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UNITED STATES DISTRICT COURT
NORTHERN DISTRICT OF CALIFORNIA
SAN FRANCISCO DIVISION

UNITED STATES OF AMERICA

v.

AU OPTRONICS CORPORATION;
AU OPTRONICS CORPORATION AMERICA;
HSUAN BIN CHEN, aka H.B. CHEN;
HUI HSIUNG, aka KUMA;
LAI-JUH CHEN, aka L.J. CHEN;
SHIU LUNG LEUNG, aka CHAO-LUNG
LIANG and STEVEN LEUNG;
BORLONG BAI, aka RICHARD BAI;
TSANNRONG LEE, aka TSAN-JUNG LEE and
HUBERT LEE;
CHENG YUAN LIN, aka C.Y. LIN;
WEN JUN CHENG, aka TONY CHENG; and
DUK MO KOO,

Defendants.

) No. CR-09-0110 SI

)
) DECLARATION OF DR. KEITH
) LEFFLER REGARDING AUO'S U.S.
) VOLUME OF COMMERCE FOR
) SENTENCING HEARING

) Date: September 20, 2012
) Time: 10:00 a.m.
) Court: Hon. Susan Illston
) Place: Courtroom 10, 19th Floor

- 1 1. I Keith Leffler testified in the trial of *United States v. AUO et al.* My experience and
 2 background were summarized therein.
- 3 2. I have been asked by the Department of Justice to calculate the total dollar sales of the
 4 AUO LCD panels named in the AUO Superseding Indictment (“Indictment panels”) that
 5 were incorporated into computer monitors, notebook computers, and televisions sold in the
 6 United States (hereafter “AUO U.S. volume of commerce”) over the period October 2001
 7 through December 1, 2006.¹ I have also been asked to evaluate Professor Robert Hall’s
 8 estimated volume of affected commerce and “percentage gain from overcharge”.²

9

10 **I. Volume of AUO U.S. Commerce Impacted by the Conspiracy**

- 11 3. I understand that the appropriate volume of commerce includes all AUO panels whose
 12 prices were impacted by the conspiracy and that were shipped directly to the U.S. or that
 13 were incorporated into finished products shipped to the U.S.³ In order to calculate this

14

15 ¹ This is the period in which AUO participated in conspiratorial activity including group
 16 Crystal Meetings and bilateral meetings. In my trial testimony, where my objective was to
 17 determine whether the effect of the conspiracy on U.S. commerce was greater than \$500 million,
 18 I focused on the Crystal Meetings period where explicit prices were discussed. Trial Tr. vol. 19
 19 at 3274. I found that there was a very substantial effect on prices from those meetings. Trial Tr.
 20 vol. 19 at 3282. As I discuss below in responding to the estimates of the volume of commerce
 21 by Dr. Hall (Expert Declaration of Robert Hall, Ph.D. AUO- and AUOA-Specific Estimates of
 22 Consumer Harm on Behalf of AU Optronics (AUO) and AU Optronics America (AUOA),
 August 10, 2012, hereafter “Hall Decl.”) (Exhibit C), after those group meetings ended, AUO
 continued to coordinate pricing with its competitors through in-person bilateral meetings and
 phone conversations. Therefore, in my opinion, AUO’s efforts to coordinate and align its pricing
 with its competitors during this bilateral meeting time period had an anticompetitive effect on
 AUO’s panel prices.

23 ² I do not discuss the Snyder Declaration concerning the extent of the pass-on of the direct
 24 purchaser overcharge to final consumers. The economic impact of the conspiracy on U.S.
 25 commerce is independent of the extent to which the direct purchaser passed on the overcharge to
 26 final consumers. Nonetheless, I have analyzed pass-on in other cases involving components of
 27 PCs (the operating system and the microprocessors), and from that analyses I disagree with Dr.
 Snyder’s conclusions regarding the extent of the pass on to final consumers of the overcharges to
 the LCD direct purchasers. From my experience, I believe that a proper analysis would find a
 near full pass-on of the LCD overcharges to final consumers.

28 ³ This is the same concept of the volume of commerce that I used in my trial testimony in
 which I estimated the volume of U.S. commerce to be \$23.5 billion for the six conspirators. For
 that testimony, I was asked to address whether overcharges impacting U.S. commerce were at

1 volume of commerce, I rely on data from five large U.S. PC OEMs: Dell, HP, Apple,
 2 Gateway, and IBM. Using these data, I first estimate the AUO U.S. volume of commerce
 3 for these five OEMs. I then extrapolate for the rest of the U.S. PC market using data from
 4 Gartner Dataquest on PC sales to the U.S. of all OEMs.⁴ I estimate that AUO made over
 5 \$2.34 billion in sales of Indictment panels that were incorporated into products sold in the
 6 United States.⁵ This is a conservative estimate because it includes only AUO panels that
 7 were incorporated into computer monitors and notebook computers. It does not include
 8 any of AUO's panels that were incorporated into televisions sold in the United States
 9 because I have not found data sufficient to make a reliable estimate of those sales.

- 10 4. I discuss below the details of the calculations of AUO U.S. volume of commerce for each
 11 of these five OEMs, as well as my estimate of the total U.S. volume of commerce.

12
 13 **Dell**

- 14 5. As summarized in Exhibit A to this Declaration, a number of data files were received from
 15 Dell. The accounts receivables files contain Dell worldwide monitor panel purchases from
 16 2004 to June 2005. The GLOVIA text files contain Dell worldwide monitor panel
 17 purchases from June 2005 through December 1, 2006, Dell monitor purchases by region,
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22 least over \$500 million. Given that assignment, for simplicity, I focused on all large LCD panels
 23 during the period of crystal meetings where the prices of specific panels were discussed. Here I
 24 have been asked to address a different question – the total AUO U.S. volume of commerce for
 25 Indictment panels for the period in which the prices of LCD panels were impacted to *any extent*.

26 ⁴ This is the same data source I relied upon during my trial testimony in making my
 estimate of the U.S. affected commerce. Trial tr. vol. 19 at 3313-14.

27 ⁵ For my trial testimony, I calculated the direct imports of AUO Indictment panels into the
 28 United States of \$154 million. See trial exhibit 776. However, because it is possible that these
 panels are included in the finished product calculations, I have not included any additional
 volume of commerce from these directly imported panels.

1 and Dell notebook panel purchases for Dell notebooks shipped to North and South
2 America.⁶

3
4 AUO Indictment panel purchases in Dell notebooks shipped to the U.S.

5 6. All Dell notebook panels that go into notebooks shipped to North and South America are
6 purchased by Dell's entity Malaysia Direct Ship (MDS). MDS ships all of the notebooks it
7 produces to the Americas. I first identified the total MDS purchases of AUO Indictment
8 panels by quarter. This gives me the total panel purchases that went into notebooks sold in
9 the Americas. The panels that go into notebooks sold to Central and South America and to
10 Canada must be netted out of the MDS purchases to obtain the Dell notebook component
11 of AUO U.S. volume of commerce.

12 7. In order to determine the volume of MDS notebook panels purchased from AUO that were
13 in notebooks sold in Canada and in Central and South America, I rely on Gartner data on
14 Dell PC sales by region. These data allow calculation of the percentage of total Dell sales
15 in the Americas that are sales to the United States. This percentage is estimated on a
16 quarterly basis. Multiplying this percentage by the MDS AUO Indictment panel purchases
17 provides the estimated purchases of AUO Indictment panels included in Dell notebooks
18 sold in the U.S.

