

UNITED STATES PATENT AND TRADEMARK OFFICE

BEFORE THE PATENT TRIAL AND APPEAL BOARD

SAMSUNG ELECTRONICS CO., LTD. AND
SAMSUNG ELECTRONICS AMERICA, INC.,
Petitioners

v.

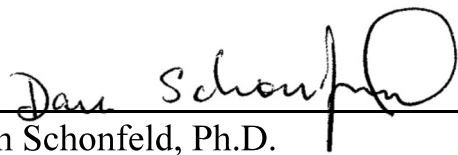
MAXELL, LTD.,
Patent Owner

Inter Partes Review No.: IPR2025-01315

**DECLARATION OF DR. DAN SCHONFELD IN SUPPORT OF
PETITION FOR *INTER PARTES* REVIEW OF
U.S. PATENT NO. 8,471,950**

I hereby declare under penalty of perjury under the laws of the United States of America that the following is true and correct, and that all statements made of my own knowledge are true and that all statements made on information and belief are believed to be true. I understand that willful false statements are punishable by fine or imprisonment or both under Section 1001 of Title 18 of the United States Code.

Date: August 29, 2025



Dan Schonfeld, Ph.D.

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EXHIBITS

Exhibit No.	Description
1001	U.S. Patent No. 8,471,950
1002	File History of U.S. Patent No. 8,471,950
1003	Declaration of Dr. Dan Schonfeld in Support of Petition for <i>Inter Partes</i> Review of U.S. Patent No. 8,471,950
1004	Curriculum Vitae of Dr. Dan Schonfeld
1005	U.S. Patent No. 8,237,850 to Tsujino
1006	Certified English Translation of Japanese Patent Publication No. 2007-25559 to Shui
1007	U.S. Publication No. US2007/0189758 to Iwasaki
1008	JP2007-25559 to Shui

TABLE OF CLAIMS

[1Pre] A signal processor comprising:
[1a] a feature detection unit which detects a position where features of each pixel of an input picture signal have changed;
[1b] a region creation unit which creates a region by removing pixels with the features from an evaluated value extraction region;
[1c] an evaluated value extraction unit which extracts an evaluated value in accordance with the evaluated value extraction region;
[1d] a processing unit which applies predetermined processing to the picture signal; and
[1e] a control unit which controls the processing unit in accordance with the evaluated value having been extracted by the evaluated value extraction unit;
[1f] wherein the control unit controls the processing unit by using an evaluated value of a region from which pixels having an extracted predetermined feature are removed.
[2Pre] A signal processor according to claim 1, wherein
[2a] the feature detection unit includes: a hold unit which holds position information of the detected pixels; and
[2b] the region creation unit which creates a region by excluding the held positions from an evaluated value extraction region.
[3Pre] A signal processor according to claim 2, wherein:
[3a] the processing unit includes a focus lens, and a drive unit for driving the focus lens;
[3b] a photoelectric conversion unit for performing photoelectric conversion is disposed between the focus lens and the extraction unit; and
[3c] the control unit controls the processing unit by using an evaluated value of a region from which pixels having an extracted predetermined feature are removed.
[4Pre] A signal processor according to claim 2, wherein:
[4a] the processing unit is a signal processing unit for adjusting white balance of an input picture signal; and
[4b] the control unit controls the processing unit by using an evaluated value of a region from which pixels having an extracted predetermined feature are removed.
[5Pre] A signal processor according to claim 2, wherein:
[5a] the region creation unit includes a region segmentation unit for segmenting an effective region in advance, and an overlap detection unit which detects

overlap of position information output from the hold unit with blocks segmented by the region segmentation unit; and
[5b] the control unit controls the processing unit by using an evaluated value of a region from which pixels having an extracted predetermined feature are removed.
[6Pre] A signal processor according to claim 2,
[6a] wherein the region creation unit includes a unit which keeps the total area of the evaluated value extraction region constant by excluding unnecessary portions from the evaluated value extraction region.
[7Pre] A signal according to claim 2, wherein:
[7a] the processing unit is a light intensity adjustment unit for controlling exposure;
[7b] a lens and a photoelectric conversion unit for performing photoelectric conversion are disposed between the light intensity adjustment unit and the extraction unit; and
[7c] the control unit controls the processing unit by using an evaluated value of a region from which pixels having an extracted predetermined feature are removed.
[8Pre] A signal processor according to claim 7, wherein:
[8a] the region creation unit includes a region segmentation unit for segmenting an effective region in advance, and an overlap detection unit which detects overlap of position information output from the hold unit with blocks segmented by the region segmentation unit; and
[8b] the control unit controls the processing unit by using an evaluated value of a region from which pixels having an extracted predetermined feature are removed.
[9Pre] A signal processor according to claim 7,
[9a] wherein the region creation unit includes a unit which keeps the total area of the evaluated value extraction region constant by excluding unnecessary portions from the evaluated value extraction region.
[10Pre] A signal processor according to claim 1, wherein:
[10a] the processing unit is a light intensity adjustment unit for controlling exposure;
[10b] a lens and a photoelectric conversion unit for performing photoelectric conversion are disposed between the light intensity adjustment unit and the extraction unit; and
[10c] the control unit controls the processing unit by using an evaluated value of a region from which pixels having an extracted predetermined feature are removed.

[11Pre] A signal processor according to claim 1,
[11a] wherein the region creation unit includes a unit which keeps the total area of the evaluated value extraction region constant by excluding unnecessary portions from the evaluated value extraction region.
[12Pre] A signal processor according to claim 1, wherein:
[12a] the processing unit includes a focus lens, and a drive unit for driving the focus lens;
[12b] a photoelectric conversion unit for performing photoelectric conversion is disposed between the focus lens and the extraction unit; and
[12c] the control unit controls the processing unit by using an evaluated value of a region from which pixels having an extracted predetermined feature are removed.
[13Pre] A signal processor according to claim 12,
[13a] wherein the region creation unit includes a unit which keeps the total area of the evaluated value extraction region constant by excluding unnecessary portions from the evaluated value extraction region.
[14Pre] A signal processor according to claim 1, wherein:
[14a] the processing unit is a signal processing unit for adjusting white balance of an input picture signal; and
[14b] the control unit controls the processing unit by using an evaluated value of a region from which pixels having an extracted predetermined feature are removed.
[15Pre] A signal processor according to claim 14,
[15a] wherein the region creation unit includes a unit which keeps the total area of the evaluated value extraction region constant by excluding unnecessary portions from the evaluated value extraction region.

I. INTRODUCTION

1. I, Dr. Dan Schonfeld, have been retained by counsel for Petitioners Samsung Electronics Co., Ltd. and Samsung Electronics America, Inc. (collectively, “Samsung”) as a technical expert in this *inter partes* review. I have been asked to provide my opinion about the patentability of the claims of U.S. Patent No. 8,471,950 (the “’950 patent,” EX1001).

2. I have been retained at my standard hourly rate of \$800 per hour. My compensation is not contingent upon my performance, the outcome of this matter, or any issues involved in or related to this matter.

3. In summary, it is my opinion that the prior art references that I analyze below render obvious the ’950 patent’s claims, as summarized in the table below.

Ground	Claims	Statutory Basis	Prior Art
1	1-15	35 U.S.C. § 103	Tsujino in view of Iwasaki
2	1-15	35 U.S.C. § 103	Tsujino in view of Shui and Iwasaki
3	1-15	35 U.S.C. § 103	Shui in view of Iwasaki

A. Background and Qualifications

4. The following is a summary of my relevant qualifications and professional experience.

5. I received my B.S. degree in Electrical Engineering and Computer Science from the University of California, Berkeley, in 1986 with a concentration

on Computer Engineering/Systems Engineering. I received my M.S. degree in Electrical and Computer Engineering from The Johns Hopkins University, Baltimore, Maryland in 1988 with a concentration on Speech Processing/Biomedical Signal Processing. I received my Ph.D. degree in Electrical and Computer Engineering from The Johns Hopkins University, Baltimore, Maryland in 1990 with a concentration on Nonlinear Signal Processing/Image Analysis.

6. In August 1990, I joined the Department of Electrical Engineering and Computer Science at the University of Illinois, Chicago, where I am a Professor Emeritus in the Departments of Electrical and Computer Engineering, Computer Science, and Biomedical Engineering. Before I joined the University of Illinois, Chicago, I served as an instructor in the Department of Electrical and Computer Engineering at The Johns Hopkins University, Baltimore, Maryland.

7. At the University of Illinois, Chicago, I have served as the Director of the University-Industry Engineering Research Center (UIERC), formerly the Manufacturing Research Center (MRC). I am also Co-Director of the Multimedia Communications Laboratory (MCL) and a member of the Signal and Image Research Laboratory (SIRL).

8. Over the past few decades, I have also served as a visiting professor in (a) the Advanced Analytics Institute (AAI) at the University of Technology in

Sydney, Australia, (b) the Department of Information Engineering and Computer Science (DISI) at the University of Trento, Italy, (c) the School of Computer Engineering at the Nanyang Technological University in Singapore, and (d) the Department of Electrical Engineering—Systems at Tel-Aviv University in Israel.

9. I have been elected Fellow of the Institute of Electrical and Electronics Engineers (IEEE) “for contributions to image and video analysis” as well as Fellow of the International Society for Optics and Photonics (“SPIE”) “for specific achievements in morphological image processing and video analysis.” I have also been elected University Scholar of the University of Illinois.

10. I have previously served as Editor-in-Chief and Deputy Editor-in-Chief of the IEEE Transactions on Circuits and Systems for Video Technology. I have also previously served as Area Editor for special issues of the IEEE Signal Processing Magazine. I have served as Associate Editor of the IEEE Transactions on Image Processing (on image and video storage, retrieval and analysis), Associate Editor of the IEEE Transactions on Circuits and Systems for Video Technology (on video analysis), Associate Editor of the IEEE Transactions on Signal Processing (on multidimensional signal processing and multimedia signal processing), and Associate Editor of the IEEE Transactions on Image Processing (on nonlinear filtering). I have also served on the editorial board of the IEEE Signal Processing Magazine, EURASIP Journal of Image and Video Processing,

Research Letters in Signal Processing, and Bentham Science Publishers, Ltd.’s

“Recent Patents on Computer Science” and “Recent Patents on Electrical Engineering” publications. I have served as guest editor of numerous special issues in various journal publications in the area of multimedia systems.

11. I have previously served on the Conference Board of the IEEE Signal Processing Society. I have previously served as Technical Program Chair of the IEEE International Conference on Acoustics, Speech, and Signal Processing (ICASSP) 2018 as well as Program Chair of the IEEE Conference on Visual Communications and Image Processing (VCIP) 2015. I have also previously served as General Co-Chair of the Workshop on Big Data in 3D Computer Vision 2013 and the IEEE International Conference on Multimedia and Expo (ICME) 2012. I have served as Chair of the IEEE Workshop on Video Mining 2008 and the SPIE Conference on Visual Communications and Image Processing 2007. I have also served on the organizing committees of various conferences including the IEEE International Conference on Image Processing 1998, 2012, and 2020, IEEE/SPIE VCIP 2010, 2017, and IEEE Workshop on Nonlinear Signal and Image Processing (NSIP) 1997. I was an organizer of the Thematic Symposium on Multimedia Search and Retrieval at ICASSP 2009.

12. I have authored and co-authored over 250 technical papers for various journals and conferences. I was author of a book chapter, entitled: “Image and

video communication networks,” and later editions entitled: “Video communication networks.” I was co-author (with Carlo Giulietti and Rashid Ansari) of a paper that won the Best Paper Award at the ACM Multimedia Workshop on Advanced Video Streaming Techniques for Peer-to-Peer Networks and Social Networking 2010. I was also co-author (with Junlan Yang) of a paper that won the Best Student Paper Award at the IEEE International Conference on Image Processing 2007. I was also co-author (with Wei Qu) of a paper that won the Best Student Paper Award at the IEEE International Conference on Image Processing 2006. I was also co-author (with Nidhal Bouaynaya) of a paper that won the Best Student Paper Award in Visual Communications and Image Processing 2006. In addition, many of my publications relate to the broad topic of multimedia systems, which includes audio, image, and video processing. My publications in the area of multimedia systems date back to 1988.

13. I have been selected to be the keynote speaker at the IEEE International Conference on Computer, Electrical and Communication Engineering (ICCECE), Kolkata, India, in 2023. I was also the keynote speaker at the International Conference on Wireless Communications and Signal Processing (WCSP), Yangzhou, China, in 2016, and the International Conference on Intelligent Control and Information Processing (ICICIP) and International Conference on Brain Inspired Cognitive Systems (BICS), Beijing, China, in 2013.

Further, I was a plenary speaker at the IEEE/IET International Conference on Audio, Language and Image Processing (ICALIP), Shanghai, China, in 2010, and at the IEEE International Conference on Advanced Video and Signal Based Surveillance (AVSS), Genoa, Italy, in 2009. I was also a plenary speaker at the INPT/ASME International Conference on Communications, Signals, and Systems (ICCSS), Rabat Morocco, in 1995 and 2001.

14. I have served as Representative of Regions 1-6 (North America) on the Chapters Committee of the IEEE Signal Processing Society. I have also served as Chairman of the IEEE Signal Processing Chicago Chapter. I have also served on the IEEE Image, Video, and Multidimensional Signal Processing (IVMSP) Technical Committee, formerly the IEEE Image and Multidimensional Signal Processing (IMDSP) Technical Committee, Visual Signal Processing and Communications (VSPC) Technical Committee, IEEE Signal and Image Processing in Medicine Technical Committee, and the IEEE Multimedia Communications Technical Committee. I currently serve on the American National Standards Institute (ANSI)/Underwriters Laboratory (UL) Standards Technical Panel (“STP”) on Multimedia Systems.

15. Since the late 1990s, I have also taught various courses that relate to multimedia systems. For example, I have introduced and taught an advanced undergraduate-level/first-year graduate-level course on multimedia systems

(originally called multimedia communication networks), which focuses on audio, image, and video processing and communications.

16. I have also served as a consultant in various engagements related to multimedia systems. For example, over the past decade, I have served as an expert witness in several cases related to multimedia systems. In 1997, I served as a consultant for Prairiecomm Corp. where, among other tasks, I developed and deployed multimedia systems. Since 2002, I have also served as a member of the American National Standards Institute (ANSI)/Underwriters Laboratory (UL) Standards Technical Panel (STP) on various standards related to multimedia systems.

17. My qualifications, publications, professional experience and expertise are set forth more fully in my curriculum vitae, attached as Appendix A.

