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D E C I S I O N
of 21 April 2004

Case Number: T 0705/00 - 3.5.3

Application Number: 91850205.5

Publication Number: 0472511

IPC: H04Q 7/38

Language of the proceedings: EN

Title of invention:

Handoff of a mobile station between half rate and full rate channels

Patentee:

Telefonaktiebolaget LM Ericsson (publ)

Opponent:

Motorola Inc.

Headword:

Handoff/ERICSSON

Relevant legal provisions:

EPC Art. 123(2), 56, 114(2)

Keyword:

"Amendments - added subject-matter (no)"
"Inventive step - yes"
"Late filed material (not admitted)"

Decisions cited:

-

Catchword:

-



Case Number: T 0705/00 - 3.5.3

D E C I S I O N
of the Technical Board of Appeal 3.5.3
of 21 April 2004

Appellant:
(Opponent)

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Respondent:
(Proprietor of the patent)

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Representative:

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Decision under appeal:

Decision of the Opposition Division of the
European Patent Office posted 12 April 2000
rejecting the opposition filed against European
patent No. 0472511 pursuant to Article 102(2)
EPC.

Composition of the Board:

Chairman: A. S. Clelland
Members: F. van der Voort
R. Moufang

Summary of Facts and Submissions

- I. This appeal is against the decision of the opposition division to reject an opposition filed against European patent No. 0 472 511.
- II. The opposition was filed against the patent as a whole and on the grounds as set out in Article 100(a) and (c) EPC. In the opposition proceedings, the opponent referred to the following prior art documents:
- D1: *J. Uddenfeldt et al.*, "Digital Technologies in Cellular Radio", 38th IEEE Vehicular Technology Conference, 15 - 17 June 1988, pages 516 - 519, Philadelphia, PA, USA; and
- D2: *D. J. Targett et al.*, "Handover - Enhanced Capabilities of the GSM System", Conference Proceedings, Digital Cellular Radio Conference, 12 - 14 October, 1988, pages 3c/1 - 3c/11, Hagen, Westphalia, DE.
- III. Following oral proceedings, the opposition division held that the ground for opposition according to Article 100(c) EPC did not prejudice the maintenance of the patent as granted and that D1 and D2, in combination, did not render the subject-matter of the claims as granted obvious.
- IV. The opponent appealed; in response to the notice of appeal and the statement of grounds of appeal as filed by the appellant (opponent) the respondent (proprietor) argued that the appeal should be rejected. Both the

appellant and the respondent conditionally requested oral proceedings.

- V. The parties were summoned by the Board to oral proceedings. In a communication accompanying the summons, the Board gave a preliminary opinion.
- VI. In response to the Board's communication, the respondent filed five auxiliary requests. The appellant also filed a response and submitted the following documents:
- D3: three copies of slides allegedly made public in 1989; and
- D4: US 4 868 811 A.
- VII. Oral proceedings were held on 21 April 2004. At the end of the oral proceedings the chairman announced the Board's decision.

The parties' requests

- VIII. The appellant requested that the decision of the opposition division be set aside and that the patent be revoked in its entirety.
- IX. The respondent requested that the appeal be dismissed or, failing that, that the patent be maintained on the basis of one of the five auxiliary requests. These five auxiliary requests, however, were not considered by the Board in view of the decision taken in respect of the main request as set out below.

X. The independent claims as granted read as follows:

"1. A method of communication and handoff in a cellular mobile radio system having a plurality of base stations (B1,B6) in a plurality of cells for communication with a plurality of mobile stations (M3, M4, M6) in the cells (C1, C6), characterized by: transmitting a signal between a first base station (B1) and at least a first mobile station (M3, M4, M6) of the cellular mobile radio system, the signal being transmitted on a half rate channel having relatively slowly repeating time slots per frame or a full rate channel having relatively quickly repeating time slots per frame as compared to the relatively slowly repeating time slot, wherein the bit rates within the time slots of both the half and full rate channels are the same, wherein each bit transmitted in said half rate channel represents more sensitive information than that of a corresponding bit transmitted in said full rate channel; estimating periodically the quality of the received signal; assigning the transmission of the signal to a half rate channel if the estimated quality is above a first predetermined value; assigning the transmission of the signal to a full rate channel if the estimated quality is below the first predetermined value; and handing off the mobile station (M3, M4, M6) between a half rate channel and a full rate channel depending upon the estimated quality."

