1. General considerations

It is noted that any references in this text to the Guidelines for Examination at the European Patent Office (GL) refer to the version valid at the date of the examination.

1.1 Introduction

The paper relates to a system for remotely monitoring at least one vital sign of the human body: pulse rate, body temperature, blood pressure and blood oxygen saturation. The four vital signs have to be monitored regularly for controlling the medical status of a patient in hospital. Monitoring vital signs at home will play a more and more important role in remote medicine. Parents wish to monitor the health status of their small children remotely and continuously. Therefore, the aim of the invention is to provide a reliable and comfortable system for long-term remote monitoring of the vital signs of a person, which is also suitable for small children and babies.

1.2 The invention as presented in the application as filed

The invention as initially claimed concerns a system for monitoring a human body, the system comprising holding means for holding an optical sensor and a motion sensor close to the human body, the holding means further comprising transmitting means for transmitting output signals of the sensors, the system further comprising evaluation means for receiving the output signals and calculating vital signs from the output signals, wherein the evaluation means is configured to combine and correct the output signals of the sensor and wherein the transmitting means is a wireless transmitting means.

1.3 The prior art

Three documents are cited against the application. Only D2 is novelty destroying for claims 1-4 of the application as originally filed.

Document D1 is from the same technical field and discloses a pulse oximeter as it is usually used in a medical environment. D1 discloses recording vital signs by attaching
sensors to the human body with a clip. This has the drawback that for long-term measurements the attachment is not reliable or comfortable for the patient. The pulse oximeter comprises in addition to the optical sensors a motion sensor. D1 is silent about correcting the output signals of the sensors. Apart from the clip D1 does not disclose or teach any other means for attaching the sensors to the human body.

Document D2 discloses a baby monitor, which is an advanced camera with additional functions. The monitor allows not only to monitor sound and images, but also to monitor the pulse rate of a baby. The camera transmits the data by means of a wireless connection and corrects the data by combining the signals of the camera with the data of a motion sensor. D2 takes away the novelty of original claim 1.

Document D3 is from a similar technical field and discloses a sock for attaching electrical medical sensors in a secure, comfortably and reliable manner. D3 is silent about optical sensors, motion sensor, wireless data transmission and correcting sensor signals. The application discusses only the disclosure of D1 in the description.

1.4 The communication

Novelty objections are raised by the examiner in the communication against claims 1-4 on the basis of document D2. Finally observations under Article 84 EPC are raised against claims 1, 5 and 6. It is noted that the technical feature "glove" is only mentioned in the claims and not in the description, wherein it is required that the claims are supported by the description. It is further noted that Optitex™ is a trademark and its composition is not further specified as required under Guidelines F-IV, 4.8.

1.5 The letter from the applicant

The client proposes a set of claims addressing only the objections raised by the examiner for claims 1-4. In this set of claims, claim 1 is limited to one of a sock, a wristband or a headband for attaching the sensors to the human body. The client in the letter also stresses that the third embodiment of the application is enjoying unexpected success in the sports article market. To cover this embodiment, he replaced the erroneous word
“glove” in original claim 5, serving as basis for amending claim 1, by “headband for goggles”.

The feature stating that a wireless transmitting means is used for transmitting the sensor output was deleted, because this kind of transmission is not suitable for some applications. In addition, the client states that he would like to protect a system comprising any kind of garment for attaching the sensors to the human body. He asks for the claims to be amended accordingly, if possible. The client stresses that, inspired by the erroneous word “glove” and by the teaching of D3, he intends to produce a glove comprising optical and motion sensors according to the inventive idea.

Therefore, it was expected from the candidates that a system comprising any kind of garment is protected by the independent claim. It was further expected to claim both the glove and headband for goggles as specific examples of a garment in the dependent claims.

The client does not address the observations under Art. 84 EPC. Therefore, it was expected from the candidates that the objection against missing support in the description for claiming a glove is discussed and that the trademark Optitex is specified by its composition in the corresponding dependent claim. In addition, the relative term “close to” had to be addressed.

The amendments proposed by the client add subject-matter, contrary to the requirements of Art. 123(2) EPC. The proposed amendment to claim 1 unallowably adds subject-matter in combination with unchanged claim 4. There is no basis in paragraphs [10]-[12], where the third embodiment is described, that the headband for goggles is claimed together with a screen for displaying the at least one of the vital signs, such as a display of a smart phone or a computer. Therefore, candidates had to amend claim 1 or claim 4 in order to overcome this violation of Art. 123(2) EPC or to provide a reasoning that such a combination of features has support in the application as originally field.
1.6 The draft set of claims

The client introduced the following deficiencies in the dependent claims of the draft set of claims:

In new dependent claim 2 the signal transmission is formulated as a method step (The “signals are transmitted by wireless transmitting means (4, 14, 24)”). Consequently, the candidates were expected to reformulate this feature as a structural feature as it was originally formulated in claim 1.

In new claim 3 the dependency was incorrect, because in claim 1 the feature of the wireless transmitting means was deleted, thus making a reference back to claim 1 unclear. New claim 4 has no basis in the description in so far as claim 4 refers back to “headband for goggles”, as discussed above.

New claim 5 does not overcome the objection of the examiner under Art. 84 EPC (trademark).

1.7 The challenges of the paper

The main challenges of the paper were to:

a) Amend the client’s draft claim set according to the wishes of the client to fulfil the requirements of the EPC.

b) Write a reasoned letter of reply
   - explaining the basis for the amendments of the claims,
   - arguing for supporting the deletion of a feature in claim 1,
   - arguing for support of original claim 4

c) Addressing all the clarity objections raised by the examiner in his communication.

d) Arguing that the subject matter of the amended independent claim is new and involves an inventive step in the light of D1-D3.

