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Datasheet for the decision of 11 October 2007

Case Number: T 0573/06 - 3.5.03

Application Number: 00944091.8

Publication Number: 1186119

IPC: H04B 7/06

Language of the proceedings: EN

Title of invention:
Method for transmitting a sequence of symbols

Patentee:
Nokia Corporation

Opponent:
QUALCOMM Incorporated

Headword:
Transmission pattern/NOKIA

Relevant legal provisions:
EPC Art. 100(a), (c), 52, 54, 56

Keyword:
"Added subject-matter - yes (main request) - no (1st auxiliary request)"
"Novelty and inventive step - yes (1st auxiliary request)"

Decisions cited:
-

Catchword:
-

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Case Number: T 0573/06 - 3.5.03

D E C I S I O N
of the Technical Board of Appeal 3.5.03
of 11 October 2007

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Decision under appeal:
Interlocutory decision of the Opposition Division of the European Patent Office posted 1 February 2006 concerning maintenance of European patent No. 1186119 in amended form.

Composition of the Board:

Chairman: A. S. Clelland
Members: D. H. Rees
R. Moufang

Summary of Facts and Submissions

I. This is an appeal by the sole opponent against the decision of the opposition division according to which European Patent No. 1 186 119 in amended form complies with the requirements of the EPC.

II. The appellant had requested revocation of the patent in its entirety on all grounds under Article 100 EPC, arguing with respect to Article 100(a) that the claimed subject-matter was not new or did not involve an inventive step over the disclosure of *inter alia* document

D1: TSGR1#3(99)152: TSG-RAN Working Group 1, meeting #3, Eskilstuna, Sweden, 22 to 26 March 1999.

The ground of lack of sufficient disclosure (Article 100(b) EPC) was raised against granted dependent claim 7 only.

III. In oral proceedings held on 16 December 2005 the opposition division decided that the patent could be maintained on the basis of claims 1 to 12 as granted (with a reference sign in claim 12 being deleted) and amended dependent claims 13 to 15 filed during the oral proceedings. Independent claim 1 read as follows:

"1. A method (300, 400, 500) for transmitting a certain sequence of symbols, where
- a frame is constructed of a certain number of consecutive symbols,
- the symbols belonging to the sequence are transmitted (404, 502, 606) using at least two antennas and

- the transmission of the sequence of symbols is characterized (401, 601) with a certain transmission pattern,
characterized in that
- the transmission of the sequence of symbols is started (402) from a predefined antenna,
- each symbol of the sequence is transmitted using not more than one antenna whereby only one antenna is transmitting at a time and
- when a partial transmission pattern is used in the end of a frame, the transmission pattern is started (403, 405) from the beginning in the beginning of a next frame."

Dependent claim 8 read as follows:

"8. A method according to claim 1, where each frame consists of a certain number of consecutive time slots and each time slot consists of a certain number of consecutive symbols, characterized in that in at least one of the time slots no symbol belonging to the sequence of symbols is transmitted."

Independent claim 12 specified "an arrangement" corresponding to method claim 1.

IV. Notice of appeal was filed, with the appropriate fee, on 11 April 2006. A statement of grounds of appeal was subsequently filed on 12 June 2006. The appellant maintained its request to revoke the patent, arguing firstly that the patent as maintained, specifically claims 1, 8 and 12, contained matter extending beyond the content as filed (Article 100(c) EPC) and secondly that the subject-matter of the independent claims

lacked novelty or an inventive step in the light of the disclosure of *inter alia* document D1 (Articles 100(a), 52(1), 54 and 56 EPC). The objection under Article 100(b) EPC was not mentioned. A conditional request for oral proceedings was made.

V. The respondent submitted counter-arguments on 19 October 2006 and the board subsequently issued a summons to oral proceedings to be held on 11 October 2007. In the accompanying communication the board expressed its preliminary opinion that one of the appellant's arguments, relating to added subject-matter, was convincing but that the others were not. It was remarked that the further documents mentioned did not seem to disclose anything more of relevance than D1 did.

VI. In preparation for the oral proceedings both parties submitted further arguments and the respondent filed claims of first to third auxiliary requests. The first auxiliary request restricted the claimed subject-matter to two antennas, the second combined claims 1 to 3 as granted (with an equivalent amendment also to the independent "arrangement" claim), and the third auxiliary request included both of these amendments.

VII. In the oral proceedings the appellant requested that the decision under appeal be set aside and that the patent be revoked.

The respondent requested that the appeal be dismissed or, in the alternative, that the decision under appeal be set aside and the patent be maintained in amended form on the basis of the 1st auxiliary request, 2nd

auxiliary request or 3rd auxiliary request, all filed with the letter dated 13 September 2007.

