



Machine Translation

FEDERAL PATENT COURT

IN THE NAME OF THE PEOPLE

VERDICT

4 Ni 8/20 (EP)
combined with
4 Ni 9/20 (EP)

(file number)

Pronounced on

4 August 2021

...

In the patent invalidity case

...

concerning to European Patent 2 145 404
(DE 60 2008 047 869)

the 4th Board (Invalidity Board) of the Federal Patent Court, based on the oral proceedings of 4 August 2021, by Presiding Judge Grote-Bittner and Judges Dipl.-Phys. Univ. Dipl.-Wirt.-Phys. Arnoldi, Dipl.-Ing. Matter, Dr. Söchtig and Dipl.-Ing. Tischler

ruled:

- I. European patent 2 145 404 is declared partially invalid with effect for the territory of the Federal Republic of Germany in that its claims are replaced by the following:

1. A method comprising:
 - 5 determining (301) whether a resource is allocated for a logical control channel comprising a paging control channel; and
 - defining (303) fields of a physical downlink control channel to signal the resource allocation for the logical control channel comprising the paging control channel, characterized in that
 - 10 the physical downlink control channel has a second format, including the fields defined to signal the resource allocation for the logical control channel comprising the paging control channel, to support resource allocation of the logical control channel comprising the paging control channel, and the physical downlink control channel has a first format, different from the second format, to support transmission of data over a physical downlink shared channel;
 - 15 wherein the method comprises
 - determining (301) whether a resource is allocated for a logical control channel comprising a broadcast control channel; and
 - defining separate fields of the physical downlink control channel to signal the resource allocation for the logical control channel comprising the broadcast control channel, the separate fields being separate from the fields defined to
 - 20 signal the resource allocation for the logical control channel comprising the paging control channel;
 - wherein the physical downlink control channel has a format, including the separate fields, to support resource allocation of the logical control channel comprising the broadcast control channel, wherein the format to support the
 - 25 resource allocation of the logical control channel comprising the broadcast control channel is different from the first format in the physical downlink control

channel to support transmission of data over the physical downlink shared channel.

2. A method comprising:
 - 5 receiving, at a user equipment, via fields, over a physical downlink control channel a resource allocation for a logical control channel comprising a paging control channel, characterized by
receiving, at the user equipment, via separate fields, over the physical downlink control channel, a resource allocation for a logical control channel comprising a
10 broadcast control channel, the separate fields being separate from the fields for receiving the resource allocation for the logical control channel comprising the paging control channel;
employing a second format in the physical downlink control channel to provide the resource allocation of the logical control channel comprising the paging
15 control channel, wherein the second format is different from a first format in the physical downlink control channel to support reception of data over a physical downlink shared channel,
employing a format in the physical downlink control channel to provide the resource allocation of the logical control channel comprising the broadcast
20 control channel,
wherein the format to provide the resource allocation of the logical control channel comprising the broadcast control channel is different from the first format in the physical downlink control channel to support reception of data over the physical downlink shared channel.
25
3. A method according to any of claims 1 to 2, wherein the separate fields include a broadcast channel radio network temporary identity, BCCH-RNTI, field, a redefined portion or entirety of a transport format indicator, TFI, field, a value tag field to indicate a change in broadcast information, a field specifying type of
30 system information block, and a field for segmentation and concatenation information.

4. A method according to any of claims 2 and 3 further comprising:
examining the value tag field to determine whether there is a change in broadcast
information without decoding a corresponding physical downlink shared
5 channel.
5. A method according to any of claims 1 to 4, wherein the separate fields further
include either a redefined hybrid automatic repeat request, HARQ, control field, a
field specifying number of transmission symbols for time division duplex, TDD,
10 idle periods, a field specifying whether reference signal boosting is utilized, an
error detection field, or a combination thereof.
6. A method according to any of claims 1 to 5, wherein the fields for receiving the
resource allocation for the logical control channel comprising the paging control
15 channel include a field specifying a user equipment identifier, a paging channel
radio network temporary identity, PCCH-RNTI, field, a redefined portion or
entirety of a transport format indicator, TFI, field, or a combination thereof.
7. A method according to any of claims 1 to 6, wherein the fields for receiving the
20 resource allocation for the logical control channel comprising the paging control
channel further include a redefined hybrid automatic repeat request, HARQ,
control field, and an error detection field.
8. A computer-readable storage medium comprising software instructions for
25 performing a method according to any of claims 1 to 7.
9. An apparatus (101, 103) comprising: means for determining whether a resource
is allocated for a logical control channel comprising a paging control channel; and
means for defining fields of a physical downlink control channel to signal the
30 resource allocation for the logical control channel comprising the paging control
channel,

characterized in that
the physical downlink control channel has a second format, including the fields
defined to signal the resource allocation for the logical control channel
comprising the paging control channel, to support resource allocation of the
5 logical control channel comprising the paging control channel, and the physical
downlink control channel has a first format, different from the second format, to
support transmission of data over a physical downlink shared channel;
wherein the apparatus comprises
means for determining whether a resource is allocated for a logical control
10 channel comprising a broadcast control channel,
means for defining separate fields of the physical downlink control channel to
signal the resource allocation for the logical control channel, wherein the logical
control channel comprises a broadcast control channel, the separate fields being
separate from the fields defined to signal the resource allocation for the logical
15 control channel comprising the paging control channel,
wherein the physical downlink control channel has a format, including the
separate fields, to support resource allocation of the logical control channel
comprising the broadcast control channel, wherein the format to support the
resource allocation of the logical control channel comprising the broadcast
20 control channel is different from the first format in the physical downlink control
channel to support transmission of data over the physical downlink shared
channel.

10. An apparatus comprising:
25 means for receiving, via fields, over a physical downlink control channel, a
resource allocation for a logical control channel comprising a paging control
channel,
means for receiving, via separate fields, over the physical downlink control
channel, a resource allocation for a logical control channel comprising a
30 broadcast control channel, the separate fields being separate from the fields for

receiving the resource allocation for the logical control channel comprising the paging control channel;

characterized by

5 means for employing a second format in the physical downlink control channel to provide the resource allocation of the logical control channel comprising the paging control channel,

wherein the second format is different from a first format in the physical downlink control channel to support reception of data over a physical downlink shared channel, and

10 means for employing a format in the physical downlink control channel to provide the resource allocation of the logical control channel comprising the broadcast control channel,

15 wherein the format to provide the resource allocation of the logical control channel comprising the broadcast control channel is different from the first format in the physical downlink control channel to support reception of data over the physical downlink shared channel.

11. An apparatus according to claim 10, wherein the apparatus is a mobile station (101).

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12. An apparatus according to claim 10 or 11, wherein the separate fields include a broadcast channel radio network temporary identity, BCCH-RNTI, field, a redefined portion or entirety of a transport format indicator, TFI, field, a value tag field to indicate a change in broadcast information, a field specifying type of system information block, and a field for segmentation and concatenation information.

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13. An apparatus according to claim 12, wherein the apparatus is further configured to examine the value tag field to determine whether there is a change in broadcast information without decoding a corresponding physical downlink shared channel.

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14. An apparatus according to any of claims 12 - 13, wherein the separate fields further include either a redefined hybrid automatic repeat request, HARQ, control field, a field specifying number of transmission symbols for time division duplex, TDD, idle periods, a field specifying whether reference signal boosting is utilized, an error detection field, or a combination thereof.
15. An apparatus according to any of claims 10 - 14, wherein the fields for receiving the resource allocation for the logical control channel comprising the paging control channel include a field specifying a user equipment identifier, a paging channel radio network temporary identity, PCCH-RNTI, field, a redefined portion or entirety of a transport format indicator, TFI, field, or a combination thereof.
16. An apparatus according to claim 15, wherein the fields for receiving the resource allocation for the logical control channel comprising the paging control channel further include a redefined hybrid automatic repeat request, HARQ, control field, and an error detection field.
17. A system comprising at least a first apparatus (103) configured to perform a method according to any of claims 1, 3, 4, 6, or 7, and a second apparatus (101) configured to perform a method according to any of claims 2 to 7.

II. In all other respects, the claims are dismissed.

III. The plaintiffs re 1 and re 3 shall bear 37.5 % of the costs of the proceedings, the plaintiff re 2 shall bear 25 % and the defendant 37.5 %.

The defendant shall bear 50 % of the out-of-court costs incurred by the plaintiffs re 1 and re 3. Of the defendants' out-of-court costs, the second plaintiff shall bear 20% and the plaintiffs re 1 and 3 shall bear 40 %. In all other respects, the parties shall bear their own out-of-court costs.

- IV. The judgment is provisionally enforceable against security in the amount of 120 % of the respective amount. 120 % of the amount to be enforced in each case.

Facts

By means of the actions plaintiff re 1 seeks partial invalidity (claim 10) and the plaintiff re 3 seeks full invalidity of European patent 2 145 404 (hereinafter: "the patent in suit"), which arose from PCT application PCT/IB2008/001137 (WO 2008/135853), was filed on 7 May 2008 claiming the priority of US patent application US 916465 P of 7 May 2007 and the grant of which was published on 14 December 2016. The patent in suit is entitled "Method and apparatus for providing control channels for broadcast and paging services" („Verfahren und Vorrichtung zur Bereitstellung von Steuerkanälen für Rundfunk-und Funkrufdienste“) and is registered with the German Patent and Trademark Office under file number 60 2008 047 869. The original proprietor of the patent in suit was N... Corporation (Finland). The patent in suit was then transferred to the defendant here with effect from 18 June 2015.

The patent in suit as granted comprises 17 claims with an independent claim 1 (method claim), a subclaim 2 (method claim) together with subclaims 3 to 7 referring back to this and/or to claim 1, subclaims 8 and 9 (apparatus claims) as well as an independent claim 10 (device claim) together with subclaims 11 to 16 referring back at least indirectly to this as well as a further subclaim 17 (apparatus claim).

