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**Datasheet for the decision
of 5 March 2019**

Case Number: T 0698/18 - 3.4.01

Application Number: 11164408.4

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H01Q1/22

Language of the proceedings: EN

Title of invention:
Wireless IC device

Applicant:
MURATA MANUFACTURING CO., LTD.

Headword:
Resonating and matching circuit / MURATA MANUFACTURING

Relevant legal provisions:
EPC Art. 83
EPC R. 42(1) (e)
RPBA Art. 13(1)

Keyword:
Sufficiency of disclosure - (no) - completeness of disclosure
Absence of embodiments

Decisions cited:

T 0990/07



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Case Number: T 0698/18 - 3.4.01

D E C I S I O N
of Technical Board of Appeal 3.4.01
of 5 March 2019

Appellant: MURATA MANUFACTURING CO., LTD.
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Decision under appeal: Decision of the Examining Division of the
European Patent Office posted on 19 October 2017
refusing European patent application No.
11164408.4 pursuant to Article 97(2) EPC.

Composition of the Board:

Chairman P. Scriven
Members: J. Geschwind
P. Fontenay

Summary of Facts and Submissions

- I. The present decision relates to the appeal which was filed by the appellant (applicant) against the decision of the Examining Division to refuse European patent application No. 11 164 408.
- II. The application is a divisional of the earlier patent application No. 10 158 746 and the subject of appeal T 2559/12. This is itself a divisional of still earlier patent application No. 07 706 650.
- III. The Examining Division held that the subject-matter of claim 1 of the main request then pending was not new and that claim 1 of the first to third auxiliary requests, then pending, defined added subject-matter, contrary to Article 123(2) EPC.
- IV. The appellant requested that the appealed decision be set aside and that a patent be granted on the basis of the claims according to the main request as filed on 1 August 2017. This was the main request before the Examining Division.

In the alternative, grant of a patent on the basis of the set of claims according to first or second auxiliary requests filed with the statement of grounds was requested.

Arguments in favour of novelty and inventive step with regard to the prior art cited by the Examining Division were put forward.

V. In a communication under Article 15(1) RPBA, the appellant was informed of the Board's preliminary view.

The Board stressed that it intended to discuss the question of sufficiency of disclosure under Article 83 EPC. This aspect had not been addressed by the Examining Division and was raised *ex officio* by the Board. It appeared relevant for all the requests on file.

The attention of the appellant was drawn, specifically, to the feature of the wireless IC device in claim 1 of the appellant's requests according to which the power supply circuit comprises a resonant circuit which has a predetermined resonant frequency and which further has a function as a matching circuit for matching the impedance of the wireless IC chip with the impedance of the radiation plate.

Although the present application as filed, and the two earlier applications as filed, appeared to provide formal support for independent claim 1 of the appellant's requests, it was observed that the present application did not contain any embodiment corresponding to the claim's definition.

As a consequence, the dependent claims, which appeared to recite features selected from various specific configurations of the wireless IC circuit, seemed to lack bases in the present and earlier applications as filed, contrary to Articles 123(2) and 76 EPC.

Insofar as inventive step was concerned, the Board did not share the analysis of the Examining Division.

VI. In reply to the communication of the Board, the appellant filed additional auxiliary requests 3 to 8.

New auxiliary requests 3, 5 and 7 differed from the main request, auxiliary request 1 and auxiliary request 2, respectively, in that dependent claims 2 and 3 had been deleted.

New auxiliary requests 4, 6 and 8 differed from the main request, auxiliary request 1 and auxiliary request 2, respectively, in that all dependent claims had been deleted.

The appellant argued that the amendments made in new auxiliary requests 3 to 8 were meant to address the misgivings of the Board about the existence of a sufficient basis in the present and earlier applications as filed for the dependent claims of the main request and auxiliary requests 1 and 2.

With regard to the question of sufficiency of disclosure, it was submitted that the skilled person knew how to elaborate a separate matching circuit by appropriately combining an inductance element with an impedance element. This well-known approach was reflected by the second branch of the alternative envisaged in paragraph [0057] of the published application. In the case of the claimed configuration of the resonating circuit additionally fulfilling the function of a matching circuit, this common knowledge taught the skilled person, in a clear and unambiguous way, to use the capacitance and inductance elements already present in the resonating circuit for impedance matching. Reference was made, more specifically, to paragraph [0044] and Figure 3 in the published application which disclosed an example of a resonating

circuit including capacitance elements as well as an inductance element and, thus, the elements required for implementing the matching functionality.

