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Datasheet for the decision of 29 March 2011

Case Number: T 0028/08 - 3.5.05

Application Number: 05024428.4

Publication Number: 1626536

IPC: H04L 12/28

Language of the proceedings: EN

Title of invention:
Wireless transmission system

Applicant:
Sony Deutschland GmbH, et al

Headword:
60 GHz Wireless communication system/SONY

Relevant legal provisions:
EPC Art. 106, 107, 108

Relevant legal provisions (EPC 1973):
EPC Art. 56

Keyword:
"Inventive step (no) - main and auxiliary requests"

Catchword:
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Case Number: T 0028/08 **-** 3.5.05

D E C I S I O N
of the Technical Board of Appeal 3.5.05
of 29 March 2011

Appellant: Sony Deutschland GmbH
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Decision under appeal: **Decision of the Examining Division of the European Patent Office posted 14 August 2007 refusing European patent application No. 05024428.4 pursuant to Article 97(1) EPC 1973.**

Composition of the Board:

Chairman: A. Ritzka
Members: P. Cretaine
D. Prietzel-Funk

Summary of Facts and Submissions

I. This appeal is against the decision of the examining division, despatched on 14 August 2007, refusing European patent application No. 05024428.4 because of lack of inventive step (Articles 52(1) and 56 EPC 1973) having regard to the disclosure of

D1: FERNANDES L.: "Freeing users from the tyranny of the plug. Developing a System Concept and Technologies for Mobile Broadband Communications" IEEE Personal Communications, IEEE COMMUNICATIONS SOCIETY, US, vol.2, No. 1, February 1995, pages 54-59,

or

D2: NESIC A. et al. : "Toward New Generation of the High Data Rate In-door Communication Systems - System and Key RF Technologies", TELECOMMUNICATIONS IN MODERN SATELLITE, CABLE AND BROADCASTING SERVICES, 4th INTERNATIONAL CONFERENCE, NIS, YUGOSLAVIA, 13-15 October 1999, IEEE, US, vol. 1, pages 232-235,

in combination with the disclosure of

D3: WO 99/60657.

II. The notice of appeal was received on 29 August 2007. The appeal fee was paid on the same day. The statement setting out the grounds of appeal was received on 7 December 2007. The appellant requested that the appealed decision be set aside and that a patent be granted on the basis of claims 1 to 6 as filed with a letter of 11 October 2006 which had been refused at the

examination stage. A further communication or oral proceedings were requested on an auxiliary basis.

III. A summons to oral proceedings to be held on 29 March 2011 was issued on 18 January 2011. In an annex accompanying the summons the board expressed the preliminary opinion that the claimed subject-matter appeared not to involve an inventive step in the light of the disclosures of D1, or D2, in combination with the disclosure of D3.

IV. By letter of 28 February 2011 the appellant filed new sets of claims according to auxiliary request I, auxiliary request II and auxiliary request III. The appellant indicated passages on which the amendments were said to be based and submitted arguments in favour of the inventive step of these claims.

V. At the oral proceedings scheduled for 29 March 2011, the appellant requested that the decision under appeal be set aside and that a patent be granted on the basis of claims 1-6 of the main request, filed with letter of 11 October 2006 or, as auxiliary request, on the basis of claims 1-5 of auxiliary request III, filed with letter of 28 February 2011, now named auxiliary request I. All other requests have been withdrawn.

VI. Independent claim 1 according to the main request reads as follows:

" 1. Wireless transmission system designed for the transmission of data in the 60 GHz range, the system comprising:

- a public download server (7) connected to an information source, the public download server (7) comprising a first antenna (2), and
- a mobile terminal (1) comprising a second antenna (3) being a narrow beam antenna, wherein the public download server (7) and the mobile terminal (1) are adapted for communication by means of a wireless transmission in the 60 GHz range via said first and second antennas (1,3),
characterized in that
the first antenna (2) of the public download server (7) is provided with a kidney shaped beam in cross-section."

Independent claim 5 according to the main request reads as follows:

"5. Method for uploading and/or downloading content from a public access server (7) having a first antenna (2) to/from mobile terminals (1) over an air interface, wherein each mobile terminal (1) has a second antenna (3) having a narrow beam characteristics and the air interface uses a 60 GHz non-licensed frequency band, characterized in that
transmission between the public access server (7) and the mobile terminals (1) is performed via the second antenna (3) of the respective mobile terminal (1) and via the first antenna (2) of the public download server (7) that has a kidney shaped beam in cross-section."

