

IN THE UNITED STATES DISTRICT COURT
FOR THE DISTRICT OF DELAWARE

IMMERVISION, INC.

Plaintiff,

v.

APPLE INC.,

Defendant.

Case Number: 1:21-cv-1484-MN-CJB

IMMERVISION, INC.

Plaintiff,

v.

APPLE INC.,

Defendant.

Case Number: 1:21-cv-1570-MN-CJB

IMMERVISION, INC.

Plaintiff,

v.

APPLE INC.,

Defendant.

Case Number: 1:21-cv-01733-MN-CJB

JOINT CLAIM CONSTRUCTION BRIEF

Plaintiff ImmerVision, Inc. (“Plaintiff” or “ImmerVision”) and Defendant Apple Inc.

(“Defendant” or “Apple”) file this Joint Claim Construction Brief in accordance with Paragraph 15 of the Scheduling Order (D.I. 26¹).

¹ All citations to the docket are with respect to case number 1:21-cv-1484 unless otherwise noted.

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I. IMMERSION'S BRIEF OVERVIEW OF THE PATENTS-IN-SUIT

A. The '990 Patent

U.S. Patent No. 6,844,990 (“the '990 Patent”), which claims a May 11, 2001 priority date, relates to obtaining and displaying panoramic images. '990 Patent, at 1:13-15. More specifically, the '990 Patent discloses methods and structures for obtaining panoramic images having one or more “expanded zones” (which create a higher relative resolution in that area of the image) and one or more “compressed zones” (which create a lower relative resolution in that area of the image). '990 Patent, at 19:28-36, 20:51-61. In columns 6-10, the '990 Patent details the concepts of compressing and expanding zones of an image, which results in a distribution of image points the patent describes as “non-linear.” *Compare e.g.*, Fig. 4A with Fig. 7A. In columns 15-18, the '990 Patent discloses two example lenses that embody the invention. In columns 10-15, the '990 Patent discloses two example algorithms for “correction of the non-linearity” in the captured image. These concepts will be further explained below.

B. The '120 Patent

U.S. Patent No. 10,795,120 (“the '120 Patent”) claims priority to provisional applications filed in December 2015 and February 2016 and relates to a “miniature wide-angle imaging lens.” '120 Patent, title. The '120 Patent discloses three example multi-element miniature wide-angle lenses. The patent describes that prior wide-angle lenses tended to be longer and produced a smaller image circle. '120 Patent, at 1:23-29. However, as industry needs evolved, thinner lenses for use with larger image sensors became desirable ('120 Patent, at 1:29-30), which have heightened performance requirements ('120 Patent, at 1:47-52). The invention of the '120 Patent involved the realization that the relative resolution provided by a lens can be manipulated to offset known image quality issues with traditional wide-angle lenses, as measured by relative illumination and modulation transfer function (“MTF”). '120 Patent, at 1:53-2:61.

II. LEVEL OF SKILL IN THE ART

ImmerVision proposes that the relevant level of skill in the art is a person having at least a master's degree in optics or a related discipline and at least three years' work experience in optical design.

III. AGREED-UPON CONSTRUCTIONS

The parties have agreed to the following constructions which the Court and jury may find helpful in understanding the asserted claims:

Claim and Patent	Term	Construction
27, '990 Patent	a size L of the obtained image	the size of the image disk in number of pixels
29, '990 Patent	apodizer	a set of lenses that controls the propagation of incoming light to obtain a non-linear image point distribution
1, '120 Patent	image circle diameter	diameter of the image circle, as measured at the focal plane

IV. DISPUTED CONSTRUCTIONS

A. panoramic objective lens

1. Plaintiff's Opening Position

ImmerVision's Construction	Apple's Construction
wide-angle objective lens	a lens having an angular aperture on the order of 180 degrees, such as a fisheye lens Alternatively, a lens that projects a panoramic image

This term appears in claims 17² and 21 of the '990 Patent, as follows:

17. A **panoramic objective lens** comprising:

optical means for projecting a panorama into an image plane of the **objective lens**, the optical means having an image point distribution

² Claim 17 is not asserted in this case as it was cancelled in a prior *ex parte* reexamination proceeding. However, claim 21 is asserted, which depends from claim 17.

function that is not linear relative to the field angle of object points of the panorama, the distribution function having a maximum divergence of at least $\pm 10\%$ compared to a linear distribution function, such that a panoramic image obtained by means of the **objective lens** comprises at least one substantially expanded zone and at least one substantially compressed zone.

21. The **panoramic objective lens** according to claim 17, wherein **the lens** compresses the center of the image and the edges of the image, and expands an intermediate zone of the image located between the center and the edges of the image.

The Court construed this exact term in *ImmerVision, Inc. v. LG Electronics, Inc.*, C.A. Nos. 18-1630 and 1631-MN-CJB (D. Del.) (the “*LG* cases”), a case which involved the same asserted claim and patent. ImmerVision proposes the Court adopt the exact same construction as there. *See* D.I. 164 in C.A. No. 18-1630. Apple’s first proposal matches language the Court ultimately rejected as being too narrow in light of the intrinsic record. *See* Ex. 1, D.I. 163 in C.A. No. 18-1630, at 5, 8. Apple’s second proposal does not resolve any dispute. It merely rearranges the words of the claim without specifying what is meant by “panoramic,” a suggestion the Court also previously found unsatisfactory. *Id.*, at 5.

The prior adopted construction, which ImmerVision proposes here, was issued after “a full and thorough process” that included review of the patent at issue, the briefing, the expert declarations, the transcript of the hearing in front of the Magistrate Judge, the expert declarations, hearing transcripts, discovery filings, scientific publications, *inter partes* review documents, and dictionaries, as well as oral argument. *Id.*, at 4. Critically, that review found the construction to be “supported by the intrinsic evidence.” *Id.*, at 7. That evidence includes embodiments, but not limitations, that the claimed lenses can be on the order of 180 degrees. *Id.* But it also contains evidence of lenses with a smaller field of view. *Id.*, citing ’990 Patent at 1:46-64. The Court also cited supporting extrinsic evidence, such as expert declarations, scientific publications, and dictionary definitions. *Id.*, at 7-8.

None of that evidence, particularly the intrinsic record, has changed. The Court’s well-reasoned construction should apply in this case, concerning the same term in the same asserted claim of the same asserted patent. While Apple has the right to be heard in this matter, the evidence on which claim construction is based leads to the same conclusion now as it did before, regardless of the defendant. For that reason, ImmerVision proposes that “panoramic objective lens” should continue to mean “wide-angle objective lens.”

2. Defendant’s Answering Position

Claims	ImmerVision’s Proposal	Apple’s Proposal
21 (incorporates base claim 17)	Wide-angle objective lens	a lens having an angular aperture on the order of 180 degrees, such as a fisheye lens Alternatively, a lens that projects a panoramic image

With respect to the term “panoramic objective lens” (and the related terms “objective lens” and “the lens”), the parties dispute whether the term should be construed consistent with the patent’s repeated usage (as Apple proposes), or given a construction that is inconsistent with the term’s plain meaning and not drawn from the intrinsic evidence (as ImmerVision urges). Apple’s proposal aligns with this Court’s construction in ImmerVision’s prior litigation with LG; ImmerVision’s with the District Court’s. The issues, evidence, and record here differ dramatically from those in the *LG* cases and on the record in this case, Apple’s construction is correct.

a) Because the Issues Raised and Evidence Presented Here Are Fundamentally Different from Those in ImmerVision’s Prior Case, the District Court’s Prior Construction Does Not Control Here

ImmerVision’s brief makes no effort to substantively justify its construction as either the plain meaning of the term “panoramic objective lens,” or a specific definition in the ’990 Patent. Instead, ImmerVision simply notes that the District Court adopted its construction in the *LG* cases. (*Supra* at 3–4.) But the District Court’s *LG* construction should not govern here for multiple

reasons: Apple’s arguments are very different than LG’s; Apple has presented new evidence; and the prior decision was guided in part by tactical concessions LG made that Apple has not.

First, Apple has presented evidence not before the District Court in the *LG* cases. The District Court noted that LG had not presented evidence of the plain meaning of “panoramic lens”, and that LG’s “expert opinions . . . are not based on whether [the] terms have a particular meaning to a person of skill in the art, but rather focus[ed] on the embodiments in the ’990 Patent’s specification.” (Ex. 1, D.I. 163 in C.A. No. 18-1630 at 8 (citation and internal quotation marks omitted).) Here, however, Apple provided expert opinions, textbooks, and articles showing the term’s “meaning to a person of skill in the art.” (*See* Ex. 2, Declaration of Jack Feinberg (“Feinberg Dec.”) ¶¶ 16–19; Ex. 3, Sidney F. Ray, *Scientific Photography and Applied Imaging* (Focal Press, 1st ed. 2015) (APL-IMV_00048879–APL-IMV_00048890)³; Ex. 4, Byeong-Ju Han & Jae-Young Sim, *Saliency Detection for Panoramic Landscape Images of Outdoor Scenes*, 49 J. Vis. Commun. Image Represent. 27–37 (2017) (APL-IMV_00048802–APL-IMV_00048812).) This evidence remedies the shortfall the District Court identified in LG’s record.

Second, the arguments here are very different from those the District Court addressed in the *LG* cases. There, the parties agreed that the ’990 Patent used “panoramic objective lens” consistent with its plain meaning, and that one of their constructions captured that meaning. The only dispute was which one. (*See* Ex. 5, D.I. 115 in C.A. No. 18-1630 at 12, 14, 17.) The District Court found that LG had not proven its construction was the plain meaning, and required LG—but not ImmerVision—to show the patentee “act[ed] as his own lexicographer and clearly set[] forth a definition of the disputed claim term” matching its construction. (Ex. 1, D.I. 163 in C.A. No.

³ Any book attached hereto as an exhibit has been excerpted due to volume. The complete books will be made available for inspection upon request.

18-1630 at 6, 8 (citation and internal quotation marks omitted).) Finding that LG could not do this, the District Court adopted ImmerVision’s construction. (*Id.* at 9.) As set forth below at 3–9, however, the ’990 Patent does **not** use “panoramic” consistent with its plain meaning, and **neither** party’s construction represents that meaning. Thus, unlike the arguments presented before—which resulted in LG’s construction being judged by the “lexicography” standard where ImmerVision’s was not—both parties’ constructions here should be scrutinized on an equal footing.

Third, this case raises issues that the parties in the *LG* cases opted not to litigate. Both parties in the *LG* cases appeared to concede “that the term should be defined by the field of view of the lens”—and that field alone. (E.g., Ex. 5, D.I. 115 in C.A. No. 18-1630 at 12.) Thus, the only issue presented was whether the plain meaning of “panoramic” was “super-” or “ultra-wide”, or merely “wide.” Apple, however, has not conceded that the plain meaning of “panoramic objective lens” is defined solely “by the field of view.” Rather, the plain meaning requires a high aspect ratio in addition to a wide field of view—the horizontal and vertical fields of view must be significantly different. Because of LG’s concession, this issue was not litigated in the *LG* cases. But, as set forth below, this argument bears directly on why ImmerVision’s construction is not the plain meaning of the disputed term.

b) ImmerVision’s Construction Is Inconsistent with the Plain Meaning of “Panoramic” and Unmoored from the Intrinsic Record

Judged on its merits, ImmerVision’s proposal—“wide-angle objective lens”—is neither the term’s plain meaning nor grounded in the intrinsic record. ImmerVision’s construction does nothing more than substitute “wide-angle” for “panoramic” in the claim. But, in the relevant field, these two words do not mean the same thing.

“Panoramic” is the adjectival form of “panorama.” Consistent with this, each asserted claim requires that the “panoramic objective lens” “project a panorama.” (Reiley Dec. at Ex. A,

'990 Pat. at 20:52, Reexam. Cert. at 1:56–57.) But, as Apple's expert, Dr. Feinberg, confirms, a "panorama" does not just refer to a wide angle of view. Rather, a panorama is substantially wider in one direction than in the other (i.e., has a high "aspect ratio") and is usually free of gross distortion. (Ex. 2, Feinberg Dec. ¶ 16.) An example of a panorama or panoramic image in keeping with this plain meaning is shown below.



(Ex. 2, Feinberg Dec. ¶ 18; Ex. 15, APL-IMV_00048850–APL-IMV_00048852 at 52.)

Consistent with this, treatises and technical publications consistently describe a panorama as having a high aspect ratio, or being longer in one dimension than in the other. For instance:

- “Panoramic photography is taken to mean a true wide FOV [field of view] or synthesis of images in one meridian, giving an image a high aspect ratio, i.e. width to height (W:H) dimensions.” (Ex. 3, Scientific Photography and Applied Imaging at APL-IMV_00048882.)
- “Panoramic photographs typically have a length that is at least twice as long as the panorama's width.” (Ex. 6, Library of Congress Collection: Panoramic Photographs (APL-IMV_00048848–APL-IMV_00048849).)
- “The aspect ratios of the test panoramic images range from 2.5:1 to 9.7:1.” (Ex. 4, *Saliency Detection for Panoramic Landscape Images of Outdoor Scenes* at APL-IMV_00048807.)

These references come from the precise technical field relevant to the '990 Patent. For instance, several relate to the field of panoramic photography. The '990 Patent ties its invention to this field, stating that “the idea of the present invention is to produce panoramic photographs by means of a panoramic objective lens,” and referring to a website entitled “The Guide to

Panoramas and Panoramic Photography.” (Reiley Dec. at Ex. A, ’990 Pat. at 2:60–64, 3:66–4:1; *see id.* at 15:1–6. (describing an embodiment as “applicable when there are two complementary image discs, one corresponding to a front photograph and the other to a rear photograph of a panorama”).

As noted above, the asserted claims require that a “panoramic objective lens” “project[s] a panorama.” (*Id.* at 20:52, Reexam. Cert. at 1:56–57.) The plain meaning therefore requires a lens that projects not only a wide-angle image, but one with a high aspect ratio. ImmerVision’s construction does not capture this and is therefore not the term’s plain meaning. Nor is ImmerVision’s construction grounded in the intrinsic record. The terms “wide” and “wide angle” do not appear anywhere in the ’990 Patent. The ’990 Patent also does not suggest that every lens with a wide field of view is also “panoramic.” And ImmerVision has provided no expert testimony, treatises, scholarly articles, or other evidence here to suggest that “wide angle” and “panoramic” are equivalent. There is therefore no basis in the intrinsic or extrinsic record of this case to adopt ImmerVision’s construction.

c) The ’990 Patent Uses the Term “Panoramic Lens” in a Manner and Consistent with Apple’s Construction

In contrast with ImmerVision’s construction, Apple’s construction is supported by the intrinsic record, which implicitly defines the term “panoramic lens” as Apple proposes. As the Federal Circuit has made clear, “a claim term may be clearly redefined [from its ordinary meaning] without an explicit statement of redefinition.” *Trs. of Columbia Univ. v. Symantec Corp.*, 811 F.3d 1359, 1364 (Fed. Cir. 2016) (citing *Philips v. AWH Corp.*, 415 F.3d 1303, 1320–21 (Fed. Cir. 2005)). Rather, “the specification may define claim terms by implication such that the meaning may be found in or ascertained by a reading of the patent documents.” *Id.* Here, the ’990 Patent

implicitly defines a “panoramic objective lens” as Apple’s construction does: “a lens with an angular aperture on the order of 180 degrees, such as a fisheye lens.”

