IN THE UNITED STATES DISTRICT COURT
FOR THE EASTERN DISTRICT OF TEXAS
MARSHALL DIVISION

RADIAN MEMORY SYSTEMS LLC, *Plaintiff*, v. SAMSUNG ELECTRONICS CO., LTD., SAMSUNG ELECTRONICS AMERICA, INC., *Defendants*.	Case No. 2:24-cv-01073-JRG **JURY TRIAL DEMANDED**

DEFENDANTS SAMSUNG ELECTRONICS CO., LTD. AND SAMSUNG ELECTRONICS AMERICA, INC.'S AMENDED ANSWER, DEFENSES AND COUNTERCLAIMS

Defendants Samsung Electronics Co., Ltd. ("SEC") and Samsung Electronics America, Inc. ("SEA") (collectively, "Samsung" or "Defendants") hereby submit their First Amended Answer and Counterclaims in response to the Complaint for Patent Infringement (the "Complaint") filed by Radian Memory Systems, LLC ("Radian" or "Plaintiff") as set forth below.

Samsung denies all allegations in the Complaint unless expressly admitted in the following Paragraphs. Any admissions herein are for purposes of this matter only. Samsung reserves all rights to amend its pleading, including the right to take further positions and raise additional defenses and counterclaims that may become apparent as a result of additional information discovered subsequent to the filing of this Answer. Each Paragraph of the Answer below responds to the corresponding numbered or lettered Paragraph of the Complaint.

THE PARTIES[1]

A. Radian

1. Samsung is without knowledge or information sufficient to form a belief as to the truth of the allegations of Paragraph 1 and on that basis denies them.

B. Samsung

2. Samsung admits that it is a corporation organized under the laws of the Republic of Korea with its principal place of business located at 129 Samsung-ro, Yeongtong-gu, Suwon-si, Gyeonggi-do, 16677, Republic of Korea.

3. Samsung admits that SEA is a wholly-owned subsidiary of SEC. Samsung admits that SEA has a principal place of business at 85 Challenger Road, Ridgefield Park, New Jersey 07660. Samsung admits that it has offices at 6625 Excellence Way, Plano, Texas 75023; 2601 Preston Road, Suite #1214, Frisco, Texas 75034; and 1005 Placid Avenue, Suite #120, Plano, Texas 75074. Except as expressly admitted, Samsung denies any remaining allegations of this Paragraph.

4. Samsung admits that SEA may be served through its registered agent for service of process, CT Corporation System, 1999 Bryant Street, Suite 900, Dallas, Texas 75201.

FACTUAL BACKGROUND AND ALLEGATIONS

5. Paragraph 5 contains no allegations and Samsung therefore is not required to respond. To the extent a response is required, Samsung denies the allegations of Paragraph 5, and

[1] For ease of reference, Samsung repeats the headings as set forth in the Complaint. In doing so, Samsung makes no admissions regarding the substance of the headings or any other allegations of the Complaint. Unless explicitly stated otherwise, to the extent a particular heading can be construed as an allegation, Samsung specifically denies all such allegations.

specifically denies that it has committed, induced, or contributed to any acts of infringement in this District or any other district and denies all allegations of patent infringement.

6. Paragraph 6 contains no allegations and Samsung therefore is not required to respond. To the extent a response is required, Samsung denies the allegations of Paragraph 6, and specifically denies that it has committed, induced, or contributed to any acts of infringement in this District or any other district and denies all allegations of patent infringement.

A. Overview

7. Samsung is without knowledge or information sufficient to form a belief as to the truth of the allegations of Paragraph 7 and on that basis denies them. To the extent that the allegations in Paragraph 7 purports to characterize the Asserted Patents as innovative, Samsung denies that characterization. To the extent this Paragraph purports to describe Samsung products and/or services, the functionality of those products and services speak for themselves and will be subject to fact and expert discovery in this case. Samsung specifically denies that it has committed, induced, or contributed to any acts of infringement in this District or any other district and denies all allegations of patent infringement.

8. Samsung admits that Flash SSDs have included an FTL to manage flash memory and communicate with a host system. Samsung is without knowledge or information sufficient to form a belief as to the truth of the remaining allegations of Paragraph 8 and on that basis denies them. To the extent that the allegations in Paragraph 8 purports to characterize the Asserted Patents as innovative, Samsung denies that characterization. To the extent this Paragraph purports to describe Samsung products and/or services, the functionality of those products and services speak for themselves and will be subject to fact and expert discovery in this case. Samsung specifically denies that it has committed, induced, or contributed to any acts of infringement in this District or any other district and denies all allegations of patent infringement.

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9. Samsung admits that NAND flash memory is a non-volatile media that has specific characteristics and attributes. Samsung is without knowledge or information sufficient to form a belief as to the truth of the remaining allegations of Paragraph 9 and on that basis denies them. To the extent that the allegations in Paragraph 9 purports to characterize the Asserted Patents as innovative, Samsung denies that characterization. To the extent this Paragraph purports to describe Samsung products and/or services, the functionality of those products and services speak for themselves and will be subject to fact and expert discovery in this case. Samsung specifically denies that it has committed, induced, or contributed to any acts of infringement in this District or any other district and denies all allegations of patent infringement.

10. Samsung is without knowledge or information sufficient to form a belief as to the truth of the allegations of Paragraph 10 and on that basis denies them. To the extent that the allegations in Paragraph 10 purports to characterize the Asserted Patents as innovative, Samsung denies that characterization. To the extent this Paragraph purports to describe Samsung products and/or services, the functionality of those products and services speak for themselves and will be subject to fact and expert discovery in this case. Samsung specifically denies that it has committed, induced, or contributed to any acts of infringement in this District or any other district and denies all allegations of patent infringement.

11. Samsung is without knowledge or information sufficient to form a belief as to the truth of the allegations of Paragraph 11 and on that basis denies them. To the extent that the allegations in Paragraph 11 purports to characterize the Asserted Patents as innovative, Samsung denies that characterization. Samsung specifically denies that it has committed, induced, or contributed to any acts of infringement in this District or any other district and denies all allegations of patent infringement.

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12. Samsung is without knowledge or information sufficient to form a belief as to the truth of the allegations of Paragraph 12 and on that basis denies them. To the extent that the allegations in Paragraph 12 purports to characterize the Asserted Patents as innovative, Samsung denies that characterization. Samsung specifically denies that it has committed, induced, or contributed to any acts of infringement in this District or any other district and denies all allegations of patent infringement.

13. Samsung admits that it is a member of the NVMe industry standard organization. Samsung is without knowledge or information sufficient to form a belief as to the truth of the allegations of Paragraph 13 and on that basis denies them. Samsung specifically denies that it has committed, induced, or contributed to any acts of infringement in this District or any other district and denies all allegations of patent infringement.

14. Samsung is without knowledge or information sufficient to form a belief as to the truth of the allegations of Paragraph 14 and on that basis denies them. To the extent that the allegations in Paragraph 14 purports to characterize the Asserted Patents as innovative, Samsung denies that characterization. Samsung specifically denies that it has committed, induced, or contributed to any acts of infringement in this District or any other district and denies all allegations of patent infringement.

B. Background on Conventional Solid-State Drives ("SSDs")

15. Samsung denies the allegations of Paragraph 15.

16. Samsung admits that memory devices are used in computing systems to store and access data. Samsung admits that a solid-state drive ("SSD") is a memory device that includes, among other components, a plurality of flash memory chips where the data is stored. Samsung admits that an SSD contains a memory controller that has responsibilities for memory

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management. Except as expressly admitted, Samsung denies any remaining allegations of this Paragraph.

17. Samsung admits that, in the context of data storage, the host may be a computer or server which accesses and uses the SSD for data storage and retrieval. Except as expressly admitted, Samsung denies any remaining allegations of this Paragraph.

18. Samsung admits that SSDs have benefits over prior forms of memory devices. Except as expressly admitted, Samsung denies any remaining allegations of this Paragraph.

19. Samsung admits that SSDs have benefits over prior forms of memory devices. Except as expressly admitted, Samsung denies any remaining allegations of this Paragraph.

20. Samsung admits that an HDD has moving mechanical components. Samsung denies the remainder of the allegations in this Paragraph.

21. Samsung admits that an SDD does not have moving mechanical components. Except as expressly admitted, Samsung denies any remaining allegations of this Paragraph.

22. Samsung admits that SSDs are faster than HDDs in accessing data. Except as expressly admitted, Samsung denies any remaining allegations of this Paragraph.

23. Samsung admits that the document entitled "Samsung Solid State Drive White Paper" states, "SSDs deliver consistent performance thanks to their use of integrated circuits instead of physical spinning platters." Except as expressly admitted, Samsung denies any remaining allegations of this Paragraph.

24. Samsung admits that the document entitled "Samsung Solid State Drive White Paper" states, "while rotating disks must wait for spindles, motors, heads, and arms to physically locate data locations, SSDs can access any location with lightning speed." Except as expressly admitted, Samsung denies any remaining allegations of this Paragraph.

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25. Samsung admits that the document entitled "Samsung Solid State Drive White Paper" states, "while rotating disks must wait for spindles, motors, heads, and arms to physically locate data locations, SSDs can access any location with lightning speed." Except as expressly admitted, Samsung denies any remaining allegations of this Paragraph.

26. Samsung admits that the document entitled "Samsung Solid State Drive White Paper" states, "An SSD benefits from massive latency advantages." Except as expressly admitted, Samsung denies any remaining allegations of this Paragraph.

27. Samsung admits that the document entitled "Samsung Solid State Drive White Paper" states, "The ability to access any drive location without a performance penalty means you can have more applications open at the same time with less lag." Except as expressly admitted, Samsung denies any remaining allegations of this Paragraph.

28. Samsung admits that the document entitled "Samsung Solid State Drive White Paper" states, "SSD users also experience dramatic improvements in boot time, shutdown, application loads, web browsing, application installations, and file copies." Except as expressly admitted, Samsung denies any remaining allegations of this Paragraph.

29. Samsung admits that the document entitled "Samsung Solid State Drive White Paper" states, "Fast sequential speeds allow for quick file copies and smoother performance when working with large files, like videos." Except as expressly admitted, Samsung denies any remaining allegations of this Paragraph.

30. Samsung admits that SSDs are faster than HDDs with respect to IOPS. Except as expressly admitted, Samsung denies the remainder of the allegations in this Paragraph.

31. Samsung admits that the document entitled "Samsung Solid State Drive White Paper" states, "An SSD can withstand more than 40 times the vibration (20G) than an HDD (0.5G)

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and up to 1500G of shock (compared to less than 350Gs for a typical HDD).” Except as expressly admitted, Samsung denies any remaining allegations of this Paragraph.

32. Samsung admits that an SSD may comprise NAND flash memory, a controller and firmware. Except as expressly admitted, Samsung denies any remaining allegations of this Paragraph.

33. Samsung admits that NAND flash memory may be used for storing data. Except as expressly admitted, Samsung denies any remaining allegations of this Paragraph.

34. Samsung admits that the controller and firmware may interoperate in memory management. Except as expressly admitted, Samsung denies any remaining allegations of this Paragraph.

35. Samsung admits that the document entitled “Samsung Solid State Drive White Paper” states, “Using the control program contained in the drive firmware, the controller (an embedded microchip) executes automated signal processing, wear-leveling, Error Correcting Code (ECC), bad block management, and garbage collection algorithms, communicates with the host device (e.g. a PC), and facilitates data encryption, among other tasks.” Except as expressly admitted, Samsung denies any remaining allegations of this Paragraph.

36. Samsung admits that SSD performs maintenance. Except as expressly admitted, Samsung denies any remaining allegations of this Paragraph.

37. Samsung admits that the document entitled “Samsung Solid State Drive White Paper” states, “Redundantly stored in NAND flash, the firmware may be updated manually to improve or extend functionality when the SSD manufacturer releases an update.” Except as expressly admitted, Samsung denies any remaining allegations of this Paragraph.

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38. Samsung admits that the document entitled "Samsung Solid State Drive White Paper" states, "The NAND flash itself is a kind of digital repository, while the controller functions as the command center for everything the SSD does – from actually reading and writing data to executing the garbage collection and wear-leveling algorithms that keep the drive clean and speedy." Except as expressly admitted, Samsung denies any remaining allegations of this Paragraph.

39. Samsung admits that NAND flash memory includes memory cells comprised of floating gate transistors. Except as expressly admitted, Samsung denies any remaining allegations of this Paragraph.

40. Samsung admits that a cell has a finite lifetime which may be measured in terms of P/E cycles. Except as expressly admitted, Samsung denies any remaining allegations of this Paragraph.

41. Samsung admits that data may be written to or read from NAND cells. Except as expressly admitted, Samsung denies any remaining allegations of this Paragraph.

42. Samsung admits that, according to NVM Express Command Set Specifications Revision 1.1, "The Write Command writes data and metadata, if applicable, to the I/O controller for the logical blocks indicated." Except as expressly admitted, Samsung denies any remaining allegations of this Paragraph.

43. Samsung admits that, according to NVM Express Command Set Specifications Revision 1.1, "The Read command reads data and metadata, if applicable, from the I/O controller for the LBAs indicated." Except as expressly admitted, Samsung denies any remaining allegations of this Paragraph.

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44. Samsung admits that the document entitled "Samsung Solid State Drive White Paper" states, "Physical NAND writes are not required to correspond directly to the space the host system requests." Except as expressly admitted, Samsung denies any remaining allegations of this Paragraph.

45. Samsung admits that the document entitled "Samsung Solid State Drive White Paper" states, "Utilizing the FTL, SSDs implement a logical to physical mapping system called Logical Block Addressing (LBA)." Except as expressly admitted, Samsung denies any remaining allegations of this Paragraph.

46. Samsung admits that an FTL may contain a table including mapping information regarding physical locations. Except as expressly admitted, Samsung denies any remaining allegations of this Paragraph.

47. Samsung admits than an FTL may be stored in an SSD. Except as expressly admitted, Samsung denies any remaining allegations of this Paragraph.

48. Samsung admits that an FTL uses DRAM to maintain its translation table. Except as expressly admitted, Samsung denies any remaining allegations of this Paragraph.

49. Samsung admits than an FTL table may be stored in an SSD. Except as expressly admitted, Samsung denies any remaining allegations of this Paragraph.

50. Samsung admits that the document entitled "Samsung Solid State Drive White Paper" states, "The complexity of NAND storage necessitates some extra management processes, including bad block management, wear leveling, garbage collection (GC), and Error Correcting Code (ECC), all of which is managed by the device firmware through the SSD controller." Except as expressly admitted, Samsung denies any remaining allegations of this Paragraph.

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51. Samsung admits that NAND storage may include scrubbing process. Except as expressly admitted, Samsung denies any remaining allegations of this Paragraph.

52. Samsung admits that data may be stored in NAND cells. Except as expressly admitted, Samsung denies any remaining allegations of this Paragraph.

53. Samsung admits that NAND storage may include wear-leveling and garbage collection functionalities. Except as expressly admitted, Samsung denies any remaining allegations of this Paragraph.

54. Samsung admits that garbage collection algorithms may preemptively prepare fresh storage space to consolidate valid data and make space for new writes. Except as expressly admitted, Samsung denies any remaining allegations of this Paragraph.

55. Samsung admits that the document entitled "Samsung Solid State Drive White Paper" states, "Improved Error-Correcting Code (ECC) is able to detect and recover from errors at the bit level caused by the natural wear out of individual NAND cells." Except as expressly admitted, Samsung denies any remaining allegations of this Paragraph.

56. Samsung admits that over-provisioning is the allocation of extra storage space for SSDs. Except as expressly admitted, Samsung denies any remaining allegations of this Paragraph.

57. Samsung admits that over-provisioning is the allocation of extra storage space for SSDs. Except as expressly admitted, Samsung denies any remaining allegations of this Paragraph.

58. Samsung admits that the document entitled "Samsung Solid State Drive White Paper" states, "As a precautionary measure, some vendors choose to pre-set a certain amount of mandatory over-provisioning at the factory, and there is always the option to manually set aside additional space for even further-improved performance (e.g. under demanding workloads)." Except as expressly admitted, Samsung denies any remaining allegations of this Paragraph.

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59. Samsung admits that the document entitled "Samsung Solid State Drive White Paper" states, "As a precautionary measure, some vendors choose to pre-set a certain amount of mandatory over-provisioning at the factory, and there is always the option to manually set aside additional space for even further-improved performance (e.g. under demanding workloads)." Except as expressly admitted, Samsung denies any remaining allegations of this Paragraph.

60. Samsung admits that the document entitled "Samsung Solid State Drive White Paper" states, "The additional free space has the added benefit of providing the controller with unused capacity to use as a kind of non-official over-provisioning space." Except as expressly admitted, Samsung denies any remaining allegations of this Paragraph.

61. Samsung admits that the document entitled "Samsung Solid State Drive White Paper" states, "Samsung has taken the first step by introducing 3-bit MLC NAND to the SSD market with its 840 Series SSD, made possible by its fully integrated design approach, proprietary controller architecture and firmware algorithms, and superior NAND quality. As mentioned previously, increased SSD capacity leads to increased performance and endurance, so SSDs using this technology will only improve as densities grow. Thus, 3-bit MLC may represent the beginning of the next personal storage revolution." Except as expressly admitted, Samsung denies any remaining allegations of this Paragraph.

62. Admitted.

63. Admitted.

64. Admitted.

65. Samsung admits that the document entitled "Samsung Solid State Drive White Paper" states, "On top of all of the above advancements, the modern trend towards increasing storage densities has a convenient side benefit – with higher capacities also comes higher

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performance, because increasing the number of NAND chips in an SSD allows for more parallelization, helping to overcome the inherently slow program times that MLC NAND suffers compared to its SLC predecessor (this same phenomenon also explains why the same or similar NAND flash can deliver very different performance, lifespan, and reliability among various NAND-based devices)." Except as expressly admitted, Samsung denies any remaining allegations of this Paragraph.

66. Samsung admits that it has knowledge of the components in SSDs manufactured by Samsung. Except as expressly admitted, Samsung denies any remaining allegations of this Paragraph.

67. Samsung admits that it has knowledge of the components in enterprise SSDs manufactured by Samsung. Except as expressly admitted, Samsung denies any remaining allegations of this Paragraph.

68. Samsung admits that the document entitled "Samsung Solid State Drive White Paper" states, "In order to ensure that your SSD stays in prime working condition, the SSD controller must manage complex performance and lifetime optimization algorithms." Except as expressly admitted, Samsung denies any remaining allegations of this Paragraph.

69. Admitted.

70. Admitted.

71. Admitted.

72. Admitted.

73. Admitted.

74. Samsung admits that the document entitled "Samsung Solid State Drive White Paper" states, "Hard disks are not subject to the same write/erase limitations that SSDs are – they

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can easily overwrite data in an existing location without erasing it first." Except as expressly admitted, Samsung denies any remaining allegations of this Paragraph.

75. Samsung admits that the document entitled "Samsung Solid State Drive White Paper" states, "Hard disks are not subject to the same write/erase limitations that SSDs are – they can easily overwrite data in an existing location without erasing it first." Except as expressly admitted, Samsung denies any remaining allegations of this Paragraph.

76. Samsung admits that the document entitled "Samsung Solid State Drive White Paper" states, "Physical NAND writes are not required to correspond directly to the space the host system requests. Instead of performing all of the unnecessary copies described above to overwrite a piece of old data, the SSD writes the new data to the next available page and simply marks the old data as 'invalid.'" Except as expressly admitted, Samsung denies any remaining allegations of this Paragraph.

77. Samsung admits that the document entitled "Samsung Solid State Drive White Paper" states, "Once a block is full of pages that all contain invalid data, that block is considered free and may be erased." Except as expressly admitted, Samsung denies any remaining allegations of this Paragraph.

78. Samsung admits that the document entitled "Samsung Solid State Drive White Paper" states, "As an SSD is filled with more and more data, there will naturally be fewer free blocks readily available." Except as expressly admitted, Samsung denies any remaining allegations of this Paragraph.

79. Samsung admits that the document entitled "Samsung Solid State Drive White Paper" states, "The SSD is then forced to actively consolidate valid data and prepare free blocks

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in order to write new data and perform maintenance." Except as expressly admitted, Samsung denies any remaining allegations of this Paragraph.

80. Samsung admits that the document entitled "Samsung Solid State Drive White Paper" states, "This process of moving and consolidating data takes time, which is perceived as decreased performance, and requires free space." Except as expressly admitted, Samsung denies any remaining allegations of this Paragraph.

81. Samsung admits that the document entitled "Samsung Solid State Drive White Paper" states, "This process of moving and consolidating data takes time, which is perceived as decreased performance, and requires free space." Except as expressly admitted, Samsung denies any remaining allegations of this Paragraph.

82. Samsung admits that the document entitled "Samsung Solid State Drive White Paper" states, "This is why Over Provisioning, which guarantees a certain amount of free swap space to use for Garbage Collection and other maintenance activities, is so important for SSD performance – it allows the Garbage Collection algorithm to prepare free space in advance through data consolidation." Except as expressly admitted, Samsung denies any remaining allegations of this Paragraph.

83. Samsung admits that the document entitled "Samsung Solid State Drive White Paper" states, "There are two methods of Garbage Collection, one that takes place in the background (when the SSD sits idle) and one that takes place in the foreground (when the SSD is working with data)." Except as expressly admitted, Samsung denies any remaining allegations of this Paragraph.

84. Samsung admits that the document entitled "Samsung Solid State Drive White Paper" states, "There are two methods of Garbage Collection, one that takes place in the

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background (when the SSD sits idle) and one that takes place in the foreground (when the SSD is working with data). Samsung's SSDs use a proprietary implementation of the latter, as this allows them to actively manage data and create free blocks on demand." Except as expressly admitted, Samsung denies any remaining allegations of this Paragraph.

85. Samsung admits that the document entitled "Samsung Solid State Drive White Paper" states, "Modern operating systems have enabled another form of SSD maintenance, TRIM. TRIM is a facility by which the OS can notify the SSD when data is either marked for erase or no longer valid." Except as expressly admitted, Samsung denies any remaining allegations of this Paragraph.

86. Samsung admits that the document entitled "Samsung Solid State Drive White Paper" states, "TRIM helps to make Garbage Collection more efficient by preparing invalid data for deletion." Except as expressly admitted, Samsung denies any remaining allegations of this Paragraph.

87. Samsung admits that the document entitled "Samsung Solid State Drive White Paper" states, "In addition to maintenance at the drive level, the SSD must also perform maintenance at the chip level." Except as expressly admitted, Samsung denies any remaining allegations of this Paragraph.

88. Samsung admits that the document entitled "Samsung Solid State Drive White Paper" states, "In every NAND cell, each page contains a few extra bytes of extra capacity that the SSD controller uses to store a 'parity bit.'" To the extent Radian alleges that every NAND page must have a parity bit, Samsung denies this allegation. Except as expressly admitted, Samsung denies any remaining allegations of this Paragraph.

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89. Samsung admits that the document entitled "Samsung Solid State Drive White Paper" states, "Error-correcting code ('ECC') uses this parity bit to compensate for other bits that may fail during normal operation of the drive." To the extent Radian alleges that every NAND page must have a parity bit, Samsung denies this allegation. Except as expressly admitted, Samsung denies any remaining allegations of this Paragraph.

90. Samsung admits that the document entitled "Samsung Solid State Drive White Paper" states, "When the controller detects a read failure, it will invoke ECC to try and recover from it." Except as expressly admitted, Samsung denies any remaining allegations of this Paragraph.

91. Samsung admits that the document entitled "Samsung Solid State Drive White Paper" states, "If recovery is not possible, the firmware's bad block management feature will retire the block and replace it with one of several free 'reserved blocks.'" Except as expressly admitted, Samsung denies any remaining allegations of this Paragraph.

92. Samsung admits that "bad blocks" may be created during read, program, or erase operations and may be managed for SSD performance. Except as expressly admitted, Samsung denies any remaining allegations of this Paragraph.

93. Samsung admits that "bad blocks" may be identified during read, program, or erase operations and may be managed for SSD performance. Except as expressly admitted, Samsung denies any remaining allegations of this Paragraph.

94. Samsung admits that "bad blocks" may be marked during read, program, or erase operations and may be managed for SSD performance. Except as expressly admitted, Samsung denies any remaining allegations of this Paragraph.

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95. Samsung admits that the document entitled "Samsung Solid State Drive White Paper" states, "NAND flash memory suffers from one final limitation: each cell has a finite lifespan and can only withstand a limited number of program/erase cycles (called P/E cycles)." Except as expressly admitted, Samsung denies any remaining allegations of this Paragraph.

96. Samsung admits that the document entitled "Samsung Solid State Drive White Paper" states, "The specific amount of P/E cycles depends on the process technology (e.g. 27nm, 21nm, 19 nm, etc.) and on the program mechanism (e.g. SLC, MLC)." Except as expressly admitted, Samsung denies any remaining allegations of this Paragraph.

97. Samsung admits that the document entitled "Samsung Solid State Drive White Paper" states, "In order to overcome this limitation, the SSD firmware employs a wear-leveling algorithm that guarantees that write operations are spread evenly among all NAND cells." Except as expressly admitted, Samsung denies any remaining allegations of this Paragraph.

98. Samsung admits that the document entitled "Samsung Solid State Drive White Paper" states, "Using this technique, no single cell should be unduly stressed and prematurely fail." Except as expressly admitted, Samsung denies any remaining allegations of this Paragraph.

99. Samsung admits that the document entitled "Samsung Solid State Drive White Paper" states, "If too many cells were to fail, the entire block would have to be retired as just discussed above." Except as expressly admitted, Samsung denies any remaining allegations of this Paragraph.

100. Samsung admits that the document entitled "Samsung Solid State Drive White Paper" states, "There are only a limited number of reserved blocks, however, so this event should be avoided to prolong overall drive life." Except as expressly admitted, Samsung denies any remaining allegations of this Paragraph.

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101. Samsung admits that maintenance procedures like wear-leveling and garbage collection help ensure that an SSD performs well over extended use. Except as expressly admitted, Samsung denies any remaining allegations of this Paragraph.

102. Samsung admits that the document entitled "Samsung Solid State Drive White Paper" states, "Thus, the key in designing a great SSD is finding the optimum balance among lifespan, performance, and reliability." Except as expressly admitted, Samsung denies any remaining allegations of this Paragraph.

103. Samsung admits that the document entitled "Samsung Solid State Drive White Paper" states, "Samsung's unique, integrated approach to SSD manufacturing affords it full control of every component." Except as expressly admitted, Samsung denies any remaining allegations of this Paragraph.

104. Samsung admits that over-provisioning is a method for improving SSD performance. Except as expressly admitted, Samsung denies any remaining allegations of this Paragraph.

105. Samsung admits that the document entitled "Samsung Solid State Drive White Paper" states, "An SSD controller is responsible for the massive task of managing all data traffic and storage for the drive." Except as expressly admitted, Samsung denies any remaining allegations of this Paragraph.

106. Samsung admits that the document entitled "Samsung Solid State Drive White Paper" states, "NAND technology's intrinsic complexities require a lot of extra work behind the scenes." Except as expressly admitted, Samsung denies any remaining allegations of this Paragraph.

107. Admitted.

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108. Admitted.

109. Samsung admits that the document entitled "Samsung Solid State Drive White Paper" states, "As NAND process technology advances, the chips themselves become increasingly smaller. As they shrink, the chips also become less reliable at holding data." Except as expressly admitted, Samsung denies any remaining allegations of this Paragraph.

110. Samsung admits that the document entitled "Samsung Solid State Drive White Paper" states, "As NAND process technology advances, the chips themselves become increasingly smaller. As they shrink, the chips also become less reliable at holding data." Except as expressly admitted, Samsung denies any remaining allegations of this Paragraph.

111. Samsung admits that erase actions may be carried out at the block level. Except as expressly admitted, Samsung denies any remaining allegations of this Paragraph.

112. Samsung admits that the document entitled "Samsung Solid State Drive White Paper" states, "Each NAND cell has a limited lifespan – it can only endure a specific number of data reads/writes. An additional layer of complexity is added by the fact that overwriting old data on NAND requires an erase of the entire NAND block (this same block may contain other data that is still valid). As a result, the controller is constantly moving data around to ensure that the cells wear evenly and to preemptively prepare 'free blocks' to use for future data writes." Except as expressly admitted, Samsung denies any remaining allegations of this Paragraph.

113. Samsung admits that the document entitled "Samsung Solid State Drive White Paper" states, "OP is a way to set aside a minimum amount of free space, inaccessible to the user or the OS, which the SSD controller can utilize as a kind of 'work bench.'" Except as expressly admitted, Samsung denies any remaining allegations of this Paragraph.

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114. Samsung admits that the document entitled "Samsung Solid State Drive White Paper" states, "OP is a way to set aside a minimum amount of free space, inaccessible to the user or the OS, which the SSD controller can utilize as a kind of 'work bench.'" Except as expressly admitted, Samsung denies any remaining allegations of this Paragraph.

115. Samsung admits that the document entitled "Samsung Solid State Drive White Paper" states, "Also, different OP ratio is recommended by usage applications and workload." Except as expressly admitted, Samsung denies any remaining allegations of this Paragraph.

116. Samsung admits that the document entitled "Samsung Solid State Drive White Paper" states, "Activities that produce frequent Read/Write requests, especially Random Read/Writes, put extra stress on the SSD, which in turn increases Write Amplification (a phenomenon by which physical NAND writes outnumber logical write requests from the host)." Except as expressly admitted, Samsung denies any remaining allegations of this Paragraph.

117. Samsung admits that the document entitled "Samsung Solid State Drive White Paper" states, "Activities that produce frequent Read/Write requests, especially Random Read/Writes, put extra stress on the SSD, which in turn increases Write Amplification (a phenomenon by which physical NAND writes outnumber logical write requests from the host)." Except as expressly admitted, Samsung denies any remaining allegations of this Paragraph.

118. Samsung admits that the document entitled "Samsung Solid State Drive White Paper" states, "Activities that produce frequent Read/Write requests, especially Random Read/Writes, put extra stress on the SSD, which in turn increases Write Amplification (a phenomenon by which physical NAND writes outnumber logical write requests from the host)." Except as expressly admitted, Samsung denies any remaining allegations of this Paragraph.

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119. Samsung admits that the document entitled "Samsung Solid State Drive White Paper" states, "Heavy workloads wear out NAND cells faster, which increases the need for Bad Block management so that the controller can retire worn out cells." Except as expressly admitted, Samsung denies any remaining allegations of this Paragraph.

120. Samsung admits that the document entitled "Samsung Solid State Drive White Paper" states, "Retiring a NAND cell requires the controller to copy all of the cell's valid data to a new block, taken from a limited number of 'reserved' blocks." Except as expressly admitted, Samsung denies any remaining allegations of this Paragraph.

121. Samsung admits that the document entitled "Samsung Solid State Drive White Paper" states, "Heavy workloads wear out NAND cells faster, which increases the need for Bad Block management so that the controller can retire worn out cells." Except as expressly admitted, Samsung denies any remaining allegations of this Paragraph.

122. Samsung admits that the document entitled "Samsung Solid State Drive White Paper" states, "Retiring a NAND cell requires the controller to copy all of the cell's valid data to a new block, taken from a limited number of 'reserved' blocks." Except as expressly admitted, Samsung denies any remaining allegations of this Paragraph.

123. Samsung admits that the document entitled "Samsung Solid State Drive White Paper" states, "Working in tandem with bad block management, and reducing the need to use it altogether, is wear-leveling, which ensures that no single cell is written to more than others." Except as expressly admitted, Samsung denies any remaining allegations of this Paragraph.

124. Samsung admits that the document entitled "Samsung Solid State Drive White Paper" states, "Working in tandem with bad block management, and reducing the need to use it

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altogether, is wear-leveling, which ensures that no single cell is written to more than others." Except as expressly admitted, Samsung denies any remaining allegations of this Paragraph.

125. Samsung admits that the document entitled "Samsung Solid State Drive White Paper" states, "To ensure free blocks are available, garbage collection algorithms consolidate good data and erase blocks of invalid data." Except as expressly admitted, Samsung denies any remaining allegations of this Paragraph.

126. Samsung admits that the document entitled "Samsung Solid State Drive White Paper" states, "OP helps with garbage collection, wear-leveling and bad block management by effectively increasing the size of the controller's 'work bench,' thus giving it extra free space to use while it consolidates and moves data or retires worn out cells." Except as expressly admitted, Samsung denies any remaining allegations of this Paragraph.

127. Samsung admits that the document entitled "Samsung Solid State Drive White Paper" states, "OP helps with garbage collection, wear-leveling and bad block management by effectively increasing the size of the controller's 'work bench,' thus giving it extra free space to use while it consolidates and moves data or retires worn out cells." Except as expressly admitted, Samsung denies any remaining allegations of this Paragraph.

128. Samsung admits that the document entitled "Samsung Solid State Drive White Paper" states, "All of the above tasks are the reason WAF exists – writing data to an SSD is not a simple one-to-one operation. There are complex processes taking place behind the scenes at all times." Except as expressly admitted, Samsung denies any remaining allegations of this Paragraph.

129. Samsung admits that the document entitled "Samsung Solid State Drive White Paper" states, "OP has a direct effect on SSD performance under sustained workloads and as the

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drive is filled with data." Except as expressly admitted, Samsung denies any remaining allegations of this Paragraph.

130. Samsung admits that the document entitled "Samsung Solid State Drive White Paper" states, "Guaranteeing free space to accomplish the NAND management tasks discussed above (Garbage Collection, Wear-Leveling, Bad Block Management) means the SSD does not have to waste time preparing space on demand, a process that requires additional time as data is copied, erased, and recopied." Except as expressly admitted, Samsung denies any remaining allegations of this Paragraph.

131. Samsung admits that the document entitled "Samsung Solid State Drive White Paper" states, "An added benefit is that OP makes all of the SSD maintenance procedures more efficient, reducing the WAF by ensuring there's room to work." Except as expressly admitted, Samsung denies any remaining allegations of this Paragraph.

