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

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

Office Action Summary	Application No. 14/051,646	Applicant(s) PAJUKOSKI ET AL.	
	Examiner OTIS L. THOMPSON, JR	Art Unit 2477	AIA (First Inventor to File) Status No

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

Period for Reply

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

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

Status

- 1) ☒ Responsive to communication(s) filed on 10/13/2013.
☐ A declaration(s)/affidavit(s) under **37 CFR 1.130(b)** was/were filed on _____.
- 2a) ☐ This action is **FINAL**. 2b) ☒ This action is non-final.
- 3) ☐ An election was made by the applicant in response to a restriction requirement set forth during the interview on _____; the restriction requirement and election have been incorporated into this action.
- 4) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims*

- 5) ☒ Claim(s) 1-55 is/are pending in the application.
5a) Of the above claim(s) _____ is/are withdrawn from consideration.
- 6) ☐ Claim(s) _____ is/are allowed.
- 7) ☒ Claim(s) 1-55 is/are rejected.
- 8) ☐ Claim(s) _____ is/are objected to.
- 9) ☐ Claim(s) _____ are subject to restriction and/or election requirement.

* If any claims have been determined allowable, you may be eligible to benefit from the **Patent Prosecution Highway** program at a participating intellectual property office for the corresponding application. For more information, please see http://www.uspto.gov/patents/init_events/pph/index.jsp or send an inquiry to PPHfeedback@uspto.gov.

Application Papers

- 10) ☐ The specification is objected to by the Examiner.
- 11) ☒ The drawing(s) filed on 10/11/2013 is/are: a) ☒ accepted or b) ☐ objected to by the Examiner.
Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).
Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).

Priority under 35 U.S.C. § 119

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

Certified copies:

- a) ☐ All b) ☐ Some** c) ☐ None of the:
1. ☐ Certified copies of the priority documents have been received.
 2. ☐ Certified copies of the priority documents have been received in Application No. _____.
 3. ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

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

Attachment(s)

- 1) ☐ Notice of References Cited (PTO-892)
- 2) ☒ Information Disclosure Statement(s) (PTO/SB/08a and/or PTO/SB/08b)
Paper No(s)/Mail Date 10/11/2013
- 3) ☐ Interview Summary (PTO-413)
Paper No(s)/Mail Date. _____
- 4) ☐ Other: _____

IPR2017-1540
Huawei v. NSN

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

DETAILED ACTION

Claim Rejections – 35 USC § 101

2. 35 U.S.C. 101 reads as follows:

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

3. Claims 1, 3, 4, 7, 9, 10, 50, 51, and 55 are rejected under 35 U.S.C. 101 because the claimed invention is directed to non-statutory subject matter. Claims 1, 3, 4, 7, 9, 10, 50, 51, and 55 recite steps of a method that do not appear to be specifically or inherently performed by a machine and that do not appear to transform in any way. In accordance with the interim guidelines for examining 35 USC 101 subject matter, these method claims do not pass the machine or transformation test and are considered non-statutory.

4. Claims 11-14, 40, and 41 rejected under 35 U.S.C. 101 because the claimed invention is directed to non-statutory subject matter. Claims 11-14, 40, and 41 recite computer readable mediums encoded with computer programs executable by a processor. This recitation is non-statutory because the recited computer readable mediums are transitory and therefore encompass transmission media including signals and carrier waves. In accordance with the interim guidelines for examining 35 USC 101 subject matter, Examiner suggests that Applicant amend the claims to recite “non-transitory” computer-readable mediums.

Claim Rejections - 35 USC § 112

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

Art Unit: 2477

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.

6. Claims 1-34, 52, 53, and 54 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.

7. Each of claims 1, 11, 15, 25, and 52-54 recites the limitation "the case" in various features. There is insufficient antecedent basis for this limitation in the claim.

Claim Rejections – 35 USC § 102

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

A person shall be entitled to a patent unless –

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

9. Claims 1, 2, 4-12, 14-16, 18-26, 28-52, and 55 are rejected under 35 U.S.C. 102(e) as being anticipated by Bachl et al. (US 2008/0316959, IDS Reference).

