

Internal distribution code:

- (A) [] Publication in OJ
(B) [] To Chairmen and Members
(C) [X] To Chairmen
(D) [] No distribution

D E C I S I O N
of 4 November 2004

Case Number: T 0845/99 - 3.5.1

Application Number: 91907056.5

Publication Number: 0521995

IPC: H04N 7/08

Language of the proceedings: EN

Title of invention:

Transmission and reception in a hostile interference environment

Patentee:

DIGI-MEDIA VISION LIMITED

Opponent:

Robert Bosch GmbH

Headword:

Hostile interference/DIGI-MEDIA VISION

Relevant legal provisions:

EPC Art. 123(2), 56

Keyword:

"Admissibility of amended main and first auxiliary requests (no)"
"Inventive step - admissible second auxiliary request (no)"

Decisions cited:

-

Catchword:

-



Case Number: T 0845/99 - 3.5.1

D E C I S I O N
of the Technical Board of Appeal 3.5.1
of 4 November 2004

Appellant: DIGI-MEDIA VISION LIMITED
(Proprietor of the patent) P.O. Box 495
Virginia Street
London E1 9XY (GB)

Representative: Molyneaux, Martyn Willian
Harrison Goddard Foote
40-43 Chancery Lane
London WC2A 1JA (GB)

Respondent: Robert Bosch GmbH
(Opponent) Postfach 30 02 20
D-70442 Stuttgart (DE)

Representative: Friedmann, Jürgen, Dr.-Ing.
Robert Bosch GmbH
Abteilung ZGE2
Postfach 30 02 20
D-70442 Stuttgart (DE)

Decision under appeal: Decision of the Opposition Division of the
European Patent Office posted 23 June 1999
revoking European patent No. 0521995 pursuant
to Article 102(1) EPC.

Composition of the Board:

Chairman: S. V. Steinbrener
Members: W. E. Chandler
B. J. Schachenmann

Summary of Facts and Submissions

I. This appeal is against the decision of the opposition division to revoke European patent No. 0 521 995. Opposition had been filed against the patent as a whole based on Article 100 EPC *inter alia* in conjunction with Article 56 EPC having regard, in particular, to the following documents:

D1: EP-A-0 278 192

D3: IEEE Transactions on Consumer Electronics, volume 35, no. 3, August 1989, New York, US, B. Le Floch et al.: "Digital sound broadcasting to mobile receivers", pages 493-503.

D6: US-A-3 917 906

In reply to the notice of opposition, the patent proprietor argued that none of the prior art described techniques which had the features or the advantages of the patent, and that all of the prior art accepted interference in the transmission.

Concerning D1, the patent proprietor essentially repeated the content of its acknowledgement in the granted patent, at page 2, lines 41 to 47. This described a system for transmitting digital data in the same channels as a conventional television signal. The data to be transmitted modulated the carriers of an OFDM signal. Interference was reduced by offsetting the OFDM carriers with respect to harmonics of the line repetition frequency in the existing television signal.

The opposition division held that none of the cited documents rendered obvious the subject-matter of claims 1 and 8 of the single request, filed with the letter of 14 October 1997. Claim 11 of the request, as amended at the oral proceedings before the opposition division, was held not to be inventive having regard to D6 and the well known techniques of OFDM as exemplified in D3.

- II. The proprietor (appellant) appealed the decision and requested that the decision of the opposition division be set aside. With the grounds of appeal, dated 22 October 1999, the appellant filed a new claim 11 of a main request and new claims 11 to 16 of a first auxiliary request. As a second auxiliary request, the appellant deleted claims 11 to 23. Although not explicitly stated, it is assumed that independent claims 1 and 8 of these requests are those upon which the decision was based (see point I above).

The respondent (opponent) requested that the decision of the opposition division be upheld and that the patent be revoked in its entirety. In the reply to the grounds of appeal, the respondent held *inter alia* that claim 11 of the first auxiliary request was not admissible since the originally disclosed receiver did not "identify" carriers likely to experience interference from other transmissions. Rather, the identification was carried out on a purely intellectual basis by calculating the frequencies concerned within a known frequency scheme prior to reception. Both parties made an auxiliary request for oral proceedings.

