IN THE UNITED STATES DISTRICT COURT
FOR THE DISTRICT OF DELAWARE

DYNAMIC DATA TECHNOLOGIES, LLC, Plaintiff, v. INTEL CORPORATION, Defendant.	Civil Action No._____ **JURY TRIAL DEMANDED**

COMPLAINT FOR PATENT INFRINGEMENT

Dynamic Data Technologies, LLC ("Dynamic Data") bring this action and make the following allegations of patent infringement relating to U.S. Patent Nos.: 7,050,114 (the "'114 patent"); 8,385,426 (the "'426 patent"); 6,760,376 (the "'376 patent"); 6,782,054 (the "'2054 patent"); 7,929,609 (the "'609 patent"); 7,982,799 (the "'799 patent"); 7,995,793 (the "'793 patent"); 8,155,459 (the "'459 patent"); 8,335,392 (the "'392 patent"); 8,442,118 (the "'118 patent"); and 8,526,502 (the "'502 patent") (collectively, the "patents-in-suit"). Defendant Intel Corporation ("Intel" or "Defendant") infringes each of the patents-in-suit in violation of the patent laws of the United States of America, 35 U.S.C. § 1 *et seq*.

INTRODUCTION

1. Dynamic Data's portfolio of over 1,000 patent assets encompasses core technologies in the field of image and video processing. Dynamic Data's patents arose from the research and development efforts of Koninklijke Philips N.V. ("Philips"). Founded in 1891, for well over a century, Philips pioneered ground breaking technologies, including compact audio cassettes, magnetic resonance imaging (MRI) machines, and compact discs.

2. In an effort to facilitate the licensing of Philips' foundational technology, Dynamic Data is pursuing remedies for infringement of its patents in venues throughout the world.

Contemporaneous to the filing of this Complaint and complaints against other companies selling the technologies claimed by Dynamic Data's patent portfolio, Dynamic Data filed patent enforcement actions against Google LLC,[1] Advanced Micro Devices, Inc.,[2] and Microsoft Corporation[3] in the Peoples Republic of China before the Specialized Intellectual Property Tribunals in Shanghai and Nanjing. In addition, Dynamic Data has filed a patent enforcement action against Apple, Inc. in Düsseldorf, Germany.[4]

DYNAMIC DATA'S LANDMARK INVENTIONS

3. The groundbreaking inventions in image and video processing taught in the patents-in-suit were pioneered by Philips. Video and image processing were at the heart of Philips' business for over fifty years. In 1891, Philips, then known as Philips & Company, was founded in Eindhoven, Netherlands to manufacture carbon-filament lamps.[5] In the 1920s, Philips began to produce vacuum tubes and small radios, which would augur Philips' later entry into video and audio processing.

[1] Asserting Patent Nos. CN1266944C; CN1333373C; and CN1329870C (南京专业知识产权法院).

[2] Asserting Patent Nos. CN1303818C; CN1333373C; and CN1266944C (南京专业知识产权法院).

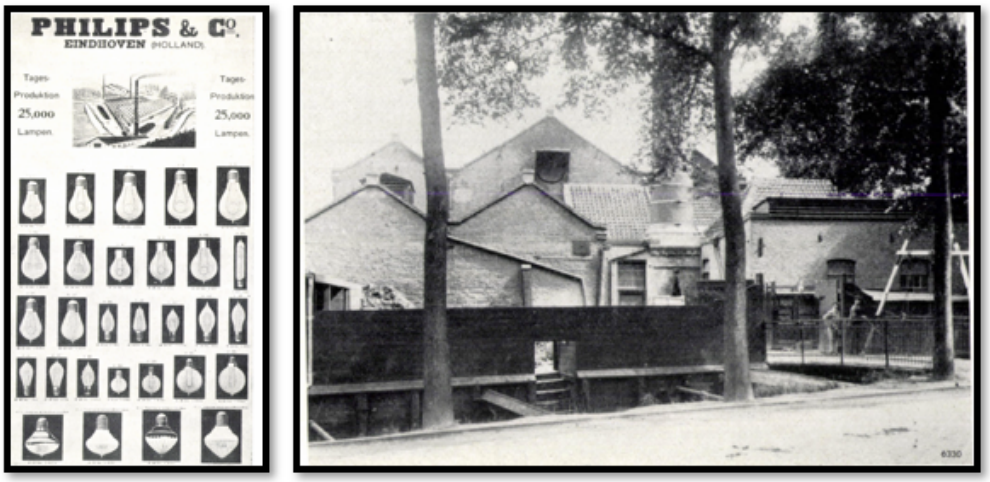
[3] Asserting Patent Nos. CN1266944C, CN1329870C, and CN1333373C (南京专业知识产权法院).

[4] Asserting Patent No. EP1520409 (Landgericht Düsseldorf).

[5] Gerard O'Regan, A BRIEF HISTORY OF COMPUTING at 99 (2012).

N.A. Halbertsma, *The Birth of a Lamp Factory In 1891*, PHILIPS TECHNICAL REVIEW, Vol. 23 at 230, 234 (1961).

4. In 1962, Philips introduced the first audio cassette tape.[6] A year later, Philips launched a small battery-powered audio tape recorder that used a cassette instead of a loose spool.[7] Philips C-cassette was later used as the first mass storage device for early personal computers in the 1970s and 1980s.



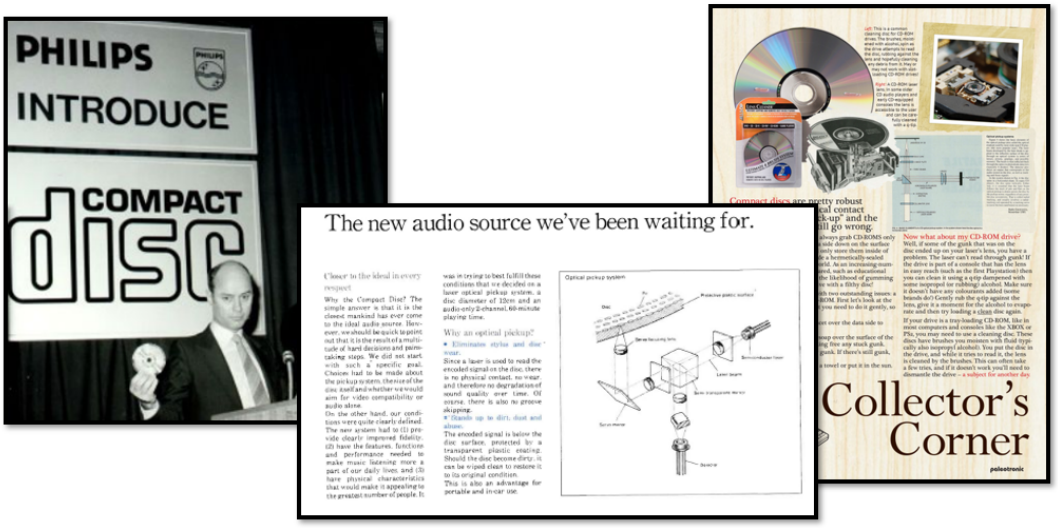
THE ROTARIAN MAGAZINE, Vol. 101 No. 6 at 70 (December 1962) (advertisement showing Philips Norelco device which used cassettes for recording audio for transcription); Fred Chandler,

[6] Gerard O'Regan, PILLARS OF COMPUTING: A COMPENDIUM OF SELECT, PIVOTAL TECHNOLOGY FIRMS at 172 (2015) ("Philips invented the compact cassette for audio storage in 1962.")

[7] Anthony Pollard, GRAMOPHONE: THE FIRST 75 YEARS at 231 (1998).

European Mfrs. Bid For Market Share, BILLBOARD MAGAZINE AT P-6 (April 8, 1967) (image of the Philips EL 3300 battery-operated tape recorder which was released in 1963); Jan Syrjala*, Car Stereo: How Does The Music Sound?,* N.Y. TIMES at 2-M (September 25, 1966) (showing Philips's Norelco Cassette "the Philips device has two tiny reels inside it, with the tape traveling from one to the other").

5. In 1971, Philips demonstrated the world's first videocassette records (VCR). A year later, Philips launched the world's first home video cassette recorder, the N1500. In 1982, Philips teamed with Sony to launch the Compact Disc; this format evolved into the DVD and later Blu-ray, which Philips launched with Sony in 1997 and 2006 respectively.



Hans Peek, Jan Bergmans, Jos Van Haaren, Frank Toolenaar, and Sorin Stan, ORIGINS AND SUCCESSORS OF THE COMPACT DISC: CONTRIBUTIONS OF PHILIPS TO OPTICAL STORAGE at 15 (2009) (showing image of Joop Sinjou of Philips introducing the compact disc in March 1979); Advertisements for Philip's Compact Disc Products (1982).

6. In the late 1990s and early 2000s, Philips pioneered the development of technologies for encoding and decoding of video and audio content. At the time most of the technologies claimed by the patents in Dynamic Data's portfolio were invented, Philips' subsidiary primarily responsible for Philips' work in this field, Philips Semiconductor was the world's sixth

largest semiconductor company.[8] The video encoding technologies developed by Philips Semiconductor enable video streaming on set-top boxes, smartphones, popular gaming consoles, Internet-connected computers, and numerous other types of media streaming devices.

7. Philips Semiconductor dedicated significant research and development resources to advancing the technology of video compression and transmission by reducing file sizes and decreasing the processing resources required to transmit the data.[9] Philips Semiconductor was among the first companies aggressively driving innovation in the field of video processing:

> The late 1980s and early 1990s saw the announcement of several complex, programmable VSPs. Important examples include chips from Matsushita, NTT, Philips [Semiconductors], and NEC. All of these processors were high-performance parallel processors architected from the ground up for real-time video signal processing. . . . The Philips VSP-1 and NEC processor were probably the most heavily used of these chips.[10]

8. Starting in the 1960s Philips pioneered the development of audio and video technologies that would establish itself as a leader in the field that would later develop into the audio and video encoding fields. Continuing Philips' pioneering history in these fields, the patents-in-suit disclose cutting-edge video compression and transmission technologies.

DYNAMIC DATA'S PATENT PORTFOLIO

9. Dynamic Data's patent portfolio includes over 1,000 patent assets, with over 400 issued patents granted by patent offices around the world. Dynamic Data owns numerous patents issued by the United States Patent and Trademark Office, including each of the patents-in-suit,

[8] *Company News; Philips in $1 Billion Deal for VLSI Technology*, THE NEW YORK TIMES (May 4, 1999), *available at*: https://www.nytimes.com/1999/05/04/business/company-news-philips-in-1-billion-deal-for-vlsi-technology.html.

[9] HU, YU HEN, PROGRAMMABLE DIGITAL SIGNAL PROCESSORS: ARCHITECTURE, PROGRAMMING, AND APPLICATIONS, at 190 (Dec. 6, 2001) ("Philips Semiconductors developed early dedicated video chips for specialized video processors.").

[10] *Id.* at 191.

The State Intellectual Property Office of the People's Republic of China,[11] the European Patent Office,[12] the German Patent and Trademark Office,[13] the Japan Patent Office,[14] and many other national patent offices.

10. Philips Semiconductor's pioneering work in the area of video processing and encoding has resulted in various inventions that are fundamental to today's video processing technologies. Dynamic Data is the owner by assignment of over 1,000 of these patent assets, which include over 400 patents issued by patent offices around the world.

11. Highlighting the importance of the patents-in-suit is the fact that the patents-in-suit have been cited by over 400 U.S. and international patents and patent applications by a wide variety of the largest companies operating in the field. For example, the patents-in-suit have been cited by companies such as:

- Samsung Electronics Co., Ltd.[15]
- Qualcomm Inc.[16]
- Google LLC[17]
- ***Intel Corporation***[18]
- Broadcom Corporation[19]
- Microsoft Corporation[20]

[11] *See, e.g.,* CN100504925C; CN100438609C; CN1679052B; CN1333373C; CN1329870C; CN1303818C.

[12] *See, e.g.,* European Patent Nos. EP1032921B1; EP1650978B1; EP1213700B1; EP1520409B1.

[13] *See, e.g.,* German Patent Nos. DE60120762; DE50110537; DE60126151; DE60348978; DE602004049357.

[14] *See, e.g.,* Japanese Patent Nos. JP4583924B2; JP5059855B2; JP5153336B2; JP4637585B2.

[15] *See, e.g.*, U.S. Patent Nos. 6,930,729; 7,911,537; 7,532,764; 8,605,790; and 8,095,887.

[16] *See, e.g.*, U.S. Patent Nos. 7,840,085; 8,649,437; 8,750,387; 8,918,533; 9,185,439; 9,209,934; 9,281,847; 9,319,448; 9,419,749; 9,843,844; 9,917,874; and 9,877,033.

[17] *See, e.g.*, U.S. Patent No. 8,787,454 and U.S. Patent Appl. No. 10/003,793.

[18] *See, e.g.*, U.S. Patent Nos. 7,554,559; 7,362,377; and 8,462,164.

[19] *See, e.g.*, U.S. Patent Nos. 8,325,273 and 9,377,987.

[20] *See, e.g.*, U.S. Patent Nos. 7,453,939; 7,670,227; 7,408,986; 7,421,129; 7,558,320; and 7,929,599.

- Sony Corporation[21]
- Fujitsu Ltd.[22]
- Panasonic Corporation[23]
- Matsushita Electric Industrial Company Limited[24]

THE PARTIES

DYNAMIC DATA TECHNOLOGIES, LLC

12. Dynamic Data Technologies, LLC ("Dynamic Data" or "Plaintiff") is a limited liability company organized under the laws of Delaware.

13. In an effort to obtain compensation for Philips' pioneering work in the fields of video data encoding, decoding, and transmission, Dynamic Data acquired the patents-in-suit along with the several hundred additional issued United States and international Patents.

14. Dynamic Data pursues the reasonable royalties owed for Intel's use of the inventions claimed in Dynamic Data's patent portfolio, which primarily arise from Philips' groundbreaking technology, both here in the United States and throughout the world.

INTEL CORPORATION

15. On information and belief, Intel Corporation ("Intel"), is a Delaware corporation with its principal place of business at 2200 Mission College Blvd., Santa Clara, California 95054. Intel may be served through its registered agent The Corporation Trust Company, 1209 Orange Street, Wilmington, Delaware 19801.

[21] *See, e.g.*, U.S. Patent Nos. 7,218,354 and 8,174,615.
[22] *See, e.g.*, U.S. Patent Nos. 7,092,032 and 8,290,308.
[23] *See, e.g.*, U.S. Patent Nos. 8,164,687 and 8,432,495.
[24] *See, e.g.*, U.S. Patent Nos. 7,362,378 and 7,423,961.

JURISDICTION AND VENUE

16. This action arises under the patent laws of the United States, Title 35 of the United States Code. Accordingly, this Court has exclusive subject matter jurisdiction over this action under 28 U.S.C. §§ 1331 and 1338(a).

17. Upon information and belief, this Court has personal jurisdiction over Intel in this action because Intel has committed acts within the State of Delaware giving rise to this action and has established minimum contacts with this forum such that the exercise of jurisdiction over Intel would not offend traditional notions of fair play and substantial justice. Defendant Intel, directly and/or through subsidiaries or intermediaries (including distributors, retailers, and others), has committed and continues to commit acts of infringement in this District by, among other things, offering to sell and selling products and/or services that infringe the patents-in-suit. Moreover, Intel incorporated in the State of Delaware, and actively directs its activities to customers located in the State of Delaware.

18. Venue is proper in this district under 28 U.S.C. §§ 1391(b)-(d) and 1400(b). Defendant Intel is incorporated in the State of Delaware, and upon information and belief, has transacted business in the State of Delaware and has committed acts of direct and indirect infringement in the State of Delaware.

THE ASSERTED PATENTS

U.S. PATENT NO. 7,050,114

19. U.S. Patent No. 7,050,114 entitled, *Picture Signal Contrast Control*, was filed on April 8, 2002, and claims priority to April 11, 2001. The '114 patent is subject to a 35 U.S.C. § 154(b) term extension of 541 days. Dynamic Data is the owner by assignment of all right, title, and interest in the '114 patent. A true and correct copy of the '114 patent is attached hereto as Exhibit 1.

20. The ‘114 patent discloses novel methods and systems for controlling the contrast in a picture signal. The various embodiments of the ‘114 patent disclose a method of obtaining the maximum light output from a display by controlling the contrast of picture signals.

21. The various embodiments of the ‘114 patent disclose methods and systems wherein a sub signal is split into two groups of picture information and a sub signal is transformed from being represented by the first set of basic colors to a second set of basic colors, for example, U, V, and Y.

22. In one embodiment of the ‘114 patent, the amplitudes of the basic colors never exceed a maximum value, which is the result of hard clipping.

23. In another embodiment of the ‘114 patent, the first and/or second values may be soft clipped to avoid distortion of images on a display.

24. The ‘114 patent discloses controlling contrast in a first part of a picture, said picture being represented by a picture signal.