10. **Regarding claims 1 and 11**, Bachl et al. discloses *a method comprising and a computer readable medium encoded with a computer program executable by a processor to perform actions* (Paragraphs 0023-0024, wherein processing is performed in a computing system and a program storage medium with encoded software thereon are disclosed) *comprising:*

a. *Determining that an acknowledgment is to be sent* (Abstract, see "...determining whether a first resource for transmission of a scheduling request over an unscheduled

uplink control channel is allocated concurrently with a second resource for transmission of other control information [i.e. acknowledgment is to be sent]..."; Paragraph 0008, wherein three types of control information (ACK/NACK, CQI, and scheduling request) are transmitted over the PUCCH); *and*

- b. *For the case where there is also a scheduling request to be sent, combining the acknowledgment with the scheduling request on a scheduling resource* (Abstract, see "...determining whether a first resource [i.e. scheduling resource] for transmission of a scheduling request over an unscheduled uplink control channel is allocated concurrently with a second resource for transmission of other control information [i.e. acknowledgment] over the unscheduled uplink control channel...modulating the scheduling request and the other control information into one symbol for transmission using the first resource [i.e. scheduling resource]..."; Paragraph 0012, wherein ACK/NACK and the scheduling request are multiplexed and transmitted on the PUCCH),
- c. *Else placing the acknowledgment in another resource* (Abstract, wherein a second resource [i.e. another resource] is allocated for transmission of other control information [i.e. acknowledgment] besides the scheduling request; If the second resource is allocated concurrently [collides] with the first resource of the scheduling request, the two are combined and transmitted together over first resource. If the two are not concurrently allocated, the other control information [i.e. acknowledgement] remains in the second resource).

11. **Regarding claims 2 and 12**, Bachl et al. discloses *for the case where there is also the scheduling request to be sent, transmitting the acknowledgment with the scheduling request on*

Art Unit: 2477

the scheduling resource (Abstract, see "...determining whether a first resource [i.e. scheduling resource] for transmission of a scheduling request over an unscheduled uplink control channel is allocated concurrently with a second resource for transmission of other control information [i.e. acknowledgment] over the unscheduled uplink control channel...modulating the scheduling request and the other control information into one symbol for transmission using the first resource [i.e. scheduling resource]...").

12. **Regarding claims 4 and 14**, Bachl et al. discloses *where the another resource is a data-non-associated resource* (Paragraph 0008, wherein ACK/NACK is a data-non-associated signal transmitted over a data-non-associated resource of the PUCCH; Abstract, wherein the data-non-associated resource is represented by the second resource for the other control information).

13. **Regarding claim 5**, Bachl et al. discloses *where the transmitting is on a physical uplink control channel* (Paragraph 0008, 0028, 0036, 0040, see where the PUCCH is used for transmission of the control information including scheduling request, ACK/NACK, and CQI).

14. **Regarding claim 6**, Bachl et al. discloses *where the transmitting is on an uplink* (Paragraph 0008, 0028, 0036, 0040, see where the PUCCH is an uplink).

15. **Regarding claim 7**, Bachl et al. discloses *where the acknowledgment comprises an unmodulated sequence 1 and a BPSK/QPSK modulate sequence 2* (Paragraph 0032, wherein the ACK/NACK uses BPSK and QPSK modulation).

16. **Regarding claim 8**, Bachl et al. discloses *the method of claim 1 being implemented in a user equipment* (Paragraph 0032 and figure 1, wherein the mobile unit 110 [i.e. user equipment] multiplexes the scheduling request and ACK/NACK; Also see paragraph 0008, wherein mobile units transmit ACK/NACK, scheduling request, and CQI over PUCCH to base stations).

Art Unit: 2477

17. **Regarding claim 9**, Bachl et al. discloses *the method of claim 1 being implemented in a wireless communications network* (Figure 1 depicts wireless network communication between a mobile unit and a base station).

