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UNITED STATES DISTRICT COURT

NORTHERN DISTRICT OF CALIFORNIA

UNITED STATES OF AMERICA, Plaintiff, v. AU OPTRONICS CORPORATION, et al., Defendants.	Case No. CR-09-0110 (SI) **DECLARATION OF KIRK C. JENKINS IN SUPPORT OF DEFENDANT AU OPTRONICS CORPORATION'S SENTENCING MEMORANDUM PART TWO: APPLICATION OF THE SENTENCING GUIDELINES** Judge: Hon. Susan Illston Date: September 20, 2012 Time: 10:00 a.m. Place: Courtroom 10, 19th Floor

I, Kirk C. Jenkins, declare as follows:

1. I am a partner at Sedgwick LLP, counsel of record for Defendant AU Optronics Corporation. I have personal knowledge of the facts set forth herein.

2. Attached as Exhibit A hereto is a true and correct copy of the Expert Declaration of Robert Hall, Ph.D. "AUO and AUOA-Specific Estimates of Consumer Harm."

3. Attached as Exhibit B hereto is a true and correct copy of the Government's Draft Declaration of Dr. Keith Leffler Regarding AUO's Volume of Commerce for Sentencing Hearing. The Government produced this document to counsel for defendants on August 10, 2012, and as of the time of filing, defendants have received no updated or revised version.

4. Attached as Exhibit C hereto is a true and correct copy of the Expert Declaration of Edward A. Snyder, Ph.D.

I declare under penalty of perjury under the laws of the United States of American that the foregoing is true and correct, and that this declaration was executed this 11th day of September, 2012, in Chicago, Illinois.

By: /s/ Kirk C. Jenkins
Kirk C. Jenkins

EXHIBIT A

Expert Declaration of Robert Hall, Ph.D.

AUO- and AUOA-Specific Estimates of Consumer Harm

on Behalf of AU Optronics (AUO)
and AU Optronics America (AUOA)

September 11, 2012

CONTENTS

I. Assignment and Summary of Opinions

1. My name is Robert Hall. I serve as the McNeil Joint Professor of Economics at Stanford University and Senior Fellow at Stanford's Hoover Institution. I am also director of the research program on economic fluctuations and growth of the National Bureau of Economic Research, an inter-university research organization. I served as President of the American Economic Association for the year 2010; I was Vice President in 2005 and Ely Lecturer in 2001. I received a Ph.D. in economics from the Massachusetts Institute of Technology. I am an elected member of the National Academy of Sciences, a Distinguished Fellow of the American Economic Association, and a fellow of the Econometric Society, the organization of professionals who apply statistical methods to economic issues. Appendix A contains my CV.

2. This declaration provides data and analysis on five economic issues relevant to the sentencing of AU Optronics (AUO), AU Optronics America (AUOA), and defendants Hsuan Bin Chen and Hui Hsiung:

- The volume of affected commerce (VOC) of AUO and AUOA, including comments on the volume of commerce calculations performed by Dr. Leffler in his recent declaration,[1]
- How AUO's overcharge as a percentage of AUO's sales compares to the 10 percent benchmark in the Sentencing Guidelines,
- How AUO's harm to consumers who failed to buy LCD products on account of the overcharge, as a percentage of AUO's sales, compares to the 10 percent benchmark in the Sentencing Guidelines,
- Comparative analysis of the relative volume of commerce, sales volume, and fines imposed to date for the six Crystal Meeting attendees, and
- Analysis of the financial condition of AUO, based on publicly available financial information.

3. In this section, I summarize these issues and provide a brief overview of my conclusions. The remainder of the declaration contains a more complete discussion of each issue and provides the basis for my opinions.

[1] Declaration of Dr. Keith Leffler Regarding AUO's U.S. Volume of Commerce for Sentencing Hearing, September 14, 2012 ("Leffler Declaration").

4. My understanding is that the standard guideline fine in a criminal price-fixing case is 20 percent of the volume of affected commerce. The 20 percent includes 10 percentage points for the overcharge and 10 percentage points for lost consumer opportunities. The result of this multiplication is then itself increased by a multiplier derived from other sources, which I do not address. I further understand that a court may deviate in either direction from this standard.

A. AUO and AUOA's affected volume of commerce

5. Using the same three categories of sales as the Department of Justice used in its prior four sentencing calculations in the TFT-LCD cases and the period from October 2001 through January 2006, I calculate that the volume of commerce for AUO is $797.2 million. Eliminating products potentially outside the influence of the cartel, because no price discussions at Crystal Meetings were documented, reduces the affected volume of commerce to $272.1 million. Eliminating sales to cartel members LG and Samsung, which would not be subject to an overcharge based on standard economic logic, further reduces the affected volume of commerce to $223.7 million.

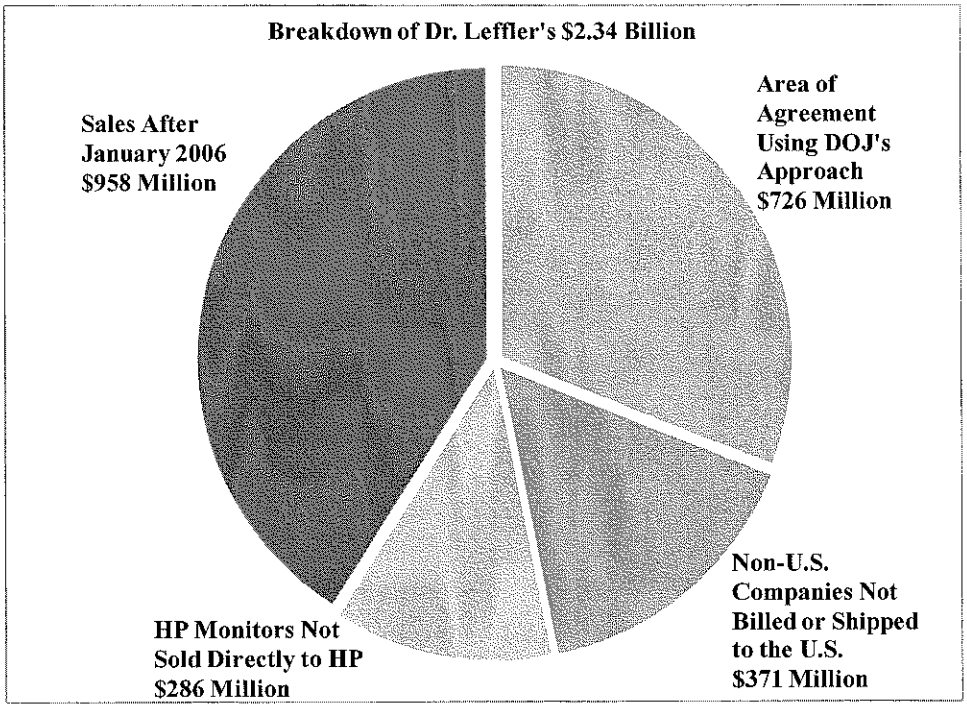
6. AUO's American subsidiary, AUOA, had small sales. All were billed in or shipped to the U.S. From the government's indictment and the jury instructions, I understand that the volume of commerce for AUOA should begin in spring 2003. Based on my calculations, the corresponding volume of commerce for AUOA is $389,440.

7. Dr. Leffler uses purchase data from several of AUO's U.S. customers and additional data on the estimated geographic location of sales by customer to calculate his estimates of the affected volume of commerce. Dr. Leffler calculates a corresponding volume of commerce of $2.34 billion for AUO.[2] He does not perform any calculation for AUOA.

8. The figure below shows the areas of agreement and disagreement between Dr. Leffler's volume of commerce calculations and mine. The overall area of the chart is the $2.34 billion calculated by Dr. Leffler. The green area indicates the area of agreement, while the red indicates areas of disagreement.

[2] Leffler Declaration, ¶3.

Figure 1. Dr. Leffler's U.S. Volume of Commerce, October 2001 through December 1, 2006, in Millions of U.S. Dollars



9. The largest difference between Dr. Leffler's estimate and mine, $958 million, results from his inclusion of 10 months of sales from February 2006 through December 1, 2006. The ending time I used, January 2006, corresponds to the termination of the price discussions at the Crystal Meetings. It was also the ending time for the overcharge calculations Dr. Leffler presented at trial.[3] In my opinion, Dr. Leffler has provided no economic basis for the extension of the additional 10 months.

10. Dr. Leffler's estimate of the volume of commerce of $1.38 billion for the same period that I considered (October 2001 through January 2006) exceeds my highest baseline calculation of $797 million, for two main reasons. First, he starts with data from five U.S. companies and scales this up to account for sales from all other companies. I included the sales to 13 U.S. companies who are customers of AUO and sales to 20 non-U.S companies that were directly shipped or billed to the U.S.,[4] which I believe is the right way to implement the DOJ's measure of the volume of commerce.

[3] Trial Testimony of Dr. Keith Leffler, 3363:4-14.
[4] These sales also include TV panel sales, which were not included in Dr. Leffler's VOC calculations.

Dr. Leffler's scaling up does include the sales to the 8 additional U.S. companies and sales to non-U.S. companies that were directly shipped or billed to the U.S. However, Dr. Leffler's scaling up also has the effect of including sales to non-U.S. companies of products that were neither directly shipped to the U.S. nor billed to the U.S. These sales are not included in the DOJ's approach. My estimate of the scaled-up sales that were neither directly shipped nor billed to the U.S. which should *not* be included in the volume of commerce is $371 million. Dr. Leffler's estimate of volume of commerce is $1.01 billion after deducting this amount.

11. The third significant difference between Dr. Leffler's and my approaches is that Dr. Leffler includes $286 million in sales of monitor panels to HP in his calculations. My understanding is that these should not be included because AUO sold the monitor panels to non-U.S. system integrators, not to HP, and the DOJ did not include such sales in their concept of volume of commerce. Dr. Leffler's estimate of volume of commerce is $726 million after deducting this amount.

12. The remaining difference between my estimate and Dr. Leffler's results from his use of customer purchase data rather than AUO sales data, his use of specific sizes included in the DOJ's indictment rather than all panels 12 through 30 inches, and his use of different data on U.S. shares.

B. Percentage gain from overcharge

13. The term *gain from the overcharge* is the dollar amount of the overcharge stated as a percent of the volume of commerce. The Sentencing Guidelines take 10 percent as an estimate of the average overcharge across price-fixing cases. The use of an average avoids the time and expense of calculating an overcharge, but does not reflect the actual overcharge associated with a specific price-fixing violation. In this matter, involving hundreds of millions of dollars of sales, even a difference of one percent in the gain from the overcharge amounts to millions of dollars in the corresponding guideline fine.

14. In the recent Toshiba civil trial, the jury heard testimony from economists who presented estimates of an overcharge ranging from less than one percent to 18 percent. In the jury verdict form, the jury was asked to identify the amount of consumer overcharge that members of classes of panel and finished product purchasers suffered as a result of a conspiracy involving multiple

companies, including AUO.[5] The verdicts were stated as dollar amounts totaling $87 million, which is 1.8 percent of sales.[6]

15. My conclusion in this matter, based on extensive study of AUO's data and other evidence, is that the gain is substantially less than 10 percent. My work does not find a measurable overcharge attributable to AUO.[7]

C. Lost consumer opportunity

16. The Sentencing Guidelines include another 10 percent as an estimate of the additional harm to consumers from the overcharge. Economists agree that there is a loss to consumers who would have purchased a product at the non-cartel price but do not purchase it when the price includes an overcharge. Using reasonable estimates for each of these factors leads to a quite modest increase to the basic overcharge estimate. For example, in the case of a 10 percent overcharge, the appropriate additional consumer impact estimate for AUO would be only 0.5 percent, according to the approach widely used by economists. I conclude that, whatever the overcharge percentage, using a ratio $1/20^{th}$ of that number is a reasonable estimate of the harm from the lost consumer opportunity.

D. Comparative analysis of volume of commerce, sales volumes, and fines

17. I have provided comparative analyses illustrating various comparative measures of the six Crystal Meeting participants and fines levied to date, which range from $30 million to $400 million.

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[5] Special Verdict, In Re: TFT-LCD (Flat Panel) Antitrust Litigation, No. M 07-1827 SI, MDL No. 1827, filed July 3, 2012 ("Toshiba Verdict"), p. 3.

[6] The plaintiffs' expert estimated sales of TFT-LCD panels to class members of $939 million (Leamer demonstratives, slide 44). The jury awarded damages of $17 million to the panel class (Toshiba Verdict, p. 3). $17 million is 1.8 percent of $939 million. The plaintiffs' expert estimated an overcharge of $696 million, or 18 percent, on sales of finished products containing TFT-LCD panels to class members (Leamer demonstratives, slide 46). The jury awarded damages of $70 million to the finished product class (Toshiba Verdict, p. 3). The jury award is one-tenth of Leamer's overcharge estimate, which is consistent with a 1.8 percent overcharge.

[7] I worked extensively with Mr. Deal, who testified at trial, on the overcharge questions. I agree with his opinions as presented at trial (Trial Testimony of Bruce Deal, 4406:18-23, 4407:1-2). In addition, Mr. Deal and I have co-authored several reports on overcharge in the related civil matters (Expert Report of Robert E. Hall and Bruce F. Deal on Behalf of AU Optronics and AU Optronics America, Class of Direct Purchasers and Class of Indirect Purchasers, March 2, 2012 ("Hall/Deal IPP DPP Expert Report"); Supplemental Report of Robert E. Hall and Bruce F. Deal on Behalf of AU Optronics and AU Optronics America, Class of Direct Purchasers and Class of Indirect Purchasers, April 10, 2012 ("Hall/Deal IPP DPP Supplemental Expert Report"); Expert Report of Robert E. Hall and Bruce F. Deal on Behalf of AU Optronics and AU Optronics America, Direct Action Plaintiffs (DAP) Track 1, Report Concerning Large Panel Purchases, 10 Inches and Above, May 7, 2012 ("Hall/Deal Large Panel Expert Report"); Expert Report of Robert E. Hall and Bruce F. Deal on Behalf of AU Optronics and AU Optronics America, Direct Action Plaintiffs (Track 1), Report Concerning Small Panel Purchases, Smaller than 10 Inches, May 7, 2012 ("Hall/Deal Small Panel Expert Report")).

I find that AUO is in the middle of the six companies using various measures of volume of commerce or sales volume.

E. AUO's financial condition based on publicly available information

18. I have also reviewed various publicly available measures of AUO's financial condition. These include financial measures that incorporate debt and equity measures, including Altman's Z score, rating agencies' ratings, and AUO's debt yields. Each of these measures is consistent with AUO facing significant financial challenges.

II. Affected Volume of Commerce

A. Baseline calculation

19. This court has fined four companies for participating in the Crystal Meetings, each of which pled guilty. Table 1 summarizes the corresponding volume of commerce, guideline ranges for the fines, and actual fines.[8]

[8] LG Display Joint Sentencing Memorandum, December 8, 2008; Transcript of LG Sentencing Hearing, December 15, 2008; CPT Joint Sentencing Memorandum, January 5, 2009; Transcript of CPT Sentencing Hearing, January 14, 2009; CMO Joint Sentencing Memorandum, February 1, 2010; Transcript of CMO Sentencing Hearing, February 8, 2010; HannStar Joint Sentencing Memorandum, July 22, 2010; Transcript of HannStar Sentencing Hearing, July 30, 2010.

Table 1. Volume of Commerce, Guideline Ranges, and Fines Imposed for Other Crystal Meeting Participants, in Millions of U.S. Dollars

Company	*Sentenced*	*Volume of commerce*	*Guideline range for fine*	*Actual fine*
LG	12/15/2008	2,500	800 to 1,600	400
CPT	1/14/2009	358	114 to 229	65
CMO	2/8/2010	986	315 to 631	220
HannStar	7/30/2010	107	30 to 60	30

Sources:
[1] LG Display Joint Sentencing Memorandum, December 8, 2008; LG Sentencing Hearing, December 15, 2008.
[2] CPT Joint Sentencing Memorandum, January 5, 2009; CPT Sentencing Hearing, January 14, 2009.
[3] CMO Joint Sentencing Memorandum, February 1, 2010; CMO Sentencing Hearing, February 8, 2010.
[4] HannStar Joint Sentencing Memorandum, July 22, 2010; HannStar Sentencing Hearing, July 30, 2010.

20. I have reviewed the transcripts and other documents related to the calculation of the volume of commerce underlying each of these fines.[9] Appendix B contains the November 15, 2010, letter from the Department of Justice describing the three categories of sales it included in the calculations:

- Category 1: all sales shipped to the U.S.,
- Category 2: sales billed, but not shipped, to the U.S., and
- Category 3: sales to U.S. companies, where the final products were estimated to end up in the U.S. even though the sales were neither billed nor shipped directly to the U.S.

21. I have used these categories to develop a baseline calculation for AUO. I start with all of AUO's worldwide transactions. I take the relevant time period from the government's expert, Dr. Keith Leffler, who testified that the overcharge began in October 2001 and ended in January 2006.[10] I also take the relevant products from Dr. Leffler's testimony as all products with a diagonal

[9] United States Sentencing Commission, *Guidelines Manual* (Nov. 2011) ("USSG"); Letter to Judge Illston, Re: In re TFT-LCD (Flat Panel) Antitrust Litigation; Case No. M07-1827 SI from the U.S. Department of Justice Antitrust Division, November 15, 2010; Transcript of HannStar Sentencing Hearing, July 30, 2010; Transcript of LG Sentencing Hearing, December 15, 2008; Trial Testimony of Keith Leffler, February 9, 2012; LG Display Joint Sentencing Memorandum, December 8, 2008; CPT Joint Sentencing Memorandum, January 5, 2009; CMO Joint Sentencing Memorandum, February 1, 2010; HannStar Joint Sentencing Memorandum, July 22, 2010; AUO Trial Jury Instructions, March 1, 2012; AUO SEC 20-F Filings, 2009 - 2011; AUO Public Financials, January - March 2012.
[10] Trial Testimony of Keith Leffler, 3320:10-12.

measurement from 12 inches through 30 inches.[11] I exclude all internal sales to AUO and all sales to AUOA. I discuss the AUOA volume of commerce later in this section.

1. Category 1 sales

22. To calculate sales in category 1—those shipped to U.S. customers—I took sales in the AUO transaction database for which the field named *ship_to_area* was the U.S. All of these sales are U.S. sales, so I take the U.S. share of category 1 sales to be 100 percent throughout my analysis.

2. Categories 2 and 3 sales

23. Determining the volume of affected U.S. sales for categories 2 and 3 involves two steps: (1) determining the total worldwide sales in each category, and (2) estimating the U.S. share of these worldwide sales.

a) Step 1: Determining worldwide sales for categories 2 and 3

24. For category 2, I identified the worldwide sales in the AUO database for which the field named *bill_to_area* was the U.S., if these sales had not already been included in category 1. An example of the second category is a panel shipped to a systems integrator in Asia but billed to Apple.

25. For category 3, I reviewed all AUO customers with purchases greater than $100,000 and identified 13 U.S. companies, listed in Appendix C.[12] I included sales to these companies from the AUO database as category 3 when neither the *ship_to_area* nor the *bill_to_area* was the U.S. An example of the third category would be a panel sold to Dell, shipped to a factory in Asia, billed to a Dell entity outside the U.S., but estimated to end up in the U.S.

[11] Trial Testimony of Keith Leffler, 3462:13-15.

[12] There were 140 companies with sales of 12 to 30 inch panels from October 2001 through January 2006, with sales less than $100,000. These combined companies comprise only $2 million in worldwide purchases from AUO over the relevant period, compared to billions of dollars of total worldwide sales.

b) Step 2: Estimating the U.S. share of worldwide sales for categories 2 and 3

26. The guidelines call for the volume of commerce to be U.S. sales affected by the overcharge. Accordingly, it is necessary to estimate the share of AUO's worldwide sales in categories 2 and 3 that end up in the U.S.

27. I use a Gartner database to make AUO-specific estimates of the U.S. share for monitors and notebooks.[13] Gartner is a widely-used third-party source of market information across a wide variety of industries and technologies.[14] Gartner reports customer-level estimates of the shares of sales to the U.S., separately for monitors and notebooks. Using the mix of AUO's customers corresponding to categories 2 and 3, I have estimated the U.S. share for monitors and notebooks of AUO's categories 2 and 3 sales. To calculate TV-specific estimates, I use data from DisplaySearch,[15] a leading third party source of market information for the LCD industry.[16] DisplaySearch reports customer-level estimates of the share of sales to North America for TVs. I used census population data to calculate the U.S. proportion of North America sales, and used the mix of AUO's TV panel customers to develop estimates of the U.S. share of AUO's TV panel sales for categories 2 and 3.

28. Table 2 summarizes my findings. Appendix D includes a detailed table corresponding to the calculations in the table.

[13] Gartner Group Detailed Data, SAML-815325_Confidential.
[14] http://www.gartner.com/technology/home.jsp
[15] *DisplaySearch* Quarterly LCD TV Shipment and Forecast Report, Q2 2002, Q2 2003, Q2 2004, and Q2 2006 History Data Tables.
[16] http://www.displaysearch.com/cps/rde/xchg/displaysearch/hs.xsl/index.asp

Table 2. U.S. Share of Worldwide Monitor, Notebook, and TV Sales in Categories 2 and 3, in Percent

	Customer weighted estimates
Monitor	47.6
Notebook	45.2
TV	76.3
Weighted Average	46.1

Sources:
[1] Gartner Group Detailed Data and DisplaySearch. See Appendix D for details.
[2] AUO transaction data.

29. Table 3 combines the category 1 U.S. sales with the estimated U.S. volume for categories 2 and 3. The estimate of the corresponding baseline volume of commerce is $797.2 million.

