Exhibit 12

SUBJECT TO PROTECTIVE ORDER
CONTAINS HIGHLY CONFIDENTIAL – ATTORNEYS' EYES ONLY INFORMATION

UNITED STATES DISTRICT COURT
NORTHERN DISTRICT OF CALIFORNIA
SAN JOSE DIVISION

APPLE, INC., a California corporation Plaintiff, v. SAMSUNG ELECTRONICS CO., LTD., a Korean corporation; SAMSUNG ELECTRONICS AMERICA, INC., a New York corporation; and SAMSUNG TELECOMMUNICATIONS AMERICA, LLC, a Delaware limited liability company, Defendants.	)	Case No. 11-cv-01846-LHK

EXPERT REPORT OF MARK LEHTO

I. INTRODUCTION

I, Mark Lehto, have been retained by Quinn Emanuel Urquhart & Sullivan, LLP, attorneys for Defendants Samsung Electronics Co., Ltd., Samsung Electronics America, Inc. and Samsung Telecommunications America, LLC (hereinafter "Samsung") to serve as an expert in this case. I expect to testify at trial regarding the matters set forth in this report, if asked about those matters by the Court or the parties' attorneys.

II. BACKGROUND/QUALIFICATIONS

A. I have been working in the field of safety, human factors, ergonomics, and warnings for over twenty-five years. I received a Ph.D. in the field of Industrial Engineering from the University of Michigan in 1986. I am currently a Professor at Purdue University, where I have taught courses and conducted research for over twenty-five years on topics including the Design of Interactive Systems, Human-Computer-Interaction, Safety Engineering, Human Factors Engineering and Ergonomics,

Product Design, and Warnings. My CV is attached as Exhibit A, which contains a complete listing of my education and experience.

B. I have published numerous articles and books related to these topics. One of my books, An Introduction to Human Factors and Ergonomics for Engineers published in 2008 is used by an international audience for educating engineers. My attached CV in Exhibit A also contains a complete listing of my publications, including those in the past ten years.

C. My testimony history over the past four years is attached as Exhibit B.

D. Compensation.

1. Fees for my professional services include $300/hour for material review and $400/hour for expert testimony.

2. I have no financial interest in the outcome of this lawsuit.

III. SUMMARY OF OPINIONS

For the reasons set forth in this report, I have formed the following opinions:

(1) The design shown in United States Design Patent No. D504,889 is functional and contains functional features.

(2) The design shown in United States Design Patent No. D593,087 is functional and contains functional features.

(3) The design shown in United States Design Patent No. D618,677 is functional and contains functional features.

(4) The design shown in United States Design Patent No. D622,270 is functional and contains functional features.

(5) The design shown in United States Design Patent No. D627,790 is functional and contains functional features.

(6) The design shown in United States Design Patent No. D604,305 is functional and contains functional features.

(7) The design shown in United States Design Patent No. D617,334 is functional and contains functional features.

(8) The asserted trade dress and trademarks of the Apple iPhone, iPhone 3G/S, iPhone 4, iPod Touch, iPad, and iPad 2 are functional.

This report provides my expert opinions and the basis and reasons for them. Beyond my credentials and experience in the field of human factors and ergonomics, I have also relied upon

the materials listed in Exhibit C in forming the opinions expressed in this report. However, I am informed that depositions and document productions have not yet concluded, and also that Apple has continued to produce pertinent documents after the depositions of the inventors, industrial designers, and other witnesses relevant to my analysis. I reserve the right to modify or supplement this report and my opinions based on additional documents, discovery responses, deposition testimony and any other evidence as this matter progresses.

IV. THE ASSERTED DESIGN PATENTS, TRADE DRESS AND TRADEMARKS ARE FUNCTIONAL

IV.A. Design Patent Functionality

I am not an expert in patent law. However, for the purpose of rendering the opinions set forth in this report, counsel has advised me of certain legal principles relevant to my analysis.

It is my understanding that design patents are fundamentally different from utility patents in that design patents protect the ornamental design of a given product, while utility patents protects the way a given product is used, how it works, or how it is created.[1] I am also aware that functional aspects of a design cannot receive design patent protection.[2] I also understand that many designs can be well-constructed or aesthetically pleasing, but still cannot enjoy design patent protection where they are functional.[3]

Counsel has informed me that the functionality inquiry may be framed in different ways, such as inquiring whether the design element "is essential to the use or purpose of the article or if it affects the cost or quality of the article,"[4] or whether "the appearance of the claimed design is 'dictated by' the use or purpose of the article."[5] It is my opinion that United States Design Patent Nos. D504,889, D622,270, D618,677, D593,087, D604,305, D617,334, and D627,790 are functional however the functionality inquiry is framed.

I understand that invalidity based on functionality must be shown by clear and convincing evidence.[6] I understand the clear and convincing evidence standard to require evidence that produces an abiding conviction that the truth of a factual assertion is highly probable.[7] Thus, my opinions in this report reflect my understanding that functionality must be shown by clear and convincing evidence.

I also understand that even if a design is not proven to be functional, functional elements must be excluded in construing the patent for infringement. When a design contains both ornamental and function aspects, "it is entitled to a design patent whose scope is limited to those

1 Richardson v. Stanley Works, Inc., 597 F.3d 1288, 1293-94 (Fed. Cir 2010).

2 Lee v. Dayton-Hudson Corp., 838 F.2d 1186, 1188 (Fed Cir. 1998) (citing 35 U.S.C. § 171).

3 Id. (quoting In re Carletti, 328 F.2d 1020, 1022 (CCPA 1964).

4 Amini Innovation Corp. v. Anthony Cal. Inc., 439, F.3d 1365, 1372 (Fed. Cir. 2006).

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

6 Titan Tire Corp. v. Case New Holland, Inc., 566 F.3d 1372, 1376-77 (Fed. Cir. 2009).

7 Price v. Symsek, 988 F.2d 1187, 1191 (Fed. Cir. 1993).

[ornamental] aspects alone and does not extend to any functional elements of the claimed article."[8]

IV.B. The D504,889 Patent Design Is Functional

Design patent D504,889 is titled "Electronic Device." The application for the patent was filed on March 17, 2004 and the patent was issued on May 10, 2005. The D'889 patent contains nine figures (*see* Figure 1 in this report). It is my understanding that Apple offered the following construction of this patent in its Motion for Preliminary Injunction:

> an overall rectangular shape with four evenly rounded corners;
>
> a flat clear surface covering the front of the device that is without any ornamentation;
>
> a thin rim surrounding the front surface;
>
> a substantially flat back panel that rounds up near the edges to form the thin rim around the front surface; and
>
> a thin form factor[9]

No matter what claim construction is used, however, my opinion is that the D'889 patent is functional.

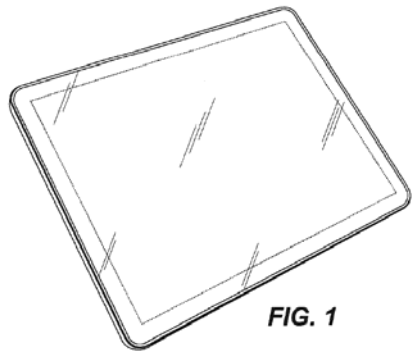

FIG. 1

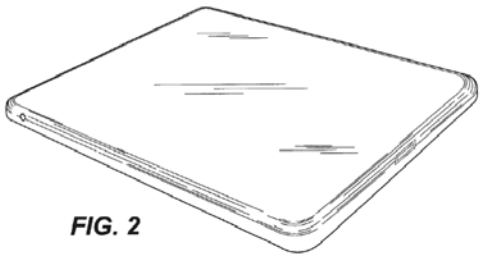

FIG. 2

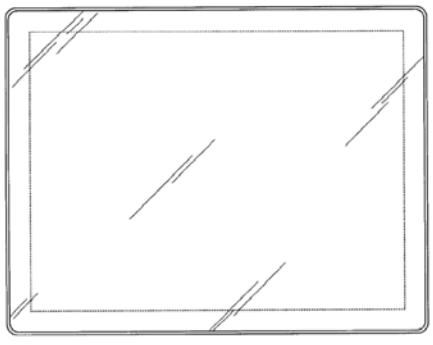

FIG. 3

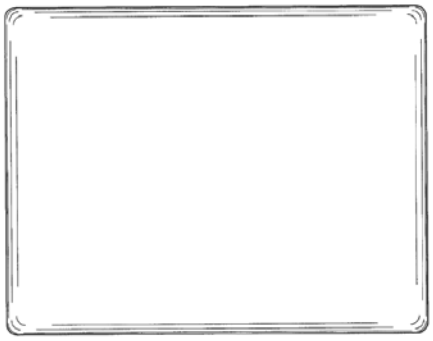

FIG. 4

8 Richardson, 597 F.3d at 1294.

9 See Apple Inc.'s Motion Preliminary Injunction at 14-15, citing Declaration of Cooper Woodring ¶ 46.

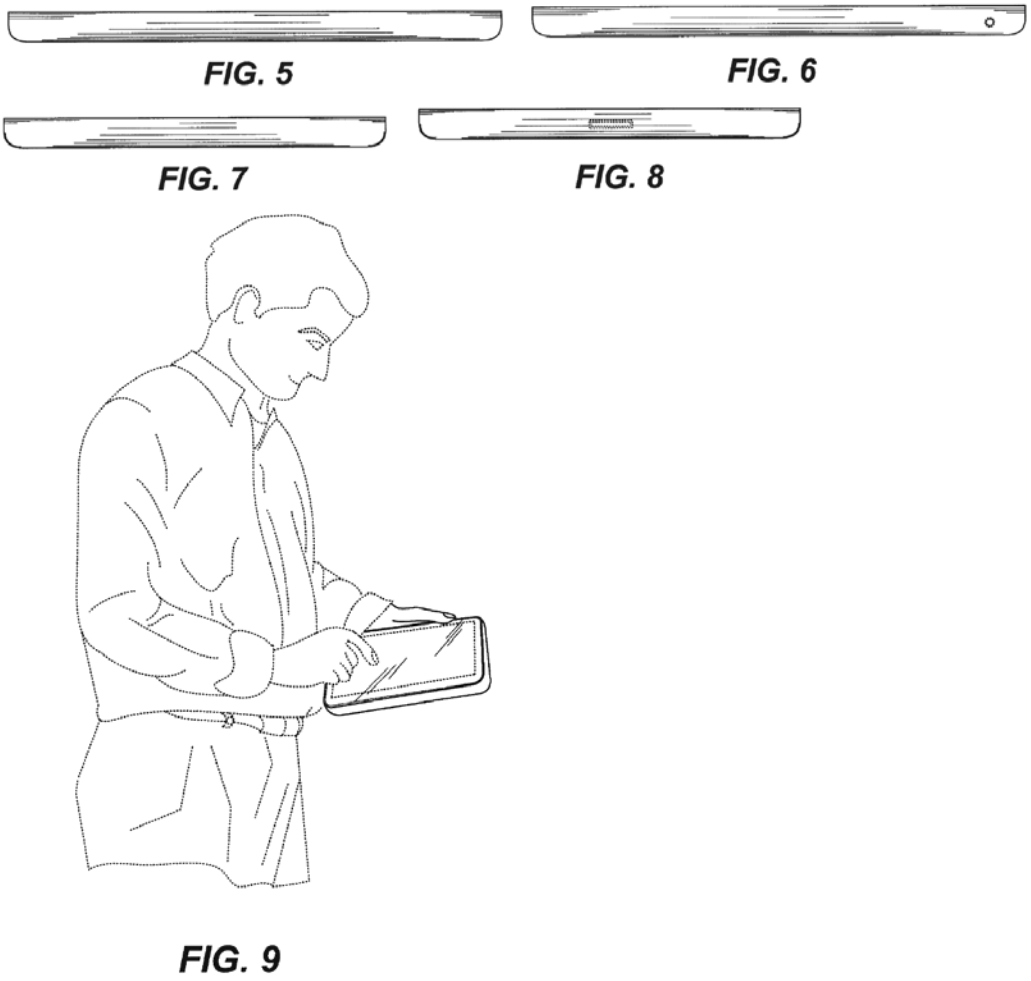

Figure 1. D504,889 Patent Figures 1 through 9.

