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State Intellectual Property Office

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Room 2105, Building B, Century Science and Trade Building, No. 66, Zhongguancun East Road, Haidian District, Beijing

Beijing Beihui Law Firm Peng Rui, Gao Dong (010-62698598)

Date of publication:

Application number or patent number: 201611098328.7

Publication number:

Case Number: 4W115289

Invention name: A method and device in a UE and a base station for multi-antenna transmission

Patentee: Aurora Technology Consulting Co., Ltd.

Invalidation petitioner: Huang Yanli

Decision on invalidation request

(No. 562088)

According to Article 46, Paragraph 1 of the Patent Law, the State Intellectual Property Office shall

The request for invalidation has been reviewed and the decision is as follows:

☒ All patent rights are declared invalid.

☐ The patent right is partially declared invalid.

☐ Maintain patent rights.

Pursuant to Article 46, Paragraph 2 of the Patent Law, if you are dissatisfied with this decision, you may file a claim within three months from the date of receipt of this notice.

The case was filed with the Beijing Intellectual Property Court, and the other party participated in the litigation as a third party.

Appendix: The main text of the decision is 15 pages (the main text starts from page 2).

Head of the panel: Zhao Bohua

Chief judge: Wu Weimin

Counselor: Wu Lei

Patent Office Reexamination and Invalidation Trial Department

APPLE 1151
Apple v. Apex Beam
IPR2025-00894

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State Intellectual Property Office

Decision on Invalidation Request (No. 562088)

Case Number	No. 4W115289
Decision date	May 25, 2023
Name of invention	A method and device in a UE and a base station for multi-antenna transmission
International Classification Number	H04L 1/00
Invalidation Requester	Huang Yanli
Patentee	Aurora Technology Consulting LLC
Patent No	201611098328.7
Application date	December 03, 2016
Invalidation request date	November 18, 2022
Legal basis	Article 22, Paragraph 3 of the Patent Law

Decision points:

If the technical solution protected by the claim has distinguishing features compared with the reference document that is the closest prior art, but the difference The features are disclosed in another comparative document, and those skilled in the art can make a conclusion based on the prior art and their ordinary knowledge and ability. There is a motivation to apply the technical means disclosed in another comparative document to the closest prior art to solve the same technical problem as this patent. The technical problem is solved, thereby obtaining the technical solution protected by the claim, and the effect obtained is predictable to those skilled in the art. If the invention is not expected or reasonably anticipated, the claim does not involve an inventive step.

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1. Cause of the Case

The invalidation request examination decision involves patent No. 201611098328.7 and patent name “A UE and a base station used for multi-antenna transmission”. The invention patent of "method and device for" (hereinafter referred to as this patent) is filed on December 3, 2016, and the authorization announcement date of this patent is On May 22, 2020, the patent owner was originally Shanghai Langbo Communication Technology Co., Ltd., and later changed to Jiguang Technology Consulting Co., Ltd.

The claims in the patent authorization announcement are as follows:

“1. A method in a user equipment for multi-antenna transmission, comprising the following steps:

-Step A. receiving a first wireless signal;

-Step B. receiving a first signaling;

The first wireless signal is sent by K antenna port groups, and the antenna port group includes a positive integer number of antenna ports; The antenna port group is one of the K antenna port groups; the first signaling is used to determine a first time resource pool; {first At least the latter of the antenna virtualization vector, the second antenna virtualization vector} is associated with the first antenna port group; the first antenna virtualization vector is the available antenna virtualization vector of the sender of the first signaling in the first time resource pool; the second antenna virtualization vector is The available antenna virtualization vector of the user equipment in the first time resource pool; the K is a positive integer greater than 1.

2. The method according to claim 1, further comprising the steps of:

-Step C. receiving a second signaling;

-Step D. operating a second wireless signal in the first time resource sub-pool;

The operation is receiving, or the operation is sending; the second signaling is used to determine the first time resource pool from the first time resource pool. The first time resource subpool, the second signaling is used to determine {occupied frequency domain resources, MCS, HARQ process of the second wireless signal number, RV, NDI, transmitting antenna port}.

3. The method according to claim 2, characterized in that the step C further comprises:

-Step C1. Monitoring the second signaling in the second time resource pool;

The second signaling occupies at most one time resource block in the second time resource pool, and the second time resource pool includes An integer number of said time resource blocks.

4. The method according to any one of claims 1 to 3, characterized in that the second antenna virtualization vector is used for The received simulated beamforming of the first signaling is described.

5. The method according to any one of claims 1 to 3, characterized in that the step B further comprises step B0:

- Step B0: receiving first information;

The first information is used to determine the first antenna port group.

6. The method according to any one of claims 1 to 3, characterized in that the step A further comprises step A0:

- Step A0: Sending second information;

The second information is used to determine K1 antenna port groups, the K1 antenna port groups belong to the K antenna port groups,

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The first antenna port group is one of the K1 antenna port groups: and K1 is a positive integer.

7. The method according to any one of claims 1 to 3, characterized in that the first time resource pool is non-

continuously.

8. The method according to any one of claims 1 to 3, characterized in that the first signaling is semi-static signaling.

9. A method in a base station for multi-antenna transmission, comprising:

-Step A. Sending a first wireless signal;

-Step B. Sending a first signaling;

The first wireless signal is sent by K antenna port groups, and the antenna port group includes a positive integer number of antenna ports;

The antenna port group is one of the K antenna port groups; the first signaling is used to determine a first time resource pool; {first

At least the latter of the antenna virtualization vector, the second antenna virtualization vector} is associated with the first antenna port group; the first antenna virtualization vector

is the available antenna virtualization vector of the sender of the first signaling in the first time resource pool; the second antenna virtualization vector is

The available antenna virtualization vector of the target receiver of the first signaling in the first time resource pool; the K is a positive integer greater than 1.

