second frame to form a first sub-region, a
second sub-region, a third sub-region or a second sub-region in the data region of the first frame
or the second frame according to the first mapping information or the second mapping
information;

further dividing the data region of the first frame or the second frame to form a fifth sub-
region or a sixth sub-region according to the first mapping information;

performing the first data transmission of the first communication system by using the first
sub-region or the third sub-region; and

performing the second data transmission of the second communication system by using
the second sub-region or the fourth sub-region; and

performing the third data transmission of the first communication system or the second

communication system by using the fifth sub-region or the sixth sub-region, wherein each symbol in one of the fifth and sixth sub-regions has a shorter symbol period than that in the data region of the first or the second frame other than the fifth and sixth sub-regions, wherein the first communication system and the second communication system co-exist in one transmission scheme.

47. (Canceled)

48. (Currently Amended) A method of allocating information in a frame of a communication system, the frame comprising:

a first frame, a second frame and a band between the first frame and the second frame, the communication system comprising a first communication system and a second communication system, the frame configured for performing first data transmission of the first communication system and second data transmission of the second communication system, the method comprising:

allocating data of the first communication system and the second communication system [[in]] according to first mapping information or second mapping information;

dividing a data region of the first frame or the second frame to form a first sub-region, a second sub-region, a third sub-region or a second sub-region in the data region of the first frame or the second frame according to the first mapping information or the second mapping information;

further dividing the data region of the first frame or the second frame to form a fifth sub-region or a sixth sub-region according to the first mapping information, wherein pilot symbols in one of the fifth and sixth sub-regions are denser than those in the data region of the first or the second frame other than the fifth and sixth sub-regions;

performing the first data transmission of the first communication system by using the first sub-region or the third sub-region; and

performing the second data transmission of the second communication system by using the second sub-region or the fourth sub-region; and

performing the third data transmission of the first communication system or the second

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communication system by using the fifth sub-region or the sixth sub-region, wherein each symbol in one of the fifth and sixth sub-regions has a shorter symbol period than that in the data region of the first or the second frame other than the fifth and sixth sub-regions, wherein the first communication system and the second communication system co-exist in one transmission scheme.

49. (Canceled)

50. (Currently Amended) The method of claim 46, further comprising:
carrying data of the first communication system or the second communication system by the band.

51. (Previously presented) The method of claim 23, wherein at least one of the first frame or second frame comprises, and the third frame is devoid of, a region comprising a ranging sub-channel.

Remarks

Introduction

The following remarks are responsive to the Office Action sent November 23, 2011. Claims 1-4, 6, 8-12, 14, 16-41, 43, 45, 46, 48, 50 and 51 are pending. Claims 1-4, 6, 8-12, 14, 16-22, 40, 41, 43, 45, 46, 48 and 50 are pending and are currently stand rejected.

Claims 1-4, 9-12, 16-18, 20-22, 40-42, 44-47 and 49 were rejected under 35 U.S.C. § 103(a) as being unpatentable over U.S. Patent Application Publication No. 2008/0095195 (“Ahmadi”), in view of U.S. Patent No. 7,809,020 (“Douglas”).

Claims 6 and 14 were rejected unpatentable under 35 U.S.C. § 103(a) over Ahmadi, in view of U.S. Patent No. 7,586,887 (“Trachewsky”).

Claim 8 was rejected as being unpatentable under 35 U.S.C. § 103(a) over Ahmadi, in view of Douglas and further PCT Patent Application Publication No. WO 2006/092852 (“Seki”).

Claim 19 was rejected as being unpatentable under 35 U.S.C. § 103(a) over Ahmadi, in view of Douglas and Trachewsky.

Claim 43 was rejected as being unpatentable under 35 U.S.C. § 103(a) over Ahmadi, in view of Trachewsky.

Claim 48 was rejected as being unpatentable under 35 U.S.C. § 103(a) over Ahmadi, in view of Douglas and Trachewsky.

Claim 50 was rejected as being unpatentable under 35 U.S.C. § 103(a) over Ahmadi, in view of Douglas and Seki.

Applicants appreciate the indication of allowability of Claim 23-39 and 51.

Applicants have amended independent Claims 1, 6, 11, 14, 40, 43, 46 and 48 to recite, “wherein the first communication system and the second communication system co-exist in one transmission scheme.” Applicants respectfully traverse all rejections in view of the foregoing amendments and following remarks. The claim amendments add no new matter and are fully supported by Applicants’ originally-filed application.

Applicants' reply to the rejection of Claims 1, 11, 40, 46 and 48 regarding symbol periods

As noted above, Applicants have amended independent Claims 1, 11, 40, 46 and 48. In particular, Claims 1, 11, 40, 46 and 48 have been amended to recite, "wherein the first communication system and the second communication system co-exist in one transmission scheme" Support for this amendment may be found at, for example, paragraph [0025] of Applicants' published specification (i.e., U.S. Patent Application Publication No. 2009/0016371).

The Examiner acknowledges that Ahmadi fails to show the symbol period of each symbol. *See* Office Action, pages 3, 5, 8, 9 and 16. Douglas is cited to compensate for the deficiency of Ahmadi.

Douglas generally relates to detecting the start of a packet (SOP) in receiver in a packet based wireless network. Douglas's SOP indicators are determined differently for DSSS packets (802.11b) and for OFDM packets (802.11a,g) (Douglas, col. 11, lines 62-65). Specifically, Douglas states that the method can be applied to the DSSS transmission scheme using 2-10 symbol periods in one embodiment and applied to the OFDM transmission scheme using 1-3 symbol periods in another embodiment (Douglas, col. 12, lines 42-46). (It is known that the DSSS transmission scheme is used for the original IEEE802.11 and in 802.11b. In contrast, OFDM is a transmission scheme used for IEEE802.11a, g.)

Therefore, Douglas fails to show or suggest the first communication system and the second communication system co-existing in one transmission scheme (e.g., OFDM or DSSS). Applicants' amended Claim 1, on the other hand, recites a first communication system and a second communication system co-existing in one transmission scheme. Amended Claims 11, 40, 46 and 48 have been amended to recite "generating a first sub-frame for downlink transmission within one transmission scheme" In other words, Applicants' amended claims recite different symbol periods co-existing in one data frame that uses the same transmission scheme.

For at least this reason, namely Ahmadi and/or the other documents of record failing to show or otherwise suggest each recitation of Applicants' independent Claims 1, 11, 40 and 46, Applicants' amended Claims 1, 11, 40, 46 and 48 are not made obvious by Ahmadi, Douglas and/or any other document of record. Applicants respectfully request that the rejections of Claims 1, 11, 40 and 46 be withdrawn.

Applicants' reply to the rejection of Claims 6, 14, 43 and 48 regarding density of pilots

Claims 6 and 14 were rejected unpatentable under 35 U.S.C. § 103(a) over Ahmadi, in view of Trachewsky.

Claim 43 was rejected as being unpatentable over Ahmadi, in view of Trachewsky.

Claim 48 was rejected as being unpatentable over Ahmadi, in view of Douglas and Trachewsky.

As noted above, Applicants have amended independent Claims 6, 14, 43 and 48 to recite, "wherein the first communication system and the second communication system co-exist in one transmission scheme."

The Examiner acknowledges that Ahmadi fails to show the density of the pilots. *See* Office Action, pages 10, 12, 14 and 17. Trachewsky is cited to fill the gap.

The cited portion of Trachewsky, however, does not show the second communication system has more pilot symbols than that in the first communication system. Rather, Trachewsky shows that compared to the number of pilot symbols on sub-carriers -2, -1, +1 and +2 that are used in **conventional** 802.11g/802.12a device, four extra pilot symbols are placed on sub-carriers -2, -1, +1 and +2 in Trachewsky's invented device. As such, Trachewsky fails to show a comparison between two communication systems within one transmission scheme in one device. Hence, Ahmadi and/or Trachewsky fail to show or otherwise suggest "wherein the first communication system and the second communication system co-exist in one transmission scheme."

For at least this reason, namely Ahmadi and/or the other documents of record failing to show or otherwise suggest each recitation of Applicants' independent Claims 6, 14, 43 and 48, Applicants' amended Claims 6, 14, 43 and 48 are not made obvious by Ahmadi, Trachewsky and/or any other document of record. Applicants respectfully request that the rejections of Claims 6 and 14 be withdrawn.

Applicants' reply to the rejections of dependent Claims 2-4, 8-10, 12, 16-22, 41, 45 and 50

For at least the foregoing reasons, independent Claims 1, 6, 11, 14, 40, 43, 46 and 48 are patentable over the various rejections. Since Claims 2-4, 8-10, 12, 16-22, 41, 45 and 50 depend

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from and necessarily include all of the recitations of one of independent Claims 1, 6, 11, 14, 40, 43, 46 and 48, the cited documents, whether taken alone or in any proper combination, do not show or otherwise suggest the systems or methods of dependent Claims 2-4, 8-10, 12, 16-22, 41,45 and 50 for at least the same reasons as described above in conjunction with the respective independent claims.

Conclusion

It is respectfully submitted that all of the present claims of the present application are in condition for allowance. It is therefore respectfully requested that a Notice of Allowance be issued. The Examiner is encouraged to contact Applicants' undersigned attorney to resolve any remaining issues in order to expedite examination of the present application.

It is believed that a two month extension of time and related fees are due and provided for in documents accompanying this paper, but that no additional fees for net addition of claims are required. However, in the event that additional extensions of time are necessary to allow consideration of this paper, such extensions are hereby petitioned under 37 CFR § 1.136(a), and any fee required therefor (including fees for net addition of claims) is hereby authorized to be charged to Deposit Account No. 16-0605.

Respectfully submitted,



Adam M. Kaplan
Registration No. 59,109

Customer No. 00826
ALSTON & BIRD LLP
Bank of America Plaza
101 South Tryon Street, Suite 4000
Charlotte, NC 28280-4000
Tel Silicon Valley Office (704) 444-1000
Fax Charlotte Office (704) 444-1111

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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
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07/07/2008

Yan-Xiu ZHENG

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ALSTON & BIRD LLP

BANK OF AMERICA PLAZA

101 SOUTH TRYON STREET, SUITE 4000

CHARLOTTE, NC 28280-4000

EXAMINER

RUTKOWSKI, JEFFREY M

ART UNIT

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PAPER

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

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

Office Action Summary	Application No.	Applicant(s)	
	12/168,855	ZHENG ET AL.	
	Examiner	Art Unit	
	JEFFREY M. RUTKOWSKI	2473	

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

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) OR THIRTY (30) DAYS, WHICHEVER IS LONGER, FROM THE MAILING DATE OF THIS COMMUNICATION.

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

Status

- 1) ☒ Responsive to communication(s) filed on 30 November 2010.
- 2a) ☐ This action is **FINAL**. 2b) ☒ This action is non-final.
- 3) ☐ 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

- 4) ☒ Claim(s) 1-4,6,8-12,14,16-41,43,45,46,48,50 and 51 is/are pending in the application.
- 4a) Of the above claim(s) _____ is/are withdrawn from consideration.
- 5) ☒ Claim(s) 23-39 and 51 is/are allowed.
- 6) ☒ Claim(s) 1-4,6,8-12,14,16-22,40,41,43,45,46,48 and 50 is/are rejected.
- 7) ☐ Claim(s) _____ is/are objected to.
- 8) ☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

- 9) ☐ The specification is objected to by the Examiner.
- 10) ☐ 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).
- 11) ☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

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).
- a) ☐ All b) ☐ Some * c) ☐ None of:
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) | 4) ☐ Interview Summary (PTO-413) |
| 2) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948) | Paper No(s)/Mail Date. _____ |
| 3) ☐ Information Disclosure Statement(s) (PTO/SB/08) | 5) ☐ Notice of Informal Patent Application |
| Paper No(s)/Mail Date _____ | 6) ☐ Other: _____ |

Exhibit 1004

DETAILED ACTION

Claims 5, 7, 13, 15, 42, 44, 47 and 49 have been cancelled.
Claims 1-4, 6, 8-12, 14, 16-41, 43, 45, 46, 48, and 50-51 are now pending.

Continued Examination Under 37 CFR 1.114

A request for continued examination under 37 CFR 1.114, including the fee set forth in 37 CFR 1.17(e), was filed in this application after final rejection. Since this application is eligible for continued examination under 37 CFR 1.114, and the fee set forth in 37 CFR 1.17(e) has been timely paid, the finality of the previous Office action has been withdrawn pursuant to 37 CFR 1.114. Applicant's submission filed on 11/30/2010 has been entered.

Claim Rejections - 35 USC § 103

The text of those sections of Title 35, U.S. Code not included in this action can be found in a prior Office action.

1. **Claims 1-4, 9-12, 16-18, 20-22, 40-42, 44-47 and 49** are rejected under 35 U.S.C. 103(a) as being unpatentable over Ahmadi et al. (US Pg Pub 2008/0095195), hereinafter referred to as Ahmadi, in view of Douglas et al. (US Pat 7,809,020), hereinafter referred to as Douglas.
2. For **claim 1**, Ahmadi discloses *generating a first section* (legacy zone; see figure 18) *comprising data configured in a first format compatible with a first communication system* (the legacy zone is compatible with a IEEE 802.16e system; see paragraph 0117) *using symbols* (the IEEE 802.16e system uses OFDM symbols; see paragraph 0050); *generating a second section* (new zone; see figure 18) *following the first section* (figure 18 shows the new zones follow the legacy zones), *the second section* (new zone) *comprising data configured in a second format*

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compatible with a second communication system (the new zone is compatible with an IEEE 802.16m system; see paragraph 0117) using symbols (the IEEE 802.16m system uses OFDM symbols; see paragraph 0060), wherein the second format is compatible with the second communication system configured to support higher mobility than the first communication system (Ahmadi's frame structure is compatible with higher mobility communication systems; see paragraphs 0113 and 0117), generating at least one non-data section (preamble and DL/UL MAPS sections; see figure 18) containing information describing an aspect of data in at least one of the first section and the second section (the DL/ UL MAPS describe the resource allocations of the DL and UL new and/or legacy relay zones; see paragraph 0057); and combining the first section (legacy zone), the second section (new zone) and the at least one non-data section (DL/UL MAPS sections) to form the frame structure (a super-frame is formed that contains the legacy zone, new zone and the DL/UL MAPS section; see paragraph 0131).

3. Ahmadi discloses the use of 5 ms fixed frame sizes (see paragraphs 0037 and 0048). Ahmadi does not disclose the symbol periods of each symbol. Douglas suggests *wherein each symbol period in the second communication system (802.11b packets) has a shorter symbol period than that in the first communication system (OFDM packets; there are 2-10 symbol periods used in the 802.11b packets as opposed to 1-3 symbol periods in the OFDM packets; see col. 12 lines 40-55).* It would have been obvious to a person of ordinary skill in the art at the time of the invention to use Douglas' arrangement in Ahmadi's invention to rapidly detect packets (Douglas, col. 2 lines 25-30).

4. For **claim 2**, Ahmadi discloses *wherein the non-data section comprises mapping information for at least one of the first section and the second section (the DL/UL MAPS are in a*

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non-data section; see figure 18. The DL/ UL MAPS describe the resource allocations of the DL and UL new and/or legacy relay zones; see paragraph 0057).

5. For **claim 3**, Ahmadi discloses *wherein the non-data section comprises at least one of a preamble (legacy and supplemental preambles), a frame control header (FCH), a burst, and a map (DL/UL MAPS) of at least one of the first section and the second section (see figure 18).*

6. For **claim 4**, Ahmadi suggests *wherein the second section (new zone) follows the first section (legacy zone) in at least one of time sequence and frequency spectrum (the information in the superframe can be transmitted in either TDD or FDD duplex modes; see paragraphs 0127 and 0131).*

7. For **claim 9**, Ahmadi discloses *wherein each of the first section and the second section carries at least one of uplink and downlink data (figure 18 shows each section carries uplink or downlink information).*

8. For **claim 10**, Ahmadi suggests *wherein the second section carries mapping information for data in the second section (MAPS can be placed in the new and legacy zones; see paragraph 0062).*

9. For **claim 11**, Ahmadi discloses *generating a first sub-frame for downlink transmission (figure 18 shows a downlink subframe), wherein the first sub-frame comprises: a first region comprising first mapping information (DL MAPS; see figure 18); a second region comprising second mapping information (UL MAPS; see figure 18); and a third region carrying data to be transferred in the downlink transmission (the third region is made up of the legacy and the new DL zones; see figure 18), the third region comprising a first sub-region (legacy DL zone) and a second sub-region (new DL zone), wherein the first sub-region and second sub-region are*

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defined by the first mapping information (the DL MAP information is describes the resource allocation of the DL zones; see paragraph 0057), the first sub-region being configured to carry first data of the first system (the legacy DL zone carries information for IEEE 802.16e systems; see paragraph 0121) and the second sub-region (the new DL zone) being configured to carry second data of the second system in the downlink transmission (the new DL zone carries information for IEEE 802.16m systems; see paragraph 0126), wherein the third region further comprises a fifth sub-region, the fifth sub-region being configured to carry fifth data of the first system or the second system under high mobility in the downlink transmission (Ahmadi's invention is also compatible with higher mobility standards; see paragraph 0111) and generating a second sub-frame for uplink transmission (figure 18 shows a subframe used for uplink transmission), wherein the second sub-frame comprises: a fourth region carrying data to be transferred in the uplink transmission (the fourth region includes the legacy UL and the new UL zones; see figure 18), the fourth region comprising a third sub-region (legacy UL zone) and a fourth sub-region (new UL zone), wherein the third sub-region and the fourth sub-region are defined by the second mapping information (the UL MAP information is describes the resource allocation of the UL zones; see paragraph 0057), the third sub-region being configured to carry third data of the first system (the legacy UL zone carries information for IEEE 802.16e systems; see paragraph 0121) and the fourth sub-region being configured to carry fourth data of the second system in the uplink transmission (the new UL zone carries information for IEEE 802.16m systems; see paragraph 0126).

