

Exhibit A
(Submitted Under Seal)

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UNITED STATES DISTRICT COURT
NORTHERN DISTRICT OF CALIFORNIA
SAN JOSE DIVISION

APPLE INC., a California corporation,

Plaintiff,

v.

SAMSUNG ELECTRONICS CO., LTD., A
Korean business entity; SAMSUNG
ELECTRONICS AMERICA, INC., a New York
corporation; SAMSUNG
TELECOMMUNICATIONS AMERICA, LLC, a
Delaware limited liability company,

Defendants.

Case No. 11-cv-01846-LHK

**REBUTTAL EXPERT REPORT
OF DR. ALAN HEDGE**

****CONFIDENTIAL – CONTAINS MATERIAL DESIGNATED AS HIGHLY
CONFIDENTIAL – ATTORNEYS’ EYES ONLY PURSUANT TO A PROTECTIVE
ORDER****

TABLE OF CONTENTS

1
2
3
4
5
6
7
8
9
10
11
12
13
14
15
16
17
18
19
20
21
22
23
24
25
26
27
28

	Page
I. INTRODUCTION	1
II. QUALIFICATIONS	1
III. SUMMARY OF TASK AND CONCLUSIONS	4
IV. COMPENSATION	5
V. RELEVANT LEGAL PRINCIPLES	6
A. The Law of Design Patent Functionality	6
B. The Law of Trade Dress and Trademark Functionality	7
VI. APPLE’S ASSERTED DESIGNS AND TRADE DRESS	8
A. The D’087 Patent	8
B. The D’677 Patent	10
C. The D’270 Patent	11
D. The D’889 Patent	12
E. The D’790 Patent	13
F. The D’305 Patent	14
G. The D’334 Patent	15
H. Apple’s Asserted Trade Dress and Trademarks	16
VII. PRINCIPLES OF ERGONOMICS AND HUMAN FACTORS	21
A. Overview	21
B. Application of These Principles in the Design Process	23
C. Application of These Principles to the Design of Handheld Devices	24
VIII. THE DESIGNS IN THE D’087, D’677, D’270 PATENTS ARE NOT DICTATED BY PRINCIPLES OF ERGONOMICS AND HUMAN FACTORS	25
A. The Principles of Ergonomics and Human Factors Do Not Dictate Any Particular Design for a Smartphone or Media Player.	25
1. Dr. Lehto has not identified ergonomic principles that would dictate a particular smartphone design.	26
a. Apple iOS Human Interface Guidelines.	26
b. Apple’s design process.	26
c. Hand dimension.	28
d. Hand grasp.	29
e. Phone length.	33
2. There are several ergonomically viable alternative smartphone designs available on the market.	34
a. Alternative Smartphone Designs by Samsung.	34
b. Alternative Smartphone Designs by Third Parties.	38

1	B.	The D’087 Patented Design Is Not Dictated by Function.....	43
2	1.	The overall design is not functional based on the principles of ergonomics and human factors..	43
3	2.	The individual elements in the D’087 patented design are not dictated by function based on the principles of ergonomics and human factors.	45
4			
5	C.	The D’677 Patented Design Is Not Dictated by Function.....	50
6	1.	The overall design is not functional based on the principles of ergonomics and human factors.	50
7	2.	The individual elements in the D’677 patented design are not dictated by function based on the principles of ergonomics and human factors.	51
8			
9	D.	The D’270 Patented Design Is Not Dictated by Function.....	53
10	1.	The overall design is not functional based on the principles of ergonomics and human factors.	53
11	2.	The individual elements in the D’270 patented design are not dictated by function based on the principles of ergonomics and human factors.	53
12	IX.	THE DESIGN IN THE D’889 PATENT IS NOT DICTATED BY PRINCIPLES OF ERGONOMICS AND HUMAN FACTORS	54
13			
14	A.	The Principles of Ergonomics and Human Factors Do Not Dictate Any Particular Design for a Tablet Computer.	54
15	1.	Dr. Lehto has not identified ergonomic principles that would dictate a particular tablet design.....	55
16	a.	Apple iOS Human Interface Guidelines..	55
17	b.	Apple’s design process.....	55
18	c.	Voluntary ergonomic standards..	55
19	2.	There are several ergonomically viable alternative tablet designs available on the market.	56
20	B.	The D’889 Patented Design Is Not Dictated by Function.....	64
21	1.	The overall design is not functional based on the principles of ergonomics and human factors..	64
22	2.	The individual elements in the D’889 patented design are not dictated by function based on the principles of ergonomics and human factors.	67
23	X.	THE D’790, D’305, AND D’334 PATENTED DESIGNS ARE NOT DICTATED BY PRINCIPLES OF ERGONOMICS AND HUMAN FACTORS.....	72
24			
25	A.	The Principles of Ergonomics and Human Factors Do Not Dictate Any Particular Graphical User Interface Design.....	72
26	1.	Dr. Lehto has not identified ergonomic principles that would dictate a particular smartphone or media player design.....	73
27			
28			

1
2
3
4
5
6
7
8
9
10
11
12
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16
17
18
19
20
21
22
23
24
25
26
27
28

2. There are several ergonomically viable alternative designs available on the market that are consistent with principles of ergonomics and human factors75

B. The D’790 Patented Design Is Not Dictated by Function.....79

C. The D’305 Patented Design Is Not Dictated by Function.....80

D. The D’334 Patented Design Is Not Dictated by Function.....81

XI. APPLE’S ASSERTED ORIGINAL IPHONE, IPHONE 3G, IPHONE 4, AND IPHONE TRADE DRESS ARE NOT FUNCTIONAL BASED ON PRINCIPLES OF ERGONOMICS AND HUMAN FACTORS83

XII. APPLE’S ASSERTED IPAD AND IPAD2 TRADE DRESS ARE NOT FUNCTIONAL BASED ON PRINCIPLES OF ERGONOMICS AND HUMAN FACTORS.....85

XIII. APPLE’S ASSERTED TRADEMARKS ARE NOT FUNCTIONAL BASED ON PRINCIPLES OF ERGONOMICS AND HUMAN FACTORS.....87

XIV. CONCLUSION87

XV. SUPPLEMENTATION88

XVI. EXHIBITS TO BE USED.....88

1 **REBUTTAL EXPERT REPORT OF DR. ALAN HEDGE**

2 **I. INTRODUCTION**

3 1. I, Dr. Alan Hedge, submit this Rebuttal Expert Report in connection with certain
4 patent, trade dress, and trademark claims being asserted by Apple Inc. (“Apple”) in the above-
5 captioned case. I have been informed that Apple has alleged that Defendants Samsung
6 Electronics Co. Ltd., Samsung Electronics America, Inc., and Samsung Telecommunications
7 America, LLC (collectively, “Samsung”) have infringed Apple’s patents, trade dress, and
8 trademarks.
9

10 2. This Rebuttal Expert Report is in rebuttal to the Expert Report of Mark Lehto
11 dated March 22, 2012.

12 **II. QUALIFICATIONS**

13 3. I am a Full Professor in the Department of Design and Environmental Analysis at
14 Cornell University and a Research Professor in the Department of Mechanical and Aerospace
15 Engineering at Syracuse University. At Cornell, I have directed the Human Factors and
16 Ergonomics teaching and research programs, including the Human Factors and Ergonomics
17 laboratory, since 1987. Before joining Cornell, I was a tenured Lecturer and ran the Graduate
18 Program in Applied Psychology and Ergonomics at Aston University, Birmingham, U.K.¹ From
19 1990-1993, I was also an Honorary Research Fellow at the Institute of Occupational Health,
20 University of Birmingham, U.K.
21

22 4. My research and teaching activities have focused on issues of design and
23 workplace ergonomics as these affect the health, comfort, and productivity of workers. My
24 research themes include alternative keyboard and input system designs (such as computer mice
25 and multitouch surfaces); product and workstation design and musculoskeletal injury (*e.g.*, carpal
26
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28 ¹ In the U.K. university system, a Lecturer is equivalent to an assistant professor.

1 tunnel syndrome) risk factors for users; the performance and health effects of postural strain; and
2 the health and comfort impacts of various environmental stressors, such as the effects of indoor
3 air quality on sick building syndrome complaints among office workers and the effects of office
4 lighting on eyestrain problems among computer workers. I have co-authored the book *Healthy*
5 *Buildings*, and I have co-edited *Advances in Ergonomics Modeling and Usability Evaluation* and
6 the *Handbook of Human Factors and Ergonomics Methods*. I have published 35 book chapters,
7 55 refereed journal articles, 140 refereed conference proceedings, 40 other conference
8 proceedings, 26 other articles, and 13 legislative reports on the above topics.

10 5. I received the 2003 Alexander J. Williams Jr. Design Award from the Human
11 Factors and Ergonomics Society for “outstanding human factors contributions to the design of a
12 major operational system.” This work included the design of a multifunction hand-operated
13 joystick controller and a hand-operated driving wheel control, as well as the design of information
14 displays. I received the 2009 Oliver Keith Hansen Outreach Award from the Human Factors and
15 Ergonomics Society for significant activities that broaden awareness of the existence of the
16 human factors/ergonomics profession and the benefits it brings to humankind.

18 6. My professional activities in the field of Human Factors and Ergonomics have
19 been extensive. I am a Fellow of the Human Factors and Ergonomics Society (U.S.A.); a Fellow
20 of the International Ergonomics Association; a Fellow of the Institute of Ergonomics and Human
21 Factors (formerly the Ergonomics Society, U.K.); and a Certified Professional Ergonomist. I am
22 a member of the Editorial boards of the journals *Ergonomics*, *Theoretical Issues in Ergonomics*,
23 *Work*, *International Journal of Human Factors and Ergonomics*, *Journal of Environmental*
24 *Psychology*, and *The Open Ergonomics Journal*.

26 7. I have chaired the Work Environment technical group of the International
27 Ergonomics Association (IEA) and the Work Environment Design Technical Subcommittee of
28

1 the US Human Factors and Ergonomics Society Technical Advisory Group to the International
2 Standards Organization, as well as the Work Environment subcommittee of the BSR/HFES 100
3 Computer Workstation Standard Revision Committee. I serve on Advisory Boards for the
4 National Ergonomics Industry Advisory Board, Ergoweb, and HealthyComputing.com.

5
6 8. I started my academic career as a Biologist. I hold a First Class Special Honors
7 B.S. degree (1970) and an M.S. (1971) in Zoology from the University of Sheffield, U.K. I then
8 obtained an M.S. degree in Applied Psychology (1972) that included the study of Human Factors
9 and of Ergonomics in the Department of Applied Psychology at Aston University in Birmingham,
10 U.K, then the leading center for Ergonomics in the U.K. My thesis investigated the effects of
11 spatial compatibility in the design of computer controls and displays. I then extended this spatial
12 compatibility research and obtained a Ph.D. (1972-74, submitted and awarded 1979) in Cognitive
13 Psychology at the University of Sheffield, U.K.

14
15 9. In 1974, I began working as a Research Assistant in local government in South
16 Yorkshire MCC, U.K. In 1975, I became a Principal Research Officer in local government with
17 West Midlands MCC, U.K. I began as a Lecturer in the Department of Applied Psychology at
18 Aston University in 1976 and received tenure in 1979. In 1987, I moved to Cornell University as
19 an Associate Professor to direct the Human Factors and Ergonomics programs in the Department
20 of Design and Environmental Analysis. I became a Full Professor in 1995 and I continue to work
21 at Cornell University. I have undertaken collaborative research at Syracuse University and I have
22 also been a Research Professor in the College of Engineering there since 2006.

23
24 10. My experiences include conducting a substantial amount of human factors and
25 ergonomics-related teaching. Since 1987, I have taught classes to undergraduate and graduate
26 students that include the principles of designing ergonomic hand-operated devices. In my
27
28

1 capacity as a consultant, I have also taught these materials to an international hand tools
2 manufacturer. Additionally, I have authored two book chapters on these principles.

3 11. My experiences also include providing consulting services to input device
4 manufacturers and industrial design firms in connection with projects relating to the design of
5 ergonomic input devices. Starting in 1990, I was the first ergonomic researcher to investigate and
6 study benefits of a downward sloping keyboard arrangement to place the hands in a neutral
7 posture while typing. In the same time period, I consulted with an industrial design firm on the
8 design of a downward sloping keyboard platform, which resulted in an Industrial Design
9 Excellence Gold Award from *Business Week* and an Institute of Business Designers
10 (IBD)/Contract Magazine Bronze Award for the ergonomic design of the PROTEX computer
11 keyboard/mouse tray system in 1992. I have consulted with various industrial design firms and
12 with manufacturers of computer products on the design of hand-operated devices ranging from
13 computer mice to video game controllers. In 2002, I began consulting work on the design of
14 products using multitouch input (e.g., iGesture pad, iNumber pad, iMini, Touchstream keyboards,
15 prototype laptop) with Fingerworks. I have also consulted with major consumer product
16 manufacturers on the cognitive ergonomic design of their products and their packaging.

17 12. I was awarded U.S. Patent No. 6,568,650 for a laptop computer accessory jointly
18 with an industrial designer, Eugene Helmetsie.

19 13. A copy of my *curriculum vitae* is attached as Exhibit 1. A list of proceedings in
20 which I have testified as an expert in the past four years is attached as Exhibit 2.

21 **III. SUMMARY OF TASK AND CONCLUSIONS**

22 14. This Rebuttal Expert Report contains my initial opinions concerning the
23 statements and opinions contained in the initial Expert Report of Dr. Mark Lehto (“Lehto
24 Report”), which is dated March 22, 2012, and relates to U.S. Patent Nos. D504,889 (the “D’889
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1 Patent”), D593,087 (the “D’087 Patent”), D618,677 (the “D’677 Patent”), D622,270 (the “D’270
2 Patent”), D627,790 (the “D’790 Patent”), D604,305 (the “D’305 Patent”), and D617,334 (the
3 “D’334 Patent”) and Apple’s asserted trade dress and trademarks. Collectively, I refer to the
4 design patents mentioned above as the “Asserted Design Patents.”

5
6 15. I have been informed that Apple is disputing the timeliness of Samsung’s
7 disclosure of the arguments covered by Dr. Lehto’s report.

8 16. In general, I understand that my task is to review materials and to provide teaching
9 and opinions as to whether the designs in the Asserted Design Patents and Apple’s asserted trade
10 dress and trademarks are dictated by principles of ergonomics and human factors. I am informed
11 that additional experts will be addressing other related issues.

12 17. This Rebuttal Expert Report is not intended to be an exhaustive explanation of
13 every point in the Lehto Report with which I disagree. I may express my opinion on additional
14 statements or opinions in the Lehto Report when appropriate.

15 18. In forming the opinions expressed in this Rebuttal Expert Report, I relied on the
16 Lehto Report, the Asserted Design Patents, and certain publicly available materials. A list of the
17 documents I considered and relied upon is attached as Exhibit 3.

18 19. I reserve the right to rely upon any additional information or materials that may be
19 provided to me or that are relied upon by any of Samsung’s experts or witnesses if I am asked to
20 testify or give additional opinions regarding this matter.

21 22 **IV. COMPENSATION**

23 20. I am being compensated at a rate of \$605 per hour for testifying at deposition and
24 trial and \$555 per hour for non-testifying work. My compensation is in no way contingent upon
25 the outcome of this case or any other litigation or upon the nature of the opinions I express.

26 27 **V. RELEVANT LEGAL PRINCIPLES**

1 **A. The Law of Design Patent Functionality**

2 21. I have not been asked to offer an opinion on the law. However, as an expert
3 opining on whether ergonomics and human-factors considerations render the designs claimed in
4 the Asserted Design Patents to be dictated by function, I understand that I am obliged to follow
5 existing law.

6 22. I understand that a design patent is directed to the appearance of an article of
7 manufacture and that functional designs cannot be patented. I further understand that “[i]n
8 determining whether a design is primarily functional or primarily ornamental the claimed design
9 is viewed in its entirety, for the ultimate question is not the functional or decorative aspect of each
10 separate feature, but rather the overall appearance of the article, in determining whether the
11 claimed design is dictated by the utilitarian purpose of the article.”²

12 23. I also understand that under the functionality analysis, the relevant inquiry is not
13 whether the design performs or serves a function, because all useful articles perform some
14 function, but rather whether the design is “dictated” by function.³ “A design patent is directed
15 to the appearance of an article of manufacture,”⁴ and “the fact that the article of manufacture
16 serves a function is a prerequisite of design patentability, not a defeat thereof.”⁵ “An article of
17 manufacture necessarily serves a utilitarian purpose, and the design of a useful article is deemed
18 to be functional when the appearance of the claimed design is ‘dictated by’ the use or purpose of
19 the article. If the particular design is essential to the use of the article, it can not be the subject of
20 a design patent.”⁶ I have also been informed that when there are several ways to achieve the

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26 ² *L.A. Gear, Inc. v. Thom McAn Shoe Co.*, 988 F.2d 1117, 1123 (Fed. Cir. 1993).

27 ³ *See id.*

28 ⁴ *Id.* (internal citation omitted).

⁵ *Hupp v. Siroflex of Am., Inc.*, 122 F.3d 1456, 1460 (Fed. Cir. 1997).

⁶ *L.A. Gear*, 988 F.2d at 1123 (internal citations omitted).

1 function of an article of manufacture, “[a] design is not dictated solely by its function.”⁷

2 Similarly, if other designs could achieve the same or similar functional capabilities, “the design of
3 the article in question is likely ornamental, not functional.”⁸

4 **B. The Law of Trade Dress and Trademark Functionality**

5 24. I have not been asked to offer an opinion on the law. However, as an expert
6 opining on whether ergonomics and human-factors considerations render Apple’s asserted trade
7 dress and trademarks functional, I understand that I am obliged to follow existing law. I have
8 been informed by counsel that product design trade dress is entitled to protection only if it is
9 nonfunctional. A trade dress is functional “if it is essential to the product’s use or if it [favorably]
10 affects the cost and quality of the article.”⁹

11 25. I understand that in determining functionality, a product’s trade dress must be
12 analyzed as a whole, and not by its individual elements.¹⁰ “The fact that individual elements of
13 the trade dress may be functional does not necessarily mean that the trade dress as a whole is
14 functional.”¹¹

15 26. I understand that courts generally consider four factors in assessing the
16 functionality of a trade dress:

- 17 (1) Whether the design yields a utilitarian advantage;
18 (2) Whether alternative designs are available;
19 (3) Whether advertising touts the utilitarian advantages of the design; and
20
21
22

23
24 ⁷ See *Best Lock Corp. v. Ilco Unican*, 94 F.3d 1563, 1566 (Fed. Cir. 1996).

25 ⁸ *L.A. Gear*, 988 F.2d at 1123; see also *Rosco, Inc. v. Mirror Lite Co.*, 304 F.3d 1373, 1378
(Fed. Cir. 2002).

26 ⁹ *Fuddrucker, Inc. v. Doc’s B.R. Others, Inc.*, 826 F.2d 837, 843 (9th Cir. 1987).