The contemporary design of electronic devices involves a process of systematically analyzing the needs and wants of the intended customer, and assessing the degree to which the provided features satisfy these requirements.[10] Apple, in its *iOS Human Interface Guidelines* for developers of mobile applications,[11] also recommends following such a process. During this process, frameworks such as Quality Function Deployment[12] (QFD) are often used to systematically relate a large set of functional requirements, such as ease of use, safety, reliability, and quality, to the design features of a product. This analysis is typically done for each stage of customer use of the product, including purchase, installation, assembly, setup, use, malfunction, service, and repair. Satisfying these requirements at each stage of use is essential to ensure the product adequately performs its intended functions for the intended group of consumers. This

10 Lehto, M.R. and Buck, J.R., An Introduction to Human Factors and Ergonomics for Engineers, Lawrence Erlbaum Associates, Inc., Mahwah, NJ, in print, 2008, 878 pages. Also see Stockbridge, L. and Mughal A., Design Guidelines: Mobile Phones, Experience Lab: London, 2007, for an example of a company marketing services of this type for electronic devices.

11 iOS Human Interface Guidelines, Apple, Inc., 2012.

12 Hauser, J.R. and Clausing, D., "The House of Quality," Harvard Business Review, 1988, 63-73.

approach is often referred to as Customer Driven or Human Centered Design and is followed by large manufacturers to improve the quality of the products and services they provide.[13]

Sophisticated manufacturers such as Apple routinely conduct analyses of this type in preparing designs like the designs in the D'889 patent. The testimony of Apple designers and named inventors indicates that Apple considered ergonomic factors and that the designs satisfy functional considerations.[14] Moreover, my independent analysis reveals that the features Apple claims are shown in the D'889 patent are functional and dictated by human factors engineering and ergonomics considerations, as discussed below.

The following discussion will address each of the elements in the D'889 patent identified above, as well as the design as a whole.

IV.B.i Rectangular shape or form factor

There are many reasons to conclude that a rectangular shape or form factor plays an important functional role for electronic devices, such as portable computers, media players, personal digital assistants, or mobile phones. A rectangular form is used in most such devices. Two critical elements drive the form of such devices, namely the display and internal components, which tend to be rectangular in form. When the rectangular display and control components are combined, the resulting configuration is itself naturally rectangular, such as when a rectangular array of keys, buttons, or touch sensitive icons is placed in a rectangular visual display.[15]

Illustrating this approach, Apple's *iOS Human Interface Guidelines* for developers of mobile applications,[16] provide numerous examples of display and control elements that are rectangular in form, such as 1) status, navigation, tab, and tool bars, 2) popovers, 3) split, table, text, and web views, 4) alerts, action sheets, and modal views, 5) controls, including activity indicators, detail disclosure buttons, info buttons, labels, page indicators, pickers, rounded rectangle buttons, scope bars, search bars, segmented controls, slider, steppers, and text field, and 6) system provided buttons and icons. These interface elements required by Apple are provided to assist developers, in Apple's own words, to design a "superlative user interface and user experience."[17] These elements are intended to be configured in a larger rectangular form factor.

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13 Edosomwan, J.A., "Total Quality Leadership," in Salvendy, G. (Ed), Handbook of Industrial Engineering, (3rd edition pp 1793-1807), 2001, John Wiley.

14 October 21, 2011 Deposition of Daniele de Iuliis at 37:8-9 ("[w]e look at all sides of usability in the design of all our products"); see also de Iuliis Depo. Tr. at 36:18-39:10 (acknowledging that single-handed use would be a consideration in designing a phone).

15 For examples see: Helander, M.G., ed., et al, Handbook of Human-Computer Interaction, Second, Completely Revised Edition, Elsevier: New York, 1997, p.545. MacKenzie, I.S, and Zhang, S.X., "The Design and Evaluation of a High-Performance Soft Keyboard," In Proceedings of CHI 1999, New York: Association for Computing Machinery, 1999. Jenkins, M., et al, Usable Cell Phone Design, Capstone Design Program: Mechanical Engineering, Paper 107, 2007. Watson, L.M., "Kansei Engineering and Cultural Differences in Mobile Phone Design," Rochester Institute of Technology: Rochester, NY, 2011. Han, S.J., et al, "Identifying Mobile Phone Design Features Critical to User Satisfaction," Human Factors and Ergonomics in Manufacturing, Vol. 14 (1), 15-29, 2004.

16 iOS Human Interface Guidelines, Apple, Inc., 2012.

17 iOS Human Interface Guidelines, Apple Inc., 2012, p 1.

In my opinion this demonstrates that Apple recognizes the functional role of a rectangular form factor for electronic devices.

A rectangular form is also a natural outcome of using rows and columns as an organizing principle for arranging both display and control elements. A wide variety of electronic devices apply this principle by displaying information elements in rectangular windows. Many of these applications build on the metaphor of a page or some variation of a page metaphor to organize and present information in a format familiar to users. This allows users efficiently to apply search strategies, such as scanning through a list of names in alphabetical order or reading text, that they have developed through years of experience using books or other devices. Some of the many specific examples of page metaphors that are particularly relevant to certain types of electronic devices that naturally correspond to rectangular layouts include:

1. Calendars (laying out days of the month as columns and weeks as rows);
2. Appointment or to do books or lists (each page a column and times in the day as lines or rows);
3. Telephone books (columns of alphabetically ordered names);
4. Photo albums (each photo a rectangle arranged on a page);
5. Web pages (a rectangular display window with rectangular windows for displaying text, graphics, photographs, or videos); and
6. Tables (organizing information with categories in rows and attributes in columns or vice versa).

Control elements are also often organized in a way that results in a rectangular form, for similar reasons to those mentioned above for display elements. Some examples include:

1. Key pads (a rectangular array of numbers ordered either as sequential elements of a row or column, such as those found on calculators, telephone pads, cash registers, etc.);
2. Keyboards (a rectangular array of alphanumeric characters ordered either numerically, alphabetically, or arbitrarily (QWERTY layout), such as those found on typewriters, teletype, computer keyboards);
3. Menu bars (a horizontally oriented rectangular array that displays a vertically oriented list of options, vertical and horizontal scroll bars, etc.); and
4. Graphical User Interfaces (GUIs) – both desktop computers and mobile electronic devices include screen organizers that group icons into rows and columns, etc.

As the above examples demonstrate, a rectangular form factor plays an important functional role in ensuring usability in a wide application of electronic devices, by building on traditional uses that facilitate a quick understanding of how to effectively use the electronic device. This approach is in fact followed by Apple in the guidelines and interface elements it provides to developers of apps for the iOS operating system developed expressly for such devices.

IV.B.ii Rounded Edges, Smooth Flat Front Surface, Rounded Corners, and Thin Form Factor

Rounded edges and a smooth flat front surface are common functional elements of electronic devices, such as portable hand-held computers, media players, media storage devices, personal digital assistants, and mobile phones. These features are functional because they improve the usability, safety, and reliability of the delivered products in many different ways. Many hand held mobile devices employ rounded edges and corners to one degree or another and have a flat smooth viewing surface because of the function of such devices.

The use of a flat smooth surface for devices with touch-sensitive interfaces enables users to slide their fingers easily over the active area of the display. If, for example, a raised edge surrounds the active display area, the user's fingers and thumbs might bump against it, rendering the touch screen more challenging and less pleasant to use. The capability of easily sliding fingers over the active area is especially important when finger movements or gestures over the touch screen are used to execute actions such as scrolling, selecting text, or opening and closing windows. Another advantage is that the lack of ornamentation on the front viewing surface, such as protruding buttons, eliminates clutter and display elements not necessary to the tasks performed that can interfere with view and access. Apple designer Jonathan Ive testified that the combination of the display with multi-touch technology meant that the display screen became the primary way that a user interacted with the device and allowed for a design with fewer visual distractions for the user when interacting with the display.[18] A smooth flat surface is also easier to clean. In addition, the lack of a keyboard or numerous other physical buttons reduces the weight of the device, contributing to the ease of holding and carrying it, and other portability related issues.

Rounded edges offer other functional advantages, and are used in many mobile phones and other portable electronic devices.[19] One advantage is that the rounded edges make it easier to pick up the device when it is lying on a flat surface, by allowing immediate access of the user's fingers to a location under the device. This functional feature is especially important for a thin device because it reduces the risk of fumbling and dropping it when picking it up from a flat surface. Another closely related advantage is that rounded edges and corners reduce the chance the device will catch when putting it into a pocket, briefcase, or other container for stowage or transport, which also reduces the chance the person will fumble and drop the device or otherwise damage the product. Eliminating sharp corners is also a standard approach followed in safety engineering and ergonomics for eliminating hazards and discomfort by reducing force concentrations at the location where objects contact the body. The latter issue is especially important when a device is held for a longer period of time either in the hand or against a body surface. Apple has recognized this design issue in electronic devices. In fact, Apple designer Eugene Whang acknowledged that rounded corners "serve many purposes," including being "more comfortable against the ear or in the hands."[20] Similarly, Michael Tschao, Apple's head

18 December 1, 2011 Deposition of Jonathan Ive at 51:23-56:6.

19 Han, S.J., et al, "Identifying Mobile Phone Design Features Critical to User Satisfaction," Human Factors and Ergonomics in Manufacturing, Vol. 14 (1), 15-29, 2004.

20 October 27, 2011 Deposition of Eugene Whang at 58:13-59:16.

of marketing for the iPad testified that the physical design of the iPad and iPad 2, including its rectangular shape, weight and rounded corners make it easy and comfortable to hold.[21]

A thin form factor further contributes to the overall portability of an electronic device, by both reducing weight and making it easier to stow the device. Mr. Tschao confirmed this when he stated that a thin form factor for the iPad and iPad 2 was an important feature to consumers because a thinner tablet is "easier to transport" and could be used in more situations than previous tablet PCs.[22]

IV.C. The D593,087 Patent Design Is Functional

The D593,087 design patent is also titled "Electronic Device." The application for the D'087 was filed on July 30, 2007 and the patent issued on May 26, 2009. The D'087 patent includes 48 figures (Figure 2 in this report). It is my understanding that Apple offered the following construction of this patent in its Motion for Preliminary Injunction:

> a flat rectangular front surface with four evenly rounded corners;
>
> an inset rectangular display screen centered on the front surface that leaves very narrow borders on either side of the display screen and substantial borders above and below the display screen;
>
> a rounded, horizontal speaker slot centered on the front surface above the display screen, where the rectangular front surface is otherwise substantially free of ornamentation outside of an optional button area centrally located below the display; and
>
> a thin, continuous bezel surrounding the rectangular front surface that is substantially uniform in appearance and having an inwardly sloping profile[23]

No matter what claim construction is used, however, my opinion is that the D'087 patent is functional.

An initial point is that rounded edges, rounded corners, a rectangular shape and form factor, and flat front surface all play an important functional role in the design of an electronic device by providing the usability, comfort, and ergonomics of the product, as discussed above in reference to the D'889 patent. Thus, the overall rectangular shape, smooth top surface, rounded edges, and rounded corners in the D'087 design is functional for all the reasons set forth above, and as expanded upon further below. The following discussion also addresses the functionality of the additional features of (a) a rounded circular band surrounding and flush with the top surface of the device, (b) a centered rectangular element that appears to be the display area, (c) a circular

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[21] February 21, 2012 Deposition of Michael Tschao ("Tschao Dep.") at 66:18-70:13.

[22] *Id.* at 131:24-132:23.

[23] See Apple Inc.'s Motion Preliminary Injunction at 8, citing Declaration of Cooper Woodring ¶¶ 31, 37.

area centered near the bottom of the front face, and (d) a horizontal lozenge-shaped slot centered near the top of the front face.

