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**Datasheet for the decision
of 4 July 2024**

Case Number: T 1426/22 - 3.5.03

Application Number: 17890958.6

Publication Number: 3570447

IPC: H04B5/00, H04B1/59

Language of the proceedings: EN

Title of invention:

Transmission antenna module, non-contact transmission module,
non-contact communication system provided therewith and
non-contact communication method

Applicants:

Hosiden Corporation
Keio University

Headword:

Blunting a digital signal/HOSIDEN

Relevant legal provisions:

EPC Art. 56

Keywords:

Inventive step - all requests (no): distinguishing features
relate to a mere trial-and-error exercise

Decisions cited:

T 1601/15



Beschwerdekammern

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Case Number: T 1426/22 - 3.5.03

D E C I S I O N
of Technical Board of Appeal 3.5.03
of 4 July 2024

Appellant: Hosiden Corporation
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Appellant: Keio University
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Decision under appeal: **Decision of the Examining Division of the
European Patent Office posted on 15 February
2022 refusing European patent application
No. 17890958.6 pursuant to Article 97(2) EPC.**

Composition of the Board:

Chair K. Bengi-Akyürek
Members: P. Tabery
C. Heath

Summary of Facts and Submissions

I. The appeal is directed against the decision of the examining division to refuse the present application. The examining division found that the claimed subject-matter did not comply with Article 123(2) EPC (all claim requests) and Article 56 EPC (main request, auxiliary request 1).

II. The prior-art documents referred to by the examining division included:

D1: US 2015/209591 A1.

III. Oral proceedings were held before the board on 4 July 2024.

The final requests of the appellant were that the decision under appeal be set aside and that a patent be granted on the basis of a **main request** or one of **auxiliary requests 1 to 9** all filed in the examination proceedings and re-filed with the statement of grounds of appeal, or **auxiliary requests 10 to 16** filed with the submission dated 3 June 2024.

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

V. Claim 1 of the **main request** reads as follows (board's labelling):

"A non-contact transmission module (Ma) comprising:
(a) a transmission antenna module (Ma1); and
(b) a transmitter (200a) configured to transmit a digital signal,

- (c) wherein the transmission antenna module (Ma1) includes:
- (d) a transmission antenna (100a) constituted by a metal plate, or by a conductor formed on an insulator, the transmission antenna being configured to be electromagnetically or magnetically coupled to a reception antenna (100b) of a non-contact reception module (Mb);
- (e) at least one resistor (400a) connected in series between the transmission antenna (100a) and the transmitter (200a);
characterized in that
- (f) a distance between the transmitter (200a) and the transmission antenna (100a) is between 2 millimeters and 200 millimeters, and
- (g) a resistance value of the at least one resistor is between 2 ohms and 100 ohms,
- (h) such that applying the digital signal to the at least one resistor (400a) entirely blunts a waveform of the digital signal
- (i) so as to reduce or suppress ringing occurring in the digital signal,
- (j) the blunted digital signal is to be inputted into the transmission antenna (100a).

Claim 6 of the **main request** reads as follows:

A non-contact transmission method comprising:
transmitting a digital signal using a
transmitter (200a);

applying the digital signal to at least one resistor (400a), wherein a resistance value of the at least one resistor is between 2 ohms and 100 ohms, and thereby entirely blunting a waveform of the digital signal so as to reduce or suppress ringing occurring in the digital signal, wherein the at least one

resistor (400a) is connected in series between a transmission antenna (100a) and the transmitter (200a), wherein the transmission antenna (100a) is configured to be electromagnetically or magnetically coupled to a reception antenna (100b) of a non-contact reception module (Mb), wherein a distance between the transmitter (200a) and the transmission antenna (100a) is between 2 millimeters and 200 millimeters; and

inputting the blunted digital signal into the transmission antenna (100a).

Claim 1 of **auxiliary request 1** differs from claim 1 of the main request in that the values "2 millimeters" and "2 ohms" have been replaced by the phrase "a plurality of millimeters" and "a plurality of ohms" respectively.

Claim 1 of **auxiliary request 2** is further specifying, compared to claim 1 of auxiliary request 1, in feature (b) the aspect of "the digital signal containing high-frequency components of a plurality of hundred MHz or higher".