Independent claim 1 according to the auxiliary request I reads as follows:

"1. Wireless transmission system designed for the transmission of data in the 60 GHz range,
the system comprising:
- a public download server (7) connected to an information source, the public download server (7) comprising a first antenna (2), and
- a mobile terminal (1) comprising a second antenna (3) being a narrow beam antenna with a pencil shaped beam,
wherein the public download server (7) and the mobile terminal (1) are adapted for communication by means of a wireless transmission in the 60 GHz range via said first and second antennas (1,3),
characterized in that
the first antenna (2) of the public download server (7) is provided with a kidney shaped beam in cross-section in a horizontal plane, and
the public download server (7) and the mobile terminal are designed for a dual frequency operation, one transmission frequency being the 60 GHz range and the second transmission frequency being an intermediate frequency below the 60 GHz range, and the second transmission frequency being in a non licensed frequency band or ISM-band."

Independent claim 4 according to the auxiliary request I reads as follows:

"4. Method for uploading and/or downloading content from a public access server (7) having a first antenna (2) to/from mobile terminals (1) over an air interface wherein each mobile terminal (1) has a second antenna (3) having a narrow beam with a pencil-shaped beam characteristics and the air interface uses a 60 GHz non-licensed frequency band,

characterized in that
transmission between the public access server (7) and the mobile terminals (1) is performed via the second antenna (3) of the respective mobile terminal (1) and via the first antenna (2) of the public download server (7) that has a kidney shaped beam in cross-section in a horizontal plane, and
the public download server (7) and the mobile terminal are designed for a dual frequency operation, one transmission frequency being the 60 GHz range and a second transmission frequency being an intermediate frequency below the 60 GHz range, and the second transmission frequency being in a non licensed frequency band or ISM-band."

VII. At the end of the oral proceedings the chair announced the board's decision.

Reasons for the Decision

1. Admissibility

The appeal complies with the provisions of Article 106 to 108 EPC 1973 (cf. Facts and Submissions, II). Therefore it is admissible.

2. Inventive step - Article 56 EPC 1973

2.1 Prior art

D1 and D2 both disclose a wireless transmission system designed for the transmission of data in the 60 GHz range and comprising base and mobile stations. D1

describes (see figure 4) a demonstrator comprising a base station and a mobile station both having horn antennas. The antennas at the transmitter have a beam width of 15x15 degree or 28x28 degree while the antennas at the receivers have a beam width of 28x28 degree (see page 58, right-hand column, lines 31 to 36). D2 describes (see figure 4) a demonstrator comprising a base station and a mobile station having directive antennas (see page 234, right-hand column, lines 26 to 28). In the board's view, the antennas of the mobile stations of D1 and D2 fall under the broad designation of "narrow beam antennas", as used in the application.

D3 discloses a base station antenna adapted for indoor surroundings (page 1, lines 2 to 7). Figure 4 shows a ceiling-mounted base station antenna, having a kidney shaped beam in cross section.

2.2 Main request:

2.2.1 The only difference between the subject-matter of claim 1 and the disclosure of D1 or D2 is that the antenna of the base station has a kidney shaped beam in cross section instead of a narrow beam.

In the board's view the terms "narrow beam" and "kidney shaped beam" have a broad meaning and do not accurately define an antenna pattern. These two terms only define classes of antenna beams corresponding to a large number of antennas.

However, it is assumed, for the sake of assessing inventive step, that the technical effects of the above mentioned distinguishing feature are that the radio

coverage is increased for directions having a large angular separation from the antenna's axis, while it is decreased for directions having a small angular separation from the antenna's axis.

The objective technical problem can thus be formulated as how to adapt the radio coverage of the server to situations where the mobile stations move in directions remote from the antenna's axis.

In the board's view, the skilled person to be considered for the problem-solution analysis is an engineer familiar with the field of antennas for radio-communications systems.

Starting from D1 or D2 as closest prior art and faced with the above-mentioned problem, the skilled person would search for base station antennas and come across document D3. D3 (see from page 7, lines 34 to page 8, line 8; figure 4) describes a ceiling-mounted antenna comprising two radiating slots spaced by $\lambda/2$ and energised in phase opposition. The energy radiated by the system, i.e. the antenna beam, forms two lobes which are symmetrical about the median plane of the slots. Interference between waves radiated by the two slots greatly reduces the energy radiated near the median plane. This greatly reduces the horizontal component of the electric field radiated unnecessarily at points vertically aligned with the antenna system. The skilled person would thus realise that the antenna described in D3 achieves a coverage suitable to solve the above mentioned objective technical problem and he would implement the antenna of D3, figure 4, in the

base station of D1 or D2, thereby arriving at the subject-matter of claim 1.

