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**Datasheet for the decision  
of 2 February 2018**

**Case Number:** T 1472/11 - 3.5.05

**Application Number:** 08162639.2

**Publication Number:** 2028781

**IPC:** H04L1/18

**Language of the proceedings:** EN

**Title of invention:**

System and method for DRX control and NACK/ACK

**Applicant:**

BlackBerry Limited

**Headword:**

Discontinuous ACK-NACK reception/BlackBerry

**Relevant legal provisions:**

EPC Art. 56, 123(2)

**Keyword:**

Inventive step - main, first and second auxiliary requests (no)  
Added subject-matter - third auxiliary request (yes)



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Case Number: T 1472/11 - 3.5.05

**D E C I S I O N**  
**of Technical Board of Appeal 3.5.05**  
**of 2 February 2018**

**Appellant:** BlackBerry Limited  
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**Representative:** MERH-IP Matias Erny Reichl Hoffmann  
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**Decision under appeal:** Decision of the Examining Division of the  
European Patent Office posted on 17 February  
2011 refusing European patent application  
No. 08162639.2 pursuant to Article 97(2) EPC

**Composition of the Board:**

**Chair** A. Ritzka  
**Members:** K. Bengi-Akyuerek  
F. Blumer

## Summary of Facts and Submissions

- I. The appeal is against the decision of the examining division to refuse the present European patent application for lack of inventive step (Article 56 EPC) with respect to the claims of a main request and two auxiliary requests, having regard to the combined disclosures of
- D4:** "DRx and VoIP", 3GPP TSG-RAN WG2 Meeting #59, R2-073208, pp. 1-3, 15 August 2007, and
- D3:** "Semi-persistent Scheduling and DRX Control", 3GPP TSG-RAN WG2 Meeting #59, R2-073245, pp. 1-5, 14 August 2007.
- II. With the statement setting out the grounds of appeal, the appellant filed amended sets of claims according to a main request and two auxiliary requests. It requested that the examining division's decision be set aside and that a patent be granted on the basis of one of those claim requests. In addition, it requested that evidence be provided for the quoted publication dates of standardisation documents D3 and D4.
- III. In an annex to the summons to oral proceedings pursuant to Article 15(1) RPBA, the board expressed its preliminary opinion on the appeal. In particular, in response to the appellant's request as regards the publication dates of documents D3 and D4, it introduced two evidential documents into the appeal proceedings in support of the publication dates as indicated by the decision under appeal. Moreover, it raised objections under Articles 123(2), 54 and 56 EPC, having regard to document D4 combined with D3, and expressed concerns about the admissibility of the first and second

auxiliary requests under Article 12(4) RPBA.

IV. By letter of reply dated 20 December 2017, the appellant filed amended claims according to three new auxiliary requests, replacing the former auxiliary requests on file, and requested that a patent be granted on the basis of the main request or one of the newly filed auxiliary requests.

V. Oral proceedings were held on 2 February 2018, during which all the pending claim requests were admitted into the proceedings and their allowability was discussed.

The appellant's final request was that the decision under appeal be set aside and that a patent be granted on the basis of the main request as filed with the statement setting out the grounds of appeal dated 22 June 2011 or, subsidiarily, on the basis of any of the first to third auxiliary requests as filed with the letter dated 20 December 2017.

At the end of the oral proceedings, the board's decision was announced.

VI. Claim 1 of the **main request** reads as follows:

"A method of receiving acknowledgment 'ACK' or negative-acknowledgment 'NACK' at a wireless device (101) having a radio, the method comprising:  
receiving discontinuous reception 'DRX' control signalling;

configuring the wireless device (101) for DRX having on durations in accordance with the control signalling, such that the wireless device (101) monitors control channel elements during the on durations, wherein configuring the wireless

device (101) for discontinuous reception comprises controlling the radio to have periods during which the radio is on, and periods during which the radio is off, the periods during which the radio is on having a nominal on duration and the periods during which the radio is off having a nominal off duration; and

receiving ACK or NACK information in respect of transmissions made during the on durations irrespective of the DRX on durations, wherein the method comprises, for each period that the radio is on for which there is content to send from the wireless device (101):

making a transmission during the period the radio is on; and

receiving ACK or NACK corresponding to the transmission at a time determined for ACK or NACK reception, irrespective of nominal on duration and nominal off duration definitions."