Table 3. AUO's Volume of U.S. Commerce, in Millions of U.S. Dollars

Category	*Volume of sales*	*U.S. share (percent)*	*U.S. volume of sales*
1. Panels imported directly into the U.S.	148.3	100.0	148.3
2. Billed or invoiced to purchasers in the U.S.	135.5	46.1	62.4
3. Purchased by foreign affiliates of U.S. companies and integrated into final products imported to the U.S.	1,273.1	46.1	586.5
Total categories 1, 2 and 3			797.2

Note:
[1] Volume of sales excludes internal AUO and AUOA sales.

Sources:
[1] AUO transaction data.
[2] Gartner Group Detailed Data and DisplaySearch.

B. Potential measures of sales volume focused on cartel-related conduct

30. Here I discuss modifications in the U.S. sales volume calculations to consider those more likely to have been affected by the cartel's activities.

1. Limit to sales with cartel prices

31. At the cartel's Crystal Meetings, only a fraction of all LCD products distinguished by panel type, size, and resolution were discussed. Appendix E shows Dr. Leffler's compilation of the data on the incidence of price discussions across products. I have validated his compilation and found it broadly reliable. The compilation shows that some products were discussed in most months and others were only discussed sporadically. In some months for which records of the Crystal Meetings are available, none of AUO's products were discussed and in some months prices of as many as 15 AUO products by type, size, and resolution were discussed.

32. Economists have studied many target-price cartels and are in agreement that those cartels require significant data and monitoring, particularly in the presence of many product variations, as is the case for LCDs. A leading scholar of the economics of cartels has written:

> A more challenging matter for the cartel in setting price arises when there are potentially many variants of the product. The relevance of this issue varies across products according to the diversity of consumer preferences and the technological constraints for providing different products. For example, this was an issue with graphite electrodes –an input in the production of steel – but not an issue with vitamins. One approach is for firms to agree on an array of standardized products – which meant cartel members would only supply those products – and assigning a price to each standardized product. Alternatively, firms could coordinate on a pricing formula that would prescribe a price based on a product's characteristics.[17]

33. Given the focus on target prices and the variation in the number and type of products being discussed, the reasonable economic conclusion is that the cartel's overcharges would occur among the product/size/resolutions where prices were shared among rivals. Using Dr. Leffler's list of product/size/resolution combinations, I have calculated the volume of commerce in each of the categories previously discussed, but only including sales known to be subject to cartel influence, in the sense that their prices for the corresponding time period were discussed at the Crystal Meetings. Table 4 shows the resulting estimates after limiting sales of panels to the specific months and product/size/resolutions where future applicable prices were available. This step reduces the sales volume from $797.2 million to $272.1 million. I note that the U.S. share estimate changes from 46.1 to 43.6 percent with this modification, corresponding to the resulting different mix of customers and products in categories 2 and 3.

[17] Harrington, Joseph E. (2006). "How Do Cartels Operate?" *Foundations and Trends in Microeconomics*, Vol. 2, No. 1, p. 9.

Table 4. AUO's Volume of U.S. Commerce in Products Known to be Subject to Cartel Influence, in Millions of U.S. Dollars

Category	*Volume of sales*	*U.S. share (percent)*	*U.S. volume of sales*
1. Panels imported directly into the U.S.	60.2	100.0	60.2
2. Billed or invoiced to purchasers in the U.S.	21.5	43.6	9.4
3. Purchased by foreign affiliates of U.S. companies and integrated into final products imported to the U.S.	464.7	43.6	202.6
Total categories 1, 2 and 3			272.1

Notes:
[1] Volume of sales excludes internal AUO and AUOA sales.
[2] Product/size/resolution combinations identified using both general and AUO-specific price data.

Sources:
[1] AUO transaction data.
[2] Gartner Group Detailed Data and DisplaySearch.
[3] List of product/size/resolution combinations provided by Dr. Leffler.

2. Sales to other cartel members

34. A second adjustment recognizes the potential differences in sales made to vertically integrated companies which were—directly or through affiliated companies[18]—both members of the cartel and capable of self-supply. It would make no economic sense for significant volumes of sales among cartel members to occur at cartel prices incorporating overcharges. If AUO did attempt to impose overcharges on Samsung and LG, these companies would respond in the rational economic way by self-supplying at internal costs comparable to competitive prices, instead of purchasing at higher prices from AUO. Although it would take time to enlarge capacity to carry through this response, the threat to self-supply would be immediately effective in bargaining down AUO's price to the level of Samsung's and LG's cost.

35. My study finds that Samsung and LG did purchase large volumes of panels from AUO. A significant fraction of these panels are included in the volume of commerce calculations shown

[18] LG and Samsung manufacture LCD panels and produce products that incorporate LCD panels, directly (Samsung) or through affiliated companies with significant common ownership (LG). They do not manufacture solely for their own needs, but rather manufacture some and purchase some of their LCD needs, as well as sell LCD panels to others. See Deposition of Robert Hall, June 28, 2012, 11:13-19, 21:20-22:8.

above. Because these sales occurred at prices without an overcharge, it would not be appropriate to include the sales in the volume of commerce affected by an overcharge.

36. The cartel had an incentive to conceal its effects. Samsung's and LG's purchases at the same prices as non-cartel-member customers might be seen as an attempt to avoid detection. But self-supply would be even more effective at concealment and strongly in the interest of Samsung and LG. Their volume of purchases—hundreds of millions of dollars—would involve the sacrifice of many millions of dollars if the companies were purchasing panels at inflated prices.

37. Making just the LG-Samsung exclusions reduces the corresponding volume of commerce estimate to $668.1 million. Making both this change and the limitation to products with Crystal Meeting prices discussed earlier reduces the volume of commerce to $223.7 million. Appendix F includes a detailed table with the calculations excluding Samsung and LG.

C. Comments on recent volume of commerce calculation of Dr. Keith Leffler

38. The Department of Justice estimated sales in the prior four sentencings of LCD manufacturers by adding together (1) sales shipped from the LCD maker to the U.S., (2) sales billed to the U.S., and (3) sales to foreign subsidiaries of U.S. companies not otherwise included in the shipped or billed to U.S. categories.[19] This approach is outlined in a letter to the court from the DOJ dated November 15, 2010 and included as Appendix B. AUO's counsel instructed me to follow the Department's method. I followed the approach taken by the DOJ, arriving at a baseline calculation of $797 million, whereas Dr. Leffler has used an entirely different approach from the DOJ's in calculating his $2.34 billion estimate of volume of commerce.

39. In his declaration, Dr. Leffler describes his assignment as follows:

> I have been asked by the Department of Justice to calculate the total dollar sales of the AUO LCD panels named in the AUO Superseding Indictment ("Indictment panels") that were incorporated into computer monitors, notebook computers, or televisions sold in the United States (hereafter "AUO US VoC") over the period October 2001 through December 1, 2006.[20]

[19] Letter to Judge Illston, Re: In re TFTLCD (Flat Panel) Antitrust Litigation; Case No. M07-1827 SI from the U.S. Department of Justice Antitrust Division, November 15, 2010.
[20] Leffler Declaration, ¶2.

A footnote to this sentence explains:

> This is the period in which AUO participated in conspiratorial activity including group Crystal Meetings (through January 2006) and bilateral meetings (through November 2006). In my trial testimony, I found that the group Crystal Meetings had a substantial effect on prices. Leffler Tr. 3274, 3282. After those group meetings ended, the conspirators during their bilateral meetings continued to exchange the same kind of price information that they had exchanged in the group meetings. Kuan Tr. 3792-96. And during this bilateral meeting time period, AUO continued to rely on the price information it was receiving from its conspirators when setting its own panel prices. *E.g.*, trial exhibits 106T, 107, 108, 111, 112, 189. Therefore, in my opinion, the conduct during this bilateral meeting time period had at least some effect on AUO's panel prices.[21]

1. Inclusion of sales after January 2006

40. The biggest difference between my volume of commerce calculations and Dr. Leffler's is his inclusion of sales after January 2006. He provides no economic analysis to support his new conclusion that these sales should be included. The extension period accounts for $958 million, or 41 percent of his $2.34 billion total. AUO's counsel have instructed me to take the end of the overcharge to be January 2006, because the government offered no evidence at trial of overcharges after this point. Dr. Leffler's trial testimony repeatedly identified January 2006 as the ending period of the cartel's overcharge.[22] Excluding sales from February 2006 through December 1, 2006 reduces Dr. Leffler's AUO U.S. volume of commerce from $2.34 billion to $1.38 billion.

2. Inclusion of non-U.S. company sales not directly shipped or billed to the U.S.

41. The approach taken by the DOJ in the prior four sentencing calculations excluded sales to non-U.S. companies that were neither shipped nor billed to the U.S., even though some of the panels ultimately made their way to the U.S. I followed the Department's method. Dr. Leffler did not. His method includes an imputation of large volumes of sales to non-U.S. companies that were neither shipped nor billed to the U.S.

42. Dr. Leffler uses purchase data for five U.S. companies: Apple, HP, Dell, Gateway, and IBM. To account for purchases by companies other than these five, including purchases by non-U.S. companies, he scales up his estimates of U.S. sales using estimates of the share of U.S. sales

[21] Leffler Declaration, Footnote 1.
[22] Trial Testimony of Dr. Keith Leffler, 3313:2-13, 3363:4-14, and 3370:18-25.

accounted for by the five companies for which he does have data. Because his data show that the five companies for which he has purchase data account for 62 percent of U.S. sales during the period October 2001 through January 2006, meaning that purchasers other than the five accounted for 38 percent of sales, he uses the following formula to estimate sales to companies other than the five:

Sales to all other companies = (38 percent/62 percent) × (VOC data for the five companies) = 60 percent × $861 million = $521 million

43. To be consistent with the DOJ approach, Dr. Leffler should divide the $521 million into two components: (1) sales to U.S. companies and sales to non-U.S. companies that were directly shipped or billed to the U.S., and (2) sales to non-U.S. companies neither directly shipped nor billed to the U.S. The first component belongs in the VOC, while the second does not. Using my calculation of AUO's sales VOC, and subtracting the sales for Dr. Leffler's five companies and limiting the sizes to the sizes included by Dr. Leffler,[23] I can accomplish the needed breakdown. I start with a calculation based on AUO's sales data as described above, but adjusted to Dr. Leffler's conceptual basis. Recall that my earlier figure for AUO's U.S. VOC is $797 million. After the minor adjustment to bring it in line with Dr. Leffler's set of products to include in the VOC, my estimate on his basis is $778 million. My calculation of the part of Dr. Leffler's extra $521 million that belongs in the VOC is:

U.S. VOC[24]: $778 million

less

Sales of the 5 U.S. companies used by Dr. Leffler[25]: $627 million

equals

Other U.S. sales to include[26]: $150 million

[23] Dr. Leffler limits products to sizes included in the DOJ's indictment.

[24] This includes sales shipped to the U.S., the U.S. portion of sales billed to the U.S., and the U.S. portion of sales to U.S. companies not otherwise shipped or billed to the U.S. It is also limited to the specific size included in the DOJ indictment to be comparable to Dr. Leffler's calculations.

[25] Dr. Leffler reports zero IBM or Gateway purchases from AUO. AUO transaction data show modest sales to these two companies which are included in my sales to all U.S. companies' calculations.

[26] Sales that made their way into the U.S. that Leffler does not account for.

44. The amount by which Dr. Leffler overstates the volume of commerce, relative to the Department of Justice's method, is:

Dr. Leffler's estimate of other sales in the U.S.: $521 million

less

Other U.S. sales to include (from above): $150 million

equals

Non-U.S. company sales neither shipped nor billed to the U.S.: $371 million

45. Eliminating the estimated portion of Dr. Leffler's total attributable to non-U.S. companies' sales that were neither shipped directly nor billed to the U.S. reduces the total by a further $371 million, to $1.01 billion.

3. Additional differences in volume of commerce calculations

46. The most significant additional issue is Dr. Leffler's inclusion of $286 million in sales of HP monitor panels. HP provided a spreadsheet with calculations of the share of its panel purchases from various providers during the years from 2003 through 2006.[27] But AUO's sales database does not list *any* sales to HP for monitor panels during the period from October 2001 through January 2006. The difference arises because all HP monitor panel sales were made to non-U.S. system integrators and not to HP itself. These sales fall within the category that AUO's counsel has instructed me should not be included in the volume of commerce.

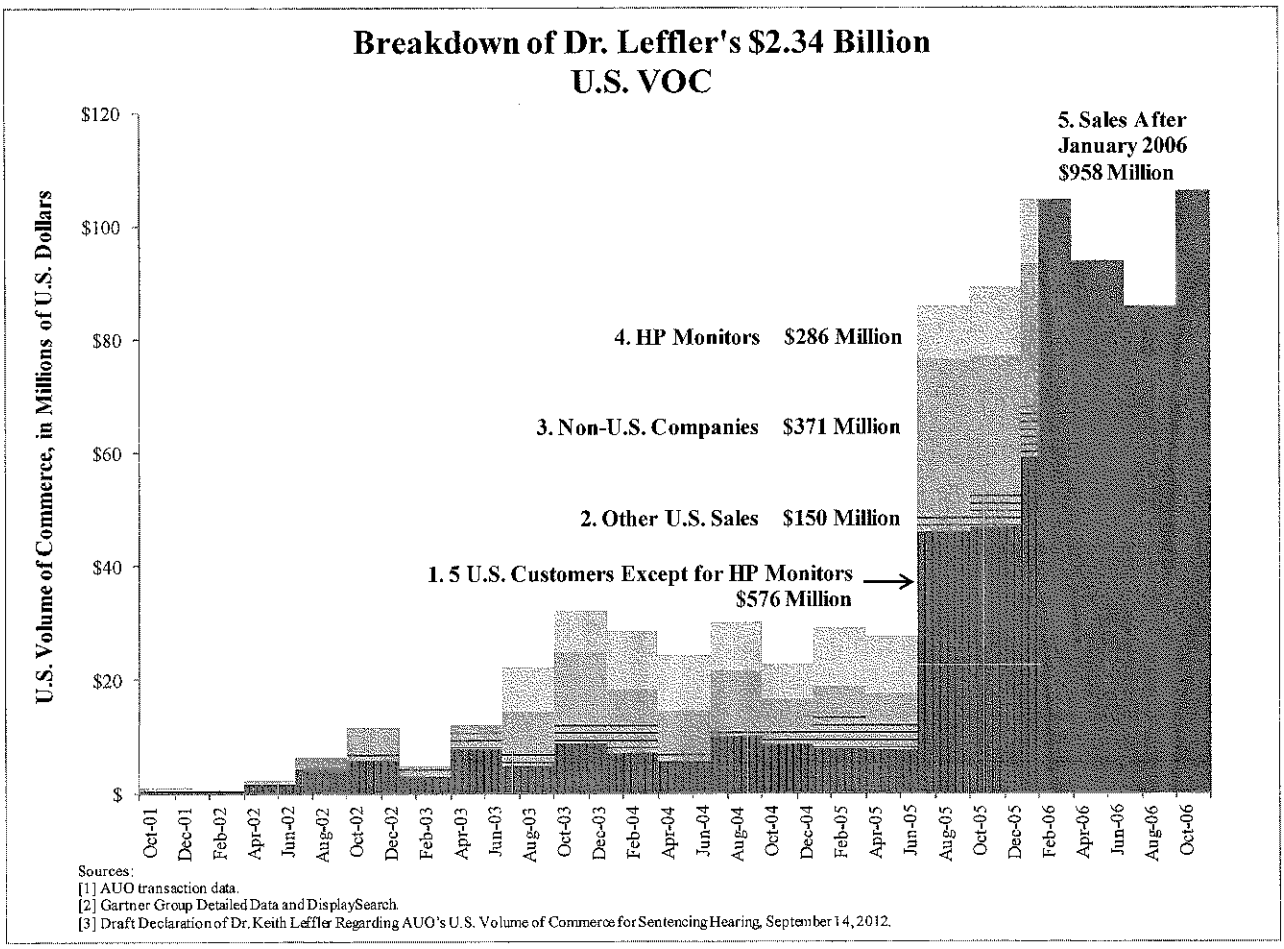
47. Eliminating the HP monitor panel sales reduces Dr. Leffler's total to $726 million, somewhat lower than my baseline estimate of $797 million. The remaining differences are the result of Dr. Leffler's use of different U.S. share data, his use of indictment sizes rather than panels with a diagonal measurement from 12 inches through 30 inches, and his use of customer purchase data rather than AUO's sales data.

[27] HP Monitor Panel Purchase Spreadsheet (Jan 03 to Dec 06).xls.

4. Summary of Dr. Leffler's AUO volume of commerce modifications

48. Figure 2 shows the areas of agreement and disagreement between Dr. Leffler's volume of commerce calculations and mine. The overall area of the chart is the $2.34 billion calculated by Dr. Leffler, displayed by month. The green striped areas indicate the two areas of agreement ($576 million for the five U.S. companies plus $150 million scaling up to account for the other U.S. sales,[28] totaling $726 million) and the different shades of solid red indicate the three areas of disagreement ($958 million for the post-January 2006 data, plus $371 million for the scaling up for non-U.S. companies[29] plus $286 million for HP monitor panels, totaling $1.61 billion).

Figure 2. Dr. Leffler's U.S. Volume of Commerce, by Month, October 2001 through December 1, 2006, in Millions of U.S. Dollars



[28] Other U.S. sales include sales to U.S. companies not accounted for by Dr. Leffler and sales to non-U.S companies that were directly shipped or billed to the U.S.

[29] Sales to non-U.S. companies not directly shipped or billed to the U.S.

49. Table 5 summarizes the effects of the modifications I discussed above on my calculations and Dr. Leffler's, after making the appropriate adjustments.[30] My volume of commerce estimate starts at $797.2 million. Applying both of the discussed reductions reduces the corresponding volume of commerce estimate to $223.7 million. I believe my calculations use more accurate data and better reflect the approach used by the DOJ and the court in the four previous sentencings.

Table 5. Summary of Affected U.S. Volume of Commerce, in Millions of U.S. Dollars

	Dr. Leffler's U.S. volume of commerce	*U.S. Volume of Commerce Using AUO's Sales Data and DOJ Concepts*
As reported by Dr. Leffler	**2,341**	
Exclude sales after January 2006 ($958 million)	1,382	
Exclude sales to non-U.S. companies neither billed nor shipped to the U.S. ($371 million)	1,011	
Exclude HP monitor purchases not recorded as sales from AUO to HP ($286 million)	**726**	**797**
Exclude sales with no discussed prices ($478 million Leffler; $525 million AUO sales data and DOJ concepts)	248[1]	272
Exclude sales to LG and Samsung ($44 million Leffler; $48 million AUO sales data and DOJ concepts)	204[1]	224

Note:

[1] Estimated based on percent change of Dr. Hall's U.S. volume of commerce.

Sources:

[1] AUO transaction data.

[2] Gartner Group Detailed Data and DisplaySearch.

[3] List of product/size/resolution combinations provided by Dr. Leffler.

[4] Draft Declaration of Dr. Keith Leffler Regarding AUO's U.S. Volume of Commerce for Sentencing Hearing, September 14, 2012.

[30] I have also been asked by counsel to calculate volume of commerce estimates excluding sales to Dell on or after January 1, 2005. See Appendix I.

D. AUOA's volume of commerce

50. AUOA had a modest volume of sales during the relevant period.[31] I have calculated the volume of commerce for AUOA for the relevant products and relevant period to be $389,440, the company's entire sales. Dr. Leffler provides no volume of commerce estimate for AUOA. For AUOA, the relevant time period is slightly different from the period for AUO: March 2003 through January 2006. The March 2003 start date is identified from the jury instructions, which indicate that AUOA joined the conspiracy in spring 2003.[32] I have not applied any of the reductions discussed above to this number.

III. Percentage Gain from Overcharge

51. The Sentencing Guidelines consider two elements of the harm caused by an overcharge. The first is the overcharge itself and the second is the value lost by the consumers who would have purchased at a lower price but chose not to purchase because of the overcharge. I call the first element the *gain from overcharge* and the second the *lost consumer opportunity* element. Both are stated as percentages of the sales, so that the total consumer harm is the sum of the two percentages times the volume of commerce.

52. The commentary associated with the guidelines states (emphasis added):

> The fine for an organization is determined by applying Chapter Eight (Sentencing of Organizations). In selecting a fine for an organization within the guideline fine range, the court should consider both the gain to the organization from the offense and the loss caused by the organization. **It is estimated that the average gain from price-fixing is 10 percent of the selling price.** The loss from price-fixing exceeds the gain because, among other things, injury is inflicted upon consumers who are unable or for other reasons do not buy the product at the higher prices. Because the loss from price-fixing exceeds the gain, subsection (d)(1) provides that 20 percent of the volume of affected commerce is to be used in lieu of the pecuniary loss under §8C2.4(a)(3). The purpose for specifying a percent of the volume of commerce is to avoid the time and expense that would be required for the court to determine the actual gain or loss. **In cases in which the actual monopoly overcharge appears to be either substantially more or substantially less than 10 percent, this factor should be considered in setting the fine within the guideline fine range.**[33]

[31] AUOA-MDL-00000249-AUOA Sales.xls.
[32] AUO Trial Jury Instructions, March 1, 2012, p. 12.
[33] USSG §2R1.1, comment (n.3).

53. The professional literature on overcharges from price fixing notes the wide range of estimated overcharges in past cartels.[34] A recent meta-analysis of many different overcharge estimates found a range of overcharge estimates from zero to over 50 percent.[35]

54. A recent Organisation for Economic Co-operation and Development (OECD) paper discusses the limitations of using a standard overcharge estimate across the range of price-fixing infractions.[36] The paper offers guidance on enforcing competition laws to regulators and law-enforcement agencies in the 34 countries of the organization. It concludes that a standard overcharge presumption based on average overcharge estimates has severe limitations:

> …the strong fluctuation of overcharges indicates important industry, country and cartel-specific factors influencing the level of overcharges, rendering an average approach inaccurate. Appropriate databases that allow a cartel candidate market to be benchmarked with some comparable historical cartel cases do not exist so far.[37]

A. Effectiveness of cartels attempting to impose overcharges through target prices

55. Evidence that the LCD cartel operated other than by setting target prices is sparse. Economists recognize the particular difficulty in sustaining an overcharge of any size in target-price cartels, as opposed to those where production quotas, such as OPEC, or other effective means of enforcement, such as fixing market shares, are employed.