The plaintiffs claim and give reasons for this that the patent in suit is not patentable to the extent attacked, namely that it is neither new nor inventive. In addition, they assert the ground of invalidity of the inadmissible extension.

Moreover, the version of the patent in suit (dated 22 January 2021) defended by the defendant in auxiliary request 3 lacks the necessary practicability.

Defendant defends the patent in suit as issued and as amended pursuant to auxiliary claims 1 through 5 filed in briefs dated 22 January 2021 and 22 April 2021, placing auxiliary claim 3 first.

The plaintiff re 3 declared its intervention as a further plaintiff in the proceedings 4 Ni 9/20 (EP), which were subsequently combined, by written statement dated 4 October 2019, to which the plaintiff re 2 (and plaintiff re 1 of the proceedings 4 Ni 9/20 (EP)) had already agreed in its statement of claim and, subsequently, again by written statement dated 9 April 2020.

By decision of 14 September 2020, proceedings 4 Ni 8/20 (EP) and 4 Ni 9/20 (EP) were joined.

The plaintiff re 2 withdrew the action by pleading dated 2 June 2021.

Claim 10 of the patent in suit, as granted, reads in the English language of the proceedings and as translated by the Senate into German (with added feature division) as follows:

1 An apparatus comprising:

Vorrichtung, umfassend:

2 means for receiving, via one or more fields, over a physical downlink control channel, a resource allocation for a logical control channel comprising a paging control channel,

Mittel zum Empfangen, über ein oder mehrere Felder, über einen physikalischen Downlink-Steuerkanal, einer Ressourcenzuordnung für einen logischen Steuerkanal, umfassend einen Paging-Steuerkanal,

characterized by

gekennzeichnet durch

- 3 means for employing a second format in the physical downlink control channel to provide the resource allocation of the logical control channel,
Mittel zum Anwenden eines zweiten Formats in dem physikalischen Downlink-Steuerkanal, um die Ressourcenzuordnung des logischen Steuerkanals bereitzustellen,
- 3.1 wherein the second format is different from a first format in the physical downlink control channel to support reception of data over a physical downlink shared channel.
wobei das zweite Format sich von einem ersten Format in dem physikalischen Downlink-Steuerkanal unterscheidet, um Empfang von Daten über einen gemeinsam genutzten physikalischen Downlink-Kanal zu unterstützen.

For the wording of the subclaims 1, 2, 8, 9 and 17 as well as subclaims 3 to 7 and 11 to 16, reference is made to the patent in suit.

Claim 10, arranged by features, according to auxiliary request 3 of 22 January 2021, reads in the language of the proceedings, English, or as translated by the Board into German:

- 1 An apparatus comprising:
Vorrichtung, umfassend:
- 2' means for receiving, via fields, over a physical downlink control channel, a resource allocation for a logical control channel comprising a paging control channel,
Mittel zum Empfangen, über Felder, über einen physikalischen Downlink-Steuerkanal, einer Ressourcenzuordnung für einen logischen Steuerkanal, umfassend einen Paging-Steuerkanal,
- 2.1 means for receiving, via separate fields, over the physical downlink control channel, a resource allocation for a logical control

channel comprising a broadcast control channel,

Mittel zum Empfangen, über separate Felder, über den physikalischen Downlink-Steuerkanal, einer Ressourcenzuordnung für einen logischen Steuerkanal, umfassend einen Broadcast-Steuerkanal,

- 2.2 the separate fields being separate from the fields for receiving the resource allocation for the logical control channel comprising the paging control channel;

wobei die separaten Felder getrennt sind von den Feldern zum Empfangen der Ressourcenzuordnung für den logischen Steuerkanal, umfassend den Paging-Steuerkanal;

characterized by

gekennzeichnet durch

- 3' means for employing a second format in the physical downlink control channel to provide the resource allocation of the logical control channel comprising the paging control channel,

Mittel zum Anwenden eines zweiten Formats in dem physikalischen Downlink-Steuerkanal, um die Ressourcenzuordnung des logischen Steuerkanals, umfassend den Paging-Steuerkanal, bereitzustellen,

- 3.1 wherein the second format is different from a first format in the physical downlink control channel to support reception of data over a physical downlink shared channel, and

wobei das zweite Format sich von einem ersten Format in dem physikalischen Downlink-Steuerkanal unterscheidet, um Empfang von Daten über einen gemeinsam genutzten physikalischen Downlink-Kanal zu unterstützen, und

- 4 means for employing a format in the physical downlink control channel to provide the resource allocation of the logical control channel comprising the broadcast control channel,

Mittel zum Anwenden eines Formats in dem physikalischen

schen Downlink-Steuerkanal, um die Ressourcenzuordnung des logischen Steuerkanals, umfassend den Broadcast-Steuerkanal, bereitzustellen,

- 4.1 wherein the format to provide the resource allocation of the logical control channel comprising the broadcast control channel is different from the first format in the physical downlink control channel to support reception of data over the physical downlink shared channel.

wobei sich das Format zum Bereitstellen der Ressourcenzuordnung des logischen Steuerkanals, umfassend den Broadcast-Steuerkanal, von dem ersten Format im physikalischen Downlink-Steuerkanal unterscheidet, um Empfang von Daten über den gemeinsam genutzten physikalischen Downlink-Kanal zu unterstützen.

For the wording of subclaims 1, 2, 8, 9 and 17 and subclaims 3 to 7, 11 to 16, reference is made to subclaim 3 of 22 January 2021.

The plaintiffs re 1 and 3 are of the opinion that the patent in suit, as granted and in the alternatively defended versions, does not validly claim the priority of the US application of 7 May 2007 (US 916465) either formally or substantively, so that prior art up to May 2008 (or up to the filing of the patent in suit) must be taken into account. From a formal point of view, there is no valid transfer of the priority right of the US prior application from its three owners to the legal predecessor of the defendant. In this context, the plaintiffs re 1 and 3 refer, inter alia, to the decision of the Federal Court of Justice in the case "Wireless communication network" (BGH GRUR 2019, 271). The defendant has not sufficiently demonstrated an effective transfer of the priority right by legal transaction in accordance with the principles set out there. This is also not substantiated by the legal opinions submitted by the defendant in this context. From a substantive point of view, there is no disclosure in the priority application that only one

field can be received for the allocation of resources. Rather, the priority document always speaks of fields in a plurality. Furthermore, feature 3.1 of claim 10 of the patent in suit requires a first and a second format on the physical downlink control channel, which are different. This is also not disclosed in the priority application.

They further contend that the patent in suit should be declared invalid to the extent challenged in each case on the grounds of inadmissible broadening. Thus, the originally disclosed "logic set up to receive a control message" was generalised in feature.2 of claim 10 to "receiving, via one or more fields". Further, the granted claim 10 also extends to the combination of "broadcast control channel" and "paging control channel", which is also not originally disclosed. Furthermore, the independent claims 2 and 10 of the patent in suit also impermissibly went beyond the disclosure of the original application with regard to the feature "receiving, via one or more fields [...] a resource allocation".

With regard to the lack of patentability, the plaintiff re 1 relies in particular on the following documents

- BP 3 provisional US application of 7 May 2007 (US 916465 P)

- BP7 N... Corporation, N... Networks, R2-080987 (Title: Allocation of RNTI values), 3GPP TSG-RAN WG2 Meeting #61, Sorrento, Italy, 11 - 15 February 2008, published according to the plaintiff re1 on 2 February 2008.

- BP8 N1 ..., Inc, R2-070780 (Title: Paging Procedure in LTE), 3GPP TSG-RAN WG2 #57,12 - 16 Feb 2007, Saint-Louis, USA, published according to the plaintiff re 1 on 9 February 2007.

- BP9 WO 2008/083804 A2

BP10 ETSI TS 136 300 V8.0.0 (2007-03)

The plaintiffs re 1 and 3 also rely jointly, in particular, on the following documents:

NK6 3GPP TS 36.300 V0.9.0 (2007-03)

BP6 N..., R1-070398, (Title: Structure and transport of the Downlink Control Channel), 3GPP TSG RAN WG1 #47bis Meeting, Sorrento, Italy 15 - 19 Jan, 2007, according to the plaintiff re 1 published on 10 January 2007.

QED1 S..., R2-071173 (Title: Idle mode paging), 3GPP TSG-RAN2 Meeting #57bis, St. Julian, Malta, 26 - 30 March 2007, according to the plaintiff re 2 published on 22 March 2007.

QED2 N1..., Inc, R2-071313 (Title: Paging Procedure in LTE), 3GPP TSG-RAN WG2 #57bis, St. Julian's, Malta, 26 - 30 March 2007, according to the plaintiff re 2 published on 22 March 2007.

QED3 M..., R1-072173 (Title: E-UTRA DL L1/L2 Control Channel Design - PICH/AICH), 3GPP TSG RAN1 #49, Kobe, Japan, 7 – 11 May 2007, according to the plaintiff re 2 published on 2 May 2007.

QED4 E..., R1-060577 (Title: Text Proposal on E-UTRA Paging), TSG-RAN WG1 #44, Denver, CO, USA, 13 – 17 February 2006, according to the plaintiff re 2 published on 9 February 2006; and E..., R1-060576 (Title: Paging for E-UTRAN), TSG-RAN WG1 #44, Denver, CO, USA, 3 – 17 February 2006, according to the plaintiff re 2 published on 9 February 2006.