18. **Regarding claim 10**, Bachl et al. discloses *the method of claim 1 being implemented in an evolved universal terrestrial radio access network* (Paragraph 0007-0008, wherein UMTS-LTE wireless system is disclosed).

19. **Regarding claims 15 and 25**, Bachl et al. discloses *an apparatus* (Figure 1 mobile unit 110) *comprising:*

d. *A processor configured to determine and means for determining* (Paragraphs 0023-0024, wherein processing is performed in a computing system and the processor [i.e. means for determining] in the mobile unit is therefore inherent for performing the features of the invention) *that an acknowledgment is to be sent* (Abstract, see "...determining whether a first resource for transmission of a scheduling request over an unscheduled uplink control channel is allocated concurrently with a second resource for transmission of other control information [i.e. acknowledgment is to be sent]..."; Paragraph 0008, wherein three types of control information (ACK/NACK, CQI, and scheduling request) are transmitted over the PUCCH); *and*

e. *The processor further configured to combine and means for combining* (Paragraphs 0023-0024, wherein processing is performed in a computing system and the processor [i.e. means for combining] in the mobile unit is therefore inherent for performing the features of the invention), *in the case where there is also a scheduling request to be sent, the acknowledgment with the scheduling request on a scheduling*

resource (Abstract, see "...determining whether a first resource [i.e. scheduling resource] for transmission of a scheduling request over an unscheduled uplink control channel is allocated concurrently with a second resource for transmission of other control information [i.e. acknowledgment] over the unscheduled uplink control channel...modulating the scheduling request and the other control information into one symbol for transmission using the first resource [i.e. scheduling resource]..."; Paragraph 0012, wherein ACK/NACK and the scheduling request are multiplexed and transmitted on the PUCCH),

f. *Else placing the acknowledgment in another resource* (Abstract, wherein a second resource [i.e. another resource] is allocated for transmission of other control information [i.e. acknowledgment] besides the scheduling request; If the second resource is allocated concurrently [collides] with the first resource of the scheduling request, the two are combined and transmitted together over first resource. If the two are not concurrently allocated, the other control information [i.e. acknowledgement] remains in the second resource).

20. **Regarding claims 16 and 26**, Bachl et al. discloses *a transmitter configured to transmit and means for transmitting* (Figure 1, wherein mobile unit 110 transmits via uplink channel 130 and thus comprises a transmitter as means for transmitting), *in the case where there is also the scheduling request to be sent, the acknowledgment with the scheduling request on the scheduling resource* (Abstract, see "...determining whether a first resource [i.e. scheduling resource] for transmission of a scheduling request over an unscheduled uplink control channel is allocated concurrently with a second resource for transmission of other control information [i.e.

Art Unit: 2477

acknowledgment] over the unscheduled uplink control channel...modulating the scheduling request and the other control information into one symbol for transmission using the first resource [i.e. scheduling resource]...").

21. **Regarding claims 18 and 28**, Bachl et al. discloses *where the another resource is a data-non-associated resource* (Paragraph 0008, wherein ACK/NACK is a data-non-associated signal transmitted over a data-non-associated resource of the PUCCH; Abstract, wherein the data-non-associated resource is represented by the second resource for the other control information).

22. **Regarding claims 19 and 29**, Bachl et al. discloses *where the transmitter/means for transmitting is configured to transmit the acknowledgment with the scheduling request on a physical uplink control channel* (Paragraph 0008, 0028, 0036, 0040, see where the PUCCH is used for transmission of the control information including scheduling request, ACK/NACK, and CQI; Paragraph 0032, wherein ACK/NACK and scheduling request are transmitted on uplink 130 of figure 1, which is the PUCCH according to paragraph 0028).

23. **Regarding claims 20 and 30**, Bachl et al. discloses *where the transmitter/means for transmitting is configured to transmit the acknowledgment with the scheduling request on an uplink* (Paragraph 0008, 0028, 0036, 0040, see where the PUCCH is an uplink; Paragraph 0032, wherein ACK/NACK and scheduling request are transmitted on uplink 130 of figure 1, which is the PUCCH according to paragraph 0028).