132. Samsung admits that it has knowledge of the components in enterprise SSDs manufactured by Samsung. Except as expressly admitted, Samsung denies any remaining allegations of this Paragraph.

133. Samsung admits that it has knowledge of the components in enterprise SSDs manufactured by Samsung. Except as expressly admitted, Samsung denies any remaining allegations of this Paragraph.

134. Samsung admits that the document entitled "Samsung Solid State Drive White Paper" states, "Having full control over the NAND, controller and firmware has major implications both for performance and reliability." Except as expressly admitted, Samsung denies any remaining allegations of this Paragraph.

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135. Samsung admits that the document entitled "Samsung Solid State Drive White Paper" states, "Samsung has intimate knowledge of every nuance of these components and can tweak them along each step in the development process to ensure that they work perfectly together." Except as expressly admitted, Samsung denies any remaining allegations of this Paragraph.

136. Samsung admits that the document entitled "Samsung Solid State Drive White Paper" states, "Samsung has intimate knowledge of every nuance of these components and can tweak them along each step in the development process to ensure that they work perfectly together." Except as expressly admitted, Samsung denies any remaining allegations of this Paragraph.

137. Samsung admits that the document entitled "Samsung Solid State Drive White Paper" states, "As the most-integrated SSD manufacturer in the industry, Samsung controls all of the most crucial design elements of an SSD: NAND, Controller, DRAM, and Firmware." Except as expressly admitted, Samsung denies any remaining allegations of this Paragraph.

138. Samsung admits that the document entitled "Samsung Solid State Drive White Paper" states, "As the most-integrated SSD manufacturer in the industry, Samsung controls all of the most crucial design elements of an SSD: NAND, Controller, DRAM, and Firmware." Except as expressly admitted, Samsung denies any remaining allegations of this Paragraph.

139. Samsung admits that Samsung designs and manufactures major components of Samsung's SSD products. Except as expressly admitted, Samsung denies any remaining allegations of this Paragraph.

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140. Samsung admits that Samsung designs and manufactures major components of Samsung's SSD products. Except as expressly admitted, Samsung denies any remaining allegations of this Paragraph.

C. Over-provisioning in Conventional SSDs

141. Samsung denies the allegations of Paragraph 141.

142. Samsung admits that over-provisioning is a method for improving SSD performance. Except as expressly admitted, Samsung denies any remaining allegations of this Paragraph.

143. Admitted.

144. Admitted.

145. Samsung admits that the ratio of over-provisioning is calculated in percentages by dividing the OP capacity by the standard user capacity. Except as expressly admitted, Samsung denies any remaining allegations of this Paragraph.

146. Samsung admits that the ratio of over-provisioning is calculated in percentages by dividing the OP capacity by the standard user capacity. Except as expressly admitted, Samsung denies any remaining allegations of this Paragraph.

147. Samsung admits that the document entitled "For Data Centers Over-provisioning Maximize the lifetime and performance of your SSD with small effect to earn more" states, "However, under a heavy workload (for example, a server, data center or heavy workload client PC applications), a minimum of 6.7% OP is recommended and over 20% and even 50% is being used. Different OP ratios are recommended depending upon usage applications and the workload." Except as expressly admitted, Samsung denies any remaining allegations of this Paragraph.

148. Samsung admits that the document entitled "For Data Centers Over-provisioning Maximize the lifetime and performance of your SSD with small effect to earn more" states,

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"Activities that produce frequent read/write requests, especially random read/writes, put extra stress on the SSD, which in turn increases write amplification (a phenomenon by which physical NAND writes outnumber logical write requests from the host)." Except as expressly admitted, Samsung denies any remaining allegations of this Paragraph.

149. Samsung admits that the document entitled "For Data Centers Over-provisioning Maximize the lifetime and performance of your SSD with small effect to earn more" states, "OP has a direct effect on the SSD's random performance as the drive is filled with data." Except as expressly admitted, Samsung denies any remaining allegations of this Paragraph.

150. Samsung admits that the document entitled "For Data Centers Over-provisioning Maximize the lifetime and performance of your SSD with small effect to earn more" states, "Guaranteeing free space to accomplish the NAND management tasks (GC, wear-leveling, bad block management) means the SSD does not have to waste time preparing space on demand, a process that requires additional time as data is copied, erased and recopied." Except as expressly admitted, Samsung denies any remaining allegations of this Paragraph.

151. Samsung admits that the document entitled "For Data Centers Over-provisioning Maximize the lifetime and performance of your SSD with small effect to earn more" states, "An added benefit is that OP makes all of the SSD maintenance procedures more efficient, reducing the Write Amplification Factor (WAF) by ensuring there's room to work, which improves the SSD's lifetime." Except as expressly admitted, Samsung denies any remaining allegations of this Paragraph.

152. Samsung admits that different over-provisioning ratios are recommended depending upon the use-case and circumstances. Except as expressly admitted, Samsung denies any remaining allegations of this Paragraph.

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153. Admitted.

154. Admitted

155. Admitted.

156. Samsung admits that the document entitled "For Data Centers Over-provisioning Maximize the lifetime and performance of your SSD with small effect to earn more" lists "OP ratio" for the "845DC EVO" as "6.7%". Except as expressly admitted, Samsung denies any remaining allegations of this Paragraph.

157. Samsung is without knowledge or information sufficient to form a belief as to the truth of the allegations of Paragraph 157 because they are vague and indefinite, including in their use of undefined terms such as "with an over-provisioning ratio of" and on that basis denies them.

158. Samsung is without knowledge or information sufficient to form a belief as to the truth of the allegations of Paragraph 158 because they are vague and indefinite, including in their use of undefined terms such as "with an over-provisioning ratio of" and on that basis denies them.

159. Samsung is without knowledge or information sufficient to form a belief as to the truth of the allegations of Paragraph 159 because they are vague and indefinite, including in their use of undefined terms such as "with an over-provisioning ratio of" and on that basis denies them..

160. Samsung is without knowledge or information sufficient to form a belief as to the truth of the allegations of Paragraph 160 because they are vague and indefinite, including in their use of undefined terms such as "with an over-provisioning ratio of" and on that basis denies them.

161. Samsung is without knowledge or information sufficient to form a belief as to the truth of the allegations of Paragraph 161 because they are vague and indefinite, including in their use of undefined terms such as "with an over-provisioning ratio of" and on that basis denies them.

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162. Samsung is without knowledge or information sufficient to form a belief as to the truth of the allegations of Paragraph 162 because they are vague and indefinite, including in their use of undefined terms such as "with an over-provisioning ratio of" and on that basis denies them.

163. Samsung is without knowledge or information sufficient to form a belief as to the truth of the allegations of Paragraph 163 because they are vague and indefinite, including in their use of undefined terms such as "with an over-provisioning ratio of" and on that basis denies them.

164. Samsung is without knowledge or information sufficient to form a belief as to the truth of the allegations of Paragraph 164 because they are vague and indefinite, including in their use of undefined terms such as "with an over-provisioning ratio of" and on that basis denies them.

165. Samsung admits that the document entitled "For Data Centers Over-provisioning Maximize the lifetime and performance of your SSD with small effect to earn more" lists "OP ratio" for the "845DC PRO" as "28%". Except as expressly admitted, Samsung denies any remaining allegations of this Paragraph.

166. Samsung is without knowledge or information sufficient to form a belief as to the truth of the allegations of Paragraph 166 because they are vague and indefinite, including in their use of undefined terms such as "with an over-provisioning ratio of" and on that basis denies them.

167. Samsung is without knowledge or information sufficient to form a belief as to the truth of the allegations of Paragraph 167 because they are vague and indefinite, including in their use of undefined terms such as "with an over-provisioning ratio of" and on that basis denies them.

168. Samsung admits that the document entitled "For Data Centers Over-provisioning Maximize the lifetime and performance of your SSD with small effect to earn more" lists "OP ratio" for the "845DC EVO" as "6.7%". Except as expressly admitted, Samsung denies any remaining allegations of this Paragraph.

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169. Samsung is without knowledge or information sufficient to form a belief as to the truth of the allegations of Paragraph 169 because they are vague and indefinite, including in their use of undefined terms such as "with an over-provisioning ratio of" and on that basis denies them.

170. Samsung is without knowledge or information sufficient to form a belief as to the truth of the allegations of Paragraph 170 because they are vague and indefinite, including in their use of undefined terms such as "with an over-provisioning ratio of" and on that basis denies them.

171. Samsung admits that the document entitled "For Data Centers Over-provisioning Maximize the lifetime and performance of your SSD with small effect to earn more" lists "OP ratio" for the "845DC PRO" as "28%". Except as expressly admitted, Samsung denies any remaining allegations of this Paragraph.

172. Samsung is without knowledge or information sufficient to form a belief as to the truth of the allegations of Paragraph 172 because they are vague and indefinite, including in their use of undefined terms such as "with an over-provisioning ratio of" and on that basis denies them.

173. Samsung is without knowledge or information sufficient to form a belief as to the truth of the allegations of Paragraph 173 because they are vague and indefinite, including in their use of undefined terms such as "with an over-provisioning ratio of" and on that basis denies them.

D. Performance Measurements of SSDs

174. The conversion of units (MB, GB, etc.) speaks for themselves. Samsung is without knowledge or information sufficient to form a belief as to the truth of the allegations of Paragraph 174 and on that basis denies them.

175. Samsung admits that the document entitled "Samsung Solid State Drive White Paper" states, "Sequential Read speeds are reported in megabytes per second (MB/s) and indicate how fast the SSD will be at completing tasks like accessing large multimedia files, transcoding,

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game level loading, some types of game play, watching and editing video." Except as expressly admitted, Samsung denies any remaining allegations of this Paragraph.

176. Samsung admits that the document entitled "Samsung Solid State Drive White Paper" states, "Sequential Read speeds are reported in megabytes per second (MB/s) and indicate how fast the SSD will be at completing tasks like accessing large multimedia files, transcoding, game level loading, some types of game play, watching and editing video." Except as expressly admitted, Samsung denies any remaining allegations of this Paragraph.

177. Samsung admits that the document entitled "Samsung Solid State Drive White Paper" states, "Sequential Read speeds are reported in megabytes per second (MB/s) and indicate how fast the SSD will be at completing tasks like accessing large multimedia files, transcoding, game level loading, some types of game play, watching and editing video. This is the speed at which the drive can read data from contiguous memory spaces." Except as expressly admitted, Samsung denies any remaining allegations of this Paragraph.

178. Samsung admits that the document entitled "Samsung Solid State Drive White Paper" states, "Sequential Write speeds, also reported in megabytes per second (MB/s) indicate how fast the SSD will be at tasks like application installation and document backup." Except as expressly admitted, Samsung denies any remaining allegations of this Paragraph.

179. Samsung admits that the document entitled "Samsung Solid State Drive White Paper" states, "Sequential Write speeds, also reported in megabytes per second (MB/s) indicate how fast the SSD will be at tasks like application installation and document backup." Except as expressly admitted, Samsung denies any remaining allegations of this Paragraph.

180. Samsung admits that the document entitled "Samsung Solid State Drive White Paper" states, "Sequential Write speeds, also reported in megabytes per second (MB/s) indicate

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how fast the SSD will be at tasks like application installation and document backup. This is the speed at which the drive can write data to contiguous memory spaces." Except as expressly admitted, Samsung denies any remaining allegations of this Paragraph.

181. Samsung admits that the document entitled "Samsung Solid State Drive White Paper" states, "Random Read speeds, reported in Input/Output Operations Per Second (IOPS) indicate how fast the SSD will be at completing tasks like antivirus scans, searching for email in Outlook, web browsing, application loading, PC booting, or working in Microsoft Word. This is the speed at which the drive can read data from non-contiguous memory spaces." Except as expressly admitted, Samsung denies any remaining allegations of this Paragraph.

182. Samsung admits that the document entitled "Samsung Solid State Drive White Paper" states, "Random Read speeds, reported in Input/Output Operations Per Second (IOPS) indicate how fast the SSD will be at completing tasks like antivirus scans, searching for email in Outlook, web browsing, application loading, PC booting, or working in Microsoft Word. This is the speed at which the drive can read data from non-contiguous memory spaces." Except as expressly admitted, Samsung denies any remaining allegations of this Paragraph.

183. Samsung admits that the document entitled "Samsung Solid State Drive White Paper" states, "Random Read speeds, reported in Input/Output Operations Per Second (IOPS) indicate how fast the SSD will be at completing tasks like antivirus scans, searching for email in Outlook, web browsing, application loading, PC booting, or working in Microsoft Word. This is the speed at which the drive can read data from non-contiguous memory spaces." Except as expressly admitted, Samsung denies any remaining allegations of this Paragraph.

184. Samsung admits that the document entitled "Samsung Solid State Drive White Paper" states, "Random Write speeds, also reported in IOPS, indicate how fast the drive will be

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able to complete tasks like downloading email, compressing files, or browsing the web. This is the speed at which the drive can write data to non-contiguous memory spaces." Except as expressly admitted, Samsung denies any remaining allegations of this Paragraph.

185. Samsung admits that the document entitled "Samsung Solid State Drive White Paper" states, "Random Write speeds, also reported in IOPS, indicate how fast the drive will be able to complete tasks like downloading email, compressing files, or browsing the web. This is the speed at which the drive can write data to non-contiguous memory spaces." Except as expressly admitted, Samsung denies any remaining allegations of this Paragraph.

186. Samsung admits that the document entitled "Samsung Solid State Drive White Paper" states, "Random Write speeds, also reported in IOPS, indicate how fast the drive will be able to complete tasks like downloading email, compressing files, or browsing the web. This is the speed at which the drive can write data to non-contiguous memory spaces." Except as expressly admitted, Samsung denies any remaining allegations of this Paragraph.

187. Samsung admits that the document entitled "Samsung Solid State Drive White Paper" states, "Idle Time, which is the period of time when an SSD is not handling requests to read or write data." Except as expressly admitted, Samsung denies any remaining allegations of this Paragraph.

188. Samsung admits that the document entitled "Samsung Solid State Drive White Paper" states, "Latency, which is the response time of the SSD, or the time between when you initiate a request to read or write data and when the SSD completes the request." Except as expressly admitted, Samsung denies any remaining allegations of this Paragraph.

189. Samsung admits that the document entitled "Samsung Solid State Drive White Paper" states, "Latency, which is the response time of the SSD, or the time between when you

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initiate a request to read or write data and when the SSD completes the request." Except as expressly admitted, Samsung denies any remaining allegations of this Paragraph.

190. Samsung admits that in some instances latency can be reported in microseconds (µs) or milliseconds (ms). Except as expressly admitted, Samsung denies any remaining allegations of this Paragraph.

191. Samsung admits that the document entitled "Samsung Solid State Drive White Paper" states, "Queue Depth/Concurrent IOs, which is the outstanding (pending) number of IO requests that must be handled by the drive. Multiple requests are placed in a queue of a specific length, where they will wait for their turn to be addressed by the SSD if another task is already underway. The most common queue depths to test are a Queue Depth of 1, which is typical of light consumer workloads, and a Queue Depth of 32, which is representative of a heavy workload as might be seen on a on a server (e.g. web server, database server, etc.). Where in that spectrum an SSD will perform best varies based on the drive's firmware algorithm. Being optimized for high or low queue depths or vice versus is not necessarily a bad thing, but rather a design decision." Except as expressly admitted, Samsung denies any remaining allegations of this Paragraph.

192. Samsung admits that the document entitled "Samsung Solid State Drive White Paper" states, "Queue Depth/Concurrent IOs, which is the outstanding (pending) number of IO requests that must be handled by the drive. Multiple requests are placed in a queue of a specific length, where they will wait for their turn to be addressed by the SSD if another task is already underway. The most common queue depths to test are a Queue Depth of 1, which is typical of light consumer workloads, and a Queue Depth of 32, which is representative of a heavy workload as might be seen on a on a server (e.g. web server, database server, etc.). Where in that spectrum an SSD will perform best varies based on the drive's firmware algorithm. Being optimized for high

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or low queue depths or vice versus is not necessarily a bad thing, but rather a design decision." Except as expressly admitted, Samsung denies any remaining allegations of this Paragraph.

193. Samsung admits that in some instances bandwidth can be defined as the amount of data that can be transferred in a given time. Except as expressly admitted, Samsung denies any remaining allegations of this Paragraph.

194. Samsung admits that in some instances bandwidth can be reported in megabytes per second (MB/s) or gigabytes per second (GB/s). Except as expressly admitted, Samsung denies any remaining allegations of this Paragraph.

E. Zoned Namespaces ("ZNS")

195. Samsung admits that representatives from Microsoft gave a presentation titled, "DENALI: The Next-Generation High-Density Storage Interface." Samsung also admits that working group(s) from the NVM Express ("NVMe") organization helped develop the ZNS specification. Samsung is without knowledge or information sufficient to form a belief as to the truth of the allegations of Paragraph 195 and on that basis denies them.

196. Samsung admits that the article entitled "New NVMe™ Specification Defines Zoned Namespaces (ZNS) as Go-To Industry Technology" states, "The new NVMe Zoned Namespaces industry standard will be available to members and later to the public when the NVMe base specification 2.0 is released in 2020." Except as expressly admitted, Samsung denies any remaining allegations of this Paragraph.

197. Samsung admits that the "NVMe Base Set Specification 2.0" states, "The NVM Express Management Interface (NVMe-MI) specification defines an optional management interface for all NVM Express Subsystems." Except as expressly admitted, Samsung denies any remaining allegations of this Paragraph.

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198. Samsung admits that the "NVMe Base Set Specification 2.0" states, "The capabilities and settings that apply to an NVM Express controller are indicated in the Controller Capabilities (CAP) property and the Identify Controller data structure (refer to Figure 275). A namespace is a formatted quantity of non-volatile memory that may be accessed by a host. Associated with each namespace is an I/O Command Set that operates on that namespace. An NVM Express controller may support multiple namespaces that are referenced using a namespace ID. Namespaces may be created and deleted using the Namespace Management and Capacity Management commands. The Identify Namespace data structure, the I/O Command Set specific Identify Namespace data structure, and the I/O Command Set Independent Identify Namespace data structure indicate capabilities and settings that are specific to a particular namespace." Except as expressly admitted, Samsung denies any remaining allegations of this Paragraph.

199. Samsung admits that the "NVMe Base Set Specification 2.0" states, "The capabilities and settings that apply to an NVM Express controller are indicated in the Controller Capabilities (CAP) property and the Identify Controller data structure (refer to Figure 275). A namespace is a formatted quantity of non-volatile memory that may be accessed by a host. Associated with each namespace is an I/O Command Set that operates on that namespace. An NVM Express controller may support multiple namespaces that are referenced using a namespace ID. Namespaces may be created and deleted using the Namespace Management and Capacity Management commands. The Identify Namespace data structure, the I/O Command Set specific Identify Namespace data structure, and the I/O Command Set Independent Identify Namespace data structure indicate capabilities and settings that are specific to a particular namespace." Except as expressly admitted, Samsung denies any remaining allegations of this Paragraph.

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200. Samsung admits that the "NVMe Base Set Specification 2.0" states a "Command Set Identifier Value" for "Zone Namespace Command Set" is "02h." Except as expressly admitted, Samsung denies any remaining allegations of this Paragraph.

201. Samsung admits that the "NVMe Base Set Specification 2.0" states, "A namespace is a formatted quantity of non-volatile memory that may be accessed by a host." Except as expressly admitted, Samsung denies any remaining allegations of this Paragraph.

202. Samsung admits that the "NVMe Base Set Specification 2.0" states, "Associated with each namespace is an I/O Command Set that operates on that namespace." Except as expressly admitted, Samsung denies any remaining allegations of this Paragraph.

203. Samsung admits that the "NVM Express Zoned Namespace Command Set Specification Revision 1.2" states, "A zoned namespace is a namespace that is associated with the Zoned Namespace Command Set." Except as expressly admitted, Samsung denies any remaining allegations of this Paragraph.

204. Samsung admits that the "NVM Express Zoned Namespace Command Set Specification Revision 1.2" states, "A zoned namespace is divided into a set of equally-sized zones, which are contiguous non-overlapping ranges of logical block addresses." Except as expressly admitted, Samsung denies any remaining allegations of this Paragraph.

205. Samsung admits that the "NVM Express Zoned Namespace Command Set Specification Revision 1.2" states, "Each zone has an associated Zone Descriptor that contains a set of attributes." Except as expressly admitted, Samsung denies any remaining allegations of this Paragraph.

206. Samsung admits that the "NVM Express Zoned Namespace Command Set Specification Revision 1.2" states, "A Zone Management Receive command may be used to

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retrieve one or more Zone Descriptors." Except as expressly admitted, Samsung denies any remaining allegations of this Paragraph.

207. Samsung admits that the "NVM Express Zoned Namespace Command Set Specification Revision 1.2" states, "The host may use the Zone Management Receive command to determine the current write pointer for a zone." Except as expressly admitted, Samsung denies any remaining allegations of this Paragraph.

208. Samsung admits that the "NVM Express Zoned Namespace Command Set Specification Revision 1.2" states, "The Zone Management Receive command returns a data buffer that contains information about zones. That information includes characteristics of the zone, the state of the zone, the capacity of the zone, and other information defined in section 3.4.2.2. The host uses this command to determine the current settings for this information." Except as expressly admitted, Samsung denies any remaining allegations of this Paragraph.

209. Samsung admits that the "NVM Express Zoned Namespace Command Set Specification Revision 1.2" states, "Data Pointer (DPTR): This field specifies the location of a data buffer where data is transferred from." Except as expressly admitted, Samsung denies any remaining allegations of this Paragraph.

210. Samsung admits that the "NVM Express Zoned Namespace Command Set Specification Revision 1.2" states, "Starting LBA (SLBA): This field specifies an LBA in the lowest numbered zone that the Zone Receive Action operates on. Command Dword 10 contains bits 31:00; Command Dword 11 contains bits 63:32." Except as expressly admitted, Samsung denies any remaining allegations of this Paragraph.

211. Samsung admits that the "NVM Express Zoned Namespace Command Set Specification Revision 1.2" states, "The Zone Management Receive command Zone Receive

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Action field specifies what action to perform." Except as expressly admitted, Samsung denies any remaining allegations of this Paragraph.

212. Samsung admits that the "NVM Express Zoned Namespace Command Set Specification Revision 1.2" states, "The Report Zones action returns the Report Zones data structure." Except as expressly admitted, Samsung denies any remaining allegations of this Paragraph.

213. Samsung admits that the "NVM Express Zoned Namespace Command Set Specification Revision 1.2" states, "The Zone Descriptors of the Report Zones data structure shall: a) report only Zone Descriptors of zones for which the ZSLBA value is greater than or equal to the ZSLBA value of the zone specified by the SLBA value in the command; b) match the criteria in the Zone Receive Action Specific field; and c) be sorted in ascending order by the ZSLBA value of each zone." Except as expressly admitted, Samsung denies any remaining allegations of this Paragraph.

214. Samsung admits that the "NVM Express Zoned Namespace Command Set Specification Revision 1.2" states, "The Extended Report Zones action returns the Extended Report Zones data structure (refer to Figure 47)." Except as expressly admitted, Samsung denies any remaining allegations of this Paragraph.

215. Samsung admits that the "NVM Express Zoned Namespace Command Set Specification Revision 1.2" states, "The Zone Descriptors and Zone Descriptor Extensions of the Extended Report Zones data structure shall: a) report only Zone Descriptors and Zone Descriptor Extensions of zones for which the ZSLBA value of is greater than or equal to the ZSLBA value of the zone specified by the SLBA value in the command; b) match the criteria in the Zone Receive

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Action Specific field; and c) be sorted in ascending order by the ZSLBA value of each zone." Except as expressly admitted, Samsung denies any remaining allegations of this Paragraph.

216. Samsung admits that the "NVM Express Zoned Namespace Command Set Specification Revision 1.2" states, "The Reset Zone Recommended attribute indicates that the controller recommends that the host resets that zone." Except as expressly admitted, Samsung denies any remaining allegations of this Paragraph.

217. Samsung admits that the "NVM Express Zoned Namespace Command Set Specification Revision 1.2" states, "Reset Zone Recommended (RZR): If this bit is set to '1', then the controller recommends that this zone be reset." Except as expressly admitted, Samsung denies any remaining allegations of this Paragraph.

218. Samsung admits that the "NVM Express Zoned Namespace Command Set Specification Revision 1.2" states, "Zone Attributes Information (ZAI): Indicates additional information associated with attributes for the Zone: Reset Zone Recommended Time Limit (RZRTL): If the Reset Zone Recommended bit is set to '1', then the value in this field selects a field in the I/O Command Set specific Identify Namespace data structure for the Zoned Namespace Command Set that indicates amount of time before the NVM subsystem may perform a vendor specific action on a zone after the Reset Zone Recommended bit is set to '1' in the Zone Attributes field for that zone." Except as expressly admitted, Samsung denies any remaining allegations of this Paragraph.

219. Samsung admits that the "NVM Express Zoned Namespace Command Set Specification Revision 1.2" states, "If the Reset Zone Recommended bit is set to '1', then the value in this field selects a field in the I/O Command Set specific Identify Namespace data structure for the Zoned Namespace Command Set that indicates amount of time before the NVM subsystem

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may perform a vendor specific action on a zone after the Reset Zone Recommended bit is set to '1' in the Zone Attributes field for that zone." Except as expressly admitted, Samsung denies any remaining allegations of this Paragraph.

220. Samsung admits that the "NVM Express Zoned Namespace Command Set Specification Revision 1.2" states, "Zone Start Logical Block Address (ZSLBA): This field contains the 64-bit address of the lowest logical block for the zone." Except as expressly admitted, Samsung denies any remaining allegations of this Paragraph.

221. Samsung admits that the "NVM Express Zoned Namespace Command Set Specification Revision 1.2" states, "Write Pointer (WP): This field is the logical block address where the next write operation for this zone should be issued." Except as expressly admitted, Samsung denies any remaining allegations of this Paragraph.

222. Samsung admits that the "NVM Express Zoned Namespace Command Set Specification Revision 1.2" states, "The Zone Management Send command requests an action on one or more zones." Except as expressly admitted, Samsung denies any remaining allegations of this Paragraph.

223. Samsung admits that the "NVM Express Zoned Namespace Command Set Specification Revision 1.2" states, "The Zone Management Send command with a Zone Send Action of Reset Zone sets the write pointer to the ZSLBA for that zone." Except as expressly admitted, Samsung denies any remaining allegations of this Paragraph.

F. Radian's Innovations

224. Samsung is without knowledge or information sufficient to form a belief as to the truth of the allegations of Paragraph 224 and on that basis denies them. To the extent that the allegations in Paragraph 224 purports to characterize the Asserted Patents as innovative, Samsung denies that characterization.

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225. Samsung is without knowledge or information sufficient to form a belief as to the truth of the allegations of Paragraph 225 and on that basis denies them. To the extent that the allegations in Paragraph 225 purports to characterize the Asserted Patents as innovative, Samsung denies that characterization.

226. Samsung is without knowledge or information sufficient to form a belief as to the truth of the allegations of Paragraph 226 and on that basis denies them. To the extent that the allegations in Paragraph 226 purports to characterize the Asserted Patents as innovative, Samsung denies that characterization.

227. Samsung is without knowledge or information sufficient to form a belief as to the truth of the allegations of Paragraph 227 and on that basis denies them. To the extent that the allegations in Paragraph 227 purports to characterize the Asserted Patents as innovative, Samsung denies that characterization.

228. Samsung is without knowledge or information sufficient to form a belief as to the truth of the allegations of Paragraph 228 and on that basis denies them. To the extent that the allegations in Paragraph 228 purports to characterize the Asserted Patents as innovative, Samsung denies that characterization.

229. Samsung is without knowledge or information sufficient to form a belief as to the truth of the allegations of Paragraph 229 and on that basis denies them. To the extent that the allegations in Paragraph 229 purports to characterize the Asserted Patents as innovative, Samsung denies that characterization.

230. Samsung is without knowledge or information sufficient to form a belief as to the truth of the allegations of Paragraph 230 and on that basis denies them. To the extent that the

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allegations in Paragraph 230 purports to characterize the Asserted Patents as innovative, Samsung denies that characterization.

231. Samsung is without knowledge or information sufficient to form a belief as to the truth of the allegations of Paragraph 231 and on that basis denies them. To the extent that the allegations in Paragraph 231 purports to characterize the Asserted Patents as innovative, Samsung denies that characterization.

232. Samsung is without knowledge or information sufficient to form a belief as to the truth of the allegations of Paragraph 232 and on that basis denies them. To the extent that the allegations in Paragraph 232 purports to characterize the Asserted Patents as innovative, Samsung denies that characterization.

233. Samsung is without knowledge or information sufficient to form a belief as to the truth of the allegations of Paragraph 233 and on that basis denies them. To the extent that the allegations in Paragraph 233 purports to characterize the Asserted Patents as innovative, Samsung denies that characterization.

234. Samsung is without knowledge or information sufficient to form a belief as to the truth of the allegations of Paragraph 234 and on that basis denies them. To the extent that the allegations in Paragraph 234 purports to characterize the Asserted Patents as innovative, Samsung denies that characterization.

235. Samsung is without knowledge or information sufficient to form a belief as to the truth of the allegations of Paragraph 235 and on that basis denies them. To the extent that the allegations in Paragraph 235 purports to characterize the Asserted Patents as innovative, Samsung denies that characterization.

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236. Samsung is without knowledge or information sufficient to form a belief as to the truth of the allegations of Paragraph 236 and on that basis denies them. To the extent that the allegations in Paragraph 236 purports to characterize the Asserted Patents as innovative, Samsung denies that characterization.

237. Samsung is without knowledge or information sufficient to form a belief as to the truth of the allegations of Paragraph 237 and on that basis denies them. To the extent that the allegations in Paragraph 237 purports to characterize the Asserted Patents as innovative, Samsung denies that characterization.

238. Samsung is without knowledge or information sufficient to form a belief as to the truth of the allegations of Paragraph 238 and on that basis denies them. To the extent that the allegations in Paragraph 238 purports to characterize the Asserted Patents as innovative, Samsung denies that characterization.

239. Samsung is without knowledge or information sufficient to form a belief as to the truth of the allegations of Paragraph 239 and on that basis denies them. To the extent that the allegations in Paragraph 239 purports to characterize the Asserted Patents as innovative, Samsung denies that characterization.

240. Samsung is without knowledge or information sufficient to form a belief as to the truth of the allegations of Paragraph 240 and on that basis denies them. To the extent that the allegations in Paragraph 240 purports to characterize the Asserted Patents as innovative, Samsung denies that characterization.

241. Samsung is without knowledge or information sufficient to form a belief as to the truth of the allegations of Paragraph 241 and on that basis denies them. To the extent that the

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allegations in Paragraph 241 purports to characterize the Asserted Patents as innovative, Samsung denies that characterization.

242. Samsung is without knowledge or information sufficient to form a belief as to the truth of the allegations of Paragraph 242 and on that basis denies them. To the extent that the allegations in Paragraph 242 purports to characterize the Asserted Patents as innovative, Samsung denies that characterization.

243. Samsung is without knowledge or information sufficient to form a belief as to the truth of the allegations of Paragraph 243 and on that basis denies them. To the extent that the allegations in Paragraph 243 purports to characterize the Asserted Patents as innovative, Samsung denies that characterization.

G. Radian and Samsung

244. Samsung is without knowledge or information sufficient to form a belief as to the truth of the allegations of Paragraph 244 and on that basis denies them.

245. Samsung is without knowledge or information sufficient to form a belief as to the truth of the allegations of Paragraph 245 and on that basis denies them.

246. Samsung is without knowledge or information sufficient to form a belief as to the truth of the allegations of Paragraph 246 and on that basis denies them.

247. Samsung is without knowledge or information sufficient to form a belief as to the truth of the allegations of Paragraph 247 and on that basis denies them.

248. Samsung is without knowledge or information sufficient to form a belief as to the truth of the allegations of Paragraph 248 and on that basis denies them.

249. Samsung is without knowledge or information sufficient to form a belief as to the truth of the allegations of Paragraph 249 and on that basis denies them.

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250. Samsung is without knowledge or information sufficient to form a belief as to the truth of the allegations of Paragraph 250 because they are vague and indefinite, including in their use of undefined terms such as "Samsung employees" and on that basis denies them. Samsung denies the remainder of the allegations in Paragraph 250.

251. Samsung is without knowledge or information sufficient to form a belief as to the truth of the allegations of Paragraph 251 because they are vague and indefinite, including in their use of undefined terms such as "Samsung employees" and on that basis denies them. Samsung denies the remainder of the allegations in Paragraph 251.

252. Samsung is without knowledge or information sufficient to form a belief as to the truth of the allegations of Paragraph 252 and on that basis denies them.

253. Samsung is without knowledge or information sufficient to form a belief as to the truth of the allegations of Paragraph 253 and on that basis denies them.

254. Samsung is without knowledge or information sufficient to form a belief as to the truth of the allegations of Paragraph 254 and on that basis denies them.

255. Samsung is without knowledge or information sufficient to form a belief as to the truth of the allegations of Paragraph 255 and on that basis denies them.

256. Samsung is without knowledge or information sufficient to form a belief as to the truth of the allegations of Paragraph 256 because they are vague and indefinite, including in their use of undefined terms such as "Samsung employees" and on that basis denies them. Samsung denies the remainder of the allegations in Paragraph 256.

257. Samsung is without knowledge or information sufficient to form a belief as to the truth of the allegations of Paragraph 257 because they are vague and indefinite, including in their

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use of undefined terms such as "Samsung employees" and on that basis denies them. Samsung denies the remainder of the allegations in Paragraph 257.

258. Samsung is without knowledge or information sufficient to form a belief as to the truth of the allegations of Paragraph 258 and on that basis denies them.

259. Samsung is without knowledge or information sufficient to form a belief as to the truth of the allegations of Paragraph 259 and on that basis denies them.

