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**Datasheet for the decision  
of 30 March 2022**

**Case Number:** T 0596/17 - 3.5.04

**Application Number:** 10154959.0

**Publication Number:** 2362658

**IPC:** H04N7/26, H03M7/40

**Language of the proceedings:** EN

**Title of invention:**

Encoding and decoding methods and devices employing dual codesets

**Applicant:**

BlackBerry Limited

**Headword:**

**Relevant legal provisions:**

EPC Art. 123(2)

RPBA 2020 Art. 13(1), 13(2)

**Keyword:**

Main request - amendment after summons - exercise of discretion - admitted

Main request - amendments - added subject-matter (yes)

First to third auxiliary requests - amendment to appeal case - amendment overcomes issues raised (no) - not admitted

**Decisions cited:**

T 0989/15, T 0954/17

**Catchword:**



**Beschwerdekammern**  
**Boards of Appeal**  
**Chambres de recours**

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Case Number: T 0596/17 - 3.5.04

**D E C I S I O N**  
**of Technical Board of Appeal 3.5.04**  
**of 30 March 2022**

**Appellant:** BlackBerry Limited  
(Applicant) 2200 University Avenue East  
Waterloo, ON N2K 0A7 (CA)

**Representative:** Murgitroyd & Company  
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**Decision under appeal:** **Decision of the Examining Division of the  
European Patent Office posted on 5 December 2016  
refusing European patent application  
No. 10154959.0 pursuant to Article 97(2) EPC.**

**Composition of the Board:**

**Chair** B. Willems  
**Members:** A. Seeger  
T. Karamanli

## **Summary of Facts and Submissions**

- I. The appeal is against the examining division's decision to refuse European patent application No. 10 154 959.0, published as EP 2 362 658 A1.
- II. The prior-art documents cited in the decision under appeal included:  
  
D1: GB 2 285 374 A
- III. The decision under appeal was based on the grounds that claims 1 and 8 of the then sole request did not meet the requirements of Article 123(2) EPC and the subject-matter of all claims of this sole request was not new (Article 54 EPC).
- IV. The applicant (appellant) filed notice of appeal. With the statement setting out the grounds of appeal, the appellant filed claims according to a main request and first to third auxiliary requests. The appellant requested that the decision under appeal be set aside and that a European patent be granted on the basis of the claims of the main request or, alternatively, on the basis of the claims of one of the first to third auxiliary requests. It indicated a basis in the application as filed for the claimed subject-matter and provided arguments as to why the claims met the requirements of Articles 54 and 56 EPC.
- V. A summons to oral proceedings and a communication under Article 15(1) of the Rules of Procedure of the Boards of Appeal in the 2020 version (RPBA 2020, see OJ EPO 2019, A63) were issued. In that communication, the board expressed the following preliminary opinion.

- (a) Claims 1 and 8 of all requests had been amended in such a way that they contained subject-matter which extended beyond the content of the application as filed (Article 123(2) EPC).
  
- (b) The combination of features of claim 1 of all requests, except the feature that "*at least one leaf node has  $u$  that is greater than 1*", was known from document D1. The board doubted that a claim including this feature had been searched. Therefore, the board was not in a position to assess novelty and inventive step for a claim including this feature. Should the discussion at the oral proceedings reveal that the only issues relevant to the allowability of the main request were novelty and inventive step, then it might have to be first discussed whether a remittal to the department of first instance would be appropriate (Article 111(1), second sentence, EPC and Article 11 RPBA 2020).

VI. By letter dated 1 February 2022, the appellant filed amended claims according to a main request and first to third auxiliary requests. It provided reasons why the amended claims according to these requests should be admitted into the appeal proceedings. Furthermore, the appellant indicated a basis in the application as filed for the subject-matter of the amended claims and provided reasons why the subject-matter of claim 1 of all requests should have been searched and was new and inventive over the available prior art.

VII. On 30 March 2022, oral proceedings took place before the board.

The appellant's final requests were that the decision under appeal be set aside and that a European patent be granted on the basis of the claims of the main request or, alternatively, on the basis of the claims of one of the first to third auxiliary requests, all requests filed by letter dated 1 February 2022.

