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**Datasheet for the decision  
of 15 January 2013**

**Case Number:** T 2019/08 - 3.4.01

**Application Number:** 07000708.3

**Publication Number:** 1808707

**IPC:** G01R 33/3875

**Language of the proceedings:** EN

**Title of invention:**

Magnetic resonance imaging apparatus and static magnetic field correction method

**Applicant:**

Kabushiki Kaisha Toshiba  
Toshiba Medical Systems Corporation

**Headword:**

-

**Relevant legal provisions:**

RPBA Art. 13(1)

**Relevant legal provisions (EPC 1973):**

EPC Art. 54

**Keyword:**

"Novelty (No - Main Request)"

"Admissibility (Auxiliary Requests I to III, No)"

**Decisions cited:**

-

**Catchword:**

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Case Number: T 2019/08 - 3.4.01

**DECISION**  
of the Technical Board of Appeal 3.4.01  
of 15 January 2013

**Appellants:**  
(Applicant 1)

Kabushiki Kaisha Toshiba  
1-1 Shibaura 1-chome  
Minato-ku  
Tokyo 105-8001 (JP)

and

(only co-appellant)

Toshiba Medical Systems Corporation  
1385, Shimoishigami  
Otawara-shi,  
Tochigi-ken 324-8550 (JP)

**Representative:**

Kramer - Barske - Schmidtchen  
Landsberger Strasse 300  
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**Decision under appeal:**

**Decision of the Examining Division of the  
European Patent Office posted 9 June 2008  
refusing European patent application  
No. 07000708.3 pursuant to Article 97(2) EPC.**

**Composition of the Board:**

**Chairman:** H. Wolfrum  
**Members:** P. Fontenay  
J. Geschwind

## **Summary of Facts and Submissions**

- I. The appeal lies from the decision of the examining division to refuse the European patent application No. 07 000 708.3. The decision was despatched on 9 June 2008.

In the "Reasons" for the decision, the examining division held that the main request and auxiliary request then on file did not meet the requirements of Article 84 EPC as to clarity of the claims and support by the description and that the independent claims of both requests did not define new subject-matter in the sense of Article 54 EPC with regard to document D1 (D-H. Kim et al., "Regularized Higher-Order In Vivo Shimming", Magnetic Resonance in Medicine, Vol. 48, (2002), pages 715-722). Moreover, the dependent claims of the auxiliary request were considered to define undisclosed subject-matter in violation of Article 123(2) EPC.

- II. The appellants (applicants) filed an appeal against the above-mentioned decision by notice of appeal received on 08 August 2008. The prescribed appeal fee was paid on the same day. The written statement setting out the grounds of appeal was received on 30 September 2008.

With the statement of grounds, the appellants requested that the impugned decision be set aside and a patent be granted on the basis of amended sets of claims according to a main request and, alternatively, on the basis of claims 1 to 11 according to two auxiliary requests, all three sets of claims being filed with the statement of grounds.

An auxiliary request for oral proceedings was made.

- III. In the statement of grounds, the appellants presented arguments explaining why, in their view, the requirements of Article 123(2) EPC and Articles 84 and 54 EPC 1973 were met by the new filed requests.

With regard, more particularly, to the issue of novelty, the appellants emphasized that document D1 described a magnetic resonance imaging apparatus and method relying merely on a designated ROI (region of interest). In contrast thereto, the correction magnetic field generator of the apparatus according to claim 1 of the main and auxiliary requests was adapted to generate a correction magnetic field on the basis of magnetic resonance signals collected from a specific region which formed a part of the region of interest, i.e. a subset of the magnetic resonance signals collected by the collector.

- IV. On 11 September 2012 the appellants were summoned to oral proceedings and on 27 September 2012 the Board issued a communication pursuant to Article 15(1) Rules of Procedure of the Boards of Appeal (RPBA), expressing its provisional opinion with regard to the requests then on file.

