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Datasheet for the decision of 7 February 2008

Case Number: T 1446/07 - 3.5.03

Application Number: 95929183.2

Publication Number: 0728388

IPC: H04H 1/00

Language of the proceedings: EN

Title of invention:
Single frequency transmission network

Applicant:
Koninklijke Philips Electronics N.V.

Opponent:
-

Headword:
Transmission network/PHILIPS

Relevant legal provisions:
EPC Art. 56, 123(2)
EPC R. 43

Relevant legal provisions (EPC 1973):
EPC R. 29(2)

Keyword:
"Amendments - added subject-matter (no)"
"Inventive step - yes (after amendment)"

Decisions cited:
T 0671/06

Catchword:
-

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Case Number: T 1446/07 - 3.5.03

D E C I S I O N
of the Technical Board of Appeal 3.5.03
of 7 February 2008

Appellant: Koninklijke Philips Electronics N.V.
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Decision under appeal: **Decision of the examining division of the European Patent Office posted 3 April 2007 refusing European application No. 95929183.2 pursuant to Article 97(1) EPC 1973.**

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 examining division refusing European patent application No. 95929183.2 (publication number EP 0728388), which was originally filed as international application PCT/IB95/00736 (publication number WO 96/08889 A).

II. The reason given for the refusal was that the claimed subject-matter lacked an inventive step, Articles 52(1) and 56 EPC. Additional comments related to Article 123(2) EPC and Rule 29(2) EPC 1973.

III. The following documents were referred to in the decision and/or the international search report for the present application:

D1: WO 94/05110;
D2: US 4972410 A;
D3: DE 4403408 C; and
D4: US 5216717 A.

IV. With the statement of grounds of appeal the appellant requested that the decision be set aside and a patent be granted on the basis of the claims on file, with a correction in claims 1 and 8. Arguments in support were submitted and oral proceedings were conditionally requested.

V. The appellant was summoned to oral proceedings. In a communication accompanying the summons the board drew attention to issues to be discussed at the oral proceedings, in particular objections under Articles 84 and 123(2) EPC and the question of whether or not the

claimed subject-matter involved an inventive step.

VI. Oral proceedings were held on 7 February 2008. The appellant requested that the decision under appeal be set aside and that a patent be granted on the basis of claims 1 to 5 of a main request as submitted at the oral proceedings.

At the end of the oral proceedings, after deliberation, the board's decision was announced.

VII. The claims of the main request read as follows:

"1. Source station for transmitting a signal comprising packets of digital symbols via at least two transmission links to at least two transmitter stations, the source station comprising:
- an input for receiving the packets of digital symbols to be transmitted,
- determining means for determining the packets of digital symbols to be transmitted by each of the transmitter stations in one transmission frame, and
- means for transmitting in a frame to said transmitter stations the determined packets and an identification of said packets of digital symbols to be transmitted by each of the transmitter stations in one transmission frame, characterised in that the source station is further arranged:
- for obtaining an absolute time reference and
- for transmitting, together with the determined packets and the identification, information about the respective instant on which said frame was transmitted by the source station.

2. Source station according to claim 1, characterised in that the absolute time reference is obtained from a Global Positioning System receiver.

3. Transmitter station for a multi transmitter transmitter *[sic]* network comprising:
- a receiver for receiving a digital signal comprising a frame including packets of digital symbols from a source station via a transmission link and an identification of the packets of digital symbols to be transmitted by the transmitter station in one transmission frame,
- assembling means for assembling the packets of digital symbols received from its transmission link in respective transmission frames, each transmission frame comprising said received packets of digital symbols, and
- a radio transmitter for transmitting said transmission frames on a carrier,
characterised in that the transmitter station is further arranged:
- for receiving information in said received frame about the respective instant on which said frame was transmitted by the source station, and
- for obtaining an absolute time reference and
- to use the information received to calculate the transmission delay of its transmission link
and
- for adjusting a delay value of a delay element in the transmitter station such that the sum of the delay of the signal in the respective transmission link and the delay in the respective transmitter station is substantially the same for all transmitter stations, thereby permitting substantially simultaneous transmission of the digital symbols by the transmitter stations of the multi transmitter transmitter *[sic]*

network, and
where each transmission frame is defined by a number of time slots and includes a header comprising frame overhead signals and said packets of digital symbols as indicated.

