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**Datasheet for the decision  
of 1 June 2022**

**Case Number:** T 0222/17 - 3.4.01

**Application Number:** 08803964.9

**Publication Number:** 2201390

**IPC:** G01R21/133, G01R21/08, H02J3/24

**Language of the proceedings:** EN

**Title of invention:**  
METHOD AND APPARATUS FOR MONITORING POWER TRANSMISSION

**Patent Proprietor:**  
Ably AS  
Energyinfo AS

**Opponent:**  
Genscape, Inc.

**Headword:**  
Monitoring Power Transmission / Ably, Energyinfo

**Relevant legal provisions:**  
EPC Art. 100(b), 83, 123(3)  
RPBA 2020 Art. 13(1), 13(2)

**Keyword:**

Sufficiency of disclosure - enabling disclosure (no)

Late-filed auxiliary requests - request clearly allowable (no)



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Case Number: T 0222/17 - 3.4.01

**D E C I S I O N**  
**of Technical Board of Appeal 3.4.01**  
**of 1 June 2022**

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**Decision under appeal:**

**Decision of the Opposition Division of the  
European Patent Office posted on 8 November 2016  
revoking European patent No. 2201390 pursuant to  
Article 101(3) (b) EPC.**

**Composition of the Board:**

**Chairman**            P. Fontenay  
**Members:**            T. Zinke  
                              C. Almberg

## **Summary of Facts and Submissions**

- I. An opposition was filed against the European Patent EP-B-2 201 390 based on Article 100(a) EPC in combination with Articles 54 and 56 EPC; on Article 100(b) EPC; and on Article 100(c) EPC. The Opposition Division held that the subject-matter of claim 1 of the patent proprietor's main request (patent as granted) was insufficiently disclosed (Article 100(b) EPC), and that the subject-matter of independent claim 1 of each of a first and a second auxiliary request extended the protection conferred (Article 123(3) EPC). Consequently, the patent was revoked.
- II. The patent proprietor appealed.
- III. With the statement of grounds of appeal, the patent proprietor requested that the decision be set aside and that the opposition be rejected (main request), or that the patent be maintained based on one of the claim sets according to auxiliary requests 1 to 3 filed with that statement.
- IV. In the reply to the appeal, the opponent requested that the appeal be dismissed.
- V. With a subsequent submission of 31 December 2019, the patent proprietor filed claim sets for auxiliary requests 4 to 7.
- VI. Both parties requested oral proceedings.
- VII. The Board summoned to oral proceedings and issued its preliminary opinion according to Article 15(1) RPBA 2020.

- VIII. The opponent did not file a response to the Board's preliminary opinion, withdrew its request for oral proceedings and indicated that oral proceedings would not be attended.
- IX. With its response to the Board's preliminary opinion, the proprietor filed claim sets for further auxiliary requests 8 to 10.
- X. Oral proceedings took place on 1 June 2022. As indicated, the opponent did not attend.
- XI. As confirmed by the proprietor at the start of oral proceedings, its initial requests were that the appealed decision be set aside and that the patent be maintained as granted, i.e. that the opposition be rejected (main request), or maintained as amended based on the claims of one of the
- first to third auxiliary requests filed with the statement of grounds of appeal,
  - auxiliary request 4 to 7 filed with the letter of 31 December 2019, or
  - auxiliary request 8 to 10 filed with the response to the Board's communication issued under Article 15(1) RPBA 2020.
- XII. As apparent from the file, the opponent requested
- that the appeal be dismissed, or
  - if the Board finds the main request or any of the first to third auxiliary requests allowable in view of some pending objections under Articles 83, 84 and 123(3) EPC, that the case be remitted to the Opposition Division for assessment of the remaining pending objections.

XIII. During oral proceedings, the proprietor withdrew the second auxiliary request, auxiliary requests 4 to 7, and 9 and 10, so that its final requests were: that the appealed decision be set aside and that the patent be maintained as granted, i.e. that the opposition be rejected (main request), or maintained as amended based on the claims of one of the

- first and third auxiliary requests filed with the statement of grounds of appeal, and
- auxiliary request 8 filed with the response to the Board's communication issued under Article 15(1) RPBA 2020.

