10-CV-01823-ORD

UNITED STATES DISTRICT COURT
WESTERN DISTRICT OF WASHINGTON
AT SEATTLE

MICROSOFT CORPORATION, Plaintiff, v. MOTOROLA, INC., et al., Defendants.	CASE NO. C10-1823JLR FINDINGS OF FACT AND CONCLUSIONS OF LAW
MOTOROLA MOBILITY, INC., et al., Plaintiffs, v. MICROSOFT CORPORATION, Defendant.	

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This is a breach of contract case between Microsoft Corporation ("Microsoft") and Motorola, Inc., Motorola Mobility, Inc., and General Instrument Corporation (collectively, "Motorola"). Microsoft claims that Motorola has an obligation to license patents to Microsoft at a reasonable and non-discriminatory ("RAND") rate, and that Motorola breached its RAND obligations through two offer letters. (*See generally* Am. Compl. (Dkt. # 53).) Microsoft sued Motorola for breach of contract in this court in November, 2010. (*See id.*)

At this stage of the case, Microsoft and Motorola are attempting to decipher the meaning of Motorola's RAND licensing obligation.[1] Without a clear understanding of what RAND means, it would be difficult or impossible to figure out if Motorola breached its obligation to license its patents on RAND terms. The parties disagree substantially about the meaning of RAND. Thus, to resolve the dispute, the court held a bench trial from November 13-20, 2012, with the aim of determining a RAND licensing rate and a RAND royalty range for Motorola's patents.

These findings of fact and conclusions of law represent the culmination of the court's and the parties' efforts to calculate a RAND rate and range. To establish a context for these findings and conclusions, the court will briefly outline the details of Motorola's RAND obligation, the patents at issue in this case, and the nature of the dispute between Microsoft and Motorola.

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[1] This matter has a complex procedural history involving several patent infringement claims as well as claims and counter claims relating to Microsoft's breach of contract claim. The court's February, 27, 2012, order provides a more complete procedural history of the case. (*See generally* 2/27/12 Order (Dkt. # 188).)

Motorola's RAND commitment arises out of its and Microsoft's relationship with two international standard-setting organizations ("SSOs"), the Institute of Electrical Electronics Engineers ("IEEE") and the International Telecommunication Union ("ITU"). These organizations create standards for use in designing and manufacturing technology products. These and other SSOs play a significant role in the technology market by allowing companies to agree on common technological protocols so that products complying with the standards will work together.

The standards at issue in this case involve wireless communications, commonly known as "WiFi," and video coding technology. More specifically, this case involves two standards: an IEEE wireless local area network ("WLAN") standard called the "802.11 Standard" and an ITU[2] advanced video coding technology standard called the "H.264 Standard."

Both of these standards incorporate patented technology. Thus, in order for a company to practice the standard, it is necessary for that company to utilize technology that is covered by one or more patents. Patents that are essential to the standard (in that they must be practiced to accomplish the standard) are called standard essential patents, or "SEPs." The existence of SEPs is a common problem in the world of technology standards. To deal with this problem, SSOs have devised a solution. To make it easier for companies to practice their standards, SSOs seek commitments from the owners of

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[2] As detailed below, the ITU developed the H.264 Standard jointly with two other SSOs—the International Organization for Standardization and the International Electrotechnical Commission.

SEPs to license their patents to standard-users on RAND terms. Motorola owns patents that are essential to the 802.11 and H.264 Standards and has committed to license them on RAND terms.

Microsoft claims that Motorola breached its RAND obligation by making an unreasonable offer in a negotiation to license Motorola's 802.11 and H.264 SEPs. On October 21, 2010, Motorola sent Microsoft a letter offering to license Motorola's 802.11 SEPs. Motorola offered to license its patents at what it considered the RAND rate of 2.25 % of the price of the end product:

> This letter is to confirm Motorola's offer to grant Microsoft a worldwide non-exclusive license under Motorola's portfolio of patents and pending applications having claims that may be or become Essential Patent Claims (as defined in section 6.1 of the IEEE bylaws) for a compliant implementation of the IEEE 802.11 Standards. . . . Motorola offers to license the patents under reasonable and non-discriminatory terms and conditions ("RAND"), including a reasonable royalty of 2.25 % per unit for each 802.11 compliant product, subject to a grant back license under the 802.11 essential patents of Microsoft. As per Motorola's standard terms, the royalty is calculated based on the price of the end product (e.g, each Xbox 360 product) and not on component software (e.g., Windows Mobile Software).

(10/21/10 Offer Ltr. (Dkt. # 79-5) at 2.) On October 29, 2010, Motorola sent a similar letter offering to license its H.264 SEPs on similar terms. The letter again offered a royalty rate of 2.25 % of the end product price:

> Motorola offers to license the patents on a non-discriminatory basis on reasonable terms and conditions ("RAND"), including a reasonable royalty, of 2.25 % per unit for each H.264 compliant product, subject to a grant back license under the H.264 patents of Microsoft, and subject to any Motorola commitments made to JVT in connection with an approved H.264 recommendation. As per Motorola's standard terms, the royalty is calculated based 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.).

(10/29/10 Offer Ltr. (Dkt. # 79-6) at 2.)

Eleven days later, on November 9, 2010, Microsoft initiated this breach of contract action against Motorola based on Motorola's two offer letters, claiming that the letters breached Motorola's RAND commitments to the IEEE and the ITU. In a previous order, the court held that these RAND commitments create enforceable contracts between Motorola and the respective SSO. (2/27/12 Order (Dkt. # 188).) The court has also held that Microsoft—as a standard-user—can enforce these contracts as a third-party beneficiary. (*See id.*) In a separate prior order, the court interpreted Motorola's commitments to the ITU and IEEE as requiring initial offers by Motorola to license its SEPs to be made in good faith. (6/6/12 Order (Dkt. # 335) at 25.) However, the court has also held that initial offers do not have to be on RAND terms so long as a RAND license eventually issues. (*Id.*, *see also* 10/10/12 Order (Dkt. # 465).)

To decide whether Motorola's opening offers were in good faith, a fact-finder must be able to compare them with a reasonable RAND royalty rate and, because more than one rate could conceivably be RAND, a reasonable RAND royalty range. However, as the court ruled on October 10, 2012, the RAND royalty rate is a heavily disputed, fact-sensitive issue that must be resolved by a finder of fact. (10/10/12 Order at 22.) Accordingly, the court held a bench trial to determine: (1) a RAND royalty range for Motorola's SEPs; and (2) a specific RAND royalty rate for Motorola's SEPs. The purpose of this is to enable a fact-finder in a later trial to determine whether Motorola's

offer letters breached Motorola's RAND obligation to offer a license for its patents in good faith.

During the November 13-20, 2012, bench trial, the court heard testimony from eighteen witnesses: Mr. John Devaan, Mr. Garrett Glanz, Dr. Kevin M. Murphy, Dr. Gary Sullivan, Ms. Jennifer Ochs, Mr. Leonard Del Castillo, Dr. Jerry Gibson, Dr. Timothy Simcoe, Dr. Matthew Lynde, Dr. Ajay Luthra, Dr. Timothy J. Drabik, Dr. Michael Orchard, Dr. Tim Arthur Williams, Dr. Richard Schmalensee, Dr. Ramairtham Sukumar, Mr. Michael J. Dansky, Mr. Kirk Dailey, and Mr. Charles R. Donohoe.

Unless stated herein, the court credits the testimony of each of these witnesses. More often than not, the court found that the testimony of the witnesses was not in conflict. Where conflict exists, the court uses law, reason, and logic to resolve the conflict in an effort to determine a reasonable royalty rate and range for Motorola's 802.11 and H.264 SEPs.

In these Findings of Fact and Conclusions of Law, the court uses the evidence the parties presented at trial to set forth a methodology for determining a RAND royalty rate and range. The court then applies this methodology to determine a RAND royalty rate and range between Microsoft and Motorola for Motorola's 802.11 and H.264 SEP portfolios. The court's methodology is necessarily dictated by the circumstances of this litigation—a dispute between an SEP owner and a standard-user over a reasonable royalty rate. The court recognizes that real-world negotiations involving patents committed to the RAND obligation might include layers of complexity beyond determining monetary royalty rates. However, this litigation is limited in scope by the

pleadings and evidence provided to the court, and the court is therefore likewise constrained to determining what constitutes a reasonable royalty rate for Motorola's SEP portfolio under the RAND obligation.[3] (*See generally* Am. Compl. (Dkt. # 53); Motorola Answer (Dkt. # 68).)

The court's analysis proceeds in six parts. First, the court introduces the parties and their relation to one another. Second, the court provides background on standards, SSOs, and the RAND commitment. Third, the court develops a framework for assessing RAND terms. Specifically, the court adopts a modified version of the *Georgia-Pacific* factors to recreate a hypothetical negotiation between the parties. *See Georgia-Pacific Corp. v. United States Plywood Corp.*, 318 F. Supp. 1116 (S.D.N.Y. 1970). Importantly, the court determines that the parties in a hypothetical negotiation would set RAND royalty rates by looking at the importance of the SEPs to the standard and the importance of the standard and the SEPs to the products at issue. These considerations are central to the court's analysis. Fourth, after establishing a framework for assessing RAND terms, the court introduces the H.264 Standard and Motorola's H.264 SEPs, analyzing each patent in turn and setting out the portfolio's relative importance to the H.264 Standard

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[3] Regarding the scope of this litigation, Motorola elicited evidence at trial pertaining to the value of patents that Microsoft owns. The pleadings in this case, however, do not implicate the value of Microsoft's patents because there is no allegation that Microsoft breached its RAND obligations by failing to license its SEPs on reasonable terms. Indeed, the allegations in the pleadings pertain exclusively to the licensing practices of Motorola. (*See generally* Am. Compl. (Dkt. # 53); Motorola Answer (Dkt. # 68).) Insofar as Motorola seeks to insert the value of Microsoft's patents into the trial to determine the value of Motorola's patents, it is outside the scope of this action. Accordingly, as explained below, analysis relating to patents owned by Microsoft is relevant to this case not for their technological value, but for purposes of analogizing patent pools to find a reasonable rate for Motorola's 802.11 and H.264 SEP portfolios.

and to Microsoft's standard-using products. Fifth, the court introduces the 802.11 Standard and Motorola's 802.11 SEPs and analyzes each 802.11 Patent using the same framework.

Sixth, the court uses all of the foregoing information, along with comparables suggested by the parties, to determine an appropriate RAND royalty rate for Motorola's SEPs. Based on this analysis, the court sets the royalty rate and range as follows:

- The RAND royalty rate for Motorola's H.264 SEP portfolio is 0.555 cents per unit; the upper bound of a RAND royalty range for Motorola's H.264 SEP portfolio is 16.389 cents per unit; and the lower bound is 0.555 cents per unit. This rate and this range are applicable to both Microsoft Windows and Xbox products. For all other Microsoft products using the H.264 Standard, the royalty rate will be the lower bound of 0.555 cents.

- The RAND royalty rate for Motorola's 802.11 SEP portfolio is 3.471 cents per unit; the upper bound of a RAND royalty range for Motorola's 802.11 SEP portfolio is 19.5 cents per unit; and the lower bound is 0.8 cents per unit. This rate and range is applicable to Microsoft Xbox products. For all other Microsoft products using the 802.11 Standard, the royalty rate will be the low bound of 0.8 cents per unit.

Pursuant to Federal Rule of Civil Procedure 52(a), the following constitute the court's Findings of Fact and Conclusions of Law.[4]

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[4] Although the court has not labeled paragraphs specifically as Findings or Conclusions, such labels are not necessary. The nature of the Findings and Conclusions to follow is apparent. *See Tri-Tron Int'l. v. A.A. Velto*, 525 F.2d 432, 435-36 (9th Cir. 1975) ("We look at a finding or a conclusion in its true light, regardless of the label that the district court may have placed on it. . . . [T]he findings are sufficient if they permit a clear understanding of the basis for the decision of the trial court, irrespective of their mere form or arrangement.") (citations omitted); *In re Bubble Up Delaware, Inc.*, 684 F.2d 1259, 1262 (9th Cir. 1982) ("The fact that a court labels determinations 'Findings of Fact' does not make them so if they are in reality conclusions of law.").

FINDINGS OF FACT AND CONCLUSIONS OF LAW

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 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. (Dkt. # 635 (sealed), Dkt. # 636 (redacted)) at 58-59 (Dailey Testimony).)

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 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 at 3.)

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

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

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

8. The court has subject matter jurisdiction over this dispute pursuant to 28 U.S.C. § 1332 because this is an action between citizens of different states and because the amount in controversy exceeds $75,000.00.

9. Venue is proper in this district pursuant to 28 U.S.C. §§ 1391(a).

II. STANDARDS & STANDARD-SETTING ORGANIZATIONS

A. Background

10. SSOs are voluntary membership organizations whose participants engage in the development of industry standards, including telecommunication and information technology standards. (*See, e.g.*, 11/16/12 Tr. (Dkt. # 631) at 15:15-20 (Simcoe Testimony).)

11. 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.)

12. Standards lower costs by increasing product manufacturing volume, and they increase price competition by eliminating switching costs for consumers who want to switch from products manufactured by one firm to those manufactured by another. (6/6/12 Order at 3.)

13. SSOs seek to promote widespread adoption of their standards because the interoperability benefits of standards depend on broad implementation. (11/16/12 Tr. at 15:15-20 (Simcoe Testimony); 11/19/12 Tr. (Dkt. # 632) at 136:25-137:3 (Schmalensee Testimony).)

14. SSOs also seek to develop standards that incorporate technology that will make the standard attractive to implementers, while at the same time ensuring a feasible price to those same implementers to promote broad implementation.[5] (11/13/12 Tr. (Dkt. # 629) at 167 (Murphy Testimony); 11/19/12 Tr. at 137:4-8 (Schmalensee Testimony).)

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

16. This case concerns two standards: the 802.11 Standard and the H.264 Standard. The 802.11 Standard is a wireless communication standard that has been developed over a period of years by the IEEE. (*See, e.g.*, 11/15/12 Tr. (Dkt. # 633 (sealed), Dkt. # 634 (redacted)) at 91:10-12, 92:14-93:11 (Gibson Testimony).) Two different organizations, the International Organization for Standardization and the

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[5] For purposes of this order, an implementer is a person or entity who practices all or part of a standard.

International Electrotechnical Commission ("ISO/IEC"), and ITU, jointly developed the H.264 Standard, which relates to video compression. (*See, e.g.*, 11/13/12 Tr. at 210:24-211:21; 213:7-214:1; 214:11-12 (Sullivan Testimony).)

B. Patented Technology in Standards

17. 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. at 17:5-8 (Simcoe Testimony).)

18. For example, Gary Sullivan, Co-chairman of the Joint Video Team ("JVT") that developed the H.264 video compression standard, did not analyze any particular patents in his work on the standard. (11/14/12 Tr. (Dkt. # 630) at 44:4-21 (Sullivan Testimony).)

19. Similarly, Ajay Luthra, the other Co-chairman of the JVT, did not provide other participants with information about relevant Motorola patents. (11/19/12 Tr. at 22:6-12 (Luthra Testimony).)

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

21. For example, many of the core innovations of the H.264 Standard were made by Telenor Group, which did not obtain patents on the technology that it contributed and made its contributions available to all implementers of the standard without patent licensing restrictions. (11/13/12 Tr. at 215:12-18 (Sullivan Testimony); 11/14/12 Tr. 114:21-115:5 (Orchard Testimony).)

22. Likewise, the 802.11 Standard was based in part on a long history of publicly-shared research and development by companies, government agencies, and academic institutions. (11/15/12 Tr. at 96:16-24 (Gibson Testimony).)

23. Nevertheless, using a standard frequently does require use of patented technology. (*See, e.g.*, Ex. 1152 (listing more than 2,400 patents determined to be essential to the H.264 Standard); 11/16/12 Tr. 108:21-109:9 (Lynde Testimony) (stating that there are probably thousands of patents essential to the 802.11 Standard).)

C. SSO Intellectual Property Policies and the RAND Commitment

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

25. 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 ensure that standards do not allow essential patent owners to extort their competitors or prevent competitors from entering the marketplace.

(6/6/12 Order at 3-4; *see also* Ex. 1414 at 28,036-37 (describing basic elements of SSO intellectual property policies); 11/16/12 Tr. at 19:3-24, 21:24-23:7 (Simcoe Testimony)

(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).)

i. The ITU/ISO/IEC Patent Policy

26. The ITU and ISO/IEC maintain a common patent policy (the "ITU/ISO/IEC Common Patent Policy"), which constitutes the "code of practice" regarding patents covering subject matters of "Recommendations" and "Deliverables" of the respective SSOs. (Ex. 1575 at MOTM_WASH1823_0602815.) The ITU/ISO/IEC Common Patent Policy states that "Recommendations" and "Deliverables" are drawn up by technical (and not patent) experts who may "not be very familiar with the complex international legal situation of intellectual property rights such as patents." (*Id.*)

27. The objective of "Recommendations" and "Deliverables" is to "ensure compatibility of technologies and systems on a worldwide basis." (Ex. 1575 at MOTM_WASH1823_0602815.) To meet this objective, "Recommendations" and "Deliverables" must be accessible to everybody. It follows then that the "sole objective" of the ITU/ISO/IEC Common Patent Policy is to ensure that "a patent embodied fully or partly in a Recommendation | Deliverable must be accessible to everybody without undue constraints." (*Id.* at MOTM_WASH1823_0602815.)

28. The ITU and ISO/IEC have also published their "Guidelines for Implementation of the Common Patent Policy for ITU-T/ITU-R/ISO/IEC/" ("Guidelines for the Common Patent Policy"). (Ex. 1575 at MOTM_WASH1823_0602808-14.) The Guidelines for the Common Patent Policy encourage disclosure by patentees of

potentially essential patents "as early as possible" in the standards development process. (*Id.* at MOTM_WASH1823_0602808.)

29. Once a patent holder has disclosed a potentially essential patent or has made a blanket disclosure stating that one or more of its patents may be essential to a proposed standard, the ITU will seek a licensing commitment from the patent-holder using a standardized intellectual property rights ("IPR") disclosure form. The ITU refers to such an assurance as a "Patent Statement and Licensing Declaration." (*See, e.g.*, Exs. 2838, 2839.) In practice, this assurance is often referred to as a "Letter of Assurance," or an "LOA" for short.

30. The ITU LOA 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, MOTM_WASH1823_0602818.)

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

32. With respect to licensing arrangements for SEPs, the ITU/ISO/IEC Common Patent Policy provides that "[t]he detailed arrangements arising from patents (licensing, royalties, etc.) are left to the parties concerned, as these arrangements might differ from case to case." (Ex. 1575 at MOTM_WASH1823_0602815.) Also, the

ITU/ISO/IEC Common Patent Policy and its licensing declaration form further state that "negotiations are left to the parties concerned and are performed outside the [ITU]." (*Id.* at MOTM_WASH1823_0602815, MOTM_WASH1823_0602818.)

33. 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.) The LOAs further state that "[a]s used herein, the word 'reciprocity' means that the Patent Holder shall only be required to license any prospective licensee if such prospective licensee will commit to license its essential patents(s) or essential patent claims for implementation of the same above document free of charge or under reasonable terms and conditions." (*See, e.g.*, Ex. 2838 at MOTM_WASH1823_0000036; *see also id.* at MOTM_WASH1823_0000040, 046, 053, 057, 061.)

34. 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.)

35. 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.)

36. All of Motorola's LOAs 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.[6] (Ex. 2838 at MOTM_WASH1823_0000036, 039, 046, 053, 057, 061; 11/20/12 Tr. at 33:21-34:12 (Dailey Testimony).)

ii. The IEEE Intellectual Property Rights Policy

37. The IEEE Standards Association ("IEEE-SA") established the 802.11 Standard, which relates to WLAN and is the second of the standards at issue here.

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

39. 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_00004073097 (§ 6.2).)

40. The IEEE-SA 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

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[6] Although not all of Motorola's LOAs included precisely the quoted language, each LOA contained words to that effect.

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).) This Letter of Assurance form is the IEEE version of an LOA.

41. The IEEE LOA 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).) The latter option constitutes the IEEE RAND commitment for "Essential Patent Claims," or SEPs.

42. The IEEE LOA 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. at 19:3:24 (Simcoe Testimony); 11/16/12 Tr. at 108:21-109:4 (Lynde Testimony).)

43. An IEEE LOA from an SEP holder that commits to license unspecified patents or pending applications for a particular standard is called a "blanket" disclosure. (11/16/12 Tr. at 19:21-24 (Simcoe Testimony); 11/16/12 Tr. at 108:21-109:4 (Lynde Testimony).)

44. Motorola and Symbol Technologies submitted numerous blanket LOAs to the IEEE in relation to the 802.11 Standard. (Exs. 1407, 2839.) With these LOAs,

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

45. IEEE-SA Standards Board Bylaws state that "[n]o license is implied by the submission of a Letter of Assurance." (Ex. 1568 at MS-MOTO_1823_00004073098.) The bylaws further state that "[t]he IEEE is not responsible . . . for determining whether any licensing terms or conditions provided in connection with submission of a Letter of Assurance, if any, or in any licensing agreements are reasonable or non-discriminatory." (*Id.*)

46. Symbol and Motorola submitted their first blanket LOAs 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).)

47. The IEEE Operations Manual in place at the time that Motorola and Symbol made their initial 802.11 RAND commitments provided that "[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).)

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

iii. The ITU and IEEE are Silent as to What Constitutes RAND

49. The intellectual property rights policies of the IEEE and ITU focus on technical issues and do not describe, explain, or govern RAND licensing terms and conditions. (*See, e.g.*, Ex. 2838 at MOTM_WASH1823_0000036.)

50. The IEEE and ITU have declined to provide a definition of what constitutes RAND terms and conditions. Further, the organizations do not attempt to determine what constitutes a reasonable royalty rate or what other terms and conditions are reasonable or nondiscriminatory for any license between interested parties. (11/16/12 Tr. at 47:12-16; 49:9-14, 62:19-22, 73:22-25 (Simcoe Testimony); Ex. 3010 at 8.)

D. The Purpose of the RAND Commitment

51. The purpose of the RAND commitment is to encourage widespread adoption of the standard. (11/13/12 Tr. at 147:19-21 (Murphy Testimony).)

52. When the standard becomes widely used, the holders of SEPs obtain substantial leverage to demand more than the value of their specific patented technology. This is so even if there were 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. at 140:2-23, 141:18-23 (Murphy Testimony); Ex. 1414 at 28036.)

53. A given patent is "essential" to a standard if use of the standard requires infringement of the patent, even if acceptable alternatives of that patent could have been written into the standard. (11/16/12 Tr. at 18:9-21 (Simcoe Testimony); 11/13/12 Tr. at 199:11-200:15 (Murphy Testimony).)

54. SSOs define a patent as essential even if the patent only reads onto an optional portion of the standard. (11/16/12 Tr. at 18:1-6 (Simcoe Testimony).)

55. The ability of a holder of an 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. at 140:2-23, 141:18-23 (Murphy Testimony); Ex. 1414 at 28036; *see also* 11/19/12 Tr. 166:24-167:22 (Schmalensee Testimony) (explaining that the "essence of hold-up" is that 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).)

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

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

58. 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 onto them. (Ex. 1414 at 28036; 11/13/12 Tr. at 144:25-145:6, 147:22-148:13 (Murphy Testimony).)

59. 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. at 144:25-145:11 (Murphy Testimony).)

60. Indeed, Motorola's expert, Dr. Richard Schmalensee, acknowledged that "the RAND commitment and the whole apparatus exists [sic] to deal with hold-up." (11/19/12 Tr. at 142:13-16, 157:20-23 (Schmalensee Testimony).)

61. Similarly, the Federal Trade Commission ("FTC") 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 28037.)

62. Complex industry standards like the H.264 and 802.11 Standards 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. at 108:21-109:8 (Lynde Testimony) (the number of SEPs related to the 802.11 Standard "generally is acknowledged to be in the thousands").)

63. High-tech products can comply with dozens or even hundreds of different standards. For example, a typical personal computer ("PC") implements as many as 90 different formal standards and over 100 informal interoperability standards. (11/16/12 Tr. at 128:2-10 (Lynde Testimony).)

64. 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 and can result in cumulative royalty payments that can undermine the standards. (11/13/12 Tr. at 141:24-142:22, 145:12-146:14 (Murphy Testimony); 11/16/12 Tr. at 127:23-128:10 (Lynde Testimony).)

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

66. 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. at 146:15-147:2 (Murphy Testimony); 11/16/12 Tr. at 15:14-16:7 (Simcoe Testimony).)

67. Indeed, 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. at 25:16-24 (Simcoe Testimony).) In its ETSI submission, Motorola recited a commonly understood purpose 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 Testimony) (agreeing with the statements contained in Motorola's ETSI submission).)

68. In the same submission, Motorola also explained a commonly understood principle of proportionality that "[c]ompensation under FRAND[7] must reflect the patent owner's proportion of 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 Testimony) (agreeing with the statements contained in Motorola's ETSI submission).)

69. 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. at 76:2-10 (Simcoe Testimony) (agreeing with statement contained in Motorola's ETSI submission).)

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[7] FRAND, which stands for fair, reasonable, and non-discriminatory, has the same meaning as RAND. (*See* 11/16/12 Tr. at 53 (Simcoe Testimony) (using FRAND and RAND interchangeably).)

III. ECONOMIC GUIDEPOSTS FOR ASSESSING RAND TERMS

A. Basic Principles

70. 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. at 139:17-140:1, 203:14-18 (Murphy Testimony).)

71. 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 intended to avoid. (11/16/12 Tr. at 15:14-16:7, 44:10-13, 71:14-25 (Simcoe Testimony); 11/13/12 Tr. at 144:11-24, 203:14-18 (Murphy Testimony).)

72. 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 other SEP holders made royalty demands of the implementer. (11/16/12 Tr. at 15:14-16:7, 44:10-13 (Simcoe Testimony); 11/13/12 Tr. at 203:14-19 (Murphy Testimony).)

73. At the same time, a RAND royalty should be set with the understanding that SSOs include technology intended to create valuable standards. (11/19/12 Tr. at 136:24-137:8 (Schmalensee Testimony).) To induce the creation of valuable standards, the RAND commitment must guarantee that holders of valuable intellectual property will receive reasonable royalties on that property. (*Id.*)

74. 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 patented technology into the standard. (11/13/12 Tr. at 151:19-153:21 (Murphy Testimony).) Motorola's expert, Dr. Schmalensee, agreed that if a company makes a RAND commitment, it is 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. at 168:21-169:8 (Schmalensee Testimony).)

B. Microsoft's Approach

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

76. Although Microsoft's approach suffers from several flaws, *ex ante* examination of the incremental contribution of the patented technology to the standard can be helpful in determining a RAND rate in the context of a dispute over a RAND royalty rate.

77. One flaw in Microsoft's approach is its lack of real-world applicability. Neither the IEEE nor the ITU specifies that RAND terms must be determined using an incremental value approach. (11/16/12 Tr. at 63:10-12 (Simcoe Testimony).) Moreover, neither the IEEE nor the ITU require *ex ante* disclosure of RAND terms during the

standard setting process. In fact, explicit multilateral *ex ante* negotiations cannot be conducted under the auspices of many SSOs, including the IEEE. (*Id.* at 67:11-68:1.)

78. It is possible that SSOs remain generally fearful of the antitrust implications of moving to an *ex ante* policy. (11/16/12 Tr. at 68:2-10 (Simcoe Testimony).) As Dr. Simcoe, Microsoft's standards expert, wrote, "most SSOs prohibit any prospective discussion of licensing terms—generally citing fears of antitrust litigation." (Ex. 3118 at 6.) Dr. Simcoe believes that antitrust concerns have caused SSOs to be scared of engaging in *ex ante* multilateral negotiations. (11/16/12 Tr. at 68:2-10 (Simcoe Testimony).) Dr. Simcoe testified that, among the SSOs, "there are these conversations where they bring up antitrust concerns as a reason to avoid getting into [an] explicit definition of RAND." (*Id.* at 62:16-18.)

79. Another flaw in Microsoft's approach is its impracticability with respect to implementation by courts. In practice, approaches linking the value of a patent to its incremental contribution to a standard are hard to implement. (Ex. 293 at 676.) Calculating incremental value for multi-patent standards "gets very complicated, because when you take one patent out of a standard and put another one in you may make other changes, the performance of the standard is multidimensional, different people value different aspects." (11/19/12 Tr. at 168:3-9 (Schmalensee Testimony).)

80. Nevertheless, a reasonable royalty rate for an SEP committed to a RAND obligation must value the patented technology itself, which necessarily requires considering the importance and contribution of the patent to the standard. If alternatives available to the patented technology would have provided the same or similar technical

contribution to the standard, the actual value provided by the patented technology is its incremental contribution. (*See* 11/13/12 Tr. at 152-53 (Murphy Testimony).) Thus, comparison of the patented technology to the alternatives that the SSO could have written into the standard is a consideration in determining a RAND royalty.

81. Using an example to explain this incremental approach, Dr. Murphy stated:

> Yeah, that's the goal. And this is more—this is like in most things in life, it's tougher to do than it is to say. What you'd ideally like to do is sit down and say: Okay, Kevin, you've contributed this piece of technology. Bob had this alternative piece of technology we could have used instead of yours. Yours was some increment better than his, that is the value you added, because we could have used his rather than yours, so your net contribution was that amount. And that's what you should get as a reasonable royalty. That's ideally what you do. That's not an easy exercise always to do.

(11/13/12 Tr. at 153:1-11 (Murphy Testimony).)

82. Likewise, Dr. 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 any substitute technologies and the general level of competition." (Ex. 293 at 675; *see also* 11/19/12 Tr. at 177:20-178:5 (Schmalensee Testimony).) Dr. 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. at 165:23-166:6 (Schmalensee Testimony).)

C. Motorola's Approach

83. Motorola suggests that RAND terms and conditions can be determined by simulating a hypothetical bilateral negotiation under the RAND obligation. (11/19/12 Tr. at 149:14-17 (Schmalensee Testimony).) As explained and modified herein, the court generally agrees with Motorola's approach.

84. Support for a hypothetical bilateral negotiation approach is found in real-world negotiations. Indeed, based on the evidence before the court, RAND license agreements often consummate through bilateral negotiations between the SEP owner and the implementer. (11/19/12 Tr. at 149:18-150:3 (Schmalensee Testimony).) Because bilateral negotiations occur in practice, there exists evidence of the results of such real-world negotiations that can be used in simulating the hypothetical negotiation. (*Id.*)

85. Typically, the SEP owner and the potential licensee determine RAND terms through good-faith, bilateral negotiations, which take place independent of ITU and IEEE's activities. (*See, e.g.*, Ex. 2838 at MOTM_WASH1823_0000036, 039, 046, 053; Ex. 2970 at 14; 11/16/12 Tr. at 137:3-138:18 (Lynde Testimony); see also 11/13/12 Tr. at 181:12-15 (Murphy Testimony); 11/19/12 Tr. at 142:17-21, 149:18-22 (Schmalensee Testimony); 11/20/12 Tr. at 45:23-46:3 (Dailey Testimony).) Microsoft's experts agree that RAND licenses can be determined between parties through private bilateral negotiations after an SSO adopts a standard. (11/16/12 Tr. at 65:15-66:2 (Simcoe Testimony); 11/13/12 Tr. at 181:12-15 (Murphy Testimony); 11/16/12 Tr. at 138:7-18 (Lynde Testimony).)

86. Indeed, Microsoft's statements regarding the RAND commitment show that bilateral negotiations take place in real world settings. On June 14, 2011, seven months after Microsoft filed its complaint in this case, David Heiner, Microsoft's Vice President and Deputy General Counsel, and Amy Marasco, Microsoft's General Manager for Standards Strategy and Policy, submitted a letter (Ex. 2970) to the FTC on behalf of Microsoft in response to the FTC's May 13, 2011, Request for Comments and Announcement of Workshop on Standards-Setting Issues regarding "patent hold-up" in connection with standardization efforts. The letter included the following statements:

> a. "RAND-based IPR policies provide a flexible framework to help enable customized bi-lateral negotiations for patent licenses that generally are not limited to just the essential patent claims in connection with a standard." (Ex. 2970 at 3.)
>
> b. "RAND is a time-tested and effective approach to licensing commitments. Like other 'reasonableness' standards, it does not dictate specific licensing terms, but it does provide flexibility across a diverse range of situations. As mentioned above, companies make decisions about whether to initiate licensing discussions and, if so, what considerations beyond just the essential claims vis-a-vis the final standard will be included. The negotiation associated with a standards-related patent license typically is no different from any general patent licensing discussion and will involve trade-offs on all of the terms and conditions." (Ex. 2970 at 12.)

87. Support for a hypothetical bilateral negotiation approach is also found in the experience of the courts. Courts have long experience in conducting hypothetical bilateral negotiations to frame the reasonable royalty inquiry in patent infringement cases under the *Georgia-Pacific* framework. *See Georgia-Pacific Corp. v. United States Plywood Corp.*, 318 F. Supp. 1116 (S.D.N.Y. 1970). (11/19/12 Tr. at 149:18-150:3 (Schmalensee Testimony); Ex. 293 at 675, 679, 680-82.)

88. Indeed, the Federal Circuit Court of Appeals, the appellate court for patent-related issues, has consistently sanctioned the *Georgia-Pacific* approach. *LaserDynamics, Inc. v. Quanta Computer, Inc.*, 694 F.3d 51, 60 n.2 (Fed. Cir. 2012) ("This court has sanctioned the use of the *Georgia-Pacific* factors to frame the reasonable royalty inquiry. Those factors properly tie the reasonable royalty calculation to the facts of the hypothetical negotiation at issue." (citing *Uniloc USA, Inc. v. Microsoft Corp.*, 632 F.3d 1292, 1317 (Fed. Cir. 2011))).

89. Additionally, other courts have spoken to the applicability of the *Georgia-Pacific* framework in determining a reasonable royalty in the RAND context. *Broadcom Corp. v. Qualcomm Inc.*, 501 F.3d 297, 314-15 n.8 (3d Cir. 2007) ("The reasonableness of royalties is an inquiry that courts routinely undertake using the 15-factor test set forth in *Georgia-Pacific* . . . and some courts have already applied this test in the [RAND] context.").

90. As Anne Layne-Farrar, A. Jorge Padilla, and Richard Schmalensee wrote in 2007 in an article in the Antitrust Law Journal entitled *Pricing Patents for Licensing in Standard Setting Organizations: Making Sense of FRAND Commitments*, "[o]ne option" for courts seeking to "evaluate what behavior is and what is not compliant with SSO members' FRAND commitments" is "extending *Georgia-Pacific*, which is the primary case guiding reasonable royalty determination in patent infringement cases in the United States." (Ex. 293 at 673.) They add that the "majority of [the *Georgia-Pacific*] factors are directly applicable to FRAND evaluations in a standard-setting context." (Ex. 293 at 681.) In using a hypothetical bilateral negotiation, courts should modify the *Georgia-*

Pacific framework to take the RAND obligation into account. (11/19/12 Tr. at 150:4-10 (Schmalensee Testimony).)

91. Finally, in the context of a dispute over the proper RAND royalty rate, judicial simulation of a hypothetical, bilateral negotiation under the RAND obligation logically will lead to a royalty rate that both parties would have found to be reasonable.

92. However, the hypothetical negotiation under a RAND obligation must be different than the typical *Georgia-Pacific* analysis historically conducted by courts in a patent infringement action. This is so for at least two reasons. First, the owner of an SEP is under the obligation to license its patents on RAND terms, whereas the owner of a patent uncommitted to RAND has monopoly power over its patent and may choose to withhold licensing. Second, the hypothetical negotiation almost certainly will not take place in a vacuum: the implementer of a standard will understand that it must take a license from many SEP owners, not just one, before it will be in compliance with its licensing obligations and able to fully implement the standard.

93. With respect to methodology, there is one question left to be answered: what factors would an SEP owner and standard-implementer consider during such a hypothetical negotiation?