10. Ahmadi discloses the use of 5 ms fixed frame sizes (see paragraphs 0037 and 0048).

Ahmadi does not disclose the symbol periods of each symbol. Douglas suggests *wherein each*

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symbol in the fifth sub-region has a shorter symbol period than that in at least one of the first or second system (OFDM packets; there are 2-10 symbol periods used in the 802.11b packets as opposed to 1-3 symbol periods in the OFDM packets; see col. 12 lines 40-55). It would have been obvious to a person of ordinary skill in the art at the time of the invention to use Douglas' arrangement in Ahmadi's invention to rapidly detect packets (Douglas, col. 2 lines 25-30).

11. For **claim 12**, Ahmadi discloses *wherein the second sub-region (new DL zone) further comprises third mapping information for data placement in the second sub-region (MAPs can be transmitted in the new DL zone; see paragraph 0058).*

12. For **claim 16**, Ahmadi suggests *wherein the fifth sub-region is defined by the first mapping information (the DL/UL MAPS are in a non-data section; see figure 18. The DL/ UL MAPS describe the resource allocations of the DL and UL superframe zones; see paragraph 0057)..*

13. For **claim 17**, Ahmadi suggests *wherein the fifth sub-region further comprises fourth mapping information for defining data placement in the fifth sub-region (MAPs can be transmitted in the same zone where the data is placed; see paragraph 0058).*

14. For **claim 18**, Ahmadi suggests *wherein the fourth region further comprises a sixth sub-region, the sixth sub-region being capable of carrying sixth data of the first system or the second system under high mobility in the uplink transmission (Ahmadi's invention is also compatible with higher mobility standards; see paragraph 0111).*

15. For **claim 20**, Ahmadi suggests *wherein each symbol in the sixth sub-region has a shorter symbol period than that in at least one of the first or second system (frames in high*

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mobility environment the frame size is 0.617 ms; see paragraph 0111. Whereas, in other systems, the frame size is at least 2 ms; see paragraph 0037).

16. For **claim 21**, Ahmadi suggests *wherein the sixth sub-region is defined by the second mapping information* (the UL MAP information is describes the resource allocation of the UL zones; see paragraph 0057).

17. For **claim 22**, Ahmadi suggests *wherein the sixth sub-region further comprises fifth mapping information for defining data placement in the sixth sub-region* (MAPs can be transmitted in the same zone where the data is placed; see paragraph 0058).

18. For **claim 40**, Ahmadi discloses *allocating data of the first system and the second system in first mapping information* (the DL/ UL MAPS describe the resource allocations of the DL and UL new and/or legacy relay zones; see paragraph 0057); *dividing a data region of the frame to form a first sub-region* (legacy zone; see figure 18) *and a second sub-region* (new zone; see figure 18) *according to the first mapping information; performing the first data transmission of the first system by using the first sub-region; and performing the second data transmission of the second system by using the second sub-region* (the legacy and new zones are used to carry information for two different types of communications systems; see paragraphs 0125-0126) *wherein the frame further comprising third data transmission of the first system or the second system under high mobility* (Ahmadi's invention is also compatible with higher mobility standards; see paragraph 0111), *the method further comprising: further dividing the data region of the frame into the first sub-region* (legacy DL zone; see figure 18), *the second sub-region* (new DL zone; see figure 18) *and a third region* (UL zone; see figure 18) *according to the first mapping information* (DL/UL MAPS; see figure 18); *performing the third data transmission of*

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the first system or the second system by using the third sub-region (the UL zone is used to transmit legacy and new zone information; see figure 18).

19. Ahmadi discloses the use of 5 ms fixed frame sizes (see paragraphs 0037 and 0048). Ahmadi does not disclose the symbol periods of each symbol. Douglas suggests *wherein each symbol in the third system has a shorter symbol period than that in at least one of the first or second system* (OFDM packets; there are 2-10 symbol periods used in the 802.11b packets as opposed to 1-3 symbol periods in the OFDM packets; see col. 12 lines 40-55). It would have been obvious to a person of ordinary skill in the art at the time of the invention to use Douglas' arrangement in Ahmadi's invention to rapidly detect packets (Douglas, col. 2 lines 25-30).

20. For **claim 41**, Ahmadi discloses *allocating data of the second system carried in the second sub-region in a second mapping information* (supplemental preamble; see figure 18).

21. For **claim 45**, Ahmadi discloses *allocating data of the first system or the second system carried in the third sub-region in third mapping information* (the DL/ UL MAPS describe the resource allocations of the DL and UL new and/or legacy relay zones; see paragraph 0057).

22. For **claim 46**, Ahmadi discloses *allocating data of the first system* (legacy system) *and the second system* (new system) *in first mapping information or second mapping information* (the DL/ UL MAPS describe the resource allocations of the DL and UL new and/or legacy relay zones; see paragraph 0057); *dividing a data region of the first frame or the second frame to form a first sub-region* (legacy DL zone; see figure 18), *a second sub-region* (new DL zone; see figure 18), *a third sub-region* (legacy UL zone; see figure 18) *or a second sub-region in the data region of the first frame or the second frame according to the first mapping information or the second mapping information* (the DL/ UL MAPS describe the resource allocations of the DL and UL

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new and/or legacy relay zones; see paragraph 0057); *performing the first data transmission of the first system by using the first sub-region or the third sub-region* (see paragraph 0125); *and performing the second data transmission of the second system by using the second sub-region or the fourth sub-region* (see paragraph 0126), *further dividing the data region of the first frame or the second frame to form a fifth sub-region or a sixth sub-region* (new UL zone; see figure 18) *according to the first mapping information* (the DL/ UL MAPS describe the resource allocations of the DL and UL new and/or legacy relay zones; see paragraph 0057); *and performing the third data transmission of the first system or the second system by using the fifth sub-region or the sixth sub-region* (see paragraph 0126).

23. Ahmadi discloses the use of 5 ms fixed frame sizes (see paragraphs 0037 and 0048). Ahmadi does not disclose the symbol periods of each symbol. Douglas suggests *wherein each symbol in the third system has a shorter symbol period than that in at least one of the first or second system* (OFDM packets; there are 2-10 symbol periods used in the 802.11b packets as opposed to 1-3 symbol periods in the OFDM packets; see col. 12 lines 40-55). It would have been obvious to a person of ordinary skill in the art at the time of the invention to use Douglas' arrangement in Ahmadi's invention to rapidly detect packets (Douglas, col. 2 lines 25-30).

24. **Claims 6 and 14** are rejected under 35 U.S.C. 103(a) as being unpatentable over Ahmadi in view of Trachewsky (US Pat 7,586,887).

25. For **claim 6**, Ahmadi discloses *generating a first section* (legacy zone; see figure 18) *comprising data configured in a first format compatible with a first communication system* (the legacy zone is compatible with a IEEE 802.16e system; see paragraph 0117); *generating a second section* (new zone; see figure 18) *following the first section* (figure 18 shows the new

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zones follow the legacy zones), *the second section* (new zone) *comprising data configured in a second format compatible with a second communication system* (the new zone is compatible with an IEEE 802.16m system; see paragraph 0117), *wherein the second format is different from the first format* (Ahmadi suggests the formats are different because legacy terminals do not recognize IEEE 802.16e formats; see paragraph 0043); *generating at least one non-data section* (preamble and DL/UL MAPS sections; see figure 18) *containing information describing an aspect of data in at least one of the first section and the second section* (the DL/ UL MAPS describe the resource allocations of the DL and UL new and/or legacy relay zones; see paragraph 0057); *and combining the first section* (legacy zone), *the second section* (new zone) *and the at least one non-data section* (DL/UL MAPS sections) *to form the frame structure* (a super-frame is formed that contains the legacy zone, new zone and the DL/UL MAPS section; see paragraph 0131).

26. Ahmadi discloses the use of a high mobility environment (see paragraph 0111). Ahmadi does not disclose the density of pilots. Trachewsky discloses *wherein pilots in the third system* (greenfield portion) *are denser than those in the first communication system* (802.11a,g; the non-legacy greenfield portion has four extra pilots than the 802.11a,g portion; see col. 6 lines 15-63). It would have been obvious to a person of ordinary skill in the art at the time of the invention to use Trachewsky's arrangement in Ahmadi's invention to transmit frames at higher rates while remaining backward compatible (Trachewsky, col. 2 lines 10-15).

27. For **claim 14**, Ahmadi discloses *generating a first sub-frame for downlink transmission* (figure 18 shows a downlink sub frame), *wherein the first sub-frame comprises: a first region comprising first mapping information* (DL MAPS; see figure 18); *a second region comprising*

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second mapping information (UL MAPS; see figure 18); and a third region carrying data to be transferred in the downlink transmission (the third region is made up of the legacy and the new DL zones; see figure 18), the third region comprising a first sub-region (legacy DL zone) and a second sub-region (new DL zone), wherein the first sub-region and second sub-region are defined by the first mapping information (the DL MAP information is describes the resource allocation of the DL zones; see paragraph 0057), the first sub-region being capable of carrying first data of the first system (the legacy DL zone carries information for IEEE 802.16e systems; see paragraph 0121) and the second sub-region (the new DL zone) being capable of carrying second data of the second system in the downlink transmission (the new DL zone carries information for IEEE 802.16m systems; see paragraph 0126), and generating a second sub-frame for uplink transmission (figure 18 shows a sub frame used for uplink transmission), wherein the second sub-frame comprises: a fourth region carrying data to be transferred in the uplink transmission (the fourth region includes the legacy UL and the new UL zones; see figure 18), the fourth region comprising a third sub-region (legacy UL zone) and a fourth sub-region (new UL zone), wherein the third sub-region and the fourth sub-region are defined by the second mapping information (the UL MAP information is describes the resource allocation of the UL zones; see paragraph 0057), the third sub-region being capable of carrying third data of the first system (the legacy UL zone carries information for IEEE 802.16e systems; see paragraph 0121) and the fourth sub-region being capable of carrying fourth data of the second system in the uplink transmission (the new UL zone carries information for IEEE 802.16m systems; see paragraph 0126).

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28. Ahmadi discloses the use of a high mobility environment (see paragraph 0111). Ahmadi does not disclose the density of pilots. Trachewsky discloses *wherein pilots in the fifth sub-region (greenfield portion) are denser than those in at least one of the first or second system* (802.11a,g; the non-legacy greenfield portion has four extra pilots than the 802.11a,g portion; see col. 6 lines 15-63). It would have been obvious to a person of ordinary skill in the art at the time of the invention to use Trachewsky's arrangement in Ahmadi's invention to transmit frames at higher rates while remaining backward compatible (Trachewsky, col. 2 lines 10-15).

29. **Claim 8** is rejected under 35 U.S.C. 103(a) as being unpatentable over Ahmadi in view of Douglas, as applied to **claim 1** above, and further in view of Seki (WO 2006/092852).

30. For **claim 8**, Ahmadi suggests *wherein a portion of the second section may be in guard band or non- communicational region of the first system* (the new zone information is placed in areas that are not used by the legacy terminals; see paragraph 0085). The combination of Ahmadi and Douglas does not disclose the transmission of information in a guard band. Seki discloses *wherein a portion of the first section may be in guard band (DD) or non- communicational region of the first system* (the guard band DD can be used for data transmission; see abstract). It would have been obvious to a person of ordinary skill in the art at the time of the invention to send information in a guard band in Ahmadi's invention to make full use of the frequency spectrum (Seki, abstract).

31. **Claim 19** is rejected under 35 U.S.C. 103(a) as being unpatentable over Ahmadi in view of Douglas, as applied to **claim 19** above, and further in view of Trachewsky.

32. For **claim 19**, Ahmadi discloses the use of a high mobility environment (see paragraph 0111). The combination of Ahmadi and Douglas does not disclose the density of pilots.

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Trachewsky discloses *wherein pilots in the sixth sub-region (greenfield portion) are denser than those in at least one of the first or second system* (802.11a,g; the non-legacy greenfield portion has four extra pilots than the 802.11a,g portion; see col. 6 lines 15-63). It would have been obvious to a person of ordinary skill in the art at the time of the invention to use Trachewsky's arrangement in Ahmadi's invention to transmit frames at higher rates while remaining backward compatible (Trachewsky, col. 2 lines 10-15).

33. **Claim 43** is rejected under 35 U.S.C. 103(a) as being unpatentable over Ahmadi in view of Trachewsky.

34. For **claim 43**, Ahmadi discloses *generating a first section* (legacy zone; see figure 18) *comprising data configured in a first format compatible with a first communication system* (the legacy zone is compatible with a IEEE 802.16e system; see paragraph 0117); *generating a second section* (new zone; see figure 18) *following the first section* (figure 18 shows the new zones follow the legacy zones), *the second section (new zone) comprising data configured in a second format compatible with a second communication system* (the new zone is compatible with an IEEE 802.16m system; see paragraph 0117), *wherein the second format is different from the first format* (Ahmadi suggests the formats are different because legacy terminals do not recognize IEEE 802.16e formats; see paragraph 0043); *generating at least one non-data section* (preamble and DL/UL MAPS sections; see figure 18) *containing information describing an aspect of data in at least one of the first section and the second section* (the DL/ UL MAPS describe the resource allocations of the DL and UL new and/or legacy relay zones; see paragraph 0057); *and combining the first section (legacy zone), the second section (new zone) and the at least one non-data section (DL/UL MAPS sections) to form the frame structure* (a super-frame is

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formed that contains the legacy zone, new zone and the DL/UL MAPS section; see paragraph 0131); *allocating data of the first system and the second system in first mapping information* (the DL/UL MAPS describe the resource allocations of the DL and UL new and/or legacy relay zones; see paragraph 0057); *dividing a data region of the frame to form a first sub-region* (legacy zone; see figure 18) *and a second sub-region* (new zone; see figure 18) *according to the first mapping information; performing the first data transmission of the first system by using the first sub-region; and performing the second data transmission of the second system by using the second sub-region* (the legacy and new zones are used to carry information for two different types of communications systems; see paragraphs 0125-0126) *wherein the frame further comprising third data transmission of the first system or the second system under high mobility* (Ahmadi's invention is also compatible with higher mobility standards; see paragraph 0111), *the method further comprising: further dividing the data region of the frame into the first sub-region* (legacy DL zone; see figure 18), *the second sub-region* (new DL zone; see figure 18) *and a third region* (UL zone; see figure 18) *according to the first mapping information* (DL/UL MAPS; see figure 18); *performing the third data transmission of the first system or the second system by using the third sub-region* (the UL zone is used to transmit legacy and new zone information; see figure 18).

35. Ahmadi discloses the use of a high mobility environment (see paragraph 0111). Ahmadi does not disclose the density of OFDM pilots. Trachewsky discloses *wherein pilots in the third system* (greenfield portion) *are denser than those in the first communication system* (802.11a,g; the non-legacy greenfield portion has four extra pilots than the 802.11a,g portion; see col. 6 lines 15-63). It would have been obvious to a person of ordinary skill in the art at the time of the

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invention to use Trachewsky's arrangement in Ahmadi's invention to transmit frames at higher rates while remaining backward compatible (Trachewsky, col. 2 lines 10-15).

36. **Claim 48** is rejected under 35 U.S.C. 103(a) as being unpatentable over Ahmadi in view of Douglas and Trachewsky.

37. For **claim 48**, Ahmadi discloses *generating a first section* (legacy zone; see figure 18) *comprising data configured in a first format compatible with a first communication system* (the legacy zone is compatible with a IEEE 802.16e system; see paragraph 0117); *generating a second section* (new zone; see figure 18) *following the first section* (figure 18 shows the new zones follow the legacy zones), *the second section* (new zone) *comprising data configured in a second format compatible with a second communication system* (the new zone is compatible with an IEEE 802.16m system; see paragraph 0117), *wherein the second format is different from the first format* (Ahmadi suggests the formats are different because legacy terminals do not recognize IEEE 802.16e formats; see paragraph 0043); *generating at least one non-data section* (preamble and DL/UL MAPS sections; see figure 18) *containing information describing an aspect of data in at least one of the first section and the second section* (the DL/ UL MAPS describe the resource allocations of the DL and UL new and/or legacy relay zones; see paragraph 0057); *and combining the first section* (legacy zone), *the second section* (new zone) *and the at least one non-data section* (DL/UL MAPS sections) *to form the frame structure* (a super-frame is formed that contains the legacy zone, new zone and the DL/UL MAPS section; see paragraph 0131); *allocating data of the first system* (legacy system) *and the second system* (new system) *in first mapping information or second mapping information* (the DL/ UL MAPS describe the resource allocations of the DL and UL new and/or legacy relay zones; see paragraph 0057);

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dividing a data region of the first frame or the second frame to form a first sub-region (legacy DL zone; see figure 18), a second sub-region (new DL zone; see figure 18), a third sub-region (legacy UL zone; see figure 18) or a second sub-region in the data region of the first frame or the second frame according to the first mapping information or the second mapping information (the DL/ UL MAPS describe the resource allocations of the DL and UL new and/or legacy relay zones; see paragraph 0057); performing the first data transmission of the first system by using the first sub-region or the third sub-region (see paragraph 0125); and performing the second data transmission of the second system by using the second sub-region or the fourth sub-region (see paragraph 0126), further dividing the data region of the first frame or the second frame to form a fifth sub-region or a sixth sub-region (new UL zone; see figure 18) according to the first mapping information (the DL/ UL MAPS describe the resource allocations of the DL and UL new and/or legacy relay zones; see paragraph 0057); and performing the third data transmission of the first system or the second system by using the fifth sub-region or the sixth sub-region (see paragraph 0126).

38. Ahmadi discloses the use of 5 ms fixed frame sizes (see paragraphs 0037 and 0048).

Ahmadi does not disclose the symbol periods of each symbol. Douglas suggests *wherein each symbol in the third system has a shorter symbol period than that in at least one of the first or second system* (OFDM packets; there are 2-10 symbol periods used in the 802.11b packets as opposed to 1-3 symbol periods in the OFDM packets; see col. 12 lines 40-55). It would have been obvious to a person of ordinary skill in the art at the time of the invention to use Douglas' arrangement in Ahmadi's invention to rapidly detect packets (Douglas, col. 2 lines 25-30).