24. **Regarding claims 21 and 31**, Bachl et al. discloses *where the acknowledgment comprises an unmodulated sequence 1 and a BPSK/QPSK modulate sequence 2* (Paragraph 0032, wherein the ACK/NACK uses BPSK and QPSK modulation).

Art Unit: 2477

25. **Regarding claims 22 and 32**, Bachl et al. discloses *the apparatus of claims 15 and 25 being embodied in a user equipment* (Paragraph 0032 and figure 1, wherein the mobile unit 110 [i.e. user equipment] multiplexes the scheduling request and ACK/NACK; Also see paragraph 0008, wherein mobile units transmit ACK/NACK, scheduling request, and CQI over PUCCH to base stations).

26. **Regarding claims 23 and 33**, Bachl et al. discloses *the apparatus of claims 15 and 25 configured to operate in a wireless communications network* (Figure 1 depicts wireless network communication between a mobile unit and a base station).

27. **Regarding claims 24 and 34**, Bachl et al. discloses *the apparatus of claim 15 and 25 configured to operate in an evolved universal terrestrial radio access network* (Paragraph 0007-0008, wherein UMTS-LTE wireless system is disclosed).

28. **Regarding claims 35 and 40**, Bachl et al. discloses *a method comprising and a computer readable medium encoded with a computer program executable by a processor to perform the actions* (Paragraphs 0023-0024, wherein processing is performed in a computing system and a program storage medium with encoded software thereon are disclosed; Also see paragraph 0026 wherein functionality of base station is implemented in hardware, firmware, software, or combination thereof) *comprising:*

g. *Receiving information on a scheduling resource* (Figure 1, base station 105 receives information on the PUCCH 130 [paragraph 0028]; Abstract, wherein a scheduling request of a first resource [scheduling resource] and other control information of a second resource are multiplexed and transmitted to the base station from a mobile unit via PUCCH 130);

Art Unit: 2477

- h. *Determining that the information received on the scheduling resource comprises an acknowledgment* (Claim 25, wherein the base station determines whether the first resource [scheduling resource] of the scheduling request is allocated concurrently with the second resource of other control information [i.e. determination that acknowledgment is comprised in the received information]; Paragraph 0008, wherein three types of control information (ACK/NACK, CQI, and scheduling request) are transmitted over the PUCCH).
29. **Regarding claims 36 and 41**, Bachl et al. discloses *responding accordingly to the determining that the information received on the scheduling resource is an acknowledgment* (Claim 25, wherein in response to the determination, the base station demodulates the symbol comprising the scheduling request and the other control information [acknowledgment]).
30. **Regarding claim 37**, Bachl et al. discloses *where the information is received on a physical uplink control channel* (Figure 1, base station 105 receives information on the PUCCH 130 [paragraph 0028]).
31. **Regarding claim 38**, Bachl et al. discloses *where the information is received from a wireless communications network* (Figure 1, base station 105 receives via uplink channels wirelessly).
32. **Regarding claim 39**, Bachl et al. discloses *where the information is received from an evolved universal terrestrial radio access network* (Paragraph 0007-0008, wherein UMTS-LTE wireless system is disclosed as the wireless system in which the bases receives from the mobile unit).

Art Unit: 2477

33. **Regarding claims 42 and 47**, Bachl et al. discloses *an apparatus* (Figure 1 Base Station 105) *comprising*:

- i. *A receiver and means for receiving* (Figure 1 Base station 105 received transmissions from mobile unit via channels 125 and 130. A receiver is therefore present in the base station);
- j. *The receiver and means for receiving configured to receive information on a scheduling resource* (Figure 1, base station 105 receives information on the PUCCH 130 [paragraph 0028]; Abstract, wherein a scheduling request of a first resource [scheduling resource] and other control information of a second resource are multiplexed and transmitted to the base station from a mobile unit via PUCCH 130);
- k. *A processor and means for determining configured to determine that the information received on the scheduling resource comprises an acknowledgment* (Claim 25, wherein the base station comprises a processing unit that determines whether the first resource [scheduling resource] of the scheduling request is allocated concurrently with the second resource of other control information [i.e. determination that acknowledgment is comprised in the received information]; Paragraph 0008, wherein three types of control information (ACK/NACK, CQI, and scheduling request) are transmitted over the PUCCH).

