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**D E C I S I O N**  
**of 17 December 2004**

**Case Number:** T 0968/01 - 3.5.1  
**Application Number:** 91122099.4  
**Publication Number:** 0492569  
**IPC:** G06K 7/08, G06K 19/07,  
H04L 25/48  
**Language of the proceedings:** EN

**Title of invention:**

A system and method for the non-contact transmission of data

**Patentee:**

ON TRACK INNOVATIONS LTD.

**Opponent:**

Giesecke & Devrient GmbH

**Headword:**

Non-contact transmission/ON TRACK INNOVATIONS

**Relevant legal provisions:**

EPC Art. 56

**Keyword:**

"Inventive step (no)"

**Decisions cited:**

-

**Catchword:**

-



Case Number: T 0968/01 - 3.5.1

**D E C I S I O N**  
**of the Technical Board of Appeal 3.5.1**  
**of 17 December 2004**

**Appellant:** ON TRACK INNOVATIONS LTD.  
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**Representative:** VOSSIUS & PARTNER  
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**Respondent:** Giesecke & Devrient GmbH  
(Opponent) Prinzregentenstrasse 159  
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**Representative:** -

**Decision under appeal:** Decision of the Opposition Division of the  
European Patent Office posted 17 July 2001  
revoking European patent No. 0492569 pursuant  
to Article 102(1) EPC.

**Composition of the Board:**

**Chairman:** S. V. Steinbrener  
**Members:** R. S. Wibergh  
G. E. Weiss

## Summary of Facts and Submissions

- I. This is an appeal against the decision of the opposition division to revoke European patent No. 0 492 569.
- II. In the opposition proceedings the opposition division referred in particular to the following documents:

E1: EP-A-0 377 257

E2: Jansen/Rötter, "Telekommunikationstechnik-Fachbildung", Verlag Europa-Lehrmittel, Wuppertal, 1988, Chapter 8.2 "Leitungseigenschaften", pages 400 to 420

D1: EP-A-0 289 136

D7: US-A-4 196 418.

According to the decision under appeal, E1 in combination with E2 rendered obvious the subject-matter of claim 1 as granted and as amended in accordance with three auxiliary requests.

- III. With the appeal the appellant (patent proprietor) requested that the decision be set aside and the patent maintained as granted. In reply to the statement of grounds the respondent (opponent) requested that the decision by the opposition division be confirmed.
- IV. By communication dated 18 August 2004, the Board briefly discussed a number of points raised by the

appellant in the grounds of appeal. Reference was in particular made to documents E1, D1 and D7.

- V. By letter of 16 November 2004 the appellant made further comments and presented claims according to two auxiliary requests.
- VI. Oral proceedings, requested by both parties on an auxiliary basis, were held on 17 December 2004. During the oral proceedings the appellant presented three new auxiliary requests.
- VII. Claim 1 according to the appellant's *main request* is the version as granted, which reads:

"A system for non-contact transmission of data between a station (1) and a portable data carrier (2), wherein the station (1) comprises:  
a station transmitter (3) operating at predetermined frequency for generating a first signal,  
a receiver (7) for receiving a second signal superimposed on the first signal, and a coil antenna;  
and wherein the portable data carrier (2) comprises:  
supply means (13) for coupling to a source of electric power, and  
a data carrier modulator (14) for modulating the first signal with the second signal in response to first data generated by the data carrier (2) by means of inductive coupling, and thereby enabling the first data to be transmitted from the data carrier (2) to the station (1), and  
a tuned antenna circuit (10, 55) inductively coupled with the station coil antenna (5) so as to receive therefrom an induced signal

CHARACTERIZED IN THAT:

the station coil antenna (5) is a matched antenna coupled via a length of cable (4) to the station transmitter (3) so as to be operative at said frequency regardless of the length of cable."

VIII. According to the *first auxiliary request*, the characterising part of claim 1 reads:

"CHARACTERIZED IN THAT:

the station comprises a station transmitter (3), which is coupled to the station coil antenna (5) via a length of cable (4) and

the station coil antenna (5) is coupled to said cable via a matching circuit (6) so as to be operative at said frequency regardless of the length of cable."