56. With respect to one of the most notorious recent American cartels, that in lysine, Nicolas De Roos explains that the cartel was ineffective when only target prices were set: "In the first phase of the cartel, price targets were agreed to, but there were no quantity allocations, monitoring was informal and uncoordinated, and uncertainty was unresolved."[38] Yuliy Sannikov and Andrzej Skrzypacz analyzed the sources of the low overcharge in lysine: "The failure of the lysine cartel to

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[34] Connor, John M. and Yuliya Bolotova (2006). "Cartel Overcharges: Survey and meta-analysis", *International Journal of Industrial Organization*, Vol. 24, p. 1128; Allain, Marie-Laure, Marcel Boyer, and Jean-Pierre Ponssard (2011). "The Determination of Optimal Fines in Cartel Cases: Theory and Practice," *Law & Economics*, p. 34; Levenstein, Margaret C. and Valerie Y. Suslow (March 2006). "What Determines Cartel Success?" *Journal of Economic Literature*, Vol. XLIV, pp. 79-81.

[35] Boyer, Marcel and Rachidi Kotchoni (May 2012). "How Much Do Cartels Typically Overcharge?" Scientific Series, CIRANO, pp. 6-7, 20, 24. Available at: http://www.cirano.qc.ca/pdf/publication/2012s-15.pdf.

[36] OECD, *Roundtable on the Quantification of Harm to Competition by National Courts and Competition Agencies – Background Note by the Secretariat–*, October 7, 2011.

[37] Ibid., p. 13.

[38] De Roos, Nicolas (2006). "Examining Models of Collusion: the Market for Lysine," *International Journal of Industrial Organization*, Vol. 24, p. 1087.

collude by setting a target price at the beginning of its operation illustrates how the provision of incentives can break down under flexible production."[39]

57. The difficulty in maintaining a target price cartel and the evidence that the LCD cartel used price targets point in the direction of a lower overcharge. Bruce Deal and I have conducted several years of intensive joint research on the amount of the overcharge.[40] The consistent finding of our analyses of prices, quantities, and profits was an overcharge far below 10 percent. In fact, our analyses are consistent with the absence of a measurable overcharge on sales of LCD panels by AUO during the period from 2001 through 2006.[41]

58. While the commentary associated with the Sentencing Guidelines does not address variations in the types of price fixing arrangements, it does note that the overcharge percentage may be lower with larger volumes of commerce:

> Another consideration in setting the fine is that the average level of mark-up due to price-fixing may tend to decline with the volume of commerce involved.[42]

In the TFT-LCD matters, tens of billions of dollars of sales were included on a worldwide basis.

B. Evidence about prices for sales between cartel members

59. Mr. Deal and I have analyzed AUO's sales to LG and Samsung and compared these to sales to other AUO customers to look for evidence of an overcharge to other AUO customers. As noted earlier, LG and Samsung had no reason to pay an overcharge to AUO when they were both aware of the cartel and are able to produce internally—using existing capacity or expanding capacity—at a cost equal to the competitive price. This consideration explains why I presented calculations earlier removing sales to those cartel members from the relevant volume of commerce calculations.

60. We found that both LG and Samsung purchased at essentially the same prices as other customers and that the volumes of purchases from AUO by Samsung and LG were substantial both

[39] Sannikov, Yuliy and Andrzej Skrzypacz (December 2007). "Impossibility of Collusion under Imperfect Monitoring with Flexible Production," *The American Economic Review*, Vol. 97, No. 5, p. 1795.
[40] Hall/Deal IPP DPP Expert Report; Hall/Deal IPP DPP Supplemental Expert Report; Hall/Deal Large Panel Expert Report; Hall/Deal Small Panel Expert Report.
[41] Trial Testimony of Bruce Deal, 4406:18-23, 4407:1-2.
[42] USSG §2R1.1, comment (n.4).

during and after the cartel period.[43] Given that sales to cartel members should not include the cartel's overcharge and that those sales occurred at the same prices that the cartel's victims paid, we concluded that AUO did not achieve any meaningful overcharge.

C. Overcharge rate from the Toshiba trial

61. The jury's damages award in the recent Toshiba civil trial was much lower than an award based on a 10 percent overcharge. The jury heard overcharge estimates ranging from 0.6 percent[44] to 18 percent.[45] The jury awarded a combined $87 million in damages, which is 1.8 percent of the volume of commerce.[46]

D. Implications of LCD prices 10 percent lower than actually charged

62. The overcharge is defined as the difference between the cartel price and the normal price absent cartel distortion. Normal prices are practical, remunerative prices in all but the short run. A conclusion that the LCD cartel overcharged its customers by 10 percent carries the implication that prices would have been 10 percent lower absent the cartel. One way to test the realism of a 10 percent overcharge is to calculate the return to invested capital that AUO and other LCD makers would have earned with lower prices. If the return is below the level needed to attract capital, it means that the LCD business would not be viable at the lower price. The price is thus found to be impractical. That finding would cast doubt on the realism of an overcharge as high as 10 percent.

63. My joint research with Mr. Deal demonstrated that, during the cartel period, AUO earned a return on its capital near—but not above—the normal return for an industry with the level of risk of the LCD business.[47] With prices 10 percent lower, the return would have been well below the

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[43] Deposition of Robert Hall, June 28, 2012, 11:13-12:17, 15:2-13, 21:12-19, 23:11-23. See also Deposition Exhibit 5763 and Deposition Exhibit 5764.

[44] Trial Testimony of Dennis Carlton, 3164:23 - 3165:3.

[45] Trial Testimony of Edward Leamer, 2316:20 - 2317:3.

[46] The plaintiffs' expert estimated sales of TFT-LCD panels to class members of $939 million (Leamer demonstratives, slide 44). The jury awarded damages of $17 million to the panel class (Toshiba Verdict, p. 3). $17 million is 1.8 percent of $939 million. The plaintiffs' expert estimated an overcharge of $696 million, or 18 percent, on sales of finished products containing TFT-LCD panels to class members (Leamer demonstratives, slide 46). The jury awarded damages of $70 million to the finished product class (Toshiba Verdict, p. 3). The jury award is one-tenth of Leamer's overcharge estimate, which is consistent with a 1.8 percent overcharge. Toshiba was liable for cartel-wide damages resulting from the conspiracy between January 1, 1999 through December 31, 2006 (Jury Instructions, In Re: TFT-LCD (Flat Panel) Antitrust Litigation, No. M 07-1827 SI, MDL No. 1827, filed June 28, 2012, p. 26).

[47] Hall/Deal Large Panel Expert Report, pp. 61-63.

market return. AUO and other LCD makers depend on world capital markets to provide the capital for facilities that cost many billions of dollars. At 10 percent lower prices, investors could not have been promised returns sufficient to induce them to invest. Without the capital and the facilities it would fund, output would have been far lower. We concluded that meaningful overcharges could not have occurred during the cartel period.

64. The government offered the theory that the LCD industry would have operated unprofitably for an extended period had the cartel not come into being. Dr. Keith Leffler, the government's economic expert, testified:

> …the industry was at desperate times. The Taiwan producers had added very, very substantial capacity in 2000 and 2001, which had caused prices to be very, very low, caused profits to be under intense pressure, where there are actually negative margins being earned. "Negative margins" means you weren't even recovering your costs of assembling the products, for some products. They came together, started the meetings, and things improved.[48]

In the government's closing statements, DOJ attorney Michael Scott stated:

> Now, why did these meetings start in the fall of 2001? You saw evidence of the dire market conditions in this LCD industry at that time. (Document displayed) There was a serious over-supply of LCD products. According to AUO's own SEC filings around that time, the average LCD prices fell 40 percent between 2000 and 2001. A significant fall in pricing. The LCD producers including AUO were desperate. They were losing a lot of money. These Crystal Meetings were set up to try to stop these price declines, and they were set up to try to make more money.[49]

That theory defies normal economic logic. Had the industry not earned enough to attract capital, a natural economic process would have ensued. New capacity would not have been financed and installed, because investors would not anticipate a market return from their investments. With no expansion of output and rising demand, prices would have risen, and the industry would return to a normal state. The fact that AUO earned almost normal profits during the cartel period is fully consistent with normal economic processes and not an indication that the cartel saved it from a long period of inadequate return on its investors' capital.

65. My conclusion in this matter, based on extensive study of AUO's data and other evidence, is that the gain is substantially less than 10 percent. My work does not find a measurable overcharge attributable to AUO.

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[48] Trial Testimony of Dr. Keith Leffler, 4533:8-15.
[49] Trial Testimony of Michael Scott, 4742:14-25.

IV. Lost Consumer Opportunity

66. The economic harm from price fixing is mainly the higher prices that customers pay. The harm also includes the losses of consumers who would have purchased the cartel's products absent the overcharge, but were priced out of the market by the cartel. Because the cartel does not collect an overcharge for these lost sales, the loss from price fixing exceeds the gain to the cartel. The commentary associated with the guidelines discusses the lost consumer opportunity (emphasis added):

> The fine for an organization is determined by applying Chapter Eight (Sentencing of Organizations). In selecting a fine for an organization within the guideline fine range, the court should consider both the gain to the organization from the offense and the **loss caused by the organization**. It is estimated that the average gain from price-fixing is 10 percent of the selling price. **The loss from price-fixing exceeds the gain because, among other things, injury is inflicted upon consumers who are unable or for other reasons do not buy the product at the higher prices.** Because the loss from price-fixing exceeds the gain, subsection (d)(1) provides that 20 percent of the volume of affected commerce is to be used in lieu of the pecuniary loss under §8C2.4(a)(3). The purpose for specifying a percent of the volume of commerce is to avoid the time and expense that would be required for the court to determine the actual gain or loss. In cases in which the actual monopoly overcharge appears to be either substantially more or substantially less than 10 percent, this factor should be considered in setting the fine within the guideline fine range.[50]

A. Relationship of the lost consumer opportunity calculation to the overcharge calculation

67. The economic harm to consumers resulting from lower quantities consumed is directly related to the overcharge. Appendix G provides the mathematical and theoretical details of the relationship. The link between the two involves three factors multiplied together. The product of the three is the ratio of the lost opportunity amount to the basic overcharge amount. For the reasons described in Appendix G, the first factor is a constant, one half, which recognizes that the first consumer who stopped consuming when the price rose had almost no benefit from it, because a very small price increase induced the consumer to quit buying. When the price is halfway up, the lost benefit is half the price increase, and so on, up to the last consumer to quit buying, whose loss is the full amount of the price increase. The average loss occurs halfway through the process, hence the one-half in the formula. The second factor is what economists call the price elasticity of

[50] USSG §2R1.1, comment (n.3).

demand, measuring the sensitivity of consumer demand to price changes. It is the percent change in quantity demanded in response to each percent change in price.[51] For example, if the elasticity of demand is 0.9, an *increase* in price of 10 percent will lead to a corresponding *decrease* in consumer demand of 9 percent. The third factor is the overcharge itself, measured as the price elevation stated as a fraction of the price. The amount of harm to consumers from lost opportunities will also be affected by the rate at which any overcharges from LCD manufacturers are passed through to final consumers. For simplicity, I have not included the pass-through factor in the equation below.

68. Using an estimate of the elasticity of demand for LCD panels of 1.0 and the 10 percent overcharge presumed in the guidelines yields a ratio of the lost opportunities harm to the overcharge itself:

$$\text{Lost Opportunities Percentage} = \text{Overcharge Percentage} \times (\tfrac{1}{2} \times 1.0 \times 10 \text{ percent})$$

$$= \text{Overcharge Percentage} \times 5 \text{ percent}$$

69. In other words, under reasonable conditions, the harm from the lost consumer opportunity is 5 percent, or $1/20^{th}$, of the size of the overcharge. The Sentencing Guidelines include a 10 percent overcharge presumption and a 10 percent additional amount for lost consumer opportunities, for a total of 20 percent. As Appendix G shows, it is virtually impossible for the lost opportunities element, as defined by economists, to be as large as the overcharge element. To the extent the 10 percent for lost opportunities is intended to be a measure of additional harm to consumers as quantified by economists, using a percentage for the loss to consumers that is equal to the overcharge percentage substantially overstates any actual harm.

B. Elasticity of demand for a consumer product with respect to the price of an intermediate product

70. The preceding logic applies to finished products sold to consumers. Intermediate products, such as LCD panels, are sold first to firms that use the product as an input into the finished product, such as a laptop, monitor, or TV. These finished products are then sold to consumers.

[51] Pindyck, Robert S. and Daniel L. Rubinfeld, *Microeconomics*, 6th ed., 2005, Chapter 2, p. 32.

71. The elasticity of demand for a finished product with respect to the price of an intermediate product is the elasticity of demand with respect to the price to the consumer multiplied by share of the consumer price contributed by the intermediate product. For example, if the elasticity of demand for TVs at retail is 1.0 and the LCD is 70 percent of the retail price, the elasticity of demand with respect to the LCD price is 0.7.

72. In testimony at the trial, the highest reported percentage of the cost of computer monitors represented by the LCD was 80 percent.[52] The figure for notebook computers was 40 percent.[53] No specific estimate was provided for TVs, but a 2006 DisplaySearch report estimated LCD panels to comprise at least 70 percent of the cost of an LCD TV.[54] The weighted average is 56 percent using the mix of products in the baseline calculation in Table 3. This factor can be used to scale down the elasticity used in the calculation of the lost opportunity element of the calculation of harm. As an example, rather than using a number $1/20^{th}$ the size of the overcharge, a number $1/20^{th} \times 56$ percent = approximately $1/36^{th}$ the size of the overcharge.

73. I conclude that, whatever the overcharge percentage, using a ratio $1/20^{th}$ of that number is a reasonable estimate of the harm from the lost consumer opportunity. A more precise estimate would take into account both the elasticity of LCD panels and the pass-through of any overcharge to consumers.

V. Comparison of Volume of Commerce and Fines to Date using Comparable Methods and Time Periods

74. AUO's counsel have asked me to provide the court with comparative analyses showing, for the six Crystal Meeting participants, various measures of commerce, sales revenue, and fines paid to date. I begin with what I understand to be the appropriate analysis—the DOJ volume of commerce method. I then use the uncorrected Leffler volume of commerce approach for each of the six companies, ending with a broad measure of worldwide sales. For comparability, I have standardized the date ranges for the DOJ volume of commerce method and the worldwide sales method to October 2001 through January 2006. For the Leffler volume of commerce approach, I standardize the date ranges to October 2001 through December 1, 2006, though as noted earlier I do

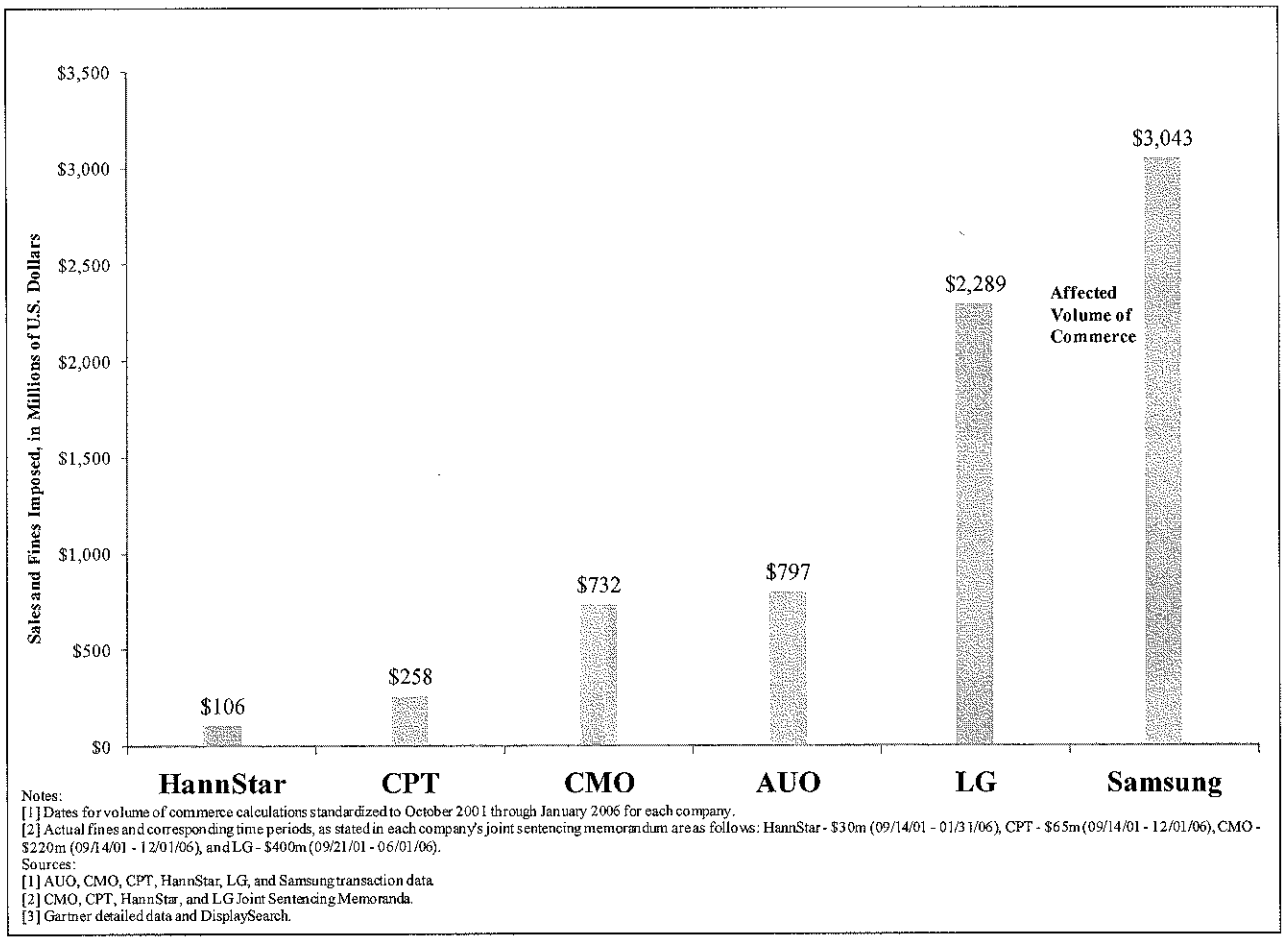
[52] Trial Testimony of Piyush Bhargava, 2525:19-21. See also Trial Testimony of Tim Tierney, 526:15-17.
[53] Trial Testimony of Piyush Bhargava, 2525:16-18. See also Trial Testimony of Tim Tierney, 525:17-19.
[54] DisplaySearch Display Trends, "LCD Demand, Panels, Substrates All Move from Large to Larger," Spring 2006, p. 30.

not understand this to be an appropriate time period. I also provide the estimate of fines for AUO's volume of commerce based on previous fines paid. The actual fines, ranging from $30 million to $400 million, appear in Table 1.

A. Comparison based on the DOJ's method

75. Figure 3 shows the volume of affected commerce for each of the six companies, estimated using DOJ's method and a standardized period, October 2001 through January 2006. It includes my baseline AUO calculation of $797 million, and a calculation for Samsung.[55] AUO is in the middle of the six Crystal Meeting companies using this measure.

Figure 3. DOJ Method Sales Calculation, Standardized to October 2001 through January 2006, in Millions of U.S. Dollars



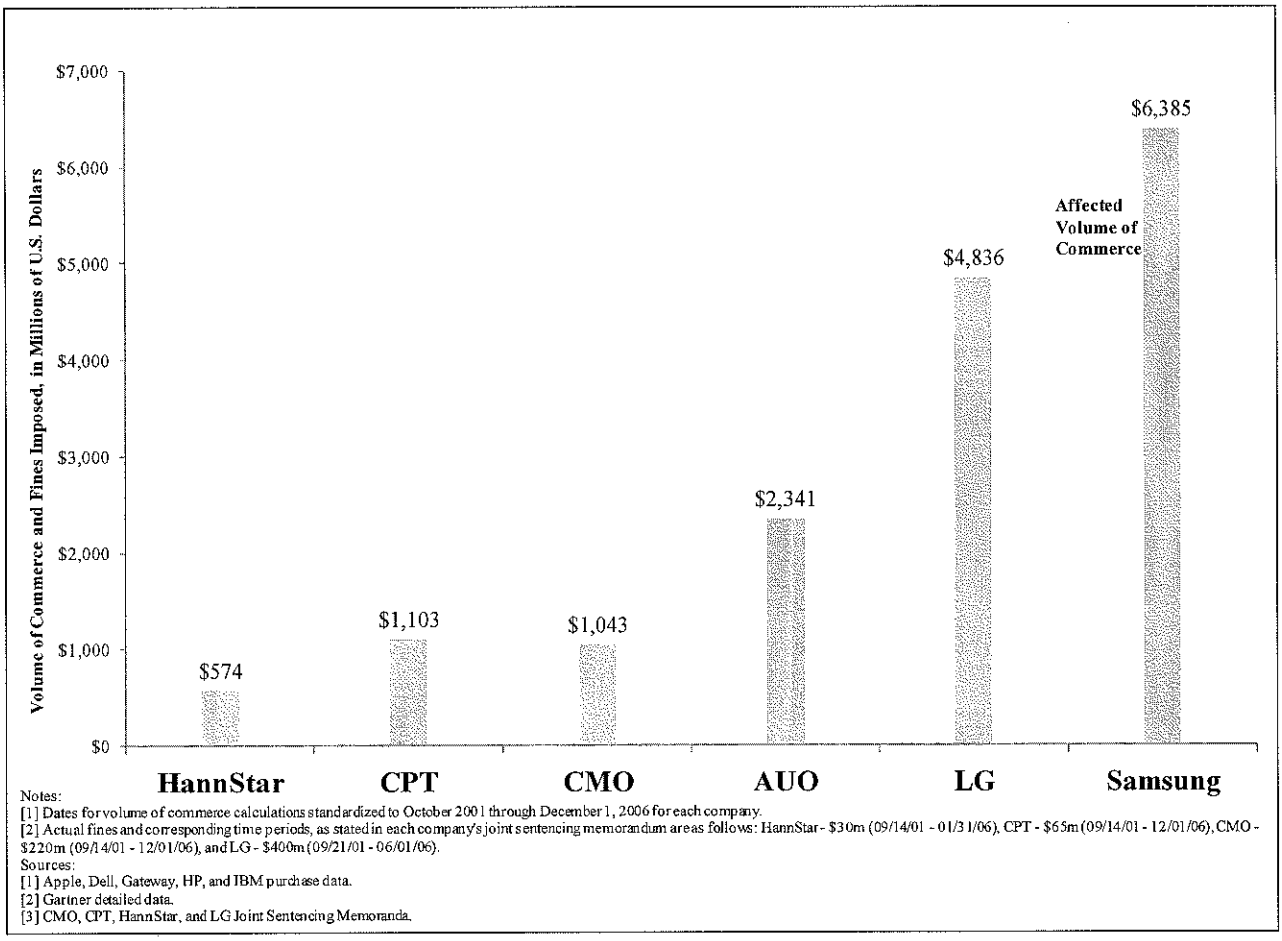
Notes:
[1] Dates for volume of commerce calculations standardized to October 2001 through January 2006 for each company.
[2] Actual fines and corresponding time periods, as stated in each company's joint sentencing memorandum are as follows: HannStar - $30m (09/14/01 - 01/31/06), CPT - $65m (09/14/01 - 12/01/06), CMO - $220m (09/14/01 - 12/01/06), and LG - $400m (09/21/01 - 06/01/06).
Sources:
[1] AUO, CMO, CPT, HannStar, LG, and Samsung transaction data.
[2] CMO, CPT, HannStar, and LG Joint Sentencing Memoranda.
[3] Gartner detailed data and DisplaySearch.