19
20 AUO Indictment panel purchases in Dell computer monitors shipped to the U.S.

21 8. Dell uses a single entity, Dell Global Procurement Malaysia (DGPM), to buy all of its
22 LCD monitor panels. DGPM made purchases from AUO beginning in the third quarter of
23 2005. The panels purchased by DGPM are "resold" to system integrators (LCD monitor
24 producers) who then sell finished monitors back to Dell through Dell regional purchasers.
25 From the Dell data, I calculate by quarter the value of the purchases by DGPM of AUO
26 Indictment monitor panels.

27
28 ⁶ Duplicate records from the accounts receivables files and the GLOVIA files in June 2005
were removed.

- 1 9. All Dell monitor purchases for the Americas are through Dell Americas Operations
2 (DAO). By dividing the annual quantity of monitor purchases going to the Americas by the
3 total quantity of monitor panel purchases (DAO monitors/DGPM panels), I obtain the
4 percentage of AUO monitor panels that go to the Americas. By then multiplying this by
5 the percentage of total Dell sales in the Americas that are sales to the United States, as
6 described in paragraph 7, I determine the annual percentage of all Dell monitors that are
7 monitors going to the U.S.
- 8 10. I then multiply the Dell purchases by DGPM of AUO Indictment panels by the percentage
9 of monitors going to the U.S. to obtain the estimated purchases of Indictment panels
10 included in Dell monitors sold in the U.S.
- 11 11. Adding the purchases of Indictment panels in Dell notebooks and in Dell monitors sold in
12 the U.S. gives the total Dell Indictment panel purchases for PC sales to the U.S. As
13 shown in the attached Table 1, these purchases total \$721,148,464. All underlying data are
14 provided in the attached Table 2A Dell Data.

15
16 **Hewlett-Packard**

17 AUO Indictment panel purchases in HP notebooks shipped to the U.S.

- 18 12. HP provided data on its notebook panel purchases. From these data, I determine the total
19 purchases by quarter of AUO Indictment panels that went into HP notebooks. HP also
20 provided data on its shipments of notebooks. From these data, I calculate the annual
21 percentages of HP notebooks that were shipped to North America, where North America
22 includes the U.S. and Canada. Multiplying these percentages by the purchases of AUO
23 Indictment panels in HP notebooks gives the purchases of AUO Indictment panels shipped
24 to North America in HP notebooks.
- 25 13. The purchases of AUO Indictment panels that are incorporated into notebooks sold in
26 Canada must be netted out of the estimated HP purchases of Indictment panels that are in
27 notebooks sold in North America. This is done using the same Gartner data sources
28

1 described above.⁷ I first estimate HP PC sales in Canada using the HP market share in
 2 Canada multiplied by total PC sales in Canada. I then estimate the percentage of HP
 3 notebooks shipped to North America that are shipped to the U.S. by calculating the ratio of
 4 HP U.S. PC sales to U.S. plus Canadian sales.

- 5 14. The final step in estimating HP purchases of Indictment panels that are in notebooks sold
 6 in the U.S. is to multiply the estimated percent of North America notebooks going to the
 7 U.S. by the HP Indictment panel purchases for notebooks sold in North America.

8
 9 AUO Indictment panel purchases in HP computer monitors shipped to the U.S.

- 10 15. HP provided data on the worldwide purchases of monitor panels for which HP negotiated
 11 prices. From these data, I calculate by quarter the total purchases of monitor panels
 12 incorporated into HP monitors and the purchases of those panels that were AUO
 13 Indictment monitor panels.
- 14 16. HP also provided quarterly data on its North America commercial LCD monitor sales for
 15 fiscal years 2001 to 2006. HP reported that 93 percent of these North American sales were
 16 to the U.S. By multiplying the North America sales by 93 percent, these data give me the
 17 estimated commercial monitor sales by quarter to the U.S.⁸ HP also provided data on its
 18 U.S. consumer LCD monitor sales, by fiscal year, 2001 to 2006. From these data I
 19 calculate the HP consumer LCD monitor sales by quarter to the U.S.⁹ The quarterly HP
 20 commercial monitor sales estimate for the U.S. is added to the quarterly HP consumer
 21 monitor sales estimate for the US to get an estimate of HP's quarterly LCD monitors sold
 22 in the U.S.¹⁰

23
 24

 25 ⁷ HP purchased notebook panels from AUO from October 2001 through November 2006.
 I do not have complete Gartner data for this period. For periods when the Gartner data is not
 available, I use interpolations and back-casts.

26 ⁸ Fiscal year (November 1 through October 31) data were converted to calendar years.

27 ⁹ The data were converted to calendar quarterly data, based on the quarterly commercial
 HP LCD monitor sales.

28 ¹⁰ These data are not available for the last quarter of 2006. The fourth quarter was
 estimated by adjusting HP's third quarter U.S. LCD monitor sales for the change in HP's

1 17. I next calculate the percentage of total HP monitor panels that were for monitors sold in the
2 U.S. by dividing the number of monitors sold in the U.S. by total number of monitor panel
3 purchases. The final step in estimating the purchases of AUO Indictment panels
4 incorporated into HP monitors sold in the U.S. is to multiply the total Indictment monitor
5 panel purchases for HP monitors by the percentage of all HP LCD monitors that were sold
6 by HP in the U.S.

7 18. Adding the purchases of AUO Indictment panels in HP notebooks and in HP monitors sold
8 in the U.S. gives the total AUO Indictment panel purchases for HP PC sales to the U.S.
9 As shown in the attached Table 1, these purchases total \$701,725,776. All underlying data
10 are provided in the attached Table 2B HP Data.

11
12 **Apple**

13 19. Apple provided data on its purchases of LCD panels. From these data, I calculate the
14 quarterly Apple purchases of AUO Indictment panels.

15 20. Apple also provided data on their PC sales by region. From these data, I calculate the
16 quarterly percentage of Apple PCs that went to the U.S. by dividing U.S. Apple PC unit
17 sales by the total Apple PCs sold worldwide. Multiplying these percentages by the Apple
18 AUO Indictment panel purchases gives the estimated Apple purchases of AUO Indictment
19 panels incorporated into Apple notebooks and monitors sold in the U.S.

20 21. As shown in the attached Table 1, these purchases total \$85,660,835. All underlying data
21 are provided in the attached Table 2C Apple Data.

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28 worldwide monitor purchases third to fourth quarter 2006 (\$73,900,000 for Q3/06, \$67,000,000
for Q4/06).

1 **Gateway and IBM**

2 22. Data on Gateway and IBM LCD panel purchases were received. Examination of these
3 data reveals that neither Gateway nor IBM purchased panels from AUO during the relevant
4 time period.

5
6 **Total U.S. AUO Indictment panel purchases**

7 23. Table 1 summarizes the estimated purchases of AUO Indictment panels that were sold into
8 the U.S. in notebooks and monitors for Dell, HP, Apple, Gateway and IBM. As shown in
9 the Table, I estimate that the purchases of AUO Indictment panels that were sold by these
10 five sellers in PCs in the U.S. were \$1.51 billion from October 2001 through December 1,
11 2006.