The decision of the board was announced at the end of the oral proceedings.

Reasons for the Decision

1. The main request - added subject-matter

1.1 The appellant argued that three features of the claims of the main request were introduced during examination and constituted subject-matter which extended beyond the content of the application as filed, in violation of Article 100(c) EPC. These were:

1.1.1 "Each symbol of the sequence is transmitted using not more than one antenna whereby only one antenna is transmitting at a time" (claim 1 and equivalently in claim 12);

1.1.2 "A partial transmission pattern" (claims 1 and 12);

1.1.3 "In at least one of the time slots no symbol belonging to the sequence of symbols is transmitted," (claim 8).

1.2 With respect to the first feature it was argued that although the example on page 7 lines 19 to 32 of the published application satisfied it there was no indication anywhere that this feature was relevant to the invention. The example did not disclose the generalised principle claimed and the principle was not clearly and unambiguously derivable from the

application as a whole, particularly since at page 11 lines 33 to 35 and page 12 line 11 the published application disclosed that plural antennas could be used simultaneously. Further there was no indication in the application that this principle contributed to the solution of the technical problem the invention set out to solve.

1.3 The respondent agreed that the initial application envisaged the use of plural antennas simultaneously, but argued that it had merely subsequently exercised its right to restrict the claims to an embodiment of the invention, namely that embodiment disclosed at page 7 lines 19 to 32 of the published application. The application supported the generalisation to more than two antennas and the general use of one antenna for one symbol, the word "antenna" in the singular frequently being used in association with the word "symbol". As to the problem solved, the invention was aimed at associating the correct channel estimate with each received symbol. This was only possible if each symbol came from one antenna.

1.4 The parties disputed the meaning of the paragraph on page 8 lines 26 to 31 of the published application. On the one hand the appellant argued that, "If more than two diversity antennas are in use," meant in use simultaneously. The respondent disagreed, arguing that it merely meant in use at some point in a frame, and that this paragraph in fact supported the generalisation.

1.5 The board considers that there is no clear and unambiguous disclosure of the feature of using only one transmission antenna at a time in the context of the invention as claimed in the remaining features of claim 1 and 12 of the main request.

1.5.1 The board agrees with the respondent that page 8 lines 26 to 31 do not necessarily relate to antennas in use simultaneously, but otherwise considers this paragraph too unclear to be useful in deciding the question of added subject-matter.

1.5.2 The references in the application to "antenna" and "symbol" in the singular are irrelevant. Even if a specific symbol is only transmitted from one antenna in a MIMO system this does not preclude plural symbols being transmitted simultaneously. The application moreover makes it clear that it is not concerned with the particular values of the symbols transmitted, only the pattern of where they are transmitted from, so that not even the simultaneous transmission of the same symbol value from multiple antennas is excluded by this usage.

1.5.3 Page 7 lines 19 to 32 disclose a specific example, which is in particular limited to two antennas. If this example is to be extended to more than two antennas, it is simply speculation how the applicant would envisage them being used. The skilled person would know for example that antennas may be used in groups for beam-forming, as mentioned by the appellant.

1.5.4 Finally the respondent's argument that the correct channel estimate could only be associated with each received symbol if each symbol came from one antenna is not convincing. The skilled person would be aware that in MIMO systems the spatial diversity and therefore differing channel characteristics of the transmission antennas make it possible to receive different symbols from each antenna simultaneously.

1.6 The board therefore concludes that the subject-matter of claims 1 and 12 of the main request extends beyond the content of the application as filed, in violation of Article 100(c) EPC. Hence the main request is not allowable.

2. The first auxiliary request - added subject-matter

2.1 The appellant raised the same arguments relating to added subject-matter for the first auxiliary request.

2.2 On page 4 lines 23 and 24 of the published application it is stated that, "In time switched transmit diversity (TSTD) both antennas are used to transmit the symbols, one at a time." While the appellant is correct in pointing out that this statement belongs to the description of the prior art according to Rule 27(1)(b) EPC, and the application does not state explicitly anywhere that the invention concerns TSTD, the application goes on at page 5 line 27 and following to say, "The problem is that when the TSTD diversity scheme is in use, the mobile station cannot necessarily distinguish ...". It is clear from this passage that the invention is either a form or a development of TSTD. The skilled person would therefore read the features of

TSTD into the description of the invention, in particular that at least if there are two antennas they are used one at a time.

