

EXHIBIT A TO THE
DECLARATION OF
KEITH LEFFLER, Ph.D

FILED WITH REDACTIONS PURSUANT TO
DOCKET NO. 305 AND MICROSOFT'S
CONFIDENTIALITY DESIGNATIONS

Report of Keith Lefler, Ph.D. in Kelley et al., v. Microsoft, No C07-0475 MJP

I. Background and Experience

1. I am an Associate Professor of Economics at the University of Washington. I received my Ph.D. in Economics in 1977 from UCLA. I have teaching and research experience in the area of industrial organization. My specialty within industrial organization is the study of competition including pricing and promotion. I have taught classes and conducted research in industrial organization for over thirty years.
2. I have been performing economic analysis in litigation related matters throughout my academic career. I have been qualified as an economic expert in proceedings before federal courts, state courts, the Federal Trade Commission, and federal and state regulatory agencies. I have analyzed economic issues and damages related to competition and pricing in a number of industries including prescription drugs, gasoline, cigarettes, and computer operating systems. My curriculum vitae is attached to this Declaration as Exhibit A. My experience, qualifications, publications, and testimony given in the last four years are summarized therein. I am charging my usual hourly rate at the time of my engagement in this case of \$650.

II. Area of Analyses and Bases for Opinions

3. I have been asked by class counsel in this case to address three issues in this case. The first concerns the impact of Microsoft's Vista Capable program on the demand for and prices of personal computers during the period April 2006 through January 2007 (the Vista Capable Program period). The second concerns the revenue and profits earned by

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Microsoft from the operating system sales it made during the Vista Capable Program period. The third concerns the adverse impact on consumers from the purchase of personal computers sold as Vista Capable computers that would run only the Vista Home Basic operating system and not the premium Vista operating systems.

4. To undertake this assignment, I have reviewed the Third Amended Complaint (Complaint), the Class Certification briefs and accompanying materials, the Court's Certification Order, the named class plaintiffs' depositions, documents and data produced in discovery by Microsoft, the Declaration of Robert Moline and the supporting workpapers, the deposition of Katharine Griffith and the supporting workpapers,¹ Interrogatory Responses of Microsoft, the Report of Ronald Alepin, and relevant economics and trade literature. Exhibit B to this Declaration lists the materials I have considered in forming my opinions. My review of these materials has verified and supplemented my understanding of economics of the marketplace for personal computers. I have also relied upon my economics background and training, and knowledge of the personal computer markets gained from previous consulting work, including my work for the Federal Trade Commission and the Department of Justice in the Microsoft cases, and my work on the class certification issue in the indirect purchaser Microsoft cases.
5. I understand that the Court has certified a class of end-user purchasers of personal computers that were sold in the U.S. with the XP Microsoft operating systems and were sold as being Vista Capable but not meeting

¹ By supporting workpapers I refer to the various electronic files referred to in the Griffith deposition as residing on the "share drive" at Microsoft.

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the requirements to be "Vista Premium Ready,"

6. For purposes of this Report, I assume plaintiffs will establish, as alleged, that Microsoft's Vista Capable Program was deceptive because PCs capable of running only Vista Home Basic do not provide consumers with the ability to use the important and promoted features of the premium Vista operating systems.

III. Summary of Opinions

7. I have reached the opinions discussed in this Report including:

- A. Consumer anticipation of a pending significant change in a personal computer operating system (OS) will result in many customers delaying purchase of a new PC until the new operating system is available. By delaying the purchase, the consumers minimize their costs of acquiring the state of the art operating system, hardware, and software. Thus, when consumers expect a significant change in the OS in the near future, the demand for PCs will fall. According to basic and fundamental economic principles, as a result of a reduced demand, sales and prices will fall.
- B. Microsoft, PC makers, and Intel were all aware of the reduced demand that would result from consumer knowledge of the pending change from the Microsoft Windows XP OS to the Windows Vista OS. To avoid the adverse impact on the licensing of Windows XP, and the adverse impact on PC sales and Intel microprocessor sales, Microsoft designed a transition strategy by which consumers could buy "upgradeable" PCs prior to the market availability of Vista and then "upgrade" to Vista when it became available. This transition strategy which was known as the Vista Ready or Vista Capable Program was intended to minimize the expected adverse impact on Microsoft's, OEMs' and Intel's sales.²
- C. The forthcoming release of Windows Vista became publicly known in the spring of 2006. However, the technological requirements of the Vista operating system were greater than the capabilities of the typical PC being offered at that time. General consumer knowledge of this incompatibility would have resulted in many consumers delaying their purchase until PCs were available that offered the new Windows Vista OS. Such delay in purchase would have further reduced sales for the

² The adverse impact on Intel would have been particularly severe as Intel and OEMs had in inventory substantial amounts of microprocessors that would not run the Vista OS.

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OEMs, for Intel, and for Microsoft. Microsoft responded to this problem with a new Vista Capable Program which lowered the requirements for a PC to be called Vista Capable. Microsoft initiated and publicized this Program, advising the market that by purchasing a Vista Capable PC, the transition to the Vista OS could be accomplished via an upgrade from Microsoft. However, an upgrade of XP to Vista Home Basic does not allow a consumer to run important and highly promoted features of the new Vista operating system.