As an initial matter, the ’990 Patent makes clear that it is redefining “panoramic objective lens” by consistently using it in a way that not only differs from, but is inconsistent with, its ordinary meaning. As noted above, a panorama has a wide field of view *and* is substantially wider in one direction than in the other. (*See supra* at 7–8.) The ’990 Patent, however, uses the term to refer to round images. For example, Figure 2 shows “a panoramic image before it is processed by a computer.” (Reiley Dec. at Ex. A, 6:15–16.) Figure 3 illustrates “transforming a two-dimensional panoramic image into a three-dimensional digital panoramic image.” (*Id.* at 6:17–19.) As shown below the images in both Figures 2 and 3 are round:

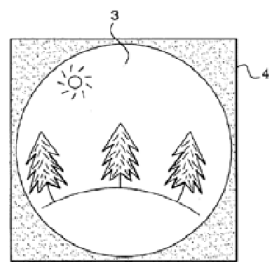


Fig. 2

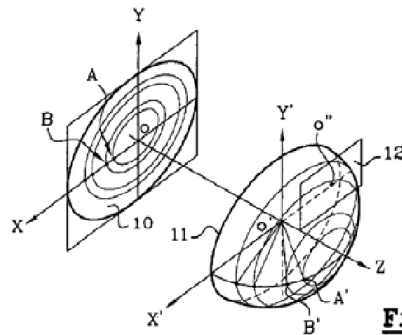


Fig. 3

Similarly, Figures 4A and 7A, respectively, show an “image disk” formed by a “panoramic objective lens.” (*Id.* at 2:14–18, 8:12–18.) Both images are round:

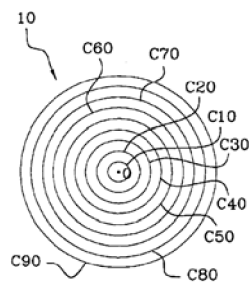


Fig. 4A

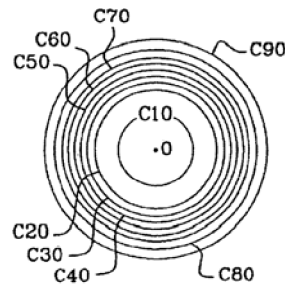


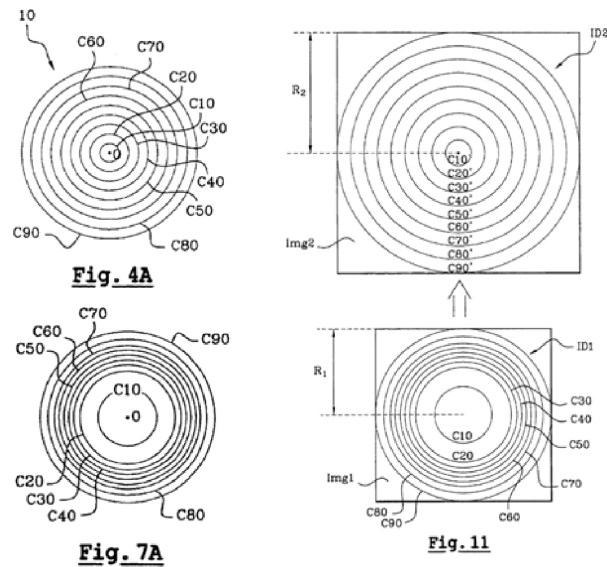
Fig. 7A

The round images that the '990 Patent describes as being formed by its “panoramic lens” have the same size in all directions—an aspect ratio of 1. The '990 Patent does not describe a single example of an image that is substantially higher than wide, or vice versa. In other words, the '990 Patent does not disclose anything that would fit the conventional definition of a panorama. This is strong evidence that the '990 Patent is redefining the term from its ordinary meaning.

Having made clear its intent to use the term “panoramic objective lens” differently than its plain meaning, the '990 Patent also makes clear what meaning it intends the term to have. “[A] patent’s repeated and consistent description of a claim term may inform its construction.” *Groove Digit., Inc. v. United Bank*, 825 Fed. App’x 852, 856 (Fed. Cir. 2020). Here, the '990 Patent repeatedly refers to a “panoramic objective lens,” or an “objective lens,” as a lens with an angular aperture on the order of 180°:

- The device comprises a digital camera **1** equipped with a panoramic objective lens **2** of the “fish-eye” type, having an angular aperture on the order of 180°. (Reiley Dec. at Ex. A, 1:17–19);
- The field angle of an object point can be between 0 and 90° for an objective lens having an aperture of 180°. (*Id.* at 2:22–23);
- The classical linear distribution function, expressed by $Fdc=K\alpha$ and in the form of a straight line of gradient K , is also represented as a guide mark (the constant K being equal to $1/90$ for an objective lens having an aperture of 180°, i.e., a gradient of 0.111 per degree). (*Id.* at 8:30–34);
- $Fdlin^{-1}$ is the reciprocal function of a distribution function of a classical linear objective lens . . . with an objective lens having an angular aperture of 180°. (*Id.* at 11:49–52);
- The example considered until now was of a panoramic objective lens having an aperture of 180° (*Id.* at 13:6–8); and
- The divergent optical group $L1, L2, L3$ defines the field angle of the objective lens **30**, here of 180°. (*Id.* at 16:31–32).

Further, the figures in the '990 Patent consistently depict a lens with an angular aperture on the order of 180° . In these figures, each concentric circle represents 10° from the center of the image. (E.g., Reiley Dec. at Ex. A, 2:24–29.) In particular, “the circle C90 [is] formed by [] image points having a field angle of 90° .” (*Id.*) “Field angle” here refers to the angle from the optical axis in the center of the image. (E.g., Reiley Dec. at Ex. A, 2:18–22.) Every figure in the '990 Patent that depicts a “panoramic objective lens” includes eighteen circles from left to right, extending from the center to C90 to the left and to the right—an angular aperture of 180° :



(Reiley Dec. at Ex. A, Figs. 4A, 7A, 11.) The “repeated and consistent usage of” “panoramic objective lens” and “the lens” to refer to a lens with an angular aperture on the order of 180° confirms the patentee’s intent to define the term as Apple proposes. *Groove Digit.*, 825 Fed. App’x at 856.

ImmerVision has offered no substantive arguments against Apple’s construction. And the reasons the District Court gave for rejecting this construction on the record developed in the *LG* cases do not apply on the record developed here. First, column 1, line 46 of the '990 Patent is not

inconsistent with a 180° aperture requirement. (Ex. 1, D.I. 163 in C.A. No. 18-1630 at 6.) That portion of the specification states that the “image points form a hemisphere **11** when the panoramic objective lens used has an aperture of 180°, otherwise a portion of a hemisphere.” (Reiley Dec. at Ex. A, 1:61–64.) It is true that the reference to a “portion of a hemisphere” contemplates “a panoramic objective lens with an angular aperture that is less than 180 degrees.” (Ex. 1, D.I. 163 in C.A. No. 18-1630 at 6.) But Apple’s construction, consistent with the ’990 Patent, requires only that the angular aperture of the lens be “*on the order* of 180 degrees.” A lens that had an angular aperture “on the order of,” but less than, 180°, could generate “image points [that] form . . . a portion of a hemisphere,” exactly as column 1 describes. (Reiley Dec. at Ex. A, 1:60–64.)

Second, even if the specification did not define the term “panoramic objective lens” as Apple proposes, that would not be a reason to adopt ImmerVision’s construction of a “wide angle lens.” As set forth above, ImmerVision’s construction is not the plain meaning of “panoramic objective lens.” And ImmerVision has not argued that the ’990 Patent redefines the term—either explicitly or implicitly—to mean “a wide angle lens.” Thus, if the Court finds that the ’990 Patent does not implicitly redefine “panoramic objective lens,” the term should be given its plain and ordinary meaning. This can be expressed as “a lens that projects a panorama,” where a panorama is a wide-angle image that has a high aspect ratio. The Court should thus adopt either Apple’s proposed construction or its alternative, plain-meaning proposal.

3. Plaintiff’s Reply Position

Apple first disputes the Court’s prior construction of this term and alleges a shortfall in the prior record. According to Apple, LG did not propose a plain meaning or provide evidence in support. But, LG’s actions are irrelevant. “[T]he ordinary meaning of a claim term is its

meaning to the ordinary artisan after reading the entire patent.” *Phillips*, 415 F.3d at 1321 (*en banc*). This meaning is largely dictated by the intrinsic record – the patent claims and specification and the prosecution history. *Id.*, at 1316-17. This is the evidence the District Court previously relied on. None of that evidence has changed, and Apple offers no contradictory evidence, other than a suggestion about a plain and ordinary meaning that Apple itself admits is inconsistent with the specification. Thus, the Court’s prior construction remains correct.

Procedural issues aside, Apple’s substantive arguments are confusing at best. Apple first claims that the plain meaning of “panoramic lens” requires a high aspect ratio, but cites only extrinsic evidence from an improper time. The proper construction of a term “is the meaning that the term would have to a person of ordinary skill in the art in question *at the time of the invention*, *i.e.*, as of the effective filing date of the patent application.” *Phillips*, 415 F.3d at 1313; *see also* *TEK Glob., S.R.L. v. Sealant Sys. Int’l*, 920 F.3d 777, 786 (Fed. Cir. 2019) (confirming construction using “dictionary definitions *at or around the time of the invention*”) (emphases added). The ’990 Patent claims priority to a French application filed in **2001**. ’990 Patent, at 1. Apple’s citations are to the **2015** edition of *Scientific Photography and Applied Imaging* (Ex. 3), an undated article from the Library of Congress’s website retrieved in **2023** (Ex. 6), and a **2017** journal article (Ex. 4). None of these sources show the meaning of the term *at the time of the invention*. On the other hand, Apple completely ignores the **1993** technical dictionary cited by ImmerVision in the LG cases that defined “panoramic,” specifically within the field of optics and regarding a lens, as “pertaining to a lens or optical instrument that has a wide field of view.” *See* D.I. 116-4 in C.A. No. 18-1630, at Exhibit D, page 24 (attached here as Exhibit M). The District Court even found that this evidence supported its (and ImmerVision’s) construction. Ex. 1, at 8.

Further, ImmerVision’s argument properly omits any general meaning of “panoramic,” for that is not what the law asks for. “We cannot look at the ordinary meaning of the term in a vacuum. Rather, we must look at the ordinary meaning in the context of the written description and the prosecution history.” *Phillips*, 415 F.3d at 1313 (cleaned up). ImmerVision’s argument now, like before, is based on what the term would mean to a skilled artisan *in the context of the patent disclosure*.⁴

Apple ultimately admits this, as it acknowledges the ’990 Patent uses “panoramic objective lens” in a different context than Apple’s untimely evidence might suggest – one in which all disclosed embodiments are round images. Thus, ImmerVision and Apple agree that the proper construction is not one requiring a very wide aspect ratio. Apple’s remaining argument, however, is *exactly* the argument that LG made and that the District Court rejected – that “the ’990 Patent repeatedly refers to a ‘panoramic objective lens,’ or an ‘objective lens,’ as a lens with an angular aperture on the order of 180°.” (*compare* with LG’s argument: “All embodiments disclosed in the patent, including in ‘Background of the Invention’ and ‘Detailed Description of the Invention,’ are directed to lenses with a 180° field of view....” Ex. 5, at 15.)

The District Court explicitly rejected this argument: “[t]hese embodiments, however, are just that – embodiments. ... Thus, although the specification describes very specific embodiments of the panoramic objective lens having an angular aperture *on the order of 180 degrees*, I must not confine the claims to those embodiments.” Ex. 1, at 6 (quotations omitted, emphasis added). The District Court went on to note that, in addition, “the ’990 Patent

⁴ The first sentence of ImmerVision’s opening argument for this term in the LG cases was that its “proposed construction is consistent with the specification.” Ex. 5, at 12.

contemplates a panoramic objective lens with an angular aperture that is less than 180 degrees” at column 1, beginning at line 46. *Id.*

Apple tries to rebut this by claiming that the “portion of a hemisphere” disclosed at this section of the patent is consistent with its construction because the “portion of a hemisphere” is still somehow “on the order of 180 degrees.” But, there is no support for this suggestion, and it directly conflicts with the explicit finding of the District Court quoted above. Nothing in the ’990 Patent puts a limit on the bounds of a “portion of a hemisphere.” While a 179° lens would no doubt be a portion of a hemisphere, so too would a much smaller field of view, such as 120°. Nothing in the ’990 Patent requires the field of view to be on the order of 180°. The Court should reject Apple’s arguments and adopt the construction used in the LG cases.⁵

4. Defendant’s Surreply Position

The parties agree that the construction of “panoramic lens” is not governed by the term’s ordinary meaning. Apple stated this in its responsive brief, (*supra* at 9), and ImmerVision states in its reply brief that its “argument properly omits any general meaning of ‘panoramic’” because the proper construction “is based on what the term would mean to a skilled artisan in the context of the patent disclosure.” (*Supra* at 14–15.) Thus, the Court should “adopt ‘the construction that stays true to the claim language and most naturally aligns with the patent’s description of the invention.’” *Medicines Co. v. Mylan, Inc.*, 853 F.3d 1296, 1309 (Fed. Cir. 2017) (citation omitted).

That construction is Apple’s. As Apple showed, the ’990 Patent describes its invention at least nine times—in three figures and six parts of the specification—as using a lens with a field of

⁵ Apple’s suggestion that “ImmerVision has not argued that the ’990 Patent redefines the term” should also be rejected. As noted above, ImmerVision’s arguments, in this case and the last, have always been consistent with the *Phillips* requirement to read the term in the context of the patent disclosure, not in isolation.

view of “180 degrees” or “on the order of 180 degrees.” (*Supra* at 9–11.) In contrast, the ’990 Patent never mentions a “wide-angle lens” or suggests that such a lens is equivalent to the claimed “panoramic objective lens.” ImmerVision’s only reference to the intrinsic record is to column 1’s reference to a “portion of a hemisphere.” ImmerVision argues that this could cover “a much smaller field of view, such as 120°.” (*Supra* at 15–16.) That argument, however, is merely speculation. The ’990 Patent never refers to any lens with an angular aperture, or field of view, of 120°. Rather, every time it specifies the angular aperture of a lens—including four times in the Detailed Description of the Invention—it specifies it as either 180° or “on the order of 180°.” (Reiley Dec. at Ex. A, ’990 Pat. 1:17–19, 2:22–23, 8:30–34, 11:49–52, 13:6–8, 16:31–32.) Moreover, column 1 appears in the Background of the Invention and describes “classical steps” for manipulating an image—i.e., the prior art. (*Id.* at 1:11, 1:46–48, 1:61–64.) It is implausible that a single, unelaborated statement in a description of the prior art was intended to contradict multiple explicit statements in the patent’s description of the invention itself.

None of ImmerVision’s other arguments have merit. First, ImmerVision argues that “LG’s actions [in failing to raise certain arguments Apple made] are irrelevant.” (*Supra* at 13.) But ImmerVision’s entire argument in support of its construction is that the District Court in *LG* adopted it. That LG did not offer the arguments or evidence that Apple is advancing illustrates why the prior decision is not dispositive here. Second, ImmerVision complains that Apple’s extrinsic evidence regarding plain meaning is at “an improper time” because it post-dates the ’990 Patent’s 2001 priority date. (*Id.* at 14.) This is immaterial because both parties agree that the ’990 Patent does not use “panoramic” in keeping with its general “plain meaning.” (*See id.* at 16.) Further, ImmerVision is wrong: Apple’s expert, Dr. Feinberg, cited a 1999 treatise on imaging and a 1996 book on panoramic photography. (Ex. 2, Feinberg Dec. ¶¶ 17–18.) The additional

sources from 2015 and 2017 merely confirm that the general definition of “panoramic” remained unchanged over that time, which covers the priority date of the ‘990 Patent. (*Supra* at 7–8.)

B. optical means for projecting a panorama into an image plane of the objective lens

1. Plaintiff’s Opening Position

ImmerVision’s Construction	Apple’s Construction
The term is a means-plus-function term.	The term is in means-plus-function form.
Function: projecting a panorama into an image plane of the objective lens	Function: projecting a panorama into an image plane of the objective lens, by compressing the center of the image and the edges of the image, and expanding an intermediate zone of the image
Structure: a series of optical elements, as disclosed in the specification at column 16, line 5 through column 18, line 15 and Figures 15-18, and equivalents thereof	Structure: None, and therefore the term is indefinite

This term appears in claim 17 of the ‘990 Patent, as follows:

A panoramic objective lens comprising:

optical means for projecting a panorama into an image plane of the objective lens, the optical means having an image point distribution function that is not linear relative to the field angle of object points of the panorama, the distribution function having a maximum divergence of at least $\pm 10\%$ compared to a linear distribution function, such that a panoramic image obtained by means of the objective lens comprises at least one substantially expanded zone and at least one substantially compressed zone.

The Parties agree that this claim element involves means-plus-function language under pre-AIA 35 U.S.C. § 112(6). “The first step in construing a means-plus-function claim limitation is to determine the function of the limitation. ... After identifying the function of the means-plus-function claim limitation, the next step is to determine the corresponding structure disclosed in the specification.” *Sony Corp. v. Iancu*, 924 F.3d 1235, 1239 (Fed. Cir. 2019). As with the

“panoramic objective lens” term, the Court already construed this exact term in the same claim of the same patent.

a) The Function

ImmerVision’s Function	Apple’s Function
projecting a panorama into an image plane of the objective lens	projecting a panorama into an image plane of the objective lens, by compressing the center of the image and the edges of the image, and expanding an intermediate zone of the image

Just as in the prior case, the dispute is how much of the claim should be incorporated into the function, as opposed to simply being an additional claim limitation. And like the earlier defendant, Apple is trying to inject too much of the claim into the function.

ImmerVision’s proposed construction was previously adopted by this Court. Initially, Magistrate Judge Burke agreed with ImmerVision that any additional words of the claim describe a “characteristic or property” of the claimed lens, not what the lens “does”. *See* Ex. 1, D.I. 163 in C.A. No. 18-1630, at 12-13. Judge Burke then elaborated on the important distinction: the last portion of claim 17 (“such that a panoramic image obtained by means of the objective lens comprises at least one substantially expanded zone and at least one substantially compressed zone”) is not “the function,” but rather describes “characteristics of the ‘panoramic image’ obtained via the work of the objective lens.” *Id.*, at 14. On review, Judge Noreika found no clear error in the record and adopted that construction. *See* Ex. 1, D.I. 163 in C.A. No. 18-1630, at 5.