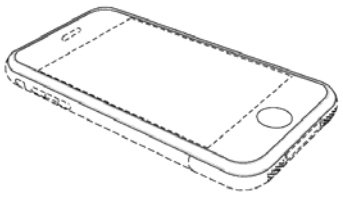
FIG. 1


FIG. 2

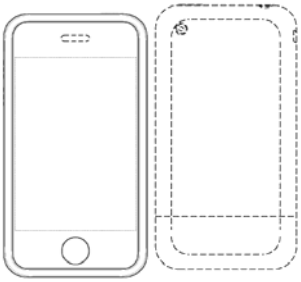
FIG. 3

FIG. 4


FIG. 5


FIG. 6


FIG. 7


FIG. 8

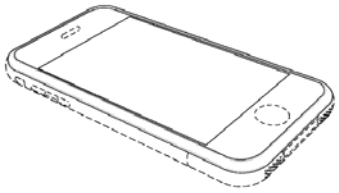
FIG. 9


FIG. 10


FIG. 11


FIG. 12


FIG. 13


FIG. 14

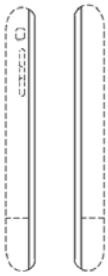
FIG. 15

FIG. 16

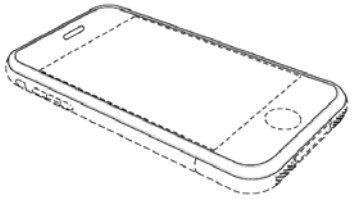
FIG. 17


FIG. 18


FIG. 19


FIG. 20


FIG. 21


FIG. 22


FIG. 23


FIG. 24

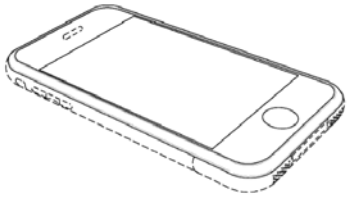
FIG. 25


FIG. 26


FIG. 27


FIG. 28


FIG. 29

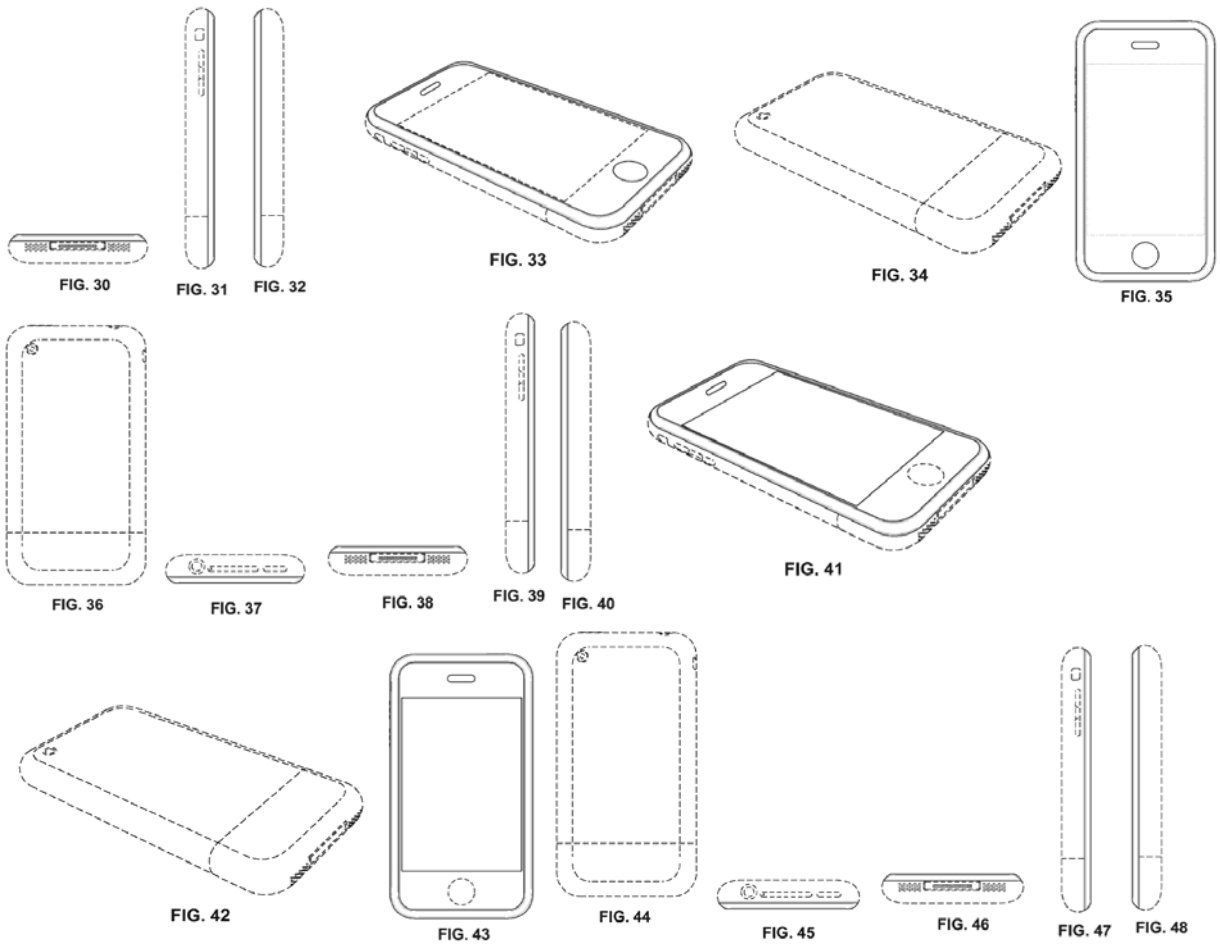

Figure 2. D593,087 Patent Figures 1 to 48.

IV.C.i Thin Rectangular Device With Rounded Corners

A thin rectangular shape with rounded corners performs numerous functional roles in an electronic device, resulting in improved safety, ergonomics, and reliability as discussed previously. To examine these elements of the electronic device in D'087, I used an Apple iPhone 1 because I understand that Apple has claimed it to be an embodiment of the patented design. I do not have a basis to state, nor do I state, any opinion regarding whether the iPhone 1 is such an embodiment. I have merely conducted an analysis of how these elements of the D'087 patent are driven by the function of a hand held electronic device using the iPhone 1 as an example.

The primary focus during my analysis was on how rounded corners and a thin rectangular shape or form factor influence the usability and quality of a handheld electronic device. This was done by applying principles of applied anthropometry and ergonomics.[24] The first step in the analysis was to identify the basic proportions of a handheld electronic device that would provide the following functionality:

24 Pheasant, S. Bodyspace: Anthropometry, Ergonomics, and the Design of Work, Second Edition, CRC Press: Boca Raton, 1996. Also see Lehto, M.R. and Buck, J.R., ibid.

1. Comfortably fit the human hand for users varying from a small woman to a large man;

2. Afford use as a communication device;

3. Afford clear viewing of a display when held in either one or both hands;

4. Afford effective entry of data when held in either one or both hands; and

5. Easily and comfortably fit into shirt, pants, or other pockets.

My analysis began with examining the relation between the dimensions of the human hand for users varying from a small woman to a large man when gripping a rectangular shape with a form factor of the iPhone 1. This process involved identifying several foreseeable types of grips that would be used when performing tasks with the device and assessing the influence of the form factor on comfort and other functional factors. [25]

Figure 3 shows an example where a user corresponding to a large man uses a Power Grip[26] to hold the iPhone 1. The width of the device is close to the length of a large man's thumb[27] and fits naturally in the user's palm. Also, the rounded edges of the circular band surrounding and flush with the top surface of the device (FIG 1 of D'087 shown in Figure 2 of this report) fit into the joint between the second and third digits of the four fingers gripping the outer edge of the device, reducing the pressure concentration at that location. A small woman has a corresponding hand size of roughly 2/3 the size of a large man.[28] Overall, the width is close to the upper limit for a small woman to comfortably use a Power Grip to hold the device.

25 Kim, T. and Jung, E.S., "Customer-Oriented Design of Mobile Phones for Optimal Controllability," IEEE: 2010 4th International Conference on Multimedia and Ubiquitous Engineering (MUE), 2010.

26 Konz, S.A., Work Design: Industrial Ergonomics, Publishing Horizons, Inc., 1990. Also see: Kroemer, K.H.E., "Coupling the Hand with the Handle: An Improved Notation of Touch, Grip, and Grasp," Human Factors, 1986, 28(3), 337-339.

27 Konz, S.A., ibid.

28 See Pheasant, S. ibid. Also see Lehto, M.R. and Buck, J.R., ibid. Konz, S.A., ibid.

Figure 3. Example of User Holding iPhone 1 with a Power Grip

Figure 4. Example of User Holding iPhone 1 with an Oblique Power Grip

Further insight can be obtained from Figure 4, which shows the same large man holding the iPhone using a modified version of a Power Grip, called the Oblique Power Grip (Konz, 1990). Just as was shown for the Power Grip, the device fits naturally in the users palm. Also, the rounded upper and lower corners and edges of the device reduce the pressure concentration respectively where the thumb and palm contact the device. The device also fits naturally into the hand of a small woman, but the width is close to the upper limit for the small women to reach her fingers around the device.

My overall conclusion is that the form factor of the device, along with the rounded edges, and rounded corners, is functional and designed to provide a comfortable fit for a variety of users.

As also shown by Figure 4, the device is designed to offer a clear and unimpeded view of its entire viewing surface when gripped using an Oblique Power Grip. When holding the device in such an orientation the user can easily touch any spot on the screen using their other hand, allowing easy input. As noted in my book,[29] the degree to which a user can use the designed device with either hand is an important population characteristic to be considered in product design. One of the many reasons for this is that a significant proportion of people are left-handed. The symmetry of the form factor used in the device accommodates this need of the user population, and therefore provides functionality. Furthermore, when the user moves her hand up to her ear when holding the device in this orientation, this grip results in the top portion of the device being directly positioned over the ear, and the device oriented at an angle directly towards the mouth of the user without requiring any deviation of the wrist. That is, there is no need to bend the wrist. Avoiding the need for wrist deviation is important because wrist deviation is

29 Lehto, 2008, ibid.

difficult for some users, reduces comfort, and is a risk factor for cumulative trauma disorders. The design is also functional in this regard.

Two other important points are as follows. First, the length of the iPhone is about the same distance between the ear and mouth.[30] This design obviously achieves the objective of placing the receiver and microphone of a communication device in a position that will improve its effectiveness for the majority of users. Second, reducing the length of the device is likely to cause users with large hands to modify their grip of the device to a power grip because the phone will not reach far enough down across their palm to allow a secure Oblique Power Grip, causing a need for wrist deviation to orient the bottom of the device directly towards the mouth.

The latter points lead me to the conclusion that the length of the device and the ratio of length to width play an important role in designing an effective communication device that easily, effectively, and comfortably attains its objective of placing the receiver and microphone in appropriate positions. The features of the D'087, such as the form factor, proportions, and layout are functional and not decorative.

Returning to the point that the device is designed to offer a clear and unimpeded view of its entire viewing surface when gripped using an Oblique Power Grip,[31] further insight regarding the latter issue can be obtained by considering other ways the device is likely to be gripped when viewing its display or activating its controls. When performing such activities, the device is likely to be held using variations of what is referred to in the ergonomics literature as a hook grip, using either one or two hands, as shown in Figures 5, 6, 7, and 8.[32] [33]

Figure 5 shows the same large man shown earlier, now holding the iPhone using a single handed version of a Hook Grip.[34] As shown there, the device offers a clear and unimpeded view of its entire viewing surface when gripped in this way. The area of the device above his thumb can also be easily touched with either hand, and this continues to be the case regardless of which hand the device is held in. Figure 6 shows the same subject holding the device with a variation of the Hook Grip in which the thumb is rotated upwards. An important point illustrated by the two figures is that the user can easily touch each point on the rectangular display area on the surface of the device using his or her thumb. However, the user cannot reach the upper edge of the device with his thumb, without sliding the device downwards and re-gripping it. This implies that increasing the length of the device will create an area not easily reached using a single-handed grip. This further confirms the functionality of the form factor of this design.

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30 Schaefer, E. and Bates, B.T., Anthropometric Comparisons Between Face Measurements of Men and Women, Bio-Dynamics Corporation, June 1988.

31 Konz, S.A., ibid.

32 Pelosi, M., et al, "A Grip Study for Talk and Data Modes in Mobile Phones," IEEE Transactions on Antennas and Propagation, Vol 57, No. 4, April 2009.

33 Apple in the section entitled "User Experience Guidelines" of the iOS Human Interface Guidelines, Apple Inc., 2012, states that "users are likely to interact with the device by holding the device in the following ways: in their nondominant hand (or laying it on a surface), and gesturing with a finger of the dominant hand; in one hand and gesturing with the thumb of the same hand; between their hands, and gesturing with both thumbs."