- QED5 C..., R..., R2-061899 (Title: Paging control and Paging Channels), 3GPP TSG RAN WG2 ad-hoc on LTE, Cannes, France, 27 – 30 June 2006, according to the plaintiff re 2 published on 22 June 2006.
- QED6 Q..., R1-074952 (Title: PDCCH format for Paging), 3GPP TSG RAN WG1 #51, Jeju, Korea, 5 – 9 November 2007, according to the plaintiff re 2 published on 30 October 2007.
- QED7 WO 2007/127 945 A2
- QED13 E1..., R2-071320 (Title: Considerations on L1/L2 control signaling), 3GPP TSG RAN2 WG2 #57bis, St. Julian's, Malta, 26 - 30 March 2007, published on 22 March 2007.
- QED14 S..., R2-071337 (Title: System information scheduling and change notification), 3GPP TSG-RAN2 Meeting #57bis, St. Julian's, Malta, 26 - 30 March 2007, published on 22 March 2007.
- QED15 L..., R2-061959 (Title: Delivery of LTE System Information), 3GPP TSG-RAN WG2 ad-hoc on LTE, Cannes, France, 27 – 30 June 2006, published on 22 June 2006.
- QED16 N..., N... Networks, R1-080925 (Title: Associated PDCCH signaling for PCH, RACH response and BCCH transmission on PDSCH), 3GPP TSG RAN WG1 Meeting #52, Sorrento, Italy, 11 – 15 February 2008, published on 6 February 2008.

The plaintiffs re 1 and 3, who have adopted the arguments of the plaintiff re 2, consider that the subject-matter of claim 10 (both plaintiffs) and, in addition, the subject-matter of the other claims of the patent in suit (plaintiff re 3) are not patentable. Thus, it

was submitted that these claims are not new vis-à-vis citations BP6, BP7, BP8, BP9, QED1, QED2, QED3, QED4, QED5, QED6, QED7, QED13, QED14 and QED16.

The lack of novelty resulted in particular from the citation QED1 published on 22 March 2007 by making it available on the Internet. QED1 disclosed all features of claims 10, 2, 1 and 9 of the patent in suit. The features additionally included in the back-referred claims 3 to 8 and 11 to 17 did not cause an assessment of patentability deviating from the assessment of the independent claims.

The lack of patentability of claim 10 of the patent in suit is also apparent in particular from publication BP6, since the latter also has all the features of claim 10.

However, even if the novelty of the patent in suit were to be assumed, according to the plaintiffs there was at least no inventive step on the basis of publications QED1 to QED6 and publication BP6.

Finally, according to the plaintiff re 3, the arguments would also prevail with respect to claim 1 and the subclaims 2, 8, 9 and 17 with comparable features adapted to claim 10 to the respective patent category.

The patent in suit is also not legally valid in the version of auxiliary request 3 of 22 January 2021.

In this respect, claim 10 also goes beyond the content of the original application: Neither the cumulative implementation of a resource allocation for the paging control channel and the broadcast control channel, nor the resource allocation by means of one and the same format in the physical downlink control channel, nor the resource allocation by means of separately defined fields are disclosed by origin. Furthermore, the necessary practicability is lacking. Even if a separate definition of separate fields

were to be regarded as disclosed by the original application as part of the invention, the person skilled in the art would not be able to carry out the invention, since the patent specification in dispute did not provide any indication as to how the separate definition of the separate fields was to be carried out.

In view of publications QED14 and QED16, auxiliary claim 3 was not patentable, namely it was not new. It was also suggested in particular by QED13. The same applies to independent claim 1, subclaims 2 and 9 and the other subclaims.

The Board issued a qualified notice to the parties dated 19 October 2020 and a further legal notice at the hearing on 4 August 2021.

The plaintiff re 1 claims that the Court should

declare European Patent 2 145 404 invalid with effect for the territory of the Federal Republic of Germany to the extent of claim 10.

The plaintiff re 3 claims that the Court should

declare European Patent 2 145 404 invalid with effect for the territory of the Federal Republic of Germany.

The defendant requests

to dismiss the actions,
in the alternative, dismiss the actions with the proviso that the patent in suit is amended in accordance with auxiliary requests 1, 1a, 1b, 2, 2a, 2ac, 2b, 3, 3a, 3b, 4, 4a, 4ac, 4b, 5 filed by the pleadings of 22 January 2021 and 22 April 2021,

with the proviso that auxiliary request 3 (22 January 2021) comes first among the auxiliary requests and otherwise receives the order as set forth in the pleading of 22 April 2021.

Defendant contests the plaintiffs' view on all points.

The defendant contends that the patent in suit in all defended versions effectively claims the claimed priority of US application US 916465 both formally and substantively, so that the prior art is to be taken into account only up to 7 May 2007. With regard to the effective formal claiming of priority, this arises both from the point of view of the so-called "Joint Applicants Approach" and on the basis of an implied transfer of the priority right. In this context, the defendant refers to the decision of the OLG Düsseldorf in the case Cinanalcet II (GRUR-RR 2021, 249). However, the same also follows on the basis of a legally effective transfer of the priority right from the three proprietors of the US application to their predecessor in title, as evidenced by corresponding expert opinions. The priority had also been validly claimed. Thus, the priority application also discloses the receipt of a resource allocation via "one or more" fields on the physical downlink control channel, and further that the second format in the PDCCH to signal the resource allocation to the paging control channel (PCCH) is different from the first format.

Contrary to the plaintiffs' view, the subject-matter of all the claims of the patent in suit is disclosed by origin. This was true first of all with regard to the feature "receiving one or more fields" in feature 2 of claim 10 of the patent in suit. Also, feature 3 of granted claim 10, by omitting the term "control message", does not show any inadmissible generalisation and is therefore directly and unambiguously disclosed in the originally filed application. Further, the combination of issued claims 10 and 12 was disclosed by

origin. Furthermore, the feature in claims 2 and 10: "receiving, via one or more field [...] a resource allocation" was also directly and unambiguously disclosed in the originally filed application. Finally, the same applies to the transmission of data via a 'physical downlink shared channel'.

The patent in suit, as granted, proved to be new and inventive in relation to all the citations. This applied in particular to citation BP6 because it did not disclose feature 3.1 of claim 10 of the patent in suit.

The patent in suit is legally valid at least in the version of auxiliary request 3 of 22 January 2021. In this version, contrary to plaintiffs' representation, it is not inadmissibly extended. Both the cumulative implementation of resource allocation for the paging control channel via one or more fields and for the broadcast control channel via separate one or more fields, wherein the separate one or more fields are separated from the one or more fields for receiving resource allocation for the logical control channel comprising the paging control channel, are clearly and directly disclosed in the original application. In addition, the auxiliary claim 3 does not include the specific feature that the resource allocation for the paging control channel and the broadcast control channel is transmitted using one and the same format. Rather, the subject matter of claim 10 of auxiliary claim 3 leaves open how the format for the BCCH relates to the format for the PCCH. This leaving open of the relationship between the format for the BCCH and the format for the PCCH is clearly and directly disclosed in NK4.

The "multiple fields" variant was disclosed neither in QED13 nor in QED16, the printed publication QED16 already not constituting prior art. The subject-matter of claim 10 of auxiliary claim 3 of 22 January 2021 was therefore new and inventive. The same applies to claims 1, 2 and 9 of the auxiliary request and the corresponding subclaims.

For further details of the facts and the dispute, reference is made to the pleadings of the parties together with the annexes and the further contents of the file.

Reasons for Decision:

The invalidity actions asserting the grounds for invalidity of inadmissible extension, lack of patentability and, with regard to the alternatively defended version, lack of practicability (Art. II § 6(1) sentence 1 nos. 1, 2, 3 IntPatÜG, Art. 138(1)(a), (b), (c), Art. 54, Art. 56 EPC) are admissible and partly well founded.

Insofar as the patent in suit is defended as granted, it proves to be unpatentable. Insofar as the patent in suit is defended in the restricted version according to auxiliary request 3 (as amended on 22 January 2021), the actions are unfounded. In this respect, the patent in suit proves not to be inadmissibly extended, to be executably disclosed as well as patentable, namely new and based on an inventive step. It was therefore no longer necessary to consider the other auxiliary requests.

I.

The actions for invalidity are admissible.

The intervening action of the plaintiff re 3 to the invalidity action of the plaintiff re 2, declared in the written statement of 4 October 2019, is admissible as a subjective accumulation of actions, after the plaintiff re 2 has agreed to the intervening action and this is also relevant to avoid a separate invalidity action within the meaning of Section 263 of the German Code of Civil Procedure in conjunction with Section 99 of the German Patent Act.

The plaintiff re 3 assumed the legal position of a further plaintiff in the proceedings 4 Ni 9/20 (EP) or after combination with the proceedings 4 Ni 8/20 (EP) at the latest on 9 April 2020. Nor did it lose this position as a result of the withdrawal of the action by the plaintiff re 2, to which it had intervened, since in the case of the joint litigation in question here the respective legal relationships in the proceedings remain fundamentally independent (cf. MüKo ZPO, 6th edition, 2020, § 263, para. 99).

II.

The actions for invalidity are well founded in part, namely in so far as they are directed against the patent in suit which has been granted, and are otherwise unfounded.

1. The patent in suit relates to methods and apparatus in radio communication systems for providing control channels for broadcast and paging services (designation and paragraph 0001 of the patent in suit (SPS)).

According to the claims made *mutatis mutandis* in the patent in suit, radio communication systems, such as LTE (Long Term Evolution) systems, offer their subscribers the convenience of mobility together with a wide range of services and functions. This has led to significant penetration among an ever-increasing number of consumers as an accepted form of communication for business and private purposes (paragraph 0001).

To encourage greater adoption, he said, the telecommunications industry has agreed to develop standards for communications protocols that underlie various services and functions. One area of effort includes resource allocation and control signaling to support such allocation. Traditionally, different channel formats have been used to perform resource allocations for different services, such as broadcast, paging, etc., creating unnecessary overhead. 3GPP (Third Generation Partnership Project) document

"R1- 060573" by E... and N1... (as document QED10 in the proceedings) discusses a downlink control signalling method in which scheduling information could be transmitted using an a priori known time/frequency allocation or within the planned resource blocks (paragraph 0002).