Here, Apple is advancing nearly the same position the Court already rejected – that the “function” should include properties of the resulting image. This should be rejected for the same reasons previously followed by the Court. But Apple takes the argument one step further, attempting to import image properties from *another claim*. The claim language to be construed –

the “optical means for projecting a panorama into an image plane of the objective lens” – is in claim 17. The additional language in Apple’s alleged function – “by compressing the center of the image and the edges of the image, and expanding an intermediate zone of the image” – is a paraphrasing of dependent claim 21. But the limitation of claim 21 is a further narrowing of the panoramic image portion of claim 17 that the Court already found was not part of the function. Apple’s argument should be rejected for the same reasons.

b) The corresponding structure

ImmerVision’s Structure	Apple’s Structure
a series of optical elements, as disclosed: in the specification at Col. 4, ll. 39-48; Col. 5, ll. 56-67; Col. 15, l. 42 – Col. 18, l. 15; and Figs. 15-18; and equivalents thereof;	None, and therefore the term is indefinite

Apple’s argument regarding the structure can only stem from its recitation of the function. But the Court already found sufficient structure supporting the function identified by ImmerVision – *i.e.*, the structure identified by ImmerVision. *See* Ex. 1, D.I. 163 in C.A. No. 18-1630, at 14-18. Since that function is the correct one, the previously identified structure is also correct, and Apple’s indefiniteness argument should be rejected.

2. Defendant’s Answering Position

Claims	ImmerVision’s Proposal	Apple’s Proposal
21 (incorporates base claim 17)	Function: projecting a panorama into an image plane of the objective lens Structure: a series of optical elements, as disclosed in the specification at column 16, line 5 through column 18, line 15 and Figures 15–18, and equivalents thereof	Function: projecting a panorama into an image plane of the objective lens, by compressing the center of the image and the edges of the image, and expanding an intermediate zone of the image Structure: none, and therefore the term is indefinite

The parties agree that “optical means” is in means-plus-function format under 35 U.S.C. § 112 ¶ 6 (pre-AIA).⁶ The parties disagree, however, about (a) what the function of this term is and (b) whether the specification provides an adequate corresponding structure for that function.

As an initial matter, contrary to ImmerVision’s suggestion, construing “optical means” is not just a matter of adopting the Court’s construction from the *LG* cases. There, the disputed issues related to language in independent claim 17. (Ex. 7, D.I. 149 in C.A. No. 18-1630, at 12–18.) The dispute here, however, relates to language in claim 21, which depends from claim 17. The language at issue here was not considered in the *LG* cases, and the Court’s construction there does not address the parties’ dispute here.

a) The Function

The parties agree that “projecting a panorama into an image plane of the objective lens” is part of the function of the optical means. But dependent claim 21 uses active verbs—“compresses” and “expands”—to further specify what the “optical means” *does*. This language therefore is also part of the function of the optical means. The relevant language is highlighted below:

17. A panoramic objective lens comprising:

optical means for projecting a panorama into an image plane of the objective lens, the optical means having an image point distribution function that is not linear relative to the field angle of object points of the panorama, the distribution function having a maximum divergence of at least $\pm 10\%$ compared to a linear distribution function, such that a panoramic image obtained by means of the objective lens comprises at least one substantially expanded zone and at least one substantially compressed zone.

21. The panoramic objective lens according to claim 17, ***wherein the lens compresses the center of the image and the edges of the image, and***

⁶ The ’990 Patent was filed on November 12, 2003, and thus the pre-AIA statute applies. Apple further contends the “optical means” is not “[a]n element in a claim for a combination” as required by § 112 ¶ 6 and is therefore invalid for that independent reason. However, for purposes of this brief, Apple will solely address the claim construction issue regarding the proper function and corresponding structure of the term.

expands an intermediate zone of the image located between the center and the edges of the image.

(Reiley Dec. at Ex. A, '990 Pat. at cls. 17, 21 (emphasis added).)

As an initial matter, although claim 21 states that the ***lens*** compresses and expands portions of the image, these functions are attributable to the “optical means.” Claim 17’s “panoramic objective lens” is made up of only one element—the “optical means.” And claim 21, which depends from claim 17, adds no structural elements of its own. Thus, according to the claim language itself, the “optical means” and “lens” are coextensive—there is nothing else that is part of the claimed lens. The specification of the '990 Patent confirms this conclusion. The passages in columns 16 through 18 that ImmerVision identifies as corresponding structure for “optical means” refer repeatedly to “lens[es]” or “objective lens[es],” but not to an “optical means” or any other distinct optical element.⁷ (See Reiley Dec. at Ex. A, 16:5–18:15.)⁸

Next, as Apple’s construction recognizes, the “compress[ing] and “expand[ing]” recited by claim 21 are part of the function of the “optical means.” Active verbs that specify actions to be performed are routinely found to be part of the function of a means plus function term. *See, e.g., Media Rights Techs., Inc. v. Capital One Fin. Corp.*, 800 F.3d 1366, 1374 (Fed. Cir. 2015); *Noah Sys., Inc. v. Intuit Inc.*, 675 F.3d 1302, 1313–14 (Fed. Cir. 2012). Here, claim 21 uses active verbs, requiring that “the lens ***compresses*** the center of the image and the edges of the image, and ***expands*** an intermediate zone.” (Reiley Dec. at Ex. A, '990 Pat. at cl. 21 (emphasis added).) The claimed

⁷ As explained in the immediately following section on “The Structure,” the specification does not disclose an embodiment that can perform the function of claim 21.

⁸ Indeed, because the only structural element of the claimed lens is the optical means, if the compresses and expands action is not performed by the optical means, it is a stand-alone method step. Because claim 21 is an apparatus claim, the presence of a freestanding method step renders it indefinite. *IPXL Holdings, L.L.C. v. Amazon.com, Inc.*, 430 F.3d 1377, 1384 (Fed. Cir. 2005).

“compress[ing]” and “expand[ing]” are things that the optical means, or lens, *does*, rather than a description of what it *is*. They are, therefore, part of its function.

The fact that claim 21’s “compresses” and “expands” are separated from the admittedly-functional “projecting a panorama” language in claim 17 does not change this conclusion. A single means-plus-function term can have multiple functions even if the functional language is separated by non-functional limitations. For instance, in *Baran v. Medical Device Technologies, Inc.*, the court found the term “a release means for retaining the guide in the charged position” to have both a “release function” and a “retention function.” 616 F.3d 1309, 1317 (Fed. Cir. 2010). The plaintiff argued that the “release” language should be construed as a characteristic of the “release means” and not a function because it precedes the “means for” clause. *Id.* at 1317. But the Federal Circuit rejected that argument. It emphasized that, in determining whether language is part of a means-plus-function term’s function, the “relevant inquiry is whether the term at issue is purely functional” and not where it appears in the claim. *Id.* Here, the language of claim 21—“compresses” and “expands”—is purely functional. This language does not describe characteristics or properties of an image, but rather “vital function[s] to be performed by the means-plus-function element.” *Id.* Thus, the “compresses” and “expands” language is part of the function of the “optical means” even though it is included in a separate claim from that term.

ImmerVision’s attempt to analogize the language at issue to a clause that the *LG* Court found to be non-functional fails. (*Supra* at 19–20.) In the *LG* cases, the Court ruled that claim 17’s reference to “such that a panoramic image obtained by means of the objective lens comprises at least one substantially expanded zone and at least one substantially compressed zone,” was not part of the function of the “optical means.” (Ex. 7, D.I. 149 in C.A. No. 18-1630, at 12.) The Court reasoned that this language describes properties of an image obtained by the

“optical means” rather than a function of the “optical means.” (*See id.* at 14.) But the language found non-functional in the *LG* cases is very different from the phrase at issue here:

Descriptive clause of claim 17	Functional limitation of claim 21
<i>such that a panoramic image</i> obtained by means of the objective lens <i>comprises</i> at least one substantially expanded zone and at least one substantially compressed zone	wherein <i>the lens compresses</i> the center of the image and the edges of the image, <i>and expands</i> an intermediate zone of the image located between the center and the edges of the image

By its own terms, the clause in claim 17 is not tied to the “optical means,” but to an “image obtained by” that means. The clause in claim 21, by contrast, is tied to the lens itself, and specifies what that lens must do: compress and expand parts of the image. Further, the non-functional clause in claim 17 did not describe what the “optical means” does. Rather, it used “such that” to signal that it described a *result* of the optical means’ activity—specifically, a property of an image obtained by the lens. Unlike the clause in claim 17, claim 21 recites, using active language, as something the lens *does*, rather than a property the resulting image *has*.

In sum, the language of claim 21 describes a function of the “optical means” of claim 17. The Court should therefore adopt Apple’s construction, which includes that function.

b) The Structure

With its function properly construed, claim 17’s “optical means” is indefinite because the specification fails to disclose any corresponding structure. For a means-plus-function term to be definite, the specification must disclose structure adequate to perform the claimed function, and clearly link that structure to the function. *Williamson v. Citrix Online, LLC*, 792 F.3d 1339, 1351–52 (Fed. Cir. 2015). Where a means-plus-function term claims multiple functions, “the patentee must disclose adequate corresponding structure to perform all of the claimed functions.” *Id.* Thus, “in order to adequately disclose structure corresponding to the ‘[optical means]’ limitation, the specification must disclose *a* structure that [performs] both [functions].” *Cardiac Pacemakers, Inc.*

v. St. Jude Med., Inc., 296 F.3d 1106, 1115 (Fed. Cir. 2002) (emphasis added). The corresponding-structure requirement is not satisfied if the specification discloses one structure that performs one of the functions and a second, unrelated structure that performs the second. *See id.* at 1116.

Here, the '990 Patent does not disclose any structure capable of both: (1) “projecting a panorama into an image plane of the objective lens” (Reiley Dec. at Ex. A, cl. 17 (20:52–53)) by (2) “compress[ing] the center of the image and the edges of the image, and expand[ing] an intermediate zone of the image” (*id.* at cl. 21 (21:8–9)). The Court already found, and ImmerVision does not dispute, that the only structure capable of performing the first function (“projecting a panorama”) is at column 16, line 5 through column 18, line 15 and Figures 15–18. (*See* Ex. 7, D.I. 149 in C.A. No. 18-1630, at 14–18.) But this structure cannot perform the second function. The cited portions of the specification disclose two embodiments for “a non-linear objective lens,” each of which “expand[s] the image in the center.” (*Id.* at 16:5–9 (First Embodiment); *see also id.* at 17:49–51 (“result obtained [by Second Embodiment] is equivalent to that of the optical system described above [in the First Embodiment]”).) The “compress” and “expand” function of claim 21, however, requires the opposite: the lens must “compress[] the center of the image and the edges of the image, and expand[] an intermediate zone of the image.” (*Id.* at cl. 21.)

Nor is there anything elsewhere in the specification that could serve as corresponding structure. The specification refers only once to an image with compressed center and edges and an expanded intermediate zone. But this description, at column 9, line 53 through column 10, line 5, and Figure 9, merely describes desired characteristics of an image. (Reiley Dec. at Ex. A, '990 Pat. at 9:53–10:5.) It does not disclose any **structure** for a lens or an optical means for projecting that image. (*Id.*) Further, the disclosure is not linked in any way to the first function of the “optical means”—“projecting a panorama.” Because an adequate corresponding structure must perform

both functions associated with the optical means, the disclosure at column 9, line 53 cannot qualify. *Cardiac Pacemakers*, 296 F.3d at 1115. The '990 Patent fails to recite adequate structure for the “optical means,” and this term is, therefore, indefinite.

3. Plaintiff's Reply Position

a) The Function

Apple's attempts to inject extra language into the function are unavailing. ImmerVision is not proposing that the Court merely rubber stamp its prior ruling on this term. Rather, ImmerVision's construction should be adopted because the Court's prior ruling, based on the full and unchanged intrinsic record, was correct when made and remains correct today.

Apple argues that the language it wishes to add to the function (the *entirety* of claim 21) “is purely functional” and “does not describe characteristics or properties of an image.” Apple tries to distinguish this from the non-functional language of claim 17 because that claim has a phrase that begins with “such that a panoramic image obtained ... comprises,” thus describing a **result**, while claim 21 states “the lens compresses ... and expands...,” thus describing what the lens **does**. But this construction puts undue emphasis on the form of individual words rather than on the claim as a whole. Patents should be construed “in a manner that renders the patent internally consistent.” *Budde v. Harley-Davidson, Inc.*, 250 F.3d 1369, 1380 (Fed. Cir. 2001). “[T]he same terms appearing in different portions of the claims should be given the same meaning unless it is clear from the specification and prosecution history that the terms have different meanings at different portions of the claims.” *Fin Control Sys. Pty v. Oam*, 265 F.3d 1311, 1318 (Fed. Cir. 2001).

The Court previously found that in claim 17, the portion discussing expansion and compression (“such that a panoramic image obtained by a means of the objective lens comprises at least one substantially expanded zone and at least one substantially compressed zone”) is a

characteristic of the image obtained or projected by the lens, not part of the means-plus-function phrase at all. Ex. 7, at 13-14. The antecedent basis of the language in claim 21 ties directly back to these words: “wherein the lens compresses the center of *the image* and the edges of *the image*, and expands an intermediate zone of *the image*...” can only refer back to claim 17’s recitation of “*a panoramic image* obtained by means of the objective lens...”. Similarly, claim 21 uses “compresses” and “expands an intermediate zone” to have the same meaning as claim 17 uses “compressed zone” and “expanded zone.” In other words, claim 21 further narrows the *result* of the function and structure, but is not part of the function itself. While the result may be relevant to the doctrine of equivalents or establishing structural equivalents under § 112, paragraph 6 (*Odetics, Inc. v. Storage Tech. Corp.*, 185 F.3d 1259, 1267 (Fed. Cir. 1999)), those infringement inquiries are distinct from determining the function at the claim construction stage. Apple’s construction improperly imports this result into the function and should be rejected.

b) The corresponding structure

Under ImmerVision’s construction of the function, Apple has not offered any argument against the Court’s prior construction of the structure. Apple’s arguments on the structure are constrained to its interpretation of the function.

However, even under Apple’s interpretation of the function, the claim is not indefinite. The relevant inquiry is whether “a person of ordinary skill in the art would be unable to recognize the structure in the specification and associate it with the corresponding function in the claim.” *AllVoice Computing PLC v. Nuance Communs., Inc.*, 504 F.3d 1236, 1241 (Fed. Cir. 2007). Apple does not dispute that the ’990 Patent discloses structure, it merely claims that the disclosed structure “cannot perform the second function.” But here, Apple merely focused on the text of the specification and did not examine the figures, which is an error of law. The drawings

themselves “can provide support for the corresponding structure.” *Playtex Prods., Inc. v. Procter & Gamble Co.*, 400 F.3d 901, 909 (Fed. Cir. 2005).

As shown in the attached Declaration of Daniel Reiley, Ph.D. in Support of ImmerVision’s Claim Construction Reply Brief (“Reiley Reply Dec.”), the lens disclosed in Figures 15-16 of the ’990 Patent performs Apple’s proposed function as drawn.⁹ Using standard computer-aided lens design tools (as noted at Column 17, lines 29-32 of the ’990 Patent), Dr. Reiley obtained the “mathematical shapes” of the lens surfaces shown in Fig. 16 such that they can be interpreted by Zemax OpticStudio, a standard lens design software. Reiley Reply Dec., ¶¶ 8-9. Using Zemax, Dr. Reiley plotted the distortion of Fig. 16’s lens and its image point distribution function. *Id.*, ¶¶ 10-13.

Even without any optimization steps that would be a routine part of lens design, the image point distribution function of the lens shown at Fig. 16 is very similar to the image point distribution function shown in Fig. 9 of the ’990 Patent. *Id.*, ¶ 13. The ’990 Patent describes the image point distribution function of Fig. 9 as being compressed between the center and the point Pd1 at 30°, expanded from Pd1 (30°) to Pd2 (70°), and compressed again from Pd2 (70°) to the edge. (’990 Patent, at 9:58-64; 10:2-5). This is *exactly the function* proposed by Apple: “projecting a panorama into an image plane of the objective lens, by compressing the center of the image and the edges of the image, and expanding an intermediate zone of the image.” Thus, there is ample structure disclosed for this function and claim 21 is not indefinite under either party’s construction of the function.

⁹ It also performs the broader function articulated by ImmerVision.

4. Defendant's Surreply Position

Function: ImmerVision argues that the language of claim 21 should not be considered part of the function because other language in claim 17 was found not to be. ImmerVision is wrong. As Apple explained, claim 21 recites the lens performing specific functions (“compresses” and “expands”), but claim 17 recites properties of an image: “such that a panoramic image obtained by means of the objective lens comprises” an “expanded zone” and “compressed zone.” ImmerVision makes no attempt to reconcile this difference, but asserts that these phrases “have the same meaning” because another term in claim 21 (“the image”) has antecedent basis in claim 17. (*Supra* at 26–27.) But “the image” is not the term in dispute here, so ImmerVision’s argument is irrelevant.

