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D E C I S I O N
of 12 October 1995

Case Number: T 0061/94 - 3.5.1

Application Number: 87110260.4

Publication Number: 0255628

IPC: H04Q 7/04

Language of the proceedings: EN

Title of invention:

Handoff apparatus and method with interference reduction for a radio system

Patentee:

MOTOROLA LTD

Opponent:

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Headword:

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Relevant legal provisions:

EPC Art. 84, 113(1)
EPC R. 29, 67, 68(2)

Keyword:

"Essential features (yes)"
"Substantial procedural violation (no)"

Decisions cited:

T 0032/82
T 1055/92

Catchword:

-



Case Number: T 0061/94 - 3.5.1

D E C I S I O N
of the Technical Board of Appeal 3.5.1
of 12 October 1995

Appellant: MOTOROLA LTD
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Decision under appeal: Decision of the Examining Division of the European Patent Office dated 30 July 1993 refusing European patent application No. 87 110 260.4 pursuant to Article 97(1) EPC.

Composition of the Board:

Chairman: P. K. J. van den Berg
Members: A. S. Clelland
C. Holtz

Summary of Facts and Submissions

- I. European patent application No. 87 110 260.4, publication No. 255 628, was refused by a decision of the Examining Division dated 30 July 1993.

- II. The reasons given for the refusal were that the subject-matter of Claim 1 did not meet the requirements of Article 84 taken in combination with Rules 29(1) and (3) EPC, in that it did not contain all the technical features essential to the invention, and that Claims 5 and 10 were not clear as required by Article 84 EPC.

- III. The Appellant (Applicant) lodged an appeal against this decision and in a statement of grounds received on 9 December 1993 argued that the claims were allowable; he also requested oral proceedings. In a communication from the Board dated 17 August 1995 the Rapporteur discussed the clarity of Claims 1, 5 and 10. In response, on 12 September 1995 the Appellant filed new claims.

Oral proceedings were held on 12 October 1995.

- IV. The Appellant's main request is that the Examining Division's decision be set aside and the case remitted to the first instance for continued examination on the basis of the following documents:

Claims: 1 to 10 as filed on 12 September 1995
Description: pages 1, 2 and 5 to 33 as originally filed, with the amendment to page 33 requested in the letter received 5 June 1992
pages 3, 3a and 4 as filed on 5 June 1992
Drawings: sheets 1 to 20 as originally filed.

As an auxiliary request the Appellant asks that if the main request is allowed the appeal fee be refunded because a serious procedural violation was committed in refusing the application for the reasons given.

V. Claim 1 reads as follows:

"A method of operation of a multichannel two way radio system having at least two geographic radio coverage areas established by a fixed site apparatus in each coverage area and a plurality of remote stations, each remote station capable of transmitting at one of a plurality of power levels and capable of being handed off from one coverage area to another, characterized by the steps of:

calculating (1633, 1635, 1637), prior to a hand-off, a power level for the remote station transmitting to fixed site apparatus in a first coverage area which, following the handoff, will produce a received signal level of a predetermined magnitude at the fixed site apparatus in the second coverage area; and

communicating (1665) said power level to said transmitting remote station during a handoff of said transmitting remote station from said first coverage area to said second coverage area."

Claim 5 reads as follows:

"A method of remote station handoff from transmission and reception on a first radio channel of a first base site apparatus to transmission and reception on a second radio channel of a second base site apparatus of a two way radio system having at least two radio channels and a plurality of remote stations, each remote station being able to transmit at one of a plurality of power

levels determined by a current power level increment signal, the method being characterized by the steps of:

measuring (1611), at the second base site, a received signal strength resulting from transmission to the first base site by an active remote station on the first radio channel;

calculating (1633) a remainder signal strength from said measured received signal strength and a predetermined nominal signal strength;

transforming (1635) said remainder signal strength into a relative power level increment signal;

calculating (1637) a handoff power level increment signal from said relative power level increment signal and the current power level increment signal; and

conveying (1665) said handoff power increment signal and a handoff command to said active remote station."