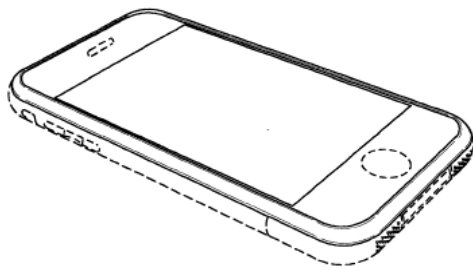
27 ¹⁰ *Fuddrucker*, 826 F.2d at 842 (“functional elements that are separately unprotectable
can be protected together as part of a trade dress”).

28 ¹¹ *Clicks Billiards, Inc. v. Sixshooters, Inc.*, 251 F.3d 1252, 1259 (9th Cir. 2001)
(emphasis in original).

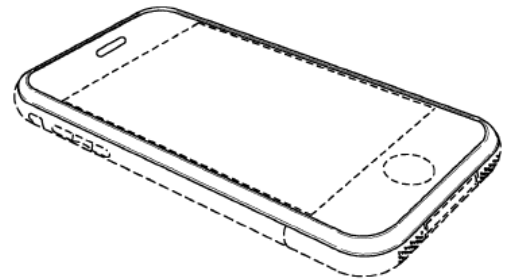
1 (4) Whether the particular design results from a comparatively simple or
2 inexpensive method of manufacture.¹²

3 **VI. APPLE'S ASSERTED DESIGNS AND TRADE DRESS**

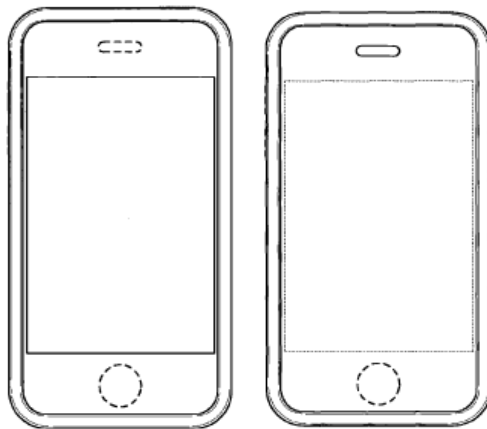
4 **A. The D'087 Patent**



10 **FIG. 9**



11 **FIG. 17**



19 **FIG. 11**

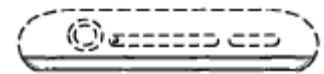
20 **FIG. 19**



21 **FIG. 7**



22 **FIG. 8**



23 **FIG. 5**



24 **FIG. 6**

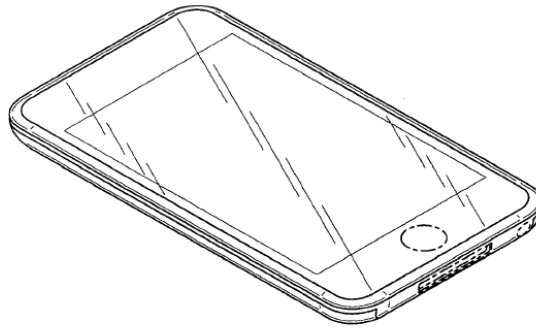
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27. The D'087 Patent is directed toward the ornamental design of the front face and bezel of an electronic device as shown in selected embodiments as depicted in Figures 5–9, 11, 17 & 19 (reproduced above).¹³ Attached as Exhibit 4 is a true and correct copy of the D'087 Patent.

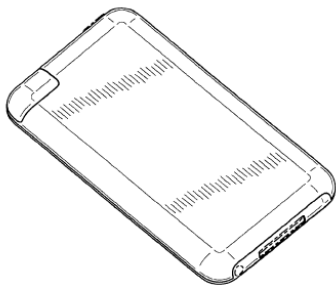
¹² *Disc Golf Ass'n, Inc. v. Champion Discs, Inc.*, 158 F.3d 1002, 1006 (9th Cir. 1998).

¹³ In this report, images of the Asserted Design Patents, Apple's asserted trade dress and trademarks, alternative designs, and Apple products have been scaled so that they correspond with one another. Care has been taken not to change the proportional relationship (*i.e.*, aspect ratio) of the images.

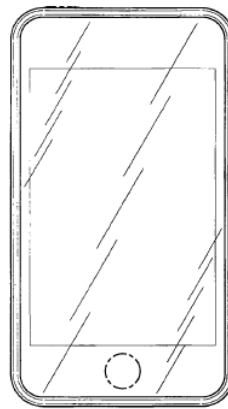
1 **C. The D'270 Patent**



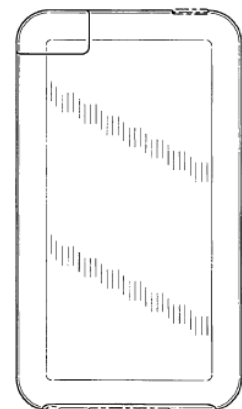
8 **FIG. 1**



13 **FIG. 2**



16 **FIG. 3**



17 **FIG. 4**



22 **FIG. 5**



23 **FIG. 7**



24 **FIG. 8**



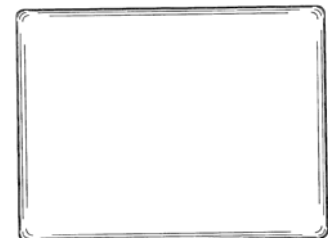
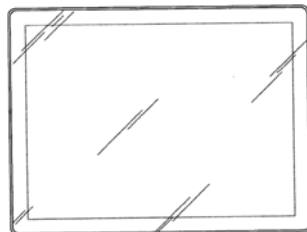
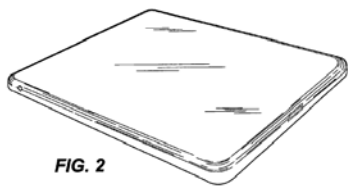
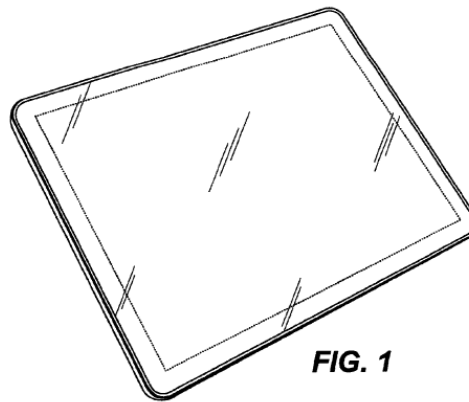
25 **FIG. 9**

26 33. The D'270 Patent is directed toward the ornamental design of the body and front
27 face of an electronic device as shown in Figures 1–9 (reproduced above). Attached as Exhibit 6
28 is a true and correct copy of the D'270 Patent.

1 34. The D'270 Patent states that "The broken lines show portions of the electronic
2 device which form no part of the claimed design."¹⁶

3 35. I understand that the design disclosed in the D'270 Patent is embodied by Apple's
4 iPod touch.

5 **D. The D'889 Patent**

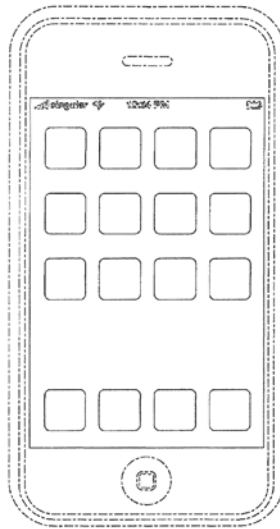


25 36. The D'889 Patent is directed toward the ornamental design of an electronic device
26 as shown in Figures 1-9 (reproduced above). Attached as Exhibit 7 is a true and correct copy of
27 the D'889 Patent.

28 ¹⁶ D'270 Patent at Description.

1 37. I understand that the design disclosed in the D'889 Patent is embodied by Apple's
2 iPad 2.

3 **E. The D'790 Patent**

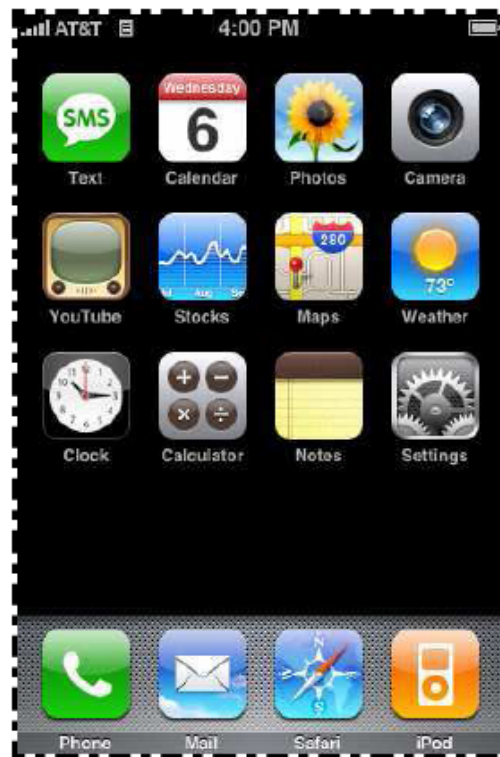


13 **D'790 Figure 1**

14 38. The D'790 Patent depicts an overall appearance for the layout and shape of icons
15 in a graphical user interface for a display screen. A 4 x 3 array (4 columns, 3 rows) of rounded
16 rectangular or square shapes, which appear to be squares with rounded corners, is shown in the
17 top portion of a display screen. A separate row of rounded rectangular shapes is shown along the
18 bottom of the display screen. In both the 4 x 3 array and the row along the bottom of the display
19 screen, the shapes are evenly spaced horizontally. Within the 4 x 3 array, the shapes are evenly
20 spaced vertically, with slightly more space vertically than horizontally. The width:height ratio of
21 the display screen is approximately 1:1.5. Attached as Exhibit 8 is a true and correct copy of the
22 D'790 Patent.
23

24 39. I understand that the design disclosed in the D'790 Patent is embodied by Apple's
25 original iPhone, iPhone 3G, iPhone 3GS, iPhone 4, and iPhone 4S.
26
27
28

1 **F. The D'305 Patent**



15 **D'305 Figure 1**¹⁷

16 40. The D'305 Patent depicts icons displayed on a display screen. The width:height
17 ratio of the display screen is approximately 1:1.5. There is a 4 x 3 array (4 columns, 3 rows) on a
18 black background, with an additional row of icons in a gray gradient area at the bottom of the
19 screen. Approximately the top 80% appears as a solid black background containing the 4 x 3
20 array. Against the black background, the 12 icons in the top portion provide a bright contrast and
21 appear virtually illuminated against the black. The lower approximately 20% of the screen has a
22 gray gradient-patterned background containing the additional row of icons—the main effect being
23 that the top part and lower part of the screen appear as separate, bounded areas, setting off the
24

25 _____
26 ¹⁷ Although the D'305 patent was published in black-and-white, I have been informed that
27 this color image submitted during prosecution of the patent is available from the U.S. Patent and
28 Trademark Office (“USPTO”). I have also been informed that this drawing corresponds to Figure
1 in the issued patent, and that this drawing has been produced to Samsung by Apple in this
proceeding. *See* APLNDC-Y0000232557–232608 at 232558.

1 icons in the lower part as a separate group. The icons in the D'305 Patent have the shape of
2 squares with rounded corners. Under each icon there is gray text that describes the application
3 represented by the icon. There is a band across the top of the screen displaying information:
4 signal strength, carrier name, time, and battery charge status. Attached as Exhibit 9 is a true and
5 correct copy of the D'305 Patent.

7 41. I understand that the design disclosed in the D'305 Patent is embodied by Apple's
8 original iPhone, iPhone 3G, iPhone 3GS, iPhone 4, and iPhone 4S.

9 G. The D'334 Patent



23 **D'334 Patent Figure 6¹⁸**

24
25 ¹⁸ I have been informed that the D'334 does not incorporate the color versions of the
26 designs submitted during prosecution of the patent. I have been informed that this figure is an
27 image submitted during prosecution of the patent that corresponds to Figure 6 in the issued patent
28 and is available from the USPTO. I have included this image because it is a higher quality image
than what can be reproduced from the printed patent, and I have been informed that this drawing
has been produced to Samsung by Apple in this proceeding. See APLNDC-0000237387-237394
at Y0000237392.

1 42. The D'334 Patent shows a display screen like the one shown in the D'305 Patent
2 except with two additional features. First, there are additional icons placed in a fourth row in the
3 top portion of the screen. Second, there is a row of dots between the top portion and the bottom
4 portion of the screen. The width:height ratio of the display screen is approximately 1:1.5.

5 Attached as Exhibit 10 is a true and correct copy of the D'334 Patent.

6
7 43. I understand that the design disclosed in the D'334 Patent is embodied by Apple's
8 iPhone 3G, iPhone 3GS, iPhone 4, and iPhone 4S.

9 **H. Apple's Asserted Trade Dress and Trademarks**

10 44. I understand that the trade dress at issue involves the distinctive shape and
11 appearance of certain Apple products. In particular, I understand that the original iPhone trade
12 dress (the "Original iPhone Trade Dress") includes:

- 13
14 • a rectangular product with four evenly rounded corners;
- 15 • a flat clear surface covering the front of the product;
- 16 • the appearance of a metallic bezel around the flat clear surface;
- 17 • a display screen under the clear surface;
- 18 • under the clear surface, substantial black borders above and below the display
19 screen and narrower black borders on either side of the screen;
- 20 • when the device is on, a matrix of colorful square icons with evenly rounded
21 corners within the display screen; and
- 22 • when the device is on, a bottom dock of colorful square icons with evenly
23 rounded corners set off from the other icons on the display, which does not
24 change as other pages of the user interface are viewed.¹⁹

27 ¹⁹ *Apple Inc., v. Samsung Electronics Co., Ltd.*, Amended Complaint, U.S. District Court,
28 Northern District of California, Case No: 11-cv-01846-LHK ("Am. Compl.") ¶ 57.

1 45. The iPhone 3G trade dress includes all of the elements of the Original iPhone
2 Trade Dress, plus “when the device is on, a row of small dots on the display screen” (the “iPhone
3 3G Trade Dress”).²⁰

4 46. The iPhone 4 trade dress includes all of the elements of the Original iPhone Trade
5 Dress and the iPhone 3G Trade Dress except that it does not have a metallic bezel, but does have
6 a thin metallic band around the outside edge of the iPhone 4, which creates a thin rim adjacent to
7 the face of the phone (the “iPhone 4 Trade Dress”).²¹ The iPhone 4’s profile is also flatter than
8 the previous versions of the iPhone.

9 47. The iPhone trade dress (the “iPhone Trade Dress”) includes the elements that are
10 common to all versions of the iPhone, namely:

- 11 • a rectangular product with four evenly rounded corners;
- 12 • a flat clear surface covering the front of the product;
- 13 • a display screen under the clear surface;
- 14 • under the clear surface, substantial neutral (black and white) borders above and
15 below the display screen and narrower neutral borders on either side of the
16 screen;
- 17 • when the device is on, a matrix of colorful square icons with evenly rounded
18 corners within the display screen; and
- 19 • when the device is on, a bottom dock of colorful square icons with evenly
20 rounded corners set off from the other icons on the display, which does not
21 change as other pages of the user interface are viewed.²²

22 ²⁰ Am. Compl. ¶¶ 35, 59–60. The iPhone 3G Trade Dress also applies to iPhone 3GS.
23 See Am. Compl. ¶ 35.

24 ²¹ Am. Compl. ¶¶ 37, 61–62.

25 ²² Am. Compl. ¶¶ 63–64.

1 48. I understand that another Apple product at issue in this case, the iPod touch, builds
2 upon the original iPhone's appearance and configuration and includes all of the elements of the
3 iPhone Trade Dress.

4 49. Moreover, the trade dress registered in U.S. Registration No. 3,470,983 consists of
5 the following image shown in the registration:
6



14 The registration describes this trade dress as follows:

15 The color(s) black, blue, brown, brown-gray, gray-green, green,
16 orange, red, silver, tan, white and yellow is/are claimed as a feature
17 of the mark. The mark consists of the configuration of a
18 rectangular handheld mobile digital electronic device with rounded
19 silver edges, a black face, and an array of 16 square icons with
20 rounded edges. The top 12 icons appear on a black background,
21 and the bottom 4 appear on a silver background. The first icon
22 depicts the letters "SMS" in green inside a white speech bubble on
23 a green background; the second icon is white with a thin red stripe
24 at the top; the third icon depicts a sunflower with yellow petals, a
25 brown center, and a green stem in front of a blue sky; the fourth
26 icon depicts a camera lens with a black barrel and blue glass on a
27 silver background; the fifth icon depicts a tan television console
28 with brown knobs and a gray-green screen; the sixth icon depicts a
 white graph line on a blue background; the seventh icon depicts a
 map with yellow and orange roads, a pin with a red head, and a red-
 and- blue road sign with the numeral "280" in white; the eighth
 icon depicts an orange sun on a blue background, with the
 temperature in white; the ninth icon depicts a white clock with
 black and red hands and numerals on a black background; the tenth
 icon depicts three brown-gray circles and one orange circle on a
 black background with a white border, with the mathematical
 symbols for addition, subtraction, multiplication, and the equal sign

1 displayed in white on the circles; the eleventh icon depicts a portion
2 of a yellow notepad with blue and red ruling, with brown binding at
3 the top; the twelfth icon depicts three silver gears over a thatched
4 black-and-silver background; the thirteenth icon depicts a white
5 telephone receiver against a green background; the fourteenth icon
6 depicts a white envelope over a blue sky with white clouds; the
7 fifteenth icon depicts a white compass with a white- and-red needle
8 over a blue map; the sixteenth icon depicts the distinctive
9 configuration of applicant's media player device in white over an
10 orange background.²³

11 Attached as Exhibit 11 is a true and correct copy of U.S. Registration No. 3,470,983.

12
13 50. The trade dress registered in U.S. Registration No. 3,457,218 consists of the
14 following image shown in the registration:



15
16 The registration describes this trade dress as follows:

17 The mark consists of the configuration of a rectangular handheld
18 mobile digital electronic device with rounded corners. The matter
19 shown in broken lines is not part of the mark.²⁴

20 Attached as Exhibit 12 is a true and correct copy of U.S. Registration No. 3,457,218.

21
22 51. The trade dress registered in U.S. Registration No. 3,475,327 consists of the
23 following image shown in the registration:



24
25
26 The registration describes this trade dress as follows:

27
28 ²³ APLNDC-Y0000182302-182304.

²⁴ APLNDC-Y0000182305-182306.