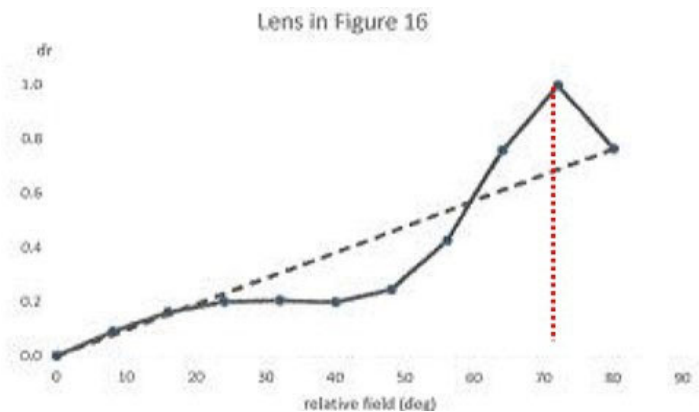
Structure: ImmerVision does not dispute that the text of the specification fails to disclose corresponding structure for Apple’s proposed function. Rather, to show structure, ImmerVision relies on its expert’s attempt to model the lens embodied in Figures 15 and 16. ImmerVision is wrong for at least three reasons.

First, ImmerVision’s argument contradicts the specification. For a structure to qualify as “corresponding structure” for a means-plus-function term, the patent must “clearly link[] or associate[] that structure to the function recited in the claim.” *Williamson*, 792 F.3d at 1351–52. Here, the ’990 Patent does the opposite. Column 16 states that the lens in Figures 15–16 produces a distribution function which “*expand[s]* the image in the center.” (Reiley Dec. at Ex. A, 16:5–10.) But ImmerVision claims that this lens *compresses* the center. (*Supra* at 27.) Because the specification says that the cited structure does the opposite of what ImmerVision claims, it cannot clearly link that structure with the function recited in claim 21. *See also Phillips*, 415 F.3d at 1318 (“a court should discount any expert testimony ‘that is clearly at odds

with . . . the written record of the patent” (quoting *Key Pharms. V. Hercon Lab’ys Corp.*, 161 F.3d 709, 716 (Fed. Cir. 1998)).

Second, ImmerVision’s expert modeled a different lens than the one depicted in Figures 15–16. In a lens, an element referred to as a “diaphragm” or “stop” is used to control the amount of light that reaches the image sensor, and moving the stop from one place to another alters how the lens behaves. (Ex. 13, Feinberg Surreply Dec. at ¶ 3.) For the lens depicted in Figures 15–16, the ’990 Patent explains that “diaphragm D1 is arranged between the lenses L6 and L7.” (Reiley Dec. at Ex. A, 16:14–15.) In contrast, Dr. Reiley states that he “put [the] stop between L3 & L4.” (Reiley Reply Dec. ¶ 11.) Dr. Reiley’s lens is therefore not the one depicted in Figures 15–16 and has very different properties.¹⁰ (Ex. 13, Feinberg Surreply Dec. at ¶¶ 5–6.)

Third, Dr. Reiley’s lens does not work, and its inoperability further shows that the specification fails to disclose sufficient structure. As shown below, Dr. Reiley’s distribution function plots the relative distance of a point in an image from the center (on the y-axis) against the field angle of the corresponding point in the real-world object (on the x-axis).



¹⁰ Dr. Reiley’s lens is also implausibly large. His diagram has a scale of 500 mm, showing the lens as two meters long. (*Id.*) The patent’s lens is for wall or ceiling cameras used in video surveillance or conference, which are typically not the size of a tall human. (Reiley Dec. at Ex. A, 3:43–52.)

(Reiley Reply Dec. ¶ 13) (annotation added.) In Dr. Reiley’s model, the field angle increases from left to right, which corresponds to points in the real-world object that are increasingly far from the optical axis. While moving left to right, the function shows corresponding image points moving further from the image center (i.e., up the y-axis). At a field angle of around 72°, however, the function reverses course and *decreases*. This means that, for angles above 72°, the image points move back toward the center, falling on an area that already captured other field angles. A real lens could not operate this way because a sensor or piece of film cannot separately image light from two angles at the same location. (Ex. 13, Feinberg Surreply Dec. at ¶¶ 8–9.) Thus, ImmerVision’s own expert could not accurately model an operative lens based on Figures 15–16, which further confirms that the specification fails to disclose sufficient corresponding structure.

C. the image

1. Plaintiff’s Opening Position

ImmerVision’s Construction	Apple’s Construction
the image projected by the panoramic objective lens	“the image” as used in claim 21 means “the obtained panoramic image”

This term appears in claim 21 of the ’990 Patent, as follows:

21. The panoramic objective lens according to claim 17, wherein the lens compresses the center of the image and the edges of **the image**, and expands an intermediate zone of the image located between the center and the edges of the image.

The dispute here is whether “the image” simply means the image projected by the claimed panoramic objective lens or an image captured by an unclaimed image sensor that may be utilized with the lens.

ImmerVision’s proposed construction is consistent with the claim itself. “[T]he claims themselves provide substantial guidance as to the meaning of particular claim terms.” *Phillips*, 415 F.3d at 1314 (*en banc*). “[T]he analytical focus of claim construction must begin, and

remain centered, on the language of the claims themselves.” *ACTV, Inc. v. Walt Disney Co.*, 346 F.3d 1082, 1088 (Fed. Cir. 2003). “There is a heavy presumption that claim terms mean what they say, and a difference in meaning and scope is likewise presumed when different words or phrases are used in separate claims.” *Cooper Notification, Inc. v. Twitter, Inc.*, 867 F. Supp. 2d 485, 492 (D. Del. 2012) (citations omitted). Those doctrines dictate the result here.

Claim 21 depends from claim 17, which is directed to “a panoramic objective *lens* comprising” certain properties (emphasis added). Claim 21 further limits the panoramic objective *lens* of claim 17 by further defining “the image” recited in claim 17, which is “a panoramic image obtained by means of the objective lens.” *Nowhere* in claims 17 and 21 is anything more than a lens and a projected image claimed. Critically, a lens projects an image whether or not there is some type of image capture medium (an electronic sensor, chemical film, etc.) paired with it. Reiley Dec., ¶¶ 19-20. The lens and projected image are all that is claimed in claim 17 and its dependent claims, not an image “captured” by an unclaimed image sensor.

This is confirmed by the other original claims from the ’990 Patent. As issued, the ’990 Patent contained two independent claims: claim 17, at issue in this dispute, and claim 1. Critically, claim 1 is directed to a “method for *capturing* a *digital* panoramic image, by projecting a panorama *onto an image sensor* by means of a panoramic objective lens” (emphasis added). The patentee made the distinctions clear between claims 1 and 17 in multiple ways. First, claim 1 is directed to “capturing” an image, while claim 17 merely discusses “projecting” an image. Second, claim 1 is specifically limited to capturing a “digital” image, a limitation that is absent in claim 17. Finally, claim 1 explicitly claims an “image sensor,” while claim 17 instead recites that the panorama is projected into an “image plane,” which exists whether an image sensor is present or not. Each of these distinctions makes clear the patentee’s intent that

the “image” of claim 1 is what is captured on an image sensor, while the “image” of claim 17 is merely that which is projected by a lens into a focal plane.

The patentee’s intent was further demonstrated years later. On May 8, 2015, the USPTO issued an *ex parte* reexamination certificate, cancelling certain claims of the ’990 Patent, amending others, and adding new claims, all based on prior art references not cited in the original prosecution. *See* ’990 Patent, pp. 25-27. The *ex parte* reexamination resulted in three additional independent claims. Two of them, claims 27 and 38, are like claim 1, in that they are methods for “displaying” or “capturing” a “digital” image and both explicitly recite that the lens projects a panorama “onto an image sensor.” Claim 32 is similar to claim 17 – it is directed only to a “panoramic objective lens,” it only “project[s]” the image, it is not limited to a “digital” image, and the panorama is projected into an “image plane,” not onto an “image sensor.” The patentee was clear with the USPTO, on two separate occasions over a decade apart, about the differing scope of different claims.

Ironically, Apple’s second proposed construction of “panoramic objective lens” shows the fallacy of its position here. For that term, Apple correctly recognized that the panoramic objective lens is “a lens that **projects** a panoramic image.” (emphasis added). Here, Apple wants to change course and require the image be projected and then **captured** by an unclaimed image sensor. The Court should reject Apple’s inconsistencies and adopt ImmerVision’s proposals.

2. Defendant’s Answering Position

Claims	ImmerVision’s Proposal	Apple’s Proposal
21 (incorporates base claim 17)	the image projected by the panoramic objective lens	“the image” as used in claim 21 means “the obtained panoramic image”

The parties' dispute here is whether claim 21's reference to "the image" refers back to the only "image" previously referenced in the claims—the "obtained panoramic image" (as Apple proposes) or to a previously-unreferenced "projected image" (as ImmerVision suggests).

Apple's proposed construction flows from the claim language as a simple application of the "antecedent basis" rule. Under that rule, "use of the definite articles 'the' or 'said' in a claim refers back to the same term recited earlier in the claim." *Hytera Commc'ns Co. Ltd. v. Motorola Sols., Inc.*, 840 F. App'x 555, 559 (Fed. Cir. 2021) (citation and internal quotation marks omitted). Similarly, the Manual of Patent Examining Procedure (MPEP) requires that a claim that refers to "the" or "said" element must generally have recited that element earlier. *See* Manual of Patent Examining Procedure § 2173.05(e) (9th ed. Rev. 07.2022, February 2023).

Here, when claim 21 refers to "**the** image," there is only one prior reference to an "image" for it to "refer back to"—claim 17's "panoramic image obtained by means of the objective lens":

17. A panoramic objective lens comprising:

optical means for projecting a panorama into an image plane of the objective lens, the optical means having an image point distribution function that is not linear relative to the field angle of object points of the panorama, the distribution function having a maximum divergence of at least $\pm 10\%$ compared to a linear distribution function, such that **a panoramic image obtained by means of the objective lens** comprises at least one substantially expanded zone and at least one substantially compressed zone.

21. The panoramic objective lens according to claim 17, wherein the lens compresses the center of **the image** and the edges of **the image**, and expands an intermediate zone of **the image** located between the center and the edges of **the image**.

(Reiley Dec. at Ex. A, '990 Pat. at cls. 17, 21 (emphasis added).) Apple's construction is, thus, consistent with the language of claims 17 and 21.

By contrast, ImmerVision's construction—"the image **projected** by the panoramic objective lens"—violates at least three rules of claim construction. First, ImmerVision's

construction violates the antecedent-basis rule. Neither claim 17 nor claim 21 refers to an “image projected by” a lens or a “projected image” that could provide an antecedent for “the image.”

Second, ImmerVision’s construction violates the rule that claim terms should be given their plain meaning. As noted above, claim 17 recites a lens and “a panoramic image *obtained* by means of the objective lens.” (Reiley Dec. at Ex. A, ’990 Pat. at cl. 17 (emphasis added).) But ImmerVision argues that claims 17 and 21 do not claim “anything more than a lens and a *projected* image.” (*Supra* at 32–33 (emphasis added).) ImmerVision’s construction thus construes “obtained” to mean “projected.” But “projected” is not the plain meaning of “obtained.” As ImmerVision’s expert conceded, “obtain[ed]” means “captur[ed].” (Ex. 8, Reiley Tr. 20:21–21:12.) And, as ImmerVision itself repeatedly argued, “captur[ed]” is different from “project[ed].” (*Supra* at 31–34.)

Third, ImmerVision’s construction violates the rule that where a patent uses different words in its claims, it is presumed that they mean different things. *SimpleAir, Inc. v. Sony Ericsson Mobile Commc’ns. AB*, 820 F.3d 419, 431 (Fed. Cir. 2016). ImmerVision used the word “projected” liberally in claim limitations other than the one at issue here. For instance, the ’990 Patent refers to “projecting a panorama” in claims 1, 27, 32, and 38. (Reiley Dec. at Ex. A, cls. 1, 27, 32, 38.) When it came to claim 17’s “image,” however, ImmerVision described it not as “projected” but as “obtained.” ImmerVision’s construction improperly treats these different words as meaning the same thing. *SimpleAir*, 820 F.3d at 431.

ImmerVision’s argument that claim 21’s “image” cannot be limited to one captured with a sensor is a red herring. (*Supra* at 32–34.) It is true that claim 17 does not reference an image sensor while claims 1, 27, and 38 do. (*Id.*) But Apple’s construction does not limit “the image” to one captured by an image sensor. Apple’s proposal refers to the image “obtained” by means of

the lens, but does not specify *how* the image must be obtained. As both parties’ experts agreed, an image can be “obtained” without using an image sensor, for instance by capturing it on film or in the eye of a human or animal. (Ex. 2, Feinberg Dec. ¶ 20; Ex. 8, Reiley Tr. 22:10–19.) Indeed, as ImmerVision’s brief noted, claim 17 is not limited to “capturing a ‘digital image,’” which is what an image sensor would produce. (*Supra* at 32–33; Ex. 2, Feinberg Dec. ¶ 20.) Rather, consistent with Apple’s construction, claim 17 also covers “obtaining” an image in an analog medium, like film.

Finally, ImmerVision is wrong to accuse Apple of construing “the image” and “panoramic objective lens” inconsistently. ImmerVision says that Apple “correctly recognized that the panoramic objective lens is ‘a lens that *projects* a panoramic image’” and then wants to “change course and require the image be projected and then *captured* by an unclaimed image sensor.” (*Supra* at 33–34.) But there is no “change [of] course” here. (*Id.*) Claims 17 and 21 have two separate requirements: the lens must first “project a panoramic image,” and, after that, an image with certain characteristics is “obtained.” (Reiley Dec. at Ex. A, ’990 Pat. at cl. 17.) There is nothing “inconsistent” in giving effect—as Apple’s construction does—to both of these distinct limitations.

Apple’s proposal is consistent with the plain language of the claims and the antecedent-basis rule, and gives meaning to all words of the claim. The Court should, therefore, adopt it.

3. Plaintiff’s Reply Position

Apple admits that its construction “does not limit ‘the image’ to one captured by an image sensor.” This was ImmerVision’s sole concern with the term. So long as Apple’s construction cannot be used to argue noninfringement based on whatever image is captured by the image sensor in the accused devices, ImmerVision does not object to Apple’s construction.

Otherwise, ImmerVision reverts to its original brief, wherein it explained why its construction properly clarifies the issue for the infringement analysis.

4. Defendant's Surreply Position

As set forth in Apple's responsive brief, under the antecedent-basis rule, "the image" in claim 21 must refer to the "panoramic image obtained by means of the objective lens" in claim 17. Apple's construction "does not limit 'the image' to one captured by an image sensor" simply because there are ways of "obtaining" an image other than using a sensor, such as using film. (*See supra* at 36.) ImmerVision's speculation about infringement issues is of no relevance here.

D. **correcting the non-linearity of the initial image**

1. Plaintiff's Opening Position

ImmerVision's Construction	Apple's Construction
removing the distortion caused by the non-linear distribution function	removing, from the image's distribution function, deviations from a linear relation between the distance of an image point from the center of the image and the field angle of the corresponding object point

This term appears in claim 27 of the '990 patent, as follows:

27. A method for displaying a digital panoramic image, the method comprising:

obtaining a digital panoramic image by projecting a panorama onto an image sensor using a panoramic objective lens, the panoramic objective lens having an image point distribution function that is not linear relative to a field angle of object points of the panorama, the distribution function having a maximum divergence of at least +/-10% compared to a linear distribution function, such that the panoramic image obtained has at least one substantially expanded zone and at least one substantially compressed zone, and

displaying the obtained panoramic image by **correcting the non-linearity of the initial image**, performed by retrieving image points on the obtained image in a coordinate system of center O' using at least the non-linear distribution function and a size L of the obtained image.

The dispute here is the difference between “distortion,” as ImmerVision writes, or a very specific and narrow definition of distortion that Apple proposes. Otherwise, the parties seem to agree that “correcting the non-linearity” means to remove some kind of distortion from the image, despite disagreeing over how to define that distortion.

ImmerVision’s construction does not arbitrarily limit the correction method to a single disclosed embodiment. The specification of the ’990 Patent discloses two example embodiments for correcting the non-linearity of the initial image. ’990 Patent, at 10:6-15:41. The first, described at 10:60-12:56, is conceptually simple. It simply turns the distribution function of the lens on its head and essentially cancels it out:

A first embodiment involves correcting the initial image by means of a function Fd^{-1} that is the **reciprocal function** of the distribution function Fd according to the present invention. As the distribution function Fd is known and determined at the time the non-linear objective lens is designed, it is easy to deduce the reciprocal function Fd^{-1} therefrom. This correction step allows a corrected image to be obtained in which **the non-linearity due to the objective lens according to the present invention is removed**. The corrected image is equivalent to an image taken by means of a classical panoramic objective lens.... (’990 Patent, at 10:39-49) (emphasis added).

The second embodiment does not rely on this reciprocal function. Rather, it performs corrections within “an image sector” of the image disk. (’990 Patent, at 12:61-63). It creates a “virtual equivalent” of the original scene to determine the relevant angles in real time. (*Id.*, at 13:13). Critically, the ’990 Patent explicitly states that the second embodiment “does not require calculating a corrected image disk, contrary to the previous embodiment.” (*Id.*, at 12:64-65). By using the broad term “distortion,” ImmerVision’s construction properly recognizes that correcting the non-linearity must be construed as encompassing both of these disclosed methods. See Reiley Dec., ¶ 22.