25. The ‘114 patent further discloses a picture signal comprising a number of sub signals each holding color information for different areas of the picture, said color information being represented by a first set of basic colors, each of said basic colors having an amplitude.

26. The ‘114 patent further discloses increasing contrast by increasing the amplitudes of all basic colors in a selected sub signal representing that part of the picture to be contrast increased.

27. The ‘114 patent further discloses determining if an amplitude of one of said basic colors exceeds a predefined value.

28. The ‘114 patent discloses reducing saturation of the color information if an amplitude of one of the basic colors exceeds the predefined value.

29. The ‘114 patent discloses a novel solution to a technical problem: obtaining maximum light output from a display by controlling the contrast of picture signals.

30. The ‘114 patent and its underlying patent application have been cited by 18 patents and patent applications as relevant prior art. Specifically, patents issued to the following companies have cited the ‘114 patent and its underlying patent application as relevant prior art:

- Samsung Electronics Co., Ltd.
- STMicroelectronics Asia Pacific Pte Limited
- Cheertek Inc.
- GE Medical Systems Global Technology Co.
- Genesis Microchip Inc.
- Himax Technologies Ltd.
- International Business Machines Corporation
- MStar Semiconductor Incorporated

U.S. PATENT NO. 8,385,426

31. U.S. Patent No. 8,385,426 entitled, Method For A Mosaic Program Guide, was filed on December 12, 2003, and claims priority to December 16, 2002. The ‘426 patent is subject to a 35 U.S.C. § 154(b) term extension of 1,974 days. Dynamic Data is the owner of all right, title, and interest in the ‘426 patent. A true and correct copy of the ‘426 patent is attached hereto as Exhibit 2.

32. The ‘426 patent claims specific methods and systems to generate a mosaic program guide.

33. The ‘426 patent discloses methods and systems of providing mosaic program guides by generating I frames from a coded video bit stream, placing each I frame into mosaic windows, and combining the mosaic windows into a mosaic video frame.

34. The ‘426 patent discloses technology that enables providers of encoded video content to save significant resources by streamlining the process of presenting mosaic program guides.

35. The ‘426 patent claims a method of generating a mosaic program guide comprising generating I frames from a coded video bit stream by a video decoder of a receiver.

36. The ‘426 patent claims a method of generating a mosaic program guide comprising placing each I frame into one of a multiplicity of mosaic windows by the receiver.

37. The ‘426 patent claims a method of generating a mosaic program guide comprising combining in the receiver the multiplicity of mosaic windows into a mosaic video frame.

38. The ‘426 patent has been cited by 49 United States and international patents and patent applications as relevant prior art. Specifically, patents issued to the following companies have cited the ‘426 patent as relevant prior art:

- ActiveVideo Networks Inc.
- ARRIS Group Inc.
- Cox Communications Inc.
- EchoStar Broadcasting Holding Corp.
- Google LLC
- DIVX LLC
- Huawei Technologies Co., Ltd.
- Konica Minolta Technology USA Inc.
- LG Electronics Inc.
- Panasonic Corp.
- Qualcomm Inc.
- Samsung Electronics Co., Ltd.
- Sony Corp.
- Verizon Patent and Licensing Inc.

U.S. PATENT NO. 6,760,376

39. U.S. Patent No. 6,760,376 entitled, *Motion Compensated Upconversion For Video Scan Rate Conversion*, was filed on November 6, 2000. The ‘376 patent is subject to a 35 U.S.C.

§ 154(b) term extension of 697 days. Dynamic Data is the owner by assignment of all right, title, and interest in the '376 patent. A true and correct copy of the '376 patent is attached hereto as Exhibit 3.

40. The '376 patent discloses novel methods and systems for motion compensated upconversion in a video image that uses motion compensation to generate an interpolated video field using motion vectors.

41. The inventions disclosed in the '376 patent provide a sharp video image by comparing a calculated correlation value of pixels with a threshold value.

42. The '376 patent discloses technologies that improve video image quality by selecting a motion compensated pixel that will provide a sharp video image by comparing a calculated correlation value of pixels with a threshold value.

43. The '376 patent discloses a method of motion compensation for use in a video image upconversion unit of the type that uses motion compensation to generate an interpolated field using motion vectors.

44. The '376 patent discloses a method of motion compensation that includes calculating a correlation value from the values of causal neighbor pixels of a generated field and from the values of corresponding neighbor pixels of a next field.

45. The '376 patent discloses a method of motion compensation that includes comparing the correlation value with a threshold value.

46. The '376 patent discloses a method of motion compensation that includes setting the value of a pixel to be created within the generated field to be equal to the value of a corresponding pixel of the next field if the correlation value is less than the threshold value.

47. The ‘376 patent and its underlying patent application have been cited by several patents and patent applications as relevant prior art. Specifically, patents issued to the following companies have cited the ‘376 patent and its underlying patent application as relevant prior art: Samsung Electronics Co., Ltd.; Blip X Ltd.; Himax Technologies Limited; and Snell Ltd.

U.S. PATENT NO. 6,782,054

48. U.S. Patent No. 6,782,054 entitled, *Method And Apparatus For Motion Vector Estimation*, was filed on April 20, 2001. The ‘2054 patent is subject to a 35 U.S.C. § 154(b) term extension of 485 days. Dynamic Data is the owner by assignment of all right, title, and interest in the ‘2054 patent. A true and correct copy of the ‘2054 patent is attached hereto as Exhibit 4.

49. The ‘2054 patent discloses novel methods and systems for motion estimation in a sequence of moving video pictures.

50. The inventions disclosed in the ‘2054 patent increase the speed of convergence of motion vectors to improve the convergence process.

51. The ‘2054 patent discloses a method to enhance motion estimation that includes selecting a displacement vector as a best motion vector for a region in a field from a plurality of at least two candidate motion vectors by applying an error function to each of said plural candidate motion vectors, wherein the candidate motion vector with the least error is selected as the displacement vector for the region in the field.

52. The ‘2054 patent discloses a method to enhance motion estimation that includes an error function comprising a first penalty term that depends on a type of the candidate motion vector and a second penalty term that depends on the position and size of the candidate motion vector.

53. The '2054 patent and its underlying patent application have been cited by 54 patents and patent applications as relevant prior art. Specifically, patents issued to the following companies have cited the '2054 patent and its underlying patent application as relevant prior art:

- ***Intel Corporation***
- Samsung Electronics Co., Ltd.
- Sony Corporation
- MediaTek Inc.
- Qualcomm Incorporated
- Micronas GmbH
- Google Inc.
- Thomson Licensing
- Brightscale, Inc.
- Genesis Microchip Inc.
- STMicroelectronics SA
- Toshiba Corp.

U.S. PATENT NO. 7,929,609

54. U.S. Patent No. 7,929,609 entitled, *Motion Estimation And/Or Compensation*, was filed on September 9, 2002, and claims priority to September 12, 2001. The '609 patent is subject to a 35 U.S.C. § 154(b) term extension of 1,242 days. Dynamic Data is the owner by assignment of all right, title, and interest in the '609 patent. A true and correct copy of the '609 patent is attached hereto as Exhibit 5.

55. The '609 patent discloses novel methods and systems for compensation and estimation of motion in video images.

56. The inventions disclosed in the '609 patent improve video signal processing functionality used in motion compensated prediction in encoding and compressing of digital video signals, motion compensated filtering in noise reduction, motion compensated interpolation in video format conversion, and motion compensated de-interlacing of interlaced video signals, among other video processing functionalities.

57. The ‘609 patent discloses a method of estimating or compensating motion in video images that includes using a video processor to select an image segment of a given video image.

58. The ‘609 patent discloses a method of estimating or compensating motion in video images that includes using the video processor to define an asymmetric search area surrounding the image segment based on ranges of possible motion vectors for the image segment.

59. The ‘609 patent discloses a method of estimating or compensating motion in video images that includes using the video processor to retrieve image data related to the asymmetric search area.

60. The ‘609 patent discloses a method of estimating or compensating motion in video images that includes a video processor that defines the asymmetric search area to have a center offset from a center of the image segment, the offset thereby defining asymmetry of the asymmetric search area, and statistically determines from an average vector of motion vectors established for one or more previous images.

61. The ‘609 patent and its underlying patent application have been cited by 64 patents and patent applications as relevant prior art. Specifically, patents issued to the following companies have cited the ‘609 patent and its underlying patent application as relevant prior art:

- Canon Inc.
- Xaxis Holdings, Inc.
- Samsung Electronics Co., Ltd.
- Electronics and Telecommunications Research Institute
- Broadcom Limited
- Sony Corporation
- Rakuten, Inc.
- Elan Microelectronics Corp.
- Garmin Ltd.
- State University System of Florida
- Ricoh Company Ltd.
- ***Intel Corporation***
- Novatek Microelectronics Corp.
- Pearl River Hydraulic Research Institute

U.S. PATENT NO. 7,982,799

62. U.S. Patent No. 7,982,799 entitled, *Method And Device For Interpolation Of An Image Information Value For Pixel Of An Interline*, was filed on December 29, 2006, and claims priority to December 30, 2005. The '799 patent is subject to a 35 U.S.C. § 154(b) term extension of 1,233 days. Dynamic Data is the owner by assignment of all right, title, and interest in the '799 patent. A true and correct copy of the '799 patent is attached hereto as Exhibit 6.

63. The '799 patent discloses novel methods and systems for interpolating an image information value for a pixel of an interline situated between two original image lines in an image.

64. The inventions disclosed in the '799 patent reduce or prevent ambiguities in the determination of an optimal image direction by adding a single direction values of several adjacent pixels.

65. The '799 patent discloses a method for interpolation of an image information value for a pixel of an interline that includes selecting from a number of image directions, to each of which a direction quality value is assigned, a direction of interpolation by comparing the direction quality values.

66. The '799 patent discloses a method for interpolation of an image information value for a pixel of an interline that includes determining the image information value being interpolated in dependence on image information values assigned to pixels lying adjacent to the pixel being interpolated in the direction of interpolation.

67. The '799 patent discloses a method for interpolation of an image information value for a pixel of an interline that includes ascertaining a direction quality value for an image direction by selecting a pixel group having at least two pixels.

68. The ‘799 patent discloses a method for interpolation of an image information value for a pixel of an interline that includes ascertaining a direction quality value for an image direction by determining a single direction quality value for each pixel of the pixel group, the single direction quality value being dependent on image information values assigned to image regions lying adjacent to the particular pixel of the group in the image direction.

69. The ‘799 patent discloses a method for interpolation of an image information value for a pixel of an interline that includes ascertaining a direction quality value for an image direction by creating the direction quality value as a function of the single direction quality values of the pixel group.

70. The ‘799 patent and its underlying patent application have been cited by several patents and patent applications as relevant prior art. Specifically, patents issued to the following companies have cited the ‘799 patent and its underlying patent application as relevant prior art: NEC Corporation; ***Intel Corporation***; Qualcomm Inc.; MediaTek, Inc.; and Zoran Corporation.

U.S. PATENT NO. 7,995,793

71. U.S. Patent No. 7,995,793 entitled, *Occlusion Detector For And Method Of Detecting Occlusion Areas*, was filed on October 24, 2002, and claims priority to November 7, 2001. The ‘793 patent is subject to a 35 U.S.C. § 154(b) term extension of 1,416 days. Dynamic Data is the owner by assignment of all right, title, and interest in the ‘793 patent. A true and correct copy of the ‘793 patent is attached hereto as Exhibit 7.

72. The ‘793 patent discloses novel methods and systems for detecting occlusion areas in an image based on a set of motion vectors.

73. The inventions disclosed in the ‘793 patent enable pixel accurate halo reduction in up-conversion.

74. The inventions disclosed in the ‘793 patent further enable image enhancement by allowing the decrease in the level of image enhancement in areas where occlusions are detected.

75. The ‘793 patent discloses an occlusion detector for detecting occlusions areas in a first image based on a set of motion vectors that includes a motion vector selector for selecting a first motion vector and a second motion vector from the set of motion vectors, based on a substantial vector difference between the first motion vector and the second motion vector.

76. The ‘793 patent discloses an occlusion detector for detecting occlusions areas in a first image based on a set of motion vectors that includes a pixel value comparator for calculating a first pixel value difference between a first luminance value of a first pixel of a second image and a second luminance value of a second pixel of a third image, with a first relation between the first pixel and the second pixel given by the first motion vector, and for calculating a second pixel value difference between a third luminance value of a third pixel of the second image and a fourth luminance value of a fourth pixel of the third image, with a second relation between the third pixel and the fourth pixel given by the second motion vector.

77. The ‘793 patent discloses an occlusion detector for detecting occlusions areas in a first image based on a set of motion vectors that includes a decision unit for deciding whether a particular pixel of the first image, corresponding to an intersection of the first motion vector and the second motion vector, belongs to one of the occlusion areas by checking whether the first pixel value difference is larger than a first predetermined threshold and the second pixel value difference is larger than a second predetermined threshold.

78. The ‘793 patent and its underlying patent application have been cited by 27 patents and patent applications as relevant prior art. Specifically, patents issued to the following companies have cited the ‘793 patent and its underlying patent application as relevant prior art:

- MediaTek, Inc.
- International Business Machines Corp.
- Samsung Electronics Co., Ltd.
- ***Intel Corporation***

U.S. PATENT NO. 8,155,459

79. U.S. Patent No. 8,155,459 entitled, *Video Processing Device With Low Memory Bandwidth Requirements*, was filed on May 6, 2004, and claims priority to May 19, 2003. The '459 patent is subject to a 35 U.S.C. § 154(b) term extension of 1,689 days. Dynamic Data is the owner by assignment of all right, title, and interest in the '459 patent. A true and correct copy of the '459 patent is attached hereto as Exhibit 8.

80. The '459 patent discloses novel methods and systems for processing data corresponding to a sequence of pictures according to a predictive block-based encoding technique.

81. The inventions disclosed in the '459 patent reduces the required circuit surface, and therefore the cost, of video processing by reducing the area of the reference picture in the reconstruction process of a picture.

82. Accordingly, the technologies disclosed in the '459 patent reduce the memory bandwidth required by a processing device.

83. The '459 patent discloses a video processing device for processing data corresponding to a sequence of pictures according to a predictive block-based encoding technique including a processing unit that includes a reconstruction circuit for reconstructing pictures from decoded data.

84. The '459 patent discloses a video processing device for processing data corresponding to a sequence of pictures according to a predictive block-based encoding technique including an external memory for storing reference pictures delivered by the processing unit.

85. The ‘459 patent discloses a video processing device for processing data corresponding to a sequence of pictures according to a predictive block-based encoding technique including a processing unit that further includes a memory controller for controlling data exchange between the processing unit and the external memory.

86. The ‘459 patent discloses a video processing device for processing data corresponding to a sequence of pictures according to a predictive block-based encoding technique including a processing unit that further includes a cache memory for temporarily storing data corresponding to a prediction area, the data being read out from the external memory via the memory controller.

87. The ‘459 patent discloses a video processing device for processing data corresponding to a sequence of pictures according to a predictive block-based encoding technique including a processing unit that further includes a motion compensation circuit for delivering motion compensated data to the reconstruction circuit on the basis of the prediction area read out from the cache memory.

88. The ‘459 patent discloses a video processing device for processing data corresponding to a sequence of pictures according to a predictive block-based encoding technique configured to divide the data corresponding to the prediction area within the cache memory into zones of equal size.

89. The ‘459 patent discloses a video processing device for processing data corresponding to a sequence of pictures according to a predictive block-based encoding technique configured to determine a subset of the zones that contain pixels corresponding to an image to be retrieved.

90. The ‘459 patent discloses a video processing device for processing data corresponding to a sequence of pictures according to a predictive block-based encoding technique configured to retrieve, during decoding, only the subset from the external memory to the cache memory, wherein bandwidth required to retrieve the image is reduced as a function of a quantity of the zones that are not retrieved based on failure to contain the corresponding pixels.

91. The ‘459 patent and its underlying patent application have been cited by 15 patents and patent applications as relevant prior art. Specifically, patents issued to the following companies have cited the ‘459 patent and its underlying patent application as relevant prior art:

- Renesas Electronics Corporation
- Panasonic Corporation
- Nvidia Corporation
- Samsung Electronics Co., Ltd.
- Electronics and Telecommunications Research Institute
- Seoul National University
- Qualcomm, Inc.
- Sony Corporation
- NEC Electronics Corporation
- Seoul National University Industry Foundation
- CSR Technology Inc.
- Zenverge, Inc.

U.S. PATENT NO. 8,335,392

92. U.S. Patent No. 8,335,392 entitled, *Method For Reducing Image Artifacts*, was filed on August 11, 2008, and claims priority to August 10, 2007. The ‘392 patent is subject to a 35 U.S.C. § 154(b) term extension of 1,039 days. Dynamic Data is the owner by assignment of all right, title, and interest in the ‘392 patent. A true and correct copy of the ‘392 patent is attached hereto as Exhibit 9.

