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Datasheet for the decision of 17 December 2010

Case Number: T 0522/07 - 3.5.05

Application Number: 97118177.1

Publication Number: 0841787

IPC: H04L 27/26

Language of the proceedings: EN

Title of invention:
Synchronisation in a multicarrier receiver

Applicant:
Kabushiki Kaisha Kenwood

Headword:
Controlling reception timing with regard to a target position/KENWOOD

Relevant legal provisions:
EPC Art. 83, 84, 111(1)
EPC R. 42(1)(e)
RPBA Art. 15(3)

Relevant legal provisions (EPC 1973):
EPC Art. 106, 107, 108

Keyword:
"Sufficiency of disclosure and support by the description - main request and first auxiliary request (no), second auxiliary request (yes)"

Decisions cited:
J 0010/07, T 0042/90, T 0409/91

Catchword:
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Beschwerdekammern | Boards of Appeal | Chambres de recours

Case Number: T 0522/07 - 3.5.05

D E C I S I O N
of Technical Board of Appeal 3.5.05
of 17 December 2010

Appellant: Kabushiki Kaisha Kenwood
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Decision under appeal: **Decision of the Examining Division of the European Patent Office posted 28 November 2006 refusing European patent application No. 97118177.1 pursuant to Article 97(1) EPC 1973.**

Composition of the Board:

Chairman: A. Ritzka
Members: M. Höhn
F. Blumer

Summary of Facts and Submissions

I. This appeal is against the decision of the examining division dispatched 28 November 2006, refusing European patent application No. 97118177.1 because of non-compliance with Article 83 EPC 1973.

II. The notice of appeal was received on 25 January 2007. The appeal fee was paid on the same day. The statement setting out the grounds of appeal was received on 15 March 2007. The appellant requested that the appealed decision be set aside and that a patent be granted on the basis of the documents as originally filed (main request), or on the basis of claims 1 to 3 as filed on 12 October 2006 (first auxiliary request) or of claim 1 as filed on 13 November 2006 (second auxiliary request) together with the description and the drawings as originally filed. Oral proceedings were requested on an auxiliary basis.

III. A summons to oral proceedings to be held on 17 December 2010 was issued on 1 October 2010. In an annex accompanying the summons the board expressed the preliminary opinion that the subject-matter of the independent claims did not fulfil the requirements of Articles 83 and 84 EPC. The board gave its reasons for the objections and stated that the appellant's arguments were not convincing.

IV. With a letter dated 16 November 2010 the appellant submitted three independent claims according to a main request and first and second auxiliary requests, together with arguments that these claims fulfilled the requirements of Articles 83 and 84 EPC.

V. Independent claim 1 according to the main request reads as follows:

"1. A demodulator of a receiver for receiving an orthogonal frequency division multiplex modulated signal, comprising:
a Fourier Transformation circuit (3):[sic]
first calculating means (5, 6, 7) for calculating a transfer function of a transmission path at a frequency point for each carrier present in said modulated signal, based on an output signal from said Fourier Transformation circuit (3);
an Inverse Fourier Transformation circuit (8) for obtaining an impulse response signal from said transfer function output by said calculating means on the basis of the calculated result by said first calculating means;
detecting means (13) for detecting a maximum value position in the obtained impulse response signal:[sic] and
control means (14) for controlling a reception timing in accordance with the position of the maximum value detected by said detecting means so as to shift the position of the maximum value to a target position;
CHARACTERIZED BY
second calculation means (10, 11, 12) responsive to the output of said Inverse Fourier Transformation circuit for calculating a sum of levels of said impulse response signal in a sequentially shifted window having a time duration nearly equal to a guard interval period so that the sum of levels is calculated for each of window periods shifted to one another, wherein

said detecting means (13) is arranged to detect a maximum value of the sums obtained for all the shifted window periods on the basis of said second calculation means."