1 The color(s) gray, silver and black is/are claimed as a feature of the
2 mark. The mark consists of the configuration of a handheld mobile
3 digital electronic device. The material shown in dotted lines,
4 namely, the buttons and openings on the device show the position
5 of the mark in relation to the device and are not considered a part of
6 the mark. The color gray appears as a rectangle at the front, center
7 of the device. The color black appears on the front of the device
8 above and below the gray rectangle and on the curved corners of
9 the device. The color silver appears as the outer border and sides of
10 the device. The color white is shown solely to identify placement
11 of the mark and is not claimed as a part of the mark.²⁵

12 Attached as Exhibit 13 is a true and correct copy of U.S. Registration No. 3,475,327.

13 52. In addition to the trade dress associated with the various generations of the iPhone
14 and iPod touch, the trade dress associated with Apple’s tablet computers, namely the iPad and the
15 iPad 2, are also at issue. The iPad trade dress (the “iPad Trade Dress”) includes:

- 16 • a rectangular product with four evenly rounded corners;
- 17 • a flat clear surface covering the front of the product;
- 18 • the appearance of a metallic rim around the flat clear surface;
- 19 • a display screen under the clear surface;
- 20 • under the clear surface, substantial neutral (black or white) borders on all sides
21 of the display screen; and
- 22 • when the device is on, a matrix of colorful square icons with evenly rounded
23 corners within the display screen.²⁶

24 53. The iPad 2 trade dress (the “iPad 2 Trade Dress”) at issue includes all of the
25 elements of the iPad Trade Dress.²⁷ The overall appearance of the iPad and iPad 2 provides an
26 extremely thin side profile, making the products appear to be relatively flat when placed on the
27 table.

28 ²⁵ APLNDC-Y0000182307–182308.

²⁶ Am. Compl. ¶¶ 65–66.

²⁷ Am. Compl. ¶¶ 65–68.

1 54. I understand that the trademarks at issue represent various application icons. I
2 understand that Apple has asserted trademark rights in the following icon images²⁸:



11 **VII. PRINCIPLES OF ERGONOMICS AND HUMAN FACTORS**

12 **A. Overview**

13 55. The term “ergonomics” means “the laws of work,” derived from the Greek
14 “ergon” (work) and “nomos” (natural laws).²⁹ Formalized in Great Britain after the end of World
15 War II, it was founded as a human-performance-oriented engineering design discipline.³⁰ In the
16 United States, the equivalent discipline was called “human factors.”³¹ Today, both terms are
17 often used together and interchangeably. The discipline is defined by the International
18 Ergonomics Association as follows: “Ergonomics (or human factors) is the scientific discipline
19
20

21 _____
22 ²⁸ The icons shown here are the subject of the following USPTO trademark registrations
23 and application: U.S. Registration Nos. 3,886,196 (APLNDC-Y00000182288–182289),
24 3,889,642 (APLNDC-Y00000182290–182291), 3,886,200 (APLNDC-Y00000182292–182293),
25 3,889,685 (APLNDC-Y00000182294–182295), 3,886,169 (APLNDC-Y00000182296–182297),
26 3,886,197 (APLNDC-Y00000182298–182299), and 2,935,038 (APLNDC-Y00000182300–
182301), and U.S. Application Serial No. 85/041,463 (APLNDC-Y00000183090–183097).
Attached as Exhibits 14–20 are true and correct copies of U.S. Registration Nos. 3,886,196;
3,889,642; 3,886,200; 3,889,685; 3,886,169; 3,886,197; and 2,935,038. Attached as Exhibit 21 is
a true and correct copy of U.S. Application Serial No. 85/041,463.

27 ²⁹ Alan Hedge, *Ergonomics and Design: Applying the Laws of Work*, 2 INFORMEDSIGN,
no. 3, at 1, available at http://www.informedesign.org/_news/mar_v02-p.pdf.

28 ³⁰ *Id.*

³¹ *Id.*

1 concerned with the understanding of the interactions among human and other elements of a
2 system, and the profession that applies theory, principles, data and methods to design in order to
3 optimize human well-being and overall system performance.”³² The distinguishing characteristic
4 of ergonomics is that it applies scientific study to the design of products, and as such it blends
5 aspects of both science and art.

6
7 56. Ergonomists study ways of optimizing the design of people-technology systems,
8 using a variety of sources, including information on human physical and mental abilities that
9 affect performance and reliability, anthropometrics, work physiology, biomechanics, social
10 behavior, and work environment conditions.³³ To determine whether a product is ergonomically
11 designed, typical factors to consider include: whether the product feels comfortable to use,
12 whether the product puts the user in a more neutral posture, whether the product improves safety,
13 whether the product enhances performance and efficiency, whether the manufacturer/designer can
14 clearly articulate what the ergonomic objectives were for a specific design element (*i.e.*, why the
15 product was designed the way it was), and whether the manufacturer/designer has any research
16 evidence to demonstrate that the particular product works in an ergonomically proper way.³⁴ This
17 also includes consideration of the cognitive components of a product, such as its form and
18 appearance, that relate to the ornamental design of a product.³⁵ This interplay between physical
19 considerations that focus on performance and comfort, on the one hand, and cognitive
20 considerations that focus on aesthetics and desirability, on the other, is at the core of the study of
21 ergonomics as it relates to consumer products. To be successful, a product needs to be both
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23

24
25 ³² INT’L ERGONOMICS ASS’N,
http://www.iea.cc/01_what?What%20is%20Ergonomics.html.

26 ³³ Alan Hedge, *Ergonomics and Design: Applying the Laws of Work*, 2 INFORMEDSIGN,
no. 3, at 1, available at http://www.informedesign.org/_news/mar_v02-p.pdf.

27 ³⁴ *Id.* at 3.

28 ³⁵ Alan Hedge, *Consumer Product Design*, in 2 ENCYCLOPEDIA OF ERGONOMICS AND
HUMAN FACTORS 1555–1560 (W. Karwowski ed., 2d ed. 2006).

1 functional and desirable to use. Ergonomics advocates human-centered design. Ergonomics does
2 not dictate the design of a product but rather it recommends ways of designing products to
3 perform the desired functions in an optimal way for the human user.

4 57. This analysis also takes into consideration the trade-offs of designing a product in
5 a particular way in light of the product’s intended uses, customer demographics, and
6 environments in which the product is likely to be used. For example, to achieve optimal design
7 for a handheld device that is primarily used for typing, the designer will have to take into
8 consideration a different set of factors than for a device that is primarily used for verbal
9 communication, or one that is primarily used for entertainment, such as watching videos or
10 playing video games. A device that is intended for multiple uses—for example, a handheld
11 device that can be used for verbal communication as well as watching videos—will inevitably
12 reflect compromises that an ergonomically minded designer would have to make.

13
14
15 **B. Application of These Principles in the Design Process**

16 58. Large manufacturing companies often either include professionals educated in
17 ergonomics principles as members of in-house design teams or outsource such work to
18 consultants. An ergonomist may, for example, help with the initial assessment of how and in
19 what environments the product will be used in order to design a set of specifications that the
20 industrial designers would then implement in various prototypes. Once the designers develop a
21 pre-production model, the ergonomists may test the physical model with actual users. Depending
22 on the results of those tests, the designers may go back to the drawing board to reassess the
23 product’s design.

24
25 59. The process of ergonomic design is described in ISO 26800:2011 (Ergonomics —
26 General approach, principles and concepts), which “presents the general ergonomics approach
27 and specifies basic ergonomics principles and concepts” and emphasizes human-centered
28

1 design.³⁶ The goal of ergonomics is to strive continually to develop new and better ways to
2 optimize the performance of people using products, including by improving the design of
3 products.³⁷ Yet, ergonomists usually are not designers who conceive of product designs.
4 Designers aim to create distinctive, unique designs. While ergonomic principles may frame the
5 total universe of options, that universe nonetheless includes many available design options and
6 designers thus invariably must make design-driven choices on whether and how to adopt
7 ergonomic considerations. Thus, ergonomic/human factors considerations are only one
8 component of the overall design process.
9

10 **C. Application of These Principles to the Design of Handheld Devices**

11 60. Several principles of ergonomic design consistently apply to the design of
12 handheld products. Some of these principles relate to the shape and form of the product.³⁸ Of
13 paramount importance among these is: “When designing a handheld device, the smallest and
14 largest users in the target population must be able to grasp, view and manipulate the product
15 (typically, the 5th percentile female and 95th percentile male).”³⁹ Two key considerations
16 regarding whether a product meets this requirement are (1) hand dimensions for a 5th percentile
17 female and 95th percentile male and (2) grip strength for a 5th percentile female and 95th percentile
18 male. While no fixed-width handheld product can cover this entire subset of the population,
19 ergonomic considerations counsel maximizing the number who can grasp, view, and manipulate
20 the device.
21
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23 ³⁶ INT’L ORGANIZATION FOR STANDARDIZATION, ERGONOMICS—GENERAL APPROACH,
24 PRINCIPLES AND CONCEPTS, ISO 26800:2011, *available at*
25 http://www.iso.org/iso/iso_catalogue/catalogue_tc/catalogue_detail.htm?csnumber=42885.

26 ³⁷ For a description of the process of ergonomic design, see generally ERGONOMICS—
27 GENERAL APPROACH, PRINCIPLES AND CONCEPTS (ISO 26800:2011).

28 ³⁸ Alan Hedge, *Ergonomic Design of Hand-Operated Devices*, in HUMAN FACTORS IN
CONSUMER PRODUCTS 203–222 (N. Stanton ed., Taylor & Francis 1998).

³⁹ J.R. Lewis, P.M. Commarford, P.J. Kennedy & W.J. Sadowski, *Handheld Electronic
Devices*, 4 REVIEWS OF HUMAN FACTORS & ERGONOMICS 105, 106 (2008).

1 **VIII. THE DESIGNS IN THE D'087, D'677, D'270 PATENTS ARE NOT DICTATED BY**
2 **PRINCIPLES OF ERGONOMICS AND HUMAN FACTORS**

3 **A. The Principles of Ergonomics and Human Factors Do Not Dictate Any**
4 **Particular Design for a Smartphone or Media Player.**

5 61. As detailed below, in my opinion, considerations of ergonomics and human factors
6 do not compel a particular design, or any element of ornamental design, for a smartphone.

7 Rather, principles of ergonomics are guidelines that allow for substantial design variations for
8 devices that provide the same functionality. It is my understanding that smartphones, such as the
9 various generations of the iPhone, can be used for making phone calls, sending and receiving
10 emails or text messages, surfing the internet, running applications, playing games, and taking
11 pictures, among other things. I also understand that media players, such as the various
12 generations of the iPod touch, can be used for surfing the internet, running applications, playing
13 games, watching videos, and listening to music, among other things. In my opinion, the variety
14 of different smartphones on the market confirms that ergonomic principles impose minimal
15 restrictions on the design choices available to smartphone designers and do not dictate any
16 particular smartphone design, let alone the specific designs set forth in the D'087, D'677, and
17 D'270 patents.

18
19 62. The various functions performed by a smartphone also highlight the significance
20 of design trade-offs; namely, the fact that designs that are advantageous for certain functions may
21 be disadvantageous for other functions so trade-offs are made in the design process. A
22 smartphone with a larger keyboard may facilitate easier and more accurate typing, or a larger
23 touchscreen may facilitate easier viewing, but a larger device may fit less comfortably in smaller
24 hands or be less comfortable when held against the ear on phone calls. I have personally
25 examined a number of samples of different smartphones and I have visited websites that provide
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1 pictures and other information of an even larger number of smartphones.⁴⁰ Based on this review,
2 it is clear to me that there are a large number of ergonomically acceptable smartphones that have
3 a wide variety of form factors in light of the goals that these devices are intended to achieve.
4 Indeed, Samsung alone manufactures a wide variety of smartphones, many of which have
5 substantially different form factors.
6

7 **1. Dr. Lehto has not identified ergonomic principles that would dictate a**
8 **particular smartphone design.**

9 63. Dr. Lehto has not pointed to any guidelines or principles that support his position
10 that the D’087, D’677, and D’270 patented designs are dictated by the function, purpose, or use
11 of smartphones.

12 **a. Apple iOS Human Interface Guidelines**

13 64. Dr. Lehto refers to the “Apple iOS Human Interface Guidelines” to support the
14 proposition that “contemporary design of electronic devices involves a process of systematically
15 analyzing the needs and wants of the intended customer, and assessing the degree to which the
16 provided features satisfy these requirements.”⁴¹ These Guidelines are directed to the developers
17 of software ‘apps’ that run on the iOS operating system and there is nothing to suggest they had
18 any impact on the physical hardware designs of the various generations of the iPhone and the
19 iPod touch or the D’087, D’677, and D’270 design patents.
20

21 **b. Apple’s design process**

22 [REDACTED]
23 [REDACTED]
24 [REDACTED]
25 [REDACTED]

26 ⁴⁰ See, e.g., <http://www.gsmarena.com>.

27 ⁴¹ Lehto Report at 5, 16. The Apple iOS Human Interface Guidelines may be found at:
28 <http://developer.apple.com/library/ios/documentation/UserExperience/Conceptual/MobileHIG/MobileHIG.pdf>.

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[REDACTED]

67. To illustrate that ergonomic principles do not dictate any particular smartphone design, I will analyze the specific factors identified by Dr. Lehto as they pertain to various models of the iPhone and to the first-generation iPod touch. The various models of the iPhone and the first-generation iPod touch have been enormously successful, and that success has been achieved despite ergonomic principles, not because of them. Indeed, as described below, the application of conventional ergonomic principles suggests that various models of the iPhone and the first-generation iPod touch were ideally designed for only a small subset of the consumer population.⁴⁵

⁴² Lehto Report at 5.

⁴³ Lehto Report at 6.

[REDACTED]

See discussion *infra* ¶¶ 68–76.

1 This suggests to me that ergonomic considerations were far from the driving force in the design
2 of the various iPhone models and the first-generation iPod touch.

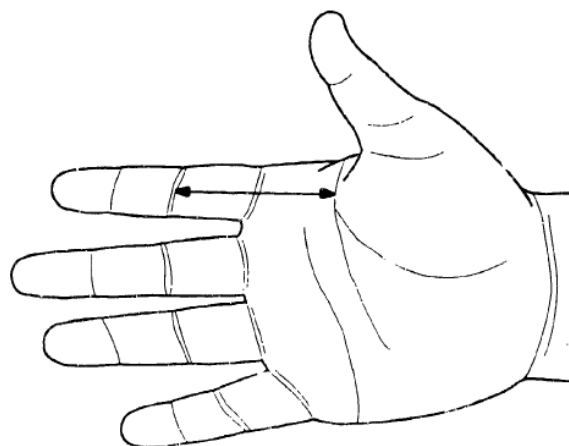
3 **c. Hand dimension**

4 68. Dr. Lehto identifies various steps to consider in the ergonomic analysis for
5 handheld electronic devices. He states: “The first step in analysis was to identify the basic
6 proportions of a handheld electronic device that would provide the following functionality:

7 ‘Comfortably fit the human hand for users varying from a small woman to large man.’”⁴⁶

8 Although Dr. Lehto does not specify what he means by a “small woman” and a “large man,”
9 ergonomists typically understand these terms to refer to a 5th percentile woman and a 95th
10 percentile man on that anthropometric dimension.
11

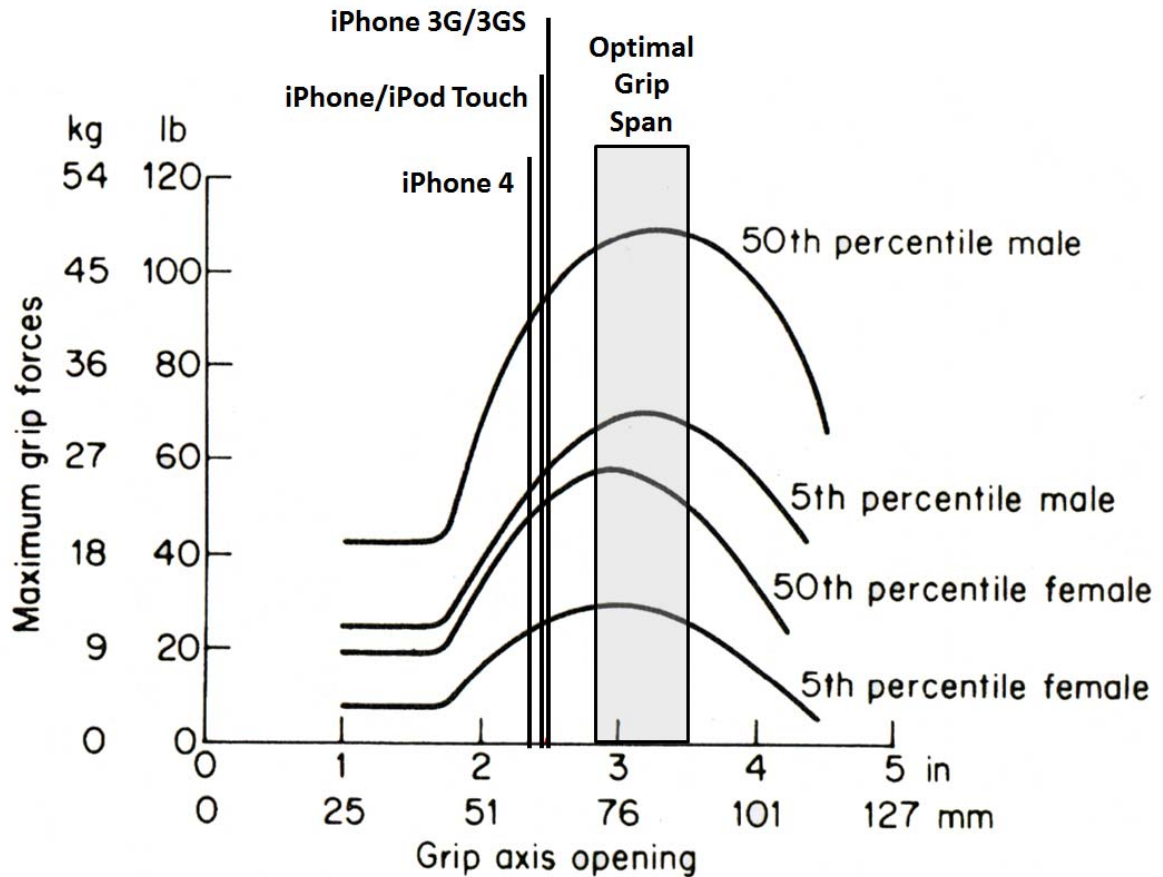
12 69. To estimate the size range for a handheld product, the appropriate anthropometric
13 dimension that is used is the proximal phalanx link length (*i.e.*, the distance from the middle of
14 the proximal interphalangeal joint of the index finger and the center of rotation of the metacarpo-
15 phalangeal joint, which is approximated by the transverse palm crease below the thumb, as
16 illustrated in the following figure).
17



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27
28 ⁴⁶ Lehto Report at 11–12.