260. Samsung is without knowledge or information sufficient to form a belief as to the truth of the allegations of Paragraph 260 and on that basis denies them.

261. Samsung is without knowledge or information sufficient to form a belief as to the truth of the allegations of Paragraph 261 and on that basis denies them.

262. Samsung is without knowledge or information sufficient to form a belief as to the truth of the allegations of Paragraph 262 because they are vague and indefinite, including in their use of undefined terms such as "Samsung employees" and on that basis denies them. Samsung denies the remainder of the allegations in Paragraph 262.

263. Samsung is without knowledge or information sufficient to form a belief as to the truth of the allegations of Paragraph 263 because they are vague and indefinite, including in their use of undefined terms such as "Samsung employees" and on that basis denies them. Samsung denies the remainder of the allegations in Paragraph 263.

264. Samsung is without knowledge or information sufficient to form a belief as to the truth of the allegations of Paragraph 264 and on that basis denies them.

265. Samsung is without knowledge or information sufficient to form a belief as to the truth of the allegations of Paragraph 265 and on that basis denies them.

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266. Samsung is without knowledge or information sufficient to form a belief as to the truth of the allegations of Paragraph 266 and on that basis denies them.

267. Samsung is without knowledge or information sufficient to form a belief as to the truth of the allegations of Paragraph 267 and on that basis denies them.

268. Samsung is without knowledge or information sufficient to form a belief as to the truth of the allegations of Paragraph 268 because they are vague and indefinite, including in their use of undefined terms such as "Samsung employees" and on that basis denies them. Samsung denies the remainder of the allegations in Paragraph 268.

269. Samsung is without knowledge or information sufficient to form a belief as to the truth of the allegations of Paragraph 269 because they are vague and indefinite, including in their use of undefined terms such as "Samsung employees" and on that basis denies them. Samsung denies the remainder of the allegations in Paragraph 269.

270. Samsung is without knowledge or information sufficient to form a belief as to the truth of the allegations of Paragraph 270 and on that basis denies them.

271. Samsung is without knowledge or information sufficient to form a belief as to the truth of the allegations of Paragraph 271 and on that basis denies them.

272. Samsung is without knowledge or information sufficient to form a belief as to the truth of the allegations of Paragraph 272 and on that basis denies them.

273. Samsung is without knowledge or information sufficient to form a belief as to the truth of the allegations of Paragraph 273 and on that basis denies them.

274. Samsung is without knowledge or information sufficient to form a belief as to the truth of the allegations of Paragraph 274 because they are vague and indefinite, including in their

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use of undefined terms such as "Samsung employees" and on that basis denies them. Samsung denies the remainder of the allegations in Paragraph 274.

275. Samsung is without knowledge or information sufficient to form a belief as to the truth of the allegations of Paragraph 275 because they are vague and indefinite, including in their use of undefined terms such as "Samsung employees" and on that basis denies them. Samsung denies the remainder of the allegations in Paragraph 275.

276. Admitted.

277. Admitted.

278. Admitted.

279. Samsung is without knowledge or information sufficient to form a belief as to the truth of the allegations of Paragraph 279 because they are vague and indefinite, including in their use of undefined terms such as "Samsung employees" and on that basis denies them. Samsung denies the remainder of the allegations in Paragraph 279.

280. Samsung is without knowledge or information sufficient to form a belief as to the truth of the allegations of Paragraph 280 because they are vague and indefinite, including in their use of undefined terms such as "Samsung employees" and on that basis denies them. Samsung denies the remainder of the allegations in Paragraph 280.

281. Samsung is without knowledge or information sufficient to form a belief as to the truth of the allegations of Paragraph 281 because they are vague and indefinite, including in their use of undefined terms such as "Samsung employees" and on that basis denies them. Samsung denies the remainder of the allegations in Paragraph 281.

282. Samsung is without knowledge or information sufficient to form a belief as to the truth of the allegations of Paragraph 282 because they are vague and indefinite, including in their

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use of undefined terms such as "Samsung employees" and on that basis denies them. Samsung denies the remainder of the allegations in Paragraph 282.

283. Samsung denies the allegations of Paragraph 283.

284. Samsung is without knowledge or information sufficient to form a belief as to the truth of the allegations of Paragraph 284 and on that basis denies them.

285. Samsung is without knowledge or information sufficient to form a belief as to the truth of the allegations of Paragraph 285 and on that basis denies them.

286. Samsung admits that Samsung was a member of the NVM Express community when the ZNS specification was published. Except as expressly admitted, Samsung denies any remaining allegations of this Paragraph.

287. Samsung is without knowledge or information sufficient to form a belief as to the truth of the allegations of Paragraph 287 because they are vague and indefinite, including in their use of undefined terms such as "Samsung employees" and on that basis denies them. Samsung denies the remainder of the allegations in Paragraph 287.

288. Samsung is without knowledge or information sufficient to form a belief as to the truth of the allegations of Paragraph 288 because they are vague and indefinite, including in their use of undefined terms such as "Samsung employees" and on that basis denies them. Samsung denies the remainder of the allegations in Paragraph 288.

289. Samsung is without knowledge or information sufficient to form a belief as to the truth of the allegations of Paragraph 289 because they are vague and indefinite, including in their use of undefined terms such as "Samsung employees" and on that basis denies them. Samsung denies the remainder of the allegations in Paragraph 289.

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290. Samsung is without knowledge or information sufficient to form a belief as to the truth of the allegations of Paragraph 290 because they are vague and indefinite, including in their use of undefined terms such as "Samsung employees" and on that basis denies them. Samsung denies the remainder of the allegations in Paragraph 290.

291. Samsung is without knowledge or information sufficient to form a belief as to the truth of the allegations of Paragraph 291 because they are vague and indefinite, including in their use of undefined terms such as "Samsung employees" and on that basis denies them. Samsung denies the remainder of the allegations in Paragraph 291.

292. Samsung is without knowledge or information sufficient to form a belief as to the truth of the allegations of Paragraph 292 because they are vague and indefinite, including in their use of undefined terms such as "Samsung employees" and on that basis denies them. Samsung denies the remainder of the allegations in Paragraph 292.

293. Samsung is without knowledge or information sufficient to form a belief as to the truth of the allegations of Paragraph 293 because they are vague and indefinite, including in their use of undefined terms such as "Samsung employees" and on that basis denies them. Samsung denies the remainder of the allegations in Paragraph 293.

294. Samsung is without knowledge or information sufficient to form a belief as to the truth of the allegations of Paragraph 294 because they are vague and indefinite, including in their use of undefined terms such as "Samsung employees" and on that basis denies them. Samsung denies the remainder of the allegations in Paragraph 294.

295. Samsung is without knowledge or information sufficient to form a belief as to the truth of the allegations of Paragraph 295 because they are vague and indefinite, including in their

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use of undefined terms such as "Samsung employees" and on that basis denies them. Samsung denies the remainder of the allegations in Paragraph 295.

296. Samsung is without knowledge or information sufficient to form a belief as to the truth of the allegations of Paragraph 296 because they are vague and indefinite, including in their use of undefined terms such as "Samsung employees" and on that basis denies them. Samsung denies the remainder of the allegations in Paragraph 296.

297. Samsung is without knowledge or information sufficient to form a belief as to the truth of the allegations of Paragraph 297 and on that basis denies them.

298. Samsung is without knowledge or information sufficient to form a belief as to the truth of the allegations of Paragraph 298 and on that basis denies them.

299. Samsung admits that the "NVM Express, Inc. Intellectual Property Policy" states, "Subject to Section 5, each Member hereby grants to each of the other Members , a non-exclusive, irrevocable, worldwide, royalty-free license under its copyrights in any and all of its Contribution to create derivative works of the Contribution and to reproduce, distribute, publish, display, and perform the Contribution, or derivative works of the Contribution for the purposes of developing Draft Specifications and/or Final Specifications (all under NVMe's copyright) and for the purposes of creating, using, and distributing implementations of the Final Specifications." Except as expressly admitted, Samsung denies any remaining allegations of this Paragraph.

300. Samsung admits that the "NVM Express, Inc. Intellectual Property Policy" states, "Subject to Section 5, each Member hereby grants to each of the other Members , a non-exclusive, irrevocable, worldwide, royalty-free license under its copyrights in any and all of its Contribution to create derivative works of the Contribution and to reproduce, distribute, publish, display, and perform the Contribution, or derivative works of the Contribution for the purposes of developing

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Draft Specifications and/or Final Specifications (all under NVMe's copyright) and for the purposes of creating, using, and distributing implementations of the Final Specifications." Except as expressly admitted, Samsung denies any remaining allegations of this Paragraph.

301. Samsung is without knowledge or information sufficient to form a belief as to the truth of the allegations of Paragraph 301 and on that basis denies them.

302. Samsung is without knowledge or information sufficient to form a belief as to the truth of the allegations of Paragraph 302 and on that basis denies them.

303. Samsung is without knowledge or information sufficient to form a belief as to the truth of the allegations of Paragraph 303 and on that basis denies them.

304. Samsung is without knowledge or information sufficient to form a belief as to the truth of the allegations of Paragraph 304 and on that basis denies them.

305. Samsung is without knowledge or information sufficient to form a belief as to the truth of the allegations of Paragraph 305 and on that basis denies them.

306. Samsung is without knowledge or information sufficient to form a belief as to the truth of the allegations of Paragraph 306 and on that basis denies them.

307. Samsung is without knowledge or information sufficient to form a belief as to the truth of the allegations of Paragraph 307 and on that basis denies them.

308. Samsung is without knowledge or information sufficient to form a belief as to the truth of the allegations of Paragraph 308 and on that basis denies them.

309. Samsung is without knowledge or information sufficient to form a belief as to the truth of the allegations of Paragraph 309 and on that basis denies them.

310. Samsung is without knowledge or information sufficient to form a belief as to the truth of the allegations of Paragraph 310 and on that basis denies them.

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311. Samsung is without knowledge or information sufficient to form a belief as to the truth of the allegations of Paragraph 311 and on that basis denies them.

312. Samsung is without knowledge or information sufficient to form a belief as to the truth of the allegations of Paragraph 312 and on that basis denies them.

313. Samsung is without knowledge or information sufficient to form a belief as to the truth of the allegations of Paragraph 311 and on that basis denies them.

314. Samsung is without knowledge or information sufficient to form a belief as to the truth of the allegations of Paragraph 314 and on that basis denies them.

315. Samsung is without knowledge or information sufficient to form a belief as to the truth of the allegations of Paragraph 315 and on that basis denies them.

316. Samsung admits that it is not a party to an express bilateral license agreement between Samsung and Radian. Samsung denies the remainder of the allegations of Paragraph 316.

317. Samsung denies the allegations of Paragraph 317.

318. Samsung denies the allegations of Paragraph 318.

319. Samsung denies the allegations of Paragraph 319.

H. Samsung and ZNS

320. Samsung admits that Exhibit L purport to be an article from Samsung's website. Except as expressly admitted, Samsung denies any remaining allegations of this Paragraph.

321. Samsung admits that Exhibit L, which purports to be an article from Samsung's website, includes a quote from Sangyeun Cho, senior vice president of the Memory Software Development Team at Samsung Electronics. Except as expressly admitted, Samsung denies any remaining allegations of this Paragraph.

322. Samsung admits that Exhibit L, which purports to be an article from Samsung's website, includes a quote from Sangyeun Cho, senior vice president of the Memory Software

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Development Team at Samsung Electronics. Except as expressly admitted, Samsung denies any remaining allegations of this Paragraph.

323. Samsung admits that Exhibit L purports to be an article from Samsung's website. Except as expressly admitted, Samsung denies any remaining allegations of this Paragraph.

324. Samsung admits that Exhibit L purports to be an article from Samsung's website. Except as expressly admitted, Samsung denies any remaining allegations of this Paragraph.

325. Samsung admits that Exhibit M purports to be an article from Samsung's website. Except as expressly admitted, Samsung denies any remaining allegations of this Paragraph.

326. Samsung admits that Exhibit N purports to be a presentation entitled "ZNS: Enabling In-place Updates and Transparent High Queue-depths." Samsung admits that Exhibit O purports to be an article entitled "[ON DEMAND] Zoned Namespaces: From Archival to I/O Predictability." Samsung admits that Exhibit P purports to be a presentation entitled "A New Adapter for Zoned Namespace SSDs. Except as expressly admitted, Samsung denies any remaining allegations of this Paragraph.

327. Samsung denies the allegations of Paragraph 327.

328. Samsung denies the allegations of Paragraph 328.

329. Samsung denies the allegations of Paragraph 329.

330. Samsung denies the allegations of Paragraph 330.

331. Samsung denies the allegations of Paragraph 331.

332. Samsung denies the allegations of Paragraph 332.

333. Samsung denies the allegations of Paragraph 333.

334. Samsung denies the allegations of Paragraph 334.

335. Samsung denies the allegations of Paragraph 335.

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336. Samsung denies the allegations of Paragraph 336.

337. Samsung denies the allegations of Paragraph 337.

338. Samsung denies the allegations of Paragraph 338.

339. Samsung denies the allegations of Paragraph 339.

340. Samsung denies the allegations of Paragraph 340.

341. Samsung denies the allegations of Paragraph 341.

342. Samsung denies the allegations of Paragraph 342.

343. Samsung denies the allegations of Paragraph 343.

344. Samsung denies the allegations of Paragraph 344.

345. Samsung denies the allegations of Paragraph 345.

346. Samsung denies the allegations of Paragraph 346.

347. Samsung denies the allegations of Paragraph 347.

348. Samsung denies the allegations of Paragraph 348.

349. Samsung denies the allegations of Paragraph 349.

350. Samsung denies the allegations of Paragraph 350.

351. Samsung denies the allegations of Paragraph 351.

352. Samsung denies the allegations of Paragraph 352.

353. Samsung denies the allegations of Paragraph 353.

354. Samsung denies the allegations of Paragraph 354.

355. Samsung denies the allegations of Paragraph 355.

356. Samsung denies the allegations of Paragraph 356.

357. Samsung denies the allegations of Paragraph 357.

358. Samsung denies the allegations of Paragraph 358.

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359. Samsung denies the allegations of Paragraph 359.

360. Samsung denies the allegations of Paragraph 360.

361. Samsung denies the allegations of Paragraph 361.

362. Samsung denies the allegations of Paragraph 362.

363. Samsung denies the allegations of Paragraph 363.

364. Samsung denies the allegations of Paragraph 364.

365. Samsung denies the allegations of Paragraph 365.

366. Samsung denies the allegations of Paragraph 366.

367. Samsung denies the allegations of Paragraph 367.

368. Samsung denies the allegations of Paragraph 368.

369. Samsung denies the allegations of Paragraph 369.

370. Samsung denies the allegations of Paragraph 370.

371. Samsung denies the allegations of Paragraph 371.

372. Samsung denies the allegations of Paragraph 372.

373. Samsung denies the allegations of Paragraph 373.

374. Samsung denies the allegations of Paragraph 374.

375. Samsung denies the allegations of Paragraph 375.

376. Samsung denies the allegations of Paragraph 376.

377. Samsung denies the allegations of Paragraph 377.

378. Samsung denies the allegations of Paragraph 378.

379. Samsung denies the allegations of Paragraph 379.

380. Samsung denies the allegations of Paragraph 380.

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I. Radian's Prevalence in Samsung's Patent Prosecution

381. Samsung admits that Radian's patent applications, patent application publications, and issued patents have been cited during prosecution of one or more of Samsung's patent applications. Except as expressly admitted, Samsung denies any remaining allegations of this Paragraph.

382. Samsung admits that Radian's patent applications, patent application publications, and issued patents have been cited during prosecution of one or more of Samsung's patent applications. Except as expressly admitted, Samsung denies any remaining allegations of this Paragraph.

383. Samsung admits that Radian's patent applications, patent application publications, and issued patents have been cited during prosecution of one or more of Samsung's patent applications. Except as expressly admitted, Samsung denies any remaining allegations of this Paragraph.

384. Admitted.

385. Samsung denies the allegation of Paragraph 385.

386. Samsung admits that U.S. Pat. No. 11,544,183 claims it is a continuation of U.S. patent application Ser. No. 15/625,931, which in turn is a continuation of U.S. patent application Ser. No. 14/466,167, which in turn is a continuation of U.S. patent application Ser. No. 13/767,723 (issued on May 16, 2017 as U.S. Pat. No. 9,652,376). Samsung denies that the '376 Patent was cited against the '689 Application during prosecution. Samsung denies that the '183 and '376 Patents were duly and legally issued.

387. Admitted.

388. Samsung admits that U.S. Pat. Pub. No. 2014/0215129 was cited by Samsung during prosecution of Samsung's '770 Patent. Samsung admits that U.S. Pat. Pub. No.

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2014/0215129 is the published application of U.S. Pat. App. No. 13/767,723. Samsung denies that the '376 Patent was duly and legally issued.

389. Samsung admits that U.S. Pat. No. 11,544,183 claims it is a continuation of U.S. patent application Ser. No. 15/625,931, which in turn is a continuation of U.S. patent application Ser. No. 14/466,167, which in turn is a continuation of U.S. patent application Ser. No. 13/767,723 (issued on May 16, 2017 as U.S. Pat. No. 9,652,376). Samsung admits that the U.S. Pat. Pub. No. 2014/0215129 was cited by Samsung during prosecution of Samsung's '770 Patent. Samsung denies that the '183 and '376 Patents were duly and legally issued .

390. Admitted.

391. Admitted.

392. Samsung admits that U.S. Pat. Pub. No. 2014/0215219 is the published application of U.S. Pat. App. No. 13/767,723. Samsung denies that the '376 Patent was duly and legally issued.

393. Samsung admits that U.S. Pat. No. 11,544,183 claims it is a continuation of U.S. patent application Ser. No. 15/625,931, which in turn is a continuation of U.S. patent application Ser. No. 14/466,167, which in turn is a continuation of U.S. patent application Ser. No. 13/767,723 (issued on May 16, 2017 as U.S. Pat. No. 9,652,376). Samsung admits that the U.S. Pat. Pub. No. 2014/0215219 was cited by Samsung during prosecution of Samsung's '010 Patent. Samsung denies that the '183 and '376 Patents were duly and legally issued .

394. Admitted.

395. Samsung denies the allegations of Paragraph 395.

396. Samsung admits that U.S. Pat. No. 11,544,183 claims it is a continuation of U.S. patent application Ser. No. 15/625,931, which in turn is a continuation of U.S. patent application

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Ser. No. 14/466,167, which in turn is a continuation of U.S. patent application Ser. No. 13/767,723 (issued on May 16, 2017 as U.S. Pat. No. 9,652,376). Samsung denies that the '376 Patent was cited during prosecution of the '324 Application. Samsung denies that the '183 and '376 Patents were duly and legally issued.

397. Admitted.

398. Admitted.

399. Samsung admits that U.S. Pat. No. 9,400,749 claims it is a continuation of U.S. patent application Ser. No. 13/767,723 (issued on May 16, 2017 as U.S. Pat. No. 9,652,376). Samsung admits that U.S. Pat. No. 11,544,183 claims it is a continuation of U.S. patent application Ser. No. 15/625,931, which in turn is a continuation of U.S. patent application Ser. No. 14/466,167, which in turn is a continuation of U.S. patent application Ser. No. 13/767,723 (issued on May 16, 2017 as U.S. Pat. No. 9,652,376). Samsung admits that the '749 Patent was cited by Samsung during prosecution of Samsung's '138 Patent. Samsung denies that the '183, '376, and '749 Patents were duly and legally issued.

400. Admitted.

401. Samsung denies the allegations of Paragraph 401.

402. Admitted.

403. Samsung admits that U.S. Pat. No. 9,229,854 claims it is a continuation-in-part of U.S. patent application Ser. No. 13/767,723 (issued on May 16, 2017 as U.S. Pat. No. 9,652,376). Samsung admits that the '854 Patent was cited by Samsung during prosecution of Samsung's '772 Application. Samsung denies that the '854 and '376 Patents were duly and legally issued.

404. Samsung admits that U.S. Pat. No. 11,544,183 claims it is a continuation of U.S. patent application Ser. No. 15/625,931, which in turn is a continuation of U.S. patent application

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Ser. No. 14/466,167, which in turn is a continuation of U.S. patent application Ser. No. 13/767,723 (issued on May 16, 2017 as U.S. Pat. No. 9,652,376). Samsung denies that the '376 Patent was cited during prosecution of the '772 Application. Samsung denies that the '183 and '376 Patents were duly and legally issued.

405. Samsung admits that the USPTO issued Pat. No. 10,254,998 on April 9, 2019, entitled "Coordinated garbage collection of flash devices in a distributed storage system." Samsung denies that the U.S. Pat. App. No. 15/046,435 was filed in 2017.

406. Samsung denies the allegations of Paragraph 406.

407. Samsung admits that U.S. Pat. No. 9,229,854 claims it is a continuation-in-part of U.S. patent application Ser. No. 13/767,723 (issued on May 16, 2017 as U.S. Pat. No. 9,652,376). Samsung admits that U.S. Pat. Pub. No. 2014/0215129 purports to be the published application of U.S. Pat. No. 9,652,376. Samsung denies that the '129 Publication and '854 Patent were cited against Samsung during the prosecution of Samsung's '998 Patent. Samsung denies that the '376 and '854 Patents were duly and legally issued.

408. Samsung denies the allegations of Paragraph 408.

409. Admitted.

410. Admitted.

411. Samsung denies that the '129 Publication was cited against Samsung's '435 Application during prosecution. Samsung admits that U.S. Pat. Pub. No. 2014/0215129 is the published application of the '376 Patent. Samsung denies that the '376 Patent was duly and legally issued.

412. Samsung admits that U.S. Pat. No. 9,229,854 claims it is a continuation-in-part of U.S. patent application Ser. No. 13/767,723 (issued on May 16, 2017 as U.S. Pat. No. 9,652,376).

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Samsung denies that the ’854 Patent was cited against Samsung’s ’435 Application during prosecution.

413. Samsung admits that U.S. Pat. No. 11,544,183 claims it is a continuation of U.S. patent application Ser. No. 15/625,931, which in turn is a continuation of U.S. patent application Ser. No. 14/466,167, which in turn is a continuation of U.S. patent application Ser. No. 13/767,723 (issued on May 16, 2017 as U.S. Pat. No. 9,652,376). Samsung denies that the ’129 Publication was cited against Samsung’s ’435 Application during prosecution. Samsung denies that the ’183 and ’376 Patents were duly and legally issued.

414. Admitted.

415. Admitted.

416. Samsung admits that the ’719 Publication was the published application of U.S. Pat. App. No. 14/466,167. Samsung admits that the ’719 Publication was cited by Samsung during the prosecution of Samsung’s ’642 Patent. Samsung denies that the ’454 Patent was duly and legally issued.

417. Samsung admits that U.S. Pat. No. 11,544,183 claims it is a continuation of U.S. patent application Ser. No. 15/625,931, which in turn is a continuation of U.S. patent application Ser. No. 14/466,167 (issued on Aug. 8, 2017 as U.S. Pat. No. 9,727,454). Samsung denies that the ’183 and ’454 Patents were duly and legally issued. Samsung denies that the ’304 patent was issued on June 4, 2018.

418. Samsung admits that the U.S. Pat. App. No. 14/941,512 was filed on November 13, 2015 and was issued as the ’304 patent. Samsung denies that the ’304 patent was issued on June 4, 2018.

419. Admitted.

420. Samsung admits that the ’719 publication is the published application of the ’454 Patent. Samsung denies that the ’454 Patent was duly and legally issued.

421. Samsung admits that U.S. Pat. No. 11,544,183 claims it is a continuation of U.S. patent application Ser. No. 15/625,931, which in turn is a continuation of U.S. patent application Ser. No. 14/466,167 (issued on Aug. 8, 2017 as U.S. Pat. No. 9,727,454). Samsung denies that the ’183 and ’454 Patents were duly and legally issued.

422. Admitted.

423. Admitted.

424. Samsung admits that the ’719 Publication is the published application of the ’454 Patent. Samsung denies that the ’454 Patent was duly and legally issued.

425. Samsung admits that U.S. Pat. No. 11,544,183 claims it is a continuation of U.S. patent application Ser. No. 15/625,931, which in turn is a continuation of U.S. patent application Ser. No. 14/466,167 (issued on Aug. 8, 2017 as U.S. Pat. No. 9,727,454). Samsung denies that the ’183 and ’454 Patents were duly and legally issued.

426. Admitted.

427. Admitted.

428. Samsung admits that Samsung cited the ’719 Publication during the prosecution of Samsung’s ’028 Patent. Samsung denies that the ’454 Patent was duly and legally issued.

429. Samsung admits that U.S. Pat. No. 11,544,183 claims it is a continuation of U.S. patent application Ser. No. 15/625,931, which in turn is a continuation of U.S. patent application Ser. No. 14/466,167 (issued on Aug. 8, 2017 as U.S. Pat. No. 9,727,454). Samsung denies that the ’183 and ’454 Patents were duly and legally issued.

430. Admitted.

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431. Admitted.

432. Samsung admits that the ’129 Publication was the published application of the ’723 Application. Samsung denies that the ‘376 Patent was duly and legally issued.

433. Samsung admits that U.S. Pat. No. 11,544,183 claims it is a continuation of U.S. patent application Ser. No. 15/625,931, which in turn is a continuation of U.S. patent application Ser. No. 14/466,167, which in turn is a continuation of U.S. patent application Ser. No. 13/767,723 (issued on May 16, 2017 as U.S. Pat. No. 9,652,376). Samsung admits that the ’129 Publication was cited by Samsung during the prosecution of Samsung’s ’051 Patent. Samsung denies that the ’183 and ’376 Patents were duly and legally issued.

434. Admitted.

435. Admitted.

436. Samsung admits that the ’129 Publication was the published application of the ’723 Patent. Samsung denies that the ’376 Patent was duly and legally issued.

437. Samsung admits that U.S. Pat. No. 11,544,183 claims it is a continuation of U.S. patent application Ser. No. 15/625,931, which in turn is a continuation of U.S. patent application Ser. No. 14/466,167, which in turn is a continuation of U.S. patent application Ser. No. 13/767,723 (issued on May 16, 2017 as U.S. Pat. No. 9,652,376). Samsung admits that the ’129 Publication was cited by Samsung during the prosecution of Samsung’s ’719 Patent. Samsung denies that the ’183 and ’376 Patents were duly and legally issued.

438. Admitted.

439. Admitted.

440. Samsung admits that the ’129 Publication was the published application of the ’723 Application. Samsung denies that the ’376 Patent was duly and legally issued.

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441. Samsung admits that U.S. Pat. No. 11,544,183 claims it is a continuation of U.S. patent application Ser. No. 15/625,931, which in turn is a continuation of U.S. patent application Ser. No. 14/466,167, which in turn is a continuation of U.S. patent application Ser. No. 13/767,723 (issued on May 16, 2017 as U.S. Pat. No. 9,652,376). Samsung admits that the '129 Publication was cited by Samsung during the prosecution of Samsung's '450 Patent. Samsung denies that the '183 and '376 Patents were duly and legally issued.

442. Admitted.

443. Admitted.

444. Samsung admits that the '129 Publication was the published application of the '723 Application. Samsung denies that the '376 Patent was duly and legally issued.

445. Samsung admits that U.S. Pat. No. 11,544,183 claims it is a continuation of U.S. patent application Ser. No. 15/625,931, which in turn is a continuation of U.S. patent application Ser. No. 14/466,167, which in turn is a continuation of U.S. patent application Ser. No. 13/767,723 (issued on May 16, 2017 as U.S. Pat. No. 9,652,376). Samsung admits that the '129 Publication was cited by Samsung during the prosecution of Samsung's '159 Patent. Samsung denies that the '183 and '376 Patents were duly and legally issued.

446. Admitted.

447. Admitted.

448. Samsung admits that the '129 Publication was the published application for the '723 Application. Samsung denies that the '376 Patent was duly and legally issued.

449. Samsung admits that U.S. Pat. No. 11,544,183 claims it is a continuation of U.S. patent application Ser. No. 15/625,931, which in turn is a continuation of U.S. patent application Ser. No. 14/466,167, which in turn is a continuation of U.S. patent application Ser. No. 13/767,723

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(issued on May 16, 2017 as U.S. Pat. No. 9,652,376). Samsung admits that the '129 Publication was cited by Samsung during the prosecution of Samsung's '076 Patent. Samsung denies that the '183 and '376 Patents were duly and legally issued.

450. Admitted.

451. Admitted.

452. Samsung admits that U.S. Pat. No. 9,400,749 claims it is a continuation of U.S. patent application Ser. No. 13/767,723 (issued on May 16, 2017 as U.S. Pat. No. 9,652,376). Samsung admits that U.S. Pat. No. 11,544,183 claims it is a continuation of U.S. patent application Ser. No. 15/625,931, which in turn is a continuation of U.S. patent application Ser. No. 14/466,167, which in turn is a continuation of U.S. patent application Ser. No. 13/767,723 (issued on May 16, 2017 as U.S. Pat. No. 9,652,376). Samsung admits that the '749 Patent was cited by Samsung during prosecution of Samsung's '659 Patent. Samsung denies that the '183, '376, and '749 Patents were duly and legally issued.

453. Admitted.

454. Admitted.

455. Samsung admits that U.S. Pat. No. 9,400,749 claims it is a continuation of U.S. patent application Ser. No. 13/767,723 (issued on May 16, 2017 as U.S. Pat. No. 9,652,376). Samsung admits that U.S. Pat. No. 11,544,183 claims it is a continuation of U.S. patent application Ser. No. 15/625,931, which in turn is a continuation of U.S. patent application Ser. No. 14/466,167, which in turn is a continuation of U.S. patent application Ser. No. 13/767,723 (issued on May 16, 2017 as U.S. Pat. No. 9,652,376). Samsung admits that the '749 Patent was cited by Samsung during prosecution of Samsung's '258 Patent. Samsung denies that the '183, '376, and '749 Patents were duly and legally issued.

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456. Admitted.

457. Admitted.

458. Samsung admits that U.S. Pat. No. 9,400,749 claims it is a continuation of U.S. patent application Ser. No. 13/767,723 (issued on May 16, 2017 as U.S. Pat. No. 9,652,376). Samsung admits that U.S. Pat. No. 11,544,183 claims it is a continuation of U.S. patent application Ser. No. 15/625,931, which in turn is a continuation of U.S. patent application Ser. No. 14/466,167, which in turn is a continuation of U.S. patent application Ser. No. 13/767,723 (issued on May 16, 2017 as U.S. Pat. No. 9,652,376). Samsung admits that the '749 Patent was cited by Samsung during prosecution of Samsung's '496 Patent. Samsung denies that the '183, '376, and '749 Patents were duly and legally issued.

459. Admitted.

460. Samsung denies the allegations of Paragraph 460.

461. Samsung admits that U.S. Pat. No. 11,544,183 claims it is a continuation of U.S. patent application Ser. No. 15/625,931, which in turn is a continuation of U.S. patent application Ser. No. 14/466,167, which in turn is a continuation of U.S. patent application Ser. No. 13/767,723 (issued on May 16, 2017 as U.S. Pat. No. 9,652,376). Samsung denies that the '376 Patent was cited by Samsung during the prosecution of Samsung's '123 Patent. Samsung denies that the '183 and '376 Patents were duly and legally issued.

462. Admitted.

463. Admitted.

464. Samsung admits that U.S. Pat. No. 9,400,749 claims it is a continuation of U.S. patent application Ser. No. 13/767,723 (issued on May 16, 2017 as U.S. Pat. No. 9,652,376). Samsung admits that U.S. Pat. No. 11,544,183 claims it is a continuation of U.S. patent application

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Ser. No. 15/625,931, which in turn is a continuation of U.S. patent application Ser. No. 14/466,167, which in turn is a continuation of U.S. patent application Ser. No. 13/767,723 (issued on May 16, 2017 as U.S. Pat. No. 9,652,376). Samsung admits that the '749 Patent was cited by Samsung during the prosecution of Samsung's '041 Patent. Samsung denies that the '183, '376, and '749 Patents were duly and legally issued.

465. Samsung denies that U.S. Pat. App. No. 15/481,147 issued on April 6, 2017.

466. Admitted.

467. Samsung admits that the '129 Publication was the published application of the '723 Application. Samsung denies that the '376 Patent was duly and legally issued.

468. Samsung admits that U.S. Pat. No. 11,544,183 claims it is a continuation of U.S. patent application Ser. No. 15/625,931, which in turn is a continuation of U.S. patent application Ser. No. 14/466,167, which in turn is a continuation of U.S. patent application Ser. No. 13/767,723 (issued on May 16, 2017 as U.S. Pat. No. 9,652,376). Samsung admits that the '129 Publication was cited by Samsung during the prosecution of Samsung's '687 Patent. Samsung denies that the '183 and '376 Patents were duly and legally issued.

469. Admitted.

470. Samsung denies the allegations of Paragraph 470.

471. Samsung admits that U.S. Pat. No. 11,544,183 claims it is a continuation of U.S. patent application Ser. No. 15/625,931, which in turn is a continuation of U.S. patent application Ser. No. 14/466,167, which in turn is a continuation of U.S. patent application Ser. No. 13/767,723 (issued on May 16, 2017 as U.S. Pat. No. 9,652,376). Samsung denies that the '376 Patent was cited during prosecution of the '690 Application. Samsung denies that the '183 and '376 Patents were duly and legally issued.

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472. Admitted.

473. Samsung denies the allegations of Paragraph 473.

474. Samsung admits that U.S. Pat. No. 11,544,183 claims it is a continuation of U.S. patent application Ser. No. 15/625,931, which in turn is a continuation of U.S. patent application Ser. No. 14/466,167, which in turn is a continuation of U.S. patent application Ser. No. 13/767,723 (issued on May 16, 2017 as U.S. Pat. No. 9,652,376). Samsung denies that the '376 Patent was cited during prosecution of the '631.5 Application. Samsung denies that the '183 and '376 Patents were duly and legally issued.