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D. The Hypothetical Negotiation

In this section, the court sets out the factors that an SEP owner and standard-implementer would consider during a hypothetical negotiation over a reasonable royalty rate to be paid for patents obligated to a RAND commitment.

94. The notion of a reasonable royalty in patents originates in the context of a damages award after a finding of patent infringement. Title 35, section 284 of the United States Code provides that "[u]pon finding for the claimant the court shall award the claimant damages adequate to compensate for the infringement, but in no event less than a *reasonable royalty* for the use made of the invention by the infringer, together with interest and costs as fixed by the court." 35 U.S.C. § 284 (emphasis added).

95. The Southern District of New York, in its frequently cited opinion in *Georgia-Pacific*, 318 F. Supp. 1116, compiled the following list of fifteen factors relevant to a reasonable royalty calculation in the context of damages in a patent infringement suit:

> 1. The royalties received by the patentee for the licensing of the patent in suit, proving or tending to prove an established royalty.
>
> 2. The rates paid by the licensee for the use of other patents comparable to the patent in suit.
>
> 3. The nature and scope of the license.
>
> 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.
>
> 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.

> 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.
>
> 7. The duration of the patent and the term of the license.
>
> 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 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.
>
> 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.
>
> 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.
>
> 14. The opinion testimony of qualified experts.
>
> 15. The amount that a licensor and a licensee would have agreed upon (at the time the infringement began) if both had been reasonably and voluntarily trying to reach an agreement.

318 F. Supp. at 1119-20.

96. The *Georgia-Pacific* factors are widely accepted. *See Minks v. Polaris Indus., Inc.*, 546 F.3d 1364, 1372, (Fed. Cir. 2008) ("A determination of the royalty stemming from a hypothetical negotiation is often made by assessing factors such as

those set forth in *Georgia-Pacific Corp. v. U.S. Plywood Corp.*, 318 F. Supp. 1116, 1120 (S.D.N.Y. 1970).").

97. The *Georgia-Pacific* case and the factors it propounds are often cited as setting forth the guiding principles to determine a reasonable royalty through a hypothetical negotiation or the 'willing licensor-willing licensee' approach. This approach attempts to ascertain the royalty upon which the parties would have agreed had they successfully negotiated an agreement just before infringement began. The hypothetical negotiation tries, as best as possible, to recreate the *ex ante* licensing negotiation scenario and to describe the resulting agreement. *Lucent Techs., Inc. v. Gateway, Inc.*, 580 F.3d 1301, 1324-25 (Fed. Cir. 2009); *Unisplay, S.A. v. Am. Elec. Sign Co., Inc.*, 69 F.3d 512, 517 n.7 (Fed. Cir. 1995).

98. Courts have wide discretion to decide which of the *Georgia-Pacific* factors are relevant to a given case. *See Minco, Inc. v. Combustion Eng'g, Inc.*, 95 F.3d 1109, 1119-20 (Fed. Cir. 1996) (relying on only a few of the *Georgia-Pacific* factors to uphold reasonable royalty award of 20 % of the infringer's gross sales).

99. The *Georgia-Pacific* factors must be adjusted to account for the purpose of the RAND commitment. Specifically, the court concludes that the following *Georgia-Pacific* factors must be modified.

100. Factor 1 examines the royalties received by the patentee for the licensing of the patent in suit, proving or tending to prove an established royalty. In the RAND context, such licensing royalties for a given patent(s) must be comparable to RAND licensing circumstances. In other words, to prove an established royalty rate for an SEP,

the past royalty rates for a patent must be negotiated under the RAND obligation or a comparable negotiation. Thus, license agreements where the parties clearly understood the RAND obligation, and as discussed below, patent pools, will be relevant to a hypothetical negotiation for SEPs.

101. Factor 4 considers 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. This factor is inapplicable in the RAND context because the licensor has made a commitment to license on RAND terms and may no longer maintain a patent monopoly by not licensing to others. In fact, as the court has found in this case, the RAND commitment requires the SEP owner to grant licenses on RAND terms to all implementers of the standard. (*See* 10/10/12 Order (Dkt. # 465) at 14.)

102. Factor 5 examines 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. Similar to factor 4, this factor does not apply in the RAND context. This is because having committed to license on RAND terms, the patentee no longer may discriminate against its competitors in terms of licensing agreements. Instead, as explained, the patent owner is obligated to license all implementers on reasonable terms.

103. Factors 6 and 8 examine the importance of the patented invention to both the licensor and licensee's sales, as well as to derivative and convoyed sales to the licensee. Although both of these factors are relevant to a reasonable royalty in the RAND

context, it is important to focus the analysis of both of these factors on the value of the patented technology apart from the value associated with incorporation of the patented technology into the standard. (11/13/12 Tr. at 151:19-153:21 (Murphy Testimony).)

104. With respect to Factors 6 and 8, a reasonable royalty would not take into account the value to the licensee created by the existence of the standard itself, but would instead consider the contribution of the patent to the technical capabilities of the standard and also the contribution of those relevant technological capabilities to the implementer and the implementer's products. (*See* 11/13/12 Tr. at 144:12-17 (Murphy Testimony).) This is because there is substantial value in the agreed standard itself apart from any contribution of the patented technology to the standard, and the RAND commitment exists so that SEP patent holders cannot demand more than they contribute. (*See id.* at 151:21-152:23 (describing how RAND commitment limits reasonable royalty to that of contribution of patent and not value of the standard itself).)

105. Factor number 7 examines the duration of the patent and the term of the license. The analysis concerning Factor 7 is greatly simplified in the context of a dispute over a reasonable royalty for a RAND-committed patent because the term of the license would equate to the duration of the patent. In many circumstances, this factor will have little influence on what constitutes a reasonable royalty under the RAND commitment.

106. Factor 9 considers 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. Through this factor, the parties to a hypothetical negotiation under a RAND commitment would consider alternatives that could have been written into the standard instead of the

patented technology. The focus is on the period before the standard was adopted and implemented (i.e., *ex ante*). (11/13/12 Tr. at 199:9-200:15 (Murphy Testimony).) Thus, through factor 9, Microsoft's incremental approach to determination of a RAND royalty rate is realized, in part.

107. Factor 10 generally relates to the character of the patented invention and the benefits to those who used the invention. Similarly, factor 11 examines the extent to which the infringer has made use of the invention and value of that use to the infringer. In the RAND context, both of these factors focus the hypothetical negotiation on the contribution of the patent to the technical capabilities of the standard and also the contribution of those relevant technical capabilities to the implementer and the implementer's products. Again, in such an analysis, however, it is important to separate the patented technology from the value associated with incorporation of the patented technology into the standard. Nevertheless, evidence of the benefit and value of the patent to the owner and implementer is relevant to the contribution of the patent to the certain capabilities of the standard, as well as the contribution of the standard's capabilities to the implementer.

108. Factor 12 states, "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." *Georgia-Pacific*, 318 F. Supp. at 1120. This factor must be viewed through the lens of business practices involving RAND commitments. In other words, licensing fees for non-RAND committed patents

customary in a business industry cannot form the basis for comparison. Instead, factor 12 must look to customary practices of businesses licensing RAND-committed patents.

109. Factor 13 looks at 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. As with many of the other factors, in the RAND context, it is critical to consider the contribution of the patented technology apart from the value of the patent as the result of its incorporation into the standard, the latter of which would improperly reward the SEP owner for the value of the standard itself. Rewarding the SEP owner with any of the value of the standard itself would constitute hold-up value and be contrary to the purpose behind the RAND commitment. (*See* 11/13/12 Tr. at 152:14-23 (Murphy Testimony).)

110. Factor 15 considers the amount that a licensor and a licensee would have agreed upon (at the time the infringement began) if both had been reasonably and voluntarily trying to reach an agreement. The SEP owner and the implementer would consider the RAND commitment and its purposes in their efforts to reach a license agreement. In trying to reach an agreement, the SEP owner would have been obligated to license its SEPs on RAND terms which necessarily must abide by the purpose of the RAND commitment of widespread adoption of the standard through avoidance of hold-up and stacking.

111. With respect to hold-up, the parties would examine a reasonable royalty rate under the RAND commitment based on the contribution of the patented technology to the capabilities of the standard, and in turn, the contribution of those capabilities of the

standard to the implementer and the implementer's products. Thus, a patent that is extremely important and central to the standard would reasonably command a higher royalty rate than a less important patent. Importantly, however, because an "essential" patent is one that is necessary to implement either an optional or mandatory provision of a standard, a specific SEP may contribute greatly to an optional portion of a given standard, but if that portion is not used by the implementer, the specific SEP may have little value to the implementer.

112. With respect to stacking concerns, the parties attempting to reach an agreement would consider the overall licensing landscape in existence vis-à-vis the standard and the implementer's products. In other words, a RAND negotiation would not be conducted in a vacuum. The parties would instead consider other SEP holders and the royalty rate that each of these patent holders might seek from the implementer based the importance of these other patents to the standard and to the implementer's products.

113. Finally, reasonable parties in search of a reasonable royalty rate under the RAND commitment would consider the fact that, to induce the creation of valuable standards, the RAND commitment must guarantee that holders of valuable intellectual property will receive reasonable royalties on that property.

With the aforementioned framework for determining a RAND royalty rate set forth, the court conducts a hypothetical negotiation for Motorola's 802.11 and H.264 SEPs. First, the court examines Motorola's H.264 and 802.11 patent portfolios to determine each portfolio's importance to its respective standard as well as the importance to Microsoft's products. Second, the court fashions a royalty rate and range for

Motorola's H.264 and 802.11 patent portfolios based on certain Microsoft products. In determining a royalty rate and range, the court considers possible comparable licensing agreements and patent pools, which could provide indications of a reasonable royalty rate for Motorola's patent portfolios. The court also applies the principles behind the RAND commitment in finding the appropriate royalty rate and range.

IV. THE H.264 STANDARD

Motorola owns a portfolio of patents essential to the H.264 Standard. To determine a reasonable royalty for Motorola's H.264 SEP portfolio, the court provides background on the H.264 Standard and then examines the importance of Motorola's patent portfolio to the H.264 Standard and to Microsoft products using the standard.

A. Background on Video Processing

114. Video compression is the process of transforming video into compressed video that requires less data storage than the original uncompressed video. (11/14/12 Tr. at 101 (Orchard Testimony).)

115. Video compression is important because modern digital video, particularly high definition video, requires immense amounts of data storage. (*Id.*)

116. 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. (*Id.*) Decoding turns an encoded smaller file back into an approximation of the original, uncompressed video. (*Id.*)

117. Coding tools are individual tools that are used in the process of encoding or decoding. (*Id.* at 101-02.) A video compression standard normally defines many

different coding tools, with different tools used for different purposes. (*Id.* at 102.) Each tool contributes a small amount to the compression of video. (*See id.* at 101-02.) Together, the coding tools provide an aggregate level of compression that varies from standard to standard. (*Id.*)

B. Interlaced and Progressive Video

118. Interlaced video is a compression technology developed around 1940. (11/13/12 Tr. at 214 (Sullivan Testimony); 11/14/12 Tr. at 104 (Orchard Testimony).) The aim of interlaced video is and 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. at 37 (DeVaan Testimony).) Modern digital techniques compress video more efficiently than interlaced video. (11/13/12 Tr. at 214 (Sullivan Testimony); 11/14/12 Tr. at 102, 105 (Orchard Testimony).)

119. Interlaced video compression separately captures the even and odd lines of the pictures comprising a video. (11/14/12 Tr. at 102 (Orchard Testimony); 11/13/12 Tr. at 37 (DeVaan Testimony).) 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. at 103 (Orchard Testimony).) 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 rather than the entire picture being displayed repeatedly at a slower pace. (*Id.* at 104.)

120. Modern flat screen televisions and computer displays do not use interlaced video. Instead, they rapidly show the entire picture independent of the speed at which television pictures are stored or transmitted. (11/14/12 Tr. at 104 (Orchard Testimony).) This is called progressive video. (*Id.*) Progressive video is a sequence of entire pictures, such as those taken with a still camera. Each picture (or frame) contains all the lines, not just half of them. (*Id.* at 102.)

121. 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. at 103 (Orchard Testimony).) This process is called de-interlacing. (11/14/12 Tr. at 48 (Sullivan Testimony).) Progressive video is rarely (if ever) converted to interlaced video. (*Compare* 11/14/12 Tr. at 103 (Orchard Testimony) *with* 11/19/12 Tr. at 43 (Drabik Testimony) (stating that interlaced format is used to represent progressive video in a format named "progressive segment frame").)

122. The weight of the evidence before the court demonstrates that interlaced video content is increasingly rare in today's world. (*See, e.g.*, 11/14/12 Tr. at 102-04 (Orchard Testimony).)

C. Compressing Interlaced Video

123. Interlaced coding tools increase the efficiency of coding interlaced material. (11/14/12 Tr. at 103, 105 (Orchard Testimony).) Tools for coding interlaced material were developed for MPEG-2 in 1991 and 1992 and were included in an earlier video coding standard, MPEG-2, that was published in 1995. (*Id.* at 105; Ex. 1479.) Tools for coding interlaced material have also been incorporated into other standards, such as

MPEG-4, another standard that predates H.264. (11/14/12 Tr. at 48-49 (Sullivan Testimony).)

124. Adaptive frame/field coding chooses whether to code a particular piece of interlaced material as a frame or as two separate fields. (11/14/12 Tr. at 118 (Orchard Testimony).) Frame coding processes consecutive lines of the picture together. (*Id.* at 103.) Field coding separates odd and even lines and processes each separately.

125. There are two types of adaptive frame/field coding: Picture Adaptive Frame/Field coding ("PICAFF" or "PAFF") and Macroblock Adaptive Frame/Field Coding ("MBAFF"). (11/14/12 Tr. at 27-28 (Sullivan Testimony).) Motorola did not invent or make the seminal contributions to either PICAFF or MBAFF. (*Id.* at 12-13; 11/19/12 Tr. at 53 (Drabik Testimony).)

126. PICAFF chooses between field and frame coding for an entire picture so that the picture is entirely coded either as a frame or as two separate fields. (11/14/12 Tr. at 119 (Orchard Testimony).) PICAFF is not used for progressive video. (*Id.* at 103, 106; Ex. 424 at MOTM_WASH1823_0336712 (describing PICAFF as a tool used in interlaced coding).)

127. 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. at 119 (Orchard Testimony).) MBAFF is not used for progressive video. (*Id.* at 120; Ex. 424 at MOTM_WASH1823_0336712 (describing MBAFF as a tool used in interlaced coding).)

128. During the development of the H.264 Standard, 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 Testimony).) To distinguish the two types of MBAFF, MPEG-2's MBAFF is referred to as single macroblock MBAFF, and Motorola's proposal is referred to as paired macroblock MBAFF. Paired macroblock MBAFF was adopted as a part of the H.264 Standard. (*Id.*)

D. Background of the H.264 Standard

i. Overview and Development of H.264 Standard

129. The H.264 Standard is a video coding standard, also known as MPEG-4 Part 10, or AVC (Advanced Video Coding). (Ex. 421; Ex. 424 at 560.) The first version of the H.264 Standard was adopted in May 2003. (Ex. 610.)

130. Three core features of the H.264 Standard are coding (described above), prediction, and transform/quantization. (11/19/12 Tr. at 26:23-27:4 (Drabik Testimony); 11/14/12 Tr. at 31:21-32:14 (Sullivan Testimony); 11/14/12 Tr. at 109:10-15 (Orchard Testimony) (prediction, transform, and quantization are "core video coding components of the H.264 standard"); Ex. 424 at 566-71; Ex. 574 at 136-38; Ex. 421 at 4 (0.6.2), 24-25 (6.3), 26 (6.4.2), 129-81.)

131. The basic idea of prediction is to eliminate redundancy from picture to picture in order to reduce the number of bits that need to be transmitted or stored. There are two types of prediction: intra prediction and inter prediction. In intra prediction, a prediction is created from spatial extrapolation of neighboring image samples from

within the same picture frame. In inter prediction, blocks are predicted using blocks from different pictures, called reference pictures. Inter prediction is a way to perform motion compensation—that is, to exploit the high correlation between successive pictures of a video stream that represent moving objects. (Ex. 424 at 568-70; Ex. 574 at 137-38; Ex. 421 at 4 (0.6.3).)

132. The basic idea of transform is to convert pixel values into frequency coefficients. The frequency coefficients are easier to compress than the pixel values. The basic idea of quantization is to reduce the number of bits required to represent each coefficient. After the frequency coefficients are quantized, they are scanned. During encoding, a scanning procedure scans the frequency coefficients from locations in two dimensions and repositions them in one dimension for the next coding step. (Ex. 424 at 570-71; Ex. 574 at 138-39; Ex. 421 at 4 (0.6).)

133. H.264 is currently the most widely used video coding format. (Ex. 2515 at MOTM_WASH1823_0608878 ("[I]n the past four quarters, the H.264 format went from 31 percent of all videos to 66 percent, and is now the largest format by far."); Ex. 2747 at MOTM_WASH1823_0610702, 704; 11/20/12 Tr. at 15:16-16:23, 17:15-18:2 (Dansky Testimony).)

134. The ISO/IEC and the ITU, two SSOs, jointly developed the H.264 Standard. (11/13/12 Tr. at 208-09 (Sullivan Testimony).) The MPEG (Motion Picture Experts Group) video subgroup of ISO/IEC and the VCEG (Video Coding Experts Group) subgroup of ITU develop video compression standards. (*Id.* at 208.) VCEG performed the early development of what became the H.264 Standard. (*Id.* at 210-13.)

As part of the development of the H.264 Standard, MPEG Video and VCEG created the JVT, a joint organization that finalized the H.264 video standard. (*Id.* at 208-09.)

ii. Timeline of Development

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

136. 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. at 212-16 (Sullivan Testimony).) In other words, on average VCEG's draft standard required only half the bits to compress video with the same quality as prior standards. (*Id.*) However, the actual compression achieved varied from video sequence to video sequence. (*See* Ex. 424 at MOTM_WASH1823_0336720.)

137. Performance of the standard for interlaced video was not, however, measured by VCEG in the spring of 2001. Instead, the estimated 50 percent compression improvement was based on a video sequence of resolution lower than standard definition. (11/14/12 Tr. at 28 (Sullivan Testimony); Ex. 424 at MOTM_WASH1823_0336721 ("note that Fig. 18 does not show performance for interlaced video").) As of summer 2001, the VCEG design did not include specialized tools for coding interlaced video. (11/13/12 Tr. at 214 (Sullivan Testimony).)

138. In January 2001, MPEG called for proposals for advanced compression technology. (11/13/12 Tr. at 213 (Sullivan Testimony).) In July 2001, VCEG submitted its draft design to MPEG for evaluation and proposed to join forces with MPEG to finalize the draft standard. (*Id.* at 213.) After testing VCEG's proposal, MPEG adopted

it and agreed to join with VCEG to finalize it as a new standard. (*Id.* at 213-14.) In December 2001, VCEG and MPEG formally created the JVT. (*Id.*)

139. After the JVT was formed, the standard underwent six new versions. Testing and development continued through the partnership between MPEG and VCEG and through contributions of other entities. (Ex. 424 at MOTM_WASH1823_0336720.)

140. The JVT finalized the first version of H.264 in May 2003. (11/13/12 Tr. at 214 (Sullivan Testimony).) Like the VCEG draft standard from July 2001, it achieved an average of approximately 50 percent improvement in compression over prior standards. (*Id.* at 215; 11/14/12 Tr. at 9-10 (Sullivan Testimony).)

141. Again, performance of the standard for interlaced video was not measured for the final version. (11/14/12 Tr. at 28 (Sullivan Testimony); Ex. 424 at MOTM_WASH1823_0336721 ("note that Fig. 18 does not show performance for interlaced video").) Instead, the estimated 50 percent compression improvement in the final standard was based on a video sequence of resolution lower than standard definition. (11/14/12 Tr. at 28 (Sullivan Testimony); Ex. 424 at MOTM_WASH1823_0336721 ("note that Fig. 18 does not show performance for interlaced video").)

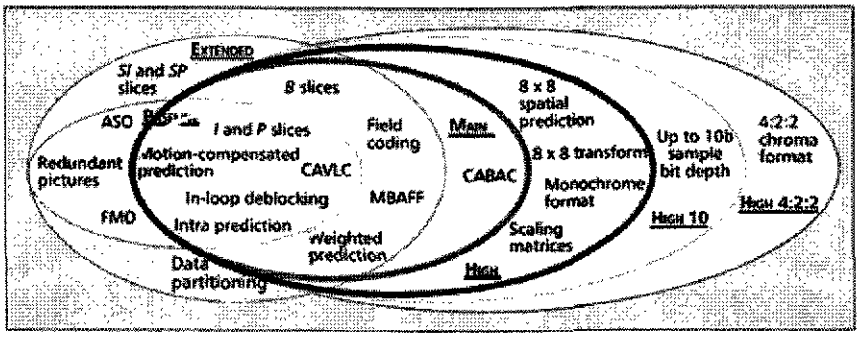
142. The final H.264 Standard contained interlaced coding tools, including the Motorola-proposed paired macroblock MBAFF. (11/14/12 Tr. at 119-20 (Orchard Testimony).)

iii. The Profiles and Levels of the H.264 Standard

143. 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 at 140.) These include the Baseline, Main, High, and Extended profiles. (*Id.*) The standard also defines "levels" ranging from 1 through 5.1 that restrict how the compression techniques allowed by a profile are used. (*Id.*; Ex. 610 at 209.) Compliance with the H.264 Standard is in reference to a profile and a level. (Ex. 610 at 204.)

144. The figure below from the "Marpe" paper illustrates the H.264 profiles:



Ex. 574: Marpe et al., *The H.264/MPEG4 Advanced Video Coding Standard and its Applications*, IEEE Communications Magazine, August 2006 ("Marpe"), at 140 (MOTM_WASH1823_0094434)

(Ex. 574 at 140; 11/19/12 Tr. at 36:20-37:4 (Drabik Testimony).)

145. To comply with a particular profile and level of the H.264 Standard, an H.264 video decoder must be able 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 at 140.)

146. H.264 does not require an encoder to use any particular compression technique even if that technique is allowed by the profiles and levels with which the encoder complies. (Ex. 610 at 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 at 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 at 140.)

147. The Constrained Baseline profile (depicted in the "Marpe" paper illustration by the circle within "Baseline") is a package of features that "must be supported by any H.264 decoder." (11/19/12 Tr. at 36:23-24 (Drabik Testimony); Ex. 574 at 140.) The Baseline profile is a superset of the Constrained Baseline profile and adds three additional tools for transport efficiency. (Ex. 574 at 140.) "'Baseline' refers to a limited functionality version of the technology that would not support, for example, high definition video." (11/13/12 Tr. at 77:1-3 (Glanz Testimony).)

148. The Baseline profile prohibits the use of interlaced coding tools. (Ex. 574 at 140; 11/14/12 Tr. at 19-20 (Sullivan Testimony).)

149. The Main profile and High profile (both depicted in the "Marpe" paper illustration) provide additional coding tools, including field coding, MBAFF, and PAFF. (11/19/12 Tr. at 36:25-37:4 (Drabik Testimony); Ex. 574 at 140.)

150. The Main and High profiles are commonly used for standard definition ("SD") and high definition ("HD") video. (11/19/12 Tr. at 36:25-37:4 (Drabik Testimony); 11/16/12 Tr. at 193:21-23 (Luthra Testimony); Ex. 574 at 141 ("the High profile . . . has overtaken the Main profile for prospective applications of H.264/MPEG4-AVC in typical SD and HD consumer applications"); Ex. 3399 at MOTM_WASH1823_0612357 (the Main profile was "designed with an emphasis on compression coding efficiency capability") (emphasis in original); Ex. 2739 at 17; Ex.

3345 at 7 ("Main—All features of H.264 except Flexible Macroblock Ordering (FMO). Progressive or interlaced video. Targets broadcast market.").)

151. 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. at 37 (Drabik Testimony).) Thus, a decoder that conforms to levels 2.1 to 4.1 of the Main or High profiles must support interlace coding. (Ex. 421 (H.264 Standard, March 2010) at 299 (Table A-4, showing "frame_mbs_only_flag" undefined for levels 2.1 to 4.1); 11/14/12 Tr. at 19:24-20:1, 20:8-10 (Sullivan Testimony); 11/19/12 Tr. at 37:6-9 (Drabik Testimony).)

152. 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 at 1.)

153. For example, Google'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. Therefore, an H.264 compliant decoder that decodes YouTube H.264 video must include the capability to decode interlaced video even if that functionality is not used. (Ex. 592 at 1.)

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iv. Intellectual Property Relating to the H.264 Standard

154. The H.264 Standard resulted from the contributions of roughly 170 entities that submitted over 2,300 documents. (11/14/12 Tr. at 108 (Orchard Testimony).) 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. at 211 (Sullivan Testimony).)

155. 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. at 215 (Sullivan Testimony); 11/14/12 Tr. at 115 (Orchard Testimony).) Telenor decided not to seek patents on its contributions and notified the JVT of its decision. (11/14/12 Tr. at 52 (Sullivan Testimony); 11/14/12 Tr. at 115 (Orchard Testimony).)

156. In addition to Telenor's contribution to the standard, there are at least 2,500 patents throughout the world that are essential to the H.264 Standard. (11/14/12 Tr. at 110-13 (Orchard Testimony).) Of those 2,500 patents, over 360 are United States patents. (*See* Ex. 1544.)

157. Approximately 33 United States companies have enumerated their declared-essential H.264 Patents. All of these patents are subject to the RAND commitment. Nineteen additional companies have provided "blanket" LOAs to the ITU obligating their patents to the RAND commitment. (*See* Ex. 1544.)

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v. Motorola's Contributions to the Development of the H.264 Standard

158. Motorola did not contribute to the VCEG draft H.264 design that MPEG evaluated in July 2001. (*See* 11/19/12 Tr. at 22 (Luthra Testimony).)

159. Rather, Motorola became interested in VCEG's work around mid-2001. (11/13/12 Tr. at 215 (Sullivan Testimony); Ex. 420 at 1; 11/19/12 Tr. at 21 (Luthra Testimony).) Motorola made its initial proposal at the first meeting of the JVT in December 2001, after MPEG and VCEG had already joined forces. (11/13/12 Tr. at 216 (Sullivan Testimony).) Additionally, Motorola employee Dr. Ajay Luthra began serving as one of the co-chairs of the JVT.[8] (Ex. 424 at MOTM_WASH1823_0336722.)

160. 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.264 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. at 215 (Sullivan Testimony).)

161. The JVT adopted Motorola contributions into the H.264 Standard related to interlaced video. (11/14/12 Tr. at 109 (Orchard Testimony); 11/14/12 Tr. at 12 (Sullivan Testimony); 11/19/12 Tr. at 50-51 (Drabik Testimony).) After the JVT was formed, Motorola submitted 25 proposals, 18 of which related to interlaced video and seven of

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[8] The court cannot ascertain at what point in the development of the H.264 Standard Dr. Luthra became involved. It appears Dr. Luthra's involvement began at the time of, or soon after, the creation of the JVT. (11/13/12 Tr. at 215 (Sullivan Testimony).)

which related to wavelet coding. (11/14/12 Tr. 108-09 (Orchard Testimony).) The JVT did not adopt Motorola's wavelet coding contributions into the H.264 Standard. (*Id.*) The JVT did, however, adopt Motorola's contributions related to interlaced video, including PICAFF and MBAFF. (*Id.* at 119-20.)

162. Accordingly, Motorola's role in H.264 development related almost entirely to interlaced video. (11/14/12 Tr. at 12 (Sullivan Testimony); 11/14/12 Tr. at 12, 109 (Orchard Testimony); Ex. 420 at 1.)

E. Motorola's Patents

163. There are 16 Motorola U.S. patents, and many foreign counterparts to those patents, that are essential to the practice of the H.264 Standard. These 16 patents are distributed among 6 patent "families." (11/19/12 Tr. at 25:18-19 (Drabik Testimony).)

Family	**U.S. Patent**
1. Krause Family	5,235,419 (Ex. 270)
2. Wu Family	5,376,968 (Ex. 283)
3. Eifrig Family	6,005,980 (Ex. 268)
4. MBAFF Family	6,980,596 (Ex. 271) 7,310,374 (Ex. 272) 7,310,375 (Ex. 273) 7,310,376 (Ex. 274) 7,310,377 (Ex. 275) 7,421,025 (Ex. 276) 7,477,690 (Ex. 277) 7,817,718 (Ex. 278)
5. PAFF Family	7,769,087 (Ex. 281) 7,660,353 (Ex. 280) 7,839,931 (Ex. 282)
6. Scan Family	7,162,094 (Ex. 266) 6,987,888 (Ex. 265)

164. The six families of Motorola H.264 essential patents are directed to: (a) prediction, (b) adaptive frame/field coding, and (c) transform/quantization. The Krause, Wu, and Eifrig Families are directed to prediction. The MBAFF and PAFF Families are directed to adaptive frame/field coding. The Scan Family is directed to transform/quantization.

i. The Krause Patent Family

165. The Krause Family consists of U.S. Patent No. 5,235,419 (the '419 Patent), and foreign counterparts 2079862 (CA), EP0538667 (GB, GER, FR), 2875117 (JP), and 264507(KR). (Ex. 270; Ex. 2 at 17; 11/19/12 Tr. at 26:3-19 (Drabik Testimony).)

166. The '419 patent discloses adaptive video compression using a plurality of motion compensators to more effectively encode video data in which complex movements occur. (*See* Ex. 270 ('419 Patent) at Abstract, FIG. 1.)

167. The Krause Family is "essential" to the H.264 Standard at the Baseline, Main, and High profiles. (11/19/12 Tr. at 26:3-19, 36:18-37:17 (Drabik Testimony).)

168. **Importance to the Standard.** The Krause Family has technical value with respect to the H.264 Standard because it is directed to the core feature of prediction. It allows video encoders to encode video more efficiently by adaptively using the block size that results in the most compression of the video data. (11/19/12 Tr. at 27:22-28:17 (Drabik Testimony).) Likewise, it allows video decoders to retrieve a code word that indicates which block size the encoder used, and then use that code word to recover motion vectors. (*Id.*)

169. Motorola presented uncontroverted opinion evidence from Dr. Timothy Drabik that at least one claim of the '419 Patent is practiced by the H.264 Standard. (11/19/12 Tr. at 26:3-19 (Drabik Testimony).) The court credits this testimony, with one caveat: none of the terms comprising the claims of the '419 Patent have been construed by a court. Thus, Dr. Drabik's ultimate opinion requires the assumption that a court of law would construe the claim terms to cover a similar scope as used by Dr. Drabik in his analysis. *See generally Markman v. Westview Instruments, Inc.*, 517 U.S. 370, 372 (1996) (placing sole responsibility for construing patent claims on the court); *Cybor Corp. v. FAS Tech., Inc.*, 138 F.3d 1448, 1456 (Fed. Cir. 1998) (establishing that the court construes claims purely as a matter of law).

170. Motorola presented undisputed evidence that the '419 Patent contributed to the 50 % coding gain reported for H.264 (progressive scan sequences only). (11/16/12 Tr. at 192:25-193:16 (Luthra Testimony); Ex. 424 at 574-75.)

171. The '419 Patent expired in October 2011, approximately a year after Motorola sent its letter to Microsoft offering to license Motorola's H.264 SEPs. (11/14/12 Tr. at 133 (Orchard Testimony); 11/19/12 Tr. at 56-57 (Drabik Testimony); Ex. 270.) During trial, Microsoft did not present sufficient evidence that, despite the relatively older age of the '419 Patent, it had lost importance to the H.264 Standard.

172. Microsoft did assert that the JVT could have adopted alternatives to the '419 Patent, including similar methods of motion compensation on blocks or sub-blocks described in Exhibits 1477, 633, 462, and 632. (11/14/12 Tr. at 135 (Orchard Testimony).) Microsoft did not, however, provide detail, aside from *ipse dixit* expert

testimony, as to how these alternatives would have fully replaced the '419 Patent or how they would have affected related aspects of the H.264 Standard. Moreover, the court concludes, on the evidence before it, that Motorola, through its expert Dr. Drabik, has provided sufficient evidence and explanation as to why the Krause Family of patents are superior in functionality to any of the alternatives set forth by Microsoft. (*See* 11/19/12 Tr. at 25, 44-45 (Drabik Testimony).)

173. The court has examined the specification of the '419 Patent and concludes that it only discloses specific hardware implementations of the means-plus-function elements. (11/14/12 Tr. at 134-35 (Orchard Testimony).) According to Microsoft expert Dr. Michael Orchard, at the time the application for the '419 Patent was filed, one of ordinary skill would not understand the '419 Patent to disclose software structures. (*See id.*) Although Motorola's expert, Dr. Drabik, testified that the '419 Patent specification used the word "algorithm," Motorola did not identify an actual software algorithm disclosed by the specification, and the court can find none. *See Aristocrat Techs. Austl. Pty Ltd. v. Int'l Game Tech.*, 521 F.3d 1328, 1333 (Fed. Cir. 2008) ("[I]n a means-plus-function claim 'in which the disclosed structure is a computer, or microprocessor, programmed to carry out an algorithm, the disclosed structure is not the general purpose computer, but rather the special purpose computer programmed to perform the disclosed algorithm.'" (quoting *WMS Gaming, Inc. v. Int'l Game Tech.*, 184 F.3d 1339, 1349 (1999))); (*see* 11/19/12 Tr. at 41 (Drabik Testimony)). Thus, Motorola presented no evidence that the specification of the '419 Patent 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) corresponding to the means-plus-function claim limitations. Thus, the '419 Patent contributes to the standard, but its contribution is limited to implementation of the standard through hardware.

ii. The Wu Patent Family

174. The Wu Family of patents consists of U.S. Patent No. 5,376,968 (the '968 Patent) and foreign counterparts 663671(AU), 2118668(CA), EP0615384 (FR, GER, GB, IRE, NETH, ES, SWED), 2945268(JP), 187606(MX), 311960(NOR), 244827(KR), and NI-084114(TAI). (Ex. 283; Ex. 2 at 19; 11/19/12 Tr. at 26:3-19 (Drabik Testimony).)

175. The '968 Patent discloses a system that enables compression of video data by providing adaptive video compression using a plurality of compression modes. (Ex. 283 ('968 Patent) at Abstract, Fig. 1; 11/19/12 Tr. at 29:3-13 (Drabik Testimony).) Specifically, the patent discloses that compression can occur on an entire block or indicate with a code that the block should be broken up into sub-blocks. (11/14/12 Tr. at 138 (Orchard Testimony).)

176. The Wu Family of patents is "essential" to the H.264 Standard at the Baseline, Main, and High profiles. (11/19/12 Tr. at 26:3-19, 36:18-37:17 (Drabik Testimony).)

177. **Importance to the Standard.** The Wu Family has technical value to the H.264 Standard because it is directed to the core H.264 feature of prediction. The Wu Family patents provide flexibility in adaptively choosing compression modes leading to enhanced coding efficiency. (11/19/12 Tr. at 29:3-13 (Drabik Testimony).) Likewise,

the Wu Family patents allow video decoders to retrieve overhead data so that they know the compression mode used by the encoder and can perform the appropriate decompression corresponding to that compression mode. (*Id.*)

178. At trial, Motorola presented uncontested opinion evidence from Dr. Timothy Drabik that at least one claim of the '968 Patent covers adaptive compression as employed by the H.264 Standard. (11/19/12 Tr. at 26:3-19 (Drabik Testimony).) Like with the '419 Patent, the court credits this testimony with the caveat that none of the terms comprising the claims of the '968 Patent have been construed by a court. Thus, Dr. Drabik's ultimate opinion requires the assumption that a court of law would construe the claim terms to cover a similar scope as Dr. Drabik used in his analysis.

