

8/31/09 Burtis Report:
Exhibit A

1 Robert A. Mittelstaedt #060359
2 Craig E. Stewart #129530
3 Michael Scott #255282
4 JONES DAY
5 555 California Street, 26th Floor
6 San Francisco, CA 94104
7 Telephone: (415) 626-3939
8 Facsimile: (415) 875-5700
9 ramittelstaedt@jonesday.com
10 cestewart@jonesday.com
11 michaelscott@jonesday.com

12 Attorneys for Defendant
13 APPLE INC.

14 UNITED STATES DISTRICT COURT
15 NORTHERN DISTRICT OF CALIFORNIA
16 SAN JOSE DIVISION

17 **THE APPLE IPOD iTUNES ANTI-
18 TRUST LITIGATION**

Case No. C 07-6507 JW (RS)

**EXPERT REPORT OF
19 DR. MICHELLE M. BURTIS**

20 **This Document Relates to:**

21 ***Somers v. Apple Inc.*, No. C 07-6507
22 JW**

23 **I. BACKGROUND AND EXPERIENCE.**

24 1. I am a Vice President at Cornerstone Research, an economic and finance
25 consulting firm with six offices in the United States, including Washington, D.C. I have a Ph.D.
26 in Economics from the University of Texas at Austin and have published in the field of
27 economics.

28 2. My work in antitrust cases and class actions is summarized in my curriculum vitae
attached as Exhibit 1. In addition to testifying as an expert in other litigation matters, government
regulatory proceedings and private arbitrations, I recently was the expert witness retained by

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1 defendants in *In Re Graphics Processing Units Antitrust Litigation* where Judge Alsup denied
2 class certification to the proposed class of indirect purchasers and certified a limited class of
3 direct purchasers. I have taught undergraduate microeconomics at the University of Texas and
4 graduate economics at George Mason University.

5 3. As an economist, I have substantial experience and familiarity with regression
6 analysis. In graduate school, one of my two fields of specialization was econometrics and my
7 dissertation was based on econometric models of input substitution due to changes in relative
8 prices. Since then, I have developed or analyzed numerous regression analyses for a wide variety
9 of purposes including, for example, models developed to identify relevant product markets,
10 models that analyzed possible reasons that wholesale gasoline prices increased and decreased at
11 different rates, and models that have been offered to estimate damages in a variety of contexts.

12 4. My hourly rate is \$540.

13 **II. ASSIGNMENT.**

14 5. Counsel for Apple asked me to review the reports and deposition transcript of Dr.
15 Gary L. French and to address issues associated with his proposed econometric analysis.¹
16 Specifically, I have been asked to address whether his proposed econometric analysis is a valid
17 methodology to demonstrate antitrust impact (or injury) and measure damages to proposed class
18 members.

19 6. A list of material that I considered in preparing this report is included as
20 Exhibit 2.

21 7. I summarize my conclusions in Section III; provide a primer on regression
22 analyses with examples in Section IV; and describe the basis and reasons for my conclusions in
23 Sections IV and V. In particular, Section IV focuses on why Dr. French's regression model will
24 not work, and Section V focuses on his inappropriate use of averages.

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27 ¹ Affidavit of Gary L. French, Ph.D., February 23, 2009 ("French Report"); Reply Affidavit of
28 Gary L. French, Ph.D., Regarding Class Certification, May, 19, 2009 ("French Rebuttal Report");
Deposition of Gary L. French, Ph.D., *Somers v. Apple*, April 3, 2009 ("French Dep.").

1 **III. SUMMARY OF CONCLUSIONS.**

2 8. Dr. French fails to support his opinion that the alleged impact on indirect
3 purchasers and the amount of damages caused by the alleged antitrust violation can be determined
4 and measured through regression models. He has not developed any actual model or provided
5 sufficient information about his proposed models to demonstrate or even suggest that they would
6 work. He has collected little if any data. He has not identified or quantified any specific
7 variables. He has written no equations. He has proposed no solutions to the numerous obstacles
8 that his proposed methodology creates.

9 9. Dr. French has not shown that a regression model would work here, and my
10 conclusion based on my analysis to date is that his proposed regression models would not work.
11 The purported baseline period before the alleged violation is too short; most of the iPod models at
12 issue were not even sold during that period; the differences among the models are too great; and
13 pricing in this nascent, dynamic industry was affected by too many complex factors that cannot
14 be measured. Dr. French proposes using, for example, the 2001 price of the original white iPod
15 to determine what the prices of all the different iPods, including the nano, shuffle, touch, photo
16 and classic models, would have been today but for the alleged violation. These newer models are
17 so much smaller in size and weight with so much more capacity and so many new and different
18 features that they bear little resemblance to the original iPod models. The current iPod shuffle,
19 for example, is one-twentieth the size of the original iPod with nearly the same capacity.²

20 10. Dr. French has not proposed a reliable method to determine the dividing line
21 between the baseline, or “before,” period and the period when the conduct at issue allegedly had
22 any effect on pricing. Nor has he proposed any method to distinguish the effects of Apple’s
23 business decisions that are not challenged in this lawsuit (*e.g.*, the launch of the iTunes Music
24 Store (iTS) or the launch of progressively smaller, multi-colored, lower priced, higher capacity
25 iPod models) from any effects of the alleged unlawful conduct (*e.g.*, use of proprietary DRM).

26 11. Dr. French exclusively addresses iPod prices. He ignores the prices of iTS music

27 ² See iPod shuffle technical specifications at <http://www.apple.com/ipodshuffle/specs.html>; first
28 generation iPod technical specifications at [http://web.archive.org/web/20011217064651/
www.apple.com/ipod/specs.html](http://web.archive.org/web/20011217064651/www.apple.com/ipod/specs.html) (Exhibit 3).

1 even though, under plaintiff's theory, if iPod prices were higher because of the alleged violation
2 than they would have been in the "but-for" world, iTS music prices may have been lower.

3 Individuals with large iTS music purchases relative to their iPod purchases therefore would not
4 have paid any **net** overcharge under plaintiff's theory. By ignoring iTS music prices, Dr. French
5 fails to propose any methodology to determine whether any consumer paid a net overcharge.

6 12. Dr. French's proposed method would use average prices, so that the results (if he
7 could overcome all other obstacles) would be at best a putative measure of an average
8 overcharge. His methodology will not determine whether or not an individual proposed class
9 member has been impacted or the particular amount of any such impact.

10 **IV. BACKGROUND ON ECONOMETRIC ANALYSIS AND LIMITS TO ITS USE TO**
11 **DETERMINE IMPACT AND OVERCHARGE AMOUNTS.**

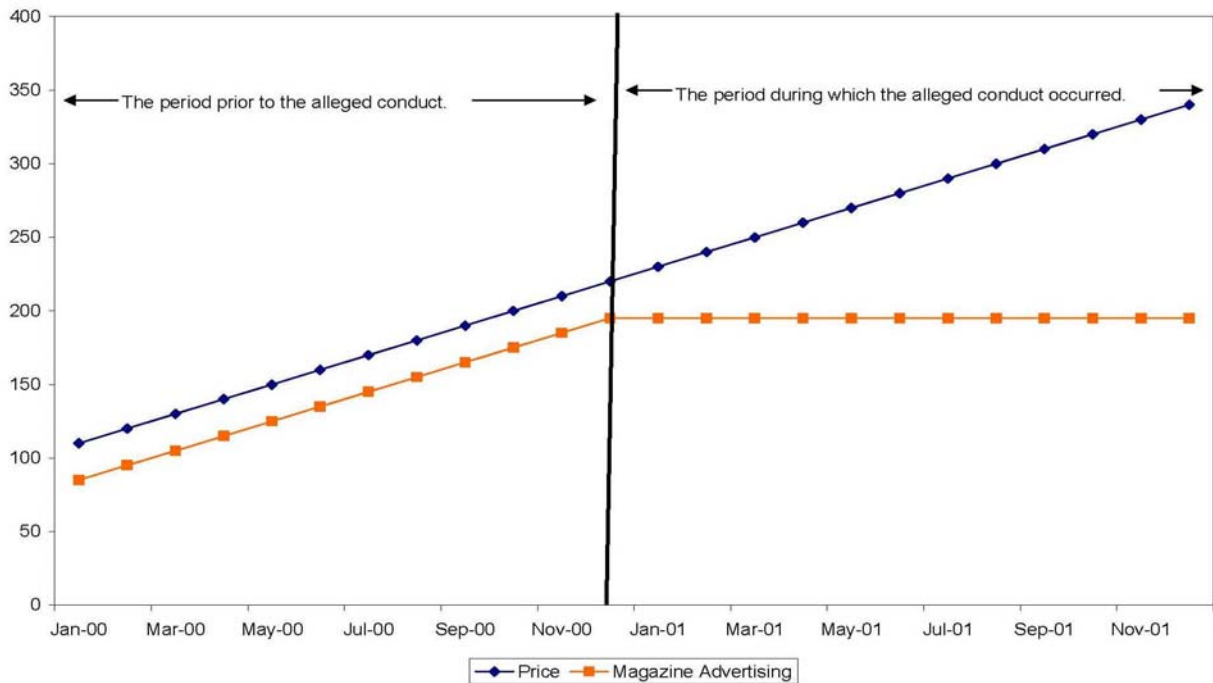
12 13. In this section, I describe a simple regression model to provide background for my
13 conclusions regarding Dr. French's methodology. Assume a product is sold during two relevant
14 periods of time – a period before some alleged anti-competitive conduct and a period during
15 which the alleged conduct may have impacted prices. Assume in addition that the price of the
16 product depends solely on demand for the product which, in turn, is driven solely by advertising
17 in popular magazines. The greater the amount of advertising, the higher the demand for the
18 product, and as a result, the higher the price.³

19 14. A regression equation may be prepared, or "specified" and "estimated," as
20 econometricians use those terms, to determine the relationship between the price of the product
21 and the amount of magazine advertising. The price and the amount of advertising in popular
22 magazines are shown in Example 1. This example shows that in the "before" period, price
23 increased due to magazine advertising and that, in the "during" period, price continued to increase
24 even though magazine advertising leveled off and remained constant.

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26 ³ This example and related graphs are obviously highly simplified. The example relates to a
27 single product, sold by one firm at a single price to all consumers in a given time period. Real-
28 world pricing, even for a single product, can be substantially more complex, varying over
customers, geography and other dimensions, dependent on more variables than a single one, and
not measured so precisely that each price point lines up one right after another in a straight line,
over time.

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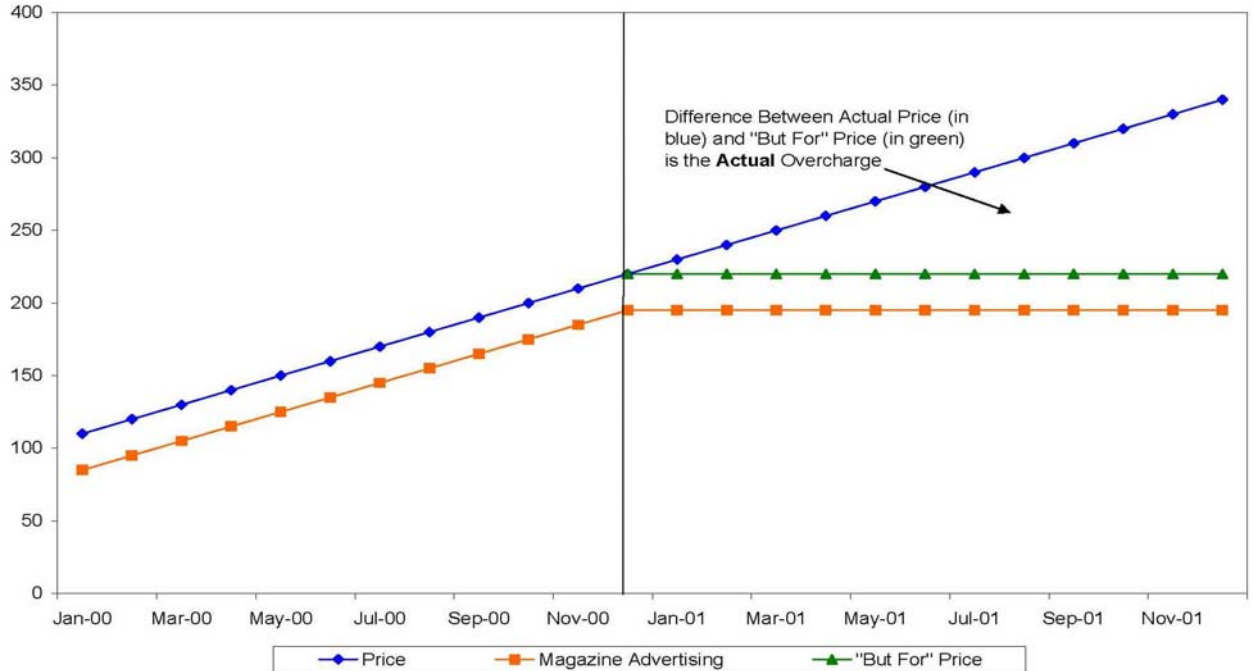
EXAMPLE 1
Graphical Example of Modeling An Alleged Overcharge in Price



15. If advertising in popular magazines was the only variable that determined price, an average overcharge could be obtained from a regression analysis of price and the amount of advertising in popular magazines by using a “dummy variable” in the regression equation that is given a different value depending on time period. This is shown in Example 2.⁴ The dummy variable is given a value of zero when it is “off,” *i.e.*, before the misconduct occurred, and a value of one when it is “on,” *i.e.*, during the misconduct period. The regression will produce a number or “coefficient” for the dummy variable, reflecting the number of units by which the price is higher (or lower) when the dummy variable is on. In this way, a basic regression model would provide a measure of the average overcharge, controlling for the relationship between advertising and price. The regression would generate a single “measured overcharge,” applicable to the

⁴ The graph is drawn so that actual prices and “but for” prices are identical until the change in magazine advertising occurs. An actual regression, estimated even with the overly simplified data hypothesized in the example, would generate some differences in the actual and “but for” price lines. Also, in more realistic scenarios, price variability would exist due to the presence of factors in addition to advertising in popular magazines. (To simplify this example, the units of price and advertising are shown on a single scale.)

EXAMPLE 2
Graphical Example of Modeling An Alleged Overcharge in Price



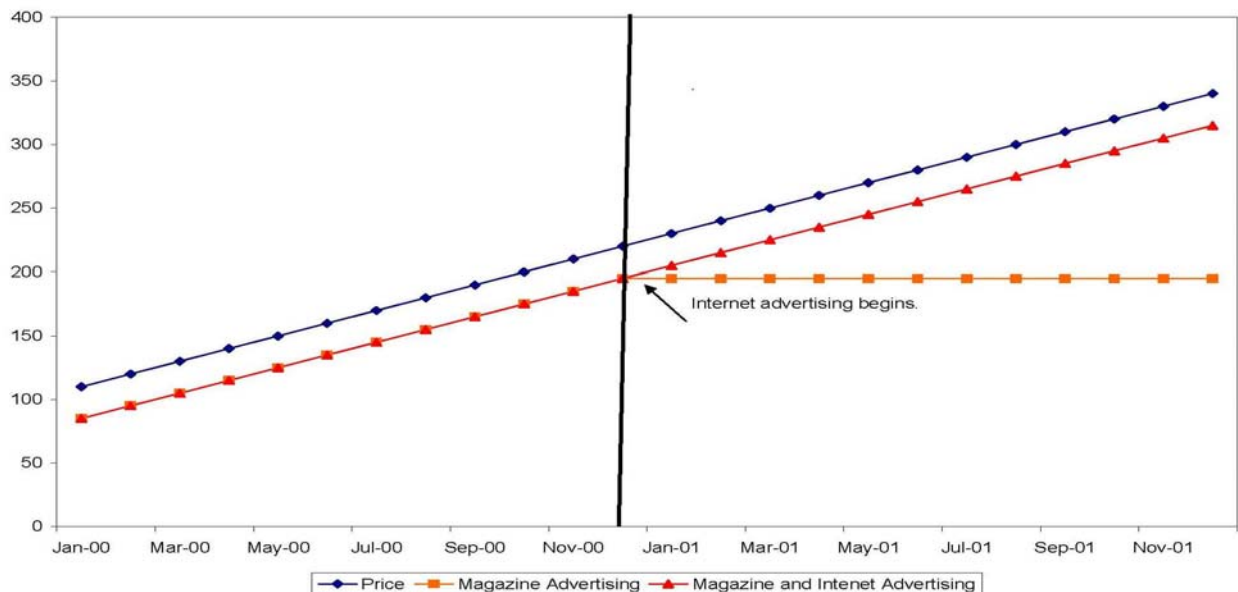
entire period of alleged misconduct, even though (as shown in Example 2) the actual overcharge, the difference between the actual price and the price but for the alleged conduct, would vary over time.

16. However, there is no way to know from the regression model whether the coefficient of the dummy variable (the “measured overcharge”) is due to the alleged wrongful conduct or whether it reflects some other new factor. Rather, the regression result shows only that the price was, on average, higher during the period when the dummy variable is on.