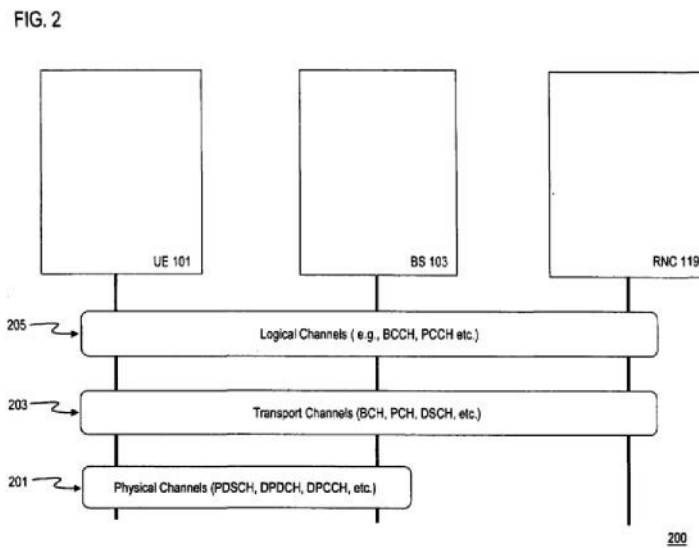
Therefore, there is a need for an approach to provide efficient signalling that can coexist with already developed standards and protocols (paragraph 0003). In particular, conventional systems do not provide a channel format at the physical layer that can properly and efficiently signal resource allocation information for broadcast and paging services (paragraph 0017).

These problems are sought to be solved in the issued version of the patent by the methods according to claims 1 and 2, the computer-readable storage medium according to claim 8, the devices according to claims 9 and 10, and the system according to claim 17.

2. The responsible expert is a graduate engineer in electrical engineering (M. Sc., Dipl.-Ing.) with several years of professional experience and relevant knowledge in the field of radio communications, who is particularly familiar with LTE network infrastructures and protocols and their further development. In particular, he/she may work in a group of experts dealing with the further development of standards for radio communication systems.

3. Several claims in the issued claim 10 require further consideration:

a) A **channel** (features 2, 3, 3.1) denotes a flow of information between different layers of the protocol stack of a communication system. In LTE radio communication systems, a distinction is made between physical channels, transport channels and logical channels (cf. Figure 2 and paragraph 0019, line 24).



SPS, Figure 2

A channel transports information either in the direction of the end device (downlink) or in the opposite direction (uplink). A shared channel is used by several terminals, a dedicated channel by a single terminal. Channels can also be identified by whether they transport signalling or control data (control channel) or traffic data (traffic channel) (cf. the channels mentioned in paragraph 0019 and paragraph 0021).

A **physical downlink control channel** (feature 2) transports control data over the air interface towards the terminal and is defined by resources at the physical layer of the protocol stack in a radio communication system, such as a frequency, a time slot and/or a spreading code. For example, a physical downlink control channel in LTE systems is the **PDCCH** (Physical Downlink Control Channel, cf. Figure 2 (referred to as DPCCH there and in paragraph 0019) and paragraph 0025, line 56).

A transport channel connects the MAC (Medium Access Control) layer with the physical layer. Transport channels in LTE systems are, for example, the broadcast channel BCH (Broadcast Channel) and the paging channel PCH (Paging Channel, cf. Figure 2 and paragraph 0020, line 30).

A **logical control channel** (feature 2) connects the RLC (Radio Link Control) layer with the MAC layer and transports control data. A logical control channel in LTE systems is, for example, the **paging control channel** PCCH (Paging Control CHannel) and the **broadcast control channel** BCCH (Broadcast Control CHannel) (cf. Figure 2, paragraph 0021, lines 37, 38 and paragraph 0025, lines 54, 55).

A **physical downlink shared channel** (feature 3.1) transports signalling and/or user data over the air interface in the downlink direction and is shared by several terminals, i.e. they share it (physical downlink **shared** channel). A physical downlink shared channel in LTE systems is, for example, the PDSCH (Physical Downlink Shared CHannel, cf. Figure 2 and paragraph 0019, lines 26, 27).

b) Paging and broadcast are services in radio communication systems. **Paging** is used to inform a terminal or a group of terminals about a specific event, such as an incoming call or data to be received. **Broadcast** is the broadcasting of data, e.g. system information, that terminals need to access the radio communication system. For example, in an LTE system, the broadcast control channel BCCH transports system information blocks (paragraph 0034, lines 39, 40: "SIB or SU (scheduling unit)" and Figure 4B, line "SIB type").

c) **One or more fields** received via a physical downlink control channel (feature 2) are understood by the skilled person as data structures transported in this channel.

d) A **format** in the physical downlink control channel (features 3, 3.1) is understood by the skilled person to indicate how data is structured and provided in the control channel and how it is to be interpreted when processed. By **applying a second format** in the physical downlink control channel, the device can interpret and provide the data received via the channel as a resource allocation for a logical control channel.

e) A **resource allocation** for a logical control channel (features 2, 3) is understood by the person skilled in the art to be indications of those physical resources over which the logical control channel is transmitted on the air interface.

In the embodiment of the patent in suit, receiving a resource allocation for the paging control channel PCCH is done by receiving the five fields indicated in Figure 4C in the physical downlink control channel PDCCH. Each field is a bit string of a specific length (column "Effective Length [bit]") that contains a specific type of information (column "Name of the Identity"). For example, physical resource blocks corresponding to OFDM (Orthogonal Frequency Divisional Multiplexing) symbols are allocated as resources (paragraph 0015 and Figure 4C, "Physical Resource Block Allocation Indicator" field). Contrary to the applicants' view, the embodiment example of the patent in suit does not convey the doctrine that the receiving of a resource allocation already takes place merely by receiving a so-called radio network temporary identity RNTI (Radio Network Temporary Identify, cf. Figure 4C, field "Identification ... RNTI").

f) The second format is said to **differ** from a first format in the physical downlink control channel, the first format supporting the reception of data over a physical downlink shared channel (feature 3.1). For the person skilled in the art, two formats are distinguished, for example, if the number of fields or their length is different in the two formats.

4. The granted version of the patent is opposed by the ground for invalidity of lack of patentability (Art. 138(1)(a) in conjunction with Art. 54 EPC in conjunction with Art. II Sec. 6 (1) sentence 1 No. 1 IntPatÜG).

a) The subject matter of granted subsidiary claim 10 is not new.

This is because the document R2-071 173 entitled "Idle mode paging" (= **QED1**), prepared for the working group meeting "3GPP TSG-RAN2 Meeting #57bis" held in St. Julian's, Malta from 26 to 30 March 2007, shows all the instructions of granted claim 10. According to the plaintiffs, QED1 became publicly available on 22 March 2007. Defendant has not contradicted this statement.

QED1 considers the content of the physical downlink control channel PDCCH and the physical downlink shared channel PDSCH when paging a group of terminals (page 1, chapter 1, last sentence and page 2, chapter 3.1., heading). In particular, QED1 takes up a proposal to optimize the format of the downlink control channel PDCCH when paging by omitting fields (page 3, chapter 3.3., heading and paragraph 3). The LTE specification cited as reference [3] in QED1 describes a format in PDCCH as follows (page 3, paragraph 4 and following table).

		Field	Size	Comment
Cat. 1 (Resource indication)		ID (UE or group specific)	[8-9]	Indicates the UE (or group of UEs) for which the data transmission is intended
		Resource assignment	FFS	Indicates which (virtual) resource units (and layers in case of multi-layer transmission) the UE(s) shall demodulate.
		Duration of assignment	2-3	The duration for which the assignment is valid, could also be used to control the TTI or persistent scheduling.
Cat. 2 (transport format)		Multi-antenna related information	FFS	Content depends on the MIMO/beamforming schemes selected.
		Modulation scheme	2	QPSK, 16QAM, 64QAM. In case of multi-layer transmission, multiple instances may be required.
		Payload size	6	Interpretation could depend on e.g. modulation scheme and the number of assigned resource units (c.f. HSDPA). In case of multi-layer transmission, multiple instances may be required.
Cat. 3 (RLM)	If asynchronous hybrid ARQ is adopted	Hybrid ARQ process number	3	Indicates the hybrid ARQ process the current transmission is addressing.
		Redundancy version	2	To support incremental redundancy.
		New data indicator	1	To handle soft buffer clearing.
	If synchronous hybrid ARQ is adopted	Retransmission sequence number	2	Used to derive redundancy version (to support incremental redundancy) and 'new data indicator' (to handle soft buffer clearing).

QED1, page 3, table after paragraph 4

QED1 concludes that if the marked fields (Duration of assignment, Modulation scheme, If asynchronous hybrid ARQ is adopted) can be omitted when paging terminals, it is indeed possible to save at least a few 10 bits, probably more (e.g. MIMO) (page 3, paragraph 5).