B. Materials Considered

18. In preparing this Declaration and forming my opinions, I have considered the materials referenced in this Declaration, including in the table of exhibits at the beginning of this Declaration. My opinions also are based on my years of education, research, and experience, as well as my review of relevant materials.

II. LEGAL STANDARDS

A. Date of Invention

19. I have been asked to use the date of the earliest application to which

the '950 patent claims priority (November 28, 2008) as the date of the purported invention for purposes of my analysis.

B. Anticipation

20. I understand from counsel that a patent claim is invalid under 35 U.S.C. § 102 if a prior art disclosure teaches every element required by the claim, either expressly or inherently. The identical invention must be shown in as complete detail as is contained in the claim. When a claim covers several structures or compositions, either generically or as alternatives, the claim is deemed anticipated if any of the structures or compositions within the scope of the claim is known in the prior art.

C. Obviousness

21. I understand from counsel that a patent claim is invalid under 35 U.S.C. § 103 if the differences between the invention and the prior art are such that the subject matter as a whole would have been obvious at the time of the invention to a person having ordinary skill in the art to which the subject matter pertains. Obviousness, as has been explained to me, is based on (i) the scope and content of the prior art, (ii) the differences between the prior art and the claim, (iii) the level of ordinary skill in the art, and (iv) any secondary indicia of non-obviousness (*e.g.*, “secondary considerations” such as commercial success in the market place of the claimed invention), to the extent that they exist.

22. I further understand from counsel that obviousness may be demonstrated by showing that it would have been obvious to combine the teachings of more than one item of prior art. In determining whether a piece of prior art could have been combined with other prior art or with other information within the knowledge of a person having ordinary skill in the art, the following are examples of approaches and rationales that may be considered:

- Combining prior art elements according to known methods to yield predictable results;
- Simple substitution of one known element for another to obtain predictable results;
- Use of a known technique to improve similar devices (methods, or products) in the same way;
- Applying a known technique to a known device (method or product) ready for improvement to yield predictable results;
- Applying a technique or approach that would have been obvious to try (choosing from a finite number of identified, predictable solutions, with a reasonable expectation of success);
- Known work in one field of endeavor may prompt variations of it for use in either the same field or a different one based on design incentives or other market forces if the variations would have been predictable to a person having ordinary skill in the art; and
- Some teaching, suggestion, or motivation in the prior art that would have led one of ordinary skill to modify the prior art reference or to combine prior art reference teachings to arrive at the claimed invention.

23. I further understand that an invention may be obvious if one of

ordinary skill in the art, facing a wide range of needs created by developments in the field, would have seen an obvious benefit to the solutions tried by the Applicant. When there is a design need or market pressure to solve a problem and there are a finite number of identified, predictable solutions, it may be obvious to a person of ordinary skill to try the known options. If a technique has been used to improve one device, and a person of ordinary skill in the art would recognize that it would improve similar devices in the same way, using the technique would have been obvious.

24. I further understand that a person of ordinary skill in the art is a hypothetical person who is presumed to be aware of all of the relevant art at the time of the invention. The person of ordinary skill may be able to fit together the teachings of multiple patents and/or printed publications employing ordinary creativity and the common sense that familiar items may have uses in another context or beyond their primary purposes.

25. I also understand that when considering the obviousness of a patent claim, one should consider whether a teaching, suggestion, or motivation to combine the references exists so as to avoid impermissibly applying hindsight when combining or modifying the prior art. I understand this test should not be applied rigidly, but that the test can be important to avoid such hindsight.

26. I also understand that one of ordinary skill in the art must have a

reasonable expectation of success in combining or modifying prior art references.

27. I also understand that all elements of a claim must be considered in an obviousness analysis.

D. Standard of Proof

28. I understand that the standard to prove unpatentability in an *inter partes* review is by a preponderance of the evidence, which means more likely than not.

III. THE '950 PATENT

A. Summary of the '950 Patent

29. The '950 patent issued from U.S. Patent Application No. 12/621,304, filed November 18, 2009, and it claims priority to Japanese Patent Application No. 2008-303423, filed on November 28, 2008. EX1001, cover page. The '950 patent's earliest possible effective filing date therefore is November 28, 2008.

30. The '950 patent addresses the problem that when high-luminance portions exist in focusing lens position detection regions, conventional systems may need to repeatedly change regions and confirm the absence of high-luminance portions, which can be inefficient. *Id.*, 1:20-31. The patented solution analyzed the image, detects problematic pixels (bright spots) and excludes them from the evaluation for controlling the intensity of the input signal via the processing unit. *Id.*, 3:9-22.

FIG. 11

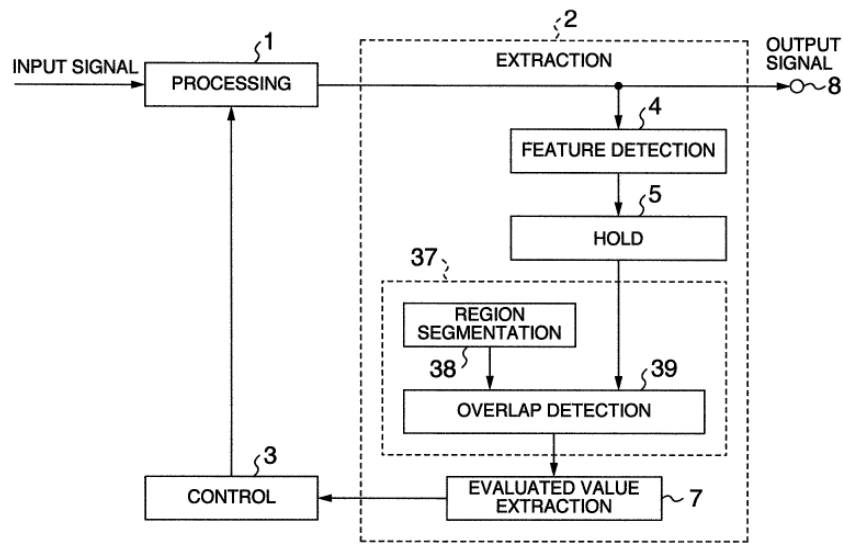
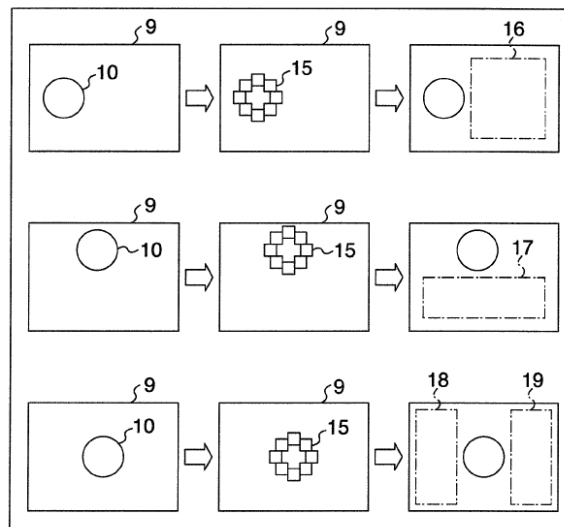


FIG. 4



31. The '950 patent's solution involves detecting feature change positions (such as high-luminance areas like spotlights) and excluding these positions from evaluated value extraction regions used for automatic control functions like signal intensity control. *Id.*, 4:29-40, Figs. 1 and 4.

B. Summary of the '950 Patent's File History

32. The '304 application claims priority to Japanese patent application JP 2008-303423, filed on 11/28/2008. The United States Patent and Trademark Office ("USPTO") issued the '950 patent on June 25, 2013. EX1002, Issue Notification page 1.

33. During prosecution, the Applicant amended claims 1, 2, 9, and 10 and argued that the prior art could not anticipate the claims because it failed to disclose "a region creation unit which creates a region by removing pixels with the features from an evaluated value extraction region" and "a control unit which controls the processing unit in accordance with the evaluated value having been extracted by the elevated value extraction unit." EX1002, Response dated 11/26/2012, at pages 8-9.

34. In the Notice of Allowance, the Examiner noted that the prior art failed to disclose "the active creation of a region from the entire image where pixels containing a certain feature are actively removed" and distinguished the claimed invention from Takeda, which chooses a "separate fixed evaluation region when an area of irregular brightness is detected, which is not the same as creating a dynamic region where the irregularity is removed." *Id.*, Notice of Allowance dated March 19, 2013 at page 4.

C. A Person of Ordinary Skill in the Art

35. In my opinion, a person of ordinary skill in the art (“POSITA”) at the time of the alleged invention of the ’950 patent (November 28, 2008) would have had a bachelor’s degree in computer science, electrical engineering, computer engineering, or a comparable field of study, plus approximately two to three years of professional experience with image processing, video processing, or other relevant industry experience. Additional education could substitute for professional experience, and significant industry experience could substitute for formal education.

36. I met and exceeded the above qualifications for a POSITA as of at least November 28, 2008, and consider myself to be a POSITA of the ’950 patent.

IV. CLAIM CONSTRUCTION

37. In this section, I address the construction of certain claim terms, and I have applied those constructions in my analysis. For all other terms, I have applied the plain and ordinary meaning (POM) as understood by a POSITA at the time of the purported invention.

38. For the following claim terms, I offer their construction under 35 U.S.C. 112, paragraph 6, referred to herein as means-plus-function (MPF) constructions. I analyze these claim terms in this Declaration under both their POM and MPF interpretations.

1. Processing Unit (Claims 1, 3-5, 7, 8, 10, 12, and 14)

39. **Function:** Applying predetermined processing to the picture signal.

40. **Structure:** The corresponding structure shown at Elements 1 and 35 in Figs. 1, 10, 11, and 13 is a software algorithm executing on a processor.

EX1001, 2:14-16 and 4:53-58. The predetermined processing algorithm controls signal intensity of the input image signal and white balancing. *Id.*, 3:6-59, 4:29-35, and 6:35-44.

2. Control Unit (Claims 1, 3-5, 7, 8, 10, 12, and 14)

41. **Function:** Controlling the processing unit in accordance with evaluated values.

42. **Structure:** The corresponding structure shown at Element 3 in Figs. 1, 6, 7, 10, 11, and 13 is a software algorithm executing on a processor. *Id.*, 2:14-16 and 4:53-58. The control algorithm includes adjusting focus and exposure based on evaluated values, as well as controlling the processing unit and/or the drive unit that drives the lens and aperture. *Id.*, 3:6-22 and 5:1-29.

3. Hold Unit (Claims 2, 5, and 8)

43. **Function:** Holding position information of detected pixels.

44. **Structure:** The corresponding structure shown at Element 5 in Figs. 1, 6, 7, 10, 11, and 13 is a software algorithm executing on a processor. *Id.*, 2:14-16 and 4:53-58. The hold unit's algorithm includes storing and retrieving position

information for multiple pixels, which requires rapid data storage and retrieval capabilities. *Id.*, 3:39-59.

4. Light Intensity Adjustment Unit (Claims 7 and 10)

45. **Function:** Controlling exposure.

46. **Structure:** The light intensity adjustment unit is a controllable shutter mechanism for adjusting exposure. *Id.*, Fig. 6 element 28. The '950 patent's discussion of controlling exposure in response to evaluated values is a controllable shutter in a camera system. *Id.*, 4:60-5:9.

5. Drive Unit (Claims 3 and 12)

47. **Function:** Driving the lens.

48. **Structure:** The drive unit is a component connected to the lens for controlling its movement. *Id.*, Fig. 7 element 33. The '950 patent's description of control over lens movement is an electrical driver circuit in a camera system. *Id.*, 5:45-49, 5:60-64, and 6:17-23.

6. Photoelectric Conversion Unit (Claims 3, 7, 10, and 12)

49. **Function:** Converting light to electrical charge that indicates image intensity.

50. **Structure:** The photoelectric conversion unit is a component in the optical path. *Id.*, Figs. 6, 7, and 10 element 30. The '950 patent describes it as converting light into electrical signals that represent image intensity, *i.e.*, an image

sensor. *Id.*, 5:1-9 and 5:14-18.

7. Feature Detection Unit (Claims 1 and 2)

51. **Function:** Detecting a position where features of each pixel of an input picture signal have changed.

52. **Structure:** The overall structure shown at Element 4 in Figs. 1, 6, 7, 10, 11, and 13 is a software algorithm executing on a processor. EX1001, 2:14-16, 3:22-59, and 4:36-58. The specific feature detection algorithm analyzes pixel data to identify changes in image features. *Id.*, 2:22-47 and 3:23-59.

8. Region Creation Unit (Claims 1, 2, 5, 6, 8, 9, 11, 13, and 15)

53. **Function:** Creating a region by removing pixels with the detected features from an evaluated value extraction region.

54. **Structure:** The overall structure shown as element 6 in Figs. 1, 6, 7, and 10, element 37 in Fig. 11, and element 43 in Fig. 13 is a software algorithm executing on a processor. *Id.*, 2:14-16, 3:60-4:35, and 4:53-58. The region creation algorithm manipulates pixel data to define specific regions for evaluation. *Id.*, 2:60-3:5 and 3:60-4:35.

9. Evaluated Value Extraction Unit (Claims 1, 3, 7, 10, and 12)

55. **Function:** Extracting an evaluated value in accordance with the created region.

56. **Structure:** The overall structure shown as Elements 7, 34, and 36 in

Figs. 1, 6, 7, 10, 11, and 13 is a software algorithm executing on a processor. *Id.*, 2:14-16, 4:23-40, and 4:53-58. The evaluated value extraction algorithm performs calculations on pixel data within defined regions. *Id.*, 4:1-10, 4:23-40.

10. Region Segmentation Unit (Claims 5 and 8)

57. **Function:** Segmenting the effective region in advance.

58. **Structure:** The overall structure shown as Element 38 in Figs. 11 and 13 and is described as a software algorithm executing on a processor. *Id.*, 2:14-16, 4:53-58, and 7:5-44. The region segmentation algorithm divides the image into multiple regions for analysis. *Id.*, 7:5-44.

11. Overlap Detection Unit (Claims 5 and 8)

59. **Function:** Detecting overlap of position information with segmented blocks.

60. **Structure:** The overall structure shown as Element 39 in Figs. 11 and 13 and is described as a software algorithm executing on a processor. *Id.*, 2:14-16, 4:53-58, and 7:5-44. The overlap detection algorithm compares pixel positions with predefined regions. *Id.*, 7:5-44.

V. SUMMARY OF THE PRIOR ART

A. Tsujino

61. U.S. Patent No. 8,237,850 (“Tsujino”) was filed on August 26, 2008, which predates the earliest priority date of November 28, 2008, of the ’950 patent.