[55] Figure H1 in Appendix H shows a similar calculation displaying the unstandardized date ranges.

B. Comparison based on Dr. Leffler's method

76. Another way to compare the six companies' volume of affected commerce on a standardized basis is to use Dr. Leffler's method and data sources. For the reasons noted above, I do not believe this is an appropriate calculation method or time period for purposes of sentencing, but for illustrative purposes I present the data using the standardized period from October 2001 through December 1, 2006, the period used by Dr. Leffler for AUO's volume of commerce calculation.[56] Figure 4 shows that AUO is in the middle of the five companies by this measure of sales and less than half the size of LG.

Figure 4. Volume of Commerce Calculation by Dr. Leffler's Method, Standardized to October 2001 through December 1, 2006, in Millions of U.S. Dollars

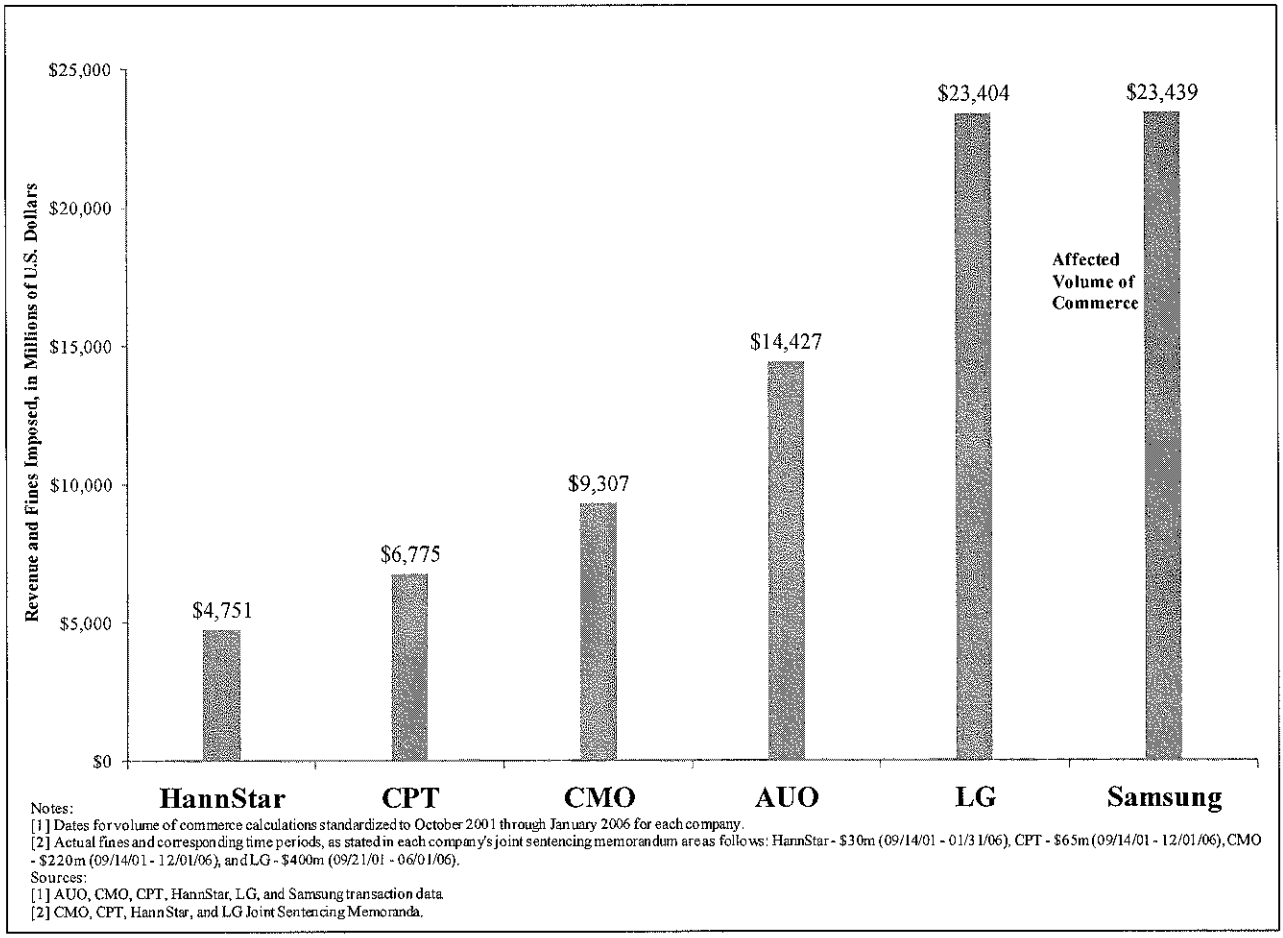


[56] Figure H2 in Appendix H shows a similar calculation displaying the unstandardized date ranges.

C. Worldwide revenue comparison

77. Figure 5 shows the worldwide LCD panel sales in the 12 to 30 inch size range for each of the six Crystal Meeting companies calculated using the standardized period October 2001 through January 2006.[57] Again, AUO is approximately in the middle of the six Crystal Meeting companies.

Figure 5. 12 to 30 Inch LCD Panel Worldwide Revenue, October 2001 through January 2006, in Millions of U.S. Dollars



78. Table 6 shows the range between the highest and lowest fine for AUO's volume of commerce based on previous fines. The third column shows the fine based on the lowest rate per dollar of VOC in previous sentencings and the fourth column the fine based on the highest earlier rate per dollar of VOC.

[57] Figure H3 in Appendix H shows a similar calculation displaying the unstandardized date ranges.

Table 6. Summary of Comparable Volume of Commerce Calculation Methods, October 2001 through January 2006

Method	*AUO VOC (in Millions of U.S. Dollars)*	*Lowest Equivalent Fine for AUO's VOC (in Millions of U.S. Dollars)*	*Highest Equivalent Fine for AUO's VOC (in Millions of U.S. Dollars)*	*Lowest Fine per $1 Million VOC (in U.S. Dollars)*	*Company Paying Lowest Fine*	*Highest Fine per $1 Million VOC (in U.S. Dollars)*	*Company Paying Highest Fine*
DOJ VOC	797	128	224	160,000	LG	280,374	HannStar
Leffler VOC	2,341	138	494	58,956	CPT	210,924	CMO
Worldwide Sales	14,427	91	253	6,283	HannStar	17,559	CMO

Notes:

[1] Dates for volume of commerce calculations for the DOJ Method and Worldwide Sales Method are standardized to October 2001 through January 2006 for each company. For the Leffler VOC Method, dates are standardized to October 2001 through December 1, 2006.

[2] Actual fines and corresponding time periods, as stated in each company's joint sentencing memorandum are as follows: HannStar - $30m (09/14/01 - 01/31/06), CPT - $65m (09/14/01 - 12/01/06), CMO - $220m (09/14/01 - 12/01/06), and LG - $400m (09/21/01 - 06/01/06).

Sources:

[1] AUO, CMO, CPT, HannStar, LG, and Samsung transaction data.

[2] CMO, CPT, HannStar, and LG Joint Sentencing Memoranda.

[3] Apple, Dell, Gateway, HP, and IBM purchase data.

[4] Gartner detailed data.

VI. AUO's Financial Condition

79. Counsel has informed me that AUO's financial condition is also a relevant factor in sentencing. To understand AUO's financial condition, I studied several measures of a company's financial condition available through public sources. I discuss these measures in the remainder of this section.

A. Altman's Z-score

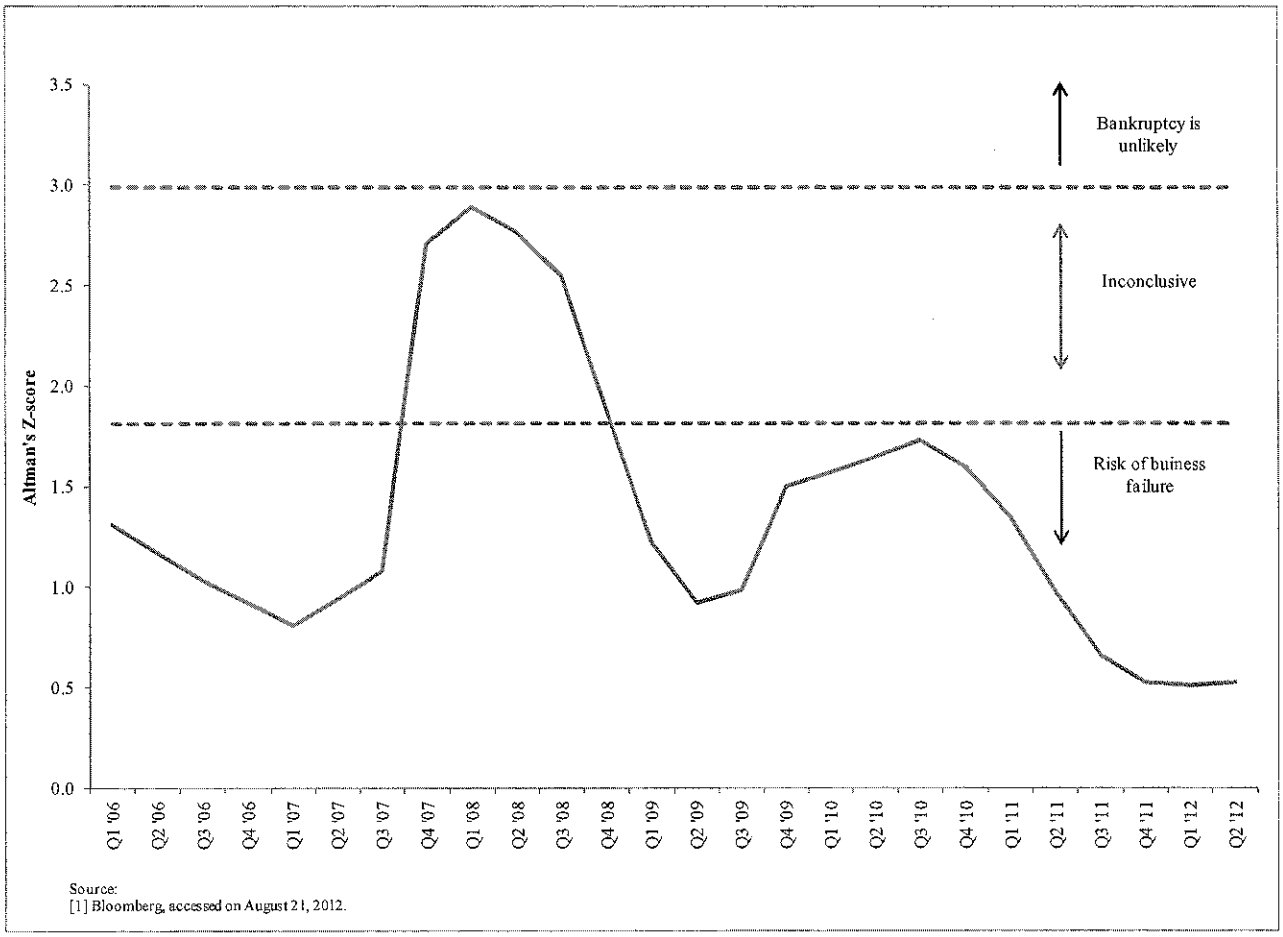
80. The Z-score is a measure of a company's financial condition.[58] It is used by academics and finance professionals to measure of the degree of financial challenges facing a company and is calculated using financial statement data and the market value of equity.[59] It takes both market and accounting data into account. As of March 2012, AUO's Altman's Z-score was 0.51.[60] Scores above

[58] Altman, Edward I. (September, 1968). "Financial Ratios, Discriminant Analysis and the Prediction of Corporate Bankruptcy," *Journal of Finance,* Vol. 23, No. 4 ("Altman"), pp. 589–609.
[59] Altman, p. 594.
[60] Bloomberg, accessed on August 21, 2012.

2.99 indicate bankruptcy is unlikely, scores between 1.81 and 2.99 are inconclusive, and scores below 1.81 indicate a risk of failure.[61]

81. Figure 6 shows AUO's Z-score since 2006. The low level of AUO's Altman's Z-score indicate that it is financially challenged, facing a high risk of failure.

Figure 6. AUO's Altman's Z-Score



B. Hillegeist one year probability of default

82. Another measure of financial condition, the Hillegeist one year probability of default, quantifies the risk of default by AUO as 1.9 percent within the next 4 to 16 months following the fiscal year end.[62]

[61] Altman, p. 606.

C. Company ratings

83. Rating agencies—Moody's, Standard & Poors, and Fitch—analyze companies and offer opinions on the default risk of companies and their public debt issues. These agencies' ratings are used by analysts and investors as indications of the financial strength of companies. None of these agencies rates AUO's specific public debt issues, but Fitch rated AUO as an issuer until August 10, 2011, after which Fitch stopped rating AUO. Its final rating was BB-. Fitch does not specifically define BB-, but BB- is worse than BB, which Fitch defines as:

> Speculative … an elevated vulnerability to default risk, particularly in the event of adverse changes in business or economic conditions over time; however, business or financial flexibility exists which supports the servicing of financial commitments.[63]

D. Bond yield

84. The yield on a bond is the rate of interest a purchaser at current market value receives per year. A high yield is another indication that a company faces financial stress. Investors worry about the risk of the company defaulting and not paying back the bond, and will demand a high yield when purchasing the bond to compensate for the increased risk of default. AUO has a zero-coupon, convertible bond maturing October 13, 2015.[64] As of August 21, 2012, its yield was 11.9 percent.[65] In today's bond market, AUO is deep in junk-bond territory. On the same date, three year United States Treasury bonds yielded 0.4 percent.[66] That AUO's bond yields 11.5 percentage points more than did United States Treasury bonds of similar maturity indicates that the market sees a meaningful risk that AUO will default on its bonds.

---

[62] Hillegeist uses the same inputs as does Altman's Z-score, but, relative to the Altman 1968 estimation, Hillegeist uses an updated and larger sample of firms (Hillegeist, Stephen A., Elizabeth K. Keating, Donald P. Cram and Kyle G. Lundstedt (March 2004). "Assessing the Probability of Bankruptcy," *Review of Accounting Studies,* Vol. 9, pp. 5–34); Bloomberg, accessed on August 21, 2012.

[63] Fitch Ratings, "Definitions of Ratings and Other Forms of Opinion", August 2012, p. 9.

[64] Note that the bond's convertibility makes it more valuable, which decreases its yield. In this sense, the yield on this bond is a downwards-biased indication of its default risk.

[65] Bloomberg, accessed on August 21, 2012.

[66] Bloomberg, accessed on August 21, 2012.

E. Conclusion about AUO's financial condition

85. Each of the measures discussed above indicates that AUO faces serious financial challenges.

VII. Conclusions and Summary

86. I have been asked to estimate the harm to U.S. consumers from AUO's participation in the LCD cartel. To estimate the first element of the harm is the affected volume of commerce I used approach taken by the DOJ[67] in its prior four calculations of volume of commerce for purposes of sentencing . For the relevant products and the relevant time period I calculate the baseline volume of commerce value of $797 million. Applying both the reductions I propose reduces these estimates of the affected volume of commerce to $224 million.

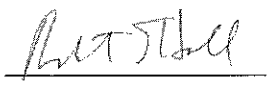
87. Dr. Leffler has used an approach quite different from the approach used by the DOJ and calculated a volume of commerce equal to $2.34 billion. He has also used a longer time period than used for his prior work on price overcharge effects, and has reached new conclusions about overcharges after January 2006. These departures result in a much larger estimate of AUO's volume of commerce. Adjusting Dr. Leffler's volume of commerce estimates results for the time period and making additional adjustments results in a volume of commerce of $726 million, which is similar to—though smaller than—my baseline calculation of $797 million. I believe that my calculations are more accurate and are more faithful to the DOJ's prior approach.

88. My volume of commerce estimate is then multiplied by the percentage obtained by adding the overcharge percentage and the relevant lost consumer opportunity percentage. As an example, I start with the 1.8 percent overcharge and a harm to consumers percentage equal to $1/20^{th}$ of this number (0.09 percent), for a total of 1.89 percent. Applying this percentage to the baseline relevant volume of commerce calculation of $797 million results in a harm estimate of $15.1 million. Applying the same framework to AUOA's relevant sales results in a volume of commerce calculation of $389,440 and the example multiplication using 1.89 percent totals $7,360.

89. I have provided comparative analyses illustrating various comparative measures of the volume of commerce. I find that AUO is in the middle of the six companies using various measures of volume of commerce or sales volume.

[67] See Appendix B for a letter from the DOJ to Judge Illston discussing the methodology.

90. Finally, I have reviewed various publicly available measures of financial condition, each of which shows that AUO is financially challenged.



September 11, 2012

Appendix A. C.V. of Robert Hall

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PhD in economics, MIT; BA in economics, University of California, Berkeley

Robert and Carole McNeil Joint Senior Fellow, Hoover Institution, and Professor, Department of Economics, Stanford University

Previously in the economics departments of MIT and the University of California, Berkeley.

Member, National Academy of Sciences
Fellow, American Academy of Arts and Sciences, Econometric Society, and Society of Labor Economists

American Economic Association: Distinguished Fellow, 2011; President, 2010; Vice President, 2005; Ely Lecturer, 2001

Director, Research Program on Economic Fluctuations and Growth, National Bureau of Economic Research, since 1977
Member, Advisory Committee, Congressional Budget Office, since 1993
Member, Oversight Panel for Economics, National Science Foundation, 1989, and Advisory Panel for Economics, 1970-72

Visit Stanford.edu/~rehall to download any of my writings.

Recent unpublished paper

"Quantifying the Forces Leading to the Collapse of GDP after the Financial Crisis" September 2011

Selected published and forthcoming papers

"Evidence on the Determinants of the Choice between Wage Posting and Wage Bargaining" (with Alan B. Krueger), *AEJ: Macroeconomics*, forthcoming, October 2012

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The Rational Consumer: Theory and Evidence, MIT Press, Cambridge, Massachusetts. 1990

Macroeconomics (with David Papell), W.W. Norton, sixth edition (previous editions with John Taylor). 2005

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Low Tax, Simple Tax, Flat Tax (with Alvin Rabushka), McGraw-Hill. 1983

Inflation: Causes and Effects (editor), University of Chicago Press for the National Bureau of Economic Research. 1982

Appendix B. Copy of November 15, 2010 Letter from the Department of Justice to Judge Illston Regarding the Volume of Commerce Calculation

U.S. Department of Justice

Antitrust Division

San Francisco Field Office

450 Golden Gate Avenue *415/436-6660*
Box 36046, Room 10-0101 *FAX 415/436-6687*
San Francisco, California 94102

November 15, 2010

By ECF & Hand Delivery

Honorable Susan Illston
United States District Court
Northern District of California
450 Golden Gate Avenue
San Francisco, CA 94102

Re: In re TFT-LCD (Flat Panel) Antitrust Litigation; Case No. M07-1827 SI

Dear Judge Illston:

On November 5, 2010, the Court requested that the government provide a written statement of its views on the applicability of the Foreign Trade Antitrust Improvements Act of 1982, 15 U.S.C. §6a (the "FTAIA") to the criminal LCD case, *United States v. AU Optronics, Corp.*, et al., CR-09-0110 SI. The government is aware that the Court is currently considering defendants' motions in the LCD multi-district civil litigation which argue that plaintiffs' claims based on certain categories of purchases of LCD panels, including purchases of LCD panels by foreign affiliates of the plaintiffs, are barred under the FTAIA. *In re TFT-LCD (Flat Panel) Antitrust Litigation*, Case No. M 07-1827; MDL No. 1827.

The FTAIA relates only to issues of subject-matter jurisdiction. It does not apply to sentencing issues in a criminal antitrust case, including the determination of which commerce to include in the calculation of criminal fines under the U.S. Sentencing Guidelines (U.S.S.G.). Under U.S.S.G. §2R1.1(d)(1), fines for organizations are based, among other factors, on the "volume of affected commerce." As this Court is aware, three categories of LCD commerce were included as "affected" commerce in the calculation of the criminal fines of the pleading companies in the LCD criminal matter:

1. LCD panels directly imported into the U.S.;

2. Sales of LCD panels that were billed to or invoiced to purchasers located in the U.S.; and

3. LCD panels purchased by foreign affiliates of U.S. companies that were integrated into final products imported to the U.S.