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39. Ahmadi discloses the use of a high mobility environment (see paragraph 0111). Ahmadi does not disclose the density of pilots. Trachewsky discloses *wherein pilots in the third system (greenfield portion) are denser than those in the first communication system* (802.11a,g; the non-legacy greenfield portion has four extra pilots than the 802.11a,g portion; see col. 6 lines 15-63). It would have been obvious to a person of ordinary skill in the art at the time of the invention to use Trachewsky's arrangement in Ahmadi's invention to transmit frames at higher rates while remaining backward compatible (Trachewsky, col. 2 lines 10-15).

40. **Claim 50** is rejected under 35 U.S.C. 103(a) as being unpatentable over Ahmadi in view of Douglas, as applied to **claim 46** above, and further in view of Seki.

41. For **claim 50**, Ahmadi discloses the super frame structure is compatible with other standards (see paragraph 0061). The combination of Ahmadi and Douglas does not disclose the transmission of information in a guard band. Seki discloses *carrying data of the first system or the second system by the band* (the guard band DD can be used for data transmission; see abstract). It would have been obvious to a person of ordinary skill in the art at the time of the invention to send information in a guard band in Ahmadi's invention to make full use of the frequency spectrum (Seki, abstract).

Response to Arguments

42. The arguments with respect to **claims 1-4, 6, 8-12, 14, 16-22, 40, 41, 43, 45, 46, 48, and 50** are moot in view of the new grounds of rejection.

Allowable Subject Matter

43. **Claims 23-39 and 51** are allowed.

Conclusion

Any inquiry concerning this communication or earlier communications from the examiner should be directed to JEFFREY M. RUTKOWSKI whose telephone number is (571)270-1215. The examiner can normally be reached on Monday - Friday 7:30-5:00 PM EST.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Kwang Yao can be reached on (571) 272-3182. 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.

/Jeffrey M Rutkowski/
Examiner, Art Unit 2473

Amendments to the Claims:

1. (Previously Presented) A method of constructing a frame structure for data transmission, the method comprising:
 - generating a first section comprising data configured in a first format compatible with a first communication system using symbols;
 - generating a second section following the first section, the second section comprising data configured in a second format compatible with a second communication system using symbols, wherein:
 - the second format is compatible with the second communication system configured to support higher mobility than the first communication system, wherein each symbol in the second communication system has a shorter symbol period than that in the first communication system;
 - generating at least one non-data section containing information describing an aspect of data in at least one of the first section and the second section; and
 - combining the first section, the second section and the at least one non-data section to form the frame structure.
2. (Original) The method of claim 1, wherein the non-data section comprises mapping information for at least one of the first section and the second section.
3. (Original) The method of claim 1, wherein the non-data section comprises at least one of a preamble, a frame control header (FCH), a burst, and a map of at least one of the first section and the second section.
4. (Original) The method of claim 3, wherein the second section follows the first section in at least one of time sequence and frequency spectrum.
5. (Canceled)

6. (Previously Presented) A method of constructing a frame structure for data transmission, the method comprising:

generating a first section comprising data configured in a first format compatible with a first communication system;

generating a second section following the first section, the second section comprising data configured in a second format compatible with a second communication system, wherein the second communication system has pilot symbols that are denser than those in the first communication system;

generating at least one non-data section containing information describing an aspect of data in at least one of the first section and the second section; and

combining the first section, the second section and the at least one non-data section to form the frame structure.

7. (Canceled)

8. (Currently Amended) The method of claim 1, wherein a portion of the ~~second~~ first section may be in guard band or non-communicational region of the first system.

9. (Original) The method of claim 1, wherein each of the first section and the second section carries at least one of uplink and downlink data.

10. (Original) The method of claim 1, wherein the second section carries mapping information for data in the second section.

11. (Previously Presented) A method of generating a frame for a communication system having a first system and a second system, the method comprising:

generating a first sub-frame for downlink transmission, wherein the first sub-frame comprises:

a first region comprising first mapping information;
a second region comprising second mapping information; and
a third region carrying data to be transferred in the downlink transmission, the third region comprising a first sub-region and a second sub-region, wherein the first sub-region and second sub-region are defined by the first mapping information, the first sub-region being configured to carry first data of the first system and the second sub-region being configured to carry second data of the second system in the downlink transmission, wherein the third region further comprises a fifth sub-region, the fifth sub-region being configured to carry fifth data of the first system or the second system under high mobility in the downlink transmission and each symbol in the fifth sub-region has a shorter symbol period than that in at least one of the first or second system, and generating a second sub-frame for uplink transmission, wherein the second sub-frame comprises:

a fourth region configured to carry data to be transferred in the uplink transmission, the fourth region comprising a third sub-region and a fourth sub-region, wherein the third sub-region and the fourth sub-region are defined by the second mapping information, the third sub-region being configured to carry third data of the first system and the fourth sub-region being configured to carry fourth data of the second system in the uplink transmission.

12. (Original) The method of claim 11, wherein the second sub-region further comprises third mapping information for data placement in the second sub-region.

13. (Canceled)

14. (Previously Presented) A method of generating a frame for a communication system having a first system and a second system, the method comprising:

generating a first sub-frame for downlink transmission, wherein the first sub-frame comprises:

a first region comprising first mapping information;

a second region comprising second mapping information; and
a third region carrying data to be transferred in the downlink transmission, the third region comprising a first sub-region and a second sub-region, wherein the first sub-region and second sub-region are defined by the first mapping information, the first sub-region being configured to carry first data of the first system and the second sub-region being configured to carry second data of the second system in the downlink transmission, wherein the third region further comprises a fifth sub-region having pilot symbols that are denser than those in at least one of the first or second sub-region, and generating a second sub-frame for uplink transmission, wherein the second sub-frame comprises:

a fourth region configured to carry data to be transferred in the uplink transmission, the fourth region comprising a third sub-region and a fourth sub-region, wherein the third sub-region and the fourth sub-region are defined by the second mapping information, the third sub-region being configured to carry third data of the first system and the fourth sub-region being configured to carry fourth data of the second system in the uplink transmission.

15. (Canceled)

16. (Previously Presented) The method of claim 11, wherein the fifth sub-region is defined by the first mapping information.

17. (Previously Presented) The method of claim 11, wherein the fifth sub-region further comprises fourth mapping information for defining data placement in the fifth sub-region.

18. (Previously Presented) The method of claim 11, wherein the fourth region further comprises a sixth sub-region, the sixth sub-region being configured to carry sixth data of the first system or the second system under high mobility in the uplink transmission.

19. (Previously Presented) The method of claim 18, wherein pilot symbols in the sixth sub-region are denser than those in at least one of the first or second system.

20. (Previously Presented) The method of claim 18, wherein each symbol in the sixth sub-region has a shorter symbol period than that in at least one of the first or second system.

21. (Original) The method of claim 18, wherein the sixth sub-region is defined by the second mapping information.

22. (Original) The method of claim 18, wherein the sixth sub-region further comprises fifth mapping information for defining data placement in the sixth sub-region.

23. (Currently Amended) A method of generating a frame for transferring data in a communication system, the communication system comprising a first system and a second system, the method comprising:

generating a first frame comprising a first sub-frame for downlink transmission and a second sub-frame for uplink transmission in a first frequency band;

generating a second frame comprising a third sub-frame for downlink transmission and a fourth sub-frame for uplink transmission in ~~at least one of a first frequency and a second frequency band;~~

identifying a guard band between the first frequency band and the second frequency band; and

generating a third frame comprising a fifth sub-frame for downlink transmission and a sixth sub-frame for uplink transmission in the guard band,

wherein the first frame is configured to carry data of the first system and data of the second system in parallel with the second frame being configured to carry data of the first system and data of the second system, and wherein the third frame is configured to carry data of the second system but not data of the first system.

24. (Previously Presented) The method of claim 23, wherein at least one of the first sub-frame or the third sub-frame comprises:

- a first region comprising first mapping information;
- a second region comprising second mapping information; and
- a third region carrying data to be transferred in the downlink transmission, the third region comprising a first sub-region and a second sub-region, wherein the first sub-region and second sub-region are defined by the first mapping information, the first sub-region being configured to carry first data of the first system and the second sub-region being configured to carry second data of the second system in the downlink transmission.

25. (Previously Presented) The method of claim 23, wherein at least one of the second sub-frame or the fourth sub-frame comprises:

- a fourth region carrying data to be transferred in the uplink transmission, the fourth region comprising a third sub-region and a fourth sub-region, wherein the third sub-region and the fourth sub-region are defined by second mapping information, the third sub-region being configured to carry third data of the first system and the fourth sub-region being configured to carry fourth data of the second system in the uplink transmission.

26. (Original) The method of claim 24, wherein the second sub-region further comprises third mapping information for data placement in the second sub-region.

27. (Previously Presented) The method of claim 24, wherein the third region further comprises a fifth sub-region, the fifth sub-region being configured to carry fifth data of the first system or the second system under high mobility in the downlink transmission.

28. (Previously Presented) The method of claim 27, wherein pilot symbols in the fifth sub-region are denser than those in at least one of the first or second system.

29. (Original) The method of claim 27, wherein each symbol in the fifth sub-region has a shorter symbol period than that in at least one of the first or second system.

30. (Original) The method of claim 27, wherein the fifth sub-region is defined by the first mapping information.

31. (Original) The method of claim 27, wherein the fifth sub-region further comprises fourth mapping information for defining data placement in the fifth sub-region.

32. (Previously Presented) The method of claim 27, wherein the fourth region further comprises a sixth sub-region, the sixth sub-region being configured to carry sixth data of the first system or the second system under high mobility in the uplink transmission.

33. (Previously Presented) The method of claim 32, wherein pilot symbols in the sixth sub-region are denser than those in at least one of the first or second system.

34. (Original) The method of claim 32, wherein each symbol in the sixth sub-region has a shorter symbol period than that in at least one of the first or second system.

35. (Original) The method of claim 32, wherein the sixth sub-region is defined by the second mapping information.

36. (Original) The method of claim 32, wherein the sixth sub-region further comprises fifth mapping information for defining data placement in the sixth sub-region.

37. (Original) The method of claim 23, further comprising a band between the first frame and the third frame, wherein the band is applicable for carrying data of the first system or the second system.

38. (Original) The method of claim 35, wherein the band further comprises sixth mapping information defining first placement of the data carried by the band.

39. (Original) The method of claim 35, wherein the third mapping information defines second placement of the data carried by the band.

40. (Previously Presented) A method of allocating information in a frame of a communication system, the communication system comprising:

a first system and a second system, the frame configured for performing first data transmission of the first system, second data transmission of the second system, and third data transmission of the first system or the second system under high mobility, the method comprising:

allocating data of the first system and the second system in first mapping information;
dividing a data region of the frame to form a first sub-region and a second sub-region according to the first mapping information;

further dividing the data region of the frame into the first sub-region, the second sub-region and a third sub-region according to the first mapping information;

performing the first data transmission of the first system by using the first sub-region;
performing the second data transmission of the second system by using the second sub-region; and

performing the third data transmission of the first system or the second system by using the third sub-region, wherein each symbol in the third sub-region has a shorter symbol period than that in at least one of the first or second sub-region.

41. (Original) The method of claim 40, further comprising:
allocating data of the second system carried in the second sub-region in a second mapping information.

42. (Canceled)

43. (Previously Presented) A method of allocating information in a frame of a communication system, the communication system comprising:

a first system and a second system, the frame configured for performing first data transmission of the first system, second data transmission of the second system, the method comprising:

allocating data of the first system and the second system in first mapping information;
dividing a data region of the frame to form a first sub-region and a second sub-region according to the first mapping information;

further dividing the data region of the frame into the first sub-region, the second sub-region and a third sub-region according to the first mapping information;

performing the first data transmission of the first system by using the first sub-region;
performing the second data transmission of the second system by using the second sub-region; and

performing the third data transmission of the first system or the second system by using the third sub-region, wherein pilot symbols in the third sub-region are denser than those in at least one of the first or second sub-region.

44. (Canceled)

45. (Previously Presented) The method of claim 40, further comprising:

allocating data of the first system or the second system carried in the third sub-region in third mapping information.

46. (Previously Presented) A method of allocating information in a frame of a communication system, the frame comprising:

a first frame, a second frame and a band between the first frame and the second frame, the communication system comprising a first system and a second system, the frame configured for performing first data transmission of the first system, second data transmission of the second

system, and third data transmission of the first system or the second system under high mobility, the method comprising:

allocating data of the first system and the second system in first mapping information or second mapping information;

dividing a data region of the first frame or the second frame to form a first sub-region, a second sub-region, a third sub-region or a second sub-region in the data region of the first frame or the second frame according to the first mapping information or the second mapping information;

further dividing the data region of the first frame or the second frame to form a fifth sub-region or a sixth sub-region according to the first mapping information;

performing the first data transmission of the first system by using the first sub-region or the third sub-region; and

performing the second data transmission of the second system by using the second sub-region or the fourth sub-region; and

performing the third data transmission of the first system or the second system by using the fifth sub-region or the sixth sub-region, wherein each symbol in one of the fifth and sixth sub-regions has a shorter symbol period than that in the data region of the first or the second frame other than the fifth and sixth sub-regions.

47. (Canceled)

48. (Previously Presented) A method of allocating information in a frame of a communication system, the frame comprising:

a first frame, a second frame and a band between the first frame and the second frame, the communication system comprising a first system and a second system, the frame configured for performing first data transmission of the first system and second data transmission of the second system, the method comprising:

allocating data of the first system and the second system in first mapping information or second mapping information;

dividing a data region of the first frame or the second frame to form a first sub-region, a second sub-region, a third sub-region or a second sub-region in the data region of the first frame or the second frame according to the first mapping information or the second mapping information;

further dividing the data region of the first frame or the second frame to form a fifth sub-region or a sixth sub-region according to the first mapping information, wherein pilot symbols in one of the fifth and sixth sub-regions are denser than those in the data region of the first or the second frame other than the fifth and sixth sub-regions;

performing the first data transmission of the first system by using the first sub-region or the third sub-region; and

performing the second data transmission of the second system by using the second sub-region or the fourth sub-region; and

performing the third data transmission of the first system or the second system by using the fifth sub-region or the sixth sub-region, wherein each symbol in one of the fifth and sixth sub-regions has a shorter symbol period than that in the data region of the first or the second frame other than the fifth and sixth sub-regions.

49. (Canceled)

50. (Original) The method of claim 46, further comprising:
carrying data of the first system or the second system by the band.

51. (New) The method of claim 23, wherein at least one of the first frame or second frame comprises, and the third frame is devoid of, a region comprising a ranging sub-channel.

REMARKS/ARGUMENTS

The present Reply is being filed in response to the final Official Action of August 31, 2010, and concurrent with a Request for Continued Examination (RCE). Initially, the Official Action rejects Claims 23-39 under 35 U.S.C. § 112, second paragraph, as being indefinite for including multiple instances of “a first frequency.” In response, Applicants have amended the second instance of “a first frequency band” in Claim 23 to instead read “the first frequency band.” Applicants therefore respectfully submit that the rejection of Claims 23-39 as being indefinite is overcome.

The final Official Action also rejects Claims 1-4, 9-12, 16-18, 20-22, 40, 41, 45 and 46 under 35 U.S.C. § 102(e) as being anticipated by U.S. Patent Application Publication No. 2008/0095195 to Ahmadi et al. The Official Action then rejects Claims 6, 14, 19, 43 and 48 under 35 U.S.C. § 103(a) as being unpatentable over Ahmadi, in view of U.S. Patent Application Publication No. 2007/0189149 to Terabe; rejects Claims 8, 23-27, 29-32, 34-36 and 50 as being unpatentable over Ahmadi, in view of PCT Patent Application Publication No. WO 2006/092852 to Seki;¹ rejects Claims 28 and 33 as being unpatentable over Ahmadi in view of Seki,² and further Terabe; and rejects Claims 37-39 as being unpatentable over Ahmadi in view of Seki, and further in view of U.S. Patent No. 5,491,531 to Adams et al.

As explained below, Applicants respectfully submit that the claimed invention is patentably distinct from Ahmadi, Terabe, Seki and Adams, taken individually or in any proper combination. Nonetheless, Applicants have amended independent Claim 23 to further clarify the claimed invention, and added new Claim 51 to recite a further patentable feature. In view of the amendments to the claims and the remarks presented herein, Applicants request reconsideration and allowance of all of the pending claims of the present application.

¹ The PCT publication of Seki corresponds to U.S. Patent Application Publication No. 2007/0297323, which is referred to herein as “Seki” and has been analyzed for purposes of this Official Action.

² The Official Action erroneously refers to the rejection of Claims 27 and 32 (from which Claims 28 and 33) applying Ahmadi and Adams, even though the rejection of those claims actually applies Ahmadi and Seki.

A. Claims 1-4, 9-12, 16-18, 20-22, 40, 41, 45 and 46 are Patentable

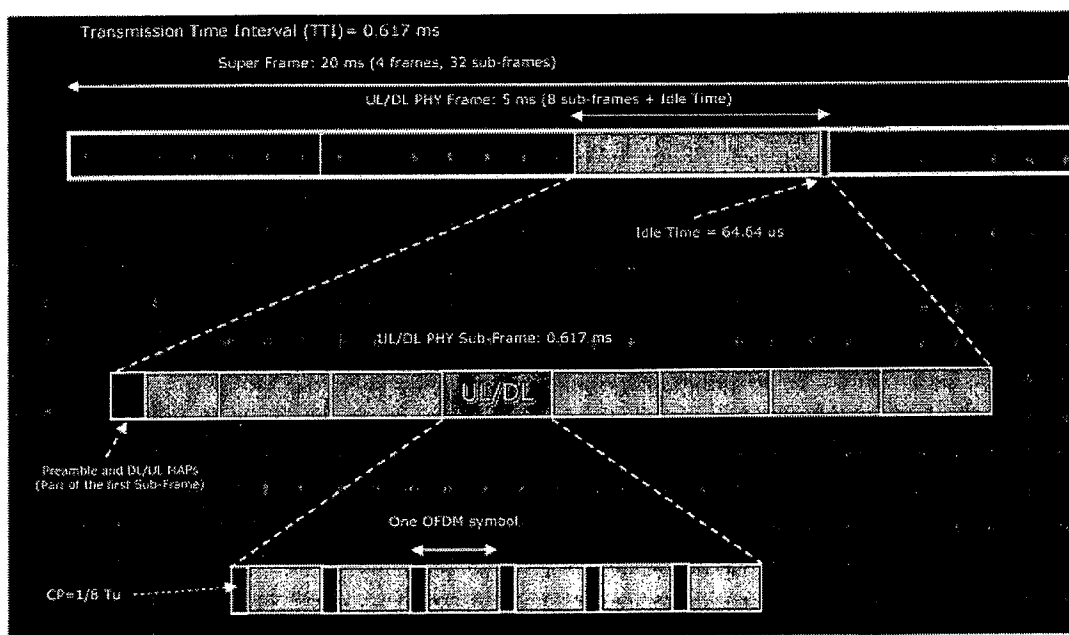
The final Official Action rejects Claims 1-4, 9-12, 16-18, 20-22, 40, 41, 45 and 46 as being anticipated by Ahmadi. Independent Claims 1, 11, 40 and 46 recite constructing a frame structure including first and second sections including data configured in first and second formats compatible with first and second communication systems, in which symbols in the second communication system have a shorter symbol period than those in the first communication system. The Official Action cites Ahmadi for disclosing this feature. In particular, the Official Action alleges that Ahmadi discloses that frames in high mobility environment have a frame size of 0.617 ms (see para. [0111]), whereas in other systems, the frame size is at least 2 ms (see para. [0037]). Applicants respectfully disagree with this assessment.