1 generated by the hand and it represents 100% of the maximal grasping force. An Oblique Power
2 Grip is a variant of the Power Grip that typically can generate only 65% of the strength of a
3 Power Grip. Where possible, ergonomists recommend that handheld products should be designed
4 to allow a Power Grip in preference to an Oblique Power Grip. The strength of both types of
5 grips is significantly influenced by the grip span required to hold a product in the hand. When a
6 product can be held with the strongest Power Grip, it is the most stable grasp on the product and it
7 is unlikely that the product will be dropped. The weaker the grip, the greater the likelihood that
8 the product will be unstable in the hand, and the greater the risk that it will be dropped. The
9 relationship between grip span and grip strength is well understood and is shown in the following
10 figure.⁴⁸
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27 ⁴⁸ This figure is based on data from M.M. Sanders & E.J. McCormick, HUMAN FACTORS
28 IN ENGINEERING & DESIGN 393 (7th ed. McGraw-Hill, NY 1993).



73. This figure shows the grip span (x axis) and grip strength (y axis) for 5th percentile and 50th percentile women and men. The optimal grip span is that which allows the maximum grip force to be generated, and this region is shown by the gray box. The widths of the iPhone, iPhone 3G/3GS, iPhone 4, and first-generation iPod touch are plotted and these fall below the optimal grip span by a considerable margin for both for 5th percentile and 50th percentile women and men. To meet ideal ergonomic design requirements, a phone should have an adjustable width that can accommodate a 5th percentile female to 95th percentile male hand.

74. This discrepancy between the widths of the iPhone, iPhone 3G/3GS, iPhone 4, and first-generation iPod touch and the optimal grip span for women and men undoubtedly accounts in part for the large secondary market that rapidly developed for iPhone and iPod touch covers that increase the phone size, improve the grasp strength and comfort of holding the phone, and

1 protect the phone against damage from being dropped. For example, Belkin sells the Belkin®
2 Grip Ergo iPhone® 3G Silicone Case which has a textured overlay and offers an easy grip.⁴⁹



Belkin® Grip Ergo
iPhone® 3G Silicone

12 Amazon also sells the AmazonBasics Silicone Case for AT&T and Verizon iPhone 4 and iPhone
13 4S, which is specifically advertised as follows: “This silicone case for Apple’s iPhone 4 offers a
14 soft-touch rippled pattern for added comfort and improved grip.”⁵⁰ In other words, the size and
15 shape of the iPhone are not “functional” at all.



Silicone Case for AT&T and
Verizon iPhone 4 and iPhone 4S

⁴⁹ This photo is from http://www.amazon.com/Belkin-Grip-Silicon-Sleeve-BLACK/dp/B002K8MB3Y/ref=pd_cp_e_2.

⁵⁰ This photo and quotation are from <http://www.amazon.com/AmazonBasics-Silicone-Verizon-iPhone-Black/dp/B003Y74AZ2>.

1 **2. There are several ergonomically viable alternative smartphone designs**
2 **available on the market.**

3 77. Below I describe a number of smartphones that are or will be available on the
4 market. All of these perform conventional smartphone functions, but they nevertheless have
5 different form factors. This wide variety of commercially available products indicates that the
6 functionality of a smartphone does not dictate any particular design. Indeed, if Dr. Lehto's
7 position that ergonomic principles dictated the designs in the D'087, D'677, and D'270 Patents
8 were true, all manufacturers would have converged upon these designs.

9 **a. Alternative Smartphone Designs by Samsung**

10 78. For example, the form factor of the Samsung Gem SCH-I100 (released in February
11 2011) is basically rectangular but with asymmetric curvature of the top and bottom.⁵⁵ Attached as
12 Exhibit 22 are images of the Samsung Gem SCH-I100. The display takes up most of the user side
13 of the phone, and it comprises a rectangular touch screen (68mm x 43mm) that is asymmetrically
14 positioned between the top and bottom. The bottom of the phone consists of a curved lower
15 section that has sharply curved corners to the body of the phone. The top of the phone consists of
16 a more squared upper section that has sharply curved corners to the body of the phone. The lower
17 section has a greater radius of curvature than the top of the phone. Five physical buttons are
18 located beneath the touch screen.⁵⁶ A large "home" key, consisting of an irregular pentagonal
19 push button, is centered between the edges of the lower section. Beneath this push button is a
20 sweeping double-winged rocker switch that functions as the Menu key (left press) and Back key
21 (right press), and to either side of this switch are arc-shaped push buttons that function as the
22 Send key (left) and the End key (right). The Samsung website states that this smartphone is
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27 ⁵⁵ See <http://www.samsung.com/us/mobile/cell-phones/SCH-I100ZKAXAR;>
28 [http://www.gsmarena.com/samsung_i100_gem-3738.php.](http://www.gsmarena.com/samsung_i100_gem-3738.php)

⁵⁶ See [http://www.samsung.com/us/mobile/cell-phones/SCH-I100ZKAXAR.](http://www.samsung.com/us/mobile/cell-phones/SCH-I100ZKAXAR)

1 capable of making phone calls, sending and receiving emails, and a variety of other functions.⁵⁷
2 It also includes a 3.2Mp camera and runs the Android operating system. The integrated earpiece
3 speaker is in the shape of an inverted irregular pentagon. There is a definite overall ‘soft’ look to
4 this phone, with subtle curves running top to bottom, softer radii on all edges and corners, and a
5 larger radius side to side at the top and bottom adding to a more visually pleasing and comfortable
6 look than a simpler, harder, straight-edge rectangular form. The product dimensions are listed as
7 113mm x 55mm x 12mm, and the device weighs 109 grams.⁵⁸ Based on the width of this phone,
8 it will have an optimal fit to the hand of a 15th percentile man and 45th percentile woman.⁵⁹ These
9 optimal fit percentiles are different than those for the different models of the iPhone, indicating
10 that ergonomic considerations do not dictate any single smartphone design.
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Samsung Gem SCH-I100

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20 79. As another example, the Samsung Gravity Touch SGH-T669 (released in June
21 2010) performs virtually the same functions as the Samsung Gem SCH-I100 but has a completely
22 different form factor.⁶⁰ Attached as Exhibit 23 are images of the Samsung Gravity Touch SCH-
23 T669. The display takes up most of the user side of the phone but it is smaller than that of the
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25 ⁵⁷ *See id.*

26 ⁵⁸ *Id.*; *see also* http://www.gsmarena.com/samsung_i100_gem-3738.php.

27 ⁵⁹ The issue of optimal fit also arises with respect to the length, shape, weight, and
28 thickness of the device. I have used width as an example in this report because it can be readily
measured and compared against standard ergonomic metrics.

⁶⁰ *See* http://www.gsmarena.com/samsung_t669_gravity_t-3336.php.

1 Samsung Gem SCH-I100, and it comprises a rectangular touch screen (57mm x 42mm) that is
2 symmetrically positioned between the top and bottom. It has more heavily curved top and bottom
3 portions that give this phone a much softer and more visually pleasing and comfortable
4 appearance than a rectangular shape. The earpiece is in the top section and is a thick crescent
5 shape, and there are two physical buttons below the touch screen: a central Menu push button
6 and a U-shaped rocker switch with a Call key (left) and a Power key (right). A slide-out
7 QWERTY keyboard that is the whole underside of the phone can be used instead of the touch
8 screen. The product dimensions are listed as 110mm x 56.6mm x 15mm, and the device weighs
9 120 grams.⁶¹ Based on the width of this phone, it will have an optimal fit to the hand of a 20th
10 percentile man and 50th percentile woman. These optimal fit percentiles are different than those
11 for the different models of the iPhone, indicating that ergonomic considerations do not dictate any
12 single smartphone design.
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Samsung Gravity
Touch SGH-T669

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23 80. The Samsung Beat DJ M7600 (released in May 2009) has a shape with semi-
24 circular ends and no corners.⁶² Attached as Exhibit 24 are images of the Samsung Beat DJ
25 M7600. The display screen is 61mm x 40mm, and it is almost symmetrically centered on the
26 body of the phone. In the top section, it has an asymmetrically placed camera and a curved

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28 ⁶¹ See http://www.gsmarena.com/samsung_t669_gravity_t-3336.php.

⁶² See http://www.gsmarena.com/samsung_m7600_beat_dj-2684.php.

1 speaker earpiece. In the bottom section, it has a curved three-way rocker switch to activate the
2 phone and perform back and power functions. One variant of the model has a sliding face that
3 reveals an alphanumeric keypad, the top section of which has beveled corners. This phone shows
4 that no specific corner design is an essential functional element of phone design. The product
5 dimensions for the M7600 are listed as 112mm x 51mm x 13.9 mm, and the device weighs 99.7
6 grams.⁶³ Based on the width of this phone, it has an optimal fit to the hand of a 40th percentile
7 man and 70th percentile woman. These optimal fit percentiles are different than those for the
8 different models of the iPhone, indicating that ergonomic considerations do not dictate any single
9 smartphone design.
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Samsung Beat DJ M7600

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20 81. Samsung also appears poised to offer a clamshell touchscreen smartphone called
21 the Samsung W999.⁶⁴ Attached as Exhibit 25 is a printout from the website GSM Arena
22 displaying images of the device. It will reportedly perform all of the usual smartphone functions
23 but has a completely different form factor, namely, it is a clamshell.⁶⁵ The top half of the phone
24 consists of dual touchscreens (front and back) that take up most of the phone, and the bottom half
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27 ⁶³ See http://www.gsmarena.com/samsung_m7600_beat_dj-2684.php.

28 ⁶⁴ See http://www.gsmarena.com/samsung_w999-4660.php.

⁶⁵ See *id.*

1 consists of physical buttons and a conventional alphanumeric phone pad.⁶⁶ The design will
2 apparently allow the consumer to use the touchscreen both while the phone is open and while it is
3 closed. The product dimensions are listed as 111mm x 59mm x 17.8mm, and the device weighs
4 206 grams.⁶⁷ Based on the width of this phone, it has an optimal fit to the hand of a 40th
5 percentile man and 70th percentile woman. These optimal fit percentiles are different than those
6 for the different models of the iPhone, indicating that ergonomic considerations do not dictate any
7 single smartphone design.
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Samsung W999

17 **b. Alternative Smartphone Designs by Third Parties**

18 82. Other companies have also introduced smartphones that have still more design
19 variations, yet have similar or identical functionality. The Casio GzOne Commando 4550
20 (released in April 2011) is a ruggedized phone with additional protective bumpers.⁶⁸ Attached as
21 Exhibit 26 are images of the Casio GzOne Commando 4550. It has a large, centered display
22 (77mm x 46mm), there are no buttons on the front face of the phone, and the touch screen is
23 recessed in the casing. The ends of the phone are arched. The product dimensions for the GzOne
24 Commando 4550 are listed as 129mm x 65.5mm x 15.2 mm, and the device weighs 154
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27 ⁶⁶ See *id.*

28 ⁶⁷ See *id.*

⁶⁸ See http://www.gsmarena.com/casio_g'zone_commando-4550.php.

1 grams.⁶⁹ Based on the width of this phone, it will have an optimal fit to the hand of an 80th
2 percentile man and 90th percentile woman. These optimal fit percentiles are different than those
3 for the different models of the iPhone, indicating that ergonomic considerations do not dictate any
4 single smartphone design.



Casio GzOne
Commando 4550

14 83. The Sony Ericsson Xperia Arc S (released in September 2011) is a large
15 touchscreen phone (93mm x 6mm).⁷⁰ Attached as Exhibit 27 are images of the Sony Ericsson
16 Xperia Arc S. It has a rectangular shape with shallow curves on the top and bottom, and it also
17 has a hard casing with angular corners with very small radiuses. It has three curvilinear buttons—
18 Back, Home, and Menu—beneath the smooth glass surface. The product dimensions for the Arc
19 S are listed as 125mm x 63mm x 8.7mm, and the device weighs 117 grams.⁷¹ Based on the width
20 of this phone, it will have an optimal fit to the hand of a 65th percentile man and 88th percentile
21 woman. These optimal fit percentiles are different than those for the different models of the
22 iPhone, indicating that ergonomic considerations do not dictate any single smartphone design.

27 ⁶⁹ See *id.*

28 ⁷⁰ See http://www.gsmarena.com/sony_ericsson_xperia_arc_s-4134.php.

⁷¹ See *id.*

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Sony Ericsson Xperia
Arc S

84. The Nokia Lumia 800 (released in November 2011) is a rectangular phone that has nearly 90 degree corners when viewed from the front.⁷² Attached as Exhibit 28 are images of the Nokia Lumia 800. This contradicts Dr. Lehto’s argument that rounded corners are a functional requirement for a smartphone. The large display (76mm x 55mm) is centered on the phone and it is inserted into a metal body with edges that can be felt. All buttons are placed at the right side of the phone. The product dimensions for the Nokia Lumia 800 are listed as 116.5mm x 61.2mm x 12.1mm, and the device weighs 142 grams.⁷³ Based on the width of this phone, it will have an optimal fit to the hand of a 55th percentile man and 82nd percentile woman. These optimal fit percentiles are different than those for the different models of the iPhone, indicating that ergonomic considerations do not dictate any single smartphone design.

⁷² See http://www.gsmarena.com/nokia_lumia_800-4240.php.

⁷³ See *id.*

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Nokia Lumia 800

85. The Pantech Crossover P8000 (aka Pantech Moon; released in June 2011) has acute “angled” rather than rounded corners.⁷⁴ Attached as Exhibit 29 are images of the Pantech Crossover P8000. There is a flat clear surface covering much of the front of the product and the phone has distinctive trapezoidal arrangements above and below the display screen. The top section of the phone has buttons at the corners—Function in the left corner, Lock/Power in the right corner. The earpiece is an irregular quadrilateral that is centrally positioned. The display takes up most of the user side of the phone, and it comprises a rectangular touch screen (65mm x 43mm) that is subtly asymmetrically positioned between the top and bottom. The bottom section is identically shaped to the earpiece but inverted and it has a centrally positioned menu key and home key rocker switch. The whole underside of the Crossover is also a slide-out QWERTY keyboard. The product dimensions are listed as 113mm x 58mm x 14mm and it weighs 146 grams.⁷⁵ Based on the width of this phone, it will have an optimal fit to the hand of a 25th percentile man and 55th percentile woman. These optimal fit percentiles are different than those for the different models of the iPhone, indicating that ergonomic considerations do not dictate any single smartphone design.

⁷⁴ See http://www.phonearena.com/phones/Pantech-Crossover_id5598.

⁷⁵ See *id.*

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Pantech Crossover
P8000

86. The Nokia X5 (released in September 2010) is almost a perfectly square phone with sharply angled corners.⁷⁶ Attached as Exhibit 30 are images of the Nokia X5. This design illustrates that Dr. Lehto’s assertion that a smartphone needs a rectangular shape with rounded corners to be functional is untrue. This phone has a small display (36mm x 48mm) that is centered in the body of the phone. Beneath this are two buttons, one inserted within the other and an earpiece is located centrally in the top section. The top of the phone slide to reveal a QWERTY keypad. The product dimensions are listed as 74.3mm x 66.4mm x 16.9mm and it weighs 129 grams.⁷⁷ Based on the width of this phone, it will have an optimal fit to the hand of an 85th percentile man and 95th percentile woman. These optimal fit percentiles are different than those for the various models of the iPhone, indicating that ergonomic considerations do not dictate any single smartphone design.



Nokia X5

⁷⁶ See http://www.gsmarena.com/nokia_x5_01-3396.php.

⁷⁷ See *id.*

1 87. All of the above phones illustrate that the design of a smartphone is not dictated by
2 the functionality of the phone. These examples further illustrate that specific elements of a
3 smartphone’s design—such as the nature of the phone surface or the design of any corners—are
4 not dictated by the functionality of the device.

5 **B. The D’087 Patented Design Is Not Dictated by Function**

6 **1. The overall design is not functional based on the principles of**
7 **ergonomics and human factors.**

8 88. As set forth above, the D’087 Patent sets forth aspects of a specific design of a
9 smartphone. As set out in Section V.A., my understanding is that the standard for functionality is
10 stringent—*i.e.*, whether a design is “dictated” by the use or purpose of the article. In my opinion,
11 the overall design set forth in D’087 is not functional based on the principles of ergonomics and
12 human factors.

13 89. Though Dr. Lehto identifies what I understand to be the proper standard at the
14 beginning of his report in Section IV.A., he does not actually apply this standard in his analysis
15 (Sections IV.B.-H.). Rather, he seems to conflate the concepts of (1) having a function and
16 (2) being dictated by function. As an example, he seems to state that because any small
17 rectangular shape can be held in the human hand, it follows that this shape has certain functional
18 advantages, and from that he seems to conclude that a rectangular shape is dictated by function. I
19 disagree, as many other shapes of small-sized objects can equally well be held in the human hand.
20 Indeed, ergonomic design guidelines teach that a handheld product should be shaped to
21 comfortably fit the hand and hence a simple rectangular shape is not an optimal design.⁷⁸ Thus, I
22 believe Dr. Lehto’s analysis misses the point and sets the “dictated by function” bar far too low.
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28 ⁷⁸ Alan Hedge, *Design of Hand-Operated Devices, in* Human Factors in Consumer
Products 203, 203–222 (N. Stanton ed., 1998).

1 90. The principal ergonomic requirement for a handheld mobile device is that it is
2 capable of being safely held in a human hand. This is an issue of object size and is not driven by
3 object shape (assuming that the design meets the minimum safety requirements for its intended
4 use). Beyond that, myriad design choices determine the exact shape and appearance of the
5 device. While ergonomic considerations may influence the design process to some extent, they
6 do not dictate any specific form factor. Instead, the final design is the result of various trade-offs
7 between aesthetic considerations and feature-related priorities.
8

9 91. A handheld mobile device such as a smartphone need not be rectangular with
10 evenly rounded corners and a completely flat, smooth face in order to satisfy ergonomic
11 requirements. The base shape could be rounded, oval, square, or cylindrical, not rectangular, and
12 still fit comfortably in one's hand. The corners could also be squared, not rounded, and all four
13 corners need not have the same radial curvature. Corners can even be eliminated from the design
14 altogether by rounding the ends of the device without affecting functionality. Any number of
15 departures from the patented design could still achieve the same functions commonly present in
16 smartphones. The variety of smartphone designs on the market highlights this fact.
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18 92. Similarly, if the design of electronic devices were dictated by the need to house
19 internal components or the need to display information in rows and columns, as Dr. Lehto
20 suggests,⁷⁹ then all smartphones would be rectangular. As the discussion above shows, this is not
21 the case.⁸⁰
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23 93. Moreover, as demonstrated above, there are many alternative designs for
24 smartphones that all have the same level of functionality. This analysis is not difficult in that it
25 does not require one to imagine or create different designs that could have the same functionality.
26 Here, it only requires a review of some of the smartphones offered by a few of the major
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28 ⁷⁹ Lehto Report at 6-7.

⁸⁰ See discussion *supra* ¶¶ 77-87.

1 manufacturers, such as Samsung. Dr. Lehto's analysis fails to consider these alternatives in
2 detail, rendering his analysis incomplete and erroneous. In evaluating alternatives, I considered
3 whether alternative designs could perform the same function, not whether the alternative offered
4 an identical set of benefits.