93. The ‘392 patent discloses novel methods for reducing image artifacts that result from block-based digital video compression.

94. The ‘392 patent discloses a method for reducing image artifacts in an image that includes a number of pixels each of which includes at least one video information value that generates a plurality of filter coefficients for at least some of the pixels of the image, on the basis of which the video information values of the pixels can be reconstructed.

95. The ‘392 patent discloses a method for reducing image artifacts in an image that includes a number of pixels each of which includes at least one video information value that performs artifact detection to detect artifact regions within the image.

96. The ‘392 patent discloses a method for reducing image artifacts in an image that includes a number of pixels each of which includes at least one video information value that modifies at least some filter coefficients of those pixels that lie within the artifact regions to generate modified filter coefficients.

97. The ‘392 patent discloses a method for reducing image artifacts in an image that includes a number of pixels each of which includes at least one video information value that synthesizes the video information values using the filter coefficients, the modified filter coefficients being employed for the synthesis for pixels lying within the artifact regions.

98. The ‘329 patent and its underlying patent application have been cited by several patents and patent applications as relevant prior art. Specifically, patents issued to the following companies have cited the ‘329 patent and its underlying patent application as relevant prior art: Qualcomm Inc.; Dialogic Corp.; and Sony Corporation.

U.S. PATENT NO. 8,442,118

99. U.S. Patent No. 8,442,118 entitled, *Calculating Transformation Parameters For Image Processing*, was filed on May 19, 2006, and claims priority to May 31, 2005. The ‘118 patent is subject to a 35 U.S.C. § 154(b) term extension of 1,297 days. Dynamic Data is the owner

by assignment of all right, title, and interest in the '118 patent. A true and correct copy of the '118 patent is attached hereto as Exhibit 10.

100. The '118 patent discloses novel methods and systems for obtaining transformation parameters.

101. The inventions disclosed in the '118 patent reduce the processing capacity associated with obtaining transformation parameters from a vector field.

102. The '118 patent discloses a method of obtaining transformation parameters from a vector field with an image processing device that includes receiving a video image from a video source, the video image having consecutive video frames.

103. The '118 patent discloses a method of obtaining transformation parameters from a vector field with an image processing device that includes obtaining, with a processor, the vector field from the video image.

104. The '118 patent discloses a method of obtaining transformation parameters from a vector field with an image processing device that includes projecting, with the processor, the vector field on at least one axis.

105. The '118 patent discloses a method of obtaining transformation parameters from a vector field with an image processing device that includes deriving, with the processor, the transformation parameters from the projection of the vector field.

106. The '118 patent discloses a method of obtaining transformation parameters from a vector field with an image processing device that includes compressing, with the processor, the video image using the transformation parameters.

107. The ‘118 patent discloses a method of obtaining transformation parameters from a vector field with an image processing device that includes storing the compressed video image on a non-transitory computer-readable medium.

108. The ‘118 patent and its underlying patent application have been cited by several patents and patent applications as relevant prior art. Specifically, patents issued to the Samsung Electronics Co., Ltd. and Spreadtrum Communications (Shanghai) Co., Ltd. have cited the ‘118 patent and its underlying patent application as relevant prior art.

U.S. PATENT NO. 8,526,502

109. U.S. Patent No. 8,526,502 entitled, *Method And Apparatus For Line Based Vertical Motion Estimation And Compensation*, was filed on August 5, 2008, and claims priority to September 10, 2007. The ‘502 patent is subject to a 35 U.S.C. § 154(b) term extension of 410 days. Dynamic Data is the owner by assignment of all right, title, and interest in the ‘502 patent. A true and correct copy of the ‘502 patent is attached hereto as Exhibit 11.

110. The ‘502 patent discloses novel methods and systems for the processing of a video signal for vertical motion estimation and vertical motion compensation.

111. The ‘502 patent discloses a computer program product comprising a non-transitory computer usable medium having a computer readable program code embodied therein, the code being configured to implement a method for providing line based vertical motion estimation and vertical motion compensation in consecutive frames of a motion picture, wherein the picture is divided in at least one region.

112. The ‘502 patent discloses a computer program product comprising a non-transitory computer usable medium having a computer readable program code embodied therein, the code being configured to implement a method that includes a first summing of luminance values for

each horizontal line of the at least one region of a previous frame, wherein the first summing of luminance values results in a previous accumulation profile.

113. The '502 patent discloses a computer program product comprising a non-transitory computer usable medium having a computer readable program code embodied therein, the code being configured to implement a method that includes a second summing of luminance values for each horizontal line of the at least one region of a current frame, wherein the second summing of luminance values results in a current accumulation profile.

114. The '502 patent discloses a computer program product comprising a non-transitory computer usable medium having a computer readable program code embodied therein, the code being configured to implement a method that includes deriving a vertical motion vector by use of the previous accumulation profile and of the current accumulation profile, wherein the deriving a vertical motion vector selects summed luminance values of a number of horizontal lines of the at least one region of the current frame around a central line of the at least one region of the current frame in the current accumulation profile as a subprofile of the current accumulation profile and matches the subprofile of the current accumulation profile in the previous accumulation profile.

115. The '502 patent and its underlying patent application have been cited by 50 patents and patent applications as relevant prior art. Specifically, patents issued to the following companies have cited the '502 patent and its underlying patent application as relevant prior art:

- Advanced Micro Devices, Inc.
- Broadcom Limited
- Google LLC
- Himax Media Solutions, Inc.
- Imagination Technologies Limited
- LG Display Co. Ltd.
- LSI Corporation
- Magna Electronics Inc.
- MediaTek Inc.
- Nvidia Corporation

- Pixelworks, Inc.
- Qualcomm, Inc.
- Samsung Electronics Co., Ltd.
- Seiko Epson Corporation
- Sony Corporation
- Spreadtrum Communications (Shanghai) Co., Ltd.
- Technicolor S.A.
- Tsinghua Holdings Co., Ltd.
- Vixs Systems, Inc.

COUNT I
INFRINGEMENT OF U.S. PATENT NO. 7,050,114

116. Dynamic Data references and incorporates by reference the preceding paragraphs of this Complaint as if fully set forth herein.

117. Intel designs, makes, uses, sells, and/or offers for sale in the United States products and/or services for controlling the contrast of picture signals.

118. Intel designs, makes, sells, offers to sell, imports, and/or uses Intel products that control the contrast in a first part of a picture by increasing the amplitudes of all basic colors in a selected sub signal, including processors that implement Localized Adaptive Contrast Control, including but not limited to the following Intel processor models: Pentium Silver J5005 Processor, Pentium Silver N5000 Processor, Celeron J4105 Processor, Celeron J4005 Processor, Celeron N4100 Processor, and Celeron N4000 Processor (collectively, the "Intel '114 Product(s)").

119. On information and belief, Intel has directly infringed and continues to directly infringe the '114 patent by, among other things, making, using, offering for sale, and/or selling technology for controlling the contrast of picture signals, including but not limited to the Intel '114 Products.

120. On information and belief, one or more Intel subsidiaries and/or affiliates use the Intel '114 Products in regular business operations.

121. On information and belief, one or more of the Intel '114 Products include technology for controlling the contrast of picture signals.

122. On information and belief, one or more of the Intel '114 Products split a sub signal into two groups of picture information and transform a sub signal from being represented by the first set of basic colors to a second set of basic colors, for example, U, V, and Y.

123. On information and belief, one or more of the Intel '114 Products control the amplitudes of the basic colors so that they never exceed a maximum value.

124. On information and belief, one or more of the Intel '114 Products control the distortion of images on a display by soft clipping the first and/or second values of the basic colors of a sub signal.

125. On information and belief, one or more of the Intel '114 Products control contrast in a first part of a picture, said picture being represented by a picture signal.

126. On information and belief, one or more of the Intel '114 Products process a picture signal comprising a number of sub signals each holding color information for different areas of the picture, said color information being represented by a first set of basic colors, each of said basic colors having an amplitude.

127. On information and belief, one or more of the Intel '114 Products increase contrast by increasing the amplitudes of all basic colors in a selected sub signal representing that part of the picture to be contrast increased.

128. On information and belief, one or more of the Intel '114 Products determine if an amplitude of one of said basic colors exceeds a predefined value.

129. On information and belief, one or more of the Intel '114 Products reduces saturation of the color information if an amplitude of one of the basic colors exceeds the predefined value.

130. On information and belief, the Intel '114 Products are available to businesses and individuals throughout the United States.

131. On information and belief, the Intel '114 Products are provided to businesses and individuals located in Delaware.

132. By making, using, testing, offering for sale, and/or selling products and services for controlling the contrast of picture signals, including but not limited to the Intel '114 Products, Intel has injured Dynamic Data and is liable to the Plaintiff for directly infringing one or more claims of the '114 patent, including at least claim 1 pursuant to 35 U.S.C. § 271(a).

133. On information and belief, Intel also indirectly infringes the '114 patent by actively inducing infringement under 35 USC § 271(b).

134. Intel has had knowledge of the '114 patent since at least service of this Complaint or shortly thereafter, and on information and belief, Intel knew of the '114 patent and knew of its infringement, including by way of this lawsuit.

135. On information and belief, Intel intended to induce patent infringement by third-party customers and users of the Intel '114 Products and had knowledge that the inducing acts would cause infringement or was willfully blind to the possibility that its inducing acts would cause infringement. Intel specifically intended and was aware that the normal and customary use of the accused products would infringe the '114 patent. Intel performed the acts that constitute induced infringement, and would induce actual infringement, with knowledge of the '114 patent and with the knowledge that the induced acts would constitute infringement. For example, Intel provides the Intel '114 Products that have the capability of operating in a manner that infringe one or more of the claims of the '114 patent, including at least claim 1, and Intel further provides documentation and training materials that cause customers and end users of the Intel '114 Products

to utilize the products in a manner that directly infringe one or more claims of the '114 patent.[25] By providing instruction and training to customers and end-users on how to use the Intel '114 Products in a manner that directly infringes one or more claims of the '114 patent, including at least claim 1, Intel specifically intended to induce infringement of the '114 patent. On information and belief, Intel engaged in such inducement to promote the sales of the Intel '114 Products, e.g., through Intel user manuals, product support, marketing materials, and training materials to actively induce the users of the accused products to infringe the '114 patent. Accordingly, Intel has induced and continues to induce users of the accused products to use the accused products in their ordinary and customary way to infringe the '114 patent, knowing that such use constitutes infringement of the '114 patent.

136. The '114 patent is well-known within the industry as demonstrated by multiple citations to the '114 patent in published patents and patent applications assigned to technology companies and academic institutions. Intel is utilizing the technology claimed in the '114 patent without paying a reasonable royalty. Intel is infringing the '114 patent in a manner best described as willful, wanton, malicious, in bad faith, deliberate, consciously wrongful, flagrant, or characteristic of a pirate.

137. To the extent applicable, the requirements of 35 U.S.C. § 287(a) have been met with respect to the '114 patent.

138. As a result of Intel's infringement of the '114 patent, Dynamic Data has suffered monetary damages, and seeks recovery in an amount adequate to compensate for Intel's

[25] *See, e.g.*, *Intel Pentium Silver J5005 Processor*, INTEL WEBSITE (last visited Dec. 2018), *available at*: https://www.intel.com/content/www/us/en/products/processors/pentium/j5005.html; *Intel Celeron N4100 Processor*, INTEL WEBSITE (last visited Dec. 2018); INTEL PENTIUM SILVER AND INTEL CELERON PROCESSORS, VOLS. 1 AND 2 (Feb. 2018).

infringement, but in no event less than a reasonable royalty for the use made of the invention by Intel together with interest and costs as fixed by the Court.

COUNT II
INFRINGEMENT OF U.S. PATENT NO. 8,385,426

139. Dynamic Data references and incorporates by reference the preceding paragraphs of this Complaint as if fully set forth herein.

140. Intel designs, makes, uses, sells, and/or offers for sale in the United States products and/or services for generating a mosaic program guide.

141. Intel designs, makes, sells, offers to sell, imports, and/or uses Intel products that contain functionality for generating a mosaic program guide, including but not limited to Intel Multi-Media Samples ("MMS") Version 1.3 (collectively, the "Intel '426 Product(s)").

142. On information and belief, one or more Intel subsidiaries and/or affiliates use the Intel '426 Products in regular business operations.

143. On information and belief, one or more of the Intel '426 Products include technology for generating mosaic program guides.

144. On information and belief, the Intel '426 Products are available to businesses and individuals throughout the United States.

145. On information and belief, the Intel '426 Products are provided to businesses and individuals located in Delaware.

146. On information and belief, Intel has directly infringed and continues to directly infringe the '426 patent by, among other things, making, using, offering for sale, and/or selling technology for generating mosaic program guides, including but not limited to the Intel '426 Products.

147. On information and belief, the Intel '426 Products create mosaic program guides by generating I frames from a coded video bit stream, placing each I frame into mosaic windows, and combining the mosaic windows into a mosaic video frame.

148. On information and belief, the Intel '426 Products perform a method of generating a mosaic program guide comprising generating I frames from a coded video bit stream by a video decoder of a receiver.

149. On information and belief, the Intel '426 Products perform a method of generating a mosaic program guide comprising placing each I frame into one of a multiplicity of mosaic windows by the receiver.

150. On information and belief, the Intel '426 Products perform a method of generating a mosaic program guide comprising combining in the receiver the multiplicity of mosaic windows into a mosaic video frame.

151. By making, using, testing, offering for sale, and/or selling products and services, including but not limited to the Intel '426 Products, Intel has injured Dynamic Data and is liable for directly infringing one or more claims of the '426 patent, including at least claim 1, pursuant to 35 U.S.C. § 271(a).

152. On information and belief, Intel also indirectly infringes the '426 patent by actively inducing infringement under 35 USC § 271(b).

153. On information and belief, Intel has had knowledge of the '426 patent since at least service of this Complaint or shortly thereafter, and on information and belief, Intel knew of the '426 patent and knew of its infringement, including by way of this lawsuit.

154. On information and belief, Intel intended to induce patent infringement by third-party customers and users of the Intel '426 Products and had knowledge that the inducing acts

would cause infringement or was willfully blind to the possibility that its inducing acts would cause infringement. Intel specifically intended and was aware that the normal and customary use of the accused products would infringe the '426 patent. Intel performed the acts that constitute induced infringement, and would induce actual infringement, with knowledge of the '426 patent and with the knowledge that the induced acts would constitute infringement. For example, Intel provides the Intel '426 Products that have the capability of operating in a manner that infringe one or more of the claims of the '426 patent, including at least claim 1, and Intel further provides documentation and training materials that cause customers and end users of the Intel '426 Products to utilize the products in a manner that directly infringe one or more claims of the '426 patent.[26] By providing instruction and training to customers and end-users on how to use the Intel '426 Products in a manner that directly infringes one or more claims of the '426 patent, including at least claim 1, Intel specifically intended to induce infringement of the '426 patent. On information and belief, Intel engaged in such inducement to promote the sales of the Intel '426 Products, e.g., through Intel user manuals, product support, marketing materials, and training materials to actively induce the users of the accused products to infringe the '426 patent. Accordingly, Intel has induced and continues to induce users of the accused products to use the accused products in their ordinary and customary way to infringe the '426 patent, knowing that such use constitutes infringement of the '426 patent.

155. The '426 patent is well-known within the industry as demonstrated by multiple citations to the '426 patent in published patents and patent applications assigned to technology companies and academic institutions. Intel is utilizing the technology claimed in the '426 patent

[26] *See, e.g.*, *Multi-Media Samples (MMS),* INTEL WEBSITE (last visited Dec. 2018), *available at*: https://software.intel.com/sites/landingpage/mmsf/documentation/index.html.

without paying a reasonable royalty. Intel is infringing the '426 patent in a manner best described as willful, wanton, malicious, in bad faith, deliberate, consciously wrongful, flagrant, or characteristic of a pirate.

156. To the extent applicable, the requirements of 35 U.S.C. § 287(a) have been met with respect to the '426 patent.

157. As a result of Intel's infringement of the '426 patent, Dynamic Data has suffered monetary damages, and seeks recovery in an amount adequate to compensate for Intel's infringement, but in no event less than a reasonable royalty for the use made of the invention by Intel together with interest and costs as fixed by the Court.

COUNT III
INFRINGEMENT OF U.S. PATENT NO. 6,760,376

158. Dynamic Data references and incorporates by reference the preceding paragraphs of this Complaint as if fully set forth herein.

159. Intel designs, makes, uses, sells, and/or offers for sale in the United States products and/or services for motion compensated upconversion in a video image that uses motion compensation to generate an interpolated video field using motion vectors.

