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Datasheet for the decision of 18 September 2018

Case Number: T 0820/15 - 3.5.05

Application Number: 09755804.3

Publication Number: 2324607

IPC: H04L25/02, H04L25/03

Language of the proceedings: EN

Title of invention:
Transmission of multimedia streams to mobile devices with variable training information

Applicant:
Coherent Logix Incorporated

Headword:
Pilot training patterns/COHERENT

Relevant legal provisions:
EPC Art. 56
EPC R. 137(5)
RPBA Art. 15(3)

Keyword:
Oral proceedings held in the absence of the appellant
Unsearched subject-matter - (no)
Inventive step - (no)

Decisions cited:
T 0274/03, T 2334/11

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Case Number: T 0820/15 - 3.5.05

D E C I S I O N
of Technical Board of Appeal 3.5.05
of 18 September 2018

Appellant: (Applicant)	Coherent Logix Incorporated 1120 South Capital of Texas Highway Building 3, Suite 310 Austin, TX 78746 (US)
Representative:	Freischem & Partner Patentanwälte mbB Salierring 47-53 50677 Köln (DE)
Decision under appeal:	**Decision of the Examining Division of the European Patent Office posted on 3 December 2014 refusing European patent application No. 09755804.3 pursuant to Article 97(2) EPC.**

Composition of the Board:

Chair	A. Ritzka
Members:	K. Bengi-Akyuerek
	F. Blumer

Summary of Facts and Submissions

I. The appeal is against the decision of the examining division to refuse the present European patent application for an unallowable amendment under Rule 137(5) EPC with respect to claim 1 of a main request, lack of inventive step (Article 56 EPC) with respect to the independent claims of a first and second auxiliary request, having regard to the disclosures of

D1: O. Simeone et al.: "Adaptive pilot pattern for OFDM systems", Proceedings of IEEE ICC 2004, pp. 978-982, June 2004;
D3: WO-A-2007/138283;
D7: WO-A-2007/129944.

II. With its statement setting out the grounds of appeal dated 10 April 2015, the appellant further filed amended sets of claims according to third to seventh auxiliary requests. It requested that the examining division's decision be set aside and that a patent be granted on the basis of the main request and the first auxiliary request as filed in the examination proceedings with letter dated 10 September 2014 or the second auxiliary request as filed in the examination proceedings with letter dated 23 September 2014 or one of the above third to seventh auxiliary requests.

III. In a communication annexed to the summons to oral proceedings pursuant to Article 15(1) RPBA, the board gave its preliminary opinion on the appeal. It introduced, in response to the appellant's arguments and the newly submitted auxiliary requests, the following document into the appeal proceedings under Article 114(1) EPC:

D8: EP-A-1 542 488,

and made further reference to

D5: F. Tsuzuki et al.: "SAGE Algorithm for Channel Estimation and Data Detection Using Superimposed Training in MIMO system", Proceedings of IEEE GLOBECOM 2006, pp. 1-5, November 2006 (cited in the International Search Report).

In particular, it raised objections under Article 84 EPC, and indicated that the claimed subject-matter of the main request did not appear to involve an inventive step, having regard to the combination of D1 and D7 or D8 alone, while the subject-matter of the auxiliary requests on file were not inventive over D8 alone or D8 combined with D5.

IV. In its letter of reply, the appellant submitted counter-arguments to the objections raised in the board's communication under Article 15(1) RPBA.

V. By its letter dated 17 September 2018, i.e. one day before the scheduled oral proceedings, the appellant informed the board that it would not be attending them.

VI. Oral proceedings were held as scheduled on 18 September 2018 in the absence of the appellant. The board established from the file that the appellant's final requests were that the decision under appeal be set aside and that a patent be granted on the basis of the main request or any of the first to seventh auxiliary requests; the main request and the first auxiliary request as filed with letter dated 10 September 2014, the second auxiliary request as filed with letter dated 23 September 2014, the third to seventh auxiliary

requests as filed with the statement setting out the grounds of appeal dated 10 April 2015.

