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**Datasheet for the decision  
of 11 October 2017**

**Case Number:** T 0621/16 - 3.5.02

**Application Number:** 10710679.1

**Publication Number:** 2407009

**IPC:** H05B33/08

**Language of the proceedings:** EN

**Title of invention:**

LED Lighting With Incandescent Lamp Color Temperature Behavior

**Patent Proprietor:**

Koninklijke Philips N.V.

**Opponents:**

Wilson Gunn

Megaman (UK) Limited/Neonlite International Ltd/

Neonlite Electronic & Lighting (HK) Limited

**Relevant legal provisions:**

EPC Art. 100(c), 83

RPBA Art. 13(3)

**Keyword:**

Grounds for opposition - main request - added subject-matter (yes) - undisclosed combination of features  
Sufficiency of disclosure - intermediate auxiliary request / auxiliary request 1 - enabling disclosure (no)  
Late-filed auxiliary request 2 - amendments after arrangement of oral proceedings - not prima facie allowable  
Late-filed auxiliary requests 3 and 4 - not admitted - procedural economy



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Case Number: T 0621/16 - 3.5.02

**D E C I S I O N**  
**of Technical Board of Appeal 3.5.02**  
**of 11 October 2017**

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**Decision under appeal:**           **Decision of the Opposition Division of the  
European Patent Office posted on 4 January 2016  
rejecting the opposition filed against European  
patent No. 2407009 pursuant to Article 101(2)  
EPC.**

**Composition of the Board:**

**Chairman**           R. Lord  
**Members:**         G. Flyng  
                      W. Ungler

## Summary of Facts and Submissions

- I. The contested decision is the decision of the opposition division, taken at oral proceedings on 11 December 2015, that the opposition against European patent EP 2 407 009 is rejected.
- II. The parties to the proceedings are as follows:
- The appellant opponent Wilson Gunn, hereinafter the "**Opponent**";
  - The respondent patent proprietor Koninklijke Philips N.V., hereinafter the "**Proprietor**"; and
  - Assumed infringers Megaman (UK) Limited, Neonlite International Ltd and Neonlite Electronic & Lighting (HK) Limited, hereinafter the "**Intervenors**".
- III. The patent as granted (see EP 2 407 009 B1) comprises a single independent claim, claim 1, as well as dependent claims 2 to 15.

Claim 1 of the patent as granted reads as follows (underlining added by the Board):

"1. Lighting device (100), comprising:  
an LED driver (101) capable of generating dimmed LED current;  
a two-terminal LED module (110; 300; 400; 500; 600), having two input terminals (111, 112) for receiving an input current ( $I_{in}$ ) from the LED driver (101) and comprising:

a first LED group (113) comprising at least one first type LED for producing light having a first color temperature;

a second LED group (114) comprising at least one second type LED for producing light having a second color temperature different from the first color temperature;

wherein the module is capable of supplying LED currents to the LED groups, these LED currents being derived from the input current ( $I_{in}$ );

wherein the LED module produces a light output having at least a *[sic]* light output contributions from the first LED group (113) and from the second LED group (114);

and wherein the module is designed to vary the individual LED currents in the individual LED groups in dependency of the average magnitude of the received input current ( $I_{in}$ ), such that the color point of the light output of the module varies as a function of the input current magnitude,

**characterized in that** the LED module comprises an electronic division circuit (115) capable of controlling a ratio of the LED currents ( $I_1$ ,  $I_2$ ) in said first and second LED groups (113, 114) as a function of the input current level received at the input of the LED module."

The pre-characterising part of claim 1 as granted corresponds to claim 1 of the application as filed (see WO 2010/103480). Except for the features underlined in the above, the characterising part of claim 1 as granted corresponds to dependent claim 11 of the application as filed (see also paragraph IV. below).

Dependent claims 5 to 9 of the patent as granted read as follows; except as indicated with struck-out text they correspond to dependent claims 5 to 9 of the application as filed:

"5. Lighting device according to claim 1, wherein the first group of LEDs has a varying first luminous flux output as a function of junction temperature of the first type LED, and the second group of LEDs has a varying second luminous flux output as a function of junction temperature of the second type LED, and wherein, at varying junction temperatures, the ratio of the first luminous flux output to the second luminous flux output varies;  
and wherein [~~preferably~~] the first color temperature is lower than the second color temperature, while, at decreasing junction temperatures, the ratio of the first luminous flux output to the second luminous flux output increases, and vice versa."