17. This simple example is based on the assumption that no other variable affects price. Relaxing this assumption shows its importance. If the firm being modeled here supplemented its advertising in popular magazines with advertising on the internet at the same time as the alleged unlawful conduct is alleged to have taken place, then attributing the increase in price to unlawful conduct would be fallacious. This is shown in Example 3. It shows that there is no change in the relationship between price and total advertising (in both magazines and through the internet) from the “before” period to the “during” period and thus no overcharge.

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EXAMPLE 3
Graphical Example of Modeling An Alleged Overcharge in Price

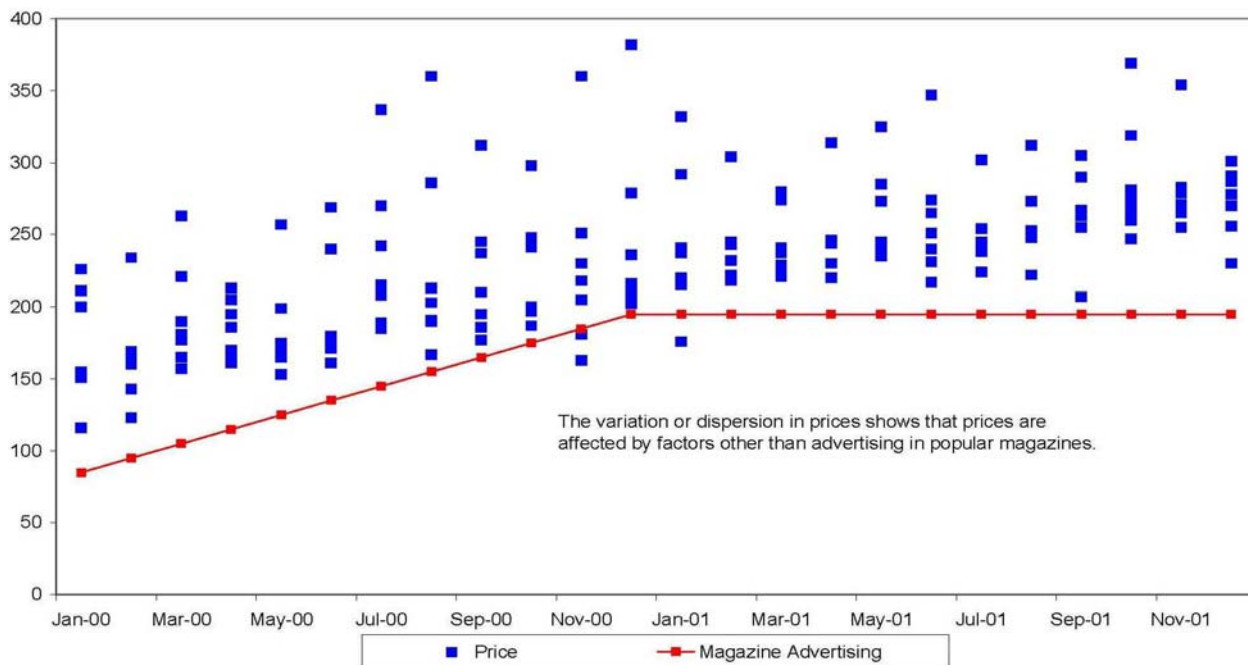


18. If the model ignored internet advertising, the effect of the internet advertising on price would be attributed to the alleged unlawful conduct, represented by the dummy variable. If data were available to measure the actual amount of internet advertising, the internet advertising could be added as another variable in the regression equation. If such data were not available, another dummy variable could be used to measure the period when internet advertising began, like the one that measures the effect of the alleged conduct. However, given that internet advertising and the alleged conduct occurred during the same time periods, the regression results would attribute the same number or coefficient to both dummy variables. In other words, the regression would have no way to separate the effects of internet advertising and the misconduct.

19. These examples are highly simplistic in assuming that price is determined by only one variable. Example 4 shows price and advertising data, where price is affected by more factors than advertising. In this example, the variation (or “dispersion”) in price may be related to various factors, such as the particular customer to whom the product is sold, the terms of the sale, or whether the product is sold alone or bundled with some other product. Price variation may also be due to the product being offered by different suppliers that charge varying prices. In addition, price variation may occur if there are variations in the product. A regression analysis that does not account for the important reasons for variation in prices cannot produce accurate or

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Example 4
Graphical Example of Price Dispersion
Prices are Affected by More Factors Than Advertising in Magazines



reliable estimates.

20. As will be described below, the models proposed by Dr. French to determine and measure impact suffer from a number of flaws illustrated by this simplified example.

V. WHY DR. FRENCH'S PROPOSED MODELS WILL NOT WORK.

A. Dr. French Has Provided No Actual Empirical Analysis To Support His Conclusion That His Proposed Econometric Models Can Be Appropriately Estimated.

21. Dr. French says that he intends to use a "temporal competitive benchmark," *i.e.*, "a time period outside of the Class Period when the conduct at issue did not occur." French Report, ¶ 66. The theory underlying this approach is to ascertain how relevant factors determine prices in a period unaffected by the alleged conduct (the "before" period), and then use the same relationship of relevant factors to price to determine what the prices would have been during the misconduct period but for the alleged misconduct (the "during" period). If the "but for" prices in the during period are lower than the actual prices, the alleged violation is said to have impacted or caused injury during the class period.

1 22. To obtain a robust and accurate measure of any alleged overcharge, a regression
2 model must be able to account for all of the important factors relevant to determining iPod prices.
3 Otherwise, it has no probative value. At his deposition, Dr. French agreed that: “[i]f you don’t
4 account for the other factors you can’t draw a conclusion [regarding the price impact of the
5 violation].” French Dep. 158:4–158:12. The effect of omitted factors or variables is well known
6 in the econometrics literature.⁵

7 23. Dr. French has not demonstrated that he can identify or account for necessary
8 variables. He has not obtained iPod prices for direct or indirect purchases. He has not identified
9 specific variables affecting iPod prices or obtained the data relevant to those variables. He simply
10 refers to the need to identify “other relevant variables.” Although he recognizes the need to
11 control for various iPod features (French Dep. 31:7-18), he has not attempted to catalog them.
12 For example, at deposition he was unsure what a USB connection was and whether he would
13 include a variable for it. French Dep. 76:23 – 77:6. A USB port, which Apple first offered on
14 iPods in April 2003, made it significantly easier for PC owners to use iPods and thus would be
15 expected to increase demand for iPods.⁶

16 24. Nor has he determined whether the value of those features can be quantified for
17 regression purposes, or if the data necessary to quantify them is available. For example, at
18 deposition, he admitted that the “coolness” factor, *i.e.*, the perception that the iPod is a “cool”
19 product,” was not something that could be captured in a regression analysis. French Dep. 125:1 –
20 125:7.⁷ And he has not demonstrated that his regression could capture and quantify other features

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22 ⁵ For example: “the omission of relevant variables can bias the results. If, for example, costs
23 were high during those periods of alleged wrongful behavior because of the influence of variables
24 not included in the regression model, or if demand grew more inelastic during that period in ways
25 not captured by the included demand-side variables, then a dummy variable reflecting the likely
26 effect of wrongful behavior might have a large positive coefficient for reasons unrelated to the
27 existence of the alleged conspiracy.” Daniel L. Rubinfeld, *Quantitative Methods in Antitrust, in 1*
28 *Issues in Competition Law and Policy 723* (ABA Section of Antitrust Law 2008), p. 726.

⁶ “Apple Admits USB Dominance Too Big to Ignore; Experts See it as Right Move,” *The MacObserver*, February 24, 2005 (Exhibit 4).

⁷ “[The iPod] has gone from gizmo to life-changing cultural icon. . . . [It] has smacked right into
the sweet spot where a consumer product becomes something much, much more: a pet, a status
symbol and an indispensable part of one’s life.” *Newsweek*, July 26, 2004 (Exhibit 5);

1 like iPod's design, the availability of multiple product colors, the touch screen interface, video
2 capabilities, battery life, weight, size, operating system, and other product characteristics. These
3 features, and others, vary among iPod models, and also differ from the features in competing
4 players.

5 25. Dr. French appears to consider the use of dummy (or "indicator" as he calls them)
6 variables to be a panacea for accounting for many of these factors. French Rebuttal Report, ¶ 17.
7 He may use a dummy variable to indicate, for example, the time period when a particular version
8 of iPod shuffles was sold (*i.e.*, to reflect that price data are for an iPod shuffle). But, as illustrated
9 in the earlier examples, turning on a dummy variable during the period that an iPod shuffle is sold
10 simply results in a measure of average price differences between an iPod shuffle and other iPod
11 models, showing for example that iPod shuffles are, on average, less expensive than the baseline
12 iPod. It does nothing to show how much the shuffle could have cost but for the alleged violation.

13 26. Consider the difference between an "explanatory variable" such as the amount of
14 advertising expenditures, and a dummy variable that simply indicates whether or not there was
15 advertising. In the former case, the number (or coefficient) for the explanatory variable for
16 advertising expenditures in the regression example would indicate the amount that price changes
17 when advertising changes. For example, if the coefficient were 10 (using a log-linear
18 specification as described by Dr. French), the interpretation of the coefficient is that, for every
19 one percent change in advertising expenditures, the price of the product increases 10 percent. The
20 regression coefficient indicates something about the relationship between the variables and
21 provides information about the change in one variable (advertising) and the consequent change in
22 another variable (price).

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24 (continued...)

25 "No other product has the incredible, loyal devotion that the iPod inspires. . . . It revolutionized
26 and popularized music players" CNet.com (http://www.cnet.com/1990-11136_1-6312246-1.html) (Exhibit 6);

27 "Apple Computer's iPod portable digital music player has become the gold standard for digital
28 music fans. No other player has been able to match its combination of elegant design, small size
and high capacity." Wall Street Journal, May 1, 2003 (Exhibit 7).

1 27. Contrast this with the information derived from a dummy variable in a regression.
2 Instead of using the amount of advertising, a dummy variable is included in the equation to
3 indicate whether or not there is advertising. The coefficient provides no information about how
4 price changes when advertising changes. It shows only that price was different by some average
5 amount in the period with advertising compared to the period without advertising.⁸

6 28. There is also a technical limit to the number of dummy variables that can be used.
7 If Dr. French proposes to use dummy variables for different retailers, various product features,
8 characteristics, and capabilities (French Rebuttal Report, ¶ 17), it is likely that as a group they
9 will be too overlapping in time for the model to be able to isolate any effect of the alleged
10 misconduct (also proposed by Dr. French to be measured with a dummy variable). In
11 econometrics jargon, they will be perfectly correlated with the misconduct dummy variable.
12 Thus, the results will not be valid.

13 **B. Dr. French Has Not Proposed A Methodology For Determining When The**
14 **Price Effect Of The Alleged Tie Began.**

15 29. Dr. French has not determined when any alleged impact on iPod prices began and
16 has not proposed any specific methodology to determine any such date. French Dep. 42:9–
17 42:15. This is a critical date for his proposed approach because it defines the “temporal
18 competitive benchmark,” or the “before” period. It also defines the time period for the dummy
19 variable that he claims can be used to measure the price effect, or overcharge, due to the alleged
20 violation.

21 30. If the period of impact of the alleged misconduct is not accurately defined, the
22 regression model will be inaccurate. It may find an overcharge when none exists. It may
23 overstate or understate the amount of any overcharge.

24 31. To resolve this critical issue, Dr. French proposes to make a “judgment call” as to
25 when a sufficient number of iTS consumers became “locked-in” to using the iPod so that Apple

26 ⁸ The limited ability of dummy variables to provide explanatory power is well known in
27 econometrics. Peter Kennedy, *A Guide to Econometrics*, 254 (5th ed. 2003) (“Care must be taken
28 in evaluating models containing dummy variables designed to capture structural shifts or seasonal
factors, since these dummies could play a major role in generating a high R^2 , hiding the fact that
the independent variables have little explanatory power.”).

1 could allegedly price iPods at higher levels. French Dep. 43:15–51:5, 52:9–59:8, 82:9-8, 80:9–
2 85:9. He apparently believes that this date can be determined by analyzing purchases of iTunes
3 music although he has not explained exactly what he would be looking for. His contention is
4 obviously flawed. First, purchasing from iTunes does not mean that the purchaser is “locked-in” to
5 iTunes or iPods. A consumer, for example, may have intended to buy an iPod regardless of whether
6 he bought or planned to buy iTunes music. Second, Dr. French admits that he does not know how
7 many iTunes songs it would take to be “locked-in” or how much “lock-in” would be needed to affect
8 price. French Dep. 57:18–58:2. He has not proposed a methodology for dealing with these
9 issues. Third, the only way to determine if an individual was “locked-in” would be to make an
10 individual inquiry. Without such inquiry, Dr. French would simply be assuming the very thing
11 that he is supposedly testing for.

12 **C. The “During” Or “Class Period” Contains Different Products.**

13 32. Dr. French’s proposed “temporal competitive benchmark” method depends on an
14 assumption that the relationship between prices and their determining factors (other than the
15 alleged misconduct) is known and remains the same. For example, if price is assumed to depend
16 on cost and demand changes, it is assumed that price reacts similarly to cost changes, or demand
17 changes, in both the before and during periods. Without this stability, the model is mis-specified
18 and any estimate of the impact of the alleged violation is invalid.

19 33. This critical assumption is violated in this case. Most obviously, the products in
20 the before period are different from the products in the during period. Although Dr. French has
21 not determined the beginning of the alleged overcharge period, he surmised that: “I’d be amazed
22 if it’s more than a couple of months after December ‘03.” French Dep. 177:7 – 177:8. The large
23 majority of iPod products were not introduced until after this time. As shown in Exhibit 8, only
24 the first three generations of the original iPod and the original iPod mini were sold in the “before”
25 period (assuming he were able to demonstrate that the “before” period began “a couple of
26 months” after December 2003). The rest of the 42 iPod models—including the iPod photo, video,
27 touch, nano and shuffle—were all sold only in the “during” period.⁹ The characteristics, technical

28 ⁹ See Exhibit 9: “Apple Introduces iPod Photo,” Apple press release, October 26, 2004; “Apple

1 capabilities and features of these models changed dramatically. The original iPods were
2 substantially larger, heavier, and had less capacity than the models that followed.¹⁰ Products
3 introduced later were more advanced with more features and technical capabilities. The iPod
4 touch, for example, was introduced with a 3.5 inch widescreen display and “multi-touch
5 interface,” allowing users to “pinch” the screen to make images larger or smaller or “flick” the
6 screen to change the image. The iPod touch automatically senses when its position changes and
7 rotates the image to a landscape position. It allows users to play music, watch videos and full-
8 length feature movies, send and receive e-mail, store and view photographs, and access the
9 internet with wi-fi capability. It is 8 millimeters thick, less than half the thickness of the original
10 iPod.¹¹ To take another example, as innovative as the original iPod was, the iPod nano was hailed
11 in its own right in 2006 as “irrevocably alter[ing] the landscape for portable audio players.” It
12 took “clean design aesthetics to a new level [and] brought us the first high-capacity (4GB) flash-
13 based player—and one priced within reach of the masses, no less.”¹²

14 34. Dr. French proposes to use the prices of the early generations of iPods, with their
15 much more limited capabilities and features, to determine what the prices of the more advanced
16 models should have been absent the alleged conduct in this case. But he has not considered or
17 demonstrated that the factors that determined prices in the before period (whenever that period
18 may have ended) had similar effects on prices in the during period (whenever that period may
19 have started). For example, the popularity and demand for MP3 players in general grew
20 tremendously in the during period whereas the benchmark period was quite early in the
21 development of these products.

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(continued...)

24 Introduces iPod shuffle,” Apple press release, January 11, 2005; “Apple Introduces iPod nano,”
25 Apple press release, September 7, 2005; “Apple Unveils iPod touch,” Apple press release,
September 5, 2007.

26 ¹⁰ <http://web.archive.org/web/20011217064651/www.apple.com/ipod/specs.html> (Exhibit 3).

27 ¹¹ See, for example, “Apple Unveils iPod touch,” Apple press release, September 5, 2007
(Exhibit 9).

28 ¹² 2006 PC World Innovations Awards, ABC News (Exhibit 10).

1 35. Dr. French’s only proposal is to include “dummy” variables in the regression
2 analysis to account for the differences in product features. I have addressed the problems with
3 this approach above. In addition, this proposed solution begs the important question. For a
4 proposed model to reliably estimate the effect of alleged misconduct, the relationship between
5 prices and the variables that determine the prices must be the same in the two periods. But there
6 is no reason to assume that the relationship between the type of screen on an iPod and its price in
7 2001 is the same as the relationship in 2008, particularly when the type of screen was different.
8 Therefore, this assumption underlying the proposed model cannot be valid.

9 36. The number of products and the number of prices of early iPods are also limited in
10 number, which makes it more difficult to estimate a regression model where the premise of the
11 model is a comparison of prices in two periods.¹³

12 37. Also, Dr. French has suggested that he could prepare separate models for different
13 iPods. However, any individual regression for iPods introduced after late 2003 or early 2004 (or
14 whatever date Dr. French may pick) would by definition not have a “before” period. In other
15 words, there is no “temporal competitive benchmark.” French Report, ¶ 67. Thus, this proposed
16 method fails.