III. In a reply to the communication from the Board accompanying the summons to oral proceedings, the appellant made no comment on substantive issues and stated that he did not intend to appear or argue at the oral proceedings.

IV. Oral proceedings were held on 4 November 2004, at which the Board announced its decision.

V. Independent claims 1, 8 and 11, of the **main request** read as follows:

"1. A method of transmitting information in a frequency band subject to interference from other transmissions, the method comprising the steps of:
identifying the frequencies likely to be affected by interference from said other transmissions;
modulating a set of OFDM carriers using a block of data samples;
transmitting the modulated OFDM carriers at a power which is low compared with the power of said other transmissions
characterised by the modulation of OFDM carriers being carried out such that a data sample located in the block at a position corresponding to an OFDM carrier having a frequency identified as likely to experience interference is either omitted, translated or duplicated to another location in the block whereby to modulate another OFDM carrier having a frequency which is not identified as likely to experience interference."

"8. Apparatus for transmitting information in a frequency band subject to interference from other transmissions comprising:
means (19) for inputting in the form of blocks of digital data the information to be transmitted;
means (20) for coding each of the data samples in a block into one of a plurality of allowed values;
means (21,22,23) for modulating a set of OFDM carriers with the coded data sample values such that a data sample located in the block at a position corresponding to an OFDM carrier having a frequency identified as likely to experience interference is omitted, translated or duplicated to another location in the block whereby to modulate another OFDM carrier having a frequency which is not identified as likely to experience interference; and
means (25,26,27,28) for transmitting the modulated OFDM carriers at a power which is low compared with the power of said other means."

"11. Apparatus for receiving an orthogonal frequency division multiplex (OFDM) signal of the type generated by the method of any of claims 1 to 7 or the apparatus of any of claims 8 to 10 and transmitted at a frequency band subject to interference from other transmissions, said OFDM signal being transmitted at a power which is low compared with the power of said other transmissions and comprising a plurality of OFDM carriers, the apparatus comprising:
means for demodulating data from each carrier using a Fourier transform technique;
means for decoding the demodulated data only from the OFDM carriers which have been identified as not likely

to experience interference from said other transmissions; and means for outputting said decoded information."

In the **first auxiliary request**, claim 11 is amended as follows:

The feature "being transmitted at a power which is low compared with the power of said other transmissions and" is deleted.

The penultimate feature has been replaced by:

"means for identifying which of the OFDM carriers are expected to experience interference prior to receiving the signal;

means for decoding the demodulated data only from the OFDM carriers which have not been identified as expected to experience interference from said other transmissions; and"

In the **second auxiliary request**, claims 11 to 23 are deleted.

Reasons for the Decision

1. The appeal complies with the requirements referred to in Rule 65(1) EPC and is, therefore, admissible.
2. The patent is in the field of data transmission using orthogonal frequency division multiplexing (OFDM). It concerns the problem of reducing interference on an OFDM signal transmitted in an environment with interference at fixed frequencies, such as in or adjacent to a channel containing an analogue television

signal. The solution is essentially not to use the OFDM carriers at the frequencies of the fixed interference. This can be implemented at the transmitter side (independent claims 1 and 8), or at the receiver side (independent claim 11).

Main request (amendments to claim 11)

3. Receiver claim 11 as originally filed and as granted defines the decoding means to "ignore data demodulated from OFDM carriers at frequencies likely to experience interference." Claim 11 of the main request defines decoding "only from the OFDM carriers which have been identified as not likely to experience interference." The respondent argues that the new wording covers the case that the receiver itself identifies the carriers expected to experience interference, which was not originally disclosed.