475. Samsung denies the allegations of Paragraph 475.

476. Samsung admits that U.S. Pat. Nos. 11,307,995, 11,347,657, and 11,347,656 state they are continuations of U.S. Pat. No. 9,542,118. Samsung denies that the '118 Patent was cited during prosecution of the '631.5 Application. Samsung denies that the '657, '656, and '118 Patents were duly and legally issued.

477. Samsung denies the allegations of Paragraph 477.

478. Samsung admits that U.S. Pat. No. 10,552,058 claims priority to U.S. Provisional Patent Application No. 62/199,970, to U.S. Provisional patent Application No. 62/199,969, and to U.S. Provisional Patent Application No. 62/194,172. Samsung denies that the '058 Patent was duly and legally issued.

479. Samsung admits that U.S. Pat. Nos. 11,307,995, 11,347,657, and 11,347,656 claim the benefit of U.S. Prov. Pat. App. No. 62/199,969 and U.S. Prov. Pat. App. No. 62/194,172. Samsung denies that the '657, '656, and '118 Patents were duly and legally issued.

480. Admitted.

481. Samsung denies the allegations of Paragraph 481.

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482. Samsung admits that the U.S. Pat. No. 9,229,854 claims to be a continuation-in-part of application No. 13/767,723 (issued on May 16, 2017 as U.S. Pat. No. 9,652,376). Samsung denies that the '854 Patent was cited during prosecution of the '983 Patent. Samsung denies that the '854 and '376 Patents were duly and legally issued.

483. Samsung denies the allegations of Paragraph 483.

484. Samsung admits that U.S. Pat. No. 11,544,183 claims it is a continuation of U.S. patent application Ser. No. 15/625,931, which in turn is a continuation of U.S. patent application Ser. No. 14/466,167, which in turn is a continuation of U.S. patent application Ser. No. 13/767,723 (issued on May 16, 2017 as U.S. Pat. No. 9,652,376). Samsung denies that the '376 Patent was cited during prosecution of the '197.2 Application. Samsung denies that the '183 and '376 Patents were duly and legally issued.

485. Admitted.

486. Admitted.

487. Samsung admits that U.S. Pat. No. 11,354,234 claims it is a continuation of U.S. patent application Ser. No. 15/625,931, which in turn is a continuation of U.S. patent application Ser. No. 14/466,167, which in turn is a continuation of U.S. patent application Ser No. 13/767,723 (issued on May 16, 2017 as U.S. Pat. No. 9,6652,376). Samsung denies that the '234 Patent was cited against Samsung's '684 Application. Samsung denies that the '234 and '376 Patents were duly and legally issued.

488. Samsung admits that U.S. Pat. No. 11,544,183 claims it is a continuation of U.S. patent application Ser. No. 15/625,931, which in turn is a continuation of U.S. patent application Ser. No. 14/466,167, which in turn is a continuation of U.S. patent application Ser. No. 13/767,723

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(issued on May 16, 2017 as U.S. Pat. No. 9,652,376). Samsung denies that the '183 and '376 Patents were duly and legally issued.

489. Admitted.

490. Admitted.

491. Samsung admits that the '129 Publication was the published application of the '723 Application. Samsung denies that the '376 Patent was duly and legally issued.

492. Samsung admits that U.S. Pat. No. 11,544,183 claims it is a continuation of U.S. patent application Ser. No. 15/625,931, which in turn is a continuation of U.S. patent application Ser. No. 14/466,167, which in turn is a continuation of U.S. patent application Ser. No. 13/767,723 (issued on May 16, 2017 as U.S. Pat. No. 9,652,376). Samsung admits that the '129 Publication was cited by Samsung during the prosecution of Samsung's '918 Patent. Samsung denies that the '183 and '376 Patents were duly and legally issued.

493. Admitted.

494. Admitted.

495. Samsung admits that the '129 Publication was the published application of the '723 Application. Samsung denies that the '376 Patent was duly and legally issued.

496. Samsung admits that U.S. Pat. No. 11,544,183 claims it is a continuation of U.S. patent application Ser. No. 15/625,931, which in turn is a continuation of U.S. patent application Ser. No. 14/466,167, which in turn is a continuation of U.S. patent application Ser. No. 13/767,723 (issued on May 16, 2017 as U.S. Pat. No. 9,652,376). Samsung admits that the '129 Publication was cited against Samsung's '634 Patent. Samsung denies that the '183 and '376 Patents were duly and legally issued.

497. Admitted.

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498. Admitted.

499. Samsung admits that the ’129 Publication was the published application of the ’723 Application. Samsung denies that the ’376 Patent was duly and legally issued.

500. Samsung admits that U.S. Pat. No. 11,544,183 claims it is a continuation of U.S. patent application Ser. No. 15/625,931, which in turn is a continuation of U.S. patent application Ser. No. 14/466,167, which in turn is a continuation of U.S. patent application Ser. No. 13/767,723 (issued on May 16, 2017 as U.S. Pat. No. 9,652,376). Samsung admits that the ’129 Publication was cited against Samsung’s ’210 Patent during prosecution. Samsung denies that the ’183 and ’376 Patents were duly and legally issued.

501. Admitted.

502. Samsung denies the allegations of Paragraph 502.

503. Samsung admits that U.S. Pat. No. 11,544,183 claims it is a continuation of U.S. patent application Ser. No. 15/625,931, which in turn is a continuation of U.S. patent application Ser. No. 14/466,167, which in turn is a continuation of U.S. patent application Ser. No. 13/767,723 (issued on May 16, 2017 as U.S. Pat. No. 9,652,376). Samsung denies that the ’376 Patent was cited during prosecution of the ’991 Application. Samsung denies that the ’183 and ’376 Patents were duly and legally issued.

504. Admitted.

505. Admitted.

506. Samsung admits that U.S. Pat. No. 10,642,505 claims it is a continuation in-part of U.S. patent application Ser . No. 14 / 047,193, which in turn is a continuation in-part of U.S. patent application Ser. No. 13/767,723 (issued on May 16, 2017 as U.S. Pat. No. 9,652,376). Samsung

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denies that the ’505 Patent was cited against Samsung’s ’399 Application during prosecution. Samsung denies that the ’505 and ’376 Patents were duly and legally issued.

507. Samsung admits that U.S. Pat. No. 11,544,183 claims it is a continuation of U.S. patent application Ser. No. 15/625,931, which in turn is a continuation of U.S. patent application Ser. No. 14/466,167, which in turn is a continuation of U.S. patent application Ser. No. 13/767,723 (issued on May 16, 2017 as U.S. Pat. No. 9,652,376). Samsung denies that the ’183 and ’376 Patents were duly and legally issued.

508. Admitted.

509. Samsung admits that U.S. Pat. No. 11,347,639 claims to be a continuation of application No. 14/466,167, filed on Aug. 22 , 2014, now Pat . No. 9,727,454, which is a continuation of application No. 13/767,723 (issued on May 16, 2017 as U.S. Pat. No. 9,652,376). Samsung denies that the ’639 Patent was cited against Samsung’s ’399 Application during prosecution. Samsung denies that the ’639 and ’376 Patents were duly and legally issued.

510. Samsung admits that U.S. Pat. No. 11,544,183 claims it is a continuation of U.S. patent application Ser. No. 15/625,931, which in turn is a continuation of U.S. patent application Ser. No. 14/466,167, which in turn is a continuation of U.S. patent application Ser. No. 13/767,723 (issued on May 16, 2017 as U.S. Pat. No. 9,652,376). Samsung denies that the ’183 and ’376 Patents were duly and legally issued.

511. Admitted.

512. Samsung admits that U.S. Pat. No. 11,275,695 claims to be a continuation of U.S. Utility patent application Ser. No. 15/690,006 (issued on May 5, 2020 as U.S. Pat. No. 10,642,748). Samsung denies that the ’695 Patent was cited against Samsung’s ’399 Application during prosecution. Samsung denies that the ’695 and ’748 Patents were duly and legally issued.

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513. Samsung admits that U.S. Pat. Nos. 11,307,995, 11,347,657, and 11,347,656 claim to be continuations of U.S. Utility patent application Ser. No. 16/808,304, which in turn is a continuation of U.S. Utility patent application Ser. No. 15/690,006 (issued on May 5, 2020 as U.S. patent Ser. No. 10/642,748). Samsung denies that the '656, '657, '995, and '748 Patents were duly and legally issued.

514. Samsung denies that U.S. Pat. App. No. 18/099,246 published on December 1, 2022.

515. Admitted.

516. Samsung admits that '719 Publication purports to be the published application of U.S. Pat. Appl. No. 14/466,167. Samsung denies that the '719 Publication was cited against Samsung's '246 Application during the prosecution. Samsung denies that the '454 Patent was duly and legally issued.

517. Samsung admits that U.S. Pat. No. 11,544,183 claims it is a continuation of U.S. patent application Ser. No. 15/625,931, which in turn is a continuation of U.S. patent application Ser. No. 14/466,167 (issued on Aug. 8, 2017 as U.S. Pat. No. 9,727,454). Samsung denies that the '183 and '454 Patents were duly and legally issued.

518. Samsung denies that Samsung filed Korea Pat. App. No. 10-2013-0146321, that Korea Pat. App. No. 10-2013-0146321 issued as Korea Pat. App. No. 10-2103543, and that Korean Pat. App. No. 10-2103543 issued on May 29, 2015.

519. Samsung denies the allegations of Paragraph 519.

520. Samsung admits that U.S. Pat. No. 11,544,183 claims it is a continuation of U.S. patent application Ser. No. 15/625,931, which in turn is a continuation of U.S. patent application Ser. No. 14/466,167, which in turn is a continuation of U.S. patent application Ser. No. 13/767,723

(issued on May 16, 2017 as U.S. Pat. No. 9,652,376). Samsung denies that the '376 Patent was cited during prosecution of the '321 Application. Samsung denies that the '183 and '376 Patents were duly and legally issued.

521. Admitted.

522. Samsung denies the allegations of Paragraph 522.

523. Samsung admits that U.S. Pat. No. 11,544,183 claims it is a continuation of U.S. patent application Ser. No. 15/625,931, which in turn is a continuation of U.S. patent application Ser. No. 14/466,167, which in tum is a continuation of U.S. patent application Ser. No. 13/767,723 (issued on May 16, 2017 as U.S. Pat. No. 9,652,376). Samsung denies that the '376 Patent was cited against Samsung's '245 Application during prosecution. Samsung denies that the '183 and '376 Patents were duly and legally issued.

524. Samsung denies that Korean Pat. App. No. 10-2014-0107128 was filed on August 18, 2018.

525. Samsung denies the allegations of Paragraph 525.

526. Samsung admits that the U.S. Pat. No. 9,229,854 claims priority to U.S. Utility patent application Ser. No. 13/767,723 (issued on May 16, 2017 as U.S. Pat. No. 9,652,376). Samsung denies that the '854 Patent was cited during prosecution of the '128 Application. Samsung denies that the '854 and '376 Patents were duly and legally issued.

527. Samsung admits that U.S. Pat. No. 11,544,183 claims it is a continuation of U.S. patent application Ser. No. 15/625,931, which in turn is a continuation of U.S. patent application Ser. No. 14/466,167, which in turn is a continuation of U.S. patent application Ser. No. 13/767,723 (issued on May 16, 2017 as U.S. Pat. No. 9,652,376). Samsung denies that the '376 Patent was

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cited against Samsung's '128 Application. Samsung denies that the '183 and '376 Patents were duly and legally issued.

528. Admitted.

529. Admitted.

530. Samsung admits that the '129 Publication was the published application of the '723 Application. Samsung denies that the '376 Patent was duly and legally issued.

531. Samsung admits that U.S. Pat. No. 11,544,183 claims it is a continuation of U.S. patent application Ser. No. 15/625,931, which in turn is a continuation of U.S. patent application Ser. No. 14/466,167, which in turn is a continuation of U.S. patent application Ser. No. 13/767,723 (issued on May 16, 2017 as U.S. Pat. No. 9,652,376). Samsung admits that the '129 Publication was cited against Samsung's '741 Application. Samsung denies that the '183 and '376 Patents were duly and legally issued.

532. Admitted.

533. Samsung denies the allegations of Paragraph 533.

534. Samsung admits that U.S. Pat. No. 11,544,183 claims it is a continuation of U.S. patent application Ser. No. 15/625,931, which in turn is a continuation of U.S. patent application Ser. No. 14/466,167, which in turn is a continuation of U.S. patent application Ser. No. 13/767,723 (issued on May 16, 2017 as U.S. Pat. No. 9,652,376). Samsung denies that the '376 Patent was cited during prosecution of the '611 Patent. Samsung denies that the '183 and '376 Patents were duly and legally issued.

535. Admitted.

536. Samsung denies the allegations of Paragraph 536.

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537. Samsung admits that U.S. Pat. No. 11,544,183 claims it is a continuation of U.S. patent application Ser. No. 15/625,931, which in turn is a continuation of U.S. patent application Ser. No. 14/466,167, which in turn is a continuation of U.S. patent application Ser. No. 13/767,723 (issued on May 16, 2017 as U.S. Pat. No. 9,652,376). Samsung denies that the '376 Patent was cited during prosecution of the '430 Patent. Samsung denies that the '183 and '376 Patents were duly and legally issued.

538. Admitted.

539. Samsung denies the allegations of Paragraph 539.

540. Samsung admits that U.S. Pat. No. 11,544,183 claims it is a continuation of U.S. patent application Ser. No. 15/625,931, which in turn is a continuation of U.S. patent application Ser. No. 14/466,167, which in turn is a continuation of U.S. patent application Ser. No. 13/767,723 (issued on May 16, 2017 as U.S. Pat. No. 9,652,376). Samsung denies that the '376 Patent was cited during prosecution of the '140 Patent. Samsung denies that the '183 and '376 Patents were duly and legally issued.

541. Samsung denies the allegations of Paragraph 541.

542. Samsung admits that U.S. Pat. Nos. 11,307,995, 11,347,657, and 11,347,656 claim to be continuations of U.S. Utility patent application Ser. No. 16/808,304, which in turn is a continuation of U.S. Utility patent application Ser. No. 15/690,006, which in turn is a continuation of U.S. Utility Patent application Ser. No. 15/074,778, which in turn, is a continuation of U.S. Utility patent application Ser. No. 14/880/529 (issued on Jan. 10, 2017 as U.S. Pat. No. 9,542,118). Samsung denies that the '118 Patent was cited during prosecution of the '140 Patent. Samsung denies that the '656, '657, '995, and '118 Patents were duly and legally issued.

543. Admitted.

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544. Samsung denies the allegations of Paragraph 544.

545. Samsung admits that U.S. Pat. No. 11,544,183 claims it is a continuation of U.S. patent application Ser. No. 15/625,931, which in turn is a continuation of U.S. patent application Ser. No. 14/466,167, which in turn is a continuation of U.S. patent application Ser. No. 13/767,723 (issued on May 16, 2017 as U.S. Pat. No. 9,652,376). Samsung denies that the '376 Patent is cited during prosecution of the '346 Patent. Samsung denies that the '183 and '376 Patents were duly and legally issued.

546. Admitted.

547. Samsung denies the allegations of Paragraph 547.

548. Samsung admits that U.S. Pat. No. 11,544,183 claims it is a continuation of U.S. patent application Ser. No. 15/625,931, which in turn is a continuation of U.S. patent application Ser. No. 14/466,167, which in turn is a continuation of U.S. patent application Ser. No. 13/767,723 (issued on May 16, 2017 as U.S. Pat. No. 9,652,376). Samsung denies that the '376 Patent was cited during prosecution of the '649 Application. Samsung denies that the '183 and '376 Patents were duly and legally issued.

549. Admitted.

550. Samsung denies the allegations of Paragraph 550.

551. Samsung admits that U.S. Pat. No. 11,544,183 claims it is a continuation of U.S. patent application Ser. No. 15/625,931, which in turn is a continuation of U.S. patent application Ser. No. 14/466,167, which in turn is a continuation of U.S. patent application Ser. No. 13/767,723 (issued on May 16, 2017 as U.S. Pat. No. 9,652,376). Samsung denies that the '376 Patent was cited against Samsung's '655 Application. Samsung denies that the '183 and '376 Patents were duly and legally issued.

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552. Admitted.

553. Samsung denies the allegations of Paragraph 553.

554. Samsung admits that the U.S. Pat. No. 9,229,854 claims priority to U.S. Utility patent application Ser. No. 13/767,723 (issued on May 16, 2017 as U.S. Pat. No. 9,652,376). Samsung denies that the '854 Patent was cited during prosecution of the '347 Application. Samsung denies that the '854 and '376 Patents were duly and legally issued.

555. Samsung denies the allegations of Paragraph 555.

556. Samsung admits that U.S. Pat. No. 11,544,183 claims it is a continuation of U.S. patent application Ser. No. 15/625,931, which in turn is a continuation of U.S. patent application Ser. No. 14/466,167, which in turn is a continuation of U.S. patent application Ser. No. 13/767,723 (issued on May 16, 2017 as U.S. Pat. No. 9,652,376). Samsung denies that the '376 Patent was cited during the prosecution of the '347 Patent. Samsung denies that the '183 and '376 Patents were duly and legally issued.

557. Admitted.

558. Samsung denies the allegations of Paragraph 558.

559. Samsung admits that U.S. Pat. No. 11,544,183 claims it is a continuation of U.S. patent application Ser. No. 15/625,931, which in turn is a continuation of U.S. patent application Ser. No. 14/466,167, which in turn is a continuation of U.S. patent application Ser. No. 13/767,723 (issued on May 16, 2017 as U.S. Pat. No. 9,652,376). Samsung denies that the '376 Patent was cited during the prosecution of the '348 Application. Samsung denies that the '183 and '376 Patents were duly and legally issued.

560. Admitted.

561. Samsung denies the allegations of Paragraph 561.

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562. Samsung admits that U.S. Pat. No. 11,544,183 claims it is a continuation of U.S. patent application Ser. No. 15/625,931, which in turn is a continuation of U.S. patent application Ser. No. 14/466,167, which in turn is a continuation of U.S. patent application Ser. No. 13/767,723 (issued on May 16, 2017 as U.S. Pat. No. 9,652,376). Samsung denies that the '376 Patent was cited during the prosecution of the '001 Application. Samsung denies that the '183 and '376 Patents were duly and legally issued.

563. Samsung denies the allegations of Paragraph 563.

564. Samsung admits that U.S. Pat. No. 10,552,058 claims priority to U.S. Provisional Patent Application No. 62/199,970, to U.S. Provisional patent Application No. 62/199,969, to U.S. Provisional Patent Application No. 62/194,172, and to U.S. Provisional Patent Application No. 62/241,429. Samsung admits that U.S. Pat. Nos. 11,347,656, 11,347,657, and 11,307,995 are related to U.S. Provisional patent Application Nos. 62/199,969 and 62/194,172. Samsung denies that the '058 Patent was cited during prosecution of the '001 Application. Samsung denies that the '058, '656, '657 and '995 Patents were duly and legally issued.

565. Admitted.

566. Samsung denies the allegations of Paragraph 566.

567. Samsung admits that U.S. Pat. No. 11,544,183 claims it is a continuation of U.S. patent application Ser. No. 15/625,931, which in turn is a continuation of U.S. patent application Ser. No. 14/466,167, which in turn is a continuation of U.S. patent application Ser. No. 13/767,723 (issued on May 16, 2017 as U.S. Pat. No. 9,652,376). Samsung denies that the '376 Patent was cited during the prosecution of the '806 Application. Samsung denies that the '183 and '376 Patents were duly and legally issued.

568. Admitted.

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569. Samsung denies the allegations of Paragraph 569.

570. Samsung admits that U.S. Pat. No. 11,544,183 claims it is a continuation of U.S. patent application Ser. No. 15/625,931, which in turn is a continuation of U.S. patent application Ser. No. 14/466,167, which in turn is a continuation of U.S. patent application Ser. No. 13/767,723 (issued on May 16, 2017 as U.S. Pat. No. 9,652,376). Samsung denies that the '376 Patent was cited during the prosecution of the '053 Application. Samsung denies that the '183 and '376 Patents were duly and legally issued.

571. Admitted.

572. Samsung denies the allegations of Paragraph 572.

573. Samsung admits that U.S. Pat. No. 11,544,183 claims it is a continuation of U.S. patent application Ser. No. 15/625,931, which in turn is a continuation of U.S. patent application Ser. No. 14/466,167, which in turn is a continuation of U.S. patent application Ser. No. 13/767,723 (issued on May 16, 2017 as U.S. Pat. No. 9,652,376). Samsung denies that the '376 Patent was cited during the prosecution of the '516 Application. Samsung denies that the '183 and '376 Patents were duly and legally issued.

574. Admitted.

575. Samsung denies the allegations of Paragraph 575.

576. Samsung admits that U.S. Pat. No. 11,709,772 claims it is a continuation of U.S. application Ser. No. 17/563,481, which in turn is a continuation of U.S. application Ser. No. 16/751,925, which in turn is a continuation of U.S. application Ser. No. 16/570,922, which in turn is a continuation of U.S. application Ser. No. 15/621,888 (issued on Oct. 15, 2019 as U.S. patent Ser. No. 10/445,229). Samsung admits that U.S. Pat. No. 11,681,614 claims it is a continuation of U.S. patent application Ser. No. 17/563,481, which is a continuation of U.S. patent application Ser.

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No. 16/751,925, which is a continuation of U.S. patent application Ser. No. 16/570,922, which is a continuation of U.S. patent application Ser. No. 15/621,888, (issued on Oct. 15, 2019 as U.S. Pat. No. 10,445,229). Samsung denies that the '229 Patent was cited against Samsung's '008 Application during prosecution. Samsung denies that the '772, '614, and '229 Patents were duly and legally issued.

577. Admitted.

578. Samsung denies the allegations of Paragraph 578.

579. Samsung admits that U.S. Pat. No. 11,709,772 claims it is a continuation of U.S. application Ser. No. 17/563,481, which in turn is a continuation of U.S. application Ser. No. 16/751,925, which in turn is a continuation of U.S. application Ser. No. 16/570,922, which in turn is a continuation of U.S. application Ser. No. 15/621,888 (issued on Oct. 15, 2019 as U.S. patent Ser. no. 10/445,229). Samsung admits that U.S. Pat. No. 11,681,614 claims it is a continuation of U.S. patent application Ser. No. 17/563,481, which is a continuation of U.S. patent application Ser. No. 16/751,925, which is a continuation of U.S. patent application Ser. No. 16/570,922, which is a continuation of U.S. patent application Ser. No. 15/621,888, (issued on Oct. 15, 2019 as U.S. Pat. No. 10,445,229). Samsung denies that the '229 Patent was cited during prosecution of the '516 Application. Samsung denies that the '772, '614, and '229 Patents were duly and legally issued.

580. Admitted.

581. Admitted.

582. Samsung admits that U.S. Pat. Nos. 11,307,995, 11,347,657, and 11,347,656 claim to be continuations of U.S. Utility patent application Ser. No. 16/808,304, which in turn is a continuation of U.S. Utility patent application Ser. No. 15/690,006, which in turn is a continuation

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of U.S. Utility Patent application Ser. No. 15/074,778 (issued on Oct. 10, 2017 as U.S. Pat. No. 9,785,572). Samsung admits that the '572 Patent was cited by Samsung during the prosecution of Samsung's '394 Patent. Samsung denies that the '656, '657, '995, and '572 Patents were duly and legally issued.

583. Admitted.

584. Admitted.

585. Samsung admits that U.S. Pat. Nos. 11,307,995, 11,347,657, and 11,347,656 claim to be continuations of U.S. Utility patent application Ser. No. 16/808,304, which in turn is a continuation of U.S. Utility patent application Ser. No. 15/690,006, which in turn is a continuation of U.S. Utility Patent application Ser. No. 15/074,778, which in turn is a continuation of U.S. Utility patent application Ser. No. 14/880,529 (issued on Jan. 10, 2017, as U.S. Pat. No. 9,542,118). Samsung denies that the '118 Patent was cited against Samsung's '200 Application during prosecution. Samsung denies that the '656, '657, '995, and '118 Patents were duly and legally issued.

586. Admitted.

587. Samsung admits that U.S. Pat. No. 10,552,058 claims priority to U.S. Prov. Pat. App. No. 62/199,969 and U.S. Prov. Pat. App. No. 62/194,172; Samsung admits that U.S. Pat. Nos. 11,307,995, 11,347,657, and 11,347,656 claim to be continuations of U.S. Utility patent application Ser. No. 16/808,304, which in turn is a continuation of U.S. Utility patent application Ser. No. 15/690,006, which in turn is a continuation of U.S. Utility Patent application Ser. No. 15/074,778, which in turn is a continuation of U.S. Utility patent application Ser. no. 14/880,529, which in turn claims the benefit of: U.S. Provisional Patent Application Nos. 62/199,969 and 62/194,172. Samsung denies that the '058 Patent was cited against Samsung's '200 Application

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during prosecution. Samsung denies that the '058, '656, '657, and '995 Patents were duly and legally issued.

588. Admitted.

589. Samsung denies the allegations of Paragraph 589.

590. Samsung admits that U.S. Pat. Nos. 11,307,995, 11,347,657, and 11,347,656 claim to be continuations of U.S. Utility patent application Ser. No. 16/808,304, which in turn is a continuation of U.S. Utility patent application Ser. No. 15/690,006, which in turn is a continuation of U.S. Utility Patent application Ser. No. 15/074,778, which in turn is a continuation of U.S. Utility patent application Ser. no. 14/880,529 (issued on Jan. 10, 2017, as U.S. Pat. no. 9,542,118). Samsung denies that the '118 Patent was cited against Samsung's '562 Patent during prosecution. Samsung denies that the '656, '657, '995, and '118 Patents were duly and legally issued.

J. Samsung Entity Relationships

591. Samsung admits that SEC is one entity of the Samsung Group, a South Korean chaebol comprised of approximately 63 affiliated companies as of 2023. Except as expressly admitted, Samsung denies any remaining allegations of this Paragraph.

592. Samsung admits that SEC is one of the world's largest manufacturer of semiconductor memory and is a manufacturer of consumer electronics, electronic components, and semiconductors. Except as expressly admitted, Samsung denies any remaining allegations of this Paragraph.

593. Samsung admits that SEA is a wholly owned subsidiary of SEC. Except as expressly admitted, Samsung denies any remaining allegations of this Paragraph.

594. Samsung admits that SEA is involved with domestic sales and distribution of Samsung's consumer electronics products. Except as expressly admitted, Samsung denies any remaining allegations of this Paragraph.

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595. Samsung admits that SEA is involved with domestic sales and distribution of Samsung's consumer electronics products. Except as expressly admitted, Samsung denies any remaining allegations of this Paragraph.

596. Samsung admits that SEA is involved with domestic sales and distribution of Samsung's consumer electronics products. Except as expressly admitted, Samsung denies any remaining allegations of this Paragraph.

597. Samsung admits that SEA is involved with domestic sales and distribution of Samsung's consumer electronics products. Except as expressly admitted, Samsung denies any remaining allegations of this Paragraph.

598. Samsung admits that SEC designs, manufactures, or provides to the United States and other markets hardware and software products and services, including consumer electronics, mobile phones, handheld devices, tablets, laptops and other personal computers, storage devices, televisions, and electronic devices. Except as expressly admitted, Samsung denies any remaining allegations of this Paragraph.

599. Samsung admits that SEC designs, manufactures, or provides to the United States and other markets hardware and software products and services, including consumer electronics, mobile phones, handheld devices, tablets, laptops and other personal computers, storage devices, televisions, and electronic devices. Samsung admits that SEA is involved with domestic sales and distribution of Samsung's consumer electronics products. Except as expressly admitted, Samsung denies any remaining allegations of this Paragraph.

600. Admitted.

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601. Samsung is without knowledge or information sufficient to form a belief as to the truth of the allegations of Paragraph 601 because they are vague and indefinite, including in their use of undefined terms such as "arms' length as equals" and on that basis denies them.

602. Samsung denies the allegations of Paragraph 602.

603. Samsung denies the allegations of Paragraph 603.

604. Samsung is without knowledge or information sufficient to form a belief as to the truth of the allegations of Paragraph 604 because they are vague and indefinite, including in their use of undefined terms such as "effective control" and on that basis denies them.

605. Samsung is without knowledge or information sufficient to form a belief as to the truth of the allegations of Paragraph 605 because they are vague and indefinite, including in their use of undefined terms such as "merely," "exists for the purpose of," "agent," and "conduct business" and on that basis denies them.

606. Samsung is without knowledge or information sufficient to form a belief as to the truth of the allegations of Paragraph 606 because they are vague and indefinite, including in their use of undefined terms such as "degree of control" and on that basis denies them.

607. Samsung denies the allegations of Paragraph 607.

608. Samsung is without knowledge or information sufficient to form a belief as to the truth of the allegations of Paragraph 608 because they are vague and indefinite, including in their use of undefined terms such as "effective control" and on that basis denies them.

609. Samsung denies the allegations of Paragraph 609.

610. Samsung complies with South Korean law. Except as expressly admitted, Samsung denies any remaining allegations of this Paragraph.

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611. When SEC takes a license to a U.S. company's intellectual property, SEC withholds tax according to South Korean tax law. Except as expressly admitted, Samsung denies any remaining allegations of this Paragraph.

612. Samsung is without knowledge or information sufficient to form a belief as to the truth of the allegations of Paragraph 612 because they are vague and indefinite, including in their use of undefined terms such as "any given Samsung entity" and on that basis denies them.

613. Samsung is without knowledge or information sufficient to form a belief as to the truth of the allegations of Paragraph 613 because they are vague and indefinite, including in their use of undefined terms such as "Samsung employees" and on that basis denies them. Samsung denies the remainder of the allegations in Paragraph 613.

614. Samsung is without knowledge or information sufficient to form a belief as to the truth of the allegations of Paragraph 614 because they are vague and indefinite, including in their use of undefined terms such as "Samsung employees" and on that basis denies them. Samsung denies the remainder of the allegations in Paragraph 614.

615. Samsung is without knowledge or information sufficient to form a belief as to the truth of the allegations of Paragraph 615 because they are vague and indefinite, including in their use of undefined terms such as "Samsung employees" and on that basis denies them. Samsung denies the remainder of the allegations in Paragraph 615.

616. Samsung is without knowledge or information sufficient to form a belief as to the truth of the allegations of Paragraph 616 because they are vague and indefinite, including in their use of undefined terms such as "Samsung employees" and on that basis denies them. Samsung denies the remainder of the allegations in Paragraph 616.

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617. Samsung is without knowledge or information sufficient to form a belief as to the truth of the allegations of Paragraph 617 because they are vague and indefinite, including in their use of undefined terms such as "Samsung employees" and on that basis denies them. Samsung denies the remainder of the allegations in Paragraph 617.

618. Samsung is without knowledge or information sufficient to form a belief as to the truth of the allegations of Paragraph 618 because they are vague and indefinite, including in their use of undefined terms such as "Samsung entities" and on that basis denies them. Samsung denies the remainder of the allegations in Paragraph 618.

619. Admitted.

620. Admitted.

621. Samsung denies the allegations of Paragraph 621.

K. Samsung Electronics Co., Ltd.'s Vicarious Liability

622. Samsung denies the allegations of Paragraph 622.

623. Samsung denies the allegations of Paragraph 623.

624. Samsung denies the allegations of Paragraph 624.

625. Samsung denies the allegations of Paragraph 625.

626. Samsung denies the allegations of Paragraph 626.

627. Samsung denies the allegations of Paragraph 627.

628. Samsung denies the allegations of Paragraph 628.

629. Samsung denies the allegations of Paragraph 629.

630. Samsung denies the allegations of Paragraph 630.

631. Samsung denies the allegations of Paragraph 631.

632. Samsung denies the allegations of Paragraph 632.

633. Samsung denies the allegations of Paragraph 633.

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634. Samsung denies the allegations of Paragraph 634.

635. Samsung denies the allegations of Paragraph 635.

636. Samsung denies the allegations of Paragraph 636.

637. Samsung denies the allegations of Paragraph 637.

638. Samsung denies the allegations of Paragraph 638.

639. Samsung denies the allegations of Paragraph 639.

640. Samsung denies the allegations of Paragraph 640.

641. Samsung denies the allegations of Paragraph 641.

642. Samsung denies the allegations of Paragraph 642.

643. Samsung denies the allegations of Paragraph 643.

644. Samsung denies the allegations of Paragraph 644.

645. Samsung denies the allegations of Paragraph 645.

646. Samsung denies the allegations of Paragraph 646.

647. Samsung denies the allegations of Paragraph 647.

648. Samsung denies the allegations of Paragraph 648.

649. Samsung denies the allegations of Paragraph 649.

650. Samsung denies the allegations of Paragraph 650.

651. Samsung denies the allegations of Paragraph 651.

652. Samsung denies the allegations of Paragraph 652.

653. Samsung denies the allegations of Paragraph 653.

654. Samsung denies the allegations of Paragraph 654.

655. Samsung denies the allegations of Paragraph 655.

656. Samsung denies the allegations of Paragraph 656.

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657. Samsung denies the allegations of Paragraph 657.

658. Samsung denies the allegations of Paragraph 658.

659. Samsung denies the allegations of Paragraph 659.

660. Samsung denies the allegations of Paragraph 660.

661. Samsung denies the allegations of Paragraph 661.

662. Samsung denies the allegations of Paragraph 662.

663. Samsung denies the allegations of Paragraph 663.

664. Samsung denies the allegations of Paragraph 664.

665. Samsung denies the allegations of Paragraph 665.

666. Samsung denies the allegations of Paragraph 666.

667. Samsung denies the allegations of Paragraph 667.

668. Samsung denies the allegations of Paragraph 668.

669. Samsung denies the allegations of Paragraph 669.

670. Samsung denies the allegations of Paragraph 670.

671. Samsung denies the allegations of Paragraph 671.

672. Samsung denies the allegations of Paragraph 672.

673. Samsung denies the allegations of Paragraph 673.

674. Samsung denies the allegations of Paragraph 674.

L. Samsung Electronics America, Inc.'s Vicarious Liability

675. Samsung denies the allegations of Paragraph 675.

676. Samsung denies the allegations of Paragraph 676.

677. Samsung denies the allegations of Paragraph 677.

678. Samsung denies the allegations of Paragraph 678.

679. Samsung denies the allegations of Paragraph 679.

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680. Samsung denies the allegations of Paragraph 680.

