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**Datasheet for the decision
of 26 November 2024**

Case Number: T 1801/22 - 3.5.05

Application Number: 17177903.6

Publication Number: 3280164

IPC: H04W8/18, H04W48/18, H04W84/00

Language of the proceedings: EN

Title of invention:
Distributed wireless communication system for moving vehicles

Patent Proprietor:
Icomera AB

Opponent:
Marks & Clerk LLP

Headword:
Onboard router network/ICOMERA

Relevant legal provisions:
EPC Art. 100(c), 123(2)

Keyword:
Added subject-matter - all claim requests (yes)



Beschwerdekammern

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Case Number: T 1801/22 - 3.5.05

D E C I S I O N
of Technical Board of Appeal 3.5.05
of 26 November 2024

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Decision under appeal: **Decision of the Opposition Division of the
European Patent Office posted on 16 May 2022
rejecting the opposition filed against European
patent No. 3280164 pursuant to Article 101(2)
EPC.**

Composition of the Board:

Chair K. Bengi-Akyürek
Members: J. Eraso Helguera
F. Bostedt

Summary of Facts and Submissions

I. This case concerns the appeal filed by the opponent against the decision of the opposition division to reject the opposition under Article 101(2) EPC.

II. Oral proceedings before the board were held on 26 November 2024. The final requests of the parties were:

- The opponent (appellant) requested that the appealed decision be set aside and that the patent be revoked.
- The proprietor (respondent) requested, as a **main request**, that the appeal be dismissed, i.e. that the opposition be rejected and the patent be maintained as granted, or, in the alternative, that the patent be maintained in amended form on the basis of the claims of any of **twelve auxiliary requests** filed during the opposition proceedings and re-submitted with the written reply to the statement of grounds of appeal.

At the end of those oral proceedings, the board announced its decision.

III. Claim 1 as granted (**main request**) reads as follows:

"A wireless communication system for a moving vehicle (1) having a plurality of carriages (2), said wireless communication system comprising:

a plurality of routers (3), each router being arranged in a separate carriage (2) and each router being configured to:

receive and transmit wireless data communication to and from a stationary communication server outside said moving vehicle through at least one exterior mobile network (4) via at least one external antenna (5), wherein said at least one exterior mobile network provides at least one data link;

receive and transmit data packets to and from at least one client (6) onboard the moving vehicle (1);

communicate with every other router (3) in said moving vehicle in order to receive and transmit data packets to and from said every other router, thereby forming an onboard router network;

at least one controller (9) configured to evaluate a set of performance parameters of said at least one data link between each router (3) and said at least one exterior mobile network (4) and to assign data streams to said at least one data link, through said onboard router network, at least partly based on said evaluated set of performance parameters, **characterized in that** each router comprises a plurality of modems (8a-n) for communication with said at least one exterior mobile network (4), wherein each modem (8a-n) is accessible by each router (3) of the plurality of routers through said onboard router network, wherein for each router (3) at least one of said modems (8a-n) is configured to be connected to at least two of said external antennas (5) in order to enable MIMO, multiple input multiple output,

communication wherein the at least two external antennas (5) are arranged close to the fore and aft end of the carriage, respectively."

Claim 1 of **auxiliary request 1** differs from claim 1 as granted in the following addition at the very end of the claim:

", and in that each of said plurality of routers is a standalone and independent router, the plurality of routers forming a distributed peer-to-peer network".

Claim 1 of **auxiliary request 2** differs from claim 1 as granted in the following addition at the very end of the claim:

", and in that each router is arranged to communicate on at least one different data link as compared to the other routers onboard the moving vehicle, and wherein data streams on one or several of said links are forwarded to a dedicated aggregation server, the different links thereby forming a single virtual link".

Claim 1 of **auxiliary request 3** differs from claim 1 as granted in the following addition at the very end of the claim:

", in that each of said plurality of routers is a standalone and independent router, the plurality of routers forming a distributed peer-to-peer network, and in that each router is arranged to communicate on at least one different data link as compared to the other routers onboard the moving vehicle, and wherein data streams on one or several of said

links are forwarded to a dedicated aggregation server, the different links thereby forming a single virtual link".

