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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 **DECLARATION OF KARAN SINGH, PH.D., IN SUPPORT OF APPLE'S REPLY IN SUPPORT OF ITS MOTION FOR A PERMANENT INJUNCTION AND FOR DAMAGES ENHANCEMENTS**

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

DECLARATION OF DR. KARAN SINGH IN SUPPORT OF APPLE'S REPLY ISO PERMANENT INJUNCTION MOTION
Case No. 11-cv-01846-LHK
sf-3213216

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I, KARAN SINGH, do hereby declare as follows:

1.   I have personal knowledge of the facts set forth herein, and am competent to testify to the same.

2.   I previously testified at deposition and at trial in this matter. I also submitted an Expert Infringement and Rebuttal Report, as well as a Declaration opposing Samsung's pre-trial summary judgment motion.

3.   I submit this Declaration in support of Apple's Reply In Support of its Motion for a Permanent Injunction and for Damages Enhancement.

4.   I reserve the right to supplement or amend this Declaration based on any new information that is relevant to my opinion.

5.   Below I provide a very brief summary of my qualifications. I received my Bachelor of Technology degree in Computer Science from the Indian Institute of Technology in 1991. I was awarded a Master of Science degree in 1992, and a Ph.D. in 1995, both in Computer and Information Science, from Ohio State University. Since 2002, I have been a Professor (or Associate Professor) of Computer Science at the University of Toronto where I co-direct a graphics and human computer interaction laboratory, dynamic graphics project. I can read and program fluently in object-oriented programming languages, including C++ and Java.

II.   MATERIALS CONSIDERED

6.   In forming my opinions in this Declaration, I reviewed a number of materials, including U.S. Patent Nos. 7,844,915 (the '915 Patent) as well as its file history, and relevant portions of the record in this case to date. I reviewed Mr. Gray's Declaration In Support of Samsung's Opposition to Apple's Motion for a Permanent Injection and Damages Enhancement ("Gray Decl."). I also reviewed Mr. Gray's Declaration In Support of Samsung's Motion for Summary Judgment, Mr. Gray's Expert Invalidity and Rebuttal Reports, and his deposition and trial testimony.

7.   I examined the "modified" source code for the Web Browser application made available by Samsung at Quinn Emanuel's office. I understand that Samsung represents that this

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1 code is from Samsung Android version 4.0.4, Baseband Version T989UVL11, Kernel version

2 3.0.8, and Build number IMM76D.UVL11. For ease of reference, I will refer to this code as the

3 "modified code." I also examined a Samsung Galaxy S III (T-Mobile) phone and a video of a

4 Samsung Galaxy S II (T-Mobile) phone that I understand were running Samsung's modified

5 code.

6   8.   I understand that Mr. Gray also examined the modified code, though Mr. Gray

7 failed to cite to any of it in either his Declaration or exhibits. Mr. Gray declares that it is his

8 "understanding" that the modified code also is found in the public Jelly Bean (4.1) version of

9 Android as of July 2012. Mr. Gray cited to a specific web link that contained this code:

10 http://grepcode.com/file_/repository.grepcode.com/java/ext/com.google.android/android/4.1.1_r1/

11 android/webkit/WebViewClassic.java/?v=source.   But at his deposition, Mr. Gray admitted that

12 he did not actually examine this code. (11/6/12 Gray Dep. Tr. at 36:1-37:20.) I examined the

13 code at this web link and disagree with Mr. Gray that the code is the same as the modified code

14 provided by Samsung.   None of the differences between the public code and the code provided

15 for review at Quinn Emanuel's office, however, changes my opinion that both sets of code

16 infringe the '915 patent. In my analysis below, I focus specifically on the modified code

17 provided by Samsung, as this apparently is the code that Mr. Gray asserts does not infringe the

18 '915 patent.

19   9.   During my visit to Quinn Emanuel's offices to review the modified code, I noticed

20 that Samsung failed to provide a full code tree or folder as it would typically be kept in

21 Samsung's ordinary course of business. Samsung instead appears to have provided only a subset

22 of source code files in folders created by attorneys. This stands in contrast to my prior reviews of

23 Samsung code in this litigation, in which a full code tree was provided.   The lack of a code tree

24 makes it more difficult to determine the context of code and to identify missing files.

25 Notwithstanding this additional challenge, it is my opinion that the modified code I reviewed

26 demonstrates continuing infringement of the '915 patent.