17 **D. Dr. French Has Not Proposed A Methodology To Isolate The Effect Of The**
18 **Alleged Tie From Other Confounding Events Not At Issue.**

19 38. A regression analysis does not work when it cannot differentiate the effect of the
20 alleged misconduct (*e.g.*, Apple’s use of proprietary DRM) from other confounding events not
21 alleged to be unlawful (*e.g.*, other factors affecting the demand for iPods). For example, to the
22 extent that iTS created demand for iPods independent of Apple’s use of proprietary DRM, that
23 effect would be confounded with any effect of the alleged violation. Dr. French has proposed no
24 methodology to separate the pro-competitive and beneficial effect of iTS from the aspect of iTS
25 alleged to be unlawful. French Dep. 78:5 – 78:14.

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28 ¹³ Dr. French’s own analysis shows the limited number of products that were available in a
“before” period defined to end in late 2003 or early 2004. See French Report, Exhibits 1a and 2.

1 39. The problem of confounding events or factors would also exist because the
2 changing features of different iPod models may be confounded with the allegedly wrongful
3 conduct. For example, a regression of the price of an iPod touch cannot differentiate any effect of
4 the alleged violation from the effect of the touch screen, because both factors exist (*i.e.*, the
5 dummy variable is turned “on”) for the entire period of iPod touch sales.

6 **E. Dr. French’s Methodology Does Not Consider The Overall Or Net Injury To**
7 **Individual Proposed Class Members.**

8 40. Plaintiff’s theory is that Apple’s use of proprietary DRM for its music store
9 increased the demand and therefore prices for iPods. It would follow from plaintiff’s theory that
10 some consumers would have elected not to purchase iTS music for the same reason and, to that
11 extent, the demand for and price of iTS music would have decreased due to the use of DRM.
12 Accordingly, to determine whether any consumer paid a **net** overcharge would require an analysis
13 of both the prices of iPod products and the price of iTS music. For example, depending on the
14 amount of any iPod “overcharge” and the amount of any iTS music “undercharge,” whether an
15 individual paid a net overcharge would turn on the number of iPods and music files purchased by
16 that individual. Individuals with sufficiently large purchases of music relative to iPods would not
17 have paid a net overcharge, even under plaintiff’s theory and even if they could establish an iPod
18 overcharge. Dr. French does not address this issue at all, or propose any method to do so.¹⁴

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23 ¹⁴ In addition to the econometric methods discussed in this report, Dr. French also mentions that
24 direct purchasers’ overcharge could be determined using a “yardstick” approach or a “margin
25 analysis.” However, in each case he simply describes the approach in a single sentence with no
26 further analysis or discussion (French Report, ¶ 65). A “yardstick” method would require Dr.
27 French to identify products comparable to iPod products (but without the alleged wrongful
28 conduct) and, based on a comparison of the prices of those products to the prices of iPod
products, determine the impact of the alleged conduct. Dr. French has not identified “yardstick”
products that could be used in such an exercise and, given the unique features of iPod products,
this method is likely infeasible. Similarly, any “margin analysis” would require some benchmark
of comparison. Dr. French has not identified any benchmark margin or provided information that
would lead to its discovery.

1 **VI. DR. FRENCH'S PROPOSED USE OF AGGREGATED AND AVERAGED DATA**
 2 **WILL NOT SHOW IMPACT FOR ANY INDIVIDUAL INDIRECT PURCHASER.**

3 41. At his deposition, Dr. French stated that he intends to calculate only an average
 4 overcharge and not to determine whether individual sale transactions included any overcharge.
 5 French Dep. 20:25-21:23, 64:11-15. He further stated that, even if transactional data is available,
 6 he will aggregate that data into monthly average data before running his regression. French Dep.
 7 18:8-20, 21:11-12.

8 42. This use of average monthly prices hides pricing variation that Dr. French's
 9 analysis needs to explain. As stated in ABA Section of Antitrust Law, *Econometrics* (2005):

10 [s]ometimes the prices used by economists are averages of a number of different prices
 11 charged to different customers or for somewhat different products. Using such averages
 12 can lead to serious analytical problems. For example, averages can hide substantial
 13 variation across individual cases, which may be key to determining whether there is
 14 common impact.¹⁵

15 In other words, because this methodology assumes that the conduct in question "has the same
 16 effect on every purchaser and focuses on an average effect," it does not "test whether there is
 17 impact on all members of a proposed class." Rather, "it assumes the very proposition that is
 18 being tested." *Id.* at 222.

19 43. In his Reply Affidavit (¶ 22), Dr. French confirms that his proposed regression
 20 models will yield only an "average overcharge or average pass-through." He states that he
 21 believes that he will be able to obtain monthly average prices on a retailer-by-retailer basis, rather
 22 than an average price across all retailers. He has not actually obtained those data, however. Nor
 23 does he state whether the data are available for all of the relevant retailers or for the entire
 24 relevant period.

25 44. Even assuming that such data are available, however, these monthly averages will
 26 mask significant price differences in any given month arising from such things as sales or
 27 promotions in which the iPod is effectively discounted by being bundled with other merchandise
 28 or gift cards. Exhibit 1 to Dr. French's Reply Affidavit (which Dr. French offers to show

¹⁵ ABA Section of Antitrust Law, *Econometrics* (2005), p. 220.

1 supposed price uniformity) illustrates these differences. In just a single month, four of the listed
2 retailers offered sale prices that differed from that retailer's regular price for that month, ranging
3 from \$15 to \$70. To take another example, on one day in November 2007, Amazon.com offered
4 an iPod nano (4GB) for \$30 or almost 20% lower than Apple's store, and raised it two days later
5 by \$15, which was \$23 above CompUSA's price that day. *See* Declaration of Michael Scott
6 (filed 4/20/09), Exs. 15-16. Moreover, Dr. French admits that he omitted from that exhibit
7 "[p]rices of refurbished models and bundled products." French Rebuttal Report, Exhibit 1, fn. c.
8 Retailers such as Best Buy, WalMart and Target have offered iPods bundled with gift cards worth
9 as much as \$50 or valuable merchandise such as exercise machines, Sony stereo headphones, FM
10 transmitters and multi-device USB AC/DC chargers. *See* Scott Declaration, Exs. 23-27.

11 45. In addition to using only monthly averages, Dr. French is vague about the degree
12 to which he intends to aggregate data across iPod models. Over the years, Apple has sold the
13 iPod, iPod photo, iPod classic, iPod mini, iPod nano, iPod shuffle and the iPod touch as well as
14 special edition iPods such as the U2 iPods. And most of these broad model categories include a
15 number of different generations, with at least 42 different specific models sold since the iPod was
16 first introduced. These models vary widely in features and price. For example, in 2003 Apple
17 sold at a retail price of \$399 a 15GB iPod with a black and white screen and no video
18 capabilities.¹⁶ Compare that to a 16GB iPod touch that is now sold for three-quarters the price,
19 \$299, with all of the new features noted above (¶ 33) plus the availability of thousands of video
20 games and software applications.¹⁷ And compare those to an iPod shuffle now sold for \$79 that
21 weighs less than half an ounce and has no display at all, but instead a "voice" that indicates the
22 song and identity of the performer.¹⁸ There is no reason to believe that, if any overcharge existed,
23 it would be uniform across all of these models.

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26 ¹⁶ "Apple Introduces New iPods," Apple press release, April 28, 2003 (Exhibit 9).

27 ¹⁷ "Apple Introduces New iPod Touch," Apple press release, September 9, 2008 (Exhibit 9).

28 ¹⁸ "Apple Announces Incredible New iPod Shuffle," Apple press release, March 11, 2009
(Exhibit 9). <http://www.apple.com/ipodshuffle/specs.html> (Exhibit 3)

1 46. While Dr. French stated at deposition that he would “be surprised if it was very
2 different from model to model” (French Dep. 37:3–37:4), Dr. French suggests that he could
3 prepare separate regressions, with varying specifications, for different iPods. French Dep. 35:5–
4 37:10, 63:22–64:9. Under this scenario, there could be as many as 42 different specifications of
5 the regression model for direct purchasers and an equal number for indirect purchasers.¹⁹
6 Without doing this, he would simply be relying on an assumption that any overcharge would be
7 common to all iPods. In addition, Dr. French’s methodology would not work because, as
8 described above, there would be no “before” period for the vast majority of these products and
9 therefore no way for the regression to be estimated.

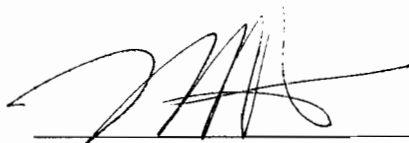
10 47. A similar problem exists for regressions run for separate resellers. Not only would
11 separate regression models for dozens or hundreds of different resellers be inconsistent with the
12 required commonality for class treatment, but for those resellers that purchased only during the
13 class period there would be no “before” period and therefore the proposed models could not be
14 used to estimate any alleged overcharge.

15 48. Dr. French suggests that he would combine data for various iPod models to create
16 a “before” period. In addition to the defects discussed above, this methodology would not
17 determine whether individual purchasers of a particular iPod model were impacted by the alleged
18 violation. In such a specification the estimated overcharge would be, as Dr. French describes, an
19 average across all the included iPod models, retailers, and purchasers, direct or indirect.

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27 ¹⁹ French Report, Exhibit 2. Dr. French is not clear about how he would determine what
28 constitutes an iPod “model” for his proposed separate regressions (*e.g.*, whether he would
consider a 20GB iPod photo to be a distinct model from a 60GB iPod photo).

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I declare under penalty of perjury under the laws of the United States of America that the foregoing is true to the best of my knowledge and belief. Executed on June 17, 2009 in Washington, D.C.



Michelle M. Burtis, Ph.D.

SFI-612782v4

Exhibit 1

MICHELLE M. BURTIS, Ph.D.
Vice President

Cornerstone Research
1919 Pennsylvania Avenue NW, Suite 600 • Washington, DC 20006
202.912.8940 • fax 202.912.8999
mburtis@cornerstone.com

ACADEMIC BACKGROUND

1986	University of Texas <i>Ph.D., Economics</i>	Austin, Texas
1981	University of Colorado <i>B.A., Economics/ Political Science</i>	Boulder, Colorado

PROFESSIONAL EXPERIENCE

2006 – Present	Cornerstone Research, Inc. <i>Vice President</i>	Washington, D.C.
2004 – 2006	LECG <i>Managing Director, Competition Policy</i>	Washington, D.C.
1998 – 2006	LECG <i>Director</i>	Washington, D.C.
1988 – 1998	Capital Economics <i>Vice President</i>	Washington, D.C.
1986 – 1988	ICF Incorporated <i>Associate</i>	Washington, D.C.
1985 – 1986	University of Texas <i>Lecturer</i>	Austin, Texas

PUBLICATIONS

“Petroleum Refining Industry Business Interruption Losses due to Hurricane Katrina,” with Kivanc Kirgiz and David Lunin, *Journal of Business Valuation*, forthcoming 2009.

“Economics of Antitrust: An Economic Analysis of Resale Price Maintenance,” with D. Garrett and V. Howell, *The Antitrust Review of the Americas*, 2008.

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MICHELLE M. BURTIS, Ph.D.
Vice President

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“Supply and Demand Shocks in Energy Markets,” Energy Markets in the 21st Century: Competition Policy in Perspective, FTC, 2007.

“Class Certification and Damages in Antitrust Litigation,” NorthStar Conference, New York City, 2006.

“Economics and Robinson Patman,” American Bar Association Antitrust Meetings, 2005.

“Economic Analysis of Pricing Issues in Gasoline Marketing,” Petroleum Marketers Lawyers Association, 2005.

“Daubert and Economic Evidence,” LECG Seminar Series, 2003.

“New Industrial Organization, from the Classroom to the Courtroom,” George Mason Law Review Symposium, 2003.

“The Role of Economics in Antitrust,” American Bar Association Antitrust Meetings, 2000 and 2001.

“Remedies for the Abuse of Market Power in High Technology Industries,” American Bar Association Meetings, July 2000.

“Empirical Methods in Intellectual Property Disputes,” LECG Intellectual Property Conference, Chicago, 1998.

MICHELLE M. BURTIS, Ph.D.
Vice President

TESTIMONY, EXPERT REPORTS AND DECLARATIONS

In Re Western States Wholesale Natural Gas Antitrust Litigation, on behalf of Defendants regarding class certification, 2009.

SunOpta, Inc. and SunOpta Bioprocess, Inc. v. Abengoa Bioenergy New Technologies, Inc., and David Weidong He, on behalf of Defendants regarding alleged damages, 2009.

In re: Static Random Access Memory (SRAM) Antitrust Litigation, on behalf of Defendants regarding class certification in indirect purchaser litigation, 2009.

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MICHELLE M. BURTIS, Ph.D.
Vice President

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Johnson & Johnson et al. MDL Litigation and related state cases, on behalf of Johnson & Johnson, regarding pricing issues related to disposable contact lenses, 1995-1997.

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Puerto Rico Department of Consumer Affairs v. Texaco, on behalf of Texaco, regarding competition in wholesale gasoline markets, 1994.

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Schumacher v. Silver Wallpaper, on behalf of Schumacher, regarding alleged vertical restraint, 1992.

ECONOMIC CONSULTING/ LITIGATION

Snapp v. Ford Motor Company, for Ford, regarding alleged abuse of monopsony power, 2005.

Chevron, regarding wholesale gasoline caps proposed by state legislature and Public Utilities Commission, 2005.

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MICHELLE M. BURTIS, Ph.D.
Vice President

MERGERS AND ACQUISITIONS

Oracle/PeopleSoft, regarding business software in US District Court, Northern District of California (2004).

Sun Chemical/Bayer, regarding pigments before the Federal Trade Commission (2002).

FMC/Solutia, regarding chemical products before the Federal Trade Commission (1999-2000).
Keebler/Presidents regarding cookies before the Federal Trade Commission (1998).

Columbia Hospital Corporation/Medical Center Hospital regarding hospital services before the Federal Trade Commission and U.S. District Court (1993).
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Carnaud-MetalBox/Anchor-Hocking, regarding closures before the Federal Trade Commission (1992).

Koch Industries/Elf Asphalt, regarding asphalt before the Federal Trade Commission (1992).

RTZ/Cyprus Minerals, regarding talc before the Federal Trade Commission (1992).

Cargill/Pillsbury, regarding flour mills before the Federal Trade Commission (1991).

3M/General Mills, regarding sponges before the Federal Trade Commission (1990).

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Republic Health/Parkway, regarding hospitals, before the Federal Trade Commission (1989).

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Heinz/Bumble Bee, regarding tuna fish before the U.S. Justice Department (1988).

MICHELLE M. BURTIS, Ph.D.
Vice President

OTHER

Editor, Market Definition, *Antitrust Law Developments*, 2003-2004.

Lecturer, Mathematical Economics, Graduate Department of Economics, George Mason University, 2003.

