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AO, AT, AU, AZ, BA, BB, BG, BH, BR, BW, BY, BZ, CA, CH, CN, CO, CR, CU, CZ, DE, DK, DM, DO, DZ, EC, EE, EG, ES, FI, GB, GD, GE, GH, GM, GT, HN, HR, HU, ID, IL, IN, IS, JP, KE, KG, KM, KN, KP, KR, KZ, LA, LC, LK, LR, LS, LT, LU, LY, MA, MD, ME, MG, MK, MN, MW, MX, MY, MZ, NA, NG, NI, NO, NZ, OM, PG, PH, PL, PT, RO, RS, RU, SC, SD, SE, SG, SK, SL, SM, ST, SV, SY, TJ, TM, TN, TR, TT, TZ, UA, UG, US, UZ, VC, VN, ZA, ZM, ZW.

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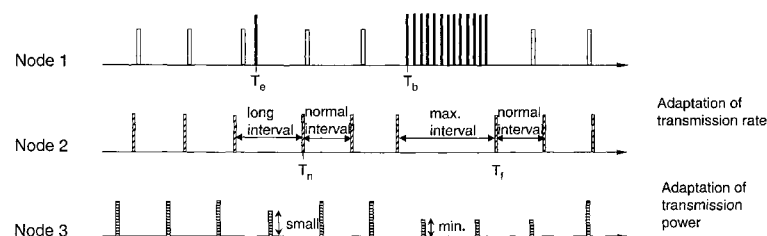


Fig. 2

(57) Abstract: A method for controlling the load of a wireless channel in a network, in particular in a WLAN-based vehicular ad hoc network (VANET), said network including a multitude of mobile nodes, wherein said mobile nodes send out periodic messages - ordinary messages - for exchanging information among each other and/or for communication with infrastructure elements of said network, and wherein said mobile nodes send out specific messages - extraordinary messages -, which have a higher priority than said ordinary messages and which are, in particular, related to an event, is characterized in that said mobile nodes, upon identification of a received message as an extraordinary message, start to take action that is intended to reduce their resource usage. Furthermore, a network with wireless channel load control functionality is described.

METHOD FOR CONTROLLING THE LOAD OF A WIRELESS CHANNEL IN A NETWORK AND NETWORK WITH WIRELESS CHANNEL LOAD CONTROL FUNCTIONALITY

The present invention relates to a method for controlling the load of a wireless channel in a network, in particular in a WLAN-based vehicular ad hoc network (VANET), said network including a multitude of mobile nodes, wherein said mobile nodes send out periodic messages – ordinary messages – for exchanging information among each other and/or for communication with infrastructure elements of said network, and wherein said mobile nodes send out specific messages – extraordinary messages –, which have a higher priority than said ordinary messages and which are, in particular, related to an event.

Furthermore, the invention relates to a network with wireless channel load control functionality, in particular WLAN-based vehicular ad hoc network (VANET), including a multitude of mobile nodes, wherein said mobile nodes are configured to send out periodic messages – ordinary messages – for exchanging information among each other and/or for communication with network infrastructure elements, and wherein said mobile nodes are configured to send out specific messages – extraordinary messages –, which have a higher priority than said ordinary messages and which are, in particular, related to an event.

Controlling the load of a wireless channel in a network is a crucial task, especially in vehicular communication networks, like VANETs (Vehicular Ad Hoc Networks), as congestion may occur due to different reasons which may severely impair the functionality of such networks. VANETs are highly dynamic networks in which motor vehicles equipped with appropriate communication devices, in general called on-board units, act as communication nodes. The functionality of such wireless networks is typically directed to safety, traffic efficiency, travelling comfort and on-board entertainment applications. Congestion of the wireless channel may impair this functionality, what can lead to serious consequences, especially with respect to traffic safety applications.

In WLAN-based VANETs, each mobile node sends out periodic messages to communicate its status to all neighbouring nodes within a certain area. In the following, this kind of messages will be referred to as "ordinary messages". Ordinary messages are typically sent out at a certain frequency with a typical value of about 2 Hz and at a certain transmission power corresponding to a certain transmission range/area in which the messages can be received by other network nodes. In certain cases, ordinary messages may also be forwarded by other nodes so that their coverage area and reliability can be increased.