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6 94. Significantly, the large secondary market for iPhone-related accessories indicates
7 that the iPhone itself is not the pinnacle of ergonomic design for some consumers. There are
8 numerous third-party accessories such as cases that aim to supplement or alter the physical design
9 of the iPhone, or to protect it from damage. When placed on the phone, some of these cases
10 render the device easier or more comfortable for some people to hold, suggesting that the
11 iPhone's design was not dictated by the ergonomic goals of optimal comfort or ease of grip.

12
13 95. In my opinion, the design depicted in the D'087 Patent is not dictated by the
14 purpose or use of a smartphone.

15 **2. The individual elements in the D'087 patented design are not dictated**
16 **by function based on the principles of ergonomics and human factors.**

17 96. Based on my understanding of the functionality analysis in design patent law,
18 Dr. Lehto's piecemeal approach to the alleged functionality of individual design elements is
19 improper. Dr. Lehto separates the D'087 patent into a list of broadly defined elements and then
20 summarily opines that each of these elements in isolation are functional.⁸¹ My understanding is
21 that this type of piecemeal analysis is incorrect, as a proper functionality analysis looks at the
22 patented design as a whole.⁸² Nonetheless, for the sake of completeness, I address the individual
23 elements of the D'087 design discussed by Dr. Lehto.
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28 ⁸¹ See Lehto Report at 9.

⁸² See discussion *supra* ¶¶ 77–87.

1 97. Dr. Lehto states that the overall “rectangular shape” of the D’087 design is
2 “functional.”⁸³ For the reasons set forth above, ergonomics does not dictate the specific design of
3 the D’087 patent, a fact again made clear by the many different designs of smartphones available
4 on the market. As those many designs demonstrate, there are a variety of form factors that can
5 and are used for smartphones. There are designs that are rectangular with rounded edges of
6 different radiuses, rectangular with squared edges, oval shapes with differing degrees of
7 curvature, square shapes, slider phones with QWERTY keyboards that slide out from beneath a
8 touch screen, and clamshell forms, among others. In my opinion, ergonomic principles do not
9 dictate any specific form factor, and, indeed, different smartphone designers have utilized
10 different form factors.
11

12 98. The fact that rectangular shapes are “used in most [electronic] devices”⁸⁴ does not
13 mean that the choice of a rectangular shape is driven by ergonomic considerations, that other
14 shapes are ergonomically unsound, or that other forms factors cannot be used. As the diversity of
15 form factors on the market demonstrates, there are a variety of shapes that satisfy the minimal
16 ergonomic requirement that the size of the phone can be held in the hand.⁸⁵ I note that Dr. Lehto
17 does not present a detailed analysis of any of the many different form factors on the market.⁸⁶
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19 99. Dr. Lehto also asserts that the “smooth top surface, rounded edges, and rounded
20 corners in the D’087 design is [sic] functional.”⁸⁷ Because these design features are not mandated
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22 ⁸³ Lehto Report at 9.

23 ⁸⁴ Lehto Report at 6.

24 ⁸⁵ Dr. Lehto suggests that many consumer electronics devices are rectangular because
25 there are key pads or keyboards. *See* Lehto Report at 7. As set forth above, smartphones utilize a
26 variety of form factors notwithstanding the fact that many have key pads, keyboards, or both. It
27 is worth noting that this variety of non-rectangular form factors occurs in other handheld
28 electronic devices with key pads and/or keyboards. For example, TiVo’s DVR remote controls,
which it touts as “ergonomic,” are peanut-shaped. *See* <https://www3.tivo.com/store/accessories-remote.do>.

⁸⁶ *See* Lehto Report at 30–31.

⁸⁷ Lehto Report at 9.

1 by ergonomic factors, I disagree that they are functional on that basis. Ergonomic design does
2 recommend that a design should not have sharp corners that could lacerate the skin or cause
3 uncomfortable compression, but a variety of design alternatives can satisfy this recommendation,
4 such as the use of softer materials, protective covers, and many different corner radiuses that can
5 be two- or three-dimensional. Again, the multitude of smartphones on the market demonstrates
6 that ergonomic considerations do not mandate any particular corner design and this applies to
7 these elements as well.

9 100. There are smartphones in the marketplace with rounded corners (both small and
10 large radius corners), squared corners, angled corners, and no corners. The spectrum of available
11 options is far more varied than the dichotomy of sharp vs. rounded that Dr. Lehto appears to
12 suggest. Indeed, Dr. Lehto oversimplifies the design process by suggesting that designers must
13 round their corners in order to “[e]liminat[e] sharp corners” and thus adhere to a “standard
14 approach followed in safety engineering and ergonomics for eliminating hazards and discomfort
15 by reducing force concentrations at the location where objects contact the body.”⁸⁸ Smartphone
16 designers can incorporate ergonomically acceptable corners that are squared or angled, or they
17 can round the entire end of the smartphone to eliminate “corners” altogether. Dr. Lehto also
18 states that the use of rounded edges and corners “reduce[] the chance the person will fumble and
19 drop the device or otherwise damage the product.”⁸⁹ Significantly, the large secondary market for
20 iPhone cases to protect the iPhone from damage when dropped suggests that the rounding of the
21 iPhone corners did not allow Apple to create a phone that was very difficult to drop accidentally.

22 24 101. In Dr. Lehto’s report, there is considerable discussion of rounded corners being
25 functional. All of this discussion focuses on the potential safety benefits of rounded versus
26 square corners. However, there are many ways to protect the corners of a product and square

27 ⁸⁸ Lehto Report at 8.

28 ⁸⁹ Lehto Report at 8.

1 corners can be covered with flexible material, such as rubber, or harder material, such as a plastic
2 bumper. A corner can be rounded along two dimensions (front to back, as in the Lumia 800, or
3 along the side, as in the iPhone 4) or along three dimensions (as in the original iPhone). Indeed,
4 the primary reason for having rounded corners is for aesthetic design reasons rather than
5 functionality.

6
7 102. There are also smartphones with flat or contoured fronts and smartphones with
8 rounded edges (both small and large radius edges), squared edges, and angled edges.

9 103. As to a “smooth top surface,”⁹⁰ there are no ergonomic requirements that would
10 dictate such a form. A smartphone could have a raised or sunken screen, which would help
11 differentiate touch-sensitive parts of screen from other parts of front face. Even if a smooth
12 surface were somehow deemed necessary to use the touch-sensitive portion of the phone, this
13 consideration would not require that the entire front face of the device be smooth. A designer
14 could frame the surface with plastic, include a variety of buttons, or incorporate a keyboard
15 above, below, or adjacent to the screen as shown by some of the phones illustrated in this report.⁹¹
16 Those alternative design features would not interfere with the user’s unimpeded view of and
17 access to the touch-sensitive parts of the screen. Indeed, many of the iPhone covers available on
18 the secondary market simulate the addition of such features. Moreover, Dr. Lehto’s assertion that
19 a smooth flat surface “eliminates clutter” is precisely an ornamental or aesthetic goal, not a
20 functional one.⁹² In reality, each function still requires a button, but because electronic softkeys
21 can be hidden beneath a smooth surface, this design gives the illusion of eliminating clutter,
22 which is an ornamental goal. These design options do not change the functions of a smartphone.
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27 ⁹⁰ Lehto Report at 9.

28 ⁹¹ See discussion *supra* ¶¶ 77–87.

⁹² Lehto Report at 8.

1 104. Though Dr. Lehto includes a heading titled “Thin Rectangular Device with
2 Rounded Corners,” the subsequent analysis addresses the alleged “functionality” of “rounded
3 corners and a thin rectangular shape or form factor” of the D’087 patented design.⁹³ I have
4 already addressed the flaws in Dr. Lehto’s analysis regarding these design elements above.
5

6 105. Dr. Lehto also asserts that the “centered rectangular display area” in the D’087
7 patented design is “functional” because it “offer[s] a clear and unimpeded view of the entire
8 viewing surface when gripped using an Oblique Power Grip” and this specific “form factor of the
9 claimed design is particularly important” to allowing the device to be held in a hook grip.”⁹⁴ As
10 discussed above, however, the D’087 patented design, as embodied in the original iPhone, iPhone
11 3G, and iPhone 3GS, is not the optimal design in terms of hand grasp considerations from an
12 ergonomic perspective.⁹⁵
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14 106. Dr. Lehto also concludes that “a design placing a horizontally centered receiver
15 aperture or hole near the top of the device is crucial to the function of an electronic
16 communication device.”⁹⁶ Though Dr. Lehto alleges that there may be ergonomic reasons for
17 placing the speaker centered near the top of the device, he offers no explanation for why
18 ergonomics would dictate the particular shape of the speaker slot. Indeed, the rounded, oval
19 shape of the feature is purely ornamental from an ergonomics perspective; the speaker could have
20 a rectangular, square, circular, diamond, trapezoidal, or other shape instead and still perform its
21 function as a speaker. Nor does Dr. Lehto consider the possibility that a smartphone design could
22 incorporate multiple speaker slots, which could enhance the function of the device ergonomically.
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24 107. Moreover, different companies may target different audiences, and those audiences
25 may have different preferences regarding the ease of some functions (*e.g.*, typing) over other
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27 ⁹³ Lehto Report at 11.

28 ⁹⁴ Lehto Report at 17.

⁹⁵ See discussion *supra* ¶¶ 68–76.

⁹⁶ Lehto Report at 18.

1 functions (*e.g.*, taking photographs), which may result in design trade-offs that impact the form
2 factors the designer considers and ultimately adopts.⁹⁷

3 108. For all of these reasons, the individual elements described by Dr. Lehto in his
4 analysis of the D'087 Patent are not dictated by the purpose or use of a smartphone or other
5 electronic device.

6
7 **C. The D'677 Patented Design Is Not Dictated by Function**

8 **1. The overall design is not functional based on the principles of**
9 **ergonomics and human factors.**

10 109. As set forth above, the D'677 patent sets forth aspects of a specific design of a
11 smartphone. As set out in Section V.A, my understanding is that the standard for functionality is
12 stringent—*i.e.*, whether a design is “dictated” by the use or purpose of the article. In my opinion,
13 the overall design set forth in the D'677 patent is not functional based on the principles of
14 ergonomics and human factors.

15 110. As with his analysis of the D'087 Patent, Dr. Lehto does not apply the proper
16 standard in his analysis of the functionality of the D'677 Patent. As explained above, he seems to
17 conflate the concepts of (1) having a function and (2) being dictated by function.

18
19 111. In analyzing the D'677 Patent, Dr. Lehto concludes that the “smooth flat top
20 surface and rectangular viewing area in the D'677 design are functional for all the reasons set
21 forth above” for the D'889 and D'087 patents.⁹⁸ As discussed above, Dr. Lehto seems to assume
22 that the rectangular shape of the design is dictated by function without considering that
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25 ⁹⁷ See discussion *supra* ¶¶ 57, 62, 90. Dr. Lehto asserts that the Asserted Design Patents
26 and the asserted trade dress and trademarks are functional because they “[a]ccommodate multiple
27 forms and stages of use.” Lehto Report at 39. The availability of a broad range of smartphone
28 designs indicates that different smartphone manufacturers have optimized their designs for
different uses. Thus some smartphones are better designed than others for browsing the internet,
typing messages, viewing videos, or making calls.

⁹⁸ Lehto Report at 19.

1 ergonomic principles actually teach that other shapes would work equally well if not better.⁹⁹ For
2 the same reasons explained above, the overall design of the D’677 Patent is not dictated by
3 function.

4 **2. The individual elements in the D’677 patented design are not dictated**
5 **by function based on the principles of ergonomics and human factors.**

6 112. Based on my understanding of the functionality analysis in design patent law,
7 Dr. Lehto’s piecemeal approach to the alleged functionality of individual design elements is
8 improper. Dr. Lehto identifies one additional element in the D’677 Patent not present in the
9 D’889 and D’087 Patents, namely “a single uniform color such as black for the top of the device’
10 [sic].”¹⁰⁰ Though I am informed that Dr. Lehto’s piecemeal functionality analysis is incorrect, for
11 the sake of completeness, I address this additional individual element discussed by Dr. Lehto.

12 113. Dr. Lehto asserts that “[t]he use of a single uniform color such as black for the top
13 of the device’ [sic] plays a functional role” because it “provides an easily perceived way for users
14 to tell when the device is active or inactive.”¹⁰¹ This same goal could be achieved through
15 various other designs. For example, the borders above and below the display area could use a
16 color that contrasts with the color of the inactive screen, as they do on the Sony Ericsson Xperia
17 Arc S, the Nokia Lumia 800, and the Nokia X5.¹⁰² These alternative designs readily signal the
18 active/inactive status of the device just as clearly as the design in the D’677 patent. Therefore, it
19 is my opinion that principles of ergonomics and human factors do not dictate that the entire top
20 surface of the device be black.

21 114. Dr. Lehto also asserts “[a] black background, when the display is inactive, . . . adds
22 to functionality by maximizing the potential contrast attainably when display pixels are
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⁹⁹ See discussion *supra* ¶¶ 89, 91–92 & *infra* ¶ 118, 150–152, 180, 187.

27 ¹⁰⁰ Lehto Report at 19.

28 ¹⁰¹ Lehto Report at 19.

¹⁰² See discussion *supra* ¶¶ 83–84, 86.

1 activated.”¹⁰³ Ergonomic principles do not dictate that a black background is the optimal
2 ergonomic design for a device with a display screen. In fact, they teach the opposite. Ergonomic
3 principles recommend that computer input devices should have reflectances less than 45%;¹⁰⁴ this
4 also applies to screen bezels¹⁰⁵ with recommended reflective values in the 25%-45% range.¹⁰⁶ In
5 the past, many computer products had neutral gray or cream colors to meet this recommendation.
6 However, experimental research has found no difference in the effects of a white or black bezel
7 on office task performance or on visual behavior.¹⁰⁷ Experimental research comparing black and
8 silver matte and glossy bezels finds that bezel color and glossiness do not appear to affect visual
9 performance, but user acceptability is affected, and of the designs compared, acceptability ratings
10 were lowest for a glossy black bezel.¹⁰⁸ Black bezels, especially when glossy, can be the least
11 desirable design from an ergonomic standpoint.
12

13
14 115. For all of these reasons, the individual elements described by Dr. Lehto in his
15 analysis of the D’677 Patent are not dictated by the purpose or use of a smartphone or other
16 electronic device.
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20

21 ¹⁰³ Lehto Report at 19.

22 ¹⁰⁴ See ANSI/HFES 100-2007, HUMAN FACTORS ENGINEERING OF COMPUTER
23 WORKSTATIONS, Human Factors and Ergonomics Society, Santa Monica, CA.

24 ¹⁰⁵ In this paragraph, I use the term “bezel” to refer to the frame or casing that surrounds a
25 display area, such as the frame around a computer monitor. I understand, however, that Apple
26 uses the term “bezel” in this proceeding to refer to the stainless steel material that surrounds the
27 front face of the original iPhone, iPhone 3G, and iPhone 3GS devices.

28 ¹⁰⁶ See M.M. Sanders & E.J. McCormick, HUMAN FACTORS IN ENGINEERING AND DESIGN
533 (7th ed. McGraw-Hill, NY1993).

¹⁰⁷ See, e.g., C.M. Hunter, P.R. Boyce & J.H. Watt, *Effect of Bezel Reflectance on People
Using a Computer Monitor*, in 3 HUMAN-CENTERED COMPUTING: COGNITIVE, SOCIAL, AND
ERGONOMIC ASPECTS 58, 58–62 (Don Harris, Vincent Duffy, Michael Smith, Constantine
Stephanidis eds., Lawrence Erlbaum Associates Inc. 2003).

¹⁰⁸ P.A. Howarth & S.G. Hodder, *Bezel Gloss and Glare*, 25 DISPLAYS 77, 87.

1 **D. The D'270 Patented Design Is Not Dictated by Function**

2 **1. The overall design is not functional based on the principles of**
3 **ergonomics and human factors.**

4 116. As set forth above, the D'270 patent sets forth a specific design of an electronic
5 device. As set out in Section V.A, my understanding is that the standard for functionality is
6 stringent—*i.e.*, whether a design is “dictated” by the use or purpose of the article. In my opinion,
7 the overall design set forth in the D'270 patent is not functional based on the principles of
8 ergonomics and human factors.

9 117. As with his analysis of the D'087 and D'677 Patents, Dr. Lehto does not apply the
10 proper standard in his analysis of the functionality of the D'270 Patent. As explained above, he
11 seems to conflate the concepts of (1) having a function and (2) being dictated by function.

12 118. In analyzing the D'270 Patent, Dr. Lehto concludes that the “thin, rectangular
13 shape and form factor with rounded corners, smooth flat top surface, and rectangular viewing area
14 is [sic] functional for all the reasons set forth above” for the D'889, D'087, and D'677 Patents.¹⁰⁹
15 As discussed above, Dr. Lehto seems to assume that the rectangular shape of the design is
16 dictated by function without considering that ergonomic principles actually teach that other
17 shapes would work equally well if not better.¹¹⁰ For the same reasons explained above, the
18 overall design of the D'270 Patent is not dictated by function.¹¹¹

19 **2. The individual elements in the D'270 patented design are not dictated**
20 **by function based on the principles of ergonomics and human factors.**

21 119. Based on my understanding of the functionality analysis in design patent law,
22 Dr. Lehto's piecemeal approach to the alleged functionality of individual design elements is
23 improper. Dr. Lehto identifies one additional element in the D'270 Patent not present in the
24
25
26

27 ¹⁰⁹ Lehto Report at 20.

28 ¹¹⁰ See discussion *supra* ¶¶ 89, 91–92, 111 & *infra* ¶¶ 150–152, 180, 187.

¹¹¹ See discussion *supra* Section VIII.B.–C.

1 D'889, D'087, and D'677 Patents, namely "a small rectangular area on the upper left in Figures 2
2 and 4 of the patent."¹¹² Dr. Lehto states that the iPod touch, which embodies the D'270 design,
3 "has such as rectangular element to cover the antennae, which provides functionality related to
4 receiving and sending signals."¹¹³ Dr. Lehto does not state that this "rectangular element" is
5 dictated by function, nor does he tie this feature to any principle of ergonomics or human factors.
6 In my opinion, the presence of this rectangular design element on the back of the design depicted
7 in the D'270 Patent is not dictated by any principle of ergonomics or human factors.
8

9 **IX. THE DESIGN IN THE D'889 PATENT IS NOT DICTATED BY PRINCIPLES OF**
10 **ERGONOMICS AND HUMAN FACTORS**

11 **A. The Principles of Ergonomics and Human Factors Do Not Dictate Any**
12 **Particular Design for a Tablet Computer**

13 120. As detailed below, in my opinion, considerations of ergonomics and human factors
14 do not compel a particular design for a tablet computer. Rather, principles of ergonomics are
15 guidelines that allow for substantial design variations for devices that provide the same
16 functionality. It is my understanding that tablets, such as the iPad 2, can be used for video
17 chatting, sending and receiving emails, surfing the internet, running applications, playing games,
18 watching video content, reading e-books, and listening to music, among other things. In my
19 opinion, the variety of different tablets on the market confirms that ergonomic principles impose
20 minimal restrictions on the design choices available to tablet designers and do not dictate any
21 particular tablet design, let alone the specific design set forth in the D'889 Patent.
22

23 121. Much as with smartphones, the various functions performed by a tablet highlight
24 the significance of design trade-offs. Certain designs may be advantageous for certain functions
25 but disadvantageous for other functions. For example, a tablet with a larger display screen may
26 facilitate easier viewing, but a larger device may fit less comfortably in smaller hands or be less
27

28 ¹¹² Lehto Report at 20.

