United States District Court,
N.D. Illinois, Eastern Division.

IP INNOVATION L.L.C, Technology Licensing Corporation, New Medium Technologies LLC, and AV Technologies LLC,
Plaintiffs.
v.
SONY ELECTRONICS,
INC. Defendant.

Aug. 18, 2005.

Raymond P. Niro, Arthur Anthony Gasey, Joseph Nevi Hosteny, Paul Christopher Gibbons, David J. Mahalek, Niro, Scavone, Haller & Niro, Ltd., Chicago, IL, for Plaintiffs.

Michelle Carniaux, Richard S. Gresalfi, Stuart J. Sinder, Thomas R. Makin, John Flock, Kenyon & Kenyon, New York, NY; Philip T. Petti, Rudy I. Kratz, Fitch, Even, Tabin & Flannery, Chicago, IL, for Defendant.

MEMORANDUM OPINION AND ORDER

KENNELLY**, J.**

IP Innovation, L.L.C., Technology Licensing Corporation, New Medium Technologies LLC, and AV Technologies LLC, (collectively, "IPI") have sued Sony Electronics, Inc. for infringement of six patents relating to video displays and signals. This case is before the Court for construction of the disputed claim language. Because of the large number of claim terms at issue, the Court initially will address only the disputed claim language found in the three patents-in-suit referred to as the '780 family. These include U.S. Patent Nos. 5,424,780, 6,529,637, and 6,870,964. Additionally, the Court is requesting that the parties supplement and clarify their positions with respect to a few of the disputed claim terms from these patents.

Facts

The '780 family of patents is directed to methods and apparatuses for improving or enhancing the apparent image resolution of a display by altering elements of the image through "scan modulation." IPI states that the benefit of the invention is its ability to process images in standard definition or NTSC television signals while taking advantage of the higher resolution display technologies that are currently being used in televisions and other consumer electronics devices. The result is a more pleasing appearance, i.e., a perceived increase in resolution.

IPI asserts claims 15 and 146 against Sony with respect to the '780 patent, entitled "Apparatus and Method for Spacial Scan Modulation of a Video Display," claims 1, 107, 145, and 159 with respect to the '637 patent, entitled "Spatial Scan Replication Circuit," and claims 4 and 10 of the '964 patent, entitled "Spatial Scan Replication Circuit." Both the '637 and '964 patents are based on an application which was filed as a

continuation-in-part of the application from which the '780 patent issued. In addition to the briefs submitted, the parties presented oral argument and submitted additional material on claim construction during a July 8, 2005 hearing.

Discussion

Claim construction of the patent-in-suit, which entails questions of law to be determined by the Court, *see* Markman v. Westview Instruments, Inc., 52 F.3d 967, 977-78 (Fed.Cir.1995), is the first step in any patent infringement case. *See* Mars, Inc. v. H.J. Heinz Co., 377 F.3d 1369, 1373 (Fed.Cir.2004). In Phillips v. AWH Corp., Nos. 03-1269, 03-1286, 2005 WL 1620331 (Fed.Cir. July 12, 2005), the Federal Circuit recently clarified the approach courts should use when analyzing claim language. The Court criticized the methodology adopted in Texas Digital Systems, Inc. v. Telegenix, Inc., 308 F.3d 1193 (Fed.Cir.2002)-a case to which district courts have routinely turned for guidance in the claim construction process-for its over-reliance on extrinsic sources, such as dictionaries, treatises, and encyclopedias, and the limited role it assigned to the specification. *See* Phillips, 415 F.3d 1303, 2005 WL 1620331, at *13. *Texas Digital* had essentially instructed courts to begin the analysis by consulting dictionaries or similar sources to determine the ordinary and customary meaning of a term, and, only as a secondary step, to examine the specification and prosecution history to ensure that the patentee had not supplied an alternative definition or disavowed the ordinary meaning of the term. *See id*. at *13-14. Noting that "heavy reliance on the dictionary divorced from the intrinsic evidence risks transforming the meaning of the claim term to the artisan into the meaning of the term in the abstract," the Federal Circuit directed federal courts instead to focus at the outset on how the patentee used the claim term in the claims, specification, and prosecution history. *Id*. at *14.

The claim term's ordinary and customary meaning, as understood by persons who were skilled in the relevant technology at the time the patent application was filed, continues to serve as the baseline interpretation of the proper scope of the claim. The inquiry into how a person of ordinary skill in the technology would understand a claim term involves analyzing the term in the context of the disputed claim itself, as well as in the context of the patent as a whole.

For instance, the way a term is used within the particular claim "provides a firm basis for construing the term." *Id*. at *6. Similarly, other claims of the patent in question, both asserted and unasserted, can be helpful in ascertaining the appropriate scope of claim language. *Id*. at ("Because claim terms are normally used consistently throughout the patent, the usage of a term in one claim can often illuminate the meaning of the same term in other claims."). The Federal Circuit took pains to emphasize that in addition to evaluating the claims of a patent in dispute, the specification is the "single best guide to the meaning of a disputed term." *Id*. (quoting Vitronics Corp. v. Conceptronic, Inc., 90 F.3d 1576, 1582 (Fed.Cir.1996)). If the specification indicates that the patentee defined the term in a manner that differs from its generally conceived meaning or disavowed the claim scope, the inventor's intention is dispositive. *Id*. at *8. In short, claims must be construed consistently with the specification.

Finally, courts should consider the patent's prosecution history, if it is in evidence, as it provides evidence of how the inventor and the Patent and Trademark Office understood the claims. However, because this negotiation process frequently contains more ambiguity than the specification, it is less useful for claim construction purposes. *Id*. at *9. But if the inventor unequivocally disavowed a particular meaning to obtain the patent or otherwise limited the scope of the invention during the course of the prosecution, "the doctrine of prosecution disclaimer attaches and narrows the ordinary meaning of the claim congruent with the scope of the surrender." Omega Eng'g, Inc. v. Raytek Corp., 334 F.3d 1314, 1324 (Fed.Cir.2003).

Though the Federal Circuit emphasized the primary role intrinsic evidence should play in discerning the proper scope of claims, it did not preclude the use of extrinsic evidence altogether. Judges remain free to consult dictionaries or comparable sources to assist in understanding the meaning of words and to gain a better understanding of the underlying technology. Phillips, 2005 WL 16203331, at *15. Thus, dictionaries, and particularly technical treatises, may continue to inform claim construction, so long as courts do not adopt a definition that contradicts the intrinsic evidence. *Id*. at *15.

Likewise, the Federal Circuit acknowledged that expert testimony can be useful for providing background on the relevant technology and to shed light on what a person skilled in the pertinent field would understand a particular term to mean. *Id*. at *10. The court warned, however, that judges should be particularly weary of expert testimony that consists of conclusory statements or is offered in a form that is not subject to cross-examination. *Id*. at *10-11. Moreover, as with other types of extrinsic evidence, courts should discount expert testimony that is clearly at odds with the intrinsic record. *Id*. at *10.

In sum, though there exists no "magic formula or catechism for conducting claim construction," and the sequence of steps used by the judge is unimportant, *id*. at 16, the focus should remain centered around construing the claims within the context of the patent itself. The disputed claims of each patent-in-dispute will be discussed in turn.

