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Datasheet for the decision of 13 October 2011

Case Number: T 0922/08 - 3.2.02

Application Number: 95937538.7

Publication Number: 784448

IPC: A61B 5/00

Language of the proceedings: EN

Title of invention:
Signal Processing Apparatus

Applicant:
Masimo Corporation

Headword:
-

Relevant legal provisions:
EPC Art. 123(2)
RPBA Art. 12(4)

Keyword:
"Admissibility of the requests (main and first auxiliary requests: no)"
"Added subject-matter (second and third auxiliary requests: yes)"

Decisions cited:
T 0284/94

Catchword:
-

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Case Number: T 0922/08 - 3.2.02

D E C I S I O N
of the Technical Board of Appeal 3.2.02
of 13 October 2011

Appellant: (Applicant)
Masimo Corporation
40 Parker
Irvine
CA 92618 (US)

Representative:
Vossius & Partner
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Decision under appeal:
Decision of the Examining Division of the European Patent Office posted 20 December 2007 refusing European application No. 95937538.7 pursuant to Article 97(2) EPC.

Composition of the Board:

Chairman: M. Noël
Members: M. Stern
A. Pignatelli

Summary of Facts and Submissions

I. The applicant lodged an appeal, by notice received on 20 February 2008, against the decision of the Examining Division dispatched on 20 December 2007 to refuse the European patent application No. 95 937 538.7 on the ground of extended subject-matter in contravention of the provisions of Article 123(2) EPC. The fee for appeal was paid on 20 February 2008.

II. A statement setting out the grounds of appeal was received on 30 April 2008.

III. The Board forwarded its provisional opinion to the appellant regarding the admissibility of the main request and deficiencies under Articles 123(2) and 84 EPC, by communication dated 10 May 2011.

IV. In preparation of the oral proceedings, the appellant filed amended sets of claims by letter dated 13 September 2011.

V. Oral proceedings took place on 13 October 2011.

The appellant requested that the decision under appeal be set aside and that a patent be granted on the basis of a main request comprising independent claim 1 filed on 30 April 2008 with the statement of grounds and dependent claims 2 to 31 filed on 13 September 2011, or of a first auxiliary request comprising claims 1 to 8 filed on 13 September 2011, or of a second auxiliary request comprising independent claim 1 filed on 30 April 2008 with the statement of grounds and claims 2 to 21 filed on 13 September 2011, or of a

third auxiliary request comprising claims 1 to 21 filed on 13 September 2011.

VI. Claim 1 of the **main request** reads as follows:

"A physiological monitoring system (299) for pulse oximetry including a sensor (300) configured to detect intensity signals of at least two different wavelengths attenuated by body tissue and to output one or more signals, the sensor output signals including a primary and secondary portion, the sensor output signals representative of at least one physiological characteristic of body tissue (310),
and a digital signal processing device (334) configured to accept one or more signals representative of the physiological characteristic and configured to determine a resulting value indicative of the physiological characteristic,
the physiological monitoring system comprising:
a sensor (300) including a light-sensitive detector (320) configured to detect light of at least first and second wavelengths attenuated by body tissue (310) carrying pulsing blood and configured to output one or more signals based on the detected light; and a digital signal processing device (334) including:
a first calculator (404) capable of utilizing a first calculation technique to determine at least a first value representative of at least one physiological characteristic of the pulsing blood based on at least one of the one or more output signals,
a second calculator (406) capable of utilizing a second calculation technique different from the first calculation technique, to determine at least a second value representative of the at least one physiological

characteristic based on at least one of the one or more output signals, and
a processing module (408 or 410) configured to utilize at least one of the first and second calculators to determine a resulting value indicative of the at least one physiological characteristic, wherein the physiological characteristic is one or more of the blood oxygen saturation, heart rate and a clean plethysmographic waveform."