After due deliberation on the basis of those requests and the written submissions, the decision of the board was announced at the end of the oral proceedings.

VII. Claim 1 of the **main request** reads as follows:

"A method for broadcasting audiovisual information to mobile devices in a wireless manner, wherein the mobile devices comprise receivers, the method comprising:

storing training information in a memory;

generating a plurality of packets, wherein a first portion of the plurality of packets comprises the training information;

wherein at least one of the plurality of packets comprises first information which identifies a first training pattern of a plurality of possible training patterns, wherein the first training pattern specifies one or more locations of the training information in the plurality of packets;

wherein the first information is useable by the receivers to determine the first training pattern of the plurality of possible training patterns;

transmitting the plurality of packets in a wireless manner;

characterized in that the amount of training information is variable and can be dynamically adjusted so that more bandwidth is allocated to training information during times of day when more receivers may be moving than during times of day when stationary reception is more common;

wherein the plurality of packets further comprise audiovisual information."

Claim 1 of the **first auxiliary request** reads as follows:

"A method for broadcasting audiovisual information to mobile devices in a wireless manner, wherein the mobile devices comprise receivers, the method comprising:

storing training information in a memory;

generating a plurality of packets, wherein a first portion of the plurality of packets comprises the training information;

wherein at least one of the plurality of packets comprises first information which identifies a first training pattern of a plurality of possible training patterns, wherein the first training pattern specifies one or more locations of the training information in the plurality of packets;

wherein the first information is useable by the receivers to determine the first training pattern of the plurality of possible training patterns;

transmitting the plurality of packets in a wireless manner;

characterized in that the first information comprises an orthogonal gold code, wherein each of a plurality of orthogonal gold codes corresponds to each of the plurality of possible training patterns;

wherein the plurality of packets further comprise audiovisual information."

Claim 1 of the **second auxiliary request** combines the characterising portions of claim 1 of the main and the first auxiliary requests.

Claim 1 of the **third auxiliary request** comprises all the features of claim 1 of the main request, and

further adds the following phrase to its characterising portion:

> "wherein more bandwidth is allocated to training information during common commute times than during 'prime time' or day time;"

Claim 1 of the **fourth auxiliary request** comprises all the features of claim 1 of the second auxiliary request, and also adds the following phrase to its characterising portion:

> "wherein more bandwidth is allocated to training information during common commute times than during 'prime time' or day time;"

Claim 1 of the **fifth auxiliary request** comprises all the features of claim 1 of the first auxiliary request, and adds the following phrase to its characterising portion:

> "wherein the amount of training information is variable and can be dynamically adjusted so that a smaller amount of training information is transmitted as equalizer technology improves;"

Claim 1 of the **sixth auxiliary request** comprises all the features of claim 1 of the first auxiliary request, and adds the following phrase to its characterising portion:

> "wherein codes with weak autocorrelation properties are not selected from a given set of orthogonal gold codes as first information corresponding to a possible training pattern;"

Lastly, claim 1 of the **seventh auxiliary request** combines the characterising portions of claim 1 of the main, first and sixth auxiliary requests.

Reasons for the Decision

1. *Non-attendance of the appellant at oral proceedings*

1.1 The appellant decided not to attend the scheduled oral proceedings before the board (cf. point V above). Pursuant to Article 15(3) RPBA, the board is not "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."

1.2 In the present case, in response to the objections raised in the board's communication under Article 15(1) RPBA, the appellant filed arguments in support of the patentability of the pending claim requests (cf. point IV above). The board considered those arguments and found that claim 1 of all claim requests still gave rise to objections under Article 56 EPC (cf. points 3 and 4 below). So, in exercise of its discretion under Article 15(3) RPBA, the board took a decision at the end of the oral proceedings, in the absence of the duly summoned appellant.