- D. As a result of the Microsoft Vista Capable Program, the demand for PCs that were designated as Vista Capable but were not Vista Premium Ready was increased. The increased demand from the Program resulted in increased sales and higher prices for these PCs than in the absence of the Program. Thus, those consumers who purchased a Vista Capable but not Premium Ready PC during the period April 2006 until the release of the Windows Vista operating system in January 2007 paid higher prices for these PCs as a result of the Program. Therefore, I have reached the opinion that all consumers that purchased a Vista Capable PC that was not Vista Premium Ready were adversely impacted because they paid higher prices for the PCs as a consequence of the Vista Capable Program.³
- E. I have estimated that 19.4 million PCs were sold in the U.S. that were Vista Capable but not Vista Premium Ready. In addition to paying higher prices for these PCs, these consumers did not receive computers that were capable of running a premium version of Vista that included important and promoted features of the Vista operating system. I understand that, generally, the technologically deficient PCs could be upgraded to be able to run Vista by the addition of RAM memory, by the addition of a new video card, or both. However, I also understand that some notebook PCs could not be so upgraded.
- F. I have estimated that the minimum costs to the Plaintiff Class members of rectifying their Vista Capable but not Premium Ready PCs to make them in fact capable of running a premium version of Windows Vista would be in the range of \$3.084 to \$8.522 billion.⁴
- G. I have also estimated that the licensing revenue to Microsoft from the sales of PCs to the Plaintiff Class members was \$1.505 billion.
- H. I have also estimated that the revenue to Microsoft from Class members' upgrades to Windows Vista Home Basic under the Microsoft Express

³ The Vista Capable Program would cause a shift in demand from the lower quality computers (not Vista Capable) and the higher quality computers (Vista Premium Ready) to the segment of the market that was Vista Capable but not Premium Ready. As a result it is likely that the prices of the lower and higher quality segments of the market were lower as a result of the Vista Capable program.

⁴ The range results from the range of costs of fixing notebooks with insufficient GPUs discussed below.

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Upgrade Program was

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I detail below the basis for each of these opinions.

IV. Background

8. Windows XP was launched in 2001. Windows XP was subject to substantial criticism because of its security vulnerabilities. The next generation operating system that had been labeled "Longhorn" was promised as the solution to the security problems. In response to continued criticism about security issues, in early 2002, Bill Gates announced a Microsoft "Trustworthy Computing Initiative" to focus on security for all Microsoft software. This security initiative was given priority over the completion of the next generation Longhorn OS.⁶
9. On August 27, 2004, Microsoft announced that it was scrapping its original plan to develop Longhorn based on XP source code and that the new OS would rather be based on the Windows Server 2003 Service Pack 1 code.⁶ Microsoft announced in July 2005 that the new OS would be named Windows Vista and that it would incorporate security improvements, an updated graphical user interface called Windows Aero, improved searching, multimedia tools, and improved home networking capabilities.⁷ In February 2006, Windows Vista was considered "feature complete" with the release of the "February Community Technology

⁶ http://news.ynet.com/Microsoft-Longhorn-beta-unlikely-this-year/2100-1008_3-5183386.html.

⁶ <http://msdn.microsoft.com/en-us/library/ms995349.aspx>.

⁷ In addition, Vista includes a new Windows Shell, Windows Sidebar, Backup and Restore Center, Windows Mail, Windows Calendar, Windows Photo Gallery, Windows Mobility Center, Windows Meeting Space, Windows Shadow Copy, parental controls, Windows Slide Show, speech recognition, Windows System Assessment Tool.

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Preview" beta version.⁹ Additional beta versions were made available for downloading and testing in May, September and October of 2006.

10. Microsoft had planned on commercial release of Windows Vista for the Christmas 2006 buying season. However, in March 2006, Microsoft announced a push back in the release to January 2007.¹⁰ The delay was the result, at least in part, of the need for PCs to become generally available that met the system requirements to run Vista.¹⁰ On November 8, 2006, Microsoft announced the completion of Windows Vista and its public release date of January 30, 2007.¹¹

11. Microsoft recognized that the relatively high system requirements for running Vista presented a problem for its adoption.¹² Microsoft estimated that the minority of PCs in the market in early 2006 would be able to run Vista.¹³ In order to protect the sales of PCs and the licensing of Windows XP during the period between the March 2006 announcement of Vista's launch and its actual launch on January 30, 2007, Microsoft altered its Vista Ready Program to allow PCs that could not run important features of

⁹ http://www.winsupersite.com/showcase/winvista_roadtgold_07.asp;
http://news.cnet.com/Microsoft-opens-window-for-new-Vista-tes/2100-1016_3-6042016.html?tag=mncl.

¹⁰ http://news.cnet.com/2100-1016_3-6062270.html.

¹¹ MS-KELL 27186, MS-KELL 80073-83; MS-KELL 64476, MS-KELL 64480-82, MS-KELL 64620.

¹² <http://windowsvistablog.com/blogs/windowsvista/archive/2006/11/08/windows-vista-releases-to-manufacturing.aspx>.

¹³ See, e.g., MS-KELL 30061 (Vista release would kill sales of existing PCs because few are Vista Premium Ready.).

¹⁴ MS-KELL 21978 ("as of [January 2006] only 4% of Desktops are Windows Vista PREMIUM Capable."); See also MS-KELL 22117; MS-KELL 70020; MS-KELL 19346. See also MS-KELL 27389 ("PCs that don't meet these [Vista Premium Ready - Requirements] are either "Vista capable" or unsupported."); MS-KELL 17696 ("most PCs would not qualify for the Ready Logo.");

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Vista to be designated as Vista Capable.¹⁴ Those PCs that could effectively run all features of the new Vista operating system were then called Vista Premium Ready. The Vista Capable but not Premium Ready PCs would run the operating system that had been known as "Windows 2008 Home Basic" and that was renamed Windows Vista Home Basic.¹⁵ This change allowed a much larger percent of the available PCs to be "Vista Capable."¹⁶

V. The Economic Impact of the Vista Capable Program.

12. It is a well known feature of certain capital goods markets, including personal computers and other electronics goods, that a pending expected improvement in the technological capability of the products causes some consumers to delay purchase until products incorporating the new technology are available. A current example is the decline of analog television sales in anticipation of the change to digital signals.¹⁷
13. This phenomenon of consumer purchase delays awaiting the release of products incorporating new technology is well known in the PC industry. Indeed, it is sufficiently recognized in this industry to be called the "Osborne Effect." In 1983, Osborne Computer Corp, an early manufacturer of what became known as personal computers, announced

¹⁴ MS-KELL 18845; MS-KELL 21979; MS-KELL 23209-10; MS-KELL 19346-82; MS-KELL 19361; MS-KELL 18624; MS-KELL 59827; Sony doc. no. KELLEY 18.

¹⁵ MS-KELL 25054; MS KELL 19361.