Claim 1 of the **first auxiliary request** reads as follows:

"A physiological monitor for processing at least two measured signals, each containing a primary signal portion and a secondary signal portion, said first and second signals substantially adhering to a predefined signal model, the physiological monitor comprising:
a processor configured to:

sample said first and second signals over a period to obtain a first plurality of data points representing said first signal over said period and a second series of data points representing said second signal over said period;

transform said series of data points into a first transformed series of points having at least a frequency component and a magnitude component and transforming said second series of data points into a second transformed series of points having at least a frequency component and a magnitude component;

compare said first and second transformed series of points to obtain a third series of comparison values;

select at least one of said comparison values that has a magnitude within a selected threshold; and

from said selected at least one comparison value, determine a first value consistent with the predefined signal model;
wherein the processor is further configured to:
perform statistical calculations on the first and second signals; and
calculate a blood oxygen saturation value using said first value and said statistical calculations."

Claim 1 of the **second auxiliary request** reads as follows:

"A physiological monitoring system (299) for pulse oximetry comprising:
a sensor (300) including a light-sensitive detector (320) that detects intensity signals of at least two different wavelengths attenuated by body tissue and outputs an electrical signal corresponding to the attenuated intensity signals, each of the intensity signals including a primary and secondary portion and is representative of at least one physiological characteristic of body tissue (310), wherein the physiological characteristic is one or more of blood oxygen saturation, heart rate and a clean plethysmographic waveform;
and a digital signal processing device (334) that accepts the output electrical signal representative of the physiological characteristic and determines a resulting value indicative of the physiological characteristic, the digital signal processing device (334) including:
a statistics module (404) responsive to the output electrical signal, that subjects the output electrical signal to statistics operations,

a calculation module (406) responsive to the output electrical signal, that provides information of the physiological characteristic present in the output electrical signal or examines the spectral content of the output electrical signal, and
saturation calculation and pulse rate modules (408, 410), responsive to the statistics module and the calculation module, that ascertain one or more of the physiological characteristics."

Claim 1 of the **third auxiliary request** reads as follows:

"A physiological monitoring system (299) for pulse oximetry comprising:
a sensor (300) including two light emitters (301, 302) for emitting light of two different wavelengths and a light-sensitive detector (320) that detects intensity signals of the light of the two different wavelengths attenuated by body tissue and outputs an electrical signal corresponding to the attenuated intensity signals, each of the intensity signals representative of at least one physiological characteristic of body tissue (310), wherein the physiological characteristic is one or more of blood oxygen saturation, heart rate and a clean plethysmographic waveform;
a signal conditioning circuitry (330);
an analog-to-digital conversion circuit (332);
and a digital signal processing device (334) that accepts the digital output electrical signal representative of the physiological characteristic and determines a resulting value representative of the physiological characteristic, the digital signal processing device (334) including:
a demodulation module (400);

a statistics module (404) responsive to the output electrical signal, that subjects the output electrical signal to statistics operations,
a saturation transform module (406) responsive to the output electrical signal, that provides information of the physiological characteristic present in the output electrical signal or examines the spectral content of the output electrical signal, and
saturation calculation and pulse rate calculation modules (408, 410), to which the data subjected to statistics operations and saturation transform operations in the statistics and saturation transform modules (404, 406) are forwarded;
wherein the saturation calculation module (408) ascertains the blood oxygen saturation and the pulse rate calculation module (410) obtains the heart rate and the clean plethysmographic waveform."

VII. The arguments of the appellant are summarised as follows:

(a) Regarding the admissibility of the requests:

The fact that the applicant had withdrawn the present main request during the oral proceedings before the Examining Division did not imply an express abandonment of this request. The withdrawal of said request during the oral proceedings before the Examining Division was made with the sole purpose of simplifying the work of the Examining Division. The request should therefore be admitted at the appeal stage.

Claim 1 of the first auxiliary request was filed in response to the communication issued by the Board. It

was based on original independent claim 15 and the application as originally filed, in particular on page 77 et seq (see Chapter "Alternative to Saturation Transform - Complex FFT"). Hence, the first auxiliary request should be admitted into the appeal procedure.

Claim 1 of the second and third auxiliary requests should be admitted since they were filed, respectively, with the statement of grounds of appeal and as a response to the objections raised in the Board's communication under Articles 123(2) and 84 EPC.