1.8 The marking scheme

Answer papers are marked on a scale of 0 to 100 marks:

Appropriate amendments to the draft set of claims: Max. 30 marks, min. 0 marks.
This year again not the claim set as a whole, but the amendments carried out received marks. However, from the marks awarded for the amendments, marks were deducted for unnecessary limitations or non-compliance e.g. with Art. 123(2) EPC or 84 EPC. The overall number of marks per claim could not be negative.

As in the previous years the number of available marks corresponds to the difficulties of each challenge or the complexity of the expected amendment. Therefore, more difficult challenges may receive more marks than easier challenges. This year, as in some previous years, a considerable number of challenges/expected amendments have been in the dependent claims such that for dependent claims an important part of the marks for the claim set was available.

For the argumentation max. 70 marks and min. 0 marks have been available.

Unless otherwise stated, the individual marks referred to in the various sections of this document apply to the example set of claims. This year the expected amendments required a detailed reasoning, such that one third of the available marks for the letter of reply was available for this section. Again one third of all marks was available for a reasoning in support of inventive step.

Although the marking scheme is divided into separate sections such as the marks awarded for amendments to the claims and marks awarded for argumentation, the answer paper as a whole was considered and the scheme reflects this. Candidates who have provided very good arguments for the claims they have submitted can receive good marks for argumentation even if the claims receive few marks. Reasoning supporting novelty and inventive step based on an un-amended draft set of claims was this year almost the same as for the example claim set.

No marks were available for formulating a letter to the client setting out the reasons why the client’s suggested claims were further amended.
2. Example set of claims

A suitable wording for the amended claims is as follows:

1. System for monitoring at least one vital sign of a human body, the system comprising:
   - attaching means holding means (1, 11, 21) for attaching holding an optical sensor (2, 12, 22) and a motion sensor (3, 13, 23) close to the human body 810, 27), the attaching means holding means (1, 11, 21) comprising in addition to the sensors (2, 12, 22, 3, 123, 23) transmitting means (4, 14, 24) for transmitting output signals from the sensors (2, 12, 22, 3, 13, 23),
   - evaluation means (5, 25) for receiving the output signals and calculating from the output signals the at least one vital sign,
   characterised in that
   - the attaching means (1, 11, 21) is a garment and in that
   - the evaluation means (5, 25) is configured to correct the output signal from the optical sensor (2, 12, 22) based on the output signal of the motion sensor (3, 13, 23) or to correct the output signal from the motion sensor (3,13,23) based on the output signal of the optical sensor and in that the transmitting means (4, 14, 24) is a wireless transmitting means.

[Original claim 2 deleted]

2. System according to claim 1 wherein the transmitting means (4, 14, 24) is a wireless transmitting means (4, 14, 24).

3. System according to claim 1 or 2 wherein the wireless transmitting means (4, 14, 24) is a wireless local network emitter.

4. System according to any of claims 1 to 3, further comprising a screen (6) and configured to display the at least one vital sign on the screen.

5. System according to any of claims 1 to 4, wherein the garment is the holding means is an attaching means (1, 11, 24) such as a sock (1) or a wristband (11) or a glove.
6. System according to claim 1 to 4, wherein the garment is a glove.

7. System according to any of claims 1 to 3, wherein the garment is a headband (21) for goggles (20).

8. System according to any of claims 1 to 5, wherein the attaching means (1, 11, 21) is at least partly made of Optitex™ a material comprising 50-60% cotton, 30-40% polyurethane and 10-20% polyethylene glycol in % by weight.

(For convenience, here is a set of claims where the amendments are shown vis à vis the client’s draft set of claims.):

1. System for monitoring at least one vital sign of a human body, the system comprising:
   - attaching means (1, 11, 21) for attaching an optical sensor (2, 12, 22) and a motion sensor (3, 13, 23) to the human body (10, 27), the attaching means (1, 11, 21) comprising in addition to the sensors (2, 12, 22, 3, 13, 23) transmitting means (4, 14, 24) for transmitting output signals from the sensors (2, 12, 22, 3, 13, 23),
   - evaluation means (5, 25) for receiving the output signals and calculating from the output signals the at least one vital sign,
   characterised in that the attaching means (1, 11, 21) is one of a sock (1), a wristband (11) or a headband (21) for goggles (20) a garment and in that the evaluation means (5, 25) is configured to correct the output signal from the optical sensor (2, 12, 22) based on the output signal of the motion sensor (3, 13, 23) or to correct the output signal from the motion sensor (3,13,23) based on the output signal of the optical sensor.

2. System according to claim 1 wherein the output signals are transmitted by the transmitting means (4, 14, 24) is a wireless transmitting means (4, 14, 24).

3. System according to claim 1 or 2 wherein the wireless transmitting means (4, 14, 24) is a wireless local network emitter.

4. System according to any of claims 1 to 3, further comprising a screen (6) and configured to display the at least one vital sign on the screen.
5. System according to any of claims 1 to 4, wherein the garment is a sock (1) or a wristband (11);

6. System according to claim 1 to 4, wherein the garment is a glove.

7. System according to any of claims 1 to 3, wherein the garment is a headband (21) for goggles (20).

8. System according to any of claims 1 to 4, wherein the attaching means (1, 11, 21) at least partly made of Optitex™ a material comprising 50-60% cotton, 30-40% polyurethane and 10-20% polyethylene glycol in % by weight.