¹⁶ See MS-KELL 26802; MS-KELL 48317-18 (Vista Capable Program launch date would affect Intel's ability to ship Vista Capable parts in a way "material" to Intel's business); MS-KELL-48949-50 ("even after June 1 [2006] Intel is planning on continuing 915GM on 50% of chipsets volume"); MS-KELL 56838.

¹⁷ See, e.g., http://www.c2.org/Press/CEA_Pubs/2007.asp.

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that it would soon be offering next-generation models. An immediate decline in Osborne's current sales, profits and cash flow followed, at least in part because of consumers waiting to buy until the new models were available.¹⁸ An even earlier, frequently noted example concerned North Star, an early manufacturer of disk drives. In 1978, North Star announced a forthcoming doubling of disk drive capacity. The announcement resulted in substantial reductions in current sales.¹⁹ More recently, Apple faced the same decreased demand problem with its announced switch to Intel microprocessors in Apple personal computers.²⁰ It is significant to note that this effect on demand, and on sales and prices, requires only that a segment of the market react to the pending technological improvement by delaying purchase.

14. Microsoft faced the Osborne Effect problem with its Vista operating system. Microsoft was aware of the likely adverse impact on both PC sales and its XP licensing revenues because of the pending release of Vista.²¹ Industry observers, OEMs, and retailers also recognized this problem confronting the PC industry.²² In an e-mail received by

¹⁸ See, e.g., Osborne and Dvoak, *Hypergrowth*, 1886.

¹⁹ http://www.theregister.co.uk/2005/08/20/no_osborne_effect_at_osborne/.

²⁰ http://www.theregister.co.uk/2005/08/08/apple_sales_ohhhh/.

²¹ See, e.g., MS KELL 27088 ("MS is not changing our strategy of doing very little to drive demand and awareness of Windows Vista ... as we do not want to do anything that would stall XP PC ... sales during the Holidays."); MS-KELL 17898 (Risks of "announcing the Ready PC program in Jan 06 - stalling the market"); MS-KELL 27364; MS-KELL 48249-60 ("announcing a product too far in advance such that it kills current product sales"); MS-KELL 26105-06; MS-KELL 58978-83.

²² See, e.g., http://news.onet.com/IDC-cuts-PC-forecast-on-Vista-delay/2100-1003_3-6064322.html?laq=bit; http://news.onet.com/Vista-debut-hits-a-delay/2100-1016_3-6062270.html?laq=mncol;bit; MS-KELL 25148 ("There has been Retailer feedback and concerns that creating high visibility for the Vista-Ready program could serve to stall PC sales."); MS-KELL

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Microsoft, Dell noted its concerns of a "huge risk of stalling demand ... we saw Pocket PC sales fall off the cliff when the new OS was pre-announced."²³ To minimize the impact of the customers' delays in PC purchasing awaiting the availability of PCs preloaded with Windows Vista, Microsoft initiated its Vista Capable Program.²⁴ The Program was intended to alleviate some of the likely "Osborne Effect."

15. Microsoft noted that the Vista Capable Program would "[e]nsure sustained demand for current-generation hardware during lead in to Vista launch;"²⁵ and that the Program would "[k]eep the XP sales momentum."²⁶ The goal of the Vista Capable Program was clearly stated as to "enable XP sales momentum to continue till Vista launches;"²⁷ to "maintain Microsoft Windows XP PC sales;" and "to not stall PC sales."²⁸ A number of class plaintiffs have also testified that the Vista Capable program influenced them to not delay their PC purchases awaiting the release of

¹⁷⁸⁹⁶ ("The primary concern cited by OEMs is the risk of stalling PCs by announcing the [Ready] program early."); MS-KELL 30051; MS-KELL 48294; MS-KELL 64480.

²³ MS-KELL 18799.

²⁴ MS-KELL 19346.

²⁵ MS-KELL 27384. See also MS-KELL 24864 ("Retailers here in the States still have XP systems they are selling, now at a discount through March 16th"); MS-KELL 25709 ("The alternate [to the Vista Capable Program] according to Sony and many retail OEMs would be to take mark downs at retail."); MS-KELL 25711 ("Apparently retailers, esp Circuit city and COMPUSA are telling OEMs that on April 1 [2006] systems not logo'd Capable would get marked down or returned, unless they are logo'd Capable, [sic]"); See also MS-KELL 26711; MS-KELL 46480 (IT's about not stalling sales. Nothing else really matters."); MS-KELL 75842 ("The main goal of the program is not stall sales of PCs preinstalled with Windows XP, as we approach the launch of Windows Vista."); MS-KELL 92849; MS-KELL 86710-12; MS-KELL 98061-63.

²⁶ MS-KELL 27363.

²⁷ MS-KELL 25620.

²⁸ MS KELL 00038; MS-KELL 12952; MS-KELL 22069. See also MS-KELL 20339 ("Additional risk is that the Vista Premium Ready program launches on April 1st, further increasing the probability that customers will wait to purchase their next PC."); MS-KELL 18381 (describes the changes in the Vista Premium Ready to Vista Capable program as "to further increase the ability of the Windows Vista Capable Program to help with PC sales prior to the Windows Vista launch later this year."). See also MS-KELL 65218-19.

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Vista.²⁹

16. The impact of the increased demand for XP based PCs as a result of the Vista Capable Program is clear. Elementary economics conclusively shows that an increase in demand will result in an increase in price and in sales.³⁰ This basic economic proposition was well understood at Microsoft. Microsoft was aware that during the transition to Windows Vista, XP based PCs that were sold as Vista Capable would have higher value and price than PCs not deemed so capable.³¹ Some class plaintiffs also verified this through their testimony that they were willing to pay more

²⁹ See, e.g., depositions of class representatives Walters p. 56 ("...by seeing the Vista capable sticker, I thought...it was going to be able to run Vista, and I was buying this computer for my son so it could get him through his last bit of high school and continue on into college without buying a new computer, and I was worried about the obsolescence of Window XP when it came out"); Hall p. 78-79 ("I was going to wait and buy a computer when Vista came out, but with the Vista upgrade sticker and the Vista upgrade program, it made me want to buy it even more, so I finally decided that it was worth it to buy it and then upgrade to Vista when it came out...") and p. 106-107, "Q. the fact that there was going to be an upgrade program led you to purchase it prior to the release of Vista, correct? A. Yes."); Hansen p. 23 ("So, I selected - one of the criteria for selecting the laptop was something that would run the new operating system so that when XP was finally phased out, I wouldn't have an obsolete computer." and p. 43 ("..yes, I was aware that the one I was ordering did in fact say it would handle Vista."); Morales p. 28 ("Because that computer was Windows Vista capable within my price range..."); Schroder p. 49-50 ("...that's how we reached or he reached the decision to purchase the Vista capable machine, because he wanted a machine capable of running the program that was going to replace, succeed XP.").