"6. Lighting device according to claim 1, wherein a gradient of the first luminous flux output as a function of junction temperature of the first type LED differs from a gradient of the second luminous flux output as a function of junction temperature of the second type LED;  
and wherein [~~preferably~~] the first color temperature is lower than the second color temperature, while the absolute value of the gradient of the first luminous flux output as a function of temperature of the first type LED is higher than the gradient of the second luminous flux output as a function of temperature of the second type LED."

"7. Lighting device according to claim 1, wherein a thermal resistance to ambient of the first group of

LEDs differs from the thermal resistance to ambient of the second group of LEDs;  
and wherein [~~preferably~~] the first color temperature is lower than the second color temperature, while the thermal resistance to ambient of the first group of LEDs is higher than the thermal resistance to ambient of the second group of LEDs."

"8. Lighting device according to claim 1, wherein the first group of LEDs has a first dynamic electrical resistance, and the second group of LEDs has a second dynamic electrical resistance.

"9. Lighting device according to claim 1, wherein one of the first group of LEDs and the second group of LEDs is connected in series with a resistor, and wherein this series arrangement is connected in parallel to the other one of the first group of LEDs and the second group of LEDs,  
and wherein this parallel arrangement is connected between the two input terminals (111, 112) of the LED module;  
and wherein [~~preferably~~] the resistor is a negative temperature coefficient, NTC, type resistor."

IV. In the application as filed claim 1 was the sole independent claim. There were dependent claims 2 to 16 which had the following dependencies:

- Claims 2 to 9 were dependent only on claim 1;
- Claim 10 was dependent on any of the preceding claims;
- Claim 11 (which corresponds to the characterising feature of claim 1 as granted) was dependent only on claim 1;



- Claims 12 and 14 to 16 were dependent only on claim 11; and
- Claim 13 was dependent only on claim 12.

Claim 11 of the application as filed reads as follows (underlining added by the Board to highlight differences with respect to claim 1 as granted, cf. paragraph III. above):

"11. Lighting device according to claim 1, wherein the LED module comprises an electronic division circuit (115) capable of controlling the LED currents (I1, I2) in said two groups (113, 114) of LEDs as a function of the input current level received at the input of the LED module".

- V. Oral proceedings were held on 11 October 2017 with all parties present.

The Proprietor presented the following documents:

Auxiliary Request 13:06h

- description pages 1 to 4, 4a, 5 to 17
- claims no. 1 to 10
- Figures sheets 1/9 to 9/9

Auxiliary Request 14:30h

- description pages 3 and 5

Auxiliary Request 15:12h

- description pages 5, 12, 15 and 16

Amended Auxiliary Request 2

- description pages 3, 4, 4a, 4b
- claims no. 1 to 10

The final requests of the Opponent and the Interveners were that the decision under appeal be set aside and the European patent be revoked.

The Proprietor requested finally that the appeal be dismissed and the opposition of the Interveners be rejected (**main request**), auxiliarily that the decision under appeal be set aside and the patent be maintained in amended form on the basis of one of the following requests:

- (a) a request designated as "**intermediate auxiliary request**", comprising the documents filed during the oral proceedings of 11 October 2017 as "auxiliary request 13:06h", with the exception of description pages 3, 5, 12, 15 and 16 which were replaced during those oral proceedings by corresponding replacement pages (page 3 at 14:30 and pages 5, 12, 15 and 16 at 15:12),
- (b) **auxiliary request 1** filed with letter dated 11 September 2017,
- (c) **auxiliary request 2** comprising claims no. 1 to 10 and replacement description pages 3, 4, 4a and 4b filed as amended auxiliary request 2 during the oral proceedings of 11 October 2017, with the remainder of the description and the figures of the intermediate auxiliary request,
- (d) **auxiliary request 3** filed with letter dated 12 May 2017, or
- (e) **auxiliary request 4** filed with letter dated 11 September 2017.

The order of the present decision was pronounced at the end of the oral proceedings.