Independent claim 1 according to the first auxiliary request reads as follows:

"1. A demodulator of a receiver for receiving an orthogonal frequency division multiplex modulated signal, comprising:
an A/D converter (1);
a serial / parallel converter (2);
a Fourier Transformation circuit (3);
first calculating means (5, 6, 7) for calculating a transfer function of a transmission path at a frequency point for each carrier present in said modulated signal, based on an output signal from said Fourier Transformation circuit (3);
an Inverse Fourier Transformation circuit (8) for calculating an impulse response signal from said transfer function output by said calculating means;
detecting means (13) for detecting a maximum value position;
control means (14) for controlling a reception timing in accordance with the position of the maximum value detected by said detecting means so as to converge the position of the maximum value into a target position; and
a timing generator (17) for outputting a sampling clock signal of said A/D converter (1),
characterized by
second calculation means (10, 11, 12) for calculating a sum of levels of said impulse response signal in a

sequentially shifted window having a time duration nearly equal to a guard interval period, wherein said detecting means (13) is arranged to detect a position where a maximum value of said sum is obtained as said maximum value position, and said converging into said target position corresponds to a shifting of the phase of said sampling clock signal to obtain an optimum reception timing."

Independent claim 1 according to the second auxiliary request comprises the following feature in addition to the wording of claim 1 of the first auxiliary request:

"all signals received through transmission paths being in the time duration of the guard interval period."

VI. By letter dated 9 December 2010 the appellant withdrew the request for oral proceedings and informed the board that neither the applicant (appellant) nor its representatives would be attending.

VII. By facsimile received on 10 December 2010 the appellant submitted amended description pages 4, 4a, 4b, 5, 5a and 7, replacing original pages 4, 5 and 7.

VIII. The appellant requested in writing that the decision under appeal be set aside and that a patent be granted on the basis of the main request, the first auxiliary request or the second auxiliary request, all as filed with letter dated 16 November 2010.

IX. Oral proceedings were held on 17 December 2010 in the absence of the appellant. After due deliberation on the basis of the written submissions in the statement

setting out the grounds of appeal, the letters of 16 November and 10 December 2010 and the requests, the board announced its decision.

Reasons for the Decision

1. Admissibility

The appeal complies with the provisions of Articles 106 to 108 EPC 1973, which are applicable according to J 0010/07, point 1 (see Facts and Submissions, point II above). Therefore the appeal is admissible.

2. Non-attendance at oral proceedings

In its letter of 9 December 2010 the appellant withdrew the request for oral proceedings and announced that neither it nor its representatives would be attending. The board considered it expedient to maintain the date set for oral proceedings. Nobody attended the hearing on behalf of the appellant.

Article 15(3) RPBA stipulates that the board shall not be obliged to delay any step in the proceedings, including its decision, by reason only of the absence at the oral proceedings of any party duly summoned, who may then be treated as relying only on its written case.

Thus, the board was in a position to take a decision at the end of the hearing.

3. The decision under appeal was based on Article 83 EPC 1973. The examining division argued that the feature referring to a "target position" of claim 1 was not sufficiently disclosed, because the application neither defined what a "target position" was nor disclosed where such a target position was located. The knowledge

of the location of the target position was held to be a prerequisite for optimising reception timing. It was considered that "the only information given related to this position, i.e. 'optimum reception timing' and that it is found within a time period of a guard band, are [sic] not enough to determine it." In particular, there was no basis in the application as filed for the applicant's argument that the target position was located in the centre of the FFT window.

General Considerations

4. The following features referring to the "target position" are found in independent claim 1 of the three requests:

- "control means (14) for controlling a reception timing … so as to shift the position of the maximum value to a target position …" (main request) and
- "control means (14) for controlling a reception timing … so as to converge the position of the maximum value into a target position" (first and second auxiliary requests).

This implies that controlling the reception timing requires knowledge of the location of a target position.

5. The claimed subject-matter according to claim 1 of all requests is directed to the first embodiment of the application illustrated in figure 1 which shows a control loop.

6. The first embodiment provides a demodulator capable of suppressing interference between symbols when a plurality of radio waves are received with a single antenna in an SFN environment or in a multipath environment (see column 2, line 29 onwards of the published application). The criterion to be controlled in the loop is to suppress interference between symbols.

7. The application further provides for an even more detailed criterion for the first embodiment in column 6, lines 35-39:

"With the above operations, it becomes possible to always set the optimum reception timing without any symbol interference if all signals received through transmission paths are in the time duration of the guard interval period." - emphasis added.