¹¹³ Lehto Report at 20–21.

1 comfortable to hold. I have personally examined a number of samples of different tablets. Based
2 on this review, it is clear to me that there are a large number of tablets with acceptable ergonomic
3 designs that have a wide variety of form factors in light of the goals that these devices are
4 intended to achieve.

5
6 **1. Dr. Lehto has not identified ergonomic principles that would dictate a particular tablet design.**

7 122. As in his analysis of the other design patents, Dr. Lehto has not pointed to any
8 guidelines or principles that support his position that the D’889 patented design is dictated by the
9 purpose or use of a tablet computer.

10
11 **a. Apple iOS Human Interface Guidelines**

12 123. As discussed above, nothing in the “Apple iOS Human Interface Guidelines”
13 suggests that they had any impact on the physical design of the iPad 2 or the D’889 Patent.¹¹⁴

14 **b. Apple’s design process**

15 124. I understand that Apple’s practice is to allow its designers to maintain authority
16 over the appearance of the products throughout the design process rather than relinquishing
17 control to engineers or other specialists.¹¹⁵

18 **c. Voluntary ergonomic standards**

19 125. In the United States, the voluntary ergonomic design standard for computer
20 products and workstations describes the active touch area of tablets as “flat, slate-like panels that
21 can be used for cursor movement and object selection tasks.”¹¹⁶ There is no specific shape that is
22 specified for a tablet. In fact, there are no mandatory ergonomic design requirements for a tablet
23
24

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¹¹⁴ See discussion *supra* ¶ 64 & *infra* ¶¶ 161, 174.

27 ¹¹⁵ See discussion *supra* ¶¶ 65–66.

28 ¹¹⁶ ANSI/HFES 100-2007, HUMAN FACTORS ENGINEERING OF COMPUTER WORKSTATIONS, Human Factors and Ergonomics Society, Santa Monica, CA.

1 in this standard. There is one generic recommendation: “The active area of a tablet or touch-
2 sensitive surface should . . . [b]e flat, smooth, and free from warping or surface imperfections.”¹¹⁷

3 **2. There are several ergonomically viable alternative tablet designs**
4 **available on the market.**

5 126. The Sony Tablet S is a tablet computer with a 9.4” touchscreen. It is 9.5”L x
6 6.8”W x 0.3”D and weighs 1 lb. 5 oz. Attached as Exhibit 31 are images of the Sony Tablet S.
7 The device does not have a flat, rectangular form factor; rather, it has a “folded” design.
8 Commentators have praised the this device’s “[c]omfortable, ergonomic design,”¹¹⁸ noting that
9 “[i]ts unique wedge shape gives it a futuristic look and provides improved balance in your hand
10 compared with the flat competition”¹¹⁹ and that when “placed on a table, the screen’s forward
11 slant minimizes glare and makes it more comfortable to type.”¹²⁰ Sony’s website describes the
12 product as “[e]rgonomically designed,” noting that the “ergonomic, wedge-shaped form shifts
13 weight closer to the side, making it feel ultra light in one hand” and that “[i]t also makes for a
14 perfect typing angle when set on a table.”¹²¹



24 ¹¹⁷ *Id.*

25 ¹¹⁸ Sascha Segan, “Sony Tablet S,” PCMag, Dec. 5, 2011,
26 <http://www.pcmag.com/article2/0,2817,2397089,00.asp> (APLNDC-Y0000233713- APLNDC-
Y0000233714).

27 ¹¹⁹ CNET, “Sony Tablet S,” [http://reviews.cnet.com/tablets/sony-tablet-s-32gb/4505-
3126-7-35003724.html#reviewPage1](http://reviews.cnet.com/tablets/sony-tablet-s-32gb/4505-3126-7-35003724.html#reviewPage1) (APLNDC-Y0000233702–233712).

28 ¹²⁰ *Id.*

¹²¹ <http://discover.store.sony.com/tablet/#design/ergonomics>.

1 127. The Barnes & Noble Nook Color is a tablet computer with a 7” touchscreen. It is
2 8.1”L x 5.0”W x 0.48”D and weighs 15.8 oz.¹²² Attached as Exhibit 32 are images of the Barnes
3 & Noble Nook. The device does not have a flat, clear surface on the front of the product.
4 Instead, the device includes a gray opaque casing that frames the display area on the device. One
5 reviewer observed that “[t]he Nook Tablet does feel a little better in your hand, largely because
6 the border around the screen has a textured finish whereas the [other tablet] has a glossy, clear
7 plastic border.”¹²³ The Nook tablet does not have evenly rounded corners, as one corner of the
8 device features a distinctive “loop” design. One reviewer stated that this loop design “serves as
9 both a handle and a way to conceal the reader’s MicroSD card slot.”¹²⁴



Barnes & Noble
Nook

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20 128. The Coby Kyros MID8125 is a tablet computer with an 8” touchscreen. It is
21 8.11”L x 6.22”W x 0.55”D and weighs 1.18 lb.¹²⁵ Attached as Exhibit 33 are images of the Coby
22 Kyros MID8125 tablet. The device includes a casing that frames the display area such that it

25 ¹²² <http://www.barnesandnoble.com/p/nook-color-barnes-noble/1100437663>.

26 ¹²³ CNET, “Barnes & Noble Nook Tablet,” http://reviews.cnet.com/tablets/barnes-noble-nook-tablet/4505-3126_7-35059751.html#reviewPage1.

27 ¹²⁴ Sascha Segan, “Barnes & Noble Nook Tablet Review,” Nov. 18, 2011, PCMag, <http://www.pcmag.com/article2/0,2817,2396554,00.asp> (APLNDC-Y0000233669-233670).

28 ¹²⁵ http://www.cobyusa.com/?p=prod&prod_num_id=10581&pcat_id=3001.

1 does not have a flat clear surface on the front of the product. This casing is comprised of an
2 opaque plastic housing.

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5 Coby Kyros
6 MID8125
7



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10 129. The Acer Iconia A500 is a tablet computer with a 10.1" touchscreen. It is 10.2"L
11 x 7.0"W x 0.5"D and weighs 1.7 lb.¹²⁶ Attached as Exhibit 34 are images of the Acer Iconia
12 A500 tablet. This device does not have a flat clear surface on the front of the product. Instead,
13 the vertical sides of the device include an opaque aluminum casing that wraps from the back to
14 the front of the device. This casing consists of a different material than the other parts of the front
15 screen of the device.
16

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20 Acer Iconia
21 A500
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28 ¹²⁶ <http://acer.us/ac/en/US/content/iconia-tab-a500>.

1 130. The Sony Tablet P is a tablet computer with a dual 5.5” touchscreen. When open,
2 the device is 6.22”L x 7.08”W x 0.53”D and weighs 0.82lb.¹²⁷ Attached as Exhibit 35 are images
3 of the Sony Tablet P. This device consists of two rectangular screens that fold over in a
4 clamshell-like format.

5
6
7 Sony Tablet P



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12 131. The Panasonic Toughbook H2 is a ruggedized tablet computer with a 10.1” screen.
13 It is 10.8”L x 10.6”W x 2.3”D and weighs 3.5 lb.¹²⁸ Attached as Exhibit 36 are images of the
14 Panasonic Toughbook H2. This device is described by the manufacturer as having “superior
15 ergonomics.”¹²⁹ It has a rectangular display area inside an outer border that has an irregular shape
16 and incorporates a large carry handle and a panel of external buttons.

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21 Panasonic
22 Toughbook H2



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27 ¹²⁷ http://discover.store.sony.com/tablet/tablet_p/index.html#intro.

28 ¹²⁸ See ftp://ftp.panasonic.com/pub/Panasonic/toughbook/specsheets/TB-H2_ss.pdf.

¹²⁹ *Id.*

1 132. The Panasonic Toughpad A1 is a ruggedized tablet computer with a 10.1”
2 touchscreen. It is 10.5”L x 8.4”W x 0.7”D and weighs 2.1 lb.¹³⁰ Attached as Exhibit 37 are
3 images of the Panasonic Toughbook. This device has a rectangular display area inside an outer
4 border that has an irregular shape.

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8 Panasonic
9 Toughpad A1



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14 133. The Panasonic Toughbook U1 is a ruggedized tablet computer with a 5.6” screen.
15 It is 5.9”L x 7.2”W x 2.2”D and weighs 2.3 lb.¹³¹ Attached as Exhibit 38 are images of the
16 Panasonic Toughbook U1. This device has a rectangular display area inside an outer border that
17 has an irregular shape and incorporates a physical keyboard as well as various function buttons.

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19
20
21 Panasonic
22 Toughbook
23 U1



24
25
26 ¹³⁰ See [ftp://ftp.panasonic.com/pub/Panasonic/business/toughpad/downloads/
27 Toughpad_A1_Spec_Sheet.pdf](ftp://ftp.panasonic.com/pub/Panasonic/business/toughpad/downloads/Toughpad_A1_Spec_Sheet.pdf).

28 ¹³¹ See [http://www.panasonic.com/business/toughbook/ultra-mobile-rugged-toughbook-
u1-ultra.asp](http://www.panasonic.com/business/toughbook/ultra-mobile-rugged-toughbook-u1-ultra.asp); ftp://ftp.panasonic.com/pub/Panasonic/toughbook/specsheets/TB-U1-Ultra_ss.pdf.

1 134. The Juniper Mesa is a ruggedized tablet computer with a 5.7” screen. It is 7.9”L x
2 5.3”W x 2.0”D and weighs 1.9 lb.¹³² Attached as Exhibit 39 is a brochure for the Juniper Mesa.
3 This device has a rectangular display area inside an outer border that has an irregular shape and
4 incorporates various physical function buttons.

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7
8 Juniper Mesa



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14 135. The Armor X10gx is a ruggedized tablet computer with a 5.7” screen. It is 11.4”L
15 x 8.6”W x 1.8”D and weighs 4.7 lbs.¹³³ Attached as Exhibit 40 is a brochure for the Armor
16 X10gx. This device has a rectangular display area inside an outer border that has an irregular
17 shape and incorporates various physical function buttons. It also has a detachable carrying
18 handle.

19
20
21
22 Armor X10gx



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26 ¹³² <http://www.junipersys.com/Juniper-Systems/products/Mesa-Rugged-Notepad/Specifications>.

27 ¹³³ http://www.drsarmor.com/pdf/ARMOR_X10gx.pdf; see also
28 <http://www.ruggednotebooks.com/drs-armor-x10gx-fully-rugged-tablet>.

1 136. The Intel Studybook is a tablet for students with a 7” screen.¹³⁴ It weighs about
2 1.2 lbs.¹³⁵ This device has a rectangular display area inside what is described as “an easy-to-grip
3 plastic shell.”¹³⁶

4
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6 Intel
7 Studybook



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10 137. Motion offers a line of tablets for healthcare professionals.¹³⁷ The Motion C5v is a
11 tablet with a 10.4” screen. It is 10.0”L x 10.0”W x 0.95”D and weighs 3.3 lbs.¹³⁸ Attached as
12 Exhibit 41 are images of the Motion C5v tablet. This device incorporates a molded handle and is
13 described as “ergonomic.”¹³⁹



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16 Motion C5v

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23 ¹³⁴ See [http://news.cnet.com/8301-17938_105-57413096-1/intel-studybook-tablet-](http://news.cnet.com/8301-17938_105-57413096-1/intel-studybook-tablet-designed-for-molding-young-minds/)
24 [designed-for-molding-young-minds/](http://news.cnet.com/8301-17938_105-57413096-1/intel-studybook-tablet-designed-for-molding-young-minds/).

25 ¹³⁵ See [http://news.cnet.com/8301-17938_105-57413096-1/intel-studybook-tablet-](http://news.cnet.com/8301-17938_105-57413096-1/intel-studybook-tablet-designed-for-molding-young-minds/)
26 [designed-for-molding-young-minds/](http://news.cnet.com/8301-17938_105-57413096-1/intel-studybook-tablet-designed-for-molding-young-minds/). This image in Paragraph 36 is available at
27 <http://www.ubergizmo.com/2012/04/intel-studybook/>.

28 ¹³⁶ [http://gizmodo.com/5900658/intels-studybook-hands+on-the-indestructible-education-](http://gizmodo.com/5900658/intels-studybook-hands+on-the-indestructible-education-tablet-for-students)
tablet-for-students.

¹³⁷ See http://www.motioncomputing.com/products/tablet_pc_c5.asp.

¹³⁸ http://www.motioncomputing.com/resources/C5_spec_sheet_US.pdf.

¹³⁹ See *id.*; see also http://www.motioncomputing.com/choose/spec_ergo_c5.htm.

1 138. Philips and Intel have launched a joint product, the Philips Mobile Clinical
2 Assistant (“MCA”) for healthcare professionals.¹⁴⁰ The Philips MCA is a tablet with a 10.4”
3 screen.¹⁴¹ Attached as Exhibit 42 are images of the Philips MCA tablet. This device incorporates
4 a stand that also assists with gripping the device.



Philips MCA

12 139. The Panasonic Toughbook H1 MCA is a tablet marketed to healthcare
13 professionals. It has a 10.4” screen, and it is 10.4”L x 10.6”W x 0.75”D (top)-1.3”D (bottom)
14 and weighs 3.1 lbs.¹⁴² Attached as Exhibit 43 are images of the Panasonic Toughbook H1 MCA
15 tablet. This device is designed to incorporate “[r]efined ergonomics (rearranged controls, added
16 handstrap, dual digitizers, etc.)”¹⁴³



Panasonic Toughbook H1 MCA

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26 ¹⁴⁰ See http://medgadget.com/2007/03/philipsintel_mo.html.

¹⁴¹ *Id.*

27 ¹⁴² See http://www.ruggedpcreview.com/3_slates_panasonic_h1.html; <http://www.coollest-gadgets.com/20081106/panasonic-toughbook-h1-mobile-clinical-assistant/>.

28 ¹⁴³ See http://www.ruggedpcreview.com/3_slates_panasonic_h1.html.

1 140. The Vinci Tablet is a 7” tablet computer. Attached as Exhibit 44 are images of the
2 Vinci Tablet. This device has a rectangular display area inside an outer border with chamfered
3 corners, which in turn is placed within a rubberized “protective ring.” This protective ring offers
4 ergonomic benefits because, as one reviewer noted, it “serves as a bumper against drops or
5 collisions.”¹⁴⁴ Another reviewer explained that “one of the Vinci’s greatest advantages is that it
6 isn’t nearly as easy to break as an iPad.”¹⁴⁵
7



Vinci Tablet

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16 **B. The D’889 Patented Design Is Not Dictated by Function**

17 **1. The overall design is not dictated by function based on the principles**
18 **of ergonomics and human factors.**

19 141. As noted above, the D’889 Patent sets forth a specific design of a tablet computer.
20 As set out in Section V.A., my understanding is that the standard for functionality is stringent—
21 *i.e.*, whether a design is “dictated” by the use or purpose of the article. In my opinion, the overall
22 design set forth in D’889 is not functional based on the principles of ergonomics and human
23 factors.

24 142. A tablet should be capable of being safely held in one or both hands. This is
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27 ¹⁴⁴ David Pierce, “Vinci Tab Review,” PCMag, Sep. 22, 2011,
<http://www.pcmag.com/article2/0,2817,2392593,00.asp> (APLNDC-Y0000233684).

28 ¹⁴⁵ David Pierce, “Vinci Tab Review,” PCMag, Sep. 22, 2011,
<http://www.pcmag.com/article2/0,2817,2392593,00.asp> (APLNDC-Y0000233684).

1 largely an issue of object size and is not driven by object shape (assuming that the design meets
2 the minimum safety requirements for its intended use). Beyond that, myriad design choices
3 determine the exact shape and appearance of the device. While ergonomic considerations may
4 influence the design process to some extent, they do not dictate any specific form factor. Instead,
5 the final design is the result of various trade-offs between aesthetic considerations and feature-
6 related priorities.
7

8 143. The variety of forms of tablets included in this report is only a sample of the many
9 alternatives on the market. Designs that incorporate features such as a handle are more
10 ergonomic because they are easier to grasp and carry in one hand. The incorporation of a
11 handstrap further adds to safe, one-handed carrying of the tablet. Some forms, such as the Vinci,
12 provide addition graspable areas for two-handed holding. The variety of forms shown above
13 illustrates that the principles of ergonomic design do not dictate any particular form of tablet.
14

15 144. Moreover, the variety of iPad accessories on the secondary market suggests that
16 the iPad and iPad 2 do not have ergonomically optimal designs for some consumers. There is a
17 large market for iPad and iPad 2 accessories, including those that allow users alternative methods
18 to enter commands or information (*e.g.*, keyboards or a mouse) and those that allow users to more
19 easily use these devices (*e.g.*, stands or cases). For example, Griffin sells a product called the
20 AirStrap, which is a molded frame with “thick, comfortable, contoured grips” and a “wide
21 neoprene strap on the back.”¹⁴⁶ The AirStrap “hugs your hand, making your iPad easier to hold
22 whether you’re reading in a coffee shop or checking out the headlines as you ride the 6:45 in to
23 work.”¹⁴⁷ This product suggests that the various models of the iPad can be improved for some
24 people for some uses, such that the specific design of a tablet is not dictated by the function of a
25 tablet.
26

27 ¹⁴⁶ See <https://store.griffintechnology.com/airstrap>.

28 ¹⁴⁷ *Id.*



145. The AIData Spinstand attaches to an iPad tablet and provides additional ergonomic benefits by allowing for an easier grasp to hold the device, and also by serving as a stand for the device. AIData sells Spinstand multi-function stands that work with both the iPad and iPad 2 models.¹⁴⁸



146. Apple also offers accessories that allow the iPad devices to be used in a more ergonomic manner, such as the iPad Smart Cover, which is “compatible with iPad 2 or later.”¹⁴⁹ The iPad Smart Cover allows for automatic on/off control and also folds to create a stand for the device.¹⁵⁰ Apple sells a wireless keyboard for the various iPad models,¹⁵¹ and Apple.com also

¹⁴⁸ See http://www.ergocanada.com/detailed_specification_pages/aidata_spinstand_multi_function_stand_for_ipad.html; http://www.ergocanada.com/detailed_specification_pages/aidata_tabstand_multi_function_stand_for_ipad_2.html.