In the Board's preliminary view, the passages referred to by the appellants in the statement of grounds appeared to constitute a valid support for the amended claims of the main request. However, the Board also indicated that it was not convinced by the arguments put forward by the appellants with regard to their

analysis of document D1. In the Board's opinion, although D1 made use of a different terminology than the one used in the application in suit, the technical teaching derivable from document D1 seemed to anticipate the subject-matter of claim 1 of the main and first auxiliary request.

Concerning claim 1 of the second auxiliary request, the appellants' attention was drawn to ambiguities in the claim's wording with regard to the requirement of clarity under Article 84 EPC 1973. Contrary to the opinion expressed by the appellants under section II.3.b) of the statement of grounds, the Board was not convinced that claim 1 of the second auxiliary request clearly defined the meaning of and mutual relationship existing between the "set region of interest", the "imaging region" and the "specific region".

- V. In a letter filed on 14 December 2012, the appellants reiterated their main request to have a patent granted on the basis of claims 1 to 13, as filed as the main request with the statement of grounds on 30 September 2008. The previous auxiliary requests were replaced by new amended auxiliary requests I, II and III.

Insofar as the main request was concerned, the appellants merely referred to the arguments submitted with the statement of grounds.

Concerning auxiliary requests I, II and III, the appellants presented arguments as to why the claimed subject-matter was new and inventive and submitted that the analysis relied upon by the Board in the provisional opinion was based on a misunderstanding of

document D1. Particular emphasis was put on the fact that D1 did not disclose a user selected ROI but, instead, only disclosed selecting a specific shimming ROI within an entire imaging region.

VI. Oral proceedings took place on 15 January 2013.

VII. Claim 1 of the main request reads as follows:

*"1. A magnetic resonance imaging apparatus adapted to reconstruct an image associated with a subject placed in a static magnetic field on the basis of magnetic resonance signals emitted from the subject, comprising:  
a collector (8, 102) adapted to collect magnetic resonance signals emitted from a region of interest of the subject, the region of interest being set by a user; and  
a correction magnetic field generator (107) adapted to generate a correction magnetic field to correct the non-uniformity of the static magnetic field on the basis of magnetic resonance signals which are contained in the magnetic resonance signals collected by the collector and emitted from a specific region which forms only a part of the region of interest."*

Independent claim 13 of the main request reads as follows:

*"13. A method of correcting the static magnetic field in a magnetic resonance imaging apparatus in which a subject under examination from which magnetic resonance signals are to be collected is placed in a static magnetic field, comprising the steps of:*

*collecting the magnetic resonance signals emitted from a region of interest of the subject; and  
generating a correction magnetic field to correct the non-uniformity of the static magnetic field on the basis of magnetic resonance signals which are contained in the collected magnetic resonance signals and emitted from a specific region which forms only a part of the region of interest."*

Claims 2 to 12 refer to a magnetic resonance imaging apparatus and depend on claim 1.

Claim 1 of auxiliary request I reads as follows:

*"1. A magnetic resonance imaging apparatus adapted to reconstruct an image associated with a subject placed in a static magnetic field on the basis of magnetic resonance signals emitted from the subject, comprising:  
a collector (8, 102) adapted to collect magnetic resonance signals emitted from a region of interest of the subject, the region of interest being set by a user within an entire imaging region of the magnetic resonance imaging apparatus and the region of interest comprising a local region, for which an imaging diagnosis is to be made, and a surrounding region surrounding the local region, thereby allowing to prevent aliasing with respect to the readout and encoding direction; and  
a correction magnetic field generator (107) adapted to generate a correction magnetic field to correct the non-uniformity of the static magnetic field on the basis of magnetic resonance signals which are contained in the magnetic resonance signals collected*

*by the collector and emitted from a specific region which forms only a part of the region of interest."*

Independent claim 13 of auxiliary request I refers to a method of correcting the static magnetic field in a magnetic resonance imaging apparatus. It reads as follows:

*"13. A method of correcting the static magnetic field in a magnetic resonance imaging apparatus in which a subject under examination from which magnetic resonance signals are to be collected is placed in a static magnetic field, comprising the steps of:*

*collecting the magnetic resonance signals emitted from a region of interest of the subject, the region of interest being set by a user within an entire imaging region of the magnetic resonance imaging apparatus and the region of interest comprising a local region, for which an imaging diagnosis is to be made, and a surrounding region surrounding the local region, thereby allowing to prevent aliasing with respect to the readout and encoding direction; and*

*generating a correction magnetic field to correct the non-uniformity of the static magnetic field on the basis of magnetic resonance signals which are contained in the collected magnetic resonance signals and emitted from a specific region which forms only a part of the region of interest."*

Claims 2 to 12 of the first auxiliary request are dependent claims.