EX1005, cover page. Tsujino is prior art under at least 35 U.S.C. § 102(e).

62. Tsujino relates to an electronic camera that adjusts the distance from an optical lens to an imaging surface. *Id.*, Fig. 1 element 10. Tsujino discloses signal processor 26, luminance evaluator 28, and CPU 46 that work in conjunction to detect high-luminance pixels in an image, exclude the high-luminance pixels from evaluation to improve camera control functions such as signal intensity control via AGC 20. *Id.*, Figs. 1 and 11, 6:8-47 and 10:62-12:62.

63. Tsujino is analogous art to the '950 patent and was not considered during prosecution of the '950 patent.

B. Shui

64. JP Patent Application Publication No. 2007-25559 ("Shui") was filed July 21, 2005, and published on February 1, 2007, which predates the earliest priority date of November 28, 2008, of the '950 patent. EX1006, cover page. Shui is prior art under at least 35 U.S.C. § 102(b).

65. Shui relates to a focal position detection method and apparatus that can accurately detect focal position even when high-luminance point light sources exist in the image. *Id.*, Paragraph [0006]. Shui discloses dividing a focus area into multiple regions, obtaining focus evaluation values and photometric values across the entire focal range, and selectively excluding regions with high-luminance points from focus evaluation. *Id.*, Paragraphs [0015]-[0016]. The system detects

positions where focus evaluation values peak and compares photometric values at positions before and after these peaks to determine whether they represent true focal positions or false peaks caused by point light sources. *Id.*, Figs. 1 and 6, Paragraphs [0007]-[0008].

66. Shui is analogous art to the '950 patent and was not considered during prosecution of the '950 patent.

C. Iwasaki

67. U.S. Patent Application Publication No. 2007/0189758 ("Iwasaki") was filed January 24, 2007 and published on August 16, 2007, which predates the earliest priority date of November 28, 2008, of the '950 patent. EX1007, cover page. Iwasaki is prior art under at least 35 U.S.C. § 102(b).

68. Iwasaki relates to a camera and imaging method for appropriately photographing scenes having large differences in luminance. *Id.*, Abstract, Paragraph [0007]. Iwasaki discloses a photometry section that obtains photometry values at multiple positions of a subject, an exposure calculating section that obtains exposure values based on the photometry values, and a correction calculating section that obtains correction values based on the highest values among the photometry values belonging to a predetermined range. *Id.*, Paragraph [0009].

69. The system performs subject segmentation processing to group pixels

into areas belonging to the same subject, calculates average luminance values for each grouped area, and determines proper exposure values so that the average luminance value of the group including the main subject becomes the standard output value. *Id.*, Paragraphs [0080]-[0082]. Iwasaki teaches excluding groups showing average luminance values that are larger than a predetermined value from exposure calculations and determining the highest remaining value as the basis for exposure correction. *Id.*, Paragraphs [0083]-[0084]. The system automatically adjusts exposure correction values and gradation characteristic data based on difference values between proper exposure values and the highest values to prevent white saturation of high-luminance subjects and black saturation of low-luminance subjects. *Id.*, Paragraphs [0085], [0086], and [0108]. The system selects gradation characteristic data suitable for processing the image data based on the combination of a proper exposure value and the highest value or the difference value from the photographing condition data. *Id.*, Paragraphs [0085], [0086], and [0105]. Digital processing circuit 37 then executes gradation conversion processing based on the selected gradation characteristic data to generate the appropriate photographed image data. *Id.*, Paragraphs [0100] and [0106].

70. Iwasaki is analogous art to the '950 patent and was not considered during prosecution of the '950 patent.

VI. GROUND 1: CLAIMS 1-15 ARE OBVIOUS OVER TSUJINO IN VIEW OF IWASAKI

A. Proposed Combination

73. In my opinion, Tsujino in view of Iwasaki discloses and renders obvious claims 1-15 of the '950 patent. A POSITA would have been motivated to combine Tsujino and Iwasaki because both references address the common problem of improving camera performance in challenging lighting conditions through selective evaluation of image regions. Tsujino teaches a system for excluding high-luminance pixels from autofocus evaluation to prevent focus errors caused by bright light sources. EX1005, 12:45-58. Iwasaki complements this approach by teaching exposure control techniques that similarly exclude problematic high-luminance regions from exposure calculations. EX1007, Paragraph [0084].

74. Both references employ analogous methodologies of analyzing image regions and selectively excluding certain areas from processing to achieve better results. Tsujino's high-luminance excluding function for AF control and Iwasaki's technique of excluding groups with average luminance values that are larger than a predetermined value from exposure calculations represent the same underlying principle applied to different camera functions. EX1005, 12:45-58; EX1007, Paragraph [0084].

75. A POSITA would have recognized that combining these complementary techniques would result in a comprehensive camera system capable of handling both autofocus and exposure control in scenes with challenging lighting conditions. Iwasaki's teachings would naturally extend Tsujino's selective evaluation approach from AF control to AE control, as both processes benefit from accurate scene analysis that excludes potentially misleading high-luminance regions. EX1007, Paragraphs [0056]-[0058], [0085], [0086], [0100], and [0105]-[0106].

76. The combination would have been straightforward for a POSITA because both references use similar hardware architectures (image sensors, processing circuits, CPUs) and compatible image processing techniques (luminance evaluation, region-based analysis). EX1005, Fig. 1; EX1007, Paragraphs [0053]-[0058]. A POSITA would have had a reasonable expectation of success in combining these references to create an improved camera system with enhanced performance in both focus and exposure control under difficult lighting conditions.

B. Claim 1

77. In my opinion, Tsujino in view of Iwasaki discloses claim 1.

[1pre] ("A signal processor comprising:")

78. In my opinion, Tsujino discloses a signal processor for image processing that performs autofocus and exposure control functions. EX1005, Fig. 1, 6:8-20. The signal processor in Tsujino includes multiple components working together to process image signals, including CDS/AGC/AD circuit 20 that performs correlated double sampling, automatic gain control, and analog-to-digital conversion on raw image signals. *Id.*, Fig. 1, 6:8-41. Additional processing components include signal-processing circuit 26 that applies white-balance adjustment and other image processing, luminance evaluation circuit 28 that calculates luminance evaluation values, focus evaluation circuit 30 that calculates focus evaluation values, and CPU 46 that controls these components based on the evaluation results. *Id.*, Fig. 1, 6:16-41, 7:4-41. Together, these components form a comprehensive signal processor that analyzes image data and controls various camera functions based on the analysis results. *Id.*, Fig. 1, 6:8-7:41.

79. The above argument also applies to preambles of claims 2-15.

[1a] ("a feature detection unit which detects a position where features of each pixel of an input picture signal have changed;")

80. In my opinion, Tsujino in view of Iwasaki discloses this element. Tsujino discloses a CMOS-type image sensor that converts an optical image into a digital image. EX1005, 6:10-16. Further, Tsujino discloses CPU 46 detecting positions of high-luminance pixels that exceed a threshold by implementing a

process that evaluates each pixel in the focus area to determine if its luminance value exceeds predefined thresholds. EX1005, Fig. 12, 11:26-36. When a light source is detected in the scene, TH1 is used as the reference value (REF) for excluding high-luminance pixels from evaluation. *Id.*, Fig. 12, 11:47-55. This detection process systematically scans through the image in a raster scanning mode to identify positions where the luminance characteristics meet the specified criteria. *Id.*, Fig. 12, 11:26-36. Tsujino's pixel-by-pixel analysis identifies changes in luminance for each pixel of the input picture signal. *Id.*, 11:26-36. Therefore, Tsujino discloses a feature detection unit that detects a position where features of each pixel of an input picture signal have changed.

81. To the extent Patent Owner argues that Tsujino may not specifically teach detecting positions where features of pixels "have changed," Tsujino discloses data changes at the position of the light source, where "exceeding TH1" indicates a degree of change in data due to the light source. This corresponds to the '950 patent's disclosure where signal intensity distribution 13 changes at the position of the light source (*see* Fig. 2 of the '950 patent), and at the same position, differential result 14 also changes and exceeds a threshold due to the light source (*see* '950 patent, 3:32-42). Thus, a POSITA would have understood that the claimed "detecting a position where features of each pixel have changed" and Tsujino's threshold-based detection method are functionally equivalent because

Tsujino's method identifies positions where pixel luminance values differ from a baseline threshold value, which represents a change in pixel characteristics. *Id.*, Fig. 12, 11:26-36. A POSITA would have recognized that when Tsujino's system detects pixels exceeding luminance thresholds, it is identifying positions where pixel features have changed relative to a reference state (*i.e.*, below-threshold state), which is particularly relevant when identifying high-luminance areas that affect autofocus performance. *Id.*, Fig. 12, 11:26-36.

82. Furthermore, to the extent Patent Owner still argues that Tsujino may not specifically teach detecting positions where features of pixels "have changed," a POSITA would have understood that Tsujino's threshold-based detection method considers a baseline range of luminance values that are below a threshold value and identifies pixel positions whose luminance values exceed that baseline (*i.e.*, luminance values that are higher than a threshold). This detection therefore identifies pixel locations whose luminance values have changed compared to the luminance values of other pixel locations in the image. Once again, this identification is particularly relevant when identifying high-luminance areas that affect autofocus performance. *Id.*, Fig. 12, 11:26-36.

83. In addition, Iwasaki teaches feature detection through its analyzing calculating section 34 that performs subject segmentation processing to group pixel areas belonging to the same subject and calculates average luminance values for

each grouped area. EX1007, Paragraphs [0080]-[0082]. This segmentation identifies positions where different subjects with different luminance characteristics are located, which corresponds to detecting positions where pixel features have changed. The combination of Tsujino's threshold-based detection and Iwasaki's subject-based grouping provides a comprehensive approach to feature detection.

84. Tsujino and Iwasaki disclose this element under either the POM of the element or the MPF interpretation. Tsujino and Iwasaki disclose the same or equivalent structures as referenced in the claim construction section above—software algorithms executing on signal processors (Tsujino CPU 46 in Fig. 1, Iwasaki analyzing calculating section 34 and CPU 42) that analyze pixel data to identify changes in image features.

[1b] ("a region creation unit which creates a region by removing pixels with the features from an evaluated value extraction region;")

85. In my opinion, Tsujino in view of Iwasaki teaches this element. Tsujino teaches a system where CPU 46 designates evaluation areas on the object scene image and modifies focus evaluation values based on brightness characteristics. EX1005, Fig. 1, 12:41-45. CPU 46 implements a high-luminance excluding function that excludes pixels having luminance exceeding a threshold "TH1" from being considered during focus evaluation. *Id.*, Fig. 1, 12:45-58. This

exclusion process creates regions where certain pixels (high-luminance pixels) are excluded from consideration during the evaluation process. *Id.*, Fig. 1, 12:41-45.

86. While the claim recites creating a region by removing pixels with the features from an evaluated value extraction region, Tsujino teaches excluding high-luminance pixels from focus evaluation consideration. A POSITA would have understood that these teachings are functionally equivalent because in both cases, specific pixels with particular characteristics (high luminance) are identified and removed from the evaluation process, thereby creating a modified region consisting of only those pixels that remain after the exclusion process.

87. In addition, Iwasaki complements this approach by teaching a system that excludes groups showing average luminance values that are larger than a predetermined value from exposure calculations and determines the highest remaining value as the basis for processing. EX1007, Paragraph [0084]. This exclusion process creates modified regions by removing problematic luminance areas from consideration, which reinforces Tsujino's approach of creating regions by removing pixels with certain characteristics from evaluation regions.

88. Tsujino and Iwasaki disclose this element under either the POM of the element or the MPF interpretation. Tsujino and Iwasaki disclose the same or equivalent structures as referenced in the claim construction section above—software algorithms executing on signal processors (Tsujino CPU 46 in Fig. 1,

Iwasaki analyzing calculating section 34 and CPU 42) that manipulate pixel data to define specific regions for evaluation by excluding pixels with particular characteristics.

[1c] ("an evaluated value extraction unit which extracts an evaluated value in accordance with the evaluated value extraction region;")

89. In my opinion, Tsujino in view of Iwasaki teaches this element.

Tsujino teaches a system that calculates evaluation values from pixels in the region for autofocus control. EX1005, Fig. 12, 11:56-67. The system processes focus evaluation values by determining whether luminance evaluation values exceed threshold values. *Id.*, Fig. 12, 11:56-67. Specifically, when a vertical synchronization signal is generated, the system iterates coordinate values corresponding to an 8x8 block of pixels and evaluates whether non-excluded luminance evaluation values at those coordinates exceed predetermined thresholds. *Id.*, Fig. 12, 11:56-67. When the luminance value at a particular coordinate exceeds the predetermined threshold TH1, the system may modify focus evaluation values according to specific equations. In this way, Tsujino discloses extracting evaluated values (luminance evaluation values) in accordance with the evaluated value extraction region (non-excluded low-luminance pixels). *Id.*, Fig. 12, 11:56-67. This extraction process allows the system to properly adjust focus based on

relevant pixel data while excluding potentially problematic high-luminance pixels.

Id., 12:1-10.

90. In addition, Iwasaki teaches extracting evaluated values through its analyzing calculating section 34 that performs divided photometry to obtain luminance values corresponding to respective pixels or groups of pixels and calculates proper exposure values based on these measurements. EX1007, Paragraphs [0079], [0082]. This extraction of photometric values from defined subject groups complements Tsujino's focus evaluation value extraction, demonstrating that evaluated value extraction from modified regions was well known in the art.

91. Tsujino and Iwasaki disclose this element under either the POM of the element or the MPF interpretation. Tsujino and Iwasaki disclose the same or equivalent structures as referenced in the claim construction section above—software algorithms executing on signal processors and evaluation circuits (Tsujino's focus evaluation circuit 30 and luminance evaluation circuit 28 in Fig. 1, Iwasaki analyzing calculating section 34) that perform calculations on pixel data within defined regions.

[1d] ("a processing unit which applies predetermined processing to the picture signal; and")

92. In my opinion, Tsujino in view of Iwasaki discloses this element.

Tsujino discloses a processing unit (CDS/AGC/AD circuit 20) applying predetermined processing to the picture signal. EX1005, Fig. 1. This circuit performs multiple predetermined signal processing functions including correlated double sampling, automatic gain control, and analog-to-digital conversion on the raw image signal when driven by driver 22. *Id.*, 6:31-36. CDS/AGC/AD circuit 20 receives the raw image signal output from imaging portion 18 and applies these predetermined processing operations to prepare the signal for further processing. *Id.*, Fig. 1, 6:31-36. Additionally, Tsujino discloses signal-processing circuit 26 that applies further processing, including white-balance adjustment, color separation, and YUV conversion to the raw image data outputted from CDS/AGC/AD circuit 20. *Id.*, 6:32-41. This signal processing functionality may be considered part of the overall processing unit that handles various aspects of image processing in Tsujino's system. *Id.*, Fig. 1.