10. The method according to claim 9, further comprising the steps of:

-Step C. Sending a second signaling;

-Step D. Execute a second wireless signal in the first time resource sub-pool;

wherein the execution is sending, or the execution is receiving; the second signaling is used to determine the first time resource pool from the first time resource pool

The first time resource subpool; the second signaling is used to determine the {occupied frequency domain resources, MCS, HARQ process of the second wireless signal

number, RV, NDI, transmitting antenna port}.

11. The method according to claim 10, characterized in that said step C further comprises:

-Step C1. Sending the second signaling in a second time resource pool;

The second signaling occupies at most one time resource block in the second time resource pool, and the second time resource pool includes

An integer number of said time resource blocks.

12. The method according to any one of claims 9 to 11, characterized in that the second antenna virtualization vector is used

The reception of the first signaling simulates beamforming.

13. The method according to any one of claims 9 to 11, characterized in that the step B further comprises step B0:

- Step B0: Sending first information;

The first information is used to determine the first antenna port group.

14. The method according to any one of claims 9 to 11, characterized in that the step A further comprises step A0:

- Step A0: receiving second information;

The second information is used to determine K1 antenna port groups, the K1 antenna port groups belong to the K antenna port groups,

The first antenna port group is one of the K1 antenna port groups; and K1 is a positive integer.

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15. The method according to any one of claims 9 to 11. characterized in that the first time resource pool is

Non-continuous.

16. The method according to any one of claims 9 to 11, characterized in that the first signaling is semi-static signaling.

17. A user equipment for multi-antenna transmission, comprising the following modules:

- A first module, receiving a first wireless signal;

- A second receiving module, receiving the first signaling;

The first wireless signal is sent by K antenna port groups, and the antenna port group includes a positive integer number of antenna ports;

The antenna port group is one of the K antenna port groups; the first signaling is used to determine a first time resource pool; {first

At least the latter of the antenna virtualization vector, the second antenna virtualization vector} is associated with the first antenna port group; the first antenna virtualization vector

is the available antenna virtualization vector of the sender of the first signaling in the first time resource pool; the second antenna virtualization vector is

The available antenna virtualization vector of the user equipment in the first time resource pool; the K is a positive integer greater than 1.

18. The user equipment according to claim 17, characterized in that it comprises the following modules:

- A third receiving module. receiving a second signaling:

- A second module, operating a second wireless signal in the first time resource sub-pool;

wherein the operation is receiving; or the operation is sending; the second signaling is used to determine the first time resource pool from the first time resource pool

The first time resource subpool, the second signaling is used to determine {occupied frequency domain resources, MCS, HARQ process of the second wireless signal

number, RV, NDI, transmitting antenna port}.

19. The user equipment according to claim 18, wherein the third receiving module monitors the first

Second signaling; wherein the second signaling occupies at most one time resource block in the second time resource pool, and the second time resource pool includes

A positive integer number of the time resource blocks is enclosed.

20. The user equipment according to any one of claims 17 to 19, wherein the second antenna virtualization vector is

Reception analog beamforming for the first signaling.

21. The user equipment according to any one of claims 17 to 19, wherein the second receiving module receives the first

information;

The first information is used to determine the first antenna port group.

22. The user equipment according to any one of claims 17 to 19, wherein the first module sends second information;

The second information is used to determine K1 antenna port groups, the K1 antenna port groups belong to the K antenna port groups, and the

An antenna port group is one of the K1 antenna port groups; and K1 is a positive integer.

23. The user equipment according to any one of claims 17 to 19, wherein the first time resource pool is in the time domain

The above is non-continuous.

24. The user equipment according to any one of claims 17 to 19, characterized in that the first signaling is semi-static signaling.

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25. A base station device for multi-antenna transmission. comprising:

- A third module, sending a first wireless signal;

- A second sending module, sending a first signaling;

The first wireless signal is sent by K antenna port groups, and the antenna port group includes a positive integer number of antenna ports;

The antenna port group is one of the K antenna port groups; the first signaling is used to determine a first time resource pool; {first

At least the latter of the antenna virtualization vector, the second antenna virtualization vector} is associated with the first antenna port group; the first antenna virtualization vector

is the available antenna virtualization vector of the sender of the first signaling in the first time resource pool; the second antenna virtualization vector is

The available antenna virtualization vector of the target receiver of the first signaling in the first time resource pool; the K is a positive integer greater than 1.

26. The base station device according to claim 25, characterized in that it comprises:

- A third sending module, sending a second signaling;

-A fourth module, executing a second wireless signal in the first time resource sub-pool;

wherein the execution is sending; or the execution is receiving; the second signaling is used to determine the first time resource pool from the first time resource pool

The first time resource subpool, the second signaling is used to determine {occupied frequency domain resources, MCS, HARQ process of the second wireless signal

number, RV, NDI, transmitting antenna port}.

27. The base station device according to claim 26, characterized in that the third sending module sends the first

Second signaling; wherein the second signaling occupies at most one time resource block in the second time resource pool, and the second time resource pool includes

A positive integer number of the time resource blocks is enclosed.

28. The base station device according to any one of claims 25 to 27, wherein the second antenna virtualization vector is

Reception analog beamforming for the first signaling.

29. The base station device according to any one of claims 25 to 27, characterized in that the second sending module sends the first

Information; wherein the first information is used to determine the first antenna port group.

30. The base station device according to any one of claims 25 to 27, characterized in that the third module receives second information;

The second information is used to determine K1 antenna port groups, the K1 antenna port groups belong to the K antenna port groups, and the

An antenna port group is one of the K1 antenna port groups; and K1 is a positive integer.

31. The base station device according to any one of claims 25 to 27, characterized in that the first time resource pool is in the time domain

The above is non-continuous.

32. The base station device according to any one of claims 25 to 27, wherein the first signaling is semi-static signaling.