First, Applicants do not believe that the size of a frame is necessarily the same as the period of symbols in the frame. Nowhere does Ahmadi appear to disclose that shorter or longer frame sizes correlate to shorter or longer symbol periods. Ahmadi does disclose that a frame may include a number of different symbols, depending on a number of different variables including sub-carrier spacing, cyclic prefix length and sampling frequency. Ahmadi, para. [0039]. But again, nowhere does Ahmadi appear to disclose that a shorter frame size necessarily equates to a shorter symbol period.

Second, Applicants note that the Official Action appears to confuse the frame size with the transmission time interval (TTI), which refers to the length of an independently decodable transmission. Although a frame may have the same size as its TTI, the values are not necessarily coextensive. Ahmadi discloses that IEEE 802.16e has specified a number of different frame sizes from 2 ms to 20 ms, of which Ahmadi selects 5 ms as the duration of the frame. Ahmadi, para. [0037]. The length of the frame defines the TTI for legacy terminals such that the TTI for legacy terminals may be 5 ms. *Id.* at para. [0041].

For new terminals, Ahmadi proposes to super-frame structure in which a super-frame includes a number of frames, and each frame is divided into a number of sub-frames (e.g., eight sub-frames). To be backward compatible with legacy terminals, however, Ahmadi maintains the same length of the frame (e.g., 5 ms). *Id.* at para. [0048]. The length of each sub-frame defines

the TTI for new terminals (e.g., 0.617 ms); and the length of each frame is maintained as the TTI for legacy terminals (e.g., 5 ms). *Id.* This is shown clearly in FIG. 8 of Ahmadi's corresponding provisional patent application, U.S. Patent Application No. 60/852,891, reproduced below. In FIG. 8, each frame of size of 5 ms is divided into eight 0.617 ms sub-frames and further includes 0.06464 ms idle time ($0.617 \text{ ms} \times 8 + 0.06464 = 5 \text{ ms}$).



Ahmadi Provisional, FIG. 8

As further shown and described, each sub-frame includes a fixed number of symbols (e.g., six symbols). Ahmadi, para. [0048]. Thus, each sub-frame defining a TTI for a new terminal may include for example 6 symbols, and each frame including 8 sub-frames and defining a TTI for a legacy terminal may include for example 48 symbols ($6 \times 8 = 48$). As can be seen, then, the symbols in a sub-frame decoded by a new terminal are the same as the symbols in the frame decoded by the legacy terminal, which therefore appears to suggest that the symbol period for the new terminals is the same as that for the legacy terminals – and not shorter similar to independent Claims 1, 11, 40 and 46.

Applicants therefore respectfully submit that independent Claims 1, 11, 40 and 46, and by dependency Claims 2-4, 8-10, 12, 16-22, 41, 45 and 50, are patentably distinct from Ahmadi. And accordingly, Applicants respectfully submit that the rejection of Claims 1-4, 9-12, 16-18, 20-22, 40, 41, 45 and 46 as being anticipated by Ahmadi is overcome.

B. Claims 6, 14, 19, 43 and 48 are Patentable

The final Official Action rejects Claims 6, 14, 19, 43 and 48 as being unpatentable over Ahmadi, in view of Terabe.

1. Dependent Claim 19

Claim 19 depends from independent Claim 11, which as indicated above, the Official Action rejects as being anticipated by Ahmadi. As explained above, independent Claim 11, and by dependency Claim 19, is patentably distinct from Ahmadi. Applicants respectfully submit that Terabe does not cure the deficiencies of Ahmadi. That is, even considering Terabe, neither Ahmadi nor Terabe, taken individually or in any proper combination, teaches or suggests the method of independent Claim 11. And there is no apparent reason for the combination of Ahmadi and Terabe to disclose the claimed method. Thus, for at least the reasons given above, independent Claim 11, and by dependency Claim 19, is also patentably distinct from Ahmadi and Terabe, taken individually or in any proper combination.

For at least the foregoing reasons, Applicants respectfully submit that the rejection of Claim 19 as being unpatentable over Ahmadi, in view of Terabe is overcome.

2. Independent Claims 6, 14, 43 and 48

Independent Claims 6, 14, 43 and 48 recite constructing a frame structure including first and second sections including data configured in first and second formats compatible with first and second communication systems, in which the second communication system has pilot symbols that are denser than those in the first communication system. The Official Action concedes that Ahmadi does not disclose this feature, but alleges that Terabe discloses the feature and that it would have been obvious to have incorporated it into Ahmadi.

Terabe generally discloses an OFDM communication system, and as cited against the claimed invention, discloses grouping pilot and data signals such that the density of pilot subcarriers in the groups is higher than outside the groups. *See* Terabe, para. [0086]; and FIG. 10. Even given this disclosure of Terabe, however, none of Ahmadi, Terabe or the Official Action provides any explanation or support for the proposition that the increased density is applied in one communication system relative to another, similar to independent Claims 6, 14, 43 and 48. Thus, Applicants respectfully submit that the Official Action fails to establish *prima facie* obviousness of independent Claims 6, 14, 43 and 48.

For at least the foregoing reasons, Applicants respectfully submit that the rejection of Claims 6, 14, 43 and 48 as being unpatentable over Ahmadi, in view of Terabe is overcome.

C. Claims 8, 23-27, 29-32, 34-36 and 50 are Patentable

The Official Action rejects Claims 8, 23-27, 29-32, 34-36 and 50 as being unpatentable over Ahmadi, in view of Seki.

1. Dependent Claims 8 and 50

Claims 8 and 50 depend from respective ones of independent Claims 1 and 46, which as indicated above, the Official Action rejects as being anticipated by Ahmadi. As explained above, independent Claims 1 and 46, and by dependency Claims 8 and 50, are patentably distinct from Ahmadi. Applicants respectfully submit that Seki does not cure the deficiencies of Ahmadi. That is, even considering Seki, neither Ahmadi nor Seki, taken individually or in any proper combination, teaches or suggests the methods of independent Claims 1 and 46. And there is no apparent reason for the combination of Ahmadi and Seki to disclose the claimed methods. Thus, for at least the reasons given above, independent Claims 1 and 46, and by dependency Claims 8 and 50, are also patentably distinct from Ahmadi and Seki, taken individually or in any proper combination.

For at least the foregoing reasons, Applicants respectfully submit that the rejection of Claims 8 and 50 as being unpatentable over Ahmadi, in view of Seki is overcome.

2. Claims 23-27, 29-32 and 34-36

Independent Claim 23 recites generating a frame including a first frame in a first frequency band and a second frame in the first frequency band or a second frequency band, and further including a third frame in a guard band between the first and second frequency bands. The Official Action concedes that Ahmadi does not disclose this feature, but alleges that Seki discloses the feature and that it would have been obvious to have incorporated it into Ahmadi.

Seki generally discloses an OFDM communication system in which a band region is divided into a plurality of bands assigned to a respective plurality of users, where the bands are separated by guard bands at the boundaries of the plurality of bands. As disclosed, the system adaptively determines whether to use a guard band region as a guard band or for data transmission. Even given this disclosure of Seki, however, none of Ahmadi, Seki or the Official Action provides any explanation or support for use of the guard band in the manner recited by independent Claim 23. That is, nowhere do any of the references or the Official Action provide any explanation or support for use of the guard band for a third frame including downlink and uplink subframes, as opposed to simply being used as additional subcarriers for transmission of first and second frames in bands on either side of the guard band. Thus, Applicants respectfully submit that the Official Action fails to establish *prima facie* obviousness of independent Claim 23.

Moreover, Applicants respectfully submit that neither Ahmadi nor Seki, taken individually or in any proper combination, teaches or suggests the aforementioned frame structure in which the first frame is configured to carry data of the first system and data of the second system in parallel with the second frame being configured to carry data of the first system and data of the second system; and the third frame is configured to carry data of the second system but not data of the first system, as now recited by independent Claim 23.

For at least the foregoing reasons, Applicants respectfully submit that independent Claim 23, and by dependency Claims 24-39 and 51, is patentably distinct from Ahmadi and Seki, taken individually; and Applicants respectfully submit that the Official Action has fail to provide an apparent reason for the combination of Ahmadi and Seki in the manner recited by independent Claim 23, and by dependency Claims 24-39 and 51. Accordingly, Applicants submit that the

rejection of Claims 23-27, 29-32 and 34-36 as being unpatentable over Ahmadi, in view of Seki is overcome.

D. Claims 28 and 33 are Patentable

The Official Action rejects Claims 28 and 33 as being unpatentable over Ahmadi in view of Seki, and further Terabe. As explained above, independent Claim 23, and by dependency Claims 28 and 33, is patentably distinct from Ahmadi and Seki taken individually, and the Official Action has not provided an apparent reason for their combination in the manner claimed. Applicants respectfully submit that Terabe does not cure the deficiencies of Ahmadi and Seki. That is, even considering Terabe, none of Ahmadi, Seki or Terabe, taken individually or in any proper combination, teaches or suggests the method of independent Claim 23. And there is no apparent reason for the combination of Ahmadi, Seki and Terabe to disclose the claimed method. Thus, for at least the reasons given above, independent Claim 23, and by dependency Claims 28 and 33, is also patentably distinct from Ahmadi, Seki and Terabe, taken individually or in any proper combination.

For at least the foregoing reasons, Applicants respectfully submit that the rejection of Claims 28 and 33 as being unpatentable over Ahmadi in view of Seki, and further Terabe is overcome.

E. Claims 37-39 are Patentable

Finally, the Official Action rejects Claims 37-39 as being unpatentable over Ahmadi in view of Seki, and further in view of Adams. As explained above, independent Claim 23, and by dependency Claims 37-39, is patentably distinct from Ahmadi and Seki taken individually, and the Official Action has not provided an apparent reason for their combination in the manner claimed. Applicants respectfully submit that Adams does not cure the deficiencies of Ahmadi and Seki. That is, even considering Adams, none of Ahmadi, Seki or Adams, taken individually or in any proper combination, teaches or suggests the method of independent Claim 23. And there is no apparent reason for the combination of Ahmadi, Seki and Adams to disclose the claimed method. Thus, for at least the reasons given above, independent Claim 23, and by

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Amdt. dated November 30, 2010
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dependency Claims 37-39, is also patentably distinct from Ahmadi, Seki and Adams, taken individually or in any proper combination.

For at least the foregoing reasons, Applicants respectfully submit that the rejection of Claims 37-39 as being unpatentable over Ahmadi in view of Seki, and further Adams is overcome.

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CONCLUSION

In view of the amendments to the claims and the remarks presented herein, Applicants respectfully submit that the present application is in condition for allowance. As such, the issuance of a Notice of Allowance is therefore respectfully requested. In order to expedite the examination of the present application, the Examiner is encouraged to contact Applicants' undersigned attorney in order to resolve any remaining issues.

It is not believed that extensions of time or fees for net addition of claims are required, beyond those that may otherwise be provided for in documents accompanying this paper. However, in the event that additional extensions of time are necessary to allow consideration of this paper, such extensions are hereby petitioned under 37 CFR § 1.136(a), and any fee required therefor (including fees for net addition of claims) is hereby authorized to be charged to Deposit Account No. 16-0605.

Respectfully submitted,



Andrew T. Spence
Registration No. 45,699

Customer No. 00826
ALSTON & BIRD LLP
Bank of America Plaza
101 South Tryon Street, Suite 4000
Charlotte, NC 28280-4000
Tel Charlotte Office (704) 444-1000
Fax Charlotte Office (704) 444-1111

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Yan-Xiu ZHENG

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ALSTON & BIRD LLP

BANK OF AMERICA PLAZA

101 SOUTH TRYON STREET, SUITE 4000

CHARLOTTE, NC 28280-4000

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RUTKOWSKI, JEFFREY M

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PAPER

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

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

Office Action Summary	Application No. 12/168,855	Applicant(s) ZHENG ET AL.	
	Examiner JEFFREY M. RUTKOWSKI	Art Unit 2473	

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

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) OR THIRTY (30) DAYS, WHICHEVER IS LONGER, FROM THE MAILING DATE OF THIS COMMUNICATION.

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

Status

- 1) ☒ Responsive to communication(s) filed on 17 June 2010.
- 2a) ☒ This action is **FINAL**. 2b) ☐ This action is non-final.
- 3) ☐ 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

- 4) ☒ Claim(s) 1-4, 6, 8-12, 14, 16-41, 43, 45, 46, 48 and 50 is/are pending in the application.
- 4a) Of the above claim(s) _____ is/are withdrawn from consideration.
- 5) ☐ Claim(s) _____ is/are allowed.
- 6) ☒ Claim(s) 1-4, 6, 8-12, 14, 16-41, 43, 45, 46, 48, and 50 is/are rejected.
- 7) ☐ Claim(s) _____ is/are objected to.
- 8) ☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

- 9) ☐ The specification is objected to by the Examiner.
- 10) ☐ 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).
- 11) ☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

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).
- a) ☐ All b) ☐ Some * c) ☐ None of:
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) | 4) ☐ Interview Summary (PTO-413) |
| 2) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948) | Paper No(s)/Mail Date. _____ |
| 3) ☐ Information Disclosure Statement(s) (PTO/SB/08) | 5) ☐ Notice of Informal Patent Application |
| Paper No(s)/Mail Date _____ | 6) ☐ Other: _____ |

Exhibit 1004

DETAILED ACTION

Claims 5, 7, 13, 15, 42, 44, 47 and 49 have been cancelled.

Claims 1-4, 6, 8-12, 14, 16-41, 43, 45, 46, 48, and 50 are now pending.

Claim Rejections - 35 USC § 112

1. The following is a quotation of the second paragraph of 35 U.S.C. 112:

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.

2. **Claims 23-39** are rejected under 35 U.S.C. 112, second paragraph, as being indefinite for failing to particularly point out and distinctly claim the subject matter which applicant regards as the invention.

3. For **claims 23-39**, it is not clear if the first frequency band on line 5 of **claim 23** is the same or different from the first frequency band on lines 7-8 of **claim 23**.

Claim Rejections - 35 USC § 102

(e) the invention was described in (1) an application for patent, published under section 122(b), by another filed in the United States before the invention by the applicant for patent or (2) a patent granted on an application for patent by another filed in the United States before the invention by the applicant for patent, except that an international application filed under the treaty defined in section 351(a) shall have the effects for purposes of this subsection of an application filed in the United States only if the international application designated the United States and was published under Article 21(2) of such treaty in the English language.

4. **Claims 1-4, 9-12, 16-18, 20-22, 40-42, 44-47 and 49** are rejected under 35 U.S.C. 102(e) as being anticipated by Ahmadi et al. (US Pg Pub 2008/0095195), hereinafter referred to as Ahmadi.

5. For **claim 1**, Ahmadi discloses *generating a first section* (legacy zone; see figure 18) *comprising data configured in a first format compatible with a first communication system* (the legacy zone is compatible with a IEEE 802.16e system; see paragraph 0117) *using symbols* (the IEEE 802.16e system uses OFDM symbols; see paragraph 0050); *generating a second section*

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(new zone; see figure 18) *following the first section* (figure 18 shows the new zones follow the legacy zones), *the second section* (new zone) *comprising data configured in a second format compatible with a second communication system* (the new zone is compatible with an IEEE 802.16m system; see paragraph 0117) *using symbols* (the IEEE 802.16m system uses OFDM symbols; see paragraph 0060), *wherein the second format is compatible with the second communication system configured to support higher mobility than the first communication system* (Ahmadi's frame structure is compatible with higher mobility communication systems; see paragraphs 0113 and 0117), *wherein each symbol period in the second communication system has a shorter symbol period than that in the first communication system* (frames in high mobility environment the frame size is 0.617 ms; see paragraph 0111. Whereas, in other systems, the frame size is at least 2 ms; see paragraph 0037); *generating at least one non-data section* (preamble and DL/UL MAPS sections; see figure 18) *containing information describing an aspect of data in at least one of the first section and the second section* (the DL/ UL MAPS describe the resource allocations of the DL and UL new and/or legacy relay zones; see paragraph 0057); *and combining the first section* (legacy zone), *the second section* (new zone) *and the at least one non-data section* (DL/UL MAPS sections) *to form the frame structure* (a super-frame is formed that contains the legacy zone, new zone and the DL/UL MAPS section; see paragraph 0131).

6. For **claim 2**, Ahmadi discloses *wherein the non-data section comprises mapping information for at least one of the first section and the second section* (the DL/UL MAPS are in a non-data section; see figure 18. The DL/ UL MAPS describe the resource allocations of the DL and UL new and/or legacy relay zones; see paragraph 0057).