12 24. According to data from Gartner, these five PC sellers (Dell, HP, Apple, Gateway and IBM)
13 accounted for about 62 percent of PC sales in the U.S. from October 2001 through
14 December 2006. To account for the remaining 38 percent of the market, I use quarterly
15 Gartner data to estimate the total U.S. AUO Indictment panel purchases by adjusting the
16 purchases of these five PC sellers for the portion of the U.S. market that is not included.
17 This calculation assumes that the OEMs accounting for the remaining 38 percent of U.S.
18 PC sales purchased panels from AUO from October 2001 through November 2006 in the
19 same proportion as Dell, HP, Apple, Gateway and IBM during that same time period. This
20 is a reasonable assumption because there were large periods during that time when AUO
21 did not sell any monitor or notebook panels to these five OEMs, though it was producing
22 and selling substantial numbers of panels to others. Neither Gateway nor IBM purchased
23 any panels from AUO during this entire time period. Dell did not purchase any notebook
24 panels from AUO before the second quarter of 2004, and did not purchase any monitor
25 panels from AUO before the third quarter of 2005. Similarly, HP did not purchase any
26 AUO notebook panels until the third quarter of 2002. Also, the HP data on monitor
27 purchases only starts tracking the HP quantities with AUO for monitor panels in July 2003.
28 As HP was one of AUO's largest customers and a large buyer of notebook panels before

1 July 2003, it is highly unlikely that HP did not purchase AUO monitor panels before July
2 2003.

3 25. Using the methodology described above, and as summarized in Table 1, I estimate total
4 purchases of AUO Indictment panels sold into the U.S. from October 2001 through
5 November 2006 were \$2,340,508,656. This estimate is conservative because it excludes
6 AUO's panels that were incorporated into televisions sold in the United States.¹¹ Based on
7 the AUO invoice database, AUO's sales of television panels on a worldwide basis
8 accounted for about seven percent of its total sales of Indictment panels from October 2001
9 through November 2006 time period.

10 26. The conservativeness of this estimate is also demonstrated by comparing AUO's share of
11 the U.S. commerce affected by all six crystal meeting companies with its share of sales of
12 large panels on a worldwide basis by all six of those companies. At trial, I presented an
13 estimate of the total volume of U.S. commerce affected by the six conspirators -- \$23.5
14 billion.¹² That estimate included all panels 12.1 to 30 inches and was based on a shorter
15 time period (the 48 months during the Crystal Meetings where explicit prices were
16 discussed) than my \$2.34 billion estimate of AUO U.S. volume of commerce. Adjusting
17 my \$2.34 billion estimate for difference in the time period and to include all panels 12.1 to
18 30 inches results in an estimate of approximately \$1.51 billion in AUO large panels in U.S.
19 commerce during the 48 months during the Crystal Meetings where explicit prices were
20 discussed.¹³ Thus, during this period, AUO's share of the entire conspiracy's affected U.S.
21 commerce is less than 6.5 percent (\$1.51 billion divided by \$23.5 billion). This percentage
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24 ¹¹ It is possible that a minimal number of Dell TV panel purchases are included in the Dell
25 Monitor panel purchases.

26 ¹² Trial Tr. vol. 19 at 3309-10.

27 ¹³ For the October 2001 through January 2006 period, I estimate the purchases of AUO
28 Indictment panels in U.S. PCs were \$1.38 billion. Adjusting this for the four months not
included in the \$23.5 billion estimate of the six conspirator's volume of commerce (a reduction
of 6.4%) and for the non-included panels (an increase of 17.2%) implies approximately \$1.51
billion in AUO commerce for the comparable panels and time period.

1 is far lower than AUO's 19.1 percent share of the six crystal meeting companies
2 worldwide sales of large panels during the same period.¹⁴

3
4 **II. Response to Dr. Hall's Estimates of the Volume of Commerce and Likely Overcharges**

5 **U.S. Volume of Commerce**

6 27. Dr. Hall estimates that the AUO U.S. volume of commerce was between \$797.2 and
7 \$151.1 million.¹⁵ In my opinion, Dr. Hall's estimates are conceptually flawed and
8 incorrect.

9 28. Dr. Hall makes a number of improper exclusions to the AUO panel sales that account for
10 the differences between his and my estimates of the AUO U.S. volume of commerce.¹⁶

11 These include:

- 12 A) Exclusion of all AUO sales February 1 through December 1, 2006;
13 B) Exclusion of AUO panels that are not shown in the AUO database as being purchased
14 by one of 13 purchasers selected by Dr. Hall.
15 C) Exclusion of panels for all months in which there was not a crystal meeting notation
16 that a general industry price or an AUO price was discussed;
17 D) Exclusion of the purchases of AUO panels by LG and Samsung billed to or shipped
18 to the U.S.

19 In my opinion, each of these exclusions is inappropriate. I discuss each in turn.
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23
24 ¹⁴ AUO's share is estimated from the invoice databases for the 48 months of the Crystal Meeting price discussions for all panels 12.1 to 30 inches.

25 ¹⁵ Hall Declaration ¶¶4-5.

26 ¹⁶ Dr. Hall uses the AUO invoice database for his calculations while I use the five OEM purchaser databases. In addition, I include only notebook and monitor Indictment panels while Dr. Hall includes all panels 12 to 30 inches. However, the difference in the estimated AUO U.S. volume of commerce from the use of the different data and different panels is minor. See Expert Declaration of Robert Hall, Ph.D. AUO- and AUOA-Specific Estimates of Consumer Harm, August 27, 2012, ¶43 (Attached to AUO's Objections to August 13, 2012 Draft PSR).
27
28

1 Exclusion of all AUO sales February 1 through December 1, 2006

- 2 29. Dr. Hall does not include sales of any AUO panels that were incorporated into products
3 sold in the U.S. after January 31, 2006. This eliminates over 41% of the AUO U.S.
4 volume of commerce.¹⁷ The Department of Justice charged a conspiracy that extended
5 through December 1, 2006. However, Dr. Hall excludes AUO sales after January 31, 2006
6 based on his incorrect understanding of my testimony in the trial. Dr. Hall writes that – “I
7 [Dr. Hall] take the relevant time period from the government’s expert Keith Leffler, who
8 testified that the overcharges began in October 2001 and ended in January 2006.”¹⁸
9 Contrary to Dr. Hall’s understanding, I did not testify that the overcharges ended on
10 January 31, 2006. Rather I *calculated* overcharges over that period.¹⁹ The price-fixing
11 conspiracy for which AUO was found guilty concerned scores of meetings among the
12 major LCD producers. These meetings lasted through November 2006. During the period
13 October 2001 through at least January 2006, the meetings were group meetings, known as
14 crystal meetings, of the six major Taiwanese and Korean producers. After January 2006,
15 the group crystal meetings ended, and the conspirators reverted to bilateral in-person
16 meetings and phone conversations.
- 17 30. I understand that for sentencing purposes, the proper period for the determination of the
18 U.S. volume of commerce impacted includes all of the conspiracy period in which the
19 prices charged by AUO were impacted in any way.²⁰ The evidence is clear that the

20
21 ¹⁷ For the period October 2001 through January 2006, I estimate AUO U.S. volume of
22 commerce of \$1.38 billion or 58.9 percent of the \$2.34 billion over the entire conspiracy period.
23 These ten months from February to December 1, 2006 account for a disproportionate amount of
24 AUO’s commerce because of the rapid growth of the industry sales and the even more rapid
25 growth of AUO sales to the U.S. OEMs.