34 Kroemer, K.H.E., ibid.

Figure 5. Example of User Holding iPhone 1 with Hook Grip

Figure 6. Example of User Holding iPhone 1 with modified Hook Grip

Further insight can be obtained from Figure 7, which shows a variation of a Hook Grip where the same user now uses both hands to grasp the device. The latter grip accommodates access to the screen with either thumb. As shown in the figure, the user has a clear and unimpeded view of the rectangular display area, but the outer edges of the device are covered by the user's thumbs. Figure 8 shows a variation of the two handed Hook Grip where the right thumb is rotated. An important point is that by rotating the thumbs in this way, the two thumbs sweep out over an area that covers the rectangular display area in its entirety for both a small woman and large man, which again demonstrates the functional role played by the form factor of the device.

Figure 7. Example of User Holding iPhone 1 with a two handed Hook Grip

Figure 8. Example of User Holding iPhone 1 with a variation of a two handed Hook Grip

In sum, the form factors, including the rounded corners and rectangular shape, are functional in that they enhance and are driven by the usability, comfort, ergonomics, and quality of the product.

This conclusion is further supported Apple's iOS Human Interface Guidelines for 2012, in the section entitled "User Experience Guidelines." In this document, Apple provides the following guidelines to software developers who are creating applications for use on Apple's mobile phones and other devices:

> *The top of the screen is most visible to people, because they tend to interact with the device by holding the device in the following ways:*
>
> - *In their nondominant hand (or laying it on a surface), and gesturing with a finger of the dominant hand*
> - *In one hand, and gesturing with the thumb of the same hand*
> - *Between their hands, and gesturing with both thumbs*

Apple further states in its guidelines:

> ***Put the most frequently used (usually higher level) information near the top**, where it is most visible and easy to reach. As the user scans the screen from top to bottom, the information displayed should progress from general to specific and from high level to low level.*
>
> *For example, in a game, the most important action can take place in the top half of the screen. This leaves the bottom half of the screen for supplementary information and for controls users can tap without obscuring their view.*

These guidelines provided by Apple confirm that Apple is aware that the way the device is held influences visibility and ease of access, and also shows consideration of the user populations' "handedness". In the same guidelines, Apple states:

> ***Make Targets Fingertip-Size***
>
> *The screen size of iOS-based devices might vary, but the average size of a fingertip does not. Regardless of the device your app runs on, following these guidelines ensures that people can comfortably use your app.*
>
> ***Give tappable elements in your application a target area of about 44 x 44 points**.*
>
> *The iPhone Calculator application is a good example of fingertip-size controls.*
>
> *If you create smaller controls, or if you place them too close together, people must aim carefully before they tap and they're more likely to tap the wrong element. As a consequence, the application becomes much less enjoyable, or even impossible, to use. For example, a game that has small controls that are too close together forces people to concentrate on the interface, instead of on playing the game.*

The latter guidelines further confirm the important functional role that anthropometric variables, such as the average size of a user fingertip, play in the comfort, usability, and function of the device. The findings of functionality I have made from analyzing the D'087 design are further supported by Apple's recommendation that the same human factors issues be considered by developers of applications on its mobile devices. Apple's D'087 design is also based on human factors engineering and ergonomic analyses, and are therefore functional designs.

IV.C.ii. Centered rectangular display area

As described above, a centered rectangular display area is functional in the design of an electronic device. First, a centered rectangular display offers a clear and unimpeded view of the entire viewing surface when gripped using an Oblique Power Grip. Furthermore, the above discussion regarding tasks in which the device is gripped using variations of what is referred to in the ergonomics literature as a hook grip, shows that the form factor of the claimed design is particularly important to this functionality.

Returning to the earlier discussion of Figures 5 and 6 showing a large man holding the iPhone using different single-handed versions of a Hook Grip, it was mentioned there that the user can easily touch each point on the rectangular display area on the surface of the device by rotating a thumb from the lower to upper corner of the centered rectangular display area. This demonstrates that the rectangular display area facilitates the ability easily to touch points on the screen by allowing the user to easily activate controls by touching the appropriate spot on the touch screen. This is functional. A second issue illustrated by Figure 5, is that the thumb does not obstruct the rectangular display area on the surface of the device. This again shows that the chosen proportions and layout are consistent with standard recommendations of the scientific literature and therefore are functional.

The earlier discussion of Figure 7, which showed a variation of a Hook Grip where the same user used both hands to grasp the device provides further insight into functionality. As shown in Figure 7, the user has a clear and unimpeded view of the rectangular display area, but the outer edges of the front face are covered by the user's thumbs. This again shows that the rectangular display area combined with the borders above and below it are functional and consistent with standard human factors recommendations of the scientific literature. The centering of the rectangular display area further contributes to the functionality of the device, by providing symmetrical areas of equal size at the top and bottom of the device for gripping the device. This symmetry accommodates both left and right handed users by allowing the device to held and used in either hand, and also results in maximizing unimpeded view and access to the rectangular display area.

Figure 8 provides additional evidence that the dimensions of the rectangular display area are functional because they match relevant anthropometric measures of bodily dimensions and resulting movement envelopes.[35] As shown there, when the user uses a variation of the two handed Hook Grip where the right thumb is rotated to activate the touch screen, the two thumbs sweep out an area that covers the rectangular display area in its entirety for both a small woman

35 Movement envelopes describe the volume or area swept out when people move body parts during task performance. For more on this topic, see Lehto and Buck, 2008 ibid.

and large man. Increasing the width of the device would cause a need for the small women user to slide her hand forward to reach areas at the extreme end of her thumb reach envelop. This increases the effort needed and significantly interferes with the usability of the device, which again demonstrates the functional role related to both the centering and proportions of the rectangular display area on the front face of the device.

Accordingly, the inset centered rectangular element is functional, not decorative.

IV.C.iii Centered slot for receiver at the top of the device

The analyses of Section IV.C.i also show that a design placing a horizontally centered receiver aperture or hole near the top of the device is crucial to the function of an electronic communication device.

This is because when a user moves her hand up to her ear when holding the device using an Oblique Power Grip (Figure 4), the top portion of the device will be directly positioned over the ear. The receiver located under the centered horizontal slot near the top of the device is thus located near the center of the ear, thereby maximizing the ability of the user to hear when using the communication device or phone.[36] The horizontal shape and length of the slot is functional because it helps to ensure that part of the receiver will stay located over the ear when the device is moved upwards or downwards. Moreover, the fact that the slot is centered horizontally makes the receiver equally accessible regardless of whether the device is held in the left or right hand, providing another functional advantage.

In my opinion, the design shown in the D'087 patent is functional and is compliant with the scientific literature of human factors engineering.

IV.D. The D618,677 Patent Design is Functional

The D618,677 design patent is also titled "Electronic Device." The application for the D'677 patent was filed on November 18, 2008 and the patent was issued on June 29, 2010. The D'677 patent includes six figures (Figure 9 in this report). It is my understanding that Apple offered the following construction of this patent in the preliminary injunction context:

> a flat, clear, black-colored, rectangular front surface with four evenly rounded corners;
>
> an inset rectangular display screen centered on the front surface that leaves very narrow borders on either side of the display screen and substantial borders above and below the display screen; and
>
> a rounded, horizontal speaker slot centered on the front surface above the display screen, where the rectangular front surface is otherwise substantially free of

36 Also see Kwon, J. et al, "Development of Slim Rectangular Microspeaker Used for Miniultimedia Phones," IEEE Transactions on Magnetics, Vol. 43, No. 6, June 2007. Lee, C., and Hwang, S., "Development of Advanced Rectangular Microspeakers Used for Wide Liquid-Crystal Display Mobile Phones," Journal of Applied Physics, 109, 07E504, 2011.

ornamentation outside of an optional button area centrally located below the display[37]

No matter what claim construction is used, however, my opinion is that the D'677 patent is functional.

A smooth flat top surface and a rectangular viewing area are discussed above in reference to the D'889 and D'087 patents. Thus, the smooth flat top surface and rectangular viewing area in the D'677 design are functional for all the reasons set forth above. The use of a single uniform color such as black for the top of the device' plays an additional functional role as expanded upon further below.

IV.D.i Single, uniform color for the top of the device and inactive area

The use of a single uniform color such as black for the top of the device' plays a functional role in several ways. As an initial observation, this approach provides an easily perceived way for users to tell when the device is active or inactive. The rectangular display area will contrast sharply against the overall background of the top surface of the device when the device is active. When the device is inactive, the rectangular display area will blend into the background. As such, this feature of the design adds to the usability by providing a conspicuous, easily understood signal of the product's status (i.e. active or inactive).

A black background, when the display is inactive, is also a common feature of electronic devices and adds to functionality by maximizing the potential contrast attainable when display pixels are activated. This follows because the brightness contrast ratio is defined as the difference in luminance between two contrasting areas, divided by the luminance of the brighter of the two areas.[38] The use of a black background minimizes the background luminance against which the brightness of the image is compared, thereby maximizing the attainable brightness contrast. This increases the ability to ensure that displayed images are displayed with an adequate contrast to be easily perceived. In particular, the need to provide adequate contrast to ensure people can read text has been recognized for many years.[39] The provision of adequate contrast is especially important when a small display is used, because a small display will often require the use of small characters, creating a visually demanding task. This is useful functionality for an electronic device that displays text, such as the iPhone, iPad, or iPod.

37 See Preliminary Injunction Motion at 8, citing Declaration of Cooper Woodring ¶¶ 16, 22.

38 See Lehto, 2008, ibid.

39 See Lehto, 2008, ibid.

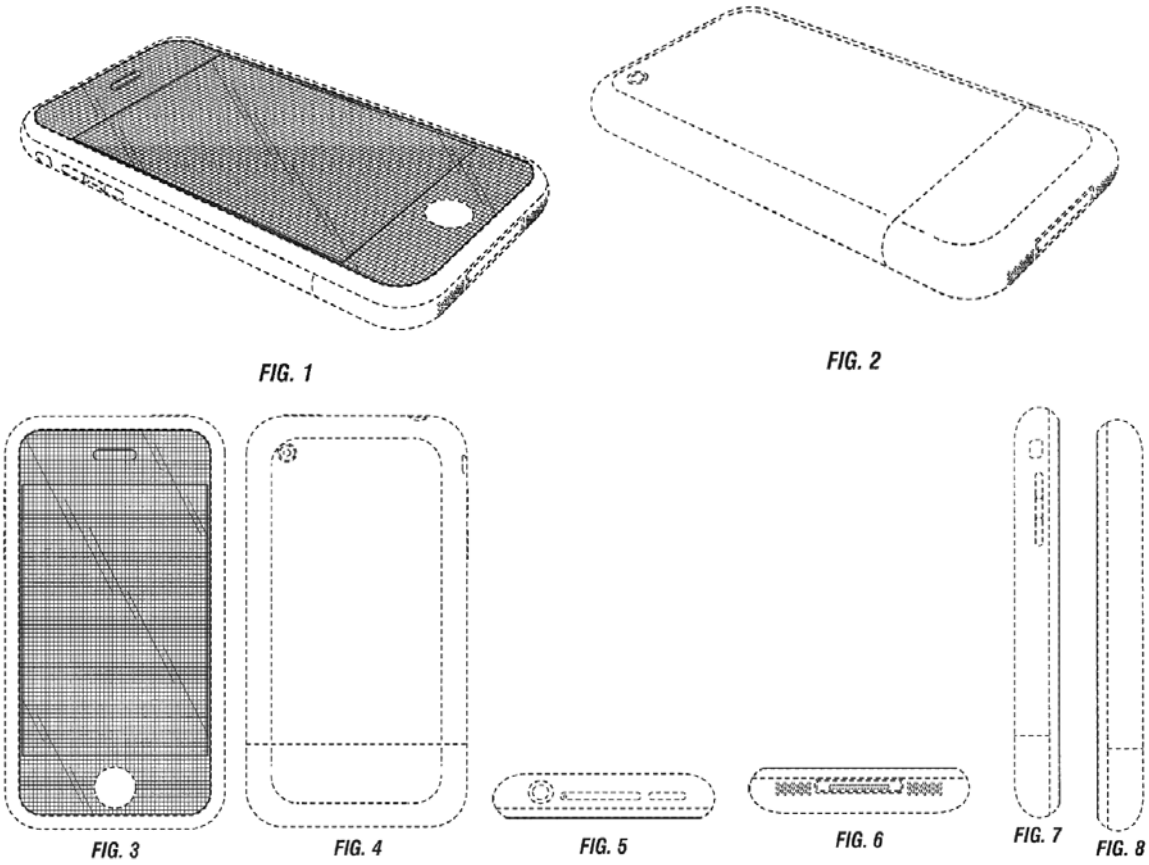


Figure 9. D618,677 Patent Figures 1 to 8.