Regarding the above-mentioned patent rights, Huang Yanli (hereinafter referred to as the applicant) filed a request for invalidation with the National Intellectual Property Administration on November 18, 2022.

The applicant requested that all claims 1-32 of this patent be declared invalid, and submitted the patent authorization announcement text CN108155923B.

The grounds for invalidity are: Claims 1-32 are not supported by the description and the scope of protection is unclear, which does not comply with the provisions of Article 26, Paragraph 4 of the Patent Law;

The patent specification is not fully disclosed and does not comply with the provisions of Article 26, paragraph 3 of the Patent Law.

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After passing the formal review, the National Intellectual Property Administration accepted the above-mentioned invalidation request on December 5, 2022, and sent the invalidation request and

The text of this patent authorization announcement is forwarded to the patent owner, requiring him to reply within the specified time limit. At the same time, a collegial group will be established to review this case.

The petitioner submitted a statement of opinion and the following attachments on December 19, 2022:

Appendix 1: Patent authorization announcement text CN108155923B;

Appendix 2: The patent publication CN108155923A, published on June 12, 2018;

Appendix 3: Comparison of the revised specification submitted on September 11, 2018 during the substantive examination stage of this patent, which the applicant used to claim the existence of this patent

Modify out-of-scope issues;

Appendix 4 (hereinafter referred to as comparative document 1): Chinese invention patent CN108111198A, application date November 24, 2016, publication date 2018

June 1, 2019;

Appendix 5 (hereinafter referred to as comparative document 2): Chinese invention patent CN104620551A, published on May 13, 2015,

Annex 6 (hereinafter referred to as Reference Document 3): 3GPP TSG RAN WG1 87th meeting proposal R1-1612190 and its Chinese translation, requesting

The person claimed that the date of publication was November 18, 2016;

Annex 7 (hereinafter referred to as Reference Document 4): 3GPP TSG RAN WG1 86bis meeting proposal R1-1609080 and its Chinese translation, please

The petitioner claimed that the date of publication was October 14, 2016;

Annex 8 (hereinafter referred to as Reference Document 5): 3GPP TSG RAN WG1 86bis meeting proposal R1-1609256 and its Chinese translation, please

The petitioner claimed that the date of publication was October 14, 2016;

Annex 9 (hereinafter referred to as Reference Document 6): International Patent Application WO2015166840A1 and its Chinese Translation, published on November 5, 2015

Day;

Annex 10 (hereinafter referred to as Reference Document 7): International Patent Application WO2015113205A1, published on August 6, 2015;

Annex 11 (hereinafter referred to as Reference Document 8): 3GPP TSG RAN WG1 87th meeting proposal R1-1611386 and its Chinese translation, please

The petitioner claimed that the date of publication was November 18, 2016;

Annex 12 (hereinafter referred to as Reference Document 9): Proposal R1-1611421 of the 87th meeting of 3GPP TSG RAN WG1 and its partial Chinese translation,

The applicant claims that the publication date was November 18, 2016.

The grounds for invalidation raised by the applicant are: (1) the technical solutions of claims 1-32 exceed the scope recorded in the original application documents and do not comply with the Patent Law.

Article 33; (2) the disclosure of this patent specification is insufficient and does not comply with Article 26, paragraph 3 of the Patent Law; (3) Claims 1-32

It is not supported by the description and the scope of protection is unclear, which does not comply with the provisions of Article 26, Paragraph 4 of the Patent Law; (4) Reference document 1 is the

Conflicting application, comparative documents 2-9 are prior art; claims 1, 5-9, 13-17, 21-25, 29-32 are not novel relative to comparative document 1

Compared with the reference document 2, claims 1, 4-6, 9, 12-14, 17, 20-22, 25, 28-30 are not novel and do not comply with the provisions of Article 1 of the Patent Law.

Article 22, paragraph 2; (5) Comparative Document 2/Comparative Document 4/Comparative Document 5/Comparative Document 6/Comparative Document 8/Comparative Document 9 as

The closest prior art, combined with other comparative documents or common knowledge in the field, claims 1-32 do not have creativity and do not comply with the Patent Law.

The provisions of Article 22, paragraph 3.

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The panel issued a notice of forwarding documents on January 9, 2023, forwarding the petitioner's statement of opinion and

The attachments shall be forwarded to the patent owner.

In response to the applicant's request for invalidation, the patent owner submitted a statement of opinion on January 4, 2023, arguing that the patent complies with the Patent Law.

According to the relevant provisions of the law, the applicant's grounds for invalidity are not valid.

The panel sent a document transfer notice to the applicant on January 11, 2023, forwarding the patent owner's opinion submitted on January 4, 2023 to the applicant.

See statement forwarded to petitioner.

In response to the petitioner's statement of opinion filed on December 19, 2022, the patent owner filed a statement of opinion on February 9, 2023.

The patent is believed to comply with the relevant provisions of the Patent Law and the applicant's invalidation reasons are not established. The Chinese translation of the reference document 8 is partially submitted.

Objection to Rong's translation.

The panel sent a document transfer notice to the applicant on February 15, 2023, forwarding the patent owner's opinion submitted on February 9, 2023 to the applicant.

See statement forwarded to petitioner.

The collegial panel sent a notice of oral hearing to both parties on February 28, 2023, and the oral hearing was scheduled for April 25, 2023.

The applicant submitted the relevant materials of the trusted timestamp certification on April 23. 2023. The panel sent a letter to the applicant on April 26. 2023.

The patentee shall issue a document transfer notice to transfer the relevant materials of the trusted timestamp certification certificate submitted by the patent owner on April 23, 2023 to the applicant.

The oral hearing was held as scheduled. Both parties attended the oral hearing. The following matters were clarified during the oral hearing:

1. Both parties have no request for the members of the collegial panel to recuse themselves, and have no objection to the identity and qualifications of the other party's persons appearing in court.