¹⁴⁹ See <http://store.apple.com/us/product/MD306>.

¹⁵⁰ *Id.*

1 lists a variety of stands for sale.¹⁵² Because the iPad devices do not include a substantial speaker,
2 there are also many external speakers available for the iPad.¹⁵³



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13 147. Instead, designs can be based on aesthetics and various design trade-offs, such as
14 ease-of-use or durability. Griffin also sells the “Survivor” case, which is a “shatter-resistant
15 polycarbonate frame clad in rugged, shock absorbing silicone,” with a “built-in screen protector”
16 and “hinged plugs” to seal connectors and ports.¹⁵⁴ Thus, the thin profile and completely glass
17 surface likely do not optimize durability. Griffin also sells a variety of stands and cases that
18 facilitate use of the iPad devices under a variety of circumstances.¹⁵⁵

19
20 148. The availability of these secondary-market accessories suggests that the design of
21 the iPad devices were not dictated by ergonomics or human factors.

22 **2. The individual elements in the D’889 patented design are not dictated**
23 **by function based on the principles of ergonomics and human factors.**

24 149. Dr. Lehto asserts that the “[r]ectangular shape or form factor” and the “[r]ounded

25 ¹⁵¹ See http://store.apple.com/us/browse/home/shop_ipad/ipad_accessories/keyboards.

26 ¹⁵² See http://store.apple.com/us/browse/home/shop_ipad/ipad_accessories/stands.

27 ¹⁵³ http://store.apple.com/us/browse/home/shop_ipad/ipad_accessories/speakers.

28 ¹⁵⁴ See <http://store.griffintechology.com/ipad/survivor-ipad-3>.

¹⁵⁵ See, e.g., <http://store.griffintechology.com/ipad/ipad-2/elan-folio-leather> (Élan Folio, a multi-position fold-over case).

1 edges, smooth flat front surface, rounded corners, and thin form factor” are functional elements of
2 the D’889 patented design.¹⁵⁶ For the reasons discussed below, in my opinion, none of these
3 elements discussed by Dr. Lehto is dictated by the principles of ergonomics and human factors.

4 150. Dr. Lehto states that “a rectangular shape or form factor plays an important
5 functional role for electronic devices.”¹⁵⁷ He asserts that “[t]wo critical elements drive the form
6 of such devices, namely the display and internal components, which tend to be rectangular in
7 form.”¹⁵⁸ The shape of these components do not dictate the overall appearance of the design of a
8 tablet device; the casing of a tablet device could be rectangular with rounded edges of different
9 radiuses, rectangular with squared edges, square-shaped, or clamshell form, among others. In my
10 opinion, ergonomic principles do not dictate any specific form factor, and, indeed, different tablet
11 computer designers have utilized different form factors.

12 151. The fact that rectangular shapes are “used in most [electronic] devices”¹⁵⁹ does not
13 mean that the choice of a rectangular shape is driven by ergonomic considerations, that other
14 shapes are ergonomically unsound, or that other forms factors cannot be used. As the diversity of
15 form factors on the market demonstrates, there are a variety of form factors that satisfy the
16 minimal ergonomic requirement that the tablet can be held with one or two hands.¹⁶⁰ I note that
17 Dr. Lehto does not present a detailed analysis of any of the many different form factors on the
18 market.¹⁶¹

23 ¹⁵⁶ Lehto Report at 6–8.

24 ¹⁵⁷ Lehto Report at 6.

25 ¹⁵⁸ Lehto Report at 6.

26 ¹⁵⁹ Lehto Report at 6.

27 ¹⁶⁰ Dr. Lehto suggests that many consumer electronics devices are rectangular because
28 there are key pads or keyboards. *See* Lehto Report at 7. As noted above, handheld electronic
devices utilize a variety of form factors notwithstanding the fact that many have key pads,
keyboards, or both. *See* discussion *supra* ¶ 98 & note 85.

¹⁶¹ *See* Lehto Report at 30–31.

1 152. Dr. Lehto also asserts that “[a] rectangular form is also a natural outcome of using
2 rows and columns as an organizing principle by displaying information elements in rectangular
3 windows.”¹⁶² As discussed below, information and control elements need not be displayed in
4 rectangular windows.¹⁶³ Yet even if such information and control elements are often displayed in
5 rectangular format, it does not “dictate” that the design of a tablet be rectangular in form. The
6 casing on the device could take the form of any number of shapes.
7

8 153. Dr. Lehto also asserts that rounded edges, a smooth flat front surface, rounded
9 corners, and a thin form factor are functional features of the D’889 Patent.¹⁶⁴ Because these
10 design features are not mandated by ergonomic factors, I disagree that they are functional on that
11 basis. As discussed above,¹⁶⁵ one generic ergonomic recommendation for touchscreen tablet
12 designs is for the active area of a touchscreen to have a flat, smooth surface free from warping or
13 surface imperfections, but this is not a requirement. However, even if all manufacturers followed
14 this recommendation, it would not result in identical-looking tablet computers because a variety
15 of design alternatives can satisfy other possible ergonomics considerations, such as avoiding
16 sharp corners or edges that could lacerate the skin or cause uncomfortable compression through
17 the use of softer materials, protective covers, and many different corner radiuses that can be two-
18 or three-dimensional. Again, the multitude of tablets on the market demonstrates that ergonomic
19 considerations do not mandate any particular corner design and this applies to these elements as
20 well.¹⁶⁶
21

22
23 154. There are tablets in the marketplace with rounded corners (both small and large
24 radius corners), squared corners, chamfered corners, and corners with a cut-out space. The
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26 ¹⁶² Lehto Report at 7.

27 ¹⁶³ See discussion *infra* ¶¶ 162–168.

28 ¹⁶⁴ Lehto Report at 8.

¹⁶⁵ See discussion *supra* ¶ 125.

¹⁶⁶ See discussion *supra* ¶¶ 126–140.

1 spectrum of available options is far more varied than the dichotomy of sharp vs. rounded that
2 Dr. Lehto appears to suggest.¹⁶⁷ Indeed, Dr. Lehto oversimplifies the design process by
3 suggesting that designers must round their corners in order to “[e]liminat[e] sharp corners” and
4 thus adhere to a “standard approach followed in safety engineering and ergonomics for
5 eliminating hazards and discomfort by reducing force concentrations at the location where objects
6 contact the body.”¹⁶⁸ A tablet will not be held at the corners, so the corner shape is not a major
7 consideration in this respect from an ergonomics perspective. Tablet designers can incorporate
8 ergonomically acceptable corners that are squared or chamfered. Dr. Lehto also states that the
9 use of rounded edges and corners “reduce[] the chance the person will fumble and drop the device
10 or otherwise damage the product.”¹⁶⁹ Significantly, the large secondary market for cases to
11 protect the iPad and iPad 2 from damage when dropped suggests that the rounding of the iPad and
12 iPad 2’s corners did not allow Apple to create a tablet that was very difficult to drop accidentally.
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15 155. Dr. Lehto’s considerable discussion of rounded corners being functional focuses
16 on the potential safety benefits of rounded versus square corners on a product. However, there
17 are many ways to protect the corners of a product. Square corners can be covered with flexible
18 material, such as rubber, or harder material, such as a plastic bumper. A corner can also be
19 rounded along two dimensions or along three dimensions. What is lacking from Dr. Lehto’s
20 analysis is the recognition that a primary reason for having rounded corners is for aesthetic design
21 reasons rather than functional ones and that “rounded” can encompass a multiple of alternative
22 designs.
23

24 156. As to a “flat smooth surface,”¹⁷⁰ there are no mandatory ergonomic requirements
25 that would dictate such a form for the overall shape of the tablet computer, only a
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27 ¹⁶⁷ See Lehto Report at 8.

28 ¹⁶⁸ Lehto Report at 8.

¹⁶⁹ Lehto Report at 8.

¹⁷⁰ Lehto Report at 8.

1 recommendation with respect to the design of the active touchscreen areas on tablets.¹⁷¹ A tablet
2 could have a raised or sunken screen, which would help differentiate touch-sensitive part of
3 screen from other parts of front face. Even if a smooth surface were deemed necessary to use the
4 touch-sensitive portion of the phone, this consideration would not require that the entire front face
5 of the device be smooth. A designer could frame the surface with plastic, include a variety of
6 buttons, or incorporate a keyboard above, below, or adjacent to the screen as shown by some of
7 the tablets illustrated in this report.¹⁷² Those alternative design features would not interfere with
8 the user's unimpeded view of and access to the touch-sensitive parts of the screen. Indeed, many
9 of the covers available on the secondary market simulate the addition of such features. Moreover,
10 Dr. Lehto's assertion that a smooth flat surface "eliminates clutter" is precisely an ornamental or
11 aesthetic goal, not a functional one.¹⁷³ In reality, in terms of function, there can still be the same
12 number of buttons. Each function still requires a button, but because these are electronic softkeys
13 that can be hidden beneath a smooth surface, this design gives the illusion of eliminating clutter
14 which is an ornamental goal. This specific design does not change the function of the tablet.

15
16
17 157. Dr. Lehto also states that "[a] thin form factor further contributes to the overall
18 portability of an electronic device, by both reducing weight and making it easier to stow the
19 device."¹⁷⁴ Though thinness can help make a device more portable, Dr. Lehto does not conclude
20 that the thinness of the D'889 patented design is dictated by ergonomic principles. Thinness is
21 often achieved in the design process only through trade-offs by minimizing the importance of
22 another feature. The thinness of a device may add to the perception that it is also lightweight, but
23 weight is a function of materials as well and not just thickness. The use of rounded sides can also
24 contribute to the perceived thinness of a device. Given the iPad and iPad 2's respective thinness,
25

26 ¹⁷¹ See discussion *supra* ¶ 125.

27 ¹⁷² See discussion *supra* ¶¶ 126–140.

28 ¹⁷³ Lehto Report at 8.

¹⁷⁴ Lehto Report at 9.

1 the weight of these devices is deceptively heavy. Moreover, Dr. Lehto's position seems to be that
2 any degree of thinness is functional. If this were true, then any design could be considered
3 functional because thinness is a matter of degree relative to other widths. I do not believe that
4 ergonomic principles dictate any particular form factor for a tablet computer.

5
6 **X. THE D'790, D'305, AND D'334 PATENTED DESIGNS ARE NOT DICTATED BY
PRINCIPLES OF ERGONOMICS AND HUMAN FACTORS**

7
8 **A. The Principles of Ergonomics and Human Factors Do Not Dictate Any
Particular Graphical User Interface Design for a Smartphone.**

9 158. As detailed below, in my opinion, considerations of ergonomics and human factors
10 do not compel a particular design for the graphical user interface of a smartphone. Rather,
11 principles of ergonomics and human factors are guidelines that allow for substantial design
12 variations for graphical user interfaces that provide the same functionality. In my opinion, the
13 variety of different graphical user interfaces on smartphones on the market confirms that
14 ergonomic and human-factors principles impose minimal restrictions on the design choices
15 available to smartphone designers and do not dictate any particular graphical user interface design
16 for smartphones, let alone the specific designs set forth in the D'790, D'305, and D'334 patents.

17
18 159. The specific appearance of a smartphone graphical user interface is not dictated by
19 the purpose or use of a smartphone. The main ergonomic requirement for a smartphone graphical
20 user interface is that the interface be visible, usable, and understandable, and that requirement
21 imposes minimal restrictions on the actual appearance of the graphical user interface. In terms of
22 any ergonomic requirements, the specific icons used can take many shapes or sizes, and the
23 images used on the icons themselves can take nearly any pictorial, numerical, or textual form.
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1 **1. Dr. Lehto has not identified ergonomic principles that would dictate a**
2 **particular smartphone or media player design.**

3 160. Dr. Lehto has not pointed to any guidelines or principles that support his position
4 that the D’790, D’305, and D’334 patented designs are dictated by the purpose or use of
5 smartphones or media players.

6 161. Dr. Lehto refers to the “Apple iOS Human Interface Guidelines” to support the
7 proposition that “contemporary design of electronic devices involves a process of systematically
8 analyzing the needs and wants of the intended customer, and assessing the degree to which the
9 provided features satisfy these requirements.”¹⁷⁵ These Guidelines are directed to the developers
10 of software ‘apps’ that run on the iOS operating system, where Apple has set certain aesthetic
11 standards for icons. In that context, they offer guidelines for designing interface elements that
12 will be used in the Apple iOS environment. These Guidelines do not suggest that Apple is
13 encouraging developers to follow these specific guidelines when designing interface elements for
14 use on other platforms. Therefore, these Guidelines do not dictate the use of specific interface
15 elements in any absolute sense, contrary to what Dr. Lehto suggests. Moreover, even taken at
16 face value, the Guidelines are just that—guidelines rather than rules.

17
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19 162. In his report, Dr. Lehto also discusses various other human-factors considerations,
20 such as Fitts’ Law, “the notion of functional grouping of controls,” and the principle of
21 consistency.¹⁷⁶ Fitts’ Law applies to many interfaces, such as remote controls. As with
22 smartphone interfaces, there is still considerable room for trade-offs, choices, and aesthetic
23 considerations. While such principles may guide the design process, they do not dictate any
24 specific graphical user interface design for smartphones. Alternative designs can also be
25

26 ¹⁷⁵ Lehto Report at 5, 16. The Apple iOS Human Interface Guidelines may be found at:
27 <http://developer.apple.com/library/ios/documentation/UserExperience/Conceptual/MobileHIG/MobileHIG.pdf>

28 ¹⁷⁶ Lehto Report at 23-24.

1 consistent with these considerations. Therefore, it is my opinion that principles of ergonomics
2 and human factors do not dictate that a grid of rectangular icons with rounded corners is the only
3 way to display and arrange icons on a display screen.

4 163. There are ergonomic recommendations for elements of screen icon design.¹⁷⁷
5 Section 6 of the ISO 11581-1 standard for information technology graphical user interfaces states
6 that “[i]t is important that icons are viewed not only as individual graphics with their associated
7 functionality, but also that the context in which they are used is considered as well.”¹⁷⁸ In Section
8 6.3.2, the standard addresses the global variations for corner attributes, and, as illustrated, a
9 rounded corner is only one of the acceptable ergonomic designs.
10

11 ISO/IEC 11581-1:2000(E)

12
13 6.3.2 Global variations for corner attributes are: rounding, beveling, radius, and connection, as illustrated in
14 Figure 7.



17 Figure 7 — Examples of corner attributes

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27 ¹⁷⁷ ISO/IEC 11581-3 2000, INFORMATION TECHNOLOGY – USER SYSTEM INTERFACES AND
28 SYMBOLS – ICON SYMBOLS AND FUNCTIONS: PART 1 ICONS - GENERAL, International Standards
Organisation, Geneva, Switzerland, 8.

¹⁷⁸ *Id.*

1 164. Software interfaces such as Google+ offer a circular arrangement of icon images
2 reminiscent of an old-style rotary telephone dial, as shown below.¹⁷⁹



10 165. There are several software interfaces for Windows PCs that offer a circular icon
11 arrangement, which are also similar to an old-style rotary telephone dial, as shown below.¹⁸⁰



21 166. Therefore, it is my opinion that principles of ergonomics and human factors do not
22 dictate that rectangular icons with rounded corners or that a grid of these icons is the only way to
23 display and arrange icons on a display screen.

24 **2. There are several viable alternative designs available on the market**
25 **that are consistent with principles of ergonomics and human factors.**

26 167. There are several examples of alternative graphical user interface designs for

27 ¹⁷⁹ <http://product-ivity.com/discovering-the-lost-tribes-of-the-google-plus-ecosystem/>.

28 ¹⁸⁰ <http://www.techyard.net/circle-dock-application-launcher-for-windows/>.

1 mobile devices. For example, Sony Ericsson's Xperia Arc S smartphone displays a grid of icons
2 that are presented as irregular shapes. Attached as Exhibit 45 are images of the graphical user
3 interface of Sony Ericsson's Xperia Arc S. The Blackberry Storm 2, on the other hand, features
4 its icons in a grid format, but each icon is set against an individual black rectangle. The black
5 rectangle nearly completely fills the space between icons. Attached as Exhibit 46 are images of
6 the graphical user interface of the Blackberry Storm 2. The icons are not set against a colorful,
7 rounded rectangle in either of these devices.
8



168. Other smartphones further illustrate alternative approaches to displaying icons.

For example, the Nokia N9 shown below demonstrates that it is not essential that icons be displayed in a 4 x 4 or 4 x 5 grid. Moreover, the icons displayed on the Nokia N9 have a different shape than those depicted in the D'790, D'305, and D'334 Patents, as do the icons displayed on the Blackberry Torch 9850, also shown below. Attached as Exhibits 47 and 48 are images of the Nokia N9 and Blackberry Torch 9850, respectively. Other smartphone designs, such as the HTC

1 HD2 T8585¹⁸¹ and the KDDI INFOBAR A01,¹⁸² show icons arranged without using a rectangular
2 grid of rows and columns. The Samsung Omnia 7 runs the Windows Phone 7 OS, which uses an
3 interface consisting of rectangular shapes of various sizes and designs.¹⁸³
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Nokia N9



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Blackberry Torch 9850

25 ¹⁸¹ [http://www.lovebargaining.com/t8585-hd2-43-inch-screen-windows-mobile-65-os-50-](http://www.lovebargaining.com/t8585-hd2-43-inch-screen-windows-mobile-65-os-50-pixel-camera-build-in-gps-wifi-gsensor-cell-phone-p-276.html)
26 [pixel-camera-build-in-gps-wifi-gsensor-cell-phone-p-276.html; http://www.amazon.com/HTC-](http://www.amazon.com/HTC-Unlocked-Screen-Windows-Professional/dp/B0030MHQXO)
27 [Unlocked-Screen-Windows-Professional/dp/B0030MHQXO.](http://www.warungdigital.com/wp-content/uploads/2011/05/kddi-infobar-a01-android.jpg)

27 ¹⁸² [http://www.warungdigital.com/wp-content/uploads/2011/05/kddi-infobar-a01-](http://www.warungdigital.com/wp-content/uploads/2011/05/kddi-infobar-a01-android.jpg)
28 [android.jpg.](http://www.warungdigital.com/wp-content/uploads/2011/05/kddi-infobar-a01-android.jpg)

28 ¹⁸³ [http://www.samsung.com/global/microsite/omnia7/.](http://www.samsung.com/global/microsite/omnia7/)

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HTC HD2 T8585



KDDI INFOBAR A01



Samsung Omnia 7

1 **B. The D’790 Patented Design Is Not Dictated by Function**

2 169. As evidenced by the many available alternative graphical user interface designs
3 discussed above,¹⁸⁴ principles of ergonomics and human factors do not dictate the specific design
4 depicted in the D’790 Patent, nor do they dictate the use of the individual features identified by
5 Dr. Lehto in his report. As discussed above, my understanding is that Dr. Lehto’s piecemeal
6 analysis of the D’790 Patent is improper, yet I will address the individual elements he describes
7 for the sake of completeness.
8

9 170. Simply put, principles of ergonomics and human factors do not dictate the design
10 of a graphical user interface that displays icons only in the shape of rounded rectangles, evenly
11 spaced in a grid-like array. Any number of icon shapes or sizes or icon graphics with different
12 corner designs could be ergonomically viable alternatives. Dr. Lehto discusses the importance of
13 the size of the target in interface design and appears to conclude that the particular arrangement
14 depicted in the D’790 Patent “is the inevitable outcome if a designer tries to achieve the
15 functional goal of efficiently and effectively fitting a set of control/display elements into the
16 space available.”¹⁸⁵ Yet Dr. Lehto’s analysis simply does not support this conclusion. The icon
17 sizes in the various iPhone models, the Windows phones, and the other examples shown above
18 are all different.¹⁸⁶ For example, his report does not take into account that the specific shape of
19 the icons is purely ornamental; the function of an icon does not require that the icon appear in the
20 shape of a rectangle with rounded corners. Moreover, much of Dr. Lehto’s analysis seems to
21 focus on the importance of the size of the active area beneath an icon. Recommendations for the
22 size of a softkey touch area are contained in the ANSI/HFES 100 standard, which states in
23 Section 6.2.9.1 that the Minimum Touch areas (*i.e.*, softkeys) should be at least 9.5mm (0.4 in.)
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27 ¹⁸⁴ See discussion *supra* ¶¶ 164–165, 167–168.