The government believes that these three categories of commerce represent harm caused to U.S. consumers by the LCD cartel. Inclusion of this commerce also has resulted in fines that are commensurate with the scope and impact on U.S. consumers of the LCD cartel.

The government is unaware of any case law or other authority, or anything in the language of the FTAIA itself, suggesting that the FTAIA subject-matter jurisdiction standard should apply to the calculation of volume of "affected commerce" under §2R1.1 or to any other issue related to sentencing in a criminal antitrust case. Therefore, this court's ruling on the applicability of the FTAIA to certain civil claims in the MDL case will not affect the government's ability to seek appropriate fines in the criminal case pending before this Court.

Respectfully Submitted,

Peter K. Huston
Michael L. Scott
Heather S. Tewksbury
E. Kate Patchen
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Appendix C. List of AUO's Customers that are U.S. Companies

Company
Apple
Audiovox
Bell Microproducts
Dell
Dupont Display Solution
Gateway
Hewlett Packard
IBM Singapore
Imagequest
Jaco Electronics
Panelview
Viewsonic
White Electronic Designs Corporation

Source:
[1] AUO transaction data.

Appendix D. Calculation of U.S. Share of Monitor, Notebook and TV Worldwide Sales, by Year

Table D1. Customer Calculation of U.S. Percentage Share of Monitor, Notebook, and TV Worldwide Sales, by Year, Using Baseline Category 2 and 3 Volume of Commerce Estimates, in Percent

	Q4 2001	*2002*	*2003*	*2004*	*2005*	*Jan-06*	*Weighted average*
Monitor	32.3	33.1	32.2	21.0	49.2	49.7	47.6
Notebook		44.3	43.9	44.2	47.0	43.0	45.2
TV		90.2	17.3	17.3	90.2		76.3
Weighted average	32.3	43.1	42.2	43.9	48.2	46.2	46.1

Notes:

[1] Weighted averages are calculated using the mix of products represented by categories 2 and 3 of the baseline.

[2] North America sales are scaled by U.S. population as percent of North America population.

[3] If a customer-level percentage is not available for a particular year the percentage from the closest year is used (with preference to later years).

[4] There were no relevant sales of Notebook panels in Q4 2001, or of TV panels in Q4 2001 or January 2006.

Sources:

[1] Monitor and NB data are from Gartner Group Detailed Data.

[2] TV data are from DisplaySearch Quarterly LCD TV Shipment and Forecast Report, Q2 2006 History Data Tables.

[3] U.S. Census Bureau Population Estimates, National Totals, <http://www.census.gov/popest/national/national.html>.

[4] Statistics Canada. Table 051-0001 - Estimates of population, by age group and sex for July 1, Canada, provinces and territories, annual (persons unless otherwise noted), CANSIM (database).

[5] AUO transaction data.

Appendix E. Dr. Leffler's List of Prices Shared at Crystal Meetings

dateofmeeting	screensize	resolution	application	yearstr	month	generalprice_crystal	auo_crystal	cmo_crystal	cpt_crystal	hannstar_crystal	lg_crystal	samsung_crystal
9/14/2001	15	XGA	NB	2001	10	195						
9/14/2001	14.1	XGA	NB	2001	10	165						
9/14/2001	17	SXGA	Monitor	2001	10	330						
9/14/2001	18	SXGA	Monitor	2001	10			480				
9/21/2001	14.1	XGA	NB	2001	10		165+(5-10)	165+(5-10)	165+(5-10)	175		
9/21/2001	15	XGA	Monitor	2001	10		195+10	200-205	195+10	195+(0-10)		
9/21/2001	12.1	XGA	NB	2001	10	165	165	165	165	165	165	165
10/5/2001	14.1	XGA	NB	2001	10		170-180	175	160-175	175-180	180-185	
10/5/2001	15	XGA	NB	2001	10		205	205-215	205-215	205-210	205-210	
10/19/2001	14.1	XGA	NB	2001	11	175						
10/19/2001	15	XGA	Monitor	2001	11	220						
10/30/2001	12.1	XGA	NB	2001	11					165	165	170
10/30/2001	13.3	XGA	NB	2001	11		165				170	
10/30/2001	14.1	XGA	NB	2001	11		180	180-185	180-185	185	180	180
10/30/2001	15	XGA	NB	2001	11						230	245
10/30/2001	15	SXGA+	NB	2001	11					220	255	280
10/30/2001	15	XGA	Monitor	2001	11		220	220	220-225		220	220
10/30/2001	17	SXGA	Monitor	2001	11		330	330				340
10/30/2001	18	SXGA	Monitor	2001	11			430-450			450	
10/19/2001	14.1	XGA	NB	2001	12	180						
10/19/2001	15	XGA	Monitor	2001	12	225						
10/30/2001	12.1	XGA	NB	2001	12					170	170	170
10/30/2001	13.3	XGA	NB	2001	12		170				175	
10/30/2001	14.1	XGA	NB	2001	12		185	185-190	185	185-190	185	185
10/30/2001	15	XGA	NB	2001	12						240	255
10/30/2001	15	SXGA+	NB	2001	12							
10/30/2001	15	XGA	Monitor	2001	12		225	225		225-230	225	225
10/30/2001	17	SXGA	Monitor	2001	12		335	335				345
10/30/2001	18	SXGA	Monitor	2001	12			430-450			450	

dateofmeeting	screensize	resolution	application	yearstr	month	generalprice_crystal	auo_crystal	cmo_crystal	cpt_crystal	hannstar_crystal	lg_crystal	samsung_crystal
11/6/2001	12.1	SVGA	NB	2001	12					160		
11/6/2001	12.1	XGA	NB	2001	12							175
11/6/2001	13.3	XGA	NB	2001	12		180					
11/6/2001	14.1	XGA	NB	2001	12		185	185		185		185
11/6/2001	15	XGA	NB	2001	12							255
11/6/2001	15	SXGA+	NB	2001	12							280
11/6/2001	15	XGA	Monitor	2001	12		225	225		225		225
11/6/2001	17	SXGA	Monitor	2001	12		340	340				
11/6/2001	17	SXGA	Monitor	2001	12							370
11/6/2001	18.1	SXGA		2001	12			450				
11/13/2001	15	XGA	Monitor	2001	12	225						
11/13/2001	17	SXGA	Monitor	2001	12	340						
11/13/2001	18	SXGA	Monitor	2001	12	450						
11/13/2001	12.1	XGA	NB	2001	12	160						
11/13/2001	14.1	XGA	NB	2001	12	185						
11/13/2001	15	XGA	NB	2001	12	245						
11/13/2001	15	SXGA+	NB	2001	12	270-280						
12/7/2001	12.1	XGA	NB	2001	12	170-175						
12/7/2001	13.3	XGA	NB	2001	12	175						
12/7/2001	14.1	XGA	NB	2001	12	185						
12/7/2001	15	XGA	NB	2001	12	235						
12/7/2001	15	SXGA+	NB	2001	12	260-280						
12/7/2001	15	XGA	Monitor	2001	12	225						
12/7/2001	17	SXGA	Monitor	2001	12	340						
12/7/2001	18	SXGA	Monitor	2001	12	450						
12/7/2001	12.1	XGA	NB	2002	1	170-175						
12/7/2001	13.3	XGA	NB	2002	1	185						
12/7/2001	14.1	XGA	NB	2002	1	195						
12/7/2001	15	XGA	NB	2002	1	240 (US) 260(TWN)						
12/7/2001	15	SXGA+	NB	2002	1	265-270(US) 290(TWN)						
12/7/2001	15	XGA	Monitor	2002	1	235						
12/7/2001	17	SXGA	Monitor	2002	1	350						
12/7/2001	18	SXGA	Monitor	2002	1	450						

dateofmeeting	screensize	resolution	application	yearstr	month	generalprice_crystal	auo_crystal	cmo_crystal	cpt_crystal	hannstar_crystal	lg_crystal	samsung_crystal
1/3/2002	12.1	SVGA	NB	2002	1					170		
1/3/2002	12.1	XGA	NB	2002	1							170-175
1/3/2002	13.3	XGA	NB	2002	1		180-185					
1/3/2002	14.1	XGA	NB	2002	1		188-190	190	195			195-200
1/3/2002	14.1	SXGA+	NB	2002	1							205
1/3/2002	15	XGA	NB	2002	1							260
1/3/2002	15	SXGA+	NB	2002	1							285
1/3/2002	15	XGA	Monitor	2002	1		230-235	230-235	235	228-230		235
1/3/2002	17	SXGA	Monitor	2002	1		350-355	345-355				340
1/3/2002	18.1	SXGA	Monitor	2002	1			450-460				
1/11/2002	15	XGA	Monitor	2002	2	245						
1/11/2002	17	SXGA	Monitor	2002	2		355	355				355
1/11/2002	18	SXGA	Monitor	2002	2			450			450	
1/11/2002	12.1	XGA	NB	2002	2					175-180	175	175
1/11/2002	13.3	XGA	NB	2002	2		190				180	
1/11/2002	14.1	XGA	NB	2002	2		200	200	200	200	205	205
1/11/2002	15	XGA	NB	2002	2					245	245	255
1/11/2002	15	SXGA+	NB	2002	2		275	275			275	285
2/6/2002	12.1	XGA	NB	2002	3							
2/6/2002	13.3	XGA	NB	2002	3							
2/6/2002	14.1	XGA	NB	2002	3		215	215	215	215	220	
2/6/2002	15	XGA	NB	2002	3		260			260	265	
2/6/2002	15	SXGA+	NB	2002	3	295 (ALL)						
2/6/2002	15	XGA	Monitor	2002	3	250						
2/6/2002	17	SXGA	Monitor	2002	3	370						
2/6/2002	18	SXGA	Monitor	2002	3	430						
2/20/2002	12.1	XGA	NB	2002	3	195						
2/20/2002	14.1	XGA	NB	2002	3	230						
2/20/2002	14.1	SXGA+	NB	2002	3							
2/20/2002	15	XGA	NB	2002	3	265						
2/20/2002	15	SXGA+	NB	2002	3	295						

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3/8/2002	12.1	XGA	NB	2002	3							
3/8/2002	13.3	XGA	NB	2002	3	220						
3/8/2002	14.1	XGA	NB	2002	3	220-225						
3/8/2002	15	XGA	NB	2002	3	265-270						
3/8/2002	15	SXGA+	NB	2002	3	295						
3/8/2002	15	XGA	Monitor	2002	3	250						
3/8/2002	17	SXGA	Monitor	2002	3	365						
3/8/2002	18	SXGA	Monitor	2002	3	440-450						
3/8/2002	12.1	XGA	NB	2002	4	190-195						
3/8/2002	13.3	XGA	NB	2002	4	240						
3/8/2002	14.1	XGA	NB	2002	4	240-245						
3/8/2002	15	XGA	NB	2002	4	290						
3/8/2002	15	SXGA+	NB	2002	4	310-320						
3/8/2002	15	XGA	Monitor	2002	4	255						
3/8/2002	17	SXGA	Monitor	2002	4	370						
3/8/2002	18	SXGA	Monitor	2002	4	440-450						
3/13/2002	12.1	XGA	NB	2002	4					190	195	192-198
3/13/2002	13.3	XGA	NB	2002	4		220					
3/13/2002	14.1	XGA	NB	2002	4	240 (Taiwanese)					245	245-250
3/13/2002	15	XGA	NB	2002	4		285			285	290	290-295
3/13/2002	15	XGA	NB	2002	4		315		315	315	320	320-325
3/13/2002	15	XGA	Monitor	2002	4	255					260	
3/13/2002	17	SXGA	Monitor	2002	4	380						
3/13/2002	18	SXGA	Monitor	2002	4			460-470			445-450	
4/10/2002	12.1	XGA	NB	2002	4	190-195				190	195	192-198
4/10/2002	13.3	XGA	NB	2002	4	240	220				220	
4/10/2002	14.1	XGA	NB	2002	4	240-245	240	240	240	240	245	245-250
4/10/2002	15	XGA	NB	2002	4	290	285			285	290	290-295
4/10/2002	15	SXGA+	NB	2002	4	310-320			315	316	320	320-325
4/10/2002	15	XGA	Monitor	2002	4	255	255	255	255	260	260	255
4/10/2002	17	SXGA	Monitor	2002	4	370	380	380				
4/10/2002	18	SXGA	Monitor	2002	4	440-450		460-470			445-450	

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4/10/2002	12.1	XGA	NB	2002	5	200-205				200	205	200
4/10/2002	13.3	XGA	NB	2002	5							
4/10/2002	14.1	XGA	NB	2002	5	250-260	250	255	265	255-260	255-260	255-260
4/10/2002	15	XGA	NB	2002	5	300-310	300			300-305	300	300-310
4/10/2002	15	SXGA+	NB	2002	5	325-340	325		330	330-335	330	330-340
4/10/2002	15	XGA	Monitor	2002	5	260-265	260	260-265	260	265	265	260
4/10/2002	17	SXGA	Monitor	2002	5	380-385	385	385				380-385
4/10/2002	18	SXGA	Monitor	2002	5	450-470		465-470			450	
5/15/2002	12.1	XGA	NB	2002	5	200				200	205	200
5/15/2002	13.3	XGA	NB	2002	5							
5/15/2002	14.1	XGA	NB	2002	5	250-260	205	255	255		255-260	255-260
5/15/2002	15	XGA	NB	2002	5	300-310	300			300-305	300	306-310
5/15/2002	15	SXGA+	NB	2002	5	325-340	325		330	330-335	330	336-340
5/15/2002	15	XGA	Monitor	2002	5	260-265	260	260-265	260	265	265	260
5/15/2002	17	SXGA	Monitor	2002	5	380-385	385	385				380-385
5/15/2002	18	SXGA	Monitor	2002	5	450-470		465-470			450	
5/15/2002	12.1	XGA	NB	2002	6	205						
5/15/2002	13.3	XGA	NB	2002	6							
5/15/2002	14.1	XGA	NB	2002	6	255-265						
5/15/2002	15	XGA	NB	2002	6	305-315						
5/15/2002	15	SXGA+	NB	2002	6	330-345						
5/15/2002	15	XGA	Monitor	2002	6	265-270						
5/15/2002	17	SXGA	Monitor	2002	6	385-390						
5/15/2002	18	SXGA	Monitor	2002	6	450-470						
6/5/2002	12.1	XGA	NB	2002	6	205				205	205-210	205
6/5/2002	13.3	XGA	NB	2002	6							
6/5/2002	14.1	XGA	NB	2002	6	255-265	255-260	260	260	263	260-266	263-265
6/5/2002	15	XGA	NB	2002	6	305-315	310			315	305-310	315
6/5/2002	15	SXGA+	NB	2002	6	330-345	330-335		340	340-345	340	340-345
6/5/2002	15	XGA	Monitor	2002	6	260-270	260	260	260	265	270	260
6/5/2002	17	SXGA	Monitor	2002	6	385-300	385-390(tn)	385				380-385 tn
6/5/2002	18	SXGA	Monitor	2002	6	450-470		465-470			450	

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6/5/2002	12.1	XGA	NB	2002	7	205-210				205	205-210	205
6/5/2002	13.3	XGA	NB	2002	7							
6/5/2002	14.1	XGA	NB	2002	7	255-265	255-260	260	260	263	263-267	265-267
6/5/2002	15	XGA	NB	2002	7	310-315	315			315	310-315	317
6/5/2002	15	SXGA+	NB	2002	7	330-345	330-335		335	340-345	345	342-347
6/5/2002	15	XGA	Monitor	2002	7	265-270	260	260	260	265	270	260
6/5/2002	17	SXGA	Monitor	2002	7	380-385	380-385 tn	385				380-385 tn
6/5/2002	18	SXGA	Monitor	2002	7	465		465-470			450	
8/15/2002	12.1	XGA	NB	2002	8						200	195-200
8/15/2002	14.1	XGA	NB	2002	8		240-250	240	240	245	245	245-255
8/15/2002	15	XGA	NB	2002	8		285-290			285-290	285-295	295-300
8/15/2002	15	SXGA+	NB	2002	8		300-305		300-305	305-310	305-325	305-300
8/15/2002	15	XGA	Monitor	2002	8		240-245	240	240-245	240-245		
8/15/2002	17	SXGA	Monitor	2002	8		350-355	345-350				340-345
8/15/2002	18	SXGA	Monitor	2002	8			400-410			430	
12/19/2002	15	XGA	Monitor	2002	12	180						
12/19/2002	14.1	XGA	NB	2002	12	165-170						
12/19/2002	15	XGA	NB	2002	12	180-185						
12/19/2002	15	SXGA+	NB	2002	12	220-235						
12/19/2002	15	XGA	Monitor	2002	12	170 (-5 for SIP)						
12/19/2002	17	SXGA	Monitor	2002	12	265-275						
12/19/2002	18	SXGA	Monitor	2002	12	320						
12/19/2002	14.1	XGA	NB	2003	1	165-170						
12/19/2002	15	XGA	NB	2003	1	182.50-187.50						
12/19/2002	15	SXGA+	NB	2003	1	220-235						
12/19/2002	15	XGA	Monitor	2003	1	175(-5 for SIP)						
12/19/2002	17	SXGA	Monitor	2003	1	272.5						
12/19/2002	18	SXGA	Monitor	2003	1	320						
1/9/2003	17	SXGA	Monitor	2003	1		260					270
1/9/2003	14.1	XGA	NB	2003	1		170					
1/9/2003	15	XGA	NB	2003	1		165-175	165-175	165-175	165-175		

dateofmeeting	screensize	resolution	application	yearstr	month	generalprice_crystal	auo_crystal	cmo_crystal	cpt_crystal	hannstar_crystal	lg_crystal	samsung_crystal
2/13/2003	12.1	XGA	NB	2003	2					160	160	160
2/13/2003	13.3	XGA	NB	2003	2							
2/13/2003	14.1	XGA	NB	2003	2		165	160	155-160	165	165-170	165-170
2/13/2003	15	XGA	NB	2003	2		180			180-185	180	180
2/13/2003	15	SXGA+	NB	2003	2		200		195	200	200	200
2/13/2003	15.4	WXGA	NB	2003	2							205
2/13/2003	17	WXGA+	NB	2003	2						310	310
2/13/2003	15	XGA	Monitor	2003	2		170-175	170-180	180 Sip	175-180sip	175-180	180
2/13/2003	17	SXGA	Monitor	2003	2		265	255-265				280
2/13/2003	18	SXGA	Monitor	2003	2			290			280	
2/13/2003	19	SXGA	Monitor	2003	2			420				420
2/13/2003	17	WXGA	Monitor	2003	2						290	
2/13/2003	20.1	VGA	TV	2003	2			480				
2/13/2003	12.1	XGA	NB	2003	3					160	165	165
2/13/2003	13.3	XGA	NB	2003	3							
2/13/2003	14.1	XGA	NB	2003	3		165-170	160-165	160-165	170	170-175	170-175
2/13/2003	15	XGA	NB	2003	3		185			185	185	185
2/13/2003	15	SXGA+	NB	2003	3		210		205	210	205	210
2/13/2003	15.4	WXGA	NB	2003	3							210
2/13/2003	17	WXGA+	NB	2003	3						315	315
2/13/2003	15	XGA	Monitor	2003	3		175-180	175-180	keep	keep		
2/13/2003	17	SXGA	Monitor	2003	3		270	260-270				285
2/13/2003	18	SXGA	Monitor	2003	3			280			280	
2/13/2003	19	SXGA	Monitor	2003	3			420				420
2/13/2003	17	WXGA	Monitor	2003	3						280-290	
2/13/2003	20.1	VGA	TV	2003	3			480				

dateofmeeting	screensize	resolution	application	yearstr	month	generalprice_crystal	auo_crystal	cmo_crystal	cpt_crystal	hannstar_crystal	lg_crystal	samsung_crystal
3/20/2003	15	XGA	Monitor	2003	4		180-185	180-185	180sip	185-188	180-185	190
3/20/2003	17	SXGA	Monitor	2003	4		273	273				273
3/20/2003	18	SXGA	Monitor	2003	4			285			280-290	
3/20/2003	19	SXGA	Monitor	2003	4			420				420
3/20/2003	20.1	VGA	TV	2003	4			480				
3/20/2003	17	WXGA	Monitor	2003	4						281-290	
3/20/2003	12.1	XGA	NB	2003	4					165	165	165
3/20/2003	13.3	XGA	NB	2003	4							
3/20/2003	14.1	XGA	NB	2003	4		160-170	160-165	160-165	170	172-177	170-175
3/20/2003	15	XGA	NB	2003	4		180	185-190		185	185	190
3/20/2003	15	SXGA+	NB	2003	4		195		190	205	205	220
3/20/2003	15.4	WXGA	NB	2003	4							230
3/20/2003	17	WXGA+	NB	2003	4						320	320
4/11/2003	15	XGA	NB	2003	4	180	180	180				
4/11/2003	15	XGA	NB	2003	5	182	182	182				
5/14/2003	12.1	XGA	NB	2003	5					175	165	165
5/14/2003	13.3	XGA	NB	2003	5							
5/14/2003	14.1	XGA	NB	2003	5		165-175	165-170	165	180	175-180	180
5/14/2003	15	XGA	NB	2003	5		190-195	190-195	190-195	195-198	190	200
5/14/2003	15	SXGA+	NB	2003	5		215	215	210	215	210	230
5/14/2003	15.4	WXGA	NB	2003	5							240
5/14/2003	17	WXGA+	NB	2003	5						330	340
5/14/2003	15	XGA	Monitor	2003	5		185-190	185-190	185 sip	190-195sip	190	190
5/14/2003	17	SXGA	Monitor	2003	5		273	270-273	270		270-275	285
5/14/2003	18	SXGA	Monitor	2003	5			290			290-295	
5/14/2003	19	SXGA	Monitor	2003	5		410-420	430				430
5/14/2003	17	WXGA	Monitor	2003	5						280-290	
5/14/2003	20.1	VGA	TV	2003	5			480				
5/14/2003	30	WXGA	Monitor	2003	5			1350			1400	