681. Samsung denies the allegations of Paragraph 681.

682. Samsung denies the allegations of Paragraph 682.

683. Samsung denies the allegations of Paragraph 683.

684. Samsung denies the allegations of Paragraph 684.

685. Samsung denies the allegations of Paragraph 685.

686. Samsung denies the allegations of Paragraph 686.

687. Samsung denies the allegations of Paragraph 687.

688. Samsung denies the allegations of Paragraph 688.

689. Samsung denies the allegations of Paragraph 689.

690. Samsung denies the allegations of Paragraph 690.

691. Samsung denies the allegations of Paragraph 691.

692. Samsung denies the allegations of Paragraph 692.

693. Samsung denies the allegations of Paragraph 693.

694. Samsung denies the allegations of Paragraph 694.

695. Samsung denies the allegations of Paragraph 695.

696. Samsung denies the allegations of Paragraph 696.

697. Samsung denies the allegations of Paragraph 697.

698. Samsung denies the allegations of Paragraph 698.

699. Samsung denies the allegations of Paragraph 699.

700. Samsung denies the allegations of Paragraph 700.

701. Samsung denies the allegations of Paragraph 701.

702. Samsung denies the allegations of Paragraph 702.

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703. Samsung denies the allegations of Paragraph 703.

704. Samsung denies the allegations of Paragraph 704.

705. Samsung denies the allegations of Paragraph 705.

706. Samsung denies the allegations of Paragraph 706.

707. Samsung denies the allegations of Paragraph 707.

708. Samsung denies the allegations of Paragraph 708.

JURISDICTION AND VENUE

709. Samsung repeats, realleges, and incorporates by reference, as fully set forth herein, its responses to the allegations set forth in the previous sections into the following section. To the extent that Radian sets forth any new allegations in Paragraph 709, Samsung denies the allegations.

710. Samsung admits that Radian's claims purport to be claims for patent infringement arising under the Patent Laws of the United States of America, 35 U.S.C. & 1, et seq. Except as expressly admitted, Samsung denies any remaining allegations of this Paragraph.

711. Samsung admits that this Court has subject matter jurisdiction over actions arising under 28 U.S.C. §§ 1331 and 1338(a). Except as expressly admitted, Samsung denies any remaining allegations in Paragraph 711.

712. Samsung, solely for the purposes of the present litigation, do not contest that the Court has personal jurisdiction over SEC and SEA. Except as expressly admitted, Samsung denies any remaining allegations of this Paragraph.

713. Samsung admits that in *Mobile Data Technologies LLC v. Samsung Elecs. Am., Inc. et al.*, No. 2:24-cv-00435, Dkt. 26 at ¶ 7 (E.D. Tex. Oct. 7, 2024); *Four Batons Wireless, LLC v. Samsung Elecs. Co., Ltd. et al.*, No. 2:24-cv-00284, Dkt. 24 at ¶ 8 (E.D. Tex. Aug. 19, 2024); and *Cerrence Operating Co. v. Samsung Elec. Co., Ltd. et al.*, No. 2:24-cv-00181-JRG, Dkt. 25 at ¶ 8 (E.D. Tex. July 10, 2024), Samsung did not contest personal jurisdiction solely for the purposes

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of those actions. Except as expressly admitted, Samsung denies any remaining allegations of this Paragraph.

714. Samsung does not contest, for the purposes of this action only, whether personal jurisdiction properly lies in this District. Samsung specifically denies that it has committed, induced, or contributed to any acts of infringement in this District or any other district and denies all allegations of patent infringement. Samsung denies the remaining allegations of Paragraph 714.

715. Samsung does not contest, for the purposes of this action only, whether personal jurisdiction properly lies in this District. Samsung specifically denies that it has committed, induced, or contributed to any acts of infringement in this District or any other district and denies all allegations of patent infringement. Samsung denies the remaining allegations of Paragraph 715.

716. Samsung denies the allegations of Paragraph 716. Samsung specifically denies that it has committed, induced, or contributed to any acts of infringement in this District or any other district and denies all allegations of patent infringement.

717. Samsung denies the allegations of Paragraph 717. Samsung specifically denies that it has committed, induced, or contributed to any acts of infringement in this District or any other district and denies all allegations of patent infringement.

718. Samsung denies the allegations of Paragraph 718. Samsung specifically denies that it has committed, induced, or contributed to any acts of infringement in this District or any other district and denies all allegations of patent infringement.

719. Samsung denies the allegations of Paragraph 719. Samsung specifically denies that it has committed, induced, or contributed to any acts of infringement in this District or any other district and denies all allegations of patent infringement.

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720. Samsung denies the allegations of Paragraph 720. Samsung specifically denies that it has committed, induced, or contributed to any acts of infringement in this District or any other district and denies all allegations of patent infringement.

721. Samsung, solely for the purposes of this litigation, do not contest that venue is proper in this District. Except as expressly admitted, Samsung denies any remaining allegations of this Paragraph.

722. Samsung, solely for the purposes of this litigation, do not contest that venue is proper in this District. Except as expressly admitted, Samsung denies any remaining allegations of this Paragraph.

723. Samsung admits that it maintains offices at 6625 Excellence Way, Plano, Texas 75023. Except as expressly admitted, Samsung denies any remaining allegations of this Paragraph.

724. Samsung admits that in *Four Batons Wireless, LLC v. Samsung Elecs. Co., Ltd. et al.*, No. 2:24-cv-00284, Dkt. 24 at ¶ 15 (E.D. Tex. Aug. 19, 2024) and *Cerrence Operating Co. v. Samsung Elec. Co., Ltd. et al.*, No. 2:24-cv-00181-JRG, Dkt. 25 at ¶ 9 (E.D. Tex. July 10, 2024), Samsung did not contest that venue was proper in this District solely for purposes of those actions. Except as expressly admitted, Samsung denies any remaining allegations of this Paragraph.

725. Samsung denies the allegations of Paragraph 725. Samsung specifically denies that it has committed, induced, or contributed to any acts of infringement in this District or any other district and denies all allegations of patent infringement.

726. Samsung admits that SEA employees in the Plano, Texas office are responsible for the marketing, sale, and commercialization of certain Samsung branded products that SEA sells to customers in the United States.

727. Admitted.

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728. Samsung admits that searching the term "Samsung" under the "Owner Name" field at https://www.collincad.org/propertysearch lists several addresses as purportedly associated with SEA. Except as expressly admitted, Samsung denies any remaining allegations of this Paragraph.

729. Samsung admits that searching the term "Samsung" under the "Owner Name" field at https://esearch.dentoncad.com/ lists several addresses as purportedly associated with SEA. Except as expressly admitted, Samsung denies any remaining allegations of this Paragraph.

730. Samsung admits that searching the term "Samsung" under the "Owner Name" field at https://esearch.jcad.org/ lists an address purportedly associated with SEA. Except as expressly admitted, Samsung denies any remaining allegations of this Paragraph.

731. Samsung admits that searching the term "Samsung" under the "Owner Name" field at https://www.smithcad.org/Search/PropertySearch.html lists an address purportedly associated with SEA. Except as expressly admitted, Samsung denies any remaining allegations of this Paragraph.

732. Samsung admits that searching the term "Samsung" under the "Owner Name" field at https://esearch.graysonappraisal.org/ lists an address purportedly associated with SEA. Except as expressly admitted, Samsung denies any remaining allegations of this Paragraph.

733. Samsung admits that searching the term "Samsung" under the "Owner Name" field at https://esearch.gcad.org/ lists an address purportedly associated with SEA. Except as expressly admitted, Samsung denies any remaining allegations of this Paragraph.

734. Samsung denies the allegations of Paragraph 734.

735. Samsung denies the allegations of Paragraph 735.

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COUNT ONE: INFRINGEMENT OF THE '183 PATENT

736. Samsung repeats, realleges, and incorporates by reference, as fully set forth herein, its responses to the allegations set forth in the previous sections into the following section. To the extent that Radian sets forth any new allegations in Paragraph 736, Samsung denies the allegations.

737. Samsung admits that what purports to be a copy of U.S. Patent No. 11,544,183 (the "'183 Patent") is attached to Plaintiff's Complaint as Exhibit A. Samsung admits that, on its face, the '183 patent is entitled, "Nonvolatile Memory Controller Host-Issued Address Delimited Erasure and Memory Controller Remapping of Host Address Space of Bad Blocks." The '183 patent states on its face that it issued on January 3, 2023. Samsung denies that the '183 patent was duly and legally issued.

738. Samsung is without knowledge or information sufficient to form a belief as to the truth of the allegations of Paragraph 738 and on that basis denies them.

739. Paragraph 739 alleges legal conclusions and contentions, and therefore, a response to this allegation is premature and not required. *See Cywee Group Ltd. v. Samsung Elecs. Co., Ltd.*, No. 2:17-CV-00140-JRG-RSP, Dkt. 40, at *2 (E.D. Tex. Sept. 20, 2017) ("Given our Local Patent Rules and our District's well-established process for identifying and resolving claim-construction issues, the interest of justice do not require Samsung to make an unconditional admission or denial as to specific claim limitations this early. The construction of all or part of those limitations might be disputed, in which case [plaintiff's] concerns would be best raised after the Court resolves any such disputes."). To the extent a response is required, Samsung denies the allegations in Paragraph 739.

740. Samsung is without knowledge or information sufficient to form a belief as to the truth of the allegations of Paragraph 740 and on that basis denies them.

741. Samsung is without knowledge or information sufficient to form a belief as to the truth of the allegations of Paragraph 741 and on that basis denies them.

742. To the extent that the allegations in Paragraph 742 purports to characterize the Asserted Patents as novel, Samsung denies that characterization. Samsung is without knowledge or information sufficient to form a belief as to the truth of the allegations of Paragraph 742 and on that basis denies them.

743. To the extent that the allegations in Paragraph 743 purports to characterize the Asserted Patents as novel or innovative, Samsung denies that characterization. Samsung is without knowledge or information sufficient to form a belief as to the truth of the allegations of Paragraph 743 and on that basis denies them.

744. Samsung denies the allegations of Paragraph 744.

745. Admitted.

746. Samsung denies the allegations of Paragraph 746.

747. Samsung denies the allegations of Paragraph 747.

748. Samsung denies the allegations of Paragraph 748.

749. Samsung denies the allegations of Paragraph 749.

750. Samsung is without knowledge or information sufficient to form a belief as to the truth of the allegations of Paragraph 750 and on that basis denies them. Samsung specifically denies that it has committed, induced, or contributed to any acts of infringement in this District or any other district and denies all allegations of patent infringement.

751. Samsung denies the allegations of Paragraph 751.

752. Samsung denies the allegations of Paragraph 752.

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753. Samsung admits that Exhibit Q, which purports to be a "Samsung PM1733 Product Brief", includes the captured image. Except as expressly admitted, Samsung denies any remaining allegations of this Paragraph. Samsung specifically denies that it has committed, induced, or contributed to any acts of infringement in this District or any other district and denies all allegations of patent infringement.

754. Samsung denies the allegations of Paragraph 754.

755. Samsung denies the allegations of Paragraph 755.

756. Samsung denies the allegations of Paragraph 756.

757. Samsung admits that Exhibit Q, which purports to be a "Samsung PM1733 Product Brief", includes the captured image. Except as expressly admitted, Samsung denies any remaining allegations of this Paragraph. Samsung specifically denies that it has committed, induced, or contributed to any acts of infringement in this District or any other district and denies all allegations of patent infringement.

758. Samsung denies the allegations of Paragraph 758.

759. Samsung admits that Exhibit Q, which purports to be a "Samsung PM1733 Product Brief", includes the captured image. Except as expressly admitted, Samsung denies any remaining allegations of this Paragraph. Samsung specifically denies that it has committed, induced, or contributed to any acts of infringement in this District or any other district and denies all allegations of patent infringement.

760. Samsung denies the allegations of Paragraph 760.

761. Samsung denies the allegations of Paragraph 761.

762. Samsung denies the allegations of Paragraph 762.

763. Samsung denies the allegations of Paragraph 763.

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764. Samsung admits that the "NVM Express Command Set Specifications Revision 1.1" states, "The Write command writes data and metadata, if applicable, to the I/O controller for the logical blocks indicated. The host may also specify protection information to include as part of the operation." Except as expressly admitted, Samsung denies any remaining allegations of this Paragraph.

765. Samsung admits that the "NVM Express Command Set Specifications Revision 1.1" states, "The Write command writes data and metadata, if applicable, to the I/O controller for the logical blocks indicated. The host may also specify protection information to include as part of the operation." Except as expressly admitted, Samsung denies any remaining allegations of this Paragraph.

766. Samsung admits that the "NVM Express Zoned Namespace Command Set Specification Revision 1.1" states, "All Zoned Namespace Command Set Commands use the Namespace Identifier (NSID) field." Except as expressly admitted, Samsung denies any remaining allegations of this Paragraph.

767. Samsung admits that the "NVM Express Zoned Namespace Command Set Specification Revision 1.1," refers the "Write" command to "NVM Command Set Specification" 3.3.7. Except as expressly admitted, Samsung denies any remaining allegations of this Paragraph.

768. Samsung admits that the "NVM Express Zoned Namespace Command Set Specification Revision 1.1" states, "A namespace is a collection of NVM and is defined in the NVMe Base Specification and in the NVM Command Set Specification, as modified by this specification. A zoned namespace is a namespace that is associated with the Zoned Namespace Command Set. A zoned namespace is divided into a set of equally-sized zones, which are contiguous non-overlapping ranges of logical block addresses. Figure 2 shows a zoned namespace

with x zones and z LBAs where LBA 0 is the lowest LBA of zone 0, LBA z-1 is the highest LBA of zone x-1, and for Zone 1, m is the lowest LBA and n-1 is its highest LBA." Except as expressly admitted, Samsung denies any remaining allegations of this Paragraph.

769. Samsung denies the allegations of Paragraph 769.

770. Samsung admits that the "NVM Express Zoned Namespace Command Set Specification Revision 1.1" states, "The Zone Append command writes data and metadata, if applicable, to the I/O controller for the zone indicated by the ZSLBA field." Except as expressly admitted, Samsung denies any remaining allegations of this Paragraph.

771. Samsung admits that the "NVM Express Zoned Namespace Command Set Specification Revision 1.1" lists "Opcodes for Zoned Namespace Command Set I/I Commands." Except as expressly admitted, Samsung denies any remaining allegations of this Paragraph.

772. Samsung admits that the "NVM Express Zoned Namespace Command Set Specification Revision 1.1" states, "The Zone Append command writes data and metadata, if applicable, to the I/O controller for the zone indicated by the ZSLBA field. The controller assigns the data and metadata, if applicable, to a set of logical blocks within the zone. The lowest LBA of the set of logical blocks written is returned in the completion queue entry (refer to section 3.4.1.2). The host may also specify protection information to include as part of the operation. This command uses Command Dword 2, Command Dword 3, Command Dword 10, Command Dword 11, Command Dword 12, Command Dword 13, Command Dword 14, and Command Dword 15 fields. If the command uses PRPs for the data transfer, then the Metadata Pointer, PRP Entry 1, and PRP Entry 2 fields are used. If the command uses SGLs for the data transfer, then the Metadata SGL Segment Pointer and SGL Entry 1 fields are used. All other command specific fields are reserved." Except as expressly admitted, Samsung denies any remaining allegations of this Paragraph.

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773. Samsung denies the allegations of Paragraph 773.

774. Samsung denies the allegations of Paragraph 774.

775. Samsung denies the allegations of Paragraph 775.

776. Samsung denies the allegations of Paragraph 776.

777. Samsung denies the allegations of Paragraph 777.

778. Samsung admits that the "NVM Express Zoned Namespace Command Set Specification Revision 1.1" states, "The Zone Management Send command requests an action on one or more zones. The command uses the Data Pointer, Command Dword 10, Command Dword 11, and Command Dword 13 fields. All other command specific fields are reserved." Except as expressly admitted, Samsung denies any remaining allegations of this Paragraph.

779. Samsung admits that the "NVM Express Zoned Namespace Command Set Specification Revision 1.1" states, "Starting LBA (SLBA): This field specifies the lowest LBA of the zone on which the Zone Send Action is performed." Except as expressly admitted, Samsung denies any remaining allegations of this Paragraph.

780. Samsung denies the allegations of Paragraph 780.

781. Samsung denies the allegations of Paragraph 781.

782. Samsung denies the allegations of Paragraph 782.

783. Samsung denies the allegations of Paragraph 783.

784. Samsung denies the allegations of Paragraph 784.

785. Samsung denies the allegations of Paragraph 785.

786. Samsung denies the allegations of Paragraph 786.

787. Samsung denies the allegations of Paragraph 787.

788. Samsung denies the allegations of Paragraph 788.

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789. Samsung denies the allegations of Paragraph 789.

790. Samsung denies the allegations of Paragraph 790.

791. Samsung denies the allegations of Paragraph 791.

792. Samsung denies the allegations of Paragraph 792.

793. Samsung denies the allegations of Paragraph 793.

794. Samsung denies the allegations of Paragraph 794.

795. Samsung denies the allegations of Paragraph 795.

796. Samsung denies the allegations of Paragraph 796.

797. Samsung denies the allegations of Paragraph 797.

798. Samsung denies the allegations of Paragraph 798.

799. Samsung denies the allegations of Paragraph 799.

800. Samsung denies the allegations of Paragraph 800.

801. Samsung denies the allegations of Paragraph 801.

802. Samsung denies the allegations of Paragraph 802.

803. Samsung denies the allegations of Paragraph 803.

804. Samsung denies the allegations of Paragraph 804.

805. Samsung denies the allegations of Paragraph 805.

806. Samsung denies the allegations of Paragraph 806.

807. Samsung denies the allegations of Paragraph 807.

808. Samsung denies the allegations of Paragraph 808.

809. Samsung denies the allegations of Paragraph 809.

810. Samsung admits that SEC was aware of Radian's Asserted Patent and infringement allegations at least as of when the Complaint was served on SEC. Samsung specifically denies that

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it has committed, induced, or contributed to any acts of infringement in this District or any other district and denies all allegations of patent infringement.

811. Samsung denies the allegations of Paragraph 811.

812. Samsung denies the allegations of Paragraph 812.

813. Samsung denies the allegations of Paragraph 813.

814. Samsung denies the allegations of Paragraph 814.

815. Samsung denies the allegations of Paragraph 815.

816. Samsung admits that SEA was aware of Radian's Asserted Patent and infringement allegations at least as of when the Complaint was served on SEA. Samsung specifically denies that it has committed, induced, or contributed to any acts of infringement in this District or any other district and denies all allegations of patent infringement.

817. Samsung denies the allegations of Paragraph 817.

818. Samsung denies the allegations of Paragraph 818.

819. Samsung denies the allegations of Paragraph 819.

820. Samsung denies the allegations of Paragraph 820.

821. Samsung denies the allegations of Paragraph 821.

822. Samsung denies the allegations of Paragraph 822.

823. Samsung denies the allegations of Paragraph 823.

824. Samsung denies the allegations of Paragraph 824.

825. Samsung denies the allegations of Paragraph 825.

826. Samsung denies the allegations of Paragraph 826.

827. Samsung denies the allegations of Paragraph 827.

828. Samsung denies the allegations of Paragraph 828.

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829. Paragraph 829 alleges legal conclusions and contentions, and therefore, a response to this allegation is premature and not required. *See Cywee Group Ltd. v. Samsung Elecs. Co., Ltd.*, No. 2:17-CV-00140-JRG-RSP, Dkt. 40, at *2 (E.D. Tex. Sept. 20, 2017) ("Given our Local Patent Rules and our District's well-established process for identifying and resolving claim-construction issues, the interest of justice do not require Samsung to make an unconditional admission or denial as to specific claim limitations this early. The construction of all or part of those limitations might be disputed, in which case [plaintiff's] concerns would be best raised after the Court resolves any such disputes."). Samsung is without knowledge or information sufficient to form a belief as to the truth of the allegations of Paragraph 829 and on that basis denies them. Samsung specifically denies that it has committed, induced, or contributed to any acts of infringement in this District or any other district and denies all allegations of patent infringement.

830. Paragraph 830 alleges legal conclusions and contentions, and therefore, a response to this allegation is premature and not required. *See Cywee Group Ltd. v. Samsung Elecs. Co., Ltd.*, No. 2:17-CV-00140-JRG-RSP, Dkt. 40, at *2 (E.D. Tex. Sept. 20, 2017) ("Given our Local Patent Rules and our District's well-established process for identifying and resolving claim-construction issues, the interest of justice do not require Samsung to make an unconditional admission or denial as to specific claim limitations this early. The construction of all or part of those limitations might be disputed, in which case [plaintiff's] concerns would be best raised after the Court resolves any such disputes."). Samsung is without knowledge or information sufficient to form a belief as to the truth of the allegations of Paragraph 830 and on that basis denies them. Samsung specifically denies that it has committed, induced, or contributed to any acts of infringement in this District or any other district and denies all allegations of patent infringement.

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831. Paragraph 831 alleges legal conclusions and contentions, and therefore, a response to this allegation is premature and not required. *See Cywee Group Ltd. v. Samsung Elecs. Co., Ltd.*, No. 2:17-CV-00140-JRG-RSP, Dkt. 40, at *2 (E.D. Tex. Sept. 20, 2017) ("Given our Local Patent Rules and our District's well-established process for identifying and resolving claim-construction issues, the interest of justice do not require Samsung to make an unconditional admission or denial as to specific claim limitations this early. The construction of all or part of those limitations might be disputed, in which case [plaintiff's] concerns would be best raised after the Court resolves any such disputes."). Samsung is without knowledge or information sufficient to form a belief as to the truth of the allegations of Paragraph 831 and on that basis denies them. Samsung specifically denies that it has committed, induced, or contributed to any acts of infringement in this District or any other district and denies all allegations of patent infringement.

832. Samsung denies the allegations of Paragraph 832.

833. Samsung denies the allegations of Paragraph 833.

COUNT TWO: INFRINGEMENT OF THE '772 PATENT

834. Samsung repeats, realleges, and incorporates by reference, as fully set forth herein, its responses to the allegations set forth in the previous sections into the following section. To the extent that Radian sets forth any new allegations in Paragraph 834, Samsung denies the allegations.

835. Samsung admits that what purports to be a copy of U.S. Patent No. 11,709,772 (the "'772 Patent") is attached to Plaintiff's Complaint as Exhibit B. Samsung admits that, on its face, the '772 patent is entitled, "Storage System with Multiplane Segments and Cooperative Flash Management." The '772 patent states on its face that it issued on July 25, 2023. Samsung denies that the '772 patent was duly and legally issued.

836. Samsung is without knowledge or information sufficient to form a belief as to the truth of the allegations of Paragraph 836 and on that basis denies them.

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837. Paragraph 837 alleges legal conclusions and contentions, and therefore, a response to this allegation is premature and not required. *See Cywee Group Ltd. v. Samsung Elecs. Co., Ltd.*, No. 2:17-CV-00140-JRG-RSP, Dkt. 40, at *2 (E.D. Tex. Sept. 20, 2017) ("Given our Local Patent Rules and our District's well-established process for identifying and resolving claim-construction issues, the interest of justice do not require Samsung to make an unconditional admission or denial as to specific claim limitations this early. The construction of all or part of those limitations might be disputed, in which case [plaintiff's] concerns would be best raised after the Court resolves any such disputes."). To the extent a response is required, Samsung denies the allegations of Paragraph 837.

838. Samsung is without knowledge or information sufficient to form a belief as to the truth of the allegations of Paragraph 838 and on that basis denies them.

839. To the extent that the allegations in Paragraph 839 purports to characterize the Asserted Patents as novel or innovative, Samsung denies that characterization. Samsung is without knowledge or information sufficient to form a belief as to the truth of the allegations of Paragraph 839 and on that basis denies them.

840. To the extent that the allegations in Paragraph 840 purports to characterize the Asserted Patents as novel or innovative, Samsung denies that characterization. Samsung is without knowledge or information sufficient to form a belief as to the truth of the allegations of Paragraph 840 and on that basis denies them.

841. To the extent that the allegations in Paragraph 841 purports to characterize the Asserted Patents as novel or innovative, Samsung denies that characterization. Samsung is without knowledge or information sufficient to form a belief as to the truth of the allegations of Paragraph 841 and on that basis denies them.

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842. Samsung denies the allegations of Paragraph 842.

843. Admitted.

844. Samsung denies the allegations of Paragraph 844.

845. Samsung denies the allegations of Paragraph 845.

846. Samsung denies the allegations of Paragraph 846.

847. Samsung denies the allegations of Paragraph 847.

848. Samsung is without knowledge or information sufficient to form a belief as to the truth of the allegations of Paragraph 848 and on that basis denies them. Samsung specifically denies that it has committed, induced, or contributed to any acts of infringement in this District or any other district and denies all allegations of patent infringement.

849. Samsung denies the allegations of Paragraph 849.

850. Samsung denies the allegations of Paragraph 850.

851. Samsung admits that Exhibit Q, which purports to be a "Samsung PM1733 Product Brief", includes the captured image. Except as expressly admitted, Samsung denies any remaining allegations of this Paragraph. Samsung specifically denies that it has committed, induced, or contributed to any acts of infringement in this District or any other district and denies all allegations of patent infringement.

852. Samsung denies the allegations of Paragraph 852.

853. Samsung admits that Exhibit Q, which purports to be a "Samsung PM1733 Product Brief", includes the captured image. Except as expressly admitted, Samsung denies any remaining allegations of this Paragraph. Samsung specifically denies that it has committed, induced, or contributed to any acts of infringement in this District or any other district and denies all allegations of patent infringement.

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854. Samsung denies the allegations of Paragraph 854.

855. Samsung admits that Exhibit Q, which purports to be a "Samsung PM1733 Product Brief", includes the captured image. Except as expressly admitted, Samsung denies any remaining allegations of this Paragraph. Samsung specifically denies that it has committed, induced, or contributed to any acts of infringement in this District or any other district and denies all allegations of patent infringement.

856. Samsung denies the allegations of Paragraph 856.

857. Samsung admits that the document entitled "Samsung Solid State Drive White Paper" states, "Before we can understand the various maintenance algorithms that the controller employs to keep your SSD neat and tidy, we need to understand a few basics about how we read and write data to a NAND chip. Data is stored in a unit called a 'page,' which is finite in size and can only be written to when it is empty. Therefore, in order to write to a page that already contains data, it must first be erased. This would be a simple process, except each page belongs to a group of pages collectively known as a 'block.' While data is written in pages, it can only be erased in blocks." Except as expressly admitted, Samsung denies any remaining allegations of this Paragraph.

858. Samsung denies the allegations of Paragraph 858.

859. Samsung denies the allegations of Paragraph 859.

860. Samsung denies the allegations of Paragraph 860.

861. Samsung denies the allegations of Paragraph 861.

862. Samsung denies the allegations of Paragraph 862.

863. Samsung denies the allegations of Paragraph 863.

864. Samsung denies the allegations of Paragraph 864.

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865. Samsung denies the allegations of Paragraph 865.

866. Samsung admits that the "NVM Express Zoned Namespace Command Set Specification Revision 1.1" states, "A zoned namespace is a namespace that is associated with the Zoned Namespace Command Set. A zoned namespace is divided into a set of equally-sized zones, which are contiguous non-overlapping ranges of logical block addresses." Except as expressly admitted, Samsung denies any remaining allegations of this Paragraph.

867. Samsung denies the allegations of Paragraph 867.

868. Samsung denies the allegations of Paragraph 868.

869. Samsung denies the allegations of Paragraph 869.

870. Samsung denies the allegations of Paragraph 870.

871. Samsung denies the allegations of Paragraph 871.

872. Samsung denies the allegations of Paragraph 872.

873. Samsung denies the allegations of Paragraph 873.

874. Samsung admits that the "NVM Express Zoned Namespace Command Set Specification Revision 1.1" states, "Reset Zone Recommended: A controller that schedules an internal operation (e.g., background operation on the non-volatile media) on a zone that is in the ZSF:Full state may notify host software to initiate a zone reset operation." Except as expressly admitted, Samsung denies any remaining allegations of this Paragraph.

875. Samsung admits that the "NVM Express Zoned Namespace Command Set Specification Revision 1.1" states, "Reset Zone Recommended (RZR): If this bit is set to '1', then the controller recommends that this zone be reset." Except as expressly admitted, Samsung denies any remaining allegations of this Paragraph.

876. Samsung denies the allegations of Paragraph 876.

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877. Samsung denies the allegations of Paragraph 877.

878. Samsung denies the allegations of Paragraph 878.

879. Samsung denies the allegations of Paragraph 879.

880. Samsung denies the allegations of Paragraph 880.

881. Samsung denies the allegations of Paragraph 881.

882. Samsung denies the allegations of Paragraph 882.

883. Samsung denies the allegations of Paragraph 883.

884. Samsung denies the allegations of Paragraph 884.

885. Samsung denies the allegations of Paragraph 885.

886. Samsung denies the allegations of Paragraph 886.

887. Samsung denies the allegations of Paragraph 887.

888. Samsung denies the allegations of Paragraph 888.

889. Samsung denies the allegations of Paragraph 889.

890. Samsung denies the allegations of Paragraph 890.

891. Samsung denies the allegations of Paragraph 891.

892. Samsung denies the allegations of Paragraph 892.

893. Samsung denies the allegations of Paragraph 893.

894. Samsung denies the allegations of Paragraph 894.

895. Samsung denies the allegations of Paragraph 895.

896. Samsung denies the allegations of Paragraph 896.

897. Samsung denies the allegations of Paragraph 897.

898. Samsung denies the allegations of Paragraph 898.

899. Samsung denies the allegations of Paragraph 899.

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900. Samsung denies the allegations of Paragraph 900.

901. Samsung admits that SEC was aware of Radian's Asserted Patent and infringement allegations at least as of when the Complaint was served on SEC. Samsung specifically denies that it has committed, induced, or contributed to any acts of infringement in this District or any other district and denies all allegations of patent infringement.

902. Samsung denies the allegations of Paragraph 902.

903. Samsung denies the allegations of Paragraph 903.

904. Samsung denies the allegations of Paragraph 904.

905. Samsung denies the allegations of Paragraph 905.

906. Samsung denies the allegations of Paragraph 906.

907. Samsung admits that SEA was aware of Radian's Asserted Patent and infringement allegations at least as of when the Complaint was served on SEA. Samsung specifically denies that it has committed, induced, or contributed to any acts of infringement in this District or any other district and denies all allegations of patent infringement.

908. Samsung denies the allegations of Paragraph 908.

909. Samsung denies the allegations of Paragraph 909.

910. Samsung denies the allegations of Paragraph 910.

911. Samsung denies the allegations of Paragraph 911.

912. Samsung denies the allegations of Paragraph 912.

913. Samsung denies the allegations of Paragraph 913.

914. Samsung denies the allegations of Paragraph 914.

915. Samsung denies the allegations of Paragraph 915.

916. Samsung denies the allegations of Paragraph 916.

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917. Samsung denies the allegations of Paragraph 917.

918. Samsung denies the allegations of Paragraph 918.

919. Samsung denies the allegations of Paragraph 919.

920. Paragraph 920 alleges legal conclusions and contentions, and therefore, a response to this allegation is premature and not required. *See Cywee Group Ltd. v. Samsung Elecs. Co., Ltd.*, No. 2:17-CV-00140-JRG-RSP, Dkt. 40, at *2 (E.D. Tex. Sept. 20, 2017) ("Given our Local Patent Rules and our District's well-established process for identifying and resolving claim-construction issues, the interest of justice do not require Samsung to make an unconditional admission or denial as to specific claim limitations this early. The construction of all or part of those limitations might be disputed, in which case [plaintiff's] concerns would be best raised after the Court resolves any such disputes."). Samsung is without knowledge or information sufficient to form a belief as to the truth of the allegations of Paragraph 920 and on that basis denies them. Samsung specifically denies that it has committed, induced, or contributed to any acts of infringement in this District or any other district and denies all allegations of patent infringement.

921. Paragraph 921 alleges legal conclusions and contentions, and therefore, a response to this allegation is premature and not required. *See Cywee Group Ltd. v. Samsung Elecs. Co., Ltd.*, No. 2:17-CV-00140-JRG-RSP, Dkt. 40, at *2 (E.D. Tex. Sept. 20, 2017) ("Given our Local Patent Rules and our District's well-established process for identifying and resolving claim-construction issues, the interest of justice do not require Samsung to make an unconditional admission or denial as to specific claim limitations this early. The construction of all or part of those limitations might be disputed, in which case [plaintiff's] concerns would be best raised after the Court resolves any such disputes."). Samsung is without knowledge or information sufficient to form a belief as to the truth of the allegations of Paragraph 921 and on that basis denies them. Samsung specifically

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denies that it has committed, induced, or contributed to any acts of infringement in this District or any other district and denies all allegations of patent infringement.

922. Paragraph 922 alleges legal conclusions and contentions, and therefore, a response to this allegation is premature and not required. *See Cywee Group Ltd. v. Samsung Elecs. Co., Ltd.*, No. 2:17-CV-00140-JRG-RSP, Dkt. 40, at *2 (E.D. Tex. Sept. 20, 2017) ("Given our Local Patent Rules and our District's well-established process for identifying and resolving claim-construction issues, the interest of justice do not require Samsung to make an unconditional admission or denial as to specific claim limitations this early. The construction of all or part of those limitations might be disputed, in which case [plaintiff's] concerns would be best raised after the Court resolves any such disputes."). Samsung is without knowledge or information sufficient to form a belief as to the truth of the allegations of Paragraph 922 and on that basis denies them. Samsung specifically denies that it has committed, induced, or contributed to any acts of infringement in this District or any other district and denies all allegations of patent infringement.