³⁰ This economic fact is discussed in any elementary or intermediate microeconomics textbook. A text published this year notes - "A decrease in demand results in a lower equilibrium price and a lower equilibrium quantity." Boyes and Melvin, *Microeconomics*, Houghton Mifflin, 2008, 7th ed., p. 81. The textbook I have used for years in the beginning microeconomics course I have taught also notes that when the demand for some good decreases, it will cause lower market prices. Silberberg, *Principles of Microeconomics*, Prentice Hall, 1996, p. 173. The classic text by Alchian and Allen makes the same point "A decrease in demand results in a lower equilibrium price and a lower equilibrium quantity." Alchian and Allen, *Exchange and Production*, Wadsworth, 1983, p. 77. Intermediate texts make the same point. See, e.g., Mansfield and Yoch, *Microeconomics*, Norton, 2000, 10th edition ("Suppose now that consumer demand for good X fell ... Clearly, the new equilibrium price would be at a lower level." p. 40).

³¹ MS-KELL 25711. This is also implied in MS-KELL 33028 ("Leading up to the transition the team would more efficiently coordinate close out events on XP inventory.") See also MS-KELL 25619-20 ("Vista Premium Ready - Goal - Reassure customers that their near-term PC investments will retain their value after Windows Vista is available.")

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for their computer because it was sold as "Vista Capable."³² After the release of Windows Vista in January 2007, Microsoft noted the success of the Vista Capable Program in maintaining the demand for XP based PCs during the transition period to Vista.³³

17. Based on the clear evidence that the Vista Capable Program increased the demand for XP based PCs, based on fundamental and non-controversial economic propositions, and based on Microsoft's documents concerning the Program, I have reached the opinion that all purchasers of Vista Capable but not Vista Premium Ready PCs, who purchased during the period April 2006 through January 30, 2007, were adversely impacted by the Program. The adverse impact was of two types. First of all, the prices of the Vista Capable but not Ready PCs were artificially maintained at a price inflated by the Program.³⁴ Secondly, rather than receiving a PC of the technological quality sufficient to run the Vista Premium OS, these purchasers received an inferior PC. In the next section of this Report, I quantify both the number of U.S. PCs sold to U.S. purchasers that were adversely impacted by the Program, and I also estimate the quantitative

³² See, e.g., depositions of Hall p. 108 ("I have a better recollection that I paid upgrade redemption program."); Schroder p. 60 ("...if you want more expensive features, you have to pay for it."); Morales p. 41 ("...there was a few more that were roughly the same technically that had the same technical specifications that were cheaper. Q. Why didn't you buy those? A. Because they weren't Windows Vista capable or they didn't come with the Express Upgrade." and p. 76, "Q. Did you believe when you purchased your computer that you were paying some extra amount for the Express Upgrade? A. Yes. Yes." and p. 83-84, "...That's why I would have to say that I would be willing to pay more, because I believed that I was paying more to receive those capabilities."); Walters p. 88 ("Q. Do you believe this PC should have been even less expensive than it was? A. I believe that it could have been.").

³³ MS-KELL 18626 ("Customers did notice the merchandising (there was demand labeled systems"); MS-KELL 96313-15.

³⁴ While there is no doubt as to the qualitative impact of the Vista Capable Program on the price of these PCs, I am unaware of sufficient data to estimate the quantitative impact.

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Impact on those purchasers.

Quantifying the Impact on the Plaintiffs from Purchase of Vista Capable but Not Ready PCs.

18. Microsoft retained PricewaterhouseCoopers (PwC) to produce financial and sales information in response to Plaintiffs' Requests for Admissions. Robert Moline, the lead Advisory Services partner for PwC at Microsoft, prepared a Declaration in which he estimated the number of "upgradeable" PCs sold to non-volume license customers in the U.S. during the period April 2006 and the launch of Windows Vista in January 2007.³⁵

Upgradeable PCs are those PCs that were Vista Capable including those that were also Vista Premium Ready.

19. Kathryn Griffith, a PwC Manager reporting to Mr. Moline, testified at deposition on June 10, 2008 concerning the methodology underlying the estimates offered by Mr. Moline. Ms. Griffith also testified that the PwC team at Microsoft was engaged to check and supplement Mr. Moline's estimate of the upgradeable PCs sold to U.S. customers to include the volume licensing customers. At the time of her deposition, Ms. Griffith's work was not completed.

20. On June 23, 2008, Microsoft produced Supplemental Responses to Notice of Videotaped 30(b)(6) Deposition (Supplemental Responses). In these Responses, Microsoft estimated "that between April 2006 and the launch of Windows Vista in January 2007, approximately

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³⁵ Declaration of Robert L. Moline in Support of Microsoft's Opposition to Plaintiffs' Motion for Class Certification, November 19, 2007.

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upgradeable PCs were sold to U.S. customers."³⁵ In addition, a "share drive" set of electronic files were subsequently produced by Microsoft that included the backup to the calculations summarized in the Supplemental Responses.

21. The PwC estimates of the sales of "Vista upgradeable" PCs are derived from a few fundamental sources.³⁷ Firstly, the Microsoft MS Sales data base was used to estimate the worldwide total of PCs sold with Microsoft operating system licenses during the class period. A separate "PCs MIT Report" was relied upon by PwC and Microsoft to estimate the percentage of these PCs that were sold in the U.S. Finally, surveys done for Microsoft by a third party consulting firm Current Analysis were relied upon for a breakdown of PCs into those that were upgradeable, and those that were not upgradeable. In Table 1, I reproduce the PwC-Microsoft calculation of upgradeable PCs sold in the U.S. on a monthly basis for the period April 2006 through January 2007.