2. The applicant acknowledged the objection to the partial translation of the comparative document 8 submitted by the patentee, and submitted the following common knowledge evidence in court:

Common knowledge evidence: Cover, copyright page, translator's preface, introduction, pages 207-210 of "3G Evolution HSPA and LTE (2nd Edition)",

Copy of the back cover page, translated by Du Jiuhui, Liao Qingyu, Xu Bin, etc., Posts and Telecommunications Press, first printing in April 2010.

3. The patent owner verified the original time stamp certification certificate submitted by the applicant in court and verified the authenticity and disclosure time of all evidence submitted by the applicant.

There was no objection to the translation of the reference document 8, except for the objection to the partial translation of the reference document 8. The patentee verified in court

The original evidence of common knowledge submitted by the applicant has no objection to the authenticity and disclosure time of the evidence of common knowledge, but believes that the evidence of common knowledge

The summary of the contents of sexual evidence mentions that it can be used as a teaching reference book, but does not mention that it can be used as a teaching material. Therefore, it cannot be used as common knowledge evidence.

4. During the oral proceedings, both parties fully expressed their opinions on the basis of adhering to their written opinions.

At this point. the collegial panel believes that the facts of the case are clear and a review decision can be made.

II. Reasons for the decision

1. Review Basis

The patentee did not modify the claims during the invalidation stage. The examination text of this invalidation request is the patent grant document.

Claims 1-32 of the patent announcement.

(II) Evidence identification

Comparative Document 2 is a Chinese patent document. The patentee has no objection to the authenticity and publication time of Comparative Document 2.

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It is also recognized that the publication date of comparative document 2. May 13. 2015. is earlier than the application date of this patent. which can be used to evaluate the inventiveness of this patent.

Comparative Documents 3 and 9 are copies of 3GPP meeting proposals. The applicant submitted a trusted timestamp certification certificate to prove that the comparative documents

In order to verify the authenticity and publication time of Document 3 and Comparative Document 9, the patentee verified the original time stamp certification certificate submitted by the applicant and compared the comparative documents.

The authenticity and disclosure time of Document 3 and Comparative Document 9 are not disputed, and the collegial panel also approves them after verification.

The dates are all November 18, 2016, which is earlier than the application date of this patent and can be used as prior art to evaluate the inventiveness of this patent.

The collegial panel has verified that the common knowledge evidence submitted by the applicant in court, "3G Evolution HSPA and LTE (2nd Edition)", is

The latter paragraph records that "This book is an essential reference guide for personnel in the mobile communications industry, and is also a rare teaching reference for teachers and students in related majors in colleges and universities.

The book was printed in April 2010, earlier than the application date of this patent. Therefore, the panel recognized that the book could serve as evidence of common knowledge.

according to.

The patent owner has no objection to the accuracy of the Chinese translation of the comparative documents 3 and 9. Therefore, the translation of the comparative documents 3 and 9 is based on the content submitted by the applicant.

shall prevail.

(III) Article 22, Paragraph 3 of the Patent Law

Article 22. Paragraph 3 of the Patent Law stipulates: Creativity means that the invention has outstanding substantive features and significant progress compared with the existing technology.

The utility model has substantial features and progress.

1. Claim 1 claims a method in a user equipment for multi-antenna transmission, and reference 2 discloses a method for a user equipment having a large number of antennas.

Device and method for control channel beam management in a wireless system (see paragraphs [0003], [0078]-[0217] of the specification of comparative document 2, and Figures 5-15

and Figure 25):

[0003] The PDCCH is included in one or more transmit (TX) beams. A TX beam is composed of a cell-specific reference signal transmitted through the TX beam.

The TX beam is configured to carry a beam identifier, and the PDCCH is configured to include resource allocation information for the user equipment.

breath.

[0078] The base station may use one or more antennas or antenna arrays to perform beamforming. The antenna array may form beams with different widths.

beam (e.g., wide beam, narrow beam, etc.). Downlink control channel information, broadcast signals and messages, and broadcast data channels and control channels can be

For example, it may be transmitted in a wide beam. A wide beam may include a single wide beam transmitted simultaneously or a plurality of narrow beams transmitted at successive times. Multicast and

Unicast data as well as control signals and messages may be sent, for example, in narrow beams.

[0080] The mobile station (MS) may also use one or more antennas or antenna arrays to perform beamforming (equivalent to multi-antenna transmission).

Like the BS antenna array, the antenna array at the MS can form beams with different widths (eg,

Broadcast signals and messages as well as broadcast data channels and control channels can be sent, for example, in wide beams. Multicast and unicast data

Data as well as control signals and messages may be sent, for example, in narrow beams.

FIG. 5A illustrates a simulated waveform for multiple-input multiple-output (MIMO) baseband processing and utilizing a large number of antennas according to an embodiment of the present disclosure.

The transmit path 500 includes a beamforming architecture in which all signals output from the baseband processing are fully connected to the antenna array.

All phase shifters and power amplifiers (PA) in the series.

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FIG. 5C illustrates a receive path for MIMO baseband processing and analog beamforming using a large number of antennas according to an embodiment of the present disclosure.

The receive path 550 includes a beamforming architecture in which all signals received at the RX antenna are passed through an amplifier (eg, a low noise amplifier)

The signals are then combined to form an analog stream that can be further converted to a baseband signal and processed in baseband.

[0123] In the example shown in Figure 9, UE 116 measures the TX beam 905 of BS 102. A strong beam TX B1 910 is found.

UE 116 may then let BS 102 know that TX B1 910 is strong. BS 102 may then send a signal on BS TX B1 beam 910.

The UE 116 may send information, such as resource allocation for data communication for the UE 116. When certain conditions are met, such as if the UE 116 increases its mobile

If the UE 116 has high mobility, it can find two strong BS TX beams, for example, TX B1 910 and TX B4 915. The UE 116 can

BS 102 reports detection of two strong beams. BS 102 then sends information on BS TX B1 910 and BS TX B4 915,

Such as resource allocation for data communication for UE 116.