4. Transmitter network comprising a source station according to claim 1 and at least two transmitter stations according to claim 3.

5. Transmission method using a multi transmitter network, said method comprising:
- transmitting a digital signal comprising a frame including packets of digital symbols from a source station via at least two transmission links to at least two transmitter stations,
- receiving said packets of digital symbols from the source station at each of said transmitter stations via said transmission links,
- further receiving in said frame, via the transmission links, an identification of the packets of digital symbols to be transmitted by the transmitter stations in one transmission frame,
- each of said transmitter stations assembling the packets of digital symbols received from the corresponding transmission link in respective transmission frames, each transmission frame comprising said received packets of digital symbols, and
- determining at the source station the packets of digital symbols to be transmitted by each of the transmitter stations in one transmission frame, and
- transmitting in said frame from the source station to said transmitter stations, the determined packets and an identification of said packets of digital symbols to be

transmitted by each of the transmitter stations in one transmission frame,
- each of said transmitter stations transmitting said transmission frames on a carrier,
characterised in further comprising
- the source station:
 - obtaining an absolute time reference and
 - transmitting, together with the determined packets and the identification, information about the respective instant on which said frame was transmitted by the source station,
- the transmitter stations:
 - obtaining an absolute time reference,
 - receiving in said frame the information about the respective instant on which said frame was transmitted by the source station,
 - using the information transmitted for calculating the transmission delay of its respective transmission link,
 - adjusting a delay value of a delay element in the transmitter station such that the sum of the delay of the signal in the respective transmission link and the delay in the respective transmitter station is substantially the same for all transmitter stations, thereby obtaining substantially simultaneously transmission of the digital symbols by the transmitter stations, and
where each transmission frame is defined by a number of time slots and includes a header comprising frame overhead signals and said packets of digital symbols as indicated."

Reasons for the Decision

1. *Amendments*

1.1 Claim 1 is based on claim 5 as originally filed, in which further features disclosed in the description are added, see page 4, lines 7 and 8 (re. packets of digital symbols), reference being made to the international application as published, Fig. 2 (re. source station input), page 4, lines 9 and 10 (re. determining the packets to be transmitted), page 4, lines 10 to 13 and page 2, lines 29 to 31 (re. identification of the packets), page 3, line 25 (re. transmission frame), page 5, lines 20 and 21 (re. absolute time reference), and page 5, lines 31 and 32 (re. information about the instant).

The additional feature of claim 2 is disclosed at page 6, lines 1 to 3.

Claim 3 is based on claim 9 as originally filed, in which further features disclosed in the description are added, see the above references to the description in relation to claim 1 and, in addition, page 7, lines 1 and 2 (re. absolute time reference), page 5, lines 32 and 33 (re. calculation of the transmission delay), page 6, line 32 to page 7, line 1 (re. reception of the information about the time instant and adjustment of the delay value) and page 5, lines 3 to 8 (re. definition of the transmission frame). Further, the conversion means are more specifically defined in terms of an assembling means for assembling the packets in transmission frames, see the description, page 4, lines 16 to 18 and 23 to 25.

Claim 4 is based on claim 1 as originally filed and Fig. 1.

Claim 5 is based on claim 10 as originally filed, in which further features disclosed in the description are added, see the above references to the description in relation to claims 1 and 3.

1.2 The board is therefore satisfied that the amendments to the claims as originally filed according to the main request do not give rise to objections under Article 123(2) EPC.