34. **Regarding claims 43 and 48**, Bachl et al. discloses *the apparatus of claims 42 and 47 further comprising a transmitter* (Figure 1, wherein base station 105 transmits via downlink 115 to mobile unit 110. Hence, the transmitter is present in the base station); *the transmitter, the processor, and a means for responding accordingly to the determining that the information*

Art Unit: 2477

received on the scheduling resource comprises the acknowledgment (Claim 25, wherein in response to the determination, the processing unit [means for responding] of the base station demodulates the symbol comprising the scheduling request and the other control information [acknowledgment]).

35. **Regarding claim 44**, Bachl et al. discloses *where the receiver is further configured to receive the information on a physical uplink control channel* Figure 1, base station 105 receives information on the PUCCH 130 [paragraph 0028]).

36. **Regarding claim 45**, Bachl et al. discloses *where the receiver is further configured to receive the information from a wireless communications network* (Figure 1, base station 105 receives via uplink channels wirelessly).

37. **Regarding claim 46**, Bachl et al. discloses *where the receiver is further configured to receive the information from an evolved universal terrestrial radio access network* (Paragraph 0007-0008, wherein UMTS-LTE wireless system is disclosed as the wireless system in which the bases receives from the mobile unit).

38. **Regarding claim 49**, Bachl et al. discloses *where the means for receiving comprises a receiver* (Figure 1, wherein base station 105 receives uplink data from the mobile unit 110 and therefore comprises a receiver), *the means for determining comprises a processor* (Claim 25, wherein the base station comprises a processing unit), *and the means for responding comprises a transmitter* (Figure 1, wherein base station 105 transmits data on the downlink to mobile unit 110 and therefore comprises a transmitter for responding to the mobile unit 110).

39. **Regarding claim 50**, Bachl et al. discloses *a method comprising:*

- l. *Determining that a scheduling request resource and at least one other resource are reserved for a user equipment in a same sub-frame* (Abstract, see "...determining whether a first resource [i.e. scheduling resource] for transmission of a scheduling request over an unscheduled uplink control channel is allocated concurrently with a second resource [i.e. one other resource] for transmission of other control information..."; Paragraph 0008, wherein three types of control information (ACK/NACK, CQI, and scheduling request) are transmitted over the PUCCH from the mobile unit 110 of figure 1); *and*
- m. *Based on whether a scheduling request is desired to be transmitted by the user equipment, placing at least one of an acknowledgment/negative acknowledgment and a channel quality indicator that is desired to be transmitted by the user equipment in one of the resources and leaving the at least one other resource unused* (Abstract, see "...determining whether a first resource [i.e. scheduling resource] for transmission of a scheduling request over an unscheduled uplink control channel is allocated concurrently with a second resource for transmission of other control information [i.e. acknowledgment or channel quality indicator] over the unscheduled uplink control channel...modulating the scheduling request and the other control information [i.e. acknowledgment or channel quality indicator] into one symbol for transmission using the first resource [i.e. one of the resource in which the scheduling request and ACK/NACK or CQI are placed]..."; Paragraph 0012, wherein ACK/NACK and the scheduling request are multiplexed and transmitted on the PUCCH; According to the abstract, since the first resource [i.e. scheduling resource] is used to transmit both the scheduling request and

other control information, the second resource that has been allocated for the other control information is left unused).

40. **Regarding claim 51**, Bachl et al. discloses *where the scheduling request resource and the at least one other resource are physical uplink control channel resources* (Figure 1, base station 105 receives information on the PUCCH 130 [paragraph 0028]j; Abstract, wherein the first and second resources [i.e. scheduling request and other control information resources] are of an unscheduled uplink control channel which is the PUCCH according to paragraph 0028).