(b) Regarding the objections under Articles 123(2) and 84 EPC:

The present application was not as structured in its presentation of the invention as it could have been if it had not resulted from a continuation-in-part application. Nevertheless, a person of ordinary skill studying the teaching of Figures 11 and 14 as well as the description referring thereto, would, without doubt, realize that the underlying problem of the present invention was the elimination of motion-induced noise and that this problem was solved by parallel processing of data detected by an optical sensor using two calculation techniques. This parallel data processing was explained to occur in Figure 14 at the point where the data was split into a statistics module 404 and a saturation transform module 406. The application indicated on page 56, lines 22 to 24 that this parallel processing solved the problem of eliminating erratic motion-induced noise. Hence, Figures 11 and 14 together with the corresponding passages of the description provided a clear and enabling teaching of a

physiological monitoring system for pulse oximetry according to the claimed invention. All the recited features were therefore fairly supported. As a consequence, it would appear inappropriate to incorporate further details, such as those shown in relation to Figures 17 to 20, into claim 1 of the second auxiliary request.

Similar arguments applied, a fortiori, to claim 1 of the third auxiliary request since the latter incorporated further features depicted in Figures 11 and 14.

Reasons for the Decision

1. The appeal is admissible.

2. Admissibility of the requests

2.1 Main request

Claim 1 of the main request is identical to claim 1 filed as first auxiliary request on 29 October 2007 before the Examining Division. During the oral proceedings before the Examining Division, the applicant withdrew this request of its own volition (cf decision under appeal, point 4 of the facts and submissions, and minutes of the oral proceedings, point 8). The withdrawal of this request consequently prevented the Examining Division from giving a final decision on its merits.

It is established jurisprudence of the boards of appeal that the primary purpose of the appeal is to provide the adversely affected party with the opportunity to challenge the decision on its merits and to obtain a judicial ruling as to whether the first-instance decision was correct (G 9/91 and G 10/91 - OJ 1993, 408, 420). Even if the withdrawal of the present main request during the examination procedure is not considered an abandonment of this request for subsequent appeal proceedings as argued by the appellant, the fact that the request was withdrawn in the first-instance proceedings precluded the issue of a reasoned decision on its merits by the Examining Division. Reinstating this request upon appeal would compel the Board either to give a first ruling on the critical issues, which runs contrary to the purpose of a second-instance ruling, or to remit the case to the department of first instance, which is clearly contrary to procedural economy.

It is precisely with the purpose of forestalling these unsatisfactory options that Article 12(4) RPBA provides the Board with the discretionary power to hold inadmissible requests which could have been presented (or were not admitted) in the first-instance proceedings. In the Board's view, this provision is hence applicable to the present main request.

For these reasons, the Board decides not to admit the main request into the appeal procedure.

2.2 First auxiliary request

Claim 1 of the first auxiliary request was filed one month before the oral proceedings before the Board and is based on original independent method claim 15, supplemented by features taken from the description. However, original method claim 15 had been deleted at the time of entry of the application into the regional phase before the EPO and had consequently not been searched. The subject-matter of the claim contains an alternative to a "Saturation Transform" which is provided by a "fast Fourier transform" (complex FFT) as described in the description starting on page 77, line 13. Consequently, this fresh case would require an additional search and a complete examination on all formal and substantive aspects and would thus necessitate the remittal of the case for further prosecution, which at this stage of the procedure is excluded for reasons of procedural economy.

The Board does not accept appellant's justification that the idea of reverting to one of the original independent claims in order to avert objections under Article 123(2) EPC was only realized once the appellant received the Board's communication. Indeed, since these objections had already been raised in the course of the procedure before the Examining Division it could have been reasonably expected that the applicant would already at that stage have reverted to one of the original independent claims and filed a corresponding auxiliary request.

As a result, the first auxiliary request is not admitted following the provisions of Articles 12(4) and 13(1) RPBA.

2.3 Second and third auxiliary requests

Claim 1 of the second auxiliary request is identical to the version refused by the Examining Division and to claim 1 of the auxiliary request filed with the statement of grounds of appeal. This request is therefore not open to objections concerning the admissibility.

The amendments made to claim 1 of the third auxiliary request represent a fair attempt to remedy the deficiencies raised in the Board's communication under Articles 123(2) and 84 EPC and do not raise issues which the Board cannot deal with without adjournment of the oral proceedings (Article 13(3) RPBA).

