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Datasheet for the decision of 30 January 2019

Case Number: T 1757/14 - 3.5.03

Application Number: 08021654.2

Publication Number: 2071896

IPC: H04W72/12

Language of the proceedings: EN

Title of invention:
Method of radio resource allocation and related communication apparatus

Patent Proprietor:
Innovative Sonic Limited

Opponent:
Telefonaktiebolaget L M Ericsson (publ)

Headword:
Radio resource allocation/INNOVATIVE SONIC

Relevant legal provisions:
EPC Art. 100(c), 54, 84

Keyword:

Added subject-matter - main request (yes)
Novelty - first to fourth auxiliary requests (no)
Clarity - fifth to tenth auxiliary requests (no)

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Case Number: T 1757/14 - 3.5.03

D E C I S I O N
of Technical Board of Appeal 3.5.03
of 30 January 2019

Appellant: (Patent Proprietor)	Innovative Sonic Limited 2nd Floor, The Axis 26 Cybercity Ebene 72201 (MU)
Representative:	Grünecker Patent- und Rechtsanwälte PartG mbB Leopoldstraße 4 80802 München (DE)
Respondent: (Opponent)	Telefonaktiebolaget L M Ericsson (publ) 164 83 Stockholm (SE)
Representative:	Hoffmann Eitle Patent- und Rechtsanwälte PartmbB Arabellastraße 30 81925 München (DE)
Decision under appeal:	**Decision of the Opposition Division of the European Patent Office posted on 6 June 2014 revoking European patent No. 2071896 pursuant to Article 101(3)(b) EPC.**

Composition of the Board:

Chairman	F. van der Voort
Members:	B. Noll
	O. Loizou
	T. Snell
	P. Guntz

Summary of Facts and Submissions

I. This appeal is against the decision of the opposition division revoking European patent No. 2 071 896. The reasons given in the decision were that claim 1 as granted and claim 1 of each of second to tenth auxiliary requests related to subject-matter which extended beyond the content of the application as filed (Articles 100(c) and 123(2) EPC) and that claim 1 of each of the first to tenth auxiliary requests did not comply with Article 123(3) EPC. Further, the opposition division gave, in an obiter dictum, an opinion on patentability and sufficiency of disclosure (Article 100(a) and (b) EPC).

II. In a communication accompanying a summons to oral proceedings, the board gave its preliminary view, *inter alia*, that claim 1 as granted related to subject-matter which extended beyond the content of the application as filed (Article 100(c) EPC) and that the subject-matter of claim 1 of each of the first to tenth auxiliary requests lacked novelty (Articles 52(1) and 54 EPC) having regard to the disclosure of document:

A1: "Text Proposal for UL Logical Channel Priorization" QUALCOMM Europe, R2-075039, 3GPP TSG-RAN WG2 #60, 5-9 November 2007, Jeju, Korea.

The board further noted that claim 1 of each of the fifth to tenth auxiliary requests did not comply with Article 84 EPC.

III. Oral proceedings were held on 30 January 2019.

The appellant (patent proprietor) requested that the decision under appeal be set aside and that the

opposition be rejected (main request) or, in the alternative, that the case be remitted to the department of first instance for further prosecution or that the patent be maintained in amended form on the basis of the set of claims of one of first to tenth auxiliary requests on file.

The respondent (opponent) requested that the appeal be dismissed.

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

IV. Claim 1 of the main request, i.e. claim 1 as granted, reads as follows:

"A method of radio resource allocation in a wireless communication system comprising:

allocating radio resource to a plurality of logical channels according to a grant (402);

decreasing a token bucket value of a first logical channel of the plurality of logical channels by the amount of allocated radio resource; and **characterized by**

allowing the plurality of logical channels to use the remaining grant, according to a decreasing priority order of the plurality of logical channels until either the data or the grant exhausted, when the grant remains and all token bucket values of the plurality of logical channels having data available for transmission are smaller or equal to zero (404).".

V. Claim 1 of the first auxiliary request differs from claim 1 of the main request in that the wording before "and characterized by" reads:

"A method of radio resource allocation in a wireless communication system comprising:

allocating radio resource to a plurality of logical channels according to a grant (402), including decreasing the grant and a token bucket value of each of the plurality of logical channels by the amount of allocated radio resource allocated to the respective logical channel of the plurality of logical channels".

VI. Claim 1 of the second auxiliary request differs from claim 1 of the first auxiliary request in that in the preamble the wording "the grant and" after "decreasing" has been deleted.