In addition, mobile nodes are assumed to send out specific messages, which have a higher priority than ordinary messages and which are, in particular, related to an event. Accordingly, in the following this kind of messages will be designated as "extraordinary messages". Due to their high priority, extraordinary messages typically have very stringent requirements on delay and reliability. Extraordinary messages may also be forwarded by other nodes so that their coverage area and reliability can be increased.

The load of the wireless communication channel may be very high even under normal circumstances without any extraordinary messages being present. Typically, this holds true in areas with a high density of mobile nodes sending a large amount of periodic messages. If extraordinary messages are to be sent in such congested channel, this will lead to on the one hand, long latency at a transmitting side because extraordinary messages will have to contend for the wireless channel with other (ordinary) messages, and on the other hand, to a low reception probability at a receiving side due to interference caused by the transmission of other messages. Consequently, the stringent requirements of extraordinary messages with respect to latency and reliability may not be met any more.

Generally two types of approaches of how to manage this congestion problem may be adopted. The first is to reserve resources for extraordinary messages. However, if there are reserved too many resources, the transmission of ordinary messages will be affected unnecessarily. On the other hand, reservation of an amount of resources for extraordinary messages, which is too small, will insuffi-

ciently solve the congestion problem and will limit the capacity of sending extraordinary messages.

A second approach is to apply congestion control mechanisms in response to network load. The most widely used congestion control algorithm in conventional data networks is Transmission Control Protocol (TCP). Congestion control in TCP is based on the estimated round-trip time (RTT) between a sender and the receiver of a message. There are a large number of congestion control algorithms proposed, which are either variants of TCP or extensions to TCP. However, TCP or TCP-like congestion control is based on an end-to-end approach. In particular in ad hoc networks, like for instance VANETS, which are typically highly dynamic, such an end-to-end approach is not suitable.

Furthermore, the available congestion control algorithms react relatively slow, as they take action to reduce resource usage by relying on feedback from the network, for example in the forms of round-trip time, channel load, etc. To get such feedback typically requires certain time as, for example, the round-trip time has to be evaluated and/or the channel load has to be measured. Moreover, the measured values are typically averaged over a time period, e.g. by means of exponential moving average algorithm, in order to obtain a relatively stable value. Thus, a burst of packets leading to temporary increase in the channel load will be averaged out at the beginning. Such congestion control algorithm is too slow in response to unexpected extraordinary messages burst, as mobile nodes may take action only after the burst of extraordinary messages. If the network feedback is not averaged over time, any temporary increase in network load may lead to resource usage reduction at nodes performing congestion control algorithms, which will further lead to resource usage increase at other nodes, thus making the network unstable.

It is therefore an object of the present invention to improve and further develop a method for controlling the load of a wireless channel in a network and a network with wireless channel load control functionality of the initially described type in such a way that a low latency and high reliability with respect to the reception of extraordinary messages is ensured.

In accordance with the invention, the aforementioned object is accomplished by a method comprising the features of claim 1. According to this claim, such a method is characterized in that the mobile nodes, upon identification of a received message as an extraordinary message, start to take action that is intended to reduce their resource usage.

Furthermore, the aforementioned object is accomplished by a network with wireless channel load control functionality comprising the features of independent claim 15. According to this claim, such a network is characterized in that the mobile nodes are further configured, upon identification of a received message as an extraordinary message, to start to take action that is intended to reduce their resource usage.

According to the invention it has first been recognized that in the context of controlling the load of a wireless channel in a network existing congestion control algorithms are relatively slow in reaction and thus not suitable for burst extraordinary messages. Furthermore, it has been recognized that in particular in VANETs a distributed rather than an end-to-end approach is more suitable. As only those nodes that receive an extraordinary message will take action, the reaction is basically confined to the area around the originator node of the extraordinary message and the nodes that forward the extraordinary message. In case the extraordinary message is event-related, the confinement relates to an area around the place where the event took place.

In contrast to an end-to-end approach, the present invention rather pursues a distributed approach, which is faster in reaction, thus providing a low latency. More specifically, each mobile node, when it receives a message and identifies the received message as an extraordinary message, starts to take action that is intended to reduce the resource usage of the mobile node. Hence, a solution is described which realizes a direct and instantaneous reaction to a presence of extraordinary messages. Consequently, a method and a network according to the present invention allow for the optimization of the wireless channel load manage-

ment in that, with respect to the reception of high priority extraordinary messages, latency is reduced and reliability is enhanced.