Apple’s construction, on the other hand, is overly narrow. It only encompasses the first of the two disclosed correction methods. This is legally improper. “Where a specification does not *require* a limitation, that limitation should not be read from the specification into the claims.” *Specialty Composites v. Cabot Corp.*, 845 F.2d 981, 987 (Fed. Cir. 1988) (emphasis in original); *Arlington Indus. v. Bridgeport Fittings, Inc.*, 632 F.3d 1246, 1256 (Fed. Cir. 2011). Further, Courts “‘normally do not interpret claim terms in a way that excludes embodiments disclosed in the specification.’” *Cadence Pharm. Inc., v. Paddock Labs., Inc.*, 886 F. Supp. 2d 445, 455 (D. Del. 2012), *quoting Oatey Co. v. IPS Corp.*, 514 F.3d 1271, 1276-77 (Fed. Cir. 2008).

Apple’s construction – “removing, from the image’s distribution function, deviations from a linear relation between the distance of an image point from the center of the image and the field angle of the corresponding object point” – is an exact match for the first of the two disclosed correction methods, which uses the inverse of the distribution function to cancel out the deviations within. Apple’s construction is overly narrow, as it excludes the second disclosed embodiment. This Court should reject Apple’s attempt to import a limitation from the specification into the claim, and instead adopt ImmerVision’s proposed construction.

2. Defendant’s Answering Position

Claims	ImmerVision’s Proposal	Apple’s Proposal
27	removing the distortion caused by the non-linear distribution function	removing, from the image’s distribution function, deviations from a linear relation between the distance of an image point from the center of the image and the field angle of the corresponding object point

Apple’s proposed construction for the “correcting” term comes directly from the patent’s definition of “linearity,” together with the plain meaning of the term “correct.” ImmerVision’s construction, in contrast, is inconsistent with the intrinsic evidence and needlessly confusing.

Claim 27 has two steps: (1) “obtaining a digital panoramic image,” and (2) “displaying” an image to a user. The “panoramic image” has “an image point distribution function that is not linear.” (Reiley Dec. at Ex. A, ’990 Pat. at cl. 27.) The ’990 Patent explains that, if the displayed image contains this same non-linearity, it will include “geometrical distortions unpleasant for the observer.” (*Id.* at 2:4–8.) To avoid this, claim 27 requires “correcting the non-linearity of the initial image” when displayed. (*Id.* at cl. 27.) This “correcting” term raises two issues: first, how to define the “non-linearity” being corrected for; and second, what it means to “correct” that non-linearity.

a) Apple’s Construction Follows the ’990 Patent’s Specific Definition of “Linearity” and Non-Linearity

Apple’s construction is based on an explicit definition of the term “linear” from the ’990 Patent. That definition should govern: “[i]f the specification [of a patent] reveals ‘a special definition given to a claim term . . . the inventor’s lexicography governs.’” *SkinMedica, Inc. v. Histogen Inc.*, 727 F.3d 1187, 1195 (Fed. Cir. 2013), *citing Philips*, 415 F.3d at 1316. Here, as the ’990 Patent itself recognizes, there are multiple ways that “linearity” can be defined in optical applications. (Reiley Dec. at Ex. A, 7:28–31.) The ’990 Patent explicitly specifies which definition it intends to apply: “the term ‘linearity’ here refers to a ratio of proportionality between the distance of an image point measured relative to the center of the image and the field angle of the corresponding object point.” (*Id.* at 7:24–28.)

The '990 Patent consistently uses “linearity” consistent with its chosen definition, making clear that “non-linearity” refers to deviations from a linear ratio of proportionality between distance and field angle. For instance, the '990 Patent explains that “F[igure] 4B represents the shape of the distribution function [] of a classical panoramic objective lens.” (*Id.* at 2:31–32.) As

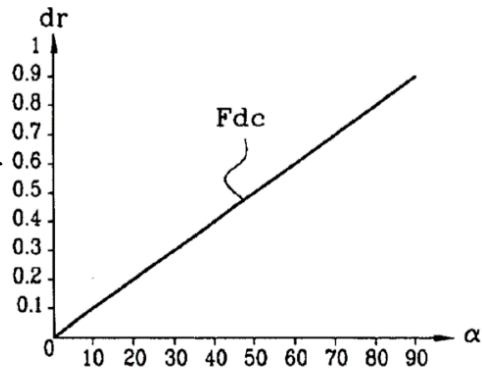


Fig. 4B

shown at right, in the “linear” distribution function shown in Figure 4B, the “field angle α of the object points” (shown on the horizontal axis) is proportional to “relative distance dr of an image point in relation to the center of the image” (shown on the vertical axis). (*Id.* at Fig. 4B, 8:34–38; *see id.* at 8:30–32 (“classical linear distribution [is] expressed by $Fdc = K\alpha$ and in the form of a straight line of gradient K ”).) As another example, the patent discusses a “system for taking panoramic shots.” (*Id.* at 6:66–67.) In images created by that system, “the distribution of the image points according to the field angle of the object points is linear . . . the distances d_1 and d_2 are linked by the following relation: $d_1/\alpha_1 = d_2/\alpha_2$.” (*Id.* at 7:14–19.) In other words, the ratio of the distance (d_1, d_2) to the field angle (α_1, α_2) is constant; the distance and angle are thus proportional to each other. (*Id.*; Ex. 2, Feinberg Dec. ¶ 26.)

ImmerVision’s own expert, Dr. Reiley, conceded that the '990 Patent defines “linearity” consistent with Apple’s construction. In particular, Dr. Reiley agreed that the '990 Patent used the term “linearity” to refer to a distribution in which the “ratio of field angle to distance from image center would be constant,” meaning that distance and angle are proportional:

Q: In an ideal F theta lens, the ratio of field angle to distance from image center would be constant for all pairs of corresponding image and object points; correct?

A: Yes.

...

Q: The portions of the '990 Patent that we've reviewed together define linearity in terms of an ideal F-theta distribution; right?

A: Yes.

(Ex. 8, Reiley Tr. 31:12–16, 40:21–24.) Thus, the '990 Patent defines “linearity” as a linear, proportional relationship between the distance of an image point from the center of the image and the field angle of the corresponding point in the object. Under this definition, “non-linearity” refers to deviations from that proportional relationship. Again, ImmerVision’s expert agreed, opining that a “‘nonlinear targeted resolution function’ is a distortion curve that deviates meaningfully from $f\text{-}\theta$ [theta] for a useful purpose.” (Reiley Dec. ¶ 36.) As set forth above, an “f-theta” distribution is one in which there is a proportional relationship between distance and field angle.

ImmerVision’s construction, in contrast, is untethered from the intrinsic evidence. The '990 Patent never refers to “distortion caused by the non-linear distribution function,” much less suggests that this phrase is equivalent to “non-linearity.” And ImmerVision’s construction is broader than, and inconsistent with, the '990 Patent’s definition of “linear.” As noted above, in the '990 Patent, linearity requires the position of an image point to be proportional to the field angle of the corresponding point in the object. (*See supra* at 40.) There are, however, other ways to define “linearity” in the optics field. Indeed, the '990 Patent recognizes as much, noting that its definition is “different from that prevailing in the field of paraxial optics.” (Reiley Dec. at Ex. A, 7:28–31.)

As one example, in some optical applications, the position of an image point has a “linear” relationship not to the field angle of the corresponding object point (as in the '990 Patent), but to the *tangent* of that angle. (Ex. 2, Feinberg Dec. ¶ 22.) The linearity present in

such a system differs from the '990 Patent's definition. Indeed, as ImmerVision's expert admitted, trying to make a distribution function "linear" in this latter sense can *worsen*, rather than "correct," the distribution's "non-linearity" under the '990 Patent's definition. (Ex. 8, Reiley Tr. 52:7–14; *see id.* at 49:18–51:23.) ImmerVision's construction would improperly capture this—and other—forms of "non-linearity" that are inconsistent with the '990 Patent's definition.

Further, ImmerVision's construction is confusing. The construction refers to "removing the distortion caused by the non-linear distribution function." (*Supra* at 40.) But a common use of "distortion" in an optical system refers to a variation in the magnification of a part of an image depending on how far one is from the center. (Ex. 2, Feinberg Dec. ¶ 29, *see* Ex. 9, Eugene Hecht & Alfred Zajac, *Optics* (Addison-Wesley Publishing Company, Inc., 4th ed. 1979) (APL-IMV_00048813–APL-IMV_00048843) at APL-IMV_00048833; Ex. 10, Frank L. Pedrotti, Leno M. Pedrotti & Leno S. Pedrotti, *Introduction to Optics* (Cambridge University Press, 3rd ed. 2018) (APL-IMV_00048857–APL-IMV_00048878) at APL-IMV_00048872.) A "linear" system, as the '990 Patent uses the term, would not have this type of "distortion" removed. Rather, the magnification of the image would decrease as one moved further from the center—a form of distortion known as "barrel distortion." (Ex. 2, Feinberg Dec. ¶ 29; *see* Ex. 10, Pedrotti at APL-IMV_00048872; Ex. 9, Hecht at APL-IMV_00048834–35.) A construction suggesting the "removal" of something that is admittedly present in the final image needlessly risks confusing the jury. Further, it is confusing to talk, as ImmerVision does, about the "distortion caused by the non-linear distribution function." (*Supra* at 40.) Distortion is caused by the physical properties and arrangements of the lens elements. (Ex. 2, Feinberg Dec. ¶ 28.) The "distribution function," in contrast, is a mathematical representation of how a lens distributes light in the images it forms.

(Reiley Dec. at Ex. A, '990 Pat. at 2:31–40, 8:29–41; Figs. 4B, 7B, 8, 9.) A distribution function, thus, is a measurement, not a cause, of optical distortion in a lens.

b) Apple's Construction Is Consistent with the Plain Meaning and the '990 Patent's Use of the Term "Correct"

In addition to defining “linearity” (and, thus, “non-linearity”), the '990 Patent makes clear that “correcting” non-linearity means removing deviations between an image’s actual distribution function and a linear one. For instance, the '990 Patent explains that the “correction step allows a corrected image to be obtained in which the non-linearity due to the objective lens according to the present invention is removed.” (Reiley Dec. at Ex. A, 10:45–48.) This is consistent with the plain meaning of claim 27. “Correcting” is a common English word that means to “counteract; neutralize” or “to alter or adjust so as to bring to some standard or required condition.” (Ex. 11, *Correcting*, Merriam-Webster’s Dictionary (10th ed. 1999) (APL-IMV_00048853–APL-IMV_00048856) at APL-IMV_00048855.) And ImmerVision’s expert conceded that the '990 Patent uses the term “correcting” as Apple proposes:

Q: “Correcting the non-linearity of the initial image” as the '990 Patent uses the term would mean removing at least part of the deviation from linearity from the images distribution function; correct?

A: Yes.

(Ex. 8, Reiley Tr. 44:12–16.) Apple’s proposed construction, which requires “removing” deviations from linearity to “counteract” the image’s non-linearity and to “bring to [a] standard” of linearity, is thus consistent with the intrinsic record, the plain meaning of “correct,” and ImmerVision’s expert’s admissions.

c) ImmerVision's Construction Is Nonsensical, Does Not Resolve the Parties' Dispute, and Is Not Tied to the Intrinsic Evidence

ImmerVision’s only critique of Apple’s construction is an incorrect assertion that it reads out one of the “correction” embodiments disclosed in the specification. As ImmerVision notes, the

'990 Patent discloses “two example embodiments for correcting the non-linearity.” (*Supra* at 38.) The first embodiment uses the “reciprocal” (or inverse) of the non-linear distribution function to “cancel out” the distortion. (*Id.*) The second embodiment does not use an inverse function. Instead, it uses mathematical operations involving the non-linear distribution function itself to project a point from a display onto a three-dimensional hemisphere and from there to a flat display. (Reiley Dec. at Ex. A, '990 Pat. at 12:59–13:13.) But ImmerVision is wrong that, Apple’s construction “only encompasses the first of the two disclosed correction methods” because it matches “us[ing] the inverse of the distribution function,” Apple’s construction (*Supra* at 39–40.) Apple’s construction merely specifies what has to be removed from a distribution function in order to “correct the non- linearity.” It does not limit *how* that removal is accomplished. In particular, Apple’s construction does not require using the inverse of the distribution function or any other function.¹¹

Because Apple’s construction is consistent with the '990 Patent’s definition of linearity, and ImmerVision’s is not, the Court should adopt Apple’s construction.

3. Plaintiff’s Reply Position

Apple’s construction and arguments suffer from many flaws. Chief among these is a conflation of linearity in a lens and linearity in an image, along with a failure to consider the

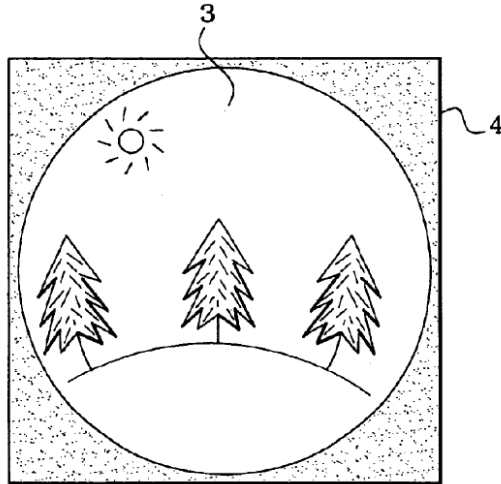
¹¹ ImmerVision is also wrong that claim 27 as a whole “must be construed as encompassing both of the[] disclosed” embodiments. (*Supra* at 39.) Claim 27 requires that the correction be “performed by retrieving image points on the obtained image in a coordinate system of center O’ using at least the non-linear distribution function and a size L of the obtained image.” (Reiley Dec. at Ex. A, '990 Patent at cl. 27.) The “second embodiment of the correction method” disclosed in the '990 Patent does use both “L[, which] is the size of the image disk, in number of pixels,” and “the non-linear distribution function Fd.” (*Id.* at 13:9–10, 48, 14:33–33.) The “first embodiment,” however, does not use the image size or the non-linear distribution function. (*See id.* at 11:9–12:26.)

context and purpose of the invention. Considering these issues together reveals that ImmerVision's construction is the correct one.

Every one of Apple's citations to the specification refers to the linearity of a lens.

ImmerVision does not dispute that in the context of claim 27 of the '990 Patent, the linearity of a *lens* is "a ratio of proportionality between the distance of an image point measured relative to the center of the image and the field angle of the corresponding object point," as shown at Col. 7, lines 24-28 of the '990 Patent and repeatedly cited by Apple. But, even if this phrasing rises to the level of lexicography, as Apple argues but ImmerVision disagrees with, this definition is provided specifically in the context of a "panoramic objective *lens*" (Col. 7, line 16), while the term being construed is *not a lens*. As Apple admits, claim 27 of the '990 Patent has two steps. The lens, however, appears only in the first step, while the term being construed is in the second step, wherein the image is displayed to a user. Thus, the focus needs to be on what "non-linearity" means in the context of the captured image, not on what "linearity" means in a panoramic lens.

As the '990 Patent makes clear, its invention sits within the field of obtaining digital panoramic images and displaying them on computer screens. ('990 Patent, at 1:12-14). In this context, as shown below in Fig. 2 of the '990 Patent, a traditional panoramic image may look somewhat strange to a human, as it results in portions of the image (particularly toward the edge) appearing unnaturally curved:



As Apple's expert explained, this is the result of the way in which different lenses are designed. To design a lens in which straight lines appear straight, the lens must be projected with an $f^*\tan(\theta)$ relationship between object point and image point. Ex. 2, ¶ 22. Unfortunately, at wide angles, mathematical laws make this projection unwieldy or even impossible, as the tangent of 90° is infinite and the tangent of smaller angles grows larger and larger as they approach 90° .¹² *Id.*, ¶ 23. Thus, in order to capture these wide angles, a lens designer often calibrates a wide-angle lens to an $f^*(\theta)$ mapping, which does not suffer from the problem of such large or infinite values, but comes with the trade-off of the image appearing curved, as shown above. *Id.*, ¶ 30.

But the lens itself is not the sole focus of the invention. Rather, the inventive lens with a non-linear $f^*(\theta)$ mapping is intended to capture images that are then displayed to a human, such as on a computer screen. ('990 Patent, at 1:12-14). Thus, the inventors specifically disclosed that the invention also related to "transforming the two-dimensional panoramic image

¹² Here, 90° relates to a lens with a 180° field of view. The field of view represents the angle as measured from one edge of the image circle to the opposite edge. However, linearity is measured from the center of the image, such that the edge of the image is 90° away from the center but 180° away from the opposite edge.

into a panoramic image offering a *realistic perspective effect*.” (*Id.*, at 1:46-48). As Apple’s expert admits, in optics, perspective equates to “images where straight features, such as the edges of walls of building, appear as straight lines, as opposed to being curved....” Ex. 2, ¶ 22.