41. **Regarding claim 52**, Bachl et al. discloses *for the case where the user equipment desires to transmit a scheduling request and transmit an acknowledgment/negative acknowledgment, transmitting the acknowledgment/negative acknowledgment with the scheduling request on the scheduling request resource and leaving the at least one other resource unused* (Abstract, see "...determining whether a first resource [i.e. scheduling resource] for transmission of a scheduling request over an unscheduled uplink control channel is allocated concurrently with a second resource for transmission of other control information [i.e. acknowledgment] over the unscheduled uplink control channel...modulating the scheduling request and the other control information [i.e. acknowledgment] into one symbol for transmission using the first resource [i.e. one of the resource in which the scheduling request and ACK/NACK or CQI are placed]..."; Paragraph 0012, wherein ACK/NACK and the scheduling request are multiplexed and transmitted on the PUCCH; According to the abstract, since the first resource [i.e. scheduling resource] is used to transmit both the scheduling request and other control information, the second resource that has been allocated for the other control information is left unused); *or for the case where the user equipment does not desire to transmit a scheduling request and does*

Art Unit: 2477

desire to transmit an acknowledgment/negative acknowledgment, transmitting the acknowledgment/negative acknowledgment on the at least one other resource and leaving the scheduling request resource unused (Paragraph 0038 and figure 4 step 445, wherein the mobile unit determines that there is an ACK/NACK to transmit to the base station; Step 450, wherein the mobile unit determines that there is no SR (scheduling request) to transmit; Step 460, wherein the mobile unit transmits the ACK/NACK on the resource allocated for transmission of the ACK/NACK [i.e. at least one other resource] in the PUCCH and leaves the scheduling request resource unused).

42. **Regarding claim 55**, Bachl et al. discloses *wherein the scheduling request information is conveyed based on a selected physical uplink control channel selection* (Abstract, wherein a first resource of the physical uplink control channel is allocated for the scheduling request).

Claim Rejections - 35 USC § 103

43. 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.

44. Claims 3, 13, 17, 27, 53, and 54 are rejected under 35 U.S.C. 103(a) as being unpatentable over Bachl et al. as applied to claims 1, 11, 15, 25, and 50 above, and further in view of Papasakellariou et al. (US 2009/0022135, IDS Reference).

45. **Regarding claims 3, 13, 17, and 27**, Bachl et al. discloses the claimed invention above but does not specifically disclose *for a case where a channel quality indicator is also to be sent*,

Art Unit: 2477

the channel quality indicator is not sent and the another resource is unused [the processor/means, in case where a channel quality indicator is also to be sent, for dropping the channel quality indicator such that it is not sent and the another resource is unused]. However, Papasakellariou et al. discloses a method for multiplexing ACK/NACK signals with CQI signals (See Abstract). In paragraph 0062, Papasakellariou et al. discloses that a UE has a CQI transmission that is typically periodic and may occur in the same sub-frame as the ACK/NACK transmission. While Papasakellariou et al. discloses that multiplexing ACK/NACK signals with CQI signals is beneficial, Papasakellariou et al. also discloses that the CQI signal transmission is dropped (i.e. *channel quality indicator is not sent [dropped such that it is not sent]*) when it occurs in the same sub-frame as the ACK/NACK, and the PUCCH is used to transmit only the ACK/NACK (Paragraph 0062). Since the CQI signal transmission has an allocated resource for transmission in the PUCCH (i.e. periodic transmission), it is clear that this *resource remains unused [the another resource is unused]* for transmission.

Therefore, it would have been obvious to one of ordinary skill in the art at the time the applicant's invention was made to incorporate the teachings of Papasakellariou et al. into Bachl et al. in order to multiplex or not multiplex ACK/NACK transmissions with CQI transmissions.