Thus, claim 1 does not meet the requirements of Article 56 EPC.

Independent claim 5 substantially contains the same features as claim 1 but expressed in terms of a method claim. Therefore claim 5 does not meet the requirements of Article 56 EPC.

2.2.2 Although the appellant has acknowledged in the written and oral proceedings that D1, or D2, and D3 disclose features that could be combined to realise the system defined in claim 1, he argued that the skilled person would not combine D3 with D1 or D2 for the following reasons.

The appellant first argued that the skilled person would not have considered the combination of D1, or D2, and D3 because these documents refer to two different application fields of wireless communication, namely outdoor and indoor systems respectively. However the board first notes that claim 1 is not restricted to an indoor communication system but defines more broadly a wireless transmission system. Secondly, the board notes that D1 deals with indoor systems as well as outdoor systems (see for instance page 54, right-hand column, line 34: "indoor/outdoor"; page 55, right-hand column, line 2: "wireless customer premises network"; page 58, right-hand column, line 21: "indoor measurements") and that D2 deals with indoor systems (see page 235, "Conclusion"). Therefore, in the board's judgement, the skilled person would not exclude a combination of D1,

or D2, and D3 based on the argument that their technical fields are different.

The appellant further argued that, even if the skilled person were considering a combination of D3 with D1, or D2, he would not exchange only the antenna of the server but also the antenna of the mobile station; by doing this the skilled person would not arrive at the subject-matter of claim 1 because the mobile station in D3 does not have a narrow beam antenna, as required by claim 1. The board is not convinced by this argument because the problem to be solved (see paragraph 2.2.1) is related to the coverage achieved by the server antenna and not by the mobile station antenna. The skilled person would thus implement the teaching of D3 in respect of the server antenna in a system according to D1 or D2, without modifying the narrow beam antenna of the mobile station of D1 or D2.

The appellant also pointed to the teaching of D2 on page 234, right-hand column, lines 26 to 30, and argued that it would prevent the skilled person from using a non-directive antenna for the server, as in claim 1, and would rather incite him to use tracking instead of changing the antenna's beam. In the board's view however, the wording "cannot be avoided" used in the above mentioned passage of D2 would rather incite the skilled person, in his attempts to improve the system, to try to avoid usage of directive antennas, in particular for the server antenna.

Furthermore, according to the appellant, the skilled person would not consider applying the teaching of D3, since the embodiment of D3 which involves a kidney

shaped beam, described in relation to figure 4, uses specifically a ceiling-mounted server antenna. The board notes however in that respect that claim 1 does not define where the server antenna is mounted and thus encompasses systems using ceiling-mounted server antennas.

The appellant also argued that the effect of the distinguishing feature is that for a larger communication distance the antenna gain is larger and for a smaller communication distance the antenna gain is smaller. The board considers however that this is true only when considering communication distances as angular distances between the antenna axis and a line connecting the antenna to the mobile station. The board took this technical effect into account when defining the objective technical problem (see paragraph 2.2.1 above).

The appellant further argued that, based on the above mentioned identified technical effects, the objective technical problem is to provide a uniform coverage and an extension of the communication range. The board judges however that the antenna's beam with the kidney-shaped cross section does not achieve a coverage as uniform as would be achieved by a beam with a semicircular disc shaped cross section for instance. As to the extension of the communication range in respect of a narrow beam antenna, the board considers that only an angular extension may be achieved by the kidney shape beam, since the range in the direction of the antenna axis is not extended. Therefore, in the board's judgement, the aim of obtaining a uniform coverage is

not achieved by the claimed features and can thus not be part of the technical problem.

The appellant also argued that the aim of having a kidney shaped beam in D3 is mainly to avoid unnecessary emissions under a ceiling-mounted antenna and therefore D3 would not be considered by the skilled person for solving the problem of providing a uniform coverage and an extension of the communication range. In the board's judgment, a uniform coverage is not provided by a kidney shape beam (see the above paragraph). The skilled person would thus not be prevented from using D3 based on the fact that D3 does not provide a uniform coverage. Moreover, even if D3 does not explicitly mention an angular extension of the communication range, it is common general knowledge that this technical effect is inherent in the kidney shape of the beam disclosed in D3, figure 4.