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III.   SAMSUNG'S MODIFIED CODE LITERALLY INFRINGES THE '915 PATENT

2   10.   I understand that Mr. Gray's Declaration only asserts that the modified code does

3   not meet element [c] of claim 8 of the '915 patent, as highlighted below.

4   **Claim 8.** A machine readable storage medium storing executable
                   program instructions which when executed cause a data processing
5   system to perform a method comprising:

6   [a] receiving a user input, the user input is one or more input points
                   applied to a touch-sensitive display that is integrated with the data
7   processing system;

8   [b] creating an event object in response to the user input;

9   **[c] determining whether the event object invokes a scroll or
                   gesture operation by distinguishing between a single input point**
10   **applied to the touch-sensitive display that is interpreted as the
                   scroll operation and two or more input points applied to the**
11   **touch-sensitive display that are interpreted as the gesture
                   operation**

12
                   [d] issuing at least one scroll or gesture call based on invoking the
13   scroll or gesture operation;

14   [e] responding to at least one scroll call, if issued, by scrolling a
   window having a view associated with the event object;

15
                   [f] responding to at least one gesture call, if issued, by scaling the
16   view associated with the event object based on receiving the two or
                   more input points in the form of the user input.

17   11.   My observations and analysis show that the modified code continues to infringe

18 the preamble and all limitations of claim 8. Because Samsung's Opposition Brief and Mr. Gray's

19 Declaration do not contest that Samsung devices with the modified code infringe the preamble or

20 the limitations Mr. Gray had labeled as [a], [b], [d], [e] and [f], but instead challenge only

21 whether the Galaxy S II (T-Mobile) running the modified code meets limitation [c], I will focus

22 on that limitation rather than reiterate all of the reasons why the other limitations are present in

23 the modified code.

24 **IV.   BACKGROUND**

25   12.   As Mr. Gray states in his Declaration, at trial I testified that various Samsung

26 devices infringe the '915 patent. In explaining the test for determining whether the event object

27 invokes a scrolling operation or a gesture operation, I referred to demonstratives numbered PDX

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1   29.12 and PDX 29.13, reproduced below, to illustrate the operation of Samsung's Android

2   versions 2.1, 2.2, and 2.3:
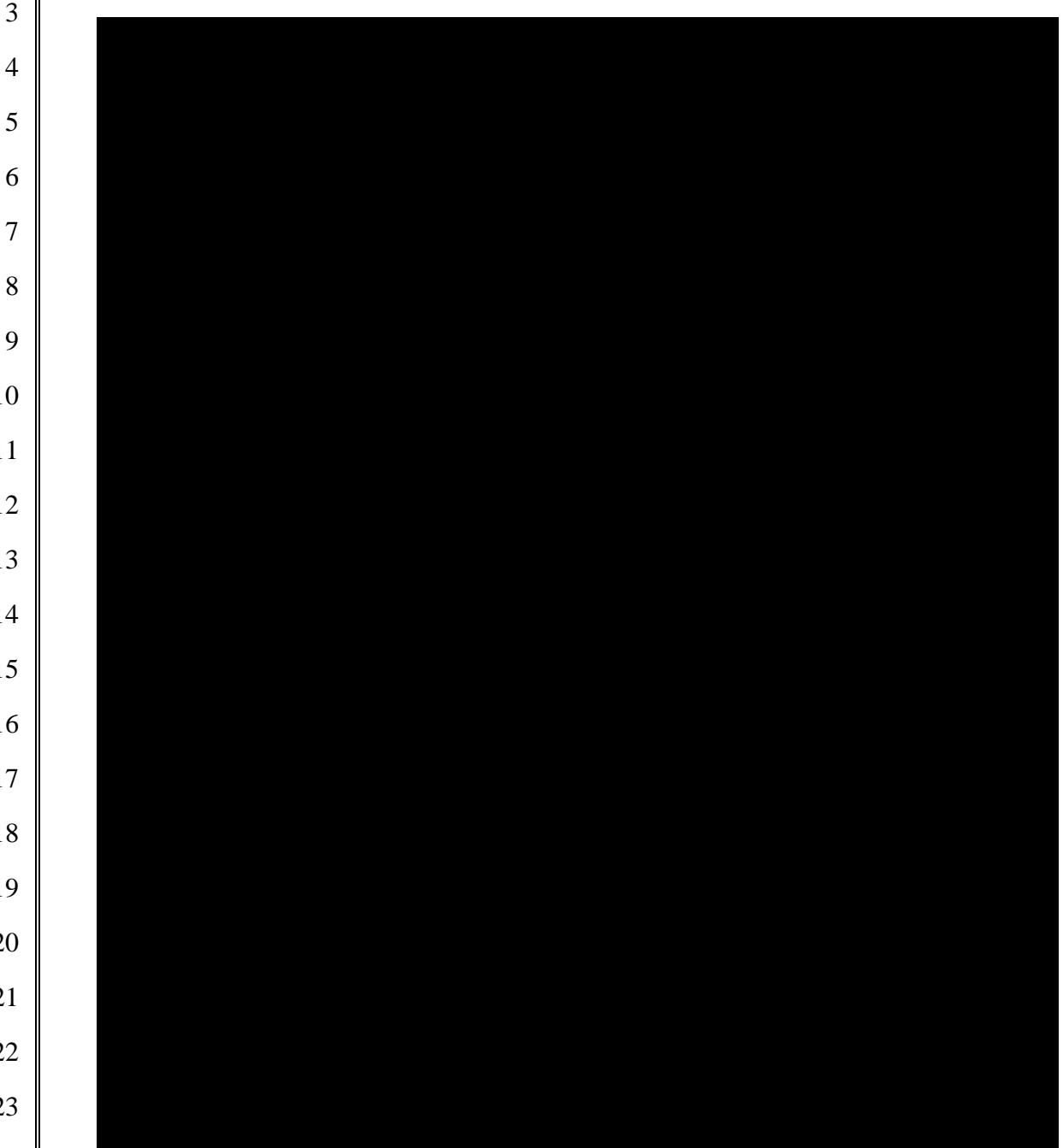
25   13.   I also testified at trial that the Galaxy Tab 10.1 infringes the '915 patent, and