179. Motorola presented uncontroverted evidence that the technology claimed in the '968 patent contributed to the 50 % coding gain reported for H.264 (progressive scan sequences only). (11/16/12 Tr. at 192:25-193:11 (Luthra Testimony); Ex. 424 at 574-75.)

180. The '968 Patent expired March 11, 2013, approximately two and a half years after Motorola sent its letter to Microsoft offering to license Motorola's H.264 SEPs. (*See* 11/14/12 Tr. at 138 (Orchard Testimony); Ex. 283.) Similar to evidence presented about the '419 Patent, during trial, Microsoft did not provide sufficient evidence that despite the relatively older age of the '968 Patent, it had lost importance to the H.264 Standard.

181. With respect to the '968 Patent, Microsoft asserted that alternatives could have been adopted by the JVT. Microsoft's suggested alternatives are found in Exhibits 462, 632, 633, and 1477. (11/14/12 Tr. at 135 (Orchard Testimony).) However,

Microsoft did not provide detail, aside from *ipse dixit* expert testimony, as to how these alternatives would have fully replaced the '968 Patent or how they would have affected related aspects of the H.264 Standard. (*See* 11/14/12 Tr. at 138-39 (Orchard Testimony) (opining, without explanation, that Microsoft's alternatives would practice or be equivalent to the '968 Patent).) Moreover, the court concludes on the evidence before it that Motorola, through its expert Dr. Drabik, has provided sufficient evidence and explanation as to why the Wu Family of patents are superior in functionality to any of the alternatives set forth by Microsoft. (*See* 11/19/12 Tr. at 45-46 (Drabik Testimony).)

182. As Microsoft points out, the claim of the '968 Patent, as analyzed by Dr. Drabik, covers adaptive compression as described by the H.264 Standard and contains means-plus-function limitations. (Ex. 283; 11/14/12 Tr. at 139 (Orchard Testimony).) The court has examined the specification of the '968 Patent and concludes that it only discloses specific hardware implementations corresponding to the means-plus-function elements. (*See* Ex. 283; 11/14/12 Tr. at 134-35 (Orchard Testimony).) According to Microsoft expert Dr. Orchard, at the time the application for the '968 Patent was filed, one of ordinary skill would not understand the '968 Patent to disclose software structures. (*See* 11/14/12 Tr. at 138 (Orchard Testimony).) Again, Motorola presented only the expert testimony of Dr. Drabik that the '968 Patent specification used the word "algorithm," but no evidence that the specification of the '968 Patent discloses an actual software structure or algorithm (or that the disclosed hardware structures would have been viewed by a person of ordinary skill as equivalent to software structures or algorithms) corresponding to the means-plus-function claim limitations.

183. Unlike the '419 Patent, the '968 Patent includes a claim, claim 16, which does not include means-plus-function limitations. Thus, on its face, claim 16 is not limited to the hardware structures disclosed in the '968 specification. Motorola did not, however, provide evidence that claim 16 of the '968 Patent covers the technology of the H.264 Standard. Nevertheless, the '968 Patent is declared essential to the H.264 Standard and thus parties negotiating over this claim may view this patent as applicable to both hardware and software implementation of the H.264 Standard.

184. Thus, the '968 Patent contributes to the coding and prediction efficiency of the H.264 Standard. It would be a point of contention between the parties to a hypothetical negotiation whether or not the patent's contribution relates only to software implementation or to both software and hardware implementation.

iii. The Eifrig Patent Family

185. The Eifrig Family consists of U.S. Patent No. 6,005,980 (the '980 Patent) and foreign counterparts 2230567(CA), 2702769(CA), and 245861(MX). (Ex. 268; Ex. 2 at 1; 11/19/12 Tr. at 26:3-19 (Drabik Testimony).)

186. The '980 Patent is directed to deriving a predictor motion vector ("PMV") for a block based on the motion vectors of that block's three neighboring blocks (left (A), top (B), and top-right (C)), where there is at least one field coded block. (11/19/12 Tr. at 30:6-16 (Drabik Testimony); 11/16/12 Tr. at 200:15-201:10 (Luthra Testimony).)

187. The Eifrig Family is declared "essential" to the H.264 Standard at the Main and High profiles, levels 2.1 to 4.1. (11/19/12 Tr. at 26:3-12, 37:6-9, 37:14-19 (Drabik Testimony).)

188. **Importance to the Standard.** The Eifrig Family has technical value to the H.264 Standard because it is directed to the core H.264 feature of prediction. It improves the coding gain over other choices of blocks for motion vector prediction. (11/19/12 Tr. at 30:4-23 (Drabik Testimony); 11/16/12 Tr. at 200:21-202:11 (Luthra Testimony).)

189. At trial, Motorola presented uncontested opinion evidence from Dr. Luthra that at least one claim of the '980 Patent covers deriving PMVs as described by the H.264 Standard. (11/16/12 Tr. at 200:15-202:11 (Luthra Testimony).) Like with the '419 Patent and '968 Patent, the court credits this testimony with the caveat that none of the terms comprising the claims of the '980 Patent have been construed by a court. Thus, Dr. Luthra's ultimate opinion rests on the assumption that a court of law would construe the claim terms to cover a similar scope as used by Dr. Luthra in his analysis.

190. During the development of the H.264 Standard, Motorola proposed to the JVT a technique for calculating a PMV for a block based on neighboring blocks, where the blocks are frame or field coded. (Ex. 423 (VCEG-O37) at 8; 11/16/12 Tr. at 199:10-200:14 (Luthra Testimony).)

191. Motorola's '980 Patent discloses Motorola's PMV invention: it calculates the PMV for a current block based on the motion vectors of the left, top, and top-right neighboring blocks, where one of the blocks is in field mode. (Ex. 268; 11/16/12 Tr. at 200:15-201:7 (Luthra Testimony).)

192. The JVT adopted Motorola's PMV invention into the H.264 Standard. (*See, e.g.*, Ex. 610 (H.264 Standard, April 2003) at 21 (Fig. 6-9); Ex. 421 (H.264

Standard, March 2010) at 31 (Fig. 6-14); 11/16/12 Tr. at 200:15-201:24 (Luthra Testimony).)

193. Microsoft and Motorola disagree as to whether the '980 Patent relates to only interlaced video (Microsoft's position) or to both interlaced video and progressive video (Motorola's position). In support of its position, Motorola contends that the '980 Patent relates to field coding and mixed frame/field coding, the latter of which would apply to progressive video. (*See* 11/19/12 Tr. at 54-55 (Drabik Testimony) (asserting that the '980 Patent relates to progressive or interlaced video).)

194. According to Motorola's expert, Dr. Drabik, the limitation of the '980 Patent is that one of the blocks must be field coded. (11/19/12 Tr. at 54 (Drabik Testimony).) The evidence before the court demonstrates that field coding is a tool applicable only to interlaced video. (11/14/12 Tr. at 105 (Orchard Testimony) (asserting it would be a mistake to field code progressive video); Ex. 424 (describing adaptive frame/field coding tools as used for interlaced coding).) Indeed, at his deposition, Dr. Drabik stated that the '980 Patent was used for interlaced video. (11/19/12 Tr. at 55 (Drabik Testimony).) Accordingly, the court concludes that the '980 Patent applies to only interlaced video, or at the very least would be a less efficient coding tool compared to other tools for coding progressive video.[9]

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[9] At trial, Dr. Drabik testified that interlaced coding tools could be invoked to decode progressive content and that there may be advantages to doing so. (11/19/12 Tr. at 63-64 (Drabik Testimony).) Dr. Drabik, however, did not identify any circumstance where this actually occurred. Although the court does not disagree that interlaced coding tools could be

195. Moreover, Microsoft presented convincing evidence that the '980 Patent disclosed prediction of motion using the same three blocks that the prior art used for progressive video. (11/14/12 Tr. at 130-31 (Orchard Testimony). In particular, the draft H.263 standard from May 1996 showed utilization of the same three blocks as used in the '980 Patent for motion prediction. (*Id.* at 132; Ex. 611.) Accordingly, the court concludes that 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. at 56 (Drabik Testimony); 11/14/12 Tr. at 131 (Orchard Testimony).)

196. Thus, even if the '980 Patent relates to both interlaced and progressive video, as Motorola argues, the improvements disclosed by the '980 Patent would not apply in the context of progressive video. Accordingly, the court concludes that the '980 Patent provides minimal technical advancements compared to the technology in existence prior to development of the H.264 Standard.

iv. The MBAFF Patent Family

197. The MBAFF Family consists of U.S. Patent Nos. 6,980,596 (the '596 Patent), 7,310,374 (the '374 Patent), 7,310,375 (the '375 Patent), 7,310,376 (the '376 Patent), 7,310,377 (the '377 Patent), 7,421,025 (the '025 Patent), 7,477,690 (the '690 Patent), and 7,817,718 (the '718 Patent) and foreign counterparts 2468087(CA), 10182726.9(EP), 10182629.5(EP), 10182686.5 (EP), 10182624.6(EP), 10182654.3(EP), 2804054.1(EP), 2009-244955(JP), 2008-234061(JP), 244982(MX), 20042544 (NOR),

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used to decode progressive video content, from the trial record, doing so is at the very least highly uncommon and not advantageous.

10-2004-7007762(KR). (Exs. 271-78; Ex. 2 at 2-17; 11/19/12 Tr. at 26:3-19 (Drabik Testimony).)

198. The '596 Patent is directed to AFF coding on a pair of macroblocks. (Ex. 271 ('596 Patent) at 7:32-8:6, FIG. 7.) This is referred to as macroblock adaptive frame/field ("MBAFF") coding in the H.264 Standard. (*See, e.g.*, Ex. 421 (H.264 Standard, March 2010) at 13, 29.) As stated previously, for purposes of this document, to distinguish the two types of MBAFF, pre-H.264 MBAFF technology is referred to as single macroblock MBAFF (11/14/12 Tr. at 120 (Orchard Testimony)), and the technology disclosed by the '596 Patent is referred to as paired macroblock MBAFF (11/14/12 Tr. at 120 (Orchard Testimony)).

199. The '374, '375, '376, '377, '025, '690, and '718 Patents are directed to the fundamental paired macroblock MBAFF technology combined with other prediction techniques that had already been developed such as intra prediction, inter prediction, macroblock skipping, and bi-prediction. (Ex. 272 ('374 Patent) at 9:9-14:36 (inter); Ex. 273 ('375 Patent) at 9:11-17, 14:41-17:2 (intra); Ex. 274 ('376 Patent) at 8:3-20 (horizontal or vertical scan path); Ex. 275 ('377 Patent) at 9:11-16:63 (intra and inter); Ex. 276 ('025 Patent) at 7:18-8:36 (smaller portions with a size that is a multiple of a pair of macroblocks); Ex. 277 ('690 Patent) at 12:38-65, 13:58-14:13 (skipped macroblock); Ex. 278 ('718 Patent) at 12:56-13:47 (bi-prediction).)

200. Motorola's MBAFF Patents—the '374, '375, '376, '377, '025, '690, and '718 Patents, along with the '590 Patent—all stem from the same initial patent

application, and they all share the same specification. (11/14/12 Tr. at 116 (Orchard Testimony); Exs. 271-78.)

201. The MBAFF Family of patents is "essential" to the H.264 Standard at the Main and High profiles, levels 2.1 to 4.1. (11/19/12 Tr. at 26:3-19, 31:22-32:3, 37:6-19 (Drabik Testimony).)

202. **Importance to the Standard.** The MBAFF Family is technically valuable because it is directed to the core H.264 features of AFF coding and prediction. It provides coding gain through the use of macroblock pairs, which permit prediction on all seven block sizes in frame and field mode. (11/19/12 Tr. at 30:24-32:3 (Drabik Testimony); Ex. 424 at 566-68; Ex. 574 (Marpe paper) at 136-37 (describing MBAFF as a "main innovative feature" of H.264); 11/14/12 Tr. at 27:23-28:6, 28:22-29:4, 31:21-32:14 (Sullivan Testimony).)

203. At trial, Motorola presented uncontested opinion evidence from Dr. Luthra and Dr. Drabik that at least one claim of each of the MBAFF Patents covers the MBAFF and prediction techniques described by the H.264 Standard. (11/19/12 Tr. at 26:3-19 (Drabik Testimony); 11/16/12 Tr. at 210:4-11 (Luthra Testimony).) As before, the court credits this testimony with the caveat that none of the terms comprising the claims in each of the MBAFF Patents have been construed by a court. Thus, Dr. Luthra's and Dr. Drabik's ultimate opinions rest on the assumption that a court of law would construe the claim terms to cover a similar scope as used by Dr. Luthra and Dr. Drabik in their analyses.

204. It is important to make clear, however, that Motorola did not invent MBAFF. (11/14/12 Tr. at 12 (Sullivan Testimony).) By the time Motorola filed its patent application for its MBAFF patents, MBAFF technology had been used to compress video in prior video standards, such as the MPEG-2 Standard and the MPEG-4 Standard. (*Id.*) Microsoft presented evidence that, in terms of functionality and performance, MBAFF in H.264 is essentially the same as MBAFF in MPEG-2. (*Id.* at 50, 56-57, 59.) Instead, Motorola's MBAFF Family patents relate to paired macroblock MBAFF, and its contribution is determined by the importance of paired macroblock MBAFF to the H.264 Standard.

205. The coding gain achieved by Motorola's paired macroblock MBAFF invention is documented in contribution documents submitted to the JVT by Motorola and third parties during the development of the H.264 Standard. Motorola submitted its first proposal regarding MBAFF for the January 2002 JVT meeting in Geneva, Switzerland, using the name "Super MB" to discuss paired macroblock MBAFF. (Ex. 2209 (JVT-B106) at 3 ("Super MB is therefore introduced as follows. Input frame is divided into super MB consisting of 2 MBs of 16x16, as shown in Fig. 4. A super MB of 32x16 can be coded as two frame MBs of 16x16, or one top-field MB of 16x16 and one bottom-field MB of 16x16. For frame coding, a super MB is coded as two frame MBs and each of two MBs can be further divided into one of seven modes (Fig. 2). For field coding, a super MB is first split into one top-field MB and one bottom-field MB, as shown in Fig. 5. The top-field, or the bottom-field, MB is further divided into one of seven block patterns (modes 1a - 7a), as shown in Fig. 5. The block size in the seven

modes can be 16x16, 16x8, 8x16, 8x8, 8x4, 4x8 or 4x4,—the same as for frame MB (Fig. 2)."); 11/16/12 Tr. at 205:1-207:12 (Luthra Testimony).)

206. At the JVT meeting in Geneva, Motorola presented test results on its paired macroblock MBAFF invention. The graph in Figure 11 of Motorola's JVT-B106 submission shows a "20 percent improvement with MB pair AFF in comparison to picture AFF". (Ex. 2209 at 10; 11/16/12 Tr. at 205:1-206:22 (Luthra Testimony).) In JVT-B106, Motorola compared MBAFF to PAFF because it was "generally comparing to the current state of the standard." (11/16/12 Tr. at 206:23-207:5, 197:25-198:13 (Luthra Testimony) ("[G]enerally the benchmark was the current state of the standard at that stage" because "[a] key goal of the standard was to improve the coding efficiency. And for the committee to be able to understand whether to adopt a proposal or not, a key criteria was whether it improves the coding efficien[cy] or not. So that's why generally we use the current state of the standard, so we could show that a given proposal improved the coding efficiency in comparison to that.").)

207. Dr. Luthra testified that, "When [Motorola] described our MB pair AFF proposal the committee liked it very much, and they enthusiastically embraced it." (11/16/12 Tr. at 207:6-12 (Luthra Testimony).) The JVT concluded that Motorola's MBAFF proposal "[s]hows good potential for the sequences where the pictures have mixed motion types." (Ex. 2216 at 28.)

208. In May 2002, Motorola presented additional paired macroblock MBAFF test results in JVT-C139 for the JVT meeting in Fairfax, Virginia. Consistent with the B106 results, these test results demonstrated improved coding efficiency by up to 18 %

over the PAFF technique in the draft standard: "MB/picture level adaptive coding provides the best performance (up to about 18 % savings in the bit rate over current technology in WD2r8 [6])." (Ex. 674 (JVT-C139) at 1; 11/16/12 Tr. at 207:20-208:12 (Luthra Testimony); *see also* Ex. 424 at 568 ("During the development of the standard, MBAFF was reported to reduce bit rates in the range of 14 to 16 % over PAFF for ITU-R 601 resolution sequences like "Mobile and Calendar" and "MPEG-4 World News.").)

209. Following Motorola's proposals, third-party video coding experts verified the improved efficiency gains provided by Motorola's paired macroblock MBAFF invention and recommended MBAFF for adoption into the H.264 Standard. Sony stated: "We regard this feature [MBAFF] important for developing SDTV/HDTV applications with JVT coding technology. This contribution provides supportive information of MB-level field/frame adaptive coding. We reccomend [sic] the proposal be adopted." (Ex. 2274 (JVT-D081) at 1; 11/16/12 Tr. at 208:13-209:11 (Luthra Testimony).) VideoTele stated: "Our simulation results support that macroblock-level frame/field adaptive coding is a useful technique in the JVT standard, giving a bit rate savings of 11 % to 18 % on the two sequences tested." (Ex. 2227 (JVT-E067) at 4; 11/16/12 Tr. at 209:12-210:3 (Luthra Testimony).)

210. The JVT adopted Motorola's proposed paired macroblock MBAFF technique into the H.264 Standard. (*See, e.g.*, Ex. 610 (H.264 Standard, March 2003) at 16; Ex. 421 (H.264 Standard, March 2010) at 25; 11/16/12 Tr. at 210:4-8 (Luthra Testimony).)

211. Despite the preceding evidence that Motorola's paired macroblock MBAFF technique provided technical advancement to the H.264 Standard, Microsoft asserts that an alternative to the paired macroblock MBAFF would have been the single macroblock MBAFF as used in MPEG-2. (11/14/12 Tr. at 120-21 (Orchard Testimony); Exs. 782, 785.)

212. Moreover, as Microsoft correctly points out, Motorola provided no evidence that paired macroblock MBAFF performs any better than single macroblock MBAFF. (11/14/12 Tr. at 121 (Orchard Testimony); 11/14/12 Tr. at 51-52 (Sullivan Testimony).) Instead, as shown above, 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 or using PICAFF.

213. The only evidence relevant to a comparison between single macroblock MBAFF and paired macroblock MBAFF demonstrates that 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. at 202 (Luthra Testimony)), while Exhibit 2209 reports a Motorola comparison of paired macroblock MBAFF to PICAFF (*id.* at 205). The graphs in those exhibits show the efficiency gain of the MBAFF types over PICAFF. (*Id.* at 206.) One video, "Mobile (IP)", was used in both sets of tests. (Ex. 423 at 16; Ex. 2209 at 9.)

214. 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 9.1 %: (2804 - 2569)/2569. (Ex. 423 at 16.)

215. 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 5.3 %: (4400 - 4175)/4175. (Ex. 2209 at 9.) These results—while minimally conclusive without direct comparison between paired macroblock MBAFF and single macroblock MBAFF—suggest that the paired macroblock approach that Motorola advocated was, in fact, inferior to single macroblock MBAFF.

216. Nevertheless, the court credits the inherent value to Motorola's paired macroblock MBAFF invention for two reasons. First, simple logic suggests that Motorola's paired macroblock MBAFF is superior to single macroblock MBAFF in that paired macroblock MBAFF provides greater flexibility in terms of possible macroblock coding options. Second, the JVT was well aware of single macroblock MBAFF due to its use in MPEG-2, but nevertheless chose to incorporate paired macroblock MBAFF into the H.264 Standard.

217. Thus, the court concludes based on the evidence before it that paired macroblock MBAFF has technical value to the H.264 Standard. This technical value is diminished by the alternative of single macroblock MBAFF. It is also diminished by the court's earlier conclusion that such MBAFF technology is directed towards interlaced video as opposed to both interlaced and progressive video. (*See supra* ¶ 127; 11/14/12

Tr. at 120 (Orchard Testimony); Ex. 424 at MOTM_WASH1823_0336712 (describing MBAFF as a tool used in interlaced coding).) Parties to a hypothetical negotiation would consider the importance of Motorola's MBAFF patents in this context.

218. Finally, the entirety of Motorola's MBAFF Patent Family—the '374, '375, '376, '377, '025, '690, and '718 Patents, along with the '590 Patent—amounts to a single invention, paired macroblock MBAFF, applied to various coding tools incorporated into the H.264 Standard. These tools include intra prediction, inter prediction, macroblock skipping, and bi-prediction. Indeed, all of Motorola's MBAFF patents stem from the same initial patent application and share the same specification. (11/14/12 Tr. at 116 (Orchard Testimony); Exs. 271-78.) The court concludes that parties to a hypothetical negotiation would value Motorola's MBAFF Patent Family recognizing that, cumulatively, the patent family provides only one core innovative function.

v. The PAFF Patent Family

219. The PAFF Family consists of U.S. Patent Nos. 7,769,087 (the '087 Patent), 7,660,353 (the '353 Patent), and 7,839,931 (the '931 Patent) and foreign counterparts 2468086(CA), 200910254137.9(CN), 200910254136.4(CN), 200910254135.X(CN), ZL02827402.4(CN), 200910254134.5(CN), 10182595.8(EP), 10182605.5(EP), 10182643.6 (EP), 10183042(EP), 2804044.2(EP), 2003-548552(JP), MX/a/2008/001309(MX), MX/a/2008/001308(MX), MX/a/2008/001311(MX), MX/a/2008/001312(MX), 253886(MX), 20042543(NOR), 10-2010-7006173(KR), and 10-2004-7007734(KR). (Exs. 280-82; Ex. 2 at 20-23; 11/19/12 Tr. at 26:3-19 (Drabik Testimony).)

220. These patents share the same specification and stem from the same original patent application. (*See* 11/14/12 Tr. at 116 (Orchard Testimony); Exs. 280-82).)

221. The '087 patent is directed to deciding, on a picture-by-picture basis, whether to code a bi-predicted picture in a frame mode or in a field mode. It is used where the picture has two motion vectors, which can both point in the forward or backward direction (i.e., both can refer to earlier or later pictures/fields). (Ex. 281 ('087 Patent) at Abstract, Fig. 11.)

222. The '353 Patent is directed to deciding, on a picture-by-picture basis, whether to code a bi-predicted picture in frame mode or in field mode. It is used where the picture has two motion vectors, the second of which is encoded as an offset of the first. (Ex. 280 ('353 Patent) at Abstract, Fig. 11.)

223. The '931 Patent is directed to deciding, on a picture-by-picture basis, whether to code a picture in frame mode or in field mode. It is used where the reference pictures are indexed. (Ex. 282 ('931 Patent) at Abstract, Fig. 11.)

224. The PAFF Family is "essential" to the H.264 Standard at the Main and High profiles, levels 2.1 to 4.1. (11/19/12 Tr. at 26:3-19, 31:22-32:22, 37:6-19 (Drabik Testimony).)

225. **Importance to the Standard.** The PAFF Family is technically valuable because it is directed to core features of the H.264 Standard—coding and prediction. It provides coding gain by applying PAFF to "bi-predicted" pictures (pictures having two motion vectors) through flexibility not found in prior PAFF methods. (11/19/12 Tr. at 32:7-22 (Drabik Testimony); 11/16/12 Tr. at 210:12-212:16 (Luthra Testimony).)

226. At trial, Motorola presented uncontested opinion evidence from Dr. Luthra and Dr. Drabik that at least one claim of each of the PAFF patents covers the PAFF techniques described by the H.264 Standard. (11/19/12 Tr. at 26:3-19 (Drabik Testimony); 11/16/12 Tr. at 212:17-22 (Luthra Testimony).) As before, the court credits this testimony with the caveat that none of the terms comprising the claims in each of the PAFF Patents have been construed by a court. Thus, Dr. Luthra's and Dr. Drabik's ultimate opinions rest on the assumption that a court of law would construe the claim terms to cover a similar scope as used by Dr. Luthra and Dr. Drabik in their analyses.

227. During the development of the H.264 Standard, Motorola submitted written proposals to the JVT regarding its improved PAFF inventions. (Ex. 654 (JVT-B071) at 5 (Fig. 3); 11/16/12 Tr. at 210:12-212:16 (Luthra Testimony).)

228. Motorola's test results demonstrated that PAFF improved coding efficiency by up to 20-30 % over the frame and field coding in the draft standard. (Ex. 654 (JVT-B071) at 1 ("[PAFF] guarantees a performance over frame and field coding"), 5, Fig. 23; 11/16/12 Tr. at 210:12-212:5 (Luthra Testimony); Ex. 424 at 567 ("During the development of the H.264/AVC standard, PAFF coding was reported to reduce bit rates in the range of 16 % to 20 % over frame-only coding mode for ITU-R 601 resolution sequences like 'Canoa,' 'Rugby', etc.").)

229. Motorola's PAFF inventions further improved coding efficiency because being able to choose two reference pictures in the future or two reference pictures in the past provided more flexibility than being limited to choosing one reference picture in the

future and one in the past. (11/16/12 Tr. at 210:12-212:22 (Luthra Testimony); 11/19/12 Tr. at 32:4-22 (Drabik Testimony).)

230. The JVT adopted Motorola's proposed PAFF techniques into the H.264 Standard. (11/16/12 Tr. at 212:17-19 (Luthra Testimony).)

231. Microsoft contends that Motorola's PAFF patents are unimportant to the H.264 Standard because single macroblock MBAFF was an acceptable alternative. (11/14/12 Tr. at 124 (Orchard Testimony).)

232. Microsoft also contends that Motorola's PAFF Patent Family is unimportant to the H.264 Standard because Motorola's patented PAFF technology was proposed for use in the MPEG-2 standard between 1991 and 1992 and there is no significant difference in the type or performance of PAFF in H.264 as compared with PAFF in the prior standards. (*Id.* at 105, 123; 11/14/12 Tr. at 13, 50 (Sullivan Testimony).)

233. Microsoft, however, provides only *ipse dixit* expert testimony that there was no significant difference between PAFF in the H.264 Standard compared with prior standards. Moreover, the court concludes on the evidence before it that Motorola, through its expert Dr. Luthra, has provided sufficient evidence and explanation as to why the PAFF Family of patents provides superior functionality to that employed by prior standards. For instance, Dr. Luthra testified that PAFF as it existed in MPEG-2 does not disclose a suitable alternative to the '087 Patent because it did not permit the additional flexibility of how motion is estimated and motion vectors are compressed that Motorola's

PAFF inventions provided, and therefore had worse efficiency. (11/16/12 Tr. at 211:4-212:16 (Luthra Testimony).)

234. Additionally, Microsoft contends that single macroblock MBAFF as was employed in MPEG-2 was available to the JVT during development of the H.264 Standard and could have been used as an alternative to Motorola's PAFF Patent Family without performance degradation. (11/14/12 Tr. at 124 (Orchard Testimony); Exs. 782, 785, 1479.)

235. Microsoft asserts that Motorola's own test results show that PAFF performs worse than single macroblock MBAFF. (11/14/12 Tr. at 124-25 (Orchard Testimony); Ex. 423 at 12-16.) Based on the evidence before it, the court disagrees. As Motorola correctly explains, the test results Microsoft relies on (provided in VCEG-O37) are irrelevant to Motorola's improved PAFF Patent Family because they were based on PAFF found in earlier standards, not Motorola's improved PAFF. (11/16/12 Tr. at 203:7-18 (Luthra Testimony).) The VCEG-O37 contains no test results for single macroblock adaptive frame/field ("AFF") using bi-predicted pictures, which is an element of Motorola's PAFF patent claims. (Ex. 423 at 10-11 (under "Results for I, P and B," VCEG-O37 states: "Simulations on MB and picture levels are still in progress.").)

236. Moreover, based on the evidence, Microsoft has not shown that the single macroblock AFF technique that was used in MPEG-2 was a comparable alternative. VCEG-N76 discloses the prior art single macroblock AFF technique that had only five block sizes (excluding 16×16 and 8×16) available in field mode. (Ex. 785 at 3.) AFF coding on a single macroblock as in VCEG-N57r2 and VCEG-N76 does not disclose a

suitable alternative to Motorola's PAFF inventions because the block sizes of 16×16 and 8×16 are not available for a single macroblock in field mode, and therefore would result in less efficient compression. (Ex. 785 at 3.)

237. Thus, the court concludes based on the evidence before it that Motorola's PAFF Patent Family has technical value to the H.264 Standard. This technical value, however, is diminished by the court's earlier conclusion that such PAFF technology is directed only towards interlaced video as opposed to both interlaced and progressive video. (*See supra* ¶ 126; 11/14/12 Tr. at 120 (Orchard Testimony); Ex. 424 at MOTM_WASH1823_0336712 (describing PAFF as a tool used in interlaced coding).) Parties to a hypothetical negotiation would consider the importance of Motorola's PAFF patents in this context.

238. Finally, the entirety of Motorola's PAFF Patent Family—the '087, '931, and '353 Patents—amounts to a single invention, PAFF, applied to various coding and prediction tools incorporated into the H.264 Standard. Indeed, like Motorola's MBAFF Patents, Motorola's PAFF Patents stem from the same initial patent application and share the same specification. The court, therefore, concludes that parties to a hypothetical would value Motorola's PAFF Patent Family recognizing that cumulatively the patent family provides one core innovative function.

vi. The Scan Patent Family

239. Motorola's Scan Family consists of U.S. Patent Nos. 7,162,094 (the '094 Patent) and 6,987,888 (the '888 Patent). (Exs. 265-66; Ex. 2 at 18; 11/19/12 Tr. at 26:3-

19 (Drabik Testimony).) Motorola's Scan Family patents share the same specification. (11/14/12 Tr. at 116 (Orchard Testimony); Exs. 265-66.)

240. The '094 Patent discloses FIG. 6 as an embodiment of the invention, which shows a preferable scanning pattern for a 4×4 pixel block's frequency coefficient array. (Ex. 266 ('094 Patent) at 8:42-54, 9:12-45, FIG. 6.)

241. The '888 patent discloses FIG. 9 as an embodiment of the invention, which shows a preferable scanning pattern for a 8×8 pixel block's frequency coefficient array. (Ex. 265 ('888 Patent) at 8:44-54, 11:24-12:35, FIG. 9.)

242. The '094 Patent is "essential" to the H.264 Standard at the Main and High profiles, levels 2.1 to 4.1. (11/19/12 Tr. at 26:3-19, 37:6-19 (Drabik Testimony).) The '888 Patent is "essential" to the H.264 Standard at the High profile, levels 2.1 to 4.1. (*Id.* at 26:3-19, 37:6-19; 11/16/12 Tr. at 214:18-25 (Luthra Testimony).)

243. **Importance to the Standard.** The Scan Family is technically valuable because it is directed to the core features the H.264 Standard of transform and quantization. (11/19/12 Tr. at 32:23-33:18 (Drabik Testimony).) The claimed 4×4 and 8×8 scan patterns improve coding efficiency. (*Id.* at 32:23-33:18; 11/16/12 Tr. at 213:14-214:11 (Luthra Testimony).)

244. At trial, Motorola presented uncontested opinion evidence from Dr. Luthra and Dr. Drabik that at least one claim of the '094 patent covers the 4×4 field scan described by the H.264 Standard. (Ex. 421 (H.264 Standard, March 2010) at 179-80 (8.5.6, Fig. 8-8(b), Table 8-13); 11/19/12 Tr. at 26:3-19 (Drabik Testimony); 11/16/12 Tr. at 214:12-25 (Luthra Testimony); Ex. 610 (H.264 Standard, April 2003) at 135.)

Likewise, Motorola presented uncontested evidence from the same experts that at least one claim of the '888 patent covers the 8×8 field scan described by the H.264 Standard. (11/19/12 Tr. at 26:3-19 (Drabik Testimony); 11/16/12 Tr. at 214:18-25 (Luthra Testimony); Ex. 421 (H.264 Standard, March 210) at 180-81 (8.5.7, Fig. 8-9(b), Table 8-14).) Again, the court credits this testimony with the caveat that none of the terms comprising the claims in each of the Scan Family Patents have been construed by a court. Thus, Dr. Luthra's and Dr. Drabik's ultimate opinions rest on the assumption that a court of law would construe the claim terms to cover a similar scope as used by Dr. Luthra and Dr. Drabik in their analyses.

245. During the development of the H.264 Standard, Motorola submitted written proposals to the JVT regarding its 4×4 and 8×8 scans. (Ex. 675 (JVT-C140); 11/16/12 Tr. at 213:2-19 (Luthra Testimony).)

246. Motorola's test results demonstrated that its scans improved coding efficiency by up to 7 % over the zig-zag scan in the draft standard: "Preliminary results with alternate scanning patterns have shown bitrate savings of up to about 7 %." (Ex. 675 (JVT-C140) at 1; *see also* 11/16/12 Tr. at 213:2-19 (Luthra Testimony).)

247. Third-party video coding experts from Samsung and Sony verified the improved efficiency gains provided by Motorola's 4×4 scan and recommended it for adoption in the H.264 Standard. Samsung and Sony stated: "The computer simulation carried out using the current JM2.1 codec with CVLC demonstrated that additional bit rate reduction (BDBR) of up to 8.64 % and 6.15 % on average is possible." (Ex. 2281 (JVT-D073) at 5; *see also* 11/16/12 Tr. at 213:20-214:3 (Luthra Testimony).) Sony

stated: "The simulation results show that by employing the proposed method[,] coding efficiency gain by up to 3 % will be obtained." (Ex. 710 (JVT-E118) at 2; *see* also 11/16/12 Tr. at 214:4-11 (Luthra Testimony).)

248. The JVT adopted Motorola's proposed scans into the H.264 Standard. (11/16/12 Tr. at 214:12-25 (Luthra Testimony).)

249. Microsoft and Motorola disagree as to whether Motorola's Scan Family Patents relate only to interlaced video (Microsoft's position) or to both interlaced video and progressive video (Motorola's position). (11/14/12 Tr. at 125 (Orchard Testimony (stating Microsoft's position)); 11/19/12 Tr. at 32:23-33:18 (Drabik Testimony (stating Motorola's position)).)

250. At trial, Dr. Drabik testified that Motorola's Scan Family Patents relate to any field-coded material, regardless of whether that material was progressive or interlaced as initially captured. (11/19/12 Tr. at 33 (Drabik Testimony).) The uncontroverted evidence before the court, however, is that field coding is a tool applicable only to interlaced video. (11/14/12 Tr. at 105 (Orchard Testimony) (asserting it would be a mistake to field code progressive video); Ex. 424 (describing adaptive frame/field coding tools as used for interlaced coding).) Accordingly, the court concludes that the Scan Family Patents apply to only interlaced video, or at the very least would be a significantly less efficient coding tool compared to other available tools for coding progressive video.

251. Microsoft contends that the JVT had alternatives to the scan paths in Motorola's patents that could have been used in the H.264 Standard instead. Sony

proposed its own 4×4 alternate scan and the MPEG-2 8×8 alternate scan for use with interlaced video in H.264. (11/14/12 Tr. at 126 (Orchard Testimony) (citing Ex. 653); Ex. 653.)

252. Microsoft also contends that the natural and best alternative to Motorola's 4×4 scan of Exhibit 266 would have been the 4×4 scan path Sony proposed for the H.264 Standard. (*See* 11/14/12 Tr. at 126, 128 (Orchard Testimony); Ex. 653.) Microsoft correctly points out that Motorola provided no tests directly comparing 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. at 127, 128 (Orchard Testimony); Exs. 653, 710, 2281.) Moreover, Microsoft correctly explains that 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. at 127-30 (Orchard Testimony).) 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 they initially believed that they had copied a Sony scan. (Ex. 675 at 2 ("Since our data was also consistent with a 4×4 blocksize as described in [Exhibit 653 (Sony alternate-scan proposal)], we used the same 4×4 alternate scan as used there.").)

253. With respect to Motorola's 8×8 scan path, Microsoft asserts that the best alternative would have been the MPEG-2 8×8 alternate scan proposed to the JVT by Sony. (11/14/12 Tr. at 126 (Orchard Testimony) (citing Ex. 653); Ex. 653.) Again,

Microsoft correctly points out that Motorola provided no test results comparing the Motorola 8×8 scan path to the MPEG-2 alternative.