2. *Article 84 EPC and Rule 43 EPC*

2.1 In the impugned decision the examining division did not raise objections under Article 84 EPC and nor does the board see any reason for doing so in respect of the present claims. In the board's view, a skilled reader would readily understand that "to use the information received to calculate the transmission delay" in claim 3 and "using the information transmitted for calculating the transmission delay" in claim 5 respectively express that the claimed transmitter station is arranged to calculate the transmission delay and that the claimed method includes the step of calculating the transmission delay. Further, it is evident that in claim 3 "multi transmitter transmitter network" should read "multi transmitter network" (as in claim 5) and that, in claim 5, the identification which is transmitted from the source station is the same identification as is received by the transmitter stations. As concerns the term "substantially" in claims 3 and 5 ("the delay in the respective transmitter station is substantially the same

for all transmitter stations" and "substantially simultaneous(ly) transmission"), the board judges that, although imprecise in itself, the term does not give rise to a clarity objection, since the features in question are clear when appropriately interpreted in the context of a multi transmitter network, it being noted that in multi transmitter networks, which are commonly referred to in the prior art as "simulcast" transmission systems (see D1, the abstract, and D2, the abstract), broadcast time offsets may be applied (D1, page 49, lines 11 to 14) and only "close phase alignment" or "close time coherence" is achieved (D2, col. 2, lines 31 and 63), i.e. the signals are broadcast at "approximately the same time" (D2, col. 1, lines 34 to 38) in order to be "in phase substantially at the center of the critical areas" (D4, col. 10, lines 32 to 36).

2.2 The examining division raised objections under Rule 29 EPC 1973. However, the present set of claims includes three independent claims 1, 3 and 5, claim 5 of which is in a different category to claims 1 and 3, whilst claims 1 and 3 define inter-related products in the sense of Rule 43(2)(a) EPC. Claims 2 and 4 include all the features of at least one other claim and are therefore dependent claims (following T 671/06, not published in OJ EPO).

2.3 The board is therefore satisfied that the claims comply with the requirements of Article 84 EPC and Rule 43 EPC.

3. *Novelty*

3.1 None of the prior art documents on file (D1, D2 and D4) disclose the feature in each of the independent claims 1,

3 and 5 concerning the transmission by the source station, or the reception by the transmitter station, of information about the instant on which the frame was transmitted by the source station. Nor did the examining division argue otherwise.

3.2 D3 does not constitute prior art in the sense of Article 54 EPC, since the present application validly claims a priority date which is before the publication date of D3. The board further notes that European patent application EP 0 666 661 A, which is a prior art document within the meaning of Article 54(3) EPC which corresponds to D3 and has the same content, is not novelty destroying for the same reasons as set out above at point 3.1.

3.3 The subject-matter of the claims is therefore novel in the sense of Articles 52(1) and 54 EPC having regard to the disclosure of each of the prior art documents known to the board.

4. *Inventive step*

4.1 The examining division regarded D1 as representing the closest prior art and so did the appellant. The board sees no reason to question this.

4.2 D1 discloses a digital simulcast transmission system in which a source station (hub 28, see Fig. 1) receives at an input digital pages (page 11, lines 11 and 12) from a paging terminal 24 and transmits them, repacked into a frame 328 which includes digital data-type paging data blocks (PDBs) 36b, via at least two transmission links, to at least two stations 30 (see page 11, lines 27 to 31,

page 21, lines 4 to 6, and page 32, lines 24 to 27 and Figs 5, 6 and 17). The stations 30 subsequently simultaneously broadcast the paging data. Each data-type PDB 36b includes a start time field 150 (see Fig. 8) which indicates the start time at which the paging data in the PDB is to be broadcast by each of the stations 30 (see page 21, lines 6 to 9).

4.3 The subject-matter of claim 1 particularly differs from the source station of D1 in that the claimed source station is arranged "for transmitting, together with the determined packets and the identification, information about the respective instant on which the frame was transmitted by the source station".

4.4 Hence, whereas in D1, in order to permit a simultaneous broadcast by the stations, the source station provides each station with information as to when the data is to be broadcast, i.e. the start time, the claimed source station transmits the time instant on which the data frame was transmitted to the transmitter stations. Consequently, the start time of the subsequent broadcasting must be determined by the transmitter stations themselves or by other means.