26 ¹⁸ Hall Decl. ¶15.

27 ¹⁹ In the testimony cited by Dr. Hall, I testified that “my *calculations* are during the Crystal
28 Meeting period, which is a 52-month period from October ‘01 through January, ‘06” Trial Tr.
vol. 19 at 3320, emphasis added. This was the assignment I was given (my assignment in the
case was to “study the effect of the *Crystal Meetings* on the revenues of the companies who went
to those meetings.” Trial Tr. vol. 19 at 3274 emphasis added.

²⁰ In my trial testimony, I was concerned only with whether the impact on U.S. commerce
was greater than \$500 million. To do this, I focused my analysis on the effect of the group
crystal meetings because that period is the most susceptible to quantification of the overcharges

1 conspiracy impacted prices from October 2001 through December 1, 2006. The
 2 conspirators continued to meet one-on-one in cafes around Taiwan after January 31, 2006.
 3 In those meetings, they provided the same information that they provided in the group
 4 crystal meetings.²¹

5 31. In addition, AUO continued to have bilateral contacts – either in person or over the phone
 6 – where it coordinated with its competitors and aligned its pricing with its competitors to
 7 specific accounts. I have reviewed several AUO documents from these ten months in 2006
 8 where AUO made efforts to coordinate and align its pricing with its competitors. For
 9 example, in an April 2006 email from AUO’s Steven Leung to his sales team, he directs
 10 them to “align with other TFT vendors to ensure we are not quoting too low or much too
 11 high.”²² Other 2006 AUO documents also exemplify AUO’s efforts to coordinate pricing
 12 with competitors.²³ Even as late as November 23, 2006, an AUO document notes the
 13 importance of “market info. sharing” on its December “pricing ideas” and also notes that
 14 “some of the major suppliers would like to keep flat for the first quotation, but prepare for
 15 \$2-3 down for 17” and 19”. An AUO sales executive then proceeds to make the same
 16 proposal in his email.²⁴ Based on my review of these materials, I have concluded that
 17 AUO’s bilateral contacts with its competitors affected AUO’s pricing to its customers.
 18 Accordingly, Dr. Hall has no basis to exclude AUO panel sales made from February 2006
 19 through December 1, 2006.
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 24 by virtue of the thorough records kept by some of the participating companies that memorialized
 25 the price discussions on a monthly basis. After the group crystal meetings ended in January
 26 2006, the companies no longer kept monthly records of their price discussions and instead relied
 on bilateral contacts to coordinate their pricing. These bilateral contacts were not recorded in the
 same systematic manner as was the group crystal meetings.

27 ²¹ Trial Tr. vol. 21 at 3795.

28 ²² Trial Ex. 108.

²³ See Exhibit D.

²⁴ Trial Ex. 189.

1 Exclusion of AUO panels that were not shown in the AUO database as being purchased by
 2 one of 13 purchasers selected by Dr. Hall

3 32. I understand that the proper measure of the AUO U.S. volume of commerce impacted by
 4 the conspiracy should include all sales of AUO LCD Indictment panels that were
 5 incorporated into finished products sold in the U.S. However, Dr. Hall uses a narrower
 6 criterion that excludes LCD panels that were incorporated into finished products imported
 7 to the U.S. if those panels are not shown in the AUO database as being purchased by one
 8 of his 13 “U.S. companies.”²⁵

9
 10 Exclusion of HP monitor panels

11 33. One of the 13 companies included in Dr. Hall’s estimate of the AUO U.S. volume of
 12 commerce is HP, the second leading seller of PCs in the U.S. with a market share of about
 13 19.5 percent over the conspiracy period.²⁶ However, Dr. Hall includes only the AUO
 14 panels purchased for HP notebooks, while not including those AUO panels used in HP
 15 monitors. This exclusion results from Dr. Hall not recognizing that HP acquired AUO
 16 panels at prices it negotiated with AUO when it purchased the finished HP monitors from
 17 system integrators. These panels are thus recorded on the AUO database as purchases by
 18 system integrators working with HP. For these panels, HP negotiates the purchase price
 19 with AUO; it then instructs AUO as to the quantity and timing of the shipments to the
 20 system integrator.²⁷ The system integrators then assemble the panels into HP monitors for
 21 delivery as instructed by HP. A substantial number of these HP monitors using AUO
 22 panels are delivered to the U.S. These HP AUO panels are included in my estimate of the
 23 AUO U.S. volume of commerce, but are excluded by Dr. Hall.²⁸

24
 25 ²⁵ Hall Decl. ¶19. Dr. Hall does not explain in any detail how he identified these 13
 26 companies other than noting that he did not examine any company that bought less than
 \$100,000 of LCD panels from October 2001 through January 2006.

27 ²⁶ From the Gartner data discussed above.

28 ²⁷ See, e.g., Trial Tr. vol. 3 at 518-20, 528-30.

²⁸ During the conspiracy period, HP was AUO’s largest customer for notebook panels and
 second largest customer for monitor panels.

Exclusion of AUO Indictment panels that were not purchased by one of 13 purchasers

34. As mentioned above, Dr. Hall limits his analysis to 13 AUO “U.S.” purchasers. These 13 purchasers include each of the five OEMs, Apple, Dell, Gateway, HP, and IBM, that I estimate sold products into the U.S. incorporating \$1.51 billion of AUO panels. Gartner data indicates that about 38 percent of PC sales in the U.S. are from OEMs other than these five. That Gartner data forms the basis for my expansion of the five OEMs’ AUO U.S. panel sales to the total of \$2.34 billion. These five OEMs account for over 95 percent of the total AUO sales of the 13 purchasers considered by Dr. Hall. Therefore, although Dr. Hall includes eight purchasers in addition to Apple, Dell, Gateway, HP, and IBM, his approach only expands the amount of AUO U.S. purchases of the five U.S. PC OEMs by about five percent.²⁹ Hence, by including less than an additional five percent for all OEMs other than Apple, Dell, Gateway, HP, and IBM, Dr. Hall incorrectly excludes a significant volume of purchases of AUO panels that are incorporated into finished products sold in the U.S.³⁰

Exclusion of Indictment panels for all months with no general industry price or AUO price notations in Crystal Meeting notes

35. Dr. Hall calculates “the volume of commerce ... only including sales known to be subject to cartel influence, in the sense that their prices were discussed at the crystal meetings.”³¹ In fact, Dr. Hall does not include all panels noted in price discussions at the crystal meetings, but rather includes only panels where there were price notations in the crystal

²⁹ Apple, Dell, Gateway, HP and IBM make up 95.5 percent of the AUO purchases considered by Dr. Hall. The purchases of the other eight purchasers make up the remaining 4.5 percent. Therefore, Dr. Hall’s approach is equivalent to expanding the five OEMs’ purchases by 4.7 percent ($104.7\% * .955 = 100\%$).