Exhibit 2

Materials Considered

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- Affidavit of Gary L. French, Ph.D. in THE APPLE IPOD ITUNES ANTI-TRUST LITIGATION, February 23, 2009
- Reply Affidavit of Gary L. French, Ph.D., Regarding Class Certification in THE APPLE IPOD ITUNES ANTI-TRUST LITIGATION, May, 19, 2009
- Deposition of Gary L. French, Ph.D., Somers v. Apple, April 3, 2009
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- Peter Kennedy, *A Guide to Econometrics*, 254 (5th ed. 2003)
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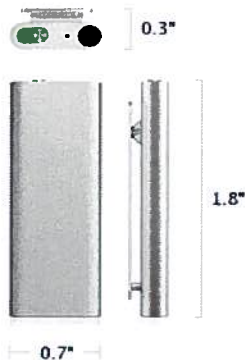
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- “Apple Unveils New iPods,” Apple press release, July 17, 2002
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- “Apple Introduces iPod mini,” Apple press release, January 6, 2004
- “Apple Introduces the New iPod,” July 19, 2004
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- “Apple Introduces the U2 iPod,” October 26, 2004
- “Apple Introduces iPod Shuffle,” Apple press release, January 11, 2005
- “Apple Unveils New iPod mini Starting at Just \$199,” Apple press release, February 23, 2005
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- “Apple Merges iPod & iPod photo Lines,” Apple press release, June 28, 2005
- “Apple Introduces iPod nano,” Apple press release, September 7, 2005
- “Apple Unveils the New iPod,” Apple press release, October 12, 2005
- “Apple Unveils New 1GB iPod nano at \$149,” Apple press release, February 7, 2006
- “Apple Introduces the New U2 iPod,” Apple press release, June 6, 2006
- “Apple Introduces the New iPod nano,” Apple press release, September 12, 2006
- “Apple Unveils the New iPod shuffle,” Apple press release, September 12, 2006
- “Apple Introduces the New iPod,” Apple press release, September 12, 2006
- “Apple Announces iPod nano (PRODUCT) RED Special Edition,” Apple press release, October 13, 2006
- “Apple Announces New 8GB Model of iPod nano (PRODUCT) RED Special Edition,” Apple press release, November 3, 2006
- “iPod shuffle Now Available in Five Brilliant Colors,” Apple press release, January 30, 2007
- “iPhone Premieres This Friday Night at Apple Stores,” Apple press release, June 28, 2007
- “Apple Sets iPhone Price at \$399 for this Holiday Season,” Apple press release, September 5, 2007
- “Apple Introduces All New iPod nano,” Apple press release, September 5, 2007
- “Apple Introduces New iPod classic,” Apple press release, September 5, 2007
- “Apple Unveils iPod touch,” Apple press release, September 5, 2007

- “Apple Announces Major Software Upgrade for iPod touch,” Apple press release, January 15, 2008
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- “iPod shuffle Now Just \$49,” Apple press release, February 19, 2008
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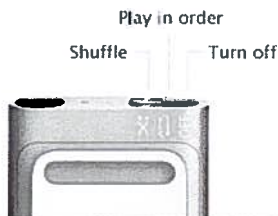
Exhibit 3

Size and weight

- Height: **1.8 inches (45.2 mm)**
- Width: **0.7 inch (17.5 mm)**
- Depth: **0.3 inch (7.8 mm) including clip**
- True volume: **0.26 cu inch (4326 cu mm)**
- Weight: **0.38 ounce (10.7 grams)¹**



External controls



Input and output

- 3.5-mm stereo headphone jack

Environmental requirements

- Operating temperature: 32° to 95° F (0° to 35° C)
- Nonoperating temperature: -4° to 113° F (-20° to 45° C)
- Relative humidity: 5% to 95% noncondensing
- Maximum operating altitude: 10,000 feet (3000 m)

Capacity

- 4GB flash drive²
- Holds up to 1,000 songs in 128-Kbps AAC format³
- Stores data via USB flash drive



Battery and power⁴

- Built-in rechargeable lithium polymer battery
- Playback time: Up to 10 hours when fully charged
- Charging via USB to computer system or power adapter (sold separately)
 - 80% charged in 2 hours; fully charged in 3 hours



Audio

- Skip-free playback
- Frequency response: 20Hz to 20,000Hz
- Audio formats supported: AAC (16 to 320 Kbps), Protected AAC (from iTunes Store), MP3 (16 to 320 Kbps), MP3 VBR, Audible (formats 2, 3, and 4), Apple Lossless, WAV, and AIFF

iPod shuffle embodies Apple's continuing environmental progress. It is designed with the following features to reduce environmental impact:

- Brominated flame retardant free
- PVC free
- Highly recyclable aluminum enclosure
- Smaller, more compact packaging (40% smaller, 28% lighter)

VoiceOver Kit

- Chinese (Cantonese)
- Chinese (Mandarin)
- Czech
- Danish
- Dutch
- English
- Finnish
- French
- German
- Greek
- Italian
- Japanese
- Korean
- Norwegian
- Polish
- Portuguese
- Russian
- Spanish
- Swedish
- Turkish



Headphones

- Apple Earphones with Remote
- Frequency response: 20Hz to 20,000Hz
- Impedance: 32 ohms



See how the controls work

Mac system requirements

- Mac computer with USB 2.0 port
- Mac OS X v10.4.11 or later
- iTunes 8.1 or later⁵
- Broadband Internet access (fees may apply)

Windows system requirements

- PC with USB 2.0 port
- Windows Vista or Windows XP Home or Professional with Service Pack 3 or later
- iTunes 8.1 or later⁵
- Broadband Internet access (fees may apply)

In the box

- iPod shuffle
- Apple Earphones with Remote
- iPod shuffle USB cable (1.8 inches/45 mm)
- Quick Start guide





iPod plays without skipping a beat.

With its 1000-song capacity, 10-hr battery, 6.5-oz weight and industry-leading skip protection, iPod significantly improves the quality of the digital lifestyle.

Holds the contents of 100 CDs

Small though it is, iPod has a hefty 5GB hard disk drive. The number of songs it holds depends on the compression rate you choose for your songs. At a 160Kbps compression rate (the default setting for encoding MP3s in iTunes), 5GB equals approximately 1,000 songs, or about 100 CDs. At lower-quality 128 Kbps — the most common compression rate used for MP3s — 5GB is equivalent to approximately 1,300 songs, or about 130 CDs. Who knows, you might also find yourself storing documents, files and applications on your iPod in FireWire disk mode.



Don't skip it

With an industry-leading 20 minutes of skip protection, iPod keeps playing without missing a beat. In addition to its 5GB hard drive, iPod has a 32MB memory cache. The cache is made up of solid-state memory, meaning that it has no mechanical or moving parts, so it's not affected by movement of the device. iPod skip protection works by continually preloading up to 20 minutes of music into the cache.

Fast-charge battery

iPod's rechargeable lithium polymer battery gives you 10 hours of continuous playback, so your music keeps going and going and going. In a hurry to get it recharged? You can fast-charge the battery to 80% of capacity in an hour, and get it fully recharged in three hours. Best of all, FireWire charges your iPod battery whenever it's connected to your Mac so iPod automatically charges while you're transferring your music.



 tech specs	take iPod for a spin	sync with iTunes 2
--	----------------------	--------------------

Technical Specifications

Capacity

- 5GB hard disk drive (1)
 - ___ Holds up to 1,000 songs in 160-Kbps MP3 format (2)
- ___ Stores data in FireWire disk mode

Audio

- Up to 20 minutes of skip protection
- Maximum output power: 60 mW rms (30 mW per channel)
- Frequency response: 20 to 20,000 Hz
- Audio formats supported: MP3 (up to 320 Kbps), MP3 Variable Bit Rate (VBR), WAV, AIFF

Environmental requirements

- Operating temperature: 32° to 113° F (0° to 45° C)
- Nonoperating temperature: -4° to 158° F (-20° to 70° C)
- Relative humidity: 5% to 95% noncondensing
- Maximum operating altitude: 10,000 feet (3000 m)

Size and weight

- Height: 4.02 inches (102 mm)
- Width: 2.43 inches (61.8 mm)
- Depth: 0.78 inches (19.9 mm)
- Weight: 6.5 ounces (185 g)

Customizable settings

- Shuffle
- Repeat one or all
- Startup volume
- Sleep timer
- Backlight timer
- Display contrast
- Clicker
- Languages: English, French, German, Japanese



iPod is multilingual

iPod supports English, French, German and Japanese, and can even display different languages simultaneously. So you can view French songs (with native language information tags) alongside German, Japanese and American ones.

- Upgradable firmware enables support for future audio formats

Headphones

- Earbud-style headphones with 18-mm drivers using Neodymium transducer magnets
- Frequency response: 20 to 20,000 Hz
- Impedance: 32 ohms
- Sensitivity: 104-dB sound pressure level at 1 mW

Input and output

- FireWire (IEEE 1394a) port
- 3.5-mm stereo headphone jack

Display

- 2-inch (diagonal) liquid crystal display with white LED backlight
- 160-by-128-pixel resolution, 0.24-mm dot pitch
- Support for display of multiple languages and characters simultaneously

Included accessories

- iPod earbud-style headphones
- Apple FireWire Cable (2 m)
- Apple iPod Power Adapter
- iPod also includes a CD-ROM with iTunes 2 software and electronic documentation, a getting started guide, and a 90-day limited warranty.

Power and battery

- Built-in rechargeable lithium polymer battery (1200 mAh)
- Playtime: 10 hours when fully charged
- Charges via FireWire connector to Mac system(6) or power adapter
 - ___ Fast-charge time: up to 1 hour (charges to 80% of battery capacity)
 - ___ Full-charge time: up to 3 hours

Power adapter

- 6-pin FireWire connector
- AC input: 100V to 240V at 0.4 amp maximum
- Frequency: 50 to 60 Hz
- DC output: 12V at 1 amp maximum

Requirements

- Apple computer with built-in FireWire port
- Mac OS 9.2.1 (or later) or Mac OS X v10.1 (or later)
- iTunes 2 software (included)

 [iPod Data Sheet](#)

 [iPod FAQ](#)

Requires Adobe [Acrobat Reader](#)

Other Options

Apple FireWire Cable (0.5 m) [M8633G/A](#)
Apple FireWire Cable (2 m) [M8634G/A](#)

Apple iPod Power Adapter with FireWire Cable (2 m) [M8636LL/A](#)

- (1) 1GB = 1 billion bytes; actual formatted capacity less.
- (2) Capacity based on an average song length of 4 minutes and 160-Kbps encoding.
- (3) Battery life may vary according to use.
- (4) iPod and iTunes are for legal or rightholder-authorized copying only. Don't steal music.
- (5) Actual rates will vary.
- (6) iPod automatically charges whenever you're connected and your Mac is on.

[Home](#) > [Hardware](#) > [iPod](#) > Technical Specifications

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Exhibit 4



I NEEDED A WEBSITE



Web design for designers

Apple Admits USB Dominance Too Big to Ignore; Experts See it as Right Move

February 24th, 2005 at 2:00 PM - [Reports](#) by Brad Gibson

Universal Serial Bus (USB) 2.0 is the king of connectivity and [Apple Computer](#) acknowledged that fact Wednesday by no longer including a FireWire cable with its new line of [iPod](#) digital media devices. Most industry experts agree Apple's decision was the right one in a marketplace where USB is standard equipment on every PC sold today.

In announcing [new models of the iPod color](#) and a [second-generation iPod mini](#), Apple dropped the FireWire cable as standard equipment. Although iPod users can still use FireWire to transfer data and charge their devices, consumers must now pay an additional US\$19 for the cable.

The move is part of Apple's gradual shift to use USB 2.0 as the defacto standard on the iPod, which is far more common in the Windows world.

"I think it was a prudent decision, as well as a cost effective one," Mark Margevicius, research director at the technology analysis firm [Gartner, Inc.](#), told *The Mac Observer*.

"USB allows for so much more diversity," Mr. Margevicius said. "It was a common sense decision for Apple, much like making iTunes available for Windows. You can't overlook what the marketplace is using.

"In the PC market in 2004, high-speed USB has nearly saturated the desktop market, and now comprises over three-quarters of the notebook market."

Mr. Margevicius also believes another factor in favor of USB 2.0 is its ability to now recharge via a USB connection -- something that wasn't available on iPods and PCs until just the past two years.

When comparing FireWire and USB 2.0, the speed at which data transfers is roughly the same. USB 2.0 has a theoretical top speed of 480 megabits per second while FireWire 400, or IEEE 1394, tops out at 400 Mbps. A faster version of FireWire, known as IEEE 1394.b or FireWire 800, is roughly twice the speed of FireWire and USB 2.0. It is currently offered on Apple's [Power Mac G5](#) models and offered on a selected few Windows-based PCs.

But that is where the similarities end.

USB 2.0 is standard fare on the majority of Windows-based [personal computers](#) available today. Mr. Margevicius said market penetration of USB 2.0 is "virtually 100%" of all personal computers sold today and either it or USB version 1.0 has been in Windows-based PCs since 2000. USB 2.0 has been [standard on iMacs since September of 2003](#). When the iPod debuted in 2001, it used only FireWire. When Apple released Windows-ready iPods, USB was not supported. It wasn't until April 2003 that Apple first offered iPods with USB 2.0 for an additional \$19.

As for FireWire, it is often an option on Windows-ready PCs and its adoption on third-party hard drives and other peripherals has not been as profound as USB 2.0, which is found on everything from digital cameras to flash drives. While FireWire 400 is prevalent, Mr. Margevicius figures it is only available on about 25% of PCs sold today.

Another factor, according to Mr. Margevicius is adoption of USB

to Mr. Margevicius is adoption of USB 2.0 by third-party peripheral makers. According to the latest In-Stat at forecast,

ecast, the number of USB-enabled devices will rise from 705.7 million in 2004 to 2.1 billion in 2009 -- thing from hard drives and printers, to coffee cup warmers and adjustable reading lights.

ore USB-ready devices that are out there just solidifies its acceptance and use," Mr. Margevicius said. Another possible

le future factor: The growth potential of Wirel

f Wireless USB 1.0. Mr. Mergevicius predicts Wireless USB will make its debut in the PC market late in in the form of dongles that hook into USB ports.

is looking at for the future," h

re," he said. "Iim sure Apple is too."

alked to agree the most popular connection standard won out fair and square, all agreed the issue of ving money had to have been a major factor Apple considered when deciding to cut its Firewire

irewire shackles.

-Stat who has done extensive research on USB adoption. "It can often be installed at a much cheaper price because many of the components and processors USB works with are already configured to work

e already configured to work with it."

ed into the core logic chipset --

known as SouthBridge -- of all Intel and AMD processors used in Windows-based personal computers. building in USB 2.0 much easier and cheaper for PC makers," he said.

one analyst

alyst who watches component pricing for

icing for a living, the savings is a little less than \$1.

aving about a dollar by dropping the Firewire cable," IdaRose Sylvester, an analyst with the research firm **IDC**, told *TMO*. "While that doesnit sound like a lot of money, it adds up to millions over time."

f money, it adds up to millions over time."

owners are upset with Appleis decision.

etition saying "users and supporter" of Apple products are "dismayed" about the Apple decision.

fortunate that you have left your faithful out in the dark on this one,"

left your faithful out in the dark on this one," Mr. Reich writes on the petition site. "it seems wholly ly irrational to remove it from the people who provide the

people who provide the support, promotion and word of mouth iadvertisingi that provides your company

the millions of iswitchersi you want each year, free of charge."

800 people had signed the online petition calling on Apple to again include a FireWire cable with iPods.

But despite the concerns of many, fearful that Apple might be ringing the

<http://tmo.to/e4J4>

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at **TMO** but **Twitter** might be ringing the death knell of FireWire, fear not.

analyst Joe Wilcox. "While USB ce was an important factor, Apple has made a cost decision here. a cost decision here.

on here.

here. It was simply the

Exhibit 5

iPod Nation

IN JUST THREE YEARS, APPLE'S ADORABLE MINI MUSIC PLAYER HAS GONE FROM GIZMO TO LIFE-CHANGING CULTURAL ICON

Steven Levy
NEWSWEEK

From the magazine issue dated Jul 26, 2004

Steve Jobs noticed something earlier this year in New York City. "I was on Madison," says Apple's CEO, "and it was, like, on every block, there was someone with white headphones, and I thought, 'Oh, my God, it's starting to happen.'" Jonathan Ive, the company's design guru, had a similar experience in London: "On the streets and coming out of the tubes, you'd see people fiddling with it." And Victor Katch, a 59-year-old professor of kinesiology at the University of Michigan, saw it in Ann Arbor. "When you walk across campus, the ratio seems as high as 2 out of 3 people," he says.

They're talking about the sudden ubiquity of the iPod, the cigarette-box-size digital music player (and its colorful credit-card-size little sister, the Mini) that's smacked right into the sweet spot where a consumer product becomes something much, much more: an icon, a pet, a status indicator and an indispensable part of one's life. To 3 million-plus owners, iPods not only give constant access to their entire collection of songs and CDs, but membership into an implicit society that's transforming the way music will be consumed in the future. "When my students see me on campus with my iPod, they smile," says Professor Katch, whose unit stores everything from Mozart to Dean Martin. "It's sort of a bonding."

The glue for the bond is a tiny, limited-function computer with a capacious disk drive, decked in white plastic and loaded with something that until very recently was the province of ultrageeks and music pirates: digital files that play back as songs. Apple wasn't the first company to come out with a player, but the earlier ones were either low-capacity toys that played the same few songs, or brick-size beasts with impenetrable controls. Apple's device is not only powerful and easy to use, but has an incandescent style that makes people go nuts about it. Or, in the case of 16-year-old Brittany Vendryes of Miami, to dub it "Bob the Music Machine." ("I wanted to keep it close to my heart and give it a name," she explains.)

Adding to the appeal is the cachet of A-list approbation. "I love it!" says songwriter Denise Rich. "I have my whole catalog on it and I take it everywhere." She is only one voice in a chorus of celebrity Podsters who sing the same praises voiced by ordinary iPod users, but add a dollop of coolness to the device, as if it needed it. Will Smith has bumbled to Jay Leno and *Wired* magazine about his infatuation with "the gadget of the century." Gwyneth Paltrow confided her Pod-love to *Vogue* (her new baby is named Apple—coincidence?). It's been seen on innumerable TV shows, movies and music videos, so much so that Fox TV recently informed Josh Schwartz, producer of its hit series "The O.C.," that future depictions of music players would have to forgo the telltale white ear buds. Schwartz, himself a 27-year-old who still hasn't recovered from the shock of having his unit stolen from his BMW, was outraged. "It's what our audience uses and what our characters would use," he says.

People who actually create music are among the biggest fans: "The layout reminds the musician of music," says tuner John Mayer. And couture maven Karl Lagerfeld's iPod collection is up to 60, coded in the back by laser etching so he can tell what's on them. "It's *the* way to store music," he says. Lagerfeld's tribute to the iPod is a \$1,500 Fendi pink copper rectangular purse that holds 12 iPods. It is one of more than 200 third-party accessories ranging from external speakers, microphones and—fasten your seat belt—a special connector that lets you control your iPod from the steering wheel of a BMW.

Music hits people's emotions, and the purchase of something that opens up one's entire music

collection--up to 10,000 songs in your pocket--makes for an intense relationship. When people buy iPods, they often obsess, talking incessantly about playlists and segues, grumbling about glitches, fixating on battery life and panicking at the very thought of losing their new digital friend. "I'd be devastated if I lost it," says Krystyn Lynch, a Boston investment marketer.