Consequently, the second and third auxiliary requests are admitted into the proceedings.

3. Amendments - second and third auxiliary requests

3.1 The present application as originally filed defined the matter for which protection was sought in thirteen independent claims (seven independent device claims and six independent method claims), and described the "invention" in a lengthy description of more than 100 pages and more than 50 figure sheets. Current independent claim 1 of the second auxiliary request is however an entirely newly formulated definition of the "invention" which contains a novel combination of

isolated features extracted from a complex description of a preferred embodiment described in the original application over a large number of pages (starting mainly at page 49, line 17). As will be explained below, these features have been extracted by inspection of just two of the figures depicting said embodiment, while leaving out other essential features which also belong to the same context.

3.2 In particular, claim 1 of the second auxiliary request gives a definition of a physiological monitoring system for pulse oximetry by reciting elements or modules which are depicted in Figures 11 and 14. According to the description, "Figure 11 is an example of a physiological monitor in accordance with the teachings of one aspect of the present invention" (page 9, lines 17 to 18), and, moreover, "Figure 11 depicts a general hardware block diagram of a pulse oximeter" (page 50, lines 18 to 19). Furthermore, "Figure 14 illustrates additional detail of the operations performed by the digital signal processing circuitry of Figure 11" (page 9, lines 24 to 25). This digital signal processing system is first shown with a low level of detail in the schematic diagram of Figure 14, and further details of its functions and constituent modules are described in relation to Figures 15 to 21a (see page 56, lines 6 to 7; page 9, line 26 to page 10, line 6).

3.3 One of the modules of the digital signal processing system depicted in Figure 14 is labelled as a "saturation transform" module 406. The description makes it clear that this term is "used to describe an operation which converts the sample data from time

domain to saturation domain values *as will be apparent from the discussion below*" (cf page 52, lines 11 to 12; emphasis added). Hence, what follows in the description thereafter, notably the different calculations carried out by the "saturation transform" module 406 depicted in Figure 18 (and described on page 60, line 5 et seq), is indispensable for understanding what the label "saturation transform" in fact involves (inter alia, the use of a correlation canceller, and the creation of master power curves and bin power curves; cf page 60, lines 6 to 8, and page 63, lines 1 to 23). Neither the meaning carried by the label itself (of "transforming" a "saturation"), nor the vacuous functional definition given in claim 1 (of "providing information of the physiological characteristic present in the output electrical signal") reflects the indispensable features indicated in the description. Thus, the replacement of these features by something which is no more than a label or buzzword has no support in the description and leads to an unallowable generalization of the embodiment disclosed in the application as filed.

Another module depicted in Figure 14 is labelled as a "statistics" module 404. In this respect, the description makes it clear that "*certain* statistics are calculated" by this module (cf page 56, line 13; emphasis added), such as first order oximetry calculations and RMS signal values of the red and infrared channels, as well as a cross-correlation output which indicates a cross-correlation between the red and infrared signals (cf page 58, lines 12 to 14; see Figure 17). The replacement of such indispensable specific cross-correlation calculations by "statistics operations" has no support in the description, whereby

this expression also leads to an unallowable generalization of the embodiment disclosed in the application as filed.

3.4 It is thus clear to the reader of the application as filed that merely for the sake of clarity of presentation, the pulse oximeter was depicted not just in a single overcrowded figure, but in the usual way of depicting it first with a reduced level of detail, i.e. in the schematic block diagram of Figure 11, and explaining the structural and functional features of the different elements or modules in relation to the ensuing figures. Contrary to the appellant's view, a drawing is not to be interpreted in isolation from the overall content of the application but only in that general context.

The skilled person thus understands that the schematic presentation in Figures 11 and 14 of the described "example of a physiological monitor in accordance with the teachings of one aspect of the present invention" is not to be seen as a generalizing definition of said example, as argued by the appellant.

3.5 Therefore, retaining in claim 1 just those modules which first appear in the description of the present complex embodiment (in Figures 11 and 14) while leaving out additionally described constituent modules of the embodiment is seen as an arbitrary selection of features.