2. *The present invention*

The present application is concerned with providing different training data from a wireless sender (base station) to multiple wireless receivers (mobile devices) in a standardised ATSC (Advanced Television

Systems Committee) audio/video broadcast system. This training data is typically used for channel-state estimations regarding the mobile connections between the sender and the receiver side and can be transmitted with distinct time-dependent training patterns, i.e. involving more or less training data by dedicating more or less bandwidth for their transmission.

3. MAIN REQUEST

Claim 1 includes the following limiting features, as labelled by the board:

A method for broadcasting in a wireless manner audio-visual information to mobile devices comprising receivers, the method comprising the steps of:

A) storing training information in a memory;
B) generating a plurality of packets, wherein a first portion of the plurality of packets comprises the training information;
C) wherein at least one of the plurality of packets comprises first information which identifies a first training pattern of a plurality of possible training patterns;
D) wherein the first training pattern specifies one or more locations of the training information in the plurality of packets;
E) wherein the first information is usable by the receivers to determine the first training pattern of the plurality of possible training patterns;
F) transmitting the plurality of packets in a wireless manner;
G) wherein the amount of training information is variable and can be dynamically adjusted so that more bandwidth is allocated to training

information during times of day when more receivers may be moving than during times of day when stationary reception is more common;

H) wherein the plurality of packets further comprise audio-visual information.

3.1 *Allowability of claim amendments (Rule 137(5) EPC)*

3.1.1 The examining division found that present claim 1 did not comply with the requirements of Rule 137(5) EPC because its subject-matter as amended related to unsearched subject-matter and did not combine with the originally claimed invention to form a single general inventive concept (see Reasons 1 to 3). This was essentially because the originally filed independent claims did not comprise any feature pointing towards adapting the amount of training information within the meaning of feature G) of claim 1 (see appealed decision, Reasons 3.2.2).

3.1.2 As to the application of Rule 137(5) EPC, the board first points out that, in the present case, Rule 137(4) EPC - as in force from 13 December 2007 until 31 March 2010 - applies, since the respective International Search Report had been completed on 22 October 2009, i.e. before 1 April 2010 (cf. Decision of the Administrative Council of 25 March 2009, OJ EPO 2009, 299, Article 2).

Rule 137(4)(2007) EPC (corresponding to Rule 86(4) EPC 1973 and Rule 137(5) EPC as from 1 April 2010) stipulates that amended claims "may not relate to unsearched subject-matter which does not combine with the originally claimed invention or group of inventions to form a single general inventive concept". Given the principle that the EPC assumes that a search fee must

always be paid for an invention presented for examination, this rule is intended to prevent amendments of the application which circumvent this principle (see T 274/03, Reasons 4).

To determine the compliance with Rule 137(4)(2007) EPC, it has to be first ascertained whether or not the amended claims relate to unsearched subject-matter and only in the event that the subject-matter is considered to be unsearched must it be further checked whether this subject-matter combines with the originally claimed invention to form a single general inventive concept, i.e. whether the respective subject-matters may be considered to be unitary (see e.g. Reasons 2.2 of T 2334/11, cited in the decision under appeal).

3.1.3 In the present case, claim 1 of the main request differs from claim 1 as originally filed in that it now includes added features G) and H) and further specifies that the audio-visual information is broadcast to *multiple* receivers.

3.1.4 It is apparent to the board that the entire application relates to TV broadcast systems, i.e. inherently broadcasting *audio-visual* data in accordance with feature H) and that using dynamic amounts of training information within the meaning of feature G) had been appropriately reflected in dependent claims 3, 11, 19 and 27 as originally filed. It also appears from the file that those dependent claims were in fact searched according to the respective International Search Report dated 4 November 2009.

3.1.5 The board therefore concludes that the above added features cannot objectively be considered to be

unsearched within the meaning of Rule 137(4)(2007) EPC.