Claim 10 reads as follows:

"A base site controller for a cellular radio telephone system which reduces co-channel and adjacent interference after handoff of remote transceivers, said remote transceivers transmitting at one of a plurality of power levels determined by a current power level increment signal, the base site controller characterized by:

means for measuring (926) a received signal strength of a signal which is received at a target base site and transmitted from the remote transceiver to a source base site on a first radio channel;

means for calculating (1633) a remainder signal strength by subtracting a predetermined nominal signal strength from said measured received signal strength;

means for transforming (1635) said remainder signal strength into a relative power level increment signal;

means for calculating (1637) a handoff power level increment signal, which determines the power level of the remote transceiver when handed off to a second radio channel, by adding said relative power level increment signal to the current power level increment signal;

means for measuring (1611) received signal strength received on at least two antennas;

means for comparing (1617) said received signal strength from said at least two antennas; and

means for selecting (1619) the weaker of the strongest two received signal strengths."

Reasons for the Decision

1. The appeal is admissible.

2. This application is concerned with a problem which arises in cellular radio systems when a remote station such as a mobile radio is handed off from one cell to the next. In the system on which the application is based the transmitted power for each remote station is adjusted so that its signal strength at the cell base site lies within predetermined values; in this manner an adequate signal quality is maintained whilst minimizing interference between adjacent cells. When a remote station is handed off to an adjacent cell the fact that

this is necessary suggests that it will be transmitting at its maximum power and hence that, after handoff, it could cause interference within the new cell if the power level is maintained. This problem is in accordance with the application overcome by calculating in advance of handoff a new transmitting power level for the remote station which after handoff will produce the desired signal level at the base site of the new cell. In the preferred embodiment this is effected by polling adjacent cells once a remote station becomes a candidate for handoff and, after a particular cell has been selected as that most suitable to receive the remote station, the signal strength received in that cell is used to calculate the new transmitting power level, which is then commanded during handoff.

3. Claim 1 is in essence characterized by the steps of calculating, prior to handoff, a power level which will produce the desired signal level at the new base site after handoff, and by communicating this power level to the remote station during handoff. The Examining Division objected under Article 84 EPC taken in combination with Rules 29(1) and (3) EPC that the claim before them (of substantially the same scope as present Claim 1) did not contain all the technical features essential to the invention but merely defined a result to be achieved; it considered that the features of Claim 2 were essential in order to determine the appropriate transmitting power level in the new cell, these features requiring, in addition to the calculation of the power level and its communication to the remote station in accordance with Claim 1, the measurement of received signal strength at the base site of the second

cell and its comparison with a predetermined signal strength to derive a difference signal, which is used to calculate a post-handoff power level. The application was said to disclose no means for carrying out the invention without these features.

4. The Examining Division's objection is apparently based on the Guidelines for Examination at part C, chapter III, paragraph 4.3, headed "(ii) Inconsistency regarding apparently essential features". This passage states:

"for example, it may appear, ...that a certain described technical feature not mentioned in an independent claim is essential to the performance of the invention, or in other words is necessary for the solution of the problem to which the invention relates. In such a case a claim is unclear, because Article 84 when read in conjunction with Rules 29(1) and (3), has to be interpreted as meaning not only that an independent claim must be comprehensible from a technical point of view but also that it must define clearly the object of the invention, that is to say indicate all the essential features thereof (see T 32/82, OJ 8/1984, 354)."

5. The latter part of this passage in substance quotes from the cited decision at point 15; in the context, as the decision clearly states in the succeeding paragraph, "the object of the invention" is not to be understood as a problem to be solved; a claim should contain "all features which are necessary to obtain the desired effect or, differently expressed, which are necessary to solve the technical problem with which the application is concerned."