Claim 1 of the **first auxiliary request** reads as follows:

"A method of receiving acknowledgment 'ACK' or negative-acknowledgment 'NACK' at a wireless device (101) comprising:

receiving, at the wireless device (101), discontinuous reception 'DRX' control signalling, the DRX control signalling defining on durations and off durations of a radio of the wireless device (101);

configuring the wireless device (101) for DRX in accordance with the received DRX control signalling, such that the wireless device (101) monitors control channel elements during the on durations, the control channel elements signalling dynamic allocations for the transmission of data packets from the wireless device (101);

transmitting, from the wireless device (101), a

data packet during an on duration;

determining, based on signalling, a predefined ACK/NACK reception interval aligned with times when reception of ACK/NACK information is expected;

at the beginning of the predefined ACK/NACK reception interval, turning the radio of the wireless device (101) on; and

receiving, at the wireless device (101), ACK or NACK information in respect of the transmitted data packet, during the predefined ACK/NACK reception interval."

Claim 1 of the **second auxiliary request** is identical to claim 1 of the first auxiliary request, while independent claim 2 of the second auxiliary request reads as follows:

"A method of transmitting acknowledgment 'ACK' or negative-acknowledgment 'NACK' in a wireless device (101) comprising:

receiving, at the wireless device (101), discontinuous reception 'DRX' control signalling, the DRX control signalling defining on durations and off durations of a radio of the wireless device (101);

configuring the wireless device (101) for DRX in accordance with the control signalling, such that the wireless device monitors control channel elements during the on durations, the control channel elements signalling dynamic allocations for the reception of data packets at the wireless device (101);

determining, based on signalling, a predefined ACK/NACK transmission interval aligned with times when transmission of ACK/NACK information is expected;

if a data packet is received at the wireless device (101) during an on duration, at the beginning of a predefined ACK/NACK transmission interval, turning

the radio of the wireless device (101) on; and  
transmitting, from the wireless device (101),  
ACK or NACK information in respect of the received data  
packet, during the predefined ACK/NACK transmission  
interval if the radio is turned on."

Claim 1 of the **third auxiliary request** reads as follows  
(amendments compared to claim 1 of the first and second  
auxiliary requests underlined by the board):

"A method of receiving acknowledgment 'ACK' or  
negative-acknowledgment 'NACK' at a wireless  
device (101) comprising:

receiving, at the wireless device (101),  
discontinuous reception 'DRX' control signalling, the  
DRX control signalling defining on durations and off  
durations of a radio of the wireless device (101);

configuring the wireless device (101) for DRX  
in accordance with the received DRX control signalling,  
such that the wireless device (101) monitors control  
channel elements during the on durations, the control  
channel elements signalling dynamic allocations for the  
transmission of data packets from the wireless  
device (101);

transmitting, from the wireless device (101), a  
data packet during an on duration;

determining, based on signalling, a predefined  
ACK/NACK reception interval aligned with times when  
reception of ACK/NACK information is expected;

at the beginning of the predefined ACK/NACK  
reception interval, turning the radio of the wireless  
device (101) on; and

receiving, at the wireless device (101), ACK or  
NACK information in respect of the transmitted data  
packet, and monitoring control channel elements during  
the predefined ACK/NACK reception interval."

## Reasons for the Decision

### 1. MAIN REQUEST

**Claim 1** of the main request relates to the receipt of ACK/NACK messages at a wireless device following *uplink* transmissions of data packets, and comprises the following features (as labelled by the board):

A method of receiving ACK or NACK at a wireless device having a radio, the method comprising the steps of:

- A) receiving DRX control signalling and configuring the wireless device for DRX having on-durations in accordance with the control signalling, such that the wireless device monitors control-channel elements (CCEs) during the on-durations,
- B) wherein configuring the wireless device for DRX comprises controlling the radio to have periods during which the radio is on, and periods during which the radio is off, the periods during which the radio is on having a nominal on-duration and the periods during which the radio is off having a nominal off-duration;
- C) receiving ACK or NACK information in respect of transmissions made during the on-durations irrespective of the DRX on-durations, wherein, for each period that the radio is on for which there is content to send from the wireless device, making a transmission during the period the radio is on and receiving ACK or NACK corresponding to the transmission at a time determined for ACK or NACK reception, irrespective of nominal on-duration and nominal off-duration definitions.



1.1 *Novelty and inventive step (Articles 54 and 56 EPC)*

The board judges that the subject-matter of present claim 1 is novel but does not involve an inventive step within the meaning of Article 56 EPC, for the reasons set out below.