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5/14/2003	12.1	XGA	NB	2003	6					175	165	170
5/14/2003	13.3	XGA	NB	2003	6							
5/14/2003	14.1	XGA	NB	2003	6		165-175	165-170	165	180	175-180	180-185
5/14/2003	15	XGA	NB	2003	6		195-200	195-200	195-200	195-200	195	200-205
5/14/2003	15	SXGA+	NB	2003	6		215	215	215	225	215	230-235
5/14/2003	15.4	WXGA	NB	2003	6							240
5/14/2003	17	WXGA+	NB	2003	6						335	340
5/14/2003	15	XGA	Monitor	2003	6		185-190	185-190	185 sip	190-195sip	190	190
5/14/2003	17	SXGA	Monitor	2003	6		273	273	270		270-275	285
5/14/2003	18	SXGA	Monitor	2003	6			290			290-295	
5/14/2003	19	SXGA	Monitor	2003	6		410-420	430				430
5/14/2003	17	WXGA	Monitor	2003	6						280-290	
5/14/2003	20.1	VGA	TV	2003	6			480				
5/14/2003	30	WXGA	Monitor	2003	6			1350			1400	
6/11/2003	15	XGA	Monitor	2003	6		185-190	185-190	185 sip	190-195	182-187	190
6/11/2003	17	SXGA	Monitor	2003	6		273	273	265		270-275	285
6/11/2003	18	SXGA	Monitor	2003	6			290			280-290	
6/11/2003	19	SXGA	Monitor	2003	6		410-420	430				430
6/11/2003	20.1	VGA	TV	2003	6			480				
6/11/2003	17	WXGA	Monitor	2003	6						281-290	
6/11/2003	12.1	XGA	NB	2003	6					175	165	165
6/11/2003	13.3	XGA	NB	2003	6							
6/11/2003	14.1	XGA	NB	2003	6		165-175	165-170	165-170		175	180
6/11/2003	15	XGA	NB	2003	6		190-195	190-195		195-198	190-195	200
6/11/2003	15	SXGA+	NB	2003	6		215		210	215	210	230
6/11/2003	15.4	WXGA	NB	2003	6							240
6/11/2003	17	WXGA+	NB	2003	6						340	340

dateofmeeting	screensize	resolution	application	yearstr	month	generalprice_crystal	auo_crystal	cmo_crystal	cpt_crystal	hannstar_crystal	lg_crystal	samsung_crystal
6/11/2003	15	XGA	Monitor	2003	7		185-190	185-190	185sip	190	182-187	190
6/11/2003	17	SXGA	Monitor	2003	7		270	265-270	260		265-270	270
6/11/2003	18	SXGA	Monitor	2003	7			290			280-290	
6/11/2003	19	SXGA	Monitor	2003	7		410-420	430				430
6/11/2003	20.1	VGA	TV	2003	7			480				
6/11/2003	17	WXGA	Monitor	2003	7						281-290	
6/11/2003	12.1	XGA	NB	2003	7					175	165	165
6/11/2003	13.3	XGA	NB	2003	7							
6/11/2003	14.1	XGA	NB	2003	7		165-175	165-170	175		180	180
6/11/2003	15	XGA	NB	2003	7		190-195	190-195		195-198	190-195	200
6/11/2003	15	SXGA+	NB	2003	7		215		210	215	210	230
6/11/2003	15.4	WXGA	NB	2003	7							240
6/11/2003	17	WXGA+	NB	2003	7						340	340
7/9/2003	15	XGA	Monitor	2003	7		185-190	185-190	185 sip	191-192sip	190	190
7/9/2003	17	SXGA	Monitor	2003	7		260	255-260	255-260		265	275
7/9/2003	18	SXGA	Monitor	2003	7			290			310-320	
7/9/2003	19	SXGA	Monitor	2003	7		410-420	420				420
7/9/2003	17	WXGA	Monitor	2003	7						280-290	
7/9/2003	20.1	VGA	TV	2003	7			440				
7/9/2003	23	WXGA	TV	2003	7					700	720	
7/9/2003	26	WXGA	TV	2003	7							1000
7/9/2003	30	WXGA	TV	2003	7			1300-1350			1350-1400	
7/9/2003	32	WXGA	TV	2003	7							1450
7/9/2003	12.1	XGA	NB	2003	7					178	170	170
7/9/2003	13.3	XGA	NB	2003	7							
7/9/2003	14.1	XGA	NB	2003	7		165-175	170	170	180	180	180-185
7/9/2003	15	XGA	NB	2003	7		195-200	195-200	195-200	195-203	200	200-205
7/9/2003	15	SXGA+	NB	2003	7		215-220		230	235	230	230-235
7/9/2003	15.4	WXGA	NB	2003	7							240
7/9/2003	17	WXGA+	NB	2003	7						330	340

dateofmeeting	screensize	resolution	application	yearstr	month	generalprice_crystal	auo_crystal	cmo_crystal	cpt_crystal	hannstar_crystal	lg_crystal	samsung_crystal
7/9/2003	15	XGA	Monitor	2003	8		185-190	185-190	185sip	191-192sip	190	190
7/9/2003	17	SXGA	Monitor	2003	8		260	255-260	255-260		265	275
7/9/2003	18	SXGA	Monitor	2003	8			290			310-320	
7/9/2003	19	SXGA	Monitor	2003	8		410-420	420				420
7/9/2003	17	WXGA	Monitor	2003	8						280-290	
7/9/2003	20.1	VGA	TV	2003	8			440				
7/9/2003	23	WXGA	TV	2003	8							
7/9/2003	26	WXGA	TV	2003	8							1000
7/9/2003	30	WXGA	TV	2003	8			1300-1350			1350-1400	
7/9/2003	32	WXGA	TV	2003	8							1450
7/9/2003	12.1	XGA	NB	2003	8					178	170	170
7/9/2003	13.3	XGA	NB	2003	8							
7/9/2003	14.1	XGA	NB	2003	8		165-175	170	170	180	180	180-185
7/9/2003	15	XGA	NB	2003	8		195-200	195-200	195-200	195-203	200	200-205
7/9/2003	15	SXGA+	NB	2003	8		215-220		230	235	230	230-235
7/9/2003	15.4	WXGA	NB	2003	8							240
7/9/2003	17	WXGA+	NB	2003	8						330	340
8/5/2003	15	XGA	Monitor	2003	8		185-190	185-190	188-190sip	191-193sip	190	10k>195
8/5/2003	17	SXGA	Monitor	2003	8		262-267	262-265	258-260		265-270	275
8/5/2003	18	SXGA	Monitor	2003	8			290-295			310-320	
8/5/2003	19	SXGA	Monitor	2003	8		420	420			420	
8/5/2003	17	WXGA	Monitor	2003	8						290-300	330
8/5/2003	20.1	VGA	TV	2003	8			440-450				
8/5/2003	22	WSGA	TV	2003	8							850
8/5/2003	23	WXGA	TV	2003	8							
8/5/2003	26	WXGA	TV	2003	8							1000
8/5/2003	30	WXGA	TV	2003	8			1300-1350			1350-1400	
8/5/2003	32	WXGA	TV	2003	8							1450
8/5/2003	40	WXGA	TV	2003	8							3900
8/5/2003	12.1	XGA	NB	2003	8					178	170	170
8/5/2003	13.3	XGA	NB	2003	8							
8/5/2003	14.1	XGA	NB	2003	8		175	175	180		180-185	185
8/5/2003	15	XGA	NB	2003	8		200-205	200-205	200-205	205-208	200-205	205-209
8/5/2003	15	SXGA+	NB	2003	8		230-235		230-235	230-235	235	240
8/5/2003	15.2	WXGA	NB	2003	8		235					
8/5/2003	15.4	WXGA	NB	2003	8			245				245
8/5/2003	17	WXGA+	NB	2003	8						335	340

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8/5/2003	15	XGA	Monitor	2003	9		190-195	190-195	192sip	193-195sip	190	190
8/5/2003	17	SXGA	Monitor	2003	9		255-270	262-265	262-265		255-270	275
8/5/2003	18	SXGA	Monitor	2003	9							
8/5/2003	19	SXGA	Monitor	2003	9							420
8/5/2003	17	WXGA	Monitor	2003	9							330
8/5/2003	20.1	VGA	TV	2003	9							
8/5/2003	22	WSGA	TV	2003	9							850
8/5/2003	23	WXGA	TV	2003	9							
8/5/2003	26	WXGA	TV	2003	9							1000
8/5/2003	30	WXGA	TV	2003	9							
8/5/2003	32	WXGA	TV	2003	9							1460
8/5/2003	40	WXGA	TV	2003	9							
8/5/2003	12.1	XGA	NB	2003	9							170
8/5/2003	13.3	XGA	NB	2003	9							
8/5/2003	14.1	XGA	NB	2003	9				180			185
8/5/2003	15	XGA	NB	2003	9							205
8/5/2003	15	SXGA+	NB	2003	9							235
8/5/2003	15.2	WXGA	NB	2003	9							
8/5/2003	15.4	WXGA	NB	2003	9							245
8/5/2003	17	WXGA+	NB	2003	9							340

dateofmeeting	screensize	resolution	application	yearstr	month	generalprice_crystal	auo_crystal	cmo_crystal	cpt_crystal	hannstar_crystal	lg_crystal	samsung_crystal
9/4/2003	12.1	XGA	NB	2003	9					185-187	180	180
9/4/2003	13.3	XGA	NB	2003	9							
9/4/2003	14.1	XGA	NB	2003	9		175-178	175	185		188	190
9/4/2003	15	XGA	NB	2003	9		205	205	205	205-209	205	210
9/4/2003	15	SXGA+	NB	2003	9		235		235	235	235	240
9/4/2003	15	UXGA	NB	2003	9					280	260	285
9/4/2003	15.2	WXGA	NB	2003	9		240					
9/4/2003	15.4	WXGA	NB	2003	9			245	245			255
9/4/2003	17	WXGA+	NB	2003	9						330	330
9/4/2003	15	XGA	Monitor	2003	9		195-200	192-195	192-195sip	200sip	190	195
9/4/2003	17	SXGA	Monitor	2003	9		268-273	265-270(TN)	265		265-270	275-280
9/4/2003	18	SXGA	Monitor	2003	9			295-300			320	
9/4/2003	19	SXGA	Monitor	2003	9		420	420				420
9/4/2003	20.1	SXGA	Monitor	2003	9		570				590	
9/4/2003	17	WXGA	Monitor	2003	9						290-300	330
9/4/2003	20.1	VGA	TV	2003	9		450-470(SVGA)	430-440			430	
9/4/2003	22	WSGA	TV	2003	9							850
9/4/2003	23	WXGA	TV	2003	9					700	700	
9/4/2003	26	WXGA	TV	2003	9							1000
9/4/2003	27	WXGA	TV	2003	9			1000				
9/4/2003	30	WXGA	TV	2003	9		1350	1300-1350			1350	
9/4/2003	32	WXGA	TV	2003	9							1450
9/4/2003	40	WXGA	TV	2003	9							3900
9/4/2003	42	WXGA	TV	2003	9							

dateofmeeting	screensize	resolution	application	yearstr	month	generalprice_crystal	auo_crystal	cmo_crystal	cpt_crystal	hannstar_crystal	lg_crystal	samsung_crystal
9/4/2003	12.1	XGA	NB	2003	10					185-190	180	180
9/4/2003	13.3	XGA	NB	2003	10							
9/4/2003	14.1	XGA	NB	2003	10		180	180	185		190	190
9/4/2003	15	XGA	NB	2003	10		210	210	210	210-214	210	210
9/4/2003	15	SXGA+	NB	2003	10		240		240	240	240	240
9/4/2003	15	UXGA	NB	2003	10					280	265	285
9/4/2003	15.2	WXGA	NB	2003	10		240					
9/4/2003	15.4	WXGA	NB	2003	10			250	250			255
9/4/2003	17	WXGA+	NB	2003	10						330	330
9/4/2003	15	XGA	Monitor	2003	10		195-200	195	192-195sip	205-210sip	190	195
9/4/2003	17	SXGA	Monitor	2003	10		275	270	268		270	280
9/4/2003	18	SXGA	Monitor	2003	10			295-300			320	
9/4/2003	19	SXGA	Monitor	2003	10		420	420			420maybe	420
9/4/2003	20.1	SXGA	Monitor	2003	10		570				590	
9/4/2003	17	WXGA	Monitor	2003	10						290-300	330
9/4/2003	20.1	VGA	TV	2003	10		450-470(SVGA)	430-440			430	
9/4/2003	22	WSGA	TV	2003	10							850
9/4/2003	23	WXGA	TV	2003	10					650		
9/4/2003	26	WXGA	TV	2003	10							1000
9/4/2003	27	WXGA	TV	2003	10			1000				
9/4/2003	30	WXGA	TV	2003	10			1300-1350			1350	
9/4/2003	32	WXGA	TV	2003	10							1450
9/4/2003	40	WXGA	TV	2003	10							3900
9/4/2003	42	WXGA	TV	2003	10							
10/3/2003	14.1	XGA	NB	2003	10		185-190	180	185-190		195	200
10/3/2003	15	XGA	NB	2003	10		210	210	210	210-214	210-215	220
10/3/2003	15	XGA	Monitor	2003	10		200	195-200	200	205-210	193-197	210
10/3/2003	17	SXGA	Monitor	2003	10		275	270-275	270-275		270	285
10/3/2003	19	SXGA	Monitor	2003	10		420	420			420	420

dateofmeeting	screensize	resolution	application	yearstr	month	generalprice_crystal	auo_crystal	cmo_crystal	cpt_crystal	hannstar_crystal	lg_crystal	samsung_crystal
11/3/2003	15	XGA	Monitor	2003	11		203-206	203-205	203-205	220sip	200	220
11/3/2003	17	SXGA	Monitor	2003	11		280-283	275	278-280		278-280	290
11/3/2003	18	SXGA	Monitor	2003	11						320	
11/3/2003	19	SXGA	Monitor	2003	11		420	420			410	410
11/3/2003	17	WXGA	Monitor	2003	11						300	330
11/3/2003	20.1	UXGA	Monitor	2003	11		570	570			570	
11/3/2003	21.3	UXGA	Monitor	2003	11							620
11/3/2003	20.1	VGA	TV	2003	11		440	430-440				
11/3/2003	22	WSGA	TV	2003	11							850
11/3/2003	23	WXGA	TV	2003	11					650		
11/3/2003	26	WXGA	TV	2003	11		900					1000
11/3/2003	27	WXGA	TV	2003	11			950-1000				
11/3/2003	30	WXGA	TV	2003	11		1300	1300			1350	
11/3/2003	32	WXGA	TV	2003	11							1450
11/3/2003	40	WXGA	TV	2003	11							3900
11/3/2003	42	WXGA	TV	2003	11							
11/3/2003	14	VGA	TV	2003	11		225					
11/3/2003	15	XGA	TV	2003	11		215					
11/3/2003	17	SXGA	TV	2003	11		310					
11/3/2003	12.1	XGA	NB	2003	11						185	190
11/3/2003	13.3	XGA	NB	2003	11							
11/3/2003	14.1	XGA	NB	2003	11		190	190	195		200	210-215
11/3/2003	15	XGA	NB	2003	11		215	215	215	225-235	215	230
11/3/2003	15	SXGA+	NB	2003	11		240-245	245-250	245	250	250	260
11/3/2003	15	UXGA	NB	2003	11					290	280	320
11/3/2003	15.2	SXGA	NB	2003	11		245					
11/3/2003	15.4	WXGA	NB	2003	11			255	255		270	270
11/3/2003	17	WXGA+	NB	2003	11						330	330
12/10/2003	14.1	XGA	NB	2003	12		190-195	190-195	190-195	190-195		
12/10/2003	14.1	XGA	NB	2003	12		225-245	225-245	225-245	225-245		
12/10/2003	15	XGA	Monitor	2003	12		215-225	215-225	215-225	215-225		
12/10/2003	17	SXGA	Monitor	2003	12		270-285	270-285	270-285	270-285		
12/10/2003	19	SXGA	Monitor	2003	12		420	420	420	420		

dateofmeeting	screensize	resolution	application	yearstr	month	generalprice_crystal	auo_crystal	cmo_crystal	cpt_crystal	hannstar_crystal	lg_crystal	samsung_crystal
12/10/2003	14.1	XGA	NB	2004	1		195-200	195-200	195-200	195-200		
12/10/2003	14.1	XGA	NB	2004	1		228-250	228-250	228-250	228-250		
12/10/2003	15	XGA	Monitor	2004	1		218-230	218-230	218-230	218-230		
12/10/2003	17	SXGA	Monitor	2004	1		275-290	275-290	275-290	275-290		
12/10/2003	19	SXGA	Monitor	2004	1							
1/16/2004	15	XGA	Monitor	2004	1		220-225	220	220-225	230-235	210-215	220
1/16/2004	17	SXGA	Monitor	2004	1		285-290	285-290	285-290		288-292	310
1/16/2004	18	SXGA	Monitor	2004	1						340	
1/16/2004	19	SXGA	Monitor	2004	1		415	415-420			410	415
1/16/2004	20.1	SXGA	Monitor	2004	1		570	570			570	
1/16/2004	21.3	UXGA	Monitor	2004	1							620
1/16/2004	17	WXGA	Monitor	2004	1						300	340
1/16/2004	20.1	VGA	TV	2004	1		420	420			420	
1/16/2004	22	WSGA	TV	2004	1							850
1/16/2004	23	WXGA	TV	2004	1					650	710	
1/16/2004	26	WXGA	TV	2004	1		900					1000
1/16/2004	27	WXGA	TV	2004	1			850				
1/16/2004	30	WXGA	TV	2004	1		1250	1200-1250			1300	
1/16/2004	32	WXGA	TV	2004	1							1450
1/16/2004	40	WXGA	TV	2004	1							3900
1/16/2004	14	VGA	TV	2004	1		225					
1/16/2004	15	XGA	TV	2004	1		225					
1/16/2004	17	SXGA	TV	2004	1							
1/16/2004	12.1	XGA	NB	2004	1		200				190	200
1/16/2004	13.3	XGA	NB	2004	1							
1/16/2004	14.1	XGA	NB	2004	1		200	200-210			222	220
1/16/2004	15	XGA	NB	2004	1		225	225-230	225-230	235-245	235	250
1/16/2004	15	SXGA+	NB	2004	1		255	250	245	260-270	282	280
1/16/2004	15	UXGA	NB	2004	1					300-305	300	340
1/16/2004	15.2	WXGA	NB	2004	1		250					
1/16/2004	15.4	WXGA	NB	2004	1			275	265		270	270
1/16/2004	17	WXGA+	NB	2004	1						320	340

dateofmeeting	screensize	resolution	application	yearstr	month	generalprice_crystal	auo_crystal	cmo_crystal	cpt_crystal	hannstar_crystal	lg_crystal	samsung_crystal
1/16/2004	15	XGA	Monitor	2004	2		220-225	225	220-225	230-235	210-215	220
1/16/2004	17	SXGA	Monitor	2004	2		290	285-290	285-290		288-292	310
1/16/2004	18	SXGA	Monitor	2004	2						350	
1/16/2004	19	SXGA	Monitor	2004	2		415	420			410	415
1/16/2004	20.1	SXGA	Monitor	2004	2		570	570			570	
1/16/2004	20.1	SXGA	Monitor	2004	2							620
1/16/2004	17	WXGA	Monitor	2004	2						300	340
1/16/2004	20.1	VGA	TV	2004	2		420	420			420	
1/16/2004	22	WSGA	TV	2004	2							850
1/16/2004	23	WXGA	TV	2004	2					650	710	
1/16/2004	26	WXGA	TV	2004	2		900					1000
1/16/2004	27	WXGA	TV	2004	2			850				
1/16/2004	30	WXGA	TV	2004	2		1250	1200-1250			1300	
1/16/2004	32	WXGA	TV	2004	2							1450
1/16/2004	40	WXGA	TV	2004	2							3900
1/16/2004	14	VGA	TV	2004	2		225					
1/16/2004	15	XGA	TV	2004	2		225					
1/16/2004	17	SXGA	TV	2004	2							
1/16/2004	12.1	XGA	NB	2004	2					200	190	200
1/16/2004	13.3	XGA	NB	2004	2							
1/16/2004	14.1	XGA	NB	2004	2		205	215			224	220
1/16/2004	15	XGA	NB	2004	2		230	225-230	225-230	235-245	235	250
1/16/2004	15	SXGA+	NB	2004	2		260	270-280	245	260-270	282	280
1/16/2004	15	UXGA	NB	2004	2					300-305	300	340
1/16/2004	15.2	WXGA	NB	2004	2		260					
1/16/2004	15.4	WXGA	NB	2004	2			275	265		270	270
1/16/2004	17	WXGA+	NB	2004	2						320	340