IX. Claim 1 according to the *second auxiliary request* is a combination of claims 1 and 5 as granted. The addition to claim 1 of the main request reads:

"... wherein the station (1) further includes:

a station control circuit (9) for deactuating the station transmitter (3) in response to second data stored in the station (1) and, by means of said inductive coupling, deactuating the signal induced in the data carrier tuned antenna circuit (10, 55); and the data carrier (2) further includes a detector (18) coupled to the data carrier tuned antenna circuit (10, 55) for detecting the state of the induced voltage of the data carrier tuned antenna circuit (10, 55), a logic circuit (15) coupled to the detector (18) and responsive to said state, whereby an output of the logic circuit (15) corresponds to the second data, and

means for coupling the output of the logic circuit (15) to a memory (16) within the data carrier (2) so as to store the second data therein."

X. Claim 1 according to the *third auxiliary request* is a combination of claims 1 and 6 as granted. The addition to claim 1 of the main request reads:

"... wherein the data carrier modulator (14) comprises a decoupling means (46) for decoupling the tuned antenna circuit (10, 55) in response to the first data thereby modulating the first signal with the second signal."

XI. The appellant requested that the decision under appeal be set aside and that the patent be maintained as granted (main request) or, in the alternative, in amended form on the basis of the first, second and third auxiliary requests filed at the oral proceedings.

XII. The respondent requested that the appeal be dismissed.

XIII. At the end of the oral proceedings the Board announced its decision.

## **Reasons for the Decision**

1. Admissibility of the appeal and late-filed requests

1.1 The appeal complies with the provisions referred to in Rule 65(1) EPC and is, therefore, admissible.

1.2 In view of the subject-matter claimed and the nature of the amendments involved, the Board exercised its discretion so as to admit the appellant's three auxiliary requests filed during the oral proceedings.

2. *The invention*

The invention (see in particular figure 1 and associated text of the patent specification) concerns a system for transferring data between a station and a portable record carrier, typically a card. The station comprises a coil antenna which generates a magnetic field of a certain frequency. A circuit within the card responds to the field by modulating it in accordance with data contained in a memory. This modulation is sensed in the station as a load variation. According to the invention the station antenna is a matched antenna, which implies that the transmitter does not contain a resonant circuit which has to be tuned as a function of the length of the antenna cable. A further feature of the invention concerns data transmission from the station to the card (second auxiliary request).

*The appellant's main request*

3. The appellant's main request is for maintenance of the patent-in-suit as granted.

4. *Construction of claim 1*

The respondent has argued that the words "matched" and "operative" in claim 1 are so vague that the invention as claimed is not limited to matching the impedance of the antenna to the characteristic impedance of the

antenna cable, as described in the specification. There is however no need to go into this question since even if claim 1 is interpreted narrowly in accordance with the description its subject-matter does not, in the Board's view, involve an inventive step, as will be explained below.

5. *The prior art*

5.1 E1, which the respondent takes to be the closest prior art document, describes a system according to the preamble of the present claim 1, with the exception of the claim feature "a receiver for receiving a second signal superimposed on the first signal". In E1 there is strictly speaking no superimposition, but the data from the card to the station are received when the signal from the transmitter (the "first" signal) is zero. Furthermore, nothing about matching is said, which means that E1 does not disclose the characterising portion of claim 1.

5.2 D7, a family member of which is referred to in E1, is also concerned with systems for non-contact transmission and in substance anticipates the features of the preamble of claim 1. A transmitter station is implicitly disclosed as the source of an electromagnetic field in a detection zone (column 1, lines 13 to 30). There is mentioned the principle of superimposition in that data from the card to the station are detected by monitoring the amount of energy absorbed by a periodically detuned resonant circuit in the card (column 2, line 65 to column 3, line 6). In this respect D7 comes closer to the claimed invention than E1.