1.1.1 As regards the question whether 3GPP standardisation documents D3 and D4 belong to the state of the art under Article 54(2) EPC (cf. point II above), the board, in view of corresponding 3GPP-server upload data proving the quoted publication dates of those documents, has established that D3 was made available on the 3GPP server on 14 August 2007 and that D4 was made available on the 3GPP server on 15 August 2007 (see the board's communication under Article 15(1) RPBA, point 3.1.1). The board therefore concludes that D3 and D4 do indeed constitute state of the art within the meaning of Article 54(2) EPC. This was not contested by the appellant at the oral proceedings before the board.

1.1.2 It is apparent to the board that the closest prior art **D4**, concerned with DRX configurations in 3GPP-based networks, discloses the following limiting features of present claim 1 (missing features struck out by the board):

A method of receiving ACK/NACK at a wireless device ("UE") having a radio (see e.g. page 1, section 2.1), the method comprising the steps of:

- A) receiving DRX control signalling and configuring the wireless device for DRX having on-durations ("DRx intervals"; "DRx cycles") in accordance with the control signalling (see in particular page 1,

section 2.1: "... With DRx, the UE is allowed to turn off its radio receiver and transmitter for certain intervals. Both mechanisms are configured by the RRC ..." such that the wireless device ~~monitors CCEs during the on-durations,~~

- B) wherein configuring the wireless device for DRX comprises controlling the radio to have periods during which the radio is on, and periods during which the radio is off, the periods during which the radio is on having a nominal on-duration and the periods during which the radio is off having a nominal off-duration (see page 1, section 2.2, second and third paragraphs);
- C) receiving ACK or NACK information in respect of transmissions made during the on-durations irrespective of the DRX on-durations, wherein, for each period that the radio is on for which there is content to send from the wireless device, making a transmission during the period the radio is on and receiving ACK or NACK corresponding to the transmission at a time determined for ACK or NACK reception, irrespective of nominal on-duration and nominal off-duration definitions (see e.g. page 2, sub-section "DRx and HARQ for VoIP", second paragraph: "For uplink transmissions, ... the UE must be awake at least when the ACK/NACK is expected ...").

1.1.3 As to feature C), the appellant argued that D4 did not provide any detailed teaching as to how it is actually achieved that the UE is awake when ACK/NACK messages are expected to be received. More particularly, the appellant assumed, referring to the third alternative as regards the operation of DRX and HARQ (cf. page 2, penultimate paragraph: "3. DRx resumes, but wakes-up every X TTIs, until HARQ succeeds ..."), that D4 relied

on re-scheduling the corresponding DRX configuration pattern as regards the nominal on/off-durations, in order for the wireless device to be awake when receipt of ACK/NACK messages is expected, rather than applying *additional* on-durations, irrespective of the nominal on-durations, as claimed.

In that regard, the board notes that the above alternative of D4 cited by the appellant (like the other two alternatives mentioned at the bottom of page 2 of D4) refers only to HARQ retransmissions of data packets. Thus, it does not refer to ACK/NACK transmissions but only to the actual HARQ *retransmissions* of data packets, initiated in response to a NACK transmission. Even if that alternative were to be applied to ACK/NACK transmissions, the board finds that re-scheduling nominal on/off-durations, based on expected ACK/NACK reception intervals (i.e. after every HARQ cycle), would dramatically increase the complexity and stability of the overall system and therefore would make no technical sense. This is, in the board's view, further corroborated by the fact that the above-mentioned alternative starts with "DRx resumes, but wakes-up ..." and thus clearly indicates to the skilled person that the wireless device is supposed to resume the nominal DRX on/off-periods as configured by the uplink device, i.e. the RRC unit, rather than changing them. Furthermore, D4 does indeed teach, contrary to the appellant's view, that, in the event of HARQ-based uplink transmissions, the wireless device *must* be awake when the ACK/NACK response to a previous uplink transmission is expected to be received (see page 2, sub-section "DRx and HARQ for VoIP", second paragraph, first sentence: "*For uplink transmissions, ... where the UE must be awake at least when the ACK/NACK is expected*"). D4 also states that

such an additional on-period can be specified "outside" the DRX configuration pattern (see page 2, sub-section "DRx and HARQ for VoIP", first paragraph, second sentence). Thus, the wireless device has to be turned on at the expected ACK/NACK reception times in the proposed system of D4, irrespective of the initially configured nominal DRX on-duration, in full accordance with feature C).

1.1.4 As to feature A), however, the board accepts that D4, although implying that the receiving part of the wireless device receives any data or control packet which has been sent to it during the on-durations, does not expressly mention control channel elements (CCEs) or, more importantly, the *monitoring* of such CCEs.

1.1.5 It follows from the above that the subject-matter of present claim 1 differs from the disclosure of D4 in that DRX configuration is performed such that

i) the wireless device monitors CCEs during the on-durations.