³⁰ Dr. Hall thus excludes any AUO panels that are included in PCs sold by OEMs such as Toshiba, Sony, Acer, Lenovo, NEC, and Fujitsu. The exclusion of the AUO LCD panels sold in the U.S. by OEMs other than the 13 purchasers considered by Dr. Hall reduces the estimated AUO U.S. volume of commerce by about 35 percent below the correct estimate.

³¹ Hall Decl. ¶29.

1 meetings notes specific to AUO or “general price.”³² This exclusion by Dr. Hall eliminates
 2 over 75 percent of all AUO sales of Indictment panels from the volume of commerce
 3 calculation.³³

4 36. There are a number of problems with Dr. Hall’s exclusion of these AUO sales. First of all,
 5 Dr. Hall assumes that AUO’s pricing is not impacted in any way when its competitors
 6 reveal their pricing plans, but when an AUO price is not included in the crystal meeting
 7 notes. However, the greatest impact on AUO pricing is expected when AUO learns of its
 8 competitors’ pricing plans, regardless of whether it reveals its pricing plans. For example,
 9 in November 2005, the crystal meeting notes record target prices for the SXGA 17-inch
 10 monitor for CMO of \$168, for CPT of \$168, for Hannstar of \$167-168, and for Samsung of
 11 \$168-169. In that month, AUO had the second highest average price for this monitor of
 12 any of the crystal meeting participants, higher than Hannstar, higher than CMO, and higher
 13 than CPT.³⁴ But Dr. Hall considers AUO’s price for this panel not to be impacted. It
 14 makes no economic sense to conclude that AUO’s prices were not affected by the
 15 revelation of its competitors’ pricing plans. Numerous other examples exist – in June
 16 2005, CMO, CPT, Hannstar, and Samsung noted target prices for 17 and 19-inch SXGA
 17 monitors. AUO attended this meeting. Yet Dr. Hall assumes that such pricing information
 18 had no impact on AUO’s pricing.

19 37. Other problems attend this exclusion criterion of Dr. Hall. In February 2004, the AUO
 20 prices for 15, 17, 19, and 20.1-inch monitor panels were discussed and recorded in crystal
 21

22 ³² Hall Decl. Appendix E. This exclusion limits Dr. Hall to 39 of the 62 months of
 23 conspiratorial activity. It excludes the period after January 2006. It also excludes the four
 24 months of “conspiracy meetings” during the October 2001 to January 2006 period in which
 25 crystal meetings were held but I found no notes of explicit price discussions, and another nine
 26 months from October 2001 to January 2006 where explicit prices were discussed at the crystal
 27 meetings though an AUO or general industry price is not noted.

28 ³³ When I exclude these panels I estimate a volume of AUO commerce in the U.S. of about
 \$574 million, or less than 25 percent of the proper \$2.34 billion. Note that because the group
 crystal meetings ended in February 2006, this exclusion also incorporates Dr. Hall’s exclusion of
 all panels sold after January 2006.

³⁴ See Leffler Expert Disclosure, September 13, 2011, (“Leffler Expert Disclosure”) Chart
 6D (Exhibit B).

1 meeting notes. Dr. Hall includes these AUO panels as having prices impacted in that
 2 month. However, Dr. Hall assumes that AUO's prices of 18-inch monitors were not
 3 impacted in that month because only a target price for LG for that panel was recorded in
 4 the crystal meeting notes.³⁵ Because there can and will be consumer substitution among
 5 monitors of close sizes, it makes no economic sense to conclude the prices of somewhat
 6 smaller and larger panels were impacted but the 18-inch panel was not impacted. At this
 7 same meeting of February 2004, the AUO "target" prices for 14.1, 15 and 15.2-inch
 8 notebook panels were recorded. These are included by Dr. Hall as having their prices
 9 impacted by the conspiracy. But because target prices for the close substitute 15.4-inch
 10 panel were recorded only for CMO, CPT, LG, and Samsung, Dr. Hall assumes no impact
 11 on AUO pricing. Given the impact of AUO's knowledge of its competitors' pricing plans,
 12 of consumer substitution across size, and of the homogeneity of the panels of the various
 13 conspirators, this exclusion makes no economic sense.³⁶

14 38. In my Expert Disclosure filed for trial in this case I demonstrate that "AUO's pricing is
 15 generally comparable to that of the other Crystal Meeting Participants."³⁷ I also
 16 demonstrate that for the top-selling panels, AUO had a price that "was higher than the
 17
 18

19 ³⁵ Dr. Hall's inclusion of all months in which an AUO price was discussed but exclusion of
 20 all months regardless of whether all other conspirators' prices were discussed is contradictory.
 21 There are many months and panels for which the only recorded crystal meeting price was for
 22 AUO. Dr. Hall includes these panels for those months as being impacted by the conspiracy.
 23 There are many other months in which there were other panels whose prices of one or even all
 24 competitors other than AUO were discussed. Dr. Hall excludes these panels for those months.
 25 Yet purchasers will substitute from one to another conspirator's panels if there is a significant
 26 price difference. This implies that either all conspirators' prices are impacted at a given time or
 27 none are impacted. Given the jury's finding of a significant impact on prices from the
 28 conspiracy, it makes no economic sense to pick and choose which products are included in the
 AUO U.S. volume of commerce depending on which specific conspirators' price targets are
 recorded in crystal meeting notes. Such picking and choosing is inconsistent with basic
 economic concepts of consumer substitution.

³⁶ The evidence at trial indicates that purchasers consider panels of the same size,
 resolution, type and quality to be homogeneous. See, e.g., Trial Tr. vol. 3 at 500-05, 552-54;
 Trial Tr. vol. 15 at 2528-34; Trial Tr. vol 16 at 2880-81.

³⁷ Leffler Expert Disclosure ¶28 and Charts 5A-5E.

1 average of the other Crystal Meeting Participants' price" about half the time.³⁸ I have re-
 2 examined the underlying price data and find that the AUO price compared to that of its
 3 fellow conspirators is in fact lower when Dr. Hall concludes that AUO prices were
 4 impacted by the conspiracy than when he concludes they were not.³⁹ This is completely
 5 inconsistent with Dr. Hall's presumption that impact is dependent on an AUO price being
 6 discussed (and recorded).

7 39. The economically arbitrary inclusions and exclusions underlying Dr. Hall's volume of
 8 commerce estimate are also clearly seen by the time pattern of the exclusions. For
 9 example, the 13.3-inch XGA notebook panel is included as an impacted panel in January
 10 and March of 2002 but not for the month in-between - February 2002. Dr. Hall examines
 11 no data showing any reduction on the AUO prices of this panel in that month compared to
 12 the impacted prices before and after, and the data show no such reduction. As another
 13 example, the 15-inch SXGA+ notebook panel is included as an impacted panel in
 14 November 2003 and in January 2004, but not in December 2003. The 17-inch SXGA
 15 monitor panel is included as impacted by Dr. Hall in July 2005 and January 2006, while
 16 that panel is excluded for all months between even though the target price for that panel
 17 was discussed by one or more competitors in each of those months.