Fans of the devices use it for more than music. "It's the limousine for the spoken word," says Audible CEO Don Katz, whose struggling digital audiobook company has been revitalized by having its products on Apple's iTunes store. (Podsters downloaded thousands of copies of Bill Clinton's autobiography within minutes of its 3 a.m. release last month.) And computer users have discovered that its vast storage space makes it a useful vault for huge digital files--the makers of the "Lord of the Rings" movies used iPods to shuttle dailies from the set to the studio. Thousands of less-accomplished shutterbugs store digital photos on them.

iPods aren't conspicuous everywhere--their popularity seems centered on big cities and college towns--but sometimes it seems that way. "I notice that when I'm in the gym, as I look down the treadmills, that just about everybody in the row has one," says Scott Piro, a New York City book publicist. And the capper came earlier this year during the Apple vs. Apple case--wherein the Beatles' record company is suing the computer firm on a trademark issue. The judge wondered if he should recuse himself--because he is an avid iPod user. (The litigants had no objection to his staying on.)

In 1997, when Steve Jobs returned to the then struggling company he had cofounded, he says, there were no plans for a music initiative. In fact, he says, there wasn't a plan for anything. "Our goal was to revitalize and get organized, and if there were opportunities we'd see them," he says. "We just had to be ready to catch the ball when it's thrown by life." After some painful pink-slipping and some joyous innovating, the company was solvent.

But in the flurry, Jobs & Co. initially failed to notice the impending revolution in digital music. Once that omission was understood, Apple compensated by developing a slick "jukebox" application known as iTunes. It was then that Apple's brain trust noticed that digital music players weren't selling. Why not? "The products stank," says Apple VP Greg Joswiak.

Life had tossed Jobs a softball, and early in 2001 he ordered his engineers to catch it. That February, Apple's hardware czar, Jon Rubinstein, picked a team leader from outside the company--an engineer named Tony Fadell. "I was on the ski slopes in Vail when I got the call," says Fadell, who was told that the idea was to create a groundbreaking music player--and have it on sale for Christmas season that year. The requirements: A very fast connection to one's computer (via Apple's high-speed Firewire standard) so songs could be quickly uploaded. A close synchronization with the iTunes software to make it easy to organize music. An interface that would be simple to use. And gorgeous.

Fadell was able to draw on all of Apple's talents from Jobs on down. VP Phil Schiller came up with the idea of a scroll wheel that made the menus accelerate as your finger spun on it. Meanwhile, Apple's industrial designer Ive embarked on a search for the obvious. "From early on we wanted a product that would seem so natural and so inevitable and so simple you almost wouldn't think of it as having been designed," he says. This austerity extended to the whiteness of the iPod, a double-crystal polymer Antarctica, a blankness that screams in brilliant colors across a crowded subway. "It's neutral, but it is a bold neutral, just shockingly neutral," says Ive.

Assessing the final product, Jobs bestows, for him, the ultimate accolade: "It's as Apple as anything Apple has ever done."

The October 2001 launch was barely a month after 9/11, with the country on edge and the tech industry in the toilet. Skeptics scoffed at the \$399 price and the fact that only Macintosh users, less than a twentieth of the marketplace, could use it. But savvy Mac-heads saw the value, and the iPod was a hit, if not yet a sensation. What pushed it to the next level was a number of Apple initiatives beginning with a quick upgrade cycle that increased the number of songs (while actually lowering the price). Then Apple released a version that would run on Windows and Mac, dramatically increasing the potential market. Finally, after intense negotiations with the record labels, Apple licensed hundreds of thousands of songs for its iTunes Music Store, which blended seamlessly with the iPod. As with the iPod itself, the legal-download store was not the first of its kind but was so felicitous and efficient that it leapt to a 70 percent market share.

Then sales began to spike. No one was surprised that Apple sold an impressive 733,000 iPods during the Christmas season last year, but the normally quiet quarter after that saw an increase to 807,000. And last week Apple announced that sales in the just-completed third quarter,

traditionally another dead one--hit 860,000, up from 249,000 a year ago.

That total would have been higher had Apple not had problems getting parts for the latest iteration, the iPod Mini. Though critics praised its compactness and its panache--a burnished metallic surface made it look like a futuristic Zippo--they sniffed at its relatively low capacity (only 1,000 songs!). But apparently there were lots of people like Los Angeles chiropractor Pat Dengler, who saw the Mini as a must. "At first I thought, I already have an iPod, I don't need it," she says. "But after I played with it, I thought, I really dig it. Now I use them both." Dengler was lucky, as many had to suffer through a monthlong waiting list. To the delight of Apple (and the chagrin of Sony), the no-brainer description of the iPod is "the Walkman of the 21st century." And just as the Walkman changed the landscape of music and the soundscape of our lives, the iPod and the iTunes store are making their mark on the way we handle our music, and even the way we listen to it.

The store has proved that many people will pay for digital music (though certainly many millions of gigabytes of iPod space are loaded with tunes plucked from the dark side of the Internet). "The iPod and iTunes store are a shining light at a very bleak time in the industry," says Cary Sherman, president of the Record Industry Association of America. Since just about everybody feels that within a decade almost everybody will get their music from such places, this is a very big.

An equally big deal is the way the iPod is changing our listening style. Michael Bull, a lecturer at the University of Sussex, has interviewed thousand of iPod users, finding that the ability to take your whole music collection with you changes everything. "People define their own narrative through their music collection," says Bull.

The primary way to exploit this ability is the iPod's "shuffle" feature. This takes your entire music collection, reorders it with the thoroughness of a Las Vegas blackjack dealer and then plays back the crazy-quilt melange. "Shuffle throws up almost anything--you don't know it's coming but you know you like it," says Bull. "Because of this people often say, 'It's almost as if my iPod understands me'."

Shuffle winds up helping people make connections between different genres of music. "People feel they're walking through musicology," says rock-er John Mayer. These abilities have a predictable effect: peo-ple who use iPods wind up listening to more music, and with more passion.

And since the iTunes store encourages customers to eschew buying entire CDs, instead buying the best song or two for a buck a pop, it's easy to see why some think that the era of the CD is playing its final tracks, a circumstance many will lament. "The one cool thing about a CD is really getting to know an album," says iPod fan Wil-Dog Abers, bassist for the hip-hop collective Ozomatli. "I don't know what we're gonna do about that."

In Silicon Valley, the question is what Apple can do to maintain its dominant position in the field. While Apple execs say that they are surprised at how lame the competition has been to date, it's reasonable to think that rivals might eventually close the gap. Almost all the hounds chasing Apple use technology from its longtime rival Microsoft. And Sony, whose initial efforts in the field were constrained by the copy-protection demands of its music unit, is introducing a new line of digital players this summer. "We feel that the experience is as good as Apple's, and we have the Walkman brand, which has sold 200 million units. We're in the game," says Sony America's CEO Howard Stringer. Meanwhile, the ultimate competition may come from services that stream unlimited music for a monthly fee, like Real Networks' Rhapsody. "The fat lady isn't even on the stage yet," says Chris Gorog, CEO of Napster.

But at the moment, the iPod *is* the category. And everything points to a humongous Christmas season for the iPod. The introduction of the new iPods this week extends the company's technology lead. If Apple, as promised, manages to get enough drives to satisfy the demand, the Mini iPod --may achieve the ubiquity of its wide-bodied companion. And later this summer, when computer giant HP begins selling a co-branded version of the iPod, consumers will be able to get iPods in thousands of additional retail stores.

All this is infinitely gratifying for Steve Jobs, the computer pioneer and studio CEO who turns 50 next February. "I have a very simple life," he says, without a trace of irony. "I have my family and I have Apple and Pixar. And I don't do much else." But the night before our interview, Jobs and his kids sat down for their first family screening of Pixar's 2004 release "The Incredibles." After that, he tracked the countdown to the 100 millionth song sold on the iTunes store. Apple had promised a prize to the person who moved the odometer to 10 figures, and as the big number approached,

fortune seekers snapped up files at a furious rate. At around 10:15, 20-year-old Kevin Britten of Hays, Kans., bought a song by the electronica band Zero 7, and Jobs himself got on the phone to tell him that he'd won. Then Jobs asked a potentially embarrassing question: "Do you have a Mac or PC?"

"I have a Macintosh... *duh!*" said Britten.

Jobs laughs while recounting this. Even though Macintosh sales have gone up recently, he knows that the odds are small of anyone's owning a Mac as opposed to the competition. He doesn't want that to happen with his company's music player. "There are lots of examples where not the best product wins," he says. "Windows would be one of those, but there are examples where the best product wins. And the iPod is a great example of that." As anyone can see from all those white cords dangling from people's ears.

*WITH BRAD STONE IN SAN FRANCISCO, JENNIFER ORDONEZ IN LOS ANGELES,
CATHARINE SKIPP IN MIAMI, JAMIE RENO IN SAN DIEGO, RON DEPASQUALE IN BOSTON
AND JORDANA LEWIS AND CLAIRE SULMERS IN NEW YORK*

URL: <http://www.newsweek.com/id/54529>

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Exhibit 6

- 10-year IQ test
- CNET look back

Power of 10: The past, present, and future of digital living

THE POWER OF 10 The past, present, and future of digital living

Top 10 products

By Tom Merritt

Gadgets of every description have flowed through the doors of CNET for 10 years. Picking a list of the 10 best is an exercise in healthy but vocal arguments. Everyone has a different idea of what is meant by *best*. You can make great arguments for the Diamond Multimedia Rio 300, Mac OS X, the Sony PSP, and many more gadgets that aren't on our list. But the 10 we've included here had the most wide-ranging acceptance. Don't agree? Good. Tell us your top 10 in TalkBack.

1



iPod (2001)

No other product has had the incredible, loyal devotion that the iPod inspires. It's also one of only a handful of products to get a 9 rating from CNET. It revolutionized and popularized music players with its stylish design and is still considered the industry leader. Even if you devoutly believe other music players have better features now, you have to acknowledge that iPod is still the king.

Exhibit 7



1 of 1 DOCUMENT

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THE WALL STREET JOURNAL

The Wall Street Journal

May 1, 2003 Thursday

SECTION: PERSONAL TECHNOLOGY; Pg. B1

LENGTH: 803 words

HEADLINE: Apple's iPod Just Keeps Getting Better As Top Digital Player

BYLINE: By Walter S. Mossberg

BODY:

APPLE COMPUTER'S iPod portable digital music player has become the gold standard for digital music fans. No other player has been able to match its combination of elegant design, small size and high capacity.

But other companies are feverishly working on iPod clones. So, in an effort to stay ahead, Apple this week released a totally redesigned version of the iPod, which is even thinner and lighter than the original version, yet packs in more songs. There are also many other new features, including a new desktop dock to hold the iPod.

Like the prior models, these new iPods will work on Windows PCs in addition to Apple's own Macintosh computers. But now, they are compatible with many more Windows computers than the old iPods.

The new iPods also work closely and well with Apple's new online music store, the first really good legal music downloading service.

They play the new music-file format Apple uses at its store, but can still handle regular MP3 files from any source.

I've been testing the new iPod for several days, using a wide variety of music from different sources. I find it to be even better designed and easier to use than the original model. I can still recommend it highly, as I did the first version.

THE NEW IPOD does have one big drawback, however. To reduce the size of the unit, Apple had to cut the size of the battery. So, the battery life of the new iPods, while still respectable, is significantly lower than it was on the original version. The old models claimed 10 hours of battery life, but mine got 12 hours. The new models claim eight hours of battery life, but my test iPod lasted only 7.5 hours -- nearly 40% less than my old one.

The new iPods come in three models. For \$299, you get 10 gigabytes of storage, enough to hold about 2,500 songs. That's double the capacity of the old \$299 model. For \$399, you get 15 gigabytes, or about 3,700 songs. For \$499, you get 30 gigabytes, or about 7,500 songs. Those latter two models have 50% more capacity than their predecessors did at the same prices.

There are no longer separate versions for Mac and Windows PCs. The box contains the software for both, and a single iPod that automatically adapts itself to whichever type of computer you first connect it to.

The new models are noticeably thinner, and the weight is way down. Even the highest-capacity new model weighs less than the lightest of the old models, and holds triple the songs.

Apple's iPod Just Keeps Getting Better As Top Digital Player The Wall Street Journal May 1, 2003 Thursday

One striking difference is that the buttons controlling play, pause, backward, forward and menu functions have been moved from the edges of the famous iPod scroll wheel to a new row above the wheel; and they light up orange when the screen backlight goes on.

All of these buttons, and the wheel itself, are molded into the surface of the unit and don't really depress or turn. They work solely by detecting the touch of a finger, and I found it took a while to develop just the right touch to make them work. At first, I was pressing too forcefully or too lightly, and nothing happened.

THE OTHER BIG CHANGE is that the connector for the cable that transfers music files from a computer to the iPod has been moved to the bottom edge of the unit from the top. And the connector itself has been changed so it now accepts cables that work with different ports on a PC.

The standard cable still hooks into a FireWire, or 1394, a port many Macs have but few Windows PCs include. So, Apple offers an alternate cable for \$19 that plugs into the USB 2.0 port that's standard equipment on new Windows PCs. It will also work, albeit much more slowly, with the older USB ports found on nearly every Windows PC in the past four years. This opens up many more Windows computers for working with the iPod.

The top two iPod models now also come standard with a small dock that sits on the desktop and holds the iPod for recharging or connecting to a computer. The dock also has a line-out jack so you can easily connect the iPod to speakers.

The excellent user interface has been improved. You can now customize the main menu so that some common commands can be reached more easily. And now you can build playlists of favorite songs right on the iPod, instead of only on a computer.

But the battery life is a weak spot. Even Apple's reduced claim of eight hours is suspect. It's based on tests in which some key iPod features, like the screen backlight and equalizer controls, are turned off and the volume is limited to 50%. You shouldn't have to disable key features to achieve a claimed battery life.

The company says the new batteries still will last for a full day of typical use. But if you were used to the extraordinary battery life of the old models, the drop-off will be a shock. Other than that, you'll find the new iPods to be even better than the old ones, and a delight to use.

E-mail me at mossberg@wsj.com.

NOTES:

PUBLISHER: Dow Jones & Company

LOAD-DATE: December 5, 2004

Exhibit 8

iPod Products Sold Before and After February 2004 October 2001–March 2009

Product	Sold Before or During February 2004	Sold After February 2004
iPod		
iPod 5 GB (1st Gen)	✓	✓
iPod 10 GB (1st Gen)	✓	
iPod 5 GB (2nd Gen)	✓	
iPod 10 GB (2nd Gen)	✓	✓
iPod 20 GB (2nd Gen)	✓	
iPod 10 GB (3rd Gen)	✓	
iPod 15 GB (3rd Gen)	✓	✓
iPod 20 GB (3rd Gen)	✓	✓
iPod 30 GB (3rd Gen)	✓	
iPod 40 GB (3rd Gen)	✓	✓
iPod 20 GB (4th Gen)	✓	✓
iPod 40 GB (4th Gen)	✓	✓
20 GB iPod U2 Special Edition	✓	✓
iPod photo (or with color display)		
iPod photo 20 GB		✓
iPod photo 30 GB		✓
iPod photo 40 GB		✓
iPod photo 60 GB		✓
20 GB iPod U2 Special Edition (color screen)		✓
20 GB iPod Special Edition Harry Potter (color display)		✓

Product	Sold Before or During February 2004	Sold After February 2004
iPod video/classic		
iPod 30 GB (5th Gen)		✓
iPod 60 GB (5th Gen)		✓
30 GB iPod Special Edition Harry Potter (based on 5th Gen)		✓
30 GB iPod U2 Special Edition (based on 5th Gen)		✓
iPod 80 GB (5th Gen)		✓
iPod 80 GB (6th Gen/Classic)		✓
iPod 120 GB (6th Gen/Classic)		✓
iPod 160 GB (6th Gen/Classic)		✓
iPod mini		
iPod mini 4 GB (1st Gen)	✓	✓
iPod mini 4 GB (2nd Gen)		✓
iPod mini 6 GB (2nd Gen)		✓
iPod nano		
iPod nano 1 GB		✓
iPod nano 2 GB		✓
iPod nano 4 GB		✓
iPod nano 2 GB (2nd Gen)		✓
iPod nano 4 GB (2nd Gen)		✓
iPod nano 8 GB (2nd Gen)		✓
iPod nano (PRODUCT) RED Special Edition 4 GB		✓
iPod nano (PRODUCT) RED Special Edition 8 GB		✓
iPod nano 4 GB (3rd Gen)		✓
iPod nano 8 GB (3rd Gen)		✓
iPod nano 8 GB (4th Gen)		✓
iPod nano 16 GB (4th Gen)		✓

Product	Sold Before or During February 2004	Sold After February 2004
iPod shuffle		
iPod shuffle 512 MB		✓
iPod shuffle 1 GB		✓
iPod shuffle 1 GB (2nd Gen)		✓
iPod shuffle 2 GB (2nd Gen)		✓
iPod shuffle 4 GB (3rd Gen)		✓
iPod touch		
iPod touch 8 GB		✓
iPod touch 16 GB		✓
iPod touch 32 GB		✓
iPod touch 8 GB (2nd Gen)		✓
iPod touch 16 GB (2nd Gen)		✓
iPod touch 32 GB (2nd Gen)		✓

Source: Apple Press Releases; <http://support.apple.com/kb/HT1353>; Apple

Exhibit 9

Apple Introduces New iPods

Holds up to 7,500 Songs, Yet Lighter than Two CDs

CUPERTINO, California—April 28, 2003—Apple® today introduced its third generation iPods, which hold up to 7,500 songs in a stunning enclosure that is lighter and thinner than two CDs. The new ultra-portable iPods feature completely solid-state “no moving parts” navigation wheel and buttons; an elegant new dock with audio out for fast and easy connection to your computer or stereo; an “On-The-Go” playlist so users can build a playlist right on their iPod™; a customizable main menu so users can promote the features they use most often to their top level menu; and Apple’s unique, patent pending Auto-Sync for automatically syncing your computer’s music library with iPod. The new ultra-portable iPods are available in three models: a 10GB model for just \$299 (US), a 15GB model for \$399 (US) and a 30GB model for \$499 (US).