VII. Claim 1 of the third auxiliary request differs from claim 1 of the first auxiliary request in that the wording before "and characterized by" reads:

"A method of radio resource allocation in a wireless communication system comprising:

allocating radio resource to a plurality of logical channels according to a grant (402), wherein token bucket values are used for indicating the allowed resource amount of the plurality of logical channels, including:

calculating each of the token bucket values according to a formula using bucket size, the token bucket value, and token rate, wherein the bucket size is used for indicating the largest allowed resource amount of each

logical channel, and wherein the token rate is used for indicating the number of bytes added to the token bucket value of the logical channel at every Transmission Time Interval, TTI,

allocating resource amount to each of the logical channels according to a formula using the grant, the token bucket value, and data amount, and
decreasing a token bucket value of each of the plurality of logical channels by the amount of allocated radio resource allocated to the respective logical channel of the plurality of logical channels".

VIII. Claim 1 of the fourth auxiliary request differs from claim 1 of the third auxiliary request in that in the preamble the phrases

"according to a formula using bucket size, the token bucket value, and token rate" and

"according to a formula using the grant, the token bucket value, and data amount"

have respectively been replaced by:

"according to a formula: Min (bucket size, the token bucket value + token rate)" and

"according to a formula: Min (the grant, the token bucket value, and data amount)".

IX. Claim 1 of each of the fifth to tenth auxiliary requests includes, *inter alia*, the additional feature "wherein each of said plurality of logical channels corresponds to a Guarantee Bit Rate, GBR, bearer".

Reasons for the Decision

1. *The patent in suit*

The patent in suit relates to the allocation of radio resource to uplink logical channels for transmitting data from a mobile communication device (in the patent referred to as "user equipment" UE) to a base station ("eNB"). The individual allocation of radio resource to logical channels must be carefully managed in order to maximize the use of the total radio resource available to the UE (referred to as the "grant"), whilst balancing the temporary demands by the different logical channels such that each channel can satisfactorily be served.

The patent in suit makes use of a so-called "PBR (Prioritized Bit Rate) token bucket framework", which is known in the prior art as a means for calculating the allowed amount of radio resource for each logical channel in a decreasing priority (see, for example, paragraph [0013] of the patent specification). In the patent in suit, a two-step procedure for allocating radio resource is proposed as shown in the flowchart diagram of Fig. 4:

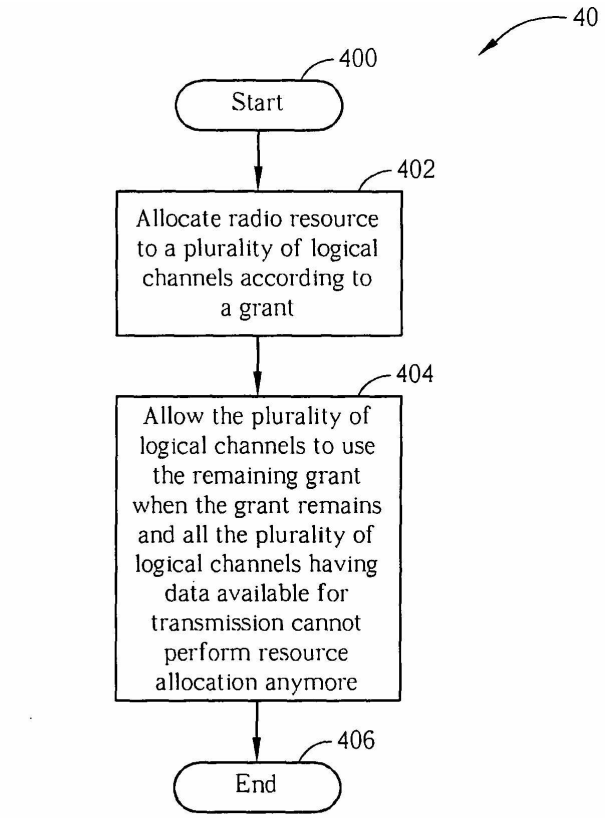

FIG. 4

2. *Claim 1 as granted - Article 100(c) EPC*

2.1 Claim 1 as granted seeks protection for a method of allocating radio resource based on the token bucket model in which the radio resource which may be allocated to a channel is limited by the available grant, which is the overall bandwidth allocated by the system to the terminal, and the token bucket value of the channel. The first limitation is defined in claim 1 by the feature that radio resource is allocated to a plurality of logical channels according to a grant. The second limitation is implied in claim 1 by the feature "... when the grant remains and all token bucket values of the plurality of logical channels having data available for transmission are smaller or equal to

zero", which implies that those channels still having data available for transmission after a bucket-based allocation resulting in a token bucket value smaller or equal to zero can no longer be served by means of the bucket-based resource allocation. If there is still bandwidth available, these channels are allowed to use the remaining grant, i.e. the bandwidth which was not and could not yet be allocated. These limitations substantially correspond to the procedure shown in Fig. 4.