VI. The content of the relevant claims of the Proprietor's requests can be summarised as follows:

Intermediate auxiliary request

In the application documents according to the intermediate auxiliary request, claims 1 to 4 are identical to the claims as granted, claims 5 to 9 as granted have been deleted, and claims 10 to 15 as granted have been renumbered as claims 5 to 10 and their dependencies have been amended accordingly.

Auxiliary Request 1

Like claim 1 as granted and claim 1 of the intermediate auxiliary request, claim 1 of auxiliary request 1 filed with the letter dated 11 September 2017 states that the LED module comprises "an electronic division circuit (115) capable of controlling a ratio of the LED currents (I1, I2) in said first and second LED groups (113, 114) as a function of the input current level received at the input of the LED module", but does not specify that the device comprises a current sensor.

Auxiliary Request 2

Claim 1 of the amended auxiliary request 2 filed during the oral proceedings of 11 October 2017 reads as follows (changes compared to claim 1 of the patent as granted indicated by strikeout and underlining):

"1. Lighting device (100), comprising:

an LED driver (101) capable of ~~generating~~ receiving  
an input mains voltage and acting as a current source  
to convert the input mains voltage so as to generate

dimmed LED current suitable for driving an LED array consisting of LEDs;

a two-terminal LED module (110; 300; 400; 500; 600), the two-terminal LED module having two input terminals (111, 112) for receiving an input current (I<sub>in</sub>) from the LED driver (101) and comprising:

a first LED group (113) comprising at least one first type LED for producing light having a first color temperature;

a second LED group (114) comprising at least one second type LED for producing light having a second color temperature different from the first color temperature;

wherein the module is capable of supplying LED currents to the LED groups, these LED currents being derived from the input current (I<sub>in</sub>);

wherein the LED module produces a light output having at least a *[sic]* light output contributions from the first LED group (113) and from the second LED group (114);

~~and~~ wherein the module is designed to vary the individual LED currents in the individual LED groups in dependency of the average magnitude of the received input current (I<sub>in</sub>), such that the color point of the light output of the module varies as a function of the input current magnitude; and

~~characterized in that~~ wherein the LED module comprises current sensor means (116) arranged to sense the input current level (I<sub>in</sub>), and an electronic division circuit (115) capable of controlling a ratio of the LED currents (I<sub>1</sub>, I<sub>2</sub>) in said first and second LED groups (113, 114) by distributing the input current to the first and second LED groups as a function of the input current level received at the input of the LED module sensed by the current sensor means."

Auxiliary Request 3

Auxiliary request 3 comprises two independent claims. Independent claim 9 is a combination of claim 1 as granted with all except the final feature of dependent claim 9 as granted, that "the resistor is a negative temperature coefficient, NTC, type resistor".

Auxiliary Request 4

Auxiliary request 4 comprises a single claim, claim 1. It includes all of the features of independent claim 9 of auxiliary request 3, with the following additional feature added at the end:

"; and wherein the electronic division circuit (115) consists of an electronic circuit with passive electronic components and wherein the electronic circuit design defines a relationship between the input current ( $I_{in}$ ) and the ratio of the LED currents in said first and second LED groups (113, 114)".

VII. The parties' relevant submissions may be summarised as follows:

Main Request

Various objections were raised by the Opponent and the Interveners along the lines that in the application as filed the circuit arrangements with an electronic division circuit (i.e. figures 1 to 5, as described from page 5, line 31 to page 12, line 7, and corresponding to dependent claims 11 to 16 as filed) were not disclosed in combination with the circuit arrangements which obtain the desired behaviour on the

basis of intrinsic characteristics of the LEDs and/or a series resistor (i.e. figures 6 and 10, as described from page 12, line 8 to page 15, line 19 with reference to figures 7 to 9 and 11, and corresponding to dependent claims 5 to 9 as filed). It was argued that in the patent as granted, claims 5 to 9 taken together with claim 1 upon which they were dependent created a combination of these different circuit arrangements that was not disclosed in the application as filed.

The Interveners argued in particular that in the context of the present application "controlling" by means of an "electronic division circuit" implied the use of active components and that it was not derivable from the description of figure 10 that the ratio of the LED currents was "controlled" "as a function of the input current level received at the input of the LED module".