“The competition hasn’t even caught up with our first generation iPod, and we’re introducing our third generation,” said Steve Jobs, Apple’s CEO. “With the new iTunes Music Store, you can now buy music online and transfer it right onto your iPod for listening wherever you want.”

The new 15GB and 30GB models come with an elegant dock for effortless connecting to a Mac® or Windows PC. The dock provides a stylish home base for the iPod and includes an audio line out for easy connection to a home stereo or powered speakers, making it easy to sync, charge and go. iPod plays more than eight hours of continuous music and recharges automatically whenever iPod is in the dock or connected to a Mac or Windows PC.

iPod is the only portable music player with Apple’s patent pending Auto-Sync, an innovative feature that automatically downloads an entire digital music library into iPod and keeps it up-to-date whenever the iPod is plugged into a Mac or Windows PC. With Apple’s new fast disk mode switching, iPod switches from Auto-Sync mode to music-player mode faster than ever before.

Building on the success of the original touch wheel, the new iPod is designed with a solid-state “no moving parts” navigation wheel and all touch buttons for enhanced sensitivity and precision over mechanical buttons. The buttons are backlit for easy operation in low light and continue to enable easy, one-handed operation. In addition to MP3, iPod now supports the industry-standard AAC audio format, providing higher quality sound in the same disk space. Whether at the gym, at work, in the car or at the airport, iPod puts 7,500 songs in your pocket—the equivalent of three weeks of continuous music without repeating a single song.

iPod features new customization options including the ability to move frequently used menu items to the main menu. Users also have the power to create an “On-The-Go” playlist and rate their music collection directly on their iPod, offering a new level of control whenever they’re away from their computer.

Pricing & Availability

The new iPod for Mac and Windows PCs will be available on May 2, for a suggested retail price of \$299 (US) for the 10GB iPod, \$399 (US) for the 15GB iPod, and \$499 (US) for the 30GB iPod through the Apple Store® (www.apple.com), Apple’s retail stores and Apple Authorized Resellers. Laser engraving is available for \$19 (US) and can include two lines of text with up to 27 characters per line. The new iPod will also support high-speed syncing via USB 2.0 with Windows PCs starting in June via a free software download. A separate USB 2.0 cable will be available in June for \$19 (US).

All iPod models include earbud headphones, an Apple iPod power adapter, a FireWire® cable and a 4-pin-to-6-pin iPod FireWire adapter. 15GB and 30GB iPod models also include the iPod Dock, carrying case and wired remote; these optional accessories can be ordered for 10GB iPod models through the Apple Store. iPod requires a Mac with FireWire port, Mac® OS X version 10.1.5 or later (Mac OS X v10.2 or later recommended) or a Windows PC with FireWire or USB 2.0 port, or Windows-certified FireWire or USB 2.0 card, Windows Me, Windows 2000, or Windows XP Home or Professional. A CD containing iTunes®* for Mac OS X and MUSICMATCH Jukebox Plus 7.5 software is included with iPod purchases.

*Some iPod features require a Mac and iTunes.

Apple ignited the personal computer revolution in the 1970s with the Apple II and reinvented the personal computer in the 1980s with the Macintosh. Apple is committed to bringing the best personal computing experience to students, educators, creative professionals and consumers around the world through its innovative hardware, software and Internet offerings.

Press Contacts:

Lara Vacante
Apple
(408) 974-7142
larav@apple.com

Christine Monaghan
Edelman
(212) 642-7730
christine.monaghan@edleman.com

NOTE TO EDITORS: For additional information visit Apple's PR website (www.apple.com/pr/), or call Apple's Media Helpline at (408) 974-2042.

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iPod Images

Apple Introduces iPod Photo

Your Entire Music & Photo Library in Your Pocket

SAN JOSE, California—October 26, 2004—Apple® today introduced iPod® Photo, the newest member of the iPod family that lets you take your entire music and photo library with you wherever you go. iPod Photo holds up to 25,000 digital photos alongside your music library and displays them on its stunning high-resolution color screen, allowing you to scroll through your photo library almost instantly using iPod's patent pending Click Wheel. iPod Photo lets you combine your music and your favorite photos to create magical slideshows on your iPod, and features TV-out for sharing your slideshows on big screen televisions and projectors. iPod Photo comes in 40GB or 60GB models which hold up to 10,000 or 15,000 songs, and its extended battery life gives users up to 15 hours of music playback or up to 5 hours of slideshows.

"Having both your entire photo and music collections with you wherever you go is the next big thing," said Steve Jobs, Apple's CEO. "Everyone has a digital camera and wants to enjoy and share their growing library of digital photos wherever they are. Unlike video content, photo content is free and abundant, and there are no copyright issues to deal with."

With its vivid color screen and backlight, iPod Photo displays crisp, clear photos both indoors and outdoors, so users can take their digital photo collection wherever they go and easily share their memories with family and friends. iPod Photo creates an entirely new iPod experience in full color for viewing album artwork, calendars, contacts and games, adding even more excitement to iPod.

Featuring Apple's patent pending Auto-Sync technology, iPod Photo makes it easy to automatically download your entire digital music and digital photo library onto iPod and keep it up-to-date whenever it is plugged into a Mac® or Windows computer using FireWire® or USB. Mac users can Auto-Sync their iPod with their photo library in iPhoto™ and Windows users can Auto-Sync their iPod with their photo collection in Adobe Photoshop Elements, Photoshop Album or their My Pictures folder. iPod Photo works with iTunes® 4.7, released today, providing music fans with the best digital jukebox on either a Mac or Windows computer and access to the iTunes Music Store, the number one digital music service in the world.

iPod Photo comes with Apple's patent pending Click Wheel, which combines the smooth and continuous scrolling of a touch-sensitive wheel with five push buttons for superior one handed navigation to easily find, view and share thousands of photos.

Pricing & Availability

The new 40GB and 60GB iPod Photo models will begin shipping today for a suggested retail price of \$499 (US) and \$599 (US) respectively, through the Apple Store® (www.apple.com), Apple's retail stores and Apple Authorized Resellers. iPod Photo includes a dock with audio and video out, earbud headphones, 1.4m AV cable, 1.2m 30-pin to FireWire cable, a 1.2m 30-pin to USB cable, AC adapter, black carrying case and a CD with iTunes 4.7 for Mac and Windows computers.

iPod Photo requires a Mac with a FireWire or USB 2.0 port and Mac OS® X version 10.2.8 or later (v10.3.4 or later required for USB 2.0); or a Windows PC with a FireWire or USB 2.0 port or FireWire or USB 2.0 card and Windows 2000 (with Service Pack 4 or later), XP Home or Professional.

All iPods include rechargeable batteries which have a limited number of charge cycles and may eventually need to be replaced. Battery life and number of charge cycles vary by use and settings. See www.apple.com/batteries for more information. Music capacity is based on four minutes per song and 128-Kbps AAC encoding; photo capacity is based on iPod-viewable photos transferred from iTunes.

Apple ignited the personal computer revolution in the 1970s with the Apple II and reinvented the personal computer in the 1980s with the Macintosh. Today, Apple continues to lead the industry in innovation with its award-winning desktop and notebook computers, OS X operating system, and iLife and professional applications. Apple is also spearheading the digital music revolution with its iPod portable music players and iTunes online music store.

Press Contacts:

Tom Neumayr
Apple
(408) 974-1972
tneumayr@apple.com

Pam Bennett
Apple
(408) 974-7608
pamb@apple.com

NOTE TO EDITORS: For additional information visit Apple's [PR website](#), or call Apple's Media Helpline at (408) 974-2042.

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[iPod shuffle images](#)

Apple Introduces iPod shuffle

First iPod Under \$100

MACWORLD EXPO, SAN FRANCISCO—January 11, 2005—Apple® today introduced iPod® shuffle, a breakthrough digital music player based on iPod's legendary shuffle feature which lets users experience their music in a million different ways. Smaller and lighter than a pack of gum, iPod shuffle comes with its own lanyard so it's ready to wear right out of the box. iPod shuffle works seamlessly with iTunes' innovative AutoFill feature which automatically selects songs from a user's music library to fill up iPod shuffle with just one click. iPod shuffle is the most affordable iPod ever and is available in two models: 512MB holding up to 120 songs for just \$99 and 1GB holding up to 240 songs for just \$149.

"iPod shuffle is smaller and lighter than a pack of gum and costs less than \$100," said Steve Jobs, Apple's CEO. "With most flash-memory music players users must use tiny displays and complicated controls to find their music; with iPod shuffle you just relax and it serves up new combinations of your music every time you listen."

iPod shuffle is based on iPod's pioneering and widely-used shuffle feature, which randomly selects songs from the user's music library or playlists. In addition, iPod shuffle works seamlessly with iTunes® and its innovative new patent-pending AutoFill feature, which automatically selects the perfect number of songs to fill iPod shuffle from a user's complete music library on their computer. And at any time, with a flip of a switch on the back of iPod shuffle, users can choose to listen to their music in order rather than shuffled, perfect for listening to a favorite new album.

Users can conveniently charge and transfer music from their Mac® or PC by plugging iPod shuffle directly into a USB port. iPod shuffle doubles as a portable USB flash drive with up to 1GB of storage space to back up personal files and exchange them between computers.

iPod shuffle is the newest member of Apple's wildly popular iPod family for both Mac and PC which includes the fourth generation iPod, the iPod mini, the iPod U2 Special Edition and iPod photo. More than 10 million iPods have been sold since it was introduced, and it is the number one selling digital music player in the world.

The popularity of iPod has also created a booming accessory market, and iPod shuffle is being introduced with several optional accessories. In addition to the included lanyard, there is an optional armband that makes iPod shuffle perfect for many athletic activities. An optional sport case keeps iPod shuffle safely protected from outdoor elements with its clear case and neck strap. An optional dock serves as an elegant and convenient home base for syncing and charging iPod shuffle, and an optional USB power adapter easily charges iPod shuffle when it's away from the computer by simply plugging it into any electrical outlet. Users can extend the iPod shuffle battery life (up to 12 hours) with an optional battery pack that holds two AAA batteries and keeps the music playing for up to 20 additional hours.

Pricing & Availability

The 512MB and 1GB models of iPod shuffle for Mac or Windows are now shipping for a suggested retail price of \$99 (US) and \$149 (US) respectively, and include earbud headphones, lanyard and a CD with iTunes 4.7.1 for Mac and Windows computers. iPod shuffle is available through the Apple Store® (www.apple.com), Apple's retail stores and Apple Authorized Resellers. The iPod shuffle arm band, sport case, battery pack, dock and USB power adaptor optional accessories will become available over the next few weeks for a suggested retail price of \$29 (US) each.

iPod shuffle requires a Mac with a USB port and Mac OS® X version 10.2.8 or Mac OS X version 10.3.4 or later; or a Windows PC with a USB port, or a USB card and Windows 2000 Service Pack 4 or later, or Windows XP Home or Professional Service Pack 2 or later.

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Press Contacts:

Tom Neumayr
Apple
(408) 974-1972
tneumayr@apple.com

Jaime Schopflin
Apple
(408) 974-3314
jaimes@apple.com

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[iPod nano images](#)

Apple Introduces iPod nano

SAN FRANCISCO—September 7, 2005—Apple® today introduced the iPod® nano, a revolutionary full-featured iPod that holds 1,000 songs yet is thinner than a standard #2 pencil and less than half the size of competitive players. The iPod nano features an ultra-portable, lightweight design with a gorgeous color screen, Apple's patent pending Click Wheel and the ability to hold 1,000 songs or 25,000 photos. iPod nano works seamlessly with the iTunes® Music Store, the world's number one digital music service. The iPod nano is available immediately in a 4GB model priced at just \$249 and a 2GB model priced at just \$199, with both models available in stunning white or black designs.

"iPod nano is the biggest revolution since the original iPod," said Steve Jobs, Apple's CEO. "iPod nano is a full-featured iPod in an impossibly small size, and it's going to change the rules for the entire portable music market."

iPod nano is the perfect combination of innovative design, storage capacity and ease of use. Thinner than a standard #2 pencil and weighing only 1.5 ounces, iPod nano comes in two models—the 4GB iPod nano holds up to 1,000 songs and the 2GB iPod nano holds up to 500 songs. iPod nano features Apple's innovative Click Wheel for precise, one-handed navigation, and its ultra-portable design fits into even the smallest pocket making it easy to take iPod nano to the gym, in the car, traveling, commuting or anywhere you go.

The most fashionable and wearable iPod ever, the iPod nano features optional accessories including lanyard headphones, which integrate the headphone cables into the lanyard, so users can wear their iPod nano around their neck without dangling headphone cables. For customers looking to personalize their iPod nano with colors, an optional set of iPod nano Tubes in pink, purple, blue, green and clear offers fashionable protection in a sheer casing while enabling full operation of all functions including the Click Wheel. Optional armbands available in gray, pink, blue, red and green allow users to wear their iPod nano as the ultimate fashion and sports accessory.

iPod nano features the same 30-pin dock connector as the iPod and iPod mini, allowing it to work effortlessly with a wide range of over 1,000 accessories developed for iPod, including home stereo speakers and iPod car adapters for an incredible music experience at home or in the car.

Featuring seamless integration with the iTunes Music Store and the iTunes digital music jukebox, iPod nano includes Apple's patent pending Auto-Sync technology that automatically downloads a user's digital music collection, photos or Podcasts onto iPod nano and keeps it up-to-date whenever iPod nano is plugged into a Mac® or Windows computer using USB 2.0. With its stunning, high-resolution color screen, iPod nano allows users to display album art while playing music, view photo slideshows or play games in full color. iPod nano features up to 14 hours battery life* and completely skip-free playback, as well as new stopwatch, world clock and screen lock applications.

Pricing & Availability

The 4GB and 2GB white and black models of iPod nano for Mac or Windows are available worldwide immediately for a suggested retail price of \$249 (US) and \$199 (US) respectively, through the Apple Store® (www.apple.com), Apple's retail stores and Apple Authorized Resellers. All iPod nano models include earbud headphones, a USB 2.0 cable and a CD with iTunes for Mac and Windows computers.

New optional accessories designed for iPod nano with the following suggested retail prices include: Lanyard headphones for \$39 (US), armbands in five colors each for \$29 (US), dock for \$29 (US) and a set of iPod nano Tubes in five different colors for \$29 (US) and will be available within the next 30 days.

iPod nano requires a Mac with a USB 2.0 port and Mac OS® X version 10.3.4 or later and iTunes 4.9 (or later); or a Windows PC with a USB 2.0 port and Windows 2000, XP Home or Professional (SP2) and iTunes 4.9 (or later).

* Battery life and number of charge cycles vary by use and settings. See www.apple.com/batteries for more information. Music capacity is based on four minutes per song and 128-Kbps AAC encoding; photo capacity is based on iPod-viewable photos transferred from iTunes.

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Press Contacts:

Tom Neumayr
Apple
(408) 974-1972
tneumayr@apple.com

Jaime Schopflin
Apple

iPhone images

iPhone Premieres This Friday Night at Apple Retail Stores

Free Workshops, Genius Bar Support and One to One Personal Training

CUPERTINO, California—June 28, 2007—Apple's revolutionary iPhone™ will go on sale this Friday, June 29 at 6:00 p.m. local time at Apple® retail stores nationwide. All 164 Apple retail stores in the US will stay open until midnight, and customers can purchase up to two iPhones on a first come, first served basis. Beginning Saturday morning, iPhone customers can learn how to get the most out of the iPhone with free, in-depth workshops offered throughout the day at all Apple retail stores. Every Apple retail store will offer support for iPhone at the Genius Bar and personal training through Apple's new One to One program.

"Apple retail stores were created for this moment—to let customers touch and experience a revolutionary new product," said Ron Johnson, Apple's senior vice president of Retail. "With our legendary Genius Bar support, free workshops and our One to One personal training, we're here to help customers get the most from their new iPhone."

iPhone introduces an entirely new user interface based on a revolutionary multi-touch display and pioneering new software that allows users to control iPhone with just a tap, flick or pinch of their fingers. iPhone combines three products into one small and lightweight handheld device—a revolutionary mobile phone, a widescreen iPod®, and the Internet in your pocket with best-ever applications on a mobile phone for email, web browsing and maps. iPhone ushers in an era of software power and sophistication never before seen in a mobile device, which completely redefines what users can do on their mobile phones.