The QED1 discloses, in terms of granted claim 10: a

- 1 An apparatus comprising:
 - 2 means for receiving,
 - (Page 2, chapter 3.1., no. 1: UE reads the PDCCH; A subscriber terminal UE (User Equipment) in an LTE network is usually an apparatus with receiving and transmitting means).
 - via several fields, over a physical downlink control channel (PDCCH),
 - (Page 3, paragraph 4: "PDCCH format" and following table)
 - a resource allocation for a logical control channel comprising a paging control channel (PCCH),
 - (Page 2, chapter 3.1., no. 1: "PCCH over PDSCH"; page 3, table, field "Resource assignment")
- comprising
 - 3 means for employing a second format in the physical downlink control channel,
 - (by omitting the fields marked in the table on page 3 in the PDCCH format, a special format is created, see also page 3, paragraph 1: "a special format for the L1/L2 control")
 - to provide the resource allocation of the logical control channel,
 - (Page 2, paragraph 3: "PCCH over PDSCH"; Page 3, table, row "Resource assignment")
- 3.1 wherein the second format is different from a first format in the physical downlink control channel,
 - (Since about 10 bits, possibly more, can be saved by omitting fields, the special format differs from the PDCCH format specified in the mobile radio specification, cf. page 3, paragraphs 4, 5).

to support reception of data over a physical downlink shared channel.

(Page 1, paragraph 3: "PDSCH contents for paging")

b) Nor are the subject matter of granted claim 1 and granted subclaims 2, 8, 9, and 17 novel.

Similar considerations apply as to claim 10 granted.

III.

The defendant successfully defends the patent in suit in the version according to auxiliary request 3 of 22 January 2021, since this version is admissible and no grounds for invalidity oppose it.

1. Several claims in claim 10 as set forth in auxiliary claim 3, dated 22 January 2021, require further consideration:

a) Claim 10 calls for three formats in the physical downlink control channel and identifies them by functional characteristics:

- a **first format** to support the reception of data over a physical downlink shared channel (features 3.1, 4.1),
- a **second format** to provide resource allocation for a paging control channel (feature 3'); and
- a **format** to provide the resource allocation for a broadcast control channel (feature 4).

The second format shall be different from the first format in the physical downlink control channel (feature 3.1). Also, the one format to provide resource allocation for a broadcast control channel is said to be different from the first format (feature 4.1). However, claim 10 is silent as to whether or not the one format is different from the second format.

"first format"

Downlink Signaling Entry	
Name of the Identity	Effective Length [bit]
Identification (C-RNTI)	16
Error Detection (CRC)	(0, 8)
Physical Resource Block Allocation Indicator	Configurable
Transport Format Indicator	5
HARQ control	5

"one format"

PDCCH Format For BCCH	
Name of the Identity	Effective Length [bit]
Identification (BCCH-RNTI)	16
Error Detection (CRC)	(0, 8)
Physical Resource Block Allocation Indicator	Configurable
Transport Format Indicator	0 or 1
Value tag	4
SIB type	Configurable
Segmentation/Concatenation information	Configurable

"second format"

PDCCH Format For PCCH	
Name of the Identity	Effective Length [bit]
Identification (PCCH-RNTI)	16
Error Detection (CRC)	(0, 8)
Physical Resource Block Allocation Indicator	Configurable
Transport Format Indicator	This can be less than 5
A part of (e.g. first 5 bits of) precise UE identifier (IMSI etc.)	Configurable

SPS, Figures 4A to 4C with identification of the Board as "first format", "one format" and "second format".

b) The term field is not to be understood differently than in the granted version: **Fields of** a physical downlink control channel (features 2', 2.1) are understood by the skilled person as data structures transported in this channel.

c) The separate fields used to receive a resource allocation for the broadcast control channel shall be **separate** from the fields used to receive the resource allocation for the paging control channel (feature 2.2). This statement requires two separate sets of fields. If a resource allocation for the paging control channel is received over certain fields in the physical downlink control channel, no resource allocation for a broadcast control channel is received over these fields and vice versa. Thus, a resource allocation for either a broadcast control channel or a paging control channel is received over a set of fields in the physical downlink control channel.

The marking of the fields used to receive a resource allocation for the broadcast control channel as **separate fields** (feature 2.1) does not contain any technical provision beyond the instruction in feature 2.2.

In the embodiment of the patent in suit, the two resource allocations are received by two separate control messages having the fields indicated in Figures 4B and 4C, respectively.

d) In all other respects, the foregoing discussion of the understanding of claim 10 as issued also applies to claim 10 as recited in auxiliary claim 3, filed 22 January 2021.

2. In the version of the patent in suit according to auxiliary request 3 of 22 January 2021, the ground for invalidity of lack of disclosure is not present (Art. 138(1)(b) EPC in conjunction with Art. II Sec. 6 (1) sentence 1, no. 2, IntPatÜG).

The patent in suit discloses the invention so clearly and completely that the skilled person can carry out the. In particular, with the disclosure in the patent in suit, the skilled person can carry out the instruction in feature 2.2 of claim 10 according to auxiliary claim 3 of 22 January 2021 that the separate fields used to receive a resource allocation for a broadcast control channel are separate from the fields used to receive the resource allocation for the paging control channel. For paragraphs 0031, 0032 and Figures 4A to 4C of the patent in suit disclose the fields in the physical downlink control channel as strings of bits of a particular length (Figures 4A to 4C, column "Effective Length [bit]"), each containing a particular type of information (column "Name of the Identity"). The skilled person can therefore separate each field from other fields in the physical downlink control channel based on its bit positions.

3. As amended in accordance with auxiliary request 3 of 22 January 2021, the patent in suit permissibly goes back to the original application (Art. 138(1)(c) EPC in conjunction with Art. II, Sec. 6 (1), sentence 1, no. 3, IntPatÜG) and to the granted version of the patent (Art. 123 (3) EPC in conjunction with Art. II, Sec. 6 (1), no. 4, IntPatÜG).

a) The instructions in the features of claim 10 according to auxiliary claim 3 of

22 January 2021 are supported by the following references in the documents of international application PCT/IB2008/001 137:

- 1, 2', 2.1: Claims 8 and 9 of the application disclose an apparatus for defining one or more fields of a physical downlink control channel to signal the resource allocation for the logical control channel, wherein the physical downlink control channel comprises a first format to support transmission of data over a downlink channel and has a second format, including several fields, to support allocation of the logical control channel, and wherein the logical control channel comprises **either** a broadcast control channel **or** a paging control channel. The application also discloses in numerous places an apparatus that supports resource allocation for broadcast **and** paging services, see the title of the invention and paragraphs 0010-0012, 0021, 0026, 0031, 0032. Contrary to plaintiffs' view, an apparatus for receiving the resource allocation via ("over") the physical downlink control channel is also disclosed (claim 22 of the application date). Since fields of a physical downlink control channel are defined for signaling the resource allocation (claim 8 of the application date), the resource allocation is also received over ("via") these fields.
- 2.2: Since receiving several fields supports resource allocation of either the broadcast control channel or the paging control channel (cf. claims 8, 9 of the filing date), two separate sets of fields are received for allocation of the broadcast control channel **and** the paging control channel.
- 3', 4: Paragraphs 0013, 0037, clause 1, and Figures 4A to 4C of the application date disclose three formats in the physical downlink control channel: a traditional PDCCH format, a broadcast control

channel resource mapping PDCCH format, and a paging control channel resource mapping PDCCH format. Numbering the conventional format first and the paging control channel resource mapping format second does not expand the content of the application.

3.1, 4.1: The original claim 8 discloses that the first (conventional) format in the downlink physical control channel supports receiving data over a downlink channel. Paragraph 0040, penultimate sentence in conjunction with paragraph 0041, first sentence, of the filing date concretizes this downlink channel as a physical downlink shared channel (PDSCH). Based on the different names and functions of the three formats disclosed in the application in the physical downlink control channel, the skilled person readily reads the variants that the formats for resource allocation of the paging or broadcast control channel differ from the conventional (first) format. The variant that the paging and broadcast control channel resource allocation formats are not different from each other is disclosed in the general teachings of original claims 8, 9, as these call for a second format containing the fields to support allocation of either the broadcast control channel or the paging control channel.

b) The instructions in claim 10 as set forth in auxiliary claim 3, dated 22 January 2021, permissibly recite the issued version of the patent.

This is because claim 10 according to auxiliary claim 3 contains all the necessary features of the granted claim 10 and, with features 2.1, 2.2, 4 and 4.1, additional requirements for the device which do not extend the scope of protection of the patent. Feature 2' (via fields) is a permissible selection from the variants according to feature 2 (via one or more fields).

c) The subject matter of the remaining claims under auxiliary claim 3, filed 22 January 2021, permissibly recites the application documents and the issued version of the patent. Similar considerations as set forth above with respect to claim 10 apply.

4. As amended in accordance with auxiliary request 3 of 22 January 2021, the ground for invalidity of lack of patentability is not present (Art. 138(1)(a) in conjunction with Art. 54, 56 EPC in conjunction with Art. II Sec. 6 (1) sentence 1, no. 1 IntPatÜG).

a) The subject matter of claim 10 as set forth in auxiliary claim 3, dated 22 January 2021, is considered new.

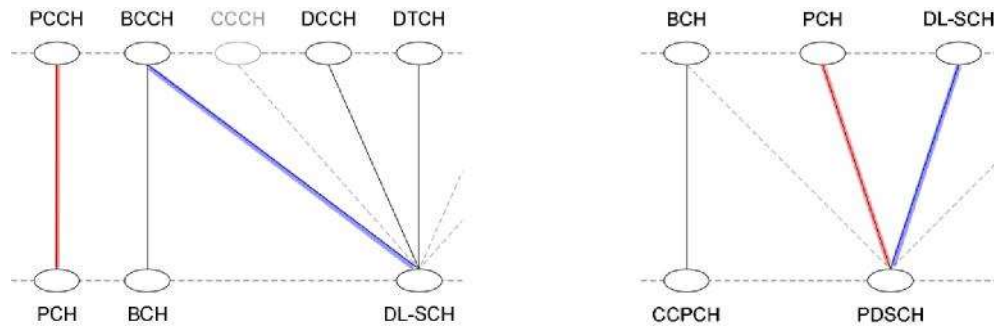
aa) The subject matter of claim 10 according to auxiliary claim 3 of 22 January 2021 is new compared to the prior art according to **QED1**.