160. Intel designs, makes, sells, offers to sell, imports, and/or uses Intel products that enable motion compensation where an interpolated field using motion vectors is generated, including but not limited to Intel processors that contain Intel Quick Sync Video versions 5 and later and a graphics processing unit (e.g., UHD Graphics 600, UHD Graphics 605, HD Graphics 610, HD Graphics 615, HD Graphics 620, UHD Graphics 620, HD Graphics 630, UHD Graphics 630, HD Graphics P630, Iris Plus Graphics 640, Iris Plus Graphics 650, HD Graphics (Skylake), HD Graphics 510, HD Graphics 515, HD Graphics 520, HD Graphics 530, HD Graphics P530, Iris Graphics 540, Iris Graphics 550, Iris Pro Graphics P555, Iris Pro Graphics 580, and Iris Pro

Graphics P580). The infringing Intel processors include, but are not limited to, the following models: Celeron 3865U, Celeron 3965U, Celeron G3930, Celeron G3930E, Celeron G3930T, Celeron G3930TE, Celeron G3950, Pentium 4415U, Pentium G4560, Pentium G4560T, Celeron 3965Y, Core i5-7Y54, Core i5-7Y57, Core i7-7Y75, Core m3-7Y30, Core m3-7Y32, Pentium 4410Y, Pentium 4415Y, Corei3-7020U, Core i3-7100U, Core i3-7130U, Core i5-7200U, Core i5-7300U, Core i7-7500U, Core i7-7600U, Core i3-7100, Core i3-7100E, Core i3-7100H, Core i3-7100T, Core i3-7101E, Core i3-7101TE, Core i3-7102E, Core i3-7300, Core i3-7300T, Core i3-7320, Core i3-7350K, Core i5-7300HQ, Core i5-7400, Core i5-7400T, Core i5-7440EQ, Core i5-7440HQ, Core i5-7442EQ, Core i5-7500, Core i5-7500T, Core i5-7600, Core i5-7600K, Core i5-7600T, Core i7-7700, Core i7-7700HQ, Core i7-7700K, Core i7-7700T, Core i7-7820EQ, Core i7-7820HK, Core i7-7820HQ, Core i7-7920HQ, Pentium G4600, Pentium G4600T, Pentium G4620, Xeon E3-1225 v6, Xeon E3-1245 v6, Xeon E3-1275 v6, Xeon E3-1285 v6, Xeon E3-1501L v6, Xeon E3-1501M v6, Xeon E3-1505L v6, Xeon E3-1505M v6, Xeon E3-1535M v6, Core i5-7260U, Core i5-7360U, Core i7-7560U, Core i7-7660U, Core i3-7167U, Core i5-7267U, Core i5-7287U, Core i7-7567U, Celeron G4900, Celeron G4900T, Celeron G4920, Pentium Gold G5400, Pentium Gold G5400T, Core i5-8200Y, Core i7-8500Y, Core m3-8100Y, Core i5-8210Y, Core i3-8130U, Core i3-8145U, Core i5-8250U, Core i5-8265U, Core i5-8350U, Core i7-8550U, Core i7-8565U, Core i7-8650U, Core i3-8100, Core i3-8100H, Core i3-8100T, Core i3-8300, Core i3-8300T, Core i3-8350K, Core i5+8500 , Core i5-8300H, Core i5-8400, Core i5-8400B, Core i5-8400H, Core i5-8400T, Core i5-8500B, Core i5-8500T, Core i5-8600, Core i5-8600K, Core i5-8600T, Core i5-9600K, Core i7+8700 , Core i7-8086K, Core i7-8700B, Core i7-8700K, Core i7-8700T, Core i7-8750H, Core i7-8850H, Core i7-9700K, Core i9-8950HK, Core i9-9900K, Pentium Gold G5500, Pentium Gold G5500T, Pentium Gold G5600, Xeon E-2124G, Xeon E-

2126G, Xeon E-2144G, Xeon E-2146G, Xeon E-2174G, Xeon E-2176G, Xeon E-2176M, Xeon E-2186G, and Xeon E-2186M. In addition, the infringing Intel products include Intel Media Server Studio (Community, Essentials, and Professional Editions) (collectively, the "Intel '376 Product(s)").

161. On information and belief, one or more Intel subsidiaries and/or affiliates use the Intel '376 Products in regular business operations.

162. On information and belief, one or more of the Intel '376 Products include technology for motion compensated upconversion in a video image that uses motion compensation to generate an interpolated video field using motion vectors.

163. On information and belief, Intel has directly infringed and continues to directly infringe the '376 patent by, among other things, making, using, offering for sale, and/or selling technology for motion compensated upconversion in a video image that uses motion compensation to generate an interpolated video field using motion vectors, including but not limited to the Intel '376 Products.

164. On information and belief, one or more of the Intel '376 Products provide a sharp video image by comparing a calculated correlation value of pixels with a threshold value.

165. The On information and belief, one or more of the Intel '376 Products improve video image quality by selecting a motion compensated pixel that will provide a sharp video image by comparing a calculated correlation value of pixels with a threshold value.

166. On information and belief, one or more of the Intel '376 Products perform a method of motion compensation for use in a video image upconversion unit of the type that uses motion compensation to generate an interpolated field using motion vectors.

167. On information and belief, one or more of the Intel '376 Products perform a method of motion compensation that includes calculating a correlation value from the values of causal neighbor pixels of a generated field and from the values of corresponding neighbor pixels of a next field.

168. On information and belief, one or more of the Intel '376 Products perform a method of motion compensation that includes comparing the correlation value with a threshold value.

169. On information and belief, one or more of the Intel '376 Products perform a method of motion compensation that includes setting the value of a pixel to be created within the generated field to be equal to the value of a corresponding pixel of the next field if the correlation value is less than the threshold value.

170. On information and belief, the Intel '376 Products are available to businesses and individuals throughout the United States.

171. On information and belief, the Intel '376 Products are provided to businesses and individuals located in Delaware.

172. By making, using, testing, offering for sale, and/or selling products and services for motion compensated upconversion in a video image that uses motion compensation to generate an interpolated video field using motion vectors, including but not limited to the Intel '376 Products, Intel has injured Dynamic Data and is liable to the Plaintiff for directly infringing one or more claims of the '376 patent, including at least claim 4 pursuant to 35 U.S.C. § 271(a).

173. On information and belief, Intel also indirectly infringes the '376 patent by actively inducing infringement under 35 USC § 271(b).

174. Intel has had knowledge of the '376 patent since at least service of this Complaint or shortly thereafter, and on information and belief, Intel knew of the '376 patent and knew of its infringement, including by way of this lawsuit.

175. On information and belief, Intel intended to induce patent infringement by third-party customers and users of the Intel '376 Products and had knowledge that the inducing acts would cause infringement or was willfully blind to the possibility that its inducing acts would cause infringement. Intel specifically intended and was aware that the normal and customary use of the accused products would infringe the '376 patent. Intel performed the acts that constitute induced infringement, and would induce actual infringement, with knowledge of the '376 patent and with the knowledge that the induced acts would constitute infringement. For example, Intel provides the Intel '376 Products that have the capability of operating in a manner that infringe one or more of the claims of the '376 patent, including at least claim 4, and Intel further provides documentation and training materials that cause customers and end users of the Intel '376 Products to utilize the products in a manner that directly infringe one or more claims of the '376 patent.[27] By providing instruction and training to customers and end-users on how to use the Intel '376 Products in a manner that directly infringes one or more claims of the '376 patent, including at least claim 4, Intel specifically intended to induce infringement of the '376 patent. On information and belief, Intel engaged in such inducement to promote the sales of the Intel '376 Products, e.g.,

[27] *See, e.g.*, INTEL PENTIUM SILVER AND INTEL CELERON PROCESSORS, VOLS. 1 AND 2 (Feb. 2018); *Intel Core m3-8100Y Processor*, INTEL WEBSITE (last visited Dec. 2018), *available at*: https://ark.intel.com/products/185282/Intel-Core-m3-8100Y-Processor-4M-Cache-up-to-3-40-GHz-; INTEL HD GRAPHICS P530 & INTEL IRIS PRO GRAPHICS P580 (Jan. 2017); *Intel Pentium Gold G5500 Processor*, INTEL WEBSITE (last visited Dec. 2018), *available at*: https://ark.intel.com/products/129946/Intel-Pentium-Gold-G5500-Processor-4M-Cache-3-80-GHz-; *Intel Core i7-8086K Processor*, INTEL WEBSITE (last visited Dec. 2018), *available at*: https://www.intel.com/content/www/us/en/products/processors/core/i7-processors/i7-8086k.html.

through Intel user manuals, product support, marketing materials, and training materials to actively induce the users of the accused products to infringe the '376 patent. Accordingly, Intel has induced and continues to induce users of the accused products to use the accused products in their ordinary and customary way to infringe the '376 patent, knowing that such use constitutes infringement of the '376 patent.

176. The '376 patent is well-known within the industry as demonstrated by multiple citations to the '376 patent in published patents and patent applications assigned to technology companies and academic institutions. Intel is utilizing the technology claimed in the '376 patent without paying a reasonable royalty. Intel is infringing the '376 patent in a manner best described as willful, wanton, malicious, in bad faith, deliberate, consciously wrongful, flagrant, or characteristic of a pirate.

177. To the extent applicable, the requirements of 35 U.S.C. § 287(a) have been met with respect to the '376 patent. As a result of Intel's infringement of the '376 patent, Dynamic Data has suffered monetary damages, and seeks recovery in an amount adequate to compensate for Intel's infringement, but in no event less than a reasonable royalty for the use made of the invention by Intel together with interest and costs as fixed by the Court.

COUNT IV
INFRINGEMENT OF U.S. PATENT NO. 6,782,054

178. Dynamic Data references and incorporates by reference the preceding paragraphs of this Complaint as if fully set forth herein.

179. Intel designs, makes, uses, sells, and/or offers for sale in the United States products and/or services for motion estimation in a sequence of moving video pictures.

180. Intel designs, makes, sells, offers to sell, imports, and/or uses Intel products that contain functionality for enhanced motion estimation using an error function that depends on the

position and size of a candidate motion vector, including but not limited to processors that contain Intel Quick Sync Video Versions 5 and later and a graphics processing unit (e.g., UHD Graphics 600, UHD Graphics 605, HD Graphics 610, HD Graphics 615, HD Graphics 620, UHD Graphics 620, HD Graphics 630, UHD Graphics 630, HD Graphics P630, Iris Plus Graphics 640, Iris Plus Graphics 650, HD Graphics (Skylake), HD Graphics 510, HD Graphics 515, HD Graphics 520, HD Graphics 530, HD Graphics P530, Iris Graphics 540, Iris Graphics 550, Iris Pro Graphics P555, Iris Pro Graphics 580, and Iris Pro Graphics P580). The infringing Intel processors include, but are not limited to, the following models: Celeron 3865U, Celeron 3965U, Celeron G3930, Celeron G3930E, Celeron G3930T, Celeron G3930TE, Celeron G3950, Pentium 4415U, Pentium G4560, Pentium G4560T, Celeron 3965Y, Core i5-7Y54, Core i5-7Y57, Core i7-7Y75, Core m3-7Y30, Core m3-7Y32, Pentium 4410Y, Pentium 4415Y, Corei3-7020U, Core i3-7100U, Core i3-7130U, Core i5-7200U, Core i5-7300U, Core i7-7500U, Core i7-7600U, Core i3-7100, Core i3-7100E, Core i3-7100H, Core i3-7100T, Core i3-7101E, Core i3-7101TE, Core i3-7102E, Core i3-7300, Core i3-7300T, Core i3-7320, Core i3-7350K, Core i5-7300HQ, Core i5-7400, Core i5-7400T, Core i5-7440EQ, Core i5-7440HQ, Core i5-7442EQ, Core i5-7500, Core i5-7500T, Core i5-7600, Core i5-7600K, Core i5-7600T, Core i7-7700, Core i7-7700HQ, Core i7-7700K, Core i7-7700T, Core i7-7820EQ, Core i7-7820HK, Core i7-7820HQ, Core i7-7920HQ, Pentium G4600, Pentium G4600T, Pentium G4620, Xeon E3-1225 v6, Xeon E3-1245 v6, Xeon E3-1275 v6, Xeon E3-1285 v6, Xeon E3-1501L v6, Xeon E3-1501M v6, Xeon E3-1505L v6, Xeon E3-1505M v6, Xeon E3-1535M v6, Core i5-7260U, Core i5-7360U, Core i7-7560U, Core i7-7660U, Core i3-7167U, Core i5-7267U, Core i5-7287U, Core i7-7567U, Celeron G4900, Celeron G4900T, Celeron G4920, Pentium Gold G5400, Pentium Gold G5400T, Core i5-8200Y, Core i7-8500Y, Core m3-8100Y, Core i5-8210Y, Core i3-8130U, Core i3-8145U, Core i5-8250U, Core i5-8265U,

Core i5-8350U, Core i7-8550U, Core i7-8565U, Core i7-8650U, Core i3-8100, Core i3-8100H, Core i3-8100T, Core i3-8300, Core i3-8300T, Core i3-8350K, Core i5+8500 , Core i5-8300H, Core i5-8400, Core i5-8400B, Core i5-8400H, Core i5-8400T, Core i5-8500B, Core i5-8500T, Core i5-8600, Core i5-8600K, Core i5-8600T, Core i5-9600K, Core i7+8700 , Core i7-8086K, Core i7-8700B, Core i7-8700K, Core i7-8700T, Core i7-8750H, Core i7-8850H, Core i7-9700K, Core i9-8950HK, Core i9-9900K, Pentium Gold G5500, Pentium Gold G5500T, Pentium Gold G5600, Xeon E-2124G, Xeon E-2126G, Xeon E-2144G, Xeon E-2146G, Xeon E-2174G, Xeon E-2176G, Xeon E-2176M, Xeon E-2186G, and Xeon E-2186M. In addition, the infringing Intel products include Intel Media Server Studio (Community, Essentials and Professional Editions) (collectively, the "Intel '2054 Product(s)").

181. On information and belief, one or more Intel subsidiaries and/or affiliates use the Intel '2054 Products in regular business operations.

182. On information and belief, one or more of the Intel '2054 Products include technology for motion estimation in a sequence of moving video pictures.

183. On information and belief, Intel has directly infringed and continues to directly infringe the '2054 patent by, among other things, making, using, offering for sale, and/or selling technology for motion estimation in a sequence of moving video pictures, including but not limited to the Intel '2054 Products.

184. On information and belief, one or more of the Intel '2054 Products increase the speed of convergence of motion vectors to improve the convergence process.

185. On information and belief, one or more of the Intel '2054 Products perform a method to enhance motion estimation that includes selecting a displacement vector as a best motion vector for a region in a field from a plurality of at least two candidate motion vectors by

applying an error function to each of said plural candidate motion vectors, wherein the candidate motion vector with the least error is selected as the displacement vector for the region in the field.

186. On information and belief, one or more of the Intel '2054 Products perform a method to enhance motion estimation that includes an error function comprising a first penalty term that depends on a type of the candidate motion vector and a second penalty term that depends on the position and size of the candidate motion vector.

187. On information and belief, the Intel '2054 Products are available to businesses and individuals throughout the United States.

188. On information and belief, the Intel '2054 Products are provided to businesses and individuals located in Delaware.

189. By making, using, testing, offering for sale, and/or selling products and services for motion estimation in a sequence of moving video pictures, including but not limited to the Intel '2054 Products, Intel has injured Dynamic Data and is liable to the Plaintiff for directly infringing one or more claims of the '2054 patent, including at least claim 13 pursuant to 35 U.S.C. § 271(a).

190. On information and belief, Intel also indirectly infringes the '2054 patent by actively inducing infringement under 35 USC § 271(b).

191. Intel has had knowledge of the '2054 patent since at least service of this Complaint or shortly thereafter, and on information and belief, Intel knew of the '2054 patent and knew of its infringement, including by way of this lawsuit.

192. Alternatively, Intel has had knowledge of the '2054 patent since at least October 21, 2008, when U.S. Patent No. 7,440,008, which is owned by Intel and cites the '2054 patent as relevant prior art, was issued.