"8. A method of controlling communications in a cellular communications system characterized by:

estimating directly or indirectly parameter values indicative of quality of information transfer on communication channels used for ongoing calls in a cell (C1) of a cellular communications system, the communication channels including a half rate channel having relatively slowing [sic] repeating time slots per frame and a full rate channel having relatively quickly repeating time slots per frame as compared to the relatively slowly, repeating time slots, wherein the bit rates within the time slot of both the half and full rate channel are the same, wherein each bit transmitted in said half rate channel represents more sensitive information than that of a corresponding bit transmitted in said full rate channel;

comparing said estimated parameter values indicative of quality with parameter values set by information transfer quality requirements;

changing the communication channel of at least one call from a full rate channel to a half rate channel when the comparison indicates that a half rate communication channel would provide sufficient quality for the call;

changing the communication channel of at least one call from a half rate channel to a full rate channel when the comparison indicates that a full rate communication channel will be required to provide sufficient quality for the call."

Reasons for the Decision

1. *Added subject-matter*

- 1.1 The appellant argued that the subject-matter of the patent extended beyond the content of the application

as filed, Article 123(2) EPC, since claim 1 included the following features which had no basis in the application as filed:

- (a) the bit rates within the time slots of both the half and full rate channels are the same;
- (b) each bit transmitted in said half rate channel represents more sensitive information than that of a corresponding bit transmitted in said full rate channel; and
- (c) the signal is transmitted on a half rate channel having relatively slowly repeating time slots per frame or a full rate channel having relatively quickly repeating time slots per frame as compared to the relatively slowly repeating time slot.

The same objection was raised *mutatis mutandis* against claim 8.

- 1.2 At the oral proceedings the appellant further argued that the present claim 1 differed from that originally filed in that the criteria for assigning a channel had been reversed by replacing "below" by "above" and *vice versa*. This was based on the disclosure of Figure 5. However, Figure 5 did not use the quality of the received signal as the criterion for channel assignment but specifically used bit error rate (BER). Hence, this amendment was not based on the application as originally filed.

1.3 Regarding feature (a), the Board notes that there is no explicit reference to "bit rate" in the application as published. However, the invention is particularly described and illustrated in relation to the EIA IS-54 standard (see the application as published, column 2, line 43 to column 3, line 25, column 7, line 49 to column 8, line 17, and Figures 2 and 3), which defines a fixed bit rate within the time slots of both the half and full rate channels. The same applies to the other standard (GSM) explicitly referred to in the application as published (column 2, line 44). It is also noted that the invention is not limited to the IS-54 standard; at column 5, lines 9 to 13 of the application as published, it is implied that a mobile station may be assigned to a communication channel comprising any number of time slots in a radio channel, whereas according to the IS-54 standard the number of time slots in a communication channel is either 1 or 2 every 6 time slots (for half and full rate, respectively). Therefore, the description provides a basis for time slot formats in general, having the same bit rate in the half and full rate channels. Hence, feature (a) is considered to be originally disclosed.

1.4 Regarding feature (b), the appellant argued that the expression "sensitive information" could be understood as relating to the nature of the information, e.g. confidential information, for which there is no basis in the application as filed. In the Board's view, the expression "sensitive information" is *prima facie* open to different interpretations and thus, following the established case law, must be interpreted in the light of the description and drawings. In the application as filed, the expression "sensitive information" is not

used. However, throughout the application it is consistently stated that for a half rate channel there is a greater susceptibility to loss of data due to noise or interference than for a full rate channel (see column 2, line 52, to column 3, line 22; column 8, lines 29 to 34, and column 9, lines 11 to 13 of the application as published), whereas there is no disclosure of the transmitted bits representing different kinds of information in either of the half and full rate channels. Hence, in the Board's view, feature (b) can only be interpreted as meaning that information transmitted in a half rate channel is more susceptible to being lost due to noise and interference than if transmitted in a full rate channel.