Claim 1 of **auxiliary request 3** is identical to claim 6 of the main request.

Claim 1 of **auxiliary request 4** differs from claim 1 of auxiliary request 3 in that the same amendment has been introduced as in auxiliary request 1.

Claim 1 of **auxiliary request 5** differs from claim 1 of auxiliary request 4 in that the same amendment has been introduced as in auxiliary request 2.

Claim 1 of **auxiliary request 6** differs from claim 1 of the main request in that it further specifies that

"only the at least one resistor (400a) is connected in series between the transmission antenna (100a) and the transmitter (200a)".

Claim 1 of **auxiliary request 7** differs from claim 1 of auxiliary request 6 in that the same amendment has been introduced as in auxiliary request 1.

Claim 1 of **auxiliary request 8** differs from claim 1 of auxiliary request 7 in that the same amendment has been introduced as in auxiliary request 2.

Claim 1 of **auxiliary request 9** differs from claim 1 of auxiliary request 5 in that the same amendment has been introduced as in auxiliary request 6.

Claim 1 of **auxiliary requests 10 to 16** corresponds respectively to claim 1 of the main request and auxiliary requests 2, 3, 5, 6, 8 and 9, differing only in each case in that the phrase "or suppress" is deleted from the wording "reduce or suppress ringing".

Reasons for the Decision

1. The present application concerns a non-contact transmission module and a non-contact transmission method, wherein damping resistors are introduced to reduce or suppress ringing of the underlying digital signal.
2. Main request - inventive step (Article 56 EPC)
 - 2.1 The main request is identical to the main request considered in the decision under appeal, save for a correction of an editorial error in claim 6.

2.2 Distinguishing features

2.2.1 The board agrees with the feature mapping set out in the decision under appeal (cf. Reasons 14.1).

2.2.2 The board does not concur with the appellant's argument that document **D1** did not disclose feature (h) of claim 1. This effect is typically achieved by the "resistor" being connected in series between the "transmission antenna" and the "transmitter". As even acknowledged by the appellant, such a resistor is evidently disclosed in document D1. That document D1 additionally discloses an LC circuit providing further, frequency-dependent attenuation (i.e. "blunts" the digital signal, in the application's terminology) is immaterial in the context of this novelty assessment.

2.2.3 Moreover, the board does not subscribe to the appellant's argument that claim 1 was limited to having only a "resistor" between the "transmitter" and "transmission antenna". The fact that claim 1 specifies a resistor blunting the digital signal and this "blunted digital signal" is then "inputted into the transmission antenna" does not preclude that other components may also be involved in the blunting process. Paragraph [0055] of the description as translated even explicitly discloses that the "invention encompasses [...] another electronic component, such as a capacitor or a coil".

2.2.4 The board thus essentially concurs with the identification of the distinguishing features in the decision under appeal, i.e. that the subject-matter of claim 1 differs from the disclosure of document D1 in that:

- A) the conductor is formed on an insulator;
- B) the distance between the transmitter and the transmission antenna is between 2 and 200 millimeters
- C) the resistance value of the resistor is between 2 and 100 ohms.

2.3 Technical effects

2.3.1 The board understands from the present description itself that **differences A), B) and C)** do not interact synergistically.

- **Difference A)** is concerned with insulating the transmission antenna from other conducting parts.
- **Difference B)** contributes, like **difference C)**, to suppressing ringing in the signal. However, differences B) and C) use different means therefore which are not interacting. Thus, the effect caused by applying both measures concurrently is no more than the sum of the effects of each individual measure. It is therefore sufficient to show that each of these differences is obvious in order to conclude that their aggregation is obvious.

2.3.2 The board does not subscribe to the appellant's argument that the claimed "distance" and the "resistor" had to be balanced and thus were interacting synergetically to cause blunting over a wide frequency range. Although the resistor certainly needs to be balanced with the distance, the "blunting" caused specifically by the use of a resistor is independent of the actual distance between the transmitter and the antenna (and *vice versa*).