Claim 1 of **auxiliary request 4** differs from claim 1 as granted in the following addition at the very end of the claim:

", and in that it further comprises a distributed database, distributed over said plurality of routers, including at least one of available bandwidth of each data link of each router (3), a current mobile network operator of each router (3), a set of signal parameters for each data link of each router (3), a network topology of said onboard router network, a number of routers in said onboard router network and an IP-address of each router in said onboard router network".

Claim 1 of **auxiliary request 5** differs from claim 1 as granted in the following addition at the very end of the claim:

", and in that at least one router (3) further has access to at least one SIM (12a-d) in another router (3), and wherein each router (3) further comprises a subscriber identity module, SIM, pool including a plurality of SIMs (12a-d), and wherein said controller is configured to periodically assign SIMs (12a-d) within said SIM pool to any one of said plurality of routers through said onboard router network".

Claim 1 of **auxiliary request 6** differs from claim 1 as granted in the following addition at the very end of the claim:

", in that it further comprises a distributed database, distributed over said plurality of routers, including at least one of available bandwidth of each data link of each router (3), a current mobile network operator of each router (3), a set of signal parameters for each data link of each router (3), a network topology of said onboard router network, a number of routers in said onboard router network and an IP-address of each router in said onboard router network, and in that at least one router (3) further has access to at least one SIM (12a-d) in another router (3), and wherein each router (3) further comprises a subscriber identity module, SIM, pool including a plurality of SIMs (12a-d), and wherein said controller is configured to periodically assign SIMs (12a-d) within said SIM pool to any one of said plurality of routers through said onboard router network".

Claim 1 of **auxiliary request 7** differs from claim 1 as granted in the following addition at the very end of the claim:

", in that each of said plurality of routers is a standalone and independent router, the plurality of routers forming a distributed peer-to-peer network, and in that at least one router (3) further has access to at least one SIM (12a-d) in another router (3), and wherein each router (3) further comprises a subscriber identity module, SIM, pool including a plurality of SIMs (12a-d), and wherein said controller is configured to periodically assign SIMs (12a-d) within said SIM pool to any one of said plurality of routers through said onboard router network".

Claim 1 of **auxiliary request 8** differs from claim 1 as granted in the following addition at the very end of the claim:

", in that each router is arranged to communicate on at least one different data link as compared to the other routers onboard the moving vehicle, and wherein data streams on one or several of said links are forwarded to a dedicated aggregation server, the different links thereby forming a single virtual link, and in that at least one router (3) further has access to at least one SIM (12a-d) in another router (3), and wherein each router (3) further comprises a subscriber identity module, SIM, pool including a plurality of SIMs (12a-d), and wherein said controller is configured to periodically assign SIMs (12a-d) within said SIM pool to any one of said plurality of routers through said onboard router network".

Claim 1 of **auxiliary request 9** differs from claim 1 as granted in the following addition at the very end of the claim:

", in that each of said plurality of routers is a standalone and independent router, the plurality of routers forming a distributed peer-to-peer network, in that it further comprises a distributed database, distributed over said plurality of routers, including at least one of available bandwidth of each data link of each router (3), a current mobile network operator of each router (3), a set of signal parameters for each data link of each router (3), a network topology of said onboard router network, a number of routers in said onboard router network and an IP-address of each router in

said onboard router network, and in that at least one router (3) further has access to at least one SIM (12a-d) in another router (3), and wherein each router (3) further comprises a subscriber identity module, SIM, pool including a plurality of SIMs (12a-d), and wherein said controller is configured to periodically assign SIMs (12a-d) within said SIM pool to any one of said plurality of routers through said onboard router network".

Claim 1 of **auxiliary request 10** differs from claim 1 as granted in the following addition at the very end of the claim:

", in that each router is arranged to communicate on at least one different data link as compared to the other routers onboard the moving vehicle, and wherein data streams on one or several of said links are forwarded to a dedicated aggregation server, the different links thereby forming a single virtual link, in that it further comprises a distributed database, distributed over said plurality of routers, including at least one of available bandwidth of each data link of each router (3), a current mobile network operator of each router (3), a set of signal parameters for each data link of each router (3), a network topology of said onboard router network, a number of routers in said onboard router network and an IP-address of each router in said onboard router network, and in that at least one router (3) further has access to at least one SIM (12a-d) in another router (3), and wherein each router (3) further comprises a subscriber identity module, SIM, pool including a plurality of SIMs (12a-d), and wherein said controller is configured to

periodically assign SIMs (12a-d) within said SIM pool to any one of said plurality of routers through said onboard router network".