2.2 The further feature in the preamble of claim 1, i.e. the step of decreasing a token bucket value of a first logical channel by the amount of allocated radio resource is defined independently of the above-mentioned steps of allocating radio resource to logical channels and of allowing the channels to use the grant remaining after the resource allocation. Hence, this further step merely defines on its own that the token bucket value of a single "first logical channel" is, e.g. unconditionally, decreased by an amount of - unspecific - allocated radio resource.

2.3 From the application documents as originally filed, a basis for independently decreasing a token bucket value cannot be directly and unambiguously derived, as a decrease in a token bucket value is consistently linked to allocating an amount of radio resource to the corresponding logical channel.

2.4 The appellant argued that paragraph [0027], step 4 (reference being made to the A-publication) and claim 3 as filed provided a basis for this further step.

2.5 The board does not agree. Claim 3 as filed defines the decrease in the token bucket value only in conjunction

with an allocation of radio resource to the first channel ("*after the resource amount allocated to the first logical channel, the token bucket value is decreased by the resource amount allocated to the first logical channel*"). Similarly, step 4 in paragraph 27 describes the decrease in the token bucket value as inherently linked to a corresponding decrease in the grant. These passages cannot therefore serve as a basis for an unconditional decrease in the token bucket value as defined in claim 1.

2.6 The ground for opposition pursuant to Article 100(c) EPC therefore prejudices the maintenance of the patent as granted.

3. *Claim 1 of the first auxiliary request - Article 54 EPC*

3.1 The method of claim 1 of the first auxiliary request lacks novelty (Article 54 EPC) having regard to A1 for the following reasons.

3.2 A1 is a written contribution for the standardization meeting of the 3GPP Technical Specification Group Radio Access Networks Working Group 2 (TSG RAN WG2) held in Jeju, Korea, on 5 to 9 November, 2007, and relates to the prioritization of logical channels in the context of UL resource allocation. It describes (see page 4) the following prioritization procedure formulated in terms of quasi-program instructions:

At every TTI boundary for which a new transmission is requested by the HARQ entity (see subclause 5.4.2.1), the UE shall perform the operations described below:

- [other operations that need to be performed by the UE before the token bucket operations are FFS]
- for each logical channel ordered in a decreasing priority order, perform the following:
  - PBR_Token_Bucket = MIN(PBR_BUCKET_SIZE, PBR_TOKEN_BUCKET + PBR_TOKEN_RATE),
  - serve this logical channel up to MIN(UL_Grant, PBR_Token_Bucket, amount of data buffered for transmission, PBR_MAX_OUTPUT_RATE) bytes,
  - decrement UL_Grant by the served amount of bytes.
- If UL_Grant is greater than zero, for each logical channel ordered in a decreasing priority order, perform the following:
  - if a MBR token bucket has been configured for this logical channel
    - MBR_Token_Bucket = MIN(MBR_BUCKET_SIZE, MBR_TOKEN_BUCKET + MBR_TOKEN_RATE),
    - serve this logical channel up to MIN(UL_Grant, MBR_Token_Bucket, amount of data buffered for transmission, MBR_MAX_OUTPUT_RATE) bytes;
  - else
    - serve the logical channel up to MIN(UL_Grant, amount of data buffered for transmission) bytes;
  - decrement UL_Grant by the served amount of bytes.
- [If UL_Grant is greater than zero, further operations are FFS]

The step "- for each logical channel ..." in line 4, together with the three subsequent sub-steps in lines 5 to 8 define a step of allocating radio resource to a plurality of logical channels within the meaning of claim 1. This allocation step includes a step of decreasing the grant (line 8) in conjunction with a serve step in lines 6 and 7, in which the token bucket value of the respective logical channel is decreased by the amount of radio resource allocated to that channel; this decrease is also explicitly mentioned as a rule in paragraph 2.3 of A1 ("At each TTI when this service performs an UL transmission of X bytes, the bucket is decremented by X").