Therefore, with respect to images, the inventors expressly disclosed that “correcting the non-linearity of the initial image” is not the same as the non-linearity of the lens. In the section of the disclosure headed “Correction of the Non-linearity of the Initial Image,” they wrote that the invention “involves correcting the non-linearity of the image disk obtained in order to present the observer with an image free from optical distortion.” (’990 Patent, at 10:16-18). And as Apple’s expert admits, there is another type of distortion: “*Image* distortion is a measure of how much an image appears warped, so that straight lines do not appear straight.” Ex. 2, ¶ 30 (emphasis added). Apple’s construction and arguments erroneously use the concept of lens linearity where image linearity or distortion is more appropriate. ImmerVision’s, on the other hand, correctly captures the idea that “non-linearity” of an image relates to both types of distortion or non-linearity.

Still further, ImmerVision’s construction, unlike Apple’s, appropriately reflects the two correction methods disclosed in the ’990 Patent. The first of these methods is summarized at Col. 10, lines 39-53 and described in detail at Col. 10, line 61 through Col. 12, line 56 and Figs. 11 and 12. This method includes five steps, as shown in Fig. 12: (1) capturing an image with a camera having a lens with a non-linear distribution function; (2) transferring the image to a computer; (3) “linearizing” the image disk; (4) converting the image disk into a hemisphere; and (5) displaying a portion of the hemisphere on a screen. Step 3 is described at Col. 10, lines 45-47 as: “This correction step allows a corrected image to be obtained in which the non-linearity due to the objective lens according to the present invention is removed,” which is very similar to

Apple's proposed construction. The specification describes this concept as "the reciprocal function of the distribution function." ('990 Patent, at 10:41). But this is not the concept in the disputed portion of claim 27. That portion of the claim more closely matches the following sentence: "The corrected image is equivalent to an image taken by means of a classical panoramic objective lens and can then be processed by any classical display software program available in stores, provided for transferring the image points of an image disk into a three-dimensional space and *for interactively displaying a sector of the image obtained.*" (*Id.*, at 10:48-53, emphasis added). As the specification notes at Col. 10, lines 16-17, when the image is to be *displayed* (the action claimed in the second step of the method of claim 27), it is to be done "in order to present the observer with an image free from optical distortion." As explained above, even Apple's own expert knows that image distortion can relate to $f \cdot \tan(\theta)$ linearity.

The second method is summarized at Column 10, lines 54-58 and described in detail at Column 12, line 58 through Column 15, line 41 and Figs. 13 and 14. Critically, this is the method captured by claim 27. Apple's construction and arguments ignore that the claim requires the correction be performed using an "image in a coordinate system of center O" using at least the non-linear distribution function and a size L of the obtained image." These three variables are explicitly called out in the second method: the use of the "coordinate system of center O" is referenced at Col. 13, line 19; the non-linear distribution function is referenced at Col. 13, line 30; and the size L is referenced at Col. 13, line 47. But, this second method explicitly states that it "does not require calculating a corrected image disk." ('990 Patent, at 12:64). Thus, it specifically conflicts with Apple's construction.

Apple's other criticisms also lack merit. Apple claims that "ImmerVision's expert admitted, trying to make a distribution function 'linear' in this latter sense can *worsen*, rather

than ‘correct,’ the distribution’s ‘non-linearity’ under the ’990 Patent’s definition.” (emphasis Apple’s). ImmerVision’s expert admitted nothing of the sort. Apple’s argument is a grossly inaccurate paraphrasing of the portion of the deposition in which Dr. Reiley merely admitted that performing a mathematical operation on a curve to move the curve in one direction results in the curve being moved away from the opposition direction. At the very least, this hypothetical question, and Apple’s argument stemming from it, ignore the distinction explained above between lenses and images. While a *lens* cannot simultaneously be mapped to both $f^*(\theta)$ and $f^*\tan(\theta)$, a lens of one mapping can be used to obtain an *image* that is later digitally processed to correct for a different mapping. In fact, this is expressly the invention of the ’990 Patent: a lens being nonlinear in the $f^*(\theta)$ perspective for the purpose of adding fidelity to desired zones of the resulting image (Col. 3, line 35 – Col. 5, line 10) being used to capture an image that is then presented on a screen “free from optical distortion” (10:16-17), with “a realistic perspective effect” (1:48).

Apple also criticizes ImmerVision’s construction for stating “distortion caused by the non-linear distribution function” when distortion is caused by the physical properties and arrangements of the lens elements rather than a mathematical formula. This is a criticism of form, not substance. The distribution function is directly tied to the physical properties of the lens elements. (’990 Patent, at 16:44-48). ImmerVision’s construction could alternately be stated as “removing the distortion in the initial image” or “removing the distortion caused by the lens” and convey the same concept.

4. Defendant’s Surreply Position

Apple’s construction for this term is rooted in the ’990 Patent’s definition of “linearity” and the common meaning of “correcting.” ImmerVision, by contrast, relies on a “distinction” that is found nowhere in the intrinsic record. ImmerVision concedes that “in the context of claim 27 of

the '990 Patent, the linearity of a lens is ‘a ratio of proportionality between the distance of an image point [from] the center of the image and the field angle of the corresponding object point’”—as reflected in Apple’s construction. (*Supra* at 46 (emphasis omitted).) It argues, however, that there is a difference between “linearity in a lens and linearity in an image,” and that “the focus needs to be on what ‘non-linearity’ means in the context of the captured image.” (*Id.*) The intrinsic evidence rejects ImmerVision’s “distinction.”

Images are created by lenses, and their properties—including linearity or non-linearity—depend on the lens that created them. The '990 Patent recognizes this: both claim 27, and the intrinsic evidence Apple cited, uniformly discuss linearity in the context of *an image produced by a lens*. For instance, claim 27 requires “obtaining a digital panoramic *image* . . . *using a* panoramic objective *lens*.” (Reiley Dec. at Ex. A.) It then refers back to “the non-linearity of the initial image.” (*Id.*)

Consistent with this, the '990 Patent’s express definition of linearity refers to linearity in an image: “the term ‘linearity’ here refers to a ratio of proportionality between the distance of an *image point* measured relative to the *center of the image* and the field angle of the corresponding object point.” (Reiley Dec. at Ex. A, 7:24–27.) Contrary to ImmerVision’s suggestion, the other parts of the specification cited by Apple likewise discuss linearity in an image created by a lens. For instance, the discussion of linearity at column 2, lines 31–32 refers to linearity in terms of “the relative distance dr of an *image point* in relation to the center of *the image disk* according to the field angle ax of the corresponding object point.” (*Id.* at 2:32–34.) Likewise, the discussion of linearity at column 8, lines 30–38 refers to “[t]he relative distance dr of *an image point* in relation to the center of *the image disk* [as] represented on the Y-axis” of a graph. (*Id.* at 8:36–38.) And it explains that, in a non-linear distribution, “[a] high gradient means an expansion

of the image and a low gradient means a compression *of the image*.” (*Id.* at 8:41–42.) There is simply no “distinction” in the ’990 Patent between linearity in an image and linearity in a lens.

ImmerVision also cites disclosures about “transforming” an image, but these disclosures are of no help to ImmerVision. This discussion states that “transforming the two-dimensional panoramic image into a panoramic image offering a realistic perspective effect.” (*Supra* at 48, citing Reiley Dec. at Ex. A, ’990 Pat. 1:46–48 (quotations omitted).) Yet, the patent defines “linear” with respect to this “transforming” method in accordance with Apple’s proposed definition: one where “the ratio between the angles [for object points A’ and B’] must be equal to the ratio between the distances OA and OB on the image disk.” (Reiley Dec. at Ex. A, ’990 Pat. 2:9–14; Ex. 13, Feinberg Surreply Dec. ¶¶ 11–12.) Further, ImmerVision’s reference to “[i]mage distortion, [which] is a measure of how much an image appears warped,” is irrelevant. (*Supra* at 48.) The ’990 Patent specifically states that “correcting the non-linearity” involves generating “an image free from *optical* distortion,” which ImmerVision concedes is different from “image distortion.” (Reiley Dec. at Ex. A, 10:15–18.)

Finally, ImmerVision argues that Apple’s construction excludes the second image-correction embodiment in the ’990 Patent, which “does not require calculating a corrected image disk.” (*Supra* at 49–50.) But Apple’s construction does not require this calculation, either. As the ’990 Patent makes clear, the non-linearity of the image disk is indeed corrected in the second method. It is merely corrected implicitly: “[a]s it will be clear to those skilled in the art, the *correction of the non-linearity of the image disk is implicit* here since the image points . . . are ‘retrieved’ from the image disk ID1, by means of the [non-linear distribution] function Fd.” (Reiley Dec. at Ex. A, 13:25–30, 13:9–10.) There is nothing here that remotely suggests the use of

a different definition of “non-linearity.” Further, ImmerVision’s arguments regarding the ’990 Patent’s correction methods are attorney argument, and should thus be given no weight.

ImmerVision’s construction introduces language—“distortion caused by the non-linear distribution function”—found nowhere in the intrinsic record. Its reply makes almost no effort to defend this language. The Court should thus reject ImmerVision’s proposal(s) and adopt Apple’s.

E. a non-linear targeted resolution to intentionally create a zone in an image captured by the miniature wide-angle optical apparatus with a lower or higher object to image magnification compared to linear targeted resolution

1. Plaintiff’s Opening Position

ImmerVision’s Construction	Apple’s Construction
No construction necessary, plain and ordinary meaning applies	indefinite

This phrase appears in claim 1 of the ’120 Patent, as follows:

1. A miniature wide-angle optical apparatus comprising:

...

a non-linear targeted resolution to intentionally create a zone in an image captured by the miniature wide-angle optical apparatus with a lower or higher object to image magnification compared to linear targeted resolution, the lower or higher object to image magnification being used to compensate, at least in part, for a lower image quality due to at least one of a drop of relative illumination or a drop of MTF in a zone of the image, ...

ImmerVision proposes the term is readily understandable and needs no construction, while Apple believes the term is indefinite.

“[A] patent is invalid for indefiniteness if its claims, read in light of the specification delineating the patent, and the prosecution history, fail to inform, with reasonable certainty, those skilled in the art about the scope of the invention.” *Nautilus, Inc. v. Biosig Instruments, Inc.*, 572 U.S. 898, 901 (2014). “[T]he definiteness requirement must take into account the inherent

limitations of language. Some modicum of uncertainty ... is the price of ensuring the appropriate incentives for innovation. ... [A]bsolute precision is unattainable.” *Id.*, at 909-910.

As shown in the Reiley Dec., this claim phrase is understood with reasonable certainty by one of skill in the art. The phrase centers around the idea of a “targeted resolution,” which Dr. Reiley explains as being easily understandable as a function of distortion, a well-known optical concept. Reiley Dec., ¶¶ 24-37. He also explains that it “can be described as a local magnification across the field.” *Id.*, ¶ 29. Figures 6 and 7 of the ’120 Patent “clearly plot resolution as a function of field angle,” which is a type of plot that “is available as a default analysis of distortion in OpticsStudio, a popular lens design program.” *Id.*, ¶ 25. Dr. Reiley then gives several traditional examples of different targeted resolutions, their different use cases, and descriptions of their effects. *Id.*, ¶¶ 29-33.

Dr. Reiley then describes this phrase as describing “a distortion curve that deviates meaningfully from [a standard distortion curve] for a useful purpose.” *Id.*, ¶ 36. He describes that modern lenses, with “complex surfaces,” allow designers to “fine-tune resolution curves to have localized deviations from the typically described curves....” *Id.* According to Dr. Reiley, a POSA would recognize these “localized deviations” as being an “intentional creation” of the lens designer, and that such variations are “very unlikely” to be unintended by the lens designer. *Id.* Because the term is readily understood with reasonable certainty by one skilled in the art, there is no basis on which to find this claim portion indefinite.

2. Defendant’s Answering Position

Claims	ImmerVision’s Proposal	Apple’s Proposal
1	No construction necessary, plain and ordinary meaning applies	Indefinite

The “intentionally create” phrase is indefinite because it nonsensically requires an inanimate object—an optical apparatus—to act with a mental state. “One circumstance in which claims are indefinite is where the claims, as properly construed, are nonsensical.” *Horizon Pharma, Inc. v. Dr. Reddy’s Lab ’ys Inc.*, 839 Fed. App’x 500, 505 (Fed. Cir. 2021), citing *Trs. of Columbia Univ.*, 811 F.3d at 1366–67; *Koki Holdings, Ltd. v. Kyocera Senco Indus. Tools, Inc.*, No. 18-313-CFC, 2021 WL 1092579, at *1 (D. Del. Mar. 22, 2021) (“[a] claim that is nonsensical or requires an impossibility is indefinite as a matter of law”).

Claims that require an inanimate object to act with a particular mental state are nonsensical and thus indefinite. For instance, in *Horizon Pharma*, the court confronted a claim for a method of treating arthritis and other diseases. *Horizon Pharma, Inc. v. Dr. Reddy’s Lab ’ys Inc.*, No. 15-3324 (SRC), 2018 WL 6040265, at *1 (D.N.J. Nov. 19, 2018) (“*Horizon Order*”). The claim referred to “dose forms,” which it defined as formulations of medicines, such as a pill. *Id.* The claim then required that these “dose forms further target a mean [percentage] time at which the” acidity level, or pH, in the patient’s digestive system was above 4.0. *Id.* The *Horizon* district court construed “target” to mean “set as a goal.” *Id.* at *2. It then held that the claim was “incomprehensible” and thus indefinite: “[i]t is not possible to comprehend what these phrases mean, because pills cannot be said to set goals.” *Id.* at *4. The Federal Circuit affirmed, holding that the “clauses are incomprehensible” because “a dose form, which is an inanimate object, cannot set a goal.” *Horizon*, 839 Fed. App’x at 505.

Just like the indefinite claim in *Horizon*, Claim 1 of the ’120 Patent requires an inanimate object to act with a goal or intent. Claim 1 is an apparatus claim covering a “miniature wide-angle optical apparatus. (Reiley Dec. at Ex. B, the ’120 Pat. at 7:11.) The claim requires that either a

“wide-angle optical apparatus” or a “non-linear targeted resolution” “intentionally create” certain effects in an image:

1. A *miniature wide-angle optical apparatus* comprising:

...

a *non-linear targeted resolution to intentionally create a zone in an image* captured by the miniature wide-angle optical apparatus with a lower or higher object to image magnification . . .

(*Id.* at cl. 1 (emphasis added).)

“Intentional” means “done . . . on purpose” or “deliberate.” (Ex. 11, *Intentional*, Merriam-Webster’s Dictionary at APL-IMV_00048856; Ex. 12, *Intentional*, Collins English Dictionary (APL-IMV_00048844–APL-IMV_00048847).) ImmerVision’s expert, Dr. Reiley, confirmed that the ’120 Patent used the term consistent with its ordinary meaning, to mean “done on purpose or done with intent.” (Ex. 8, Reiley Tr. 80:6–13.) Claim 1 thus requires that either an “optical apparatus” or a “targeted resolution” create a zone in an image “on purpose” or “deliberately.”

This requirement is nonsensical and thus indefinite under *Horizon*. An optical apparatus is a series of inanimate “optical elements,” such as lenses and related components like sensors. (E.g., Reiley Dec. at Ex. B, ’120 Pat. at 3:41–54, 4:26–36; Ex. 2, Feinberg Dec. ¶ 21.) It makes no sense to talk about the optical apparatus—a thing of glass, plastic, and metal—acting “intentionally” or on purpose. It is similarly nonsensical to speak of a “non-linear targeted resolution” as acting intentionally. As the ’120 Patent explains, “non-linear targeted resolution” refers to a “lower or higher object to image magnification” in parts of an image. (Reiley Dec. at Ex. B, 7:19–23.) It is thus a property of the image generated by the claimed “optical apparatus.” (*Id.*) This property cannot act intentionally any more than a pebble’s color could be intentionally bright or a waterfall’s sound could be intentionally loud.

In its brief, ImmerVision argues that the “intentionally create[s]” phrase is definite because “targeted resolution” is “easily understandable as a function of distortion, a well-known optical concept.” (*Supra* at 54.) Even if this were true, it is irrelevant. The problem is not that a person of skill would not know what a “targeted resolution” is. It is that the claim nonsensically requires that that “resolution” (or the optical apparatus that creates it) act with a mental state, as if it were human.

The efforts of ImmerVision’s expert, Dr. Reiley, to address this issue only underscore its indefiniteness. As noted above, Dr. Reiley conceded that claim 1 required that a “targeted resolution” be created “on purpose or done with intent.” (Ex. 8, Reiley Tr. 80:6–13.) Dr. Reiley proposed that this requirement could be satisfied if the distortion created by a lens must not only “deviate[] meaningfully from [a benchmark]” but must do so “*for a useful purpose.*” (Reiley Dec. ¶ 36 (emphasis added).) But Dr. Reiley conceded that not all deviations would be considered “useful.” (Ex. 8, Reiley Tr. 42:22–25.) He also conceded that knowing whether a deviation was useful could “depend on the function or purpose the lens is being put to.” (*Id.* at 42:20–43:14.) Thus, even if Dr. Reiley’s position were accepted, whether claim 1 is infringed would depend on the “purpose” that some unspecified actor was putting the lens to. But infringement cannot turn on the mental state of a human being: “it simply cannot be that the question of infringement . . . turns on the mental state of the accused infringer.” *Horizon* Order at *5. Moreover, it is not even clear whose intent would matter—the person who designed the lens, for instance, the person who chose to include it in a particular product, or the person who used it to capture an image? Dr. Reiley’s opinions—even if accepted—cannot save claim 1.