46. **Regarding claim 53**, Bachl et al. discloses the claimed invention above as well as *the case where the user equipment desires to transmit a scheduling request* (Figure 4 Step 435) *but no acknowledgment/negative acknowledgment* (Figure 4 Step 420), *and transmitting the scheduling request on the scheduling resource* (Figure 4 Step 440) but does not specifically disclose *where the user equipment desires to transmit a channel quality indicator at the same*

Art Unit: 2477

time, but not transmitting the channel quality indicator leaving the at least one other resource unused.

However, Papasakellariou et al. discloses a method for multiplexing an ACK/NACK signal and a CQI signal (See Abstract). In paragraph 0062, Papasakellariou et al. discloses a case in which a CQI signal is dropped when it collides with the transmission an ACK/NACK (i.e. *desires to transmit a channel quality indicator at the same time, but not transmitting the channel quality indicator leaving the at least one other resource unused*). In combination with Bachl et al., since there is a scheduling request transmission but no ACK/NACK transmission, dropping the CQI transmission is an obvious action since, according to Bachl et al., the scheduling request and CQI use different resources within the PUCCH for transmission (Abstract of Bachl et al. wherein the scheduling request has a first resource in the channel and other control information, such as the CQI, has a second resource in the channel).

Therefore, it would have been obvious to one of ordinary skill in the art at the time the applicant's invention was made to incorporate the teachings of Papasakellariou et al. in order to multiplex ACK/NACK transmissions with CQI transmissions when possible.

47. **Regarding claim 54**, Bachl et al. discloses the claimed invention above but does not specifically disclose *for the case where the user equipment desires to transmit a scheduling request, transmit a channel quality indicator, and transmit an acknowledgment/negative acknowledgment, transmitting the acknowledgment/negative acknowledgment with the scheduling request on the scheduling request resource and not transmitting the channel quality indicator leaving the at least one other resource unused; or for the case where the user equipment does not desire to transmit a scheduling request and does desire to transmit a channel*

Art Unit: 2477

quality indicator and an acknowledgment/negative acknowledgement, transmitting the acknowledgment/negative acknowledgement and the channel quality indicator on the at least one other resource and leaving the scheduling request resource unused.

However, Papasakellariou et al. discloses a method for multiplexing an ACK/NACK signal and a CQI signal (See Abstract). Bachl et al. discloses a case wherein there is an ACK/NACK to transmit but *there is no desire to transmit a scheduling request*, and the ACK/NACK is transmitted on its allocated resource (i.e. *transmitting on the at least one other resource*) in PUCCH while the *scheduling resource is left unused* (Paragraph 0038 and Figure 4, See steps 445, 450, and 460). In Papasakellariou et al., *there is a desire to transmit a channel quality indicator and an acknowledgment/negative acknowledgement* as evidenced by the multiplexing of the two in the abstract. In paragraph 0062, Papasakellariou et al. discloses that a CQI transmission, which is periodic in nature, may occur in the same sub-frame as the ACK/NACK transmission. Since the ACK/NACK transmission cannot be postponed, it is beneficially multiplexed with the CQI transmission and transmitted from the mobile unit to the base station (i.e. *transmitting the acknowledgment/negative acknowledgement and the channel quality indicator on the at least one other resource and leaving the scheduling request resource unused*). By incorporating Papasakellariou et al. into Bach et al., the system is able to multiplex ACK/NACK and CQI while maintaining CQI performance and ACK/NACK accuracy (Paragraph 0068).

Therefore, it would have been obvious to one of ordinary skill in the art at the time the applicant's invention was made to incorporate the teachings of Papasakellariou et al. into Bachl

Art Unit: 2477

et al. in order to multiplex ACK/NACK and CQI while maintaining CQI performance and ACK/NACK accuracy.

Conclusion

Any inquiry concerning this communication or earlier communications from the examiner should be directed to OTIS L. THOMPSON, JR whose telephone number is (571)270-1953. The examiner can normally be reached on Monday to Thursday 7:30 am to 5:00 pm EST.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Chirag Shah can be reached on (571)272-3144. The fax phone number for the organization where this application or proceeding is assigned is 571-273-8300.

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/OTIS L THOMPSON, JR/
Primary Examiner, Art Unit 2477

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