3.1.6 Since the first requirement of Rule 137(4)(2007) EPC, i.e. that the amended claims may not relate to unsearched subject-matter, is found to be fulfilled, the claims of the main request do not infringe Rule 137(4)(2007) EPC.

3.2 *Novelty and inventive step (Articles 54 and 56 EPC)*

The board holds that the subject-matter of present claim 1 is new but does not involve an inventive step, for the reasons set out below.

3.2.1 Prior-art document **D1** was regarded as closest prior art for all claim requests in the decision under appeal and relates to providing dynamic pilot patterns for channel estimation purposes in multi-carrier OFDM systems. The board concurs with the impugned decision that D1 fails to disclose features G) and H) of present claim 1 (cf. appealed decision, Reasons 4.1 and 6).

3.2.2 Prior-art document **D8** teaches the use of different training patterns ("pilot patterns") including different locations of training information ("pilots") respectively communicated to multiple receivers in a wireless system (see e.g. paragraphs [0020], [0041] and [0044], in conjunction with Figs. 3B and 10). Moreover, D8 relies explicitly on multi-carrier systems such as DVB/DAB and thus on transmission/reception of audio-visual information (see e.g. paragraph [0004]). Hence, it anticipates feature H) but fails to directly and unambiguously disclose that the amount of pilots used depends on specific "times of day", as required by feature G).

3.2.3 Hence, present claim 1 is considered to be novel over D1 or D8 (Article 54 EPC).

3.2.4 As to the assessment of inventive step, the board holds that D8 is a more suitable starting point than D1. More specifically, document D8 likewise provides clear hints towards using *more* pilots for *dynamic* user movement scenarios and using *less* pilots for *stationary* scenarios (see e.g. column 7, lines 14-18: *"... It is beneficial, e.g. to assign resources for mobiles with certain fast varying channel or Doppler conditions in the dense parts of the pilot pattern and users with more slowly varying conditions in the less dense parts"*).

3.2.5 Regarding distinguishing feature G), the appellant argued that the statement "times of day when more receivers may be moving than during times of day when stationary reception is more common" logically excluded the option of performing mobility measurements and left only the option of predetermining the "times of day" such that the respective dynamic adjustment did not depend on any measurement results, thereby introducing a simple and error-proof concept. With regard to document D8, the appellant put forward that it was impossible, without performing mobility measurements, to determine which mobiles were subject to "fast varying channel/Doppler conditions" and which mobiles were subject to "slowly varying conditions" in the system of D8.

This argument is not persuasive. Firstly, the wording of feature G) as it stands does not preclude the execution of mobility measurements in order to establish the times of day when more or less receivers move. This is because mobility measurements are

commonly used for deriving estimations of network parameters which may realistically be used for predicting whether receivers may be moving or are commonly stationary.

Secondly, D8 clearly teaches that an assumption based on the expected speed of the receivers may be made (see e.g. column 5, lines 51-57: *"This estimation can be provided in many different ways. The actual radio conditions can be measured and evaluated. Another possibility is to assume an estimate from knowledge about the characteristics in the cell and possibly based on e.g. location and/or speed of the receiver ..."*). Thus, the skilled person would deduce therefrom that it is indeed possible to predict - based on estimates and without any current measurements - that some mobile terminals are exposed to more or less dynamic channel conditions, and would consequently arrive at the claimed solution in a straightforward way.