In a specific embodiment the extraordinary messages, sent out by the mobile nodes, are emergency messages. Particularly in case of emergency it is essential that warning messages are received with smallest possible latency and with highest possible reliability. Emergency messages are for instance related to emergency braking, a sharp turn, a road accident, etc.

According to a preferred embodiment the mobile nodes have a normal operation state, at which they send out said ordinary messages with a certain size, with a certain frequency and with certain transmit power. It is also possible that frequency, size and transmission power of ordinary messages may vary as a result of the communication environment and other congestion algorithms being applied. However, this is typically a relatively slow process.

Advantageously, the mobile nodes, upon identification of a received message as an extraordinary message, switch from their normal operation state to a load decreasing operation state, at which their resource usage is reduced compared to said normal operation state. Thus, following extraordinary messages take precedence over ordinary messages and a reliable and fast reception and/or dissemination of extraordinary messages is ensured.

In a preferred embodiment mobile nodes monitor the wireless channel load and switch to the load decreasing operation state only if the measured wireless channel load is above a predefined threshold. This avoids unnecessary actions upon receiving an extraordinary message as well as unnecessary impairment of ordinary messages in case the channel load is very low, so that congestion is to be precluded even when extraordinary messages are present.

In the load decreasing operation state, resource reduction may be accomplished, for instance, by reducing the transmission power with which ordinary messages are sent out. Further, mobile nodes may transmit ordinary messages with a lower frequency as soon as extraordinary messages are received. They also may re-

duce the packet size, e.g. by dropping information from their ordinary messages which is dispensable and which is not required necessarily for ensuring full network functionality. Resource usage reduction also applies to those nodes that forward ordinary messages originated by other nodes, in that the forwarding nodes should reduce resource usage by forwarding ordinary messages. Resource usage reduction may also be applied by completely stopping forwarding of ordinary messages. A combination of two or more different reactions is also possible.

With respect to a steady reception of extraordinary messages, the mobile nodes, as long as extraordinary messages are received, may keep on reducing their resource usage with respect to ordinary messages until predefined thresholds are reached. The thresholds may be predefined by taking into consideration different aspects, for instance depending on types of messages and/or application requirements. In case a mobile node reduces its transmission power, a minimum threshold may be defined. As the transmission power corresponds to a certain transmission range, the minimum threshold may be specified depending on the average distance between the communicating mobile nodes, i.e. indirectly to the actual population density of nodes within the network. The higher the density, the lower may be the minimum transmission power threshold, and vice versa. Other thresholds may be specified in a similar way for a mobile node's transmission frequency and for the packet size of ordinary messages.

Once no more extraordinary messages are present or received, the risk of congestion is decreased and it may be provided that the mobile nodes return to their normal operation state.

Advantageously, it may be provided that mobile nodes analyse received messages in order to evaluate whether the message is an extraordinary message or not. To this end, it may be provided that extraordinary messages include a dedicated field, which is set and which can be analysed by the receiving nodes.

In a particularly preferred embodiment the mobile nodes identify received messages as extraordinary messages by analysing the time structure of received messages. Extraordinary messages may be sent out with a time structure in-

cluding an initial extraordinary message and, with a time-lag, a subsequent bulk of extraordinary messages. In particular as what regards emergency messages in VANETS, it is possible to make use of the fact, that these messages are typically refreshed many times from a source, e.g. at a frequency of 10 Hz and may also be retransmitted many times either by the source itself or by its neighbouring nodes in order to increase the reception probability and to increase the dissemination area.

As regards a best possible load control, mobile nodes may additionally apply other congestion control mechanisms. Even though these congestion control mechanisms typically require a relatively long period of time to react to congestion, in combination with the proposed solution an overall performance improvement may be achieved.

With respect to an across-the-network load control it may be provided that a mobile node, while reducing its resource usage upon receiving extraordinary messages, signals the reception of extraordinary messages to other mobile nodes in its ordinary periodic messages. Thus, neighbouring mobile nodes are warned immediately and can prepare themselves for a possible bulk of extraordinary messages by switching to the decreasing operation state. Furthermore, it is possible that some nodes do not receive any extraordinary message but monitor a lower channel load as a result of resource reduction at those nodes which receive extraordinary messages. If these nodes also run other congestion control algorithms, they may increase their resource usage if they monitor that channel load becomes lower. By signalling the reception of extraordinary messages to other mobile nodes as stated above, it can be prevented that neighboured nodes increase their resource usage as a result of the reduced resource usage of those nodes which receive extraordinary messages.