4.5 The objective problem when starting out from the disclosure of D1 may therefore be seen in providing an alternative solution for permitting a simultaneous broadcast.

4.6 None of the prior art documents known to the board suggests the claimed solution:

More specifically, the system proposed in D1 consistently requires that the start time for the broadcast is determined by the source station and transmitted to the transmitter stations (see, e.g., the abstract, page 4, lines 2 to 4, page 9, lines 25 to 27, page 21, lines 7 to 9, page 42, lines 9 to 12, page 49, lines 11 to 14, and claims 1, 22 and 47).

The board notes that in D1, in the acknowledgement of the prior art (page 2, line 9 to page 3, line 17), reference is made to an analog simulcast transmission system in which maintenance receivers are provided for continually monitoring the "delay between the time a signal is first forwarded by a central unit and the time it is finally broadcast by a transmitter site" (page 3, lines 3 to 6). This information is then used by the system's control circuitry to regularly adjust the transmission delay time for the individual transmitter sites. The central unit and the transmitter site of this analog simulcast transmission system may be seen as corresponding to the source station and the transmitter station of the present system.

However, the reference to "the time a signal is first forwarded by a central unit" does not imply or suggest that this time is transmitted in the frame to the transmitter stations. In fact, delay rate instructions are sent to the individual transmitter sites (page 2, lines 24 to 26) and, in the case of a change in a link, a new link propagation time is forwarded to the transmitter site (see page 3, lines 1 to 3), which rather suggests that at each of the transmitter sites the time of broadcasting the signal is determined on the basis of the time of receiving the signal, the link

propagation time and the delay rate instructions.

Hence, D1 neither discloses nor suggests the above-mentioned distinguishing feature of transmitting information about the instant on which the frame was transmitted by the source station.

4.7 D2, see the abstract and Fig. 1, discloses a simulcast system in which time coherency of data received from different remote sites 104, 106 is achieved by using a synchronous digital transmission network 340 (see Fig. 3) for connecting a control site 110 to the remote sites and by using time delay circuits at the control site (Fig. 3, T-1 delays 332, 334). The delays are not for individual data frames but are set for each individual remote site (col. 7, lines 4 to 15).

D4 discloses a synchronised broadcast network including a main transmitter 22 at a production site 10 (Figs 1 and 3) and a plurality of receiver/transmitter units 30_{1-3}, in which a phase synchronisation is achieved by time delay means 430 in the units (col. 10, lines 3 to 6 and 47 to 51, and Fig. 5). The phase synchronisation is not for individual data frames; the time delays are predetermined and based on, *inter alia*, the propagation time (T_{t1-t3}) needed to transmit a source signal from the production site 10 to the receiver/transmitter units 30_{1-3}.

Hence, neither D2 nor D4 suggests the transmission of information about the instant on which an individual data frame was transmitted by the control or production site.

4.8 The board is furthermore not aware of any prior art which would indicate that the above-mentioned distinguishing feature (see point 4.3) is part of the common general knowledge of the person skilled in the art.

4.9 It follows that the skilled person, starting from D1 and taking into account the teaching of any one of or both of D2 and D4, would not without the exercise of inventive skill arrive at the subject-matter according to claim 1.

4.10 The above reasons apply to the subject-matter of dependent claim 2 too and also apply, *mutatis mutandis*, to claims 3 to 5, each of which includes either the same distinguishing feature as mentioned at point 4.3 above or, in the case of claims 3 and 4, the corresponding feature that the transmitter station is arranged for receiving information in the received frame about the respective instant on which the frame was transmitted by the source station.

4.11 The board concludes that the subject-matter of each of claims 1 to 5 involves an inventive step having regard to the disclosure of each of or any combination of the above-mentioned prior art documents and taking into account the common general knowledge of a person skilled in the art (Articles 52(1) and 56 EPC).

5. No other objections have been raised by the examining division or are apparent to the board.

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 claims 1 to 5 as submitted at the oral proceedings.

The Registrar: The Chairman:

D. Magliano A. S. Clelland