Independent claims 1 and 11 of auxiliary request II differ from claims 1 and 13 of auxiliary request I,



respectively, in that the region of interest has been specified as *"being a space in the shape of a rectangular parallelepiped or a cube"* and in that the clause *"wherein the specific region is the inside region of a sphere, ellipsoid or combined ellipsoid which is inscribed with the region of interest and has its center substantially at the center of the region of interest"*, has been added at the end of the claims.

Claims 2 to 10 of auxiliary request II are dependent on claim 1.

Independent claims 1 and 11 of auxiliary request III differ from claims 1 and 13 of auxiliary request I, respectively, in that the region of interest has been specified as *"being a space in the shape of a rectangular parallelepiped which is larger than the local region"* and in that the clause *"wherein the specific region is the inside region of a sphere or ellipsoid which is inscribed with the region of interest"* has been added at the end of the claims.

Claims 2 to 10 of auxiliary request III are dependent on claim 1.

VIII. In this decision, reference is made to the provisions of the EPC 2000, which entered into force as of 13 December 2007, unless the former provisions of the EPC 1973 still apply to pending applications, in which case the evocation of the Article or Rule is followed by the indication "1973".

## Reasons for the Decision

### 1. Admissibility

The notice of appeal and the corresponding statement of grounds comply with the requirements of Articles 106 to 108 EPC and Rule 99 EPC. The appeal is, thus, admissible.

### 2. Main request - Novelty (Article 54 EPC 1973)

2.1 Document D1 discloses a magnetic resonance imaging apparatus adapted to reconstruct an image associated with a subject placed in a static magnetic field on the basis of magnetic resonance signals emitted from the subject (cf. D1, Figures 5 and 7, section "Results"). The ability of such an apparatus to reconstruct an image implies the presence of a corresponding collector adapted to collect magnetic resonance signals emitted from a region of interest (ROI) of the subject, as recited in claim 1 of the main request. The presence of such a collector in the system of D1 is thus implicitly established.

It is also implicit from document D1 that the field maps of a given object or subject to be shimmed, referred to on page 718, left hand column, third paragraph, are determined for the region for which the field reference matrix has been determined. In the Board's judgement, this region defines an ROI within the meaning of the present application.

During the oral proceedings before the Board, the appellants contested this interpretation of document

D1, underlining that the region referred to by the Board was not selected by a user as required by the claim's wording. The region referred to by the Board was, in effect, corresponding to the field of view (FOV), i.e. the region that could be imaged with the coil. The field of view defined, however, a characteristic of the system which resulted from its sole geometry. It could not thus be selected by a user.

The Board rejects this argumentation. In this respect, the field of view should not be confused with the entire imaging region of the magnetic resonance imaging system. The field of view results from the selection being made regarding the parameters (intensity, timing) of the gradients to be applied by the various gradient coils during imaging.

A correction magnetic field generator adapted to generate a correction magnetic field to correct the non-uniformity of the static magnetic field on the basis of magnetic resonance signals which are contained in the magnetic resonance signals collected by the collector is also provided in the apparatus of D1 (cf. section "Methods" and section "Results", first paragraph). It is further underlined that the signals which serve as a basis for the correction to be carried out in the correction magnetic field generator are emitted from a specific region which forms only a part of the region of interest (cf. section "Theory", first and second paragraph; section "Methods", penultimate and last paragraph).

