HONORABLE JAMES L. ROBART

IN THE UNITED STATES DISTRICT COURT
FOR THE WESTERN DISTRICT OF WASHINGTON
AT SEATTLE

MICROSOFT CORPORATION, Plaintiff, v. MOTOROLA INC., et al., Defendant.	No. C10-1823-JLR **REDACTED** PLAINTIFF MICROSOFT CORPORATION'S POST-TRIAL PROPOSED FINDINGS OF FACT AND CONCLUSIONS OF LAW
MOTOROLA MOBILITY, LLC, et al., Plaintiffs, v. MICROSOFT CORPORATION, Defendant.	

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Plaintiff Microsoft Corporation ("Microsoft") respectfully submits the following proposed findings of fact and conclusions of law. To the extent that anything categorized as a finding of fact is more properly categorized as a conclusion of law, or vice versa, it should be so deemed.

FINDINGS OF FACT

I. THE PARTIES

1. Microsoft is a Washington corporation having its principal place of business in Redmond, Washington. 10/24/12 Pretrial Order (Dkt. # 493) at 2.

2. Motorola, Inc. has changed its corporate name to Motorola Solutions, Inc. ("Motorola Solutions"). Motorola Solutions is a Delaware corporation, having its principal place of business in Schaumburg, Illinois. 10/24/12 Pretrial Order (Dkt. # 493) at 3.

3. Symbol Technologies, Inc. ("Symbol"), which was acquired by Motorola, Inc. in 2007, is now a wholly-owned subsidiary of Motorola Solutions. 11/20/12 Tr. 58-59 (Dailey).

4. Motorola Mobility LLC ("Motorola Mobility") is a Delaware limited liability company, having its principal place of business in Libertyville, Illinois. Motorola Mobility's predecessor-in-interest was Motorola Mobility, Inc. ("MMI"), which was a Delaware corporation also having its principal place of business in Libertyville, Illinois. 10/24/12 Pretrial Order (Dkt. # 493) at 3.

5. MMI was an indirect wholly-owned subsidiary of Motorola, Inc. until it was spun-off from Motorola, Inc. on January 4, 2011. MMI was acquired by Google, Inc. ("Google") on May 22, 2012. Motorola Mobility is MMI's successor-in-interest and a wholly-owned subsidiary of Google. 10/24/12 Pretrial Order (Dkt. # 493) at 3.

6. General Instrument Corporation ("General Instrument") is a Delaware corporation, having its principal place of business in Horsham, Pennsylvania. General

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Instrument was a wholly-owned subsidiary of MMI and now is a direct wholly-owned subsidiary of Motorola Mobility and an indirect wholly-owned subsidiary of Google, Inc. 10/24/12 Pretrial Order (Dkt. # 493) at 3.

7. Motorola, Inc., Motorola Solutions, Symbol, MMI, Motorola Mobility, and General Instrument are collectively referred to herein as "Motorola."

II. STANDARDS & STANDARDS-SETTING ORGANIZATIONS

A. Background

8. The Court has previously found that standards-setting organizations ("SSOs") "play a significant role in the technology market by allowing companies to agree on common technological standards so that all compliant products will work together." 6/6/12 Order (Dkt. # 335) at 3.

9. The Court has likewise found that "[s]tandards lower costs by increasing product manufacturing volume, and they increase price competition by eliminating 'switching costs' for consumers who desire to switch from products manufactured by one firm to those manufactured by another." 6/6/12 Order (Dkt. # 335) at 3.

10. Particularly in the case of interoperability standards, the benefits of standardization often flow from many participants agreeing to make a common choice, rather than from the merits of the specific technology chosen. 11/13/12 Tr. 143 (Murphy).

11. Participants in the standards-setting process enjoy significant potential benefits to having their technology incorporated into a standard, independent of potential royalty income from licensing patents they might have covering their technology. These non-income benefits can include increased demand for participants' products, advantages flowing from familiarity with the contributed technology leading potentially to shorter development lead times, and improved compatibility with proprietary complements. 11/16/12 Tr. 39-40 (Simcoe).

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12. Motorola has recognized that, apart from potential royalties, it benefits from participating in SSOs because such participation "helps drive the standard to allow [it] to deliver what we think our customers will want to buy," "builds a far great understanding of the standard further in advance, and in greater detail, than would be possible from just buying and reading the published specification," and "provides an excellent opportunity to get information from operators, manufacturers and the regulators." Ex. 141 at MOTM_WASH1823_0539064; 7/17/12 Dep. of H. Benn at 42:15-44:24.

B. Patented Technology In Standards

13. The engineers that develop industry standards typically do not know if the use of the technology they are considering implicates a patent or patents. 11/16/12 Tr. 17:5-8 (Simcoe).

14. For example, Gary Sullivan, Co-chairman of the Joint Video Team that developed the H.264 video compression standard, did not analyze any particular patents in his work on the standard. 11/14/12 Tr. 44:4-21 (Sullivan).

15. Ajay Luthra, the other Co-chairman of the Joint Video Team, did not provide other participants with information about relevant Motorola patents. 11/19/12 Tr. 22:6-12.

16. Much of the technology that is incorporated in industry standards is not patented. 11/16/12 Tr. 17:9-12 (Simcoe).

17. For example, the key contribution to the H.264 standard was made by Telenor Group, which did not obtain patents on the technology that it contributed. 11/14/12 Tr. 43:3-8 (Sullivan); 11/14/12 Tr. 114:21-115:5 (Orchard).

18. Likewise, the 802.11 standard was based in large measure on a long history of research and development by companies, government agencies, and academic institutions that was in the open literature. 11/15/12 Tr. 96:16-24 (Gibson).

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C. The Risks Of "Hold-up" And Royalty Stacking

19. Nevertheless, using a standard frequently does require use of patented technology. *See, e.g.*, Ex. 1152 (listing more than 2400 patents determined to be essential to the H.264 standard); 11/16/12 Tr. 108:21-109:9 (Lynde) (stating there are probably thousands of patents essential to the 802.11 standard).

20. When the standard becomes widely used, the holders of "standard essential patents" or "SEPs" obtain substantial leverage to demand more than the value of their specific patented technology even if there were many equally good alternatives to that technology available when the original standard was adopted. After the standard is widely implemented, switching to those alternatives is either no longer viable or would be very costly. 11/13/12 Tr. 140:2-23, 141:18-23 (Murphy); Ex. 1414 at 28036.

21. Where a given patent is "essential" to a standard, it does not follow that that patent was economically valuable beforehand or was "essential" to creating the standard; rather, it becomes "essential" because use of the standard requires infringement of the patent, even if acceptable alternatives could have been written into the standard instead. To be economically valuable before adoption, the patent in question must be the only or a substantially superior way to achieve the desired end; if there were alternatives to achieve that function, and those setting the standard simply chose an approach that happens to be patented, the "essential" patent in question would not be economically valuable. 11/16/12 Tr. 18:9-21 (Simcoe); 11/13/12 Tr. 199:11-200:15 (Murphy).

22. The ability of a holder of a SEP to demand more than the value of its patented technology and to attempt to capture the value of the standard itself is referred to as patent "hold-up." 11/13/12 Tr. 140:2-23 and 141:18-23 (Murphy); Ex. 1414 at 28036. *See also* 11/19/12 Tr. 166:24-167:22 (Schmalensee) (explaining that the "essence of hold-up" is that

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while *ex ante* competition constrains what a patent holder can obtain for access to its patent, *ex post*, the technology in the standard does not face that competition).

23. The threat of hold-up increases as the standard becomes more widely implemented and firms make sunk cost investments that cannot be recovered should they be forced to forego implementation of the standard or the standard is changed. 11/13/12 Tr. 143:1-18 (Murphy); 11/16/12 Tr. 86:20-87:2 (Lynde).

24. Hold-up can threaten the diffusion of valuable standards and undermine the standards-setting process. Ex. 1414 at 28036; 11/13/12 Tr. 144:25-145:11, 147:22-148:13 (Murphy).

25. In addition to harming firms that are forced to pay higher royalties, hold-up also harms consumers to the extent that those excess costs are passed on to them. Ex. 1414 at 28036; 11/13/12 Tr. 144:25-145:6, 147:22-148:13 (Murphy).

26. Hold-up by one SEP holder also harms other firms that hold SEPs relating to the same standard because it jeopardizes further adoption of the standard and limits the ability of those other holders to obtain appropriate royalties on their technology. 11/13/12 Tr. 144:25-145:11 (Murphy).

27. Complex industry standards like the H.264 and 802.11 standards at issue here can require the use of hundreds or thousands of SEPs held by dozens of patent holders. Exs. 1150-54 (listing patents claimed or determined to be essential to the H.264 standard and patent holders that made blanket disclosures); Exs. 1156, 1158-59, 1164 (listing patents claimed or determined to be essential to the 802.11 standard and patent holders that made blanket disclosures); 11/16/12 Tr. 108:21-109:8 (Lynde) (the number of SEPs related to the 802.11 standard "generally is acknowledged to be in the thousands").

28. High tech products can comply with dozens or even hundreds of different standards. For example, a typical PC implements as many as 80 or 90 different formal

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standards, and a couple hundred informal interoperability standards. 11/16/12 Tr. 128:2-10 (Lynde).

29. In the context of standards having many SEPs, and products that comply with multiple standards, the risk of the use of post-adoption leverage to exact excessive royalties is compounded by the number of potential licensors, which can result in cumulative royalty levels that can undermine the standards. 11/13/12 Tr. 141:24-142:22, 145:12-146:14 (Murphy); 11/16/12 Tr. 127:23-128:10 (Lynde).

30. The payment of excessive royalties to many different holders of SEPs is referred to as "royalty stacking." 11/13/12 Tr. 141:24-142:22 (Murphy).

D. SSO Intellectual Property Policies

31. Standards-setting organizations seek to promote widespread adoption of their standards because the interoperability benefits of standards depends on their broad implementation. 11/16/12 Tr. 15:15-20 (Simcoe); 11/19/12 Tr. 136:25-137:3 (Schmalensee).

32. As the Court has previously found:

> In order to reduce the likelihood that owners of [standard] essential patents will abuse their market power, many standard setting organizations, including the IEEE and ITU have adopted rules relating to the disclosure and licensing of essential patents. The policies often require or encourage members of the standards setting organizations to identify patents that are essential to a proposed standard and to agree to license their essential patents on reasonable, and non-discriminatory ("RAND") terms to anyone who requests a license. Such rules help to insure that standards do not allow essential patent owners to extort their competitors or prevent competitors from entering the marketplace.

6/6/12 Order (Dkt. # 335) at 3-4. *See also* Ex. 1414 at 28036-37 (describing basic elements of SSO intellectual property policies); 11/16/12 Tr. 19:3-24, 21:24-23:7 (Simcoe) (same); Exs. 1575 (Guidelines for Implementation of Common Patent Policy of the ITU-T/ITU-R/ISO/IEC) and 1568 (IEEE-SA Standards Board By-Laws).

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33. As the term is used by SSOs, an "essential" patent is one that is necessary to implement either an optional or mandatory provision of a standard. 11/16/12 Tr. 17:18-25 (Simcoe); Ex. 1568 at MS-MOTO_1823_00004073096 (IEEE-SA Standards Board Bylaws).

34. The Federal Trade Commission has stated that "[t]he most common mechanism used by SSOs to attempt to prevent patent hold-up is the RAND commitment." Ex. 1414 at p. 28037.

35. Likewise, Motorola's expert, MIT economics professor Richard Schmalensee, has acknowledged that "the RAND commitment and the whole apparatus exists to deal with hold-up." 11/19/12 Tr. 142:13-16, 157:20-23 (Schmalensee).

36. The RAND commitment also addresses royalty stacking and the need to ensure that the aggregate royalties associated with a given standard are reasonable. 11/13/12 Tr. 146:15-147:2 (Murphy); 11/16/12 Tr. 15:14-16:7 (Simcoe).

37. Motorola emphasized the risk of royalty stacking in the standards context in a submission it made (together with Nokia and Ericsson) to the European Telecommunications Standards Institute ("ETSI") in 2006. Ex. 1031 at MOTM_WASH1823_0420998 ("cumulative royalties are perceived to be uncertain and often too high, possibly even prohibitive."); 11/16/12 Tr. 25:16-24 (Simcoe).

38. In its ETSI submission, Motorola proposed that RAND commitments be interpreted to require patent holders "to grant licenses on terms that are objectively commercially reasonable taking into account the overall licensing situation and including the cost of obtaining all necessary licenses from all other relevant patent holders for the technologies in the end product." Ex. 1031 at MOTM_WASH1823_0420999; 11/16/12 Tr. 25:25-26-22 (Simcoe).

39. In the same submission, Motorola also advocated a principle of proportionality, suggesting that "[c]ompensation under FRAND must reflect the patent owner's proportion of

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all essential patents. This is not simply a numeric equation but the compensation must, within reasonable bounds, reflect the contribution." Ex. 1031 at MOTM_WASH1823_0420999; 11/16/12 Tr. 25:25-26:22 (Simcoe).

40. Motorola sought to "signal to judges in patent litigation that they can and should look at the overall cumulative royalty costs for a given standard and not just assess whether the terms being offered by one particular licensor are fair and reasonable *in vacuo*." Ex. 1031 at MOTM_WASH1823_042999; 11/16/12 Tr. 76:2-10 (Simcoe).

41. While ETSI did not formally modify its intellectual property policy in response to Motorola's submission, the principles that Motorola articulated were already commonly understood elements of the RAND commitment. 11/16/12 Tr. 27:5-12, 75:19-76:1 (Simcoe).

42. Indeed, Motorola stated in its submission to ETSI that notions that RAND royalties must be objectively commercially reasonable taking into account the cost of obtaining all necessary licenses from all other relevant patent holders for the technologies in the end product and that each patent holder's compensation should reflect only its proportion of all standard essential patents were not new, but were "really in the nature of clarifications of *existing* FRAND rules and *commonly understood goals*." Ex. 1031 at MOTM_WASH1823_0420999 (emphasis added).

1. The ISO/IEC/ITU Common Patent Policy

43. The International Organization for Standardization and the International Electrotechnical Commission ("ISO/IEC"), and the International Telecommunications Union ("ITU"), two standards setting organizations, jointly developed the H.264 standard, which relates to video compression and is one of the two standards at issue in this case. 11/13/12 Tr. 208-209 (Sullivan).

44. The ITU and ISO/IEC maintain a common patent policy, the "sole objective" of which is to ensure that "a patent embodied fully or partly in a Recommendation | Deliverable

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must be accessible to everybody without undue constraints." Ex. 1575 at MOTM_WASH1823_0602815.

45. The ITU/ISO/IEC Common Patent Policy and Implementation Guidelines encourage disclosure of potentially essential patents "as early as possible" in the standards development process. Ex. 1575 at MOTM_WASH1823_0602808.

46. Once a patent holder has disclosed a potentially essential patent or makes a blanket disclosure stating that it may have a patent or patents essential to a proposed standard without identifying them specifically, the ITU will seek a licensing commitment from the patent-holder using a standardized IPR disclosure form. This form provides three options to the patent holder: (1) the patent holder may commit to license its essential patent(s) on a royalty-free basis; (2) the patent holder may commit to license its essential patent(s) on RAND terms and conditions; or (3) the patent holder may decline to make any licensing commitment. Ex. 1575 at MOTM_WASH1823_0602815.

47. A patent holder willing to make a licensing commitment is given the option of making its commitment conditional on "reciprocity." Ex. 1575 at MOTM_WASH1823_0602818.

48. Under the ISO/IEC/ITU policy, when a patent holder has conditioned its licensing commitment on reciprocity, "the Patent Holder shall only be required to license any prospective licensee if such prospective licensee will commit to license its essential patent(s) or essential patent claim(s) for implementation of the same above document free of charge or under reasonable terms and conditions." Ex. 1575 at MOTM_WASH1823_0602818.

49. If the owner of a declared essential patent declines to make a RAND or royalty-free licensing commitment, the standard must be written to avoid infringing the patent. Specifically, the ISO/IEC/ITU policy indicates that the approved standard "shall not include provisions depending on the patent." Ex. 1575 at MOTM_WASH1823_0602815.

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50. Motorola Mobility, its predecessors, and its wholly-owned subsidiary General Instrument submitted several intellectual property disclosures to the ITU in connection with the development of the H.264 standard. Ex. 2838.

51. All of Motorola's disclosures indicated that it would "grant to an unrestricted number of applicants on a worldwide, non-discriminatory basis and on reasonable terms and conditions" licenses conditioned on reciprocity or words to that effect. Ex. 2838; 11/20/12 Tr. 33:21-34:12 (Dailey).

2. The IEEE IP Policy

52. The Institute of Electrical and Electronics Engineers Standards Association ("IEEE-SA" or "IEEE") established the 802.11 standard, which relates to wireless local area networks and is the second of the standards at issue in this matter.

53. The intellectual property policy of the IEEE is set forth in the IEEE-SA Standards Board Bylaws and its Operations Manual. 11/16/12 Tr. 27:22-28:9 (Simcoe); Ex. 1568 at MS-MOTO_1823_00004073082; Ex. 1130 at MS-MOTO_1823_00005246469.

54. The IEEE-SA Standards Board Bylaws provide that IEEE standards may include "Essential Patent Claims," which it defines as "any Patent Claim the use of which was necessary to create a compliant implementation of either mandatory or optional portions of the normative clauses of the [Proposed] IEEE Standard when, at the time of the [Proposed] IEEE Standard's approval, there was no commercially and technically non-infringing alternative." Ex. 1568 at MS-MOTO_1823_00004073096 (§ 6.1).

55. The Standards Board Bylaws indicate that "[i]f the IEEE receives notice that a [Proposed] IEEE Standard may require the use of a potential Essential Patent Claim, the IEEE shall request licensing assurance, on the IEEE Standards Board approved Letter of Assurance form, from the patent holder or patent applicant." Ex. 1568 at MS-MOTO_1823_000040730976 (§ 6.2).

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56. The IEEE Letter of Assurance form allows declared essential patent holders to provide either "[a] general disclaimer to the effect that the Submitter without conditions will not enforce any present or future Essential Patent Claims" or "[a] statement that a license for a compliant implementation of the standard will be made available to an unrestricted number of applicants on a worldwide basis without compensation or under reasonable rates, with reasonable terms and conditions that are demonstrably free of any unfair discrimination." Ex. 1568 at MS-MOTO_1823_000040730977 (§ 6.2).

57. The IEEE Letter of Assurance form allows, but does not require, the disclosure of specific patents or pending patent applications that may be or become essential to the standard under consideration. 11/16/12 Tr. 19:3:24 (Simcoe); 11/16/12 Tr. 108:21-109:4 (Lynde).

58. A Letter of Assurance that commits to license unspecified patents or pending applications for a particular standard is called a "blanket" disclosure. 11/16/12 Tr. 19:21-24 (Simcoe); 11/16/12 Tr. 108:21-109:4 (Lynde).

59. Motorola and Symbol Technologies submitted numerous blanket Letters of Assurance to the IEEE in relation to the 802.11 standard. Exs. 1407, 2839.

60. With these Letters of Assurance, Motorola and Symbol agreed to grant, on reasonable terms and conditions, licenses to their patents that are essential to the 802.11 on a worldwide and non-discriminatory basis. 11/20/12 Tr. 32:19-23 (Dailey).

61. Symbol and Motorola submitted their first blanket Letters of Assurance committing to license their patents essential to the 802.11 standard in 1993 and 1994, respectively. Ex. 1407 (Symbol Letter of Assurance dated 11/8/1993); Ex. 2839 at MOTM_WASH1823_0000004 (Motorola Letter of Assurance dated 3/1/1994).

62. The IEEE Operations Manual in place at the time that Motorola and Symbol made their initial RAND commitments with respect to the 802.11 standard provided that

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"[p]atent holders shall submit to the Patent Committee of the IEEE Standards Board, prior to any significant drafting of the standard, a draft of their license that assures that the technology will be made available *at nominal competitive costs* to all who seek to use it for compliance with an incorporated IEEE standard." Ex. 1130 at MS-MOTO_1823_00005246490 (§ 6.3.2) (emphasis added).

63. The requirement to license at nominal competitive costs was part of the RAND commitment at the time that Motorola and Symbol first committed to license their 802.11 SEPs on RAND terms. 11/16/12 Tr. 28:10-30:9 (Simcoe).

III. ECONOMIC GUIDEPOSTS FOR ASSESSING RAND TERMS

A. Basic Principles

64. From an economic perspective, a RAND commitment should be interpreted to limit a patent holder to a reasonable royalty on the economic value of its patented technology itself, apart from the value associated with incorporation of the technology into the standard. 11/13/12 Tr. 151:19-153:21 (Murphy).

65. Motorola's expert, Professor Richard Schmalensee, agreed that if you make a RAND commitment, you are entitled only "to some ill-defined measure [of] return on the value of the [patented] property, but you are not entitled to the incremental value that you get because you are part of the standard." 11/19/12 Tr. 168:21-169:8 (Schmalensee).

66. The economic value of patented technology isolated from the value derived from incorporation in the standard would ideally be determined by calculating the incremental value of the technology compared to the alternatives that could have been written into the standard instead. The focus is on the period before the standard was adopted and implemented (*i.e., ex ante*). 11/13/12 Tr. 199:9-200:15 (Murphy).

67. Professor Schmalensee has written that "FRAND licensing must consider two key factors: (1) contribution of the patented invention to the standard and (2) the existence of

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any substitute technologies and the general level of competition." Ex. 293 at 675. *See also* 11/19/12 Tr. 177:20-178:5 (Schmalensee).

68. Professor Schmalensee has likewise acknowledged that, in the event of a dispute regarding RAND royalties, "[t]he various parties could make their cases in court for the relative values of their IP contributions to the standard, *in the context of other options considered during the standard's early developmental phases*. If a component had multiple alternatives before the standard was settled, its incremental contribution, properly measured, may be close or equal to zero." Ex. 293 at 705-06 (emphasis added); 11/19/12 Tr. 165:23-166:6 (Schmalensee).

69. In any event, a RAND royalty should be set at a level consistent with the SSOs' goal of promoting widespread adoption of their standards. 11/13/12 Tr. 139:17-140:1, 203:14-18 (Murphy).

70. In the context of a dispute concerning whether or not a given royalty is RAND, a proper methodology used to determine a RAND royalty should therefore recognize and seek to mitigate the risk of patent hold-up that RAND commitments are supposed to avoid. 11/16/12 Tr. 15:14-16:7, 44:10-13, 71:14-25 (Simcoe); 11/13/12 Tr. 144:11-24, 203:14-18 (Murphy).

71. Likewise, a proper methodology for determining a RAND royalty should address the risk of royalty stacking by considering the aggregate royalties that would apply if similarly situated SEP holders made royalty demands equivalent to those of the patent holder in question. 11/16/12 Tr. 15:14-16:7, 44:10-13 (Simcoe); 11/13/12 Tr. 203:14-19 (Murphy).

72. In its submission to ETSI, Motorola advocated considering the implications of a given party's royalty demand in light of the potential demands of other holders of SEPs relating to the standard. Ex. 1031 at MOTM_WASH1823_0420999.

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B. The Selection Of Appropriate Comparables

73. Given the potential complexity of attempting to determine the hypothetical *ex ante* value of a large number of SEPs years after a standard has been developed, economists look for market-based transactions or comparables that can serve as a proxy for that difficult retrospective effort and are consistent with the underlying purposes of the RAND commitment. 11/13/12 Tr. 152:21-153:21; 203:3-10 (Murphy).

1. Patent Pools

74. Patent pools have several features that can make them appropriate benchmarks for establishing RAND terms and conditions. 11/13/12 Tr. 155:9-24, 147:2-21, 152:21-153:21 (Murphy); 11/16/12 Tr. 31:8-22 (Simcoe); 11/16/12 Tr. 84:21-86:4 (Lynde).

75. Such pools are generally focused on a single standard and include only patents that have been analyzed by an independent reviewer and found essential to that standard. 11/13/12 Tr. 156:25-157:10 (Murphy); 11/16/12 Tr. 20:16-21:2 (Simcoe); 11/16/12 Tr. 85:9-12 (Lynde); 11/13/12 Tr. 124:9-17 (Glanz with reference to MPEG LA H.264 patent pool).

76. Consistent with the underlying purpose of the RAND commitment, pools share the SSOs' goal of fostering the success and widespread adoption of the standard, a goal that Motorola itself advocated with respect to the MPEG LA H.264 patent pool. 11/13/12 Tr. 147:2-21 (Murphy); 11/13/12 Tr. 75:2-76:5 (Glanz with reference to MPEG LA H.264 patent pool); Ex. 1642 (with respect to MPEG LA H.264 patent pool, Motorola was in "favor of finding the right mix of terms that will result in a successful license for the marketplace.").

77. Given their desire to facilitate widespread implementation of the standard, pools set rates at levels that implicitly avoid the hold-up and royalty stacking problems that could be a barrier to broad adoption. 11/13/12 Tr. 147:2-21, 155:9-24 (Murphy).

78. Particularly when a pool is formed at or near the time the standard is promulgated or before it is widely implemented, the terms and conditions of the pool

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arrangement provide a real-world indication of the terms that would have been reached in a pre-adoption *ex ante* setting – *i.e.*, before implementers have made substantial sunk cost investments. 11/13/12 Tr. 156:9-14 (Murphy); 11/16/12 Tr. 84:21-85:17 (Lynde).

79. Because of their multilateral nature and the expectation that additional patent holders will eventually join the pool as licensors, patent pools must choose an aggregate royalty rate covering many different licensors and patents; as a result, pools also address the royalty stacking problem. 11/13/12 Tr. 125:2-10 (Glanz); 11/13/12 Tr. 147:2-21; 179: 9-14; 203:12-20 (Murphy); 11/15/12 Tr. 84:21-85:8; 89:8-90:1 (Lynde).

80. Indeed, pools of SEPs have emerged, in part, to address the problem of royalty stacking. Ex. 2945 at MOTM_WASH1823_0604875, 0604877.

81. Because of the need to attract both licensors and licensees, pool royalties must balance the interests of SEP holders and implementers. Royalties must be set high enough to attract a critical mass of patent holders and low enough to foster the basic purpose of the standard itself: widespread adoption (which in turn enhances the total royalty payment to pool members). Failure to achieve this balance could lead many prospective licensees to implement a competing standard instead, a problem that Motorola identified in connection with the H.264 standard. 11/13/12 Tr. 74:19-76:5 (Glanz with reference to the MPEG LA H.264 patent pool); 11/16/12 Tr. 89:8-90:10 (Lynde); 11/16/12 Tr. 34:18-35:10 (Simcoe); 11/13/12 Tr. 147:2-21, 156:14-22, 170:2-11 (Murphy); Ex. 1139 at 17604-05 and 11/13/12 Tr. 80:19-81:1 (Glanz) (Motorola noted that certain proposed MPEG LA pool rates for H.264 were "too expensive for mobile" devices and would lead to adoption of "alternative video coding technologies.")

82. In a submission to ETSI, Motorola stated that an approach to RAND determination that looks to collective licensing arrangements like pools was "complementary" and "synergistic" with the need for RAND terms to produce aggregate reasonable royalties and

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reflect the principle of proportionality. 11/16/12 Tr. 33:19-34:8 (Simcoe); Ex. 1033 at MOTM_WASH1823_0421106.

83. Motorola noted that pools can provide a "one stop shop," making it easier for licensees to access large numbers of essential patents in one place. 11/16/12 Tr. 33:14-17; Ex. 1033 at MOTM_WASH1823_0421106.

84. In the same vein, the U.S. Department of Justice and Federal Trade Commission *Antitrust Guidelines for the Licensing of Intellectual Property* state that patent pools "may provide procompetitive benefits by integrating complementary technologies, reducing transaction costs, clearing blocking positions, and avoiding costly infringement litigation." Ex. 1032 at § 5.5; 11/16/12 Tr. 36:8-21 (Simcoe).

85. The Department of Justice reviewed and approved two of the early standards-focused patent pools, the MPEG LA MPEG-2 patent pool and the DVD patent pool. 11/16/12 Tr. 37-22-38:2 (Simcoe).

86. In its 2006 submission to ETSI, Motorola endorsed the view that the licensing terms that emerge from pools can be expected to be "reasonable due to the 'dual' role of most of the members (IPR owners and future licensees)." Ex. 1033 at MOTM_WASH1823_0421107; 11/16/12 Tr. 34:18-35:10 (Simcoe).