26   explained that its Android 3.1 code is structured a bit differently than the code on the other

27   Samsung Accused Products I analyzed at trial. The Android 3.1 logic allows for a more complex

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1 "gesture transform" that simultaneously scales and translates the view. My testimony on that

2 topic appears below for reference:

3 > The Samsung Galaxy Tab 10.1 also infringes this claim, but for the
> purposes of claim – for elements C and D, it's structured a little bit
4 > differently . . . . As you can see on [slide PDX 29.14], the schematic
> of the source code, it's virtually – it's very similar. And for the
5 > purposes of these claims, it's actually identical.

6 > You still have the motion event object causing this all-important
> test of one finger input or two or more fingers with inputs, so you
7 > still have the logical test. You still have the branching taking place
> in the code, and going down the scroll part results in a scroll call.
8 > Eventually it results in a scroll operation. Going down the gesture
> box essentially results in a gesture call and then the corresponding
9 > gesture operation.

10 > This logic that you see actually allows the Galaxy Tab 10.1 to
> perform what you can think of as a more complex gesture transform
11 > where it simultaneously scales and translates the view. If you go
> back to that picture of a bicycle and imagine your fingers are down
12 > on the wheels of the bicycle and now you're going to start to move
> your fingers around, moving – spreading them apart will scale the
13 > bicycle. But you also want to move it so that your fingers remain
> on the bicycle. If you don't move with it, simultaneously, all of a
14 > sudden your bicycle is off in space and it's bigger but it doesn't
> have that direct feel. And that direct feel is what the Apple
15 > products provide.