IV.E. The D622,270 Patent Design Is Functional

The D622,270 design patent is also titled "Electronic Device." The application for the patent was filed on October 1, 2009 and the patent was issued on August 24, 2010. The D'270 patent includes nine figures (Figure 10 in this report). It is my understanding that Apple has not offered a uniform verbal construction of this patent. No matter what claim construction is used, however, my opinion is that the D'677 patent is functional.

The D'270 patent is assumed to show a thin, rectangular shape and form factor with rounded corners, a smooth flat top surface, and an inset rectangular area. A thin, rectangular shape and form factor with rounded corners, and a smooth flat top surface all play an important functional role in the design of an electronic device by providing the usability, comfort, and ergonomics of the product, as discussed above in reference to the D'889, D'087, and D'677 patents. The use of a rectangular viewing area also plays an important functional role, as discussed above in reference to the D'087 patent. Thus, the thin, rectangular shape and form factor with rounded corners, smooth flat top surface, and rectangular viewing area is functional for all the reasons set forth above.

The D'270 patent also shows a small rectangular area on the upper left in Figures 2 and 4 of the patent (see Figure 10 in this report). The iPod Touch, the product Apple claims embodies

the design of the D'270 patent, has such a rectangular element to cover the antennae, which provides functionality related to receiving or sending signals.

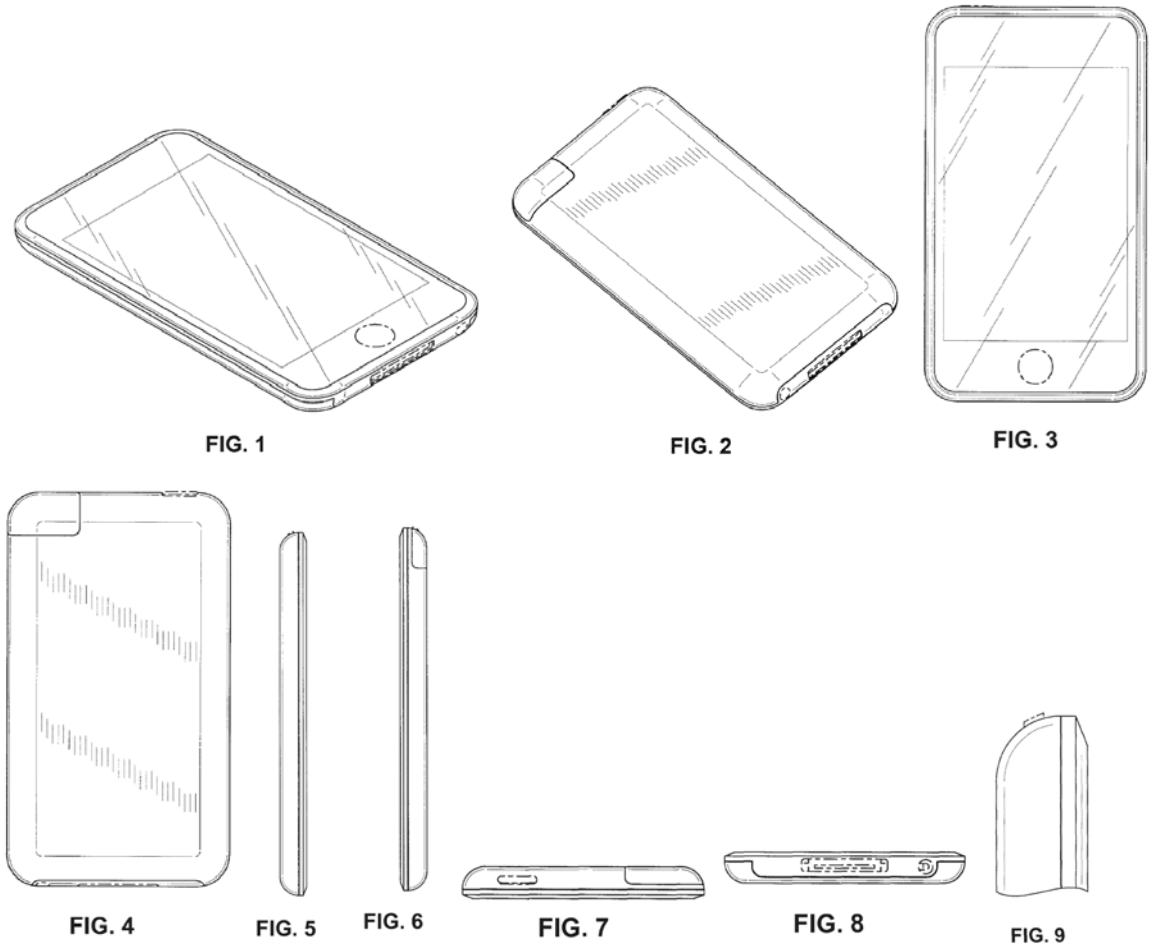


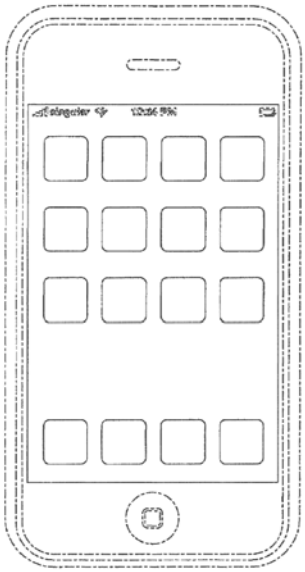
Figure 10. D622,270 Patent Figures 1 through 9.

IV.F. The D627,790 Patent Design Is Functional

The D627,790 Patent is titled "Graphical User Interface for a Display Screen or Portion Thereof." The application for the D'790 patent was filed on August 20, 2007 and the patent was issued on November 23, 2010. The D'790 patent includes one figure (Figure 11 in this report). The figure shows a rectangular shape with 16 rounded squares in rows and columns. It is my understanding that Apple has not offered a uniform verbal construction of this patent. No matter what claim construction is used, however, my opinion is that the D'790 patent is functional.

Based upon the title of the D'790 patent, I assume that the rectangular shape depicts a display screen (Figure 11). The use of a rectangular viewing area plays an important functional role, as discussed above in reference to the D'087 patent. Thus, the rectangular viewing area in the D'790 design is functional for all the reasons set forth above. The graphical user interface

includes square elements arranged in rows and columns. These elements are also functional for reasons discussed below.



FIGURE

Figure 11. D627,790 Patent Figure.

IV.F.i Graphical User Interface with Square Elements in Rows and Columns

Arranging interface elements in rows and columns is a commonly followed approach for organizing interface elements, as discussed earlier in reference to the D'889 patent, because that structure provides important functionality that is equally relevant in analyzing the D'790 patent. The arrangement of interface elements in rows and columns offers additional functionality for many other reasons, as expanded upon below.

The specific arrangement shown of four rows and four columns in the rectangular display area provides easy access and readily identified control and display elements when implemented in an rectangular viewing area equal to or larger than that of the iPhone. Matching the size of control elements to the size of an average users fingertip has been cited by Apple themselves, as mentioned earlier, in their iOS Human Interface Guidelines as a desirable feature for the display interface elements. A large amount of literature and set of guidelines in the field of Human Factors Engineering focus on this issue.[40] Much of this literature is focused on ensuring controls are large enough so as to be easily touched and adequately separated to reduce the effort needed to reach the control and also avoid inadvertent activation of adjacent controls.

40 See Sears, A. and Shneiderman, B. "High Precision Touchscreens: Design Strategies and Comparisons with a Mouse," University of Maryland Department of Computer Science: College Park, MD, 1989. Michalski, R., et al, "The effects of Graphical Interface Design Characteristics on Human-Computer Interaction Task Efficiency," International Journal of Industrial Ergonomics, 36 (2006) p. 959-977.; and Gunawardana, A., et al, "Usability Guided Key-Target Resizing for Soft Keyboards," IUI '10 Proceedings of the 15th International Conference on Intelligent User Interfaces: New York, 2010.

Part of the issue is that it takes more attention and effort to touch a small target compared to a large one. This relation between target width and task difficulty is described by what is referred to as Fitt's Law.[41] Fitt's law shows that it will take more time and effort to touch a smaller target, and also that the accuracy will be lower for a smaller target if the allowed positioning time is held constant. This leads to another important function related issue. That is, when traditional controls, such as physical buttons or adjacent keys, are closely spaced, users will often inadvertently depress both controls at the same time. For this reason, traditional guidelines for controls recommend separating controls with a substantial safety margin.

The overall conclusion from the discussion above is that the size and arrangement of the elements shown in the D'790 patent is the inevitable outcome if a designer tries to achieve the functional goal of efficiently and effectively fitting a set of control/display elements into the space available. In referring to what he called the icon grid in the D'790 patent, named inventor Imran Chaudhri testified that "there is a -- an evenness to the amount of - to the rhythm of the spacing, that there's rows and columns that are orderly - laid out in an orderly fashion."[42] Mr. Chaudhri further explains that the layout "makes it predictable".[43] Essentially describing an icon grid and its function, Chaudhri also defines the blank row in the drawing as part of the icon grid, noting that "[i]t's an area where additional icons would go."[44] The blank row could play a functional role in some interfaces, as a strategy for separating groups of controls that are in some way functionally different. For example, the lowest row might correspond to a set of controls expected to be used more often. Placing the most commonly used controls in such a location would minimize the distance traveled to reach them, resulting in added usability by reducing the mean (or average) time for operation of the device. Placement of a control at this location would also make it easier for the user to remember where it is, allowing the user to quickly locate it without having to expend as much effort in visual search, compared to when a control is embedded within the matrix of rows and columns.

The notion of functional grouping of controls is, of course, another well recognized principle in the field of Human Factors Engineering I have discussed in my textbook.[45] In the iPhone, an alleged embodiment of the D'790 patent, it certainly seems to be the case that a functional grouping was in mind, as the corresponding applications in the bottom row are "Mail," "Phone," "iPod," and "Safari." The latter controls perform common functions likely to be used by a large proportion of users, so placing them in this lower row, close to where the thumb normally rests when holding the device clearly serves a functional purpose by increasing usability of the device. As Mr. Chaudhri testified, the bottom row of icons remains static and

41 See Lehto, 2008, ibid. Also see Sears, A. and Shneiderman, B. ibid.; Parhi, P., et al, "Target Size Study for One-Handed Thumb Use on Small Touchscreen Devices," Mobile HCI '06: Proceedings of the 8th conference on Human Computer Interaction with Mobile Devices and Services: New York, 2006.; and Gokturk, M. and Sibert, J., "An Analysis of the Index Finger as a Pointing Device," CHI 99: 15-20, May 1999.

42 October 14, 2011 Deposition of Imran Chaudhri ("Chaudhri Dep.") at 135:11-14.

43 *Id.* at 135:17.

44 *Id.* at 141:4-5.

45 See Lehto (2008), ibid. Also see Nam, C.S., et al, "Development of a Guidelines Tool for Mobile Phone Interfaces," Proceedings of the Human Factors and Ergonomics Society 47th Annual Meeting, 2003.

gives the "customer a quicker access to them."[46] This statement effectively defines the functional role of the lower square elements in the D'790 patent. Further, the placement of a dock of frequently used controls on the bottom end of the display screen is the most convenient location to access when operating the device with a single hand. Mr. Chaudhri further testified that the bottom row of squares in D'790 is in "closer proximity to where their finger was previously… [s]o the customer would press the home button, which would bring them to this home screen. And generally their -- their finger would be towards the bottom of the screen anyway. And it means that their -- that their finger wouldn't have to travel as far."[47]

A final observation is that elements depicted in the D'790 patent are squares with a slight rounding of the corners. This shape is clearly functional for many different reasons. One of the more obvious reasons is that such a shape is likely to be familiar and intuitive to users with some familiarity with Graphical User Interfaces because they are so commonly used in that context. Furthermore, each of the shapes has the same dimensions, making them consistent in form. Consistency[48] is one of the most fundamental principles of interface design. In regard to the D'790 patent, the consistent form of the elements therefore has a functional purpose. For an electronic device with a touch screen, such as the iPhone, iPad, or iPod, this would imply that shapes of this type are all tappable. That is, tapping the shape will cause a function of the device to be activated. Such behavior is, of course, common to most, if not all, Graphical User Interfaces (GUIs) that use touch screens. Mouse-driven and other clickable GUIs follow a similar logic, in which depressing a button performs the same role as tapping with the finger. The concept of tapping is very similar to that of clicking, making it easy for users of the latter types of interfaces to transfer their knowledge and skills to touch screen devices.