The Proprietor argued that although the description of the circuit of figure 10 did not explicitly state that the disclosed circuit arrangement constituted an "electronic division circuit", it would nevertheless be evident to the skilled reader that that was the case, and that the disclosed circuit arrangement would be capable of controlling the ratio of the LED currents in the two LED groups as a function of the input current level received at the input of the LED module, as set out in granted claim 1. Hence, together with its description, figure 10 as filed disclosed the features of claim 1, 8 and 9 of the patent in combination.

Furthermore, the Proprietor argued that the circuit arrangement of figure 10 was an example of a cost-efficient embodiment in which the "division circuit 115 consists of an electronic circuit with passive and/or

active electronic components", as disclosed at page 7, lines 6 to 10 of the application as filed, in which the resistor 59 was the passive electronic component.

The Proprietor also referred to page 15, lines 20 to 28 of the application as filed, in particular lines 24 to 26 which refer to circuit arrangements in which the first and second sets of LEDs are connected in series, or in parallel, possibly with a resistive element in series with the first or the second set. The Proprietor argued that this gave a basis for combining the features of any of claims 5 to 9 as filed with an electronic division circuit.

#### Intermediate Auxiliary Request

The Interveners requested that this late-filed request not be admitted, with arguments relating to claim 2. The Proprietor argued that this was not an issue because claim 2 had not been changed.

The Interveners submitted that the patent as amended according to the intermediate auxiliary request did not meet the requirements of Article 83 EPC, arguing *inter alia* that claim 1 encompassed devices which did not include a current sensor, but there was no disclosure of how to provide an electronic division circuit that was capable of controlling the ratio of the LED currents as a function of the input current level received at the input of the LED module without the use of a current sensor. As the arrangements of figures 6 and 10 were not embodiments of the invention they did not show how control could be achieved without the use of a current sensor.

The Proprietor argued that there were many ways in which information about the input current level could be obtained that would be evident to the person skilled in the art. For example the LED driver could provide a signal to the LED module giving information about the input current level, or information about the light intensity could be fed back to the LED module.

The Interveners argued that controlling as a function of light intensity was not the same as controlling as a function of the input current level and that it was apparently not possible for the two-terminal LED module to receive information about input current level or light intensity as it had no input terminals other than the two which received the input current from the LED driver. The Proprietor responded that the reference in claim 1 to a "two-terminal LED module" was to be interpreted in the sense that it had two terminals for receiving power, which did not exclude that there were further input terminals for other purposes, such as for receiving information about the input current level.

#### Auxiliary Request 1

The Interveners argued that the objection under Article 83 EPC as set out above applied also to auxiliary request 1.

#### Auxiliary Request 2

The Interveners and the Opponent argued that the second auxiliary request filed during the oral proceedings of 11 October 2017 should not be admitted into the procedure. Claim 1 as amended was not clearly allowable because it *prima facie* gave rise to new objections under Articles 84 (clarity), 123(2) and 123(3) EPC



which neither they nor the Board could reasonably be expected to deal with without adjournment of the oral proceedings, cf. Article 13(3) RPBA. In particular, they argued that with the changes made to the wording of the final feature of claim 1, as compared to claim 1 as granted, it was no longer clearly specified that:

- the electronic division circuit was capable of controlling the ratio of the LED currents as a function of the input current level received at the input of the LED module; and
- the input current level used to control the ratio of the LED currents was that received at the input of the LED module.

The Proprietor disagreed, arguing that these features were still clearly present, despite the changes in wording.

#### Auxiliary Requests 3 and 4

The Interveners argued that in claim 1 of the third auxiliary request, filed with the letter dated 12 May 2017, only some of the features of claim 11 of the patent as granted had been incorporated.

The last feature of granted claim 11 had been omitted, i.e. the feature that "there is at least a range of input current magnitudes where  $dp/d(I_{in})$  is always positive and  $dq/d(I_{in})$  is always negative". This omission added fresh subject-matter (see letter dated 30 June 2017, page 15).

Furthermore independent claim 9 of auxiliary request 3 and claim 1 of auxiliary request 4 comprised the combination of the lighting device of claim 1 as granted (i.e. including an electronic division circuit) with the circuit arrangement of claim 9 as granted

(i.e. a resistor connected in series with one of the LED groups and that series arrangement connected in parallel to the other LED group). When considering the main request the board had decided that this combination of features was not disclosed in the application as filed. For these reasons auxiliary requests 3 and 4 should not be admitted into the proceedings.