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7. For **claim 3**, Ahmadi discloses *wherein the non-data section comprises at least one of a preamble (legacy and supplemental preambles), a frame control header (FCH), a burst, and a map (DL/UL MAPS) of at least one of the first section and the second section (see figure 18).*
8. For **claim 4**, Ahmadi implies *wherein the second section (new zone) follows the first section (legacy zone) in at least one of time sequence and frequency spectrum (the information in the superframe can be transmitted in either TDD or FDD duplex modes; see paragraphs 0127 and 0131).*
9. For **claim 9**, Ahmadi discloses *wherein each of the first section and the second section carries at least one of uplink and downlink data (figure 18 shows each section carries uplink or downlink information).*
10. For **claim 10**, Ahmadi implies *wherein the second section carries mapping information for data in the second section (MAPS can be placed in the new and legacy zones; see paragraph 0062).*
11. For **claim 11**, Ahmadi discloses *generating a first sub-frame for downlink transmission (figure 18 shows a downlink subframe), wherein the first sub-frame comprises: a first region comprising first mapping information (DL MAPS; see figure 18); a second region comprising second mapping information (UL MAPS; see figure 18); and a third region carrying data to be transferred in the downlink transmission (the third region is made up of the legacy and the new DL zones; see figure 18), the third region comprising a first sub-region (legacy DL zone) and a second sub-region (new DL zone), wherein the first sub-region and second sub-region are defined by the first mapping information (the DL MAP information is describes the resource allocation of the DL zones; see paragraph 0057), the first sub-region being configured to carry*

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first data of the first system (the legacy DL zone carries information for IEEE 802.16e systems; see paragraph 0121) and the second sub-region (the new DL zone) being configured to carry second data of the second system in the downlink transmission (the new DL zone carries information for IEEE 802.16m systems; see paragraph 0126), wherein the third region further comprises a fifth sub-region, the fifth sub-region being configured to carry fifth data of the first system or the second system under high mobility in the downlink transmission (Ahmadi's invention is also compatible with higher mobility standards; see paragraph 0111) and wherein each symbol in the fifth sub-region has a shorter symbol period than that in at least one of the first or second system (frames in high mobility environment the frame size is 0.617 ms; see paragraph 0111. Whereas, in other systems, the frame size is at least 2 ms; see paragraph 0037) and generating a second sub-frame for uplink transmission (figure 18 shows a subframe used for uplink transmission), wherein the second sub-frame comprises: a fourth region carrying data to be transferred in the uplink transmission (the fourth region includes the legacy UL and the new UL zones; see figure 18), the fourth region comprising a third sub-region (legacy UL zone) and a fourth sub-region (new UL zone), wherein the third sub-region and the fourth sub-region are defined by the second mapping information (the UL MAP information describes the resource allocation of the UL zones; see paragraph 0057), the third sub-region being configured to carry third data of the first system (the legacy UL zone carries information for IEEE 802.16e systems; see paragraph 0121) and the fourth sub-region being configured to carry fourth data of the second system in the uplink transmission (the new UL zone carries information for IEEE 802.16m systems; see paragraph 0126).

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12. For **claim 12**, Ahmadi discloses *wherein the second sub-region (new DL zone) further comprises third mapping information for data placement in the second sub-region* (MAPs can be transmitted in the new DL zone; see paragraph 0058).

13. For **claim 16**, Ahmadi anticipates *wherein the fifth sub-region is defined by the first mapping information* (the DL/UL MAPS are in a non-data section; see figure 18. The DL/ UL MAPS describe the resource allocations of the DL and UL superframe zones; see paragraph 0057)..

14. For **claim 17**, Ahmadi anticipates *wherein the fifth sub-region further comprises fourth mapping information for defining data placement in the fifth sub-region* (MAPs can be transmitted in the same zone where the data is placed; see paragraph 0058).

15. For **claim 18**, Ahmadi anticipates *wherein the fourth region further comprises a sixth sub-region, the sixth sub-region being capable of carrying sixth data of the first system or the second system under high mobility in the uplink transmission* (Ahmadi's invention is also compatible with higher mobility standards; see paragraph 0111).

16. For **claim 20**, Ahmadi implies *wherein each symbol in the sixth sub-region has a shorter symbol period than that in at least one of the first or second system* (frames in high mobility environment the frame size is 0.617 ms; see paragraph 0111. Whereas, in other systems, the frame size is at least 2 ms; see paragraph 0037).

17. For **claim 21**, Ahmadi implies *wherein the sixth sub-region is defined by the second mapping information* (the UL MAP information is describes the resource allocation of the UL zones; see paragraph 0057).

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18. For **claim 22**, Ahmadi implies *wherein the sixth sub-region further comprises fifth mapping information for defining data placement in the sixth sub-region* (MAPs can be transmitted in the same zone where the data is placed; see paragraph 0058).

19. For **claim 40**, Ahmadi discloses *allocating data of the first system and the second system in first mapping information* (the DL/ UL MAPS describe the resource allocations of the DL and UL new and/or legacy relay zones; see paragraph 0057); *dividing a data region of the frame to form a first sub-region* (legacy zone; see figure 18) *and a second sub-region* (new zone; see figure 18) *according to the first mapping information; performing the first data transmission of the first system by using the first sub-region; and performing the second data transmission of the second system by using the second sub-region* (the legacy and new zones are used to carry information for two different types of communications systems; see paragraphs 0125-0126) *wherein the frame further comprising third data transmission of the first system or the second system under high mobility* (Ahmadi's invention is also compatible with higher mobility standards; see paragraph 0111), *the method further comprising: further dividing the data region of the frame into the first sub-region* (legacy DL zone; see figure 18), *the second sub-region* (new DL zone; see figure 18) *and a third region* (UL zone; see figure 18) *according to the first mapping information* (DL/UL MAPS; see figure 18); *performing the third data transmission of the first system or the second system by using the third sub-region* (the UL zone is used to transmit legacy and new zone information; see figure 18) *and wherein each symbol in the third system has a shorter symbol period than that in at least one of the first or second system* (frames in high mobility environment the frame size is 0.617 ms; see paragraph 0111. Whereas, in other systems, the frame size is at least 2 ms; see paragraph 0037).

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20. For **claim 41**, Ahmadi discloses *allocating data of the second system carried in the second sub-region in a second mapping information* (supplemental preamble; see figure 18).

21. For **claim 45**, Ahmadi discloses *allocating data of the first system or the second system carried in the third sub-region in third mapping information* (the DL/ UL MAPS describe the resource allocations of the DL and UL new and/or legacy relay zones; see paragraph 0057).

22. For **claim 46**, Ahmadi discloses *allocating data of the first system (legacy system) and the second system (new system) in first mapping information or second mapping information* (the DL/ UL MAPS describe the resource allocations of the DL and UL new and/or legacy relay zones; see paragraph 0057); *dividing a data region of the first frame or the second frame to form a first sub-region (legacy DL zone; see figure 18), a second sub-region (new DL zone; see figure 18), a third sub-region (legacy UL zone; see figure 18) or a second sub-region in the data region of the first frame or the second frame according to the first mapping information or the second mapping information* (the DL/ UL MAPS describe the resource allocations of the DL and UL new and/or legacy relay zones; see paragraph 0057); *performing the first data transmission of the first system by using the first sub-region or the third sub-region* (see paragraph 0125); *and performing the second data transmission of the second system by using the second sub-region or the fourth sub-region* (see paragraph 0126), *further dividing the data region of the first frame or the second frame to form a fifth sub-region or a sixth sub-region (new UL zone; see figure 18) according to the first mapping information* (the DL/ UL MAPS describe the resource allocations of the DL and UL new and/or legacy relay zones; see paragraph 0057); *and performing the third data transmission of the first system or the second system by using the fifth sub-region or the sixth sub-region* (see paragraph 0126), *wherein each symbol in the third system has a shorter*

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symbol period than that in at least one of the first or second system (frames in high mobility environment the frame size is 0.617 ms; see paragraph 0111. Whereas, in other systems, the frame size is at least 2 ms; see paragraph 0037).

Claim Rejections - 35 USC § 103

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

(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negated by the manner in which the invention was made.

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

1. Determining the scope and contents of the prior art.
2. Ascertaining the differences between the prior art and the claims at issue.
3. Resolving the level of ordinary skill in the pertinent art.
4. Considering objective evidence present in the application indicating obviousness or nonobviousness.

25. **Claims 6, 14, 19, 43 and 48** are rejected under 35 U.S.C. 103(a) as being unpatentable over Ahmadi in view of Terabe (US Pg Pub 2007/0189149).

26. For **claims 6, 43 and 48**, Ahmadi discloses *generating a first section (legacy zone; see figure 18) comprising data configured in a first format compatible with a first communication system (the legacy zone is compatible with a IEEE 802.16e system; see paragraph 0117); generating a second section (new zone; see figure 18) following the first section (figure 18 shows the new zones follow the legacy zones), the second section (new zone) comprising data*

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configured in a second format compatible with a second communication system (the new zone is compatible with an IEEE 802.16m system; see paragraph 0117), wherein the second format is different from the first format (Ahmadi implies the formats are different because legacy terminals do not recognize IEEE 802.16e formats; see paragraph 0043); generating at least one non-data section (preamble and DL/UL MAPS sections; see figure 18) containing information describing an aspect of data in at least one of the first section and the second section (the DL/ UL MAPS describe the resource allocations of the DL and UL new and/or legacy relay zones; see paragraph 0057); and combining the first section (legacy zone), the second section (new zone) and the at least one non-data section (DL/UL MAPS sections) to form the frame structure (a super-frame is formed that contains the legacy zone, new zone and the DL/UL MAPS section; see paragraph 0131).

27. Specifically for **claim 43**, Ahmadi discloses *allocating data of the first system and the second system in first mapping information (the DL/ UL MAPS describe the resource allocations of the DL and UL new and/or legacy relay zones; see paragraph 0057); dividing a data region of the frame to form a first sub-region (legacy zone; see figure 18) and a second sub-region (new zone; see figure 18) according to the first mapping information; performing the first data transmission of the first system by using the first sub-region; and performing the second data transmission of the second system by using the second sub-region (the legacy and new zones are used to carry information for two different types of communications systems; see paragraphs 0125-0126) wherein the frame further comprising third data transmission of the first system or the second system under high mobility (Ahmadi's invention is also compatible with higher mobility standards; see paragraph 0111), the method further comprising: further dividing the*

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data region of the frame into the first sub-region (legacy DL zone; see figure 18), the second sub-region (new DL zone; see figure 18) and a third region (UL zone; see figure 18) according to the first mapping information (DL/UL MAPS; see figure 18); performing the third data transmission of the first system or the second system by using the third sub-region (the UL zone is used to transmit legacy and new zone information; see figure 18) and wherein each symbol in the third system has a shorter symbol period than that in at least one of the first or second system (frames in high mobility environment the frame size is 0.617 ms; see paragraph 0111. Whereas, in other systems, the frame size is at least 2 ms; see paragraph 0037).

28. Specifically for **claim 48**, Ahmadi discloses *allocating data of the first system (legacy system) and the second system (new system) in first mapping information or second mapping information (the DL/ UL MAPS describe the resource allocations of the DL and UL new and/or legacy relay zones; see paragraph 0057); dividing a data region of the first frame or the second frame to form a first sub-region (legacy DL zone; see figure 18), a second sub-region (new DL zone; see figure 18), a third sub-region (legacy UL zone; see figure 18) or a second sub-region in the data region of the first frame or the second frame according to the first mapping information or the second mapping information (the DL/ UL MAPS describe the resource allocations of the DL and UL new and/or legacy relay zones; see paragraph 0057); performing the first data transmission of the first system by using the first sub-region or the third sub-region (see paragraph 0125); and performing the second data transmission of the second system by using the second sub-region or the fourth sub-region (see paragraph 0126), further dividing the data region of the first frame or the second frame to form a fifth sub-region or a sixth sub-region (new UL zone; see figure 18) according to the first mapping information (the DL/ UL MAPS*

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describe the resource allocations of the DL and UL new and/or legacy relay zones; see paragraph 0057); *and performing the third data transmission of the first system or the second system by using the fifth sub-region or the sixth sub-region* (see paragraph 0126), *wherein each symbol in the third system has a shorter symbol period than that in at least one of the first or second system* (frames in high mobility environment the frame size is 0.617 ms; see paragraph 0111. Whereas, in other systems, the frame size is at least 2 ms; see paragraph 0037).

29. Ahmadi discloses the use of a high mobility environment (see paragraph 0111). Ahmadi does not disclose the density of OFDM pilots. Terabe discloses *wherein pilots in the third system (OFDM) are denser than those in the first communication system* (the density of OFDM pilots in certain subcarriers are higher than pilots in other subcarriers; see paragraph 0087). It would have been obvious to a person of ordinary skill in the art at the time of the invention to use denser pilots in Ahmadi's invention to enhance the receiving performance of data subcarriers (Terabe, paragraph 0087).

30. For **claim 14**, Ahmadi discloses *generating a first sub-frame for downlink transmission* (figure 18 shows a downlink subframe), *wherein the first sub-frame comprises: a first region comprising first mapping information (DL MAPS; see figure 18); a second region comprising second mapping information (UL MAPS; see figure 18); and a third region carrying data to be transferred in the downlink transmission* (the third region is made up of the legacy and the new DL zones; see figure 18), *the third region comprising a first sub-region (legacy DL zone) and a second sub-region (new DL zone), wherein the first sub-region and second sub-region are defined by the first mapping information* (the DL MAP information is describes the resource allocation of the DL zones; see paragraph 0057), *the first sub-region being capable of carrying*

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first data of the first system (the legacy DL zone carries information for IEEE 802.16e systems; see paragraph 0121) and the second sub-region (the new DL zone) being capable of carrying second data of the second system in the downlink transmission (the new DL zone carries information for IEEE 802.16m systems; see paragraph 0126), and generating a second sub-frame for uplink transmission (figure 18 shows a subframe used for uplink transmission), wherein the second sub-frame comprises: a fourth region carrying data to be transferred in the uplink transmission (the fourth region includes the legacy UL and the new UL zones; see figure 18), the fourth region comprising a third sub-region (legacy UL zone) and a fourth sub-region (new UL zone), wherein the third sub-region and the fourth sub-region are defined by the second mapping information (the UL MAP information is describes the resource allocation of the UL zones; see paragraph 0057), the third sub-region being capable of carrying third data of the first system (the legacy UL zone carries information for IEEE 802.16e systems; see paragraph 0121) and the fourth sub-region being capable of carrying fourth data of the second system in the uplink transmission (the new UL zone carries information for IEEE 802.16m systems; see paragraph 0126).

31. Ahmadi discloses the use of a high mobility environment (see paragraph 0111). Ahmadi does not disclose the density of OFDM pilots. Terabe discloses *wherein pilots in the fifth sub-region (OFDM) are denser than those in at least one of the first or second system* (the density of OFDM pilots in certain subcarriers are higher than pilots in other subcarriers; see paragraph 0087). It would have been obvious to a person of ordinary skill in the art at the time of the invention to use denser pilots in Ahmadi's invention to enhance the receiving performance of data subcarriers (Terabe, paragraph 0087).

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32. For **claim 19**, Ahmadi discloses the use of a high mobility environment (see paragraph 0111). Ahmadi does not disclose the density of OFDM pilots. Terabe discloses *wherein pilots in the sixth sub-region (OFDM) are denser than those in at least one of the first or second system* (the density of OFDM pilots in certain subcarriers are higher than pilots in other subcarriers; see paragraph 0087). It would have been obvious to a person of ordinary skill in the art at the time of the invention to use denser pilots in Ahmadi's invention to enhance the receiving performance of data subcarriers (Terabe, paragraph 0087).

33. **Claims 8, 23-27, 29-32, 34-36 and 50** are rejected under 35 U.S.C. 103(a) as being unpatentable over Ahmadi in view of Seki (WO 2006/092852).

34. For **claim 8**, Ahmadi implies *wherein a portion of the second section may be in guard band or non- communicational region of the first system* (the new zone information is placed in areas that are not used by the legacy terminals; see paragraph 0085). Ahmadi does not disclose the transmission of information in a guard band. Seki discloses *wherein a portion of the first section may be in guard band (DD) or non- communicational region of the first system* (the guard band DD can be used for data transmission; see abstract). It would have been obvious to a person of ordinary skill in the art at the time of the invention to send information in a guard band in Ahmadi's invention to make full use of the frequency spectrum (Seki, abstract).

35. For **claim 23**, Ahmadi discloses *generating a first frame* (the superframe in figure 18) *comprising a first sub-frame for downlink transmission* (figure 18 shows the superframe has a sub-frame for downlink communication) *and a second sub-frame for uplink transmission* (figure 18 shows the superframe has a sub-frame for uplink transmission) *in a first band* (the information is transmitted over sub-carriers; see figure 18) *and generating a second frame*

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comprising a third sub-frame for downlink transmission and a fourth sub-frame for uplink transmission in a second band (figure 18 shows that each portion of the superframe is spread over a plurality of subcarriers).

36. Ahmadi discloses *generating a third frame comprising a fifth sub-frame for downlink transmission and a sixth sub-frame for uplink transmission* (figure 18 shows that each portion of the superframe is spread over a plurality of subcarriers) in the region ignored by legacy terminals (see paragraphs 0064-0065). Ahmadi also discloses the superframe structure is compatible with other standards (see paragraph 0061). Ahmadi does not disclose the transmission of information in a guard band. Seki discloses *identifying a guard band (DD) between the first frequency band (AA) and the second frequency band (BB)* and transmitting information in the *guard band* (the guard band DD can be used for data transmission; see abstract). It would have been obvious to a person of ordinary skill in the art at the time of the invention to send information in a guard band in Ahmadi's invention to make full use of the frequency spectrum (Seki, abstract).

37. For **claim 24**, Ahmadi discloses *a first region comprising first mapping information (DL MAPS; see figure 18); a second region comprising second mapping information (UL MAPS; see figure 18); and a third region carrying data to be transferred in the downlink transmission (DL new and legacy zones; see figure 18), the third region comprising a first sub-region (legacy zone; see figure 18) and a second sub-region (new zone; see figure 18), wherein the first sub-region and second sub-region are defined by the first mapping information* (the DL/ UL MAPS describe the resource allocations of the DL and UL new and/or legacy relay zones; see paragraph 0057), *the first sub-region being capable of carrying first data of the first system and the second sub-region being capable of carrying second data of the second system in the downlink*

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transmission (the legacy and new zones are used for two different types of downlink communication systems; see figure 18).