8. The parameter to be controlled is disclosed in column 6, lines 27-30 of the application:

"Therefore, the phase of a sampling clock signal of the A/D converter 1 output from the timing generator 17 is shifted to obtain the target position, i.e., optimum reception timing".

Thus, when the control element is adjusted until the criterion is fulfilled, then the target position is reached. Thereby the target position is implicitly defined and therefore disclosed in the description and the drawings.

9. The board agrees with the appellant's argument found in the minutes of the oral proceedings before the

department of first instance that the application is not limited to a single target position for achieving an optimum reception timing, but the criterion can be fulfilled by several positions (see minutes, page 1, fifth paragraph "any point on the plateau of Fig. 2e …"). This interpretation has a basis in column 6, lines 26 and 27 of the present application disclosing

"… being converged into a target position …" - emphasis added.

This passage implies that there are more positions possible than only one.

Main request

10. Independent claim 1 of this request does not specify where a target position is located.

11. However, as discussed in points 5 to 9 above, the description implicitly discloses or at least allows the skilled person to derive a way to find out where a target position is located, but the independent claim does not comprise the information necessary, in particular not the criterion (see points 7 and 8 above) to be optimised, for arriving at the target position when the optimum is reached. Claim 1 of this request, *inter alia*, comprises embodiments according to which a target position is not the result of a control loop, but can be a preset value derived from other criteria than the one for which the application provides an enabling disclosure.

Hence, the subject-matter of claim 1 is so broad in scope that it encompasses embodiments for which there is no enabling disclosure in the application as originally filed.

12. According to established case law, an enabling disclosure is required for the whole range of the subject-matter claimed. Sufficiency of disclosure presupposes that the skilled person is able to perform substantially all embodiments falling within the ambit of the claims (see e.g. T 0409/91, OJ 1994, 653 and Case Law of the Boards of Appeal of the European Patent Office, 6th edition 2010, Chapter II.A.3.c).

13. Based on the analysis of the disclosure presented in points 4 to 9 above, the board judges that the present application does not disclose the subject-matter according to claim 1 in a manner sufficiently clear and complete for it to be carried out by a person skilled in the art over the whole range claimed. Therefore the requirements of Article 83 EPC and Rule 42(1)(e) EPC are not fulfilled.

14. For the same reasons, independent claim 1 of the main request fails to define all the essential features which are required for a complete and workable solution, since it does not specify the criterion to be controlled in the loop in order to reach the target position and thereby suppress interference between symbols (see points 7 and 8 above). Thus, claim 1 is not supported by the description as required according to Article 84 EPC.

First auxiliary request

15. Claim 1 of this request still fails to specify how the position of the maximum value is converged into a target position, in particular such that all signals received through transmission paths are in the time duration of the guard interval period, which is considered to be an essential feature (see points 4 to 9 above). It therefore does not fulfil the requirements of Articles 83 and 84 EPC.

Second auxiliary request

16. Claim 1 of this request overcomes the above objections by specifying that converting into the target position corresponds to a shifting of the phase of the sampling clock signal to obtain reception timing and that all signals received through transmission paths are in the time duration of the guard interval period. The board judges that the application provides an enabling disclosure for the claimed subject-matter according to the considerations in points 4 to 9 above. The requirements of Article 83 and Rule 42(1)(e) EPC are therefore fulfilled.

17. The description provides an antecedent basis and supports claim 1 of this request over the whole range claimed. Claim 1 comprises all the essential features.

The requirements of clarity for the wording of claim 1, however, have not yet been examined by the board, since this was not an issue in the decision under appeal.

18. According to Article 111(1) EPC the board may exercise any power within the competence of the examining division (which was responsible for the decision appealed) or remit the case to that department for further prosecution. It is thus at the board's discretion whether it examines and decides the case or whether it remits the case to the first instance. The appealed decision was solely based on Article 83 EPC 1973. In particular, the requirements of Article 52(1) EPC have not yet been examined by the first instance for the subject-matter of the present independent claims on file. The board therefore considers that in the present case remittal is the more appropriate course of action.

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 for further prosecution on the basis of the Second Auxiliary Request (claim 1) as filed with letter dated 16 November 2010.

The Registrar: The Chair:

K. Götz A. Ritzka