16 > Of the 24 infringing devices, only the – over here with this code,
> only the Samsung Galaxy Tab 10.1 kind of provides this, this – it
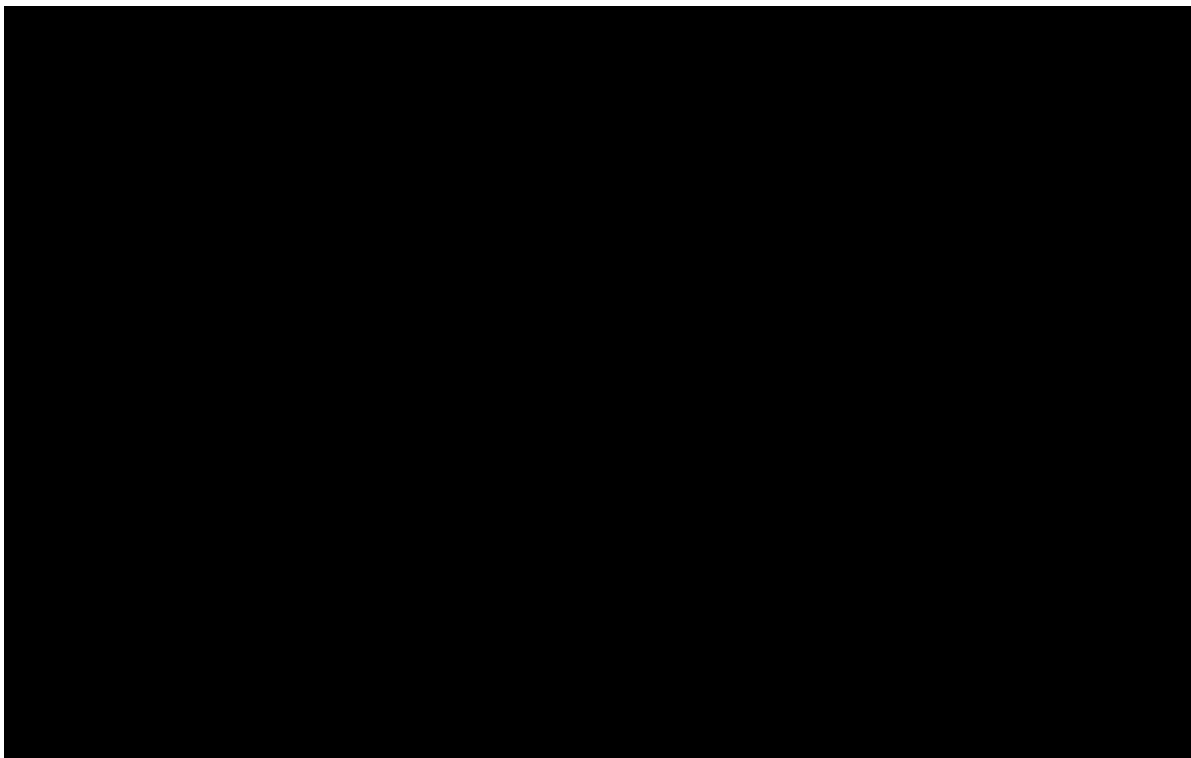17 > makes it more like the Apple products.

18 (Trial Tr. 1826:2-1827:17.)

19   14.   During my testimony, I referred to the following demonstrative of the Galaxy Tab

20 10.1 code. ██

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15.   I understand that Mr. Gray testified at trial that some Samsung products did not infringe because they performed two-finger scrolling. He stated: "[T]he patent calls for distinguishing between . . . a multipoint scale and a single point scroll. What I was able – what I've observed is that some of the devices do perform multipoint scrolling which, again, is contrary to the way the . . . patent claims operate." (Trial Tr. 2912:12-19.) I testified at trial that the Android 3.1 code performs a two finger compound gesture operation that includes both scaling and translating.

16.   I understand that the jury determined that 21 of 24 accused products infringed the '915 patent. In finding infringement by the Galaxy Tab 10.1 (wifi) (JX1037), which runs the Android 3.1 code illustrated in PDX 29.14, the jury agreed that a device that performs two finger scrolling along with scaling still infringes the '915 patent. In doing so, the jury implicitly rejected Mr. Gray's non-infringement argument.

17.   Mr. Gray's Declaration omits my testimony and demonstratives relating to the Galaxy Tab 10.1 running Android version 3.1. This is a significant omission, as the modified code (and my observed behavior of a device running the modified code) is most similar to the Android version 3.1 code running on the Galaxy Tab 10.1. Mr. Gray also acknowledged at his

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1   deposition that there are "no observable differences" between the Galaxy Tab 10.1 running

2   Android 3.1 and the Galaxy S II running the modified Android 4.0.4 software that are relevant to

3   infringement or non-infringement of the '915 patent. (11/6/12 Gray Dep. Tr. at 80:17-81:11.)