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

VIII. Claim 1 of the main request reads as follows:

"A method (200) for encoding an input binary sequence of symbols, the method comprising:

selecting (204) an encoding tree, based on an estimated probability,  $p_k$ , determined from a context model, wherein the encoding tree includes a plurality of leaf nodes each having an associated primary codeword, the primary codewords being associated with a primary code set, corresponding to an input binary sequence and having a probability value of  $p_k^u(1-p_k)^v$  where

$p_k$  is a probability value for a least probable symbol, LPS, of the input sequence;

$1-p_k$  is a probability value for a most probable symbol, MPS, of the input sequence;

$u$  is the number of LPS in the input sequence; and

$v$  is the number of MPS in the input sequence,

such that at least one leaf node can have a  $u$  value that is greater than 1; and a plurality of internal nodes each corresponding to a prefix of one of the

input binary sequences and each having an associated secondary codeword, wherein the primary codewords form a primary Huffman codeset and the secondary codewords form a secondary Huffman codeset; and

traversing (206) the encoding tree, based on the input binary sequence of symbols until either a leaf node is reached, and in response, outputting (210) the primary codeword associated with the leaf node, or a flush event occurs while at an internal node of the encoding tree, and in response, outputting (214) the secondary codeword associated with the internal node."

- IX. Claim 1 of the first auxiliary request is identical to claim 1 of the main request up to and including the feature "*such that at least one leaf node can have a u value that is greater than 1*". Thereafter, claim 1 of the first auxiliary request reads as follows:

"wherein parsing of the input binary sequence ends when the probability value  $p_k^u(1-p_k)^v$  has reached a value less than a threshold value; and a plurality of internal nodes each corresponding to a prefix of one of the input binary sequences and each having an associated secondary codeword, wherein the primary codewords form a primary Huffman codeset and the secondary codewords form a secondary Huffman codeset; and

traversing (206) the encoding tree, based on the input binary sequence of symbols until either a leaf node is reached, and in response, outputting (210) the primary codeword associated with the leaf node, or a flush event occurs while at an internal node of the encoding tree, and in response, outputting (214) the secondary codeword associated with the internal node."

X. Claim 1 of the second auxiliary request is identical to claim 1 of the main request up to and including the feature "*such that at least one leaf node can have a  $u$  value that is greater than 1*". Thereafter, claim 1 of the second auxiliary request reads as follows:

"wherein parsing of the input binary sequence ends when the probability value  $p_k^u(1-p_k)^v$  has reached a value less than a threshold value; and a plurality of internal nodes each corresponding to a prefix of one of the input binary sequences and each having an associated secondary codeword, wherein the primary codewords form a primary Huffman codeset and the secondary codewords form a secondary Huffman codeset; and

traversing (206) the encoding tree, based on the input binary sequence of symbols until either a leaf node is reached, and in response, outputting (210) the primary codeword associated with the leaf node, or a flush event occurs while at an internal node of the encoding tree, and in response, outputting (214) the secondary codeword associated with the internal node, wherein the method further comprises for instances where the primary codeword and the secondary codeword are overlapping, defining an escape codeword, and on identification of the escape codeword during the traversing of the encoding tree identifying codewords following the escape code as secondary codewords."

XI. Claim 1 of the third auxiliary request is identical to claim 1 of the main request up to and including the feature "*such that at least one leaf node can have a  $u$  value that is greater than 1*". Thereafter, claim 1 of the third auxiliary request reads as follows:



"wherein parsing of the input binary sequence ends when the probability value  $p_k^u(1-p_k)^v$  has reached a value less than a threshold value; and a plurality of internal nodes each corresponding to a prefix of one of the input binary sequences and each having an associated secondary codeword, wherein the primary codewords form a primary Huffman codeset and the secondary codewords form a secondary Huffman codeset; and

traversing (206) the encoding tree bit by bit using the input binary sequence of symbols and for each bit assessing whether the input binary sequence thus far results in a leaf node, and in response, outputting (210) the primary codeword associated with the leaf node, or a flush event occurs while at an internal node of the encoding tree, and in response, outputting (214) the secondary codeword associated with the internal node, wherein the method further comprises for instances where the primary codeword and the secondary codeword are overlapping, defining an escape codeword, and on identification of the escape codeword during the traversing of the encoding tree identifying codewords following the escape code as secondary codewords."