Thus the board judges that the skilled person would recognise that the embodiment of D3, figure 4, is suitable, in combination with the features of D1, or D2, to solve the objective technical problem as defined in paragraph 2.2.1 above.

2.3 Auxiliary request I

Claim 1 adds to claim 1 according to the main request the following features:

a) the antenna of the mobile terminal has ***a pencil shaped beam***,
b) the antenna of the server has a kidney shaped beam in cross section ***in a horizontal plane***, and

c) the server and the mobile terminal are designed for a dual frequency operation, one transmission frequency being the 60 GHz range and the second transmission frequency being an intermediate frequency below the 60 GHz range, and the second transmission frequency is in a non-licensed frequency band or ISM-band.

As to feature a), the appellant argued that using at the mobile station a narrow beam antenna with a pencil shaped beam solves the problem of achieving a higher gain and directivity of the mobile station antenna, while D2, by using a directive antenna and suggesting smart tracking, leads away from this solution. The board is not convinced by this argument, since narrowing the beam is a common measure for increasing the directivity and gain of an antenna, which the skilled person would apply without the exercise of any inventive skill, in particular to achieve an extreme narrow beam, as it is assumed is meant by the broad wording "pencil shaped" in claim 1.

As to feature b), the appellant argued that claim 1 as amended by incorporating this feature defines that the server antenna is mounted on a wall, whereas D3 discloses a kidney shaped beam only in relation to a ceiling-mounted antenna. The skilled person would thus, according to the appellant, not consider the teaching of D3 for combining it with the prior art of D2. In the board's view, the mere feature in claim 1 that the beam has a kidney shape in cross section in a horizontal plane does not preclude the server antenna to be ceiling-mounted. However, the only embodiment disclosed in the application as originally filed involving such a server antenna having a kidney shaped beam in cross

section in a horizontal plane is the embodiment described in relation to figure 4b where the server antenna is wall-mounted. An objection based on Article 123(2) could thus be raised. To counter such an objection the appellant suggested in oral proceedings amending feature b) by defining that the beam has a kidney shape "seen from above".

However, the board judges that, even if claim 1 were amended that way, the skilled person would consider combining D3 with D2 and would arrive at a system comprising feature b), without the exercise of inventive skill, for the following reasons. The problem-solution analysis would in that case be derived from the one presented in paragraph 2.2.1:
- starting from D2 as closest prior art, the technical effect of feature b) would be that the radio coverage is increased for directions, in the horizontal plane, having a large angular separation from the horizontal antenna's axis while it is decreased for directions, in the horizontal plane, having a small angular separation from the horizontal antenna's axis;
-the partial objective technical problem solved by feature b) could thus be formulated as how to adapt the radio coverage of the server to situations where the mobile stations move in the horizontal plane in directions remote from the horizontal antenna's axis.
The person skilled in the art of antennas would consider that the antenna disclosed in D3 could equally be positioned, with no further modifications, with its axis in a horizontal direction, thereby achieving the coverage wished, due to its particular beam shape.

Therefore feature b), even if amended as above mentioned, does not contribute to the inventive step of claim 1.

As to feature c), the board judges that a dual frequency operation is unambiguously disclosed in D2 (see page 233, right-hand column, lines 47 to 53, and page 234, right-hand column, lines 10 to 20). Although the appellant argued that D2 does not disclose a parallel, i.e. simultaneous, operation on both frequencies, the board notes that neither claim 1 nor the description mentions such a parallel operation. Moreover the board regards having a transmission frequency in a non-licensed frequency band or in an industrial scientific medical ISM-band as a choice performed by the designer of the communication system in order to comply with radio frequency regulations in force in a given country or region. This feature is thus more related to the business implementation of the system than with engineering. Since the appellant did not further mention any technical advantage of using such frequency bands, the board judges that this feature is of a non-technical nature and, as such, cannot contribute to the inventive step. Therefore feature c) does not add anything of inventive significance to the subject-matter of claim 1 according to the main request, when starting from D2 as closest prior art.

Moreover, features a), b) and c) relate to solutions to separate partial problems, without any interaction between those features that brings about a technical effect in excess of the sum of their individual effects, the features being merely juxtaposed.

The board therefore judges that claim 1 according to auxiliary request I does not meet the requirements of Article 56 EPC, having regard to the combination of D2 and D3.

2.4 In the absence of an allowable request the appeal must be dismissed.

Order

For these reasons it is decided that:

The appeal is dismissed.

The Registrar: The Chair:

K. Götz A. Ritzka