87. Motorola concluded in its submission to ETSI that pool arrangements are good comparables and provide a "benchmark" for RAND terms and conditions. 11/16/12 Tr. 35:18-25 (Simcoe); Ex. 1033 at MOTM_WASH1823_0421107 (pool licensing terms "provide a benchmark for the level of Aggregate Reasonable Terms and the proportionality in the public domain, which will increase transparency").

2. Bilateral *Ex Post* Agreements

88. Where a patent owner has engaged in hold-up, the hold-up royalties will be reflected in a bilateral agreement. 11/15/12 Tr. 158:10-15 (Schmalensee).

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89. If a bilateral agreement was entered into after widespread adoption of a standard, it must be scrutinized for evidence of improper hold-up, in part because, up to this point, "the RAND commitment hasn't been fully litigated through" and one cannot simply assume that patent owners have always complied with their RAND commitments. 11/13/12 Tr. 162:19-22, 180:2-22 (Murphy).

90. Efforts to interpret the RAND commitment solely as an obligation to negotiate simply facilitate hold-up. Absent imposition of a meaningful constraint on the royalties that a SEP holder can receive, the skewed bargaining dynamic between a SEP holder and an implementer in the context of bilateral negotiation is likely to result in hold-up. 11/13/12 Tr. 153:22-155:8, 180:2-181:17 (Murphy); 11/16/12 Tr. 51:4-8 (Simcoe).

91. As a result, absent facts and circumstances indicating that they were negotiated under external conditions that prevented hold-up altogether or that forced the parties to exclude hold-up value, *ex post* bilateral license agreements are, as a general matter, a less reliable benchmark than collective license arrangements for assessing RAND terms. 11/13/12 Tr. 180:2-22, 155:9-24 (Murphy).

92. A clear judicial statement that a RAND commitment requires more than negotiation and, instead, places a meaningful constraint on the ability of SEP holders to capture hold-up value or impose royalties that would be unreasonable in the aggregate will facilitate agreement in future bilateral negotiations. 11/13/12 Tr. 180:2-13, 181:13-18 (Murphy).

IV. H.264

A. H.264 Related Patents – Summary

93. Of the Motorola patents that Motorola claims are essential to practice the H.264 standard, all but two relate to interlaced video. 11/14/12 Tr. 98 (Orchard). Motorola's other two patents, which are not limited to interlaced video, apply only to specific hardware

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implementations, which are not included in any Microsoft product. 11/14/12 Tr. 98, 134-135, 139 (Orchard).

94. Interlaced video is not important to H.264 now and will not be in the future. 11/14/12 Tr. 98 (Orchard); 11/19/12 Tr. 65 (Drabik). Most modern video is progressive, not interlaced, and interlaced video is becoming even less common. 11/14/12 Tr. 104 (Orchard).

95. During the development of the H.264 standard, the Motorola patents had known substitutes that could have been used instead without affecting the performance of the standard. 11/14/12 Tr. 98 (Orchard).

B. Background On Video Processing

96. Video compression is the processing of video to transform it into compressed video that requires less data storage than the original uncompressed video. 11/14/12 Tr. 101 (Orchard).

97. Video compression is important because modern digital video, particularly high definition video, requires immense amounts of data storage. 11/14/12 Tr. 101 (Orchard).

98. Encoding compresses the original uncompressed video by turning it into a smaller file or stream that requires less storage capacity and less bandwidth to transmit. 11/14/12 Tr. 101 (Orchard). Decoding turns an encoded smaller file back into an approximation of the original, uncompressed video. 11/14/12 Tr. 101 (Orchard).

99. Coding tools are individual tools that are used in the process of encoding or decoding. 11/14/12 Tr. 101-102 (Orchard). A video compression standard normally defines many different coding tools, with different tools used for different purposes. 11/14/12 Tr. 102 (Orchard). Each tool contributes a small amount to the compression of video. 11/14/12 Tr. 101-102 (Orchard). Together, the coding tools provide some aggregate level compression; this compression level varies from standard to standard. 11/14/12 Tr. 101-102 (Orchard).

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1. Interlaced And Progressive Video

100. Interlaced video is a "primitive compression technology" developed around 1940. 11/13/12 Tr. 214 (Sullivan); 11/14/12 Tr. 104 (Orchard). The aim of using interlaced video was to reduce the amount of data being sent in a television broadcast signal by sending only half of a picture at a time. 11/13/12 Tr. 37 (DeVaan). Modern digital techniques compress video more efficiently than interlaced video. 11/13/12 Tr. 214 (Sullivan); 11/14/12 Tr. 102 (Orchard); 11/14/12 Tr. 105 (Orchard). As a result, interlaced video is not widely used today. 11/14/12 Tr. 102 (Orchard).

101. As indicated above, interlaced video compression separately captures the even and odd lines of the pictures comprising a video. 11/14/12 Tr. 102 (Orchard); 11/13/12 Tr. 37 (DeVaan). The odd lines are collectively called a field, and the even lines are another field. Two consecutive fields, an odd field and the corresponding even field, represent an entire picture and are called a frame. 11/14/12 Tr. 103 (Orchard). In old interlaced televisions sets which showed analog television broadcasts, motion appeared smoother if different halves of the picture (alternating between the even and odd lines) were displayed in quick succession, compared to displaying the entire picture repeatedly, but at a slower pace. 11/1412 Tr. 104 (Orchard).

102. Using interlaced video is no longer necessary because modern flat screen televisions and computer displays rapidly show the entire picture independently of the speed at which television pictures are stored or transmitted. 11/14/12 Tr. 104 (Orchard). Given the capabilities of computer displays and modern televisions, interlaced video "is a solution to a problem that no longer exists." 11/14/12 Tr. 105 (Orchard).

103. Modern televisions use progressive video, where each picture (or frame) contains all the lines, not just half. 11/14/12 Tr. 104 (Orchard); 11/14/12 Tr. 105 (Orchard).

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Computer displays all use progressive video; they do not use interlaced video. 11/13/12 Tr. 37-38 (DeVaan); 11/14/12 Tr. 104 (Orchard); 11/14/12 Tr. 105 (Orchard).

104. Progressive video is simply a sequence of entire pictures, such as those taken with a still camera. 11/14/12 Tr. 102 (Orchard).

105. Video captured as interlaced video can be converted to progressive form, particularly if it is eventually going to be displayed on a progressive screen. 11/14/12 Tr. 103 (Orchard). Progressive video is never converted to interlaced video. 11/14/12 Tr. 103 (Orchard).

106. Accordingly, interlaced content is very rare in today's world. Archived interlaced video may still be stored in interlaced format, but this is rare and it is becoming increasingly rarer, as archived video is converted to progressive form and used that way. 11/14/12 Tr. 102-104 (Orchard).

2. Compressing Interlaced Video

107. Interlaced coding tools increase the efficiency of coding interlaced material. 11/14/12 Tr. 103, 105 (Orchard). These tools were developed for MPEG-2 in 1991 and 1992 and were included in the MPEG-2 standard that was published in 1995. 11/14/12 Tr. 105 (Orchard); Ex. 1479. These tools have been incorporated into other standards such as MPEG-4 that predate H.264. 11/14/12 Tr. 48-49 (Sullivan).

108. Adaptive frame/field coding chooses whether to code a particular piece of interlaced material as a frame, or to code the material as two separate fields. 11/14/12 Tr. 118 (Orchard). Frame coding processes consecutive lines of the picture together. 11/14/12 Tr. 103 (Orchard). Field coding separates odd and even lines and processes each separately. Motorola did not invent adaptive frame/field coding. 11/14/12 Tr. 118 (Orchard).

109. There are two types of adaptive frame/field coding: Picture Adaptive Frame/Field coding ("PICAFF" or "PAFF") and Macroblock Adaptive Frame/Field Coding

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("MBAFF"). 11/14/12 Tr. 27-28 (Sullivan). Motorola did not invent or make the seminal contributions to either PICAFF or MBAFF. 11/14/12 Tr. 12, 13 (Sullivan); 11/19/12 Tr. 53 (Drabik). The PICAFF and MBAFF technologies in H.264 are essentially the same as PICAFF and MBAFF in prior video coding standards. 11/14/12 Tr. 12, 13 (Sullivan).

110. PICAFF chooses between field and frame coding for an entire picture, so the picture is either entirely coded as a frame or as two separate fields. 11/14/12 Tr. 119 (Orchard). PICAFF is not used for progressive video. 11/14/12 Tr. 103, 106 (Orchard).

111. MBAFF chooses between field coding and frame coding for each macroblock, thereby choosing to code a macroblock as a frame or as two separate fields. 11/14/12 Tr. 119 (Orchard). MBAFF is not used for progressive video. 11/14/12 Tr. 120 (Orchard).

112. During the development of H.264, Motorola proposed a change to MBAFF where the choice between field or frame coding would be made for two macroblocks at a time, rather than for each macroblock individually. 11/14/12 Tr. 120 (Orchard). To distinguish the two types of MBAFF, MPEG-2's MBAFF is referred to as single macroblock MBAFF (11/14/12 Tr. 120 (Orchard)), and Motorola's proposal is referred to as paired macroblock MBAFF, (11/14/12 Tr. 120 (Orchard)). Paired macroblock MBAFF was adopted as a part of the H.264 standard. 11/14/12 Tr. 120 (Orchard).

C. Background Of The H.264 Standard

1. Development Of The H.264 Standard

113. The H.264 standard resulted from the contributions of roughly 170 entities, who submitted over 2300 contribution documents. 11/14/12 Tr. 108 (Orchard). H.264 is a large and technically complex standard developed with the goal of providing significantly improved compression compared to prior video standards. Ex. 610; 11/13/12 Tr. 211 (Sullivan). Motorola was late to the H.264 development process and had only a limited role in H.264

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development, related entirely to old-fashioned interlaced video. 11/14/12 Tr. 12 (Sullivan); 11/14/12 Tr. 109 (Orchard); 11/14/12 Tr. 12 (Orchard); Ex. 420 at 1.

114. The International Organization for Standardization and the International Electrotechnical Commission ("ISO/IEC"), and the International Telecommunications Union ("ITU"), two standards setting organizations, jointly developed the H.264 standard. 11/13/12 Tr. 208-209 (Sullivan).

115. The MPEG video (Motion Picture Experts Group Video) subgroup of ISO/IEC and the VCEG (Video Coding Experts Group) subgroup of ITU develop video compression standards. 11/13/2012 Tr. 208 (Sullivan).

116. VCEG performed the early development of what became the H.264 standard. 11/13/12 Tr. 210-213 (Sullivan). As part of the development of the H.264 standard, MPEG Video and VCEG created the Joint Video Team ("JVT"), a joint organization that finalized the H.264 video standard. 11/13/2012 Tr. 208-09 (Sullivan).

2. Timeline Of Development

117. Between January 1998, and August 2001, VCEG had compiled a draft of what would become the H.264 standard. 11/13/12 Tr. 211 (Sullivan).

118. By the spring of 2001, VCEG estimated its draft provided about 50 percent better compression than had been possible in prior standards. 11/13/12 Tr. 212-213 (Sullivan). In other words, on average VCEG's draft standard required only half the bits to compress video with the same quality as prior standards. 11/13/12 Tr. 212-213 (Sullivan). The actual compression achieved, however, varied from video sequence to video sequence. 11/14/12 Tr. 9 (Sullivan).

119. In January of 2001, MPEG called for proposals for advanced compression technology. 11/13/12 Tr. 213 (Sullivan). In July of 2001, VCEG submitted its draft design to MPEG for evaluation and proposed to join forces with MPEG to finalize the draft standard.

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11/13/12 Tr. 213 (Sullivan). After testing VCEG's proposal, MPEG adopted it and agreed to join with VCEG to finalize it as a new standard. 11/13/12 Tr. 213-214 (Sullivan).

120. As of the summer 2001, the VCEG design did not include specialized tools for coding interlaced video. The video compression community recognized that modern digital compression technologies were superior to the old technique of compressing through interlaced video scanning and that video content in interlaced format was therefore waning in importance. 11/13/12 Tr. 214 (Sullivan). Had VCEG wanted to include techniques in the new standard to compress interlaced video efficiently, such tools were readily available from existing standards. 11/14/12 Tr. 50 (Sullivan).

121. Even without interlaced coding tools, the VCEG design could still encode interlaced video by converting the video into progressive form before encoding it. 11/14/12 Tr. 48 (Sullivan). This process is called de-interlacing. 11/14/12 Tr. 48 (Sullivan). Alternatively, the VCEG design could code each field in interlaced video as if it were a progressive picture, or code odd and even fields as separate frames. 11/14/12 Tr. 48 (Sullivan).

122. The first version of H.264 was finalized in May of 2003. 11/13/12 Tr. 214 (Sullivan). Like the draft standard from July 2001, it achieved an approximately 50 percent improvement in compression, on average, over prior standards. The finalized standard did not materially improve on the mid-2001 draft standard from the standpoint of compression improvement. 11/13/12 Tr. 215 (Sullivan); 11/14/12 Tr. 9-10 (Sullivan).

3. Motorola's Contributions

123. Motorola's contributions were miniscule when viewed in the context of H.264 as a whole. 11/14/12 Tr. 114 (Orchard); 11/14/12 Tr. 16, 57 (Sullivan). Motorola contributed only unimportant tweaks to aspects of H.264's interlaced coding tools. 11/14/12 Tr. 12, 57 (Sullivan); 11/14/12 Tr. 109 (Orchard); 11/19/12 Tr. 50-51 (Drabik)

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124. Motorola became interested in VCEG's work around mid-2001. 11/13/12 Tr. 215 (Sullivan). A Motorola employee, Ajay Luthra, who served as one of the co-chairs of the JVT, described Motorola as a "late bird" in terms of its involvement in H.264 standard development. Ex. 420 at 1; 11/19/12 Tr. 21 (Luthra). Motorola made its first proposal at the first meeting of the JVT in December of 2001, after MPEG and VCEG had already joined forces. 11/13/12 Tr. 216 (Sullivan). By then, VCEG's summer 2001 design had already achieved a 50 percent compression improvement over prior standards. 11/13/12 Tr. 216 (Sullivan). As Luthra admitted, Motorola contributed nothing to the summer 2001 design. 11/19/12 Tr. 22 (Luthra).

125. Before Motorola began to participate in the development of the H.264 standard, many other companies and research institutes had already contributed to the development of VCEG's H.26L draft standard, which led eventually to the H.264 standard. Ex. 420 at 1. These entities made possible much of the innovation associated with the H.264 standard. They included Telenor, Nokia, Fraunhofer Heinrich Hertz Institute, and others. 11/13/12 Tr. 215 (Sullivan).

126. The only Motorola contributions that were adopted into the H.264 standard relate to old fashioned interlaced video. 11/14/12 Tr. 109 (Orchard); 11/14/12 Tr. 12 (Sullivan); 11/19/12 Tr. 50-51 (Drabik). After the JVT was formed, Motorola submitted twenty-five proposals, of which eighteen related to interlaced video and seven related to wavelet coding. 11/14/12 Tr. 108-109 (Orchard). The JVT did not adopt Motorola's wavelet coding contributions into H.264. 11/14/12 Tr. 108-109 (Orchard).

127. Motorola did not make any contributions that substantively changed the way the core video coding tools of H.264—prediction, transform, quantization, and entropy coding—operate compared to previous standards. 11/14/12 Tr. 110 (Orchard).

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128. During the development of the H.264 standard, Motorola never told the other participants in the H.264 standard development process about patents it relies on now. 11/19/12 Tr. 22 (Luthra). Motorola did not tell the other participants that it would demand a 2.25% royalty for its patents if Motorola technology were included in the H.264 standard. 11/19/12 Tr. 22 (Luthra).

4. Vast Scope Of Intellectual Property Relating To The H.264 Standard

129. "[T]he Motorola patents are really a small, very slight sliver" of the technology employed in the H.264 standard. 11/14/12 Tr. 98 (Orchard).

130. Over 2300 contribution documents were submitted to the JVT. 11/14/12 Tr. 108 (Orchard). The largest technology contributor to the H.264 standard was Telenor Group, which contributed many of the core innovations of H.264 and submitted the August 1999 proposal that became the basis of the first draft of the design. 11/13/12 Tr. 215 (Sullivan); 11/14/12 Tr. 115 (Orchard). Telenor decided not to seek patents on its contributions and notified the JVT of its decision. 11/14/12 Tr. 52 (Sullivan); 11/14/12 Tr. 115 (Orchard).

131. Microsoft also made important technological contributions to the H.264 standard. 11/14/12 Tr. 109 (Orchard). Microsoft has forty U.S. patents that are essential to H.264. 11/14/12 Tr. 141 (Orchard). Of these, thirty-six patents have already been reviewed and deemed essential by an independent evaluator who evaluates patents for the MPEG-LA pool. 11/14/12 Tr. 141 (Orchard). Unlike Motorola (whose contribution was limited to old fashioned interlaced video), Microsoft made contributions in several important technological areas. 11/14/12 Tr. 141 (Orchard).

132. For example, Microsoft made important contributions in the areas of prediction and transform. Prediction uses characteristics of one part of a video to estimate the characteristics of another part of the video so that detailed information about the second part does not need to be stored. Ex. 575, p. 19. Transform coding represents a smooth area of a

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picture (*e.g.*, a blue sky background) as a short set of numbers instead of providing brightness and color information about each point in that smooth area. Ex. 575, p. 19. Microsoft's innovations fundamentally changed how prediction operates in H.264 compared to previous standards. 11/14/12 Tr. 109 (Orchard). Microsoft's contributions to transform coding are used almost all the time in H.264. 11/14/12 Tr. 110 (Orchard). Microsoft's contributions are not limited to interlaced video but apply generally. 11/14/12 Tr. 110 (Orchard).

133. Microsoft's patents that contribute to prediction are Exhibits 890, 893, 924, 906, 840, 1411, 841, 816 and 817. 11/14/12 Tr. 142 (Orchard). The patents that contribute to transform and quantization are Exhibits 848, 856, 855, 857, 854 and 846. 11/14/12 Tr. 142 (Orchard).

134. Another group of Microsoft patents adds advanced functionality to the H.264 algorithm. These patents fall into six categories: (1) the hypothetical reference decoder, which is fundamental to the way decoders are tested (Exhibit 833 and 1669); (2) time-coding information (Exhibits 818, 823, 824, 825, 822, 830 and 831); (3) pan and scan, which are functionalities that allow coded information to be sent to different size displays, handheld displays, HD TV displays in a uniform way (Exhibits 829, 828, 827); (4) random access points (Exhibit 870); (5) error resilience, which is important for video over wireless channels (Exhibits 869, 884 and 895); and (6) color space, which allows for more efficient treatment of most natural images and video (Exhibit 868). 11/14/12 Tr. 143-144 (Orchard).

135. Other Microsoft patents contribute to the core components of the H.264 coding algorithm and add value to ranges of applications. These patents involve signaling (Exhibits 796, 798, 800 and 842), deblocking, (Exhibit 847), and error resilience (Exhibits 813, 815 and 814). 11/14/12 Tr. 142-143 (Orchard).

136. Motorola's technical expert, Timothy J. Drabik did not dispute that the majority of Microsoft's patents cover important aspects of the H.264 standard. 11/19/12 Tr. 47 (Drabik)

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(conclusory contention that of Microsoft's forty patents only, five cover minor aspects and only seven had alternatives).

5. The Profiles And Levels Of The H.264 Standard

137. The H.264 standard describes the formatting that is used to implement various compression techniques. Because many techniques are allowed, the standard groups these compression techniques into "profiles." Ex. 574, p. 140. These include the Baseline, Main, High, and Extended profiles. Ex. 574, p. 140. The standard also defines "levels" ranging from 1 through 5.1 that restrict how the compression techniques allowed by a profile are used. Ex. 574, p. 140; Ex. 610, p. 209. Compliance with the H.264 standard is in reference to a profile and a level. Ex. 610 at 204.

138. To comply with a particular profile and level of the H.264 standard, an H.264 video decoder must contain functionality to decompress any video that was encoded using any compression techniques allowed by that profile within the restrictions of that level. Ex. 610 at 204; Ex. 574, p. 140.

139. H.264 does not require an encoder to use any particular compression technique even if that technique is allowed by the profiles and levels that the encoder complies with. Ex. 610, p. 201 (H.264 standard specifying that "Encoders are not required to make use of any particular subset of features supported in a profile); Ex. 574, p. 140. Instead an encoder complies with a particular profile and level of the H.264 standard if it produces video that can be decoded by a decoder that complies with that profile and level. Ex. 574, p. 140.

140. The Baseline profile prohibits the use of interlaced coding tools. Ex. 574, p. 140; 11/14/12 Tr. 19-20 (Sullivan). Levels below 2.1 and above 4.1 independently prohibit use of interlaced coding tools regardless of the profile used. Use of interlaced coding tools is allowed by the Main and High profiles for levels 2.1 through 4.1. 11/19/12 Tr. 37 (Drabik).

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141. If one wishes to take advantage of any technique allowed by the Main and High profiles for levels 2.1 through 4.1 that is not allowed in other profiles and levels, one must use decoders that have interlaced coding functionality, regardless of whether that functionality is ever used. Ex. 574, p. 1.

142. For example, Google, Inc.'s YouTube specifies the High profile in order to make use of "CABAC" and "B-frame" compression techniques that are allowed by the High profile but not the Baseline profile—but also specifies that video is never interlaced. So an H.264 compliant decoder that decodes YouTube H.264 video must include the capability to decode interlaced video even though that functionality is not used. Ex. 592 at 1.

143. All H.264 profiles, including those that do not allow interlaced video, support high definition video. 11/14/12 Tr. 19-20 (Sullivan). High definition H.264 video is almost always progressive. For example, *all* video on Microsoft's Xbox Live and Google, Inc.'s YouTube is progressive. 11/15/12 Tr. 19-20 (Del Castillo); 11/14/12 Tr. 147 (Orchard); 592, p. 1.

D. Motorola's Patents

144. At the time the H.264 standard was developed, there were acceptable alternatives to each of Motorola's patents that could have been used instead in the standard without affecting its performance. 11/14/12 Tr. 117 (Orchard).

145. Fourteen of the sixteen Motorola patents that Motorola says are essential to the H.264 standard relate to interlaced video. 11/14/12 Tr. 106 (Orchard).

146. The other two patents Motorola points to apply narrowly to the hardware implementations disclosed in the patents and have either expired or will expire shortly. 11/14/12 Tr. 98, 134-135, 139 (Orchard). Microsoft sells no H.264 compliant hardware, and therefore does not infringe these patents. 11/14/12 Tr. 135, 139 (Orchard).

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147. Dr. Drabik simply failed to perform a meticulous infringement analysis keyed to Microsoft products. 11/19/12 Tr. 49-50 (Drabik).

148. Motorola presented no evidence that a patent pool has ever evaluated any Motorola patent and determined that it was essential to practicing the H.264 standard.

149. Motorola presented no evidence of the validity of any of its H.264 standard essential patents.

150. Dr. Drabik had no opinion about the "specific monetary value" of Motorola's H.264 patents. 11/19/12 Tr. 50 (Drabik).

151. Dr. Drabik never compared the technical value of Motorola's H.264 standard essential patents with those in the MPEG LA pool (11/19/12 Tr. 60 (Drabik)), and he offered no opinion as to "whether the Motorola patents are more or less important than the 2,500 patents in the MPEG LA pool," 11/19/12 Tr. 60 (Drabik).

1. Interlaced Video Patents

152. Interlaced video use is of minor and diminishing importance to the H.264 standard. 11/14/12 Tr. 98 (Orchard).

153. Motorola's parent company, Google, does not support interlaced H.264 video in its products. While Motorola's expert did not know the "market reasons" why Google did not support interlaced coding for YouTube, he testified that "it might have something to do with how they [Google] see the future." (11/19/12 Tr. 65 (Drabik).

154. Google's Android operating system also does not support interlaced H.264 video. It uses the Baseline profile of H.264, Ex. 2115 at MOTM_WASH1823_0601853, which does not allow use of the interlaced coding tools (Ex. 574 at MS-MOTO_1823_00004052873 (field coding and adaptive frame/field coding excluded from Baseline profile); 11/14/12 Tr. 19-20 (Sullivan).

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155. Microsoft does not support interlaced H.264 video in its Xbox Live service, or its Silverlight, Zune, Lync, or Skype products. 11/15/12 Tr. 20-21 (Del Castillo); 11/14/12 Tr. 150-151 (Orchard).

156. Although obscure video clips may be found on the Internet in H.264 interlaced format, most web pages that contain video, such as Google's YouTube or Hulu, have no interlaced video content. 11/14/12 Tr. 147, 149 (Orchard). In the unlikely event that a Windows user encountered an interlaced H.264 video file on the Internet, Windows allows the file to be played. 11/14/12 Tr. 147 (Orchard).

157. Drabik pointed to three interlaced H.264 videos that he found on the Internet, but these do not show that interlaced H.264 video is important. 11/19/12 Tr. 61 (Drabik).

158. The first is a pirated video from the Pirate Bay website. 11/14/12 Tr. 148 (Orchard). The other two are one or two second-long test videos for use by people in developing video software. The videos are not intended to be viewed. 11/14/12 Tr. 148 (Orchard).

159. Drabik mistakenly pointed to two video samples that were actually not interlaced H.264 video. The first was video of NBC's Olympics coverage, which was provided through YouTube. 11/14/12 Tr. 148 (Orchard). YouTube does not allow interlaced video, and this video is progressive, not interlaced. 11/14/12 Tr. 148 (Orchard). The second contained NASA videos that are available on a NASA website. These videos were not compressed using the H.264 standard and were not interlaced. 11/14/12 Tr. 148 (Orchard). Drabik knew of no other examples of interlaced H.264 video on the Internet. 11/19/12 Tr. 61-62 (Drabik).

160. Motorola offered Exhibit 2342 to suggest that interlaced H.264 video is common. Exhibit 2342 is a submission, presented by a Motorola employee four months before the November 2012 trial in this case, calling for interlaced support to be added to the HEVC

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standard; Exhibit 2342 does not relate to H.264. The television providers discussed in Exhibit 2342 broadcast in MPEG-2 in the United States, not H.264. 11/14/12 Tr. 153 (Orchard).

161. When that MPEG-2 video is recompressed into H.264, it is almost always converted to progressive if it is interlaced. 11/13/12 Tr. 214 (Sullivan) (explaining that the modern techniques in H.264 compress more efficiently than using interlaced video).

162. Exhibit 2342 provides an example of interlaced television that Dr. Drabik cited in error: coverage of the London Olympics. When the London Olympics was distributed as H.264, that distribution was in progressive form. 11/14/12 Tr. 148 (Orchard).

163. For the broadcast channels listed in Exhibit 2342 were discussed at trial as possibly being distributed as H.264 video, that distribution was progressive over Xbox Live, not interlaced. 11/15/12 Tr. 31 (Del Castillo) (explaining that, except in three cases, the Xbox Live software did not allow the fifty-five providers listed in Exhibit 2161 (including three also listed in Exhibit 2343) to use interlaced H.264 video, and that two of the exceptions, French and Spain provider Canal and U.K. provider BSkyB, likely provided only progressive video even without that software restriction).

164. Motorola's interlaced H.264 patents are not used for encoding or decoding progressive video. 11/14/12 Tr. 106 (Orchard).

165. Dr. Drabik offered the conclusory unsupported opinion that interlaced coding tools could be used to encode progressive video but never explained how that could be done. He made no such claim in his expert report. 11/19/12 Tr. 57 (Drabik). At trial, he testified that he first heard that interlaced coding could be used with progressive video from a Motorola employee whom he encountered in his work on this case. 11/19/12 Tr. 57-58 (Drabik).

166. The Motorola employee who suggested that it was possible to use interlaced coding tools with progressive video did not identify anyone who had actually done so and did not refer Drabik to any engineering or scientific publications that discussed using interlaced

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coding tools with progressive video. 11/19/12 Tr. 58-60 (Drabik). Dr. Drabik was not aware of any Microsoft product being used to decode progressively captured content that was compressed using field coding. 11/19/12 Tr. 60 (Drabik).

a. MBAFF Patents

167. Motorola's MBAFF patents are Exhibits 271, 272, 273, 274, 275, 276, 277 and 278. 11/14/12 Tr. 116 (Orchard). All of these patents stem from the same initial patent application, and they all share the same specification. 11/14/12 Tr. 116 (Orchard).

168. Motorola did not invent MBAFF. 11/14/12 Tr. 12 (Sullivan). MBAFF had already been used to compress video in prior video standards, such as the MPEG-2 standard and the MPEG-4 standard. 11/14/12 Tr. 12 (Sullivan). In terms of functionality and performance, MBAFF in H.264 is essentially the same as MBAFF in MPEG-2. 11/14/12 Tr. 50, 59, 56-57 (Sullivan).