[0128] In some embodiments, the data control beam may carry a reference signal. After the UE 116 measures the reference signal, it may send a

BS 102 sends a measurement report (1005). BS 102 may then decide (1010) how to deliver the data control beam to UE 116, such as in the data

BS 102 may include more beams in the data control beam set or remove beams from the data control beam set based on, for example, the MS measurement report.

The BS 102 sends a configuration with scan and scan report to the UE 116.

In response, UE 116 sends a scan report to BS 102 (1020).

[0130] In some embodiments, if BS 102 steers its TX beam (equivalent to the user equipment receiving the first wireless signal), the MS (ie,

UE 116 measures the pair of BS TX beam and MS RX beam. UE 116 sends a measurement report on the data control beam to BS 102

1105. The measurement report 1105 may include information such as good or preferred BS TX data control beams, measurement results (such as signal strength,

SINR, SIR, SNR, etc.) etc. Then, BS 102 decides (1110) which one or more data control beams include information, such as for UE 116

BS 102 sends resource allocation information to UE 116 regarding the BS TX to be used.

UE 116 may send a confirmation 1120 regarding message 1115. BS 102 may transmit the determined beam using the determined beam.

The UE 116 uses (1130) the good beam (e.g., base station 1120) corresponding to the notified BS TX beam.

The BS TX beam is received by measuring the RX beam with good signal quality.

[0138] The measurement report 1405 from the UE 116 may be configured to include information such as good BS TX beams and MS RX beams.

Beam pairs, and MS RX beam capabilities, such as which RX beams can be steered or formed in parallel, etc. Report 1405 Alternatively

Sets of beam pairs that the UE 116 can receive may be included, and so on, where in each set, the beam pairs can be received in parallel.

[0139] Based on the report, BS 102 determines (1410) which data control beam or beams include information for UE 116 (e.g.,

BS 102 may decide (1415) a transmission scheme for the selected beam of UE 116, e.g., whether to steer the beam or transmit it across multiple

Information is sent in parallel on the beams.

[0140] BS 102 sends information 1420 including the TX beam it is to use to UE 116. Information 1420 may also include the BS TX beam.

How the beams are sent, for example, by steering, or the beams are sent in parallel.

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[0146] The following procedures describe some examples. Example setup As in FIG. 12, BS 102 has four TX beams. UE 116 has

Three RX beams from the same or different RF chains.

[0147] If BS TX B1 and BS TX B4 are formed in parallel (in the time domain), where they may have some spacing in the frequency domain,

and TX B1 and TX B4 carry different information, then UE 116 may use RX B2 or B3 on RF chain 1 1220 and RX B4 on RF chain 2 1221.

2 RX B1 on 1225 to receive BS TX B1 and BS TX B4 in parallel and decode the information on BS TX B1

and information on BS TX B4.

[0148] If UE 116 determines the good BS TX and MS RX pairs: (TX B1, RX B3), (TX B4, RX B2), and

And assume that RX B2 and RX B3 cannot be formed simultaneously on RF chain 1 1220, such as due to directional limitations, orientation, etc., and RF chain

2 1225 cannot form beam B2 or B3. Then UE 116 can only use RX B2 or RX B3, and UE 116 sends beam B2 or B3 to BS 102.

BS 102 then notifies UE 116 which TX beam it will use, e.g.

UE 116 is informed that BS 102 will use TX Bl, and then UE 116 will use RX B3 to receive beam TX Bl.

[0153] In some embodiments, the control beams may be multiplexed in the time domain or the frequency domain, or in the spatial domain, or a mixture of the three domains.

When beams are multiplexed in the spatial domain, the beams can share the same time and frequency. Alternatively, the beams can be multiplexed in the joint spatial and frequency domains.

Alternatively, the beams can be multiplexed in the joint spatial and temporal domains, while they share the same frequency.

Rate.

[0215] In the PDCCH, the BS 102 may send (2415) information about the next PDSCH (Physical Downlink Shared

Then, UE 116 receives (2420) using the RX beam.

[0217] BS 102 sends (2505) synch, BCH, CRS on B1-B4. UE 116 optionally performs downlink measurements (2510).

BS 102 sends (2515) PDCCH, CRS on B1, B2, etc. BS 102 sends (2520) PDSCH to UE 116. In some implementations

In this example, BS 102 transmits (2520) a PDSCH on the same beam as the PDCCH, and UE 116 receives the PDSCH on the same beam as the PDCCH.

UE 116 receives PDSCH on the same RX beam. UE 116 sends an uplink message to BS 102 (2525). BS 102 optionally performs uplink measurement.

BS 102 sends (2535) a PDCCH beam or a UE-specific PDCCH beam and sends (2540) a PDSCH. In response, UE 116

The PUSCH is sent (2545) to the BS 102. The BS 102 sends (2550) the CRS on beams B1, B2, etc. The UE 116 may optionally perform downlink

Link measurement (2555). UE 116 sends an uplink message (2560) to BS 102. BS 102 sends (2565) a PDCCH beam or UE-specific

102 and transmits (2570) the PDSCH. In response, UE 116 transmits (2575) the PUSCH to BS 102. UE 116 may

The PUSCH is sent on the same beam as the one used by the UE 116 to receive the PDSCH, and the BS 102 may utilize the same beam as the one used by the UE 116 to receive the PDCCH.

The same RX beam receives PUSCH.