The Proprietor argued that the omitted feature of granted claim 11 was implicit in the other features of claim 11 that had been taken into claim 1.

## **Reasons for the Decision**

### 1. Admissibility of the Appeal and of the Intervention

The admissibility of the Opponent's appeal and the admissibility of the intervention have not been contested and the Board also sees no reason to put this in question.

### 2. Main Request

- 2.1 Various objections were raised by the Opponent and the Interveners along the lines that in the application as filed the circuit arrangements with an electronic division circuit (i.e. figures 1 to 5, as described from page 5, line 31 to page 12, line 7, and corresponding to dependent claims 11 to 16 as filed) were not disclosed in combination with the circuit arrangements which obtain the desired behaviour on the basis of intrinsic characteristics of the LEDs and/or a series resistor (i.e. figures 6 and 10, as described from page 12, line 8 to page 15, line 19 with the help of figures 7 to 9 and 11, and corresponding to dependent claims 5 to 9 as filed). It was argued that in the patent as granted, claims 5 to 9 taken together with claim 1 upon which they were dependent created a combination of these different circuit arrangements that was not disclosed in the application as filed.

The Opponent's objections in this respect were late filed and not admitted by the opposition division. Furthermore, the Interveners' objections in this respect were not filed within the time limit for

intervention. Hence, the Board had to exercise their discretion on whether or not to admit this amendment to the Interveners' case (see Article 13(1) RPBA). As the Board stated in their communication prior to oral proceedings, they had the impression that the matter concerned was *prima facie* relevant, not overly complex and could be handled without delaying the proceedings. This was not challenged, so the Board decided to admit this amendment to the Interveners' case into the appeal proceedings.

2.2 In the claims as filed the feature that the two-terminal LED module of the lighting device comprises an electronic division circuit capable of controlling the LED currents in the LED module's two LED groups as a function of the input current level received at the input of the LED module (hereinafter just "electronic division circuit" for short) was disclosed only in claim 11. Claim 11 as filed was dependent only on claim 1 as filed, i.e. not on any of the claims 5 to 9. Hence, the claims as filed did not disclose a lighting device with an electronic division circuit in combination with the features of dependent claims 5 to 9 as filed. That has not been disputed. The question remains whether this combination of features was disclosed, directly and unambiguously, elsewhere in the application as filed.

2.3 In the summary of the invention of the application as filed "an aspect of the invention" is disclosed in which there is an "electronic circuit" within the LED module which "distributes the current to different LED sections of the LED module" (see page 3, lines 17 to 23). Furthermore, at page 4, lines 7 to 17 and 18 to 22 of the summary of the invention two embodiments are described which correspond in essence to the matter

claimed in claims 5 and 8 as filed. However there is no indication in the summary of the invention that either of these two embodiments is disclosed in combination with the "electronic circuit" aspect.

2.4 The question remains whether the combination of features in question was disclosed in the detailed description of the invention.

2.4.1 The detailed description of the invention of the application as filed starts by describing the block diagrams of figures 1A to 1D which schematically illustrate the invention (see page 5, lines 2 and 3). The paragraph starting at page 6, line 15 states that "Figure 1C is a block diagram schematically illustrating the basic concept of the LED module 110 according to the present invention". The paragraph goes on to explain that the module 110 "comprises a division circuit 115 providing drive current to the LED arrays 113, 114", that "the ratio between the individual drive currents in the respective LED arrays 113, 114 depends on the momentary average input current" and that to that end, "the division circuit 115 may be provided with a memory 117".

At the end of the paragraph it is stated at page 7, lines 6 to 10 that "in a cost-efficient embodiment preferred by the present invention, the division circuit 115 consists of an electronic circuit with passive and/or active electronic components, supplied by the voltage drop over the LEDs, and the memory function is implemented in the design of the electronic circuit". The Proprietor argued that the circuit arrangement of figure 10 was an example of such an embodiment and that it would thus be evident to the skilled reader that the arrangement of figure 10

constituted a "division circuit" in the sense of granted claim 1. The Board was not convinced by this, because according to granted claim 1 the electronic division circuit was capable of controlling "as a function of the input current level", whereas the circuit of figure 10 appeared to rely on the forward voltage across the parallel arrangement (FV, see figure 11) and required specific intrinsic characteristics of the LEDs themselves, which were not mentioned in the description of figures 1A to 1D.