Hence, present claim 1 is found to be novel over D4 (Article 54 EPC).

1.1.6 As to inventive step, however, the board notes first that D4 indicates that "dynamic scheduling", i.e. using "scheduling grants" for transmissions, is also possible for uplink/downlink HARQ retransmissions (see page 2, section 2.3, sub-section "Uplink and Downlink HARQ", emphasis added: "... *The synchronous retransmission can be configured to be either adaptive or non-adaptive; if adaptive, a scheduling grant is used ... HARQ retransmissions are dynamically scheduled using grants"). The board finds that the skilled person in*

the field of 3GPP-based mobile networks would regard this as a hint towards a possible combined use of both semi-persistent and dynamic scheduling and would seek feasible solutions for its implementation. More specifically, the skilled person would attempt to solve the objective technical problem of "how to adapt the HARQ scheme of D4 (based on semi-persistent scheduling) in the event of possible dynamic scheduling grants".

From document **D3**, originating from the same 3GPP standardisation working group as D4 and also concerned with the problem of saving battery power at the wireless device (see e.g. D3, section 1), the skilled person would deduce that D3 specifically teaches that, for the purpose of implementing "dynamic scheduling" in addition to "semi-persistent scheduling", the UE has necessarily to monitor CCEs during on-durations (see e.g. D3, page 2, third paragraph, penultimate sentence: *"During the ... DRX-ON period, the UE will ... keep monitoring all the CCEs ..."* or page 3, last paragraph: *"... only during the DRX-ON period does the UE need to ... monitor the Layer 1 CCEs for possible dynamic scheduling ..."*, in conjunction with Figure 4, steps 1 and 3).

In view of the above, the board holds that the skilled person would indeed combine the teachings of prior-art documents D4 and D3 to solve the above-mentioned objective technical problem and would arrive at the solution according to distinguishing feature i), and thus at the subject-matter claimed, without exercising inventive skills.

- 1.2 As a consequence, the main request is not allowable under Article 56 EPC.

2. FIRST AUXILIARY REQUEST

Claim 1 of the first auxiliary request differs from claim 1 of the main request essentially in that it no longer includes feature C) but instead specifies that (emphasis added by the board)

- D) the DRX control signalling is received at the wireless device;
- E) the CCEs signal dynamic allocations for the transmission of data packets from the wireless device;
- F) a data packet is transmitted from the wireless device during an on-duration;
- G) a predefined ACK/NACK reception interval aligned with times when reception of ACK/NACK information is expected is determined, based on signalling, the radio of the wireless device is turned on at the beginning of the predefined ACK/NACK reception interval, ACK/NACK information in respect of the transmitted data packet is received at the wireless device during the predefined ACK/NACK reception interval.

Added features D) to G) are in particular supported by the embodiment relating to *additional* awake or on-durations, i.e. "predefined ACK/NACK reception intervals" in the language of feature G), as described on page 24, line 5 to page 26, line 8, in conjunction with Figures 13A and 13B of the present application as originally filed.

2.1 *Inventive step (Article 56 EPC)*

2.1.1 As to feature D) of present claim 1, D4 discloses that the wireless device, i.e. the UE, receives the DRX

control signalling from the base station, i.e. here the RRC unit (see e.g. D4, page 1, section 2.1).

- 2.1.2 As to feature E), the board notes that document D3 teaches that control-channel elements (CCEs) are supposed to convey "dynamic scheduling grants", i.e. dynamic allocations for data transmissions of the UE (see e.g. D3, page 2, first paragraph: *"... monitoring the layer 1 CCE for dynamic scheduling grants for possible data coming."*).
- 2.1.3 As to feature F), D4 indicates that the wireless device must be awake, i.e. be turned on, in order to send data packets such as in the case of HARQ retransmissions (see e.g. D4, page 2, sub-section "DRx and HARQ for VoIP", second paragraph: *"For uplink transmissions, ... the UE ... must also be awake when the retransmission is performed"*).
- 2.1.4 As to feature G), which relates to the actual process of receiving ACK/NACK messages at the wireless device, the board holds that the skilled person in the field of 3GPP-based mobile networks would be aware from his common general knowledge that, after sending a data packet, e.g. by HARQ retransmission, on the part of the wireless device, a corresponding ACK/NACK message sent from the uplink device (i.e. the RRC unit) can be expected to be received at that wireless device after one round-trip time (RTT) at the earliest. This knowledge is also underpinned by D4 (see e.g. page 2, sub-section "Uplink and Downlink HARQ", first paragraph: *"For the uplink ... a retransmission is always expected to come after one HARQ RTT ..."* in terms of HARQ retransmissions or page 2, penultimate paragraph: *"... For the uplink, the value X can match the HARQ RTT ..."* in terms of ACK/NACK transmissions).