The patentee believes that: Comparative Document 2 does not disclose antenna ports, antenna port groups, time resource pools, antenna virtualization vectors, that is, antenna

ports, antenna port groups, time resource pools, antenna virtualization vectors, etc. Therefore, the comparative document 2 does not disclose claim 1

The following feature in “the first wireless signal is sent by K antenna port groups, and the antenna port group includes a positive integer number of the antenna ports;

The first antenna port group is one of the K antenna port groups; the first signaling is used to determine a first time resource pool;

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At least the latter of the first antenna virtualization vector and the second antenna virtualization vector is associated with the first antenna port group; the first antenna virtualization vector

The quantity is the antenna virtualization vector available to the sender of the first signaling in the first time resource pool; the second antenna virtualization vector is

the available antenna virtualization vector of the user equipment in the first time resource pool; and K is a positive integer greater than 1. ”

In this regard, the panel believes that: First, regarding antenna ports and antenna port groups, the relevant content recorded in this patent specification is "as a

In an embodiment, the antenna port is formed by superimposing multiple physical antennas through antenna virtualization, and the mapping of the multiple physical antennas to the antenna port

The radiation coefficients form an antenna virtualization vector for the antenna virtualization" (see paragraph 0020 of this patent specification), "the K antenna ports

The groups correspond to K different beam groups respectively” (see paragraph 0322 of this patent specification) and “as an embodiment, one of the antenna port groups

only includes one antenna port" (see paragraph 0039 of this patent specification), "as an embodiment, one of the antenna port groups includes 2

Antenna port” (see paragraph 0040 of this patent specification), “As an embodiment, the first antenna port group includes L antenna ports;

The L is a positive integer” (see paragraph 0064 of this patent specification). It can be seen that according to the description of this patent specification and the drawings, this patent

The antenna port group in the example includes one or more antenna ports, and the multiple TX beams of the base station correspond to the antenna port group, and the antenna port group corresponds to the time

The accompanying drawings 9 and 15 in Comparative Document 2 and the corresponding description in the specification show that the base station can manipulate multiple TX beams to control the beam

The beams can be multiplexed in the time domain or the frequency domain. or in a mixture of the three domains in the spatial domain (see paragraph 0153 of the specification of reference document 2). the base station

It can be determined which one or more data control beams include information for the terminal (eg, resource allocation information). The base station can determine which one or more data control beams include information for the terminal (eg, resource allocation information).

The transmission scheme of the selected beam, for example, whether to steer the beam or send information in parallel on multiple beams (see the specification of reference document 2, No. 0139

), and disclosed that “the TX beam is defined by a cell-specific reference signal (CRS) transmitted through the TX beam” (see reference document 2).

0003 of the specification) and “A base station may use one or more antennas or antenna arrays to perform beamforming. Antenna arrays may form beams with different

beams of the same width (e.g., wide beams, narrow beams, etc.)” (see paragraph 0078 of the specification of reference document 2). At the same time, those skilled in the art

According to the common technical knowledge, the antenna port is defined as

The channel on which a symbol is transmitted on an antenna port can be inferred from the channel on which another symbol on the same antenna port is transmitted, i.e., the antenna port is related to

The logical concepts related to the physical layer do not refer to specific physical antennas. Antenna ports are defined by antenna port-specific reference signals (reference

See Common Knowledge Evidence, p. 209), so it can also represent RS ports; the mapping of antenna ports to physical antennas is formed by antenna virtualization,

The mapping coefficients of the antenna virtualization constitute the beamforming vector. Therefore, the technical solution protected by claim 1 of this patent is compared with the technical solution disclosed in reference document 2.

Compared with the content, it can be seen that the TX beam in Comparative Document 2 corresponds to the antenna port group, which is composed of antenna virtualization vectors.

The base station has multiple TX beams (equivalent to K antenna port groups) and manipulates multiple TX beams. that is. the reference document 2 discloses the “first wireless signal

The signal is transmitted by K antenna port groups, wherein the antenna port group includes a positive integer number of the antenna ports, and the first antenna port group is the K antenna ports.

An antenna port group in a port group; said K is a positive integer greater than 1".

Secondly, paragraphs [0123], [0130], [0148] and [0215] of the specification of Comparative Document 2 all disclose that the base station transmits a signal to the user device through the TX beam.

The UE sends resource allocation information to the user equipment, and the UE uses the corresponding RX beam to receive the BS TX beam according to the notification of the base station.

2 Paragraph [0153] of the specification discloses that control beams can be multiplexed in the time domain or the frequency domain. It can be seen that the allocated resources disclosed in the reference document 2

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That is, the beam information used by the user equipment for reception, the available beams corresponding to the available time resources, the TX beams and RX beams available to the base station and the user equipment

A beam is equivalent to a time resource pool, and thus the resource allocation information is equivalent to information used to determine the first time resource pool.

Again, paragraph [0130] of the specification of Reference Document 2 discloses that "BS 102 transmits (1125) a data control beam using the determined beam to be transmitted."

The UE 116 uses (1130) the good beam (e.g., based on the measurement having good signal quality) corresponding to the notified BS TX beam.

The RX beam of the BS is used to receive the BS TX beam. The technicians in this field can understand the following problems based on the common technical knowledge they have mastered and the above-mentioned patent and the comparative example.

Document 2 and common sense evidence show that the beam can be represented by the antenna virtualization vector, so the beam used by the BS to send data control beam

The beam is equivalent to the first antenna virtualization vector available in the resource pool of the base station at the first time, and the beam used by the UE is equivalent to the first antenna virtualization vector available in the resource pool of the user equipment at the first time.

The available second antenna virtualization vector in the source pool, the beam used by the UE corresponds to the beam notified by the BS, which is equivalent to the second antenna virtualization vector.

The quantity is associated with the first antenna port group, so the reference document 2 discloses the quantity in "{first antenna virtualization vector, second antenna virtualization vector}".

The latter is associated with the first antenna port group; the first antenna virtualization vector is the sender of the first signaling in the first time resource

The second antenna virtualization vector is an available antenna virtualization vector of the user equipment in the first time resource pool.

Antenna Virtualization Vector".