At an even more fundamental level, square shapes maximize the efficiency of the column and row structure while maintaining separation between them. For example, for the same minimum separation distance between interface elements, the display area of the square would equal the width (w) squared (w*w). For a circle, the area would be 3.1416*w*w/4, or only about 75% of the area. Another observation is that the separation between the rows is slightly larger than the separation between the columns (Figure 13). This is a functional element as well, as doing so provides space to put a label below each of the display elements. In fact, Mr. Chaudhri testified that "[i]f you look at the grid here between the rows there's a -- an appreciable amount of room to accommodate a label that would indicate what the icon is."[49]

This, again, is another significant functional benefit of using square shapes for the interface elements. Thus, the elements of the D'790 patent are functional individually and taken as a whole.

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[46] Chaudhri Dep. 133:2-3.

[47] *Id.* at 133:14-15, 19-24.

48 See Lehto (2008), ibid. Also see Nielsen, J. "Usability Engineering," Boston: Academic Press, 1994.

IV.G. The D604,305 Patent Design is Functional

The D604,305 Patent is titled "Graphical User Interface for a Display Screen or Portion Thereof." The application for the D'305 patent was filed on June 23, 2007 and the patent was issued on November 17, 2009. The D'305 patent includes two figures (Figure 12 in this report). The figures show a rectangular area with rounded square elements in rows and columns. It is my understanding that Apple has not offered a uniform verbal construction of this patent. No matter what claim construction is used, however, my opinion is that the D'305 patent is functional.

Figure 12. D604,305 Patent Figures 1 and 2.

The D'305 patent includes what appears to be the same rectangular arrangement of elements as the D'790 design. The rectangular arrangement of square interface elements in the D'305 design plays an important functional role, as discussed above in reference to the D'790 patent. Thus, D'305 design is functional for all the reasons set forth above. The additional and modified elements of D'305 are also functional for the reasons discussed below.

An initial observation is that each of the square elements includes a descriptive pictorial, along with a short, descriptive label below each square element. Each of the descriptive pictorials, assumed for this analysis to be icons on a display screen based on the title of D'305, appear to have been selected to convey their meaning in a stereotypical, easily understood manner to users familiar with the function of the depicted interface element.[50] Pictorials and icons designed in the way depicted in the D'305 patent also offer other advantages. One such advantage is that the graphical elements of the pictorials and icons shown differ in fundamentally different functional ways. These include differences in color, shape, brightness, and contrast. These differences increase the perceptual discriminability of the shown interfaces which can help users find the particular icon they are looking for more quickly.[51]

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50 Apple in the section entitled "User Experience Guidelines" of the iOS Human Interface Guidelines, Apple Inc., 2012, states that "People expect standard views and controls to look and behave consistently across applications. Follow the recommended usages for standard user interface elements. In this way, users can depend on their prior experience to help them as they learn to use your application."

51 Lehto, M.R. and Miller, J.M., Warnings Volume I. Fundamentals, Design, and Evaluation Methodologies, Fuller Technical Publications, Ann Arbor, MI, 1986, 287 pages.; Lehto 2008, ibid., Lehto, M.R. "Designing Warning Signs and Warning Labels: Part I – Guidelines for the Practitioner," International Journal of Industrial Ergonomics, 10 (1992), 105-113. Lehto, M.R. "Designing Warning Signs and Warning Labels: Part II – Scientific Basis for Initial Guidelines," International Journal of Industrial Ergonomics, 10 (1992), 115-138.

As such, the provided pictorials or icons are highly functional and consistent with the efforts of practitioners in Human Factors Engineering and other fields to develop easily understood pictorials and icons that are both easily discriminable and meaningful to the intended audience.[52] The ability for masses of people to easily recognize an icon relies on the familiarity of the symbols. Named inventor Freddy Anzures defines this goal in his testimony: "Familiar in the sense that designers have a general understanding of the symbols and icons that people, in general, see every day in their lives."[53] Mr. Anzures also noted that "the main reason to use icons on a touchscreen display is, obviously, there isn't a lot of real estate to present text or labels that may represent those icons. Also, icons serve a role of providing a picture that can be understood by many different types of people; whereas, if things were rendered in a text or letters, you're limiting it based on the language of people who are using it."[54]

The provision of a short descriptive label beneath each of the interface elements is also highly functional and consistent with the standard recommendations of the literature and guidelines for controls found in both my publications and numerous other sources.[55] One of the most important reasons for including a descriptive label is that not all users, and especially inexperienced users, will understand the intended meaning of pictorials or icons. Including the descriptive label helps such users interpret and learn the intended meaning and function of the interface elements. It also should be mentioned that the descriptive labels are designed to be short, concise, and meaningful. As such, the descriptive labels are consistent with the recommendations of the Human Factors literature, including handbooks, guidelines, and other sources.[56] Apple also recommends the use of terse descriptive labels for labeling interface elements in their iOS Human Interface Guidelines.[57]

The number of the icons in the grid is also functional as determined by the overall area of the rectangular outline, the size of the icon and the spacing of the icon. Mr. Anzures, speaking to the number of icons shown in the D'305 Patent, stated that "based on a design perspective, there were a certain number of applications that we were looking at for the phone, they happen to round out to a particular number, and so we determined this grid based on the number of applications that we had."[58]

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52 See Lehto 2008, ibid. Also see Lehto, M.R. and Miller, J.M., Warnings Volume I. Fundamentals, Design, and Evaluation Methodologies, Fuller Technical Publications, Ann Arbor, MI, 1986, 287 pages.; Lehto, M.R. "Designing Warning Signs and Warning Labels: Part II – Scientific Basis for Initial Guidelines," International Journal of Industrial Ergonomics, 10 (1992), 115-138.

53 October 18, 2011 Deposition of Freddy Anzures ("Anzures Dep.") at at 63.

54 *Id.* at 29-30.

55 See Lehto 2008, ibid. Also see Lehto, M.R. and Miller, J.M., Warnings Volume I. Fundamentals, Design, and Evaluation Methodologies, Fuller Technical Publications, Ann Arbor, MI, 1986, 287 pages.

56 see Lehto, M.R. and Miller, J.M., Warnings Volume I. Fundamentals, Design, and Evaluation Methodologies, Fuller Technical Publications, Ann Arbor, MI, 1986, 287 pages.

57 Apple in the section entitled "User Experience Guidelines" of the iOS Human Interface Guidelines, Apple Inc., 2012, states that "Make the main function of your application immediately apparent. You can make it so by… Labeling controls clearly so that people understand exactly what to do."

58 Anzures Dep. at 141:14-19.

The design also shows a narrow row of display elements at the top of the display area. The design of the latter feature is also functional for several reasons. An initial observation is that the elements in this row serve a display function and do not act as controls. Consequently, placing them in the top most row, close to the edge of the display, satisfies two important functional goals. First, this top location allows clear unimpeded visibility, for reasons expanded upon earlier in this report. Second, this location is at the outer range of the reachable area of the thumb, when the device is held in one hand as shown in Figure 5, and the thumb is used to touch locations on the screen (Figure 6), as discussed earlier. Placement at this topmost location is therefore less than ideal for a control, but ideal for display purposes, leading to the conclusion that this feature is highly functional.

It therefore follows from the above discussion that the elements shown in the D'305 patent are functional in that they greatly contribute to the usability of the device in many different ways and are in accordance with the principles of Human Factors Engineering. This conclusion is reinforced by Apple in the section entitled "Tips for Designing Great Icons and Images" of the iOS Human Interface Guidelines, Apple Inc., 2012. Within this section, Apple states:

Far from being merely decorative, the icons and images in your app play an essential role in communicating with users.…..

Use universal imagery that people will easily recognize. Avoid focusing on a secondary or obscure aspect of an element.

Embrace simplicity. In particular, avoid cramming lots of different images into your icon. Try to use a single object that expresses the essence of your app. Start with a basic shape and add details cautiously. If an icon's content or shape is overly complex, the details can become confusing and may appear muddy at smaller sizes.

Use color and shadow judiciously to help the icon tell its story.

Apple in the same guidelines, goes on to state in reference to application icons:

Try to balance eye appeal and clarity of meaning in your icon so that it's rich and beautiful and clearly conveys the essence of your application's purpose. Also, it's a good idea to investigate how your choice of image and color might be interpreted by people from different cultures.

Give your application icon a discernible background. Icons with visible backgrounds look best on the Home screen primarily because of the rounded corners iOS adds. This is because uniformly rounded corners ensure that all the icons on a user's Home screen have a consistent appearance that invites tapping. If you create an icon with a background that disappears when it's viewed on the Home screen, users don't see the rounded corners. Such icons often don't look tappable and tend to interfere with the orderly symmetry of the Home screen that users appreciate.

When iOS displays your application icon on the Home screen of a device, it automatically adds the following visual effects:

· *Rounded corners*

· *Drop shadow*

· *Reflective shine (unless you prevent the shine effect)*

For example, a simple 57 x 57 pixel iPhone application icon might look like this:

When it's displayed on an iPhone Home screen, iOS adds rounded corners, a drop shadow, and a reflected shine. So the same application icon would look like this:

Apple in the same guidelines, goes on to state in reference to icons for Navigation Bars, Toolbars, and Tab Bars:

If your app supports custom tasks users need to perform frequently, you need to create custom icons that represent these tasks in your toolbar or navigation bar. Similarly, if your app displays a tab bar that allows users to switch among custom application modes or custom subsets of data, you need to design tab bar icons that represent these modes or subsets.

Before you create the art for your icon, you need to spend some time thinking about what it should convey. As you consider designs, aim for an icon that is:

· *Simple and streamlined. Too many details can make an icon appear sloppy or indecipherable.*

· *Readily understood and widely acceptable. Strive to create a symbol that most users will interpret correctly and that no users will find offensive.*

These points made by Apple in their interface guidelines clearly are directed towards adding functionality and are consistent with the efforts of practitioners in Human Factors

Engineering and other fields to develop easily understood pictorials and icons that are both easily discriminable and meaningful to the intended audience.

Thus, the elements of the D'305 patent are functional individually and taken as a whole.

IV.H. The D617,334 Patent Design Is Functional

The D617,334 Patent is titled "Graphical User Interface for a Display Screen or Portion Thereof" The application for the D'334 patent was filed on July 15, 2008 and the patent was issued on June 8, 2010. The D'334 patent includes eight figures (Figure 13 in this report). The figures show a rectangular area with square elements in rows and columns. It is my understanding that Apple has not offered a uniform verbal construction of this patent. No matter what claim construction is used, however, my opinion is that the D'334 patent is functional.

FIG. 1

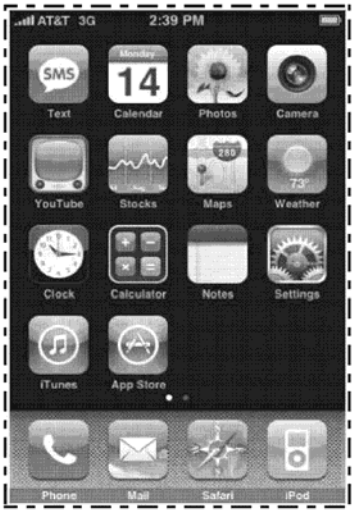

FIG. 2

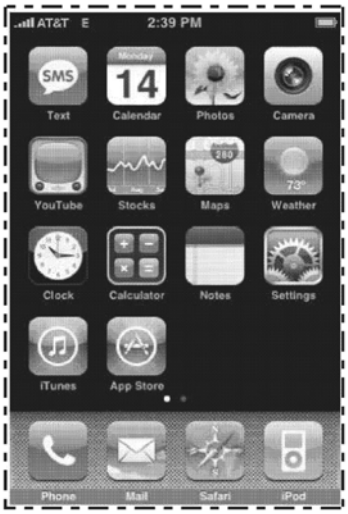

FIG. 3

FIG. 4

FIG. 5

FIG. 6

FIG. 7 FIG. 8

Figure 13. D617,334 Patent Figures 1 through 8.