254. Indeed, the documents Motorola cited in its trial brief 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 alternate scans with the progressive zigzag scan path on interlaced video. (11/14/12 Tr. at 128-29 (Orchard Testimony); Ex. 2281; Ex 710.) The progressive zigzag scan path was known not to work well with interlaced video. (11/14/12 Tr. at 128 (Orchard Testimony); Exs. 2227, 2274.)

255. Here, Motorola does not explain beyond *ipse dixit* expert testimony why its Scan Family of patents would be superior to the alternatives cited by Microsoft. (*See* 11/16/12 Tr. at 215:1-14 (Luthra Testimony) (asserting without explanation that "[t]his scan looks a lot more complex to me, compared to Motorola's scan.").) There is no concrete evidence, such as tests or logical explanation, before the court as to why the suggested alternatives could not have been incorporated into the H.264 Standard without degradation. Nevertheless, Motorola's Scan Patents were adopted by the JVT, and thus the court credits the judgment of the JVT in doing so.

256. Based on the foregoing, the court concludes that Motorola's Scan Patents provide technical value to the H.264 Standard as directed to a core feature of the standard, but that alternatives were available that may have provided similar technical value. Thus, parties to a hypothetical negotiation would consider the importance of

Motorola's Scan patents in this context. Moreover, parties to a hypothetical negotiation would view Motorola's Scan Patents as related to interlaced video only.

F. Motorola's H.264 Patents and Microsoft's Products

257. Factors 6, 8, 10, and 15 of the court's RAND-modified *Georgia-Pacific* analysis all require the court to examine the importance of Motorola's H.264 SEPs not only to the H.264 Standard itself, but also with respect to Microsoft's products. Indeed, an implementer would see little to no value in licensing a SEP if that patent did not cover a portion of the standard utilized by the implementer.

258. As an initial matter, although there is clear value to implementers, such as Microsoft, to offer products compliant with the H.264 Standard, this value reflects the value of standard compliance and interoperability, not the value of any individual patents. (11/13/12 Tr. at 34 (DeVaan Testimony); 11/15/12 Tr. at 21 (Del Castillo Testimony).) The court concludes that under a RAND obligation, reasonable parties in a hypothetical negotiation would not consider the value associated with incorporation of the patented technology into the standard. Instead, the negotiating parties would consider only the economic value of the patented technology—based on the technology's contribution to the standard and to the implementer's product itself—apart from the value associated with the standard. (11/13/12 Tr. at 151:19-153:21 (Murphy Testimony).)

259. At trial, Motorola mentioned that the following Microsoft products used the H.264 Standard: Windows, Xbox, Silverlight, Zune, Lync, and Skype. Based on the evidence presented at trial, the court will examine each of these products in turn to

determine the importance of Motorola's H.264 SEPs to the overall functionality of the product.

260. Before doing so, however, having already concluded that 14 of the 16 Motorola H.264 SEPs are directed only to interlaced video, the court will discuss the importance of interlaced video to Microsoft's products. Then, on a product-by-product basis, the court will examine the value of all of Motorola's 16 SEPs vis-à-vis Microsoft's products.

i. Importance of Interlaced Video in the Marketplace

261. In this section, the court recounts the evidence submitted at trial related to the importance of interlaced video in the marketplace. Based on the evidence, the court concludes that despite ample opportunity to do so at trial, Motorola presented little evidence that users of Microsoft products commonly encounter interlaced H.264 video. The court also concludes that although interlaced video is becoming less prevalent in the market, Motorola demonstrated that support for interlaced video in coding tools is important to Microsoft.

262. First, the evidence at trial demonstrated that Microsoft does not support interlaced H.264 video in many of its products. For example, 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. at 20-21 (Del Castillo Testimony); 11/14/12 Tr. at 150-51 (Orchard Testimony).)

263. 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 available. (11/15/12 Tr. at 24, 33 (Del Castillo Testimony).) For purposes of comparison, over 35 million Xbox units have been sold. (*Id.* at 24.)

264. Second, it does not appear that major content providers often use interlaced video. For example, Motorola's parent company, Google, does not support interlaced H.264 video in its products. Although Motorola's expert, Dr. Drabik, 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. at 65 (Drabik Testimony).)

265. As another example, Google's Android operating system also does not support interlaced H.264 video. Instead, Android 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. at 19-20 (Sullivan Testimony).)

266. Similarly, the company Hulu has no interlaced video content. (11/14/12 Tr. at 147, 149 (Orchard Testimony).)

267. Motorola expert Michael Dansky offered his opinion as to the importance of interlaced H.264 video, discussing Exhibits 2768, 2249, 2724, and 2342. (11/20/12 Tr. at 18-21 (Dansky Testimony).) The exhibits cited by Mr. Dansky, however, do not relate to interlaced H.264. 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 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.)

268. Moreover, much of the testimony and evidence presented by Motorola's experts related not to the importance of the technologies allegedly covered by Motorola's H.264 SEPs, but to the general importance of the H.264 Standard to Microsoft's products. For example, Motorola expert Mr. Dansky did not discuss any particular Motorola patent. (11/19/12 Tr. at 206:4-219:23 (Dansky Testimony); 11/20/12 Tr. at 8:16-23:6 (Dansky Testimony).) Rather, Mr. Dansky presented testimony solely relating to the importance of the H.264 Standards to Microsoft's products. (*See, e.g.*, 11/20/12 Tr. at 17:15-22 (Dansky Testimony) (discussing that the "H.264 [S]tandard 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"); 11/20/12 Tr. at 17:23 - 18:2 (Dansky Testimony) (discussing importance of H.264 for tablets and smartphones); Ex. 2724 (discussing importance of H.264 video to the Xbox).)

269. As explained above, Mr. Dansky's approach thus reflects an improper attempt by Motorola to capture the value of the H.264 Standard itself as opposed to a royalty on the actual economic value of Motorola's patented technology. (11/13/12 Tr. at 151-52 (Murphy Testimony) ("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. at 168-69 (Schmalensee Testimony) (an SEP holder is "not entitled to the incremental value that you get because you are part of the standard").)

270. Similarly, Motorola expert Dr. Drabik testified 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. at 57 (Drabik Testimony).) 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. (*Id.* at 57-58.)

271. The Motorola employee who suggested to Dr. Drabik 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 coding tools with progressive video. (11/19/12 Tr. at 58-60 (Drabik Testimony).) Dr. Drabik was not aware of any Microsoft product being used to decode progressively captured content that was compressed using field coding. (*Id.* at 60.) Nevertheless, even taking Dr. Drabik's analysis as true, the analysis merely demonstrates that Microsoft products could utilize the interlaced coding tools, but does little to demonstrate that Microsoft products use such tools prevalently or that Microsoft deems such tools important to the overall functionality of its products.

272. Dr. Drabik also pointed to three interlaced H.264 videos that he found on the Internet. The court concludes, however, that these examples do little to demonstrate that interlaced H.264 video is important in the marketplace. (11/19/12 Tr. at 61 (Drabik Testimony).) The first was a pirated video from the Pirate Bay website. (11/14/12 Tr. at 148 (Orchard Testimony).) The other two are one- or two-second-long test videos for use by people in developing video software. The court finds that these videos are not

intended to be viewed by typical users of Microsoft products and therefore do little to show the prevalence of interlaced H.264 video in the marketplace. (*See id.* at 148.)

273. Dr. Drabik also 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. at 148 (Orchard Testimony).) YouTube does not allow interlaced video, so this video is progressive, not interlaced. (*Id.* at 148.) 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. (*Id.* at 148.) Drabik knew of no other examples of interlaced H.264 video on the Internet. (11/19/12 Tr. at 61-62 (Drabik Testimony).)

274. 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 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. at 153 (Orchard Testimony).)

275. 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. at 214 (Sullivan Testimony) (explaining that the modern techniques in H.264 compress more efficiently than using interlaced video).)

276. Exhibit 2342 provides an example of interlaced television that Dr. Drabik cited in error: coverage of the London Olympics. When coverage of the London

Olympics was distributed as H.264, that distribution was in progressive form. (11/14/12 Tr. at 148 (Orchard Testimony).)

277. Of broadcast channels listed in Exhibit 2342 discussed at trial, the H.264 video distribution over Xbox Live was progressive. (11/15/12 Tr. at 31 (Del Castillo Testimony) (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 Spanish provider Canal and U.K. provider BSkyB, likely provided only progressive video even without that software restriction).)

278. Motorola did, however, present evidence that support for interlaced video was important to Microsoft. For instance, as recently as 2009, industry companies requested that interlaced coding tools be included in the Stereo High Profile extension of the H.264 Standard, the first profile of the H.264 Standard designed for multiview coding. (Ex. 3398 at MOTM_WASH1823_0612350; 11/14/12 Tr. at 20:11-17, 22:7-21 (Sullivan Testimony).) Additionally, Microsoft's Gary Sullivan reported in a technical paper that "[o]ne key restriction imposed in the design of the Multiview High profile was that the pictures could not be coded as individual fields or using macroblock-adaptive frame-field coding." (Ex. 3398 at MOTM_WASH1823_0612350.) The restriction referred to as the inability to code pictures as individual fields refers to lack of picture-level frame/field adaptivity, also known as PICAFF or PAFF. (11/14/12 Tr. at 21:15-22:6 (Sullivan Testimony).)

279. Accordingly, the court concludes that (1) interlaced video is becoming less prevalent in the marketplace; (2) little evidence suggests that users of Microsoft products often encounter interlaced video; (3) and Motorola demonstrated that support for interlaced video in coding tools is important to Microsoft so that its products will seamlessly play any video encountered by users.

280. The court now examines each of Microsoft's products that Motorola contends use Motorola's H.264 SEPs.[10]

ii. Windows

281. 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. at 25-26 (DeVaan Testimony).) With each version of Windows, Microsoft adds thousands of features which typically build on the capabilities of previous releases. (*Id.* at 28-29.) For example, the new features of Windows 7 are described in two voluminous books. (Exs. 1408-09.) 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. at 34 (DeVaan Testimony).)

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[10] During the course of the trial, Motorola and Microsoft referenced additional Microsoft products to those listed in this order, such as the Surface tablet. Neither party, however, presented any evidence as to the overall functionality of these other products which would be necessary for the court to analyze the importance of Motorola's SEPs to the product. Accordingly, the court declines to provide an analysis or a royalty rate for products for which insufficient evidence was presented.

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

283. There is little need for Windows to be able to decode interlaced H.264 video content. (11/13/12 Tr. at 38 (DeVaan Testimony); 11/14/12 Tr. at 146 (Orchard Testimony).) Windows users do not commonly encounter interlaced H.264 content. (11/13/12 Tr. at 38 (DeVaan Testimony).) Based on the evidence submitted at trial, the vast majority of video used with Windows comes from Internet websites, where interlaced H.264 video is not commonly found. (11/14/12 Tr. at 147, 149 (Orchard Testimony); Ex. 592.)

284. 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. at 33-35 (DeVaan Testimony).)

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

286. Windows is a software product. Thus, it lacks the hardware structures that are required by the means-plus-function elements of the claims of the '419 Patent. Additionally, as explained above, the parties to a hypothetical negotiation would dispute

whether the claims of the '968 Patent cover software products such as Windows. (11/14/12 Tr. at 135, 139 (Orchard Testimony).)

287. Windows 7 can play DVDs, but DVDs are not H.264 encoded; they use MPEG-2 instead. (11/14/12 Tr. at 147 (Orchard Testimony).) Broadcast television in the United States uses MPEG-2, not H.264. (*Id.* at 153.) Windows 7 cannot play Blu-ray discs. (11/19/12 Tr. at 67 (orchard Testimony).) 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. at 54 (DeVaan Testimony).)

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

289. The court concludes, based on this evidence, that Motorola's H.264 SEPs provide only minor importance to the overall functionality of Microsoft's Windows product. Windows is first and foremost an operating system designed to permit various applications to operate vis-à-vis a user. As explained by Microsoft at trial, the Windows operating system has vast functionality completely unrelated to any video playing. Only when a Microsoft Windows user chooses to play interlaced video would Windows employ the functionality of Motorola's H.264 SEPs, which in turn only provide a portion of the coding tools necessary to view the interlaced video. Moreover, the interlaced video would still play without Motorola's H.264 SEPs, it might just be 5-8 % slower.

iii. The Xbox

290. The biggest use of the Xbox is to play single player games. (11/14/12 Tr. at 144-45 (Orchard Testimony).) The Xbox can also be used to play multiplayer games using the Xbox Live service. (11/15/12 Tr. at 11 (Del Castillo Testimony).) Xbox games never contain H.264 video content, whether played single-player or online via Xbox Live. (*Id.* at 19-20; 11/14/12 Tr. at 145 (Orchard Testimony).)

291. The 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. at 20-21 (Del Castillo Testimony).)

292. The Xbox can be used to play rented or purchased DVDs, but DVDs use MPEG-2 and not H.264. (11/14/12 Tr. at 145 (Orchard Testimony); 11/13/12 Tr. at 209-10 (Sullivan Testimony); 11/15/12 Tr. at 22 (Del Castillo Testimony).)

293. Microsoft recently added a web browser to the Xbox. (Ex. 3448 at 1.) This web browser is capable of decoding interlaced video if encountered by an Xbox user. (Ex. 3448 at 1.)

294. Microsoft presented uncontested evidence that the Xbox employs a software decoder and therefore does not include the hardware structures that are required by the means-plus-function claims of the '419 Patent. (11/14/12 Tr. at 138-39 (Orchard Testimony).) Additionally, as explained above, the parties to a hypothetical negotiation would dispute whether the claims of the '968 Patent cover software products such as the Xbox. (*Id.* at 135-39.)

295. Motorola presented evidence that Microsoft has continued its efforts to make the Xbox an all-in-one entertainment hub capable of providing television content and video. (11/15/12 Tr. at 54:7-1356:10-15 (Del Castillo Testimony); 11/19/12 Tr. at 217:10-218:4 (Dansky Testimony); Ex. 2265, 2688, 2727.)

296. Microsoft CEO Steve Ballmer explained that: "[t]he living room is very important" to Microsoft, "[i]t's a place where there's a high volume of consumption of digital goods and services. So Xbox is very important." (Ex. 2265 at 2; 11/15/12 Tr. at 54:23-56:1 (Del Castillo Testimony).)

297. Consumer video consumption has continued to grow on the Xbox. In the spring of 2012, "for the first time, subscribers to Xbox's Live online service in the U.S. spent more time consuming video and music than multiplayer games. Globally, the hours spent on Xbox Live have grown 30 % year-over-year, including gaming and entertainment, while video consumption has risen 140 %." (Ex. 2265 at 2-3; 11/15/12 Tr. at 56:2-57:5 (Del Castillo Testimony).)

298. [redacted] (11/19/12 Tr. at 67 (Orchard Testimony); 11/15/12 Tr. at 22 (Del Castillo Testimony)), [redacted] (11/15/12 Tr. at 71:24-72:15 (Del Castillo Testimony); 11/14/12 Tr. at 162:3-8 (Orchard Testimony); Ex. 2353 at 9.)

299. The court concludes, based on this evidence, that Motorola's H.264 SEPs provide only minor importance to the overall functionality of Microsoft's Xbox product.

Although it is important that the Xbox have the ability to play video, the evidence suggests that much of that video will be in progressive form. Motorola points to Xbox Live as a source of such video, but Xbox Live does not support interlaced video at this time, and in the past it appears that video over Xbox Live was also in progressive form. (*See* 11/15/12 Tr. at 31 (Del Castillo Testimony).) Similarly, 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 this software is no longer available and was installed by only 10,000 to 11,000 users out of 35 million Xbox owners. (*Id.* at 24.)

300. [redacted] The court also concludes that video capabilities are becoming more important to Microsoft's Xbox product as Microsoft attempts to provide an all-in-one entertainment device capable of gaming, video, and music entertainment.

301. The court, however, makes clear that the interlaced coding tools covered by Motorola's SEPs are not the inventive patents in interlaced coding and are not central to the main function of the Xbox, which is to play video games. Like with Windows, only when an Xbox user chooses to play interlaced video will the Xbox employ the functionality of Motorola's H.264 SEPs. The court concludes that parties to a hypothetical negotiation would consider the importance of Motorola's H.264 SEPs as they apply to the Xbox based on the foregoing analysis.

iv. Other Microsoft Products

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

303. Windows Embedded is an operating system to run on embedded hardware, and it does not support video and does have not a decoder. (11/14/12 Tr. at 151 (Orchard Testimony).)

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

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

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

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

V. THE 802.11 STANDARD

A. The Development of the 802.11 Standard

308. The 802.11 Standard is a wireless communications standard colloquially known as "Wi-Fi." (11/15/12 Tr. at 48:3-10 (Del Castillo Testimony).) The 802.11 Standard comprises a set of standards that allow for companies to build products to a set of specifications for wireless local area networking. It is the *de facto* standard for wireless home networks. (11/15/12 Tr. at 87-89 (Gibson Testimony).)

309. Wireless communication is the transfer of information between points not connected by a wire, typically using radio frequencies such as AM/FM radio, satellite communications, and Bluetooth. (11/15/12 Tr. at 86 (Gibson Testimony).) Wireless networking is the process of using a wireless link to connect a device such as a laptop—known as a "station" in the 802.11 Standard—with an access point. When the access point is wired to a modem, the station may access the Internet. (11/15/12 Tr. at 87 (Gibson Testimony).)

310. Wireless networks differ from cellular systems, in that each are designed for different purposes. For example, cellular systems provide 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. at 97 (Gibson Testimony).)

311. The first wireless packet radio network, ALOHAnet was developed in the 1970s by the University of Hawaii. ALOHAnet connected to the ARPANET, the predecessor of today's Internet in 1972. To do so, ALOHAnet used many technologies that were ultimately adopted by the 802.11 Standard. (11/15/12 Tr. at 90-91 (Gibson Testimony).)

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

313. Following the FCC decision, in 1990, 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. at 90-91

(Gibson Testimony).) The proprietary solutions were expensive and forced users to buy all networking components from the same manufacturer. (*Id.* at 92.)

314. In part to address this problem, the IEEE 802.11 committee established the 802.11 Working Group to create a wireless local area network standard. 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. at 91-92 (Gibson).)

315. The 802.11 Working Group spent seven years developing the first draft of the 802.11 Standard. (11/15/12 Tr. at 92-93 (Gibson Testimony).)

316. The Working Group issued its first standard, "IEEE 802.11," in 1997 (referred to as "802.11-1997"). (11/15/12 Tr. at 92:20-93:11 (Gibson Testimony).) Subsequently, the Working Group issued amendments to the original standard including amendments for higher speeds (802.11a, 802.11b, and 802.11g), improved security (802.11i), quality of service ("QoS") (802.11e), higher throughput (802.11n), and other areas. (*Id.* at 92:20-94:14; Ex. 520.)

317. The development of the 802.11 Standard involved the participation of many entities: over 1,000 companies participated in the standard-setting process. (11/15/12 Tr. at 94-95 (Gibson Testimony); Ex. 514.) The 802.11 Working Group has met over 130 times since its inception and has formed over 30 different task groups to develop amendments to the standard. (11/15/12 Tr. at 94-95 (Gibson Testimony).)

318. The 802.11 Standard today is immense and complex; the current version is 2,793 pages long. (Ex. 386A.)

319. Some of the later amendments replace prior technologies in certain areas. For example, in 2009, the Working Group approved the "802.11n" protocol, which provides for higher throughput. This protocol generally replaced 802.11a, 802.11b, and 802.11g, though the 802.11n amendment requires compliant devices to have backward compatibility with 802.11b and 802.11g. (11/15/12 Tr. at 93-94, 190:3-12, 192:1-7 (Gibson Testimony).)

320. 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. at 97-98 (Gibson Testimony).)

321. The development of the 802.11 Standard dealt primarily with the implementation of well-known technologies rather than innovation. As such, the majority of the technologies available to and/or adopted by the 802.11 drafters were in the public domain and not covered by patents. (11/15/12 Tr. at 154-55 (Gibson Testimony).) Public domain technology 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, such as data modulation, error control coding, multiple access methods, direct sequence spread spectrum and orthogonal frequency division multiplexing. (11/15/12 Tr. at 96-97 (Gibson Testimony).)

322. By 2005, the 802.11 Standard was beginning to be used in homes and was increasing in popularity. (11/15/12 Tr. at 43:4-44:2 (Del Castillo Testimony).)

323. Currently, the 802.11 Standard is the most widely used and universally accepted wireless communications standard for ordinary consumer and business use. (11/15/12 Tr. at 46:4-19, 77:23-78:14 (Del Castillo Testimony); 11/15/12 Tr. at 89:15-18 (Gibson Testimony).) Most homes do not have wired networks, and instead rely on 802.11 networks because 802.11 networks do not require the user to place cables all over the home. (11/15/12 Tr. at 78:1-14 (Del Castillo Testimony).) For example, Xbox users may connect the device to their network wirelessly. (*Id.* at 24-25.)

B. The Relative Technical Value of Different Portions of the 802.11 Standard

324. When considering the relative technical importance of different sections of the 802.11 Standard, it is important to note that core enabling features are more important than advanced and peripheral features. (11/19/12 Tr. at 71:6-8, 73:9-74:14 (Williams Testimony).) The core features are needed to build any 802.11-compliant device. (*Id.* at 73:9-80:3.) Advanced features are technologies that may be in a particular device. (*Id.* at 74:4-14, 80:2-19.) Peripheral features are features in technology areas that have not been proven and may or may not have future technological value. (*Id.* at 102:6-14.)

325. 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. at 120 (Williams Testimony).)

326. **Core Enabling Features.** Four core enabling features of an 802.11 communications network are: (1) network setup, (2) channel access management, (3) data

modulation, and (4) security and encryption. (11/19/12 Tr. at 84:7-88:19 (Williams Testimony).)

327. Before any communication can occur in 802.11, the user must establish a network connection through a network setup procedure. (11/19/12 Tr. at 85:8-86:2 (Williams Testimony).)

328. Once a network connection exists, the network's communication units must gain access to a communication channel before they can send or receive information. (11/19/12 Tr. at 86:3-23 (Williams Testimony).) This is accomplished by a channel access procedure specified by the 802.11 Standard. (*Id.*)

329. Further, to send and receive information over the channel, a communication unit's receiver must understand how transmitted information is formatted so that the receiver can interpret the messages it receives from a sender. In particular, it is necessary to properly synchronize and modulate signals between two communication units. (11/19/12 Tr. at 86:24-87:22 (Williams Testimony).)

330. Another core enabling feature of 802.11 communications is security, which is necessary because wireless communications can be intercepted by third-party eavesdroppers. (11/15/12 Tr. at 178:22-179:19 (Gibson Testimony); 11/19/12 Tr. at 87:23-88:19 (Williams Testimony).) Users can secure transmissions by encrypting the information using an encryption key. (11/19/12 Tr. at 88:8-12 (Williams Testimony).) In addition, it is important for users to know that a received message was actually sent by an authorized sender rather than by an interloper masquerading as the sender. (11/15/12 Tr. at 113:6-9 (Gibson Testimony); 11/19/12 Tr. at 84:24-85:1, 87:23-88:19 (Williams

Testimony).) This requires a process that enables a receiver to confirm that a received message was transmitted by the particular communication device from which the receiver is expecting the message. (11/15/12 Tr. at 113:6-9 (Gibson Testimony); 11/19/12 Tr. at 88:13-19 (Williams Testimony).)

331. **Advanced Features.** Advanced features in 802.11 are important to some devices, but not all devices. (11/19/12 Tr. at 80:2-19 (Williams Testimony).) For example, battery operated devices typically make use of power management patents. (*Id.* at 80:12-19.) Other features that fall in this category are features that are not currently mandatory in the 802.11 Standard but may become mandatory in future generations of the standard. (*Id.* at 80:12-19.)

332. **Peripheral Features.** Some features of the 802.11 Standard are peripheral and based on technology that has not yet been proven. Their future value to the standard is questionable. (11/15/12 Tr. at 102:6-14 (Williams Testimony).)

C. Many Patents Cover the 802.11 Standard

333. A patent is deemed "essential" to the 802.11 Standard if any of its claims are essential. (11/19/12 Tr. at 71:19-72:14 (Williams); Ex. 5 at 14, § 6.1.) An essential claim is a claim that is "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 feasible non-infringing alternative." (11/19/12 Tr. at 71:19-72:14 (Williams Testimony); Ex. 5 at 14, § 6.1.)

334. There is no formal process for determining whether a patent is essential to the 802.11 Standard. (11/15/12 Tr. at 98-99 (Gibson Testimony).) However, companies may declare that they have essential patents in an LOA. (11/15/12 Tr. at 98-99 (Gibson Testimony).)

335. Since 1994, approximately 92 companies have identified—in LOAs—over 350 patents and 30 patent applications as essential to the 802.11 Standard.[11] (11/15/12 Tr. at 99 (Gibson Testimony); Exs. 7, 1592.) Companies may also provide "blanket" LOAs to the IEEE, which do not identify specific patents. (*Supra* ¶ 43.) As stated previously, through "blanket" LOAs, SEP holders commit to license unspecified patents or pending applications for a particular standard. (*Id.*) At this time, approximately 59

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[11] In its proposed findings of fact and conclusions of law, Microsoft asserted that over 100 companies have identified patents in LOAs as essential to the 802.11 Standard. In support of this assertion, Microsoft cites to portions of Dr. Gibson's testimony and Exhibits 7 and 1592. (Microsoft Pr. FC (Dkt. # 621) ¶ 238.) Indeed, Dr. Gibson testified that Exhibits 7 and 1592 support a finding that over 100 companies have identified patents essential to 802.11 Standard, but those exhibits demonstrate no such thing. (*See* Exs. 7, 1592.) Instead, Exhibit 1592 lists 59 companies that have submitted blanket LOAs to the IEEE. Because the number of companies contributing technology to the 802.11 Standard is relevant to the court's analysis for determining a royalty rate, the court attempted to discern how and in what portions of the record Microsoft and Dr. Gibson came up with their claim that over 100 companies have identified essential patents. The court concluded that no such evidence exists in the record. In fact, Microsoft experts Dr. Murphy and Dr. Lynde both asserted that somewhere between 90 and 93 companies had submitted LOAs. (11/16/12 Tr. at 109 (Lynde Testimony); 11/13/12 Tr. at 175 (Murphy Testimony) (Q: "And I believe in one of your demonstratives you indicated there were around 90 SEP holders of 802.11 patents?" A: "I don't remember the precise number, I think it was 93.").)

Additionally, it is important to note that patents of course expire over time, meaning that at any one time there are less than 350 patents identified as essential to the 802.11 Standard. Although Dr. Gibson's testimony on this point is ambiguous (*see* 11/15/12 Tr. at 99 (Gibson Testimony)), as explained in the section analyzing the Via Licensing 802.11 patent pool, there are currently approximately 250 patents identified as essential to the 802.11 Standard. (*See infra* ¶¶ 567-68.)

companies have filed these blanket LOAs for the 802.11 Standard, including wireless communication industry leaders such as Atheros, Broadcom, Qualcomm, Research in Motion, and Intel.[12] (Exs. 7, 1592.) Thus, according to the expert testimony of Dr. Lynde, there are possibly thousands of essential patents to the 802.11 Standard at any one time. (*See* 11/16/12 Tr. at 108-109 (Lynde).)

336. 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. at 118-19 (Williams Testimony).)

337. 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. at 64 (Ochs Testimony).)

D. Motorola's 802.11 Patents

338. The court now determines the importance of Motorola's 802.11 SEPs to both the 802.11 Standard and to Microsoft products. At trial, Motorola presented scant evidence that its patents are essential to the 802.11 Standard. Thus, the court concludes that even though parties to a hypothetical negotiation would examine Motorola's patents

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[12] Here, Dr. Gibson, a Microsoft expert, testified that 94 companies had submitted blanket LOAs and directed the court to Exhibit 1592 in support of that assertion. (11/15/12 Tr. at 99-100 (Gibson Testimony).) Exhibit 1592, however, lists only 59 companies that have submitted such blanket LOAs. (Ex. 1592.) Likewise, Exhibit 1159 lists 59 companies that have submitted blanket LOAs. (Ex. 1159.) Further, Dr. Lynde, also a Microsoft expert, testified that 59 companies had submitted blanket LOAs. (11/16/12 Tr. at 109 (Lynde Testimony) ("So there are 59 [entities] that have these blanket disclosures that I was able to identify.").) Despite significant time searching, the court cannot find support for Dr. Gibson's higher number and therefore disregards his testimony on this matter.

for their importance to the 802.11 Standard and to Microsoft's products, their value would be diminished by the lack of evidence regarding their relevance. With this in mind the court evaluates the importance of Motorola's patents to the 802.11 Standard and to the Xbox—the only product that Motorola alleges uses the patents.

i. Motorola's Essential Patents

339. At the time of trial, Motorola contended that 24 of its patents were essential to the 802.11 Standard. It did not analyze any other patents as essential. (11/15/12 Tr. at 102-05 (Gibson Testimony).)

340. Though Motorola claims 24 of its patents are essential to the 802.11 Standard, it did not provide any independent analysis to substantiate this claim. (*See generally* 11/19/12 Tr. at 67-134 (Williams Testimony).) In other words, Motorola provided no expert or fact testimony that one or more claims of its SEPs do in fact cover portions of the 802.11 Standard. (*See* 11/19/12 Tr. at 76-77 (Williams Testimony) (admitting, only as a demonstrative, claim charts relating sections of the 802.11 Standard to elements of the claims of the SEPs at issue).) Instead, Motorola provided only conclusory expert opinion testimony that an 802.11-compliant device would necessarily infringe the SEPs at issue. (*See id.* at 78.) Even though the court finds Dr. William's testimony conclusory, the court will minimally credit his assertion that Motorola's SEPs are in fact essential to the 802.11 Standard.[13]

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[13] Motorola's expert did not 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

341. Having failed to provide sufficient explanation as to why any of its SEPs relate to the 802.11 Standard, Motorola relies on attorney submissions that each of the SEPs relate to corresponding portions of the 802.11 Standard in its proposed findings of fact and conclusions. (Motorola Pr. FC (Dkt. ## 618 (sealed), 624 (redacted) ¶¶ 264-365).) The court finds the attorney representations insufficient to demonstrate that any of Motorola's alleged 802.11 SEPs are in fact essential to the 802.11 Standard.

342. Without better evidence that the Motorola patents at issue are essential to the 802.11 Standard, the implementer in a hypothetical negotiation would view Motorola's patents with skepticism. Nevertheless, because Motorola contends that these patents are essential and used by Microsoft products, parties to a hypothetical negotiation would sit down at the bargaining table and examine these patents for their importance to the 802.11 Standard and to Microsoft's products, although their value would be diminished by the lack of better evidence regarding their true relevance.

343. The parties in a hypothetical negotiation would also consider the relative importance of Motorola's patents to the 802.11 Standard by examining whether—at the time the standard was developed—there existed viable alternatives to the patents at issue.

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and ordinary meaning, a meaning which he did not articulate. (11/19/12 Tr. at 109 (Williams Testimony).) Using this approach, Motorola's expert determined that two patents, not subject to this litigation—U.S. Patent Nos. 5,319,712 and 5,636,22—were essential to the standard, yet those two patents were judicially determined to be non-essential based on claim construction. (*Id.* at 107-09.) Nevertheless, Microsoft's experts did not dispute that Motorola's 11 SEPs are essential to the 802.11 Standard. Instead, Microsoft's experts assumed for purposes of their analyses that all of Motorola's declared essential patents were indeed essential to the 802.11 Standard pursuant to the IEEE's definition of "essential." (*See* Ex. 5 at 14, § 6.1.)

If viable alternatives existed, the patents are less important to the standard and will be valued accordingly.

344. Here, the parties dispute whether or not technically feasible alternatives existed for Motorola's 802.11 SEPs when the 802.11 Standard was being developed. The parties also dispute whether adoption of those alternatives would have degraded the performance of the standard. (11/15/12 Tr. at 114-15, 118-44 (Gibson Testimony).) Microsoft, through its expert Dr. Gibson, asserts that technologically feasible alternatives existed to Motorola's 802.11 SEPs. Motorola, through its expert Dr. Williams, disagrees. (*Compare* 11/15/12 Tr. at 121-28, 130-35, 138-39, 141-43 (Gibson Testimony) *with* 11/19/12 Tr. at 102-06 (Williams Testimony).)

345. The court has carefully examined the relevant portions of the trial testimony and concludes that both Microsoft's and Motorola's experts provide little more than *ipse dixit* testimony regarding such alternatives. (*Compare* 11/15/12 Tr. at 120-28, 130-35, 138-39, 141-43 (Gibson Testimony) *with* 11/19/12 Tr. at 102-06 (Williams Testimony).) Although Microsoft's expert, Dr. Gibson, lists alternatives to Motorola's 802.11 SEPs, he provides little or no explanation as to why these alternatives would adequately replace Motorola's SEPs without degrading the standard. (*See, e.g.*, 11/15/12 Tr. at 120-28 (Gibson Testimony) (declaring without explanation that "[t]he 802.3 ethernet standard from 1995, had a version of carrier sense multiple access that could have been used as an alternative to the DCF and the EDCA.").) For its part, Motorola's expert simply states that he does not believe the alternatives would have been acceptable. He also declines to explain why the alternatives proposed by Microsoft's expert for 23 of

the 24 Motorola patents were not feasible. (11/19/12 Tr. at 102-06 (Williams Testimony) ("My conclusion is that none of Dr. Gibson's proposed alternatives would have been acceptable alternatives in the 802.11 Standard.").) For the remaining patent, Motorola's expert addressed only two of the four alternatives proposed by Microsoft's expert. (11/19/12 Tr. at 104-06 (Williams Testimony) (discussing only two of the four proposed alternatives to Ex. 148).) The court is left with these competing expert opinions and little evidence or explanation to resolve the conflict.

346. Accordingly, the court finds that neither party has demonstrated the presence or absence of feasible alternatives to Motorola's SEPs. The court therefore concludes that in a hypothetical negotiation, the parties simply would disagree as to the technical contribution of Motorola's SEPs to the 802.11 Standard.

ii. Motorola Agrees that Only the Microsoft Xbox Uses its 802.11 SEPs

347. Motorola analyzed its patents with respect to only Microsoft's Xbox product, and presented no evidence that other products, such as the Microsoft Surface, used these patents. (11/19/12 Tr. at 71 (Williams Testimony).)

348. The Xbox is a special purpose computer: its primary function is to run video games. (11/15/2012 Tr. at 8-9 (Del Castillo Testimony).) The original Xbox 360 was launched in 2005. (*Id.* at 13.) The Xbox contains an optical drive that it uses to load and play video games, but it can also be used to watch DVDs and listen to audio Compact Discs (CDs). (11/15/12 Tr. at 8-9 (Del Castillo Testimony).) In 2010, Microsoft introduced the Xbox 360S, which included WiFi capabilities. (*Id.* at 15.) The Xbox

360S uses a WiFi module made by Marvell or Atheros. (*Id.* at 24, 48-49.) Microsoft does not build any of the hardware necessary for WiFi connectivity. (*Id.* at 25.)

349. 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. (*Id.* at 25.) The Xbox can connect to the Internet to download applications and games from the Xbox Live service. (*Id.* at 8-9.) Some applications allow for media streaming, such as the Netflix application. (*Id.*) 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 the customer plays. (*Id.* at 11.)