2.2 Notwithstanding the diverging terminology used in the present application and in the prior art, what really

matters when analysing published prior art is the technical teaching it actually discloses. The fact that the "specific region" and the "region of interest" referred to in present claim 1 are dubbed "region of interest" and "sample" (or "FOV"), respectively, in document D1 does thus not affect the finding that both teachings are identical. In particular, it is evident from Figure 5 of D1 that the ROI in the shape of an oblique ellipsoid aspect of the image of a human head to which shimming of the static magnetic field is confined qualifies as the "*specific region which forms only a part of the region of interest*" referred to in claim 1 under consideration.

2.3 Consequently, the subject-matter of independent claim 1 of the main request is not new in the meaning of Article 54 EPC 1973 with regard to document D1.

3. Auxiliary requests I to III

3.1 In accordance with Article 12(1) RPBA, appeal proceedings shall be based on the notice of appeal and the statement of grounds of appeal. The new auxiliary requests I to III have been filed in the course of the appeal proceedings, following the issuance by the Board of a provisional opinion regarding the merits of the previously pending main request and first and second auxiliary requests. Under Article 13(1) RPBA, a board has, however, the discretion to admit and consider new requests presented by an appellant after it has filed its grounds of appeal. 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.

In this respect, criteria commonly applied by the boards of appeals consist in determining whether the new requests overcome outstanding objections under the EPC and whether or not they give rise to new objections (cf. Case Law of the Boards of Appeal, 6th Edition, VII.E, sections 16.4 and 16.5).

- 3.2 In the present case, the Board indicated in its preliminary opinion of 27 September 2012 that a first aspect to be addressed with regard to the then pending second auxiliary request concerned the requirement of clarity under Article 84 EPC 1973. The Board observed, in this respect, that the meaning of and mutual relationship between the "set region of interest", the "imaging region" and the "specific region", which were referred to in claim 1, was not clearly defined.

The Board observes that independent claims 1 and 13 of present auxiliary request I and claims 1 and 11 of present auxiliary requests II and III refer to "*an entire imaging region*", "*a region of interest*", a "*local region*", a "*surrounding region*" and a "*specific region*". Although the specific region is defined as forming only a part of the region of interest, the claim fails to establish, for instance, the relationship existing between this specific region and the local region.

The ambiguity in the claims' wording is further exacerbated by the fact that the notion of "local region" as it derives from the claims' wording is contradicted by the content of the original disclosure, thus leading to further confusion when attempting to

identify the various regions referred to in the independent claims. In their letter dated 14 December 2012, the appellants indicated (cf. Sections B.1, C.1 and D.1) that the independent claims of the auxiliary requests had been clarified with regard to independent claims 1 and 13 of the main request, taking into account Figure 3A and the teaching on page 10, lines 1 to 8, and page 11, lines 5 to 8 of the original description.

While the former passage referred to relates to the shape of the ROI, the latter paragraph indeed refers to the notion of a "local region". This passage forms part of a larger section corresponding to paragraph [0042] of the application as published, which reads: "*FIGS. 3A and 4A show ROI setup conditions in an axial plane and in a coronal plane. Although, as shown in FIGS. 3A and 4A, the entire region may be designated as the ROI, it is desired in this embodiment that a local region which is comprised of only an object for which a diagnostic image is to be obtained and its surrounding region be designated as the ROI. In FIGS. 3A and 4A, the heart region is designated as the ROI. As shown in FIGS 3A and 4A, the ROI includes a breast wall portion in addition to the heart portion. Such a thing can occur often.*" (with emphasis added by the Board on the passage cited by the appellants). It follows that a local region, according to the original disclosure, is actually formed of the object for which a diagnostic image is to be obtained together with its surrounding region. This interpretation is further confirmed by the discussion of Figures 3A and 4A in the quoted passage and differs from the information conveyed by the independent claims of auxiliary requests I to III,

according to which the local region consists of the region for which an imaging diagnosis is to be made.

It follows from the above that the problem of clarity already addressed in the preliminary opinion of the Board has not been solved. Independently of the problems regarding added subject-matter which may result from the proposed amendments, the Board holds that the lack of clarity of the independent claims of auxiliary requests I to III is in itself sufficient in order to decide not to admit auxiliary requests I to III in the appeal proceedings.

**Order**

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

The appeal is dismissed.

The Registrar

The Chairman

R. Schumacher

H. Wolfrum