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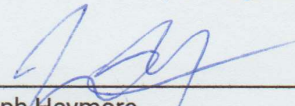
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Signed this 13th day of August, 2021.

  
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Joseph Haymore  
Program Manager


### ACKNOWLEDGMENT BEFORE NOTARY

State of Utah  
§  
County of Utah

On this 13th day of August, in the year 2021, before me (Stephanie Haymore), a notary public, personally appeared Joseph Haymore, proved on the basis of satisfactory evidence to be the person whose name is subscribed to this Translator's Certificate of Translation, and acknowledged that he or she executed the same..

IN WITNESS WHEREOF, I hereunto set my hand and official seal.



  
\_\_\_\_\_  
Notary Public, residing at Orem, UT

## Written Submission

**Case** 2020Heo6323 Registration Invalidation (Patent)

**Plaintiff** Corephotonics Ltd.

**Defendant** LG Innotek

Regarding the above case, the **Plaintiff's attorney** hereby submits Written Response with arguments to the Defendant's Briefs dated February 8, 2021 and May 28, 2021 as below.

### Below

#### 1. Gist of Defendant's claim and its unjustness

The Defendant stated in the Brief dated May 28, 2021 that the corrected subject invention: ① fails to meet the requirement for the supporting description and the requirement for the description to enable one to easily embody the invention; ② fails to meet the requirement for clear and concise description of the claims; and ③ includes a reason for invalidation on new matter ground.

In addition, the Defendant stated again in the Brief dated February 8, 2021 that: ④ the corrected subject invention loses inventive step in view of Reference 1 alone or Reference 1 combined with the known technology (or Prior Art in Exhibit No. Eul-5,6); and ⑤ the corrected subject invention is the same as Reference 2 and thus has a reason for invalidation on the ground of the violation of enlarged concept of novelty, because its application date is not retroactive to the priority date.

However, the Defendant's allegations are without merit.

Hereinafter, we will provide supplementary explanations to the questions asked by the board at the hearing date on June 10, 2021, and then explain in detail how the Defendant's allegations are unjust.

## 2. Supplementary explanation to the questions of the board on the date of hearing on June 10, 2021

### A. Cameras that were applied to portable terminals at the time of filing the application of the invention of the subject patent

The invention of the subject patent is the original technology for the telephoto lens assembly mounted on a portable terminal and is widely used until now.

At the time of filing the application of the invention of the subject patent (around 2013), there was only one prior document that mounted the telephoto lens assembly on a portable terminal,<sup>1</sup> and most of the camera manufacturers for portable terminals were trying to develop 'wide-angle lens assembly' rather than 'telephoto lens assembly'.<sup>2</sup>

In paragraphs [0004] and [0005] of the specification of the subject patent, it describes that conventional lens assemblies comprising four lens elements are no longer sufficient for good quality imaging in a compact imaging lens system, and that US8,395,851 (that is, wide-angle lens assembly) using five lens elements suffers from the problem that the ratio between TTL and EFL is too large. This is because there were hardly any telephoto lens assemblies applied to portable terminals at the time the application of the invention of the subject patent was filed.

Registered Patent No. 10-1757101

Consumer demand for digital camera modules in host devices continues to grow. Cameras in cellphone devices in particular require a compact imaging lens system for good quality imaging and with a small total track length (TTL). Conventional lens assemblies comprising four lens elements are no longer sufficient for good quality imaging in such devices. The latest lens assembly designs, e.g. as in US 8,395,851, use five lens elements. However, the design in US 8,395,851 suffers from at least the fact that the ratio between TTL and an effective focal length (EFL) is too large.

[0005] Therefore, a need exists in the art for a five lens element optical lens assembly that can provide a small TTL/EFL ratio and better image quality than existing lens assemblies.

[Excerpt from the subject patent specification]

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<sup>1</sup> Among the documents submitted by the Defendant, only one, that is, Reference 1 (Exhibit No. Eul-4) discloses the small telephoto lens assembly for portable terminals before the priority date of the invention of the subject patent. The Plaintiff has no additional information regarding this.

<sup>2</sup> The wide-angle cameras were applied to portable terminals in the late 1990s, and it was in the second half of 2017 when the telephoto cameras for portable terminals were actually applied. The fact that it took about 20 years until the telephoto camera were applied to portable terminal demonstrates the technical excellence of the invention of the subject patent.

In order to obtain sufficient image quality under the constrained environment of short total track length (TTL), the telephoto lens assembly applied to portable terminal required a new structure and shape different from those of the conventional telephoto lens assembly for general cameras.<sup>3</sup> To this end, the invention of the subject patent adopted a new structure that: ① has a short total track length ( $TTL \leq 6.5$  mm); ② has a focal length (EFL) longer than the total track length; ③ has an increased refractive power of the first lens element ( $f1 < TTL/2$ ); and ④ has an F# of less than 2.9 (See page 2, Plaintiff's Written Submission dated November 25, 2020).

**B. Relationship between the upper limit of TTL, the upper limit of F#, and the positive refractive power of the first lens element and TTL**

Regarding the configuration of  $TTL < 6.5$  mm,  $TTL/EFL \leq 1$ ,  $F\# < 2.9$ ,  $f1 < TTL/2$ , ① the 6.5 mm upper limit of TTL (related to  $TTL < 6.5$  mm configuration) is related to the limit of the lens assembly according to the thickness of the portable terminal, ② the 2.9 upper limit of F# is related to the maximum incident light amount of the lens assembly, and ③ there is correlation such that TTL decreases as the positive refractive power of the first lens element increases.