2.4.2 After the description of figures 1A to 1D, the detailed description describes figures 2A and 2B which according to page 5, lines 4 and 5 show "graphs illustrating the current division behaviour of a division circuit according to the present invention".

2.4.3 Thereafter, from page 8, line 26 to page 12, line 7, the detailed description describes figures 3A, 3B, 4A, 4B and 5, each of which illustrates a "possible embodiment of a division circuit according to the present invention" (see page 5, lines 6 to 15). For each of these embodiments the respective electronic division circuit is individually referenced both in the figure and in the description (see 315, 415, 515, 615, 715), and the detailed construction and operation of electronic division circuit is described in detail.

2.4.4 After the description of these embodiments there is a separate paragraph at page 12, lines 8 and 9 which states: "It is also possible to obtain the desired behaviour on the basis of intrinsic characteristics of the LEDs itself". From this point onwards the description makes no further mention of an electronic division circuit.

2.4.5 From page 12, line 10 the detailed description goes on to describe figure 6, which according to page 5, lines 16 and 17 depicts "an LED lighting device in a fifth embodiment of the present invention" and in which the intrinsic characteristics of the LEDs 11, 12 set out at page 12, lines 22 to 25 correspond to those specified in claim 6 as filed, i.e. gradient of the luminous flux output as a function of junction temperature. The passages which follow (page 12, line 25 to page 14, line 2) illustrate further by reference to figures 7, 8 and 9 how the intrinsic characteristics of the LEDs produce the desired behaviour, citing characteristics which correspond to those specified in claims 5 and 7 as filed, i.e. luminous flux output ratio and thermal resistance to ambient.

In the circuit of figure 6 the (groups of) LEDs 11 and 12 are series connected and the whole of the input current passes in series through both of them. Hence, the arrangement disclosed in figure 6 does not "vary the individual LED currents in the individual LED groups" and clearly does not comprise an electronic division circuit capable of controlling the ratio of the LED currents in the two LED groups as required by the final pre-characterising feature and the characterising feature of claim 1 as granted. Hence, whilst this section of the description discloses a lighting device which has LED characteristics as set out in claims 5, 6 and 7, there is no suggestion that the lighting device disclosed comprises an electronic division circuit.

2.4.6 After this section, from page 14, line 3 onwards, the detailed description describes figure 10, which according to page 5, lines 24 and 25 depicts an "LED lighting device in a sixth embodiment of the present

invention". The lighting device includes two groups of LEDs 51, 52 of different types, and a resistor 59. The resistor is connected in series with one of the groups of LEDs and that series arrangement is connected in parallel with the other group of LEDs, which corresponds to the arrangement set out in dependent claim 9 of the application as filed. According to page 14, lines 20 to 25 the two types of LEDs have different dynamic resistances (cf. claim 8 as filed) and as a result the ratio of the currents through the two groups will be variable as illustrated in figure 11.

The description of the circuit arrangement of figure 10 does not explicitly state that it comprises an "electronic division circuit". The Proprietor argues that it would nevertheless be evident to the skilled reader that the disclosed circuit arrangement (i.e. with a resistor connected in series with one of the LED groups and with that series arrangement connected in parallel to the other LED group) did constitute an "electronic division circuit" which would be capable of controlling the ratio of the LED currents in the two LED groups as a function of the input current level received at the input of the LED module, as set out in granted claim 1. Furthermore, the Proprietor argued that it did so using a resistor, i.e. is a passive component, which is in line with what was disclosed at page 7, lines 6 to 10 as filed.

The Interveners argued that in the context of the present application "controlling" means of an "electronic division circuit" implied the use of active components and that it was not derivable from the description of figure 10 that the ratio of the LED currents was "controlled" "as a function of the input current level received at the input of the LED module".



The Board does not doubt that it is evident to the skilled reader that with the circuit arrangement of figure 10 the input current is divided between the two LED groups in such a way that the ratio of the currents through the two LED groups will be variable.