3. Expected amendments to the claims

The draft set of claims submitted by the client contains features, which result in claims, which are considered not to be consistent with the EPC. Marks were awarded for making amendments to the draft claim set appropriate for bringing it into accordance with the EPC.

No marks were awarded for merely filing the claim set provided by the client or for the formulation of additional (dependent) claims.

Apart from the claims explicitly requested by the client, drafting additional claims was not expected. The client had stated in the last sentence of his letter after all his very specific wishes, that “otherwise we do not want you to add further dependent claims”. It was clear from the context and the structure of his letter that this relates only to subject matter other than the garment being a sock, a wristband, a glove or a headband.

It is noted that full marks were awarded for amendments that differ from those of the example claim set, provided their scope is comparable. This was considered on a case-by-case basis. Marking of the dependent claims was adapted accordingly.
3.1 The independent claim (6 marks)

The expected solution for claim 1 was generalising the feature “one of a sock, a glove or a headband for goggles” to “garment”. Basis for this generalisation can be found in the description for all embodiments. The last but one sentence of paragraph [02] states that the attaching means may be a garment. Paragraph [07] states that the sock is a garment and paragraph [09] discloses that instead of a sock and a wristband any kind of garment can be used. In paragraph [10] the headband for goggles is defined as garment.

Replacing “sock, wristband and headband for goggles” by “garment” was awarded with 5 marks, 1 mark was awarded for replacing the feature “holding … close to” by “attaching … to “.

3.2 The dependent claims (24 marks)

3.2.1 Wireless transmitting means

In claim 2 (3 marks) a structural feature like “the transmitting means (4, 14, 24) is a wireless transmitting means” was expected. The expected reformulation was disclosed in original claim 1. 3 marks were available for replacing the feature related to a method by a structural feature.

3.2.2 Local network emitter

Claim 3 (3 marks) had to be made dependent exclusively upon claim 2, because the “wireless transmitting means” has no antecedent in claim 1. 3 marks were available for correcting the dependency of claim 3.

3.2.3 Screen

Claim 4 could remain unchanged, if claim 1 was amended as suggested.
3.2.4 Sock, wristband

The client has included the features “sock, wristband and headband for goggles” into claim 1 of the draft set of claims, because he was not sure whether a generalisation by “garment” was authorised. If the features “sock, wristband and headband for goggles” are replaced by the more general term “garment”, it was expected from the candidates to resume these features in the dependent claims.

4 marks were available for a dependent claim related to a sock and a wristband.

In the example set of claims several dependent claims have been formulated. However, other solutions are possible, provided that the whole set of claims is clear and the dependencies are correct: e.g. instead of separate dependent claim 5 and claim 6 one single claim could be formulated in line with original claim 5: “System according to any of claims 1 to 4, wherein the garment is a sock (1), a wristband (11) or a glove”. (9 marks)

3.2.5 Glove

5 marks were available for maintaining “glove”. The option “glove” was originally disclosed only in the claims and only in combination with wireless transmitting means. However, paragraph [02] provides a sufficient basis under Art. 123(2) EPC to omit the feature “wireless transmitting means” from this embodiment (see also the GL F-IV, 6.3).

The feature “glove” was apparently erroneously claimed instead of “goggles” in the original application. This is clear from the client’s letter, paragraph [04]. Although no explicit support is provided in the description (cf. communication, section 3.2), it is very important for the client to have protection for this embodiment. Inspired by the (erroneous) word “glove” and by the teaching of D3, he intends to produce a glove comprising optical and motion sensors according to the invention (client’s letter, paragraph [04]).

A glove is
• originally disclosed by the claims,
• not in contradiction to the description,
• in alignment with the invention and
• an alternative attaching means known by the prior art (D3, paragraph [04]).
In order to make the claims consistent with the description, the statement of invention in paragraph [02] of the description could at any time be replaced by a reference to the set of claims.

### 3.2.6 Headband for goggles

Claim 7 (6 marks). The headband for goggles had to be claimed in a separate dependent claim, because it could be argued that this embodiment is – in contrast to the sock, wristband and glove - not disclosed in combination with a screen as claimed in claim 4. A suitable solution in this exceptional case was to formulate a new claim 7 directed to the headband and not dependent upon claim 4. 3 marks were available for a dependent claim directed to the headband for goggles, 3 marks were available for the correct dependency of such a claim. If however “headband for goggles” was claimed in combination with a screen, reasoning was expected in the letter of reply that such a combination has a basis in the application as originally filed. Up to 3 marks were available for such a set of claims.

### 3.2.7 Optitex

Claim 8 (3 marks). In claim 5 of the draft set of claims the lack of clarity related to the trade mark Optitex™ could be overcome by replacing Optitex™ by “a material comprising 50-60% cotton, 30-40% Polyurethane and 10-20% Polyethylene Glycol in % by weight”. This definition can be found in paragraph [09] of the description. In view of new dependent claims the claim had to be renumbered to new claim 8 according to the example set of claims. 3 marks were available for claiming the composition of Optitex™ instead of the expression “Optitex™”, for deleting Optitex™ and the correct dependency of this claim, i.e. all other claims.

### 4. Claims differing from the example claims

Note: The overall number of marks per claim cannot be negative.
4.1 Deductions for too “narrow” claims

Where an independent claim of an answer paper differs from that of the example solution and results in a claim which is considered to be inappropriate for protecting the client’s invention, e.g. because it does not give the applicant the broadest possible protection for his invention, marks have been deducted. Marks were also deducted for an independent claim not corresponding to the applicant’s wish (see below).

