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UNITED STATES DISTRICT COURT
NORTHERN DISTRICT OF CALIFORNIA
SAN JOSE DIVISION

APPLE INC., a California corporation,

Plaintiff,

v.

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

Defendants.

Case No. 11-cv-01846-LHK

**EXPERT REPORT OF KARAN
SINGH, PH.D. REGARDING
INFRINGEMENT OF U.S.
PATENTS NOS. 7,864,163,
7,844,915 AND 7,853,891**

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

1 **I. INTRODUCTION**

2 1. I, Dr. Karan Singh, have been asked by counsel for Apple Inc. (“Apple”) to
3 provide an opinion in the above-captioned case. I understand that Apple has alleged that
4 Defendants Samsung Electronics Co. Ltd., Samsung Electronics America, Inc., and Samsung
5 Telecommunications America, LLC (collectively “Samsung”) have infringed various patents
6 assigned to Apple. I have been asked to provide opinions as to whether Samsung has infringed
7 United States Patents Nos. 7,864,163 (the “’163 patent), 7,844,915 (the “’915 patent) and
8 7,853,891 (the “’891 patent”). My opinions are set forth below in this Report and in the
9 accompanying exhibits.

10 2. I submit this expert Report in compliance with Federal Rule of Civil Procedure
11 26(a)(2). I reserve the right to supplement or amend this Report pursuant to Rule 26(e) and as
12 otherwise provided if additional data or other information that affects my opinions becomes
13 available. I expect to testify at trial regarding the matters expressed in this Report and any
14 supplemental Reports that I may prepare for this litigation. I also may prepare and rely on
15 audiovisual aids to demonstrate various aspects of my testimony at trial. I also expect to testify
16 with respect to any matters addressed by any expert testifying on behalf of Samsung, if asked to
17 do so.

18 3. I am being compensated for my work in connection with this matter at my current
19 standard consulting rate of \$450 per hour. I am separately being reimbursed for any out-of-
20 pocket expenses. My compensation is not based in any way on the outcome of the litigation or
21 the nature of the opinions that I express.

22 **II. QUALIFICATIONS**

23 4. Here, I provide a brief summary of my qualifications. I received my Bachelor of
24 Technology degree in Computer Science from the Indian Institute of Technology in 1991. I was
25 awarded a Master of Science degree in 1992, and a Ph.D. in 1995, both in Computer and
26 Information Science, from Ohio State University. I can read and program fluently in object-
27 oriented programming languages, such as C++ and Java. My qualifications and experience are
28 stated more fully in my curriculum vitae, which includes a list of all my honours, patents,

1 through a demonstration of some double-tap zooming elements of claim 2 of the ’163 patent,
2 confirming that the iPhone demonstrated in his deposition exhibited behavior meeting certain
3 elements of that claim (Forstall Dep. Tr. at 24:17 – 27:10).

4 **C. Priority Date of the ’163 Patent**

5 36. I intend to rely upon the documentary evidence and testimony of one or more of
6 the named co-inventors of the ’163 patent or other witnesses to testify regarding facts relevant to
7 the conception and reduction to practice of the claimed invention prior to the filing date of the
8 patent.

