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**Datasheet for the decision
of 1 December 2009**

Case Number: T 1299/06 - 3.5.05

Application Number: 04252278.9

Publication Number: 1473870

IPC: H04L 12/12

Language of the proceedings: EN

Title of invention:

Adaptive sleeping and awakening protocol for an energy efficient adhoc network

Applicant:

LUCENT TECHNOLOGIES INC.

Headword:

Receiving residual energies of neighboring nodes/LUCENT

Relevant legal provisions:

EPC Art. 123(2)
RPBA Art. 15(3)

Relevant legal provisions (EPC 1973):

EPC Art. 84, 106, 107, 108

Keyword:

"Clarity and support by the description - no"
"Extension of subject-matter - yes"

Decisions cited:

J 0010/07

Catchword:

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Case Number: T 1299/06 - 3.5.05

D E C I S I O N
of the Technical Board of Appeal 3.5.05
of 1 December 2009

Appellant: LUCENT TECHNOLOGIES INC.
600 Mountain Avenue
Murray Hill NJ 07974-0636 (US)

Representative: Sarup, David Alexander
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Decision under appeal: Decision of the Examining Division of the
European Patent Office posted 30 March 2006
refusing European application No. 04252278.9
pursuant to Article 97(1) EPC 1973.

Composition of the Board:

Chairman: A. Ritzka
Members: M. Höhn
G. Weiss

Summary of Facts and Submissions

- I. This appeal is against the decision of the examining division dispatched 30 March 2006, refusing European patent application No. 04252278.9 for lack of novelty (Article 54(1) and (2) EPC 1973) over one of prior art documents:
- D1: WO 0048367 and
D2: US 5392287.
- II. The notice of appeal was received on 27 May 2006. The appeal fee was paid on 26 May 2006. It was requested that the decision under appeal be set aside and a patent be granted. The statement setting out the grounds of appeal was submitted on 31 July 2006 and comprised a main request and a first auxiliary request.
- III. With a letter dated 15 February 2008 the appellant filed a set of claims 1 to 4 according to a second auxiliary request and presented arguments supporting the patentability of the claims. The appellant maintained the main request and the first auxiliary request.
- IV. A summons to oral proceedings to be held on 1 December 2009 was issued on 5 August 2009. In an annex accompanying the summons the board expressed the preliminary opinion that the subject-matter of independent claim 1 of the main request did not appear to fulfil the requirements of Article 54(1) and (2) EPC 1973 in the light of D1. The subject-matter of claim 1 of the first auxiliary request appeared to be at least obvious in the light of

D1 (Article 56 EPC 1973). Furthermore, the board raised several objections under Article 84 EPC 1973 against claim 1 of the first auxiliary request and claims 1, 3 and 4 of the second auxiliary request. The board presented arguments on which its objections were based and commented on the appellant's submissions, which were not considered to be convincing. The board expressed the preliminary opinion that claim 1 according to the second auxiliary request appeared to be novel over D1 and D2, and noted that, since an assessment with respect to inventive step had not yet been carried out, it was inclined to remit the case to the department of first instance for further prosecution (Article 111(1) EPC 1973), should the deficiencies in the second auxiliary request be rectified.

- V. With a letter dated 27 October 2009 the appellant withdrew the main request and the first auxiliary request, and filed an amended set of claims according to the second auxiliary request. The appellant submitted arguments in favour of this sole request and also announced that it did not intend to attend the oral proceedings set for 1 December 2009. It was further requested that the oral proceedings be cancelled and that the procedure be continued in writing.

- VI. The appellant was informed that the date for oral proceedings was maintained, with a facsimile communication dated 4 November 2009.

VII. Independent claim 1 according to the sole request reads as follows:

"1. In a multiple node network, a method characterized by:

receiving at at least one node (10), residual energies from neighboring nodes (14);

waking up the at least one node (10) from a sleep mode after sleeping a period of time, determined based on a residual energy of the at least one node (10) and the received residual energies for the neighboring nodes (14), and during one or more wake-up slots of a network time-slotted frame, the sleep mode being a low power consumption mode;

receiving data, at the at least one awakened node (10), from one or more neighboring nodes (14) that may have transmitted data during one or more of the wake-up slots of the awakened node (10);

determining, at the at least one awakened node (10), whether one or more neighboring nodes (14) each belonging to a respective sleeper class from a set of sleeper classes including at least two sleeper classes will awaken using the received residual energies and a wake-up determination process employed by the one or more neighboring nodes (14), each of the at least two sleeper classes including at least a first sleeper class and-[sic]a second sleeper class, the first sleeper class including nodes having a sleep period that is less than the sleep period of the second sleeper class; and

transmitting, from the at least one awakened node (10), in one or more wake-up slots of neighboring nodes (14), when there is data to be sent to one or more of the neighboring nodes, based on the determination of when

the neighboring nodes (14) wake up from their respective sleep modes."

VIII. The appellant requested in writing that the decision under appeal be set aside and that a patent be granted on the basis of claims 1 to 4 filed with letter dated 27 October 2009 (sole remaining request after withdrawal of the main and first auxiliary requests).

