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**Datasheet for the decision  
of 23 May 2007**

**Case Number:** T 1318/05 - 3.4.01

**Application Number:** 00304618.2

**Publication Number:** 1058123

**IPC:** G01R 33/565

**Language of the proceedings:** EN

**Title of invention:**

Fast spin echo phase correction for MRI system

**Applicant:**

GENERAL ELECTRIC COMPANY

**Opponent:**

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**Headword:**

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**Relevant legal provisions:**

EPC Art. 84

**Keyword:**

"Clarity (no)"

**Decisions cited:**

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**Catchword:**

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Case Number: T 1318/05 - 3.4.01

**D E C I S I O N**  
of the Technical Board of Appeal 3.4.01  
of 23 May 2007

**Appellant:**

GENERAL ELECTRIC COMPANY  
1 River Road  
Schenectady  
NY 12345 (US)

**Representative:**

Pedder, James Cuthbert  
London Patent Operation  
General Electric International, Inc.  
15 John Adam Street  
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**Decision under appeal:**

Decision of the Examining Division of the  
European Patent Office posted 24 May 2005  
refusing European application No. 00304618.2  
pursuant to Article 97(1) EPC.

**Composition of the Board:**

**Chairman:** B. Schachenmann  
**Members:** H. Wolfrum  
R. Bekkering

## Summary of Facts and Submissions

- I. European patent application 00 304 618.2 (publication No. 1 058 123) was refused by a decision of the examining division dispatched on 24 May 2005, on grounds set out in preceding communications dated 23 December 2003 and 29 December 2004, objecting *inter alia* to lack of clarity within the meaning of Article 84 EPC for claim 1 as originally filed.
  
- II. The applicant lodged an appeal against the decision and paid the prescribed fee on 22 July 2005. On 27 September 2005 a statement of grounds of appeal was filed.  
  
The appellant requested that a patent be granted on the basis of claim 1 as originally filed and claims 2 to 10 filed with a letter dated 1 July 2004.
  
- III. On 7 September 2006 the appellant was summoned to oral proceedings to take place on 23 May 2007.  
  
In a communication dated 9 February 2007 the board gave a preliminary view on the issues to be addressed during the oral proceedings and indicated in particular that it concurred in essence with the findings of the examining division as far as the question of clarity of claim 1 on file was concerned.
  
- IV. The appellant did not respond to the board's communication but informed the board by facsimile of 19 April 2007 that it withdrew the request for oral proceedings and requested a decision according to the present state of the file.

V. Oral proceedings were held on 23 May 2007 in the absence of the appellant.

VI. Claim 1 on file reads as follows :

*"1. A prescan for a magnetic resonance imaging system which performs a scan to acquire MR data using a fast spin echo (FSE) pulse sequence in which an RF magnetic field is produced by an RF excitation pulse followed by a series of RF refocusing pulses and readout, phase-encoding and slice-select magnetic field gradients are applied to spatially encode echo signals that are acquired during the pulse sequence, the prescan, in which the FSE pulse sequence is adjusted prior to conducting the scan, comprising:*

- a) acquiring MR data using a first modified FSE pulse sequence;*
- b) calculating first order phase error that corresponds to readout gradient corrections from the MR data acquired in step a);*
- c) acquiring MR data using a second modified FSE pulse sequence;*
- d) calculating first order phase error that corresponds to phase-encoding gradient corrections from the MR data acquired in step c)*
- e) calculating zeroth order phase error that corresponds to spatially invariant magnetic field corrections from the MR data acquired in step a) or step c);*
- f) acquiring MR data using a third modified FSE pulse sequence;*

*g) calculating a first order phase error that corresponds to slice-select gradient correction from the MR data acquired in step f); and*  
*h) adjusting the FSE pulse sequence with the phase shift corrections calculated in steps b), d), e) and g)."*

Claim 7 is an independent claim directed to an MR system having means for performing the steps defined in claim 1.

Claims 2 to 6 and 8 to 10 are dependent claims.

VII. In its communications, the examining division had raised a plurality of objections pursuant to Article 84 EPC concerning the clarity of the wording of claim 1. For example, the division held that it was not clear in which respect and in comparison to what the first to third pulse sequences were modified and in which respect they differed from each other. Moreover, in the division's judgement it was obscure how and on which basis the various phase errors were calculated, in which sense they could "correspond" to respective gradient corrections, and how the FSE pulse sequence was adjusted.

VIII. The appellant argued in writing that it was clear to a skilled person what a pre-scan was, that FSE pulse sequences had to be modified, and how this was to be done. In this respect, the description of the application provided sufficient information. Moreover, one skilled in the art could calculate a phase error correction as recited in claim 1 based in part on the description and the description at various points

explained one method for deriving the corrections from the errors.

## **Reasons for the Decision**

1. The appeal complies with the requirements of Articles 106 to 108 and Rule 64 EPC and is, therefore, admissible.

2. *Clarity (Article 84 EPC)*

2.1 As regards the issue of lack of clarity for the definitions of claim 1 on file, the Board concurs in essence with the findings given in the aforementioned communications of the examining division.

2.2 In particular, claim 1 does not provide any indication as to the nature of the "first" to "third modifications" claimed of an FSE pulse sequence which would be required in order to produce useful MR data for the respective phase error calculations.

Moreover, claim 1 does not contain any information as to the relationship between a useful modification and the error calculations to be performed as well as to the kind of corrections to be effected to the various gradients (eg in terms of phase, amplitude, waveform and timing).

Given the large number of parameters determining FSE pulse sequences and of theoretically conceivable modifications thereto, the complexity of the mathematical evaluations involved in analysing the

measured data, as well as the dissimilitude of the causes of phase errors, claim 1 fails to define the essential elements of a working solution to the specific problem set out in column 1, lines 53 to 57 of the published application, namely to produce artefact free FSE images in situations where multiple root causes of phase error coexist and interact with each other.

- 2.3 Contrary to the appellant's opinion, the deficiency of an unclear or incomplete claim definition cannot, as a matter of principle, be resolved by making reference to an application description since Article 84 EPC requires the claims themselves to be clear, which, according to established jurisprudence, entails that an independent claim must indicate all features which are necessary for solving the technical problem with which an application is concerned (see Case Law of the Boards of Appeal of the European Patent Office, fifth edition, December 2006, pages 189 ff).

Therefore, claim 1 on file does not comply with the requirement of Article 84 EPC having regard to clarity.

3. Consequently, the appellant's request for grant of a patent is not allowable.

**Order**

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

The appeal is dismissed.

The Registrar:

The Chairman:

R. Schumacher

B. Schachenmann