Pricing and Availability

iPhone goes on sale in the US on June 29, 2007 at 6:00 p.m. local time through Apple's retail stores and AT&T's select retail stores. Apple's online store will be taking orders for iPhone beginning at 6:00 p.m. PDT. iPhone will be available in a 4GB model for \$499 (US) and an 8GB model for \$599 (US), and will work with either a PC or Mac®. Beginning June 30 and continuing through the summer, Apple Stores in the US will open early at 9:00 a.m. for iPhone sales. Customers can check iPhone availability at their local Apple retail store starting at 9:00 p.m. the night before at www.apple.com/retail.

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Press Contacts:

Steve Dowling
Apple
dowling@apple.com
(408) 974-1896

Amy Barney
Apple
abarney@apple.com

iPod touch images

Apple Unveils iPod touch

Revolutionary Multi-touch Interface & Built-in Wi-Fi Wireless Networking

SAN FRANCISCO—September 5, 2007—Apple® today introduced the new iPod® touch featuring Apple's revolutionary multi-touch user interface that enables users to find and enjoy all of their music, videos and more on its gorgeous widescreen display with just the touch of a finger. First introduced on iPhone™, the multi-touch interface uses pioneering new software to present the perfect user interface for each application. The iPod touch also includes Wi-Fi wireless networking, the first on any iPod, and three amazing applications that use it—Safari™, the most advanced browser on any mobile device, lets users wirelessly view web pages just as they look on their computer, and features Google Search or Yahoo! oneSearch; Apple's YouTube application lets users wirelessly watch over 10 million free videos from the Internet's most popular video website; and the new iTunes® Wi-Fi Music Store lets users wirelessly browse, preview and buy songs and albums from the most popular online music store in the world. The iPod touch is an unbelievable 8 mm thin, and is priced starting at just \$299.

"The iPod touch is a landmark iPod, ushering in a whole new generation of features based on its revolutionary multi-touch interface and built-in Wi-Fi wireless networking," said Steve Jobs, Apple's CEO. "People are going to be amazed at how thin it is and how much it does."

With its gorgeous 3.5-inch widescreen display, iPod touch is perfect for watching movies and TV shows, as well as viewing photos and album art. iPod touch has a built-in accelerometer that automatically senses when you rotate it into its landscape position. When you're in music, it automatically switches to Cover Flow™ so you can browse your music collection by album cover artwork with just a flick of a finger. When in Photos, it automatically displays the photo in its landscape aspect ratio; and when in Safari it displays the web page horizontally. iPod touch also has a built-in ambient light sensor that automatically adjusts the display's brightness. iPod touch features up to 22 hours of audio playback and up to five hours of video playback.

The iTunes Wi-Fi Music Store lets you browse the iTunes Top Ten lists of songs and albums overall or by genre, check out new releases and "What's Hot," or search for your favorite songs, albums or artists. You can preview any song for free, then purchase and download the ones you like directly onto your iPod touch over Wi-Fi. The music you download will be automatically uploaded into your iTunes library the next time you sync your iPod touch with your computer.

With Safari, the most advanced web browser ever on a portable device, you can see web pages the way they were meant to be seen, with the ability to zoom into any webpage with a tap of your finger. The Safari web browser includes built-in Google Search and Yahoo! oneSearch so you can quickly and easily find information you need. iPod touch also includes Apple's incredible YouTube application that allows you to access, browse and search for millions of free YouTube videos over Wi-Fi.

Apple today also announced an exclusive agreement with Starbucks that allows you to access the iTunes Wi-Fi Music Store for free in participating US Starbucks stores starting next month. When you enter a participating Starbucks location, your iPod touch, iPhone, or PC or Mac® running iTunes will automatically recognize the iTunes Wi-Fi Music Store. You can see what song is currently playing or has recently played in the store, and immediately preview, buy and download it over Wi-Fi.

The iPod is the world's most popular family of digital music players with over 100 million sold. Today, Apple released its most exciting iPod lineup ever with the iPod shuffle in five new colors; iPod classic holding up to

40,000 songs; the incredible all new iPod nano with video playback; and the breakthrough iPod touch with a revolutionary multi-touch user interface. iPod owners can choose from a vast ecosystem of accessories with over 4,000 products made specifically for the iPod including cases, fitness accessories, speaker systems and iPod connectivity in over 70 percent of US automobiles.

Pricing & Availability The new iPod touch is scheduled to be available later this month. The 8GB iPod touch model is \$299 (US) and the 16GB iPod model is \$399 (US). iPod touch requires a Mac with a USB 2.0 port, Mac OS® X 10.4.10 or later and iTunes 7.4; or a Windows PC with a USB 2.0 port and Windows Vista or Windows XP Home or Professional (Service Pack 2) or later and iTunes 7.4. Internet access is required and a broadband connection is recommended, fees may apply. The iTunes Store is not available in all countries.

* Battery life and number of charge cycles vary by use and settings. See www.apple.com/batteries for more information. Music capacity is based on four minutes per song and 128-Kbps AAC encoding; photo capacity is based on iPod-viewable photos transferred from iTunes; and video capacity is based on H.264 1.5-Mbps video at 640-by-480 resolution.

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Press Contacts:

Tom Neumayr
Apple
(408) 974-1972
tneumayr@apple.com

Natalie Kerris
Apple
(408) 974-6877
nat@apple.com

NOTE TO EDITORS: For additional information visit Apple's PR website, or call Apple's Media Helpline at (408) 974-2042.

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iPod touch images

Apple Introduces New iPod touch

The Funnest iPod Ever—Perfect for Music, Movies & Games

SAN FRANCISCO—September 9, 2008—Apple® today introduced the second generation iPod® touch featuring an amazingly thin contoured metal design, a gorgeous 3.5-inch widescreen glass display, 802.11 b/g Wi-Fi wireless networking, integrated volume control buttons, a built-in speaker for casual listening, a built-in accelerometer and other advanced sensors, and Apple's revolutionary Multi-Touch™ user interface. iPod touch, now available for just \$229 for the 8GB model, is perfect for playing music, movies and games, with millions of songs, thousands of Hollywood movies and hundreds of games available on the iTunes® Store.

"iPod touch is the funnest iPod we've ever created," said Steve Jobs, Apple's CEO. "Users can listen to millions of songs, watch thousands of Hollywood movies and now, thanks to the App Store, download and play hundreds of great games on their iPod touch."

The new iPod touch is smaller and lighter than the original, with a sleek new design that features a contoured metal enclosure with integrated volume control buttons and a brilliant 3.5-inch widescreen glass display. With its rounded edges, flush display and curved, more compact design, the new iPod touch is more comfortable to hold and more portable than ever.

iPod touch users can choose from hundreds of exciting game titles such as "Spore Origins" and "Scrabble" from Electronic Arts, and "Real Football 2009" from Gameloft available on iTunes or directly through the App Store application on the iPod touch. The revolutionary App Store works over Wi-Fi, enabling users to browse, purchase and wirelessly download applications directly onto their iPod touch and start using them instantly. The App Store features an incredible array of applications in a wide variety of categories, including games, travel, entertainment, social networking, sports and much more.

iPod touch works seamlessly with iTunes so you can import, manage, and then easily auto-sync your favorite content. With up to 36 hours of music playback or six hours of video playback on a single charge, the new iPod touch is the ultra-portable way to enjoy your favorite music, TV shows, movies and games on the go. The 32GB model holds up to 7,000 songs, 25,000 photos or 40 hours of video; the 16GB model holds up to 3,500 songs, 20,000 photos or 20 hours of video, and the 8GB model holds up to 1,750 songs, 10,000 photos and 10 hours of video.*

The new iPod touch works with the new iTunes 8 Genius feature, allowing customers to automatically create playlists while on the go. Users can preview the playlist Genius creates, refresh the list to choose different songs and save Genius playlists to enjoy again later.

The new iPod touch also features built-in Nike + iPod support making it an incredible workout companion. Users simply place the optional Nike + iPod sensor (\$19 US) in their Nike + shoe to seamlessly connect with the new iPod touch to track miles run or sync with the latest generation gym equipment.

The iPod is the world's most popular family of digital music players with over 160 million sold. Apple's incredible new lineup includes the iPod shuffle in four vivid new colors starting at just \$49; the iPod classic in one slimline model with 50 percent more capacity for the same great price—120GB of storage for just \$249; the fourth generation iPod nano featuring a gorgeous curved metal and curved glass enclosure, in nine

vibrant colors starting at \$149; and the second generation iPod touch now starting at just \$229. iPod owners can choose from a vast ecosystem of accessories with over 5,000 products made specifically for the iPod including speaker systems, fitness accessories, fashionable cases and iPod connectivity available in over 90 percent of new car models sold in the US.

Pricing & Availability

The new iPod touch is available immediately for a suggested price of \$229 (US) for the 8GB model, \$299 (US) for the 16GB and \$399 (US) for the 32 GB model through the Apple Store® (www.apple.com), Apple's retail stores and Apple Authorized Resellers. iPod touch requires a Mac® with a USB 2.0 port, Mac OS® X v10.4.10 or later and iTunes 8; or a Windows PC with a USB 2.0 port and Windows Vista or Windows XP Home or Professional (Service Pack 2) or later and iTunes 8. Existing iPod touch users can update to the latest 2.1 software for just \$9.95 to add the new Genius feature. iPod touch owners who already have the 2.0 software get the 2.1 software update for free. Simply download the latest version of iTunes onto your Mac or PC, and purchase the 2.1 software update via iTunes.

*Battery life and number of charge cycles vary by use and settings. See www.apple.com/batteries for more information. Music capacity is based on four minutes per song and 128-Kbps AAC encoding; photo capacity is based on iPod-viewable photos transferred from iTunes; and video capacity is based on H.264 1.5-Mbps video at 640-by-480 resolution.

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Press Contacts:

Christine Monaghan
Apple
cmonaghan@apple.com
(408) 974-8850

Tom Neumayr
Apple
tneumayr@apple.com
(408) 974-1972

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iPod shuffle images

Apple Announces Incredible New iPod shuffle

World's Smallest Music Player Now Talks to You

CUPERTINO, California—March 11, 2009—Apple® today introduced the all-new iPod® shuffle, the world's smallest music player at nearly half of the size of the previous model, and the first music player that talks to you. The revolutionary new VoiceOver feature enables iPod shuffle to speak your song titles, artists and playlist names. The third generation iPod shuffle is significantly smaller than a AA battery, holds up to 1,000 songs and is easier to use with all of the controls conveniently located on the earphone cord. With the press of a button, you can play, pause, adjust volume, switch playlists and hear the name of the song and artist. iPod shuffle features a gorgeous new aluminum design with a built-in stainless steel clip that makes it ultra-wearable.

"Imagine your music player talking to you, telling you your song titles, artists and playlist names," said Greg Joswiak, Apple's vice president of iPod and iPhone™ Product Marketing. "The amazingly small new iPod shuffle takes a revolutionary approach to how you listen to your music by talking to you, also making it the first iPod shuffle with playlists."

iPod shuffle is based on Apple's incredibly popular shuffle feature, which randomly selects songs from your music library. And now, when you can't remember the name of a song or an artist playing, with the press of a button iPod shuffle tells you the name of the song and artist. iPod shuffle can even tell you status information, such as battery life. With the ability to hold up to 1,000 songs and the VoiceOver feature, you can now easily switch between multiple playlists on your iPod shuffle. iPod shuffle can speak 14 languages including English, Czech, Dutch, French, German, Greek, Italian, Japanese, Mandarin Chinese, Polish, Portuguese, Spanish, Swedish and Turkish.

The new iPod shuffle comes in silver or black and features a sleek and ultra-wearable design with a built-in stainless steel clip. iPod shuffle is the smallest music player in the world and is incredibly easy to clip to almost anything and take with you everywhere you go. iPod shuffle features up to 10 hours of battery life.*

Pricing & Availability

The third generation 4GB iPod shuffle is now shipping and comes in silver or black for a suggested price of \$79 (US) through the Apple Store® (www.apple.com), Apple's retail stores and Apple Authorized Resellers. iPod shuffle comes with the Apple Earphones with Remote and the iPod shuffle USB cable. iPod shuffle requires a Mac® with a USB 2.0 port, Mac OS® X v10.4.11 or later and iTunes® 8.1 or later; or a Windows PC with a USB 2.0 port and Windows Vista, Windows XP Home or Professional (Service Pack 3) or later and iTunes 8.1.

*Battery life and number of charge cycles vary by use and settings. See www.apple.com/batteries for more information. Song capacity is based on four minutes per song and 128-Kbps AAC encoding; in 256-Kbps AAC format, song capacity is up to 500 songs; actual capacity varies by encoding method and bit rate.

Apple ignited the personal computer revolution in the 1970s with the Apple II and reinvented the personal computer in the 1980s with the Macintosh. Today, Apple continues to lead the industry in innovation with its award-winning computers, OS X operating system and iLife and professional applications. Apple is also spearheading the digital media revolution with its iPod portable music and video players and iTunes online

store, and has entered the mobile phone market with its revolutionary iPhone.

Press Contacts:

Christine Monaghan
Apple
cmonaghan@apple.com
(408) 974-8850

Tom Neumayr
Apple
tneumayr@apple.com
(408) 974-1972

NOTE TO EDITORS: For additional information visit Apple's PR website, or call Apple's Media Helpline at (408) 974-2042.

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Exhibit 10



2006 PC World Innovations Awards

Twenty-five groundbreaking products, five categories. See what our editors picked.

Innovation is everywhere: In sleek industrial design (Apple's iPod Nano), in unique technologies that enable new capabilities (Kodak's dual-lens EasyShare V570), and in products that bring the cost of high-end technologies down from the stratosphere (Sony's Handycam HDR-HC1 high-definition camcorder). Innovative products and services do it first, do it well, or re-imagine what's been done before. They're the kind of products that make you wonder: Why didn't I think of that?

It wasn't easy to narrow down this year's list of *PC World* Innovations Award winners--but the 25 hardware devices, software products, and Web services spotlighted here say a lot about where technology is today and where it's going. While some products, notably Fujitsu's LifeBook P1510D convertible Tablet PC/notebook and NEC's MultiSync LCD2180WG-LED monitor, are aimed at boosting productivity, this year's picks clearly have a common theme: The majority of them aim to change the way you consume media and entertainment--whether in the living room, the den, or on the go (see our methodology for more on how we made our picks).

As *PC World* Editor in Chief Harry McCracken noted in his recent Up Front column, many of these products defy clear categorization. Nonetheless, we've managed to group our 25 favorites into five categories: Audio, Cameras and Camcorders, Entertainment, Mobile and Wireless, and Video. And the winners are...

AudioMobile and WirelessApple iPod NanoAirgo True MIMO Gen3JVC RX-D702B AvvenuSonos Digital Music SystemFujitsu LifeBook P1510DYamaha RX-V4600 Google EarthYamaha YSP-1000Nokia N91Cameras and CamcordersPanasonic OxyrideJVC Everio GZ-MG70VideoKodak EasyShare V570 Maxtor Shared Storage PlusSony Cyber-shot DSC-R1Mitsubishi HC3000USony Handycam HDR-HC1NEC MultiSync LCD2180WG-LEDEntertainmentSling Media SlingboxCreative Zen Vision Sony DVDirect VRD-MC1Microsoft Xbox 360Toshiba RD-XS54Nintendo Nintendogs for Nintendo DSTiVoToGoAudio

Apple iPod Nano PORTABLE AUDIO PLAYER (\$249) Overnight, the svelte iPod Nano () irrevocably altered the landscape for portable audio players. Not only did this model take clean design aesthetics to a new level, but it brought us the first high-capacity (4GB) flash-based player--and one priced within reach of the masses, no less. Now, if only it didn't have that scratch-prone surface....

JVC RX-D702B HOME THEATER RECEIVER (\$880) There are lots of ways to play digital music on your stereo system. The problem is how to make the music sound good, since speakers of any quality will show the imperfections of compressed audio files. JVC's receiver () uses a wireless USB link to transmit music from your PC to your stereo, but the real magic is what the receiver then does with it. Technology the company has dubbed "CC Conversion" cleans up digital music signals, making even music streamed off the Internet sound fabulous on my system. One caveat: We found that the wireless USB link broke up if we moved the notebook more than 15 to 20 feet from the receiver. If you want to

use a distant PC, you'll need to connect it to the receiver through an ethernet cable.

Sonos Digital Music System AUDIO STREAMING DEVICE (\$1200) The Sonos system () is an elegant, if pricey, way of hearing digital music all around your house. Setup is simple: Load the Sonos software on your PC, and then connect the company's ZonePlayers--squat boxes that combine a wired or wireless network client and an amplifier--in any room where you want to hear tunes. You can connect any set of speakers to the ZonePlayers. Sonos's remote control combines a sharp color screen and iPod-like scroll-wheel navigation to let you manage music for a single zone or the whole house. But as with a lot of network devices, we found that the Sonos system occasionally lost contact with our network and had to be reconnected. The \$1200 Introductory Bundle includes two ZonePlayers and a remote. Extra ZonePlayers cost \$500 each.