According to established jurisprudence of the boards of appeal (see Case Law, 6th edition 2010, III.A.2), if a claim is to be restricted to a preferred embodiment, it

is normally not admissible under Article 123(2) EPC to extract isolated features from a set of features which have originally been disclosed in combination for that embodiment. Such formulation would only be justified in the absence of any clearly recognisable functional or structural relationship among the originally disclosed features. In the present case, in view of the inextricability of closely related essential features of the disclosed embodiment, the isolation of some individual features from the original combination is not allowable.

3.6 Furthermore, when extracting some features from a combination of features, the main relevant question to be answered is whether it is clear beyond any doubt that the subject-matter of the claim thus amended provides a complete solution to a technical problem unambiguously recognisable from the application as filed (see T 284/94, OJ 1999, 464).

As explained in the description, for example, on page 4, line 25 to page 5, line 17; page 49, lines 18 to 23; and page 50, lines 10 to 17, the present invention addresses the problem of eliminating erratic motion-induced noise in pulse oximetry other than by traditional filtering techniques. In the "Summary of the Invention", it is stated that "the present invention involves several different embodiments using the novel signal model in accordance with the present invention to isolate either a primary signal portion or a secondary signal portion of a composite measured signal" (cf page 3, lines 17 to 19), wherein a processor "in accordance with the invention" removes the primary (or, alternatively, the secondary) signal

portion (cf page 5, lines 18 to 33). Then, on page 6, line 1 to page 8, line 6, "the signal model of the present invention" is summarized, with particular reference to a physiological monitor for calculating a saturation value using the said "present invention" (cf page 7, line 20 to page 8, line 6). A physiological monitor according to the invention is also defined in some of the original independent device claims, e.g. original claims 8, 14, and 32, as the Board indicated under point 3 of its communication.

3.7 However, from the application as originally filed it is not evident that the specific combination of features defined in claim 1 of the second auxiliary request would, by itself, solve the aforementioned problem of eliminating erratic motion-induced noise in pulse oximetry other than by traditional filtering techniques, which is the problem which the "invention" as stated in the application sets out to solve.

In particular, the application as originally filed does not disclose that the splitting of data into two branches, one labelled "statistics" and the other labelled "saturation transform" in Figure 14, *by itself* solves any particular problem, let alone the aforementioned problem of eliminating erratic motion-induced noise, as argued by the appellant. The statement on page 56, lines 22 to 24 ("the resulting data is subjected to statistics and to the saturation transform operations in order to calculate a saturation value which is very tolerant to motion artefacts and other noise in the signal") is to be understood in the context of the meaning given by the description to the labels "statistics" and "saturation transform",

explained above under point 3.3. To the skilled reader it is thus immediately apparent that it is not just the "parallel processing" mentioned by the appellant which solves the problem of eliminating erratic motion-induced noise, but the entire processing implemented by the particular "statistics" and "saturation transform" calculations disclosed in the specification as filed.

The unusual and ambiguous presentation of the invention in the application as filed, using a plurality of independent claims of overlapping scope and lacking a clear statement about the essential features of the invention, does not allow the skilled reader to directly and unambiguously derive that the solution of the problem of eliminating motion-induced noise should reside in the parallel data processing using two different calculation methods, irrespective of the specific nature of these calculations. These specific calculations are in fact highly relevant and should have been incorporated into the claimed subject-matter to provide a complete solution to the stated problem.

3.8 Hence, since the subject-matter of claim 1 of the second auxiliary request does not provide a complete solution to the mentioned technical problem, claim 1 defines subject-matter extending beyond the content of the application as filed, contrary to the requirement of Article 123(2) EPC. Moreover, since essential features are missing from the solution of the technical problem identified in the application, the claim also lacks adequate support by the description within the meaning of Article 84 EPC, second sentence taken in combination with Rule 43(1) and (3) EPC.

3.9 In claim 1 according to the third auxiliary request, some clarifications and additions have been made, without however properly addressing the foregoing objections, which still apply. Therefore, claim 1 of the third auxiliary request is not allowable under Articles 123(2) and 84 EPC for the same reasons as those stated above.

Order

For these reasons it is decided that:

The appeal is dismissed.

The Registrar: The Chairman:

C. Eickhoff M. Noël