28 ¹⁸⁵ Lehto Report at 23.

¹⁸⁶ See discussion *supra* ¶¶ 164–165, 167–168.

1 wide and 9.5 mm (0.4 in.) high. If the touchscreen and the image plane of the screen are
2 separated, the dimensions of the touch areas should be increased to avoid user performance
3 degradation attribute to parallax problems. The optimum touch-sensitive area depends on the
4 application and required accuracy. Touch areas greater than 22 mm square do not improve
5 performance.¹⁸⁷ The size of the softkeys on the iPhone devices clearly do not conform to this
6 ergonomic recommendation and, consequently, ergonomic considerations did not drive the design
7 of the icons or their spatial arrangement.

9 171. In addition, though consistency may be an important principle of interface design,
10 it does not dictate this particular graphical user interface. Several of the alternative designs
11 discussed above similarly incorporate consistent graphical elements.¹⁸⁸

12 **C. The D'305 Patented Design Is Not Dictated by Function**

13 172. For the same reasons discussed above,¹⁸⁹ the design depicted in the D'305 Patent
14 is not dictated by principles of ergonomics and human factors. As explained above, the specific
15 arrangement of rectangular icons with rounded corners is not the only way to design an
16 ergonomically viable graphical user interface.¹⁹⁰

17 173. In his discussion of the D'305 Patent, Dr. Lehto also concludes that “the provided
18 pictorials or icons are highly functional and consistent with the efforts of practitioners in Human
19 Factors Engineering and other fields to develop easily understood pictorials and icons that are
20 both easily discriminable and meaningful to the intended audience.”¹⁹¹ Again, Dr. Lehto’s

23 ¹⁸⁷ See R.J. Beaton & N. Weiman, *Effects of Touch Key Size and Separation on Menu-*
24 *Selection Accuracy*, Tech. Report TR 500-01 (Beaverton, OR: Tektronix, Human Factors
25 Research Laboratory, 1984); D.B. Beringer & J.G. Peterson, *Underlying Behavior Parameters of*
26 *the Operation of Touch-Input Devices: Biases, Models, and Feedback*, 27 Human Factors 445,
445–458.

27 ¹⁸⁸ See discussion *supra* ¶¶ 164–165, 167–168.

28 ¹⁸⁹ See discussion *supra* ¶¶ 163–171.

¹⁹⁰ See discussion *supra* ¶¶ 163–168.

¹⁹¹ Lehto Report at 26.

1 conclusion does not rise to the stringent level that I understand is required under design patent
2 law—*i.e.*, that the purpose or use the device “dictate” the particular design at issue. Any number
3 of pictorial images could satisfy these goals of being easily understood and meaningful as is
4 recommended by ISO 11581.¹⁹² Several of the alternative designs discussed above offer
5 examples of other pictorial icons that are viable from a human-factors perspective.¹⁹³ The notion
6 that a specific pictorial image must be used to design a graphical user interface consistent with
7 human-factors principles is not supportable.

9 174. Dr. Lehto also suggests that this design is functional given Apple’s practice of
10 making iPhone application icons consistent in their appearance by placing a pictorial image in a
11 rectangle with rounded corners.¹⁹⁴ This analysis improperly concludes that because Apple
12 appears to desire consistency in the graphical design of icons within its own mobile OS, it follows
13 that *all* mobile OS platforms must use consistent graphical icons. Nothing in Apple’s iOS Human
14 Interface Guidelines supports that conclusion. Rather, though Apple may desire consistency in
15 the appearance of its graphical user interface design, Apple’s desire for consistency simply does
16 not dictate the use of icons of a particular shape or pictorial image.

18 **D. The D’334 Patented Design Is Not Dictated by Function**

19 175. For the same reasons discussed above,¹⁹⁵ the design depicted in the D’334 Patent
20 is not dictated by principles of ergonomics and human factors. As explained above, the specific
21 arrangement of rectangular icons with rounded corners is not the only way to design an
22 ergonomically viable graphical user interface.¹⁹⁶ Indeed, there are several other different user
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26 ¹⁹² See source cited in notes 177–178.

27 ¹⁹³ See discussion *supra* ¶¶ 164–165, 167–168.

28 ¹⁹⁴ Lehto Report at 27–29.

¹⁹⁵ See discussion *supra* ¶¶ 163–174.

¹⁹⁶ See discussion *supra* ¶¶ 163–168.

1 interfaces with the same or similar functionality, as shown in ISO 11581-1.¹⁹⁷ In addition, the
2 particular pictorial images shown in the D’334 Patent are not dictated by principles of ergonomics
3 and human factors for the same reasons discussed in connection with the D’305 Patent.¹⁹⁸

4 176. Dr. Lehto identifies two additional elements in the D’334 patented design not
5 present in the D’305 Patent. First, the D’334 Patent depicts two additional icons between the
6 three top rows and icons and the row of icons against the gray band at the bottom of the interface
7 display. Dr. Lehto suggests that the addition of this “fourth row of square elements assumed to be
8 icons in the D’334 patent increases the number of interface elements that can be shown in the
9 rectangular viewing area” and “is therefore clearly functional.”¹⁹⁹ But in his analysis of the
10 D’790 and D’305 Patents, which do not display icons in this “fourth row,” Dr. Lehto stated that
11 “[t]he blank row could play a functional role in some interfaces, as a strategy for separating
12 groups of controls that are in some way functionally different.”²⁰⁰ These two design variations
13 cannot both be “dictated” by function in light of principles of ergonomics and human factors.
14 Indeed, Dr. Lehto’s conflicting analysis underscores his conflation of the concepts of being
15 “dictated” by function, on the one hand, and having a function, on the other.²⁰¹

16 177. Second, Dr. Lehto notes the “[i]nclusion of two dots above the bottom row of
17 interface elements,” which “depict[s] a centered progress bar indicator.”²⁰² The fact that
18 “[p]rogress bars are commonly used in the design of graphical user interfaces” does not mean that
19 they constitute a single required design element under principles of ergonomics and human
20 factors. Moreover, Dr. Lehto’s assertion that they are “well recognized as an important approach
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25 ¹⁹⁷ See source cited in notes 177–178.

26 ¹⁹⁸ See discussion *supra* ¶¶ 172–174.

27 ¹⁹⁹ Lehto Report at 30.

28 ²⁰⁰ Lehto Report at 23, 25.

²⁰¹ See discussion *supra* ¶¶ 89, 110, 117.

²⁰² Lehto Report at 30.

1 for enhancing the attractiveness . . . of programs that incorporate them”²⁰³ supports the conclusion
2 that these features serve a largely ornamental purpose. To the extent that progress bars
3 “enhance[e] the . . . effectiveness of programs that incorporate them,”²⁰⁴ they appear to serve the
4 purpose of indicating what page of a display the user is viewing. That purpose does not dictate
5 any one form of progress bar, as the indicators could just as easily be depicted in another shape,
6 such as squares, rectangles, diamonds, lines, or even a scroll bar. The screens could also be
7 numbered. Principles of ergonomics and human factors do not dictate that progress bars take any
8 particular shape or form.

10 **XI. APPLE’S ASSERTED ORIGINAL IPHONE, IPHONE 3G, IPHONE 4, AND**
11 **IPHONE TRADE DRESS ARE NOT FUNCTIONAL BASED ON PRINCIPLES**
12 **OF ERGONOMICS AND HUMAN FACTORS**

13 178. As with his analysis of the various design patents at issue, Dr. Lehto improperly
14 engages in a piecemeal analysis of the alleged functionality of Apple’s Original iPhone Trade
15 Dress, iPhone 3G Trade Dress, iPhone 4 Trade Dress, and iPhone Trade Dress.²⁰⁵ It is my
16 understanding that the overall appearance of a trade dress must be considered under a proper
17 analysis of trade dress functionality.²⁰⁶ In analyzing whether Apple’s asserted trade dress is
18 essential to the use or purpose of the various models of the iPhone based on principles of
19 ergonomics and human factors, I examine Apple’s trade dress as a whole. I also consider the
20 individual elements discussed by Dr. Lehto for the sake of completeness.

22 179. In my opinion, the overall appearance of each of the Original iPhone Trade Dress,
23 iPhone 3G Trade Dress, iPhone 4 Trade Dress, and iPhone Trade Dress is not essential to the use

24 ²⁰³ Lehto Report at 30.

25 ²⁰⁴ Lehto Report at 30.

26 ²⁰⁵ In his report, Dr. Lehto addresses “the alleged trade dress of the iPod Touch” and
27 concludes that these “elements provide functionality” and that the dimensions of the device are
28 “functional.” Lehto Report at 36. I have been informed that there is no separate iPod touch trade
dress at issue in this case, so I will not address that trade dress in my report.

²⁰⁶ See discussion *supra* ¶¶ 24–26.

1 or purpose of the original iPhone, iPhone 3G, iPhone 3GS, iPhone 4, and iPhone 4S devices. As
2 discussed above, principles of ergonomics and human factors do not dictate a singular industrial
3 or graphical user interface design for smartphones.²⁰⁷ Apple’s asserted trade dress consists of
4 both industrial design and graphical user interface design features.²⁰⁸

5
6 180. As discussed above, a “rectangular shape with four evenly rounded corners,” a
7 “flat clear face,” a “large display screen under the clear surface,” “[s]ubstantial black borders
8 above and below the display screen and narrower black borders on either side of the screen under
9 the clear surface,” a “matrix of colorful square icons with evenly rounded corners,” “[a] bottom
10 row (or ‘dock’) of colorful square icons set off from the other icons, which does not change as
11 other pages of the user interface are viewed” are not essential to the use or purpose of any model
12 of the iPhone based on principles of ergonomics and human factors.²⁰⁹

13
14 181. Dr. Lehto also states that a “metallic bezel around the flat clear surface, as in the
15 iPhone and iPhone 3G/S, provides functionality for reasons discussed earlier in Section IV” of his
16 report.²¹⁰ Dr. Lehto, however, does not discuss the alleged functionality of the “metallic bezel” in
17 Section IV of the report; therefore, he has offered no opinion that I can rebut. Nonetheless, for
18 the sake of completeness, it is my opinion that the metallic bezel in the original iPhone, iPhone
19 3G, and iPhone 3GS devices is ornamental and is not essential to the use or purpose of the
20 devices from an ergonomic or human-factors standpoint.

21
22 182. With respect to the iPhone 4 Trade Dress, Dr. Lehto asserts that the “thin rim
23 adjacent to the face of the phone as in the iPhone 4, provides functionality by providing a surface
24 for placing controls and additional structural integrity.”²¹¹ Notably, Dr. Lehto mischaracterizes

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26 ²⁰⁷ See discussion *supra* in Sections XIII & X.

²⁰⁸ See discussion *supra* in Section VI.H.

²⁰⁹ See discussion *supra* Section XIII & X.

²¹⁰ Lehto Report at 35.

²¹¹ Lehto Report at 35.

1 this element of the asserted iPhone 4 Trade Dress; as defined in the Amended Complaint, the
2 iPhone 4 Trade Dress includes “a thin *metallic* band around the outside edge of the iPhone 4,
3 which creates a thin rim adjacent to the face of the phone.”²¹² Dr. Lehto presents no reasons why
4 a metallic band is essential to the use or function of the device from an ergonomic or human-
5 factors standpoint. Moreover, the numerous alternative smartphone designs that do not include
6 this design element further establish that it is not functional based on ergonomic or human-factors
7 principles.²¹³

9 183. Moreover, contrary to the conclusions in Dr. Lehto’s report,²¹⁴ my earlier analysis
10 shows that the various models of the iPhone do not have an ergonomically optimal design.²¹⁵

11 184. For these reasons, the Original iPhone Trade Dress, iPhone 3G Trade Dress,
12 iPhone 4 Trade Dress, and iPhone Trade Dress are not essential to the use and purpose of these
13 devices based on principles of ergonomics and human factors.
14

15 **XII. APPLE’S ASSERTED IPAD AND IPAD 2 TRADE DRESS ARE NOT**
16 **FUNCTIONAL BASED ON PRINCIPLES OF ERGONOMICS AND HUMAN**
17 **FACTORS**

18 185. As with his analysis of the various design patents at issue, Dr. Lehto improperly
19 engages in a piecemeal analysis of the alleged functionality of Apple’s iPad Trade Dress and
20 iPad 2 Trade Dress.²¹⁶ As stated above, it is my understanding that overall appearance of a trade
21 dress must be considered under a proper analysis of trade dress functionality.²¹⁷ In analyzing
22 whether Apple’s asserted trade dress is essential to the use or purpose of the iPad and iPad 2
23 based on principles of ergonomics and human factors, I examine Apple’s trade dress as a whole.

24 ²¹² See discussion *supra* ¶ 46 (emphasis added).

25 ²¹³ See discussion *supra* ¶¶ 77–87.

26 ²¹⁴ See Lehto Report at 33–35.

27 ²¹⁵ See discussion *supra* ¶¶ 68–76.

28 ²¹⁶ As set forth above, I have been informed that there are no differences between the
asserted iPad Trade Dress and iPad 2 Trade Dress. See discussion *supra* ¶¶ 52–53.

²¹⁷ See discussion *supra* ¶¶ 24–26, 178.

1 I also consider the individual elements discussed by Dr. Lehto for the sake of completeness.

2 186. In my opinion, the overall appearance of the iPad Trade Dress and iPad 2 Trade
3 Dress is not essential to the use or purpose of the iPad and iPad 2 devices. As discussed above,
4 principles of ergonomics and human factors do not dictate a singular industrial design for
5 tablets.²¹⁸ In addition, for the same reasons discussed in the context of smartphone graphical user
6 interface designs, principles of ergonomics and human factors do not dictate a singular graphical
7 user interface design for tablets.²¹⁹ Apple's asserted trade dress consists of both industrial design
8 and graphical user interface design features.²²⁰

10 187. As discussed above, a "rectangular shape with four evenly rounded corners," a
11 "flat clear face," a "large display screen under the clear surface," "[s]ubstantial black or white
12 borders on all sides of the display screen under the clear surface," a "matrix of colorful square
13 icons with evenly rounded corners," and a "thin side profile" are not essential to the use or
14 purpose of the iPad and iPad 2 based on principles of ergonomics and human factors.²²¹

16 188. Dr. Lehto also summarily concludes that a "metallic rim around the flat clear
17 surface, as in the iPad and iPad 2, provides functionality by providing structural integrity."²²²
18 Dr. Lehto does not elaborate on this point; he does not point to any specific evidence in support of
19 this conclusion; and he does not appear to base this statement on any ergonomics or human-
20 factors recommendations or requirements. In my opinion, this metallic rim, as visible externally
21 on the device, is ornamental and is not essential to the use or purpose of the devices from an
22 ergonomic or human-factors standpoint.
23

24
25
26 ²¹⁸ See discussion *supra* Sections IX.

27 ²¹⁹ See discussion *supra* Section X.

28 ²²⁰ See discussion *supra* Section VI.H.

²²¹ See discussion *supra* Sections IX.

²²² Lehto Report at 37.

1 189. Moreover, contrary to the conclusions in Dr. Lehto's report,²²³ my earlier analysis
2 shows that the iPad 2 does not have an ergonomically optimal design.²²⁴ The same analysis
3 applies equally to the design of the first-generation iPad.

4 190. For these reasons, the iPad Trade Dress and iPad 2 Trade Dress are not essential to
5 the use and purpose of these devices based on principles of ergonomics and human factors.

6
7 **XIII. APPLE'S ASSERTED TRADEMARKS ARE NOT FUNCTIONAL BASED ON**
8 **PRINCIPLES OF ERGONOMICS AND HUMAN FACTORS**

9 191. Dr. Lehto states that "[e]ach of the asserted colorful square icons with evenly
10 rounded corners are [sic] functional,"²²⁵ but his analysis of ergonomic and human-factors
11 considerations do not support this conclusion. Any number of pictorial images could have been
12 used on these icons, and the icons need not be in the shape of a rounded rectangle. Users could
13 just as easily access applications on the iPhone and iPad if icons with different shapes and
14 different pictorial images were used. In my opinion, none of these asserted trademarks is
15 essential to the use or purpose of any of the various generations of the iPhone and iPad based on
16 principles of ergonomics and human factors.

17
18 **XIV. CONCLUSION**

19 192. In my opinion, the designs set forth in the Asserted Design Patents as well as
20 Apple's asserted trade dress and trademarks are not functional in terms of ergonomics or human
21 factors. There are numerous commercial alternatives to these designs on the market that perform
22 equivalent functions and their forms have not been driven primarily by ergonomic design
23 requirements. Thus, under the law as it has been explained to me, ergonomics and human-factors
24 considerations do not dictate a single design that is required to perform the functions of a
25 smartphone or tablet, nor is any one such design essential to the use or purpose of a smartphone

26
27 ²²³ See Lehto Report at 36–37.

²²⁴ See discussion *supra* Section IX.

²²⁵ Lehto Report at 38.

1 or tablet. For the same reasons, the individual elements discussed in the report of Dr. Lehto are
2 also not functional.

3 **XV. SUPPLEMENTATION**

4 193. I reserve the right to supplement this report with new information and/or
5 documents that may be discovered or produced in this case.

6 **XVI. EXHIBITS TO BE USED**

7 194. I anticipate using as exhibits during trial certain documents and things referenced
8 or cited in this report or accompanying this report. I also anticipate using other demonstrative
9 exhibits or things at trial.
10

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13 Dated: April 16, 2012
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17 ALAN HEDGE