5.3 E2 is a text book on telecommunications which explains the concept of matching in general terms and within the framework of telecommunication networks. It is observed that a cable loads the transmitter with its characteristic impedance ("Wellenwiderstand") (part 8.2.7), which is independent of the cable's length (part 8.2.6).

6. *Inventive step*

6.1 The appellant has argued that the invention solves a problem which had not been recognised before, that there was a long-felt need for a solution and that there had existed a prejudice against not using a resonant circuit in the station.

6.2 The technical problem as explained in the patent-in-suit (see column 3, line 3 onwards) is that, in order to operate at the resonant frequency, the resonant circuit components including the antenna and any cable connected to it have to be carefully calibrated. This means that the maximum displacement is fixed and cannot be altered without retuning the resonant circuit. The description goes on to say that this is not always desirable for several reasons. In bank applications, for example, it may be desirable to locate the antenna a significant distance from the station, but the capacitance of a long connecting cable may throw the resonant circuit out of resonance.

6.3 The respondent is of the opinion that this problem was immediately apparent to the skilled person. Systems for non-contact transmission of data were commonly used

when space was scarce, eg in door locking mechanisms, or in heavily contaminated surroundings. In such cases it would obviously be desirable to separate the bulky and/or sensitive electronics from the antenna.

6.4 The opposition division expressed the problem as "providing means to locate the antenna a significant distance from the station". This formulation has been criticised by the appellant as containing part of the solution, namely the need for separation between antenna and station. A more suitable formulation would in the appellant's view be to "provide an improved system".

6.5 The Board takes the view that a distinction must be made between the desirability of a certain result and the obviousness of arriving at it from the prior art. If in prior systems it was needed to retune the resonant circuit of a station in order to separate it sufficiently from the antenna, as mentioned in the patent-in-suit, this means that the aim of varying the distance between the antenna and the station was a known one. This is also confirmed by the appellant's argument that a long-felt need existed. Nor is this very surprising since non-contact transmission systems are used for very different applications (the introduction of the patent-in-suit mentions shop floor control systems and bank transaction systems), and there is evidently no reason to assume that the ideal place for the antenna is always at the same distance from the station.

The Board therefore agrees with the opposition division that starting from the prior art as described in

document D7 the technical problem can be properly stated as providing means to locate the antenna a significant and/or varying distance from the station.

6.6 The skilled person would have tried to solve the above problem by searching the relevant prior art. There can be little doubt that he would have found E2, which is a common text book, and even if he had not, the concept of characteristic impedance is - as accepted by the appellant - well known. It was therefore immediately clear to the skilled person that the use of a cable having a characteristic impedance matched to the antenna impedance would allow him to vary the distance between the station and the antenna at will. This was also the conclusion reached by the opposition division.

6.7 Nevertheless, it may be questioned whether the skilled person would have accepted this solution since it meant not using a resonant circuit in the station, and resonant circuits, according to the appellant, have been widely used because they permit maximum sensitivity (see the statement setting out the grounds of appeal, point 2.1). In the appellant's view this constituted a technical prejudice against non-resonant antennas. However, the existence of a prejudice must normally be demonstrated by reference to literature, such as text books. This has not been done here, and therefore the Board cannot accept as proved that a true *prejudice* in this respect has ever existed.

What is accepted, however, is that the skilled person may have been inclined to use a resonant transmitter in order to obtain a good sensitivity. In this respect the appellant has argued that the invention in fact offers

an *increased* sensitivity of the receiving antenna (see the letter dated 16 November 2004, point 2.6), a view supported by a passage in the description (column 11, lines 17 to 24): "the effect on the first signal is significantly greater than the effect achieved by loading the antenna as taught in hitherto proposed systems". On the other hand, the patent states also that the "principal novel feature resides in the provision of a matching circuit in the station for ensuring that the output impedance seen by the antenna remains constant regardless of the length of cable connecting the antenna to the transmitter within the station" (column 14, lines 13 to 17), without reference to the sensitivity. From this somewhat diverging information it can at best be concluded that the patent teaches that a non-resonant antenna performs better than many would have been expected. It is not denied that this alleged insight could contribute to an inventive step if the skilled person had no reason for abandoning the resonance circuit. But, as demonstrated above, he had in fact one, namely trying to solve the technical problem before him. Moreover, the Board doubts that he had assumed *a priori* that a station not employing a resonant antenna would be insensitive to such a degree that it would be pointless even to *try* a matched connection. A certain willingness to test new ideas must be expected by the average development engineer.