1. '780 patent

a. Claim 15

The parties dispute several terms found in claim 15, which in its entirety discloses:

A method of improving the quality of an image which may be displayed on an image display device, the image made up of a number of image elements, including the step of selecting a plurality of pixels of said image, the step of comparing a first of said selected pixels to at least a second of said selected pixels to select voids of said image to be altered and including the further step of altering voids in said image in response to said comparing step thereby improving the apparent resolution of the image without requiring an increase in the number of image elements originally making up the image.

i. Pixel

The term "pixel" is used throughout the '780 family of patents, including contested claims 15, 110, and 146 of the '780 patent, claims 1 and 107 of the '637 patent, and claims 4 and 10 of the '964 patent. Claim 15 serves as an example of how the term "pixel" is used within the patents. Both parties agree that the term should be construed consistently throughout the three patents-in-suit, and thus the meaning the Court adopts with respect to the '780 patent will apply to the '637 and '964 patents as well.

IPI contends that the term "pixel" is an acronym for "picture element" and is defined as the smallest complete element of an image. According to IPI, pixels can be formed of sub pixels, which themselves are not considered complete pixels as defined above. Sony argues that IPI's proffered definition is incomplete, as it does not take into account that the meaning of pixel is dependent on whether it is being used in the context of an electronically coded image or in an electronic display device. Instead, Sony asserts that the better definition is the following one set forth in the McGraw-Hill technical dictionary: "the smallest part of an electronically coded picture image" or "the smallest addressable element in an electronic display; a short

form for picture element...." FN1 McGraw-Hill Dictionary of Scientific and Technical Terms 1436 (4th ed.1989).

FN1. Sony first defines pixel to mean "the smallest part of an electronically coded picture image, *and* the smallest addressable element in an electronic display." Def's Brief at 4 (emphasis added). It later inserts an "or" in place of the "and." Because the Court has not adopted Sony's definition, it is unnecessary to address the discrepancy.

When defining terms, courts are directed to give words their broadest reasonable construction that is consistent with the use of the term in the patent. *See* In re Am. Acad. of Sci. Tech Ctr., 367 F.3d 1359, 1364 (Fed.Cir.2004). In this instance, as defendant avers, the definition of pixel is highly context dependent. *See* Def's Brief at 4. IPI's definition more fully encompasses the range of meanings for pixel, as it is not obvious from the patent that the term is used only in the context of an electronically coded image or an electronic display device.

Most importantly, IPI"s interpretation comports with the use of "pixel" in the context of the patent. Claim 16 references "a portion of a pixel." This usage is consistent with the idea that a pixel may be formed by sub-pixels, which themselves do not constitute complete elements. The Court therefore adopts IPI's interpretation of "pixel" as the smallest complete element of an image; synonymous with image element.

ii. Image Element

The parties next dispute the meaning of "image element," as used in claims 15, 110, and 146 of the '780 patent, claims 1 and 107 of the '637 patent, and claims 4 and 10 of the '964 patent. Though the parties' interpretations vary, they concur that the Court should adopt a uniform meaning for the term.

IPI defines "image element" as encompassing complete pixels, as well as sub pixels and other elements of images that are not pixel-related. It submits that although pixel is synonymous with image element, the reverse is not true, as an image element may refer to a sub-pixel or something altogether unrelated to a pixel. Sony, in contrast, urges the Court to adopt identical meanings for the terms pixel and image element, namely, the smallest part of an electronically coded picture image or the smallest addressable element in an electronic display.

The Court believes IPI's definition more closely aligns with how a person of ordinary skill in the technology would understand the term "image element." Admittedly, in the context of the disputed claims, it is somewhat unclear whether the terms "pixel" and "image element" carry differing meanings. As Sony observes, the patentee appears to frequently use the two terms interchangeably. For example, Sony highlights two descriptions of figure seven in the '780 patent's specification. One describes the figure as depicting "a group of nine neighboring image elements." U.S. Patent No. 5,424,780, col. 3, lines 18-20. Another refers to the same figure as showing "a group of 9 pixels which are located on 3 scan lines of a raster." Id. at col. 7, lines 26-27. This example, however, is not necessarily inconsistent with IPI's construction. As IPI suggests, all pixels may be image elements, but not all image elements are necessarily pixels. Thus the fact that the patentee uses both terms to describe the items in the figure does not run counter to IPI's position. Sony also argues that the patent directly equates the two terms when it describes "spatial resolution" as "the number of elements or pixels [that] make up an image." But again, this excerpt does not conclusively support Sony's position.

Moreover, the use of "image element" in unasserted claims clearly supports IPI's interpretation. In the '637 patent, claim 127 repeatedly refers to the term "image elements." Claim 140 of that same patent discloses "The method of claim 127 wherein the image elements are pixels." As a dependent claim, claim 140 must be narrower in scope than claim 127. If the patent used image element and pixel interchangeably, it would violate the doctrine of claim differentiation by rendering claim 140 wholly superfluous. Furthermore, the patentee is entitled to a presumption that there is a difference in meaning and scope when different words are used in separate claims. *See* Tandon Corp. v. United States Int'l Trade Comm'n, 831 F.2d 1017, 1023 (Fed.Cir.1987); *see also* Power Mosfet Techs., L.L.C. v. Siemens AG, 378 F.3d 1396, 1410 (Fed.Cir.2004). In particular, where "the absence of such difference in meaning and scope would make a claim superfluous, the doctrine of claim differentiation states the presumption that the difference between claims is significant." Tandon Corp., 831 F.2d at 1023. Finally, the Court notes that IPI's interpretation is in accord with the only dictionary definition submitted by the parties.FN2 The Court therefore accepts IPI's definition of "image element" as encompassing complete pixels, as well as sub pixels, and other elements of images that are not pixel related.

FN2. Tech-Notes Glossary of Broadcast Terms' definition of "pixel" includes the following excerpts differentiating the terms pixel and image element:
Many unskilled people, and sometimes skilled people, incorrectly use pixel and image element interchangeably, or use pixel to refer to sub-parts. Unskilled people don't know any better and the skilled people know better but because the meaning is clear from the context do so anyway. Many dictionaries also get it wrong.

Image elements is a broader term than pixels and is also highly context sensitive. Image elements includes both complete pixels as well as those various sub-parts of pixels and other elements of images which are not pixel related such as DCI coefficients. For example, it is correct to say that the red part of an RGB pixel is an image element but it is not normally considered correct to refer to the red part as a pixel itself (although persons who are not skilled in the television industry often do).

When someone says a pixel is the smallest part of an image, that statement is incorrect if the image is made up of pixels having sub-parts, but is correct if the pixel is the smallest element.... Consequently one can say something like pixels and image elements are essentially the same when talking about technology when the pixel is the smallest part but can disagree that they are the same when talking about technology when the pixels is made up of sub-parts. This tends to confuse the hell out of unskilled people who can't pick up on the intended meaning from the context of the usage.