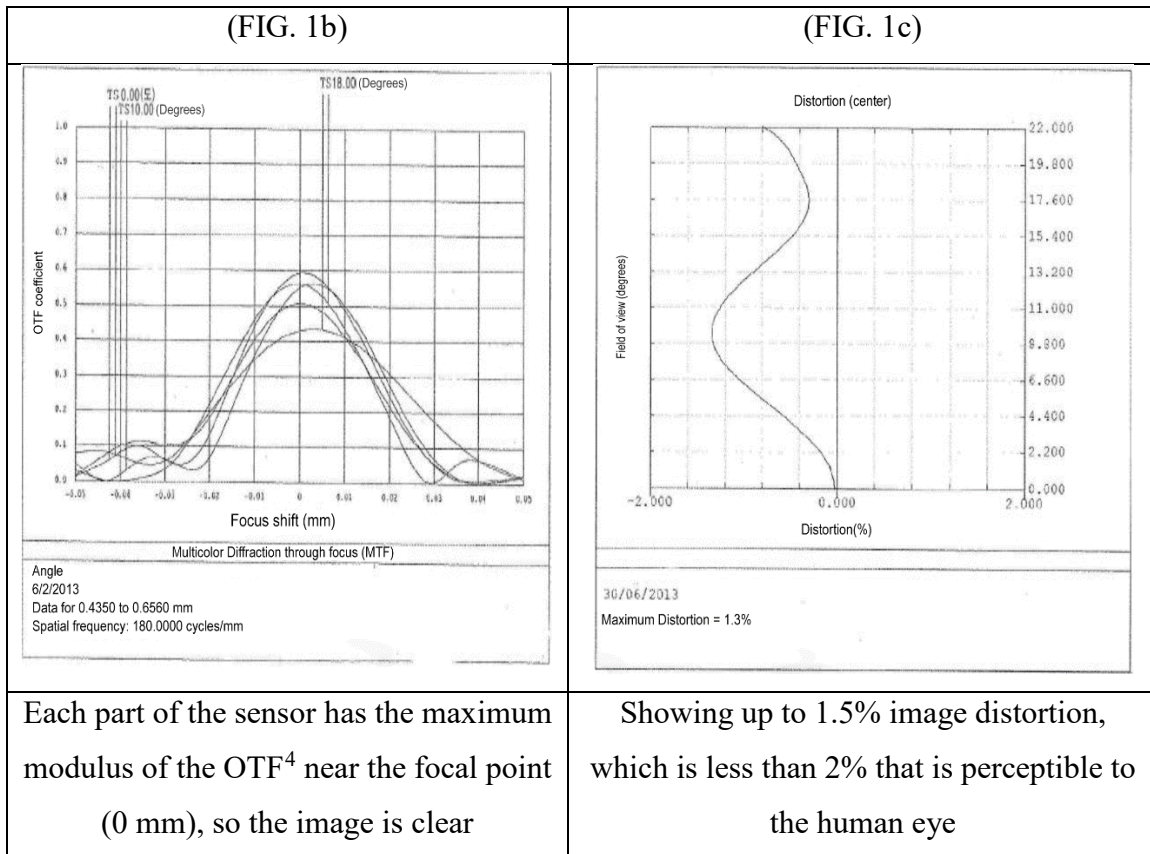
However, in judging the inventive step, one should not look at whether or not each of the above configurations is individually disclosed in the prior art, but rather judge the inventive step on the basis of the overall invention in which each of the above configurations is organically combined.

In Claim 1 of the corrected subject invention, the configurations of  $TTL < 6.5$  mm,  $TTL/EFL \leq 1$ ,  $F\# < 2.9$ , and  $f1 < TTL/2$ , and so on are **organically combined**, thus enabling a small telephoto lens assembly for portable terminal to obtain high image quality, and a high-quality image can be obtained, with a distortion error of the obtained image within 2% that is not perceptible to the human eye. This is also confirmed in the drawings of the subject patent, that is, in FIGS. 1b, 1c, 2b, 2c, 3b, 3c, and so on. FIGS. 1b and 1c are shown below as representative examples.

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<sup>3</sup> If the telephoto lens assembly for a general camera is reduced as it is, the area of the image pickup device corresponding to the film becomes extremely narrow, and a good image cannot be obtained (See pages 19-20, Plaintiff's Written Submission dated May 25, 2021). This is also clearly stated in Exhibit No. Eul-6-1 which was submitted by the Defendant.





**C. How low a person of ordinary skill in the art would currently consider the ‘Lower limit of TTL’ to be**

As shown in the table below, at the time of the priority date of the invention of the subject patent (July 4, 2013), the lower limit of the thickness of the portable terminal was 6.5 mm or greater. Considering the development of the technology of parts for the operation of portable terminals and the number of lenses installed in the wide-angle and telephoto lens assemblies, the thickness of the current portable terminal (or the maximum lower limit of TTL) is estimated to be 4.5 mm to 5 mm.

[Table of thicknesses of portable terminals by portable terminal manufacturers at the time of priority date of the invention of the subject patent]

<sup>4</sup> OTF, which is the abbreviation of the optical transfer function, is the function that represents spatial frequency transmission capability of an optical system such as a lens, and it refers to a method of displaying resolution (Reference 1. Science Encyclopedia, search result screen for “response function”)

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