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Datasheet for the decision of 6 March 2007

Case Number: T 0548/04 - 3.5.03

Application Number: 01941716.1

Publication Number: 1290844

IPC: H04L 27/26

Language of the proceedings: EN

Title of invention:
Packet configuration for interoperability between 802.11a and 802.11b standards

Applicant:
Globespan Virata Incorporated

Opponent:
-

Headword:
Packet configuration/GLOBESPAN VIRATA

Relevant legal provisions:
EPC Art. 56
RPBA Art. 10b

Keyword:
"Inventive step - main request (no)"
"Late-filed auxiliary requests - not admitted"

Decisions cited:
-

Catchword:
-

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Case Number: T 0548/04 - 3.5.03

D E C I S I O N
of the Technical Board of Appeal 3.5.03
of 6 March 2007

Appellant: Globespan Virata Incorporated
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Decision under appeal: **Decision of the examining division of the European Patent Office posted 6 November 2003 refusing European application No. 01941716.1 pursuant to Article 97(1) EPC.**

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. 01 941 716.1 which was published as international application WO 01/95579 A pursuant to Article 158(1) EPC.

II. The reason for the refusal was that the subject-matter of the independent claims lacked an inventive step, Articles 52(1) and 56 EPC.

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

D1: Carl Andren and Mark Webster, "CCK Modulation delivers 11 Mbps for High Rate IEEE 802.11 Extension", white paper (online), 14 March 2000, pages 1 to 8;

D2: Richard van Nee et al, "New High-Rate Wireless LAN Standards", IEEE Communications Magazine, Vol. 37, No. 12, December 1999, pages 82 to 88;

D3: Uwe Lambrette et al, "OFDM Burst Frequency Synchronization by Single Carrier Training Data", IEEE Communications Letters, Vol. 1, No. 2, March 1997, pages 46 to 48; and

D4: IEEE Standard 802.11b - 1999, Supplement to IEEE Standard for information technology, "Part 11: Wireless LAN Medium Access Control (MAC) and Physical Layer (PHY) specifications: Higher-Speed

Physical Layer Extension in the 2.4 GHz Band", 20 January 2000, IEEE, New York, USA, pages 1 to 90.

IV. With the statement of grounds of appeal the appellant filed a new set of claims and amended description pages. The appellant requested that the impugned decision be set aside and the application be allowed, i.e. that a patent be granted, on the basis of the new application documents.

V. The appellant was summoned to oral proceedings. In a communication accompanying the summons, the board gave a preliminary opinion.

VI. Oral proceedings were held on 6 March 2007 during which the appellant filed two further sets of claims by way of first and second auxiliary requests.

The appellant requested that the decision under appeal be set aside and that a patent be granted on the basis of claims 1 to 16 of the main request filed with letter of 8 March 2004, i.e. with the statement of grounds of appeal, or, in the alternative, on the basis of auxiliary request 1 consisting of claims 1 to 18 or auxiliary request 2 consisting of claims 1 to 17, both as submitted at the oral proceedings.

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

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

"A wireless communication system that communicates using a dual packet configuration, characterised in

that the dual packet configuration comprises a first portion that is modulated according to a single carrier modulation, and a second portion that is modulated according to a multi-carrier modulation, the single carrier modulation comprising direct sequence spread spectrum (DSSS); and the multi-carrier modulation comprising orthogonal frequency division multiplexing (OFDM)."

Claim 1 of the first auxiliary request reads as follows:

"A wireless communication system that communicates using a dual packet configuration, wherein the dual packet configuration comprises a first portion that is modulated according to a single carrier modulation, and a second portion that is modulated according to a multi-carrier modulation, characterised in that the single carrier modulation comprising direct sequence spread spectrum (DSSS); the multi-carrier modulation comprising orthogonal frequency division multiplexing (OFDM); and the second portion comprising an OFDM synchronization pattern, an OFDM signal symbol, and an OFDM payload."

Claim 1 of the second auxiliary request reads as follows:

"A wireless communication system that communicates using a dual packet configuration, wherein the dual packet configuration comprises a first portion that is modulated according to a single carrier modulation, and a second portion that is modulated according to a multi-carrier modulation, characterised in that the

single carrier modulation comprising direct sequence spread spectrum (DSSS); the multi-carrier modulation comprising orthogonal frequency division multiplexing (OFDM); and wherein the first portion includes a preamble and a header, the header including an OFDM mode bit, and the header further including a length field indicating the time duration of the second portion."

Reasons for the Decision

1. *Main request - inventive step*

1.1 The examining division held that D1, which was apparently published on the internet, represented the closest prior art. The appellant did not dispute that D1 formed part of the state of the art in accordance with Article 54(2) EPC and that it represented the closest prior art.