The Board therefore concludes that the skilled person would have included a matched antenna in the station to obtain the advantages offered by matching, and that any possibly achieved, more or less unexpected improvement in sensitivity was a mere additional effect which

cannot be considered when assessing the inventive activity in the present case.

7. It follows that the subject-matter of claim 1 does not involve an inventive step (Article 56 EPC).

*The appellant's first auxiliary request*

8. Claim 1 according to the first auxiliary request specifies that the matching is performed with a matching circuit coupled between the antenna and the cable. It is however well known in the art to employ such circuits to achieve matching between a cable and its load (eg E2, part 8.2.8). Therefore, this request cannot be allowed either (Article 56 EPC).

*The appellant's second auxiliary request*

9. In accordance with the second auxiliary request claim 5 as granted is incorporated in claim 1 as granted. The claim thus adds to the subject-matter of the main request the features that the station comprises a control circuit for deactuating the station transmitter in response to data stored in the station. The effect is to deactuate the signal induced in the card, a change which can be detected in the card and exploited to send data from the station to the card, where they are stored.
10. The respondent has argued that this functionality is already known from D1 and that its use in the system known from E1 was obvious. The appellant has argued that in D1 two resonant circuits are used, one in the card and one in the transmitter, and that the frequency

divider crucial for the function in D1 has no correspondence in the invention.

11. The Board notes that in D1 data are transmitted from the station to the card by deactuation of the station resonant circuit (see the abstract). The resonant circuit (see figure 2) responds to pulses from a frequency divider fed by an oscillator. The deactuation is achieved by altering the frequency division ratio (rather than inhibiting the oscillator), so that the resonant circuit substantially ceases to resonate (column 11, lines 31 to 42). A skilled person, wishing to improve on the card known from D7 (or E1), would appreciate the advantages of being able to exchange data not only from the card to the station but also in the opposite direction. The remaining technical difficulty involved in adopting the teaching of D1 was only how to stop periodically the transmission from the station when no resonant antenna is used. The solution consisting in deactivating the transmitter is banal as such since the transmitter is the radiation source. But it remains banal also in the context of D1 since the skilled person would realise that the more elaborate way of inhibiting the radiation described in this document was designed especially to cope with the resonant circuit, and was thus irrelevant in the present circumstances.

12. The further features of the claim being known from D1 (see figure 3 and the corresponding text), the subject-matter of claim 1 of the second auxiliary request does not involve an inventive step (Article 56 EPC).

*The appellant's third auxiliary request*

13. In accordance with the third auxiliary request, claim 6 as granted is incorporated in claim 1 as granted. It specifies that the modulator in the card comprises "a decoupling means" for decoupling the tuned antenna circuit in response to the first data thereby modulating the first signal with the second signal. This feature is however a standard one when data contained in the card are to be detected in the station in the form of a modulation of the emitted signal. For example, it is known from D7 to periodically detune or short-circuit the resonant circuit (column 2, lines 54 to 57), something which clearly calls for some kind of switching means for switching in the detuning circuitry in response to the data. It might be added that since these data are binary, so that the circuit is tuned for one kind of digit and detuned for the other, no particular technical significance can be attributed to the choice of the word *decoupling* means in the claim (rather than *coupling* means).

Therefore, the subject-matter of claim 1 of the third auxiliary request does not involve an inventive step (Article 56 EPC) and the request must be refused.

**Order**

**For these reasons it is decided that:**

The appeal is dismissed.

The Registrar:

The Chairman:

M. Kiehl

S. Steinbrener