For the reasons stated above with regard to the granted version, the QED1 document does indeed disclose an apparatus with **features 1, 2', 3' and 3.1**. However, the QED1 does not disclose a resource allocation for a broadcast control channel (**feature 2.1**). Consequently, the instructions in **features 2.2, 4 and 4.1**, which refer to fields or formats of such a resource allocation, cannot be inferred from QED1.

bb) The subject-matter of claim 10 according to auxiliary claim 3 of 22 January 2021 is new compared to the prior art according to the specification ETSI TS 136 300 V8.0.0 (2007-03) (= **BP10**).

(1) Specification BP10 discloses downlink control signalling directed to terminals in the physical downlink control channel PDDCH with a resource allocation for a shared downlink transport channel DL-SCH and a paging transport channel PCH (page 16, chapter 5.1.3, heading and sentence 1).

Associated with these resource allocations for transport channels may also be resource allocations for logical control channels, namely for the paging control channel and for the broadcast control channel. This is because, according to BP10, the paging control channel PCCH may be mapped to the paging transport channel PCH (page 32, stroke 3 and figure 6.1.3.2) and the latter may be mapped to the physical downlink shared channel PDSCH (page 21, figure 5.3.1.-1). The broadcast control channel BCCH may be mapped to the shared downlink transport channel DL-SCH (page 32, line 2 and Figure 6.1.3.2) and this may be mapped to the physical downlink shared channel PDSCH (page 21, Figure 5.3.1.-1).



BP10, page 32, figure 6.1.3.2 and page 21, figure 5.3.1.-1 (both extracts)
emphasis by the Senate

(2) Specifications BP10 does not go beyond the following with respect to the subject matter of claim 10 according to auxiliary claim 3 of 22 January 2021: a

- 1 An apparatus comprising:
(page 14, figure 4.3.2, box "UE" (User Equipment))
- 2^{Part} Means for receiving, over a physical downlink control channel, a resource allocation for a logical control channel comprising a paging control channel,
(Page 16, Chapter 5.1.3, heading and sentence 1: "resource allocation ... related to ... PCH";
page 32, figure 6.1.3.2 and page 21, figure 5.3.1.-1, the mapping of the PCCH to the PCH and the mapping of the PCH to the PDSCH)

2.1_{Part} Means for receiving, via the physical downlink control channel, a resource allocation for a logical control channel comprising a broadcast control channel.

(Page 16, Chapter 5.1.3, heading and sentence 1: "resource allocation ... related to DL-SCH";

page 32, Figure 6.1.3.2 and page 21, Figure 5.3.1.-1, the mapping of the BCCH to the DL-SCH and the mapping of the DL-SCH to the PDSCH).

The references in BP10 cited by the plaintiffs do not either disclose that the resource allocation is received via (several) fields (**rest of features 2', 2.1**), whereby the fields with the resource allocation for a broadcast control channel are separated from the fields with the allocation for a paging control channel (**feature 2. 2**), nor that a second or a format in which PDCCH is to be applied to provide the resource allocation for the paging control channel or the broadcast control channel, respectively, wherein both the second and the one formats being different from a first format that supports receiving data via the PDSCH (**features 3', 3.1, 4, 4.1**).

cc) The subject-matter of claim 10 according to auxiliary claim 3 of 22 January 2021 is new compared to the prior art according to the specification 3GPP TS 36.300 V0.9.0 (2007-03) (= **NK6**). This is because 3GPP specification NK6 is identical in content to ETSI edition BP10 at the references cited by the plaintiffs.

dd) The subject matter of claim 10 according to auxiliary claim 3 of 22 January 2021 is new compared to the prior art according to the document R2-071320 entitled "Considerations on L1/L2 control signaling" (= **QED13**) prepared for the working group meeting "3GPP TSG RAN WG2 #57bis" held in St. Julian's, Malta from 26 to 30 March 2007.

(1) The starting point of the QED13 document is the decision of the 3GPP working group RAN WG1 (Radio Access Network WorkGroup 1) to use the physical

downlink control channel PDCCH as L1/L2 control channel (page 1, chapter 1).

In order to maximize resource utilization, most transport channels, such as broadcast channel BCH, paging channel PCH, and shared downlink transport channel DL-SCH, shall be dynamically managed. The control signaling for these transport channels shall be transported over the PDCCH. A temporary radio network identifier (x-RNTI) implicitly encoded in the CRC (cyclic redundancy check) of the PDCCH addresses the control signaling and designates the associated transport channel (page 1, chapter 2, lines 1-6). For example, a radio network identifier of type C-RNTI uniquely addresses a specific terminal and the shared transport channel SCH; a radio network identifier of type BCCH-RNTI addresses the broadcast control channel BCCH mapped to the shared downlink transport channel DL-SCH; a radio network identifier of type PCH-RNTI addresses the paging transport channel (page 1, chapter 2, lines 7, 11, 12).

According to the comments in QED13, the task remaining for the RAN WG2 working group was to clarify the content of the L1/L2 control channel. The definition of the detailed format of the PDCCH was linked to the decision of another working group (RAN WG1) (page 2, paragraph 1). The contents of the PDCCH proposed in Table 1 of QED13 concern indicators for the data flow direction in the shared transport channel SCH (DL/UL indicator), transport format indicators (TFI or TFI (limited)) for the transport channel SCH, the broadcast control channel BCCH or the paging transport channel PCH, information on the antenna configuration (Antenna info) and on the hybrid automatic repeat request for data (HARQ info).

Table 1. L1/L2 control channel contents

RNTI type	C-RNTI	RA-RNTI	BCCH-RNTI	PCH-RNTI
Contents (L1/L2 control channel)	DL/UL indicator, TFI, Antenna info, HARQ info.	TFI (limited)	TFI (limited)	TFI (limited)

QED13, page 2, table 1 (excerpt)

In addition, in the case of a persistent resource allocation for a shared transport channel, the PDCCH may also contain an indicator for the resource empty, which signals the terminal not to decode a particular resource (page 2, paragraph 3, indent 2).

(2) None of the contents of the PDCCH proposed in QED13 concerns a resource allocation for the paging control channel or for the broadcast control channel (**features 2', 2.1, 2.2**) or even for a transport channel to which these control channels may be mapped. This is because a resource mapping requires details of those physical resources over which the logical control channel is transmitted on the air interface (cf. the above considerations for understanding claim 10). These resources are not apparent from page 2, table 1 or paragraph 3, indent 2. The QED13 may therefore also not disclose the use of a second or one format in the downlink physical control channel to provide resource allocation of the logical control channel comprising the paging control channel or the broadcast control channel, respectively, the second or one format being different from a first format in the downlink physical control channel supporting reception of data over a physical downlink shared channel (**features 3', 3.1, 4, 4.1**).

QED13 does contain the general reference that a scheduler may allocate unused resources to other terminals by signaling (page 2, paragraph 3, indent 2, last sentence). However, this general reference does not directly and unambiguously disclose the instructions in claim 10 according to auxiliary claim 3 of 22 January 2021.

ee) The subject matter of claim 10 according to auxiliary claim 3 of 22 January 2021 is new compared to the prior art according to the document R2-071337 entitled "System information scheduling and change notification" (= **QED14**) prepared for the working group meeting "3GPP TSG-RAN2 Meeting #57bis" held in St. Julian's, Malta from 26 to 30 March 2007.

(1) The document QED14 relates to the scheduling of system information and the notification of terminal equipment in the event of changes (page 1, title). The person skilled in the art is aware, based on his general knowledge, that the system information comprises identifiers for the radio communication network (PLMN identities), for the tracking area (Tracking Area Code) and for the radio cell (Cell identity, cf. BP10, page 36, chapter 7.4 "System information"), which the terminal requires to access the radio communication system. This system information can be transmitted in the broadcast control channel BCCH and can change at a certain point in time (BCCH modification time), for example during a synchronous reconfiguration of the radio communication system (cf. QED14, page 2, chapter 2.2.2, section "BCCH modification time", sentence 1). Scheduling information specifies start times for a group of System Information Blocks (SIBs) that have the same periodicity. Such a group is called a scheduling unit (SU) (page 1, chapter 1).

QED14 proposes to use the physical downlink control channel PDCCH to indicate a planning unit and detailed time/frequency resource allocation (page 2, sentence 1). Changes to system information should be indicated to terminals through a paging/notification mechanism (page 2, Section 2.2.1, Summary of main proposals section, bullet 1). Paging/notification can be done in different ways (page 3, section "Further signalling aspects"):

- 1: "PDCCH only": a special temporary radio network identifier (special RNTI value)

in the physical downlink control channel (PDCCH CRC) indicates the change of the system information (BCCH modification). The modification information is transmitted in a special format in the physical downlink control channel PDCCH (the obvious error PDDCH is easily corrected by the skilled person as PDCCH).

- 2: "PDCCH+PCH": A temporary radio network identifier for paging (paging RNTI) in the physical downlink control channel (PDCCH CRC) indicates a paging message in the transport channel PCH. A change of system information is indicated by an optional information unit in the paging message (optional BCCH modification IE).
- 3: "BCH": the terminal periodically checks an identifier (value tag) for each planning unit (SU), for example at least once every 5 s.

QED14 discusses the advantages and disadvantages of these three variants. Contrary to plaintiffs' view, the expert will only select and use one of the three proposed variants 1, 2 or 3 (see page 3, third last paragraph: "In case approach 2 is adopted..." and page 4, line 3: "then approach 1 seems most attractive").