XIV. Independent claim 1 of the main request (patent as granted) reads as follows:

*An apparatus (10) for measurement of power in an electric power transmission line (20) comprising:*

- a processor (40);*
- a first electromagnetic sensor (30) for making a first measurement of an electromagnetic field (35) at the electric power transmission line (20) and transmitting first electromagnetic data (37) to the processor (40), wherein the first electromagnetic sensor (30) is arranged proximate to but at a distance from the electric power transmission line (20);*
- a second electromagnetic sensor (50) connected to a low voltage part of the electric power transmission line (20) for making a second measurement associated with the voltage in the low voltage part of the electrical power transmission line (20) and for transmitting second electromagnetic data (55) to the processor (40);*
- a clock (38) characterized by*

- a transfer function calculator (60) for calculating the relationship between the first electromagnetic data (37) and the second electromagnetic data (55), wherein the processor is adapted to calculate the power in the electric power transmission line (20) from the first electromagnetic data (37), the second electromagnetic data (55) and by accessing the transfer function calculator (60).

Claims 2 to 5 are dependent apparatus claims.

Independent claim 6 defining a corresponding method reads as follows:

*A method for measurement of power in an electric power transmission line (20) comprising:*

- *measuring an electromagnetic field (35) to obtain electromagnetic field data (37) about the electric power transmission line (20) proximate to but at a distance from the electric power transmission line (20);*
- *measuring a distal electromagnetic waveform (55) performed in a low voltage part of the electric power transmission line (20);*
- *calculating a transmission line electromagnetic waveform data from the distal electromagnetic waveform (55); and*
- *calculating the power in the electric power transmission line (20), characterized in that the power in the electric power transmission line (20) is calculated from the transmission line electromagnetic waveform data, the electromagnetic field data (37) and by accessing a transfer function calculator.*

Claims 7 and 8 are dependent method claims.



XV. Independent claim 1 of the first auxiliary request was amended by the specifications that the first electromagnetic sensor is a magnetic field sensor, that the electromagnetic field (35) is a magnetic field (35), that the first electromagnetic field data (37) is magnetic field data (37), that the second electromagnetic field sensor (50) is a voltage sensor (50), and that the second electromagnetic data (55) is voltage waveform data (55). Further, it was added that the processor is adapted to calculate the power by also using "the relationship between the magnetic field data (37) and the voltage waveform data (55)". It thus reads:

*An apparatus (10) for measurement of power in an electric power transmission line (20) comprising:  
a processor (40);  
a magnetic field sensor (30) for making a first measurement of a magnetic field (35) at the electric power transmission line (20) and transmitting magnetic field data (37) to the processor (40), wherein the magnetic field sensor (30) is arranged proximate to but at a distance from the electric power transmission line (20);  
a voltage sensor (50) connected to a low voltage part of the electric power transmission line (20) for making a second measurement associated with the voltage in the low voltage part of the electrical power transmission line (20) and for transmitting voltage waveform data (55) to the processor (40);  
a clock (38); characterized by  
a transfer function calculator (60) for calculating the relationship between the magnetic field data (37) and the voltage waveform data (55), wherein the processor is adapted to calculate the power in the electric power transmission line (20) from the magnetic field data*

*(37), the voltage waveform data (55) and the relationship between the magnetic field data (37) and voltage waveform data (55) and by accessing the transfer function calculator (60).*

Similar amendments were made to the independent method claim (now claim 5), which reads:

*A method for measurement of power in an electric power transmission line (20) comprising:*

- measuring a magnetic field (35) to obtain magnetic field data (37) about the electric power transmission line (20) proximate to but at a distance from the electric power transmission line (20);*
- measuring a distal voltage waveform (55) performed in a low voltage part of the electric power transmission line (20);*
- calculating a transmission line voltage waveform data from the distal voltage waveform (55) and the magnetic field data (37); and*
- calculating the power in the electric power transmission line (20), characterized in that the power in the electric power transmission line (20) is calculated from the transmission line waveform data, a transfer function calculator (60) and the magnetic field data (37).*

The dependent claims were also amended, the amendments, however, are not relevant for this decision.

XVI. Independent claim 1 of the third auxiliary request was amended as compared to independent claim 1 of the first auxiliary request by the specifications that the magnetic field sensor is "at a first location", and that the voltage sensor is "at a second location", and the characterizing part was amended to read:

...[characterized by]

- a transform phase calculator (60) for calculating a voltage waveform timing at the first location from the relationship between the voltage waveform data (55) and the magnetic field data (37) for the processor (40) to determine a U-I phase angle, wherein the processor (40) is adapted to calculate the power in the electric power transmission line (20) from a predefined voltage in the electric power transmission line (20), magnetic field data (37), the voltage waveform data (55), the U-I phase angle and by accessing the transform phase calculator (60).