Sometimes, candidates have drafted very narrow independent claims. Such claims are much easier to argue for novelty and inventive step. Such claims often also go against the client’s wishes. Therefore, in general fewer marks were awarded in the inventive step argument section for very limited independent claims.

Examples:

- Adding to claim 1 the feature that the motion sensor is placed next to or between the optical sensor(s).
- Candidates having an independent claim comprising the composition of Optitex in most cases could not achieve more than 20 out of 32 marks for reasoning in favour of inventive step.

4.1.1 Independent claim

For an independent claim of an answer paper having one or more additional features that are considered to limit the claim unnecessarily, 3 marks per unnecessarily limiting feature were deducted from the total marks awarded for the claim. However for severe limitations that result in a claim of minimum use for the client 6 marks were deducted.

Examples:

- Claiming one or more of sock, wristband or headband, instead of garment. However, only 1 – 2 marks may have been deducted (cf F-IV,4.9), if these features were claimed as optional features/examples for garment (“such as …”), especially, if these examples have rendered features in the dependent claims unclear.
- Adding the composition of Optitex™: 6 marks were deducted
- Claiming that the evaluation means (5, 25) is configured to correct the output signals from the optical sensors (2, 12, 22) based on the output signal of the motion sensor
to correct the output signal from the motion sensor based on the output signal of the optical sensor, or to omit one of the two options: 3 marks were deducted.

4.1.2 Dependent claims

For a dependent claim of an answer paper having one or more additional features that are considered to limit the claim unnecessarily, 2 marks per unnecessarily limiting feature per claim were deducted from the total marks awarded for the claims.

Examples:
- Claiming wireless transmitting means only in combination with wireless local network emitter or combining other dependent claims.
- Unnecessarily excluding other claims in the dependency.
- Headbands for goggles in combination with an earphone or transmitter of audio signals.

4.2 Deductions for non-compliance with the EPC

Claim sets which have been amended so that they differ from the client’s draft set of claims, but which result in claims which do not fulfil the requirements of the EPC, for example because they result in an unclear or non-inventive claim, have not received full marks.

Examples:
- Keeping “sock, wristband or headband for goggles”,
- Deletion of technical features in the independent claim of the draft set of claims leading to lack of novelty/ inventive step,
- Addition of technical features from the description leading to unallowable intermediate generalisation or unclear back-references.
4.2.1 Independent claim

For an independent claim of an answer paper not fulfilling the requirements of the EPC, for example due to lack of novelty or inventive step **6 marks** were deducted, for added subject matter or lack of clarity, up to **3 marks** per issue were deducted from the total marks awarded for the claim.

Examples:

- The features “garment” or “correcting the signals” are omitted in the independent claim. Omitting “garment” in the claim, but maintaining all the other features as suggested in the example set of claims would define a system not solving the technical problem reported by the application (paragraph [01]) vis-à-vis D1 of providing a comfortable and reliable way of monitoring vital signs. Moreover, since D2 suggests that the output of an optical sensor as a function of the output of a motion sensor be corrected to reduce noise, a system obtained by adding in D1 the signal correction would be obvious over a combination of D1 and D2.

- An independent claim as proposed above but omitting the feature related to the signal correction would be unallowable under Art. 123(2) EPC because this feature is in original claim 1 and is essential for the invention. Such a claim would arguably not be inventive in view of a combination of the teachings of D1 and D3.

- The client explicitly requests a claim comprising garment and suggests a claim with the specific examples of the garment. Any claim omitting features from the suggested claim would be against the explicit wish of the client. Up to 6 marks were deducted for an independent claim not being in line with the wishes of the client.

4.2.2 Dependent claims

For a dependent claim of an answer paper not fulfilling the requirements of the EPC, for example due to added subject matter or lack of clarity, **2 marks** per issue were deducted from the total marks awarded for the claim.
Examples:

- Unclear back-references to the independent claim,
- Wrong dependencies,
- Addition of technical features from the description leading to unallowable intermediate generalisation.
- No marks were deducted for adding to the claim related to the goggles the literal wording from the description “wherein the evaluation means 25 is configured to correct the output signal from the sensor 22 based on the output signal of sensor 23, and vice-versa” (see below).

4.3 Formal matters

For an answer paper having an independent claim according to the example solution it is considered appropriate to use the two-part form with respect to one of D1-D3. 1 mark was deducted if the two-part form was not correct with respect to any of these documents. 1 mark was not deducted, if the document chosen is not the document being considered the closest prior art in the example solution. 1 mark was deducted, if the claims did not comprise reference signs.

Example:

- D1 is considered to represent the closest prior art. D1 discloses all the technical features of the draft independent claim except that the attaching means is a garment and that the sensor signals are corrected.
- D2 discloses all the technical features of the draft independent claim except that attaching means attach the sensors to the human body and that the attaching means is a garment.

4.4 Solutions not based on the client’s draft claim set

The client provides a draft claim set that he proposes for filing. He asks for any necessary amendments for fulfilling the requirements of the EPC, whilst giving him the broadest possible protection. Answer papers which have claim sets not based on client’s wishes are
not considered to be in the interest of the client and such claims may therefore receive less marks or no marks.

For dependent claims in addition to the dependent claims of the expected solution, **no marks** were available, because it was the explicit request of the client not to add new, i.e. further dependent claims. However, new dependent claims are not considered new if they claim the originally claimed subject-matter or subject-matter claimed in the client’s draft claim set in a different way.

For amendments to the description **no marks** were available.