Claim 1 of **auxiliary request 11** differs from claim 1 as granted in the following addition at the very end of the claim:

", in that each of said plurality of routers is a standalone and independent router, the plurality of routers forming a distributed peer-to-peer network, in that each router is arranged to communicate on at least one different data link as compared to the other routers onboard the moving vehicle, and wherein data streams on one or several of said links are forwarded to a dedicated aggregation server, the different links thereby forming a single virtual link, in that each of said plurality of routers is a standalone and independent router, the plurality of routers forming a distributed peer-to-peer network, in that it further comprises a distributed database, distributed over said plurality of routers, including at least one of available bandwidth of each data link of each router (3), a current mobile network operator of each router (3), a set of signal parameters for each data link of each router (3), a network topology of said onboard router network, a number of routers in said onboard router network and an IP-address of each router in said onboard router network, and in that at least one router (3) further has access to at least one SIM (12a-d) in another router (3), and wherein each router (3) further comprises a subscriber identity module, SIM, pool including a plurality of SIMs (12a-d), and wherein said controller is configured to

periodically assign SIMs (12a-d) within said SIM pool to any one of said plurality of routers through said onboard router network".

Claim 1 of **auxiliary request 12** differs from claim 1 as granted in the insertion of the phrase "and in operative connection with" right after the expression "is accessible by".

Reasons for the Decision

1. MAIN REQUEST

Claim 1 as granted comprises the following limiting features (board's outline):

- 1.1 A wireless communication system for a moving vehicle having a plurality of carriages, said wireless communication system comprising:
- 1.2 a plurality of routers, each router being arranged in a separate carriage and each router being configured to:
- 1.3 receive and transmit wireless data communication to and from a stationary communication server outside said moving vehicle through at least one exterior mobile network via at least one external antenna, wherein said at least one exterior mobile network provides at least one data link;
- 1.4 receive and transmit data packets to and from at least one client onboard the moving vehicle;
- 1.5 communicate with every other router in said moving vehicle in order to receive and transmit data packets to and from said every other router, thereby forming an onboard router network;

- 1.6 at least one controller configured to evaluate a set of performance parameters of said at least one data link between each router and said at least one exterior mobile network and to assign data streams to said at least one data link, through said onboard router network, at least partly based on said evaluated set of performance parameters,
- 1.7 each router comprises a plurality of modems for communication with said at least one exterior mobile network, wherein each modem is accessible by each router of the plurality of routers through said onboard router network,
- 1.8 for each router at least one of said modems is configured to be connected to at least two of said external antennas in order to enable MIMO communication
- 1.9 the at least two external antennas are arranged close to the fore and aft end of the carriage, respectively.

1.1 *Claim 1 - added subject-matter (Articles 100(c) and 123(2) EPC)*

1.1.1 During examination proceedings, the phrase "wherein each modem is accessible by each router of the plurality of routers through said onboard router network" (emphasis added) in **feature 1.7** of claim 1 as granted replaced "wherein each modem is in operative connection with each router of the plurality of routers through said on board router network" (emphasis added). The latter had literal basis in original claim 2.

1.1.2 In Reasons 3.2.2 of the appealed decision, the opposition division concluded that the original feature "in operative connection with" disclosed that modems

and routers were physically linked. This was directly and unambiguously derived from the fact that two devices were "in operative connection" (i.e. they exchanged data). On the other hand, the expression "accessible by" meant that a certain device could be used and/or reached by a further device. If it was assumed that a device could be reached or used by another device, those two devices should be "physically linked", either wired or wireless. Thus, "accessibility" was a direct and unambiguous consequence of the two devices being physically linked, i.e. the two devices being "in operative connection", and "accessible by" in **feature 1.7** was derivable from the original application.

1.1.3 The appellant submitted the following arguments in that regard:

- The application as filed did not explicitly describe that each modem was "accessible by" each router of the "onboard router network". Rather, the application as filed merely disclosed that the routers were interconnected such that the "data packets from client(s) that are connected to the same LAN can be routed through 'local' modems and/or modems of other routers in the onboard router network" (see paragraph [0071] as filed).
- The term "accessible by" was ambiguous. Not all logically reasonable interpretations of this term followed directly and unambiguously from the originally disclosed "in operative connection with". For example, "accessible by each router" might reasonably be considered to mean that the routers themselves may selectively access each

modem.