Tech-Notes Glossary of Broadcast Terms, at http://www.tech-notes.tv. No argument has been made that it is improper to consider this online dictionary definition, however the Court notes that even if it were to disregard this definition, the same outcome would be reached.

iii. Void(s)

The terms "void" or "voids" is used in disputed claims 15 and 146 of the '780 patent and claims 1, 107, and

145 of the '637 patent. IPI proposes that, as with the previously discussed terms, a uniform definition of voids should be adopted throughout the '780 family of patents. Sony, however, argues that with respect to this term, the patentee used one meaning of the term in the '780 patent but explicitly redefined the term in the continuation-in-part '637 patent. The Court considers the term within the context of each patent.

For purposes of both the '780 and '637 patents, IPI defines voids as spaces around or in the image where a change of illumination may be made to cause an improvement of the perceived quality of the image (e.g., blank areas of the image near a detailed area of the image). Importantly, IPI adds that these spaces may or may not include an unused image element.

Sony contends that a void in an image, as used in the '780 patent, means a physical point in a displayed image-that is not addressed by image elements on the incoming-signal at any time. Thus, according to Sony, the voids disclosed in the '780 patent reflect an empty space, opening, gap, or the quality without being something in the video information in the signal carrying the image. Sony submits that the patentee redefined the term in the '637 patent, as any location in an image including defects, unwanted elements, improper elements, corrupted elements, valid but replaceable elements, locations with no image information, and other locations or elements which may be in question or in need for improvement.

The term "voids" was not expressly defined in the '780 patent, and thus we must ascertain its meaning from the context of the patent. IPI emphasizes that language used in surrounding claims indicates that "voids" must include locations containing existing image elements. It points out that claim 110, which was added during reexamination of the '780 patent, discloses "the method of claim 15 characterized in that the void can include at least in part a portion of a space occupied by another image element." IPI argues that this claim makes it clear that a void can include a space occupied by another element. It also draws the Court's attention to the specification's discussion of how a video fill signal can generate a new pixel or pixels, which may be "used for "filling, substitution or replacement [and] may be comprised of all or a portion of a pixel." U.S. Patent No. 5,424,780, col. 5, lines 48-50. IPI reasons that if a fill signal includes substitution or replacement of old pixels with newly generated pixels, then a void, by definition, must include the possibility that a pixel exists within the space designated as a void.

Other claim language supports Sony's interpretation. The Court counted five claims that refer to a "void between image elements." *See* claims 3, 11, 12, 96 and 147. Moreover, the claims and specification contain numerous references to "blank areas," a phrase that the patentee appears to use interchangeably with "voids." For instance, claim 135 discloses a "means for changing the shape of at least one element [that] can include generating fill image elements in blank areas of the display." Use of the term blank tends to suggest that the patentee had the ordinary meaning of "void" in mind when drafting the patent. In sum, the claims and specification do not conclusively support one interpretation over the other.

The prosecution history, however, sheds more light on the intended meaning of the term. During prosecution of the '780 patent, the inventor, James Cooper, responded to an examiner's objection of a claim based on obviousness by stating:

Applicant has reviewed and considered the examiner's remarks given in his 35 U.S.C. s. 103 rejection over Cooper '070. Applicant believes however that the examiner is incorrect in his assertion that a defective pixel such as corrected by the '070 invention is the same as, and would include, voids in the image as in the present disclosure and claims. The '070 patent generally shows replacing a given pixel with an average of pixels based on the similarity or ranking of pixels. The similarity or ranking of pixels is not related to the

absence of elements as the examiner suggests. It might be noted that Webster defines the noun void as empty space, opening, gap, the quality of being without something, etc. Such definition would preclude the filling of voids from being obvious in view of the averaging of similar elements for removal of noise which is disclosed in the '070 patent.

See S/N 355,461 O.A. response 6/18/92 at 17. The Court reads Cooper's remarks, and in fact believes that this is only sound interpretation of his comments, as an unambiguous limit on the scope of "voids."

Moreover, during prosecution of the '780 patent on reexamination, Cooper made amendments to certain claims on March 16, 2001. In this document, he amended then claim 138, which read "the apparatus of claim 1 characterized in that the void can include at least in part a portion of a space occupied by another element" to read "the apparatus of claim 1 characterized in that the void can be filled in part with portions of two image elements." See G15/7422R1F at 9. When Cooper, later in the same document, discussed his interview with the examiner, he noted that

[i]n respect to the "portion of a space occupied by another image element" in claim 138, the undersigned pointed out how the voids may be filled by all or a portion of a pixel (fig. 5A; col 4 Ins 51-52; col 5 In 50; col 10 Ins 26-31; col 12 Ins 23-34). This use could utilize a combination of a plurality of pixels for the fill element, thus utilizing a portion of two (or more) elements to fill a given void. The examiner indicated he would again reconsider this rejection with the wording as currently constituted.

Id. at 17. Though the Court was not provided with subsequent excerpts of the prosecution so as to determine later changes made to the above mentioned claim 138, the inventor's remarks are illustrative. Following this reasoning, current claim 110, which reads "The method of claim 15 characterized in that the void can include at least in part a portion of a space occupied by another image element," most likely refers to the newly generated elements rather than image elements already existing in the space.

Because the prosecution history of the '780 patent limits the interpretation of "voids" in a manner that unequivocally excludes IPI's interpretation, *see* Omega, 334 F.3d at 1324, the Court adopts for that patent Sony's proposed definition of "void" as a physical point in a displayed image that is not addressed by image elements on the incoming signal at any time.

The parties do not truly dispute the meaning of "void" in the '637 patent, aside from their preferred phraseology. Both agree that in the context of the disputed claims in that patent, a "void" may include a space occupied by an image element. Indeed, as Sony highlights, the specification contains the following discussion defining the scope of "void:"

It will be also understood that although the word void is used in this specification, the invention is directed towards replicating new image information utilizing neighboring image elements, which new image information is utilized at a certain location(s). These locations might or might not have previously had image information available therefor. The void may exist at the point of image creation, before/after storage and/or at the point of presentation. Examples of voids would include such things as defects, unwanted elements, improper elements, corrupted elements, valid but replacable elements, locations with no image information, and/or other locations or elements which may be in question or need for improvement. The term void is used to cover all these and similar situations for uniformity.

U.S. Patent No. 6,529,637, col. 3, lines 33-47. This excerpt clearly demonstrates that the patentee used the

term in the '637 patent in a manner outside the bounds of its ordinary meaning. Where the specification contains a definition for a term that differs from the meaning the word would otherwise possess, the patentee's lexicography governs. Phillips, 415 F.3d 1303, 2005 WL 1620331, at *8.

Courts presume that a claim term carries the same meaning throughout a particular patent and related patents, including a continuation-in-part. *See* Omega Eng'g, Inc. v. Raytek Corp., 334 F.3d 1314, 1334 (Fed.Cir.2003). But this presumption may be overcome by evidence that the patentee clearly assigned different meanings to a term that appears in two related patents. In this case the presumption has been overcome.