93. In addition, Iwasaki teaches a comprehensive processing unit including second digital processing circuit 37 that executes various image processing operations such as defective pixel correction, gradation conversion, white balancing, and edge enhancement on the image signals. EX1007, Paragraphs [0064]-[0065]. This processing unit applies predetermined processing operations to picture signals, complementing Tsujino's CDS/AGC/AD circuit and

signal processing circuit to show that comprehensive signal processing was well established in the art.

94. Tsujino and Iwasaki disclose this element under either the POM of the element or the MPF interpretation. Tsujino and Iwasaki disclose the same or equivalent structures as referenced in the claim construction section above—signal processing circuits and algorithms (Tsujino CDS/AGC/AD circuit 20 and signal-processing circuit 26 in Fig. 1, Iwasaki second digital processing circuit 37 and analog processing circuit 36) that apply predetermined processing operations to image signals.

[1e] ("a control unit which controls the processing unit in accordance with the evaluated value having been extracted by the evaluated value extraction unit;")

95. In my opinion, Tsujino in view of Iwasaki discloses this element. Tsujino discloses a control unit (CPU 46) that controls the processing unit (CDS/AGC/AD circuit 20 and signal processing circuit 26) based on evaluated values (luminance evaluation values) extracted from the image. EX1005, Fig. 1 element 46. CPU 46 analyzes luminance evaluation values from luminance evaluation circuit 28 to calculate appropriate exposure values. *Id.*, 7:4-8. Based on these evaluated values, CPU 46 controls various processing parameters including aperture settings and exposure timing. *Id.*, 7:8-11. This control relationship

directly affects image processing operations, as CPU 46 adjusts brightness parameters of the displayed image according to the evaluation values. *Id.*, 7:11-12. Furthermore, CPU 46 also uses luminance evaluation values from luminance evaluation circuit 28 to calculate focus evaluation values and based on those values controls the focus lens position. *Id.*, 7:20-23; *see also id.*, 9:64-10:41 and 13:20-23. CPU 46 operation demonstrates how it controls the processing unit (CDS/AGC/AD circuit 20) based on evaluated values (luminance evaluation values) that have been extracted by the evaluation circuits in the system. *Id.*, Fig. 1 element 46, 7:4-12.

96. While Tsujino primarily discusses AF control, Iwasaki teaches complementary techniques for exposure control based on selective evaluation of image regions. Iwasaki discloses an analog processing circuit and digital processing circuit that perform various image processing functions, including analyzing calculating section 34 performing calculations for analyzing the image. EX1007, Paragraphs [0053]-[0058]. Under control of Iwasaki's CPU 42, analyzing calculating section 34 calculates exposure correction values based on the difference between proper exposure values and upper limit luminance values in predetermined luminance ranges, and determines appropriate gradation characteristics for image processing. EX1007, Paragraphs [0056]-[0058]. Iwasaki's CPU 42 in conjunction with recording calculating section 38 controls

second digital processing circuit 37 to execute various image processing operations on the image including defective pixel correction, gradation conversion, white balancing, and edge enhancement using the values extracted by analyzing calculating section 34. EX1007, Paragraphs [0064]-[0065] and annotated Fig. 1 below showing the control path.

97. During operation, CPU 42 instructs analyzing calculating section 34 to perform divided photometry to obtain luminance values corresponding to respective pixels or groups of pixels. EX1007, Paragraph [0079]. Iwasaki's system calculates proper exposure values so that the average luminance value of the group including the main subject becomes the standard output value. EX1007, Paragraph [0082]. Notably, Iwasaki teaches excluding groups showing average luminance values that are larger than a predetermined value from exposure calculations and determining the highest remaining value as the basis for exposure correction. EX1007, Paragraph [0084].

98. Under control of Iwasaki's CPU 42, both analyzing calculating section 34 and recording calculating section 38 select appropriate gradation characteristic data based on the combination of proper exposure value and the highest value, and instruct digital processing circuit 37 to execute gradation conversion processing according to the selected characteristics. EX1007, Figs. 4 and 14, Paragraphs [0058] and [0105]-[0106]. These teachings from Iwasaki

complement Tsujino's system by providing sophisticated techniques for selectively processing image regions to improve the overall image quality. By incorporating Iwasaki's approach of excluding high-luminance groups from exposure calculations, Tsujino's system could achieve more balanced exposure across challenging lighting conditions, preserving details in both shadows and highlights that would otherwise be lost. Furthermore, Iwasaki's gradation conversion processing enhances Tsujino's capability to render scenes with high dynamic range, allowing the combined system to produce more visually appealing images with natural-looking contrast and improved detail retention in both bright and dark areas.

99. Tsujino and Iwasaki disclose this element under either the POM of the element or the MPF interpretation. Tsujino and Iwasaki disclose the same or equivalent structures as referenced in the claim construction section above—software algorithms executing on signal processors (Tsujino CPU 46 in Fig. 1, Iwasaki CPU 42 in conjunction with recording calculating section 38) that control processing operations based on evaluated values.

[1f] ("wherein the control unit controls the processing unit by using an evaluated value of a region from which pixels having an extracted predetermined feature are removed.")

100. In my opinion, Tsujino in view of Iwasaki discloses this element.

Tsujino discloses a control unit (CPU 46) that controls the processing unit (CDS/AGC/AD circuit 20) based on evaluated pixel values (luminance evaluation values) from regions from which pixels having an extracted predetermined feature have been removed (non-excluded low-luminance pixels). EX1005, 7:4-12. CPU 46 calculates appropriate exposure values using luminance evaluation values from the luminance evaluation circuit. *Id.*, 7:4-8. These calculated exposure values are then used to control aperture settings and exposure timing through the driver as well as other features such as automatic gain control 20. *Id.*, 7:8-11. The system adjusts the brightness of displayed images based on these evaluations. *Id.*, 7:11-12. Furthermore, CPU 46 also uses luminance evaluation values from luminance evaluation circuit 28 to calculate focus evaluation values and based on those values controls the focus lens position. *Id.*, 7:20-23; *see also id.*, 9:64-10:41 and 13:20-23. Tsujino's system excludes high-luminance pixels (those exceeding threshold TH1) from the evaluation process and then uses the luminance evaluation values from the remaining pixels to control various camera functions. *Id.*, 11:26-36. This approach allows the system to make more accurate adjustments by removing potentially problematic high-luminance areas from consideration when determining control parameters. *Id.*, 6:26-36.

101. While Tsujino primarily discusses AF control, Iwasaki teaches complementary techniques for AE control based on selective evaluation of image regions. As discussed above in element [1e], Iwasaki's system calculates proper exposure values and excludes groups showing average luminance values that are larger than a predetermined value from exposure calculations and determining the highest remaining value as the basis for exposure correction during AE control. EX1007, Paragraphs [0082], [0084]. These teachings from Iwasaki complement Tsujino's system by providing techniques for selectively processing image regions to improve the overall image quality. This extension of Tsujino's teachings to AE control result in more precise exposure adjustments, improving the overall image quality. *Id.*, 7:4-12.

102. Tsujino and Iwasaki disclose this element under either the POM of the element or the MPF interpretation. Tsujino and Iwasaki disclose the same or equivalent structures as referenced in the claim construction section above—software algorithms executing on signal processors (Tsujino CPU 46 in Fig. 1, Iwasaki CPU 42 in conjunction with recording calculating section 38) that control processing operations based on evaluated values.

C. Claim 2

103. Claim 2 depends from claim 1. In my opinion, Tsujino in view of Iwasaki teaches or renders obvious all the elements of claim 1, as described above.

See elements [1pre]-[1f]. Tsujino in view of Iwasaki also discloses or renders obvious all the elements of claim 2 as described below.

[2a] ("the feature detection unit includes: a hold unit which holds position information of the detected pixels; and")

104. In my opinion, Tsujino teaches various memory components including SDRAM 34, memory control circuit 32, and other storage elements that function as working memory for CPU 46 and signal processing unit. EX1005, Fig. 1, 7:33-41. These memory components store image data and support various processing operations performed by the system. *Id.*, Fig. 1, 7:33-41. The memory control circuit manages data flow between storage components and processing units, allowing for efficient handling of image information. *Id.*, Fig. 1, 7:33-41. While the claim recites hold unit that holds position information of detected pixels, Tsujino's memory system performs analogous functions by storing and managing image data that contains position information. *Id.*, Fig. 1, 7:33-41. A POSITA would have understood that Tsujino's memory components store position information of detected pixels because such information is required for the system to perform its image processing functions, including the pixel-by-pixel analysis described throughout Tsujino's disclosure.

105. Tsujino and Iwasaki disclose a hold unit under either the POM of the element or the MPF interpretation. Tsujino and Iwasaki disclose the same or

equivalent structures as referenced in the claim construction section above—

software algorithms executing on signal processors (Tsujino CPU 46 with SDRAM 34 in Fig. 1, Iwasaki CPU 42 with memory resources) utilizing memory components for storing and retrieving position information of detected pixels.

[2b] ("the region creation unit which creates a region by excluding the held positions from an evaluated value extraction region.")

106. As discussed in element [1b], Tsujino teaches a region creation unit that identifies and removes high-luminance pixels from an evaluated value extraction region. Additionally, as explained in element [2a], Tsujino's system includes memory components (*e.g.*, RAM) that store image data and processing information. In my opinion, a POSITA would have understood that these memory components would store the position information of the detected high-luminance pixels in order for the system to properly exclude them from evaluation. The combination of the elements described in elements [1a] and [2a] allows Tsujino's system to process images while avoiding the negative effects of high-luminance areas on focus evaluation.

D. Claims 3 and 12

107. Claim 3 depends from claim 2. Claim 12 depends from claim 1. Claims 3 and 12 recite identical elements. In my opinion, Tsujino in view of Iwasaki discloses or renders obvious all the elements of claims 1 and 2 as

described above. *See* elements [1pre]-[1f] and [2a]-[2b]. Tsujino in view of Iwasaki also discloses or renders obvious all the elements of claims 3 and 12 as described below.

[3a] and [12a] ("the processing unit includes a focus lens, and a drive unit for driving the focus lens;")

108. In my opinion, Tsujino discloses a processing unit that includes focus lens 12 and CPU 46. EX1005, Fig. 1. Tsujino teaches that focus lens 12 moves in a direction that increases the total value of focus evaluation values. *Id.*, 12:4-6. Driver 22 controls various components of image sensor 16 and logically extend to controlling the movement of focus lens 12. *Id.*, Fig. 1, 7:1-12. Additionally, CPU 46 executes the AF process and sends control signals that drive focus lens 12 to the appropriate position. *Id.*, 12:1-10. A POSITA would have understood that either driver 22 or CPU 46 (or both working together) function as the drive unit for driving the focus lens in Tsujino's system, as some mechanism exists to physically move the lens in response to the AF process calculations performed by CPU 46.

[3b] and [12b] ("a photoelectric conversion unit for performing photoelectric conversion is disposed between the focus lens and the extraction unit; and")

109. In my opinion, Tsujino discloses an imaging element positioned between the focus lens and the processing components that performs photoelectric

conversion of the optical image. *Id.*, Fig. 1 element 18, 6:10-15. Imaging portion 18 of image sensor 16 receives light that passes through lens 12 and converts it to electrical signals that are then processed by subsequent components. *Id.*, Fig. 1, 6:10-15. This arrangement in Tsujino shows the photoelectric conversion unit (imaging sensor 16) positioned in the optical path between focus lens 12 and the extraction/processing units that analyze the image data. *Id.*, Fig. 1.

110. Tsujino and Iwasaki disclose this element under either the POM of the element or the MPF interpretation. Tsujino and Iwasaki disclose the same or equivalent structures as referenced in the claim construction section above—image sensors (Tsujino imaging portion 18 in Fig. 1, Iwasaki recording-purpose image pickup device 17) that convert light into electrical signals representing image intensity.

[3c] and [12c] ("the control unit controls the processing unit by using an evaluated value of a region from which pixels having an extracted predetermined feature are removed.")

111. *See* element [1f].

E. Claims 4 and 14

112. Claim 4 depends from claim 2. Claim 14 depends from claim 1. Claims 4 and 14 recite identical elements. In my opinion, Tsujino in view of Iwasaki discloses or renders obvious all the elements of claims 1 and 2 as

described above. *See* elements [1pre]-[1f] and [2a]-[2b]. Tsujino in view of Iwasaki also discloses or renders obvious all the elements of claims 4 and 14 as described below.

[4a] and [14a] ("the processing unit is a signal processing unit for adjusting white balance of an input picture signal; and")

113. In my opinion, Tsujino discloses a signal-processing circuit that performs various image processing functions including white-balance adjustment to the raw image data. EX1005, Fig. 1 element 26, 6:36-41. Signal-processing circuit 26 in Tsujino processes the raw image data outputted from CDS/AGC/AD circuit 20 and applies white-balance adjustment as part of its image processing operations. *Id.*, 6:36-41. This signal processing unit is controlled by CPU 46 which adjusts various parameters based on evaluation values. *Id.*, 7:8-12.

[4b] and [14b] ("the control unit controls the processing unit by using an evaluated value of a region from which pixels having an extracted predetermined feature are removed.")

114. *See* element [1f].

F. Claims 5 and 8

115. Claim 5 depends from claim 2. Claim 8 depends from claim 7. Claims 5 and 8 recite identical elements. In my opinion, Tsujino in view of Iwasaki discloses or renders obvious all the elements of claims 2 and 7 as

described above and below. *See* elements [1pre]-[1f] and [7a]-[7c]. Tsujino in view of Iwasaki also discloses or renders obvious all the elements of claims 5 and 8 as described below.