6. This does not however mean that a claim must describe the invention in all its details. As noted in decision T 1055/92 (OJ EPO 1995, 214), see point 4:

"...the primary function of a claim is to set out the scope of protection sought for an invention. This implies that it is not always necessary for a claim to identify technical features or steps in detail ...the Board considers that it is sufficient if the application as a whole (the claims together with the description and drawings) describes the necessary characteristics of an invention...in a degree of detail such that a person skilled in the art can perform the invention. This requirement, however, relates to Article 83 EPC and is not relevant to Article 84 EPC."

This decision then goes on at point 5 to consider the requirement of Article 84 EPC that the claims shall be supported by the description and affirms the conclusion of decision T 32/82 that this requirement is met if those features which are necessary to solve the technical problem concerned are present in the claim.

7. In the Board's view the present Claim 1 defines the matter for which protection is sought, is clear and is concise. It is not inconsistent with the description. The only question remaining is accordingly whether the claim is supported by the description. This question must also be answered in the affirmative: Claim 1 contains - in functional language - the minimum steps necessary to solve the technical problem of avoiding interference after handoff from a first cell to a second cell. The Board notes that this is also in agreement with the Guidelines, which state at Part C, Chapter III, paragraph 6.5, that "A claim may broadly define a feature in terms of its function, even where only one

example of the feature has been given in the description, if the skilled reader would appreciate that other means could be used for the same function".

8. Moreover, as correctly pointed out by the Appellant, the steps of Claim 2, which in the Examining Division's view belong in Claim 1, are much more specific and contain limitations for which clear alternatives present themselves; thus, Claim 2 requires the calculation of a "remainder signal strength" from the actual received signal strength and a predetermined nominal signal strength which in turn is transformed into a "relative power level signal". It is however evident that instead of a relative power level signal an absolute power level signal could be calculated and used to control the power level of the remote station after handoff.
9. Claim 1 is accordingly considered to meet the requirements of Article 84 EPC.
10. Claims 5 and 10 were objected to by the Examining Division under Article 84 EPC on the ground of lack of clarity. The claims before the Examining Division referred to first and second channels rather than geographic coverage areas and contained the erroneous

implication that the calculations for power level of the remote station after hand-off are carried out in the originating cell. These deficiencies have been remedied in the claims before the Board and no objection arises to them under Article 84.

11. The Board notes that the Examining Division apparently reached its conclusion without reference to the prior art cited in the European Search Report. The impugned decision makes no reference to any prior art, whilst the single examination report dated 28 January 1992 merely states that two documents should be acknowledged in the description without taking a position on the relevance of these documents to the claims. The Board wishes in this connection to draw attention to its decision T 1055/92, point 5:

"During proceedings before an Examining Division, it often happens that pertinent documents are cited with the result that the core of a claimed invention has to be changed and also the corresponding problem to be solved appears in modified form. In such cases often new essential features must be added to the claim in order to identify clearly the solution and to distinguish the invention from the prior art."

12. The Examining Division's single communication contains the implication that Claims 2 to 4 and 6 to 9 were considered to be both novel and inventive, the communication stating that they "seem to be allowable", but does not refer to the independent claims in this context. The Board accordingly considers it necessary, in order to preserve two instances, to remit the application to the Examining Division for examination as to novelty and inventive step to be carried out on the independent claims. It will be appreciated from the

Board's reasoning that if the Examining Division concludes that the independent claims are novel and inventive having regard to the prior art, then no objection exists under Article 84 EPC which would stand in the way of grant.

13. Turning now to the Appellant's request for reimbursement of the appeal fee, this was requested on the basis that the Examining Division committed a substantial procedural violation in refusing the application for the reasons given in the decision. There is however no doubt that the decision complies with Rule 68(2) EPC in that it is reasoned; the reasons were communicated to the Appellant in the single communication, so that Article 113(1) EPC is also met. The Board accordingly cannot identify any procedural violation. Accordingly, it is considered that reimbursement of the appeal fee is not justified.

Order

For these reasons it is decided that:

1. The decision under appeal is set aside.
2. The case is remitted to the first instance with the order that further prosecution is to be based on the claims of paragraph V. above.

The Registrar:

M. Kiehl

The Chairman:

P. K. J. van den Burg