Thus, with respect to the use of void in the '637 patent, the term is defined as any location, existing at the point of image creation, before or after storage, or at the point of presentation, in or around an image where a change of illumination may be made to cause an improvement of the perceived quality of the image. Such voids may include, but are not limited to, defects, unwanted elements, improper elements, corrupted elements, valid but replaceable elements, locations with no image information, and other locations or elements which may be in question or need for improvement.

iv. Comparing a first of said selected pixels to at least a second of said selected pixels to select voids

IPI contends that the limitation "comparing a first of said selected pixels to at least a second of said selected pixels to select voids" means taking the selected pixels of an image, and within the group of them, comparing a pixel of the original image to at least a second of the selected pixels to select voids to be altered. According to IPI, the language does not limit this process to a particular number of voids or a particular arrangement of voids. Sony proposes the following meaning: to choose only particular voids for altering, from amongst possible voids in the image which may be displayed, based on a comparison between one of the pixels chosen in the selecting step and one or more other pixels chosen in that step. The Court is at a loss as to what the parties are disputing with respect to this limitation. Both appear to agree that at least two pixels that are chosen during the selection step are compared to identify voids and that the invention provides for detecting voids rather than merely filling them, unlike certain prior art that coincidentally fills voids. If the Court has missed some point of disagreement, the parties should feel free to enlighten us at the next scheduled hearing.

v. Altering voids

Claim 15 also discloses a step that includes "altering voids in said image in response to said comparing step thereby improving the apparent resolution of the image...." Again, no dispute appears to exist. IPI defines "altering" as meaning a thing different in some respect, to change its characteristics, position, etc., or to modify. *See* The New Shorter Oxford English Dictionary on Historical Principles 60 (1993). This definition is consistent with the term's use in this claim, as well as other claims throughout the '780 patent that disclose various ways in which an image can be improved, including changing the size, position, or shape of image elements to fill a void or altering the signal illumination. Moreover, Sony disputes IPI's proffered definition only to the extent that the parties disagree on the appropriate scope of the term "void." Thus, the Court adopts the following interpretation of "altering voids": to make a void different in some respect, to change its characteristics, position, etc., or to modify the void (as the Court has previously defined the term "void").

vi. Improving the apparent resolution of the image

The parties dispute the meaning of the following limitation found in both claims 15 and 146: "thereby

improving the apparent resolution of the image without requiring an increase in the number of image elements originally making up the image." IPI's proposed construction for the phrase is: improving the original image to make it appear to have a higher resolution when displayed, without actually increasing the number of image elements originally making up the image, i.e., without increasing the number of elements in the image which is to be operated on by the claimed invention. In other words, under IPI's reasoning, the language "originally making up the image" refers to the signal that is originally input into the processing circuitry device. It argues that the invention has the ability to take an image from an input signal in a lower resolution and process that image in a manner that improves the resolution. Though no image elements are added to the image carried by the input signal, it maintains that the invention teaches that new image elements may be generated during processing of the signal in the device. Thus, the invention may include, but does not require, interpolation (i.e., inserting additional elements). IPI points out that adding new elements or replacing existing elements in an image that is subsequently displayed is a stated embodiment of the invention.

In contrast, Sony asserts that the limitation means to make the image which may be displayed appear as if it has more elements than it actually has, without adding further elements to that image, through interpolation or otherwise. Thus, it asserts that IPI is incorrect to the extent that it suggests that there can be an increase in the number of pixels of the image conveyed on the signal any time up until the image is displayed. The patent defines "spatial resolution" as "the number of elements or pixels which are used to make up an image." U.S. Patent No. 5,424,780, col. 1, lines 22-24. Thus, Sony argues that "improving the apparent resolution" of the image means to make the image appear to have more image elements than it actually does, without increasing the actual resolution by adding elements to the image carried by the signal.

Sony likewise attempts to gather support from the prosecution history. In one of several relevant excerpts cited, Sony claims that Cooper was silent in response to, and therefore acquiesced in, the examiner's comments concerning how the King '478 patent did not anticipate or render obvious claims 1 through 25:

First, King does not improve the apparent resolution of the image without requiring an increase in the number of image elements originally making up the image as required by claims 1-25. Instead, King performs interpolation which generates new pixels. Therefore, there is an increase in the number of image elements originally making up the image.

Secondly, King does not alter the size or shape of [the] central element in order to provide information for the blank or void areas as required by claims 26-41. Interpolation generates new pixels in blank or void areas. Interpolation does not change the size or shape of one or more pixels in order to provide information for a blank area. In the King reference the size of the matrix (containing pixel elements) has increased from a 7x5 to a 13x9. However, there is no direct relationship between the size of the matrix and the size or the shape of an individual pixel element.

Examiner's response to 11/29/99 communications during reexamination of the '780 patent at 16-17.

Sony likewise suggests that Cooper disclaimed de-interlacing techniques during prosecution when he distinguished the Birch '045 patent as follows:

As previously explained, Birch is not directed towards altering "voids" of the image; Birch merely substitutes one piece of modified information present at one time for another present at another time. In addition, the resolution of Birch remains unchanged over any scan conversion type device (i.e., in both the

maximum of 480 lines of data will be perceived). At most it is believed that it could be said that Birch replaces the data with interpolated values for alternatives which it believes is more logical than the true value Y). Birch does not have or teach of filling any voids.

3/4/94 Amendment, R3/7422A at 9-10.

Finally, Sony invites the Court to consider a rebuttal report that Cooper submitted during the Dell litigation, which discusses the role-or lack thereof-of interpolation in the '780 and '637 patents. Though it is permissible for a Court to consider inventor testimony as one type of extrinsic evidence, *see* Phillips, 415 F.3d 1303, 2005 WL 1620331, at * 10, it has only minimal probative value. *See, e.g.,* E-Pass Technologies, Inc. v. 3Com Corp., 343 F.3d 1364, 1370 n. 5 (Fed.Cir.2003). The Court has reviewed the report but does not find it to tip the balance in favor of Sony's proffered construction.

Both parties make persuasive arguments in support of their respective positions. The Court agrees with Sony that the ordinary meaning of the term "apparent" suggests that the resolution is not actually improved, but only appears to be improved. Sony's interpretation, however, is directly at odds with language in the specification that clearly indicates that one method for filling voids is to generate new pixels. Bearing in mind the principles set forth in *Phillips,* the Court adopts IPI's interpretation, as it is truer to the claim language when read in light of the specification. Stating that the apparent resolution is improved "without requiring" more image elements does not preclude adding image elements as one way to increase apparent resolution, so long as other methods may also be used.

For example, the '780 patent states that "[i]t is yet still another object of this invention to provide a means and method to improve the quality of an image by inspecting a plurality of neighboring elements to selectively generate new fill elements in response thereto." U.S. Patent No. 5,424,780, col. 2, lines 41-45. Similarly, the specification later reveals that "[t]he video fill signal may be utilized to generate additional pixels in the video signal in response to 9, thus providing pixels to fill in the blank areas of the image." Id. at col. 5, lines 33-35.