- 2.3.3 The board concurs with the examining division that **difference A)** constitutes a typical design measure in order to avoid unwanted currents that affect performance and in order to protect the antenna structurally. Therefore, it would have been obvious to the skilled person to apply this design measure to the system of document D1. In that regard, no further counter-arguments were advanced at the oral proceedings before the board.
- 2.3.4 With respect to **differences B) and C)**, it is apparent to the board that document D1 shows a "distance" and a "resistor", but is silent about their exact values. It is thus to be assessed whether it would have been obvious for the skilled person, when putting the device of document D1 into practice, to select values falling within the claimed range.
- 2.3.5 As to **difference B)**, the board notes that it was commonly known at the application's priority date that electro-magnetic interference is being lowered by increasing the distance. The board thus disagrees with the appellant's argument that the skilled person would have required an explicit hint in document D1 in order to take this fact into account (see e.g. **T 1601/15**, Reasons 3.5).
- 2.3.6 On the other hand, the skilled person would have strived for keeping the hearing prostheses of document D1 as compact as possible in order to avoid inconvenience to its user. The board holds that this is even hinted at in Figure 1 of D1. Therein, it is palpably shown that the "external component 142" (comprising elements 124, 130, 134) is evidently smaller than a human ear. The board thus holds that the skilled person would have indeed arrived at a distance

of several millimeters without employing any inventive skill. Since this is falling within the claimed range, difference B) is rendered obvious by document D1. Effectively, in view of paragraph [0028] of the description as translated, the "distance" recited in claim 1 appears to constitute a *constraint* rather than a parameter which may be chosen deliberately as part of the *solution*.

2.3.7 The appellant further argued that Figure 1 of document D1 did not show the "power source", as indicated in paragraph [0022]. This could be interpreted as suggesting other remote parts of the device being distant from the user's ear. Then, however, this distance would exceed the claimed "distance", thus effectively teaching away from difference B). The board's considerations as to the overall size of the "external component 142" of D1 being derivable from Figure 1 were thus purely speculative. Notably, in Figure 1, the dashed line of element 134 indicated an unspecified length of this element.

In that regard, the board however holds that Figure 1 in fact shows the major elements of the underlying hearing prostheses, while omitting negligible elements. Hence, the board interprets paragraph [0022] - in view of Figure 1 - as implying that the "power source" has been omitted in Figure 1 due to it being already included in the housing of sound processor 134. This impression is reinforced by a lack of any external connections (i.e. cables), which would constitute a major element of the hearing prostheses and would thus have certainly been reflected in a figure providing an overview about the appearance of a particular device. As to element 134 of Figure 1, the board holds that it

is immediately apparent that this element is partially hidden behind the human ear and that it is merely this fact which is indicated by the dashed line. Therefore, the appellant's argument fails to convince the board.

2.3.8 As to **difference C)**, the board concurs with the examining division that this difference does not allow to derive a technical effect over the whole scope claimed. Notably, it is already disclosed in document D1 that the resistor "reduces the ringing effects" (see paragraph [0045] of D1), i.e. the technical effect argued by the appellant and recited in claim 1. Selecting a particular value for the respective resistance merely sets the amount by which ringing is reduced. Rather, the level of ringing (if it occurs at all) depends on further unclaimed parameters, notably the "transmission distance" (see paragraph [0031] of the description as translated). Depending on this unclaimed parameter, ringing may even be suppressed entirely (or not). Hence, when attempting to put into practice what is disclosed in document D1, the skilled person would have determined a suitable value for the "resistor" by way of a trial-and-error exercise. Depending on the circumstances, they would then have readily arrived at a value falling within the claimed range, without employing any inventive skill. Therefore, difference C) may not support an inventive step, either.

