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**Datasheet for the decision
of 22 July 2013**

Case Number: T 2399/09 - 3.4.01

Application Number: 04257137.2

Publication Number: 1533626

IPC: G01S 7/52, G01S 7/521,
G10K 11/34, B06B 1/02

Language of the proceedings: EN

Title of invention:
Ultrasound probe transceiver circuitry

Applicant:
GENERAL ELECTRIC COMPANY

Headword:
-

Relevant legal provisions:
EPC R. 137(4) valid before 1 April 2010

Keyword:
"Amended claims: unsearched subject-matter, no single general
inventive concept"
"Admissibility of the sole request (no)"

Decisions cited:
-

Catchword:
-



Case Number: T 2399/09 - 3.4.01

D E C I S I O N
of the Technical Board of Appeal 3.4.01
of 22 July 2013

Appellant:
(Applicant)

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Representative:

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Decision under appeal:

**Decision of the Examining Division of the
European Patent Office posted 6 July 2009
refusing European patent application
No. 04257137.2 pursuant to Article 97(2) EPC.**

Composition of the Board:

Chairwoman: F. Neumann
Members: H. Wolfrum
M. J. Vogel

Summary of Facts and Submissions

I. European patent application 04 257 137.2 (publication No. EP 1 533 626) was refused by a decision of the examining division dispatched on 6 July 2009 *inter alia* for the reason that the subject-matter of the claims then on file infringed Rule 137(4) EPC.

II. The applicant lodged an appeal against the decision on 7 September 2009. The prescribed appeal fee was paid on the same day. A statement of grounds of appeal was filed on 13 November 2009.

The appellant requested that the decision be set aside and a patent be granted on the basis of a new set of claims 1 to 10 filed with the statement of grounds of appeal. Furthermore, an auxiliary request for oral proceedings was made.

III. On 9 April 2013 the appellant was summoned to oral proceedings to take place on 1 August 2013.

In a communication pursuant to Article 15(1) RPBA annexed to the summons to oral proceedings the Board raised the question of admissibility of the amendments made to claim 1 with respect to the stipulation of Rule 137(4) EPC 2000 valid before 1 April 2010.

IV. The appellant did not comment on the Board's observations nor did it file any further amendments. Instead, the appellant withdrew the request for oral proceedings by letter of 24 May 2013 and requested that a written decision be issued in accordance with the current state of the file.

V. Oral proceedings were cancelled by notification of 28 June 2013.

VI. Independent claim 1 of the appellant's request reads as follows:

"1. Passive transceiver circuitry (700) for coupling a plurality of signal processors (110) connected in series to ultrasound transducer elements (E), the transceiver circuitry (700) permitting the transducer elements (E) to be multiplexed between signal reception and signal transmission and comprising:

a plurality of transmit sections (702) for coupling to respective signal processors (110) each transmit section (702) comprising:

a transmit section input (704);

a transmit section output (706); and

receive signal blocking circuitry (718) coupled between the transmit section input (704) and the transmit section output (706); and

a receive section (708) for coupling to a respective signal processor (110) comprising:

a receive section input (712) for transporting receive signals obtained from the transducer elements to the respective signal processor (110);

a receive section output (710) for acting as a receive sub-aperture output when driven by the respective signal processor (110) in a receive direction and

transmit signal blocking circuitry coupled between the receive section input (712) and the receive section output (710) for protecting the inputs and outputs of the respective signal processor (110);

characterized in that:

the ultrasound transducer elements (E) are arranged in groups of sub-apertures, wherein each respective signal processor (110) of the plurality of signal processors is configured for handling a plurality of receive sub-apertures and for performing beam-forming on the individual receive sub-apertures, and wherein the signal processors (110) are provided on respective processing boards (106), the sub-apertures being configured such that they do not cross a partition boundary onto two or more of the processing boards (106)."

Claims 1 to 9 are dependent claims and claim 10 is directed to an ultrasound probe comprising a plurality of signal processors, a transducer array comprising array transducer elements and transceiver circuitry according to any preceding claim.

Reasons for the Decision

1. The appeal complies with the requirements of Articles 106 to 108 and Rule 99 EPC and is, therefore, admissible.
2. Admissibility of the amendments
 - 2.1 In its decision (point 4 of the "Facts and Submissions" and point 1.3 of the "Reasons") the examining division identified two separate inventions in the originally-filed claims and the amended claims, respectively before it. Based on an "*a posteriori*"-consideration with respect to prior art as given by document D2 : US-A-4 671 115, the examining division identified a searched "invention I" in the originally-filed claims,

addressing the problem of electrically isolating the receive from the transmit path, and an unsearched "invention II" in the amended claim 1 then on file, addressing the problem of reducing the large number of channels typically required in medical imaging systems. The examining division held that "invention II" did not combine with the originally-claimed "invention I" to form a single general inventive concept and hence did not comply with Rule 137(4) EPC in the version valid before 1 April 2010.