22. In addition to breaking down PC sales into upgradeable and not upgradeable, the Current Analysis surveys relied upon by PwC and Microsoft also subdivide the upgradeable PCs into those that were Vista Capable but not Vista Premium Ready, and those that are Vista Premium Ready. These percentages are used to calculate on a monthly basis the number of PCs sold in the U.S. that were Vista Capable but not Vista

³⁵ Supplemental Response to Topic No. 1.

³⁷ The sources are described in the Griffith Deposition at pp. 108-109.

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Premium Ready.³⁸ From these data I calculate that Plaintiff Class members purchased 18.4 million Vista Capable but not Premium Ready PCs during the period April 2006 through January 2007.

23. The Current Analysis surveys further document the hardware deficiencies of the Vista Capable but not Vista Premium Ready PCs. The hardware deficiencies are broken down separately for desktop and for notebook PCs, and also separately for RAM deficiencies and for GPU deficiencies. Table 2 shows the estimated number of impacted desktop PCs and notebook PCs, by month, that were sold with insufficient memory to run Vista, with insufficient GPU capability to run Vista, and with both insufficient memory and insufficient GPU capability.³⁹

24. I have been asked to estimate the amount that the Plaintiffs would need to modify the PCs purchased in order for those PCs to properly run Windows Vista other than the Home Basic version. I rely on the Expert Report of Ronald Alepin for the estimates of the expected per PC cost of such these modifications. These costs are as shown in Table 3.

25. Table 4 combines the number of impacted PCs in each of the relevant "deficiency" categories from Table 2 with the cost of rectifying the deficiencies as in Table 3. The total costs to Plaintiffs as a group of modifying their purchased PCs to properly run Windows Vista is estimated

³⁸ The data from Current Analysis is available through July 2006. For the months August 2006 through January 2007, I have extrapolated the data using similar methodology as in the PwC-Microsoft workpapers.

³⁹ The figures in Table 2 for insufficient memory and insufficient GPU are not duplicative of those with both insufficient memory and GPU; that is, e.g., the reported figures of PCs with insufficient memory are those PCs that have sufficient GPU capability.

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as the range \$3.084 to \$6.522 billion.

VI. Revenue Earned by Microsoft from XP Licenses on Vista Capable but not Vista Premium Ready PCs.

26. I have been asked by Plaintiffs' counsel to estimate the amount of revenue earned by Microsoft from the licensing of Windows XP on Vista Capable but not Vista Premium Ready PCs sold to Plaintiffs. In Microsoft's Supplemental Responses, it estimates that it received revenue of _____ from Windows XP licenses installed on upgradeable PCs sold in the U.S. during the April 2006 through January 2007 period. From the estimates of Windows Capable but not Vista Premium Ready PCs compared to all upgradeable PCs as in Table 1, I estimate that 52.3% of the _____ from Windows XP licenses on upgradeable PCs were for XP licenses on Vista Capable but not Vista Premium Ready PCs - those PCs purchased by the Plaintiff class. From these figures, I have, therefore, reached the opinion that the Microsoft revenue from the Windows XP licensing on Vista Capable but not Vista Premium Ready PCs sold to Plaintiffs was _____.

VII. Microsoft Revenue from Express Upgrade Licenses of Vista Home Basic to Class Plaintiffs.

27. I have been asked by counsel for Plaintiffs to estimate the revenue earned by Microsoft from the licensing of Vista Home Basic upgrades to the Class Plaintiffs under Microsoft's Express Upgrade Program. According to Microsoft's Supplemental Responses to Notice of Videotaped 30(b)(6)

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Deposition, _____ Windows Vista Home Basic licenses were distributed in the United States. According to a Microsoft document, the cost of upgrading to Windows Vista Home Basic was _____⁴⁰ This implies Microsoft revenue from the licensing of Vista Home Basic to Class Members under the Express Upgrade Program of _____

⁴⁰ MS-KELL 00053; MS-KELL 45660; Griffith Dep. p. 182.

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Keith Leffler
Keith Leffler, Ph.D.

9/15/08
Date

TABLE 1
 Monthly Breakdown of PC Sales and Percentage of Sales Vista Capable and Premium Ready

	Apr-05	May-05	Jun-05	Jul-05	Aug-05	Sep-05	Oct-05	Nov-05	Dec-05	Jan-06	TOTAL
Number of PCs Sold	REDACTED										
Vista Premium Ready	REDACTED										

TABLE 2
Monthly Sales of Vista Capable but not Vista Premium Ready PCs

	Apr-06	May-06	Jun-06	Jul-06	Aug-06	Sep-06	Oct-06	Nov-06	Dec-06	Jan-07	TOTAL
PREMIUM DEFICIENT DESKTOPS:	798,584	736,266	677,404	591,477	510,488	503,133	546,937	514,541	451,268	318,587	5,648,615
Insufficient RAM only	0	0	0	0	0	0	0	0	0	0	0
Insufficient GPU only	40,610	43,001	72,368	119,726	47,821	46,688	50,082	46,440	40,094	27,824	534,654
Insufficient RAM and GPU	757,974	693,265	605,036	471,751	462,627	456,445	496,855	468,101	411,174	290,763	5,113,991
PREMIUM DEFICIENT NOTEBOOKS:	1,412,633	1,273,378	1,428,864	1,226,166	1,179,853	1,300,247	1,553,389	1,608,613	1,555,646	1,213,326	13,752,117
Insufficient RAM only	0	0	0	0	0	0	0	70,200	151,328	161,198	402,726
Insufficient GPU only	267,624	200,936	95,926	128,870	99,337	176,726	289,017	377,504	438,460	397,585	2,471,937
Insufficient RAM and GPU	1,145,009	1,072,442	1,332,938	1,097,296	1,080,516	1,123,520	1,264,373	1,160,909	965,858	634,593	10,877,454

Table 3
Component Cost to Upgrade to Premium Ready

	Parts Cost	Service Cost*	Total
Desktop Memory**	\$40.00	\$39.99	\$79.99
Desktop Graphics	\$35.00	\$39.99	\$74.99
Desktop Both	\$75.00	\$79.98	\$154.98
Notebook Memory^*	\$50.00	\$39.99	\$89.99
Notebook Graphics			\$154.98 - \$500
Notebook Both	\$50.00	\$39.99	\$244.97 - \$589.99

*In Store Service - Fixed In store prices were used.