(2) QED14 does not go beyond the following with respect to the subject matter of claim 10 according to auxiliary claim 3 of 22 January 2021: a

1 Device comprising:

2.1Part Means for receiving, via fields,

(Page 1, third last paragraph: "special format, including a field for indicating the SU")

over the physical downlink control channel, a resource allocation for a logical control channel comprising a broadcast control channel,

(Page 2, sentence 1, page 1;

Since the planning unit (SU) is transmitted in the broadcast control channel (chapter 2.1 section "BCCH mapped to

DL-SCH", sentence 1), a time/frequency resource allocation for a planning unit represents a resource allocation for a broadcast control channel).

Further comprising

- 4 Means for employing a format in the physical downlink control channel to provide the resource allocation of the logical control channel comprising the broadcast control channel.

(Page 1, third last paragraph: "special format, including a field for indicating the SU")

QED14 does not disclose **feature 2'** of claim 10, relating to receiving, over fields, over a physical downlink control channel, a resource allocation for a paging control channel, and thus necessarily does not disclose **features 2.2, 3' and 3.1 and remaining feature 2.1** relating to such resource allocation or fields separate therefrom. In particular, the reference provided by the plaintiffs in QED14, page 3, section "Further signalling aspects", section 2. does not identify feature 2'. This is because Alternative 2: "PDCCH+PCH" discloses two information elements: the temporary radio network identifier for paging (paging RNTI) encoded in the physical downlink control channel PDCCH, and the optional information element included in the paging message in the paging transport channel PCH indicating a change in system information (optional BCCH modification IE). None of these information elements transport a resource allocation for a paging control channel. Nor can feature 2' of claim 10 be inferred from the other references in QED14. This is because the only reference in QED14 that mentions the paging control channel PCCH at all indicates that the broadcast control channel BCCH and the paging control channel PCCH are terminated in the base station (eNB = evolved node B) (page 3, paragraph 4, lines 1, 2). There is no mention of resource allocation for the paging control channel over the physical downlink control channel.

The QED14 writing does not disclose a format in the physical downlink control channel

to support receiving data over the physical downlink shared channel. Therefore, the designation of the format for resource allocation for a broadcast control channel as a special format in QED14 also cannot directly and unambiguously disclose the instruction in **feature 4.1** of claim 10.

ff) The subject-matter of claim 10 according to auxiliary claim 3 of 22 January 2021 is new compared to the prior art according to the document R2-061959 entitled "Delivery of LTE System Information" (= **QED15**), prepared for the working group meeting "3GPP TSG-RAN WG2 ad-hoc on LTE" held in Cannes, France, from 27 to 30 June 2006.

(1) The QED15 document discusses the transmission of system information in the broadcast control channel BCCH (page 3, chapter 3., heading) and distinguishes between primary and secondary system information (page 2, table 2).

The QED15 proposes to transmit the primary system information in the broadcast transport channel BCH and the secondary system information in the shared downlink transport channel DL-SCH (page 4, chapter 4. number 2.). Primary and secondary system information forms a broadcast control channel BCCH, which is thus to be mapped to the broadcast transport channel BCH and to the shared downlink transport channel DL-SCH, respectively (page 3, chapter 3.1.1, heading).

The QED15 further describes that the broadcast transport channel (BCH) has a globally fixed configuration in the radio communication system (fixed configuration) so that all terminals can decode this channel without any control information (page 3, chapter 3.1.1, sentence 1). On the other hand, if the shared downlink transport channel DL-SCH transports the broadcast control channel BCCH, L1/L2 control information shall indicate BCCH. L1/L2 control information shall also indicate the resource blocks assigned to the transmission of the BCCH (page 3, paragraph before chapter 3.2).

(2) Contrary to plaintiffs' view, QED15 does not disclose any of features **2'**, **2.1**, **2.2**, **3'**, **3.1**, **4** and **4.1** of claim 10 according to auxiliary claim 3 of 22 January 2021.

This is because at no point does QED15 propose that the L1/L2 control information with the resource allocation for the broadcast control channel BCCH should be transported in the physical downlink control channel PDCCH. Rather, the configuration of the broadcast control channel shall be transported in the primary system information in the broadcast transport channel BCH (page 3, chapter 3.1.1, last sentence). Therefore, the QED15 does not show **feature 2.1** of claim 10. The QED15 also does not describe a resource allocation for a paging control channel (**feature 2'**). Thus, features **2.2**, **3'**, **3.1**, **4**, and **4.1**, which refer to resource allocations over the physical downlink control channel, are also not ascertainable from QED15. In particular, the statement "ARQ/HARQ is not needed" (page 3, sentence before chapter 3.2) does not refer to fields in the physical downlink control channel - which according to the QED15 proposal should not be used at all - but indicates that the system information is transmitted in the broadcast control channel without redundant bits for error detection and without parity bits.

gg) Paper R1-080925, entitled "Associated PDCCH signaling for PCH, RACH response and BCCH transmission on PDSCH" (= **QED16**), prepared for the Working Group Meeting "3GPP TSG RAN WG1 Meeting #52" held in Sorrento, Italy, 11-15 February 2008, and publicly available during the priority interval of the patent-in-suit, according to the applicants, is not prior art for the patent-in-suit as amended according to auxiliary request 3 dated 22 January 2021.

As such, the patent in suit validly claims the priority of the US provisional application US 916465 P of 7 May 2007, both formally and substantively.

(1) The patent in suit validly claims the priority of the US application of 7 May 2007 (US 916465 P) from a formal point of view.

According to Article 87(1) EPC, any person who has duly filed a patent application in certain countries, or his successor in title, shall enjoy a right of priority for the filing of an application for a European patent for the same invention for a period of twelve months from the filing date of the first application, which allows him to claim the earlier priority of the first application for the subsequent application as if the subsequent application itself had been filed on the date of the first application.

The case law and literature in Germany as well as the Boards of Appeal of the EPO regularly assume that the priority right is to be qualified as an independent property right to claim priority, which can be transferred by the applicant of the first application to a third party as legal successor (cf. BGH GRUR 2019, 271, para. 62 - Wireless communication network).

The US prior application, the priority of which is claimed, was filed as a so-called "Provisional Application" before the United States Patent and Trademark Office (USPTO) on 7 May 2007 (cf. Exhibit BP3).

Under the U.S. patent law in effect at the time of the prior application at issue, the inventor was required to file the application himself by filing the application for a patent and executing the application documents.

According to the "Provisional Application for Patent Cover Sheet" (see Annex BP3), Mr. G..., Mr. K... and K1 ... were named as inventors. Thus, the inventors G..., K... and K1 ... were the applicants for the US prior application and holders of the relevant priority.

The patent in suit is based on the international application PCT/IB2008/001137 (published as WO 2008/135853 A1 - see BP2), which entered the European phase before the EPO on 19 October 2009. According to the aforementioned PCT subsequent

application, all applicants of the previous application (i.e. Mr. G..., Mr. K... and Mr. K1 ...) were also applicants of the international PCT subsequent application (only limited to the US territory). Furthermore, the legal predecessor of the defendant here, the N... Corporation, (for all states outside the USA) as well as N... Inc. (for Saint Lucia) were indicated as applicants in the subsequent application.

The application procedure described, namely the filing of the subsequent application with the participation of the three first applicants as well as the legal predecessor of the defendant in this case, justifies the assumption that the patent in suit has the priority of the first application of 7 May 2007. Neither the participation of further applicants in the subsequent application nor the territorial division of the subsequent application according to geographical areas of protection precludes this.

It is essential to establish that the PCT application, from which the patent in suit only emerged at a further stage, is to be regarded as the subsequent application. In particular, it must be taken into account that the PCT application does not provide for the possibility of indicating different priority claims for different filing states, so that the corresponding priority claims must apply to all applicants.

The defendant has relied on the so-called "joint applications approach" with regard to an effective formal claim of priority of the US prior application.

The so-called "Joint Applicants Approach" is recognised in the case of European patent applications (cf. Official Journal of the European Patent Office March 2014 issue, A33 III No. 5 as well as No. 9; EPO Guidelines A-III,6.1).

In the case of joint applicants filing a subsequent application for a European patent, it is sufficient if one of the applicants of the subsequent application is the applicant (or successor in title) of the earlier application. In this case, there is no need for a special

transfer of the right of priority to the other applicants, since the subsequent application was filed jointly.

The same principles could therefore apply to a PCT application such as the one at issue here, even if - as is the case here - the priority-holding joint applicants are purely US applicants and therefore not part of the European phase. Therefore, even if the priority-holding applicants are only applicants for certain designations (in the present case the US), they could introduce the priority right into the PCT application, with full effect for the PCT application as a whole. This effect could not be considered lost in this case merely because the application is processed as a European application upon entry into the European phase and the priority applicants are not entitled to the grant of a European patent because they are not designated for this territory (cf. in this respect also the EPO's preliminary decision of 21 Dec. 2020 in the matter of 17185704.8) according to Annex CF 26).

Ultimately, however, it can be left open whether the formally effective transfer of the priority claim arises from the point of view of the "Joint Applicants Approach". Even if a material transfer of the priority right had been required - which is possible informally and also impliedly - such a transfer would exist in the present case for the following reasons:

First, the subsequent application can be regarded as a joint application filed by all subsequent applicants. All the first applicants were thus involved in the subsequent application, so that the applicants are identical in this respect. The PCT subsequent application extended by two parties expresses the fact that the first applicants agreed to tolerate further persons as additional subsequent applicants. This constellation of facts only allows the conclusion that the first applicants transferred their priority rights acquired from the first application to the two additional subsequent applicants (including the legal predecessor of the defendant) in such a way that they should be able to act jointly with them as priority beneficiaries. The two other subsequent applicants, including the defendant's predecessor in title, are therefore entitled to act as legal successors of all the first applicants in their priority rights.