193. On information and belief, Intel intended to induce patent infringement by third-party customers and users of the Intel '2054 Products and had knowledge that the inducing acts would cause infringement or was willfully blind to the possibility that its inducing acts would cause infringement. Intel specifically intended and was aware that the normal and customary use of the accused products would infringe the '2054 patent. Intel performed the acts that constitute induced infringement, and would induce actual infringement, with knowledge of the '2054 patent and with the knowledge that the induced acts would constitute infringement. For example, Intel provides the Intel '2054 Products that have the capability of operating in a manner that infringe one or more of the claims of the '2054 patent, including at least claim 13, and Intel further provides documentation and training materials that cause customers and end users of the Intel '2054 Products to utilize the products in a manner that directly infringe one or more claims of the '2054 patent.[28] By providing instruction and training to customers and end-users on how to use the Intel '2054 Products in a manner that directly infringes one or more claims of the '2054 patent, including at least claim 13, Intel specifically intended to induce infringement of the '2054 patent. On information and belief, Intel engaged in such inducement to promote the sales of the Intel '2054 Products, e.g., through Intel user manuals, product support, marketing materials, and training materials to actively induce the users of the accused products to infringe the '2054 patent. Accordingly, Intel has induced and continues to induce users of the accused products to use the

[28] *See, e.g.*, INTEL PENTIUM SILVER AND INTEL CELERON PROCESSORS, VOLS. 1 AND 2 (Feb. 2018); *Intel Core m3-8100Y Processor*, INTEL WEBSITE (last visited Dec. 2018), *available at*: https://ark.intel.com/products/185282/Intel-Core-m3-8100Y-Processor-4M-Cache-up-to-3-40-GHz-; INTEL HD GRAPHICS P530 & INTEL IRIS PRO GRAPHICS P580 (Jan. 2017); *Intel Pentium Gold G5500 Processor*, INTEL WEBSITE (last visited Dec. 2018), *available at*: https://ark.intel.com/products/129946/Intel-Pentium-Gold-G5500-Processor-4M-Cache-3-80-GHz-; *Intel Core i7-8086K Processor*, INTEL WEBSITE (last visited Dec. 2018), *available at*: https://www.intel.com/content/www/us/en/products/processors/core/i7-processors/i7-8086k.html.

accused products in their ordinary and customary way to infringe the '2054 patent, knowing that such use constitutes infringement of the '2054 patent.

194. The '2054 patent is well-known within the industry as demonstrated by multiple citations to the '2054 patent in published patents and patent applications assigned to technology companies and academic institutions. Intel is utilizing the technology claimed in the '2054 patent without paying a reasonable royalty. Intel is infringing the '2054 patent in a manner best described as willful, wanton, malicious, in bad faith, deliberate, consciously wrongful, flagrant, or characteristic of a pirate.

195. To the extent applicable, the requirements of 35 U.S.C. § 287(a) have been met with respect to the '2054 patent. As a result of Intel's infringement of the '2054 patent, Dynamic Data has suffered monetary damages, and seeks recovery in an amount adequate to compensate for Intel's infringement, but in no event less than a reasonable royalty for the use made of the invention by Intel together with interest and costs as fixed by the Court.

COUNT V
INFRINGEMENT OF U.S. PATENT NO. 7,929,609

196. Dynamic Data references and incorporates by reference the preceding paragraphs of this Complaint as if fully set forth herein.

197. Intel designs, makes, uses, sells, and/or offers for sale in the United States products and/or services for compensation and estimation of motion in video images.

198. Intel designs, makes, sells, offers to sell, imports, and/or uses Intel products that perform a method of estimating and/or compensating motion in video images using an asymmetric search area, including but not limited to Intel processors that contain Intel Quick Sync Video versions 5 and later and a graphics processing unit (e.g., UHD Graphics 600, UHD Graphics 605, HD Graphics 610, HD Graphics 615, HD Graphics 620, UHD Graphics 620, HD Graphics 630,

UHD Graphics 630, HD Graphics P630, Iris Plus Graphics 640, Iris Plus Graphics 650, HD Graphics (Skylake), HD Graphics 510, HD Graphics 515, HD Graphics 520, HD Graphics 530, HD Graphics P530, Iris Graphics 540, Iris Graphics 550, Iris Pro Graphics P555, Iris Pro Graphics 580, and Iris Pro Graphics P580). The infringing Intel processors include, but are not limited to, the following models: Celeron 3865U, Celeron 3965U, Celeron G3930, Celeron G3930E, Celeron G3930T, Celeron G3930TE, Celeron G3950, Pentium 4415U, Pentium G4560, Pentium G4560T, Celeron 3965Y, Core i5-7Y54, Core i5-7Y57, Core i7-7Y75, Core m3-7Y30, Core m3-7Y32, Pentium 4410Y, Pentium 4415Y, Corei3-7020U, Core i3-7100U, Core i3-7130U, Core i5-7200U, Core i5-7300U, Core i7-7500U, Core i7-7600U, Core i3-7100, Core i3-7100E, Core i3-7100H, Core i3-7100T, Core i3-7101E, Core i3-7101TE, Core i3-7102E, Core i3-7300, Core i3-7300T, Core i3-7320, Core i3-7350K, Core i5-7300HQ, Core i5-7400, Core i5-7400T, Core i5-7440EQ, Core i5-7440HQ, Core i5-7442EQ, Core i5-7500, Core i5-7500T, Core i5-7600, Core i5-7600K, Core i5-7600T, Core i7-7700, Core i7-7700HQ, Core i7-7700K, Core i7-7700T, Core i7-7820EQ, Core i7-7820HK, Core i7-7820HQ, Core i7-7920HQ, Pentium G4600, Pentium G4600T, Pentium G4620, Xeon E3-1225 v6, Xeon E3-1245 v6, Xeon E3-1275 v6, Xeon E3-1285 v6, Xeon E3-1501L v6, Xeon E3-1501M v6, Xeon E3-1505L v6, Xeon E3-1505M v6, Xeon E3-1535M v6, Core i5-7260U, Core i5-7360U, Core i7-7560U, Core i7-7660U, Core i3-7167U, Core i5-7267U, Core i5-7287U, Core i7-7567U, Celeron G4900, Celeron G4900T, Celeron G4920, Pentium Gold G5400, Pentium Gold G5400T, Core i5-8200Y, Core i7-8500Y, Core m3-8100Y, Core i5-8210Y, Core i3-8130U, Core i3-8145U, Core i5-8250U, Core i5-8265U, Core i5-8350U, Core i7-8550U, Core i7-8565U, Core i7-8650U, Core i3-8100, Core i3-8100H, Core i3-8100T, Core i3-8300, Core i3-8300T, Core i3-8350K, Core i5+8500 , Core i5-8300H, Core i5-8400, Core i5-8400B, Core i5-8400H, Core i5-8400T, Core i5-8500B, Core i5-8500T, Core i5-8600, Core i5-8600K, Core i5-

8600T, Core i5-9600K, Core i7+8700 , Core i7-8086K, Core i7-8700B, Core i7-8700K, Core i7-8700T, Core i7-8750H, Core i7-8850H, Core i7-9700K, Core i9-8950HK, Core i9-9900K, Pentium Gold G5500, Pentium Gold G5500T, Pentium Gold G5600, Xeon E-2124G, Xeon E-2126G, Xeon E-2144G, Xeon E-2146G, Xeon E-2174G, Xeon E-2176G, Xeon E-2176M, Xeon E-2186G, and Xeon E-2186M. In addition, the infringing Intel products include Intel Media Server Studio (Community, Essentials, and Professional Editions) (collectively, the "Intel '609 Product(s)").

199. On information and belief, one or more Intel subsidiaries and/or affiliates use the Intel '609 Products in regular business operations.

200. On information and belief, one or more of the Intel '609 Products include technology for compensation and estimation of motion in video images.

201. On information and belief, Intel has directly infringed and continues to directly infringe the '609 patent by, among other things, making, using, offering for sale, and/or selling technology for compensation and estimation of motion in video images, including but not limited to the Intel '609 Products.

202. On information and belief, one or more of the Intel '609 Products improve video signal processing functionality used in motion compensated prediction in encoding and compressing of digital video signals, motion compensated filtering in noise reduction, motion compensated interpolation in video format conversion, and motion compensated de-interlacing of interlaced video signals, among other video processing functionalities.

203. On information and belief, one or more of the Intel '609 Products enable a method of estimating or compensating motion in video images that includes using a video processor to select an image segment of a given video image.

204. On information and belief, one or more of the Intel '609 Products enable a method of estimating or compensating motion in video images that includes using the video processor to define an asymmetric search area surrounding the image segment based on ranges of possible motion vectors for the image segment.

205. On information and belief, one or more of the Intel '609 Products enable a method of estimating or compensating motion in video images that includes using the video processor to retrieve image data related to the asymmetric search area.

206. On information and belief, one or more of the Intel '609 Products enable a method of estimating or compensating motion in video images that includes a video processor that defines the asymmetric search area to have a center offset from a center of the image segment, the offset thereby defining asymmetry of the asymmetric search area, and statistically determines from an average vector of motion vectors established for one or more previous images.

207. On information and belief, the Intel '609 Products are available to businesses and individuals throughout the United States.

208. On information and belief, the Intel '609 Products are provided to businesses and individuals located in Delaware.

209. By making, using, testing, offering for sale, and/or selling products and services for compensation and estimation of motion in video images, including but not limited to the Intel '609 Products, Intel has injured Dynamic Data and is liable to the Plaintiff for directly infringing one or more claims of the '609 patent, including at least claim 1 pursuant to 35 U.S.C. § 271(a).

210. On information and belief, Intel also indirectly infringes the '609 patent by actively inducing infringement under 35 USC § 271(b).

211. Intel has had knowledge of the '609 patent since at least service of this Complaint or shortly thereafter, and on information and belief, Intel knew of the '609 patent and knew of its infringement, including by way of this lawsuit.

212. Alternatively, Intel has had knowledge of the '609 patent since at least September 13, 2016, when U.S. Patent No. 9,445,103, which is owned by Intel and cites the '609 patent as relevant prior art, was issued.

213. Alternatively, Intel has had knowledge of the '609 patent since at least November 29, 2016, when U.S. Patent No. 9,509,995, which is owned by Intel and cites the '609 patent as relevant prior art, was issued.

214. Alternatively, Intel has had knowledge of the '609 patent since at least January 3, 2017, when U.S. Patent No. 9,538,197, which is owned by Intel and cites the '609 patent as relevant prior art, was issued.

215. Alternatively, Intel has had knowledge of the '609 patent since at least May 16, 2017, when U.S. Patent No. 9,654,792, which is owned by Intel and cites the '609 patent as relevant prior art, was issued.

216. Alternatively, Intel has had knowledge of the '609 patent since at least April 24, 2018, when U.S. Patent No. 9,955,179, which is owned by Intel and cites the '609 patent as relevant prior art, was issued.

217. Alternatively, Intel has had knowledge of the '609 patent since at least November 6, 2018, when Chinese Patent No. CN104053005B, which cites the '609 patent as relevant prior art, was issued.

218. On information and belief, Intel intended to induce patent infringement by third-party customers and users of the Intel '609 Products and had knowledge that the inducing acts

would cause infringement or was willfully blind to the possibility that its inducing acts would cause infringement. Intel specifically intended and was aware that the normal and customary use of the accused products would infringe the '609 patent. Intel performed the acts that constitute induced infringement, and would induce actual infringement, with knowledge of the '609 patent and with the knowledge that the induced acts would constitute infringement. For example, Intel provides the Intel '609 Products that have the capability of operating in a manner that infringe one or more of the claims of the '609 patent, including at least claim 1, and Intel further provides documentation and training materials that cause customers and end users of the Intel '609 Products to utilize the products in a manner that directly infringe one or more claims of the '609 patent.[29] By providing instruction and training to customers and end-users on how to use the Intel '609 Products in a manner that directly infringes one or more claims of the '609 patent, including at least claim 1, Intel specifically intended to induce infringement of the '609 patent. On information and belief, Intel engaged in such inducement to promote the sales of the Intel '609 Products, e.g., through Intel user manuals, product support, marketing materials, and training materials to actively induce the users of the accused products to infringe the '609 patent. Accordingly, Intel has induced and continues to induce users of the accused products to use the accused products in their ordinary and customary way to infringe the '609 patent, knowing that such use constitutes infringement of the '609 patent.

[29] *See, e.g.*, INTEL PENTIUM SILVER AND INTEL CELERON PROCESSORS, VOLS. 1 AND 2 (Feb. 2018); *Intel Core m3-8100Y Processor*, INTEL WEBSITE (last visited Dec. 2018), *available at*: https://ark.intel.com/products/185282/Intel-Core-m3-8100Y-Processor-4M-Cache-up-to-3-40-GHz-; INTEL HD GRAPHICS P530 & INTEL IRIS PRO GRAPHICS P580 (Jan. 2017); *Intel Pentium Gold G5500 Processor*, INTEL WEBSITE (last visited Dec. 2018), *available at*: https://ark.intel.com/products/129946/Intel-Pentium-Gold-G5500-Processor-4M-Cache-3-80-GHz-; *Intel Core i7-8086K Processor*, INTEL WEBSITE (last visited Dec. 2018), *available at*: https://www.intel.com/content/www/us/en/products/processors/core/i7-processors/i7-8086k.html.

219. The '609 patent is well-known within the industry as demonstrated by multiple citations to the '609 patent in published patents and patent applications assigned to technology companies and academic institutions. Intel is utilizing the technology claimed in the '609 patent without paying a reasonable royalty. Intel is infringing the '609 patent in a manner best described as willful, wanton, malicious, in bad faith, deliberate, consciously wrongful, flagrant, or characteristic of a pirate.

220. To the extent applicable, the requirements of 35 U.S.C. § 287(a) have been met with respect to the '609 patent.

221. As a result of Intel's infringement of the '609 patent, Dynamic Data has suffered monetary damages, and seeks recovery in an amount adequate to compensate for Intel's infringement, but in no event less than a reasonable royalty for the use made of the invention by Intel together with interest and costs as fixed by the Court.

COUNT VI
INFRINGEMENT OF U.S. PATENT NO. 7,982,799

222. Dynamic Data references and incorporates by reference the preceding paragraphs of this Complaint as if fully set forth herein.

223. Intel designs, makes, uses, sells, and/or offers for sale in the United States products and/or services for interpolating an image information value for a pixel of an interline situated between two original image lines in an image.

224. Intel designs, makes, sells, offers to sell, imports, and/or uses Intel products that contain functionality for interpolating an image information value for a pixel where the image information value is dependent on image information values assigned to pixels lying adjacent to the pixel being interpolated, including but not limited to Intel processors that contain Intel Quick Sync Video versions 5 and later and a graphics processing unit (e.g., UHD Graphics 600, UHD

Graphics 605, HD Graphics 610, HD Graphics 615, HD Graphics 620, UHD Graphics 620, HD Graphics 630, UHD Graphics 630, HD Graphics P630, Iris Plus Graphics 640, Iris Plus Graphics 650, HD Graphics (Skylake), HD Graphics 510, HD Graphics 515, HD Graphics 520, HD Graphics 530, HD Graphics P530, Iris Graphics 540, Iris Graphics 550, Iris Pro Graphics P555, Iris Pro Graphics 580, and Iris Pro Graphics P580). The infringing Intel processors include, but are not limited to, the following models: Celeron 3865U, Celeron 3965U, Celeron G3930, Celeron G3930E, Celeron G3930T, Celeron G3930TE, Celeron G3950, Pentium 4415U, Pentium G4560, Pentium G4560T, Celeron 3965Y, Core i5-7Y54, Core i5-7Y57, Core i7-7Y75, Core m3-7Y30, Core m3-7Y32, Pentium 4410Y, Pentium 4415Y, Corei3-7020U, Core i3-7100U, Core i3-7130U, Core i5-7200U, Core i5-7300U, Core i7-7500U, Core i7-7600U, Core i3-7100, Core i3-7100E, Core i3-7100H, Core i3-7100T, Core i3-7101E, Core i3-7101TE, Core i3-7102E, Core i3-7300, Core i3-7300T, Core i3-7320, Core i3-7350K, Core i5-7300HQ, Core i5-7400, Core i5-7400T, Core i5-7440EQ, Core i5-7440HQ, Core i5-7442EQ, Core i5-7500, Core i5-7500T, Core i5-7600, Core i5-7600K, Core i5-7600T, Core i7-7700, Core i7-7700HQ, Core i7-7700K, Core i7-7700T, Core i7-7820EQ, Core i7-7820HK, Core i7-7820HQ, Core i7-7920HQ, Pentium G4600, Pentium G4600T, Pentium G4620, Xeon E3-1225 v6, Xeon E3-1245 v6, Xeon E3-1275 v6, Xeon E3-1285 v6, Xeon E3-1501L v6, Xeon E3-1501M v6, Xeon E3-1505L v6, Xeon E3-1505M v6, Xeon E3-1535M v6, Core i5-7260U, Core i5-7360U, Core i7-7560U, Core i7-7660U, Core i3-7167U, Core i5-7267U, Core i5-7287U, Core i7-7567U, Celeron G4900, Celeron G4900T, Celeron G4920, Pentium Gold G5400, Pentium Gold G5400T, Core i5-8200Y, Core i7-8500Y, Core m3-8100Y, Core i5-8210Y, Core i3-8130U, Core i3-8145U, Core i5-8250U, Core i5-8265U, Core i5-8350U, Core i7-8550U, Core i7-8565U, Core i7-8650U, Core i3-8100, Core i3-8100H, Core i3-8100T, Core i3-8300, Core i3-8300T, Core i3-8350K, Core i5+8500 , Core i5-8300H, Core i5-8400, Core

i5-8400B, Core i5-8400H, Core i5-8400T, Core i5-8500B, Core i5-8500T, Core i5-8600, Core i5-8600K, Core i5-8600T, Core i5-9600K, Core i7+8700 , Core i7-8086K, Core i7-8700B, Core i7-8700K, Core i7-8700T, Core i7-8750H, Core i7-8850H, Core i7-9700K, Core i9-8950HK, Core i9-9900K, Pentium Gold G5500, Pentium Gold G5500T, Pentium Gold G5600, Xeon E-2124G, Xeon E-2126G, Xeon E-2144G, Xeon E-2146G, Xeon E-2174G, Xeon E-2176G, Xeon E-2176M, Xeon E-2186G, and Xeon E-2186M. In addition, the infringing Intel products include Intel Media Server Studio (Community, Essentials, and Professional Editions) (collectively, the "Intel '799 Product(s)").