9 37. I have reviewed the documentary evidence regarding the design and
10 implementation work done on the inventions claimed in the ’163 patent, including the deposition
11 transcripts of Scott Forstall, Chris Blumenberg, and Richard Williamson, emails regarding
12 technology demonstrations and planned and completed development tasks, as well as code check-
13 in logs. From that evidence, it appears that the claims of the ’163 patent that I analyze below
14 were conceived of by Andre Boule, Scott Forstall, Greg Christie, Stephen O. Lemay, Imran
15 Chaudhri, Richard Williamson, Chris Blumenberg, and Marcel van Os in or before March 2006,
16 and reduced to practice in March/April 2006. I am informed that multiple groups at Apple
17 contributed to the claimed inventions, including the Human Interface, iOS, and Safari groups.
18 These groups sought to aid the user in zooming to the correct region of a webpage without having
19 to zoom and then scroll to center. They pursued a method of a two finger tap that would zoom to
20 the space between two spread fingers. This option did not work to the groups’ satisfaction. In
21 early 2006, Mr. Forstall recommended a solution in which an action, a double-tap for example,
22 would automatically determine which region of a webpage to zoom in on. Mr. Christie, along
23 with the Human Interface group, suggested that after a user double-tapped to zoom in on an area
24 of interest, a subsequent double-tap in a new area of interest should retarget to that new area. A
25 subsequent double-tap that was not in a new area would cause a zoom-out effect. Mr. Williamson
26 and Mr. Blumenberg were the two primary individuals implementing the computer code that
27 reduced the inventions to practice. The feature was a high priority and implementing it was Mr.
28 Blumenberg’s main task for the time period, between two weeks and two months, it took for him

1 to complete it. By March/April 2006, the inventors had a functional version of computer code
2 practicing the inventions. I understand that the asserted claims were also constructively reduced
3 to practice in a provisional patent application filed on September 6, 2006 and in U.S. Patent
4 Application No. 11/850,013 filed September 4, 2007. Documents relating to these facts are found
5 in, for example: APLNDC00016628; APLNDC00019636-637; APLNDC00019638;
6 APLNDC0001200348-353; APLNDC0001200354-360; APLNDC0001200361-373;
7 APLNDC0001200374; APLNDC0000019634; APLNDC-X0000002313-2319; and
8 APLNDCX0000004557-4561.

9 **D. Samsung’s Infringement of the ’163 Patent**

10 38. In the discussion that follows, I analyze whether certain Samsung Accused
11 Products embody the apparatus claims of the ’163 patent and whether the ordinary and intended
12 use of the Samsung Accused Products would practice the method claims of the patent. For
13 purposes of this section of my Report, the “Accused Products” include the following Samsung
14 products: Acclaim, Captivate, Continuum, Droid Charge, Epic 4G, Exhibit 4G, Fascinate, Galaxy
15 Ace, Galaxy Prevail, Galaxy S (i9000), Galaxy S 4G, Galaxy S II (including the i9100, T-Mobile,
16 AT&T, Epic 4G Touch and Skyrocket variants), Galaxy S Showcase (i500), Galaxy Tab 7.0,
17 Galaxy Tab 10.1, Gem, Gravity Smart, Indulge, Infuse 4G, Intercept, Mesmerize, Nexus S, Nexus
18 S 4G, Replenish, Sidekick, Transform, and Vibrant.

19 39. In performing this analysis I reviewed the ’163 patent and its file history, tested the
20 operation of these Samsung Accused Products, reviewed source code that Samsung produced
21 prior to the March 8 fact discovery cutoff, and reviewed other materials described in this Report.
22 Because the Samsung source code is built upon the foundation of publicly-available Android code,
23 I reviewed portions of that Android code and its accompanying documentation. I have analyzed
24 Samsung source code on at least one Accused Product representative of each major release of
25 Android that appears on the Accused Products. I reviewed source code that implements the
26 accused functionalities of the ’163 patent on, among other devices, the Samsung Captivate
27 (Android 2.1), the Samsung Vibrant, (Android 2.2), the Samsung Galaxy S II (Android 2.3), and
28 the Samsung Galaxy Tab 10.1 (Android 3.1). I have compared portions of the relevant code on

1 each of these devices to analogous code (where available) on other Accused Products running that
2 version, as well as the publicly available version of each major Android release. Based on those
3 comparisons, I conclude that, for each major Android release, all of the Accused Products based
4 on that release implement the accused functionalities of the ’163 patent in substantially the same
5 way as the representative device for that release whose source code I have analyzed and cited in
6 this Report.

7 40. In the paragraphs that follow, I will set forth the claims of the ’163 patent for
8 which it is my opinion that Samsung Accused Products, or the ordinary and intended use of
9 Samsung Accused Products, meets every limitation of the claim.