5. **Letter of reply to the EPO (up to 70 marks available)**

5.1 **General remark**

It was necessary to provide arguments demonstrating that the objections raised by the examiner have been overcome, providing a basis for all the amendments made and explaining why the subject-matter is both novel and inventive.

It is noted that the examples for sections of a letter of reply given in the following are, unless otherwise stated, appropriate for the example claim set. For an answer paper having a different claim set, the letter of reply may differ and the answer paper is considered accordingly.

**No marks** were available for

- a letter to the applicant
- a letter to the marker

All the necessary information should be contained in the letter of reply to the examining division.

A total of 70 marks was available for the arguments. The arguments were assessed on the basis of the actual set of claims submitted. Thus for example, if additional claims are formulated, a full basis needs to be provided for all the claims. If additional independent
claims are submitted, novelty and inventive step arguments for these claims are expected, the total amount of marks for arguments staying the same.

5.2 Basis for the amendments (24 marks)

A full basis had to be provided for all amendments. In order to obtain full marks it is necessary to identify all the amendments made in the set of claims filed as compared to the original set of claims. The basis needs to be provided irrespective of whether or not the amendment was proposed in the client's letter or is a further amendment to the draft set of claims. Amendments proposed by the client but not being in the set of claims submitted should not be discussed.

Arguments needed to be provided if features have been combined from different parts of the application. Similarly, if the wording used in the application was modified, if a feature was taken from an example or if features were deleted from a claim, detailed arguments needed to be provided in support of these amendments.

5.2.1 Claim 1 (12 marks)

12 marks were available for indicating and explaining a basis for claim 1. For the example claim 1, these marks were awarded according to the following scheme:

**2 marks** were available for appropriately stating claims 1 and 5 as basis for new claim 1 and explaining that based on the original disclosure of claim 1 “holding … close to the human body” was replaced by “attaching … to the human body”. Further basis for the new wording of claim 1 is paragraph [02], first sentence. A statement addressing the clarity objections of the examiner is discussed below in section 5.3.1.

**2 marks** were awarded for indicating paragraph [02] as general basis for adding the feature that the attaching means is a garment.

**2 marks** were given, if additionally the paragraphs [07], [09] and [10] as further basis for claim 1 were mentioned:

Paragraph [07] discloses for the first embodiment the general statements “Accommodating an optical sensor into a garment. For the second embodiment paragraph [09] discloses clearly the use of any garment instead of a sock or a wristband: “The sock 1 may be
replaced by a wristband 11 as shown in the embodiment in Fig. 2. However, any garment may be used”. As to the third embodiment paragraph [10] discloses “The headband 21 is a garment and may be made of Optitex™ which provides reliable, secure and comfortable attachment of the sensors to the ear”.

GL H-V,3.2.1 (intermediate generalisation) requires that, “when a feature is taken from a particular embodiment and added to the claim, it has to be established that the feature is not related or inextricably linked to the other features of that embodiment and that the overall disclosure justifies the generalising isolation of the feature and its introduction into the claim”. As the general term “garment” is mentioned for all embodiments, the requirements of GL H-V,3.2.1 are fulfilled. Therefore, the description not only provides a basis for generalizing the specific examples of sock, wristband and headband to “garment”, but mentions for each of the three examples the more general term “garment”. The detailed description of the embodiments reflects the broad scope of the claims, because specific features are given only as optional examples. Consequently, generalizing the features sock, wristband and headband to garment is not an unallowable intermediate generalization.

6 marks were available for a reasoning supporting the deletion of “wireless transmitting means using the essentiality test (GL H-V,3.1).

Example:
New claim 1 is based on original claim 1 and 5 and paragraphs [02], [07], [09] and [10] of the description. Based on the original disclosure of claim 5 and paragraph [02], first sentence, “holding …close to the human body” was replaced by “attaching … to the human body”. The general term garment is disclosed for all three embodiments ([07], [09] and [10]). From paragraph [02] and [07], it is clear that any garment can be used instead of sock, wristband and headband. Par [09] directly and unambiguously teaches that instead of the specific examples for the attaching means any garment can be used. As the general term “garment” is mentioned for all embodiments as well as in the general description of the invention in paragraph [02], the requirements of GL H-V,3.2.1 are fulfilled. Adding garment to claim 1 therefore is not an unallowable intermediate generalisation. (6 marks)
The feature “wireless transmitting means” was deleted from original claim 1. The gist of the invention lies in the design of the attaching means and the correction of the sensor signals. Therefore, the feature “wireless transmitting means” is not essential for the inventive idea. Paragraphs [02], [04], [09] and [12] make clear that any kind of transmitting means can be used, such as a serial port for a cable for instance. From the same passages the skilled person learns that a wireless transmission is not indispensable for the invention, because wireless transmission is just one option out of several possibilities. Carrying out the inventive idea is independent from the transmitting means. Wireless transmitting means can be replaced without any technical difficulty e.g. by a serial port for a cable and there is no need to modify the remaining features to compensate for the change. (6 marks)

5.2.2 Claim 2 – wireless transmitting means (2 marks)

1 mark was available for indicating and explaining a basis for claim 2, i.e. for stating that the claim is based on the feature, which was removed from original claim 1.

5.2.3 Claim 3 – local network emitter (2 marks)

1 mark was available for indicating that claim 3 corresponds to original claim 3. 1 additional mark was available for indicating that only the dependency was changed.