2.3.9 Consequently, the subject-matter of claim 1 is not inventive over the disclosure of document D1.

2.4 In view of the above, the main request is not allowable under Article 56 EPC.

3. Auxiliary requests 1 to 9

3.1 Claim 1 of the auxiliary requests 1 to 9 differs from claim 1 of the main request in that

(k) the values "2 millimeters" and "2 ohms" have been replaced by "a plurality of millimeters" and "a plurality of ohms", respectively [**auxiliary requests 1, 2, 4, 5, 7, 8, 9**]

(l) the digital signal to be transmitted by the transmitter contains high-frequency components of a plurality of hundred MHz or higher [**auxiliary requests 2, 5, 8, 9**]

(m) the apparatus claims (i.e., claims 1 to 5) have been deleted [**auxiliary requests 3, 4, 5, 9**]

(n) only the at least one resistor is supposed to be connected in series between the transmission antenna and the transmitter [**auxiliary requests 6 to 9**]

3.2 **Feature (k)** has been introduced in response to the objection as to added subject-matter. Since the board judges that this objection is not pertinent, the amendment does not alter the claimed subject-matter in substance. Therefore, the above considerations on the lack of inventive step regarding the main request apply likewise.

3.3 As to **feature (l)**, the appellant submitted that the claimed "plurality of hundred MHz" did further limit the claimed subject-matter, since the apparatus of claim 1 had to be adapted to handle these frequencies. In combination with the claimed "distance", these frequencies exhibited a combined technical effect.

The board is not convinced by this argument, since claim 1 does not specify that the apparatus is actually operating at frequencies "of a plurality of hundred MHz or higher". That is, claim 1 comprises the case of a "digital signal containing high-frequency *components* of a plurality of hundred MHz or higher" (board's emphasis) where the actual transmission frequency is significantly lower (e.g. 5 MHz, as in D1) and the digital signal is subsequently crossing a bandpass filter, as in D1, such that the "high-frequency components" are removed and not inputted into the transmission antenna of the apparatus. Hence, even if feature (1) is considered as effectively limiting the subject-matter of claim 1, it cannot contribute to an inventive step since it does not allow to derive a credible technical effect over its entire breadth. In consequence, feature (1) may also not contribute to a combined technical effect.

- 3.4 As to **amendment (m)**, the board holds that the subject-matter of the independent method claims differs from the disclosure of document D1 in the same differences as the corresponding apparatus claims. As to the obviousness of these differences, the respective considerations apply likewise. The board does not subscribe to the appellant's argument that the independent method claims were inventive, since they were limited by "transmitting a digital signal", rather than merely being "configured to transmit" said signal in an unspecified way. As noted before, the claim does not specify whether certain properties of the signal according to feature (1) are also present in the blunted signal inputted into the "transmission antenna" (see the considerations set out in point 3.3 above).

3.5 As to **feature (n)**, the board considers that it is beyond doubt that this feature constitutes a further difference over the disclosure of document D1.

The appellant argues that feature (n) yields the technical effect of simplifying the system shown in document D1. This was inventive, as it would not have been obvious to modify the transmitter circuit of D1 in this way. Notably, paragraphs [0045] and [0046] of document D1 taught that the underlying resonant circuit ("RLC circuit") could not be removed. Therefore, the skilled person would not have considered omitting it in the disclosed context. Consequently, starting from document D1, the skilled person could not have arrived at feature (n) by performing only small changes. Rather, a new and non-obvious approach would have been required.

This is not persuasive. The board holds that the technical effect argued by the appellant is not credibly derivable from the wording of the respective independent claims. In particular, it is not apparent whether the claimed "transmitter" is the same as the transmitter disclosed in document D1. Rather, the board considers that the claimed "transmitter" may also comprise a bandpass filter which is equivalent to the RLC circuit of D1. This is in fact not excluded according to the wording of claim 1. Then, however, no simplification over D1 can be achieved at all. In the absence of a technical effect which is credibly achieved over the whole scope claimed, feature (n) may consequently not contribute to an inventive step.

3.6 In view of the above, none of auxiliary requests 1 to 9 is allowable under Article 56 EPC.

4. Auxiliary requests 10 to 16

4.1 The amendments according to auxiliary requests 10 to 16 concern solely modifications related to the clarity objections. Since these amendments are not affecting the assessment of inventiveness, the above considerations having regard to the main request as well as auxiliary requests 2, 3, 5, 6, 8 and 9, respectively, apply likewise.

4.2 Hence, none of auxiliary requests 10 to 16 is allowable under Article 56 EPC either.

Order

For these reasons it is decided that:

The appeal is dismissed.

The Registrar:

The Chair:



B. Brückner

K. Bengi-Akyürek

Decision electronically authenticated