Independent method claim 5 of the third auxiliary request was amended as compared to independent method claim 5 of the first auxiliary request by the removal of a part from the feature defining calculating a transmission line voltage waveform data, to read (emphasis added):

...calculating a transmission line voltage waveform data from the distal voltage waveform (55) ~~and the magnetic field data (37);...~~

XVII. In auxiliary request 8, independent apparatus claim 1 was amended, *inter alia*, by the specifications that the magnetic field sensor (30) measures "a magnitude and a timing of a magnetic field (35)", and that the voltage sensor is for making "a measurement associated with a timing of the voltage" in the low voltage part and for transmitting "voltage phase data" to the processor. Moreover, the definitions of the transfer function calculator and the processor when calculating a phase relationship between the magnetic field data and the voltage phase data were amended. Claim 1 thus reads:

An apparatus (10) for measurement of power in an electric power transmission line (20) comprising:

- a magnetic field sensor (30) for making a measurement of a magnitude and a timing of a magnetic field (35) at the electric power transmission line (20) and transmitting magnetic field data (37) to the processor (40), wherein the magnetic field sensor (30) is arranged proximate to but at a distance from the electric power transmission line (20);
- a voltage sensor (50) connected to a low voltage part of the electric power transmission line (20) for making a measurement associated with a timing of the voltage in the low voltage part of the electrical power transmission line (20) and for transmitting voltage phase data (55) to the processor (40);
- a clock (38),  
characterized by
- a transfer function calculator (60) for providing a transfer function of the voltage phase data (55) for calculating a phase relationship between the magnetic field data (37) and the voltage phase data (55),
- a processor (40) for calculating the phase relationship between the magnetic field data (37) and the voltage phase data (55),

wherein the processor is further adapted to calculate the power in the electric power transmission line (20) from the magnetic field data (37), a predefined rms value of the voltage and, by accessing the transfer function calculator (60), the phase relationship between the magnetic field data (37) and the voltage phase data (55).

Independent method claim 5 was amended accordingly to read:

*A method for measurement of power in an electric power transmission line (20) comprising:*

- measuring a magnitude and a timing of a magnetic field (35) to obtain magnetic field data (37) about the electric power transmission line (20) proximate to but at a distance from the electric power transmission line (20);*
- measuring a timing of a voltage to obtain voltage phase data (55) in a low voltage part of the electric power transmission line (20);*
- calculating a transfer function of the voltage phase data (55) for calculating a phase relationship between the magnetic field data (37) and the voltage phase data (55); and*
- calculating the power in the electric power transmission line (20),*

*characterized in that the power in the electric power transmission line (20) is calculated from a predefined rms value of the voltage, the magnetic field data (37), and, based on the transfer function, the phase relationship between the magnetic field data (37) and the voltage phase data (55).*

## **Reasons for the Decision**

*Main request (patent as granted)*

1. In the decision under appeal, the Opposition Division held that the subject-matter of claim 1 of the patent as granted (main request) can be interpreted by the

skilled person in two ways, both being different from the invention disclosed in the patent specification. Since none of the two interpretations enabled the skilled person to carry out the claimed invention, the Opposition Division concluded that the invention according to claim 1 of main request was not sufficiently disclosed (Article 100 (b) EPC) (decision, grounds, sections 1 and 4).

2. The Board concurs with the position of the Opposition Division.
3. The invention as disclosed in the patent aims at measuring the power in a power transmission line (B1-document, paragraph [0010]). It was common general knowledge, and is undisputed by the parties, that in order to measure the power for alternating currents it is necessary to determine a current, a voltage and a phase between the current and the voltage at a particular location in the power transmission line (cf. B1-document, paragraph [0044]).
4. The embodiments disclosed in the patent in order to determine the power
  - measure the timing and magnitude of the current at the particular location ("first electromagnetic data") by using a magnetic field sensor ("a first electromagnetic field sensor") near said particular location
  - use a voltage magnitude in the electric power transmission line as provided by an electricity supply company (B1-document, paragraph [0099])
  - determine the phase between voltage and current at the particular location by measuring voltage timing data ("second electromagnetic data" measured with a "second electromagnetic field sensor") at a low voltage

part of the electric power transmission line (i.e. another location than the particular location) and using this timing data to determine the timing data of the voltage at the particular location. This latter step is performed by using a transfer function for the voltage ( $U_{t\_trans}$ ) (cf. B1-document, paragraphs [0066], [0072], [0073]). In particular the sentence dealing with the transfer function in paragraph [0066] reads:

*By the use of lookup tables for the transfer function of the voltage from the first location to the second location, it is possible to calculate the timing of the voltage waveform  $U$  at the same place and time as the first location at which the current measurement was done.*

5. As already pointed out by the Opposition Division in the decision under appeal, independent claim 1, however, defines the transfer function (or here: the transfer function calculator 60) differently. It refers namely to

*... a transfer function calculator (60) for calculating the relationship between the first electromagnetic data (37) and the second electromagnetic data (55),...*

6. There is no disclosure let alone any enabling disclosure in the application for such a transfer function. More fundamentally, the transfer function as presently referred to in the claim is useless in the context of the invention since it merely associates two known (measured) quantities. It is thus not adapted to provide the missing information as to the voltage and phase at the first location in case the first electromagnetic sensor delivers current data.