5.2.4 Claim 5 and 6 – sock, wristband, glove (2 marks)

1 mark was available for indicating that claims 5 and 6 (sock, wristband, glove) correspond to the original claim 5. 1 mark was available for referring to the reasoning as provided under section 5.2.1, where it is argued that the feature “wireless transmitting means” is not essential for the inventive concept and thus can also be isolated from the embodiment “glove”.

5.2.5 Claim 7 - Headband for goggles (marks)

1 mark was available for indicating that claim 7 (headband for goggles) corresponds to paragraph [11] of the description. 3 marks were available for arguments supporting this: Paragraph [11] discloses that the evaluation means is configured to correct the output
signals from the optical sensors based on the output signal of the motion sensor and vice versa, i.e. the option “or to correct the output signal from the motion sensor based on the output signal of the optical sensor” is not explicitly disclosed as an alternative option. Here, arguments should be provided that this expression has to be seen in the light of the statement of invention in paragraph [02] and the original version of the independent claim. From both disclosures in combination the skilled person directly and unambiguously understands that with the term “and vice versa” the second alternative option of correcting the signal is meant and that both ways of correcting the signal are alternative options.

Example:
Claim 7 is based on paragraph [11] of the description. This paragraph corresponds almost literally to the claim wording of present claim 1. The only difference is that “attaching means” is replaced by “headband for goggles” and that “the evaluation means is configured to correct the output signals from the optical sensors based on the output signal of the motion sensor and vice versa”. The option “or to correct the output signal from the motion sensor based on the output signal of the optical sensor” is here not explicitly disclosed as an alternative option. However, this expression has to be seen in the light of the statement of invention in paragraph [02] in combination with the original version of the independent claim, where the two alternative options of correcting the signal are explicitly claimed. Therefore, in view of the general description of the invention in paragraph [02] and the formulation of independent claim 1 it is clear that with “and vice versa” the second alternative option of correcting the signal is meant and that both ways of correcting the signal are alternative options.

Furthermore, the wireless transmitting means is an optional feature. Therefore, new claim 7 does not represent an unallowable intermediate generalisation. (4 marks)

Note: For this embodiment only an ear plug is disclosed as output means. Therefore, this claim cannot be dependent upon claim 4.

5.2.6 Claim 8 – Optitex (3 marks)

1 mark was available for indicating that claim 8 corresponds to original claim 6. The term Optitex™ was replaced by the material composition as disclosed in paragraph [09].

(2 marks)
Further arguments as to why the claim is now clear were expected and are discussed under “clarity” (see next section).

5.3 Clarity (8 marks)

In the letter of reply it needs to be explained how the clarity objections raised in the communication have been overcome.

5.3.1 “close to human body” (claim 1) (2 marks)

Replacing “holding …close to the human body” by “attaching … to the human body” as originally disclosed in claim 5 and in paragraph [02] overcomes the objections in section 3.1 of the examiners’ communication. (2 marks)

5.3.2 Glove supported by the description (claim 6) (4 marks)

Apparently the word “goggles” was erroneously replaced by “glove” in original claim 5. “Glove” is not mentioned in the description. This has been noted in the examiner’s communication. It has not been objected as lacking clarity, but it is clear from the examiner’s statement that a reasoning is expected, as to how the example of a glove is supported by the inventive idea and by the description as required by GL F-IV,6.3. GL F-IV,6.3 requires that “as a general rule, a claim should be regarded as supported by the description unless there are well-founded reasons for believing that the skilled person would be unable, on the basis of the information given in the application as filed, to extend the particular teaching of the description to the whole of the field claimed by using routine methods of experimentation or analysis”.

4 marks have been available for the reasoning supporting the maintenance of “glove” in the claims.

Example:
“Glove” is mentioned in original claim 5, but is not mentioned in the description as originally filed. “Glove” is not in contradiction to the disclosure and to the teaching of the description. Therefore, no lack of clarity under Art. 84 EPC arises. For all three embodiments the description (cf. paragraphs [07], [09] and [10]) discloses that any
garment can be used instead of the examples described in more detail in the description. A glove is furthermore in alignment with “garment” as stated in paragraph [02]. As illustrated by the last paragraph of D3, it is common knowledge for the skilled person that instead of a sock and a wristband a glove may be used as attaching means for attaching a medical sensor to the human body.

The description therefore fulfils the requirements of GL F-IV,6.3 concerning support under Art. 84 EPC, i.e.: “as a general rule, a claim should be regarded as supported by the description unless there are well-founded reasons for believing that the skilled person would be unable, on the basis of the information given in the application as filed, to extend the particular teaching of the description to the whole of the field claimed by using routine methods of experimentation or analysis”.

If the examiner is of the opinion that the embodiment of the glove is to be mentioned in the description, it can always be added to the description based on original claim 5 without violating Art. 123(2) EPC. (4 marks)

5.3.3 Trademark Optitex™ (claim 8) (2 marks)

2 marks were available for reasoning that Optitex™ was replaced by “material comprising 50-60% cotton, 30-40% polyurethane and 10-20% polyethylene glycol in % by weight.” This feature clearly specifies the composition of the claimed material and is not objectionable under Art. 84 EPC.

5.4 Novelty (6 marks)

Novelty of the claims also had to be discussed. It is sufficient to mention a single technical feature rendering claim 1 novel with respect to D1, D2 and D3.
Examples:
(1) Claim 1 is novel with respect to D1, because D1 does not disclose a garment for attaching the sensors to the human body. D1 does not disclose means for correcting the sensor signals (2 marks).

(2) D2 does not disclose attaching means for attaching a garment to the human body (2 marks).

(3) D3 does not disclose a motion sensor. D3 further does not disclose means for correcting the sensor signals (2 marks).