10 41. By “ordinary and intended use” in this section of my Report, I mean actions that
11 virtually every user of a Samsung Accused Product would perform when using the Accused
12 Product, and which Samsung encouraged and intended the user to perform. For example,
13 manuals included with Samsung Accused Products instruct users to “[t]ap the screen twice to
14 zoom in or out” when viewing a web page in the Browser application. (*See, e.g.*, APLNDC-
15 Y0000058046, APLNDC-Y0000060424, APLNDC-Y0000061493, APLNDC-Y0000061697,
16 APLNDC-Y0000061866, APLNDC-Y0000063918, APLNDC-Y0000065351, APLNDC-
17 Y0000066627, APLNDC-Y0000065800.) In addition, each of the Samsung Accused Products,
18 with the exception of the Galaxy Tab 10.1, includes a “tool tip” (i.e., contextual instructions to the
19 user in a pop-up window) that is programmed to appear automatically when a user first uses the
20 Browser application. The tool tip displays the text “Tip: double tap to zoom in and out.”⁴ Once a
21 user zooms in using a double tap, it is overwhelmingly likely—given the relatively small size of
22 the displays of the Accused Products and typical practice in using touch screen devices—that he
23 will tap again on a different box, resulting in centering on that box, as he attempts to navigate

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25 4

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1 around the displayed web page using touch gestures like the double tap described in the manuals
2 and on-screen tool tip. Accordingly, it is my opinion that all or virtually all users of the Samsung
3 Accused products would engage in direct infringement of the '163 patent. Because Samsung
4 encouraged and intended this direct infringement by end users, it is my opinion that the Samsung
5 defendants have indirectly infringed the method claims of the '163 patent discussed below.

6 42. With respect to the claims of the '163 patent that claim an apparatus, device, or
7 medium, it is my opinion that a Samsung defendant who makes, uses, sells, imports or offers to
8 sell the Samsung Accused Product in the United States has engaged in direct infringement of
9 the '163 claims discussed below.

10 43. Attached as Exhibits 4 and 5 are exemplary claim charts that illustrate the
11 infringement of the claims below by the Galaxy Tab 10.1 (Exhibit 4) and the Galaxy S II
12 (Exhibit 5). Where source code is cited in the Galaxy S II claim chart (corresponding to Android
13 2.3), reference is also made to analogous code in Android 2.2 (as exemplified by the Samsung
14 Vibrant) and Android 2.1 (as exemplified by the Samsung Captivate).

15 44. **Claim 2.** Claim 2 of the '163 patent recites:

16 A computer-implemented method, comprising:

17 [a] at a portable electronic device with a touch screen display;

18 [b] displaying at least a portion of a structured electronic document
19 on the touch screen display, wherein the structured electronic
document comprises a plurality of boxes of content;

20 [c] detecting a first gesture at a location on the displayed portion of
21 the structured electronic document;

22 [d] determining a first box in the plurality of boxes at the location
of the first gesture;

23 [e] enlarging and translating the structured electronic document so
24 that the first box is substantially centered on the touch screen
display;

25 [f] while the first box is enlarged, a second gesture is detected on a
26 second box other than the first box; and

27 [g] in response to detecting the second gesture, the structured
28 electronic document is translated so that the second box is
substantially centered on the touch screen display.

1 311. User manuals for Samsung products teach users how to scroll. For example, the
2 user manual for the Epic 4G includes the following description:

3 Navigation and Customization

4 The Epic 4G™ is touch-sensitive, and this allows you to
5 not only select an onscreen option with a single tap,
6 but also scroll through long menu lists. Simply slide up
7 and down through the display with your fingertip.

8 *Tip:* Some menu options are also accessed by pressing and
9 holding an onscreen item, such as a Contact entry from
10 the Contacts tab.