4. The Board agrees. In essence, ignoring the inversion of the sense of the feature in the two versions, the carriers in question have been changed from those "likely to experience interference" to those **"which have been identified as** [not] likely to experience interference" (Board's emphasis). The nature of the restriction of this identification therefore has to be investigated. The Board agrees with the respondent that the amendment implies an identifying step occurring at any time before the decoding step, including after receiving the data in the receiver. However, the originally filed application only envisages calculating the affected frequencies before transmission, or at least before reception, but not after reception (see in particular page 19, third paragraph to page 20, first

paragraph and page 24, third paragraph to page 26, first paragraph of the international publication corresponding to the patent in suit). Thus, the Board judges that the subject-matter of claim 11 extends beyond the content of the application as filed contrary to Article 123(2) EPC.

5. Claim 11, and consequently the main request, is therefore inadmissible under Article 123(2) EPC.

First auxiliary request (further amendments to claim 11)

6. Claim 11 of the first auxiliary request adds the feature "means for identifying which of the OFDM carriers are expected to experience interference prior to receiving the signal". These means specify explicitly the step of "identifying" the carriers referred to in connection with the main request. Thus, the arguments made in connection with the main request apply *a fortiori* to the first auxiliary request.

7. Claim 11, and consequently the first auxiliary request, is therefore inadmissible under Article 123(2) EPC.

Second auxiliary request (inventive step)

8. In the appeal proceedings, the respondent repeated the attack against the patentability of transmitter claims 1 and 8. At the oral proceedings the respondent stated that the closest prior art was the known technique of OFDM coding described in D1 or D3. The respondent also pointed out that claim 1, in fact, claimed three alternative solutions to the problem of avoiding transmitting on interfering carriers, namely

omitting, translating or duplicating the associated data samples, and that it was difficult to pose a single problem embracing all three alternatives. In reply to the Board's question as to how, in the respondent's opinion, claim 1 in the least restrictive of these alternatives differed from the closest prior art, the respondent replied that he could not see how the claim in the alternatives of omitting or translating carriers differed at all from interlacing the carriers with the interfering signals at the line scan rate described at page 2, lines 47 to 50 and shown in Figure 1 of D1.

9. The Board derives from this and the acknowledgement of D1 in the patent in suit as well as the appellant's comments in the opposition proceedings (see point I above) that it is common ground that D1 can be considered to be the closest prior art for claims 1 and 8. It discloses a method of transmitting information in a frequency band subject to interference from other transmissions (existing television signal) comprising the steps of identifying frequencies (harmonics of the line repetition frequency) likely to be affected by interference and modulating a set of OFDM carriers using a block of data samples. The OFDM carriers are tailored so as to be interlaced with the interfering signals.

10. The Board agrees with the respondent that interlacing the carriers in D1 is equivalent to translating them from the neighbouring positions they normally occupy in conventional OFDM, but not necessarily omitting them because that entails a loss of information that is not disclosed in D1. However, claim 1 does not disclose

- translating the carriers themselves, but translating the data sample "located in the block at a position corresponding to" the carrier. Thus, the Board judges that the "translating" alternative of claim 1 differs from D1 by translating the relevant data sample. The claim also differs from D1 by explicitly transmitting the modulated OFDM carriers at low power compared with the other transmissions.
11. The difference of translating data samples has the same effect achieved in D1, namely translating the carrier frequencies to avoid the loss of data on carriers at the frequencies of the interference. The Board therefore considers that the first distinguishing feature solves the objective technical problem of providing an alternative way of translating the carrier frequencies to avoid the loss of data on carriers at the frequencies of the interference.
 12. The Board considers that it is a fundamental, and therefore well known, property of the inverse Fourier transform used in OFDM modulation systems that the input data samples of the transformed block represent the amplitudes of the carriers to be output. Thus, faced with the problem of translating the carriers, the Board judges that the skilled person would immediately recognise that this is equivalent to translating the data samples, as claimed.
 13. The remaining difference of transmitting the modulated OFDM carriers at low power is a well known possibility when transmitting OFDM signals alongside or next to analogue television signals. D3, for example, discloses this at page 501, section 7, third paragraph.

14. The subject-matter of claim 1 of the second auxiliary request accordingly does not involve an inventive step Article 56 EPC.

15. There being no other requests, it follows that the appeal must be dismissed.

Order

For these reasons it is decided that:

The appeal is dismissed.

The Registrar:

The Chairman:

M. Kiehl

S. Steinbrener