- 2.2 As indicated in the Board's communication of 9 April 2013 claim 1 presently on file still contains amendments vis-à-vis the original claims which led the examining division to its finding.

The amendments in question concern the features of the characterizing portion of claim 1 on file as well as those features in the preamble thereof which specify details of the structure and arrangement of the signal processors and ultrasound transducer elements.

As a matter of fact, none of the aspects introduced by the amendments to claim 1 figured in the originally-claimed invention (see claims 1 to 10 as originally filed and published). In particular, whilst original claim 1 was directed to a transceiver circuitry simply comprising a transmit section and a receive section, amended claim 1 is now directed to an extended transceiver circuitry which comprises a plurality of transmit sections and a receive section, these sections being arranged to couple to peripheral building blocks (the signal processors and ultrasound transducer

elements) which are apparently used to construct an arrangement as shown in Figure 7 of the application.

The Board has no reason to doubt the examining division's finding that the search did not cover technical details of the signal processors and ultrasound transducer elements.

Moreover, the Board concurs with the examining division's conclusion that the subject-matter now defined in claim 1 does not combine with the originally claimed invention to form a single general inventive concept. In particular, the Board supports the "*a-posteriori*"-analysis given in the contested decision. Current claim 1 contains the features of original claim 1 (which are all known from document D2) and a number of additional features concerning the arrangement of the ultrasound transducer elements and the signal processors. None of these additional features appeared in the original claims. In view of the lack of novelty of the subject-matter of original claim 1 with respect to the teaching of document D2, a single general inventive concept cannot exist between the subject-matter of present claim 1 and that of the original claims.

- 2.3 In the opinion of the Board the same conclusion would also be reached using an "*a-priori*"-assessment. The two inventions address different technical problems and employ different technical means to this effect.

The invention as defined by the originally-filed (and searched) claims is concerned with the components of a transceiver circuitry and their respective arrangement.

It serves the purpose of allowing multiplexing of ultrasound transducer elements between transmission and reception without the need for transmit/receive switches (see paragraphs [0003] to [0007] of the published application). In distinction thereto and notwithstanding the fact that it makes use of the aforementioned transceiver circuitry, the invention as defined by present claim 1 is concerned with the mutual arrangement and configuration of the transducer elements and signal processors. The Board notes that signal processors were not even mentioned in the original claims.

The appellant tentatively suggested that the problem addressed by the subject-matter of present claim 1 was to provide transceiver circuitry for a steerable array of ultrasound transducer elements having improved scalability. The thus claimed invention solved this problem by providing *"a parallel processing architecture that simplifies the construction of individual processing boards thereby ensuring that there is no need to route analogue signals from one processing board to another"* (page 2, third paragraph of the statement setting out the grounds of appeal).

Irrespective of whether one takes into consideration the specific problem of steering and scalability or a more general problem of a simplified parallel processing architecture, neither of these two problems and the claimed elements of their solution can be considered as forming a single general inventive concept with the originally-claimed invention which aims to permit multiplexing of ultrasound transducer elements between transmission and reception.

2.4 The appellant regards the improved transceiver circuitry of the embodiment of Figure 7 of the application as providing the single general inventive concept linking the original invention with the presently claimed invention.

However, the mere circumstance that Figure 7 shows an example of an implementation of the originally-claimed transceiver circuitry and that the corresponding portion of the description discusses the function of this circuitry within an ultrasound probe has no bearing on the above assessment of two inventions identified above. Present claim 1 does not elaborate the measures set out in the original claims which solve the problem of allowing the ultrasound transducer elements to be multiplexed. Instead, present claim 1 defines other measures which are directed to the solution of the steering and scalability problem. In this respect, present claim 1 cannot be regarded as further specifying the solution to the problem which the original claims address and which, in view of the lack of novelty of the subject-matter of original claim 1 with respect to the teaching of document D2, is not linked by a single general inventive concept to the originally claimed invention.

3. For the above reasons, the Board has come to the conclusion that the amended claims of the appellant's current (and sole) request infringes the requirement of Rule 137(4) EPC in the version valid before 1 April 2010 and is therefore not admissible.

4. Although having been informed about the above deficiency, the appellant did not present any further comments nor propose further amendment.

Order

For these reasons it is decided that:

The appeal is dismissed.

The Registrar

The Chairwoman

R. Schumacher

F. Neumann