225. On information and belief, one or more Intel subsidiaries and/or affiliates use the Intel '799 Products in regular business operations.

226. On information and belief, one or more of the Intel '799 Products include technology for interpolating an image information value for a pixel of an interline situated between two original image lines in an image.

227. On information and belief, Intel has directly infringed and continues to directly infringe the '799 patent by, among other things, making, using, offering for sale, and/or selling technology for interpolating an image information value for a pixel of an interline situated between two original image lines in an image, including but not limited to the Intel '799 Products.

228. On information and belief, one or more of the Intel '799 Products reduce or prevent ambiguities in the determination of an optimal image direction by adding a single direction values of several adjacent pixels.

229. On information and belief, one or more of the Intel '799 Products enable a method for interpolation of an image information value for a pixel of an interline that includes selecting

from a number of image directions, to each of which a direction quality value is assigned, a direction of interpolation by comparing the direction quality values.

230. On information and belief, one or more of the Intel '799 Products enable a method for interpolation of an image information value for a pixel of an interline that includes determining the image information value being interpolated in dependence on image information values assigned to pixels lying adjacent to the pixel being interpolated in the direction of interpolation.

231. On information and belief, one or more of the Intel '799 Products enable a method for interpolation of an image information value for a pixel of an interline that includes ascertaining a direction quality value for an image direction by selecting a pixel group having at least two pixels.

232. On information and belief, one or more of the Intel '799 Products enable a method for interpolation of an image information value for a pixel of an interline that includes ascertaining a direction quality value for an image direction by determining a single direction quality value for each pixel of the pixel group, the single direction quality value being dependent on image information values assigned to image regions lying adjacent to the particular pixel of the group in the image direction.

233. On information and belief, one or more of the Intel '799 Products enable a method for interpolation of an image information value for a pixel of an interline that includes ascertaining a direction quality value for an image direction by creating the direction quality value as a function of the single direction quality values of the pixel group.

234. On information and belief, the Intel '799 Products are available to businesses and individuals throughout the United States.

235. On information and belief, the Intel '799 Products are provided to businesses and individuals located in Delaware.

236. By making, using, testing, offering for sale, and/or selling products and services for interpolating an image information value for a pixel of an interline situated between two original image lines in an image, including but not limited to the Intel '799 Products, Intel has injured Dynamic Data and is liable to the Plaintiff for directly infringing one or more claims of the '799 patent, including at least claim 1 pursuant to 35 U.S.C. § 271(a).

237. On information and belief, Intel also indirectly infringes the '799 patent by actively inducing infringement under 35 USC § 271(b).

238. Intel has had knowledge of the '799 patent since at least service of this Complaint or shortly thereafter, and on information and belief, Intel knew of the '799 patent and knew of its infringement, including by way of this lawsuit.

239. Alternatively, Intel has had knowledge of the '799 patent since at least July 7, 2015, when U.S. Patent No. 9,076,230, which is owned by Intel and cites the '799 patent as relevant prior art, was issued.

240. On information and belief, Intel intended to induce patent infringement by third-party customers and users of the Intel '799 Products and had knowledge that the inducing acts would cause infringement or was willfully blind to the possibility that its inducing acts would cause infringement. Intel specifically intended and was aware that the normal and customary use of the accused products would infringe the '799 patent. Intel performed the acts that constitute induced infringement, and would induce actual infringement, with knowledge of the '799 patent and with the knowledge that the induced acts would constitute infringement. For example, Intel provides the Intel '799 Products that have the capability of operating in a manner that infringe one

or more of the claims of the '799 patent, including at least claim 1, and Intel further provides documentation and training materials that cause customers and end users of the Intel '799 Products to utilize the products in a manner that directly infringe one or more claims of the '799 patent.[30] By providing instruction and training to customers and end-users on how to use the Intel '799 Products in a manner that directly infringes one or more claims of the '799 patent, including at least claim 1, Intel specifically intended to induce infringement of the '799 patent. On information and belief, Intel engaged in such inducement to promote the sales of the Intel '799 Products, e.g., through Intel user manuals, product support, marketing materials, and training materials to actively induce the users of the accused products to infringe the '799 patent. Accordingly, Intel has induced and continues to induce users of the accused products to use the accused products in their ordinary and customary way to infringe the '799 patent, knowing that such use constitutes infringement of the '799 patent.

241. The '799 patent is well-known within the industry as demonstrated by multiple citations to the '799 patent in published patents and patent applications assigned to technology companies and academic institutions. Intel is utilizing the technology claimed in the '799 patent without paying a reasonable royalty. Intel is infringing the '799 patent in a manner best described as willful, wanton, malicious, in bad faith, deliberate, consciously wrongful, flagrant, or characteristic of a pirate.

[30] *See, e.g.*, INTEL PENTIUM SILVER AND INTEL CELERON PROCESSORS, VOLS. 1 AND 2 (Feb. 2018); *Intel Core m3-8100Y Processor*, INTEL WEBSITE (last visited Dec. 2018), *available at*: https://ark.intel.com/products/185282/Intel-Core-m3-8100Y-Processor-4M-Cache-up-to-3-40-GHz-; INTEL HD GRAPHICS P530 & INTEL IRIS PRO GRAPHICS P580 (Jan. 2017); *Intel Pentium Gold G5500 Processor*, INTEL WEBSITE (last visited Dec. 2018), *available at*: https://ark.intel.com/products/129946/Intel-Pentium-Gold-G5500-Processor-4M-Cache-3-80-GHz-; *Intel Core i7-8086K Processor*, INTEL WEBSITE (last visited Dec. 2018), *available at*: https://www.intel.com/content/www/us/en/products/processors/core/i7-processors/i7-8086k.html.

242. To the extent applicable, the requirements of 35 U.S.C. § 287(a) have been met with respect to the '799 patent.

243. As a result of Intel's infringement of the '799 patent, Dynamic Data has suffered monetary damages, and seeks recovery in an amount adequate to compensate for Intel's infringement, but in no event less than a reasonable royalty for the use made of the invention by Intel together with interest and costs as fixed by the Court.

COUNT VII
INFRINGEMENT OF U.S. PATENT NO. 7,995,793

244. Dynamic Data references and incorporates by reference the preceding paragraphs of this Complaint as if fully set forth herein.

245. Intel designs, makes, uses, sells, and/or offers for sale in the United States products and/or services for detecting occlusion areas in an image based on a set of motion vectors.

246. Intel designs, makes, sells, offers to sell, imports, and/or uses Intel products that contain functionality for detecting occlusion areas based on motion vectors, including but not limited to the following Intel RealSense products: Intel RealSense Depth Cameras, including Intel RealSense D435i, Intel RealSense D435, and Intel RealSense D415 (collectively, the "Intel '793 Product(s)").

247. On information and belief, one or more Intel subsidiaries and/or affiliates use the Intel '793 Products in regular business operations.

248. On information and belief, one or more of the Intel '793 Products include technology for detecting occlusion areas in an image based on a set of motion vectors.

249. On information and belief, Intel has directly infringed and continues to directly infringe the '793 patent by, among other things, making, using, offering for sale, and/or selling

technology for detecting occlusion areas in an image based on a set of motion vectors, including but not limited to the Intel '793 Products.

250. On information and belief, one or more of the Intel '793 Products enable pixel accurate halo reduction in up-conversion.

251. On information and belief, one or more of the Intel '793 Products enable image enhancement by allowing the decrease in the level of image enhancement in areas where occlusions are detected.

252. On information and belief, one or more of the Intel '793 Products include an occlusion detector for detecting occlusions areas in a first image based on a set of motion vectors that includes a motion vector selector for selecting a first motion vector and a second motion vector from the set of motion vectors, based on a substantial vector difference between the first motion vector and the second motion vector.

253. On information and belief, one or more of the Intel '793 Products include an occlusion detector for detecting occlusions areas in a first image based on a set of motion vectors that includes a pixel value comparator for calculating a first pixel value difference between a first luminance value of a first pixel of a second image and a second luminance value of a second pixel of a third image, with a first relation between the first pixel and the second pixel given by the first motion vector, and for calculating a second pixel value difference between a third luminance value of a third pixel of the second image and a fourth luminance value of a fourth pixel of the third image, with a second relation between the third pixel and the fourth pixel given by the second motion vector.

254. On information and belief, one or more of the Intel '793 Products include an occlusion detector for detecting occlusions areas in a first image based on a set of motion vectors

that includes a decision unit for deciding whether a particular pixel of the first image, corresponding to an intersection of the first motion vector and the second motion vector, belongs to one of the occlusion areas by checking whether the first pixel value difference is larger than a first predetermined threshold and the second pixel value difference is larger than a second predetermined threshold.

255. On information and belief, the Intel '793 Products are available to businesses and individuals throughout the United States.

256. On information and belief, the Intel '793 Products are provided to businesses and individuals located in Delaware.

257. By making, using, testing, offering for sale, and/or selling products and services for detecting occlusion areas in an image based on a set of motion vectors, including but not limited to the Intel '793 Products, Intel has injured Dynamic Data and is liable to the Plaintiff for directly infringing one or more claims of the '793 patent, including at least claim 1 pursuant to 35 U.S.C. § 271(a).

258. On information and belief, Intel also indirectly infringes the '793 patent by actively inducing infringement under 35 USC § 271(b).

259. Intel has had knowledge of the '793 patent since at least service of this Complaint or shortly thereafter, and on information and belief, Intel knew of the '793 patent and knew of its infringement, including by way of this lawsuit.

260. Alternatively, Intel has had knowledge of the '793 patent since at least May 13, 2014, when U.S. Patent No. 8,724,022, which is owned by Intel and cites the '793 patent as relevant prior art, was issued.

261. On information and belief, Intel intended to induce patent infringement by third-party customers and users of the Intel '793 Products and had knowledge that the inducing acts would cause infringement or was willfully blind to the possibility that its inducing acts would cause infringement. Intel specifically intended and was aware that the normal and customary use of the accused products would infringe the '793 patent. Intel performed the acts that constitute induced infringement, and would induce actual infringement, with knowledge of the '793 patent and with the knowledge that the induced acts would constitute infringement. For example, Intel provides the Intel '793 Products that have the capability of operating in a manner that infringe one or more of the claims of the '793 patent, including at least claim 1, and Intel further provides documentation and training materials that cause customers and end users of the Intel '793 Products to utilize the products in a manner that directly infringe one or more claims of the '793 patent.[31] By providing instruction and training to customers and end-users on how to use the Intel '793 Products in a manner that directly infringes one or more claims of the '793 patent, including at least claim 1, Intel specifically intended to induce infringement of the '793 patent. On information and belief, Intel engaged in such inducement to promote the sales of the Intel '793 Products, e.g., through Intel user manuals, product support, marketing materials, and training materials to actively induce the users of the accused products to infringe the '793 patent. Accordingly, Intel has induced and continues to induce users of the accused products to use the accused products in their ordinary and customary way to infringe the '793 patent, knowing that such use constitutes infringement of the '793 patent.

[31] *See, e.g.*, INTEL REALSENSE D400 SERIES PRODUCT FAMILY (Nov. 2018); INTEL REALSENSE DEPTH CAMERA D400-SERIES (Sept. 2017).

262. The '793 patent is well-known within the industry as demonstrated by multiple citations to the '793 patent in published patents and patent applications assigned to technology companies and academic institutions. Intel is utilizing the technology claimed in the '793 patent without paying a reasonable royalty. Intel is infringing the '793 patent in a manner best described as willful, wanton, malicious, in bad faith, deliberate, consciously wrongful, flagrant, or characteristic of a pirate.

263. To the extent applicable, the requirements of 35 U.S.C. § 287(a) have been met with respect to the '793 patent.

264. As a result of Intel's infringement of the '793 patent, Dynamic Data has suffered monetary damages, and seeks recovery in an amount adequate to compensate for Intel's infringement, but in no event less than a reasonable royalty for the use made of the invention by Intel together with interest and costs as fixed by the Court.

COUNT VIII
INFRINGEMENT OF U.S. PATENT NO. 8,155,459

265. Dynamic Data references and incorporates by reference the preceding paragraphs of this Complaint as if fully set forth herein.

266. Intel designs, makes, uses, sells, and/or offers for sale in the United States products and/or services for processing data corresponding to a sequence of pictures according to a predictive block-based encoding technique.

267. Intel designs, makes, sells, offers to sell, imports, and/or uses Intel products that contain functionality for processing data corresponding to a sequence of pictures using predictive block-based encoding, including but not limited to Intel processors that contain Intel Quick Sync Video versions 5 and later and a graphics processing unit (e.g., UHD Graphics 600, UHD Graphics 605, HD Graphics 610, HD Graphics 615, HD Graphics 620, UHD Graphics 620, HD Graphics

630, UHD Graphics 630, HD Graphics P630, Iris Plus Graphics 640, Iris Plus Graphics 650, HD Graphics (Skylake), HD Graphics 510, HD Graphics 515, HD Graphics 520, HD Graphics 530, HD Graphics P530, Iris Graphics 540, Iris Graphics 550, Iris Pro Graphics P555, Iris Pro Graphics 580, and Iris Pro Graphics P580). The infringing Intel processors include, but are not limited to, the following models: Celeron 3865U, Celeron 3965U, Celeron G3930, Celeron G3930E, Celeron G3930T, Celeron G3930TE, Celeron G3950, Pentium 4415U, Pentium G4560, Pentium G4560T, Celeron 3965Y, Core i5-7Y54, Core i5-7Y57, Core i7-7Y75, Core m3-7Y30, Core m3-7Y32, Pentium 4410Y, Pentium 4415Y, Corei3-7020U, Core i3-7100U, Core i3-7130U, Core i5-7200U, Core i5-7300U, Core i7-7500U, Core i7-7600U, Core i3-7100, Core i3-7100E, Core i3-7100H, Core i3-7100T, Core i3-7101E, Core i3-7101TE, Core i3-7102E, Core i3-7300, Core i3-7300T, Core i3-7320, Core i3-7350K, Core i5-7300HQ, Core i5-7400, Core i5-7400T, Core i5-7440EQ, Core i5-7440HQ, Core i5-7442EQ, Core i5-7500, Core i5-7500T, Core i5-7600, Core i5-7600K, Core i5-7600T, Core i7-7700, Core i7-7700HQ, Core i7-7700K, Core i7-7700T, Core i7-7820EQ, Core i7-7820HK, Core i7-7820HQ, Core i7-7920HQ, Pentium G4600, Pentium G4600T, Pentium G4620, Xeon E3-1225 v6, Xeon E3-1245 v6, Xeon E3-1275 v6, Xeon E3-1285 v6, Xeon E3-1501L v6, Xeon E3-1501M v6, Xeon E3-1505L v6, Xeon E3-1505M v6, Xeon E3-1535M v6, Core i5-7260U, Core i5-7360U, Core i7-7560U, Core i7-7660U, Core i3-7167U, Core i5-7267U, Core i5-7287U, Core i7-7567U, Celeron G4900, Celeron G4900T, Celeron G4920, Pentium Gold G5400, Pentium Gold G5400T, Core i5-8200Y, Core i7-8500Y, Core m3-8100Y, Core i5-8210Y, Core i3-8130U, Core i3-8145U, Core i5-8250U, Core i5-8265U, Core i5-8350U, Core i7-8550U, Core i7-8565U, Core i7-8650U, Core i3-8100, Core i3-8100H, Core i3-8100T, Core i3-8300, Core i3-8300T, Core i3-8350K, Core i5+8500 , Core i5-8300H, Core i5-8400, Core i5-8400B, Core i5-8400H, Core i5-8400T, Core i5-8500B, Core i5-8500T, Core i5-8600, Core i5-8600K, Core i5-

8600T, Core i5-9600K, Core i7+8700 , Core i7-8086K, Core i7-8700B, Core i7-8700K, Core i7-8700T, Core i7-8750H, Core i7-8850H, Core i7-9700K, Core i9-8950HK, Core i9-9900K, Pentium Gold G5500, Pentium Gold G5500T, Pentium Gold G5600, Xeon E-2124G, Xeon E-2126G, Xeon E-2144G, Xeon E-2146G, Xeon E-2174G, Xeon E-2176G, Xeon E-2176M, Xeon E-2186G, and Xeon E-2186M (collectively, the "Intel '459 Product(s)").