Thus, the specification unambiguously provides that generating new pixels is one way in which the invention can fill voids in the image. In addition, the Court disagrees with Sony's contention that the inventor unequivocally disclaimed or limited the invention during prosecution in a manner that would exclude IPI's interpretation. In sum, the proper construction of "improving the apparent resolution" should be read as improving the original image to make it appear to have a higher resolution when displayed, without increasing the number of elements in the image carried on the signal originally input into the processing circuitry device.

b. Claim 146

Claim 146 of the '780 patent discloses the following:

Apparatus for improving the image quality of a displayed image, the image made up of a number of image elements carried by a signal,

the apparatus including in combination,

a neighboring pixel means responsive to the signal carrying said displayed image to provide a plurality of

image elements including a central pixel and a plurality of neighboring pixels and a fill calculator means responsive to said central and neighboring pixels to generate a fill signal indicating voids in said displayed image which may be filled which filling can include movement of image elements,

which said displayed image is displayed by a display device thereby improving the apparent resolution of the image without requiring an increase in the number of image elements originally making up the image.

Two disputed limitations within claim 146 and several disputed limitations within the '637 patent involve means-plus-function limitations governed by 35 U.S.C. s. 112, para. 6. In each such instance, the Court has determined whether or not the language indeed falls within the ambit of s. 112, para. 6, and where it does, has construed the recited function. The Court, however, postpones identifying corresponding structure for the recited function until the parties have had an opportunity to orally supplement the relatively scant discussions in their briefs on that point. Due to page constraints, along with some less than comprehensive arguments made by IPI, the Court does not feel that it has a good enough handle on each side's position with respect to the issue of corresponding structure, and more particularly, with respect to the rather complicated underlying technology, to be able to address the issue without further assistance from the parties. The Court requests that each party be prepared to identify the structure they claim corresponds to the Court's construction of the elements' functions and to provide the Court with supporting evidence or case law where appropriate. Specifically, the parties should address that issue regarding the following limitations: fill calculator means and neighboring pixel means, found in claim 146 of the '780 patent; and neighboring element means, inspection means, and replication means, found in claim 1 of the '637 patent.

i. Central pixel

IPI defines "central pixel" as a pixel with existing value located at a central spatial and/or temporal position relative to the group of neighboring pixels. As Sony does not dispute this construction, the Court adopts IPI's definition.

ii. Displayed image

According to IPI, this term should be construed as an image to be presented by a display device. Again, Sony offers no competing definition, and thus the Court accepts IPI's reading.

iii. Fill calculator means

The Court must first determine whether the phrase "fill calculator" is a means-plus-function limitation that invokes 35 U.S.C. s. 112, para. 6. Section 112, paragraph 6 provides that:

An element in a claim for a combination may be expressed as a means or step for performing a specified function without the recital of structure, material, or acts in support thereof, and such claim shall be construed to cover the corresponding structure, material, or acts described in the specification and equivalents thereof.

Id. This provision allows applicants to claim an element of a combination functionally, that is, without reciting structures that perform the stated functions. *See* Apex Inc. v. Raritan Computer, Inc., 325 F.3d 1364, 1371 (Fed.Cir.2003). If the Court were to conclude that the claim language were in means-plus-function form, we would construe "fill calculator means" as covering only the type of fill calculator described in the specification, as well as any equivalent structures. Conversely, if the Court determines that the phrase does

not constitute a means-plus-function limitation, the scope of the term would not be limited to corresponding structures disclosed in the specification and their equivalents. *See* Phillips, 415 F.3d 1303, 2005 WL 1620331, at *3.

The Federal Circuit has consistently held that there exists a rebuttable presumption that s. 112, para. 6 applies if the limitation in question contains the word "means." Apex, 325 F.3d at 1371. Thus, we presume that "fill calculator means" is subject to s. 112, para. 6. The party challenging the application of the statute, IPI, may rebut the presumption by demonstrating that the claim term does not recite a corresponding function or that the claim term recites sufficient structure or material for performing the function. Id. at 1372. If IPI can, by a preponderance of the evidence, show that either of these scenarios is true, s. 112, para. 6 is inapplicable. *Id*.

IPI asserts that the means-plus-function presumption is overcome because "fill calculator" is recognized by a person of ordinary skill in the relevant technology as reciting sufficient structure. According to IPI, the term "calculator" is a machine or programmed electronic device for carrying out calculations, thus, a "fill calculator" is a machine or device that carries out calculations to generate a fill signal. In support of its position, IPI emphasizes that the preferred embodiments of the "fill calculator" are described in the specification as "pixel fill calculator means 9" and "pixel fill calculator means 26."

To demonstrate that a claim term recites sufficient structure, and thereby rebut the presumption, IPI must provide evidence that "fill calculator" has a reasonably well understood meaning in the field. IPI has failed to do so. The fill calculator means limitation found in claim 146 is a purely functional placeholder. *See* Phillips, 415 F.3d 1303, 2005 WL 1620331, at *3. The claim itself does not provide a structure that performs the stated function of being "responsive to said central and neighboring pixels to generate a fill signal indicating voids in said displayed image which may be filled." And IPI provides only conclusory statements rather than persuasive evidence to support its stance that the term "fill calculator" would evoke a structure that has a reasonably well understood meaning to a person of ordinary skill in the field. Though the term need not connote a precise physical structure, IPI has offered no evidence that the term is sufficiently definite to convey *any* class of structures. *See* Nilssen v. Magnetek, Inc., No. 98 C 2229, 1999 WL 982966, at (N.D.Ill. Oct.26, 1999).

Moreover, IPI's position is belied by statements Cooper made during prosecution of the '780 patent. In the discussion of a similar claim involving the term "fill calculator means," Cooper stated: "According to 35 USC 112, one must view a means plus function language in a claim in accord with the specification and interpret that language in light of the corresponding structure, material, or acts described therein, and equivalents thereof." 5/13/94 Amendment, R3/7422B at 8-9. Based on this excerpt, Cooper clearly recognized and intended the language to denote a means-plus-function limitation.

Sony's expert, Walter Ciciora, states in an affidavit that he had "never seen or heard the term 'fill calculator' used in any technical field, let alone with respect to television and video technology," and thus, it was his opinion that the term would not have any meaning to a person of ordinary skill in the technology. Ciciora Decl. at 3. Though the Court places little emphasis on Ciciora's testimony, as it consists largely of conclusory statements and was not subject to cross examination, *see* Phillips, 415 F.3d 1303, 2005 WL 1620331, at *10, his testimony, the only offered by either party, bolsters Sony's position. *See* Default Proof Credit Card System, Inc. v. Home Depot U.S.A., Inc., 412 F.3d 1291, 1300 n. 2 (Fed.Cir.2005). In sum, the evidence fails to show by a preponderance of the evidence that one of ordinary skill in the field would conclude that the term "fill calculator means" evokes a sufficiently definite structure for performing the

function, and the limitation therefore falls within the ambit of s. 112, para. 6.

The initial step in constructing a means-plus-function element is to identify the claimed function. Medical Instrumentation & Diagnostics Corp. v. Elekta AB, 344 F.3d 1205, 1210 (7th Cir.2003). Next, the Court must identify corresponding structure in the specification for that function. *Id*. Structure will be deemed corresponding structure "only if the specification or prosecution history clearly links or associates that structure to the function recited in the claim." *Id*. (quoting B. Braun Med. Inc. v. Abbott Labs., 124 F.3d 1419, 1424 (Fed.Cir.1997)); *see also* Home Depot, 412 F.3d at 1299. The scope of the claim under s. 112, para. 6 must be limited to these corresponding structures and their equivalents. *Id*. at 1219.