IX. Oral proceedings were held on 1 December 2009 in the absence of the appellant. After due deliberation on the basis of the written submissions and 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 decision J 0010/07, point 1 (see Facts and Submissions, point II above). Therefore the appeal is admissible.

2. Non-attendance of oral proceedings

In its letter of 27 October 2009 the appellant announced that it would not be represented at the oral proceedings and requested that the oral proceedings be cancelled and that the procedure be continued in writing. The board considered it to be expedient to maintain the set date for oral proceedings and informed the appellant that the date for oral proceedings was maintained, with a facsimile communication dated

4 November 2009. 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. In the annex to the summons for oral proceedings, the appellant was explicitly informed that if amendments to the appellant's case were filed it would be necessary at the oral proceedings to discuss their admissibility and their compliance with the EPC, including Articles 123(2), 84 and 52(1). In the light of Article 15(3) RPBA, the board might consider these issues and announce a decision based on new objections arising from such newly submitted amendments even if the appellant chose not to attend.

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

3. Article 84 EPC 1973

3.1 Independent claim 1

Claim 1 has been amended to specify that determining at the at least one awakened node, whether one or more neighboring nodes will awaken, is performed by "using the received residual energies and a wake-up determination process" instead of "using the received data and a wake-up determination process" as it was claimed in the previous version of the claim filed with

letter of 15 February 2008 (emphasis added by the board).

As far as the determination of the wake-up periods of neighboring nodes is concerned, the following is disclosed in paragraph [0010] of the published application:

"The awakening slots for each node in a sleep mode may be determined using a known process (e.g. any well-known hashing algorithm). Furthermore, using knowledge of the process employed by a neighboring node to determine its awakening slots, a node may also determine when that neighboring node awakens."

According to paragraph [0023] the sensor nodes transmit messages providing their awakening slots, addresses and/or positions during this interval, and receive the same information from their neighbours.

In paragraph [0024] of the published application the following is stated:

"Each sensor node 10 stores the addresses and positions of its neighbor sensor nodes 10, and determines the slots S during which the neighbor sensor nodes 10 awaken. Because a sensor node 10 knows when its neighbor sensor nodes 10 awaken during a frame and know [sic] the position of the neighbor sensor nodes 10, the sensor node 10 can perform a form of directional transmission."

Thus, the application provides a basis for determining at the at least one awakened node, whether one or more neighboring nodes will awaken, which is performed by using knowledge of the process employed by a

neighboring node to determine its awakening slots and the data received by the messages of the neighboring sensor nodes, i.e. their awakening slots, addresses and/or positions during this interval. The only example given for the process employed by a node to determine its awakening slots is a hashing algorithm.

However, the application does not disclose that the received residual energies are used by the awakened node 10 in order to determine whether or when neighboring nodes will awaken.

According to the first feature of claim 1, the received residual energies are received from neighboring nodes. According to the description of the present application, the residual energy of the awakened node 10 and the residual energies of the neighboring nodes may be used in order to determine the sleeper class of the awakened node and for adaptively changing the sleeper class (see paragraphs [0028] to [0031] of the published application). Each sleeper class has a predetermined sleep period associated therewith and predefined network operating characteristics associated therewith. The predefined network operating characteristics may include whether sensor nodes of a particular sleeper class can serve as relay nodes, (see column 5, line 58 to column 6, line 5). During operation the sensor node adaptively changes its sleeper class, (see column 6, lines 21 and 22). The adaptive change operation may be performed based on the residual energy of the sensor node and the neighboring sensor nodes (see column 6, lines 28 to 32). The application does not provide a basis for using the residual energy in a different

process, e.g. for determining whether one or more neighboring nodes will awaken.

This would not even be possible according to the embodiment disclosed in column 7, lines 3 to 14 of the published application, according to which an awakened sensor node 10 determines the average residual energy of the neighboring sensor nodes in order to determine its own sleeper class. Under these circumstances, the awakened sensor node 10 (even when using knowledge of the process employed by a neighboring node) would not be able to determine a neighboring node's sleeping class by just receiving the neighboring node's residual energy, because it would not be able to determine the neighboring node's average residual energy on which the neighboring node's sleeping class depends. It may be theoretically possible to determine whether a neighboring node will awaken based on its sleeping class and the corresponding sleeping periods although this option is not explicitly disclosed in the application. However, without knowing a neighboring node's sleeping class and the corresponding sleeping periods, the awakened sensor node 10 is not able to determine whether this neighboring node will awaken as specified in the method according to claim 1.

Therefore, the amendment to claim 1 is not supported by the description (Article 84 second sentence EPC 1973). Independent claim 1, hence, does not fulfil the requirements of Article 84 EPC 1973.

4. Article 123(2) EPC

For the same reasons as presented in section 3.1 above, the application does not provide a direct and unambiguous disclosure that the received residual energies are used by the awakened node 10 in order to determine when neighboring nodes will awaken.

Therefore, claim 1 also fails to comply with the requirements of Article 123(2) EPC.

Order

For these reasons it is decided that:

The appeal is dismissed.

The Registrar

The Chair

K. Götz

A. Ritzka