Lines 9 and 10 of the above instructions ("- If UL_Grant is greater than zero ...") together with the sub-steps in lines 11 to 18 define a step of allowing the plurality of logical channels to use the remaining grant when the plurality of logical channels have data

available (e.g. line 17 "- serve the logical channel up to MIN(..., amount of data buffered for transmission) bytes". Hence, the serve step in line 17 is carried out only if the respective logical channel has data available for transmission.

3.3 The appellant argued that the claimed method differs from the method disclosed in A1 by the feature in the last paragraph of claim 1, according to which the allowing step is only carried out if two conditions are met, i.e. a grant remains and all token bucket values of the plurality of logical channels having data available for transmission are smaller or equal to zero.

The board however understands this feature ("when ...") as defining the circumstances under which the allowing step is carried out. These circumstances are that the UE still has data available to be transmitted by a number of logical channels, even after the channels were served by the bucket-based allocation of radio resource. This may occur when the data for transmission by one or more logical channels exceeds the respective token bucket value. In A1, these circumstances are equally considered in the allocation procedure, see line 9 ff in the above-cited instructions in point 3.2, which become relevant only when at the beginning of the allocation procedure the amount of data to be transmitted by each of the logical channels is higher than their respective PBR_Token_Bucket values and, therefore, data remains available to be transmitted after the bucket-based allocation has been completed. As noted above, in A1, after the bucket-based allocation, i.e. the steps in lines 4 to 8 for all logical channels, all values "PBR_Token_Bucket" will be zero.

3.4 The ground for opposition pursuant to Article 100(a) EPC therefore prejudices the maintenance of the patent in amended form on the basis of the first auxiliary request.

4. *Second to fourth auxiliary requests* - Article 54 EPC

4.1 The reasons set out in point 3 equally apply to claim 1 of the second auxiliary request, it being noted that this claim (see point VI above) is broader than claim 1 of the first auxiliary request.

4.2 As regards claim 1 of each of the third and fourth auxiliary requests (see points VII and VIII above), the board notes that the claim includes additional features which define a calculation of token bucket values and resource amount to be allocated. These features are known from A1, see point 3.2 above, see the cited instructions, line 5, the step defining the "PBR_Token_Bucket" and the serve step in the subsequent line. Therefore, the subject-matter of claim 1 of each of the third and fourth auxiliary requests lacks novelty. The appellant did not argue otherwise.

4.3 The ground for opposition pursuant to Article 100(a) EPC therefore prejudices the maintenance of the patent in amended form on the basis of one of the second to fourth auxiliary requests.

5. *Fifth to tenth auxiliary requests* - Article 84 EPC

5.1 The additional feature in claim 1 of each of the fifth to tenth auxiliary requests (see point IX above), i.e. "wherein each of the plurality of logical channels

corresponds to a Guarantee Bit Rate, GBR, bearer" violates Article 84 EPC for the reasons set out below.

5.2 In the context of claim 1 of each of these auxiliary requests, the term "GBR bearer" and the wording "each ... corresponds to ..." do not clearly define what technical features are implied with respect to the steps of the claimed allocation method.

5.3 The appellant argued that a GBR bearer was commonly known in the art. In the present case, the feature of a logical channel corresponding to a GBR bearer implied that to each logical channel both a PBR (prioritized bit rate) token bucket and an MBR (maximum bit rate) token bucket were assigned. The method therefore required that the allocation of radio resource was governed both by PBR and MBR token bucket values and that a remaining grant would be allocated if all PBR and MBR token values were less than or equal to zero.

5.4 In the board's judgement, this interpretation is speculative and cannot be derived from the wording of the feature in question alone. In this respect, it is noted, for the sake of argument, that in paragraph [0011] of the patent specification voice over IP (VoIP) is mentioned as an exemplary service for transmission by a GBR bearer. However, in A1, section "2.4. Example for VoIP", as regards VoIP it is mentioned that "[i]n a single mode VoIP service, it is expected that a PBR only may be required". The appellant's argument that a logic channel corresponding to a GBR bearer necessarily implies that an MBR token bucket is present for this channel is thus not convincing.

5.5 The board concludes that claim 1 of each of the fifth to tenth auxiliary requests lacks clarity (Article 84

EPC). These requests are therefore not allowable either.

6. As there is no allowable request on the basis of which the patent can be maintained, the appeal is to be dismissed.

Order

For these reasons it is decided that:

The appeal is dismissed.

The Registrar: The Chairman:

G. Rauh F. van der Voort

Decision electronically authenticated