**Desktop Memory is DDR2 533MHz PC2-4200 CL3 Non-ECC 240 Pin DIMM
 2 sticks @ 512MB each are used

^* Notebook Memory is 200 Pin DDR2 PC2-3200 400MHz SODIMMS
 2 sticks @ 512MB each are used

TABLE
Cost to Upgrade Production Facilities Computerized Data to Monthly Data and to Full Cost Component

	2007	2008	2009	2010	2011	2012	2013	2014	2015	2016	2017	TOTAL
MANUFACTURING	100	100	100	100	100	100	100	100	100	100	100	1200
SALES	100	100	100	100	100	100	100	100	100	100	100	1200
ADMINISTRATIVE	100	100	100	100	100	100	100	100	100	100	100	1200
RESEARCH AND DEVELOPMENT	100	100	100	100	100	100	100	100	100	100	100	1200
FINANCIAL	100	100	100	100	100	100	100	100	100	100	100	1200
LEGAL	100	100	100	100	100	100	100	100	100	100	100	1200
OTHER	100	100	100	100	100	100	100	100	100	100	100	1200
TOTAL	600	600	600	600	600	600	600	600	600	600	600	7200

December 2006 Report (MS-KELL
107831-33):

Jan-06 Feb-06 Mar-06 Apr-06 May-06 Jun-06

Total PC Non-VC
Total PC Vista Capable
Total PC Premium Ready

Notebooks Non-VC
Notebooks Vista Capable
Notebooks Premium Ready

Desktops Non-VC
Desktops Vista Capable
Desktops Premium Ready

Total PC Non-VC Assortment
Total PC Vista Capable Assortment
Total PC Premium Ready Assortment

Notebooks Non-VC Assortment
Notebooks Vista Capable Assortment
Notebooks Premium Ready Assortment

Desktops Non-VC Assortment
Desktops Vista Capable Assortment
Desktops Premium Ready Assortment

REDACTED

Jul-06 Aug-06 Sep-06 Oct-06 Nov-06 Dec-06 Jan-07

REDACTED

Jan-06 Feb-06 Mar-06 Apr-06 May-06 Jun-06 Jul-06 Aug-06

REDACTED

Monthly Counts
 Monthly Counts
 MS % Non-Vista Capable

Non-Vista Capable
 TOTAL Vista Basic Capable NOT Prem Ready
 Vista Premium Capable

No Sales Current Analysis US Retail - Vista Capable Analysis - July 2006

Notebooks NVG
 Notebooks VBC
 Notebooks VPC
 Desktops NVG
 Desktops VBC
 Desktops VPC

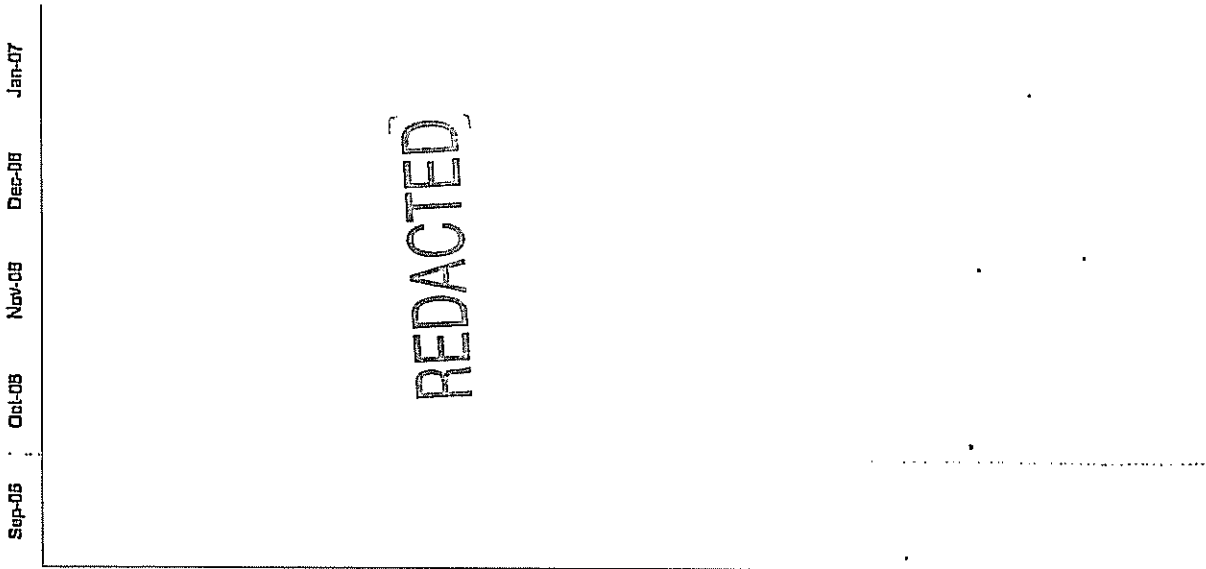
NB + DT NVG
 NB + DT VBC
 NB + DT VPR

NB+DT Non-Vista Capable
 NB+DT Vista Basic Capable
 NB+DT Vista Premium Capable

Non-Vista Capable
 Vista Basic Capable
 Vista Premium Capable

%NB sales = NVG
 %NB sales = VBC incl VPR
 %NB sales = VPR
 %DT sales = NVG
 %DT sales = VBC incl VPR
 %DT sales = VPR

% All sales = NB
 % All sales = DT



Report of Keith Leffler, Ph.D. in Kelley et al., v. Microsoft, No C07-0475 MJP

as the range \$3.917 to \$8.522 billion.

