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**Datasheet for the decision
of 7 October 2016**

Case Number: T 1915/13 - 3.5.05

Application Number: 06817113.1

Publication Number: 1938529

IPC: H04L12/56

Language of the proceedings: EN

Title of invention:

Method and apparatus for flow control of data in a mesh network

Applicant:

QUALCOMM Incorporated

Headword:

Flow control/QUALCOMM

Relevant legal provisions:

EPC Art. 123(2)

RPBA Art. 15(3)

Keyword:

Oral proceedings - non-attendance of the appellant
Allowable amendments - (no)



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Case Number: T 1915/13 - 3.5.05

D E C I S I O N
of Technical Board of Appeal 3.5.05
of 7 October 2016

Appellant: QUALCOMM Incorporated
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Representative: Tomkins & Co
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Decision under appeal: **Decision of the Examining Division of the European Patent Office posted on 29 April 2013 refusing European patent application No. 06817113.1 pursuant to Article 97(2) EPC.**

Composition of the Board:

Chair A. Ritzka
Members: K. Bengi-Akyuerek
G. Weiss

Summary of Facts and Submissions

I. The appeal is against the decision of the examining division to refuse the present European patent application on the grounds of lack of clarity (Article 84 EPC) and/or lack of inventive step (Article 56 EPC) with respect to the claims of a main request and two auxiliary requests, having regard to the combined disclosures of

D1: WO-A-2004/036838 and

D2: Y. Li et al.: "Access Point Power Saving in Solar/Battery Powered IEEE 802.11 ESS Mesh Networks", Proceedings of Conference QShine'05, August 2005.

By way of an *obiter dictum* under the heading "Further points", the decision under appeal also cited the following document (as labelled by the board) in support of lack of inventive step as regards the dependent claims on file:

D4: D. Gao et al.: "Physical Rate Based Admission Control for HCCA in IEEE 802.11e WLANs", Proceedings of Conference AINA'05, March 2005.

II. With the statement setting out the grounds of appeal, the appellant filed amended sets of claims according to a main request and first to third auxiliary requests. It requested that the decision of the examining division be set aside and that a patent be granted on the basis of the main request or one of the auxiliary requests. In addition, oral proceedings were requested as an auxiliary measure.

- III. In a communication under Rule 100(2) EPC, the board gave its preliminary opinion on the appeal. In particular, it considered the objections raised in the decision under appeal under Article 84 EPC to be overcome by the amendments made. It also raised further objections under Articles 123(2) and 84 EPC, and made some remarks on the questions of novelty and inventive step in view of D1 and D4.
- IV. With a letter of reply, the appellant submitted amended sets of claims according to a new main request and new first to third auxiliary requests.
- V. In an annex to the summons to oral proceedings pursuant to Article 15(1) RPBA, the board indicated that it considered some of the objections raised under Article 123(2) and/or 84 EPC to have been overcome but maintained one objection under Article 123(2) EPC. Furthermore, it provided a more detailed assessment of novelty and inventive step having regard to D1.
- VI. With a letter of reply dated 7 September 2016, the appellant submitted amended claims according to a main request and first to third auxiliary requests, replacing the previous ones, alongside counter-arguments on the objections raised in the board's communication under Article 15(1) RPBA, and requested that a patent be granted on the basis of the main request or one of those auxiliary requests.
- VII. By letter dated 5 October 2016 (i.e. two days before the scheduled oral proceedings), the appellant informed the board that it would not be attending the oral proceedings before the board.

VIII. Oral proceedings were held on 7 October 2016 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 amended claims according to the main request or any of the first to third auxiliary requests filed with letter dated 7 September 2016.

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

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

"A method for controlling the flow of data within a mesh network that includes a plurality of mesh nodes, each of the plurality of mesh nodes functioning as a wireless repeater separated from a given mesh portal within the mesh network by a given number of hops to other mesh nodes, the given mesh portal coupled to one or more external networks characterised in that the method comprises:

receiving a requested flow rate of data from a transmitting mesh node at a receiving mesh node at least one hop away from the transmitting mesh node;

measuring, at the receiving mesh node, a channel characteristic of the channel through which the data is received;

determining, at the receiving mesh node, an achievable physical access layer transmission rate based at least in part on the channel characteristic; and

calculating, at the receiving mesh node, a desired transmission opportunity to achieve the requested flow

rate at the achievable physical access layer transmission rate."