923. Samsung denies the allegations of Paragraph 923.

924. Samsung denies the allegations of Paragraph 924.

COUNT THREE: INFRINGEMENT OF THE '614 PATENT

925. Samsung repeats, realleges, and incorporates by reference, as fully set forth herein, its responses to the allegations set forth in the previous sections into the following section. To the extent that Radian sets forth any new allegations in Paragraph 925, Samsung denies the allegations.

926. Samsung admits that what purports to be a copy of U.S. Patent No. 11,681,614 (the "'614 Patent") is attached to Plaintiff's Complaint as Exhibit C. Samsung admits that, on its face, the '614 patent is entitled, "Storage Device with Subdivisions, Subdivision Query, and Write Operations." The '614 patent states on its face that it issued on June 20, 2023. Samsung denies that the '614 patent was duly and legally issued.

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927. Samsung is without knowledge or information sufficient to form a belief as to the truth of the allegations of Paragraph 927 and on that basis denies them.

928. Paragraph 928 alleges legal conclusions and contentions, and therefore, a response to this allegation is premature and not required. *See Cywee Group Ltd. v. Samsung Elecs. Co., Ltd.*, No. 2:17-CV-00140-JRG-RSP, Dkt. 40, at *2 (E.D. Tex. Sept. 20, 2017) ("Given our Local Patent Rules and our District's well-established process for identifying and resolving claim-construction issues, the interest of justice do not require Samsung to make an unconditional admission or denial as to specific claim limitations this early. The construction of all or part of those limitations might be disputed, in which case [plaintiff's] concerns would be best raised after the Court resolves any such disputes."). To the extent a response is required, Samsung denies the allegations in Paragraph 928.

929. Samsung is without knowledge or information sufficient to form a belief as to the truth of the allegations of Paragraph 929 and on that basis denies them.

930. To the extent that the allegations in Paragraph 930 purports to characterize the Asserted Patents as novel or innovative, Samsung denies that characterization. Samsung is without knowledge or information sufficient to form a belief as to the truth of the allegations of Paragraph 841 and on that basis denies them.

931. To the extent that the allegations in Paragraph 931 purports to characterize the Asserted Patents as novel or innovative, Samsung denies that characterization. Samsung is without knowledge or information sufficient to form a belief as to the truth of the allegations of Paragraph 931 and on that basis denies them.

932. To the extent that the allegations in Paragraph 932 purports to characterize the Asserted Patents as novel or innovative, Samsung denies that characterization. Samsung is without

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knowledge or information sufficient to form a belief as to the truth of the allegations of Paragraph 841 and on that basis denies them.

933. Samsung denies the allegations of Paragraph 933.

934. Admitted.

935. Samsung denies the allegations of Paragraph 935.

936. Samsung denies the allegations of Paragraph 936.

937. Samsung denies the allegations of Paragraph 937.

938. Samsung denies the allegations of Paragraph 938.

939. Samsung is without knowledge or information sufficient to form a belief as to the truth of the allegations of Paragraph 939 and on that basis denies them. Samsung specifically denies that it has committed, induced, or contributed to any acts of infringement in this District or any other district and denies all allegations of patent infringement.

940. Samsung denies the allegations of Paragraph 940.

941. Samsung denies the allegations of Paragraph 941.

942. Samsung denies the allegations of Paragraph 942.

943. Samsung admits that Exhibit Q, which purports to be a "Samsung PM1733 Product Brief", includes the captured image. Except as expressly admitted, Samsung denies any remaining allegations of this Paragraph. Samsung specifically denies that it has committed, induced, or contributed to any acts of infringement in this District or any other district and denies all allegations of patent infringement.

944. Samsung denies the allegations of Paragraph 944.

945. Samsung admits that a presentation entitled, "What You Can't Forget: Exploiting Parallelism for Zoned Namespaces," states, "Zone namespaces (ZNS): Merging storage interface

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. . . Divide logical address space into multiple zones." Except as expressly admitted, Samsung denies any remaining allegations of this Paragraph.

946. Samsung admits that the document entitled "Samsung Solid State Drive White Paper" states, "Before we can understand the various maintenance algorithms that the controller employs to keep your SSD neat and tidy, we need to understand a few basics about how we read and write data to a NAND chip. Data is stored in a unit called a 'page,' which is finite in size and can only be written to when it is empty. Therefore, in order to write to a page that already contains data, it must first be erased. This would be a simple process, except each page belongs to a group of pages collectively known as a 'block.' While data is written in pages, it can only be erased in blocks." Except as expressly admitted, Samsung denies any remaining allegations of this Paragraph.

947. Samsung denies the allegations of Paragraph 947.

948. Samsung admits that the "NVM Express Command Set Specifications Revision 1.1" states, "A namespace is a collection of NVM and is defined in the NVMe Base Specification and in the NVM Command Set Specification, as modified by this specification. A zoned namespace is a namespace that is associated with the Zoned Namespace Command Set. A zoned namespace is divided into a set of equally-sized zones, which are contiguous non-overlapping ranges of logical block addresses. Figure 2 shows a zoned namespace with x zones and z LBAs where LBA 0 is the lowest LBA of zone 0, LBA z-1 is the highest LBA of zone x-1, and for Zone 1, m is the lowest LBA and n-1 is its highest LBA." Except as expressly admitted, Samsung denies any remaining allegations of this Paragraph.

949. Samsung denies the allegations of Paragraph 949.

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950. Samsung admits that the "NVM Express Command Set Specifications Revision 1.1" states, "A namespace is a collection of NVM and is defined in the NVMe Base Specification and in the NVM Command Set Specification, as modified by this specification. A zoned namespace is a namespace that is associated with the Zoned Namespace Command Set. A zoned namespace is divided into a set of equally-sized zones, which are contiguous non-overlapping ranges of logical block addresses. Figure 2 shows a zoned namespace with x zones and z LBAs where LBA 0 is the lowest LBA of zone 0, LBA z-1 is the highest LBA of zone x-1, and for Zone 1, m is the lowest LBA and n-1 is its highest LBA." Except as expressly admitted, Samsung denies any remaining allegations of this Paragraph.

951. Samsung denies the allegations of Paragraph 951.

952. Samsung denies the allegations of Paragraph 952.

953. Samsung admits that the "NVM Express Command Set Specifications Revision 1.1" states, "Transition ZSIO:ZSF: The zone shall transition from the ZSIO:Implicitly Opened state to the ZSF:Full state: a) as a result of successful completion of a Zone Management Send command with a Zone Send Action of Finish Zone; b) as a result of successful completion of a write operation that writes one or more logical blocks that causes the zone to reach its writeable zone capacity; c) due to a Zone Active Excursion (refer to section 5.6); and d) as a result of the zoned namespace becomes write protected (refer to the Namespace Write Protection section in the NVMe Base Specification)." Except as expressly admitted, Samsung denies any remaining allegations of this Paragraph.

954. Samsung denies the allegations of Paragraph 954.

955. Samsung admits that the "NVM Express Command Set Specifications Revision 1.1" states, "Figure 5 shows an example of a zone in the ZSE:Empty state. LBA m is the ZSLBA

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attribute, the write pointer indicates ZSLBA, and n-1 is the highest LBA of the zone." Except as expressly admitted, Samsung denies any remaining allegations of this Paragraph.

956. Samsung denies the allegations of Paragraph 956.

957. Samsung denies the allegations of Paragraph 957.

958. Samsung denies the allegations of Paragraph 958.

959. Samsung admits that the "NVM Express Command Set Specifications Revision 1.1" states, "The Zone Management Receive command returns a data buffer that contains information about zones. That information includes characteristics of the zone, the state of the zone, the capacity of the zone, and other information defined in section 3.4.2.2. The host uses this command to determine the current settings for this information. If this information changes (e.g., as indicated by the Capacity Changed bit set to '1' in the completion queue entry of a Zone Management Send command, or by a Zone Descriptor Changed event), then the host may use this command to determine the current state of this information (e.g., the current capacity of the zone or the Reset Zone Recommended attribute). The Zone Management Receive command uses the Data Pointer, Command Dword 10, Command Dword 11, Command Dword 12, and Command Dword 13 fields. All other command specific fields are reserved." Except as expressly admitted, Samsung denies any remaining allegations of this Paragraph.

960. Samsung admits that the "NVM Express Command Set Specifications Revision 1.1" states, "The following commands may be used to write to logical blocks in a specific zone of zone type Sequential Write Required: • Write command; • Write Zeroes command; • Write Uncorrectable command; • Copy command; and • Zone Append command. A write pointer is maintained for each zone in the zoned namespace that indicates the next writeable logical block

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address in that zone. The write pointer is valid for a subset of the zone states as defined in Figure 4." Except as expressly admitted, Samsung denies any remaining allegations of this Paragraph.

961. Samsung denies the allegations of Paragraph 961.

962. Samsung denies the allegations of Paragraph 962.

963. Samsung denies the allegations of Paragraph 963.

964. Samsung denies the allegations of Paragraph 964.

965. Samsung denies the allegations of Paragraph 965.

966. Samsung denies the allegations of Paragraph 966.

967. Samsung denies the allegations of Paragraph 967.

968. Samsung denies the allegations of Paragraph 968.

969. Samsung denies the allegations of Paragraph 969.

970. Samsung denies the allegations of Paragraph 970.

971. Samsung denies the allegations of Paragraph 971.

972. Samsung denies the allegations of Paragraph 972.

973. Samsung denies the allegations of Paragraph 973.

974. Samsung denies the allegations of Paragraph 974.

975. Samsung denies the allegations of Paragraph 975.

976. Samsung denies the allegations of Paragraph 976.

977. Samsung denies the allegations of Paragraph 977.

978. Samsung denies the allegations of Paragraph 978.

979. Samsung denies the allegations of Paragraph 979.

980. Samsung denies the allegations of Paragraph 980.

981. Samsung denies the allegations of Paragraph 981.

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982. Samsung denies the allegations of Paragraph 982.

983. Samsung denies the allegations of Paragraph 983.

984. Samsung denies the allegations of Paragraph 984.

985. Samsung denies the allegations of Paragraph 985.

986. Samsung denies the allegations of Paragraph 986.

987. Samsung denies the allegations of Paragraph 987.

988. Samsung denies the allegations of Paragraph 988.

989. Samsung denies the allegations of Paragraph 989.

990. Samsung denies the allegations of Paragraph 990.

991. Samsung denies the allegations of Paragraph 991.

992. Samsung denies the allegations of Paragraph 992.

993. Samsung admits that SEC was aware of Radian's Asserted Patent and infringement allegations at least as of when the Complaint was served on SEC. Samsung specifically denies that it has committed, induced, or contributed to any acts of infringement in this District or any other district and denies all allegations of patent infringement.

994. Samsung denies the allegations of Paragraph 994.

995. Samsung denies the allegations of Paragraph 995.

996. Samsung denies the allegations of Paragraph 996.

997. Samsung denies the allegations of Paragraph 997.

998. Samsung denies the allegations of Paragraph 998.

999. Samsung admits that SEA was aware of Radian's Asserted Patent and infringement allegations at least as of when the Complaint was served on SEA. Samsung specifically denies that

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it has committed, induced, or contributed to any acts of infringement in this District or any other district and denies all allegations of patent infringement.

1000. Samsung denies the allegations of Paragraph 1000.

1001. Samsung denies the allegations of Paragraph 1001.

1002. Samsung denies the allegations of Paragraph 1002.

1003. Samsung denies the allegations of Paragraph 1003.

1004. Samsung denies the allegations of Paragraph 1004.

1005. Samsung denies the allegations of Paragraph 1005.

1006. Samsung denies the allegations of Paragraph 1006.

1007. Samsung denies the allegations of Paragraph 1007.

1008. Samsung denies the allegations of Paragraph 1008.

1009. Samsung denies the allegations of Paragraph 1009.

1010. Samsung denies the allegations of Paragraph 1010.

1011. Samsung denies the allegations of Paragraph 1011.

1012. Paragraph 1012 alleges legal conclusions and contentions, and therefore, a response to this allegation is premature and not required. *See Cywee Group Ltd. v. Samsung Elecs. Co., Ltd.*, No. 2:17-CV-00140-JRG-RSP, Dkt. 40, at *2 (E.D. Tex. Sept. 20, 2017) ("Given our Local Patent Rules and our District's well-established process for identifying and resolving claim-construction issues, the interest of justice do not require Samsung to make an unconditional admission or denial as to specific claim limitations this early. The construction of all or part of those limitations might be disputed, in which case [plaintiff's] concerns would be best raised after the Court resolves any such disputes."). Samsung is without knowledge or information sufficient to form a belief as to the truth of the allegations of Paragraph 1012 and on that basis denies them. Samsung specifically

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denies that it has committed, induced, or contributed to any acts of infringement in this District or any other district and denies all allegations of patent infringement.

1013. Paragraph 1013 alleges legal conclusions and contentions, and therefore, a response to this allegation is premature and not required. *See Cywee Group Ltd. v. Samsung Elecs. Co., Ltd.*, No. 2:17-CV-00140-JRG-RSP, Dkt. 40, at *2 (E.D. Tex. Sept. 20, 2017) ("Given our Local Patent Rules and our District's well-established process for identifying and resolving claim-construction issues, the interest of justice do not require Samsung to make an unconditional admission or denial as to specific claim limitations this early. The construction of all or part of those limitations might be disputed, in which case [plaintiff's] concerns would be best raised after the Court resolves any such disputes."). Samsung is without knowledge or information sufficient to form a belief as to the truth of the allegations of Paragraph 1013 and on that basis denies them. Samsung specifically denies that it has committed, induced, or contributed to any acts of infringement in this District or any other district and denies all allegations of patent infringement.

1014. Paragraph 1014 alleges legal conclusions and contentions, and therefore, a response to this allegation is premature and not required. *See Cywee Group Ltd. v. Samsung Elecs. Co., Ltd.*, No. 2:17-CV-00140-JRG-RSP, Dkt. 40, at *2 (E.D. Tex. Sept. 20, 2017) ("Given our Local Patent Rules and our District's well-established process for identifying and resolving claim-construction issues, the interest of justice do not require Samsung to make an unconditional admission or denial as to specific claim limitations this early. The construction of all or part of those limitations might be disputed, in which case [plaintiff's] concerns would be best raised after the Court resolves any such disputes."). Samsung is without knowledge or information sufficient to form a belief as to the truth of the allegations of Paragraph 1014 and on that basis denies them. Samsung specifically

denies that it has committed, induced, or contributed to any acts of infringement in this District or any other district and denies all allegations of patent infringement.

1015. Samsung denies the allegations of Paragraph 1015.

1016. Samsung denies the allegations of Paragraph 1016.

COUNT FOUR: INFRINGEMENT OF THE '801 PATENT

1017. Samsung repeats, realleges, and incorporates by reference, as fully set forth herein, its responses to the allegations set forth in the previous sections into the following section. To the extent that Radian sets forth any new allegations in Paragraph 1017, Samsung denies the allegations.

1018. Samsung admits that what purports to be a copy of U.S. Patent No. 11,740,801 (the "'801 Patent") is attached to Plaintiff's Complaint as Exhibit D. Samsung admits that the '801 patent states on its face field (54) "Cooperative Flash Management of Storage Device Subdivisions." The '801 patent states on its face field (45) Date of Patent: Aug. 29, 2023. The '801 patent lists on its face field (72) Inventors: Andrey V. Kuzmin, Moscow (RU); Alan Chen, Simi Valley, CA (US); Robert Lercari, Thousand Oaks, CA (US). Samsung denies that the '801 patent was duly and legally issued.

1019. Samsung is without knowledge or information sufficient to form a belief as to the truth of the allegations of Paragraph 1019 and on that basis denies them.

1020. Paragraph 1020 alleges legal conclusions and contentions, and therefore, a response to this allegation is premature and not required. *See Cywee Group Ltd. v. Samsung Elecs. Co., Ltd.*, No. 2:17-CV-00140-JRG-RSP, Dkt. 40, at *2 (E.D. Tex. Sept. 20, 2017) ("Given our Local Patent Rules and our District's well-established process for identifying and resolving claim-construction issues, the interest of justice do not require Samsung to make an unconditional admission or denial as to specific claim limitations this early. The construction of all or part of those limitations might

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be disputed, in which case [plaintiff's] concerns would be best raised after the Court resolves any such disputes."). To the extent a response is required, Samsung denies the allegations in Paragraph 1020.

1021. Samsung is without knowledge or information sufficient to form a belief as to the truth of the allegations of Paragraph 1021 and on that basis denies them.

1022. To the extent that the allegations in Paragraph 1022 purports to characterize the Asserted Patents as novel, Samsung denies that characterization. Samsung is without knowledge or information sufficient to form a belief as to the truth of the allegations of Paragraph 1022 and on that basis denies them.

1023. To the extent that the allegations in Paragraph 1023 purports to characterize the Asserted Patents as novel, Samsung denies that characterization. Samsung is without knowledge or information sufficient to form a belief as to the truth of the allegations of Paragraph 1023 and on that basis denies them.

1024. To the extent that the allegations in Paragraph 1024 purports to characterize the Asserted Patents as novel, Samsung denies that characterization. Samsung is without knowledge or information sufficient to form a belief as to the truth of the allegations of Paragraph 1024 and on that basis denies them.

1025. Samsung denies the allegations of Paragraph 1025.

1026. Admitted.

1027. Samsung denies the allegations of Paragraph 1027.

1028. Samsung denies the allegations of Paragraph 1028.

1029. Samsung denies the allegations of Paragraph 1029.

1030. Samsung denies the allegations of Paragraph 1030.

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1031. Samsung is without knowledge or information sufficient to form a belief as to the truth of the allegations of Paragraph 1031 and on that basis denies them. Samsung specifically denies that it has committed, induced, or contributed to any acts of infringement in this District or any other district and denies all allegations of patent infringement.

1032. Samsung denies the allegations of Paragraph 1032.

1033. Samsung denies the allegations of Paragraph 1033.

1034. Samsung denies the allegations of Paragraph 1034.

1035. Samsung admits that Exhibit Q, which purports to be a "Samsung PM1733 Product Brief", includes the captured image. Except as expressly admitted, Samsung denies any remaining allegations of this Paragraph. Samsung specifically denies that it has committed, induced, or contributed to any acts of infringement in this District or any other district and denies all allegations of patent infringement.

1036. Samsung denies the allegations of Paragraph 1036.

1037. Samsung admits that Exhibit Q, which purports to be a "Samsung PM1733 Product Brief", includes the captured image. Except as expressly admitted, Samsung denies any remaining allegations of this Paragraph. Samsung specifically denies that it has committed, induced, or contributed to any acts of infringement in this District or any other district and denies all allegations of patent infringement.

1038. Samsung denies the allegations of Paragraph 1038.

1039. Samsung denies the allegations of Paragraph 1039.

1040. Samsung denies the allegations of Paragraph 1040.

1041. Samsung denies the allegations of Paragraph 1041.

1042. Samsung denies the allegations of Paragraph 1042.

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1043. Samsung admits that the "NVM Express Command Set Specifications Revision 1.1" states, "The Write command writes data and metadata, if applicable, to the I/O controller for the logical blocks indicated. The host may also specify protection information to include as part of the operation." Except as expressly admitted, Samsung denies any remaining allegations of this Paragraph.

1044. Samsung admits that the "NVM Express Command Set Specifications Revision 1.1" states, "The Write command writes data and metadata, if applicable, to the I/O controller for the logical blocks indicated. The host may also specify protection information to include as part of the operation." Except as expressly admitted, Samsung denies any remaining allegations of this Paragraph.

1045. Samsung admits that the "NVM Express Zoned Namespace Command Set Specification Revision 1.1" states, "All Zoned Namespace Command Set Commands use the Namespace Identifier (NSID) field." Except as expressly admitted, Samsung denies any remaining allegations of this Paragraph.

1046. Samsung admits that the "NVM Express Command Set Specifications Revision 1.1" states, "A namespace has an associated namespace identifier that a host uses to access that namespace." Except as expressly admitted, Samsung denies any remaining allegations of this Paragraph.

1047. Samsung admits that the "NVM Express Zoned Namespace Command Set Specification Revision 1.1," refers the "Write" command to "NVM Command Set Specification" 3.3.7. Except as expressly admitted, Samsung denies any remaining allegations of this Paragraph.

1048. Samsung admits that the "NVM Express Zoned Namespace Command Set Specification Revision 1.1" states, "Start Logical Block Address (ZSLBA): This field indicates

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the 64-bit address of the lowest logical block of the zone in which the data and metadata, if applicable, associated with this command is to be stored." Except as expressly admitted, Samsung denies any remaining allegations of this Paragraph.

1049. Samsung denies the allegations of Paragraph 1049.

1050. Samsung admits that the "NVM Express Zoned Namespace Command Set Specification Revision 1.1" states, "The Zone Append command writes data and metadata, if applicable, to the I/O controller for the zone indicated by the ZSLBA field." Except as expressly admitted, Samsung denies any remaining allegations of this Paragraph.

1051. Samsung admits that the "NVM Express Zoned Namespace Command Set Specification Revision 1.1" lists "Opcodes for Zoned Namespace Command Set I/I Commands." Except as expressly admitted, Samsung denies any remaining allegations of this Paragraph.

1052. Samsung admits that the "NVM Express Zoned Namespace Command Set Specification Revision 1.1" lists "The Zone Append command writes data and metadata, if applicable, to the I/O controller for the zone indicated by the ZSLBA field. The controller assigns the data and metadata, if applicable, to a set of logical blocks within the zone. The lowest LBA of the set of logical blocks written is returned in the completion queue entry (refer to section 3.4.1.2). The host may also specify protection information to include as part of the operation. This command uses Command Dword 2, Command Dword 3, Command Dword 10, Command Dword 11, Command Dword 12, Command Dword 13, Command Dword 14, and Command Dword 15 fields. If the command uses PRPs for the data transfer, then the Metadata Pointer, PRP Entry 1, and PRP Entry 2 fields are used. If the command uses SGLs for the data transfer, then the Metadata SGL Segment Pointer and SGL Entry 1 fields are used. All other command specific fields are reserved." Except as expressly admitted, Samsung denies any remaining allegations of this Paragraph.

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1053. Samsung denies the allegations of Paragraph 1053.

1054. Samsung denies the allegations of Paragraph 1054.

1055. Samsung denies the allegations of Paragraph 1055.

1056. Samsung admits that the "NVM Express Zoned Namespace Command Set Specification Revision 1.1" lists "The following commands may be used to write to logical blocks in a specific zone of zone type Sequential Write Required: • Write command; • Write Zeroes command; • Write Uncorrectable command; • Copy command; and • Zone Append command. A write pointer is maintained for each zone in the zoned namespace that indicates the next writeable logical block address in that zone. The write pointer is valid for a subset of the zone states as defined in Figure 4." Except as expressly admitted, Samsung denies any remaining allegations of this Paragraph.

1057. Samsung denies the allegations of Paragraph 1057.

1058. Samsung denies the allegations of Paragraph 1058.

1059. Samsung denies the allegations of Paragraph 1059.

1060. Samsung denies the allegations of Paragraph 1060.

1061. Samsung denies the allegations of Paragraph 1061.

1062. Samsung denies the allegations of Paragraph 1062.

1063. Samsung denies the allegations of Paragraph 1063.

1064. Samsung denies the allegations of Paragraph 1064.

1065. Samsung denies the allegations of Paragraph 1065.

1066. Samsung denies the allegations of Paragraph 1066.

1067. Samsung denies the allegations of Paragraph 1067.

1068. Samsung denies the allegations of Paragraph 1068.

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1069. Samsung admits that the "NVM Express Zoned Namespace Command Set Specification Revision 1.1" states, "A controller that schedules an internal operation (e.g., background operation on the non-volatile media) on a zone that is in the ZSF:Full state may notify host software to initiate a zone reset operation." Except as expressly admitted, Samsung denies any remaining allegations of this Paragraph.

1070. Samsung denies the allegations of Paragraph 1070.

1071. Samsung denies the allegations of Paragraph 1071.

1072. Samsung denies the allegations of Paragraph 1072.

1073. Samsung denies the allegations of Paragraph 1073.

1074. Samsung denies the allegations of Paragraph 1074.

1075. Samsung denies the allegations of Paragraph 1075.

1076. Samsung denies the allegations of Paragraph 1076.

1077. Samsung denies the allegations of Paragraph 1077.

1078. Samsung denies the allegations of Paragraph 1078.

1079. Samsung denies the allegations of Paragraph 1079.

1080. Samsung denies the allegations of Paragraph 1080.

1081. Samsung denies the allegations of Paragraph 1081.

1082. Samsung denies the allegations of Paragraph 1082.

1083. Samsung denies the allegations of Paragraph 1083.

1084. Samsung denies the allegations of Paragraph 1084.

1085. Samsung denies the allegations of Paragraph 1085.

1086. Samsung denies the allegations of Paragraph 1086.

1087. Samsung denies the allegations of Paragraph 1087.

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1088. Samsung denies the allegations of Paragraph 1088.

1089. Samsung denies the allegations of Paragraph 1089.

1090. Samsung denies the allegations of Paragraph 1090.

1091. Samsung denies the allegations of Paragraph 1091.

1092. Samsung denies the allegations of Paragraph 1092.

1093. Samsung denies the allegations of Paragraph 1093.

1094. Samsung denies the allegations of Paragraph 1094.

1095. Samsung denies the allegations of Paragraph 1095.

1096. Samsung admits that SEC was aware of Radian's Asserted Patent and infringement allegations at least as of when the Complaint was served on SEC. Samsung specifically denies that it has committed, induced, or contributed to any acts of infringement in this District or any other district and denies all allegations of patent infringement.

1097. Samsung denies the allegations of Paragraph 1097.

1098. Samsung denies the allegations of Paragraph 1098.

1099. Samsung denies the allegations of Paragraph 1099.

1100. Samsung denies the allegations of Paragraph 1100.

1101. Samsung denies the allegations of Paragraph 1101.

1102. Samsung admits that SEA was aware of Radian's Asserted Patent and infringement allegations at least as of when the Complaint was served on SEA. Samsung specifically denies that it has committed, induced, or contributed to any acts of infringement in this District or any other district and denies all allegations of patent infringement.

1103. Samsung denies the allegations of Paragraph 1103.

1104. Samsung denies the allegations of Paragraph 1104.

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1105. Samsung denies the allegations of Paragraph 1105.

1106. Samsung denies the allegations of Paragraph 1106.

1107. Samsung denies the allegations of Paragraph 1107.

1108. Samsung denies the allegations of Paragraph 1108.

1109. Samsung denies the allegations of Paragraph 1109.

1110. Samsung denies the allegations of Paragraph 1110.

1111. Samsung denies the allegations of Paragraph 1111.

1112. Samsung denies the allegations of Paragraph 1112.

1113. Samsung denies the allegations of Paragraph 1113.

1114. Samsung denies the allegations of Paragraph 1114.

1115. Paragraph 1115 alleges legal conclusions and contentions, and therefore, a response to this allegation is premature and not required. *See Cywee Group Ltd. v. Samsung Elecs. Co., Ltd.*, No. 2:17-CV-00140-JRG-RSP, Dkt. 40, at *2 (E.D. Tex. Sept. 20, 2017) ("Given our Local Patent Rules and our District's well-established process for identifying and resolving claim-construction issues, the interest of justice do not require Samsung to make an unconditional admission or denial as to specific claim limitations this early. The construction of all or part of those limitations might be disputed, in which case [plaintiff's] concerns would be best raised after the Court resolves any such disputes."). Samsung is without knowledge or information sufficient to form a belief as to the truth of the allegations of Paragraph 1115 and on that basis denies them. Samsung specifically denies that it has committed, induced, or contributed to any acts of infringement in this District or any other district and denies all allegations of patent infringement.

1116. Paragraph 1116 alleges legal conclusions and contentions, and therefore, a response to this allegation is premature and not required. *See Cywee Group Ltd. v. Samsung Elecs. Co., Ltd.*,

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No. 2:17-CV-00140-JRG-RSP, Dkt. 40, at *2 (E.D. Tex. Sept. 20, 2017) ("Given our Local Patent Rules and our District's well-established process for identifying and resolving claim-construction issues, the interest of justice do not require Samsung to make an unconditional admission or denial as to specific claim limitations this early. The construction of all or part of those limitations might be disputed, in which case [plaintiff's] concerns would be best raised after the Court resolves any such disputes."). Samsung is without knowledge or information sufficient to form a belief as to the truth of the allegations of Paragraph 1116 and on that basis denies them. Samsung specifically denies that it has committed, induced, or contributed to any acts of infringement in this District or any other district and denies all allegations of patent infringement.

1117. Paragraph 1117 alleges legal conclusions and contentions, and therefore, a response to this allegation is premature and not required. *See Cywee Group Ltd. v. Samsung Elecs. Co., Ltd.*, No. 2:17-CV-00140-JRG-RSP, Dkt. 40, at *2 (E.D. Tex. Sept. 20, 2017) ("Given our Local Patent Rules and our District's well-established process for identifying and resolving claim-construction issues, the interest of justice do not require Samsung to make an unconditional admission or denial as to specific claim limitations this early. The construction of all or part of those limitations might be disputed, in which case [plaintiff's] concerns would be best raised after the Court resolves any such disputes."). Samsung is without knowledge or information sufficient to form a belief as to the truth of the allegations of Paragraph 1117 and on that basis denies them. Samsung specifically denies that it has committed, induced, or contributed to any acts of infringement in this District or any other district and denies all allegations of patent infringement.

1118. Samsung denies the allegations of Paragraph 1118.

1119. Samsung denies the allegations of Paragraph 1119.

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COUNT FIVE – INFRINGEMENT OF THE '657 PATENT

1120. Samsung repeats, realleges, and incorporates by reference, as fully set forth herein, its responses to the allegations set forth in the previous sections into the following section. To the extent that Radian sets forth any new allegations in Paragraph 1120, Samsung denies the allegations.

1121. Samsung admits that what purports to be a copy of U.S. Patent No. 11,347,657 (the "'657 Patent") is attached to Plaintiff's Complaint as Exhibit E. Samsung admits that, on its face, the '657 patent is entitled, "Addressing Techniques for Write and Erase Operations in a Non-Volatile Storage Device." The '657 patent states on its face that it issued on May 31, 2022. Samsung denies that the '657 patent was duly and legally issued.

1122. Samsung is without knowledge or information sufficient to form a belief as to the truth of the allegations of Paragraph 1122 and on that basis denies them.

1123. Samsung is without knowledge or information sufficient to form a belief as to the truth of the allegations of Paragraph 1123 and on that basis denies them.

1124. To the extent that the allegations in Paragraph 1124 purports to characterize the Asserted Patents as novel or innovative, Samsung denies that characterization. Samsung is without knowledge or information sufficient to form a belief as to the truth of the allegations of Paragraph 1124 and on that basis denies them.

1125. To the extent that the allegations in Paragraph 1125 purports to characterize the Asserted Patents as novel or innovative, Samsung denies that characterization. Samsung is without knowledge or information sufficient to form a belief as to the truth of the allegations of Paragraph 1125 and on that basis denies them.

1126. To the extent that the allegations in Paragraph 1126 purports to characterize the Asserted Patents as novel or innovative, Samsung denies that characterization. Samsung is without

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knowledge or information sufficient to form a belief as to the truth of the allegations of Paragraph 1126 and on that basis denies them.

1127. Samsung denies the allegations of Paragraph 1127.

1128. Admitted.

1129. Samsung denies the allegations of Paragraph 1129.

1130. Samsung denies the allegations of Paragraph 1130.

1131. Samsung denies the allegations of Paragraph 1131.

1132. Samsung denies the allegations of Paragraph 1132.

1133. Samsung is without knowledge or information sufficient to form a belief as to the truth of the allegations of Paragraph 1133 and on that basis denies them. Samsung specifically denies that it has committed, induced, or contributed to any acts of infringement in this District or any other district and denies all allegations of patent infringement.

1134. Samsung denies the allegations of Paragraph 1134.

1135. Samsung denies the allegations of Paragraph 1135.

1136. Samsung denies the allegations of Paragraph 1136.

1137. Samsung admits that Exhibit Q, which purports to be a "Samsung PM1733 Product Brief", includes the captured image. Except as expressly admitted, Samsung denies any remaining allegations of this Paragraph. Samsung specifically denies that it has committed, induced, or contributed to any acts of infringement in this District or any other district and denies all allegations of patent infringement.

1138. Samsung denies the allegations of Paragraph 1138.

1139. Samsung denies the allegations of Paragraph 1139.

1140. Samsung denies the allegations of Paragraph 1140.

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1141. Samsung admits that the "NVM Express Command Set Specifications Revision 1.1" states, "The Write command writes data and metadata, if applicable, to the I/O controller for the logical blocks indicated. The host may also specify protection information to include as part of the operation." Except as expressly admitted, Samsung denies any remaining allegations of this Paragraph.

1142. Samsung admits that the "NVM Express Command Set Specifications Revision 1.1" states, "The Write command writes data and metadata, if applicable, to the I/O controller for the logical blocks indicated. The host may also specify protection information to include as part of the operation." Except as expressly admitted, Samsung denies any remaining allegations of this Paragraph.

1143. Samsung admits that the "NVM Express Zoned Namespace Command Set Specification Revision 1.1" states, "All Zoned Namespace Command Set Commands use the Namespace Identifier (NSID) field." Except as expressly admitted, Samsung denies any remaining allegations of this Paragraph.

1144. Samsung admits that the "NVM Express Command Set Specifications Revision 1.1" states, "A namespace has an associated namespace identifier that a host uses to access that namespace." Except as expressly admitted, Samsung denies any remaining allegations of this Paragraph.