169. An alternative to the paired macroblock MBAFF as used in H.264 would have been to use the single macroblock MBAFF as used in MPEG-2. 11/14/12 Tr. 120-121 (Orchard); Exs. 782, 785. No test results show that paired macroblock MBAFF performs any better than single macroblock MBAFF. 11/14/12 Tr. 121 (Orchard); 11/14/12 Tr. 51-52 (Sullivan).

170. During the development of H.264, Motorola provided the JVT with test results that compared using paired macroblock MBAFF with using no adaptive frame/field technique. Motorola also provided test results that compared using paired macroblock MBAFF with using PICAFF. Motorola never supplied the JVT with data for the relevant comparison of paired macroblock MBAFF with single macroblock MBAFF. 11/14/12 Tr. 122 (Orchard); Ex. 656. Likewise, the documents that Motorola cited in its trial brief (Moto. Tr. Br., p. 18) as allegedly showing the performance improvement of paired macroblock also compared paired macroblock MBAFF with PICAFF. 11/14/12 Tr. 123 (Orchard); Exs. 2227, 2274.

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171. Motorola's own test results show that single macroblock MBAFF is as efficient as paired macroblock MBAFF. Exhibit 423 reports a Motorola comparison of single macroblock MBAFF to PICAFF, (11/16/12 Tr. 202 (Luthra)), while Exhibit 2209 reports a Motorola comparison of paired macroblock MBAFF to PICAFF. 11/16/12 Tr. 205 (Luthra). The graphs in those exhibits show the efficiency gain of the MBAFF types over PICAFF. 11/16/12 Tr. 206 (Luthra). One video, "Mobile (IP)", was used in both sets of tests. Ex. 423 at 16; Ex. 2209 at 9.

172. In Exhibit 423, the bit rate of single macroblock MBAFF at 31 dB quality is approximately 2804 kb/sec while the bit rate of PICAFF for the same clip and quality is approximately 2569 kb/sec. Ex. 423 at 16 (Fig. 19). Thus, the efficiency gain of single macroblock MBAFF over PICAFF was approximately 8.4%: (2804-2569)/2804. Ex. 423 at 16.

173. In Exhibit 2209, the bit rate of paired macroblock MBAFF for "Mobile (IP)" at 32 dB is approximately 4400 kb/sec while the bit rate of PICAFF for the same clip and quality is approximately 4175 kb/sec. Ex. 2209 at 9 (Fig. 10). Thus, for this comparison, the efficiency gain of paired macroblock MBAFF over PICAFF was only approximately 5.1%: (4400-4175)/4400. Ex. 2209 at 9. These results suggest that the paired macroblock approach that Motorola advocated was, in fact, inferior to single macroblock MBAFF.

b. PICAFF Patents

174. Motorola's PICAFF patents are also unimportant to the H.264 standard because single macroblock MBAFF was an acceptable alternative that could have been used instead. 11/14/12 Tr. 124 (Orchard).

175. The PICAFF patents are Exhibits 280, 281, and 282. 11/14/12 Tr. 116 (Orchard). These patents share the same specification and stem from the same original patent application. 11/14/12 Tr. 116 (Orchard). PICAFF technology was proposed for use in the

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MPEG-2 standard between 1991 and 1992. 11/14/12 Tr. 105, 123 (Orchard); 11/14/12 Tr. 13 (Sullivan). There is no significant difference in the type or performance of PICAFF in H.264 as compared with PICAFF in the prior standards. 11/14/12 Tr. 13, 50 (Sullivan).

176. The H.264 standard could have used single macroblock MBAFF as was employed in MPEG-2. 11/14/12 Tr. 124 (Orchard); Exs. 782, 785, 1479. That technique was available to the JVT during the development of the H.264 standard and could have been used instead of the Motorola PICAFF patents. Luthra Dep. Tr. 89:22-90:2.

177. There are no performance benefits to using PICAFF as proposed by Motorola instead of single macroblock MBAFF. To the contrary, test results show that PICAFF performs worse than single macroblock MBAFF. 11/14/12 Tr. 124-125 (Orchard). Motorola's own test results showed that single macroblock MBAFF was more efficient than PICAFF in every instance tested. Ex. 423 at 12-16.

c. Alternate Scan Patents

178. Motorola's alternate scan patents are Exhibit 265 and Exhibit 266. They share the same specification. 11/14/12 Tr. 116 (Orchard); Ex. 265; Ex. 266.

179. Alternate scans are used for scanning transform coefficients in interlaced video. 11/14/12 Tr. 125 (Orchard). Progressive video is scanned using the zigzag scan. 11/14/12 Tr. 125 (Orchard). These alternate scan path patents do not apply to progressive video. 11/14/12 Tr. 125 (Orchard).

180. Motorola did not invent scanning. 11/14/12 Tr. 125 (Orchard). Nor did Motorola invent using an alternate scan for interlaced video. MPEG-2 specified an alternate scan, which Sony proposed to the JVT before Motorola proposed its scan path. Ex. 656 at 1, 2 (Fig 2.1).

181. The JVT had alternatives to the scan paths in Motorola's patents that could have been used in the H.264 patent instead. Sony proposed its own four-by-four alternate scan and

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the MPEG-2 eight-by-eight alternate scan for use with interlaced video in H.264. 11/14/12 Tr. 126 (Orchard) (citing Ex. 653); Ex. 653.

182. The natural and best alternative to Motorola's four-by-four scan of Exhibit 266 would have been the four-by-four scan path Sony proposed for the H.264 standard. 11/14/12 Tr. 126, 128 (Orchard); Ex. 653. No tests directly compared Sony's scan path with Motorola's scan path, but both scans were separately shown to perform modestly better than the zigzag scan path for interlaced video. 11/14/12 Tr. 127, 128 (Orchard); Ex. 653, 710, 2281. The average performance of Sony's scan path compared to the zigzag scan path was slightly better than the average performance of the Motorola scan path compared to the zigzag scan path. 11/14/12 Tr. 127-130 (Orchard).

183. In fact, Motorola's inventors reported to the JVT that their test results showed that performance of their scans was "consistent" with the performance of the Sony scans, and initially believed that they had copied a Sony scan. Ex. 675 at 2 ("Since our data was also consistent with a 4x4 blocksize as described in [Exhibit 653 (Sony alternate-scan proposal)], we used the same 4x4 alternate scan as used there").

184. Using the Sony four-by-four scan path in H.264 would have led to comparable performance for interlaced video if the JVT had selected it rather than the Motorola scan path. 11/14/12 Tr. 128 (Orchard).

185. The best alternative to the eight-by-eight scan of Exhibit 265 would have been the MPEG-2 eight-by-eight alternate scan proposed to the JVT by Sony. 11/14/12 Tr. 126 (Orchard citing Ex. 653); Ex. 653. No tests compared the Motorola eight-by-eight scan path to the MPEG-2 alternative.

186. The documents Motorola cited in its trial brief, (Moto Tr. Br. at 19), as allegedly showing the value of Motorola's alternate scan paths did not compare Motorola's scan paths with the best alternative. Instead they compared the performance of Motorola's

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alternate scans with the progressive zigzag scan path on interlaced video. 11/14/12 Tr. 128-129 (Orchard); Ex. 2281; Ex 710. The progressive zigzag scan path was known not to work well with interlaced video. 11/14/12 Tr. 128 (Orchard); Exs. 2227, 2274.

d. The Eifrig Patent

187. The Eifrig patent (U.S. Patent No. 6,005,980) is Exhibit 268 and relates only to interlaced video. 11/19/12 Tr. 54-55 (Drabik). It involves using three specific motion vectors with interlaced video. 11/14/12 Tr. 132 (Orchard). Exhibit 268 does not apply to progressive video.

188. For interlaced video, Exhibit 268 proposes to predict the motion using the same three blocks that the prior art used for progressive video. 11/14/12 Tr. 130-131 (Orchard).

189. In particular, the draft H.263 standard from May 1996 showed the same blocks as Exhibit 268. 11/14/12 Tr. 132 (Orchard); Ex. 611. It would have been intuitive for a person of ordinary skill to use the same blocks for interlaced video that were already known to work for progressive video. 11/19/12 Tr. 56 (Drabik); 11/14/12 Tr. 131 (Orchard).

190. Alternatives to Exhibit 268 at the time the H.264 standard was adopted included using a different set of three blocks from the same neighborhood. 11/14/12 Tr. 131 (Orchard). Writing this alternative into the H.264 standard would not have degraded performance. 11/14/12 Tr. 117 (Orchard).

2. The Expired '419 Patent

191. Exhibit 270 expired in October 2011. 11/14/12 Tr. 133 (Orchard); 11/19/12 Tr. 56-57 (Drabik); Ex. 270.

192. The claim of Exhibit 270 that were analyzed by Motorola and its expert contain means-plus-function limitations. As a result, these claims only cover structures disclosed in the specification and their equivalents. 11/14/12 Tr. 134 (Orchard). One of skill in the art would have understood that Exhibit 270 discloses only specific hardware implementations of

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the means-plus-function elements. 11/14/12 Tr. 134-135 (Orchard). Particularly considering its date, one of ordinary skill would not understand Exhibit 270 to disclose software structures. 11/14/12 Tr. 134-135 (Orchard). Motorola presented no evidence that Exhibit 270 discloses software structures or algorithms, or that the disclosed hardware structures would have been viewed by a person of ordinary skill as equivalent to software structures or algorithms.

193. Exhibit 270 claims a method for performing motion compensation on a block, but allows the choice of either applying the method to the entire block or to four subblocks independently. 11/14/12 Tr. 133 (Orchard).

194. Alternatives to Exhibit 270 that could have been adopted by the JVT include similar methods of motion compensation on blocks or subblocks described in Exhibits 1477, 633, 462, and 632. 11/14/12 Tr. 135 (Orchard).

3. The Expiring '968 Patent

195. Exhibit 283 (U.S. Patent 5,376,968) expires in March 2013. 11/14/12 Tr. 138 (Orchard); Ex. 283.

196. The claim of Exhibit 283 that was analyzed by Motorola and its experts contains means-plus-function limitations. Ex. 283; 11/14/12 Tr. 139 (Orchard). The '968 patent discloses only particular hardware implementations of the mean-plus-function elements and discloses nothing that would suggest to one of ordinary skill in the art software structures or an algorithm. 11/14/12 Tr. 139 (Orchard). Particularly considering its date, one of ordinary skill would not understand Exhibit 283 to disclose software structures. 11/14/12 Tr. 139 (Orchard). Again Motorola presented no evidence that Exhibit 283 discloses software structures or algorithms, or that the disclosed hardware structures are equivalent to software structures or algorithms.

197. Exhibit 283 describes a specific way of offering options for motion compensation. One can either motion compensate an entire block, or indicate with a code that

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the block should be broken up into subblocks so that independent vectors can be sent for each of the subblocks. 11/14/12 Tr. 138 (Orchard).

198. Exhibits 618, 632, and 617 describe alternatives to Exhibit 283 that could have been adopted by the JVT. 11/14/12 Tr. 139-140 (Orchard).

E. Motorola's H.264 Patents And Microsoft's Products

199. While it is important to Microsoft to offer products that are compliant with the H.264 standard, this reflects the value of standard compliance and interoperability, not the value of Motorola's patents. 11/13/12 Tr. 34 (DeVaan); 11/15/12 Tr. 21 (Del Castillo). Motorola's H.264 patents are not important to Microsoft products. Some products, such as the Xbox Live service, Silverlight, Zune, Lync, and Skype, do not support interlaced video at all. Other products such as Windows and certain seldom-used functionality in Xbox do support interlaced decoding, but users rarely, if ever, encounter interlaced content. 11/14/12 Tr. 151 (Orchard).

200. Motorola presented no evidence that users of Microsoft products commonly encounter interlaced H.264 video. Motorola offered evidence that some AT&T U-verse content is interlaced and could be received on the Xbox after special software was added. But that software is no longer available and was installed by only 10,000 to 11,000 users when it was. 11/15/12 Tr. 24, 33 (Del Castillo).

201. The only other contention that interlaced video content is important to users of Microsoft products was made by Michael Dansky. But Dansky is not an expert in video compression, 11/20/12 Tr. 23 (Dansky), and the exhibits that Dansky cited as showing the importance of interlaced video did not relate to interlaced H.264. Dansky discussed Exhibits 2768, 2249, 2724, and 2342. 11/20/12 Tr. 18-21 (Dansky). Exhibit 2768 relates to the Windows Media Video codec, not H.264. Ex. 2728 at 1. Exhibit 2249 relates to the VC-1 codec, not H.264. Ex. 2249 at 1. The CNET report that Dansky cited in Exhibit 2724 did not

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mention interlaced video and instead referred to "1080p" and "720p," which both indicate progressive video. Ex. 2724 at 1. Exhibit 2342 related to the HEVC codec, not H.264. Exhibit 2342 at 1.

202. Of the two Motorola patents that are not limited to interlaced video, one expired a year ago and the other will expire in March 2013. 11/13/12 Tr. 34 (DeVaan); Ex. 1409, p. 1. In any event, neither patent covered Microsoft products because their claims only extend to specific hardware implementations, as explained above, and the decoders that Microsoft distributes are all software implementations. 11/14/12 Tr. 135 (Orchard); 11/14/12 Tr. 139 (Orchard).

1. Windows

203. Windows is an operating system that "provides an abstraction over the hardware, and presents an application interface" so that "third parties can write programs that run on the computer." 11/13/12 Tr. 25-26 (DeVaan). With each version of Windows, Microsoft adds thousands of features which typically build on the capabilities of previous releases. 11/13/12 Tr. 28-29 (DeVaan). The new features of Windows 7 are described in two voluminous books. Ex. 1408; Ex. 1409. Video encoding and decoding is only a tiny part of what the Windows software does and Windows supports many other video compression standards in addition to H.264, 11/13/12 Tr. 34 (DeVaan).

204. Microsoft first included support for H.264 in Windows with Windows 7 which was released in October 2009. 11/13/12 Tr. 33 (DeVaan); Ex. 1409, p. 1. Microsoft chose to implement H.264 in Windows 7 because it was standard. 11/13/12 Tr. 34 (DeVaan).

205. There is little need for Windows to be able to decode interlaced H.264 video content. 11/13/12 Tr. 38 (DeVaan); 11/14/12 Tr. 146 (Orchard). Windows users do not commonly encounter interlaced H.264 content. 11/13/12 Tr. 38 (DeVaan). The vast majority of video used with Windows comes from Internet websites where interlaced H.264 video is not

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found. 11/14/12 Tr. 147, 149 (Orchard); Ex. 592. Microsoft only supports interlaced H.264 video in Windows because decoding such video is part of the standard. 11/13/12 Tr. 38 (DeVaan).

206. Most H.264 decoding, in the context of Windows, is not performed by the Windows product. Many computers have non-Microsoft video devices and software that perform any necessary H.264 decoding instead of the built-in Windows decoder. 11/13/12 Tr. 33-35 (DeVaan).

207. Such software includes the VLC Media Player and Flash. 11/13/12 Tr. 36 (DeVaan). For example, when video from Google, Inc.'s YouTube website is played on a Windows-based computer, virtually all of the H.264 video content is decoded by non-Microsoft Flash software. 11/13/12 Tr. 53 (DeVaan).

208. Windows is a software product. It lacks the hardware structures that are required by the means-plus-function elements of the claims of Exhibits 270 and 283 (the '419 and '968 patents respectively) that Motorola's expert analyzed. 11/14/12 Tr. 135, 139 (Orchard). Motorola presented no evidence that Exhibits 270 and 283 cover software structures like the Windows H.264 decoder.

209. Windows 7 can play DVDs, but DVDs are not H.264 encoded, using MPEG-2 instead. 11/14/12 Tr. 147 (Orchard). Broadcast television in the United States uses MPEG-2, not H.264. 11/14/12 Tr. 153 (Orchard). Windows 7 cannot play Blu-ray discs. 11/19/12 Tr. 67 (Orchard). A Windows computer with a Blu-ray drive must include a third-party application to decode the video on Blu-ray discs. 11/13/12 Tr. 54 (DeVaan).

210. The Windows H.264 encoder does not use H.264 interlaced coding tools. 11/14/12 Tr. 150 (Orchard).

211. Windows cannot receive H.264 television feeds from satellite providers or encrypted H.264 television feeds from cable providers. 11/19/12 Tr. 66-67 (Orchard).

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2. Xbox

212. Motorola's interlaced H.264 patents contribute nothing to the normal use of the Xbox 360. 11/14/12 Tr. 144 (Orchard).

213. The major uses of Xbox do not involve decoding interlaced H.264. The biggest use of the Xbox is to play single player games. 11/14/12 Tr. 144-145 (Orchard). Xbox can also be used to play multiplayer games using the Xbox Live service. 11/15/12 Tr. (Del Castillo). Xbox games never contain H.264 video content. 11/15/12 Tr. 19-20 (Del Castillo); 11/14/12 Tr. 145 (Orchard).

214. Xbox is also used, via Xbox Live, to access video from sources such as Hulu and Netflix. Xbox Live does not support interlaced video, and many of these third-party sources do not use H.264 and instead use a different video compression standard called VC-1. 11/15/12 Tr. 20-21 (Del Castillo).

215. Xbox cannot play Blu-ray disks. 11/19/12 Tr. 67 (Orchard); 11/15/12 Tr. 22 (Del Castillo).

216. The Xbox can be used to play rented or purchased DVDs, but DVDs use MPEG-2 and not H.264. 11/14/12 Tr. 145 (Orchard); 11/13/12 Tr. 209-210 (Sullivan); 11/15/12 Tr. 22 (Del Castillo).

217. A web browser was recently added to Xbox. Ex. 3448 at 1. Although the browser is capable of decoding interlaced video if encountered, Ex. 3448 at 1, interlaced H.264 content is rarely found on Internet web pages, as discussed above.

218. Xbox's software decoder does not include the hardware structures that are required by the means-plus-function elements of the claims of Exhibits 270 and 283 (the '419 and '968 patents, respectively) that Motorola's expert analyzed. 11/14/12 Tr. 135, 139 (Orchard). Motorola presented no evidence that Exhibits 270 and 283 cover software structures like the Xbox H.264 decoder.

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3. Other Microsoft Products

219. Windows Phone 7 and 7.5 do not include a H.264 decoder. 11/14/12 Tr. 150 (Orchard). Windows Phone relies on hardware decoders provided by third parties. Ex. 936 at 1-3.

220. Windows Embedded is an operating system to run on embedded hardware, and it does not support video and does have not have a decoder. 11/14/12 Tr. 151 (Orchard). Motorola points only to support for a non-Microsoft decoder from Adobe. 11/19/12 Tr. 34-35 (Drabik citing Ex. 1489); Ex. 1489. Motorola has not presented evidence that the Adobe decoder is used in the normal operation of Windows Embedded.

221. Silverlight, a framework for dealing with multimedia content, does not support interlaced video. 11/14/12 Tr. 150 (Orchard).

222. The Zune, a now discontinued portable media player, does not support interlaced video. 11/14/12 Tr. 150 (Orchard).

223. Lync, a chatting environment, does not support interlaced video. 11/14/12 Tr. 150 (Orchard).

224. Skype, a teleconferencing system, does not support interlaced video. 11/14/12 Tr. 150-151 (Orchard).

V. 802.11

A. The Development Of The 802.11 Standard

225. 802.11 is a set of standards that allow for companies to build products to a set of specifications for wireless local area networking and is the de facto standard for wireless home networks. 11/15/12 Tr. 87-89 (Gibson).

226. Wireless communications refer to communications without a wire, typically using radio frequencies such as AM/FM radio, satellite communications, and Bluetooth. 11/15/12 Tr. 86 (Gibson). Wireless networking refers to using a wireless link to connect a

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device, such as a laptop, referred to as a station in the 802.11 standard, with an access point. The access point may be wired to a modem, which allows for access to the internet. 11/15/12 Tr. 87 (Gibson).

227. Wireless networks differ from cellular systems; each are designed for different purposes. For example, cellular systems require connection from many mobile users to base stations over longer ranges. Wireless networks are designed for low mobility and a range of about 100 feet. 11/15/12 Tr. 97 (Gibson).

228. The first wireless packet radio network, ALOHAnet was developed in the 1970s by the University of Hawaii and connected to the ARPANET, the predecessor of today's internet in 1972. ALOHAnet employed many of the technologies that were ultimately used in the 802.11 standard. 11/15/12 Tr. 90-91 (Gibson).

229. In 1985, the FCC allowed wireless communication technologies in unlicensed bands, the ISM bands. This decision opened up the possibility of commercial wireless local area networks. 11/15/12 Tr. 90-91 (Gibson).

230. After the FCC decision, in 1990, the IEEE 802 committee established the 802.11 Working Group to create a wireless local area network standard, and companies such as Zircom and NCR/AT&T began developing proprietary wireless local area networking products, including the NCR and AT&T product called WaveLAN in 1991. 11/15/12 Tr. 90-91(Gibson). The proprietary solutions were expensive and forced users to buy all networking components from the same manufacturer. 11/15/12 Tr. 92 (Gibson).

231. ALOHAnet and WaveLAN served as a roadmap for the development of the 802.11 standard. The systems used data modulation, carriers, multiple access techniques, error control coding, and direct sequence spread spectrum technologies, which all ended up in the 802.11 standard. 11/15/12 Tr. 91-92 (Gibson).

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232. The 802.11 Working Group spent seven years developing the first draft of the 802.11 standard. 11/15/12 Tr. 92-93 (Gibson). To develop additional 802.11 functionality, various 802.11 task groups were formed by the Working Group to develop amendments to the standard, which are designated with letters such as 802.11a and 802.11b. 11/15/12 Tr. 92-93 (Gibson); Ex. 520.

233. The development of the 802.11 standard involved the participation of an enormous number of entities, with over 1,000 companies participating in the standards-setting process. 11/15/12 Tr. 94-95 (Gibson); Ex. 514. The 802.11 Working Group has had over 130 meetings since its inception and has formed over 30 different task groups to develop amendments to the standard. 11/15/12 Tr. 94-95 (Gibson).

234. The 802.11 standard today is immense and complex; the current version of the standard is 2793 pages long. Ex. 386A.

235. Some of the later amendments to the 802.11 standard replace prior technologies in certain areas. For example, 802.11n is a high throughput improvement and generally replaces 802.11a, 802.11b, and 802.11g. 11/15/12 Tr. 93-94 (Gibson). There are also many optional portions of the 802.11 standard; a device does not need to implement an optional portion of the standard in order to be compliant with the 802.11 standard. 11/15/12 Tr. 97-98 (Gibson).

236. The development of the 802.11 standard dealt primarily with the implementation of well-known technologies rather than innovation. The majority of the technologies available to and/or adopted by the 802.11 drafters were well-known and in the public domain and not covered by patents. 11/15/12 Tr. 154-155 (Gibson). The technology in the public domain that was incorporated into the 802.11 standard was based on a long history of research and development done by companies, government agencies, and academic institutions. These prior technologies included the central elements of the 802.11 standard,

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such as data modulation, error control coding, multiple access methods, direct sequence spread spectrum and orthogonal frequency division multiplexing. 11/15/12 Tr. 96-97 (Gibson).

B. There Are An Immense Number Of Patents That Cover The 802.11 Standard

237. There is no formal process for determining whether a patent is essential to the 802.11 standard. 11/15/12 Tr. 98-99 (Gibson). However, companies may declare they have essential patents in what is known as a letter of assurance (LOA). 11/15/12 Tr. 98-99 (Gibson).

238. Over 100 companies have identified over 350 patents and 30 patent applications in LOAs as essential to the IEEE. 11/15/12 Tr. 99 (Gibson); Exs. 7, 1592. Companies may also provide "blanket" LOAs to the IEEE, which do not identify specific patents. Ninety-four companies have filed these blanket LOAs, including wireless communication industry leaders such as Atheros, Broadcom, Qualcomm, Research in Motion, and Intel. 11/15/12 Tr. 99-100 (Gibson); Exs. 7, 1592. Thus there are likely more than a thousand essential patents to the 802.11 standard, and perhaps several thousand. 11/15/12 Tr. 98 (Gibson); 11/16/12 Tr. 108-109 (Lynde).

239. Atheros is an example of a company that signed a blanket LOA and which owns patents that are important to the 802.11 standard. 11/19/12 Tr. 118-119 (Williams).

240. Marvell also has a very valuable 802.11 portfolio and owns a few hundred issued patents essential to the 802.11 standard. Marvell's portfolio is particularly important to the newer standards such as 802.11n. 11/14/12 Tr. 64 (Ochs).

C. Motorola's 802.11 Patents

241. In its 2010 demand letter to Microsoft, Motorola identified 53 U.S. patents as essential to the 802.11 standard, divided across 27 different patent "families." Ex. 1.

242. Motorola now contends that only 24 of its patents are essential to the 802.11 standard, and that it did not analyze any other patents as essential. 11/15/12 Tr. 102-105

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(Gibson); Exs. 100, 101, 148, 151, 154, 156, 157, 160, 161, 164, 166, 169, 170, 171, 177, 179, 180, 181, 183, 383, 2013, 2014, 2016, 2019.

243. The majority of Motorola's patents have either expired or will soon expire – of Motorola's 24 patents: 2 patents had expired when Motorola sent its 2010 letter (Exs. 2013, 2014); 3 more expired between then and trial (Exs. 148, 151, 154) and 8 more will expire within 2 years from the end of trial (Exs. 156, 157, 160, 161, 164, 166, 169, 180). *See generally* Ex. 1589 (listing expiration date for all Motorola 802.11 patents).

244. Patents that are essential to optional parts of the standard have a lower value than patents that are essential to the required portions. 11/19/12 Tr. 120 (Williams).

245. Motorola's 802.11 patents are related to isolated, and often optional, technology areas. 11/15/12 Tr. 85, 106-107, 134, 140, 154, 155 (Gibson); Ex. 1589. Motorola's expert concluded that 13 of Motorola's 24 patents were optional to the 802.11 standard. 11/19/12 Tr. 73-74 (Williams).

246. Motorola's expert did not provide any analysis that showed that any of Motorola's patents were essential to the 802.11 standard. *See generally* 11/19/12 Tr. 67-134 (Williams). Nor did Motorola's expert review any patent file histories before concluding that Motorola's patents were essential to the 802.11 standard, and he did not articulate a construction for any term, but instead assumed that every term of every analyzed patent required only its plain and ordinary meaning, a meaning which he also did not articulate. 11/19/12 Tr. 109 (Williams). Using this approach, Motorola's expert determined that two patents, U.S. Patent Nos. 5,319,712 and 5,636,223 were essential to the standard, yet those two patents were judicially determined to be non-essential based on claim construction. 11/19/12 Tr. 107-109 (Williams).

247. Motorola's expert did not consider the validity of the Motorola patents he analyzed. 11/19/12 Tr. 125–126 (Williams). He also ruled out as an alternative to the

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Motorola patents anything that would have required any changes to other portions of the 802.11 standard. 11/19/12 Tr. 115–116 (Williams).

248. Motorola's expert did not assess the contributions of companies other than Microsoft or Motorola to the 802.11 standard, nor did he evaluate the patents of any company other than Motorola and Microsoft with respect to 802.11. 11/19/12 Tr. 116–117 (Williams). Motorola's expert also did not determine the relative importance of Motorola's patents as compared to any third party patents (including patents in the Via 802.11 patent pool). 11/19/12 Tr. 117–120 (Williams).

249. Even accepting Motorola's analysis, the Motorola patents only cover small pieces of technologies that are themselves a small part of the overall technologies that are contained in the 802.11 standard. 11/15/12 Tr. 143-144, 147 (Gibson).

250. Technically feasible alternatives existed for all of Motorola's patents when the relevant portions of the 802.11 standard were being developed and adoption of the alternatives would not have degraded the performance of standard-compliant implementations. 11/15/12 Tr. 114-115, 118-144 (Gibson). Motorola's patents provide little to no benefit over these alternatives. 11/15/12 Tr. 121-128, 130-135, 138-139, 141-143 (Gibson). Motorola's expert failed to introduce any evidence that the alternatives proposed by Microsoft's expert for 23 of the 24 Motorola patents were not feasible alternatives. 11/19/12 Tr. 104–106 (Williams). And for the remaining patent, Motorola's expert only addressed two of the four alternatives proposed by Microsoft's expert. 11/19/12 Tr. 104–106 (Williams) (discussing only two of the four proposed alternatives to Ex. 148).