The recited function of "fill calculator means" in claim 146 is: "responsive to said central and neighboring pixels to generate a fill signal indicating voids in said displayed image which may be filled which filling can include movement of image elements." The parties dispute the proper construction of this language. IPI proposes that the function should be construed as being responsive to at least the neighboring pixel means to generate a fill signal indicating voids that may be filled, which can include moving a pixel, pixels, or portions of pixels; creating a new pixel, pixels, or portions of pixels; or altering the value of an existing pixel for filling, substituting, or replacing a void (e.g., by changing the location, size, shape, value, brightness, and/or intensity of a pixel). Sony's proffered interpretation is a structure that is responsive to the central and neighboring elements provided by the "neighboring pixel means" to generate a signal that points out which particular voids in the displayed image carried by the signal are permitted to be filled, and that must be capable of filling those voids by moving image elements. Sony distinguishes its construction from IPI's by pointing out that IPI's interpretation ignores that the fill signal indicates or points out only particular voids, and that IPI construes the "movement of image elements" as optional rather than required.

"[A] claimed function may not be improperly narrowed or limited beyond the scope of the claim language," but neither should the "function be improperly broadened by ignoring the clear limitations contained in the claim language." Lockheed Martin Corp. v. Space Sys./Loral, Inc., 324 F.3d 1308, 1319 (Fed.Cir.2003); *see also* Generation II Orthotics, Inc. v. Med. Tech., Inc., 263 F.3d 1356, 1364-65 (Fed.Cir.2001) ("When construing the functional statement in a means-plus-function limitation, we must take great care not to impermissibly limit the function by adopting a function different from that explicitly recited in the claim.").

Sony aptly notes that the fill signal generated by the fill calculator means indicates or points out particular voids to be filled. The plain language of the claim and other intrinsic evidence supports this interpretation. It does not appear to the Court that IPI contests this reading. But it is not entirely clear to the Court what Sony is arguing with respect to the function of moving elements. IPI maintains that moving elements is one function of the fill calculator but that it also has several other functions. IPI does not appear to suggest that moving elements is an optional capability of a fill calculator, but instead that the fill calculator has a variety of capabilities at its disposal to fill voids.

Sony improperly narrows the function of the fill calculator means if it is claiming that the device is capable of filling the particular voids only by moving image elements. The plain meaning of "which filling *can* include movement of image elements" (emphasis added) is that moving image elements is one possible means of filling voids, but that other means exist. Moreover, other claims in the patent disclose that the fill calculator means can alter the shape and/or position of image elements, *see* claims 42, 48, 66, and 67, or increase the number of illuminated pixels from that provided by the signal, *see* claims 49 and 68.

For these reasons, the Court construes the function of "fill calculator means" as being responsive to the

central and neighboring elements provided by the neighboring pixel means to generate a signal that indicates particular voids that may be filled, which filling can include, for example, moving image elements, changing the location or size of pixels, or increasing the number of illuminated pixels.

iv. Neighboring pixel means

The parties dispute whether the limitation, "neighboring pixel means," falls within the ambit of s. 112, para. 6. Sony, which contends that this limitation is in means-plus-function form, is entitled to the presumption that the limitation is within the scope of the statute, as the limitation contains the term "means." *See* Apex, 325 F.3d at 1371. IPI argues that "neighboring pixel means" connotes specific structure to those of ordinary skill. The only support it offers, however, is that the '637 patent specification describes embodiments of the "neighboring pixel means" as "neighboring element means 25." This is insufficient to establish that the claim term recites structure for performing the function. Moreover, as with the "fill calculator means" limitation, "neighboring pixel means" is expressed in purely functional language. The Court therefore concludes that s. 112, para. 6 applies.

As discussed above, the Court must next ascertain the function of this element. The function recited in the patent is to be "responsive to the signal carrying said displayed image to provide a plurality of image elements including a central pixel and a plurality of neighboring pixels." The parties appear to be in general agreement concerning the proper construction of this function, though their proposed language somewhat differs. IPI contends that we should construe the language to mean providing a plurality (e.g., a neighborhood) of picture elements in response to a signal which carries the image. Sony urges the Court to interpret the function as providing a plurality of image elements (including a central pixel and neighboring elements) from the image to be displayed that is carried by the signal. The Court adopts what it believes to be the most natural reading of the language: providing a plurality of image elements (including a central pixel and neighboring elements) in response to a signal carrying the image.

2. '637 Patent

a. Claim 1

The parties dispute several terms within claim 1 of the '637 patent, which discloses

An improved signal processing circuit for selectively filling a void located at a particular position having at least partially surrounding image elements respectively,

said circuit comprising: neighboring element means to provide said at least partially surrounding image elements in respect to said particular position,

inspection means to inspect a plurality of said at least partially surrounding image elements of the image to determine the presence of a void at said particular position,

and replication means for selectively filling in the void at said particular position with a value which decreases the visibility of the void, which void can include a location between at least partially surrounding image elements.

i. Neighboring element means

IPI maintains that the term "neighboring element means" evokes a specific structure to one of ordinary skill, and thus should not be treated as a means-plus-function element. In support of its position, IPI again highlights the fact that the specification describes preferred embodiments as "neighboring element means 25." As Sony avers, IPI has not met its burden of overcoming the presumption that s. 112, para. 6 applies. The claim language "to provide said at least partially surrounding image elements in respect to said particular position" is expressed functionally. Nor has IPI provided evidence that supports its position that a person of ordinary skill in the field would understand the phrase to convey material or structure. Thus, the element is within the bounds of s. 112, para. 6.

The recited function of the "neighboring element means" is "to provide said at least partially surrounding image elements in respect to said particular position." IPI construes this language to mean providing a plurality (e.g., a neighborhood) of picture elements in response to a signal which carries the image, where the elements should at least spatially and/or temporally partially surround a particular position in the image in space and/or time. Sony's proposed construction of the function is to provide at least two image elements that surround a specific position under consideration in the image.

The main difference between these two definitions appears to be that IPI urges the Court to specifically define the term "surrounding" as encompassing elements that surround a particular position in either space or time. Sony does not incorporate the time element into its definition, but neither does it argue that including the time dimension would be inappropriate. At this juncture, the Court believes Sony's definition is more in keeping with the ordinary meaning of the language, with the caveat that the Court is not excluding temporally surrounding elements from the definition. We believe that determination may more appropriately be made during the infringement analysis.

ii. Inspection means

IPI and Sony agree that the claim term "inspection means" is a means-plus-function limitation governed by s. 112, para. 6. Thus the dispute centers around the proper construction of the function and identifying corresponding structure.

The recited function is as follows: "to inspect a plurality of said at least partially surrounding image elements of the image to determine the presence of a void at said particular position." IPI construes the stated function as determining the presence of a void at a particular position in the image. Sony believes that the "inspection means" performs two functions. First, it construes "to inspect a plurality of said at least partially surrounding image elements of the image" as meaning to conduct an appraisal of at least two of the partially surrounding image elements provided by the neighboring element means. And second, it construes "to determine the presence of a void at said particular position" as to decide whether or not a void is present at a specific position in the image under consideration based on the appraisal.