350. [redacted] (11/15/12 Tr. at 61:19-62:1 (Del Castillo Testimony).) [redacted] (*Id.* at 72:19-21.) [redacted] (*Id.* at 74:25-75:5.)

iii. The Xbox Does Not Use All of Motorola's 802.11 SEPs

351. Motorola contends that the Xbox uses only 11 of the 24 patents Motorola asserts are essential to the 802.11 Standard. (11/15/12 Tr. at 102-03 (Gibson Testimony); 11/19/12 Tr. at 107 (Williams Testimony) ("It's my opinion that 11 must be used."); Exs. 148, 151, 156, 157, 161, 164, 169, 170, 171, 177, 180.) These eleven patents are U.S. Patent Nos. 5,142,533 (the '533 Patent); 5,272,724 (the '724 Patent); 5,329,547 (the '547 Patent); 5,357,571 (the '571 Patent); 5,467,398 (the '398 Patent); 5,519,730 (the '730 Patent); 5,689,563 (the '563 Patent); 5,822,359 (the '359 Patent);

6,069,896 (the '896 Patent); 6,331,972 (the '972 Patent); 6,473,449 (the '449 Patent). There is no evidence that the Xbox (or any other Microsoft product) uses the other 13 patents that Motorola contends are essential to the 802.11 Standard. (11/15/12 Tr. 102-04 (Gibson Testimony); Exs. 100, 101, 154, 160, 166, 179, 181, 183, 383, 2013, 2014, 2016, 2019.)

352. The court concludes that in a hypothetical negotiation, Microsoft would not take a license to any of the 13 Motorola SEPs that Motorola does not contend are used by the Xbox, despite the fact that Motorola argues that these 13 patents are "essential" to the 802.11 Standard. Because Motorola admits that Microsoft products do not use these patents in any way, Microsoft would not seek a license to them. Accordingly, the court will analyze only the 11 Motorola 802.11 SEPs that Motorola contends are used by Microsoft's Xbox.

vi. The Importance of Motorola's 11 SEPs to the Standard and to the Xbox

353. For efficiency purposes, the court will analyze the importance of each SEP to the Xbox as it discusses the relative technical contribution of the SEP to the 802.11 Standard. Motorola argues that the Xbox uses 11 patents covering five technology areas.

802.11 Technology Area	**U.S. Patent**
1. Channel Access Management Patent	5,142,533 (Ex. 148)
2. Data Modulation (a/g/n) Patents	5,272,724 (Ex. 151) 5,519,730 (Ex. 164)
3. Network Setup Patents	6,069,896 (Ex. 171) 6,331,972 (Ex. 177)
4. Data Modulation (b/g) Patents	5,329,547 (Ex. 156) 6,473,449 (Ex. 180) 5,822,359 (Ex. 170)

5. Security Patents	5,357,571 (Ex. 157) 5,467,398 (Ex. 161) 5,689,563 (Ex. 169)

a. Channel Access Management Patent

354. Motorola identified one patent, the '533 Patent 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. at 106-07 (Gibson Testimony); Ex. 148.) The '533 Patent expired on March 28, 2011. (11/19/12 Tr. at 78 (Williams Testimony); Ex. 1589.) Thus, the '533 Patent would be relevant to the Xbox 360, [redacted].

355. As discussed earlier, Motorola did not elicit testimony regarding the meaning of the '533 claims as they relate to portions of the 802.11 Standard, but now asserts a claims-to-standard relationship through attorney representations in proposed findings of fact and conclusions of law. (Motorola Pr. FC ¶¶ 272-77.) Motorola's expert, Dr. Williams, in a conclusory statement, contends that the '533 Patent covers "collision-avoidance" within channel access. (11/19/12 Tr. at 86 (Williams Testimony) ("So that's called a collision-avoidance system. And that is covered by the Crisler patent, Exhibit 148.").)

356. Based on the foregoing, the court finds minimal evidence in the record to demonstrate that the '533 Patent is indeed essential to any portion of the 802.11 Standard, let alone channel access—a core feature of the 802.11 Standard. Nevertheless, because Microsoft does not contest that the '533 Patent is essential, the court will credit

Motorola's scant evidence that the '533 Patent is essential to channel access in the 802.11 Standard.

357. Moreover, absolutely no evidence exists in the record explaining the relative importance in relation to other technological contributions of Motorola's '533 Patent to channel access or to the 802.11 Standard.[14] Absent such evidence, the court has no tools with which to evaluate whether the '533 Patent contributes the entirety of the channel access, or provides only a small component. Microsoft did make clear, however, that Motorola did not invent channel access in wireless networks, and so at minimum the '533 Patent did not provide the inventive functionality of channel access. (*See* 11/15/12 Tr. at 107 (Gibson Testimony).)

358. Because of the limited evidence showing the importance of the '533 Patent to the 802.11 Standard, parties in a hypothetical negotiation would view the '533 Patent as providing very minimal technical contribution to channel access.[15]

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[14] As for each of Motorola's 802.11 "essential" patents, 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 the 802.11 Standard. (11/19/12 Tr. at 116-17 (Williams Testimony).) 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 Licensing 802.11 patent pool). (*Id.* at 117-120.)

[15] Lending support for the court's conclusion is the fact that other companies have disclosed patents essential to the 802.11 Standard in the area of channel access. Apple Computer identified two U.S. patents related to channel access as essential to the 802.11 Standard: 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. at 150 (Gibson Testimony); Exs. 89, 88.) 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. at 150-51 (Gibson Testimony);

359. Having determined that the '533 Patent provides minimal contribution to the standard, parties to a hypothetical negotiation would next consider whether the '533 Patent is nevertheless important to the Xbox's implementation of the standard.

360. For its part, Microsoft asserts that the Xbox does not use the '533 Patent. Microsoft argues that to the extent Motorola relates the '533 Patent to EDCA, EDCA is optional and related to QoS, which is not used by the Xbox. (11/15/12 Tr. at 106-07 (Gibson Testimony); 11/15/2012 Tr. at 28 (Del Castillo Testimony).) Motorola also relates the '533 Patent to using DCF with RTS/CTS, and according to Microsoft, the Xbox does not use RTS/CTS either. (11/15/12 Tr. at 106-07 (Gibson Testimony); 11/15/2012 Tr. at 28 (Del Castillo Testimony).)

361. In response, Motorola elicited testimony from its expert, Dr. Williams, that the '533 patent is practiced by the general channel access mechanism in the 802.11

Ex. 129.) 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. at 150-51 (Gibson Testimony); Exs. 137, 325.) 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. at 150-51 (Gibson Testimony); Ex. 485.) Nokia Corp. sent an LOA 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 appropriate radio flow for each packet from a selection of predefined flows. (11/15/12 Tr. at 150-51 (Gibson Testimony); Ex. 391.) 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. at 150-51 (Gibson Testimony); Ex. 484.) And, 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. at 150-51 (Gibson Testimony); Exs. 476, 483, 486.)

Standard and the use of RTS/CTS and QoS is not required for infringement. (11/19/12 Tr. at 97:14-98:10 (Williams Testimony).)

362. Albeit conclusory in nature, Dr. Williams' testimony creates a genuine dispute as to whether or not an Xbox would necessarily infringe the '533 Patent through ordinary use of the 802.11 Standard.

363. In sum, the court concludes that parties to a hypothetical negotiation for the '533 Patent would view the patent as providing very little contribution to the 802.11 Standard and would disagree over whether the Xbox in fact required a license to the '533 Patent in its use of the 802.11 Standard.

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

364. Motorola identified two patents that relate to data modulation for 802.11a, g, and n, and more specifically to a portion of the orthogonal frequency division multiplexing functionality ("OFDM"), the '724 Patent and the '730 Patent. (11/15/12 Tr. at 107-08 (Gibson Testimony); Exs. 151, 164.) The '724 Patent expired on May 3, 2011. (11/19/12 Tr. at 78 (Williams Testimony); Ex. 151; 11/15/12 Tr. at 108-09 (Gibson Testimony).) Thus, the '724 Patent would be relevant to the Xbox 360, [redacted]. The '730 Patent expires on May 21, 2013, and thus, although it is certainly relevant to the Xbox 360, [redacted].

365. As with the '533 Patent, Motorola did not elicit testimony regarding the meaning of the '724 Patent's or the '730 Patent's claims as they relate to portions of the

802.11 Standard, but now asserts a claims-to-standard relationship through attorney representations in proposed findings of fact and conclusions of law. (Motorola Pr. FC ¶¶ 296-98 ('730 Patent), 301-02 ('724 Patent).) Motorola's expert, Dr. Williams, in a conclusory statement, contends that the '730 and '724 Patents cover OFDM in the 802.11a, g, and n modulation schemes. (11/19/12 Tr. at 87 (Williams Testimony) ("Two of those patents relate to a technology called OFDM, which is a high-speed data transport mechanism.").)

366. In response, Microsoft—through its expert, Dr. Gibson—contends that neither the '724 Patent nor the '730 Patent is essential to the 802.11 Standard. According to Microsoft (and apparently Motorola's expert report), Motorola relates claim 14 of the '730 Patent to 802.11 a/g OFDM and asserts that "PLCP preambles" located in subcarrier signals satisfy the first step of this claim. (11/15/12 Tr. at 108 (Gibson Testimony); Ex. 164.) Also, according to Microsoft, Motorola analyzed claim 20 of the '724 Patent as essential to synchronizing the timing of data signals, using OFDM and the 802.11 Standard under the same analysis as it provided for claim 14 of the '730 Patent. (11/15/12 Tr. at 108-09 (Gibson Testimony); Ex. 151.)

367. Microsoft argues that neither the '724 nor the '730 Patents are essential under Motorola's analysis because the "PLCP preamble" is not intermixed with the information signals in the 802.11 Standard, and therefore the Xbox does not use this patent and it has no value to Microsoft. (11/15/12 Tr. at 108-09 (Gibson Testimony).)

368. Regarding the '730 Patent, Motorola argues that Dr. Gibson failed to explain why the claim limitation at issue is not met by sending the synchronization signal

with all subcarriers. (citing 11/15/12 Tr. at 108:10-21 (Gibson Testimony).) As Dr. Williams explained, the 802.11 Standard requires information signals to be combined with the PLCP preamble, as Dr. Gibson testified is required by claim 14 of the '730 Patent. (11/19/12 Tr. at 95:5-11 (Williams Testimony).) Thus, according to Motorola, the '730 Patent is essential to the 802.11 Standard.

369. With respect to the '724 Patent, Motorola argues, with the assistance of Dr. Williams, that the 802.11 Standard requires two synchronization signals to be sent, as claim 20 of the '724 Patent requires. (11/19/12 Tr. at 94:24-95:3 (Williams Testimony).) Thus, according to Motorola, the '724 Patent is essential.

370. The court finds the record ambiguous regarding whether the '724 and '730 Patents are essential to the 802.11 Standard. Microsoft's explanation as to why these patents are not essential is unsatisfactory to the court. Microsoft provides no explanation as to what a "PLCP preamble" is, why sending the synchronization signal with all subcarriers is not covered by the claim limitation, and why the 802.11 Standard does not require information signals to be combined with the "PLCP preamble," whatever that may be. Again, the parties have put the court in the middle of a battle of the experts and have provided no basis for the court to determine a winner. In other words, the court has insufficient evidence to determine essentiality for the '724 and '730 Patents.

371. With no clear evidence of essentiality, the court is left to credit Dr. Williams' conclusory statement that the '730 and '724 Patents cover OFDM in the 802.11a, g, and n modulation schemes and are essential to the 802.11 Standard. (11/19/12 Tr. at 87 (Williams Testimony) ("Two of those patents relate to a technology

called OFDM, which is a high-speed data transport mechanism.").) Thus, based on the foregoing, the court finds minimal evidence on the record to demonstrate that either the '724 Patent or the '730 Patent is indeed essential to any portion of the 802.11 Standard, let alone data modulation via OFDM—a core feature of the 802.11 Standard.

372. Moreover, absolutely no evidence exists in the record explaining the relative importance in relation to other technological contributions of Motorola's '724 and '730 Patents to OFDM. Absent such evidence, the court has no tools with which to evaluate whether the '724 and '730 Patents contribute the entirety of OFDM functionality in the standard or provide only a small component. Microsoft did make clear, however, that Motorola did not invent OFDM. (*See* 11/15/12 Tr. at 108 (Gibson Testimony).)

373. Because of the limited evidence showing the importance of the '724 and '730 Patents to the 802.11 Standard, parties in a hypothetical negotiation would view both patents as providing very minimal technical contribution to data modulation or OFDM.[16]

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[16] Lending support for the court's conclusion is the fact that other companies have disclosed declared patents essential to the 802.11 Standard in the area of data modulation. 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. at 151-52 (Gibson Testimony); Ex. 264.) Nokia Corporation disclosed two applications and two patents related to spread spectrum technology in the 802.11 Standard: (1) Application No. 20020160769, which became U.S. Patent Nos. 6,675,012 (dynamic frequency selection that indicates transmission frequency and level of interference) and 6,298,035 (estimating separate channel frequencies when using OFDM with two transmitters); and (2) Application No. 20030050012, which became U.S. Patent Nos. 6,738,599 (dynamic frequency selection in an ad-hoc network) and 6,834,045 (a method for allocating frequencies in a WLAN operating in the 5 GHz range). (11/15/12 Tr. at 151-52 (Gibson Testimony); Exs. 321, 255, 327, 357.) 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, time-

c. Network Setup Patents

374. Motorola identified two patents as essential to network setup functionality in the 802.11 Standard: the '896 Patent and the '972 Patent. (11/15/12 Tr. at 109, 122 (Gibson Testimony); Exs. 171 ('896 Patent), 177 ('972 Patent).)

375. According to Microsoft, 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 access point. (11/15/12 Tr. at 109, 122 (Gibson Testimony); '896 Patent; '972 Patent.) The '896 Patent expires on October 15, 2016, and the '972 Patent expires on February 3, 2017. (*See* '896 Patent; '972 Patent.) Thus, both are relevant to the Xbox 360 [redacted].

376. As with the previous patents, Motorola did not elicit testimony regarding the meaning of the '896 Patent's or the '972 Patent's claims as they relate to portions of the 802.11 Standard, but now asserts a claims-to-standard relationship through attorney representations in proposed findings of fact and conclusions of law. (Motorola Pr. FC ¶¶ 264-65.) Motorola's expert, Dr. Williams, in a conclusory statement, contends that the

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division multiplexing and frequency division multiplexing). (11/15/12 Tr. at 151-52 (Gibson Testimony); Ex. 318.) 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 other antennas by using time-division multiplexing in an orthogonal manner). (11/15/12 Tr. at 151-52 (Gibson Testimony); Ex. 260.) Certain patents in the Via license pool also 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. at 151-152 (Gibson Testimony); Exs. 131, 478, 481.)

'896 and '972 Patents cover initiation of communications between a station and an access point in the 802.11 Standard. (11/19/12 Tr. at 85 (Williams Testimony) ("The Harris and Borgstahl patents, Exhibits 177 and 171, deal with the messages that are communicated back and forth between a station set and an access point, in order to facilitate that acceptance of the station set onto the access point, and the initiation of communications.").)

377. Based on the foregoing, the court finds minimal evidence in the record to demonstrate that the '896 and '972 Patents are indeed essential to any portion of the 802.11 Standard, let alone to network setup functionality—a core feature of the 802.11 Standard. Nevertheless, because Microsoft does not contest the essentiality of the '896 and '972 Patents, the court will credit Motorola's scant evidence that the '896 and '972 Patents are essential to network setup in the 802.11 Standard.

378. Moreover, absolutely no evidence exists in the record explaining the relative importance in relation to other technological contributions of Motorola's '896 and '972 Patents to network setup, initial association of a station to an access point, or generally to the 802.11 Standard. Absent such evidence, the court has no tools with which to evaluate whether the '896 and '972 Patents contribute the entirety of these functions or whether they provide only a small component. Microsoft did make clear, however, that Motorola did not invent associating stations with access points. (11/15/12 Tr. at 109 (Gibson Testimony).)

379. Because of the limited evidence showing the importance of the '896 and '972 Patents to the 802.11 Standard, the court concludes that parties in a hypothetical

negotiation would view the '896 and '972 Patents as providing very minimal technical contribution to channel access.

380. Having determined that the '896 and '972 patents provide minimal contribution to the standard, parties to a hypothetical negotiation would next consider whether the patents are important to the Xbox's implementation of the standard.

381. Microsoft contends that the Xbox does not use either the '896 Patent or the '972 Patent. Microsoft argues that the '896 and '972 Patents do not relate to infrastructure connections such as those between access points and stations (such as between a router/modem and Xbox), but instead relate to communications between peer devices, such as between two stations. (11/15/12 Tr. at 109-10 (Gibson Testimony).) According to Microsoft, the Xbox does not use the '896 and '972 Patents 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. (*Id.* at 110.)

382. In response, Motorola's expert, Dr. Williams, testified that the claims of the '896 and '972 Patents do not contain the term "peer-to-peer" and are not limited to peer-to-peer communications. (11/19/12 Tr. at 95:14-21, 96:5-8 (Williams Testimony); '896 Patent at claim 17; '972 Patent at claim 9; 11/15/12 Tr. at 193:15-16 (Gibson Testimony).)

383. Because the parties dispute the scope of the '896 and '972 Patents, the court examined the specifications of the '896 and '972 Patents and concludes that the specifications discuss the claimed technology in the context of peer-to-peer communications. (*E.g.*, Ex. 177 at MS-MOTO_1823_00004042238 ("More specifically,

the present invention relates to peer-to-peer network in which node addressing is dynamically configurable.").) Although this may lend some credence to Microsoft's argument, nothing in the specifications limits the claims to peer-to-peer communications. Further, even if the claims were so limited, the court does not see why a communication between an Xbox and a router could not constitute a peer-to-peer communication because the patents leave that term undefined. Thus, the court declines to limit, as a matter of law, the claims of the '896 and '972 Patents so as to exclude Xbox to access point communications.

384. In sum, the court concludes that parties to a hypothetical negotiation for the '896 and '972 Patents would view the patents as providing very little contribution to the 802.11 Standard and would disagree over whether licenses to the '896 and '972 Patents are in fact required for the Xbox's use of the 802.11 Standard.

d. Data Modulation (b/g) Patents

385. Motorola identifies three patents as related to data modulation for 802.11b and g: the '547 Patent, the '449 Patent, and the '359 Patent. (11/15/12 Tr. at 110 (Gibson Testimony); Exs. 156 (the '547 Patent), 170 (the '359 Patent), 180 (the '449 Patent).) The '547 Patent expires on March 11, 2013, and thus, although it is relevant to the Xbox 360, [redacted]. The '359 Patent expires on October 13, 2015, and thus, is relevant to both the Xbox 360 [redacted]. Similarly, the '449 Patent is relevant to both the Xbox 360 [redacted].

386. Motorola relates the '449 Patent to a method of wirelessly transmitting data using a data modulation technique known as "direct sequence spread spectrum" (DSSS)

to suppress interference. (Motorola Pr. FC ¶¶ 286-87 (citing '449 Patent at col. 6, lns. 55-67, claim 1).) Similarly, Motorola identifies the '547 and '359 Patents as relevant to DSSS and, in particular, to sending data signals coherently by inserting "reference symbols" into data to be transmitted. (Motorola Pr. FC ¶¶ 291-92 (citing '547 Patent at Abstract; '359 Patent at Abstract).) Because DSSS is relevant to 802.11b and 802.11g, Motorola contends that the '449, '547, and '359 Patents are relevant to those versions of the 802.11 Standard and not to the 802.11n version. (11/15/12 Tr. at 110:15-111:1 (Gibson Testimony).)

387. As with the previous patents, Motorola did not elicit testimony regarding the meaning of the '449, '547, or '359 Patents' claims as they relate to portions of the 802.11 Standard, but now asserts a claims-to-standard relationship through attorney representations in proposed findings of fact and conclusions of law. (Motorola Pr. FC ¶¶ 286-87, 291-92.) Motorola's expert, Dr. Williams, in a conclusory statement, contends that the '449, '547, and '359 Patents cover how to modulate the carrier signal to transmit information in the 802.11 Standard. (11/19/12 Tr. at 87 (Williams Testimony) ("In the bottom three patents, Exhibits 180, 156, and 170, these deal with the fundamental process of how to change the carrier, how to modulate that carrier in order to convey the information to the other side.").)

388. Based on the foregoing, the court finds minimal evidence on the record to demonstrate that the '449, '547, and '359 Patents are indeed essential to any portion of the 802.11 Standard, let alone to data modulation—a core feature of the 802.11 Standard. Nevertheless, because Microsoft does not contest the essentiality of the '449, '547, and

'359 Patents, the court will credit Motorola's scant evidence that the '449, '547, and '359 Patents are essential to data modulation using the DSSS technique in the 802.11b and 802.11g versions of the 802.11 Standard.

389. Moreover, absolutely no evidence exists in the record explaining the relative importance in relation to other technological contributions of Motorola's '449, '547, and '359 Patents to data modulation or DSSS, or generally to the 802.11 Standard. Absent such evidence, the court has no tools with which to evaluate whether the '449, '547, and '359 Patents contribute the entireties of these functions, or provide only a small component. Microsoft did make clear, however, that Motorola did not invent data modulation or DSSS. (11/15/12 Tr. at 109 (Gibson Testimony).)

390. Because of the limited evidence showing the importance of the '449, '547, and '359 Patents to the 802.11 Standard, parties in a hypothetical negotiation would view the '449, '547, and '359 Patents as providing very minimal technical contribution to data modulation and DSSS.[17]

391. Having determined that the '449, '547, and '359 Patents provide minimal contribution to the standard, parties to a hypothetical negotiation would next consider whether the patents are nevertheless important to the Xbox's implementation of the standard.

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[17] As seen with data modulation relevant to 802.11a, 802.11g, and 802.11n, lending support for the court's conclusion is the fact that other companies have disclosed patents essential to the 802.11 Standard in the area of data modulation. (*See supra* note 16.)

392. Through its expert, Dr. Gibson, Microsoft contends that the '449, '547, and '359 Patents are not relevant to the Xbox because these patents relate only to the 802.11b and 802.11g versions of the standard, but not to the 802.11n version, which will be the dominant version going forward. (11/15/12 Tr. at 110:15-112:1 (Gibson Testimony).) In response, Motorola contends that the Xbox supports 802.11b and 802.11g. (11/19/12 Tr. at 81:11-16 (Williams Testimony); Ex. 2329 at MOTM_WASH1823_0606790; Ex. 2329A.) Further, as Dr. Gibson admitted, the availability of 802.11b and 802.11g in the Xbox allows the Xbox to drop back from 802.11n (to 802.11b or 802.11g) when there is too much interference to allow the Xbox to communicate using 802.11n. (11/15/12 Tr. at 192:1-7 (Gibson Testimony); *see also* 11/19/12 Tr. at 96:9-19 (Williams Testimony).) The presence of 802.11b and 802.11g in the Xbox also allows users in homes with older access points to use the Xbox. (11/19/12 Tr. at 96:19-21 (Williams Testimony).)

393. Based on the foregoing evidence, the court concludes that although 802.11n will be the dominant version going forward, it is important for the Xbox to continue to support and use the 802.11b and 802.11g versions of the 802.11 Standard. Doing so allows the Xbox to function in a greater number of user network setups and therefore adds value to Microsoft.

394. Accordingly, the court concludes that parties to a hypothetical negotiation for licenses to the '449, '547, and '359 Patents would deem these patents as providing very little contribution to core functionality of the 802.11 Standard. Additionally, the parties would agree that these Patents relate only to the 802.11b and 802.11g versions of the standard, and that those versions are becoming less prevalent. Nevertheless,

Motorola is correct that the ability to support and use the 802.11b and 802.11g versions provides value to Microsoft's Xbox product.

e. Security Patents

395. Motorola relates the '571 Patent to the four-way handshake used for exchanging secure encryption keys. The "handshake" is a method for exchanging encryption keys used in 802.11 Temporal Key Integrity Protocol ("TKIP") and Counter Mode with Cipher Block Chaining Message Authentication Code Protocol ("CCMP"). (11/15/12 Tr. at 112 (Gibson Testimony); Ex. 157 (the '571 Patent).) The '571 Patent expires on July 1, 2013, and thus is relevant to the Xbox 360 [redacted]. (Exs. 157, 1589.)

396. Motorola relates the '398 Patent 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. at 112-13 (Gibson Testimony); Ex. 161 ('398 Patent).) Similarly, Motorola identifies the '563 Patent as related to using a packet sequence number in the calculation of the MIC. (11/15/12 Tr. at 112-13 (Gibson Testimony); Ex. 169 ('563 Patent).) The '398 Patent expires on July 5, 2014, and thus is relevant to both the Xbox 360 [redacted]. Likewise, the '563 Patent expires on November 18, 2014, and is relevant to both systems.

397. As before, Motorola did not elicit testimony regarding the meaning of the '571, '398, or '563 Patents' claims as they relate to portions of the 802.11 Standard, but now asserts a claims-to-standard relationship through attorney representations in

proposed findings of fact and conclusions of law. (Motorola Pr. FC ¶¶ 310-12, 327-28, 332-33.) Motorola's expert, Dr. Williams, in a conclusory statement, contends that the '571 Patent covers the four-way handshake used for exchanging secure encryption keys in the 802.11 Standard. (11/19/12 Tr. at 88 (Williams Testimony) ("In the ['571 Patent] it discusses a process called in the 802.11 standard as a four-way handshake. The ['571 Patent] covers the first handshake of that four-way handshake, and ultimately ends up in the generation of encryption keys on both sides in order to encrypt the information.").) In similarly conclusory fashion, Dr. Williams opines that the '398 and '563 Patents relate to encryption, and specifically to the MIC message. (11/19/12 Tr. at 88 (Williams Testimony) ("The ['398 and '563 Patents] deal with something called the 'message integrity code.' And this integrity code identifies, specifically to the receiver, that this information was generated by the sender.").)

398. Based on the foregoing, the court finds minimal evidence in the record to demonstrate that the '571, '398 and '563 Patents are indeed essential to any portion of the 802.11 Standard, let alone to security and encryption—core features of the 802.11 Standard. Nevertheless, because Microsoft does not contest that the '571, '398 and '563 Patents are essential, the court will credit Motorola's scant evidence that the '571, '398 and '563 Patents are essential to security and encryption in the 802.11 Standard.

399. Additionally, absolutely no evidence exists in the record explaining the relative importance in relation to other technological contributions of Motorola's '571, '398 and '563 Patents to security or encryption, or generally to the 802.11 Standard. Microsoft, however, presented undisputed evidence that security is a large and complex

topic in the 802.11 Standard, spanning roughly 150 pages. (11/15/12 Tr. at 112 (Gibson Testimony); Ex. 386A.) Also, the record is clear that Motorola did not invent security and encryption in wireless networks. (11/15/12 Tr. at 110-12 (Gibson Testimony).)

400. Because of the limited evidence showing the importance of the '571, '398 and '563 Patents to the 802.11 Standard and strong evidence that other significant technology has been incorporated into security and encryption in the 802.11 Standard, the court concludes that parties in a hypothetical negotiation would view the '571, '398 and '563 Patents as providing very little technical contribution to the overall technology involved in security and encryption in the 802.11 Standard.[18]

401. Microsoft also argues that the Xbox derives little benefit from Motorola's '571, '398 and '563 Patents, aside from compliance with the standard. (11/15/12 Tr. at 114 (Gibson Testimony).)

402. Microsoft presented undisputed evidence explaining that 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. at 114

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[18] Lending support for the court's conclusion is the fact that other companies have disclosed patents essential to the 802.11 Standard in the area of security. Nokia disclosed three U.S. patents to the 802.11 Working Group related to encryption of data in communications: U.S. Patent Nos. 5,987,137; 6,118,775; and 7,120,422. (11/15/12 Tr. at 148-49 (Gibson Testimony); Exs. 234, 245, 397.) LG disclosed two U.S. patents related to encryption of data in communications: U.S. Patent Nos. 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. at 148-49 (Gibson Testimony); Exs. 477, 475.) Finally, ETRI disclosed one U.S. patent related to encryption of data in communications: U.S. Patent No. 7,477,746 (dynamically managing a group transient key). (11/15/12 Tr. at 148-49 (Gibson Testimony); Ex. 480.)

(Gibson Testimony).) Microsoft also presented uncontested evidence that the Xbox provides its own end-to-end security between the Xbox and another Xbox or between Xbox and Xbox Live servers independent of the technology claimed in the Motorola patents. (*Id.* at 113-14.) Microsoft does not rely on the 802.11 security, and thus, 802.11 security and encryption are redundant to the Xbox security, according to Microsoft. (*Id.*)

403. In response, Motorola explained that the Xbox allows a user to use Internet Explorer, a web browser. (11/15/12 Tr. at 22:15-16 (Del Castillo Testimony).) When an Xbox is used with Internet Explorer, the data transmitted is not encrypted by the Xbox security. (*Id.* at 75:9-20.) Thus, communications using Internet Explorer would be visible to anyone browsing an 802.11 network that is not secured. (*Id.* at 75:15-20.)

404. Motorola also presented evidence that when a user streams videos from Netflix or other content providers over the Internet, they do not use the Xbox security. In response, Microsoft presented evidence that content providers, such as Netflix, typically protect their content using security that does not implicate 802.11 encryption. (11/15/12 Tr. at 26-28 (Del Castillo Testimony); 11/15/12 Tr. at 113 (Gibson Testimony).)

405. Finally, Motorola presented evidence that CCMP and TKIP are commonly used security settings when connecting to the Internet through the Xbox. (11/19/12 Tr. at 191:4-18, 191:25-192:9 (Sukumar Testimony); Ex. 2392; Ex. 3034-A.) Microsoft does not appear to dispute that CCMP and TKIP are commonly used settings. (11/15/12 Tr. at 178:5-8 (Gibson Testimony).) Accordingly, the court agrees that CCMP and TKIP are commonly used.

406. Based on the foregoing, the court concludes that Motorola's '571, '398 and '563 Patents contribute very little technology to the security and encryption portions of the 802.11 Standard. Moreover, in certain Xbox functionality, such as game playing, Microsoft—not the 802.11 Standard—provides security and encryption. Nevertheless, in other operations, such as viewing Internet content, the Xbox will use 802.11 security and encryption. In sum, the court concludes that the '571, '398 and '563 Patents contribute very little to the standard, but what they do contribute will be used by the Xbox in certain circumstances. Parties to a hypothetical negotiation would consider the '571, '398 and '563 Patents in this light.

VI. APPROPRIATE RAND ROYALTIES FOR MOTOROLA'S SEPs

The next step in the court's analysis is to determine a RAND rate and range for Motorola's H.264 and 802.11 SEP portfolios. At trial, with respect to determining a RAND royalty rate for both Motorola's H.264 and 802.11 patent portfolios, the parties submitted evidence of license agreements and patent pools that were allegedly comparable to a RAND royalty rate. The court examines the parties' proposed, and competing, comparables to determine applicability to the proper RAND royalty rate and range for Motorola's SEP portfolios vis-à-vis Microsoft. In its analysis, the court considers the RAND-modified *Georgia-Pacific* factors set forth above. At the conclusion of its analysis, the court provides a RAND royalty rate and range for Motorola's H.264 and 802.11 SEPs based on Microsoft's products.

A. Motorola's Suggested Comparables

Through its licensing expert, Mr. Donohoe, Motorola contends that it is entitled to a royalty rate of 2.25 % of the net selling price of Microsoft's Windows and Xbox products in exchange for a license to its H.264 and 802.11 SEP portfolios. Motorola seeks this amount as value for its patent portfolios and is indifferent as to whether the value is in the form of monetary payment, a grant-back license, or another form of compensation. (11/20/12 Tr. at 149-50 (Donohoe Testimony) ("Q: . . . [W]hat you're saying is that Motorola wants 2.25 percent, and doesn't really care whether it's compensated in cash, or in grant-back, but it wants 2.25 percent? A: That's correct.").)

Specifically, with respect to Motorola's 802.11 SEP portfolio, Mr. Donohoe selected 2.25 % of the end-product price as the applicable rate for Motorola's patents, and using this rate, he calculated the total payments that Microsoft would have made based on annual revenues in the fiscal year 2010 to 2011. (11/20/12 Tr. at 140:9-141:3 (Donohoe Testimony).) Mr. Donohoe then picked a royalty rate ranging from 0.25 to 0.5 % for Microsoft's 802.11 SEP portfolio, and using this rate, Mr. Donohoe calculated the total payments that Motorola would have made to Microsoft based on annual revenues of unidentified Motorola products in the fiscal year 2010 to 2011. (11/20/12 Tr. at 141:4-25 (Donohoe Testimony).) Mr. Donohoe then subtracted the amount Motorola would pay to Microsoft from the amount Microsoft would pay to Motorola and determined that Microsoft would have made a net payment to Motorola of $36 to $54 million in the fiscal year 2010 to 2011. Applying this amount to the number of Xbox units sold in that time period, Mr. Donohoe calculated a per unit royalty of $3.00 to $4.50 or 1.15 % to 1.73 %

of average selling price of the Microsoft Xbox. (11/20/12 Tr. at 144:1-19 (Donohoe Testimony).)

Similarly, with respect to Motorola's H.264 SEP portfolio, Mr. Donohoe applied a 2.25 % end-product price royalty to unidentified Microsoft and Motorola products and determined that a net annual payment (for some unidentified year or years) from Microsoft would have been $137 million. He then capped the payment at $100 to $125 million and converted that payment range into a per unit range of $0.50 to $0.63, which he expressed as a rate of 0.68 to 0.84 %. (11/20/12 Tr. at 145:6-146:15 (Donohoe Testimony).)

In this case, as previously explained, Motorola has not placed the value of Microsoft's patents at issue, making it impossible for the court to determine the value of any of Microsoft's patents. In any event, regardless of the form of compensation, Motorola's position is that its 802.11 SEP portfolio is worth 2.25 % of the net selling price of Microsoft's products, and that its H.264 SEP portfolio is worth the same rate with yearly payments capped at $100 to $125 million. To support this position, Mr. Donohoe, Motorola's licensing expert, addressed *Georgia-Pacific* Factor 1, which examines the royalties received by the patentee for licensing the patents in suit, proving or tending to prove an established royalty. Mr. Donohoe discussed: (1) a 2011 license agreement between MMI and VTech Telecommunications Ltd. ("VTech"); (2) a 2010 patent cross license agreement between Motorola and Research In Motion Limited ("RIM"); and (3) three agreements entered into by Symbol before it was acquired by Motorola. (11/20/12 Tr. at 138:5-140:23 (Donohoe Testimony); Exs. 13, 36-38, 2833.)

i. The VTech License Agreement

407. VTech is the world's leading manufacturer and seller of cordless telephones. (11/20/12 Tr. at 85:24-86:1 (Dailey Testimony).)

408. On November 13, 2007, Motorola brought suit against VTech in the Eastern District of Texas accusing VTech of infringing six Motorola patents. These patents were not SEPs and they had no RAND licensing requirements. (11/20/12 Tr. at 87:19-88:5 (Dailey Testimony).)

409. Motorola and VTech settled this lawsuit in January 2010 and signed a one-year licensing agreement. Pursuant to this agreement, Motorola was required to provide written notice of any further infringement after the license expired in January 2011. If Motorola and VTech could not agree on new licensing terms, then they would arbitrate to settle the dispute. (11/20/12 Tr. at 88:6-89:16 (Dailey Testimony); Ex. 1680.)

410. On June 17, 2011, Motorola notified VTech that it considered VTech to be infringing a number of Motorola's corded and cordless phone patents. (11/20/12 Tr. at 89:18-22 (Dailey Testimony); Ex. 13 at MOTM_WASH1823_0394368 (second "Whereas" clause).) Motorola valued this alleged infringement at [redacted] on VTech's past sales, and [redacted] in forward-facing royalties through 2019. (Ex. 1681 at 13; 11/20/12 Tr. at 91:21-23 (Dailey Testimony).)

411. In October 2011, 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.)

412. Motorola subsequently settled its infringement claims against VTech and provided VTech with a paid-up license under its cordless and corded phone patents for

$12 million. (Ex. 13 at §§ 3.1(a)-(b) and 4.1.) As a part of the same agreement, VTech agreed to take a license to Motorola's 802.11 and H.264 Patents with a running royalty of 2.25 %. (Ex. 13 § 4.2.)