Claim 1 of the **first auxiliary request** reads as follows (amendments to claim 1 of the main request indicated by the board):

"A method for controlling the flow of data within a mesh network that includes a plurality of mesh nodes, each of the plurality of mesh nodes functioning as a wireless repeater separated from a given mesh portal within the mesh network by a given number of hops to other mesh nodes, the given mesh portal coupled to one or more external networks characterised in that the method comprises:

receiving a requested flow rate of data from a transmitting mesh node at a receiving mesh node at least one hop away from the transmitting mesh node;

measuring, at the receiving mesh node, a signal to noise ratio of the channel through which the data is received;

determining, at the receiving mesh node, an achievable physical access layer transmission rate based at least in part on the signal to noise ratio; and

~~calculating, at the receiving mesh node,~~ a desired transmission opportunity duration to achieve the requested flow rate at the achievable physical access layer transmission rate;

comparing, at the receiving mesh node, the desired transmission opportunity and a measured transmission opportunity; and

increasing, at the receiving mesh node, the measured transmission opportunity to the desired transmission opportunity if it is determined that the measured opportunity is less than the desired

transmission opportunity."

Claim 1 of the **second auxiliary request** reads as follows (amendments to claim 1 of the first auxiliary request indicated by the board):

"A method for controlling the flow of data within a mesh network that includes a plurality of mesh nodes, each of the plurality of mesh nodes functioning as a wireless repeater separated from a given mesh portal within the mesh network by a given number of hops to other mesh nodes, the given mesh portal coupled to one or more external networks characterised in that the method comprises:

receiving a requested flow rate of data from a transmitting mesh node at a receiving mesh node at least one hop away from the transmitting mesh node;

measuring, at the receiving mesh node, a signal to noise ratio, R_{snr}, of the channel through which the data is received;

determining, at the receiving mesh node, an achievable physical access layer transmission rate based at least in part on the signal to noise ratio; and

calculating a desired transmission opportunity duration to achieve the requested flow rate at the achievable physical access layer transmission rate;

comparing, at the receiving mesh node, the desired transmission opportunity and a measured transmission opportunity; and

increasing, at the receiving mesh node, the measured transmission opportunity to the desired transmission opportunity if it is determined that the measured opportunity is less than the desired transmission opportunity; wherein the method further comprises the steps of:

determining if the transmission rate at the physical access layer, R_{phy} , is less than the achievable physical access layer transmission rate for the received signal to noise ratio, R_{snr} ; and
if it is determined that the transmission rate at the physical access layer, R_{phy} , is less than the achievable physical access layer transmission rate for the received signal to noise ratio, R_{snr} , increasing the transmission rate from R_{phy} to R_{snr} ."

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

"A method for controlling the flow of data within a mesh network (100) that includes a plurality of mesh nodes (108, 134), comprising:

receiving a transmit specification including a desired flow rate and a delay bound of a data flow at a first (108) of the plurality of mesh nodes from a second of the plurality of mesh nodes (134) the second node at least one hop away from the first (108) mesh node, to negotiate admission of the data flow through the first (108) and second (134) mesh nodes, wherein each of the plurality of mesh nodes functions as a wireless repeater that is separated from a given mesh portal within the mesh network by a given number of hops to other mesh nodes, the given mesh portal coupled to one or more external networks;

measuring at the first mesh node (108), a channel characteristic of a channel on which the data flow associated with the received transmit specification will be transmitted on by the second mesh node (134) to the first mesh node (108);

determining at the first mesh node (108), a desired physical access layer transmission rate based at least in part on the channel characteristic;

calculating at the first mesh node (108), a desired transmission opportunity duration to achieve the flow rate at the desired physical access layer transmission rate for the transmission of the data flow by the second mesh node (134) to the first mesh node (108);

comparing, at the receiving mesh node, the desired transmission opportunity and a measured transmission opportunity; and

increasing, at the receiving mesh node, the measured transmission opportunity to the desired transmission opportunity if it is determined that the measured opportunity is less than the desired transmission opportunity."