7. It is emphasised, in this respect, that the nature of the physical parameters measured by the first and second electromagnetic sensors are without bearing on the present findings. If, according to a first interpretation, the first electromagnetic data are considered to relate to the current at the particular location and the second electromagnetic data are considered to relate to voltage data at the lower voltage part of the power transmission line, the transfer function as defined in claim 1 would be unable to provide the missing voltage data (amplitude and phase) at said particular location. If, according to a second interpretation, both first and second electromagnetic data were considered voltage data the calculated transfer function would still be unable to provide the missing current data needed to determine the power in the power transmission line.
8. In the course of the oral proceedings, the proprietor acknowledged that the claim's wording did not reflect the content of the patent specification, but emphasised that the skilled person would have been in a position, on the basis of common general knowledge, to make sense of the claimed subject-matter. In particular, the skilled person would have understood that the electromagnetic data and the transfer function were such as to provide the required information as to the voltage, the current intensity and the phase at the particular location.
9. With regard, more specifically, to the information required to define the transfer function, the proprietor argued that a skilled person would understand that among the first electromagnetic data there is also location data about the particular



location of the first electromagnetic sensor. This location is actually used by the transfer function (or by the transfer function calculator), since it is this particular location to which the timing of the voltage data has to be transferred to in order to determine the phase between voltage and current at this particular location (cf. for instance, statement of grounds of appeal, last two paragraphs on page 4; submission of 31 December 2019, top of page 8, number 4)). This information as to the location of the electromagnetic sensors combined with the knowledge of the grid at the time the measurements are carried out allowed a calculation of the transfer function as required to determine the voltage and phase at the particular location.

10. The Board is not persuaded.
11. Independently of the above findings regarding the claimed definition of the transfer function, a skilled person would, first, not consider location data alone as electromagnetic data. It might be that location data is needed together with electric or magnetic field data in order to describe an electromagnetic field completely. But it is not apparent that a skilled person would interpret the term "electromagnetic data" in a way neglecting the electric or magnetic field values completely, considering location data only.
12. Second, it is established case law (cf. Case Law of the Boards of Appeal, 9th edition 2019, section II.C.5.4) that the disclosure is sufficient only if it allows the invention to be performed in the whole range claimed. The term "electromagnetic data" is so broad that it also includes magnetic and/or electric data without location data (like, for instance, a current value

alone). For the latter case, the transfer function can not determine a relationship to the measured voltage at the lower voltage part of the power transmission line, so that the claimed subject-matter cannot be carried out.

13. Hence, the main request is not allowable due to insufficient disclosure (Article 100(b) EPC).

*First Auxiliary Request*

14. The first auxiliary request was filed with the statement of grounds of appeal. The Board considers the amendments made as a genuine attempt to overcome the objections raised by the Opposition Division and admitted the first auxiliary request into the proceedings (Article 12(4) RPBA 2007).
15. With the amendments made to the first auxiliary request it is defined that the first electromagnetic data is magnetic data measured by a magnetic sensor and the second electromagnetic data is voltage form data measured by a voltage sensor.
16. This amendment rules out the second interpretation of claim 1 of the main request discussed above (i.e. that the first and second electromagnetic data are both voltage data). In this respect, it better reflects the actual teaching of the patent specification, as discussed above under the first interpretation. However, as also discussed above, and independently of the fact that there is no disclosure for a transfer function calculator or a corresponding transfer function that relates magnetic field data and voltage form data, the determination of the transfer function

between these two measured quantities would still be useless for the determination of the power flow.

17. Hence, also the subject-matter of claim 1 of the first auxiliary request is not disclosed in a way that can be carried out by a skilled person.
18. The first auxiliary request is not allowable (Article 83 EPC).