The statement, in paragraph [0057] of the published application, that the design of the resonating circuit is complicated when said circuit includes the function of a matching circuit simply made the skilled person aware that a trade-off had somehow to be made when combining both functions.

Evidence was provided that the conjugate match impedance of IC chips for the intended frequencies of use was generally made available in the specifications of the IC provided by the manufacturers.

VII. Oral proceedings before the Board took place on 5 March 2019 in the presence of the appellant.

The appellant reiterated the view that the skilled person would have had no particular difficulties in elaborating the claimed wireless IC device. It was stressed that many tools existed to assist in designing electric circuits. Specifically, simulation programs were available. They allowed the skilled person to test, effectively by trial and error, various configurations or even to define the requirements that the circuit to be elaborated had to fulfil.

It was further submitted that a matching circuit was, by its very construction, also a resonating circuit.

VIII. In the course of the oral proceedings, new auxiliary request 9 was filed. It consisted of a single claim.

The feature regarding the matching functionality of the resonating circuit was deleted. The claim according to auxiliary request 9 is identical to claim 1 as originally filed.

In support of the admissibility of the new request, the appellant emphasised that the objection raised under Article 83 EPC had been raised for the first time in the provisional opinion issued by the Board.

IX. Claim 1 of the main request reads:

*A wireless IC device comprising:
a wireless IC chip (5);
a power supply circuit board (10; 50)
connected to the wireless IC chip (5), and
comprising a power supply circuit (16; 56)
including a resonant circuit having a
predetermined resonant frequency; and
a radiation plate (20; 22), to which the
power supply circuit board (10; 50) is
adhered or disposed adjacent thereto,
arranged to perform at least one of
radiation of a transmission signal supplied
from the power supply circuit (16; 56), and
receiving of a reception signal and
supplying of the reception signal to the
power supply circuit (16; 56),
wherein the transmission signal and/or the
reception signal have a frequency
substantially corresponding to the resonant
frequency of the resonant circuit, wherein
the resonant circuit has a function as a
matching circuit for matching the impedance*

of the wireless IC chip (5) with the impedance of the radiation plate (20; 22).

- X. Claim 1 of auxiliary request 1 differs from claim 1 of the main request in that it includes a further limitation, at the end of the claim, regarding the electrical length of the radiating plate.
- XI. Claim 1 of auxiliary request 2 differs from claim 1 of the main request in that it specifies that the resonant circuit included in the power supply circuit is a parallel resonant circuit and in that it specifies, at the end of the claim, that
- the parallel resonant circuit includes an inductance element (L) and a floating capacitance element between conductor patterns of the inductance element, wherein a first end of the inductance element (L) is connected to a first terminal of the wireless IC chip (5), and wherein a second end of the inductance element (L) is connected to a second terminal of the wireless IC chip (5).*
- XII. Claim 1 of auxiliary requests 3 and 4 is identical to claim 1 of the main request.
- XIII. Claim 1 of auxiliary requests 5 and 6 is identical to claim 1 of auxiliary request 1.
- XIV. Claim 1 of auxiliary requests 7 and 8 is identical to claim 1 of auxiliary request 2.

XV. Claim 1 of auxiliary request 9 differs from claim 1 of the main request essentially in that the wording:

wherein the resonant circuit has a function as a matching circuit for matching the impedance of the wireless IC chip (5) with the impedance of the radiation plate (20; 22)

has been deleted at the end of the claim.

Reasons for the Decision

Sufficiency of disclosure (Article 83 EPC)

1. Claim 1 according to the main request and to auxiliary requests 1 to 8 relates to a wireless IC device comprising:
 - a wireless IC chip,
 - a radiation plate, and a
 - power supply circuit board connected to the wireless IC chip and comprising a power supply circuit including a resonant circuit having a predetermined resonant frequency.