dateofmeeting	screensize	resolution	application	yearstr	month	generalprice_crystal	auo_crystal	cmo_crystal	cpt_crystal	hannstar_crystal	lg_crystal	samsung_crystal
2/3/2004	12.1	XGA	NB	2004	2					200	190	200
2/3/2004	13.3	XGA	NB	2004	2							
2/3/2004	14.1	XGA	NB	2004	2		205	215			224	220
2/3/2004	15	XGA	NB	2004	2		230	225-230	225-230	235-245	235	250
2/3/2004	15	SXGA+	NB	2004	2		260	270-280	245	270	282	280
2/3/2004	15	UXGA	NB	2004	2						305	340
2/3/2004	15.2	WXGA	NB	2004	2		260					
2/3/2004	15.4	WXGA	NB	2004	2			275	265		270	270
2/3/2004	17	WXGA+	NB	2004	2						320	340
2/3/2004	15	XGA	Monitor	2004	2		220-225	225	220-225	230-235	210-215	220
2/3/2004	17	SXGA	Monitor	2004	2		290	285-290	285-290		288-292	310
2/3/2004	18	SXGA	Monitor	2004	2						350	
2/3/2004	19	SXGA	Monitor	2004	2		415	415-420			410	415
2/3/2004	19	SXGA	Monitor	2004	2							
2/3/2004	17	WXGA	Monitor	2004	2						300	340
2/3/2004	20.1	UXGA	Monitor	2004	2		570	570			570	
2/3/2004	21.3	UXGA	Monitor	2004	2							620
2/3/2004	20.1	VGA	TV	2004	2		420	420-430			420	
2/3/2004	22	WSGA	TV	2004	2							850?
2/3/2004	23	WXGA	TV	2004	2						710	
2/3/2004	26	WXGA	TV	2004	2		800					1000
2/3/2004	27	WXGA	TV	2004	2			850				
2/3/2004	30	WXGA	TV	2004	2		1250	1200-1250			1300	
2/3/2004	32	WXGA	TV	2004	2							1450
2/3/2004	40	WXGA	TV	2004	2							3900
2/3/2004	42	WXGA	TV	2004	2							
2/3/2004	14	VGA	TV	2004	2		225					
2/3/2004	15	XGA	TV	2004	2		225					
2/3/2004	17	SXGA	TV	2004	2		310				310	

dateofmeeting	screensize	resolution	application	yearstr	month	generalprice_crystal	auo_crystal	cmo_crystal	cpt_crystal	hannstar_crystal	lg_crystal	samsung_crystal
3/5/2004	12.1	XGA	NB	2004	3					200	190	205
3/5/2004	13.3	XGA	NB	2004	3							
3/5/2004	14.1	XGA	NB	2004	3		205	215			224	225
3/5/2004	15	XGA	NB	2004	3		230	225-230	225-230	230-235	235	245
3/5/2004	15	SXGA+	NB	2004	3		260	270-275	245	250-255	282	270
3/5/2004	15	UXGA	NB	2004	3					305	305	340
3/5/2004	15.2	SXGA	NB	2004	3		260					
3/5/2004	15.4	WXGA	NB	2004	3			275	260		265	265
3/5/2004	17	WXGA+	NB	2004	3						310	330
3/5/2004	15	XGA	Monitor	2004	3		220-225	225-230	225-230	245	220	220
3/5/2004	17	SXGA	Monitor	2004	3		290	290	285-290	290	295-310	310
3/5/2004	18	SXGA	Monitor	2004	3						360	
3/5/2004	19	SXGA	Monitor	2004	3		415	415-420			410	415
3/5/2004	19	SXGA	Monitor	2004	3						395	
3/5/2004	17	WXGA	Monitor	2004	3						300	340
3/5/2004	20.1	UXGA	Monitor	2004	3		570	570			570	
3/5/2004	21.3	UXGA	Monitor	2004	3							620
3/5/2004	20.1	VGA	TV	2004	3		410	400-420			420	
3/5/2004	22	WSGA	TV	2004	3							800
3/5/2004	23	WXGA	TV	2004	3					670	710	
3/5/2004	26	WXGA	TV	2004	3		780					1000
3/5/2004	27	WXGA	TV	2004	3			800-850				
3/5/2004	30	WXGA	TV	2004	3		1150	1150-1250			1200	
3/5/2004	32	WXGA	TV	2004	3							1450
3/5/2004	40	WXGA	TV	2004	3							3900
3/5/2004	42	WXGA	TV	2004	3							
3/5/2004	14	VGA	TV	2004	3		225					
3/5/2004	15	XGA	TV	2004	3		230					
3/5/2004	17	SXGA	TV	2004	3		310				310	

dateofmeeting	screensize	resolution	application	yearstr	month	generalprice_crystal	auo_crystal	cmo_crystal	cpt_crystal	hannstar_crystal	lg_crystal	samsung_crystal
3/5/2004	12.1	XGA	NB	2004	4							
3/5/2004	13.3	XGA	NB	2004	4							
3/5/2004	14.1	XGA	NB	2004	4		205					
3/5/2004	15	XGA	NB	2004	4		230					
3/5/2004	15	SXGA+	NB	2004	4		260					
3/5/2004	15	UXGA	NB	2004	4							
3/5/2004	15.2	WXGA	NB	2004	4		260					
3/5/2004	15.4	WXGA	NB	2004	4							
3/5/2004	17	WXGA+	NB	2004	4							
3/5/2004	15	XGA	Monitor	2004	4		225-230					
3/5/2004	17	SXGA	Monitor	2004	4		290					
3/5/2004	18	SXGA	Monitor	2004	4							
3/5/2004	19	SXGA	Monitor	2004	4		415					
3/5/2004	19	SXGA	Monitor	2004	4							
3/5/2004	17	WXGA	Monitor	2004	4							
3/5/2004	20.1	UXGA	Monitor	2004	4		570					
3/5/2004	20.1	VGA	TV	2004	4		405					
3/5/2004	22	WSGA	TV	2004	4							
3/5/2004	23	WXGA	TV	2004	4							
3/5/2004	26	WXGA	TV	2004	4		750					
3/5/2004	27	WXGA	TV	2004	4							
3/5/2004	30	WXGA	TV	2004	4		1050					
3/5/2004	32	WXGA	TV	2004	4							
3/5/2004	40	WXGA	TV	2004	4							
3/5/2004	42	WXGA	TV	2004	4							
3/5/2004	14	VGA	TV	2004	4		225					
3/5/2004	15	XGA	TV	2004	4		230					
3/5/2004	17	SXGA	TV	2004	4		310					
4/2/2004	15	XGA	Monitor	2004	4	increase $3-5						
4/2/2004	17	SXGA	Monitor	2004	4	increase $3-5			300			
4/2/2004	15	XGA	Monitor	2004	4	225-230						
4/2/2004	17	SXGA	Monitor	2004	4	290-295						

dateofmeeting	screensize	resolution	application	yearstr	month	generalprice_crystal	auo_crystal	cmo_crystal	cpt_crystal	hannstar_crystal	lg_crystal	samsung_crystal
5/6/2004	12.1	XGA	NB	2004	5						200	205
5/6/2004	13.3	XGA	NB	2004	5							
5/6/2004	14.1	XGA	NB	2004	5		205-210	215			224	220
5/6/2004	15	XGA	NB	2004	5		230	225-230	225-230	225-230	230-240	240
5/6/2004	15	SXGA+	NB	2004	5		255	270-280	250	255-260	282	265
5/6/2004	15	UXGA	NB	2004	5					310	305	330
5/6/2004	15.2	WXGA	NB	2004	5		260					
5/6/2004	15.4	WXGA	NB	2004	5			260	255-260		266	260
5/6/2004	15.4	SXGA	NB	2004	5						320	
5/6/2004	17	WXGA+	NB	2004	5						300	320
5/6/2004	15	XGA	Monitor	2004	5		230-235	230-235	230-235	255	233-235	235
5/6/2004	17	SXGA	Monitor	2004	5		295-300	290-295	300	295	295-310	310
5/6/2004	18	SXGA	Monitor	2004	5							
5/6/2004	19	SXGA	Monitor	2004	5		415-420	415-420			410	415
5/6/2004	19	SXGA	Monitor	2004	5						390	
5/6/2004	17	WXGA	Monitor	2004	5						320-330	330
5/6/2004	20.1	UXGA	Monitor	2004	5		550	545			510-530	
5/6/2004	21.3	UXGA	Monitor	2004	5							650
5/6/2004	20.1	VGA	TV	2004	5		400	390-400			400	
5/6/2004	22	WSGA	TV	2004	5							650
5/6/2004	23	WXGA	TV	2004	5					650	680-690	
5/6/2004	26	WXGA	TV	2004	5		700				790	800
5/6/2004	27	WXGA	TV	2004	5			700				
5/6/2004	30	WXGA	TV	2004	5		1000	1000-1050			1100-1150	
5/6/2004	32	WXGA	TV	2004	5							1250
5/6/2004	40	WXGA	TV	2004	5							3350
5/6/2004	42	WXGA	TV	2004	5							
5/6/2004	14	VGA	TV	2004	5		220					
5/6/2004	15	XGA	TV	2004	5		235					
5/6/2004	17	SXGA	TV	2004	5		315				320	

dateofmeeting	screensize	resolution	application	yearstr	month	generalprice_crystal	auo_crystal	cmo_crystal	cpt_crystal	hannstar_crystal	lg_crystal	samsung_crystal
6/4/2004	15.4	WXGA	NB	2004	6			245				
6/4/2004	17	SXGA	Monitor	2004	6		295-300	290-295	300	295	295-310	310
6/4/2004	30	WXGA	TV	2004	6			900				
6/4/2004	19	SXGA	Monitor	2004	6		400-410	400-410			395-400	400-405
7/8/2004	12.1	XGA	NB	2004	6						205	205
7/8/2004	13.3	XGA	NB	2004	6							
7/8/2004	14.1	XGA	NB	2004	6		205-210	205			220	215
7/8/2004	15	XGA	NB	2004	6		230	225	225-230	230-235	230-247	230-240
7/8/2004	15	SXGA+	NB	2004	6		255	270	250	255	282	265
7/8/2004	15	UXGA	NB	2004	6					310	305	320
7/8/2004	15.2	WXGA	NB	2004	6		260					
7/8/2004	15.4	WXGA	NB	2004	6			245	255-260		266	260
7/8/2004	17	WXGA+	NB	2004	6						300	320
7/8/2004	15	XGA	Monitor	2004	6		230-235	230-235	230-235	245	235	235
7/8/2004	17	SXGA	Monitor	2004	6		295-300	295/tn	300	295	295-310	310
7/8/2004	18	SXGA	Monitor	2004	6							
7/8/2004	19	SXGA	Monitor	2004	6		410-415				410-415	415
7/8/2004	19	SXGA	Monitor	2004	6						390-405	
7/8/2004	17	WXGA	Monitor	2004	6						310-315	330
7/8/2004	20.1	UXGA	Monitor	2004	6		510-530	545			510-550	
7/8/2004	21.3	UXGA	Monitor	2004	6							650
7/8/2004	20.1	VGA	TV	2004	6		360-380	390-400			390	
7/8/2004	22	WSGA	TV	2004	6							650
7/8/2004	23	WXGA	TV	2004	6					650	670	
7/8/2004	26	WXGA	TV	2004	6		670-680				770	780
7/8/2004	27	WXGA	TV	2004	6			700				
7/8/2004	30	WXGA	TV	2004	6		965-975	1000-1050			1050-1100	
7/8/2004	32	WXGA	TV	2004	6							1200
7/8/2004	40	WXGA	TV	2004	6							3100
7/8/2004	42	WXGA	TV	2004	6							
7/8/2004	14	VGA	TV	2004	6		220					
7/8/2004	15	XGA	TV	2004	6		235				240	
7/8/2004	17	SXGA	TV	2004	6		315				310	

dateofmeeting	screensize	resolution	application	yearstr	month	generalprice_crystal	auo_crystal	cmo_crystal	cpt_crystal	hannstar_crystal	lg_crystal	samsung_crystal
7/8/2004	12.1	XGA	NB	2004	7						200	195
7/8/2004	14	WXGA	NB	2004	7		230-235					
7/8/2004	14.1	XGA	NB	2004	7		200-210	205			220	210
7/8/2004	15	XGA	NB	2004	7		210-220	215-220	220	215-220	225-243	225
7/8/2004	15	SXGA+	NB	2004	7		245-255	260-265	250	255	265-275	260
7/8/2004	15	UXGA	NB	2004	7					310	305	310
7/8/2004	15.2	SXGA	NB	2004	7		255					
7/8/2004	15.4	WXGA	NB	2004	7		240-250	240-245	250		255-260	245-260
7/8/2004	17	WXGA+	NB	2004	7						295-305	300
7/8/2004	15	XGA	Monitor	2004	7		225-235	225	225	225	225-230	220
7/8/2004	17	SXGA	Monitor	2004	7			285-290	285	285	293-300	295
7/8/2004	18	SXGA	Monitor	2004	7							
7/8/2004	19	SXGA	Monitor	2004	7		400-410	390-400			405	400
7/8/2004	19	SXGA	Monitor	2004	7			385-390			385-395	
7/8/2004	17	WXGA	Monitor	2004	7						305-310	300
7/8/2004	20.1	UXGA	Monitor	2004	7		500-530	535			505-545	
7/8/2004	21.3	UXGA	Monitor	2004	7							600
7/8/2004	20.1	VGA	TV	2004	7		300-370	360				
7/8/2004	22	WSGA	TV	2004	7							600
7/8/2004	23	WXGA	TV	2004	7					600		
7/8/2004	26	WXGA	TV	2004	7		620					750
7/8/2004	27	WXGA	TV	2004	7			650				
7/8/2004	30	WXGA	TV	2004	7		925	900-940				
7/8/2004	32	WXGA	TV	2004	7							1100
7/8/2004	40	WXGA	TV	2004	7							3050
7/8/2004	42	WXGA	TV	2004	7							
7/8/2004	14	VGA	TV	2004	7		200					
7/8/2004	15	XGA	TV	2004	7		225	225				
7/8/2004	17	SXGA	TV	2004	7		300					
8/10/2004	15	XGA	Monitor	2004	8	180						
8/10/2004	17	SXGA	Monitor	2004	8	230						
8/10/2004	19	SXGA	Monitor	2004	8	320(TN) 340 (VA)						
8/10/2004	14.1	XGA	NB	2004	8	180						
8/10/2004	15	XGA	NB	2004	8	190						
8/10/2004	15	SXGA+	NB	2004	8	220						
8/10/2004	15.4	WXGA	NB	2004	8	230						

dateofmeeting	screensize	resolution	application	yearstr	month	generalprice_crystal	auo_crystal	cmo_crystal	cpt_crystal	hannstar_crystal	lg_crystal	samsung_crystal
9/3/2004	14.1	XGA	NB	2004	9	180						
9/3/2004	15	XGA	NB	2004	9	190						
9/3/2004	15.4	WXGA	NB	2004	9	220						
9/3/2004	15	SXGA+	NB	2004	9	230						
9/3/2004	12.1	XGA	NB	2004	9	180						
9/3/2004	15	XGA	Monitor	2004	9	170						
9/3/2004	17	SXGA	Monitor	2004	9	205						
9/3/2004	19	SXGA	Monitor	2004	9	300 (TN -$30)						
10/6/2004	12.1	XGA	NB	2004	10							190
10/6/2004	14.1	XGA	NB	2004	10							160
10/6/2004	15	XGA	NB	2004	10							170
10/6/2004	15	SXGA+	NB	2004	10							240
10/6/2004	15	UXGA	NB	2004	10							280
10/6/2004	15.4	WXGA	NB	2004	10							200
10/6/2004	17	WXGA+	NB	2004	10							280
10/6/2004	15	XGA	Monitor	2004	10				155-165	155-165		165
10/6/2004	17	SXGA	Monitor	2004	10					170-180		195
10/6/2004	19	SXGA	Monitor	2004	10							310
10/6/2004	17	WXGA	Monitor	2004	10							280
10/6/2004	20.1	UXGA	Monitor	2004	10			550				
10/6/2004	22	WSGA	TV	2004	10							500
10/6/2004	23	WXGA	TV	2004	10							560
10/6/2004	32	WXGA	TV	2004	10							800
10/6/2004	40	WXGA	TV	2004	10							2000
12/8/2004	17	SXGA	Monitor	2004	12				150			
12/8/2004	15	XGA	Monitor	2004	12		120			115		
12/8/2004	15	SXGA+	NB	2004	12		180	190	170			
12/8/2004	15	XGA	NB	2004	12		140			140-145		
12/8/2004	12.1	XGA	NB	2004	12			160				
12/8/2004	15.4	WXGA	NB	2004	12			170	155			
12/8/2004	14.1	XGA	NB	2004	12		130	140				
12/8/2004	12.1	WXGA	NB	2004	12							

dateofmeeting	screensize	resolution	application	yearstr	month	generalprice_crystal	auo_crystal	cmo_crystal	cpt_crystal	hannstar_crystal	lg_crystal	samsung_crystal
1/7/2005	17	SXGA	Monitor	2005	1							150
1/7/2005	19	SXGA	Monitor	2005	1					215-220	230	
1/7/2005	14.1	XGA	NB	2005	1							160
1/7/2005	15	XGA	NB	2005	1					140-145		
1/7/2005	15.4	WXGA	NB	2005	1			160-165				
1/7/2005	14	WXGA	NB	2005	1							160
1/7/2005	32	WXGA	TV	2005	1						~670	700
3/4/2005	15	XGA	Monitor	2005	3					115		
3/4/2005	17	SXGA	Monitor	2005	3		155-160	153-157		150		
3/4/2005	19	SXGA	Monitor	2005	3		220-225			210-215		
3/4/2005	15	XGA	NB	2005	3		120					
4/6/2005	15	SXGA+	NB	2005	4					170		
4/6/2005	15.4	WXGA	NB	2005	4	140				140		
4/6/2005	15	XGA	NB	2005	4					115-120		
4/6/2005	12.1	WXGA	NB	2005	4					160		
4/6/2005	14	WXGA	NB	2005	4					150		160
4/6/2005	17	SXGA	Monitor	2005	4			163-165				165
4/6/2005	40	WXGA	TV	2005	4							1300-1400
4/6/2005	15	XGA	Monitor	2005	4							115-120
4/6/2005	15.4	WXGA	NB	2005	4							140
4/6/2005	14.1	XGA	NB	2005	4					125		125
4/6/2005	17	SXGA	Monitor	2005	5			163-165				
5/5/2005	17	SXGA	Monitor	2005	5				165	165	165	
5/5/2005	15	XGA	NB	2005	5				125-130			
5/5/2005	14.1	XGA	NB	2005	5			120				120
5/5/2005	15	XGA	NB	2005	5			113-115				130
5/5/2005	15.4	WXGA	NB	2005	5			120-125		120-125		120
5/5/2005	15	XGA	Monitor	2005	5					125-130		140
5/5/2005	17	SXGA	Monitor	2005	5					165	165	170
5/5/2005	19	SXGA	Monitor	2005	5					215	240-245	230
5/5/2005	21	WSXGA+	Monitor	2005	5							340

dateofmeeting	screensize	resolution	application	yearstr	month	generalprice_crystal	auo_crystal	cmo_crystal	cpt_crystal	hannstar_crystal	lg_crystal	samsung_crystal
5/5/2005	17	SXGA	Monitor	2005	6						170	
6/14/2005	15	XGA	Monitor	2005	6				138-140	135-140	140	
6/14/2005	17	SXGA	Monitor	2005	6				168	165-170	170	170
6/14/2005	19	SXGA	Monitor	2005	6				210	225	230	220
6/14/2005	12.1	WXGA	NB	2005	6			150				155
6/14/2005	14.1	XGA	NB	2005	6							120-125
6/14/2005	15	XGA	NB	2005	6					120-125	130	135-140
6/14/2005	15.4	WXGA	NB	2005	6				135-140			120-130
6/14/2005	20.1	SXGA	Monitor	2005	6			250				
6/14/2005	27	WXGA	TV	2005	6			380-390				
6/14/2005	30	WXGA	TV	2005	6			520-530				
6/14/2005	32	WXGA	TV	2005	6			590				
6/14/2005	37	WXGA	TV	2005	6			900-950				
6/14/2005	12.1	XGA	NB	2005	7	150						
6/14/2005	14.1	XGA	NB	2005	7	115-125						
6/14/2005	12.1	WXGA	NB	2005	7	155-160						
6/14/2005	14.1	WXGA	NB	2005	7	130-135						
6/14/2005	15.4	WXGA	NB	2005	7	135						
6/14/2005	15	XGA	NB	2005	7	125-130						
7/8/2005	15	XGA	Monitor	2005	7		140		140			
7/8/2005	17	SXGA	Monitor	2005	7		165-170		170	170-175	170	168
7/8/2005	19	SXGA	Monitor	2005	7		220-230		205	210-225		220
7/8/2005	15.4	WXGA	NB	2005	7				145			135-138
7/8/2005	14.1	XGA	NB	2005	7				120			
7/8/2005	14	WXGA	NB	2005	7				135-140			
7/8/2005	15	XGA	NB	2005	7				135-140			140
7/8/2005	37	WXGA	TV	2005	7						870	
7/8/2005	15.4	WXGA	NB	2005	7							
7/8/2005	32	WXGA	TV	2005	7						600	

dateofmeeting	screensize	resolution	application	yearstr	month	generalprice_crystal	auo_crystal	cmo_crystal	cpt_crystal	hannstar_crystal	lg_crystal	samsung_crystal
8/4/2005	15	XGA	Monitor	2005	8				141-142			
8/4/2005	17	SXGA	Monitor	2005	8				173	170-175		175
8/4/2005	19	SXGA	Monitor	2005	8				210	218-220(8ms) 205-207(12ms)		
8/4/2005	15.4	WXGA	NB	2005	8				150-155			
8/4/2005	14.1	XGA	NB	2005	8				130			
8/4/2005	14	WXGA	NB	2005	8				140			
8/4/2005	15	XGA	NB	2005	8				135			
8/4/2005	12.1	WXGA	NB	2005	8				155-160			
8/4/2005	32	WXGA	TV	2005	8				570-580			580
8/4/2005	40	WXGA	TV	2005	8							980
9/6/2005	15.4	WXGA	NB	2005	9		145-150		155-160			155
9/6/2005	23	WXGA	TV	2005	9							320
9/6/2005	17	SXGA	Monitor	2005	9				170			170-173
9/6/2005	32	WXGA	TV	2005	9				570			590
9/6/2005	40	WXGA	TV	2005	9							990
9/6/2005	14	WXGA	NB	2005	9							135-140
9/6/2005	15	XGA	NB	2005	9							150
9/6/2005	19	SXGA	Monitor	2005	9							220
9/6/2005	17	WXGA+	NB	2005	9							185
9/6/2005	14.1	XGA	NB	2005	9							135
9/6/2005	17	SXGA+	Monitor	2005	9							225
9/6/2005	15	XGA	Monitor	2005	9				140			