There are several ways how to design and further develop the teaching of the present invention in an advantageous way. To this end, it is to be referred to the patent claims subordinate to patent claims 1 and 15 on the one hand and to the following explanation of a preferred example of an embodiment of the invention, illustrated by the drawing on the other hand. In connection with the explanation of the preferred example of an embodiment of the invention by the aid of the drawing,

generally preferred embodiments and further developments of the teaching will be explained. In the drawings:

- Fig. 1 illustrates two mobile nodes sending out ordinary messages at a normal operation state and
- Fig. 2 illustrates mobile nodes sending out messages at a load decreasing operation state after receiving extraordinary messages according to an embodiment of the invention.

Fig. 1 illustrates exemplarily two mobile nodes, node 1 and node 2, which are part of a network that includes a multitude of mobile nodes. In case of a VANET, vehicles equipped with a so called on-board unit would function as mobile nodes. Fig.1 is related to a scenario in which the mobile nodes send out ordinary periodic messages at a normal operation state. By means of these ordinary messages, which are indicated in Fig. 1 by white bars (for node 1) and by striped bars (for node 2), the mobile nodes periodically exchange information among each other and/or communicate with infrastructure elements of the network.

The term “normal operation state” refers to a state, at which the mobile nodes send their ordinary messages at a certain size (indicated by the width of the bars), at a certain frequency (indicated by the distance between two subsequent bars) and at a certain transmit power (indicated by the height of the bars). For instance, as can be obtained from Fig. 1, node 2 sends out its ordinary messages with a higher frequency and with a higher transmission power than node 1. It is to be noted that the mobile node's operation states may be predefined and kept constant, i.e. frequency, size and transmission power of ordinary messages do not change, independent of the load of the wireless channel employed for communication. It is also possible that frequency, size and transmission power of ordinary messages may vary as a result of the communication environment and other congestion algorithms being applied, typically being a relatively slow process.

Fig. 2 illustrates an embodiment of the present invention according to which mobile nodes reduce their resource usage after receiving extraordinary messages. As in Fig. 1, Fig. 2 again illustrates only exemplarily very few mobile nodes – node 1, node 2 and node 3 – which are representative for a multitude of mobile nodes included in the respective network.

As shown in Fig. 2, first all three nodes are sending out ordinary messages periodically at a normal operation state. For node 1, the ordinary messages are indicated by white bars, for node 2 by sloped stripe bars, and for node 3 by horizontally striped bars. As discussed in connection with Fig. 1, the normal operation state may differ from node to node, i.e. send out of ordinary messages may vary, for instance, in transmission power, in transmission frequency and/or in packet size.

At a certain point in time, referred to as T_e , node 1 additionally starts to send out an extraordinary message, which is indicated by a black bar. In the specific example discussed, the extraordinary message is intended to warn other mobile nodes of a road accident which has been discovered by node 1. The neighbouring mobile nodes 2, 3, which are assumed to be within the transmission range of node 1, will receive and identify the extraordinary message as such. To further distribute the information regarding the road accident within the network, extraordinary messages may also be retransmitted by the neighbouring nodes (which is not shown in Fig. 2).

Upon reception of the extraordinary message, nodes 2 and 3 switch to a load decreasing operation state, at which their resource usage is reduced compared to their normal operation state. The switch is performed in order to reduce the channel load to avoid congestion and to assure that possibly following high priority extraordinary messages are received with low latency and with high reliability. As shown in Fig. 2, node 2 reduces the transmission frequency, e.g. increases the interval between two consecutive messages. As a result, it will schedule the next periodic message at a time later than the originally planned time. Node 3 keeps its transmission frequency constant, but reduces the transmission power (which is indicated by the reduced height of the bars). Alternatively, however not shown in

Fig. 2, the packet size of the ordinary messages can be reduced, e.g. by including only most relevant information into the messages.

After having received the extraordinary message, nodes 2 and 3 wait a predefined time period and, in case no more extraordinary messages are present/received, they return to their normal operation states. In the example illustrates in Fig. 2, this is the case at a time T_n . From then on, node 2 returns to sending out ordinary messages at its normal transmission frequency, and node 3 returns to sending out ordinary messages at its normal transmission power.