VI. Revenue Earned by Microsoft from XP Licenses on Vista Capable but not Vista Premium Ready PCs.

26. I have been asked by Plaintiffs' counsel to estimate the amount of revenue earned by Microsoft from the licensing of Windows XP on Vista Capable but not Vista Premium Ready PCs sold to Plaintiffs. In Microsoft's Supplemental Responses, it estimates that it received revenue of _____ from Windows XP licenses installed on upgradeable PCs sold in the U.S. during the April 2006 through January 2007 period. From the estimates of Windows Capable but not Vista Premium Ready PCs compared to all upgradeable PCs as in Table 1, I estimate that 52.3% of the _____ from Windows XP licenses on upgradeable PCs were for XP licenses on Vista Capable but not Vista Premium Ready PCs - those PCs purchased by the Plaintiff class. From these figures, I have, therefore, reached the opinion that the Microsoft revenue from the Windows XP licensing on Vista Capable but not Vista Premium Ready PCs sold to Plaintiffs was _____

VII. Microsoft Revenue from Express Upgrade Licenses of Vista Home Basic to Class Plaintiffs.

27. I have been asked by counsel for Plaintiffs to estimate the revenue earned by Microsoft from the licensing of Vista Home Basic upgrades to the Class Plaintiffs under Microsoft's Express Upgrade Program. According to Microsoft's Supplemental Responses to Notice of Videotaped 30(b)(6)

REDACTED

Report of Keith Leffler, Ph.D. in Kelley et al., v. Microsoft, No C07-0475 MJP

Deposition, Windows Vista Home Basic licenses were distributed in the United States. According to a Microsoft document, the cost of upgrading to Windows Vista Home Basic was _____,⁴⁰ This implies Microsoft revenue from the licensing of Vista Home Basic to Class Members under the Express Upgrade Program of _____.

Keith Leffler, Ph.D.

Date

⁴⁰ MS-KELL 00053; MS-KELL 45660; Griffith Dep. p. 182.

REDACTED

TABLE 1
Monthly Breakdown of PC Sales

	Apr-06	May-06	Jun-06	Jul-06	Aug-06	Sep-06	Oct-06	Nov-06	Dec-06	Jan-07	TOTAL
Number of PCs Sold	REDACTED										
Vista Premium Ready											

TABLE 2
 Monthly Sales of Vista Capable but not Vista Premium Ready PCs

	Apr-06	May-06	Jun-06	Jul-06	Aug-06	Sep-06	Oct-06	Nov-06	Dec-06	Jan-07	TOTAL
PREMIUM DEFICIENT NOTEBOOKS:	1,412,633	1,273,378	1,428,864	1,726,166	1,179,853	1,300,247	1,553,389	1,608,613	1,555,646	1,713,326	13,752,117
Insufficient RAM only	0	0	0	0	0	0	0	70,200	151,328	181,198	402,726
Insufficient GPU only	267,624	200,936	95,926	128,870	99,337	176,728	289,017	377,504	438,460	397,535	2,471,937
Insufficient RAM and GPU	1,145,009	1,072,442	1,332,938	1,097,296	1,080,516	1,123,520	1,264,373	1,160,909	965,858	634,593	10,877,454
PREMIUM DEFICIENT DESKTOPS:	798,584	736,266	677,404	591,477	510,448	503,133	546,937	514,541	451,268	318,587	5,648,645
Insufficient RAM only	0	0	0	0	0	0	0	0	0	0	0
Insufficient GPU only	40,610	43,001	72,368	119,726	47,821	46,688	50,082	46,440	40,094	27,824	534,654
Insufficient RAM and GPU	757,974	693,265	605,036	471,751	462,627	456,445	496,855	468,101	411,174	290,763	5,113,991

Table 3
Component Cost to Upgrade to Premium Ready

	Parts Cost	Service Cost*	Total	
			MIN	MAX
Notebook Memory**	\$50.00	\$39.99	\$89.99	
Notebook Graphics			\$154.98	\$500.00
Notebook Both	\$50.00	\$39.99	\$244.97	\$589.99
Desktop Memory^*	\$40.00	\$39.99	\$79.99	
Desktop Graphics	\$35.00	\$39.99	\$74.99	
Desktop Both	\$75.00	\$79.98	\$154.98	

*In Store Service - Firedog In store prices were used.

**Notebook Memory is 200 Pin DDR2 PC2-8200 400MHz SODIMMS
 2 sticks @ 512MB each are used

^*Desktop Memory is DDR2 533MHz PC2-4200 CL3 Non-ECC 240 Pin DIMM
 2 sticks @ 512MB each are used

TABLE
Cost to Upgrade Premium Deficient Computers Based

	Apr-06		May-06		Jun-06		Jul-06		Aug-06		Sep	
	MIN	MAX	MIN	MAX	MIN	MAX	MIN	MAX	MIN	MAX	MIN	MAX
NOTEBOOKS:												
RAM ONLY	\$0		\$0		\$0		\$0		\$0		\$0	
GPU ONLY	\$41,476,355	\$133,811,960	\$31,141,119	\$100,468,187	\$14,866,661	\$47,963,160	\$19,972,199	\$64,434,762	\$15,395,304	\$49,668,679	\$27,389,295	\$27,389,295
RAM & GPU	\$280,492,957	\$675,544,106	\$262,716,093	\$632,729,999	\$326,529,776	\$786,419,980	\$266,804,689	\$647,393,879	\$264,693,907	\$657,493,400	\$275,228,582	\$275,228,582
Total	\$321,969,312	\$809,356,066	\$293,857,212	\$733,198,186	\$341,396,437	\$834,383,140	\$288,776,888	\$711,828,641	\$280,089,211	\$667,152,079	\$302,617,876	\$302,617,876
DESKTOPS:												
RAM ONLY	\$0		\$0		\$0		\$0		\$0		\$0	
GPU ONLY	\$3,045,331		\$3,224,656		\$5,426,875		\$8,978,276		\$3,586,087		\$9,50	
RAM & GPU	\$117,470,797		\$107,442,167		\$93,768,453		\$73,111,997		\$71,697,892		\$70,75	
Total	\$120,516,127		\$110,666,823		\$99,195,308		\$82,090,273		\$75,283,980		\$74,24	
COMBINED:												
TOTAL	\$442,485,440	\$829,872,194	\$404,524,035	\$843,865,009	\$440,591,745	\$933,578,448	\$370,867,161	\$793,918,914	\$355,373,190	\$762,446,059	\$376,858,867	\$376,858,867