Just as the inanimate “dose form” in *Horizon* could not “set[] a goal,” the inanimate optical apparatus in claim 1 of the ’120 Patent cannot act “intentionally.” Claim 1 is “nonsensical in the way a claim to extracting orange juice from apples would be, and [is] thus indefinite.” *Trs. of*

Columbia Univ., 811 F.3d at 1367; *Synchronoss Techs., Inc. v. Dropbox, Inc.*, 987 F.3d 1358, 1366–67 (Fed. Cir. 2021) (claim indefinite because it was “nonsensical and require[d] an impossibility”)

3. Plaintiff’s Reply Position

Apple argues this portion of claim 1 of the ’120 Patent is indefinite because it allegedly “nonsensically requires an inanimate object – an optical apparatus – to act with a mental state.” Not so – this portion of the claim simply requires the lens to have a non-linear targeted resolution of a nontrivial amount. The rest of the phrase simply describes what the non-linear targeted resolution is. This is the same concept as the non-linear distribution function of the ’990 Patent (but put to a new and different use, as specified elsewhere in the claim). To get around this simple explanation, Apple misapplies the cited case law and misinterprets the facts.

Apple’s argument stems from, but only selectively quotes, a case in the District of New Jersey that is readily distinguishable – *Horizon Pharma*, 2018 WL 6040265. There, the Court held the asserted claim indefinite because, when properly construed, it required pills (*i.e.*, inanimate objects) to “set goals.” The Court found this to be “nonsensical.” But a further explanation of this case, which is absent from Apple’s arguments, is necessary to understand that Court’s conclusion.

The claims in *Horizon Pharma* were for a *method* of treating certain conditions, including steps of giving certain “dose forms” (*i.e.*, pills) that “target” certain defined blood concentrations and pH levels. *Id.*, at *2. The Court’s conclusion was not merely that the claim was indefinite because inanimate pills cannot set goals. Rather, the crux of the Court’s decision was that *there was no other way to interpret the claims with reasonable certainty*. *Id.*, at *5. The *Horizon Pharma* court conducted a lengthy examination of how else the claims could be interpreted. It analyzed an interpretation based on the idea that as the performer of the claimed method, it was

the treating physician's actions in trying to "target" the defined parameters that mattered. But, the Court found that the real issue was the claims' use of an aspirational word – "target" – rather than a more objective and result-oriented word like "produce." This made the alternate interpretation indefinite, too, because infringement cannot turn on the mental state of an accused infringer (*i.e.*, what the physician hoped would occur). *Id.*, at *5.

The claim here is significantly different. It is an apparatus, unlike the method claims at issue in *Horizon Pharma*, *Synchronoss Techs.*, and *Trs. of Columbia Univ.*, all of which are cited in Apple's argument. Thus, it is not important to try to attribute a mental state to an accused infringer, but rather to analyze the apparatus itself in light of the claim. Unlike in *Horizon Pharma*, the language of the '120 Patent does not suffer from the problems of the word "target," which led to *both* possible interpretations being indecipherable. Rather than claim an optical apparatus that "targets" certain features, the '120 Patent affirmatively claims an optical apparatus having a non-linear targeted resolution that "create[s] a zone in an image ... with a lower or higher object to image magnification compared to linear targeted resolution...." An accused infringer need not speculate whether he or she is acting with a particular mental state or merely hope that the lens creates the required zone(s). Rather, one of skill in the art can analyze an optical apparatus and objectively determine whether it creates an image with a lower or higher object to image magnification compared to linear targeted resolution (*i.e.*, a non-linear targeted¹³ resolution).

Thus, unlike in *Horizon Pharma*, this portion of claim 1 of the '120 Patent does not require subjectivity and can easily be interpreted by one skilled in the art "with reasonable

¹³ Note that "targeted" in this claim differs from "target" in the *Horizon Pharma* claim. A "targeted resolution" is, as Dr. Reiley described in his opening Declaration, merely one in which the distribution function differs from linear by more than happenstance or manufacturing defect.

certainty.” *Nautilus*, 572 U.S. at 901. Dr. Reiley demonstrated just that. At paragraph 36 of his original Declaration, Dr. Reiley described a nonlinear targeted resolution function as one that an optical designer would recognize as having a useful purpose, rather than merely being an unintended artifact of the design process. While the use of “intentionally” may not be the perfect word choice, that does not make the claim indefinite. All that is required is that the claim can be understood. *See VR Optics, LLC v. Peloton Interactive, Inc.*, 345 F. Supp. 3d 394, 401 (S.D.N.Y. 2018) (“This may have been poor drafting, but that poor drafting does not provide clear and convincing evidence sufficient to render these claim terms indefinite.”); *Trover Grp., Inc. v. Dedicated Micros USA*, 2015 U.S. Dist. LEXIS 33876, at *28 (E.D. Tex. Mar. 19, 2015) (“Although all parties concur that claim 5 is poorly drafted, the claim is understandable despite its drafting flaws. The Court is persuaded that the claim would be reasonably clear to a person of ordinary skill in the art and therefore is not indefinite.”); *Eyetailk365, LLC v. Zmodo Tech. Corp.*, 2018 U.S. Dist. LEXIS 83096, at *14 (D. Nev. May 17, 2018) (“Although poorly worded, the term limits the claim with reasonable clarity...”).

Apple also contests Dr. Reiley’s use of the term “for a useful purpose” in distinguishing intentional and unintentional nonlinear distribution functions. Apple argues that this injects the same mental state ambiguities as “intentionally” allegedly does. But like with “intentionally,” a “useful purpose” is not a subjective intent, but merely a way to express that one skilled in the art will recognize when a nonlinear distribution function is useful¹⁴ or intentional from when it is

¹⁴ Apple also misses the mark when it argues that “knowing whether a deviation was useful could depend on the function or purpose the lens is being put to. Thus, even if Dr. Reiley’s position were accepted, whether claim 1 is infringed would depend on the purpose that some unspecified actor was putting the lens to.” The claim is not infringed based on whether the lens is ultimately used for that purpose. As claim 1 is an apparatus claim, a lens reads on the claim when its distribution function has some useful nonlinearity, regardless whether it is actually used for that purpose.

not useful or unintentional. And the patent even states what the useful purpose is – compensating for lower relative illumination or lower MTF. The term is not indefinite, but rather, is the common situation where the judgment of a skilled artisan will inform the factual disputes underlying the infringement analysis.

4. Defendant’s Surreply Position

This term is indefinite because it requires an inanimate “optical apparatus” to act “intentionally.” The Federal Circuit rejected this type of claim in *Horizon Pharma*, 839 Fed App’x at 505. ImmerVision’s reply cannot save it.

First, ImmerVision asks the Court to ignore the word “intentionally.” It proposes that claim 1 be read to “simply requir[e] the lens to have a non-linear targeted resolution of a nontrivial amount.” (*Supra* at 58.) It later omits the word “intentionally” when quoting the claim, saying that “[t]he ’120 Patent affirmatively claims an optical apparatus having a non-linear targeted resolution that ‘[intentionally] creates a zone in image . . . with’” the claimed properties. (*Id.* at 59–60.) But “claims are interpreted with an eye toward giving effect to all terms in the claim.” *Bicon, Inc. v. Straumann Co.*, 441 F.3d 945, 950 (Fed. Cir. 2006). The Federal Circuit rejects constructions that “read out [a] phrase” because doing so “impermissibly broaden[s] the claim.” *Enzo Biochem Inc. v. Applera Corp.*, 780 F.3d 1149, 1154 (Fed. Cir. 2015); *Rothschild Connected Device Innovations, LLC v. Coca-Cola Co.*, 813 F. App’x 557, 562 (Fed. Cir. 2020). Indeed, ImmerVision’s own expert confirmed that “intentionally” had meaning, requiring that something be “done on purpose or done with intent.” (Ex. 8, Reiley Tr. 80:10–13.)

Second, ImmerVision suggests that claim 1 is not indefinite because “it is an apparatus, unlike the method claims [found indefinite] in *Horizon Pharma*, *Synchronoss* . . . and *Tr[ustees] of Columbia*.” (*Supra* at 59.) Not true: four system claims were found indefinite in *Synchronoss*. See *Synchronoss Techs.*, 987 F.3d at 1361 n. 1, 1366–67. In any event, it is irrelevant whether a

claim recites a method or apparatus. Requiring an inanimate “optical apparatus” to act “intentionally” is nonsensical, whether in an apparatus or a method.

Further, ImmerVision’s method/apparatus argument is just another effort to delete the word “intentionally.” ImmerVision suggests that “one of skill in the art can analyze an optical apparatus and objectively determine whether it creates an image with a lower or higher object to image magnification.” (*Supra* at 59–60.) Maybe so. But Claim 1 requires not only that the optical apparatus create such an image, but that it do so *intentionally*. Determining the mental state of an “optical apparatus” is a nonsensical inquiry, not a question for one of skill in the art.

Third, it is no help to ImmerVision that “the crux of the [*Horizon*] Court’s decision was that there was no other way to interpret the claims with reasonable certainty” than to require an inanimate object act with a particular mental state. (*Id.* at 59 (emphasis omitted).) The same is true here. ImmerVision suggests reading claim 1 to require a “resolution function . . . that an optical designer would recognize as having a useful purpose, rather than merely being an unintended artifact of the design process.” (*Id.* at 60.) To begin, this reading improperly redrafts claim 1 to inject an “optical designer” in an effort to save the claim. But “courts may not redraft claims, whether to make them operable or to sustain their validity.” *Chef Am., Inc. v. Lamb-Weston, Inc.*, 358 F.3d 1371, 1374 (Fed. Cir. 2004). Even under ImmerVision’s proposal, whether the resolution is “unintended” or “useful” depends on what the “designer” intended. The district court in *Horizon* rejected a similar construction that was based on a physician’s “subjective intent to achieve the defined outcomes.” *Horizon* Order at *5. As the *Horizon* Court held, and as ImmerVision concedes, that interpretation is indefinite: “it simply cannot be that the question of infringement . . . turns on the mental state of the accused infringer.” *Id.* at *5; (*Supra* at 58).

Finally, ImmerVision misses the mark when it argues that claim 1 “can be understood.” (*Supra* at 58–59.) Claim 1 is indefinite precisely because it **can** be understood, and that understanding requires a nonsensical result: an optical apparatus acting intentionally.

F. the lower or higher object to image magnification being used to compensate, at least in part, for a lower image quality due to at least one of a drop of relative illumination or a drop of MTF in a zone of the image

1. Plaintiff’s Opening Position

ImmerVision’s Construction	Apple’s Construction
the non-linear resolution offsets differences in image quality over substantially the entire field of view, the differences in image quality caused by differences in relative illumination or MTF	indefinite

This phrase appears in claim 1 of the ’120 Patent, as follows:

1. A miniature wide-angle optical apparatus comprising:

...

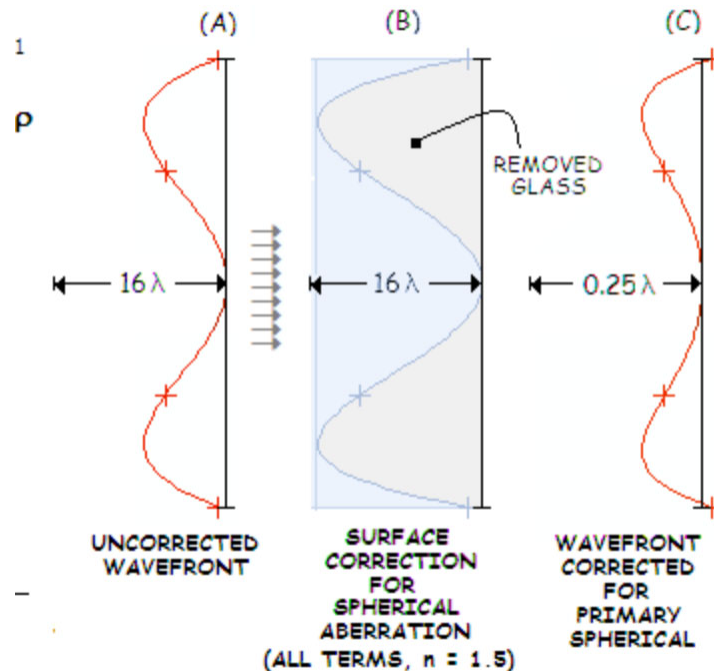
a non-linear targeted resolution to intentionally create a zone in an image captured by the miniature wide-angle optical apparatus with a lower or higher object to image magnification compared to linear targeted resolution, **the lower or higher object to image magnification being used to compensate, at least in part, for a lower image quality due to at least one of a drop of relative illumination or a drop of MTF in a zone of the image, ...**

Again, this is a claim phrase that ImmerVision proposes is readily understandable by a POSA, while Apple asserts the term is indefinite. In this instance, ImmerVision puts forward a construction to clarify the phrase for the Court and the jury.

Dr. Reiley explains how a POSA would interpret the term. He first notes that a “lower or higher object to image magnification” is clearly described in the ’120 Patent as a deviation from a “nominal resolution function,” as described in the prior section. Reiley Dec., ¶ 41. He further notes that the claim phrase itself defines “lower image quality” to mean “a drop of relative illumination or a drop of MTF.” *Id.*, ¶ 42. Relative illumination and MTF (modulation transfer

function) are common measures of image quality that are often used, and understood, by both POSAs and lens analysis software. *Id.*, ¶ 43.

Next, Dr. Reiley explains that “compensate” is equivalent in lens design to “correction.” *Id.*, ¶ 44. Correction of aberrations is “one of the essential elements of lens design, in which an excess of one form of image degradation is corrected by the addition of a *similar amount, but opposite sign*, of the same form of image degradation.” *Id.* (emphasis added). Dr. Reiley gives examples of several types of aberration correction, including a detailed explanation of a long-known technique for the correction of “spherical aberration.” *Id.*, ¶¶ 44-46.



In this example, column (A) shows a measure of distortion across the spectrum that results from the inability of spherical lenses to focus all light rays onto the same point. The amount of the aberration is shown by how far the plot deviates from the vertical axis. Column (B) shows the physical shape of the surface corrector lens (an added lens meant to compensate for the aberrations inherent in the spherical lens). As can be seen, its shape matches the shape of the aberrations in column (A) (*i.e.*, the curve has inflection points at the same points of the field

of view), although the amplitude may not exactly match ¹⁵Column (C) shows the waveform of the image projected after the surface corrector lens is added to the system. The amplitude or quantity of the aberration is significantly reduced – the scale of column (A), 16λ ,¹⁶ has been reduced by a factor of 64 to 0.25λ . Thus, a proportional amount of the same type of aberration (here, spherical aberration), was introduced in an opposing amount to compensate for the spherical aberration present in the original lens.

Dr. Reiley then explains that, with this type of background knowledge, a POSA in the lens design field would understand this portion of claim 1 of the '120 Patent to mean that the claimed lens applies this type of correction to a different set of optical properties – here, using the variations in image magnification to correct for undesirable amounts of relative illumination and/or MTF. Reiley Dec., ¶ 46. Thus, the term is not indefinite.

2. Defendant's Answering Position

Claims	ImmerVision's Proposal	Apple's Proposal
1	the non-linear resolution offsets differences in image quality over substantially the entire field of view, the differences in image quality caused by differences in relative illumination or MTF	Indefinite

The “compensate” limitation is indefinite for two reasons: (1) it nonsensically requires a physical impossibility and (2) it again requires an inanimate object—an optical apparatus—to act with a goal or intent.

¹⁵ This differs from claim 2 of the '120 Patent, which requires “a constant image quality across a whole field of view.” Where the defects caused by relative illumination or MTF variations are reduced, but not eliminated, by a curve of a matching shape but differing amplitude, that satisfies the “at least in part language,” but not the “constant image quality” language of claim 2

¹⁶ λ represents wavelength in optical sciences.