413. Motorola argues that the VTech's agreement to a 2.25 % license for Motorola's 802.11 and H.264 patent portfolios is distinct from the settlement discussions for the alleged infringement. (*See generally* Motorola Pr. FC ¶¶ 104-07.) The court, however, does not reach the same conclusion.

414. The court's conclusion is supported by an October 7, 2011, e-mail VTech sent to Motorola seeking a license to Motorola's 802.11 and H.264 portfolios. The e-mail provides, in relevant part:

> We have an interest in licensing your WiFi, 802.11 and MPEG video portfolios particularly if it would give us some measure of protection on some future products on our road map. We see a convergence of technologies on future home communication phones/devices that would use some of these technologies.
>
> We could enter into a long term license as part of the agreement we are trying to settle on the assumption that we would list products using MMI's IP after determining that they qualified. What we are seeking to learn is the areas that they cover and the degree of practical application to our product direction. Our motivation is to seek a degree of protection by this license.

(Ex. 2832.)

415. The language in the October 7, 2011, e-mail makes clear to the court that 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. Under the threat of a potential infringement lawsuit, the court cannot say that the VTech license agreement for Motorola's 802.11 and H.264 SEPs is a reliable indicator of a RAND royalty rate. As

stated above, a RAND royalty rate would be the result of a reasonable SEP patentee and a reasonable implementer negotiating towards a reasonable royalty rate. The threat of a lawsuit, following a history of litigation between the parties, cannot form the basis for such a reasonable negotiation.

416. Dr. Murphy explained this logic: "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." (11/13/12 Tr. at 192:15-193:21 (Murphy Testimony).) The court agrees with Dr. Murphy and thus concludes, as Microsoft contends, that VTech would not have agreed to pay 2.25 % in royalties for Motorola's 802.11 and H.264 SEP portfolios independent of the broader licensing agreement.

417. Lending support to the court's conclusion is the fact that Motorola and VTech entered into this agreement during the pendency of the present litigation. More specifically, Motorola and VTech agreed on the eve of a hearing in the International Trade Commission ("ITC") at which Motorola relied on the agreement as evidence of the reasonableness of its royalty demands on Microsoft. (11/20/12 Tr. at 94:9-95:14 (Dailey Testimony).)

418. That VTech has paid very little under its license agreement for Motorola's 802.11 and H.264 SEPs strongly diminishes the license agreement's relevance as an established royalty rate under Factor 1. 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 [redacted] for December 2011, based on U.S. sales for the month of [redacted] radios); Ex. 3373 (indicating royalties on Internet radio were [redacted] for the third calendar quarter of 2012).) VTech has never paid any royalties on any product compliant with the H.264 Standard. (11/20/12 Tr. at 100:10-13 (Dailey Testimony).)

419. Finally, Motorola contends that VTech recently launched toy tablet products—the Innotab 2 and Innotab 2S—that appear to implement the 802.11 and H.264 Standards, and (according to Motorola) are expected to generate significant royalty revenue in the near future. (Motorola Pr. FC ¶¶ 110-11.) VTech, however, has not yet paid any royalties on those products, and Mr. Dailey could not predict how many of the toys VTech was going to sell. (11/20/12 Tr. at 100:14-25, 101:11-13 (Dailey Testimony).) Again, the court concludes that hypothetical future sales do little to demonstrate an established royalty rate under Factor 1.

420. In sum, based on the foregoing, the court concludes that the VTech license agreement does not establish a RAND royalty rate and is not an indicator to what is in fact an appropriate RAND royalty rate for Motorola's 802.11 and H.264 patent portfolios in a negotiation with Microsoft.

ii. The RIM License Agreement

421. On January 1, 2003, Motorola and RIM entered into a Cellular Essential Properties Cross License Agreement. (Ex. 2800.) As a result of the negotiation between RIM and Motorola, the parties reached an agreement that included a cross license to

Motorola under RIM's SEPs and a running royalty of [redacted] to be paid by RIM on any mobile device sold by RIM that was compliant with Narrowband CDMA, Wideband CDMA and TD/CDMA. (Ex. 2800 at MOTM_WASH1823_0025608 (§ 4.1.2).) RIM paid a flat lump sum for TDMA-compliant mobile phones. (Ex. 2800 at MOTM_WASH1823_0025608 (§ 4.1.1).) By its terms, the agreement lasted until December 31, 2007. (Ex. 2800 at MOTM_WASH1823_0025610.)

422. Around the time the 2003 RIM agreement expired, the parties negotiated for, but were unable to consummate, a new cross license agreement. As a result of this impasse, the parties engaged in litigation, including litigation regarding certain of Motorola's 802.11 SEPs. (*See, e.g.*, Ex. 1672.)

423. On June 1, 2010, Motorola and RIM entered into a second cross license agreement for various wireless communications standards, including Wi-Fi (802.11), certain cellular properties, video coding standards (including H.264), and non-essential wireless messaging patents. (Ex. 2833; 11/20/12 Tr. at 56:20-57:8 (Dailey Testimony).) In exchange for this license, RIM granted a license to Motorola under RIM's essential patents and agreed to pay a lump sum of [redacted] and a running royalty rate of [redacted] of the net selling price of any mobile device sold, regardless of the number of standards the product used. (11/20/12 Tr. at 56:22-57:24 (Dailey Testimony); Ex. 2833 at MOTM_WASH1823_0025522.)

424. The June 2010 agreement capped royalty payments made by RIM at [redacted] annually. (11/20/19 Tr. at 57:25-58:6 (Dailey Testimony).) Motorola and RIM each exchanged patent "picks" for non-essential patents. (*Id.* at 106:4-8.) The parties

also transferred certain patents to one another. (*Id.* at 56:20-57:1.) This agreement is effective until May 30, 2020. (Ex. 2833 at MOTM_WASH1823_0025524.)

425. Motorola contends that the RIM license is comparable to a RAND license agreement with Microsoft for Motorola's H.264 and 802.11 patent portfolios. In support of its contention, Motorola argues that under the payment provision of the agreement, if RIM were to market a product that used only the 802.11 and H.264 Standards and not the cellular portfolios, RIM would pay [redacted]. (11/20/12 Tr. at 57:16-20 (Dailey Testimony).) For the following reasons, the court disagrees that Motorola's RIM license agreement is comparable to a RAND royalty rate between Microsoft and Motorola in this case.

426. First, the RIM agreement is a "fairly broad cross-license" that licenses patents essential to many standards in addition to 802.11 and H.264, including Motorola's cellular patents, as well as other non-standard-essential patents.[19] (11/20/12 Tr. at 56:20-57:8, 105:7-106:11 (Dailey Testimony).)

427. The court concludes that where 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 licensed properties. (*See, e.g.*, 11/19/12 Tr. at 160:10-18 (Schmalensee Testimony) (if H.264 Patents were licensed together with patents essential to other standards, "one

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[19] The RIM license agreement also involves patent transfers going both ways, providing mutual benefit to both parties. (11/20/12 Tr. at 56:20-57:8, 105:7-106:11 (Dailey Testimony).)

would need to estimate the value of the other patents and subtract it out"); 11/13/12 Tr. at 162:7-18 (Murphy Testimony).)

428. Such apportionment would be difficult. (11/19/12 Tr. at 160:10-19 (Schmalensee Testimony) (agreeing it would be a "pretty tough thing to do").) Here, the challenge in apportionment is made more difficult by Motorola's practice of providing licensees with a license to its 802.11 and H.264 portfolios at no additional charge if a licensee takes a license to its cellular portfolios. (*See* 11/20/12 Tr. at 74:16-20, 74:25-75:11 (Dailey Testimony) ("It makes it challenging, I suppose.").)

429. At trial, Motorola did not apportion the amount RIM paid between Motorola's 802.11 or H.264 portfolios and the other patents licensed in the RIM license agreement. Although Mr. Dailey asserted that the RIM license agreement apportioned the royalties payable among the different portfolios (11/20/12 Tr. at 57:9-15 (Dailey Testimony)), the terms of the agreement do no such thing. To the contrary, the agreement makes clear that royalty payments are to be made on RIM's aggregate sales regardless of the standards its products implement or the patents its products infringe:

[redacted]

(Ex. 2833 § 5.1.2.)

430. As a result, the court has no way of determining the value of Motorola's 802.11 and H.264 patent portfolios as distinct from Motorola's wireless cellphone

portfolio and the other patents included in the RIM agreement. It is also important to the court that the uncontroverted evidence elicited at trial demonstrated that Motorola's wireless cellphone portfolio is extremely strong. (11/20/12 at Tr. 87:6-8 (Dailey Testimony).) Accordingly, the court first concludes that an agreement that licenses Motorola's cellphone portfolio as well as other Motorola patents may, in terms of value, be dominated by the cellphone portfolio, as opposed to the other patents included in the agreement.

431. Second, the RIM license agreement provides for a comprehensive settlement of a wide range of litigation between the parties, including litigation in which Motorola was seeking an exclusion order in the ITC to prevent the importation of RIM's flagship BlackBerry products. (11/20/12 Tr. at 101:22-25, 104:7-13 (Dailey Testimony).) Thus, like the VTech agreement, the RIM agreement resolves a long-lasting dispute and litigation between Motorola and the licensee. The court agrees with Microsoft that no evidence exists tending to prove that RIM would have agreed to royalties for either 802.11 or H.264 Patents alone, apart from this broader agreement that allows RIM to avoid an exclusion order on its BlackBerry products.

432. Third, the RIM licensee agreement caps royalty obligations at [redacted] annually. (Ex. 2833 at §§ 1.7, 5.1.3.) When the agreement was negotiated, RIM hit the [redacted] cap on the basis of sales of its cellular-compliant BlackBerry products alone (11/20/12 Tr. at 106:21-107:6 (Dailey Testimony)), meaning that it would have paid no incremental royalties for any non-cellular products it might have sold that implemented the 802.11 or H.264 Standards.

433. Fourth, under the terms of a prior license (Ex. 2800), RIM paid Motorola the same [redacted] for patents not including the rights to 802.11 or H.264 implementations. (11/20/12 Tr. at 116:3-8, 117:7-12 (Dailey Testimony).) The court concludes that to the extent any value can be derived from the RIM agreement for Motorola's H.264 and 802.11 Patents, the evidence suggests that the value is very little.

434. Finally, Motorola contends that RIM pays this [redacted] running royalty on its BlackBerry devices, as well as its PlayBook tablet, the latter of which implements the 802.11 and H.264 Standards, but is not cellular capable. (11/20/20 Tr. at 58:9-23 (Dailey Testimony).) The evidence before the court, however, is that the PlayBook tablet is not a strong selling item for RIM. (*See id.* at 107.) Thus, the court cannot conclude that Motorola has established the RIM license agreement as a comparable royalty pursuant to Factor 1.

435. In sum, based on the foregoing, the court concludes that the RIM license agreement does not establish a RAND royalty rate and is not an indicator to what is in fact an appropriate RAND royalty rate for Motorola's 802.11 and H.264 patent portfolios in a negotiation with Microsoft.

iii. The Symbol License Agreements

436. On January 9, 2007, Motorola, Inc., completed its acquisition of Symbol Technologies, Inc. ("Symbol"). (11/20/12 Tr. at 59:2-6 (Dailey Testimony).)

437. U.S. Patent Nos. 5,029,183; 5,479,441; 6,236,674; 6,404,772; and 6,473,449 are 802.11 SEPs owned by Symbol at the time of Motorola's acquisition. Each

of these patents was listed in the Annex attached to Motorola's October 2010 offer to Microsoft. (Ex. 1; 11/20/12 Tr. at 60:3-9 (Dailey Testimony).)

438. Motorola's licensing expert Mr. Donohoe also identified three license agreements between Symbol and various counterparties that he testified were relevant under Factor 1. These agreements involved the six 802.11 SEPs listed in the preceding paragraph. Mr. Donohoe admitted, however, that there are "a lot of differences between the three Symbol agreements and what's being negotiated between Microsoft and Motorola." (11/20/12 Tr. at 140:1-12 (Donohoe Testimony)); *see also* 11/20/12 Tr. at 59:12-61:24 (Dailey Testimony) (discussing Symbol licenses); Exs. 36-38.)

439. The first agreement that Mr. Donohoe referenced was between Symbol and Proxim. (11/20/12 Tr. at 140:1-7 (Donohoe Testimony); Ex. 36.) In 2003, a jury awarded Symbol a royalty of 6 % of the average selling price of Proxim's finished products for two of the patents offered to Microsoft in October 2010—U.S. Patent Nos. 5,029,183 and 5,479,441. (11/20/12 Tr. at 59:20-60:2; 81:15-19 (Dailey Testimony); *see also* 11/16/12 Tr. at 166:6-13 (Lynde Testimony).) In settling this dispute, [redacted]. (Ex. 36; 11/20/12 Tr. at 59:20-60:9 (Dailey Testimony).) The final agreement indicated that total compensation was valued at no less than a running royalty of [redacted] of the net product revenue of Proxim's licensed products. (Ex. 36 at MOTM_WASH1823_0398587.)

440. For several reasons, the court concludes that the Symbol-Proxim agreement is not a good indicator of a RAND license agreement between Microsoft and Motorola for Motorola's 802.11 and H.264 SEPs.

441. First, Mr. Dailey, who provided the only substantive testimony regarding the Symbol-Proxim license, did not know whether the jury had been instructed that there were RAND limitations on the royalties that could be awarded. (11/20/12 Tr. at 81:20-24 (Dailey Testimony).) Thus, there is no indication that Symbol and Proxim negotiated for the patents at issue (the '441 and '183 Patents) under the RAND obligation.

442. Second, 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) expired before Motorola even sent the October 21, 2010, demand letter to Microsoft. (Ex. 1589 (summary exhibit identifying that the '441 and '183 patents expired on June 29, 2009); 11/16/12 Tr. at 177:15-22 (Lynde Testimony); Ex. 1.) Thus, the court concludes that Microsoft and Motorola would not have considered the patents involved in the Proxim agreement during a negotiation for Motorola's 802.11 and H.264 SEPs.

443. Third, as before, the court declines to find an agreement fashioned under duress of litigation to be indicative of a RAND license agreement. Accordingly, the court finds that the Symbol-Proxim agreement has no relevance to a proper RAND royalty rate in this case.

444. The second Symbol agreement Mr. Donohoe referenced was with Hand Held Products ("HHP"). (11/20/12 Tr. at 140:1-7 (Donohoe Testimony); Ex. 36.) In

2004, Symbol licensed to HHP three of the 802.11 Patents offered to Microsoft in the October 2010 letter—U.S. Patent Nos. 5,029,183; 5,157,687; and 5,479,441. (Ex. 38.) Under the agreement, HHP agreed to pay Symbol [redacted] on products covered by the patents at issue. This rate was subject to an annual cap of [redacted], which could increase by [redacted], at which point the license was deemed fully paid-up. (Ex. 38 at §§ 5.1, 5.2; 11/20/12 Tr. at 84:3-23 (Dailey Testimony).) Symbol also received grant-back rights under the agreement. (Ex. 38; 11/20/12 Tr. at 60:17-25 (Dailey Testimony).)

445. For the reasons below, the court concludes that the HHP agreement is not a good indicator of RAND in this case.

446. First, like the Symbol agreement with Proxim, the Symbol agreement with HHP was a settlement agreement, and it involved the same now-expired patents involved in the Proxim agreement—the '441 and '183 Patents. (11/20/12 Tr. at 83:7-21 (Dailey Testimony); Ex. 38 at MOTM_WASH1823_0398559.) The HHP agreement also included one other patent—the '687 Patent—which the court has determined does not apply to Microsoft. (*Id.*) Thus, the court concludes that in a hypothetical negotiation between Microsoft and Motorola, Microsoft would not consider any of the patents involved in the HHP agreement relevant to their products.

447. Second, the royalty payments in the HHP agreement were subject to an annual cap of [redacted], far below the total amount of money Motorola is seeking from Microsoft.

448. Third, like the Proxim agreement, Symbol and HHP reached the agreement as part of a settlement. As before, the court declines to credit a license agreement brought about by pending litigation as being a good indicator of a RAND royalty rate.

449. Fourth, and finally, there is no indication that the HHP agreement was the result of a negotiation where the parties thereto considered the RAND obligations of Motorola's '441, '183, and '687 Patents.

450. The last Symbol agreement Mr. Donohoe referenced was with Terabeam. In 2006, Symbol licensed to Terabeam three of the 802.11 Patents Motorola offered to Microsoft—U.S. Patent Nos. 5,029,183; 5,479,441; and 6,473,449. (Ex. 37.) According to the agreement itself, the consideration paid by Terabeam in lump-sum amounts was valued at [redacted] of the net selling price of licensed products through expiration of two of the patents and [redacted] through expiration of the final patent. (Ex. 37 at MOTM_WASH1823_0398549; 11/20/12 Tr. at 61:15-24 (Dailey Testimony).)

451. For the reasons below, the court concludes that the Terabeam license is a poor indicator of a RAND royalty rate in this case.

452. As stated, two of the three patents involved in the Terabeam license—the '441 and '183 Patents—were expired by the time Motorola sent its October 2010 offer letters to Microsoft and therefore would not have been considered by Microsoft and Motorola during a RAND negotiation. Moreover, the court has already found that the third patent—U.S. Patent No. 6,473,449—provided very minimal technical contribution to data modulation and DSSS within the 802.11 Standard.

453. Additionally, although the Terabeam license listed nominal running royalty rates for the licensed patents (including the expired '441 and '183 Patents), it required Terabeam to make fixed quarterly payments ranging from [redacted]. (Ex. 37 at MOTM_WASH1823_0398558.) The Terabeam license was fully paid up after the payment of [redacted] in royalties. (11/20/12 Tr. at 85:13-19 (Dailey Testimony); Ex. 37 at MOTM_WASH1823_0398558.) This total payment amount is significantly less than the amount Motorola seeks in this case.

454. As a result of the foregoing, the court concludes that the Terabeam license agreement does little to show an established royalty rate commensurate with the amount of royalties Motorola seeks from Microsoft in this matter for the license of its H.264 and 802.11 patent portfolios.

iv. Stacking Issues with the Rates Motorola Seeks

455. As stated, for its 802.11 SEP portfolio, Motorola seeks a royalty rate of 2.25 % of the end-product price. (11/20/12 Tr. at 140:9-141:3 (Donohoe Testimony).) Motorola expert Mr. Donohoe, however, calculated a royalty rate based on the net royalty flow accounting for the exchange of a cross license between Microsoft and Motorola. (*Id.* at 141:4-25.) Mr. Donohoe's calculation resulted in payments from Microsoft to Motorola at a per unit royalty of $3.00 to $4.50 or 1.15 % to 1.73 % of the average selling price of the Microsoft Xbox. (*Id.* at 144:1-19.) In this case, Motorola has not placed the value of Microsoft's patents at issue, and as a result, the court declines to determine the value of Microsoft's patents in determining a royalty rate. Therefore,

because Mr. Donohoe's calculations are offset by payments from Microsoft to Motorola, they are artificially low.

456. Nevertheless, even taking Mr. Donohoe's royalty rates as accurate, Motorola's royalty request for its 802.11 SEP portfolio raises significant stacking concerns. There are at least 92 entities that own 802.11 SEPs. (*Supra* ¶ 335.) If each of these 92 entities sought royalties similar to Motorola's request of 1.15 % to 1.73 % of the end-product price, the aggregate royalty to implement the 802.11 Standard, which is only one feature of the Xbox product, would exceed the total product price. The court concludes that a royalty rate that implicates such clear stacking concerns cannot be a RAND royalty rate because such a royalty rate does not stand up to the central principle of the RAND commitment—widespread adoption of the standard. 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. at 179:1-8 (Lynde Testimony).)

457. Additionally, the court concludes that stacking concerns are heightened in this case because Motorola's 802.11 SEP portfolio provides only minimal contribution to the 802.11 Standard.

458. Similarly, for its H.264 SEP portfolio, Motorola seeks a royalty rate of 2.25 % of the end-product price, but with total yearly royalties capped at $100 to $125 million. (11/20/12 Tr. at 145:6-146:15 (Donohoe Testimony).) As with Motorola's 802.11 SEP portfolio, Mr. Donohoe calculated a royalty rate based on the net royalty flow accounting for the exchange of a cross license between Microsoft and Motorola.

(*Id.*) Mr. Donohoe's calculation resulted in payments from Microsoft to Motorola at a per unit rate of $0.50 to $0.63 or 0.68 % to 0.84 % of the average selling price of Microsoft's H.264-compliant products. (*Id.*) As stated, Motorola has not placed the value of Microsoft's patents at issue, and as a result, the court declines to determine the value of Microsoft's patents in determining a royalty rate. Therefore, because Mr. Donohoe's calculations are offset by payments from Microsoft to Motorola, they are artificially low.

459. As with Motorola's 802.11 SEP portfolio, even taking Mr. Donohoe's royalty rates as accurate, Motorola's royalty request for its H.264 SEP portfolio raises significant stacking concerns. There are at least 52 entities that own H.264 SEPs. (*Supra* ¶ 157.) If each of these entities sought royalties similar to Motorola's request of 0.68 to 0.84 % of the end-product price, the aggregate royalty to implement the H.264 Standard, which is only one feature of Microsoft's products, would amount to 35.36 % to 43.68 % of the total product price. The court concludes that this royalty rate, like the aggregate royalty rate requested by Motorola for its 802.11 SEP portfolio, would not promote widespread adoption of the standard and therefore is not commensurate with the RAND commitment. Additionally, stacking concerns are heightened in the case of Motorola's H.264 SEP portfolio because the court has determined that Motorola's H.264 SEP portfolio relates almost entirely to interlaced video—a functionality not important to Microsoft's H.264-compliant products.

460. Motorola argues that potential royalty stacking concerns have not, to date, impeded widespread adoption of the H.264 and 802.11 Standards. (*See* 11/13/12 Tr. at

177-79 (Murphy Testimony); 11/16/12 Tr. at 139-41 (Lynde Testimony); 11/19/12 Tr. at 148 (Schmalensee Testimony).) This argument is misplaced. In this litigation, the court is the arbiter to a dispute over whether Motorola has met its RAND obligations. Whether other SEP holders have complied with their RAND obligations says nothing as to whether Motorola has met its own RAND obligations. Stated in other words, it would make little sense for the court to decline to enforce Motorola's RAND obligations simply because other SEP owners have complied with their own obligations. Thus, the court must determine a reasonable royalty rate for Motorola's SEPs based on the principles underlying the RAND commitment, one of which is the concern of royalty stacking.

461. In sum, the court concludes that the royalty rates sought by Motorola for its 802.11 and H.264 SEP portfolios do not fall within the range of RAND royalties.

B. Microsoft's Suggested Comparables

Microsoft's comparables are mostly based on two patent pools—an H.264 standard essential patent pool and an 802.11 Standard essential patent pool. The court begins its analysis with an overview of patent pools generally and then analyzes the patent pool that Microsoft alleges best compares to Motorola's H.264 SEPs (the MPEG LA H.264 patent pool) followed by the patent pool that Microsoft asserts best compares to Motorola's 802.11 SEPs (the Via 802.11 pool). With respect to Motorola's 802.11 SEP portfolio, the court also analyzes other licensing arrangements Microsoft asserts are comparable to a RAND royalty rate.

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i. Overview of Patent Pools

462. Generally, patent pools are created by two or more SEP owners or by an administrator of a prospective patent pool who collects SEP owners to act as licensors with the purpose of licensing SEPs to third-party licensees, and usually to the other licensors, in a single licensing package. (*See, e.g.*, Ex. 2345 at MS-MOTO_1823_00002433307-08.)

463. Participation in a patent pool is voluntary. (11/13/12 Tr. at 98:7-12 (Glanz Testimony); 11/13/12 Tr. at 169:12-14 (Murphy Testimony).) A patent holder can choose to license its SEPs outside of a pool.[20] (11/16/12 Tr. at 151:10-13 (Lynde Testimony).)

464. Patent pools are also independent from SSOs. As Microsoft's Gary Sullivan—who was the chairman of the JVT, the organization that finalized the H.264 video standard (11/13/12 Tr. at 208:24-209:16 (Sullivan Testimony))—explained, "[o]pen standards (e.g., ITU-T, ISO, IECI) . . . do not force anyone to join any pool and have no relationship whatsoever with any pools that do form." (Ex. 2345 at MS-MOTO_1823_00002433307.)

465. Patent pools generally—as well as the specific pools at issue in this case, MPEG LA H.264 and Via Licensing patent pools—distribute royalties on a per patent basis as part of a patent-counting system. (11/13/12 Tr. at 62:21-63:8, 132:16-24 (Glanz Testimony); 11/13/12 Tr. at 157:23-158:1 (Murphy); 11/16/12 Tr. at 143:3-5 (Lynde

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[20] Microsoft itself preferred and chose to engage in bilateral negotiations for the 802.11 Standard rather than joining a pool. (11/16/12 Tr. at 155:2-15 (Lynde Testimony).)

Testimony).) This structure generally provides equal compensation for any given patent in the pool without regard to the technology of each patent, its merit, its importance, or its contribution to the standard. (11/13/12 Tr. at 62:21-63:8, 124:18-125:21, 132:16-24 (Glanz Testimony); 11/13/12 Tr. at 157:23-158:1 (Murphy Testimony); 11/16/12 Tr. at 143:7-144:11 (Lynde Testimony).) "Everyone who joins in the pool agrees to have essentially an equal valuation on a per patent basis." (11/13/12 Tr. at 125:19-21 (Glanz Testimony).)

466. Pools generally set a fee so participants do not need to negotiate with individual prospective licensees. (11/13/12 Tr. at 170:12-171:3 (Murphy Testimony).) Once the terms of a patent pool are set, a potential licensor cannot go to the pool and renegotiate the deal. (11/13/12 Tr. at 171:1-3 (Murphy Testimony).) This results in fundamental or broad patents being given the same value as weak or narrow patents. (11/13/12 Tr. at 148:14-24 (Murphy Testimony); 11/16/12 Tr. at 143:25-144:11 (Lynde Testimony).)

ii. The MPEG LA H.264 Patent Pool

467. Using the MPEG LA H.264 patent pool as a comparable, Microsoft contends that the range of RAND royalties for a Microsoft-Motorola license for Motorola's H.264 SEPs would be between 0.065 and 0.204 cents per unit or between $167,000.00 and $502,000.00 per year at current volumes. (11/16/12 Tr. at 99:3-104:8 (Lynde Testimony); 11/20/12 Tr. at 161:7-18 (Lynde Testimony); Exs. 1161, 1163.) According to Microsoft, 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 $474,000.00 at current volumes. (11/16/12 Tr. at 100:3-17 (Lynde Testimony); 11/20/12 Tr. at 159:7-12 (Lynde Testimony).)

468. Microsoft contends that 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. at 155:25-158:12 (Murphy Testimony); 11/16/12 Tr. at 80:15-81:2, 84:15-86:4 (Lynde Testimony).)

a. Background Regarding the Formation of the MPEG LA H.264 Patent Pool

469. 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 finalized. (11/13/12 Tr. at 61:10-15 (Glanz Testimony); 11/16/12 Tr. at 94:25-95:9 (Lynde Testimony).)

470. Microsoft, Motorola, and other companies participated in efforts to form the MPEG LA H.264 patent pool. (Ex. 1584 at MS-MOTO_1823_0002353109 (listing participants); Ex. 1139 (same); 11/13/12 Tr. at 67:10-17 (Glanz Testimony).)

471. Meetings concerning the formation of the MPEG LA H.264 pool occurred before widespread implementation of the H.264 Standard. Indeed, many potential licensees waited to implement the standard until the MPEG LA pool meetings and the meetings of another pool sponsor, Via Licensing Corporation, concluded. They wanted to know the respective pool royalty rates and structures before committing to implement the H.264 Standard. (11/13/12 Tr. at 63:15-67:4, 67:5-68:1, 89:11-90:2 (Glanz Testimony).)

472. 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. at 63:21-64:8 (Glanz Testimony).) With this in mind, the parties involved in the formation of the MPEG LA H.264 pool, including Microsoft and Motorola, tried 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 use an alternative. (11/13/12 Tr. at 74:13-76:5 (Glanz Testimony); Ex. 1642 (email string in which Motorola's 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").)

473. 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. at 72:21-73:10 (Glanz Testimony).) At that meeting, Microsoft was represented by Garrett Glanz, and Motorola was represented by Paul Bawel. (11/13/12 Tr. at 62:7-11, 67:10-16 (Glanz Testimony).) The main focus of this two-day meeting was the royalty amount per codec (a combination of an encoder and a decoder) and whether to apply annual caps or some other form of volume discount. (11/13/12 Tr. at 68:23-69:2, 85:20-25 (Glanz Testimony).)

474. During the meetings, Mr. Glanz took detailed notes of the views expressed by the representatives of the approximately eighteen participating companies, including

the views expressed by Motorola. (11/13/12 Tr. at 72:21-73:10 (Glanz Testimony); Ex. 1139.)

475. On behalf of Motorola, Mr. Bawel criticized elements of one proposal that called for uncapped royalties for codecs that implement the main and extended profiles of H.264 of between $0.20 and $1.50 per unit depending on volume as being "too expensive for mobile" devices and stated that Motorola was strongly in favor of annual caps. (Ex. 1139 at MS-MOTO_1823_00003927604-05; 11/13/12 Tr. at 80:8-9, 80:19-81:1 (Glanz Testimony).) Mr. Bawel said that if the proposal with uncapped royalties was adopted, it would lead mobile manufacturers like Motorola to choose to implement video compression technologies other than H.264. (11/13/12 Tr. at 80:19-81:1 (Glanz Testimony).)

476. Mr. Bawel later indicated that, as between two other 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 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. at 82:19-84:25, 86:6-10 (Glanz Testimony).)

477. 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. at 87:4-88:11 (Glanz Testimony); 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 H.264 SEPs, assuming they could be persuaded to participate in the pool. (*See id.*)

478. The MPEG LA meetings eventually led to a consensus on royalties in the fall of 2003, which was expressed in a November 17, 2003, "News Release." The release 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. at 88:21-24, 89:11-90:2 (Glanz Testimony).) The News Release 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 and scaling up to $5 million over the licensing term. (Ex. 1584 (MPEG LA's November 17, 2003, News Release) at 2-3.)

479. Motorola approved the November 2003 "News Release" including these announced royalties and caps. (11/13/12 Tr. at 64:9-66:23(Glanz Testimony) (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).)

480. 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. at 91:20-92:7 (Glanz Testimony).) Motorola agreed with those changes 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 Testimony).)

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

482. 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 the total pool based on the licensor's number of SEPs relative to the total number of SEPs 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. at 62:12-63:11, 131:19-132:7 (Glanz Testimony).)

483. Motorola did not object to this allocation method during the formation of the MPEG LA H.264 pool, nor did it state that its patents were more valuable than, or deserved a higher royalty than, the average pool patent. (11/13/12 Tr. at 95:5-10, 131:25-132:11 (Glanz Testimony).)

484. Indeed, Motorola was familiar with the earlier pools on which MPEG LA H.264 was modeled. Motorola 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. at 92:10-93:4, 94:6-14, 101:5-17 (Lynde Testimony); 11/13/12 Tr. at 85:13-17 (Glanz Testimony).) 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. at 93:5-10 (Lynde Testimony).)

485. 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. at 93:11-94:14 (Lynde Testimony).) 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.)

486. 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 included 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.)

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

b. The MPEG LA H.264 Pool Today

488. The MPEG LA H.264 pool currently includes approximately 275 U.S. SEPs and over 2,400 SEPs worldwide. (Ex. 1152.) Those SEPs 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. at 85:18-21, 90:11-91:20 (Lynde Testimony).)

489. Over 1,100 licensees participate in the MPEG LA H.264 patent pool. (11/16/12 Tr. at 85:18-21, 94:22-24 (Lynde Testimony).)

490. Pursuant to the form MPEG LA H.264 pool agreement, licensees agree that if they or their affiliates have H.264 SEPs, they will license them to pool licensors on RAND terms. This arrangement is based on 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. at 95:25-97:19 (Lynde Testimony).)

491. 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 Testimony); Ex. 1626.)

492. 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. at 65:10-14, 95:14-20 (Glanz Testimony); Ex. 1626.)

493. 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. at 102:22-23 (Lynde Testimony).) 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 § 3.1.6; Ex. 103 § 3.1.6.)

494. The agreement also provides that royalty rates will not increase by more than 10 % upon renewal of the agreement, although increases have not occurred since the agreement commenced. (Ex. 3087 § 6.1; 11/16/12 Tr. at 100:18-101:4 (Lynde Testimony).)

495. The agreement that MPEG LA has entered into with the licensors participating in the pool obligates MPEG LA to use commercially reasonable best efforts

to maximize the royalties generated by the MPEG LA H.264 patent pool. (Ex. 1636 at § 3.9.)

c. The MPEG LA H.264 Pool as an Indicator of RAND Terms for Motorola's H.264 SEPs

496. Microsoft contends that the MPEG LA H.264 patent pool is the best indicator of a RAND royalty rate for Motorola's H.264 SEPs. According to Microsoft, 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, support the conclusion that 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. at 155:25-158:12 (Murphy Testimony); 11/16/12 Tr. at 80:15-81:2, 84:15-86:4 (Lynde Testimony).)

497. Microsoft also asserts that 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 confirm that the MPEG LA H.264 pool is an appropriate benchmark in this case. (11/16/12 Tr. at 91:21-94:14 (Lynde Testimony).)

498. For its part, Motorola presented significant evidence that patent pools generally have lower rates than those that can be achieved through bilateral, private negotiations. (Ex. 3013 at 167; 11/16/12 Tr. at 72:6-12 (Simcoe Testimony); 11/19/12 Tr. at 137:13-138:3 (Schmalensee Testimony); 11/16/12 Tr. at 141:25-142:13 (Lynde

Testimony).) According to Motorola, there are many factors that make patent pools more likely to have rates lower than the rates in bilaterally-negotiated licenses. The main factors are: (1) the principal objective of most pools is not to maximize licensing revenue but instead to minimize royalty exposure and maximize freedom of operation for licensees, which drives down the royalty rate (11/19/12 Tr. at 143:23-144:6 (Schmalensee Testimony)); (2) pools that allocate revenue based on patent-counting ignore the value of the individual patents being licensed (*see* 11/13/12 Tr. at 125:11-21, 134:3-6 (Glanz Testimony); *see also* 11/16/12 Tr. at 143:3-6, 145:11-13, 146:16-20 (Lynde Testimony)); (3) due to the non-negotiable nature of patent pool licenses, royalty rates must be low to entice licensees to join (*see, e.g.*, 11/19/12 Tr. at 147:25-148:4 (Schmalensee Testimony)); (4) pools have low licensing transaction costs that allow for lower rates (11/16/12 Tr. at 147:11-148:8 (Lynde Testimony)); and (5) concerns over antitrust scrutiny lead to lower rates (*see* 11/16/12 Tr. at 68:2-6 (Simcoe Testimony)). Motorola elicited testimony that because of the typically lower rates found in patent pools, if a patent holder wanted to pursue an "aggressive" licensing strategy, "the pool is not the place to do that." (11/13/12 Tr. at 134:3-6 (Glanz Testimony).)

499. Based on this extensive testimony, the court agrees as a general matter that patent pools tend to produce lower rates than those that could be achieved through bi-lateral negotiations. Indeed, the uncontroverted trial evidence is that a rate higher than a pool rate could still be RAND. (11/16/12 Tr. at 71:14-72:10 (Simcoe Testimony); 11/19/12 Tr. at 137:13-17 (Schmalensee Testimony).)