268. On information and belief, one or more Intel subsidiaries and/or affiliates use the Intel '459 Products in regular business operations.

269. On information and belief, one or more of the Intel '459 Products include technology for processing data corresponding to a sequence of pictures according to a predictive block-based encoding technique.

270. On information and belief, Intel has directly infringed and continues to directly infringe the '459 patent by, among other things, making, using, offering for sale, and/or selling technology for processing data corresponding to a sequence of pictures according to a predictive block-based encoding technique, including but not limited to the Intel '459 Products.

271. On information and belief, one or more of the Intel '459 Products reduce the required circuit surface, and therefore the cost, of video processing by reducing the area of the reference picture in the reconstruction process of a picture.

272. On information and belief, one or more of the Intel '459 Products reduce the memory bandwidth required by a processing device.

273. On information and belief, one or more of the Intel '459 Products include a video processing device for processing data corresponding to a sequence of pictures according to a predictive block-based encoding technique including a processing unit that includes a reconstruction circuit for reconstructing pictures from decoded data.

274. On information and belief, one or more of the Intel '459 Products include a video processing device for processing data corresponding to a sequence of pictures according to a predictive block-based encoding technique including an external memory for storing reference pictures delivered by the processing unit.

275. On information and belief, one or more of the Intel '459 Products include a video processing device for processing data corresponding to a sequence of pictures according to a predictive block-based encoding technique including a processing unit that further includes a memory controller for controlling data exchange between the processing unit and the external memory.

276. On information and belief, one or more of the Intel '459 Products include a video processing device for processing data corresponding to a sequence of pictures according to a predictive block-based encoding technique including a processing unit that further includes a cache memory for temporarily storing data corresponding to a prediction area, the data being read out from the external memory via the memory controller.

277. On information and belief, one or more of the Intel '459 Products include a video processing device for processing data corresponding to a sequence of pictures according to a predictive block-based encoding technique including a processing unit that further includes a motion compensation circuit for delivering motion compensated data to the reconstruction circuit on the basis of the prediction area read out from the cache memory.

278. On information and belief, one or more of the Intel '459 Products include a video processing device for processing data corresponding to a sequence of pictures according to a predictive block-based encoding technique configured to divide the data corresponding to the prediction area within the cache memory into zones of equal size.

279. On information and belief, one or more of the Intel '459 Products include a video processing device for processing data corresponding to a sequence of pictures according to a predictive block-based encoding technique configured to determine a subset of the zones that contain pixels corresponding to an image to be retrieved.

280. The '459 patent discloses a video processing device for processing data corresponding to a sequence of pictures according to a predictive block-based encoding technique configured to retrieve, during decoding, only the subset from the external memory to the cache memory, wherein bandwidth required to retrieve the image is reduced as a function of a quantity of the zones that are not retrieved based on failure to contain the corresponding pixels.

281. On information and belief, the Intel '459 Products are available to businesses and individuals throughout the United States.

282. On information and belief, the Intel '459 Products are provided to businesses and individuals located in Delaware.

283. By making, using, testing, offering for sale, and/or selling products and services for processing data corresponding to a sequence of pictures according to a predictive block-based encoding technique, including but not limited to the Intel '459 Products, Intel has injured Dynamic Data and is liable to the Plaintiff for directly infringing one or more claims of the '459 patent, including at least claim 1 pursuant to 35 U.S.C. § 271(a).

284. On information and belief, Intel also indirectly infringes the '459 patent by actively inducing infringement under 35 USC § 271(b).

285. Intel has had knowledge of the '459 patent since at least service of this Complaint or shortly thereafter, and on information and belief, Intel knew of the '459 patent and knew of its infringement, including by way of this lawsuit.

286. On information and belief, Intel intended to induce patent infringement by third-party customers and users of the Intel '459 Products and had knowledge that the inducing acts would cause infringement or was willfully blind to the possibility that its inducing acts would cause infringement. Intel specifically intended and was aware that the normal and customary use of the accused products would infringe the '459 patent. Intel performed the acts that constitute induced infringement, and would induce actual infringement, with knowledge of the '459 patent and with the knowledge that the induced acts would constitute infringement. For example, Intel provides the Intel '459 Products that have the capability of operating in a manner that infringe one or more of the claims of the '459 patent, including at least claim 1, and Intel further provides documentation and training materials that cause customers and end users of the Intel '459 Products to utilize the products in a manner that directly infringe one or more claims of the '459 patent.[32] By providing instruction and training to customers and end-users on how to use the Intel '459 Products in a manner that directly infringes one or more claims of the '459 patent, including at least claim 1, Intel specifically intended to induce infringement of the '459 patent. On information and belief, Intel engaged in such inducement to promote the sales of the Intel '459 Products, e.g., through Intel user manuals, product support, marketing materials, and training materials to actively induce the users of the accused products to infringe the '459 patent. Accordingly, Intel has induced and continues to induce users of the accused products to use the accused products in their ordinary

[32] *See, e.g.*, INTEL PENTIUM SILVER AND INTEL CELERON PROCESSORS, VOLS. 1 AND 2 (Feb. 2018); *Intel Core m3-8100Y Processor*, INTEL WEBSITE (last visited Dec. 2018), *available at*: https://ark.intel.com/products/185282/Intel-Core-m3-8100Y-Processor-4M-Cache-up-to-3-40-GHz-; INTEL HD GRAPHICS P530 & INTEL IRIS PRO GRAPHICS P580 (Jan. 2017); *Intel Pentium Gold G5500 Processor*, INTEL WEBSITE (last visited Dec. 2018), *available at*: https://ark.intel.com/products/129946/Intel-Pentium-Gold-G5500-Processor-4M-Cache-3-80-GHz-; *Intel Core i7-8086K Processor*, INTEL WEBSITE (last visited Dec. 2018), *available at*: https://www.intel.com/content/www/us/en/products/processors/core/i7-processors/i7-8086k.html.

and customary way to infringe the '459 patent, knowing that such use constitutes infringement of the '459 patent.

287. The '459 patent is well-known within the industry as demonstrated by multiple citations to the '459 patent in published patents and patent applications assigned to technology companies and academic institutions. Intel is utilizing the technology claimed in the '459 patent without paying a reasonable royalty. Intel is infringing the '459 patent in a manner best described as willful, wanton, malicious, in bad faith, deliberate, consciously wrongful, flagrant, or characteristic of a pirate.

288. To the extent applicable, the requirements of 35 U.S.C. § 287(a) have been met with respect to the '459 patent.

289. As a result of Intel's infringement of the '459 patent, Dynamic Data has suffered monetary damages, and seeks recovery in an amount adequate to compensate for Intel's infringement, but in no event less than a reasonable royalty for the use made of the invention by Intel together with interest and costs as fixed by the Court.

COUNT IX
INFRINGEMENT OF U.S. PATENT NO. 8,335,392

290. Dynamic Data references and incorporates by reference the preceding paragraphs of this Complaint as if fully set forth herein.

291. Intel designs, makes, uses, sells, and/or offers for sale in the United States products and/or services for reducing image artifacts that result from block-based digital video compression.

292. Intel designs, makes, sells, offers to sell, imports, and/or uses Intel products that contain functionality for reducing image artifacts through synthesizing video information values using filter coefficients, including but not limited to Intel field-programmable gate array ("FPGA") Video Image Processing ("VIP") Suite IP cores in the following device families: Intel Arria 10,

Intel Cyclone 10 LP, Intel Cyclone 10 GX, Intel MAX 10, Arria II GX/GZ, Arria V GX/GT/SX/ST, Arria V GZ, Cyclone IV E/GX, Cyclone V, Stratix IV, and Stratix V (collectively, the "Intel '392 Product(s)").

293. On information and belief, one or more Intel subsidiaries and/or affiliates use the Intel '392 Products in regular business operations.

294. On information and belief, one or more of the Intel '392 Products include technology for reducing image artifacts that result from block-based digital video compression.

295. On information and belief, Intel has directly infringed and continues to directly infringe the '392 patent by, among other things, making, using, offering for sale, and/or selling technology for reducing image artifacts that result from block-based digital video compression, including but not limited to the Intel '392 Products.

296. On information and belief, one or more of the Intel '392 Products enable a method for reducing image artifacts in an image that includes a number of pixels each of which includes at least one video information value that generates a plurality of filter coefficients for at least some of the pixels of the image, on the basis of which the video information values of the pixels can be reconstructed.

297. On information and belief, one or more of the Intel '392 Products enable a method for reducing image artifacts in an image that includes a number of pixels each of which includes at least one video information value that performs artifact detection to detect artifact regions within the image.

298. On information and belief, one or more of the Intel '392 Products enable a method for reducing image artifacts in an image that includes a number of pixels each of which includes

at least one video information value that modifies at least some filter coefficients of those pixels that lie within the artifact regions to generate modified filter coefficients.

299. On information and belief, one or more of the Intel '392 Products enable a method for reducing image artifacts in an image that includes a number of pixels each of which includes at least one video information value that synthesizes the video information values using the filter coefficients, the modified filter coefficients being employed for the synthesis for pixels lying within the artifact regions.

300. On information and belief, the Intel '392 Products are available to businesses and individuals throughout the United States.

301. On information and belief, the Intel '392 Products are provided to businesses and individuals located in Delaware.

302. By making, using, testing, offering for sale, and/or selling products and services for reducing image artifacts that result from block-based digital video compression, including but not limited to the Intel '392 Products, Intel has injured Dynamic Data and is liable to the Plaintiff for directly infringing one or more claims of the '392 patent, including at least claim 1 pursuant to 35 U.S.C. § 271(a).

303. On information and belief, Intel also indirectly infringes the '392 patent by actively inducing infringement under 35 USC § 271(b).

304. Intel has had knowledge of the '392 patent since at least service of this Complaint or shortly thereafter, and on information and belief, Intel knew of the '392 patent and knew of its infringement, including by way of this lawsuit.

305. On information and belief, Intel intended to induce patent infringement by third-party customers and users of the Intel '392 Products and had knowledge that the inducing acts

would cause infringement or was willfully blind to the possibility that its inducing acts would cause infringement. Intel specifically intended and was aware that the normal and customary use of the accused products would infringe the '392 patent. Intel performed the acts that constitute induced infringement, and would induce actual infringement, with knowledge of the '392 patent and with the knowledge that the induced acts would constitute infringement. For example, Intel provides the Intel '392 Products that have the capability of operating in a manner that infringe one or more of the claims of the '392 patent, including at least claim 1, and Intel further provides documentation and training materials that cause customers and end users of the Intel '392 Products to utilize the products in a manner that directly infringe one or more claims of the '392 patent.[33] By providing instruction and training to customers and end-users on how to use the Intel '392 Products in a manner that directly infringes one or more claims of the '392 patent, including at least claim 1, Intel specifically intended to induce infringement of the '392 patent. On information and belief, Intel engaged in such inducement to promote the sales of the Intel '392 Products, e.g., through Intel user manuals, product support, marketing materials, and training materials to actively induce the users of the accused products to infringe the '392 patent. Accordingly, Intel has induced and continues to induce users of the accused products to use the accused products in their ordinary and customary way to infringe the '392 patent, knowing that such use constitutes infringement of the '392 patent.

306. The '392 patent is well-known within the industry as demonstrated by multiple citations to the '392 patent in published patents and patent applications assigned to technology

[33] *See, e.g.*, *Intel Acceleration Stack Quick Start Guide for Intel Programmable Acceleration Card with Intel Arria 10 GX FPGA*, INTEL WEBSITE (last visited Dec. 2018), *available at*: https://www.intel.com/content/www/us/en/programmable/documentation/iyu1522005567196.html; HIGH-DEFINITION MULTIMEDIA INTERFACE (HDMI) INTEL FPGA IP RELEASE NOTES (May 17, 2018); INTEL CYCLONE 10 LP DEVICE DATASHEET (May 7, 2018); SRATIX IV DEVICE HANDBOOK VOL. 1 (Jan. 2016).

companies and academic institutions. Intel is utilizing the technology claimed in the '392 patent without paying a reasonable royalty. Intel is infringing the '392 patent in a manner best described as willful, wanton, malicious, in bad faith, deliberate, consciously wrongful, flagrant, or characteristic of a pirate.

307. To the extent applicable, the requirements of 35 U.S.C. § 287(a) have been met with respect to the '392 patent.

308. As a result of Intel's infringement of the '392 patent, Dynamic Data has suffered monetary damages, and seeks recovery in an amount adequate to compensate for Intel's infringement, but in no event less than a reasonable royalty for the use made of the invention by Intel together with interest and costs as fixed by the Court.

COUNT X
INFRINGEMENT OF U.S. PATENT NO. 8,442,118

309. Dynamic Data references and incorporates by reference the preceding paragraphs of this Complaint as if fully set forth herein.

310. Intel designs, makes, uses, sells, and/or offers for sale in the United States products and/or services for obtaining transformation parameters.

311. Intel designs, makes, sells, offers to sell, imports, and/or uses Intel products that contain functionality for obtaining transformation parameters from a vector field, including but not limited to Intel processors that contain Intel Quick Sync Video versions 5 and later and a graphics processing unit (e.g., UHD Graphics 600, UHD Graphics 605, HD Graphics 610, HD Graphics 615, HD Graphics 620, UHD Graphics 620, HD Graphics 630, UHD Graphics 630, HD Graphics P630, Iris Plus Graphics 640, Iris Plus Graphics 650, HD Graphics (Skylake), HD Graphics 510, HD Graphics 515, HD Graphics 520, HD Graphics 530, HD Graphics P530, Iris Graphics 540, Iris Graphics 550, Iris Pro Graphics P555, Iris Pro Graphics 580, and Iris Pro

Graphics P580). The infringing Intel processors include, but are not limited to, the following models: Celeron 3865U, Celeron 3965U, Celeron G3930, Celeron G3930E, Celeron G3930T, Celeron G3930TE, Celeron G3950, Pentium 4415U, Pentium G4560, Pentium G4560T, Celeron 3965Y, Core i5-7Y54, Core i5-7Y57, Core i7-7Y75, Core m3-7Y30, Core m3-7Y32, Pentium 4410Y, Pentium 4415Y, Corei3-7020U, Core i3-7100U, Core i3-7130U, Core i5-7200U, Core i5-7300U, Core i7-7500U, Core i7-7600U, Core i3-7100, Core i3-7100E, Core i3-7100H, Core i3-7100T, Core i3-7101E, Core i3-7101TE, Core i3-7102E, Core i3-7300, Core i3-7300T, Core i3-7320, Core i3-7350K, Core i5-7300HQ, Core i5-7400, Core i5-7400T, Core i5-7440EQ, Core i5-7440HQ, Core i5-7442EQ, Core i5-7500, Core i5-7500T, Core i5-7600, Core i5-7600K, Core i5-7600T, Core i7-7700, Core i7-7700HQ, Core i7-7700K, Core i7-7700T, Core i7-7820EQ, Core i7-7820HK, Core i7-7820HQ, Core i7-7920HQ, Pentium G4600, Pentium G4600T, Pentium G4620, Xeon E3-1225 v6, Xeon E3-1245 v6, Xeon E3-1275 v6, Xeon E3-1285 v6, Xeon E3-1501L v6, Xeon E3-1501M v6, Xeon E3-1505L v6, Xeon E3-1505M v6, Xeon E3-1535M v6, Core i5-7260U, Core i5-7360U, Core i7-7560U, Core i7-7660U, Core i3-7167U, Core i5-7267U, Core i5-7287U, Core i7-7567U, Celeron G4900, Celeron G4900T, Celeron G4920, Pentium Gold G5400, Pentium Gold G5400T, Core i5-8200Y, Core i7-8500Y, Core m3-8100Y, Core i5-8210Y, Core i3-8130U, Core i3-8145U, Core i5-8250U, Core i5-8265U, Core i5-8350U, Core i7-8550U, Core i7-8565U, Core i7-8650U, Core i3-8100, Core i3-8100H, Core i3-8100T, Core i3-8300, Core i3-8300T, Core i3-8350K, Core i5+8500 , Core i5-8300H, Core i5-8400, Core i5-8400B, Core i5-8400H, Core i5-8400T, Core i5-8500B, Core i5-8500T, Core i5-8600, Core i5-8600K, Core i5-8600T, Core i5-9600K, Core i7+8700 , Core i7-8086K, Core i7-8700B, Core i7-8700K, Core i7-8700T, Core i7-8750H, Core i7-8850H, Core i7-9700K, Core i9-8950HK, Core i9-9900K, Pentium Gold G5500, Pentium Gold G5500T, Pentium Gold G5600, Xeon E-2124G, Xeon E-

2126G, Xeon E-2144G, Xeon E-2146G, Xeon E-2174G, Xeon E-2176G, Xeon E-2176M, Xeon E-2186G, and Xeon E-2186M. In addition, the infringing Intel products include Intel Media Server Studio (Community, Essentials, and Professional Editions) (collectively, the "Intel '118 Product(s)").