1.1.4 The respondent argued as follows:

- **Feature 1.7** was clearly supported by originally filed claim 2. There was no technical difference between each modem being "in operative connection with" each router and each modem being "accessible by" each router. Further, this feature also had basis in paragraphs [0025] and [0051] of the application as filed. In its broadest sense, both terms should be understood to mean that each modem could be used and/or reached by each router.

- Any interpretation of the term "accessible by" as to "having active selection, granted access or control of a specific modem of the second router" in the context of the claim 1 necessitated the first router to manage the routing functionality of the second router as a "master router" routing the traffic, and the second router to be used only as a network switch or a gateway. This interpretation inherently contradicted the explicit features 1.3 and 1.7 of claim 1 that routers must *independently* perform data routing functionalities, and therefore was technically implausible. The only logical technical interpretation of the wording "accessible by" read by the skilled person with a mind willing to understand was that modems and routers of the onboard router network were "in operative connection", as clearly and unambiguously derivable from the original application. Further, "accessed" and "accessible" were used at multiple occasions in the patent (such as in paragraphs [0002], [0015], [0018], [0028], [0060] and [0070]), and from the totality of the disclosure it was clear that

"accessed" and "accessible" should be understood to have their ordinary meaning, without any implication of a more restrictive interpretation.

1.1.5 The board agrees with the appellant. The application as filed - in particular paragraphs [0025] and [0051] cited by the respondent - unambiguously establishes that within the distributed "onboard router network" the respective routers communicate with each other. Within that onboard router network, "data streams can be efficiently be distributed among the plurality of routers and the corresponding exterior network connections. Thus, each router can 'borrow' bandwidth capacity from any one of the routers onboard the vehicle" (see paragraph [0025]). Indeed, as explained in paragraph [0071], the "data packets from the client(s) that are connected to the same LAN can be routed through 'local' modems and/or modems of other routers in the onboard router network". More specifically, the "sharing of modems between the plurality of routers can for example be performed establishing a plurality of tunnels between each router or by forming different Virtual LANs (VLANs)" (see paragraph [0072]). Yet, in the application as filed, the distribution of data streams is performed between routers. Even if a "first router" might end up sending or receiving data which is routed through a modem of a "second router", there is no indication that the first router should even be aware of which specific modem of the second router is actually involved the data exchange, i.e. "in operative connection with" the first router, using the wording of original claim 2. Against this background, the use of "accessible by" in feature 1.7 of claim 1 as granted adds technical information which was not directly and unambiguously derivable from the application as filed. Specifically,

the board agrees with the appellant that "accessible by" now encompasses situations in which the first router can selectively identify a specific modem of a second router and gain access to it as a separate entity. In other words, the wording "each modem **is in operative connection with** each router of the plurality of routers" implies merely that physical and/or logical data connections are established involving the respective routers and modems, whereas the phrase "each modem **is accessible by** each router of the plurality of routers" implies at least an end-to-end relationship between those entities. For instance, the latter implies that the router may initiate the establishment of a (physical/logical) data connection to gain access to a certain modem - if access is granted at all by the modem or by a third-party device - in order to subsequently retrieve data (like configuration data) from that modem.

1.2 Thus, the ground for opposition under Article 100(c) EPC in conjunction with Article 123(2) EPC prejudices the maintenance of the patent as granted.

2. AUXILIARY REQUESTS

2.1 *Claim 1 - added subject-matter (Article 123(2) EPC)*

Claim 1 of each of the auxiliary requests also comprises **feature 1.7**. Hence, the reasons set out in point 1.1.5 above apply *mutatis mutandis* to claim 1 of each of the present auxiliary requests.

2.2 It follows that none of auxiliary requests 1 to 12 is allowable under Article 123(2) EPC.

Order

For these reasons it is decided that:

1. The decision under appeal is set aside.
2. The patent is revoked.

The Registrar:

The Chair:



B. Brückner

K. Bengi-Akyürek

Decision electronically authenticated