251. The proper analysis of an alternative considers it in the context of the 802.11 Working Group deliberations at the time the standard was being implemented, and allows the engineers participating in the Working Group flexibility in integrating alternative technology into the standard. 11/15/12 Tr. 115-116 (Gibson).

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D. Motorola's 802.11 Patents Have Little To No Value To The Standard Or To Microsoft's Products

252. From a technical standpoint, the Motorola patents have little if any value to Microsoft, because the 802.11 standard writers could have adopted alternatives to the Motorola patents with little impact on the performance of standard-compliant devices and because the Motorola patents have no particular value to Microsoft's products. 11/15/12 Tr. 155 (Gibson).

1. The 11 Patents That Motorola's Expert Concluded Were Used By Microsoft Are Either Not Used By Or Not Relevant To Microsoft's Products

253. Motorola analyzed its patents with respect to only the Microsoft Xbox and presented no evidence with respect to these patents regarding other products (such as Microsoft Surface). 11/19/12 Tr. 71 (Williams).

254. The Motorola patents have little to no value to the Xbox console. 11/15/12 Tr. 155 (Gibson). The Xbox does not rely on many of the technologies related to Motorola's 802.11 patents, such as QoS, LDPC, Mesh Networking, Fast Transitions, or Power Management, because those technologies are not used universally in home networks. 11/15/12, 28-32 (Del Castillo); 11/19/12 Tr. 80 (Williams).

255. Motorola contends that the Xbox uses only 11 of the 24 patents its expert has concluded are essential to the 802.11 standard. 11/15/12 Tr. 102-103 (Gibson); Exs. 148, 151, 156, 157, 161, 164, 169, 170, 171, 177, 180. There is no evidence that the Xbox (or any other Microsoft product) uses the other 13 patents that Motorola contends are essential to 802.11. 11/15/12 Tr. 102-104 (Gibson); Exs. 100, 101, 154, 160, 166, 179, 181, 183, 383, 2013, 2014, 2016, 2019.

256. The majority of the 11 patents that Motorola contends are used by the Xbox have either already expired or are expiring soon. Two have already expired (Exs. 148, 151), three more will expire within a year of trial (Exs. 156, 157, 164), three more will expire within

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two years of trial (Exs. 161, 169, 180) and all will have expired by early 2017. Exs. 170, 171, 177. 11/20/12 Tr. 156 (Lynde).

257. Each of the 11 patents that Motorola's expert concluded are used by the Xbox are either not used by the Xbox, or are related to technologies not relevant to the normal operation of the Xbox. 11/15/12 Tr. 106-114 (Gibson).

a. The Xbox Console

258. The Xbox is a special purpose computer with the primary function of running video games. 11/15/2012 Tr. 8-9 (Del Castillo). The original Xbox 360 was launched in 2005. 11/15/2012 Tr. 13 (Del Castillo). In 2010, Microsoft introduced the Xbox 360S, which included WiFi capabilities. 11/15/2012 Tr. 15 (Del Castillo). A WiFi module made by Marvell or Atheros provides the Xbox 360 with WiFi capabilities. 11/15/2012 Tr. 24, 48-49 (Del Castillo). Microsoft does not build any of the hardware necessary for WiFi connectivity. 11/15/2012 Tr. 25 (Del Castillo). The Xbox does not send and receive on two antennas at the same time. 11/15/2012 Tr. 59 (Del Castillo).

259. The Xbox contains an optical drive that is used to load and play video games, but can also be used to watch DVD and listen to CD audio discs. 11/15/2012 Tr. 8-9 (Del Castillo). Every Xbox has an Ethernet port, so every Xbox can be connected to the internet using a wired Ethernet link rather than a wireless connection. 11/15/2012 Tr. 25 (Del Castillo). The Xbox can connect to the internet to download applications and games from the Xbox LIVE service. 11/15/2012 Tr. 8-9 (Del Castillo). Some applications allow for media streaming, such as the Netflix application. 11/15/2012 Tr. 8-9 (Del Castillo). Xbox LIVE allows users to play video games against or with other people over the internet. The service also allows a customer to make financial transactions, such as buying additional content for the games that you play. 11/15/2012 Tr. 11 (Del Castillo).

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260. A user may prefer a wired connection over a wireless connection because wired connections are not subject to the interference or bandwidth congestion problems faced by wireless connections. 11/15/2012 Tr. 26 (Del Castillo).

b. Channel Access Management Patent

261. Motorola identified one patent, U.S. Patent 5,142,533 ("the '533 patent" or Ex. 148) as essential to enhanced distributed channel access (EDCA) functionality and to the distributed coordination function (DCF), which are methods of accessing a channel within the 802.11 standard. 11/15/12 Tr. 106-107 (Gibson); Ex. 148. Exhibit 148 expired on March 28, 2011. 11/19/12 Tr. 78 (Williams); Ex. 1589. Motorola did not invent channel access in wireless networks. 11/15/12 Tr. 107 (Gibson).

262. The Xbox does not use the '533 patent. To the extent that Motorola relates the Ex. 148 to EDCA, EDCA is optional and related to quality of service (QoS), which is not used by the Xbox. 11/15/12 Tr. 106-107 (Gibson); 11/15/2012 Tr. 28 (Del Castillo). Motorola also relates Ex. 148 to using DCF with RTS/CTS. The Xbox does not use RTS/CTS either. 11/15/12 Tr. 106-107 (Gibson); 11/15/2012 Tr. 28 (Del Castillo).

263. The CSMA channel access method in the 802.3-1985 standard is an alternative channel access method. 11/15/12 Tr. 120-121 (Gibson); Ex. 532. Additionally, the collision avoidance methods evaluated by Kleinrock and Scholl in their 1980 paper, the ALOHAnet carrier access scheme and the PCF described in the 802.11 standard were all alternatives to Ex. 148. 11/15/12 Tr. 120-121 (Gibson); Exs. 386A § 9.2.3., 534.

c. Data Modulation (a/g/n) Patents

264. Motorola identifies two patents as related to data modulation for the "a," "g," and, "n" modes of operation and more specifically a portion of the orthogonal frequency division multiplexing functionality (OFDM), U.S. Patent Nos. 5,272,724 (Ex. 151) and

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5,519,730 (Ex. 164). 11/15/12 Tr. 107-108 (Gibson); Exs. 151, 164. Motorola did not invent OFDM. 11/15/12 Tr. 108 (Gibson).

265. Motorola relates claim 14 of Ex. 164 to 802.11 a/g OFDM and asserts that PLCP preambles located in subcarrier signals satisfies the first step of this claim. 11/15/12 Tr. 108 (Gibson); Ex. 164. Ex. 164 expires on May 21, 2013. *Id.* Ex. 164 is not essential under Motorola's analysis because the PLCP preamble is not intermixed with the information signals, and therefore the Xbox does not use this patent and this patent has no value to Microsoft. 11/15/12 Tr. 108-109 (Gibson).

266. Motorola analyzed Claim 20 of Ex. 151 as essential to synchronizing the timing of data signals, using OFDM and the 802.11 standard under the same analysis as Ex. 164. 11/15/12 Tr. 108-109 (Gibson); Ex. 151. Ex. 151 expired on May 3, 2011, is not essential under Motorola's analysis, is not used by the Xbox, and has no value to Microsoft. 11/19/12 Tr. 78 (Williams); Ex. 1589; 11/15/12 Tr. 108-109 (Gibson).

267. The 1985 paper published in the IEEE Transactions on Communications by Leonard Cimini is a direct alternative to Exs. 151 and 164 and illustrates inserting pilot streams on subchannels for carrier offset estimation. 11/15/12 Tr. 127-128 (Gibson); Ex. 385.

268. The 1989 edition of Principles of Digital and Analog Communications (Gibson) discusses standard symbol synchronization methods that are used in digital and wireless communications that serve as alternatives to Exs. 151 and 164. 11/15/12 Tr. 127-128 (Gibson); Ex. 530.

d. Network Setup Patents

269. Motorola has analyzed two patents as essential to network setup functionality in 802.11 – U.S. Patent Nos. 6,069,896 (Ex. 171) and 6,331,972 (Ex. 177). Motorola relates claim 17 of the '896 patent and claim 9 of the '972 patent to the initial association of a station to an access point, in particular transmitting unsolicited probe requests from a station to an

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access point. 11/15/12 Tr. 109, 122 (Gibson); Exs. 171, 177. Ex. 171 expires on October 15, 2016 and Ex. 177 expires on February 3, 2017. Exs. 171, 177. Motorola did not invent associating stations with access points. 11/15/12 Tr. 109 (Gibson).

270. Exhibits 171 and 177 do not relate to infrastructure connections such as those between access points and stations, but instead relate to communications between peer devices, such as between station to station. 11/15/12 Tr. 109-110 (Gibson). The Xbox does not use Ex. 171 and 177 in normal operations because the Xbox is normally connected to an access point in an infrastructure connection and not to another Xbox in a peer-to-peer connection. 11/15/12 Tr. 110 (Gibson).

271. One alternative to Exs. 171 and 177 was for the access point to transmit a beacon, which is unsolicited, then for the station to respond to the beacon in order to make the connection. 11/15/12 Tr. 122 (Gibson).

272. Another alternative system that transmitted unsolicited messages to associate devices was the WaveLAN system. The WaveLAN system utilized access points transmitting beacon frames to stations for initial sign-on. 11/15/12 Tr. 122 (Gibson); Exs. 384, 387, 545, 569.

e. Data Modulation (b/g) Patents

273. Motorola identifies three patents as related to data modulation for the "b" and "g" modes of operation, U.S. Patent Nos. 5,329,547 (Ex. 156); 6,473,449 (Ex. 180), and 5,822,359 (Ex. 170). 11/15/12 Tr. 110 (Gibson); Exs. 156, 170, 180. Motorola did not invent data modulation or direct sequence spread spectrum (DSSS) and the current method of connecting is 802.11n, which is much faster and more efficient than the earlier 802.11 "b" and "g" amendments. 11/15/12 Tr. 110-111 (Gibson). 802.11n will be dominant going forward and use of the "b" and "g" modes will disappear; therefore the technologies relating to "b" and "g" modes have little technical value. 11/15/12 Tr. 111 (Gibson).

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274. Motorola analyzed Claim 22 of Ex. 170 and Claim 36 of Ex. 156 as essential to the use of reference symbols of channel estimation, and Claim 1 of Ex. 180 as essential to complimentary code key (CCK) modulation in the 802.11 standard (11/15/12 Tr. 111 (Gibson).

275. The Xbox will normally be connecting to an access point using 802.11n and, therefore, derives very little value from Exs. 156, 170, 180. 11/15/12 Tr. 111 (Gibson).

i. U.S. Patent Nos. 5,329,547 (Ex. 156) And 5,822,359 (Ex. 170)

276. Motorola interpreted the claims it analyzed in Exs. 156 and 170 to be concerned with the synchronization field in the high rate direct sequence spread spectrum mode of 802.11b. 11/15/12 Tr. 125-126 (Gibson). Ex. 156 expires on March 11, 2013 and Ex. 170 expires on October 13, 2015. Exs. 156, 170, 1589.

277. The IS-95 standard transmitted a pilot channel that was used for timing recovery for synchronization with the network, channel estimation, and frequency offset correction, and pilot strength, measurements, which would provide an alternative to Ex. 156 and 170. 11/15/12 Tr. 125-126 (Gibson).

ii. U.S. Patent No. 6,473,449 (Ex. 180)

278. Motorola analyzed Ex. 180 as related to two devices in the network using the same orthogonal direct sequence spread spectrum codes. 11/15/12 Tr. 126-127 (Gibson). Ex. 180 expires on February 17, 2014. Exs. 180, 1589.

279. Khaled Fazel's 1993 IEEE UCUPC paper describes suppressing unknown interference using direct sequence spread spectrum and the short orthogonal codes, where the short orthogonal codes could be the same codes but used on different carriers, which would be an alternative to Ex. 180. 11/15/12 Tr. 126-127 (Gibson); Ex. 527.

f. Security Patents

280. Security is a large and complex topic in the 802.11 standard, spanning roughly 150 pages. 11/15/12 Tr. 112 (Gibson); Ex. 386A. Motorola did not invent security and

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encryption in wireless networks. 11/15/12 Tr. 112 (Gibson). Open Authentication, or no security, is the default security mode in 802.11, which is not implicated by the Motorola patents. 11/15/12 Tr. 112 (Gibson). IEEE 802.11 networks have evolved through several security approaches, including WEP, TKIP, and CCMP. 11/15/12 Tr. 112 (Gibson).

281. 802.11 encryption only encrypts communications from the Xbox to the router in a user's home and does not protect those communications as they go out onto the Internet. 11/15/12 Tr. 114 (Gibson).

282. The Xbox provides its own end-to-end security between the Xbox and another Xbox or between and Xbox and Xbox LIVE servers independent of the technology claimed in the Motorola patents because Microsoft does not rely on the network connection security. Additionally, providers of content that users might access via an Xbox, such as Netflix, typically protect their content using security that does not implicate 802.11 encryption. 11/15/12 Tr. 26-27 (Del Castillo); 11/15/12 Tr. 113 (Gibson). Any additional encryption performed by the Xbox for the purposes of 802.11 is redundant to the Xbox security and only adds complexity and may delay gaming. 11/15/12 Tr. 113-114 (Gibson).

283. The Xbox derives little to no benefit from Motorola's security patents (Exs. 157, 161, 169) aside from compliance with the standard. 11/15/12 Tr. 114 (Gibson).

i. U.S. Patent No. 5,357,571 (Ex. 157)

284. Motorola relates Claim 12 of Ex. 157, to the four-way handshake used for exchanging secure encryption keys, which is a method for exchanging encryption keys used in 802.11 TKIP and CCMP. 11/15/12 Tr. 112 (Gibson). Ex. 157 expires on July 1, 2013. Exs. 157, 1589.

285. The key exchange protocol in Whitfield Diffie's paper "New Directions in Cryptography" is an alternative to Ex. 157. 11/15/12 Tr. 123 (Gibson); Ex. 505.

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286. The Challenge-Handshake Authentication Protocol (CHAP) provides for key exchange through the use of a 3-way handshake, which is an alternative to Ex. 157. 11/15/12 Tr. 123 (Gibson); Exs. 570, 506.

287. The GSM standard, a digital cellular standard, provides a method of authenticating devices and creating encryption keys that is an alternative to Ex. 157. 11/15/12 Tr. 123 (Gibson); Ex. 526.

ii. U.S. Patent Nos. 5,467,398 (Ex. 161) And 5,689,563 (Ex. 169)

288. Motorola relates Claims 1 and 21 of Ex. 161 to the process by which the 802.11 encryption protocols calculate a message integrity code (MIC) to include with data packets. The MIC is a message that is used to verify that the packet is from the correct source. 11/15/12 Tr. 112-113 (Gibson). Motorola relates claim 1 of Ex. 169 to using a packet sequence number in the calculation of the MIC. 11/15/12 Tr. 112-113 (Gibson). Ex. 161 expires on July 5, 2014 and Ex. 169 expires on November 18, 2014. Exs. 161, 169, 1589.

289. Generating a new encryption key to encrypt the authentication key was known at the time of the drafting of the standard and is an alternative to Ex. 161. 11/15/12 Tr. 124-125 (Gibson).

290. Generating the authentication key using message data itself would be an alternative to Ex. 169. 11/15/12 Tr. 124-125 (Gibson).

2. The Other 13 Motorola Patents Analyzed By Motorola's Expert Likewise Have Little To No Value To Microsoft Or The 802.11 Standard

a. U.S. Patent No. 6,038,263 (Ex. 383)

291. Motorola analyzed Ex. 383 as related to high throughput. 11/15/12 Tr. 129 (Gibson). Ex. 383 expires on July 31, 2017. Exs. 383, 1589. Motorola did not invent high throughput and Ex. 383 is not essential to the 802.11 standard under Motorola's analysis because the patent refers to a different orthogonal code sent on spatially separate antennas,

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whereas the standard sends one binary sequence on one antenna, and then flips the polarity to get the other binary sequence on the second antenna. 11/15/12 Tr. 129-130 (Gibson). Thus Ex. 383, as analyzed by Motorola, is not used by any products that comply with the 802.11 standard. 11/15/12 Tr. 130 (Gibson).

292. There were existing alternatives to the high throughput techniques incorporated into the 802.11 standard. For example, Wittneben's 1991 and 1993 papers described using different filtering techniques to identify different base stations, an approach that can be used for multiple antennas by filtering the streams on each antenna. 11/15/12 Tr. 130 (Gibson); Exs. 550, 551.

b. U.S. Patent No. 7,236,477 (Ex. 101)

293. Motorola related Claim 12 of Ex. 101 to certain "fast transition" functionality in the 802.11 standard where stations participate in the decision to reassociate with a new access point. 11/15/12 Tr. 130-131 (Gibson). Fast transitions are where a station switches between access points rapidly, functionality that Motorola did not invent. 11/15/12 Tr. 130-131 (Gibson). Ex. 101 expires on March 4, 2026. Exs. 101, 1589.

294. Having an access point enforce transitions, such as is performed in cellular systems, is an alternative to Ex. 101. 11/15/12 Tr. 131 (Gibson).

c. U.S. Patent No. 5,311,516 (Ex. 154)

295. Motorola identified one patent as relating to data fragmentation/defragmentation, Ex. 154, which expired on May 29, 2012. 11/15/12 Tr. 131-132 (Gibson); Ex. 1589. Data fragmentation refers to breaking a data stream into packets. 11/15/12 Tr. 131-132 (Gibson). Motorola did not invent fragmentation. 11/15/12 Tr. 132 (Gibson). In 802.11 and Ethernet networks, fragmentation does not always occur, but is controlled by a threshold value that is used to determine when fragmentation should occur. 11/15/12 Tr. 132 (Gibson).

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296. Fragmentation of larger packets into smaller packets was well-known in the art since the earliest days of packet communication systems, and these earlier fragmentation methods would serve as an alternative to Motorola's. Just one example is the internet protocol version 4 (IPv4) published by the IETF in 1980 as RFC 760, which described procedures for fragmenting and defragmenting data packets. 11/15/12 Tr. 133 (Gibson); Ex. 539. Indicating the number of fragments to be received at the beginning of series of fragmented packets rather than setting a flag to indicate no more fragments is an alternative to Ex. 154. 11/15/12 Tr. 133 (Gibson).

d. U.S. Patent Nos. 7,143,333, 7,165,205, And 7,493,548 (Exs. 181, 183, 2019)

297. Motorola identifies three patents as relating to Low Density Parity Check Codes (LDPC codes): Ex. 181, 183 and 2019. 11/15/12 Tr. 133-134 (Gibson); Exs. 181, 183, 2019. Ex. 181 expires on March 3, 2025, Ex. 183 expires on April 24, 2025, and Ex. 2019 expires on July 8, 2027. Exs. 181, 183, 1589, 2019.

298. LDPC codes are used for error detection and error correction and are an optional part of the 802.11 standard. 11/15/12 Tr. 133-134 (Gibson). Motorola did not invent LDPC codes; LDPC codes were invented by Bob Gallagher in 1961. 11/15/12 Tr. 133-134 (Gibson).

299. The convolutional codes that are required by the 802.11 standard and have been used effectively for years are a well-accepted alternative to the error control coding approach provided by LDPC codes. 11/15/12 Tr. 134 (Gibson).

e. U.S. Patent No. 7,197,016 (Ex. 100)

300. Motorola has analyzed Ex. 100 as essential to the mesh station routing storage procedures of the mesh networking functionality in the 802.11 standard. 11/15/12 Tr. 135-136 (Gibson); Ex. 100. Ex. 100 expires on March 22, 2021. Exs. 100, 1589. Mesh networking is

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connecting a number of nodes without an access point connected to the wired network. 11/15/12 Tr. 135 (Gibson).

301. The 1978 IEEE Proceedings paper by Robert Kahn, et al. *Advances in Packet Radio Technology*, Proceedings of the IEEE, November 1978, pp. 1468-1496, describes several alternative approaches for Ex. 100. 11/15/12 Tr. 135-136 (Gibson); Ex. 533.

302. The Wikipedia page on ad-hoc routing protocols lists a number of different protocols that have been proposed for building routes and distributing data within a mesh network that could be alternatives to Ex. 100. 11/15/12 Tr. 135-136 (Gibson); Ex. 565.

303. U.S. Patent No. 5,488,608 filed on April 14, 1994 and issued on January 30, 1996 describes a system where routing decisions are stored locally at each node/device in a routing table, which is an alternative to Ex. 100. 11/15/12 Tr. 135-136 (Gibson); Ex. 548.

f. U.S. Patent No. 6,404,772 (Ex. 179)

304. Motorola relates claim 1 of Ex. 179 to the QoS functions of an access point distributing data to remote terminals based on the presence of voice packets by giving priority to voice packets. 11/15/12 Tr. 136-138 (Gibson). The '772 patent expires on July 27, 2020. Exs. 179, 1589.

305. The Xbox does not prioritize voice packets. 11/15/12 Tr. 201 (Gibson).

306. Many alternatives existed to Ex. 179. The point coordination function (PCF) within the 802.11 standard is an alternative to Ex. 179. 11/15/12 Tr. 137-138 (Gibson); Ex. 386A. The real time RTP/RTCP protocols assign priority levels to different types of data and are alternatives to Ex. 179. 11/15/12 Tr. 137-138 (Gibson); Ex. 540. The ITU ATM Forum (Asynchronous Transfer Mode—ATM), which provide for the special characteristics of traffic such as VoIP and multimedia and is an alternative to Ex. 179. 11/15/12 Tr. 137-138 (Gibson); Exs. 529, 525. The distributed coordination function (DCF) channel access method is also an alternative to Ex. 179. 11/15/12 Tr. 137-138 (Gibson); Ex. 386A. And the request-to-

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send/clear-to-send method in the 802.11 standard is an alternative to Ex. 179. 11/15/12 Tr. 137-138 (Gibson); Ex. 386A.

g. U.S. Patent No. 5,412,722 (Ex. 160)

307. Motorola relates claim 1 of Ex. 160 to features of 802.11 key exchange. 11/15/12 Tr. 139 (Gibson); Ex. 160. Ex. 160 expires on July 27, 2020. Exs. 160, 1589.

308. There were many known ways to exchange encryption keys, and key exchange protocols have been known at least since the 1976 publication "New Directions in Cryptography," by Whitfield Diffie, which is an alternative to Ex. 160. 11/15/12 Tr. 139 (Gibson); Ex. 505. The Challenge-Handshake Authentication Protocol (CHAP) provides for an alternative to Ex. 160's key exchange through the use of a 3-way handshake. 11/15/12 Tr. 139 (Gibson); Ex. 570. GSM, a cellular system, is a natural alternative to Ex. 160. 11/15/12 Tr. 139 (Gibson); Ex. 526.

h. Power Management Functionality Patents

309. Motorola has analyzed the following U.S. patents as essential to 802.11 power management functionality: Exs. 166, 2016, 2013, 2014. 11/15/12 Tr. 140-43 (Gibson). Power management is conserving battery power for mobile devices and is an optional feature in the 802.11 standard. 11/15/12 Tr. 140 (Gibson).

i. U.S. Patent No. 5,560,021 (Ex. 166)

310. Motorola's analysis of Ex. 166 related the patent to placing stations in an active mode during certain time intervals when the access point indicated that there was waiting data traffic. 11/15/12 Tr. 140-41 (Gibson). Ex. 166 expires on April 4, 2014. Exs. 166, 1589.

311. Within the 802.11 standard itself, alternative power saving methods to Ex. 166 are provided. U.S. Patent No. 5,440,560, filed in March 20, 1992 and issued on August 8, 1995, entitled "Sleep Mode and Contention Resolution Within a Common Channel Medium Access Method" describes a method of placing stations in sleep and awake modes based on

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polling requests by an access point, which would be a natural alternative to the '021 patent. 11/15/12 Tr. 140-41 (Gibson); Ex. 547. Additionally, transmitting packets stored for transmission "at a later time" as discussed in the 802.11 standard also provides an alternative to Ex. 166. 11/15/12 Tr. 140-41 (Gibson); Ex. 386A. And instead of a time period when all user devices are in active mode, a method that allowed only selected devices to be in active mode during a specified time period would be an alternative to Ex. 166. 11/15/12 Tr. 140-41 (Gibson).

ii. U.S. Patent No. 6,236,674 (Ex. 2016)

312. Motorola's analysis relates Ex. 2016 to the dynamic power save mode, and transitioning stations between sleep and awake modes. 11/15/12 Tr. 142 (Gibson). The '674 patent expires on February 23, 2016. Exs. 1589, 2016.

313. Several alternatives could have been adopted by the drafters of the 802.11 instead of Ex. 2016. U.S. Patent No. 5,440,560, filed in March 20, 1992 and issued on August 8, 1995, entitled "Sleep Mode and Contention Resolution Within a Common Channel Medium Access Method" describes a method of placing stations in sleep and awake modes based on polling requests by an access point, which would be a natural alternative to Ex. 2016. 11/15/12 Tr. 142 (Gibson); Ex. 547. Also, the Static Power Save Mode within the 802.11 standard itself provides an alternative to Ex. 2016. 11/15/12 Tr. 142 (Gibson); Ex. 386A.

iii. U.S. Patent Nos. 5,029,183 (Ex. 2013) And 5,479,441 (Ex. 2014)

314. Motorola analyzed Ex. 2013 and 2014 as related to placing stations into sleep or awake modes based on messages transmitted to get buffered data and receiving an acknowledgement or ACK before data transmission. 11/15/12 Tr. 143 (Gibson). Both Ex. 2013 and 2014 had expired by the time of Motorola's October 2010 letter to Microsoft. Exs. 1589, 2013, 2014.

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315. U.S. Patent No. 5,440,560, filed in March 20, 1992 and issued on August 8, 1995, entitled "Sleep Mode and Contention Resolution Within a Common Channel Medium Access Method" describes a method of placing stations in sleep and awake modes based on polling requests by an access point, which would be an alternative to the '183 and '441 patents. 11/15/12 Tr. 143 (Gibson); Ex. 547.

316. Within the 802.11 standard itself, alternative power saving methods are provided. For example, in one mode the access point will wait for a transmission from a station and then "respond with the corresponding [buffered packet] immediately" without waiting for an acknowledgement frame. 11/15/12 Tr. 143 (Gibson); Ex. 386A.

E. Microsoft Has At Least Seven Patents That Are Essential To The 802.11 Standard

317. Microsoft has at least seven patents as essential to the 802.11 standard. U.S. Patent Nos.: 7,194,263; 6,745,360; 7,613,426; 6,999,545; 7,974,574; 7,522,551; 7,440,754. 11/15/12 Tr. 144-45 (Gibson); Exs. 435, 503, 345, 434, 439, 438, 437.

318. Motorola's expert admitted that two of the Microsoft patents were essential to 802.11 and failed to articulate any basis as to why the other five were not essential to the 802.11 standard. 11/19/12 Tr. 101 (Williams).

319. Motorola's expert concluded that Motorola's patent portfolio was more valuable than Microsoft's, but did not consider the value of Microsoft's '263 patent (Ex. 435) in performing that analysis. 11/19/12 Tr. 101 (Williams).

F. If Essential, Motorola's Patents Cover Only A Small Portion Of The 802.11 Standard

320. Motorola's patents cover less than one percent of the technology in the 802.11 standard. 11/15/12 Tr. 154 (Gibson).

321. Motorola does not have all the essential patents in even the few areas of the 802.11 standard that it identified as relating to its patents. 11/15/12 Tr. 153-54 (Gibson).

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322. In every area of technology in which Motorola claims to have innovated, other companies have also obtained patents and committed them to the 802.11 standard. 11/15/12 Tr. 147-48 (Gibson).

1. Companies Other Than Motorola Have Patents On The Security/Encryption Functionality In 802.11

323. Nokia disclosed three U.S. patents to the 802.11 Working Group related to encryption of data in communications: 5,987,137; 6,118,775; and 7,120,422. 11/15/12 Tr. 148-49 (Gibson); Exs. 234, 245, 397.

324. LG disclosed two U.S. patents related to encryption of data in communications: 6,839,553 (general authentication process between a network and a mobile station) and 6,347,144 (preventing copying of data streams by placing encryption information inside a header of that stream). 11/15/12 Tr. 148-49 (Gibson); Exs. 477, 475.

325. ETRI disclosed one U.S. Patent related to encryption of data in communications: 7,477,746 (dynamically managing a group transient key). 11/15/12 Tr. 148-49 (Gibson); Ex. 480.