The Court agrees with Sony that IPI's construction is incomplete, as it fails to account for the language "inspect a plurality of ... image elements." Yet it would be misleading to construe this element as requiring two discrete functions. The plain and ordinary meaning of the language requires that the "inspection means" function to conduct an appraisal of at least two of the partially surrounding image elements provided by the neighboring element means in order to determine the presence of a void at a particular position in the image. This reading is supported by the specification, which provides that "[i]t is an additional object of this invention to provide a means and method for inspecting a certain element or location with respect to one or more surrounding or neighboring elements of an image to determine the desirability for changing the shape,

position or size of other elements to improve the spatial and/or temporal resolution relationship between elements which may neighbor in time or space" (i.e., to fill a void). U.S. Patent No. 6,529,637, col. 2, lines 28-34. Thus, the Court construes the function of "inspection means" as conducting an appraisal of at least two of the partially surrounding image elements provided by the neighboring element means in order to determine the presence of a void at a particular position in the image.

iii. Replication means

IPI and Sony likewise agree that the claim element "replication means" is a means-plus-function limitation falling within the realm of s. 112, para. 6. The recited function of "replication means" involves "selectively filling in the void at said particular position with a value which decreases the visibility of the void, which void can include a location between at least partially surrounding image elements." IPI's proffered construction is: selectively filling a void at a particular position, e.g., by changing the location, size, shape, value, brightness and/or intensity of an image element or creating a new image element. Sony, in contrast, interprets the language to mean filling in the void at the specific location only sometimes, and not other times, based upon some special circumstances. If the void is to be filled, it fills it with a value that makes the void less visible in the image to be displayed relative to the original image. Sony further contends that the replication means should be construed as being capable of filling in a void at a physical point in a displayed image that is not addressed by the image elements on the incoming signal at any time.

The Court does not fully comprehend the parties' dispute over the meaning of "selectively filling." Sony appears to support an interpretation that requires the "replication means" to fill a void at a particular location only sometimes and that precludes the possibility that it might always perform the filling-in function. IPI seems to interpret "selectively" as referring to both whether the replication means chooses to fill a particular void and the manner in which the filling occurs, the latter of which is dependent on the content of the image. IPI argues that "selectively filling" includes the possibility that a particular point will always be filled, with the manner of filling being selective.

Both interpretations find support in the specification. The only additional evidence submitted by the parties is the rebuttal report Cooper created in connection with the Dell litigation, but as was the case on the other point on which the report was offered, it does not tip the scales in Sony's favor. Because Courts are directed to give claims their broadest reasonable construction, *see* Phillips, 415 F.3d 1303, 2005 WL 1620331, at *9, the Court agrees with IPI that the term "selectively" may refer to both whether to fill a particular void and the manner chosen to fill the void.

With respect to the claim phrase "which void can include a location between at least partially surrounding elements," Sony's argument is misplaced. The plain and ordinary meaning of "can include" indicates that a void may be a location between elements, but that the term also encompasses other possibilities. Moreover, as previously discussed, the patentee explicitly stated in the '637 patent that the term "voids" encompasses locations with no image information and locations or elements that include unwanted, improper elements, and other locations that may have previously contained image information. *See* U.S. Patent No. 6,529,637, col. 3, lines 33-47. It is counterintuitive to suggest that although the inventor specifically stated that the term void is used to cover all of the listed examples, he only intended the invention to operate on one particular type of void. Moreover, the specification reveals that

[A]lthough the word combination "filling in" is used in the specification and claims, the invention is directed towards replicating an image element at a particular location-again, an image element which might or might

not have previously had information available therefor. This replication includes creating, modifying, replacing, substituting, adding to, providing and/or filling in for the element at this location. This term filling in is used to cover all these and similar situations for uniformity.

U.S. Patent No. 6,529,637, col. 3, lines 48-56.

Sony cites several excerpts from the prosecution history that it claims supports its position that the invention is limited to operating on physical points in a displayed image that are not addressed by image elements on the incoming signal at any time. These excerpts however, actually serve to buttress IPI's stance by demonstrating that Cooper added the language in question to distinguish the invention from prior art that purely altered or replaced existing image elements. For instance, Cooper remarked,

To further clarify the distinctiveness of the claimed invention, applicant has amended main independent claims 1, 21, 39 and 54 to recite that the void *can* include a location "between" image elements, thus to more completely distinguish over the Wataya and Kaplan references which only process differing image areas themselves pixel by pixel and can not alter anything between the image elements.

5/12/00 Amendment R7/7449H at 32-33 (emphasis in original). These passages do not imply that the '637 patent only fills voids between image elements; rather, they suggest that the invention can or is capable of filling these particular types of voids, whereas the prior art under discussion is not.

In short, the Court adopts IPI's proposed interpretation of the function: selectively filling a void at a particular position, e.g., by changing the location, size, shape, value, brightness and/or intensity of an image element or creating a new image element.

b. Claim 107

Claim 107 of the '637 patent provides for:

A method for selectively filling a void located at a particular position having at least partially surrounding image elements respectively,

said method comprising: providing said at least partially surrounding image elements in respect to said particular position,

inspecting a plurality of said at least partially surrounding image elements of the image to determine the presence of a void at said particular position,

and selectively filling in the void at said particular position with a value which decreases the visibility of the void, which void can include a location between at least partially surrounding image elements.

i. Inspecting

IPI's proffered construction of the term "inspecting" is: analyzing a certain element or location and one or more at least partially surrounding or neighboring elements of an image to determine the desirability of creating elements (in time or space) or modifying the location, value, brightness, shape, position, intensity, or size of at least one element so as to improve the spatial and/or temporal resolution relationship between elements, which may neighbor in time or space. Sony proposes that the Court adopt its construction of the

function of the "inspection means" limitation found in claim 1.

The Court agrees with Sony that the term "inspecting" should be construed consistent with the "inspection means" function of claim 1. *See* Phillips, 415 F.3d 1303, 2005 WL 1620331 at *7 (noting that claim terms are normally used consistently throughout the patent). These claims share nearly identical language and context. Thus, the Court adopts the following construction of the claim term: to conduct an appraisal of at least two of the partially surrounding image elements provided by the neighboring element means in order to determine the presence of a void at a particular position in the image.

ii. Providing said at least partially surrounding image elements in respect to said particular position

IPI asserts that the limitation "providing said at least partially surrounding image elements in respect to said particular position" means making at least some of the image elements of the original image that surround the particular position available for inspection. At least some of the surrounding image elements may surround in space and/or time. Sony maintains that the term should be construed consistent with its proposed function of "neighboring element means," namely, to provide at least two image elements that surround a specific position under consideration in the image.