312. On information and belief, one or more Intel subsidiaries and/or affiliates use the Intel '118 Products in regular business operations.

313. On information and belief, one or more of the Intel '118 Products include technology for obtaining transformation parameters.

314. On information and belief, Intel has directly infringed and continues to directly infringe the '118 patent by, among other things, making, using, offering for sale, and/or selling technology for obtaining transformation parameters, including but not limited to the Intel '118 Products.

315. On information and belief, one or more of the Intel '118 Products reduce the processing capacity associated with obtaining transformation parameters from a vector field.

316. On information and belief, one or more of the Intel '118 Products enable a method of obtaining transformation parameters from a vector field with an image processing device that includes receiving a video image from a video source, the video image having consecutive video frames.

317. On information and belief, one or more of the Intel '118 Products enable a method of obtaining transformation parameters from a vector field with an image processing device that includes obtaining, with a processor, the vector field from the video image.

318. On information and belief, one or more of the Intel '118 Products enable a method of obtaining transformation parameters from a vector field with an image processing device that includes projecting, with the processor, the vector field on at least one axis.

319. On information and belief, one or more of the Intel '118 Products enable a method of obtaining transformation parameters from a vector field with an image processing device that includes deriving, with the processor, the transformation parameters from the projection of the vector field.

320. On information and belief, one or more of the Intel '118 Products enable a method of obtaining transformation parameters from a vector field with an image processing device that includes compressing, with the processor, the video image using the transformation parameters.

321. On information and belief, one or more of the Intel '118 Products enable a method of obtaining transformation parameters from a vector field with an image processing device that includes storing the compressed video image on a non-transitory computer-readable medium.

322. On information and belief, the Intel '118 Products are available to businesses and individuals throughout the United States.

323. On information and belief, the Intel '118 Products are provided to businesses and individuals located in Delaware.

324. By making, using, testing, offering for sale, and/or selling products and services for obtaining transformation parameters, including but not limited to the Intel '118 Products, Intel has injured Dynamic Data and is liable to the Plaintiff for directly infringing one or more claims of the '118 patent, including at least claim 1 pursuant to 35 U.S.C. § 271(a).

325. On information and belief, Intel also indirectly infringes the '118 patent by actively inducing infringement under 35 USC § 271(b).

326. Intel has had knowledge of the '118 patent since at least service of this Complaint or shortly thereafter, and on information and belief, Intel knew of the '118 patent and knew of its infringement, including by way of this lawsuit.

327. On information and belief, Intel intended to induce patent infringement by third-party customers and users of the Intel '118 Products and had knowledge that the inducing acts would cause infringement or was willfully blind to the possibility that its inducing acts would cause infringement. Intel specifically intended and was aware that the normal and customary use of the accused products would infringe the '118 patent. Intel performed the acts that constitute induced infringement, and would induce actual infringement, with knowledge of the '118 patent and with the knowledge that the induced acts would constitute infringement. For example, Intel provides the Intel '118 Products that have the capability of operating in a manner that infringe one or more of the claims of the '118 patent, including at least claim 1, and Intel further provides documentation and training materials that cause customers and end users of the Intel '118 Products to utilize the products in a manner that directly infringe one or more claims of the '118 patent.[34] By providing instruction and training to customers and end-users on how to use the Intel '118 Products in a manner that directly infringes one or more claims of the '118 patent, including at least claim 1, Intel specifically intended to induce infringement of the '118 patent. On information and belief, Intel engaged in such inducement to promote the sales of the Intel '118 Products, e.g.,

[34] *See, e.g.*, INTEL PENTIUM SILVER AND INTEL CELERON PROCESSORS, VOLS. 1 AND 2 (Feb. 2018); *Intel Core m3-8100Y Processor*, INTEL WEBSITE (last visited Dec. 2018), *available at*: https://ark.intel.com/products/185282/Intel-Core-m3-8100Y-Processor-4M-Cache-up-to-3-40-GHz-; INTEL HD GRAPHICS P530 & INTEL IRIS PRO GRAPHICS P580 (Jan. 2017); *Intel Pentium Gold G5500 Processor*, INTEL WEBSITE (last visited Dec. 2018), *available at*: https://ark.intel.com/products/129946/Intel-Pentium-Gold-G5500-Processor-4M-Cache-3-80-GHz-; *Intel Core i7-8086K Processor*, INTEL WEBSITE (last visited Dec. 2018), *available at*: https://www.intel.com/content/www/us/en/products/processors/core/i7-processors/i7-8086k.html.

through Intel user manuals, product support, marketing materials, and training materials to actively induce the users of the accused products to infringe the '118 patent. Accordingly, Intel has induced and continues to induce users of the accused products to use the accused products in their ordinary and customary way to infringe the '118 patent, knowing that such use constitutes infringement of the '118 patent.

328. The '118 patent is well-known within the industry as demonstrated by multiple citations to the '118 patent in published patents and patent applications assigned to technology companies and academic institutions. Intel is utilizing the technology claimed in the '118 patent without paying a reasonable royalty. Intel is infringing the '118 patent in a manner best described as willful, wanton, malicious, in bad faith, deliberate, consciously wrongful, flagrant, or characteristic of a pirate.

329. To the extent applicable, the requirements of 35 U.S.C. § 287(a) have been met with respect to the '118 patent.

330. As a result of Intel's infringement of the '118 patent, Dynamic Data has suffered monetary damages, and seeks recovery in an amount adequate to compensate for Intel's infringement, but in no event less than a reasonable royalty for the use made of the invention by Intel together with interest and costs as fixed by the Court.

COUNT XI
INFRINGEMENT OF U.S. PATENT NO. 8,526,502

331. Dynamic Data references and incorporates by reference the preceding paragraphs of this Complaint as if fully set forth herein.

332. Intel designs, makes, uses, sells, and/or offers for sale in the United States products and/or services for the processing of a video signal for vertical motion estimation and vertical motion compensation.

333. Intel designs, makes, sells, offers to sell, imports, and/or uses Intel products that contain functionality for vertical motion estimation and vertical motion compensation in consecutive frames of a motion picture, including but not limited to Intel processors that contain Intel Quick Sync Video versions 5 and later and a graphics processing unit (e.g., UHD Graphics 600, UHD Graphics 605, HD Graphics 610, HD Graphics 615, HD Graphics 620, UHD Graphics 620, HD Graphics 630, UHD Graphics 630, HD Graphics P630, Iris Plus Graphics 640, Iris Plus Graphics 650, HD Graphics (Skylake), HD Graphics 510, HD Graphics 515, HD Graphics 520, HD Graphics 530, HD Graphics P530, Iris Graphics 540, Iris Graphics 550, Iris Pro Graphics P555, Iris Pro Graphics 580, and Iris Pro Graphics P580). The infringing Intel processors include, but are not limited to, the following models: Celeron 3865U, Celeron 3965U, Celeron G3930, Celeron G3930E, Celeron G3930T, Celeron G3930TE, Celeron G3950, Pentium 4415U, Pentium G4560, Pentium G4560T, Celeron 3965Y, Core i5-7Y54, Core i5-7Y57, Core i7-7Y75, Core m3-7Y30, Core m3-7Y32, Pentium 4410Y, Pentium 4415Y, Corei3-7020U, Core i3-7100U, Core i3-7130U, Core i5-7200U, Core i5-7300U, Core i7-7500U, Core i7-7600U, Core i3-7100, Core i3-7100E, Core i3-7100H, Core i3-7100T, Core i3-7101E, Core i3-7101TE, Core i3-7102E, Core i3-7300, Core i3-7300T, Core i3-7320, Core i3-7350K, Core i5-7300HQ, Core i5-7400, Core i5-7400T, Core i5-7440EQ, Core i5-7440HQ, Core i5-7442EQ, Core i5-7500, Core i5-7500T, Core i5-7600, Core i5-7600K, Core i5-7600T, Core i7-7700, Core i7-7700HQ, Core i7-7700K, Core i7-7700T, Core i7-7820EQ, Core i7-7820HK, Core i7-7820HQ, Core i7-7920HQ, Pentium G4600, Pentium G4600T, Pentium G4620, Xeon E3-1225 v6, Xeon E3-1245 v6, Xeon E3-1275 v6, Xeon E3-1285 v6, Xeon E3-1501L v6, Xeon E3-1501M v6, Xeon E3-1505L v6, Xeon E3-1505M v6, Xeon E3-1535M v6, Core i5-7260U, Core i5-7360U, Core i7-7560U, Core i7-7660U, Core i3-7167U, Core i5-7267U, Core i5-7287U, Core i7-7567U, Celeron G4900, Celeron G4900T,

Celeron G4920, Pentium Gold G5400, Pentium Gold G5400T, Core i5-8200Y, Core i7-8500Y, Core m3-8100Y, Core i5-8210Y, Core i3-8130U, Core i3-8145U, Core i5-8250U, Core i5-8265U, Core i5-8350U, Core i7-8550U, Core i7-8565U, Core i7-8650U, Core i3-8100, Core i3-8100H, Core i3-8100T, Core i3-8300, Core i3-8300T, Core i3-8350K, Core i5+8500 , Core i5-8300H, Core i5-8400, Core i5-8400B, Core i5-8400H, Core i5-8400T, Core i5-8500B, Core i5-8500T, Core i5-8600, Core i5-8600K, Core i5-8600T, Core i5-9600K, Core i7+8700 , Core i7-8086K, Core i7-8700B, Core i7-8700K, Core i7-8700T, Core i7-8750H, Core i7-8850H, Core i7-9700K, Core i9-8950HK, Core i9-9900K, Pentium Gold G5500, Pentium Gold G5500T, Pentium Gold G5600, Xeon E-2124G, Xeon E-2126G, Xeon E-2144G, Xeon E-2146G, Xeon E-2174G, Xeon E-2176G, Xeon E-2176M, Xeon E-2186G, and Xeon E-2186M. In addition, the infringing Intel products include Intel Media Server Studio (Community, Essentials, and Professional Editions) (collectively, the "Intel '502 Product(s)").

334. On information and belief, one or more Intel subsidiaries and/or affiliates use the Intel '502 Products in regular business operations.

335. On information and belief, one or more of the Intel '502 Products include technology for the processing of a video signal for vertical motion estimation and vertical motion compensation.

336. On information and belief, Intel has directly infringed and continues to directly infringe the '502 patent by, among other things, making, using, offering for sale, and/or selling technology for the processing of a video signal for vertical motion estimation and vertical motion compensation, including but not limited to the Intel '502 Products.

337. On information and belief, one or more of the Intel '502 Products include a computer program product comprising a non-transitory computer usable medium having a

computer readable program code embodied therein, the code being configured to implement a method for providing line based vertical motion estimation and vertical motion compensation in consecutive frames of a motion picture, wherein the picture is divided in at least one region.

338. On information and belief, one or more of the Intel '502 Products include a computer program product comprising a non-transitory computer usable medium having a computer readable program code embodied therein, the code being configured to implement a method that includes a first summing of luminance values for each horizontal line of the at least one region of a previous frame, wherein the first summing of luminance values results in a previous accumulation profile.

339. On information and belief, one or more of the Intel '502 Products include a computer program product comprising a non-transitory computer usable medium having a computer readable program code embodied therein, the code being configured to implement a method that includes a second summing of luminance values for each horizontal line of the at least one region of a current frame, wherein the second summing of luminance values results in a current accumulation profile.

340. On information and belief, one or more of the Intel '502 Products include a computer program product comprising a non-transitory computer usable medium having a computer readable program code embodied therein, the code being configured to implement a method that includes deriving a vertical motion vector by use of the previous accumulation profile and of the current accumulation profile, wherein the deriving a vertical motion vector selects summed luminance values of a number of horizontal lines of the at least one region of the current frame around a central line of the at least one region of the current frame in the current

accumulation profile as a subprofile of the current accumulation profile and matches the subprofile of the current accumulation profile in the previous accumulation profile.

341. On information and belief, the Intel '502 Products are available to businesses and individuals throughout the United States.

342. On information and belief, the Intel '502 Products are provided to businesses and individuals located in Delaware.

343. By making, using, testing, offering for sale, and/or selling products and services for the processing of a video signal for vertical motion estimation and vertical motion compensation, including but not limited to the Intel '502 Products, Intel has injured Dynamic Data and is liable to the Plaintiff for directly infringing one or more claims of the '502 patent, including at least claim 8 pursuant to 35 U.S.C. § 271(a).

344. On information and belief, Intel also indirectly infringes the '502 patent by actively inducing infringement under 35 USC § 271(b).

345. Intel has had knowledge of the '502 patent since at least service of this Complaint or shortly thereafter, and on information and belief, Intel knew of the '502 patent and knew of its infringement, including by way of this lawsuit.

346. On information and belief, Intel intended to induce patent infringement by third-party customers and users of the Intel '502 Products and had knowledge that the inducing acts would cause infringement or was willfully blind to the possibility that its inducing acts would cause infringement. Intel specifically intended and was aware that the normal and customary use of the accused products would infringe the '502 patent. Intel performed the acts that constitute induced infringement, and would induce actual infringement, with knowledge of the '502 patent and with the knowledge that the induced acts would constitute infringement. For example, Intel

provides the Intel '502 Products that have the capability of operating in a manner that infringe one or more of the claims of the '502 patent, including at least claim 8, and Intel further provides documentation and training materials that cause customers and end users of the Intel '502 Products to utilize the products in a manner that directly infringe one or more claims of the '502 patent.[35] By providing instruction and training to customers and end-users on how to use the Intel '502 Products in a manner that directly infringes one or more claims of the '502 patent, including at least claim 8, Intel specifically intended to induce infringement of the '502 patent. On information and belief, Intel engaged in such inducement to promote the sales of the Intel '502 Products, e.g., through Intel user manuals, product support, marketing materials, and training materials to actively induce the users of the accused products to infringe the '502 patent. Accordingly, Intel has induced and continues to induce users of the accused products to use the accused products in their ordinary and customary way to infringe the '502 patent, knowing that such use constitutes infringement of the '502 patent.

347. The '502 patent is well-known within the industry as demonstrated by multiple citations to the '502 patent in published patents and patent applications assigned to technology companies and academic institutions. Intel is utilizing the technology claimed in the '502 patent without paying a reasonable royalty. Intel is infringing the '502 patent in a manner best described

[35] *See, e.g.*, INTEL PENTIUM SILVER AND INTEL CELERON PROCESSORS, VOLS. 1 AND 2 (Feb. 2018); *Intel Core m3-8100Y Processor*, INTEL WEBSITE (last visited Dec. 2018), *available at*: https://ark.intel.com/products/185282/Intel-Core-m3-8100Y-Processor-4M-Cache-up-to-3-40-GHz-; INTEL HD GRAPHICS P530 & INTEL IRIS PRO GRAPHICS P580 (Jan. 2017); *Intel Pentium Gold G5500 Processor*, INTEL WEBSITE (last visited Dec. 2018), *available at*: https://ark.intel.com/products/129946/Intel-Pentium-Gold-G5500-Processor-4M-Cache-3-80-GHz-; *Intel Core i7-8086K Processor*, INTEL WEBSITE (last visited Dec. 2018), *available at*: https://www.intel.com/content/www/us/en/products/processors/core/i7-processors/i7-8086k.html.

as willful, wanton, malicious, in bad faith, deliberate, consciously wrongful, flagrant, or characteristic of a pirate.

348. To the extent applicable, the requirements of 35 U.S.C. § 287(a) have been met with respect to the '502 patent.

349. As a result of Intel's infringement of the '502 patent, Dynamic Data has suffered monetary damages, and seeks recovery in an amount adequate to compensate for Intel's infringement, but in no event less than a reasonable royalty for the use made of the invention by Intel together with interest and costs as fixed by the Court.

PRAYER FOR RELIEF

WHEREFORE, Dynamic Data respectfully requests that this Court enter:

A. A judgment in favor of Dynamic Data that Intel has infringed, either literally and/or under the doctrine of equivalents, the '114, '426, '376, '2054, '609, '799, '793, '459, '392, '118, and '502 patents;

B. An award of damages resulting from Intel's acts of infringement in accordance with 35 U.S.C. § 284;

C. A judgment and order finding that Intel's infringement was willful, wanton, malicious, bad-faith, deliberate, consciously wrongful, flagrant, or characteristic of a pirate within the meaning of 35 U.S.C. § 284 and awarding to Dynamic Data enhanced damages.

D. A judgment and order finding that this is an exceptional case within the meaning of 35 U.S.C. § 285 and awarding to Dynamic Data its reasonable attorneys' fees against Intel.

E. Any and all other relief to which Dynamic Data may show themselves to be entitled.

JURY TRIAL DEMANDED

Pursuant to Rule 38 of the Federal Rules of Civil Procedure, Dynamic Data Technologies, LLC requests a trial by jury of any issues so triable by right.

Dated: December 13, 2018

BAYARD, P.A.

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