4   Copies of the pages from Mr. Gray's deposition transcript that I cite are attached to the Hung

5   Declaration as Exhibit 17.

6   18.   I also note that Mr. Gray previously submitted a Declaration in support of

7   Samsung's pre-trial summary judgment motion. There, Mr. Gray alleged that the MotionEvent

8   object did not "invoke" a scroll or gesture operation. I understand that Mr. Gray interpreted the

9   term "invoke" to require that the event object itself must call a scroll or gesture operation directly,

10 with no intervening steps. I submitted a Declaration disagreeing with Mr. Gray, as his

11 interpretation was inconsistent with the '915 patent specification.

12   19.   I understand that the Court denied Samsung's motion for summary judgment and

13 instead agreed with me in construing "invokes" to mean "causes" or "causes a procedure to be

14 carried out." (Dkt. No. 1158.) Thus, the event object was not required to directly call a function.

15   20.   Mr. Gray's Declaration appears to rely upon earlier arguments that were rejected

16 by the jury or this Court. For example, Mr. Gray apparently contends that a device capable of

17 panning while it is scaling, just like the Apple products that practice the '915 patent, cannot

18 infringe the patent. (*See* Gray Decl. ¶ 42; 11/6/12 Gray Dep. Tr. at 49:21-51:4.) This is the same

19 argument that the jury implicitly rejected in finding that the Galaxy Tab 10.1 infringes claim 8 of

20 the '915 patent.

21   21.   Mr. Gray fails to analyze the code in sufficient detail to explain why the modified

22 code purportedly does not infringe. For example, Mr. Gray asserts that "if the scaling code

23 determines that a scaling operation is taking place, it sends information to the code that redraws

24 the screen to reflect the scaling operation." (Gray Decl. ¶ 34.) But Mr. Gray never cites to any

25 code for this determination, nor does he explain *how* the scaling code determines that a scaling

26 operation is taking place.

27   22.   Similarly, Mr. Gray asserts that "if the scrolling operation determines that a scroll

28 operation is taking place, it sends information to code that redraws the screen to reflect the scroll

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1 operation." (Gray Decl. ¶ 33.) Again, Mr. Gray does not cite to any code for this determination,

2 nor does he explain *how* the scrolling code determines that a scrolling operation is taking place.

3 **V.   SAMSUNG'S MODIFIED CODE STILL LITERALLY INFRINGES THE '915
        PATENT**

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5   23.   In my opinion, Samsung products with the modified code still literally infringe the

6 '915 patent. These products continue to determine whether an event object invokes a scroll or

7 gesture operation by distinguishing between a single input point (one finger) applied to the touch-

8 sensitive display that is interpreted as the scroll operation and two or more input points (more

9 than one finger) applied to the touch-sensitive display that are interpreted as the gesture operation.

10   24.   I examined the Web Browser application in a Samsung Galaxy S III (T-Mobile)

11 phone that runs the modified Android 4.0.4 software. Using this device, I observed the exact

12 same infringing behavior as in the old code. I scrolled web pages using one finger and zoomed in

13 and out of web pages using two fingers. Attached as Exhibit A is a video of a Samsung Galaxy S

14 II (T-Mobile) running the modified code that demonstrates this effect. I understand that Mr. Gray

15 also observed this same behavior operating the Galaxy S II (T-Mobile). (*See* Gray Decl. ¶ 44.)

16 Operation of the device demonstrates that the device still distinguishes between a single input

17 point (one finger) and two or more input points (more than one finger). I also examined the

18 modified source code provided by Samsung. The modified code does not employ a

19 "fundamentally different technique" for processing scroll and scaling operations, as suggested by

20 Mr. Gray, but instead only obfuscates the test for distinguishing between scroll and gesture

21 operations by using terminology that may be more difficult for a layperson to understand. As I

22 explain below, the modified code still contains the test for distinguishing between scroll and

23 gesture operations based upon whether there is a single input point or more than one input point

24 in the event object.