5.5 Inventive step argumentation for the independent claim (up to 32 marks)

It is appropriate to provide arguments, which are structured to follow the problem solution approach (see Guidelines G-VII 5).

5.5.1 Identifying the closest prior art (7 marks)

In selecting the closest prior art, the first consideration is that it should be directed to a similar purpose or effect as the invention, or at least belong to the same or a closely related technical field as the claimed invention.

5.5.1.1 Stating the closest prior art (1 mark)

For stating an item of prior art as being the closest prior art in a consistent manner with the two-part form of the independent claim, 1 mark was available.

For claims such as the example claims presented herein above, D1 is considered to represent the closest prior art according to GL-VII,5.3, since it addresses the same field as that of the invention and is the best starting point for the most convincing problem-solution-approach in favour of inventive step; for a clear statement to this effect, 1 mark is available.

D2 is not a suitable starting point for assessing inventive step, because it is not in the same technical field. This is true even if D2 has many technical features in common.
D3 could *prima facie* also be a suitable starting point. However, it has fewer features in common than D1.

### 5.5.1.2 Arguments justifying the choice of closest prior art (6 marks)

Discussing D1 (*2 marks*), discussing D2 (*2 marks*) and discussing D3 (*2 marks*).

**Example for the example independent claim:**

Closest prior art is D1, because D1 is the only available document in the field of the invention. D1 mentions indirectly in the last paragraph the underlying purpose of the invention, i.e. attaching the optical and motion sensor to the human body in a comfortable and reliable manner. Therefore, D1 is the closest of the available prior art (*2 marks*).

D2 has as many features in common as D1, but is in a remote technical field with respect to the invention, i.e. in the field of baby phones and remotely monitoring the behaviour of babies. The system in D2 is not adapted for monitoring the vital signs of a human body in a reliable manner as required in the medical sector. This however is a key feature of the invention (*2 marks*).

D3 could also be a suitable starting point. However, it has fewer features in common than D1 and is silent about a motion sensor, which is of fundamental importance for the invention. (*2 marks*).

### 5.5.2 Formulation of the objective technical problem (7 marks)

The next stage is to establish in an objective way the technical problem to be solved. This requires the steps of:

1. identifying, in terms of features, the difference between the claimed invention and the closest prior art, i.e. the distinguishing features of the claimed invention (*1 mark*);
2. stating the technical effects or the advantages of the difference (*3 marks*); and
3. formulating a problem which is solved by these technical effects (*3 marks*).
Example:
The subject-matter of claim 1 differs from D1 by the features of the characterising portion, i.e. in that the attaching means is a garment and in that the evaluation means is configured to correct the output signal from the optical sensor based on the output signal of the motion sensor or vice versa (1 mark).

The technical effect of a garment as the attaching means is that sensors required for pulse oximetry are attached in a secure, comfortable and reliable manner to the human body for remotely monitoring the vital signs of the human body. An undesirable side effect of accommodating an optical sensor into a garment is that noise is added to the output signal of the optical sensor 2 (paragraph [07]). Therefore, in the evaluation means the signal of the optical sensor has to be combined with the signal of the motion sensor and corrected such that the noise is reduced (paragraph [08]). In addition to improving the attachment of the sensors therefore also the signal to noise ratio must be improved. This also overcomes the prejudice mentioned in D3 that a garment may not be used for attaching an optical/motion sensor to the human body for monitoring vital signs.

The advantage of the invention is that the vital signs can be monitored in a remote position over a long period. The patient is able to wear the sensors attached to his body in a comfortable manner. This allows medical staff a secure and reliable monitoring of vital signs of a patient on a long-term scale (see paragraphs [01] and [10]).

In contrast to the system disclosed in D1, long-term observation is possible. The system described in D1 is designed only for short-term observation.

Contrary to D2, the invention has the advantage that the four vital signs (pulse, body temperature, blood pressure and blood oxygen saturation) can be monitored. These vital signs can be monitored only if the sensors are attached to the human body.

With respect to D3, the invention has also the advantage that the four vital signs can be monitored by means of an optical/motion sensor. In addition, the signal to noise ratio is improved for the sensor signals. (3 marks).

Citing the advantages provided by the client in paragraph [01] of his letter attracts 2 marks: The invention has the advantage that the vital signs can be remotely monitored with a reliable, secure and comfortable attachment of the sensors in combination with a high signal quality, which is achieved by noise reduction through correcting the sensor output signals.
The **objective technical problem** may therefore be formulated as:
Providing a reliable and comfortable system for long-term remote monitoring of the vital signs of a person, including small children and babies, in combination with a high signal quality (paragraph [01] of the description and paragraph [01] of the client’s letter) *(3 marks)*.

Other convincing argumentation could also achieve full **7 marks**. Marks were redistributed accordingly between the formulation of the effect/advantages of the invention and the formulation of the problem, as long as they are consistent overall.

**5.5.3 Arguments in support of inventive step (18 marks)**

Arguments should support the features of the independent claim. They should be convincing and well structured. In order to obtain full marks in this section, arguments which fully answer the question as to why the skilled person, knowing the teaching of the prior art as a whole, would not arrive at the claimed subject matter had to be presented. Such arguments can be structured to consider the following aspects:

- Would the skilled person arrive at the subject matter of the claim by considering the teaching of the closest prior art on its own?

- Would the skilled person consider combining the teaching of the closest prior art with that of other prior art documents in order to solve the objective technical problem?