The board notes that D1 relates to a wireless communication system for communicating data using a dual packet configuration and that one of the authors of D1 is one of the inventors designated in the present application. Further, on page 1 of the printed copy of D1, "P.D." is stamped, followed by "14-03-2000" in handwriting and, on page 8, see section "Future Developments", the last sentence reads "The chip set is scheduled for release in the early part of 1999".

In view of the above, the board is satisfied that D1 was made available to the public on 14 March 2000 at the latest, which is before the claimed priority date

of the application in suit, and thus forms part of the state of the art in accordance with Article 54(2) EPC and further that it may be taken as representing the closest prior art.

1.2 More particularly, D1 relates to a wireless communication system for communicating data using a dual packet configuration according to an extension of the IEEE 802.11 standard for WLAN systems, which eventually became known as the IEEE 802.11b standard (see also D2, page 82, right-hand column, last paragraph). In the system described in D1, see in particular page 2, last paragraph, page 3, lines 6 to 10, and Fig. 4, a dual packet configuration is used which comprises a first portion and a second portion. The first portion includes a header and a preamble and is modulated according to a single carrier modulation (e.g. DSSS BPSK). The second portion includes the payload and is modulated according to a second, different modulation, namely complementary code keying (CCK). CCK supports higher data rates than the original 802.11 standard (5,5 and 11 Mbps compared to 1 and 2 Mbps). At page 3, lines 1 and 2, it is stated that interoperability was a priority for the 802.11 working group in the selection of the waveform for higher rates. By maintaining the DSSS BPSK modulation at 1 Mbps for the preamble and header as in the original 802.11 standard, interoperability with the existing networks, i.e. legacy stations, is achieved; if a legacy station receives a packet header, but is not capable of processing the higher data rate, a deferral mechanism comes into operation, based on knowing that an 802.11 signal has been sensed and, from the length field in

the header, the length of time the signal will be on the air (page 3, lines 6 and 7 and 13 to 16).

1.3 The subject-matter of claim 1 differs from the system disclosed in D1 in that according to claim 1 the second modulation is orthogonal frequency division multiplexing (OFDM).

1.4 As acknowledged by the appellant, OFDM is a well-known multi-carrier modulation technique which supports payload data rates higher than 1 or 2 Mbps, see, e.g., the application as published, page 2, lines 23 to 28, and page 8, lines 3 to 6, and the statement of grounds of appeal, page 2, 2nd paragraph.

1.5 Starting out from D1, the technical problem underlying the claimed subject-matter may therefore be seen in providing an alternative modulation technique to the CCK modulation described in D1.

1.6 Even though, as reported in D1, the IEEE 802.11 working group eventually adopted CCK as the basis for the high data rate physical layer extension in view of the fact that it easily provided a path for interoperability with the existing 1 and 2 Mbps networks, the bandwidth, preamble and header being maintained (see D1, page 1, lines 21 to 25, and page 3, lines 17 to 21), OFDM was explicitly considered and evaluated as one of various modulation proposals in order to achieve a higher data rate extension to the physical layer of the 802.11 standard (see D1, page 1, lines 1 to 20).

1.7 When faced with the above-mentioned technical problem, it would therefore have been obvious to the person

skilled in the art, starting out from D1, that OFDM could alternatively be used as the modulation scheme for the second portion in order to achieve higher data rates for the payload than could be obtained with the original 802.11 standard. By selecting OFDM, he would thus arrive at the subject-matter of claim 1 without the exercise of inventive skill.

1.8 The appellant argued that from the description of the present application it was clear that considerable inventive thought and planning had to take place in order to achieve a workable implementation of the modulation provisions and that many technical challenges had to be overcome in order to establish the claimed dual packet configuration.

The board notes however that claim 1 does not include any features relating to the implementation of the specified modulation, such as in relation to the sample rates, power and spectrum matching, distortion calculations and/or the provision of a transition zone, as referred to by the appellant at pages 2 and 3 of the statement of grounds of appeal.

The appellant further argued that, to his knowledge, no one had combined a time-domain waveform with a frequency domain waveform in the same packet. The board notes however that D3 discloses a combination of a time-domain waveform (CAZAC) for training data with a frequency-domain waveform (OFDM) for the payload in one block of a data burst (see D3, page 46, left-hand column, section II, first and third paragraphs, and Fig. 1). Hence, the idea of combining a time-domain

waveform with a frequency-domain waveform in the same packet was already known before the priority date.

1.9 In view of the above, the board concludes that the subject-matter of claim 1 does not involve an inventive step, Articles 52(1) and 56 EPC.