25   25.   ███████████████████████████████

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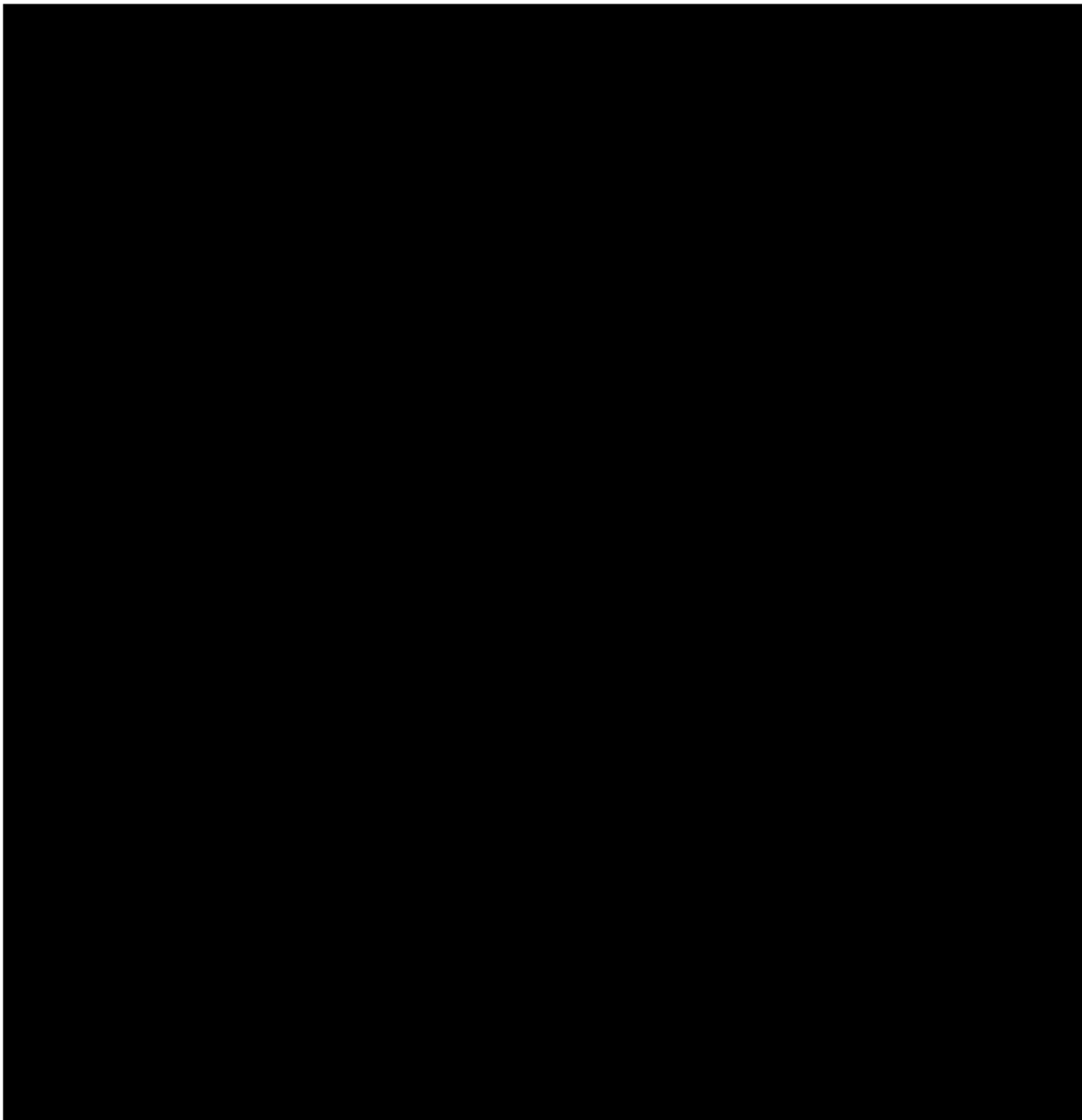
27   32.   For the above reasons, it is my opinion that Samsung devices with the modified

code still literally infringe claim 8[c].   Each is a machine readable medium containing

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1   instructions that "determin[e] whether the event object invokes a scroll or gesture operation by

2   distinguishing between a single input point applied to the touch-sensitive display that is

3   interpreted as the scroll operation and two or more input points applied to the touch-sensitive

4   display that are interpreted as the gesture operation."

5   **VI.   DOCTRINE OF EQUIVALENTS INFRINGEMENT OF THE '915 PATENT**

6   33.   To the extent that this limitation is not met literally, in my opinion it is met under

7   the doctrine of equivalents because each of the Samsung devices with the modified code is a

8   machine readable medium containing instructions that perform steps insubstantially different

9   from "determining whether the event object invokes a scroll or gesture operation by

10 distinguishing between a single input point applied to the touch-sensitive display that is

11 interpreted as the scroll operation and two or more input points applied to the touch-sensitive

12 display that are interpreted as the gesture operation."