XII. The appellant's arguments, in so far they were relevant to the present decision, may be summarised as follows.

(a) The person skilled in the art would understand the term "*full binary tree*" in paragraph [0050] of the description as meaning a tree in which at least one leaf node has a  $u$  value that is greater than one. A tree not having this property, namely a tree in which every branch emerging from an internal node

labelled with a least probable input symbol immediately ended in a leaf node, would be slanted. Such a slanted tree would not be considered by the person skilled in the art to be a "full" binary tree.

- (b) The example provided in paragraph [0070] of the description disclosed that  $u$  can have a value of two.
- (c) Paragraphs [0091] to [0095] of the description disclosed switching between two encoding trees for two sources, A and B. In this process, it could happen that a sequence of input bits from source A did not lead to an encoding tree leaf node before the next input bits from source B arrived. Then, an incomplete sequence of input bits from source A was stored in a buffer element. Such an incomplete sequence of input bits could not have occurred if every branch labelled with a least probable input symbol immediately ended in a leaf node. In such a case, every least probable input symbol would have immediately resulted in an output codeword and no buffering of incomplete sequences would have occurred. Hence, it followed from the described buffering that not every branch labelled with a least probable input symbol immediately ended in a leaf node. The description thus implied that a tree in which at least one leaf node had a  $u$  value that was greater than one was required.
- (d) The feature of claim 1 according to the main request that an encoding tree was selected "*such that at least one leaf node can have a  $u$  value that is greater than 1*" was a natural consequence of

reading all the cited parts of the description together.

### **Reasons for the Decision**

1. The appeal is admissible.
2. Main request - admittance (Article 13(2) RPBA 2020)
  - 2.1 In the case in hand, the summons to oral proceedings was notified after the date on which RPBA 2020 entered into force, i.e. 1 January 2020 (Article 24(1) RPBA 2020). Thus, in accordance with Article 25(1) and (3) RPBA 2020, Article 13(2) RPBA 2020 applies to the question of whether to admit the appellant's main request, which was filed after the notification of the summons to oral proceedings and is therefore an amendment within the meaning of Article 13(2) RPBA 2020.
  - 2.2 The board considers the main request to be a reaction to the objection under Article 123(2) EPC raised for the first time in the board's communication under Article 15(1) RPBA 2020 and that therefore the circumstances leading to the amendment are exceptional in the case at hand. Therefore, the board exercised its discretion under Article 13(2) RPBA 2020 and decided to admit the main request into the appeal proceedings.
3. Main request - added subject-matter (Article 123(2) EPC)
  - 3.1 Claim 1 of the main request had been amended to specify that an encoding tree is selected "*such that at least one leaf node can have a u value that is greater than 1*".

Therein,  $u$  is the number of least probable symbols (LPS) in an input binary sequence.

- 3.2 This feature means that a choice among possible encoding trees is restricted in such a way that only those trees can be selected in which at least one leaf node can have a  $u$  value that is greater than one.

In other words, trees which do not have this property, for example trees in which for all leaf nodes  $u$  has a value of either zero or one, cannot be selected.

Trees in which  $u$  has a value of either zero or one for all leaf nodes exhibit the property that all branches emerging from an internal node and pointing towards the direction labelled with the LPS immediately end in a leaf node, i.e. a node from which no branches emerge.

- 3.3 The appellant referred to the following passages of the description as a basis for the feature quoted under point 3.1 above:

- (a) paragraph [0050]
- (b) paragraph [0070]
- (c) paragraphs [0091] to [0095]

- 3.4 The board is not convinced by the appellant's argument that the person skilled in the art would not consider a tree in which every branch emerging from an internal node labelled with an LPS immediately ended in a leaf node to be a "*full*" binary tree (see point XII.(a) above).

Paragraph [0050] of the description sets out the following two conditions for a tree to be a "*full binary tree*".

- (a) Every path in the tree defines a bit sequence.
- (b) Every node on that path, including the leaf, designates a value of the form  $p_k^u(1-p_k)^v$ , where  $u$  is the number of LPS and  $v$  is the number of most probable symbols (MPS) in the path.

These conditions are met if every branch in the tree is labelled with an input bit, the probability of an LPS is  $p_k$  and the probability of an MPS is  $1-p_k$ . These conditions do not require specific values of  $u$  and  $v$  and are thus fulfilled even if  $u$  is restricted to zero or one for all leaf nodes.