Therefore, compared with the content disclosed in the comparative document 2, the difference between the technical solution protected by claim 1 and the content disclosed in the comparative document 2 is that: receiving the first signaling.

The first signaling is used to determine the first time resource pool. Based on the technical effect obtained by the above distinguishing features, it is determined that claim 1 actually solves

The technical problem is: how to transmit resource allocation information to user equipment

Regarding the above distinguishing features, Reference Document 3 discloses a discussion on the DCI content for NR PDCCH, specifically disclosing the following content (see

See reference 3 (full text of Chinese translation):

"The main DCI contents considered in LTE are summarized as follows:

1. Public control signaling

2. UE-specific scheduling information: includes scheduling information for data transmission and the corresponding HARQ transmission of the scheduled data

a) Resource allocation information

b) MCS indicator

c) HARQ process related signaling, such as HARQ process number, RV and NDI

d) MIMO process related signaling, such as PMI, RI, DMRS settings, etc.

Others: carrier indicator, DCI format flag, codeword exchange flag, frequency hopping flag, etc.

One possible approach is to implicitly signal the UE via scheduling information (i.e., time domain resource allocation information) for the subframe/time slot UL/DL direction.

and duration; another way is to explicitly signal the subframe/time slot configuration to the UE by introducing a new format field in the DCI content. "

It can be seen that the reference document 3 discloses transmitting resource allocation information to the UE through DCI signaling, and the resource allocation information includes time domain resource configuration information.

information, and the base station also allocates time domain resources to the user equipment through signaling, so the comparative document 3 provides the application of its technical means to the comparative document.

For those skilled in the art, the technical enlightenment of claim 1 can be obtained by combining comparative document 2 with comparative document 3.

The solution is obvious to those skilled in the art, and claim 1 does not have a prominent advantage over the combination of reference 2 and reference 3.

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Substantial features and significant progress do not constitute inventive step as stipulated in Article 22. Paragraph 3 of the Patent Law.

2. Dependent claim 2 refers to claim 1. Reference document 9 discloses beam management for control channels, specifically disclosing the following contents:

(See the full Chinese translation of D29):

"After beam measurement, the UE reports multiple desired Tx beam IDs, which may contain multiple desired Tx beam IDs that are associated with different Rx beams via QCL/QCB[5].

Then a beam resource pool is established. The beam group used for DL control channel transmission should be determined by considering one of the beam resource pools.

For example, as shown in Figure 1, the UE reports two beam groups, namely beam group A and beam group B, where

The corresponding beams are Rx Beam 1 and Rx Beam 2. If the gNB selects beam group B to send the DL control channel at the scheduling point, the UE

"

Rx beam 1 is selected as dictated by some predefined rules.

"DL control channels can dynamically configure and indicate different information of data channels, but it is necessary to carefully study how DL control channels are sent or

Since the DL control channel should be applicable to various scenarios and use cases, it is best to perform DL control through specific signaling instructions.

There is some flexibility in the configuration of channel transmission. MAC or RRC signaling can be considered. At the same time, the earlier DL control channel can also be used

In addition, some time or frequency modes can be used for DL control channel transmission with different configurations, such as

different beam widths or different beam groups or different transmission schemes. The time or frequency patterns can be predefined or configured in a semi-static manner. For example.

The DL control channel transmission in FIG3 uses a variety of transmission schemes. Based on transmission scheme 1, it is assumed that each subframe contains time slots 1, 4,

The time slot pattern 1 of 7 is used for the transmission of DL control channels, while based on the transmission scheme 2, it is assumed that the remaining time slots in each subframe are used for DL control channels.

transmission of the road."

It can be seen that the multiple time slots occupied by the transmission scheme of the control channel configured in the reference document 9 are equivalent to the first time resource pool, one of which is

The slot is equivalent to the first time resource subpool; the earlier DL control channel in reference document 9 can be used for the configuration of the later DL control channel, which is equivalent to receiving

receiving a second signaling, the second signaling being used to determine a first time resource sub-pool from the first time resource pool, and to operate a first time resource sub-pool in the first time resource sub-pool;

2. Wireless signal.

Comparative Document 3 also discloses the following contents (see the full Chinese translation of Comparative Document 3):

"2.UE-specific scheduling information: Includes scheduling information for data transmission and the corresponding HARQ transmission of the scheduled data

e) Resource allocation information

f) MCS indicator

g) HARQ process related signaling, such as HARQ process number, RV and NDI

h) MIMO process related signaling, such as PMI, RI, DMRS settings, etc.

i) Others: carrier indicator, DCI format flag, codeword exchange flag, frequency hopping flag, etc. "

It can be seen that the reference document 3 discloses allocating time resources to UE through signaling, and UE receiving signaling to determine resource allocation for wireless signal transmission.

The transmission antenna port is a common transmission resource, which determines the transmission of wireless signals through signaling.

Transmitting antenna ports are common knowledge in the art. Therefore, reference documents 9 and 3 provide technical methods for applying their technical means to reference document 2.

For those skilled in the art, based on the reference document 2, combined with the reference documents 3, 9 and the common knowledge in the art,

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It is obvious to those skilled in the art that the technical solution of claim 2 is obvious to those skilled in the art. and claim 2 is superior to reference 2 and reference 3.

The combination of Document 3, Reference Document 9 and common knowledge in the field does not have outstanding substantive features and significant progress, and does not meet the requirements of Article 22 of the Patent Law.

The inventive step provided for in paragraph 3 .

3. Dependent claim 3 refers to claim 2. D19 discloses (see above) “DL control through specific signaling instructions”.

There is some flexibility in the configuration of channel transmission. MAC or RRC signaling can be considered. At the same time, the earlier DL control channel can also be used

The latter configuration of the DL control channel is based on transmission scheme 1, assuming that each subframe contains slots 1, 4 and 7.