18 40. As mentioned, Dr. Hall's approach includes less than 25 percent of AUO sales during the
 19 conspiracy period as being impacted by the conspiracy. However, as I discuss in my
 20 Expert Disclosure in the case, the panels specifically subject to discussions accounted for
 21 98 percent of AUO's sales at the beginning of the conspiracy period, and it remained at
 22 about 66 percent throughout the period.⁴⁰ Dr. Hall also ignores that the price discussions

23
 24 ³⁸ Leffler Expert Disclosure ¶28.

25 ³⁹ For the products in the crystal meetings database (all products with prices reported for
 26 one or more of the conspirators in any month October 2001 through January 2006) that Dr. Hall
 27 includes in the AUO U.S. volume of commerce, the AUO price is 97.6 percent of the average of
 the other conspirators. For the products in the crystal meetings database that Dr. Hall excludes,
 the AUO price is 102 percent of the average of the other conspirators.

28 ⁴⁰ See Leffler Expert Disclosure ¶38 and Table 8. Crystal meeting participants testified at
 trial that the focus of their discussions was on the most important, best-selling panels. E.g., Trial
 Tr. vol. 3 at 667-68, 670; Trial Tr. vol. at 2072-2073.

1 included “general pricing relationships among LCD panels of different specifications.”⁴¹

2 Dr. Hall also ignores the evidence of “a close fit between the price movements of the
3 panels with price discussions on panels and other panels.”⁴² Finally, in my Disclosure and
4 in my trial testimony, I performed empirical analysis of prices and of margins.⁴³ Those
5 analyses included *all* AUO panels larger than 10 inches, and I found significant impacts for
6 this inclusive set of panels.

7 41. In summary, basic economic principles imply substitution across panel sizes and types and
8 across manufacturers. Thus, if in one month AUO does not reveal a target price but others
9 do and the others set supra-competitive prices, as found by the jury, then AUO’s prices
10 will be impacted. If the conspirators set supra-competitive prices for some panel sizes but
11 not for others, and the conspiracy was effective, as found by the jury, then the prices of
12 other panels of different sizes that have some substitutability for the discussed panels must
13 also have been impacted. Therefore, I have reached the opinion that Dr. Hall’s exclusion
14 of over 75 percent of the panels sold by AUO, based on the nature of the price discussions
15 of specific panels discussed at the crystal meetings, is not warranted and is not consistent
16 with basic economic principles.

17
18 Exclusion of purchases of AUO Indictment panels by LG and Samsung

19 42. The final exclusion of AUO sales in Dr. Hall’s estimate of AUO U.S. volume of commerce
20 is the exclusion of the sales shipped to or billed to the U.S. by LG and Samsung.⁴⁴ Dr.
21 Hall asserts that “[i]f AUO did attempt to impose overcharges on Samsung and LG, those
22 companies would respond in the rational economic way by self-supplying at internal costs
23 comparable to competitive prices.”⁴⁵ Dr. Hall makes this assertion with no study of why
24

25 ⁴¹ Leffler Expert Disclosure ¶34 and the citations therein.

26 ⁴² Leffler Expert Disclosure ¶35 and Charts 10A-10C.

27 ⁴³ Leffler Expert Disclosure ¶¶40-52; Trial Tr. vol. 19 at 3327-74.

28 ⁴⁴ LG and Samsung are not one of Dr. Hall’s 13 “U.S” purchasers. Therefore, he is
excluding only the \$48 million otherwise included in his categories 1 or 2 (shipped to or billed to
the U.S.).

⁴⁵ Hall Decl. ¶30.

1 such purchases were made and no study of whether LG and Samsung had the capability to
 2 self-supply at the time of such purchases from AUO. In addition, Dr. Hall performs no
 3 analysis of the relationships among the LCD producing LG and Samsung entities and the
 4 purchasing entities. Yet, LG Display, the purchaser of LCD panels, is a distinct and
 5 separate firm from LGE, the manufacturer of LCD panels. Indeed, in a filing with the U.S.
 6 Security and Exchange Commission, LG Display stated that it sells panels to LGE on an
 7 arms-length basis on substantially the same terms as it does to other customers.⁴⁶ In
 8 addition, the conspirators reached agreements to deal with any potential problems from
 9 sales between and to vertically related entities.⁴⁷ Dr. Hall apparently ignores this
 10 testimony.

11 43. In a latter part of his Declaration, Dr. Hall notes that “both LG and Samsung purchased at
 12 essentially the same prices as other customers....”⁴⁸ This implies that if the commerce to
 13 other customers was impacted by the conspiracy, then so was the commerce to LGE and
 14 Samsung. The jury has found that there was such an impact and that the impact was over
 15 \$500 million. The jury’s finding therefore implies that the prices charged by AUO to LGE
 16 and Samsung were impacted. As a consequence, I have concluded that Dr. Hall’s
 17 exclusion of those AUO sales is not warranted or proper.⁴⁹

18
 19 ⁴⁶ LG Display SEC Form 20-F 2004, at 72, (“We sell TFT-LCD panels, primarily large-size
 20 panels for desktop monitors and televisions, to LG Electronics (including its overseas
 21 subsidiaries) and certain of its affiliates on a regular basis, as both an end-brand customer and as
 22 a systems integrator for use in products they assemble on a contract basis for other end-brand
 23 customers. Pricing and other principal terms of the sales are negotiated on an arm’s-length basis
 24 and are substantially the same as those for our non-affiliated end-brand customers”).

25 ⁴⁷ Trial Tr. vol.7 at 1293; Trial Tr. vol. 8 at1400; Trial Tr. vol. 12 at1975-77; Trial Tr. vol.
 26 17 at 3002-04.

27 ⁴⁸ Hall Decl. ¶44.

28 ⁴⁹ Hall Decl. ¶56. While he does not explicitly so state, Dr. Hall appears to have the
 opinion that there are no overcharges resulting from this six-year plus price-fixing conspiracy.
 He excludes all sales to LG and Samsung because, in his opinion, it would make no economic
 sense for these buyers to pay more than the competitive price. This implies that in Dr. Hall’s
 opinion, LG and Samsung paid competitive prices. But elsewhere he notes that LG and
 Samsung paid the same prices as other buyers. Hence, according to Dr. Hall, other buyers must
 also have paid competitive prices. Dr. Hall’s opinion is therefore inconsistent with the jury’s
 finding of an effective conspiracy.

1 **III. The Percentage Gain from Overcharge**

2 44. I understand that the Sentencing Guidelines adopt a “typical” overcharge of ten percent. In
3 my testimony at trial, I referenced literature that supports a typical overcharge as being
4 greater than ten percent.⁵⁰ The conclusion from this literature is

5 Median overcharges are, in fact, two or three times as high as the level presumed
6 by the [Sentencing] Commission. Moreover, the great majority of the overcharge
7 estimates--those with overcharges above 20%-- have a mean overcharge of 75%,
8 more than seven times the Guidelines' presumption. Base fines of 20% of
9 cartelists' affected commerce, even when adjusted by significant culpability
10 multipliers, will do little to deter most of these cartels.⁵¹

11 45. In my trial testimony, I summarized my extensive empirical analysis concerning the likely
12 magnitude of the overcharge in this case.⁵² My purpose in that analysis was to determine
13 whether the overcharge was in excess of \$500 million. In Table 12 of my Expert
14 Disclosure, I found a statistically significant mean estimate of the AUO overcharge on
15 panels 12.1 to 30 inches of over 19 percent. In my trial testimony in which I compared
16 margins before and after the conspiracy period to those earned during the conspiracy, I
17 found higher conspiracy margins consistent with overcharges well above ten percent.⁵³

18 46. I therefore have reached the opinion that Dr. Hall’s opinion that the overcharge by AUO is
19 minimal or zero is inconsistent both with the evidence in the case and with expectations
20 from the economic literature.