[5a] and [8a] ("the region creation unit includes a region segmentation unit for segmenting an effective region in advance, and an overlap detection unit which detects overlap of position information output from the hold unit with blocks segmented by the region segmentation unit; and")

116. In my opinion, Tsujino teaches dividing the focus area into multiple evaluation areas, which can be implemented by processing unit 26 that divides the imaging area into discrete blocks for evaluation purposes. *Id.*, Fig. 2, 6:48-52. Tsujino further discloses that the processing unit determines the presence of high-luminance pixels within these evaluation regions and tracks their positions. This functionality corresponds to the recited overlap detection unit. *Id.*, Fig. 11, 11:55-65. The system in Tsujino systematically processes each coordinate position within the focus area, determining whether luminance values exceed specific thresholds at each position. *Id.*, 11:55-60. When processing each coordinate, the system updates positions in a raster scanning direction and checks whether the updated coordinates have reached the end of the evaluation area. *Id.*, 11:60-65. This coordinate-based tracking and threshold comparison functions as an overlap detection mechanism that identifies when pixels with specific characteristics (such

as high luminance values) overlap with or exist within the segmented evaluation blocks. *Id.*, Fig. 13-14, 12:1-10. A POSITA would have understood that Tsujino's pixel-level analysis could be adapted to work with block-based processing, as both approaches aim to mitigate the effects of high-luminance areas on image processing. Tsujino executes the "AF process" in the form of coordinate blocks after the light-source determining process, which aligns with the block-based approach of the claimed overlap detection unit. *Id.*, Fig. 13 S43. Thus, a POSITA would have understood that Tsujino's coordinate-based tracking system functions in the same way as the claimed "overlap detection unit" because both systems identify the presence of pixels with specific characteristics within defined regions of an image to enable appropriate processing of those regions.

117. While Tsujino teaches pixel-level detection and removal methods, and Iwasaki teaches subject segmentation processing that groups pixels into areas belonging to the same subject (Paragraphs [0080]-[0082]), a POSITA would have been motivated to combine these approaches. Specifically, a POSITA would apply Iwasaki's block segmentation approach first to partition the image into multiple regions, then apply Tsujino's pixel-level detection and removal method to each of those pre-segmented blocks. This combination addresses the sequence required by the claims: first segmenting regions in advance, then detecting overlap of individual pixel positions with those segmented blocks.

118. Tsujino and Iwasaki disclose a region segmentation unit and overlap detection unit under either the POM of the element or the MPF interpretation. Tsujino and Iwasaki disclose the same or equivalent structures as referenced in the claim construction section above—software algorithms executing on signal processors (Iwasaki analyzing calculating section 34 and CPU 42 for region segmentation, and Tsujino's CPU 46 for pixel-level overlap detection in those regions) that divide images into multiple regions for analysis, and—compare individual pixel positions with predefined regions through coordinate-based tracking and threshold comparison applied to the pre-segmented blocks.

[5b] and [8b] ("the control unit controls the processing unit by using an evaluated value of a region from which pixels having an extracted predetermined feature are removed.")

119. *See* element [1f].

G. Claims 6, 9, 11, 13, and 15

120. Claim 6 depends from claim 2. Claim 9 depends from claim 7. Claim 11 depends from claim 1. Claim 13 depends from claim 12. Claim 15 depends from claim 14. Claims 6, 9, 11, 13, and 15 recite identical elements. In my opinion, Tsujino in view of Iwasaki discloses or renders obvious all the elements of claims 1, 2, 7, 12, and 14 as described in the sections above and below. *See* elements [1pre]-[1f], [2a]-[2b], [7a]-[7c], [12a]-[12c], and [14a]-[14b]. Tsujino in

view of Iwasaki also discloses or renders obvious all the elements of claims 6, 9, 11, 13, and 15 as described below.

[6a], [9a], [11a], [13a], and [15a] ("wherein the region creation unit includes a unit which keeps the total area of the evaluated value extraction region constant by excluding unnecessary portions from the evaluated value extraction region.")

121. In my opinion, Tsujino shows evaluation areas arranged in a grid pattern with a defined structure covering a specific portion of the imaging surface. EX1005, Fig. 2. Tsujino teaches a focus evaluation process that selectively excludes high-luminance pixels exceeding threshold TH1 from focus evaluation processing. *Id.*, 12:45-58. When the system excludes these pixels, the overall evaluation area remains intact while only the processing of specific pixels within that framework changes. *Id.*, Fig. 4, 9:55-63. These claims all require “keeps the total area of the evaluated value extraction region constant by excluding unnecessary portions from the evaluated value extraction region,” and Tsujino’s system accomplishes this by maintaining the same evaluation grid structure while selectively excluding specific pixels within that structure that would otherwise negatively impact accurate focus evaluation. *Id.*, 9:55-10:41.

H. Claims 7 and 10

122. Claim 7 depends from claim 2. Claim 10 depends from claim 1.

Claims 7 and 10 recite identical elements. In my opinion, Tsujino in view of Iwasaki discloses or renders obvious all the elements of claims 1 and 2 as described above. *See* elements [1pre]-[1f] and [2a]-[2b]. Tsujino in view of Iwasaki also discloses or renders obvious all the elements of claims 7 and 10 as described below.

[7a] and [10a] ("the processing unit is a light intensity adjustment unit for controlling exposure;")

123. In my opinion, Tsujino teaches aperture unit 14 that functions as a light intensity adjustment unit for controlling exposure in the camera system. EX1005, Fig. 1, element 14. Aperture unit 14 shown in Tsujino's Fig. 1 is designed to adjust the amount of light entering the imaging system, which directly controls the exposure of the captured image. *Id.*, 7:4-12. Tsujino further explains that CPU 46 sets an amount of aperture to aperture unit 14 based on calculated appropriate EV values, demonstrating that this component actively controls light intensity for proper exposure. *Id.*, 7:13-23.

124. Tsujino and Iwasaki disclose a light intensity adjustment unit under either the POM of the element or the MPF interpretation. Tsujino and Iwasaki disclose the same or equivalent structures as referenced in the claim construction

section above—controllable mechanisms for adjusting exposure (Tsujino aperture unit 14 in Fig. 1, Iwasaki mechanical shutter 16 and aperture 14).

[7b] and [10b] ("a lens and a photoelectric conversion unit for performing photoelectric conversion are disposed between the light intensity adjustment unit and the extraction unit; and")

125. In my opinion, Tsujino discloses a lens and an image sensor that performs photoelectric conversion as shown in the system diagram. EX1005, Fig. 1, elements 12, 18. Imaging portion 18 performs photoelectric conversion of the optical image that passes through lens 12. *Id.*, 6:8-16. While Tsujino's figures show the lens positioned before the aperture, a POSITA would have understood that the relative positioning of the lens and aperture could be reversed without affecting the functionality of the system. This represents a routine design choice in optical systems where components may be rearranged based on factors such as space constraints, manufacturing considerations, or specific optical performance requirements while maintaining the same functional relationship between components. *Id.*, Fig. 1.

126. Tsujino and Iwasaki disclose this element under either the POM of the element or the MPF interpretation. Tsujino and Iwasaki disclose the same or equivalent structures as referenced in the claim construction section above—movable optical lens components (Tsujino focus lens 12 in Fig. 1, Iwasaki

focusing lens 13) capable of being repositioned to adjust focus, and—image sensors (Tsuji no imaging portion 18 in Fig. 1, Iwasaki recording-purpose image pickup device 17) that convert light into electrical signals representing image intensity.

[7c] and [10c] ("the control unit controls the processing unit by using an evaluated value of a region from which pixels having an extracted predetermined feature are removed.").

127. *See* element [1f].

128. If Patent Owner argues that Tsujino in view of Iwasaki does not disclose any element of the challenged claims, such element would have nonetheless been obvious to a POSITA in light of Tsujino and Iwasaki. Practicing any element of the challenged claims in light of Tsujino and Iwasaki would have been within the knowledge and skill of a POSITA, would have required minimal effort, would have yielded predictable results, would have been fully compatible with Tsujino and Iwasaki, and would have been a mere design choice. Motivation to do so arises from at least common sense and the disclosures of Tsujino and Iwasaki set forth above.

VII. GROUND 2: CLAIMS 1-15 ARE OBVIOUS OVER TSUJINO IN VIEW OF SHUI AND IWASAKI

A. Proposed Combination

129. In my opinion, Tsujino in view of Shui and Iwasaki discloses and renders obvious claims 1-15 of the '950 patent. A POSITA would have combined Tsujino, Shui, and Iwasaki by incorporating Shui's techniques for detecting changes in pixel features and creating regions by removing pixels with specific features from an evaluated value extraction region, along with Iwasaki's techniques for controlling processing based on evaluated values, into Tsujino's signal processor. EX1006, Paragraph [0016]; EX1007, Paragraph [0057]. Specifically, Tsujino's system can be modified to incorporate Shui's methods for detecting positions where features of pixels have changed (such as detecting positions where focus evaluation values peak and calculating differences between photometric values) and creating regions by excluding pixels with certain features from evaluation, while further implementing Iwasaki's approach to controlling image processing based on evaluation values extracted from regions where problematic pixels have been removed. EX1006, Paragraph [0011]; EX1007, Paragraph [0057].

130. Tsujino already teaches a signal processor that performs autofocus and exposure control functions through its image sensor and processing components. EX1005, Fig. 1 element 26. Shui enhances this functionality by teaching a focal position detection method that obtains focus evaluation values and photometric values across the entire field from minimum distance to infinity,

detects peak positions, and calculates differences between values at different positions to identify changes in pixel features. EX1006, Paragraph [0011].

Iwasaki further improves the system by providing a control unit that controls processing units based on evaluated values extracted from regions where pixels with certain features have been removed, allowing for more accurate exposure control and image processing. EX1007, Paragraphs [0042], [0057].

131. A POSITA would have been motivated to combine Tsujino, Shui, and Iwasaki because all three references address related technical problems of improving image capture performance in challenging lighting conditions.

132. Such a combination involves integrating prior art elements according to known methods to yield predictable results. Tsujino already provides a framework for excluding high-luminance pixels from focus evaluation through its high-luminance excluding function. EX1005, cols. 7:4-12 and 11:26-36. Shui enhances this capability by teaching specific methods for detecting positions where focus evaluation values peak and calculating differentials between photometric values to identify changes. EX1006, Paragraph [0016]. Iwasaki adds a control unit that controls various processing units (including focus lens driving, exposure adjustment, and image processing) based on evaluated values extracted from regions where problematic pixels have been removed. EX1007, Paragraphs [0042], [0057]-[0058].

133. When these references are combined, the resulting system would provide improved performance in challenging lighting conditions by not only excluding problematic high-luminance pixels from focus evaluation but also using the resulting evaluated values to control various processing operations. A POSITA would have had a reasonable expectation of success in making this combination because all three references use similar hardware components (imaging sensors, processing units) and image processing techniques (focus evaluation, photometric analysis, exposure control) that can be integrated through software modifications to existing camera systems.

B. Claim 1

134. In my opinion, Tsujino in view of Shui and Iwasaki discloses claim 1.

[1pre] ("A signal processor comprising:")

135. *See* Ground 1, element [1pre].

136. The above argument also applies to preambles of claims 2-15.

[1a] ("a feature detection unit which detects a position where features of each pixel of an input picture signal have changed;")

137. *See* Ground 1, element [1a].

138. In my opinion, Tsujino, Shui, and Iwasaki disclose this element under either the POM of the element or the MPF interpretation. These references disclose the same or equivalent structures as referenced in the claim construction

section above—software algorithms executing on signal processors (Tsujino CPU 46 in Fig. 1, Shui digital signal processing unit 24 and CPU 42 in Fig. 1, Iwasaki analyzing calculating section 34 and CPU 42) that analyze pixel data to identify changes in image features.

139. To the extent Patent Owner argues that Tsujino may not teach detecting positions where features of pixels have changed, Shui teaches this element through its comprehensive focus evaluation system. Shui discloses a method that obtains focus evaluation values and photometric values across the entire focal range. EX1006, Fig. 6, Paragraph [0007]. Shui detects the position X_0 where focus evaluation values peak, which represents a position where pixel features exhibit significant change in brightness. *Id.*, Paragraph [0011]. Shui further analyzes positions before and after this peak (X_1 and X_2) and calculates the differential between their photometric values (ΔY_{1-2}), which directly identifies positions where brightness characteristics change. *Id.*, Paragraph [0007]. This approach enables Shui's system to distinguish between true peaks and false peaks caused by high-luminance point light sources. *Id.*, Paragraph [0008]. When combined with Tsujino's threshold-based detection method that identifies pixels exceeding luminance thresholds, the resulting system can identify positions where pixel features change in visual characteristics. EX1005, Fig. 12 and 11:22-67.

140. The combination of Tsujino's pixel-by-pixel luminance evaluation with Shui's pixel-wise differential provides a comprehensive approach to feature detection that offers enhanced precision in identifying feature changes at the pixel level. EX1005, Fig. 12 and 11:22-67. A POSITA would have understood that Tsujino's detection of pixels exceeding brightness thresholds and Shui's detection of positions where focus evaluation values peak both represent methods of identifying positions where pixel features have changed, as both systems are designed to detect variations in pixel characteristics that affect autofocus performance. *Id.*, 11:22-65; EX1006, Paragraph [0016].

[1b] ("a region creation unit which creates a region by removing pixels with the features from an evaluated value extraction region;")

141. *See* Ground 1, element [1b].

142. In my opinion, Tsujino, Shui, and Iwasaki disclose this element under either the POM of the element or the MPF interpretation. These references disclose the same or equivalent structures as referenced in the claim construction section above—software algorithms executing on signal processors (Tsujino CPU 46 in Fig. 1, Shui digital signal processing unit 24 and CPU 42 in Fig. 1, Iwasaki analyzing calculating section 34 and CPU 42) that manipulate pixel data to define specific regions for evaluation by excluding pixels with particular characteristics.

143. To the extent Patent Owner argues that Tsujino may not explicitly teach “creating a region” within the image as claimed, Shui addresses this by teaching area-based analysis that creates regions within the image. Shui divides the focus area into multiple discrete regions for separate evaluation and processing. EX1006, Figs. 1 and 6, Paragraph [0015]. Shui’s system obtains focus evaluation values for each divided area from minimum distance to infinity, allowing for targeted analysis of specific image regions. *Id.*, Paragraph [0015]. When combined with Tsujino’s approach of excluding high-luminance pixels from evaluation, Shui’s region-based methodology provides a way to create modified regions that no longer contains problematic high-luminance pixels. *Id.*, Paragraph [0016]. This combination implements the claimed feature of creating a region by removing pixels with certain features from an evaluated value extraction region. This combined approach of Tsujino’s pixel exclusion and Shui’s area-based analysis creates a new evaluation region by excluding problematic areas which provides a more accurate representation of the scene.

144. A POSITA would have understood that Tsujino’s exclusion of high-luminance pixels from evaluation combined with Shui’s area-based analysis would result in creating regions where certain pixels are removed from evaluation, as both references aim to improve focus accuracy by selectively processing image data to exclude problematic high-luminance areas.