Yamaha RX-V4600 HOME THEATER RECEIVER WITH HIGH-DEFINITION RADIO (\$1899) Yamaha's RX-V4600 () is the first home theater receiver with an integrated high-definition radio tuner. HD radio is to FM radio as FM is to AM--the improvement in audio quality is easily discernible. Because HD is a digital format, it also addresses problems like FM multipath distortion, a type of signal interference that makes FM broadcasts almost unlistenable in, say, a house in a hilly area. The RX-V4600 initially plays the standard FM or AM broadcast, and then transitions seamlessly to the HD broadcast, so you can hear the static melt away. Too bad it can't do anything about annoying commercials, but unlike satellite radio, HD radio is free. Otherwise, the RX-V4600 is a monster of a receiver, with 7.1 channels, two zones and two remotes (so it can output different sources in two different rooms), plus Yamaha's Parametric Room Acoustic Optimizer for automatically setting up the receiver for your room.

Yamaha YSP-1000 SPEAKER SYSTEM (\$1700) Surround sound generated by one box might be old news, but Yamaha's YSP-1000 () stands out from the rest. This unique device includes 42 speakers packed into one long horizontal unit that's compatible with the latest formats, including Dolby Digital, DTS, Dolby Pro Logic II, and DTS Neo:6. Instead of hooking up to a receiver, the YSP-1000 includes its own internal amplification. Yamaha trumps its competitors and takes surround sound a step further by auto-calibrating and optimizing its sound according to the parameters of the room it's placed in. The result? Amazingly rich and vibrant surround sound. The unit's elegant design makes it a perfect match for 42-inch flat panel TVs, and as an added bonus it can be wall-mounted. At \$1700 it's not a cheap alternative to a multiple-speaker setup, but auto-calibration and easy installation make this one-unit speaker a winner.

Cameras and Camcorders

JVC Everio GZ-MG70 CAMCORDER WITH HARD-DISK DRIVE (\$799) You don't record your TV shows onto tape anymore--you use DVDs. And you don't copy music to tape anymore--you use CDs or MP3s. So why are you still recording your home movies to videotape? The JVC Everio GZ-MG70 () is one of the first camcorders both to jettison videotapes and to record video to the same type of compact hard drive that MP3 players like the iPod use. This means it can store more video: A MiniDV digital videotape can hold up to 90 minutes of video, while the GZ-MG70 can hold up to 14 hours. Although this camcorder isn't perfect (the video quality is not as good as that of a comparably priced MiniDV camcorder and most video editing programs can't import the video directly), the future of camcorders is clearly hard-drive based, and the GZ-MG70 marks a big step in that direction.

Kodak EasyShare V570 POINT-AND-SHOOT DIGITAL CAMERA (\$399) When you're taking a group shot, it's a drag to have to squish everyone into the picture. One solution is to get a camera with a really wide angle lens--like Kodak's V570 (). It's the first point-and-shoot model--stateside--to incorporate two lenses (and two CCD image sensors) inside a compact 5-megapixel camera. One lens

handles 23 millimeter wide-angle shots and the other takes care of the 3X optical zoom shots between 39mm and 117mm. Combined, the lenses are capable of magnifying up to 5X, allowing you to zoom into a subject from a distance. Kodak went the dual-lens route (instead of, say, one ultrawide 5X zoom lens) to keep the camera small and fairly slim. The result is stylish and impressive--and the camera takes good-looking photos, to boot. (if available)

Sony Cyber-shot DSC-R1 ADVANCED DIGITAL CAMERA (\$999) Sony's big and heavy Cyber-shot DSC-R1 () may be a fixed-lens camera, but it uses a 10.3-megapixel, SLR-size CMOS image sensor--making it the first cross between a digital point-and-shoot and a digital SLR. Unlike current digital SLRs, this camera can display a real-time preview of the image you're capturing, directly from the sensor. You can frame shots through the unit's electronic viewfinder or use its fully adjustable 2-inch LCD, which pops up from the top of the camera. An added bonus: The Carl Zeiss lens offers a versatile zoom range, between 24mm and 120mm.

Sony HandyCam HDR-HC1 HIGH-DEFINITION CAMCORDER (\$1999) Although it's not the first camcorder to record high-definition video, Sony's HDR-HC1 () is the world's smallest and lightest. At 23 ounces, it weighs only 2 ounces more than Sony's DCR-DVD403 camcorder--the company's smallest model. It captures gorgeous video, with sharpness and color depth far beyond what a standard-definition camcorder offers. You'll need a very fast computer to edit the high-definition video files it creates, and your options for exporting high-def movies are limited. The hefty price is more than twice what an otherwise-comparable SD camcorder costs. But it's easy to understand why when you see its incredible image quality.

Entertainment

Creative Zen Vision PORTABLE MEDIA PLAYER (\$400) Even Steve Jobs admits that the new video-enabled iPod is a music player that offers video as a bonus, not a video-centric device. If you're looking for a truly multimedia handheld, Creative's Zen Vision () may fit the bill better than any product with an Apple logo on it. And the Vision is decidedly more practical than the bulky, pricey first-generation portable Media Center players that debuted in 2004.

Compact enough to fit (just barely) into a shirt pocket, the Vision has a knockout 3.7-inch display that makes the video iPod's screen look like it shrank in the wash. Movies in a variety of formats are very watchable indoors and out, and you can output them to a TV. You can also load photos onto the Vision's 30GB hard drive, via its USB port, a built-in CompactFlash slot, or an optional adapter for other memory-card formats. And, hey, this video player offers audio as a bonus, including subscription services based on Microsoft's Windows Media 10. It even sports an FM radio tuner.

What the Vision lacks is a service for acquiring video that's as simple and seamless as the iTunes Music Store's new TV downloads. But if you're willing to put some effort into getting video onto this gadget, it'll sure look good once it's there.

Microsoft Xbox 360 GAME CONSOLE (\$400) Within a few days after it launched, the Xbox 360 () sold out in stores and started appearing on eBay for \$5000 and above--games included. It earns points for being the first console with a well-integrated online gaming component, support for high-definition TVs with resolutions up to 1080 interlaced, and impressive 3D graphics horsepower. The first time you power up the Xbox, it asks you to create a log-in name, which you'll need if you participate in Microsoft's Xbox Live online gaming community. Games, such as Activision's Call of Duty 2 and Microsoft's Perfect Dark Zero, look very impressive on the new Xbox. In fact, Call of Duty looks about as good on the 360 as it does on a relatively new PC with a low- to mid-level graphics card. You can use

up to four controllers with the 360, and we appreciate that Microsoft improved the game controller; it's better designed and more comfortable to hold than the one that came with the first-gen Xbox. If you plan to put the system in a room without an ethernet connection, consider dishing out an extra \$100 for the Wi-Fi adapter.

Nintendo Nintendogs for Nintendo DS GAME (\$30) Nintendo's () uncannily realistic canines, including Labrador retrievers, Chihuahuas, dachshunds, and other breeds, are irresistible. This title for the DS handheld isn't just addictive--it's also one of the most inventive games in years, taking full advantage of the DS's quirky features. You interact mostly through voice commands ("sit!") and by using the DS's pen to do everything from taking your pup for a walk to scratching him or her under the chin. You can even blow bubbles by gently blowing into the handheld's microphone.

The game has no particular goal other than to raise a happy and well-behaved pooch, and the closest the game gets to conflict is if a fellow doggie parent chews you out for failing to clean up after your pet. But if you're a fan of dogs, simulation games, or both, you'll love this puppy.

TiVoToGo DVR (free with TiVo subscription) No longer is the content on your beloved TiVo tethered to the hard drive you recorded it on. TiVoToGo unleashes your recordings onto your home network, and lets you take those recordings with you. Connect a wireless adapter to a Series2 TiVo and install the free software on your Windows PC, and you can transfer as many recorded episodes of *The Simpsons* as you can fit on your hard drive. Watch your action flick on the computer in the den while a romantic comedy plays in the living room. Or load up a laptop with shows before a trip, and watch all your favorites on the road. Plus, TiVoToGo lets you browse and play all the digital music stored on your computer through your TiVo. The company recently started rolling out for transferring TiVoToGo content to Apple's video-capable iPod.

Mobile and Wireless

Airgo True MIMO Gen3 WI-FI CHIPSET Wireless networking at 10/100 ethernet speeds: That's the pitch for products (specifically the Linksys SRX400 and Netgear RangeMax 240 lines) based on the latest chips from Airgo Networks, and--amazingly, given the hype surrounding most Wi-Fi speed claims--that's what we've observed, at least at close range with encryption turned off. Airgo has been wowing the Wi-Fi world with its True MIMO spatial multiplexing technology for a couple of years now, but the company has outdone itself here, enabling a future in which streaming video from the den to the bedroom will be commonplace.

Avvenu REMOTE ACCESS and FILE SHARING (Free) Avvenu's new, free service provides ready access to files on any Avvenu-enabled computer from any other computer, Web-enabled phone, or PDA. After installing Avvenu's software on a Windows PC, you can browse through all the files on that computer, or search using Google Desktop, by logging in to the company's Web site. Download any given file via the site; or share files or entire directories by sending someone an e-mail with a Web link to (only) that folder or file. Want to show all those great travel pictures on your phone? No problem: Avvenu resizes photos on-the-fly for mobile devices.

Fujitsu LifeBook P1510D NOTEBOOK (\$1649) At 2.2-pounds, the LifeBook P1510D from Fujitsu () is eye-catchingly small and slim, with a twist-around screen that converts this notebook into a slate-style tablet. It's also the first notebook using Microsoft's Windows XP Tablet PC Edition operating system to have a touch-screen display that conveniently works with any stylus pen, or even your fingers. The notebook comes with a stylus and tablet-friendly apps such as EverNote and RitePen, so you can easily jot notes and annotate documents.

Google Earth SATELLITE MAPPING SERVICE (Free) One of the search king's handful of out-of-browser experiences, Google Earth lets you pan and zoom over satellite images of the far-flung corners of the globe. Then when you're ready to find a cheeseburger in Paradise, Michigan, simply check the Restaurant option in the Layers panel on the left to view specific locations (the same goes for hotels, gas stations, parks, schools, government buildings, and millions of other points of interest). And if you're getting ready for a road trip, just enter your start and end points to view the route superimposed over the satellite image, along with turn-by-turn directions in the left pane. Fun, practical, and free--that's a tough combination to beat.

Nokia N91 CELL PHONE (around \$700) Nokia takes cell phones to the next level, with the hard-drive-equipped N91, the first of its kind in the United States. (Samsung was the first to announce a hard-disk-based phone, but for now the company plans to sell it only in Korea.) That's certainly exciting news given the amount of files that are being stored in phones these days, including photos, music, video clips, contacts, and text messages. Although the N91 () is a bit hefty, its capabilities--such as a 2-megapixel camera, Bluetooth, and Wi-Fi--more than make up for its large size. The phone's substantial 4GB hard drive lets you store thousands of files--be they photos, songs, or videos. With this much storage capacity, it trumps competing music phones such as Motorola's Rokr and Sony Ericsson's Walkman W800i. At press time, Nokia had not yet announced carrier partnerships; it plans to ship the phone in the first quarter. (if available)

Panasonic Oxyride BATTERY (\$4 for four AA batteries) For the same price as disposable alkaline batteries, Oxyrides can keep your portable devices going significantly longer than today's top-of-the-line alkalines. That's great news given the proliferation of high-drain battery-powered devices these days, such as cameras, MP3 players, and handheld gaming devices. In *PC World* tests using the Canon A400 digital camera, the Oxyride disposable AAs lasted more than twice as long as alkaline AAs. What's behind the power boost? Panasonic uses a patented process and a combination of new and improved electrolytes to manufacture these AA and AAA cells. (if available)

Video

Maxtor Shared Storage Plus NETWORK HARD DRIVE (\$500) We've seen lots of network hard drives, but Maxtor's () is the first to hit 500GB--plenty of room even for digital movie and music pack rats. This model has the added advantage of compliance with the Universal Plug and Play and Digital Living Room Networking Alliance specs, so it can be used independently of your PC--for example, to stream video and audio files to any media devices that support those specs. Plus, when you're using it connected to your PC, it has integrated backup and file-sorting software as well. (if available)

Mitsubishi HC3000U HOME THEATER PROJECTOR (\$2999) This projector () aims high, and it shows. The HC3000U--the first to use Texas Instruments' DLP chip set with BrilliantColor technology--provides outstanding image quality. BrilliantColor is an approach to image processing that's designed to increase color depth, which in turn improves overall image quality. We were also impressed by the projector's 720p native resolution, 4000:1 contrast ratio, and compact 6.4-pound chassis. (if available)

NEC MultiSync LCD2180WG-LED LCD MONITOR (\$6750) The LCD industry has been buzzing with talk about LED backlights, saying that the technology will deliver not only evenly bright screens and a wide color gamut, but also mercury-free LCD monitors that are environmentally friendly. The LCD2180WG-LED () is the first of these monitors we've seen, and it lives up to the hype. In our tests in the PC World Test Center, it showed more accurate flesh tones than we'd seen before on an LCD monitor. In photographs, flesh tones still looked realistic and correctly shaded, without the masklike effect you sometimes see. What really knocked us out, though, was its expertise in handling areas of extreme dark and light: The LCD2180WG-LED displayed the nuances of snowy Mount McKinley while

making a black zipper and black zipper pull stand out from a black jacket.

Although the screen's a knockout, for now so is the price: \$6750. For a high-powered graphics professional, perhaps that's worth it. The rest of us will just have to wait until the decimal point moves a place to the left.

Sling Media Slingbox VIDEO STREAMING (\$250) These days, a number of devices let you watch your video even if you're not sitting in front of the recording device. Of the few approaches to this we've seen, we particularly liked Sling Media's catchy-looking Slingbox (). This unit has audio/visual connectors on the back that connect to whatever video device you plan to use with it (TV, DVD player, digital video recorder, but not HDTV). Add it to your home network, and you can use the device as a conduit to access channels and watch TV anywhere in the house, as if you were sitting in front of your TV in the living room. Then, install the SlingPlayer software on your notebook or remote computer, and you can view your video from afar. The Slingbox compresses video using the Windows Media 9 codec and optimizes the video stream automatically for the available bandwidth. The faster the bandwidth you get across a network--whether the Internet or your home network--the better the image quality Slingbox will provide.

Sony DVDirect VRD-MC1 DVD DRIVE (\$300) Sony's DVDirect VRD-MC1 () aims to give you the best of the PC burner and stand-alone DVD recorder worlds. At its heart is a 16X, double- and dual-layer DVD burner. Connect it to your PC through the USB 2.0 port, and it will function as an external drive. Use it in stand-alone mode, and it will convert video and still images (when connected to a VCR, cable box, TV, or camcorder via its composite-video, S-Video, or DV inputs; or when you insert a flash memory card into one of the supplied slots). This third-generation unit becomes exponentially more useful thanks to a snazzy redesign that adds a 2-inch color LCD screen (for menu navigation and playback) on the top surface of the unit, as well as integrated media card slots for creating photo slide-show discs on a DVD-R. It can also print images to a PictBridge-compatible printer (when connected to the printer via USB). (if available)

Toshiba RD-XS54 DVD RECORDER (\$700) The Toshiba RD-XS54 () may be pricey, but it's also one of the most feature-packed DVD recorders we've seen. Topping its impressive list of features are the capabilities to connect the unit to your network, and to program recordings over the Internet using its Network NAVI feature, which lets you access the recorder from any Web browser. On top of all that, this unit did an impressive job of capturing video: We saw sharp video with plenty of depth and good contrast.

Methodology and Full List of Products

A team of *PC World* editors surveyed the products we'd seen and learned about in 2005, nominated a few dozen of the most original, and then voted for the 25 winners that ultimately made our list. Our criteria for innovation included such elements as design, and the integration of technology with function. In all cases, we looked for products and services that did something first, did it much better than its predecessors, or reimagined what had been done before.

Airgo True MIMO Gen3 Apple iPod Nano Avvenu Creative Zen Vision Fujitsu LifeBook P1510D Google Earth JVC Everio GZ-MG70 JVC RX-D702B Kodak EasyShare V570 Maxtor Shared Storage Plus Microsoft Xbox 360 Mitsubishi HC3000 UNEC MultiSync LCD2180 WG-LED Nintendo Nintendo DS Nokia N91 Panasonic Oxyride Sling Media Slingbox Sonos Digital Music System Sony Cyber-shot DSC-R1 Sony DVDirect VRD-MC1 Sony Handycam HDR-HC1 TiVo ToGo Toshiba RD-XS54 Yamaha RX-V4600 Yamaha YSP-1000

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Exhibit 11



First generation 5GB iPod, \$399, introduced October 23, 2001.



Current iPod touch, 8GB (\$229), 16GB (\$299), and 32GB (\$399), introduced September 9, 2008.



Current iPod nano, 8GB (\$149) and 16GB (\$199), introduced September 9, 2008.



Current 4GB iPod shuffle, \$79, introduced March 11, 2009.