- If the skilled person were to combine the teaching of the closest prior art with other items of prior art, would they arrive at the subject matter of the claim?

**Example:**

**5.5.3.1 Considering D1 on its own (4 marks)**

In the last paragraph of D1 the attachment of the sensors is addressed. D1 discloses only a clip for attaching the sensors. D1 does not provide any teaching for using garment as
attaching means. In D1 the motion sensor is too large and heavy for being integrated into garment. In D1 the pulse is measured separately and independently. This teaches away from combining the different sensor signals. Apparently, a special motion sensor was developed or the author of D1 was not aware of such a sensor. Therefore, the skilled person faced with the teaching of D1 had no suitable sensor at hand, which could be integrated into a sock, a wristband or a headband for suitably carrying out the invention. Even if the skilled person had had such a motion sensor, he would still have been faced with the problem of suitable attaching means and noise reduction. The general knowledge of a person skilled in the medical area does not provide any solution to these problems.

5.5.3.2 Considering D1 + D2 (6 marks)

D2 is not concerned with the problem of providing a way of attaching a sensor to a body in a comfortable and reliable way. To the contrary, the camera of D2 has to be kept at a distance from the body. Therefore, the skilled person has no motivation to look in D2 for a solution to the technical problem. Furthermore, D2 neither discloses nor remotely suggests a sensor attached to a body by means of a garment, because the camera of D2 is too large to be integrated in a garment and would presumably not function properly if in contact with the human body. Therefore, even if the skilled person would look in D2 for a feature of interest in D1, he would not find any suggestion of implementing a garment in D1.

Accordingly, the signal correction algorithm of D2 is not directed to the reduction of noise introduced by implementing the sensors in a garment. It is also noted that no further software can be integrated in the electronics of D1 ([04]), so that the implementation in D1 of the correction algorithm of D2 would require an extensive modification of the electronics of D1. The skilled person would not attempt to overcome these technical difficulties in absence of a clear suggestion in D2 that the modification would solve the technical problem.
5.5.3.3  **Considering D1 + D3** (8 marks)

In the event that the skilled person is pointed to D3 to solve the problem, he would see that D3 teaches using garment for attaching electrical sensors. In D3 none of pulse, body temperature, blood pressure and blood oxygen saturation is measured. D3 does not teach to integrate optical and motions sensors into a garment. To the contrary, D3 teaches (paragraph [03]) that the integration of optical sensors such as in D1 in the garment disclosed by D3 creates additional noise representing additional technical difficulties, leading the skilled person away from the combination of D1 and D3. The garment of D3 and the optical sensor of D1 are therefore presented to the skilled person as incompatible features (Guidelines G-VII 6 (i)).

The skilled person might try to override this drawback by looking for another material for the garment, but he does not find in D3 any suggestion of a correction algorithm based on the output of a motion sensor.

For this technical drawback neither D1 nor D3 suggests a possible solution. As discussed above, even the algorithm disclosed for the SMOOTHY App is not suitable for improving the signal to noise ratio for an optical sensor and a motion sensor. Therefore, even if the skilled person combines D1 and D3, (s)he would still be faced with the problem of increased noise on the sensor signals.

5.5.3.4  **Considering D1 + D2 + D3**

To arrive at the invention, the skilled person should implement in D1 the correction algorithm of D2 and the garment of D3, even overriding the contrary indications given by D3. In any event, the fact that more than one document must be combined with the closest prior art is an indication of inventive step (Guidelines G VII 6, paragraph 1) since the invention is not a mere aggregation of features, rather there is a functional interaction (Guidelines G-VII 7, paragraph 1) between the correction algorithm and the garment (see paragraph [07] of the application). It would therefore not be correct to argue that each of these features is an obvious solution to a respective independent technical problem. Therefore, in the unlikely case, where the skilled person tried to combine the teachings of D1, D2 and D3 (s)he would encounter the technical difficulties mentioned above.
Consequently the subject-matter of claim 1 is inventive in view of the available prior art D1-D3.

All the other claims are dependent on claim 1 and therefore also relate to inventive subject matter. It is concluded that the invention defined in claim 1 involves an inventive step.

It was not expected that candidates provide all the above-listed arguments. With a convincing reasoning comprising many of the above-listed arguments full marks could be achieved. On the other hand the above-listed arguments are not exhaustive and other convincing arguments may attract marks.

The distribution given above (4,6 and 8 marks) is only indicative for a possible distribution. The available 18 marks have been distributed as a whole for discussing inventive step with respect to D1-D3.

Candidates starting their reasoning from D2 and D3 as closest prior art could in most cases not attract more than 20 marks and 26 marks, respectively, out of available 32 marks, because their reasoning in support of inventive step was less convincing. In the case of very limited independent claims, e.g. comprising the composition of Optitex™, in most cases not more than 20 marks out of 32 marks were achieved, because the reasoning was less complex and less convincing.
<table>
<thead>
<tr>
<th>Category</th>
<th>Max. marks possible</th>
<th>Marker 1</th>
<th>Marker 2</th>
</tr>
</thead>
<tbody>
<tr>
<td>Claims</td>
<td>30</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Arguments</td>
<td>Amendments</td>
<td>24</td>
<td></td>
</tr>
<tr>
<td>Arguments</td>
<td>Clarity</td>
<td>8</td>
<td></td>
</tr>
<tr>
<td>Arguments</td>
<td>Novelty</td>
<td>6</td>
<td></td>
</tr>
<tr>
<td>Arguments</td>
<td>Inventive step</td>
<td>32</td>
<td></td>
</tr>
</tbody>
</table>

**Total**