2. Companies Other Than Motorola Have Patents On The Power Management Functionality In 802.11

326. Nokia disclosed several patent applications and patents relevant to power management essential to the 802.11 standard: the 09/613952 application (transmission power control scheme for use in an 802.11 operable system), which matured in to U.S. Patent No. 6,842,605; the 20070201467 application, which matured into U.S. Patent Number 7,751,396 (using power-save multi-polling frames to transmit information in a multi-cast transmission); the 20060285517 application, which matured into U.S. Patent Number 7,873,018 (scheduling downlink transmissions on one link, uplink transmissions on another link, and both downlink and uplink transmissions on a third link); and 8,189,506 (802.11-2012 sec. 13.14 - sending

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IBSS beacons to identify an awake period for the stations and operating in hibernation mode in between awake periods). 11/15/12 Tr. 150 (Gibson); Exs. 359, 78, 60, 195.

327. Agere Systems, Inc. identified patent application 10/368018 which became RE40032 (using doze and awake states with message synchronization). 11/15/12 Tr. 150 (Gibson); Ex. 494.

3. Companies Other Than Motorola Have Patents On The Channel Access/ Quality of Service Functionality In 802.11

328. Apple Computer identified two U.S. patents related to channel access as essential to 802.11: U.S. Patent Nos. 4,689,786 (using a three-step handshake method wherein periods before attempted retransmissions are dynamically adjusted based on recent traffic history) and 4,661,902 (handshake method and the retransmission timing after an assumed collision). 11/15/12 Tr. 150 (Gibson); Exs. 89, 88.

329. Proxim, Inc. identified at least one patent, U.S. Patent No. 5,231,634, as essential to the 802.11 standard relating to a collision avoidance scheme when there are multiple agents in the wireless system. 11/15/12 Tr. 150-51 (Gibson); Ex. 129.

330. Agere Systems Inc. identified at least one patent and one application that matured into a patent as essential to the 802.11 standard relating to collision avoidance: U.S. Patent No. 5,422,887 (providing equitable access using a CDMA-CD scheme) and Application 10/092,295, which became U.S. Patent No. 6,707,867 (transmitting signals with timing information related to transmission delays). 11/15/12 Tr. 150-51 (Gibson); Exs. 137, 325.

331. Spectrix has identified at least one patent as related to channel access: U.S. Patent No. 7,643,509 (multiple access/collision avoidance protocol). 11/15/12 Tr. 150-51 (Gibson); Ex. 485.

332. Nokia Corp. sent a Letter of Assurance to the 802.11 Working Group disclosing U.S. Patent No. 7,006,472 as essential to the standard, relating to QoS and selecting the

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appropriate radio flow for each packet from a selection of predefined flows. 11/15/12 Tr. 150-51 (Gibson); Ex. 391.

333. ETRI identified a U.S. patent related to channel access: 7,616,612 (method of guaranteeing QoS for VoIP using priority information). 11/15/12 Tr. 150-51 (Gibson); Ex. 484.

334. LG identified at least three patents as related to channel access or Qos: 6,469,993 (preparing a table of dynamic priority numbers and each terminal); 7,616,592 (communication between a mobile station and a base station having header information); and 7,653,025 (scheduling packet transmission based on a service identification related to the packet). 11/15/12 Tr. 150-151 (Gibson); Exs.483, 476, 486.

4. Companies Other Than Motorola Have Patents On The Data Modulation Functionality In 802.11

335. Spectrix Corp. identified U.S. Patent No. 5,247,380 as essential to the 802.11 standard and related to spread spectrum technology (describing an infrared two-way communication system). 11/15/12 Tr. 151-152 (Gibson); Ex. 264.

336. Nokia Corp. disclosed two applications and two patents related to spread spectrum technology in 802.11: 20020160769, which became U.S. Patent No. 6,675,012 (dynamic frequency selection that indicates transmission frequency and level of interference); 6,298,035 (estimating separate channel frequencies when using OFDM with two transmitters); 20030050012, which became U.S. Patent No. 6,738,599 (dynamic frequency selection in an ad-hoc network)); and U.S. Patent No. 6,834,045 (a method for allocating frequencies in a WLAN operating in the 5 GHz range). 11/15/12 Tr. 151-152 (Gibson); Exs. 321, 255, 327, 357.

337. Cisco Systems Inc. also made contributions in the area of data modulation: U.S. Patent No. 6,654,921 (receipt of signals from multiple transmission management schemes,

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time-division multiplexing and frequency division multiplexing). 11/15/12 Tr. 151-152 (Gibson); Ex. 318.

338. AT&T also identified one patent related to data modulation: U.S. Patent No. 6,430,231 (method for using two or more antennas to receive one more symbol than antennas by using time-division multiplexing in an orthogonal manner). 11/15/12 Tr. 151-152 (Gibson); Ex. 260.

339. Certain patents in the Via license pool patents relate to data modulation, including U.S. Patent Nos. 5,307,376 (providing higher quality transmission of a digital signal interlaced in time and infrequency), 6,925,587 (creating an Interleaver design such that the same design is near-optimal for all Interleavers within a set of sizes), and 7,526,687 (creating an Interleaver design such that the same design is near-optimal for all Interleavers within a set of sizes). 11/15/12 Tr. 151-152 (Gibson); Exs. 131, 478, 481.

5. Companies Other Than Motorola Have Patents On The LDPC/ Error Control Coding Functionality In 802.11

340. Nokia Corp. disclosed at least one patent and one application as essential to 802.11 relating to LDPC or error control coding: U.S. Patent No. 7,664,008 (a method for determining a number of available bits in an OFDM system using LDPC); and Application 2008-0109699, which became U.S. Patent No. 7,934,146 (using LDPC in the encoding of an information block). 11/15/12 Tr. 151-152 (Gibson); Exs. 74, 61.

341. Cisco Systems Inc. also made contributions in the area of LDPC/error control coding: Application 11/665,171, which became U.S. Patent No. 7,996,746 (expansion of the base parity matrix to accommodate larger code rates without redesigning the parity check matrix). 11/15/12 Tr. 152 (Gibson); Ex. 97.

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6. Companies Other Than Motorola Have Patents On The Mesh Networking/Ad-Hoc Functionality In 802.11

342. Apple Computer identified U.S. Patent No. 6,069,887 to the IEEE 802.11 Working Group, disclosing the use of time synchronization among end stations in an ad hoc network. 11/15/12 Tr. 153 (Gibson); Ex. 240.

343. Nokia disclosed application number 20060121883 to the IEEE 802.11 Working Group. The application became U.S. Patent No. 8,019,344, which discusses the hand-off mechanism of a mobile station going from one fixed-site station to the next, including applicable security. 11/15/12 Tr. 153 (Gibson); Ex. 499.

7. Companies Other Than Motorola Have Patents On The Fragmentation/Aggregation Functionality In 802.11

344. Microsoft's patent U.S. Patent No. 6,745,360 generally relates to fragmentation and aggregation. 11/15/12 Tr. 153 (Gibson); Ex. 503.

VI. APPROPRIATE RAND ROYALTIES FOR MOTOROLA'S H.264 SEPs

345. Based on the best available evidence, the range of RAND royalties for a license for Microsoft to Motorola's H.264 SEPs would be between 0.065 and 0.204 cents per unit or between $167,000 and $502,000 per year at current volumes. 11/16/12 Tr. 99:3-104:8 (Lynde); 11/20/12 Tr. 161:7-18 (Lynde); Exs. 1161, 1163.

346. Within that range, the best estimate for a RAND royalty for a license for Microsoft to Motorola's H.264 SEPs is 0.197 cents per unit or an annual royalty of $474,000 at current volumes. 11/16/12 Tr. 100:3-17 (Lynde); 11/20/12 Tr. 159:7-12 (Lynde).

347. The foregoing estimates are based on the MPEG LA H.264 patent pool, which is the closest real-world comparable for the determination of RAND royalties for Motorola's H.264 SEPs. 11/13/12 Tr. 155:25-158:12 (Murphy); 11/16/12 Tr. 80:15-81:2, 84:15-86:4 (Lynde).

348. The approach taken by Microsoft's expert, Dr. Matter Lynde, is conservative. Although Motorola's H.264 portfolio related predominately to interlaced video which is of

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little or no importance to Microsoft's products, he made no downward adjustment for that fact. 11/16/12 Tr. 105:2-8 (Lynde).

A. Background Regarding The Formation Of The MPEG LA H.264 Patent Pool

349. Efforts to form the MPEG LA H.264 pool, which is also known as the MPEG LA AVC pool, began in June 2003, shortly after the H.264 standard was adopted in May of that year. 11/13/12 Tr. 61:10-15 (Glanz); 11/16/12 Tr. 94:25-95:9 (Lynde).

350. Both Microsoft and Motorola, among many others, participated in efforts to form the MPEG LA H.264 pool. Ex. 1584 at MS-MOTO_1823_0002353109 (listing participants); Ex. 1139 (same); 11/13/12 Tr. 67:10-17 (Glanz).

351. Meetings concerning the formation of the MPEG LA H.264 pool occurred before widespread implementation of the standard. Many potential licensees were awaiting the result of both the MPEG LA pool meetings and the meetings of another pool sponsor, Via Licensing Corporation, which were occurring in the same time frame. They wanted to know the respective pool royalty rates and structures before committing to implementation of the H.264 standard. 11/13/12 Tr. 63:15-67:4, 67:5-68:1, 89:11-90:2 (Glanz).

352. At the time the MPEG LA H.264 pool was being formed, a number of alternative video compression technologies existed that could have been used instead of the H.264 standard, including MPEG-4 Visual, Real Video from RealNetworks, and Microsoft's own Windows Media Video. 11/13/12 Tr. 63:21-64:8 (Glanz).

353. The parties involved in the formation of the MPEG LA H.264 pool, including Microsoft and Motorola, sought to strike a balance between setting a royalty high enough to motivate a significant number of patent holders to contribute their patents to the pool and low enough to ensure that licensees would implement the H.264 standard rather than using one of the alternatives. 11/13/12 Tr. 74:13-76:5 (Glanz); Ex. 1642 (email string in which Motorola's

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representative to MPEG LA, Paul Bawel, noted that Motorola is "in favor of finding the right mix of terms that will result in a successful license for the marketplace").

354. The general framework for MPEG LA H.264 pool royalties began to take shape during a two-day meeting on July 31 and August 1, 2003. Ex. 1581: Ex. 1139; 11/13/12 Tr. 72:21-73:10 (Glanz). At that meeting, Microsoft was represented by Garrett Glanz and Motorola was represented by Paul Bawel. 11/13/12 Tr. 62:7-11, 67:10-16 (Glanz).

355. The main focus at this two-day meeting was the royalty amount per codec (a combination of an encoder and a decoder) and whether annual caps or some other form of volume discount should be applied. 11/13/12 Tr. 68:23-69:2, 85:20-25 (Glanz).

356. During the meetings, Mr. Glanz took detailed notes of the views expressed by the representatives of the approximately eighteen participating companies on each of the two days, including the views expressed by Motorola. 11/13/12 Tr. 72:21-73:10 (Glanz); Ex. 1139.

357. On behalf of Motorola, Mr. Bawel criticized elements of one strawman proposal that called for uncapped royalties for codecs that implement the main and extended profiles of H.264 of between $1.50 and $0.20 per unit depending on volume as being "too expensive for mobile" devices and stated that Motorola was in strong favor of annual caps. Ex. 1139 at MS-MOTO_1823_00003927604-05; 11/13/12 Tr. 80:8-9, 80:19-81:1 (Glanz).

358. Mr. Bawel said that if the strawman proposal with uncapped royalties were adopted, it would lead mobile manufacturers like Motorola to choose to implement video compression technologies other than H.264. 11/13/12 Tr. 80:19-81:1 (Glanz).

359. Mr. Bawel later indicated that, as between two other strawman proposals, Motorola favored a proposal that provided for royalties ranging from $1.00 per unit down to $0.20 per unit based on volumes above 50,000 (sales below that would be royalty-free) subject to annual caps of either $2 million per business unit or $8-10 million per enterprise. Ex. 1581 at MS-MOTO_1823_00003927558-62 (slide deck for MPEG LA's presentation at 7/31-8/1/03

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Meeting of AVC Essential IP Holders); Ex. 1139 at MS-MOTO_1823_00003927611-12 (Glanz's notes from MPEG LA's 7/31-8/1/03 meeting); 11/13/12 Tr. 82:19-84:25, 86:6-10 (Glanz).

360. On August 5-6, 2003, both Microsoft and Motorola participated in a separate meeting convened by Via Licensing Corporation ("Via"), a competitor of MPEG LA's that was also trying to establish an H.264 patent pool. At that meeting Motorola outlined the specific royalty structure it wished to have adopted: $0.25 for manufacture and sale of each codec with annual caps of $2 million. 11/13/12 Tr. 87:4-88:11 (Glanz); Ex. 1583 (Glanz's notes from 8/4-8/5/03 Via Licensing meeting). The amounts were a total royalty to be divided among all owners of 802.11 SEPs, assuming they could be persuaded to participate in the Via pool.

361. The MPEG LA meetings eventually led to a consensus on royalties in the fall of 2003, culminating in a November 17, 2003 "News Release." It was intended to publicize the proposed pool royalties so that potential licensees would proceed to implement H.264 while the MPEG LA pool members worked out detailed agreements and terms. Ex. 1584 (MPEG LA's November 17, 2003 News Release); 11/13/12 Tr. 88:21-24, 89:11-90:2 (Glanz).

362. Motorola approved the November 2003 "News Release". It announced royalties of $0.20 per codec after the first 100,000 units (which were at no charge) and $0.10 per unit above 5 million units, with an annual cap of $3.5 million in year one, scaling up to $5 million over the licensing term. Ex. 1584 (MPEG LA's November 17, 2003 News Release) at 2-3 (describing royalties and identifying as a cooperating patent owner); 11/13/12 Tr. 64:9-66:23(Glanz) (identifying and describing Ex. 1584 and explaining that Motorola had agreed to the terms reflected in the press release); Ex. 1179 at MS-MOTO_1823_2353356 (email from P. Bawel of Motorola to L. Horne of MPEG LA approving terms of release).

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363. After receiving feedback on the terms announced in November 2003, MPEG LA made changes to the royalty structure relating to the distribution of video content. 11/13/12 Tr. 91:20-92:7 (Glanz).

364. Motorola concurred in that change as well, stating that it was "in favor of finding the right mix of terms that will result in a successful license for the marketplace." Ex. 1642 at MS-MOTO_1823_00002352332; 11/13/12 Tr. 91:20-92:21 (Glanz).

365. MPEG LA then issued a final press release on May 18, 2004, confirming the same basic per codec royalty and caps as in the November 17, 2003 New Release. Ex. 1625 (email string discussing draft final press release); Ex. 1626 (MPEG LA's May 18, 2004 press release). 11/13/12 Tr. 93:3-94:12 (Glanz).

366. Motorola approved the terms of MPEG LA's May 18, 2004 press release. Ex. 1625 (email string discussing draft final press release); Ex. 1626 (MPEG LA's May 18, 2004 press release); 11/13/12 Tr. 93:3-94:12 (Glanz).

367. It was understood during the formative discussions among the MPEG LA H.264 pool participants that the revenue sharing model would parallel that in MPEG LA's predecessor MPEG-2 and MPEG-4 Visual patent pools: each contributing licensor would receive a share of total pool based on the licensor's number of standard essential patents relative to the total standard essential patents in the pool for the country in question (*e.g.*, a contributor of one patent in a pool of 100 patents would receive 1%). 11/13/12 Tr. 62:12-63:11, 131:19-132:7 (Glanz).

368. During the discussions regarding the formation of the MPEG LA H.264 pool, Motorola never objected to this allocation method and never stated that its patents were more valuable than the average pool patent or deserved a higher royalty. 11/13/12 Tr. 95:5-10, 131:25-132:11 (Glanz).

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369. Motorola had participated as a licensor in the earlier MPEG LA MPEG-4 Visual patent pool, which involved similar video compression technology and involved royalty rates and caps similar to those proposed for the MPEG LA H.264 pool. 11/16/12 Tr. 92:10-93:4, 94:6-14, 101:5-17 (Lynde); 11/13/12 Tr. 85:13-17 (Glanz).

370. Motorola contributed and licensed through the MPEG LA MPEG-4 Visual pool at least one of the patents that it currently claims is essential to the H.264 standard. 11/16/12 Tr. 93:5-10 (Lynde).

371. In explaining its decision to join the MPEG LA MPEG-4 Visual pool as a licensor, Motorola characterized the royalty rates of the pool as reasonable, observing that participation would provide Motorola with "a simple business solution for most of the patent issues at reasonable rates." Ex. 71 at MOTM_WASH1823_0505113; 11/16/12 Tr. 93:11-94:14 (Lynde).

372. Motorola further observed that participation in the MPEG-4 Visual pool would allow Motorola to "recover a significant portion of the royalties" it would be obligated to pay, while "the cost of negotiating [its] own agreements for all the companies involved [would] cost more than the royalties it could expect to receive." Ex. 71 at MOTM_WASH1823_0505113.

373. On July 7, 2004, Microsoft formally joined the MPEG LA H.264 pool as both a licensor and a licensee by executing (a) the MPEG LA Agreement Among Licensors Regarding the AVC Standard, which contained the royalty structure outlined in the May 18, 2004 press release and the apportionment method described above; (b) the MPEG LA Licensing Administrator Agreement Regarding the AVC Standard; and (c) the AVC Patent Portfolio License. Exs. 1141, 1636, 3087.

374. On July 14, 2004, Microsoft learned that Motorola had decided not to join the MPEG LA H.264 pool. Microsoft received no explanation for this decision beyond the information contained in an email from MPEG LA's CEO, Larry Horne, stating that Motorola

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had sold the patent on which it had predicated its pool membership. 11/13/12 Tr. 122:7-1 (Glanz); Ex. 124.

375. Because it claimed privilege during discovery as to its reasons for not participating in the MPEG LA H.264 pool, the Court ruled *in limine* that Motorola could present no evidence at trial concerning its reasons for not participating.

B. The MPEG LA H.264 Pool Today

376. The MPEG LA H.264 pool currently includes approximately 275 U.S. standard-essential patents and over 2400 standard-essential patents worldwide. Ex. 1152.

377. Those standard-essential patents have been contributed by twenty-six licensors including leading technology firms such as Apple, Cisco, Ericsson, Fujitsu, LG, Microsoft and Sony. Ex. 1152; 11/16/12 Tr. 85:18-21, 90:11-91:20 (Lynde).

378. There are over 1100 licensees of the MPEG LA H.264 patent pool. 11/16/12 Tr. 85:18-21, 94:22-24 (Lynde).

379. Pursuant to the form MPEG LA H.264 pool agreement, licensees agree that they if they or their affiliates have H.264 SEPs, they will license them to pool licensors on RAND terms with the presumption that the licensor's per patent share of the royalties paid by the licensee represent RAND terms for the licensee's SEPs. Ex. 3087 at § 8.3; 11/16/12 Tr. 95:25-97:19 (Lynde).

380. The MPEG LA H.264 patent pool charges royalties to licensees for products that incorporate an H.264 codec according to the following schedule:

- the first 100,000 units are royalty-free;
- for unit volumes between 100,000 and 5 million, the royalty is $0.20 per unit; and
- for unit volumes above 5 million, the royalty rate is $0.10 per unit.

Ex. 3087 at §3.1.1; 11/13/12 Tr. 65:7-17, 95:14-20 (Glanz); Ex. 1626.

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381. The foregoing per unit royalties were originally subject to the following annual caps:

- Sales in 2005 and 2006: $3.5 million
- Sales in 2007 and 2008: $4.25 million
- Sales in 2009 and 2010: $5 million

Ex. 3087 at §3.1.1; 11/13/12 Tr. 65:10-14, 95:14-20 (Glanz); Ex. 1626.

382. The annual enterprise cap for products containing an H.264 codec is presently set at $6.5 million. Ex. 103 at GGMM 00000327; 11/16/12 Tr. 102:22-23 (Lynde).

383. Computer operating systems sold to OEM computer manufacturers would be subject to a separate annual enterprise cap of an additional $6.5 million, for a total enterprise cap for a firm like Microsoft of $13 million. Ex. 3087 at § 3.1.6; Ex. 103 at § 3.1.6 and GGMM00000327.

384. The agreement provides that royalty rates will not increase by more than 10% upon renewal of the agreement, although they have not done so. Ex. 3087 at § 6.1; 11/16/12 Tr. 100:18-101:4 (Lynde).

385. The agreement that MPEG LA has entered with the licensors participating in the pool obliges MPEG LA use commercially reasonable best efforts to maximize the royalties generated by MPEG LA H.264 patent pool. Ex. 1636 at § 3.9.

C. Google's Status As An MPEG LA H.264 Patent Pool Licensee

386. Google, Inc. is a licensee of the MPEG LA H.264 patent pool. 7/12/12 Dep. of A. Lo at 30:14-17, 30:22-25, 31:4-5, 31:8-32:1, 33:8-34:7; Ex. 103.

387. Microsoft is explicitly named as a "Licensor" and is an intended third-party beneficiary of the Google-MPEG LA H.264 patent pool agreement. Ex. 103 at § 8.17.

388. The H.264 patent pool agreement includes a provision pertaining to the obligations of licensees like Google which states in full:

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> License Grant. Upon full execution of this Agreement, Licensee agrees to grant a worldwide, nonexclusive license and/or sublicense (commensurate to the scope of the licenses which Licensee has selected hereunder) **under any and all AVC Essential Patent(s) that Licensee and its Affiliates, if any, have the right to license and/or sublicense**, to any Licensor or any sublicensee of the Licensing Administrator desiring such a license and/or sublicense on fair and reasonable terms and conditions. For purposes of this Section 8.3 only, the Licensors' per patent share of royalties which are payable pursuant to Article 3 of this Agreement shall be presumed to be a fair and reasonable royalty rate for the aforementioned license and/or sublicense to be granted by the Licensee.

Ex. 103 at § 8.3 (emphasis added).

389. Section 8.3 of the MPEG LA H.264 patent pool agreement requires the "Licensee" to grant a worldwide, nonexclusive license under "any and all AVC Essential Patents" (H.264 essential patents) that the "Licensee ***or its Affiliates***, if any, have the right to license or sublicense" under fair and reasonable terms, including specifically the "presumed" fair and reasonable royalty rate as specified. Ex. 103 (emphasis added).

390. "Affiliate," in turn, is defined in the MPEG LA H.264 patent pool agreement as "a Legal Entity [which by definition includes a corporation] which now or hereinafter, directly or indirectly, controls, is controlled by or is under common control with Licensee," where "control" includes ownership of at least 50% of the shares of the Legal Entity. Ex. 103 at §§ 1.1, 1.29.

391. As of May 22, 2012, Google acquired more than 50% of the shares of Motorola Mobility and General Instrument. 10/24/12 Pretrial Order (Dkt. # 493) at 3; 7/12/12 Dep. of A. Lo at 47:2-6, 47:9-21, 48:2-4, 48:6-8, 48:11, 48:14-15, 49:5-8, 49:11-13.

392. The presumed fair and reasonable royalty rate for a license to the H.264 SEPs of Google and its affiliates pursuant to Section 8.3 of the MPEG LA-Google H.264 patent pool agreement is "the Licensors' per patent share of royalties payable" by Google under its license agreement. Ex. 103 at § 8.3; 11/16/12 Tr. 96:12-97:3 (Lynde).

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D. The MPEG LA H.264 Pool Is The Best Indicator Of RAND Terms For Motorola's H.264 SEPs

393. Given the timing of its formation (shortly after promulgation of the H.264 standard and before it had been widely adopted), the number and diversity of the firms that have participated as licensors and licensees in the pool, and the success of the standard, the MPEG LA H.264 patent pool is the closest real-world comparable for the determination of RAND royalties for Motorola's H.264 SEPs. 11/13/12 Tr. 155:25-158:12 (Murphy); 11/16/12 Tr. 80:15-81:2, 84:15-86:4 (Lynde).

394. Motorola's endorsement of the MPEG LA H.264 pool royalty structure (including the caps), and its participation as a licensor in MPEG LA's MPEG 4 Visual pool (which has similar royalties for related technology), further confirms that the MPEG LA H.264 pool is an appropriate benchmark in this case. 11/16/12 Tr. 91:21-94:14 (Lynde).

395. Google is a sophisticated, substantial technology firm. Google's agreement (as the parent of Motorola Mobility and General Instrument) to the grant-back license provisions in the MPEG LA-Google H.264 patent pool agreement further corroborates that the MPEG LA H.264 pool arrangement is an appropriate benchmark for determining RAND royalties in this case. 11/16/12 Tr. 95: 15-24, 97:4-11 (Lynde).

396. Motorola's expert, Richard Schmalensee, testified that pools are biased towards low rates because they are comprised of vertically-integrated firms that prefer lower royalties on their standard-compliant products. 11/16/12 Tr. 143:18-144:6 (Schmalensee).

397. This contention is undermined by Motorola's own submission to ETSI in which it emphasized that the "'dual' role of most [pool] members (IPR owners and future licensees)" would ensure that royalties were, in fact, "reasonable." Ex. 1033 at MOTM_WASH1823_04221107; 11/16/12 Tr. 34:18-35:10 (Simcoe).

398. Moreover, in the case of the H.264 pool, several of the licensors, including Dolby Laboratories, the Electronics and Telecommunications Research Institute ("ETRI"),

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Fraunhofer-Gesellschaft (also known as the Heinrich Hertz Institute), and the Trustees of Columbia University, are not vertically integrated and generate returns on their research and development entirely through licensing revenues rather than product sales. Ex. 1152; 11/16/12 Tr. 87:18-89:7 (Lynde).

399. In any event, pools cannot systematically under-compensate licensors because they need to ensure broad and diverse licensor participation in order to make the pool successful. 11/13/12 Tr. 75:5-11 (Glanz); 11/16/12 Tr. 90:2-10 (Lynde).

400. Motorola has also suggested that, because pools divide royalties among the participating licensors based on their number of patents, firms with high value patents have little incentive to participate. 11/16/12 Tr. 146:8-147:3 (Lynde cross-examination).

401. There is, however, no evidence that this has been true with respect to the MPEG LA H.264 pool, in which many leading technology firms are licensors. 11/16/12 Tr. 90:11-91:20, 146:8-147:3 (Lynde).

402. In fact, Microsoft's technical expert, Professor Michael Orchard, characterized the patents in the MPEG LA H.264 pool as "broad, covering all fundamental aspects [of the standard], and rich." 11/14/12 Tr. 112:21-113:9 (Orchard).

403. In contrast, Motorola's technical expert, Timothy Drabik, offered no opinion as to whether Motorola's patents are more or less valuable than the patents in the MPEG LA H.264 pool. 11/19/12 Tr. 60:16-23 (Drabik).

404. Likewise, Kirk Dailey, the current head of patent transactions for Google, and the former Corporate Vice President of Intellectual Property for Motorola who authored the October 2010 demand letters that gave rise to this dispute, [redacted] 11/20/12 Tr. 34:25-35:20, 110:11-15 (Dailey); Exs. 1, 2.

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405. Dailey did not know if [redacted] 11/20/12 Tr. 68:6-10 (Dailey). And Motorola never made any claim that its patents were particularly valuable or that it was entitled to greater compensation during the formation of the MPEG LA H.264 patent pool. 11/13/12 Tr. 95:5-10, 131:25-132:11 (Glanz).

406. Motorola has also suggested that because patent pools involve lower transaction costs, they are inappropriate benchmarks. 11/16/12 Tr. 148:21-149:17 (Lynde cross-examination).

407. The fact that pools involve lower transaction costs is one of the reasons that economists feel strongly that they are pro-competitive and benefit the public. 11/16/12 Tr. 147:11-17 (Lynde).

408. Conversely, it would be economically unreasonable to reward a firm for running up high transaction costs by make unreasonable royalty demands and requiring the counter-party to bear those excess costs in the form of a "RAND" royalty. 11/16/12 Tr. 178:13-20 (Lynde).

409. In any event, differences in legitimate transaction costs cannot plausibly explain the enormous difference between the RAND royalties derived from the pools in this case and level of royalties demanded by Motorola. 11/16/12 Tr. 178:21-25 (Lynde).