14

Net Monthly Units Sold and Deficient Component

	Oct-06		Nov-06		Dec-06		Jan-07		TOTAL	
	MIN	MAX	MIN	MAX	MIN	MAX	MIN	MAX	MIN	MAX
0										
\$88,363,966	\$44,781,785	\$144,508,274	\$58,505,617	\$188,752,152	\$67,957,514	\$218,729,947	\$61,609,974	\$198,767,500	\$383,100,823	\$1,235,968,586
\$662,865,293	\$308,733,435	\$745,967,880	\$287,587,921	\$684,324,805	\$236,606,221	\$568,846,531	\$155,456,309	\$374,403,672	\$2,664,649,880	\$6,417,589,045
\$751,229,259	\$354,525,219	\$890,475,654	\$349,210,803	\$879,894,222	\$318,176,748	\$802,684,489	\$233,372,303	\$589,477,192	\$3,083,952,010	\$7,689,798,828
0	\$0		\$0		\$0		\$0		\$0	
1,108	\$3,755,625		\$3,482,547		\$3,006,683		\$2,086,518		\$40,083,705	
39,903	\$77,002,649		\$72,546,301		\$63,723,753		\$45,063,499		\$792,566,890	
41,011	\$80,758,274		\$76,028,848		\$66,730,435		\$47,149,017		\$832,660,095	
\$825,470,269	\$435,289,493	\$974,239,928	\$425,239,651	\$956,023,070	\$384,907,183	\$869,424,925	\$280,521,320	\$696,626,209	\$3,916,652,105	\$8,522,459,024

Aug-06

Jul-06

Jun-06

May-06

Apr-06

Mar-06

Feb-06

Jan-06

REDACTED

Monthly Counts
 Monthly Counts
 MS % Non-Vista Capable

Non-Vista Capable
 TOTAL Vista Basic Capable NOT Prem Ready
 Vista Premium Capable

No Rates: Current Analysis US Retail - Vista Capable Analysis - July 2006

Notebooks NVC
 Notebooks VBC
 Notebooks VPC
 Desktops-NVC
 Desktops VBC
 Desktops VPC

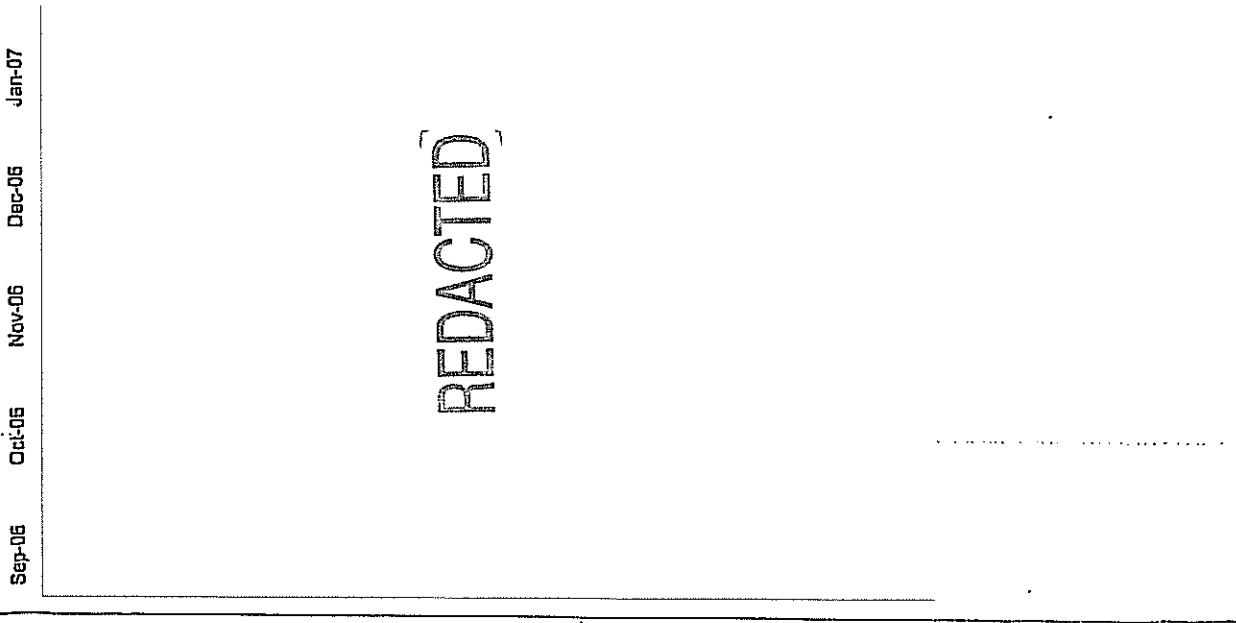
NB + DT NVC
 NB + DT VBC
 NB + DT VPR

NB+DT Non-Vista Capable
 NB+DT Vista Basic Capable
 NB+DT Vista Premium Capable

Non-Vista Capable
 Vista Basic Capable
 Vista Premium Capable

%NB sales = NVC
 %NB sales = VBC not VPR
 %NB sales = VPR
 %DT sales = NVC
 %DT sales = VBC not VPR
 %DT sales = VPR

% All sales = NB
 % All sales = DT



December 2006 Report (MS-KELL 107831-33):

	Jan-06	Feb-06	Mar-06	Apr-06	May-06	Jun-06
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Total PC Non-VC
Total PC Vista Capable
Total PC Premium Ready

Notebooks Non-VC
Notebooks Vista Capable
Notebooks Premium Ready

Desktops Non-VC
Desktops Vista Capable
Desktops Premium Ready

Total PC Non-VC Assortment
Total PC Vista Capable Assortment
Total PC Premium Ready Assortment

Notebooks Non-VC Assortment
Notebooks Vista Capable Assortment
Notebooks Premium Ready Assortment

Desktops Non-VC Assortment
Desktops Vista Capable Assortment
Desktops Premium Ready Assortment

REDACTED

Jul-06 Aug-06 Sep-06 Oct-06 Nov-06 Dec-06 Jan-07

REDACTED