[1c] ("an evaluated value extraction unit which extracts an evaluated value in accordance with the evaluated value extraction region;")

145. *See* Ground 1, element [1c].

146. In my opinion, Tsujino, Shui, and Iwasaki disclose this element under either the POM of the element or the MPF interpretation. These references disclose the same or equivalent structures as referenced in the claim construction section above—software algorithms executing on signal processors and evaluation circuits (Tsujino focus evaluation circuit 30 and luminance evaluation circuit 28 in Fig. 1, Shui digital signal processing unit 24 in Fig. 1, Iwasaki analyzing calculating section 34) that perform calculations on pixel data within defined regions.

[1d] ("a processing unit which applies predetermined processing to the picture signal; and")

147. *See* Ground 1, element [1d].

148. In my opinion, Tsujino, Shui, and Iwasaki disclose this element under either the POM of the element or the MPF interpretation. These references disclose the same or equivalent structures as referenced in the claim construction section above—signal processing circuits and algorithms (Tsujino CDS/AGC/AD circuit 20 and signal-processing circuit 26 in Fig. 1, Shui analog signal processing unit 18 and digital signal processing unit 24 in Fig. 1, Iwasaki second digital

processing circuit 37 and analog processing circuit 36) that apply predetermined processing operations to image signals.

[1e] ("a control unit which controls the processing unit in accordance with the evaluated value having been extracted by the evaluated value extraction unit;")

149. *See* Ground 1, element [1e].

150. In my opinion, Tsujino, Shui, and Iwasaki disclose this element under either the POM of the element or the MPF interpretation. These references disclose the same or equivalent structures as referenced in the claim construction section above—software algorithms executing on signal processors (Tsujino CPU 46 in Fig. 1, Shui CPU 42 in Fig. 1, Iwasaki CPU 42 in conjunction with recording calculating section 38) that control processing operations based on evaluated values.

[1f] ("wherein the control unit controls the processing unit by using an evaluated value of a region from which pixels having an extracted predetermined feature are removed.")

151. *See* Ground 1, element [1f].

152. In my opinion, Tsujino, Shui, and Iwasaki disclose this element under either the POM of the element or the MPF interpretation. These references disclose the same or equivalent structures as referenced in the claim construction

section above—software algorithms executing on signal processors (Tsujino CPU 46 in Fig. 1, Shui CPU 42 in Fig. 1, Iwasaki CPU 42) that control processing operations based on evaluated values.

C. Claim 2

153. Claim 2 depends from claim 1. In my opinion, the combination of Tsujino, Shui and Iwasaki renders obvious all the elements of claim 1, as described above. *See* elements [1pre]-[1f]. The combination of Tsujino, Shui and Iwasaki also discloses or renders obvious all the elements of claim 2 as described below.

[2a] ("the feature detection unit includes: a hold unit which holds position information of the detected pixels; and")

154. *See* Ground 1, element [2a].

155. In my opinion, Tsujino, Shui, and Iwasaki disclose a hold unit under either the POM of the element or the MPF interpretation. These references disclose the same or equivalent structures as referenced in the claim construction section above—software algorithms executing on signal processors (Tsujino CPU 46 with SDRAM 34 in Fig. 1, Shui CPU 42 with RAM 46 in Fig. 1, Iwasaki CPU 42 with memory resources) utilizing memory components for storing and retrieving position information of detected pixels.

156. To the extent that Patent Owner argues that Tsujino does not disclose this feature, Shui further teaches detecting positions where focus evaluation values

peak and calculating differences between photometric values at positions before and after these peaks. EX1006, Paragraph [0011]. Shui implements memory components including ROM 44, RAM 46, and flash ROM 48 that function together to store position information and other data necessary for camera operations. *Id.*, Paragraph [0036]. RAM 46 serves as working memory that stores the detected position information during processing operations. *Id.*, Paragraph [0036]. A POSITA would have understood that Shui's memory components hold position information of detected pixels because such information is required for Shui's focus detection method to function properly when comparing values at different positions. *Id.*, Paragraph [0065]. The combination of Tsujino and Shui would result in a hold unit that holds position information of detected pixels, providing the benefit of more accurate focus detection even in challenging lighting conditions.

[2b] ("the region creation unit which creates a region by excluding the held positions from an evaluated value extraction region.")

157. *See* Ground 1, element [2b].

D. Claims 3 and 12

158. Claim 3 depends from claim 2. Claim 12 depends from claim 1.

Claims 3 and 12 recite identical elements. In my opinion, the combination of Tsujino, Shui and Iwasaki discloses or renders obvious all the elements of claims 1

and 2 as described above. *See* elements [1pre]-[1f] and [2a]-[2b]. The combination of Tsujino, Shui and Iwasaki also discloses or renders obvious all the elements of claims 3 and 12 as described below.

[3a] and [12a] ("the processing unit includes a focus lens, and a drive unit for driving the focus lens;")

159. *See* Ground 1, elements [3a] and [12a].

160. In my opinion, Tsujino, Shui, and Iwasaki disclose a drive unit under either the POM of the element or the MPF interpretation. These references disclose the same or equivalent structures as referenced in the claim construction section above—movable optical lens components (Tsujino focus lens 12 in Fig. 1, Shui focus lens 12f in Fig. 1, Iwasaki focusing lens 13) capable of being repositioned to adjust focus, and—electrical driver circuits and control components (Tsujino driver 22 in Fig. 1, Shui focus motor driver 62f in Fig. 1, Iwasaki sequence driving section 43) for controlling movement of optical components.

161. To the extent that Patent Owner argues that Tsujino does not teach this feature, Shui discloses focus lens 12f that is driven by dedicated focus motor 60f for controlling lens movement along the imaging optical axis. EX1006, Fig. 1, Paragraph [0037]. Shui further explains that focus motor 60f moves focus lens 12f back and forth on the imaging optical axis to change the image location. *Id.*, Paragraph [0037]. Additionally, Shui teaches that CPU 42 controls the driving of

focus motor 60f via focus motor driver 62f, providing a complete system for precise lens positioning. *Id.*, Paragraph [0037]. This teaching, when combined with Tsujino's focus lens system, provides a complete drive unit for driving the focus lens as claimed.

[3b] and [12b] ("a photoelectric conversion unit for performing photoelectric conversion is disposed between the focus lens and the extraction unit; and")

162. *See* Ground 1, elements [3b] and [12b].

163. In my opinion, Tsujino, Shui, and Iwasaki disclose this element under either the POM of the element or the MPF interpretation. These references disclose the same or equivalent structures as referenced in the claim construction section above—image sensors (Tsujino imaging portion 18 in Fig. 1, Shui imaging element 14 in Fig. 1, Iwasaki recording-purpose image pickup device 17) that convert light into electrical signals representing image intensity.

[3c] and [12c] ("the control unit controls the processing unit by using an evaluated value of a region from which pixels having an extracted predetermined feature are removed.")

164. *See* Ground 1, element [1f].

E. Claims 4 and 14

165. Claim 4 depends from claim 2. Claim 14 depends from claim 1.

Claims 4 and 14 recite identical elements. In my opinion, the combination of Tsujino, Shui and Iwasaki discloses or renders obvious all the elements of claims 1 and 2 as described above. *See* elements [1pre]-[1f] and [2a]-[2b]. The combination of Tsujino and Shui also discloses or renders obvious all the elements of claims 4 and 14 as described below.

[4a] and [14a] ("the processing unit is a signal processing unit for adjusting white balance of an input picture signal; and")

166. *See* Ground 1, elements [4a] and [14a].

[4b] and [14b] ("the control unit controls the processing unit by using an evaluated value of a region from which pixels having an extracted predetermined feature are removed.")

167. *See* Ground 1, element [1f].

F. Claims 5 and 8

168. Claim 5 depends from claim 2. Claim 8 depends from claim 7.

Claims 5 and 8 recite identical elements. In my opinion, Tsujino in view of Shui and Iwasaki discloses or renders obvious all the elements of claims 2 and 7 as described above and below. *See* elements [1pre]-[1f], [2a]-[2b], and [7a]-[7c]. Tsujino in view of Shui and Iwasaki also discloses or renders obvious all the elements of claims 5 and 8 as described below.

[5a] and [8a] ("the region creation unit includes a region segmentation unit for segmenting an effective region in advance, and an overlap detection unit which detects overlap of position information output from the hold unit with blocks segmented by the region segmentation unit; and")

169. *See* Ground 1, elements [5a] and [8a].

170. In my opinion, Tsujino, Shui, and Iwasaki disclose a region segmentation unit and an overlap detection unit under either the POM of the element or the MPF interpretation. These references disclose the same or equivalent structures as referenced in the claim construction section above—software algorithms executing on signal processors (Tsujino CPU 46 in Fig. 1, Shui digital signal processing unit 24 and CPU 42 in Fig. 1, Iwasaki analyzing calculating section 34 and CPU 42) that manipulate pixel data to define specific regions for evaluation by excluding pixels with particular characteristics.

[5b] and [8b] ("the control unit controls the processing unit by using an evaluated value of a region from which pixels having an extracted predetermined feature are removed.")

171. *See* Ground 1, element [1f].

G. Claims 6, 9, 11, 13, and 15

172. Claim 6 depends from claim 2. Claim 9 depends from claim 7. Claim 11 depends from claim 1. Claim 13 depends from claim 12. Claim 15 depends from claim 14. Claims 6, 9, 11, 13, and 15 recite identical elements. In my opinion, the combination of Tsujino, Shui and Iwasaki discloses or renders obvious all the elements of claims 1, 2, 7, 12, and 14 as described in the sections above and below. *See* elements [1pre]-[1f], [2a]-[2b], [7a]-[7c], [12a]-[12c], and [14a]-[14b]. The combination of Tsujino, Shui and Iwasaki also discloses or renders obvious all the elements of claims 6, 9, 11, 13, and 15 as described below.

[6a], [9a], [11a], [13a], and [15a] ("wherein the region creation unit includes a unit which keeps the total area of the evaluated value extraction region constant by excluding unnecessary portions from the evaluated value extraction region.")

173. *See* Ground 1, elements [6a], [9a], [11a], [13a], and [15a].

174. In my opinion, to the extent that patent owner argues that Tsujino does not teach this feature, Shui teaches a focus position detection method that divides the focus area into multiple regions for evaluation purposes. EX1006, Paragraph [0015]. Shui's system obtains focus evaluation values for each divided area across the entire range. *Id.*, Paragraph [0015]. Shui teaches a technique that maintains the overall evaluation framework while selectively excluding areas that contain problematic features such as high-luminance point light sources. *Id.*,

Paragraph [0016]. In Shui's approach, the system calculates deviation amounts of peak positions across different areas and then performs focal position detection by excluding only those areas where the deviation amount exceeds an allowed value.

Id., Paragraph [0018]. This methodology allows Shui's system to maintain the total evaluation area as a constant while intelligently removing only those portions that would negatively impact accurate focus evaluation. *Id.*, Paragraph [0018]. A POSITA would have understood that Shui's technique of maintaining the overall evaluation framework while selectively excluding problematic areas keeps the total area constant while removing portions that would compromise focus accuracy. *Id.*, Paragraph [0016]. The combination of Tsujino and Shui results in a region creation unit that keeps the total area of the evaluated value extraction region constant by excluding unnecessary portions from the evaluated value extraction region.

H. Claims 7 and 10

175. Claim 7 depends from claim 2. Claim 10 depends from claim 1. Claims 7 and 10 recite identical elements. In my opinion, the combination of Tsujino, Shui and Iwasaki discloses or renders obvious all the elements of claims 1 and 2 as described above. *See* elements [1pre]-[1f] and [2a]-[2b]. The combination of Tsujino, Shui and Iwasaki also discloses or renders obvious all the elements of claims 7 and 10 as described below.

[7a] and [10a] ("the processing unit is a light intensity adjustment unit for controlling exposure;")

176. *See* Ground 1, elements [7a] and [10a].

177. In my opinion, Tsujino, Shui, and Iwasaki disclose this element under either the POM of the element or the MPF interpretation. These references disclose the same or equivalent structures as referenced in the claim construction section above—signal processing circuits and algorithms (Tsujino CDS/AGC/AD circuit 20 and signal-processing circuit 26 in Fig. 1, Shui analog signal processing unit 18 and digital signal processing unit 24 in Fig. 1, Iwasaki second digital processing circuit 37 and analog processing circuit 36) that apply predetermined processing operations to image signals.

[7b] and [10b]("a lens and a photoelectric conversion unit for performing photoelectric conversion are disposed between the light intensity adjustment unit and the extraction unit; and")

178. *See* Ground 1, elements [7b] and [10b].

179. In my opinion, Tsujino, Shui, and Iwasaki disclose this element under either the POM of the element or the MPF interpretation. These references disclose the same or equivalent structures as referenced in the claim construction section above—movable optical lens components (Tsujino focus lens 12 in Fig. 1, Shui focus lens 12f in Fig. 1, Iwasaki focusing lens 13) capable of being

repositioned to adjust focus, and—image sensors (Tsuji no imaging portion 18 in Fig. 1, Shui imaging element 14 in Fig. 1, Iwasaki recording-purpose image pickup device 17) that convert light into electrical signals representing image intensity.

[7c] and [10c] ("the control unit controls the processing unit by using an evaluated value of a region from which pixels having an extracted predetermined feature are removed.")

180. *See* Ground 1, element [1f].

181. In my opinion, if Patent Owner argues the portions of Tsujino, Shui and Iwasaki cited above relate to different, incompatible embodiments (which they do not), it would have been obvious to a POSITA to combine such embodiments into a single system at least because such embodiments are described in the same prior art references, are fully compatible with each other, and could be combined with minimal effort to achieve predictable results.

182. If Patent Owner argues that Tsujino or Shui or Iwasaki does not disclose any element of the challenged claims, such element would have nonetheless been obvious to a POSITA in light of Tsujino, Shui and Iwasaki. Practicing any element of the challenged claims in light of Tsujino, Shui and Iwasaki would have been within the knowledge and skill of a POSITA, would have required minimal effort, would have yielded predictable results, would have been fully compatible with both references, and would have been a mere design choice.

Motivation to do so arises from at least common sense and the disclosures of Tsujino, Shui and Iwasaki set forth above.