E. RAND Royalties For Motorola's H.264 SEPs Based On The MPEG LA H.264 Patent Pool

410. Based on the licensing rates and reflecting the caps employed by the MPEG LA H.264 pool, Microsoft's economic and valuation expert, Dr. Matthew Lynde, estimated the effective per unit rates and annual royalties at current volumes that Microsoft would be expected to pay under three scenarios: (a) if Motorola received royalties equivalent to what a firm with a like-sized portfolio would receive as a licensor member of the MPEG LA H.264 pool; (b) if Motorola received royalties equivalent to what it would have received if it and the

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other holders of other readily identifiable H.264 SEPs were all added to the pool with the current pool rate structure; and (c) if Motorola received royalties equivalent to what it would have received if it and the other holders of other readily identifiable H.264 SEPs were all added to the pool at rates increased by the maximum 10 percent permitted under the MPEG LA license arrangement. 11/16/12 Tr. 99:3-101:4 (Lynde); 11/20/12 Tr. 158:10-161:18 (Lynde); Exs. 1161-62.

411. If Motorola received royalties based on the addition of only its patents to the MPEG LA H.264 patent pool, it would receive from Microsoft 0.197 cents per unit or approximately $502,000 per year at current volumes. 11/16/12 Tr. 99:11-100:2 (Lynde); 11/20/12 Tr. 158:21-159:12, 159:21-160:3 (Lynde).

412. Accounting for Motorola's claim for reciprocity (i.e. a grant back license to Microsoft's H.264 SEPs), Motorola's annual payment to Microsoft for such a license to Microsoft's H.264 SEPs using the same methodology would amount to $248,000 per year at current volume levels or 1.12 cents per unit. 11/20/12 Tr. 159:21-160:1 (Lynde).

413. Thus, Microsoft's net annual payment to Motorola under a scenario where royalties for both Microsoft and Motorola's H.264 SEPs were set at a level under the MPEG LA pool equivalent to what both parties would receive as members of the MPEG LA patent pool would be approximately $254,000. 11/20/12 Tr. 159:21-160:6 (Lynde).

414. To better account for royalty stacking concerns, Dr. Lynde considered the effect of adding, in addition to Motorola's 63 worldwide H.264 patents, the 89 other specific H.264 SEPs that have been disclosed by companies submitting Letters of Assurance that do not presently participate in the MPEG LA patent pool under the current MPEG LA rate structure. 11/16/12 Tr. 100:3-17 (Lynde).

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415. Under this scenario, Microsoft would pay Motorola royalties of 0.185 cents per unit or approximately $474,000 per year at current volumes. 11/16/12 Tr. 100:3-17 (Lynde); 11/20/12 Tr. 160:7-15 (Lynde); Ex. 1161.

416. Under the same assumptions, Motorola's annual payment to Microsoft for a grant-back license to Microsoft's H.264 SEPs would be approximately $231,000 per year or 1.05 cents per unit. 11/20/12 Tr. 160:7-161:6 (Lynde); Ex. 1162.

417. Therefore, under a full participation scenario based on the current rates of the MPEG LA H.264 patent pool, Microsoft's net payment to Motorola would be approximately $243,000 per year at current volumes. 11/20/12 Tr. 160:23-161:6 (Lynde).

418. If, in the prior scenario, the MPEG LA H.264 pool rates were increased by the full 10% permitted under the MPEG LA H.264 pool agreements, Microsoft would pay Motorola royalties of 0.204 cents per unit or approximately $521,000 per year at current volumes. 11/16/12 Tr. 100:18-101:2 (Lynde); 11/20/12 Tr. 161:7-18 (Lynde); Ex. 1161.

419. Under the same assumptions, Motorola's annual payment to Microsoft for a grant-back license to Microsoft's H.264 SEPs would be approximately $254,000 or 1.15 cents per unit. 11/20/12 Tr. 161:7-18 (Lynde); Ex. 1162.

420. Therefore, under a full participation scenario based on rates of the MPEG LA H.264 patent pool that are assumed to have been increased by 10%, Microsoft's net payment to Motorola would be approximately $267,000 per year at current volumes. 11/20/12 Tr. 161:7-18 (Lynde).

421. The assumptions underlying Dr. Lynde's royalty estimates are conservative and favorable to Motorola because they assume that all patents that Motorola has asserted are essential to the H.264 standard are, in fact, essential and infringed. 11/16/12 Tr. 82:21-83:13 (Lynde).

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422. The following chart summarizes the estimates Dr. Lynde derived from the MPEG LA H.264 pool royalty rates and reflecting the applicable caps:

RAND Royalties Based on the MPEG LA H.264 Pool

	Per Unit Royalty Paid by Microsoft	Microsoft Annual Payment	Per Unit Royalty Paid by Motorola if Cross-License	Motorola Annual Payment if Cross-License	Net Payment to Motorola if Cross-License
As if Motorola's Patents in Pool	0.197¢	$ 502,000	1.12¢	$ 248,000	$ 254,000
Motorola's and Other Identified Patents Added	0.185¢	$ 474,000	1.05¢	$ 231,000	$ 243,000
Rates Increased by 10%	0.204¢	$ 521,000	1.15¢	$ 254,000	$ 267,000

11/20/12 Tr. 158-61 (Lynde); Exs. 1161-62.

423. The work papers underlying Dr. Lyndes calculations based on the MPEG LA H.264 pool were admitted as Exhibits 1160-62.

F. RAND Royalties Based On The Grant Back Provision Under Google's License With The MPEG LA H.264 Patent Pool

424. As noted above, Google is a licensee of the MPEG LA H.264 patent pool. 7/12/12 Dep. of A. Lo at 30:14-17, 30:22-25, 31:4-5, 31:8-32:1, 33:8-34:7; Ex. 103.

425. The presumed fair and reasonable royalty rate for a license to the H.264 SEPs of Motorola Mobility and General Instrument pursuant to Section 8.3 of the MPEG LA-Google H.264 patent pool agreement is "the Licensors' per patent share of royalties payable" by Google under its license agreement. Ex. 103 at § 8.3; 11/16/12 Tr. 96:12-97:3 (Lynde).

426. Assuming that Google pays a current enterprise cap of $6.5 million and based on the 2,458 patents in the MPEG LA pool as of today, the Licensors' per patent share of the

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royalties currently payable by Google under its license are approximately $2,644 per patent per year. Ex. 1163.

427. Given that Motorola claims to have 63 H.264 SEPs worldwide, if it received a royalty equivalent to the Licensors' per patent royalties payable by Google pursuant to Section 8.3 of Google's MPEG LA H.264 license for each of its patents, Motorola would receive approximately $167,000 per year. Given Microsoft's current sales volume, this would come out to a per unit royalty of 0.0652 cents. 11/16/12 Tr. 102:9-25 (Lynde); Ex. 1163.

428. Exhibit 1163 sets forth the basis for Dr. Lynde's calculations based on the Google grant back provision.

VII. APPROPRIATE RAND ROYALTIES FOR MOTOROLA'S 802.11 SEPs

429. Based on the evidence introduced at trial, the range of RAND royalties for a license for Microsoft to Motorola's 802.11 SEPs would be between 3 and 6.5 cents per unit. 11/16/12 Tr. 113:3-116:17, 123:25-124:13 (Lynde).

430. The best point estimate of a RAND royalty for Motorola's 802.11 SEPs within that range is 5 cents per unit or $736,000 per year at current volumes. 11/16/12 Tr. 114:18-115:3 (Lynde).

431. The foregoing estimates are derived from the Via 802.11 patent pool and other corroborating benchmarks discussed below. 11/16/12 Tr. 123:14-124:22 (Lynde).

A. The Via Licensing 802.11 Patent Pool

1. Background

432. Via Licensing formed a pool of patents essential to the 802.11 standard between 2003 and 2005. Tr. 107:11-13 (Lynde).

433. Current licensors of the Via 802.11 pool include ETRI, Japan Radio Co., Ltd., Koninklijke Philips Electronics N.V., LG Electronics, Inc., and Nippon Telegraph and Telephone Corporation. Ex. 1125.

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434. The pool currently includes 35 worldwide patents essential to the 802.11 standard. 11/16/12 Tr. 112:9-11 (Lynde).

435. There are eleven licensees of the Via 802.11 pool, including five firms that are or were at one time licensors of the pool. 11/16/12 Tr. 106:25-107:4 (Lynde); Ex. 1164.

436. Current licensees that have not contributed patents to the pool include Eastman Kodak, Fujitsu, LG, Sony, and Koss. Ex. 1164.

437. On or about April 15, 2004, while the Via 802.11 pool was being formed, Motorola submitted a patent for evaluation to Via Licensing for potential inclusion in the pool. 4/18/12 Dep. R. Sonnentag at 34:13-16, 35:16-25; Ex. 45.

438. The patent submitted by Motorola was determined by Via's independent evaluator, Robert Sachs of Fenwick & West, not to be essential to the 802.11 standard. 4/18/12 Dep. of R. Sonnentag at 45:8-10, 45:17-21, 46:4-8; Ex. 12. Motorola was therefore unable to participate in the discussions which led to the setting of the Via pool royalty rates. Exs. 43, 44.

439. The 802.11 licensing pool has rates that vary from $0.05 to $0.55 per unit depending on the volume pursuant to the following schedule:

Units/Year	License Fee Per Unit
1 to 500,000	$0.55
500,001 to 1,000,000	$0.50
1,000,001 to 5,000,000	$0.45
5,000,001 to 10,000,000	$0.30
10,000,001 to 20,000,000	$0.20
20,000,001 to 40,000,000	$0.10
40,000,001 or more	$0.05

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Ex. 52.

440. As in the case of the MPEG LA H.264 pool, participating licensors receive a share of the royalties collected by the pool based upon their relative patent contributions, which is a function of the number of patents contributed to the pool relative to the total as well as the country in which the patent was granted. 11/16/12 Tr. 111:6-10, 112:21-113:2 (Lynde).

2. The Via 802.11 Pool Is An Appropriate Benchmark In This Case

441. Although the Via 802.11 patent pool has enjoyed less success than the MPEG LA H.264 patent pool, it nevertheless provides the best available evidence of a pool arrangement relating to the 802.11 standard. 11/16/12 Tr. 81:3-14 (Lynde); 11/13/12 Tr. 159:9-11 (Murphy) ("I think it's probably the best thing we have").

442. The Via 802.11 pool has the virtue of being focused exclusively on the standard at issue, and it covers the same kinds of products for the same ultimate purposes as are at issue in the present dispute. 11/13/12 Tr. 158:22-159:2 (Murphy).

443. The Via 802.11 pool also has the key feature that it was designed to foster widespread adoption of the 802.11 standard consistent with the intent behind the RAND commitment. 11/13/12 Tr. 159:20-25 (Murphy).

444. Given that the 802.11 standard was first issued in 1997, however, the Via 802.11 pool is not an ideal *ex ante* comparable. 11/16/12 Tr. 107:11-21 (Lynde); 11/13/12 Tr. 174:9-11.

445. Nevertheless, to the extent that the Via 802.11 pool was formed significantly after the standard was issued, this would tend to push the rates up because of the investments had already been made and licensors would have had more leverage. 11/16/12 Tr. 107:22-108:3 (Lynde).

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446. Likewise, the fact that the Via 802.11 pool has not achieved a large level of participation may suggest that rates have been set too high to attract licensees. 11/13/12 Tr. 159:3-6 (Murphy); 11/16/12 Tr. 117:21-23 (Lynde).

447. For both of those reasons – the fact that the pool was formed after the standard was issued and the limited level of licensee participation – the Via 802.11 pool is a conservative benchmark because the royalty rates of the pool are likely higher than they would be had the pool been formed earlier and/or enjoyed greater licensee participation. 11/16/12 Tr. 117:15-25 (Lynde).

448. Reliance on the Via 802.11 pool as a benchmark in this case is further supported by the fact that neither Motorola's fact nor its expert witnesses offered any evidence that Motorola's 802.11 SEPs are more valuable than the patents in the pool. 11/19/12 Tr. 119:16-12 (Williams); 11/20/12 Tr. 110:16-20 (Dailey).

3. RAND Royalties Based on Via 802.11 Pool

449. Dr. Lynde estimated RAND royalties for Motorola's 802.11 SEPs based on the royalty structure of the Via 802.11 pool. 11/16/12 Tr. 113:3-116:17 (Lynde); Exs. 1155, 1165, 1167.

450. Because of the relatively low level of participation in the pool, an appropriate analysis of a RAND royalty for Motorola's standard-essential patents using the Via Licensing pool requires assessing the royalties Motorola might expect to receive from Microsoft if more of the standard-essential patents related to 802.11 were in the Via Licensing pool and Microsoft took a license to the pool. 11/16/12 Tr. 113:9-24 (Lynde).

451. To assess such a scenario, Dr. Lynde adjusted the Via pool to include: (a) the 263 worldwide patents of Motorola originally claimed to be essential to the 802.11 standard; (b) the 21 worldwide patents that Microsoft claims are essential to the 802.11 standard; and (c)

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186 other 802.11 SEPs that have been specifically disclosed in company submissions to the IEEE. 11/16/12 Tr. 108:11-15, 113:9-24 (Lynde); Exs. 1155, 1156, 1158.

452. Assuming that royalty rates of the pool would remain unchanged with the addition of those patents, Microsoft would pay Motorola royalties of approximately 5 cents ($0.05) per unit or approximately $736,000 per year at current volumes. 11/16/12 Tr. 114:7-115:3 (Lynde); Ex. 1167.

453. If one assumes instead that the rates would increase by the 25% maximum rate increase permitted under the Via pool agreement, Microsoft would pay Motorola royalties of approximately 6.5 cents ($0.065) per unit or approximately $920,000 at current volumes. 11/16/12 Tr. 115:21-116:10 (Lynde); Ex. 1167.

454. Accounting for Motorola's demand for reciprocity (i.e., a grant back license to Microsoft's 802.11 SEPs), and assuming the royalty rates remain unchanged, Microsoft would receive 0.45 cents ($0.0045) per Motorola licensed unit or $97,000 per year at current volumes. 11/20/12 Tr. 162:3-163:13 (Lynde); Ex. 1167.

455. Therefore, under a cross-licensing scenario based on the current rates of the MPEG LA H.264 patent pool, Microsoft's net payment to Motorola would be approximately $639,000 per year at current volumes. 11/20/12 Tr. 163:5-13 (Lynde); Ex. 1167.

456. Assuming the rates increased as permitted by the Via 802.11 pool arrangement, Microsoft would receive approximately 0.56 cents ($0.0056) per Motorola licensed unit or $121,000 at current volumes. 11/20/12 Tr. 163:14-164:9 (Lynde); Ex. 1167.

457. Under this scenario, Microsoft net payment to Motorola would be approximately $799,000 per year at current volumes. 11/20/12 Tr. 164:5-8 (Lynde); Ex. 1167.

458. The following chart summarizes the estimates Dr. Lynde derived from the Via 802.11 pool licensing rates:

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RAND Royalties Based on the Via Pool

	Per Unit Royalty Paid by Microsoft	Microsoft Annual Payment	Per Unit Royalty Paid by Motorola if Cross-License	Motorola Annual Payment if Cross-License	Net Payment to Motorola if Cross-License
Current Rates	5.16¢	$ 736,000	0.45¢	$ 97,000	$ 639,000
Rates Increased Per Agreement	6.45¢	$ 920,000	0.56¢	$ 121,000	$ 799,000

11/20/12 Tr. 162-64 (Lynde); Exs. 1165, 1167.

459. The work papers underlying Dr. Lyndes calculations based on the Via 802.11 pool were admitted as Exhibits 1155, 1156, 1165, and 1167.

460. The foregoing estimates are highly conservative and represent a ceiling on the RAND royalties for Motorola's 802.11 SEPs because, due to the lack of available information of the total number of patents essential to the 802.11 standard, they rest on the artificial and conservative assumption that Motorola's holds a very high percentage of all 802.11 SEPs. 11/16/12 Tr. 113:12-114:17, 117:15-118:4 (Lynde).

461. Because a large number (59) of the participants in the 802.11 standards-setting process (including many of the leading firms in the wireless industry such as Sony, IBM, Atheros, Texas Instruments, Qualcomm, and Marvell) submitted only blanket Letters of Assurance to the IEEE that did not identify specific patents that may be essential the 802.11 standard, it is impossible to determine the total number of patents essential to the 802.11 standard. 11/16/12 Tr. 108:21-109:18, 110:12-15 (Lynde); Ex. 1159.

462. Marvell alone has "a few hundred" issued U.S. patents that relate "to the latest 802.11 standards." 11/14/12 Tr. 64:7-16 (Ochs).

463. As a result, there are likely thousands of patents essential to the 802.11 standard and Motorola's share of this total is significantly less than was assumed by Dr. Lynde in his

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calculations. 11/16/12 Tr. 108:21-109:9, 113:12-114:17, 117:15-118:4 (Lynde). In this respect, the calculations were generous to Motorola.

B. Corroborating Evidence Of An Appropriate RAND Royalty For Motorola's 802.11 SEPs

464. Because the Via 802.11 pool is a less robust comparable, Dr. Lynde examined other evidence to corroborate that the estimates derived from the Via 802.11 pool are reasonable RAND royalty estimates for Motorola's 802.11 SEPs. 11/16/12 Tr. 81:15-18, 118:5-10 (Lynde).

1. The Marvell WiFi Chip That Supplies 802.11 Functionality In The Xbox Is The Smallest Saleable Unit For Assessing 802.11 Royalties

465. Marvell Semiconductor, Inc. ("Marvell") supplies the "WiFi chips" that provide 802.11 functionality in the Xbox gaming console. 11/14/12 Tr. 62:5-13 (Ochs).

466. WiFi chips, such as the Marvell WiFi chip used in the Xbox, are commodity products sold by many different companies. 11/19/12 Tr. 115 (Williams). Marvell sells these commodity WiFi chips to many different companies, including Microsoft, Motorola, and Sony, and they are used in a variety of different products, ranging from the Sony Playstation to the Audi A8 automobile. 11/14/12 Tr. 63:2-10 (Ochs).

467. The Marvell WiFi chip implements the 802.11 standard, contains substantially all that is needed to provide 802.11 functionality in a product like Xbox, and is intended for that use. 11/14/12 Tr. 62:5-15 (Ochs).

468. Marvell's WiFi chips have no other use besides providing 802.11 functionality. 11/14/12 Tr. 62:16-18 (Ochs).

469. The WiFi chipset includes the ability to transmit and receive information on radio frequency carriers, and the baseband portion of that chipset includes the intelligence to take information from the end user and place it on the RF carrier, and take information from the RF carrier and present it to the user. 11/19/12 Tr. 113 (Williams). The WiFi chipset

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implements the elements of protocol for 802.11 and controls the presentation of that information to the RF system. 11/19/12 Tr. 114-15 (Williams).

470. Although Motorola has claimed that the Xbox stores a "pass phrase" needed for 802.11 security outside of the Marvell WiFi chip (11/19/12 Tr. 98-99), the chip nevertheless provides essentially all of the 802.11 standard's functionality and substantially embodies the patented inventions. As a result, the chip can reasonably be construed as the smallest saleable unit providing 802.11 functionality in the Xbox. 11/16/12 Tr. 158:20-160:2 (Lynde) ("To an economist, it's obvious that chip is the smallest saleable unit … this is the only thing that could reasonably be construed in that way, irrespective of what these technical or legal differences might be").

471. Kirk Dailey, the former Vice President of Intellectual Property for Motorola, admitted that [redacted] Motorola could therefore not double dip by collecting royalties for its 802.11 patents from both the chip supplier and the end user. 11/20/12 Tr. 112:1-14 (Dailey).

472. In the past, Marvell has charged $3 to $4 per chip for WiFi chips of the kind it sells to Microsoft. 11/14/12 Tr. 62:19-21 (Ochs).

473. Microsoft currently pays just under $3 per chip for the specific Marvell WiFi chip used in the Xbox gaming console. 11/15/12 Tr. 25:6-9 (Del Castillo).

474. It is economically advisable to focus on the smallest saleable unit when considering a reasonable royalty in order minimize the risk of assessing a royalty that captures the value of features and technologies unrelated to the patented technology in question. 11/16/12 Tr. 118:11-119:4 (Lynde).

475. Applying even Motorola's allegedly "standard" 2.25% royalty, which is unreasonable for a host of reasons, to the $3 to $4 chip that is the smallest saleable unit

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providing 802.11 functionality in the Xbox gaming console, yields a royalty of 7 to 9 cents per unit. 11/16/12 Tr. 119:12-24 (Lynde).

476. At Microsoft's request, Marvell sought a license from Motorola to cover the Marvell WiFi chip used in the Xbox gaming console under Motorola's 802.11 patents. 11/14/12 Tr. 65:5-66:4 (Ochs); Ex. 1608.

477. In response to Marvell's request, Motorola offered Marvell a license to its 802.11 portfolio at 2.25% of the end product price. The license did not cover Marvell's WiFi chips and specifically excluded any products sold by Microsoft or Apple. 11/14/12 Tr. 67:7-68:11 (Ochs); Ex. 16.

478. Marvell regarded a license that would only cover products sold by some of its customers, while specifically excluding others, to be discriminatory. 11/14/12 Tr. 68:16-19 (Ochs).

479. At 2.25% of the end product price, the royalties sought by Motorola with respect to chips used in a product like the Xbox would exceed the selling price of Marvell's WiFi chips. 11/14/12 Tr. 69:5-70:3 (Ochs).

480. For a Marvell chip used in a $100,000 Audi A8, the royalty Motorola demanded from Marvell would be $2000.

481. Jennifer Ochs, Marvell's Director of IP Litigation, was not aware of any chip maker paying royalties on the price of the end product incorporating its chip. 11/14/12 Tr. 71:7-10 (Ochs)

482. Marvell's WiFi chips are essentially commodity chips and subject to intense competition. Therefore, Marvell could not have afforded to pay the royalty rates sought by Motorola, as this would have been a "going-out-of-business-model." 11/14/12 Tr. 63:17-20; 70:4-8; 93:18-94:2 (Ochs).

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483. Marvell did not believe that Motorola's offer of a royalty of 2.25% of the end product price was a reasonable starting point for a negotiation. 11/14/12 Tr. 72:9-13 (Ochs).

484. Similarly, Marvell did not believe that it would be would be a reasonable starting point for a negotiation if Motorola had offered Marvell a license at 2.25% of the price of just the WiFi chip. Furthermore, if other companies with 802.11 patents sought royalties of 2.25% of the price of Marvell's WiFi chips, this would lead to royalty stacking and would erase any potential profit. 11/14/12 Tr. 70:17-71:6; 72:14-17 (Ochs).

485. Although Marvell eventually proposed a royalty-free cross license offer to Motorola, this was not an indicator of the value of Motorola's 802.11 patents, but rather simply an attempt by Marvell to resolve the dispute. 11/14/12 Tr. 77:9-12; 91:3-92:1 (Ochs).

2. The Real-World Benchmark Used By Marvell Semiconductor In Licensing Negotiations of The Royalties Charged By ARM Holdings For A License to Fundamental Semiconductor Technology

486. When assessing the reasonableness of running royalties on semiconductor chips like their WiFi chips, Jennifer Ochs testified that Marvell uses the publicly-reported licensing rate of 1% of the average selling price of the chip charged by ARM Holdings for a license to its fundamental semiconductor technology. 11/14/12 Tr. 71:11-21 (Ochs).

487. ARM Holdings is an English company. It licenses both patents and know-how, and specializes in creating software and other tools for designing application-specific integrated circuit ("ASIC") chips. 11/16/12 Tr. 120:5-18, 121:12-15 (Lynde); Ex. 1190.

488. The royalties that are charged by ARM are not limited by RAND commitments. 11/16/12 Tr. 122:9-11 (Lynde).

489. The intellectual property that Marvell licenses from ARM Holdings, which includes designs and know-how in addition to a patent license, is more valuable than a bare license to a party's 802.11 SEPs for use in making standard-compliant products only. 11/14/12 Tr. 72:2-8 (Ochs).

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490. Because the ARM Holdings license conveys considerable intellectual property that is ready to use, Marvell considers 1% of the average selling price of a semiconductor chip to be the "high ceiling" of what a semiconductor company should pay for a royalty on a chip. 11/14/12 Tr. 71:22-72:1 (Ochs).

491. Marvell's reliance on the ARM Holdings royalty as a real world benchmark for assessing the reasonableness of running royalties in the semiconductor industry makes it useful corroborative evidence in this case. 11/16/12 Tr. 121:18-122:8 (Lynde).

492. Across all of the kinds of chips that it licenses, ARM Holdings earned between 5 and 9 cents per chip in royalties and licensing fees in 2011. 11/16/12 Tr. 122:17-123:8 (Lynde); Ex. 1190.

493. If one applied the ARM Holdings' 1% royalty rate to the $3 to $4 WiFi chip of the type sold by Marvell to Microsoft, it would yield a royalty of 3 to 4 cents per chip. 11/16/12 Tr. 123:9-13 (Lynde). Because there is one WiFi chip in each Xbox 360 console, this equates to a royalty of 3 to 4 cents per Xbox.

494. This provides corroboration that the range of RAND royalties derived from the Via 802.11 patent pool for Motorola's 802.11 SEPs is reasonable. 11/16/12 Tr. 123:14-18 (Lynde).

VIII. MOTOROLA'S EXPERTS' OPINIONS REGARDING RAND TERMS FOR A LICENSE TO MOTOROLA'S H.264 AND 802.11 SEPS

A. Motorola's Experts' Alleged Methodology

495. In its Pretrial Brief, Motorola argued that the Court should "employ a modified form of the well-known *Georgia-Pacific* hypothetical negotiation, used in patent damages analysis" to determine a RAND royalty. Mot. Tr. Br. at 2. However, at trial, no Motorola witness conducted a *Georgia-Pacific* analysis, explained how *Georgia-Pacific* needed to be modified or otherwise testified about a hypothetical negotiation.

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496. In his scholarly publications, Motorola's expert Professor Richard Schmalensee has criticized the *Georgia-Pacific* factors because they leave the specific method of royalty determination an open question and thus allow for considerable uncertainty in outcomes. 11/19/20 Tr. 163:4-11 (Schmalensee); Ex 293 at 681-82.

497. In one of his articles, Professor Schmalensee and his co-authors considered two *ex ante* economic models – an "ECPR" model and a model based on Shapley values – and concluded that "[w]hile the *Georgia-Pacific* factors may make good guidelines (albeit varyingly applied by the courts) for FRAND licensing evaluations under general circumstances, we argue that the two economic models provide *the most solid framework for courts and competition authorities faced with FRAND cases*." Ex. 293 at 675 (emphasis added); 11/19/12 Tr. 163:15-164:13 (Schmalensee).

498. Nevertheless, in this case, Professor Schmalensee opined that the most appropriate way to determine RAND royalties is to employ a modified form of the *Georgia-Pacific* hypothetical negotiation framework. 11/19/12 Tr. 160:24-161:5 (Schmalensee).

499. He emphasized that because the *Georgia-Pacific* framework "does not contemplate the RAND obligation," it needs to "be modified carefully and thoughtfully to take into account the RAND commitment." 11/19/12 Tr. 150:8-9, 162:4-5 (Schmalensee).

500. Professor Schmalensee did not, however, offer any opinion as to how *Georgia-Pacific* should be modified to account for the RAND obligation. Instead, he left to Motorola's licensing expert, Charles Donohoe, "the task of modifying that [*Georgia-Pacific*] analysis in light of the RAND commitment." 11/19/12 Tr. 161:9-162:9 (Schmalensee).

501. Mr. Donohoe, in turn, [redacted] (11/20/12 Tr. 137:2-138:1 (Donohoe)), [redacted] 11/20/12 Tr. 138:2-141:2 (Donohoe).

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502. Mr. Donohoe [redacted] 11/20/12 Tr. 131:22-154:12 (Donohoe).

503. Mr. Donohoe failed to address the relevance or application to this case of *Georgia-Pacific* Factor 2 (the rates paid by the licensee for use of other patents comparable to the patents-in-suit). 11/20/12 Tr. 131:22-154:12 (Donohoe).

504. Mr. Donohoe failed to address the relevance or application to this case of *Georgia-Pacific* Factor 3 (the nature and scope of the license). 11/20/12 Tr. 131:22-154:12 (Donohoe).

505. Mr. Donohoe failed to address the relevance or application to this case, if any, of *Georgia-Pacific* Factor 4 (the licensor's established policy of maintaining its patent monopoly). 11/20/12 Tr. 131:22-154:12 (Donohoe).

506. Mr. Donohoe failed to address the relevance or application to this case, if any, of *Georgia-Pacific* Factor 5 (the commercial relationship of the licensor and licensee, e.g. whether they are competitors). 11/20/12 Tr. 131:22-154:12 (Donohoe).