This interpretation is consistent with the disclosure of the application as filed. Feature (b) accordingly does not give rise to objection of added subject-matter.

- 1.5 Regarding feature (c), the appellant argued that the expressions "slowly" and "quickly" covered ratios of assigned time slots between half and full rate channels other than 1/2, e.g. 1 or 1/3, and that since these ratios were not disclosed in the originally filed application, subject-matter had been added. The Board cannot follow this argument. Whereas the relative expressions "slowly" and "quickly" as such are imprecise, the expressions "half rate channel" and "full rate channel" as used in claim 1 have a clear and precise meaning in the field of cellular mobile radio systems. A half rate channel is a communication channel in which the number per unit of time of time slots assigned to the user of the communication channel is

half the number of equally sized time slots as assigned in a full rate channel (see, e.g., the application as published, column 2, lines 49 to 56, column 3, lines 14 to 15, column 7, line 49 to column 8, line 14, and Figures 2 and 3). Consequently, time slots assigned to a particular user occur twice as often in a full rate channel as in a half rate channel, i.e. the ratio of assigned time slots between half and full rate channels is always 1/2; ratios other than 1/2 would thus be inconsistent with the definition of half and full rate channels. Hence, feature (c) is effectively redundant and does not give rise to objection of added subject-matter.

- 1.6 The replacement of "below" by "above", and *vice versa*, in claim 1 in the course of examination is considered a correction of an obvious error, it being immediately evident to the skilled person that an error had occurred and how it should be corrected; switching from half to full rate when transmission quality increases, i.e. when the bit error rate decreases, does not make technical sense and contradicts the overall teaching of the application (see the application as published, e.g., column 3, lines 47 to 51, column 7, lines 20 to 25, column 9, lines 22 to 28, claim 8 and Figure 5). The correction being of a strictly declaratory nature, it does not add subject-matter.
- 1.7 For these reasons, the Board does not consider valid the objections under Article 100(c) and 123(2) EPC as raised by the appellant against claim 1. The reasons as given under points 1.3 to 1.5 apply *mutatis mutandis* to claim 8.

2. *Admissibility of documents D3 and D4*

2.1 Documents D3 and D4 were introduced by the appellant for the first time with his letter of 22 March 2004, i.e. more than seven years after the grant of the patent, and were cited against the claims as granted. At the oral proceedings the respondent objected to the admissibility of D3 and D4.

2.2 The Board exercises its discretion under Article 114(2) EPC not to admit documents D3 and D4 to the proceedings. Their objective relevance is *prima facie* not such that it is highly likely that they prejudice the maintenance of the patent.

3. *Inventive step*

3.1 The appellant argued that the subject-matter of claim 1 lacked an inventive step in view of the disclosure of D2 or a combination of D2 and D1.

3.2 D2 relates to a communication method in a cellular mobile radio system in which a signal between a mobile station and a base station is transmitted on a half rate or a full rate channel (page 3c/2, 2nd par.). Both intracell and intercell handover are mentioned (pages 3c/1, 3c/2, 2nd par., and 3c/8, point 4). It was common ground between the parties that the expression "handover" was a synonym for "handoff", that D2 represented the closest prior art, and that the subject-matter of claim 1, on a literal interpretation thereof, was distinguished from the method disclosed in D2 by the following features:

- (i) assigning the transmission of the signal to a half rate channel if the estimated quality is above a first predetermined value;
- (ii) assigning the transmission of the signal to a full rate channel if the estimated quality is below the first predetermined value; and
- (iii) handing off the mobile station between a half rate channel and a full rate channel depending upon the estimated quality.