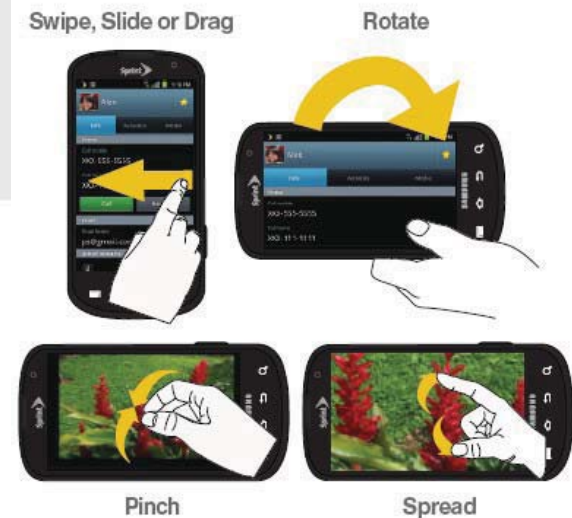
11 Getting Around Your Device

12 Move Around Your Device’s Menus and Screens

- 13 ● **Tap:** When you want to type using the onscreen
14 keyboard, select items such as application and
15 settings icons, or press onscreen buttons, simply tap
16 them with your finger. A light touch works best.
- 17 ● **Press and hold:** To open the available options for an
18 item (for example, a link in a Web page), simply
19 press and hold the item.
- 20 ● **Flick:** Move your finger in lighter, quicker strokes than
21 swiping. This finger gesture is always used in a
22 vertical motion, such as when flicking through
23 contacts or a message list.

Device Basics

- **Swipe or slide:** Quickly drag your finger vertically or horizontally across the screen.
- **Drag:** Press and hold your finger with some pressure before you start to move it. Do not release your finger until you have reached the target position.



2A. Device Basics 27

16 312. In the manual displayed above, a Swipe, Slide, or Drag, all of which invoke a
17 scroll operation, are distinguished from a Pinch or Spread, which invoke a gesture operation.

18 313. To the extent that the preamble is found to be a limitation and is not met literally,
19 in my opinion it is met under the doctrine of equivalents because each of the Accused Products
20 perform steps insubstantially different from scrolling on a touch-sensitive display of a device, and
21 accomplishes the same function in the same way to achieve the same result.

22 314. **Claim 1 – Element [a]** “receiving a user input, the user input is one or more
23 input points applied to the touch-sensitive display that is integrated with the device.” In my
24 opinion, each of the Accused Products performs this step of claim 1.

25 315. The Accused Products receive a user input. The user input includes one or more
26 input points (one or more fingers) applied to the touch-sensitive display that is integrated with the
27 Samsung device.

1 316. For example, the Galaxy Tab 10.1 receives user a user input with one input point
2 (one finger) applied to the touch-sensitive display as illustrated above. I also note that the touch-
3 sensitive display is integrated into the Galaxy Tab 10.1.

4 317. For example, the Galaxy S II receives a user input with one input point (one
5 finger) applied to the touch-sensitive display as shown above. The touch-sensitive display is
6 integrated into the Galaxy S II.

7 318. Based on my observations of the Accused Products, as well as my analysis of the
8 source code for each major release of Android running on the Accused Products (Android 2.1,
9 2.2, 2.3, and 3.1), I have determined that each Accused Product receives a user input, where the
10 user input is one or more input points applied to the touch-sensitive display that is integrated with
11 the device. The claim chart in Exhibit 17 identifies analogous code that satisfies this element in
12 Android 2.1, 2.2, and 2.3.

13 319. To the extent that this limitation is not met literally, in my opinion it is met under
14 the doctrine of equivalents because each of the Accused Products perform steps insubstantially
15 different from machines receiving a user input, the user input is one or more input points applied
16 to the touch-sensitive display that is integrated with the device, and accomplishes the same
17 function in the same way to achieve the same result.

18 320. **Claim 1 – Element [b] “creating an event object in response to the user**
19 **input.”** In my opinion, each of the Accused Products performs this step of claim 1.

20 321. Each of the Accused Products, via the Android platform on which they operate,
21 creates an event object in response to the user input.