38. For **claim 25**, Ahmadi discloses *a fourth region carrying data to be transferred in the uplink transmission* (new and legacy uplink zones; see figure 18), *the fourth region comprising a third sub-region* (legacy zone) *and a fourth sub-region* (new zone), *wherein the third sub-region and the fourth sub-region are defined by the second mapping information* (UL MAPS), *the third sub-region being capable of carrying third data of the first system and the fourth sub-region being capable of carrying fourth data of the second system in the uplink transmission* (the legacy and new zones are used for two different types of uplink communication systems; see figure 18).

39. For **claim 26**, Ahmadi discloses *wherein the second sub-region* (new DL zone) *further comprises third mapping information for data placement in the second sub-region* (MAPs can be transmitted in the new DL zone; see paragraph 0058).

40. For **claim 27**, Ahmadi discloses *wherein the third region further comprises a fifth sub-region, the fifth sub-region being capable of carrying fifth data of the first system or the second system under high mobility in the downlink transmission* (Ahmadi's invention is also compatible with higher mobility standards; see paragraph 0111).

41. For **claim 29**, Ahmadi suggests *wherein each symbol in the fifth sub-region has a shorter symbol period than that in at least one of the first or second system* (frames in high mobility environment the frame size is 0.617 ms; see paragraph 0111. Whereas, in other systems, the frame size is at least 2 ms; see paragraph 0037).

42. For **claim 30**, Ahmadi anticipates *wherein the fifth sub-region is defined by the first mapping information* (the DL/UL MAPS are in a non-data section; see figure 18. The DL/ UL

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MAPS describe the resource allocations of the DL and UL superframe zones; see paragraph 0057).

43. For **claim 31**, Ahmadi suggests *wherein the fifth sub-region further comprises fourth mapping information for defining data placement in the fifth sub-region* (MAPs can be transmitted in the same zone where the data is placed; see paragraph 0058).

44. For **claim 32**, Ahmadi anticipates *wherein the fourth region further comprises a sixth sub-region, the sixth sub-region being capable of carrying sixth data of the first system or the second system under high mobility in the uplink transmission* (Ahmadi's invention is also compatible with higher mobility standards; see paragraph 0111).

45. For **claim 34**, Ahmadi suggests *wherein each symbol in the sixth sub-region has a shorter symbol period than that in at least one of the first or second system* (frames in high mobility environment the frame size is 0.617 ms; see paragraph 0111. Whereas, in other systems, the frame size is at least 2 ms; see paragraph 0037).

46. For **claim 35**, Ahmadi suggests *wherein the sixth sub-region is defined by the second mapping information* (the UL MAP information is describes the resource allocation of the UL zones; see paragraph 0057).

47. For **claim 36**, Ahmadi suggests *wherein the sixth sub-region further comprises fifth mapping information for defining data placement in the sixth sub-region* (MAPs can be transmitted in the same zone where the data is placed; see paragraph 0058).

48. For **claim 50**, Ahmadi discloses the superframe structure is compatible with other standards (see paragraph 0061). Ahmadi does not disclose the transmission of information in a guard band. Seki discloses *carrying data of the first system or the second system by the band*

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(the guard band DD can be used for data transmission; see abstract). It would have been obvious to a person of ordinary skill in the art at the time of the invention to send information in a guard band in Ahmadi's invention to make full use of the frequency spectrum (Seki, abstract).

49. **Claims 28 and 33** are rejected under 35 U.S.C. 103(a) as being unpatentable over Ahmadi in view Adams, as applied to **claims 27 and 32 respectively** above, and further in view of Terabe (US Pg Pub 2007/0189149).

50. For **claim 28**, Ahmadi discloses the use of a high mobility environment (see paragraph 0111). Ahmadi does not disclose the density of OFDM pilots. Terabe discloses *wherein pilots in the fifth sub-region (OFDM) are denser than those in at least one of the first or second system* (the density of OFDM pilots in certain subcarriers are higher than pilots in other subcarriers; see paragraph 0087). It would have been obvious to a person of ordinary skill in the art at the time of the invention to use denser pilots in Ahmadi's invention to enhance the receiving performance of data subcarriers (Terabe, paragraph 0087).

51. For **claim 33**, Ahmadi discloses the use of a high mobility environment (see paragraph 0111). Ahmadi does not disclose the density of OFDM pilots. Terabe discloses *wherein pilots in the sixth sub-region (OFDM) are denser than those in at least one of the first or second system* (the density of OFDM pilots in certain subcarriers are higher than pilots in other subcarriers; see paragraph 0087). It would have been obvious to a person of ordinary skill in the art at the time of the invention to use denser pilots in Ahmadi's invention to enhance the receiving performance of data subcarriers (Terabe, paragraph 0087).

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52. **Claims 37-39** are rejected under 35 U.S.C. 103(a) as being unpatentable over Ahmadi in view of Seki, as applied to **claims 23 and 35 respectively**, and further in view of Adams et al. (US Pat 5,491,531), hereinafter referred to as Adams.

53. For **claim 37**, Ahmadi discloses the superframe structure is compatible with other standards (see paragraph 0061). Ahmadi does not disclose the transmission of information in a guard band. Adams discloses *comprising a band* (guard band **56**; see figure 3) *between the first frame and the third frame* (see figure 3), *wherein the band is applicable for carrying data of the first system or the second system* (the guard band is used to carry packet data; see col. 8 lines 25-35). It would have been obvious to a person of ordinary skill in the art at the time of the invention to send information in a guard band in Ahmadi's invention to share control information amongst the nodes on a network (Adams, col. 8 lines 36-42).

54. For **claims 38 and 39**, Ahmadi discloses *mapping information* (supplemental preamble) is placed in a region ignored by legacy terminals (see paragraph 0065). Ahmadi does not disclose the placing of control information in a guard band. Adams discloses the placing of control information in a *guard band* (see col. 8 lines 25-35). It would have been obvious to a person of ordinary skill in the art at the time of the invention to send information in a guard band in Ahmadi's invention to share control information amongst the nodes on a network (Adams, col. 8 lines 36-42). The combination of Ahmadi and Adams discloses *the band* (guard band of Adams) *further comprises sixth mapping information* (supplemental preamble) *defining first placement of the data carried by the band*.

Response to Arguments

55. The arguments with respect to Ahmadi's invention being susceptible to the Doppler Effect because the legacy transmission period is designed with a relatively large symbol period are not persuasive. It is not clear how long a relatively large symbol period has to be to become susceptible to the Doppler Effect. The specification states that a relatively large symbol period is susceptible to the Doppler Effect, but does not define what is meant by a relatively large symbol period (specification, 0006). Ahmadi discloses symbol periods that range from the relatively small (2 ms) to the relatively large (20 ms; see paragraph 0037). Also, Ahmadi's fast feedback mechanism is used to provide support for high mobility (see paragraphs 0112-0113).

56. The arguments with respect to **claim 23** are moot in view of the new grounds of rejection.

57. The arguments with respect to Terabe not disclosing or suggesting either a system having denser pilot symbols than another system or a sub-region having denser pilot symbols than another sub-region are not persuasive. Terabe suggests that one sub-region has denser pilot symbols than another sub-region because the figures 7-8 show sub-regions **301 and 302** of a frame that has a denser pilot symbols than sub-regions **402,403** of the frame (see paragraph 0087). The combination of Ahmadi and Terabe suggests one system having denser pilot symbols than another system because the frame sub-regions in Ahmadi's are divided among different systems (Ahmadi, figure 18).

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 JEFFREY M. RUTKOWSKI whose telephone number is (571)270-1215. The examiner can normally be reached on Monday - Friday 7:30-5:00 PM EST.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Kwang Yao can be reached on (571) 272-3182. 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.

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/Jeffrey M Rutkowski/
Examiner, Art Unit 2473

/KWANG B. YAO/
Supervisory Patent Examiner, Art Unit 2473

Amendments to the Claims

The following Listing of Claims replaces all prior listings, and versions, of claims in the present application.

Listing of Claims:

1. (Currently amended) A method of constructing a frame structure for data transmission, the method comprising:
 - generating a first section comprising data configured in a first format compatible with a first communication system using symbols;
 - generating a second section following the first section, the second section comprising data configured in a second format compatible with a second communication system using symbols, wherein:
 - the second format is ~~different from the first format~~ compatible with the second communication system configured to support higher mobility than the first communication system, wherein each symbol in the second communication system has a shorter symbol period than that in the first communication system;
 - generating at least one non-data section containing information describing an aspect of data in at least one of the first section and the second section; and
 - combining the first section, the second section and the at least one non-data section to form the frame structure.
2. (Original) The method of claim 1, wherein the non-data section comprises mapping information for at least one of the first section and the second section.
3. (Original) The method of claim 1, wherein the non-data section comprises at least one of a preamble, a frame control header (FCH), a burst, and a map of at least one of the first section and the second section.
4. (Original) The method of claim 3, wherein the second section follows the first section in at least one of time sequence and frequency spectrum.

5. (Canceled)

6. (Currently amended) A [[The]] method of ~~claim 5~~ constructing a frame structure for data transmission, the method comprising:

generating a first section comprising data configured in a first format compatible with a first communication system;

generating a second section following the first section, the second section comprising data configured in a second format compatible with a second communication system, wherein the second communication system has pilot symbols that ~~wherein pilots in the third system~~ are denser than those in ~~at least one of the first or second~~ communication system;

generating at least one non-data section containing information describing an aspect of data in at least one of the first section and the second section; and

combining the first section, the second section and the at least one non-data section to form the frame structure.

7. (Canceled)

8. (Currently amended) The method of claim 1, wherein a portion of the ~~second~~ first section may be in guard band or non-communicational region of the first system.

9. (Original) The method of claim 1, wherein each of the first section and the second section carries at least one of uplink and downlink data.

10. (Original) The method of claim 1, wherein the second section carries mapping information for data in the second section.

11. (Currently amended) A method of generating a frame for a communication system having a first system and a second system, the method comprising:

generating a first sub-frame for downlink transmission, wherein the first sub-frame comprises:

a first region comprising first mapping information;
a second region comprising second mapping information; and
a third region carrying data to be transferred in the downlink transmission, the third region comprising a first sub-region and a second sub-region, wherein the first sub-region and second sub-region are defined by the first mapping information, the first sub-region being ~~capable of carrying~~ configured to carry first data of the first system and the second sub-region being ~~capable of carrying~~ configured to carry second data of the second system in the downlink transmission, wherein the third region further comprises a fifth sub-region, the fifth sub-region being configured to carry fifth data of the first system or the second system under high mobility in the downlink transmission and each symbol in the fifth sub-region has a shorter symbol period than that in at least one of the first or second system, and generating a second sub-frame for uplink transmission, wherein the second sub-frame comprises:

a fourth region ~~carrying~~ configured to carry data to be transferred in the uplink transmission, the fourth region comprising a third sub-region and a fourth sub-region, wherein the third sub-region and the fourth sub-region are defined by the second mapping information, the third sub-region being ~~capable of carrying~~ configured to carry third data of the first system and the fourth sub-region being ~~capable of carrying~~ configured to carry fourth data of the second system in the uplink transmission.

12. (Original) The method of claim 11, wherein the second sub-region further comprises third mapping information for data placement in the second sub-region.

13. (Canceled)

14. (Currently amended) A [[The]] method of ~~claim 13~~ generating a frame for a communication system having a first system and a second system, the method comprising: generating a first sub-frame for downlink transmission, wherein the first sub-frame comprises:

a first region comprising first mapping information;
a second region comprising second mapping information; and
a third region carrying data to be transferred in the downlink transmission, the

third region comprising a first sub-region and a second sub-region, wherein the first sub-region and second sub-region are defined by the first mapping information, the first sub-region being configured to carry first data of the first system and the second sub-region being configured to carry second data of the second system in the downlink transmission, wherein the third region further comprises a fifth sub-region having pilot symbols that pilots in the fifth sub-region are denser than those in at least one of the first or second system sub-region, and generating a second sub-frame for uplink transmission, wherein the second sub-frame comprises:

a fourth region configured to carry data to be transferred in the uplink transmission, the fourth region comprising a third sub-region and a fourth sub-region, wherein the third sub-region and the fourth sub-region are defined by the second mapping information, the third sub-region being configured to carry third data of the first system and the fourth sub-region being configured to carry fourth data of the second system in the uplink transmission.

15. (Canceled)

16. (Currently amended) The method of ~~claim 13~~ claim 11, wherein the fifth sub-region is defined by the first mapping information.

17. (Currently amended) The method of ~~claim 13~~ claim 11, wherein the fifth sub-region further comprises fourth mapping information for defining data placement in the fifth sub-region.

18. (Currently amended) The method of ~~claim 13~~ claim 11, wherein the fourth region further comprises a sixth sub-region, the sixth sub-region being ~~capable of carrying~~ configured to carry sixth data of the first system or the second system under high mobility in the uplink transmission.

19. (Currently amended) The method of claim 18, wherein ~~pilots~~ pilot symbols in the sixth sub-region are denser than those in at least one of the first or second system.

20. (Currently amended) The method of claim 18, wherein each symbol in the sixth sub-region has a shorter symbol period ~~that~~ than that in at least one of the first or second system.

21. (Original) The method of claim 18, wherein the sixth sub-region is defined by the second mapping information.

22. (Original) The method of claim 18, wherein the sixth sub-region further comprises fifth mapping information for defining data placement in the sixth sub-region.

23. (Currently amended) A method of generating a frame for transferring data in a communication system, the communication system comprising a first system and a second system, the method comprising:

generating a first frame comprising a first sub-frame for downlink transmission and a second sub-frame for uplink transmission in a first frequency band;

generating a second frame comprising a third sub-frame for downlink transmission and a fourth sub-frame for uplink transmission in at least one of a first frequency and a second frequency band;

identifying a guard band between the first frequency band and the second frequency band; and

generating a third frame comprising a fifth sub-frame for downlink transmission and a sixth sub-frame for uplink transmission in the guard band.

24. (Currently amended) The method of claim 23, wherein at least one of the first sub-frame or the third sub-frame comprises:

a first region comprising first mapping information;

a second region comprising second mapping information; and

a third region carrying data to be transferred in the downlink transmission, the third region comprising a first sub-region and a second sub-region, wherein the first sub-region and second sub-region are defined by the first mapping information, the first sub-region

being ~~capable of carrying~~ configured to carry first data of the first system and the second sub-region being ~~capable of carrying~~ configured to carry second data of the second system in the downlink transmission.

25. (Currently amended) The method of claim 23, wherein at least one of the second sub-frame or the fourth sub-frame comprises:

a fourth region carrying data to be transferred in the uplink transmission, the fourth region comprising a third sub-region and a fourth sub-region, wherein the third sub-region and the fourth sub-region are defined by ~~[[the]]~~ second mapping information, the third sub-region being ~~capable of carrying~~ configured to carry third data of the first system and the fourth sub-region being ~~capable of carrying~~ configured to carry fourth data of the second system in the uplink transmission.

26. (Original) The method of claim 24, wherein the second sub-region further comprises third mapping information for data placement in the second sub-region.

27. (Currently amended) The method of claim 24, wherein the third region further comprises a fifth sub-region, the fifth sub-region being ~~capable of carrying~~ configured to carry fifth data of the first system or the second system under high mobility in the downlink transmission.

28. (Currently amended) The method of claim 27, wherein ~~pilots~~ pilot symbols in the fifth sub-region are denser than those in at least one of the first or second system.

29. (Original) The method of claim 27, wherein each symbol in the fifth sub-region has a shorter symbol period than that in at least one of the first or second system.

30. (Original) The method of claim 27, wherein the fifth sub-region is defined by the first mapping information.

31. (Original) The method of claim 27, wherein the fifth sub-region further comprises

fourth mapping information for defining data placement in the fifth sub-region.

32. (Currently amended) The method of claim 27, wherein the fourth region further comprises a sixth sub-region, the sixth sub-region being ~~capable of carrying~~ configured to carry sixth data of the first system or the second system under high mobility in the uplink transmission.

33. (Currently amended) The method of claim 32, wherein ~~pilots~~ pilot symbols in the sixth sub-region are denser than those in at least one of the first or second system.

34. (Original) The method of claim 32, wherein each symbol in the sixth sub-region has a shorter symbol period than that in at least one of the first or second system.

35. (Original) The method of claim 32, wherein the sixth sub-region is defined by the second mapping information.

36. (Original) The method of claim 32, wherein the sixth sub-region further comprises fifth mapping information for defining data placement in the sixth sub-region.

37. (Original) The method of claim 23, further comprising a band between the first frame and the third frame, wherein the band is applicable for carrying data of the first system or the second system.

38. (Original) The method of claim 35, wherein the band further comprises sixth mapping information defining first placement of the data carried by the band.

39. (Original) The method of claim 35, wherein the third mapping information defines second placement of the data carried by the band.

40. (Currently amended) A method of allocating information in a frame of a communication system, the communication system comprising:

a first system and a second system, the frame configured for performing first data transmission of the first system, ~~[[and]]~~ second data transmission of the second system, and third data transmission of the first system or the second system under high mobility, the method comprising:

allocating data of the first system and the second system in first mapping information;
dividing a data region of the frame to form a first sub-region and a second sub-region according to the first mapping information;

further dividing the data region of the frame into the first sub-region, the second sub-region and a third sub-region according to the first mapping information;

performing the first data transmission of the first system by using the first sub-region;
~~[[and]]~~

performing the second data transmission of the second system by using the second sub-region; and

performing the third data transmission of the first system or the second system by using the third sub-region, wherein each symbol in the third sub-region has a shorter symbol period than that in at least one of the first or second sub-region.

41. (Original) The method of claim 40, further comprising:
allocating data of the second system carried in the second sub-region in a second mapping information.