The contested language is nearly identical to the recited function of the "neighboring element means" limitation of claim 1. In an effort to construe similar terms consistently throughout the patent, the Court adopts its construction of the "neighboring element means" function: selectively filling a void at a particular position, e.g., by changing the location, size, shape, value, brightness and/or intensity of an image element or creating a new image element. If the parties seek to further define "providing," which is not clear since Sony does not define this term in its proposed construction, IPI's definition "making ... available" is appropriate. As with the limitation "neighboring element means," the Court declines to define "surrounding" in a manner that strictly limits it to elements in a spatial context.

c. Claim 145

Claim 145 of the '637 patent discloses:

An improved method for selectively filling a void located at a particular position having at least partially surrounding image elements, respectively,

said method comprising: providing at least partially surrounding image elements in respect to a particular position,

determining the difference between image elements of the at least partially surrounding image elements to determine the similarity of such surrounding image elements,

inspecting said plurality of the at least partially surrounding image elements of the image to determine the presence of a void at said particular position,

discarding sets of image elements not sufficiently similar,

and filling in the void at said particular position with a value which decreases the visibility of the void, which said particular position can include a location between at least partially surrounding image elements.

i. Determining the difference between image elements ... such surrounding image elements

IPI construes the limitation "determining the difference between image elements ... such surrounding image elements" to mean calculating the difference between two or more surrounding image elements to determine their similarity. Sony urges the Court to construe the limitation as involving subtracting a value representing at least one of the image elements provided by the providing step, from a value representing at least another of the image elements provided by the providing step, for the purpose of deciding how similar to one another such image elements are. These proposed constructions differ only slightly, as "calculating the difference" can suggest a subtraction function. The Court adopts IPI's proposed construction because it presents a more streamlined definition, and the specification discusses the calculation in terms of "comput[ing] pair *differences*" and "to determine the relative *difference*." U.S. Patent No. 6,529,637, col. 17, lines 14-18 (emphasis added).

ii. Discarding sets of image elements not sufficiently similar

In a joint chart of the parties' respective claim constructions, IPI defines the limitation "discarding sets of image elements not sufficiently similar" as eliminating a plurality of image elements ("sets") not sufficiently similar in respect to each other and/or other image elements from subsequent processing. The Court, however, is unable to locate in IPI's materials a discussion concerning how IPI arrived at this construction. Sony construes the limitation as meaning to eliminate more than one dissimilar set of image elements from further processing based on the determination of similarity. It thus appears the parties are in general agreement concerning the proper construction of this limitation. Other terms at issue in this claim should be construed consistent with the definitions already adopted by the Court.

d. Claim 159

Claim 159 of the '637 patent provides "[t]he method of claim 145 characterized by the addition of the step of determining if an image element is defective and removing a defective image element to produce a void at said particular position." Again, aside from reciting its proposed definitions in the joint chart, IPI fails to elaborate upon its construction.

i. Determining if an image element is defective

Based on the joint chart, it appears that the parties' views align regarding the phrase "determining if an image element is defective." IPI construes the term "defective" to mean an element lacking the desired value, such as an image element having an artifact. Sony proposes that the phrase in its entirety should be construed as deciding whether or not an image element is defective. IPI's definition does not account for the term "determining" and Sony fails to define the term "defective." Combining the two definitions, the Court adopts the following construction of this phrase: deciding whether or not an image element lacks the desired value.

ii. Removing a defective image element to produce a void at said particular position

IPI proposes that the phrase "removing a defective image element to produce a void at said particular position" means eliminating a defective image element, such as through the replacement of the defective image element with a valid image element. Sony interprets the phrase to mean eliminating a defective image element from the image to produce, at the specific position, a location with no image information. It argues that if one simply removes an element from the image, that particular location becomes a point that no

longer contains image information.

IPI's construction overlooks the distinct steps set forth in claim 145 by attempting to combine the determining/removing step added by dependent claim 159 with the final "filling the void" step of claim 145. In other words, IPI's construction of the disputed term in claim 145 effectively would render dependent claim 159 superfluous. Moreover, Sony's construction makes intuitive sense and is consistent with the specification, which provides that locations with no image information constitute one possible type of void. The Court therefore adopts Sony's proffered definition: eliminating a defective image element from the image to produce, at the specific position, a location with no image information.

3. '964 Patent

a. Claim 4

Claim 4 of the '964 patent discloses:

An improved display apparatus for displaying an enhanced version of an image conveyed by a signal,

said apparatus including in combination a neighboring element circuit responsive to said signal and operable to recover and temporarily store known ones of picture elements of said image so as to provide a group of neighboring elements including a central element,

fill calculator circuit coupled to said neighboring circuit to determine if said neighboring elements, including said central element match known patterns of elements,

video fill circuit coupled to at least said fill calculator circuit to modify the value of said central element in response thereto thereby providing enhancement of said image, and display means coupled to said video fill circuit and operative to display said enhanced image.

The parties dispute four limitations in claim 4: neighboring element circuit, fill calculator circuit, video fill circuit, and display means. The Court requests that the parties supplement their arguments with respect to the limitations "neighboring element circuit," "fill calculator circuit," and "video fill circuit." The Court is inclined to construe "neighboring element circuit" and "fill calculator circuit" consistent with what appears to be their sister limitations "neighboring element means" and "fill calculator means." Because these corresponding terms appear to be used consistently, it would seem to thwart the basic principles of claim construction to construe the set containing the term "means" as means-plus-function limitations, but to interpret the corresponding terms that do not contain the word "means" as falling outside the bounds of s. 112, para. 6. At the same time, the patentee's failure to use the word "means" shifts the presumption in the opposite direction, and it is not entirely clear whether Sony has overcome this hurdle. The Court would also like the parties to be prepared to elaborate on their proposed construction of "video fill circuit," as IPI does not respond to Sony's contention that this phrase constitutes a means-plus-function limitation. The "display means" limitation is discussed below.

i. Display means

IPI construes the term "display means" as a camera, scanner, television, laser printer, fax machine, or the like that is coupled to the video fill circuit and displays the enhanced image. The only mention of this term in Sony's materials that the Court was able to locate indicates that Sony interprets this term in accordance

with its ordinary meaning. *See* Joint Claim Construction Chart at 24. Because Sony does not appear to contest IPI's definition, the Court adopts IPI's proposal.

b. Claim 10

Claim 10 of the '964 patent discloses:

A method for displaying an enhanced version of an image conveyed by a signal,

said method including recovering and temporarily storing known ones of picture elements of said image so as to provide a group of neighboring elements including a central element,

determining if said neighboring elements, including said central element match known patterns of elements,

modifying the value of said central element in response thereto thereby providing enhancement of said image, displaying said enhanced image.

The parties dispute the following three limitations: "recovering and temporarily storing ... to provide a group of neighboring elements including a central element," "determining if said neighboring elements, including said central element match known patterns of elements," and "modifying the value of said central element in response thereto thereby providing enhancement of said image, displaying said enhanced image." Sony's proposed constructions are set forth in connection with its discussion of the limitations at issue in claim 4, thus the Court postpones constructing this claim until we obtain a better understanding of the parties' positions with respect to claim 4.

Conclusion

The disputed claim terms are construed in accordance with the conclusions set forth in this Memorandum Opinion and Order. The case is set for further argument on the matters left open in this ruling on August 30, 2005 at 2:30 p.m.

N.D.Ill.,2005.
IP Innovation L.L.C. v. Sony Electronics, Inc.