*Third auxiliary request*

19. The third auxiliary request was filed with the statement of grounds of appeal. The Board considers the amendments made as a genuine attempt to overcome the objections raised by the Opposition Division and admitted the third auxiliary request into the proceedings (Article 12(4) RPBA 2007).
20. Whereas the amendments made towards defining the first location of the magnetic field sensor and the second location of the voltage sensor is acceptable under Articles 123(2) and (3) EPC, the amendments made to the characterising part of claim 1 are considered to introduce subject-matter extending the protection conferred, which is not allowable under Article 123(3) EPC.
21. In claim 1 as granted there was defined a "transfer function calculator for calculating the relationship between the first electromagnetic data (37) and the second electromagnetic data (55)". Re-naming of "transfer function calculator (60)" into "transform phase calculator (60)" is considered acceptable under Articles 123(2) and (3) EPC, because a skilled person

could understand that the term "transform phase calculator (60)" - as used in the description for the device with reference sign 60 - is the same as the "transform function calculator (60)" - as used in the claims as filed and as granted for the device with reference sign 60. However, the new formulation of claim 1 no longer defines a device that is "for calculating the relationship between the first electromagnetic data (37) and the second electromagnetic data (55)" or - with the further definitions of these data as currently amended - "for calculating the relationship between magnetic field data (37) and voltage waveform data (55)". The amended version of claim 1 only defines that the transform phase calculator uses this relationship, but how (and by whom) it is calculated or determined is no longer part of the claim. The removal of this claim feature extends the protection conferred, and consequently, this amendment is not allowable under Article 123(3) EPC.

22. As argued by the proprietor, this amendment was made in order to overcome the objection under Articles 100(b) and 83 EPC against the main request and the first auxiliary request. However, even the wording of this feature in the third auxiliary request still includes a "relationship between the voltage waveform data (55) and the magnetic field data (37)". As discussed above, independently of the finding, that there is no disclosure in the patent application of this relationship, said relationship is as such irrelevant for the determination of the voltage and phase at the particular location. Hence, even with the amendment, the objection under Article 83 EPC remains.

23. Since the third auxiliary request introduces subject-matter extending the protection conferred by the patent (Article 123(3) EPC), and still includes insufficiently disclosed subject-matter (Article 83 EPC), the third auxiliary request is not allowable.

*Auxiliary Request 8*

24. Auxiliary request 8 was filed on 1 April 2022 after notification of the summons to oral proceedings. Its admission is, therefore, governed by Article 13(2) RPBA 2020.
25. Article 13(2) RPBA 2020 lays down that amendments to a party's appeal case made at such a late stage of the proceedings shall, in principle, not be taken into account unless there are exceptional circumstances, which have been justified with cogent reasons by the party concerned.
26. In Article 13(1) RPBA 2020, the criteria of which the Board can also rely on, it is further specified that the Board shall exercise its discretion in view of, inter alia, [...],
- in the case of an amendment to a patent application or patent, whether the party has demonstrated that any such amendment, prima facie, overcomes the issues raised by another party in the appeal proceedings or by the Board and does not give rise to new objections.*
27. Auxiliary request 8 is not admitted into the appeal proceedings under Articles 13(1), (2) RPBA 2020 since, prima facie, the amendments made are not allowable

under Article 123(3) EPC because they extend the protection conferred.

28. With the amendments made to the characterising part of claim 1 of the auxiliary request 8, the distribution of the tasks between the "transfer function calculator (60)" and the "processor (40)" has changed. In claim 1 as granted, the transfer function calculator was "for calculating the relationship between the first electromagnetic data (37) and the second electromagnetic data (55)". In claim 1 of auxiliary request 8, however, the transfer function calculator is "for providing a transfer function of the voltage phase data (55) for calculating a phase relationship between the magnetic field data (37) and the voltage phase data (55)", whereas it is the processor that is "for calculating the phase relationship between the magnetic field data (37) and the voltage phase data (55)". This has to be interpreted in that the transfer function calculator is for a preparatory step ("for providing a transfer function of the voltage phase data (55)") that is then used by the processor (40) for calculating the (phase) relationship between the magnetic field data (37) and the voltage phase data (55). Even if the transfer function calculator could be understood as being a part of the processor - as argued by the proprietor (cf. for instance, proprietor's submission of 31 December 2019, section 2.6.2), but not defined in the claim - it is no longer necessarily the transfer function calculator that calculates the relationship between the data (as in claim 1 as granted); it might be another part or another software loaded into the processor. Hence, the amendment made *prima facie* extends the protection conferred by the patent (Article 123(3) EPC), so that the eighth auxiliary request gives rise to a new objection under Article 123(3) EPC,

different from the objection under the same article against the third auxiliary request.

*Conclusion*

29. Since the main request, and the first and third auxiliary requests are not allowable, and since auxiliary request 8 is not admitted into the appeal proceedings, the decision of the Opposition Division to revoke the patent must be upheld.

**Order**

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

The appeal is dismissed.

The Registrar:

The Chair:



H. Jenney

P. Fontenay

Decision electronically authenticated