42. (Canceled)

43. (Currently amended) A ~~[[The]]~~ method of ~~claim 42~~ allocating information in a frame of a communication system, the communication system comprising:

a first system and a second system, the frame configured for performing first data transmission of the first system, second data transmission of the second system, the method comprising:

allocating data of the first system and the second system in first mapping information;
dividing a data region of the frame to form a first sub-region and a second sub-region according to the first mapping information;

further dividing the data region of the frame into the first sub-region, the second sub-region and a third sub-region according to the first mapping information;

performing the first data transmission of the first system by using the first sub-region;

performing the second data transmission of the second system by using the second sub-region; and

performing the third data transmission of the first system or the second system by using the third sub-region, wherein pilots pilot symbols in the third sub-region are denser than those in at least one of the first or second sub-region.

44. (Canceled)

45. (Currently amended) The method of ~~claim 42~~ claim 40, further comprising:

allocating data of the first system or the second system carried in the third sub-region in third mapping information.

46. (Currently amended) A method of allocating information in a frame of a communication system, the frame comprising:

a first frame, a second frame and a band between the first frame and the second frame, the communication system comprising a first system and a second system, the frame configured for performing first data transmission of the first system, [[and]] second data transmission of the second system, and third data transmission of the first system or the second system under high mobility, the method comprising:

allocating data of the first system and the second system in first mapping information or second mapping information;

dividing a data region of the first frame or the second frame to form a first sub-region, a second sub-region, a third sub-region or a second sub-region in the data region of the first frame or the second frame according to the first mapping information or the second mapping information;

further dividing the data region of the first frame or the second frame to form a fifth sub-region or a sixth sub-region according to the first mapping information;

performing the first data transmission of the first system by using the first sub-region

or the third sub-region; and

performing the second data transmission of the second system by using the second sub-region or the fourth sub-region; and

performing the third data transmission of the first system or the second system by using the fifth sub-region or the sixth sub-region, wherein each symbol in one of the fifth and sixth sub-regions has a shorter symbol period than that in the data region of the first or the second frame other than the fifth and sixth sub-regions.

47. (Canceled)

48. (Currently amended) A [[The]] method of ~~claim 47~~ allocating information in a frame of a communication system, the frame comprising:

a first frame, a second frame and a band between the first frame and the second frame, the communication system comprising a first system and a second system, the frame configured for performing first data transmission of the first system and second data transmission of the second system, the method comprising:

allocating data of the first system and the second system in first mapping information or second mapping information;

dividing a data region of the first frame or the second frame to form a first sub-region, a second sub-region, a third sub-region or a second sub-region in the data region of the first frame or the second frame according to the first mapping information or the second mapping information;

further dividing the data region of the first frame or the second frame to form a fifth sub-region or a sixth sub-region according to the first mapping information, wherein pilots pilot symbols in one of the fifth and sixth sub-regions are denser than those in the data region of the first or the second frame other than the fifth and sixth sub-regions;

performing the first data transmission of the first system by using the first sub-region or the third sub-region; and

performing the second data transmission of the second system by using the second sub-region or the fourth sub-region; and

performing the third data transmission of the first system or the second system by

using the fifth sub-region or the sixth sub-region, wherein each symbol in one of the fifth and sixth sub-regions has a shorter symbol period than that in the data region of the first or the second frame other than the fifth and sixth sub-regions.

49. (Canceled)

50. (Original) The method of claim 46, further comprising:
carrying data of the first system or the second system by the band.

Remarks

I. Introduction

The following remarks are responsive to the final Office Action mailed April 13, 2010. Claims 1-50 were pending and were rejected.

Claim 1 was provisionally rejected on the ground of nonstatutory obviousness-type double patenting in view of Claim 1 of copending U.S. Patent Application No. 12/168,846 (“the ‘846 Application”) in view of U.S. Patent Application Publication No. 2008/0095195 (“Ahmadi”).

Claims 11-22, 25 and 42 were rejected under 35 U.S.C. § 112, second paragraph, as being indefinite for failing to particularly point out and distinctly claim the subject matter which Applicants regard as the invention.

Claim 1-5, 7-13, 15-18, 20-22, 40-42, 44-47, and 49 were rejected under 35 U.S.C. § 102(e) as being anticipated by Ahmadi.

Claims 6, 14, 19, 43, 48 were rejected under 35 U.S.C. § 103(a) as being unpatentable over Ahmadi in view of U.S. Patent Application Publication No. 2007/0189149 (“Terabe”).

Claims 23-27, 29-32, 34-39 and 50 were rejected under 35 U.S.C. § 103(a) as being unpatentable over Ahmadi in view of U.S. Patent No. 5,491,531 (“Adams”).

Applicants have canceled Claims 5, 7, 13, 15, 42, 44, 47, and 49 without prejudice. Claims 1-4, 6, 8-12, 14, 16-41, 43, 45, 46, 48, and 50 are now pending. Applicants have amended Claims 1, 6, 11, 14, 16-18, 40, 43, 45, 46, and 48 and respectfully traverse the rejections of currently pending Claims 1-4, 6, 8-12, 14, 16-41, 43, 45, 46, 48, and 50.

II. Applicants’ Reply to the Provisional Double Patenting Rejection of Claim 1

Claim 1 was provisionally rejected on the ground of nonstatutory obviousness-type double patenting in view of Claim 1 of the ‘846 Application and Ahmadi. Independent Claim 1 has been amended. Applicants respectfully request that the double patenting rejection be withdrawn in view of the amendments to Claim 1.

III. Applicants' Reply to the Indefinite Rejections

Claims 11-22, 25 and 42 were rejected under 35 U.S.C. § 112, second paragraph, as being indefinite for failing to particularly point out and distinctly claim the subject matter which applicants regard as the invention.

The phrase "capable of" in Claims 11-22 was amended to recite "configured to" to more particularly point out and distinctly claim the subject matter Applicants regard as the invention.

Claim 25 was amended to remove the word "the" before "second mapping information" to correct antecedent basis.

Claim 42 has been canceled.

In view of the amendments made to Claims 11-22, 25 and 42, Applicants respectfully request the indefinite rejections of Claims 11-22, 25 and 42 be withdrawn.

IV. Applicants' Reply to the Rejection of Independent Claims 1, 11, 40 and 46

Independent Claims 1, 11, 40 and 46 have been amended. In particular, independent Claim 1 has been amended to comprise the recitations previously included in Claims 5 and 7, independent Claim 11 has been amended to comprise the recitations previously included in Claims 13 and 15, independent Claim 40 has been amended to comprise the recitations previously included in Claims 42 and 44, and independent Claim 46 has been amended to comprise the recitations previously included in Claims 47 and 49.

As amended, independent Claims 1, 11, 40 and 46 recite symbols having a shorter symbol period than that in other data regions or systems also recited in the independent claims. Applicants' claimed systems and methods support high mobility. Ahmadi, on the other hand, is directed to a fast feedback mechanism, namely using subframes within the pre-designated legacy transmission period. However, the pre-designated legacy transmission period would be susceptible to a Doppler effect in a high mobility scenario, because the placement is designed with a relatively large symbol period, which in turn induces relatively short carrier spacing and less dense pilot symbol placement. See applicants' specification, paragraph [0006].

For at least this reason, Applicants' amended Claims 1, 11, 40 and 46 are not anticipated by Ahmadi. Applicants respectfully request that the rejections of Claims 1, 11, 40 and 46 be withdrawn.

V. Applicants' Reply to the Rejection of Independent Claim 23

Independent Claim 23 was rejected under 35 U.S.C. 103(a) as being obvious in view of Ahmadi in combination with Adams.

Prior to the amendments submitted herewith, Claim 23 recited "generating a first frame ... in a first band; generating a second frame ... in a second band; identifying a guard band between the first band and the second band; and generating a third frame ... in the guard band."

The Examiner acknowledges on page 12 of the Office Action that Ahmadi fails to disclose any type of guard band. To fill this void, the Examiner cites Adams.

Adams' guard band, however, is a "period of time ... reserved at the end of the periodic interval 50." Adams, col. 8, lines 25-26.

Accordingly, Adams fails to show a guard band between a first band and a second band, let alone a frequency-based guard band that "comprises a fifth sub-frame for downlink transmission and a sixth sub-frame for uplink transmission" as recited by Applicants' Claim 23.

Additionally, to expedite allowance, Applicants have amended independent Claim 23 to recite "a first frequency band" and "a second frequency band."

For at least this reason, Applicants' Claim 23 is patentable over the Ahmadi-Adams combination. Applicants respectfully request that the rejection of Claim 23 be withdrawn.

VI. Applicants' Reply to the Rejection of Claims 2-12, 15-22, 24-34, 36-39, 41, 45, and 50

For at least the foregoing reasons, independent Claims 1, 11, 23, 40 and 46 are patentable over the various rejections. Since Claims 2-4, 8-10, 12, 16-22, 24-39, 41, 45, and 50 depend from and necessarily include all of the recitations of one of independent Claims 1, 11, 23, 40 and 46, the cited documents, whether taken alone or in combination, do not teach or suggest the systems or methods of dependent Claims 2-4, 8-10, 12, 16-22, 24-39, 41, 45, and 50 for at least the same reasons as described above in conjunction with the

respective independent claims.

VII. Applicants' Reply to the Rejection of Claims 6, 14, 43, and 48

Additionally, Claims 6, 14, 43, and 48 have been amended to be in independent form. Claims 6, 14, 43 and 48 recite high density pilot symbols, which the Examiner acknowledges is not shown or otherwise suggested by Ahmadi.

To fill the void of Ahmadi, the Examiner cites paragraph [0087] of Terabe. The Examiner seems to be referring to the portion that reads, "FIG. 10 shows an example of making the density of the pilot subcarriers which are present in the subcarrier groups 301 and 302 higher than the density of the pilot subcarriers outside the subcarrier groups. In the example of FIG. 10, the receiving performance of the data subcarriers in the subcarrier groups can be enhanced." Terabe, [0087]. However, Terabe only suggests there being higher density of pilot subcarriers as compared to groups outside the subcarriers. Like Ahmadi, Terabe fails to show or suggest either a system having denser pilot symbols than another system (Applicants' Claim 6) or a sub-region having denser pilot symbols than another sub-region (Applicants' Claims 14, 43, and 48).

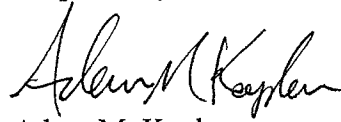
For at least this reason, Applicants' Claims 6, 14, 43, and 48 are patentable over the Ahmadi-Terabe combination. Applicants respectfully request that the rejections of Claims 6, 14, 43, and 48 be withdrawn.

VIII. Conclusion

In view of the foregoing remarks and amendments, Applicants submit that the instant application is in condition for allowance.

It is believed that no additional petitions and/or fees are required. However, in the event that any additional extensions of time and/or other fees are necessary to allow consideration of this Reply, such extensions are hereby petitioned under 37 CFR § 1.136(a), and any fee required therefore (including fees for net addition of claims) is hereby authorized to be charged to Deposit Account No. 16-0605.

Respectfully submitted,



Adam M. Kaplan
Registration No. 59,109

Customer No. 00826
ALSTON & BIRD LLP
Bank of America Plaza
101 South Tryon Street, Suite 4000
Charlotte, NC 28280-4000
Tel Charlotte Office (704) 444-1000
Fax Charlotte Office (704) 444-1111

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12/168,855

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Yan-Xiu ZHENG

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ALSTON & BIRD LLP

BANK OF AMERICA PLAZA

101 SOUTH TRYON STREET, SUITE 4000

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EXAMINER

RUTKOWSKI, JEFFREY M

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PAPER

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

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

Office Action Summary	Application No.	Applicant(s)	
	12/168,855	ZHENG ET AL.	
	Examiner	Art Unit	
	JEFFREY M. RUTKOWSKI	2473	

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

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) OR THIRTY (30) DAYS, WHICHEVER IS LONGER, FROM THE MAILING DATE OF THIS COMMUNICATION.

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

Status

- 1) ☒ Responsive to communication(s) filed on 07 July 2008.
- 2a) ☐ This action is **FINAL**. 2b) ☒ This action is non-final.
- 3) ☐ 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

- 4) ☒ Claim(s) 1-50 is/are pending in the application.
- 4a) Of the above claim(s) _____ is/are withdrawn from consideration.
- 5) ☐ Claim(s) _____ is/are allowed.
- 6) ☒ Claim(s) 1-50 is/are rejected.
- 7) ☐ Claim(s) _____ is/are objected to.
- 8) ☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

- 9) ☐ The specification is objected to by the Examiner.
- 10) ☒ The drawing(s) filed on 07 July 2008 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).
- 11) ☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

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).
- a) ☐ All b) ☐ Some * c) ☐ None of:
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) | 4) ☐ Interview Summary (PTO-413) |
| 2) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948) | Paper No(s)/Mail Date. _____ |
| 3) ☒ Information Disclosure Statement(s) (PTO/SB/08) | 5) ☐ Notice of Informal Patent Application |
| Paper No(s)/Mail Date _____ | 6) ☐ Other: _____ |

Exhibit 1004

DETAILED ACTION***Double Patenting***

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

A timely filed terminal disclaimer in compliance with 37 CFR 1.321(c) or 1.321(d) may be used to overcome an actual or provisional rejection based on a nonstatutory double patenting ground provided the conflicting application or patent either is shown to be commonly owned with this application, or claims an invention made as a result of activities undertaken within the scope of a joint research agreement.

Effective January 1, 1994, a registered attorney or agent of record may sign a terminal disclaimer. A terminal disclaimer signed by the assignee must fully comply with 37 CFR 3.73(b).

2. **Claim 1** is provisionally rejected on the ground of nonstatutory obviousness-type double patenting as being unpatentable over **claim 1** of copending Application No. 12/168846, hereinafter referred to as the ‘846 Application in view of Ahmadi et al. (US Pg Pub 2008/0095195), hereinafter referred to as Ahmadi. **Claim 1** of the instant application and **claim 1** of the ‘846 Application are essentially the same except that **claim 1** of the ‘846 Application does not recite generating a non-data section. Ahmadi discloses *generating at least one non-data section (DL/UL MAPS; see figure 18) containing information describing an aspect of data in at least one of the first section and the second section* (the DL/ UL MAPS describe the resource allocations of the DL and UL new and/or legacy relay zones; see paragraph 0057). It would have

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been obvious to a person of ordinary skill in the art at the time of the invention to use a non-data section in the '846 Application to acquire configuration information (Ahmadi, paragraph 0045).

This is a provisional obviousness-type double patenting rejection.

Claim Rejections - 35 USC § 112

3. The following is a quotation of the second paragraph of 35 U.S.C. 112:

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.

4. **Claims 11-22, 25, 42** are rejected under 35 U.S.C. 112, second paragraph, as being indefinite for failing to particularly point out and distinctly claim the subject matter which applicant regards as the invention.

5. For **claims 11-22**, the use of the phrase "capable of" in the independent **claim 11** renders the claims indefinite because it not clear what is or what is not required by the claims.

6. **Claim 25** recites the limitation "the second mapping information" in line 5. There is insufficient antecedent basis for this limitation in the claim.

7. **Claim 42** recites the limitation "the third sub-region" in line 6. There is insufficient antecedent basis for this limitation in the claim.

Claim Rejections - 35 USC § 102

(e) the invention was described in (1) an application for patent, published under section 122(b), by another filed in the United States before the invention by the applicant for patent or (2) a patent granted on an application for patent by another filed in the United States before the invention by the applicant for patent, except that an international application filed under the treaty defined in section 351(a) shall have the effects for purposes of this subsection of an application filed in the United States only if the international application designated the United States and was published under Article 21(2) of such treaty in the English language.

8. **Claims 1-5, 7-13, 15-18, 20-22, 40-42, 44-47 and 49** are rejected under 35 U.S.C. 102(e) as being anticipated by Ahmadi.

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9. For **claim 1**, *generating a first section* (legacy zone; see figure 18) *comprising data configured in a first format compatible with a first communication system* (the legacy zone is compatible with a IEEE 802.16e system; see paragraph 0117); *generating a second section* (new zone; see figure 18) *following the first section* (figure 18 shows the new zones follow the legacy zones), *the second section* (new zone) *comprising data configured in a second format compatible with a second communication system* (the new zone is compatible with an IEEE 802.16m system; see paragraph 0117), *wherein the second format is different from the first format* (Ahmadi implies the formats are different because legacy terminals do not recognize IEEE 802.16e formats; see paragraph 0043); *generating at least one non-data section* (preamble and DL/UL MAPS sections; see figure 18) *containing information describing an aspect of data in at least one of the first section and the second section* (the DL/ UL MAPS describe the resource allocations of the DL and UL new and/or legacy relay zones; see paragraph 0057); *and combining the first section* (legacy zone), *the second section* (new zone) *and the at least one non-data section* (DL/UL MAPS sections) *to form the frame structure* (a super-frame is formed that contains the legacy zone, new zone and the DL/UL MAPS section; see paragraph 0131).

10. For **claim 2**, Ahmadi discloses *wherein the non-data section comprises mapping information for at least one of the first section and the second section* (the DL/UL MAPS are in a non-data section; see figure 18. The DL/ UL MAPS describe the resource allocations of the DL and UL new and/or legacy relay zones; see paragraph 0057).

11. For **claim 3**, Ahmadi discloses *wherein the non-data section comprises at least one of a preamble* (legacy and supplemental preambles), *a frame control header (FCH)*, *a burst*, *and a map* (DL/UL MAPS) *of at least one of the first section and the second section* (see figure 18).

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12. For **claim 4**, Ahmadi implies *wherein the second section (new zone) follows the first section (legacy zone) in at least one of time sequence and frequency spectrum* (the information in the superframe can be transmitted in either TDD or FDD duplex modes; see paragraphs 0127 and 0131).

13. For **claim 5**, Ahmadi discloses *wherein the second format is compatible with a third system capable of supporting higher mobility than the first and the second systems* (Ahmadi's invention is also compatible with higher mobility standards; see paragraph 0111).

14. For **claims 7, 44 and 49**, Ahmadi implies *wherein each symbol in the third system has a shorter symbol period than that in at least one of the first or second system* (frames in high mobility environment the frame size is 0.617 ms; see paragraph 0111. Whereas, in other systems, the frame size is at least 2 ms; see paragraph 0037).

15. For **claim 8**, Ahmadi implies *wherein a portion of the second section may be in guard band or non- communicational region of the first system* (the new zone information is placed in areas that are not used by the legacy terminals; see paragraph 0085).