VIII. GROUND 3: CLAIMS 1-15 ARE OBVIOUS OVER SHUI IN VIEW OF IWASAKI

A. Proposed Combination

183. In my opinion, Shui in view of Iwasaki discloses and renders obvious claims 1-15 of the '950 patent. A POSITA would have been motivated to combine Shui and Iwasaki because both references address the common problem of improving camera performance in challenging lighting conditions through selective evaluation of image regions. Shui teaches a system for detecting and excluding high-luminance point light sources from focus evaluation to prevent focus errors caused by bright light sources. EX1006, Paragraphs [0016], [0018]. Iwasaki complements this approach by teaching exposure control techniques that similarly exclude problematic high-luminance regions from exposure calculations. EX1007, Paragraph [0084].

184. Both references employ analogous methodologies of analyzing image regions and selectively excluding certain areas from processing to achieve better results. Shui's technique of excluding areas with high-luminance point light sources from focus evaluation and Iwasaki's technique of excluding groups with average luminance values that are larger than a predetermined value from exposure

calculations represent the same underlying principle applied to different camera functions. EX1006, Paragraph [0016]; EX1007, Paragraph [0084].

185. A POSITA would have recognized that combining these complementary techniques would result in a comprehensive camera system capable of handling both autofocus and exposure control in scenes with challenging lighting conditions. Iwasaki's teachings would naturally extend Shui's selective evaluation approach from AF control to AE control, as both processes benefit from accurate scene analysis that excludes potentially misleading high-luminance regions. EX1007, Paragraphs [0056]-[0058], [0105]-[0106].

186. The combination would have been straightforward for a POSITA because both references use similar hardware architectures (image sensors, processing circuits, CPUs) and compatible image processing techniques (luminance evaluation, region-based analysis). EX1006, Fig. 1; EX1007, Paragraphs [0053]-[0058]. A POSITA would have had a reasonable expectation of success in combining these references to create an improved camera system with enhanced performance in both focus and exposure control under difficult lighting conditions.

B. Claim 1

187. In my opinion, the combination of Shui and Iwasaki discloses claim 1.

[1pre] ("A signal processor comprising:")

188. In my opinion, Shui in view of Iwasaki teaches this element. Shui's disclosure shows a signal processor architecture designed for processing image signals and performing various camera functions. EX1006, Fig. 1. The signal processor in Shui comprises multiple interconnected components that work together to analyze and process image data, including an analog signal processing unit that performs initial signal conditioning. *Id.*, Fig. 1 element 18. This architecture further includes a digital signal processing unit that handles more complex signal transformations and analysis. *Id.*, Fig. 1 element 24 and Paragraph [0042]. Additionally, Shui's processor incorporates a CPU that coordinates the overall operation and makes control decisions based on the processed image data. *Id.*, Fig. 1 element 42 and Paragraph [0043]. Together, these components form a comprehensive signal processor that manages autofocus functions and other camera operations based on image analysis results. *Id.*, Paragraph [0033].

189. The above argument also applies to preambles of claims 2-15.

[1a] ("a feature detection unit which detects a position where features of each pixel of an input picture signal have changed;")

190. In my opinion, Shui in view of Iwasaki teaches this element. Shui teaches a system that detects positions where features of pixels have changed by implementing a comprehensive method for analyzing image data across focal positions. EX1006, Paragraph [0007]. The system obtains focus evaluation values

and photometric values across the entire focal range and identifies specific positions where these values peak. *Id.*, Paragraph [0008]. Shui's approach identifies positions X_1 and X_2 that are located before and after a detected peak position X_0 , and calculates the differential ΔY_{1-2} between photometric values Y_1 and Y_2 at these respective positions. *Id.*, Paragraph [0011].

191. Shui further teaches that the detected focus evaluation value peak X_0 is treated as the focal position when the differential ΔY_{1-2} is less than an allowed threshold. *Id.*, Paragraph [0011]. On the other hand, the detected focus evaluation value peak X_0 is treated as a false peak due to a point light source when the differential ΔY_{1-2} is greater or equal than the allowed threshold. *Id.*, Paragraph [0011]. This threshold of the differential calculation identifies positions where pixel features have changed, and the system uses these calculations to determine whether detected peaks represent actual subject features or false readings from high-luminance sources. *Id.*, Paragraph [0012].

192. Shui's approach relies on both pixel-wise differentials and area differentials, providing a comprehensive method for detecting feature changes. The pixel-wise differentials offer detailed information about local brightness changes, thus detecting changes in each pixel of the input picture signal. *Id.*, Paragraph [0011]. A POSITA would have understood that Shui's detection of positions in the image where the calculated differential meets or exceeds a

threshold, directly corresponds to detecting positions where features of pixels have changed, because these calculations identify locations in the image where visual characteristics transition or differ from surrounding pixels. *Id.*, Paragraph [0056]-[0057].

193. Moreover, a POSITA would have further understood that Shui's method where the calculated differential between focus evaluation values at adjacent focal positions to the detected focus evaluation value peak corresponds to detecting positions where features of pixels have changed because these differentials identify pixel locations where the focus evaluation values have an abrupt change around the peak due to a point light source. *Id.*, Paragraphs [0012], [0056]-[0057].

194. Shui and Iwasaki disclose this element under either the POM of the element or the MPF interpretation. Shui and Iwasaki disclose the same or equivalent structures as referenced in the claim construction section above—software algorithms executing on signal processors (Shui digital signal processing unit 24 and CPU 42 in Fig. 1, Iwasaki analyzing calculating section 34 and CPU 42) that analyze pixel data to identify changes in image features.

[1b] ("a region creation unit which creates a region by removing pixels with the features from an evaluated value extraction region;")

195. In my opinion, Shui in view of Iwasaki teaches this element. Shui teaches a system that creates regions by selectively excluding areas with specific features from evaluation. EX1006, Paragraph [0016]. Shui describes dividing a focus area into multiple areas and obtaining focus evaluation values for each area. *Id.*, Paragraph [0015]. Shui then explains that the system calculates differentials between minimum and maximum photometric values in each area to identify areas containing unwanted features. *Id.*, Paragraph [0016]. When these differentials meet or exceed an allowed threshold value, the system excludes those areas from further processing. *Id.* This process creates a modified region by removing pixels with particular characteristics from the evaluation region. *Id.* Shui's method of excluding areas based on differential calculations effectively creates a new region from an initial larger area (*e.g.*, areas A, B, and C combined in Fig. 16) by removing problematic areas (*e.g.*, area C), resulting in a refined region (*e.g.*, areas A and B combined). *Id.*, Paragraphs [0015] and [0016].

196. A POSITA would have understood that this exclusion process in Shui directly corresponds to the claimed region creation unit, which creates a region by removing pixels with the features because Shui teaches generating a refined evaluation region by eliminating unwanted pixel data in regions with a high-luminance point light source that would otherwise interfere with accurate focal position detection.

197. Shui and Iwasaki disclose this element under either the POM of the element or the MPF interpretation. Shui and Iwasaki disclose the same or equivalent structures as referenced in the claim construction section above—software algorithms executing on signal processors (Shui digital signal processing unit 24 and CPU 42 in Fig. 1, Iwasaki analyzing calculating section 34 and CPU 42) that manipulate pixel data to define specific regions for evaluation by excluding pixels with particular characteristics.

[1c] ("an evaluated value extraction unit which extracts an evaluated value in accordance with the evaluated value extraction region;")

198. In my opinion, Shui in view of Iwasaki teaches this element. Shui teaches a comprehensive system for obtaining and processing focus evaluation values from defined regions within an image frame. EX1006, Paragraph [0015]. Shui describes a process where focus evaluation values are extracted for each divided area of the image across the entire range from minimum distance to infinity. *Id.* These values are then analyzed to identify areas with high-luminance sources. *Id.*, Paragraph [0016]. After identifying problematic areas, Shui's system performs focal position detection by excluding the focus evaluation values for areas where calculated differentials exceed an allowed value. *Id.*, Paragraph [0018]. This refined data, which has excluded high-luminance areas, is then used in subsequent processing to determine optimal focal positions. *Id.*, Paragraph

[0022]. A POSITA would have recognized that Shui's refined evaluation data, after excluding problematic areas, serves a similar function to the evaluated value because the approach aims to improve focus accuracy by mitigating the effects of high-luminance sources.

199. Shui and Iwasaki disclose this element under either the POM of the element or the MPF interpretation. Shui and Iwasaki disclose the same or equivalent structures as referenced in the claim construction section above—software algorithms executing on signal processors and evaluation circuits (Shui digital signal processing unit 24 in Fig. 1, Iwasaki analyzing calculating section 34) that perform calculations on pixel data within defined regions.

[1d] ("a processing unit which applies predetermined processing to the picture signal; and")

200. In my opinion, Shui in view of Iwasaki teaches this element. Shui teaches a comprehensive signal processing architecture that includes multiple processing units designed to apply predetermined processing to the picture signal. EX1006, Fig. 1 elements 18 and 24. Shui describes analog signal processing unit 18 that includes a sampling hold circuit, a color separation circuit, a gain adjustment circuit and the like, and performs correlated double sampling (CDS) processing of the image signals sequentially output from imaging element 14 as well as color separation processing into the RGB color signals, and adjustment of

the signal levels of the color signals (pre-white balance processing). *Id.*, Paragraph [0039].

201. Additionally, Shui's digital signal processing unit 24 applies further predetermined processing to the image signal, as it includes a synchronization circuit, a gamma correction circuit, a contour correction circuit, and a luminance/color difference signal generation circuit, and the like, processes the image signal stored in RAM 46 according to instructions from CPU 42, and generates a luminance, blue-difference chrominance and red-difference chrominance (YUV) signal composed of a luminance signal and a color difference signal. *Id.*, Paragraph [0042].

202. Shui and Iwasaki disclose this element under either the POM of the element or the MPF interpretation. Shui and Iwasaki disclose the same or equivalent structures as referenced in the claim construction section above—signal processing circuits and algorithms (Shui analog signal processing unit 18 and digital signal processing unit 24 in Fig. 1, Iwasaki second digital processing circuit 37 and analog processing circuit 36) that apply predetermined processing operations to image signals.

[1e] ("a control unit which controls the processing unit in accordance with the evaluated value having been extracted by the evaluated value extraction unit;")

203. In my opinion, Shui in view of Iwasaki teaches this element. Shui discloses a control unit that controls the processing unit in accordance with evaluated values extracted by the evaluation unit. EX1006, Fig. 1 element 42, Paragraph [0036]. The control unit (CPU 42) in Shui coordinates the overall operation of the camera system and makes control decisions based on the processed image data. *Id.*, Paragraph [0034]. CPU 42 executes various processes using memory resources and applies instructions to digital signal processing unit 24 based on the values obtained from detection units. *Id.*, Paragraph [0036]. The system controls signal processing operations according to the evaluation values obtained from regions of the image. *Id.*, Paragraph [0042].

204. Iwasaki teaches complementary techniques for exposure control based on selective evaluation of image regions. Iwasaki discloses an analog processing circuit and digital processing circuit that perform various image processing functions, including analyzing calculating section 34 performing calculations for analyzing the image. EX1007, Paragraphs [0053]-[0058]. Under control of CPU 42, Iwasaki's analyzing calculating section 34 calculates exposure correction values based on the difference between proper exposure values and upper limit luminance values in predetermined luminance ranges, and determines appropriate gradation characteristics for image processing. EX1007, Paragraphs [0056]-[0058]. Iwasaki's CPU 42 controls second digital processing circuit 37 to execute

various image processing operations on the image including defective pixel correction, gradation conversion, white balancing, and edge enhancement.

EX1007, Paragraphs [0064]-[0065].

205. During operation, Iwasaki's CPU 42 in conjunction with recording calculating section 38 instructs analyzing calculating section 34 to perform divided photometry to obtain luminance values corresponding to respective pixels or groups of pixels. EX1007, Paragraph [0079]. Iwasaki's system calculates proper exposure values so that the average luminance value of the group including the main subject becomes the standard output value. EX1007, Paragraph [0082].

206. Notably, Iwasaki teaches excluding groups showing average luminance values larger than a predetermined value from exposure calculations and determining the highest remaining value as the basis for exposure correction. EX1007, Paragraph [0084]. Under control of Iwasaki's CPU 42, both analyzing calculating section 34 and recording calculating section 38 select appropriate gradation characteristic data based on the combination of the proper exposure value and the highest value, and instruct digital processing circuit 37 to execute gradation conversion processing according to the selected characteristics. EX1007, Figs. 4 and 14, Paragraphs [0058] and [0105]-[0106]. These teachings from Iwasaki complement Shui's system by providing techniques for selectively processing image regions to improve the overall image quality.

207. Shui and Iwasaki disclose this element under either the POM of the element or the MPF interpretation. Shui and Iwasaki disclose the same or equivalent structures as referenced in the claim construction section above—software algorithms executing on signal processors (Shui CPU 42 in Fig. 1, Iwasaki CPU 42) that control processing operations based on evaluated values.

[1f] ("wherein the control unit controls the processing unit by using an evaluated value of a region from which pixels having an extracted predetermined feature are removed.")

208. In my opinion, Shui in view of Iwasaki teaches this element. Shui teaches a control unit that controls processing operations based on evaluated values obtained from regions where certain pixels have been excluded from consideration. EX1006, Paragraph [0042]. Shui's system includes a digital signal processing unit that processes image signals according to instructions from CPU 42, which serves as the control unit. EX1006, Paragraph [0042]. CPU 42 receives evaluated values from detection units and uses these values to make control decisions for the processing components. *Id.*, Paragraph [0050]. Specifically, when performing automatic exposure control, CPU 42 obtains integrated values (evaluated values) from the auto-exposure (AE) detection unit and uses these values to control exposure parameters. *Id.*, Paragraph [0050]. In the context of focus detection, the system similarly uses evaluated values from regions where pixels with certain

features (such as high luminance point light sources) have been removed to control the processing unit. *Id.*, Paragraph [0016].

209. Iwasaki teaches complementary techniques for AE control based on selective evaluation of image regions. As discussed above in element [1e], Iwasaki's system calculates proper exposure values and excludes groups showing average luminance values that are larger than a predetermined value from exposure calculations and determining the highest remaining value as the basis for exposure correction during AE control. EX1007, Paragraphs [0082], [0084]. These teachings from Iwasaki complement Tsujino's system by providing techniques for selectively processing image regions to improve the overall image quality. This extension of Shui's teachings to comprehensive camera control, including both AF and AE, results in more accurate focus and exposure adjustments by considering evaluation values from regions that exclude potentially misleading high-luminance areas.

C. Claim 2

210. Claim 2 depends from claim 1. In my opinion, Shui and Iwasaki teaches or renders obvious all the elements of claim 1, as described above. *See* elements [1pre]-[1f]. Shui and Iwasaki also discloses or renders obvious all the elements of claim 2 as described below.