2.3 Moreover, the example of page 7 lines 19 to 32 discloses a pattern of transmission using two antennas defined by a sequence of "0"s, "1"s and "2"s. By its nature a pattern expressed in this way can only represent one antenna broadcasting at a time. It is explained how to interpret one particular pattern expression. It is implicit in the way that this particular pattern is put forward as an example that for the purposes of the invention any such pattern will do (with the exception of extreme examples, such as continuous "0"s, which would not fulfil the function for which the symbols are transmitted in the first place). Thus the board considers that the application as filed discloses a class of solutions to the technical problem put forward, even if it does not disclose any reason for particular features of that class, in which (i) two antennas are used, (ii) at most one antenna transmits at a time, and (iii) there may be any number, from zero upwards, of time slots when no symbol is transmitted, in particular as expressed in dependent claim 8, there may be at least one such time slot.

2.4 Thus the board does not agree with the appellant's objections as given at points 1.1.1 and 1.1.3 above, when raised in the context of the claimed invention being restricted to two antennas.

2.5 The appellant's further objection arose from the fact that the expression "a partial transmission pattern" in

claims 1 and 12 was not to be found in the application as filed, which had referred rather to "a certain part ... of the transmission pattern". It was argued that the former expression would encompass for example all the odd-numbered elements in a pattern, whereas the latter would not, being confined to a contiguous part of the pattern.

2.6 The respondent argued to the contrary that the latter expression would also cover the odd-numbered elements in a pattern and that there was no difference in the meaning of the two ways of expressing this feature.

2.7 The board notes that ultimately the extent of protection of a patent is to be determined by the claims, using the description and drawings to interpret them (Article 69(1) EPC). It would appear highly artificial to attribute any difference in scope to the expressions "a partial transmission pattern" and "a certain part ... of the transmission pattern", given that there is no indication in the patent as a whole that these expressions are supposed to mean different things. The appellant argued that the very fact that different expressions are used, e.g. in claims 1 and 2, was such an indication, but the board considers that anyone familiar with patent specifications would be aware that they often, regrettably, contain meaningless variations in wording, especially when they have been amended during prosecution. Thus the substitution of the former expression for the latter does not, in the view of the board, imply a difference in meaning and add matter which extends beyond the content of the application as filed.

2.8 For completeness it is noted that in the written procedure the appellant raised another objection which it considered to relate to added subject-matter, namely that claim 1 was not restricted to a pattern shorter than the frame. This objection would also apply to the first auxiliary request. However, the application as filed clearly discloses the possibility of a pattern longer than a frame at e.g. page 10 lines 3 and 4.

2.9 Hence the board concludes that in the claims according to the first auxiliary request none of the features objected to by the appellant extend beyond the content of the application as filed.

3. The first auxiliary request - novelty and inventive step

3.1 As a matter of interpretation the board first notes that it considers the feature "when a partial transmission pattern is used in the end of a frame," to exclude the possibility that no partial transmission pattern is used in any frame. In the context the "when" does not indicate a situation which is optional, but rather a feature which must occur in order for the claim to be satisfied.

3.2 It is not disputed that the closest prior art is document D1. Neither has the appellant argued that any of the other documents cited disclose any relevant features not to be found in D1. It is therefore unnecessary for the board to discuss any of these other documents.

3.3 D1 discloses (see in particular Figure 2(a)) a scheme for transmitting synchronisation symbols (Cp, Cs) from a pair of antennas in time slots within a frame, wherein in the first time slot the symbols are transmitted from Antenna 1, in the second from Antenna 2, in the third from Antenna 1, and in the last from Antenna 2. In the figure there is a gap between the third and the last time slot. These facts are not disputed. However, the gap was interpreted differently by the parties. The appellant argued that any sequence might fill it, whereas the respondent argued that the gap was shorthand for a sequence of alternations between the antennas, with the frame ending at a time slot in which the synchronisation symbols were transmitted from the second antenna. The board agrees with the respondent for the following reasons.

3.3.1 The figure conforms with a normal way of representing a regular sequence, namely enough elements at the beginning to show how it begins and develops, and then an entry to indicate the end of the sequence.

3.3.2 D1 is a proposal to a standards group. It does not seem likely to the board that such a proposal would omit to state that Figure 2(a) was meant to represent an arbitrary pattern if that was really the case.

3.3.3 The symbolic circuit given in Figure 1(a) for executing the transmission pattern shows a control signal TSW in the form of a square wave, which implies a simple alternating pattern. The appellant argued that the figure was intended merely to show the form of the control signal, i.e. sharp changes of signal level, and that its fifty per cent duty cycle was coincidental.

Given the other indications mentioned above, the board does not find this very plausible.

3.4 Thus the board concludes that Figure 2(a) would be understood by the skilled person to represent an alternating use of the two antennas, from which it directly follows that the length of the frame is assumed to be even. The appellant's arguments based on the assumption of an arbitrary pattern in Figure 2(a) are therefore irrelevant for the board's further reasoning.