The rectangular arrangement of interface elements in rows and columns is functional for all the reasons set forth above in regard to the D'790 and D'305 patents. Including interface elements in the fourth row of square elements assumed to be icons in the D'334 patent increases the number of interface elements that can be shown in the rectangular viewing area, while continuing to provide the same functionality for each of the elements discussed above. This added element is therefore clearly functional. Inclusion of two dots above the bottom row of interface elements as shown in the D'334 patent is assumed to depict a centered progress bar indicator, which also adds functionality. Progress bars are commonly used in the design of graphical user interfaces and are well recognized as an important approach for enhancing the attractiveness and effectiveness of programs that incorporate them.[59]

Thus, the elements of the D'334 patent are functional individually and taken as a whole.

IV.I Apple's Claimed Alternatives

I understand that Apple takes the position that various "alternatives" to its design patents exist that render its designs non-functional. I also understand that these purported alternative designs are legally irrelevant under trade dress law. Nevertheless, I have considered alternatives suggested by Apple[60] and they do not change my opinion regarding functionality. As but one example, Apple identifies many designs with keyboards integrated into the front surface.[61] Assuming for the sake of argument that such a different form factor could be a viable

59 See Myers, B.A., "The importance of percent-done progress indicators for computer-human interfaces," CHI '85 Proceedings of the SIGCHI conference on Human factors in computing systems, ACM New York, NY, USA ©1985

60 Apple's 4th Supplemental Objections and Responses to Respondent's First Set of interrogatories (No. 16), served Feb. 29, 2012.

61 Examples include the Samsung Replenish (SPH-M580), Samsung Blackjack II (SGH-I617), Samsung Intrepid SPH-I350, Motorola Q9h, Palm Centro, Palm Pixi Plus, and Palm Treo 700p.

"alternative," these designs have significantly smaller display screens, thus lessening the many benefits derived from a larger screen, including ease of inputting touch commands and viewing content on the screen. Other versions include a separate keyboard that slides out or folds into position.[62] The latter feature again lessens functionality by increasing the complexity of using the device, and adding both thickness, and a moving mechanical element that may fail in use. Other alternatives have a similar shape and form factor, but reduced functionality for reasons such as providing fewer interface elements in the viewing area (i.e. the HTC 7 Trophy T8686, or Pantech Hotshot CDM8992VW), or sharp corners (i.e. Nokia Lumia 800, Sony Ericsson Xperia S, Modu 1).

The only "alternatives" that are not less functional are those that are substantially similar to Apple's designs, such as the KR 30-0418547 design. Other designs attain some of the same functionality by including functional elements of the Apple design, such as a smooth flat viewing surface, a rectangular viewing area, or a graphical interface with icons, while omitting other functional elements, such as rounded corners, or adding additional elements, such as a separate keyboard that slides out or folds into position, such as in the JP1241638, at the cost of increasing the complexity of using the device, adding thickness, and including a moving mechanical element that may fail in use. In my opinion, this merely shows that the various alternatives correspond to particular mixes of functional features that satisfy particular needs of the intended users for particular intended uses, among other functional criteria, and has no bearing on whether the elements themselves are functional.

V. THE ASSERTED TRADE DRESS AND TRADEMARKS ARE FUNCTIONAL

V.A Trade Dress and Trademark Functionality

I understand that trade dress that is functional is not protected by law.[63] Trade dress is functional if it is "'essential to the use or purpose of the article [or] affects [its] cost or quality.'"[64] If the feature is essential to the use or purpose of the article or affects its cost or quality, "the inquiry is over—the feature is functional and not protected." [65] If the feature meets that test, there is no need to "proceed further to consider if there is a competitive necessity for the feature" or "engage ... in speculation about other design possibilities."[66]

Counsel informs me that trade dress can be deemed functional with respect to its utility, as noted above, or can be deemed "aesthetically functional," when the aesthetics of the trade dress itself drives consumer demand for the product. [67] Aesthetic functionality is present where "use of the feature would put competitors at a significant, non-reputation-related

62 Examples include the Samsung Epic (SPH-D700), Samsung SCH-I830, Samsung Gravity Touch SGH-T669, Samsung Intensity II SCH-U460, LG Prada II, JP1241638, HTC Touch Dual US, and Nokia X5-01.

63 See TrafFix Devices, Inc. v. Marketing Displays, Inc., 532 US 23, 27 (2001).

64 Au-Tomotive Gold, Inc. v. Volkswagen of America, Inc., 457 F.3d 1062 (9th Cir. 2006) (quoting TrafFix, 532 U.S. at 32-33).

65 Id.

66 TrafFix, 532 U.S. at 33.

67 Au-Tomotive Gold, Inc., 457 F.3d at 1068.

disadvantage."[68] Unless otherwise noted, when I refer to "functionality" in my report, I mean to refer to "utilitarian" not "aesthetic" functionality.

I am informed by counsel that Apple has the burden of proving that its *unregistered* trade dress is not functional by a preponderance of the evidence.[69] I also understand that Apple enjoys a presumption that its *registered* trade dress is not functional and that Samsung has the burden of introducing sufficient evidence to rebut the presumption of validity.[70] Once the presumption of validity is overcome, Apple bears the burden of proving that its trade dress is not functional.[71]

V.B The Asserted Trade Dress and Trademarks of the Apple iPhone, iPhone 3G/S, and iPhone 4 are Functional

In its Amended Complaint, Apple describes the alleged trade dress for the iPhone as follows: "a rectangular product with four evenly rounded corners, a flat clear face covering the front of the product, a large display screen under the clear surface, substantial black borders above and below the display screen and narrower black borders on either side of the screen under the clear surface, a metallic bezel around the flat clear surface, and on the display when the device is turned on, a matrix of colorful square icons with evenly rounded corners and a bottom row (or "dock") of colorful square icons set off from the other icons, which does not change as other pages of the user interface are viewed."

Apple defines the alleged trade dress for the iPhone 3G/S as having all of the same elements as the trade dress for the iPhone 1, with one additional component:"a row of small dots on the display screen when the device is turned on."

Apple defines the alleged trade dress for the iPhone 4 as having the same elements as the trade dress of the iPhone 3G/S, but modifies these elements slightly by stating that (1) the borders above, below, and on either side of the display screen may be either black or white and (2) the iPhone 4 includes a thin metallic band around the outside edge of the phone, creating a thin rim adjacent to the face of the phone, rather than a metallic bezel around the flat clear surface.

It is my opinion that each of the asserted elements of the alleged Apple iPhone, iPhone 3G/S, and iPhone 4 trade dress are functional for reasons discussed in Section IV, and for the additional reasons discussed below. The alleged trade dress of these phones is therefore functional as expanded upon below.

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68 TrafFix, 532 U.S. at 28-29.

69 15 U.S.C. § 1115(a).

70 See Tie Tech, Inc. v. Kinedyne Corp., 296 F. 3d 778, 783 (9th Cir. 2002); Vuitton Et Fils SA v. J. Young Enterprises, Inc., 644 F. 2d 769, 775 (9th Cir. 1981).

71 Tie Tech, 296 F.3d at 783.

V.B.i A Rectangular Shape with Four Evenly Rounded Corners as in the iPhone, iPhone 3G/S, and iPhone 4 is Functional

The rectangular shape with four evenly rounded corners of the iPhone, iPhone 3G/S, and iPhone 4 is functional for the reasons discussed earlier in Sections IV.B.i, IV.B.ii, and IV.C.i.

In addition, the rounded corners of the iPhone, iPhone 3G/S, and iPhone 4 play an important functional role by reducing the force concentration at the locations where the phone is held against or contacts the hand, ear, face, or other part of the body during use of the product as a communication device or an input or output device or during stowage in a pocket.

Further insight into the functionality of the rectangular shape of the iPhone, iPhone 3G/S, and iPhone 4 can be obtained by considering the embodied width and length of each of these devices. As shown in Table 1, the iPhone, iPhone 3G/S, and iPhone 4 have approximately the same dimensions. That is, a length of approximately 115 mm and width of approximately 61 mm for the iPhone and 62 mm for the iPhone 3G/S, and 59 mm for the iPhone 4.

TABLE 1

Device	Height (mm)	Width (mm)	Depth (mm)	Display Height (mm)	Display Width (mm)	Bezel (mm)	Width Border (mm)	Height Border (mm)	Home Button (mm)	Icon (mm)
iPhone	115.0	61.0	11.6	75	50	4	1	16	10	9
iPhone 3G	115.5	62.1	12.3	75	50	2	4	17	10	9
iPhone 3GS	115.5	62.1	12.3	75	50	2	4	17	10	9
iPhone 4	115.2	58.6	9.3	75	50	1	2	17	10	9
iPad	242.8	189.7	13.4	200	150	-	-	-	-	14
iPad 2	241.2	185.7	8.8	200	150	-	-	-	-	14
iPod Touch	110.0	61.8	8.0	75	50	-	-	-	10	9
iPod Touch 2nd Gen	110.0	61.8	8.5	75	50	-	-	-	10	9
iPod Touch 3rd Gen	110.0	61.8	8.5	75	50	1	4	15	10	9
iPod Touch 4th Gen	111.0	58.9	7.2	75	50	1	3	16	10	9

As discussed earlier in Section IV.C.i., and shown in the accompanying figures, the rectangular shape of the iPhone fits naturally into the human hand for a variety of expected grips during use of the device. The length of the human thumb and breadth of the human palm provide a benchmark for assessing the correspondence of the width and length of the iPhone, iPhone 3G/S, and iPhone 4 to known dimensions of the hand. Figure 3 shows how the width of the device can be compared to the thumb, and length to the breadth of the palm. The chosen dimensions fit a wide range of users ranging from large men to small women. The width of the device (61 mm) falls between the reported length of 69 mm for the thumb of 99th percentile users (large men) and 43 mm for the thumb of 1st percentile users (small women).[72] The length of the device (115 mm) falls between the reported breadth of 117 mm for the palm of the hand at its

72 Garrett, 1971 and Rigby, 1973, as reported by Konz, S.A. ibid.

widest point of 99th percentile users (large men) and 91 mm for 1st percentile users (small women).[73] The length of the iPhone, iPhone 3G/S, and iPhone 4 are all about the same as the cited distance between the ear and mouth of 105 mm for women and 110 mm for men.[74]

These results further confirm that the specific length and width dimensions of the iPhone, iPhone 3G/S, and iPhone 4 are functional because they allow users of varying physical sizes to hold and use the device in a variety of common grips.

V.B.ii A flat clear face covering the front of the product as in the iPhone, iPhone 3G/S, and iPhone 4 is Functional

The flat clear face covering the front of the product of the iPhone, iPhone 3G/S, and iPhone 4 is functional for the reasons discussed earlier in Section IV.B.ii.

V.B.iii A large display screen under the clear surface as in the iPhone, iPhone 3G/S, and iPhone 4 is Functional

A large display screen under the clear surface as in the iPhone, iPhone 3G/S, and iPhone 4 is functional for the reasons discussed earlier in Section IV.

Further insight into the functionality of the large display screen of the iPhone, iPhone 3G/S, and iPhone 4 can be obtained by considering the embodied width and length of the display screen of these devices. As shown in Table 1, the display screen of the iPhone, iPhone 3G/S, and iPhone 4 have approximately the same dimensions. That is, a length of approximately 75 mm and width of approximately 50 mm for the iPhone and iPhone 3G/S, and iPhone 4. These dimensions help provide the functionality discussed earlier in Section IV. In particular, among other functional considerations, the size of the display screen is sufficiently large to provide the interface elements discussed, including borders, display elements, controls, and rows of icons in way that satisfies the large set of usability and ergonomic issues discussed there for a wide variety of intended uses and user dimensions, within the constraints of the dimensions of the overall rectangular device.

V.B.iv Substantial Black Borders Above and Below the Display Screen and Narrower Black Borders on either side of the Screen under the Clear Surface as in the iPhone, iPhone 3G/S, and iPhone 4 are Functional

Substantial black borders above and below the display screen and narrower black borders on either side of the screen under the clear surface, as in the iPhone, iPhone 3G/S, and iPhone 4, provide functionality for reasons discussed earlier in Section IV.