If, on the other hand, one sees in the PCT subsequent application two subsequent applications merely combined on the face of it in a single document (namely a first subsequent application by the three inventors for the USA and a second subsequent application by the defendant's predecessor in title and N... Inc.), the result of an effective priority claim is no different. Since all prior applicants jointly hold the priority right resulting from the first application, the sole subsequent application by the defendant's predecessor in title, even if only for a geographical part of the overall territory of protection, does affect the priority rights of those not applying in this respect. Because this is the case, the applicant therefore requires a transfer of the priority rights of the other first applicants which continue to exist for the area of application. However, precisely such a legal succession results from the documentary common PCT application directed to different territories. In this way, each of the first and subsequent applicants unambiguously documents that he agrees with the sole priority-based filing of the other(s) for the respective territory assigned to him. The only conclusion that can be drawn from this is that each is prepared to make the priority transfer necessary for the sole subsequent filing by the other for the mutually allocated protected areas. Therefore, the sole applicant, if he was already a first applicant, is entitled for his territory partly by virtue of his own right as first applicant and, moreover, as successor in title to the other first applicant's right of priority in this respect. If the subsequent applicant - as in the present case the legal predecessor of the defendant - was not a first applicant, his right of priority for the territory allocated to him is derived as a whole from a legal succession of all first applicants (also OLG Düsseldorf GRUR-RR 2021, 249 - Cinacalcet II).

This result is also not contradicted by the decision of the Federal Court of Justice in the case "Drahtloses Kommunikationsnetz" (GRUR 2019, 271). In that case, the Federal Court of Justice established the existence of a legal transfer of the priority right at issue

there. Such a transfer does not exclude an implied transfer of the corresponding right - as is the case here (see above).

(2) As amended according to auxiliary request 3 of 22 January 2021, the patent in suit effectively claims the priority of U.S. provisional application US 916465 P of 7 May 2007. This is because the instructions in the features of claim 10 as per auxiliary request 3 of 22 January 2021 are disclosed in the priority application as follows:

1, 2', 2.1: Paragraphs 0064 to 0067 of the priority application describe a method for generating a control message having a format intended for resource allocation of a downlink control channel for broadcast **or** paging service, the format corresponding to a physical downlink control channel (PDCCH) of a radio access network and providing a plurality of fields associated with a paging control channel (PCCH) or a broadcast control channel (BCCH), respectively. The skilled person readily reads that a corresponding control message is also to be received by a device, such as the mobile station disclosed in paragraph 0046, line 3. The skilled person briefly refers to receiving a control message for a resource allocation as receiving a resource allocation. Also disclosed in numerous places in the priority application is an apparatus that supports resource allocation for broadcast **and** paging services, see paragraphs 0009, 0036, 0037 and 0038 in addition to the title of the invention.

2.2: Since receiving a plurality of fields supports resource allocation of the broadcast control channel or the paging control channel (cf. the references in the priority application cited above), two sets of fields separate from each other must necessarily be received to allocate the broadcast control channel **and** the paging control channel.

3', 4: Paragraphs 0008 and 0027, first sentence, and Figures 3A through 3C of the priority application disclose three downlink physical control channel (PDCCH) formats: a conventional PDCCH format, a broadcast control channel resource allocation PDCCH format, and a paging control channel resource allocation PDCCH format. The numbering of the conventional format as the first format and the paging control channel resource allocation format as the second format does not go beyond the contents of the priority filing.

3.1, 4.1: Paragraph 0028, first sentence of the priority application discloses that the conventional PDCCH format is used for resource allocation of downlink data. Paragraph 0027, penultimate sentence discloses that some information is required from the PDCCH before the PDSCH is decoded for the first time by the terminal device. The skilled person will recognize that the conventional (first) PDCCH format supports receiving of data over the physical downlink shared channel PDSCH. Based on the different names and functions of the formats disclosed in the priority application, the skilled person readily reads into the variants that the paging or broadcast control channel resource allocation formats differ from the conventional (first) format. The variant that the resource allocation formats of the paging control channel and the broadcast control channel are not different from each other is disclosed in the general teachings of paragraph 0064, as it calls for an unspecified format to support the allocation of the broadcast control channel or the paging control channel.

b) The subject-matter of claim 10 as claimed in auxiliary claim 3, dated 22 January 2021, is considered to be based on an inventive step.

aa) The average person skilled in the art who is looking for an approach to properly and efficiently signal resource allocation for broadcast and paging services (cf. the above explanations on the task of the invention) has reason to inform himself about the current state of discussion in the 3GPP working groups dealing with the further development of relevant LTE mobile radio specifications. In particular, the skilled person has reason to consider the proposals contained in the documents QED1, QED13, QED14 and QED15 together and in combination with the mobile radio specification BP10 (= NK6) (cf. for example in QED1, QED13, QED14 the reference [1]).

bb) Starting from the prior art according to the QED1 writing and looking at it together with the BP10 specification, the subject-matter of claim 10 according to auxiliary claim 3 of 22 January 2021 is based on an inventive step.

As stated above, the QED1 paper proposes to optimize the downlink control channel PDCCH format for paging by omitting fields. In particular, the PDDCH format for paging could omit fields related to resource allocation duration, modulation scheme, hybrid auto-repeat request and antenna configuration, since this information is static or does not apply in paging (page 3, chapter 3.3., paragraphs 3, 5 and the fields highlighted in the table).

Specification BP10 discloses control messages directed to terminals in the physical downlink control channel PDDCH, with which a resource allocation for a shared downlink transport channel DL-SCH and thus also for a broadcast control channel BCCH is associated (page 16, chapter 5.1.3, heading and sentence 1 i. In conjunction with page 32, figure 6.1.3.2 and page 21, figure 5.3.1.-1).

However, neither the QED1 document nor the references cited in the BP10 specification contain any indication or suggestion that any fields of the conventional PDCCH format

contain information that is static in a resource allocation for a broadcast control channel or does not apply in broadcast. Therefore, the Board cannot find any inducement for the skilled person to consider, by omitting fields or otherwise, the measure in **feature 4.1 of claim 10** according to auxiliary claim 3 of 22 January 2021, according to which the format for providing the resource allocation of the broadcast control channel is different from the first format in the physical downlink control channel that supports receiving data over the physical downlink shared channel.

cc) Based on the prior art according to the QED1 document and when considered together with the QED14 document, the subject-matter of claim 10 according to auxiliary claim 3 of 22 January 2021 is based on an inventive step.

Although QED14 refers to the PDCCH resource allocation format for a broadcast control channel BCCH as a special format (page 1, third to last paragraph), there is no mention in QED14 of any other format in the PDCCH, or any indication or suggestion that the special format is intended to be different from any other special (first) format in the physical downlink control channel that supports the reception of data over the physical downlink shared channel (Feature 4.1).

If a passage of a citation is examined in patent revocation proceedings in isolation to determine whether it contains elements of the technical teaching of the patent in suit, this increases the risk - which can never be ruled out anyway - of a retrospective reading of the teaching of the patent in suit into the prior art. This is because the context of the citation is thereby replaced, as it were, by the context of the later invention, which determines what is being searched for in the citation (cf. BGH, Judgment of 19 March 2019 - X ZR 11/17 - Bitratenreduktion II, marginal no. 18).

The Board therefore has doubts that the designation of the PDCCH format as a "special format" in QED14 in conjunction with the PDCCH format disclosed in QED1 suggests to the skilled person the instruction in **feature 4.1** that the format for providing the resource allocation of the broadcast control channel is different from a first format in the physical downlink control channel that supports the reception of data over the physical downlink shared channel.

dd) Based on the prior art according to the QED1 writing, and when considered together with the QED13 or QED15 writings, the subject matter of claim 10 according to auxiliary claim 3 of 22 January 2021 is based on an inventive step.

This is because QED13 and QED15 do not contain any suggestion or reference to the instruction in **feature 4.1 of** claim 10 according to auxiliary claim 3 dated 22 January 2021. The QED13 does not describe any format at all in the physical downlink control channel for the resource allocation of the broadcast control channel and the QED15 font suggests to transport the configuration of the broadcast control channel in the primary system information in the broadcast transport channel BCH - i.e. not in the physical downlink control channel (page 3, chapter 3.1.1, last sentence).

ee) No other assessment of the patentability of the subject-matter of claim 10 according to auxiliary request 3 of 22 January 2021 results if the skilled person, starting from the prior art according to the writing QED1, considers the writings, QED13, QED14 and QED15 together and in synopsis with the mobile radio specification BP10 (= NK6).

c) The subject-matter of claim 1 and of subclaims 2, 8, 9 and 17 according to auxiliary claim 3 of 22 January 2021 are considered to be new and to involve an inventive step. The reasons given above for claim 10 according to auxiliary claim 3 apply equally.

IV.

The decision on costs is based on Sec. 84 (2) Patent Law in conjunction with Sec. 92 (1) sentence 1, 269 (3) ZPO. The Board assesses the defendant's failure due to the restriction of the patent in suit to the version according to auxiliary request 3 (in the version of 22 January 2021) as 50 % both vis-à-vis the first plaintiff and vis-à-vis the third plaintiff, which justifies the awarded share of costs between these parties in this respect. The burden of bearing the costs of the second plaintiff to the extent stated has its basis in its withdrawal of the action before the oral proceedings.

The decision on provisional enforceability follows from Sec. 99 (1) Patent Law in conjunction with Sec. 709 sentence 1 and sentence 2 ZPO.

Information on legal remedies

This judgment is subject to appeal.

The appeal must be lodged in writing or in electronic form with the Bundesgerichtshof, Herrenstr. 45 a, 76133 Karlsruhe, Germany, by an attorney-at-law or patent attorney admitted to practice in the Federal Republic of Germany, within one month of service of the judgment in full, but at the latest within one month of the expiry of five months from the date of delivery.

Grote-Bittner

Arnoldi

Matter

Söchtig

Carpenter

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