3.5 The appellant then argued that, assuming an alternating use of the antennas, the patent's definition of "pattern" at column 7 lines 5 to 7 (or page 7 lines 21 to 23 of the published application), "a pattern that specifies both from which antenna a symbol is transmitted and at which time the symbol is transmitted", is so wide that claim 1 lacks novelty with respect to D1. For example, given a frame of length N (N even), a pattern of length N-2 would fall within the patent's definition, in which case each frame would contain a whole pattern and a partial pattern. All frames would start from Antenna 1, so that claim 1 (and 12) would be satisfied. The appellant also argued that since the patent defined the expression "transmission pattern" it was inappropriate to redefine it, as the opposition division allegedly had done.

3.6 The board considers however that the skilled person would not rely solely on this statement from the patent in determining what could be considered to be a "pattern" and what could not. Contrary to the appellant's argument this statement is not in fact a

complete definition, since it uses the term "pattern" itself. The skilled person would consider the disclosure of the patent as a whole, which also depends implicitly on the everyday meaning of the terms chosen. In this light the skilled person would most probably consider the "pattern" in Figure 2(a) to be an alternating pair, or just possibly to have the length of the entire frame. He or she would have no good reason to view the artificial construct of length N-2 put forward by the appellant to be intended to be a "pattern" within the meaning of the patent.

3.7 The appellant not having put forward any further relevant arguments with respect to novelty (see point 3.4 above), the board concludes that the claimed subject-matter is novel over the disclosure of D1.

3.8 With regard to the question of inventive step the appellant argued essentially that in the case of the skilled person being confronted with a frame length which was not a multiple of the pattern length (in the case of D1 an odd frame length), it would be obvious to adopt the solution claimed, for very much the reasons given in the patent, i.e. in order to know what channel characteristics to apply from the beginning of a frame.

3.9 The board does not find this argumentation persuasive. Firstly it assumes that frame lengths different from multiples of pattern lengths will occur. This is not necessarily the case. It may be that in the communication system of D1 even frame lengths would be the natural choice, for some reason. Secondly frame length is a system variable. In the case of D1 the frame length could be deliberately chosen to be even.

3.10 The appellant argued in the oral proceedings before the board that frame lengths were predetermined, presumably by other standards groups, and that some frame lengths were indeed odd. However no evidence to support this assertion was put forward, despite the fact that the respondent had based much of its argumentation in writing on exactly the point that the skilled person would not necessarily face or recognise the problem. In the circumstances the board considers the appellant's assertion to be unsupported. Even if it were to take this alleged fact into account the argument would not be complete; it would be necessary to demonstrate that odd-length frames were predetermined in the particular set of standards to which D1 was contributing or to make an argument starting from a different prior art.

3.11 Assuming for the sake of argument that the skilled person would be required to solve the problem of fitting the pattern into an odd frame length, the board does not consider that the solution presently claimed is necessarily obvious. There would appear to be a number of different approaches. The following are only ones which occur to the board having heard the parties' arguments.

3.11.1 The system could rely on adaptive filters to restore the correct channel characteristics in the course of the frame.

3.11.2 The pattern could be adapted so that its length became a divisor of the frame length. For example, if the frame length were 15, the pattern could be chosen to be 0, 1, 2.

3.11.3 The transmission system could be adapted so that the final (or first) time slot does not include synchronisation symbols. That is the effective pattern for a whole frame would be 1, 2, 1, 2, 1, 2, ... 1, 2, 0.

3.12 Thus the board concludes that the appellant has not made a convincing case that the claimed subject-matter of the first auxiliary request does not involve an inventive step.

4. At the end of the oral proceedings the appellant argued that the board should at least:

(a) require that the respondent amend the claims to correct the two-part form; and

(b) require that the claims be amended to exclude clearly the case where the frame length is an integer multiple of the pattern length.

As to the first point incorrect conformity with Rule 29(1) EPC is not a ground of opposition and the error, if there is one, is not affected by the amendment to the claims. Therefore according to long-standing case law of the boards of appeal there is no requirement on the appellant to amend the claims in this way. As to the second, the board considers that the claims already explicitly exclude the case mentioned (see point 3.1 above).

5. The appellant not having raised any further objections in the course of the appeal the board concludes that the first auxiliary request is essentially allowable. However since the description and/or drawings may need adaptation to the new claims, it appears that the appropriate action is to remit the case to the department of first instance for this adaptation to be carried out.

Order

For these reasons it is decided that:

1. The decision under appeal is set aside.

2. The case is remitted to the department of first instance with the order to maintain the patent in amended form on the basis of claims 1 to 15 of the first auxiliary request, filed with letter dated 13 September 2007, with any necessary amendment to the description and drawings.

The Registrar: The Chairman:

D. Magliano A. S. Clelland