1.10 The main request is therefore not allowable.

2. *First and second auxiliary requests - admissibility*

2.1 In accordance with Article 10b of the Rules of Procedure of the Boards of Appeal (OJ EPO 3/2003, pages 89 to 98) any amendment to a party's case after it has filed its grounds of appeal may be admitted and considered at the board's discretion. In the board's view, and in line with the established case law of the Boards of Appeal, one of the criteria for admitting further amendments to the claims at a late stage of the appeal proceedings, in the present case in the course of the oral proceedings, is whether or not the claims are clearly allowable. In the present case, in the board's judgement claim 1 of each of the first and second auxiliary requests is not clearly allowable for the following reasons:

2.2 *First auxiliary request*

2.2.1 Claim 1 of the first auxiliary request specifies, in addition to the subject-matter of claim 1 of the main request, that the second portion of the dual packet configuration comprises an OFDM synchronization pattern, an OFDM signal symbol, and an OFDM payload.

2.2.2 The appellant argued that these additional features were based on page 7, lines 22 to 33 and Figs 3A and 3B of the application as originally filed.

The board notes however that the packet configurations shown in Figs 3A and 3B and described in the corresponding passages of the description (page 7, line 16, to page 8, line 24, and page 9, lines 10 to 12) each include, not only the OFDM synchronization pattern, the OFDM signal symbol and the OFDM payload, but also a preamble and a header. Since claim 1 does not specify a preamble and a header accordingly, it is based on a generalisation of what is disclosed in the above-cited passages and figures. Consequently, the board has doubts as to whether these passages and figures provide a basis for the specific combination of features of claim 1. Since a basis for this intermediate generalisation is neither clearly apparent from other parts of the application documents as originally filed, the board concludes that, at least *prima facie*, claim 1 defines a combination of features which is not directly and unambiguously derivable from the content of the application as filed, contrary to Article 123(2) EPC.

2.2.3 Moreover, ignoring for the sake of argument the objection under Article 123(2) EPC, the subject-matter of the claim does not, at least *prima facie*, involve an inventive step in the sense of Article 56 EPC when starting out from D1 (see point 1.2 above) in view of the reasons given in respect of claim 1 of the main request (see point 1 above) and considering that, in order to implement the system of claim 1 of the main request, the provision of an OFDM synchronization

pattern, an OFDM signal symbol, and an OFDM payload in each packet would in itself be fully in line with the widely used OFDM modulation scheme as defined in the IEEE 802.11a standard, see, e.g., D2, page 85, section "OFDM Signal Processing".

2.2.4 For the above reasons, claim 1 of the first auxiliary request is not clearly allowable.

2.3 *Second auxiliary request*

2.3.1 Claim 1 of the second auxiliary request specifies, in addition to the subject-matter of claim 1 of the main request, the following features:

i) the first portion includes a preamble and a header;

ii) the header includes an OFDM mode bit; and

iii) the header further includes a length field indicating the time duration of the second portion.

2.3.2 Features i) and iii) do not *prima facie* contribute to an inventive step, since they are known from D1 (see page 1, lines 23 to 25, and page 3, lines 6 and 7, and section 1.2 above).

Further, it appears that, whilst the 8-bit service field of the header according to the original 802.11 standard was reserved for future use, according to the high rate 802.11 extension as described in D1 and the IEEE 802.11b standard (see, e.g., D4) at least part of

the service field is used in order to accommodate a mode selection bit for indicating the type of the modulation of the second portion, i.e. CCK or PBCC, see, e.g., D1, page 1, lines 23 to 25, and page 3, lines 6 and 7, and D4, page 13, section 18.2.2.1 and Figure 127, and page 15, section 18.2.3.4 and Table 97.

It would therefore at least *prima facie* have been obvious to the skilled person applying the teaching of D1 to OFDM modulation to use the service field for the same purpose, namely to indicate the type of modulation of the second portion, and to implement this in a similar way, namely by the inclusion of an OFDM mode bit in order to indicate that OFDM modulation is used for the second portion, cf. feature ii).

The board further notes that according to D1 the signal rate field for indicating either the 1 Mbps mode or the 2 Mbps mode according to the original 802.11 standard can be programmed in the 802.11 extension for indicating 1, 2, 5.5 or 11 Mbps (see D1, page 3, lines 9 and 10). If yet higher rates were to be obtained by using OFDM, e.g. 24, 36, 48 or 54 Mbps as in the 802.11a OFDM standard, it would *prima facie* have been obvious to the skilled person to program the signal rate field accordingly. The use of these higher rates would then imply the use of OFDM.

2.3.3 For the above reasons, claim 1 of the second auxiliary request is not clearly allowable having regard to the requirements of Articles 52(1) and 56 EPC.

2.4 In view of the above, the board exercised its discretion pursuant to Article 10b RPBA not to admit

the first and second auxiliary requests to the appeal proceedings.

Order

For these reasons it is decided that:

The appeal is dismissed.

The Registrar: The Chairman:

D. Magliano A. S. Clelland