At a time T_b node 1 again starts to send out extraordinary messages, this time a bulk of extraordinary messages. The extraordinary messages of the bulk are again related to the road accident mentioned above, which has been discovered by node 1, and are intended to warn other nodes of the VANET, among them node 2 and 3, of that accident. The time structure of the extraordinary messages – an initial message followed, with a short time-lag, by a bulk of messages – is typical for emergency messages generated by individual mobile nodes in a VANET. Extraordinary messages may also be retransmitted by the neighbouring nodes (which is not shown in Fig. 2).

Upon reception of the first extraordinary message of the bulk, node 2 and 3 switch to the decreasing operation state again. This time, however, due to the continuing reception of extraordinary messages, mobile nodes 2 and 3 keep on reducing their resource usage more and more up to a minimum threshold. The threshold may be defined depending on physical restrictions.

As shown in Fig. 2, node 2 reduces its transmission frequency until a minimum threshold is reached, i.e. node 2 increases the interval between two consecutive messages to a maximum. More specifically, if more emergency messages are received before the sending of the next scheduled periodic message, the message will again be rescheduled at a later time, until the maximum interval between two consecutive messages is reached. Alternatively, upon receiving an emergency message, a node may take only one step to increase the interval between two consecutive messages to the maximum interval.

Node 3 keeps its transmission frequency constant, but reduces the transmission power down to a minimum threshold. This threshold may be defined by the fact that the transmission power is directly related to the transmission range and that it must be guaranteed that – assuming an average distance between the nodes – at least the closest neighbours of node 3 are positioned within the transmission range of node 3. Otherwise the ordinary messages sent out by node 3 would not be received by any node and would thus be meaningless.

Once the bulk of extraordinary messages has been transmitted completely and no more extraordinary messages are present or received – which is the case at a time T_i – mobile nodes 2 and 3 return to their normal operation state – as illustrated and described before – continuing with a so far unaffected transmission.

Many modifications and other embodiments of the invention set forth herein will come to mind the one skilled in the art to which the invention pertains having the benefit of the teachings presented in the foregoing description and the associated drawings. Therefore, it is to be understood that the invention is not to be limited to the specific embodiments disclosed and that modifications and other embodiments are intended to be included within the scope of the appended claims. Although specific terms are employed herein, they are used in a generic and descriptive sense only and not for purposes of limitation.

Claims

1. Method for controlling the load of a wireless channel in a network, in particular in a WLAN-based vehicular ad hoc network (VANET), said network including a multitude of mobile nodes, wherein said mobile nodes send out periodic messages – ordinary messages – for exchanging information among each other and/or for communication with infrastructure elements of said network, and wherein said mobile nodes send out specific messages – extraordinary messages –, which have a higher priority than said ordinary messages and which are, in particular, related to an event,
c h a r a c t e r i z e d i n that said mobile nodes, upon identification of a received message as an extraordinary message, start to take action that is intended to reduce their resource usage.
2. Method according to claim 1, wherein said extraordinary messages are emergency messages.
3. Method according to claim 2, wherein said emergency messages are high priority messages related to emergency braking, a sharp turn, a road accident, etc.
4. Method according to any of claims 1 to 3, wherein said mobile nodes have a normal operation state, at which they send out said ordinary messages with a certain size, with a certain frequency and with certain transmit power.
5. Method according to claim 4, wherein said mobile nodes, upon identification of a received message as an extraordinary message, switch to a load decreasing operation state, at which their resource usage is reduced compared to said normal operation state.
6. Method according to claim 5, wherein said mobile nodes monitor the wireless channel load and switch to said load decreasing operation state, at which their resource usage is reduced compared to said normal operation state, only if the measured wireless channel load is above a predefined threshold.