2. Claim 1 further specifies that the transmission or reception signal has a frequency substantially corresponding to the resonant frequency of the resonant circuit, wherein the resonant circuit has a function as a matching circuit for matching the impedance of the wireless IC chip with the impedance of the radiation plate.
3. Insofar as the reception signal is concerned, and in view of the fact that a reception signal may cover a large spectrum of frequencies, the Board interprets the claim's wording as implying that the claimed device is specifically adapted to process signals, or the portion of signals, corresponding to the resonating frequency of the resonant circuit.
4. It is further implicit, from the claim's wording, that the matching functionality similarly refers to the signals corresponding to the resonating frequency.
5. The application does not contain any embodiment corresponding to the claim's definition, but this alone cannot justify the refusal of the application, since

the purpose of the 'examples' evoked in Rule 27(1) (e) EPC [1973] appears primarily to be to complete an otherwise incomplete teaching" and that "the application cannot be refused under this provision if the description is considered to describe, despite the [...] lack of examples actually embodying the invention, one way of carrying out the invention (T 990/07, Headnote and point 3).

The issue to be decided is whether the application is actually sufficiently complete, despite the absence of

concrete embodiments, to allow the skilled person to carry out the claimed invention.

6. The elaboration of a circuit that should not only resonate at a predetermined frequency, but also function as an impedance matching circuit is not straightforward. Paragraph [0057] of the original disclosure, which constitutes the only basis for the recited functionalities of the claimed invention, acknowledges this difficulty. It reads (*emphasis in bold added by the Board*):

*[0057] According to the present invention, the resonance circuit may function as a matching circuit for matching the impedance of the wireless IC chip with the impedance of the radiating plate. Alternatively, the power feeding circuit board may further include a matching circuit that includes an inductance element and a capacitance element and that is provided separately from the resonance circuit. **In general, when the resonance circuit includes the function of a matching circuit, the design of the resonance circuit is complicated.** However, if a matching circuit is provided separately from the resonance circuit, the resonance circuit and the matching circuit can be designed independently.*

7. The elaboration of a matching circuit for matching the impedance of the wireless IC chip with the impedance of the radiation plate requires precise knowledge of both parameters. The appellant was able to provide evidence that the impedance of the IC wireless chip is well defined for the intended frequencies of use. It typically belongs to the set of technical data made available by manufacturers. It may further be assumed

that the impedance of the radiating plate is known with sufficient precision. Such data may be obtained from the radiating plate specification or from measurements. However, the precise knowledge of these two parameters does not appear to be sufficient.

8. In the absence of any information in the application as to how the invention is to be carried out, the reader can only rely on common general knowledge in the field of matching networks.
9. The appellant's view that the elaboration of a separate matching network combining capacitance and inductance elements (the second branch of the alternative referred to in paragraph [0057]) would simply result from the application of this common knowledge is not questioned by the Board. How such knowledge can effectively be used in the context of a circuit which is required to resonate at a predetermined frequency is, however, far from straightforward, contrary to what the appellant suggests.
10. As a matter of fact, the condition that the circuit must match, for a given frequency, the impedance of the wireless IC chip with the impedance of the radiation plate, appears to conflict with the additional requirement that said circuit should resonate at said frequency. The principle underlying the elaboration of matching circuits implies, in effect, that the impedance "seen" by a power source be the complex conjugate of its own impedance. Applied to the present situation, this requires that the impedance of the resonating circuit and radiation plate, in combination, and measured at the output of the wireless IC chip, be the complex conjugate of the impedance of the IC chip.

11. When applied to the elaboration of separate matching networks, as relied upon by the appellant, the application of said principle implies that the values of the capacitance and inductance to be incorporated in such a circuit are determined by equating the real and imaginary parts of the conjugate impedance of the source with the corresponding terms of the circuit it supplies.

12. While this approach is straightforward when designing a separate matching circuit for which no other constraints apply, it is not so when applied to a circuit which must resonate at a predetermined frequency. In effect, it is even doubtful whether the equations that express the condition of resonance, on the one hand, and of matching the IC chip with the resonating plate, on the other hand, always have a solution in the case of a circuit of the kind illustrated in Figure 3.

13. In the present context, the Board has no doubts that the skilled person, despite the absence of concrete values for the capacitance and inductance elements in the various circuits disclosed in the application, would be able to determine values that make the circuit resonate at a predetermined frequency. This undoubtedly applies to the circuit of Figure 3 of the published application, referred to by the appellant.