DL control channel transmission, while based on transmission scheme 2, it is assumed that the remaining time slots in each subframe are used for DL control channel transmission".

Document 9 discloses monitoring the second signal in a time resource corresponding to a specific signal or an earlier DL control channel (equivalent to a second time resource pool).

The signaling occupies a time resource block, and the time resource includes a positive integer number of time resource blocks. It is common knowledge in the art that the signaling occupies a time resource block.

If the second claim does not have the inventive step, the third claim does not have the inventive step as stipulated in Article 22, Paragraph 3 of the Patent Law .

4. Dependent claim 4 refers to any one of claims 1 to 3. Figures 5A to 5D of reference 2 disclose the development of analog beamforming.

The transmission path and the reception path, the description of the comparative document 2 [0130] paragraph discloses (see the same above) that the BS determines the TX wave for sending information for resource allocation.

The UE uses the RX beam corresponding to the notified TX beam to receive the PDCCH. The UE receives the PDCCH on the same RX beam as the TX beam it receives.

The antenna virtualization vector (equivalent to the second antenna virtualization vector) for receiving PDSCH, that is, forming the RX beam for receiving PDSCH, is also used

The receiving analog beamforming for receiving resource allocation information is also a common technical means in this field to transmit resource allocation information through signaling.

Therefore, if claims 1 to 3 cited by it do not have an inventive step, dependent claim 4 also does not have the inventive step required by Article 22, Paragraph 3 of the Patent Law.

Creativity of regulations.

5. Dependent claim 5 refers to any one of claims 1 to 3, and paragraphs [0123] and [0130] of the specification of reference 2 disclose (see

Same as above) The UE receives notification of the selected TX beam (equivalent to the first information), and the selected TX beam is equivalent to the first antenna port group.

Therefore, if the claims 1 to 3 cited by it do not have an inventive step, the dependent claim 5 does not have an inventive step as required by Article 22, Paragraph 3 of the Patent Law .

Certain creativity.

6. Dependent claim 6 refers to any one of claims 1 to 3, and paragraphs [0146] and [0148] of the specification of reference 2 disclose (see

Same as above) The BS has four TX beams (equivalent to K antenna port groups), and the UE can send notifications using TX B1 or TX B4 (equivalent to

second information is used to determine K1 antenna port groups, the K1 antenna port groups belong to the K antenna port groups, and K1 is a positive integer);

The BS notifies the UE that the BS will use TX B1 (equivalent to the first antenna port group among the K1 antenna port groups).

If claims 1 to 3 do not involve an inventive step, dependent claim 6 also does not involve an inventive step as required by Article 22, paragraph 3 of the Patent Law.

7. Dependent claim 7 refers to any one of claims 1 to 3. Comparative document 9 discloses (see above) that based on transmission scheme 1,

Assume that time slot mode 1, which includes time slots 1, 4, and 7 in each subframe, is used for transmission of the DL control channel (equivalent to the first time resource pool being

Therefore, if claims 1 to 3 cited by it do not have an inventive step, dependent claim 7 also does not have an inventive step under the Patent Law.

Inventive step under Article 22(3) .

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8. Dependent claim 8 refers to any one of claims 1 to 3, and reference 9 discloses (see above) that "the DL control channel can be

Dynamically configure and indicate different information of the data channel, but it is necessary to carefully study the configuration of how the DL control channel is sent or received.

The control channel should be applicable to various scenarios and usage cases, so it is best to have a certain configuration for DL control channel transmission through specific signaling instructions.

MAC or RRC signaling can be considered, and at the same time, the earlier DL control channel can also be used for the configuration of the later DL control channel.

In addition, some time or frequency modes can be used for DL control channel transmission with different configurations, such as different beam widths or different

beam groups or different transmission schemes. The time or frequency patterns may be predefined or configured in a semi-static manner". Thus, in the claims cited therein

If claims 1 to 3 do not possess the inventiveness, dependent claim 8 also does not possess the inventiveness required by Article 22, paragraph 3 of the Patent Law.

9. Claims 9-16 protect a method in a base station for multi-antenna transmission, which comprises the same method steps as those in claims 1-8.

The methods in the user equipment correspond one to one. Based on the similarity of claims 1 to 8, claims 9 to 16 also do not have the characteristics of Article 22, Paragraph 3 of the Patent Law.

The creativity stipulated in paragraph 1.

10. Claims 17-32 protect a user equipment and a base station equipment for multi-antenna transmission, including functions implemented by various functional modules.

can correspond one to one with the method steps in claims 1-16, see claims 1-16 for the description of the disclosure of comparative document 2, comparative document 2

A user equipment and a base station are disclosed. In addition. the method steps for setting various functional modules in the equipment to complete the corresponding functions belong to the common knowledge in the art.

Therefore, based on similar comments as claims 1-16, claims 17-32 are superior to the combination of reference 2 and reference 3 or to the combination of reference 3 and reference 17-32.

The combination of comparative document 2, comparative document 3, comparative document 9 and common knowledge in the field does not possess the creativity stipulated in Article 22, paragraph 3 of the Patent Law.

In view of the fact that the applicant's grounds for invalidation of claims 1-32 of this patent are not inventive, the panel considers the applicant's other grounds for invalidation.

The valid reasons and evidence will not be reviewed further.

Based on the above facts and reasons, the collegial panel of this case made the following review decision.

III. Decision

It is declared that all invention patent rights No. 201611098328.7 are invalid.

If a party is dissatisfied with this decision, it may file a complaint with the Beijing Patent Office within three months from the date of receipt of this decision in accordance with Article 46, Paragraph 2 of the Patent Law.

According to the provisions of this paragraph, after one party files a lawsuit, the other party may participate in the lawsuit as a third party.

Head of the panel: Zhao Bohua Chief

judge: Wu Weimin Counselor: Patent Office Reexamination and Invalidation Trial Department

Wu Lei