It therefore cannot be derived from the conditions set out in paragraph [0050] that the choice among encoding trees must be restricted to trees in which at least one leaf node can have a  $u$  value that is greater than one.

- 3.5 The appellant argued that the example provided in paragraph [0070] of the description discloses that  $u$  can have a value of two (see point XII.(b) above).

The board acknowledges that the first, second and fourth parsed sequences listed in Table 1 of paragraph [0070] are examples of  $u = 2$ .

However, this is just an example set of codewords as stated in the first line of paragraph [0070]. No general restrictions on the kind of possible encoding trees can be derived from this single example.

- 3.6 The board is not convinced that the switching between two encoding trees for two sources A and B disclosed in paragraphs [0091] to [0095] of the description implies

that a tree in which at least one leaf node has a u value that is greater than one is required (see point XII.(c) above).

For a tree in which u has a value of either zero or one for all leaf nodes, incomplete sequences may be buffered if an incomplete sequence consists of one or several MPS. Hence, there is no contradiction between using a tree in which u has a value of either zero or one for all leaf nodes and buffering incomplete sequences.

- 3.7 The appellant argued that the feature quoted under point 3.1 above was a natural consequence of reading all the cited parts of the description together (see point XII.(d) above).

The board is not convinced that the cited parts of the description add up to more than their individual disclosures. Paragraph [0050] describes the general conditions on a tree used to encode an input binary sequence. Paragraph [0070] provides an example of such a tree. No general restrictions on the kind of possible trees can be derived from this single example. Paragraphs [0091] to [0095] illustrate alternate processing using two of these trees. However, this does not establish a further restriction on one of the individual trees.

- 3.8 In view of the above, the board concludes that the feature of claim 1 quoted under point 3.1 above has no basis in the application as filed. Hence, claim 1 does not meet the requirements of Article 123(2) EPC.

4. First to third auxiliary requests - admittance (Article 13(2) RPBA 2020)

- 4.1 The first to third auxiliary requests were filed after the notification of the summons to oral proceedings. These requests are therefore amendments within the meaning of Article 13(2) RPBA 2020.
- 4.2 The explanatory remarks on Article 13(2) RPBA 2020 contain the following guidance: "*At the third level of the convergent approach, the Board may also rely on criteria applicable at the second level of the convergent approach, i.e. as set out in proposed new paragraph 1 of Article 13*" (see Supplementary publication 2, OJ EPO 2020, page 60). The board takes the view that, at the third level of the convergent approach, the boards of appeal are free to use or not use the criteria set out in Article 13(1) RPBA 2020 when deciding, in exercising their discretion in accordance with Article 13(2) RPBA 2020, whether to admit an amendment made at this stage of the proceedings (see also decisions T 989/15, point 16.2 of the Reasons, and T 954/17, point 3.10 of the Reasons).
- 4.3 The board accepts that the board's objection under Article 123(2) EPC raised in its communication under Article 15(1) RPBA 2020 represents exceptional circumstances within the meaning of Article 13(2) RPBA 2020. However, it is still within the board's discretion to admit the first to third auxiliary requests into the appeal proceedings.
- 4.4 The board finds it appropriate, in exercising its discretion, to rely on the criterion set out in Article 13(1) RPBA 2020 as to whether a party has demonstrated that any amendment, prima facie, overcomes the issues raised by the board.

4.5 Claim 1 of the first to third auxiliary requests contains the same feature as objected to under Article 123(2) EPC for the main request and the features added to claim 1 of these auxiliary requests do not change anything in respect of that objection. Hence, the first to third auxiliary requests, prima facie, do not overcome the objection under Article 123(2) EPC raised by the board.

4.6 Therefore, the board exercised its discretion under Article 13(2) RPBA 2020 in light of the criteria of Article 13(1) RPBA 2020 and did not admit the first to third auxiliary requests into the appeal proceedings.

5. Conclusion

The main request is not allowable because claim 1 does not meet the requirements of Article 123(2) EPC. The first to third auxiliary requests were not admitted into the appeal proceedings. Since none of the appellant's requests is allowable, the appeal must be dismissed.

## **Order**

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

The appeal is dismissed.



The Registrar:

The Chair:



K. Boelicke

B. Willems

Decision electronically authenticated