Read literally, the “compensate” limitation requires that *either* a lower or a higher object to image magnification be used to compensate for *either* a drop of relative illumination or a drop of modulation transfer function (“MTF”) (or both).¹⁷ As explained below, however, at least one of these scenarios is physically impossible: making an image larger in relation to its object cannot physically compensate for a drop of relative illumination; it can only make it worse. Additionally, like the “intentionally create” term, the language “being used to” is indefinite because it nonsensically requires an inanimate object (a lens) to “use” a lower or higher object to image magnification for a specific purpose (to compensate for a drop in relative illumination or MTF).

a) The “Compensate” Limitation Requires a Physical Impossibility

As an initial matter, claim 1 is indefinite because it requires a result that is not physically possible. “A claim that is nonsensical or requires an impossibility is indefinite as a matter of law.” *Koki Holdings*, 2021 WL 1092579 at *1. Here, it is physically impossible to “compensate” for a drop in relative illumination by increasing the magnification of the image vis-à-vis the object. In optics, relative illumination measures the ratio of the irradiance at a point in the image to that at the center of the image. (Ex. 2, Feinberg Dec. ¶ 31; Ex. 8, Reiley Tr. 52:19–53:8.) Irradiance is a measure of how much light energy falls on a particular unit area. (Ex. 2, Feinberg Dec. ¶ 31.) In layman’s terms, relative illumination indicates how bright a particular point on an image is compared to the center. (*Id.*) Images captured using traditional lenses, particularly those capturing wide fields of view, often have a maximum brightness in the center (corresponding to the center of the lens), which drops off going towards the edge. (*Id.* ¶ 32.) The ’120 Patent confirms this point, explaining that, “the overall shape [of a relative illumination curve] having a value around 100% at [the image center] and under 80% at the maximum field angle . . . is present in all families

¹⁷ The claim also includes using either a lower magnification or higher magnification to compensate for both a drop of relative illumination and a drop of MTF.

of miniature wide-angle lenses according to the present invention.” (Reiley Dec. at Ex. B, 5:59–65.)¹⁸

As ImmerVision’s expert agreed, “to compensate for a drop in relative illumination in part of an image, one would need to do something to increase the relative brightness or irradiance in that area.” (Ex. 8, Reiley Tr. 72:6–10.) **Decreasing** the relative brightness in an area, in contrast, will, as ImmerVision’s expert agreed, “exacerbate[e],” rather than compensate for, a drop in relative illumination. (*Id.* at 72:11–15; Ex. 2, Feinberg Dec. ¶ 33.) But claim 1 requires such a decrease to somehow compensate for a drop in relative illumination—an impossibility. As noted above, claim 1 requires, among other scenarios, that a “higher object to image magnification be[] used to compensate, at least in part, for a lower image quality due to at least one of a drop in relative illumination.” (Reiley Dec. at Ex. B.) According to the ’120 Patent, “a **lower** object to image magnification ratio . . . redirect[s] the same amount of light from an object to a smaller region in the image.” (*Id.* at 6:35–41 (emphasis added).) A “higher object to image magnification” does the reverse—it redirects the same amount of light from an object to a **larger** region in the image. Spreading the same amount of light over a larger region will make the brightness or irradiance of that portion of the image go down. (Ex. 2, Feinberg Dec. ¶ 33.) As both parties’ experts agree, this will make a drop in relative illumination worse, rather than “compensate” for it. (Ex. 8, Reiley Tr. 72:11–15; Ex. 2, Feinberg Dec. ¶ 33.) Thus, using a **higher** object to image magnification to compensate for a drop of relative illumination is physically impossible.

¹⁸ Although MTF is a separate parameter used to evaluate the performance of a lens than relative illumination, MTF is similarly highest at the center of an image and drops off towards the edge. (See Reiley Dec. at Ex. B, ’120 Pat. at 6:1–9.)

Nor does the specification of the '120 Patent provide a way to interpret claim 1 to avoid this nonsensical possibility. To the contrary: it makes clear that the '120 Patent *intended* to claim exactly the impossible scenario Apple describes. In particular, the specification asserts that “[i]n the zone where the resolution is higher, there are more pixels of the sensors used to image a given angle of the object space. “By having more imaging pixels in this zone, this compensates for the lower image quality in this zone either due to the lower relative illumination or the lower MTF.” (Reiley Dec. at Ex. B, '120 Pat. at 6:9–27.) The increase in pixels per area corresponds to the “higher object to image magnification” of claim 1. (*Compare id.* at 6:9–27 (describing higher pixels/degree) with *id.* at 6:35–41 (explaining lower pixels/degree corresponds to lower object to image magnification.)) Thus, the specification makes clear that claim 1’s reference to the physical impossibility of compensating for a drop in illumination by spreading the available light out more is exactly what the patentee intended to claim. Because claiming compensating for a drop in relative illumination in a portion of an image by decreasing the relative amount of light captured there “requires an impossibility,” claim 1 is indefinite. *Koki Holdings*, 2021 WL 1092579, at *1.

b) The “Being Used To” Language Improperly Requires a Lens to Act with a Goal or Intent

The “compensate” element of claim 1 also requires an inanimate object—a “wide-angle optical apparatus”—to act with a particular goal or intent. Claim 1 does not just require the optical apparatus to “create a zone in an image . . . with a lower or higher” magnification. Rather, it requires the apparatus to “use” that “lower or higher object to image magnification” to compensate for a drop in relative illumination or MTF. (Reiley Dec. at Ex. B, '120 Pat. at 7:19–8:2.) This requirement is nonsensical and is indefinite under *Horizon*. *Horizon*, 839 Fed. App’x at 505. Just as the inanimate “dose form” in *Horizon* could not “set[] a goal,” claim 1’s “wide-angle optical

apparatus” is not sentient and cannot “use” a change in magnification for a particular purpose—whether compensating for a drop in relative illumination or MTF, or for any other purpose.

Nor can claim 1 be saved by attributing the decision about how the magnification is “used” to some unspecified human actor. As set forth above, infringement cannot turn on the mental state of a human being: “it simply cannot be that the question of infringement . . . turns on the mental state of the accused infringer.” *Horizon* Order at *5. And as with the “intentionally create” term it is not even clear in whose eyes the “use” of the change in object to image magnification should be judged—the lens designer, the product user, or someone else entirely?

For the reasons described above, claim 1 fails to provide “reasonable certainty . . . about the scope of the invention.” *Nautilus*, 572 U.S. at 901. This claim is therefore indefinite.

3. Plaintiff’s Reply Position

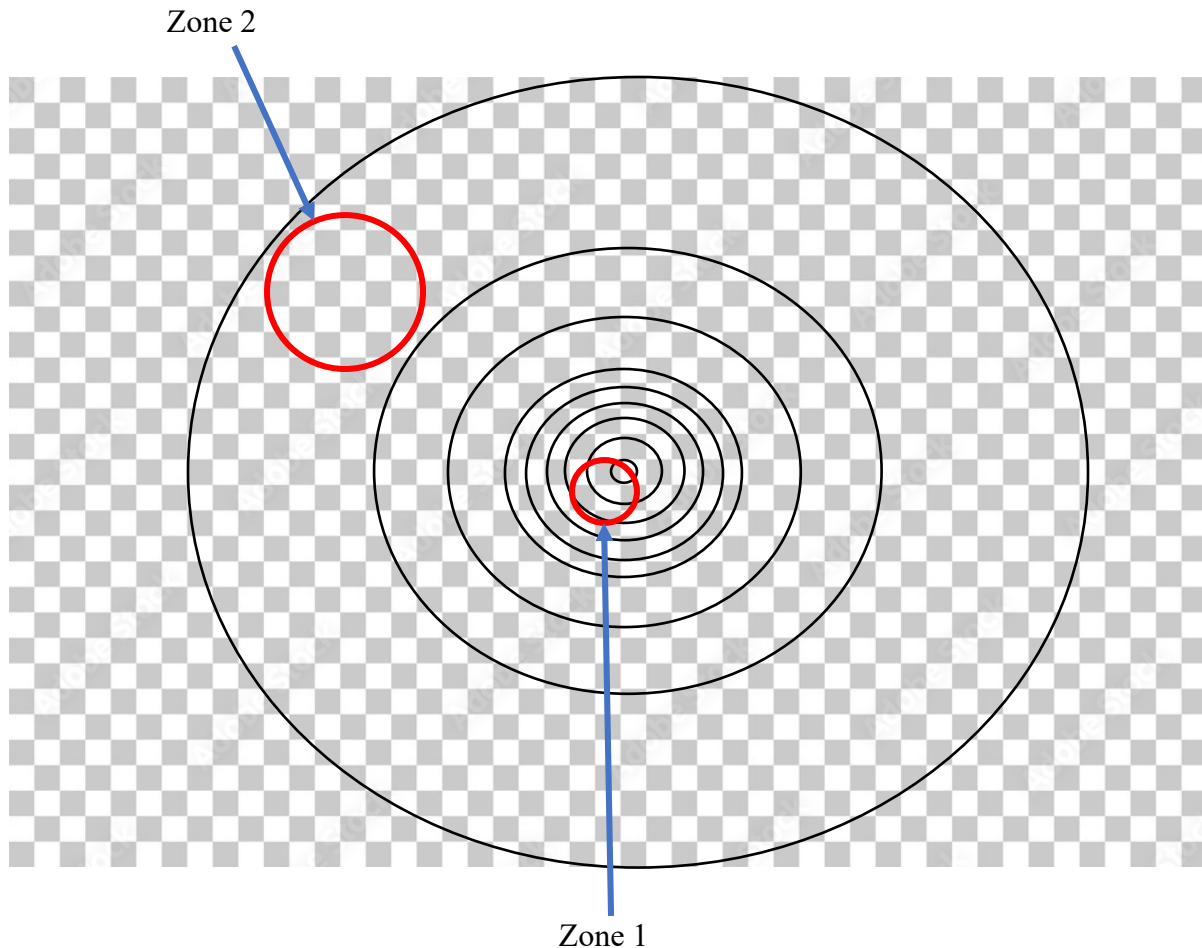
Once again, Apple misunderstands the claim. There is no requirement that “*either* a lower or a higher object to image magnification be used to compensate for *either* a drop of relative illumination or a drop of modulation transfer function (or both).” (emphasis Apple’s). As before, Apple is myopically parsing words without putting them into a technical context or understanding. Here, the prior portion of the claim shows that “lower or higher object to image magnification” means the non-linear targeted resolution *as a whole*, not a specific lower or higher magnification in a specific zone. This is because, as one skilled in the art will easily recognize, altering the resolution of a lens design is a zero-sum game – raising the resolution in one zone of the image necessarily requires lowering it in another zone because the number of pixels on an image sensor does not change. Thus, the meaning of the claim is clear: by raising (more pixels) and lowering (fewer pixels) the magnification of the image across the lens’s field of view in a controlled fashion, the lens can compensate for portions of the image that have decreased relative illumination or MTF.

This is confirmed by a proper understanding of antecedent basis in patent claims, which Apple ignored here. “To provide a proper antecedent basis, a claim must introduce a given term using an indefinite article (e.g., ‘a’ or ‘an’) before referring to it in definite form, using ‘the’ or ‘said.’” *Alcon Research, Ltd. v. Watson Labs., Inc.*, 2017 U.S. Dist. LEXIS 21400, at *20 (D. Del. Feb. 15, 2017) (internal quotation omitted). The entire claim limitation reads:

a non-linear targeted resolution to intentionally create **a zone in an image** captured by the miniature wide-angle optical apparatus **with a lower or higher object to image magnification** compared to linear targeted resolution, the lower or higher object to image magnification being used to compensate, at least in part, for a lower image quality due to at least one of **a drop of relative illumination or a drop of MTF in a zone of the image**,

The basic principles of antecedent basis dictate that while “the image” at the end of this phrase refers back to “an image” at the start of the phrase, the use of “**a zone**” of the image at the end of the phrase *does not* refer back to the same “a zone” used at the start of the phrase. Apple has thus fundamentally misunderstood the claim.

Read properly, the claim simply means that there is a non-linear distribution function, wherein the magnification is altered in one zone to allow for added resolution in *a* zone that suffers from a decrease in illumination or MTF, where the zone may be the same or different from the zone where the magnification is altered. An illustration follows representing pixels of an image on an image sensor:



As shown above, Zone 1 near the center of the image is compressed and has a low resolution, while Zone 1 near the edge of the image is expanded and has a high resolution. Here, the lower resolution of Zone 1 directly enables the higher resolution of Zone 2, and therefore, the decreased resolution of *Zone 1* compensates for any poor image quality that might be found in Zone 2.

a non-linear targeted resolution to intentionally create **a zone [Zone1]** in an image ... with a lower ... object to image magnification compared to linear targeted resolution, the lower ... object to image magnification being used to compensate ... for a lower image quality due to at least one of a drop of relative illumination or a drop of MTF in **a zone [Zone 2]** of the image

Likewise, Zone 2 could be considered “a zone” with higher resolution to compensate for poor image quality in Zone 2.

a non-linear targeted resolution to intentionally create **a zone [Zone2] in an image ... with a ... higher object to image magnification** compared to linear targeted resolution, the ... **higher object to image magnification** being used to compensate ... for a lower image quality due to at least one of **a drop of relative illumination or a drop of MTF in a zone [Zone 2] of the image**

Apple's other specific erroneous arguments are addressed below.

a) The Claim Does Not Cause a Physical Impossibility

Apple first argues that this claim phrase is a physical impossibility, apparently believing that a lens cannot compensate for a drop in relative illumination by increasing the magnification of the image. Apple suggests that “[d]ecreasing the relative brightness in an area ... will ... ‘exacerbate,’ rather than compensate for, a drop in relative illumination.” This ignores what is claimed.

The claim specifies that altering the magnification (*i.e.*, altering the resolution) can be used to *compensate for*, not eliminate, a lower illumination. As the '120 Patent explains (and as Apple even acknowledges), this is expressly the point – “By having more imaging pixels in this zone, this compensates for the lower image quality in this zone.” ('120 Patent, at 6:9-27). This can be true even though this spreads the light out and potentially decreases the irradiance on individual pixels. Distortion in a lens is just one of many factors that influences relative illumination. The '120 Patent recognizes another way: to enhance the resolution in certain regions of the image such that the benefit gained by adding pixels to that zone outweighs any further detriment to the relative illumination.

b) “Being Used To” Does Not Impart an Intent

Apple also claims this term is indefinite because the word “used” allegedly requires one “to act with a particular goal or intent.” But Apple cites no case construing “being used to” in this case, and ImmerVision likewise cannot find any. This is because the claim simply means the

lower or higher object to image magnification (i.e., the non-linear resolution) compensates for the lower image quality. It is also apparent that “being used to” imparts structure to the claim by designating the location of the magnification zone within the field of view of the lens – *i.e.*, positionally correlating the magnified zone with the drop in relative illumination or MTF. Like with the prior term, while this may not be the most articulate way to phrase the claim, it is still limited with reasonable clarity and thus not indefinite.

4. Defendant’s Surreply Position

In its reply, ImmerVision contradicts its own arguments in the briefs, and its positions before the PTAB. Its new arguments in reply improperly urge the court to strip this claim limitation of any meaningful scope and exacerbate the “intent” problem Apple identified.

First, ImmerVision’s argument that the zone of the “lower or higher magnification” need not be co-located with the zone it is compensating for (*see supra* at 70–73) contradicts its position, later in the same section of the reply, that the phrase “being used to” in the claim “designat[es] the location of the magnification zone within the field of view of the lens.” (*Id.* at 73–74.) It likewise contradicts ImmerVision’s position in response to Apple’s petition for *inter partes* review, where it argued this limitation “designat[es] the location of the magnification zone within the field of view of the lens – *e.g.*, positional correlation with respect to a drop in relative illumination or MTF.” (Ex. 14, 5/5/23 Pat. Owner Prelim. Resp., *Apple Inc. v. ImmerVision, Inc.*, No. IPR2023-00472 (P.T.A.B.) at 1.)

Further, ImmerVision’s suggestion that a zone with a higher or lower magnification could potentially “compensate” for a drop in image quality in *another* zone is unsupported by the intrinsic record. The specification exclusively describes the compensating occurring in the same zone. (Reiley Dec. at Ex. B, ’120 Pat. 6:19–24, 6:35–41.) If the zones need not be co-located, as ImmerVision contends, a person of skill would have no guidance from the specification

as to where the second “zone” is or how to draw its boundaries. *See Interval Licensing LLC v. AOL, Inc.*, 766 F.3d 1364, 1371 (Fed. Cir. 2014) (to be definite, a claim “must provide objective boundaries for those of skill in the art”). And if the zone can be some other undefined “zone” anywhere, a person of skill could not determine if a property of one zone (i.e., magnification) is “being used to compensate” for another property of another zone (MTF or relative illumination). Thus, ImmerVision’s position that the location of the magnification zone need not be tied to the location of the compensated zone not only fails to provide objective boundaries to the person of skill, it exacerbates the “intent” problem created by the phrase “being used to.” (*See supra* at 69–70.)

Second, ImmerVision’s argument that the term “compensate” does not require improving relative illumination or MTF contradicts its opening brief. There, ImmerVision asserted that “‘compensate’ is equivalent in lens design to ‘correction’” and that “image degradation is corrected by the addition of a similar amount, but opposite sign, of the same form of image degradation.” (*Supra* at 64–65, citing Reiley Dec. ¶ 44 (emphasis and quotations omitted).) In other words, ImmerVision argued that a drop in illumination or MTF would be “corrected” by something that changes it by “a similar amount, but [with] opposite sign”—i.e., an increase. (*Id.* (quotations omitted).) Now, ImmerVision says the opposite, arguing that a change in magnification can “compensate” for a drop in illumination even by dropping it further. (*Supra* at 73.) Yet, ImmerVision does not dispute that it is impossible to improve relative illumination in a portion of an image by increasing its magnification (*see id.*), and it provides no explanation of how one could compensate for a drop in illumination by lowering it even more.

The Court should reject ImmerVision’s shifting-sands approach to the construction of this term, and hold that it is indefinite for the reasons Apple described here and in its earlier brief.

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Respectfully submitted,

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