dateofmeeting	screensize	resolution	application	yearstr	month	generalprice_crystal	auo_crystal	cmo_crystal	cpt_crystal	hannstar_crystal	lg_crystal	samsung_crystal
10/6/2005	19	WXGA	Monitor	2005	10			205-210				
10/6/2005	19	SXGA	Monitor	2005	10			220-215		195-200 (12ms) 208-210 (8ms)		210-215 (tn) 235-240(VA)
10/6/2005	17	SXGA	Monitor	2005	10				169			170-173
10/6/2005	15.4	WXGA	NB	2005	10				165-170(220 nits) 155-160 (150nits)			
10/6/2005	32	WXGA	TV	2005	10				550			565-570
10/6/2005	40	WXGA	TV	2005	10							930-940
10/6/2005	15.4	WXGA	NB	2005	10							155
10/6/2005	15.4	WXGA	NB	2005	10							160
10/6/2005	20.1	SXGA	Monitor	2005	10							310
10/6/2005	20.1	WXGA	Monitor	2005	10							310
10/6/2005	21	WSXGA+	Monitor	2005	10							330
11/4/2005	17	SXGA	Monitor	2005	11			168	168	167-168		168-169
11/4/2005	19	SXGA	Monitor	2005	11			205-210	205	195-200(12ms) 205-208 (8ms)		205-210(tn) 225-235(va)
11/4/2005	20.1	WXGA	Monitor	2005	11			270				
11/4/2005	15.4	WXGA	NB	2005	11			165-170	165-170(220 nits) 155-160			
11/4/2005	32	WXGA	TV	2005	11			550	560-570			570
11/4/2005	15	XGA	Monitor	2005	11					135		
11/4/2005	40	WXGA	TV	2005	11							920
11/4/2005	15.4	WXGA	NB	2005	11							162
11/4/2005	15.4	WXGA	NB	2005	11							167
11/4/2005	20.1	SXGA	Monitor	2005	11				220-230			
11/4/2005	20.1	WXGA	Monitor	2005	11				250-270			

dateofmeeting	screensize	resolution	application	yearstr	month	generalprice_crystal	auo_crystal	cmo_crystal	cpt_crystal	hannstar_crystal	lg_crystal	samsung_crystal
12/6/2005	19	WXGA	Monitor	2005	12			190				
12/6/2005	19	SXGA	Monitor	2005	12					180		
12/6/2005	17	SXGA	Monitor	2005	12					145		
12/6/2005	15	XGA	Monitor	2005	12					130		
1/6/2006	19	WXGA	Monitor	2006	1			175-180				180
1/6/2006	22	WSGA	Monitor	2006	1			300				
1/6/2006	20.1	WXGA	Monitor	2006	1				230			
1/6/2006	15	XGA	Monitor	2006	1	125-128				115		
1/6/2006	17	SXGA	Monitor	2006	1	150				145		
1/6/2006	19	SXGA	Monitor	2006	1	190						
1/6/2006	23	WXGA	TV	2006	1	510						
1/6/2006	20.1	WXGA	Monitor	2006	1	285						
1/6/2006	20.1	UXGA	Monitor	2006	1	285						
1/6/2006	30	WXGA	TV	2006	1	900						
1/6/2006	24	WUXGA	TV	2006	1	530						
1/6/2006	21	WSXGA+	Monitor	2006	1	305						
1/6/2006	20.1	WXGA	Monitor	2006	1	245(tn)						

Appendix F. Detailed Calculations of Volume of Commerce Excluding Sales to LG and Samsung

Table F1. AUO's Volume of U.S. Commerce, Excluding Sales to LG and Samsung (No Other Changes), in Millions of U.S. Dollars

Category	*Volume of sales*	*U.S. share (percent)*	*U.S. volume of sales*
1. Panels imported directly into the U.S.	19.2	100.0	19.2
2. Billed or invoiced to purchasers in the U.S.	85.2	47.8	40.7
3. Purchased by foreign affiliates of U.S. companies and integrated into final products imported to the U.S.	1,273.1	47.8	608.2
Total categories 1, 2 and 3			668.1

Note:
[1] Volume of sales excludes internal AUO and AUOA sales.

Sources:
[1] AUO transaction data.
[2] Gartner Group Detailed Data and DisplaySearch.

Table F2. AUO's Volume of U.S. Commerce, Using Only Sales of Products Known to be Subject to Cartel Influence and Excluding Sales to LG and Samsung, in Millions of U.S. Dollars

Category	*Volume of sales*	*U.S. share (percent)*	*U.S. volume of sales*
1. Panels imported directly into the U.S.	11.8	100.0	11.8
2. Billed or invoiced to purchasers in the U.S.	12.3	44.4	5.4
3. Purchased by foreign affiliates of U.S. companies and integrated into final products imported to the U.S.	464.7	44.4	206.5
Total categories 1, 2 and 3			223.7

Notes:
[1] Volume of sales excludes internal AUO and AUOA sales.
[2] Product/size/resolution combinations identified using both general and AUO-specific price data.

Sources:
[1] AUO transaction data.
[2] Gartner Group Detailed Data and DisplaySearch.
[3] List of product/size/resolution combinations provided by Dr. Leffler.

Appendix G. Analysis of the Lost Consumer Opportunity

The standard consumer-surplus analysis of the consumer loss from an overcharge breaks the loss down into the same two elements as in the Sentencing Guidelines. The first is the direct effect equal to the higher total cost to the consumers who continue to buy the product,

$$C = Q \times \Delta P.$$

Here Q is the number of units they purchase, and ΔP is the elevation in the price per unit. Note that this can also be written as

$$C = PQ \times \frac{\Delta P}{P},$$

which is the way that the calculations are usually set up, as the actual purchases at the higher price, PQ, times the proportional increase in the price, $\Delta P/P$.

The second part is the lost consumer opportunity, also called the deadweight burden on the consumer, the welfare triangle, or the Harberger Triangle, after Arnold Harberger, who promoted the approach. That amount is

$$T = \frac{1}{2} \times \Delta P \times \Delta Q.$$

Here ΔQ is the added amount consumers would have purchased if the price had been lower by the amount ΔP. The factor 1/2 enters the calculation geometrically because the area of a triangle is half the product of its width and height. The economic logic is that the first consumer who stops consuming when the price first rises had almost no benefit from it, because a very small price increase induced the consumer to quit buying. When the price is halfway up, the lost benefit is half the price increase, and so on, up to the last consumer to quit buying, whose loss is the full amount of the price increase. The average loss occurs halfway through the process, hence the one-half in the formula.

The formula for the lost consumer opportunity can be rewritten

$$T = \frac{1}{2} \times \frac{P}{Q}\frac{\Delta Q}{\Delta P} \times \frac{\Delta P}{P} Q \times \Delta P.$$

The expression

$$\frac{P}{Q}\frac{\Delta Q}{\Delta P}$$

is the *elasticity of demand*, the proportional change in the amount consumed per unit of proportional change in the price, a fundamental concept of economics. Notice also that the last part of the formula is $C = Q \times \Delta P$, the cost to the continuing customers mentioned above. Thus the lost consumer opportunity is

$$T = \frac{1}{2} \times [\text{Elasticity}] \times \frac{\Delta P}{P} \times C.$$

The quantity

$$\frac{1}{2} \times [\text{Elasticity}] \times \frac{\Delta P}{P}$$

is the ratio of the lost consumer opportunity harm to the overcharge harm – it is the amount that needs to be added to the simple overcharge amount to get the total harm of an overcharge. Elasticities for consumer goods tend to cluster around one. Thus the add-on for the lost consumer opportunity when the elasticity is one and the overcharge is 10 percent is equal to 1/2 × 1 × 0.1 times the direct overcharge, or 0.05 times that amount, that is, 5 percent of the direct overcharge.

For the add-on for lost consumer opportunities to be equal to 10 percent of P × Q (observed revenue), as presumed in the Sentencing Guidelines, we must have

$$\frac{1}{2} \times [\text{Elasticity}] \times \left(\frac{\Delta P}{P}\right)^2 = 0.1$$

With an elasticity of 1.0, the overcharge would be the square root of 0.2, which is 0.45, or an overcharge of 45 percent.

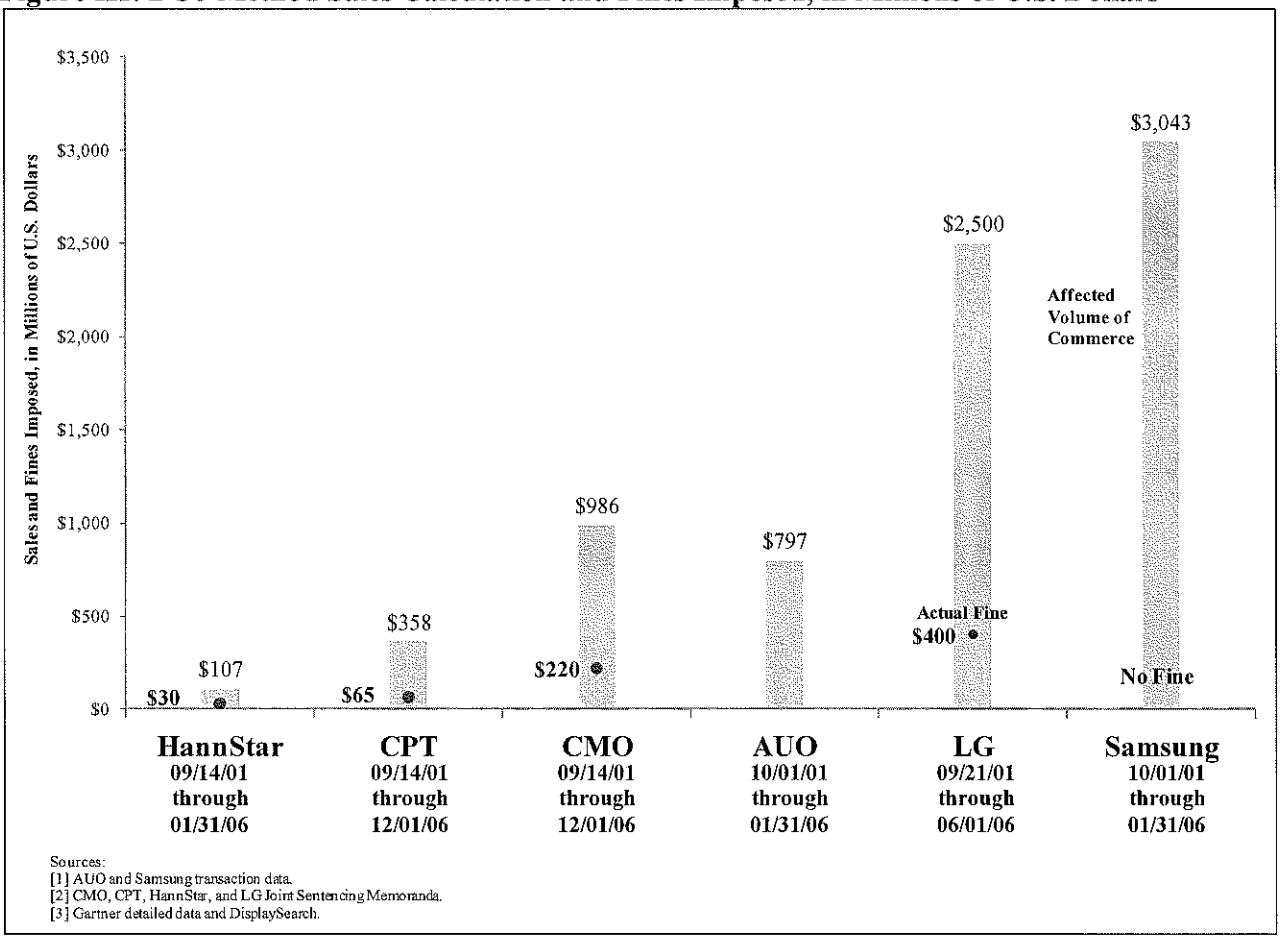
For the lost consumer opportunity element to equal the overcharge, as presumed in the guidelines,

$$\frac{1}{2} \times [\text{Elasticity}] \times \left(\frac{\Delta P}{P}\right)^2 = \frac{\Delta P}{P},$$

which, again with elasticity 1.0, has the solution that the overcharge is 2.0 or 200 percent and the consumer opportunity element is another 200 percent, far above the guidelines.

Appendix H. Comparison of Fines to Date Using Comparable Methods, Varying Time Periods

Figure H1. DOJ Method Sales Calculation and Fines Imposed, in Millions of U.S. Dollars



Sources:
[1] AUO and Samsung transaction data.
[2] CMO, CPT, HannStar, and LG Joint Sentencing Memoranda.
[3] Gartner detailed data and DisplaySearch.

Figure H2. Volume of Commerce Calculation by Dr. Leffler's Method and Fines Imposed, in Millions of U.S. Dollars

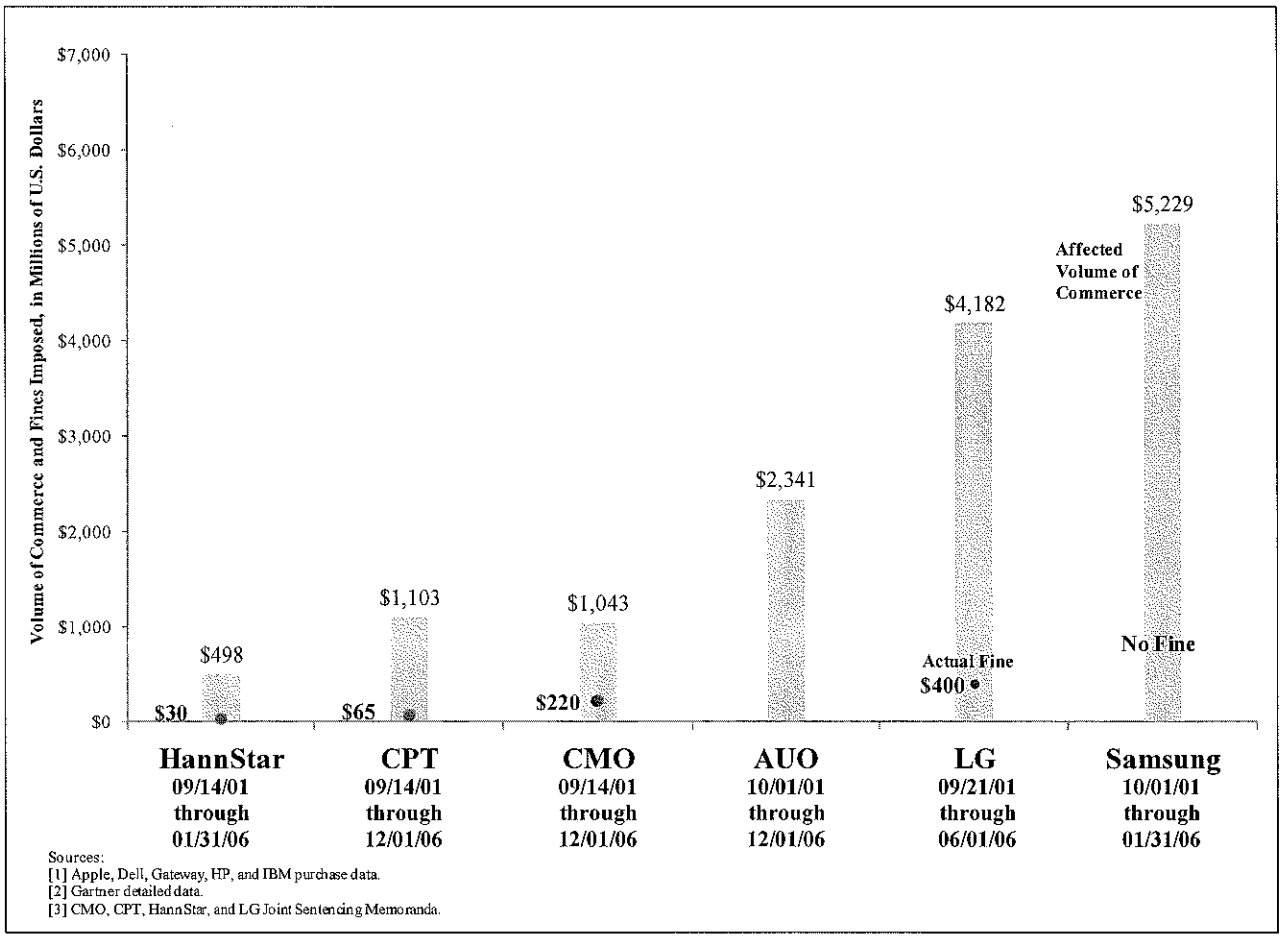
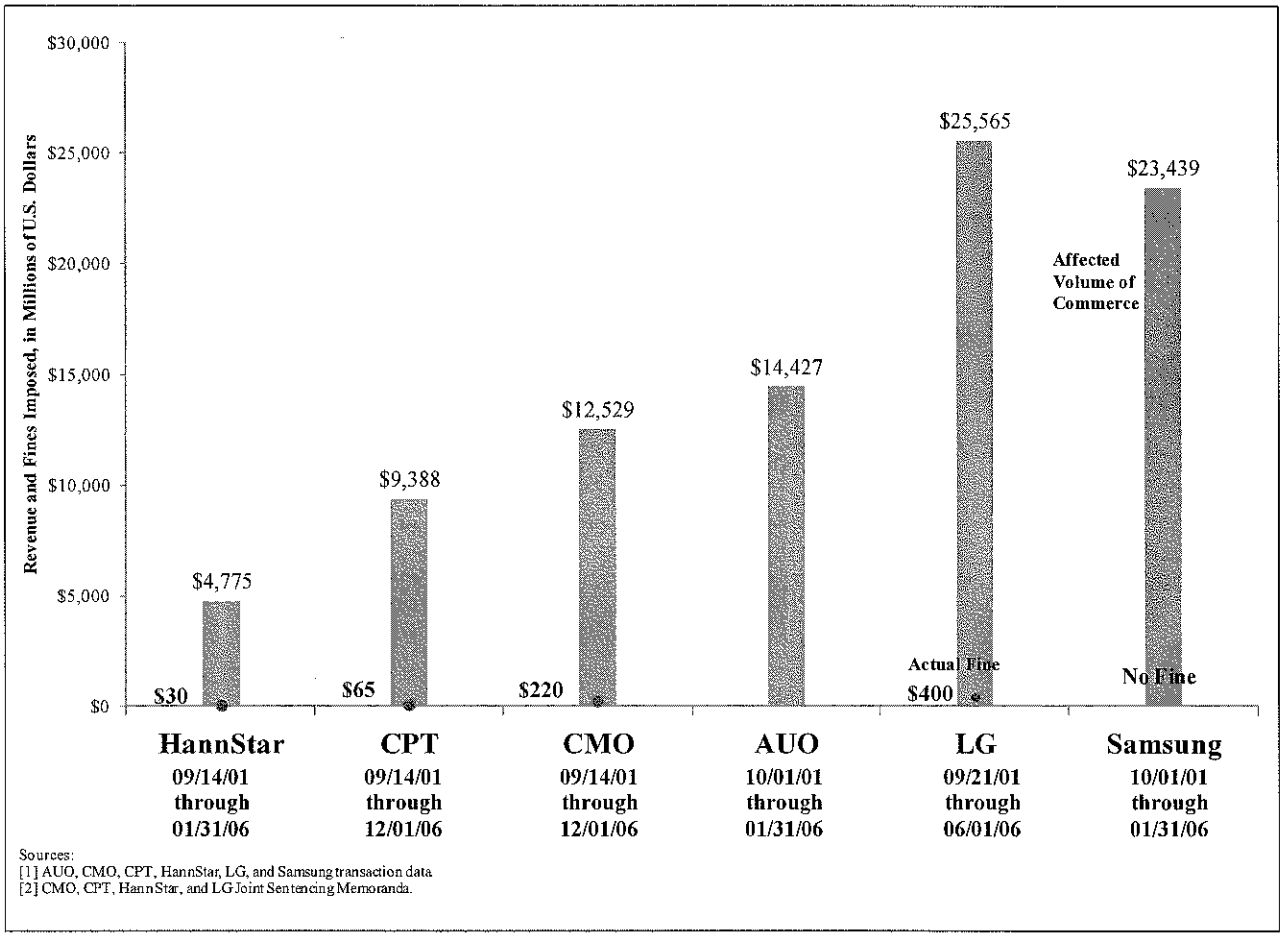


Figure H3. 12 to 30 Inch LCD Panel Worldwide Revenue and Fines Imposed, in Millions of U.S. Dollars



Sources:
[1] AUO, CMO, CPT, HannStar, LG, and Samsung transaction data.
[2] CMO, CPT, HannStar, and LG Joint Sentencing Memoranda.

Appendix I. Volume of Commerce Calculations with Various Exclusions, in Millions of U.S. Dollars

	Dr. Leffler's U.S. Volume of Commerce	*U.S. Volume of Commerce Using AUO's Sales Data and DOJ Concepts*
Baseline using DOJ formula and ending Jan 2006 (Dr. Leffler's baseline is after adjustments)	**726**	**797**
INDIVIDUAL EXCLUSIONS		
Exclude sales to LG and Samsung only	608[1]	668
Exclude sales to Dell only	433	491
CUMULATIVE EXCLUSIONS		
Exclude sales to LG, Samsung and post-2004 Dell	315[1]	362
Exclude sales to LG, Samsung and Dell post-2004 PLUS exclude all transactions without a corresponding discussed price	150[1]	165

Note:

[1] Estimated based on percent change of Dr. Hall's U.S. volume of commerce.

Sources:

[1] AUO transaction data.

[2] Gartner Group Detailed Data and Display Search.

[3] List of product/size/resolution combinations provided by Dr. Leffler.

[4] Draft Declaration of Dr. Keith Leffler Regarding AUO's U.S. Volume of Commerce for Sentencing Hearing, September 14, 2012.