Nevertheless, the Board is not convinced that the person skilled in the art would derive directly and unambiguously from the disclosure that this amounts to the circuit arrangement being capable of "controlling" the ratio of the LED currents "as a function of the input current level received at the input of the LED module".

Furthermore, the Board concurs with the Interveners that in the context of the present application controlling by means of an electronic circuit implies that active components are used, which the circuit of figure 10 does not.

From the statement at page 12, lines 8 and 9 that the desired behaviour can be obtained on the basis of intrinsic characteristics of the LEDs and the statement at page 14, line 20 to 25 that with LEDs having different dynamic resistances the ratio of the LED currents will be variable, it is not directly and unambiguously derivable that in this way the ratio of the LED currents can be "controlled" "as a function of the input current level received at the input of the LED module".

2.4.7 For these reasons the Board concluded that neither of the arrangements of figures 6 and 10 falls within the scope of claim 1 as granted.

2.5 The Proprietor also referred to page 15, lines 20 to 28 of the application as filed, in particular lines 24 to 26 which refer to circuit arrangements in which the first and second sets of LEDs are connected in series, or in parallel, possibly with a resistive element in series with the first or the second set. The Proprietor argued that this gave a basis for combining the features of any of claims 5 to 9 as filed with an electronic division circuit.

The Board was not convinced by this argument as the cited passage seems merely to indicate that by using the natural characteristics of the LEDs the need for sophisticated controls can be obviated. There is again no indication that with the circuit arrangements mentioned the ratio of the LED currents can be "controlled" "as a function of the input current level received at the input of the LED module".

2.6 As the features of dependent claims 5 to 9 as granted were only disclosed in the context of the arrangements of figures 6 and 10, the combination of the features of these claims with those of claim 1 as granted is not directly and unambiguously derivable from the detailed description of the invention either.

2.7 For these reasons the Board concluded that the subject-matter of the patent as granted extended beyond the content of the application as filed, contrary to Article 100(c) EPC. Hence, the Board could not accede to the Proprietor's main request that the appeal be dismissed and the opposition of the Interveners be rejected.

3. Intermediate Auxiliary Request

3.1 The Board decided to admit this late-filed request, considering that it could be dealt with relatively easily, as it only involved deletion of claims, and that it addressed the late-filed objection of the other parties.

3.2 The Board is convinced by the Interveners' arguments that the patent does not disclose how to provide an electronic division circuit capable of controlling the ratio of the LED currents as a function of the input current level received at the input of the LED module without the use of a current sensor.

3.3 It has been decided in the context of the main request that the arrangements of figures 6 and 10, which do not have a current sensor, are not embodiments of the invention because they do not directly and unambiguously disclose controlling the ratio of the LED currents as a function of the input current level. Hence, they cannot serve to explain to the skilled person how such control could be achieved without a current sensor.

3.4 Furthermore, the Board is not convinced that the reference in claim 1 to a "two-terminal LED module" would be understood by the person skilled in the art in the sense that there were two terminals for receiving power, but possibly further input terminals for other purposes, such as for receiving information about the input current level. In the absence of specific indications to the contrary the board considers that the skilled person would understand from the phrase "two-terminal LED module" that the LED module had two, and only two, input terminals. With that in mind, there

appeared to be no way for the two-terminal LED module to receive information about the input current level, either from the LED driver or by feedback of light intensity information.

3.5 As claim 1 encompassed devices which did not include a current sensor, the Board concluded that the patent as amended according to the intermediate auxiliary request did not disclose the invention in a manner sufficiently clear and complete for it to be put into practice over the whole scope of the claim by a person skilled in the art and that therefore the patent as amended did not meet the requirements of Article 83 EPC.

3.6 Hence, the Board could not accede to the Proprietor's request for maintenance of the patent in amended form on the basis of the intermediate auxiliary request.

#### 4. Auxiliary Request 1

4.1 Like claim 1 of the patent as granted and claim 1 of the intermediate auxiliary request, claim 1 of auxiliary request 1 filed with the letter dated 11 September 2017 states that the LED module comprises "an electronic division circuit (115) capable of controlling a ratio of the LED currents (I1, I2) in said first and second LED groups (113, 114) as a function of the input current level received at the input of the LED module" but does not specify that the device comprises a current sensor.