[2a] ("the feature detection unit includes: a hold unit which holds

position information of the detected pixels; and")

211. In my opinion, Shui in view of Iwasaki teaches this element. Shui teaches a comprehensive memory architecture that includes ROM and RAM components designed to store various types of data needed for camera operations. EX1006, Paragraph [0036]. The system includes a CPU that deploys programs from ROM to RAM and uses the RAM as working memory during execution of various processes. *Id.*, Paragraph [0036]. Shui further explains that when performing focus detection operations, the system obtains focus evaluation values and photometric values across multiple positions, which requires storing position information in memory. *Id.*, Paragraph [0067]. The claim requires a hold unit that holds position information of detected pixels, and Shui's memory system performs this exact function by storing position data of detected features during focus evaluation operations.

212. Shui and Iwasaki disclose a hold unit under either the POM of the element or the MPF interpretation. Shui and Iwasaki disclose the same or equivalent structures as referenced in the claim construction section above—software algorithms executing on signal processors (Shui CPU 42 with RAM 46 in Fig. 1, Iwasaki CPU 42 with memory resources) utilizing memory components for storing and retrieving position information of detected pixels.

[2b] ("the region creation unit which creates a region by excluding the

held positions from an evaluated value extraction region.")

213. In my opinion, Shui in view of Iwasaki teaches this element. Shui teaches a system that creates regions by selectively excluding areas with specific features from evaluation. EX1006, Paragraph [0016]. Shui describes dividing a focus area into multiple regions and obtaining focus evaluation values for each divided area. *Id.*, Paragraph [0015]. Shui then explains that the system calculates differentials between minimum and maximum photometric values in each area to identify regions containing unwanted features. *Id.*, Paragraph [0016]. When these differentials exceed an allowed threshold value, the system excludes those regions from further processing. *Id.*, Paragraph [0016]. This process creates a modified region by removing pixels with particular characteristics from the evaluation region. *Id.*, Paragraph [0016].

214. Shui and Iwasaki disclose this element under either the POM of the element or the MPF interpretation. Shui and Iwasaki disclose the same or equivalent structures as referenced in the claim construction section above—software algorithms executing on signal processors (Shui digital signal processing unit 24 and CPU 42 in Fig. 1, Iwasaki analyzing calculating section 34 and CPU 42) that manipulate pixel data to define specific regions for evaluation by excluding pixels with particular characteristics.

D. Claims 3 and 12

215. Claim 3 depends from claim 2. Claim 12 depends from claim 1.

Claims 3 and 12 recite identical elements. In my opinion, Shui in view of Iwasaki discloses or renders obvious all the elements of claims 1 and 2 as described above. *See* elements [1pre]-[1f] and [2a]-[2b]. Shui in view of Iwasaki also discloses or renders obvious all the elements of claims 3 and 12 as described below.

[3a] and [12a] ("the processing unit includes a focus lens, and a drive unit for driving the focus lens;")

216. In my opinion, Shui in view of Iwasaki teaches this element. Shui teaches a comprehensive imaging system that includes a focus lens component and a dedicated motor for driving the lens. EX1006, Fig. 1, Paragraph [0037]. Shui describes how the focus lens is positioned and moved along the optical axis by the focus motor to adjust the image location for proper focusing. *Id.*, Fig. 1, Paragraph [0037]. Shui further explains that this lens movement mechanism is controlled by CPU 42 through dedicated motor driver 62f to achieve precise positioning during autofocus operations. *Id.*, Fig. 1, Paragraph [0037]. This arrangement in Shui provides the same functionality as the claimed processing unit includes a focus lens, and a drive unit for driving the focus lens because both systems incorporate a lens element and a mechanism to move that lens for focusing purposes.

217. Shui and Iwasaki disclose this element under either the POM of the element or the MPF interpretation. Shui and Iwasaki disclose the same or

equivalent structures as referenced in the claim construction section above—

movable optical lens components (Shui focus lens 12f in Fig. 1, Iwasaki focusing lens 13) capable of being repositioned to adjust focus, and—electrical driver circuits and control components (Shui focus motor driver 62f in Fig. 1, Iwasaki sequence driving section 43) for controlling movement of optical components.

[3b] and [12b] ("a photoelectric conversion unit for performing photoelectric conversion is disposed between the focus lens and the extraction unit; and")

218. In my opinion, Shui in view of Iwasaki teaches this element. Shui teaches a photoelectric conversion unit positioned between the focus lens and processing components in its imaging system architecture. EX1006, Fig. 1, Paragraph [0038]. Shui describes imaging element 14 that contains photo diodes arranged on a light receiving surface that convert incident light into signal charges based on the volume of light received. *Id.*, Fig. 1, Paragraph [0038]. This imaging element is positioned in the optical path after focus lens 12f and before the signal processing components, as shown in the system diagram of Fig. 1. *Id.*, Fig. 1. The photoelectric conversion functionality is described as the imaging element converting light into electrical signals that are subsequently processed by downstream components. *Id.*, Paragraph [0038].

219. Shui and Iwasaki disclose this element under either the POM of the element or the MPF interpretation. Shui and Iwasaki disclose the same or equivalent structures as referenced in the claim construction section above—image sensors (Shui imaging element 14 in Fig. 1, Iwasaki recording-purpose image pickup device 17) that convert light into electrical signals representing image intensity.

[3c] and [12c] ("the control unit controls the processing unit by using an evaluated value of a region from which pixels having an extracted predetermined feature are removed.")

220. *See* Ground 3, element [1f].

E. Claims 4 and 14

221. Claim 4 depends from claim 2. Claim 14 depends from claim 1. Claims 4 and 14 recite identical elements. In my opinion, Shui in view of Iwasaki discloses or renders obvious all the elements of claims 1 and 2 as described above. *See* elements [1pre]-[1f] and [2a]-[2b]. Shui in view of Iwasaki also discloses or renders obvious all the elements of claims 4 and 14 as described below.

[4a] and [14a] ("the processing unit is a signal processing unit for adjusting white balance of an input picture signal; and")

222. In my opinion, Shui in view of Iwasaki teaches this element. Shui teaches a comprehensive signal processing architecture that includes a digital

signal processing unit designed to perform various image processing functions.

EX1006, Fig. 1, Paragraph [0042]. This digital signal processing unit contains multiple circuits including synchronization, gamma correction, and contour correction components that process image signals according to CPU instructions.

Id., Paragraph [0042]. The analog signal processing unit in Shui also performs pre-white balance processing on color signals. *Id.*, Paragraph [0039]. The claim requires a processing unit for adjusting white balance of an input picture signal, and Shui's digital signal processing system performs this function by processing image data to adjust color balance. *Id.*, Paragraphs [0039], [0042].

[4b] and [14b] ("the control unit controls the processing unit by using an evaluated value of a region from which pixels having an extracted predetermined feature are removed.")

223. *See* element [1f].

F. Claims 5 and 8

224. Claim 5 depends from claim 2. Claim 8 depends from claim 7.

Claims 5 and 8 recite identical elements. In my opinion, Shui in view of Iwasaki discloses or renders obvious all the elements of claims 2 and 7 as described above and below. *See* elements [1pre]-[1f] and [7a]-[7c]. Shui in view of Iwasaki also discloses or renders obvious all the elements of claims 5 and 8 as described below.

[5a] and [8a] ("the region creation unit includes a region segmentation

unit for segmenting an effective region in advance, and an overlap detection unit which detects overlap of position information output from the hold unit with blocks segmented by the region segmentation unit; and")

225. In my opinion, Shui in view of Iwasaki teaches this element. Shui teaches a method that divides the focus area into multiple regions for evaluation purposes. EX1006, Paragraph [0015]. Shui further implements a region segmentation approach by dividing the focus area into discrete sections (such as quadrants shown in Fig. 11) to isolate and analyze different portions of the image independently. *Id.*, Paragraph [0103]. The system then detects when position information from detected features overlaps with these segmented blocks by calculating differentials between photometric values in each region and comparing them against threshold values. *Id.*, Paragraph [0016]. When the differential exceeds the threshold, the system identifies that region as containing unwanted features (such as high luminance point light sources) that should be excluded from focus evaluation. *Id.*, Paragraph [0016]. This approach functions as an overlap detection unit by identifying which segmented regions contain problematic pixel features that would interfere with accurate focus evaluation. *Id.*, Paragraph [0124].

226. Shui and Iwasaki disclose a region segmentation unit and an overlap detection unit under either the POM of the element or the MPF interpretation. Shui

and Iwasaki disclose the same or equivalent structures as referenced in the claim construction section above—software algorithms executing on signal processors (Shui digital signal processing unit 24 and CPU 42 in Fig. 1, Iwasaki analyzing calculating section 34 and CPU 42) that divide images into multiple regions for analysis.

[5b] and [8b] ("the control unit controls the processing unit by using an evaluated value of a region from which pixels having an extracted predetermined feature are removed.")

227. *See* Ground 3, element [1f].

G. Claims 6, 9, 11, 13, and 15

228. Claim 6 depends from claim 2. Claim 9 depends from claim 7. Claim 11 depends from claim 1. Claim 13 depends from claim 12. Claim 15 depends from claim 14. Claims 6, 9, 11, 13, and 15 recite identical elements. In my opinion, Shui in view of Iwasaki discloses or renders obvious all the elements of claims 1, 2, 7, 12, and 14 as described in the sections above and below. *See* elements [1pre]-[1f], [2a]-[2b], [7a]-[7c], [12a]-[12c], and [14a]-[14b]. Shui in view of Iwasaki also discloses or renders obvious all the elements of claims 6, 9, 11, 13, and 15 as described below.

[6a], [9a], [11a], [13a], and [15a] ("wherein the region creation unit includes a unit which keeps the total area of the evaluated value

extraction region constant by excluding unnecessary portions from the evaluated value extraction region.")

229. In my opinion, Shui in view of Iwasaki teaches this element. Shui teaches a focal position detection method that divides the focus area into multiple regions for evaluation purposes. EX1006, Paragraph [0018]. The system obtains focus evaluation values for each divided area and selectively excludes certain areas from the evaluation process. *Id.*, Paragraph [0015]. When implementing area-based analysis, Shui's system maintains the overall evaluation framework while removing specific regions that contain unwanted features. *Id.*, Paragraph [0016]. The claim requires a region creation unit that keeps the total area of the evaluated value extraction region constant by excluding unnecessary portions, and Shui's system performs this function by maintaining the overall focus area structure while selectively excluding specific regions that negatively impact focus accuracy. *Id.*, Paragraph [0124]. Shui's approach divides the focus area into multiple regions and then selectively excluding certain regions from evaluation keeps the total evaluation area constant while removing portions that interfere with accurate focus determination. *Id.*, Paragraphs [0015]-[0016].

H. Claims 7 and 10

230. Claim 7 depends from claim 2. Claim 10 depends from claim 1. Claims 7 and 10 recite identical elements. In my opinion, Shui in view of Iwasaki

discloses or renders obvious all the elements of claims 1 and 2 as described above.

See elements [1pre]-[1f] and [2a]-[2b]. Shui in view of Iwasaki also discloses or renders obvious all the elements of claims 7 and 10 as described below.

[7a] and [10a] ("the processing unit is a light intensity adjustment unit for controlling exposure;")

231. In my opinion, Shui in view of Iwasaki teaches this element. Shui teaches a comprehensive exposure control system that includes an iris mechanism 12 and dedicated motor 60i designed to adjust light intensity entering the camera. EX1006, Fig. 1, Paragraph [0037]. Shui describes how the iris is driven by a dedicated motor to modify aperture settings, which directly controls the amount of light reaching the imaging sensor. *Id.*, Fig. 1, Paragraph [0037]. This arrangement provides precise control over exposure parameters through mechanical adjustment of the aperture opening size. *Id.*, Fig. 1, Paragraph [0037].

232. Shui and Iwasaki disclose this element under either the POM of the element or the MPF interpretation. Shui and Iwasaki disclose the same or equivalent structures as referenced in the claim construction section above—controllable mechanisms for adjusting exposure (Shui iris mechanism 12i and motor 60i in Fig. 1, Iwasaki mechanical shutter 16 and aperture 14).

[7b] and [10b] ("a lens and a photoelectric conversion unit for performing photoelectric conversion are disposed between the light

intensity adjustment unit and the extraction unit; and")

233. In my opinion, Shui in view of Iwasaki teaches this element. Shui teaches a photoelectric conversion unit positioned between the focus lens and processing components in its imaging system architecture. EX1006, Fig. 1, Paragraph [0038]. Shui describes imaging element 14 that contains photo diodes arranged on a light receiving surface that convert incident light into signal charges based on the volume of light received. *Id.*, Fig. 1, Paragraph [0038]. This imaging element is positioned in the optical path after focus lens 12f and before the signal processing components, as shown in the system diagram of Fig. 1. *Id.*, Fig. 1. The photoelectric conversion functionality is described as the imaging element converting light into electrical signals that are subsequently processed by downstream components. *Id.*, Paragraph [0038]. While the figures show the lens positioned before the aperture, a POSITA would have understood that the relative positioning of the lens and aperture could be reversed without affecting the functionality of the system. This represents a routine design choice in optical systems where components may be rearranged based on factors such as space constraints, manufacturing considerations, or specific optical performance requirements while maintaining the same functional relationship between components. *Id.*, Fig. 1, Paragraph [0037].

234. Shui and Iwasaki disclose this element under either the POM of the element or the MPF interpretation. Shui and Iwasaki disclose the same or equivalent structures as referenced in the claim construction section above—movable optical lens components (Shui focus lens 12f in Fig. 1, Iwasaki focusing lens 13) capable of being repositioned to adjust focus, and—image sensors (Shui imaging element 14 in Fig. 1, Iwasaki recording-purpose image pickup device 17) that convert light into electrical signals representing image intensity.

[7c] and [10c] ("the control unit controls the processing unit by using an evaluated value of a region from which pixels having an extracted predetermined feature are removed.")

235. *See* Ground 3, element [1f].

236. In my opinion, if Patent Owner argues that Shui and Iwasaki does not disclose any element of the challenged claims, such element would have nonetheless been obvious to a POSITA in light of Shui and Iwasaki. Practicing any element of the challenged claims in light of Shui would have been within the knowledge and skill of a POSITA, would have required minimal effort, would have yielded predictable results, would have been fully compatible with Shui and Iwasaki, and would have been a mere design choice. Motivation to do so arises from at least common sense and the disclosures of Shui set forth above.

IX. CONCLUSION

237. For these reasons, it is my opinion that all of the claims of the '950 patent are unpatentable.