507. Mr. Donohoe failed to address the relevance or application to this case, if any, of *Georgia-Pacific* Factor 6 (the effect of selling the patented specialty in promoting sales of other products). 11/20/12 Tr. 131:22-154:12 (Donohoe).

508. Mr. Donohoe failed to address the relevance or application to this case, if any, of *Georgia-Pacific* Factor 7 (the duration of the patent(s) and the term of the license). 11/20/12 Tr. 131:22-154:12 (Donohoe).

509. Mr. Donohoe failed to address the relevance or application to this case, if any, of *Georgia-Pacific* Factor 8 (the established profitability and commercial success of the products made under the patents). 11/20/12 Tr. 131:22-154:12 (Donohoe).

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510. Mr. Donohoe failed to address the relevance or application to this case, if any, of *Georgia-Pacific* Factor 9 (the utility and advantages of the patented property over old modes). 11/20/12 Tr. 131:22-154:12 (Donohoe).

511. Mr. Donohoe failed to address the relevance or application to this case, if any, of *Georgia-Pacific* Factor 10 (the nature of the patented invention, the commercial embodiment, and the benefits to those who have used the invention). 11/20/12 Tr. 131:22-154:12 (Donohoe).

512. Mr. Donohoe failed to address the relevance or application to this case, if any, of *Georgia-Pacific* Factor 11 (the extent of use of the patented invention and evidence probative of the value of that use). 11/20/12 Tr. 131:22-154:12 (Donohoe).

513. Mr. Donohoe failed to address the relevance or application to this case, if any, of *Georgia-Pacific* Factor 12 (the portion of the profits or of the selling price that may be customary for use of the invention or analogous inventions). 11/20/12 Tr. 131:22-154:12 (Donohoe).

514. Mr. Donohoe failed to address the relevance or application to this case, if any, of *Georgia-Pacific* Factor 13 (the portion of the realizable profit that should be credited to the invention as distinguished from non-patented elements). 11/20/12 Tr. 131:22-154:12 (Donohoe).

515. [redacted], Mr. Donohoe failed to address in any other way the relevance or application to this case of *Georgia-Pacific* Factor 14 (the opinion testimony of qualified experts). 11/20/12 Tr. 131:22-154:12 (Donohoe).

516. [redacted]

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[redacted] *Georgia-Pacific* factors 2 through 14. 11/20/12 Tr. 131:22-154:12 (Donohoe).

B. Mr. Donohoe's Opinions Regarding The Royalties Microsoft Should Pay For Motorola's 802.11 Patents

517. Mr. Donohoe did not offer a RAND royalty for Motorola's 802.11 patents other than to indicate what he thought the net royalty should be for units of Xbox 360 and the network wireless adapter. 11/20/12 Tr. 142:5-44:19 (Donohoe).

518. In summary, Mr. Donohoe [redacted] 11/20/12 Tr. 140:9-141:3 (Donohoe). [redacted] 11/20/12 Tr. 141:4-25 (Donohoe). [redacted] 11/20/12 Tr. 144:1-19 (Donohoe).

519. [redacted] 11/20/12 Tr. 149-50 (Donohoe)

520. [redacted] 11/20/12 Tr. 148:15-18 (Donohoe). [redacted]

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[redacted] (11/20/12 Tr. 150:6-9), [redacted]

521. [redacted] 11/20/12 Tr. 143:12-15 (Donohoe). However, Dr. Williams did not opine regarding the economic value of Motorola's or Microsoft's patents; he testified only as to their supposed technological value. 11/19/12 Tr. 133:14-15 (Williams) ("I am talking about technological value, not economic value."). The testimony of Dr. Williams provides no support for the rates selected by Mr. Donohoe.

522. [redacted] 11/20/12 Tr. 152:13-153:1 (Donohoe).

523. Mr. Donohoe did not offer an opinion regarding any royalty that would be payable by Microsoft for a license to Motorola's H.264 SEPs on the Xbox.

C. Mr. Donohoe's Opinions Regarding The Royalties Microsoft Should Pay For Motorola's H.264 Patents

524. Mr. Donohoe did not offer a RAND royalty for Motorola's H.264 patents other than [redacted] 11/20/12 Tr. 145:6-146:13 (Donohoe).

525. The entirety of Mr. Donohoe's testimony on the H.264 royalty [redacted]

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[redacted] 11/20/12 Tr. 145:6-146:15 (Donohoe).

526. As with his 802.11 royalty estimates, [redacted] 11/20/12 Tr. 149-50 (Donohoe) [redacted]

527. Mr. Donohoe did not explain why he used the selling price of Microsoft's Windows software as a royalty base, abandoning the position Motorola took in its October 2010 demand letter that the royalty should be calculated on the price of the "end product (e.g., each Xbox 360 product, each PC/laptop, each smartphone, etc.) and not on component software (e.g., Xbox 360 system software, Windows 7 software, Windows Phone 7 software, etc.)." Ex. 2 at MOTM_WASH1823_0018498.

528. Mr. Donohoe [redacted] 11/20/12 Tr. 146 (Donohoe). However, Dr. Drabik did not opine regarding the economic value of Motorola's or Microsoft's patents and made clear that he was not offering any opinions on that subject. 11/19/12 Tr. 50:3-6 (Drabik). The testimony of Dr. Drabik provides no support for the rates selected by Mr. Donohoe.

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529. Given Microsoft's volume of sales, [redacted] 11/20/12 Tr. 149:6-11 (Donohoe).

530. [redacted] 11/20/12 Tr. 152:13-24 (Donohoe).

IX. THE ROYALTIES MOTOROLA SEEKS ARE NOT RAND

A. Motorola's Alleged Practice Of Collecting A 2.25% Royalty For Its Portfolios Of Patents Essential To Various Cellular Communications Standards Cannot Justify Its Demands Here

531. Although Mr. Donohoe did not cite any such licenses in his testimony, Motorola's former Vice President of Intellectual Property, Kirk Dailey, testified that the basis for Motorola's practice of demanding 2.25% for its allegedly core essential patent portfolios was its experience in the 1990s licensing its patents essential to various cellular standards. 11/20/12 Tr. 36:16-37:8 (Dailey).

532. Because Motorola's cellular licenses involve altogether different standards that are more central to the licensed products – as cellular standards are to cellular handsets – those agreements do not support Motorola's demand for the same royalties for its 802.11 and H.264 portfolios for use in complex multifunction products like the Xbox gaming consoles or Windows software. 11/13/12 Tr. 160:15-162:6 (Murphy).

533. Professor Schmalensee agreed that, as a general matter, one would not expect two patent portfolios that relate to different standards to be equal in value. 11/19/12 Tr. 158:16-20 (Schmalensee).

534. Any attempt to equate the value of Motorola's cellular and 802.11 or H.264 portfolios is further undermined because, while Motorola professes to have one of the most

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valuable – if not *the* most valuable– portfolio of cellular patents in the world, Motorola's witnesses could not say whether its 802.11 and H.264 portfolios ranked in the top half or bottom half of all such portfolios in terms of value. 11/20/12 Tr. 68:6-12, 87:6-8 (Dailey); 3/20/12 Dep. of K. McN. Taylor at 73:18-74:4, 208:15-209:8, 212:13-15, 213:15-16; 4/18/12 Dep. of R. Sonnentag at 68:3-11, 85:25-86:22.

B. The Few License Agreements Mr. Donohoe Cites Do Not Justify The Royalties That Motorola Seeks

535. The sole *Georgia-Pacific* factor that Mr. Donohoe addressed in his testimony was Factor 1, which examines the royalties received by the patentee for licensing the patents in suit, proving to tending to prove an established royalty. [redacted] 11/20/12 Tr. 138:5-140:23 (Donohoe); Exs. 13, 36-38, 2833.

536. Mr. Donohoe opined that [redacted] 11/20/12 Tr. 138:24-139:1, 139:18-25, 140:4-6, and 147:9-13 (Donohoe).

537. For the reasons discussed below, none of these agreement supports Mr. Donohoe's opinions regarding the royalties that Microsoft should or would have agreed to pay for a license to Motorola's 802.11 or H.264 SEPs.

538. Where, [redacted] multiple technologies (including both standard essential and non-essential patents) are licensed within the same agreement, it is necessary to apportion the value of Motorola's 802.11 or H.264 SEPs from the other things licensed. *See, e.g.*, 11/19/12 Tr. 158:21-159:16 (it would be mistake to attribute all of the

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2.25% royalty in a license including both cellular and 802.11 patents to the 802.11 portfolio without "further information and judgment … critical thinking and expertise") and 160:10-18 (if H.264 patents were license together with patents essential to other standards, "one would need to estimate the value of the other patents and subtract it out"); 11/13/12 Tr. 162:7-18 (Murphy).

539. Such apportionment would be difficult. 11/19/12 Tr. 160:10-19 (Schmalensee) (agreeing it would be a "pretty tough thing to do").

540. The difficulty in apportionment is compounded because of Motorola's practice of [redacted] 11/20/12 Tr. 74:16-20, 74:25-75:11 (Dailey) ("It make it challenging…").

541. Furthermore, Motorola provided no evidence that either VTech or RIM would have entered into the licenses for either Motorola's 802.11 or its H.264 patents if they were not otherwise the part of a broader licensing agreement or what royalties those portfolios would have been in absence of licenses to other patents.

542. Mr. Donohoe did not apportion the payments Motorola received between Motorola's 802.11 or H.264 portfolios and the other patents licensed.

543. The RIM and VTech licenses were entered well after the standards at issue were adopted. It is therefore possible that the agreements include an element of hold-up. 11/13/12 Tr. 162:19-21 (Murphy); Ex. 1173 [redacted]

1. The VTech Agreement Is Not Comparable

544. [redacted] 11/20/12 Tr. 85:24-86:1 (Dailey).

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545. [redacted] 11/20/12 Tr. 87:6-8 (Dailey).

546. On November 13, 2007, Motorola and VTech in the Eastern District of Texas accusing it of infringing six non standards-essential patents that had no RAND licensing requirements. 11/20/12 Tr. 87:19-88:5 (Dailey).

547. [redacted] 11/20/12 Tr. 88:6-89:16 (Dailey); Ex. 1680.

548. [redacted] 11/20/12 Tr. 89:18-22 (Dailey); Ex. 13 at MOTM_WASH1823_0394368

549. [redacted] Ex. 1681 at p. 13; 11/20/12 Tr. 91:21-23 (Dailey).

550. [redacted] Ex. 1660.

551. In October 2011, after Motorola had presented VTech with information about its 802.11, H.264, and cellular portfolios, VTech proposed taking a license under Motorola's 802.11 and H.264 SEPs "as a part of the agreement we are trying to settle." Ex. 2832.

552. [redacted] Ex. 13 at §§ 3.1(a)-(b)

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and 4.1. [redacted] Ex. 13 at § 4.2.

553. Because VTech took a license to Motorola's 802.11 and H.264 portfolios only as a part of a package deal in which it also resolved Motorola's infringement claims for substantially less than Motorola had been demanding, the nominal running royalties that VTech agreed to pay for a license to Motorola's 802.11 and H.264 SEPs are not a reliable indicator of the standalone value of those portfolios. 11/13/12 Tr. 184:12-185:13 (Murphy) ("[A]s an economist I can tell you, when you see something like that, where you have terms that were negotiated together, you can't interpret the deal you got on one independent of the other. I mean, it is a package deal, as the guy is making clear here. Just read the second paragraph [of Ex. 2832]"); 192:15-193:21 ("If you look at the total value of the agreement, clearly it would be dominated by that $12 million. My understanding is that today, under the 2.25 percent, the amount VTech has paid has been very small, in the thousands, not $12 million range. And it is pretty clear ... from the letter that was originally written that the agreement to license at those rates was tied into settling ... the dispute with Motorola"). There is no evidence that VTech would have agreed to pay such royalties apart from the broader license agreement.

554. [redacted] 11/20/12 Tr. 94:9-95:14 (Dailey).

555. To date, VTech has paid only trivial royalties on its sales of a WiFi-enabled radio product that VTech has discontinued and is phasing out. Ex. 62 (indicating royalties on VTech's "obsolete" PIMA internet radio would be $384 for December 2011, based on U.S.

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sales for the month of 154 radios); Ex. 3373 [redacted]

556. [redacted] 11/20/12 Tr. 100:10-13 (Dailey).

557. In fact, three months after it entered the agreement, VTech's General Counsel questioned why VTech should be required to pay royalties to Motorola for sales of H.264-compliant products because VTech is a licensee under the MPEG LA H.264 pool. Ex. 62 at MOTM_WASH1823_0415013 ("Given VTech's license from the original MPEG group, why would VTech need to pay Moto for use of MPEG technology?").

558. While VTech recently launched toy tablet products – the Innotab 2 and Innotab 2S – that appear to implement the 802.11 and H.264 standards, [redacted] 11/20/12 Tr. 100:14-25, 101:11-13 (Dailey). Donohoe ignored the issue.

2. The RIM Agreement Is Not Comparable

559. [redacted] 11/20/12 Tr. 139:2-20 (Donohoe).

560. There are several reasons that the RIM agreement is irrelevant to this case, at least on the present record.

561. First, [redacted] 11/20/12 Tr. 56:20-57:8, 105:7-106:11 (Dailey).

562. Second, [redacted]

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11/20/12 Tr. 101:22-25, 104:7-13 (Dailey). There is no evidence that RIM would have agreed to royalties for either 802.11 or H.264 patents alone, apart from this broader agreement that allowed RIM to avoid an exclusion order on its BlackBerry products.

563. Third, while Mr. Dailey asserted that [redacted] (11/20/12 Tr. 57:9-15), [redacted] Ex. 2833 at § 5.1.2.

564. [redacted] Ex. 2833 at §§ 1.7, 5.1.3.

565. [redacted] (11/20/12 Tr. 106:21-107:6 (Dailey)), [redacted]

566. [redacted] (Ex. 2800), [redacted] 11/20/12 Tr. 116:3-8, 117:7-12 (Dailey).

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567. Finally, far from corroborating the reasonableness of Motorola's demands in this case, [redacted] 11/20/12 Tr. 102:12-103:21 (Dailey); Ex. 1672 at ¶ 83. Signing the agreement averted an ITC exclusion order covering RIM's signature product, the Blackberry. The agreed-upon royalties are therefore evidence of a hold-up royalty, not a RAND royalty.

3. The Symbol Licenses Are Not Comparable

568. [redacted] 11/20/12 Tr. 140:1-12 (Donohoe). *See also* 11/20/12 Tr. 59:12-61:24 (Dailey) (discussing Symbol licenses); Exs. 36-38. [redacted] 11/20/12 Tr. 147:9-13 (Dailey).

569. [redacted] 11/20/12 Tr. 140:1-7; Ex. 36.

570. [redacted] 11/20/12 Tr. 81:9-19 (Dailey).

571. [redacted] 11/20/12 Tr. 81:20-24 (Dailey).

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572. In any event, the Symbol-Proxim agreement, [redacted] 11/20/12 Tr. 59:20-25 (Dailey); Ex. 36 at MOTM_WASH1823_0398586-7.

573. The Proxim agreement is not probative of the value of Motorola's 802.11 portfolio because the two patents licensed under the Proxim agreement (the '441 and '183 patents) had expired before Motorola's October 21, 2010 demand letter was even sent to Microsoft. Ex. 1589 (summary exhibit identifying that the '441 and '183 patents expired on June 29, 2009); 11/16/12 Tr. 177:15-22 (Lynde); Ex. 1.

574. Although Donohoe did not reference it by name, [redacted] 11/20/12 Tr. 140:1-12 [redacted]. *See also* 11/20/12 Tr. 60:10-61:4 (Dailey); Ex. 38.

575. Like the Symbol agreement with Proxim, [redacted] 11/20/12 Tr. 83:7-21 (Dailey); Ex. 38 at MOTM_WASH1823_0398559.

576. Under the agreement, [redacted] Ex. 38 at §§ 5.1 and 5.2; 11/20/12 Tr. 84:3-23 (Dailey).

577. [redacted] the Symbol-HHP agreement does not support the level of royalties that Motorola seeks from Microsoft in this case.

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578. [redacted] 11/20/12 Tr. 140:1-12; Ex. 37.

579. [redacted] Ex. 37 at MOTM_WASH1823_0398558.

580. [redacted] 11/20/12 Tr. 85:13-19 (Dailey); Ex. 37 at MOTM_WASH1823_0398558.

581. As a result, the Terabeam license does not support the reasonableness of Motorola's substantial running royalty demands in this case.

C. Basing Royalties Here On A Percentage Of The Price Of Xbox Or Windows Software As Proposed By Motorola Is Not RAND

582. Donohoe's analysis rests on the assumption that [redacted] 11/20/12 Tr. 148:15-23, 149:22-150:1 (Donohoe) [redacted]

583. The Xbox, for example, is offered in a variety of bundles that differ based on the amount of memory or accessories like the Kinect sensor that are included. 11/15/12 Tr. 15-16 (Del Castillo). The 802.11 and H.264 functionality is the same across all of these bundles. 11/15 Tr. 18 (Del Castillo).

584. In a context, such as this, where the products to be licensed can vary substantially in price for reasons that are unrelated to the patented technology at issue, a royalty based on a fixed percentage of the prices of the end products is unreasonable and would

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reward Motorola for the value of features unrelated to its patented technology. 11/16/12 Tr. 82:3-11 (Lynde) ("[L]icensing on a percentage basis raises the risk that you have the participation of the patentholder and payment of royalties on subject matter which is completely divorced and separate and apart from the patent subject matter, number one, let alone the standard. And so that is the problem and danger, especially with consumer electronics, multicomponent sorts of end products."); 11/16/12 Tr. 38:17-39:2 (Simcoe) (percentage based royalties "end[] up capturing all kinds of value associated with other parts of the product that have nothing to do with the standard or the even smaller contribution of the patent technology that's a small piece of the standard.").

585. Motorola's witnesses suggested that percentage-based royalties are commonplace (*see, e.g.*, 11/20/12 Tr. 37-38 (Dailey)), but the evidence indicates that patent pools licensing SEPs in the context of consumer electronics – including the MPEG LA H.264 and Via 802.11 pools – uniformly employ fixed amount per unit royalties. 11/16/12 Tr. 81:19-82:2 (Lynde); 11/16/12 Tr. 38:11-16 (Simcoe).

586. Motorola has not established that compliance with the 802.11 or H.264 standards, much less use of any of its specific patented technology, is the basis of consumer demand for the Windows and Xbox products on which it seeks a royalty.

587. Windows operating system software has thousands of features; those related to implementation of H.264 and 802.11 standards are no more important to the product than any of the others. 11/13/12 Tr. 28:24-29:2, 37:2-6, 39:18-21 (DeVaan).

588. Demand for Xbox is primarily driven by games, including the release of popular games such as Halo, and, at times, by new accessories such as the Kinect. 11/15/12 Tr. 12:14-20, 16:23-17:7, 18:4-12 (Del Castillo).

589. One of Motorola's experts, Michael Dansky, suggested that the incorporation of integrated WiFi capability with the introduction of the Xbox 360S in 2010 alone led to a

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substantial increase in Xbox's market share thereafter (11/19/12 Tr. 214:15-215:5 (Dansky)), but the Xbox 360S introduced a host of other changes to the product at the same time. 11/15/12 Tr. 15:4-15 (Del Castillo) (noting that the overall design was "refreshed," the size reduced, operation made quieter, and new components included).

590. Moreover, the rise in Xbox's sales in 2010 also was driven by the introduction of Kinect sensor, which set a record in the *Guinness Book of World Records* for the fastest sale of a consumer electronics product. 11/15/12 Tr. 16:23-17:7 (Del Castillo).

D. Mr. Donohoe's Methodology Fails To Address The Declining Value of Motorola's Portfolio Resulting From The Expiration Of Motorola's Patents

591. As noted above, Motorola's SEPs, particularly those relating to the 802.11 standard are rapidly expiring.

592. Of the eleven patents that Motorola claims are used by the Xbox, only two will remain in force by 2015 and all will have expired by 2017. 11/20/12 Tr. 156:1-11 (Lynde); Ex. 1589.

593. Donohoe's methodology does not account for such patent expirations and implies that Motorola is entitled to receive the same percentage-based royalty so long as Motorola has even one SEP in force. 11/20/12 Tr. 156:12-22 (Lynde).

594. In contrast, Lynde's methodology based on the MPEG LA H.264 and Via 802.11 pools appropriately accounts for the on-going expirations of Motorola's patents because the pools adjust the allocation of royalties annually to reflect the number of that have expired and those that have been added the pools. 11/16/12 Tr. 104:15-105:1, 115:4-20 (Lynde); 11/20/12 Tr. 156:23-157:10 (Lynde). His methodology can therefore be employed to calculate a new royalty for each year, taking account of patent expirations.

E. The Royalties Demanded Greatly Exceed Motorola's Own Earlier Analyses

595. Although Motorola seeks to justify its current royalty demands on the basis that [redacted]

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[redacted] (11/20/12 Tr. [Dailey]), Motorola's own earlier analysis of a potential 802.11 licensing program belies this claim and reveals that Motorola – and the licensing experts it hired to assist it – valued a license to its 802.11 SEP portfolio at substantially less than the 2.25% royalty than Motorola now demands.

596. In 2003, Motorola retained a consulting firm called InteCap, Inc. to develop a patent licensing valuation model for Motorola's 802.11 SEPs. InteCap specialized in valuing patent portfolios. In particular, InteCap was in the business of evaluating patent portfolios for the purpose of maximizing the royalty income that could be obtained through monetization of the portfolio. 11/16/112 Tr. 126:12-20 (Lynde).

597. InteCap proposed a licensing model that segmented licensing markets and target companies into three categories or "Links":

- Link-1 companies included those that made 802.11 chipsets;
- Link-2 companies included those that made 802.11 dedicated devices like routers and access points; and
- Link-3 companies included those who made 802.11-enabled consumer products like laptops, PCs, and gaming consoles.

Ex. 65 at CRA_001290 (identifying addressable markets for potential 802.11 licensing).

598. InteCap stated that, in considering licensing in the 802.11 context, "[i]ndustry royalty stacking issues must be addressed/recognized." Ex. 65 at CRA_001289; 11/16/12 Tr. 127:7-22 (Lynde).

599. InteCap's valuation model therefore recognized that the following factors must be accounted for in setting a royalty:

- "802.11 feature factor," which InteCap defined as the "Value of 802.11 functionality related to [the] total product functionality"; and

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- "Royalty stacking adjustment factor," which InteCap defined as the "Factor to address [the] portion of total 802.11 functionality enabled by Motorola IP."

Ex. 65 at CRA_001290, CRA_001314 (describing InteCap's 802.11 Valuation Model Framework); 7/12/12 Dep. of D. Curtis, at 46:2-12.

600. For WiFi enabled products like PCs, laptops, and game consoles, the "feature factor" employed by InteCap was 10% of the product's end price. The application of this factor had the effect of reducing the base to which any royalty was applied by 90% before any other adjustments were made. Ex. 65 at CRA_001315 ("802.11 feature factor-percent of sales [=] 0.10"); 7/12/12 Dep. of D. Curtis, at 42:2-20.

601. InteCap's valuation model assumed a 25% stacking factor, based on the assumption that Motorola held 25% of all 802.11 SEPs. This "gravely exaggerated" the extent and importance of Motorola's 802.11 SEP portfolio. 11/16/12 Tr. 129:3-15 (Lynde). *See also* 11/16/12 Tr. 108:21-109:9 (Lynde) (stating there are thousands of patents essential to the 802.11 standard); Ex. 65 at CRA_001288 (InteCap's analysis assumed Motorola owned 14 802.11 technically or commercially essential patents).

602. Even accounting for Motorola's acquisition of Symbol, Motorola still does not own anywhere near 25% of the thousands of patents essential to the 802.11 standard. 11/15/12 Tr. 143:24-144:7) (Motorola contends it owns 24 patents that are essential); 11/16/12 Tr. 108:21-109:9 (Lynde) (thousands of patents essential to the 802.11 standard); 11/14/12 Tr. 64:7-9 (Ochs) (Marvell has a few hundred issued U.S. 802.11 patents). As a result, the InteCap analysis overstates the significance of Motorola's 802.11 SEP portfolio even today.

603. Accounting for the feature and stacking adjustment factors, InteCap's model resulted in an effective royalty of 0.1% on the price of end products embedded with 802.11 functionality, such as PCs, laptops, and game consoles. 7/12/12 Dep. of D. Curtis at 56:8-14

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("[T]he final royalty rate that is produced in the model is 0.1 percent of the laptop selling price, correct? A. Correct...."); Ex. 6, at MOTO-MS-000237738 ("Assumptions: Net Royalty Rates 0.1% of sales...."); Ex. 65, at CRA_001291 (applying Valuation Model); Ex. 66, at CRA_001708 (same).

604. InteCap's model resulted in an effective royalty rate of 0.5% of the price of 802.11 WiFi chips ("Link-1"), such as those sold by Marvell and Atheros. Specifically, InteCap proposed an "802.11 feature factor" of the 802.11 chips of 100%, an aggregate reasonable royalty for all industry-wide 802.11 SEPs of 2%, and a "Royalty stacking adjustment factor" to isolate Motorola's portion of that aggregate royalty of 25% (*i.e.* – 25% of 2% equals 0.5% for Motorola's 802.11 SEPs). Ex. 65 at CRA_001291 (applying InteCap model); Ex. 66, at CRA_001708 (same).

605. The Motorola STAMP Board consisted of senior representatives from each Motorola business segment who made decisions about what to do with Motorola intellectual assets. 7/12/12 Dep. of D. Curtis at 15:10-16:1 (explaining role and makeup of STAMP Board).

606. In August 2003, Motorola's STAMP Board formed an 802.11 Licensing Work Group to develop a proposal for licensing Motorola's 802.11 SEPs. 7/12/12 Dep. of D. Curtis, at 17:14-18, 19:11-16, 24:25-25:6.

607. In September 2003, the 802.11 Licensing Work Group made recommendations to the STAMP Board regarding licensing Motorola's 802.11 SEPs. 7/12/12 Dep. of D. Curtis, at 35:16-36:2.

608. In its final presentation to the STAMP Board, the 802.11 Licensing Work Group based its recommendation on InteCap's analysis indicating that Motorola should license its portfolio of 802.11 SEPs for an effective royalty of 0.1% on the price of products like PCs. 7/12/12 Dep. of D. Curtis, at 75:23-77:12, 79:7-80:23; Ex. 6, at MOTO-MS-000237738.

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609. In forming its recommendations to the STAMP Board, the 802.11 Licensing Work Group did not consider the fact that Motorola had committed to make its 802.11 SEPs available on RAND terms. 7/12/12 Dep. of D. Curtis, at 38:16-39:23.

610. Motorola subsequently initiated licensing discussions with at least two PC/laptop makers, Gateway and Acer. In connection with its effort to license Gateway, Motorola developed projections of what Gateway would pay, using 0.1% of the end product price as the assumed royalty rate. 7/12/12 Dep. of D. Curtis, at 68:1-4; Ex. 67 (9/25/03 D. Curtis email stating, "Adjusted Royalty rate of 1% (4% with 25% royalty stacking). Feature functionality is 10%. In essence, the final royalty then is 0.1%. You'll note that on a $1500 machine, this equates to $1.50.").

F. Motorola's Survey Evidence Is Flawed And Does Not Justify The Royalties It Seeks

611. Neither the opinions of Motorola's survey expert, Dr. R. Sukumar, nor any conclusions he may have drawn from the results of his surveys were placed in evidence. Instead, Dr. Sukumar generically referred to certain demonstrative exhibits characterized by Motorola's counsel as "summarizing" the results of his work. These demonstrative exhibits were not admitted as substantive evidence and Dr. Sukumar did not provide substantive testimony regarding their contents. 11/19/12 Tr. 189 (Sukumar) (Court admitting document "as a demonstrative and tak[ing] up the admission as a summary after the conclusion of [the] examination"); 205 (Court ruling that Exs. 3423 and 3424 would be treated demonstratives and indicating that the information is "in columns that I don't believe accurately portray the actual survey data.").

612. Even if otherwise admissible, the conclusions stated in Dr. Sukumar's demonstrative exhibits differed materially from those expressed in his expert report, and were excluded as substantive evidence for this additional reason, as more specifically stated below.

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613. Dr. Sukumar testified that he conducted two surveys; one related to the 802.11 standard and one related to the H.264 standard. The former "was meant to assess Xbox users' connectivity to the internet" and the latter "was meant to understand the kind of activity Xbox consumers perform on-line." 11/19/12 Tr. 185 (Sukumar).