4.2 Hence, for the same reasons as set out above for the intermediate auxiliary request the Board concluded that the patent as amended according to auxiliary request 1 filed with the letter dated 11 September 2017 did not

disclose the invention in a manner sufficiently clear and complete for it to be put into practice by a person skilled in the art over the whole scope of claim 1 and that therefore the patent as amended did not meet the requirements of Article 83 EPC.

5. Auxiliary Request 2

5.1 According to Article 13, paragraph 3 of the Rules of Procedure of the Boards of Appeal, amendments to a party's case sought to be made after oral proceedings have been arranged shall not be admitted if they raise issues which the Board or the other party or parties cannot reasonably be expected to deal with without adjournment of the oral proceedings.

5.2 Amended auxiliary request 2 was filed during the oral proceedings of 11 October 2017 at just after 6pm. At such a late stage the amendments sought to be made would have to be clearly allowable for them to be admissible. The Board came to the conclusion that that was not the case.

5.3 The Board considered that *prima facie* "controlling a ratio of the LED currents ... by distributing the input current ... as a function of the input current level", as set out in the amended claim 1, did not necessarily have the same meaning as "controlling a ratio of the LED currents ... as a function of the input current level", as was set out in claim 1 as granted. It seemed that with the amended wording, whilst the input current was distributed as a function of its level, it was no longer clear that the ratio of the LED currents was controlled as a function of the input current level. Hence, it seemed that fresh subject-matter had been

added and that the scope of protection conferred had been extended, contrary to Articles 123(2) and (3) EPC.

5.4 Furthermore, the Board considered that with the change of wording at the end of claim 1 from "the input current level received at the input of the LED module", as in granted claim 1, to "the input current level sensed by the current sensor means", it seemed *prima facie* that there was some ambiguity about which input current level was used as the basis for the control. Hence there appeared to be a lack of clarity, Article 84 EPC.

5.5 The Board considered that neither they nor the other parties could reasonably be expected to deal with these issues without adjournment of the oral proceedings and hence decided not to admit the amended auxiliary request 2 into the procedure.

## 6. Auxiliary Request 3

6.1 Independent claim 9 of auxiliary request 3 comprises the combination of the lighting device of claim 1 as granted (i.e. including an electronic division circuit) with the circuit arrangement of claim 9 as granted (i.e. a resistor connected in series with one of the LED groups and that series arrangement connected in parallel to the other LED group).

6.2 When considering the Proprietor's main request the Board already decided that this combination of features, which was present in the combination of independent claim 1 with dependent claim 9 as granted, was not disclosed in the application as filed (see paragraph 2.6 above). The Proprietor responded by

filing the intermediate auxiliary request, attempting to resolve this issue by deleting *inter alia* dependent claim 9. This change in the Proprietor's case was admitted.

6.3 Subsequently returning to auxiliary request 3, in particular claim 9 thereof, would cause this issue to be reintroduced. In this context, even though the text of auxiliary request 3 itself was first filed with the Proprietor's response to the Opponent's appeal, returning to it after the intermediate auxiliary request had been introduced and considered at length in the oral proceedings can be seen as a further change in the Proprietor's case in the sense of Article 13(3) RPBA.

6.4 The Board considered that it would not be in accordance with the need for procedural economy to reopen the debate on this issue and hence decided to exercise their discretion not to admit auxiliary request 3 into the proceedings.

6.5 In view of this finding it is not necessary to address the further objection raised by the Interveners with respect to claim 1 of this request.

7. Auxiliary Request 4

The sole claim of auxiliary request 4 includes all of the features of independent claim 9 of auxiliary request 3. Hence the Board decided to exercise their discretion not to admit auxiliary request 4 into the proceedings for the same reasons as set out above for auxiliary request 3.

8. Conclusion

As all of the Proprietor's requests were either not allowable or not admissible the Board had to accede to the requests of the Opponent and the Interveners that the decision under appeal be set aside and the European patent be revoked.

**Order**

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

1. The decision under appeal is set aside.
2. The patent is revoked.

The Registrar:

The Chairman:



U. Bultmann

R. Lord

Decision electronically authenticated