3.3 Since the signal transmission is defined in claim 1 as between one base station and one or more mobile stations, feature (iii) relates to **intracell** handoff. Features (i) to (iii) result in a further increase in the call-handling capability of the base station by using half rate channels instead of full rate channels, while at the same time a high quality data transmission is ensured over the entire cell area by assigning a mobile station to a full rate channel whenever necessary (see also the patent specification, column 3, lines 23 to 29).

3.4 The problem underlying the claimed subject-matter may therefore be seen as improving the method according to D2 such that the call-handling capability within a cell is further increased, while at the same time a high quality data transmission is ensured such as to enable communication with appropriate signal quality over the entire cell area.

3.5 The Board notes that the reference in D2 (page 3c/2, 2nd par., last sentence) to a handover in relation to

half rate and full rate channels relates to an **intercell** handover, as follows from the phrase "This form of handover" and the preceding sentence; as an example of such **intercell** handover, the handover of a call on a half rate channel in one cell to another cell in order to free a complete full rate channel in the former cell is given. The primary reference in D2 (page 3c/8, point 4, 2nd par.) to **intracell** handover is in relation to the problem of quality loss due to co-channel interference within the cell area; it is suggested to apply **intracell** handover by handing over a call from one carrier to another carrier of the same cell. The rate of a channel is however not mentioned.

Thus, in the Board's view, these references do not disclose or suggest a handover of the mobile station between a half rate and a full rate channel within the same cell as defined by the above-mentioned feature (iii). D2 thus does not render the subject-matter of claim 1 obvious.

- 3.6 D1 (see the abstract, page 517, point 2.4.3, 1st par., page 518, point 3, and page 519, 1st par.) teaches that a transmission channel may be divided into two time slots to support two users using 13 kb/s speech codecs ("full rate channel") or into three slots to support three users using 8.7 kb/s speech codecs ("reduced rate channel"). Again, there is no suggestion to switch between the full and reduced rate channels depending on the estimated quality of the received signal as defined by the above-mentioned feature (iii). Neither does D1 refer to half rate channels in the sense as used in claim 1 (see point 1.5 above).

- 3.7 At the oral proceedings, the appellant argued that D1 at point 2.1 (page 516) would suggest to a person skilled in the art to replace a reduced rate channel by a full rate channel depending on quality, which corresponded to the above-mentioned feature (iii). The Board cannot agree. The paragraph in question is concerned with the various speech qualities which can be obtained for different speech codec bit rates, whereas the quality referred to in the above-mentioned feature (iii) is an estimated quality of the received signal and therefore relates to the transmission quality rather than the quality of the digitized speech input signal to be transmitted.
- 3.8 The appellant further argued at the oral proceedings that the intracell handover based on transmit power as described in D2 in relation to an implementation of concentric small cells (see page 3c/8, last par., to page 3c/9, 2nd par.) would, when combined with the teaching of D1 on assigning a mobile station to either a reduced rate channel or a full rate channel, in practice, when a mobile station is moving away from the base station, result in switching from a reduced rate channel to a full rate channel based on quality measurements in the same way as illustrated in Figure 4 of the disputed patent.
- 3.9 The Board cannot follow this argument. In D2, the intracell handover by switching between two groups of radio channels of the concentric cells takes place depending on the base station transmit power and not depending on the transmission quality of the received signal. Further, as set out under point 3.7 above, in D1, transmission quality is not decisive for the

selection of either a reduced rate channel or a full rate channel, in contrast to the present invention.

3.10 Hence, if a person skilled in the art, starting from D2 and faced with the above-mentioned problem, were to consider D1 and were to combine its teaching with that of D2, he would not arrive at the method as defined in claim 1. The above reasoning applies *mutatis mutandis* to independent claim 8.

3.11 Consequently, D1 and D2 do not give rise to objection under Articles 52(1), 54 and 56 EPC.

4. Since the respondent's main request is found allowable, it has not proved necessary to consider the auxiliary requests.

Order

For these reasons it is decided that:

The appeal is dismissed.

The Registrar:

The Chairman:

D. Magliano

A. S. Clelland