21
22
23
24 ⁵⁰ Trial Tr. vol. 19 at 3322-23.

25 ⁵¹ Connor and Lande, “How High Do Cartels Raise Prices? Implications for Optimal Cartel
26 Fines,” *Tulane Law Review*, December 2005, p. 22. A somewhat more recent analysis by
27 Connor and Bolotova, “Cartel Overcharges: Survey and meta-analysis,” *International Journal of
28 Industrial Organization* (2006), cited by Dr. Hall, finds that while there is a wide range of
overcharges in various cases, the mean value is 29 percent and international cartels, like the LCD
cartel, have overcharges 14 percentage points higher than domestic cartels (p. 42).

⁵² Trial Tr. vol. 19 at 3378.

⁵³ Trial. Tr. vol. 19 at 3355-74.

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I declare under penalty of perjury that the foregoing is true and correct. Signed on September 10, 2012 in Seattle, Washington



Table 1: AUO Volume of U.S. Commerce

| | US Dell AUO Panels | US HP AUO Panels | US Apple AUO Panels | US IBM AUO Panels | US Gateway AUO | AUO US Five | Dell US Unit PC sales (000) | HP US Unit PC Sales (000) | Apple US Unit PC Sales (000) | IBM US Unit PC Sales (000) | Gateway US Unit PC Sales (000) | All US Unit PC Sales (000) | US Share Five OEMs | AUO US VoC |
|--------|--------------------|------------------|---------------------|-------------------|----------------|-----------------|-----------------------------|---------------------------|------------------------------|----------------------------|--------------------------------|----------------------------|--------------------|------------------|
| Q4/01 | | | | | | | | | | | | | | |
| Q1/02 | | | \$13,694 | \$0 | \$0 | \$13,694 | 2,933 | 2,325 | 350 | 579 | 645 | 11,001 | 62% | \$ 22,051 |
| Q2/02 | | | \$3,846,773 | \$0 | \$0 | \$3,846,773 | 2,925 | 1,978 | 455 | 662 | 651 | 10,664 | 63% | \$ 6,150,188 |
| Q3/02 | | \$7,674,523 | \$3,111,212 | \$0 | \$0 | \$10,785,735 | 3,433 | 2,273 | 466 | 651 | 729 | 13,150 | 57% | \$ 18,781,734 |
| Q4/02 | | \$11,639,003 | \$5,042,577 | \$0 | \$0 | \$16,681,580 | 3,692 | 2,642 | 430 | 648 | 700 | 16,537 | 49% | \$ 34,009,055 |
| Q1/03 | | \$4,024,774 | \$4,180,251 | \$0 | \$0 | \$8,205,025 | 3,634 | 2,248 | 334 | 568 | 506 | 11,846 | 62% | \$ 13,333,505 |
| Q2/03 | | \$20,156,237 | \$2,554,952 | \$0 | \$0 | \$22,711,189 | 3,689 | 2,257 | 447 | 688 | 493 | 11,847 | 64% | \$ 35,527,635 |
| Q3/03 | | \$37,166,145 | \$1,404,803 | \$0 | \$0 | \$38,570,948 | 4,288 | 3,042 | 470 | 715 | 521 | 15,657 | 58% | \$ 66,838,522 |
| Q4/03 | | \$44,412,627 | \$3,512,108 | \$0 | \$0 | \$47,924,735 | 4,334 | 3,167 | 442 | 772 | 495 | 18,385 | 50% | \$ 95,679,283 |
| Q1/04 | | \$47,516,609 | \$4,344,937 | \$0 | \$0 | \$51,861,546 | 4,489 | 2,536 | 393 | 612 | 1,078 | 14,901 | 61% | \$ 84,847,265 |
| Q2/04 | \$828,149 | \$39,226,992 | \$4,713,213 | \$0 | \$0 | \$44,768,354 | 4,295 | 2,547 | 505 | 668 | 703 | 14,157 | 62% | \$ 72,698,507 |
| Q3/04 | \$3,269,197 | \$46,289,941 | \$6,222,836 | \$0 | \$0 | \$55,781,974 | 4,920 | 3,093 | 521 | 721 | 800 | 16,227 | 62% | \$ 90,022,842 |
| Q4/04 | \$4,615,529 | \$37,249,566 | \$1,933,650 | \$0 | \$0 | \$43,798,745 | 5,174 | 3,277 | 546 | 906 | 1,020 | 16,992 | 64% | \$ 68,134,055 |
| Q1/05 | \$7,202,449 | \$44,477,706 | \$2,342,108 | \$0 | \$0 | \$54,022,263 | 4,870 | 2,620 | 571 | 623 | 826 | 15,238 | 62% | \$ 86,560,593 |
| Q2/05 | \$13,229,370 | \$37,617,648 | \$984,194 | \$0 | \$0 | \$51,831,213 | 4,988 | 2,711 | 663 | 607 | 890 | 15,567 | 63% | \$ 81,839,587 |
| Q3/05 | \$119,087,060 | \$45,686,567 | \$0 | \$0 | \$164,773,627 | 5,506 | 3,430 | 744 | 752 | 1,070 | 17,930 | 64% | \$ 256,865,605 | |
| Q4/05 | \$105,576,564 | \$69,705,128 | \$0 | \$0 | \$175,281,692 | 5,622 | 3,491 | 619 | 0 | 1,145 | 16,530 | 66% | \$ 266,379,183 | |
| Q1/06 | \$144,315,654 | \$65,571,897 | \$1,520,271 | \$0 | \$0 | \$211,407,822 | 4,881 | 3,027 | 570 | 0 | 1,225 | 14,395 | 67% | \$ 313,636,566 |
| Q2/06 | \$121,258,932 | \$50,441,975 | \$20,100,000 | \$0 | \$0 | \$191,800,906 | 5,302 | 3,135 | 666 | 0 | 1,038 | 14,853 | 68% | \$ 280,920,902 |
| Q3/06 | \$117,542,471 | \$43,384,498 | \$13,200,000 | \$0 | \$0 | \$174,126,968 | 5,113 | 3,656 | 975 | 0 | 1,011 | 15,837 | 68% | \$ 256,406,211 |
| Q4/06* | \$84,223,089 | \$49,483,940 | \$6,633,255 | \$0 | \$0 | \$140,340,284 | 4,651 | 4,053 | 808 | 0 | 1,011 | 15,887 | 66% | \$ 211,877,420 |
| Total | \$721,148,464 | \$701,725,776 | \$85,660,835 | \$0 | \$0 | \$1,508,535,074 | | | | | | | 62% | \$ 2,340,508,656 |