500. Another problem with using patent pools as the *de facto* RAND royalty rate is that the patent-counting royalty allocation structure of pools does not consider the importance of a particular SEP to the standard or to the implementer's products as the court's hypothetical negotiation requires. (*See* 11/16/12 Tr. at 143:7-10, 143:24-144:11 (Lynde Testimony).) As explained in the court's RAND-modified *Georgia-Pacific* analysis, it is entirely reasonable for the owner of a patent that is extremely important and central to the standard to seek a higher royalty rate than the owner of a less important patent. Under a patent-counting pool system, however, "one patent in the pool could be critical to a core feature of the standard and it could be a feature that most standard-compliant products use and rely on heavily. And another patent could be directed to a feature that's tangential or optional and rarely ever used, and in the pool both would get the identical royalty rate." (11/16/12 Tr. at 143:25-144:11 (Lynde Testimony).)

501. An additional issue with using patent pools as the *de facto* RAND royalty rate is that patent pools do not use an incremental value approach, an approach that is required in the court's hypothetical negotiation paradigm. (11/16/12 Tr. at 63:17-19 (Simcoe Testimony).) In other words, patent pools do not try to determine the incremental value of every patent in the pool compared to alternatives that were available prior to defining the standard. (11/16/12 Tr. at 63:19-21 (Simcoe Testimony).) Patent pools "don't go through the exercise of taking each patent and trying to determine what the alternatives available were at the time the standard was defined." (11/16/12 Tr. at 64:10-13 (Simcoe Testimony).) Indeed, Dr. Murphy testified that a system in which every patent in a pool is given the same value is not "an exact method" and "is never

going to give you exactly the right answer." (11/13/12 Tr. at 200:21-23 (Murphy Testimony).)

502. The court also has policy concerns with applying a pool rate as the *de facto* RAND royalty rate for all SEPs relevant to a given standard. If pool rates were held to be the most appropriate RAND royalty rates, SEP holders with valuable SEPs would be hesitant to participate in standard-setting activities and might instead try to develop proprietary standards.[21] (11/19/12 Tr. at 146:6-23 (Schmalensee Testimony); 11/13/12 Tr. at 168:16-20 (Murphy Testimony).) Companies and SEP holders might not participate in the standard-setting process or contribute their patents to the standard if they believe that they will not receive full and fair value for their patents. As a result, the standards might fail to incorporate the best technology available. (*See* 11/13/12 Tr. at 169:2-5 (Murphy Testimony).) Moreover, since licensing through SSOs under the RAND commitment is, at least for some entities, an important component of profitability, reducing that component would reduce the incentive to innovate and thereby slow the pace of innovation in the economy. (11/19/12 Tr. at 146:24-147:3 (Schmalensee Testimony).)

503. Finally, the uncontroverted evidence before the court demonstrates that an SEP licensor in a patent pool receives both royalty rates from the pool and value to the

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[21] The trial record supporting the court's policy concern is clear: Other things remaining the same, the higher the value of an owner's SEPs and the stronger its licensing program, the lower is its incentive to join a patent pool and the less likely it is to join a pool. (11/13/12 Tr. at 134:3-6 (Glanz Testimony); *see also* 11/16/12 Tr. at 145:11-13, 146:16-20, 148:9-20 (Lynde Testimony); Ex. 1036 at 295; 11/19/12 Tr. at 146:17-147:3 (Schmalensee Testimony); Ex. 2945 at 174 ("[F]irms with higher value patent portfolios are less likely to join a proportional pool.").)

SEP holder in terms of unfettered access to the intellectual property of the pool. Thus, companies that have SEPs for a given standard, but also have products with high potential infringement exposure to others' SEPs for that standard, may decide to join a pool even though they may not obtain as much value for their SEPs. In a paper entitled "Public Policy Toward Patent Pools," Josh Lerner and Jean Tirole stated that, for the MPEG-2 pool, "[t]he primary motive for certain companies was not to maximize licensing revenues, but rather to accelerate the adoption of the standard." (Ex. 2945 at 175.)

504. Indeed, with respect to the MPEG LA H.264 patent pool, Microsoft's motive in joining the pool was explicitly not to generate a revenue stream from its SEPs. (11/13/12 (Glanz) Tr. at 99:4-100:14; Ex. 3088; Ex. 2840 at MOTM_WASH1823_0392239.) On May 3, 2010, Dean Hachamovitch, Microsoft's Vice President of Internet Explorer (4/3 Hachamovitch Dep. Tr. at 19:8-14), published a blog posting entitled "Follow Up on HTML5 Video in IE9" on Microsoft's MSDN Blogs, in which he explained that:

> Microsoft pays into MPEG LA about twice as much as it receives back for rights to H.264. Much of what Microsoft pays in royalties is so that people who buy Windows (on a new PC from an OEM or as a packaged product) can just play H.264 video or DVD movies. Microsoft receives back from MPEG LA less than half the amount for the patent rights that it contributes because there are many other companies that provide the licensed functionality in content and products that sell in high volume. Microsoft pledged its patent rights to this neutral organization in order to make its rights broadly available under clear terms, not because it thought this might be a good revenue stream. We do not foresee this patent pool ever producing a material revenue stream, and revenue plays no part in our decision here.

(Ex. 2840 at MOTM_WASH1823_0392239.)

505. As Microsoft's intellectual property licensing manager Garrett Glanz explained in an internal email concerning the MPEG LA AVC pool, "Microsoft has consistently argued for low codecs fees with reasonable annual caps in order to promote rapid and broad adoption of the technology . . . . We have taken this approach because H.264/AVC may likely be adopted in important media standards (e.g., ATSC, DVD Forum, 3GPP, DVB, etc.) and hence having the ability to support it in Windows if needed is critical to ensure the flow of content to Windows." (Ex. 2961.) Microsoft saw the setting of low MPEG LA rates as a "business win" for the company. (11/13/12 (Glanz) Tr. at 103:7-105:19.)

506. Accordingly, a RAND royalty rate based on a patent pool must consider both royalties received by the pool and the value received by the company through membership in the pool. The value to the company will depend on the circumstances of the individual company.

507. In sum, on the evidence before it, the court concludes that a pool rate itself does not constitute a RAND royalty rate for an SEP holder who is not a member of the pool.

508. Despite the concerns with using a pool rate as the *de facto* RAND royalty rate, the court concludes that under certain circumstances, patent pools can serve as indicators of a royalty rate that falls within the range of royalties consistent with the RAND commitment. Here, the question is whether the MPEG LA H.264 patent pool is an indicator of a RAND royalty rate. The court finds that it is.

509. As explained above, 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. at 139:17-140:1, 203:14-18 (Murphy Testimony).) Here, the evidence before the court is clear: the MPEG LA H.264 patent pool has achieved widespread adoption of the H.264 Standard. The pool includes approximately 275 U.S. SEPs and over 2400 SEPs worldwide from over 26 licensors including leading technology firms such as Apple, Cisco, Ericsson, Fujitsu, LG, Microsoft and Sony. (Ex. 1152; 11/16/12 Tr. at 85:18-21, 90:11-91:20 (Lynde Testimony).) Additionally, there are over 1,100 licensees of the MPEG LA H.264 patent pool. (11/16/12 Tr. at 85:18-21, 94:22-24 (Lynde Testimony).) The court concludes that the MPEG LA H.264 pool royalty rate has been set such that it is consistent with the purpose of the RAND commitment.

510. The evidence also shows that Microsoft, Motorola, and other industry companies, in working to form the MPEG LA H.264 patent pool, tried 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 use alternatives. (11/13/12 Tr. at 74:13-76:5 (Glanz Testimony); Ex. 1642 (email string in which Motorola's 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").) This practice nicely aligns with two cornerstones of the RAND obligation: (1) SSOs seek to include advanced technology to create valuable standards, while at the same time, (2) ensuring widespread adoption.

511. Additionally, the trial record demonstrates that the MPEG LA H.264 patent pool contains significant and important technology vis-à-vis the H.264 Standard. Microsoft's technical expert, Dr. Orchard, provides the relevant testimony characterizing the patents in the MPEG LA H.264 pool as "broad, covering all fundamental aspects [of the standard], and rich." (11/14/12 Tr. at 112:21-113:9 (Orchard Testimony).) The fact the MPEG LA H.264 patent pool contains such important technology alleviates the court's concern that patent pool rates may discourage SEP holders with valuable SEPs from participating. Because the MPEG LA H.264 patent pool is voluntary, if rates were set too low, SEP holders with valuable SEPs would simply decline to join the pool.

512. The fact that the MPEG LA H.264 patent pool has over 1,100 licensees provides, in the court's view, a real-world indication that any stacking concerns of the licensees are alleviated by the immense and significant technology contained in the pool.

513. Finally, the MPEG LA H.264 patent pool appears to have been set with the understanding that SSOs obtain technology that will create valuable standards, another cornerstone of the RAND commitment. (11/19/12 Tr. at 136:24-137:8 (Schmalensee Testimony); *see also* 11/13/12 Tr. at 75:5-11 (Glanz Testimony); 11/16/12 Tr. at 90:2-10 (Lynde Testimony) (asserting that pools cannot systematically under-compensate licensors because they need to ensure broad and diverse licensor participation in order to make the pool successful).)

514. Because the characteristics of the MPEG LA H.264 pool closely align with all of the purposes of the RAND commitment, the court concludes that the pool rate is a strong indicator of a RAND royalty rate for Motorola's H.264 patent portfolio.

515. The rate set by the MPEG LA H.264 patent pool, however, is the low end of the range for a RAND royalty. As stated, Microsoft saw the low pool rate of MPEG LA H.264 patent pool as a "business win" for the company, which hoped to ensure that H.264 video or DVD movies would seamlessly play on its products. (11/13/12 Tr. at 103:7-105:19 (Glanz Testimony).) Moreover, from the various rates discussed during formation of the MPEG LA H.264 patent pool, the final rate chosen is on the very low end of those discussed.

d. Google's Status as an MPEG LA H.264 Patent Pool Licensee

516. 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.) That Google, Motorola's parent company, also participates in the MPEG LA H.264 patent pool supports the conclusion that this pool provides a logical indicator for the RAND royalty rate at issue in this case. (Ex. 103.)

517. Google is a licensee of the MPEG LA H.264 patent pool, the same pool in which Microsoft is a Licensor. Thus, Microsoft is an intended third-party beneficiary of the Google-MPEG LA H.264 patent pool agreement. (Ex. 103 at § 8.17.)

518. 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. at 95: 15-24, 97:4-11 (Lynde Testimony).)

e. RAND Royalties for Motorola's H.264 SEPs Based on the MPEG LA H.264 Patent Pool

Having determined that the MPEG LA H.264 patent pool is an indicator of a RAND royalty rate for Motorola's H.264 SEPs, the court examines the royalties Motorola would receive under that pool.

519. 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 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 % permitted under the MPEG LA license arrangement. (11/16/12 Tr. at 99:3-101:4 (Lynde Testimony); 11/20/12 Tr. at 158:10-161:18 (Lynde Testimony); Exs. 1161-62.)

520. Presented with these three scenarios from Dr. Lynde, the court concludes that scenario (b)—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 with the current pool rate structure—most closely resembles the desired

RAND licensing situation. The court so concludes because, as a general matter, the more relevant patents included in the pool, the more the pool acts to address the stacking concerns implicit in the RAND commitment. Thus, scenario (b) is better than scenario (a) as an analogy to the RAND commitment. As for scenario (c), the court finds little reason to increase the rate when that has not been done in the real world.

521. Under scenario (b), 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 LOAs that do not presently participate in the MPEG LA patent pool under the current MPEG LA rate structure. (11/16/12 Tr. at 100:3-17 (Lynde Testimony).)

522. Under this scenario, Microsoft would pay Motorola royalties of 0.185 cents per unit. (11/16/12 Tr. at 100:3-17 (Lynde Testimony); 11/20/12 Tr. at 160:7-15 (Lynde Testimony); Ex. 1161.) Although Motorola disputes that the MPEG LA H.264 patent pool is an appropriate comparable, Motorola does not dispute Dr. Lynde's actual calculations under scenario (b). (*See generally* 11/13-20/12 Tr.) The court has also examined the actual calculations of Dr. Lynde and finds them accurate.[22] (Ex. 1161.)

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[22] The court notes, however, that Dr. Lynde's royalty rate calculations are based on the $13 million cap in royalties provided under the MPEG LA H.264 patent pool royalty share agreement. (Ex. 1161.) Based on Microsoft's current sales volume, Microsoft's royalty payments into the MPEG LA H.264 patent pool meet the $13 million threshold and are therefore capped. Using $13 million as Microsoft's total royalty payments, Dr. Lynde calculates Motorola's share of those royalties based the pro rata share of Motorola's 63 H.264 SEPs. (Ex. 1161.) Having determined that the MPEG LA H.264 patent pool, including the $13 million royalty cap, is indicative of a RAND royalty rate, the court finds little problem in basing a RAND royalty on a capped royalty payment. Indeed, Motorola's licensing expert, Mr. Donohoe,

523. As stated above, the royalty rate Motorola would receive under the MPEG LA H.264 patent pool for its SEPs represents only a portion of the value Motorola would receive as a member of the MPEG LA H.264 patent pool. The remaining portion of the value would be the value to Motorola in having full access to the immense technology included in the MPEG LA H.264 patent pool. Unfortunately, there is no direct evidence in the trial record for determining the value to Motorola—or more appropriately, Motorola's parent company, Google—in being a member of the MPEG LA H.264 patent pool. Such evidence would likely consider Google's products and infringement exposure with respect to all known H.264 SEPs.

524. Regarding the value of membership in the MPEG LA H.264 patent pool, the only relevant evidence before the court is that Microsoft pays into the MPEG LA H.264 patent pool about twice as much as it receives back for rights to its H.264 SEPs. (Ex. 2840 at MOTM_WASH1823_0392239.) Based on this evidence, the court concludes that Microsoft views membership in the MPEG LA H.264 patent pool as providing a value of at least twice as much as it receives in royalty rates.

525. In the absence of any other relevant evidence, the court thereby concludes that Google, like Microsoft, would also view membership in the MPEG LA H.264 patent pool as providing a value of twice the royalty rates it would receive as a licensor in the pool. This conclusion follows logically from the simple fact that Microsoft and Google

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suggests caps on the total lump sum royalty payments. (11/20/12 Tr. at 145:6-146:15 (Donohoe Testimony).)

are similarly situated as sophisticated, substantial technology firms with vast arrays of technologically complex products.

526. Accordingly, the court concludes that an amount within the RAND royalty range for Motorola's H.264 SEP portfolio is the royalties Motorola would receive under Dr. Lynde's scenario (b) plus twice those royalties, the latter constituting the value in access to the intellectual property in the MPEG LA H.264 patent pool. This number is 0.555 cents per unit ($0.185 + 2 \times 0.185$).[23]

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[23] This equation represents a dramatic simplification of the calculation actually performed by the court. To be rigorous and transparent with the parties, the court will now explain in detail its process for calculating the RAND rate. In essence, the court compares the total value of joining a patent pool to the total value of abstaining from a patent pool and then performs simple algebra to calculate the RAND rate.

The value to a company of joining a patent pool, which the court labels "VP," can be approximated by adding together the value of all benefits of joining the pool and subtracting all costs. This means that to calculate the value of joining a pool, the court adds (1) the amount the company receives in royalties from the pool for use of its own patents by others ("P_+"); to (2) the value to the company of having the intellectual property rights to the pool patents ("IP") (*see supra* ¶ 523); and (3) any external value the company derives from adding its patents to the pool, such as promoting participation in the pool and thereby encouraging widespread adoption of the standard ("E") (*see supra* ¶ 485, 503-04); and subtracting (4) the amount the company pays into the pool to use patents ("P_-"); and (5) the opportunity cost of using the patents in a different way, such as abstaining from the patent pool and licensing patents outside the pool ("OC"). In algebra terms, this can be expressed as $VP = P_+ + IP + E - P_- - OC$. By similar methods, the court can calculate the value to a company of abstaining from a patent pool, which the court labels "VA," by adding (1) the amount the company would receive for its patents outside the pool given the RAND commitment (notice that this is, by definition, the RAND rate) ("A_+"); to (2) the value to the company of having the intellectual property rights to the pool patents ("IP"), which the court assumes a company wishing to practice the standard would obtain by some method; and subtracting (3) the amount the company would have to pay to obtain licenses to the pool patents without joining the pool ("A_-") and (4) the opportunity cost of not joining the pool. In algebra terms, this can be expressed as $VA = A_+ + IP - A_- - OC$.

The next step in this calculation is to compare the value of joining a patent pool (VP) to the value of abstaining from a patent pool (VA). To begin, both VP and VA include both "IP" and "OC." The value IP will be equivalent both in the pool and outside the pool because a company practicing the standard will acquire the same patent licensing rights whether it is inside or outside of the pool because it will presumably obtain rights to all of the patents necessary to

practice the standard. Thus, the variable IP will have the same value irrespective of pool membership and will not be affected by patent strength relative to the pool. This simplifies the comparison somewhat. Algebraically, the IP values on either side of the comparison will "cancel each other out," resulting in the variable vanishing from the comparison altogether. The situation is not quite as simple with regard to OC, as will be explained below, so OC will not always "cancel out" in quite the same way and must remain in the comparison.

The nature of the comparison between VP and VA varies depending on the value of the company's patents (measured by how important the patents are to the standard and how important they are to actual products the company knows about). For example, a company with very valuable patents relative to the pool or patents that are critical to the standard might be able to command higher royalties by abstaining from the pool (and hence could profit by abstaining). (*See supra* note 21.) On the other hand, a company with patents that are weak relative to the pool or that are unimportant to the standard might have the opposite problem (and hence could profit by joining the pool). (*See id.*) If a court can determine conclusively that, for a given company, joining a patent pool would be substantially more or less valuable than abstaining from it, the court should assign a coefficient to the comparison to reflect that fact, e.g., $C\times(P_+ - P_- - OC) + E = A_+ - A_- - OC$. Note that the coefficient C does not multiply E because the external value represented by E does not vary based on the value of the company's patents or their importance to the standard—assuming as the court does here that all patents in the pool return the same royalty rate. (*See supra* ¶¶ 465-66, 500.) Note also that the equation only applies the comparison coefficient to OC on one side of the equation, thus accounting for the fact that the opportunity cost of joining the pool or abstaining from it will vary proportionately with the relative value of the patents, their importance to the standard, and how important those patents are to actual products the company knows about. As a simple example of how to calculate the comparison coefficient C, if a court determined from the evidence before it that a company could do twice as well monetarily by abstaining from a patent pool than by joining it, the equation would be $2\times(P_+ - P_- - OC) + E = A_+ - A_- - OC$.

In this case, the court has no evidence demonstrating that Motorola's patents are any more valuable than the average patent in the MPEG LA H.264 pool (*see infra* ¶¶ 528-36) and so assumes that the comparison coefficient C is equal to 1, i.e., that VP = VA. This amounts to assuming that, for Motorola, joining the MPEG LA H.264 patent pool and abstaining from it are roughly equivalent transactions from a monetary perspective. (*See id.*) The court is therefore left with the following equation: $P_+ - P_- - OC + E = A_+ - A_- - OC$. The OC values are equivalent on both sides when C = 1 since joining the patent pool is monetarily equivalent to not joining it, so the OC values "cancel out" algebraically, leaving the court with an equation of: $P_+ - P_- + E = A_+ - A_-$.

Some of these "variables" are actually known quantities. The pool rates, P_+ and P_-, are known (*see supra* ¶¶ 522, 525-26), and will be known in most cases like this (otherwise there would be no comparison to make in the first place). On the other hand, A_+ is not known. This makes sense because A_+ is, by definition, the RAND rate—the amount a company would receive for licenses to its patents if it abstained from the pool but adhered to the RAND commitment. As for E, the court has heard testimony that Microsoft derived external value from joining the patent pool because it had a vested interest in widespread adoption of the standard. (*Supra* ¶¶ 503-05.) Specifically, as detailed above, the court heard testimony that Microsoft pays twice as much into

527. As explained above, the court also concludes that 0.555 cents per unit represents the low end of the range of a RAND royalty rate for Motorola's H.264 SEP portfolio. Based on the technology represented by Motorola's H.264 SEP portfolio, however, the court can find no reason that a hypothetical negotiation between Microsoft and Motorola would result in an increase to this low bound of RAND.

528. 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. at 60:16-23 (Drabik Testimony).)

529. Likewise, Kirk Dailey—the current head of patent transactions for Google and the former Corporate Vice President of Intellectual Property for Motorola who

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the MPEG LA H.264 patent pool as it receives back in royalties. (*Id.*) The court has inferred from this evidence that $E = P_+$. In other words, the external value of joining the pool is equivalent to the royalty deficit Microsoft incurs through pool membership. As for A_-, the court has heard no testimony whatsoever about how much a company like Motorola would have to pay for the pool's H.264 SEP collection if it abstained from the pool. Faced with this lack of evidence, the court infers that the rate Motorola would have to pay would be higher than the pool rate, but not twice as high because some, if not all, of the companies holding SEPs would be subject to the RAND commitment. Accordingly, the court weighs the evidence before it and finds that the rate outside the pool would be 1.5 times the pool rate. Algebraically, this can be expressed as $A_- = 1.5 \times P_-$.

It remains only to substitute all of these values into the operable equation and solve algebraically for the RAND rate, A_+. Substituting the known and inferred values into the operable equation yields: $P_+ - P_- + P_+ = A_+ - 1.5 \times P_-$. Simplifying and solving for A_+ yields: $A_+ = 2 \times P_+ + .5 \times P_-$. The evidence before the court demonstrates that $2 \times P_+ = P_-$. This is because Microsoft pays twice as much into the MPEG LA H.264 patent pool as it receives back in royalties (*supra* ¶ 504), and the court has already assumed that this equation would also hold true for Motorola since Microsoft is a comparable player in the technology industry to Motorola's parent company Google. (*Supra* ¶ 525.)

This allows for further simplification: $A_+ = 2 \times P_+ + .5 \times 2 \times P_+ = 3 \times P_+$. This results in precisely the formula the court used to calculate its RAND rate for Motorola's H.264 SEPs. Translating this back to English, the RAND rate in this case is three times the pool rate, or the pool rate plus twice the pool rate.

authored the October 2010 demand letters that gave rise to this dispute—did not know if Motorola's H.264 Patents are more valuable than the average patent in the H.264 pool. (11/20/12 Tr. at 34:25-35:20, 110:11-15 (Dailey Testimony); Exs. 1, 2.)

530. Mr. Dailey did not know if Motorola's portfolio of H.264 SEP portfolio "ranks in the top half or the bottom half of companies contributing patented technology to that standard." (11/20/12 Tr. at 68:6-10 (Dailey Testimony).) Indeed, 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. at 95:5-10, 131:25-132:11 (Glanz Testimony).)

531. Additionally, the court conducted a comprehensive and detailed examination of the importance of each patent in Motorola's H.264 SEP portfolio to the H.264 Standard or to Microsoft's products. This examination revealed that although some of the patents contributed to the H.264 Standard, others provided only minimal contribution due to the availability of alternative technology. The examination further revealed that, of the patents contributing to the H.264 Standard, Motorola did not provide the inventive technology, but instead built upon already-existing technology.

532. Moreover, all but two of Motorola's H.264 SEPs are directed towards interlaced video, a technology that the court determined was not overly important to either Windows or the Xbox as those products utilized the H.264 Standard. And, as explained by the court above, of the two patents not directed towards interlaced video, only one of those would be used by Microsoft products.

533. Finally, the court concludes that Motorola's H.264 SEP portfolio only constitutes a sliver of the overall technology incorporated in the H.264 Standard. Indeed, 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. at 215 (Sullivan Testimony); 11/14/12 Tr. at 115 (Orchard Testimony).) Telenor decided not to seek patents on its contributions and notified the JVT of its decision. (11/14/12 Tr. at 52 (Sullivan Testimony); 11/14/12 Tr. at 115 (Orchard Testimony).)

534. In addition to Telenor's contribution to the standard, there are at least 2,500 patents throughout the world that are essential to the H.264 Standard. (11/14/12 Tr. at 110-13 (Orchard Testimony).) Of those 2,500 patents, over 360 are United States patents. (*See* Ex. 1544.)

535. Approximately 33 United States companies have enumerated their declared-essential H.264 Patents. All of these patents are subject to the RAND commitment. Nineteen additional companies have provided "blanket" LOAs to the ITU obligating their patents to the RAND commitment. (*See* Ex. 1544.)

536. In sum, Motorola did not demonstrate that its H.264 SEP portfolio provided significant contribution to the H.264 Standard or would provide significant technological value to Microsoft's products. As a result, the court concludes that there is no reason to increase the royalty payment with respect to any of Microsoft's products from the rate received by other patents in the MPEG LA H.264 patent pool.

537. Accordingly, the court holds that the RAND royalty for Motorola's H.264 SEP portfolio with respect to all Microsoft products utilizing the H.264 Standard is **0.555 cents per unit.**[24]

538. The court also determines an upper bound of a RAND royalty rate for Motorola's H.264 SEP portfolio. As discussed with relation to SSO policy, RAND is informed by two prevailing concerns: preventing stacking and eliminating hold-up. The court finds that, among these two goals, the anti-stacking principle is the primary constraint on the upper bound of RAND.

539. The anti-stacking principle constrains RAND because parties in a RAND negotiation would determine a reasonable royalty by considering how much in total license fees the implementer can pay before implementation of the standard becomes cost-prohibitive. (11/13/12 Tr. at 145-46 (Murphy Testimony).) This limit will not be construed based only on the cost of licensing one patent in the standard, but rather on the cost of implementing the standard as a whole, which may include the cost of licensing *all* essential patents. (*Id.*) In other words, a RAND negotiation would not be conducted in a vacuum, but the parties would instead consider other SEP holders and the royalty rate

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[24] Motorola contends that Microsoft products other than Windows and the Xbox use the H.264 Standard. Motorola lists at least the Windows Phone 7 and 7.5, Windows Embedded, Silverlight, the Zune, Lync, and Skype, as Microsoft products that use the H.264 Standard. (Motorola Pr. FC ¶ 535.) Motorola, however, did not provide sufficient evidence for the court to ascertain the functionality of these products, making it impossible for the court to determine the importance of Motorola's H.264 SEPs to these products. Indeed, the little trial evidence regarding functionality of these additional products demonstrates that Motorola's SEPs would have little value to them. (*See* 11/14/12 Tr. at 150 (Orchard Testimony).) Without such evidence, the court is left to conclude that the low bound of RAND is the appropriate royalty rate for all Microsoft products—Windows, the Xbox, and all others.

that each of these patent holders might seek from the implementer based the importance of these other patents to the standard and to the implementer's products.

540. To this end, in the course of a hypothetical negotiation with an SEP owner, the implementer must ask herself, as a rational business-person, "What is the most I can pay for a license to this particular SEP or portfolio of SEPs—knowing that I may have to license all SEPs in this entire standard—while still maintaining a viable business?" This query by the implementer will undoubtedly be shaped by examining Factor 12 of the court's RAND-modified *Georgia-Pacific* methodology: customary practices of businesses licensing RAND-committed patents.

541. Thus, the fee that results from a hypothetical RAND negotiation is necessarily informed by the court considering the entire world of known SEPs relevant to a given standard. That ultimate sum must be the aggregate licensing fee of all essential patents calibrated against the principle that license fees should not be stacked in such a way that makes implementation of the standard prohibitively expensive.

542. With this understanding of the upper bound of RAND in mind, the court searches the trial record for the best evidence of the high point of customary practices of businesses licensing RAND-committed patents. The court's search ends with the highest fee discussed during formation of the MPEG LA H.264 patent pool—an uncapped $1.50 per unit price. (Ex. 1139 at MS-MOTO_1823_00003927604-05; 11/13/12 Tr. at 80:8-9, 80:19-81:1 (Glanz Testimony).)

543. As explained above, the considerations of the licensors during formation of the MPEG LA H.264 patent pool closely align with the purposes underlying the RAND

commitment. Thus, the uncapped $1.50 per unit price reflects the highest value in the record considered by industry companies during efforts to reach a royalty rate which the court has found to be an indicator of RAND.

544. Applying the pro rata share of Motorola's H.264 SEP portfolio provided by Dr. Lynde's scenario (b)—3.642 % (Ex. 1160)—the court concludes that Motorola would receive $0.05463 per unit ($1.50×3.642 %) in royalty payments.

545. As before, the court concludes that the value to Motorola under scenario (b) would be not only royalties received, but also access to the intellectual property, which equals an amount of twice the royalties received. Thus, the upper bound of a RAND royalty for Motorola's H.264 SEP portfolio is **$0.16389 per unit** ($0.05463 + 2*$0.05463).

546. The court concludes that this upper bound applies to Microsoft Windows and Xbox products.

iii. The Via Licensing 802.11 Patent Pool

Having determined the RAND rate for Motorola's H.264 SEP portfolio, the court now turns to determining a rate for Motorola's 802.11 SEP portfolio.

547. Microsoft uses the Via Licensing 802.11 patent pool, along with two other licensing arrangements, to argue that the range of RAND royalties for a Microsoft-Motorola license for Motorola's 802.11 SEP portfolio would be between 3 and 6.5 cents per unit. (11/16/12 Tr. at 113:3-116:17, 123:25-124:13 (Lynde Testimony).) Within this range, Microsoft contends that the best estimate of a RAND royalty for Motorola's

802.11 SEP portfolio is 5 cents per unit. (11/16/12 Tr. at 114:18-115:3 (Lynde Testimony).)

a. Background of the Via Licensing 802.11 Patent Pool

548. Via Licensing formed its 802.11-essential patent pool between 2003 and 2005: between six years and eight years after the IEEE Working Group issued its first 802.11 Standard in 1997. (11/16/12 Tr. at 107:11-13 (Lynde Testimony); 11/15/12 Tr. at 92:20-93:11 (Gibson Testimony).)

549. Participation in the pool is substantially lower than other patent pools, such as the MPEG LA H.264 patent pool. Five licensors have joined the Via Licensing 802.11 pool: Electronics and Telecommunications Research Institute (ETRI); Japan Radio Co., Ltd.; Koninklijke Philips Electronics N.V.; LG Electronics, Inc.; and Nippon Telegraph and Telephone Corporation. (11/13/12 Tr. at 174:16-175:3 (Murphy Testimony); Ex. 1125.) The Via Licensing 802.11 pool includes 35 worldwide patents essential to the 802.11 Standard. (11/16/12 Tr. at 112:9-11 (Lynde Testimony).) Eleven companies are licensees of the Via Licensing 802.11 patent pool: Archos, S.A.; Eastman Kodak; Enfora, L.P.; Fujitsu, Ltd.; Guillemot Corp. S.A.; Imagination Technologies, Ltd.; Japan Radio Co., Ltd.; Koninklijke Philips Electronics N.V.; Koss Corp.; LG Electronics; and Sony Corp. (11/16/12 Tr. at 106:25-107:4 (Lynde Testimony); Ex. 1164.) Current licensees that have not contributed patents to the pool include Eastman Kodak, Fujitsu, LG, Sony, and Koss. (Ex. 1164.)

550. On or about April 15, 2004, while the Via Licensing 802.11 patent pool was being formed, Motorola submitted a patent for evaluation to Via Licensing for

potential inclusion in the pool. (4/18/12 R. Sonnentag Dep. at 34:13-16, 35:16-25; Ex. 45.)

551. Via Licensing's independent evaluator—Robert Sachs of Fenwick & West—determined that the patent Motorola submitted was not essential to the 802.11 Standard. (4/18/12 R. Sonnentag Dep. 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 Licensing 802.11 patent pool royalty rates. (Exs. 43, 44.)

552. The Via Licensing 802.11 pool has rates that vary from $0.05 to $0.55 per unit, depending on 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

(Ex. 52.)

553. As is the case with the MPEG LA H.264 pool, royalties in the Via Licensing 802.11 pool are shared among licensors according to a Worldwide Revenue Sharing Algorithm. The algorithm divides revenue between licensors based on the

relative number of patents each has contributed, adjusted by a country-weight factor. (*See* 11/16/12 Tr. at 112:12-113:2 (Lynde Testimony).) The Via Licensing 802.11 patent pool thus distributes royalties based upon a patent allocation or proportional royalty structure. (11/13/12 Tr. at 171:14-18 (Murphy Testimony).)

554. Microsoft is not a licensor or licensee of the Via Licensing 802.11 patent pool. (11/13/12 Tr. at 173:6-9 (Murphy Testimony).) Microsoft informed Via Licensing Corporation that Microsoft's objections to taking a license "were the lack of Licensees and critical mass of the program," and that Microsoft "prefers to enter into bi-lateral discussions with the Licensors individually." (Ex. 3194.) Dr. Lynde, Microsoft's patent valuation expert, agreed that this strategy "makes sense" for Microsoft. (11/16/12 Tr. at 154:3-155:10 (Lynde Testimony); Ex. 3194.)

555. Like Microsoft, Motorola has not joined the pool. (11/13/12 Tr. at 173:16-21 (Murphy Testimony).)

b. The Via Licensing 802.11 Pool as an Indicator of RAND Terms for Motorola's 802.11 SEPs

556. At the outset, the court notes that the Via Licensing 802.11 patent pool as a *de facto* RAND royalty rate for Motorola's 802.11 SEP portfolio suffers from the same concerns as all patent-counting patent pools in regards to the court's RAND-modified *Georgia-Pacific* methodology. Namely, the Via Licensing 802.11 pool does not distinguish between patents in the pool on the basis of technical merit, but rather gives the exact same royalty to all patents in the pool. Also, the pool does not consider the importance of patents to the implementer's products. Likewise, setting the Via Licensing

802.11 rate as the *de facto* RAND rate would implicate the court's aforementioned policy concerns regarding an SSO's ability to obtain quality technology and the possibility of stifling innovation. (*See supra* ¶ 502.)

557. The Via Licensing 802.11 patent pool has not been very successful in obtaining licensors and licensees. It has been estimated that there are at least 93 holders of 802.11 SEPs. (*See, e.g.*, 11/13/12 Tr. at 175:4-7 (Murphy Testimony).) The vast majority of the firms holding SEPs, including MML and Microsoft, have not joined the Via Licensing 802.11 pool as licensors. (*Id.* at 175:7-10.) Likewise, it has been estimated that there are hundreds of implementers of the 802.11 Standard; a very small percentage of whom have joined the Via Licensing 802.11 pool as licensees. (*Id.* at 174:14-175:16.)

558. Thus, unlike the MPEG LA H.264 patent pool, the Via Licensing 802.11 patent pool has not been successful in encouraging widespread adoption of the 802.11 Standard through buy-in to the pool of licensors and licensees. As stated, the purpose of the RAND commitment is to achieve widespread adoption of the standard. It stands to reason then that the less a patent pool achieves widespread adoption of the standard, the less relevant the pool becomes as an indicator of a RAND royalty rate.

559. Nevertheless, the Via Licensing 802.11 patent pool has certain characteristics that are indicative of a RAND royalty rate.

560. For instance, the Via 802.11 pool is focused exclusively on the standard. It also covers the same kinds of products for the same ultimate purposes as are at issue in the present dispute. (11/13/12 Tr. at 158:22-159:2 (Murphy Testimony).)

561. Additionally, the uncontroverted evidence at trial demonstrated that those who participated in the formation of the Via pool designed it to foster widespread adoption of the 802.11 Standard consistent with the intent behind the RAND commitment. (11/13/12 Tr. at 159:20-25 (Murphy Testimony).) Although the pool did not achieve this goal, the royalty rates set by the pool provide a benchmark as to what certain businesses in the industry believed to be a RAND royalty rate. Moreover, Microsoft's expert, Dr. Murphy, opined that 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. at 159:3-6 (Murphy Testimony); 11/16/12 Tr. at 117:21-23 (Lynde Testimony).) Thus, the Via Licensing 802.11 patent pool may be a conservative indicator of a RAND royalty rate in that the pool rates may be higher than they would be had the pool been formed earlier and/or enjoyed greater licensee participation. (11/16/12 Tr. at 117:15-25 (Lynde Testimony).)

562. Based on this evidence, the court concludes that the Via Licensing 802.11 patent pool is an indicator of a RAND royalty rate for Motorola's 802.11 SEP portfolio, albeit not as strong an indicator as the MPEG LA H.264 patent pool. (11/13/12 Tr. at 159:9-11 (Murphy Testimony) ("I think [the Via Licensing 802.11 patent pool is] probably the best [indicator of RAND] we have.").)