16. For **claim 9**, Ahmadi discloses *wherein each of the first section and the second section carries at least one of uplink and downlink data* (figure 18 shows each section carries uplink or downlink information).

17. For **claim 10**, Ahmadi implies *wherein the second section carries mapping information for data in the second section* (MAPS can be placed in the new and legacy zones; see paragraph 0062).

18. For **claim 11**, Ahmadi discloses *generating a first sub-frame for downlink transmission* (figure 18 shows a downlink subframe), *wherein the first sub-frame comprises: a first region*

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comprising first mapping information (DL MAPS; see figure 18); a second region comprising second mapping information (UL MAPS; see figure 18); and a third region carrying data to be transferred in the downlink transmission (the third region is made up of the legacy and the new DL zones; see figure 18), the third region comprising a first sub-region (legacy DL zone) and a second sub-region (new DL zone), wherein the first sub-region and second sub-region are defined by the first mapping information (the DL MAP information is describes the resource allocation of the DL zones; see paragraph 0057), the first sub-region being capable of carrying first data of the first system (the legacy DL zone carries information for IEEE 802.16e systems; see paragraph 0121) and the second sub-region (the new DL zone) being capable of carrying second data of the second system in the downlink transmission (the new DL zone carries information for IEEE 802.16m systems; see paragraph 0126), and generating a second sub-frame for uplink transmission (figure 18 shows a subframe used for uplink transmission), wherein the second sub-frame comprises: a fourth region carrying data to be transferred in the uplink transmission (the fourth region includes the legacy UL and the new UL zones; see figure 18), the fourth region comprising a third sub-region (legacy UL zone) and a fourth sub-region (new UL zone), wherein the third sub-region and the fourth sub-region are defined by the second mapping information (the UL MAP information is describes the resource allocation of the UL zones; see paragraph 0057), the third sub-region being capable of carrying third data of the first system (the legacy UL zone carries information for IEEE 802.16e systems; see paragraph 0121) and the fourth sub-region being capable of carrying fourth data of the second system in the uplink transmission (the new UL zone carries information for IEEE 802.16m systems; see paragraph 0126).

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19. For **claim 12**, Ahmadi discloses *wherein the second sub-region (new DL zone) further comprises third mapping information for data placement in the second sub-region* (MAPs can be transmitted in the new DL zone; see paragraph 0058).

20. For **claim 13**, Ahmadi discloses *wherein the third region further comprises a fifth sub-region, the fifth sub-region being capable of carrying fifth data of the first system or the second system under high mobility in the downlink transmission* (Ahmadi's invention is also compatible with higher mobility standards; see paragraph 0111).

21. For **claim 15**, Ahmadi anticipates *wherein each symbol in the fifth sub-region has a shorter symbol period than that in at least one of the first or second system* (frames in high mobility environment the frame size is 0.617 ms; see paragraph 0111. Whereas, in other systems, the frame size is at least 2 ms; see paragraph 0037).

22. For **claim 16**, Ahmadi anticipates *wherein the fifth sub-region is defined by the first mapping information* (the DL/UL MAPS are in a non-data section; see figure 18. The DL/ UL MAPS describe the resource allocations of the DL and UL superframe zones; see paragraph 0057)..

23. For **claim 17**, Ahmadi anticipates *wherein the fifth sub-region further comprises fourth mapping information for defining data placement in the fifth sub-region* (MAPs can be transmitted in the same zone where the data is placed; see paragraph 0058).

24. For **claim 18**, Ahmadi anticipates *wherein the fourth region further comprises a sixth sub-region, the sixth sub-region being capable of carrying sixth data of the first system or the second system under high mobility in the uplink transmission* (Ahmadi's invention is also compatible with higher mobility standards; see paragraph 0111).

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25. For **claim 20**, Ahmadi implies *wherein each symbol in the sixth sub-region has a shorter symbol period than that in at least one of the first or second system* (frames in high mobility environment the frame size is 0.617 ms; see paragraph 0111. Whereas, in other systems, the frame size is at least 2 ms; see paragraph 0037).

26. For **claim 21**, Ahmadi implies *wherein the sixth sub-region is defined by the second mapping information* (the UL MAP information is describes the resource allocation of the UL zones; see paragraph 0057).

27. For **claim 22**, Ahmadi implies *wherein the sixth sub-region further comprises fifth mapping information for defining data placement in the sixth sub-region* (MAPs can be transmitted in the same zone where the data is placed; see paragraph 0058).

28. For **claim 40**, Ahmadi discloses *allocating data of the first system and the second system in first mapping information* (the DL/ UL MAPS describe the resource allocations of the DL and UL new and/or legacy relay zones; see paragraph 0057); *dividing a data region of the frame to form a first sub-region* (legacy zone; see figure 18) *and a second sub-region* (new zone; see figure 18) *according to the first mapping information; performing the first data transmission of the first system by using the first sub-region; and performing the second data transmission of the second system by using the second sub-region* (the legacy and new zones are used to carry information for two different types of communications systems; see paragraphs 0125-0126).

29. For **claim 41**, Ahmadi discloses *allocating data of the second system carried in the second sub-region in a second mapping information* (supplemental preamble; see figure 18).

30. For **claim 42**, Ahmadi discloses *wherein the frame further comprising third data transmission of the first system or the second system under high mobility* (Ahmadi's invention is

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also compatible with higher mobility standards; see paragraph 0111), *the method further comprising: further dividing the data region of the frame into the first sub-region (legacy DL zone; see figure 18), the second sub-region (new DL zone; see figure 18) and a third region (UL zone; see figure 18) according to the first mapping information (DL/UL MAPS; see figure 18); performing the third data transmission of the first system or the second system by using the third sub-region (the UL zone is used to transmit legacy and new zone information; see figure 18).*

31. For **claim 45**, Ahmadi discloses *allocating data of the first system or the second system carried in the third sub-region in third mapping information (the DL/ UL MAPS describe the resource allocations of the DL and UL new and/or legacy relay zones; see paragraph 0057).*

32. For **claim 46**, Ahmadi discloses *allocating data of the first system (legacy system) and the second system (new system) in first mapping information or second mapping information (the DL/ UL MAPS describe the resource allocations of the DL and UL new and/or legacy relay zones; see paragraph 0057); dividing a data region of the first frame or the second frame to form a first sub-region (legacy DL zone; see figure 18), a second sub-region (new DL zone; see figure 18), a third sub-region (legacy UL zone; see figure 18) or a second sub-region in the data region of the first frame or the second frame according to the first mapping information or the second mapping information (the DL/ UL MAPS describe the resource allocations of the DL and UL new and/or legacy relay zones; see paragraph 0057); performing the first data transmission of the first system by using the first sub-region or the third sub-region (see paragraph 0125); and performing the second data transmission of the second system by using the second sub-region or the fourth sub-region (see paragraph 0126).*

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33. For **claim 47**, Ahmadi discloses *further dividing the data region of the first frame or the second frame to form a fifth sub-region or a sixth sub-region (new UL zone; see figure 18) according to the first mapping information (the DL/ UL MAPS describe the resource allocations of the DL and UL new and/or legacy relay zones; see paragraph 0057); and performing the third data transmission of the first system or the second system by using the fifth sub-region or the sixth sub-region (see paragraph 0126).*

Claim Rejections - 35 USC § 103

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

(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negated by the manner in which the invention was made.

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

1. Determining the scope and contents of the prior art.
2. Ascertaining the differences between the prior art and the claims at issue.
3. Resolving the level of ordinary skill in the pertinent art.
4. Considering objective evidence present in the application indicating obviousness or nonobviousness.

36. **Claims 6, 14, 19, 43 and 48** are rejected under 35 U.S.C. 103(a) as being unpatentable over Ahmadi in view of Terabe (US Pg Pub 2007/0189149).

37. For **claims 6, 43 and 48**, Ahmadi discloses the use of a high mobility environment (see paragraph 0111). Ahmadi does not disclose the density of OFDM pilots. Terabe discloses *wherein pilots in the third system (OFDM) are denser than those in at least one of the first or*

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second system (the density of OFDM pilots in certain subcarriers are higher than pilots in other subcarriers; see paragraph 0087). It would have been obvious to a person of ordinary skill in the art at the time of the invention to use denser pilots in Ahmadi's invention to enhance the receiving performance of data subcarriers (Terabe, paragraph 0087).

38. For **claim 14**, Ahmadi discloses the use of a high mobility environment (see paragraph 0111). Ahmadi does not disclose the density of OFDM pilots. Terabe discloses *wherein pilots in the fifth sub-region (OFDM) are denser than those in at least one of the first or second system* (the density of OFDM pilots in certain subcarriers are higher than pilots in other subcarriers; see paragraph 0087). It would have been obvious to a person of ordinary skill in the art at the time of the invention to use denser pilots in Ahmadi's invention to enhance the receiving performance of data subcarriers (Terabe, paragraph 0087).

39. For **claim 19**, Ahmadi discloses the use of a high mobility environment (see paragraph 0111). Ahmadi does not disclose the density of OFDM pilots. Terabe discloses *wherein pilots in the sixth sub-region (OFDM) are denser than those in at least one of the first or second system* (the density of OFDM pilots in certain subcarriers are higher than pilots in other subcarriers; see paragraph 0087). It would have been obvious to a person of ordinary skill in the art at the time of the invention to use denser pilots in Ahmadi's invention to enhance the receiving performance of data subcarriers (Terabe, paragraph 0087).

40. **Claims 23-27, 29-32, 34-39 and 50** are rejected under 35 U.S.C. 103(a) as being unpatentable over Ahmadi in view of Adams et al. (US Pat 5,491,531), hereinafter referred to as Adams.

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41. For **claim 23**, Ahmadi discloses *generating a first frame* (the superframe in figure 18) *comprising a first sub-frame for downlink transmission* (figure 18 shows the superframe has a sub-frame for downlink communication) *and a second sub-frame for uplink transmission* (figure 18 shows the superframe has a sub-frame for uplink transmission) *in a first band* (the information is transmitted over sub-carriers; see figure 18) *and generating a second frame comprising a third sub-frame for downlink transmission and a fourth sub-frame for uplink transmission in a second band* (figure 18 shows that each portion of the superframe is spread over a plurality of subcarriers).

42. Ahmadi discloses *generating a third frame comprising a fifth sub-frame for downlink transmission and a sixth sub-frame for uplink transmission* (figure 18 shows that each portion of the superframe is spread over a plurality of subcarriers) *in the region ignored by legacy terminals* (see paragraphs 0064-0065). Ahmadi also discloses the superframe structure is compatible with other standards (see paragraph 0061). Ahmadi does not disclose the transmission of information in a guard band. Adams discloses *identifying a guard band* (guard band **56**) *between the first band* (unscheduled phase **54**) *and the second band* (scheduled phase **52**; see figure 3) and transmitting information in the *guard band* (guard band **56**; see col. 8 lines 25-30). It would have been obvious to a person of ordinary skill in the art at the time of the invention to send information in a guard band in Ahmadi's invention to share control information amongst the nodes on a network (Adams, col. 8 lines 36-42).

43. For **claim 24**, Ahmadi discloses *a first region comprising first mapping information* (DL MAPS; see figure 18); *a second region comprising second mapping information* (UL MAPS; see

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figure 18); and a third region carrying data to be transferred in the downlink transmission (DL new and legacy zones; see figure 18), the third region comprising a first sub-region (legacy zone; see figure 18) and a second sub-region (new zone; see figure 18), wherein the first sub-region and second sub-region are defined by the first mapping information (the DL/ UL MAPS describe the resource allocations of the DL and UL new and/or legacy relay zones; see paragraph 0057), the first sub-region being capable of carrying first data of the first system and the second sub-region being capable of carrying second data of the second system in the downlink transmission (the legacy and new zones are used for two different types of downlink communication systems; see figure 18).

44. For **claim 25**, Ahmadi discloses a fourth region carrying data to be transferred in the uplink transmission (new and legacy uplink zones; see figure 18), the fourth region comprising a third sub-region (legacy zone) and a fourth sub-region (new zone), wherein the third sub-region and the fourth sub-region are defined by the second mapping information (UL MAPS), the third sub-region being capable of carrying third data of the first system and the fourth sub-region being capable of carrying fourth data of the second system in the uplink transmission (the legacy and new zones are used for two different types of uplink communication systems; see figure 18).

45. For **claim 26**, Ahmadi discloses wherein the second sub-region (new DL zone) further comprises third mapping information for data placement in the second sub-region (MAPs can be transmitted in the new DL zone; see paragraph 0058).

46. For **claim 27**, Ahmadi discloses wherein the third region further comprises a fifth sub-region, the fifth sub-region being capable of carrying fifth data of the first system or the second

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system under high mobility in the downlink transmission (Ahmadi's invention is also compatible with higher mobility standards; see paragraph 0111).

47. For **claim 29**, Ahmadi suggests *wherein each symbol in the fifth sub-region has a shorter symbol period than that in at least one of the first or second system* (frames in high mobility environment the frame size is 0.617 ms; see paragraph 0111. Whereas, in other systems, the frame size is at least 2 ms; see paragraph 0037).

48. For **claim 30**, Ahmadi anticipates *wherein the fifth sub-region is defined by the first mapping information* (the DL/UL MAPS are in a non-data section; see figure 18. The DL/ UL MAPS describe the resource allocations of the DL and UL superframe zones; see paragraph 0057).

49. For **claim 31**, Ahmadi suggests *wherein the fifth sub-region further comprises fourth mapping information for defining data placement in the fifth sub-region* (MAPs can be transmitted in the same zone where the data is placed; see paragraph 0058).

50. For **claim 32**, Ahmadi anticipates *wherein the fourth region further comprises a sixth sub-region, the sixth sub-region being capable of carrying sixth data of the first system or the second system under high mobility in the uplink transmission* (Ahmadi's invention is also compatible with higher mobility standards; see paragraph 0111).

51. For **claim 34**, Ahmadi suggests *wherein each symbol in the sixth sub-region has a shorter symbol period than that in at least one of the first or second system* (frames in high mobility environment the frame size is 0.617 ms; see paragraph 0111. Whereas, in other systems, the frame size is at least 2 ms; see paragraph 0037).

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52. For **claim 35**, Ahmadi suggests *wherein the sixth sub-region is defined by the second mapping information* (the UL MAP information is describes the resource allocation of the UL zones; see paragraph 0057).

53. For **claim 36**, Ahmadi suggests *wherein the sixth sub-region further comprises fifth mapping information for defining data placement in the sixth sub-region* (MAPs can be transmitted in the same zone where the data is placed; see paragraph 0058).

54. For **claim 37**, Ahmadi discloses the superframe structure is compatible with other standards (see paragraph 0061). Ahmadi does not disclose the transmission of information in a guard band. Adams discloses *comprising a band* (guard band **56**; see figure 3) *between the first frame and the third frame* (see figure 3), *wherein the band is applicable for carrying data of the first system or the second system* (the guard band is used to carry packet data; see col. 8 lines 25-35). It would have been obvious to a person of ordinary skill in the art at the time of the invention to send information in a guard band in Ahmadi's invention to share control information amongst the nodes on a network (Adams, col. 8 lines 36-42).

55. For **claims 38 and 39**, Ahmadi discloses *mapping information* (supplemental preamble) is placed in a region ignored by legacy terminals (see paragraph 0065). Ahmadi does not disclose the placing of control information in a guard band. Adams discloses the placing of control information in a *guard band* (see col. 8 lines 25-35). It would have been obvious to a person of ordinary skill in the art at the time of the invention to send information in a guard band in Ahmadi's invention to share control information amongst the nodes on a network (Adams, col. 8 lines 36-42). The combination of Ahmadi and Adams discloses *the band* (guard band of

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Adams) *further comprises sixth mapping information (supplemental preamble) defining first placement of the data carried by the band.*

56. For **claim 50**, Ahmadi discloses the superframe structure is compatible with other standards (see paragraph 0061). Ahmadi does not disclose the transmission of information in a guard band. Adams discloses *carrying data of the first system or the second system by the band* (guard band **56**; see col. 8 lines 25-30). It would have been obvious to a person of ordinary skill in the art at the time of the invention to send information in a guard band in Ahmadi's invention to share control information amongst the nodes on a network (Adams, col. 8 lines 36-42).

57. **Claims 28 and 33** are rejected under 35 U.S.C. 103(a) as being unpatentable over Ahmadi in view Adams, as applied to **claims 27 and 32 respectively** above, and further in view of Terabe (US Pg Pub 2007/0189149).

58. For **claim 28**, Ahmadi discloses the use of a high mobility environment (see paragraph 0111). Ahmadi does not disclose the density of OFDM pilots. Terabe discloses *wherein pilots in the fifth sub-region (OFDM) are denser than those in at least one of the first or second system* (the density of OFDM pilots in certain subcarriers are higher than pilots in other subcarriers; see paragraph 0087). It would have been obvious to a person of ordinary skill in the art at the time of the invention to use denser pilots in Ahmadi's invention to enhance the receiving performance of data subcarriers (Terabe, paragraph 0087).

59. For **claim 33**, Ahmadi discloses the use of a high mobility environment (see paragraph 0111). Ahmadi does not disclose the density of OFDM pilots. Terabe discloses *wherein pilots in the sixth sub-region (OFDM) are denser than those in at least one of the first or second system* (the density of OFDM pilots in certain subcarriers are higher than pilots in other subcarriers; see

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paragraph 0087). It would have been obvious to a person of ordinary skill in the art at the time of the invention to use denser pilots in Ahmadi's invention to enhance the receiving performance of data subcarriers (Terabe, paragraph 0087).

Conclusion

Any inquiry concerning this communication or earlier communications from the examiner should be directed to JEFFREY M. RUTKOWSKI whose telephone number is (571)270-1215. The examiner can normally be reached on Monday - Friday 7:30-5:00 PM EST.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Kwang Yao can be reached on (571) 272-3182. The fax phone number for the organization where this application or proceeding is assigned is 571-273-8300.

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/Jeffrey M Rutkowski/
Examiner, Art Unit 2473

/KWANG B. YAO/

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Supervisory Patent Examiner, Art Unit 2473