22 322. Under the public Android platform, a MotionEvent object is created in response to
23 a touch on the touch screen. ([http://developer.android.com/reference/android/view/](http://developer.android.com/reference/android/view/MotionEvent.html)
24 [MotionEvent.html](http://developer.android.com/reference/android/view/MotionEvent.html).)

25 323. I have confirmed the public Android code also appears in the Accused Products.
26 For example, in the Galaxy Tab 10.1 tablet, which runs a version of Android 3.1, the user input is
27 processed by the device driver, which passes the input into user space and parses it into an event
28 object referred to as the “MotionEvent” object. This object is an event object created by the

1 method InputConsumer::populateMotionEvent(). (See
2 frameworks/base/libs/ui/inputTransport.cpp:683-712 [SAMNDCA-C000002822]; see also
3 frameworks/base/libs/ui/input.cpp:351-382 [SAMNDCA-C000002830 to -C000002831]
4 (MotionEvent::initialize() method)).

5 324. Based on my observations of the Accused Products, as well as my analysis of the
6 source code for each major release of Android running on the Accused Products (Android 2.1,
7 2.2, 2.3, and 3.1), I have determined that each Accused Product practices includes similar
8 computer code that creates an event object in response to user input. The claim chart in Exhibit
9 17 identifies analogous code that satisfies this element in Android 2.1, 2.2, and 2.3.

10 325. [REDACTED]
11 [REDACTED]

12 326. To the extent that this limitation is not met literally, in my opinion it is met under
13 the doctrine of equivalents because each of the Accused Products perform steps insubstantially
14 different from creating an event object in response to the user input, and accomplishes the same
15 function in the same way to achieve the same result.

16 327. **Claim 1 – Element [c]: “determining whether the event object invokes a scroll**
17 **or gesture operation by distinguishing between a single input point applied to the touch-**
18 **sensitive display that is interpreted as the scroll operation and two or more input points**
19 **applied to the touch-sensitive display that are interpreted as the gesture operation”** In my
20 opinion, each of the Accused Products performs this step of claim 1.

21 328. The Accused Products determine whether an event object invokes a scroll or
22 gesture operation by distinguishing between a single input point (one finger) applied to the touch-
23 sensitive display that is interpreted as the scroll operation and two or more input points (more
24 than one finger) applied to the touch-sensitive display that are interpreted as the gesture operation.

25 329. For example, the Galaxy Tab 10.1 tablet distinguishes between a scroll operation
26 when one finger is applied to the touch-sensitive display and a gesture operation when two or
27 more fingers are applied to the touch-sensitive display.
28

1 equivalent to the corresponding structures described in the '891 patent for performing the
2 functions in claim 74. Accordingly, these three Samsung Accused Products infringe claim 74.

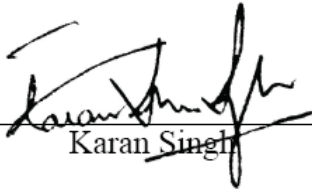
3 **VIII. CONCLUSION**

4 593. My opinions are subject to change based on additional opinions that Samsung's
5 experts may present and information I may receive in the future or additional work I may
6 perform. I reserve the right to supplement this Report with new information and/or documents
7 that may be discovered or produced in this case, or to address any new claim constructions
8 offered by Samsung or ordered by the court. With this in mind, based on the analysis I have
9 conducted and for the reasons set forth above, I have preliminarily reached the conclusions and
10 opinions in this Report.

11 594. In connection with my anticipated testimony in this action, I may use as exhibits
12 various documents produced in this Action that refer or relate to the matters discussed in this
13 Report. I have not yet selected the particular exhibits that might be used. In addition, I may
14 create or assist in the creation of certain demonstrative exhibits to assist in the presentation of my
15 testimony and opinions as described herein or to summarize the same or information cited in this
16 Report. Again, those exhibits have not yet been created.

17
18 Dated: March 22, 2012

/s/


Karan Singh