1145. Samsung admits that the "NVM Express Zoned Namespace Command Set Specification Revision 1.1," refers the "Write" command to "NVM Command Set Specification" 3.3.7. Except as expressly admitted, Samsung denies any remaining allegations of this Paragraph.

1146. Samsung admits that the "NVM Express Zoned Namespace Command Set Specification Revision 1.1" states, "Start Logical Block Address (ZSLBA): This field indicates

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the 64-bit address of the lowest logical block of the zone in which the data and metadata, if applicable, associated with this command is to be stored." Except as expressly admitted, Samsung denies any remaining allegations of this Paragraph.

1147. Samsung denies the allegations of Paragraph 1147.

1148. Samsung admits that the "NVM Express Zoned Namespace Command Set Specification Revision 1.1" states, "The Zone Management Send command requests an action on one or more zones. The command uses the Data Pointer, Command Dword 10, Command Dword 11, and Command Dword 13 fields. All other command specific fields are reserved." Except as expressly admitted, Samsung denies any remaining allegations of this Paragraph.

1149. Samsung admits that the "NVM Express Zoned Namespace Command Set Specification Revision 1.1" states, "The Zone Management Send command requests an action on one or more zones. The command uses the Data Pointer, Command Dword 10, Command Dword 11, and Command Dword 13 fields. All other command specific fields are reserved." Except as expressly admitted, Samsung denies any remaining allegations of this Paragraph.

1150. Samsung admits that the "NVM Express Zoned Namespace Command Set Specification Revision 1.1" states, "Start Logical Block Address (ZSLBA): This field indicates the 64-bit address of the lowest logical block of the zone in which the data and metadata, if applicable, associated with this command is to be stored." Except as expressly admitted, Samsung denies any remaining allegations of this Paragraph.

1151. Samsung denies the allegations of Paragraph 1151.

1152. Samsung denies the allegations of Paragraph 1152.

1153. Samsung denies the allegations of Paragraph 1153.

1154. Samsung denies the allegations of Paragraph 1154.

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1155. Samsung denies the allegations of Paragraph 1155.

1156. Samsung denies the allegations of Paragraph 1156.

1157. Samsung denies the allegations of Paragraph 1157.

1158. Samsung denies the allegations of Paragraph 1158.

1159. Samsung denies the allegations of Paragraph 1159.

1160. Samsung denies the allegations of Paragraph 1160.

1161. Samsung denies the allegations of Paragraph 1161.

1162. Samsung denies the allegations of Paragraph 1162.

1163. Samsung denies the allegations of Paragraph 1163.

1164. Samsung denies the allegations of Paragraph 1164.

1165. Samsung denies the allegations of Paragraph 1165.

1166. Samsung denies the allegations of Paragraph 1166.

1167. Samsung denies the allegations of Paragraph 1167.

1168. Samsung denies the allegations of Paragraph 1168.

1169. Samsung denies the allegations of Paragraph 1169.

1170. Samsung denies the allegations of Paragraph 1170.

1171. Samsung denies the allegations of Paragraph 1171.

1172. Samsung denies the allegations of Paragraph 1172.

1173. Samsung denies the allegations of Paragraph 1173.

1174. Samsung denies the allegations of Paragraph 1174.

1175. Samsung denies the allegations of Paragraph 1175.

1176. Samsung denies the allegations of Paragraph 1176.

1177. Samsung denies the allegations of Paragraph 1177.

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1178. Samsung denies the allegations of Paragraph 1178.

1179. Samsung denies the allegations of Paragraph 1179.

1180. Samsung denies the allegations of Paragraph 1180.

1181. Samsung denies the allegations of Paragraph 1181.

1182. Samsung denies the allegations of Paragraph 1182.

1183. Samsung denies the allegations of Paragraph 1183.

1184. Samsung denies the allegations of Paragraph 1184.

1185. Samsung denies the allegations of Paragraph 1185.

1186. Samsung denies the allegations of Paragraph 1186.

1187. Samsung denies the allegations of Paragraph 1187.

1188. Samsung denies the allegations of Paragraph 1188.

1189. Samsung denies the allegations of Paragraph 1189.

1190. To the extent a response is required, Samsung admits that SEC was aware of Radian's Asserted Patent and infringement allegations at least as of when the Complaint was served on SEC. Samsung specifically denies that it has committed, induced, or contributed to any acts of infringement in this District or any other district and denies all allegations of patent infringement.

1191. Samsung denies the allegations of Paragraph 1191.

1192. Samsung denies the allegations of Paragraph 1192.

1193. Samsung denies the allegations of Paragraph 1193.

1194. Samsung denies the allegations of Paragraph 1194.

1195. Samsung denies the allegations of Paragraph 1195.

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1196. To the extent a response is required, Samsung admits that SEA was aware of Radian's Asserted Patent and infringement allegations at least as of when the Complaint was served on SEA. Samsung specifically denies that it has committed, induced, or contributed to any acts of infringement in this District or any other district and denies all allegations of patent infringement.

1197. Samsung denies the allegations of Paragraph 1197.

1198. Samsung denies the allegations of Paragraph 1198.

1199. Samsung denies the allegations of Paragraph 1199.

1200. Samsung denies the allegations of Paragraph 1200.

1201. Samsung denies the allegations of Paragraph 1201.

1202. Samsung denies the allegations of Paragraph 1202.

1203. Samsung denies the allegations of Paragraph 1203.

1204. Samsung denies the allegations of Paragraph 1204.

1205. Samsung denies the allegations of Paragraph 1205.

1206. Samsung denies the allegations of Paragraph 1206.

1207. Samsung denies the allegations of Paragraph 1207.

1208. Samsung denies the allegations of Paragraph 1208.

1209. Paragraph 1209 alleges legal conclusions and contentions, and therefore, a response to this allegation is premature and not required. *See Cywee Group Ltd. v. Samsung Elecs. Co., Ltd.*, No. 2:17-CV-00140-JRG-RSP, Dkt. 40, at *2 (E.D. Tex. Sept. 20, 2017) ("Given our Local Patent Rules and our District's well-established process for identifying and resolving claim-construction issues, the interest of justice do not require Samsung to make an unconditional admission or denial as to specific claim limitations this early. The construction of all or part of those limitations might

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be disputed, in which case [plaintiff's] concerns would be best raised after the Court resolves any such disputes."). Samsung is without knowledge or information sufficient to form a belief as to the truth of the allegations of Paragraph 1209 and on that basis denies them. Samsung specifically denies that it has committed, induced, or contributed to any acts of infringement in this District or any other district and denies all allegations of patent infringement.

1210. Paragraph 1210 alleges legal conclusions and contentions, and therefore, a response to this allegation is premature and not required. *See Cywee Group Ltd. v. Samsung Elecs. Co., Ltd.*, No. 2:17-CV-00140-JRG-RSP, Dkt. 40, at *2 (E.D. Tex. Sept. 20, 2017) ("Given our Local Patent Rules and our District's well-established process for identifying and resolving claim-construction issues, the interest of justice do not require Samsung to make an unconditional admission or denial as to specific claim limitations this early. The construction of all or part of those limitations might be disputed, in which case [plaintiff's] concerns would be best raised after the Court resolves any such disputes."). Samsung is without knowledge or information sufficient to form a belief as to the truth of the allegations of Paragraph 1210 and on that basis denies them. Samsung specifically denies that it has committed, induced, or contributed to any acts of infringement in this District or any other district and denies all allegations of patent infringement.

1211. Paragraph 1211 alleges legal conclusions and contentions, and therefore, a response to this allegation is premature and not required. *See Cywee Group Ltd. v. Samsung Elecs. Co., Ltd.*, No. 2:17-CV-00140-JRG-RSP, Dkt. 40, at *2 (E.D. Tex. Sept. 20, 2017) ("Given our Local Patent Rules and our District's well-established process for identifying and resolving claim-construction issues, the interest of justice do not require Samsung to make an unconditional admission or denial as to specific claim limitations this early. The construction of all or part of those limitations might be disputed, in which case [plaintiff's] concerns would be best raised after the Court resolves any

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such disputes."). Samsung is without knowledge or information sufficient to form a belief as to the truth of the allegations of Paragraph 1211 and on that basis denies them. Samsung specifically denies that it has committed, induced, or contributed to any acts of infringement in this District or any other district and denies all allegations of patent infringement.

1212. Samsung denies the allegations of Paragraph 1212.

1213. Samsung denies the allegations of Paragraph 1213.

COUNT SIX: INFRINGEMENT OF THE '656 PATENT

1214. Samsung repeats, realleges, and incorporates by reference, as fully set forth herein, its responses to the allegations set forth in the previous sections into the following section. To the extent that Radian sets forth any new allegations in Paragraph 1214, Samsung denies the allegations.

1215. Samsung admits that what purports to be a copy of U.S. Patent No. 11,347,656 (the "'656 Patent") is attached to Plaintiff's Complaint as Exhibit F. Samsung admits that, on its face, the '656 patent is entitled, "Storage Drive with Geometry Emulation Based on Division Addressing and Decoupled Bad Block Management." The '656 patent states on its face that it issued on May 31, 2022. Samsung denies that the '656 patent was duly and legally issued.

1216. To the extent a response is required, Samsung is without knowledge or information sufficient to form a belief as to the truth of the allegations of Paragraph 1216 and on that basis denies them.

1217. To the extent a response is required, Samsung is without knowledge or information sufficient to form a belief as to the truth of the allegations of Paragraph 1217 and on that basis denies them.

1218. To the extent that the allegations in Paragraph 1218 purports to characterize the Asserted Patents as novel or innovative, Samsung denies that characterization. Samsung is without

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knowledge or information sufficient to form a belief as to the truth of the allegations of Paragraph 743 and on that basis denies them.

1219. To the extent that the allegations in Paragraph 1219 purports to characterize the Asserted Patents as novel or innovative, Samsung denies that characterization. Samsung is without knowledge or information sufficient to form a belief as to the truth of the allegations of Paragraph 1219 and on that basis denies them.

1220. To the extent that the allegations in Paragraph 1220 purports to characterize the Asserted Patents as novel or innovative, Samsung denies that characterization. Samsung is without knowledge or information sufficient to form a belief as to the truth of the allegations of Paragraph 1220 and on that basis denies them.

1221. Samsung denies the allegations of Paragraph 1221.

1222. Admitted.

1223. Samsung denies the allegations of Paragraph 1223.

1224. Samsung denies the allegations of Paragraph 1224.

1225. Samsung denies the allegations of Paragraph 1225.

1226. Samsung denies the allegations of Paragraph 1226.

1227. Samsung is without knowledge or information sufficient to form a belief as to the truth of the allegations of Paragraph 1227 and on that basis denies them. Samsung specifically denies that it has committed, induced, or contributed to any acts of infringement in this District or any other district and denies all allegations of patent infringement.

1228. Samsung denies the allegations of Paragraph 1228.

1229. Samsung denies the allegations of Paragraph 1229.

1230. Samsung denies the allegations of Paragraph 1230.

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1231. Samsung admits that Exhibit Q, which purports to be a "Samsung PM1733 Product Brief", includes the captured image. Except as expressly admitted, Samsung denies any remaining allegations of this Paragraph. Samsung specifically denies that it has committed, induced, or contributed to any acts of infringement in this District or any other district and denies all allegations of patent infringement.

1232. Samsung denies the allegations of Paragraph 1232.

1233. Samsung denies the allegations of Paragraph 1233.

1234. Samsung denies the allegations of Paragraph 1234.

1235. Samsung admits that the "NVM Express Zoned Namespace Command Set Specification Revision 1.1" states, "The Read command operates as defined in the NVM Command Set Specification, with the additional requirements associated with the zone type of the specified zones that the command operates on." Except as expressly admitted, Samsung denies any remaining allegations of this Paragraph.

1236. Samsung admits that the "NVM Express Command Set Specifications Revision 1.1" states, "The Read command reads data and metadata, if applicable, from the I/O controller for the LBAs indicated. The command may specify protection information to be checked as part of the read operation." Except as expressly admitted, Samsung denies any remaining allegations of this Paragraph.

1237. Samsung admits that the "NVM Express Zoned Namespace Command Set Specification Revision 1.1," refers the "Read" command to "NVM Command Set Specification" 3.3.3. Except as expressly admitted, Samsung denies any remaining allegations of this Paragraph.

1238. Samsung admits that the "NVM Express Command Set Specifications Revision 1.1" states, "A namespace has an associated namespace identifier that a host uses to access that

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namespace." Except as expressly admitted, Samsung denies any remaining allegations of this Paragraph.

1239. Samsung admits that the "NVM Express Zoned Namespace Command Set Specification Revision 1.1," refers the "Read" command to "NVM Command Set Specification" 3.3.3. Except as expressly admitted, Samsung denies any remaining allegations of this Paragraph.

1240. Samsung admits that the "NVM Express Zoned Namespace Command Set Specification Revision 1.1" states, "Start Logical Block Address (ZSLBA): This field indicates the 64-bit address of the lowest logical block of the zone in which the data and metadata, if applicable, associated with this command is to be stored." Except as expressly admitted, Samsung denies any remaining allegations of this Paragraph.

1241. Samsung denies the allegations of Paragraph 1241.

1242. Samsung denies the allegations of Paragraph 1242.

1243. Samsung denies the allegations of Paragraph 1243.

1244. Samsung denies the allegations of Paragraph 1244.

1245. Samsung denies the allegations of Paragraph 1245.

1246. Samsung denies the allegations of Paragraph 1246.

1247. Samsung denies the allegations of Paragraph 1247.

1248. Samsung denies the allegations of Paragraph 1248.

1249. Samsung denies the allegations of Paragraph 1249.

1250. Samsung denies the allegations of Paragraph 1250.

1251. Samsung denies the allegations of Paragraph 1251.

1252. Samsung denies the allegations of Paragraph 1252.

1253. Samsung denies the allegations of Paragraph 1253.

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1254. Samsung denies the allegations of Paragraph 1254.

1255. Samsung denies the allegations of Paragraph 1255.

1256. Samsung denies the allegations of Paragraph 1256.

1257. Samsung denies the allegations of Paragraph 1257.

1258. Samsung denies the allegations of Paragraph 1258.

1259. Samsung denies the allegations of Paragraph 1259.

1260. Samsung denies the allegations of Paragraph 1260.

1261. Samsung denies the allegations of Paragraph 1261.

1262. Samsung denies the allegations of Paragraph 1262.

1263. Samsung denies the allegations of Paragraph 1263.

1264. Samsung denies the allegations of Paragraph 1264.

1265. Samsung denies the allegations of Paragraph 1265.

1266. Samsung denies the allegations of Paragraph 1266.

1267. Samsung denies the allegations of Paragraph 1267.

1268. Samsung denies the allegations of Paragraph 1268.

1269. Samsung denies the allegations of Paragraph 1269.

1270. Samsung denies the allegations of Paragraph 1270.

1271. Samsung denies the allegations of Paragraph 1271.

1272. Samsung denies the allegations of Paragraph 1272.

1273. Samsung denies the allegations of Paragraph 1273.

1274. Samsung denies the allegations of Paragraph 1274.

1275. Samsung denies the allegations of Paragraph 1275.

1276. Samsung denies the allegations of Paragraph 1276.

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1277. Samsung denies the allegations of Paragraph 1277.

1278. Samsung denies the allegations of Paragraph 1278.

1279. Samsung admits that SEC was aware of Radian's Asserted Patent and infringement allegations at least as of when the Complaint was served on SEC. Samsung specifically denies that it has committed, induced, or contributed to any acts of infringement in this District or any other district and denies all allegations of patent infringement.

1280. Samsung denies the allegations of Paragraph 1280.

1281. Samsung denies the allegations of Paragraph 1281.

1282. Samsung denies the allegations of Paragraph 1282.

1283. Samsung denies the allegations of Paragraph 1283.

1284. Samsung denies the allegations of Paragraph 1284.

1285. Samsung admits that SEA was aware of Radian's Asserted Patent and infringement allegations at least as of when the Complaint was served on SEA. Samsung specifically denies that it has committed, induced, or contributed to any acts of infringement in this District or any other district and denies all allegations of patent infringement.

1286. Samsung denies the allegations of Paragraph 1286.

1287. Samsung denies the allegations of Paragraph 1287.

1288. Samsung denies the allegations of Paragraph 1288.

1289. Samsung denies the allegations of Paragraph 1289.

1290. Samsung denies the allegations of Paragraph 1290.

1291. Samsung denies the allegations of Paragraph 1291.

1292. Samsung denies the allegations of Paragraph 1292.

1293. Samsung denies the allegations of Paragraph 1293.

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1294. Samsung denies the allegations of Paragraph 1294.

1295. Samsung denies the allegations of Paragraph 1295.

1296. Samsung denies the allegations of Paragraph 1296.

1297. Samsung denies the allegations of Paragraph 1297.

1298. Paragraph 1298 alleges legal conclusions and contentions, and therefore, a response to this allegation is premature and not required. *See Cywee Group Ltd. v. Samsung Elecs. Co., Ltd.*, No. 2:17-CV-00140-JRG-RSP, Dkt. 40, at *2 (E.D. Tex. Sept. 20, 2017) ("Given our Local Patent Rules and our District's well-established process for identifying and resolving claim-construction issues, the interest of justice do not require Samsung to make an unconditional admission or denial as to specific claim limitations this early. The construction of all or part of those limitations might be disputed, in which case [plaintiff's] concerns would be best raised after the Court resolves any such disputes."). Samsung is without knowledge or information sufficient to form a belief as to the truth of the allegations of Paragraph 1298 and on that basis denies them. Samsung specifically denies that it has committed, induced, or contributed to any acts of infringement in this District or any other district and denies all allegations of patent infringement.

1299. Paragraph 1299 alleges legal conclusions and contentions, and therefore, a response to this allegation is premature and not required. *See Cywee Group Ltd. v. Samsung Elecs. Co., Ltd.*, No. 2:17-CV-00140-JRG-RSP, Dkt. 40, at *2 (E.D. Tex. Sept. 20, 2017) ("Given our Local Patent Rules and our District's well-established process for identifying and resolving claim-construction issues, the interest of justice do not require Samsung to make an unconditional admission or denial as to specific claim limitations this early. The construction of all or part of those limitations might be disputed, in which case [plaintiff's] concerns would be best raised after the Court resolves any such disputes."). Samsung is without knowledge or information sufficient to form a belief as to

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the truth of the allegations of Paragraph 1299 and on that basis denies them. Samsung specifically denies that it has committed, induced, or contributed to any acts of infringement in this District or any other district and denies all allegations of patent infringement.

1300. Paragraph 1300 alleges legal conclusions and contentions, and therefore, a response to this allegation is premature and not required. *See Cywee Group Ltd. v. Samsung Elecs. Co., Ltd.*, No. 2:17-CV-00140-JRG-RSP, Dkt. 40, at *2 (E.D. Tex. Sept. 20, 2017) ("Given our Local Patent Rules and our District's well-established process for identifying and resolving claim-construction issues, the interest of justice do not require Samsung to make an unconditional admission or denial as to specific claim limitations this early. The construction of all or part of those limitations might be disputed, in which case [plaintiff's] concerns would be best raised after the Court resolves any such disputes."). Samsung is without knowledge or information sufficient to form a belief as to the truth of the allegations of Paragraph 1300 and on that basis denies them. Samsung specifically denies that it has committed, induced, or contributed to any acts of infringement in this District or any other district and denies all allegations of patent infringement.

1301. Samsung denies the allegations of Paragraph 1301.

1302. Samsung denies the allegations of Paragraph 1302.

COUNT SEVEN: INFRINGEMENT OF THE '995 PATENT

1303. Samsung repeats, realleges, and incorporates by reference, as fully set forth herein, its responses to the allegations set forth in the previous sections into the following section. To the extent that Radian sets forth any new allegations in Paragraph 1303, Samsung denies the allegations.

1304. Samsung admits that what purports to be a copy of U.S. Patent No. 11,307,995 (the "'995 Patent") is attached to Plaintiff's Complaint as Exhibit G. Samsung admits that, on its face, the '995 patent is entitled, "Storage Device With Geometry Emulation Based on Division

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Programming and Decoupled NAND Maintenance." The '995 patent states on its face that it issued on April 19, 2022. Samsung denies that the '995 patent was duly and legally issued.

1305. Samsung is without knowledge or information sufficient to form a belief as to the truth of the allegations of Paragraph 1305 and on that basis denies them.

1306. Samsung denies the allegations in Paragraph 1306.

1307. To the extent that the allegations in Paragraph 1307 purports to characterize the Asserted Patents as novel or innovative, Samsung denies that characterization. Samsung is without knowledge or information sufficient to form a belief as to the truth of the allegations of Paragraph 1307 and on that basis denies them.

1308. To the extent that the allegations in Paragraph 1308 purports to characterize the Asserted Patents as novel or innovative, Samsung denies that characterization. Samsung is without knowledge or information sufficient to form a belief as to the truth of the allegations of Paragraph 1308 and on that basis denies them.

1309. To the extent that the allegations in Paragraph 1309 purports to characterize the Asserted Patents as novel or innovative, Samsung denies that characterization. Samsung is without knowledge or information sufficient to form a belief as to the truth of the allegations of Paragraph 1309 and on that basis denies them.

1310. Samsung denies the allegations of Paragraph 1310.

1311. Admitted.

1312. Samsung denies the allegations of Paragraph 1312.

1313. Samsung denies the allegations of Paragraph 1313.

1314. Samsung denies the allegations of Paragraph 1314.

1315. Samsung denies the allegations of Paragraph 1315.

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1316. Samsung is without knowledge or information sufficient to form a belief as to the truth of the allegations of Paragraph 1316 and on that basis denies them. Samsung specifically denies that it has committed, induced, or contributed to any acts of infringement in this District or any other district and denies all allegations of patent infringement.

1317. Samsung denies the allegations of Paragraph 1317.

1318. Samsung denies the allegations of Paragraph 1318.

1319. Samsung denies the allegations of Paragraph 1319.

1320. Samsung admits that Exhibit Q, which purports to be a "Samsung PM1733 Product Brief", includes the captured image. Except as expressly admitted, Samsung denies any remaining allegations of this Paragraph. Samsung specifically denies that it has committed, induced, or contributed to any acts of infringement in this District or any other district and denies all allegations of patent infringement.

1321. Samsung denies the allegations of Paragraph 1321.

1322. Samsung denies the allegations of Paragraph 1322.

1323. Samsung denies the allegations of Paragraph 1323.

1324. Samsung admits that the "NVM Express Command Set Specifications Revision 1.1" states, "The Write command writes data and metadata, if applicable, to the I/O controller for the logical blocks indicated. The host may also specify protection information to include as part of the operation." Except as expressly admitted, Samsung denies any remaining allegations of this Paragraph.

1325. Samsung admits that the "NVM Express Command Set Specifications Revision 1.1" states, "The Write command writes data and metadata, if applicable, to the I/O controller for the logical blocks indicated. The host may also specify protection information to include as part of the

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operation." Except as expressly admitted, Samsung denies any remaining allegations of this Paragraph.

1326. Samsung denies the allegations of Paragraph 1326.

1327. Samsung admits that the "NVM Express Zoned Namespace Command Set Specification Revision 1.1" states, "All Zoned Namespace Command Set Commands use the Namespace Identifier (NSID) field." Except as expressly admitted, Samsung denies any remaining allegations of this Paragraph.

1328. Samsung admits that the "NVM Express Command Set Specifications Revision 1.1" states, "A namespace has an associated namespace identifier that a host uses to access that namespace." Except as expressly admitted, Samsung denies any remaining allegations of this Paragraph.

1329. Samsung admits that the "NVM Express Zoned Namespace Command Set Specification Revision 1.1," refers the "Write" command to "NVM Command Set Specification" 3.3.7. Except as expressly admitted, Samsung denies any remaining allegations of this Paragraph.

1330. Samsung admits that the "NVM Express Zoned Namespace Command Set Specification Revision 1.1" states, "Start Logical Block Address (ZSLBA): This field indicates the 64-bit address of the lowest logical block of the zone in which the data and metadata, if applicable, associated with this command is to be stored." Except as expressly admitted, Samsung denies any remaining allegations of this Paragraph.

1331. Samsung denies the allegations of Paragraph 1331.

1332. Samsung denies the allegations of Paragraph 1332.

1333. Samsung denies the allegations of Paragraph 1333.

1334. Samsung denies the allegations of Paragraph 1334.

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1335. Samsung denies the allegations of Paragraph 1335.

1336. Samsung denies the allegations of Paragraph 1336.

1337. Samsung denies the allegations of Paragraph 1337.

1338. Samsung denies the allegations of Paragraph 1338.

1339. Samsung denies the allegations of Paragraph 1339.

1340. Samsung denies the allegations of Paragraph 1340.

1341. Samsung denies the allegations of Paragraph 1341.

1342. Samsung denies the allegations of Paragraph 1342.

1343. Samsung denies the allegations of Paragraph 1343.

1344. Samsung denies the allegations of Paragraph 1344.

1345. Samsung denies the allegations of Paragraph 1345.

1346. Samsung denies the allegations of Paragraph 1346.

1347. Samsung denies the allegations of Paragraph 1347.

1348. Samsung denies the allegations of Paragraph 1348.

1349. Samsung denies the allegations of Paragraph 1349.

1350. Samsung denies the allegations of Paragraph 1350.

1351. Samsung denies the allegations of Paragraph 1351.

1352. Samsung denies the allegations of Paragraph 1352.

1353. Samsung denies the allegations of Paragraph 1353.

1354. Samsung denies the allegations of Paragraph 1354.

1355. Samsung denies the allegations of Paragraph 1355.

1356. Samsung denies the allegations of Paragraph 1356.

1357. Samsung denies the allegations of Paragraph 1357.

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1358. Samsung denies the allegations of Paragraph 1358.

1359. Samsung denies the allegations of Paragraph 1359.

1360. Samsung denies the allegations of Paragraph 1360.

1361. Samsung denies the allegations of Paragraph 1361.

1362. Samsung denies the allegations of Paragraph 1362.

1363. Samsung denies the allegations of Paragraph 1363.

1364. Samsung denies the allegations of Paragraph 1364.

1365. Samsung denies the allegations of Paragraph 1365.

1366. Samsung denies the allegations of Paragraph 1366.

1367. Samsung denies the allegations of Paragraph 1367.

1368. Samsung denies the allegations of Paragraph 1368.

1369. Samsung denies the allegations of Paragraph 1369.

1370. Samsung denies the allegations of Paragraph 1370.

1371. Samsung denies the allegations of Paragraph 1371.

1372. Samsung denies the allegations of Paragraph 1372.

1373. Samsung denies the allegations of Paragraph 1373.

1374. Samsung denies the allegations of Paragraph 1374.

1375. Samsung admits that SEC was aware of Radian's Asserted Patent and infringement allegations at least as of when the Complaint was served on SEC. Samsung specifically denies that it has committed, induced, or contributed to any acts of infringement in this District or any other district and denies all allegations of patent infringement.

1376. Samsung denies the allegations of Paragraph 1376.

1377. Samsung denies the allegations of Paragraph 1377.

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1378. Samsung denies the allegations of Paragraph 1378.

1379. Samsung denies the allegations of Paragraph 1379.

1380. Samsung denies the allegations of Paragraph 1380.

1381. Samsung admits that SEA was aware of Radian's Asserted Patent and infringement allegations at least as of when the Complaint was served on SEA. Samsung specifically denies that it has committed, induced, or contributed to any acts of infringement in this District or any other district and denies all allegations of patent infringement.

1382. Samsung denies the allegations of Paragraph 1382.

1383. Samsung denies the allegations of Paragraph 1383.

1384. Samsung denies the allegations of Paragraph 1384.

1385. Samsung denies the allegations of Paragraph 1385.

1386. Samsung denies the allegations of Paragraph 1386.

1387. Samsung denies the allegations of Paragraph 1387.

1388. Samsung denies the allegations of Paragraph 1388.

1389. Samsung denies the allegations of Paragraph 1389.

1390. Samsung denies the allegations of Paragraph 1390.

1391. Samsung denies the allegations of Paragraph 1391.

1392. Samsung denies the allegations of Paragraph 1392.

1393. Samsung denies the allegations of Paragraph 1393.

1394. Paragraph 1394 alleges legal conclusions and contentions, and therefore, a response to this allegation is premature and not required. *See Cywee Group Ltd. v. Samsung Elecs. Co., Ltd.*, No. 2:17-CV-00140-JRG-RSP, Dkt. 40, at *2 (E.D. Tex. Sept. 20, 2017) (“Given our Local Patent Rules and our District’s well-established process for identifying and resolving claim-construction

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issues, the interest of justice do not require Samsung to make an unconditional admission or denial as to specific claim limitations this early. The construction of all or part of those limitations might be disputed, in which case [plaintiff's] concerns would be best raised after the Court resolves any such disputes."). Samsung is without knowledge or information sufficient to form a belief as to the truth of the allegations of Paragraph 1394 and on that basis denies them. Samsung specifically denies that it has committed, induced, or contributed to any acts of infringement in this District or any other district and denies all allegations of patent infringement.

1395. Paragraph 1395 alleges legal conclusions and contentions, and therefore, a response to this allegation is premature and not required. *See Cywee Group Ltd. v. Samsung Elecs. Co., Ltd.*, No. 2:17-CV-00140-JRG-RSP, Dkt. 40, at *2 (E.D. Tex. Sept. 20, 2017) ("Given our Local Patent Rules and our District's well-established process for identifying and resolving claim-construction issues, the interest of justice do not require Samsung to make an unconditional admission or denial as to specific claim limitations this early. The construction of all or part of those limitations might be disputed, in which case [plaintiff's] concerns would be best raised after the Court resolves any such disputes."). Samsung is without knowledge or information sufficient to form a belief as to the truth of the allegations of Paragraph 1395 and on that basis denies them. Samsung specifically denies that it has committed, induced, or contributed to any acts of infringement in this District or any other district and denies all allegations of patent infringement.

1396. Paragraph 1396 alleges legal conclusions and contentions, and therefore, a response to this allegation is premature and not required. *See Cywee Group Ltd. v. Samsung Elecs. Co., Ltd.*, No. 2:17-CV-00140-JRG-RSP, Dkt. 40, at *2 (E.D. Tex. Sept. 20, 2017) ("Given our Local Patent Rules and our District's well-established process for identifying and resolving claim-construction issues, the interest of justice do not require Samsung to make an unconditional admission or denial

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as to specific claim limitations this early. The construction of all or part of those limitations might be disputed, in which case [plaintiff's] concerns would be best raised after the Court resolves any such disputes."). Samsung is without knowledge or information sufficient to form a belief as to the truth of the allegations of Paragraph 1396 and on that basis denies them. Samsung specifically denies that it has committed, induced, or contributed to any acts of infringement in this District or any other district and denies all allegations of patent infringement.

1397. Samsung denies the allegations of Paragraph 1397.

1398. Samsung denies the allegations of Paragraph 1398.

PRAYER FOR RELIEF

Samsung denies that Radian is entitled to any of the relief requested in the section of the Complaint entitled "Prayer for Relief," or any relief in any form from either the Court or from Samsung. Radian's Prayer for Relief should, therefore, be denied in its entirety and with prejudice, and Radian should take nothing. To the extent any statement in the Relief Requested is deemed factual, it is denied.

JURY TRIAL DEMANDED

Samsung admits that Radian sets forth a demand for a trial by jury. Samsung likewise demands a trial by jury on all issues so triable raised by the Complaint or by Samsung's Answer pursuant to Rule 38 of the Federal Rules of Civil Procedure.

* * * * *

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AFFIRMATIVE AND OTHER DEFENSES

Upon information and belief, and subject to its responses above, Samsung alleges and asserts the following defenses in response to the allegations of the Complaint, without admitting or acknowledging that Samsung bears the burden of proof as to any of them or that any must be pleaded as defenses. Regardless of how such defenses are listed herein, Samsung undertakes the burden of proof only as to those defenses that are deemed affirmative defenses as a matter of law. Samsung expressly reserves the right to amend or raise additional defenses pursuant to the Docket Control Order as additional information becomes available through further investigation and discovery.

FIRST DEFENSE – NON-INFRINGEMENT OF THE '183 PATENT

1. Samsung does not infringe and has not infringed the '183 patent directly, indirectly, literally, or under the doctrine of equivalents, or in any other manner, and is not liable for infringement of any valid and enforceable claim of the '183 patent.

SECOND DEFENSE – NON-INFRINGEMENT OF THE '801 PATENT

2. Samsung does not infringe and has not infringed the '801 patent directly, indirectly, literally, or under the doctrine of equivalents, or in any other manner, and is not liable for infringement of any valid and enforceable claim of the '801 patent.

THIRD DEFENSE – NON-INFRINGEMENT OF THE '772 PATENT

3. Samsung does not infringe and has not infringed the '772 patent directly, indirectly, literally, or under the doctrine of equivalents, or in any other manner, and is not liable for infringement of any valid and enforceable claim of the '772 patent.

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FOURTH DEFENSE – NON-INFRINGEMENT OF THE '614 PATENT

4. Samsung does not infringe and has not infringed the '614 patent directly, indirectly, literally, or under the doctrine of equivalents, or in any other manner, and is not liable for infringement of any valid and enforceable claim of the '614 patent.

FIFTH DEFENSE – NON-INFRINGEMENT OF THE '955 PATENT

5. Samsung does not infringe and has not infringed the '995 patent directly, indirectly, literally, or under the doctrine of equivalents, or in any other manner, and is not liable for infringement of any valid and enforceable claim of the '995 patent.

SIXTH DEFENSE – NON-INFRINGEMENT OF THE '656 PATENT

6. Samsung does not infringe and has not infringed the '656 patent directly, indirectly, literally, or under the doctrine of equivalents, or in any other manner, and is not liable for infringement of any valid and enforceable claim of the '656 patent.

SEVENTH DEFENSE – NON-INFRINGEMENT OF THE '657 PATENT

7. Samsung does not infringe and has not infringed the '657 patent directly, indirectly, literally, or under the doctrine of equivalents, or in any other manner, and is not liable for infringement of any valid and enforceable claim of the '657 patent.