Thus, especially in view of the sub-section "DRx and HARQ for VoIP" (see second paragraph: "... *the UE must be awake at least when the ACK/NACK is expected ...*"), the skilled person would conclude that the wireless device must be awake, i.e. begin to be turned on, after the HARQ RTT period at the latest and must remain on for a period corresponding to the maximum length of typical ACK/NACK messages in the underlying system. Given that it belongs to the skilled person's common general knowledge in the field of 3GPP-based mobile networks that network parameters such as the (pre-measured) HARQ RTT and the maximum length of ACK/NACK messages have typically to be signalled by the wireless base station, i.e. the RRC unit according to the teachings of D4 and D3, the board concludes that feature G) cannot contribute to an inventive step either.

2.2 In view of the above, the first auxiliary request is likewise not allowable under Article 56 EPC.

### 3. SECOND AUXILIARY REQUEST

Claim 1 of this auxiliary request is identical to claim 1 of the first auxiliary request, while independent claim 2 is in essence complementary to present claim 1, such that it relates to the *transmission* (rather than *receipt*) of ACK/NACK messages by a wireless device following *downlink* (rather than *uplink*) transmissions of data packets.

#### 3.1 *Inventive step (Article 56 EPC)*

3.1.1 As regards present claim 1, the observations and reasoning set out for claim 1 of the first auxiliary request in point 2.1 above self-evidently applies in



full to claim 1 of the second auxiliary request.

3.1.2 As regards present claim 2, which was in particular discussed at the oral proceedings before the board, the board notes that D4 also refers to *downlink* transmissions and teaches that, if a data packet such as a VoIP frame is received at the wireless device, the device must be awake, i.e. be turned on, for transmitting the corresponding ACK/NACK message and, most importantly, that this awake period can be specified outside the nominal DRX pattern, e.g. as an additional on-duration (see e.g. D4, page 2, sub-section "DRx and HARQ for VoIP", first paragraph: "*For downlink transmissions, after a VoIP frame has been received the UE must be awake at least when ... it transmits the HARQ ACK/NACK ... This can be specified outside the DRX pattern, i.e. the UE is awake at the known occasions ...*").

3.2 In sum, the second auxiliary request is not allowable under Article 56 EPC either.

#### 4. THIRD AUXILIARY REQUEST

Claim 1 of this auxiliary request differs from claim 1 of the first and second auxiliary requests essentially in that it further specifies that (emphasis added by the board)

H) CCEs are monitored during the predefined ACK/NACK reception interval.

4.1 *Added subject-matter (Article 123(2) EPC)*

4.1.1 As to added feature H), the application as filed, on page 24, lines 6-17, as cited by the appellant, teaches

the following (emphasis added by the board):

*"... in such embodiments, a DRX/DTX period is provisioned between an awake period for a voice packet (semi-persistent resource allocation) and an awake period for the ACK/NACK. In some embodiments, CCEs transmitted during either of the awake periods can be used to signal a dynamic allocation for the uplink and/or downlink. In addition, in some embodiments, during the additional awake period, the mobile device is permitted to make requests for dynamic allocations for the uplink."*

Hence, it is only taught in the original application that during the "additional awake period" (i.e. the "predefined ACK/NACK reception interval" as claimed) the wireless device is solely permitted to make requests for dynamic scheduling for the uplink, rather than monitoring CCEs as required by feature H).

4.1.2 The appellant argued that it would be clear to the skilled person that when CCEs are transmitted during the awake periods at the transmitter side they also had to be monitored during those awake periods.

The board is not persuaded. Firstly, the CCEs may be transmitted during either the "awake period for a voice packet" or the "awake period for the ACK/NACK", i.e. not necessarily during the "predefined ACK/NACK reception interval" as claimed. Secondly, the mere fact that control packets such as CCEs are transmitted during the "predefined ACK/NACK reception interval" of the receiving wireless device does not directly and unambiguously mean to the skilled person that those CCEs are necessarily monitored during that "predefined

ACK/NACK reception interval".

4.2 In conclusion, the third auxiliary request is not allowable under Article 123(2) EPC.

## Order

**For these reasons it is decided that:**

The appeal is dismissed.

The Registrar:

The Chair:



K. Götz-Wein

A. Ritzka

Decision electronically authenticated