7. Method according to claim 5 or 6, wherein said mobile nodes in said load decreasing operation state send out their ordinary messages with reduced transmit power, reduced transmission frequency and/or reduced packet size.
8. Method according to claim any of claims 1 to 7, wherein said mobile nodes, as long as extraordinary messages are received, keep on reducing their resource usage until a predefined minimum threshold is reached.
9. Method according to any of claims 4 to 8, wherein said mobile nodes return to their normal operation state once no more extraordinary messages are received within a certain period of time.
10. Method according to any of claims 1 to 9, wherein said mobile nodes identify received messages as extraordinary messages by analysing a predefined field of the received message, which is set in said extraordinary messages.
11. Method according to any of claims 1 to 10, wherein said mobile nodes identify received messages as extraordinary messages by analysing the time structure of received messages.
12. Method according to any of claims 1 to 11, wherein said extraordinary messages are sent out with a time structure including an initial extraordinary message and, with a time-lag, a subsequent bulk of extraordinary messages.
13. Method according to any of claims 1 to 12, wherein said mobile nodes additionally apply other congestion control mechanisms.
14. Method according to any of claims 1 to 13, wherein a mobile node, while reducing its resource usage upon receiving extraordinary messages, signals the reception of extraordinary messages to other mobile nodes in its ordinary periodic messages.
15. Network with wireless channel load control functionality, in particular WLAN-based vehicular ad hoc network (VANET), including a multitude of mobile nodes,

wherein said mobile nodes are configured to send out periodic messages – ordinary messages – for exchanging information among each other and/or for communication with network infrastructure elements, and wherein said mobile nodes are configured to send out specific messages – extraordinary messages –, which have a higher priority than said ordinary messages and which are, in particular, related to an event,

c h a r a c t e r i z e d i n that said mobile nodes are further configured, upon identification of a received message as an extraordinary message, to start to take action that is intended to reduce their resource usage.

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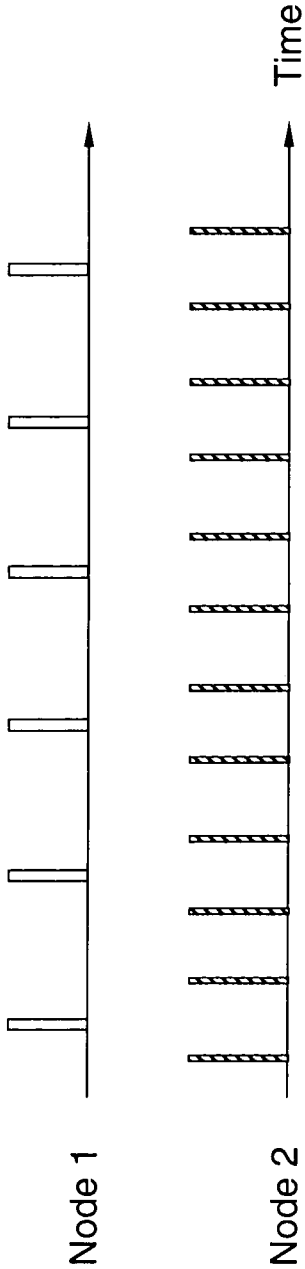


Fig. 1
(State of the Art)

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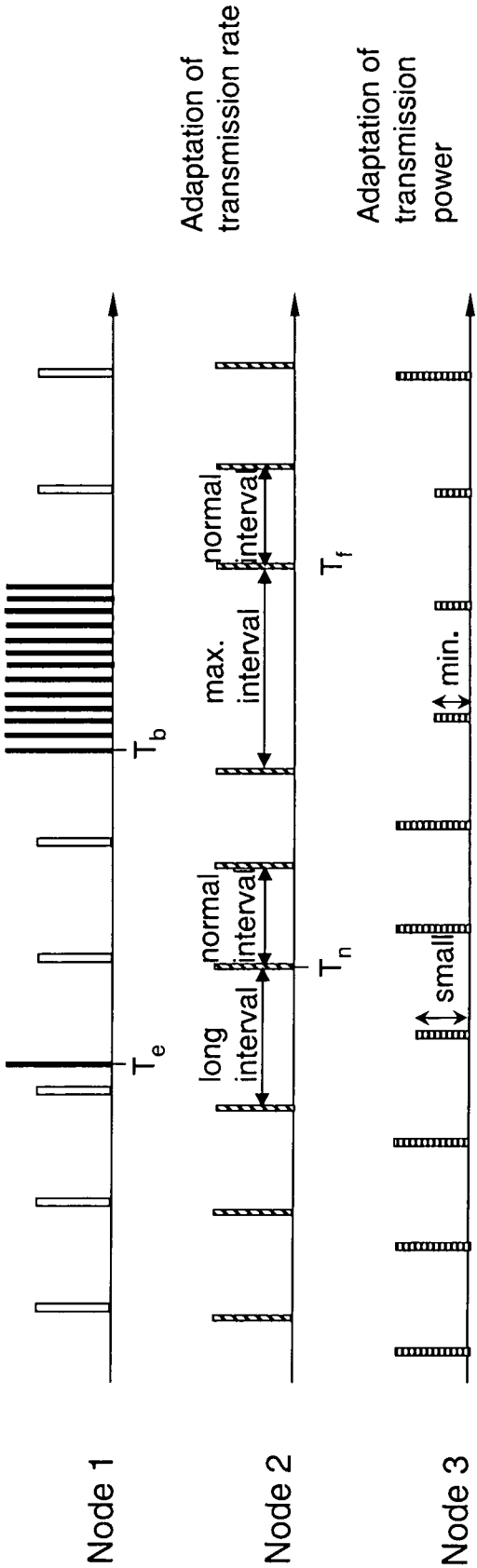