* through 12/1/06

Table 2A: Dell Data

| | Dell Can MS | Dell C&S Americas MS | Can PCs | C&S Americas | Dell AUO A NBs | Dell AUO Mon | DAO Mon | DGPM Mon |
|--------|-------------|----------------------|---------|--------------|----------------|----------------|------------|------------|
| Q4/01 | | | | | | | | |
| 2001 | | | | | | | | |
| Q1/02 | 20.3% | 6.5% | | | | | | |
| Q2/02 | | | | | | | | |
| Q3/02 | | | | | | | | |
| Q4/02 | | | | | | | | |
| 2002 | | | | | | | | |
| Q1/03 | 21.9% | 8.5% | | | | | | |
| Q2/03 | | | | | | | | |
| Q3/03 | | | | | | | | |
| Q4/03 | | | | | | | | |
| 2003 | | | | | | | | |
| Q1/04 | | 10.0% | | | | | | |
| Q2/04 | | | | | \$ 948,472 | | | |
| Q3/04 | 24.6% | | | | \$ 3,683,862 | | | |
| Q4/04 | | | | | \$ 5,172,179 | | | |
| 2004 | | | 5,829 | 11,671 | | | | |
| Q1/05 | | 6.8% | | | \$ 8,301,312 | | | |
| Q2/05 | | 7.3% | | | \$ 15,200,000 | | | |
| Q3/05 | | | | | \$ 22,600,000 | \$ 162,000,000 | | |
| Q4/05 | | | | | \$ 29,900,000 | \$ 129,000,000 | | |
| 2005 | | | 6,583 | 14,711 | | | 10,626,763 | 15,294,638 |
| Q1/06 | | | | | \$ 34,400,000 | \$ 229,000,000 | | |
| Q2/06 | | 8.5% | | | \$ 41,500,000 | \$ 168,000,000 | | |
| Q3/06 | | 9.2% | | | \$ 39,600,000 | \$ 165,000,000 | | |
| Q4/06* | | | 4,900 | 18,600 | \$ 30,300,000 | \$ 117,000,000 | 13,648,127 | 23,691,389 |
| 2006 | | | | | | | | |

* through 12/1/06

Table 2B: HP Data

| | HP AUO NBs | % HP NBs NA | % HP NBs NA | Can PCs | HP Can MS | HP US PCs | US HP Mon | HP Mon | HP AUO Mon |
|--------|---------------|----------------|----------------|---------|--------------|-----------|-----------|-----------|----------------|
| Q4/01 | | 6.5% | | | | 2,855 | 75,340 | | |
| 2001 | | | | | | | | | |
| Q1/02 | | 6.5% | | | 18.0% | 2,325 | 130,321 | | |
| Q2/02 | | 7.0% | | | | 1,978 | 120,166 | | |
| Q3/02 | \$ 18,803,500 | 7.5% | | | | 2,273 | 161,399 | | |
| Q4/02 | \$ 28,516,950 | 8.0% | | | | 2,642 | 266,569 | | |
| 2002 | | | 45.6% | | | | | | |
| Q1/03 | \$ 9,823,300 | 8.5% | | | 20.3% | 2,248 | 285,563 | | |
| Q2/03 | \$ 49,195,500 | 8.9% | | | | 2,257 | 355,750 | | |
| Q3/03 | \$ 30,755,000 | 9.3% | | | | 3,042 | 504,210 | 1,176,100 | \$ 57,300,000 |
| Q4/03 | \$ 54,806,446 | 9.6% | | | | 3,167 | 475,105 | 1,581,700 | \$ 73,100,000 |
| 2003 | | | 45.7% | | | | | | |
| Q1/04 | \$ 44,980,390 | 10.0% | | | | 2,536 | 562,404 | 1,407,268 | \$ 76,900,000 |
| Q2/04 | \$ 26,648,050 | 9.2% | | | | 2,547 | 625,365 | 2,039,770 | \$ 95,500,000 |
| Q3/04 | \$ 54,260,181 | 8.4% | | | 20.2% | 3,093 | 632,748 | 1,600,650 | \$ 64,900,000 |
| Q4/04 | \$ 48,972,180 | 7.6% | | | | 3,277 | 557,750 | 1,652,069 | \$ 54,900,000 |
| 2004 | | | 41.7% | 5,829 | | | | | |
| Q1/05 | \$ 37,266,407 | 6.8% | | | | 2,620 | 731,333 | 2,090,526 | \$ 87,700,000 |
| Q2/05 | \$ 21,972,978 | 7.3% | | | | 2,711 | 779,019 | 2,803,800 | \$ 106,000,000 |
| Q3/05 | \$ 47,568,979 | 7.6% | | | | 3,430 | 823,093 | 2,565,440 | \$ 86,000,000 |
| Q4/05 | \$ 89,121,950 | 7.9% | | | | 3,491 | 928,125 | 2,725,800 | \$ 105,000,000 |
| 2005 | | | 41.7% | 6,583 | | | | | |
| Q1/06 | \$ 83,459,950 | 8.2% | | | | 3,027 | 1,031,363 | 2,793,981 | \$ 93,700,000 |
| Q2/06 | \$ 56,876,510 | 8.5% | | | | 3,135 | 1,091,828 | 2,954,130 | \$ 79,200,000 |
| Q3/06 | \$ 52,849,615 | 9.2% | | | | 3,656 | 1,072,705 | 3,372,550 | \$ 73,900,000 |
| Q4/06* | \$ 74,433,365 | 9.2% | | 4,900 | | 4,053 | | 4,000,925 | \$ 67,000,000 |
| 2006 | | | 40.2% | | | | | | |

* through 12/1/06

Table 2C: Apple Data

| | Worldwide Apple PCs | US Apple PCs | Apple AUO Panels |
|--------|---------------------|--------------|------------------|
| Q4/01 | 607,973 | 311,351 | |
| 2001 | | | |
| Q1/02 | 671,942 | 349,878 | \$ 26,300 |
| Q2/02 | 691,506 | 409,881 | \$ 6,489,851 |
| Q3/02 | 613,002 | 420,825 | \$ 4,532,000 |
| Q4/02 | 631,740 | 340,442 | \$ 9,357,240 |
| 2002 | | | |
| Q1/03 | 633,592 | 329,138 | \$ 8,047,000 |
| Q2/03 | 700,099 | 427,555 | \$ 4,183,600 |
| Q3/03 | 650,650 | 422,314 | \$ 2,164,350 |
| Q4/03 | 702,585 | 371,866 | \$ 6,635,600 |
| 2003 | | | |
| Q1/04 | 660,697 | 355,239 | \$ 8,081,000 |
| Q2/04 | 781,340 | 470,322 | \$ 7,830,000 |
| Q3/04 | 771,722 | 487,103 | \$ 9,858,900 |
| Q4/04 | 946,506 | 500,468 | \$ 3,657,000 |
| 2004 | | | |
| Q1/05 | 823,307 | 445,586 | \$ 4,327,500 |
| Q2/05 | 944,737 | 563,518 | \$ 1,650,000 |
| Q3/05 | 1,080,265 | 672,875 | |
| Q4/05 | 1,082,347 | 546,748 | |
| 2005 | | | |
| Q1/06 | 963,538 | 505,008 | \$ 2,900,625 |
| Q2/06 | 1,201,309 | 705,146 | \$ 34,200,000 |
| Q3/06 | 1,480,412 | 918,777 | \$ 21,300,000 |
| Q4/06* | 1,521,852 | 770,942 | \$ 13,100,000 |
| 2006 | | | |

* through 12/1/06