563. The court also concludes that membership in the patent pool would provide value to Motorola of twice the royalties it would receive from the pool. The court bases this conclusion on the same evidence and rationale it employed with respect to the MPEG LA H.264 patent pool. (*See supra* ¶ 524-25.)

c. RAND Royalties Based On The Via 802.11 Pool

564. Dr. Lynde estimated RAND royalties for Motorola's 802.11 SEPs based on the royalty structure of the Via Licensing 802.11 patent pool. (11/16/12 Tr. at 113:3-116:17 (Lynde Testimony); Exs. 1155, 1165, 1167.) He determined that, because of the relatively low level of participation in the pool, an appropriate analysis of a RAND royalty for Motorola's SEPs using the Via Licensing 802.11 patent pool requires assessing the royalties Motorola might expect to receive from Microsoft if more of the SEPs related to the 802.11 Standard were in the Via Licensing 802.11 pool and Microsoft took a license to the pool. (11/16/12 Tr. at 113:9-24 (Lynde Testimony).) To assess such a scenario, Dr. Lynde adjusted the Via pool to include: (a) the 263 worldwide patents (53 of which are U.S. patents) Motorola claimed in its October 21, 2010, letter to be essential to the 802.11 Standard; (b) the 21 worldwide patents that Microsoft originally claimed were essential to the 802.11 Standard; and (c) 186 other 802.11 SEPs that have been specifically disclosed in company submissions to the IEEE. (11/16/12 Tr. at 108:11-15, 113:9-24 (Lynde Testimony); Exs. 1155, 1156, 1158.) Under this rubric—but based on existing Via Licensing 802.11 patent pool rates—Microsoft would pay Motorola royalties of approximately 5 cents ($0.05) per unit or approximately $736,000.00 per year at current volumes. (11/16/12 Tr. at 114:7-115:3 (Lynde Testimony); Ex. 1167.)

565. The court finds that Dr. Lynde's analysis is mistaken for the simple reason that by the time of trial Motorola no longer claimed that 263 of its patents were essential to the 802.11 Standard. At trial, Motorola only asserted that 24 (and not 53) of its U.S. patents were essential to the 802.11 Standard and provided no evidence regarding

whether any worldwide counterpart patents were essential. (11/15/12 Tr. at 102-05 (Gibson Testimony).) For its part, at trial, Microsoft only claimed that 7 (and not 21) of its patents were essential to the 802.11 Standard. (Microsoft Pr. FC ¶ 317.)

566. Accordingly, for the court to determine the appropriate royalties Motorola would receive as a member of the Via Licensing 802.11 pool, it must adjust Dr. Lynde's calculations by inserting the correct number of 802.11 SEPs held by both Microsoft and Motorola. To accurately adjust Dr. Lynde's calculations, the court follows the working papers underlying Dr. Lynde's calculations for the Via Licensing 802.11 pool found in Exhibits 1155, 1156, 1158, 1165, and 1167. These working papers set forth the Worldwide Revenue Sharing Algorithm including the country-weight factor.

567. In adjusting Dr. Lynde's calculations, the court takes as accurate Dr. Lynde's uncontested use of the country-weight factor to assign a total weight to the 186 802.11 SEPs—not including Microsoft's, Motorola's, and those already in the Via Licensing 802.11 pool—that have been specifically disclosed in company submissions to the IEEE. (Ex. 1158.) The total weight of those 186 SEPs is 18,110.66. The court also takes as accurate Dr. Lynde's calculation of the weight of the 35 patents already in the Via Licensing 802.11 pool. The total weight of those patents is 2,338. (*See* Ex. 1165.)

568. As explained above, at trial, Motorola asserted that 24 of its U.S. patents were essential to the 802.11 Standard. (11/15/12 Tr. at 102-05 (Gibson Testimony).) Each U.S. patent is assigned a country-weight factor of 100.00, meaning that the total weight assigned to Motorola's 24 802.11 SEPs is 2,400. (*See* Ex. 1158.) Likewise,

Microsoft asserted that 7 of its patents are essential to the 802.11 Standard. (Microsoft Pr. FC ¶ 317.) Accordingly, Microsoft's 802.11 SEPs would have a total weight of 700.

569. The sharing algorithm of the Via Licensing 802.11 patent pool determines royalties based on the proportionate weight of a licensor's patents. Thus, Motorola's proportion is the weight afforded its 802.11 SEP portfolio divided by the total weight in the pool. Here, that number is 0.1019 (= 2,400 / (2,400 + 700 + 18,110.66 + 2,338), or 10.19 %. In other words, Motorola's patents, adjusted by country weight, would be 10.19 % of the total Via Licensing 802.11 pool.

570. Using this proportional share for Motorola's 802.11 SEP portfolio, Motorola's royalties from Microsoft under the Via Licensing 802.11 pool are easily calculated as 10.19 % of Microsoft's total payments into the pool in a given year. The uncontested evidence is that Microsoft's 2011 product volume for 802.11 Standard compliant products was 14,263,000. (Ex. 1167.) Pursuant to the rate schedule of the Via Licensing 802.11 patent pool, the per unit royalty rate would have been $0.20. (Ex. 1167.) Accordingly, Microsoft's total payments into the pool for 2011 would have been $2,852,600.00, of which Motorola would have received 10.19 %, or $290,680.00. Using this total payment and dividing by the number of 802.11-complaint Microsoft products, Motorola would have received $0.02038 per unit (= $290,680.00 / 14,263,000) in 2011.

571. As stated, this per unit value must be increased by the value Motorola would receive through membership in the Via Licensing 802.11 patent pool. This value is twice the royalty rate. Accordingly, Motorola's royalty payments from Microsoft for

Motorola's 802.11 SEP portfolio would amount $0.06114 per unit, or 6.114 cents per unit.

572. Using this calculated value as an estimate for a RAND royalty rate is conservative and may represent something akin to a ceiling rate for at least two reasons.

573. First, the calculated royalty under the modified Via Licensing 802.11 patent pool does not consider any of the SEPs owned by the 59 802.11-SEP owners who have submitted blanket LOAs to the IEEE. Among these 59 802.11-SEP owners who submitted blanket LOAs are many of the leading firms in the wireless industry such as Sony, IBM, Atheros, Texas Instruments, Qualcomm, and Marvell. (Ex. 1159.) Although it is impossible to determine the total number of patents essential to the 802.11 Standard, it has been estimated that there may be thousands of 802.11 SEPs. (11/16/12 Tr. at 108:21-109:18, 110:12-15 (Lynde Testimony).) Indeed, a company named Marvell alone contends that it has "a few hundred" issued U.S. patents that relate "to the latest 802.11 standards." (11/14/12 Tr. at 64:7-16 (Ochs Testimony).)

574. Second, neither Motorola's fact nor its expert witnesses offered any evidence that any of the patents in Motorola's 802.11 SEP portfolio are more valuable than the patents in the Via Licensing 802.11 patent pool. (11/19/12 Tr. at 119:16-12 (Williams Testimony); 11/20/12 Tr. at 110:16-20 (Dailey Testimony).) Even if these experts had opined that Motorola's patents were more important than others in the Via Licensing 802.11 patent pool, the court likely would have disregarded such testimony as incorrect. Here, the court conducted a comprehensive and detailed examination of each relevant patent in Motorola's 802.11 SEP portfolio. This examination revealed, through

testimony by Motorola's own experts, that the Xbox uses only 11 of the 24 patents Motorola asserts are essential to the 802.11 Standard. Thus, Microsoft would have no reason in a (hypothetical) negotiation to take a license to any of the 13 Motorola SEPs that the Xbox does not use. In other words, Microsoft has no use for 13 of the 24 patents in Motorola's 802.11 SEP portfolio.

575. Further, in its hypothetical negotiation, the court must consider the importance of the 11 Motorola SEPs that Microsoft does use. Evidence at trial showed that each of the 11 patents provides very minimal technical contribution to the identified portions of the 802.11 Standard. Additionally, the record was clear that Motorola did not provide the inventive technology in any area of the 802.11 Standard, but instead built upon already existing technology.

576. Finally, the court must consider Motorola's contribution in relation to the standard as a whole. The amount of technology involved in the 802.11 Standard is immense. Indeed, the contributions by the University of Hawaii in developing ALOHAnet constitute the basis for the 802.11 Standard. (11/15/12 Tr. at 90-91 (Gibson Testimony).) Additionally, the 802.11 Working Group spent seven years developing the first draft of the 802.11 Standard. (*Id.* at 92-93.) Over 1,000 companies have participated in the development of the 802.11 Standard. (*Id.* at 94-95; Ex. 514.) The 802.11 Standard today is large and complex; the current version is 2,793 pages long. (Ex. 386A.) Approximately 92 companies have identified essential patents or submitted blanket LOAs to the IEEE. With this large scale contribution in mind, the court finds that

Motorola's 11 relevant SEPs constitute only a sliver of the overall technology incorporated into the 802.11 Standard.

577. In sum, the court considers the Via Licensing 802.11 patent pool an indicator of a RAND royalty rate for Motorola's SEPs, although not as strong an indicator as the MPEG LA H.264 patent pool. Nevertheless, pursuant to Factor 9 of the court's RAND-modified *Georgia-Pacific* analysis, parties in a hypothetical negotiation would consider the Via Licensing 802.11 patent pool as practice of one in the business of licensing 802.11 SEPs to fashion a RAND royalty rate. Moreover, in this case, because Motorola's 11 relevant 802.11 SEPs provide little value to the 802.11 Standard, Microsoft and Motorola acting reasonably during a (hypothetical) negotiation would conclude that 6.114 cents per unit is likely higher than an appropriate RAND rate for Motorola's 802.11 SEP portfolio.

iv. The Marvell Wi-Fi Chip

578. Microsoft uses, as an additional comparable for a Microsoft-Motorola 802.11 RAND rate, the royalty rate that a third-party company, Marvell Semiconductor, Inc. ("Marvell"), pays for the intellectual property in its WiFi chips. The court agrees that the Marvell rate provides an indicator for 802.11 RAND under Factor 12 of the hypothetical negotiation because the experiences of Marvell, a third-party, tend to establish what is customary in the business of semiconductor licensing.

a. Background On The Marvell Wi-Fi Chip

579. Marvell designs and markets semiconductor chipsets that provide 802.11 functionality for a variety of products, including the Microsoft Xbox. (11/19/12 Tr. at

114:21-25, 115:1-3 (Williams Testimony).) WiFi chips, such as the Marvell WiFi chips used in the Xbox, are commodity products sold by many different companies. (*Id.* at 115:4-7.) Marvell manufactures and sells its chips to Microsoft, Motorola, Sony and others, which the companies incorporate into products as diverse as the Sony Playstation and the Audi A8 automobile. (11/14/12 Tr. at 63:2-10 (Ochs Testimony).) Though the products are diverse, each company incorporates the Marvell chips into its products for the same reason: to provide 802.11 functionality.

580. The main purpose of the Marvell WiFi chip is to implement the 802.11 Standard: the chip has no other use than to provide 802.11 functionality to a host product. (11/14/12 Tr. at 61:16-18 (Ochs Testimony).) When embedded into a device such as an Xbox, the WiFi chip enables the device to use the 802.11 Standard to transmit and receive information on radio frequency carriers. Otherwise stated, the WiFi chip uses the 802.11 Standard to enable a host device to communicate wirelessly. (11/19/12 Tr. at 114:10-20 (Williams Testimony).) The Marvell chip contains the vast majority of what is needed to provide 802.11 functionality in a product like the Xbox. (11/14/12 Tr. at 61:11-12 (Ochs Testimony).)

581. Microsoft currently pays just under $3.00 per Marvell chip to provide 802.11 functionality to the Xbox gaming console. (11/15/12 Tr. at 25:6-9 (Del Castillo Testimony).) In the past, Marvell has charged $3.00 to $4.00 per chip for WiFi chips of the kind it sells to Microsoft. (11/14/12 Tr. at 61:19-21 (Ochs Testimony).)

582. Marvell pays a royalty and licensing fees to ARM Holdings ("ARM")—a software company—on each $3.00-4.00 chip Marvell makes. ARM Holdings is an

English company that specializes in creating software and other tools that enable customers to design and make "embedded microprocessors," such as the Marvell WiFi chips. (11/16/12 Tr. at 12:8-13 (Lynde Testimony).) ARM provides Marvell with the patent licenses and "design and know-how" Marvell needs to make its 802.11-compliant chips. In exchange, Marvell pays ARM a royalty of 1 % of the purchase price of the chip (3-4 cents per chip). (11/14/12 Tr. at 71:15-21 (Ochs Testimony).) The ARM license and royalty package includes not only the patents required to build these chips, but also the instructions the customer can use to develop the product. (11/16/12 Tr. at 120:8-13 (Lynde Testimony).)

b. The ARM Benchmark Rate

583. According to Jennifer Ochs, Marvell's Director of Intellectual Property Litigation, Marvell considers the 1 % royalty rate it pays to ARM a reasonable "high ceiling" of what a semiconductor company should pay for an intellectual property royalty. (11/14/12 Tr. at 70:24-25, 71:1 (Ochs Testimony).)

584. This "high ceiling" determination is based partially on the fact that ARM licenses not only patents, but also directions on how to design necessary elements of the chip. (11/14/12 Tr. at 71:5-8 (Ochs Testimony); *see also* 11/16/12 Tr. at 120:8-13 (Lynde Testimony).) Ms. Ochs's testimony suggested that a company should pay less than a 1 % royalty rate for a patent-only license agreement—one that does not contain ARM's additional intellectual property. (*See* 11/14/12 Tr. at 70:24-25, 71:1 (Ochs Testimony).)

585. Marvell also considers the ARM rate an appropriate benchmark because the rate is based on the selling price of the chip, not the sale price of the end-user product into which the chip is embedded. According to Ms. Ochs, the denominator in the royalty calculation must be the price of the chip rather than the price of the user end-product because even a low royalty rate applied to an expensive end-product would quickly outstrip Marvell's profit margins on its chips. (*See* 11/14/12 Tr. at 68, 69:1-3 (Ochs Testimony).) For example, a 1 % royalty on a chip placed in an $80,000.00 Audi A8 would be $800.00, or about 267 times the retail price of the chip. (*See id.* at 69:1-3.) Ms. Ochs further testified that, not only would a royalty rate based on the consumer end product often be cost-prohibitive, it would also be impractical because when Marvell sells the chips it usually does not know their intended end use. (11/14/12 Tr. at 68:5-25, 69:15-16 (Ochs Testimony).) Finally, the chips provide the same functionality in each host device regardless of the end cost of the device, so it is logical that the royalty rate be the same across all devices. (*See id.* at 62:17-20.) Likely because of these reasons, Ms. Ochs testified that she had never heard of a chip maker paying a running royalty on the end-product price of its consumers' products. (*Id.* at 70:7-10.)

586. Ms. Ochs finally testified that, because the risk of "royalty stacking" inflates the impact of any royalty on a company's bottom line, even a 1 % royalty is a "high ceiling" benchmark. This is because the profit margin on semiconductor chips is narrow, and several royalty payments can quickly subsume a company's expected profits. (*See* 11/14/12 Tr. at 70:1-6 (Ochs Testimony).) Indeed, "you can't pay too many royalties before you just run out of profit." (*Id.* at 70:2-3.)

587. Thus, the court concludes that Marvell's experience with the ARM rate shows that the 1 % rate represents a reasonable "high ceiling" royalty rate in semiconductor intellectual property licensing.

c. The ARM Benchmark Rate as an Industry Indicator

588. In light of the foregoing, the court holds that the ARM rate is a reference point in the present RAND hypothetical negotiation. More specifically, the court looks to the ARM rate to inform its consideration of Factor 12 of the modified *Georgia-Pacific* factors.

589. Under Factor 12, the court should consider, in a hypothetical negotiation, "[t]he 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." *Georgia-Pacific*, 318 F. Supp. at 1120.

590. Marvell's experience with the ARM royalty rate provides the court with a royalty rate "that may be customary in the particular business." *Id.* So, the court considers a royalty rate of 1 % per 802.11-enabling chip, between 3 and 4 cents per chip (depending on the chip's final sale price) an indicator of a RAND rate for Motorola's 802.11 SEP portfolio.[25]

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[25] The court is aware that the 1% royalty rate paid by Marvell constitutes the entirety of the royalty rates paid by Marvell for its 802.11 Wi-Fi chip. Motorola, on the other hand, only owns a portion of the intellectual property comprising the 802.11 Standard. Here, the court notes that it is not privy to financial and licensing considerations, beyond the 1% royalty to ARM, of Marvell and other third-party 802.11 SEP owners. The minimal evidence before the court suggests that other considerations exist that justify the court in employing the 1% rate as a comparable. Marvell owns significant patents relevant to the 802.11 Standard, and Marvell and

v. The InteCap Analysis

As a third possible indicator of a RAND royalty rate for Motorola's 802.11 SEP portfolio, the court examines an analysis by a consulting firm called InteCap, Inc. ("InteCap"), which developed a patent licensing valuation model for Motorola's 802.11 SEPs in 2003.

a. Background of the InteCap Analysis

591. In 2003, 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 patents. (11/16/12 Tr. at 126:12-20 (Lynde Testimony).)

592. InteCap evaluated Motorola's 802.11 SEP portfolio in 2003 and proposed a licensing model that segmented licensing markets and target companies into three categories or "Links":

- Link-1 comprised companies that made 802.11 chipsets;
- Link-2 comprised companies that made 802.11-dedicated devices like routers and access points; and
- Link-3 comprised companies that 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).)

Motorola have engaged in cross licensing discussions. (11/14/12 Tr. at 64-68 (Ochs Testimony); Exs. 16, 1608.) Without a full understanding of the considerations of Marvell and other third-party 802.11 SEP owners, the court is left to consider the 1% ARM royalty, equating to 3-4 cents per chip, only as an indicator of a reasonable royalty rate in the semiconductor intellectual property licensing industry.

593. According to InteCap's report, when 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. at 127:7-22 (Lynde Testimony).) 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
- "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 D. Curtis Dep. at 46:2-12.)

594. For Link-3 companies—802.11-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 D. Curtis Dep. at 42:2-20.)

595. InteCap's valuation model assumed a 25 % stacking factor based on the assumption that Motorola held 25 % of all 802.11 SEPs. The record here shows that this assumption clearly overemphasizes the relative size and importance of Motorola's 802.11 SEP portfolio at issue in this litigation. (11/16/12 Tr. at 129:3-15 (Lynde Testimony); *see also id.* at 108:21-109:9 (Lynde Testimony) (stating there are thousands of patents essential to the 802.11 Standard); 11/14/12 Tr. at 64:7-9 (Ochs Testimony) (Marvell has a

few hundred issued U.S. 802.11 Patents); Ex. 65 at CRA_001288 (InteCap's analysis assumed Motorola owned 14 802.11 technically or commercially essential patents).)

596. When accounting for the feature and stacking adjustment factors, InteCap's model resulted in an effective royalty of 0.1 % on the price of the products of Link-3 companies. This royalty would have been applied to products embedded with 802.11 functionality, including PCs, laptops, and game consoles, such as the Xbox. (7/12/12 D. Curtis Dep. at 56:8-14 (Q: . . . "[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).)

597. InteCap's model resulted in a 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).)

b. The InteCap Evaluation As An Indicator of a RAND Royalty

598. The court concludes that the InteCap rate would serve as a RAND indicator in a hypothetical negotiation.

599. Motorola makes several arguments against using the InteCap rate; the court will address these arguments in turn.

600. Motorola first contends that the InteCap evaluation considered only five Motorola 802.11 SEPs, whereas the Motorola 802.11 SEP portfolio at issue in this case contains many more patents. (Motorola Pr. FC ¶ 200 (citing 7/12/12 D. Curtis Dep. at 164:8-10).) The evidence before the court suggests otherwise. InteCap performed an evaluation of certain Motorola 802.11 SEPs to provide Motorola with a licensing recommendation for all of Motorola's 802.11 SEPs. (Ex. 65 at CRA_001288 (InteCap's analysis assumed Motorola owned 14 802.11 technically or commercially essential patents).) The InteCap rate is relevant because InteCap evaluated five Motorola patents as a representative sample for Motorola's entire 802.11 SEP portfolio in existence in 2003. The rate that InteCap developed based on these patents was designed to represent a reasonable rate for the entire portfolio. Because the InteCap evaluation valued Motorola's entire 802.11 SEP portfolio as of 2003, the rate can serve as an indicator in the present case.

601. Second, Motorola contends that the patents evaluated by InteCap are different from the patents in its current 802.11 SEP portfolio, particularly with respect to their relevant strength. Otherwise stated, Motorola contends that there is no way to assess the relative strength of the patents that InteCap considered compared to patents in Motorola's 802.11 SEP portfolio at issue in this litigation. (Motorola Pr. FC ¶ 200.) Motorola correctly explains that, of all the 802.11 SEPs in Motorola's portfolio at issue in

this case, only one (U.S. Patent No. 5,560,021) was considered by InteCap.[26] (Ex. 1; Ex. 6 at MOTO-MS-000237726.) Based on this fact, Motorola tries to diminish the relevance of the InteCap evaluation to seek a significantly higher royalty rate.

602. Motorola's argument is misplaced for two reasons. First, the argument is undercut by the court's earlier finding that Motorola's 802.11 SEP portfolio provides very minimal contribution to the 802.11 Standard. InteCap valued Motorola's patents as providing 25 % of the functionality of the 802.11 Standard. The court concludes that Motorola's 802.11 SEP portfolio as it exists today provides nowhere near 25 % of the overall functionality of the 802.11 Standard. Thus, if anything, the 802.11 SEPs Motorola owned in 2003 were more valuable than the 802.11 SEPs it owns today. Second, the question with respect to the InteCap analysis is not whether it provides a precise RAND royalty rate for Motorola's 802.11 SEP portfolio, but whether it is an indicator of an appropriate RAND royalty rate.

603. For the following reasons, the court concludes that the InteCap evaluation is an indicator of an appropriate RAND royalty rate for Motorola's 802.11 SEP portfolio.

604. The methodology of the InteCap evaluation exhibits characteristics consistent with the principles underlying the RAND commitment. For instance, the evaluation considered the value of the functionality of the 802.11 Standard in relation to the total product functionality. This consideration is very similar to the consideration

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[26] Although the court generally agrees that different SEP portfolios typically lead to different RAND royalty rates vis-à-vis the same implementer, that logic is case specific and does not apply here.

under Factor 15 of the court's RAND-modified *Georgia-Pacific* analysis which examines the importance of the SEP to the implementer's product.

605. The InteCap evaluation also accounted for stacking issues—an important principle of the RAND commitment—by considering the portion of the total 802.11 Standard enabled by Motorola's intellectual property. Again, this precise consideration is found in the court's hypothetical negotiation, which examines the importance of the SEP to the standard.

606. Additionally, in 2003, InteCap was in the business of evaluating patent portfolios for the purpose of licensing patents—and, in the case, evaluating Motorola's 802.11 SEP portfolio. The evidence supports the conclusion that InteCap attempted to provide Motorola with a licensing recommendation that would comport with Motorola's RAND obligation. Thus, pursuant to Factor 12 of the court's RAND-modified *Georgia-Pacific* analysis, the court concludes that parties in a hypothetical negotiation would consider the InteCap evaluation as an effort by a company in the business of licensing (RAND) patents to fashion a RAND royalty rate. Because of the minimal contribution of Motorola's patents, reasonable parties to a hypothetical negotiation would recognize that Motorola's 802.11 SEP portfolio is not worth more than the portfolio that InteCap evaluated in 2003.

607. In sum, the methodology of the InteCap evaluation exhibits certain characteristics of a RAND royalty rate, making the evaluation an appropriate indicator of RAND. The strength of the InteCap evaluation as an indicator is, however, diminished by the evaluation's over-exaggeration of the relative importance of Motorola's 802.11

SEP portfolio to the 802.11 Standard. The court has attempted to adjust for this overestimation, but without concrete evidence to accurately make such adjustments, the accuracy of the InteCap indicator is placed into question. Accordingly, the court concludes that parties to a negotiation would view the InteCap evaluation as an indicator of a RAND royalty rate, but would consider it less important than the Via Licensing Pool or the Marvell Wi-Fi chip.

c. RAND Royalties Based on the InteCap Analysis

608. The InteCap evaluation suggested a 0.1 % royalty on Link 3 products, such PCs, laptops, and game consoles. Link 3 products would naturally include the Xbox game console, which typically sold for between $200.00 and $400.00. (11/15/12 Tr. at 13 (Del Castillo Testimony).)

609. Thus, a RAND royalty rate based on InteCap as an indicator would be between 20 and 40 cents per unit.

610. However, the court concludes that InteCap overestimated the importance of Motorola's 802.11 SEP portfolio to the 802.11 Standard by assigning the portfolio a value of 25 % of the entire 802.11 Standard. Having carefully examined the importance of Motorola's 802.11 SEP portfolio with respect to Microsoft, the court concludes that the InteCap evaluation applied to Motorola's current 802.11 SEP portfolio overstates its importance by at least a factor of 25. The testimony of Dr. Gibson corroborates this conclusion. Dr. Gibson estimated that Motorola's 802.11 SEP portfolio is less than 1 % of the overall technology in the 802.11 Standard. (11/15/12 Tr. at 154 (Gibson Testimony).)

611. The court concludes that Microsoft and Motorola acting reasonably in a hypothetical negotiation would view the importance of Motorola's 802.11 SEP portfolio as vastly inferior to InteCap's estimate and would accordingly adjust the royalty rate produced by the InteCap evaluation downward by a factor of 25. The adjusted InteCap evaluation produces a royalty rate of between 0.8 and 1.6 cents per unit.

612. In sum, the court concludes that during the course of a hypothetical negotiation, Microsoft and Motorola would reasonably consider the InteCap evaluation as an indicator of a RAND royalty rate for Motorola's 802.11 SEP portfolio. The court further concludes that the parties would significantly adjust the InteCap indicator downward to compensate for overestimation by InteCap of the value of Motorola's 802.11 SEP portfolio to the 802.11 Standard. Thus, the adjusted rate the parties would look to is between 0.8 and 1.6 cents per unit.

C. A Reasonable Royalty Rate for Motorola's 802.11 SEP Portfolio

613. Pursuant to Factor 12 of the court's RAND-modified *Georgia-Pacific* analysis, Microsoft and Motorola would consider the Via Licensing 802.11 patent pool, Marvell Wi-Fi chip, and the InteCap evaluation as indicators of a RAND royalty rate for Motorola's 802.11 SEP portfolio. Microsoft and Motorola, acting reasonably in the course of their negotiation, would view the aforementioned indicators in light of the importance of Motorola's 802.11 SEP portfolio to the 802.11 Standard. More specifically, in the case of the Via Licensing 802.11 patent pool and the InteCap evaluation, the indicator would be adjusted downward due to the lack of importance of Motorola's 802.11 SEP portfolio to the standard, as explained extensively herein.

614. The three indicators produced the following estimates of a RAND royalty rate: (1) The Via Licensing 802.11 patent pool implied a royalty rate of 6.114 cents per unit; (2) the ARM rate for the Marvell Wi-Fi chip suggested a royalty rate between 3 and 4 cents per unit; and (3) the InteCap evaluation theorized a royalty rate between 0.8 and 1.6 cents per unit.

615. In relation to the amount Motorola seeks in this litigation—$6.00-8.00 per Xbox unit—these three indicators are very close to one another. The fact that three independent indicators of a RAND royalty rate produced such similar results strongly suggests that the ballpark of a RAND royalty rate for Motorola's 802.11 SEPs falls within the range of the indicative rates.

616. Placing itself into the hypothetical negotiation between Microsoft and Motorola, the court concludes that one reasonable path for the parties in pinpointing a royalty rate based on the above indicators would be to average the three. The court notes that the process of averaging is common in business negotiations, so the court will employ that process here.

617. In its calculation, the court averages the low point from the InteCap evaluation—0.8 cents per unit—in large part because the InteCap evaluation based royalties on the end-price of products. As the court's RAND-modified *Georgia-Pacific* methodology explains, a patent's royalty rate should be based on the importance of the patent to the standard and to the implementer's product. Under this analysis, this royalty rate would fluctuate little, if at all, based on the end selling price of the product. Accordingly, if 0.8 cents per unit is a reasonable royalty rate for a $200.00 Xbox, then it

should be a reasonable royalty rate for an Xbox selling for $400.00 that uses the patented technology in the same manner.

618. With respect to the indicative range of the Marvell Wi-Fi chip, the court concludes that reasonable parties would split the range, such that a rate of 3.5 cents per unit would be used in the average.

619. Thus, the average of the three indicators is 3.471 cents per unit (= (0.8 + 3.5 + 6.114) / 3).

620. Reasonable parties in the hypothetical negotiation would check the 3.471 cents per unit rate for its reliability. Here, the Motorola and Microsoft would see that the rate falls almost perfectly in between the range of rates provided by the Marvell Wi-Fi chip indicator. Additionally, the rate of 3.471 is slightly below the rate indicated by the Via Licensing 802.11 patent pool. Microsoft and Motorola would view this as an accurate assessment, because the rate of the Via Licensing pool was likely too high for the reasons explained above. Finally, the parties would view 3.471 cents per unit as "within the ballpark" vis-à-vis the rate from the InteCap indicator. As stated, the InteCap evaluation is not a strong indicator because the court's efforts to modify the overestimation by InteCap of the value of Motorola's 802.11 SEP portfolio was imprecise at best. Thus, based on the foregoing, the court concludes that the parties would agree that a rate of 3.471 cents per unit not only falls in the range of the three indicators, but also makes logical sense and is in accord with the totality of the evidence before the court.

621. Accordingly, the court adopts the rate of **3.471 cents per unit** as the rate Microsoft and Motorola would agree to for a license to Motorola's 802.11 SEP portfolio acting reasonably in a hypothetical negotiation in light of the RAND commitment.[27]

622. Next, the court determines an upper and lower bound of a RAND royalty range for Motorola's 802.11 SEP portfolio. As explained previously in relation to the MPEG LA H.264 patent pool, stacking concerns from the perspective of the implementer govern the upper bound of RAND. Keeping stacking in mind, the court searches the trial record for an indication of what this upper bound may be. The court's search ends on the high point of the royalty range offered by Microsoft at trial: 6.5 cents per unit. (Microsoft Pr. FC ¶ 429.) This rate was proposed by Microsoft expert Dr. Lynde based on his efforts to ascertain a royalty rate based on the Via Licensing 802.11 patent pool. (Microsoft Pr. FC ¶ 429.) As discussed above, the court ultimately concluded that Dr. Lynde used incorrect figures for Motorola's and Microsoft's 802.11 SEPs in calculating royalties based on the Via Licensing 802.11 patent pool. Dr. Lynde used the number of patents claimed to be essential by Motorola in Motorola's October 21, 2010, offer letter to Microsoft. Similarly, Dr. Lynde used the number of patents claimed by Microsoft as essential at an earlier stage in the litigation. By the time of trial, both Motorola and Microsoft had significantly reduced the number of patents each claimed as essential to

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[27] Although Motorola may contend that Microsoft products other than the Xbox use the 802.11 Standard, Motorola did not make such an assertion at trial. Thus, the court is unable to ascertain the functionality of any other Microsoft products that Motorola may contend use the 802.11 Standard, making it impossible for the court to determine the importance of Motorola's 802.11 SEPs to these products. Accordingly, the court is left to conclude that the RAND rate for Motorola's 802.11 SEP portfolio applies only to Microsoft's Xbox products.

the 802.11 Standard. Accordingly, the court recalculated the royalties from the Via Licensing 802.11 patent pool based on an accurate count of patents. (*Supra* ¶ 565-71.)

623. One might wonder why the court would use Dr. Lynde's royalty rate as an indicator of an upper RAND bound after it determined that Dr. Lynde used the incorrect number of patents. Microsoft, at the time of trial, knew that Dr. Lynde's calculations regarding the Via Licensing 802.11 pool included an incorrect counting of Motorola's and Microsoft's respective essential patents, but nevertheless came into the court room and suggested a rate of 6.5 cents per unit. In part, the court views the trial as simulating a hypothetical negotiation. In many ways, Microsoft's 6.5 cents per unit royalty suggestion is not dissimilar to an offer in a hypothetical negotiation. Here, Microsoft offered a 6.5 cents per unit royalty rate based on its own calculations relating to the Via Licensing 802.11 patent pool, which the court has determined to be an indicator of a RAND royalty rate. The fact that Microsoft used—in the eyes of the court—inaccurate numbers, says little about whether Microsoft was unreasonable in making this offer. Indeed, Microsoft was offering to pay more for Motorola's 802.11 SEP portfolio than it would pay had accurate numbers been used.

624. Microsoft based its 6.5 cents per unit offer on the Via Licensing 802.11 patent pool with the assumption that Motorola had joined the pool as a licensor. As the court has explained, such patent pools provide licensors value beyond mere royalties received. The court has determined this additional value to be twice the royalties received. In offering the 6.5 cents per unit rate, Microsoft failed to consider this additional value. In consideration of these benefits, the court increases the rate to **19.5**

cents per unit (= 6.5 + 2×6.5) and holds that this rate is the upper bound of a RAND royalty between Microsoft and Motorola for Motorola's 802.11 SEP portfolio.

625. Finally, the court determines a lower bound of the RAND royalty rate. The lower bound assumes both that the SEP owner is acting reasonably and that she is seeking a royalty return for her patents. Needless to say, without an assumption that the SEP owner desires return on her patents, the RAND royalty rate would fall to zero. Here, the court will (safely) assume that in a hypothetical negotiation between Microsoft and Motorola, Motorola would seek a return on its 802.11 SEP portfolio.

626. The lower bound of RAND will logically be constrained by the value of the SEP owner's portfolio. In the RAND context, an SEP owner is entitled "to some ill-defined measure [of] return on the value of the [patented] property, but [not] to the incremental value that you get because you are part of the standard." (11/19/12 Tr. at 168:21-169:8 (Schmalensee Testimony).) Thus, the question becomes what is the lowest value that an SEP owner would agree to after examining the value of the relevant patents to the 802.11 Standard and to the implementer's product.

627. Unfortunately, there is little evidence in the record to assist the court in determining a lower bound. The court must, however, provide a lower bound based on the evidence before it. Accordingly, the court chooses **0.8 cents per unit** as the lower bound of RAND. This value represents the low royalty rate based on the adjusted

InteCap evaluation as an indicator of RAND. It also represents the lowest royalty rate on the record based on a methodology the court has found to be an indicator of RAND.[28]

VII. CONCLUSION

In conclusion and as explained herein, the court concludes as follows:

- The RAND royalty rate for Motorola's H.264 SEP portfolio is 0.555 cents per unit; the upper bound of a RAND royalty for Motorola's H.264 SEP portfolio is 16.389 cents per unit; and the lower bound is 0.555 cents per unit. This rate and range are applicable to both Microsoft Windows and Xbox products. For all other Microsoft products using the H.264 Standard, the royalty rate will be the lower bound of 0.555 cents.

- The RAND royalty rate for Motorola's 802.11 SEP portfolio is 3.471 cents per unit; the upper bound of a RAND royalty for Motorola's 802.11 SEP portfolio is 19.5 cents per unit; and the lower bound is 0.8 cents per unit. This rate and range are applicable to Microsoft Xbox products. For all other Microsoft products using the 802.11 Standard, the royalty rate will be the low bound of 0.8 cents per unit.

IT IS SO ORDERED.

Dated this 25th day of April, 2013.

JAMES L. ROBART
United States District Judge

[28] As stated, Motorola did not assert at trial that any Microsoft products other the Xbox used Motorola's 802.11 SEP portfolio. The court therefore could not apply the determined RAND royalty rate to any other Microsoft products. As a result, the court applies the low bound of the RAND range to all Microsoft products, other than the Xbox, using the 802.11 Standard.