EIGHTH DEFENSE – INVALIDITY OF THE '183 PATENT

8. The claims of the '183 patent are invalid for failure to comply with the requirements of Title 35 of the United States Code, including, without limitation, 35 U.S.C. §§ 101, 102, 103, 112, and/or 116, or any other applicable statutory provisions of Title 35 of the U.S. Code.

NINTH DEFENSE – INVALIDITY OF THE '801 PATENT

9. The claims of the '801 patent are invalid for failure to comply with the requirements of Title 35 of the United States Code, including, without limitation, 35 U.S.C. §§ 101, 102, 103, 112, and/or 116, or any other applicable statutory provisions of Title 35 of the U.S. Code.

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TENTH DEFENSE – INVALIDITY OF THE '772 PATENT

10. The claims of the '772 patent are invalid for failure to comply with the requirements of Title 35 of the United States Code, including, without limitation, 35 U.S.C. §§ 101, 102, 103, 112, and/or 116, or any other applicable statutory provisions of Title 35 of the U.S. Code.

ELEVENTH DEFENSE – INVALIDITY OF THE '614 PATENT

11. The claims of the '614 patent are invalid for failure to comply with the requirements of Title 35 of the United States Code, including, without limitation, 35 U.S.C. §§ 101, 102, 103, 112, and/or 116, or any other applicable statutory provisions of Title 35 of the U.S. Code.

TWELFTH DEFENSE – INVALIDITY OF THE '995 PATENT

12. The claims of the '995 patent are invalid for failure to comply with the requirements of Title 35 of the United States Code, including, without limitation, 35 U.S.C. §§ 101, 102, 103, 112, and/or 116, or any other applicable statutory provisions of Title 35 of the U.S. Code.

THIRTEENTH DEFENSE – INVALIDITY OF THE '656 PATENT

13. The claims of the '656 patent are invalid for failure to comply with the requirements of Title 35 of the United States Code, including, without limitation, 35 U.S.C. §§ 101, 102, 103, 112, and/or 116, or any other applicable statutory provisions of Title 35 of the U.S. Code.

FOURTEENTH DEFENSE – INVALIDITY OF THE '657 PATENT

14. The claims of the '657 patent are invalid for failure to comply with the requirements of Title 35 of the United States Code, including, without limitation, 35 U.S.C. §§ 101, 102, 103, 112, and/or 116, or any other applicable statutory provisions of Title 35 of the U.S. Code.

FIFTEENTH DEFENSE – STATUTORY LIMIT ON DAMAGES

15. Radian's claim for damages, equitable relief, and/or costs is statutorily limited by 35 U.S.C. §§ 286, 287, and/or 288.

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SIXTEENTH DEFENSE – NO WILLFUL INFRINGEMENT

16. Radian is not entitled to enhanced or increased damages for willful infringement because Samsung has not engaged in any conduct that meets the applicable standard for willful infringement.

SEVENTEENTH DEFENSE – NO EXCEPTIONAL CASE

17. Radian cannot prove that this is an exceptional case justifying award of attorney's fees against Samsung pursuant to 35 U.S.C. § 285.

EIGHTEENTH DEFENSE – WAIVER, EQUITABLE ESTOPPEL, ACQUIESCENCE, UNCLEAN HANDS

18. Radian's claims are barred, in whole or in part, or its remedies limited, by the doctrines of waiver, implied waiver, equitable estoppel, acquiescence, and/or unclean hands.

NINETEENTH DEFENSE – PROSECUTION HISTORY ESTOPPEL ('183 PATENT)

19. Radian's claims for relief are barred in whole or in part by prosecution history estoppel and/or prosecution history disclaimer based on amendments, statements, admissions, omissions, representations, disclaimers, and/or disavowals made by the applicants for the '183 patent.

TWENTIETH DEFENSE – PROSECUTION HISTORY ESTOPPEL ('801 PATENT)

20. Radian's claims for relief are barred in whole or in part by prosecution history estoppel and/or prosecution history disclaimer based on amendments, statements, admissions, omissions, representations, disclaimers, and/or disavowals made by the applicants for the '801 patent.

TWENTY FIRST DEFENSE – PROSECUTION HISTORY ESTOPPEL ('772 PATENT)

21. Radian's claims for relief are barred in whole or in part by prosecution history estoppel and/or prosecution history disclaimer based on amendments, statements, admissions,

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omissions, representations, disclaimers, and/or disavowals made by the applicants for the '772 patent.

TWENTY SECOND DEFENSE – PROSECUTION HISTORY ESTOPPEL ('614 PATENT)

22. Radian's claims for relief are barred in whole or in part by prosecution history estoppel and/or prosecution history disclaimer based on amendments, statements, admissions, omissions, representations, disclaimers, and/or disavowals made by the applicants for the '614 patent.

TWENTY THIRD DEFENSE – PROSECUTION HISTORY ESTOPPEL ('955 PATENT)

23. Radian's claims for relief are barred in whole or in part by prosecution history estoppel and/or prosecution history disclaimer based on amendments, statements, admissions, omissions, representations, disclaimers, and/or disavowals made by the applicants for the '955 patent.

TWENTY FOURTH DEFENSE – PROSECUTION HISTORY ESTOPPEL ('656 PATENT)

24. Radian's claims for relief are barred in whole or in part by prosecution history estoppel and/or prosecution history disclaimer based on amendments, statements, admissions, omissions, representations, disclaimers, and/or disavowals made by the applicants for the '656 patent.

TWENTY FIFTH DEFENSE – PROSECUTION HISTORY ESTOPPEL ('657 PATENT)

25. Radian's claims for relief are barred in whole or in part by prosecution history estoppel and/or prosecution history disclaimer based on amendments, statements, admissions, omissions, representations, disclaimers, and/or disavowals made by the applicants for the '657 patent.

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TWENTY SIXTH DEFENSE – LICENSE, IMPLIED LICENSE, EXHAUSTION

26. Radian's claims for patent infringement are precluded, in whole or in part, by the doctrines of license, implied license, and/or exhaustion, including to the extent that any of the allegedly infringing conduct is premised on or related to products made, sold, used, imported, or provided by any licensed entity (whether express or implied) to the Asserted Patents.

TWENTY SEVENTH DEFENSE – NO INJUNCTIVE RELIEF

27. Radian's claims for relief are barred in whole or in part because Radian is not entitled to injunctive relief. Any alleged injury to Radian is not immediate or irreparable and Radian has an adequate remedy at law.

TWENTY EIGHTH DEFENSE – FAILURE TO STATE A CLAIM

28. The Complaint fails to state a claim upon which relief can be granted.

TWENTY NINTH DEFENSE – STANDING/OWNERSHIP

29. To the extent that Radian was not the sole and total owner of all substantial rights in any of the Asserted Patents as of the filing date of the Complaint, Radian lacks standing to bring one or more claims in this lawsuit.

THIRTIETH DEFENSE – ACTIONS OF OTHERS

30. On information and belief, Radian's claims are barred, in whole or in part, because Samsung is not liable for the acts of others over whom it has no control.

THIRTY FIRST DEFENSE – PROSECUTION LACHES

31. Radian's claims for relief are barred and unenforceable, in whole or in part, or its remedies limited, by the doctrine of laches.

THIRTY SECOND DEFENSE – ENSNAREMENT

32. To the extent Radian sufficiently alleges infringement of the Asserted Patents under the doctrine of equivalents, its claims are barred under the ensnarement doctrine to the extent that

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Radian's allegation encompasses, or "ensnares," prior art. Samsung specifically reserves the right to supplement its disclosure with respect to this defense.

RESERVATION OF DEFENSES

Discovery in this action has not yet commenced and Samsung continues to investigate the allegations set forth in the Complaint. Samsung hereby provides explicit notice to Radian that it intends to rely upon such other defenses as may become available by law or in equity, or pursuant to statute, as discovery proceeds in this action, and hereby reserves the right to assert such additional defenses.

SAMSUNG'S COUNTERCLAIMS

In accordance with Rule 13 of the Federal Rules of Civil Procedure, Samsung Electronics Co., Ltd. and Samsung Electronics America, Inc. (collectively, "Samsung") hereby allege and assert the following Counterclaims against Radian Memory Systems LLC ("Radian").

THE PARTIES

1. Samsung Electronics Co., Ltd. ("SEC") is a corporation of the Republic of Korea and has a place of business at 129, Samung-ro, Yeongtong-gu, Suwon-si, Gyeonggi-do, 16677, Republic of Korea.

2. Samsung Electronics America, Inc. ("SEA") is a New York Corporation and has a principal place of business located at 85 Challenger Road, Ridgefield Park, New Jersey 07660.

3. On information and belief, Radian is a Texas limited liability company having its principal place of business at 6275 West Plano Parkway, Suite 500, Plano, Texas 75093.

Jurisdiction and Venue

4. The declaratory judgment Counterclaims arise under the patent laws of the United States, 35 U.S.C. § 1 et seq., the Federal Declaratory Judgment Act, 28 U.S.C. § 2201 et seq. This

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Court has subject matter jurisdiction over these Counterclaims under 28 U.S.C. §§ 1331 1338, 2201, and 2202. An actual controversy exists under the Declaratory Judgment Act because Radian alleges that Samsung has infringed and is infringing United States Patent Nos. 11,544,183 ("the '183 Patent"), 11,709,772 ("the '772 Patent"), 11,681,614 ("the '614 Patent"), 11,740,801 ("the '801 Patent"), 11,347,657 ("the '657 Patent"), 11,347,656 ("the '656 Patent"), and 11,307,995 ("the '995 Patent") (collectively "the Asserted Patents"), and Samsung denies those allegations.

5. This Court has personal jurisdiction over Radian at least by virtue of Radian's consent to the personal jurisdiction of this Court by the filing of the Complaint against Samsung in this Court. Radian is also a Texas limited liability company having its place of business at 6275 West Plano Parkway, Suite 500, Plano, Texas 75093.

6. To the extent venue is found appropriate for Radian's claims against Samsung, then venue for purposes of Samsung's Counterclaims set forth herein is proper in this district under 28 U.S.C. §§ 1391 (b)-(c) and 1400(b) because: (1) this action was filed in this district by Radian and Radian has thus submitted to personal jurisdiction in this Court and has consented to this venue; and (2) the present Counterclaims are in response to the allegations raised in Radian's Complaint.

COUNT ONE

(Declaration of Noninfringement of U.S. Patent No. 11,544,183)

7. Samsung repeats and re-alleges the allegations contained in the immediately preceding Paragraphs 1 through 6 as if fully set forth herein.

8. Radian alleges in its Complaint that it is owner and assignee of all substantial rights in the '183 Patent, and alleges that Samsung infringes the '183 Patent.

9. Samsung does not and never has infringed any valid and enforceable claim of the '183 Patent at least because the Accused Products do not comprise a memory controller to control flash memory comprising: (1) "the flash memory having subdivisions, each of the subdivisions

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corresponding to a respective group of erase blocks, each of the erase blocks such that it must be erased before storage locations in that erase block can be reprogrammed," (2) "logic to track information indicating extent of page utilization of each of the subdivisions," (3) "logic to receive a write request from a host via the host interface, the write request accompanied by an address that designates a specific one of the subdivisions, wherein the logic to track is to, in association with execution of the write request, update the information indicating extent of page utilization of the specific one of the subdivisions," (4) "logic to send the host the information indicating extent of page utilization of the specific one of the subdivisions and an address corresponding to the specific one of the subdivisions,"(5) "logic to receive an erasure request from the host, via the host interface, the erasure request accompanied by the address corresponding to the specific one of the subdivisions, to responsively control erasure of each unerased erase block in the group respective to the specific one of the subdivisions, and to update the information indicating extent of page utilization of the specific one of the subdivisions," and (6) "logic to, in connection with the erasure, detect a defect in one of the erase blocks in the group respective to the specific one of the subdivisions, to responsively substitute one or more different erase blocks of the flash memory for the one of the erase blocks for which the defect was detected."

10. A valid and justiciable controversy exists between Samsung and Radian. Samsung desires a judicial determination and declaration of the respective rights and duties of the parties herein. Such a determination and declaration are necessary and appropriate at this time so that the parties may ascertain their respective rights and duties.

11. Samsung is entitled to a declaratory judgment that they have not infringed and are not infringing any valid and enforceable claim of the '183 Patent.

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COUNT TWO

(Declaration of Invalidity of U.S. Patent No. 11,544,183)

12. Samsung repeats and re-alleges the allegations contained in the immediately preceding Paragraphs 1 through 6 as if fully set forth herein.

13. The claims of the '183 Patent are invalid for failure to comply with the conditions for patentability as set forth in 35 U.S.C. §§ 1 *et seq.*, including 35 U.S.C. §§ 101, 102, 103, and/or 112. By way of example, the asserted claims of the asserted '183 patent are invalid based on, for instance, one or more of U.S. Patent Publication No. 2013/0205102 ("Ellis"), U.S. Pat. No. 7,739,444 ("Sinclair-444"), U.S. U.S. Patent Application No. 2012/0096217 ("Son"), JP2005018490A ("Terasaki-490"), U.S. Patent Publication No. 2011/0271032 ("Yamada"), U.S. Patent Publication No. 2012/0284587 ("Yu"), U.S. Patent Publication No. 2008/0189485A1 ("Jung"), and one or more other prior art references, including references listed on the face of the '183 patent.

14. Radian contends that the '183 Patent is valid and enforceable.

15. A valid and justiciable controversy exists between Samsung and Radian. Samsung desires a judicial determination and declaration of the respective rights and duties of the parties herein. Such a determination and declaration are necessary and appropriate at this time so that the parties may ascertain their respective rights and duties.

16. Samsung is entitled to a declaratory judgment that the claims of the '183 Patent are invalid.

COUNT THREE

(Declaration of Noninfringement of U.S. Patent No. 11,709,772)

17. Samsung repeats and re-alleges the allegations contained in the immediately preceding Paragraphs 1 through 6 as if fully set forth herein.

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18. Radian alleges in its Complaint that it is owner and assignee of all substantial rights in the ’772 Patent, and alleges that Samsung infringes the ’772 Patent.

19. Samsung does not and never has infringed any valid and enforceable claim of the ’772 Patent at least because the Accused Products do not practice a method for providing host with access to an SSD comprising: (1) “dividing the flash memory into zones; wherein the zones are non-overlapping subdivisions of the flash memory, each zone comprises two or more erase units, the erase units in each zone are on two or more different planes, and each zone is associated with a zone start logical block address and a range of logical block addresses,” (2) “in response to a write command from the host to write data to the range of logical block addresses of a specified zone, performing a multi-plane write of said data to erase units on different planes in the specified zone using a common page address for the respective erase units on the different planes,” (3) “generating metadata based on accessing and maintenance of erase units in the specified Zone,” and (4) “based on the metadata, making a notification available to the host that recommends performing maintenance on the specified zone, wherein the recommendation is associated with the zone start logical block address of the specified zone.”

20. A valid and justiciable controversy exists between Samsung and Radian. Samsung desires a judicial determination and declaration of the respective rights and duties of the parties herein. Such a determination and declaration are necessary and appropriate at this time so that the parties may ascertain their respective rights and duties.

21. Samsung is entitled to a declaratory judgment that they have not infringed and are not infringing any valid and enforceable claim of the ’772 Patent.

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COUNT FOUR

(Declaration of Invalidity of U.S. Patent No. 11,709,772)

22. Samsung repeats and re-alleges the allegations contained in the immediately preceding Paragraphs 1 through 6 as if fully set forth herein.

23. The claims of the '772 Patent are invalid for failure to comply with the conditions for patentability as set forth in 35 U.S.C. §§ 1 *et seq.*, including 35 U.S.C. §§ 101, 102, 103, and/or 112. By way of example, the asserted claims of the asserted '772 patent are invalid based on, for instance, one or more of U.S. Pat. No. 8,386,700 ("Olbrich-700"), U.S. Patent Publication No. 2010/0049908A1 ("Gonzalez-908"), U.S. Patent Publication No. 2011/0271032 ("Yamada"), NVM Express Revision 1.0b ("NVMe 1.0b"), U.S. Patent Publication No. 2011/0302477 ("Goss-477"), U.S. Pat. No. 5,404,485 ("Ban"), U.S. Patent Publication No. 2011/0153911 ("Sprouse"), U.S. Pat. No. 7,913,032 ("Cornwell"), and one or more other prior art references, including references listed on the face of the '772 patent.

24. Radian contends that the '772 Patent is valid and enforceable.

25. A valid and justiciable controversy exists between Samsung and Radian. Samsung desires a judicial determination and declaration of the respective rights and duties of the parties herein. Such a determination and declaration are necessary and appropriate at this time so that the parties may ascertain their respective rights and duties.

26. Samsung is entitled to a declaratory judgment that the claims of the '772 Patent are invalid.

COUNT FIVE

(Declaration of Noninfringement of U.S. Patent No. 11,681,614)

27. Samsung repeats and re-alleges the allegations contained in the immediately preceding Paragraphs 1 through 6 as if fully set forth herein.

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28. Radian alleges in its Complaint that it is owner and assignee of all substantial rights in the ’614 Patent, and alleges that Samsung infringes the ’614 Patent.

29. Samsung does not and never has infringed any valid and enforceable claim of the ’614 Patent at least because the Accused Products do not comprise a storage device comprising: (1) “flash memory divided into zones, each zone of the zones being a subdivision comprising a set of erase units, and each erase unit of the set of erase units comprising host accessible pages, wherein each zone,” (2) “has a zone size for which the storage device is operable to receive a management command from a host that results in the storage device performing an erasure of one or more erase units of the set of erase units,” (3) “logic operable to: return information about the zones in response to a query command from the host, the information about the zones comprising a list of the zones accessible by the host, a zone state, the zone size, logical addresses associated with respective zones, and information representing an extent to which the respective zones include host accessible pages available for writing,” (4) “write data to the set of erase units of a specified zone using a multi-plane write command such that the data is written concurrently to two or more erase units of the set of erase units,” and (5) “update the information representing the extent to which the specified zone includes host accessible pages available for writing.”

30. A valid and justiciable controversy exists between Samsung and Radian. Samsung desires a judicial determination and declaration of the respective rights and duties of the parties herein. Such a determination and declaration are necessary and appropriate at this time so that the parties may ascertain their respective rights and duties.

31. Samsung is entitled to a declaratory judgment that they have not infringed and are not infringing any valid and enforceable claim of the ’614 Patent.

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COUNT SIX

(Declaration of Invalidity of U.S. Patent No. 11,681,614)

32. Samsung repeats and re-alleges the allegations contained in the immediately preceding Paragraphs 1 through 6 as if fully set forth herein.

33. The claims of the '614 Patent are invalid for failure to comply with the conditions for patentability as set forth in 35 U.S.C. §§ 1 et seq., including 35 U.S.C. §§ 101, 102, 103, and/or 112. By way of example, the asserted claims of the asserted '614 patent are invalid based on, for instance, one or more of U.S. Patent Publication No. 2013/0205102 ("Ellis"), U.S. U.S. Patent Application No. 2012/0096217 ("Son"), International Publication No. WO 2008/082996 ("Sinclair-996"), JP2008176606A ("Takeo"), JP2005018490A ("Terasaki-490"), U.S. Pat. No. 8,095,765 ("Asnaashari"), and one or more other prior art references, including references listed on the face of the '614 patent.

34. Radian contends that the '614 Patent is valid and enforceable.

35. A valid and justiciable controversy exists between Samsung and Radian. Samsung desires a judicial determination and declaration of the respective rights and duties of the parties herein. Such a determination and declaration are necessary and appropriate at this time so that the parties may ascertain their respective rights and duties.

36. Samsung is entitled to a declaratory judgment that the claims of the '614 Patent are invalid.

COUNT SEVEN

(Declaration of Noninfringement of U.S. Patent No. 11,740,801)

37. Samsung repeats and re-alleges the allegations contained in the immediately preceding Paragraphs 1 through 6 as if fully set forth herein.

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38. Radian alleges in its Complaint that it is owner and assignee of all substantial rights in the ’801 Patent, and alleges that Samsung infringes the ’801 Patent.

39. Samsung does not and never has infringed any valid and enforceable claim of the ’801 Patent at least because the Accused Products do not comprise a storage device comprising: (1) “a memory controller having logic to cause the memory controller to,” (2) “map non-overlapping ranges of logical addresses to respective subdivisions of physical storage in the NAND flash memory, each of the respective subdivisions comprising erase blocks that must each be physically erased as a unit,” (3) “receive write requests, accompanying addresses and accompanying data from a host and, with respect to each one of the write requests, identify a specific one of the respective subdivisions dependent on which one of the non-overlapping ranges encompasses the address accompanying the one of the write requests, program the data accompanying with the one of the write requests into a next available storage location within the specific one of the respective subdivisions, and in association with the programming of the data accompanying the one of the write requests, update information, for the specific one of the respective subdivisions, representing an extent to which the erase blocks of the specific one of the respective subdivisions are full,” (4) “store a value representing a size of the NAND flash memory that is to be physically erased in fulfilling a maintenance request issued by the host,” (5) “provide to the host, responsive to a query received from the host, the information, as updated, and the stored value,” and (6) “update metadata for the specific one of the respective subdivisions, wherein the metadata represents a characteristic of the data in the specific one of the respective subdivisions, with respect to the metadata, as updated, perform a comparison based on the metadata to detect a condition, and store information, responsive to detection of the condition, wherein the information is accessible to the host and indicates that the condition was detected.”

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40. A valid and justiciable controversy exists between Samsung and Radian. Samsung desires a judicial determination and declaration of the respective rights and duties of the parties herein. Such a determination and declaration are necessary and appropriate at this time so that the parties may ascertain their respective rights and duties.

41. Samsung is entitled to a declaratory judgment that they have not infringed and are not infringing any valid and enforceable claim of the '801 Patent.

COUNT EIGHT

(Declaration of Invalidity of U.S. Patent No. 11,740,801)

42. Samsung repeats and re-alleges the allegations contained in the immediately preceding Paragraphs 1 through 6 as if fully set forth herein.

43. The claims of the '801 Patent are invalid for failure to comply with the conditions for patentability as set forth in 35 U.S.C. §§ 1 et seq., including 35 U.S.C. §§ 101, 102, 103, and/or 112. By way of example, the asserted claims of the asserted '801 patent are invalid based on, for instance, one or more of U.S. Patent Publication No. 2009/0271562 ("Sinclair-562"), U.S. Pat. No. 8,621,137 ("Olbrich-137"), JP2005018490A ("Terasaki-490"), U.S. Patent Publication No. 2011/0271032 ("Yamada"), U.S. Patent Publication No. 2014/0047159 ("Ahwal"), International Publication No. WO 2008/082996 ("Sinclair-996"), U.S. Patent Publication No. 2012/0284587 ("Yu"), U.S. Patent Publication No. 2012/0096217 ("Son"), U.S. Patent Publication No. 2008/0189485 ("Jung"), U.S. Patent No. 9,665,291 ("Lin"), U.S. Patent 9,239,781 ("Ellis"), JP 2008176606A ("Takeo"), U.S. Patent 9,423,970 ("Darragh"), and one or more other prior art references, including references listed on the face of the '801 patent.

44. Radian contends that the '801 Patent is valid and enforceable.

45. A valid and justiciable controversy exists between Samsung and Radian. Samsung desires a judicial determination and declaration of the respective rights and duties of the parties

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herein. Such a determination and declaration are necessary and appropriate at this time so that the parties may ascertain their respective rights and duties.

46. Samsung is entitled to a declaratory judgment that the claims of the '801 Patent are invalid.

COUNT NINE

(Declaration of Noninfringement of U.S. Patent No. 11,347,657)

47. Samsung repeats and re-alleges the allegations contained in the immediately preceding Paragraphs 1 through 6 as if fully set forth herein.

48. Radian alleges in its Complaint that it is owner and assignee of all substantial rights in the '657 Patent, and alleges that Samsung infringes the '657 Patent.

49. Samsung does not and never has infringed any valid and enforceable claim of the '657 Patent at least because the Accused Products do not comprise a storage device comprising: (1) "circuitry to receive from a host, and control execution of, incoming requests including data write requests and erase requests, wherein each of the incoming requests is accompanied by incoming address information," (2) "use a first division operation on the second address portion, to identify an addressed segment within the addressed block device, wherein the addressed segment corresponds to a subset of the erase units of the flash memory," (3) "for each of the data write requests, identify from the first division operation a third address portion, and use a second division operation on the third address portion to identify an address value to select one of the erase units from the subset which corresponds to the addressed segment and to identify a storage location within the selected one of the erase units," and (4) "wherein said circuitry is also to execute each one of the incoming erase requests by controlling erasure in the flash memory of one or more of the erase units in the subset corresponding to the addressed segment that was identified from the incoming address information accompanying the one of the incoming erase requests."

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50. A valid and justiciable controversy exists between Samsung and Radian. Samsung desires a judicial determination and declaration of the respective rights and duties of the parties herein. Such a determination and declaration are necessary and appropriate at this time so that the parties may ascertain their respective rights and duties.

51. Samsung is entitled to a declaratory judgment that they have not infringed and are not infringing any valid and enforceable claim of the '657 Patent.

COUNT TEN

(Declaration of Invalidity of U.S. Patent No. 11,347,657)

52. Samsung repeats and re-alleges the allegations contained in the immediately preceding Paragraphs 1 through 6 as if fully set forth herein.

53. The claims of the '657 Patent are invalid for failure to comply with the conditions for patentability as set forth in 35 U.S.C. §§ 1 et seq., including 35 U.S.C. §§ 101, 102, 103, and/or 112. By way of example, the asserted claims of the asserted '657 patent are invalid based on, for instance, one or more of U.S. Pat. No. 5,404,485 ("Ban"), U.S. Pat. No. 8,301,861 ("Reiter"), U.S. Pat. No. 7,984,233 ("Sinclair-233"), Small Computer System Interface (SCSI) Zoned Block Commands (ZBC) Revision 1a ("ZBC"), SCSI Primary Commands - 4 Revision 37 ("SPC-4"), SCSI Block Commands - 4 Revision 2 ("SBC-4"), U.S. Patent Publication No. 2009/0271562 ("Sinclair-562"), U.S. Pat. No. 8,095,765 ("Asnaashari"), U.S. Patent Publication No. 2005/0144367 ("Sinclair-367"), U.S. Patent Publication No. 2011/0271032 ("Yamada"), and one or more other prior art references, including references listed on the face of the '657 patent.

54. Radian contends that the '657 Patent is valid and enforceable.

55. A valid and justiciable controversy exists between Samsung and Radian. Samsung desires a judicial determination and declaration of the respective rights and duties of the parties

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herein. Such a determination and declaration are necessary and appropriate at this time so that the parties may ascertain their respective rights and duties.

56. Samsung is entitled to a declaratory judgment that the claims of the ’657 Patent are invalid.

COUNT ELEVEN

(Declaration of Noninfringement of U.S. Patent No. 11,347,656)

57. Samsung repeats and re-alleges the allegations contained in the immediately preceding Paragraphs 1 through 6 as if fully set forth herein.

58. Radian alleges in its Complaint that it is owner and assignee of all substantial rights in the ‘656 Patent, and alleges that Samsung infringes the ’656 Patent.

59. Samsung does not and never has infringed any valid and enforceable claim of the ’656 Patent at least because the Accused Products do not comprise a storage device comprising: (1) “identify an addressed storage location within the addressed segment from the third address portion, wherein the circuitry is to use a division operation to identify a logical erase unit within the addressed segment, wherein the circuitry is to identify one of the physical erase units that corresponds to the identified logical erase unit,” and (2) “wherein the storage device is to detect a failure condition of the physical erase units and is to remap each logical erase unit which corresponds to one of the physical erase units for which the failure condition is detected to instead correspond to one of the physical erase units for which the failure condition has not been detected and is to utilize the remapped correspondence to service one or more of the incoming data access requests.”

60. A valid and justiciable controversy exists between Samsung and Radian. Samsung desires a judicial determination and declaration of the respective rights and duties of the parties

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herein. Such a determination and declaration are necessary and appropriate at this time so that the parties may ascertain their respective rights and duties.

61. Samsung is entitled to a declaratory judgment that they have not infringed and are not infringing any valid and enforceable claim of the '656 Patent.

COUNT TWELVE

(Declaration of Invalidity of U.S. Patent No. 11,347,656)

62. Samsung repeats and re-alleges the allegations contained in the immediately preceding Paragraphs 1 through 6 as if fully set forth herein.

63. The claims of the '656 Patent are invalid for failure to comply with the conditions for patentability as set forth in 35 U.S.C. §§ 1 et seq., including 35 U.S.C. §§ 101, 102, 103, and/or 112. By way of example, the asserted claims of the asserted '656 patent are invalid based on, for instance, one or more of U.S. Pat. No. 5,404,485 ("Ban"), U.S. Pat. No. 8,301,861 ("Reiter"), Small Computer System Interface (SCSI) Zoned Block Commands (ZBC) Revision 1a ("ZBC"), SCSI Primary Commands - 4 Revision 37 ("SPC-4"), SCSI Block Commands - 4 Revision 2 ("SBC-4"), U.S. Patent Publication No. 2009/0271562 ("Sinclair-562"), U.S. Pat. No. 8,095,765 ("Asnaashari"), U.S. Patent Publication No. 2005/0144367 ("Sinclair-367"), U.S. Patent Publication No. 2011/0271032 ("Yamada"), and one or more other prior art references, including references listed on the face of the '656 patent.

64. Radian contends that the '656 Patent is valid and enforceable.

65. A valid and justiciable controversy exists between Samsung and Radian. Samsung desires a judicial determination and declaration of the respective rights and duties of the parties herein. Such a determination and declaration are necessary and appropriate at this time so that the parties may ascertain their respective rights and duties.

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66. Samsung is entitled to a declaratory judgment that the claims of the '656 Patent are invalid.

COUNT THIRTEEN

(Declaration of Noninfringement of U.S. Patent No. 11,307,995)

67. Samsung repeats and re-alleges the allegations contained in the immediately preceding Paragraphs 1 through 6 as if fully set forth herein.

68. Radian alleges in its Complaint that it is owner and assignee of all substantial rights in the '995 Patent, and alleges that Samsung infringes the '995 Patent.

69. Samsung does not and never has infringed any valid and enforceable claim of the '995 Patent at least because the Accused Products do not comprise a storage device comprising: (1) "identify an addressed storage location within the addressed segment from the third address portion, wherein the circuitry is to use a division operation on at least one of the incoming address information or information derived therefrom, to identify a logical erase unit within the addressed segment, and wherein the circuitry is to identify one of the physical erase units that corresponds to the identified logical erase unit," and (2) remap a correspondence of a logical erase unit which corresponds to the first one of the physical erase units to instead correspond to the second one of the physical erase units.

70. A valid and justiciable controversy exists between Samsung and Radian. Samsung desires a judicial determination and declaration of the respective rights and duties of the parties herein. Such a determination and declaration are necessary and appropriate at this time so that the parties may ascertain their respective rights and duties.

71. Samsung is entitled to a declaratory judgment that they have not infringed and are not infringing any valid and enforceable claim of the '995 Patent.

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COUNT FOURTEEN

(Declaration of Invalidity of U.S. Patent No. 11,307,995)

72. Samsung repeats and re-alleges the allegations contained in the immediately preceding Paragraphs 1 through 6 as if fully set forth herein.

73. The claims of the '995 Patent are invalid for failure to comply with the conditions for patentability as set forth in 35 U.S.C. §§ 1 et seq., including 35 U.S.C. §§ 101, 102, 103, and/or 112. By way of example, the asserted claims of the asserted '995 patent are invalid based on, for instance, one or more of U.S. Pat. No. 5,404,485 ("Ban"), U.S. Pat. No. 8,301,861 ("Reiter"), Small Computer System Interface (SCSI) Zoned Block Commands (ZBC) Revision 1a ("ZBC"), SCSI Primary Commands - 4 Revision 37 ("SPC-4"), SCSI Block Commands - 4 Revision 2 ("SBC-4"), U.S. Patent Publication No. 2009/0271562 ("Sinclair-562"), U.S. Pat. No. 8,095,765 ("Asnaashari"), U.S. Pat. No. 9,141,526 ("Illiadis"), U.S. Patent Publication No. 2005/0144367("Sinclair-367"), U.S. Patent Publication No. 2011/0271032 ("Yamada"), and one or more other prior art references, including references listed on the face of the '995 patent.

74. Radian contends that the '995 Patent is valid and enforceable.

75. A valid and justiciable controversy exists between Samsung and Radian. Samsung desires a judicial determination and declaration of the respective rights and duties of the parties herein. Such a determination and declaration are necessary and appropriate at this time so that the parties may ascertain their respective rights and duties.

76. Samsung is entitled to a declaratory judgment that the claims of the '995 Patent are invalid.

PRAYER FOR RELIEF

Samsung respectfully prays for the following relief and requests that this Court enter judgment as follows:

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A. That the Court enter judgment in favor of Samsung and against Radian on all of Samsung's Defenses;

B. A judgment that the claims of the Asserted Patents are invalid;

C. A judgment that Samsung has not infringed, contributed to the infringement of, or induced others to infringe, either directly or indirectly, any valid claims of the Asserted Patents;

D. An award to Samsung of its fees and expenses of litigation, including but not limited to attorney's fees and costs; and

E. Such other and further relief as this Court may deem just and proper.

DEMAND FOR JURY TRIAL

In accordance with Rule 38 of the Federal Rules of Civil Procedure and Local Rule CV-38, Samsung respectfully demands a trial by jury on all issues so triable in this action.

Dated: September 8, 2025

By */s/ Kevin Hardy*

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CERTIFICATE OF SERVICE

The undersigned hereby certifies that all counsel of record who are deemed to have consented to electronic service are being served with a copy of this document via CM/ECF on September 8, 2025.

/s/ Melissa R. Smith
Melissa R. Smith