13   34.   I understand that Mr. Gray asserts the doctrine of prosecution history estoppel

14 prevents me from applying the doctrine of equivalents. I also understand that there are exceptions

15 to the doctrine of prosecution history estoppel, such as where the reason for the narrowing

16 amendment was peripheral, or not directly relevant, to the alleged equivalent.

17   35.   In my opinion, the reasons for the narrowing amendment were peripheral and not

18 directly relevant to the alleged equivalent. ██████████████████████████

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23   36.   Mr. Gray refers to a telephone interview between Apple's counsel and the

24 Examiner. (Gray Decl. at ¶ 25.) At that interview, Apple's counsel authorized an amendment to

25 the claim language because "the combined [prior art] references fail to teach or suggest creating

26 an event object that determines whether a user input applied to a touchscreen invokes a scroll

27 operation or a gesture operation by simply distinguishing between the scroll operation and the

28 gesture operation *without having to select an object or icon to define the operation*." Interview

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1 Summary, 6/21/2010 (emphasis added). The applicant's reason for amendment was to indicate

2 that the determination of whether to invoke a scroll or gesture operation was not based on

3 selecting a predefined object or area.

4   37.   Mr. Gray also refers to the Li and Hollemans prior art references in his

5 Declaration. The examiner distinguished these prior art references because they required the user

6 to use a predefined area of the touchscreen, not because they obfuscated the test for number of

7 input points by calculating "span." (Gray Decl. ¶ 23.) As the Examiner stated in the Reasons for

8 Allowance distinguishing the prior art, Li discloses a "scroll function wherein the touchpad has

9 *predefined regions* to trigger a scroll function in response to landing and then sliding the user's

10 finger on the touchpad . . . ." July 20, 2010 Notice of Allowability at 5 (emphasis added). And

11 Hollemans discloses a "touch mechanism determines the placement of the fingers on the grid; *a*

12 *square formed by the two finger touch causes selection of items* displayed within this square."

13 July 20, 2010 Notice of Allowability at 5-6 (emphasis added). Thus, the prior art did not concern

14 the details of how the number of input points would be used or calculated to determine whether to

15 scroll or gesture, but rather were based on "predefined regions" or using a "square." Thus, in my

16 view, the reasons for the narrowing amendment are tangential or not directly related to my

17 argument for equivalence. Therefore, it is my understanding that the prosecution history estoppel

18 doctrine would not apply. I analyze the doctrine of equivalents in the following paragraphs.

19   38.   It is my opinion that the Samsung products with the modified code perform

20 substantially the same function, in substantially the same way, to achieve substantially the same

21 result as the '915 patent.

22   39.   First, it is my opinion that the modified code performs substantially the same

23 function as the recited limitation. The function of the limitation is "*determining* whether the

24 event object invokes a gesture operation by distinguishing between a single input point applied to

25 the touch-sensitive surface display that is interpreted as the scroll operation and two or more input

26 points applied to the touch-sensitive display that are interpreted as the gesture operation." ('915

27 patent claim 8[c] (emphasis added).) In the context of the '915 patent specification and claim 8,

28 the function is *determining* whether a scroll or gesture operation should execute based on

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1   distinguishing between one or two or more user input points in the event object. The functions

2   are the same.

3   40.   Second, the modified code performs this function in substantially the same way as

4   in the claim limitation. ██████████████████████████████

5   ███

6   ██

7   ██

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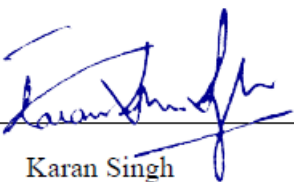
10   41.   Finally, the modified code obtains substantially the same result, *i.e.*, the execution

11   of either the scroll operation or gesture operation code, depending on whether there is a single

12   input point or two or more input points.

13   42.   For the above reasons, it is my opinion that the Samsung devices with the

14   modified code continue to infringe claim 8[c] under the doctrine of equivalents as each is a

15   machine readable medium containing instructions that perform the equivalent of "determining

16   whether the event object invokes a scroll or gesture operation by distinguishing between a single

17   input point applied to the touch-sensitive display that is interpreted as the scroll operation and two

18   or more input points applied to the touch-sensitive display that are interpreted as the gesture

19   operation."

20   I declare under penalty of perjury under the laws of the United States of America that the

21   foregoing is true and correct. Executed on the 9th day of November 2012.

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25   _____

26   Karan Singh

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