614. In his expert report, Dr. Sukumar concluded that 100% of all Xbox users connect to the Internet. This conclusion, which he attempted to change in the demonstrative exhibits used in his testimony, was entirely misleading because Dr. Sukumar had excluded from the survey all Xbox users who did not use their Xbox to connect to the Internet. 11/19/12 Tr. 200 (Sukumar) (Dr. Sukumar's report stated that "[t]he survey results indicate that 100 percent of Xbox users have connected to the internet using at least one of the options presented," and Dr. Sukumar testified that respondents were disqualified from proceeding with the survey if they "reported that they did not use their Xbox to connect to the internet.").

615. Dr. Sukumar also concluded in his expert report that the average Xbox user spends 13 hours per week using their Xbox. But Dr. Sukumar also attempted to change this conclusion in his inadmissible demonstrative exhibits because, remarkably, he had excluded from his survey all respondents who use their Xbox for less than one hour a week. 11/19/12 Tr. 202 (Sukumar) (Dr. Sukumar's report concluded "that on average Xbox users spend 13 hours per week on their consoles," but he testified that he excluded "anyone who had spent under one hour a week using the Xbox").

616. Dr. Sukumar's survey also included a number of confusing technical questions, which render the survey responses unreliable. For example, survey questions QH5A1 and QH5A2 asked respondents to indicate whether they had viewed "progressive", "interlaced", or "MBAFF"-encoded video content on their Xbox console (connected to their TV). 11/19/12 Tr. 193 (Sukumar) (describing survey questions QH5A1 and QH5A2).

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617. Dr. Sukumar did not pre-test these questions because they were supplied to him by counsel after he already completed his pre-tests. 11/19/12 Tr. 186 (Sukumar) ("When I received the request to add those additional questions, the pretests had already been completed").

618. As explained in the Federal Judicial Center's Reference Manual on Scientific Evidence, a well-known and respected publication, unclear survey questions can distort responses and can justify rejection of the survey:

> When unclear questions are included in a survey, they may threaten the validity of the survey by systematically distorting responses, if respondents are misled in a particular direction, or by inflating random error if respondents guess because they do not understand the question. If the crucial question is sufficiently ambiguous or unclear, it may be the basis for rejecting the survey.

Tr. Ex. 3035 (Reference Manual on Scientific Evidence, 2d Ed., Federal Judicial Center 2000, at p. 248 - "Reference Guide on Survey Research"); 11/19/12 Tr. 195-97 (Sukumar) (identifying Reference Guide on Survey Research as part of Ex. 3035 and confirming it as "a well-known and respected publication").

619. Despite generally agreeing with the above statement, Dr. Sukumar claimed that "questions as straightforward and uncomplicated as QH5A1 and QH5A2 do not necessarily need to be pretested." 11/19/12 Tr. 197 (Sukumar).

620. These questions are far from clear. When he prepared the survey, Dr. Sukumar did not even know the meaning of the terms or whether it was possible to discern how a video had been encoded simply by looking at the television screen. 11/19/12 Tr. 193-195 (Sukumar) (did not know "whether it was possible to discern from looking at the TV set whether you were viewing interlaced, or progressive, or MBAFF video" and did not "know what progressive, interlaced, or MBAFF meant").

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621. In fact, as Professor Orchard explained, it is unlikely survey respondents would know what those terms mean and that even he could not discern whether video on an Xbox uses MBAFF or was interlaced. 11/14/12 Tr. 145-46 (Orchard).

622. Had these questions been timely supplied to Dr. Sukumar, he "absolutely" would have pre-tested them. 11/19/12 Tr; 195 (Dr. Sukumar "absolutely" would have pretested the questions had they been timely provided to him, "No doubt about it.").

G. Motorola's Experts' Focus On The Importance Of Standards, Rather Than The Value Of Motorola's Patented Technology, Reflects An Attempt At Hold-Up

623. The testimony and evidence presented by Motorola's experts, particularly Michael Dansky, related overwhelmingly to the importance of the 802.11 and H.264 standards to Microsoft's products, as opposed to the importance of the technologies allegedly covered by Motorola's patents.

624. For example, Mr. Dansky did not discuss any particular Motorola patent. 11/19/12 Tr. 206:4-219:23; 11/20/12 Tr. 8:16-23:6.

625. Dansky did not estimate how much of the value of the 802.11 or H.264 standards was attributable to Motorola's standard essential patents. 11/20/12 Tr. 26-27 (Dansky).

626. Although Dansky holds himself out as an expert in valuing patents, he did not value Motorola's H.264 and 802.11 patents. 11/20/12 Tr. 27 (Dansky).

627. Rather, Dansky presented testimony solely relating to the importance of the 802.11 and H.264 standards to Microsoft products. *See, e.g.*, 11/19/12 Tr. Trans. at 209: 15-19. 210:2-6 (Dansky) (discussing importance of including 802.11 standard in products); 11/20/12 Tr. Trans. at 17:15 – 22 (Dansky) (discussing that "H.264 standard has become the standard, and that there is concern that when products are sold, that they need to be able to decode and code H.264."); at 17:23 – 18:2 (Dansky) (discussing importance of H.264 for

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tablets and smartphones) Ex. 2684, 3383, and 2686 [redacted] Ex. 2515, and 2747 (emphasizing popularity of H.264 video codec); Ex. 2724 (discussing importance of H.264 video to Xbox).

628. Mr. Dansky's approach thus reflects an improper attempt by Motorola to capture the value of the 802.11 and H.264 standards as opposed a royalty on the value of its patented technology. 11/13/12 Tr. 151-52 (Murphy) ("A RAND royalty must reflect the economic value of the patented technology itself and not the value attributable to the standard."); 11/19/12 Tr. 168-69 (Schmalensee) (a SEP holder is "not entitled to the incremental value that you get because you are part of the standard").

629. Mr. Dansky's approach further highlights the risk that a bilateral negotiation in this context would yield hold-up because the more successful a standard is, and the more critical it becomes, the more leverage a holder of SEPs obtains. 11/16/12 Tr. 129-30 (Lynde).

630. Indeed, in such a context, it only takes one essential patent to hold up a potential licensee, because an injunction against infringement of that patent could halt the sale of standard-compliant products. 11/16/12 Tr. Trans. at 130:24-131:1 (Lynde).

H. The Royalties That Motorola Seeks Raise Significant Stacking Concerns

631. There are more than 100 firms that claim to hold patents essential to the 802.11 standard. 11/15/12 Tr. 99-100 (Gibson); Exs. 7, 1592. Given the number of such firms, if they all sought royalties of 2.25% of the price of the Xbox like Motorola, the aggregate royalty would swamp the price of the product. 11/13/12 Tr. 145-46 (Murphy) ("if each of the other 91 standard essential patentholders … also asked for two-and-a-quarter percent, the total royalty demand would be 204.75% … plus Motorola's 2.25, would give a total demand of 207 percent. Obviously, if I'm a product producer, I can't afford to pay royalties for 802.11 for 207 percent of the product price.").

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632. If even a dozen other firms holding patents essential to the 802.11 standard sought and obtained royalties equivalent to Motorola's demand of 2.25% of the price of the Xbox, the aggregate royalty to implement 802.11, which is only one feature of the product, would exceed 25% of the total product price.

633. Likewise, there are 26 firms with patents essential to the H.264 standard in the MPEG LA H.264 pool and at least another 24 firms that have submitted either blanket or specific Letters of Assurance to the ITU claiming to have patents potentially essential to the H.264 standard that are not part of the MPEG LA pool. Exs. 1152, 1153, 1154.

634. If even ten of those firms sought and obtained royalties of $100 million for the alleged use of their H.264 SEPs in Windows, which is at the low end of the range that Motorola demands here, Microsoft would be required to pay over $1 billion per year to implement just one of thousands of features in Windows.

635. As Dr. Lynde explained, "[i]f everyone wanted the same deal [as Motorola], it would quickly make the end-product price untenable commercially." 11/16/12 Tr. 179:1-8 (Lynde).

636. Motorola attempted to minimize the significance of these potential royalty stacking issues by arguing that stacking has not, to date, been an impediment to the implementation of the H.264 and 802.11 standards. 11/13/12 Tr. 177-179 (Murphy cross-examination); 11/16/12 Tr. 139-41 (Lynde cross-examination); 11/19/12 Tr. 148 (Schmalensee).

637. It is the case that, historically, many patent holders have refrained from asserting their SEPs. 11/13/12 Tr. 160 (Murphy) ("the most common rate is actually zero ... [t]hat is the dominant rate that occurs in the marketplace in the 802.11 space"); 11/19/12 Tr. 174 (Schmalensee) ("patent rights are often not asserted in this part of the world").

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638. Pools have also helped to address stacking concerns. 11/13/12 Tr. at 179 (Murphy) ("I think patent pools, in particular the H.264 pool, has helped, as have RAND commitments").

639. There is a risk, however, that the dynamics that help mediate royalty stacking now will break down – and stacking will become a significant problem – if RAND commitments are not enforced in a way that prevents hold-up and is sensitive to aggregate royalties. 11/13/12 Tr. 150-51 ("RAND commitment plays a very central role in most analyses of saying why we've been able to mitigate that problem [of stacking and hold-up]. That is, if you have the RAND commitment ... and people are held to it, that they have to charge reasonable royalties, then one can solve both of those problems. But it requires that people be held to those RAND commitments. ... And the RAND commitment and enforcing the RAND commitment ... is central to making that system work and preserving the state where, in fact, those problems won't materialize.") 151:4-12 (Murphy) ("99 percent of the time, or more, people reach the deal and abide by the contract without ever setting foot in court. What's important to make the contracts work, without the court, is that when you end up in the court those contracts are enforced."); 11/13/12 Tr. 151:4-7 (Murphy) ("Well, I think this more speaks to what potentially could happen. The reason why you can't say it hasn't been a problem up until now, to say it won't be a problem later. I mean, that's true of most contracts.").

640. Given these potential risks, royalty stacking concerns should not be ignored. As noted above, Motorola's own licensing consultants, InteCap, insisted that "[i]ndustry royalty stacking issues must be addressed/recognized" in the 802.11 space. Ex. 65 at CRA_001289.

641. And Jennifer Ochs, the head of IP litigation for Marvell, testified that royalty stacking is a concern for Marvell because "the profit margin on semiconductor chips is quite

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small, and at 2.25 percent of even the chip price, you can't pay too many royalties before you just run out of profit." 11/14/12 Tr. 71:1-6 (Ochs).

642. Finally, Motorola itself told ETSI that royalty stacking was a real concern. Ex. 1031 at MOTM_WASH1823_0420998 ("the increasing tendency for multi-function, multi-technology products means that there are ever more patents covering the end product, giving rise to the phenomenon of so-called 'royalty stacking.' Overall, cumulative royalties are perceived to be uncertain and often too high, possibly even prohibitive."); 11/16/12 Tr. 25:16-27:1, 66:3-16 (Simcoe) (describing Motorola's proposal to ETSI).

CONCLUSIONS OF LAW

643. This is a breach of contract action. *See* Dkt. No. 335, Summary Judgment Order (June 6, 2012) at 1, 21. *See also Microsoft Corp. v. Motorola, Inc.*, No. 12-35352, -- F.3d --, 2012 WL 4477215, at *1 (9th Cir. Sept. 28, 2012) ("The underlying case before the district court concerns how to interpret and enforce patent-holders' commitments to industry standard-setting organizations."); *id.* at *9 ("The district court's conclusion[] that Motorola's RAND declarations to the ITU created a contract enforceable by Microsoft as a third-party beneficiary (which Motorola concedes) . . . [was] not legally erroneous."). Washington contract law applies. Dkt. No. 335 at 15.

644. The issue being adjudicated in this bench trial is the determination of a reasonable and nondiscriminatory ("RAND") royalty for the Motorola patents essential to the 802.11 and H.264 standards. *Id.* at 7–8, 26; Dkt. No. 346, Minute Entry (June 18, 2012).

645. The determination of a RAND royalty for a patent holder's standard-essential patents subject to a RAND licensing commitment is a justiciable issue. See Dkt. No. 335, Summary Judgment Order (June 6, 2012) at 25–27. See also Microsoft , 2012 WL 4477215, at *10 ("Whatever the appropriate method of determining the RAND licensing rate, it could well be that retrospective payment at the rate ultimately determined and a determination of the

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future rate, not an injunction banning sales while that rate is determined, is the only remedy consistent with the contractual commitment to license users of ITU standard-essential patents."); Dkt. No. 312-1, April 11, 2012 Hearing Tr. 28:7–16; 40:13–19; *Apple, Inc. v. Motorola, Inc.*, No. 1:11–cv–08540, 2012 WL 2376664, at *11 (N.D. Ill. June 22, 2012) (describing a "proper method of computing a FRAND royalty").

646. A RAND royalty should reflect the value of the patented technology, but not the benefit or utility of the standard as a whole. *Apple*, 2012 WL 2376664, at *11 ("The purpose of the FRAND requirements . . . is to confine the patentee's royalty demand to the value conferred by the patent itself as distinct from the additional value—the hold-up value—conferred by the patent's being designated as standard-essential."); *See also* Layne-Farrar, Padilla, and Schmalensee, "Pricing Patents For Licensing in Standard-Setting Organizations: Making Sense of FRAND Commitments," 74 *Antitrust L.J.* 671, 672 (2007). A RAND royalty rests on the value of the patent, before adoption or implementation of the standard, in light of available alternatives that could have been adopted instead. The primary consideration is the added benefit, if any, that stems from using the patented technology, separate and apart from its incorporation in the standard. *E.g.*, Swanson & Baumol, "Reasonable and Nondiscriminatory (RAND) Royalties, Standard Selection, and Control of Market Power," 73 *Antitrust L.J.* 7–11 (2005)

647. The patent holder is not entitled to be compensated for the value of complying with the standard after the standard has been widely implemented. *Microsoft*, 2012 WL 4477215, at *1 ("[S]tandards threaten to endow holders of standard-essential patents with disproportionate market power. In theory, once a standard has gained such widespread acceptance that compliance is effectively required to compete in a particular market, anyone holding a standard-essential patent could extract unreasonably high royalties from suppliers of standard-compliant products and services. This problem is a form of 'patent holdup.'"); *Apple*,

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2012 WL 2376664, at *11 ("[O]nce a patent becomes essential to a standard, the patentee's bargaining power surges because a prospective licensee has no alternative to licensing the patent; he is at the patentee's mercy.").

648. A RAND royalty should account for the contributions of others to the standard such that if every contributor sought a royalty, the aggregate "stacked" royalty for all essential patents would remain reasonable.

649. Other license agreements may be relevant to determining a RAND royalty, provided:

a. The licenses are comparable and provide a sound basis for deriving a royalty for the standard-essential patents at issue. *See LaserDynamics, Inc. v. Quanta Computer, Inc.*, 694 F.3d 51, 79 (Fed. Cir. 2012) ("When relying on licenses to prove a reasonable royalty, alleging a loose or vague comparability between different technologies or licenses does not suffice."); *ResQNet.com, Inc. v. Lansa, Inc.*, 594 F.3d 860, 872 (Fed. Cir. 2010) ("[Courts] must consider licenses that are commensurate with what the defendant has appropriated. If not, a prevailing plaintiff would be free to inflate the reasonable royalty analysis with conveniently selected licenses without an economic or other link to the technology in question."); *Lucent Techs. v. Gateway, Inc.*, 580 F.3d 1301, 1329 (Fed. Cir. 2009) (reasonable royalty verdict "cannot stand solely on evidence which amounts to little more than a recitation of royalty numbers, one of which is arguably in the ballpark of the jury's award, particularly when it is doubtful that the technology of those license agreements is in any way similar to the technology being litigated here").

b. The licenses reflect the value conferred by the patent itself as distinct from the additional or hold-up value conferred by the patent's being designated as standard-essential, *see Apple*, 2012 WL 2376664, at *11 ("The purpose of the FRAND requirements . . . is to confine the patentee's royalty demand to the value conferred by the patent itself as distinct

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from the additional value—the hold-up value—conferred by the patent's being designated as standard-essential."); and

c. The licenses do not result from negotiations between licensees and the patent holder where the licensees were under duress. Dkt. No. 318, Preliminary Injunction Order (May 14, 2012) at 24; *Microsoft*, 2012 WL 4477215, at *2 ("More generally, Justice Kennedy has suggested that injunctions against patent infringement 'may not serve the public interest' in cases where 'the patented invention is but a small component of the product the companies seek to produce and the threat of an injunction is employed simply for undue leverage in negotiations.'"), quoting *eBay Inc. v. MercExchange, L.L.C.*, 547 U.S. 388, 396–97 (2006) (Kennedy, J., concurring). *See* Dkt. No. 375-2 (FTC Statement) ("[T]he threat of an exclusion order may allow the holder of a RAND-encumbered SEP to realize royalty rates that reflect patent hold-up, rather than the value of the patent relative to alternatives"); *Apple*, 2012 WL 2376664, at *12 (citing FTC Statement). *See also LaserDynamics*, 694 F.3d at 77 (collecting cases and noting that "[t]he propriety of using prior settlement agreements to prove the amount of a reasonable royalty is questionable"); *Hanson v. Alpine Valley Ski Area*, 718 F.2d 1075, 1079 (Fed. Cir. 1983) ("[L]icense fees negotiated in the face of a threat of high litigation costs may be strongly influenced by a desire to avoid full litigation.") (quotation marks omitted).

650. The entire market value rule dictates that the revenues from sales of a multi-component product, where the particular patents at issue relate only to some of the components of the product, cannot be used as a royalty base for a reasonable royalty unless the patents form the basis for customer demand for the entire multi-component product. *See Sheldon v. Metro-Goldwyn Pictures Corp.*, 309 U.S. 390, 402 (1940); *Dowagiac Mfg. Co. v. Minnesota Moline Plow Co.*, 235 U.S. 641, 645–51 (1915); *Westinghouse Elec. & Mfg. Co. v. Wagner Elec. & Mfg. Co.*, 225 U.S. 604, 614–15 (1912); *Garretson v. Clark*, 111 U.S. 120, 121 (1884); *Velo-*

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Bind, Inc. v. Minnesota Min. & Mfg. Co., 647 F.2d 965, 973 (9th Cir. 1981); *LaserDynamics*, 694 F.3d at 67-68 ("We reaffirm that in any case involving multi-component products, patentees may not calculate damages based on sales of the entire product . . . without showing that the demand for the entire product is attributable to the patented feature."); *Lucent*, 580 F.3d at 1336. The purpose of the rule is to ensure that a patentee does not recover the value of unpatented features as part of a royalty award; rather, a royalty award must be strictly tied to the value of the invention. *USA, Inc. v. Microsoft Corp.*, 632 F.3d 1292, 1318 (Fed. Cir. 2011) ("The entire market value rule allows a patentee to assess damages based on the entire market value of the accused product only where the patented feature creates the 'basis for customer demand' or 'substantially create[s] the value of the component parts.'").

651. The entire market value rules cannot be evaded simply applying a low-enough royalty rate to the sales of entire products. *LaserDynamics, Inc. v. Quanta Computer, Inc.*, 694 F.3d 51, 67 (Fed. Cir. 2012). There is no exception to the entire market value rule simply because the patented feature is otherwise important or critical to the product—it must be shown that the feature is the basis for customer demand before a reasonable royalty may be based on sales of the products. *Id.* at 67–68. And there is no exception to the entire market value rule for claimed practical or economic necessity of basing a royalty on sales of the product. *Id.* at 69.

652. Patents cannot have a greater value when subject to a RAND commitment, and there is no basis in precedent, logic, or economic policy for not applying the entire market value rule that limits recovery on a given patent in the context of determining a RAND royalty. If anything, the rationale for applying the entire market value rule is even more compelling in the RAND context because of the underlying reasonableness and non-discriminatory requirements. Therefore, the revenues from sales of a standard-compliant multi-component product, where the particular patents at issue relate to only some of the components of the

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product, should not be used as a royalty base for a RAND royalty unless the patents (not simply the standard itself) form the basis for customer demand for the entire multi-component product.

653. Patent exhaustion "provides that the initial sale of a patented item terminates all patent rights to that item." *Quanta Computer, Inc. v. LG Elecs., Inc.*, 553 U.S. 617, 625 (2008). Exhaustion merely requires the authorized sale of a component substantially embodying an invention, and the Supreme Court has specifically held that a product may substantially embody an invention *even if* additional components are necessary to practice the patent. *Id.* at 631–34. A product substantially embodies a patent for the purposes of patent exhaustion if it "embodie[s] essential features of [the] patented invention" and its "only reasonable and intended use [is] to practice the patent." *Id.* at 631.

654. The factors set forth in *Georgia–Pacific Corp. v. U.S. Plywood Corp.*, 318 F. Supp. 1116 (S.D.N.Y. 1970), were developed in the context of reasonable royalty patent damages and have been allowed by the Federal Circuit for use in that context. Care must be exercised in relying on the *Georgia-Pacific* factors to determine a RAND royalty for standard essential patents, for at least the following reasons:

a. Factors 3 ("The nature and scope of the license, as exclusive or non-exclusive; or as restricted or non-restricted in terms of territory or with respect to whom the manufactured product may be sold") and 7 ("The duration of the patent and the term of the license") are resolved by the RAND commitment because RAND licenses to standard-essential patents must be non-exclusive and unrestricted in terms of duration and territory, and with respect to whom the licensee may sell its standard-compliant products. *Georgia-Pacific* factor 4 ("The licensor's established policy and marketing program to maintain his patent monopoly by not licensing others to use the invention or by granting licenses under special conditions designed to preserve that monopoly") is also resolved by the RAND commitment because the

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patent holder is obligated to license its standard-essential patents to any other party and cannot grant licenses under special conditions designed to preserve a monopoly. *See Microsoft*, 2012 WL 4477215, at *9 ("Implicit in such a sweeping promise is, at least arguably, a guarantee that the patent-holder will not take steps to keep would-be users from using the patented material, such as seeking an injunction, but will instead proffer licenses consistent with the commitment made.").

b. *Georgia-Pacific* factor 5 ("The commercial relationship between the licensor and licensee, such as, whether they are competitors in the same territory in the same line of business; or whether they are inventor and promoter") is inconsistent with the RAND commitment, because the patent holder is obligated to license its standard-essential patents to any party on non-discriminatory terms, and cannot discriminate between licensees based on their commercial relationship to the licensor, whether they are competitors, whether they are inventor and promoter, or on any other grounds.

c. Consideration of certain other *Georgia-Pacific* factors in the standard-essential patent context may lead to the improper capture of the value of standardization, especially where the standard—as intended by the standard-setting organization—has been successful and widely adopted. These include factors 6 ("The effect of selling the patented specialty in promoting sales of other products of the licensee; the existing value of the invention to the licensor as a generator of sales of his non-patented items; and the extent of such derivative or convoyed sales"); 8 ("The established profitability of the product made under the patent; its commercial success; and its current popularity"); 9 ("The utility and advantages of the patent property over the old modes or devices, if any, that had been used for working out similar results"); 10 ("The nature of the patented invention; the character of the commercial embodiment of it as owned and produced by the licensor; and the benefits to those

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who have used the invention"); 11 ("The extent to which the infringer has made use of the invention; and any evidence probative of the value of that use").

d. Certain other *Georgia-Pacific* factors, if applied in the standard-essential patent context, may lead to unreasonable, excessive royalties by focusing on the licensee's profits from selling standard-compliant products, where the standard itself is only one of a multitude of product features, and the patent holder's patents cover only a fraction of the standard. These include factors 12 ("The portion of the profit or of the selling price that may be customary in the particular business or in comparable businesses to allow for the use of the invention or analogous inventions") and 13 ("The portion of the realizable profit that should be credited to the invention as distinguished from non-patented elements, the manufacturing process, business risks, or significant features or improvements added by the infringer.").

e. The defined boundaries of the hypothetical negotiation contemplated by *Georgia-Pacific* factor 15 may also be inconsistent with the RAND commitment, because compensating a standard-essential patent holder by the amount a licensee "would have been willing to pay" to obtain complete access to the standard, may lead to an unreasonable aggregate royalty burden on the standard. Further, the contractual RAND licensing commitment displaces any independent threshold of minimum compensation which "would have been acceptable [to] a prudent patentee."

655. Determining reasonable royalties as informed by consideration of Georgia-Pacific factors requires fully analyzing the applicable factors; mere conclusory remarks about each factor's impact on a reasonable royalty are insufficient. *Whitserve, LLC v. Computer Packages, Inc.*, 694 F.3d 10, 31-32 (Fed. Cir. 2012).

656. An expert's opinion that lacks any support in the record is a worthless *ipse dixit*. *See General Elec. Co. v. Joiner*, 522 U.S. 136, 146 (1997); *Wendler & Ezra, P.C. v. Am. Intern. Group, Inc.*, 521 F.3d 790, 791 (7th Cir. 2008) (per curiam) ("An expert who supplies

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nothing but a bottom line supplies nothing of value to the judicial process.") (quotation marks omitted); *Hathaway v. Bazany*, 507 F.3d 312, 318 (5th Cir. 2007) ("[A]n expert's testimony that 'it is so' is not admissible.").

657. The proponent of survey evidence must establish that the survey was conducted in accordance with generally accepted survey principles. *See Sugar Ass'n, Inc. v. McNeil-PPC, Inc.*, No. 04-10077, 2008 WL 4755611, at *3 (C.D. Cal. Jan. 7, 2008) (internal citations omitted). Absent evidence that a survey was conducted in accordance with generally accepted survey principles, including the use of a representative sample, the survey results can be disregarded. *Id.;* citing *Keith v. Volpe*, 858 F.2d 467, 480 (9th Cir. 1988).

658. The inclusion of unclear questions in a survey threatens the validity of the survey by systematically distorting responses, if respondents are misled in a particular direction, or by inflating random error if respondents guess because they do not understand the question. If the questions are sufficiently ambiguous or unclear, they form a basis for rejecting the survey entirely. Shari Seidman Diamond, Reference Manual on Scientific Evidence: Reference Guide on Survey Research § IV.A at 248 (Ex. 3035); *see also 1-800 Contacts, Inc. v. Lens.com, Inc.*, No. 07-00591, 2010 WL 5186393, at *7 (D. Utah Dec. 15, 2010) (excluding survey in part based upon ambiguous question which was not pre-tested); *Competitive Edge, Inc. v. Staples, Inc.* 763 F. Supp. 2d 997,1008–09 (N.D. Ill. 2010) (granting motion to strike survey expert report in part because survey questions were "replete with potential ambiguities" open to multiple interpretations).

659. A "means-plus-function" claim covers only structures that the specification clearly associates with the claimed function. *Medtronic, Inc. v. Advanced Cardiovascular Systems, Inc.*, 248 F.3d 1303, 1311 (Fed. Cir. 2001) (quoting *B Braun Med., Inc. v. Abbott Labs.*, 124 F.3d 1419, 1424 (Fed. Cir. 1997)). Where the alleged disclosed structure is a computer or microprocessor, the disclosed structure cannot be a general purpose computer, but

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rather must be a special purpose computer programmed to perform an algorithm. *WMS Gaming, Inc. v. International Game Tech.*, 184 F.3d 1339, 1349 (Fed. Cir. 1999). The patent must disclose enough of an algorithm to provide the necessary structure under § 112, ¶ 6 to the satisfaction of one of ordinary skill in the art. *Finisar Corp. v. DirecTV Group, Inc.*, 523 F.3d 1323, 1340 (Fed. Cir. 2008). *See also Aristocrat Technologies Australia Pty Ltd. v. International Game Techn.*, 521 F.3d 1328, 1333. "A patentee cannot avoid providing specificity as to structure simply because someone of ordinary skill in the art would be able to devise a means to perform the claimed function. To allow that form of claiming under section 112, paragraph 6, would allow the patentee to claim all possible means of achieving a function." *Blackboard, Inc. v. Desire2Learn, Inc.*, 574 F. 3d 1371, 1385 (Fed. Cir. 2009); *see also Default Proof Credit Card Sys., Inc. v. Home Depot U.S.A., Inc.*, 412 F.3d 1291, 1300-02 (Fed. Cir. 2005).

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CERTIFICATE OF SERVICE

I, Linda Bledsoe, swear under penalty of perjury under the laws of the State of Washington to the following:

1. I am over the age of 21 and not a party to this action.

2. On the 17th day of December, 2012, I caused the preceding document to be served on counsel of record in the following manner:

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