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 VII 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, the appellant filed amended sets of claims and provided comments in support of their patentability in response to the objections raised in the board's communication under Article 15(1) RPBA. The board considered the new claim requests and noticed that claim 1 of all those requests still gave rise to objections under Article 123(2) EPC (cf. points 2 to 4 below). So, in the 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. MAIN REQUEST

Claim 1 of the main request comprises the following features:

A method for

- A) controlling the flow of data within a mesh network that includes a plurality of mesh nodes, each of the plurality of mesh nodes functioning as a wireless repeater separated from a given mesh portal within the mesh network by a given number of hops to other mesh nodes, the given mesh portal coupled to one or more external networks, comprising the steps of:
 - B) receiving a requested flow rate of data from a transmitting mesh node at a receiving mesh node at least one hop away from the transmitting mesh node;
 - C) measuring, at the receiving mesh node, a channel characteristic of the channel through which the data is received;
 - D) determining, at the receiving mesh node, an achievable physical access layer transmission rate based at least in part on the channel characteristic;
 - E) calculating, at the receiving mesh node, a desired transmission opportunity to achieve the requested flow rate at the achievable physical access layer transmission rate.

2.1 Article 123(2) EPC

In the board's judgment, claim 1 of this request does

not comply with Article 123(2) EPC, for the reasons set out below.

- 2.1.1 Claim 1 evidently relies on the embodiment related to the flow control scheme as described in paragraphs [0034] to [0051] in conjunction with the flow diagram depicted in Figure 4 of the application as originally filed.
- 2.1.2 According to step 409 of this flow diagram, the mesh node receiving a requested flow rate, i.e. the "receiving mesh node", has to determine both the *desired* and the *measured* transmission opportunity durations (i.e. "TxOP_D" and "TxOP_M"; see also paragraph [0049], first sentence and Fig. 4, steps 415 and 416 of the application as filed).
- 2.1.3 However, feature E) requires that only the *desired* transmission opportunity duration is to be determined. The appellant provided paragraph [0052] of the original description as a basis for that feature (see appellant's letter of reply dated 7 September 2016, page 2, item 2), which in fact teaches that the receiving mesh node includes *inter alia* a "calculation module 508 capable of calculating a desired TxOP duration". According to the board, this passage in no way means that the claimed receiving mesh node need not determine also the corresponding *measured* transmission opportunity duration, as unequivocally taught in paragraph [0049] and Fig. 4, steps 415 and 416 of the original application. Consequently, the board holds that feature E) of present claim 1 amounts to an intermediate generalisation of the original teaching.

2.2 In conclusion, the main request is not allowable under Article 123(2) EPC.

3. FIRST AND SECOND AUXILIARY REQUESTS

3.1 Claim 1 of these auxiliary requests differs from claim 1 of the main request *inter alia* in that it no longer requires that the calculating step according to feature E) is to be executed by the "receiving mesh node" (cf. point IX above).

3.2 This is likewise not supported by the original application, according to which it is the "receiving mesh node" that is exclusively tasked with the claimed calculation step.

3.3 In conclusion, the first and second auxiliary requests are not allowable under Article 123(2) EPC either.

4. THIRD AUXILIARY REQUEST

4.1 Claim 1 of this auxiliary request differs from claim 1 of the main request *inter alia* in that it further specifies that the claimed method includes the steps of

F) comparing, at the receiving mesh node, the desired and a measured transmission opportunity [duration];

G) increasing, at the receiving mesh node, the measured transmission opportunity [duration] to the desired one if it is determined that the former is less than the latter.

4.2 The original application, however, manifestly teaches that steps G) and H) are to be executed only if the receiving mesh node *either* determines that the

transmission rate at the physical access layer, i.e. " R_{PHY} ", is less than the achievable physical access layer transmission rate for the received signal to noise ratio, i.e. " R_{SNR} ", or increases R_{PHY} to R_{SNR} (see Fig. 4, steps 412, 414, 415 and 416 together with paragraphs [0048] and [0049] of the application as filed).

- 4.3 Hence, the third auxiliary request is likewise not allowable under Article 123(2) EPC.
5. Given that all claim requests on file are - at least - not allowable under Article 123(2) EPC, the appeal must be dismissed.

Order

For these reasons it is decided that:

The appeal is dismissed.

The Registrar:

The Chair:



K. Götz-Wein

A. Ritzka

Decision electronically authenticated