Fig. 2

INTERNATIONAL SEARCH REPORT

International application No
PCT/EP2008/008550

A. CLASSIFICATION OF SUBJECT MATTER

INV. H04W72/10 B61L15/00 G01C21/00
ADD. H04W84/12

According to International Patent Classification (IPC) or to both national classification and IPC

B. FIELDS SEARCHED

Minimum documentation searched (classification system followed by classification symbols)
H04W B61L G01C

Documentation searched other than minimum documentation to the extent that such documents are included in the fields searched

Electronic data base consulted during the international search (name of data base and, where practical, search terms used)

EPO-Internal

C. DOCUMENTS CONSIDERED TO BE RELEVANT

Category*	Citation of document, with indication, where appropriate, of the relevant passages	Relevant to claim No.
X	ZANG, Y. AND STIBOR, L. AND CHENG, X. AND REUMERMAN, H.-J. AND PARUZEL, A. AND BARROSO, A.: "Congestion Control in Wireless Networks for Vehicular Safety Applications". PROCEEDINGS OF THE 8TH EUROPEAN WIRELESS CONFERENCE, [Online] July 2007 (2007-07), pages 1-7, XP002537201 Paris, France ISBN: 2-912328-41-1 Retrieved from the Internet: URL: http://www.comnets.rwth-aachen.de/publications/gesamtlisten/abstracts/2007/zastchrepabaew2007.html [retrieved on 2009-07-14]	1-11, 13-15
Y	page 2, left-hand column, line 29 - page 5, left-hand column, line 20 ----- -/--	12

☒ Further documents are listed in the continuation of Box C.

☒ See patent family annex.

* Special categories of cited documents :

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15 July 2009

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04/08/2009

Name and mailing address of the ISA/

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Orfanos, Georgios

INTERNATIONAL SEARCH REPORT

International application No

PCT/EP2008/008550

C(Continuation). DOCUMENTS CONSIDERED TO BE RELEVANT		
Category*	Citation of document, with indication, where appropriate, of the relevant passages	Relevant to claim No.
Y	WO 2007/091219 A (PHILIPS INTELLECTUAL PROPERTY [DE]; KONINKL PHILIPS ELECTRONICS NV [NL] 16 August 2007 (2007-08-16)	12
A	page 3, line 12 - line 20; figure 2	1-11, 13-15
A	----- ZANG, Y. AND STIBOR, L. AND WALKE, B. AND REUMERMAN, H.-J. AND BARROSO, A.: "A Novel MAC Protocol for Throughput Sensitive Applications in Vehicular Environments" PROCEEDINGS OF IEEE 65TH VEHICULAR TECHNOLOGY CONFERENCE VTC2007-SPRING, [Online] April 2007 (2007-04), pages 1-5, XP002537202 Dublin, Ireland ISBN: 1-4244-0266-2 Retrieved from the Internet: URL: http://www.comnets.rwth-aachen.de/publications/gesamtlisten/abstracts/2007/zastw-arebavtc2007.html> [retrieved on 2009-07-14] page 1, right-hand column, line 16 - line 32 -----	1-15

INTERNATIONAL SEARCH REPORT

Information on patent family members

International application No

PCT/EP2008/008550

Patent document cited in search report	Publication date	Patent family member(s)	Publication date
WO 2007091219 A	16-08-2007	NONE	