3.2.6 Hence, the subject-matter of present claim 1 lacks an inventive step having regard to D8.

3.3 In view of the above, the main request is not allowable under Article 56 EPC.

4. AUXILIARY REQUESTS

Claim 1 of the first to seventh auxiliary requests differs from claim 1 of the main request basically in that it no longer contains feature G) (in the case of the first, fifth and sixth auxiliary requests), and further specifies that (emphasis added by the board)

I) the first information comprises an orthogonal gold code, wherein each of a plurality of orthogonal gold codes corresponds to each of the plurality of possible training patterns (**first, second and fourth to seventh auxiliary requests**);

J) wherein more bandwidth is allocated to training information during common commute times than during 'prime time' or day time (**third and fourth auxiliary requests**);

K) wherein the amount of training information is variable and can be dynamically adjusted so that a smaller amount of training information is transmitted as equalizer technology improves (**fifth auxiliary request**);

L) wherein codes with weak autocorrelation properties are not selected from a given set of orthogonal gold codes as first information corresponding to a possible training pattern (**sixth and seventh auxiliary requests**).

4.1 *Inventive step (Article 56 EPC)*

4.1.1 The feature analysis and reasoning outlined in point 3.2 above with respect to claim 1 of the main request apply *mutatis mutandis* to claim 1 of the present auxiliary requests.

4.1.2 As to feature I), the board agrees with the appellant that prior-art document **D3** is concerned only with using orthogonal gold codes in *wired* (rather than *wireless*) communications.

However, it is apparent to the board that at least document **D5** clearly demonstrates the use of orthogonal gold codes for the purpose of indicating pilot sequences particularly in *wireless* communication

systems (see e.g. abstract; section II, first sentence and section IV, second sentence). Therefore, the board concludes that, in order to signal the relevant training patterns in a robust way e.g. in a standard ATSC M/H system (see e.g. present application as filed, paragraphs [0050] and [0066]), the skilled person would apply such codes in the underlying wireless system of D8 in an obvious way.

In that regard, the board is not convinced by the appellants' argument that feature I) implied that orthogonal gold codes were used for *identifying* one of a plurality of training patterns rather than proposing the use of them as pilot sequences *per se* as in **D5**. This is because the fact that orthogonal gold codes, corresponding to the plurality of possible training patterns, are usable by the receivers to determine the first training pattern of the plurality of possible training patterns according to features E) and I) does not necessarily mean that the codes may only be used for identifying the respective training patterns. According to the broad wording of feature I), they could well be used as the actual pilot training patterns, i.e. pilot sequences in accordance with D5. In any event, the actual technical effect or benefit resulting from the interpretation invoked by the appellant is not derivable from the claims or the entire application. Nor did the appellant provide one.

4.1.3 As to features J) and K), the appellant argued that "prime time" corresponded to "evening broadcasting hour, generally between 8 and 11 pm" and that "day time" corresponded to the "time span between dawn and dusk" excluding "common commute times" and that the expression "as equalizer technology improves" was sufficiently clear, since there was a precise

definition of the word "equalizer".

The board however finds that the assignment of more or less pilots based on user moving characteristics such as day times or based on the current states of specific technologies - whether or not the phrase "as equalizer technology improves" implies any limitation of the claimed subject-matter - represents one of several straightforward implementation details in connection with providing dynamic or adaptive training information. This is also underpinned e.g. by D8 (see column 5, lines 53-57: *"Another possibility is to assume an estimate from knowledge about the characteristics in the cell ..."*).

4.1.4 As to feature L), the board takes the view that it is self-evident that a skilled person, when configuring the respective orthogonal gold codes known from D5, would preclude those codes that are associated with bad autocorrelation properties and are thus not reliably detectable at the receiver side.

4.1.5 In addition, the board notes that distinguishing features G), J) and K) are related to the *adaptive allocation* of training data, whereas features I) and L) are directed to enabling a *reliable communication* of training data. Thus, those feature groups are associated with different partial objective problems, which can be solved independently in a straightforward way (see points 3.2.5, 4.1.2 to 4.1.4 above) and, consequently, constitute a mere juxtaposition of obvious features.

4.2 In sum, the present auxiliary requests likewise are not allowable under Article 56 EPC.

Order

For these reasons it is decided that:

The appeal is dismissed.

The Registrar: The Chair:

K. Götz-Wein A. Ritzka

Decision electronically authenticated