Further insight into the functionality of the rectangular shape of the iPhone, iPhone 3G/S, and iPhone 4 can be obtained by considering the embodied width of each of these borders. As shown in Table 1, the borders of the iPhone, iPhone 3G/S, and iPhone 4 have approximately the same dimensions. That is, borders above and below the display screen of approximately 17 mm

73 Rigby, 1973, as reported by Konz, S.A. ibid.

74 Schaefer, E. and Bates, B.T., Anthropometric Comparisons Between Face Measurements of Men and Women, Bio-Dynamics Corporation, June 1988.

and narrower borders of approximately 3 mm on either side of the screen. An important point is that the breadth of the human thumb closely matches the distance of 18 mm above and below the display screen. That is, the thumb thickness of a 5^{th} percentile woman has been reported to be 17 mm and the same measure for a 95^{th} percentile man was 26 mm. Therefore, the dimensions of the width of the border area where the thumb is likely to be when holding the device, closely matches the breadth of the thumb of a wide range of users. This again shows that the chosen dimensions are consistent with standard recommendations of the scientific literature and therefore clearly were dictated by the intended function of the device.

A second observation is that the narrower border on either side of the device reflects the fact that the user will not ordinarily grasp this part of iPhone, iPhone 3G/S, and iPhone 4 when viewing the display, which allows the width of viewing area to be maximized by minimizing the width of this border. This functionality exists regardless of the color of the border.

V.B.iv A metallic bezel around the flat clear surface as in the iPhone, and iPhone 3G/S, or a thin rim adjacent to the face of the phone as in the iPhone 4 is Functional

A metallic bezel around the flat clear surface, as in the iPhone and iPhone 3G/S, provides functionality for reasons discussed earlier in Section IV.

A thin rim adjacent to the face of the phone as in the iPhone 4, provides functionality by providing a surface for placing controls and additional structural integrity.

V.B.v A Matrix of Colorful Square Icons with Evenly Rounded Corners as in the iPhone, iPhone 3G/S, and iPhone 4 is Functional

A matrix of colorful square icons with evenly rounded corners as in the iPhone, iPhone 3G/S, and iPhone 4 provides functionality for reasons discussed earlier in Section IV.

Further insight into the functionality of matrix of colorful square icons with evenly rounded corners as in the iPhone, iPhone 3G/S, and iPhone 4, can be obtained by considering the dimensions of the icons. As shown in Table 1, the icons of the iPhone, iPhone 3G/S, and iPhone 4 have approximately the same dimensions of 8 mm by 8 mm. These dimensions are sufficient to provide for the functionality described in Section IV.F.i, namely, to match the size of a wide variety of user's fingertips.

V.B.vi A bottom row (or "dock") of colorful square icons set off from the other icons, which does not change as other pages of the user interface are viewed as Embodied in the iPhone, iPhone 3G/S, and iPhone 4 is Functional

A bottom row (or "dock") of colorful square icons set off from the other icons, which does not change as other pages of the user interface are viewed, provides functionality for reasons discussed earlier in Section IV.F.i.

V.C The Asserted Trade Dress and Trademarks of Apple iPod Touch are Functional

In its Amended Complaint, Apple describes the alleged trade dress of the iPod Touch as follows: a rectangular product with four evenly rounded corners, a flat clear face covering the front of the product, a large display screen under the clear surface, substantial black borders above and below the display screen and narrower black borders on either side of the screen under the clear surface, and on the display when the device is turned on, a row of small dots, a matrix of colorful square icons with evenly rounded corners within the display screen, and a bottom dock of colorful square icons with four evenly rounded corners set off from the other icons, which does not change as other pages of the user interface are viewed.

The above elements provide functionality for reasons discussed earlier in Section IV. Further insight into the functionality of these elements can be obtained by considered their specific dimensions. As shown in Table 1, the dimensions of these elements for the iPod Touch are very similar to those of the Apple iPhone, iPhone 3G/S, and iPhone 4. These dimensions are therefore functional for the same reasons described in Section V.B.

V.D The Asserted Trade Dress and Trademarks of the Apple iPad and iPad 2 are Functional

In its Amended Complaint, Apple describes the alleged trade dress of the iPad and iPad 2 as follows: a rectangular product with four evenly rounded corners, a flat clear surface covering the front of the product, a metallic rim around the clear flat surface, a large display screen under the clear surface, substantial neutral (black or white) borders on all sides of the display screen under the clear surface, and when the device is turned on, a matrix of colorful icons within the display screen. Apple also notes that the overall iPad design has an extremely thin side profile, which makes the product appear to be relatively flat when placed on a table.

The above elements provide functionality for reasons discussed earlier in Section IV. Further insight into the functionality of these elements can be obtained by considered their specific dimensions. Table 1 provides the dimensions of these elements for the iPad and iPad 2. These dimensions are functional as expanded upon below.

V.D.i A Rectangular Shape with Four Evenly Rounded Corners as in the iPad and iPad 2 is Functional

The rectangular shape with four evenly rounded corners of the iPad and iPad 2 is functional for the reasons discussed earlier in Sections IV.B.i, IV.B.ii, and IV.C.i. and Section V.B.

Further insight into the functionality of the rectangular shape of the iPad and iPad 2 can be obtained by considering the embodied width and length this device. As shown in Table 1, the iPad and iPad 2 have a length of approximately 240 mm and width of approximately 185 mm. These dimensions provide functionality beyond that of the iPhone, iPhone 3G/S, and iPhone 4 by providing a larger form factor suitable for a larger viewing area.

V.D.ii A flat clear surface covering the front of the product as in the iPad and iPad 2 is Functional

A flat clear surface covering the front of the product, as in the iPad and iPad 2 is functional for the reasons discussed earlier in Section IV.B.ii.

V.D.iii A large display screen under the clear surface as in the iPad and iPad 2 is Functional

A large display screen under the clear surface, as in the iPad and iPad 2 is functional for the reasons discussed earlier in Section IV.

Further insight into the functionality of the large display screen can be obtained by considering the embodied width and length of display screen. As shown in Table 1, the display screen of the iPad and iPad 2 has a length of approximately 195 mm and width of approximately 147 mm. These dimensions help provide the functionality discussed earlier in Section IV. In particular, among other functionality, the size of the display screen is sufficient to provide the interface elements discussed, including borders, display elements, controls, and rows of icons in way that satisfies the large set of usability and ergonomic issues discussed there for a wide variety of intended uses and user dimensions, within the constraints of the dimensions of the overall rectangular device.

V.D.iv A Metallic Rim Around the Clear Flat clear surface as in the iPad and iPad 2 is Functional

A metallic rim around the flat clear surface, as in the iPad and iPad 2, provides functionality by providing structural integrity.

V.D.v Substantial Neutral (Black or White) Borders on all Sides of the Display Screen under the Clear Surface as in the iPad is Functional

Substantial black or white borders on all sides of the display screen under the clear surface, as in the iPad and iPad 2, provides functionality for reasons discussed earlier in Sections IV. and V.B. Further insight into the functionality of the rectangular shape of the iPad can be obtained by considering the embodied width of each of these borders. As shown in Table 1, the borders of the iPad and iPad 2 above and below the display screen are approximately 21 mm and approximately 18 mm on either side of the screen. An important point is that the breadth of the human thumb closely matches the borders of the iPad. That is, the thumb thickness of a 5^{th} percentile woman has been reported to be 17 mm and the same measure for a 95^{th} percentile man was 26 mm. These dimensions help provide the functionality discussed earlier in Section IV, by matching the width of the border areas where the thumb is likely to be when holding the device to the breadth of the thumb of a wide range of users. This shows that the chosen dimensions are consistent with standard recommendations of the scientific literature and therefore clearly were dictated by the intended function of the device.

V.D.vi A Matrix of Colorful Square Icons that appear when the Device is turned on as in the iPad and iPad 2 is Functional

A matrix of colorful square icons that appears when the device is turned on, as in the iPad and iPad 2 provides functionality for reasons discussed earlier in Section IV. and V.B. Further insight into the functionality of matrix of colorful square icons with evenly rounded corners as embodied in the iPad, can be obtained by considering the dimensions of the icons. As shown in Table 1, the icons of the iPad and iPad 2 have approximately the same dimensions of 14 mm by 14 mm. These dimensions are sufficient to provide for the functionality described in Section IV.F.i.

V.D.vii Thin Side Profile as in the iPad and iPad 2 is Functional

Apple also notes that the overall iPad and iPad 2 design has an extremely thin side profile, which makes the product appear to be relatively flat when placed on a table. This side profile provides functionality for reasons discussed earlier in Section IV.

V.E The Asserted Apple Trademarks are Functional

In its Amended Complaint, Apple also asserts protectable trademark rights in various colorful square icons with evenly rounded corners that have been used in the user interface in the iPhone, iPod Touch, and iPad products released to date, shown in Exhibits 23-30 of the Amended Complaint. Each of the asserted colorful square icons with evenly rounded corners used in the Apple iPhone, iPhone 3G/S, iPhone 4, iPod Touch, iPad, or iPad 2 are functional for reasons discussed in sections IV.F, IV.G, IV.H, V.B.v, and V.B.vi..

VI. CONCLUSION

My analysis of the D504,889, D622,270, D618,677, D593,087, D604,305, D617,334, and D627,790 patents reveals that their designs are functional and follow from well-accepted principles of human factors engineering to achieve that functionality. My analysis of the asserted trade dress and trademarks of the Apple iPhone, iPhone 3G/S, iPhone 4, iPod Touch, iPad, and iPad 2 reveals that the asserted trade dress and trademarks are functional and follow from well-accepted principles of human factors engineering to achieve that functionality. The functional roles underlying the design of each of the features can be summarized as following:

- Fit the person – the width and length of the device provide a good form factor for a range of users; plus, the horizontal symmetry of the design also allows it to work equally well when held in the right or left hand, and irrespective of which hand is dominant.

- Provide a clear and unimpeded view and access to displays and controls – the form factor allows the device to be held easily with either a single hand or both hands while having a clear view and easy access to the rectangular viewing and input area;

- Ease of control input – the smooth flat surface, central location, and dimensions of the rectangular viewing and touch screen area in relation to the front surface of

the device were chosen to allow easy access and swiping movements at all locations on the active area of the touch screen;

- Ease of understanding – the easily understood pictorials and icons and accompanying descriptive label result in a Graphical User Interface with elements that are both easily discriminable and meaningful to the intended audience;

- Perceptual discriminability - the graphical elements of the pictorials and icons shown differ in fundamentally different ways. These include differences in color, shape, brightness, and contrast. These differences increase the perceptual discriminability of the shown interfaces which can help users find the particular icon they are looking for more quickly.

- Eliminate unnecessary elements – the lack of ornamentation on the front viewing surface, such as protruding buttons, eliminates clutter and display elements not necessary to the tasks performed that can interfere with view and access; the elimination of physical buttons also reduces the risk of inadvertent activation;

- Organizational structure – the rectangular shape allows information and input elements to be easily displayed in a matrix format of rows and columns that can be easily reconfigured for either a vertical or horizontal viewing format. This format is also compatible with existing page oriented metaphors easily understood by users;

- Adjustability – the rectangular form factor and location of the rectangular viewing and input area allow clear and unimpeded view and access for a variety of different grips and associated methods of data entry preferred by particular users;

- Accommodate multiple forms and stages of use – the form factor provides a good fit for a variety of uses, in order to provide functionality and ease of use for communication tasks, input tasks, viewing tasks, and stowage in a pocket;

- Eliminate ergonomic stresses – rounded corners and edges reduce stress at the interface between the device and the user's hand and ear, to increase comfort and reduce the risk of possible injury (such as might occur if a sharp corner catches the outer ear when moving a phone into position); and

- Accommodate misuse and reduce human error – the use of rounded corners and good match to hand size prevent the user from accidentally dropping the product or tearing a pocket, while rounded edges and a border around the display can also reduce mistaken contact with the active area and help prevent damage if the device is dropped.

It is my opinion that the designs shown in the D504,889, D622,270, D618,677, D593,087, D604,305, D617,334, and D627,790 patents and the features shown in those patents are functional based on human factors engineering, not decorative and not incidental to a decorative design. It is also my opinion that the asserted trade dress and trademarks of the Apple iPhone, iPhone 3G/S, iPhone 4, iPod Touch, iPad, and iPad 2 are functional and follow from well-accepted principles of human factors engineering to achieve that functionality

Signature executed on March 22, 2012