Any change that the matching requirements require would, however, directly affect the behaviour of the power driving circuit and, in particular, its resonating frequency.

14. The appellant's view that the skilled person would simply have to take advantage of the capacitance and

inductance elements of the resonating circuit to realise the matching functionality is thus rejected. In effect, there is no guarantee that a matching may even be obtained within the bandwidth of the resonating circuit. For these reasons, the Board rejects the view that the difficulty in fulfilling both conditions as to matching and resonance could be solved by some trade-off between both requirements.

15. In the absence of any evidence regarding the existence and the functionalities of simulation programs, well known to the skilled person, that would indeed permit the elaboration of a circuit resonating at a certain frequency and including the function of a matching circuit at said resonance, the appellant's view that such programs would compensate for the lack of details in the description is rejected. The test of various configurations by trial and error by taking advantage of the possibilities made available by such simulation programs does not solve the fundamental dilemma evoked above regarding the compatibility of both requirements.
16. The argument that a matching circuit is also inherently a resonating circuit is not convincing. It is certainly correct that matching networks well known to the skilled person, of the kind referred to by the appellant associating a capacitance and an inductance, will also resonate at a certain frequency. In general, however, said resonating frequency will be different from that for which the matching circuit has been conceived. The claimed subject-matter requires, however, that the matching functionality be achieved at its resonating frequency.
17. To avoid any misunderstanding, it should be stressed that the Board's objection does not rely on any

inherent impossibility of realising a circuit that both resonates at a certain frequency and further includes the function of a matching circuit at said frequency, but on the fact that the appellant has not provided evidence that common general knowledge regarding the elaboration of matching circuits could compensate for the absence, in the patent application, of embodiments of the claimed invention. The absence of the required information amounts to undue burden on the shoulders of the skilled person attempting to carry out the claimed invention.

18. Consequently, the skilled person is not in a position to carry out the claimed invention on the basis of the application documents and common general knowledge. The application does thus not meet the requirements of Article 83 EPC.

Auxiliary request 9 - Admissibility

19. Auxiliary request 9 was filed during the oral proceedings before the Board, that is, at a particularly late stage of the appeal proceedings.
20. Article 13(1) RPBA relates to amendments filed by a party in the course of the appeal proceedings. It reads:

Any amendment to a party's case after it has filed its grounds of appeal or reply may be admitted and considered at the Board's discretion. The discretion shall be exercised in view of inter alia the complexity of the new subject matter submitted, the current state of the proceedings and the need for procedural economy.

21. The amendment made in claim 1 of auxiliary request 9 consists of deleting the feature regarding the ability of the resonating circuit to match the impedance of the wireless IC circuit with the impedance of the radiating plate. The amendment was intended to remedy to the objection regarding the insufficient disclosure of the invention under Article 83 EPC.
22. In support of the admissibility of the new request, the appellant emphasised that the objection raised under Article 83 EPC had been raised for the first time in the provisional opinion issued by the Board.
23. The appellant had, however, been informed of the misgivings of the Board with regard to the question of sufficiency of disclosure under Article 83 EPC before the oral proceedings. In its reply to the Board's communication, the appellant opted for defending the view that the invention had been disclosed in a manner sufficiently clear and complete to allow its reproduction.
24. The filing of auxiliary request 9 during the oral proceedings amounts to adopting a totally different strategy. It leads to the need to reconsider the relevance of the available prior art when deciding on the issues of novelty and inventive step, considering that the scope of claim 1 has become much broader as a result of the deleted features.
25. The need to address these issues at a particularly late stage of the proceedings, whether by the Board or by the examining Division, would directly conflict with the need for procedural economy referred to in Rule 13(1) RPBA. This appears all the more true considering that the claim of auxiliary request 9 reflects claim 1

of the original request which was withdrawn following the communication of the Extended European Search Report.

26. The Board, exercising its discretion under Rule 13(1) RPBA, therefore decides not to admit auxiliary request 9 into the proceedings.

Order

For these reasons it is decided that:

The appeal is dismissed.

The Registrar:

The Chairman:



R. Schumacher

P. Scriven

Decision electronically authenticated